nens in canalem integrum rectum ſive ſubaſcendentem.

27. Trochus. Animal limax. Teſta univalvis ſpiralis, ſubconica. Apertura ſubtetragono-angulata ſeu rotundata, ſuperius tranſverſe coarctata; columella obliquata.

28. Turbo. Animal limax. Teſta univalvis, ſpiralis, ſolida. Apertura coarctata, orbiculata, integra.

29. Helix. Animal limax. Teſta univalvis, ſpiralis, ſubdiaphana, fragilis. Apertura coarctata, intus lunata ſeu ſubrotunda; ſegmento circuli dempto.

30. Nerita. Animal limax. Teſta univalvis, ſpiralis, gibba, ſubtus planiuſcula. Apertura ſemiorbicularis, vel ſemilunaris; labio columellæ tranſverſo, truncato, planiuſculo.

31. Haliotis. Animal limax. Teſta auriformis, patens: ſpira occultata laterali diſco, longitudinaliter poris pertuſa.

32. Patella. Animal limax. Teſta univalvis ſubconica, abſque ſpira.

33. Dentalium. Animal terebella. Teſta tubuloſa, recta, monothalamia, utraque extremitate pervia.

34. Serpula. Animal terebella. Teſta univalvis, tubuloſa, adherens (ſæpe iſthmis integris paſſim intercepta).

35. Teredo. Animal terebella. Valvis duabus calcariis hemiſphericis, anterius exciſis, et duabus lanceolatis. Teſta teres, flexioſa, lignum penetrans.

36. Sabella. Animal nereis. Ore ringente tentaculis duobus, craſſioribus pone caput. Teſta tubuloſa contexta ex arenulis confertim membranæ vaginali inſertis.

terminating in an entire ſtraight, or ſlightly aſcending canal.

27. T. Animal a limax. Shell univalve, ſpiral, ſomewhat conic. Aperture ſomewhat angular, or rounded: the upper ſide tranſverſe and contracted; pillar placed obliquely.

28. T. Animal a limax. Shell univalve, ſpiral, ſolid. Aperture contracted, orbicular, entire.

29. H. Animal a limax. Shell univalve, ſpiral, ſubdiaphanous, brittle. Aperture contracted, ſemilunar or roundiſh.

30. N. Animal a limax. Shell univalve, ſpiral, gibbous, flattiſh at bottom. Aperture ſemiorbicular or ſemilunar, pillar lip tranſverſely truncated and flattened.

31. H. Animal a limax. Shell ear-ſhaped dilated, with a longitudinal row of orifices along the ſurface; the ſpire lateral and nearly concealed.

32. P. Animal a limax. Shell ſubconic, without ſpire.

33. D. Animal a terebella. Shell tubular, ſtraight, or ſlightly curved, with one cavity open at both ends.

34. S. Animal a terebella. Shell tubular, generally adhering to other ſubſtances (often ſeparated internally by entire diviſions.)

35. T. Animal a terebella. With two calcareous, hemiſpherical valves, anteriorly cut off, and two lanceolate ones. Shell round, flexuous, penetrating wood.

36. S. Animal a nereis. With a ringent mouth, and two thicker tentacula behind the head. Shell tubular, conſiſting of particles of ſand united to a membrane by a glutinous cement.

I. MULTIVALVES.

24 Chiton.

Gen. 1. Chiton.

Gen. Char. The animal inhabiting this ſhell is a doris. The ſhell conſiſts of ſeveral ſegments or valves, arranged along the back.

Species.

hiſpidus. 1. C. ſhell with ſix plates or valves ſtriated. America.

thalaſſinus. 2. C. ſhell ſix-valved, glabrous, oval, a little convex, ſea-green. America.

tuberculatus. 3. C. ſhell ſeven-valved, body tuberculated. America.

crinitus. * 4. C. ſhell ſeven-valved, thick ſet with ſhort hairs, $\frac{5}{8}$ inch long. Sandwich, Aberdeen.

aculeatus. 5. C. ſhell eight-valved, ſtriated, body prickly. Aſia.

faſciculatus. * 6. C. ſhell eight-valved, apparently ſmooth, but when examined with a glaſs, is found to be rough like ſhagreen. Coaſt of Barbary, Salcomb bay, Devonſhire, Sandwich.

ſquamoſus. 7. C. eight valves, ſemiſtriated, margin covered with minute ſcales. America.

punctatus. 8. C. with eight valves, ſmooth body with excavated dots, Europe, America.

9. C. eight valves, ſubſtriated; ſtriæ covered, body red. North ſeas. *ruber.*

* 10. C. eight valves, ſmooth, with tranſverſe lines at the margin of the valves: body white, oval; firſt valve notched on the hinder edge. Northern ſeas; on oyſter ſhells from Poole. *albus.*

11. C. eight valves, ſmooth, carinated, oval, compreſſed. Northern ſeas, Salcomb bay. *cinereus.*

12. C. ſeven carinated valves ſtrongly beaked; beaks frequently rufous, $\frac{1}{2}$ inch long. Salcomb bay, but rare. *Montagu, Teſt. Brit.* p. 3. *ſeptemvalvis.*

13. C. eight-valved, thick ridged; the outſide ſea-green, inſide ſnowy, edged with black. *bicolor.*

14. C. eight-valved, cherry colour, ſmooth, with ſnowy marginal teeth. *ceraſinus.*

15. C. eight-valved, thick, black brown. Straits of Magellan. *magellanicus.*

16. C. eight-valved, brown, ſmooth; inſide teeth of the margin ſnowy. India. *fuſcus.*

17. C. eight-valved, ſmooth, within ſea-green, margin covered with gray white ſcales. *maculatus.*

18. C. eight-valved, ſmooth, varied with white and black. Var. ſeven-valved. America. *marmoratus.*

19. C. flat above, with numerous raiſed dots in rows; border broad, ſpinous. America. *granulatus*

20. C. eight-valved, ſmooth above, piceous and varied with white and black. America; Red ſea. *piceus.*

indus. 21. C. eight-valved, whitiſh aſh colour, with a ſcaly border; middle valves finely punctured. America.

minimus. 22. C. eight-valved, ſmooth, black, very ſmall. Norway ſeas.

cimex. 23. C. eight-valved, carinated, diaphanous, banded: extreme valves finely punctured; ſmall. Norway.

aſellus. 24. C. eight-valved, deep black, convex above, with a yellowiſh ſpot on each valve. North ſeas.

gigas. 25. C. eight-valved, thick, convex, white; firſt valve notched, laſt toothed, middle ones emarginate; four inches long. Cape of Good Hope.

iſlandicus. 26. C. eight-valved, ſubcylindrical, finely punctured; very minute and narrow at each end.

marginatus. * 27. C. eight-valved, carinated along the back; the valves projecting over each other in a point. Salcomb bay, Sandwich.

lævis. * 28. C. eight-valved, ſmooth, with an elevated band down the back; the length $\frac{1}{4}$ inch. Loch Broom, Roſs ſhire, Salcomb bay.

amiculatus 29. C. eight-valved, kidney-ſhaped, fragile; valves imbricated. Kurile iſlands.

25
Lepas.

Gen 2. Lepas, *Acorn-ſhell.*

Gen. Char. Animal a triton; ſhell affixed at the baſe, and compoſed of many unequal erect valves.

Species.

balanus. * 1. L. conic, grooved, lid ſharp pointed. European ſeas, Britain.

balanoides. * 2. L. conic, truncated, ſmooth; lip obtuſe. American and Indian ſeas; abundant on the coaſts of Britain.

intertexta. * 3. L. ſomewhat depreſſed; valves imbricated and obliquely ſtriated. Weymouth.

cornubienſis. * 4. L. baſe dilated, aperture rather narrow; valves grooved near the lower edges. Cornwall.

tintinabulum. 5. L. conic, obtuſe, bell-ſhaped, rugged and fixed. Indian and American ſeas.

diadema. * 6. L. roundiſh, ſix-lobed; valves grooved longitudinally. European and Indian ſeas, Scotland.

balænaris. 7. L. ſubconic, with ſix elevated, wrinkled, 4-parted lobes; lid membranaceous, and two toothed; found adhering to the pectoral wrinkles of the balæna boops.

coſtata. * 8. L. ſomewhat conic, with equidiſtant ribs, divergent from the aperture; lid pointed. On rocks on the Pembrokeſhire coaſt.

conoides. * 9. L. conic, ſmooth, valves pointed, aperture very ſmall; ſhell ſmall, reddiſh; valves finely teſſelated. Weymouth.

teſtudinaria. 10. L. plano-convex, with ſix excavated ſtriated rays; lid compoſed of four triangular pieces inſerted on a membrane.

galeata. 11. L. helmet-form, with a lateral aperture; ſhell boat-ſhaped, ſmooth. Adheres to the gorgonia verrucoſa, and ventilabrum.

palmipes. 12. L. erect, conic; valves palmated at the baſe; ſhell white.

tulipa. 13. L. ſubcubic, ſmooth; lid acute, tranſverſely ſtriated. Northern ocean.

mitella. 14. L. compreſſed, erect, irregularly ſtriated. Indian ocean.

* 15. L. compreſſed, 13-valved, ſmooth, ſeated on a ſcaly peduncle, which is large, and compoſed of rings, covered with ſhort hairs. North ſeas, Plymouth. *ſcalpellum.*

* 16. L. compreſſed, five-valved, ſtriated, pedunculated. American and Atlantic ſeas, coaſt of Devonſhire; is ſometimes found in a foſſil ſtate. *anſerifera.*

* 17. L. compreſſed, 5-valved, pedunculated; adheres to the bottom of ſhips, when it is well known by the name of *bernacle.*—It was from this ſpecies of ſhell that the bernacle gooſe was ſuppoſed to have had its origin. Gerard's account of this transformation, as it affords a remarkable inſtance of the credulity of the times, is too curious to be omitted. "There are found in the north parts of Scotland, and the iſlands adjacent called Orchades, certain trees whereon do grow certain ſhells tending to ruſſet, wherein are contained little living creatures: which ſhells in time of maturitie do open, and out of them grow thoſe little living things, which falling into the water do become fowles, which we call barnakles; in the north of England brant geeſe; and in Lancaſhire, tree geeſe; but the other that do fall upon the land periſh, and come to nothing. Thus much from the writings of others, and alſo from the mouths of people of thoſe parts, which may very well accord with truth." *anatifera.*

"But what our eyes have ſeene, and hands have touched, we ſhall declare. There is a ſmall iſland in Lancaſhire, called the pile of Foulders, wherein are found the broken pieces of old and bruiſed ſhips, ſome whereof have been caſt thither by ſhipwracke, and alſo the trunks and bodies with the branches of old and rotten trees, caſt up there likewiſe: whereon is found a certain ſpume or froth that in time breedeth into certaine ſhells, in ſhape like thoſe of the muſkle, but ſharper pointed, and of a whitiſh colour: wherein is contained a thing in forme like a lace of ſilke, finely woven, as it were, together, of a whitiſh colour, one end whereof is faſtened unto the inſide of the ſhell, even as the fiſh of oiſters and muſkles are: the other end is made faſt unto the belly of a rude maſs or lumpe, which in time commeth to the ſhape and forme of a bird: when it is perfectly formed the ſhell gapeth open, and the firſt thing that appeareth is the foreſaid lace or ſtring; next come the legs of the bird hanging out, and as it groweth greater it openeth the ſhell by degrees, till at length it is all come forth and hangeth only by the bill: in ſhort ſpace after it cometh to full maturitie, and falleth into the ſea, where it gathereth feathers, and groweth to a fowl bigger than a mallard, and leſſer than a gooſe, having blacke legs, bill or beake, and feathers blacke and white, ſpotted in ſuch manner as is our magpie, called in ſome places a pie-annet, which the people of Lancaſhire call by no other name than a tree-gooſe: which place aforeſaid, and thoſe parts adjoyning do ſo much abound therewith, that one of the beſt is bought for threepence. For the truth hereof, if any doubt, let them repaire unto me, and I ſhall ſatisfie them by the teſtimonie of good witneſſes. *Herball*, p. 1588.

18. L. membranaceous, ventricoſe, ſeated on a tube and eared, 8-valved. North ſeas. *aurita.*

19. L. hooked behind, 6-valved, wrinkled, not an inch long. Chili. *pſittacus.*

minor. 20. L. reddiſh, 6-valved, unequal; lid pointed. India.

verruca. 21. L. hemiſpherical, ſerrated, 6-valved; 4 outer valves and lid plaited. North ſeas.

anguſtata. 22. L. elongated, ſmooth, 6-valved; aperture narrow, lid minute.

poroſa. 23. L. granulated and ſtriated, conic, tubular; lid obtuſe. India.

elongata. * 24. L. cylindrical, ſnowy, pellucid, 6-valved; lid obtuſe, grooved and tranſverſely ſtriated. Three inches long. Iceland, Weymouth. *Balanus Clavatus, Montagu*, p. 10.

patellaris. 25. L. 6-valved; outwardly violet mixed with white, and marked with fine longitudinal ſtriæ: valves denticulate at the margin. Coromandel, very rare.

ſpinoſa. 26. L. conic with 12 triangular valves, 6 more depreſſed, whitiſh and tranſverſely ſtriated, and 6 purple and longitudinally ſtriated; all armed with tubular recurved ſpines. India.

violacea. 27. L. 6-valved, thick, glabrous, white with violet rays. India.

pollicipes. 28. L. many-valved, compreſſed, erect, ſmooth: ſeated on a ſhort hard, ſcaly peduncle. Mediterranean.

cylindrica. 29. L. ſlightly curved, with a large oblique orifice; lip horned. Africa.

criſpata. 30. L. oval-truncated, conic, with 6 blueiſh valves ſhaded with white, and 6 reddiſh, elevated, ſpinous, and perpendicularly ſtriated; an inch high; is frequently perforated by the teredo.

curioſa. 31. L. ſolid, white, depreſſed with carinous grooves, unequally ſmooth internally. Kurile iſlands.

ſtræmia. 32. L. conico-convex, 4 valves ſerrate-ſtriated; lid 2-valved. North ſeas.

faſcicularis. * 33. L. 5-valved, ſmooth, dorſal valve dilated at the baſe. St George's Channel.

26 Pholas.

Gen. 3. Pholas.

Gen. Char.—The animal is an aſcidia. Shell bivalve, divaricate, with ſeveral leſſer differently acceſſory ones at the hinge. Hinges recurved, united by a cartilage. Beneath the hinge internally is an incurved tooth.

Species.

dactylus. * 1. P. oblong, with reticulated, ſubſpinous ſtriæ, on the upper part. Europe. Salcomb bay, Devonſhire. Five inches long; is found in hard clay, marl, and wood; has a phoſphoreſcent property.

coſtata. 2. P. ovate; ſtriated with elevated ribs; 6 inches long. American ſeas.

ſtriata. 3. P. ovate, multifariouſly ſtriated. Europe, India.—This ſpecies ſeems to be nearly equally deſtructive with the teredo navalis. The pholas perforates the wood acroſs the grain or fibre; the teredo inſinuates itſelf along the fibres, or in the ſame direction.

candida. * 4. P. oblong, muricated on all ſides, with decuſſated ſtriæ. Europe, America, Salcomb bay.

puſilla. 5. P. oblong, rounded, ſtriæ arched. America, India. This animal penetrates the bottom of ſhips.

criſpata. * 6. P. oval; part next the hinge more obtuſe, waved, ſtriated; tooth of the hinge curved, large and ſtrong. Two inches long. Europe. Weſt of England.

orientalis. 7. P. oblong, with a ſtrait margin: one half quite ſmooth, the other reticulated with ſtriæ. Siam and Tranquebar.

campechiana. 8. P. narrow, white, finely ſtriated. Bay of Campeachy.

cordata. 9. P. ſhort, turgid, furrowed, with fine elevated tranſverſe ſtriæ; aperture heart-ſhaped.

chilenſis. 10. P. oblong, depreſſed, with diſtant longitudinal ſtriæ; five inches long. Chili.

teredula. 11. P. oblong, white, with a longitudinal brown granular ſuture; penetrates timber. Belgic ſhores.

hians. 12. P. bivalve, white, with tranſverſe arched ſtriæ; convex in the middle; aperture large, oval; perforates calcareous rocks. American iſlands.

II. BIVALVE SHELLS.

27 Mya.

Gen. 4. Mya.

Gen. Char.—The animal is an aſcidia. The ſhell is bivalve, generally gaping at one end. The hinge has broad, thick, ſtrong teeth, ſeldom more than one, and not inſerted into the oppoſite valve.

Species.

truncata. * 1. M. ovate, truncated, gaping greatly behind; tooth projecting, obtuſe; $2\frac{1}{2}$ inches long. Europe.

declivis. * 2. M. brittle, ſemitranſparent, ſloping downwards near the open end. Hebrides.—A fiſh much eſteemed as food by the inhabitants.

arenaria. * 3. M. ovate, rounded behind; $2\frac{1}{2}$ inches long. European ſeas, Portſmouth.

pictorum. * 4. M. ovate; a ſingle, longitudinal, notched tooth, in one hinge, and two in the other; near 2 inches long, and $3\frac{1}{2}$ broad. Europe, Barbary, River Kennet, Berkſhire.—This ſhell is employed by painters for holding water colours.

margaritifera. * 5. M. ovate, a little contracted in the middle of the thinner margin; primary tooth of the hinge conic; length $2\frac{1}{2}$ inches, breadth 5 inches; inhabits moſt parts of the arctic circle, and is moſt frequently found in mountainous rivers, and about cataracts.—This ſhell yields mother-of-pearl and pearl. The River Conway in Wales, was formerly famous for producing pearl of great ſize and value. They have alſo been found in the river Irt, in Cumberland. Sir John Hawkins obtained a patent for fiſhing them in that river.

perna. 6. M. oblong, dilated; the narrower baſe compreſſed. Straits of Magellan, Barbary.

vulſella. 7. M. tongue-ſhaped; hinge terminal, ſemiorbicular; 4 inches long, and $1\frac{1}{2}$ broad. Indies.

arctica. 8. M. ſtriated, valves with two ſubſpinous ridges; hinge without teeth. North ſeas.

edentula. 9. M. oval, equivalve, widely gaping, and ſtriated; 1 inch long. Shores of the Caſpian ſea.

radiata. 10. M. equivalve, pellucid, finely ſtriated. Rivers of Malabar.

oblonga. 11. M. ovate, oblong; 3 inches broad, $1\frac{1}{2}$ long.

anatina. 12. M. globular, ſnowy, pellucid. Guinea.

nicobarica. 13. M. equivalve, ſnowy, ovate, oblong; ſtriæ decuſſated. Nicobar Iſlands.

auſtralis. 14. M. ovate, compreſſed, cloſed. New Zealand.

gaditana. 15. M. rounded, flattiſh, tranſverſely ſtriated. Cadiz.

corrugata. 16. M. rhombic, green, protuberant parts wrinkled. Rivers of Coromandel.

rugosa. 17. M. oval, wrinkled, outwardly greenish, within pearly. Rivers of Coromandel.

nodosa. 18. M. oval, greenish; protuberant parts knotty.

norwegica. 19. M. oval, longitudinally and thickly striated; one end rounded, the other truncated.

spuria. 20. M. rhombic; protuberant part glabrous. Rivers of Tranquebar.

glycemeris 21. M. gaping at both ends, thick, lamellous, oblong, oval; 5 inches long, 10 broad. Mediterranean sea.

syrmatophora. 22. M. ovate, depressed; margin of the hinge with a subulate projection near the primary tooth; that of the other valve dilated. Rivers of Guinea.

nitida. 23. M. oval, smooth; an obtuse tooth in each hinge. Norway.

membranacea. 24. M. ovate, membranaceous, with a protracted, reflected margin at the proboscis.

byssifera. 25. M. coarse, thick, oblong, striated, convex; hinge without a tooth. Greenland coast.

dubia. * 26. M. with an oval and large hiatus opposite to the hinge; length of a horse bean. Weymouth.

inæquivalvis. * 27. M. subtriangular, opaque, white; under valve deep; upper valve not half the size of the other. Cornwall, Devonshire. *Montagu*, *Test. Brit.* p. 38.

suborbicularis. * 28. M. subpellucid, faintly striated transversely; sides nearly equal, rounded; hinge central, $\frac{1}{8}$ of an inch; found in hard limestone at Plymouth. *Montagu*, *Test. Brit.* p. 39.

prætenuis. * 29. M. oval, thin, brittle, flat; striæ fine, concentric. Falmouth harbour.

distorta. * 30. M. subpellucid, thin, fragile, distorted into various shapes. Falmouth. *Montagu*, *Test. Brit.* p. 42.

bidentata. * 31. M. suboval, compressed; hinge with two broad, erect, laminated teeth in one valve; none in the other. Salcomb bay.

28 Solen.

Gen. 5. Solen, *Razor-sheath.*

Gen. Char.—The animal inhabiting this shell is an ascidia: shell bivalve, oblong, open at both ends; hinge with a subulate, reflected tooth, often double, and not inserted in the opposite valve.

Species.

vagina. * 1. S. linear, straight, roundish; one end margined; hinge with a single opposite tooth in each valve. European and Indian seas, Caermarthenshire, Weymouth.

siliqua. * 2. S. linear, straight, one hinge 2-toothed. European, and Indian seas. Length 1 inch, breadth 8 inches. Common on the shores of Britain, where it is employed as food.—This species lurks in the sand, near low-water mark, in a perpendicular direction, and when in want of food, they raise one end above the surface, and protrude the body a considerable way out of the shell. At the approach of danger they dart deep into the sand, as far even as to the depth of two feet; and the place is known by a small hollow on the surface. They are sometimes taken by digging them out of the sand, or by striking a barbed dart into their bodies.

ensis. * 3. S. linear, in form of a scymeter; one hinge 2-toothed; $\frac{3}{4}$ of an inch long, 5 inches broad. European seas; not uncommon on the British shores.

pellucidus. * 4. S. subarched, suboval, pellucid; one hinge 2-toothed; length $\frac{1}{4}$ inch, breadth above one inch. Anglesea, Cornwall.

* 5. S. linear, oval, straight; hinge in the middle 2-toothed, one of them bifid; $2\frac{1}{2}$ inches broad. European and Atlantic seas, Anglesea, Hampshire. *legumen.*

* 6. S. kidney-shaped, a single tooth in one valve, two in the other. Europe and India, Cornwall. *cultellus.*

7. S. oval, straight, smooth, with a transverse, depressed rib on one side. India. *radiatus.*

8. S. oval, obliquely striated. Atlantic and Indian seas. *strigilatus.*

9. S. ovate, membranaceous, hairy, with a falcated rib at the hinge. Indian ocean. *anatinus.*

10. S. oval, oblong, truncated before. Pacific ocean.—This species produces pearl. *macha.*

11. S. roundish, inflated, substriated. Indian and American seas. *bullatus.*

* 12. S. oval; angles of the valves serrated; size of a cucumber seed. Coral rocks in Norway and Greenland; in hard limestone at Plymouth. *minutus.*

13. S. ovate, oblong, with tumid bosses. Java. *virens.*

14. S. oval, straight, smooth, with prominent membranes; $2\frac{1}{2}$ inches long, 5 broad. Indian ocean. *diphos.*

15. S. linear, oval, straight. Tranquebar. *minimus.*

16. S. linear, oval, straight, with arched striæ. Nicobar. A very rare species. *maximus.*

17. S. transversely wrinkled, contracted in the middle, rounded at both ends; $\frac{1}{4}$ of an inch long, $2\frac{1}{2}$ broad. Nicobar islands. *coarctatus.*

18. S. equivalve, rosey, tooth of the hinge subbifid. Red sea. *roseus.*

19. S. oval, quite smooth; hinge callous, two toothed. Jamaica. *sanguinolentus.*

20. S. equivalve, transversely striated; hinge with a single tooth. Nicobar islands. *striatus.*

21. S. transversely striated, hinges two-toothed, with a hollow in the middle; 4 inches broad, and 2 long. *occidens.*

* 22. S. partly smooth, partly rough, with undulated, crimped lines. River Tees in England. *crispus.*

23. S. protuberances or beaks of the shell 2-parted, an inch long, $2\frac{1}{2}$ broad; rounded at the ends. *spengleri.*

* 24. S. pellucid, fragile, depressed; suboval, concentrically wrinkled; a blunt tooth in each valve; $\frac{1}{8}$ of an inch long, and $\frac{1}{4}$ broad. Torcross. *Montagu*, *Test. Brit.* p. 566. *pinna.*

Gen. 6. Tellina.

29 Tellina.

Gen. Char.—The animal is a tethys: the shell is bivalve, generally sloping on one side; in the fore part of one valve there is a convex, and in that of the other, a concave fold; the hinge has usually three teeth, the lateral ones flat, or nearly obsolete, in one valve.

Species.

A. *ovate and thickish.*

1. T. roundish, compressed, wrinkled on the forepart. Indian ocean, very rare. *gargadia.*

2. T. subovate, rough, with lunated scales, disposed in a quincunx. Indian ocean. *lingua felis.*

3. T. angular, with transverse, recurved striæ; 2 inches long, and $2\frac{1}{2}$ broad. Indian and Atlantic oceans. *virgata.*

4. T. subovate, angular before, with transverse, recurved striæ; no lateral teeth; $1\frac{1}{2}$ inch long and 2 broad. Indian ocean. *angulata.*

gari. 5. T. ſtriæ recurved, tranſverſe; lateral teeth obſolete. Indian ocean.

fragilis. * 6. T. ovate, white, gibbous, with tranſverſe, recurved ſtriæ; beaks yellowiſh. European ſeas, Britain.

depreſſa. * 7. T. very thick, depreſſed, oblong, with tranſverſe, concentric ſtriæ. Europe, Britain.

craſſa. * 8. T. very thick, broad, depreſſed; concentric ſtriæ numerous, $1\frac{1}{4}$ inch broad, and $1\frac{1}{4}$ long. Europe, Britain.

rugoſa. 9. T. wrinkles tranſverſely undulated, hinged with two lateral teeth. Indian and American ſeas.

inflata. 10. T. rounded, thick, gibbous; ſtriæ longitudinal, fine.

multangulata. 11. T. ovate, ventricoſe, inequivalve, with decuſſated ſtriæ. Tranquebar.

papyracea. 12. T. thin, ovate, ventricoſe, and tranſverſely ſtriated: wrinkles on the fore-part, plaited: 3 lines long and $1\frac{1}{2}$ inch broad. Guinea.

gippoſa. 13. T. triangular, ventricoſe, and finely ſtriated tranſverſely.

inæquilatera. 14. T. equivalve, roundiſh, white, with a few tranſverſe ſtriæ towards the margin.

knorii. 15. T. rich red colour, with a violet margin; $2\frac{1}{4}$ inches broad, and $1\frac{1}{2}$ long.

bornii. 16. T. tranſverſely ſtriated; one ſide bent and reddiſh, with red rays; $\frac{1}{4}$ inch long, and 2 inches broad.

puſilla. 17. T. ovate, ventricoſe, thin, tranſverſely ſtriated, very minute. Rivers of Europe.

maculata. * 18. T. ſubovate, thickiſh, with decuſſated ſtriæ, and irregular ſpots; figure of the ſpots different in different ſhells, but exactly ſimilar in both valves of the ſame ſhell. Denbigh in England.

rivalis. * 19. T. obliquely ſubovate, tranſverſely grooved; ſize of a pea. River Avon near Saliſbury.

B. *ovate, compreſſed.*

albida. 20. T. oval, ſmooth, with prominent membranes; ſize of an egg. European ocean.

foliacea. 21. T. oval, with rough pubes, flattened ſides, ſerrated; $1\frac{1}{2}$ inch long, and 3 broad. Indian ocean.

planata. * 22. T. ovate, compreſſed, tranſverſely ſubſtriated, ſmooth, with acute margins. European and Mediterranean ſeas, common on the ſhores of Britain.

variabilis. * 23. T. ovate, oblong, with pale purple rays. European and Atlantic ſeas, Britain.

lævigata. 24. T. ovate, ſmooth, lateral teeth, margined. European and Indian ſeas.

radiata. * 25. T. oblong; ſtriæ faint, longitudinal. European and American ſeas, Britain.

roſtrata. 26. T. oblong, the fore-part produced into an angular beak. Indian ocean.

inæquivalvis. 27. T. oblong, produced into a beak, upper valve flat, lower convex; length $\frac{1}{2}$ inch, breadth 1 inch. European and North ſeas.

trifaſciata. * 28. T. ovate, ſmoothiſh, triradiate, with red and ſlightly ſtriated tranſverſely. European ſeas, Britain.

incarnata. * 29. T. ovate, a little produced on the fore-part, flattiſh; 2 inches broad. European and Mediterranean ſeas, Britain.

donacina. * 30. T. ovate, flattiſh, very obtuſe on the fore-part. Mediterranean, Sandwich, Weymouth.

truncata. 31. T. oval, compreſſed, ſubſtriated; fore-part truncated. Java.

trilatera. 32. T. flat, fore-part truncated, yellow; $1\frac{1}{2}$ inch long, and 2 broad.

oblonga. 33. T. oblong, brittle, yellowiſh; rounded on one ſide. Europe.

ſpengleri. 34. T. white, tranſverſely ſtriated, and bifariouſly hooked on each ſide. Nicobar iſlands.

rugoſa. * 35. T. with rugged, concentric ſtriæ; the ſize of a filbert. Weymouth.

cornubienſis. * 36. T. oval, oblong, deeply ſtriated, parallel to the margin. Cornwall.

ferrvenſis. * 37. T. oblong, ovate, compreſſed, with fine, tranſverſe ſtriæ; 1 inch long, and 2 broad. North ſeas, Weymouth, Yorkſhire.

operculata. 38. T. purple, with white bands, and decuſſated ſtriæ; one valve convex, the other flat; $2\frac{1}{4}$ inches broad and $1\frac{3}{4}$ long.

hyalina. 39. T. oval, inequivalve, flat, pellucid, with fine decuſſated ſtriæ; $1\frac{1}{2}$ inch long, 3 broad. Guinea.

vitrea. 40. T. yellowiſh, very thin, perpendicularly ſtriated. North and Baltic ſeas.

lanceolata. 41. T. oval, very thin, tranſverſely ſtriated; 10 lines long, $1\frac{1}{2}$ inch broad. India.

apelina. 42. T. oval, pellucid, with a rib in each valve, reaching from the hinge to the outer margin; very thin. Nicobar.

coccinea. 43. T. oval, pellucid, ſcarlet, tranſverſely ſtriated; very thin. Sea round Iceland.

virginica. 44. T. ſtriæ fine, tranſverſe, lengthened forwards into a beak, very ſmall and rounded. Rivers of Virginia.

alata. 45. T. nearly triangular, margin dilated, 2 inches broad, and $1\frac{1}{4}$ long.

pectinata. 46. T. rounded, flat, thin, with longitudinal ſtriæ.

anguſtata. 47. T. flattiſh, red, with white rays; one end pointed, the other rounded.

variegata. 48. T. oval, rounded at each end; variegated, with a whitiſh ray at the crown.

madagaſcarienſis. 49. T. oval, a little pointed at one end; $2\frac{1}{2}$ inches long, and $3\frac{1}{2}$ broad. Madagaſcar.

purpureſcens. 50. T. purpliſh at each end; $1\frac{1}{2}$ inch long and ſomething broader.

aſpera. 51. T. pointed at one end, yellowiſh within, radiated and rough with tranſverſe ſtriæ without; $1\frac{1}{4}$ inch long and 3 inches broad.

triangularis. 52. T. ſlightly wedged, whitiſh, and tranſverſely ſtriated; $1\frac{1}{2}$ inch broad, and 1 long.

lata. 53. T. white, with unequal ſides, pointed at one end; $1\frac{1}{2}$ inch long, and 2 broad. Norway ſeas.

jamaicenſis 54. T. thick, beak purpliſh without. Jamaica.

rhomboides. * 55. T. outwardly white and rough, with tranſverſe ſtriæ; within bluiſh; 2 inches broad, 1 long. River Tees, England.

vinacea. * 56. T. purpliſh, tawny, with white rays, 1 inch long, and $1\frac{1}{2}$ broad. Britiſh and Baltic ſeas.

zonata. 57. T. roſy, with a white band. Shores of Tuſcany.

albicans. 58. T. whitiſh, with a paler band; within yellow.

rufeſcens. 59. T. reddiſh, with pale yellow ſpots, and decuſſated ſtriæ; $\frac{3}{4}$ inch long, $1\frac{1}{2}$ broad.

plana. 60. T. unequal ſided, depreſſed, minutely ſtriated.

ſtriata. 61. T. unequal ſided, round at both ends, roſy white, pellucid; 2 inches broad $1\frac{1}{4}$ long.

roſea. 62. T. roſy, with thin ribs running from the hinge to the margin; 1 inch long, $1\frac{1}{2}$ broad.

63. T.

punicea. 63. T. oval, flat, equal ſided, tranſverſely ſtriated; 1 inch long, 2 broad.

complanata. 64. T. obovate, flattened; obſoletely ſtriated, reddiſh, with a dilated margin; 2 inches long, 3 broad.

fabula. * 65. T. ovate, compreſſed, inflated, lengthened before; one valve ſmooth, the other with oblique, reflected ſtriæ. Mediterranean, American and North ſeas, Wales.

adanſoni. 66. T. whitiſh, with a violet hinge. Africa.

cancellata. 67. T. thin, with numerous longitudinal grooves croſſing the tranſverſe wrinkles. Atlantic.

ſtrigoſa. 68. T. with whitiſh bands, glabrous and wrinkled at the margin. African ſhores.

C. *ſuborbicular.*

balauſtina. 69. T. dilated, orbicular, lateral teeth in one valve. Mediterranean.

remies. 70. T. compreſſed and tranſverſely wrinkled; 3 inches long, $3\frac{1}{2}$ broad. Indian and American oceans.

reticulata. 71. T. lentiform, compreſſed, reticulate. India.

ſcobitina. 72. T. lentiform, rough, with lunated ſcales diſpoſed in a quincunx; $2\frac{1}{2}$ inches long, $2\frac{1}{4}$ broad. Indian ocean.

lactea. 73. T. lentiform, gibbous, white, pellucid, ſmooth. Mediterranean.

carnaria. * 74. T. white, with a roſy tinge within and without; fine ſtriæ, diſpoſed obliquely. Europe and American iſlands, Britain.

bimaculata * 75. T. triangularly rounded, ſmooth, whitiſh, with two oblong red ſpots on the inſide; ſcarcely an inch broad. Europe and American ſeas, Britain.

balthica. 76. T. roundiſh, ſmooth, outſide bloom colour; ſize of a horſe bean. Baltic.

piſiformis. 77. T. ſubglobular, ſmooth, obliquely ſubſtriated, ſize of a pea; mouths of rivers in Europe.

divaricata. 78. T. ſubglobular, white, with oblique bifarious ſtriæ. American ſeas.

digitaria. 79. T. ſubglobular, pale, ſurrounded with oblique uniform ſtriæ; ſize of a pea, nearly an inch long. American and Indian ſeas.

cornea. * 80. T. globular, glabrous, horn-colour, with a tranſverſe groove, ſize of a pea. Ponds and freſh waters of Europe, Britain.

lacuſtris. 81. T. rhombic, flattiſh, glabrous, with an acute protuberance. Pools and marſhes of Europe.

amnea. 82. T. heart-ſhaped, tranſverſely grooved. Pools and ditches of Europe.

fluminalis. 83. T. triangular, gibbous, tranſverſely ſtriated. River Euphrates.

fluminea. 84. T. triangular, gibbous, tranſverſely ribbed. China.

fluviatilis. 85. T. triangular, tranſverſely wrinkled. Canton.

iberica. 86. T. globular, ſmooth, poliſhed. Shores of Iberia.

adriatica. 87. T. ſubglobular, margined, denticulated, white without, pearly within. Shores of the Adriatic.

ſinuoſa. 88. T. ſubglobular, equivalve and equal ſided, with a few tranſverſe ſtriæ.

purpurata. 89. T. equal ſided, ſmooth, lucid purple colour; one inch long, $1\frac{1}{2}$ broad.

candida. 90. T. white, with fine tranſverſe ſtriæ.

gallica. 91. T. triangular, pectinated. France.

ſenegalenſis. 92. T. triangular, globoſe, with tranſverſe grooves. Africa.

anguloſa. 93. T. oval, flattiſh, tranſverſely ſtriated, fore-part angularly inflected. America.

94. T. tranſverſely ſtriated, orbicular, angular on the fore-part. India. *polygona.*

Gen. 7. Cardium, *Cockle.* 30 Cardium.

Gen. Char.—The animal is a tethys: the ſhell is bivalve, nearly equilateral, equivalve, generally convex, longitudinally ribbed, ſtriated or grooved, with a toothed margin. Hinge of the two teeth near the beak, and a larger remote lateral one on each ſide; each locking into the oppoſite.

Species.

1. C. gibbous, equivalve, with elevated, carinated, concave, membranaceous ribs; three inches long, three and a half broad, three high. African ocean. *coſtatum.*

2. C. heart-ſhaped, valves compreſſed and carinated with teeth; two and a half inches long, above two broad. Indian ocean. *cardiſſa.*

3. C. heart-ſhaped; fore-part furrowed with lines, hind part with broader ſtriæ, forming by their union the figure of a heart. Nicobar iſlands. *roſeum.*

4. C. heart-ſhaped; valves ſtriated, notched; behind the beaks a lunated, heart-ſhaped gape; two inches long, and nearly the ſame breadth. India, Arabia, and Egypt. *retuſum.*

5. C. heart-ſhaped, ſubquadrilateral; valves carinated, beaks diſtant. Indian ocean. *hemicardium.*

6. C. heart-ſhaped, ſubtrilateral; valves tranſverſely grooved, and the fore-part longitudinally ſtriated; has only been found in the foſſil ſtate. *lithocardium.*

7. C. heart-ſhaped, carinated; fore-part obliquely truncated, thin, quite ſmooth, ſnowy, with gilt ſtriæ above an inch long. *lineatum.*

* 8. C. ſomething heart-ſhaped, ſubangular, valves angular, grooved, ſmooth. European and American ſeas, coaſt of Durham. *medium.*

* 9. C. ſomewhat heart-ſhaped, ribs high, and grooved down the middle, and beſet with large hollowed ſpines near the circumference. European and Mediterranean ſeas, Devonſhire. *aculeatum.*

* 10. C. ſlightly heart-ſhaped; ribs ſpinous, carinated. European ſeas, Britain. *echinatum.*

* 11. C. ſlightly heart-ſhaped, triangular ribs, beſet along the ridges with thin ſpines; ſize of a hazel-nut. European ſeas, Cornwall. *ciliare.*

12. C. ſlightly heart-ſhaped, with elevated, ſubtriangular ciliated grooves. North ſeas. *ciliatum.*

13. C. ſomewhat heart-ſhaped, with obtuſe, knotty, tranſverſely ſtriated grooves. Mediterranean. *tuberculatum.*

14. C. heart-ſhaped, with arched imbricated ſcales along the grooves. Mediterranean. *iſocardia.*

15. C. ſomewhat heart-ſhaped, ſubangular. India. *fragum.*

16. C. ſubcordate, with lunated, coloured grooves. India. *unedo.*

17. C. ſubcordate, grooved, and muricated at the ſides. America. *muricatum.*

18. C. oblong, with angular grooves, ſerrated at the ſide. America and India. *magnum.*

19. C. ſubovate, grooved; anterior margin rough, poſterior one-toothed. India. *flavum.*

* 20. C. obovate, with obſolete, longitudinal ſtriæ, and a few tranſverſe ones concealed by a gloſſy, yellowiſh brown epidermis. European and American ſeas, Britain. *lævigatum.*

ſerratum. 21. C. obovate, ſmooth, with obſolete ſtriæ; interior margin ſerrated. Mediterranean and Indian ſeas.

edule. * 22. C. antiquated, with 28 depreſſed ribs, with obſolete, recurved ſcales. Abounds frequently on all ſandy coaſts, and is lodged a little beneath the ſand. This is employed as a wholeſome and nouriſhing food. It is the common cockle of this country.

icelandicum. 23. C. grooved with about 36 triangular, ſmooth ribs. Iceland and Greenland ſeas.

greenlandicum. 24. C. antiquated, glabrous, thin, with angular ferruginous lines; two and three-fourths inches long, three and a half broad. Greenland and Iceland.

ruſticum. 25. C. antiquated with 20 remote grooves, the intermediate ſpaces rugged. Mediterranean ſeas.

glaucum. 26. C. ſubantiquated, hind-part with 20 grooves imbricated upwards. Barbary.

pectinatum 27. C. ſlightly heart-ſhaped and pectinated. Mediterranean.

virginicum 28. C. triangular, rounded, equilateral, with tranſverſe, membranaceo-recurved wrinkles; hinges blue. Mediterranean.

trilaterum. 29. C. triangular, gibbous, ſtriated. Caſpian ſea.

auricula. 30. C. heart-ſhaped, ſubrhombic, 24 ribs on each ſide; the grooves finely notched; two and one-fourth inches long, and one three-fourths broad. Arabia and Egypt.

triſte. 31. C. oval, ſmooth; margin ſtriated on each ſide the beak.

monſtroſum. 32. C. gibbous; one ſide impreſſed and ochraceous, the other convex, heart-ſhaped, and whitiſh, ſpotted with yellow. Nicobar iſlands. A very rare ſpecies.

lima. 33. C. gibbous, with prickly ribs; anterior ones with recurved, membranaceous tubercles, crenated at the ſides. Nicobar iſlands.

ringens. 34. C. rounded, ventricoſe, white, with deep teeth on the margin; anterior ones roſy. Africa and America.

papyraceum. 35. C. pellucid, cinereous, with thin longitudinal ſtriæ. India.

æolicum. 36. C. thick, with longitudinal anterior ſtriæ, and tranſverſe poſterior ones. Guinea, Antilles iſlands.

oblongum. 37. C. yellowiſh, oblong, turgid, ribbed; anterior parts glabrous; margin notched; three inches long, two and a half broad, ribs about 30. Mediterranean.

craſſum. 38. C. browniſh, rather oblong, thick, antiquated, with deeper teeth on the margin; ribs about 23. Mediterranean and North ſeas.

latum. 39. C. broad, unequal ſided, within white; ribs flat and ſpinulous; two inches long, two and a half broad. Tranquebar and Nicobar iſlands.

pigmeum. * 40. C. ſomewhat heart-ſhaped, ſubangular; grooves imbricated, or beſet with recurved ſcales. Falmouth, Sandwich.

maculatum. 41. C. with crowded, undulated wrinkles; ribs broad, grooves narrow; three inches long, three and one-fourth broad. Bay of Campeachy.

flexuoſum. 42. C. rounded, brown; ribs flexuous, grooves wrinkled; $1\frac{3}{4}$ inch long, and about the ſame breadth.

fluviatile. * 43. C. flattiſh, thick, white, with flat ribs. Mouth of the Tees, England. Rare.

gaditanum. 44. C. rounded, yellowiſh-white, varied with red, green, and brown, and marked with decuſſated ſtriæ. Cadiz.

braſilenſe. 45. C. rounded; ribs flat, broad, finely notched. Brazil.

46. C. rather oblong, white, with blackiſh ſpots; ribs about 12, very convex; $1\frac{1}{4}$ inches long. *amboinenſe.*

47. C. heart-ſhaped, equilateral, tawny white and purpliſh within; ribs with imbricated ſcales. *ſquamoſum.*

48. C. reddiſh, thin, rounded, with decuſſated ſtriæ. *cancellatum.*

49. C. reddiſh, unequal ſided; ribs convex, tranſverſely ſtriated. *rubiginoſum.*

50. C. unequal-ſided, ribbed, whitiſh, within purple; minute. *albidum.*

51. C. inequilateral, oblong, with fine ribs doubled above. *vireſcens.*

52. C. rounded, whitiſh, with a brown band; ribs acute. *faſciatum.*

Gen. 8. Mactra. 31 Mactra.

Gen. Char.—The animal is a tethys; the ſhell is bivalve, unequal ſided and equivalve; the middle tooth of the hinge is complicated, with a ſmall hollow on each ſide; the lateral ones are remote, and inſerted into each other.

Species.

1. M. ſmooth, with a flat, anterior margin, on which is a lunated gape, $3\frac{1}{4}$ inches broad. Cape of Good Hope. *ſpengleri.*

2. M. with tranſverſe, wrinkled plaits, diaphanous; anterior margin flattiſh, ſhell thin like paper; from 1 to 2 inches long, $2\frac{1}{2}$ broad. Indian ocean. *plicatoria.*

3. M. thin, pellucid, white, convex; fore-part a little gaping, finely ſtriated and ribbed. Nicobar iſlands. Very rare. *papyracea.*

4. M. ſmooth, diaphanous; back ſubſtriated, with a ſmooth marginal impreſſion before them, ſurrounded with a rim; $2\frac{1}{2}$ inches long, 3 broad. Mediterranean and Coromandel coaſts. *ſtriatula.*

5. M. triangular, thick, with ſtrong, thick crowded, arched ſtriæ. *ſtriata.*

6. M. obtuſely triangular, whitiſh, with milk-white bands on the beaks; margins on each ſide the beaks violet; $1\frac{1}{4}$ inch long, and nearly 2 broad. Mediterranean. *rotundata.*

7. M. ſmooth, diaphanous, ſtriated; beak ſmooth, margins on each ſide of them ſtriated; $1\frac{1}{2}$ inch long and 2 broad. African and Indian oceans. *glabrata.*

8. M. ſnowy, gloſſy, thick, diaphanous, ſmooth; depreſſions on each ſide the beaks ſtriated. *nitida.*

9. M. ſmooth, ſubdiaphanous, white, with paler bands; 2 inches broad, $1\frac{1}{2}$ long. Mediterranean and Guinea. *corallina.*

10. M. thin, turgid, pellucid white; fore-part finely ſtriated, with paler bands. Indian ocean. *lactea.*

* 11. M. ſemitranſparent, ſmooth, gloſſy, obſoletely radiated, white without, purpliſh within; ſides nearly equal; length $1\frac{1}{2}$ inch, breadth $1\frac{3}{4}$. European and American ſeas, England, and ſhores of Scotland. *ſtultorum.*

12. M. ſemitranſparent, ſmooth, fawn colour with pale rays; beak and hinge placed beyond the middle; $2\frac{1}{4}$ inches long, $3\frac{1}{4}$ broad. *grandis.*

* 13. M. ſtrong, ſubtriangular, of a yellowiſh-white colour, with a few concentric ridges; equal-ſided; $1\frac{1}{2}$ inch long, $1\frac{3}{4}$ broad. Common on European ſhores, and alſo in Britain. *ſolida.*

* 14. M. oval, oblong, ſmooth, with irregular concentric ſtriæ; inſide gloſſy white, gaping a little at both *lutraria.*

ends.

ends. Europe, near the mouths of rivers. Found very large on the coaſt of Caermarthen, and ſome parts of Cornwall.—The animal which inhabits this ſhell, according to Montagu, is an aſcidia; and he obſerves that it frequently protrudes not leſs than 7 or 8 inches from the ſmaller end in ſearch of food. *Teſt. Brit.* p. 100.

cygnus. 15. M. three-ſided, finely ſtriated tranſverſely; fore-part flattiſh and ſlightly wrinkled; 1 inch long and rather broader. Tranquebar.

macula. 16. M. obtuſely triangular, ſmooth, thin, with pellucid cheſnut ſpots; within white, and finely ſtriated; a heart-ſhaped impreſſion behind the beaks; $1\frac{1}{2}$ inch long, and rather broader.

turgida. 17. M. inflated, faintly ſtriated, ochraceous and white within; hinge with a ſupernumerary, triangular, double tooth; $2\frac{1}{4}$ inches long, $3\frac{1}{2}$ broad. Tranquebar.

violacea. 18. M. thin, obſoletely radiated, finely ſtriated tranſverſely; margins on each ſide the beaks whitiſh; 2 inches long and 3 broad. Tranquebar.

cuneata. 19. M. wedge-ſhaped, blue, with fine tranſverſe ſtriæ; margin notched within; 1 inch long and ſcarcely ſo broad.

glauca. 20. M. ovate, dirty white with glaucous rays, and fine tranſverſe ſtriæ; $2\frac{1}{4}$ inches long, $3\frac{1}{2}$ broad. Mediterranean.

pellucida. 21. M. ovate, thin, pellucid, white, with unequal tranſverſe ſtriæ; $1\frac{1}{4}$ inch long, and 2 broad. Guinea.

fragilis. 22. M. ovate, thin, ſmooth, pellucid, flattiſh; anterior gape tranſverſely ſtriated, and wrinkled. Nicobar iſlands.

rugoſa. 23. M. ovate, dirty white, with elevated longitudinal ſtriæ; croſſing the tranſverſe ones, which are a little more raiſed; $2\frac{1}{2}$ inches long, $2\frac{3}{4}$ broad; thick, and white within.

nicobarica 24. M. ovate, thin, pellucid, ſmooth on the fore-part; the hind-part with cancellated ſtriæ. Nicobar iſlands.

complanata. 25. M. ovate, thin, with arched plates; the plates tranſverſely ſtriated; no lateral teeth; 1 inch long, $2\frac{1}{2}$ broad. India.

liſteri. * 26. M. very thin, nearly round, whitiſh; hinge with a triangular tooth, and large cavity; $1\frac{1}{2}$ inch long, and 2 broad. Common on the ſhores of Britain. *Mactra compreſſa*, Montagu, *Teſt. Brit.* p. 96.

piperita. 27. M. ovate, compreſſed, tranſverſely ſtriated; hinge teeth very minute, with a large oblique hollow. Mediterranean.

32 Donax.

Gen. 9. Donax, or *Wedge-ſhell.*

Gen. Char.—The animal is a tethys. The ſhell is bivalve, with generally a crenulate margin; the anterior margin very obtuſe; hinge with two teeth, and a ſingle marginal one placed a little behind; rarely double, or triple.

Species.

ſcortum. 1. D. triangular, heart-ſhaped, with a flat frontal margin. Indian ocean.

pubeſcens. 2. D. ciliated with ſpines on the anterior margin. Indian ocean.

rugoſa. 3. D. wrinkled and gibbous before, with notched margins. Mediterranean and Atlantic ſeas.

trunculus. * 4. D. oblong, ſmooth, gloſſy, finely ſtriated longitudinally; margin crenated; an inch broad. European coaſts, Wales.

ſtriata. 5. D. obtuſe before, ſtriated, the margin denticulated. Southern Europe.

denticulata. * 6. D. obtuſe in front, lips tranſverſely wrinkled; finely ſtriated longitudinally; margin denticulated. European and American ſeas; ſhores of Britain, but rare.

cuneata. 7. D. wedge-ſhaped, margins very entire; 1 inch long, $1\frac{1}{4}$ broad. Tranquebar.

faba. 8. D. gibbous, finely ſtriated tranſverſely, ſpotted with yellow.

ſcripta. 9. D. ovate, compreſſed, ſmooth, marked with purple waved lines; margins crenulate. Malabar coaſts.

muricata. 10. D. ovate, ſtriæ muricated; margin denticulated. Indian ocean.

irus. * 11. D. oval, with tranſverſe, waved, erect, ſtriated, membranaceous wrinkles; ſize of a ſmall kidney bean. Mediterranean, ſhores of Devonſhire and Cornwall, where it is found in the hardeſt limeſtone.

lævigata. 12. D. obtuſe before, obſoletely ſtriated at the ſides; margin very entire; hinge without marginal teeth; $1\frac{1}{2}$ inch long, 2 inches broad. Tranquebar.

ſpinoſa. 13. D. hind-part ſmooth and perpendicularly ſtriated; fore-part truncated, and finely cancellated; angles ſpinous. Tranquebar. Very rare.

incarnata. 14. D. fleſh-coloured, anterior part truncated, wrinkled, and marked with reticulated ſtriæ; hind-part wedge-ſhaped, and furrowed with fine perpendicular ſtriæ. Tranquebar.

argentea. 15. D. oval, ſmooth, olive-green, within ſilvery; margin with more elevated acute teeth, near the hinge.

bicolor. 16. D. ovate, with elevated ſtriæ croſſing a few tranſverſe ones; rufous with a white ray on one ſide.

radiata. 17. D. brown, with hyaline ſpots; outſide with crowded, arched, tranſverſe ſtriæ; inſide with perpendicular ones; 1 inch broad, $1\frac{1}{2}$ long. Tranquebar.

ſtraminea. 18. D. with thin perpendicular ſtriæ, croſſing the tranſverſe ribs on the fore-part; ſtraw colour, with darker tranſverſe bands; margin tawney and entire behind; 1 inch long, $\frac{3}{4}$ broad.

candida. 19. D. entirely white, with a few thin, arched, tranſverſe ſtriæ, which are oblique towards the rim; hinge with three oblique middle teeth; margin entire; 1 inch long, and ſomething broader.

complanata. * 20. D. oblong, ſmooth, gloſſy, light yellow, with ſmall ſpots or ſtreaks of white, and one broad ray of the ſame from the back to the oppoſite margin; $\frac{5}{8}$ inch long, $\frac{1}{4}$ broad. Devonſhire, but rare. Montagu, *Teſt. Brit.* p. 106.

plebeia. * 21. D. oblong, ſuboval, ſmooth, gloſſy, commonly marked with two brown ſtripes longitudinally from the beak; margin ſmooth; ſcarcely $\frac{1}{2}$ inch long, $\frac{3}{4}$ broad. Weymouth, Dorſetſhire. Montagu, *Teſt. Brit.* 107.

Gen. 10. Venus. 33 Venus.

Gen. Char.—The animal a tethys; ſhell bivalve, frontal margin flattened, with incumbent lips; hinge with three teeth, all of them approximate; the lateral ones divergent at the tip.

Species.

Species.

A. *Shell ſomewhat heart-ſhaped.*

dione. 1. V. tranſverſely grooved, with a double row of ſpines on the flattened ſide. American ocean. This ſhell is very rare.

paphia. * 2. V. ſomewhat heart-ſhaped, with thickened wrinkles; flattened ſide with attenuated wrinkles; lips complicated; 2 inches long, $1\frac{1}{4}$ broad. American iſlands, Cornwall.

marica. 3. V. heart-ſhaped, with decuſſated ſtriæ, flattened margin, lamellated. American ocean. Very rare.

diſera. 4. V. ſomewhat heart-ſhaped, with tranſverſe, remote, reflected grooves; margin crenulated. American ocean. Very rare.

bæjana. 5. V. brittle, glabrous, with a few tranſverſe ſtriæ. Brazil.

excavata. 6. V. lentiform, tranſverſely ſtriated, with a deep, heart-ſhaped depreſſion behind the beaks; flat ſide, broad.

verrucoſa. * 7. V. with membranaceous, tranſverſe, ſtriated grooves, forming tubercles towards the outer margin; margin crenulated; 2 inches long, 2 broad. Mediterranean, Antilles iſlands, Cornwall.

lapicida. 8. V. longitudinally ſtriated forwards, and tranſverſely backwards. American iſlands.

divergens. 9. V. white, with fine, crowded, divergent ſtriæ. American iſlands.

caſſina. 10. V. with tranſverſe, recurved, acute grooves; poſterior margin crenated, and grooved behind the beaks. European ſeas. It is often found in a foſſil ſtate.

cancellata. 11. V. with tranſverſe, membranaceous, remote ſtriæ, and a heart-ſhaped depreſſion behind the beaks; 1 inch long, $1\frac{1}{2}$ broad. Indian ocean.

gallina. * 12. V. radiate, with tranſverſe, obtuſe ſtriæ; hind tooth of the hinge minute; margin crenulated, 1 inch long, $1\frac{1}{4}$ broad. American and European ſeas, Cornwall.

guineenſis. 13. V. with tranſverſe, acute ſtriæ; lips finely ſtriated and roſy; margin very entire. Africa.

petulea. 14. V. ſlightly grooved, margin crenated; ſize of a hazel-nut. South of Europe.

flexuoſa. 15. V. grooves obtuſe, tranſverſe; lips of the anterior margin with an elevated angle; 1 inch long, $1\frac{1}{4}$ broad. American and Indian oceans.

erycina. 16. V. grooves tranſverſe, parallel, obtuſe; anterior margin glabrous; depreſſion behind the beaks ovate; $2\frac{1}{2}$ inches long, 3 broad. India.

mercenaria. 17. V. ſtrong and thick, with ſlight tranſverſe ſtriæ, and covered with a brown cuticle; within, pale violet; margin crenated; 3 inches long, and nearly 3 broad. Europe, North America. Shells of this ſpecies are found foſſil in the mountains of Sweden. In North America they are called *clams*, and the Indians make wampum or money of them.

icelandica. * 18. V. thick and ſtrong, with ſlight tranſverſe ſtriæ, and covered with a brown cuticle; within pure white, and ſmooth; margin entire; $3\frac{1}{2}$ inches long, 4 broad. Europe, Africa, Caſpian ſea, Caermarthenſhire, and ſhores of Scotland. The fiſh is employed as food by the Icelanders.

chione. * 19. V. ſmooth, with fine tranſverſe wrinkles; margin entire; hind tooth of the hinge lanceolate; 3 inches long, $3\frac{3}{4}$ broad. Aſiatic ſeas; Cornwall, where this ſpecies is called *queen*.

maculata. 20. V. ſmooth, with a few faint ſpots; $1\frac{1}{2}$ inch long, $2\frac{1}{2}$ broad. American ocean.

meretrix. 21. V. glabrous, with a brown gibbous ſlope before, and gaping membranes; margin entire. Near the mouths of rivers, Indian ocean.

læta. 22. V. ſmooth, radiated with white; lips of the anterior ſlope violet; $1\frac{1}{4}$ inch long, $1\frac{1}{2}$ broad. Mediterranean and Indian ſeas.

caſtrenſis. 23. V. triangular, rounded, gibbous, ſmooth, and marked with angular characters; $1\frac{1}{2}$ inch long, 2 broad. Indian ocean, Red ſea.

phryne. 24. V. ſmooth, tranſverſely ſtriated before and behind; poſterior ſlope obcordate, with violet veins. Southern ocean.

meroe. 25. V. ovate, compreſſed, tranſverſely ſtriated, with a gaping ſuture behind; $1\frac{1}{2}$ inch long, $2\frac{1}{4}$ broad. American and Indian ocean.

minuta. 26. V. ſubovate, tranſverſely ſtriated, and ſubpellucid; membranes cloſed; from 1 to 2 inches broad, $1\frac{1}{2}$ long. Iceland.

deflorata. * 27. V. oval, longitudinally wrinkled, ſemipellucid, faintly radiated with purple and white; $1\frac{1}{2}$ inch long, $1\frac{3}{4}$ broad. European and American ſeas, Falmouth.

fimbriata. 28. V. oval, gibbous, longitudinally ſtriated, and tranſverſely grooved; margin crenated; 2 inches long, 3 broad. Eaſt Indies.

reticulata. 29. V. ſtriæ elevated, decuſſated; heart-ſhaped depreſſion behind; margin entire; 2 inches long, $2\frac{1}{2}$ broad. India.

ſquamoſa. 30. V. ſtriæ reticulated, and ſcaly on the back part. India.

puerpera. 31. V. roundiſh, with decuſſated, membranaceous ſtriæ; lips flexuous. India.

tripla. 32. V. triangular, ſmooth, retuſe behind and before; 1 inch long, and rather broader. Mediterranean.

plicata. 33. V. with arched, membranaceous, tranſverſe ſtriæ; poſterior ſlope reddiſh, heart-ſhaped; lips oblique. Indian ſeas. Very rare.

rugoſa. 34. V. gibbous, with tranſverſe, membranaceous, arched ſtriæ; poſterior ſlope heart-ſhaped; margin crenated; 2 inches long, 2 broad. India.

caliſte. 35. V. with tranſverſe, acute ſtriæ, anteriorly membranaceous; anterior ſlope ſhort, poſterior indiſtinct. Red ſea.

granulata. 36. V. rounded, with decuſſated ſtriæ; fore-part and crenated margin violet. American ocean.

imbricata. 37. V. with perpendicular, imbricated ribs, tranſverſely ſtriated; margin crenated. It has been found in a foſſil ſtate in France.

divaricata. 38. V. with fine tranſverſe ſtriæ, croſſing ſome diverging longitudinal ones towards the margin; poſterior impreſſion ovate; margin crenated. E. Indies.

contraria. 39. V. oblong, flattiſh, tranſverſe ſtriæ running contrary behind; margin crenated. Guinea.

gallus. 40. V. oblong, ovate, radiated, with thick, crowded, tranſverſe ſtriæ; anterior ſlope broad, ovate; poſterior impreſſion heart-ſhaped; $1\frac{1}{2}$ inch long, 2 broad. Malabar.

flammea. 41. V. tranſverſely ſtriated, the back glabrous; anterior ſlope broad, with brown lines; poſterior impreſſions heart-ſhaped, with brown lines. Red ſea.

corbicula. 42. V. triangular, ſmooth, truncated on each ſide, with yellowiſh rays; ſlopes heart-ſhaped; margin very entire. Atlantic and American ſeas. Rare.

ſinuoſa. * 43. V. thin, convex, ſomewhat triangular, with a deep obtuſe ſinus in the middle of the front. Britain.

herma-phrodita. 44. V. triangular, very ſmooth, olive coloured, obſcurely banded: anterior ſlope heart-ſhaped; poſterior ovate. Rivers of Guinea. Rare.

coaxans. 45. V. green, within white, with tranſverſe, unequal, membranaceous ſtriæ; margin acute; $2\frac{1}{2}$ inches long, 3 broad. Rivers of Ceylon.

caſta. 46. V. gibbous, ſnowy; anterior part convex; within pale violet; anterior ſlope roundiſh, poſterior heart-ſhaped; margin very entire. India.

affinis. 47. V. thin, glabrous, convex; white variegated with brown; poſterior ſlope elongated, with oblique tumid lips; four teeth in the hinge. Mauritius.

opima. 48. V. thick, convex; anterior ſlope ovate, poſterior heart-ſhaped; hinge with three teeth. India.

triradiata. 49. V. convex, gray, with three blackiſh blue rays; poſterior ſlope elongated; lips tumid. Tranquebar.

nebuloſa. 50. V. ochraceous, with cinereous and bluiſh ſpots; anterior ſlope oval; poſterior ſlope ovate, bluiſh. Tranquebar.

contempta. 51. V. thick, triangular, equilateral, ſmooth; beaks convergent; primary tooth of the hinge crenulated: minute. Malabar.

japonica. 52. V. oblong, ovate, inequilateral; lid tranſverſe; ſtriæ crowded at the ſides; poſterior ſlope oblong, ovate. Japan.

ſtriata. 53. V. ventricoſe, anteriorly angular, with tranſverſe, thick, ſmooth and ſlightly arched ſtriæ: poſterior ſlope heart-ſhaped. India. Rare.

textilis. 54. V. oval, quite ſmooth, inequilateral; ſlopes oblong; margin very entire; $1\frac{1}{4}$ inch long, $2\frac{1}{4}$ broad. Malabar, Red ſea.

corrugata. 55. V. ovate, whitiſh; ſtriæ tranſverſe, anteriorly thick and ſtrong, poſteriorly thin and undulating. Mediterranean.

monſtroſa. 56. V. ovate, whitiſh; ſtriæ decuſſated; hinge with only two teeth in the left valve. Nicobar iſlands.

ponderoſa. 57. V. ſolid, weighty, inequilateral, wrinkled on both ſides; margin crenulated; hinge with two teeth. Southern ocean.

ſubviridis. 58. V. greeniſh, glabrous, thick: margin entire, beaks prominent.

roſtrata. 59. V. ovate; ſtriæ perpendicular, ſcaly, croſſing the tranſverſe ones.

fuſca. 60. V. brown, with fine, perpendicular ſtriæ; $1\frac{1}{4}$ inch long, $2\frac{1}{2}$ broad.

luſitanica. 61. V. oblong, with fine tranſverſe ſtriæ; margin crenated. Seas round Portugal.

punctulata. 62. V. ovate, white, with bay lines, and yellowiſh dots. Corſica.

faſciata. 63. V. round, ſmooth, with bay and yellowiſh rays, partly blue, and partly livid.

carnea. 64. V. oval, inequilateral, ſlightly wrinkled, fleſh-coloured, with three rays; $1\frac{1}{2}$ inch long, $2\frac{1}{2}$ broad.

virgata. 65. V. externally ſteel blue, with yellow rays; internally violet. Indian ocean.

verſicolor. 66. V. oval, obliquely ſtriated, whitiſh; rays white, tawny, bluiſh and red.

67. V. ovate, inequilateral, finely ſtriated and dotted with blue: rays browniſh and black. *variegata.*

68. V. ovate, violet; ſtriæ perpendicular; $1\frac{1}{4}$ inch long, $2\frac{1}{4}$ broad. *amethyſtina.*

69. V. poſteriorly ovate, tranſverſely and unequally ſtriated, and marked with angular lines. Shores of Liſbon. *callipyga.*

70. V. ovate, with fine decuſſated ſtriæ; white or fleſh-coloured, varied with brown; $1\frac{1}{2}$ inch broad, not one inch long. Senegal. *ſenegalenſis.*

71. V. triangular, white or yellow, with about 40 tranſverſe parallel grooves; $1\frac{1}{2}$ inch long. Senegal. *matadoa.*

72. V. heart-ſhaped, with tranſverſe, remote, excavated grooves; margin crenulated. *ſuccincta.*

73. V. heart-ſhaped, much compreſſed, tranſverſely grooved. *compreſſa.*

74. V. heart-ſhaped, poliſhed, white, marked with browniſh characters; margin entire. Southern ocean. *auſtralis.*

75. V. ovate, livid, with numerous, interrupted, bluiſh rays; poſterior ſlope ovate. Shores of Ceylon and Florida. *gigantea.*

B. *Orbicular.*

* 76. V. lentiform, with crenated, decuſſated ſtriæ; poſterior ſlope impreſſed, ovate. American and Indian ocean, ſhores of Weymouth. *tigerina.*

77. V. orbicular, tranſverſely ſtriated, with rough, membranaceous lips; two inches long, not ſo broad. Coromandel. *proſtrata.*

78. V. lentiform, with glabrous wrinkles, white with a longitudinal groove anteriorly on each ſide; 2 inches long. America. *penſylvanica.*

79. V. white, ſomewhat glabrous, with a longitudinal groove anteriorly, and hinge without lateral teeth. Shores of Iceland and Ferro iſlands. *ſpuria.*

80. V. lentiform, glabrous, ſmooth, with excavated dots. India. *incruſtata.*

81. V. lentiform, longitudinally grooved, dotted within; 2 inches long, $2\frac{1}{4}$ broad. India, but rare. *punctata.*

* 82. V. lentiform, tranſverſely ſtriated, pale, with obſolete rays; poſterior ſlope heart-ſhaped: 2 inches long, and 2 broad. Norway, and coaſts of Britain, Cornwall. *exoleta.*

* 83. V. thin, convex, orbicular, whitiſh, tinged with yellow, with thin, tranſverſe ſtriæ; margins waved. Britiſh ſeas, Falmouth. *undata.*

84. V. gibbous with tranſverſe, remote, rather obſolete grooves; margin entire. *tumidula.*

85. V. longitudinally ſtriated, with tranſverſe, white, and violet arches; margin interiorly crenated. Chineſe ſhores. *ſinenſis.*

86. V. lentiform, tranſverſely ſtriated, with an oblong gaping vent on the anterior ſlope; hinge with 4 teeth. Nicobar iſlands. *ſinuata.*

* 87. V. lentiform, with remote, tranſverſe, membranaceous ſtriæ; $1\frac{1}{2}$ inch long, 2 broad. European ſeas, Britain. *borealis.*

88. V. ſublentiform, with wrinkled, longitudinal grooves, branched near the anterior margin; $1\frac{1}{2}$ inch long, 2 broad. Indian and American oceans. *pectinata.*

89. V. lentiform, compreſſed, ſtriated, angular; the hinder angle ſtraight. Indian ocean, and Red ſea. Very rare. *ſcripta.*

90. V.

edentula. 90. V. ſubglobular, lenticular, wrinkled, without teeth; poſterior ſlope ovate. American ocean.

cincta. 91. V. very convex, and ſurrounded with rings; intermediate grooves crenated; poſterior ſlope heart-ſhaped; margin crenulated. A minute ſhell.

concentrica. 92. V. white, ſub-orbicular, compreſſed, with concentric ſtriæ; margin very entire; poſterior ſlope heart-ſhaped. Atlantic and American ſeas. A large ſhell.

juvenilis. 93. V. lentiform, with tranſverſe, crowded ſtriæ; anteriorly circular, and terminating in wrinkles behind; poſterior ſlope heart-ſhaped; margin very entire. India.

biſtrio. 94. V. lentiform, with tranſverſe, acute, arched ſtriæ; margin entire; poſterior ſlope heart-ſhaped. India. Rare.

globoſa. 95. V. globular, with fine tranſverſe ſtriæ; margin very entire; hinge with two teeth; 1 inch long, $1\frac{1}{2}$ broad. Red ſea. Very rare.

pectunculus. 96. V. orbicular, equilateral, tranſverſely wrinkled, and variegated with rufous. Japan.

albida. 97. V. orbicular, ſub-compreſſed, equilateral, white, with fine tranſverſe ſtriæ. Jamaica.

campeachienſis. 98. V. orbicular, inequilateral, with crowded, acute, tranſverſe ſtriæ; $2\frac{1}{2}$ inches long. Bay of Campeachy.

craſſa. 99. V. orbicular, ſolid, compreſſed, with fine tranſverſe ſtriæ, and red rays.

purpuraſcens. 100. V. orbicular, with fine tranſverſe ſtriæ, and purpliſh rays.

rubra. 101. V. orbicular, inequilateral, cheſnut with darker rays, and crowded, thick, tranſverſe ſtriæ. Jamaica.

violacea. 102. V. with perpendicular ſcaly ſtriæ; margin denticulated, violet within.

ſpadicea. 103. V. ſtriæ perpendicular, and ſcaly towards the margin; colour cheſnut; 2 inches long, $2\frac{1}{2}$ broad.

cancellata. 104. V. ſub rufous, cancellated; a minute ſhell.

bengalenſis. 105. V. orbicular, nearly equilateral, with thick, perpendicular ſtriæ; beaks turned back. Bengal.

aurea. * 106. V. ſub-orbicular, inequilateral, tranſverſely ſtriated, and marked with faint longitudinal ſtriæ: 1 inch long, $1\frac{1}{3}$ broad. Dorſetſhire.

obſcura. 107. V. brown, with thin perpendicular ſtriæ; $1\frac{3}{4}$ inch long, $2\frac{1}{2}$ broad.

purpurata. 108. V. orbicular, ſub-equilateral, perpendicularly wrinkled, and with purple rays; $1\frac{1}{2}$ inch long, $1\frac{3}{4}$ broad.

nux. 109. V. lentiform, teſtaceous, wrinkled; poſterior ſlope heart-ſhaped. Ionian ſhores.

rugata. 110. V. orbicular, teſtaceous, ſub-equilateral, with diſtant tranſverſe wrinkles.

gibbula. 111. V. lentiform, tranſverſely ſtriated, anteriorly truncated.

ſtellata. 112. V. orbicular, ſmooth, golden, with a white ſtar at the beak. Liſbon.

italica. 113. V. orbicular, pale yellow, with elevated, tranſverſe, diſtant ſtriæ. Mediterranean.

braziliana. 114. V. lentiform, yellowiſh brown, with thin, tranſverſe, diſtant ſtriæ; poſterior ſlope heart-ſhaped, bluiſh; anterior ſlope broad, bluiſh. Brazil.

pellucida. 115. V. orbicular, pellucid, ſmooth; anterior ſlope pale golden, with cheſnut ſpots; poſterior ſlope heart-ſhaped, with red and green veins. Brazil.

holoſericea. 116. V. orbicular, ſolid, white, with undulated, golden ſtriæ, and a broad yellow band towards the margin, variegated with tranſverſe, brown lines.

117. V. orbicular, ventricoſe, thick, browniſh, radiated with white; ſtriæ annular. Macaſſar. *macaſſarica.*

118. V. ſub-orbicular, of an orange colour; 2 inches long, $2\frac{1}{2}$ broad. *aurantia.*

119. V. lentiform, fulvous, with fine circular ſtriæ. *fulva.*

120. V. orbicular, white, with reticulated ſtriæ. *candida.*

121. V. orbicular, tranſverſely ſtriated, whitiſh, with brown ſpots, lines, and angular characters. *albicans.*

122. V. ſub-orbicular, tranſverſely ſtriated, white with reddiſh undulated lines and dots. *undulata.*

123. V. orbicular, equilateral, white, with fine tranſverſe ſtriæ, thicker towards the margin. *lineata.*

124. V. ſmooth, nearly equilateral, whitiſh. *lævis.*

125. V. orbicular, ſmooth, inequilateral, livid horn-colour, with a white, tranſverſe line. *cornea.*

126. V. orbicular, fulvid, dotted with white at the margin. *guttata.*

127. V. inequilateral, reddiſh, ſmooth, with a few tranſverſe lines. *rufeſcens.*

128. V. lentiform, ſtriæ cancellated and radiated; margin crenulated; greeniſh, with darker ſpots. *virens.*

129. V. white, with radiated ſpots and arched ſtriæ; in the middle a large gray ſpot, tapering upwards. *maculoſa.*

130. V. entirely of a fleſh colour, with longitudinal ribs croſſing the remote tranſverſe wrinkles; $1\frac{1}{2}$ inch long, $1\frac{1}{2}$ broad. *coſtata.*

131. V. thin, convex, with fine tranſverſe ſtriæ; within ſnowy, without marked with the letter *W*, and many ſcattered dots: beaks inflated. *wauaria.*

132. V. tumid, ſolid, ſmooth; with a few tranſverſe wrinkles towards the margin; hinge with 4 teeth in each valve; $1\frac{1}{4}$ inch long, 2 broad. Africa. *tumens.*

133. V. thin, orbicular, pellucid, ſmooth, ſnowy; hinge with two teeth in each valve; $1\frac{1}{2}$ inch diameter. Weſtern ſhores of Africa. *diaphana.*

134. V. ſub-orbicular, compreſſed, hard, tranſverſely grooved, reddiſh, with brown rays; 6 inches broad, $4\frac{1}{2}$ long. *dura.*

135. V. orbicular, compreſſed, ſnowy, with longitudinal rounded grooves, croſſed with tranſverſe ſtriæ; 9 lines in diameter. Africa. *eburnea.*

136. V. tranſparent, pale, fulvous within and without, with fine longitudinal grooves; 16 lines long. Africa. *lucida.*

137. V. orbicular, a little convex, with longitudinal ſtriæ perpendicular in the middle, obliquely divergent towards the outſide, and croſſed by tranſverſe ones; intermediate grooves and inner margin crenated. *diſcors.*

138. V. orbicular, ſub-equilateral, with elevated, acute, tuberculated ribs; margin denticulated, and crenated. *aculeata.*

C. *Oval, a little angular near the beaks.*

* 139. V. ovate, anteriorly angular, with undulated tranſverſe ſtriæ; 2 inches long, $2\frac{1}{2}$ broad. Europe and India, coaſt of Britain. *literata.*

140. V. Inequilateral, thin, with fine decuſſated ſtriæ; white, reticulated with brown. Mediterranean. *geographica.*

141. V. ovate, anteriorly angular, with tranſverſe ſtriæ; intermediate tooth of the hinge bifid; $1\frac{1}{2}$ inch long, 3 broad. Indian ocean. Rare. *rotundata.*

* 142. F. ovate, with decuſſated ſtriæ anteriorly angular; $1\frac{1}{2}$ inch long, 2 broad. Mediterranean, Britiſh coaſts. *decuſſata.*

virginea. 142. V ſubovate, anteriorly ſubangular, with unequal, tranſverſe ſtriæ; anterior ſlope tumid. Adriatic.

virginica. 143. V. ovate, tranſverſely wrinkled; 1 inch long, $1\frac{1}{2}$ broad. Virginia.

rhomboides. * 144. V. depreſſed or rhomboid, with concentric ſtriæ; pale brown, variegated; $\frac{3}{4}$ inch long, $1\frac{1}{4}$ broad. Britiſh coaſts.

cruentata. 145. V. ovate, inequilateral, tranſverſely ſtriated and ſpotted with red.

luteſcens. 146. V. ovate, tranſverſely ſtriated; outwardly radiated and marked towards the margin with characters, lines and ſpots; within yellowiſh.

ſanguinolenta. 147. V. oval, ſmooth, yellowiſh, with red ſpots and dots; $1\frac{1}{4}$ inch long, $1\frac{3}{4}$ broad. Shores of Naples.

argentea. 148. V. oblongiſh, ſmooth, ſilvery, with black lines united into bands. Shores of Cadiz.

donacina. 149. V. oblongiſh, flattened, anteriorly tranſverſely grooved; internal margin crenulated; ſlopes linear, excavated: $1\frac{1}{4}$ inch long, $1\frac{1}{4}$ broad.

afra. 150. V. grooved, umbo pointed; poſterior ſlope wrinkled and heart-ſhaped; grooves fine, about 130; 1 inch broad. Africa.

dealbata. 151. V. oblong, thin, flattened, bluiſh when the fiſh is alive, and ſnowy when it is dead; $1\frac{1}{2}$ inch broad, $\frac{3}{4}$ long. Africa.

lithophaga. 152. V. ovate, reticulated, gaping on each ſide: hinge with 2 teeth, alternately bifid. Shores of Croatia, among rocks and ſtones.

34 Spondylus.

Gen. 11. Spondylus.

Gen. Char.—The animal a tethys; ſhell hard, ſolid, with unequal valves, one of them convex, the other rather flat; hinge with two recurved teeth, ſeparated by a ſmall hollow.

Species.

gædaropus. 1. S. ſlightly eared and ſpinous. Mediterranean, Indian, and other ſeas.—This ſpecies varies greatly in ſize, thickneſs and colours. Sometimes it is entirely purple, orange, white or bloom colour, and ſometimes it is marked with various ſtreaks, ſpots, dots, or bands.

regius. 2. S. without ears, and ſpinous. In this ſpecies the ſhell is ſub-globular, white within, without purpliſh, ſcarlet, flame colour, orange or white: ſpines generally two inches long, ſometimes cylindrical, with a crenated margin. India, Malta. Very rare.

plicatus. 3. S. without ears or ſpines, plaited. India, America, and the Mediterranean. The ſhell is white, with yellowiſh, reddiſh, browniſh, or violet lines and veins.

citreus. 4. S. oblong, plaited, ſpinous. In this ſpecies the ſhell is imbricated, of a citron colour, or red, with the inner margin orange. It is 2 inches long, $1\frac{3}{4}$ broad. The whole ſhell is thin and nearly tranſparent.

35 Chama.

Gen. 12. Chama, or *Gaping Cockle.*

Gen. Char.—The animal a tethys; the ſhell bivalve, rather coarſe; hinge with a callous gibboſity, obliquely inſerted in an oblique hollow; anterior ſlope cloſed.

Species.

cor. * 1. C. roundiſh, ſmooth; beaks recurved; anterior ſloped with a gaping ſent. Adriatic and Caſpian ſeas, Hebrides. Sometimes it is found of a large ſize.

gigas. 2. C. plaited, with arched ſcales; poſterior ſlope gaping, with crenulated margins. Indian ocean.—This ſpecies ſometimes meaſures only about an inch in length, but ſometimes it is found to be the largeſt of ſhells, and equal to 532lb. weight. The fiſh which it contains is ſaid to furniſh a meal to 120 men; and its muſcular ſtrength is ſo great as to cut aſunder a cable, or lop off the hand of a man.

hippopus. 3. C. plaited, muricated, poſterior ſlope retuſe, cloſed, toothed: 5 inches long, 7 broad. Indian ocean.

antiquata. 4. C. ſomewhat heart-ſhaped, with longitudinal grooves, and tranſverſe ſtriæ; ribs from 19 to 22. Atlantic and Indian ſeas.

trapezia. 5. C. trapeziform, gibbous, with longitudinal, crenulated grooves; about the ſize of a pea. Norway ſeas.

ſemiorbiculata. 6. C. ſub-orbicular, compreſſed, coarſe, with decuſſated ſtriæ.

canaliculata. 7. C. oblong with imbricated grooves; anterior part retuſe; $\frac{1}{2}$ inch long, $1\frac{1}{2}$ broad. American and Indian ſeas.

cordata. 8. C. heart-ſhaped, tranſverſely ſtriated; one ſide elongated, compreſſed. Indian and Red ſeas.

ſatiata. 9. C. roundiſh, with toothed grooves, mixed with dots; poſterior ſlope retuſe; heart-ſhaped.

oblonga. 10. C. oblong, fore part angular, with anterior acute teeth. Shores of Guinea.

lazarus. 11. C. imbricated, with jagged lamellæ; beak a little ſpiral obliquely. India.

gryphoides. 12. C. orbicular, muricated; one valve flatter, the other with a ſub-ſpiral, produced beak. Mediterranean, American, and Indian ſeas.

bicornis. 13. C. with conic valves, and horn-ſhaped, oblique, tubular beaks, longer than the valve. Indian and American ſeas.

arcnella. 14. C. grooved, muricated, with excavated dots: hinge with a ſeſſile callus; 2 inches broad and 2 long. American ocean.

moltkiana. 15. C. obtuſely triangular, equilateral, plaited; anterior ſlope elevated, with oblique plates and ſtriæ: ſize of a hazel nut.

concamerata. 16. C. tranſverſely wrinkled, and longitudinally ſtriated. In the middle of each valve within is an additional chamber. American ocean. Small, whitiſh, very rare.

macerophylla. 17. C. rounded, with lamellæ diſpoſed in rows; internal margin crenulated. American ocean.

foliacea. 18. C. white, with foliaceous, ſerrated, tranſverſe ſtriæ, the interſtices crenated, beaks recurved. Mediterranean and American ſeas. This ſpecies is found foſſil in Campania: it is ſometimes round, and ſometimes oblong.

arata. 19. C. rounded, white, and undulated with brown, with triangular, wrinkled, perpendicular ribs: margin unequal. Shores of Syracuſe.

fuſca. 20. C. wrinkled, oblong, narrow, brown; lower valve with a projecting, rounded, ſubincurvated beak.

citrea. 21. C. roundiſh, ventricoſe, inequivalve, muricated, with ſcattered, unequal, ſcaly ſpines. America. This ſhell is of a citron colour.

thaca. 22. C. roundiſh, longitudinally ſtriated; poſterior ſlope retuſe. Shores of Chili, where it buries itſelf in the ſands. The ſhell is white, violet and yellow, and

and within an elegant purple. It is about 4 inches in diameter. The fish affords a rich and agreeable food.

rugosa. 23. C. suborbicular, with very deep grooves; wrinkles slightly imbricated; margin doubly folded. The grooves are about 30 in number.

gryphica. 24. C. oblique, with a lateral oblique pit, wrinkled; callus of the hinge toothed. Barbary.

coralliophaga. 25. C. cylindrical, white, diaphanous, with decussated striæ; the transverse striæ arched and imbricated.

36 Arca.

Gen. 13. Arca or *Ark-shell.*

Gen. Char. The animal a tethys? The shell bivalve, equivalve; the hinge with a number of teeth, sharp, alternate, and inserted all along the rim.

Species.

A. *Margin very entire, beaks recurved.*

tortuosa. 1. A. parallelopiped, deeply striated longitudinally; lesser valve obliquely carinated. Indian ocean, very rare.

B. *Margin entire, beak inflected.*

noæ. * 2. A. *Noah's ark;* oblong, striated, and emarginated at the tip; beaks very remote, bent in; margin gaping. Mediterranean and Atlantic seas, Cornwall.

barbata. 3. A. oblong, striated, bearded with byssus; beaks approximate; margin closed. Europe and Indian seas.

modiolus. 4. A. oblong, striated, anteriorly angular. Mediterranean.

pella. 5. A. ovate, pellucid, substriated; anterior slope distinct, prominent; hinge ciliar. Mediterranean.

ovata. 6. A. ovate, with decussated striæ, snowy, and covered with a russet brown epidermis; margin gaping. Red sea.

pellucida. 7. A. pellucid, brittle, round at each end, obsoletely striated; teeth of the hinge very sharp. Nicobar islands.

rostrata. 8. A. convex, with transverse striæ; hind-part rounded, fore-part extended into an acute beak; ½ inch long, 1¼ broad. Baltic and Norway seas.

striata. 9. A. lentiform, with numerous decussated striæ; lateritious and reddish within; posterior excavation triangular; hinge arched; an inch broad, and something longer. Red sea.

pulchella. 10. A. roundish, biradiated, with transverse striæ.

afra. 11. A. whitish, covered with a whiter skin, with decussated striæ; grooved, and obliquely truncated; from 4 to 5 lines long, and 3 broad. Africa.

fossilis. 12. A. thick, roundish, longitudinally striated, and transversely ribbed; ribs, with undulated striæ; 3 inches long, 3¼ broad. Found in a fossil state in the duchy of Limbourg.

cancellata. 13. A. with cancellated striæ, and bearded; margin gaping in the middle. American ocean.

minuta. * 14. A. a little compressed, transversely striated, tapering at the remoter end, and rounded at the opposite ones; 2½ lines long, and 4 broad. Greenland seas, Sandwich.

C. *Margin crenated; beaks recurved.*

lactea. * 15. A. with a rhomboidal, yellowish white, shell, and obsolete, decussated striæ; size of a horse bean. European seas, Devonshire.

nodulosa. 16. A. oblong, with striated tubercles; beaks incurved, remote; margin entire, closed. Denmark.

antiquata. 17. A. obliquely heart-shaped, with numerous unarmed grooves. Mediterranean and Indian seas.

senilis. 18. A. obliquely heart-shaped, smooth, with grooves; margin plaited; 3 inches long, 4 broad. America, Africa.

granosa. 19. A. slightly heart-shaped, with muricated grooves; 1¼ inch long, 1¾ broad. American and Indian oceans.

corbicula. 20. A. ovate compressed; with perpendicular knotty striæ; beaks obtuse, approximate. Nicobar islands.

decussata. 21. A. lenticular, with longitudinal striæ, crossed by faint, transverse ones; anterior slope closed. American ocean.

æquilatera. 22. A. lenticular, nearly equilateral, perpendicularly striated without and within; white, with chesnut spots. American ocean.

pallens. 23. A. lenticular, a little oblique, with decussated striæ; anterior slope, with a very narrow vent. Indian and American oceans.

cucullus. 24. A. ventricose; striæ decussated; anterior slope heart-shaped; 2 inches long, and 3 broad. Nicobar islands.

magellanica. 25. A. rounded on each side; chesnut, and marked with decussated striæ; external margin inflected, and repand in the middle; beaks approximate. Straits of Magellan.

reticulata. 26. A. rhomboidal, white, with decussated striæ; beaks approximate; anterior slope heart-shaped.

candida. 27. A. pellucid, rhomboid, with decussated striæ; fore-part produced; hind-part truncated. American ocean and African shores.

indica. 28. A. inequivalve, ovate, with flat, longitudinal striæ and deep grooves; anterior slope heart-shaped; ¾ inch long, 1½ broad. Indian ocean.

jamaicensis 29. A. rounded before and truncated behind, with crenated or nodulous perpendicular ribs. Jamaica.

campeachiensis. 30. A. ovate, with broad, crenated, or scaly, perpendicular striæ; hinge arched. Campeachy bay and Barbadoes.

lata. 31. A. broad, cancellated, truncated before; flattened side heart-shaped.

senegalensis. 32. A. ovate, longitudinally grooved, with slight transverse wrinkles; white; 8 lines long, 10 broad. Africa.

D. *Margin crenated, beak inflected.*

undata. 33. A. lenticular, without ears, smooth, with a plaited margin; 2 inches long, 2 broad. American ocean

pectunculus 34. A. lenticular, slightly eared, with slightly imbricated grooves; margin plaited; 1½ inch long, and something broader. American ocean and Red sea.

pectinata. 35. A. lenticular, without ears, with smooth, longitudinal striæ. American ocean.

glycymeris. * 36. A. suborbicular, gibbous, and faintly striated transversely. European and Indian seas, Cornwall. *Arca Pilosa, Montagu.*

pilosa. 37. A. suborbicular, equilateral, hairy; 1½ inches long, 2¼ broad. Asiatic and American seas.

nummaria. 38. A. roundish, smooth, slightly eared, and transversely striated. Mediterranean.

* 39. A.

nucleus. * 39. A. obliquely ovate, fmoothifh, with a triangular hinge; fize of a hazel nut. European feas. It is fometimes found foffil. Shores of Britain.

rhomboidea. 40. A. entirely white, rhomboid, heart-fhaped, and ribbed; anterior and dorfal ribs knotty; beaks remote. Indian and American oceans.

marmorata. 41. A. equilateral, thin, flattifh, with fine decuffated ftriæ; beaks approximate; hinge arched. American ocean.

angulofa. 42. A. ventricofe, with longitudinal ftriæ and lines; and angular on one fide; beaks approximate; hinge arched; brown with a few fpots. Shores of Africa and American ocean.

fcapha. 43. A. oblong, much depreffed, ftriated; beak flightly prominent. Ceylon.

37 Oftrea.

Gen. 14. Ostrea, *Oyfter.*

Gen. Char.—The animal is a tethys; the fhell bivalve; generally with unequal valves, and flightly eared; hinge without teeth, but furnifhed with an ovate hollow, and moftly lateral, tranfverfe grooves.

Species.

A. *Valves furnifhed with ears, and radiated. The* Scallop.

a. *Equilateral; ears of the valves equal.*

maxima. * 1. O. with 14 or 15 rounded ribs, longitudinally grooved, with fine tranfverfe ftriæ; 5 inches long, $5\frac{1}{4}$ broad: ears large, with decuffated ftriæ; lower valve convex, white, often varied with red bands or fpots; upper valve flat, reddifh. Found in large beds in moft European feas, where they are dredged up, pickled, and barreled for fale. It is faid, that the greateft quantity is taken after a fall of fnow. This is the fhell worn formerly by pilgrims on the hat or coat, as a mark that they had croffed the fea for the purpofe of paying their devotion to the Holy land; in commemoration of this it is ftill preferved in the arms of many families.

jacobæa. * 2. O. with about 14 angular and longitudinally ftriated rays; upper valves flat, with rounded rays which are finely ftriated tranfverfely; lower valve with angular rays, which are ftriated longitudinally. Ears concave and fmooth on the upper fide. European feas. Dorfetfhire, but rare.

ziczac. 3. O. with 18 flattened rays; ears finely wrinkled; lower valve convex; rays finely ftriated tranfverfely; upper valve flat, with about twice as many angular lines as there are rays. American ocean.

ftriatula. 4. O. with 16 faint rays with tranfverfe membranaceous ftriæ: margin very entire; valves nearly equally flat. Indian ocean.

minuta. 5. O. with 20 convex rays; lower valve white and very convex; upper valve white, clouded with brown, flatter and plaited. Indian ocean.

pleuronectes. 6. O. equivalve, with 12 doubled rays, and fmooth on the outfide; $4\frac{1}{2}$ inches long, gaping at each end. Indian ocean.

laurentii. 7. O. upper valve fub-convex, with very fine perpendicular lines, croffing very fine, concentric, tranfverfe ftriæ; lower valve with 48 rays, and 48 ftriæ within; $2\frac{1}{2}$ inches long, about the fame breadth. S. America. Rare.

japonica. 8. O. equivalve, a little convex, margined with yellow; upper valve with faint lines croffing tranfverfe concentric bands, and 48 elevated ftriæ within; $5\frac{1}{2}$ inches long, about the fame breadth. Guinea and Japan.

9. O. equivalve, glabrous, with oblong crowded ftriæ; upper valve more convex, lower flatter than in moft others. Straits of Magellan. *magellanica.*

10. O. with 9 or 10 rays; the interftices longitudinally ftriated: margin repand within. Norway feas. *hybrida.*

11. O. nearly equivalve; with 12 convex rays croffed by crenated ftriæ; $3\frac{1}{4}$ inches long, $2\frac{1}{2}$ broad. Indian ocean. *radula.*

12. O. equivalve, flattifh, with 9 unequal rays, imbricated with fcales. Red fea. *imbricata.*

13. O. roundifh with 8 convex chefnut rays; ears roundifh, white with a yellowifh border; $1\frac{3}{4}$ inches long, 2 broad. *fubrotunda.*

14. O. nearly equivalve, with 16 convex fmoothifh rays, and ftriated acrofs; $1\frac{1}{4}$ inches long, 1 inch broad. India. *plica.*

15. O. roundifh with convex rays, outer ones finely ftriated longitudinally; margin deeply crenated; ears tranfverfely ftriated. *crenata.*

16. O. ovate with numerous fine ftriæ; margin crenated within. *finuofa.*

17. O. oblong with fcaly rays; the interftices broader, and marked with perpendicular ftriæ; ears wrinkled perpendicularly. *fquamofa.*

18. O. roundifh with 18 rays imbricated with fcales; ears ftriated tranfverfely; $\frac{1}{2}$ inch long. *dubia.*

* 19. O. with 20 fmooth rays, the interftices tranfverfely ftriated; margin crenated; 2 inches long, and the fame breadth. Shores of Britain. *fubrufa.*

20. O. flattened, with 18 fmooth rays, the interftices cancellated. *verficolor.*

21. O. roundifh with 5 rays; middle-fized. *rofea.*

22. O. brown with flat rays which difappear towards the hinge; lower valve convex, upper flat. Indian ocean. *fufca.*

23. O. thin, flat, purple, with very minute pependicular ftriæ croffing circular tranfverfe ones; the ftriæ are elevated within. *tenuis.*

24. O. thin, pale yellow, with thick rays. *lutea.*

25. O. roundifh, white, with a mixture of faffron; the rays convex and finely and fharply muricated; $2\frac{1}{2}$ inches long. *muricata.*

26. O. roundifh, tawny, dotted with white and black; the rays thick. *confperfa.*

27. O. roundifh, brown, with black tranfverfe lines and dots; rays convex and knotty. *nodulofa.*

28. O. thin, whitifh, rofy, with white ftripes; rays convex. *radiata.*

29. O. oblong, pale yellow, fpotted with white; beaks varied with white and brown; rays crenated; 2 inches long. *punctata.*

30. O. roundifh, thin, varied with rofy and whitifh; rays thick with aculeate fcales. *aculeata.*

31. O. thin, flat, white, with a faffron edge; rays round and broad. *plana.*

32. O. oblong, red, minutely ftriated. *pufilla.*

33. O. convex on each fide, yellowifh within; rays convex. *flavefcens.*

34. O. roundifh, deep red, with a white hinge and few fpots; rays fmooth. *flabellum.*

35. O. glabrous, refembling a fpondylus; but the ears are equal. *fpondyloides.*

36. O.

violacea. 36. O. flattiſh on each ſide; outſide brown, inſide violet. Mediterranean.

aurantia. 37. O. roundiſh, plaited, and finely ſtriated longitudinally; a white ſemicircular band towards the hinge.

vittata. 38. O. within purple, without, alternate brown and red bands; rays convex.

miniata. 39. O. white with confluent red ſpots; rays rough; convex valve, with tranſverſe, criſp lamellæ; $1\frac{1}{2}$ inch long, $1\frac{1}{2}$ broad.

inflata. 40. O. convex on each ſide; cloſed, oblong, pellucid; 32 rays; twice as long as it is broad. A rare ſhell.

b. *Ears unequal; one of them generally ciliated, with ſpines within.*

pallium. 41. O. *Ducal mantle.* Equivalve, with 12 convex rays, ſtriated, rough, and imbricated with ſcales; red, varied with brown and white; ears ſtriated, crenated or ſcaly. India.

ſanguinolenta. 42. O. equivalve, with 9 thick obtuſe rays; interſtices longitudinally ſtriated, tuberculated and prickly. Red ſea.

maculoſa. 43. O. equivalve, pale yellow, with tawny ſpots; rays 12, thick and flattiſh; ears white, with tranſverſe ſcaly ribs.

nodoſa. 44. O. with 9 rays, covered with apparently veſicular tubercles. American and African oceans.

pes felis. 45. O. with 9 ſtriated rough rays; one of the ears very ſmall.

pellucens. 46. O. nearly equivalve, with 9 rays; ſmooth, with ſpoon-like hemiſpherical ſcales on the lower valve; minute, pellucid; upper valve ſpotted with red. African ſeas.

obliterata. 47. O. ſmooth on the outſide, with 24 doubled rays. Indian ocean.

ſanguinea. 48. O. equivalve, with 22 rays; ears ſmall; 2 inches long, $1\frac{3}{4}$ broad. Mediterranean and Atlantic ſeas.

varia. * 49. O. equivalve; rays about 30; compreſſed, and beſet with tranſverſe, prickly ſcales; one ear very ſmall; $2\frac{1}{4}$ inches long, 2 broad. European ſeas, coaſts of Britain.

puſio. * 50. O. equivalve, rays about 40, filiform; ſurface often irregular or diſtorted; 2 inches long, $1\frac{1}{2}$ broad. European and American ſeas, Cornwall.

obſoleta. * 51. O. equivalve, ſemi-tranſparent, ſmooth; dark purple; with 8 nearly obſolete rays; $\frac{3}{4}$ inch long. Britiſh coaſts.

levis. 52. O. ſmooth; ears red; $\frac{5}{8}$ inch long. Angleſea, Falmouth.

glabra. 53. O. ears nearly equal, equivalve, ſmooth, with from 10 to 15 ſmooth flattiſh rays; inſide with elevated double ſtriæ; 2 inches long, 2 broad. European and American ſeas.

opercularis * 54. O. rays 20; roundiſh and rough, with decuſſated ſtriæ; upper valve a little more convex; $2\frac{1}{2}$ inches diameter. North ſeas, Devonſhire and Cornwall, where it is called *frill* or *queen.*

gibba. 55. O. equivalve, gibbous, with 20 glabrous rays. American ſeas.

ſulcata. 56. O. white, with fleſh-coloured ſpots; rays glabrous, 32 on the lower valve, 35 on the upper; $1\frac{1}{2}$ inch long. Malabar.

hiſtrionica. 57. O. thin, flattened, pellucid, with fine tranſverſe wrinkles, and 11 rays which are waved.

58. O. orbicular, with purple circles, and about 100 rays; $3\frac{1}{2}$ inches long, $3\frac{1}{4}$ broad. Mediterranean. The fiſh of this ſpecies is employed as food. *iclandica.*

59. O. equivalve, glabrous, immaculate, with minute ſtriæ; upper valve with 3 rays. Norway ſeas. *triradiata.*

60. O. nearly equivalve, ſtriated, ſpotted rough towards the margin. Found on the fucus ſaccharinus in the North ſea. *fuci.*

61. O. nearly equivalve, ſtriated, glabrous, red, with whitiſh ſpots. On fuci in the North ſeas. *tigerina.*

62. O. nearly equivalve, ſtriated, glabrous; rays 7, convex. North ſeas. *ſeptemradiata.*

63. O. nearly equivalve; within and without grooved and red; one part rough, the other glabrous. North ſeas. *arata.*

64. O. convex on each ſide, with 22 rounded, tranſverſe, wrinkled rays; interſtices with longitudinal, granulated ſtriæ; $2\frac{1}{2}$ inches long. Indian ocean. *ſenatoria.*

65. O. orange, with 22 rounded rays, and plaited margin; lower valve flatter. India. *citrina.*

66. O. equally convex, both ſides with 20 glabrous rays; interſtices with tranſverſe, crowded wrinkles; margin with plaited teeth. Indian and American ſeas. *turgida.*

67. O. flattened, thin, pellucid, ſtriated with numerous imbricated rays; margin with crenated plates; 2 inches long. Red ſea. *ſulphurea.*

68. O. convex, purple, within, white or red, with 25 thick, rounded ſcaly rays; $2\frac{1}{4}$ inches long. Red ſea. *porphyria.*

69. O. hyaline, with an acute margin, very ſlender rays, and concentric ſcaly curves. North ſeas. *vitrea.*

70. O. with 20 rounded rays; interſtices finely wrinkled; margin repand; upper valve more convex. Tranquebar. *tranquebaria.*

71. O. white, with purple ſpots, and numerous unequal rays; margin crenated. Red ſea. *ſauciata.*

72. O. oblong, with undulated rays and ſtriæ; and tranſverſe, interrupted bands; a ſmall ſhell; margin crenulated. *crenulata.*

73. O roundiſh, ſpotted; with deep grooves finely ſtriated tranſverſely; margin crenulated. Small. *innominata.*

74. O. roundiſh, pale, rufous, with 24 rays; ears with decuſſated ſtriæ; middle ſized. *rufeſcens.*

75. O. roundiſh; rays thick, with diſtant parallel ſcales, and prickly at the ſides. *ſquamata.*

76. O. rather oblong, with narrow ſcaly rays; interſtices broader, and ſtriated perpendicularly; ears perpendicularly wrinkled. *anonyma.*

77. O. flattened, with 10 ſmooth, flat, unequal rays; ears tranſverſely ſtriated. *decemradiata.*

78. O. thin, with depreſſed, ſcaly rays; ears ſhort. India, and North ſeas. *tenuis.*

79. O. with 20 rays, and tranſverſe, ſemilunar bands. India. *valentii.*

80. O. oblong, with crowded rays, middle ſized, reddiſh. *media.*

81. O. ſaffron-coloured, with muricated ſcaly rays alternately leſs; ſmall. *crocea.*

82. O. roundiſh, white, with roſy ſpots, radiated; ſmall. *florida.*

83. O. oblong, ochraceous, with rays ſmooth on one part, and granulated on the other; minute. *ochroleuca.*

84. O. pale, tawny, with yellow ſpots and bands, and ſmooth rays; ears tranſverſely ſtriated; $2\frac{1}{4}$ inches long. *muſtelina.*

85. O.

flammea. 85. O. saffron-coloured, oblong, with fine perpendicular striæ; very minute.

incarnata. 86. O. oblong, flesh-coloured, with interrupted red bands, and flattened rays; small.

guttata. 87. O. yellowish, rounded, dotted with red; rays unequally converging at the hinge.

depressa. 88. O. ochraceous, with flat bifid rays; 1 inch long.

regia. 89. O. roundish, deep-red, with rounded rays.

palliata. 90. O. equivalve, with numerous smooth rays: is less rough, and has fewer rays than *ostrea pallium.*

seminuda. 91. O. orange, oblong, muricated, with scales as far as the middle; rays 22; $1\frac{1}{4}$ inch long, $1\frac{1}{4}$ broad.

modesta. 92. O. roundish, hoary, with brownish, reddish, and bluish spots; interstices of the rays broad; 2 filiform bands at the hinge.

principalis. 93. O. purple, with a brown margin; rays scaly from the middle, and smooth at the hinge.

versicolor. 94. O. variegated, with pectinated smooth rays.

c. *Valves more gibbous on one side.*

flavicans. 95. O. nearly equivalve, with 8 striated rays; margin rounded on one side. South sea.

fasciata. 96. O. equivalve, with 20 rough rays; interstices striated; ears equal, small. Atlantic seas.

fragilis. 97. O. equivalve, with 25 rays; margin very entire; ears acute; $1\frac{1}{4}$ inch long. Nicobar islands.

lima. 98. O. equivalve, with 22 imbricated scaly rays, rounded at one margin; ears obliterated; 3 inches long, $2\frac{1}{2}$ broad. Mediterranean and Indian seas.

glacialis. 99. O. with 50 imbricated, interrupted rays; ears equal; one of them unequally plaited. American ocean.

hians. 100. O. whitish, thin, gaping on each side, and oblique, with obsolete, undulated rays, and transverse, rounded, semilunar striæ; $1\frac{1}{2}$ inch long, $\frac{3}{4}$ broad. Norway.

excavata. 101. O. dirty white, with longitudinal, undulated striæ, and a few transverse rings; one ear obsolete; margin entire; 5 inches long $3\frac{1}{4}$ broad. Norway.

B. *Rough, and generally plaited on the outside.* Oysters.

malleus. 102. O. equivalve, 3 lobed, 2 of them placed transversely like the head of a hammer; 6 inches long, and $4\frac{1}{4}$ broad. Deep parts of the Indian and Southern oceans. Very rare.

vulsella. 103. O. sub-pellucid, narrow, elongated, lamellated; one end rounded; $3\frac{1}{2}$ inches long, 1 broad. Red sea.

anatina. 104. O. pellucid, lamellated, and laterally incurved; 1 inch broad, and including the curvature, 3 inches long. Nicobar islands.

diluviana. 105. O. plaited on the outside; margin with erect, acute, angular teeth; size of a common oyster; found in a fossil state in the calcareous mountains of Sweden.

folium. 106. O. ovate, obtusely plaited at the sides; parasitical; found adhering to gorgonia in the Indian ocean.

orbicularis. 107. O. orbicular, flat, with an entire crenated margin; size of the end joint of the thumb.

edulis. 108. O. *eatable or common oyster;* orbicular and rugged, with undulated, imbricated scales; one valve flat, and very entire. European and Indian seas.—It is found, either in large beds, or adhering to rocks. The shell is of various sizes, forms, and colours; within white, and often glossy, and of a pearly appearance. The old shells have often an anomia fixed to them, and they are frequently covered with the serpula and lepas, and the sertularia and other zoophytes.

38 Oysters employed as food.

The common oyster has been long known as a nutritious food, and indeed in most countries is greatly esteemed as a delicate luxury of the table. The oyster is supposed by naturalists to be a hermaphrodite animal. The spawn which they cast in May, adheres to the rocks and other substances at the bottom of the sea; and the shell, it is supposed, is formed in the space of 24 hours, and which, according to some, never leaves the spot till removed by violence. But from the observations of M. Dicquemare, who has particularly studied the economy of the oyster, it appears that it possesses the power of moving from place to place, and that it varies its habits according to circumstances. Oysters which are recently taken up from places which are left dry by the sea open their shell, lose their water, and die in a few days. But the same oysters kept in reservoirs, where they are left occasionally by the sea, exposed to the rays of the sun, to severe cold, or are disturbed in their beds, acquire the habit of keeping the shell close when they are uncovered with water, and exist without injury from this treatment for a long time. The oyster should be fresh, tender and moist. Those which are most esteemed are caught at the mouths of rivers, and in clear water. The want of fresh water, it is said, renders oysters hard, bitter, and unpalatable. Mud and sea weeds are extremely injurious to the propagation and increase of the oyster. Other shell fish, and crustaceous animals, as mussels, scallops, star-fish and crabs, are their most destructive enemies.

39 Of different kinds.

Oysters are of different colours in different places: in Spain they are found of a red and russet colour; in Illyria brown, with the fish black, and in the Red sea of the colour of the iris. The green oyster, which is eaten in Paris, is brought from Dieppe. This colour is ascribed to the verdure which encompasses the bed on which they are produced. The oysters from Britanny in France too, have been long famous; but those which are brought from Marennes in Saintonge, are in highest estimation. The oysters which are edged with a small brown fringe or beard, are generally preferred. These are accounted by the epicures *fecundated oysters.*

40 Adhere to trees in warm climates.

In tropical regions, the common oyster is found attached to trees. This assertion of the growth of oysters on trees has been often ranked among the exaggerated or groundless stories of the marvellous traveller; but this circumstance when properly explained, will not appear different from the usual economy of this testaceous animal. In warm climates where vegetation is so much more luxuriant than in northern latitudes, a great variety of plants, among which are seen large trees, grow on the shores to the very edge of the sea; and particularly on those places which are sheltered from the agitation of the waves. In such places, at the heads of bays and harbours, great abundance of mangrove trees grow up from the bottom, where it is several feet deep, covered with water. It is generally on the mangrove tree that the oyster is found in the West Indies. Without the trouble of picking them from the trees, the branches growing under water to which they are attached, are cut off, carried home in baskets,

baſkets, and in this ſtate brought to table, where they are either eaten raw, or roaſted, as the European oyſter. We have eaten oyſters which were produced in this way, in the Lagoons at the head of Port Morant harbour in Jamaica, a few minutes after they were taken from the water. They were of a ſmall ſize, but extremely delicate and high flavoured.

Britain has been noted for oyſters from the time of Juvenal, who, ſatirizing Montanus an epicure, ſays,

> *Circæis nata forent, an*
> *Lucrinum ad ſaxum, Rutupinove edita fundo,*
> *Oſtrea, callebat primo deprendere morſu.*

> He, whether Circe's rock his oyſters bore,
> Or Lucrine lake, or diſtant Richborough's ſhore,
> Knew at firſt taſte.

The luxurious Romans were very fond of this fiſh, and had their layers or ſtews for oyſters as we have at preſent. Sergius Orata was the firſt inventor, as early as the time of L. Craſſus the orator. He did not make them for the ſake of indulging his appetite, but through avarice, and made great profits from them. Orata got great credit for his Lucrine oyſters; for, ſays Pliny, the Britiſh were not then known.

Pennant's Brit. Zool. vol. IV. p. 102.

The ancients ate them raw, having them carried up unopened, and generally eating them at the beginning of the entertainment, but ſometimes roaſted. They alſo ſtewed them with mallows and ducks, or with fiſh.

41 Oyſters of Britain.

Britain ſtill retains its ſuperiority in oyſters over other countries. Moſt of our coaſts produce them naturally; and in ſuch places they are taken by dredging, and are become an article of commerce, both raw and pickled. The ſhells calcined are employed in medicine as an abſorbent, and in common with other ſhells, prove an excellent manure.

Stews or layers of oyſters are formed in places which nature never allotted as habitations for them. Thoſe near Colcheſter have been long famous; at preſent there are others that at leaſt rival the former, near the mouth of the Thames. The oyſters, or their ſpats, are brought to convenient places, where they improve in taſte and ſize. It is an error to ſuppoſe, that the fine green obſerved in oyſters taken from artificial beds, is owing to copper; this ſubſtance, or the ſolution of it, is deſtructive to all fiſh. The following is the account of the whole treatment of oyſters, from Biſhop Sprat's Hiſtory of the Royal Society, from p. 307 to 309.

"In the month of May the oyſters caſt their ſpawn, (which the dredgers call their *ſpats*): it is like to a drop of candle, and about the bigneſs of a halfpenny. The ſpat cleaves to ſtones, old oyſter ſhells, pieces of wood, and ſuch like things, at the bottom of the ſea, which they call *cultch*. It is probably conjectured, that the ſpat in 24 hours begins to have a ſhell. In the month of May, the dredgers (by the law of the admiralty court) have liberty to catch all manner of oyſters, of what ſize ſoever. When they have taken them, with a knife they gently raiſe the ſmall brood from the clutch, and then they throw the clutch in again, to preſerve the ground for the future, unleſs they be ſo newly ſpat, that they cannot be ſafely ſevered from the cultch; in that caſe they are permitted to take the ſtone or ſhell, &c. that the ſpat is upon, one ſhell having many times 20 ſpats. After the month of May, it is felony to carry away the cultch, and puniſhable to take any other oyſters, unleſs it be thoſe of ſize, (that is to ſay) about the bigneſs of an half-crown piece, or when, the two ſhells being ſhut, a fair ſhilling will rattle between them.

"The places where theſe oyſters are chiefly catched, are called the *Pent-Burnham*, *Malden*, and *Colne-waters;* the latter taking its name from the river of Colne, which paſſeth by Colcheſter, gives name to that town, and runs into a creek of the ſea, at a place called the *Hythe*, being the ſuburbs of the town. This brood and other oyſters they carry to the creeks of the ſea, at Brickelſea, Merſy, Langno, Fingrego, Wivenho, Toleſbury, and Saltcoaſe, and there throw them into the channel, which they call their *beds* or *layers*, where they grow and fatten; and in two or three years the ſmalleſt brood will be oyſters of the ſize aforeſaid. Thoſe oyſters which they would have green, they put into pits about three feet deep in the ſalt marſhes, which are overflowed only at ſpring-tides, to which they have ſluices, and let out the ſalt water until it is about a foot and a half deep. Theſe pits, from ſome quality in the ſoil co-operating with the heat of the ſun, will become green, and communicate their colour to the oyſters that are put into them in four or five days, though they commonly let them continue there ſix weeks or two months, in which time they will be of a dark green. To prove that the ſun operates in the greening, Toleſbury pits will green only in ſummer; but that the earth hath the greater power, Brickelſea pits green both winter and ſummer: and for a further proof, a pit within a foot of a greening pit will not green; and thoſe that did green very well, will in time loſe their quality. The oyſters, when the tide comes in, lie with their hollow ſhell downwards; and when it goes out, they turn on the other ſide; they remove not far from their place, unleſs in cold weather, to cover themſelves, in the ooſe. The reaſon of the ſcarcity of oyſters, and conſequently of their dearneſs, is, becauſe they are of late years bought up by the Dutch.

"There are great penalties by the admiralty court laid upon thoſe that fiſh out of thoſe grounds which the court appoints, or that deſtroy the cultch, or that take any oyſters that are not of ſize, or that do not tread under their feet, or throw upon the ſhore, a fiſh which they call a *five-finger*, reſembling a ſpur-rowl, becauſe that fiſh gets into the oyſters when they gape, and ſucks them out.

"The reaſon that ſuch a penalty is ſet upon any that ſhall deſtroy the cultch, is, becauſe they find that if that be taken away, the ooſe will increaſe, and the muſcles and cockles will breed there, and deſtroy the oyſters, they having not whereon to ſtick their ſpat.

"The oyſters are ſick after they have ſpat; but in June and July they begin to mend, and in Auguſt they are perfectly well, the male oyſter is black-ſick, having a black ſubſtance in the fin; the female white-ſick (as they term it), having a milky ſubſtance in the fin. They are ſalt in the pits, ſalter in the layers, but ſalteſt at ſea."

The oyſter affords the curious in microſcopic obſer-

42 Liquid about the oyster seen with the microscope.

vations a very pleasing entertainment. In the clear liquor many little round living animalcules have been found, whose bodies being conjoined, form spherical figures, with tails, not changing their place otherwise than by sinking to the bottom, as being heavier than the fluid; these have been seen frequently separating, and then coming together again. In other oysters, animalcules of the same kind were found, not conjoined, but swimming by one another, whence they seemed in a more perfect state, and were judged by Mr Leeuwenhoek to be the animalcules in the roe or semen of the oyster.

A female oyster being opened, incredible multitudes of small embryo oysters were seen, covered with little shells, perfectly transparent, and swimming along slowly in the liquor; and in another female, the young ones were found of a browner colour, and without any appearance of life or motion.

Monsieur Joblot also kept the water running from oysters three days, and it appeared full of young oysters swimming about nimbly in it; these increased in size daily; but a mixture of wine, or the vapour of vinegar, killed them.

In the month of August oysters are supposed to breed, because young ones are then found in them. Mr Leeuwenhoek, on the 4th of August, opened an oyster, and took out of it a prodigious number of minute oysters, all alive, and swimming nimbly about in the liquor, by means of certain exceeding small organs, extending a little way beyond their shells; and these he calls their beards. In these little oysters, he could discover the joinings of the shells; and perceived that there were some dead ones, with their shells gaping. These, though so extremely minute, are seen to be as like the large oysters in form as one egg is to another.

As to the size of them, he computes, that 120 of them in a row would extend an inch; and consequently, that a globular body, whose diameter is an inch, would, if they were also round, be equal to 1,728,000 of them. He reckons 3000 or 4000 are in one oyster, and found many of the embryo oysters among the bairds; some fastened thereto by slender filaments, and others lying loose: he likewise found animalcules in the liquor 500 times less than the embryo-oysters.

It is not uncommon to see on oyster-shells, when in a dark place, a shining matter or bluish light, which sticks to the fingers when touched, and continues shining and giving light for a considerable time, though without any sensible heat. This shining matter being examined with a microscope, is said to consist of three sorts of animalcules; but it is more probable that it is the phosporescent light which separates from animal matters, particularly fish, in the incipient stage of the putrefactive process.

semi-aurata. 109. O. oval, slightly eared, smooth, with an oblique base; $1\frac{1}{2}$ inch long, $1\frac{1}{4}$ broad. Mediterranean.

striata. * 110. O. oval, with longitudinal, irregular, undulated filiform ridges; inside smooth, glossy white, with a pearly hue. European seas, shores of Britain.

fornicata. 111. O. rough, oblong, linear, with divergent hinges; internally vaulted. Red sea.

sinensis. 112. O. rough, lamellated, unequal, and glabrous within; lower valve large; 4 inches long. Chinese shores.

113. O. equivalve, pellucid, flattened, oval, with perpendicular, undulated striæ on the upper valve: 3 inches long, $2\frac{1}{2}$ broad. India. *spondyloidea.*

114. O. plaited, and terminating in a long, incurved, hollow beak; middle ribs with imbricated, spinous wrinkles; 2 inches long, and 1 broad. Red sea. *forskahlii.*

115. O. with longitudinal, wrinkled plaits; lower valve smaller and flatter; varies much in shape and size. American and Mediterranean seas. *plicatula.*

116. O. oblong, rugged; upper valve lamellated, with a denticulated margin; the lower excavated, and longitudinally grooved. Mediterranean. *rostrata.*

117. O. nearly equivalve, thick, rough, lamellous; one valve with a prominent beak; 9 inches long, and 4 broad. American and Indian oceans. *virginica.*

118. O. upper valve flat, lower one hollow and striated; rough with scales, wrinkles and plaits, and terminating in an elongated beak. Indian and African oceans. *cornucopiæ*

119. O. thin; lower valve convex and thicker; the other flat. Atlantic and Indian seas.—This species, like the common oyster, fixes itself to the roots and branches of trees, particularly the mangrove, which grow out of the water. It varies in form and size, and is often as large as the palm of the hand. *parasitica.*

120. O. thin; upper valve longer and more convex. Adriatic.—It is found fixed to other shells. *exalbida.*

121. O. rugged, with imbricated lamellæ; margin with obtusely plaited teeth; 1 inch long. *cristata.*

122. O. equivalve, roundish, smooth, flat; 2 inches diameter. Shores of Senegal. *senegalensis.*

123. O. thin, depressed, rough, unequal; upper valve ribbed; ribs with a few spines. Guinea. *stellata.*

124. O. oval, thin, terminating in a short, acute, lateral channelled beak; striæ perpendicular, unequal, obsolete; 1 inch long. *ovalis.*

125. O. roundish, snowy, thin, pellucid; upper valve terminating in a short, acute beak. *papyracea.*

126. O. equivalve, orbicular, white, with concentric semicircles. North seas. *annulata.*

127. O. equivalve, oblong, white, glabrous, striated; with an umbo or knob remote from the hinge. North seas. *retusa.*

C. *Hinge with a perpendicular grooved line.*

128. O. equivalve, obovate, unequal, rounder at one end; $2\frac{1}{2}$ inches long; has some resemblance to a gammon of bacon. Indian and American seas. *perna.*

129. O. equivalve, with a larger lobe, forming a right angle with the hinge; from 5 to 7 inches long, and $1\frac{1}{4}$ broad in the middle; shell blackish, violet without, pearly within. Indian ocean and South seas. Is a rare shell. *isogonum.*

130. O. equivalve, orbicular, compressed, membranaceous; 5 inches long, $5\frac{1}{2}$ broad. Indian ocean and Cape of Good Hope. Very rare. *ephippium.*

131. O. equivalve, thin, pellucid, and pointed at the hinge; the other end dilated; margin acute; 2 inches long, more than an inch broad. Red sea. *picta.*

132. O. flat, hoary, thin, pellucid, lamellated; interstices of the grooves black; 2 inches long, 4 lines broad. Nicobar islands. *legumen.*

133. O.

alata. 133. O. flat, brittle, pellucid; dilated towards the margin. America.

mytiloides. 134. O. nearly equivalve, ovate, ventricoſe, ſtraight.

torta. 135. O. equivalve, intorted.—This and the preceding ſpecies are found foſſil in Alſace.

pes-lutræ. 136. O. equivalve, ſmooth, wedge-ſhaped with 6 obtuſe plates, varied with purpliſh and white, and marked with fine longitudinal ſtriæ; margin ſlightly ſcalloped.

Gen. 15. ANOMIA.

43
Anomia. *Gen. Char.*—The animal is a ligula or ſtrap-ſhaped body, emarginated and ciliated; the briſtles being fixed to the upper valve. There are two linear arms, longer than the body, open, ſtretched out, alternate on the valve, ciliated on both ſides; the hairs are fixed to both valves; the ſhell is inequivalve; one valve being rather flat, the other more gibbous at the baſe, with a produced beak, generally curved, over the hinge; one of the valves is often perforated at the baſe; the hinge is without teeth. A ſmall linear ſcar appears prominent, with a lateral tooth placed within; but on the very margin of the flat valve. There are two bony rays for the baſe of the animal.

SPECIES.

craniolaris 1. A. orbicular; the gibbous valve conico-convex, flat valve with three hollows at the baſe; 1 inch long, ¾ broad. Mediterranean ſeas and Philippine iſlands. It is ſometimes found foſſil.

pectinata. 2. A. oblong, with branched grooves; the gibbous valve with two hollows behind. An inch long, ¾ broad; flat valve perforated. Mediterranean.

ephippium. * 3. A. roundiſh, pellucid, with wrinkled plates; flat valve perforated; diameter ſometimes 3½ inches, moſt frequently about 2. European and American ſeas, ſhores of Britain.—It is often found adhering to the common oyſter. Mr Montagu thus accounts for the perforation in theſe ſhells. The teſtaceous plug, he obſerves, by which the animal fixes itſelf to other bodies, is firmly attached by ſtrong ligaments to theſe bodies, and ſo cloſely cemented, that they become inſeparable. When, therefore, the ſhell is torn from its native place, the plug is left behind upon the ſtone or other ſhell to which it adhered.

cepa. * 4. A. obovate, unequal, violet; upper valve convex; lower perforated. European and American ſeas, ſhores of Britain.

electrica. 5. A. roundiſh, yellow, ſmooth; one valve convex and gibbous; very thin. Coaſts of Africa.

ſquamula. * 6. A. ſmall, orbicular, entire, thin like the ſcale of a fiſh. European ſeas, Britain.

patelliformis. 7. A. ovate, convex, ſubdiaphanous, ſtriated; poſterior beak recurved and ſmooth. North ſeas.

ſcobinata. 8. A. roundiſh, ſmooth, and rough within; beak perforated.

aurita. 9. A. ſubovate, ſtriated, and ſlightly eared; beak perforated. Norway ſeas.

retuſa. 10. A. obovate, ſtriated, retuſe, with a longitudinal cavity; beak perforated. Norway ſeas, adhering to zoophytes.

gryphus. 11. A. oblong, ſmooth, with an obſolete lateral plate on one valve, and incurved beak; the other valve ſhort and flattiſh. Frequently found in a foſſil ſtate.

12. A. ſemiorbicular, depreſſed, with numerous ſtriæ; one valve flat. Found in a foſſil ſtate. *pecten.*

13. A. roundiſh, and a little dilated; gibbous on each ſide; ſtriated; valves equal. Has been only found foſſil. *ſtriatula.*

14. A. ſuborbicular, obſoletely ſtriated; hinge truncated. European ſeas. *truncata.*

15. A. heart-ſhaped, with decuſſated ſtriæ; ſhorter valve more gibbous. Found foſſil. *reticularis.*

16. A. dilated, lunated, plaited with longitudinally ſtriated grooves. Found only in a foſſil ſtate. *plicatella.*

17. A. dilated, triangular, plaited with wrinkled grooves; the middle broader. Found foſſil in England and Switzerland. *criſpa.*

18. A. roundiſh with numerous grooves; valves plaited at the tip; one of them ſhorter and pitted. Found only in a foſſil ſtate. *lacunoſa.*

19. A. obovate, grooved; beak of one valve prominent, the other gaping; about the ſize of a cucumber ſeed, covered with ſmall, erect, diſtant hairs. Norway ſeas. *pubeſcens.*

* 20. A. conic, pointed, grooved; one valve convex with an incurved beak; the other pyramidal with a large triangular foramen. Found in Derbyſhire in a foſſil ſtate. *cuſpidata.*

21. A. roundiſh with numerous grooves; the valves convex, and 8-toothed at the tip. Found foſſil in Switzerland and Weſtphalia. *farcta.*

22. A. obovate, ſtriated, downy; one valve with a longer perforated beak. Norway ſeas. It is generally found adhering to the madrepora prolifera. *caput-ſerpentis.*

23. A. obovate, ſmooth, convex; one valve with three plates; the other with two; the beak of one valve prominent and perforated. Found frequently in a foſſil ſtate. *terebratula.*

24. A. with compreſſed plates at the ſides of the baſe, anteriorly; the middle three-toothed. Found foſſil. *angulata.*

25. A. dilated, ſmooth, convex; ſtriated with about 3 lobes; anterior part depreſſed, with an acute margin. Found foſſil in Germany. *hyſterita.*

26. A. two-lobed, equal, ſtriated. Only found foſſil. *biloba.*

27. A. orbicular, flat, pellucid; hinge with two linear calloſities growing within the ſhell; 5 inches diameter. Indian ocean. *placenta.*

28. A. nearly quadrangular, convex, and neatly cloſed; bronzed; margin repand; 7 inches diameter. Indian ocean. *cella.*

* 29. A. covered with ſpines as long as the ſhells. England, in a foſſil ſtate. *ſpinoſa.*

30. A. roundiſh, prickly; crown ſmooth and recurved behind; lower valve flat, ſmooth, and perforated at the crown. Norway ſeas. *aculeata.*

31. A. hyaline, ventricoſe; crown bent towards the right; upper valve longitudinally ſtriated; lower valve flat, very thin, and the circumference of the perforation elevated. Guinea. *muricata.*

32. A. oblong, with a rounded margin; one valve flat, thin, ſmooth, with a large ovate perforation at the tip; the other convex, and longitudinally ſtriated. Seas of Norway. *ſquama.*

33. A. orbicular, hyaline, thin, punctured; flat valve perforated at the tip; ſmall, brittle. Ferro iſlands. *punctata.*

undulata. * 34. A. margin crenated; flat valve thin and ſmooth, with a large oval perforation; convex valve with tranſverſe arched ſtriæ, croſſing undulated longitudinal ones. Mediterranean, North ſeas, Devonſhire.

capenſis 35. A. longitudinally ſtriated, a little truncated; with a rounded, notched margin. Cape of Good Hope.

detruncata 36. A. truncated, orbicular, longitudinally ſtriated; flat valve with three ribs within; other valve longitudinally ſtriated within, and divided by a partition in the middle. Mediterranean.

ſanguinolenta. 37. A. horny, ſmooth, and convex on each ſide; upper valve emarginated, and radiated at the ſides, with an elevated, ſanguineous back. India.

vitrea. 38. A. ovate, ventricoſe, hyaline; lower valve with two bony rays at the hinge, beſides lateral teeth; upper valve with a prominent, perforated tip; 1½ inch long, 1 inch broad. Mediterranean.

cranium. 39. A. ſmooth, ventricoſe, finely ſtriated tranſverſely; ¾ inch broad, ſomething longer. Norway ſeas.

dorſata. 40. A. heart-ſhaped, ſolid, with arched tranſverſe ring and wrinkles, and longitudinal ſtriæ and grooves. Magellanic ſeas. Is often found foſſil.

pſittacea. 41. A. horny and finely ſtriated longitudinally; ſhorter valve gibbous; longer one flat, with an incurved tip, triangularly perforated; rather large, pellucid. Greenland. Very rare.

tridentata. 42. A. yellowiſh, pellucid, thin, finely ſtriated tranſverſely; tricuſpidate with tubular points; valves united. Mediterranean.

ſpondyloides. 43. A. ovate, antiquated, with an obtuſe channelled beak.

ventricoſa. 44. A. ſubovate, ſolid, with a channelled beak.

gryphoides. 45. A. oval, ſmooth, ſolid, opaque; leſſer valve with a ſtraight, obtuſe, truncated beak.

flexuoſa. 46. A. very thin, lamellated, hollowed in the middle; upper valve flat; lower valve convex towards the crown, with an orbicular perforation beneath it. Norway ſeas.

rugoſa. 47. A. obovate; upper valve convex and finely wrinkled; lower valve thin and ſmooth, with a kidney-ſhaped perforation. Norway ſeas.

cylindrica. 48. A. very thin, cylindrical, and narrowed outwardly; upper valve gibbous, lower hollow. North ſeas.

nucleus. 49. A. glabrous, oval, longitudinally grooved. North ſeas.

avenacea. 50. A. pyriform, protracted, and ſlightly compreſſed towards the hinges. North ſeas.

ſandaleum. 51. A. turbinated; back flat, with a ſtriated cavity; lid flat and hemiſpherical. Germany, in a foſſil ſtate.

Gen. 16. MYTILUS, *The Muſſel.*

44 Mytilus. *Gen. Char.*—The animal is allied to an aſcidia; the ſhell bivalve, rough, generally affixed by a byſſus or beard of ſilky filaments; hinge moſtly without teeth, with generally a ſubulate, excavated, longitudinal line.

SPECIES.

A. *Paraſitical, affixed as it were by claws.*

criſta-galli. 1. M. plated, ſpinous; both lips rough. Indian ocean and Red ſea.

hyotis. 2. M. plaited and imbricated, with broad, compreſſed ſcales; both lips ſmooth. Inhabits the ocean, on beds of coral.

3. M. plaited, ſmoothiſh; one lip rough. American ocean. *frons.*

B. *Flat, or compreſſed into a flattened form, and ſlightly eared.*

4. M. *Pearl-bearing muſſel.* Flattened, nearly orbiular, with a tranſverſe baſe; imbricated with toothed tunics. American and Indian ſeas.—This ſpecies is about 8 inches long, and ſomewhat broader; the inſide is finely poliſhed, and produces the true mother-of-pearl; and frequently alſo it affords the moſt valuable pearls. When the outer coat of the ſhell, which is ſometimes ſea-green, or cheſnut with white rays, or whitiſh with green rays, is removed, it exhibits the ſame pearly luſtre as the inſide; the younger ſhells have ears as long as the ſhell, and reſemble ſcallops. *margaretiferus.*

5. M. roundiſh; longitudinally ſtriated, pellucid, and ſlightly eared. Mediterranean. *unguis.*

C. *Ventricoſe or convex.*

6. M. cylindrical; rounded at both ends. European, American, and Indian ſeas. It is about an inch broad, and 3 long.—It perforates and eats away coral rocks, and even the hardeſt marbles. Thoſe which are found in Europe have a thin brittle ſhell: the ſhell of thoſe found in India is ſoft, and nearly coriaceous. *lithophagus.*

7. M. rhombic, oval, brittle, rugged, antiquated, and rounded at the ends. Seas and lakes, north of Europe.—It is uſually found lodged in limeſtone; each individual in a ſeparate apartment, with apertures too ſmall for the ſhell to paſs through. *rugoſus.*

8. M. ſtriated, with vaulted knobs, and a white partition. Nicobar iſlands. *bilocularis.*

9. M. convex; one of the margins angular; the anterior extremity crenated; 1¼ inch long. American ocean and Red ſea. *exuſtus.*

10. M. ſmoothiſh; ferruginous on the outſide, and bearded at the tip; ¼ inch long. Mediterranean and Norway ſeas. *barbatus.*

* 11. M. *Eatable or common muſſel.* Smooth, violet; valves ſlightly recurved on the obtuſe ſide, and ſomewhat angular on the acute ſide; beaks pointed; from 2 to 3 inches long. European and Indian ſeas.—This ſpecies is obſerved to be larger within the tropics, and to diminiſh gradually towards the north. It is found in large beds, and generally attaches itſelf to other bodies by means of its long ſilky beard. The fiſh is employed as food in many parts of the world, and is eſteemed rich and nutritious. *edulis.*

* 12. M. very crooked on one ſide near the beaks, then generally dilated; within with a violet tinge. Coaſt of Angleſea. *incurvatus*

* 13. M. oval, tranſparent, and elegantly radiated lengthwiſe with purple and blue; two inches long. Angleſea, in oyſter beds. *pellucidus.*

* 14. M. contracted into a deep rugged cavity, oppoſite the hinge, forming a deep hollow when the valves are cloſed; 5 inches long. Angleſea. *umbilicatus.*

* 15. M. ſhort, ventricoſe, obtuſe at the beaks, and dirty yellow. Weymouth. *curtus.*

16. M. ſmooth, ſlightly curved; hind margin inflected; hinge terminal, two-toothed. Mediterranean, Cape of Good Hope, and New Zealand. Found at the latter place reſembling M. edulis; but is 5 inches long, and 2½ broad. *ungulatus.*

17. M.

bidens. 17. M. ſtriated, ſlightly curved; hind margin inflected; hinge terminal, two-toothed; ſcarcely an inch long. Mediterranean and Atlantic ſeas.

modiolus. * 18. M. ſmooth, blackiſh, obtuſe at the ſmaller end, and rounded at the other; one ſide angular, near the beaks; from 6 to 7 inches long, 3 broad. European, American and Indian ſeas, Devonſhire, Weymouth.

cygneus. * 19. M. ovate, very brittle, tranſverſely wrinkled; anterior end compreſſed, the other rounded; hinge lateral; from 2 to 5 inches broad, and 3 long. Frequent in the lakes and rivers of Europe, Britain.—It is the largeſt of Britiſh freſh-water ſhells. It arrives at the greateſt ſize in ponds and ſtagnant waters.

anatinus. 20. M. oval, a little compreſſed; brittle and ſemitranſparent, with a membranaceous margin. Freſh waters of Europe.—It reſembles the laſt, but is longer and narrower. Ducks and crows, it is ſaid, are extremely fond of both this and the laſt ſpecies.

viridis. 21. M. ſmooth, ovate, membranaceous, pellucid, with a terminal hinge. Southern ocean.

ruber. 22. M. wrinkled; valves oblique and anteriorly dilated. Southern ocean.

albus. 23. M. tranſverſely ſtriated; beaks gibbous; hinge lateral; 6 inches long, $3\frac{1}{2}$ broad. Shores of Chili.—The fiſh is white, and affords a grateful food.

ater. 24. M. grooved, and ſcaly behind. Chili.—The fiſh is black, and unfit for being eaten.

diſcors. * 25. M. oval, horny, ſubdiaphanous; extremities longitudinally ſtriated; middle tranſverſely. European and ſouthern ſeas, Cornwall and Devonſhire. From the South ſeas it is $1\frac{1}{2}$ inch broad; in Britain rarely exceeds $\frac{1}{2}$ inch.

hirundo. 26. M. ſmooth; valves 2-lobed; lobe at the hinge longer and thinner. American, Mediterranean, and Indian ſeas.

pholadis. 27. M. oblong; more obtuſe on the fore-part; rough, with tranſverſe wrinkles; $1\frac{1}{2}$ inch long, $1\frac{1}{2}$ broad. North ſeas.—This ſpecies penetrates beds of coral and other rocks, like the pholas.

ſtriatulus. 28. M. finely ſtriated, hinge terminal, 1 tooth; $1\frac{1}{4}$ inch long, $1\frac{1}{2}$ broad. Northern and Indian ſeas.

vulgaris. 29. M. flattened on one ſide and inflected; beaks incurved, convergent; hinge 1-toothed. American ocean.

plicatus. 30. M. rhombic, inequilateral; tranſverſely ſtriated and wrinkled; beaks incurved. Nicobar iſlands.

niveus. 31. M. ovate, ſubdiaphanous; finely ſtriated longitudinally; margin acute; hinge 2-toothed; ſhell ſnowy and poliſhed within. Nicobar iſlands. Very rare.

afer. 32. M. nearly triangular, dilated before, and flattiſh gaping behind; beaks pointed, turned back; margin very acute; 4 inches long, 2 broad. Mediterranean and African ſhores.

ſmaragdinus. 33. M. nearly triangular, flattiſh; hinge 2-toothed in one valve; 1-toothed in the other. Tranquebar, Guinea.

verſicolor. 34. M. nearly triangular, flattiſh; hinge 1-toothed; margin glabrous, acute; 3 inches long, 2 broad. Guinea.

coralliophagus. 35. M. carinated in the middle, and crenated at the margin, with an obtuſe knob; $\frac{1}{4}$ inch long. Indian and American oceans. Perforates rocks like a pholas.

lineatus. 36. M. triangular and dilated outwards, with angular, decuſſated, and confluent lines; hinge 2-toothed. A minute ſhell.

faba. 37. M. oval, rufous, ſtriated, with a crenulated margin. Seas of Greenland.—This ſpecies is the food of the anas hiemalis and hiſtrionica.

fluviatilis. 38. M. thin, ſlightly wedged; beaks recurved and large. Freſh waters of Europe.

fuſcus. 39. M. oblong, narrow, finely ſtriated tranſverſely; one ſide emarginated, the other rounded; beaks prominent, curved. A minute brown ſhell.

mammarius. 40. M. broad, ſhort, and rounded behind; beaks conic, protuberant.

perſicus. 41. M. broad, and curved with a rough, rugged, yellow coat; within milky. Perſian ſea.

pictus. 42. M. broad, very ſmooth, flammeous or roſe-coloured with white bands; beaks obtuſe. Portugal.

faſciatus. 43. M. pellucid, ſhining, bluiſh, with a claret colour and pale red bands. Brazil.

undatus. 44. M. broad and rounded at both ends; claret colour, with waved, bluiſh, and greeniſh, ſtriæ; margin ſerrated. Portugueſe ſea.

purpureus. 45. M. rounded behind; pale fleſh-colour; purple within; margin denticulated. Shores of Brazil.

ſaxatilis. 46. M. ear-ſhaped, with granulated wrinkles on the outer ſide, dilated and rounded. Amboyna.

argenteus. 47. M. tranſverſely ſtriated, rounded at each end; brown, ſilvery within; beaks rounded.

fulgidus. 48. M. narrow, ſhining bluiſh colour with violet ſpots at the ſides; beaks rounded, dilated. Seas of Magellan.

azureus. 49. M. gibbous, azure, with yellowiſh ſtripes beneath; beaks obtuſe; 1 inch broad, $\frac{3}{4}$ long.

murinus. 50. M. mouſe-coloured, with violet ſpots, and a broad, rounded, roſy margin; beaks pointed ſtraight. Guinea.

teſtaceus. 51. M. long, narrow, covered with a teſtaceous ſkin; ſhining ſilvery beneath, varied with blue, red, yellow, and brown.

virgatus. 52. M. dilated outwardly; greeniſh yellow, with roſy ſtripes; beaks obtuſe, curved.

cordatus. 53. M. oblong, very thin, white, with obſolete ſtriæ, and a heart-ſhaped gap behind. Indian and Southern oceans.

ſtagnalis. 54. M. oval, flattiſh, and tranſverſely ribbed; 8 inches broad, $4\frac{1}{2}$ long. In freſh waters.

zellenſis. 55. M. oval, convex, rounded behind; elongated, and obtuſely pointed before; beaks obſolete; 7 inches broad, 3 long. Stagnant waters of Germany.

roſeus. 56. M. ſuborbicular, with 15 triangular, creſted grooves, and alternate triangular teeth; 3 inches broad. Africa.

puniceus. 57. M. gibbous, pointed, with 15 grooves; margin toothed; 14 lines long, and $\frac{1}{2}$ as broad; hinge with 4 minute teeth. Africa.

niger. 58. M. flat, thin, with fine grooves, covered with a black ſkin, under which it is milky, and finely poliſhed; $1\frac{1}{2}$ inch long; grooves about 100. Africa.

lævigatus. 59. M. flat, ſmooth, covered with a thick fulvous ſkin, under which it is roſy; $2\frac{1}{2}$ inches long. Africa.

dubius. 60. M. tranſverſely wrinkled; obtuſe at each end; fulvous, within pearly; beaks obſolete; hinge without teeth; 5 inches broad, 2 long. Freſh waters of Senegal.

polymorphus. 61. M. 5-celled; valves carinated and flattiſh on the incumbent ſide; beaks obtuſe and inflected backwards; ſize of a plumb ſtone. Ruſſian ſea, and in freſh waters, where it is much larger.

canaliculatus. 62. M. ſmoothiſh, cheſnut brown; within party coloured; ſocket of the hinge channelled.

roſtrum. 63. M. oblong, thin, truncated; beaks ſharp and carinated; valves gaping at the end. Amboyna.

camellii. 64. M. oblong, thin, truncated; beak ſharp and carinated; valves completely cloſed. Japan.

avonenſis. * 65. M. with a ſuboval ſhell, of an olivaceous brown colour, with concentric wrinkles; ſize of the M. anatinus, but broader in proportion to its length. The poſterior ſide generally more obtuſe and rounded. River Avon in Wiltſhire. *Montagu, Teſt. Brit.* 172.

Gen. 17. Pinna, *Sea-Wing.*

45 Pinna. *Gen. Char.*—The animal a limax; the ſhell bivalve, fragile, upright, gaping at one end, and furniſhed with a byſſus or beard. Hinge without teeth; the valves united into one.

Species.

rudis. 1. P. vaulted with arched ſcales, arranged in rows; from 12 to 16 inches long, and from 4 to 8 broad; red; from 6 to 8 grooves. Atlantic, Indian, and Red ſeas.

pectinata. 2. P. longitudinally ſtriated half way; one ſide ſlightly wrinkled tranſverſely; 3 inches long, 4 broad. Indian ocean.

nobilis. 3. P. ſtriated, with channelled, tubular, ſubimbricated ſcales; $7\frac{1}{2}$ inches long, $3\frac{1}{2}$ broad. Mediterranean, Adriatic, and American ſeas.

muricata. * 4. P. ſtriated with concave, ovate, acute ſcales; from 3 to 9 inches long, and 1 to 3 broad. European and Indian oceans, Weymouth.

rotundata. 5. P. with obſolete ſcales, margin rounded; ſometimes 2 feet long. Mediterranean.

ſquamoſa. 6. P. with fine undulated ſcales, and flexuous, broad wrinkles; ſmaller end pointed and naked; 13 inches long, $6\frac{1}{2}$ broad. Mediterranean.

carnea. 7. P. thin, fleſh colour, naked, longitudinally grooved; external margin acute and rounded.

ſaccata. 8. P. ſmooth, ſatchel-ſhaped; a little erect, and ſlightly faſtigiated; $5\frac{3}{4}$ inches long, $2\frac{1}{4}$ broad. Mediterranean and Indian ſeas.

digitiformis. 9. P. ſmooth, tubular, finger-ſhaped, incurved, extreme margin membranaceous; pellucid.

lobata. 10. P. naked, lobed, ſtraw-coloured, with purple ſtriæ.

vitrea. 11. P. hyaline, with longitudinal, waved ſtriæ; the ſtriæ with a few ſcales, and croſſed by other tranſverſe ſtriæ at the margin. Indian ocean. Very rare.

incurva. 12. P. narrow, long, naked, carinated, with tranſverſe, undulated wrinkles. Indian ocean.

bicolor. 13. P. thin, inflected at the lateral margin; yellowiſh, with black brown rays; thinly ſtriated longitudinally. Red ſea.

exuſta. 14. P. flattiſh, horny, with blackiſh rays, ſpots, and clouds; and many ſmooth ſtriæ. Southern ocean of India. Rare.

vexillum. 15. P. truncated at the outer margin; dilated, naked, with a few black clouds; ſtriated longitudinally on the fore-part, and tranſverſely wrinkled behind. India. Very rare.

papyracea. 16. P. thin, brittle, horny, longitudinally ribbed; extreme margin roundiſh. Indian ocean.

17. P. flattiſh, ſlightly incurved, red, with a few perpendicular, ſmooth ſtriæ; 3 inches long. *ſanguinea.*

18. P. very ſtraight, thin, and perpendicularly ſtriated, with tranſverſe, ſpinous wrinkles, on the lower margin. *bullata.*

General Obſervations.—It has been doubted whether the animal which inhabits the pinna be a limax or ſlug, according to the opinion of Linnæus; and it is even aſſerted, that it has not the ſmalleſt affinity with this animal, but approaches much more nearly to that which belongs to the mytilus. In proof of this, it is ſaid that the pinna poſſeſſes no locomotive power, but remains fixed by its byſſus or beard to other bodies; and ſo firmly attached, that it can by no means be diſengaged at the will of the animal; for the fibres are ſtrongly agglutinated to the ſand, gravel, or other extraneous bodies within its reach. Indeed it ſeems not at all improbable that all teſtaceous animals, furniſhed with a ſimilar beard, are intended by this ſtructure to remain attached to the ſpot where they are originally produced.

This ſhell-fiſh was celebrated among the ancients on account of the cloth which was made of the fine byſſus or beard by which it is attached. As a rare and coſtly production it brought a high price, and was held in great eſtimation. At the preſent day even, according to the information of modern travellers, the inhabitants of Palermo and Naples manufacture gloves and ſtockings from the ſame ſubſtance.

The pinna has obtained a little reputation for the practice of ſome of the moral virtues, in treating a ſmall ſpecies of crab with hoſpitality and friendſhip, by receiving it into the ſhell, and defending it againſt its enemies. In return for this kindneſs, the crab, like the jackall with the lion, acts the part of a provider and monitor, by warning its hoſt of the preſence of its prey or of the approach of an enemy. But this friendly intercourſe accords ill with the nature of the animals between whom it is practiſed. The crab, it is far more probable, is a troubleſome intruder; and notwithſtanding all the ſervice he can repay, is conſidered as a very unwelcome gueſt, and is indebted for his lodging to his own activity, and the ſluggiſh nature of his hoſt, rather than to his kindneſs and hoſpitality.

III. UNIVALVE SHELLS.

Gen. 18. Argonauta.

Gen. Char.—The animal is a ſepia or clio. The ſhell is univalve, ſpiral, involute, membranaceous, one-celled. 46 Argonauta.

Species.

1. A. *The paper nautilus.* Keel or ridge of the ſhell ſlightly toothed on each ſide. The ſhell, which is thin as paper, brittle, and tranſparent, is white or yellowiſh, with ſmooth or knotty ſtriæ or ribs which are ſometimes forked; the keel is generally browniſh. This ſhell preſents conſiderable varieties. Sometimes the keel is narrow, and marked with cloſe bifurcated wrinkles; ſometimes it has a broad keel with tuberculated ribs; and ſometimes a broad tuberculated keel with few and ſmooth ribs. *argo.*

The ſingular ſtructure and wonderful economy of this

this animal very early attracted the attention of naturaliſts. To its progreſſive motion on the ſurface of the ocean, mankind are indebted, it is ſaid, for the firſt hint of the art of navigation. This is alluded to in the numbers of Pope:

Learn of the little nautilus to ſail,
Spread the thin oar, and catch the driving gale.

What is the particular organization which enables this animal to riſe to the ſurface or to ſink to the bottom at pleaſure, ſeems not to be underſtood by naturaliſts; whether it is by throwing out a quantity of water by which it becomes ſpecifically lighter than the element in which it lives, or by taking in a quantity of air, which will produce the ſame effect. It is only when the ſea is calm and unruffled that the nautilus, with his feeble bark, appears on the ſurface. In riſing through the water, the ſhell is reverſed, the ſharp edge of the keel preſenting leſs reſiſtance to the liquid; and when it reaches the ſurface, the animal, by exerting its arms, reſtores it to a proper poſition for its voyage. A quantity of water is taken into the ſhell to balance it. The animal then employs its arms as oars; or if a gentle breeze ſweep the ſurface, it ſtretches two of them perpendicularly, by which means the membrane between them is extended in form of a ſail; the other arms ſerve as oars to direct the courſe, or to keep the bark ſteady, as well as part of the body which hangs over the ſhell, and ſeems to anſwer for a rudder. Thus equipped, the ſolitary navigator glides ſmoothly along the boſom of the ocean. But, on the approach of the ſmalleſt danger, the appearance of an enemy, or the ſlighteſt ruffling of the ſurface of the water, it inſtantly retires within the ſhell, and taking in a quantity of water or ejecting a quantity of air, quick as thought it ſinks to the bottom. Mediterranean and Indian ocean.

vitreus. 2. A. keel of the ſhell toothed in the middle. The ſhell is conic, tranſverſely ribbed, with a convex keel; aperture oval. It is a very rare ſpecies.

cymbium. 3. A. keel of the ſhell wrinkled, and without teeth; depreſſed, thin, wrinkled, with fine longitudinal ſtriæ croſſing the wrinkles. Mediterranean.

cornu. 4. A. keel, with 4 ſmooth elevated rings; 1 line high, 5 broad. Cape of Good Hope.

arctica. 5. A. ſhell perforated with an entire keel; $3\frac{1}{2}$ lines diameter. Greenland ſeas, where it is frequently ſeen floating in ſpring and autumn.

Some ſpecies of the argonauta are met with in all climates from the Indian ocean to the ſhores of Greenland.

Gen. 19. Nautilus.

47 Nautilus. *Gen. Char.*—The nature of the animal which inhabits this ſhell is not well known. The ſhell is univalve, divided into ſeveral compartments, communicating by an aperture with each other.

Species.

A. Spiral, rounded, with contiguous whorls.

pompilius. 1. N. aperture of the ſhell heart-ſhaped; whorls obtuſe; ſmooth. Indian and African ocean.—This ſpecies is often very large, and it is finely variegated with brown flexuous ſtreaks, ſpots, and marks, under the epidermis, which is white; within it exhibits a beautiful pearly gloſs. It is employed for drinking cups by the inhabitants of the eaſt.

* 2. N. aperture of the ſhell linear; whorls with elevated joints; minute, white, opaque. Sheppey iſland. *calcar.*

* 3. N. with lateral ſpires, with about 20 flexuous, crenated joints in the exterior whorl; marked by elevated ſtriæ; aperture ſemicordate; ſyphon central; very minute. Mediterranean, Sheppey iſland, and Sandwich. *criſpus.*

4. N. aperture obovate; 4 or 5 volutions, with deep ſulcated joints; 10 in the firſt ſpire; frequent on moſt ſhores; minute. *beccarii.*

* 5. N. ſimilar to the preceding ſpecies, but with the ſpires reverſed. Shores of Britain, frequent. *perverſus.*

* 6. N. ſpiral with ſmooth joints; ſemipellucid, white, gloſſy; very minute. Sandwich. *levigatulus.*

* 7. N. ſpiral, ſlightly umbilicated on each ſide, with many depreſſed joints. Reculver, England. Very minute, and rare. *depreſſulus*

* 8. N. ſpiral, umbilicated, with furrowed joints; colour opaque, white. Sandwich. Minute, not common. *umbilicatulus.*

* 9. N. thick, ſpiral, doubly umbilicated, with fine joints; opaque, white. Reculver, England. Minute, rare. *craſſulus.*

* 10. N. ſpiral, lobate; ſpires rounded on one ſide, depreſſed on the other. Whitſtable. *lobatulus.*

* 11. N. oblong, carinated; aperture oval, narrow. Sandwich. Minute, rare. *carinatulus.*

12. N. a little bending, with raiſed joints; length $\frac{1}{10}$th of an inch. *ſubarcuatulus.*

* 13. N. compreſſed, ſubcarinated, ſpiral, ſmooth, gloſſy, horn-coloured, with 3 viſible volutions; diameter one-fifth of an inch. Brooks, Kent; marſhes, Rotherhithe. Not unfrequent. *Lightfoot, Phil. Tranſ.* 76. *Helix nitida*, Lin. This is ſuppoſed to be the only ſpecies of freſh-water nautilus which has been deſcribed. *lacuſtris.*

14. N. white, convex; aperture linear; firſt ſpire largeſt. Baltic. *balthicus.*

15. N. ſpires of the ſhells concealed; very ſmall. Found in a foſſil ſtate on St Peter's mountain at Maeſtricht. *helicites.*

16. N. aperture linear; ſpires compreſſed, with thickened margins. Southern ocean. Very ſmall. *rugoſus.*

17. N. aperture compreſſed, linear; ſpires compreſſed; umbilicus concave; minute. Croatia. *umbilicatus.*

B. Spiral, rounded, with ſeparate whirls.

18. N. aperture orbicular; whirl cylindrical; one inch in diameter. American and Indian oceans. *ſpicula.*

19. N. ſmooth, with 4 conic tubercles; very minute. India. *ſpengleri.*

20. N. diaphanous, middle partitions protuberant outwards; ſurface with ſix conic tubercles; minute. India. *unguiculatus.*

C. Elongated, and nearly ſtraight.

* 21. N. incurved, ſpiral at the tip; whirls contiguous; minute, convex; the partitions appearing outwardly. Croatia, Sandwich. Rare. *ſemilituus.*

22. N. ſubconic; globular diviſions growing gradually leſs; tip incurved, ſpiral. Red ſea. Frequently found foſſil. *lituus.*

23. N. with a ſlight curvature; diviſions obliquely ſtriated; *obliquus.*

ſtriated; ſyphon central. Mediterranean and Adriatic ſeas.

raphaniſtrum. 24. N. ſubcylindrical, with thick diviſions, marked with 12 elevated ſtriæ; ſyphon central. Adriatic and Mediterranean ſeas.

raphanus. 25. N. jointed, diviſions thick, with 17 elevated ſtriæ; ſyphon ſublateral, oblique. Adriatic and Mediterranean.

granum. 26. N. ovate, oblong, with thick diviſions, marked with 8 interrupted elevated ſtriæ; ſyphon oblique; minute. Mediterranean.

radicula. * 27. N. oblong, ovate, with 8 or 9 ſubgloboſe articulations; aperture a ſmall ſyphon. Adriatic, Sandwich.

faſcia. 28. N. diviſions ſtriated; joints ſmooth, elevated; obtuſe at the tip; denticulated at the margin; ſyphon central. Adriatic. Very ſmall.

inæqualis. 29. N. cylindrical, with 8 diviſions; aperture margined; very minute. Red ſea.

ſiphunculus. 30. N. ſmooth, with cylindrical, remote diviſions; joints tapering, cylindrical. Seas of Sicily.

legumen. * 31. N. compreſſed, jointed, margined at one end; ſyphon lateral. Adriatic, Sandwich. Very rare.

coſtatus. * 32. N. ſtraight, ſubcylindrical, tapering; joints 12, raiſed, with 4 equidiſtant, ſtrong, longitudinal ribs the whole length; $\frac{1}{4}$ inch long. Coaſt of Kent. *Montagu, Teſt. Brit.* 199. A variety of this has been diſcovered with only 6 joints.

orthocera. 33. N. whirls of the ſhell with carinated ſtriæ. The ocean. Frequently found foſſil.

belemnita. 34. N. *Thunder-ſtone.* Equal, ſmooth, conic, acute; varies in ſize, from $\frac{1}{2}$ inch to 8 inches; found foſſil in moſt parts of Europe. It has ſome degree of tranſparency; and when burnt or rubbed, emits a ſmell like raſped horn.

48 Conus.

Gen. 20. Conus, *Cone-ſhell.*

Gen. Char.—The animal is a limax. The ſhell univalve, convolute, turbinate; aperture effuſe, longitudinal, linear, without teeth, entire at the baſe; pillar ſmooth.

Species.

A. *Spire or turban nearly truncated.*

marmoreus. 1. C. conic, brown, with ovate, ſubangular, white ſpots; whirls of the ſpire channelled. American ocean.

imperialis. 2. C. whitiſh, with longitudinal, livid bands, and divided brown and white; linear belts: ſpire flat; painted with brown undulated ſtripes, often emarginated. A rare ſhell.

literatus. 3. C. conic, white, with brown dots; ſpire marked with brown ſtripes. Aſiatic ocean.

generalis. 4. C. conic, poliſhed, with a pointed, muricated ſpire; whirls channelled. India.

virgo. 5. C. conic, with a bluiſh baſe. African ocean.

capitaneus. 6. C. conic, glabrous, with a brown baſe; ſpire a little convex: ſometimes flat, and generally ſtriped. Aſia.

tribunus. 7. C. white, with three yellowiſh bands, ſpotted with cheſnut: ſpire convex; baſe tranſverſely ſtriated.

miles. 8. C. conic, rough with a brown baſe: ſpire convex. India.

cingulum. 9. C. conic, yellowiſh, with a ſingle elevated belt in the middle: ſpire acute. Friendly iſlands.

B. *Pyriform with a rounded baſe; cylinder half as long again as the ſpire.*

10. C. yellow, with purpliſh brown; longitudinal *princeps.* branched lines, marked with two white bands, which have a few brown ſpots: ſpire obtuſe and finely ſtriated tranſverſely: $2\frac{1}{2}$ inches long. Indies.

11. C. with rough punctures at the baſe.—This ſpe- *ammiralis.* cies is divided into the following varieties. 1. Without bands. 2. With irregular bands. 3. With one regular band. 4. With two regular bands. 5. With three regular bands. 6. With four regular bands. 7. With five or more regular bands. 8. With punctated, reticulated belts. To this laſt diviſion belongs the *cedo nulli*, or celebrated admiral ſhell, which has been eſteemed the rareſt and moſt precious of teſtaceous productions. Some ſpecimens of the C. *cedo nulli* have brought the extravagant price of 100 guineas. The endleſs varieties of this ſpecies are found in the ſeas of South America.

12. C. teſtaceous, ſpotted with white; with four yel- *vacarius.* low, immaculate bands; the ſecond angularly divided. Southern ocean.

13. C. conic, ſmooth, glabrous; with obtuſe, ſculp- *ſenator.* tured whirls: yellow ſpotted with white.

14. C. ſubcylindrical, ſmooth, glabrous; finely po- *nobilis.* liſhed; yellow or brown, ſpotted with white.

15. C. with linear belts, articulated with white and *genuanus.* brown: red, with bands alternately teſſelated with brown and red.

16. C. emarginated at the baſe, ſtriated; ſpire un- *glaucus.* armed, with contiguous whirls. India and Africa.

17. C. gibbous, clouded with bluiſh brown; acute, *monochus.* ſtriated at the baſe; ſometimes dotted in rows.

18. C. grayiſh, ſurrounded with oblong dots. *minimus.*

19. C. ovate, rugged, and muricated at the baſe; *ruſticus.* ſpire conico-convex. Var. 1. Without band. 2. With a band clouded whitiſh. Africa.

20. C. ovate, white, with reticulated yellow bands. *mercator.* Africa.

21. C. ſlightly emarginated at the baſe and wrink- *betulinus.* led: ſpire flattiſh, mucronate. India. A large ſhell.

22. C. ſlightly emarginated at the baſe, and wrink- *figulinus.* led; ſpire acuminated, with flattiſh whirls: three inches long. India.

23. C. ovate, white, with black band; compoſed of *ebræus.* tranſverſe ſpots: a ſmall ſhell.

24. C. emarginated at the baſe, and ſtriated: whirls *ſtercus muſcarum.* of the ſpire channelled. Aſia.

25. C. elongated, muricated: the ſpire crowned and *varius.* acute. Indian ocean.

26. C. elongated, finely ſtriated tranſverſely; vari- *achatinus.* ouſly clouded, and ſpotted with white: ſpire ſhort, ſpotted with brown, and tipt with red. American ocean.

27. C. with white rays and bands. *radiatus.*

28. C. pale yellow or cheſnut ſpots, with white or *leoninus.* yellow tranſverſe bands: ſpire rather acute.

29. C. light olive, with multifarious white dots, and *jaſpideus.* an oblique band: oblong. Small.

30. C. brown with blue clouds and white ſpots. *nebuloſus.*

31. C. conic, yellow, with white eyes and band: *oculatus.* baſe obliquely ſtriated.

32. C. ſhort, brown, with two white bands: that *coffeæ.* neareſt the ſpire ſpotted with brown.

33. C.

amadis. 33. C. pale brown, with a broad band, and articulated belts above and beneath: ſpire acute, crowned with tubercles, and finely ſtriated tranſverſely.

fulmineus. 34. C. with cheſnut ſtripes the whole length: ſpire acute, and with the pillar lip ſpotted with cheſnut; the baſe acute and obliquely ſtriated.

arachnoideus. 35. C. reticulated with cheſnut, with two or three darker bands; ſpire crowned and acute: a very rare ſpecies.

coſtatus. 36. C. brown, with a white band; undulated with reddiſh, thick and broad ſtriæ: ſpire nodulous, with a granulated band.

leucoſtictus. 37. C. white, clouded, ſtriped, and ſpotted with brown; with numerous rows of white and brown dots: ſpire crowned with tubercles. American ocean.

citrinus. 38. C. citron with black lines, interrupted beneath: ſpire crowned with tubercles, with the baſe white. Curaçoa.

inſularis. 39. C. white with cheſnut clouds, ſpots and dots: ſpire acute.

coronatus. 40. C. with alternate, articulated belts and teſſelated ſpots: ſpire crowned with tubercles: ſhell often minute, and with a white band.

punctatus. 41. C. with two yellowiſh brown bands, and numerous lines of dots: ſpire varied with yellow dots and lines.

zeylanicus. 42. C. ſnowy with roſy and brown clouds, and numerous, articulated belts, varied with white and cheſnut: ſpire pointed.

ſolidus. 43. C. conic, thick, tranſverſely ſtriated; clouded with white and brown, with a broad white band, and pyramidal ſpire; whirls channelled.

C. *Elongated and rounded at the baſe; cylinder as long again as the ſpire.*

clavus. 44. C. with convex ſmooth ſtriæ, the baſe bluiſh. Indian ocean, very rare.

nuſſatella. 45. C. ſubcylindrical, red, rough; ſtriæ tuberculated. Iſland of Nuſſatella in Aſia, but very rare.

terebellum. 46. C. white, ſhaded with blue; ſubcylindrical, with annular ſtriæ and yellow bands.

coccineus. 47. C. red, with tranſverſe lines, dotted with black; with a white band, and ſpire ſpotted with red.

lætus. 48. C. ſubcylindrical, with annular ribs; red with darker clouds, and barred with white: ſpire ſpotted.

ochroleucus. 49. C. ſubcylindrical, yellow: the baſe obliquely ſtriated, with a white band near it: ſpire pointed with ſtriped ſpots.

lævis. 50. C. rufous with fulvous ſpots, and tranſverſe ſtriæ: ſpire ſpotted with yellow: baſe obliquely ſtriated.

affinis. 51. C. bluiſh white, with four fulvous, linear bands, and intermediate dull purple dots.

violaceus. 52. C. white with violet clouds and bands; rays pale brown; ſpire pyramidal, with ſix whirls.

granulatus. 53. C. rough, unarmed, with ſmooth, grooved ſtriæ; African ocean. Shell red with white bands, and purple linear dots.

polyzonias. 54. C. white within; outſide yellowiſh brown and rough, with fine granulated lines, with a white band at the ſpire denticulated beneath; another at the baſe with a paler tinge: ſpire flattened, with ſtriped ſpots; baſe outwardly duſky, and violet within.

bifaſciatus. 55. C. white with angular cheſnut lines, and two orange bands: ſpire prominent: baſe ſurrounded with orange lines, and intermediate teſſelated ſpots.

56. C. conic, ſnowy: ſpire prominent, and crowned with tubercles: aperture large. *niveus.*

57. C. *orange flag*, ſmooth with whitiſh bands; whirls grooved at the tips. India. *arauſiacus.*

58. C. ſubcylindrical, with longitudinal bands, dotted with white. India. *magus.*

59. C. ovate, oblong, gibbous, clouded with fine parallel brown ſtriæ: four inches long. Africa. *ſtriatus.*

60. C. with reticulated yellow veins, and yellow and brown ſpots. Aſia. *textile.*

61. C. white with brown reticular veins and interrupted longitudinal bands. Aſia. It varies much in its colours. *aulicus.*

62. C. ſmooth white with bay characters and rows of dots, with three white belts and ſpots; the tip reddiſh; ſpire conic with grooved whirls. Indian ocean. *thomæ.*

D. *Ventricoſe in the middle, and contracted at each end.*

63. C. ventricoſe, yellow with white eyes baſe tranſverſely ſtriated. *ſinenſis.*

E. *Thin, ventricoſe, and tinkling when thrown upon its back on a table.*

64. C. bluiſh with yellow clouds and yellowiſh thick dots and ſtriæ: ſpire rather acute. Aſiatic ſeas. *ſpectrum.*

65. C. yellow clouded with white: aperture large and bluiſh: ſpire ſometimes flat, ſometimes acute. *bullatus.*

66. C. oblong, gibbous, ſmooth; aperture gaping. India; South America. *tulipa.*

67. C. oblong, gibbous, crowned: aperture gaping: wrinkled at the baſe, and a little narrower: aperture white: ſpire ſometimes roſy. Indian and African ſeas. *geographicus.*

68. C. white, clouded and ſpotted with orange, with ſcattered white dots; ſpire prominent, acute. *nubecula.*

69. C. white, with alternate rows of irregular cheſnut, or blackiſh ſpots, and interrupted, punctured bands. *ſpurius.*

70. C. brown, ſhaded with white, with a white interrupted band; the white band is ſometimes cruciate. *vexillum.*

71. C. brown, barred with white, beneath narrower, ſhaded with bluiſh, and ſmooth; ſpire conic, exſerted. *ventricoſus.*

Gen. 21. Cypræa, *Cowrie.* 49 Cypræa.

Gen. Char.—The animal is a ſlug; ſhell univalve, involute, ſub-ovate, ſmooth, obtuſe at each end; aperture effuſe at each end; linear, extending the whole length of the ſhell, and toothed on each ſide.

Species.

1. C. ſlightly turbinated, ferruginous, with whitiſh round ſpots and eyes; line down the back a little branched. American, and Atlantic ſeas. *exanthema.*

2. C. ſlightly turbinated, and marked with irregular characters: line down the back branched. Indian and African ſeas. *mappa.*

3. C. ſlightly turbinated with irregular characters; ſtripe down the back ſimple. India. *arabica.*

4. C. ſlightly turbinated, ſub-cylindrical, ſprinkled with *argus.*

with eyes; beneath 4 brown ſpots; about 4 inches long. Indian and Atlantic ſeas.

teſtudinaria. 5. C. obtuſe, ſub-cylindrical; extremities depreſſed. Perſian gulf, and Indian ocean. This is the largeſt ſhell of this genus.

ſtercoraria. 6. C. ſlightly turbinated, gibbous, with livid and teſtaceous ſpots; emarginate on each ſide, and flat beneath. Guinea.

carniola. 7. C. ſlightly turbinated, pale, with fleſh-coloured bands; mouth violet; $2\frac{1}{2}$ inches long. Aſiatic ocean.

zebra. 8. C. turbinated, cinereous, with brown bands; is twice as large as the laſt, and the ſpire more prominent. India.

talpa. 9. C. ſlightly turbinated, ſub-cylindrical, teſtaceous, with pale bands; beneath thickened and brown; 3 inches long. India.

amethyſtea. 10. C. ſlightly turbinated; ſides gibbous and decorticated, 4 clouded, browniſh bands above. Madagaſcar.

lurida. 11. C. ſlightly turbinated, lurid and ſlightly barred; extremities pale yellow, with 2 black ſpots. Mediterranean and Atlantic ſeas.

venelli. 12. C. ſlightly turbinated, ſpotted, and marked with yellowiſh dots; extremities ſpotted with brown; throat rufous.

lota. 13. C. ſlightly turbinated, white, with ſubulate denticles. Sicily.

fragilis. 14. C. turbinated, ovate, glaucous, with longitudinal teſtaceous waves, and pale bands. Mediterranean.

guttata. 15. C. thin, gibbous, fulvous, dotted with white, with a horizontal line in the middle; beneath white, with yellow teeth.

cinerea. 16. C. thin, ventricoſe, reddiſh gray, with paler bands.

plumbea. 17. C. ſlightly turbinated, thin, back lead colour, with four bands varied with blue and brown; undulated with browniſh at the margin, and marked with blue and brown lines. Guinea.

oculata. 18. C. ſlightly turbinated, ruſſet brown, with white eyes, and three paler bands on the back. American ocean.

hiſtrio. 19. C. ovate, ſlightly turbinated, with livid eyes; beneath flat, white; ſides thickened, black, ſpotted with brown. Indian ocean.

aurantium. 20. C. ſlightly turbinated, orange, with a white immaculate edge; throat bright red. Friendly iſlands.

ferruginoſa. 21. C. thin, elongated, yellowiſh or bluiſh, with ferruginous ſpots; within blue.

livida. 22. C. thin, elongated, uniformly ſtraw-coloured, pale yellow or reddiſh; beneath dotted with brown; teeth ſubulate.

gibba. 23. C. thin, gibbous; back clouded, and tranſverſely barred.

turbinata. 24. C. turbinated, ovate, glaucous, with angular pale ſpots.

venerea. 25. C. oblong, brown, with ſtriped gold ſpots; within blue.

purpuraſcens. 26. C. oblong, purpliſh; beneath ſurrounded with a white line.

albida. 27. C. oblong, whitiſh; ends of the lips ſpotted with fulvous.

rufeſcens. 28. C. oblong, reddiſh brown; beneath whitiſh.

tranſlucens 29. C. cylindrical, cinereous with pellucid bands.

punctulata. 30. C. cylindrical, fragile, white, with tranſverſe bands of reddiſh dots.

tigrina. 31. C. obtuſe, ovate, ſlightly turbinated with a longitudinal teſtaceous line.

dubia. 32. C. oblong, ferruginous, with paler bands.

trifaſciata. 33. C. turbinated, thin, bluiſh brown, with three yellowiſh bands varied with brown at each end. Rare.

conſpurcata. 34. C. turbinated, bluiſh, white, dotted and clouded with brown.

bifaſciata. 35. C. oblong, ſhaded with purple, with a ſtraw-coloured band, and another narrower white one, and a brown border; 4 inches long.

cylindrica. 36. C. cylindrical, above; pale-violet, and ſpotted with brown at the ſides, with two brown ſpots at each end.

teres. 37. C. cylindrical, milk-white; one ſide bordered and varied, with a few pale-yellow, narrow marks, backed with three browniſh waved bands.

ovata. 38. C. ovate, a little depreſſed; one ſide ſlightly bordered; back whitiſh, with crowded yellowiſh brown dots and waves, and 3 obſolete darker bands; $1\frac{1}{2}$ inch long, $\frac{3}{4}$ broad.

minuta. 39. C. oblong, of one colour, with a tinge of bloom; beneath dotted with white, with the border of one ſide and the teeth of the lip white; above yellow at each end; ſpire tipt with black.

ſanguinolenta. 40. C. thin, oblong, barred with brown, and dotted with red at the ſides.

faſciata. 41. C. turbinated, glaucous, margined; above gibbous, with tranſverſe browniſh bands; throat glaucous.

regina. 42. C. gibbous, glaucous, brown, with triangular, teſtaceous and whitiſh ſpots, and 3 tranſverſe bands; throat blackiſh, glaucous.

undulata. 43. C. turbinated, undulated with browniſh, clouded with pale ochre; with deeper bands. Mauritius iſland.

B. *Obtuſe, and without a manifeſt ſpire.*

caput-ſerpentis. 44. C. triangularly gibbous, and rather obtuſe behind; brown, ſpotted with white; beneath white; $1\frac{1}{2}$ inch long. Mauritius and Nuſſatella iſlands.

reticulum. 45. C. roundiſh, gibbous, brown, with white, confluent, reticulated eyes, and a white horizontal line in the middle of the back; beneath white.

mauritiana. 46. C. triangularly gibbous; behind depreſſed, acute; beneath black; a large ſhell, ſpotted with brown. Java, Mauritius, and Nuſſatella.

vitellus. 47. C. livid, with ſmall white ſpots; 2 inches long. Indian ocean.

mus. 48. C. retuſe, gibbous, cinereous, with a longitudinal brown band; teeth of the aperture blackiſh. American and Mediterranean ſeas.

tigris. 49. C. ovate, obtuſe behind, and rounded before; ferruginous, with deep brown ſpots, and a yellow longitudinal, dorſal line; $4\frac{1}{2}$ inches long. Indian ocean.

flammea. 50. C. ovate, obtuſe behind, and rounded before, with waved yellow ſpots; a rare ſhell.

olivacea. 51. C. ovate, olive, clouded with yellow, and ſpotted with brown; beneath flat, pale brown: teeth of the lip white.

feminea. 52. C. ovate, thin, white with greeniſh yellow dots, diſpoſed in rows; within violet.

lynx. 53. C. oblong, ovate, with brown dots, and a yellowiſh line; hind part a little acute, with a rufous mouth; 2 inches long. Madagaſcar.

54. C.

isabella. 54. C. sub-cylindrical, with pale yellow extremities; $1\frac{1}{2}$ inch long. Mauritius.

ambigua. 55. C. pyriform, dusky, with paler clouds and spots.

scurra. 56. C. ovate, oblong; beneath flat; yellowish, with greenish and livid, confluent drops; sides varied with scattered brown dots. India.

C. *Umbilicated or perforated.*

onyx. 57. C. beneath brown, above whitish; small. Asia.

clandestina. 58. C. with fine transverse lines here and there meeting together. India.

succincta. 59. C. interior lip rounded at each extremity.

zig-zag. 60. C. pale yellow, with brown dots; the extremities with 2 brown spots.

hirundo. 61. C. above bluish; extremities marked with 2 brown spots. Maldivia islands.

asellus. 62. C. white, with 3 brown bands; oblong; minute. Madeira islands.

erronea. 63. C. with an equal testaceous spot.

ursellus. 64. C. oblong, white; above smooth, varied with brown, and marked with 2 brown dots at the umbilicus or perforation.

pyrum. 65. C. pale brown, with paler bands and ochraceous spots; beneath and at the sides fulvous; within blue.

maculosa. 66. C. narrow, long, with flesh-coloured spots above, varied with pale, fulvous, and glaucous ones; sides chesnut.

pulla. 67. C. thin; sides russet brown; above white, or pale brown, with transverse bands, or a fainter horizontal line.

indica. 68. C. cylindrical, marked above with characters, eyes, and a paler horizontal line; sides bloom-colour, dotted with black. India.

ovum. 69. C. thin, oblong, olivaceous, with scattered ferruginous spots; beneath white.

felina. 70. C. oblong, narrow, plumbeous, with ferruginous dots and spots, and paler bands; marked at each extremity with 2 brown spots.

atomaria. 71. C. oblong, snowy, dotted with brown; each end marked with 2 dusky dots; $\frac{1}{2}$ inch long.

nebulosa. 72. C. oblong, gibbous; brown, with chesnut spots.

ochroleuca. 73. C. thin, ochraceous, with paler spots.

stellata. 74. C. thin, cinereous, dotted with brown, and marked with transverse, elevated striæ.

subflava. 75. C. oblong, gibbous, smooth, yellowish.

leucogaster 76. C. oblong, purple; beneath white.

variolosa. 77. C. oblong, dusky, with two bands on the back, and whitish spots.

fulva. 78. C. solid, oblong, fulvous, with brown spots, disposed in rows, and two dusky bands; sides saffron.

leucostoma. 79. C. oblong, gibbous; clouded with brown and blue; sides spotted with black; mouth white.

lineata. 80. C. ovate, marked above with lines; borders spotted.

cancellata. 81. C. ovate, gibbous, with cancellated spots, and a horizontal line above.

lutea. 82. C. brownish, with two white bands; beneath pale yellow, dotted with brown.

badia. 83. C. oblong, gibbous; above bay, with brown and white dots.

punctata. 84. C. ovate, white, with testaceous dots.

zonaria. 85. C. ovate, smoothish, yellowish, with four brown lunules. Shores of Guinea. Very rare shell.

conoidea. 86. C. lip toothed within; with three rows of tubercles; pillar lip without teeth.

D. *Margined.*

cribraria. 87. C. umbilicated, pale yellow, with white round spots.

moneta. 88. C. whitish, with a knotty margin. Mediterranean, Atlantic, Ethiopic, and Indian seas.—This species is collected in great quantities, and transported to Bengal, Siam, and other parts of India, where it is employed by the natives as the medium of commerce.

annulus. 89. C. surrounded on the back with a yellow ring. Amboyna and Alexandria.

caurica. 90. C. gibbous, unequal, whitish; margin dotted with brown; back marked with testaceous clouds. Indian ocean.

erosa. 91. C. with a jagged margin; yellow, dotted with white; sides with a brownish spot. Mauritius and Ascension islands.

derosa. 92. C. with a jagged margin, flesh-colour, with a greenish back, marked with fulvous dots; sides dotted with brown. Mediterranean.

flaveola. 93. C. with a jagged margin; yellow, dotted with white; sides marked with obsolete, scattered, brown dots.

spurca. 94. C. slightly margined, yellowish with deeper specks; sides dotted with brown. Mediterranean.

oblonga. 95. C. oblong, ovate; above bluish, dotted and spotted with brown; beneath and at the sides white.

stolida. 96. C. cinereous, variegated with testaceous; white beneath, and at the sides; $1\frac{1}{2}$ inch long. Amboyna.

helvola. 97. C. triangularly gibbous, dotted with white, jagged behind; beneath yellow, immaculate. Indian ocean.

ocellata. 98. C. slightly margined, pale yellow, with black eyes; margin white, dotted with brown; $1\frac{1}{2}$ inch long.

poraria. 99. C. pale violet, dotted with white; a very small shell.

pediculus. * 100. C. with numerous transverse furrows, some of which are forked; a small shell, and ovate with various tints of red or white; sometimes it is marked with a longitudinal groove. Frequent on most shores. Britain.

nucleus. 101. C. margined on each side, slightly produced and rugged, with raised tubercles above; 1 inch long. Nussatella island.

madagascariensis. 102. C. whitish, produced on each side; back tuberculated, and marked with transverse undulated striæ. Madagascar.

staphylæa. 103. C. somewhat produced, with elevated dots; extremities pale yellow.

cicercula. 104. C. produced on each side, and sprinkled with raised dots. Mediterranean and Indian seas.

globulus. 105. C. produced on each side, and smooth, white or yellow. Amboyna.

affinis. 106. C. oblong, slightly produced, smooth, yellow; ocellated on each side before.

squalina. 107. C. thin, oblong, white, with ferruginous spots and dots.

fimbriata. 108. C. white or gray, with obsolete ferruginous spots and transverse bands; lips of the mouth marked with violet spots.

cruenta. 109. C. gibbous; above bluiſh with rufous dots; beneath and at the ſides white; lips citron.

reticulata. 110. C. reticulated; margin varied with ſtriped ſpots.

rubiginoſa. 111. C. oblong, white; within violet; back with a ferruginous blotch; each end marked with two pale yellow ſpots; teeth of the lips yellowiſh.

miliaris. 112. C. thin, ſhort, yellowiſh, green, with milk-white eyes, and marked with a lateral horizontal line.

acicularis. 113. C. ſolid; above yellowiſh, dotted with brown with a horizontal pale line; beneath milk-white, with impreſſed dots at the margin.

craſſa. 114. C. thick, yellowiſh, with 3 whitiſh bands; mouth bluiſh; 4 inches long.

vinoſa. 115. C. above white, with a claret ſtain, and marked with purple eyes, ſurrounded with a black circle, and a horizontal white line; blue within. Mediterrancan.

anguſtata. 116. C. narrow, brown, with reddiſh ſpots at the ſides.

ſimilis. 117. C. oblong, gibbous, yellowiſh, dotted with white, with a blackiſh ſpot at the margin.

ſtriata. 118. C. convex, bluiſh white, dotted with brown; beneath yellow, ſtriated on one ſide.

ſinenſis. 119. C. oblong, ſolid, variegated with orange lips.

puſilla. 120. C. bluiſh, ſpotted with brown, and marked with 3 bands.

50
Bulla.

Gen. 22. Bulla, *Dipper*.

Gen. Char.—The animal a limax; the ſhell univalve, convoluted, unarmed with teeth; aperture a little ſtraitened, oblong, longitudinal, very entire at the baſe; pillar oblique, ſmooth (B).

Species.

ovum. 1. B. ovate, obtuſe, ſlightly doubly beaked; one of the lips toothed, from which it has the appearance of a cypræa; 4 inches long. Amboyna and Friendly iſlands.

volva. 2. B. two-beaked; the beaks long, ſtriated and acute. Jamaica. A rare ſhell.

biroſtris. 3. B. two-beaked, margin thickened outwardly; beaks long, ſmooth; ſize of a bean. Java.

ſpelta. 4. B. oblong, rather obtuſe at both ends; equal; lip arched; margin thickened within; twice the ſize of a grain of wheat. Mediterranean and Adriatic.

verrucoſa. 5. B. tranſverſely angular, ovate, with a bony dot on each ſide. India.

gibboſa. 6. B. angular, with an elevated belt. Brazil.

naucum. 7. B. rounded, pellucid, ſlightly ſtriated tranſverſely; perforated at each end; an inch long. African and Indian ſeas.

aperta. * 8. B. roundiſh, pellucid, tranſverſely ſub-ſtriated; outſide a little wrinkled; gloſſy; one inch long. Europe, Africa, Devonſhire.

hydatis. * 9. B. rounded, pellucid, ſlightly ſtriated longitudinally; crown umbilicated; ſize of a pea. Mediterranean, Devonſhire.

ampulla. * 10. B. rounded, obtuſe at one end; crown umbilicated. Frequent on moſt ſhores; Britain.

lignaria. * 11. B. oblong, oval, tranſverſely ſtriated; crown narrow, and ſlightly umbilicated; 3 inches long. European ſhores, Britain.

regulbienſis. * 12. B. thick, white, opaque; aperture compreſſed in the middle; minute. Reculver, England.—*Bulla obtuſa*, Montagu, Teſt. Brit. 223.

phyſis. 13. B. rounded, glabrous, pellucid, marked with tranſverſe lines; ſpire retuſe. India.

ampluſtra. 14. B. roundiſh; ſpire elevated, obtuſe, with fleſh-coloured bands; ſhell white. Aſia.

ficus. 15. B. ob-ovate, with a clavated crown, indiſtinct ſpire, and elongated beak; ſurface marked with reticulated ſtriæ; 3 inches long. American and Indian oceans.

rapa. 16. B. rounded, turbinated, ſlightly ſtriated, with a curvated beak, and finely wrought ſpire; from 2 to 3 inches long. Indian ocean.

canaliculata. 17. B. cylindrical; whirls of the ſpire grooved.

conoidea. 18. B. oblong, turbinated, ſmooth; baſe a little ſtriated; ſutures crenulated; ſize of an acorn.

fontinalis. * 19. B. ovate, pellucid; ſpire obſolete; whirls contrary, or turning from right to left; aperture ovate, oblong; $\frac{1}{2}$ inch long. Shores of the Danube; lakes and rivers of Europe; Britain.

hypnorum. * 20. B. ovate, pellucid; ſpire contrary, prominent; aperture ovate, lanceolate. Europe, Britain.—Linnæus ſuppoſes that this ſpecies may be a variety of the laſt; but, according to Mr Montagu, the form of the ſhell, the ſtructure of the animal, and its *habitat*, are always diſtinct. Linnæus ſays, that this ſpecies is found among wet moſs. Mr Montagu found it only in ditches, and in a place occaſionally overflowed by the river Avon.

turrita. 21. B. poliſhed, with a pointed ſpire; aperture oblong. Northern Europe, in ditches and wet meadows.

gelatinoſa. 22. B. brittle, with a depreſſed contrary ſpire; aperture ending in a beak; $2\frac{1}{2}$ lines long. Rivers of Denmark.

terebellum. 23. B. ſides cylindrical, with a ſubulate ſpire, truncated at the baſe; 2 inches long. Indian ocean.

cypræa. 24. B. ovate; ſpire indiſtinct, prominent at the top; aperture more dilated behind; pillar twiſted; ſize of an acorn. Mediterranean.

virginea. 25. B. with party-coloured double bands, and purple truncated pillar: aperture ſemilunar. Rivers of Aſia.

faſciata. 26. B. conic, pointed with tranſverſe bands and undulated ſpots; aperture white. South America, India.

ſtrigata. 27. B. conic, pointed, glabrous, with undulated fulvous ſtreaks; 2 inches long; 8 whirls in the ſpire.

ſtriatula. 28. B. conic, white, ſtriated; pillar ſtraight and reflected.

exarata. 29. B. oblong, pointed, white, grooved; ſpire with 6 or 7 whirls.

bifaſciata. 30. B. tapering, erect; white, with 2 broad, reddiſh bands at the aperture; a land ſpecies.

31. B.

(B) In ſome of the ſpecies belonging to this genus, it appears that the animal poſſeſſes different characters from thoſe of the limax, and particularly that which inhabits the bulla lignaria, a Britiſh ſhell, which is furniſhed with a gizzard, of a teſtaceous nature. See Lin. Tranſ. vol. ii. p. 15.

ambigua. 31. B. a little tapering and compressed; pale, flesh-coloured, with two remote bands; one broader and brown, the other blue.

zebra. 32. B. ovate, pointed, with longitudinal brown bands; pillar inflected, entire. Tranquebar. A land species.

achatina. 33. B. ovate, pointed, with a wide crimson mouth and lip; pillar truncated; 8 inches long. American ocean.

hyalina. 34. B. oblong, horn-coloured; spire retuse; thin; ½ inch long.

ovata. 35. B. subovate, slightly two-beaked; striated on the back, and gibbous in the middle; chesnut with white spots and bands; within violet.

ferruginosa. 36. B. sub-ovate, equable, pale gray, undulated with brown, and marked with ferruginous spots, and two white bands; 1½ inch long.

velum. 37. B. thin, umbilicated on each side; white, with capillary brown lines, and a snowy band, edged with brown on each side; 1 inch long.

vesica. 38. B. ovate, oblong, within milk-white, solid, pellucid; aperture wide; two grooves on the back. Brazil.

cylindrica. * 39. B. cylindrical, smooth, white, thin, slightly umbilicated; twice as large as a grain of wheat. Europe, Britain.

oliva. 40. B. cylindrical, aperture sub-orbicular, and dilated beneath.

voluta. 41. B. smooth, cylindrical, olive; aperture effuse; pillar inflated, truncated; 7 whirls in the spire.

dominichensis. 42. B. sub-cylindrical, spiral, reddish, with longitudinal striæ, and spotted; sutures crenulated; pillars sinuated and truncated. St Domingo.

purpurea. 43. B. ventricose, rugged, and longitudinally streaked; aperture ovate, with a pointed lip, and deep black border within. Africa, in rice fields.

spreta. 44. B. ovate, thin, brown, and rough.

solida. 45. B. solid, red, varied with violet; margin red; spire a little prominent.

stercus-pulicum. 46. B. inflated, glabrous, horny; cinnamon colour; five rows of dots; pillar sinuated, with an acute lip; extremity thin and ovate.

scabra. 47. B. ovate, rough, slightly carinated on the back, and marked with decussated striæ; white with rosy lines; pillar scalloped, reflected. Java.

akera. * 48. B. ovate, pellucid, with a truncated, channelled crown; 6 lines long. Norway seas, Banff in Scotland, and near Portsmouth.

soluta. 49. B. cylindrical, horny, transversely striated, with a retuse top or crown; whirls margined, channelled.

carnea. 50. B. ovate, flesh-coloured, gibbous; lip arched, thickened and toothed within. Shores of Africa.

patula. * 51. B. smooth, glossy, white, pellucid, oblong, involuted; aperture large, terminating in a short canal, most contracted at the top; length 1 inch. Weymouth.

haliotoidea. * 52. B. sub-oval, thin, pellucid, white, resembling a haliotis; a little wrinkled; aperture oval; length ¾ inch. Weymouth.

plumula. * 53. B. ovate, oblong, depressed, pellucid, thin; strongly wrinkled concentrically; length ⅕ inch. Milton sands, Devonshire. Montagu, Test. Brit. p. 214.

catena. * 54. B. pellucid, white, finely striated transversely; the striæ, magnified, have the appearance of the links of a chain; $\frac{1}{10}$ inch diameter. Devonshire.

* 55. B. oblong, oval, smooth, white; apex rounded, umbilicated; aperture very narrow; ⅛ inch long. Falmouth. *umbilicata.*

* 56. B. sub-cylindrical, opaque, white; upper part longitudinally striated; lower plain; apex truncated, and largely umbilicated. Falmouth. *truncata.*

* 57. B. smooth, glossy, pellucid, white, suboval; body large, ventricose; apex pointed; aperture sub-oval; ⅜ inch long. Salcomb bay. Rare. *diaphana.*

Gen. 23. Voluta, *Volute.* 51 Voluta.

Gen. Char.—The animal a limax; the shell is one celled, spiral; aperture without a beak, and sometimes effuse; pillar twisted or plaited, generally without lips or perforation.

Species.

A. *Aperture entire.*

1. V. contracted, oval, oblong, with a rugged spire; pillar 2-toothed; 4 inches long. India. In marshy woods and swamps. *auris-midæ*

2. V. oval, oblong, with a wide aperture; pillar one-toothed. *flammea.*

3. V. contracted, oblong, oval, grooved; white dotted with yellow; pillar with two plaits; ¾ inch long. *fulcata.*

4. V. thin, transversely striated, flesh-colour, with two white bands; pillar one-toothed; not one inch long. *bifasciata.*

5. V. contracted on the upper part; yellow, with a crenulated lip; pillar with two plaits; 4½ lines long. *flava.*

6. V. oval, oblong, banded; pillar with three plaits. *minuta.*

7. V. thin, brown; whirls of the spire cancellated; pillar three-toothed; very minute. *pusilla.*

8. V. oval, oblong, glabrous, with a reflected grooved lip; pillar one-toothed. *glabra.*

9. V. oval, gibbous, umbilicated; pillar with one thick, flexuous plait; two inches long. *auris-sileni*

10. V. contracted, oblong; spires smooth; pillar 3-toothed. Fens of India. *auris-judæ.*

11. V. fusiform, granulate, with an ovate aperture; pillar cut, spreading; three inches long. New Caledonia. *auris-malchi.*

* 12. V. oval, pointed at each end, and spirally striated; pillar with a single fold: ¼ inch long. Europe, Wales. *tornatilis.*

* 13. V. thin, brittle, with two small spires; mouth rounded, wide. Island of Iona, Scotland. *ionensis.*

* 14. V. white, opaque, longitudinally striated. Sandwich. Very minute. *alba.*

15. V. contracted, oblong, ovate, opaque, striated; spire elevated and a little pointed; pillar slightly plaited. *solidula.*

16. V. contracted, ovate, cylindrical; spire a little elevated, obtuse; pillar with five plaits; one inch long. Africa. *livida.*

17. V. contracted, smooth, with an obtuse spire; aperture toothed on each side. *coffæa.*

B. *Subcylindrical, emarginated.*

18. V. smooth; spire obliterated at the base; lip retuse *porphyria.*

tuſe in the middle; pillar obliquely ſtriated; five inches long. Brazil.

oliva. 19. V. ſmooth; ſpire reflected at the baſe; pillar obliquely ſtriated. Indian ſeas.

annulata. 20. V. ſmooth, white, with a keel-ſhaped ring on the back; ſometimes with reddiſh waves.

utriculus. 21. V. elongated, ſmooth, with a prominent ſpire. Indian and Ethiopic ſeas.

hiatula. 22. V. thin, with a cinereous ſpotted back, callous beneath; aperture large; pillar toothed at the baſe. Shores of Spain.

jaſpidea. 23. V. white dotted with greeniſh brown, or violet; ſpire prominent; whirls with a band compoſed of ſpots at the baſe; an inch long. Shores of Spain.

nivea. 24. V. ſnowy, elongated, ſmooth, banded. Spaniſh ſeas.

iſpidula. 25. V. ſmooth with a prominent ſpire and ſingle margin; pillar obliquely ſtriated; from one to two inches long. India.

carniolus. 26. V. orange with blue bands; ſpire flattened; aperture white.

C. *Oboval, effuſe, emarginated.*

dactylus. 27. V. ſmooth, with decuſſated ſtriæ, obtuſe; pillar with ſix plaits; $1\frac{1}{2}$ inch long. India.

miliaria. 28. V. ſlightly emarginated, white, with an obliterated pale yellow ſpire; pillar obliquely ſtriated. Mediterranean.

monilis. 29. V. entire white with an obliterated white ſpire; pillar obliquely ſtriated; $1\frac{1}{2}$ inch long. China; where it is employed for making beads and necklaces. A variety is found in Africa only $2\frac{1}{2}$ lines long, with 8 or 10 thin plaits in the pillar.

exilis. 30. V. obovate, entire, yellowiſh, with two brown bands; ſpire prominent; pillar obliquely ſtriated.

perſicula. 31. V. ſmooth, with a retuſe, umbilicated ſpire; pillar with ſeven plaits; lip with a crenated margin: one inch long. African ſea.

pallida. * 32. V. ſhell entire, oblong, ovate, with an elevated ſpire; pillar with four plaits. African and European ſhores, Britain.

faba. 33. V. ſlightly emarginated, ſmooth, a little plaited; ſpire prominent; pillar with four plaits; lip with a crenulated margin; one inch long. African ocean.

glabella. 34. V. very entire, ſmooth, with a levigated ſpire; pillar with four plaits; lip gibbous; margin toothed: from one to two inches long. African and American ſeas.

prunum. 35. V. very entire, ſmooth, with a levigated ſpire; pillar with four plates; lip without tooth, or margin: $1\frac{1}{2}$ inch long. Iſland of Goree.

reticulata. 36. V. with ſlight decuſſated grooves; lip internally ſtriated; pillars ſlightly perforated; two inches long. American ocean and Guinea.

mercatoria 37. V. ſtriated, with an obtuſe ſpire; pillar retuſe, toothed; lip gibbous, denticulated; $\frac{3}{4}$ inch long. Mediterranean, American, and Indian ſeas.

ruſtica. 38. V. ſmoothiſh with a prominent ſpire; pillar retuſe, toothed; lip gibbous, denticulated. Mediterranean and American ſeas.

paupercula 39. V. entire, ſmooth, with a ſtriated baſe; ſpire a little prominent; pillar with four plaits; lip obtuſe. Mediterranean and Indian ſeas.

mendicaria 40. V. ſlightly ſtriated, with a ſlightly granulated ſpire; pillar ſmooth; lip gibbous and denticulated: ſize of a kidney bean. Mediterranean and Indian ſeas.

41. V. entire, plaited, and croſswiſe reticulated; pil- *cancellata.* lar with three plaits, ſlightly umbilicated, and a little produced. African ocean.

42. V. ſmooth, white, with blue bands and yellow *elegans.* mouth; ſpire nearly obliterated; pillar ſix-toothed; ſcarcely one inch long.

43. V. ſmooth, greeniſh white, with numerous *ovum.* bands; lip inflected; pillar with four plaits; $2\frac{1}{4}$ inches long.

44. V. ſpire obſolete; ſides with thickened margins; *marginata.* four plaits in the pillar.

45. V. ſubſtriated, glabrous; ſpire obtuſe, ſmooth, *nucea.* prominent; five plaits in the pillar. Indian ocean.

46. V. conic, white, with hollow punctured grooves *conus.* at the baſe; whirls crenated; ſix plates in the pillar.

D. *Fuſiform.*

47. V. nearly entire, oblong, ſmooth, with a promi- *tringa.* nent excoriated ſpire; three plaits in the pillar; lip ſlightly toothed inwardly. Mediterranean.

48. V. ſlightly emarginated, oblong, ſmooth; ſpire *cornicula.* longiſh; four plaits in the pillar; lip equal and unarmed. Mediterranean.

49. V. entire, tapering, plaited and tranſverſely ſtri- *virgo.* ated; three plaits in the pillar, which is perforated. About a finger's length, and marked with about 12 grooves.

50. V. emarginated, ſtriated, and tranſverſely wrink- *ſcabriuſcula.* led; four plaits in the pillar, which is perforated; lip notched; two inches long. India.

51. V. nearly entire, tranſverſely wrinkled; four *ruffina.* plaits in the pillar; lip crenulated. India.

52. V. nearly entire, ſmooth, yellowiſh with red *nubila.* clouds tranſverſely ſtriated; lip crenulated; four plaits in the pillar. Friendly iſlands.

53. V. emarginated, longitudinally grooved and *ſanguiſuga* tranſverſely ſtriated; lips ſmooth; four plaits in the pillar; $1\frac{1}{2}$ inch long. Mediterranean and Indian ſeas.

54. V. emarginated, round, ſmooth; whirls of the *caffra.* ſpire with plaited ſtriæ; four plaits in the pillar; $2\frac{1}{2}$ inches long. Aſiatic ſea.

55. V. ſlightly emarginated, round, ſmooth; about *morio.* three plaits in the pillar.

56. V. tapering, marked with tranſverſe rays of red *acus.* dots; ſpire pointed, ſmooth: ſcarcely an inch long.

57. V. emarginated, ſubangular, unarmed, and tranſ- *vulpecula.* verſely ſtriated; four plaits in the pillar; throat ſtriated; two inches long. India.

58. V. emarginated, angular, anterior angles a little *plicaria.* ſpinous; four plaits in the pillar; lip ſmooth; two inches long. Indian ocean.

59. V. cylindrical, glabrous, reddiſh, with ſublivid *bullata.* belts; four plaits in the pillar within; aperture effuſe. Indian ocean.

60. V. cylindrical with decuſſated ſtriæ, and im- *crenulata.* preſſed dots; white with yellowiſh clouds; lip and whirls nodulous; margin of the whirls crenulated; eight plaits in the pillar. Indian ocean.

61. V. tapering, black with white ſpots, tranſverſely *ſcutulata.* ſtriated, firſt whirl a little ventricoſe; four plaits in the pillar. Indian ocean.

62. V.

nigra. 62. V. tapering, emarginated, blackiſh; whirls flattiſh; four plaits in the pillar. Guinea, Greenland.

ſubdiviſa. 63. V. tapering, emarginated, longitudinally ribbed, plaited, and tranſverſely ſtriated; three plaits in the pillar. Indian ocean.

cruentata. 64. V. tapering, emarginated, barred and tranſverſely ſtriated with longitudinal knotty ribs, ſpotted with red; pillar with three plaits. Indian ocean.

exaſperata. 65. V. tapering, emarginated, granulous, with decuſſated ſtriæ and longitudinal ribs barred with brown; five plaits in the pillar. Indian ocean.

granoſa. 66. V. tapering, emarginated, tranſverſely ſtriated and longitudinally grooved, with elevated dots and reddiſh lines; three plaits in the pillar. Indian ocean.

caſta. 67. V. tapering, ſmooth, brown with white bands; ſix plaits in the pillar, which is emarginated at the baſe. Shores of Amboyna.

leucogonias. 68. V. tapering, cheſnut, with flexuous white bands; pillar obſoletely plaited: two inches long.

maculoſa. 69. V. tapering, white with reticulated and ſpotted brown bands: one inch long.

noduloſa. 70. V. tapering, brown, cancellated; angles of the ſection nodulous, and whitiſh: four plaits in the pillar.

ſpadicea. 71. V. tapering, cheſnut with yellow clouds and ſpots; eight whirls in the ſpire, which are longitudinally plaited and tranſverſely ſtriated; five plaits in the pillar.

aurantia. 72. V. tapering, orange; a white band in the four firſt whirls of the ſpire; lip denticulated; four plaits in the pillar.

decuſſata. 73. V. tapering with decuſſated ſtriæ; the longitunal one undulated; about four plaits in the pillar.

polygona. 74. V. tapering, punctured, whirls longitudinally ribbed, and finely ſtriated tranſverſely; three firſt angular; about five plaits in a ſlightly umbilicated pillar.

acuminata. 75. V. tapering, cancellated; beak ſhort and cancellated; four plaits in the pillar. Tranquebar.

biplicata. 76. V. tapering, ſmooth, white with yellow ſpots and black dots; pillar doubly plaited.

turricula. 77. V. tapering, two plaits in the pillar: whirls turgid, with a band of black dots; firſt whirl double.

lineata. 78. V. tapering, with perpendicular black lines croſſing a white band; 3 plaits in the pillar.

diſcors. 79. V. tapering; beneath brown dotted with white; above white, with perpendicular waved yellow ſtripes; a minute ſhell.

ſtriata. 80. V. tapering, finely ſtriated tranſverſely; duſky, with red dots, and two paler bands; minute.

ſulcata. 81. V. tapering and grooved longitudinally; brown, with a tranſverſe white nodulous band; pillar fivetoothed.

lævigata. 82. V. tapering, ſmooth, brown; ſpire with a paler band; narrow, ſmall.

ocellata. 83. V. tapering, cheſnut, with white eyes; minute.

naſuta. 84. V. tapering, red, with rows of black dots; lip prominent; beak reflected.

marmorea. 85. V. tapering, varied with white and brown; lip inflected.

barbadenſis. 86. V. tapering, reddiſh, finely ſtriated tranſverſely; aperture oblong, oval; ſpire obtuſe; $1\frac{1}{4}$ inch long. American ſeas.

87. V. tapering, cancellated, with an obtuſe ſpire; *clathrata.* lip margined; beak reflected. American ocean.

88. V. tapering, gibbous, yellow; each whirl with *tricolor.* a white band, teſſelated with black; 3 plaits in the pillar.

89. V. tapering, cheſnut brown, with undulated *turrita.* brown lines; aperture ſtriated; 3 plaits in the pillar.

90. V. tapering, ſmooth, white, with perpendicu- *ſyracuſana* lar, waved, blackiſh yellow ſtripes. Syracuſe.

91. V. tapering, poliſhed, cheſnut; within white; *nitens.* pillar with 4 plaits.

92. V. tapering, citron, with rufous bands; $2\frac{1}{2}$ *citrina.* inches long.

93. V. tapering, pale brown, and longitudinally *mucronata* ſtriated; ſpire perforated; pillar perforated, and 4-plaited.

94. V. tapering, a little ventricoſe; longitudinally *rugoſa.* wrinkled, and tranſverſely ſtriated; whitiſh with piceous lines.

95. V. tapering, cinereous, ſtriated with red; ſpire *ſtrigoſa.* glabrous; whirls rather tumid.

96. V. tapering, glabrous; 5 plaits in the pillar; *foſſilis.* has been only found in a foſſil ſtate.

97. V. tapering, thin, glabrous; brown ſurrounded *leucoſtecta.* with lines of white dots. Friendly iſlands.

98. V. tapering, whitiſh, cancellated; whirls with *clathrus.* a band of yellow ſpots.

99. V. tapering, tranſverſely ribbed, with a tranſ- *virgata.* verſe brown band, and longitudinal waved ſpots; two inches long.

100. V. tapering, cancellated; varied with tawny *leucoſtoma.* and white, with waved brown ſpots; mouth ochraceous.

101. V. tapering, tranſverſely ſtriated; yellow with *variegata.* a brown band and ſpots.

102. V. emarginated, tapering, marked with decuſ- *filaris.* ſated ſtriæ, and red threads; pillar 3-plaited.

103. V. cylindrical, whitiſh, glabrous; ſpire pro- *volva.* jecting, obtuſe, emarginated at the baſe; pillar 4-plaited; 2 inches long. Shores of Guinea.

104. V. ovate, bay, longitudinally wrinkled; be- *ziervoyelii* neath tranſverſely grooved; ſpire obtuſe, and crenated at the ſuture; 4 plaits in the pillar; lip denticulated.

105. V. ovate, triangular, rugged, knotty, tranſ- *rhinoceros* verſely grooved and umbilicated; pillar 3-plaited; lip toothed; throat ſtriated; whirls muricated with knobs. Shores of New Guinea.

106. V. tapering, white; ſpire with fine tranſverſe *coſtata.* ſtriæ, and rounded ribs; firſt whirl with 3 brown bands; 4 plaits in the pillar.

107. V. ovate, white; ſpire ſpotted with brown; *ſpuria.* 6 brown bands in the firſt whirl; tail emarginated; lip impreſſed; pillar 6-plaited.

108. V. emarginated, ſtriated, and marked with *pertuſa.* hollow punctures; lip denticulated; 5 plaits in the pillar; 3 inches long. India.

109. V. emarginated, tranſverſely ſtriated; white *cardinalis.* with rows of teſſelated cheſnut ſpots; pillar 5-plaited. Indian ocean.

110. V. emarginated, ſmooth; margin of the whirls *epiſcopalis.* entire; lip denticulated; 4 plaits in the pillar; 5 inches long. India.—The animal of this ſhell is ſaid to be poiſonous when it is eaten, and has the power of inflicting a wound on thoſe who touch it, with a kind of pointed trunk. The natives of the iſland Tanna employ the ſhell as a hatchet, fixing it in a handle.

111. V.

papalis. 111. V. emarginated, transversely striated; margins of the whirls and lip denticulated; pillar 4-plaited. Indian ocean.

patriarchalis. 112. V. obovate, solid, transversely striated, marked with nodulous plaits; whirls crowned with tubercles. India.

musica. 113. V. margined with obtuse spines in the whirls; lip smooth and very thick; pillar 8-plaited. American ocean. The plaits in the pillar are from 9 to 12 in some varieties.

vespertilio. 114. V. emarginated, with acute spines on the whirls; lip smooth; pillar 4-plaited; from 3 to 6 inches long. Indian seas.

arabica. 115. V. emarginated; whirls tuberculated, and marked with black characters; 4 plaits in the pillar.

hebræa. 116. V. emarginated; whirls with subacute spines; 5 stronger and 3 obsolete plaits in the pillar; 6 inches long. India, Jamaica. Very rare.

turbinellus 117. V. nearly entire, turbinated, with conic somewhat erect spines; upper ones larger; pillar 4-plaited; 3 inches long. Indian ocean.

capitellum. 118. V. ovate, rugged, knotty; 3 plaits in the pillar; $2\frac{1}{4}$ inches long. Indian and American seas.

ceramica. 119. V. ovate, acute, with divergent spires; about 5 plaits in the pillar; spines on the outer whirls gradually lessening into tubercles. Coromandel and Ceram.

pyrum. 120. V. obovate, slightly tailed, with striated whirls on the spire; tip produced and quite glabrous; pillar 3-plaited; 7 inches long. Tranquebar and Ceylon.

laponica. 121. V. obovate, smooth, with a pointed spire, and ventricose; pillar 5-plaited. Indian and American seas.

vexillum. 122. V. ventricose, yellowish-white, with orange bands; first whirl tuberculated and larger than the rest; pillar 6-plaited. Indian ocean. Very rare.

flavescens. 123. V. pyriform, smooth, with yellowish clouds; spire varied with chesnut spots; 4 plaits in the pillar.

rupestris. 124. V. elongated, ribbed; ribs crossed with fine transverse lines; lip margined; spire papillary at the tip; many plaits in the pillar; 4 inches long.

nassa. 125. V. ventricose; spire ribbed with fine transverse striæ crossing the ribs; lip margined, umbilicated; 3 plaits in the pillar; 1 inch long. Mauritius island and Guinea.

craticulata 126. V. tapering and transversely striated; white with longitudinal chesnut ribs; lip denticulated, striated; 3 plaits in the pillar; 3 inches long.

spiralis. 127. V. longitudinally ribbed, and finely striated transversely; a row of acute tubercles on the two first whirls; 3 plaits on the pillar. Indian seas.

magellanica. 128. V. ventricose, ochraceous, with white and brown lines; lip subulate; whirls of the spire convex; first largest; 2 inches long.

filosa. 129. V. finely reticulated and striated, with elevated transverse belts; lip crenated; 4 plaits in the pillar, which is a little umbilicated.

fuscata. 130. V. coarse, brown, smooth; base transversely striated; spire obtuse; first whirl ventricose, with 4 narrow bands; the rest with a broad white band; pillar with 3 plaits and umbilicated.

E. *Ventricose; the spire papillary at the tip.*

æthiopica. 131. V. emarginated; spire crowned with vaulted spines; 4 plaits in the pillar; 7 or 8 inches long. Persia, Asia, and the Cape of Good Hope.

132. V. emarginated; whirls of the spire with grooved margins; 4 plaits in the pillar; lip callous. Spain, Africa, and America. *cymbium.*

133. V. emarginated; spire smooth; pillar 3-plaited; 4 inches long. Spain, America, Philippine isles. *olla.*

134. V. elongated, with a broad aperture; lip acute; whirls of the spire scarcely visible; 1 inch long. *ampla.*

135. V. emarginated; covered with a brown cuticle, under which it is reddish; lip a little prominent; 4 plaits in the pillar; 4 whirls in the spire; 8 inches long; nearly as broad. Persian gulf. *neptuni.*

136. V. emarginated; lip a little prominent; pillar 4-plaited; 2 inches long. *navicula.*

137. V. elongated, with a long tubercle at the tip, which is sometimes oblique. *papillaris.*

138. V. elongated, yellow, with 3 bands of brown dots; 4 plaits in the pillar. India. *indica.*

139. V. coarse, clouded, with zig-zag brown lines; lip subulate, pillar bluish with 4 plaits. Cape of Good Hope. Very rare. *scapha.*

140. V. ovate, glabrous; whitish with longitudinal red lines; whirls knotty; 3 plaits in the pillar; 2 inches long. Indian ocean. *cymbiola.*

141. V. subovate, testaceous, with reddish bay spots, emarginated at the base; 4 plaits in the pillar. Coromandel coast. *præputium.*

142. V. cylindrical, yellowish, emarginated; aperture effuse, spreading; 3 plaits in the pillar. Eastern shores of Africa. *glans.*

143. V. white, smooth, reticulated with gold, emarginated; 4 plaits in the pillar; spire conic; first whirl cylindrical and ventricose; 2 inches long. Java. *reticulata.*

144. V. brownish yellow, striated with brown; 3 plaits in the pillar; $5\frac{1}{2}$ inches long. Straits of Magellan. *spectabilis.*

52 Buccinum.

Gen. 24. Buccinum, *Whelk.*

Gen. Char.—The animal is a limax; the shell univalve, spiral, gibbous; aperture ovate, terminating in a short canal, leaning to the right, with a retuse beak or projection; pillar lip expanded.

Species.

A. *Inflated, rounded, thin, subdiaphanous, and brittle.*

1. B. roundish, surrounded with obtuse grooves, between which is an elevated line; aperture without teeth; 4 inches long. Indian sea. *olearium.*

2. B. obovate, surrounded by grooves which are double on the fore-part; aperture without teeth; pillar umbilicated. Mediterranean and Adriatic seas.—This shell is nearly as large as a man's head. *galea.*

* 3. B. ovate, inflated, slightly grooved, and undulated with white; aperture without teeth; 6 inches long. India, America, Weymouth. *perdix.*

4. B. ovate, surrounded with obtuse grooves; aperture toothed; $2\frac{1}{2}$ inches long. Java, Amboyna, Mexico. *pomum.*

5. B. ovate, surrounded with remote obtuse grooves; beak a little prominent. Sicily, Africa, India. *dolium.*

6. B. ovate, surrounded with rounded ribs; beak a little prominent; $\frac{3}{4}$ inch long. *caudatum.*

7. B.

niveum. 7. B. ſnowy ribbed; outer whirls of the ſpire ſcarcely prominent.

clathratum. 8. B. ovate, longitudinally wrinkled and tranſverſely plaited; with a ſhort recurved beak; pillar lip crenated and grooved within.

lineatum. * 9. B. pyramidal or ſharp-pointed at bottom; white with dark brown ſpiral lines; very ſmall. Cornwall.

breve. * 10. B. white, with 5 whirls, which are longitudinally ribbed, and tranſverſely ſtriated. Pembrokeſhire coaſt.

minimum. * 11. B. with 5 ſpines, ſpirally ſtriated, and tranſverſely ribbed; leſs than a pea. Norway, England.

obtuſulum. * 12. B. white, opaque, with 3 ſpires; aperture oval. Faverſham creek, England. Minute and rare.

B. *With a ſhort, exſerted, reflected beak; lip outwardly unarmed.*

minutum. * 13. B. white, opaque, with 3 whirls, which are longitudinally ribbed; very minute. Pembrokeſhire coaſt.

læve. * 14. B. ſmooth, with 3 whirls and a long beak; very ſmall. Pembrokeſhire coaſt.

obtuſiſſimum. * 15. B. ſmooth, with 3 whirls, and a long beak; aperture contracted; very minute. Pembrokeſhire coaſt.

echinophorum. 16. B. with 4 tuberculated belts and prominent beak. Adriatic and Mediterranean ſeas.

plicatum. 17. B. a little plaited forwards, marked with decuſſated ſtriæ; aperture toothed; beak recurved. Jamaica.

cornutum. 18. B. *Great ſpiked caſket.* Turbinated, or crowned with ſpines; aperture toothed, beak recurved; from 9 to 12 inches long. India.

rufum. 19. B. *Red helmet.* With decuſſated ſtriæ, and knotty belts, between which is a double line; aperture toothed; beak recurved. America and India.

tuberoſum. 20. B. *Perſian whelk.* With two tuberculated belts, and recurved beak; 10 inches long. American ocean.

flammeum. 21. B. ſlightly plaited and crowned; aperture toothed; beak recurved; 5 inches long. American ocean.

teſticulus. 22. B. obovate, with decuſſated ſtriæ, and elevated longitudinal ones; aperture toothed; beak recurved; 4 inches long. America and India.

decuſſatum 23. B. with decuſſated ſtriæ, and covered with ſmall ſquare ſcales; aperture toothed; beak recurved. Africa, Mediterranean.

areola. 24. B. *Small diced caſket.* Subſtriated and ſurrounded with 4 rows of ſquare ſpots; aperture toothed; beak recurved; 3 inches long; outer pillar lip with a toothed inner margin. India, Mediterranean.

tigrinum. 25. B. ovate, ſmooth, bluiſh, with tranſverſe yellow bands; ſpotted with brown, and intermediate brown characters. New Zealand.

undulatum 26. B. with ſometimes tranſverſe, ſtriated, and waved ſpots; ſpire obtuſe; inner lip glabrous.

cicatricoſum. 27. B. ovate, ſmooth, and covered with hollow punctures; ſpire elongated; lips toothed; beaks recurved. India.

teſſelatum. 28. B. thin, cinereous with white bands teſſelated with brown; whirls with 5 rows of tubercles; 6 inches long. South ſeas. Very rare.

pennatum. 29. B. white, with variegated yellowiſh, cheſnut, and white bands; beaks recurved. India.

maculoſum 30. B. with 4 ſpotted bands; whirls a little prominent, and longitudinally ribbed; the firſt crowned with tubercles; $3\frac{1}{2}$ inches long.

* 31. B. tranſverſely ſtriated; ſpire obtuſe; whirls with a ſpotted band and 2 lines. Weymouth. *bilineatum*

32. B. coarſe, tranſverſely ſtriated and wave ſpotted; ſpire acute, pyramidal; 2 inches long. *gibbum.*

33. B. ventricoſe, ſtriated, pillar lip thin, beak ſhort. *ventricoſum.*

34. B. tranſverſely ſtriated; ſpire acute; the 2 firſt whirls crowned with ſpines; outer pillar lip ſpotted within, and emarginated without. *ſtrigoſum.*

35. B. ſmooth, with undulated ſpots; ſpire rugged and ſtriated; beak with 5 plaits; outer pillar lip ſtrong and ſtraight. *rugoſum.*

36. B. coarſe, and with a ſlightly prominent, acute ſpire; firſt whirl crowned with tubercles; outer pillar ribbed within. *ponderoſum.*

37. B. ſmooth, and marked with a band of rufous ſpots; ſpire a little prominent; firſt whirl inflected; $2\frac{1}{2}$ inches long. Barbadoes. *recurviroſtrum.*

38. B. tranſverſely ſtriated, and ſpotted here and there, with three equal bands; aperture bluiſh within; outer pillar lip toothed; inner with rows of tubercles; 3 inches long. *trifaſciatum.*

39. B. finely ſtriated tranſverſely, and with three ſpotted bands; ſecond whirl of the ſpire ſurrounded with a turgid ring; outer pillar lip crenated. Senegal. *ſenegalicum.*

40. B. ochraceous, tranſverſely ſtriated; firſt whirl crowned with ſpines; outer pillar lip toothed; inner repand; $2\frac{1}{2}$ inches long. *ochroleucum.*

41. B. tranſverſely ſtriated; ſpire depreſſed; outer whirl knotty at the margin; aperture toothed; beak recurved. America. *ſtriatum.*

42. B. obovate, umbilicated, fulvous, with numerous tranſverſe ſtriæ; pillar lip membranaceous; united lip of the aperture acute. Mediterranean. *caſſis.*

43. B. ovate, tranſverſely grooved, whitiſh with reddiſh bands, varicoſe; ſpire conic, with decuſſated ſtriæ; aperture oblong, toothed; inner pillar lip plaited, granulated; lip of the aperture fringed, ſpotted. India. *ſtrigatum.*

44. B. globular, yellowiſh, grooved and ſtriated; ſpire conic; aperture white; lip margined, and ſlightly toothed within. Seas round Tuſcany. *tyrrhenum*

45. B. ovate, white, tranſverſely ſtriated, and grooved; ſpire conic; lip of the aperture doubled, and toothed within; pillar lip reflected and wrinkled; beak very ſhort. India and America. *abbreviatum.*

C. *Lip prickly outwardly behind.*

46. B. *Small curled caſket.* A little plaited, and crowned with papillæ. America, India. *erinaceus.*

47. B. *Smooth gray caſket.* Smooth, crowned with papillæ; 5 inches long. Indian ſea. *glaucum.*

48. B. *Smooth ſpotted-lipped caſket.* Entirely ſmooth, with yellowiſh, waved, brown ſpots. America, India. *vibex.*

49. B. ventricoſe; whirls of the ſpire with a band at the baſe, teſſelated with black. *teſſelatum.*

50. B. ſlightly plaited and crowned with papillæ; lip ſmooth, with two rows of ſharp ſpines behind; 1 inch long. *noduloſum.*

51. B. grooved, with an acute ſpire; whirls with rows of tubercles. *fimbria.*

papilloſum 52. B. *Small bugle netted whelk.* Covered with tubercles, in rows; $2\frac{3}{4}$ inches long. Indian ſea. Rare.

glans. 53. B. ſmooth, inner pillar lip with two teeth; 2 inches long. Indian ocean. Very rare.

D. *Pillar lip dilated and thickened.*

arcularia. 54. B. plaited and crowned with papillæ. Indian ocean.

pullus. 55. B. *Small coffer ſhell.* Gibbous, obliquely ſtriated and tuberculated; aperture wrinkled; not an inch long. Mediterranean and European coaſts, Britain.

gibboſulum 56. B. gibbous, ſmooth, ſnowy, tinged or ſpotted; ſmall. Mediterranean and Indian ſeas.

mutabile. 57. B. ſmooth, rugged; ſpire exſerted; inner lip extended forward, and thickiſh. Mediterranean.

neriteum. 58. B. convex, obtuſe, ſmooth; inner pillar lip obſolete; ſize of a pea. Mediterranean.

E. *Pillar lip appearing as if worn flat.*

harpa. 59. B. *Muſical-harp ſhell.* With equal, longitudinal, diſtinct mucronate veins, pillar lip ſmooth; from 3 to 5 inches long. Indian ſea.

coſtatum. 60. B. with equal, longitudinal, crowded mucronate veins; pillar lip ſmooth. Falkland iſlands, Very rare.

perſicum. 61. B. flat, with the lip crenulated, and the pillar flat; 4 inches long. India, and Perſian gulf.

monodon. 62. B. rough with a crenulated lip; pillar flat, protruding obliquely a ſubulate ſpine; gray, white within. America.

patulum. 63. B. muricated; the lip crenated without; the pillar falcated; 4 inches long. America and Ethiopia.

hæmaſtoma. 64. B. ſlightly muricated; lip ſtriated within; the pillar rather flat; throat fulvous; 2 inches long. Mediterranean and Ethiopic ſeas.

lapillus. * 65. B. *Purple whelk.* Ovate, acute, ſpirally ſtriated, without protuberances; pillar flattiſh; $1\frac{1}{2}$ inches long. The colour is white, cinereous, or yellowiſh; the ſhell is often tranſverſely bored or grooved; it is ſometimes thin and without teeth in the aperture, and ſometimes more ſolid, and the aperture toothed. Shores of Europe, Britain.—This is one of the ſpecies which yields a fine purple dye.

ſmaragdulus. 66. B. ovate, acute and glabrous; pillar flattiſh and ſlightly plaited; grooved; ſhines with a green gloſs, and like mother-of-pearl.

tuba. 67. B. fuſiform, yellowiſh brown; the ſpire cancellated; firſt whirl ſmooth, and three times longer than the reſt; ventricoſe above. India.

pyrum. 68. B. turbinated; aperture red; pillar ſmooth; the ſpire ſhort; firſt whirl ventricoſe. India, Red ſea. Very rare.

ſpadiceum. 69. B. oblong, turbinated; cheſnut, with tranſverſe undulated white lines.

foſſile. 70. B. convex, tranſverſely plaited; ſpire ſhort; pillar callous. Found foſſil in Germany.

umbilicatum. 71. B. oblong, turbinated and plaited; ſpire knotty; aperture grooved within; pillar ſlightly umbilicated.

candidum. 72. B. oblong, turbinated; ſolid, ſmooth and white.

ſcala. 73. B. oblong; aperture oval, emarginated, four-toothed; baſe white; ſpire acute; the whirls diſtant; the firſt with four glabrous ribs.

74. B. ventricoſe, coarſe, gray, glabrous; aperture oval; pillar callous; baſe with two calloſities; ſpire ſcarcely prominent; has 5 whirls. *craſſum.*

75. B. ſubglobular, glabrous; aperture oval, margined on each ſide; lip toothed; pillar a little ſtriated; ſpire ſcarcely prominent. Found in a foſſil ſtate. *marginatum.*

76. B. ponderous, convex, glabrous; whirls diſtant and margined; aperture oval, ample; pillar obliquely plaited. Holland. *labyrinthus.*

77. B. coarſe, ovate, oblong, white with tranſverſe brown ſtriæ; aperture oval; beak prominent; firſt whirl ventricoſe. India, Africa. *ruſticum.*

78. B. ovate, coarſe, yellow, with elevated knotty, tranſverſe darker ribs; aperture oval, without teeth. *varium.*

79. B. ovate, whitiſh, ſurrounded with red threads; ſpire a little prominent; aperture oval; lip ſtriated with red; pillar ſlightly umbilicated. *filoſum.*

80. B. ovate, ſtriated, whitiſh with cheſnut ſhades; a white band in the middle, edged with brown ſpots on each ſide; gibbous in the middle. *coronatum.*

81. B. ſubglobular; whitiſh with leek-green and lurid teſſelated ſpots in rows; 4 whirls in the ſpire. *ſqualidum.*

82. B. ſubcylindrical, tranſverſely ſtriated, reddiſh with cheſnut bands; lip denticulated. Ceylon. *craſſum.*

83. B. ſtriated; brown, ſpotted and barred with white; whirls channelled with 4 rows of knots; $1\frac{1}{2}$ inch long. *fornicatum.*

F. *Smooth, and not included in the former diviſions.*

84. B. *Diced whelk.* Smooth; whirls 6 or 7 in the ſpire, ſeparated by a canal; pillar abrupt and perforated; 2 inches long. India and China. *ſpiratum.*

85. B. with tranſverſe plaits and undulated ſtriæ; the baſe and ſpine a little prominent; each of the whirls with a fulvous band; the firſt double. *pyrozonias*

86. B. oblong, finely ſtriated, pale brown with darker bands; aperture oval, terminating in a canal; firſt whirl gibbous and large; whirls 5 or 6. India. *læviuſculum.*

87. B. ſmooth, black with rows of white ſpots and dots; ſpire prominent; firſt whirl ventricoſe. *ocellatum.*

88. B. obtuſely pyramidal and tranſverſely ſtriated; white with blackiſh and brown clouds and ſtripes. Tranquebar. *pyramidale.*

89. B. quite glabrous and minute; ſometimes with a teſſelated band on the two firſt whirls. *glaberrimum.*

90. B. minute, tranſverſely ſtriated; toothed or ſpotted in the aperture. *ſtrigoſum.*

91. B. glabrous with 3 broad red bands within; firſt whirl of the ſpire ventricoſe; 1 inch long. *trifaſciatum.*

92. B. glabrous, and marked with a white band and cheſnut lines. Minute. *leucozonias.*

93. B. glabrous with decuſſating bands and lines. *cancellatum*

94. B. glabrous, ochraceous; ſpire with an obtuſe blue tip; firſt whirl ventricoſe; 2 inches long. *obtuſum.*

95. B. glabrous, with obtuſe whirls; the loweſt ſlightly channelled and produced at the baſe; 4 inches long. America, Africa. *glabratum*

96. B. glabrous; 5 or 6 whirls diſtinct; lip prominent; baſe obliquely ſtriated. *ſtromboides.*

97. B. ovate, ſmooth, black with a carious ſpire; pillar glabrous; ſize of a bean; crown jagged, abrupt. Southern Europe. *præroſum.*

98. B. oblong, ſmooth, thin, banded; aperture oval, entire; 3 inches long. Rivers of New Zealand. *auſtrale.*

99. B.

orbita. 99. B. ovate, thick, whitiſh, tranſverſely ribbed and grooved; aperture oval; lip plaited within; pillar lip flat. Shores of New Zealand.

turgidum. 100. B. obovate, ſlightly umbilicated; yellowiſh with rows of red ſpots; lip ſinuated. New Zealand.

G. *Angular, and not enumerated in the former diviſions.*

undoſum. 101. B. ovate, with tranſverſe, elevated, glabrous ſtriæ; belly obtuſely five-angular; lip ſtriated within; 2 inches long. Malacca.

affine. 102. B. ovate, with tranſverſe, elevated, glabrous ſtriæ; belly cylindrical; lip ſtriated within.

tranque-baricum. 103. B. ovate; ſpire with 12 angles and tranſverſely ſtriated; aperture toothed; lip orange; pillar perforated. Coromandel coaſt.

verſicolor. 104. B. coarſe, dirty brown, tranſverſely ſtriated; 2 rows of black dots in the interſtices of the ſtriæ; 4 channelled whirls in the ſpire. India.

cruenta-tum. 105. B. tranſverſely ſtriated with red parallelogram ſpots.

ſulcatum. 106. B. ovate; brown with ſnowy ſpots; whirls of the ſpire grooved; lip crenulated; throat ſtriated.

rumpſii. 107. B. thin, narrow, ventricoſe; ſpire conic, depreſſed; firſt and ſecond whirls crowned with ſpines.

bezoar. 108. B. roundiſh, wrinkled; whirls lamellated on the fore-part; pillar perforated. China.

glaciale. 109. B. ovate-oblong, ſmooth, a little ſtriated; lower whirl ſlightly keeled; 2 inches long. Northern ſeas.

undatum. * 110. B. *Waved whelk.* Oblong, coarſe, with deep, tranſverſe, undulated ſtriæ; whirls 7, with many curved angles; 3 to 4 inches long. India, Europe; very common on the ſhores of Britain.—The fiſhermen, from ſuppoſing that it is deſtructive to the large ſcallop, (*oſtrea maxima*), by inſinuating its tail, as they term it, into the ſhell, either uſe it for bait, or deſtroy it when they take it in dredging. The ſpawn of this ſpecies is often found in cluſters in many parts of the coaſt.

ſtriatum. * 111. B. ovate-oblong, with tranſverſe elevated ſtriæ, which are undulated near the tip; 4 inches long. Coaſts of Britain.

ciliatum. 112. B. elongated, ſlightly tailed; angular; longitudinally ciliated; pillar ſlightly plaited; whirls 5; 6 inches long. Greenland ſeas.

viridulum. 113. B. oblong, pointed, glabrous; minutely ſtriated tranſverſely, and longitudinally ribbed; 4 lines long. Greenland ſeas.

carinatum. 114. B. oblong, conic, and tranſverſely ſtriated; upper whirls with many oblique and obtuſe angles, lower ones with a ſingle ridge. South ſea.

ſolutum. 115. B. ovate with unequally diſtant longitudinal tubercles on the belly; lip channelled and a little diſtinct; ribs 6; firſt and ſecond whirls broadeſt; ſpire obtuſe. Shell whitiſh mixed with yellow.

tænia. 116. B. oblong, glabrous, brown, with a yellowiſh band in the middle of the firſt whirl.

lineatum. 117. B. cinereous, with longitudinal, undulated, and interrupted tranſverſe, brown ſtriæ; margin white, ſpotted with brown; aperture white.

maclovi-enſe. 118. B. oblong, with waved ſpots and clouds; ſpire ſhort; firſt whirl gibbous; tail narrow, prominent.

foliorum. 119. B. thin, with a ſhort, acute, ſlightly ribbed ſpire; the firſt whirl a little globular; 1 inch long. India, among the leaves and branches of maritime ſhrubs.

120. B. ventricoſe, cancellated; whirls diſtant; 1 inch long. *textum.*

121. B. oblong; longitudinally plaited, and tranſverſely ſtriated; the ſtriæ brown and black, and ſtriated with white, ventricoſe; aperture ribbed; pillar ſlightly plaited; 2 inches long. *ſtrigoſum.*

* 122. B. oblong with tranſverſe elevated ſtriæ; 6 brown whirls in the ſpire; a little ventricoſe. Britain. *anglicum.*

* 123. B. ventricoſe, ribbed, brown; the firſt whirl covering the next. Britain. *porcatum.*

124. B. glabrous, white; ſpire bluiſh at the tip, obtuſe; firſt whirl largeſt, ventricoſe. *læviſſimum.*

125. B. oblong, narrow, glabrous; yellowiſh with red waved ſpots and clouds; outer whirls perpendicularly ſtriated. *igneum.*

126. B. oblong, narrow, cheſnut with darker belts; throat narrow, black or blue, with ſtriated teeth; lip ſtriated within; ſpire acute. South American iſlands. *plumatum.*

127. B. oblong, narrow, horizontally ribbed; ribs tranſverſely ſtriated; pillar ſmooth. *lyratum.*

128. B. ovate, ventricoſe, hoary; longitudinally ribbed, and tranſverſely plaited; lip grooved within; ſpire acute; beak ſhort, recurved. *clathratum.*

* 129. B. *Reticulated whelk.* Oblong, ovate, tranſverſely ſtriated, and longitudinally wrinkled; aperture toothed, gloſſy; ſize of a nut. European and Ethiopic ſeas, Britain. *reticulatum.*

* 130. B. with 5 whirls, ſpirally ſtriated and tranſverſely ribbed; leſs than a pea. Norway, Britain. *minutum.*

131. B. ovate, cancellated, white; 5 whirls, firſt ventricoſe; 1 inch long. Tranquebar. *niveum.*

132. B. yellow, with pale brown bands; ſpire with 6 whirls cancellated; whirls flat, diſtant, the firſt a little convex; aperture triangular; lip toothed; pillar plaited, verrucoſe, umbilicated. A very rare ſhell. *ſcalare.*

133. B. with decuſſated ſtriæ, brown, within white. India. *indicum.*

134. B. white varied with brown; tranſverſely ſtriated; here and there knotty. Shores of American iſlands. *noduloſum.*

135. B. cancellated and nodulous in the angles of the ſection; aperture toothed on each ſide, and acute. India. *piſcatorium.*

136. B. white, within yellowiſh; lip 6-toothed; whirls crowned with ſpines, the firſt with 4 rows. Mauritius. *mauritii.*

137. B. oblong; aperture ſimple, and without teeth; each whirl crowned with a row of tubercles. *armillatum.*

138. B. oblong; perpendicularly plaited, and tranſverſely ſtriated; with alternate white and brown bands; violet within. India. *plicatulum.*

* 139. B. ventricoſe, oblong; with longitudinal plait-like ſtriæ, croſſed with fine undulated tranſverſe ones. Mediterranean, Shores of England. *vulgatum.*

140. B. with party-coloured bands, tranſverſely ſtriated; ſpire horizontally ribbed, part of the firſt whirl glabrous. Tranquebar. *ſtolatum.*

141. B. white, cancellated; ſpire acute; minute. *nanum.*

142. B. narrow, cancellated; aperture large, crenated and ſpotted; ſmall. *exile.*

143. B. cancellated; with perpendicular ribs; the interſtices *chalys.*

interstices smooth and flat; aperture ovate; spire hardly prominent; a minute shell.

verrucosum. 144. B. striæ decussated, knotted in the angles of section; ventricose; pale yellow, with a bluish band on each whirl; $1\frac{1}{2}$ inches long.

alatum. 145. B. gibbous with decussated striæ, knotty in the angles of section, the transverse striæ undulated; lip winged; 1 inch long.

nigro-punctatum. 146. B. narrow, rugged; wrinkles tuberculated with white, and dotted with black; $\frac{3}{4}$ inch long.

nitidulum 147. B. ovate, oblong, polished; barred and marked with longitudinal rugged striæ; lip slightly toothed within. Mediterranean.

lævigatum 148. B. ovate, oblong, polished, striated with brown and smooth; aperture without teeth or pillar lip; spire without plaits. Mediterranean.

lamellosum 149. B. slightly plaited, transversely ribbed, grooved, tuberculated, lamellous; barred with chesnut, brown, and white. New Zealand.

scutulatum 150. B. smooth, chesnut-brown, veined, with flattish whirls, and obtuse beak. New Zealand.

haustorium 151. B. ovate, ventricose, black with a short spire; pillar depressed, white; throat white; lip striated and crenulated within. New Zealand.

ventricosum. 152. B. ovate, oblong; brown striated with white, and slightly plaited.

testudineum. 153. B. ovate, smooth, with alternate whitish and brownish spots in interrupted rows. Shores of New Zealand.

catarrhacta. 154. B. ovate, rough, with crowded transverse grooves and flame-coloured undulations. New Zealand.

tahitense. 155. B. tapering; transversely ribbed and grooved; with a nodulous spiral stria at the suture of the whirls; aperture ovate; lip slightly plaited. Otaheite.

lamellatum. 156. B. imperforated, lamellated; white, within purple; lip white; $1\frac{1}{2}$ inches long.

H. *Tapering, subulate, smooth.*

maculatum 157. B. somewhat spindle-shaped, with smooth, undivided, entire whirls; spire with 14 or more whirls. Asia, Africa.

subulatum. 158. B. subulate, smooth, undivided, very entire; first whirl not gibbous; 5 inches long. Indian ocean.

crenulatum. 159. B. whirls of the spire bifid, with a crenated margin; 5 inches long. Africa and India.

hecticum. 160. B. whirls of the spire bifid; upper margin compressed, tapering; 4 inches long. Africa.

vittatum. 161. B. substriated, with a double crenated suture on each of the whirls; 2 inches long. Africa and India.

strigilatum 162. B. whirls of the spire 16 or 20, bifid and obliquely striated; $2\frac{3}{4}$ inches long. Southern seas of Africa.

duplicatum 163. B. whirls of the spire biparted and striated; 4 inches long. India.

lanceatum. 164. B. smooth with entire whirls, and longitudinal testaceous lines; thin; spire acute. India.

dimidiatum. 165. B. whirls of the spire bifid, smooth; 4 inches long. Africa and India.

murinum. 166. B. whirls of the spire subangular, with 3 muricated striæ; black; base gibbous; whirls white at the base. Africa.

tigrinum. 167. B. pellucid, white with reddish dots; the whirls slightly emarginated on the back; a very minute shell.

168. B. acute, whitish, with undulated horizontal lines; whirls bifid, crenulated, and wrinkled; pillar spirally twisted; $1\frac{1}{2}$ inch long. *acus.*

169. B. subulate, horizontally striated; whirls girt; white or straw colour. Indian ocean. *succinctus.*

170. B. subulate, varied with yellow or reddish patches; whirls flattish, transversely striated, and surrounded with an elevated belt. *commaculatum.*

171. B. ventricose; whirls perpendicularly striated with alternate brown and white bands; $1\frac{1}{2}$ inches long. *hastatum.*

172. B. white with brown bands of hollow dots. *aciculatum*

173. B. whirls of the spire longitudinally ribbed, the base with a rugged suture; lip a little prominent and emarginated above; 9 whirls in the spire; ribs a little curved. India. *phallus.*

174. B. whirls of the spire convex, distant, transversely striated; upper ones horizontally ribed; $3\frac{1}{2}$ inches long. Found in fresh waters. *flumineum.*

175. B. whirls of the spire ribbed, and transversely striated, the first gibbous; beak a little prominent; $1\frac{1}{2}$ inch long. *asperum.*

176. B. reticulated, wrinkled, with an incurved spire; aperture crenated; pillar wrinkled; lip thickened. *muricinum*

177. B. the whirls surrounded with a row of tubercles; minute. *tuberculatum.*

178. B. subulate, punctured, transversely striated; aperture obovate; whirls of the spire surrounded with a band, the first ventricose; 1 inch long. *punctulatum.*

179. B. subulate, smooth, thin, and finely striated transversely; whirls of the spire contiguous; tapering to a point. In fresh waters. *acicula.*

180. B. aperture ovate, oblong; whirls ventricose, distant and horizontally striated; the striæ elevated and separated by an intermediate band. *fasciolatum.*

181. B. subulate, smooth, snowy, with 2 bands; whirls of the spire contiguous. *niveum.*

182. B. a little ventricose; white with brown undulations; aperture oval; whirls 5; 3 inches long. *mucronatum.*

183. B. coarse, with a subincurved obtuse lip; $\frac{1}{2}$ inch long. India. *digitellus.*

184. B. whirls of the spire entire, with oblique decussated striæ; a finger's length, thickness of a quill. India. *obliquum.*

185. B. subangular, grooved; steel-blue or dotted with white and black; $1\frac{1}{4}$ inch long. India. *chalybeum.*

186. B. thin, with contiguous whirls; beak slightly emarginated; 4 to 5 inches long. India, in the mouths of muddy rivers. *fluviatile.*

187. B. subulate; whitish with reddish rays; whirls convex, surrounded with granulated striæ; first largest and ventricose. *radiatum.*

188. B. whirls of the spire longitudinally wrinkled, and marked with transverse granulated striæ, the first twice as large as the next; 1 inch long. *lividulum.*

189. B. whirls spotted; aperture long, without teeth; pillar plaited. *edentulum.*

190. B. longitudinally striated, with punctured spotted bands between the whirls. *pugio.*

191. B. spotted with 17 grooved whirls. *canaliculatum.*

192. B. whirls of the spire convex, and twice crowned; *varicosum.*

crowned; the first with 3 rows of punctures; $3\frac{1}{2}$ inches long.

cuspidatum 193. B. subulate, spotted; whirls convex, subremote.

cinereum. 194. B. subulate, smooth, cinereous, with obsolete bands; whirls undivided and longitudinally striated at the suture; whirls 14; 2 inches long.

virgineum. 195. B. greenish yellow with 2 red bands; whirls of the spire flattish; aperture large, oval. Rivers of Virginia.

proximatum. 196. B. whirls of the spire bifid; lower one substriated, upper one filiform; subulate, glossy.

monile. 197. B. whirls of the spire bifid; upper one grooved; lower one moniliform, subulate; yellowish white.

cingulatum 198. B. with 3 elevated belts grooved above and beneath; size of a cherry. Iceland.

geminum. 199. B. whirls of the spire bifid; the lower one substriated, upper one more protuberant; white; subulate.

obtusulum. * 200. B. white, glossy, semipellucid; 5 whirls in the spire; aperture oval. Faversham, England.

Gen. 25. Strombus.

53
Strombus.

Gen. Char.—The animal a limax: the shell univalve, spiral; aperture much dilated; the lip expanding, and produced into a groove leaning to the left (c).

Species.

A. *The lip projecting into linear divisions or claws.*

fusus. 1. S. tapering, smooth, with a subulate beak and toothed lip. Red sea.

pes-pelicani. * 2. S. *Corvorant's Foot;* lip with four palmated angular claws; mouth smooth; whirls tuberculated; 2 inches long. European and American seas, shores of Britain.

chiragra. 3. S. lip with 6 curved claws, and recurved beak; lip striated; two hind claws divergent and bent outwards; beak tuberculated. Indian ocean. Rare shell.

scorpius. 4. S. lip with 4 knotty claws; hinder one very long; 4 inches long.

lambis. 5. S. lip with seven straightish claws; mouth smooth. Asia. A large shell.

millepeda. 6. S. lip with 10 inflected claws; mouth substriated; back compressed; gibbous. Asia. Rare.

clavus. 7. S. tapering, smooth, with a subulate beak, and simple lip.

B. *Lobed.*

lentiginosus. 8. S. lip thickened and 3-lobed on the fore-part; back warty, and crowned with tubercles; beak obtuse; $3\frac{1}{2}$ inches long. Asia, America.

fasciatus. 9. S. lip entire; back crowned with 3 rows of protuberances, and rosy between them. Africa.

raninus. 10. S. lip thin, rugged, repand above; back orange, transversely striated, and crowned with tubercles; aperture white, polished.

gallus. 11. S. lip mucronate on the fore-part, and very long; back crowned with tubercles; beak straight; 6 inches long. Asia and America.

12. S. lip projecting into a sharp point; back muricated; beak erect and acute; 3 inches long. Asia. *auris-dianæ.*

13. S. anterior lip prominent, rounded, smooth; spire spinous; beak 3-lobed, obtuse. South America. *pugilis.*

14. S. anterior lip rounded, prominent, smooth; spire unarmed; beak 3-lobed, obtuse. *alatus.*

15. S. lip a little prominent; beak entire; back margined, smooth. *marginatus.*

16. S. lip a little prominent; back smooth; whirls rounded, equal; $2\frac{1}{2}$ inches long. Asia. *luhuanus.*

17. S. lip a little prominent; beak smooth; whirls gibbous, unequal. Asia. *gibberulus*

18. S. obovate, with knotty belts, and a subulate, smooth projection; an inch long. South America. *oniscus.*

C. *Dilated.*

19. S. lip rounded, entire on the fore-part; belly doubly striated; spire crowned with tubercles; upper ones minute. South America. *lucifer.*

20. S. lip rounded, and very large; shell crowned; belly and spire with conic expanded spines; glossy white; within, a rich rose colour; 10 inches long. South America. *gigas.*

21. S. lip rounded, very large; belly unarmed; spire a little knotty; 14 inches long. Asia. *latissimus.*

22. S. lip rounded, short; belly smooth; spire a little knotty; $3\frac{1}{2}$ inches long. Southern Asia. *epidromis.*

23. S. lip retuse, gibbous; belly and spire with knotty plaits; aperture 2-lipped, smooth; $1\frac{1}{2}$ inch long. India. *minimus.*

24. S. somewhat heart-shaped; with a round, short, retuse, smooth lip; pillar smooth; $2\frac{1}{2}$ inches long. Asia. *canarium.*

25. S. lip rounded, short; belly smooth; spire elongated; whirls divided by an elevated suture; 4 inches long. *vittatus.*

26. S. lip rounded, retuse; belly smooth, with 4 pale, linear, punctured belts. Asia. *succinctus.*

27. S. lip tapering, entire, slightly plaited, and crowned with fine spines; spire prickly. Hitherto found in a fossil state only. *spinosus.*

28. S. lip continued into a longitudinal cleft ridge. India. Frequently found fossil in Campania. *fissurella.*

29. S. lip tapering, retuse, short, striated; belly and spire with knotty plaits; aperture 2-lipped, unarmed; $2\frac{1}{2}$ inches long. Indian ocean. *urceus.*

30. S. thin, white, with orange spots and clouds; back smooth, plaited; whirls grooved; lip 3-toothed; beak violet. Indian ocean. *tridentatus.*

31. S. lip tapering, short-toothed; belly and spire plaited; $1\frac{1}{4}$ inch long. *dentatus.*

32. S. very thick; first whirl crowned with tubercles; interstices of the tubercles plaited; the next whirl transversely ribbed; the rest transversely striated; 6 inches long. *costatus.*

33. S.

(c) It ought to be observed, that these shells, in their young state, want the lip, and then have a thin turbinated appearance; from which circumstance they have been sometimes referred to a different genus.

bryonia. 33. S. conic, with a mucronate, 8-toothed lip; ſpire knotty; 7 inches long; very rare.

affinis. 34. S. tranſverſely ſtriated, gibbous; ſpire unarmed; firſt whirl crowned with tubercles.

lotus. 35. S. lip a little prominent, and twice emarginated beneath; firſt whirl of the ſpire ſmooth in the middle, and tranſverſely ſtriated on each ſide; the reſt crowned with obtuſe knots.

lævis. 36. S. ſmooth, ſilvery, radiated with brown; with obſolete tranſverſe plaits; ſpire elongated, with inflated, rounded whirls; above 2 inches long.

vexillum. 37. S. ſolid, ſubcylindrical, with alternate, reddiſh and ochraceous bands; lip denticulated within; pillar flat, glabrous, and emarginated at the baſe. Indian ocean; very rare.

norwegicus. 38. S. oblong, ſubulate, white, with round whirls; aperture ſpreading; ovate; beak a little aſcending.

D. *Tapering, with a very long ſpire.*

tuberculatus. 39. S. oblong, ovate, tuberculated; lip thickened.

paluſtris. 40. S. ſmoothiſh; lip ſeparated behind. Savannahs of the Indian ocean.

ater. 41. S. ſmooth; lip ſeparated before and behind; 26 lines long. Fens of Amboyna.

lineatus. 42. S. ſubulate, brown, with 7 ſpiral, impreſſed lines; aperture ovate; 11 lines long.

punctatus. 43. S. ſhell ſubulate, yellowiſh, with a white band; ſtriated with red near the ſuture; leſſer whirls grooved, 6 larger ones ſmooth; ſpire with 12 or 13.

vibex. 44. S. ſubulate, cinereous, tranſverſely ſtriated; whirls 8 to 11 knotty, and marked with red ſtreaks. Coromandel, Friendly iſlands.

auritus. 45. S. barred with brown; whirls 7, muricated; each with 7 yellow compreſſed tubercles; aperture ovate; 10 lines long. Africa.

aculeatus. 46. S. brown, tuberculated; whirls 12, with 5 rows of tubercles on each; minute; lip depreſſed, crenulated; 18 lines long. Marſhes of Africa.

agnatus. 47. S. ſmooth; lip very prominent, and emarginated behind.

dealbatus. 48. S. with black whirls tranſverſely ſtriated; outer ones ſmooth; margin of the lip and pillar white.

fuſcus. 49. S. brown, with numerous tubercles and whirls; lip ſeparated before and behind; within ſtriated with brown.

marginatus. 50. S. brown; loweſt whirl edged with white.

lividus. 51. S. ſubangular, with ſpinous knots; lip ſeparated on the fore-part; brown, tranſverſely ſtriated.

ſtriatus. 52. S. convex, ſtriated, white, with a few fulvous ſtreaks; pillar ſinuated, inflected, thin, pellucid; 2½ inches long.

ſiniſter. 53. S. whirls reverſed, thin, longitudinally ſtriated; 1¾ inch long, with 10 whirls. Hitherto found in a foſſil ſtate only in Helvetia.

Gen. 26. MUREX.

54 Murex. *Gen. Char.*—The animal a limax; the ſhell univalve, ſpiral, rough, with membranaceous ſutures; aperture oval, terminating in an entire, ſtraight, or ſlightly aſcending canal.

SPECIES.

A. *Spinous, with a produced beak.*

hauſtellum. 1. M. ovate, tuberculated; with a long ſubulate, ſtraight, muricated beak. Aſia, America, Red ſea.

2. M. *Thorny woodcock.* Ovate, with a triple row *tribulus.* of ſetaceous ſpines; beak elongated, ſubulate, with ſimilar ſpines. Var. 1. With ſpines ſhorter than the beak. 2. With ſpines as long as the beak. This laſt is rare. Aſia, America, Red ſea.

3. M. roundiſh, ſurrounded with ſubulate, oblique *cornutus.* ſpines; beak long, ſubulate, ſtraight, with a few ſhort ſpines; 8 inches long; ſpines 2 inches. Africa. Very rare.

4. M. ſubovate, ſurrounded with ſtraight ſpines; *brandaris.* beak ſubulate, ſtraight, obliquely ſurrounded with ſpines. Mediterranean, Adriatic.

5. M. ovate, knotty, and ſurrounded with ſpines on *trunculus.* the fore part; beak ſhort, perforated, truncated. Mediterranean, Jamaica.

6. M. ovate, knotty, with 3 to 7 protuberances; *pomum.* beak broad; coarſe and ponderous. Eaſtern ſhores of Africa.

7. M. ovate, tranſverſely grooved, with tranſverſe *decuſſatus.* ribs croſſed by perpendicular knots; beak imperforated; 7 diſtinct whirls in the ſpire. Africa.

8. M. turgid, knotty, tranſverſely ſtriated, with a *triacanthus.* triple row of ſpines. Found in a foſſil ſtate.

9. M. tranſverſely ſtriated, with 8 rows of hollow *melanamathos.* black ſpines; ſpire a little knotty and prickly; beak ſubulate.

10. M. white, with numerous rows of leafy, black, *radix.* undulated ſpines. A very rare ſhell.

11. M. white, with rows of ſpines, and very ſhort *candidus.* beak; ſome of the ſpines black; 2 inches long.

12. M. inflated, with rows of ſpines, white barred *faſciatus.* with brown; 4 diſtinct turgid whirls in the ſpire.

B. *Suture expanding into criſped foliations; beak abbreviated.* PURPURA.

13. M. a triple row of foliations; ſpire contiguous; *ramoſus.* beak truncated. America, Aſia, Red ſea.

14. M. a triple row of foliations; aperture 1-tooth- *foliatus.* ed. North America.

15. M. 4 rows of foliations; ſpire capitate; beak *ſcorpio.* truncated. Aſia. Very rare.

16. M. 5 rows of foliations; ſpire contiguous; *ſaxatilis.* beak abbreviated. Mediterranean, Aſia.

17. M. white, diaphanous; 6 rows of foliations, *diaphanus.* which are tipt with black.

18. M. ochraceous, tranſverſely ſtriated, with numer- *cichoreum.* ous rows of foliations.

19. M. varied with white and red; with flat acute *verſicolor.* foliations; pointed with black.

* 20. M. ſubangular; whirls crowned with tubular *erinaceus.* and ſubſpinous rays, ſcales or points; beak ſhort and covered; 2 inches long. European ſeas, ſhores of Britain.

21. M. 7 rows of foliations, white with elevated, *ſtriatus.* tranſverſe, brown ſtriæ; 7 whirls in the ſpire. India.

22. M. ſhell elongated, triangular, with membra- *triptenus.* naceous foliations at the angles; 7 whirls in the ſpire. Found foſſil in Campania.

23. M. umbilicated with muricated ribs; whirls *ſacellum.* flattiſh above, with acute margins; lip crenated; beak ſtraight, aſcending. Nicobar.

24. M. triangular, knotty, tranſverſely grooved, *motacilla.* with a triple row of tubercles; beak long, ſubulate, ſtraight; mouth white. India.

25. M.

triqueter. 25. M. long, ſubulate, triangular; ribs reticulated; beak ſtraight, cloſed; ſpire pyramidal, with 6 whirls.

C. *With thick, protuberant, rounded ſutures.*

lyratus. 26. M. protuberances croſſed by ſmooth belts; aperture ovate.

rana. 27. M. rough, with oppoſite, impreſſed protuberances, with one or two muricated belts. Aſia.

gyrinus. 28. M. protuberances oppoſite, continued, and barred with tuberculated dots; aperture orbicular. Mediterranean, Atlantic, India.

affinis. 29. M. turgid, with oppoſite continued protuberances; ſpire pointed; whirls ſurrounded with a crown of tubercles; the outermoſt glabrous.

lampas. 30. M. protuberances nearly oppoſite, gibbous, with longitudinal tuberculated protuberances; from 4 to 14 inches long. Indian ocean.

olearium. 31. M. protuberances alternate, and numerous tubercles; back unarmed and ſtriated behind; aperture toothleſs. Mediterranean and African ſeas.

femorale. 32. M. protuberances decuſſated, triangular, wrinkled and knotty on the fore-part; aperture ovate, toothleſs; from 5 to 7 inches long. Aſia, Guinea, and America.

cutaceus. 33. M. with a ſingle protuberance; angular, and a little wrinkled with knots; pillar perforated; aperture toothed; 3 inches long. Barbary, Guinea, South America.

lotorium. 34. M. protuberances decuſſated, angular, with longitudinal tuberculous knots; beak flexuous; aperture toothed. Mediterranean.

pileare. 35. M. protuberances decuſſated, and a little wrinkled with knots; aperture toothed; beak ſubaſcending. Mediterranean.

bufonius. 36. M. ſix oppoſite, continued, vaulted protuberances, and knotty belts; beak oblique. A rare ſhell.

pyrum. 37. M. varicoſe, ovate, tranſverſely grooved and knotty; beak long, flexuous, ſubulate. Indian ocean.

caudatus. 38. M. thin, tranſverſely ſtriated; beak ſubulate; ſpire a little prominent, tipt with brown; whirls grooved; firſt gibbous.

rubecula. 39. M. protuberances decuſſated, obtuſe, with knotty wrinkles; belly equal; aperture toothed. Africa, India, South America. Rare.

ſcrobiculata. 40. M. protuberances hollowed, ſmooth, nearly oppoſite; aperture toothed. Mediterranean.

reticularis. 41. M. protuberances nearly oppoſite, reticulated with tuberculated ſpots; pillar almoſt toothleſs; beak aſcending; 6 inches long. Mediterranean, America.

lamelloſus. 42. M. protuberances membranaceous, continued though the ſpire, and terminated with a ſpine. Falkland iſlands.

nodatus. 43. M. whirls knotty; aperture violet; lip toothed; beak ſtraight. New Holland.

anus. 44. M. protuberances and lips membranaceous, dilated; gibbous and reticulated with tubercles; aperture ſinuous; beak erect; 3 inches long. Mediterranean and Aſia.

miliaris. 45. M. varicoſe with tuberculated belts; aperture a little toothed; beak elongated; whirls ventricoſe.

ſenegalenſis. 46. M. tranſverſely ſtriated, with ſpinous protuberances; the ſpines decreaſing towards the head; 2½ inches long. Senegal.

carinatus. * 47. M. ventricoſe, with 5 or 6 whirls, forming angular ridges; aperture ſemicircular; beak a little reflected; 4 inches long. Europe, Britain.

D. *More or leſs ſpinous, and without manifeſt beak.*

48. M. obovate, with ſubulate ſpines in rows; aperture and lip toothed; 1½ inch long. Aſiatic ocean. *ricinus.*

49. M. obovate with conic ſpines; lip toothed; pillar ſmooth, coloured; 3½ inches long. *nodus.*

50. M. knots in numerous rows; lip with pointed angles; pillar flattiſh. India. *neritoideus*

51. M. coarſe, ventricoſe, tranſverſely ſtriated, with 4 rows of knots; pillar impreſſed; outmoſt whirls flattiſh. *fucus.*

52. M. obovate and knotty on the fore part; aperture ſuborbicular, toothleſs; 4 or 5 inches long. Chineſe ſhores. Yields a purple fluid. *loco.*

53. M. ſubovate, with acute ſpines in 4 rows; aperture toothleſs, repand. *hyſtrix.*

54. M. ovate, with obſolete ſpines, which are blackiſh; aperture toothleſs; pillar tranſverſely ſtriated. *mancinella*

55. M. ovate, ſtriated, with 3 or 5 rows of obtuſe ſpines or tubercles; aperture tranſverſely ſtriated. Guinea, India. *hippocaſtanum.*

56. M. *Small prickly whelk.* Tapering, longitudinally ribbed, and tranſverſely cancellated; aperture ſtriated; ribs prickly; 2 inches long. Indian ocean. *ſenticoſus.*

57. M. obovate, glaucous, with a ſubſpinous whirl; ſpire ſomewhat prominent; aperture ſmooth; 5½ inches long. India, America. *melongera.*

58. M. thick, ventricoſe, tranſverſely grooved and knotted; aperture repand, ovate; lip ſinuous, inwardly plaited and denticulated. India. *conſul.*

59. M. brown, ſubovate, ſlightly beaked with crowded, nodulous, paler belts. George's bay. *lima.*

E. *With a long, ſtraight, ſubulate, cloſed beak, and unarmed with ſpines.*

60. M. without beak, ſlightly plaited, ovate, pointed; lip carious. Found in the aqueduct at Seville. *carioſus.*

61. M. tapering with acute ſpotted belts, and ſtraight tail; lip cleft; 4 inches long. Indian and American iſlands. *babylonius.*

62. M. tapering, with immaculate knotty belts; lip with a ſeparate ſcoop. India. *javanus.*

63. M. ventricoſe, pointed with a cancellated, reflected beak; aperture oval; whirls with tranſverſe, granulated ſtriæ; baſe crowned with ſpines. Senegal. *ſinenſis.*

64. M. ſpire with elevated rings; interſtices filled with ſhort, ſtraw-like projections; whirls crowned with tubercles at the baſe; 3 inches long. Southern ocean. *ſtramineus.*

65. M. ovate, longitudinally ſtriated; lip undulated; whirls channelled; firſt turgid, and 4 plaited; the next 3 plaited; 2½ inches long. South ſea. *auſtralis.*

66. M. ſpire pointed, and tranſverſely ſtriated; 4 firſt whirls with a callus, armed with hooks in the middle, 5 and 6 ribbed, the reſt glabrous. *uncinatus.*

67. M. tapering; whirls crowned with tubercles, and ſurrounded with a granulate belt; the firſt finely ſtriated tranſverſely. *turris.*

68. M. beak a little reflected, and obliquely ſtriated; 3 firſt whirls of the ſpire ribbed; other 4 cancellated; firſt *coſtatus.*

first obconic; pillar with a single plait. Found fossil in Campania.

asper. 69. M. longitudinally plaited, and transversely ribbed; spire a little prominent; aperture ovate; lip crenulated.

colus. 70. M. tapering, striated, knotty; carinated, with a long straight beak; lip crenulated; beak 3 inches long. Indian ocean.

morio. 71. M. black, with a white band; beak dilated; pillar wrinkled; whirls knotty; 6 inches long. Africa.

cochlidium. 72. M. beak dilated; whirls of the spire flat above. Indian ocean.

spirillus. 73. M. beak long, spire mucronated; whirls convex above. Tranquebar.

canaliculatus. 74. M. beak dilated; whirls of the spire separated by a small canal. Canada, Frozen sea.

ficus. 75. M. beak dilated; whirls separated by a small canal; first crowned with knobs at the base.

carica. 76. M. transversely striated; beak dilated; spire a little prominent; whirls crowned with spines at the base; 8 inches long.

rapa. 77. M. solid, umbilicated, with a triple row of knots transversely striated; aperture largely striated. India.

niveus. 78. M. beak dilated; whirls of the spire separated by a small groove; the first with transverse, carinated ribs. Brazil.

granum. 79. M. hemispherical, glabrous, diaphanous; beak straight, spreading; crown papillary. North America.

aruanus. 80. M. beak dilated; spire crowned with spines. New Guniea.

perversus. 81. M. beak dilated and repand; spire recurved and slightly crowned. American ocean. Exceedingly rare.

antiquus. * 82. M. beak dilated; shell oblong; 8 round whirls, first ventricose; 4 to 6 inches long. European seas, Scotland.

despectus. * 83. M. oblong, striated, and somewhat rugged; beak dilated; whirls 8, with two elevated lines; 5 inches long. European seas, shores of Britain.

fornicatus. 84. M. ovate oblong; beak dilated; whirls ventricose; a little angular and longitudinally striated; 7 inches long. Greenland seas.

incrassatus 85. M. oblong, transversely wrinkled, and longitudinally striated; lip denticulated within, and thickened without.

truncatus. * 86. M. oblong, longitudinally ribbed; beak a little reflected, emarginated and truncated: very minute; whirls 6. Coasts of Europe, and shores of Britain.

acuminatus. * 87. M. narrow, oblong, ribbed; spire pointed. Shores of England.

argus. 88. M. gibbous, with transverse, tuberculated ribs; brown, with darker band; within white; aperture ovate.

maculosus. 89. M. cancellated, yellow, with alternate white bands, and chesnut patches; 11 round whirls in the spire. India. Very rare.

magellanicus. 90. M. ventricose, umbilicated, transversely striated; whirls of the spire with parallel ribs; the first large. Straits of Magellan.

cancellatus 91. M. ovate, solid, opaque, cinereous; whirls of the spire cancellated, and separated by a groove.

scolopaceus 92. M. whirls surrounded with grooves, and tubercles above; tip of the tubercles and aperture white.

literatus. 93. M. ventricose, tapering, spotted with black; beak short; pillar with a single plait; spire with 8 prickly whirls.

trigonus. 94. M. subtriangular, cancellated; spire with 7 inflated, contiguous whirls; the first with a large distinct tubercle; 2 inches long. Senegal.

semilunaris. 95. M. longitudinally ribbed, and finely striated transversely; spire with flattish distant whirls, with rows of tubercles; aperture semilunar; 1 inch long. Senegal.

sulcatus. 96. M. rounded with annular grooves; aperture oval; first whirl of the spire turgid; $1\frac{1}{4}$ inch long. Senegal.

tritonis. 97. M. ventricose, oblong, smooth, with rounded whirls; aperture toothed; beak short; 16 inches long. India and the South seas.—This shell is used by the natives of New Zealand as a musical instrument, and by the Africans and many nations of the East, as a military horn.

pusio. 98. M. ventricose, oblong, smooth; spire striated with rounded whirls; aperture smooth; beak short; $1\frac{1}{4}$ inch long. Mediterranean and Africa. Rare.

tulipa. 99. M. ventricose, oblong, smooth; whirls rounded with a double suture; pillar with two plaits; beak dilated, striated. South America.

clathratus. 100. M. oblong beak, and grooved with longitudinal membranaceous plaits. Iceland.

nassa. 101. M. solid, black or pale brown, with a white subdiaphanous band; whirls knotty; pillar a little plaited.

plicatus. 102. M. whirls of the spire plaited and knotty.

scala. 103. M. umbilicated with distant, wedged, ribbed, and transversely striated whirls; aperture heart-shaped.

fiscellum. 104. M. angular, longitudinally plaited, and transversely striated; lip toothed; mouth violet; beak straight, short. China.

corona. 105. M. fastigiated with brown and yellowish bands; beak straight, entire. Mexico.

dolarium. 106. M. ovate, with a few elevated obtuse belts on the whirls; size of a walnut. The ocean.

corneus. * 107. M. oblong, slender, white; margins of the whirls complicated; aperture toothless; 3 inches long. British and North seas.

lignarius. 108. M. oblong, coarse, with obtusely knotty whirls; aperture toothless; beak short.

trapezium. 109. M. oblong, obtusely angular, with slightly knotty whirls; aperture toothed; 6 inches long. Indian ocean.

vespertilio. 110. M. solid, ventricose, smooth, with an oblong oval aperture; beak and crowned spire striated; 4 inches long. Indian ocean.

scolymus. 111. M. thin, diaphanous, ventricose, and transversely striated; middle of the beak smooth; spire with obtuse, undulated knots; pillar 3 plaited.

harpa. 112. M. ventricose, longitudinally ribbed; ribs transversely striated; spire a little prominent; whirls distant.

tuba. 113. M. fusiform, transversely striated; white, with a brown tip to the spire, which has 8 whirls distant, and crowned at the base with knots. China.

syracusanus. 114. M. oblong, with striated plaited whirls, covered

vered with tuberculated ridges; aperture toothleſs; beak ſhort. Mediterranean; rare.

craticulatus. 115. M. oblong, with rounded, plaited, and tranſverſely reticulated whirls; aperture toothed, ſtriated within. Mediterranean.

ſcriptus. 116. M. nearly without beak; fuſiform, ſmooth, pale, with longitudinal brown ſtriæ; lip toothed; very ſmall. Mediterranean.

ternatanus 117. M. tranſverſely ſtriated, with diſtant undulately tuberculated whirls; aperture oblong; beak ſtraight; 4 inches long; yellow. Ternate iſland.

infundibulum. 118. M. umbilicated, undulately knotty; ſtriæ elevated, brown; perforation funnel-ſhaped; pillar two-plaited; 4 inches long; very rare.

polygonus. 119. M. ventricoſe, undulated with tubercles; ſtriated, grooved, and obtuſely angled; black, with an oval aperture, and ſhort beak; $3\frac{1}{2}$ inches long. Indian ocean.

icelandicus. 120. M. tranſverſely ſtriated; ſpire papillous at the tip, with round whirls; firſt large and ventricoſe; 5 inches long. Iceland.

lævigatus. 121. M. fuſiform; ſpire tranſverſely ſtriated; whirls diſtant, flattiſh; the firſt round, ſmooth; $3\frac{1}{2}$ inches long. Found foſſil in Campania.

foſſilis. 122. M. fuſiform, incancellated, with a long beak; $1\frac{1}{2}$ inch long. Found foſſil in Campania.

candidus. 123. M. ſnowy, tranſverſely ſtriated; ſpire with diſtant whirls, keeled in the middle, and crowned with tubercles; lip grooved within, and denticulated at the margin; $9\frac{1}{2}$ inches long.

anſatus. 124. M. brown, tranſverſely ſtriated, ſpire mucronated; whirls diſtant, convex, and knotty at the baſe; beak long.

undatus. 125. M. ſolid, ventricoſe, with waved angles, and finely ſtriated tranſverſely; ſpire mucronate; whirls knotty at the baſe; lip denticulated; $8\frac{1}{2}$ inches long; ponderous. India.

longiſſimus 126. M. thin, ſtriated, with an obtuſe, knotty ſpire, and long ſtraight beak; 9 inches long. India.

lancea. 127. M. narrowed; whirls of the ſpire tranſverſely ribbed, and longitudinally crenated; aperture ovate; ribbed with white within, and toothed at the margin; pillar 2-plaited. Amboyna.

anguſtus. 128. M. narrowed; firſt whirl of the ſpire longitudinally plaited, and tranſverſely ribbed; the other ſmooth and round; beak tranſverſely ſtriated.

verſicolor. 129. M. ſubcylindrical; ſpire obtuſe; whirls round and ſtriated; lower ones moſtly glabrous. India.

verrucoſus 130. M. umbilicated and ſurrounded with belts; middle ones more raiſed; whirls crowned with tubercles, which are ſpotted with brown. Red ſea.

ſtriatulus. 131. M. thin, tranſverſely ſtriated, ſpire mucronate; whirls round; lip crenulated; 4 inches long.

pardalis. 132. M. rounded, white, with violet ſpots, longitudinally ribbed, and tranſverſely ſtriated; ſpire obtuſe.

gigas. 133. M. whirls of the ſpire turgid, gibbous, nodulous and annulated; lip denticulated beneath; 21 inches long.

lignoſus. 134. M. whitiſh; ſpire obtuſe; whirls ſlightly crowned with wrinkled, unequal tubercles; beak tranſverſely ſtriated; $1\frac{1}{2}$ inch long.

gibbulus. 135. M. tapering, orange; ſpire obtuſe; whirls diſtant, with longitudinal ribs, and flexuous tranſverſe ſtriæ.

136. M. tapering; ſpire with contiguous whirls, ſeparated by a flexuous line; firſt ventricoſe; Adriatic. *granularis.*

137. M. tapering, tranſverſely ribbed; whirls convex; aperture oval; lip denticulated. *vexillum.*

138. M. oblong, ventricoſe; whirls with a ſtriated margin; aperture glabrous; beak ſhort, and bent outwards. *vulpinus.*

139. M. ovate, tranſverſely ſtriated; ſpire with flattiſh whirls; crowned with a row of rounded tubercles; $1\frac{1}{2}$ inch long. Senegal. *afer.*

140. M. ventricoſe; ſpire obtuſe, cancellated, with carinated whirls; firſt ventricoſe and ſmooth; beak long and ſmooth; three inches long. Found foſſil in Campania. *campanicus.*

141. M. whirls of the ſpire with decuſſated ribs, the firſt large, three outermoſt ſmooth; lip toothed outwardly; very ſmall. Sandy ſhores of India. *arenoſus.*

142. M. narrow, tranſverſely ſtriated; ſpire mucronated; whirls diſtant, contrary, round, and longitudinally ribbed; beak prominent; $1\frac{1}{2}$ inch long. Shores of Morocco. *marocenſis.*

143. M. oblong, whitiſh, with tranſverſe, reddiſh ſtriæ; beak ſhort, ſtraight. New Zealand. *lineatus.*

144. M. a little tapering; whirls carinated above, margined and flattened; beak long and ſtraight. Southern ocean. *perron.*

145. M. cylindrical; ſpire with a crenated callous belt; upper whirls with plaited knots, lower ones flattiſh; beak ſhort, ſtraight, emarginated. *larva.*

146. M. ſolid, thick, coarſe; ſpire exſerted; whirls tranſverſely ſtriated; aperture ſemiorbicular and ſtriated. *neretoideus.*

147. M. ovate, angular, irideſcent; longitudinally grooved and plaited; beak ſhort; lip denticulated. India, and South ſeas. *priſmaticus.*

148. M. ribs longitudinally plaited, and tranſverſely grooved; angular, ſpinous, carinated; alternately varied with white and brown; whirls ſuddenly diminiſhing; beak ſhort, ſtraight. Pulo Condor. *columbarium.*

149. M. ribbed, varied with brown, yellow and white; whirls oblique, with a tuberculated margin, and brown band in the middle; beak ſhort, dilated, aſcending; two inches long. *aſperrimus*

150. M. white, undulated with bay; with grooves marked with raiſed ſtriæ; whirls nodulous at the margin; beak ſtraight; four inches long. Red ſea. *undulatus.*

F. *Tapering, ſubulate, with a very ſhort beak.*

151. M. whirls of the ſpire plaited above; pillar plaited within; beak aſcending; three inches long. India. *vertagus.*

152. M. whirls of the ſpire tuberculated, with a ſpinous ſtreak in the middle; pillar with a ſingle plait; beak aſcending; four inches long. Southern ocean, Red ſea, Atlantic. *aluco.*

153. M. whirls ſurrounded with belts longitudinally ſtriated; firſt whirl tranſverſely ſtriated; beak aſcending. *annularis.*

154. M. ventricoſe; ſpire tranſverſely ſtriated; whirls longitudinally plaited and knotty; aperture oval. *plicatulus.*

155. M. ventricoſe, tranſverſely ſtriated and crowned with black knots; lip dilated. *ſordidus.*

156. M. ſpire tranſverſely ſtriated and grooved; whirls *cingulatus.*

whirls ſurrounded with three rows of granulations, the firſt a little knotty. Tranquebar.

fuſcus. 157. M. rounded, brown; firſt whirl of the ſpire gibbous; the others varicoſe; the laſt with numerous ſpines.

faſciatus. 158. M. tranſverſely ſtriated; ſpire crowned. Rivers of America.

fluviatilis. 159. M. brown; firſt whirls of the ſpire crowned with ſpines, the others with knots; aperture repand.

alatus. 160. M. reticulated; ſpire mucronate; firſt whirl grooved and tranſverſely ſtriated; lip winged.

nodulosus. 161. M. tranſverſely ſtriated, and alternately barred with brown and white; ſpire mucronate; whirls diſtant, with undulated knots.

terebella. 162. M. with a triple moniliform belt on each of the whirls; aperture oval, with curved ſtriæ within; 1 to 2½ inches long.

fuſcatus. 163. M. whirls crenulated; the upper ſtria denticulated. Mediterranean.

torulosus. 164. M. whirls of the ſpire with a ſlightly knotty zone above; beak ſhort.

radula. 165. M. whirls of the ſpire tuberculated, with a double row of punctured ſtriæ. Africa.

aſper. 166. M. whirls of the ſpire grooved, tranſverſely ſtriated and muricated. Guinea.

granulatus 167. M. rough, with decuſſated tubercles; beak acute, aſcending; 2 inches long; white. India.

decollatus. * 168. M. whirls of the ſpire with longitudinal plaited grooves, with the tip ſeemingly broken off. European ſeas. Britain.

moluccanus. 169. M. ſtriated; whirls of the ſpire tranſverſely grooved with undulated, longitudinal plaits; lip dilated, crenulated. Marſhes of Molucca iſlands.

minimus. 170. M. with tranſverſe, undulated ſtriæ, croſſed by longitudinal lines; aperture orbicular.

ſtrigilatus. 171. M. longitudinally ſtriated; whirls undivided, with a ſnowy belt at the ſuture, marked with reddiſh ſpots.

tuberculatus. 172. M. tranſverſely ſtriated, and ſurrounded with glabrous knots; lip thickened.

gibboſus. 173. M. whirls of the ſpire margined; belly gibbous; lip cleft, denticulated; beak ſhort.

atratus. 174. M. black; whirls tranſverſely ſtriated and tuberculated; pillar with one plate.

contrarius. 175. M. four contrary whirls marked with double ſtriæ; beak dilated. European and North ſeas.

eburnea. 176. M. contrary, hyaline, with 6 finely crenulated whirls.

conditus. 177. M. tapering, rough with granulations; lip doubled, emarginated on each ſide, and toothed within; aperture oval and ſtriated.

clava. 178. M. tranſverſely ſtriated and ſpotted; whirls with plaited knots; lip double, dilated. Pulo Condor.

hexagonus. 179. M. yellowiſh, hexagonal, with tranſverſe, granulated ſtriæ; firſt whirl tuberculated. South ſea; and is often found foſſil.

minutiſſimus. * 180. M. with five whirls, ſpirally ſtriated, and remote ribs; pellucid; a very minute and elegant ſhell. Coaſts of Wales.

55 Trochus.

Gen. 27. Trochus.

Gen. Char.—The animal a limax; ſhell univalve, ſpiral, more or leſs conic; aperture ſomewhat angular or rounded; the upper ſide tranſverſe and contracted; pillar placed obliquely.

Species.

A. *Erect, with the pillar perforated.*

1. T. conic, ſmooth, ſomewhat umbilicated; a large ponderous ſhell, with oblique, red, perpendicular ſtriæ. Indian ocean. *niloticus.*

2. T. conic, tuberculated, with an oblique perforation; inner lip two-lobed. Aſia, South America. *maculatus.*

3. T. convex, obtuſe, margined; the umbilicus pervious and crenulated, 2¼ inches long. Aſia, Africa. This is a very beautiful ſhell. *perſpectivus.*

4. T. convex; pillar 2-toothed; perforation crenulated. Mediterranean. *hybridus.*

5. T. convex, with callo-punctured ſtriæ; pillar 1-toothed. Mediterranean. *cruciatus.*

6. T. obovate, ſtriated; marked with concatenated, globular dots; aperture and pillar toothed; umbilicus crenated. European and Aſiatic ſeas. *pharaonis.*

* 7. T. convex, obliquely umbilicated; ridges of the whirls riſing into obtuſe tubercles. European and African coaſts, Britain. *magus.*

8. T. ſtriated, plaited above, and more convex beneath; aperture ovate and 1-toothed. Red ſea. *modulus.*

9. T. ſubovate; grooves moniliform and alternately larger; ſhell black; aperture yellowiſh. *ſcaber.*

10. T. obliquely umbilicated; convex; whirls ſlightly margined. Mediterranean. *varius.*

* 11. T. ovate, obliquely umbilicated; whirls rounded; ſize of a pea. Shores of Europe. Britain. *cinerarius.*

12. T. ovate, ſubumbilicated; perforation nearly ſhut up; loweſt whirl more remote. Mediterranean and Greenland ſeas. *divaricatus.*

13. T. conico-convex; perforation pervious, exactly cylindrical; whirl ſlightly emarginated. Shores of Europe. *umbilicaris.*

14. T. convex, conic; whirls ſpinous and margined; aperture ſemi-heart-ſhaped; 2 inches diameter. India and America. *ſolaris.*

15. T. depreſſed, oblique; white with brown lines; ſpire tranſverſely ſtriated, and longitudinally ribbed; firſt whirl ventricoſe; aperture orbicular; firſt whirl large; pillar brown. *tectum.*

16. T. conic, white ſpotted with red; whirls round, with moniliform belts; firſt whirl only perforated. India. *conus.*

17. T. ſubequal, mucronate; whirls 9, ſpinous beneath; on each ſide a linear band of white and black, with a triple row of knots. *ſpinoſus.*

18. T. lateritious, ſpotted with white; the baſe flat, with concentric lines of concatenated dots; whirls channelled, teſſelated at the lower margin with white and cheſnut. South America. *jujubinus.*

19. T. plaited with knots, tranſverſely ſtriated, with belts of concatenated dots; perforation funnel-ſhaped; pillar crenulated. India. *alveare.*

20. T. baſe and continued perforation funnel-ſhaped; whirls contiguous, undulated and plaited; aperture denticulated at the margin; 2 inches broad. India. *concavus.*

21. T. ſurrounded with granulations and knots, green, and whitiſh towards the tip; the tip varied with black dots. India. *vernus.*

22. T. covered with white, greeniſh, and buff-coloured ſpots; tip with red and black ones; baſe white *conſperſus.*

ſpotted

ſpotted with red; within pearly; whirls with many rows of knots; lower margins glabrous. India.

tentorium. 23. T. wrinkled and plaited; whirls knotty beneath, with concatenated dots in the middle; whirls diſtant; perforation funnel-ſhaped. India.

ochroleucus. 24. T. wrinkled and plaited, obliquely crenated and tranſverſely ſtriated; baſe flat; white with red dots. India.

ſtellatus. 25. T. plaited and wrinkled, ſea-green; whirls with concatenated dots; upper ones with a radiated ſpinous margin. India.

ſpengleri. 26. T. ſurrounded with rows of ochraceous knots and granulations, waved with red; one part of the baſe ſmooth.

coſtatus. 27. T. dots elevated, concatenated; whirls with oblong white knots beneath, and intermediate purple grooves.

inæqualis. 28. T. rough, with unequal knots and granulations; many rows of knots on the whirls; tubercles larger on the marginal row.

regius. 29. T. white with a roſy ſhade; tranſverſely ſtriated, with many rows of knots; margin of the whirls prominent; perforation funnel-ſhaped.

verrucoſus 30. T. white, radiated with purple; conic; margin of the whirls knotty; perforation funnel-ſhaped.

cylindricus 31. T. browniſh, cylindrical; whirls convex, marked with tranſverſe ſtriæ; perforation crenated. Very rare.

radiatus. 32. T. radiated with red; pyramidal; whirls with concatenated dots; perforation funnel-ſhaped. South America.

viridis. 33. T. green; firſt whirl with 5 rows of knots, ſecond with 4, the reſt glabrous.

ruſticus. 34. T. black-brown; obtuſely pyramidal. China.

nigerrimus. 35. T. deep black; whirls flattiſh; ſpire tranſverſely ſtriated; pillar 1-toothed. China.

fanulum. 36. T. whirls of the ſpire ochraceous, with ſpotted tubercles; and with an intermediate, ſpotted, wrinkled groove.

ſtrigoſus. 37. T. ochraceous, varied with black at the tip; pyramidal and tranſverſely ſtriated; whirls of the ſpire flattiſh; margin tumid and ſpotted with red; very ſmall. Shores of Morocco.

pyramis. 38. T. pyramidal, with cheſnut ſpots and clouds; margin of the whirls vaulted and nodulous; ½ to 2 inches long.

capenſis. 39. T. depreſſed, varied with white and cheſnut; baſe convex, with a ſcarlet ring marked with deeper ſpots. Cape.

ægyptius. 40. T. depreſſed, white ſpotted with red; whirls tranſverſely ſtriated and plaited, diſtant; pillar 1-toothed; ¼ inch long. Red ſea.

depreſſus. 41. T. whitiſh, radiated with red, and red at the tip; depreſſed; whirls ſurrounded with a belt of moniliform dots.

lævigatus. 42. T. pale brown; baſe ſub-convex; whirls ſmooth, obſoletely ſtriated tranſverſely; perforation white, funnel-ſhaped.

grœnlandicus. 43. T. pellucid, fleſh-colour; baſe convex; whirls 6, convex and finely ſtriated tranſverſely.

roſeus. 44. T. convex, roſy, grooved; perforation very minute; ſhell ſmall. Cape of Good Hope.

patholatus. 45. T. depreſſed, brown with whitiſh ſpots; very minute.

viridulus. 46. T. greeniſh, obliquely radiated with white; whirls convex, with a belt of moniliform granulations; pillar toothed.

47. T. convex, with numerous rows of granulations; perforation denticulated; aperture crenulated. *urbanus.*

48. T. clouded with brown and gray; rows of granulations numerous, with knots; aperture crenated; perforation toothed; 6 lines long. Guinea. *guineenſis.*

49. T. cinereous, with moniliform belts of granulations; perforation white, toothed; aperture crenated. *nodulus.*

50. T. depreſſed, pale fleſh colour, with crowded moniliform belts of granulations; perforation large; 1-toothed, *carneus.*

51. T. tranſverſely ſtriated; whirls diſtant; numerous ſquare ſpots on the ſpire. European ſeas. *teſſellatus.*

52. T. convex, cheſnut; whirls of the ſpire convex, the outer ones ſaffron-coloured. Africa. *croceus.*

53. T. depreſſed, convex; with oblique violet rays; whirls convex. Mediterranean. *obliquatus.*

54. T. convex, cheſnut; whirls with a fillet, varied with red and white at the upper margin. *vittatus.*

55. T. depreſſed, pyramidal; baſe concave; whirls tranſverſely ſtriated and obliquely ribbed, the firſt with a keeled margin; perforation funnel-ſhaped. Found foſſil in Campania. *ſchrœteri.*

56. T. conic-convex; whirls unarmed; aperture ſemi-heart-ſhaped; perforation ſpiral; ſcarcely 1 inch high. India. *indicus.*

57. T. depreſſed, cheſnut; whirls tranſverſely ſtriated and crenated, with rows of granulations; perforation pervious, crenulated. *infundibuliformis.*

58. T. ſtraw-colour; whirls convex, with decuſſated ſtriæ ſeparated by a groove; perforation pervious. Tranquebar. *ſtramineus*

59. T. white, marked with browniſh rays and crenated ſtriæ; perforation crenated, pervious. *variegatus*

60. T. convex, tranſverſely ſtriated; white, with ſquare reddiſh ſpots; perforation crenulated; whirls of the ſpire ſeparated by a white ſtreak. *areola.*

61. T. greeniſh yellow, with longitudinal plaited ribs terminated by a ſpine; aperture compreſſed; perforation wrinkled. *inermis.*

62. T. conic, olive, covered with rows of raiſed violet ſcales; whirls inflated, with a ſpinous radiate margin; ſpire with 7 whirls; large. South ſeas. *imperialis.*

63. T. depreſſed, ſtraw colour, with darker ribs; whirls of the ſpire plaited; perforation pervious. *planus.*

64. T. conic; white, with oblique brown bands; whirls channelled near the ſuture. *albidus.*

65. T. conic; baſe greeniſh gray, ſpotted with brown; whirls round, flattiſh at the ſuture. *fuſcatus.*

66. T. conic; red, dotted with white; ſlightly perforated; whirls round, the firſt with 15, the next with 6 rows of tubercles; 6 whirls in the ſpire; 4 lines long. Senegal. *corallinus.*

67. T. gray, with whitiſh ſpots; whirls flattiſh, and tranſverſely grooved. Senegal. *griſeus.*

68. T. convex; the whirls reverſed. Found near Scaphuſia, converted into iron ore. *ferrugineus.*

69. T. pyramidal, with contrary round whirls; 3 of them with a quadruple trifarious row of tubercles, the fourth very diſtant. *novus.*

70. T. very thin, and of a wax colour; firſt whirl large, with a brown band in the middle. *fragilis.*

71. T. obtuſely pyramidal; 4 elevated contiguous whirls, tumid at the margin, in the ſpire. *calloſus.*

 72. T.

afer. 72. T. convex, gray with whitish spots; whirls flattish; 6 lines long. Senegal.

neritoideus 73. T. sub-ovate, convex, depressed; smooth, reddish, glabrous; 2 lines long. Greenland.

perlatus. 74. T. reddish, with elevated dots; unequally ribbed; spire depressed: whirls convex.

terrestris. * 75. T. conic; livid; minute. Mountains of Cumberland.

fuscus. * 76. T. opaque, brown, margined; aperture roundish; spires 5. Sandwich.

B. *Imperforated, erect; umbilicus closed.*

vestiarius. 77. T. conic, convex, with a gibbous callous base; aperture somewhat heart-shaped; very small. Mediterranean and Asia.

labio. 78. T. ovate, sub-striated; pillar 1-toothed. Asia, Africa, New Zealand.

tuber. 79. T. depressed; whirls somewhat keeled, and knotted at the upper and lower margin; 2 inches diameter. Mediterranean and South America.

striatus. * 80. T. conic; aperture obovate; last whirl angular; minute. Mediterranean; Falmouth.

conulus. * 81. T. conic, smooth; whirls separated by a prominent line. European seas; Britain.

ziziphinus. * 82. T. conic, livid, smooth, transversely striated; whirls margined. European and African coasts, shores of Britain.

obeliscus. 83. T. conic; surrounded with numerous rows of white or green moniliform granulations; pillar 1-toothed; 2 inches high. India.

distortus. 84. T. solid, white, polished; striated, distorted, and obtuse at the tip; first whirl gibbous; aperture compressed, ovate.

virgatus. 85. T. pyramidal, with rosy and white stripes, and numerous rows of knots; base with concentric white and red circles. India.

foveolatus. 86. T. cinereous, variegated with greenish, whitish, and reddish; whirls of the spire tuberculated at the lower margin. Red sea.

diaphanus. 87. T. thin, pellucid, with alternate chesnut and white moniliform belts of granulations; $1\frac{1}{2}$ inch high. New Zealand.

iris. 88. T. covered with a smooth coat, under which it is bluish and reddish, shining with iridescent. Southern ocean.

rostratus. 89. T. pyramidal, transversely striated; varied with white and red; tip green, pellucid; 1 inch high. South sea.

notatus. 90. T. striæ decussated; grooved within; tip deep red.

elegans. 91. T. pyramidal, striated, brownish purple. South sea.

melanostoma. 92. T. obtusely pyramidal; spotted with greenish. South sea.

erythroleucus. 93. T. pyramidal; striated with white and red. Morocco.

punctulatus. 94. T. red, punctulated; very minute. Morocco.

imbricatus 95. T. pyramidal, obliquely grooved, plaited and ribbed; whirls a little prominent at the margin. South American seas.

americanus. 96. T. ochraceous; longitudinally grooved; whirls transversely striated; lip denticulated. South America.

cœlatus. 97. T. sea-green, with protuberances and oblique scaly plaits; whirls of the spire transversely striated and grooved in the middle, concave spines on the lower margin of the first whirl.

98. T. purple, with plaited tuberculated whirls. *purpureus.*

99. T. sea-green, with numerous rows of tubercles and oblique undulated plaits; 4 inches long, as broad, and covered with a horny lid. Cooke's bay. *cookii.*

100. T. brownish, with a convex base; whirls with a single row of tubercles, first with 2. South seas. *nodulosus.*

101. T. pyramidal; white, varied with reddish and green; whirls spinous; pillar emarginated, plaited. Bourbon and Mauritius islands. *mauritianus.*

102. T. pyramidal; white; whirls of the spire longitudinally ribbed, with transverse moniliform belts of green granulations: $1\frac{1}{2}$ inch wide. Indian and South seas. *fenestratus*

103. T. convex on each side, solid; spire smooth; 2 first whirls obliquely ribbed. South seas. *helicinus.*

104. T. ovate, with undulated ribs and transverse striæ; whirls ventricose; 2 inches broad and high. South sea. *argyrostomus.*

105. T. obtusely pyramidal; black, with a purple band at the base; pillar white. China. *sinensis.*

106. T. black, with a sub-convex granulate base; minute, with 5 whirls. South seas. *lugubris.*

107. T. obtuse; whirls round, with many rows of tubercles, grooved and transversely striated; pillar toothed. *asper.*

108. T. conic, convex, transversely striated, with oblong square spots disposed in rows; pillar lip spotted with black. Mediterranean, Africa. *tessellatus.*

109. T. conic, convex; citron, with angular black lines. Asia. *citrinus.*

110. T. pyramidal, white, variegated with scarlet; 2 first whirls very large; 2 inches high. South seas. *granatum.*

111. T. smooth, conic, white with a saffron tip. *crocatus.*

112. T. whirls round, and obsoletely plaited; aperture compressed, brownish; 2 inches high. South America. *conchyliophorus.*

113. T. convex; white, with green, brown, and fulvous spots; 2 rows of tubercles on the whirls; 8 lines long. Senegal. *pantherinus.*

114. T. rough, with concatenated globules; base convex, with concentric, granulated striæ; lip double-toothed. Palmerston island. *grandinatus.*

115. T. depressed, with belts dotted with white beneath; whirls crowned with spines. Friendly islands. *inæqualis.*

116. T. gray, with red stripes, and transversely striated with white. New Zealand. *tigris.*

117. T. conic, brown, obliquely striated with black. George's bay. *pulligo.*

* 118. T. conic, white; whirls 4, tuberculated. Pembrokeshire coast. *parvus.*

C. *Tapering, with an exserted pillar, and falling on the side when placed upon the base.*

119. T. imperforated, striated; pillars spiral: 4 inches long. Indian ocean. *telescopium.*

120. T. umbilicated, glabrous; pillar with recurved twisted plaits. South America. *dolabratus.*

121. T. glabrous, imperforated; whirls reversed; small. Mediterranean. *perversus.*

122. T. flat at the base; finely striated transversely; whirls reversed; $\frac{1}{4}$ inch long. Indian seas. *pusillus.*

123. T. flat at the base; longitudinally ribbed; whirls reversed. Indian shores. *undulatus.*

124. T.

ventricosus. 124. T. cancellated, glabrous at the base; whirls reversed; upper ones ventricose; very small. Indian sands.

annulatus. 125. T. aperture nearly square; whirls reversed, and ribbed on each side; small. Indian sands.

flumineus. 126. T. sub-pyramidal, umbilicated, smooth; white, with a reddish tip; whirls separated by a groove.

punctatus. 127. T. whirls with a triple row of prominent dots; imperforated; size of a barleycorn. Southern Europe, Africa.

striatulus. 128. imperforated; longitudinally and obliquely striated; small. Mediterranean.

zigzag. 129. T. sub-striated, and marked with darker angular lines; whirls five or six.

lunaris. 130. T. whirls 5, reversed; convex, smooth, umbilicated.

hortensis. 131. T. white, with a reddish band; pyramidal, nearly imperforated. In gardens in warmer climates.

56 Turbo. Gen. 28. TURBO, *the Wreath.*

Gen. Char.—The animal a limax; the shell univalve, spiral, solid; aperture contracted, orbicular, entire.

SPECIES.

A. *Pillar margin of the aperture dilated and imperforated.*

obtusatus. 1. T. roundish, smooth, very obtuse; above ventricose. North seas.

neritoides. 2. T. ovate, glabrous, obtuse; minute. Mediterranean, America.

littoreus. * 3. T. *periwinkle*: sub-ovate, acute, striated; $1\frac{1}{2}$ inch high; finely striated transversely. Shores of Europe; Britain. The animal of this species is frequently eaten.

tumidus. * 4. T. pale red; 5 distinct, tumid, striated whirls; first ventricose. England, in woods; very rare.

rudis. * 5. T. smooth; whirls 5, distinct, tumid. Western shores of England.

lineatus. * 6. T. somewhat conic, cinereous; variegated with fine zigzag black streaks. Western coasts of England.

muricatus. 7. T. umbilicated, sub-ovate, acute; surrounded with striæ of raised dots; pillar margin a little obtuse; an inch high. Europe, America.

lituus. 8. T. sub-ovate, smooth; aperture lateral, margined; umbilicus covered. Pulo Condor.

punctulatus. 9. T. sub-ovate, smooth, brown, with paler, flat, dotted belts.

B. *Solid, imperforated.*

cimex. * 10. T. oblong ovate; stria decussated and raised with dots; very minute. Shores of Europe, Britain.

pullus. * 11. T. ovate, smooth; variegated with red and white; minute, transparent, glossy. European seas, shores of Britain.

fasciatus. * 12. T. oblong, white, marbled, or banded with black; 6 tumid whirls in the spire; $\frac{1}{2}$ inch long. Coasts of Wales.

personatus. 13. T. convex, smooth; aperture somewhat angular. India.

petholatus. 14. T. ovate, smooth, glossy; whirls somewhat angular on the upper part. India, South America.

cochlus. 15. T. ovate, striated, with one stria thicker on the back. India.

chrysostomus. 16. T. sub-ovate, wrinkled; whirls surrounded with two rows of vaulted spines; yellowish, radiated with brown. India.

echinatus. 17. T. sub-ovate, wrinkled, with obtuse vaulted spines and whirls; pillar lip expanded, crenated. South sea, and Friendly islands.

tectum-persicum. 18. T. ovate; spines obtuse, depressed; beneath papillous. India.

pagodus. 19. T. conic; spines obtuse, concatenated; striæ papillous beneath: 3 inches high. India.

sulcatus. 20. T. sub-conic; variegated with black and gray, and covered with hollow scales. Friendly islands.

calcar. 21. T. nearly imperforated, depressed; whirls rough; with compressed hollow spines above. India.

rugosus. 22. T. subovate, striated; whirls rugged above. Mediterranean, New Zealand.

marmoratus. 23. T. sub-ovate, smooth; 3 rows of protuberances in the whirls; beak dilated behind. South America.

sarmaticus 24. T. convex, obtuse; whirls knotty above, and separated by a canal. Asiatic and African seas.

olearius. 25. T. convex, obtuse, smooth, angular. India.

cornutus. 26. T. whirls and spire round, with decussated striæ; the first with 3 rows of imbricated spines; a large shell. China.

radiatus. 27. T. rugged; whirls round, distant, transversely striated, and armed with small imbricated spines. Red sea.

imperialis. 28. T. glabrous, glossy green; within snowy; aperture silvery; pillar lip callous above; whirls of the spire very convex.

coronatus. 29. T. wrinkled; white, with greenish clouds; tip orange; whirls crowned with spines and knots; pillar produced into a beak. Seas of Malacca. Very rare.

canaliculatus. 30. T. grooved and transversely striated; whirls 6, very convex. India.

setosus. 31. T. whirls of the spire cylindrical; grooved and transversely striated. India.

sparverius. 32. T. oblong, with broad, smooth striæ; yellowish spotted with brown. India.

spinosus. 33. T. oblong, transversely striated; striæ spinous; aperture silvery. India.

moltkianus 34. T. silvery gray, with transverse orange and yellow bands; whirls of moniliform belts of granulations.

spenglerianus. 35. T. variegated white and yellowish; whirls round, transversely striated, and separated by a canal. Indian ocean. Very rare.

castanea. 36. T. transversely striated; chesnut brown spotted with white; whirls 5, surrounded with rows of knots. South America.

crenulatus. 37. T. silvery gray, surrounded with many rows of knots; aperture milk-white within.

smaragdus 38. T. ponderous, slightly depressed; smoothish and obliquely wrinkled; 4 whirls in the spire; first round and larger; 2 inches broad and high. New Zealand.

papyraceus. 39. T. pellucid, thin and finely annulated; first whirl large, the next with a band varied with red and white.

æthiops. 40. T. transversely grooved; first whirl black, finely striated; the rest silvery; lips bordered with brown.

nicobaricus. 41. T. brownish, reticulated; whirls surrounded with belts; throat golden. Nicobar islands.

cidaris. 42. T. smooth, with compressed roundish whirls; the first round and very large; aperture compressed, silvery; pillar a little prominent. India, China.

43. T.

nigerrimus 43. T. ſmooth, deep black; whirls diſtant, with a hollowed margin. Southern ocean.

helicinus. 44. T. ſmooth, nearly imperforated; roundiſh, with contiguous convex whirls; pillar thickened.

punctatus. 45. T. ovate, thick, with a mucronate ſpire; whirls ſmooth, flattiſh; the 2 firſt very large; 6 lines long. Senegal.

hæmaſtomus. 46. T. ovate, ſolid, glabrous; whirls 6, ſtriated; aperture margined, oval.

torquatus. 47. T. ovate, with convex, tranſverſe grooves, and rugged ſtriæ; whirls with a knotty belt. New Zealand.

undulatus. 48. T. ovate, convex, with longitudinal, undulated ſtreaks; ſpire obtuſe; mouth ſilvery. New Zealand.

niveus. 49. T. ſpiral, ſnowy, diaphanous, tranſverſely ſtriated; whirls often diſtorted. Nicobar iſlands.

helicoides. 50. T. horny, ſub-diaphanous, ſmoothiſh; ribs 3; whirls diſtant, aperture triangular. Indian ocean.

nitidus. * 51. T. ſmooth, obtuſe; whirls 4; aperture oval. Pembrokeſhire coaſt.

ſcriptus. * 52. T. ſmooth, opaque; whirls 3; with brown lines reſembling characters; aperture roundiſh; minute. Pembrokeſhire coaſt.

coſtatus. * 53. T. opaque; 4 whirls deeply ribbed longitudinally, and finely ſtriated tranſverſely. Devonſhire.

ſubluteus. * 54. T. opaque; 5 longitudinally ribbed whirls; aperture rounded, margined; minute. Pembrokeſhire coaſt.

albulus. * 55. T. opaque; whirls 5, longitudinally ribbed; aperture roundiſh; not margined. Pembrokeſhire coaſt.

reticulatus * 56. T. white, opaque; whirls 4, reticulated. Pembrokeſhire coaſt.

ruber. * 57. T. opaque, ſmooth, with 5 whirls. Cornwall.

interſtinctus. * 58. T. pellucid, ſmooth; whirls 5, finely ribbed. Devonſhire.

ſtriatus. * 59. T. pellucid, white; whirls 5, ſeparated by a fine rib. Plymouth.

ſubarcuatus. * 60. T. pellucid, white, curved towards the tip; whirls 10, longitudinally ribbed. Pembrokeſhire coaſt.

æreus. * 61. T. pellucid; whirls longitudinally ribbed; braſſy between the ribs. Pembrokeſhire coaſt.

elegans. * 62. T. pellucid; whirls 6, ſpirally ſtriated; ribs remote. Pembrokeſhire coaſt.

pellucidus. * 63. T. pellucid, white, with 5 reticulated whirls. Pembrokeſhire coaſt.

canaliculatus. * 64. T. pellucid, whitiſh; whirls 5, longitudinally grooved. Pembrokeſhire coaſt.

diviſus. * 65. T. pellucid, white; whirls 4, each divided into 2 parts; upper one ſmooth, the lower one ſpirally ſtriated. Pembrokeſhire ſands.

C. *Solid, perforated.*

pica. 66. T. conic, rounded, ſmooth; a ſmall tooth near the umbilicus; $3\frac{1}{2}$ inches broad. In moſt ſeas.

ſanguineus 67. T. umbilicated, conic, convex, ſtriated and ſmooth; whirls ſlightly grooved; ſize of a pea. Africa.

argyroſtomus. 68. T. ſubovate, with tranſverſely ſtriated lines on the back. India.

margaritaceus. 69. T. ſubovate, with ſmooth, elevated, dorſal lines. Indian ocean.

verſicolor. 70. T. glabrous; finely ſtriated tranſverſely, and varied with green and white. South ſea.

71. T. umbilicus rough; whirls with branched ſpines. India. *delphinus.*

72. T. depreſſed, knotty; an unequally tuberculated ridge on the back of the firſt whirl. *noduloſus.*

73. T. ſubmucronate; covered with ſmooth ſpines. *diſtortus.*

74. T. baſe convex; whirls radiated with ſpines; 12 large ones on the firſt; ſmall. South ſea. *ſtellaris.*

75. T. whirls crowned with laciniated ſpines; the firſt with 9 large ones. Nicobar iſlands. *aculeatus.*

76. T. baſe flattened; whirls ſpinulous at the lower margin. *ſtellatus.*

77. T. whirls convex, and ſeparated by a band, teſſelated with brown and white; colour of a medlar. South ſea. *meſpilus.*

78. T. ſurrounded with knotty rings; dirty green, with a reddiſh tip. Indian and South ſeas. *granulatus*

79. T. ſpire annulated; firſt whirl very large; perforation ſpoon-ſhaped. South ſea. *ludus.*

80. T. black, with double, alternate, black, and cinereous moniliform belts of granulations; pillar 1-toothed; ſize of a nut. Nicobar iſlands. *atratus.*

81. T. depreſſed, orbicular; white varied with brown; lower margin of the pillar denticulated. *dentatus.*

82. T. dirty green varied with brown; whirls 4, firſt large. New Zealand. A large ſhell. *diadema.*

83. T. ſmooth, roundiſh, cinereous; whirls ſubſtriated, ventricoſe, flattened at the ſuture. *cinereus.*

84. T. thin, diaphanous, white, round; 6-keel-ſhaped whirls in the ſpire; perforations ſpiral. *carinatus.*

85. T. thin, ſmooth; whirls flattened; 2 lines long. Senegal. *afer.*

86. T. depreſſed, ſmooth, opaque, brown; whirls 4; $1\frac{1}{2}$ line in diameter. *planorbis.*

87. T. hyaline, ſmooth, ſubcarinated; whirls 6, rounded; lip fringed, reflected. *marginellus.*

88. T. whirls rounded; perforation deep, wide, and funnel-ſhaped. *helicoides.*

89. T. pyramidal, with foliaceous wrinkles; perforation large. *foliaceus.*

90. T. tranſverſely ſtriated; within margaritaceous. *anguis.*

91. T. granulated, ſlightly umbilicated; within margaritaceous. New Caledonia. *porphyrites.*

92. T. white, glabrous, ſtriated green. New Zealand. *ſmaragdus*

D. *Cancellated.*

93. T. navel flattiſh, ſpreading; whirls round, with crenated ſtriæ. *crinellus.*

94. T. umbilicated, ſomewhat oblong and obtuſe; whirls round, ſmooth; 4 whirls. Minute. Freſh water near the baths in Tuſcany. *thermalus.*

95. T. *wentle-trap;* conic; whirls diſtant, longitudinally ribbed. Var. 1. perforated with 8 whirls. 2. Imperforated with 10 whirls; 2 inches long. Barbary, Coromandel.—The wentle-trap is a very rare ſhell, and therefore greatly eſteemed among collectors. As a proof of this, in the year 1753, four ſpecimens which were diſpoſed of at the ſale of Commodore Liſle's ſhells in London, brought 75l. 12s. Two were ſold at 16 guineas each; one at 18 guineas, and the fourth at 23l. 2s. *ſcalaris.*

* 96. T. *falſe wentle-trap;* taper, not umbilicated; ſpire with longitudinal ribs; whirls ſmooth, ventricoſe, and ſeparated by a deep canal; from 1 to 2 inches long. *clathrus.*

long. Indian and European feas, Britain, Falmouth, South Devon.

tuberculatus. * 97. T. dufky, with 12 finely tuberculated whirls. Northumberland coaft.

ambiguus. 98. T. tapering, perforated; whirls contiguous; fmooth, ribbed. Mediterranean.

crenatus. 99. T. taper, fubcancellated; whirls 8-ribbed, contiguous; crenated above.

lacteus. 100. T. taper; ftriæ crowded, longitudinal, raifed; fize of a barley-corn. Mediterranean.

ftriatulus. 101. T. fubcancellated, taper; whirls contiguous; belts interrupted, varicofe; fize of a barley-corn. Mediterranean.

uva. 102. T. ovate, obtufe; whirls contiguous, imbricated and longitudinally ftriated; $1\frac{1}{2}$ inch long. South America.

corneus. 103. T. umbilicated, rounded, rather acute; whirls round, with decuffated ftriæ; aperture reflected.

lincina. 104. T. oblong, obtufe, with wrinkled ftriæ; aperture with a dilated, flat, crenated border; 8 lines long. Jamaica.

linulatus. 105. T. white, cylindrical, reticulated; aperture remote.

labio. 106. T. oblong, umbilicated, brown, ftriated with convex dots; lip white, dilated; 15 lines long. Jamaica.

ftriatus. * 107. T. ovate, imperforated, ventricofe; finely ftriated fpirally; 6 lines long. Woods of Europe, Britain.

reflexus. 108. T. umbilicated, convex, a little prominent; whirls round, fubftriated; aperture reflected. Southern Europe.

dubius. 109. T. umbilicated, oblong; whirls equal; ftriæ decuffated; aperture dilated.

limbatus. 110. T. fubovate, wrinkled, perforated. Coromandel.

E. *Tapering.*

imbricatus. 111. T. whirls of the fpire imbricated downwards; 4 inches long. American iflands.

replicatus. 112. T. fmooth; whirls imbricated upwards; 3 inches long. Tranquebar.

acutangulus. 113. T. with a fingle prominent, acute, tranfverfe rib; 4 inches long. Tranquebar.

duplicatus. * 114. T. whirls with 2 prominent, acute, tranfverfe ribs; 5 inches long. Coromandel, fhores of Britain.

exoletus. * 115. T. whirls with 2 prominent, obtufe, diftant, tranfverfe ribs; 2 inches long. Europe, Guinea, fhores of Britain.

terebra. * 116. T. whirls 6, prominent, acutely ftriated; from 2 to 6 inches long. Shores of Europe, Africa and China; Britain.

lævis. * 117. T. with 8 fmooth whirls nearly obfolete. Minute. Shores of Anglefea.

albus. 118. T. white, with 8 whirls tranfverfely ftriated.

variegatus. 119. T. whirls of the fpire flattifh, with 7 obtufe ftriæ; 2 to 3 inches long. South America, Barbary.

angulinus. 120. T. whirls of the fpire with 10 obfolete ftriæ; 2 to $4\frac{1}{2}$ inches long. European, Mediterranean feas.

chryftallinus. 121. T. whirls of the fpire ribbed; aperture ovate. Denmark.

albulus. 122. T. imperforated, glabrous; whirls rounded, ftriated. Depths of the Greenland feas.

annulatus. 123. T. whirls with a prominent, margined future; $1\frac{1}{4}$ inch long.

* 124. T. pellucid; whirls contrary; futures fubcrenated; aperture 2-toothed behind; $1\frac{1}{2}$ inch long. Europe; roots of trees, Britain. *bidens.*

* 125. T. pellucid; whirls reverfed, not crenated; aperture 3-toothed; $\frac{1}{4}$ inch long. Europe, Britain, among mofs, and in old walls. *perverfus.*

126. T. obtufe; grooves curved; whirls 11; $7\frac{1}{2}$ lines long. *fufulus.*

127. T. obtufe; groove ftraight; whirls 9; aperture toothed. *fufus.*

128. T. obtufe, white; grooves oblique; aperture nearly fquare; whirls 8; 12 lines long. *fulcatus.*

129. T. whirls 9, recurved; aperture 4-toothed; 5 lines long. Bombay, Italy. *quadridens*

130. T. whitifh; whirls 7; aperture 3-toothed; 5 lines long. Italy. *tridens.*

* 131. T. ovate, obtufe, pellucid; 4 to 6 whirls; aperture toothlefs, oval; 1 line long. Among mofs, Britain. *mufcorum.*

* 132. T. deep brown, fpires 4; firft ventricofe; aperture oval; fize of a grain of wheat. Britain. *ulvæ.*

* 133. T. imperforated, fmooth; whirls 5, nearly obfolete; tranfverfely barred. Minute. Pembrokefhire coaft. *trifafciatus*

* 134. T. fmooth; whirls 5, obliquely barred; aperture fuboval. Minute. Pembrokefhire coaft. *membranaceus.*

* 135. T. whirls 5, fubobtufe, roundifh; minute. Pembrokefhire coaft. *interruptus.*

* 136. T. fmooth; whirls 5, fomewhat angular above. Pembrokefhire coaft. *fubrufus.*

* 137. T. whirls 3; the firft with 3 tranfverfe ridges; minute. Seafalter, England. *ftrigatus.*

* 138. T. whirls 7, ridged; aperture oval. Seafalter. Rare. *albidus.*

* 139. T. carinated; whirls 7; aperture contracted, margined. Sandwich. Rare. *carinatulus.*

* 140. T. whirls 6; aperture oval, margined; minute. Sandwich. Very rare. *clathratulus.*

* 141. T. thick, barred; whirls 5; aperture round, margined; minute. Sandwich. Rare. *craffus.*

* 142. T. nine whirls, dotted, reverfed; aperture contracted; minute. Sandwich. *punctatus.*

143. T. whirls 6, reticulated; aperture oval, fubmargined; minute. Sheppey ifland. *fheppeianus.*

144. T. whirls 3, elegantly reticulated; aperture oval, toothed; minute. Sandwich. *fandvicenfis.*

145. T. whirls 5, diftinct, tranfverfely ftriated, barred with white. *obtufus.*

146. T. white, fmooth; aperture with a flattifh, concave, obtufe, reflected lip. Mediterranean. *aurifcalpium.*

147. T. imperforated, glabrous; aperture oval; fize of a barley-corn. Mediterranean. *politus.*

148. T. flattifh; whirls annulated, and erected on the back; minute. In ftagnate waters in Europe. *dactylius.*

149. T. two obtufe, approximate ridges on the whirls of the fpire. *obfoletus.*

150. T. fubumbilicated, whitifh; whirls 12; aperture 5-toothed. *quinquedentatus.*

151. T. pyramidal, ventricofe, horny, pellucid; aperture compreffed; above one-fourth of an inch long. Germany. *pyramidalis.*

* 152. T. conic, fmooth, gloffy; whirls 5 or 6; aperture fuboval; pillar furnifhed near the middle with 1 tooth; $\frac{2}{10}$ inch long. Salcomb bay. *unidentatus.*

Gen.

57 Helix.

Gen. 29. Helix, *Snail.*

Gen. Char.—The animal a limax; ſhell univalve, ſpiral, ſubdiaphanous, brittle; aperture contracted, ſemilunar, or roundiſh.

Species.

A. *Whirls with a keel-ſhaped acute margin.*

ſcarabæus. 1. H. ovate, both edges keel-ſhaped; aperture toothed. Mountains of Aſia, and the Friendly iſlands.

lapicida. * 2. H. umbilicated; convex on each ſide; aperture tranſverſe, margined, ovate; ½ inch in diameter. Rocks, woods, and hedges in Europe, Britain.

marginata. 3. H. ſubumbilicated, a little depreſſed; obliquely ſtriated; aperture tranſverſe; 9 lines in diameter.

cicatricoſa. 4. H. umbilicated, depreſſed and wrinkled; whirls reverſed.

ægophthalmos. 5. H. umbilicated, depreſſed, greeniſh, immaculate; whirls 7; an inch acroſs. India, South America.

oculus capri. 6. H. ſubcarinated, umbilicated, convex; aperture margined. Trees in Aſia.

albula. * 7. H. umbilicated, flattiſh; gibbous beneath; aperture ſomewhat heart-ſhaped. Europe, Britain, rocks and dry banks.

maculata. 8. H. perforated, flattiſh, ſubcarinated; white, dotted with brown; gibbous beneath, with linear bands; 5 lines acroſs.

albina. 9. H. perforated, flattiſh, white, gibbous beneath; aperture quadrangular.

ſtriatula. 10. H. ſubcarinated, umbilicated, convex, ſtriated; more gibbous beneath; aperture roundiſh, lunated; minute. Water-falls of Lombardy.

algira. 11. H. ſubangular, umbilicated, convex; whirls 6; navel pervious.

leucas. 12. H. ſubcarinated, umbilicated, convex, ſmooth; beneath gibbous; navel very minute; aperture roundiſh, lunate.

lævipes. 13. H. perforated, ſubcarinated, contrary, convex, pale with a rufous band, united to a white one; ¾ inch in diameter.

exilis. 14. H. perforated, depreſſed, ſubcarinated; pale with a rufous band joined to a white one; whirls ſtriated; 10 lines acroſs. Tranquebar.

vermiculata. 15. H. ſubglobular, depreſſed, rough, imperforated; dotted with white; lip reflected; white. Italy and Portugal.

candida. 16. H. umbilicated, convex on each ſide; aperture not margined.

ſpadicea. 17. H. perforated, umbilicated, cheſnut; whirls 5; 7 lines high.

incarnata. 18. H. perforated, ſubglobular, ſubcarinated; whirls 6; lip fleſh-coloured; 6 lines broad. Woods of Denmark and Germany.

ſericea. 19. H. perforated, ſubglobular, convex on each ſide; tomentoſe. Denmark, in gardens.

coronulata. 20. H. perforated, globular, ſubcarinated and ſtriated; white, with a brown band; 3½ lines wide. Lyons.

planorbis. * 21. H. ſubcarinated, umbilicated, flat; above concave; aperture oblique; ovate and acute on each ſide. Ponds and rivers of Europe and Barbary, Britain.

complanata. 22. H. carinated downwards, umbilicated, convex; flat beneath; aperture ſemi-heart-ſhaped. Ponds and rivers of Europe.

ringens. 23. H. ſubcarinated, imperforated, convex, with an inverted, ringent aperture; lip 4-plaited behind; 1½ inch wide. India.

ſinuata. 24. H. imperforated, ſubcarinated, reddiſh brown, with a white ridge; aperture tranſverſe; toothed and 3-plaited behind; 9 lines in diameter. America.

lucerna. 25. H. imperforated, white; flattiſh above; beneath gibbous; aperture tranſverſe, 2-toothed; 13 lines broad.

lampas. 26. H. imperforated, flattiſh above, beneath gibbous; whirls ſcared. A rare ſhell.

carocolla. 27. H. imperforated, a little convex on each ſide, with a white tranſverſe lip. India.

lychnuchus. 28. H. imperforated, top-ſhaped, white with fulvous bands; aperture tranſverſe, 2-toothed.

cepa. 29. H. ſubglobular, umbilicated, ſubcarinated; yellowiſh, with a whitiſh band; aperture tranſverſe, 2-toothed, and ſinuated behind.

cornu-militare. 30. H. ſubcarinated, imperforated, convex; aperture with a white margin. India.

pellis-ſerpentis. 31. H. ſubcarinated, with flame-colour, red, and white bands; beneath ſurrounded with 4 rows of dots; aperture fringed. Warm parts of America.

vortex. * 32. H. flat, thin, concave above; aperture oval, flat; 3 lines wide. Ponds and rivers of Europe, Britain.

ſcabra. 33. H. ſubcarinated, imperforated, ovate, pointed, and ſtriated.

gothica. 34. H. convex on each ſide; horny, with ſubferruginous bands. Woods of Sweden.

gualteriana. 35. H. imperforated, depreſſed, with decuſſated ſtriæ; aperture acute on each ſide. India. A land ſpecies, very rare.

tricarinata. 36. H. top-ſhaped, acuminated, with convex ſpiral ſtriæ, and triple ridge; aperture dilated; 11 lines wide.

iſogonoſtamus. 37. H. browniſh, depreſſed; firſt whirl round; aperture contracted; nearly triangular; 3-toothed and margined. Virginia and Alſace.

oculus communis. 38. H. depreſſed, umbilicated; whirls contiguous; the firſt large; aperture oblong, ovate.

affinis. 39. H. umbilicated, convex on each ſide; variegated with white and cheſnut; aperture winged and ſlightly margined.

marginella. 40. H. umbilicated, obliquely ſtriated; convex above; beneath a little depreſſed; firſt whirl carinated; 1½ inch broad.

ſinuoſa. 41. H. ſubcarinated, imperforated; convex on each ſide, with hollow dots; aperture tranſverſe; 7-toothed; whirls 6.

maculoſa. 42. H. umbilicated, ſubcarinated, obliquely ſtriated and a little depreſſed; aperture lunated, with a margined lip.

punctata. 43. H. ſubumbilicated, ſubcarinated; aperture tranſverſe, oblong; lip margined, 3-toothed.

vitrea. 44. H. ovate, glabrous; whirls 5; the firſt gibbous, the reſt carinated; aperture oblong-ovate; 2 inches high.

annulata. 45. H. umbilicated, depreſſed, white; whirls 4, the firſt gibbous and doubly carinated; aperture ovate; 2 lines in diameter.

rhenana. 46. H. umbilicated, white, depreſſed above; whirls carinated

carinated and irregularly ftriated, the laft brown. Rhine.

nævia. 47. H. depreffed, umbilicated; white, with longitudinal black fpots above, and 5 bands beneath. Santa Cruz.

corrugata. 48. H. umbilicated, wrinkled, and obliquely ftriated; aperture lunated. Jamaica.

faba. 49. H. imperforated, fmooth, faffron with brown margin, and bafe of the whirls; aperture blue. Otaheite.

crenata. 50. H. rounded, brown; whirls carinated; aperture finuous. New Zealand.

carinata. * 51. H. ftriated, carinated; whirls 3; aperture fuboval; minute. Frefh water near Faverfham, England.

B. *Umbilicated; whirls rounded.*

cornea. * 52. H. above umbilicated, flat, blackifh; whirls 4. Frefh waters, Europe, Coromandel, Britain.

fpirorbis. 53. H. concave on each fide, flat, whitifh; whirls 5, rounded; 1½ line diameter. Stagnant waters, France, Germany.

polygyra. 54. H. flattifh, orbicular; aperture oval; lip fringed.

contorta. 55. H. fubumbilicated, flat on each fide, equal; aperture linear, arched; 1 to 2 lines wide. Stagnant waters of Europe.

nitida. 56. H. polifhed, yellowifh, above convex, umbilicated; flat beneath, perforated; 1 to 3 lines in diameter. Ditches of Denmark.

alba. 57. H. white, umbilicated on each fide; aperture dilated; 1 to 2 lines wide. Denmark, aquatic plants.

fimilis. 58. H. pellucid, umbilicated above; ftriated with dots. Ditches in Denmark and Berlin.

cornu-arietis. 59. H. umbilicated, flattifh; aperture oval; 12 to 16 lines in diameter. China.

hifpida. * 60. H. umbilicated, convex, hifpid, diaphanous; whirls 5; aperture roundifh, lunated. Woods of Europe, Britain.

ampullacea. 61. H. fubumbilicated, fubglobular, glabrous; whirls above more ventricofe; aperture large, ovate, oblong; 1 to 5 inches wide. Afia and America.

pifcinalis. 62. H. globular, perforated, reddifh brown; whirls four. Fifh ponds of Denmark.

pufilla. 63. H. globular, perforated; aperture rolled fpirally inwards. Lakes of Germany.

fpherica. 64. H. globular, horny, with an obtufe crown; 1 to 2 lines wide. Seas of Denmark.

pomatia. * 65. H. fubumbilicated, fubovate, obtufe; aperture roundifh, femilunar; reddifh brown, with obfolete, paler bands. Woods of Europe, Britain.—This fpecies was a favourite difh among the Romans. It is ftill ufed as an article of food in many parts of Europe, during the feafon of Lent. It was introduced into England by Sir Kenelm Digby, as a cure for confumption.

glauca. 66. H. umbilicated, roundifh, pointed; lip margined; aperture oval.

citrina. 67. H. fubumbilicated, convex, obtufe; yellowifh, with a brown band; from 12 to 18 lines wide. Woods of Jamaica and China.

caftanea. 68. H. perforated, fubglobular, dull chefnut, with a rufous band united to a white one; whirls 7, ftriated.

69. H. perforated, fubglobular, with hollow dots and a red band; firft whirl larger; 8 lines wide. *rapa.*

70. H. globular, fubumbilicated, white; lip reflected; whirls 5. *globulus.*

71. H. imperforated, depreffed; gray, with white dots; aperture red brown. Jamaica and Portugal. *lactea.*

72. H. depreffed, umbilicated, white, with a cut margin. *incifa.*

* 73. H. umbilicated, convex, pointed; aperture fuborbicular, a little reflected at the rim, brown, with a fingle black fpiral band; 9½ lines wide. Shrubberies and hedges, Britain. *arbuftorum.*

74. H. nearly imperforated, globular, pellucid; fulvous, with a white lip; 1 to 3 lines wide. Woods of Denmark. *fulva.*

75. H. fubimperforated, fubglobular, ftriated; whirls 7; 12 lines in diameter. *epiftylum.*

76. H. fubimperforated; white, with rufous lip and bands; whirls 5; 18 lines wide. *cincta.*

77. H. fubimperforated, fubglobular; white, with rufous bands; whirls 4; 14 lines wide. Italy. *ligata.*

78. H. fubimperforated, fubglobular; pale yellow, with 4 rufous bands, interrupted with white fpots; whirls 4; 12 to 18 lines in diameter. Italy. *afperfa.*

79. H. fubimperforated, fubglobular, pale, immaculate; aperture large; whirls 4, diftant. *extenfa.*

80. H. perforated, globular; white, with fubinterrupted red bands; lip rofy; 5 to 7½ lines wide. Barbary, Italy. *pifana.*

81. H. perforated, with a depreffed crown; white, with rufous bands, and numerous lines; lip white on each fide; 10 lines wide. *ftrigata.*

82. H. perforated, globular, polifhed; white, with brown bands; 15 lines wide. India. *nemorenfis.*

* 83. H. umbilicated, convex, flightly depreffed; aperture rather oblong and margined; whirls 5; firft ventricofe; 11 to 13 lines in diameter. Barbary, Europe, Britain. *zonaria.*

84. H. umbilicated; fubdepreffed, ftriated, white; 6 lines wide. Italy. *ftriata.*

* 85. H. umbilicated, depreffed, yellowifh, with a brown band or bands; 4 to 11 lines wide. Europe, Britain. *ericetorum.*

* 86. H. umbilicated, fubdepreffed, fulvous, horny, or yellowifh green; fubftriated; aperture large; whirls 4 or 5; 1 to 4 lines wide. Wet woods of Europe, Britain. *nitens.*

87. H. umbilicated, cinereous; whirls 4; rib tranfverfely plaited; aperture circular; 1 line wide. Highlands of Denmark. *coftata.*

88. H. umbilicated, fubdepreffed; aperture circinate; lip white, reflected; whirls 4; 1 line wide. Moift woods of Denmark. *pulchella.*

89. H. umbilicated, fubdepreffed, with elevated, tranfverfe lines, and ferruginous fpots; 2½ lines wide. Moift places, and rotten wood, in France, Germany, and Denmark. Common. *rotundata.*

90. H. umbilicated, depreffed; yellowifh, polifhed; white beneath; aperture large; whirls 5; 3½ lines wide. Cellars in Germany. *cellaria.*

91. H. umbilicated, depreffed on both fides; whirls obvoluted. Var. 1. Whitifh, glabrous, with a triangular aperture. 2. Brown, hifpid, with a linear aperture; 4 to 5 lines wide. Italy. *obvoluta.*

strigosula. 92. H. perforated, subdepressed, striated; white, with a rufous band; 5 lines wide. France.

radiata. 93. H. perforated, striated; convex beneath; radiated. France and Virginia.

crystallina. 94. H. perforated, depressed, glossy white, diaphanous; 4 to 5 whirls; 1 line wide. Denmark, among moss.

ungulina. 95. H. umbilicated, convex; aperture margined, suborbicular, and elongated above; of the shape of an apple; 16 lines wide. India.

varica. 96. H. globular, umbilicated, whitish yellow; whirls 5, reversed; the outermost divaricated; 19 lines wide.

fruticum. 97. H. umbilicated, globular; aperture without pillar lip; 7½ lines wide. Hedges of Denmark.

lucena. 98. H. subglobular, umbilicated; gibbous beneath; lip reflected, white; whirls 5; the first very convex.

vittata. 99. H. subglobular, subumbilicated; white, with crowded chesnut bands and blue crown; lip reflected, white; 9 lines in diameter. Coromandel.

rosacea. 100. H. subglobular, subumbilicated; flesh colour, and transversely striated; whirls 5; 19 lines wide.

itala. 101. H. umbilicated, convex, obtuse; whirls 5, round; navel wide; size of a nut. Southern Europe. A land species.

lusitanica. 102. H. umbilicated, perforated, convex, obtuse; whirls 5, round, and yellowish white; umbilicus spreading; size of a small apple. Southern Europe. A land species.

mammelaris. 103. H. umbilicated, ovate; whirls 3, striated; aperture large, ovate, and united to the tip. Rivers of Africa.

hispana. 104. H. umbilicated, convex; whirls 5, round; umbilicus thin, perforated; aperture suborbicular. Southern Europe.

lutaria. 105. H. umbilicated, ovate, oblong; finely striated; aperture white within.

ovalis. 106. H. perforated, ovate, ventricose, and streaked; tip ribbed and rosy; lip of the same colour; pillar white; whirls 6; 4 inches long.

oblonga. 107. H. perforated, ovate, oblong, striated; lip and pillar rosy; whirls 6; aperture oval; 3 inches long. South America and India.

flammea. 108. H. perforated, oblong; white, with longitudinal, rufous bands; pillar reflected, straight; 18 to 20 lines long. Guinea.

pileus. 109. H. top-shaped, white with rufous bands; whirls 6; aperture transverse, large; 15 lines long.

nucleata. 110. H. top-shaped, umbilicated; convex on both sides; brown, with prickly ribs; lip whitish; ¼ line wide. Woods of Denmark.

volvulus. 111. H. top-shaped, umbilicated, acuminated; aperture circinated; 11 to 22 lines wide.

involvulus. 112. H. top-shaped, umbilicated, pointed; white, with spiral, convex striæ; aperture circinate; 13 lines wide.

neritina. 113. H. glabrous, hardish, umbilicated; chesnut, with white bands; whirls flat beneath; aperture ovate, oblong; 1 inch long.

turturum. * 114. H. umbilicated, rounded, thin; aperture semilunar. Woods of Europe; Britain.

olivetorum. 115. H. umbilicated, a little depressed, yellow; aperture compressed; first whirl flattish, round. Olive groves, Florence.

badia. 116. H. umbilicated, subglobular, smooth; aperture linear; 1 inch high.

cretacea. 117. H. subumbilicated, smooth; whirls convex; aperture lunated; 10 lines high.

pileata. 118. H. subumbilicated, conic, white, with chesnut bands; aperture semilunar; tip obtuse.

fuscescens. 119. H. rounded, subumbilicated, thin; aperture semilunar. Thuringia.

terrestris. 120. H. umbilicated, with an obtusely mucronate spire; first whirl very large, the rest gradually decreasing; aperture margined, semilunar; whirls 6.

nivea. 121. H. rounded, umbilicated, thin, glossy white; aperture semilunar.

media. 122. H. flat on both sides, umbilicated; whirls 6, the first round; aperture suborbicular. Germany.

tenella. 123. H. umbilicated, very thin, flat, polished, and convex above; aperture compressed, semilunar; whirls 5, contiguous.

crepuscularis. 124. H. umbilicated, depressed, white; whirls 6, round, 3d and 4th brown, the last reddish at the tip; aperture semilunar, smooth. Guinea.

hyalina. 125. H. umbilicated, pellucid; beneath hemispherical, white; whirls reversed. Shores of Guinea.

avellana. 126. H. umbilicated, obtusely subtriangular, rough, plaited and silvery within; aperture smooth, eared; first whirl with an elevated circle; size and colour of a nut; pillar lip white. Southern ocean.

rufescens. 127. H. inflated, subumbilicated, fragile; whirls 5; first very large; aperture semilunar; 6 lines wide. Rivers of Hamburgh.

pervia. 128. H. umbilicated, obtusely subpyramidal; whirls 4, convex; the first with an elevated circle; the rest surrounded with a groove; aperture semilunar; minute.

lævissima. 129. H. umbilicated, oblong; whirls round and smooth; aperture orbicular.

fascicularis. 130. H. umbilicated, pellucid; whirls 3, divided by a groove; aperture orbicular and not margined. The animal, besides the two tentacula, is furnished with a crest. Waters of Strasburg and Paris. Very rare.

holosericea. 131. H. umbilicated, depressed; first whirl villous, flat; aperture triangular, margined; whirls 6; ½ inch wide. France and Switzerland.

turgida. 132. H. thin, fragile, white, umbilicated; first whirl round, inflated; whirls 6; ¼ inch wide. Waters of Hamburgh.

tenuis. 133. H. umbilicated, pellucid, horny, transversely striated, and convex; whirls 6, gradually decreasing; aperture semilunar; 4 to 5 lines in diameter.

coriacea. 134. H. cartilaginous, horny, pale yellow, subpellucid, gibbous. Kurile islands.

cornu-venatorium. 135. H. depressed, deeply umbilicated. Leaves and branches of trees, Senegal.

elegans. 136. H. pyramidal, white, umbilicated; whirls 6, acute, flattish, and margined. Barbary and Southern Europe. A land snail.

cookiana. 137. H. pyramidal, smooth, white, obtuse; base imperforated, convex. South sea islands.

bidentata. 138. H. pyramidal, subcarinated, very finely striated; lip reflected, 2-toothed. Botanic garden at Strasburg.

turbo. 139. H. pyramidal, subimperforated, varied with yellow and rufous. Coromandel.

140. H.

trifaſciata. 140. H. conic, ovate, white, with 3 browniſh bands in the firſt whirl; aperture fringed; lip white, dilated. Tranquebar. A land ſpecies.

bontia. 141. H. conic, ventricoſe, perforated, pellucid, with a black tip; firſt whirl with 3 yellowiſh bands. Bengal.

trochoides. 142. H. top-ſhaped, perforated, poliſhed; longitudinally ſtriated; whirls reverſed, the firſt keel-ſhaped; aperture angular.

tomentoſa. * 143. H. umbilicated; whirls 3, briſtly; aperture roundiſh; minute. Boggy ground, Pembrokeſhire.

tubulata. * 144. H. whirls 3, longitudinally ſtriated; tube at the baſe margined; minute. Coaſt of Pembrokeſhire.

faſciata. * 145. H. ſubumbilicated, ſmooth; whirls 3, firſt more ventricoſe; aperture dilated; minute. Sandwich and Tenbigh.

nitidiſſima. * 146. H. umbilicated; whirls 2, tranſverſely ſtriated; minute. Pembrokeſhire coaſt.

bicolor. * 147. H. ſlightly umbilicated, ſmooth; whirls 2; minute. Pembrokeſhire coaſt.

ſpinoſa. * 148. H. ſubglobular, umbilicated; mouth roundiſh; margin thorny; minute. Near Faverſham. Rare.

reticulata. * 149. H. ſubumbilicated, reticulated; mouth rounded margined; minute. Reculver. Very rare.

C. *Rounded and imperforated.*

perverſa. 150. H. ſubumbilicated, ovate, oblong; whirls 5 to 8 contrary; 18 to 28 lines long. India.

dextra. 151. H. conic, yellow; lip reflected, white; whirls 6 to 7; aperture ovate; 18 to 22 lines long.

recta. 152. H. conic, a little pointed; whitiſh with a rufous band and ſtreaks; lip reflected; whirls 7; 2½ inches long.

inverſa. 153. H. conic, pointed; whirls 8, obliquely ſtreaked, contrary; 2½ inches long. Mauritius, and Bourbon iſlands.

interrupta. 154. H. conic, pointed, white with fulvous ſtreaks; lip white, reflected; whirls 7; 22 lines long.

contraria. 155. H. conic, pointed; whirls contrary; white, with undulated, interrupted, brown ſtreaks; 15 lines long; very rare.

læva. 156. H. ſubcylindrical, glabrous, contrary, barred; pillar yellow; lip ſlightly reflected; 12 to 16 lines long; very rare.

arenaria. 157. H. gloſſy, whitiſh, thin, longitudinally ſtriated; ſpire contrary, hemiſpherical; minute. Armenian coaſt.

jamaicenſis. 158. H. globular, cheſnut-brown, barred with white; lip fringed, white; crown obtuſe. Jamaica.

rhodia. 159. H. ſubglobular, depreſſed; baſe concave; aperture lunated. Rhode iſland.

labioſa. 160. H. oblong, poliſhed, white, diaphanous; whirls 8; aperture ovate, toothleſs; 11 lines long. India.

pudica. 161. H. oblong, a little wrinkled, roſy; whirls 6; aperture toothleſs; 20 lines long.

ianthina. 162. H. nearly imperforated, roundiſh, obtuſe, diaphanous and very brittle; aperture dilated behind, with an emarginated lip; 1 inch broad and high. In moſt ſeas.—The animal which inhabits this ſhell ſhines in the night, and ſtains the hand with a violet or purple dye.

gigantea. 163. H. imperforated, roundiſh, ſolid, with a depreſſed ſpire; whirls 6, contiguous.

vivipara. * 164. H. imperforated, ventricoſe, ſubovate, obtuſe; whirls 5 to 6, very convex; aperture nearly orbicular; 1½ inches long. Stagnant waters of Europe, Britain. This ſpecies is viviparous.

165. H. ovate, ventricoſe; white with 3 ſhining red bands; whirls 5; ſpire acute; 9 to 15 lines long. Italy. *faſciata.*

166. H. ſubovate, pointed, yellowiſh white, with a black lip; whirls 6. Tranquebar. *diſſimilis.*

* 167. H. perforated, roundiſh, thin, pellucid, and marked with variouſly coloured tranſverſe bands; whirls 5, from 9 to 11 lines wide. Woods of Europe, Britain. *nemoralis.*

* 168. H. *Garden Snail;* imperforated, globular, pale, with broad interruped, brown bands; lip white; 7 to 8 lines wide. Gardens and orchards, Europe, Britain.—This ſpecies is extremely deſtructive to the tender leaves of plants, and fruits. It is oviparous; the eggs are round, and about the ſize of ſmall peas. *hortenſis.*

169. H. imperforated roundiſh, ſmooth; whitiſh with rufous ſtreaks and bands. Southern parts of Europe. *lucorum.*

170. H. imperforated, ſubovate, obtuſe, gray with two pale bands; aperture rather oblong. Woods of Europe. *griſea.*

171. H. imperforated, roundiſh, brown, with a longitudinal white band; whirls 5, round, firſt large; aperture pure purple; 1½ inch broad. Ceylon. *hæmaſtoma.*

172. H. imperforated, ſubovate, brown ſtriped; whirls 4; aperture oblique, margined, whitiſh; 2 inches broad. *pulla.*

173. H. imperforated, ſubovate; ſulphur with a white band margined with red; whirls 4; lip reflected, margined; 10 lines broad. *venuſta.*

174. H. imperforated, ſubglobular, glabrous; whirls 4, round, firſt ventricoſe, the others depreſſed; aperture lunar. Italy. *picta.*

175. H. imperforated, ſubovate, covered with a brown cuticle, under which it is barred; aperture white within. Italy. *variegata.*

176. H. imperforated, ſolid, ovate; whirls 6, round, contiguous; pillar thickened; 1 inch long. *ſolida.*

177. H. imperforated, ſubglobular, finely ſtriated longitudinally; whirls 3, firſt ventricoſe; aperture lunar; pillar ſpiral. *aperta.*

178. H. imperforated, roundiſh, and tranſverſely ſtriated; whirls round, the firſt ventricoſe; aperture ovate. *verſicolor.*

179. H. imperforated, ovate; whirls 6, flattiſh, contiguous; aperture unequal, 5-toothed; 3 lines long. Senegal. *afra.*

180. H. imperforated, ovate, tranſverſely ſtriated with black belts; aperture ſinuous. Otaheite. *nucleus.*

181. H. imperforated, ovate, ſmooth, red; aperture pale yellow. New Zealand. *coccinea.*

* 182. H. imperforated, ſubpellucid, ſmooth, with red lines; whirls 4, the firſt more ventricoſe; minute. Welch coaſt. *variegata.*

* 183. H. whirls 3; aperture rounded, margined; minute. Welſh coaſt. *fulgida.*

* 184. H. ſtriated; aperture ſuboval; whirls reflected on the back; minute. Sandwich. Very rare. *ſtriata.*

D. *Tapering.*

* 185. H. imperforated, tapering; ſpire mutilated, truncated; whirls 4 to 7, firſt large; 6 to 15 lines long. Europe, Aſia, and Africa; Britain. *decollata.*

ſcalaris. 186. H. conic, tapering, imperforated; whirls 5, ventricoſe, remote; ſpire obtuſe; aperture ovate.

circinata. 187. H. hyaline, tranſverſely ribbed, perforated, and a little tapering; whirls diſtant; aperture circular; 6 lines high.

ſubcylindrica. 188. H. imperforated, tapering, ſubcylindrical, obtuſe; whirls 4; aperture ovate; ſize of a grain of rye. Freſh waters, North of Europe.

ſtagnorum. 189. H. ſubperforated, and a little tapering; whirls 5; aperture ovate; minute. Freſh waters.

octona. * 190. H. ſubperforated, tapering; whirls 8; aperture roundiſh; 4 lines long. America, Europe, Britain.

tenera. 191. H. tapering, convex, ſtriated; pillar ſinuated, inflected; whirls 7 to 8, with incumbent margins; aperture ovate, oblong; 2½ inches long.

columna. 192. H. tapering, white, with a fulvous tip; whirls 7 or 8, contrary, ſpotted; aperture oblong; 27½ lines long.

pella. 193. H. imperforated, ovate, pointed, tranſverſely ſtriated; brown, with yellow bands; band on the firſt whirl double, on the reſt ſingle. Iceland.

plicaria. 194. H. ſubulate, ſemipellucid, longitudinally plaited; whirls 10, round; aperture ovate.

undulata. 195. H. ſubulate, ſmooth, finely ſtriated tranſverſely; whirls about 12, round; aperture ovate; pillar glabrous.

fuſcata. 196. H. ſubulate, ſmooth, finely ſtriated tranſverſely; whirls about 10, round; aperture ovate; pillar ſmooth.

priapus. 197. H. imperforated, tapering, glabrous; pillar ſomewhat depreſſed; pillar inflected.

folliculus. 198. H. tapering, pellucid, glabrous; whirls 5 or 6, round, equal; aperture ovate; pillar ſlightly plaited; ſize of an oat. Barbary.

ſepium. 199. H. tapering, milk-white, longitudinally ſtriated; whirls 7, contiguous; aperture ovate; ½ inch long. Mountains of Southern Europe.

ſplendidula. 200. H. thin, gloſſy, pellucid; whirls 6; aperture oblong; ¼ inch long. France.

mitra. 201. H. ſhell tapering; whirls 8 or 9, diſtant ribbed; firſt round, the reſt flattiſh; aperture ovate; 1 inch long.

atra. 202. H. black, tapering, minutely ſtriated; whirls 7, rather convex; aperture oblong, oval; 2 inches long.

cuſpidata. 203. H. tapering, horny, finely ſtriated tranſverſely, and longitudinally plaited; lip acute. Rivers of India.

crenata. 204. H. tapering, white, tranſverſely ſubſtriated, and ſurrounded with a crenulated belt near the ſuture. Rivers of India.

carinola. 205. H. white, tapering, ſomewhat umbilicated; firſt whirl a little keel-ſhaped, with a blackiſh band.

crocea. 206. H. cylindrical, glabrous, yellowiſh orange; tip obtuſe.

lanſchaurica. 207. H. tapering, very glabrous, cheſnut-brown with darker ſpots; throat whitiſh. Freſh waters, Coromandel.

obtuſata. 208. H. white, denſely ſtriated, ſubcylindrical; whirls a little convex; lip margined; 3 inches long.

purpurea. 209. H. ovate, oblong, purpliſh, teſſelated with purple; within irideſcent. New Zealand.

E. *Ovate, imperforated.*

pupa. 210. H. coarſe, nearly imperforated, ovate, oblong; whirls 6; aperture oblong, lunated. Mauritania.

barbara. 211. H. coarſe, oblong, imperforated; whirls 8; aperture roundiſh, lunated; ſize of a barley-corn. Algiers.

amarula. 212. H. oblong, imperforated; whirls toothed, ſpinous; 10 lines long. Rivers of India.

nævia. * 213. H. tranſverſely grooved; white ſtriated with black; whirls flattiſh, the firſt large and round; ſpire pointed; an inch long. Southern ocean, Plymouth dock.

aſpera. 214. H. pointed, cinereous, tranſverſely ſtriated; whirls 7 to 8, toothed, marked with red ſtreaks, and armed with ſharp ſpines; 5 to 8 lines long. Coromandel.

ſtagnalis. * 215. H. imperforated, ovate, tapering to a point; ſomewhat angular, by ſeveral longitudinal wrinkles; whirls 6 to 7, firſt ventricoſe; aperture oblong, oval; 2½ inches long. Still waters of Europe, Britain.

fragilis. * 216. H. imperforated, ovate, tapering to a point; ſpire acute; whirls 5 to 7; aperture oblong, oval; 11 lines long. Still waters of Europe, Britain.

glabra. 217. H. cylindrical, pointed, horny; aperture ovate; whirls 8; four lines long. Moiſt meadows of Denmark.

paluſtris. * 118. H. oblong, pointed, brown; aperture ovate; whirls 5 to 6. Meadows of Europe, Britain.

truncatula. 219. H. ovate, oblong; whirls 5, truncated upwards; aperture ovate; 2 to 5 lines long. Greece.

peregra. * 220. H. ſubconic, horny, with a ſharp point; aperture ovate; 2 to 8 lines long. Stagnant waters of Denmark, Britain.

glutinoſa. * 221. H. ventricoſe, diaphanous, with an obtuſe projection; 2 to 3 whirls; aperture wide; 2 to 4 lines long. Denmark, chiefly on the leaves of nymphæa lutea. Marſhes at Deal.

putris. * 222. H. imperforated, obtuſe, ovate, yellow; whirls 3, the firſt large, the others minute; aperture ovate; 1 to 8 lines long. Ponds in Europe, Britain.

acuta. 223. H. conic, pointed, white with a red band; whirls 7; aperture ovate, toothleſs; 4 lines long. Italy.

papilla. 224. H. conic, perforated; ſtriæ rugged; aperture tranſverſe; whirls 6; 10 lines wide.

minuta. 225. H. ſubcylindrical; whirls 5; aperture toothleſs, oval. Greece. Not a line long.

detrita. * 226. H. conic, white, with tranſverſe rufous lines; whirls 6; aperture ovate; 8½ lines long. Saxony, Britain.

ventricoſa. 227. H. conic, pale, ſtriated; whirls 7, the 4 outermoſt nearly of equal width; 8½ lines long. Greece.

obſcura. * 228. H. conic, brown; whirls 6; aperture oval, toothleſs; ſnail white; above duſky, eyes only black. Roots of trees, Europe, Britain.

lubrica. * 229. H. conic, fulvous, poliſhed; whirls 5 or 6; aperture toothleſs; 2½ lines long. Moſs and wet rotten wood, Britain.

limoſa. * 230. H. imperforated, ſomewhat oblong, pellucid; aperture ovate. Wet meadows of Europe, Sandwich, river Avon.

contortuplicata. 231. H. turbinated, cinereous, nearly imperforated; crown truncated; whirls 5; aperture circinated.

232.

ungularis. 232. H. imperforated, greenish; whirls 5, spirally angular; throat white; 12 lines long. China.

tentaculata. * 233. H. imperforated, ovate, obtuse, clouded with brown; whirls 4 or 5; aperture subovate; 1—4 lines long. Ponds and still waters of Europe, Britain.

auricularia. * 234. H. imperforated, ovate, gibbous, with a depression in the middle of the lip; whirls 3—5; the first ventricose; spire acute, short; aperture much dilated; 2—15 lines long. Ponds of Europe, Britain.

lævigata. * 235. H. whirls 2; first ventricose; the other minute, and placed laterally; pale red, pellucid. Europe, Devonshire.

balthica. 236. H. imperforated, ovate, pointed; whirls 4; wrinkles elevated; aperture ovate, dilated. Shores of the Baltic.

neritoidea. 237. H. imperforated, convex, longitudinally striated; aperture roundish.

perspicua. 238. H. imperforated, convex, ovate; without lip; aperture extending to the tip. Mediterranean.

haliotoidea 239. H. imperforated, depressed, with waved striæ; aperture oval; open all the way down; whirls 4, lateral. Mediterranean, Atlantic, Indian and North seas.

muralis. 240. H. imperforated, subdepressed, white; whirls 6; 6 lines wide. France.

vertigo. 241. H. cylindrical, glabrous; whirls 4 or 5; round, reversed; aperture square, 6-toothed; 1 line long. In decayed wood, Denmark.

carychium. 242. H. hyaline, subconic, glabrous; whirls 5, round; aperture ovate, with 3 teeth within.

ambigua. 243. H. subimperforated, convex; grooves remote, compressed; aperture semiorbicular. Mediterranean sea.

corneus. 244. H. imperforated, ovate, black; aperture ovate. Waters of Greece.

pyrum. 245. H. subcylindrical, with decussated striæ; whirls 7, reversed; 3 very large, depressed in the middle. Guinea.

marmorata. 246. H. marbled with white, cinereous and blue; whirls 5, round; aperture ovate; ¾ inch long. Rivers of Strasburg.

achatina. 247. H. chesnut, pellucid, thin; whirls 4, narrow; aperture ovate.

lugubris. 248. H. ovate, pointed, pellucid, transversely striated; whirls 7, first largest; aperture oblong, ovate; 9 lines long.

minima. 249. H. ovate, conic, subimperforated; 2 last whirls in the centre of the first; aperture orbicular; 1½ line long.

inflata. 250. H. white, solid, opaque; first whirl twice as large as the rest; aperture large, margined. River Unstrut.

albicans. 251. H. white, opaque, pointed; aperture oval. Waters of Hamburg.

repanda. 252. H. ovate, pointed, subimperforated; first whirl ventricose, large; aperture semicircular; 6 or 7 lines long. Stagnant waters.

opaca. 253. H. ovate, pointed; whirls 5, first large; aperture ovate, oblong. Aquatic.

turgida. 254. H. obtuse; whirls 4, distant, inflated in the middle; aperture orbicular, margined; 2 lines long.

cœrulescens. 255. H. bluish, ovate, pointed; whirls 4, a little ventricose; aperture oblong, rounded; 2 lines long.

256. H. inflated; whirls 4, short; two lower ones distant; aperture orbicular, not margined; 2 lines long. Alsace. *cinerea.*

257. H. imperforated, oblong, white with longitudinal red undulations; whirls 6—7, first thrice as large as the next; 1¼ inch long. *undata.*

258. H. imperforated, oblong, thin, brown; whirls 4; first ovate, and thrice as large as the next; aperture ovate. *teres.*

259. H. subimperforated, oblong, finely striated with white; whirls 5; first twice as large as the next; aperture oval, margined; ½ inch long. *substriata.*

260. H. smooth, brown; aperture triangular, margined; minute. *trigonostoma.*

261. H. ventricose, pointed, cinereous; first whirl large; aperture oval, large; margined on one side; 1¼ inch long. *tumida.*

262. H. oblong, pointed, longitudinally ribbed, and transversely straited; whirls 10, equally decreasing; aperture oval; ½ inch long. Coromandel. *acicula.*

263. H. ovate, imperforated; whirls 8—9, round, distant, and equally decreasing; aperture oval; ½ inch long. American islands. *peregrina.*

264. H. oblong, imperforated; whirls distant, ventricose; aperture orbicular; 2½ inches long. Danube. *danubialis.*

265. H. oblong, imperforated, smooth, pointed; whirls inflated; the first larger, the rest gradually decreasing; aperture suboval, margined; 3½ inches long. Danube. *turbinata.*

266. H. oblong, curved, subimperforated; aperture oval, margined; 2½ inches in diameter. Danube. *curvata.*

267. H. thin, smooth, white, with chesnut bands; spire obtuse; whirls flattish; 8 lines to one inch long. *exilis.*

Gen. 30. Nerita, *Nerite.* 58 Nerita.

Gen. Char.—The animal is a limax; the shell univalve, spiral, gibbous, flattish at bottom; aperture semiorbicular, or semilunar; pillar lip transversely truncated, flattish.

Species.

A. *Umbilicated.*

1. N. smooth; spire slightly pointed; umbilicus gibbous, and bifid. India, Africa, America. *canrena.*

2. N. with decussated striæ, and impressed dots; spire subclavate; umbilicus gibbous, bifid. American islands. *cancellata.*

* 3. N. smooth, glossy, faintly wrinkled; spire rather obtuse; umbilicus rather closed by the pillar lip, which is gibbous, and two-coloured; 2 inches long. Barbary, Europe, Britain. *glaucina.*

4. N. subglobular; umbilicus perforated, equal. Indian ocean. *vitellus.*

5. N. convex; umbilicus somewhat heart-shaped, with a flattened lobe. Cape of Good Hope, Barbary, Indian islands. Extremely rare. *albumen.*

6. N. ovate, glabrous; umbilicus partly covered; whirls 4 or 5; aperture ovate. *mammilla.*

7. N. subglobular, solid, bay with white bands; spire somewhat depressed; whirls 4 or 5; an inch long. *leucozonias.*

8. N.

ſpadicea. 8. N. ſubglobular, ſolid; tip bluiſh; lateritious bands in the throat, and a white one on the beak. Mauritius iſland. Rather large.

rufa. 9. N. thin, rufous; umbilicus darker, with a white border; throat with a reddiſh band. Mauritius iſland.

fulminea. 10. N. ſubglobular, with angular, tawny lines, and flattened lobe; white or yellowiſh. Africa. Rare.

ſtercus-muſcarum. 11. N. ſmooth, ſnowy, with rufous ſpots and ſpecks; umbilicus gibbous, bifid. Mediterranean, American ſeas.

orientalis. 12. N. ſubglobular, poliſhed very ſmooth; baſe of the ſpire a little wrinkled; pillar ſnowy. Eaſtern ſeas.

cruentata. 13. N. ſubglobular, white, with red ſpots; lip obtuſe and bluiſh; umbilicus ſpiral.

rugoſa. 14. N. wrinkled; within glabrous; umbilicus bordered with white. American iſlands.

marochienſis. 15. N. ſubglobular, ſmooth, light green, browniſh within; livid at the tip; wrinkled at the angle of the whirls. Africa.

ſulcata. 16. N. ſubglobular, obliquely plaited; ſpire with 4 whirls, mucronate; umbilicus bifid.

arachnoidea. 17. N. white, reticulated with reddiſh lines, and blackiſh at the tip; umbilicus nearly covered; whirls convex.

vittata. 18. N. ſubglobular, brown, with a double white fillet in the middle; reticulated and denticulated on each ſide. Africa.

melanoſtoma. 19. N. thin, pellucid, ſmooth, oblong; firſt whirl ventricoſe, flat and large; umbilicus half cloſed; 2 inches long. Indian ſea.

pallidula. * 20. N. ſemitranſparent, horn-colour; whirls prominent; aperture ſemilunar, and patulous; umbilicus large; a ſmall ſhell. Coaſts of Kent and Dorſet.

papilla. 21. N. pellucid, thin, oblong, with decuſſated ſtriæ; dirty yellow; whirls 4; aperture ſuboval; pillar white; umbilicus half cloſed. Tranquebar.

clathrata. 22. N. depreſſed, ovate, tranſverſely undulated and longitudinally ribbed; ribs flat, oblique, and ſemilunar; ſpire papillary. Foſſil in Campania.

valvata. 23. N. flattiſh, with a circinated aperture. N. ſeas.

icelandica. 24. N. globular, ſubacute, thick; whirls 4, ſeparated by deep grooves. North ſeas.

affinis. 25. N. globular, thick; ſpire ſubmucronated; whirls 3. New Zealand.

B. *Imperforated*; *lip toothleſs*.

corona. 26. N. whirls of the ſpire crowned with ſpines; minute. India, America.

radula. 27. N. grooved, with equal, tuberculated ribs; ſize of a walnut. Indian iſlands.

cornea. 28. N. obſoletely ſtriated; white or pale violet. Red ſea.

fluviatilis. * 29. N. rugged, ſpotted, ſtreaked, or mottled with white and purpliſh brown or pink; mouth cloſed with a teſtaceous operculum; 4 lines long. In ſlow rivers of Barbary and Europe, Britain.

littoralis. * 30. N. ſmooth, with a carious crown; whirls 4 or 5, firſt large; ſize of a horſe bean. Europe, Shores of Britain. Common.

lacuſtris. 31. N. ſmoothiſh, horny, or blackiſh, ending in a very fine point. Still waters and warm ſprings of Europe; ſuppoſed to be only a variety of N. *fluviatilis*.

magdalenæ. 32. N. grooves wide and black; within white; whirls 3; lip ſmooth, 2 toothed; 6 lines long. Magdalene iſlands.

marginata. 33. N. thin, with decuſſated ſtriæ, tuberculated; black with ochraceous ſpots; ſubglobular; aperture margined outwardly.

dubia. 34. N. thin, pellucid, ovate, poliſhed; dull yellow varied with black; outer lip acute; inner glabrous; crown prominent; very rare.

pellucida. 35. N. ſmooth, pellucid; whirls 3; very minute; Pembrokeſhire coaſt.

alba. * 36. N. ſmooth, ſomewhat pellucid; whirls 2; very minute. Pembrokeſhire coaſt.

C. *Imperforated*; *lips toothed*.

pulligera. 37. N. ſmooth, coarſe, with an excavated eye-like ſmall ſpire: inner lip ſmooth, crenulated; whirls 2, one large, terminating in an acute tooth; 14—16 lines long. Rivers of India.

undulata. 38. N. thin, ſmooth, undulated, with an obtuſe crown; outer lip ſubſtriated, and toothleſs; inner one a little denticulated. India.

aterrima. 39. N. thick, opaque, globular; deep black with coloured lines; outer lip glabrous; inner lip tuberculated, wrinkled.

larva. 40. N. ſmooth, ſubglobular; white, with yellowiſh brown bands; crown obtuſe; lip ſlightly denticulated; middle ſized. Amboyna. Rare.

pupa. 41. N. ſmooth, roundiſh, milk-white; whirls with tranſverſe, parallel, black ſtriæ; lip flat; teeth ſcarcely viſible.

bidens. 42. N. ſmooth; inner lip 2-toothed: ſize of a pea.

viridis. 43. N. ſmooth, green; inner lip crenulated in the middle. Minorca and Jamaica.

virginea. 44. N. ſmooth, ovate; inner lip denticulated; 2 to 10 lines long, India, South America.

polita. 45. N. ſmooth; crown obliterated; lip toothed on each ſide; brown. India, South ſeas.

peloronta. 46. N. ſtriated; lips toothed; inner one flattiſh and wrinkled. American iſlands.

albicilla. 47. N. ſtriated; lip ſlightly toothed; inner one tuberculated. Cape of Good Hope. Indian ocean.

hiſtrio. 48. N. grooved, tranſverſely ſtriated; inner lip toothed; ribs 30, unequal.

plicata. 49. N. grooved; 17 to 20 tranſverſe ribs; outer lip 5 or 6 teethed within; inner convex, wrinkled, with three long, ſtrong teeth, beſide leſſer ones. India.

groſſa. 50. N. grooved, lips toothed; inner lip with a yellow ſpot, and 3 or 4 teeth; convex and wrinkled. Molucca iſlands.

chamæleon. 51. N. with 20 grooves, varied with undulated alternate black and white rays; lips toothed; inner one wrinkled and tuberculated. Indian ocean.

undata. 52. N. grooves 30; ribs about 30, flattened; lips toothed; inner one wrinkled and tuberculated. Indian ſeas.

exuvia. 53. N. grooved, with 15 to 19 ribs; lip toothed; inner one tuberculated. India.

maxima. 54. N. ſolid, thick, glabrous; undulated with black and yellowiſh rays; outer lip toothleſs; inner one concave, 4-toothed; a very large ſhell.

textilis. 55. N. angular black lines; with 16 crenated ribs and grooves; outer lip crenated without, and toothed within; inner lip wrinkled above, and tuberculated beneath.

atrata. 56. N. deep black, glabrous, and thinly ſtriated above ; both lips white ; outer one finely grooved, and ſlightly toothed within. Atlantic and South ſeas.

aſcenſionis. 57. N. with 16 white grooves ; ribs ſpotted with white ; crown a little prominent ; outer lip glabrous on each ſide ; inner one concave, yellowiſh and toothed. Aſcenſion iſland ; a large ſhell.

lineata. 58. N. mouth and lips white ; whirls round, ſurrounded with black, parallel ſtriæ ; outer lip ſtriated within. Malacca ſeas.

verſicolor. 59. N. with blackiſh bluiſh, red and white ſquare ſpots, and bands, ſpotted with red and white ; inner lip ſtriated within, and toothed on each ſide. Antilles iſlands.

pica. 60. N. white, radiated with black without ; ſtriæ tranſverſe, rounded, ſmooth ; inner lip wrinkled and 4-toothed. Indian ſeas.

coſtata. 61. N. yellowiſh within, ſubglobular, ſurrounded with thicker ſtriæ ; interſtices ſnowy ; lips white, toothed ; outer one crenated without. Nicobar iſlands.

quadricolor. 62. N. ſubviolet with a yellowiſh tip ; white within, with elevated black ſtriæ : lips toothed ; outer one grooved within ; inner one wrinkled. Red ſea.

malaccenſis. 63. N. grooved, yellowiſh within ; crown a little prominent ; outer lip unarmed and crenulated outwardly ; inner lip yellowiſh, ſmooth. Malacca.

antillarum. 64. N. ſubglobular, black ; white within ; grooved and ſtriated ; lips wrinkled and denticulated. Antilles iſlands.

flammea. 65. N. ſubglobular, with crowded tranſverſe ſtriæ ; white, with purpliſh, undulated rays ; outer lip grooved within ; inner lip wrinkled above.

fulgorans. 66. N. ſubglobular, with crowded tranſverſe ſtriæ ; deep black with ochraceous rays ; lip ſlightly denticulated ; inner one tuberculated in the middle. American iſlands.

teſſelata. 67. N. obtuſe, tranſverſely ſtriated ; the ſtriæ marked with nearly ſquare black and white ſpots ; both lips denticulated ; outer lip ſlightly ſtriated within, inner lip with one or two teeth ; concave, glabrous, and denticulated beneath. Iſlands between Africa and America.

bifaſciata. 68. N. blackiſh with 2 gray bands ; crown white. India.

literata. 69. N. ſubglobular, white, with various characters ; inner lip crenulated, toothed. India.

violacea. 70. N. ovate, ſolid, ſmooth, violet dotted with white ; inner lip denticulated beneath.

ſenegalenſis. 71. N. ovate, obtuſe, deep black ; whirls 3, the firſt with turgid 25—30 grooves ; the two others very minute ; 1 inch broad. Senegal.

promontorii. 72. N. black, ovate, pointed ; whorls 3, with 30 grooves ; left lip wrinkled. Africa.

tricolor. 73. N. variegated with red, black and white ; right lip with 10 teeth ; left lip glabrous, with three large emarginated teeth ; 9 lines long.

perverſa. 74. N. ſurrounded with belts ; ſpire reverſed ; aperture 8-toothed. Found only in a foſſil ſtate.

turrita. 75. N. bands alternately white and black ; within white ; crown much elevated ; outer lip acute ; whirls 4. Freſh waters in Antilles iſlands.

aculeata. 76. N. blackiſh, tranſverſely ſtriated ; the ſtriæ ſpinous ; inner lip flattiſh, ſmooth, and ſlightly toothed. India.

59 Haliotis.

Gen. 31. Haliotis, *Sea-ear.*

Gen. Char.—The animal is a limax ; the ſhell is univalve, dilated, ear-ſhaped, with a longitudinal row of orifices along the ſurface ; ſpire lateral and nearly concealed.

Species.

midæ. 1. H. *Midas' ear ;* roundiſh, both ſides poliſhed ; orifices from 8 to 10 ; 7 to 9 inches long. Indian ocean, Cape of Good Hope.

tuberculata. 2. H. ſubovate ; outſide tranſverſely grooved, rugged and tuberculated ; wrinkles on the outſide undulated. The inner margin of the ſhell has a ridge the whole length, which terminates in one ſpiral turn at the end. This ridge is beſet with tubercles, the laſt 6 of which, or from 6 to 9, are open. The inſide is open, concave, and of a beautiful mother-of-pearl : the length is from 3 to 4 inches ; breadth from 2 to 3. It is found on the ſhores in the South of England, after violent ſtorms. It is common in the iſland of Guernſey, adhering to the rocks at the loweſt ebb. The fiſh is eaten by the inhabitants, and the common people adorn their houſes with the ſhells, by ſticking them on the outſide with plaſter.

ſtriata. 3. H. ovate, ferruginous, tranſverſely wrinkled, and longitudinally ſtriated ; 4 or 5 orifices open. Aſia, Barbary.

varia. 4. H. ovate, longitudinally ſtriated ; larger ſtriæ tuberculated ; orifices 20 to 30 ; 4 to 5 open. India.

marmorata. 5. H. oval, longitudinally ſtriated, with obſolete tranſverſe ones ; orifices about 30, 4 to 5 open ; 2 to 4 inches long. Africa, India.

aſinum. 6. H. *aſſes ear ;* ſmoothiſh, oblong ; margin ſomewhat falcated ; nerves on the outſide elevated ; orifices about 30, 5 to 7 open ; 3 inches long. India.

parva. 7. H. ovate, red, with an elevated angle on the belly ; orifices 30, 4 or 5 open. Africa, India.

biſtriata. 8. H. ovate, greeniſh, ſpotted with brown ; ſtriæ elevated, double, tranſverſe ; 6 orifices open. Africa.

auſtralis. 9. H. varied with gray, bluiſh, and red ; ovate ; ſpire prominent, inflated ; 7 to 9 orifices open ; 3 inches long. New Zealand.

guineenſis. 10. H. ovate, ſomewhat convex, ſolid, with decuſſated ſtriæ ; orifices flattened ; 6 open ; 2½ inches long. Guinea.

imperforata. 11. H. ovate, imperforated, with prickly ribs ; ſpire exſerted ; 1 inch long. India. Extremely rare.

perverſa. 12. H. ovate, imperforated ; margin oblique above, and tuberculated within ; ſpire reverſed ; ¾ inch long. Foſſil.

plicata. 13. H. tranſverſely plaited on the outſide ; margin broad, thick, and finely ſtriated longitudinally ; ¼ inch long. Foſſil near Hildeſia.

glabra. 14. H. ovate, ſmoothiſh, ſolid ; varied with white and green ; 6 orifices open ; 2½ inches long.

pulcherrima. 15. H. roundiſh, varied with roſy and white ; outer lip crenated ; orifices 30, 6 pervious ; 7 lines long. South ſea iſlands.

virginea. 16. H. ovate, with decuſſated, undulated ſtriæ ; under ſide irideſcent ; 6 orifices open ; 1½ inch long. New Zealand.

ovina. 17. H. ſuborbicular, depreſſed, wrinkled ; varied with white, cheſnut, and yellowiſh ; orifices in the middle pervious.

gigantea. 18. H. oval, rugged, varied with white and red ; ſpotted ; inner lip with a very broad margin ; 3 to 7 orifices open.

19. H.

iris. 19. H. ear ventricoſe, fulvid brown, with tranſverſe wrinkles, and longitudinal, tuberous plaits; under ſide irideſcent; $4\frac{1}{2}$ inches long. New Zealand. Extremely rare.

60 Patella.

Gen. 32. Patella, *Limpet.*

Gen. Char.—The animal is a limax; the ſhell univalve, ſubconic, ſhaped like a baſon, without ſpire.

Species.

A. *Having an internal lip; ſhell entire.*

equeſtris. 1. P. orbicular, perfoliated outwardly; lip vaulted, perpendicular; 1 inch wide. Indian and American ſeas.

neritoidea. 2. P. ovate; tip ſubſpiral; lip lateral; ſize of a cherry; inhabitant red.

ſinenſis. * 3. P. ſubconic, ſmooth; lip ſomewhat lateral. Mediterranean and Indian ſeas. On oyſters in Salcomb-bay, Devonſhire.

porcellana. 4. P. oval; tip recurved; lip placed behind and flattened. India and Goree.

fornicata. 5. P. oval, obliquely recurved behind; lip placed behind, and concave. Barbadoes, Mediterranean.

aculeata. 6. P. oval, brown, with prickly ſtriæ; crown recurved. American iſlands.

trochiformis. 7. P. conic, longitudinally plaited; internal lip lateral. Tranquebar and Falkland iſlands.

auricula. 8. P. roundiſh, with radiated grooves, and ſtriated; crown recurved; internal cavity ear-ſhaped. Borneo, Santa Cruz.

rugoſa. 9. P. ovate, thin, obſoletely wrinkled tranſverſely; margin unequal; lip unequally repand; above 1 inch long. China. It is generally found on the *buccinum ſpiratum.*

goreenſis. 10. P. oval, flat, thin, white, gloſſy, lamellated on the outſide; 5 to 6 lines in diameter. Rocks at Goree.

contorta. 11. P. granulated with white, and fine perpendicular, oblique ribs; lip thin, oblique, and covering half the cavity. Rare.

explanata. 12. P. white, finely ſtriated; crown inclining downwards and dilated, behind which the ſhell is depreſſed.

plicata. 13. P. conic, ochraceous, with ferruginous rays within; with longitudinal, tranſverſely ſtriated plaits.

ſtriata. 14. P. white, conic, ſtriated; grooves undulated; crown a little lateral.

ſolea. 15. P. twiſted, pellucid, with ferruginous ſpots; thinly plaited and tranſverſely grooved above; lip undulated, repand; $\frac{1}{2}$ inch long.

echinata. 16. P. conic, prickly; within glabrous. Found foſſil near Crignon.

B. *Margin angular, or irregularly toothed.*

crepidula. 17. P. oval, flattiſh, ſmooth; lip ſemilunar, flat behind. Mediterranean.

lacinioſa. 18. P. rays unequal, elevated; thicker and obtuſe on the outſide. India.

ſaccharina. 19. P. angular, with 7 keel-ſhaped, obtuſe ribs. Java and Barbadoes.

barbara. 20. P. toothed, with 19 elevated, vaulted, and muricated rays. Falkland iſlands.

granularis. 21. P. toothed, with elevated, angular, imbricated ſtriæ; 2 inches long. Southern Europe, and Cape of Good Hope.

granatina. 22. P. angular, with numerous muricated ſtriæ; $1\frac{1}{2}$ to 3 inches long. Jamaica, ſouthern Europe.

vulgata. * 23. P. with about 14 obſolete angles, and dilated, acute, crenated margin; crown central; 2 inches high. Marine rocks of Europe and India, Britain.

depreſſa. * 24. P. oblong with about 14 angles; crown lateral. Rocks of Europe, Britain.

cerulea. 25. P. crenated, ſubangular; ſtriæ numerous, unequal; beneath blue; blackiſh on the outſide. Mediterranean.

tuberculata. 26. P. conic, tuberculated; tubercles white, in rows; ſlightly toothed; retuſe behind.

lepas. 27. P. roundiſh, pectinated; rays imbricated, tuberculated, and tranſverſely ſtriated; crown incurved; $2\frac{1}{2}$ inches long. Chili, Falkland iſlands.

tricoſtata. 28. P. oval, three-ribbed, white; ſtriated at the ſides; internal margin flattiſh, a little jagged. Indian ocean.

mytilina. 29. P. carinated, rounded on the fore-part, with undulated ſtriæ; brown and pearly within; hinder margin crenated; 1 inch long. South America.

ovata. 30. P. toothed, oval, conic, ſomewhat compreſſed; ribbed; brown between the ribs; brown within, with white grooves; 9 lines long.

ſtellata. 31. P. angular, ovate, depreſſed; rays 10, elevated, with ſhort, intermediate ribs; 8 lines long.

icelandica. 32. P. ſolid, ovate, gibbous; unequally ribbed; glabrous within, with alternate, cinereous, and horny rays; margin crenated; $1\frac{1}{2}$ inch long. Shores of Iceland.

cypria. 33. P. oval, ſubpellucid; ribs 16 to 20; tuberculated and foliaceous on the outſide; 1 to 3 inches long. Shores of Cyprus.

coſtata. 34. P. ovate, a little gibbous, white; ribs 20 to 40; keel-ſhaped, crowded, unequal, tuberculated; 2 inches long.

leucopleura. 35. P. ovate, duſky; ribs ſmooth, unequal, white, crowded; crown uſually brown; 1 inch long.

ſtriatula. 36. P. a little rugged, white, with brown, flexuous ſtriæ, branching outwards; 2 brown ſpots in the bottom of the hollow.

octoradiata. 37. P. convex; ribs 11 to 16; 8 larger, tuberculated; $1\frac{1}{4}$ inch long. American iſlands.

rubra. 38. P. toothed; red under the brown ſkin, with elevated, rounded ſtriæ, and leſſer imbricated ones; within white; $1\frac{1}{2}$ inch long.

hepatica. 39. P. ovate, gibbous, thin; toothed, liver-colour; ſtriæ elevated, keel-ſhaped and obtuſely ſpined; crown white; $1\frac{1}{2}$ inch long.

badia. 40. P. ſubconvex, brown; with 12 larger rays, each ſurrounded by a rib, and as many leſſer ones; $2\frac{3}{4}$ inches long.

fuſceſcens. 41. P. flattiſh, brown, with 10 elevated ſtriæ; crown of a different colour; bottom of a pale liver-colour; ſpatulated ſpot, edged with glaucous and gold; inner margin brown; 2 to 3 inches long.

maculoſa. 42. P. flattened; forepart narrow and rounded; yellowiſh ſpotted with brown; crown white; rays 10 or 11 equal, rounded, flat; $\frac{3}{4}$ to 1 inch long.

rotundata. 43. P. ſuboval, flattened, varied with brown; ribs flat, rounded; crown and bottom differently coloured; 1 to 2 inches long.

pecten. 44. P. ovate, obſcurely edged with white; radiated, ed, ſtriæ diſtant, pectinated outwardly; crown gray; 1 to 2 inches long. North America.

corrugata. 45. P. ovate, wrinkled, cheſnut; crown with a white circle; $\frac{1}{2}$ inch long.

alboradiata. 46. P. oval, brown, radiated with white on each ſide; ſtriæ elevated, pectinated; crown white; bottom yellowiſh; $\frac{3}{4}$ inch long.

olivacea. 47. P. ovate, olive-coloured; within brown varied with white, with elevated unequal ſtriæ; margin with 2 rows of unequal ſpines; brown, pale yellow; $1\frac{1}{2}$ inch long.

cerea. 48. P. ovate, wax-colour on both ſides; perpendicularly ſtriated; ribs 13, flattened; bottom white; $\frac{1}{2}$ inch long.

impreſſa. 49. P. ovate, with ſtriæ elevated, tranſverſe, browniſh; ſpotted with white, and reaching half way down; crown with a white, impreſſed circumference; and 3 browniſh ſpots; $\frac{3}{4}$ inch long.

aurantia. 50. P. ovate, ſolid, citron undulated with brown; ſtriæ elevated, crowded, wrinkled; bottom white; 1 inch long.

cingulum. 51. P. ovate, denticulated, cinereous, with three black belts; within milk-white, with elevated, unequal ſtriæ, nodulous on the outſide, and ſpinous at the margin; 1 inch long; crown acute, reddiſh or whitiſh.

oculata. 52. P. ovate, white; ribs flattened, of unequal lengths; interſtices browniſh; crown obtuſe, with a brown belt; $\frac{1}{2}$ inch long.

magellanica. 53. P. thin, ovate; margin knotty; within pearly, with elevated cheſnut ſtriæ; crown pointed, brown; $\frac{1}{2}$ inch long. Straits of Magellan.

ochroleuca 54. P. ochraceous, with three yellow bands, and elevated, acute, unequal ſtriæ; crown white; 1 inch high.

dentata. 55. P. white, denticulated; ſtriæ unequal, elevated, acute; crown ſurrounded with a double row of cinereous dots, and a duſky gray band; 1 inch long.

nodoſa. 56. P. yellow, radiated with brown; ſtriæ unequal, elevated, knotty; crown and bottom white; $1\frac{1}{4}$ inch long.

cinerea. 57. P. toothed, cinereous; ſtriæ unequal, elevated; interſtices brown and rugged; crown pointed; milk-white or ſilvery.

exalbida. 58. P. whitiſh, rays browniſh, and ſtriæ unequal, elevated, rounded; interſtices rugged; crown obtuſe, white, with a broad, interrupted brown band, and another marginal one; $\frac{1}{4}$ inch long.

cancellata. 59. P. cinereous and brown, with decuſſated ſtriæ, and 2 rows of tubercles; crown yellowiſh; bottom with a ſpatulated white ſpot; $1\frac{1}{2}$ inch long. Jamaica.

levis. 60. P. rounded, ſmooth, yellowiſh, with a broad, citron, marginal band, ſpotted with brown, and another narrower one; margin dilated, acute; crown varied with bluiſh and white; $1\frac{1}{2}$ inch long.

argentea. 61. P. ſmooth, thick, ſilvery; rays 11, brown; margin ſilvery: crown pale yellow; bottom ivory, with a double white ring; 2 inches long. Very rare.

cuprea. 62. P. white, with ſtrong, rounded, brown ribs; pearly within; crown and bottom copper-coloured; 2 inches long.

rubida. 63. P. pale liver-colour on both ſides; ribs keel-ſhaped, alternately larger and leſs; crown flat, white; $1\frac{1}{4}$ inch long.

glabra. 64. P. brown, glabrous above; ſtriæ beneath, elevated, crowded, white; crown obtuſe, white; border fulvous; bottom fulvous; $1\frac{1}{2}$ inch long.

65. P. yellowiſh, varied with brown; ribs unequal, flattened; crown obtuſe; bottom varied reddiſh and white; 1 inch long. *flaveola.*

66. P. denticulated, compreſſed on each ſide; rounded, yellow, perpendicularly ſtriated; ribs keel-ſhaped; bottom varied, white and cinereous; $1\frac{1}{4}$ inch long. Rare. *infundibulum.*

67. P. rounded, glabrous, white; a ſmall ſhell. *cyathus.*

68. P. ovate, entirely yellow, with undulated grooves; perpendicularly ſtriated within; margin ſcalloped here and there; 3 inches long. China. *ſinica.*

69. P. roundiſh, white, with many coloured dots; radiated at the baſe, and ſurrounded with 2 brown rings; margin flexuous. *punctata.*

70. P. ovate, with annular ſtriæ; black, with elevated, unequal ſtriæ; margin crenated; crown and bottom white. *lugubris.*

71. P. ovate, toothed, yellowiſh, with elevated flattened ſtriæ; crown pointed, orange. Liſbon. *ulyſſiponenſis.*

72. P. oblong, red, with elevated, unequal, white ſtriæ; margin crenated. Africa. *umbella.*

73. P. thin, pellucid, ſtriated, blackiſh with olive rays; within glaucous or cinereous; crown pointed; margin crenated, bottom milk-white. Shores of Africa, Malaga, Liſbon. *crenata.*

74. P. ferruginous, with angular or undulated ruſſet lines and cinereous belts; within milk-white, with elevated, knotty ſtriæ; crown pointed; margin plaited. *ferruginea*

75. P. oval, ochraceous, with elevated black ſtriæ; within ſilvery, ſpotted; crown pointed, white, ſmooth, bottom with a ſtraw-coloured ſpot. *melanogramma.*

76. P. ovate, thin; margin flexuous; within ſilvery, with browniſh rays, and thin, undulated ſtriæ, with bay granulations. Seas of Magellan. *repanda.*

77. P. oval, white, thinly ſtriated, and varied with red ſpots and dots; margin with 8 angles. *anguloſa.*

78. P. oval, ſmooth, poliſhed, pellucid, ſtriated with 7 yellowiſh ribs; bluiſh olive dotted with brown; margin with 7 angles. *tigrina.*

79. P. oblong, flattiſh; bay ſtriated with white; within milk-white, with 11 elevated, unequal ſtriæ; crown rounded, white. American iſlands. *monopis.*

80. P. ovate, toothed, brown dotted with green; with 11 elevated, hollow, broader ſtriæ, and as many narrower ones; crown white. *chloroſticta.*

81. P. thin, white, unequally ſtriated, within pearly; crown with an orange mark, ſurrounded with a yellow ring: margin crenated. Iceland. *margaritacea.*

82. P. oval, thin, ochraceous, with angular cheſnut lines, and 10 to 12 elevated, obtuſe, hollow, unequal ſtriæ. *tenuiſſima.*

83. P. ſolid, ſubconic, tranſverſely plaited; margin flexuous. Barbadoes. *mitrula.*

84. P. ovate, toothed, with 30 elevated, obtuſe, undulated, and tranſverſely wrinkled ſtriæ. Shores of Magellan. *plicaria.*

85. P. whitiſh, obtuſely pentangular; margin crenated, dilated; crown obtuſe; bottom reddiſh. *pentagona.*

86. P. ovate, tender, pellucid; ſtriæ elevated; crown and bottom copper-coloured; $1\frac{1}{2}$ inch long. Straits of Magellan. *ænea.*

87. P. thin, oblong, ovate, with fine undulated ſtriæ; *conchacea.*

ſtriæ; yellowiſh with elevated dark rays; crown recurved. South America.

Gannea. 88. P. ovate, ſilvery; ſtriæ elevated, flattened; crown obtuſe, copper colour; bottom with an oval bay mark; margin flexuous; 1 inch long.

candidiſſima. 89. P. ſuborbicular; ſtriated; white with a browniſh band; dotted with brown; margin tranſverſely wrinkled.

C. *With the tip or crown pointed and recurved.*

hungarica. * 90. P. entire, conic, pointed, ſtriated, with a hooked, revolute crown; 2 inches high. America, Mediterranean, and Aſiatic ſeas; ſhores of Britain.

imbricata. 91. P. entire, oblong, imbricated; the crown placed behind.

mammellaris. * 92. P. entire, conic, ſtriated, ſubdiaphanous, with a ſmooth reflected crown. Shores of the Mediterranean and Africa, Britain.

tricarinata 93. P. ſubſtriated, with 3 ribs on the forepart; $2\frac{1}{2}$ inches high.

pectinata. 94. P. entire, ovate, with wrinkled, ſlightly branched ſtriæ; crown nearly central; 2 inches long. Mediterranean.

lutea. 95. P. entire, oval, convex, ſtriated, with a ſubmarginal, reflected, mucronate crown; ſize of a melon ſeed. India.

criſtata. 96. P. crown revolute; back creſted, keel-ſhaped.

lacuſtris. 97. P. entire, oval, membranaceous, with a central, mucronate, reflected crown; $1\frac{1}{2}$ to $2\frac{1}{2}$ lines long. Freſh waters of Europe, Britain.

fluviatilis. 98. P. entire, oval, a little horny, with a marginal, mucronate crown; aperture oval; $2\frac{1}{2}$ lines long. Rivers of Europe, Britain.

cæca. 99. P. entire, with elevated dots and ſtriated; crown acute, ſtraight. Bays of Norway, on ſtones.

virginea. 100. P. entire, white, with 18 red bands. Bays of Norway, on fuci.

teſſelata. 101. P. entire, whitiſh, teſſelated with red. Norway, on rocks and fuci.

fulva. 102. P. entire, orange, with a mucronate and nearly vertical crown. Norway.

ſubſpiralis. 103. P. ovate, with an obtuſe, nearly ſpiral tip. Norway.

ambigua. 104. P. ovate; margin ſlightly toothed, point reflected, ſomewhat acute. Norway.

rubicunda. 105. P. entire, ſubconic, ſmoothiſh, and reddiſh; $2\frac{1}{2}$ lines long. Deeps of Greenland.

borniana. 106. P. ovate, entire, finely ſtriated longitudinally; white with red veins; 6 lines long.

calyptra. 107. P. entire; ribs ſomewhat imbricated; crown hooked; margin ſinuated. North America.

melanoleuca. 108. P. ſtriated, entire, alternately black and white; 1 inch long.

pectunculus. 109. P. oblong, convex, ſlightly toothed, within poliſhed; ſtriæ knotty, elevated; crown bent forwards; 1 inch long.

faſciata. 110. P. ovate, white, with a brown band; ſtriæ elevated, acute; margin dilated, crenated, and cinereous within; 1 inch long.

elegans. 111. P. with decuſſated ſtriæ, white radiated with red; denticulated; crown gray; 2 inches long.

ſquamoſa. 112. P. ſtriæ elevated, and tranſverſely undulated on the outſide; brown, ſilvery towards the margin; crown hooked and bronzed; $3\frac{1}{2}$ inches long.

ſqualida. 113. P. entire brown, whitiſh within; margin bluiſh, radiated with brown, with elevated, obſolete ſtriæ; crown knotty.

114. P. ſmooth, ſubangular, yellow radiated with *crocea.* brown; crown obtuſe, white; 1 inch long.

115. P. ovate, ſmooth, white on both ſides, with a *candida.* roſy belt on the outſide; crown lateral; $\frac{1}{2}$ inch long.

116. P. compreſſed, convex in the middle, cancel- *trigona.* lated, white, with a browniſh band on the outſide, and margined within; crown marginal, obtuſe; $\frac{1}{2}$ inch long.

117. P. rounded, convex, thin; whitiſh with red ſpots; *minima.* crown obtuſe, white, marginal; $\frac{1}{4}$ inch long. Ferro iſlands.

118. P. ovate, thin, pellucid, with fine crowded *tranquebarica.* ſtriæ; cheſnut with white ſcales; within milk-white; with a brown ſpot at the bottom, and azure ſpot on the crown. Tranquebar.

119. P. oblong, horny, very thin, pellucid, glabrous, *perverſa.* with a ferruginous baſe. Africa.

120. P. with decuſſated grooves; thin, pale, fleſh- *cernua.* colour; aperture oblong.

121. P. entirely white, flat; point of the crown *incurva.* twiſted.

122. P. oval, depreſſed, browniſh with green dots, *interrupta.* diſpoſed in oblique, interrupted rays; crown with an obtuſe hook; 1 inch long.

D. *Entire, and not pointed at the tip or crown.*

123. P. conic, ſtriated, greeniſh or pale brown; *afra.* within white; crown glabrous, white, obtuſe; margin glabrous. Iſland of Goree.

124. P. conic, white, with brown rays marked with *luſitanica.* ſtriæ granulated with black; crown acute, ſurrounded with a cheſnut ring; very ſmall. Portugal, on the ſea rocks.

125. P. rounded, convex, gray with decuſſated ſtriæ; *radiata.* crown pointed, central, and marked with 12 orange, radiated lines; bottom horny. Jamaica.

126. P. pyramidal, reddiſh gray, with thin, circu- *areolata.* lar ſtriæ croſſed by longitudinal ones; crown violet.

127. P. ovate, with fine annulated ſtriæ, reddiſh *flammea.* gray, with undulated brown rays; crown acute, central; white in the middle.

128. P. reddiſh gray, with radiated ſtriæ, glabrous, *indica.* narrower on one ſide; crown acute, ſmooth, ſurrounded with a reddiſh ring; $3\frac{3}{4}$ inches long. India.

129. P. thick, ſubovate, yellowiſh, with black rays, *ſurinamenſis.* and longitudinal, unequal ſtriæ; and ſurrounded with knotty belts; crown obtuſe, ſmooth, white. Surinam.

130. P. ovate, yellow; baſe unequally ſtriated; *vitellina.* crown whitiſh, obtuſe.

131. P. ovate, convex, white, ſolid, with flexuous, *ſanguinolenta.* elevated, longitudinal ſtriæ, intermixed with capillary ones; crown lateral, ſurrounded with a broad ring, dotted with red. Africa.

132. P. ovate, yellow, within bluiſh white; with *lævigata.* oblique flattened ſtriæ alternately thicker and thinner; crown white, ſmooth, poliſhed.

133. P. rounded, white, with many-coloured dots, *punctulata.* radiated towards the baſe, and ſurrounded with 2 brown rings.

* 134. P. entire, obovate, gibbous, pellucid, with 4 *pellucida.* blue rays; ſize of a walnut. European and northern ſeas, ſhores of Britain.

135. P.

teſtudinaria. 135. P. entire, acute, ſmooth, glabrous. Indian and North ſeas.

teſtudinalis. 136. P. entire, ovate, ſtriated; crown obtuſe, nearly central; 14 lines long. Greenland ſeas.

compreſſa. 137. P. entire, oval, oblong, ſtriated, ſmooth; compreſſed on the back; 14 inches long. India.

ruſtica. 138. P. entire, conic, with 50 obtuſe ſtriæ; three inches long.

fuſca. 139. P. entire, ovate, obtuſe, with 39 cinereous, filiform, elevated ſtriæ.

notata. 140. P. entire, ſtriated, with a ſubmucronate, erect crown; within white, with a black, heart-ſhaped ſpot, white in the middle; minute. Mediterranean.

cruciata. 141. P. entire, oval, ſub-convex; brown, with a white croſs; 1 inch long.

reticulata. 142. P. entire, conic, compreſſed, with reticulated veins.

deaurata. 143. P. oval, entire, gilded; within ſilvery, with ſomewhat imbricated ſtriæ; margin with plaited teeth. Straits of Magellan, and Falkland iſlands.

ſtellifera. 144. P. oval, entire, ſtriated; black brown radiated with white; within ſilvery. Friendly iſlands and New Zealand.

radians. 145. P. entire, oval, pellucid, depreſſed, ſtriated, horny, and radiated with black ſpots. New Zealand.

rota. 146. P. roundiſh; the inſide ſilvery; the outſide with reddiſh ſtreaks, and a yellowiſh border. Indian and American ſeas.

umbellata. 147. P. entire, roundiſh, diaphanous; depreſſed with yellowiſh rays within; crown pale yellow; margin very acute; 4 inches long. Indian ocean.

puſtulata. 148. P. thin, oval, depreſſed, radiated, white dotted with red; within ſmooth; 6 lines long.

ſymmetrica. 149. P. ovate, conic, ſolid; brown divided into partitions, by perpendicular white lines; within ſmooth, white; margin cut archwiſe; 6 lines long.

citrina. 150. P. ovate, convex, with fine decuſſated ſtriæ; white, with two broad yellow bands; within whitiſh, with a milk-white bottom; crown browniſh; near 2 inches long.

capenſis. 151. P. oval, with decuſſated ſtriæ, longitudinal ones alternately brown and white; within pearly, with a white bottom; $1\frac{1}{2}$ inch long. Cape of Good Hope.

anomala. 152. P. coarſe brown, orbicular, with the crown near the margin. Deeps of the ſeas of Norway.

guttata. 153. P. finely ſtriated and varied with dots of different colours; bottom duſky; $1\frac{1}{2}$ inch long.

mytiliformis. 154. P. glabrous, lead-colour, with a white, horſe-ſhoe-ſhaped band within; $\frac{1}{4}$ inch long. Ferro iſlands.

ſcutiformis 155. P. oval, thin, black, with white, perpendicular, flattened ſtriæ; crown gray; bottom with a browniſh ſpot; not an inch long.

cochlearis. 156. P. white, flattiſh; one part narrow, channelled within, with a bluiſh callus, ſhaped like a horſe-ſhoe; the other part rounded; 1 to 2 inches long.

craticulata 157. P. oval, thin, depreſſed, cancellated, radiated; 1 to $1\frac{1}{4}$ inch long.

cruentata. 158. P. oval, convex, varied with red, and ſlightly toothed, with elevated, unequal, rough ſtriæ; 1 to 2 inches long.

papyracea. 159. P. depreſſed, thin, hyaline, dotted with red, with cheſnut rays outwardly, and crowned thinner, and granulated thicker ſtriæ; an inch long.

cylindrica. 160. P. oval, flat, with crowded longitudinal ſtriæ, of unequal thickneſs, and all granulated; an inch long.

decuſſata. 161. P. ſomewhat convex; white, with crowded red dots; within radiated with red and white, with decuſſated, glabrous ſtriæ, and a few longitudinal, thicker, white ones; $1\frac{1}{4}$ inch long.

hematoſticta. 162. P. thin, depreſſed, white dotted with red; within browniſh, ſtriated; crown varied with cinereous and browniſh; near an inch long.

aſteroides. 163. P. flattiſh, cancellated, cinereous, with a cheſnut ſtar, and rays towards the margin; crown ſmooth, gray, ſurrounded with brown dots; an inch long.

ovalis. 164. P. oval, ſomewhat convex, thin; ſtriæ crowded; gray, with blackiſh rays and ſpots; an inch long.

rubella. 165. P. a little convex, ſtriated, reddiſh; crown whitiſh, ſpotted with red; bottom whitiſh; $1\frac{1}{2}$ inch long.

ſpectabilis. 166. P. flattiſh, a little wrinkled; ſtriated, reddiſh white, with a cheſnut band towards the crown, and another bay one at the margin; 3 inches long.

conſpurcata. 167. P. ſolid, flattiſh, ſtriated; black, with cinereous dots; within bluiſh; crown dirty yellow; two inches long.

melanoſticta. 168. P. ſolid, flattiſh, ſtriated; whitiſh, with cinereous rays, and black dots, diſpoſed in 5 or 6 belts; crown pointed and whitiſh.

atra. 169. P. black, ſtriated, with a paler crown; bottom with a browniſh mark, ſurrounded with a white horſe-ſhoe-ſhaped band; $1\frac{1}{2}$ inch long.

ſpecularis. 170. P. oval, convex, ſolid, glabrous; liver colour within, and the crown browniſh; the latter ſurrounded with a white border, and interrupted, whitiſh band.

caneſcens. 171. P. oval, black; within bluiſh, ſtriated; the larger ſtriæ flattened and gray; crown obtuſe, browniſh, with a whitiſh area; 2 inches long.

vireſcens. 172. P. oblong, flattiſh, dilated on each ſide and ſtriated; olivaceous, radiated, and ſpotted with white; within blue; $1\frac{1}{4}$ inch long.

pulla. 173. P. rounded, convex, longitudinally ſtriated and tranſverſely wrinkled, browniſh; within ruſſet brown, with whitiſh and browniſh rays, and two milk-white bands above; $1\frac{1}{4}$ inch long.

revoluta. 174. P. ſuboval, crenated, ſtriated, ochraceous, with red ſpots and rays, broader on one ſide; margin revolute; an inch long.

ſquamata. 175. P. ovate, convex, ſtriated; the ſtriæ ſcaly, varied with white and black; crown gray, nearly central; an inch long.

teſtacea. 176. P. ovate, finely ſtriated, teſtaceous, with 3 tranſverſe browniſh rings; within pale yellow, with a whitiſh bottom; an inch long.

capillaris. 177. P. ovate, thin, brown, with darker bands and paler ſtriæ; within browniſh; crown and bottom white; $\frac{3}{4}$ inch long.

glauca. 178. P. ovate, narrower on one ſide, finely ſtriated; bluiſh, with a white band towards the margin, and another bluiſh one; crown and margin white; $\frac{3}{4}$ inch long.

obſcura. 179. P. ovate, flattiſh, ſtriated; varied with yellowiſh and brown, and dotted with green; within brown; crown bay; ſcarcely $\frac{1}{2}$ inch long.

exoleta. 180. P. oval, ſubconvex, unequally ſtriated; whitiſh, with a few black lines, reaching half way; near an inch long.

affinis. 181. P. oval, flattiſh, ſolid, with a few black rays, reaching

reaching half way; bottom with a ſpatulated white ſpot; $\frac{3}{4}$ inch long.

rotalis. * 182. P. white, opaque, flat, round; margin regularly toothed. Sandwich. Rare.

fuſcata. 183. P. ovate, convex, finely ſtriated and varied with brown.

mellca. 184. P. rounded, ſolid, glabrous, honey-colour; white within; crown browniſh; margin ſpotted with brown, and ſilvery within; $\frac{3}{4}$ inch long.

anceps. 185. P. ſolid, glabrous, pointed, pale cheſnut; pale fleſh-colour within.

guineenſis. 186. P. ovate, convex, ſmooth; one ſide broader, and cheſnut; the other with the crown pale yellow; margin fleſh-colour on each ſide; $\frac{3}{4}$ inch long. Guinea. Rare.

complanata. 187. P. depreſſed, hemiſpherical; obſoletely cancellated, varied with white and browniſh; margin white on one ſide.

virgata. 188. P. ovate, longitudinally ſtriated; whitiſh with brown rays and crown; pearly within,

nivea. 189. P. ſubconic, ſolid, glabrous, ſnowy; with 7 to 8 tranſverſe, concentric rings; crown rounded; 4 lines wide. Africa.

griſea. 190. P. oval, with crowded, radiated grooves, poliſhed within; crown nearly central; an inch long. Africa.

navicula. 191. P. narrow, with decuſſated ſtriæ; roſy, with a whitiſh, callous belt on one ſide in the middle; margin acute, revolute on each ſide; an inch long.

cingulata. 192. P. ſomewhat oval, obſoletely ſtriated, ferruginous, with two elevated, obſcurely barred belts; crown nearly central.

ſcapha. 193. P. clear white, with undulated ſtriæ, narrow; broader ſide with an acute callus; narrower ſide repand; crown towards the narrower ſide; $1\frac{1}{4}$ inch long.

parva. * 194. P. ſmall, entire, without gloſs, whitiſh, faintly radiated with red; rather larger than a pea. Devonſhire coaſts. Very rare.

E. *With the crown or tip perforated.*

fiſſura. • 195. P. oval, conic, with reticulated ſtriæ; cleft on the fore-part; crown recurved; $\frac{1}{2}$ inch long. European and Barbary coaſts, Devonſhire.

fiſſurella. * 196. P. grooved and perforated on the fore-part; crown recurved; $3\frac{1}{2}$ lines long. Iceland ſeas, Falmouth harbour.

puſtula. 197. P. oval, gibbous, convex, with reticulated ſtriæ; margin crenated; perforation near the poſterior margin. Mediterranean, and Indian ſeas.

græca. * 198. P. ovate, convex, reticulated; crown not much elevated; perforation oblong; margin crenulated; length $\frac{3}{4}$ inch. Foreign ſpecimens $1\frac{1}{2}$ inch. European ſeas, Sandwich.

nimboſa. 199. P. ovate, ſtriated, rugged, brown; perforation oblong; 2 inches long. Mediterranean and Atlantic.

nubecula. 200. P. ſubovate, rugged, white radiated with red; perforation ovate. Mediterranean.

picta. 201. P. ovate, ſolid, clouded white and green, with oblique, undulated, alternate, violet and white rays; $3\frac{1}{2}$ inches long. Straits of Magellan.

barbadenſis. 202. P. oblong, unequally ſtriated; within ſmooth; milk-white with greeniſh bands; margin crenated; perforation circular, and ſurrounded with a cheſnut ring. Barbadoes.

jamaicenſis. 203. P. whitiſh, tranſverſely annulated with longitudinal ſtriæ; covered with foliaceous tubercles; perforation oblong. Jamaica and Barbadoes.

caffra. 204. P. ovate, compreſſed, ſtriated; finely annulated, and radiated with black; bottom milk-white; perforation nearly central.

perforata. 205. P. a little convex, tranſverſely wrinkled; browniſh, with ſtraw-coloured rays and ſpots; ſtriæ longitudinal, and alternately larger and ſcaly; $1\frac{1}{2}$ inch long.

porphyrozonias. 206. P. oblong, compreſſed, unequally ſtriated; white, with 5 purple, interrupted belts; greeniſh white within; perforation minute, ſurrounded on the inſide with a red circle. North America.

roſea. 207. P. thinly ſtriated with alternate roſy and white rays; perforation oval, and ſurrounded with a red ring on the inſide. Minute.

ſcutellum. 208. P. repand on each ſide, compreſſed; perforation radiated with grooves; from 1 to $1\frac{1}{2}$ inch long.

avellana. 209. P. thin, white, and finely ſtriated; perforation oblong, and divided by a ligament.

ſpinoſa. 210. P. ovate, convex, white; ſtriæ elevated, thicker towards the margin, and marked with four rows of tubercles; exterior tubercles ſpinous; perforation oblong.

denticulata. 211. P. ovate, gibbous; whitiſh radiated with brown; green within; ſtriæ elevated, ſomewhat rugged, and alternately larger; margin denticulated; crenated within; perforation in form of a parallelogram.

noduloſa. 212. P. ovate, convex; ſtriæ elevated, knotty, croſſing thinner tranſverſe ones; within white; crown black.

anguſta. 213. P. depreſſed, white; ſtriæ elevated, every 4th of which is larger; perforation narrow, ſurrounded with a cheſnut band on the outſide, and a green one within; $\frac{3}{4}$ inch long.

inæqualis. 214. P. ovate, convex; ſtriæ decuſſated; perforation ſurrounded with an elevated ring and red line; 1 inch long.

minuta. 215. P. oval, pyramidal, reddiſh, with 12 elevated, white ſtriæ; bottom white; perforation oval and nearly central.

conſperſa. 216. P. ovate, convex, ſtriated; yellowiſh, with red dots and 3 oblique rays; crown central; perforation linear.

rubeſcens. 217. P. oval, ſtriated, reddiſh, with a white band in the middle; margin entire; perforation linear; 1 inch long.

ſanguinea. 218. P. oval, thin, red; within greeniſh white; ſtriæ longitudinal, croſſing finer tranſverſe ones, which are rugged outwardly; $\frac{1}{2}$ inch long.

ventricoſa. 219. P. oval, ventricoſe, with red decuſſated ſtriæ; crown depreſſed; perforation orbicular; an inch long.

triradiata. 220. P. oval, flattiſh, ſtriated; white with 3 brown rays; crown central; perforation linear; $\frac{1}{2}$ inch long.

tenuis. 221. P. pellucid, oval, a little convex; longitudinally ſtriated; white, with 5 half brown rays; perforation with a cinereous margin, not $\frac{1}{2}$ inch long.

melanozonias. 222. P. convex, roſy, with an interrupted black band, and elevated, unequal, white ſtriæ; crown pointed; perforation orbicular, and ſurrounded within with an elevated, gray ring; $1\frac{1}{4}$ inch long.

effusa. 223. P. convex, rofy, with elevated, knotty, white, and alternately larger ftriæ; perforation round and large; 1¼ inch long.

punicea. 224. P. convex, chefnut; ftriæ unequal, crowded, decuffated; within fmooth, with alternate green and white bands; perforation round, furrounded with a chefnut ring, and an elevated white one within; above an inch long.

rufefcens. 225. P. convex, white fhaded with red; here and there ftriated with red; within fmooth, white; perforation oval.

dimidiata. 226. P. convex, above clear white, and cancellated; longitudinally ftriated towards the margin, with a rofy band; perforation orbicular; an inch long.

lactea. 227. P. convex, white; ftriæ glabrous, acute, unequal; crown rofy; perforation large, orbicular; an inch long.

pyramidalis. 228. P. convex, rofy, ftriated; ribs 12, fmooth; within fmooth, and greenifh white; one and one-fourth of an inch long.

bicolor. 229. P. narrow, alternately radiated with chefnut and white; ftriæ unequally thick, lamellated; margin inflected; perforation oblong; 1¼ inch long.

erythrocephala. 230. P. convex, white, with red lines outwardly, and elevated, rugged, contrary ftriæ; 10 of them larger; margin repand, inflected; crown reddifh; 1¼ inch long.

verrucofa. 231. P. above brown, ftriated, terminated by a knotty belt; beneath radiated with red, with acute, knotty ribs; perforation orbicular; three-fourths of an inch long.

contaminata. 232. P. convex, with nodulous, unequal ribs; larger ones yellowifh brown, and marked with black dots, difpofed in interrupted circles; crown cinereous; perforation furrounded within with an elevated, grafs-coloured ring, and a brown circle.

strata. 233. P. a little convex, narrow, white, with red lines; outwardly fpotted with black, with elevated, convex, unequal ftriæ; perforation oblong, with a chefnut margin within, with a reddifh ring; ¾ inch long.

candicans. 234. P. white, chefnut towards the margin, with 20 alternately larger ribs; crown reddifh, with an oblong perforation; near an inch long.

fuccincta. 235. P. ovate, pointed, white; above fmooth, with an elevated belt in the middle; dotted with ferruginous towards the margin; with elevated, unequal, fmooth ftriæ; perforation narrow, orbicular; ¼ inch long.

pufilla. 236. P. flattifh, white, fuborbicular, with 20 elevated, alternately lefs and fhorter ftriæ; perforation round, and furrounded on each fide with a reddifh circle; ½ inch long.

flavefcens. 237. P. thin, effufe, pointed, finely ftriated, yellowifh, with 6 brown rays; crown cinereous; perforation oblong.

antiquata. 238. P. convex, obfoletely ftriated, and furnifhed with concentric, imbricated wrinkles; perforation oval, or nearly round; ½ inch diameter.

galeata. 239. P. folid, ovate, compreffed; within white; crown a little recurved, and obtufe; perforation linear; 6 lines long.

perfonata. 240. P. convex, with decuffated lines and black rays. Falkland iflands.

Gen. 33. Dentalium, *Tooth-fhell.*

61 Dentalium.

Gen. Char.—The animal a terebella; fhell univalve, tubular, ftraight or flightly curved, with an undivided cavity open at both ends.

Species.

elephantinum. 1. D. with 10 ribs, flightly curved and ftriated; 4 inches long. Indian and European feas.

aprinum. 2. D. with 10 ribs, fmooth, and flightly curved. Indian feas.

arcuatum. 3. D. ribbed, curved, fubulate, of one colour, greenifh.

ftriatulum. 4. D. with 8 ribs and 8 ftriæ, pointed; green tipped with white. Sicilian feas.

fexangulum. 5. D. ribs 6, ftriated. Found foffil at Loretto.

dentalis. 6. D. with 20 ftriæ, flightly curved, interrupted; red tipt with white. Mediterranean.

fafciatum. 7. D. finely ftriated, flightly curved; gray, with darker bands; thicknefs of a crow quill. Sicily.

rectum. 8. D. ftraight, doubly or triply ftriated, and annulated.

foffile. 9. D. roundifh, fomewhat obtufe; finely and equally ftriated. Foffil near Loretto.

annulatum. 10. D. round, obliquely ftriated. Found foffil.

radula. 11. D. flightly curved, fomewhat obtufe; ftriæ decuffated, longitudinal ones granulated; an inch long. Found foffil in Piedmont.

interruptum. 12. D. ftriæ decuffated, all of them fmooth; longitudinal ftriæ with finer interrupted ones. Found foffil in Piedmont.

politum. 13. D. round, flightly curved, continued, with crowded, annular ftriæ; 1½ inch long. Indian and European feas.

eburneum. 14. D. white, fmooth, round, flightly curved, with remote rings. India.

entalis. * 15. D. round, flightly curved; fmooth, gloffy, tapering to a fmall point; pervious; 1½ inch long. Indian and European fhores; weftern coafts of England.

arietinum. 16. D. round, curved, continued and fmooth. Scandinavia.

corneum. 17. D. round, flightly curved, interrupted, opaque; 1¼ inch long. African ocean.

nebulofum. 18. D. curved, very fmooth, white, with fulvous clouds and fpots. Sicily.

pellucidum. 19. D. horny, flexile, ftraightifh, round and fmooth; 2¼ inches long. North feas.

vitreum. 20. D. hyaline, glabrous, flightly curved, and tapering gradually; ¾ inch long. Found foffil in Piedmont.

minutum. 21. D. round, ftraightifh, fmooth, minute; not larger than a briftle. Mediterranean.

imperforatum. * 22. D. white, opaque, tranfverfely ftriated and imperforated; minute. Sandwich, Falmouth harbour.

gadus. * 23. D. fubpellucid, fubarcuated, tapering to a fmall point; pervious, contracting a little towards the larger end; white, gloffy, and fmooth. Britifh channel; called by the mariners *hake's-tooth.* It is frequently brought up with the founding line.

trachea. * 24. D. fubcylindrical, arcuated, marked with regular, ftrong, tranfverfe ftriæ; aperture round, tapering to to the other extremity, which is closed; $\frac{1}{8}$ inch long; resembles the trachea of an animal. Milton, Devonshire. Rare.

glabrum. * 25. D. cylindric, arcuated, smooth, glossy, without striæ or wrinkles; aperture orbicular; the other end closed, rounded; length one line. Devonshire coast. *Montagu*, *Test. Brit.* p. 497.

Gen. 34. Serpula.

62 Serpula. *Gen. Char.*—The animal a terebella; shell univalve, tubular, generally adhering to other substances; often separated internally by entire divisions at unequal distances.

Species.

nautiloides * 1. S. flattish, minute, confluent, verrucose, spiral, with very thin, internal, semilunar divisions. Seas of Norway, and on the byssus of the *pinna ingens* on the coast of Devonshire.

eminulum 2. S. regular, oval, loose, glabrous, not larger than a grain of sand. Adriatic and Red seas; and is sometimes found fossil.

planorbis. 3. S. orbicular, regular, flat, equal; resembles a round scale; adheres to shells.

spirillum. * 4. S. regular, spiral, orbicular; whirls round, gradually decreasing. Found in the ocean, on zoophytes, on the *corallina officinalis* from Milton rocks, Devonshire.

spirorbis. * 5. S. regular, spiral, orbicular; whirls slightly channelled above and inwardly, and diminishing gradually towards the center. Found in most seas, adhering to *fuci*. Shores of Britain.

triquetra. * 6. S. strong, opaque, irregularly twisted and contorted; triangular; $\frac{1}{2}$ to 1 inch long. Found in the ocean, adhering to marine substances, stones, and the bottoms of ships. Coasts of Britain.

intricata. * 7. S. filiform, rough, and intricately twisted; greenish white, a little rugged and coarse. European and Indian seas; shores of Britain, on shells.

filograna. 8. S. capillary, fasciculated, unbranched complications, and cancellated; forms a beautiful kind of network; 4 inches long. Mediterranean.

granulata. 9. S. round, spiral, glomerated; 3 elevated ribs on the upper side; size of a coriander seed. North seas, in masses adhering to shells and stones.

contortuplicata. * 10. S. angular, rugged, and irregularly entwined; transversely striated; 3 to 4 inches long. European and American seas; shores of Britain.

glomerata. 11. S. round, glomerated, with decussated wrinkles. European and Atlantic seas.

lumbricalis. 12. S. round, flexuous, with a spiral, acute tip; transversely ribbed, and longitudinally wrinkled; 3 to 5 inches long. Atlantic and Indian seas, in large masses.

polythalamia. 13. S. round, diaphanous, smooth, straightish, with numerous internal divisions. Mediterranean and Indian seas, under the sands.

arenaria. 14. S. jointed, entire, distinct, flattish beneath. India and Africa.

anguina. 15. S. roundish, somewhat spiral, with a longitudinal, jointed cleft. Indian ocean.

vermicularis. * 16. S. round, tapering, curved, wrinkled; 2 to 3 inches long. European seas; coasts of Britain.—The animal which inhabits this shell is of a bright scarlet colour, and is furnished with elegant feathered tentacula, from the midst of which arises a trumpet-shaped tube, and a lesser simple one.

17. S. *Watering-pot*; round, straight, taper, with a dilated, radiated, larger extremity; the disc is covered with cylindrical pores; 3 to 5 inches long. Indian ocean. *penis.*

18. S. roundish, flexuous, rosy, with numerous rows of prickles, obtuse at the end; aperture margined; size of a crow quill. *echinata.*

19. S. brown, roundish, striated. Indian ocean, adhering to corals. *ocrea.*

20. S. polished, smoothish, with annulated plaits, a little tapering towards the end; size of a quill. Indian and American seas. *protensa.*

21. S. round, with decussated striæ, slightly wrinkled, flexuous, red; within smooth, white. *decussata.*

22. S. smooth, white, the broader part straight, and transversely plaited; 2 to 4 inches long. *proboscidea.*

23. S. substriated, yellowish brown, round, twisted into 3 whirls, with a central tip. *afra.*

24. S. long, narrow, round, smooth, yellowish; many times twisted. America. *cereolus.*

25. S. conic, spirally twisted, yellowish, with brown bands; the middle round and twisted; aperture orbicular. *cornucopiæ*

26. S. round, cancellated, yellow, within horny; 8 to 9 inches long. Goree. *goreensis.*

27. S. triangular, twisted, tuberculated, with hollow dots; 8 to 9 inches long. Africa. *intestinalis.*

28. S. round, white, transversely striated, and thrice twisted; the first turn seemingly composed of 5 funnels placed in each other. Indian ocean; fixed to stones. *infundibulum.*

29. S. cinereous, convex above, beneath flat; pyramidal, and many times twisted; an inch long; open at the narower end. Indian sea. *pyramidalis.*

30. S. white, round, subulate, straight, and toothed at the sides; with a longitudinal, glabrous rib in the middle; tip glabrous, a little incurved; $\frac{1}{4}$ inch long. Found in the lepas tintinnabulum. *denticulata.*

31. S. roundish, twisted, umbilicated, with decussated striæ, and longitudinal, knotty ribs; within smooth, with numerous divisions. Found fossil in Malta. *melitensis.*

32. S. round, smooth, incurved; base nearly obsolete, undulated; mouth obliquely truncated. Norway. *norwegica.*

33. S. round, smooth, polished, ascending in a flexuous manner from the spire or base. *porrecta.*

* 34. S. round, regular, spiral, orbicular, wrinkled, with a thickened aperture. Greenland seas; shores of Britain. *vitrea.*

35. S. spiral, glomerated, with three grooves, the lower interrupted by transverse ribs; aperture 2-toothed. Greenland seas. *cancellata.*

36. S. sub-orbicular, umbilicated, convex, radiated with wrinkles. Greenland seas. *stellaris.*

37. S. somewhat triangular, and a little flexuous, gradually tapering, violet; within smooth and pale yellow; aperture white, with undulated striæ, and armed with a conic tooth; a foot high, and as thick as the little finger. Africa and America. *gigantea.*

38. S. filiform, glabrous, conglomerated, perforated. Shores of Massilia. *cinerea.*

39. S.

fulcata. * 39. S. whirls 2, deeply and fpirally grooved; greenifh, minute. Coaft of Pembrokefhire, on the roots of fucus digitalis.

ovalis. * 40. S. fub-oval. with 2 bends, imperforated, minute. Found at Denbigh.

reflexa. * 41. S. regular, rounded; margin reflected at the aperture; minute. Pembrokefhire fands.

cornea. * 42. S. regular, rounded, pellucid, with 3 whirls; horny. Pembrokefhire coaft.

bicornis. * 43. S. femilunar, ventricofe, white, opaque, gloffy; minute. Sandwich and Reculver.

perforata. * 44. S. white, opaque, gloffy; femilunar and perforated; minute. Sandwich. Rare.

lactea. * 45. S. oval, thin, fmooth, pellucid, with milky veins; minute. Sandwich; very rare.

lagena. * 46. S. round, ftriated, grooved with a narrow neck, like an oil flafk; minute. Sandwich and Sheppey.

retorta. * 47. S. rounded, margined, with a flender recurved neck. Sandwich; rare.

incurvata. * 48. S. ftraight, with 3 clofe whirls at the fmaller end; minute. Sandwich.

Gen. 35. Terfdo.

63 Teredo. *Gen. Char.*—The animal is a terebella, with two calcareous, hemifpherical valves, cut off before, and two lanceolate ones; the fhell tapering, flexuous, and penetrating wood.

Species.

navalis. 1. T. *Ship-worm*; fhell thin, cylindrical, fmooth; more or lefs twifted; rather obtufe at the tip; 4 to 6 inches long.

At the fmaller end the fhell becomes thick and ftrong, and is furnifhed within with plaits or laminæ, which contract that part, leaving a very fmall opening. The anterior valves attached to the head of the animal, are of a hemifpherical form, one half of the front projecting in a fharp angle, and fomewhat pointed. The infide of each valve is white, furnifhed with a long, flat, curved tooth, projecting inwards, under the hinge, and a fhort lateral tooth at the extremity of the hinge, correfponding in each valve. The margin oppofite the hinge runs to an acute angle, at the point of which, in each valve, is a fmall knob, which comes in contact when the valves are brought together. Near the extremity of the tail there are two valves, one on each fide; a little concave on the infide, and rounded at the end. By their means the extremity of the tube at the thickened part is clofed. Thefe are properly to be confidered as the fhell of the animal, becaufe they are attached to it. The tube, or teftaceous fheath, which lines the hole made in the wood, appears only to be formed as an apartment, in which the animal may move with more eafe; for it is found that two tubes never come in immediate contact with each other, although the fibres of the wood between them are frequently no thicker than paper. This tube it feldom fo long as the animal; the internal part of the perforation is ufually not lined with it for the fpace of 2 inches, and fometimes more; but the fmaller end is always even with the furface of the timber which is perforated; but fo fmall, as not eafily to be difcovered, yet it is fufficient to admit the water, which is regulated by the pofterior valves of the animal.

It is found in the fides and bottom of fhips, and even the ftrongeft oak, which has been fome time under water. This teftaceous animal was originally a native of the warmer climates, and was brought to Europe, where it has been produced, and has proved extremely deftructive to the bottoms of fhips, and to works conftructed of wood, which remains for fome time conftantly under water. It appears, from fome piles of folid oak which were examined in the dock yard of Plymouth, and which had remained under water for about 4 or 5 years, that the deftructive effects of thefe animals are very great in that time; for thefe piles were found to be greatly perforated, which rendered it neceffary to remove them, and replace them with others. The bottoms of fhips which frequent warm climates, it is well known, are fheathed with copper, to fecure them from the effects of thefe deftructive animals. But the method which is adopted about the dock-yards to preferve the timbers which are conftantly under water, is to cover them with broad-headed nails; which, by the effects of the fea water are foon incrufted with a coating of ruft, which is found to be impenetrable to the fhipworm.

It has been obferved that the teredo navalis cuts acrofs the grain of the wood as feldom as poffible. After it has penetrated a little way, it turns and continues with the grain, till it meets with another fhell, or a knot in the wood. The courfe which it then takes is regulated by the nature of the obftruction. If this be confiderable, it makes a fhort turn back in the form of a fyphon, rather than continue for any diftance acrofs the grain.

2. T. folid, cylindrical, undulated; 7 inches long. *utriculus.* In wood.

3. T. clavated at one end, incurved at the other; *clava.* narrower, obtufe and perforated in the middle; 2 inches long. Found in the feed-veffels of the xylofteum granatum.

Gen. 36. Sabella.

64 Sabella. *Gen. Char.*—The animal a nereis, with a ringent mouth, and two thicker tentacula behind the head; fhell tubular, compofed of particles of fand, broken fhells, and vegetable fubftances, united to a membrane by a glutinous cement.

Species.

1. S. folitary, loofe, curved with lentiform, gloffy gra- *fcrupofa.* nulations; thicknefs of a fwan's quill. India and American iflands.

2. S. folitary, fixed by the bafe, fimple, curved, with *fcabra.* radiated, rough granulations. America.

* 3. S. numerous, parallel tubes, communicating by *alveolata.* an aperture, forming in the mafs the appearance of honey combs; 2 to 3 inches long. European coafts, Britain.

* 4. S. folitary, fub-cylindrical, papyraceous, chiefly *chryfodon.* compofed of fragments of fhells; thicknefs of a quill; 2 to 6 inches long. European and Indian feas, fhores of Britain.

* 5. S. ftraight, conic, compofed of minute particles *belgica.* of fand; 2 to 3 inches long. European coafts, fhores of Britain.

6. S. brown, with alternate white and black rings; *rectangula* ftraight, with a rectangular, gibbous extremity; 9 inches long.

7. S.

capensis. 7. S. cylindrical, conic, open at both ends; membranaceous; rough, with interrupted, transverse striæ. Cape of Good Hope.

nigra. 8. S. cylindrical, black, smoothish on the outside; composed of minute particles of sand; ½ inch long. Rivulets of Thuringia.

stagnalis. 9. S. straight, tapering, open at both ends; smooth, with a margined aperture, composed of very minute particles of sand. Rivers of Thuringia.

conica. 10. S. narrow, conic, smooth, straight, cinereous; with a blackish open tip, composed of very minute particles of sand; not ½ inch long.

uncinata. 11. S. smooth, round, tapering, with an open hooked tip; ¾ inch long. Rivers of Thuringia.

sabulosa. 12. S. cylindrical, closed at the tip, subclavated, perforated, and composed of larger grains of sand; not an inch long. Thuringia and Belgium.

vegetabilis. 13. S. depressed, composed of fragments of twigs, stems and bark, and broken pieces of the tellina cornea; an inch long. Waters of Thuringia.

ammoniata 14. S. polygono-cylindrical, within smooth, composed of fragments of cornu ammonis. Rivers.

helicina. 15. S. round, within smooth, composed of fragments of the helix pucilla; an inch long. Stagnant waters of Thuringia.

dimidiata. 16. S. one part of the shell composed of sand or gravel, the other thicker, clavated, and composed of fragments of shells. Waters of Thuringia.

fixa. 17. S. composed of small stones; tapering towards the tip; an inch long; affixed to stones in the water, and open at the side by which it is fixed. Thuringia.

clavata. 18. S. composed of small stones, the open end clavated, and consisting of larger stones; solitary. Thuringia.

corticalis. 19. S. composed of pieces of bark, towards the end of broken stems.

arundinacea. 20. S. subconic, open at both ends, composed of fragments of the bark of reeds, placed on each other; an inch long.

aculeata. * 21. S. composed of small twigs, the points of which project a little; an inch long. Thuringia, Britain.

marsupialis. 22. S. black; open end cylindrical and narrower, the other part tinged and ovate; 2 inches long.

norwegica. 23. S. roundish, open at both ends, brittle, membranaceous; composed of very minute grains of sand; 4 inches long. Norway.

lumbricalis. 24. S. coarse, creeping, fragile, open at both ends; the animal not furnished with tentacula at the mouth; body prickly, jointed. Deeps of the Greenland seas; fixed to stones.

indica. 25. S. cylindrical, composed of capillary, subcylindrical, agglutinated crystals of quartz. Indian ocean.

arenaria. * 26. S. extremely fragile, cylindrical, composed of pure sand, slightly cemented together, without any internal membrane; size of a raven's quill; from 1 to 2 inches long. Dorsetshire coast. *Montagu.*

subcylindrica. * 27. S. long, sub-cylindric, slender, fragile, composed of fine sand, and minute bits of broken shells, cemented together on a fine membrane; 3 inches long. Salcomb-bay. *Montagu.*

setiformis. * 28. S. long, slender, gradually tapering to the lower end, composed of fine fragments of shells, and minute flat bits of stones, cemented together at their edges; 3 to 4 inches long. Salcomb bay.—Some have been observed with a lateral branch near the smaller end, which is supposed to be a young one. *Montagu.*

curta. * 29. S. small, short, composed of sand and minute bits of flat stones, agglutinated to a tough membrane; size of a crow quill; an inch long. Inlet near Kings-bridge. This sabella is gregarious, covering the whole surface of the shore, appearing like bits of straw covered with mud. *Montagu.*

compressa. * 30. S. short, broad, and very flat, composed of large fragments of flat, bivalve shells, placed with the concave side inwards; 1½ inch long. Deeps at Torcross, Devonshire.

65 Enumeration of the species.

Number of Species included under each Genus, in the preceding Classification.

I. MULTIVALVES.

Genera.	Species.	
1. Chiton, - -	29	
2. Lepas. - -	33	
3. Pholas, - -	12	
	—	74

II. BIVALVES.

4. Mya, - -	31	
5. Solen, - -	24	
6. Tellina, - -	94	
7. Cardium, - -	52	
8. Mactra, - -	27	
9. Donax, - -	21	
10. Venus, - -	152	
11. Spondylus, - -	4	
12. Chama, - -	25	
13. Arca, - -	43	
14. Ostrea, - -	136	
15. Anomia, - -	51	
16. Mytilus, - -	65	
17. Pinna, - -	18	
	—	743

III. UNIVALVES.

18. Argonauta, - -	5	
19. Nautilus, - -	34	
20. Conus, - -	71	
21. Cyprea, - -	120	
22. Bulla, - -	57	
23. Voluta, - -	144	
24. Buccinum, - -	200	
25. Strombus, - -	53	
26. Murex, - -	180	
27. Trochus, - -	131	
28. Turbo, - -	152	
29. Helix, - -	267	
30. Nerita, - -	76	
31. Haliotis, - -	19	
32. Patella, - -	240	
33. Dentalium, - -	25	
34. Serpula, - -	48	
35. Teredo, - -	3	
36. Sabella, - -	30	
	—	1855
Total number of species,		2672

Species

Species of Shells which have been found in the Fossil State.

Lepas Anserifera.
66 Cardium Lithocardium. Only found fossil.
Found fossil. Venus Cassina.
——— Mercenaria. Mountains of Sweden.
——— Imbricata. France.
Chama Foliacea. Campania.
Arca Fossilis. Limbourg.
——— Nucleus.
Ostrea Diluviana. Sweden.
——— Mytiloides. Alsace.
——— Torta. Alsace.
Anomia Craniolaris.
——— Gryphus.
——— Pecten.
——— Striatula. Exists only fossil.
——— Reticularis.
——— Plicatella. Only fossil.
——— Crispa. England and Switzerland.
——— Lacunosa. Only fossil.
——— Cuspidata. Derbyshire.
——— Farcta. Switzerland.
——— Terebratula.
——— Angulata.
——— Hysterita. Germany.
——— Biloba. Only fossil.
——— Spinosa. England.
——— Dorsata.
——— Sandalium. Germany.
Nautilus Helicites.
——— Lituus.
——— Orthocera.
——— Belemnita.
Voluta Fossilis. Only fossil.
Buccinum Fossile. Germany.
——— Marginatum.
Strombus Spinosus. Only fossil.
——— Fissurella. Campania.
——— Sinister. Fossil only. Helvetia.
Murex Triacanthus.
——— Triptenus. Campania.
——— Costatus. Campania.
——— Lævigatus. Campania.
——— Fossilis. Campania.
——— Campanicus. Campania.
Trochus Schrœteri. Campania.
Nerita Clathrata. Campania.
——— Perversa. Only fossil.
Haliotis Perversa.
——— Plicata.
Patella Echinata.
Dentalium Sexangulum. Loretto.
——— Fossile. Loretto.
——— Annulatum.
——— Radula. Piedmont.
——— Interruptum.
——— Vitreum. Piedmont.
Serpula Seminulum.
——— Melitensis. Malta.

CHAP. V. OF THE CONSTITUENT PARTS OF SHELLS, &c.

HAVING in the former chapter enumerated, under each genus, all the species of testaceous animals which have been hitherto discovered; and having given the characteristic marks by which each is distinguished, which marks are derived from the shell or testaceous covering; we now propose to inquire what is the nature of this substance; in what way it is produced by the animal, and how it is enlarged as the animal increases in size. These topics shall be the subject of the present chapter, which may be conveniently divided into the following sections. 1. Of the constituent parts of shells. 2. Of their formation. 3. Of the colours of shells. 4. Of the formation of the umbilicus and protuberances, &c. 5. Of the pearl.

Sect. I. *Of the constituent Parts of Shells.*

The nature and component parts of testaceous substances have been particularly investigated by Mr Hatchett, from whose paper we extract the following observations.

Phil. Transf. 1799.

67 Divisions of shells from their component parts.

In his examination of marine shells, Mr Hatchett found, from the nature of the substance of which they are composed, that they might be arranged in two divisions. Under the first are included those which have a porcellaneous appearance and enamelled surface, and exhibit, when broken, something of a fibrous texture. The other division is distinguished, by having a strong epidermis or covering, under which is the shell, composed principally or entirely of mother-of-pearl. To the first division belong different species of voluta, cypræa, and others. The second comprehends the oyster, the river mussel, and some species of haliotis and turbo.

68 Porcellaneous.

Porcellaneous shells.—The shells of this description which were examined, were different species of voluta and cypræa. When they were exposed to a red heat for a quarter of an hour, they crackled, and lost the colours of their enamelled surface. No apparent smoke, and no smell, like that of burnt horn or cartilage, were emitted during the process. The figure remained the same, excepting a few flaws; and they became of an opaque white, partially tinged with pale gray. When they were dissolved in acids, after being burnt, they deposited a small quantity of animal coal, which proves that they contain some portion of gluten. Shells which had not been exposed to the fire, dissolved with great effervescence in the different acids; and the solution remained transparent and colourless; from which it appears, that the proportion of gluten is small, since it could not be traced in the solution of the unburnt shells.

In examining the different solutions of shells, whether burnt or unburnt, by chemical tests, it was found, that no trace of phosphate of lime, or of any other combination of phosphoric acid, existed in these substances. And it appeared from many experiments, that the component parts of porcellaneous shells, are carbonate of lime, cemented with a very small portion of animal gluten.

Some

Of the Constituent Parts of Shells, &c.

Some ſpecies of patella, which were brought from Madeira, were alſo ſubjected to chemical examination, by the ſame philoſopher. When expoſed to a red heat in a crucible, they emitted a perceptible ſmell of horn or feathers; and by farther examination, by ſolution, the proportion of carbonic matter depoſited appeared to be greater, and the proportion of carbonate of lime leſs, than what was indicated by the reſult of the experiments on porcellaneous ſhells. When unburnt ſhells belonging to the ſame ſpecies, were immerſed in nitric acid very much diluted, the epidermis ſeparated, and the whole of the carbonate of lime was diſſolved. A gelatinous ſubſtance, nearly in a liquid ſtate, remained, but it did not retain the figure of the ſhell, and exhibited no appearance of a fibrous ſtructure. Theſe ſhells, therefore, contain a larger portion of gelatinous matter than the porcellaneous ſhells, but the other component part conſiſts entirely of carbonate of lime.

69 Mother of-pearl.

Shells compoſed of mother-of-pearl.—Shells of this deſcription, were ſubjected to ſimilar experiments with the former. When the common oyſter was expoſed to a red heat, the effects were the ſame as thoſe which were produced by the ſame proceſs on the ſpecies of patella from Madeira. The ſolution of the unburnt ſhell was alſo ſimilar, excepting only that the gelatinous part was of a greater conſiſtency. When the river muſſel was burnt in a crucible, it emitted much ſmoke, with a ſtrong ſmell of burnt horn or cartilage; the ſhell became of a dark gray colour, and exfoliated. By ſolution in the acids, the proportion of carbonic matter ſeparated was greater, and that of carbonate of lime obtained was leſs, than from the other ſhells on which experiments were made.

When an unburnt ſhell of this deſcription was immerſed in diluted nitric acid, a rapid ſolution and efferveſcence took place; and at the end of two days, the whole of the carbonate of lime was nearly diſſolved. A ſeries of membranes now only remained, of which the epidermis conſtituted the firſt. Theſe membranes ſtill retained the figure of the ſhell. The carbonate of lime was at firſt readily diſſolved, becauſe the acid came eaſily in contact with it; but the proceſs became ſlower, as it was more difficult for the acid to inſinuate itſelf between the different membranes of which the ſhell is compoſed. The haliotis iris, and the turbo olearius, were found to reſemble this muſſel, except that the membranaceous parts were more compact and denſe.

When theſe ſhells are deprived by an acid of the carbonate of lime, which gives them their hardneſs, they appear to be formed of different membranes, applied ſtratum ſuper ſtratum. Each membrane is furniſhed with a correſponding coat or cruſt of carbonate of lime, and it is ſo ſituated, that it is always between every two membranes, beginning with the epidermis, and ending with the internal membrane, which has been laſt formed. The animals which inhabit theſe ſtratified ſhells, increaſe their habitation by the addition of a ſtratum of carbonate of lime, which is ſecured by a new membrane. And as every additional ſtratum exceeds in extent that which was previouſly formed, the ſhell becomes ſtronger in proportion as it is enlarged; and thus the growth and age of the animal may be denoted by the number of ſtrata of which the ſhell is compoſed. Similar experiments were made on pieces of mother-of-pearl as they are imported from China, and with preciſely the ſame reſults. They appeared to be compoſed of the ſame gelatinous matter and carbonate of lime. In all the ſhells of this deſcription which were immerſed in acids, the membranaceous parts retained the exact figure of the ſhell, and they appeared diſtinctly to be compoſed of fibres, arranged in a parallel direction, correſponding to the configuration of the ſhell.

70 Pearl.

Pearl.—The conſtituent parts of pearl appear to be ſimilar to thoſe of mother-of-pearl. They are compoſed of concentric coats of membrane and carbonate of lime, and reſemble in ſtructure the globular, calcareous concretions which are known by the name of *piſolithes.* The irideſcence and undulated appearance of pearl and mother-of-pearl, evidently depend on their lamellated ſtructure and ſemitranſparency.

71 Component parts.

From theſe experiments it appears, that ſhells are compoſed of carbonate of lime and gluten. In ſome, as in the porcellaneous ſhells, the proportion of carbonate of lime is great, while that of the animal matter is ſmall; and theſe may be regarded as the beginning of the ſeries; while ſhells that come under the deſcription of mother-of-pearl are to be placed at the other extremity, having a ſmaller proportion of carbonate of lime, and a greater proportion of membranaceous ſubſtance. In the firſt the carbonate of lime is merely cemented by the animal matter; in the latter the carbonate of lime ſerves to harden the membranaceous ſubſtance. But between theſe two extremes, in the proportion of carbonate of lime and animal gluten, of which all teſtaceous ſubſtances are compoſed, there are no doubt numerous intermediate gradations, ariſing from the nature of the animal to which they form a covering, its peculiar habits, or mode of life.

SECT. II. *Of the Formation of Shells.*

THE ſhell or covering of teſtaceous animals, has been conſidered as in ſome meaſure analogous to the bones of other animals, although its formation and growth are very different, ſince it ſerves as a baſe or ſupport to the muſcles, which are attached to its internal ſurface. The principal uſe of the ſhell, however, is to ſerve as a covering or defence to the animal.

72 Teſtaceous animals oviparous and viviparous.

Teſtaceous animals are not only extremely different in external form, but alſo in the mode of their production. Some are viviparous, as the moſt of thoſe which inhabit bivalve ſhells, multivalves, and even ſome of the univalves; while the others, which form the far greater proportion, are oviparous. In one point, however, they all agree, that whatever be the mode of production, whether from an egg, or directly from the uterus of the mother, the ſhell is formed on the body of the young animal, and is proportioned to its bulk.

73 Reaumur's inveſtigation.

The beſt obſervations which have yet been made, and the moſt elaborate inveſtigation which has hitherto appeared, concerning the formation and developement of ſhells, are thoſe of the celebrated Reaumur, which were publiſhed in the Memoirs of the Academy of Sciences for the year 1709. The ſame ſubject has been proſecuted by other authors, but their reſults have been nearly the ſame as thoſe of this diſtinguiſhed naturaliſt. Klein is almoſt the only author who has advanced a different opinion. In his diſſertation concerning the formation of

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of ſhells, he charges Reaumur with ſupporting the opinion, that teſtaceous animals, when they proceed from eggs, are not furniſhed with the ſhell, but that it is formed after being hatched. This opinion indeed has been aſcribed to Reaumur by the hiſtorian of the academy, who, in the analyſis of his excellent memoir on the formation of ſhells, has obſerved, "that hitherto the

74 His opinion miſtaken.

curious have been ſtruck with the prodigious variety, the exact regularity of ſtructure, the ſingular beauty and ſplendour of colour of ſhells; but naturaliſts have been leſs attentive in ſtudying and inveſtigating the mode of their formation. They ſeem to have thought that although ſhells, as well as the covering of cruſtaceous animals, are bones placed externally to the animals which they cover, it was neceſſary to conſider them as part of their bodies, and to include this inexplicable circumſtance under that of the general formation of animals, which is incomprehenſible to the human mind. They have therefore ſuppoſed that the animal and its ſhell proceeded from the ſame egg, and were developed together; and they have reſted ſatisfied in admiring the economy of nature in providing ſo elaborate a covering for ſo low an order of animals. But this ſuppoſition, although probable, is not founded in truth. The animal only, not the ſhell, is produced from the egg. The diſcovery of this fact is owing to Reaumur."

It muſt ſeem very extraordinary, that ſuch an error ſhould have crept into the abſtract of the memoir of this celebrated philoſopher, who in the courſe of it has clearly expreſſed a contrary opinion. "I have frequently," ſays Reaumur, "compared the ſhells of ſnails which were juſt hatched, and even with thoſe which I had taken from the eggs before they were hatched, with other ſhells of full grown ſnails of the ſame ſpecies, with which I had left only the ſame number of whirls of the ſpire with the ſmall ſhells, and then they appeared in all reſpects the ſame." He farther obſerves, "that what has been ſaid with regard to the increaſe of ſhells, renders it unneceſſary to enter into the detail of their original formation; for it is eaſy to conceive, that when the body of a ſmall embryo which is one day to fill a large ſhell, has arrived at a certain ſtate, in which the different teguments in which it is included have ſufficient conſiſtence

75 All teſtaceous animals furniſhed with the ſhell before being hatched.

to ſecrete from their pores the peculiar fluid which is deſtined to the formation of the ſhell, this fluid may be depoſited on the ſurface, may thicken, and at laſt become firm and ſolid. And thus commences the formation of the ſhell, in the ſame way as its increaſe is continued. Snails do not proceed from the egg without being previouſly furniſhed with this ſhell, which then has one turn and a little more of the ſpire.

When the eggs of teſtaceous animals are hatched, the young appears with its ſhell already formed, and according to the obſervation of Reaumur, it has then one complete turn of the ſpire and a little more; but at that period the ſhell is extremely thin. It ſeems probable that the formation of the ſhell is poſterior to that of the principal organs of the animal, as the bones in the fœtus of other animals are formed after the brain and heart.

76 Shell laſt formed.

Reaumur has ſuſpected that the ſhell is the laſt formed, and if proofs are wanting to eſtabliſh this fact, it is certain that at particular periods, if the eggs of teſtaceous animals are opened, the external parts of the embryo are found already developed, without any appearance of the ſhell. But whatever may be the period of the formation of the ſhell, it may be received as an eſtabliſhed fact, that the animal is furniſhed with it at the time it leaves the egg. Leeuwenhoek firſt obſerved this fact with regard to oyſters; the ſame obſervation was afterwards made by Liſter, and extended to others, both land and river ſhells. This obſervation has been confirmed by other naturaliſts, and particularly by Rumphius, Swammerdam, Reaumur, and Adanſon. From the inveſtigations of the latter it appears, that although there are many of the marine teſtaceous animals which are viviparous, they reſemble thoſe which are oviparous, in being furniſhed with the ſhell when they are ſeparated from the parent.

77 Two opinions of the formation of ſhells.

Since then it appears, that the ſhell of teſtaceous animals is completely formed previous to the developement of the animal, and that it may be conſidered as an eſſential part of its organization, let us now inquire into the mode by which its growth is effected. According to the deciſive experiments of Reaumur, the enlargement of ſhells is owing to juxta-poſition, or ſucceſſive additions of earthy and animal matter, independent of any organized ſtructure. Klein has ſupported a contrary opinion, and ſuppoſes that the growth of ſhells is effected by intus-ſuſception, or a kind of circulation. The opinion of Reaumur, however, has moſt generally prevailed. Excepting Bonnet, few naturaliſts have adopted that of Klein; and it will appear that this celebrated naturaliſt was led to entertain this opinion concerning the mode of the formation of ſhells, by the experiments of Heriſſant on the generation of bone and ſhell. From theſe experiments it was clearly demonſtrated, that ſhells are compoſed of two ſubſtances, the one a membranaceous or animal ſubſtance, and the other an earthy matter; but no ſuch concluſion can be drawn from them in ſupport of the opinion, that the ſhell is a continuation of the body of the animal, or that it is ſo cloſely connected as the bones in the bodies of other animals; or even that this connexion is formed by means of fibres of the ligament which attaches the animal to its ſhell: for it has been ſhown, that theſe muſcular or ligamentous fibres, in all deſcriptions of teſtaceous animals, are ſucceſſively ſeparated, in proportion to the increaſe or enlargement of the ſhell. This could not poſſibly take place, if the evolution and formation of the ſhell, according to the opinion of Heriſſant, depended on an internal circulation, analogous to what happens in the body of the animal. In this caſe the veſſels which proceed from its body, having no longer a communication with thoſe which are ſuppoſed to exiſt in the ſhell, it would be deprived of nouriſhment, and conſequently could not increaſe in ſize. And it is found, that this ſeparation takes place in all ſhells. It is gradually completed as the growth of the ſhell advances.

78 Bodies organized or inorganized.

A body may increaſe in volume in two different ways. Either the particles of which it is compoſed paſs through that body by means of circulation, and undergo certain changes by which they are prepared to form part of the body; or the particles of which a body is compoſed, may unite with it by juxta-poſition, without any previous circulation or preparation within the body, to the increaſe of which they are deſtined.

It

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It is in the firſt way that the growth of vegetables and animals is accompliſhed; the ſecond is the mode by which ſhells receive new additions of matter, and enlarge in ſize. The firſt is the mode of increaſe peculiar to living, organized ſubſtances; by the ſecond, inorganized ſubſtances receive new additions of matter, and increaſe in volume. Theſe indeed afford ſufficient characteriſtic marks for a natural diviſion of bodies into two claſſes, namely organized and inorganized ſubſtances.

79 Reaumur's experiments.

The experiments of Reaumur have deciſively proved, that the growth of ſhells is owing to the latter mode of increaſe. Theſe experiments were made, not only on ſea ſhells, but alſo on land and river ſhells; on univalves and bivalves; and in all the reſult was invariably the ſame. In conducting theſe experiments, he incloſed the ſhells on the progreſs of which he made his obſervations, in boxes pierced with ſmall holes, ſo as to admit the water, but ſo ſmall as to prevent the egreſs of the animal. Theſe boxes were ſunk into the ſea, or the river, and in this way he was enabled to watch the proceſs of the growth of the ſhell. He firſt obſerved, that when the animal which exactly filled its ſhell, began to increaſe its ſize, the ſhell in a ſhort time, not being ſufficiently large to cover its whole body, part of it was naked or unprotected. This part of the animal muſt always be towards the opening of the ſhell, becauſe the ſhell being previouſly completely filled, it cannot extend in any other direction. All animals which inhabit ſhells of a ſpiral form, ſuch as the ſnail and volute, can only extend at the head, or the opening of the ſhell; whereas the animals in bivalve ſhells, ſuch as the muſſel and the oyſter, may enlarge in their whole circumference. In all the ſpecies of teſtaceous animals, it is this part which appears by the increaſe of the animal when it enlarges the ſhell. This increaſe takes place, according to Reaumur, by the following mechaniſm.

80 Proceſs of the formation of ſhell.

It is a neceſſary effect of the laws of motion, when liquids run in canals, that the ſmall particles of theſe fluids, or the ſmall foreign bodies mixed with them, which on account of their figure, or their leſs degree of ſolidity in proportion to their ſurface, move ſlower than the others, fly off from the centre of motion, and approach towards the ſides of theſe canals. It even frequently happens, that theſe ſmall particles attach themſelves to the internal ſurface of theſe canals or tubes, and form concretions of different degrees of thickneſs. It is beſides certain, that the fluids which circulate in theſe tubes, preſs againſt their ſides on every point of their interior ſurface; ſo that if they were pierced with a number of ſmall holes of ſufficient diameter to give paſſage to the ſmall particles of matter floating in theſe fluids, theſe particles would be depoſited on the external ſurface, where a cruſt would be formed, ſimilar to that in the inſide; with this difference, that it would become thicker and more ſolid, being leſs expoſed to the friction of the fluid, than that which is depoſited in the interior of the tube.

81 By ſecretion from the animal.

To a ſimilar mechaniſm Reaumur aſcribes the increaſe of ſhells. The external ſurface of that part of the body of the animal which has extended beyond the limits of the old ſhell, is furniſhed with a great number of canals, in which circulate the neceſſary fluids for the nutrition of the animal. A great many ſmall particles of a viſcid and earthy matter are mixed with theſe fluids. Now, as theſe particles are leſs fluid than thoſe of which the liquids themſelves are compoſed, they approach the ſides of the veſſels, which are themſelves furniſhed on that ſide of the external ſurface of the body of the animal, with a great number of pores, which allow them to eſcape from the veſſels, ſo that they are depoſited on the external ſurface of theſe tubes, or rather in that of the body of the animal itſelf, which is uncovered by the ſhell.

Theſe particles of earthy and viſcid matter having reached the ſurface of the body of the animal, readily unite with each other, and with the extremity of the old ſhell, eſpecially when the exceſs of moiſture is diſſipated; and thus by their union they compoſe a ſmall ſolid body, which is the firſt layer of the new addition. Other particles of ſimilar matter continuing to eſcape in the ſame way from the excretory veſſels of the animal, form a ſecond layer under the firſt; afterwards a third, and a fourth, or more, till the new part of the ſhell has acquired ſufficient conſiſtence and thickneſs. It is, however, obſerved to continue thinner for a certain time than the former opening, till the increaſe of the animal requires another enlargement of its covering.

When a teſtaceous animal is going to enlarge its ſhell, as for inſtance the common ſnail, the body projects from the opening. It is then ſeen to attach itſelf to a wall or ſome other ſolid ſubſtance, and the portion of its body which is unprotected by the ſhell, is ſoon covered with the fluids which are excreted from its ſurface. The pellicle which they produce when the fluid dries, is at firſt thin and elaſtic, but gradually aſſumes more conſiſtence, and becomes at laſt ſimilar to the old part of the ſhell. If in this ſtage of the proceſs a bit of the ſhell is broken and removed, without injuring the body of the ſnail, the ſkin of the animal is ſoon covered with a fluid, which gradually thickens, and becomes ſolid. Twenty-four hours after the operation, a fine cruſt may be obſerved, which conſtitutes the firſt and external layer, for repairing the breach which was made. At the end of ſome days this layer has become thicker, and in 10 or 12 days, the new piece of ſhell which is formed, has acquired the ſame thickneſs as that which was removed. In making this experiment, certain precautions are neceſſary, otherwiſe there is ſome riſk of its failure. If, after the broken piece of the ſhell has been removed, and particularly if the fracture is made near the edge of the opening, the animal is not ſupplied with a ſufficient quantity of nouriſhment, its volume or bulk is ſoon diminiſhed; and now finding that what remains of the ſhell is a complete covering to its diminiſhed body, no excretion takes place for the production of a new portion. In removing ſnails from a wall to which they had attached themſelves, for the purpoſe of obſerving the progreſs of the formation of the ſhell, ſome days will elapſe after they are placed in the box, before the proceſs commences, becauſe the teſtaceous matter which had been already expended after fixing on the wall, muſt be fully ſupplied before any new portion can be again formed.

82 Time neceſſary to form ſhell.

This experiment ſhows clearly, that ſhells are only enlarged by receiving new additions of matter, after it has been excreted from the body of the animal, and not

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not by *intus-susception*, or a circulation through the body of the shell itself. If this were the case, the production of new matter to fill up the breach made in the shell, would first appear all round the edge of the opening, and forming a kind of callus, similar to what happens in the reproduction of bony matter in other animals, it would gradually extend till the whole breach is filled up. But, on the contrary, this matter first appears on the body of the animal from which it has exuded, and the whole extent of the opening is closed at once by the fluid which has been directly secreted from the surface of the body. Nor can it be supposed, that the liquid has insensibly exuded from the shell, and falling on the body of the animal, is there collected in sufficient quantity for the formation of the new piece of shell. This is fully demonstrated by the two following experiments of the same naturalist.

83
Other experiments of Reaumur.

Reaumur broke several shells of snails; and, having made a very large hole about the middle of the shell, and about an equal distance between its summit and opening, he introduced between the body of the animal and its shell, through the hole, a piece of skin which was extremely fine, but of a very close texture. He glued this skin to the internal surface of the shell, so that it shut up accurately the artificial opening which he had made. It must then be obvious, that if the reproduction of the piece of shell which was removed, depended on the excretion of a fluid from the shell itself, and not on that which proceeds from the surface of the animal's body, the new piece of shell would be formed on the external surface of the piece of skin which was introduced; and it is not possible that it could be formed between the skin and the body of the animal. But the contrary of this has always happened. The new testaceous matter is always deposited on the internal surface of the skin; that is, on the side which is in contact with the animal's body; and no matter whatever was deposited on the other surface. This experiment has been repeated by others, and has been invariably attended with the same result.

The second experiment made by Reaumur is not less decisive than the first. He took a number of snails, and broke the shells, so that he diminished the number of the turns of the spire about $\frac{1}{4}$ part. Having in this way rendered the shells too small to cover the body entirely, they were nearly in the same situation as when an increase of the animal's body requires an augmentation of the shell. He then took a bit of skin, as in the former experiment, sufficiently large for the opening of the shell, and introduced one of its edges between the body of the animal and the shell, to the interior surface of which he glued it; after which having folded back the other extremity of the skin on the external surface of the shell, he glued it in like manner, so that the whole external opening was completely covered with the skin. The results were exactly the same as before. The shell grew, the skin remained in its place, and that part of it which was attached to the interior surface was fixed between the new piece and the old shell, which consequently could not contribute to its formation.

From these experiments, which may be easily repeated, it appears that the increase of shells is owing to the secretion of an earthy and viscid animal matter which is prepared in the body of the animal, and which is successively formed by layers from the interior part of the shell to the external surface. This formation is determined by the previous enlargement of the animal. The different strata or layers of which shells are composed, can be easily demonstrated by exposing them to the action of fire, and removing them before their structure is entirely destroyed. By this process the animal matter is consumed, and the earthy substance remains, exhibiting a laminated structure. The same structure may be demonstrated, as has been already observed, in detailing Mr Hatchett's experiments, by immersing a shell of the description of mother-of-pearl in a diluted acid. The earthy matter in this case is dissolved by the acid, and the layers of animal matter which are interposed, resisting the action of the acid, remain unchanged, and still retain the original figure of the shell.

84
Layers of shells seen by burning.

85
Turns of the spire increased.

It is a necessary consequence of the mode in which the shells of snails are increased, that they cannot enlarge in volume, but by the augmentation of the turns of the spire, and that the length of each turn of the shell already formed, remains always the same. This may be easily put to the test of experiment, by reducing the shell of a snail which has reached its full size to the same number of turns with those of younger shells of the same species. The two shells do not then exhibit any other difference than in their thickness; and it would be the same, by comparing the youngest shells, those which have been just separated from the egg, with the first turns of those of the same species which have been reduced by breaking them to an equal diameter. The number of turns or whirls of which the spire of a shell is composed, increases very considerably the size of the shell in univalves, and one turn more or less makes a great difference in their volume. According to Reaumur, the diameter of each turn of the spire is in the snail nearly double that of the preceding one, and $\frac{1}{2}$ of that which follows; but in many other shells, both marine and river, the last whirls of the spire, compared with the preceding ones, greatly exceed this proportion. In some, the external opening is 12 times greater than the preceding one, and in others, it is not more than eight times. This depends entirely on the increase of the animal's body, and the proportion of that increase. The growth of some is lengthwise; and in them the increase of diameter is proportionally less, while others increase more in thickness than in length. Those testaceous animals which have only a few turns in the spire of the shell, are of this description. To the former belong such as have a greater number of turns in the spire.

86
The animal is detached from the shell in many cases;

Those who have adopted the opinion of Klein with regard to the formation of shells, have denied the separation of the animal from the shell, which successively takes place near the tip in univalves. It is indeed on this circumstance of the connexion of the animal with the shell, that the truth of this theory depends. According to it, the animal is attached to the internal surface of the tip of the shell in univalves, and on this connexion depend the increase of the shell, and even the life of the animal. But it is a certain fact, that the posterior part of the body of the animal is entirely detached from the tip of the shell; and this holds, not

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not only with regard to all land and sea shells which have lost the first turns of the spine, and consequently those of the tip; but also in a great number of other marine testaceous animals. It seems not only certain, but even necessary, that this separation between the animal and the shell should also take place in bivalve shells, if we take a distinct and rational view of their growth. Whether this separation is suddenly effected, or by a gradual process, which is most probable, it seems to be sufficiently obvious, by examining the internal surface of the valves. This is still more strongly confirmed by sawing univalve shells, particularly those which are considerably elongated, and have a great number of turns in the spire, in a direction perpendicular to their axis. In old shells, several of the first turns of the spire will be found completely filled up with testaceous matter, so that the tip of the shell has become quite solid, or at least it will appear to have been long unoccupied by any part of the body of the animal. But in transparent shells, as in some species of helix, it is seen that this attachment does not exist; and the H. planorbis can be preserved alive, although the tip of the spire is broken off.

Sect. III. *Of the Colours of Shells.*

87
Inquiry curious.

The infinite variety of the colours of shells is one of the most striking parts of their history; and it becomes a curious and interesting object of investigation to inquire, whether these colours are uniform and constant in the species, and from what proceed this regularity and uniformity. The experiments and observations of Reaumur will assist us in this investigation. When a hole is made in a shell, nearly at an equal distance between its tip and opening, the new piece of shell which is formed to shut up the hole is usually of a white colour, and often very different from that of the rest of the shell. It would appear at first that the new piece is of a different nature, and that it is not formed in the same way as the rest of the shell. To meet this difficulty, it will be necessary to explain on what depends the regular variety of the colours of certain shells: the same experiments which lead to the discovery of the cause of the one, will serve to unfold the other.

88
Colours vary from particular circumstances.

This remarkable variety of colour is in no shell more remarkable than in the *helix nemoralis*. The ground of this shell is white, citron or yellow, or of a compound of different shades of these colours. Different coloured rays are traced on this ground, turning spirally with the shell; in some they are black, in others brown, and sometimes reddish. The breadth of each of these rays gradually increases as they approach to the opening of the shell. It even sometimes happens, that two of these bands are so much extended in breadth, that they meet together and form one. Some individuals have five or six of these bands, while others have three or four, and even two, and sometimes only one. Others again have none at all, although of the same species; and among the individuals which are marked with coloured bands, they are not always of the same breadth in the same parts of the shell; from which it appears, that no certain specific characters can be derived from the colour, since it is subject to so much variety. According to Reaumur, the viscid and earthy matter of which the shell is composed is secreted from the surface of the animal's body; but in certain places of the surface, particles which produce a different colour are separated; and whether this depends on a peculiar organization of those places, or on the form of the particles themselves, it appears that these particles, either of a different nature or of a different figure, by uniting, form bodies which reflect different rays of light; that is to say, form parts of the shell of different colours.

89
Colouring matter secreted from the neck.

This seems to be a necessary consequence of the mode in which the growth of shells is accomplished. The whole external layer of the shell is formed by the neck of the animal, because it is that part which is nearest to the head, and consequently as the animal increases in size, this part ceases to be covered with the old shell. It, therefore, depends on this part of the animal to extend the shell, and for this purpose it is sufficient that the neck be furnished with glands for secreting the different fluids, to form a shell of different colours. If, for instance, there are two or three glandular bodies which secrete brown or black particles, and that these glandular bodies are disposed in a parallel direction to each other, while the glands on the rest of the surface only secrete particles of matter which reflect the light of a citron colour, the shell formed by these bodies will have a citron ground, with black or brown bands, nearly parallel, or which gradually approach to each other, and become larger in the same proportion as the external organs of the animal increase in size.

90
Proved by experiment.

If no such glandular structure, or difference in the matter secreted, could be traced on the neck of the *helix nemoralis*, this explanation of the cause of the variety of colours in shells would appear extremely probable; but this probability amounts to certainty, from the actual observation of the existence of this peculiarity of structure and effect. When the *helix nemoralis* is deprived of part of its shell, the body appears of a white colour, excepting towards the neck, where the white inclines to yellow, and where besides there is a number of black or brown bands, equal to that of the bands on the shell, and arranged in the same direction. It has been observed, too, that the individuals which have only one black stripe on the shell, have only one single black spot on the neck; and those having four spots on the neck, have four stripes of the same colour on the shell. These rays are placed immediately under those of the shell; they commence at the distance of about a line from the extremity of the neck, which is itself usually spotted with black all round. The existence, therefore, of these excretory organs can no longer be doubted. The difference of colour seems to prove the difference of structure. But to establish this beyond the possibility of doubt, it is only necessary to have recourse to experiment, by observing what happens in the new piece of shell which is renewed, in place of that portion which has been removed; and if it appear that that part of the shell which is formed opposite to the black rays of the animal, is black, and if that which is formed between the stripes be of a different colour from that of the stripes themselves on the rest of the body, no farther proof can be required. Now, it has been observed, that that part of the new shell formed on the neck opposite to the black or brown stripes on the

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the animal's body, is itſelf black or brown, that formed between the ſtripes is white or citron, while the reſt of the body is white, but different from that of the neck, when it is of this colour.

91 Seeming exception.

It ſometimes happens, that the part of the ſhell which has been renewed is of a different colour. This apparent deviation will appear leſs difficult to be reconciled to the explanation of the proceſs which has now been given, if we attend to the circumſtance that the new ſhell formed oppoſite to the neck of the animal is never different from that of the old ſhell, excepting that the external ſurface is extremely rough, and preſents numerous furrows or grooves, in place of the ſmoothneſs and fine poliſh of the old ſhell. In this caſe, the inequality of ſurface is occaſioned by the motion of the animal retiring within its ſhell, before the new piece has acquired ſufficient conſiſtency and ſolidity; and thus the new ſhell, having contracted on its ſurface wrinkles or furrows, the light is very differently reflected. But there is another cauſe for this difference of colour in theſe circumſtances. When a large piece of ſhell is removed, the firſt layer which is formed is uſually white. The particles of the fluid which are neceſſary for the formation of the ſhell of this colour, ſeem to be more eaſily excreted from the ſurface of the body than the particles of fluid which go to the formation of any other colour. It is obſerved that the body of the animal is covered with this fluid, long before there is any appearance of ſecretion about the neck. This liquid is extended to the neck, and there produces a new layer of white ſhell; but as this layer is extremely thin and tranſparent, it does not prevent the uſual ſecretion of the colouring matter at the neck to appear. In this period of the proceſs, if the animal retire within its ſhell, the new layer, ſtill adhering in many points to its body, and not having acquired ſufficient ſolidity, will be diſtorted and wrinkled; and not only exhibit that inequality of ſurface which generally appears in ſhells thus formed, but the arrangement of the ſtripes or colours will alſo be deſtroyed.

92 Cauſes of this.

It would be a very falſe concluſion from this account of the mode of the formation of the ſtripes which appear on certain ſpecies of ſhells, that the external ſurface of all ſhells ſhould be marked with colours, or ſhould be uniformly of the ſame colour; and that there ſhould be no ſhells whoſe external ſurface is marked with different ſpots, differently arranged, of an irregular figure, and ſeparated from each other by unequal intervals. For if it has been ſhown, that theſe colours are produced on the ſurface of the ſhell, only by means of the ſecretory organs, ſituated on the neck of the animal, it cannot be ſuppoſed that the ſame effects will follow, unleſs the animal is placed in the ſame circumſtances. Theſe ſecretory organs, therefore, muſt exiſt during the entire formation of the ſhell, to furniſh the ſame quantity of colouring matter during the whole of its progreſs. But if it happen on the contrary, that theſe organs undergo any change; if the pores through which the liquid is poured out to form a ſhell or part of a ſhell of a brown colour, become too large or too ſmall, or in other reſpects change their form, after having poured out a certain quantity of this fluid; and that thoſe which furniſh the fluid of which the white part of the ſhell is compoſed, are alſo changed, it muſt happen that the ſhell which is produced is marked with different black and white ſpots, combined with a degree of irregularity correſponding to the change on the ſecretory organs. This will appear to be the caſe, by attending to the changes which take place in the ſecretory organs of ſnails which produce coloured ſhells; for in them it may be obſerved, that the colours are diſtinct and well marked in ſome, towards the opening, while they are ſcarcely perceptible on the firſt turn of the ſpire towards the tip of the ſhell; and theſe changes of colour cannot be ſuppoſed to exiſt without a correſponding change on the ſecretory organs.

93 Changes in the organs.

94 Difference of fluidity in the matter ſecreted.

The fluidity of the liquid ſecreted for the formation of the ſhell, has probably alſo ſome effect in the regular diſtribution of the colours which appear on ſome ſpecies. It is eaſy to imagine that ſome animals may ſecrete a fluid for the formation of the ſhell, of ſuch a degree of fluidity as to flow eaſily from one place to another, and thus produce irregular marks on the ſhell. But beſides, if there are ſecretory organs ſituated on the neck of the animal, which prepare fluids of different colours; if the animal moves, or is diſturbed by any means, when theſe fluids are excreted on the ſurface, the colours will appear in a different place from their original diſtribution, or be mixed and blended together, and thus occaſion that irregularity which is obſerved in thoſe parts of ſhells which have been laſt produced, or renewed.

93 Motion of the animal during the depoſition of the matter.

96 Secretory organs enlarge with the animal.

But it will be neceſſary to have recourſe to the firſt of theſe cauſes, namely to the change of ſtructure in the ſecretory organs of the neck, to explain the regular diſtribution of the round ſpots, or of thoſe of a ſquare or rectangular figure, with which certain ſhells are marked, and to ſuppoſe that thoſe veſſels which are arranged in a ſquare or rectangular manner, which furniſh peculiar fluids, are ſhut or open at different periods. It may happen that the developement of a great part of the animal, occaſioned by a more vigorous growth in certain ſpecies than in others, may, in ſome caſes, be the only cauſe of thoſe regular ſpots, ſometimes white on a coloured ground, and ſometimes coloured on a white ground, which the ſhell exhibits, if the glands which ſecrete the colouring matter correſpond in their diſtribution, to that of the diviſions on the ſhell; and if they occupy a greater ſpace on the neck than is uſual in other ſpecies. In this way may be accounted for the regularity of theſe marks, and the increaſe of their ſize, which is uſually proportioned to that of the turns of the ſpire, from the conſideration of the ſecretory organs of the animal enlarging in the ſame proportion as the other parts of its body; and their effects in the formation of the ſhell correſponding to the developement of theſe parts. Hence it follows, that the largeſt marks are obſerved on the external convolutions of the ſhell.

97 Laſt formed layer uſually white.

According to Reaumur, the laſt layer of the ſhell which is formed from a fluid ſecreted from that part of the ſurface of the animal's body which does not reach the neck, ſhould be white, and this is moſt generally the caſe. In thoſe ſhells which are internally coloured, the fluids ſecreted from the body of the animal are of the ſame colour, and they take the place of thoſe which are uſually white, or of a pearly nature, as is obſerved in many others. The nature of theſe internal

Of the Constituent Parts of Shells, &c. ternal layers is always obvious; for if they are not white, they exhibit everywhere a uniform colour, and never variegated, like what appears externally. By removing with a file any part of the external surface of the shell, the layers which appear immediately under the surface, are those which have been furnished by the body of the animal, while those on the surface itself, usually more variegated than the rest, owe their formation to the vessels about the neck, and have been formed in the way already described.

98 Formation of striæ. The growth of shells, being proportioned to that of the inhabitant, proceeds almost imperceptibly. In most shells, however, it is easy to distinguish the different additions which they have received; for they are marked on their convex surface with different eminences which are parallel to each other, similar to lines of different degrees of depth, which give the shell a fibrous structure. These elevations are called *striæ*, may be traced through the whole of the shell in bivalves, and in the longitudinal direction of those which have a spiral form. From the slightest observation of the manner in which shells are formed, it is easy to see that they can receive no addition, without leaving in a greater or less degree, some trace of these inequalities; for every small addition of testaceous matter which is made, must be attached to the old part of the shell, which consequently must be more elevated than the former, whatever be its thickness, when the enlargement of the animal requires the formation of the latter. Thus, the shell will be marked with a great number of these striæ, parallel to each other, which may be distinctly seen on many different species.

99 Growth interrupted. Every shell has usually some of these eminences at greater distances, and more elevated than the others. By these the different periods when the shell ceased to increase, or rather those when its growth was interrupted, are marked; and they have some degree of analogy with the different shoots from the branch of a tree. The heat of summer or the cold of winter interrupting the growth of the animal, at least among such as are testaceous, which live on the land, or inhabit rivers in temperate regions, the shell is not enlarged in extent during these seasons. It is otherwise, however, with regard to its thickness, for there is continually exuded from the body of the animal, small quantities of fluid, which increase its thickness. Hence it is, when the shell begins to increase in extent, the edge to which the new portion is cemented, is much thicker than when the growth was gradual and imperceptible, and consequently the place at which the growth commences after a long interruption is distinguished by a more elevated ridge, than in the continued progressive additions which it receives. The numerous instances of this interruption in the growth of shells, will occur to the attentive conchologist in the progress of his researches. We have at present in our possession, a

100 Example of this. fine illustration of the same thing, in a specimen of *murex ramosus*. The animal, it would appear from the original part of the shell, had been for some time in a sickly or unhealthy state; for it has undergone many of the changes to which dead shells are subject. It has lost its enamel; it seems to have undergone some degree of decomposition, and some species of *serpula*, and other parasitical animals had made it their abode; but from this sickly state it seems to have recovered, and acquired great vigour; for the next addition which is made to the shell, is equal to its original bulk. It is clean, entire, and in perfect preservation, forming a singular contrast with the old shell.

101 Distinguished by the difference of colour. The place at which shells begin to increase, after the growth has been for some time interrupted, may be distinguished by a difference of colour in the stripes with which the shell is usually marked. In these places, black or brown stripes exhibit more vivid colours, and sometimes even little different from those on the rest of the superior surface of the shell. The cause of this change is not difficult to trace, if we recollect that the secretory organs which prepare the colouring matter, at least in the *helix nemoralis*, have their origin at some distance from the extremity of the neck, from which we have seen that the first layer of shell which is traced to the extremity itself, should be of a different colour from that of the stripes; but as the increase of the animal occasions the stripes to be formed under this first shell, during which it is still very thin, and consequently transparent, it does not prevent the shell produced under it, of a black colour, to appear so. But when the animal has ceased to grow for some time, it then increases the thickness of the shell last formed, so that the shell which is next produced from the colouring matter, when the animal begins to grow, being laid on one part of the old shell much thicker and less transparent, the colour of these stripes must appear less bright, and therefore different in those places, from the other parts of the shell.

102 Colours owing to the glands about the neck. In taking a review of what has been said concerning the production of the colours of shells, it must appear that these rays or coloured lines are owing to glands which secrete the colouring fluid, and which are arranged on the anterior edge of the neck, while the posterior part furnishes only a fluid of a different colour, and usually less deep than the first. By means of this principle it is not difficult to account for the arrangement of the different colours which are so splendidly exhibited among this class of natural objects. These colours may be reduced to one or more, which are more vivid on a lighter ground; to coloured, circular bands on a ground of a less vivid colour, or pure white; to longitudinal lines, round or square spots, and in a regular, or irregular, zig-zag form. All these may be easily explained, according to the principles which have been laid down, the application of which, from what has been said, will not, we hope, be found difficult.

103 Colours of porcelain shells. But from this mode, which is the most general in the production of the colours of shells, there are certain deviations. In that division of shells which is made by some naturalists, and which is distinguished by the name of *porcelain shells*, on account of the fine enamel with which they are covered, there are two sets of colours, which are disposed in a parallel direction to each other. The external range of these colours is owing to a peculiarity of structure in the animals which inhabit them, different from that of other testaceous animals, and to an operation which does not take place in other shells. In these shells, the colouring matter seems to be deposited in two different ways, and at two different periods. In the first process, when the body of the shell is formed, the colouring matter is excreted from the glands, in the same way as

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as in other teſtaceous animals; and it is arranged according to the diſpoſition of the glands on the body of the animals. At this period of the proceſs, the ſhell is only of a moderate thickneſs, and much leſs than what it afterwards acquires, when completely formed. On the external ſurface of the ſhell firſt formed, another layer is depoſited, which is more compact than the firſt, in ſome places thicker, and uſually variegated with different colours. The external ſurface of the ſhell being thus completely covered with this ſecond layer, the original colours are concealed; and if the ſame ſhell were examined at different periods of its formation, it would appear like two diſtinct ſpecies. The organs which are employed by the animal in the production of this ſecond layer of ſhell, and ſet of colours, are two ſoft, membranaceous wings, which being protruded from the opening of the ſhell, completely cover the whole of its external, convex ſurface. Theſe two wings, which are quite diſtinct from the glandular ſtructure about the neck of the animal, which is ſituated a little lower, are alſo provided with glands, which furniſh colouring matter, uſually different from that which is furniſhed by the glands of the neck; and it is the upper ſurface of the wings, which is alone provided with this glandular ſtructure. This ſurface, when this part of the animal is protruded from the ſhell, and extended over it, comes in contact with the external ſurface of the latter. Hence it is, that theſe membranaceous organs depoſit on the firſt formed and coloured layers of the ſhell, new layers of teſtaceous matter, which is differently coloured, and diverſified with entire ſpots, either circular, or in a waved direction, which are ſometimes of a more vivid tint than that of the ground, or white upon a dark ground, or brown upon a yellow ground; or are compoſed of ſtraight lines, or curved, or interlaced with each other, reddiſh, brown, yellow or white, on different coloured grounds, or in dots or points, whoſe ſhades and arrangement are not leſs diverſified.

104 An external layer formed.

105 Proved.

This mode of the formation of the external layer of porcelain ſhells, has been proved by the actual obſervation of ſome naturaliſts. In ſome ſpecies, a longitudinal line of a paler colour is obſerved on the convex ſurface of the ſhell. This is aſcribed to the junction of the two wings of the animal, where a ſmaller quantity of colouring matter has been depoſited, or where the ſhell has been leſs completely covered with the protruded part of the animal. But the exiſtence of this ſecond layer is ſtill more diſtinctly proved by mechanical means. The external layer may be removed by means of a file, and the ſhell reſtored to its original ſtate; and then the colours which it firſt received are brought into view. This circumſtance is ſtill farther demonſtrated by an attentive examination of different ſpecies of ſhells, and particularly the *cypræa argus*. In examining this ſhell, there are obſerved under the external layer, which is of a yellow colour, ſome ſlight traces of four tranſverſe bands of a brown colour, which ſurround the ſhell, and which muſt have been formed previous to the more ſuperficial yellow layer. By a more minute examination, it will appear that the circular ſpots with which the external yellow layer is marked, have been poſteriorly formed to this layer; and finally, on the four turns of the ſpire forming a ſlight projection at the baſe of the ſhell, there are ſome brown, circular ſpots, which are quite ſuperficial, and which ſometimes include two turns of the ſpire, which could not happen if the yellow colour had not been prior in its formation to theſe circular ſpots. If the colouring matter of which theſe ſpots are compoſed, had been depoſited at the time that the different parts of the ſpire were formed, one ſpot could not have included two turns of the ſpire at the ſame time.

106 Shell becomes thicker from the ſame cauſe.

This effect of communicating a new ſet of colours to the external ſurface of the ſhell, is not the only one which is produced by the membranaceous ſtructure of the animal which inhabits the porcelain and other ſhells. The form of the ſhell is alſo changed in a remarkable manner, a great quantity of teſtaceous matter being depoſited on the ſurface of the opening, which then aſſumes a conſiderable thickneſs. The turns of the ſpire are incruſted, and ſometimes diſappear on the outſide of the ſhell; and wrinkles, furrows, and even tubercles, which exiſt on the ſurface of ſome ſpecies, are alſo formed. The ſurface of *cypræa pediculus* exhibits circular ſtriæ which did not originally exiſt, and which owe their formation to this cauſe. In other ſpecies, the ſurface is marked with projecting points or tubercles, which are produced in the ſame manner as the circular ſtriæ of the former, and which alſo depend on the ſtructure of the membranaceous wings of the animal, and the teſtaceous ſubſtance which is ſecreted and depoſited from their ſurface. Thus, it appears that porcelain ſhells, and thoſe of ſome other ſpecies, are formed at two diſtinct periods. It is during the ſecond period of the proceſs that the colour of the complete ſhell is formed. In farther illuſtration of this point, of the formation of ſhells of this deſcription at two different periods, one or two examples may be given of the difference which takes place, when the laſt layer formed is removed. In the *cypræa exanthema*, the ſhell is ferruginous, with whitiſh round ſpots and eyes, but when the outer coat is worn off, it becomes barred or teſſelated with brown or blue. The *cypræa arabica*, as its name imports, exhibits characters on its ſurface, having ſome reſemblance to Arabic letters. The ground on which theſe characters, which are of a brown colour, are placed, is whitiſh or bluiſh; but when the outer coat is worn down, the ſhell is ſometimes bluiſh with brown bands, or pale with darker angular ſpots and lines; brown, mixed with violet, or reddiſh blue.

107 External layer removed different colours appear.

108 Effects of light on ſhells.

But beſides the cauſes which have been mentioned concerning the production and variety of the colours of ſhells, ariſing from the difference of ſtructure in the organs which ſecrete the colouring matter, and the changes to which theſe organs are ſubjected in the growth of the animal, the effects of light and heat, altogether independent of the animal itſelf, are probably very conſiderable. Two individuals of the ſame ſpecies, the one from the Mediterranean or European ſeas, and the other from the tropical regions, exhibit very different ſhades of colour. The colours of the inhabitant of the torrid zone are always more bright and vivid than thoſe of the native of more temperate climates. The two ſhells, although ſimilar in form, ſize, and other characters, are uniformly different in the intenſity of their colours. Theſe differences, which have led conchologiſts to increaſe the number of ſpecies, obviouſly depend on the action of the climate, and particularly of light, on nouriſhment, and other circumſtances which have

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have hitherto eluded the obſervation of naturaliſts, are uniform and conſtant, as long as the cauſes which operate in their production, continue to act. At firſt ſight it might be ſuppoſed that the difference of temperature is the cauſe of the difference in the intenſity of colour, in ſhells produced in different climates. It might be ſuppoſed too, that the different depths at which ſhells are found in the ocean, the medium in which they live being thus very different, would occaſion great diverſity in the colour. Near the ſurface, where the heat is greateſt, if the operation of this cauſe were conſiderable, the colours of ſhells ſhould be expected to be moſt vivid, and as the depth increaſed, at leaſt to a certain extent, the intenſity of colour ſhould be diminiſhed. But it has been obſerved in bivalve ſhells which are found at great depths, ſuch as ſome ſpecies of oyſter and ſpondylus, that the lower valve which is attached to the rock, is almoſt always white or colourleſs, while the upper valve often exhibits bright and vivid colours; but this difference cannot be aſcribed to the difference of temperature, for in both valves it muſt be the ſame; the matter ſecreted for their formation is prepared by the ſame organs, and is depoſited in a ſimilar manner; and indeed they are altogether placed in the ſame circumſtances, and have been expoſed in their production and growth to the operation of the ſame cauſes, excepting that the upper valve is expoſed to the rays of light, and is therefore coloured, while the lower valve is removed from the action of this cauſe, and is colourleſs.

109 Lower valve colourleſs,

110 and ſhells included in other bodies.

The ſame difference is obſerved in the valves of other ſhells, which are produced in ſimilar circumſtances. The different ſpecies of pholas which make their abode in calcareous or coral rocks, and the *teredo navalis* or ſhip-worm, which pierces wood, and makes it its habitation, are uſually colourleſs. Thoſe teſtaceous animals too, which live at great depths in the ocean, and are thus far removed from the influence of light, are alſo diſtinguiſhed by very faint colours, or are entirely white.

Sect. IV. *Of the Formation of the Umbilicus, Protuberances, &c.*

We have hitherto conſidered only the general formation of ſhells. In the preſent ſection we ſhall treat of ſome other circumſtances which produce variations in their external figure. Such, for inſtance, is the formation of the umbilicus, of ſpines, tubercles, ribs, and other protuberances.

111 Four claſſes of ſpiral ſhells.

Umbilicus. Univalve ſhells, which are furniſhed with a regular ſpire, may be divided with regard to their form, into four claſſes; namely, ſhells having a diſc, cylindrical ſhells, turbinated, and ovoid or egg-ſhaped ſhells. Theſe four forms are the moſt common which ſpiral univalve ſhells aſſume, and they depend on the manner in which the turns of the ſpire are applied to the common axis, and the difference of their arrangement. They derive their primitive figure from the ſmall ſhell while it is yet included in the egg, and probably from that of the external organs of the animal which is contained in it. But although all univalve ſhells may be referred to one or other of theſe four principal forms, they exhibit a great variety of ſlighter ſhades of difference. Let us now ſee in what way it may be conceived that the bodies of the animals which inhabit univalve ſhells, give them a ſpiral form. If we can ſuppoſe that from the firſt production of theſe animals, when they begin to be developed, the fibres of one part of the body, ſuch as thoſe of the external ſurface, are longer than thoſe of the oppoſite ſurface, it is obvious that the body of the animal continuing to increaſe, according to this original tendency, will aſſume a curved form, the concave part of which will be on that ſide where the fibres are ſhorteſt; and if the long fibres on the external ſurface, and the ſhort fibres on the internal ſurface, continue to increaſe in the ſame proportion, this muſt give the body a ſpiral form; but in this caſe, the different convolutions of which the animal is compoſed, will be in the ſame plane, and can only apply to a ſmall number of ſhells included in the firſt diviſion, namely thoſe which are characterized with having a diſc.

112 Owe their ſhape to the form of the animal.

The convolutions of the ſpire which are deſcribed by the ſhell of univalve teſtaceous animals, and the body which ſerves as a mould for theſe, are diſpoſed in different planes. Some other cauſe, therefore, muſt operate in producing this deviation. Between the two ſurfaces of the body of the animal, which is ſuppoſed to be furniſhed with fibres of different lengths, it is eaſy to conceive two other ſurfaces directly oppoſite to each other, an upper and an under ſurface, each of which is included between the two preceding ſurfaces, but of ſmaller extent; and it is eaſy to conceive farther, that theſe two latter ſurfaces are ſo formed, that the fibres of the one are longer than the correſponding and oppoſite fibres of the other. According to this ſtructure, the body of the animal will tend to that ſurface on which the fibres are ſhorteſt, and thus deſcribe, during its developement, a ſpiral line in different planes, in proportion to the difference of tenſion between the ſuperior and inferior ſurface of the body, as well as between the lateral ſurfaces.

113 Umbilicus produced.

The form of the ſhell depending on the external form of the body of the animal, the umbilicus which is a different cavity from that of the opening of the ſhell in which the animal is contained, and which is ſeen on the inferior ſurface of ſome ſhells, in the centre of the convolutions of the ſpire, depends entirely on the plane on which the animal has formed the additions to its ſhell. If the plane of theſe convolutions has been directed round a conical or elliptical axis, and each convolution of the ſpire be more or leſs diſtant towards the centre of the ſhell, from this hollow point a ſhell may be thus formed, whoſe umbilicus will be more or leſs open, according to the greater or leſs degree of ſeparation which the animal muſt give to the convolutions of the ſpire, correſponding to its ſtructure. An oppoſite effect will be obſerved, if the increaſe of the convolutions of the ſpire is ſuppoſed to take place round an axis which is ſo ſmall as to permit them to come in contact with each other. In this caſe no cavity will be formed in the centre, no appearance of umbilicus will be ſeen. But if we conceive that the animal, in enlarging itſelf, turns round a ſolid of a curved figure, in place of the conic axis above alluded to, and that the end of this ſolid is at the ſummit of the ſhell, it is obvious that an opening or an umbilicus of the ſhape of this ſolid, will be formed in the ſhell.

Ribs. The longitudinal elevations which are obſerved

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served on univalve shells, which run in a transverse direction to the successive growth of the convolutions of the spire, have been denominated *varices*, by Linnæus, in allusion to the dilated veins on the bodies of other animals. They are composed of one or more elevations, usually arranged in a line parallel to the axis of the shell, and sometimes slightly oblique. They consist of the same substance as that of the rest of the shell, but are thicker and always more elevated than the surface of the convolutions of the spire on which they are placed. To explain the manner in which these elevations are formed, we may examine the opening of land shells which have arrived at the last stage of their growth. This period is marked in these shells by a kind of margin of about a line in breadth, which is sometimes turned outwards, although the rest of the shell turns on a regular, spiral line. This reflected margin never appears in land shells, but when they have reached the last period of their growth, and when it is once formed, the animal of some species ceases afterwards to continue the convolutions of its spire. Having now arrived at that period of its growth, when it is fit to perform the act of generation, it protrudes itself more frequently from its shell, and each time it returns, a viscid fluid which exudes from its neck, is interrupted and deposited on the external margin of the shell. The bulk which the anterior parts of the body have acquired in consequence of the evolution of the generative organs which are contained in that part of the body, causes it to press more strongly than formerly on the edges of the opening of the shell, every time it protrudes itself, and gradually forces the particles of testaceous matter which have been recently deposited, to the external surface, and in a direction quite different from that of the former plane of the spire. A short time only is requisite for the complete formation of this elevation; but after it has been formed, if the animal has the power of continuing the spire on the former plane, the shell which had arrived at a larger size will exhibit from time to time, if the same process be repeated, longitudinal projecting ribs, convex or bent, exactly similar to the external swelling of the opening of the shell, and analogous to the *varices* which are seen on some species of marine shells.

114 Formation of ribs accounted for.

115 Limited to sea-shells.

This power of continuing the spire, after the formation of the eminence at the opening, is peculiar to sea-shells. No farther increase, after it is once formed in land shells takes place. The young of some sea-shells, as some species of *murex*, also possess this faculty of continuing the growth of the shell after the formation of similar elevations, even from the earliest period of their existence, and long before it can be supposed that the organs of generation are evolved. This no doubt depends on some peculiar structure or organization of the animal, and particularly on those of the anterior parts of the body.

116 Tubercles produced in the same way.

Tubercles. Many shells are furnished with tubercles, which are produced by the same organs as the rest of the shell. The fleshy protuberances which are placed on the external surface of the neck of the animals which inhabit them, serve as a mould, and according as there are more or less of these tubercles, while the animal enlarges the turn of the spire, and increases its shell so much, there is the same number of protuberances in the convolution. These protuberances, while they remain on that part of the body of the animal on which they were formed, are hollow, and during the remaining part of its existence, as the body enlarges, they are partly hollow, and partly solid, being filled up with testaceous matter, excreted from the body of the animal, and then the internal surface of the shell becomes smooth and even.

Spines, and fringed or irregular protuberances, with which some shells are armed, have, according to all appearance, the same origin as the other inequalities on the external surface of shells. They are usually formed at the end of the different successive periods of the growth of the shell. This will be sufficiently obvious, if we trace the whole series of wrinkles or striæ which run parallel to the circumference of the opening. Those which arise immediately from the ribs or *varices*, are produced by particular organs which surround the extremity of the neck, and stretch out from every part of its circumference, secreting a testaceous matter, which partly forms a sheath around them, gradually increases in thickness, and successively assumes the form of that part of the body which in some measure serves the purpose of a mould. In all the species of murex, which are furnished with spines, the elevations called varices or ribs, as well as the spines with which they are armed, are placed on the shell at equal distances; and the intermediate parts of the shell, although frequently grooved or striated, are not furnished with spines. This uniform observation, not only in shells belonging to this genus, but also in almost all spinous shells, proves, that the spines as well as the ribs, are to be considered as formed by the margin of the anterior parts of the body, which is renewed in the same proportion as the change in the position of this part of the body takes place. It proves also, that the formation of shells is entirely owing to the successive and regular enlargement of the animal; and that it increases every time it is displaced from the whole extent in breadth of the anterior part of the body, the margin of which only being furnished with long fleshy processes or fringed appendices, is in reality the only part which produces them on the shell at each period of its increase. In the same way is formed the beak or prolongation of the shell, which terminates the inferior extremity in the form of a canal. This canal is produced in all shells in which it exists, by a cylindrical organ, susceptible of extension and contraction, and which, according to some naturalists, is employed by the animal as a kind of feeler, and occasionally to attach itself to solid bodies. It excretes and deposits a testaceous layer which serves it as a kind of sheath, in a similar manner to the production of spines.

117 Spines produced by fleshy processes.

118 Formation of ribs and grooves.

It is easy to explain the formation of the grooves or elevated ribs which are found on the outer surface of other shells; while the whole of the internal surface is smooth and polished. In bivalve shells, which exhibit this structure, the whole anterior surface of the animal is grooved or channelled in the same way; and from this the shell derives its shape and structure. In these shells it may be observed, that it is only the anterior margin that is grooved on the internal surface; because, in the progress of the growth of the animal, that part of the body which presents a smooth, equal surface has advanced, and nearly filled the whole of the shell; and the testaceous matter secreted from this

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part of the body being deposited on the grooves, channels, or striæ, which were formed when the anterior part of the body occupied that part of the shell, fills them up completely, and leaves the surface quite smooth and polished. New additions being made to the shell as the growth of the animal requires it, the smooth surface of the body advances forward, and fills up with its secretions what is now grooved; while the new part of the shell, which corresponds to that part of the body which has an unequal surface, only presents this appearance. It is in this way that the ribs or grooves are formed in different species of ostrea, cardium, and other bivalve shells.

119 Formation of hollow ribs,

But there is a peculiarity of structure in a species of cockle, the white fluted or ribbed cockle, *cardium costatum*, which seems more difficult of explanation in its mode of formation. The ribs of this species are not only of the usual structure of other species of ribbed or grooved shells, but are particularly distinguished by having them hollow. The whole number of the ribs amounts to about 18 on each valve, of which the 11 exterior ones are of a triangular form, of about three lines high, and hollowed through their whole length, from the beak to the margin of the valves. To have a distinct notion of the formation of these hollow, triangular ribs, it is necessary to conceive, that the margin of the anterior part of the animal is deeply channelled or grooved; and when this part of the body is in contact with the recent shell, the ribs or elevations are formed, and are then open to the internal surface of the shell; but the posterior part of the body being hard and smooth, never comes in contact with the excavated part of the ribs. On the contrary, as the testaceous matter is excreted from this part of the body, it is deposited on that part of the internal surface of the shell which it touches, stretches across the deep grooves, and forms the third and interior side of the triangular ribs.

120 and of striæ, &c.

Thus it appears, that spines, tubercles, and all other protuberances on the surface of bivalve shells, owe the peculiarity of their form and shape to the peculiar structure of different organs situated on the anterior margin of the body of the animal, and are composed of the testaceous matter which is excreted by these organs. The nature of the process is the same as in univalve shells of a spiral form. The diversity only appears in the difference of the organs and structure of the animals which inhabit different shells. To a similar process may be ascribed the formation of striæ, of scales, and of various excavations which sometimes accompany them.

Sect. V. *Of the Production of Pearls.*

121 Pearl found in mother-of-pearl shells.

In treating of the constituent parts of shells, it was observed, that the composition of the pearl appears, from analysis, to be precisely the same as the mother-of-pearl, or those shells in which the pearl is usually found. From this we must conclude, that the pearl, and the mother-of-pearl, are produced by the same secretion. It appears, from the observations of naturalists, and indeed it might have been expected, from the similarity of composition, that all testaceous animals, whose shells come under the description of mother-of-pearl, occasionally produce pearls.

Different opinions have been entertained with regard to the cause of the formation of this precious production. According to some, it is merely a morbid concretion, formed within some part of the body of the animal, or at least within the shell, without any apparent external injury; while others suppose that it is only owing to wounds which the shell, or the animal, or both, have received from accidental causes, or from the action of insects, or some testaceous animal, making perforations in the shell. It is not improbable that pearls may be formed in both ways.

122 Supposed to be morbid concretions;

Every day's experience informs us, that similar concretions are formed in different cavities of the bodies of other animals; but without any obvious cause or external injury. The formation of such concretions, as, for instance, biliary and urinary calculi, producing the most excruciating disorders in the human body, are too fatally known. These concretions, no doubt, owe their origin to the diseased or unhealthy action of the vessels secreting the fluids in which they are formed. By this diseased action producing a superabundance of the matter which enters into the composition of the concretion; or this matter in the fluid state meeting with some solid body, which becomes a nucleus, is attracted by it, and deposited in concentric layers, till the concretion acquires a larger or smaller size, according to the duration and quantity of the secretion and deposition. In the same way, it seems extremely probable the pearl may be frequently formed; the matter of which it is composed being constantly secreted by the animal for the production of the new part of the shell. If then this matter should at any time be produced in greater quantity than what is necessary to form the inner layers of the shell, and particularly if it should meet with a solid particle of any body, it will be attracted by it, and thus constitute the rudiments of a pearl, which will receive constant additions of concentric layers, and increase in size in proportion to the age of the animal and the quantity of matter deposited. Pearls, it is said, have been found within the body of the animal. If this be true, the pearly matter, in its passage through the vessels of the body, must have met with some nucleus, around which the concentric layers have been formed. In most cases, however, the pearl is found loose in the shell, entirely detached from the animal. It must then have been formed of the matter which was thrown out of the body; but it is not unlikely that pearls are formed both ways, or that the same pearl may be partly formed within the body of the animal, and be afterwards excluded, and arrive at its utmost size, while it remains loose in the shell.

123 or formed from external injury.

But, according to others, the pearl owes its formation to some external injury. The following seems to be a pretty distinct view of this opinion. When Faujas de St Fond visited Loch Tay, he was led to make some inquiries concerning the pearl-fishery, which had been carried on in several parts of the river Tay for some years. Shells were brought to him; and in these shells the fishermen pretended to find pearls, which they expected to sell at a higher rate, as they were found in the presence of the traveller. But he informs us, that they attempted to impose on him, by introducing a pearl secretly into the shells as they opened them. Observing this circumstance, he told them that he could know at once, by examining the outside of the

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the ſhell, before opening it, whether it contained any pearl. He mentions this to introduce ſome ſpeculations concerning its formation. When no perforation or calloſity appeared on the outſide, he concluded that there was no pearl in the ſhell. The pearl-fiſh, he ſuppoſes, is attacked by two claſſes of enemies. One is what he calls the *auger-worm*, which penetrates into the inſide near the edge of the valve, by making a longitudinal paſſage between the layers of the ſhell. The length of the channel is one inch, or one inch and a half when it doubles back in a line parallel to the firſt. At the inner extremity there is a ſmall circular portion, formed by the worm in turning round. Theſe excavations are in the pearly part of the ſhell. The pearly juice, extravaſating, forms protuberances in the ſame direction; and the cylindrical bodies which are thus formed, may be conſidered as elongated pearls adhering to the internal ſurface. When ſeveral worms of this kind unite their labours by penetrating near each other, the reſult is a kind of pearly wen with irregular protuberances.

Another ſea-worm, which he ſays belongs to the multivalves, a ſpecies of pholas, alſo attacks the pearl ſhells. The ſhell of this ſpecies of pholas has a hinge in the form of a crooked bill, as he ſaw in ſome ſpecies of oyſter, which he examined, from the coaſt of Guinea. The hole was of the ſhape of a pear. Pearls of this ſhape have been found, and have been held in great eſtimation. Obſerving this circumſtance, artificial perforations are made in the ſhell, and this forces the animal to produce pearls. In ſome ſhells brought from China, this artificial hole has been obſerved filled up with braſs wire, rivetted on the outſide like a nail, and the inner extremity of the wire was covered with a well-formed pearl, which ſeemed as if ſoldered to its extremity *.

* Trav. vol. ii.

Pearls are alſo produced by another artificial proceſs. The ſhell is opened with great care to avoid injuring the animal, and a ſmall portion of the internal ſurface of the ſhell is ſcraped off. In its place is inſerted a ſpherical piece of mother-of-pearl, about the ſize of a ſmall grain of lead ſhot. This ſerves as a nucleus, on which is depoſited the pearly fluid, and in time forms a pearl. Experiments of this kind have been made in Finland, and have been repeated in other countries.

124 Diſcovery of Linnæus.

A remarkable diſcovery has been aſcribed to Linnæus reſpecting the generation of pearls. This was a method which he found out, of putting the pearl muſſel (*mya margaritifera*) into a ſtate of producing pearls at his pleaſure. It was ſome years before the final effect could take place; but, in five or ſix years after the operation, the pearl, it is ſaid, had acquired the ſize of a vetch. But it does not ſeem to be known in what this operation conſiſted. Whether it conſiſted in imitating the proceſs of inſects, by wounding the ſhell from the outſide, or by following the other proceſs, by ſcraping away part of the inner layer; nor is it much known what have been the effects of this operation, or whether it has turned to any account, or indeed is at all practiſed in Sweden or any of the northern ſtates, where it muſt have been originally known. For this diſcovery, however, the Swediſh naturaliſt, it is ſaid, was raiſed to the rank of nobility, and otherwiſe liberally rewarded by the ſtates of the kingdom.

The value which is put on the pearl depends on its ſize, colour, ſhape, and purity. The largeſt pearls are always held in the higheſt eſtimation, when their other qualities are in any degree of perfection. The fineſt ſhape of the pearl muſt be quite globular; it muſt be of a clear brilliant white, ſmooth and gloſſy, and entirely free from ſpot or ſtain. Pearls were greatly eſteemed and much ſought after by the Romans. Servilia, the mother of Marcus Brutus, we are informed, preſented a pearl to Cæſar, which was valued at 50,000l. ſterling; and Cleopatra diſſolved one, which is ſaid to have been worth 250,000l. ſterling, in vinegar, which ſhe drank at a ſupper with Mark Antony.

CHAP. VI. OF THE HABITATION OF TESTACEOUS ANIMALS, METHODS OF FISHING, COLLECTING, &c.

TO the detailed account which we have now given of the natural hiſtory of teſtaceous animals, and particularly of the formation and growth of the ſhell, we have only to add a few obſervations concerning their habitation, the methods of fiſhing, collecting, and preſerving them. Theſe topics ſhall be the ſubject of the following ſections.

Sect. I. *Of the Habitation of Teſtaceous Animals.*

125 Found on every part of the globe.

Testaceous animals are found on every part of the ſurface of the globe. Some are inhabitants of the land, while others only frequent rivers and lakes, and a third and numerous claſs live in the ocean. From this a claſſification of ſhells has been formed, and they have been divided into land, freſh-water, and ſea ſhells. But whatever difference might exiſt in the habits and economy of teſtaceous animals which are produced in places ſo different, it affords few marks of diſcrimination for the purpoſe of claſſification.

126 Land ſhells very numerous.

Land ſhells are ſpread over the whole ſurface of the earth, and although more acceſſible, are perhaps leſs known than thoſe which inhabit the ocean. From the ſmall number of land ſhells which have been collected, it would appear at firſt ſight that they are leſs numerous than marine ſhells. This, however, ſeems not to be the caſe, with regard to the number of ſpecies; and it is well known, that the number of individuals of land ſhells, in ſome inſtances, far exceeds that of ſea ſhells. The ſea ſhells of the Mediterranean have been obſerved by naturaliſts, to be nearly the ſame from the ſtraits of Gibraltar to the iſland of Sicily; but the land ſhells of Languedoc are different from thoſe of Provence, of Dauphiny, Piedmont, and different parts of Italy. Some are found in Spain, in Corſica, in Sardinia and Sicily, which are not to be met with in other places; and

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and from the great variety and number of land shells, it seems probable that many of them are yet unknown. But let us now take a general view of those places of the world where different testaceous animals are most frequently found.

127 Shells most beautiful within the tropics.

It has been already observed, that light and heat have very considerable influence in adding to the splendour of the colours of shells. The most beautiful shells are found in countries between the tropics, where they are more immediately subject to the direct rays of the sun, and a higher temperature. From these causes, the shells produced in these countries have a lustre and brilliancy, which those of colder climates never possess.

128 Shells found in Asia.

The shores of Asia furnish us with the pearl-oysters and scallops in great perfection. About Amboyna are found the most beautiful specimens of the cabbage-shell, the arrosoir, the ducal mantle, and the coral-oysters, or echinated oysters. Here also are found a great variety of extremely beautiful mussels, tellinæ, and volutæ; some fine buccinums, and the shell called the *Ethiopian crown*, in its greatest perfection. The dolia, the murices, and the cassandræ, are also found on these coasts in great beauty. Many elegant snails and screw-shells are also brought from thence; and finally, the scorpion and spider shells. The Maldive and Philippine islands, Bengal, and the coast of Malabar, abound with the most elegant of all the species of snails, and furnish many other kinds of shells in great abundance and perfection. China abounds in the finest species of porcelain shells, and has also a great variety of beautiful snails. Japan furnishes us with all the thicker and larger bivalves; and the isle of Cyprus is famous above all other parts of the world for the beauty and variety of the patella or limpet found there.

129 In America.

America affords many very elegant shells, but neither in so great abundance nor beauty as the shores of Asia. Panama is famous for the cylinders or rhombi, and we have beside, from the same place, some good porcelains and a very fine species of *dolium*, or *concha globosa*, called from this place the *Panama purple shell*. One of the most beautiful of the cylinders is also known among our naturalists under the name of the *Panama shell*. About Brasil, and in the gulf of Mexico, there are found murices and dolia of extreme beauty; and also a great variety of porcelains, purpuræ, pectens, neritæ, bucardiæ or heart-shells, and elegant limpets. The isle of Cayenne affords one of the most beautiful of the buccinum kind, and the Midas ear is found principally about this place. Jamaica and the island of Barbadoes have their shores covered with porcelains, chamæ, and buccina; and at St Domingo there are found almost all the same species of shells that we have from the East Indies; only they are less beautiful, and the colours more pale and dead. The pearl-oyster is found also on this coast, but smaller than in the Persian gulf. At Martinico there are found in general the same shells as at St Domingo, bnt yet less beautiful. About Canada are found the violet chamæ; and the lakes of that country abound with muscles of very elegant pale blue and pale red colours. Some species of these are remarkably light and thin; others are very thick and heavy. The Great Bank of Newfoundland is very barren in shells; the principal kind found there are mussels of several species, some of which are of considerable beauty. About Carthagena there are many mother-of-pearl shells, but they are not of so brilliant colours as those of the Persian gulf. The island of Magellan, at the southern point of America, furnishes us with a very remarkable species of mussel called by its name; and several very elegant species of limpets are found there, particularly the pyramidal.

130 In Africa.

In Africa, on the coast of Guinea, there is a prodigious quantity of that small species of porcelain which is used there as money; and there is another species of porcelain on the same coast which is all over white: the women make bracelets of the latter, and the people of the Levant adorn their hair with them. The coast of Zanguebar is very rich in shells: we find there a vast variety of the large porcelains, many of them of great beauty; and the *nux maris* or sea-nut is very frequent there. Beside these, and many other shells, there are found on this coast all the species of nautili, many of which are very beautiful. The Canary isles abound with a vast variety of the murices, and some other good shells; and we have from Madeira great variety of the echini or sea-eggs, different from those of the European seas. Several species of mussels are also common there, and the sea-ears are nowhere more abundant. The Red sea is beyond all other parts of the world abundant in shells, scarcely any kind is wanting there; but what we principally have from thence are the purpuræ, porcelains, and echini marini.

131 In the Mediterranean.

The Mediterranean and Northern ocean contain a great variety of shells, and many of very remarkable elegance and beauty; they are upon the whole, however, greatly inferior to those of the East Indies. The Mediterranean abounds much more in shells than the ocean. The gulf of Tarentum affords great variety of purpuræ, of porcelains, nautili, and elegant oysters; the coasts of Naples and Sardinia afford also the same, and with them a vast number of the solens of all the known species. The island of Sicily is famous for a very elegant kind of oyster which is entirely white; pinnæ marinæ and porcelains are also found in great plenty there, with tellinæ and chamæ of many species, and a great variety of other beautiful shells. Corsica is famous, beyond all other places, for vast quantities of the pinnæ marinæ; and many other very beautiful shells are found there. About Syracuse are found the gondola shell, the alated murex, and a great variety of elegant snails, with some of the dolia and neritæ. The Adriatic sea, or gulf of Venice, is less furnished with shells than almost any of the seas thereabout. Mussels and oysters of several species are however found there, and some of the cordiform or heart shells; there are also some tellinæ. About Ancona there are vast numbers of the pholades buried in stone; and the sea-ears are particularly frequent about Puzzoli. (*Bonani Recreat. Ment. et Ocul*).

132 On the coast of France.

The ports of Marseilles, Toulon, and Antibes, are full of pinnæ marinæ, muscles, tellinæ, and chamæ. The coasts of Bretagne afford great numbers of the conchæ anatiferæ and pousse-pieds; they are found on old rotten boards, on sea substances, and among clusters of sponges. The other ports of France, as Rochelle, Dunkirk, Brest, St Maloes, and others, furnish oysters excellent for the table, but of the common kind, and of no beauty in their shells; great numbers of mussels are also found there; and the common tellinæ, the onion-peel oysters, the solens, and conchæ

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conchæ anatiferæ, are alſo frequent there. At Granville, in Lower Normandy, there are found very beautiful pectens, and ſome of the cordiform or heart-ſhells.

133 of Britain,

Our own Engliſh coaſts are not the leaſt fruitful in ſhells, though they do not produce ſuch elegantly painted ones as the Indies. About Plymouth are found oyſters, muſſels, and ſolens, in great abundance; and there, and on moſt of our ſhores, are numbers of the aures marinæ and dentalia, with pectens, which are excellent food; and many elegant ſpecies of the chamæ and tellinæ are fiſhed up in the ſea about Scarborough and other places. Ireland affords us great numbers of muſſels, and ſome very elegant ſcallop-ſhells in great abundance, and the pholades are frequent on moſt of our ſhores. We have alſo great variety of the buccina and cochleæ, ſome volutæ; and, on the Guernſay coaſt, a peculiarly beautiful ſnail, called thence the *Guernſey-ſnail.*

134 of Spain and Portugal, &c.

The coaſts of Spain and Portugal afford much the ſame ſpecies of ſhells with the Eaſt Indies, but they are of much fainter colours, and greatly inferior in beauty. There are, according to Tavernier and others, ſome rivers in Bavaria in which there are found pearls of a fine water. About Cadiz there are found very large pinnæ marinæ, and ſome fine buccina. The iſles of Majorca and Minorca afford great variety of extremely elegant ſhells. The pinnæ marinæ are alſo very numerous there, and their ſilk is wrought into gloves, ſtockings, and other things. The Baltic affords a great many beautiful ſpecies, but particularly an orange-coloured pecten, or ſcallop ſhell, which is not found in any other part of the world.

135 Freſh water ſhells.

The freſh-water ſhells are found much more frequently, and in much greater plenty than the ſea-kinds; there is ſcarce a pond, a ditch, or a river of freſh water in any part of the world, in which there are not found vaſt numbers of theſe ſhells with the fiſh living in them. All theſe ſhells are ſmall, and they are of very little beauty, being uſually of a plain grayiſh or browniſh colour. Our ditches afford us chamæ, buccina, neritæ, and ſome patellæ; but the Nile, and ſome other rivers, furniſhed the ancients with a ſpecies of tellina which was large and eatable, and ſo much ſuperior to the common ſea tellina in flavour, that it is commonly known by the name of *tellina regia*, "the royal tellina." We have a ſmall ſpecies of buccinum common in our freſh waters, which is very elegant, and always has its operculum in the manner of the larger buccina; a ſmall kind of muſſel is alſo very common, which is ſo extremely thin and tender, that it can hardly be handled without breaking to pieces. The large freſh-water muſſel, commonly called in England the *horſe-muſſel*, *mya margaritifera*, is too well known to need a deſcription; and the ſize ſufficiently diſtinguiſhes it from all other freſh-water ſhells.

SECT. II. *Of the Methods of Fiſhing and Collecting Shells.*

136 Land ſhells.

LAND ſhells are immediately within the reach of the hand of the collector, as well as many ſea and river ſhells, which inhabit ſhallow waters, or attach themſelves to rocks or marine plants on the ſhores of the ocean. Thoſe ſhells which are at moderate depths in the ſea, are to be collected by dredging. But in whatever way ſhells are found, thoſe are always to be preferred which ſtill contain the living animal; for then, not only ſome information may be obtained with regard to its ſtructure and natural hiſtory, but the ſhells themſelves are in all their natural beauty, and the full glow of their colours. Thoſe ſhells too ſhould be preferred, which are procured from the deeper parts of the ocean, becauſe they have then arrived at the largeſt ſize, and are in the greateſt perfection. But theſe are beyond the reach of man, and are only accidentally found on the ſhores after ſtorms, or attached to ſea-weeds which have been torn from the rocks by the agitation of the waves.

137 Sea ſhells.

138 Method of killing the animal.

When ſhells are found with the animal alive; the method recommended to deſtroy it and ſeparate it entirely from the ſhell, is to boil it in water for a very ſhort time, and after allowing it to cool gradually, to lay it in cold water till it is cleaned. By this proceſs, the attachment between the ſhell and animal is deſtroyed, and the latter, which has become hard and contracted, is eaſily picked out from its covering. The ſhell, after this treatment, is ready to be placed in the cabinet, or to be poliſhed in the way we ſhall preſently deſcribe, according to the ſtate in which it is found, or the views of the collector.

139 Pearl-fiſhery

As the pearl has been held in high eſtimation in all ages of the world, and as it is an important object of commerce in many parts of it, the hiſtory of the pearl fiſhery, or of thoſe ſhell fiſh which produce the pearl, cannot fail to be intereſting.

140 in Britain,

In different parts of Britain the pearl-fiſhery has been carried on to a conſiderable extent; and in ſome places it has been reckoned of ſuch value, that government have granted the right of fiſhing to individuals by patent. By a grant of this kind, Sir John Hawkins obtained the privilege of fiſhing for pearls in the river Irt in Cumberland; and Buchan of Auchmacoy ſeems to have held, by a ſimilar right, the ſole privilege of the pearl fiſhery near the mouth of the river Ythan in Aberdeenſhire; for it appears that this grant was reſumed by government in 1633, in the firſt parliament of Charles I. In the ſame river, at the diſtance of 10 miles from the ſea, a ſucceſsful fiſhery of pearls has been frequently carried on; and a few years ago, in the river Cluny in the ſame county, a Jew employed a number of people to collect the muſſels which contained them, and ſome large and valuable pearls were found. Some years ago, in the river Teath in Perthſhire, the pearls which were got brought about 100l. ſterling to thoſe employed in ſearching for them, in the courſe of one ſeaſon. It was obſerved, that thoſe muſſels only which were crooked and diſtorted, yielded pearls. The method which has been practiſed in this river for fiſhing the pearl muſſel, is the following. The fiſherman provides himſelf with an inſtrument formed of two iron plates or ſpoons, having ſomething of the ſhape of the muſſel. Each of theſe is attached to an elaſtic handle of the ſame metal, terminating in an open tube, which is fixed to the end of a long wooden handle. The concave ſides of the plates approach other, and are kept in cloſe contact by the elaſticity of the handles. With this inſtrument the fiſherman enters the water, and directs his courſe to thoſe places which he ſuppoſes are reſorted to by the muſ-ſels,

ſels. Theſe he diſcovers with his feet, and having found one, he preſſes the inſtrument upon it, the plates or valves of which, in conſequence of the elaſticity of the handles, ſeparate, and then graſp it firmly. In this way he can detach it from the place to which it adheres, and bring it to the ſurface of the water. The pearl-muſſel is a native of many other of the rivers of Scotland, as of the Eſk in Forfarſhire, where a pearl was found of the ſize of a piſtol bullet, and ſold for 4l. ſterling; of the Devon in Clackmannanſhire, the Clyde, and of Loch Ken in Galloway, where it is ſaid great numbers of pearls are fiſhed in dry ſummers, many of which ſell from one ſhilling to one guinea. But the greateſt pearl-fiſhery which has ever been eſtabliſhed in Scotland, of which there is any record, is that of the river Tay, about 30 years ago. The pearl-muſſel is found in every part of this river, from its ſource in Loch Tay, to its junction with the ſea. In different parts of the river, but particularly in the vicinity of Perth, we are informed, that not leſs than 11,000l. worth of pearls were ſent to London between the years 1761 and 1764. They were ſold from 10s. to 1l. 16s. per ounce. About this time one pearl was found which weighed 33 grs. This fiſhery, however, as well as the pearl-fiſhery in the other rivers of Scotland, ſeems to be greatly exhauſted, and very probably, as it has been ſuppoſed, from the improvident avarice of the undertakers, not allowing the animal to arrive at that age which ſeems to be neceſſary for the production of pearl.

But the pearl-fiſhery of the warmer climates, in different places of the Eaſt Indies, in the gulf of Perſia, and the Red ſea, and particularly that which is annually carried on in the bay of Condatchy, in the iſland of

141 in Ceylon. Ceylon, is by far the moſt extenſive and moſt important of any in the world. The latter, of which we have given a detailed account in the deſcription of CEYLON, and to which we refer our readers, has been under the inſpection of government ſince it fell into the hands of the Britiſh, as it was under that of the Portugueſe and Dutch, its former maſters. To the Dutch, it is ſaid, while they were in poſſeſſion of the iſland, this fiſhery brought an annual tribute of 20,000l. To the account which has been already given of this fiſhery, we may add the following, from the Aſiatic Annual Regiſter for the year 1800.

"The perſon who farmed the pearl-fiſhery at Ceylon, laſt year, was a Tamu merchant, who for the privilege of fiſhing with more than the uſual number of donies or boats, paid between two and three hundred thouſand Porto Novo pagodas (D), a ſum nearly double the uſual rent. His excellency the honourable Mr North, by the laſt ſhips from Ceylon, has tranſmitted a very minute detail of the fiſhery in all its ſtages, ſome of which are truly ſingular and remarkable. It appears that the fear of ſharks is the cauſe of a great deal of interruption to the fiſhery, the divers being extremely timid and ſuperſtitious; every one of them, even the moſt expert, entertain a dread of ſharks, and will not on any account deſcend until the conjuror has performed his ceremonies. This prejudice is ſo deeply rooted in their minds, that the government was obliged to keep two ſuch conjurors in their pay, to remove the fears of the divers. The manner of enchanting conſiſts of a number of prayers learned by heart, that nobody, probably not even the conjuror himſelf, underſtands, which he, ſtanding on the ſhore, continues muttering and grumbling from ſunriſe until the boats return. During this period, they are obliged to abſtain from food and ſleep, otherwiſe their prayers would be of no avail; they are, however, allowed to drink, which privilege they indulge in a high degree, and are frequently ſo giddy as to be rendered very unfit for devotion. Some of theſe conjurors accompany the divers in their boats, which pleaſes them very much, as they have their protectors near at hand. Nevertheleſs, I was told, ſaid Mr North, that in one of the preceding fiſheries, a diver loſt his leg by a ſhark; and when the head conjuror was called to an account for the accident, he replied, that an old witch had juſt come from the coaſt, who, from envy and malice, had cauſed this diſaſter by a counter-conjuration, which made fruitleſs his ſkill, and which he was informed of too late; but he afterwards ſhewed his ſuperiority, by enchanting the ſharks ſo effectually, that, though they appeared to moſt of the divers, they were unable to open their mouths. During my ſtay, continues Mr North, at Condatchy, no accident of this kind happened. If a ſhark is ſeen, the divers inſtantly make a ſignal, which on perceiving all the boats return immediately. A diver who trod upon a hammer oyſter, and was ſomewhat wounded, thought he was bit by a ſhark; conſequently made the uſual ſignal, which cauſed all the boats to return; for which miſtake he was afterwards puniſhed. The largeſt and moſt perfect pearl taken laſt ſeaſon, was about the ſize of a ſmall piſtol bullet."

SECT. III. *Of the Methods of Poliſhing Shells.*

THE art of poliſhing ſhells has but lately reached its preſent ſtate of perfection; and as the admiration of ſea ſhells has become ſo general, it may be expected that we ſhould give ſome inſtructions in the means of adding to their natural beauty. 142 Methods employed.

Among the immenſe variety of ſhells with which we are acquainted, ſome are taken up out of the ſea, or found on its ſhores, in all their perfection and beauty; their colours being all diſpoſed by nature upon the ſurface, and their natural poliſh ſuperior to any thing that art could give. Where nature is in herſelf thus perfect, it were madneſs to attempt to add any thing to her charms: but in others, where the beauties are latent and covered with a coarſer outer ſkin, art is to be called in; and the outer veil being taken off, all the internal beauties appear.

Among the ſhells which are found naturally poliſhed are the porcelains, or cowries; the caſſanders; the dolia, or conchæ globoſæ, or tuns; ſome buccina, the volutes and the cylinders, or olives, or, as they are generally though improperly called, the *rhombi;* excepting only two or three, as the tiara, the plumb, and the butter-tub

(D) Perhaps near 100,000l. ſterling. The pagoda is from 7s. to 8s. 6d. ſterling.

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butter-tub rhombus, where there is an unpromifing film on the furface, hiding a very great fhare of beauty within. Though the generality of the fhells of thefe genera are taken out of the fea in all their beauty, and in their utmoft natural polifh, there are feveral other genera, in which all or moft of the fpecies are taken up naturally rough and foul, and covered with an epidermis, or coarfe outer fkin, which is in many rough and downy or hairy. The tellinæ, the muffels, the cochleæ, and many others, are of this kind. The more nice collectors, as naturalifts, infift upon having all their fhells in their native and genuine appearance, as they are found when living at fea; but others who make collections, hate the difagreeable outfides, and will have all fuch polifhed. It would be very advifable, however, for both kinds of collectors to have the fame fhells in different fpecimens both rough and polifhed: the naturalift would by this means, befides knowing the outfide of the fhell, be better acquainted with its internal characters than he otherwife could be; while thofe who wifh to have them polifhed, might compare the beauties of the fhell, in its wrought ftate, to its coarfe appearance as nature gives it. How many elegancies in this part of the creation muft be wholly loft to us, if it were not for the affiftance of an art of this kind! Many fhells in their native ftate are like rough diamonds; and we can form no juft idea of their beauties till they have been polifhed and wrought into form.

Though the art of polifhing fhells is a very valuable one, yet it is very dangerous to the fhells; for without the utmoft care, the means ufed to polifh and beautify a fhell often wholly deftroy it. When a fhell is to be polifhed, the firft thing to be examined, is whether it have naturally a fmooth furface, or be covered with tubercles and prominences.

143 With leather.

A fhell which has a fmooth furface, and a natural dull polifh, need only be rubbed with the hand, or with a piece of chamoy leather, with fome tripoli, or fine rotten ftone, and it will become of a perfectly bright and fine polifh. Emery is not to be ufed on this occafion, becaufe it wears away too much of the fhell. This operation requires the hand of an experienced perfon, that knows how fuperficial the work muft be, and where he is to ftop; for in many of thefe fhells the lines are only on the furface, and the wearing away ever fo little of the fhell defaces them. A fhell that is rough, foul, and crufty, or covered with a tartareous coat, muft be left a whole day fteeping in hot water: when it has imbibed a large quantity of this, it is to be rubbed with rough emery on a ftick, or with the blade of a knife, in order to get off the coat. After this, it may be dipped in diluted aquafortis, fpirit of falt, or any other acid; and after remaining a few moments in it, be again plunged into common water. This will add greatly to the fpeed of the work. After this it is to be well rubbed with linen cloths, impregnated with common foap; and when by thefe feveral means it is made perfectly clean, the polifhing is to be finifhed with fine emery and a hair-brufh. If after this the fhell when dry appears not to have fo good a polifh as was defired, it muft be rubbed over with a folution of gum arabic; and this will add greatly to its glofs, without doing it the fmalleft injury. The gum-water muft not be too thick, and then it gives no fenfible coat, only heightening the colours. The white of an egg anfwers this purpofe alfo very well; but it is fubject to turn yellow. If the fhell has an epidermis, which will by no means admit the polifhing of it, it is to be dipped feveral times in diluted aquafortis, that this may be eaten off; and then the fhell is to be polifhed in the ufual way with putty, fine emery, or tripoli, on the hair of a fine brufh. When it is only a pellicle that hides the colours, the fhells muft be fteeped in hot water, and after that the fkin worked off by degrees with an old file. This is the cafe with feveral of the cylinders, which have not the natural polifh of the reft.

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When a fhell is covered with a thick and fatty epidermis, as is the cafe with feveral of the muffels and tellinæ; in this cafe aquafortis will do no fervice, as it will not touch the fkin: then a rough brufh and coarfe emery are to be ufed; and if this does not fucceed, feal-fkin, or, as the workmen call it, *fifh-fkin* and *pumice-ftone*, are to be employed. 144 With pumice-ftone.

When a fhell has a thick cruft, which will not give way to any of thefe means, the only way left is to plunge it feveral times into ftrong aquafortis, till the ftubborn cruft is wholly eroded. The limpets, auris marina, the helmet-fhells, and feveral other fpecies of this kind, muft have this fort of management; but as the defign is to fhow the hidden beauties under the cruft, and not to deftroy the natural beauty and polifh of the infide of the fhell, the aquafortis muft be ufed in this manner: A long piece of wax muft be provided, and one end of it made perfectly to cover the whole mouth of the fhell; the other end will then ferve as a handle, and the mouth being ftopped by the wax, the liquor cannot get in to the infide to fpoil it; then there muft be placed on a table a veffel full of aquafortis, and another full of common water.

The fhell is to be plunged into the aquafortis; and after remaining a few minutes in it, is to be taken out, and plunged into the common water. The progrefs the aquafortis makes in eroding the furface is thus to be carefully obferved every time it is taken out: the point of the fhell, and any other tender parts, are to be covered with wax, to prevent the aquafortis from eating them away; and if there be any wormholes, they alfo muft be ftopped up with wax, otherwife the aquafortis would foon eat through in thofe places. When the repeated dippings into the aquafortis fhow that the coat is fufficiently eaten away, then the fhell is to be wrought carefully with fine emery and a brufh; and when it is polifhed as high as can be by this means, it muft be wiped clean, and rubbed over with gum-water or the white of an egg. In this fort of work the operator muft always have the caution to wear gloves; otherwife the leaft touch of the aquafortis will burn the fingers, and turn them yellow; and often, if it be not regarded, will eat off the fkin and the nails. 145 With acids, &c.

Thefe are the methods to be ufed with fhells which require but a moderate quantity of the furface to be taken off; but there are others which require to have a larger quantity removed, and to be uncovered deeper: this is called entirely fcaling a fhell. This is done by means of a horizontal wheel of lead or tin, impregnated with rough emery; and the fhell is wrought down in the fame manner in which ftones are wrought by the lapidary. Nothing is more difficult, however, than the performing

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performing this work with nicety: very often ſhells are cut down too far by it, and wholly ſpoiled; and to avoid this, a coarſe vein muſt be often left ſtanding in ſome place, and taken down afterwards with the file, when the cutting it down at the wheel would have ſpoiled the adjacent parts.

After the ſhell is thus cut down to a proper degree, it is to be poliſhed with fine emery, tripoli, or rotten ſtone, with a wooden wheel turned by the ſame machine as the leaden one, or by the common method of working with the hand with the ſame ingredients. When a ſhell is full of tubercles, or protuberances, which muſt be preſerved, it is then impoſſible to uſe the wheel: and if the common way of dipping into aquafortis be attempted, the tubercles being harder than the reſt of the ſhell, will be corroded before the reſt is ſufficiently ſcaled, and the ſhell will be ſpoiled. In this caſe, induſtry and patience are the only means of effecting a poliſh. A camels-hair pencil muſt be dipped in aquafortis; and with this the intermediate parts of the ſhell muſt be wetted, leaving the protuberances dry: this is to be often repeated; and after a few moments the ſhell is always to be plunged into water to ſtop the eroſion of the acid, which would otherwiſe eat too deep, and deſtroy the beauty of the ſhell. When this has ſufficiently taken off the foulneſs of the ſhell, it is to be poliſhed with emery of the fineſt kind, or with tripoli, by means of a ſmall ſtick; or the common poliſhing-ſtone uſed by the goldſmiths may be uſed.

This is a very tedious and troubleſome thing, eſpecially when the echinated oyſters and murices, and ſome other ſuch ſhells, are to be wrought: and what is worſt of all is, that when all this labour has been employed, the buſineſs is not well done; for there ſtill remain ſeveral places which could not be reached by any inſtrument, ſo that the ſhell muſt neceſſarily be rubbed over with gum-water or the white of an egg afterwards, in order to bring out the colours and give a gloſs; in ſome caſes it is even neceſſary to give a coat of varniſh.

146 Some ſhells are diſguiſed by poliſhing, ſuch as

Theſe are the means uſed by artiſts to brighten the colours and add to the beauty of ſhells; and the changes produced by poliſhing in this manner are ſo great, that the ſhell can ſcarcely be known afterwards to be the ſame it was; and hence we hear of new ſhells in the cabinets of collectors, which have no real exiſtence as ſeparate ſpecies, but are ſhells well known, diſguiſed by poliſhing. To caution the reader againſt errors of this kind, it may be proper to add the moſt remarkable ſpecies thus uſually altered.

147 The onyx-ſhell.

The onyx-ſhell or volute, called the *purple* or *violet-tip*, which in its natural ſtate is of a ſimple pale brown, when it is wrought ſlightly, or poliſhed with juſt the ſuperficies taken off, is of a fine bright yellow; and when it is eaten away deeper, it appears of a fine milk-white, with the lower part bluiſh: it is in this ſtate that it is called the *onyx ſhell;* and it is preſerved in many cabinets in its rough ſtate, and in its yellow appearance, as different ſpecies of ſhells.

148 Violet ſhells,

The *violet ſhells* ſo common among the curious, is a ſpecies of porcelain, or common cowry, which does not appear in that elegance till it has been poliſhed; and the common ſea-ear ſhows itſelf in two or three different forms, as it is more or leſs deeply wrought. In its rough ſtate it is duſky and coarſe, of a pale brown on the outſide, and pearly within; when it is eaten down a little way below the ſurface, it ſhows variegations of black and green; and when ſtill farther eroded, it appears of a fine pearly hue within and without.

149 Nautilus,

The *nautilus*, when it is poliſhed down, appears all over of a fine pearly colour; but when it is eaten away but to a ſmall depth, it appears of a fine yellowiſh colour with duſky hairs. The burgau, when entirely cleared of its coat, is of the moſt beautiful pearl colour: but when ſlightly eroded, it appears of a variegated mixture of green and red; whence it has been called the *parroquet ſhell.* The common helmet-ſhell, when wrought, is of the colour of the fineſt agate; and the muſſels, in general, though very plain ſhells in their common appearance, become very beautiful when poliſhed, and ſhow large veins of the moſt elegant colours. The Perſian ſhell, in its natural ſtate, is all over white, and covered with tubercles; but when it has been ground down on a wheel, and poliſhed, it appears of a gray colour, with ſpots and veins of a very bright and highly poliſhed white. The limpets, in general, become very different when poliſhed, moſt of them ſhowing very elegant colours; among theſe the tortoiſe-ſhell limpet is the principal; it does not appear at all of that colour or tranſparence till it has been wrought.

150 Jonquil-chama,

That elegant ſpecies of ſhell called the *jonquil-chama*, which has deceived ſo many judges of theſe things into an opinion of its being a new ſpecies, is only a white chama with a reticulated ſurface; but when this is poliſhed, it loſes at once its reticular work and its colour, and becomes perfectly ſmooth, and of a fine bright yellow. The violet-coloured chama of New England, when worked down and poliſhed, is of a fine milk-white, with a great number of blue veins, diſpoſed like the variegations in agates.

151 The aſſes-ear ſhell.

The *aſſes-ear ſhell*, when poliſhed after working it down with the file, becomes extremely gloſſy, and obtains a fine roſe-colour all about the mouth. Theſe are ſome of the moſt frequent among an endleſs variety of changes wrought on ſhells by poliſhing; and we find there are many of the very greateſt beauties of this part of the creation which muſt have been loſt but for this method of ſearching deep in the ſubſtance of the ſhell for them.

152 Dutch method of poliſhing ſhells.

The Dutch are very fond of ſhells, and are very nice in their manner of working them; they are under no reſtraint, however, in their works; but uſe the moſt violent methods, ſo as often to deſtroy all the beauty of the ſhell. They file them down on all ſides, and often take them to the wheel, when it muſt deſtroy the very characters of the ſpecies. Nor do they ſtop here: but determined to have beauty at any rate, they are for improving upon nature, and frequently add ſome lines and colours with a pencil, afterwards covering them with a fine coat of varniſh, ſo that they ſeem the natural lineations of the ſhell: the Dutch cabinets are by theſe means made very beautiful, but they are by no means to be regarded as inſtructors in natural hiſtory. There are ſome artificers of this nation who have a way of covering ſhells all over with a different tinge from that which nature gives them; and the curious are often enticed by theſe tricks to purchaſe them for new ſpecies.

There

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There is another kind of work beſtowed on certain ſpecies of ſhells, particularly the nautilus; namely, the engraving on it lines and circles, and figures of ſtars, and other things. This is too obvious a work of art to ſuffer any one to ſuppoſe it natural. Buonani has figured ſeveral of theſe wrought ſhells at the end of his work; but this was applying his labour to very little purpoſe; the ſhells are ſpoiled as objects of natural hiſtory by it.—They are principally done in the Eaſt Indies.

153 Imperfections of ſhells natural and accidental.

Shells are ſubject to ſeveral imperfections; ſome of which are natural and others accidental. The natural defects are the effect of age, or ſickneſs in the fiſh. The greateſt miſchief happens to ſhells by the fiſh dying in them. The curious in theſe things pretend to be always able to diſtinguiſh a ſhell taken up with the fiſh alive from one found on the ſhores: they call the firſt a *living*, the ſecond a *dead* ſhell; and ſay that the colours are always much fainter in the dead ſhells. When the ſhells have lain long dead on the ſhores, they are ſubject to many injuries, of which the being eaten by ſea-worms is not the leaſt: age renders the fineſt ſhells livid or dead in their colours.

Beſides the imperfections ariſing from age and ſickneſs in the fiſh, ſhells are ſubject to other deformities, ſuch as morbid cavities, or protuberances, in parts where there ſhould be none. When the ſhell is valuable, theſe faults may be hid, and much added to the beauty of the ſpecimen, without at all injuring it as an object of natural hiſtory, which ſhould always be the great end of collecting theſe things. The cavities may be filled up with maſtic, diſſolved in ſpirit of wine, or with iſinglaſs: theſe ſubſtances muſt be either coloured to the tinge of the ſhell, or elſe a pencil dipped in water-colours muſt finiſh them up to the reſemblance of the reſt; and then the whole ſhell being rubbed over with gum-water, or with the white of an egg, ſcarce any eye can perceive the artifice: the ſame ſubſtances may alſo be uſed to repair the battered edge of a ſhell, provided the pieces chipped off be not too large. And when the excreſcences of a ſhell are faulty, they are to be taken down with a fine file. If the lip of a ſhell be ſo battered that it will not admit of repairing by any cement, the whole muſt be filed down or ground on the wheel till it become even.

EXPLANATION OF PLATES.

Plate CLII. Animals inhabiting Shells.

Fig. 1. *Chiton aculeatus.* Under part ſhewing the briſtly fringe.

Fig. 2. Animal inhabiting *Lepas tintinnabulum.*

Fig. 3. *Lepas balanus.*

Fig. 4. *Lepas anatifera.*

Fig. 5. Animal inhabiting the genus *Pholas.*

Fig. 6. Animal inhabiting the *Mya.*

Fig. 7. Animal inhabiting the *Solen.*

Fig. 8. Animal of the *Tellina.*

Fig. 9. Animal of the *Cardium.*

Fig. 10. Animal of the *Mactra.*

Fig. 11. Animal inhabiting the *Donax.*

Fig. 12. Animal inhabiting the *Venus.*

Fig. 13. Animal of the *Oſtrea.*

Fig. 14. *Chiton aculeatus.* Shell with 8 valves; *a*, *a*, the valves longitudinally arranged, and incumbent on the back; *b*, *b*, the rounded ſides.

Fig. 15. *Lepas anatifera.* Shell having 5 valves; *a*, the larger valves nearly quadrangular; *b*, the leſſer valves nearly triangular, at the apex of the ſhell; *c*, the ſolitary valve, rounded, acute.

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Plate CLIII.

Fig. 17. *Mya margaritifera*, the pearl-bearing muſſel.

Fig. 18. *Solen radiatus*, radiated ſolen.

Fig. 19. *Tellina radiata*, radiated tellina.

Fig. 20. *Cardium cardiſſa*, Venus heart cockle; *a*, *a*, beaks approaching to each other.

Fig. 21. *Mactra ſtultorum*, ſimple mactra.

Fig. 22. *Donax denticulata*, denticulated donax.

Fig. 23. *Venus fimbriata*, bordered Venus ſhell.

Fig. 24. *Spondylus gædaropus*, ſtilt ſpondylus.

Fig. 25. *Chama gigas*, giant chama, or gaping cockle.—This is the largeſt ſhell known.

Plate CLIV.

Fig. 26. *Arca Noæ*, Noah's ark.

Fig. 27. *Oſtrea pallium*, the ducal-mantle pecten.

Fig. 28. *Anomia ephippium.*

Fig. 29. *Mytilus margaritiferus*, pearl-bearing muſſel, or pearl-oyſter of the Eaſt Indies.

Fig. 30. *Pinna muricata*, muricated ſea-wing.

Fig. 31. *Argonauta argo*, paper nautilus; *a*, *a*, the ſhell; *b*, *b*, *b*, *b*, *b*, the animal protruded from the ſhell as it moves on the ſurface of the water.

Plate CLV.

Fig. 32. *Nautilus beccarii*, chambered nautilus. A ſection of the ſhell; *a*, *a*, *a*, the genicula; *b*, *b*, *b*, the articulations; *d*, *d*, the lateral ſyphon.

Fig. 33. *Cypræa lynx*; *a*, *a*, the lips turned in and toothed; *b*, the linear aperture.

Fig. 34. *Cypræa moneta*, cowrie; *a*, *a*, knobbed margin; *b*, back gibbous; *e*, *e*, prominences inſtead of a ſpire.

Fig. 35. *Bulla ampullacea*; *a*, back without ſpire; *b*, vertex umbilicated.

Fig. 36. *Voluta muſica*; *a*, venter, marked with interrupted lines; *b*, baſe emarginated; *c*, *c*, wreaths crowned at the ſutures with obtuſe ſpines; *d*, *d*, columella or pillar, plaited; *e*, *e*, outer lip, ſmooth.

Fig. 37. *Buccinum harpa*, muſical harp-ſhell; *a*, dilated venter; *b*, *b*, *b*, longitudinal varices, crowned with *c*, *c*, *c*, ſharp ſpines.

Fig. 38. *Buccinum undatum.*

Fig. 39. *Strombus ſcorpio*, ſcorpion ſtrombus; *a*, *a*, *a*, back with knobby cingula and waved ſtriæ; *b*, ſpire conical; *c*, *c*, elevated ſutures; *d*, *d*, waved margin of the lip; *e*, *e*, caudal digitus; *f*, *f*, lateral digiti.

Fig. 40.

Explanation of the Plates.

Fig. 40. *Murex tribulus*, thorny woodcock.

Fig. 41. *Trochus telefcopium*, telefcope-top fhell; *a*, the bafe; *b*, pillar projecting, fpiral; *c*, outer lip dilated.

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Fig. 43. *Helix lufitanica*; *a*, umbilicus; *b*, *b*, *b*, round venter; *c*, clofed, femilunar aperture.

Fig. 44. *Helix decollata*.

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Fig. 46. *Haliotis varia*; *a*, *a*, ribs acute, and ftriated crofswife; *b*, lateral fpire, with its margin dentated.

Fig. 47. *Patella faccharina*; *a*, *a*, feven ridged acute ribs; *b*, obtufe vertex.

Fig. 48. *Dentalium arcuatum*, arched tooth-fhell.

Fig. 49. *Serpula glomerata*.

Fig. 50. *Teredo navalis*, fhip-worm.

Fig. 51. *Sabella alveolata*.

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Land

A. Bell Prin. Wal. Sculptor fecit.

A. Bell Prin. Wal. Sculptor, fecit.

Fig. 27.

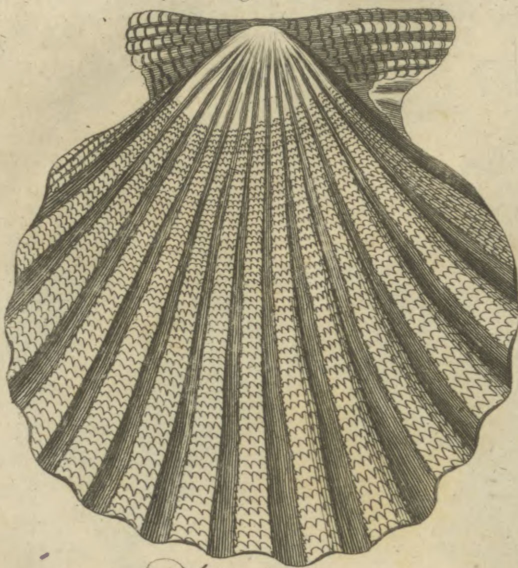

Fig. 28.

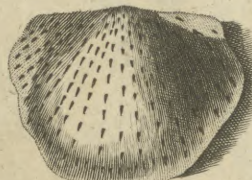

Fig. 26.

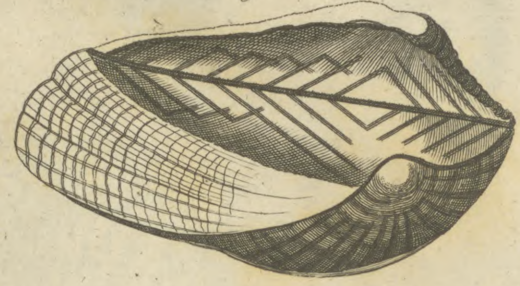

Fig. 29.

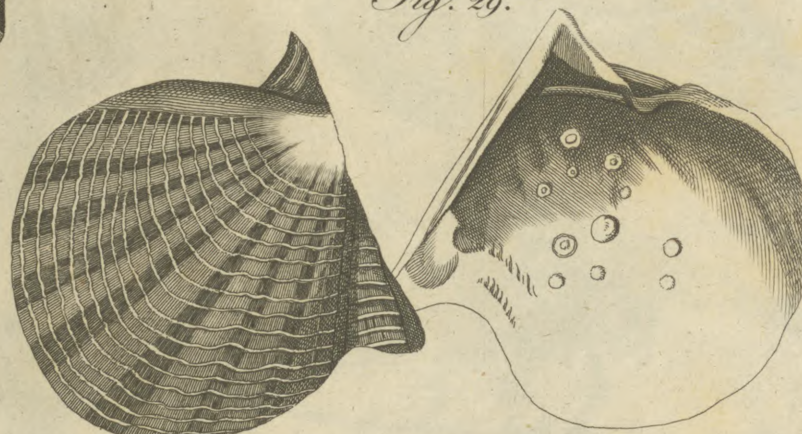

Fig. 30.

Fig. 31.

Paper Nautilus.

A.Bell Prin. Wal. Sculptor fecit.

A. Bell Prin. Wal. Sculptor fecit.

CONCHYLIA,

CONCHYLIA, a general name for all petrified shells, as limpets, cochleæ, nautili, conchæ, lepades, &c.

CONCIATOR, in the glass art, is, for the crystal-glass, what the founder is at the green-glass houses. He is the person that weighs and proportions the salt on ashes and sand, and works them with a strong fire till they run into lumps and become white; and if the metal be too hard, and consequently brittle, he adds salt or ashes, and if too soft, sand; still mixing them to a fit temper, which is only known by the working.

CONCINNOUS INTERVALS, in *Music*, are such as are fit for music, next to, and in combination with, concords; being neither very agreeable nor disagreeable in themselves; but having a good effect, as by their opposition they heighten the more essential principles of pleasure: or as, by their mixture and combination with them, they produce a variety necessary to our being better pleased.

Concinnous System, in *Music*. A system is said to be concinnous, or divided concinnously, when its parts, considered as simple intervals, are concinnous; and are besides placed in such an order between the extremes, as that the succession of sounds, from one extreme to the other, may have an agreeable effect.

CONCLAMATIO, in antiquity, a shout raised by those present at burning the dead, before they set fire to the funeral pile. See SHOUT. The word was also applied to the signal given to the Roman soldiers to decamp, whence the expression *conclamare vasa;* and *conclamare arma*, was a signal for battle. It was likewise used for a practice of calling to a person deceased three times by his name; and when no reply was returned, they thus expressed his decease, *conclamatum est*. Whence the same term was afterwards applied to the cessation of the Roman empire.

CONCLAVE, the place in which the cardinals of the Romish church meet, and are shut up, in order to the election of a pope.

The conclave is a range of small cells, 10 feet square, made of wainscot: these are numbered, and drawn for by lot. They stand in a line along the galleries and hall of the Vatican, with a small space between each. Every cell has the arms of the cardinal over it. The conclave is not fixed to any one determinate place, for the constitutions of the church allow the cardinals to make choice of such a place for the conclave as they think most convenient; yet it is generally held in the Vatican.

The conclave is very strictly guarded by troops; neither the cardinals, nor any person shut up in the conclave, are spoken to, but at the hours allowed of, and then in Italian or Latin: even the provisions for the conclave are examined, that no letters be conveyed by that means from the ministers of foreign powers, or other persons who may have an interest in the election of the pontiff.

CONCLAVE is also used for the assembly, or meeting, of the cardinals shut up for the election of a pope.

CONCLUSION, in *Logic*, the consequences or judgment drawn from what was asserted in the premises; or the previous judgments in reasoning, gained from combining the extreme ideas between themselves.

CONCOCTION, in *Medicine*, the change which the food undergoes in the stomach, &c. to become chyle. See CHYLE.

CONCOMITANT, something that accompanies or goes along with another.

CONCORD, in *Grammar*, that part of construction called *syntax*, in which the words of a sentence agree; that is, in which nouns are put in the same gender, number, and case; and verbs in the same number and person with nouns and pronouns. See GRAMMAR.

CONCORD, in *Music*, the relation of two sounds that are always agreeable to the ear, whether applied in succession or consonance.

Form of CONCORD, in ecclesiastical history, a standard-book among the Lutherans composed at Torgaw, in 1576, and thence called the book of Torgaw, and reviewed at Berg by six Lutheran doctors of Germany, the principal of whom was James Andreæ. This book contains in two parts, a system of doctrine, the subscription of which was a condition of communion, and a formal and very severe condemnation of all who differed from the compilers of it, particularly with respect to the majesty and omnipresence of Christ's body, and the real manducation of his flesh and blood in the eucharist. It was first imposed on the Saxons by Augustus, and occasioned great opposition and disturbance. The dispute about it was revived in Switzerland in 1718, when the magistrates of Bern published an order for adopting it as the rule of faith; the consequence of which was a contest, that reduced its credit and authority.

CONCORDANCE, a dictionary or index to the Bible, wherein all the leading words, used in the course of the inspired writings, are ranged alphabetically; and the various places where they occur referred to; to assist in finding out passages, and comparing the several significations of the same word.

Cardinal Hugo de St Charo, is said to have employed 500 monks at the same time in compiling a Latin concordance; besides which, we have several other concordances in the same language; one, in particular, called the *concordance* of England, compiled by J. Darlington, of the order of Predicants; another more accurate one, by the Jesuit de Zamora.

R. Mordecai Nathan has furnished us with a Hebrew concordance, first printed at Venice in 1523, containing all the Hebrew roots branched into their various significations, and under each signification all the places in scripture wherein it occurs: but the best and most useful Hebrew concordance is that of Buxtorf, printed at Basil in 1632.

Dr Taylor published, in 1754, a Hebrew concordance in two volumes folio, adapted to the English Bible, and disposed after the manner of Buxtorf.

The Greek concordances are only for the New Testament: indeed we have one of Conr. Kircher's on the Old; but this is rather a concordantial dictionary than a concordance; containing all the Hebrew words in an alphabetical order; and underneath all the interpretations or senses the LXX. give them; and in each interpretation, all the places where they occur in that version.

In 1718, Trommius published his Greek concordance for the Septuagint at Amsterdam, in two volumes folio;

folio; and Schmidius improving on a similar work of H. Stephen, has given an excellent Greek concordance for the New Testament, the best edition of which is that of Leipsic, an. 1717.

Calasius, an Italian Cordelier, has given us concordances of the Hebrew, Latin, and Greek, in two columns: the first, which is Hebrew, is that of R. Mordecai Nathan, word for word, and according to the order of the books and chapters: in the other column is a Latin interpretation of each passage of scripture quoted by R. Mordecai; this interpretation is Calasius's own; but in the margin he adds that of the LXX. and the Vulgate, when different from his. The work is in 4 vols folio, printed at Rome in 1621.

We have several very copious concordances in English, as Newmann's, &c. but the last and best esteemed is that in 4to by Alex. Cruden.

CONCORDANT VERSES, such as have several words in common; but which, by the addition of other words, convey an opposite, at least a different meaning. Such are those.

$$Et \left\{ \begin{matrix} \textit{nis} \\ \textit{lupus} \end{matrix} \right\} \textit{ in silva } \left\{ \begin{matrix} \textit{venatur} \\ \textit{nutritur} \end{matrix} \right\} \textit{ et omnia } \left\{ \begin{matrix} \textit{servat.} \\ \textit{vastat.} \end{matrix} \right.$$

CONCORDAT, in the canon law, denotes a covenant or agreement concerning some beneficiary matter, as a resignation, permutation, promotion, or the like.

The council of Trent, sess. vi. *de reform.* cap. 4. speaking of concordats made without the authority and approbation of the pope, calls them *concordias quæ tantum suos obligant auctores, non successores.* And the congregation of cardinals, who have explained this decree, declares also that a concordat cannot be valid so as to bind successors, unless confirmed by the pope.

CONCORDAT is also used, absolutely, among the French, for an agreement concluded at Bologna in 1516, between Pope Leo X. and Francis I. of France, for regulating the manner of nominating to benefices.

The concordat serves in lieu of the pragmatic sanction, which has been abrogated; or, rather, it is the pragmatic sanction softened and reformed. The concordat between the pope and the republic of Venice resembles the former.

There is also a German concordat, made between the emperor Frederic III. and the princes of Germany, in 1448, relating to beneficiary matters, confirmed by Pope Nicholas V.

CONCORDIA, a town of Italy, in the duchy of Mirandola; seated on the river Sechia, 5 miles west of Mirandola, and 15 miles south-east of Mantua; subject to the house of Austria. E. Long. 11. 13. N. Lat. 44. 52.

CONCORDIA, in *Ancient Geography*, a town of the Veneti, situated at the confluence of the rivers Romatinus Major and Minor, 31 miles to the west of Aquileia, (Pliny, Ptolemy, Antonine); a colony surnamed *Julia.* Its ruins still go by the name of *Concordia.*—Another Concordia (Ptolemy), of Lusitania, to the north-west of Trajan's bridge, on the Tagus.—A third of the Nemetes in Belgica, on the west side of the Rhine; a Roman fortress, situated between Brocomagus and Noviomagus. Now Drusenheim, in Alsace. E. Long. 8. N. Lat. 48. 40.

CONCORDIA, a Pagan divinity of the Romans. She had a temple on the declivity of the Capitol; another in the Portico of Livia; and a third on Mount Palatine, built of brass by Cn. Flavius, on account of a vow made for reconciling the senate and people. She was pictured with a cup in her right hand; in her left was sometimes a sceptre, and sometimes a *cornucopia.* Her symbols were two hands joined, as is seen in a coin of Aurelius Venus, and another of Nero; also two serpents twisting about a caduceus. She was addressed to promote the peace and union of families and citizens.

CONCOU, in *Botany*, a name given by the people of Guinea to an herb, which is in great esteem among them for killing that troublesome sort of worm called the *Guinea-worm*, that breeds in their flesh. They bruise the leaves, and mixing them with oil apply them in form of a cataplasm.

CONCRETE, in the school-philosophy, an assemblage or compound.

CONCRETE, in *Natural Philosophy* and *Chemistry*, signifies a body made up of different principles, or any mixed body: thus, soap is a factitious concrete, mixed together by art; and antimony is a natural concrete, or a mixed body compounded in the bowels of the earth.

CONCRETION, the uniting several small particles of a natural body into sensible masses or concretes, whereby it becomes so and so figured and determined, and is endued with such and such properties.

CONCRETION is also the act whereby soft bodies are rendered hard; or an insensible motion of the particles of a fluid or soft body, whereby they come to a consistence. It is indifferently used for induration, condensation, congelation, and coagulation.

CONCUBINAGE sometimes expresses a criminal or prohibited commerce between the two sexes; in which sense it comprehends adultery, incest, and simple fornication.

In its more restrained sense, concubinage is used for a man's and a woman's cohabiting together in the way of marriage, without having passed the ceremony thereof.

Concubinage was anciently tolerated: the Roman law calls it an allowed custom, *licita consuetudo.* When this expression occurs in the constitutions of the Christian emperors, it signifies what we now call a *marriage in conscience.*

The concubinage tolerated among the Romans in the time of the republic, and of the heathen emperors, was that between persons not capable of contracting marriage together; nor did they even refuse to let inheritances descend to children which sprung from such a tolerated cohabitance. Concubinage between such persons they looked on as a kind of marriage, and even allowed it several privileges; but then this concubinage was confined to a single person, and was of perpetual obligation as much as marriage itself. Hottoman observes, that the Roman laws had allowed of concubinage long before Julius Cæsar made that law whereby every one was allowed to marry as many wives as he pleased. The emperor Valentinian, Socrates tell us, allowed every man two.

CONCUBINAGE is also used for a marriage performed with less solemnity than the formal marriage: or a marriage with a woman of inferior condition, and to whom the husband does not convey his rank or quality. Cujas observes, that the ancient laws allowed a man to espouse, under the title of *concubine*, certain persons, such as were esteemed unequal him, on account of the want of some qualities requisite to sustain the full honour of marriage. He adds, that though concubinage was beneath marriage, both as to dignity and civil effects; yet was concubine a reputable title, very different from that of mistress among us. The commerce was esteemed so lawful, that the concubine might be accused of adultery in the same manner as a wife.

This kind of concubinage is still in use in some countries, particularly in Germany, under the title of a *half-marriage*, *morgengabic marriage* or *marriage with the left-hand;* alluding to the manner of its being contracted, viz. by the man's giving the woman his left hand instead of the right. This is a real marriage, though without solemnity: the parties are both bound for ever; though the woman be thus excluded from the common rights of a wife for want of quality or fortune.

The children of concubines were not reputed either legitimate or bastards, but natural children, and were capable only of donations. They were deemed to retain the low rank of the mother; and were on this ground unqualified for inheriting the effects of the father.

Concubinage, in a legal sense, is used as an exception against her that sueth for dower, alleging thereby, that she was not a wife lawfully married to the party, in whose lands she seeks to be endowed, but his concubine.

CONCUBINE, a woman whom a person takes to cohabit with him, in the manner, and under the character, of a wife, without being authorised thereto by a legal marriage.

Concubine is also used for a real, legitimate, and only wife, distinguished by no other circumstance but a disparity of birth or condition between her and the husband. Du Cange observes, that one may gather from several passages in the epistles of the popes, that they anciently allowed of such concubines. The seventeenth canon of the first council of Toledo declares, that he who, with a faithful wife, keeps a concubine, is excommunicated; but that if the concubine served him as a wife, so that he had only one woman, under the title of concubine, he should not be rejected from communion: which shows that there were legitimate wives under the title of concubines.

In effect, the Roman laws did not allow a man to espouse whom he pleased; there was required a kind of parity, or proportion, between the conditions of the contracting parties: but a woman of inferior condition, who could not be espoused as a wife, might be kept as a concubine; and the laws allowed of it, provided the man had no other wife.

It is certain the patriarchs had a great number of wives, and that these did not all hold the same rank; some being subaltern to the principal wife; which were what we call *concubines* or half-wives. The Romans prohibited a plurality of concubines, and only had regard to the children issuing from a single concubine, because she might become a legitimate wife. Solomon had 700 wives and 300 conbubines; the emperor of China has sometimes two or three thousand concubines in his palace. Q. Curtius observes, that Darius was followed in his army by 365 concubines, all in the equipage of queens.

CONCUPISCENCE, according to divines, an irregular appetite, or lust after carnal things, inherent in the nature of man ever since the fall.

COND, Con, or Conn, in sea-language, signifies to guide or conduct a ship in her right course. He that cons her, stands aloft with a compass before him, and gives the word of direction to the man at the helm how he is to steer. If the ship go before the wind, or, as they call it, betwixt the sheets, the word is either starboard, or port the helm; according as the conder would have the helm put to the right or left side of the ship, upon which the ship always goes the contrary way. If he says, helm a midship, he would have the ship to go right before the wind, or directly between her two sheets. If the ship sail by a wind, or on a quarter wind, the word is, aloof, keep your luff, fall not off, veer no more, keep her to, touch the wind, have a care of the lee-latch: all which expressions are of the same import, and imply that the steersman should keep the ship near the wind. On the contrary, if he would have her sail more large, or more before the wind, the word is, ease the helm, no near, bear up. If he cries steady, it means, keep her from going in and out, or making yaws (as they call it), howsoever she sails, whether large or before a wind: and when he would have her go just as she does, he cries, keep her thus, thus, &c.

CONDATE, in *Ancient Geography*, a town of Armorica in Gaul: called *Civitas Rhedonum*, in the Notitia; afterwards *Redonæ;* Redonica Regio, the district. Hence the modern name *Rennes*, in Britanny. W. Long. 1. 45. Lat. 48. 5. Another Condate of Britain (Antonine); now thought to be Congleton in Yorkshire; others say in Lancashire.

CONDE, Lewis de Bourbon prince of, was born at Paris Sept. 7. 1621. He was styled Duke d'Enguien, till he succeeded to the title of Prince of Conde by his father's death in 1646. As he was of a tender and delicate constitution, the prince sent him to the castle of Montrond in Berry, that he might breathe a more pure and salutary air. Here he was educated in his infancy by some experienced and prudent citizens wives. When he was of a proper age, the prince took upon himself the task of governor, and appointed for his assistant M. de la Boussieres, a private gentleman, a man of honour, fidelity, and good nature, and who made it a rule to observe inviolably the orders that were given him. Two Jesuits distinguished for their genius and knowledge were also given him for preceptors. He formed him a household of 15 or 20 officers, all men of the greatest virtue and discretion.

With these attendants the duke d'Enguien went to settle at Bourges, where he frequented the college of Jesuits. Here, besides the ordinary studies, he was taught ancient and modern history, mathematics, geography, declamation; also riding and dancing, in which last he soon excelled. He made such a surprising progress, that before the age of 13 he defended in public some questions in philosophy with incredible applause.

Conde.

applause. At his return from Montrond, he had for his tutor M. de Merille; a man deeply versed in the knowledge of common law, of ancient and modern laws, of the holy scriptures, and of the mathematics. Under his direction the duke went through that new course with prodigious success. He acquired a critical taste in the arts and sciences, which he retained all his life; he never suffered a day to pass without dedicating two or three hours at least to reading; his thirst for knowledge was universal, and he endeavoured to search every thing to the bottom. His chief inclination, however, lay towards the military art; and at the age of 18 he obtained permission to make his first campaign as a volunteer in the army commanded by M. de la Meilleraye. This campaign was unfortunate; and the duke d'Enguien was only a witness of the marshal's imprudence and disgrace. Nevertheless, in this campaign he laid the foundation of that renown which made him afterwards considered as the greatest general of his age.

On his return to Paris, the duke waited upon Cardinal Richelieu at Ruel. That minister was so pleased with his conversation, that he soon after made proposals of an alliance with the prince of Conde, by marrying the duke d'Enguien to Claire Clemence de Maille Breza, the cardinal's niece. The duke consented to this match out of obedience to his father; but the force he put upon himself by yielding to it was so great, that he fell dangerously ill. It was long before he got the better of his distemper; but at length he not only recovered, but became so strong as afterwards to bear the greatest fatigues with ease.

The duke made two more campaigns as a volunteer; the one under the marshal de la Meilleraye, the other in the army of Louis XIII. which conquered Roussillon. In 1643, at the age of 22, he obtained from the king, at the persuasion of Cardinal Mazarin, the command of the army destined to cover Champagne and Picardy; which command was confirmed to him after the king's death by the queen regent, Anne of Austria, to whose interest he was strongly devoted. In this station, though he never had been present at any battle, he soon gave such a specimen of his abilities as crowned him with glory. The Spaniards, who threatened France with an invasion, were defeated by him at Rocroi; and this signal victory made him from that time considered as the guardian genius of his country. He next formed the project of besieging Thionville, and proposed it to the council of regency. They consented with fear and distrust; but the duke carried it into execution with such skill, activity, and courage, that he became justly the subject of general admiration. In two months time Thionville surrendered. At length, having covered Alsace and Lorrain from the enterprises of the Imperialists, the duke returned to Paris, where he obtained the government of Champagne, and of the city of Stenai.

The three following years were little more than a series of military operations. The three battles of Fribourg, in which the duke d'Enguien triumphed over Velt Marshal count de Mercy, the greatest general in all Germany; the taking of Philipsbourg, and a great number of other places, which rendered him master of the palatinate, and of the whole course of the Rhine; the victory of Nortlingue, by which he revenged the viscount du Turenne's defeat at Mariendal; the siege and conquest of Dunkirk, the good and bad success of his arms in Catalonia, where, though he was forced to raise the siege of Lerida, he kept the Spaniards in awe, and cut to pieces their rear guard; these are the principal events which distinguish the campaigns of 1644, 1645, and 1646.

The victories of the duke d'Enguien, his great reputation and esteem with the people, began now to give umbrage to Mazarin. The cardinal's dislike to him appeared on the death of the duke de Breze, admiral of France. The prince of Conde earnestly demanded for his son the duke de Breze's places. But Mazarin, afraid of increasing the wealth and power of a prince whom his victories and the love and confidence of the people and the army had already rendered too formidable to him, evaded his request, by persuading the queen to take the admiralty to herself. On the death of his father, the minister's dislike to the young prince of Conde became still more apparent. By the minister's persuasion he had accepted of the command of the army in Catalonia; but, on his arrival at Barcelona, he found neither troops, money, artillery, provisions, nor ammunition. Enraged at this deception, he vented his resentment in bitter complaints and severe threats; but by the resources that he found in this dilemma, the prince added new lustre to his glory.

The campaign of 1648 was as glorious to Conde as those which preceded it had been. To disconcert at once the projects of the arch-duke Leopold, the prince resolved to attack him even in the heart of the Low Countries; and notwithstanding the considerable difficulties which he had to surmount, he besieged the important city of Ypres, and took it in sight of all the enemy's forces.

Notwithstanding this success, Conde saw himself at the point of experiencing the greatest reverse of fortune. His army was a prey to scarcity, to nakedness, contagious distempers, and desertion. For eight months it received no supply from the minister, but half a muster. Every thing was supplied by the prince himself; he lavished his money, and borrowed more to supply his troops. When it was represented to him that he was in danger of ruining himself by such an enormous expence, he replied, that "since he every day ventured his life for the service of his country, he could very well sacrifice his fortune to it. Let but the government exist (added he), and I shall want for nothing."

The French army having been reinforced by 4000 of the troops of Weimar, Conde attacked the Spaniards advantageously encamped near Lens, and gained a complete victory over them, which disabled them from attempting any thing more, and even from supporting themselves. Afterwards he besieged Furnes, the garrison of which, 500 men, surrendered themselves prisoners of war. But the prince was wounded there in the trenches by a musket-shot above the right hip; and the contusion was so great, that he was forced to submit to several incisions.

The French court, animated with the victory at Lens, thought this a proper time to take vengeance on on the factions which for some time had violently agitated the kingdom; and accordingly imprisoned Brouſſel and Blancmenil, two of the principal leaders of the country party. This vigorous proceeding, however, occaſioned a general revolt. Two hundred thouſand men took arms in Paris, barricaded the ſtreets, inveſted the palais-royal, and demanded the priſoners. It was neceſſary to releaſe them; but from that time the regal authority was annihilated; the queen was expoſed to a thouſand inſults, and Mazarin dared no longer venture out of the palais-royal. In this embarraſſment the queen recalled the prince of Conde, as the only one from whom ſhe could hope for ſupport. He retired to Ruel, whither the regent had gone with the young king and Mazarin. Anne of Auſtria propoſed to him the reducing of Paris by force of arms: but he calmed the reſentments of that princeſs; and inſtead of being acceſſory to her vengeance, he directed all his views to pacify the kingdom, and at length brought about an accommodation between the parties, who deſired it with equal ardour. But new incidents ſoon rekindled the combuſtion. The treachery of Mazarin, and the artifices of the leaders of the country party, occaſioned new cabals and freſh troubles. Conde was careſſed by the leaders of both parties; but at laſt, enraged at the arrogance of the malecontents, who every day formed new pretenſions, he took part openly with the court, though he thought it ungrateful, and protected the miniſter, though he did not eſteem him.

The royal family, the duke of Orleans, Conde, and Mazarin, left Paris privately in the night between the 5th and 6th of January 1646, and went to St Germains. The parliament ſent deputies to learn from the queen herſelf the reaſons of her departure, and to beg her to name the citizens whom ſhe ſuſpected, that they might be tried. Mazarin had the imprudence to diſmiſs them without any anſwer. Exaſperated at this, the people again took up arms in order to defend themſelves againſt the enterpriſes of the court, who had determined to block up and to ſtarve the capital, in order to ſuppreſs the party of malecontents. With 7 or 8000 men, the broken relics of the laſt campaign, the prince of Conde formed a deſign of reducing above 500,000 intrenched behind walls. He had neither money nor magazines; he ſaw himſelf in the depth of a moſt ſevere winter; nevertheleſs he triumphed over Paris, and this great ſucceſs completed his glory. It did him ſo much the more honour, as during the ſiege he conſtantly defeated the troops of the malecontents; he prevailed on the army that marched to their aſſiſtance under Turenne, to abandon that general; he ſtopped the progreſs of the duke de Longueville, who had cauſed an inſurrection in Normandy; and got the ſtart of the Spaniards, who were advancing to give him battle.

Condi de Retz, coadjutor of Paris, and afterwards cardinal, was the life and ſoul of the revolters, and directed all their motions. He had taken Catiline for his model; and was equally intrepid and capable of the greateſt actions; of an exalted genius, but governed by his ambition. He diſtinguiſhed his hatred to Mazarin by arming the malecontents; and he himſelf raiſed at his own expence a regiment which he called the regiment of *Corinth*: as ſoon as this corps took the field during the blockade of Paris, it was defeated and diſperſed. This check was called *the firſt to the Corinthians.* The peace was ſigned at St Germains; but neither party carried its point, and ſcarce any one but Conde acquired glory by this war. After the concluſion of the treaty, the prince repaired to the capital, and traverſed all the ſtreets in his coach alone. All perſons of any conſequence paid their compliments to him, and the parliament ſent a ſolemn deputation to thank him for the peace to which he had ſo powerfully contributed. The people, however, made loud complaints on account of the king's abſence (for the court was not yet returned to Paris), and the malecontents gave reaſon to apprehend a new inſurrection. Conde encouraged the king and queen to return; and at length brought them to Paris, amidſt the acclamations and bleſſings of the public.

The important ſervice which Conde had juſt done the court entitled him to the acknowledgments of the queen, and eſpecially of Mazarin; but the dark ſoul of that cardinal only remembered it to puniſh a too fortunate and too powerful protector. He privately ſwore the prince's deſtruction; at leaſt that he ſhould give the whole kingdom a pattern of ſubmiſſion and dependence on his will. However, not to excite the public indignation, he ſtill kept up appearances with the prince, while he ſecretly ſpread about him diſguſts, ſuſpicions, ſnares of every kind, and the moſt heinous calumnies. The ungrateful miniſter deceived the prince by making him the moſt flattering propoſals; and with the moſt alluring promiſes which he always found means to avoid fulfilling. The enraged prince deſpiſed the miniſter, and treated him with diſdain. After this they were reconciled again only to be again at variance. Each of them in their turn courted the country party, in order to made it ſubſervient to their deſigns. At laſt Mazarin thought of an expedient, which but too effectually anſwered his purpoſe, of making an irreconcileable quarrel between that party and the prince. Among the malecontents the marquis de la Boulaie, a man of an infamous character, had obtained the confidence of the party by falſe appearances of hatred to the cardinal, but ſecretly kept up a correſpondence with him. It is pretended that he made him an offer of privately killing Conde. Mazarin was charmed with the propoſal; yet he only required Boulaie to exhibit all the proofs of an aſſaſſination, and to act in ſuch a manner that every thing might concur to render the country party ſuſpected of that crime. He was punctually obeyed; the coach was ſtopped; ſome piſtols were fired at it; by which two of the footmen were dangerouſly wounded; and, after that ſhameful exploit, la Boulaie took refuge in the hotel of the duke of Beaufort, who was the hero of the party, in order no doubt to countenance the prince's ſuſpicion of the malecontents. Luckily Conde was not in his coach when it was ſtopped; the cardinal had ſpread the report of his intended aſſaſſination; and in concert with the queen and the prince he had prevailed to have the coach ſent away empty, to prove the reality of the attempt. Mazarin counterfeited a zeal for the prince's life; he furiouſly declaimed againſt the malecontents, who, he pretended, had made an attempt on a life ſo precious to the ſtate; and he inflamed Conde's reſentment againſt the duke of Beaufort

Conde. Beaufort and the coadjutor, whom he ſuppoſed to be the authors of this heinous outrage. The prince was ſo ſtrongly prejudiced, that he refuſed to hear them when they appeared before him to juſtify themſelves. He demanded juſtice againſt them of the king: he formally accuſed them before the parliament, and remained inflexible in ſpite of the pains which the leaders of the party took to demonſtrate to him that he had been impoſed upon. However, the affair was brought before the parliament; the accuſed defended themſelves, and the coadjutor, who had diſcovered the cardinal's ſecret, unmaſked him ſo well, that the prince agreed to a private negociation with the malecontents; he required nothing more than the coadjutor's leaving Paris, but with the rank of ambaſſador to Rome or Vienna. That prelate would have conſented to it, to ſatisfy Conde, if Mazarin, ſome days after, had not given him the choice of any recompenſe, in order to engage his concurrence in the prince's deſtruction. Affairs were now in ſuch a dangerous ſituation, that the cardinal ſaw clearly it was neceſſary to haſten to the winding up of the plot. Maſter of the queen's mind, which he guided as he pleaſed; and ſure of having inflamed againſt Conde all the reſentment of the malecontents; he ſought and obtained, by means of the ducheſs Chevreuſe, the ſupport of that powerful faction, which connected itſelf the more readily with him, in hopes that the prince's fall would ſoon enable it to cruſh without difficulty the cardinal himſelf. The coadjutor had private conferences with the queen and the miniſter. Conde had notice of it; and in order to diſcover if it were true, he endeavoured to ſurpriſe it from Mazarin's own mouth. "Cardinal (ſaid he, one day), it is publicly reported that you have nightly meetings with the coadjutor, diſguiſed like a trooper." He accompanied this ſpeech with a quick and penetrating look: but the cardinal, who was a perfect maſter of diſſimulation, anſwered him in ſuch a free, artleſs-like manner, that he entirely removed Conde's apprehenſions; and he ſlighted the information he had received, of the plot forming againſt him.

Mazarin wanted nothing but the ſupport of the duke of Orleans; and at laſt found means, by the ducheſs of Chevreuſe, to inflame the jealouſy of that fickle and inconſtant prince, and to engage him to conſent to the impriſonment of Conde. Having thus united all parties, and fearing no other obſtacle, this ungrateful and perfidious miniſter made preparations for privately arreſting the prince: the order for it was ſigned January 18th 1650. Conde having that day repaired as uſual to the palais-royal, to aſſiſt at council with the prince of Conti and the duke of Longueville, the queen gave orders to arreſt them all three, and convey them without any noiſe to the caſtle of Vincennes. She was inſtantly obeyed, and the princes were ſtrictly guarded in that priſon.

In this unexpected reverſe of fortune, the fortitude and greatneſs of Conde's mind appeared only the more remarkable. Confined with the other two princes in the tower of Vincennes, where neither ſupper, furniture, nor beds, were provided, he contented himſelf with two new laid eggs, and threw himſelf in his clothes, on a truſs of ſtraw, where he ſlept 12 hours without waking. He ſtill retained his cheerfulneſs, and dedicated the greateſt part of his time to reading, the reſt to converſation, playing at battle-door and ſhuttle-cock, to bodily exerciſes, and the cultivation of flowers.

Mazarin triumphed at the diſgrace of the princes, proſcribed all thoſe who were attached to Conde, and behaved in the moſt inſolent and arbitrary manner. The prince's friends, however, notwithſtanding their being ſtrictly watched, found means to keep up a punctual correſpondence with him. They made various attempts to releaſe him: they raiſed troops; in particular, the dukes of Bouillon and Rochefoucault, and the viſcount de Turenne. The princeſs of Conde engaged the province of Guienne to declare in his favour; ſhe made war, in order to force the court to releaſe him; at length the partizans of the prince ſigned a treaty with the Spaniards, to labour in concert for his enlargement. But all theſe efforts would, perhaps, have been ineffectual, if other more powerful reſources had not been employed.

In that gallant and warlike age, every thing was managed by the paſſions and intrigues of five or ſix women, who poſſeſſed the confidence of the leaders of the ſtate, and of the various parties. The princeſs of Mantua, wife to one of the ſons of the elector Palatine, king of Bohemia, principally directed the counſels in the party of the princes. She found means to reconcile the duke of Orleans, the coadjutor, and the malecontents, with the friends of the prince, and united their efforts againſt the cardinal. The parliament, on the other ſide, loudly demanded the releaſe of the priſoners. All the orders of the ſtate united in ſoliciting it, inſomuch that the queen was at laſt prevailed on to give her conſent. At this news, Mazarin was ſo confounded, that he fled in the diſguiſe of a trooper, and arrived at the gates of Richlieu, where a body of horſe waited for him. The parliament, informed by the queen of his flight, thundered forth an arret, by which he was obliged to leave the kingdom, with his family and foreign ſervants, in the ſpace of 15 days, under the penalty of being expoſed to a criminal proſecution. The queen deſired to follow him with the king; but the nobles and burghers inveſted the palais royal, and prevented the execution of this project, which would have kindled a civil war. Mazarin, therefore, perceiving that it was impoſſible for the queen to join him, determined to go himſelf to reſtore the princes to their liberty, and to get the ſtart of the deputies who were coming to acquaint them with it. On his arrival at Havre, he informed the princes that they were free; he entreated Conde's friendſhip; and was ſo abject as to proſtrate himſelf at the feet of him whom he had ſo baſely oppreſſed. Conde gave him a polite reception, and ſpoke to him in a free and cheerful tone; but tired with the mean ſubmiſſions which the cardinal laviſhed upon him, he left him without making any promiſe, and ſet out on his return to Paris, which he entered as it were in triumph, amidſt the acclamations of all orders of men, and the demonſtrations of a moſt ſincere and general joy.

After this a civil war enſued, in which the prince of Conde ſided with the malecontents. Being preſſed by the king's army, he retired into the ſuburbs of St Anthony, where he behaved with the utmoſt bravery; when the citizens opened their gates and received him in; and a peace ensued soon after. His hatred of the cardinal, however, made him quit Paris, and take refuge among the Spaniards, who made him generalissimo of their forces; and he took Rocroi. The peace of the Pyrenees restored him to his country; and he again signalized himself at the head of the king's armies. Being afflicted with the gout, he refused the command of the army in 1676, and retired to Chantilly, where he was as much esteemed for the virtues of peace, as he had been before for his military talents. He died in 1686, at Fontainbleau.

Conde, a town of the French Netherlands, in the province of Hainault, with the title of a principality, and a castle. It is one of the strongest towns in this country, and seated near the confluence of the rivers Haisne and Scheldt. It was taken by the allies in 1793, and retaken by the French in 1794. Its name by the convention was changed to Nord Libre. E. Long. 3. 39. N. Lat. 50. 27.

Conde, a town of France, in the department of Calvados, which carries on a considerable trade; seated on the river Nereau, 15 miles west of Paris. W. Long. 0. 37. N. Lat. 48. 50.

CONDEMNATION, the act of giving judgment, passing or pronouncing sentence against a person who is thus subjected to some penalty or punishment, either in respect of life, reputation, or fortune.

CONDENSATION, the act whereby a body is rendered more dense, compact, and heavy. The word is commonly applied to the conversion of vapour into water, by distillation, or naturally in the clouds. The way in which vapour commonly condenses, is by the application of some cold substance. On touching it, the vapour parts with its heat which it had before absorbed; and on doing so, it immediately loses the proper characteristics of vapour, and becomes water. But though this is the most common and usual way in which we observe vapour to be condensed, nature certainly proceeds after another method; since we often observe the vapours most plentifully condensed when the weather is really warmer than at other times. See the articles Cloud, Evaporation, &c.

CONDENSER, a pneumatic engine, or syringe, with which a greater quantity of air may be crowded into a given space; so that sometimes ten atmospheres, or ten times as much air as there is at the same time in the same space, under the usual pressure, may be thrown in by means of it, and its egress prevented by valves properly disposed.

It consists of a brass cylinder, wherein is a moveable piston; which being drawn out, the air rushes into the cylinder through a hole provided on purpose; and when the piston is again forced into the cylinder, the air is driven into the receiver through an orifice, furnished with a valve to hinder its getting out.

The receiver or vessel containing the condensed air, should be made very strong, to bear the force of the air's spring thus increased; for which reason they are generally made of brass; its orifice is fitted with a female screw to receive the male screw at the end of the condenser.

If glass be used for a condenser, it will not suffer so great a degree of condensation; but the experiment will be more entertaining, since the subject may be viewed in the condensed air.

CONDITION, in the civil law, a clause of obligation stipulated as an article of a treaty or a contract; or in a donation of a testament, legacy, &c. in which last case a donee does not lose his donative if it be charged with any dishonest or impossible conditions.

CONDITIONAL, something not absolute, but subject to conditions.

Conditional Conjunctions, in *Grammar*, are those which serve to make propositions conditional; as *if*, *unless*, *provided*, &c.

Conditional Propositions, in *Logic*, such as consist of two parts connected together by a conditional particle.

Conditional Syllogism, a syllogism where the major is a conditional proposition. Thus,

If there is a God, he ought to be worshipped.
But there is a God;
Therefore he ought to be worshipped.

CONDIVICNUM, in *Ancient Geography*, the capital of the Namnetes, in Armorica. Now Nantes in Brittany, on the Loire, from its name *Civitas Namnetum*. W. Long. 1. 30. Lat. 47. 15.

CONDOM, a town of Gascony in France, capital of the Condomois, with a bishop's see. It is but a poor place, and the trade is very small. It is seated on the river Gelisse, in E. Long. 0. 22. N. Lat. 44.

CONDOR, or Contor. See Vultur, Ornithology *Index*.

CONDORCET, John-Antony Nicholas Caritat, marquis of, a French writer, and political character of considerable eminence, descended from an ancient family from the principality of Orange, and born at Ribemont in Picardy, in 1743. He received his education at the college of Navarre, where he was distinguished at an early period of life for his strong attachment to the study of physics and mathematics. On his entrance into public life, he established a friendly intercourse with Voltaire, D'Alembert, and other literary characters, who professed opinions analogous to his own, and formed a very powerful party among the French literati, whose united efforts to propagate their ideas of religion and politics, have been applauded or condemned, according to the principles of their different judges. Condorcet first attracted the attention of the public as a mathematician, obtaining their approbation for his treatise on integral calculations, which he composed at the age of 22. In the year 1767, his solution of the problem of the Three Bodies made its appearance, and in the following year the first part of his "Essay on Analysis." In the year 1769 he was received a member of the Academy of Sciences, the memoirs of which were greatly enriched by him with different papers on the most abstruse branches of mathematical science. His justly merited reputation pointed him out as a fit person to cooperate with D'Alembert and Bossut, in assisting M. Turgot, that celebrated minister and able financier, with arithmetical calculations. In the mean time he laboured indefatigably in the study of politics and metaphysics, and defended, in an anonymous publication, the sect of philosophers to which he had attached himself, from an

Condorcet. an attack made upon them in the Trois Siecles; and replied to M. Necker's essay on Corn Laws. He was appointed secretary to the Academy of Sciences in the year 1773, when he employed much of his time in writing eulogies on such of its deceased members as Fontenelle had passed over in silence. Like D'Alembert and some others, Condorcet having united in himself the characters of an elegant writer and a man of profound research, was admitted into the French academy in 1783, when he pronounced an oration on the influence of philosophy, which was ordered to be printed. From the time of D'Alembert's death, which happened this year, he filled the station of secretary to that academy, rendering his name conspicuous by the publication of eulogies on different eminent characters. His panegyric on D'Alembert, to whom he was most sincerely attached, is a very elaborate performance, notwithstanding of which it is esteemed by judges as a candid account of the genuine merits of that great philosopher. His encomium bestowed on that very able mathematician Euler, furnished him with a favourable opportunity of giving a circumstantial account of the specific improvements and inventions conferred on a peculiar branch of science by the labours of an individual; a talent in a biographical writer which Condorcet appears to have possessed in an eminent degree. His eulogy on the minister Turgot was read with avidity, and admired by all those who approved of Turgot's plans of government and system of finance. In the year 1787 he gave the public his "Life of Voltaire," which was highly elaborate, and replete with lofty panegyric, on the merits of which mankind were consequently much divided, according to their sentiments of that author's philosophy. The last of his biographical works was an eulogy on the celebrated Dr Frankin, published in 1790, all of which will be read with some degree of prejudice by those who are inimical to the school of philosophy to which he belonged.

The memorable event of the French revolution, which the writings of Condorcet and his associates unquestionably accelerated, naturally interested his feelings, and called forth his exertions. But the conduct of the political parties and their leaders, during this tumultuous period, is painted in colours so diametrically opposite to each other, that a proper estimate of it is scarcely possible. In this part of Condorcet's life, therefore, we must confine ourselves to such facts as are universally acknowledged, leaving it to our readers to draw inferences for themselves.

At an early period he employed his talents to promote those reforms, (for such they appeared in his judgment) which were to pave the way to a new order of things. A work entitled "La Bibliotheque de l'Homme Public," to contain an analysis of the writings of the most eminent politicians, was chiefly conducted by him, as was also a newspaper called "La Chronique de Paris," filled with declamation against royalty. He had likewise a share in the "Journal de Paris," a paper conducted on similar principles. About the time when the unfortunate king fled to Varennes he proposed a paper called "*Le Republicain*, the obvious intention of which is clearly deducible from its title. He was an indefatigable member of the Jacobin club, and spoke frequently, though not forcibly, in it. He was chosen a representative for Paris when the constituent assembly was dissolved, and followed the general political course of the Brissotine party. A plan for public instruction was now to exercise his abilities, which he finished in two elaborate memoirs, allowed to contain some exalted and enlarged ideas, but perhaps rather extensive to be reduced to practice. He was likewise author of the manifesto addressed to the European powers by the people of France, on the approach of a war. He wrote a letter of expostulation to the king while he was president of the assembly, which some have considered as by far too severe, and destitute of that ceremony to which the sovereign was entitled. When the king was insulted by the populace at the Thuilleries, in being offered the red cap, it is said that he vindicated their proceedings. We are also informed, that while he was degrading royalty in this manner, he was secretly soliciting the office of tutor to the dauphin; a proposition which the king utterly rejected, on account of his avowed infidelity. Attempts have been made to fix upon his character the most abominable ingratitude, by making him accessory to the murder of the duke de la Rochefoucault, to whom he was under the strongest obligations, and from whose family he had received a most accomplished wife with a fortune; but we sincerely hope that this calumny entirely originated from the malevolence of party spirit. When the trial of the king came to be agitated, Condorcet gave it as his opinion that he could not be brought to judgment in a legal manner; yet it must be confessed that his conduct in regard to the sentence, was rather of an ambiguous nature, and betrayed that timidity and want of resolution which formed the most prominent features of his political career. The judgment of Madame Roland concerning the moral constitution of this wonderful man has all the air of impartiality. "The genius of Condorcet," says that lady, "is equal to the comprehension of the greatest truths; but he has no other characteristic besides fear. It may be said of his understanding, combined with his person, that it is a fine essence absorbed in cotton. The timidity which forms the basis of his character, and which he displays even in company, does not result from his frame alone, but seems to be inherent in his soul, and his talents furnish him with no means of subduing it. Thus, after having deduced a principle or demonstrated a fact in the assembly, he would give a vote decidedly opposite, overawed by the thunder of the tribunes, armed with insults, and lavish of menaces. The properest place for him was the secretaryship of the academy. Such men should be employed to write, but never permitted to act." The Gironde party, after the execution of the king, employed him to frame a new constitution, the plan of which was presented to the convention, and obtained their approbation. It was not thus esteemed by the people at large; and it has, perhaps not without reason, been considered as "a mass of metaphysical absurdities." During the violent struggle between the Gironde and Mountain parties, Condorcet took no decided part with either, which seems to have been owing to the native timidity of his mind, and his abhorrence of the state of public affairs. He was not comprehended among the number of those who were sacrificed with their leader Brissot; but having employed his pen against the victorious party, ty, he fell under the invincible difpleafure of that inhuman, blood-thirfty tyrant, Robefpierre, who iffued a decree of accufation againft him in July, 1793. He found means to effect his efcape from the arreft, and during nine months concealed himfelf in Paris. Dreading at length that the tyrant would order a domiciliary vifit for the purpofe of difcovering the place of his retreat, he paffed through the barriers without being taken notice of, and went to the houfe of a perfon in whom he could confide, on the plain of Mont-Rouge, who unfortunately for Condorcet was at that time in the metropolis. He was of confequence under the neceffity of paffing two dreary nights in the open fields, a melancholy prey to hunger and cold. On the third day he obtained an interview with his friend, who unhappily durft not venture to afford him fhelter under his roof, fo that he was once more compelled to wander in the fields. Worn out at length by hunger and fatigue, and life being no longer fupportable without fuftenance, he applied at a public houfe for an omelette, which he devoured with greedinefs. His cadaverous appearance and uncommonly keen appetite, roufed the fufpicion of a municipal officer who happened to be prefent, and by whom he was interrogated. The ambiguity and hefitation which characterized his anfwers, made the officer conclude that it would be proper to apprehend him. He was accordingly configned to a dungeon, to be next day conducted to Paris, but his melancholy fate rendered fuch a meafure unneceffary. He was found dead in the morning; and as it was generally underftood that he conftantly carried with him a dofe of poifon, to this caufe his melancholy exit was very properly afcribed. Thus terminated the career of Condorcet on the 28th of March, 1794, who for many years fuftained a brilliant and honourable reputation in the republic of letters. His manners were replete with urbanity, and as well qualified to pleafe in company as could be expected in a man who was conceived as deftitute of a heart. He was certainly bleffed with domeftic felicity, and had one daughter by his wife. Soon after his death appeared his "fketch of a hiftorical draught of the progrefs of the human mind," a methodical performance, and evincing the profoundeft refearch, in which he ftrongly recommends his favourite idea of gradually bringing human nature to a ftate of perfection, by confidering what man has been, now is, and may be. This treatife will no doubt be viewed by fome as rather fanciful, but it is clearly the effort of a very fuperior genius, and muft be peculiarly interefting to the feeling man, when it is known that it was compofed while its author was in circumftances of danger and diftrefs. The idea of man's progreffive advancement towards perfection and happinefs, infpired him with confolation under his complicated misfortunes. Befides the works which we have enumerated in this fketch of his life, he publifhed "letters to the King of Pruffia," with whom he kept up a correfpondence, as well as with Catharine, emprefs of Ruffia. A treatife on calculation, and an elementary treatife on arithmetic, were left behind him in manufcript. Although he was an enemy to revealed religion, he was certainly a man of virtue and integrity; yet all his philofophy could never infpire him with that heroic fortitude and contempt of death in a juft caufe, for which the fincere votaries of Chriftianity have ever been fo confpicuous.

CONDORMIENTES, in church hiftory, religious fectaries, who take their name from lying all together, men and women, young and old. They arofe in the 13th century, near Cologne; where they are faid to have worfhipped an image of Lucifer, and to have received anfwers and oracles from him.

CONDRIEU, a town of Lyonnois in France, remarkable for its excellent wines. It is feated at the foot of a hill near the river Rhone. E. Long. 4. 33. N. Lat. 45. 28.

CONDRUSII, in *Ancient Geography*, a people of Belgica, originally Germans, dwelling about the Maefe. Their country is now called *Condrotz*, in in the bifhopric of Liege, between Luxemburg and the Maefe.

CONDUCTOR, in *Surgery*, an inftrument which ferves to conduct the knife in the operation of cutting for the ftone, and in laying up finufes and fiftulas.

Conductors, in electrical experiments, are thofe bodies that receive and communicate electricity; and thofe that repel it are called *non-conductors*. See Electricity.

CONDUIT, a canal or pipe for the conveyance of water, or other fluid.

There are feveral fubterraneous conduits through which the waters pafs that form fprings. Artificial conduits for water are made of lead, ftone, caft-iron, potter's earth, timber, &c.

CONDYLOID and Coronoid proceffes. See Anatomy *Index*.

CONDYLOMA, in *Medicine*, a tubercle, or callous eminence, which arifes in the folds of the anus; or rather a fwelling or hardening of the wrinkles of that part.

CONDYLUS, a name given by anatomifts to a knot in any of the joints, formed by the epiphyfis of a bone.

CONE, in *Geometry*, a folid figure, having a circle for its bafe, and its top terminated in a point or vertex. See Conic Sections.

Melting Cone, in *Chemiftry*, is a hollow cone formed of copper or brafs, with a handle, and with a flat bottom adjoining to the apex of the cone, upon which it is intended to reft. Its ufe is to receive a mafs of one or more metals melted together, and caft into it. This mafs, when cold, may be eafily fhaken out of the veffel, from its figure. Alfo, if a melted mafs confifting of two or more metals, or other fubftances not combined together, be poured into this veffel, the conical figure facilitates the feparation of thefe fubftances according to their refpective denfities. The cone ought to be well heated before the melted mafs is thrown into it; that it may not contain any moifture, which would occafion a dangerous explofion. It ought alfo to be greafed internally with tallow, to prevent the adhefion of the fluid matter.

Cone of Rays, in *Optics*, includes all the feveral rays which fall from any radiant point upon the furface of a glafs.

Cone, in *Botany*. See Conus.

Cone-Shell. See Conus, Conchology *Index*.

CONESSI,

CONESSI, a sort of bark of a tree, which grows on the Coromandel coast in the East Indies. It is recommended in a letter to Dr Monro, in the Medical Essays, as a specific in diarrhœas. It is to be finely pulverized, and made into an electuary with syrup of oranges. The bark should be fresh, and the electuary new made every day, or second day, otherwise it loses its austere but grateful bitterness on the palate, and its proper effects on the intestines.

CONFARREATION, a ceremony among the ancient Romans, used in the marriage of persons whose children were destined for the honour of the priesthood.

Confarreation was the most sacred of the three modes of contracting marriage among that people; and consisted, according to Servius, in this, that the *pontifex maximus* and *flamen dialis* joined and contracted the man and woman, by making them eat of the same cake of salted bread; whence the term *far*, signifying *meal* or *flour*.

Ulpian says, it consisted in the offering up of some pure wheaten bread; rehearsing, withal, a certain formula, in presence of ten witnesses. Dionysius Halicarnasseus adds, that the husband and wife did eat of the same wheaten bread, and threw part on the victims.

CONFECTION, in *Pharmacy*, signifies, in general, any thing prepared with sugar; in particular it imports something preserved, especially dry substances. It also signifies a liquid or soft electuary, of which there are various sorts directed in dispensatories. See PHARMACY.

CONFECTOR, among the ancient Romans, a sort of gladiator, hired to fight in the amphitheatre against beasts; thence also denominated *bestiarius*.

The *confectores* were thus called *à conficiendis bestiis*, from their dispatching and killing beasts.

The Greeks called them παραβολοι, q. d. *daring*, *rash*, *desperate;* whence the Latins borrowed the appellations *parabolani* and *parabolarii*. The Christians were sometimes condemned to this sort of combat.

CONFECTS, a denomination given to fruits, flowers, herbs, roots, &c. when boiled or prepared with sugar or honey, to dispose them to keep, and render them more agreeable to the taste.

CONFEDERACY, in *Law*, is when two or more persons combine to do any damage to another, or to commit any unlawful act. Confederacy is punishable, though nothing be put in execution; but then it must have these four incidents; 1. That it be declared by some matter of prosecution, as by making of bonds or promises to one another; 2. That it be malicious, as for unjust revenge; 3. That it be false, i. e. against the innocent; and, lastly, That it be out of court voluntary.

CONFERVA. See BOTANY *Index*.

CONFESSION, in a civil sense, a declaration or acknowledgement of some truth, though against the interest of the party who makes it; whether it be in a court of justice or out of it. It is a maxim, that in civil matters, the confession is never to be divided, but always taken entire. A criminal is never condemned on his simple confession, without other collateral proofs; nor is a voluntary extrajudicial confession admitted as any proof. A person is not admitted to accuse himself, according to that rule in law, *Non auditur perire volens*. See ARRAIGNMENT.

CONFESSION, among divines, the verbal acknowledgement which a Christian makes of his sins.

Among the Jews it was the custom, on the annual feast of expiation, for the high-priest to make confession of sins to God in the name of the whole people: besides this general confession, the Jews were enjoined, if their sins were a breach of the first table of the law, to make confession of them to God; but violations of the second table were to be acknowledged to their brethren. The confessions of the primitive Christians were all voluntary, and not imposed on them by any laws of the church; yet private confession was not only allowed, but encouraged.

The Romish church requires confession not only as a duty, but has advanced it to the dignity of a sacrament: this confession is made to the priest, and is private and auricular; and the priest is not to reveal them under pain of the highest punishment.

CONFESSION *of Faith*, a list of the several articles of belief in any church.

CONFESSIONAL, or CONFESSIONARY, a place in churches under the great altar, where the bodies of deceased saints, martyrs, and confessors, were deposited.

This word is also used by the Romanists for a desk in the church where the confessor takes the confessions of the penitents.

CONFESSOR, a Christian who has made a solemn and resolute profession of the faith, and has endured torments in its defence. A mere saint is called a confessor, to distinguish him from the roll of dignified saints; such as apostles, martyrs, &c. In ecclesiastical history, we frequently find the word confessors used for martyrs: in after-times, it was confined to those who, after having been tormented by the tyrants, were permitted to live and die in peace. And at last it was also used for those who, after having lived a good life, died under an opinion of sanctity. According to St Cyprian, he who presented himself to torture, or even to martyrdom, without being called to it, was not called a *confessor* but a *professor:* and if any out of a want of courage abandoned his country, and became a voluntary exile for the sake of the faith, he was called *ex terris*.

CONFESSOR is also a priest, in the Romish church, who has a power to hear sinners in the sacrament of penance, and to give them absolution. The church calls him in Latin *confessarius*, to distinguish him from confessor, which is a name consecrated to saints. The confessors of the kings of France, from the time of Henry IV. have been constantly Jesuits: before him the Dominicans and Cordeliers shared the office between them. The confessors of the house of Austria have also, ordinarily, been Dominicans and Cordeliers; but the later emperors have all taken Jesuits.

CONFIGURATION, the outward figure which bounds bodies, and gives them their external appearance; being that which, in a great measure, constitutes the specific difference between bodies.

CONFIRMATION, in a general sense, the act of ratifying or rendering a title, claim, report, or the like, more sure and indisputable.

CONFIRMATION, in *Law*, a conveyance of an estate, or right in *esse*, from one man to another, whereby a voidable estate is made sure and unavoidable, or a particular estate is increased, or a possession made perfect.

Confirmation, in *Theology*, the ceremony of laying on of hands, for the conveyance of the Holy Ghost.

The antiquity of this ceremony is, by all ancient writers, carried as high as the apostles, and founded upon their example and practice. In the primitive church, it used to be given to Christians immediately after baptism, if the bishop happened to be present at the solemnity. Among the Greeks, and throughout the East, it still accompanies baptism; but the Romanists make it a distinct independent sacrament. Seven years is the stated time for confirmation; however, they are sometimes confirmed before, and sometimes after, that age. The person to be confirmed has a godfather and godmother appointed him, as in baptism. The order of confirmation in the church of England does not determine the precise age of the persons to be confirmed.

CONFISCATION, in *Law*, the adjudication of goods or effects to the public treasury; as the bodies and effects of criminals, traitors, &c.

CONFLAGRATION, the general burning of a city or other considerable place.

This word is commonly applied to that grand period or catastrophe of our world, when the face of nature is to be changed by fire, as formerly it was by water. The ancient Pythagoreans, Platonists, Epicureans, and Stoics, appear to have had a notion of the conflagration; though whence they should derive it, unless from the sacred books, is difficult to conceive; except, perhaps, from the Phœnicians, who themselves had it from the Jews. Seneca says expressly, *Tempus advenerit quo sidera sideribus incurrent, et omni flagrante materia uno igne, quicquid nunc ex deposito lucet, ardebit.* This general dissolution the Stoics call εκπυρωσις, *eccypyrosis*. Mention of the conflagration is also made in the books of the Sibyls, Sophocles, Hystaspes, Ovid, Lucan, &c. Dr Burnet, after F. Tachard and others, relates that the Siamese believe that the earth will at last be parched up with heat; the mountains melted down; the earth's whole surface reduced to a level, and then consumed with fire. And the Bramins of Siam do not only hold that the world shall be destroyed by fire, but also that a new earth shall be made out of the cinders of the old.

Various are the sentiments of authors on the subject of the conflagration; the cause whence it is to arise, and the effects it is to produce. Divines ordinarily account for it metaphysically; and will have it take its rise from a miracle, as a fire from heaven. Philosophers contend for its being produced from natural causes; and will have it effected according to the laws of mechanics. Some think an eruption of the central fire sufficient for the purpose, and add, that this may be occasioned several ways, viz. either by having its intensity increased; which again may be effected either by being driven into less space by the encroachments of the superficial cold, or by an increase of the inflammability of the fuel whereon it is fed; or by having the resistance of the imprisoning earth weakened, which may happen either from the diminution of its matter, by the consumption of its central parts, or by weakening the cohesion of the constituent part of the mass by the excess or the defect of moisture. Others look for the cause of the conflagration in the atmosphere, and suppose, that some of the meteors there engendered in unusual quantities, and exploded with unusual vehemence, from the concurrence of various circumstances, may effect it, without seeking any further. The astrologers account for it from a conjunction of all the planets in the sign Cancer; as the deluge, say they, was occasioned by their conjunction in Capricorn. Lastly, others have recourse to a still more effectual and flaming machine, and conclude the world is to undergo its conflagration from the near approach of a comet in its return from the sun.

CONFLUENT, among physicians, &c. an appellation given to that kind of Small-pox wherein the pustules run into each other.

CONFLUENTES, in *Ancient Geography*, a place at the confluence of the Rhine and Moselle, supposed to be one of the 50 forts erected by Drusus on the Rhine, in Gallia Belgica: Now *Coblentz*, a town of Triers. E. Long. 7. 15. N. Lat. 50. 30.

CONFORMATION, the particular consistence and texture of the parts of any body, and their disposition to compose a whole.

Conformation, in *Medicine*, that make and construction of the human body which is peculiar to every individual. Hence a *mala conformatio* signifies some fault in the first rudiments; whereby a person comes into the world crooked, or with some of the viscera or cavities unduly framed or proportioned. Many are subject to incurable asthmas, from a too small capacity of the thorax, and the like vicious conformations.

CONFORMITY, in the schools, is the congruency or relation of agreement between one thing and another; as between the measure and the thing measured, the object and the understanding, the thing and the division thereof, &c.

CONFRONTATION, the act of bringing two persons in presence of each other, to discover the truth of some fact which they relate differently.

The word is chiefly used in criminal matters, where the witnesses are confronted with the accused, the accused with one another, or the witnesses with one another.

CONFUCIUS, or Cong-fu-tse, the most eminent, and most justly venerated of all the philosophers of China, a descendant of the imperial family of the dynasty of Chang, was born in the kingdom of Lu, now called the province of Chang-tong, about 550 years before the commencement of the Christian æra. This makes him to have been cotemporary with Pythagoras and Solon, and prior to the days of Socrates. He gave striking proofs of very uncommon talents at an early period of life, which were cultivated and improved with great assiduity under the tuition of the ablest masters. Scarcely had he attained to the years of maturity, when he evinced himself acquainted with all the literature of that period, possessing, in particular, a comprehensive knowledge of the canonical and classical books, ascribed to the legislators Yao and Chun, which the Chinese emphatically denominate *the five volumes*, as as containing the eſſence of all their ſcience and morality. Nature had beſtowed upon him a moſt amiable temper, and his moral deportment was altogether unexceptionable. He acquired a diſtinguiſhed reputation for humility, ſincerity, the government of his appetites, a diſintereſted heart, and a ſovereign contempt of wealth. Theſe rare qualities pointed him out as a proper perſon to fill offices of importance and truſt in the government of his country, which he did with honour to himſelf and advantage to the empire. Theſe public ſtations afforded him excellent opportunities of eſtimating with accuracy the true ſtate of morals among his countrymen, which at this time were diſſolute and vicious in the extreme. He conceived the godlike idea of attempting a general reformation both in morals and in politics, and his efforts for ſome time were attended with ſuch remarkable effects, that he inſpired his countrymen with a juſt veneration for his excellent character, and gratitude for his exertions, being raiſed to a ſtation of the laſt importance in the kingdom of Lu. Here his counſels and advice were productive of the moſt beneficial conſequences, in eſtabliſhing good order, the due exerciſe of juſtice, concord, and decorum through the whole kingdom. As it thus very naturally became an object of admiration, ſo, likewiſe, neighbouring princes beheld with envy, its growing happineſs and proſperity; to deſtroy which, they contrived a fatal and effectual expedient. The king of Tſi being apprehenſive, that if the king of Lu continued to be directed by the wiſdom and ſound policy of Confucius, he would ſoon become by far too powerful, ſent him and his nobility a preſent of the moſt beautiful young women, trained up from their infancy in all the arts of ſeduction, who were but too ſucceſsful in plunging the whole court into voluptuouſneſs and diſſipation. This demoliſhed in a ſhort time, the whole of that beautiful fabric which had been erected by Confucius. Finding it a hopeleſs attempt to ſtem the univerſal torrent of corruption and depravity, he reſolved to exert his talents in ſome diſtant kingdom, in the philanthropic cauſe of moral reformation, in hopes of better ſucceſs. But he had the mortification to diſcover, that vice was everywhere triumphant, while virtue, that darling of his ſoul, was compelled to hide her head. This induced him to adopt the more humble, although not the leſs intereſting employment, of a teacher of youth, in which he made great and rapid progreſs. About 600 of his ſcholars were ſent into different parts of the empire, to carry on his favourite work of moral reformation. Among his diſciples, 72 were remarkably diſtinguiſhed above the reſt for their mental acquiſitions, and 10 others were deemed ſuperior, even to theſe, as having a thorough comprehenſion of their maſter's whole ſyſtem. Theſe were divided by him into four claſſes; the firſt being deſtined to the ſtudy of the moral virtues; the ſecond to the arts of logic and public ſpeaking; the third claſs ſtudied juriſprudence and the duties of the civil magiſtrate; and public ſpeaking, or the delivery of popular diſcourſes on moral topics. Indefatigable, however, as his labours were, the taſk was too mighty to be accompliſhed by human exertions. During his laſt illneſs, he declared to his pupils, that the grief of his mind occaſioned by the profligacy of human nature was become inſupportable; and with a melancholy voice, he exclaimed "Immenſe mountain, how art thou fallen? The grand machine is demoliſhed, and the wiſe and the virtuous are no more. The kings will not follow my maxims; I am no longer uſeful on earth; it is, therefore, time that I ſhould quit it." On uttering theſe words he was ſeized with a lethargy, which brought him to the grave. He finiſhed his honourable career in the 72d year of his age, in his native kingdom, to which he had returned in company with his diſciples. It is frequently the fate of illuſtrious characters, never to be properly valued till they are cut off by death, which was the caſe with Confucius. The whole empire of China bewailed the loſs of him, and erected innumerable edifices to perpetuate his memory, adorned with ſuch honourable inſcriptions as the following: "To the great maſter;" "To the chief doctor;" "To the ſaint;" "To the wiſe king of literature;" "To the inſtructor of emperors and kings." All his deſcendants, even to the preſent day, enjoy the honourable title and office of mandarins, and are exempted from the payment of taxes to the emperor, as well as the princes of the blood. The man who applies for the title of doctor, muſt previouſly have made a preſent to a mandarin deſcended in a direct line from Confucius. The writings of this great man are eſteemed by the Chineſe as of the higheſt authority, next to the five volumes, to which he modeſtly acknowledges himſelf to have been much indebted. His works are, 1. *The Tay-hio;* "The Grand Seience, or School of Adults," chiefly intended for the information of princes and magiſtrates, recommending the duties of ſelf government, and uniform obedience to the laws of right reaſon. 2. *The Chong-yong*, or "Immutable Medium", in which he ſhews its importance in the government of the paſſions by a variety of examples, and points out the method of arriving at perfection in virtue. 3. *Lung-yu*, or moral and ſententious diſcourſes, which exhibit a lively picture of the opinions, conduct, and maxims of Confucius and his followers. 4. *Meng-tſe*, the book of Mencius, which derived its name from one of that great philoſopher's diſciples. Theſe are all deſervedly eſteemed by the Chineſe, being held next in importance to the five volumes. 5. The *Hyau-king*, or diſſertation on the duty and reſpect which children owe their parents; and, 6. The *Syan-hyo*, or ſcience for children, being a judicious collection of moral ſentences from ancient and modern writers.

If a fair and impartial eſtimate of the religion of Confucius be made, it cannot be viewed in any other light than as uncorrupted deiſm, although he has ſometimes been accuſed of befriending and ſecretly propagating atheiſtical ſentiments; but ſuch an accuſation is as cruel as it is unjuſt, ſince the purity of his moral precepts, and the acknowledged rectitude of his whole deportment, are utterly incompatible with ſuch a ſuppoſition. He conſidered the Tyen or Deity as the pureſt and moſt perfect eſſence, principle, and ſource of all things in the boundleſs univerſe, who is abſolutely independent, omnipotent, the governor and guardian of every thing; poſſeſſed of infinite wiſdom which nothing can deceive; holy, without partiality, of unlimited goodneſs and juſtice. We are at a loſs to form any adequate opinion of his ſentiments relative to the ſoul of man and the doctrine of futurity, having no well authenticated data, on which to proceed. His morality is in many inſtances ſuperior to that of Greece and Rome, and yields to none upon earth, except to that of divine revelation. The religion of Confucius, notwithſtanding the eſtimation in which he is held, is adopted as a model by none of his countrymen, the literati excepted. Their prevailing ſyſtem is a medley of pagan idolatry and the fabulous ſuperſtition of the Indians, introduced into China by Fo, in the firſt century of the Chriſtian era.

CONFUSION, in a general ſenſe, is oppoſed to *order*, in a perturbation whereof confuſion conſiſts: *e. gr.* when things prior in nature do not precede, or poſterior do not follow, &c.

In a logical ſenſe, confuſion is oppoſed to diſtinctneſs or perſpicuity: and may happen either in words, as when miſcontrived or miſapplied; or in ideas, as when the idea of any thing preſents ſomething along with it, which does not properly belong to that thing. See IDEA and NOTION.

In a phyſical ſenſe, confuſion is a ſort of union or mixture by mere contiguity. Such is that between fluids of contrary nature, as oil and vinegar, &c.

CONFUSION in *Scots Law*, is a method of ſuſpending and extinguiſhing obligations. For the illuſtration of this ſee LAW *Index*.

CONFUSION of Tongues, in the hiſtory of mankind, is a memorable event, which happened in the one hundred and firſt year according to the Hebrew chronology, and the four hundred and firſt year by the Samaritan, after the flood, at the overthrow of Babel; and which was providentially brought about in order to facilitate the diſperſion of mankind and the population of the earth. Until this period there had been one common language, which formed a bond of union that prevented the ſeparation of mankind into diſtinct nations; and ſome have ſuppoſed, that the tower of Babel was erected as a kind of fortreſs, by which the people intended to defend themſelves againſt that ſeparation which Noah had projected.

There has been a conſiderable difference of opinion as to the nature of this confuſion, and the manner in which it was effected. Some learned men, prepoſſeſſed with the notion that all the different idioms now in the world did at firſt ariſe from one original language to which they may be reduced, and that the variety among them is no more than muſt naturally have happened in a long courſe of time by the mere ſeparation of the builders of Babel, have maintained, that there were no new languages formed at the confuſion; but, that this event was accompliſhed by creating a miſunderſtanding and variance among the builders without any immediate influence on their language. But this opinion, advanced by Le Clerc, &c. ſeems to be directly contrary to the obvious meaning of the word שפה, *ſhapha*, "lip," uſed by the ſacred hiſtorian.—Others have imagined, that this was brought about by a temporary confuſion of their ſpeech, or rather of their apprehenſions, cauſing them, whilſt they continued together and ſpoke the ſame language, to underſtand the words differently. Scaliger is of this opinion. Others, again, account for this event by the privation of all language, and by ſuppoſing that mankind were under a neceſſity of aſſociating together, and of impoſing new names on things by common conſent. Another opinion aſcribes the confuſion to ſuch an indiſtinct remembrance of the original language which they ſpoke before, as made them ſpeak it very differently; ſo that by the various inflexions, terminations, and pronunciations of divers dialects, they could no more underſtand one another, than they who underſtand Latin can underſtand thoſe who ſpeak French, Italian, or Spaniſh, though all theſe languages ariſe out of it. This opinion is adopted by Caſaubon, and by Biſhop Patrick in his Commentary *in loc.* and is certainly much more probable than either of the former. And Mr Shuckford maintains, that the confuſion aroſe from ſmall beginnings, by the invention of new words in either of the three families of Shem, Ham, and Japhet, which might contribute to ſeparate them from one another: and that in each family new differences of ſpeech might gradually ariſe, ſo that each of theſe families went on to divide and ſubdivide among themſelves. Others, again, as Mr Joſ. Mede and Dr Wotton, &c. not ſatisfied with either of the foregoing methods of accounting for the diverſity of languages among mankind, have recourſe to an extraordinary interpoſition of divine power, by which new languages were framed and communicated to different families by a ſupernatural infuſion or inſpiration; which languages have been the roots and originals from which the ſeveral dialects that are, or have been, or will be ſpoken, as long as this earth ſhall laſt, have ariſen, and to which they may with eaſe be reduced. As to the number of languages thus introduced, many opinions have been adopted. If there were no more than there were nations or heads of nations, then the number would be ſeven for Japhet, four for Ham, and five for Shem; but if there were as many as there were families, which is the more probable opinion, their number cannot be certainly aſſigned. However, the Hebrews fancy they were 70, becauſe the deſcendants from the ſons of Noah, enumerated Geneſis x. were juſt ſo many. Allowing, then, the languages of the chief families to have been fundamentally different from each other, the ſub-languages and dialects within each branch would probably have had a mutual affinity, greater or leſs as they ſettled nearer or farther from each other. But whichſoever of theſe hypotheſes is adopted, the primary object of the confuſion at Babel was the ſeparation and diſperſion of mankind.

Dr Bryant, in the third volume of his Analyſis of Ancient Mythology, has advanced a ſingular hypotheſis, both with reſpect to the confuſion of tongues and the diſperſion. He ſuppoſes that the confuſion of language was local and partial, and limited to Babel only. By כלהארץ, Gen. xi. 1. and 8. which our tranſlators render *the whole earth*, he underſtands *every region*; and by the ſame words in ver. 9. *the whole region* or province. This confuſion was occaſioned, as he ſuppoſes, by a labial failure; ſo that the people could not articulate. Thus their ſpeech was confounded, but not altered; for as ſoon as they ſeparated, they recovered their true tenor of pronunciation, and the language of the earth continued for ſome ages nearly the ſame. The interviews between the Hebrews and other nations, recorded in Scripture, were conducted without an interpreter; and he farther obſerves, that the various languages which ſubſiſt at this day retain ſufficient relation to ſhow, that they were once dialects from the ſame matrix, and that their variety was the effect of time. See DISPERSION.

CONFUTATION,

Confutation || Congelation.

CONFUTATION, in *Rhetoric*, &c. a part of an oration, wherein the orator seconds his own arguments and strengthens his cause, by refelling and destroying the opposite arguments of the antagonist. This is done by denying what is apparently false, by detecting some flaw in the reasoning of the adverse party, by granting their argument, and showing its invalidity, or retorting it upon the adversary.

CONGE, in the French law, a license, or permission, granted by a superior to an inferior, which gives him a dispensation from some duty to which he was before obliged. A woman cannot obligate herself without the *congé* or license of her husband; a monk cannot go out of his convent, without the *congé* of his superiors.

Conge' d'elire, in ecclesiastical policy, the king's permission royal to a dean and chapter in the time of a vacancy, to choose a bishop; or to an abbey, or priory, of his own foundation, to choose their abbot or prior.

The king of England, as sovereign patron of all archbishoprics, bishoprics, and other ecclesiastical benefices, had of ancient time free appointment of all ecclesiastical dignities, whensoever they chanced to be void; investing them first *per bacculum et annulum*, and afterwards by his letters patent; and in course of time he made the election over to others, under certain forms and limitations, as that they should at every vacation, before they choose, demand the king's congé d'elire, and after the election crave his royal assent, &c.

Conge', in *Architecture*, a mould in form of a quarter round, or a cavetto, which serves to separate two members from one another; such as that which joins the shaft of the column to the cincture, called also *apophyge*.

Conges are also rings or ferrels formerly used in the extremities of wooden pillars, to keep them from splitting, afterwards imitated in stone-work.

CONGELATION, signifies the passing of any body from a fluid to a solid state: so that the term is thus applicable to metals when they resume their solid form after being heated, to water when it freezes, to wax, spermaceti, &c. when they become solid after having been rendered fluid by heat; and in general to all processes, where the whole substance of the fluid is converted into a solid: but it differs from crystallization; because in the latter process, though the salt passes from a fluid to a solid state, a considerable quantity of liquid is always left, so that the term *congelation* is never applied in this case.

1 Is always attended with an emission of heat.

The process of congelation in all cases depends upon, or at least is accompanied with, the emission of heat, as has been evinced by experiments made not only on water, but on spermaceti, wax, &c. for in all of these, though the thermometer immersed in them while fluid continued to descend gradually till a certain period, yet it was as constantly observed to remain stationary, or even to ascend while the congelation went on. See Chemistry.

2 Congelation of quicksilver.

It is not known whether all kinds of fluids are naturally capable of congelation or not; though we are certain that there are very great differences among them in this respect. The most difficult of all those of which the congelation has been actually ascertained is quicksilver. This was long thought capable of resisting any degree of cold whatever; and it is only within a few years that its congelation by artificial means was known, and still more lately that some climates were found to be so severe as to congeal this fluid by the cold of the atmosphere.

3 Experiments of M. Braun.

The congelation of quicksilver was first ascertained by M. Joseph Adam Braun, professor of philosophy at Petersburg. He had been employed in making thermometrical experiments, not with a view to make the discovery he actually did, but to see how many degrees of cold he could produce. An excellent opportunity for this occurred on the 14th of December 1759, when the mercury stood naturally at —34, which is now known to be only five or six degrees above its point of congelation. M. Braun, having determined to avail himself of this great degree of natural cold, prepared a freezing mixture of nitric acid and pounded ice, by means of which his thermometer was reduced to —69. Part of the quicksilver had now really congealed; yet so far was M. Braun from entertaining any suspicion of the truth, that he had almost desisted from further attempts, being satisfied with having so far exceeded all the philosophers who went before him. Animated, however, by the hopes of producing a still greater degree of cold, he renewed the experiment; but having expended all his pounded ice, he was obliged to substitute snow in its place. With this fresh mixture the mercury sunk to —100, 240, and 352°. He then supposed that the thermometer was broken; but on taking it out to observe whether it was so or not, he found the quicksilver fixed, and continuing so for 12 minutes. On repeating the same experiment with another thermometer which had been graduated no lower than —120, all the mercury sunk into the ball, and became solid as before, not beginning to reascend till after a still longer interval of time. Hence the professor concluded that the quicksilver was really frozen, and prepared for making a decisive experiment. This was accomplished on the 25th of the same month, and the bulb of the thermometer broken as soon as the metal was congealed. The mercury was now converted into a solid and shining metallic mass, which extended under the strokes of a pestle, in hardness rather inferior to lead, and yielding a dull sound like that metal. Professor Æpinus made similar experiments at the same time, employing both thermometers and tubes of a larger bore: in which last he remarked, that the quicksilver fell sensibly on being frozen, assuming a concave surface, and likewise that the congealed pieces sunk in fluid mercury.

The fact being thus established, and fluidity no longer to be considered as an essential property of quicksilver, M. Braun communicated an account of his experiments to the Petersburg Academy, on the 6th of September 1760; of which a large extract was inserted in the Philosophical Transactions, vol. lii. p. 156. Five years afterwards he published another treatise on the same subject, under the title of Supplement to his former dissertation. In these he declared, that, since his former publication, he had never suffered any winter to elapse without repeating the experiment of congealing quicksilver, and never failed of success when the natural cold was of a sufficient strength for the purpose. This degree of natural cold he supposes to be —10 of Fahrenheit, though some

Congelation. commencement of the congelation might be perceived when the temperature of the air was as high as +2. The results of all his experiments were, that with the above-mentioned frigorific mixtures, and once with rectified spirits and snow, when the natural cold was at 28°, he congealed the quicksilver, and discovered that it is a real metal which melts with a very small degree of heat. Not perceiving, however, the necessary consequence of its great contraction in freezing, he, in this work, as well as in the former, confounded its point of congelation with that of its greatest contraction in freezing, and thus marked the former a great deal too low; though the point of congelation was very uncertain according to him, various difficulties having occurred to his attempts of finding the greatest point of contraction while freezing.

4 Of Mr Blumenbach.

The experiments of M. Braun were not repeated by any person till the year 1774, when Mr John Frederic Blumenbach, then a student of physic at Gottingen, performed them to more advantage than it appears M. Braun had ever done. He was encouraged to make the attempt by the excessive cold of the winter that year. "I put (says he), at five in the evening of January 11th, three drachms of quicksilver into a small sugar-glass, and covered it with a mixture of snow and Egyptian sal-ammoniac. This mixture was put loose into the glass, so that the quicksilver lay perfectly free, being only covered with it as by pieces of ice; the whole, together with the glass, weighed somewhat above an ounce. It was hung out at a window in such a position as to expose it freely to the north-west; and two drachms more of sal-ammoniac mixed with the snow on which it stood. The snow and sal-ammoniac, in the open air, soon froze into a mass like ice; no sensible change, however, appeared in the quicksilver that evening; but at one in the morning it was found frozen solid. It had divided into two large and four smaller pieces: one of the former was hemispherical, the other cylindrical, each seemingly rather above a drachm in weight; the four small bits might amount to half a scruple. They were all with their flat side frozen hard to the glass, and nowhere immediately touched by the mixture; their colour was a dull pale white with a bluish cast, like zinc, very different from the natural appearance of quicksilver. Next morning, about eleven o'clock, I found that the larger hemisphere began to melt, perhaps because it was most exposed to the air, and not so near as the others to the sal-ammoniac mixture which lay beneath. In this state it resembled an amalgam, sinking to that side on which the glass was inclined; but without quitting the surface of the glass, to which it was yet firmly congealed: the five other pieces had not yet undergone any alteration, but remained frozen hard. Toward eight o'clock the cylindrical piece began to soften in the same manner, and the other four soon followed. About eight they fell from the surface of the glass, and divided into many fluid shining globules, which were soon lost in the interstices of the frozen mixture, and reunited in part at the bottom, being now exactly like common quicksilver." At the time this experiment was made, the thermometer stood at —10° in the open air.

The circumstances attending this experiment are still unaccountable; for, in the first place, the natural cold was scarcely sufficient, along with that of the artificial mixture, which produces 32° more, to have congealed the quicksilver; which yet appears to have been very effectually done by the length of time it continued solid. 2. It is not easy to account for the length of time required for congealing the quicksilver in this experiment, since other frigorific mixtures begin to act almost immediately; and, 3. There was not at last even the appearance of action, which consists in a solution of the snow, and not in its freezing into a mass. "The whole experiment (says Dr Blagden*) remains involved in such obscurity, that some persons have supposed the quicksilver itself was not frozen, but only covered over with ice; to which opinion, however, there are great objections. It is worthy of remark, that Gottingen, though situated in the same latitude as London, and enjoying a temperate climate in general, becomes subject at times to a great severity of cold. This of 11th of January 1774 is one instance: I find others there where the thermometer sunk to —12°, —16°, or—19°; and at Cattlenburg, a small town about two German miles distant, to —30°. By watching such extraordinary occasions, experiments on the freezing of quicksilver might easily be performed in many places, where the possibility of them is at present little suspected. The cold observed at Glasgow in 1780 would have been fully sufficient for that purpose."

* *Phil. Trans.* vol. iii.

In consequence of the publication of M. Braun's Experiments, the Royal Society desired their late secretary Dr Maty to make the necessary application to the Hudson's Bay Company, in order to repeat the experiment in that country. Mr Hutchins, who was then at London, and going out with a commission as governor of Albany fort, offered to undertake the experiments, and executed them very completely, freezing quicksilver twice in the months of January and February 1775. The account of his success was read before the Royal Society at the commencement of the severest winter that had been known for many years in Europe; and at this time the experiment was repeated by two gentlemen of different countries. One was Dr Lambert Bicker, secretary to the Batavian society at Rotterdam; who, on the 28th of January 1776, at eight in the morning, made an experiment to try how low he could bring the thermometer by artificial cold, the temperature of the atmosphere being then +2°. He could not, however, bring it lower than —94°, at which point it stood immoveable: and on breaking the thermometer, part of the quicksilver was found to have lost its fluidity, and was thickened to the consistence of an amalgam. It fell out of the tube in little bits, which bore to be flattened by pressure, without running into globules like the inner fluid part. The experiment was repeated next day, when the thermometer stood at +8°, but the mercury would not then descend below —80°; and as the thermometer was not broken, it could not be known whether the mercury had congealed or not. All that could be inferred from these experiments therefore was, that the congealing point of mercury was not below —94° of Fahrenheit's thermometer. The other who attempted the congelation of this fluid was the late Dr Anthony Fothergill; but it could not be determined whether

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whether he ſucceeded or not. An account of his experiment is inſerted in the Philoſophical Tranſactions, vol. lxvi.

No other attempts were made to congeal quickſilver until the year 1781, when Mr Hutchins reſumed the ſubject with great ſucceſs, inſomuch that from his experiments the freezing point of mercury is now almoſt as well ſettled as that of water. Preceding philoſophers, indeed, had not been altogether inattentive to this ſubject. Profeſſor Braun himſelf had taken great pains to inveſtigate it; but for want of paying the requiſite attention to the difference betwixt the contraction of the fluid mercury by cold and that of the congealing metal by freezing, he could determine nothing certain concerning it. Others declared it as their opinion, that nothing certain could be determined by merely freezing mercury in a thermometer filled with that fluid. Mr Cavendiſh and Dr Black firſt ſuggeſted the proper method of obviating the difficulties on this ſubject.

5
Dr Black's directions for making the experiment.

Dr Black, in a letter to Mr Hutchins, dated October 5. 1779, gave the following directions for making the experiment with accuracy: "Provide a few wide and ſhort tubes of thin glaſs, ſealed at one end and open at the other: the wideneſs of theſe tubes may be from half to three quarters of an inch, and the length of them about three inches. Put an inch or an inch and a half depth of mercury into one of theſe tubes, and plunging the bulb of the thermometer into the mercury, ſet the tube with the mercury and the thermometer in it into a freezing mixture, which ſhould be made for this purpoſe in a common tumbler or water glaſs: and, *N. B.* in making a freezing mixture with ſnow and nitric acid, the quantity of the acid ſhould never be ſo great as to diſſolve the whole of the ſnow, and only enough to reduce it to the conſiſtence of panada. When the mercury in the wide tube is thus ſet in the freezing mixture, it muſt be ſtirred gently and frequently with the bulb of the thermometer; and if the cold be ſufficiently ſtrong, it will congeal by becoming thick like an amalgam. As ſoon as this is obſerved, the thermometer ſhould be examined without lifting it out of the congealing mercury; and I have no doubt that in every experiment thus made, with the ſame mercury, the inſtrument will always point to the ſame degree, provided it has been made and graduated with accuracy."

6
Apparatus recommended by Mr Cavendiſh.

The apparatus recommended by Mr Cavendiſh, and which Mr Hutchins made uſe of, conſiſted of a ſmall mercurial thermometer, the bulb of which reaches about $2\frac{1}{4}$ inches below the ſcale, and was incloſed in a glaſs cylinder ſwelled at the bottom into a ball, which when uſed was filled with quickſilver, ſo that the bulb of the thermometer was entirely covered with it. If this cylinder be immerſed in a freezing mixture till great part of the quickſilver in it is frozen, it is evident that the degree ſhown at that time by the incloſed thermometer is the preciſe point at which mercury freezes; for as in this caſe the ball of the thermometer muſt be ſurrounded for ſome time with quickſilver, part of which is actually frozen, it ſeems impoſſible that the thermometer ſhould be ſenſibly above that point; and while any of the quickſilver in the cylinder remains fluid, it is impoſſible that it ſhould ſink ſenſibly below it. The diameter of the bulb of the thermometer was rather leſs than a quarter of an inch, that of the ſwelled part of the cylinder two-thirds; and as it was eaſy to keep the thermometer conſtantly in the middle of the cylinder, the thickneſs of quickſilver betwixt it and the glaſs could never be much leſs than the ſixth part of an inch. The bulb of the thermometer was purpoſely made as ſmall as it conveniently could, in order to leave a ſufficient ſpace between it and the cylinder, without making the ſwelled part larger than neceſſary, which would have cauſed more difficulty in freezing the mercury in it.

The firſt experiment with this apparatus was made on the 15th of December 1781; the thermometer had ſtood the evening before at —18°. A bottle of ſpiritus nitri fortis was put on the houſe-top, in order to cool it to the ſame temperature. The thermometers made uſe of had been hung up in the open air for three weeks, to compare their ſcales. On the morning of the experiment they were about 23° below 0.—In making it, the thermometer of the apparatus was ſuſpended in the bulb of the cylinder by means of ſome red worſted wound about the upper part of its ſtem, to a ſufficient thickneſs to fill the upper part of its orifice; and a ſpace of near half an inch was left empty between the quickſilver and worſted.

The apparatus was placed in the open air, on the top of the fort, with only a few deer ſkins ſewed together for a ſhelter; the ſnow lay 18 inches deep on the works, and the apparatus was ſtuck into the ſnow, in order to bring it the ſooner to the temperature of the air. The inſtruments were afterwards placed in three freſh freezing mixtures, in hopes of being able by their means to produce a greater degree of cold, but without effect; nor was any greater cold produced by adding more nitric acid. The mercury, however, was very completely frozen, that in the thermometer deſcending to 448°. On plunging the mercury into the freezing mixture, it deſcended in leſs than one minute to 40° below 0.

The ſecond experiment was made the day following; and the ſame quantity of quickſilver employed that had been uſed in the former. As too ſmall a quantity of the freezing mixture, however, had been originally made, it was neceſſary to add more during the operation of congelation; by which means the ſpirit of nitre, in pouring it upon the ſnow, ſometimes touched the bulb of the thermometer, and inſtantly raiſed it much higher; nor did the mercury ever deſcend below 206°, which was not half as far as it had done the day before, though the temperature of the atmoſphere had been this day at —34° before the commencement of the operation. That in the apparatus, however, ſunk to —95°. The apparatus was taken out of the mixture for half a minute, in order to examine whether the mercury was perfectly congealed or not, and during that time it ſhowed no ſign of liquefaction.

The third experiment was made the ſame day, and with the freezing mixture uſed in the laſt. By it the point of congelation was determined to be not below 40°.

The fourth experiment was made January 7th 1782; and

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and in it he obferved, that the mercury in the apparatus thermometer, after ftanding at 42 and 41½ for a confiderable time, fell to 77, not gradually, but at once as a weight falls.

In the fifth experiment the weather was exceffively fevere, fo that it ought to have frozen the metal in the open air; but this did not then happen.

At the time of making the fixth experiment, the quickfilver in the open air ftood at 44 below 0; and Mr Hutchins refolved to make ufe of this opportunity to obferve how far it was poffible to make it defcend by means of cold, obferving the degrees at the fame time with a fpirit thermometer made by Nairne and Blount, with which he had been furnifhed by the Royal Society in 1774. In this, however, he did not fucceed; for the mercury never fell below 438, nor the ftandard 48. It ftood at 27½ at the beginning of the experiment. The reafon of this was fuppofed to be, that the atmofphere was too cold for making this kind of experiment, by reafon of its freezing the thread of quickfilver in the ftem of the thermometer, fo that it became incapable of contraction along with that in the bulb. In other experiments, though the metal in the bulb became folid, yet that in the ftem always remained fluid; and thus was enabled to fubfide to a great degree by the diminution of bulk in the folid mercury. That this was really the cafe, appeared from the quickfilver falling at once from —86 to —434, when the cold of the freezing mixture diminifhed, and the temperature of the air becoming about the fame time fomewhat milder, melted the congealed part in the ftem, which thus had liberty to defcend to that point.

In this experiment, alfo, the mixtures were made in double quantity to thofe of the former; thefe being only in common tumblers, but the mixtures for this experiment in pint-bafons. It was obferved that they liquefied fafter than in other experiments. He had ufually made them of the confiftence of pap; but though he added fnow at different times, it had very little effect in augmenting the cold, but rather decreafed it. The congealed pieces of the metal fell to the bottom, as might naturally have been expected from its great contraction in becoming folid.

From this experiment Mr Hutchins concluded, that the nearer the temperature of the atmofphere approached to the congealing point of mercury (fo that a great degree of cold might be communicated to the bulb of a thermometer, and yet the quickfilver in the tube remain fluid), he might make the experiment of afcertaining the greateft contraction of mercury to more advantage. With this view, he made another experiment, when the temperature of fome of his thermometers ftood as low as —37°; and after an hour's attendance, he perceived the mercury had fallen to 1367; but the thermometer unluckily was broken, and its bulb thrown away with the mixture. Profeffer Braun had likewife obferved, that his thermometers were always broken when the mercury defcended below 600.

The eighth experiment was made with a view to try whether quickfilver would congeal when in contact with the freezing mixture. For this purpofe, he did not ufe the apparatus provided for other experiments, but filled a gallipot made of flint ftone (as being thinner than the common fort), containing about an ounce, half full of quickfilver, into which he inferted a mercurial thermometer, employing another as an index. Thus he hoped to determine exactly when the quickfilver was congealed, as he had free accefs to it at all times, which was not the cafe when it was inclofed in the cylindrical glafs, the worfted wound round the tube of the thermometer to exclude the air being equally effectual in excluding any inftrument from being introduced to touch the quickfilver. He then made a kind of fkewer, with a flat blunt point, of dried cedar-wood, on account of its lightnefs, which he found would remain in the gelatinous freezing mixture at any depth he chofe; but, when inferted into the quickfilver, the great difference betwixt the fpecific gravity of it and that ponderous fluid, made it always rebound upward; and by the degree of refiftance, he could always know whether it proceeded from fluid or folid metal. At this time, however, the experiment did not fucceed; but, at another trial, having employed about ¾ths of a pound of metal, and let it remain a confiderable time immerfed in the fame mixture which had juft now been fuppofed to fail, he found that part of it was congealed; and, on pouring off the fluid part, no lefs than two-thirds remained fixed at the bottom.

7
Mr Cavendifh's experiments.

The laft experiment which has been publifhed concerning the congelation of quickfilver by means of fnow, is that of Mr Cavendifh, and of which he gives an account in the Phil. Tranfact. vol. lxxiii. p. 325. Here, fpeaking of the cold of freezing mixtures, he fays. "There is the utmoft reafon to think that Mr Hutchins would have obtained a greater degree of cold by ufing a weaker nitrous acid than he did. I found (fays he) by adding fnow gradually to fome of this acid, that the addition of a fmall quantity produced heat inftead of cold; and it was not until fo much was added as to increafe the heat from 28 to 51°, that the addition of more fnow began to produce cold; the quantity of fnow required for this purpofe being pretty exactly one quarter of the weight of the fpirit of nitre, and the heat of the fnow, and air of the room, as well as of the acid, being 28°. The reafon of this is, that a great deal of heat is produced by mixing water with fpirit of nitre; and the ftronger the fpirit is, the greater is the heat produced. Now it appears from this experiment, that before the acid was diluted, the heat produced by its union with the water formed from the melting fnow, was greater than the cold produced by the fame; and it was not until it was diluted by the addition of one quarter of its weight of that fubftance, that the cold, generated by the latter caufe, began to exceed the heat generated by the former. From what has been faid, it is evident, that a freezing mixture made with undiluted acid will not begin to generate cold until fo much fnow is diffolved as to increafe its heat from 28 to 51°; fo that no greater cold will be produced than would be obtained by mixing the diluted acid heated to 51° with fnow of the heat of 28°. This method of adding fnow gradually is much the beft way I know of finding what ftrength it ought to be of, in order to produce the greateft effect poffible. By means of this acid

Congelation. acid diluted in the above-mentioned proportion, I froze quickfilver in the thermometer called G (A) by Mr Hutchins, on the 26th of February 1782. I did not indeed break the thermometer to examine the ftate of the quickfilver therein; for, as it funk to —110°, it certainly muft have been in part frozen; but immediately took it out, and put the fpirit thermometer in its room, in order to find the cold of the mixture. It funk only to —30°; but by making allowance of the fpirit in the tube being not fo cold as that in the ball, it appears, that if it had not been for this caufe, it would have funk to —35° (B); which is 6° below the point of freezing, and is within one degree of as great a cold as that produced by Mr Hutchins.

"In this experiment the thermometer G funk very rapidly; and, as far as I could perceive, without ftopping at any intermediate point till it came to the above mentioned degree of —110°, where it ftuck. The materials ufed in making the mixture were previoufly cooled, by means of falt and fnow, to near 0; and the temperature of the air was between 20° and 25°; the quantity of acid ufed was 4½ oz.; and the glafs in which the mixture was made, was furrounded with wool, and placed in a wooden box, to prevent its lofing its cold fo faft as it would otherwife have done. Some weeks before this I made a freezing mixture with fome fpirit of nitre much ftronger than that ufed in the foregoing experiment, though not quite fo ftrong as the undiluted acid, in which the cold was lefs intenfe by 4½°. It is true the temper of the air was much lefs cold, namely 35°, but the fpirit of nitre was at leaft as cold, and the fnow not much lefs fo.

"The cold produced by mixing fulphuric acid, properly diluted with fnow, is not fo great as that produced by fpirit of nitre, though it does not differ from it by fo much as 8°; for a freezing mixture, prepared with diluted fulphuric acid, whofe fpecific gravity, at 60° of heat, was 1,5642, funk in the thermometer G to —37°, the experiment being tried at the fame time, and with the fame precautions, as the foregoing. It was previoufly found, by adding fnow gradually to fome of this acid, as was done by the nitrous acid, that it was a little, but not much ftronger, than it ought to be, in order to produce the greateft effect."

The experiment made by Mr Walker, in which he congealed quickfilver by means of nitric acid and Glauber's falt, without any fnow, concludes the hiftory of the artificial congelation of mercury. It now remains that we fay fomething of the congelation of it by the natural cold of the atmofphere.

8 Congelation of quickfilver by natural cold.

Dr Blagden, from whofe paper in the Philofophical Tranfactions, vol. lxxiii. this account is taken, obferves, that it was not till near the year 1730 that thermometers were made with any degree of accuracy; and in four or five years after this, the firft obfervations were made which prove the freezing of quickfilver. On the acceffion of the emprefs Anne Ivanouna to the throne of Ruffia, three profeffors of the Imperial academy were chofen to explore and defcribe the different parts of her Afiatic dominions, and to inquire into the communication betwixt Afia and America. Thefe were Dr John George Gmelin, in the department of natural hiftory and chemiftry; M. Gerard Frederic Muller, as general hiftoriographer; and M. Louis de l'Ifle de la Croyere, for the department of aftronomy; draughtfmen and other proper affiftants being appointed to attend them. They departed from Peterfburgh in 1733; and fuch as furvived did not return till ten years after. The thermometrical obfervations were communicated by Profeffor Gmelin, who firft publifhed them in his Flora Sibirica, and afterwards more fully in the Journal of his Travels. An abftract of them was likewife inferted in the Peterfburg Commentaries for the years 1756 and 1765, taken, after the profeffor's death, from his original difpatches in poffeffion of the Imperial academy.

In the winter of 1734 and 1735, Mr Gmelin being at Yenefeifk in 58½° N. Lat. and 92° E. Long. from Greenwich, firft obferved fuch a defcent of the mercury, as we know muft have been attended with congelation. "Here (fays he) we firft experienced the truth of what various travellers have related with refpect to the extreme cold of Siberia; for, about the middle of December, fuch fevere weather fet in, as we were fure had never been known in our time at Peterfburg. The air feemed as if it were frozen, with the appearance of a fog, which did not fuffer the fmoke to afcend as it iffued from the chimneys. Birds fell down out of the air as dead, and froze immediately, unlefs they were brought into a warm room. Whenever the door was opened, a fog fuddenly formed round it. During the day, fhort as it was, parhelia and haloes round the fun were frequently feen; and in the night mock-moons, and haloes about the moon. Finally, our thermometer, not fubject to the fame deception as the fenfes, left us no doubt of the exceffive cold; for the quickfilver in it was reduced on the 5th of January O. S. to —120° of Fahrenheit's fcale, lower than it had ever hitherto been obferved in nature." 9 Exceffive cold of Siberia.

The next inftance of congelation happened at Yakutfk, in N. Lat. 62. and E. Long. 130. The weather here was unufually mild for the climate, yet the thermometer fell to —72°; and one perfon informed the profeffor by a note, that the mercury in his barometer was frozen. He haftened immediately to his houfe to behold fuch a furprifing phenomenon; but though he was witnefs to the fact, the prejudice he entertained againft the poffibility of the congelation, would not allow him to believe it. "Not feeling (fays he), by the way, the fame effects of cold as I had experienced at other times in lefs diftances, I began, before my arrival, to entertain fufpicions about the congelation of his quickfilver. In fact, I faw that it did not continue in one column, but was divided in different places as into little cylinders, which appeared frozen; and, in fome of thefe divifions between the quickfilver, I perceived like the appearance of frozen moifture.

(A) This was a fmall mercurial thermometer, made by Nairne and Blount, on an ivory fcale, divided at every five degrees, and reaching from 215° above to 250° below the cipher.

(B) This is to be underftood of a fpirit thermometer, whofe —29° =40° of Fahrenheit's mercurial.

moiſture. It immediately occurred to me, that the mercury might have been cleaned with vinegar and ſalt, and not ſufficiently dried. The perſon acknowledged it had been purified in that manner. This ſame quickſilver, taken out of the barometer, and well dried, would not freeze again, though expoſed to a much greater degree of cold, as ſhown by the thermometer."

Another ſet of obſervations, in the courſe of which the mercury frequently congealed, were made by Profeſſor Gmelin at Kirenga fort in 57½ N. Lat. 108. E. Long.; his thermometer, at different times, ſtanding at —108°, —86°, —100°, —113°, and many other intermediate degrees. This happened in the winter of 1737 and 1738. On the 27th of November, after the thermometer had been ſtanding for two days at —46°, he found it ſunk at noon to 108°. Suſpecting ſome miſtake, after he had noted down the obſervation, he inſtantly ran back, and found it at 102°; but aſcending with ſuch rapidity, that in the ſpace of half an hour it had riſen to —19°. This phenomenon, which appeared ſo ſurpriſing, undoubtedly depended on the expanſion of the mercury frozen in the bulb of the thermometer, and which now melting, forced upwards the ſmall thread in the ſtem.

A ſimilar appearance was obſerved at the ſame fort a few days after; and on the 29th of December, O. S. he found the mercury, which had been ſtanding at —40° in the morning, ſunk to —100° at four in the afternoon. At this time, he ſays, he "ſaw ſome air in the thermometer ſeparating the quickſilver for the ſpace of about ſix degrees." He had taken notice of a ſimilar appearance the preceding evening, excepting that the *air*, as he ſuppoſed it to be, was not then collected into one place, but lay ſcattered in ſeveral.

Theſe appearances undoubtedly proceeded from a congelation of the mercury, though the prejudice entertained againſt the poſſibility of this phenomenon would not allow the profeſſor even to inquire into it at all. Several other obſervations were made; ſome of which were loſt, and the reſt contain no farther information.

The ſecond inſtance where a natural congelation of mercury has certainly been obſerved, is recorded in the Tranſactions of the Royal Academy of Sciences at Stockholm. The weather, in January 1760, was remarkably cold in Lapland; ſo that, on the 5th of that month, the thermometers fell to —76°, —128°, or lower; on the 23d and following days they fell to —58°, —79°, —92°, and below —238° entirely into the ball. This was obſerved at Tornea, Sombio, Jakaſierf, and Utſioki, four places in Lapland, ſituated between the 65th and 78th degrees of N. Lat. and the 21ſt and 28th of E. Long. The perſon who obſerved them was M. Andrew Hellant, who makes the following remarks, of themſelves ſufficient to ſhow that the quickſilver was frozen. "During the cold weather at Sombio (ſays he), as it was clear ſunſhine, though ſcarcely the whole body of the ſun appeared above the low woods that covered our horizon, I took a thermometer which was hanging before in the ſhade, and expoſed it to the riſing ſun about eleven in the forenoon, to ſee whether, when that luminary was ſo low, it would have any effect upon the inſtrument. But to my great ſurpriſe, upon looking at it about noon, I found that the mercury had entirely ſubſided into the ball, though it was ſtanding as high as —61° at 11 o'clock, and the ſcale reached down to 238° below 0." On bringing the inſtrument near a fire, it preſently roſe to its uſual height; and the reaſon of its ſubſiding before was its being ſomewhat warmed by the rays of the ſun; which, feeble as they were, had yet ſufficient power to melt the ſmall thread of congealed mercury in the ſtem of the thermometer, and allow it to ſubſide along with the reſt. Mr Hellant, however, ſo little underſtood the reaſon of this phenomenon, that he frequently attempted to repeat it by bringing the thermometer near a fire, when the cold was only a few degrees below the freezing point of water, but could never ſucceed until it fell to —58°, or lower, that is, until the cold was ſufficiently intenſe to congeal the metal. The only ſeeming difficulty in his whole account is, that when the mercury had ſubſided entirely into the ball of the thermometer, a vacuum or empty ſpot appeared, which run round the cavity like an air bubble, on turning the inſtrument; but this proceeded from a partial liquefaction of the mercury, which muſt neceſſarily melt firſt on the outſide, and thus exhibit the appearance juſt mentioned. 10

Remarkable experiments of Dr Pallas.

The moſt remarkable congelation of mercury, which has ever yet been obſerved, was that related by Dr Peter Simon Pallas, who had been ſent by the empreſs of Ruſſia, with ſome other gentlemen, on an expedition ſimilar to that of Dr Gmelin. He did not, however, ſpend the winters in which he was in Siberia in the coldeſt parts of that country; that is, about the middle of the northern part. Twice indeed he reſided at Kraſnoyarſk, in N. Lat. 56½°, E. Long. 93°; where, in the year 1772, he had an opportunity of obſerving the phenomenon we ſpeak of. "The winter (ſays he) ſet in early this year, and was felt with uncommon ſeverity in December. On the 6th and 7th of that month happened the greateſt cold I have ever experienced in Siberia; the air was calm at the time, and ſeemingly thickened; ſo that, though the ſky was in other reſpects clear, the ſun appeared as through a fog. I had only one ſmall thermometer left, in which the ſcale went no lower than —7°; and on the 6th in the morning, I remarked that the quickſilver in it ſunk into the ball, except ſome ſmall columns which ſtuck faſt in the tube. When the ball of the thermometer, as it hung in the open air, was warmed by being touched with the finger, the quickſilver roſe; and it could plainly be ſeen, that the ſolid columns ſtuck and reſiſted a good while, and were at length puſhed upward with a ſort of violence. In the mean time I placed upon the gallery, on the north ſide of my houſe, about a quarter of a pound of clean and dry quickſilver in an open bowl. Within an hour I found the edges and ſurface of it frozen ſolid, and ſome minutes afterwards the whole was condenſed by the natural cold into a ſoft maſs very much like tin. While the inner part was ſtill fluid, the frozen ſurface exhibited a great variety of branched wrinkles; but in general it remained pretty ſmooth in freezing, as did alſo a larger quantity which I afterwards expoſed to the cold. The congealed mercury was more flexible than lead; but on being bent ſhort, it was found more brittle than tin; and when hammered out thin, it ſeemed ſomewhat granulated. If the hammer had not been

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been perfectly cooled, the quickſilver melted away under it in drops; and the ſame thing happened when the metal was touched with the finger, by which alſo the finger was immediately benumbed. In our warm room it thawed on its ſurface gradually, by drops, like wax on the fire, and did not melt all at once. When the frozen maſs was broken to pieces in the cold, the fragments adhered to each other and to the bowl on which they lay. Although the froſt ſeemed to abate a little towards night, yet the congealed quickſilver remained unaltered, and the experiment with the thermometer could ſtill be repeated. On the 7th of December, I had an opportunity of making the ſame obſervations all day; but ſome hours after ſunſet, a north-weſt wind ſprung up, which raiſed the thermometer to —46°, when the maſs of quickſilver began to melt."

19 Von Elterlein's experiment.

In the beginning of the year 1780 M. Von Elterlein, of Vytegra, a town of Ruſſia, in Lat. 61. E. Long. 36. froze quickſilver by natural cold; of which he gives the following account. "On the 4th of January 1780, the cold having increaſed to —34° that evening at Vytegra, I expoſed to the open air three ounces of very pure quickſilver in a china tea-cup, covered with paper, pierced full of holes. Next day, at eight in the morning, I found it ſolid, and looking like a piece of caſt lead, with a conſiderable depreſſion in the middle. On attempting to looſen it in the cup, my knife raiſed ſhavings from it as if it had been lead, which remained ſticking up; and at length the metal ſeparated from the bottom of the cup in one maſs. I then took it in my hand to try if it would bend: it was ſtiff like glue, and broke into two pieces; but my fingers immediately loſt all feeling, and could ſcarcely be reſtored in an hour and a half by rubbing with ſnow. At eight o'clock a thermometer, made by Mr Lexmann of the academy, ſtood at —57°; by half after nine it was riſen to —40°; and then the two pieces of mercury which lay in the cup had loſt ſo much of their hardneſs, that they could no longer be broken, or cut into ſhavings, but reſembled a thick amalgam, which, though it became fluid when preſſed by the fingers, immediately afterwards reſumed the conſiſtence of pap. With the thermometer at —39°, the quickſilver became fluid. The cold was never leſs on the 5th than —28°, and by nine in the evening it had increaſed again to —33°."

An inſtance of the natural congelation of quickſilver alſo occurred in Jemtland, one of the provinces of Sweden, on the 1ſt of January 1782; and laſtly, on the 26th of the ſame month, Mr Hutchins obſerved the ſame effect of the cold at Hudſon's bay. "The

20 Experiment of Mr Hutchins.

ſubject of this curious phenomenon (ſays he), was quickſilver put into a common two-ounce phial, and corked. The phial was about a third part full, and had conſtantly been ſtanding by the thermometer for a month paſt. At eight o'clock this morning I obſerved it was frozen rather more than a quarter of an inch thick round the ſides and bottom of the phial, the middle part continuing fluid. As this was a certain method of finding the point of congelation, I introduced a mercurial and a ſpirit thermometer into the fluid part, after breaking off the top of the phial, and they roſe directly and became ſtationary; the former at 40° or $40\frac{1}{2}$°, the latter at $29\frac{3}{4}$°, both below the cypher. Having taken theſe out, I put in two others, G a mercurial one formerly deſcribed, and a ſpirit thermometer; the former of which became ſtationary at 40° and the latter at 30°. I then decanted the fluid quickſilver, to examine the internal ſurface of the frozen metal, which proved very uneven, with many radii going acroſs, ſome of which reſembled pin-heads. Urgent buſineſs called me away an hour. On my return I found a ſmall portion only had liquefied in my abſence. I then broke the phial entirely, and with a hammer repeatedly ſtruck the quickſilver. It beat out flat, yielded a deadiſh ſound, and became fluid in leſs than a minute afterwards. It may be worth remarking, that the quickſilver in one of the thermometers, which had ſunk to very near 500, and was then at 444, very readily run up and down the tube by elevating either end of the inſtrument."

Theſe are all the well authenticated accounts of the congelation of mercury by the natural cold of the atmoſphere. Some others have been publiſhed; but being either leſs important, or not ſo well authenticated, we forbear to mention them. A very conſiderable confirmation is obtained from the above hiſtory, of the theory of congelation delivered by Dr Black, and which is fully explained under the article CHEMISTRY. On Mr Hutchins's experiments, and on congelation in general, Mr Cavendiſh makes many valuable remarks; the ſubſtance of which is as follows:

21 Mr Cavendiſh's remarks on congelation.

"If a veſſel of water, with a thermometer in it, be expoſed to the cold, the thermometer will ſink ſeveral degrees below the freezing point, eſpecially if the water be covered up ſo as to be defended from the wind, and care taken not to agitate it; and then on dropping in a bit of ice, or on mere agitation, ſpiculæ of ice ſhoot ſuddenly through the water, and the incloſed thermometer riſes quickly to the freezing point, where it remains ſtationary. In a note he ſays, that though in conformity to the common opinion he has allowed that "mere agitation may ſet the water a freezing, yet ſome experiments lately made by Dr Blagden ſeem to ſhow, that it has not much, if any, effect of that kind, otherwiſe than by bringing the water in contact with ſome ſubſtance colder than itſelf. Though in general alſo the ice ſhoots rapidly, and the incloſed thermometer riſes very quick; yet he once obſerved it to riſe very ſlowly, taking up not leſs than half a minute, before it aſcended to the freezing point; but in this experiment the water was cooled not more than one or two degrees below freezing; and it ſhould ſeem, that the more the water is cooled below the freezing point, the more rapidly the ice ſhoots and the incloſed thermometer riſes."

Mr Cavendiſh then obſerves, that from the foregoing experiments we learn that water is capable of being cooled conſiderably below the freezing point, without any congelation taking place, ; and that, as ſoon as by any means a ſmall part of it is made to freeze, the ice ſpreads rapidly through the whole of the water. The cauſe of this riſe of the thermometer is, that all, or almoſt all bodies, by changing from a fluid to a ſolid ſtate, or from the ſtate of an elaſtic to that of an unelaſtic fluid, generate heat; and that cold is produced by the contrary proceſs. Thus all the circumſtances of the phenomenon may be perfectly well explained; for, as ſoon as any part of the water freezes, heat will be generated thereby in conſequence of the

Congelation.

the above-mentioned law, ſo that the new formed ice and remaining water will be warmed, and muſt continue to receive heat by the freezing of freſh portions of water, till it is heated exactly to the freezing point, unleſs the water could become quite ſolid before a ſufficient quantity of heat was generated to raiſe it to that point, which is not the caſe: and it is evident, that it cannot be heated above the freezing point: for as ſoon as it comes thereto, no more water will freeze, and conſequently no more heat will be generated.—The reaſon why the ice ſpreads all over the water, inſtead of forming a ſolid lump in one part, is, that, as ſoon as any ſmall portion of ice is formed, the water in contact with it will be ſo much warmed as to be prevented from freezing, but the water at a little diſtance from it will ſtill be below the freezing point, and will conſequently begin to freeze.

"Were it not for this generation of heat, the whole of any quantity of water would freeze as ſoon as the proceſs of congelation began; and in like manner the cold is generated by the melting of ice; which is the cauſe of the long time required to thaw ice and ſnow. It was formerly found that, by adding ſnow to warm water, and ſtirring it about until all was melted, the water was as much cooled as it would have been by the addition of the ſame quantity of water rather more than 150° degrees colder than the ſnow; or, in other words, ſomewhat more than 150° of cold are generated by the thawing of the ſnow; and there is great reaſon to believe that juſt as much heat is produced by the freezing of water. The cold generated in the experiment juſt mentioned was the ſame whether ice or
22 ſnow was uſed.

On metals when beginning to turn ſolid.

"A thermometer kept in melted tin or lead till they become ſolid, remains perfectly ſtationary from the time the metal begins to harden round the ſides of the pot till it is entirely ſolid; but it cannot be perceived at all to ſink below that point, and riſe up to it when the metal begins to harden. It is not unlikely, however, that the great difference of heat between the air and melted metal might prevent this effect from taking place; ſo that though it was not perceived in theſe experiments, it is not unlikely that thoſe metals, as well as water and quickſilver, may bear being cooled a little below the freezing or hardening point (for the hardening of melted metals, and freezing of water, ſeems exactly the ſame proceſs,) without beginning to loſe their fluidity.

"The experiments of Mr Hutchins prove, that quickſilver contracts or diminiſhes in bulk by freezing, and that the very low degrees to which the thermometers have been made to ſink, is owing to this contraction, and not to the cold having been in any degree equal to that ſhown by the thermometer. In the fourth experiment, one of the thermometers ſunk to 450°, though it appeared, by the ſpirit thermometers, that the cold of the mixture was not more than five or ſix degrees below the point of freezing quickſilver. In the firſt experiment alſo, it ſunk to 448°, at a time when the cold of the mixture was only $2\frac{1}{2}$° below that point; ſo that it appears that the contraction of quickſilver by freezing muſt be at leaſt equal to its expanſion by 404 degrees of heat (A). This however, is not the whole contraction that it ſuffers; for it appears by an extract from a meteorological journal kept by Mr Hutchins at Albany fort, that his thermometer once ſunk to 490° below 0; though it was known by a ſpirit thermometer that the cold ſcarcely exceeded the point of freezing quickſilver. There are two experiments alſo of Profeſſor Braun, in which the thermometer ſunk to 544 and 556° below 0; which is the greateſt deſcent he ever obſerved without the ball being cracked. It is not indeed known how cold his mixtures were; but from Mr Hutchins's experiments, there is great reaſon to think they could not be many degrees below 40°. If ſo, the contraction which quickſilver ſuffers in freezing, is not much leſs than its expanſion by 500° or 510° of heat, that is, almoſt $\frac{1}{23}$ of its whole bulk; and in all probability is never much more than that, though it is probable that this contraction is not always determinate; for a conſiderable variation may frequently be obſerved in the ſpecific gravity of the ſame piece of metal caſt different times over; and almoſt all caſt metals become heavier by hammering. Mr Cavendiſh obſerved, that on caſting the ſame piece of tin three times over, its denſity varied from 7.252 to 7.294, though there was great reaſon to think that no hollows were left in it, and that only a ſmall part of this difference could proceed from the error of the experiment. This variation of denſity is as much as is produced in quickſilver by an alteration of 66° of heat: and it is not unlikely, that the deſcent of a thermometer, on account of the contraction of the quickſilver in its ball by freezing, may vary as much in different trials, though the whole maſs of quickſilver is frozen without any vacuities. 23

Variation of the denſity of metals by frequent caſting.

"The cold produced by mixing ſpirit of nitre with ſnow is entirely owing to the melting of the ſnow. Now, in all probability, there is a certain degree of cold, in which the ſpirit of nitre, ſo far from diſſolving ſnow, will yield part of its own water, and ſuffer that to freeze, as is the caſe with ſolutions of common ſalt; ſo that if the cold of the materials before mixing is equal to this, no additional cold can be produced. If the cold of the materials is leſs, ſome increaſe of cold will be produced; but the total cold will be leſs than in the former caſe, ſince the additional cold cannot be generated without ſome of the ſnow being diſſolved, and thereby weakening the acid, and making it leſs able to diſſolve more ſnow; but yet the leſs the cold of the materials is, the greater will be the additional cold produced. This is conformable to Mr Hutchins's experiments; for in the fifth experiment, in 24

Of freezing mixtures.

(A) The numbers here given are thoſe ſhown by the thermometer without any correction; but if a proper allowance is made for the error of that inſtrument, it will appear, that the true contraction was 25° leſs than here ſet down; and from the manner in which thermometers have been uſually adjuſted, it is likely that in the 5th experiment of Mr Hutchins, as well as in thoſe of Profeſſor Braun, the true contraction might equally fall ſhort of that by obſervation.

in which the cold of the materials was —40°, the additional cold produced was only 5°. In the firſt experiment, in which the cold of the materials was only —23°, an addition of at leaſt 19° of cold was obtained; and by mixing ſome of the ſame ſpirit of nitre with ſnow in this climate, when the heat of the materials was +26°, Mr Cavendiſh was able to ſink the thermometer to —29°, ſo that an addition of 55 degrees of cold was produced.

" It is remarkable that in none of Mr Hutchins's experiments the cold of the mixture was more than 6° of the ſpirit thermometer below the freezing point of quickſilver; which is ſo little, that it might incline one to think that the ſpirit of nitre uſed by him was weak. This, however, was not the caſe; as its ſpecific gravity at 58° of heat was 1,4923. It was able to diſſolve $\frac{1}{1.42}$ its weight of marble, and contained very little mixture of ſulphuric or muriatic acid; as well as could be judged from an examination of it, it was as little phlogiſticated as acid of that ſtrength uſually is."

25
Congelation of ſulphuric acid.

Acids, eſpecially thoſe of the mineral kind, powerfully reſiſt congelation. There is, however, a peculiarity with regard to that of vitriol. M. Chaptal, a foreign chemiſt, obſerved, that it condenſed by the cold of the atmoſphere, and the cryſtals began to melt only at +70° of his thermometer; which, if Reaumur's, correſponds to about 47° of Fahrenheit. The cryſtals were unctuous from the melting acid, and they felt warmer than the neighbouring bodies: the form was that of a priſm of ſix ſides, flatted and terminated by a pyramid of ſix ſides; but the pyramid appeared on one end only; on the other, the cryſtal was loſt in the general maſs. The pyramid reſulted from an aſſemblage of ſix iſoſceles triangles; the oil, when the cryſtal was melted was of a yellowiſh black; on rediſtilling it in a proper apparatus, no peculiar gas came over. M. Chaptal repeated his experiments with the highly concentrated acid, but found that it did not freeze; that the denſity of the acid which he thought froze moſt eaſily was to the oil, of the uſual ſtrength for ſale, as from 63 and 65 to 66; and the neceſſary degree of cold about 19 of Fahrenheit. Sulphuric acid once melted will not cryſtallize again with the ſame degree of cold.

26
Mr Keir's experiments.

In the experiments which had been made on the freezing of ſulphuric acid, Mr Cavendiſh found ſome uncertainty in determining the point at which it freezes moſt readily; neither could he determine whether the cold neceſſary for congelation does not increaſe without any limitation in proportion to the ſtrength of the acid. A new ſet of experiments were therefore made by Mr Keir to determine this point. He had obſerved, after a ſevere froſt at the end of the year 1784 and beginning of 1785, that ſome ſulphuric acid, contained in a corked phial, had congealed, while other bottles containing the ſame, ſome ſtronger and ſome weaker, retained their fluidity. As the congelation was naturally imputed to the extremity of the cold, he was afterwards ſurpriſed to find, when the froſt ceaſed, that the acid remained congealed for many days, when the temperature of the atmoſphere was ſometimes above 40° of Fahrenheit; and when the congealed acid was brought into a warm room on purpoſe to thaw it, a thermometer placed in contact with it during its thawing continued ſtationary at 45°. Hence he concluded, that the freezing and thawing point of this acid was nearly at 45°; and accordingly, on expoſing the liquor which had been thawed to the air at the temperature of 30°, the congelation again took place in a few hours. From the circumſtance of other parcels of the ſame acid, but of different ſtrengths, remaining fluid, though they had been expoſed to a much greater degree of cold, he was led to believe that there muſt be ſome certain ſtrength at which the acid is more diſpoſed to congeal than at any other. The ſpecific gravity of the acid which had frozen was to that of water nearly as 1800 to 1000, and that of the ſtronger acid which had not frozen was as 1846 to 1000, which is the common denſity of that uſually ſold in England; and there was not the leaſt difference, excepting in point of ſtrength, between the acid which had frozen and that which had not; Mr Keir having taken the acid ſome weeks before with his own hands from the bottle which contained the latter, and diluted it with water, till it became of the ſpecific gravity of 1800.

To render the experiment complete, Mr Keir immerſed ſeveral acids of different ſtrengths in melting ſnow, inſtead of expoſing them to the air; the temperature of which was variable, whereas that of melting ſnow was certain and invariable. Thoſe which would not freeze in melting ſnow were afterwards immerſed in a mixture of common ſalt, ſnow, and water; the temperature of which, though not ſo conſtant and determinate as that of melting ſnow, generally remained for ſeveral hours at 18°, and was ſometimes ſeveral degrees lower. The intention of adding water to the ſnow and ſalt was to leſſen the intenſity of the cold of this mixture, and to render it more permanent than if the ſnow and ſalt alone were mixed. The acids which had frozen in melting ſnow were five in number; which being thawed and brought to the temperature of 60°, were found on examination to have the following ſpecific gravities, viz. 1786, 1784, 1780, 1778, 1775. Thoſe which had not congealed with the melting ſnow, but which did ſo with the mixture of ſnow, ſalt, and water, were found, when brought to the temperature of 60°, to be of the following ſpecific gravities, viz. 1814, 1810, 1804, 1794, 1790, 1770, 1759, 1750. Thoſe which remained, and would freeze neither in melting ſnow nor in the mixture of ſnow, ſalt, and water, were of the gravities 1864, 1839, 1815, 1745, 1720, 1700, 1610, 1551. From the firſt of theſe it appears, that the medium denſity of the acids which froze with the natural cold was 1780; and from the ſecond, that at the denſities of 1790 and 1770 the acid had been incapable of freezing with that degree of cold. Hence it follows, that 1780 is nearly the degree of ſtrength of eaſieſt freezing, and that an increaſe or diminution of that denſity equal to $\frac{1}{178}$th of the whole, renders the acid incapable of freezing with the cold of melting ſnow, though this cold is ſomething above the freezing point of the moſt congealable acid. From the ſecond it appears, that by applying a more intenſe cold, viz. that produced by a mixture of ſnow, ſalt, and water, the limits of the denſities of acids capable of congelation were extended to about $\frac{1}{178}$th above or below the

point

point of eafieft freezing: and there feems little reafon to doubt, that, by greater augmentations of cold, thefe limits may be further extended; but in what ratio thefe augmentations and extenfions proceed, cannot be determined, without many obfervations made in different temperatures.

"But (fays Mr Keir) though it is probable that the moft concentrated acids may be frozen, provided the cold be fufficiently intenfe, yet there feems reafon to believe, that fome of the congelations which have been obferved in highly concentrated acids, have been effected in confequence of the denfity of thefe acids being reduced nearly to the point of eafy freezing by their having abforbed moifture from the air: for the Duke d'Ayen and M. de Morveau expofed their acids to the air in cups or open veffels; and the latter even acquaints us, that on examining the fpecific gravity of the acid which had frozen, he found it to that of water as 129 to 74; which denfity being lefs than that of eafieft freezing, proves that the acid he employed, and which he had previoufly concentrated, had been actually weakened during the experiment. I have feveral times expofed concentrated fulphuric acid in open veffels in frofty weather; and I have fometimes, but not always, obferved a congelation to take place. Upon feparating the congealed part, and on examining the fpecific gravity of the latter after it had thawed, I found that it had been reduced to the point of eafieft freezing. When the congealed acid was kept longer expofed it gradually thawed, even when the cold of the air increafed; the reafon of which is not to be imputed to the heat produced by the moifture of the air mixing with the acid, but principally to the diminution below the point of eafieft freezing, which was occafioned by the continued abforption of moifture from the air, and which rendered the acid incapable of continuing frozen without a great increafe of cold.

"It appears, then, that the concentration of M. de Morveau's acid, at the time of its congelation, from which circumftance Mr Cavendifh infers generally that fulphuric acid freezes more eafily as it is more denfe, is not a true premife; and that therefore the inference, though juftly deduced, is invalid. On the contrary, there feems every reafon to believe, that as the denfity of the acids increafes beyond the point of eafieft freezing, the facility of the congelation diminifhes; at leaft to as great denfity as we have ever been able to obtain fulphuric acid: for if it were poffible to divert it entirely of water, it would probably affume a folid form in any temperature of the air.

"The cryftallization of fulphuric acid is more or lefs diftinct, according to the flownefs of the formation of the cryftals and other favourable circumftances. Sometimes they are very large, diftinctly fhaped, and hard. Their fhape is like thofe of the common mineral alkali and felenite fpar, but with angles different in dimenfions from either of thefe. They are folid, confifting of ten faces; of which the two largeft are equal, parallel, and oppofite to each other; and are oblique-angled parallelograms or rhomboids, whofe angles are, as near as could be meafured, of 105 and 75 degrees. Between thefe two rhomboidal faces are placed eight of the form of trapeziums; and thus each cryftal may be fuppofed to be compounded of two equal and fimilar fruftums of pyramids joined together by their rhomboidal bafes. They always funk in the fluid acid to the bottom of the veffel, which fhowed that their denfity was increafed by congelation. It was attempted to determine their fpecific gravity by adding to this fluid fome concentrated acid, which fhould make them float in the liquor, the examination of whofe fpecific gravity fhould afcertain that of the floating cryftals; but they were found to fink even in the moft concentrated acid, and were confequently denfer. Some of the congealable acid previoufly brought to the freezing temperature was then poured into a graduated narrow cylindrical glafs, up to a certain mark, which indicated a fpace equal to that occupied by 200 grains of water. The glafs was placed in a mixture of fnow, falt, and water; and when the acid was frozen, a mark was made on the part of the glafs to which it had funk. Having thawed the acid and emptied the glafs, it was filled with water to the mark to which it had funk by freezing; and it was then found that 15 grains more of water were required to raife it to the mark expreffing 200 grains; which fhows, that the diminution of bulk fuftained by the acid in freezing had been equal to $\frac{1}{13{,}3}$ of the whole. Computing from this datum, we fhould eftimate the fpecific gravity of the congealed acid to have been 1924; but as it evidently contained a great number of bubbles, its real fpecific gravity muft have been confiderably greater than the above calculation, and cannot eafily be determined on account of thefe bubbles. By way of comparifon, Mr Keir obferved the alteration of bulk which water contained in the fame cylindrical veffel would fuffer by freezing; and found that its expanfion was equal to about $\frac{1}{10}$th of its bulk. The water had been previoufly boiled, but neverthelefs contained a great number of air bubbles; fo that in this refpect there is a confiderable difference between the congelations of water and fulphuric acid; though perhaps it may arife principally from the bubbles of elaftic fluid being in greater proportion in the one than the other.

"Greater cold is produced by mixing fnow or pounded ice with the congealed than with the fluid fulphuric acid, though the quantity is not yet determined. The greateft cold produced by Mr M'Nab at Hudfon's Bay, was effected by mixing fnow with a fulphuric acid which had been previoufly congealed; and to this circumftance Mr Cavendifh imputes the intenfity of the cold, as the liquefaction both of the acid and the fnow had concurred in producing the fame effect; while in mixing fluid acids with fnow, the thawing of the fnow is probably the only productive caufe.

"To compare the times requifite for the liquefactions of ice and of congealed fulphuric acid, two equal and fimilar glaffes were filled, one with the congealable fulphuric acid, the other with water; and after having immerfed them in a freezing mixture, till both were congealed and reduced to the temperature of 28°, the glaffes were withdrawn, wiped dry, and placed in a room where the thermometer ftood at 62°. The ice thawed in 40 minutes, and the acid in 95; at the end

Congelation. end of which time the thermometer, which ſtood near the glaſſes, had riſen to 64°. Hence it appears that the congealed acid requires more than twice the time for its liquefaction that ice does, though it cannot thence be fairly inferred, that the cold generated by the liquefaction of the ice and of congealed acid are in the above proportions of the times, from the following conſiderations, viz. that as, during the liquefaction of the ice, its temperature remains ſtationary at 32°, and during the liquefaction of the acid, its temperature remains about 44 or 45°, it appears, that the ice being conſiderably colder than the acid, will take the heat from the contiguous air much faſter. By this experiment, however, we know that a conſiderable quantity of cold is generated by the liquefaction of the acid; and hence it appears probable, that in producing cold artificially, by mixing ſnow with acids in very cold temperatures, it would probably be uſeful to employ a ſulphuric acid of the proper denſity for congelation, and to freeze it previouſly to its mixture with ſnow. It muſt not, however, be imagined, that the cold generated by the mixture of theſe two frozen ſubſtances is nearly equal to the ſums of the colds generated by the ſeparate liquefactions of the congealed acid and ice, when ſingly expoſed to a thawing temperature; for the mixture reſulting from the liquefaction, conſiſting of ſulphuric acid and the water of the ſnow, appears from the generation of heat which occurs from the mixture of theſe ingredients in a fluid ſtate, to be ſubject to different laws than thoſe which rule either of the ingredients ſeparately.

"The ſulphuric acid, like water and other fluids, is capable of retaining its fluidity when cooled conſiderably below its freezing point. A phial containing ſome congealable ſulphuric acid being placed in a mixture of ſalt, ſnow, and water, a thermometer was ſoon afterwards immerſed in it while the acid was yet fluid, on which it quickly ſunk from 50 to 29°. On moving the thermometer in the fluid, to make it acquire the exact temperature, the mercury was obſerved ſuddenly to riſe; and on looking at the acid, numberleſs ſmall cryſtals were obſerved floating in it, which had been ſuddenly formed. The degree to which the mercury then roſe was $46\frac{1}{2}$°; and at another time, while the acid was freezing, it ſtood at 45°."

From theſe experiments our author infers, "1. That ſulphuric acid has a point of eaſieſt freezing, and that this is when the ſpecific gravity is to that of water as 1780 to 1000. 2. That the greater or leſs diſpoſition to congelation does not depend on any other circumſtance than the ſtrength of the acid. 3. That the freezing and thawing degree of the moſt congealable acid is about 45° of Fahrenheit's ſcale. It is, however, to be obſerved, that this degree is inferred from the temperature indicated by the thermometers immerſed in the freezing and thawing acids; but the congelation of the fluid acid could never be accompliſhed without expoſing it to a greater degree of cold, either by expoſing it to the air in froſty weather or to the cold of melting ſnow. 4. Like water, this acid poſſeſſes the property of retaining its fluidity when cooled ſeveral degrees below the freezing point; and of riſing ſuddenly to it when its congelation is promoted by agitation, or by contact even with a warmer thermometer. 5. That, like water and other congealable fluids, ſulphuric acid generates cold by its liquefaction, and heat during its congelation, though the quantity of this heat and cold remains to be determined by future experiments. 6. That the acid, by congelation, when the circumſtances for diſtinct cryſtallization are favourable, aſſumes a regular cryſtalline form, a conſiderable ſolidity and hardneſs, and a denſity much greater than it poſſeſſed in its fluid ſtate."

Congelation ‖ Congeſtion.

Beſides this ſpecies of congelation, ſulphuric acid is ſubject to another, probably the ſame deſcribed by Baſil Valentine and ſome of the older chemiſts. This is effected in the ordinary temperature of the air, even in ſummer; and, according to Mr Keir*, is peculiar to that ſpecies of ſulphuric acid which is diſtilled from green vitriol, and which is poſſeſſed of a ſmoking quality in a high degree; "for not only the authors (ſays Mr Keir) by whom this congelation has been obſerved, have given this deſcription of the acid employed, but alſo the late experiments of Mr Dolfuſs, ſeem to ſhow that this ſmoking quality is eſſential to the phenomenon: for neither the acid obtained from vitriol, when deprived by rectification of its ſmoking quality, nor the Engliſh ſulphuric acid, which is known to be obtained by burning ſulphur, and which does not ſmoke, were found by his trials to be ſuſceptible of this ſpecies of congelation. It may, however, be worth the attention of thoſe chemiſts who have an opportunity of ſeeing this *icy ſulphuric acid*, as it is called, to obſerve more accurately than has yet been done, the freezing temperature and the denſity of the congealable acids; and to examine whether the denſity of this ſmoking acid alſo is connected with the glacial property. It ſeems alſo further deſerving of inveſtigation, whether there be not ſome analogy between the congelation of the ſmoking ſulphuric acid and the very curious cryſtallization which Dr Prieſtley obſerved in a concentrated ſulphuric acid ſaturated with nitrous acid vapours; and whether this ſmoking quality does not proceed from ſome marine or other volatile acid, which may be contained in the martial vitriol whence the ſulphuric acid is obtained."

* *Phil. Tranſ.* vol. lxxvii. p. 267.

Mr Keir alſo obſerves, that M. Cornatter has effected the cryſtallization of ſulphuric acid, by diſtilling it with nitrous acid and charcoal; and we can add from our own experience, that a cryſtallization inſtantly takes place on allowing the fumes of the nitrous and ſulphuric acids to mix together; and this, whether the former be procured from martial vitriol or ſulphur, and whether it be in a phlogiſticated ſtate or not, concentration in both acids is here the only requiſite.

CONGER, in *Zoology*. See MURÆNA, ICHTHYOLOGY *Index*.

CONGERIES, a Latin word, ſometimes uſed in our language for a collection or heap of ſeveral particles of bodies united into one maſs or aggregate.

CONGESTION, in *Medicine*, a maſs or collection of humours, crowded together and hardened in any part of the body, and there forming a preternatural tumor.

Congeſtion is effected by little and little; in which it differs from *defluction*, which is more ſudden.

CONGIARIUM,

CONGIARIUM, Congiary, among medaliſts, a gift or donative repreſented on a medal. The word comes from the Latin *congius;* becauſe the firſt preſents made to the people of Rome conſiſted in wine and oil, which were meaſured out to them in *congii.* The congiary was properly a preſent made by the emperors to the people of Rome. Thoſe made to the ſoldiers were not called *congiaries* but *donatives.* The legend on medals repreſenting *congiaries,* is, *Congiarium* or *Liberalitas.* Tiberius gave a congiary of three hundred pieces of money to each citizen: Caligula twice gave three hundred ſeſterces a head: Nero, whoſe congiaries are the firſt that we find repreſented on medals, gave four hundred.

CONGIUS, a liquid meaſure of the ancient Romans, containing the eighth part of the amphora, or the fourth of the urna, or ſix ſextarii. The congius in Engliſh meaſure contains 2,070,676 ſolid inches; that is, ſeven pints, 4,942 ſolid inches.

CONGLOBATE gland. See Anatomy *Index.*

CONGLOMERATE gland. See Anatomy *Index.*

Conglomerate *Flowers,* are thoſe growing on a branching foot-ſtalk, to which they are irregularly but cloſely connected. This mode of infloreſcence, as Linnæus terms it, is oppoſed to that in which the flowers are irregularly and looſely ſupported on their foot-ſtalks, hence termed a *diffuſe panicle* *. The term is exemplified in ſeveral of the graſſes, particulary in ſome ſpecies of the *poa,* feſcue graſs, and agroſtis.

* See *Panicle.*

CONGLUTINATION, the glueing or faſtening any two bodies together by the intromiſſion of a third, whoſe parts are unctuous and tenacious, in the nature of glue. See Glue.

CONGO, a kingdom of Africa, bounded on the north by the river Zair, or Zarah, which divides it from Loanga; on the ſouth by the river Danda, which ſeparates it from Angola; on the eaſt by the kingdoms of Fungono and Metamba, and the burnt mountains of the ſun, thoſe of cryſtal or ſalt petre and ſil-

1 Extent. ver, or (according to Anthony Cavazzi, a traveller into thoſe parts) by the mountains of Coanza, Berbela, and the great mountains of Chilandria or Aquilonda; and on the weſt by that part of the Atlantic ocean called the *Ethiopic ſea,* or the *ſea of Congo.* According to theſe limits, Congo Proper extends about three degrees from north to ſouth; lying between the line and 18° S. Lat.; but widens in its breadth inland, by the courſe of the river Zair, which runs winding above two degrees more to the north. Its length from eaſt to weſt is very uncertain, as no obſervations have been taken of the exact ſituation of thoſe mountains which bound it.

2 Hiſtory uncertain and fabulous. The hiſtory of this kingdom affords but few intereſting particulars. Before its diſcovery by the Portugueſe, the hiſtory is altogether uncertain and fabulous, as the inhabitants were totally unacquainted with letters and learning. So little were they acquainted with chronology, that it is ſaid they did not even diſtinguiſh between day and night; much leſs could they compute their time by moons or years; and therefore could remember paſt tranſactions only by ſaying they happened in ſuch a king's reign.

The country was diſcovered by the Portugueſe in 1484. The diſcoverer was named *Diego Cam,* an expert and bold ſoldier. He was very well received by the natives, and ſent ſome of his men with preſents to the king; but they being detained by unexpected accidents beyond the promiſed time of their return, Cam was obliged to ſail away without them, and took with him four young Congoeſe, as hoſtages for the ſafety of his countrymen. Theſe he taught the Portugueſe language, in which they made ſuch progreſs that King John was highly pleaſed, and ſent them back next year to Congo with rich preſents; charging them to exhort their monarch, in his name, to become a convert to the Chriſtian religion, and to permit it to be propagated through his dominions. A firm alliance was concluded between the two monarchs, which continues to this day, though not without ſome interruptions, to which the Portugueſe themſelves have given occaſion more than the natives. 3 The country diſcovered by the Portugueſe.

Any particular account we have of this kingdom, reſts almoſt entirely on the credit of Anthony Cavazzi, the traveller above mentioned. He was a capuchin friar, a native of the duchy of Modena, and was ſent miſſionary into thoſe parts *de propaganda fide,* in the year 1654, and arrived at Congo the ſame year. During his ſtay there, his zeal to make converts made him travel through all theſe different kingdoms; and the credit he gained, as well as the great employments he was intruſted with, gave him an opportunity of informing himſelf of every thing relating to them with great exactneſs. The extent and ſituation, however, he could not poſſibly aſcertain, for want of inſtruments; nor hath this defect been ſince ſupplied. According to him the dominions of Congo extended a great deal further eaſtward and ſouthwards before the introduction of Chriſtianity than afterwards; a great number of the ſtates that were under the Congoeſe monarchs, either as ſubjects, or tributary, having withdrawn their allegiance out of diſlike to them on that account. Not content with oppoſing the officers and troops that came annually to raiſe the tribute impoſed by the king, they made ſuch frequent and powerful incurſions into his dominions, that they obliged him to draw his forces nearer the centre of Congo to prevent an invaſion; by which means the kingdom, from an extent of 600 leagues, was reduced to leſs than one half. 4 Cavazzi's account of Congo. 5 Extent leſſened ſince the introduction of Chriſtianity.

Congo Proper being ſituated within the torrid zone, is liable to exceſſive heats: as it lies on the ſouthern ſide of the equinoctial, the ſeaſons are of courſe oppoſite to ours. They reckon only two principal ſeaſons, the ſummer and winter; the former begins in October, and continues till February or March; during which time the ſun's rays dart with ſuch force, that the atmoſphere appears to an European to be in a flame. The exceſſive heat, however, is mitigated by the equal length of the days and nights, as well as by the winds, breezes, rains, and dews. The winter takes up the other part of the year; and is ſaid by the natives to be proportionally cold, though to an European it would appear hot. Theſe two ſeaſons they divide into ſix leſſer ones, viz. Maſſanza, Neaſu, Ecundi, Quitombo, Quibiſo, and Quibangala. 6 Account of the climate and ſeaſons.

Maſſanza begins with the month of October, which is the beginning of their ſpring. The rains begin to fall at that time, and continue during the next two and

Congo.

and sometimes three, months. When this happens, the low lands are commonly overflowed with extraordinary floods, and all their corn carried off. A disaster of this kind is commonly followed by a famine; for the lazy inhabitants take no care to lay up any provisions, although such misfortunes happen very frequently. This first season they reckon commences at the time the plants begin to spring.

The second season, Neasu, begins about the end of January, when the produce of their lands has arrived at its full height, and wants but a few days of being ripened for harvest. This first crop is no sooner gathered in, than they sow their fields afresh, their land commonly yielding them two harvests.

The third and fourth seasons, called *Ecundi* and *Quitombo*, are frequently blended together towards the middle of March, when the more gentle rains begin to fall, and continue till the month of May. These two seasons are distinguished by the greater or lesser quantity of rain that falls during that interval. During the rest of the time, the air is either very clear, hot, and dry; or the clouds being overcharged with electric matter, burst out into the most terrible thunders and lightnings, without yielding the least drop of rain, though they seem loaded with it.

The two last, viz. the Quibiso and Quibangala, make up their short winter, which consists not in frost or snow, but in dry, blasting winds, which strip the earth of all its verdure, till the next Massanza begins to restore them to their former bloom.

They now divide their year into twelve lunar months, and begin it in September. They have also weeks consisting of four days only, the last of which is their sabbath; and on it they religiously abstain from every kind of work. This practice, the compilers of the Universal History conjecture to have arisen from the extreme laziness for which this people, and indeed all the African nations, are so remarkable. To this shameful indolence also is to be ascribed the little produce they reap from their lands, while the Portuguese settled among them, who are at more pains in the cultivation of theirs, enjoy all manner of plenty. The natives, however, had rather run the risk of the most terrible famines, than be at the tenth part of the labour they see the Portuguese take. They seem to think it below them to use any other exercises than those of dancing, leaping, hunting, shooting, &c.; the rest of their time they spend in smoking, and downright idleness, committing the laborious part of their household affairs to their slaves, or, in want of them, to their wives. Nothing is more common than to see these poor creatures toiling in the fields and woods with a child tied to their backs, and fainting under their excessive labour and heavy burdens, or (which is still worse) hunger and thirst. What is yet more surprisingly shameful is, that though they have plenty of domestic animals which they might easily make use of for cultivating their grounds, and for other laborious services, and though they see the Portuguese do it every day to great advantage; yet they will rather see their tender females sink under their toil and labour, than be at the trouble of breeding up any of these useful creatures to their assistance.

7 Natives excessively indolent.

The ground produces variety of grain, but no corn or rice except what is cultivated by the Portuguese. Their maize, or Indian wheat, grows very strong, and is well laden. This being well ground, they make into bread, or boil with water into a kind of pap. Of this they have four kinds; one of which, resembling what we call French wheat, is produced in plenty, and makes some amends for the want of industry in the people. They cultivate also a variety of the pease and bean kind: but what they chiefly live upon, as most suitable to their lazy disposition, is a kind of nut, like our filberts, which fall to the ground of themselves, and are to be found everywhere; every nut that falls to the ground producing a new shrub next year. They have scarcely any fruit-trees but what have been brought hither by the Portuguese. They have various sorts of palm-trees, useful both by their fruit, leaves, and their juice, which is easily converted into wine; also by affording a kind of oil with which they dress their victuals, though the Europeans use it only to burn in their lamps. They have also a vast number of plants and shrubs, which it would be impossible to describe or enumerate. Wheat is the only thing that the ground will not produce. It pushes forth, indeed, the straw and the ear; the former of which grows high enough we are told, to hide a man on horseback, but the latter is empty, without one grain fit for use. Father Labat, however, who had lived a considerable time in some of the American islands, where he had observed the same thing, tells us, that he had the curiosity to examine those ears more carefully, and had found some few grains; and that, having sowed them afresh, they produced very long ears, full of large heavy grain. Whence he conjectures, that if the Portuguese had tried the same experiment in their African settlements, it might perhaps have been attended with the same success.

Congo. 8 Vegetables produced in Congo.

In the low lands the grass grows so high, rank, and thick, that it becomes one of the most dangerous receptacles for wild beasts, serpents, and other venomous insects: on this account travelling is exceedingly hazardous, as there are few beaten roads in the whole country, and travellers are obliged to march over it through vast plains, in continual danger of being devoured or stung to death; to say nothing of the manifold diseases produced by the unwholesome dews with which the grass is covered during some part of the day. The only method of guarding against all these evils effectually, is by setting fire to the grass in the hot weather, when it is quite parched by the heat of the sun: but even this cannot be done without the greatest danger; because both the wild beasts and venomous reptiles, being roused out of their places of retirement, will fly furiously at those who happen to be in the way. In this case there is no possibility of escaping, but by climbing up the highest trees, or defending one's self with fire-arms or other weapons. In such emergencies, the natives have a much better chance than the Europeans; the former being able to climb trees with surprising swiftness; while the latter must be assisted with rope-ladders, which they commonly cause their blacks to carry about with them, and to go up and fasten to one of the branches.

9 Hazardous travelling.

The flowers are here exceedingly beautiful and numerous. Almost every field and grove yields a much nobler

10 Great variety of flowers.

nobler proſpect than the European gardens can boaſt of, notwithſtanding the pains beſtowed on their cultivation. The flowers are remarkable, not only for the prodigious variety of their colours, but the vaſt quantity of heads which grow upon one ſtalk. In the day-time, indeed, they ſeem to have loſt their natural fragrancy; that being in ſome meaſure exhaled by the heat of the ſun: but this is amply compenſated after its ſetting, and more eſpecially a little before its riſing, when their ſweetneſs is again condenſed, and revived by the coldneſs and dews of the night, after which they exhale their various refreſhing ſcents in a much higher degree than ours. The lilies, which there grow naturally in the fields, valleys, and woods, excel thoſe of our gardens, not only in their extreme whiteneſs, but much more in a delightful fragrancy, without offending the head, as the European lilies do by their faintiſh ſweetneſs. The tulips which there grow wild, though generally called *Perſic*, have ſomething ſo ſurpriſingly charming in the variety and combination of their colours, that they dazzle the eyes of an intenſe beholder: neither do their flowers grow ſingly as with us, but ten or twelve upon one ſtalk; and with this double advantage, that they diffuſe a very reviving and agreeable ſweetneſs, and continue much longer in their full bloom. Of the ſame nature are their tuberoſes, hyacinths, and other native flowers; which ſpring up in vaſt groups of 100 and 200 from one root, though ſomewhat ſmaller than ours; ſome of them finely variegated, and all of them yielding an agreeable ſmell. The roſes, jeſſamines, and other exotics brought hither from Europe or America, come up likewiſe in great perfection, but require a conſtant ſupply of water, and diligent attendance, to prevent them from degenerating. The American jeſſamine, in particular, inſtead of ſingle flowers, will grow up by dozens in a bunch; ſome of them of an exquiſite white, and others of the colour of the moſt vivid fire.

11
Animals of different kinds.

A vaſt variety of animals of different kinds are found in the kingdom of Congo; the chief of which is the elephant. This creature is moſtly found in the province of Bamba, which abounds with woods, paſture, and plenty of water; the elephants delighting much to bathe themſelves during the heat of the day. They commonly go in troops of an hundred or more; and ſome of them are of ſuch a monſtrous ſize, that we are told the print of their hoof hath meaſured four, nay ſeven, ſpans in diameter. From the hair of their tails, and that of ſome other animals, the natives, eſpecially the women, weave themſelves collars, bracelets, girdles, &c. with variety of devices and figures, which denote their quality; and are in ſuch eſteem, that the hair of two elephants tails is ſufficient to buy a ſlave. The reaſon of this is, that the natives have not the art of taming them, but are obliged to ſend ſome of the braveſt and ſtouteſt men to hunt them in the woods; which is not done without great labour and danger, they being here exceedingly fierce. The moſt common way of hunting them is by digging deep holes in the ground, the top of which they cover with branches and leaves, as is practiſed in moſt parts of Aſia.

Lions, leopards, tigers, wolves, and other beaſts of prey, abound here in great plenty, and do much damage. Here are alſo a vaſt variety of monkeys of all ſizes and ſhapes. The zebra, well known for its extreme beauty and ſwiftneſs, is alſo met with in this country. They have alſo a variety of buffaloes and wild aſſes; but the *dante* ſeems to be an animal peculiar to this kingdom. It is ſhaped and coloured much like an ox, though not ſo large. Its ſkin is commonly bought by the Portugueſe, and ſent into Germany to be tanned and made into targets, which are then called *dantes*. The natives make uſe of their raw hide dried to make their ſhields; which are ſo tough that no arrow or dart can pierce them; and they are alſo large enough to cover the whole body. The creature is vaſtly ſwift; and when wounded, will follow the ſcent or ſmoke of the gunpowder with ſuch fury, that the hunter is obliged to climb up a tree with all poſſible ſpeed; and this retreat he always takes care to ſecure before he ventures to fire. The wounded beaſt finding its enemy out of its reach, ſtays for him at the foot of the tree, and will not ſtir from it; of which the hunter taking the advantage, diſpatches it with repeated ſhots. The foreſts of Congo alſo ſwarm with wild dogs, who, like the wolves, prey upon the tame cattle, and are ſo fierce that they will attack armed men. Their teeth are exceeding keen and ſharp; they never bark, but make a dreadful howling when famiſhed or in purſuit of their prey.

12
Birds.

This country alſo abounds with all the different kinds of birds that are to be found in other warm climates. One ſort, which they call *birds of muſic*, is greatly eſteemed, inſomuch that perſons of the higheſt rank have from time immemorial taken the greateſt delight in keeping them in cages and aviaries for the ſake of their ſurpriſing melody. On the other hand, as the Congoeſe are ſuperſtitious to the laſt degree, there are ſeveral kinds of birds which they look upon as ominous, and are ſo terrified at the ſight or hearing of them, that if they were going to enter upon ever ſo momentous an expedition, if they were met in council, or going to engage an enemy with ever ſo great an advantage, the flight or cry of ſuch birds would throw them into a general panic, and diſperſe them in the utmoſt haſte and confuſion. The moſt dreadful of the ominous kind are the crows, ravens, bats, and owls. The great owl is the moſt terrible of all, and to him they give the name of *kariam pemba*, by which words they likewiſe denote the devil.

Fiſh of different kinds abound on the coaſts of Congo in great numbers; but the inland parts are infeſted with ſuch numbers of ſerpents, ſcorpions, and other venomous inſects, as are perhaps ſufficient to overbalance every natural advantage we have yet mentioned.

13
Ants very dangerous.

The moſt pernicious and dangerous kind are the ants; of which they reckon no leſs than ſix ſeveral ſpecies of different colours and ſizes; all of them formidable on account of their prodigious numbers, and the miſchief they do not only to the fruits of the earth, but to men and beaſts; whom they will ſurround in the night time, and devour even to the very bone. It is a common practice, we are told, to condemn perſons guilty of ſome atrocious crimes to be ſtripped naked, tied hand and foot, and thrown into a hole where theſe inſects ſwarm; where they are ſure to be devoured by them in leſs than 24 hours to the very bones. But criminals are not the only perſons who are in danger from the

Congo.

the jaws of theſe little devouring inſects. People may be attacked by them, as we have already hinted, in the night-time, and while they are ſleeping in their beds. This obliges the natives to be careful where they lie down, and to kindle a ſmall fire, or at leaſt to have a circle of burning hot embers round their beds. This caution is ſtill more neceſſary in the country villages and hamlets, where perſons are otherwiſe in danger of being attacked by millions of them in the dead of the night. In ſuch a caſe the only expedient to ſave one's ſelf is to jump up as ſoon as one feels the bite, to bruſh them off with all poſſible ſpeed, and then at once to ſet the houſe on fire. The danger is ſtill greater in travelling through the country, where a perſon is often obliged to take up his lodging on the bare ground; and may be overtaken during the heat of the day with ſuch profound ſleep, as not to be awakened by theſe diminutive animals till they have made their way through the ſkin; and in ſuch a caſe nothing will prevent their devouring a man alive, though there were ever ſo many hands to aſſiſt him: in ſuch incredible quantities do theſe creatures abound, notwithſtanding the great numbers of monkeys who are continually ferreting the ants out of their retreats, and feed upon them with the utmoſt avidity. This can only be aſcribed to the natural lazineſs and indolence of the inhabitants; which is ſuch, that they not only neglect to rid their lands of them by proper cultivation, but will ſuffer their houſes, nay, even their very churches, to be undermined by them. Another kind of theſe deſtructive vermin lie ſo thick upon the paths and highways, that a perſon cannot walk without treading upon, and having his legs and thighs almoſt devoured by them. A third ſort of a white and red colour, but very ſmall, will gnaw their way through the hardeſt wood, penetrate into a ſtrong cheſt, and in a little while devour all the clothes, linen, and every thing that is in it. A fourth ſort, ſmall and black, leave a moſt intolerable ſtench upon every thing they touch or crawl over, whether clothes or houſehold-ſtuff, which are not eaſily ſweetened again; or if they paſs over victuals, they are entirely ſpoiled. A fifth ſort harbour chiefly on the leaves and branches of trees; and if a man chance to climb up thither to ſave himſelf from a wild beaſt, he is ſo tormented by them, that nothing but the fear of the jaws of the one could make him endure the ſtings of the other. A ſixth ſort is of the flying kind; and is probably one of the former kinds, that live wholly under ground, till nature furniſhes them with wings. After this, they riſe in ſuch ſwarms as darken the air, and would make terrible havock among all kinds of vegetables, did not the natives come out againſt them in whole companies, and by dint of flaps, and other flat weapons, knock them down by myriads, and then laying them in heaps, ſet fire to their wings, which half broils them for food. Amidſt all this variety of pernicious inſects, however, they have one ſpecies of a more friendly and profitable kind, viz. the induſtrious bee, which furniſhes the inhabitants with honey and wax in ſuch plenty, that there is ſcarce a hollow tree, cleft of a rock, or chop of the earth, in which their combs are not found in great quantities.

14 Congo very populous.

With reſpect to the populouſneſs of the kingdom of Congo, ſome authors, writing either from mere conjecture, or at beſt precarious inferences, have repreſented it as thinly peopled. The accounts of the miſſionaries and Portugueſe, however, are directly oppoſite to theſe. They found the country for the moſt part covered with towns and villages, and theſe ſwarming with inhabitants; the cities well filled with people, particularly the metropolis, which is ſaid to contain above 50,000 ſouls. The provinces, though not equally populous, yet in the whole make up ſuch an amount as plainly proves, that what is wanting in the one is amply made up by the other. We are told that the duchy of Bamba is ſtill able to raiſe 200,000 fighting men, and was formerly in a condition to raiſe double that number; and that the army of the king of Congo, in the year 1665, conſiſted of 900,000 fighting men, who were attended by an infinite number of women, children, and ſlaves. The numbers of the Congoeſe will appear the more credible, when we conſider the extreme fecundity of their women, the hardineſs with which they bring up their children, and the ſtoutneſs and healthineſs of their men. In ſome villages, if the miſſionaries are to be credited, the number of children is ſo great, that a father will part with one or two, for any commodity he wants, or even for ſome trifling bawble he fancies; ſo that the number of ſlaves they ſell abroad ſeldom amounts, *communibus annis*, to leſs than 15.000 or 16.000.

15 Congoeſe have a high opinion of themſelves.

There is ſcarcely a nation on earth that have a higher opinion of themſelves or their country than the Congoeſe, or that is more hardened againſt all conviction to the contrary, from reaſon, experience, or the moſt impartial compariſon with other countries in Europe or Aſia. Indeed it is impoſſible they ſhould think otherwiſe, when it is one of the fundamentals of their belief, that the reſt of the world was the work of angels, but that the kingdom of Congo, in its full and ancient extent, was the handywork of the Supreme Architect; and muſt of courſe have vaſt prerogatives and advantages over all others. When told of the magnificence of the European and Aſiatic courts, their immenſe revenues, the grandeur of their palaces and edifices, the richneſs and happineſs of their ſubjects, the great progreſs they have made in the arts and ſciences to which their country is wholly a ſtranger, they coolly anſwer, that all this comes vaſtly ſhort of the dignity and ſplendor of the kings and kingdom of Congo; and that there can be but one Congo in the world, to the happineſs of whoſe monarch and people all the reſt were created to contribute, and to whoſe treaſury the ſea and rivers pay their conſtant tribute of zimbis (or ſhells, which are their current coin); whilſt other princes muſt condeſcend to enrich themſelves by digging through rocks and mountains, to come at the excrements of the earth, ſo they ſtyle gold and ſilver which are in ſuch requeſt among other nations. Accordingly, they imagine, that the nations which come to traffic with them, are forced to that ſervile employment by their poverty and the badneſs of their country, rather than induced to it by luxury or avarice; whilſt they themſelves can indulge their natural indolence or ſloth, though attended with the moſt pinching poverty, rather than diſgrace the dignity of their blood by the leaſt effort of induſtry, which, how laudable and beneficial ſoever, is looked upon by them as only a leſſer degree of ſlavery. But though they generally eſteem it ſo much below their dignity to apply to any

16 Their ſloth, pride, &c.

uſeful

uſeful work, they think it no diſgrace to beg or ſteal. With reſpect to the firſt, they are ſaid to be the moſt ſhameleſs and importunate beggars in the world. They will take no denial, ſpare no crouching, lying, prayers, to obtain what they want, nor curſes and ill language when ſent away without it. With regard to the laſt, they deem no theft unlawful or ſcandalous, except it be committed in a private manner, without the knowledge of the perſon wronged. It is eſteemed a piece of bravery and gallantry to wrench any thing from another by violence; and this kind of theft is ſo common, not only among the vulgar, but alſo among the great ones, that they make no ſcruple, in their travels from place to place, to ſeize not only upon all the proviſions they meet with in towns and villages, but upon every thing elſe that falls in their way. Theſe violences oblige the poor people to conceal the few valuables they have, in ſome ſecret place out of the knowledge and reach of thoſe harpies; and they think themſelves well off if they can eſcape a ſevere baſtinading, or other cruel uſage, frequently inflicted upon them, in order to make them diſcover the place of their concealment.

17 Complexion, character, cuſtoms, &c.

The complexion of the natives, both men and women, is black, though not in the ſame degree; ſome being of a much deeper black than others. Their hair is black and finely curled; ſome have it alſo of a dark ſandy colour: their eyes are moſtly of a fine lively black; but ſome are of a dark ſea-colour. They have neither flat noſes nor thick lips like the Nubians and other negroes. Their ſtature is moſtly of the middle ſize; and, excepting their black complexion, they much reſemble the Portugueſe. In their temper they are miſtruſtful, envious, jealous, and treacherous; and where they once take a diſtaſte or affront, will ſpare no pains, and ſtick at no means, however baſe, to be avenged of, and cruſh their enemy under their feet. There is no ſuch thing among them as natural affection. A huſband, if a Heathen, may take as many wives as he pleaſes; and if a Chriſtian, may have any number of concubines, whom he may divorce at pleaſure, or even ſell them though with child. So little regard have they for their children, that there is ſcarce one among them who will not ſell a ſon or a daughter, or perhaps both, for a piece of cloth, a collar or girdle of coral or beads, and often for a bottle of wine or brandy.

18 Religion.

The religion of the Congoeſe in many parts is downright idolatry, accompanied with the moſt ridiculous ſuperſtitions, and the moſt abſurd and deteſtable rites invented by their gangas or prieſts; and even in thoſe parts where Chriſtianity is profeſſed, it is ſo darkened by ſuperſtitions of one kind or other, that we may juſtly queſtion whether the people are any gainers by the exchange.

19 Government.

The government of this kingdom is monarchical, and as deſpotic as any in Aſia or Africa. The kings are the ſole proprietors of all the lands within their dominions; and theſe they can diſpoſe of to whom they pleaſe, upon condition they pay a certain tribute out of them: upon failure of the payment of which, or any other neglect, they turn them out. Even the princes of the blood are ſubjected to the ſame law; ſo that there is no perſon of any rank or quality whatever that can bequeath a foot of land to his heirs or ſucceſſors; and when theſe owners under the crown die, the lands immediately return to it again, whether they were in their poſſeſſion, or had been left to ever ſo many tenants under them; ſo that it entirely depends on the prince whether theſe lands ſhall be continued in the ſame, or be diſpoſed into other hands. The Portugueſe, however, ſince their ſettling in theſe parts, have prevailed upon the monarchs to permit the heirs and ſucceſſors to continue in the quiet poſſeſſion of ſuch lands, in order to avoid the confuſions, or even rebellions, which the alienation and deprival of them frequently occaſioned, and to oblige the tenants of them to pay their tribute more exactly and readily than they did before.

20 Commerce.

St Salvador is the chief place of trade in this country belonging to the Portugueſe and other Europeans. There are thought to be about 4000 of them ſettled here, who trade with moſt parts of the kingdom. The chief commodities they bring hither are either the product of Brazil or European manufactures. The former conſiſt chiefly of grains, fruits, plants, &c.; the latter of Turkey carpets, Engliſh cloth, and other ſtuffs; copper, braſs veſſels, ſome kinds of blue earthen ware, rings, and ornaments of gold, ſilver, and other baſer metals; coral, glaſs-beads, bugles, and other trinkets; light ſtuffs made of cotton, woollen, and linen, for clothing; and a great variety of tools and other utenſils. In return for theſe, they carry off a great number of ſlaves, amounting to 15,000 or 16,000 annually, as we have already obſerved. Formerly they uſed alſo to carry away elephants teeth, furs, and other commodities of the country; but theſe branches of commerce are now greatly decayed, and the ſlave-trade is what the Portugueſe merchants principally depend on.

Congo, a term applied to tea of the ſecond quality.

CONGREGATION, an aſſembly of ſeveral eccleſiaſtics, united ſo as to conſtitute a body.

The term is principally uſed for aſſemblies of cardinals appointed by the pope, and diſtributed into ſeveral chambers, for the diſcharge of certain functions and juriſdictions, after the manner of our offices and courts. The firſt is the congregation of the holy office, or the inquiſition: the ſecond, that of juriſdiction over biſhops and regulars; the third, that of councils; this has power to interpret the council of Trent: the fourth, that of cuſtoms, ceremonies, precedencies, canonizations, called *the congregation of rites*: the fifth, that of St Peter's fabric, which takes cognizance of all cauſes relating to piety and charity, part whereof is due to the church of St Peter: the ſixth, that of waters, rivers, roads: the ſeventh, of fountains and ſtreets: the eighth, that of the index, which examines the books to be printed or corrected: the ninth, that of the council of ſtate, for the management of the territories belonging to the pope and church (ſee Camerlingo): the tenth, *de bono regimine*; of which two laſt the cardinal-nephew is chief: the eleventh, that of money: the twelfth, that of biſhops, wherein thoſe who are to be promoted to biſhoprics in Italy are examined; this is held before the pope: the thirteenth, that of conſiſtorial matters; the chief whereof is the cardinal-dean: the fourteenth, a congregation for propagating the faith (ſee College): and the fifteenth, that of eccleſiaſtical immunity, for ſettling ſuits againſt churchmen. There is alſo a congregation

Congregation || Congreve.

tion of alms, which takes care of every thing that relates to the ſubſiſtence of Rome and the ſtate of the church.

Congregation is alſo uſed for a company or ſociety of religious cantoned out of this or that order; and making, as it were, an inferior order, or a ſubdiviſion of the order itſelf. Such are the congregations of the oratory, and thoſe of Cluny, &c. among the Benedictines.

The word is alſo uſed for aſſemblies of pious perſons in manner of fraternities, frequent among the Jeſuits in honour of the Virgin, &c. It is likewiſe applied to the audience in a church, particularly as conſiſting of the inhabitants of the ſame pariſh.

CONGREGATIONALISTS, in church-hiſtory, a ſect of Proteſtants who reject all church-government, except that of a ſingle congregation under the direction of one paſtor.

CONGRESS, in political affairs, an aſſembly of commiſſioners, envoys, deputies, &c. from ſeveral courts meeting to concert matters for their common good.

Congress, in America, is the aſſembly of delegates from the United States. See America.

Congress, in a judicial ſenſe, the trial made by appointment of a judge before ſurgeons and matrons, in order to prove whether or not a man be impotent, before ſentence is paſſed for the diſſolution of a marriage ſolicited upon ſuch a complaint.

Neither the civil nor canon law makes any mention of the trial of virility by congreſs. It had its origin in France from the boldneſs of a young fellow, who, in open court, having been hard preſſed by his wife, demanded the congreſs. The judge, ſurpriſed with the novelty of the demand, found it could not be denied, as being the ſureſt evidence that the caſe could admit of. In time it became a branch in the French juriſprudence, and was authorized by decreets and arrets. It obtained for about 120 years; and was annulled by an arret of parliament in 1677, as being found precarious; ſome having failed under the experiment out of mere modeſty and ſhame, which is found to have the ſame effect with actual impotency.

CONGREVE, William, a younger brother of an ancient family in Staffordſhire. His father was employed in the ſtewardſhip of the great eſtate of the earl of Burlington in Ireland, where he reſided many years; and our author was born there in 1672. Mr Congreve entered into the Middle-Temple when he came to England, and began to ſtudy the law; but his bias was toward polite literature and poetry. His firſt performance was a novel, entitled, *Incognita*, or *Love and Duty reconciled*. He ſoon after began his comedy of the *Old Bachelor;* which was the amuſement of ſome leiſure hours during a ſlow recovery from a fit of illneſs ſoon after his return to England; yet was in itſelf ſo perfect, that Mr Dryden, on its being ſhown to him, declared he had never in his life ſeen ſuch a firſt play. When brought on the ſtage in 1693, it met with ſuch univerſal approbation, that Mr Congreve, though he was but 19 years old at the time of his writing it, became now conſidered as a prop to the declining ſtage, and a riſing genius in dramatic poetry. The next year he produced the *Double Dealer;* which, for what reaſon is not obvious, did not meet with ſo much ſucceſs as the former. The merit of his firſt play, however had obtained him the favour and patronage of Lord Halifax, and ſome peculiar mark of diſtinction from Queen Mary; on whoſe death, which happened in the cloſe of this year, he wrote a very elegant elegiac paſtoral. In 1695, when Betterton opened the new houſe in Lincoln's-Inn fields, Mr Congreve joining with him, gave him his comedy of *Love for Love*, with which the company opened their campaign, and which met with ſuch ſucceſs, that they immediately offered the author a ſhare in the management of the houſe, on condition of his furniſhing them with one play yearly. This offer he accepted; but whether through indolence, or that correctneſs which he looked upon as neceſſary to his works, his *Mourning Bride* did not come out till 1697, nor his *Way of the World* till two years after that. The indifferent ſucceſs this laſt mentioned play, though an exceeding good one, met with from the public, completed that diſguſt to the theatre, which a long conteſt with Jeremy Collier, who had attacked the immoralities of the Engliſh ſtage, and more eſpecially ſome of his pieces, had begun, and he determined never more to write for the ſtage. However, though he quitted dramatic writing, he did not lay down the pen entirely; but occaſionally wrote many little pieces both in proſe and verſe, all of which ſtand on the records of literary fame. It is very poſſible, however, that he might not ſo ſoon have given way to this diſguſt, had not the eaſineſs of his circumſtances rendered any ſubſervience to the opinions and caprice of the town abſolutely unneceſſary to him. For his abilities having very early in life raiſed him to the acquaintance of the earl of Halifax, who was then the Mecænas of the age; that nobleman, deſirous of raiſing ſo promiſing a genius above the neceſſity of too haſty productions, made him one of the commiſſioners for licenſing hackney-coaches; or, according to Coxeter, a commiſſioner of the wine-licenſe. He ſoon after beſtowed on him a place in the pipe-office; and not long after gave him a poſt in the cuſtoms worth 600l. per annum. In the year 1718, he was appointed ſecretary of Jamaica; ſo that the whole of his income towards the latter part of his life was upwards of 1200l. a-year.

The greateſt part of the laſt 20 years of his life was ſpent in eaſe and retirement; and he either did not, or affected not to give himſelf any trouble about reputation. Yet ſome part of that conduct might proceed from a degree of pride; to which purpoſe, T. Cibber, in his Lives of the Poets, vol. iv. p. 93. relates the following anecdote of him: "When the celebrated Voltaire was in England, he waited upon Mr Congreve, and paſſed ſome compliments upon the merit and reputation of his works. Congreve thanked him; but at the ſame time told that ingenious foreigner, that he did not chooſe to be conſidered as an author, but only as a private gentleman, and in that light expected to be viſited. Voltaire anſwered, that if he had never been any thing but a private gentleman, in all probability he had never been troubled with that viſit." He obſerves, in his own account of the tranſaction, that he was not a little diſguſted with ſo unſeaſonable a piece of vanity.

Towards the cloſe of his life he was much afflicted with the gout; and making a tour to Bath for the benefit

Congruity. nefit of the waters, was unfortunately overturned in his chariot: by which, it is supposed, he got some inward bruise, as he ever after complained of a pain in his side; and, on his return to London, continued gradually declining in his health, till the 19th of January 1729, when he died, aged 57; and, on the 26th following, was buried in Westminster Abbey, the pall being supported by persons of the first distinction.

CONGRUITY, a suitableness or relation of agreement between things.

The terms *congruity* and *propriety* are not applicable to any single object: they imply a plurality, and obviously signify a particular relation between different objects. Thus we currently say, that a decent garb is suitable or proper for a judge; modest behaviour for a young woman; and a lofty style for an epic poem: and on the other hand, that it is unsuitable or incongruous to see a little woman sunk in an overgrown farthingale, a coat richly embroidered covering coarse and dirty linen, a mean subject in an elevated style, an elevated subject in a mean style, a first minister darning his wife's stocking, or a reverend prelate in lawn sleeves dancing a hornpipe.

The perception we have of this relation, which seems peculiar to man, cannot proceed from any other cause, but from a *sense* of congruity or propriety; for, supposing us destitute of that sense, the terms would be to us unintelligible.

It is a matter of experience, that congruity or propriety, wherever perceived, is agreeable; and that incongruity, or impropriety, wherever perceived, is disagreeable. The only difficulty is, to ascertain what are the particular objects that in conjunction suggest these relations; for there are many objects that do not: the sea, for example, viewed in conjunction with a picture, or a man viewed in conjunction with a mountain, suggest not either congruity or incongruity. It seems natural to infer, what will be found true by induction, that we never perceive congruity or incongruity but among things that are connected together by some relation; such as a man and his actions, a principal and his accessories, a subject and its ornaments. We are indeed so framed by nature, as, among things so connected, to require a certain suitableness or correspondence, termed *congruity* or *propriety*; and to be displeased when we find the opposite relation of *incongruity* or *impropriety*.

If things connected be the subject of congruity, it is reasonable before hand to expect, that a degree of congruity should be required proportioned to the degree of the connexion. And upon examination we find this to hold in fact: where the relation is intimate, as between a cause and its effect, a whole and its parts, we require the strictest congruity; but where the relation is slight, or accidental, as among things jumbled together in the same place, we require little or no congruity: the strictest propriety is required in behaviour and manner of living; because a man is connected with these by the relation of cause and effect: the relation between an edifice and the ground it stands upon, is of the most intimate kind: and therefore the situation of a great house ought to be lofty; its relation to neighbouring hills, rivers, plains, being that of propinquity only, demands but a small share of congruity; among members of the same club, the congruity ought to be considerable, as well as among things placed for show in the same niche: among passengers in a stage coach, we require very little congruity; and less still at a public spectacle. Congruity.

Congruity is so nearly allied to beauty, as commonly to be held a species of it; and yet they differ so essentially as never to coincide: beauty, like colour, is placed upon a single subject; congruity upon a plurality: further, a thing beautiful in itself, may, with relation to other things, produce the strongest sense of incongruity.

Congruity and propriety are commonly reckoned synonymous terms; but they are distinguishable, and the precise meaning of each must be ascertained. Congruity is the genus of which propriety is a species; for we call nothing *propriety*, but that congruity or suitableness which ought to subsist between sensible beings and their thoughts, words, and actions.

In order to give a full view of these secondary relations, we shall trace them through some of the most considerable primary relations. The relation of a part to the whole, being extremely intimate, demands the utmost degree of congruity; even the slightest deviation is disgustful.

Examples of congruity and incongruity are furnished in plenty by the relation between a subject and its ornaments. A literary performance intended merely for amusement, is susceptible of much ornament, as well as a music-room or a play-house; for in gaiety, the mind hath a peculiar relish for show and decoration. The most gorgeous apparel, however improper in tragedy, is not unsuitable to opera-actors; the truth is, an opera, in its present form, is a mighty fine thing; but as it deviates from nature in its capital circumstances, we look not for nature or propriety in those which are accessory. On the other hand, a serious and important subject admits not much ornament: nor a subject that of itself is extremely beautiful: and a subject that fills the mind with its loftiness and grandeur, appears best in a dress altogether plain.

To a person of a mean appearance, gorgeous apparel is unsuitable; which, besides the incongruity, has a bad effect; for by contrast it shows the meanness of appearance in the strongest light. Sweetness of look and manner requires simplicity of dress, joined with the greatest elegance. A stately and majestic air requires sumptuous apparel, which ought not to be gaudy, nor crowded with little ornaments. A woman of consummate beauty can bear to be highly adorned, and yet shows best in a plain dress:

——————For loveliness
Needs not the foreign aid of ornament,
But is when unadorn'd, adorn'd the most.
Thomson's Autumn, 208.

Congruity regulates not only the quantity of ornament, but also the kind. The ornaments that embellish a dancing room ought to be all of them gay. No picture is proper for a church but what has religion for its subject. All the ornaments upon a shield ought to relate to war; and Virgil, with great judgment, confines the carvings upon the shield of Æneas to the military history of the Romans: but this beauty is overlooked by Homer; for the bulk of the sculpture

ture upon the ſhield of Achilles, is of the arts of peace in general, and of joy and feſtivity in particular: the author of Telemachus betrays the ſame inattention, in deſcribing that young hero.

In judging of propriety with regard to ornaments, we muſt attend, not only to the nature of the ſubject that is to be adorned, but alſo to the circumſtances in which it is placed: the ornaments that are proper for a ball, will appear not altogether ſo decent at public worſhip; and the ſame perſon ought to dreſs differently for a marriage feaſt and for a burial.

Nothing is more intimately related to a man, than his ſentiments, words, and actions; and therefore we require here the ſtricteſt conformity. When we find what we thus require, we have a lively ſenſe of propriety: when we find the contrary, our ſenſe of impropriety is not leſs lively. Hence the univerſal diſtaſte of affectation, which conſiſts in making a ſhow of greater delicacy and refinement than is ſuited either to the character or circumſtance of the perſon.

Congruity and propriety, wherever perceived, appear agreeable; and every agreeable object produces in the mind a pleaſant emotion: incongruity and impropriety, on the other hand, are diſagreeable; and of courſe produce painful emotions. Theſe emotions, whether pleaſant or painful, ſometimes vaniſh without any conſequence; but more frequently occaſion other emotions, which we proceed to exemplify.

When any ſlight incongruity is perceived in an accidental combination of perſons or things, as of paſſengers in a ſtage-coach, or of individuals dining at an ordinary; the painful emotion of incongruity, after a momentary exiſtence, vaniſheth without producing any effect. But this is not the caſe of propriety and impropriety: voluntary acts, whether words or deeds, are imputed to the author; when proper, we reward him with our eſteem; when improper, we puniſh him with our contempt. Let us ſuppoſe, for example, a generous action ſuited to the character of the author, which raiſes in him and in every ſpectator the pleaſant emotion of propriety; this emotion generates in the author both ſelf-eſteem and joy; the former when he conſiders the relation to the action, and the latter when he conſiders the good opinion that others will entertain of him: the ſame emotion of propriety produceth in the ſpectators eſteem for the author of the action: and when they think of themſelves, it alſo produceth, by means of contraſt, an emotion of humility. To diſcover the effects of an unſuitable action, we muſt invert each of theſe circumſtances: the painful emotion of impropriety generates in the author of the action both humility and ſhame; the former when he conſiders his relation to the action, and the latter when he conſiders what others will think of him: the ſame emotion of impropriety produceth in the ſpectators contempt for the author of the action; and it alſo produceth, by means of contraſt, when they think of themſelves, an emotion of ſelf-eſteem. Here then are many different emotions, derived from the ſame action, conſidered in different views by different perſons; a machine provided with many ſprings, and not a little complicated. Propriety of action, it would ſeem, is a chief favourite of nature, when ſuch care and ſolicitude is beſtowed upon it. It is not left to our own choice; but, like juſtice, is required at our hands; and, like juſtice, is enforced by natural rewards and puniſhments: a man cannot, with impunity, do any thing unbecoming or improper; he ſuffers the chaſtiſement of contempt inflicted by others, and of ſhame inflicted by himſelf. An apparatus ſo complicated, and ſo ſingular, ought to rouſe our attention: for nature doth nothing in vain; and we may conclude with great certainty, that this curious branch of the human conſtitution is intended for ſome valuable purpoſe.

A groſs impropriety is puniſhed with contempt and indignation, which are vented againſt the offender by correſponding external expreſſions; nor is even the ſlighteſt impropriety ſuffered to paſs without ſome degree of contempt. But there are improprieties, of the ſlighter kind, that provoke laughter; of which we have examples without end, in the blunders and abſurdities of our own ſpecies: ſuch improprieties receive a different puniſhment, as will appear by what follows. The emotions of contempt and of laughter occaſioned by an impropriety of this kind, uniting intimately in the mind of the ſpectator, are expreſſed externally by a peculiar ſort of laugh, termed *a laugh of deriſion* or *ſcorn*. An impropriety that thus moves not only contempt, but laughter, is diſtinguiſhed by the epithet of *ridiculous;* and a laugh of deriſion or ſcorn is the puniſhment provided for it by nature. Nor ought it to eſcape obſervation, that we are ſo fond of inflicting this puniſhment, as ſometimes to exert it even againſt creatures of an inferior ſpecies; witneſs a turkey-cock ſwelling with pride, and ſtrutting with diſplayed feathers; a ridiculous object, which in a gay mood is apt to provoke a laugh of deriſion.

We muſt not expect, that theſe different improprieties are ſeparated by diſtinct boundaries; for of improprieties, from the ſlighteſt to the moſt groſs, from the moſt riſible to the moſt ſerious, there are degrees without end. Hence it is, that in viewing ſome unbecoming actions, too riſible for anger, and too ſerious for deriſion, the ſpectator feels a ſort of mixt emotion, partaking both of deriſion and of anger; which accounts for an expreſſion, common with reſpect to the impropriety of ſome actions, that we know not whether to laugh or be angry.

It cannot fail to be obſerved, that in the caſe of a riſible impropriety, which is always ſlight, the contempt we have for the offender is extremely faint, though deriſion, its gratification, is extremely pleaſant. This diſproportion between a paſſion and its gratification, ſeems not conformable to the analogy of nature. In looking about for a ſolution, we muſt reflect upon what is laid down above, that an improper action not only moves our contempt for the author, but alſo, by means of contraſt, ſwells the good opinion we have of ourſelves. This contributes, more than any other article, to the pleaſure we have in ridiculing follies and abſurdities; and accordingly, it is well known, that they who put the greateſt value upon themſelves are the moſt prone to laugh at others. Pride, which is a vivid paſſion, pleaſant in itſelf, and not leſs ſo in its gratification, would ſingly be ſufficient to account for the pleaſure of ridicule, without borrowing any aid from contempt. Hence appears the reaſon of a noted obſervation, That we are the moſt diſpoſed to ridicule the

the blunders and absurdities of others, when we are in high spirits; for in high spirits, self-conceit displays itself with more than ordinary vigour.

With regard to the final causes of congruity and impropriety; one, regarding congruity, is pretty obvious, that the sense of congruity, as one principle of the fine arts, contributes in a remarkable degree to our entertainment. Congruity, indeed, with respect to quantity coincides with proportion: when the parts of a building are nicely adjusted to each other, it may be said indifferently, that it is agreeable by the congruity of its parts, or by the proportion of its parts. But propriety, which regards voluntary agents only, can never be the same with proportion: a very long nose is disproportioned, but cannot be termed *improper*. In some instances, it is true, impropriety coincides with disproportion in the same subject, but never in the same respect; for example, a very little man buckled to a long toledo: considering the man and the sword with respect to size, we perceive a disproportion; considering the sword as the choice of the man, we perceive an impropriety.

The sense of impropriety with respect to mistakes, blunders, and absurdities, is happily contrived for the good of mankind. In the spectators, it is productive of mirth and laughter, excellent recreation in an interval from business. But this is a trifle in respect of what follows. It is painful to be the subject of ridicule; and to punish with ridicule the man who is guilty of an absurdity, tends to put him more upon his guard in time coming. Thus even the most innocent blunder is not committed with impunity; because, were errors licensed where they do not hurt, inattention would grow into a habit, aad be the occasion of much hurt.

The final cause of propriety as to moral duties, is of all the most illustrious. To have a just notion of it, the moral duties that respect others must be distinguished from those that respect ourselves. Fidelity, gratitude, and the forbearing injury, are examples of the first sort; temperance, modesty, firmness of mind, are examples of the other: the former are made duties by the sense of justice; the latter by the sense of propriety. Here is a final cause of the sense of propriety, that must rouse our attention. It is undoubtedly the interest of every man, to suit his behaviour to the dignity of his nature, and to the station allotted him by Providence; for such rational conduct contributes in every respect to happiness, by preserving health, by procuring plenty, by gaining the esteem of others, and, which of all is the greatest blessing, by gaining a justly-founded self-esteem. But in a matter so essential to our well-being, even self-interest is not relied on: the powerful authority of duty is superadded to the motive of interest. The God of nature, in all things essential to our happiness, hath observed one uniform method: to keep us steady in our conduct, he hath fortified us with natural laws and principles, which prevent many aberrations, that would daily happen were we totally surrendered to so fallible a guide as human reason. Propriety cannot rightly be considered in another light, than as the natural law that regulates our conduct with respect to ourselves; as justice is the natural law that regulates our conduct with respect to others. We call propriety a law, not less than justice; because both are equally rules of conduct that ought to be obeyed: propriety includes this obligation; for to say an action is proper, is, in other words, to say, that it *ought* to be performed; and to say it is improper, is, in other words, to say that it ought to be forborne. It is this very character of *ought* and *should* that makes justice a law to us; and the same character is applicable to propriety, though perhaps more faintly than to justice: but the difference is in degree only, not in kind; and we ought, without hesitation or reluctance, to submit equally to the government of both.

But it must, in the next place, be observed, that to the sense of propriety, as well as of justice, are annexed the sanctions of rewards and punishments; which evidently prove the one to be a law as well as the other. The satisfaction a man hath in doing his duty, joined with the esteem and good will of others, is the reward that belongs to both equally. The punishments also, though not the same, are nearly allied; and differ in degree more than in quality. Disobedience to the law of justice, is punished with remorse; disobedience to the law of propriety, with shame, which is remorse in a lower degree. Every transgression of the law of justice raises indignation in the beholder; and so doth every flagrant transgression of the law of propriety. Slighter improprieties receive a milder punishment: they are always rebuked with some degree of contempt, and frequently with derision. In general, it is true, that the rewards and punishments annexed to the sense of propriety, are slighter in degree than those annexed to the sense of justice: which is wisely ordered, because duty to others is still more essential to society than duty to ourselves; for society could not subsist a moment were individuals not protected from the headstrong and turbulent passion of their neighbours.

CONI, a strong town of Italy in Piedmont, and capital of a territory of that name, with a good citadel. The town being divided into two factions, it surrendered to the French in 1641; but was restored to the duke of Savoy soon after. It is seated at the confluence of the rivers Gresse and Sture. Its trade is considerable, being the repository of all merchandise from Turin and Nice, designed for Lombardy, Switzerland and Germany. It contains about 10,000 people besides the garrison. It was taken by the French in April 1796. E. Long. 7. 45. N. Lat. 44. 30.

CONIC SECTIONS.

INTRODUCTION.

IN treating of ſo conſiderable a branch of the mathematical ſciences as the Conic Sections, it would be improper to paſs over in total ſilence the hiſtory of thoſe remarkable curves. But this topic will not require any long detail. None of the works of the more early Greek geometers have reached our time; nor have we any work of antiquity profeſſedly written on the ſubject of our inquiry. Our curioſity muſt therefore reſt ſatisfied with the knowledge of a few incidental notices and facts, gleaned from different authors.

The diſcovery of the conic ſections ſeems to have originated in the ſchool of *Plato*, in which geometry was highly reſpected, and much cultivated. It is probable that the followers of that philoſopher were led to the diſcovery of theſe curves, and to the inveſtigation of many of their properties, in ſeeking to reſolve the two famous problems of the duplication of the cube, and the triſection of an angle, for which the artifices of the ordinary or plane geometry were inſufficient. Two ſolutions of the former problem, by the help of the conic ſections, are preſerved by *Eutocius* *, and are attributed by him to *Menæchmus*, the ſcholar of *Eudoxus*, who lived not much poſterior to the time of Plato: and this circumſtance, added to a few words in an epigram of *Eratoſthenes* †, has been thought ſufficient authority, by ſome authors, to aſcribe the honour of the diſcovery of the conic ſections to *Menæchmus*. We may at leaſt infer that, at this epoch, geometers had made ſome progreſs in developing the properties of theſe curves.

* In *Arch.* lib. ii. de Sph. et Cyl.

† Ibid.

The writings of *Archimedes* that have reached us explicitly ſhew, that the geometers before his time had advanced a great length in inveſtigating the properties of the conic ſections. This author expreſsly mentions many principal propoſitions to have been demonſtrated by preceding writers; and he often refers to properties of the conic ſections, as truths commonly divulged, and known to mathematicians. His own diſcoveries in this branch of ſcience are worthy of the moſt profound and inventive genius of antiquity. In the quadrature of the parabola he gave the firſt, and the moſt remarkable inſtance that has yet been diſcovered, of the exact equality of a curvilineal to a rectilineal ſpace. He determined the proportion of the elliptic ſpaces to the circle; and he invented many propoſitions reſpecting the menſuration of the ſolids formed by the revolution of the conic ſections about their axes.

It is chiefly from the writings of *Apollonius* of Perga, a town in Pamphylia, on the ſubject of the conic ſections, that we know how far the ancient mathematicians carried their ſpeculations concerning theſe curves. *Apollonius* flouriſhed under *Ptolemy Philopator*, about forty years later than *Archimedes*. He formed his taſte for geometry, and acquired that ſuperior ſkill in the ſcience to which he is indebted for his fame, in the ſchool of Alexandria, under the ſucceſſors of *Euclid*. Beſides his great work on the conic ſections, he was the author of many ſmaller treatiſes, relating chiefly to the geometrical analyſis, the originals of which have all periſhed, and are only known to modern mathematicians by the account given of them by *Pappus* of Alexandria, in the ſeventh book of his *Mathematical Collections*.

The work of *Apollonius* on the conic ſections, written in eight books, was held in ſuch high eſtimation by the ancients, as to procure for him the name of the Great Geometer. The firſt four books of this treatiſe only have come down to us in the original Greek. It is the purpoſe of theſe four books, as we are informed in the prefatory epiſtle to *Eudemus*, to deliver the elements of the ſcience; and in this part of his labour, the author claims no farther merit than that of having collected, amplified, and reduced to order, the diſcoveries of preceding mathematicians. One improvement introduced by Apollonius is too remarkable to be paſſed over without notice. The geometers who preceded him derived each curve from a *right cone*, which they conceived to be cut by a plane perpendicular to its ſlant ſide. It will readily be perceived, from what is ſhewn in the firſt ſection of the fourth part of the following treatiſe, that the ſection would be a parabola when the vertical angle of the cone was a right angle; an ellipſe when it was acute; and a hyperbola when it was obtuſe. Thus each curve was derived from a different ſort of cone. *Apollonius* was the firſt to ſhew that all the curves are produced from any ſort of cone, whether right or oblique, according to the different inclinations of the cutting plane. This fact is one remarkable inſtance of the adherence of the mind to its firſt conceptions, and of the ſlowneſs and difficulty with which it generalizes.

The original of the firſt four books of the treatiſe of *Apollonius* is loſt; nor is it eaſy to aſcertain in what age it diſappeared. In the year 1658 *Borelli* diſcovered at Florence an Arabic manuſcript, entitled *Apollonii Pergæi Conicorum Libri Octo*. By the liberality of the *Duke of Tuſcany*, he was permitted to carry the manuſcript to Rome, and, with the aid of an Arabic ſcholar, *Abraham Ecchellenſis*, he publiſhed in 1661 a Latin tranſlation of it. The manuſcript, although from its title it was expected to be a complete tranſlation of all the eight books, was yet found to contain only the firſt ſeven books: and it is remarkable, that another manuſcript, brought from the eaſt by *Golius*, the learned profeſſor of Leyden, ſo early as 1664, as well as a third, of which *Ravius* publiſhed a tranſlation in 1669, have the ſame defect: all the three manuſcripts agreeing in the want of the eighth book, we may now conſider that part of the work of *Apollonius* as irrecoverably loſt. Fortunately, in the *Collectiones Mathematicæ* of *Pappus*, in whoſe time the entire treatiſe of *Apollonius* was extant, there is pre-

ſerved

ſerved ſome account of the ſubjects treated in each book, and all the *Lemmata* required in the inveſtigations of the propoſitions they contain. *Dr Halley*, who in 1710 gave a correct edition of the Conics of *Apollonius*, guided in his reſearches by the lights derived from *Pappus*, has reſtored the eighth book with ſo much ability as to leave little room to regret the original.

The four laſt books of the Conics of *Apollonius*, containing the higher or more recondite parts of the ſcience, are generally ſuppoſed to be the fruit of the author's own reſearches; and they do much honour to the geometrical ſkill and invention of the Great Geometer. Even in our times the whole treatiſe muſt be regarded as a very extenſive, if not a complete work on the conic ſections. Modern mathematicians make important applications of theſe curves, with which the ancients were unacquainted; and they have been thus led to conſider the ſubject in particular points of view, ſuited to their purpoſes: but they have made few diſcoveries, of which there are not ſome traces to be found in the work of the illuſtrious ancient.

The geometers who followed *Apollonius* ſeem to have contented themſelves with the humble taſk of commenting on his treatiſe, and of rendering it of more eaſy acceſs to the bulk of mathematicians. Till about the middle of the 16th century, the hiſtory of this branch of mathematical ſcience preſents nothing remarkable. The ſtudy of it was then revived; and ſince that time this part of mathematics has been more cultivated, or has been illuſtrated by a greater variety of ingenious writings.

Among the ancients, the ſtudy of the conic ſections was a ſubject of pure intellectual ſpeculation. The applications of the properties of theſe curves in natural philoſophy have, in modern times, given to this part of the mathematics a degree of importance that it did not formerly poſſeſs. That which, in former times, might be conſidered as intereſting only to the learned theoriſt and profound mathematician, is now a neceſſary attainment to him who would not be ignorant of thoſe diſcoveries in nature, that do the greateſt honour to the preſent age.

It is curious to remark the progreſs of diſcovery, and the connection that ſubſiſts between the different branches of human knowledge; and it excites ſome degree of admiration, to reflect, that the aſtronomical diſcoveries of *Kepler*, and the ſublime theory of *Newton*, depend on the ſeemingly barren ſpeculations of the Greek geometers concerning the ſections of the cone.

Apollonius, and all the writers on conic ſections before *Dr Wallis*, derived the elementary properties of the curves from the nature of the cone. In the ſecond part of his treatiſe *De Sectionibus Conicis*, publiſhed in 1655, Dr Wallis laid aſide the conſideration of the cone, deriving the properties of the curves from a deſcription *in plano*. Since his time authors have been much divided as to the beſt method of defining thoſe curves, and demonſtrating their elementary properties; many of them preferring that of the ancient geometers, while others, and ſome of great note, have followed the example of *Dr Wallis*.

In ſupport of the innovation made by *Dr Wallis*, it is urged, that in the ancient manner of treating the conic ſections, young ſtudents are perplexed, and diſcouraged by the previous matter to be learnt reſpecting the generation and properties of the cone; and that they find it no eaſy matter to conceive ſteadily, and to underſtand diagrams rendered confuſed by lines drawn in different planes: all which difficulties are avoided by defining the curves *in plano* from one of their eſſential properties. It is not our intention particularly to diſcuſs this point; and we have only to add, that, in the following treatiſe, we have choſen to deduce the properties of the conic ſections from their deſcription *in plano*, as better adapted to the nature of a work deſigned for general readers.

A geometrical treatiſe on the conic ſections muſt neceſſarily be founded upon the elements of geometry. As *Euclid's* Elements of Geometry are generally ſtudied, and in every one's hands, we have choſen to refer to it in the demonſtrations. The edition we have uſed is that lately publiſhed by Profeſſor Playfair of Edinburgh. Although the references are made to Euclid's Elements, yet they will alſo apply to the treatiſe on GEOMETRY given in this Work; for a table is there given, indicating the particular propoſition of our treatiſe that correſponds to each of the moſt material propoſitions in Euclid's Elements.

The references are to be thus underſtood: (20. 1.E.) means the 20th prop. of the 1ſt book of *Euclid's* Elements: (2 cor. 20. 6. E.) means the 2d corollary to the 20th prop. of the ſixth book of the ſame work; and ſo of others. Again, (7.) means the ſeventh propoſition of that PART of the following treatiſe in which ſuch reference happens to occur: (cor. 1.) means the corollary to the firſt propoſition: (2 cor. 3.) means the 2d corollary to the third propoſition, &c.—ſuch references being all made to the propoſitions in the diviſion of the treatiſe in which they are found.

Plate CLVI.

PART I. OF THE PARABOLA.

DEFINITIONS.

Fig. 1.

I. IF a ſtraight line BC, and a point without it F, be given by poſition in a plane, and a point D be ſuppoſed to move in ſuch a manner that DF, its diſtance from the given point, is equal to DB, its diſtance from the given line, the point D will deſcribe a line DAD, called a *Parabola*.

COROLLARY. The lines DF, DB, may become greater than any given line; therefore the parabola extends to a greater diſtance from the point F, and the line BC, than any that can be aſſigned.

II. The ſtraight line BC, which is given by poſition, is called the *Directrix of the parabola*.

III. The given point F is called the *Focus*.

IV. A ſtraight line perpendicular to the directrix, terminated at one extremity by the parabola, and produced indefinitely within it, is called a *Diameter*.

V. The point in which a diameter meets the parabola is called its *Vertex*.

VI. The

Of the Parabola.

VI. The diameter which passes through the focus is called the *Axis of the parabola*; and the vertex of the axis is called the *Principal Vertex*.

Cor. A perpendicular drawn from the focus to the directrix is bisected at the vertex of the axis.

VII. A straight line terminated both ways by the parabola, and bisected by a diameter, is called an *Ordinate to that diameter*.

VIII. The segment of a diameter between its vertex, and an ordinate, is called an *Abscifs*.

IX. A straight line quadruple the distance between the vertex of a diameter and the directrix, is called the *Parameter*, also the *Latus Rectum of that diameter*.

X. A straight line meeting the parabola only in one point, and which everywhere else falls without it, is said to *touch* the parabola at that point, and is called a *Tangent to the parabola*.

Proposition I.

The distance of any point without the parabola from the focus is greater than its distance from the directrix; and the distance of any point within the parabola from the focus is less than its distance from the directrix.

Fig. 2.

Let DA *d* be a parabola, of which F is the focus, GC the directrix, and P a point without the curve, that is, on the same side of the curve with the directrix; PF, a line drawn to the focus, will be greater than PG, a perpendicular to the directrix. For, as PF must necessarily cut the curve, let D be the point of intersection; draw DB perpendicular to the directrix, and join PB. Because D is a point in the parabola, DB=DF (Definition 1.), therefore PF=PD+DB; but PD+DB is greater than PB (20. 1. E.), and therefore still greater than PG (19. 1. E.), therefore PF is greater than PG.

Again, let Q be a point within the parabola, QF, a line drawn to the focus, is less than QB, a perpendicular to the directrix. The perpendicular QB necessarily cuts the curve; let D be the point of intersection; join DF. Then DF=DB (Def. 1.), and QD+DF=QB; but QF is less than QD+DF, therefore QF is less than QB.

Corollary. A point is without or within the parabola, according as its distance from the focus is greater or less than its distance from the directrix.

Prop. II.

Every straight line perpendicular to the directrix meets the parabola, and every diameter falls wholly within it.

Fig. 2.

Let the straight line BQ be perpendicular to the directrix at B, BQ shall meet the parabola. Draw BF to the focus, and make the angle BFP equal to FBQ; then, because QBC is a right angle, QBF and PFB are each less than a right angle, therefore QB and PF intersect each other; let D be the point of intersection, then DB=DF (5. 1. E.); therefore, D is a point in the parabola. Again, the diameter DQ falls wholly within the parabola; for take Q any point in the diameter, and draw FQ to the focus, then QB or QD+DF is greater than QF, therefore Q is within the parabola (Cor. 1.).

Cor. The parabola continually recedes from the axis, and a point may be found in the curve that shall be at a greater distance from the axis than any assigned line.

Prop. III.

The straight line which bisects the angle contained by two straight lines drawn from any point in the parabola, the one to the focus, and the other perpendicular to the directrix, is a tangent to the curve in that point.

Let D be any point in the curve; let DF be drawn to the focus, and DB perpendicular to the directrix; the straight line DE, which bisects the angle FDB, is a tangent to the curve. Join BF meeting DE in I, take H any other point in DE, join HF, HB, and draw HG perpendicular to the directrix. Because DF=DB, and DI is common to the triangles DFI, DBI, and the angles FDI, BDI, are equal, these triangles are equal, and FI=IB, and hence FH=HB (4. 1. E.): but HB is greater than HG (19. 1. E.); therefore the distance of the point H from the focus is greater than its distance from the directrix, hence that point is without the parabola (Cor. 1.), and therefore HDI is a tangent to the curve at D (Def. 10.). Fig. 3.

Cor. 1. There cannot be more than one tangent to the parabola at the same point. For let any other line DK, except a diameter, be drawn through D; draw FK perpendicular to DK; on D for a centre, with a radius equal to DB, or DF, describe a circle, cutting FK in N; draw NL parallel to the axis, meeting DK in L, and join FL. Then FK=KN (3. 3. E.) and therefore FL=LN. Now BD being perpendicular to the directrix, the circle FBN touches the directrix at B (16. 3. E.); and hence N, any other point in the circumference, is without the directrix, and on the same side of it as the parabola, therefore the point L is nearer to the focus than to the directrix, and consequently is within the parabola. Fig. 4.

Cor. 2. A perpendicular to the axis at its vertex is a tangent to the curve. Let AM be perpendicular to the axis at the vertex A, then RS, the distance of any point in AM from the directrix, is equal to CA, that is to AF, and therefore is less than RF, the distance of the same point from the focus. Fig. 3.

Cor. 3. A straight line drawn from the focus of a parabola perpendicular to a tangent, and produced to meet the directrix, is bisected by the tangent. For it has been shewn that FB, which is perpendicular to the tangent DI, is bisected at I.

Cor. 4. A tangent to the parabola makes equal angles with the diameter which passes through the point of contact, and a straight line drawn from that point to the focus. For BD being produced to Q, DQ is a diameter, and the angle HDQ is equal to BDE, that is, to EDF. Fig. 3.

Cor. 5. The axis is the only diameter which is perpendicular to a tangent at its vertex. For the angle HDQ, or BDE, is the half of BDF, and therefore less than a right angle, except when BD and DF lie in

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in a straight line, which happens when D falls at the vertex.

Scholium.

From the property of tangents to the parabola demonstrated in Cor. 4. the point F takes the name of the *Focus*. For rays of light proceeding parallel to the axis of a parabola, and falling upon a polished surface whose figure is that produced by the revolution of the parabola about its axis, are reflected to the focus.

Prop. IV.

A straight line drawn from the focus of a parabola to the intersection of two tangents to the curve, will make equal angles with straight lines drawn from the focus to the points of contact.

Fig. 5.

Let HP, Hp be tangents to a parabola at the points P, p; let a straight line be drawn from H, their intersection, to F the focus, and let FP, Fp be drawn to the points of contact, the lines PF and pF make equal angles with HF.

Draw PK, pk perpendicular to the directrix; join HK, Hk, join also FK, Fk, meeting the tangents in G and g. The triangles FPH, KPH have PF equal to PK, and PH common to both, also the angle FPH equal to KPH (3.), therefore FH is equal to KH, and the angle HFP is equal to the angle HKP. In like manner it may be shewn that FH is equal to kH, and that the angle HFp is equal to the angle Hkp; therefore HK is equal to Hk, and hence the angle HKk is equal to HkK: now the angles PKk, pkK are right angles, therefore the angle HKP is equal to Hkp; but these angles have been shewn to be equal to HFP and HFp respectively, therefore the lines PF and pF make equal angles with HF.

Prop. V.

Two tangents to a parabola, which are limited by their mutual intersection and the points in which they touch the curve, are to each other reciprocally as the sines of the angles they contain with straight lines drawn from the points of contact to the focus.

Fig. 6.

Let HP, Hp, which intersect each other at H, be tangents to a parabola at the points P, p; and let PF, pF be drawn to the focus: then

HP : Hp :: sine HpF : sine HPF.

Join HF; and in FP take FQ equal to Fp, and join HQ; then, the angles at F being equal (4.), the triangles HFQ, HFp are equal, therefore HQ is equal to Hp, and the angle HQF is equal to HpF. Now, in the triangle HPQ,

HP : HQ :: sine HQP or sine HQF : sine HPF (by Trigon.)

therefore HP : Hp :: sine HpF : sine HPF.

Prop. VI.

Any straight line terminated both ways by a parabola, and parallel to a tangent, is bisected by the diameter that passes through the point of contact; or is an ordinate to that diameter.

Of the Parabola.

The straight line Dd, terminated by the parabola, and parallel to the tangent HPh, is bisected at E by PE the diameter that passes through P the point of contact.

Fig. 7.

Let KD, Kd, tangents at the points D, d, meet the tangent at the vertex in H and h; draw DL, dl, parallel to EP, meeting Hh in L and l, and draw DF, dF, PF to the focus.

Because Hh is parallel to Dd,

HD : hd :: KD : Kd.

But KD, Kd being tangents to the parabola,

Sine hdF : sine HDF :: KD : Kd (5.),

Therefore, sine hdF : sine HDF :: HD : hd;

Now sine hPF : sine hdF :: hd : hP (5.),

Therefore, (23.5.E.) sine hPF : sine HDF :: HD : hP; but sine HPF, or sine hPF : sine HDF :: HD : HP, therefore the ratio of HD to hP is the same as that of HD to HP, wherefore HP=Ph.

Again, because the angles HDF and hdF are respectively equal to HDL and hdl, (3.)

DH : dh :: sine hdl : sine HDL,

Now HL : DH :: sine HDL : sine HLD, or sine hld (by Trigon.)

therefore (23.5.E.) HL : dh :: sine hdl : sine hld :: hl : dh, wherefore HL, and hl, have the same ratio to dh, hence HL=hl; and since it has been shewn that HP=Ph, it it follows that LP=Pl, and therefore DE=Ed.

Cor. 1. Straight lines which touch a parabola at the extremities of an ordinate to a diameter intersect each other in that diameter. For Dd and Hh being similarly divided at E and P, the straight line which joins the points E, P, will pass through K the vertex of the triangle DKd.

Cor. 2. Every ordinate to a diameter is parallel to a tangent at its vertex. For, if not, let a tangent be drawn parallel to the ordinate, then the diameter drawn through the point of contact would bisect the ordinate, and thus the same line would be bisected in two different points, which is absurd.

Cor. 3. All the ordinates to the same diameter are parallel to each other.

Cor. 4. A straight line that bisects two parallel chords, and terminates in the curve, is a diameter.

Cor. 5. The ordinates to the axis are perpendicular to it, and no other diameter is perpendicular to its ordinates. This is evident from 2 cor. and 5 cor. to Prop. III.

Cor. 6. Hence the axis divides the parabola into two parts which are similar to each other.

Prop. VII.

If a tangent to any point in a parabola meet a diameter, and from the point of contact an ordinate be drawn to that diameter, the segment of the diameter between the vertex and the tangent is equal to the segment between the vertex and the ordinate.

Fig. 7.

Let DK, a tangent to the curve at D, meet the diameter EP in K, and let DEd be an ordinate to that diameter, PK is equal to PE.

Through P, the vertex of the diameter, draw the tangent PH, meeting KD in H; draw DL parallel to EP, meeting PH in L, and draw DF, PF to the focus: then

PH

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PH : HD :: sine HDF : sine HPF (5.)
But the angle HDF is equal to HDL, and HPF is equal to HPK (3.), that is (because of the parallel lines DL, PK) to HLD, therefore

PH : HD :: sine HDL : sine HLD :: HL : HD,
wherefore PH=HL, and consequently PK=DL; but PL is parallel to DE, by last proposition, and therefore DL=PE, therefore PK=PE.

Prop. VIII.

If an ordinate to any diameter pass through the focus, the abscis is equal to one fourth of the parameter of that diameter, and the ordinate is equal to the whole parameter.

Fig. 8. Let DE*d*, a straight line passing through the focus, be an ordinate to the diameter PE; the abscis PE is equal to $\frac{1}{4}$ the parameter, and the ordinate D*d* is equal to the whole parameter of the diameter PE.

Let DK, PI be tangents at D and P; let DK meet the diameter in K; draw PF to the focus, and DL parallel to EP. The angles KPI, IPF being equal (3.), and PI parallel to EF (2 cor. 6.), the angles PEF, PFE are also equal (29. 1. E.), and PE=PF=$\frac{1}{4}$ the parameter (Def. 9. and Def. 1.). Again, the angle KDE is equal to LDK (3.), and therefore equal to DKE; consequently ED is equal to EK, or to twice EP (7.): therefore D*d* is equal to 4EP, or to 4PF, that is, to the parameter of the diameter.

Prop. IX.

If any two diameters of a parabola be produced to meet a tangent to the curve, the segments of the diameters between their vertices and the tangent are to one another as the squares of the segments of the tangent intercepted between each diameter and the point of contact.

Fig 9. Let QH, RK, any two diameters, be produced to meet PI, a tangent to the curve at P, in the points G, I; then

$$HG : KI :: PG^2 : PI^2.$$

Let PN, a semi-ordinate to the diameter HQ, meet KR in O, and let PR, a semi-ordinate to the diameter KO, meet HN in R; from H draw parallels to NO and QR, meeting KR in L and M, thus HL is a tangent to the curve, and HM a semi-ordinate to KR.

Now KI=KR, and KL=KM (7.)
Therefore, by subtraction, LI=MR=HQ,
But LO=HN=HG (7.)
Therefore by addition, IO=GQ.
The triangles PGN, PIO are similar, as also PGQ, PIR,
Therefore GN : IO, or 2 GH : IO :: PG : PI,
And GQ : IR, or IO : 2IK :: PG : PI,
Hence, taking the rectangles of the corresponding terms,

$$2GH \cdot IO : 2IO \cdot IK :: PG^2 : PI^2,$$
$$\text{Therefore } GH : IK :: PG^2 : PI^2.$$

Fig. 10. Cor. The squares of semi-ordinates, and of ordinates to any diameter, are to one another as their corresponding abscisses. Let HE*h*, KN*k* be ordinates to the diameter PN; draw PG a tangent to the curve at the vertex of the diameter, and complete the parallelograms PEHG, PNKI; then PG, PI are equal to EH, NK, and GH, IK to PE, PN, respectively; therefore $HE^2 : KN^2 :: PE : PN$.

Prop. X.

If an ordinate be drawn to any diameter of a parabola, the rectangle under the abscis and the parameter of the diameter is equal to the square of the semi-ordinate.

Let HB*b* be an ordinate to the diameter PK, the rectangle contained by PB and the parameter of the diameter is equal to the square of HB, the semi-ordinate. Fig. 8.

Let DE*d* be that ordinate to the diameter which passes through the focus. The semi-ordinates DE, E*d* are each half of the parameter, and the abscis EP is one fourth of the parameter (8.),

Therefore D*d* : DE :: DE : PE,
and $Dd \cdot PE = DE^2$,
But $Dd \cdot PE : Dd \cdot PB$, or $PE : PB :: DE^2 : HB^2$ (cor. 9.),
Therefore $Dd \cdot PB = HB^2$.

Scholium.

It was on account of the equality of the square of the semi-ordinate to a rectangle contained by the parameter of the diameter and the abscis, that Apollonius called the curve line to which the property belonged a *Parabola*.

Prop. XI.

A straight line drawn from the focus of a parabola, perpendicular to a tangent, is a mean proportional between the straight line drawn from the focus to the point of contact, and one fourth the parameter of the axis.

Let FB be a perpendicular from the focus upon the tangent PB, and FP a straight line drawn to the point of contact; let A be the principal vertex, and therefore FA equal to one fourth of the parameter of the axis; FB is a mean proportional between FP and FA. Fig. 11.

Produce FB and FA to meet the directrix in D and C, and join AB. The lines FC, FD are bisected at A and B (3 cor. 3.) therefore (2. 6. E.) AB is parallel to CD, or perpendicular to CF, and consequently a tangent to the curve at A (2 cor. 3.); now BP is a tangent at P, therefore the angle AFB is equal to BFP (4.), and since the angles FAB, FBP are right angles, the triangles FAB, FBP are equiangular; hence

FP : FB :: FB : FA.

Cor. 1. The common intersection of a tangent, and a perpendicular from the focus to the tangent, is in a straight line touching the parabola at its vertex.

Cor. 2. If PH be drawn perpendicular to the tangent meeting the axis in H, and HK be drawn perpendicular to PF, PK shall be equal to half the parameter of the axis. For the triangles HPK, PFB are manifestly equiangular, therefore

HP : PK :: PF : FB :: FB : FA :: FD : FC,

 But

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But if PD be joined, the line PD is evidently perpendicular to the directrix (3.), therefore the figure HPDF is a parallelogram, and HP=FD, therefore PK=FC=half the parameter of the axis.

Prop. XII.

If any ordinate and abscis of a parabola be completed into a parallelogram, the area of the parabola, included between the ordinate and the curve, is two thirds of the parallelogram.

Fig. 12. Let AN be any diameter of a parabola, and PQ an ordinate to that diameter. Let BC be drawn through A, parallel to PQ, and let PB, QC be drawn parallel to NA; the area comprehended by the curve line PAQ and ordinate PQ is two thirds of the parallelogram PBCQ. Join PA, QA, and draw the tangents PT, QT, meeting the diameter NA in T, and BC in E and G; through E and G draw the diameters EFD, GHK, which will bisect PA, QA in D and K, (1 cor. 6.), and through F and H, the vertices, draw the tangents RL, MV; join PF, AF, also QH, AH. Because NA=AT (7.), and therefore PQ=2 EG, the triangle PAQ is double the triangle ETG. For the same reason the triangles PFA, QHA are double the triangles REL, VGM respectively, therefore the inscribed figure PFAHQ is double the external figure TRLMV. If diameters were drawn through the points R, L, M, V, and straight lines were drawn joining the vertices of every two adjacent diameters, also tangents at the vertices of the diameters which pass through the points R, L, M, V, there would thus be inscribed in the parabola a new figure which would have the same base PQ as the former, but the number of the remaining sides double that of the former; and corresponding to it there would be a new external figure formed by the tangents at the vertices of the diameters, but still the same proportion between the two figures would hold, or the former would be double the latter, and this would evidently be the case, if the operation of inscribing and circumscribing a new figure were repeated continually. Now it is evident that by thus increasing continually the number of sides of the inscribed figure, it approaches nearer and nearer to the area of the parabola, which is its limit; also that the external figure approaches to the area contained by the two tangents TP, TQ and the parabolic arch PAQ, which space is its limit; and since the limits of any two quantities which have a constant ratio must have the same proportion to each other as the quantities themselves, the area contained by the parabolic arch PAQ and the ordinate PQ must be double the area contained by the same arch and the two tangents TP, TQ, and therefore must be two thirds of the area of the triangle TPQ, which triangle is evidently equal to the parallelogram PBCQ.

Prop. XIII. Problem.

The directrix and focus of a parabola being given by position, to describe the parabola.

First Method. By Mechanical Description.

Let AB be the given directrix, and F the focus. Fig. 13. Place the edge of a ruler ABKH along the directrix AB, and keep it fixed in that position. Let LCG be another ruler of such a form that the part LC may slide along AB the edge of the fixed ruler ABKH, and the part CG may have its edge CD constantly perpendicular to AB. Let GDF be a string of the same length as GC the edge of the moveable ruler; let one end of the string be fixed at F, and the other fastened to G, a point in the moveable ruler. By means of the pin D let the string be stretched, so that the part of it between G and D may be applied close to the edge of the moveable ruler, while, at the same time the ruler slides along AB the edge of the fixed ruler; the pin D will thus be constrained to move along CG the edge of the ruler, and its point will trace upon the plane in which the directrix and focus are situated a curve line DE, which is the parabola required. For the string GDF being equal in length to GDC, if GD be taken from both, there remains DF equal to DC; that is, the distance of the moving point D from the focus is equal to its distance from the directrix, therefore the point D describes a parabola.

Second Method. By finding any number of points in the curve.

Through the focus F draw EFC perpendicular to the directrix, and EC will be the axis. Fig. 14. Draw any straight line HEb parallel to the directrix, meeting the axis in E any point below the vertex, and on F as a centre, with a radius equal to CE, describe a circle cutting Hb in D and d; these will be points in the parabola required, as is sufficiently evident.

Prop. XIV. Problem.

A parabola being given by position, to find its directrix and focus.

Let DPd be the given parabola; draw any two parallel chords Dd, Ee, and bisect them at H and K; Fig. 15. join KH, meeting the parabola in P, the straight line PHK is a diameter (4 cor. 6.), the point P is its vertex, and Dd, Ee are ordinates to it. In HP produced take PL equal to one fourth part of a third proportional to PH and HD, and draw LN perpendicular to PL, the line LN will evidently be the directrix (10. & Def. 9.). Draw PM parallel to the ordinates to the diameter PK, then PM will be a tangent to the curve at P (2 cor. 6.). Draw LM perpendicular to PM, and take MF=ML, and the point F will be the focus of the parabola (3 cor. 3.).

PART

PART II. OF THE ELLIPSE.

Definitions.

Fig. 16. I. If two points F and f be given in a plane, and a point D be conceived to move around them in such a manner that $Df+DF$, the sum of its distances from them, is always the same, the point D will describe upon the plane a line A B a b, which is called an *Ellipse*.

II. The given points F, f are called the *Foci* of the ellipse.

III. The point C, which bisects the straight line between the foci, is called the *Centre*.

IV. The distance of either focus from the centre is called the *Excentricity*.

V. A straight line passing through the centre, and terminated both ways by the ellipse, is called a *Diameter*.

VI. The extremities of a diameter are called its *Vertices*.

VII. The diameter which passes through the foci is called the *Transverse Axis*, also the *Greater Axis*.

VIII. The diameter which is perpendicular to the transverse axis is called the *Conjugate Axis*, also the *Lesser Axis*.

IX. Any straight line not passing through the centre, but terminated both ways by the ellipse, and bisected by a diameter, is called an *Ordinate* to that diameter.

X. Each of the segments of a diameter intercepted between its vertices and an ordinate, is called an *Abscis*.

XI. A straight line which meets the ellipse in one point only, and everywhere else falls without it, is said to *touch* the ellipse in that point, and is called a *Tangent to the ellipse*.

Prop. I.

If from any point in an ellipse two straight lines be drawn to the foci, their sum is equal to the transverse axis.

Fig. 17. Let AB a b be an ellipse, of which F, f are the foci, and Aa the transverse axis; let D be any point in the curve, and DF, Df lines drawn to the foci, $Df+DF=Aa$.

Because A, a are points in the ellipse,

$$Af+AF=aF+af \text{ (Def. 1.)}$$
therefore $Ff+2AF=Ff+2af$;
Hence $2AF=2af$, and $AF=af$,
and $Af+AF=Af+af=Aa$.

But D and A being points in the ellipse

$$Df+DF=Af+AF,$$
therefore $Df+DF=Aa$.

Cor. 1. The sum of two straight lines drawn from a point without the ellipse to the foci is greater than the transverse axis. And the sum of two straight lines drawn from a point within the ellipse to the foci is less than the transverse axis.

Let PF, Pf be drawn from a point without the ellipse to the foci; let Pf meet the ellipse in D; join FD; then $Pf+PF$ is greater than $Df+DF$ (21. 1. E.), that is, than Aa. Again, let QF, Qf be drawn from a point within the ellipse, let Qf meet the curve in D, and join FD; $Qf+QF$ is less than $Df+DF$ (21. 1. E.), that is, than A a. Fig. 17.

Cor. 2. A point is without or within the ellipse, according as the sum of two lines drawn from it to the foci is greater or less than the transverse axis.

Cor. 3. The transverse axis is bisected in the centre. Let C be the centre, then $CF=Cf$ (Def. 3.), and $FA=fa$, therefore $CA=Ca$.

Cor. 4. The distance of either extremity of the conjugate axis from either of the foci is equal to half the transverse axis. Let Bb be the conjugate axis; join Fb, fb. Because $CF=Cf$, and Cb is common to the triangles CFb, Cfb, also the angles at C are right angles, these triangles are equal; hence $Fb=fb$, and since $Fb+bf=Aa$, $Fb=AC$.

Cor. 5. The conjugate axis is bisected in the centre. Join fb, fB. By the last corollary $Bf=bf$, therefore the angles fBC, fbC are equal; now fC is common to the triangles fCB, fCb, and the angles at C are right angles, therefore (26. 1. E.) $CB=Cb$.

Prop. II.

Every diameter of an ellipse is bisected in the centre.

Let Pp be a diameter, it is bisected in C. For if Cp be not equal to CP, take CQ equal to CP, and from the points P, p, Q draw lines to F, f the foci. The triangles FCP, fCQ, having $FC=Cf$, $PC=CQ$, and the angles at C equal, are in all respects equal; therefore $FP=fQ$; in like manner it appears that $fP=FQ$, therefore $FQ+fQ$ is equal to $FP+fP$, or, (Def. 1.), to $Fp+fp$, which is absurd (21. 1. E.), therefore $CP=Cp$. Fig. 18.

Cor. 1. Every diameter meets the ellipse in two points only.

Cor. 2. Every diameter divides the ellipse into two parts which are equal and similar, the like parts of the curve being at opposite extremities of the diameter.

Prop. III.

The square of half the conjugate axis of an ellipse is equal to the rectangle contained by the segments into which the transverse axis is divided by either focus.

Draw a straight line from f, either of the foci, to B, either of the extremities of the conjugate axis. Fig. 17.

Then $BC^2+Cf^2=Bf^2=Ca^2$ (4 cor. 1.),
But because Aa is bisected at C,

$$Ca^2=Af\cdot fa+Cf^2,$$
therefore $BC^2+Cf^2=Af\cdot fa+Cf^2$,
and $BC^2=Af\cdot fa$.

 Prop.

Of the Ellipse.

Prop. IV.

The straight line which bisects the angle adjacent to that which is contained by two straight lines drawn from any point in the ellipse to the foci is a tangent to the curve in that point.

Fig. 19. Let D be any point in the curve; let DF, Df be straight lines drawn to the foci, the straight line DE which bisects the angle fDG adjacent to fDF, is a tangent to the curve at D.

Take H any other point in DE, take DG=Df, and join Hf, HF, HG, fG; let fG meet DE in I. Because Df=DG, and DI is common to the triangles DfI, DGI and the angles fDI, GDI are equal, these triangles are equal, and fI=IG, and hence fH=HG (4. 1. E.), so that FH+fH=FH+HG; but FH+HG is greater than FG, that is, greater than FD+fD or Aa, therefore FH+fH is greater than Aa, hence the point H is without the ellipse (2 cor. 1.), and therefore DHI is a tangent to the curve at D (Def. 11.).

Cor. 1. There cannot be more than one tangent at the same point. For D is such a point in the line DE that the sum of DF, Df, the distances of that point from the foci, is evidently less than the sum of HF, Hf, the distances of H any other point in that line; and if another line KDL be drawn through D, there is in like manner a point K in that line, which will be different from D, such that the sum of FK, fK is less than the sum of the distances of any other point in KL, and therefore less than FD+fD; therefore the point K will be within the ellipse (2 cor. 1.), and the line KL will cut the curve.

Cor. 2. A perpendicular to the transverse axis at either of its extremities is a tangent to the curve. The demonstration is the same as for the proposition, if it be considered that when D falls at either extremity of the axis, the point I falls also at the extremity of the axis, and thus the tangent DE, which is always perpendicular to fI, is perpendicular to the axis.

Cor. 3. A perpendicular to the conjugate axis at either of its extremities is a tangent to the curve. For the perpendicular evidently bisects the angle adjacent to that which is contained by lines drawn from the extremity to the foci.

Cor. 4. A tangent to the ellipse makes equal angles with straight lines drawn from the point of contact to the foci. For the angle fDE being equal to GDE, is also equal to FDM, which is vertical to GDE.

Scholium.

From the property of the ellipse, which forms this last corollary, the points F and f take the name of *Foci*. For writers on optics shew that if a polished surface be formed, whose figure is that produced by the revolution of an ellipse about its transverse axis, rays of light which flow from one focus, and fall upon that surface, are reflected to the other focus, so that if a luminous point be placed in one focus, there is formed by reflection an image of it in the other focus.

Of the Ellipse.

Prop. V.

The tangents at the vertices of any diameter of an ellipse are parallel.

Let Pp be a diameter, HPK, hpk tangents at its vertices; draw straight lines from P and p to F and f the foci. The triangles FCP, fCp, having FC=fc, CP=Cp (2.), and the angles at C equal, are in all respects equal; and because the angle FPC is equal to Cpf, FP is parallel to fp (27. 1. E.), therefore Pf is equal and parallel to pF (33. 1. E.); thus FPfp is a parallelogram, of which the opposite angles P and p are equal (34. 1. E.). Now the angles FPH, fph are evidently half the supplements of these angles (4 cor. 4.) therefore the angles FPH, fph, and hence CPH, Cph are also equal, and consequently HP is parallel to hp. Fig. 18.

Cor. 1. If tangents be drawn to an ellipse at the vertices of a diameter, straight lines drawn from either focus to the points of contact make equal angles with these tangents. For the angle Fpk is equal to FPH.

Cor. 2. The axes of an ellipse are the only diameters which are perpendicular to tangents at their vertices. For let Pp be any other diameter, then PF and pF are necessarily unequal, and therefore the angles FpP, FPp are also unequal; to these add the equal angles Fpk, FPH, and the angles Cpk, CPH are unequal, therefore neither of them can be a right angle (29. 1. E.).

Prop. VI.

A straight line drawn from either focus of an ellipse to the intersection of two tangents to the curve, will make equal angles with straight lines drawn from the same focus to the points of contact.

Let HP, Hp be tangents to an ellipse at the points P, p; let a straight line be drawn from H, their intersection, to F, either of the foci, and let FP, Fp be drawn to the points of contact, the lines PF and pF make equal angles with HF. Fig. 20.

Draw Pf, pf to the other focus; in FP, Fp produced take PK=Pf, and pk=pf; join HK, Hk, and let fK, fk be drawn, meeting the tangents at G and g. The triangles fPH, KPH, have Pf=PK, by construction, and PH common to both, also the angle fPH equal to KPH (4.), therefore fH is equal to KH. In like manner it may be shewn that fH is equal to kH, therefore HK is equal to Hk; now FK is equal to Fk, for each is equal to FP+Pf, or Fp+pf, that is, to the transverse axis; therefore the triangles FKH, FkH are in all respects equal, and hence the angle KFH is equal to kFH; therefore PF and pF make equal angles with HF.

Prop. VII.

Two tangents to an ellipse, which are limited by their mutual intersection, and the points in which

 which they touch the curve, are to each other reciprocally as the sines of the angles they contain with straight lines drawn from the points of contact to either focus.

Fig. 21. Let the straight lines HP, Hp, which intersect each other at H, be tangents to an ellipse at the points P, p, and let PF, pF be drawn to either focus; then

$$HP : Hp :: \text{sine } HpF : \text{sine } HPF.$$

Join HF, and in FP take FQ equal to Fp, and join HQ; then the angles at F being equal (6.) the triangles HFQ, HFp are equal, therefore HQ is equal to Hp, and the angle HQF is equal to HpF. Now, in the triangle HPQ,

$$HP : HQ :: \text{sine } HQP \text{ or sine } HQF : \text{sine } HPF \text{ (Trigon.)}$$
$$\text{therefore } HP : Hp :: \text{sine } HpF : \text{sine } HPF.$$

Lemma.

Let KLl be a triangle, having its base Ll bisected at p, and let Hh, any straight line parallel to the base, and terminated by the sides, be bisected at P; then P, p, the points of bisection, and K, the vertex of the triangle, are in the same straight line, and that line bisects Dd, any other straight line parallel to the base.

Fig. 22. Complete the parallelograms KHPM, KLpN. The triangles KHh, KLl being similar, and Hh, Ll similarly divided at P and p,

$$KH : KL :: Hh : Ll :: HP : Lp,$$

hence the parallelograms KHPM, KLpN are similar. Now they have a common angle at K, therefore they are about the same diameter, that is the points K, P, p are in the same straight line (26. 6. E.).

Next, let Dd meet Kp in E, then

$$HP : DE \; (:: KP : KE) :: Ph : Ed,$$
$$\text{therefore DE is equal to } Ed.$$

Prop. VIII.

Any straight line not passing through the centre, but terminated both ways by an ellipse, and parallel to a tangent, is bisected by the diameter that passes through the point of contact; or is an ordinate to that diameter.

Fig. 23. The straight line Dd, terminated by the ellipse, and parallel to the tangent HPh, is bisected at E, by Pp the diameter that passes through the point of contact.

Let Lpl be a tangent at the other extremity of the diameter, and let KD, Kd, tangents at the points D, d, meet the parallel tangents HPh, Lpl in the points H, L, h, l, and draw DF, dF, PF, pF to either focus. Because Hh is parallel to Dd,

$$HD : hd :: KD : Kd.$$

But, KD, Kd being tangents to the ellipse,

$$\text{Sine } hdF : \text{sine } HDF :: KD : Kd \text{ (7.)}$$
$$\text{therefore sine } hdF : \text{sine } HDF :: HD : hd.$$
$$\text{Now, sine } hPF : \text{sine } hdF :: hd : hP \text{ (7.)}$$
$$\text{therefore (23. 5. E.) sine } hPF : \text{sine } HDF :: HD : hP;$$
$$\text{but sine } HPF \text{ or sine } hPF : \text{sine } HDF :: HD : HP,$$

therefore the ratio of HD to hP is the same as that of HD to HP, wherefore PH=Ph. In the same manner it may be demonstrated that pL=pl, therefore (Lemma) the diameter pP when produced passes through K, and bisects Dd, which is parallel to Hh or Ll, at E.

Cor. 1. Straight lines which touch an ellipse at the extremities of an ordinate to any diameter intersect each other in that diameter.

Cor. 2. Every ordinate to a diameter is parallel to a tangent at its vertex. For if not, let a tangent be drawn parallel to the ordinate, then the diameter drawn through the point of contact would bisect the ordinate, and thus the same line would be bisected in two different points, which is absurd.

Cor. 3. All the ordinates to the same diameter are parallel to each other.

Cor. 4. A straight line that bisects two parallel chords and terminates in the curve is a diameter.

Cor. 5. The ordinates to either axis are perpendicular to that axis; and no other diameter is perpendicular to its ordinates. This follows evidently from 2 and 3 cor. to prop. 4. and 2 cor. to prop. 5.

Cor. 6. Hence each axis divides the ellipse into two parts which are similar and equal.

Prop. IX.

If a tangent to an ellipse meet a diameter, and from the point of contact an ordinate be drawn to that diameter, the semi-diameter will be a mean proportional between the segments of the diameter intercepted between the centre and the ordinate, and between the centre and the tangent.

Let DK, a tangent to the curve at D, meet the diameter pP, produced in K, and let DEd be an ordinate to that diameter. Fig. 23.

$$\text{Then } CE : CP :: CP : CK.$$

Through P and p, the vertices of the diameter, draw the tangents PH and pL, meeting KD in H and L; these tangents are parallel to each other (5.) and to DE, the ordinate, by the last proposition. Draw PF, pF, DF to either of the foci, Then

$$\left.\begin{array}{l} DH : PH :: \text{sine } HPF : \text{sine } HDF \\ \text{and } DL : pL :: \text{sine } LpF : \text{sine } LDF \end{array}\right\} \text{(7.)}$$

Now the angles HPF, LpF are equal (cor. 5.) and the sine of HDF is the same as that of LDF, therefore

$$DH : PH :: DL : pL,$$

and by alternation,

$$DH : DL :: PH : pL;$$

therefore, because of the parallel lines PH, ED, pL,

$$EP : Ep :: PK : pK.$$

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Take CG=CE, then by division

$$EG : EP :: Pp : PK,$$

and taking the halves of the antecedents,

$$CE : EP :: CP : PK;$$

hence, by composition, CE : CP :: CP : CK.

Cor. 1. The rectangle contained by PE and Ep is equal to the rectangle contained by KE and CE.

$$\text{For } PC^2=KC\cdot CE=KE\cdot EC+EC^2 \text{ (3. 2. E.)}$$
$$\text{also } PC^2=PE\cdot Ep+EC^2 \text{ (5. 2. E.)}$$
$$\text{therefore } KE\cdot EC+EC^2=PE\cdot Ep+EC^2,$$
$$\text{and } KE\cdot EC=PE\cdot Ep.$$

Cor. 2. The rectangle contained by PK and Kp is equal to the rectangle contained by KE and KC.

$$\text{For } KC^2=PK\cdot Kp+CP^2 \text{ (6. 2. E.)}$$
$$\text{also } KC^2=EK\cdot KC+EC\cdot KC=EK\cdot KC+CP^2 \text{ (1. 2. E. and by the prop.)}$$
$$\text{therefore } PK\cdot Kp+CP^2=EK\cdot KC+CP^2,$$
$$\text{and } PK\cdot Kp=EK\cdot KC.$$

Prop. X.

If a diameter of an ellipse be parallel to the ordinates to another diameter, the latter diameter shall be parallel to the ordinates to the former.

Fig. 24. Let Pp, a diameter of an ellipse, be parallel to DEd any ordinate to the diameter Qq, the diameter Qq shall be parallel to the ordinates to the diameter Pp.

Draw the diameter dCG through one extremity of the ordinate dD, and join G and D, the other extremity, meeting Pp in H. Because dG is bisected at C, and CH is parallel to dD, the line DG is bisected at H, therefore DG is an ordinate to the diameter Pp. And because dG and dD are bisected at C and E, the diameter Qq is parallel to DG (2. 6. E.) therefore Qq is parallel to any ordinate to the diameter Pp.

Definitions.

XII. Two diameters are said to be *conjugate* to one another when each is parallel to the ordinates to the other diameter.

Cor. Diameters which are conjugate to one another are parallel to tangents at the vertices of each other.

XIII. A third proportional to any diameter and its conjugate is called the *Parameter*, also the *Latus rectum of that diameter*.

Prop. XI.

If an ordinate be drawn to any diameter of an ellipse, the rectangle under the abscisses of the diameter will be to the square of the semi-ordinate as the square of the diameter to the square of its conjugate.

Fig. 25. Let DEd be an ordinate to the diameter Pp, and let Qq be its conjugate, then

$$PE\cdot Ep : DE^2 :: Pp^2 : Qq^2.$$

Let KDL a tangent at D meet the diameter in K, and its conjugate in L; draw DG parallel to Pp, meeting Qq in G. Because CP is a mean proportional between CE and CK (9.)

$$CP^2 : CE^2 :: CK : CE \text{ (2 cor. 20. 6. E.)}$$

$$\text{and by division } CP^2 : PE\cdot Ep :: CK : KE.$$

But, because ED is parallel to CL,

$$CK : KE :: CL : DE \text{ or } CG,$$

and because CQ is a mean proportional between CG and CL (9.)

$$CL : CG :: CQ^2 : CG^2 \text{ or } ED^2;$$
$$\text{therefore } CP^2 : PE\cdot Ep :: CQ^2 : DE^2,$$

and by inversion and alternation,

$$PE\cdot Ep : DE^2 :: CP^2 : CQ^2 :: Pp^2 : Qq^2.$$

Cor. 1. The squares of semi-ordinates and of ordinates to any diameter of an ellipse are to one another as the rectangles contained by the corresponding abscisses.

Cor. 2. The ordinates to any diameter, which intercept equal segments of that diameter from the centre, are equal to one another, and, conversely, equal ordinates intercept equal segments of the diameter from the centre.

Cor. 3. If a circle be described upon A a, either of the axes of an ellipse, as a diameter, and DE, de, any two semi-ordinates to the axis meet the circle in H and h, DE shall be to de as HE to he. For Fig. 26.

$$DE^2 : de^2 :: AE\cdot Ea : Ae.ea :: HE^2 : he^2,$$
$$\text{therefore } DE : de :: HE : he.$$

Cor. 4. If a circle be described on A a the transverse axis as a diameter, and DE, any ordinate to the axis, be produced to meet the circle in H, HE shall be to DE as the transverse axis A a to the conjugate axis B b. For, produce the conjugate axis to meet the circle in K, then, by last corollary,

$$HE : DE :: KC, \text{ or } AC : BC :: Aa : Bb.$$

Cor. 5. And if HE be divided at D, so that HE is to DE, as the transverse axis to the conjugate axis, D is a point in the ellipse, and DE a semi-ordinate to the axis A a.

Prop. XII.

The transverse axis of an ellipse is the greatest of all its diameters, and the conjugate axis is the least of all its diameters.

Let Aa be the transverse axis, Bb the conjugate axis, and CD any semi-diameter. Draw DE perpendicular to A a, and DL perpendicular to B b. Fig. 26.

$$\text{Because } Aa^2 : Bb^2 :: AE\cdot Ea : DE^2 \text{ (11.)}$$
$$\text{and } Aa^2 \text{ is greater than } Bb^2,$$
$$\text{therefore } AE\cdot Ea \text{ is greater than } DE^2;$$
$$\text{and } AE\cdot Ea+EC^2 \text{ is greater than } DE^2+EC^2,$$
$$\text{that is } AC^2 \text{ is greater than } DC^2,$$
$$\text{therefore AC is greater than DC.}$$

By

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By the same manner of reasoning it may be shewn that because Bb^2 is less than Aa^2,

$$BL \cdot Lb + CL^2 \text{ is less than } DL^2 + CL^2;$$
$$\text{that is, } BC^2 \text{ is less than } DC^2,$$
$$\text{and } BC \text{ less than } DC.$$

Prop. XIII.

If an ordinate be drawn to any diameter of an ellipse, the rectangle under the abscisses of the diameter is to the square of the semi-ordinate as the diameter to its parameter.

Fig. 27. Let DE be a semi-ordinate to the diameter Pp, let PG be the parameter of the diameter, and Qq the conjugate diameter. By the definition of the parameter (Def. 13.)

$$Pp : Qq :: Qq : PG,$$
$$\text{therefore } Pp : PG :: Pp^2 : Qq^2 \text{ (2 cor. 20. 6. E.)}$$
$$\text{But } Pp^2 : Qq^2 :: PE \cdot Ep : DE^2, \text{ (11.)}$$
$$\text{therefore } PE \cdot Ep : DE^2 :: Pp : PG.$$

Cor. Let the parameter PG be perpendicular to the diameter Pp; join pG, and from E draw EM parallel to PG, meeting pG in M. The square of DE, the semi-ordinate, is equal to the rectangle contained by PE and EM.

$$\text{For } PE \cdot Ep : DE^2 :: Pp : PG,$$
$$\text{and } Pp : PG :: Ep : EM :: PE \cdot Ep : PE \cdot EM,$$
$$\text{therefore } DE^2 = PE \cdot EM.$$

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If the rectangles $PGLp$, HGKM be completed, it will appear that the square of ED is equal to the rectangle MP, which rectangle is less than the rectangle KP, contained by the abscis PE and parameter PG, by a rectangle KH similar and similarly situated to LP, the rectangle contained by the diameter and parameter. It was on account of the deficiency of the square of the ordinate from the rectangle contained by the abscis and parameter that Apollonius called the curve line to which the property belonged an Ellipse.

Prop. XIV.

If from the vertices of two conjugate diameters of an ellipse there be drawn ordinates to any third diameter, the square of the segment of that diameter intercepted between either ordinate and the centre is equal to the rectangle contained by the segments between the other ordinate and the vertices of the same diameter.

Let Pp, Qq be two conjugate diameters, and PE, QG semi-ordinates to any third diameter Rr, then $CG^2 = RE \cdot Er$, and $CE^2 = RG \cdot Gr$. Fig. 28.

Draw the tangents PH, QK meeting Rr in H and K. The rectangles $HC \cdot CE$ and $KC \cdot CG$ are equal, for each is equal CR^2 (9.), therefore

$$HC : CK :: CG : CE.$$

But the triangles HPC, CQK are evidently similar (cor. def. 12.) and PE being parallel to QG their bases CH, KC are similarly divided at E and G, therefore

$$HC : CK :: HE : CG,$$
$$\text{wherefore } CG : CE :: HE : CG,$$
$$\text{consequently } CG^2 = CE \cdot EH = \text{(1 cor. 9.) } RE \cdot Er.$$

In like manner it may be shewn that $CE^2 = RG \cdot Gr$.

Cor. 1. Let Ss be the diameter that is conjugate to Rr, then Rr is to Ss as CG to PE, or as CE to QG.

$$\text{For } Rr^2 : Ss^2 :: RE \cdot Er, \text{ or } CG^2 : PE^2,$$
$$\text{therefore } Rr : Ss :: CG : PE.$$

In like manner $Rr : Ss :: CE : QG$.

Cor. 2. The sum of the squares of CE, CG, the segments of the diameter to which the semi-ordinates PE, QG are drawn, is equal to the square of CR the semi-diameter.

$$\text{For } CE^2 + CG^2 = CE^2 + RE \cdot EG = CR^2.$$

Cor. 3. The sum of the squares of any two conjugate diameters is equal to the sum of the squares of the axes.

Let Rr, Ss be the axes, and Pp, Qq any two conjugate diameters; draw PE, QG perpendicular to Rr, and PL, QM perpendicular to Ss. Then

$$CE^2 + CG^2 = CR^2, \text{ and } CM^2 + CL^2, \text{ or } GQ^2 + PE^2 = CS^2;$$
$$\text{therefore } CE^2 + PE^2 + CG^2 + GQ^2 = CR^2 + CS^2,$$
$$\text{that is (47. 1. E.), } CP^2 + CQ^2 = CR^2 + CS^2,$$
$$\text{therefore } Pp^2 + Qq^2 = Rr^2 + Ss^2.$$

Prop. XV.

If four straight lines be drawn touching an ellipse at the vertices of any two conjugate diameters, the parallelogram formed by these lines is equal to the rectangle contained by the transverse and conjugate axes.

Fig. 29. Let Pp, Qq be any two conjugate diameters, a parallelogram DEGH formed by tangents to the curve at their vertices is equal to the rectangle contained by Aa, Bb the two axes.

Produce Aa, one of the axes, to meet the tangent PE in K, join QK, and draw PL, QM perpendicular to Aa.

$$\text{Because } CK : CA :: CA : CL \text{ (9.)}$$
$$\text{and } CA : CB :: CL : QM \text{ (1 cor. 14.)}$$
$$\text{ex aeq. } CK : CB :: CA : QM.$$
$$\text{therefore } CK \cdot QM = CB \cdot CA.$$

But $CK \cdot QM$ = twice trian. CKQ = paral. CPEQ, therefore the parallelogram CPEQ = $CB \cdot CA$, and taking the quadruples of these, the parallogram DEGH is equal to the rectangle contained by Aa and Bb.

Prop. XVI.

If two tangents at the vertices of any diameter of an ellipse meet a third tangent, the rectangle contained by their segments between the points of Plate CLVIII.

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of contact and the points of intersection is equal to the square of the semi-diameter to which they are parallel. And the rectangle contained by the segments of the third tangent between its point of contact and the parallel tangents is equal to the square of the semi-diameter to which it is parallel.

Fig. 30. Let PH, ph, tangents at the vertices of a diameter Pp meet HDh, a tangent to the curve at any point D, in H and h; let CQ be the semi-diameter to which the tangents PH, ph are parallel, and CR that to which Hh is parallel, then,

$$PH \cdot ph = CQ^2, \text{ and } DH \cdot Dh = CR^2.$$

If the tangent HDh be parallel to Pp the proposition is manifest. If it is not parallel, let it meet the semi-diameters CP, CQ in L and K. Draw DE, RM parallel to CQ, and DG parallel to CP.

$$\text{Because } LP \cdot Lp = LE \cdot LC \text{ (2 cor. 9.)},$$
$$LP : LE :: LC : Lp,$$

hence, and because of the parallels PH, ED, CK, ph,

$$PH : ED :: CK : ph,$$
$$\text{wherefore } PH \cdot ph = ED \cdot CK,$$
$$\text{but } ED \cdot CK = CG \cdot CK = CQ^2 \text{ (9.)}$$
$$\text{therefore } PH \cdot ph = CQ^2.$$

Again, the triangles LED, CMR are evidently similar, and LE, LD similarly divided at H and P, also at h and p,

$$\text{therefore } PE : HD :: (LE : LD ::) CM : CR,$$
$$\text{also } pE : hD :: (LE : LD ::) CM : CR,$$

hence, taking the rectangles of the corresponding terms,

$$PE \cdot pE : HD \cdot hD :: CM^2 : CR^2.$$

But if CD be joined, the points D and R are evidently the vertices of two conjugate diameters (cor. Def. 12.) and therefore $PE \cdot pE = CM^2$ (14.)

$$\text{therefore } HD \cdot hD = CR^2.$$

Cor. The rectangle contained by LD and DK, the segments of a tangent intercepted between D the point of contact and Pp, Qq, any two conjugate diameters, is equal to the square of CR, the semi-diameter to which the tangent is parallel.

Let the parallel tangents PH, ph meet LK in H and h, and draw DE a semi-ordinate to Pp. Because of the parallels PH, ED, CK, ph,

$$LE : LD :: EP : DH,$$
$$\text{and } EC : DK :: Ep : Dh,$$
$$\text{therefore } LE \cdot EC : LD \cdot DK :: EP \cdot Ep : DH \cdot Dh.$$
$$\text{But } LE \cdot EC = EP \cdot Ep \text{ (1 cor. 9.)}$$
$$\text{therefore } LD \cdot DK = DH \cdot Dh = \text{(by this prop.) } CR^2.$$

Prop. XVII.

If two straight lines be drawn from the foci of an ellipse perpendicular to a tangent, straight lines drawn from the centre to the points in which they meet the tangent will each be equal to half the transverse axis.

Let DPd be a tangent to the curve at P, and FD, fd perpendiculars to the tangent from the foci, the straight lines joining the points C, D, and C, d, are each equal to AC half the transverse axis. Fig. 31.

Join FP, fP, and produce FD, fP till they intersect in E. The triangles FDP, EDP, have the angles at D right angles, and the angles FPD, EPD equal (4.) and the side DP common to both, they are therefore equal, and consequently have ED = DF, and EP = PF, wherefore $Ef = FP + Pf = Aa$. Now the straight lines FE, Ff being bisected at D and C, the line DC is parallel to Ef, and thus the triangles FfE, FCD are similar,

$$\text{therefore } Ff : fE \text{ or } Aa :: FC : CD,$$

but FC is half of Ff, therefore CD is half of Aa. In like manner it may be shewn that Cd is half of Aa.

Cor. If the diameter Qq be drawn parallel to the tangent Dd, it will cut off from PF, Pf the segments PG, Pg, each equal to AC half the transverse axis. For $CdPG$, $CDPg$ are parallelograms, therefore $PG = dC = AC$, and $Pg = DC = AC$.

Prop. XVIII.

The rectangle contained by perpendiculars drawn from the foci of an ellipse to a tangent is equal to the square of half the conjugate axis.

Let DPd be a tangent, and FD, fd perpendiculars from the foci, the rectangle contained by FD and fd is equal to the square of CB half the conjugate axis. Fig. 31.

It is evident from the last proposition that the points D, d are in the circumference of a circle whose centre is the centre of the ellipse, and radius CA, half the transverse axis; now FDd being a right angle, if dC be joined, the lines DF, dC when produced will meet at H, a point in the circumference; and since $FC = fC$, and $CH = Cd$, and the angles FCH, fCd are equal, FH is equal to fd, therefore

$$DF \cdot df = DF \cdot FH = AF \cdot Fa \text{ (35. 3. E.)} = CB^2 \text{ (3.)}.$$

Cor. If PF, Pf be drawn from the point of contact to the foci, the square of FD is a fourth proportional to fP, FP and BC^2. For the lines fP, FP make equal angles with the tangent (4 cor. 4.) and fdP, FDP are right angles, therefore the triangles fPd, FPD are similar, and

$$fP : FP :: fd : FD :: fd \cdot FD \text{ or } CB^2 : FD^2.$$

Prop. XIX.

If from C the centre of an ellipse a straight line CL be drawn perpendicular to a tangent LD, and from D the point of contact a perpendicular be drawn to the tangent, meeting the transverse axis in H and the conjugate axis in h, the rectangle contained by CL and DH is equal to the square of CB, the semi-conjugate axis; and the rectangle contained by CL and Dh is equal to the square of CA, the semi-transverse axis. Fig. 32.

Produce the axes to meet the tangent in M and m, and from D draw the semi-ordinates DE, De, which will be perpendicular to the axes.

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The triangles DEH, CLm are evidently equi-angular, therefore

$$DH : DE :: Cm : CL,$$
$$\text{hence } CL \cdot DH = DE \cdot Cm;$$
$$\text{but } DE \cdot Cm, \text{ or } Ce \cdot Cm = BC^2,$$
$$\text{therefore } CL \cdot DH = BC^2.$$

In the same way it is shewn that $CL \cdot Db = AC^2$.

Cor. 1. If a perpendicular be drawn to a tangent at the point of contact, the segments intercepted between the point of contact, and the axes, are to each other reciprocally as the squares of the axes by which they are terminated.

For $AC^2 : BC^2 :: CL \cdot Db : CL \cdot DH :: Db : DH$.

Cor. 2. If DF be drawn to either focus, and HK be drawn perpendicular to DF, the straight line DK shall be equal to half the parameter of the transverse axis.

Draw CG parallel to the tangent at D, meeting DH in N, and DF in G. The triangles GDN, HDK are similar, therefore

$$GD : DN :: HD : DK, \text{ and hence } GD \cdot DK = HD \cdot DN.$$
$$\text{But } GD = AC \text{ (cor. 17.) and } ND = CL,$$
$$\text{therefore } AC \cdot DK = HD \cdot CL = \text{(by the prop.) } CB^2.$$
$$\text{wherefore } AC : BC :: BC : DK, \text{ hence DK is half the parameter of } Aa \text{ (Def. 13.)}.$$

Definition.

Fig. 33. XIV. If a point G be taken in the transverse axis of an ellipse produced, so that the distance of G from the centre may be a third proportional to CF the excentricity, and CA the semi-transverse axis, a straight line HGh, drawn through G perpendicular to the axis, is called the *Directrix of the ellipse*.

Cor. 1. If MFm, an ordinate to the axis, be drawn through the focus, tangents to the ellipse at the extremities of the ordinate will meet the axis at the point G. (9.)

Cor. 2. The ellipse has two directrices, for the point G may be taken on either side of the centre.

Prop. XX.

The distance of any point in an ellipse from either directrix is to its distance from the focus nearest that directrix in the constant ratio of the semi-transverse axis to the excentricity.

Fig. 33. Let D be any point in the ellipse, let DK be drawn perpendicular to the directrix, and let DF be drawn to the focus nearest the directrix; DK is to DF as CA, half the transverse axis, to CF, the excentricity.

Draw Df to the other focus, and DE perpendicular to Aa, take L a point in the axis, so that AL = FD, and consequently La = Df, then CL is evidently half the difference between AL and aL, or FD and fD, and CE half the difference between fE and FE, and because

$$Df + DF : fF :: fE - FE : Df - DF \text{ (Trigon.)}$$

By taking the halves of the terms of the proportion

$$CA : CF :: CE : CL,$$
$$\text{But } CA : CF :: CG : CA \text{ (Def. 14.)}$$
$$\text{therefore } CG : CA :: CE : CL,$$
$$\text{hence (20. 5. E) } EG : AL :: CG : CA :: CA : CF,$$
$$\text{that is, } DK : DF :: CA : CF.$$

Cor. 1. If the tangent GMN be drawn through M, the extremity of the ordinate passing through the focus, and ED be produced to meet GM in N, EN shall be equal to DF. For draw MO perpendicular to the directrix, then, because M and D are points in the ellipse, and from similar triangles,

$$FM : FD :: MO : DK :: GF : GE :: FM : EN,$$
$$\text{therefore } FD = EN.$$

Cor. 2. If AI and ai be drawn perpendicular to the transverse axis at its extremities, meeting the tangent GM in I, and i, then AI = AF and $ai = a$F. This follows evidently from last corollary.

Prop. XXI.

Let Aa, Bb be the transverse and conjugate axes of an ellipse; from K any point in the conjugate axis let a straight line KH, which is equal to the sum or difference of the semi-axes CA, CB, be placed so as to meet the transverse axis in H, and in KH, produced beyond H when KH is the difference of the semi-axes, let HD be taken equal to CB; the point D is in the ellipse. Fig. 34.

Draw DE perpendicular to Aa, and through C draw CG parallel to KD, meeting ED in G, then CG = KD = AC by construction, hence G is in the circumference of a circle of which C is the centre, and CA the radius; and because the triangles CEG, HED are similar,

$$GE : DE :: CG : HD :: CA : CB,$$

therefore DE is a semi-ordinate, and D a point in the ellipse (5 Cor. 11.).

Scholium.

The instrument called the *trammels*, also the *elliptic compasses*, which workmen use for describing elliptic curves, is constructed on the property of the curve demonstrated in this proposition. (See Compasses.) Upon the same principle lathes are constructed for turning picture frames, &c. of an oval form.

Prop. XXII.

If a circle be described on the transverse axis of an ellipse as a diameter, the area of the circle will be to the area of the ellipse as the transverse axis to the conjugate axis.

Let Aa be the transverse axis of the ellipse, which is also the diameter of the circle. Draw DE, D′E′, D″E″ any number of perpendiculars to the axis, meeting the ellipse in D, D′, D″, and the circle in d, d', d'', and join AD, DD′, D′D″, D″a; also Ad, dd', $d'd''$, Fig. 35.

$d'd''$, $d''a$, and draw DG, dg parallel to A a, meeting d' E′ in G and g.

The triangle A d E is to the triangle ADE as d E to DE, that is (4. cor. 11.) as the tranſverſe axis to the conjugate axis. Again, becauſe d'E′ and d E are ſimilarly divided at D′ and D (3. cor. 11.)

dE : DE :: (d'E′—d E : D′E′—DE ::) $d'g$: D′G,
But, triangle $d g d'$: triangle DGD′ :: $d'g$: D′G,

therefore the triangles $d g d'$, DGD′ as well as the rectangles d E′, DE′ are to each other as d E to DE, or as the tranſverſe axis to the conjugate axis, and conſequently the trapezoids dEE′d', DEE′D′ are to each other in the ſame ratio. In like manner it may be ſhewn, that the trapezoids d'E′E″d'', D′E′E″D″, alſo the triangles d''E″ a, D″E″ a are to each other as the tranſverſe to the conjugate axis, and therefore the whole rectilineal figure A $d\,d'd''\,a$ inſcribed in the ſemicircle to the whole figure ADD′D″ a inſcribed in the ſemiellipſe in the ſame ratio, which ratio is conſtant, and altogether independent of the number of the ſides of each figure. But, the baſe A a remaining common to both figures, if we ſuppoſe the number of perpendiculars dDE, d' D′E′, &c. indefinitely increaſed, it is evident that the polygons A $d\,d'\,d''\,a$, ADD′D″ a will approach nearer and nearer to the ſemicircle and ſemiellipſe, which are their reſpective limits, therefore, the ſemicircle is to the ſemiellipſe, and conſequently the circle is to the ellipſe, as the tranſverſe to the conjugate axis.

Cor. The area of an ellipſe is equal to the area of a circle, whoſe diameter is a mean proportional between the axes.

Prop. XXIII. Problem.

Two unequal ſtraight lines which biſect each other at right angles being given by poſition, to deſcribe an ellipſe of which theſe may be the two axes.

First Method. By a Mechanical Deſcription.

Fig. 36. Let A a, B b be the tranſverſe and conjugate axes, and C the centre. On B, one extremity of the conjugate axis, as a centre, with a radius equal to AC, half the tranſverſe axis, let a circle be deſcribed, cutting the tranſverſe axis in F and f; theſe points will be the foci of the ellipſe (4 cor. 1.).

Let the ends of a ſtring, equal in length to A a, be faſtened at the points F, f, and let the ſtring be ſtretched by a pin D, and while it is kept uniformly tenſe, let the point of the pin be carried round in the plane in which the lines A a, B b are ſituated, till it return to the place from which it ſet out; by this motion the point of the pin will trace upon the plane a curve line which is the ellipſe required, as is evident from the definition of the Ellipſe.

Second Method. By Finding any Number of Points in the Curve.

Find F either of the foci as before; draw HAK, Fig. 37. $h\,a\,k$, perpendicular to the tranſverſe axis at its extremities, and take AH and AK on each ſide of the vertex equal to AF, alſo $a\,h$ and $a\,k$ each equal to a F, join H h and K k, take E any point in A a, and through E draw NE n parallel to HK, meeting H h and K k in N and n. On F as a centre with a radius equal to EN or E n let a circle be deſcribed, meeting N n in D and d, theſe will be two points in the ellipſe, and in the ſame way may any number of points be found. The reaſon of this conſtruction is obvious from cor. 1. and 2. to prop. 20.

Prop. XXIV. Problem.

An ellipſe being given by poſition, to find its axes.

Let AB $a\,b$ be the given ellipſe. Draw two pa- Fig. 38. rallel chords H h, K k, and biſect them at L and M; join LM, and produce it to meet the ellipſe in P and p, then, P p is a diameter (4. cor. 8.). Biſect P p in C, the point C is the centre of the ellipſe (2.).

Take D any point in the ellipſe, and on C as a centre with the diſtance CD deſcribe a circle. If this circle fall wholly without the curve, then CD muſt be half the tranſverſe axis; and if it fall wholly within the curve, then CD muſt be half the conjugate axis (12.). If the circle neither falls wholly without the curve, nor wholly within it, let the circle meet it again in d, join D d, and biſect D d in E, join CE, which produce to meet the ellipſe in A and a, then A a will be one of the axes (5. cor. 8.), for it is perpendicular to D d (3. 3. E.) which is an ordinate to A a. The other axis B b will be found by drawing a ſtraight line through the centre perpendicular to A a.

PART III. OF THE HYPERBOLA.

Definitions.

Fig. 39. I. If two points F, f be given in a plane, and a point D be conceived to move in ſuch a manner that Df—DF, the difference of its diſtances from them is always the ſame, the point D will deſcribe upon the plane a line DAD′ called an *Hyperbola*. By aſſuming firſt one of the given points F, and then the other f as that to which the moving point is neareſt, the difference of the lines DF and Df in both caſes being the ſame, there will be two hyperbolas DAD′, $d\,a\,d'$, deſcribed, oppoſite to one another, which are therefore called *Oppoſite Hyperbolas*.

Cor. The lines DF, Df may become greater than any given line, therefore the hyperbolas extend to a greater diſtance from the given points F, f than any which can be aſſigned.

II. The given points F, f are called the *Foci of the hyperbola*.

III. The point C, which biſects the ſtraight line between the foci, is called the *Centre*.

IV. A ſtraight line paſſing through the centre, and terminated

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terminated by the oppofite hyperbolas, is called a *Tranfverfe Diameter.* It is alfo fometimes called, fimply, a *Diameter.*

V. The extremities of a diameter are called its *Vertices.*

VI. The diameter which paffes through the foci, is called the *Tranfverfe Axis.*

Cor. The vertices of the tranfverfe axis lie between the foci. Let A be either of the vertices, then, becaufe any fide of a triangle is greater than the difference between the other two fides, F*f* is greater than *f*D—DF which is equal to *f*A—FA (Def. 1.). Now this can only take place when A is between F and *f*.

VII. A ftraight line B*b* paffing through the centre, perpendicular to the tranfverfe axis, and limited at B and *b* by a circle defcribed on one extremity of that axis, with a radius equal to the diftance of either focus from the centre, is called the *Conjugate Axis.* It is alfo called the *Second Axis.*

Cor. The conjugate axis is bifected in the centre. This appears from 3. 3. E.

VIII. Any ftraight line terminated both ways by the hyperbola, and bifected by a tranfverfe diameter produced, is called an *Ordinate* to that diameter.

IX. Each of the fegments of a tranfverfe diameter produced, intercepted by its vertices, and an ordinate, is called an *Abfcifs.*

X. A ftraight line which meets the hyperbola in one point only, and which everywhere elfe falls without the oppofite hyperbolas, is faid to *touch* the hyperbola in that point, and is called a *Tangent to the hyperbola.*

Prop. I.

If from any point in an hyperbola two ftraight lines be drawn to the foci, their difference is equal to the tranfverfe axis.

Fig. 39.

Let DAD′, *d a d*′ be oppofite hyperbolas, of which F, *f* are the foci, and A *a* the tranfverfe axis; let D be any point in the curve, and DF, D*f* lines drawn to the foci, D*f*—DF=A *a*.

Becaufe A and *a* are points in the hyperbola,

A*f*—AF=*a* F—*af* (Def. 1.)
therefore F*f*—2AF=F*f*—2 *af;*
Hence 2AF=2 *af* and AF=*af*,
and A*f*—AF=A*f*—*af*=A *a*.

But D and A being points in the hyperbola,

D*f*—DF=A*f*—AF, therefore D*f*—DF=A *a*.

Cor. 1. The difference of two ftraight lines drawn from a point without the oppofite hyperbolas to the foci is lefs than the tranfverfe axis, and the difference of two ftraight lines drawn from a point within either of them to the foci is greater than the tranfverfe axis.

Fig. 40.

Let P*f*, PF be lines drawn from a point without the hyperbolas, that is, between the curve and its conjugate axis. The line PF muft neceffarily meet the curve, let D be the point of interfection; P*f* is lefs than PD+D*f* (20. 1. E.), therefore P*f*—PF is lefs than (PD+D*f*)—PF, that is, lefs than D*f*—DF, or A *a*. Again, let Q*f*, QF be lines drawn from a point within either of the hyperbolas, Q*f* muft neceffarily meet the curve; let D be the point of interfection, join FD; QF is lefs than QD+DF, and therefore Q*f*—QF is greater than Q*f*—(QD+DF), that is, greater than D*f*—DF or A *a*.

Cor. 2. A point is without, or within the hyperbolas, according as the difference of two lines drawn from that point to the foci is lefs or greater than the tranfverfe axis.

Cor. 3. The tranfverfe axis is bifected in the centre. Let C be the centre; then CF=C*f* (Def. 3.), and FA=*fa*, therefore CA=C *a*.

Lemma I.

Fig. 41.

Two triangles ABC, ADC on the fame bafe, and on the fame fide of it, having AB, AD, the greater of the two fides of each ending in the fame extremity of the bafe, and having their vertical angles B, D without each other, cannot have the difference of the fides of the one equal to the difference of the fides of the other.

Let AD meet BC in E. Becaufe AE+EB is greater than AB, (AE+EB)—BC=AE—EC is greater than AB—BC. Again, becaufe DC is lefs than DE+EC, AD—DC is greater than AD—(DE+EC)=AE—EC; much more therefore is AD—DC greater than AB—BC. Therefore AD—DC cannot be equal to AB—BC.

Prop. II.

Plate CLIX.

Every tranfverfe diameter of an hyperbola is bifected in the centre.

Fig. 42.

Let P*p* be a tranfverfe diameter, it is bifected in C; for if C*p* be not equal to CP, take CQ equal to CP; from the points P, *p*, Q draw ftraight lines to F and *f* the foci; draw *f*D perpendicular to C*p*, and FE parallel to PD, meeting *f*D in E; join E*p*, EQ. Becaufe *f*C=CF, and CD is parallel to EF, *f*D=DE (2. 6. E.). Now *p*D is common to the triangles *f*D*p*, ED*p*, and the angles at D are equal, being right angles, therefore the triangles are equal, and *pf*=*p* E. In like manner it appears that Q*f*=QE. Again, the triangles FCP, *f*CQ having FC=C*f*, PC=CQ, and the angles at C equal, are in all refpects equal, therefore FP=*f*Q. In like manner it appears that P*f*=QF, therefore FQ—*f*Q is equal to *f*P—FP, or (Def. 1.) to F*p*—*fp;* that is, FQ—QE is equal to F*p*—*p* E, which by the preceding lemma is abfurd; therefore CP=C*p*.

Cor. 1. Every tranfverfe diameter meets the oppofite hyperbolas each in one point only, and being produced falls within them.

Cor. 2. Every tranfverfe diameter divides the oppofite hyperbolas into parts which are equal and fimilar; the like parts of the curve being at oppofite extremities of the diameter, and on contrary fides of it.

Prop. III.

The fquare of half the conjugate axis of an hyperbola is equal to the rectangle contained by the ftraight lines between either focus and the extremities of the tranfverfe axis.

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Plate CLVIII. Fig. 39.

DRAW a ſtraight line from a, either of the extremities of the tranſverſe axis, to B, either of the extremities of the conjugate axis.

$$\text{Then } BC^2+Ca^2=Ba^2=Cf^2 \text{ (Def. 7.)}$$

But becauſe A a is biſected at C, and produced to f,

$$Cf^2=Af\cdot fa+Ca^2 \text{ (6. 2. E.)}$$
$$\text{therefore } BC^2+Ca^2=Af\cdot fa+Ca^2,$$
$$\text{and } BC^2=Af\cdot fa.$$

PROP. IV.

The ſtraight line which biſects the angle contained by two ſtraight lines drawn from any point in the hyperbola to the foci is a tangent to the curve at that point.

Plate CLIX. Fig. 43.

LET D be any point in the curve, let DF, Df be ſtraight lines drawn to the foci, the ſtraight line DE which biſects the angle fDF is a tangent to the curve.

Take H any other point in DE, take DG=Df, and join Hf, HF, HG, fG; let fG meet DE in I. Becauſe Df=DG and DI is common to the triangles DfI, DGI, and the angles fDI, GDI are equal, theſe triangles are equal, and fI=IG, and hence fH =HG (4. 1. E.), ſo that FH—fH=FH—HG: but ſince FH is leſs than FG+GH, FH—HG is leſs than FG, that is leſs than FD—fD or A a, therefore FH—fH is leſs than A a; hence the point H is without the hyperbola (2 cor. 1.), and conſequently DHI is a tangent to the curve at D (Def. 10.).

COR. 1. There cannot be more than one tangent to the hyperbola at the ſame point. For D is ſuch a point in the line DE, that the difference of the lines DF, Df, the diſtances of that point from the foci, is evidently greater than the difference of FH, fH the the diſtances of H any other point in that line; and if another line KD be drawn through D, there is in like manner a point K in that line, which will be different from D, ſuch, that the difference of FK, fK is greater than the difference of the diſtances of any other point in KD, and therefore greater than FD—fD, therefore the point K will be within the hyperbola (2 cor. 1.), and the line KD will cut the curve.

COR. 2. A perpendicular to the tranſverſe axis at either of its extremities is a tangent to the curve. The demonſtration is the ſame as for the propoſition, if it be conſidered that when D falls at either extremity of the axis, the point I falls alſo at the extremity of the axis, and thus the tangent DE, which is always perpendicular to fI, is perpendicular to the axis.

COR. 3. Every tangent to either of the oppoſite hyperbolas paſſes between that hyperbola and the centre. Let the tangent DI meet the axis in E. Becauſe DE biſects the angle FDf,

$$FD : fD :: FE : fE \text{ (3. 6. E.)}$$

But FD is greater than fD (Def. 1.), therefore FE is greater than fE, and hence E is between C and the vertex of the hyperbola to which DE is a tangent.

SCHOLIUM.

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From the property of the hyperbola which forms this propoſition, the points F and f are called *Foci*. For rays of light proceeding from one focus, and falling upon a poliſhed ſurface whoſe figure is that formed by the revolution of the curve about the tranſverſe axis, are reflected in lines paſſing through the other focus.

PROP. V.

The tangents at the vertices of any tranſverſe diameter of an hyperbola are parallel.

LET Pp be a diameter, HP, hp tangents at its vertices; draw ſtraight lines from P and p to F and f the foci. The triangles FCP, fCp, having FC=fC, CP=Cp (2.), and the angles at C equal, are in all reſpects equal, and becauſe the angle FPC is equal to Cpf, FP is parallel to fp (27. 1. E.), therefore Pf is equal and parallel to pF (33. 1. E.): thus FPfp is a parallelogram of which the oppoſite angles P and p are equal (34. 1. E.); now the angles FPH, fph are the halves of theſe angles (4.); therefore the angles FPH, fph, and hence CPH, Cph, are alſo equal, and conſequently HP is parallel to hp. Fig. 44.

COR. 1. If tangents be drawn to an hyperbola at the vertices of a tranſverſe diameter, ſtraight lines drawn from either focus to the points of contact make equal angles with theſe tangents. For the angle Fph is equal to FPH.

COR. 2. The tranſverſe axis is the only diameter which is perpendicular to tangents at its vertices. For let Pp be any other diameter. The angle CPH is leſs than FPH, that is, leſs than the half of FPf, therefore CPH is leſs than a right angle.

PROP. VI.

A ſtraight line drawn from either focus of an hyperbola to the interſection of two tangents to the curve, will make equal angles with ſtraight lines drawn from the ſame focus to the points of contact.

LET HP, Hp be tangents to an hyperbola at the points P, p; let a ſtraight line be drawn from H their interſection to F either of the foci; and let FP, Fp be drawn to the points of contact; the lines PF, pF make equal angles with HF. Fig. 45 and 46.

Draw Pf, pf to the other focus. In PF and pF take PK=Pf, and pk=pf; join HK, Hk, and let fK, fk be drawn, meeting the tangents in G and g. The triangles fPH, KPH have Pf=PK, by conſtruction, and PH common to both, alſo the angle fPH equal to KPH (4.); therefore fH is equal to KH. In like manner it may be ſhewn that fH is equal to kH, therefore HK is equal to Hk; now FK is equal to Fk, for each is equal to the difference between FP and fP, or Fp and fp, that is, to the tranſverſe axis; therefore the triangles FKH, FkH are in all reſpects equal, and hence the angle KFH is equal to kFH, therefore PF and pF make equal angles with HF.

PROP.

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Prop. VII.

Two tangents to an hyperbola, or oppofite hyperbolas, which are limited by their mutual interfection and the points in which they touch the curve, are to each other, reciprocally, as the fines of the angles they contain with ftraight lines drawn from the points of contact to either focus.

Fig. 47 and 48. Let HP, Hp, which interfect each other at H, be tangents to an hyperbola, or oppofite hyperbolas, at the points P, p; and let PF, p F be drawn to either focus,

HP : Hp :: fine Hp F : fine HPF.

Join HF, and in FP take FQ equal to Fp, and join HQ; then, the angles at F being equal (6.), the triangles HFQ, HFp are equal, therefore HQ is equal to Hp, and the angle HQF is equal to Hp F. Now in the triangle HPQ,

HP : HQ :: fine HQP, or fine HQF : fine HPF (Trig.)
therefore HP : Hp :: fine Hp F : fine HPF.

Lemma II.

Fig. 49. Let KL l be a triangle, having its bafe L l bifected at p, and let H h, any ftraight line parallel to the bafe, and terminated by the fides produced, be bifected at P, then P, p the points of bifection, and K the vertex of the triangle, are in the fame ftraight line, and that line bifects D d any other line parallel to the bafe.

Join KP, Kp. The triangles KH h, KL l being fimilar, and H h, L l fimilarly divided at P, p,

KH : KL :: (H h : L l ::) HP : Lp.

Now the angles at H and L are equal, therefore the triangles KHP, KLp are fimilar, and the angle PKH is equal to pKL; to both add the angle HKp, and the angles PKH, HKp are equal to pKL, HKp, that is, to two right angles; therefore KP, Kp lie in the fame ftraight line (14. 1. E.).

Next let D d meet Kp in E, then

HP : DE (:: PK : EK) :: Ph : E d,
therefore DE is equal to E d.

Prop. VIII.

Any ftraight line terminated both ways by an hyperbola, and parallel to a tangent, is bifected by the tranfverfe diameter produced, that paffes through the point of contact, or is an ordinate to that diameter.

Fig. 50. The ftraight line D d, terminated by the hyperbola, and parallel to the tangent HPh, is bifected at E by Pp the tranfverfe diameter produced, which paffes through P, the point of contact.

Let Lp l be a tangent at the other extremity of the diameter, and let KD, K d, tangents at the points D, d, meet the parallel tangents HPh, Lp l in the points H, L, h, l, and draw DF, dF, PF to either focus. Becaufe H h is parallel to D d,

HD : h d :: KD : K d.

But KD, K d being tangents to the hyperbola,

fine h dF : fine HDF :: KD : K d (7.)
therefore fine h dF : fine HDF :: HD : h d,
now, fine h PF : fine h dF :: $h$$d$: hP (7.)
therefore, (23. 5. E.) fine hPF : fine HDF :: HD : hP;

but fine HPF or fine h PF : fine HDF :: HD : HP, therefore the ratio of HD to h P is the fame as the ratio of HD to HP, wherefore PH=P h. In the fame manner it may be demonftrated that p L=p l, therefore (lemma 2.) the diameter P p when produced paffes through K, and bifects D d, which is parallel to H h, or L l, at E.

Cor. 1. Straight lines which touch an hyperbola at the extremities of an ordinate to any tranfverfe diameter, interfect each other in that diameter.

Cor. 2. Every ordinate to a tranfverfe diameter is parallel to a tangent at its vertex. For if not, let a tangent be drawn parallel to the ordinate, then the diameter drawn through the point of contact would bifect the ordinate, and thus the fame line would be bifected in two different points, which is abfurd.

Cor. 3. All the ordinates to the fame tranfverfe diameter are parallel to each other.

Cor. 4. A ftraight line that bifects two parallel chords, and terminates in the oppofite hyperbola, is a tranfverfe diameter.

Cor. 5. The ordinates to the tranfverfe axis are perpendicular to it, and no other tranfverfe diameter has its ordinates perpendicular to it. This follows from 2. cor. 4. and 2. cor. 5.

Cor. 6. The tranfverfe axis, indefinitely produced, divides each of the oppofite hyperbolas into two parts which are fimilar to one another.

Prop. IX.

If a tangent to an hyperbola meet a tranfverfe diameter, and from the point of contact an ordinate be drawn to that diameter, the femidiameter will be a mean proportional between the fegments of the diameter intercepted between the centre and the ordinate, and between the centre and the tangent.

Let DK a tangent to the curve at D meet the tranfverfe diameter Pp in K, and let DE d be an ordinate to that diameter, Fig. 50.

Then CE : CP :: CP : CK.

Through P and p, the vertices of the diameter, draw the tangents PH and p L, meeting KD in H and L, thefe tangents are parallel to each other (5.), and to DE, the ordinate, by laft propofition. Draw PF, p F, DF to either of the foci. Then,

$$\left.\begin{array}{l}\text{DH : HP :: fine HPF : fine HDF,}\\ \text{and DL : L}p\text{ :: fine L}p\text{F : fine LDF, or fine HDF}\end{array}\right\}(7.)$$

Now the angles HPF, Lp F are equal (1. cor. 5.); therefore,

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therefore,

$$DH : PH :: DL : pL,$$

and by alternation

$$DH : DL :: PH : pL;$$

therefore, becaufe of the parallel lines PH, ED, pL,

$$EP : Ep :: PK : pK.$$

Take $CG = CE$, then $PG = Ep$, and by compofition

$$EG : EP :: Pp : PK,$$

and taking the halves of the antecedents

$$CE : EP :: CP : PK;$$

hence, by divifion, $CE : CP :: CP : CK$.

Cor. 1. The rectangle contained by PE and Ep is equal to the rectangle contained by KE and CE.

For $CP^2 = KC \cdot CE = EC^2 - KE \cdot EC$ (2. 2. E.)
alfo $CP^2 = EC^2 - PE \cdot Ep$ (6. 2. E.)
therefore $EC^2 - KE \cdot EC = EC^2 - PE \cdot Ep$,
and $KE \cdot EC = PE \cdot Ep$.

Cor. 2. The rectangle contained by PK and Kp is equal to the rectangle contained by KE and KC.

For $KC^2 = CP^2 - PK \cdot Kp$ (5. 2. E.)
alfo $KC^2 = EC \cdot KC - EK \cdot KC = CP^2 - EK \cdot KC$ (3. 2. E. and by the prop.)
therefore $CP^2 - PK \cdot Kp = CP^2 - EK \cdot KC$,
and $PK \cdot Kp = EK \cdot KC$.

Prop. X.

If a tangent to an hyperbola meet the conjugate axis, and from the point of contact a perpendicular be drawn to that axis, the femiaxis will be a mean proportional between the fegments of the axis intercepted between the centre and the perpendicular, and between the centre and the tangent.

Fig. 51. Let DH, a tangent to the hyperbola at D, meet the conjugate axis Bb in H, and let DG be perpendicular to that axis, then

$$CG : CB :: CB : CH.$$

Let DH meet the tranfverfe axis in K, draw DE perpendicular to that axis, draw DF, Df to the foci, and defcribe a circle about the triangle DfF; the conjugate axis will evidently pafs through the centre of the circle, and becaufe the angle FDf is bifected by the tangent DK, the line DK will pafs through one extremity of the diameter; therefore the circle paffes through H. Draw DL to the other extremity of the diameter. The triangles LGD, KCH are fimilar, for each is fimilar to the right-angled triangle LDH, therefore,

$$LG : GD\ (=CE) :: CK : CH;$$

hence $LG \cdot CH = CE \cdot CK =$ (by laft prop.) CA^2.
Now $LC \cdot CH = CF^2$ (35. 3. E.)
therefore $LC \cdot CH - LG \cdot CH = CF^2 - CA^2$,
that is, $CG \cdot CH = CB^2$ (Def. 7.)
wherefore $CG : CB :: CB : CH$.

Definition.

Fig. 52. XI. If through A, one of the vertices of the tranfverfe axis, a ftraight line HAh be drawn, equal and parallel to Bb the conjugate axis, and bifected at A by the tranfverfe axis, the ftraight lines CHM, Chm drawn through the centre, and the extremities of that parallel, are called *Afymptotes*.

Cor. 1. The afymptotes of two oppofite hyperbolas are common to both. Through a, the other extremity of the axis, draw $H'ab'$, parallel to Bb, and meeting the afymptotes of the hyperbola DAD in H′ and b'. Becaufe aC is equal to AC, aH' is equal to Ah, or to BC; alfo ab' is equal to AH, or to BC; hence, by the definition, CH′ and Cb' are afymptotes of the oppofite hyperbola dad.

Cor. 2. The afymptotes are diagonals of a rectangle formed by drawing perpendiculars to the axes at their vertices. For the lines AH, CB, aH' being equal and parallel, the points H, B, H′ are in a ftraight line paffing through B parallel to Aa; the fame is true of the points b, b, b'.

Prop. XI.

The afymptotes do not meet the hyperbola; and if from any point in the curve a ftraight line be drawn parallel to the conjugate axis, and terminated by the afymptotes, the rectangle contained by its fegments from that point is equal to the fquare of half that axis.

Through D any point in the hyperbola draw a ftraight line parallel to the conjugate axis, meeting the tranfverfe axis in E, and the afymptotes in M and m; the points M and m fhall be without the hyperbola, and the rectangle $MD \cdot Dm$ is equal to the fquare of BC. Fig. 53.

Draw DG perpendicular to Bb the conjugate axis, let a tangent to the curve at D meet the tranfverfe axis in K, and the conjugate axis in L, and let a perpendicular at the vertex A meet the afymptote in H. Becaufe DK is a tangent, and DE an ordinate to the axis, CA is a mean proportional between CK and CE (9.), and therefore

$$CK : CE :: CA^2 : CE^2 \text{ (2 cor. 20. 6. E.)}$$

But $CK : CE :: LC : LG$,
and $CA^2 : CE^2 :: AH^2 : EM^2$;
therefore $LC : LG :: AH^2 : EM^2$.

Again, CB being a mean proportional between CL and CG (10.)

$$LC : CG :: CB^2 : CG^2,$$

and therefore

$$LC : LG :: CB^2 : CB^2 + CG^2, \text{ or } CB^2 + ED^2;$$

wherefore $AH^2 : EM^2 :: CB^2 : CB^2 + ED^2$.
Now $AH^2 = CB^2$ (Def. 11.)
therefore $EM^2 = CB^2 + ED^2$,

confequently EM^2 is greater than ED^2, and EM greater

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greater than ED, therefore M is without the hyperbola. In like manner it appears that m is without the hyperbola; therefore every point in both the asymptotes is without the hyperbola. Again, the straight line Mm terminated by the asymptotes, being manifestly bisected by the axis at E,

$$ME^2 = MD \cdot Dm + DE^2;$$

but it has been shewn that

$$ME^2 = BC^2 + DE^2,$$

$$\text{therefore } MD \cdot Dm = BC^2.$$

Cor. 1. Hence, if in a straight line Mm, terminated by the asymptotes, and parallel to the conjugate axis, there be taken a point D such that the rectangle MD·Dm is equal to the square of that axis, the point D is in the hyperbola.

Cor. 2. If straight lines MDm, NRn, be drawn through D and R, any points in the hyperbola, or opposite hyperbolas, parallel to the conjugate axis, and meeting the asymptotes in M, m, and N, n, the rectangles MD·Dm, NR·Rn are equal.

Prop. XII.

The hyperbola and its asymptote when produced continually approach to each other, and the distance between them becomes less than any given line.

Fig. 53.

Take two points E and O in the transverse axis produced, and through these points draw straight lines parallel to the conjugate axis, meeting the hyperbola in D, R, and the asymptotes in M, m and N, n.

Because NO^2 is greater than ME^2,
and $NR \cdot Rn = MD \cdot Dm$, (2 cor. 11.)
therefore $NO^2 - NR \cdot Rn$ is greater than $ME^2 - MD \cdot Dm$,
that is RO^2 is greater than DE^2,
and RO is greater than DE;
now On is greater than Em,
therefore Rn is greater than Dm,
and since $Rn : Dm :: DM : RN$, (2. Cor. 11.)
DM is greater than RN,

therefore the point R is nearer to the asymptote than D, that is, the hyperbola when produced approaches to the asymptote.

Let S be any line less than half the conjugate axis; then, because Dm, a straight line drawn from a point in the hyperbola, parallel to the conjugate axis, and terminated by the asymptote on the other side of the transverse axis, may evidently be of any magnitude greater than Ah, which is equal to half the conjugate axis, Dm may be a third proportional to S and BC; and since Dm is also a third proportional to DM (the segment between D and the other asymptote) and BC, DM may be equal to S; but the distance of D from the asymptote is less than DM, therefore that distance may become less than S, and consequently less than any given line.

Cor. Every straight line passing through the centre, within the angles contained by the asymptotes through which the transverse axis passes, meets the hyperbola, and therefore is a transverse diameter; and every straight line passing through the centre within the adjacent angles falls entirely without the hyperbola.

Scholium.

The name *asymptotes* (*non concurrentes*) has been given to the lines CH, Ch, because of the property they have of continually approaching to the hyperbola without meeting it, as has been proved in this proposition.

Prop. XIII.

Plate CLX.

If from two points in a hyperbola, or opposite hyperbolas, two parallel straight lines be drawn to meet the asymptotes, the rectangles contained by their segments between the points and the asymptotes are equal.

Fig. 54. and 55.

Let D and G be two points in the hyperbola, or opposite hyperbolas, let parallel lines EDe, HGh be drawn to meet the asymptotes in E, e, and H, h, the rectangles ED · De, HG · GH are equal.

Through D and G draw straight lines parallel to the conjugate axis, meeting the asymptotes in the points L, l, and M, m. The triangles HGM, EDL are similar, as also the triangles hGm, eDl,

$$\text{therefore } DL : DE :: GM : GH,$$

$$\text{and } Dl : De :: Gm : Gh;$$

hence, taking the rectangles of the corresponding terms of the proportions,

$$LD \cdot Dl : ED \cdot De :: MG \cdot Gm : HG \cdot Gh.$$

$$\text{But } LD \cdot Dl = MG \cdot Gm \text{ (2. Cor. 11.)}$$

$$\text{therefore } ED \cdot De = HG \cdot Gh.$$

Fig. 54. and 55.

Cor. 1. If a straight line be drawn through D, d, two points in the same or opposite hyperbolas, the segments DE, de between those points and the asymptotes are equal. For in the same manner that the rectangles ED · De, HG · Gh have been proved to be equal, it may be shewn that the rectangles Ed · de, HG · Gh are equal, therefore ED · De = Ed · de. Let Ee be bisected in O, then $ED \cdot De = EO^2 - OD^2$, and $Ed \cdot de = EO^2 - Od^2$, therefore $EO^2 - OD^2 = EO^2 - Od^2$; hence OD=O$d$, and ED=$ed$.

Fig. 54.

Cor. 2. When the points D and d are in the same hyperbola, by supposing them to approach till they coincide at P, the line Ee will thus become a tangent to the curve at P. Therefore any tangent KPk, which is terminated by the asymptotes, is bisected at P, the point of contact.

Fig. 54.

Cor. 3. And if any straight line KPk, limited by the asymptotes, be bisected at P a point in the curve, that line is tangent at P. For it is evident that only one line can be drawn through P which shall be limited by the asymptotes, and bisected at P.

Fig. 54.

Cor. 4. If a straight line be drawn through D, any point in the hyperbola, parallel to a tangent KPk, and terminated by the asymptotes at E and e, the rectangle ED · De is equal to the square of PK, the segment of the tangent between the point of contact and either asymptote. The demonstration is the same as in the proposition.

Fig. 55.

Cor. 5. If from any point D in a hyperbola a straight line be drawn parallel to Pp any diameter, meeting the asymptotes in E and e, the rectangle ED · De is equal to the square of half the diameter. The demonstration is the same as in the proposition.

Prop. XIV.

If two ſtraight lines be drawn from any point in an hyperbola to the aſymptotes, and from any other point in the ſame, or oppoſite hyperbolas, two other lines be drawn parallel to the former, the rectangle contained by the firſt two lines will be equal to the rectangle contained by the other two lines.

Fig. 56. From D any point in the hyperbola draw DH and DK to the aſymptotes, and from any other point d draw dh and dk parallel to DH and DK. The rectangles $HD \cdot DK$, $hd \cdot dk$ are equal.

Join D, d meeting the aſymptotes in E, e. From ſimilar trangles

$$ED : DH :: Ed : dh,$$
$$\text{and } eD : DK :: ed : dk,$$

therefore, taking the rectangles of correſponding terms,

$$ED \cdot De : HD \cdot DK :: Ed \cdot de : hd \cdot dk;$$
$$\text{but } ED \cdot De = Ed \cdot de \text{ (13.)},$$
$$\text{therefore } HD \cdot DK = hd \cdot dk.$$

Cor. 1. If the lines D′K′, D′H′, $d'k'$, $d'h'$, be parallel to the aſymptotes, and thus form the parallelograms D′K′CH′, $d'k'$ C h', theſe are equal to one another (16. and 14. 6. E.) And if D′C, d'C be joined, the halves of the parallelograms, or the triangles D′ K′ C, $d'k'$ C are alſo equal.

Cor. 2. If from D′, d', any two points in an hyperbola, ſtraight lines D′K′, $d'k'$ be drawn parallel to one aſymptote, meeting the other in K′ and k', theſe lines are to each other reciprocally as their diſtances from the centre, or $D'K' : d'k' :: Ck' : CK'$. This appears from laſt cor. and 14. 6. E.

Definitions.

Fig. 57. XII. If Aa be the tranſverſe axis, and Bb the conjugate axis of two oppoſite hyperbolas DAD, $d\ a\ d$, and if Bb be the tranſverſe axis, and Aa the conjugate axis of other two oppoſite hyperbolas EBE, $e\ b\ e$, theſe hyperbolas are ſaid to be *conjugate to the former.* When all the four hyperbolas are mentioned they are called *conjugate hyperbolas.*

Cor. The aſymptotes of the hyperbolas DAD, dad are alſo the aſymptotes of the hyperbolas EBE, $e\ b\ e$. This is evident from Cor. 2. to Definition 11.

XIII. Any diameter of the conjugate hyperbolas is called a *ſecond diameter of the other hyperbolas.*

Cor. Every ſtraight line paſſing through the centre, within the angle through which the conjugate or ſecond axis paſſes, is a ſecond diameter of the hyperbola.

XIV. Any ſtraight line not paſſing through the centre, but terminated both ways by the oppoſite hyperbolas, and biſected by a ſecond diameter, is called an *Ordinate to that diameter.*

Prop. XV.

Any ſtraight line not paſſing through the centre, but terminated by the oppoſite hyperbolas, and parallel to a tangent to either of the conjugate hyperbolas, is biſected by the ſecond diameter that paſſes through the point of contact, or is an ordinate to that diameter.

The ſtraight line Dd terminated by the oppoſite hyperbolas, and parallel to the tangent KQk, is biſected at E by Qq the diameter that paſſes through the point of contact. Fig. 58.

Let Dd meet the aſymptotes in G and g, and let the tangent meet them in K and k. The ſtraight lines Gg, Kk are evidently ſimilarly divided at E and Q, and ſince $KQ = Qk$ (2 cor. 13.) therefore $GE = Eg$; now $DG = gd$ (1 cor. 13.), therefore $DE = Ed$.

Cor. 1. Every ordinate to a ſecond diameter is parallel to a tangent at its vertex. The demonſtration is the ſame as in Cor. 2. Prop.

Cor. 2. All the ordinates to the ſame ſecond diameter are parallel to each other.

Cor. 4. A ſtraight line that biſects two parallel ſtraight lines which terminate in the oppoſite hyperbolas is a ſecond diameter.

Cor. 5. The ordinates to the conjugate or ſecond axis are perpendicular to it, and no other ſecond diameter is perpendicular to its ordinates.

Cor. 6. The oppoſite hyperbolas are ſimilar to one another, and like portions of them are, in all reſpects, equal.

Prop. XVI.

If a tranſverſe diameter of an hyperbola be parallel to the ordinates to a ſecond diameter, the latter ſhall be parallel to the ordinates to the former.

Let Pp, a tranſverſe diameter of an hyperbola, be parallel to DEd, any ordinate to the ſecond diameter Qq, the ſecond diameter Qq ſhall be parallel to the ordinates to the diameter Pp. Fig. 59.

Draw the diameter dCG through one extremity of the ordinate dD, and join G and D, the other extremity, meeting Pp in H. Becauſe dG is biſected at C, and CH is parallel to dD, the line DG is biſected at H, therefore DG is an ordinate to the diameter Pp. And becauſe dG and dD are biſected at C and E, the diameter Qq is parallel to DG (2. 6. E.), therefore Qq is parallel to any ordinate to the diameter Pp.

Definitions.

XV. Two diameters are ſaid be *conjugate to one another* when each is parallel to the ordinates to the other diameter.

Cor. Diameters which are conjugate to one another are parallel to tangents at the vertices of each other.

XVI. A third proportional to any diameter and its conjugate is called the *Parameter*, alſo the *Latus rectum of that diameter.*

Prop. XVII.

The tangent at the vertex of any tranſverſe diameter of an hyperbola, which is terminated by the aſymptotes, is equal to the diameter that is conjugate to that diameter.

Let PCp be any tranſverſe diameter of an hyperbola, HPh a tangent at its vertex, meeting the aſymptotes Fig. 60.

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totes in H and h, and Qq the diameter which is conjugate to Pp; the tangent Hh is equal to the diameter Qq.

Through D, any point in the hyperbola, draw a straight line parallel to the tangent and diameter, cutting either of the conjugate hyperbolas in d, and the asymptotes in E and e, and through D and d draw lines parallel to Bb the conjugate axis, meeting the asymptotes in the points K, k, and L, l. The triangles DEK, dEL are similar, as also eDk, edl, therefore

$$KD : DE :: Ld : dE,$$
$$\text{and } kD : De :: ld : de;$$

therefore, taking the rectangles of the corresponding terms,

$$KD \cdot Dk : ED \cdot De :: Ld \cdot dl : Ed \cdot de.$$

But $KD \cdot Dk = BC^2$ (11.) and $BC^2 = Ld \cdot dl$ (5 cor. 13.)

$$\text{therefore } ED \cdot De = Ed \cdot de.$$
$$\text{Now } ED \cdot De = HP^2 \text{ (4 cor. 13.)},$$
$$\text{and } Ed \cdot de = QC^2 \text{ (5 cor. 13.)}$$
$$\text{therefore } HP^2 = QC^2, \text{ and } HP = QC,$$
$$\text{and consequently } Hh = Qq.$$

Cor. 1. If another tangent be drawn to the curve at p, meeting the asymptotes in H′ and h', the straight lines which join the points H, H′, also h, h', are tangents to the conjugate hyperbolas at Q and q. For pH′ as well as PH is equal and parallel to CQ, therefore the points H, Q, H′ are in a straight line parallel to Pp, and HQ = H′Q (33. 1. E), therefore HQH′ is a tangent to the curve at Q. In like manner it appears that hqh' is a tangent at q.

Cor. 2. If tangents be drawn at the vertices of two conjugate diameters, they will meet in the asymptotes, and form a parallelogram of which the asymptotes are diagonals.

Prop. XVIII.

If a tangent to an hyperbola meet a second diameter, and from the point of contact an ordinate be drawn to that diameter, half the second diameter will be a mean proportional between the segments of the diameter intercepted between the centre and the ordinate, and between the centre and the tangent.

Fig. 61. Let DL a tangent to the curve at D meet the second diameter Qq in L, and let DGd' be an ordinate to that diameter, then

$$CG : CQ :: CQ : CL.$$

Let Pp be the diameter that is conjugate to Qq, let HPh be a tangent at the vertex, terminated by the asymptotes; through D draw the ordinate DEd to the diameter Pp, meeting the asymptotes in M and m; let K be the intersection of DL and Pp. Because DK is a tangent at D, and DEd an ordinate to Pp, CP is a mean proportional between CE and CK (9.) and therefore

$$CE^2 : CP^2 :: CE : CK.$$

Now, the lines CQ, PH, EM being parallel (8. and Def. 15.), from similar triangles,

$$CE^2 : CP^2 :: EM^2 : PH^2,$$
$$\text{and } CE, \text{ or } DG : CK :: LG : LC;$$
$$\text{therefore } EM^2 : PH^2 :: LG : LC,$$
$$\text{and by division, \&c. } EM^2 - PH^2 : PH^2 :: CG : LC :: CG^2 : CG \cdot LC.$$
$$\text{But since } PH^2 = MD \cdot Dm \text{ (4 cor. 13.)}, EM^2 - PH^2 = ED^2 = CG^2,$$
$$\text{therefore } PH^2 = CG \cdot LC;$$
$$\text{wherefore, and since } PH = CQ \text{ (17.)},$$
$$CG : CQ :: CQ : CL.$$

Prop. XIX.

If an ordinate be drawn to any transverse diameter of an hyperbola, the rectangle under the abscisses of the diameter will be to the square of the semi-ordinate as the square of the diameter to the square of its conjugate.

Fig. 62. Let DEd be an ordinate to the transverse diameter Pp, and let Qq be its conjugate diameter,

$$PE \cdot Ep : DE^2 :: Pp^2 : Qq^2.$$

Let DKL a tangent at D meet the diameter in K, and its conjugate in L. Draw DG parallel to Pp, meeting Qq in G. Because CP is a mean proportional between CE and CK (9.)

$$CP^2 : CE^2 :: CK : CE,$$
$$\text{and by division } CP^2 : PE \cdot Ep :: CK : KE.$$
$$\text{But, because ED is parallel to CL,}$$
$$CK : KE :: CL : DE, \text{ or } CG,$$

and because CQ is a mean proportional between CG and CL (18.)

$$CL : CG :: CQ^2 : CG^2, \text{ or } DE^2,$$
$$\text{therefore } CP^2 : PE \cdot Ep :: CQ^2 : DE^2,$$

and by inversion and alternation,

$$PE \cdot Ep : DE^2 :: CP^2 : CQ^2 :: Pp^2 : Qq^2.$$

Cor. 1. If an ordinate be drawn to any second diameter of an hyperbola, the sum of the squares of half the second diameter and its segment intercepted by the ordinate from the centre is to the square of the semi-ordinate, as the square of the second diameter to the square of its conjugate.

Let DG be a semi-ordinate to the second diameter Qq. It has been shewn that

$$CG^2 : CQ^2 :: PE \cdot Ep : CP^2,$$
$$\text{therefore, by comp.}$$
$$CQ^2 + CG^2 : CQ^2 :: CE^2 \text{ or } DG^2 : CP^2,$$
$$\text{and by alter.}$$
$$CQ^2 + CG^2 : CE^2 :: CQ^2 : CP^2 :: Qq^2 : Pp^2.$$

Cor. 2. The squares of semi-ordinates, and of ordinates to any transverse diameter, are to one another as the rectangles contained by the corresponding abscisses; and the squares of semi-ordinates, and of ordinates,

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nates to any second diameter are to one another as the sums of the squares of half that diameter and the segments intercepted by the ordinate from the centre.

Cor. 3. The ordinates to any transverse diameter, which intercept equal segments of that diameter from the centre, are equal to one another, and, conversely, equal ordinates intercept equal segments of the diameter from the centre.

Prop. XX.

Plate CLXI. The transverse axis of an hyperbola is the least of all its transverse diameters, and the conjugate axis is the least of all its second diameters.

Fig. 64. Let R r be the transverse axis, P p any other transverse diameter, draw PE perpendicular to R r; then CE being greater than CR, and CP greater than CE, much more is CP greater than CR, therefore P p is greater than R r. In like manner it is shewn that if S s be the conjugate axis, and Q q any other second diameter, Q q is greater than S s.

Prop. XXI.

Plate CLX. If an ordinate be drawn to any transverse diameter of an hyperbola, the rectangle under the abscisses of the diameter is to the square of the semi-ordinate as the diameter to its parameter.

Fig. 63. Let DE be a semi-ordinate to the transverse diameter P p; let PG be the parameter of the diameter, and Q q the conjugate diameter. By the definition of the parameter (Def. 16.)

$$Pp : Qq :: Qq : PG,$$
$$\text{therefore } Pp : PG :: Pp^2 : Qq^2, \text{ (2 cor. 20. 6. E.)}$$
$$\text{But } Pp^2 : Qq^2 :: PE \cdot Ep : DE^2, \text{ (19.)}$$
$$\text{therefore } PE \cdot Ep : DE^2 :: Pp : PG.$$

Cor. Let the parameter PG be perpendicular to the diameter P p; join pG, and from E draw EM parallel to PG, meeting pG in M. The square of DE the semi-ordinate is equal to the rectangle contained by PE and EM.

$$\text{For } PE \cdot Ep : DE^2 :: Pp : PG,$$
$$\text{and } Pp : PG :: Ep : EM :: PE \cdot Ep : PE \cdot EM,$$
$$\text{therefore } DE^2 = PE \cdot EM.$$

Scholium.

If the rectangles PGL p, HGKM be completed, it will appear that the square of ED is equal to the rectangle MP, which rectangle is greater than the rectangle KP, contained by the abscis PE, and the parameter GP, by a rectangle KH similar and similarly situated to LP, the rectangle contained by the parameter and diameter. It was on account of the excess of the square of the ordinate above the rectangle contained by the abscis and parameter that Apollonius gave the curve to which the property belonged the name of Hyperbola.

Prop. XXII.

Plate CLXI. If from the vertices of two conjugate diameters of an hyperbola there be drawn ordinates to any third transverse diameter, the square of the segment of that diameter, intercepted between the ordinate from the vertex of the second diameter, and the centre, is equal to the rectangle contained by the segments between the other ordinate and the vertices of the third transverse diameter. And the square of the segment intercepted between the ordinate from the vertex of the transverse diameter and the centre is equal to the square of the segment between the other ordinate, and the centre, together with the square of half the third transverse diameter.

Fig. 64. Let P p, Q q be two conjugate diameters, of which P p is a transverse, and Q q a second diameter; let PE, QG be semi-ordinates to any third transverse diameter R r, then $CG^2 = RE \cdot Er$, and $CE^2 = CG^2 + CR^2$.

Draw the tangents PH, QK, meeting R r in H and K. The rectangles HC · CE and KC · CG are equal, for each is equal to CR^2 (9.) therefore,

$$HC : CK :: CG : CE.$$

But the triangles HPC, CQK are evidently similar (cor. Def. 15.) and since PE, QG are parallel, their bases CH, KC similarly divided at E and G, therefore

$$HC : CK :: HE : CG,$$
$$\text{wherefore } CG : CE :: HE : CG,$$
$$\text{consequently } CG^2 = CE \cdot EH = \text{(1 cor. 9.) } RE \cdot Er.$$

Again, from the similar triangles HPC, CQK,

$$HC : CK :: CE : KG.$$

Now it was shewn that HC : CK :: CG : CE,

$$\text{therefore } CG : CE :: CE : KG,$$
consequently
$$CE^2 = CG \cdot GK = \text{(3. 2. E.) } CG^2 + GC \cdot CK.$$
$$\text{But } GC \cdot CK = CR^2 \text{ (18.)}$$
$$\text{therefore } CE^2 = CG^2 + CR^2.$$

Cor. 1. Let S s be the diameter that is conjugate to R r, then R r is to S s as CG to PE, or as CE to QG.

$$\text{For } Rr^2 : Ss^2 :: RE \cdot Er, \text{ or } CG^2 : PE^2,$$
$$\text{therefore } Rr : Ss :: CG : PE.$$

In like manner $Rr : Ss :: CE : QG$.

Cor. 2. The difference between the squares of CE, CG the segments of the transverse diameter to which the semi-ordinates PE, QG are drawn, is equal to the square of CR the semi-diameter. For it has been shewn that $CE^2 = CG^2 + CR^2$;

$$\text{therefore } CE^2 - CG^2 = CR^2.$$

Cor. 3. The difference of the squares of any two conjugate diameters is equal to the difference of the squares of the axes. Let R r, S s be the axes, and P p, Q q any two conjugate diameters; draw PE, QG perpendicular to R r, and PL, QM perpendicular to S s. Then

$$CE^2 - CG^2 = CR^2,$$
$$\text{and } CM^2 - CL^2, \text{ or } GQ^2 - PE^2 = CS^2,$$
$$\text{therefore } CE^2 + PE^2 - (CG^2 + GQ^2) = CR^2 - CS^2,$$
$$\text{that is (47. 1. E.) } CP^2 - CQ^2 = CR^2 - CS^2,$$
$$\text{therefore } Pp^2 - Qq^2 = Rr^2 - Ss^2.$$

Prop. XXIII.

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Prop. XXIII.

If four straight lines be drawn touching conjugate hyperbolas at the vertices of any two conjugate diameters, the parallelogram formed by these lines is equal to the rectangle contained by the transverse and conjugate axes.

Fig. 65. Let Pp, Qq be any two conjugate diameters, a parallelogram DEGH formed by tangents to the conjugate hyperbolas at their vertices is equal to the rectangle contained by Aa, Bb the two axes.

Let Aa, one of the axes meet the tangent PE in K; join QK, and draw PL, QM perpendicular to Aa.

Because $CK : CA :: CA : CL$ (9.)
and $CA : CB :: CL : QM$ (1 cor. 22.)
ex aeq. $CK : CB :: CA : QM$,
therefore $CK \cdot QM = CB \cdot CA$.
But $CK \cdot QM =$ twice trian. CKQ = paral. CPEQ,
therefore the parallelogram $CPEQ = CB \cdot CA$;

and, taking the quadruples of these, the parallelogram DEGH is equal to the rectangle contained by Aa and Bb.

Prop. XXIV.

If two tangents at the vertex of any transverse diameter of an hyperbola meet a third tangent, the rectangle contained by their segments between the points of contact, and the points of intersection, is equal to the square of the semi-diameter to which they are parallel. And the rectangle contained by the segments of the third tangent between its points of contact and the parallel tangents, is equal to the square of the semi-diameter to which it is parallel.

Fig. 66. Let PH, ph, tangents at the vertices of a transverse diameter Pp, meet DHb, a tangent to the curve at any point D, in H and h; let CQ be the semi-diameter to which the tangents PH, ph are parallel, and CR that to which Hh is parallel; then

$$PH \cdot ph = CQ^2 \text{ and } DH \cdot Dh = CR^2.$$

Let Hh meet the semi-diameters CP, CQ in L and K. Draw DE, RM parallel to CQ, and DG parallel to CP.

Because $LP \cdot Lp = LE \cdot LC$ (2 cor. 9.)
$LP : LE :: LC : Lp$;

hence, and because of the parallels PH, ED, CK, ph,

$PH : ED :: CK : ph$,
wherefore $PH \cdot ph = ED \cdot CK$.
But $ED \cdot CK = CG \cdot CK = CQ^2$ (18.)
therefore $PH \cdot ph = CQ^2$.

Again, the triangles LED, CMR are evidently similar, and LE, LD are similarly divided at H and P, also at h and p,

therefore $PE : HD :: (LE : LD ::) CM : CR$.
also $pE : hD :: (LE : LD ::) CM : CR$,

hence, taking the rectangles of the corresponding terms,

$$PE \cdot pE : HD \cdot hD :: CM^2 : CR^2.$$

But, if CD be joined, the points D and R are evidently the vertices of two conjugate diameters (cor. def. 15.) and therefore $PE \cdot pE = CM^2$ (22.)

therefore $HD \cdot hD = CR^2$.

Cor. The rectangle contained by LD and DK, the segments of a tangent intercepted between D the point of contact, and Pp, Qq, any two conjugate diameters, is equal to the square of CR, the semi-diameter to which the tangent is parallel.

Let the parallel tangents PH, ph meet LK in H and h, and draw DE a semi-ordinate to Pp. Because of the parallels ED, PH, CK, ph,

$LE : LD :: EP : DH$,
and $EC : DK :: Ep : Dh$,
therefore
$LE \cdot EC : LD \cdot DK :: EP \cdot Ep : DH \cdot Dh$.
But $LE \cdot EC = EP \cdot Ep$ (1 cor. 9.)
therefore $LD \cdot DK = DH \cdot Dh =$ (by this prop.) CR^2.

Prop. XXV.

If two straight lines be drawn from the foci of an hyperbola perpendicular to a tangent, straight lines drawn from the centre, to the points in which they meet the tangent, will each be equal to half the transverse axis.

Fig. 67. Let PdD be a tangent to the curve at P, and FD, fd perpendiculars to the tangent from the foci, the straight lines joining the points C, D and C, d are each equal to AC, half the transverse axis.

Join FP, fP, and produce FD, Pf till they intersect in E. The triangles FDP, EDP have the angles at D right angles, and the angles FPD, EPD equal (4.) and the side DP common to both; they are therefore equal, and consequently have ED=DF, and EP=PF, wherefore $Ef = FP - Pf = Aa$. Now the straight lines FE, Ff being bisected at D and C, the line DC is parallel to Ef, and thus the triangles FfE, FCD are similar,

therefore $Ff : fE$, or $Aa :: FC : CD$;
but FC is half Ff, therefore CD is half of Aa.

Cor. If a straight line Qq be drawn through the centre parallel to the tangent Dd, it will cut off from PF, Pf the segments PG, Pg, each equal to AC half the transverse axis. For $CdPG$, $CDPg$ are parallelograms, therefore $PG = dC = AC$, and $Pg = DC = AC$.

Prop. XXVI.

The rectangle contained by perpendiculars drawn from the foci of an hyperbola to a tangent is equal to the square of half the conjugate axis.

Fig. 67. Let PdD be a tangent, and FD, fd perpendiculars from the foci, the rectangle contained by FD and fd is equal to the square of BC half the conjugate axis.

It is evident from last proposition that the points D, d are in the circumference of a circle, whose centre is

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is the centre of the hyperbola, and radius CA half the transverse axis; now FDd being a right angle, if dC be joined, and produced, it will meet DF in H, a point in the circumference; and since FC=fC, and CH=Cd, and the angles FCH, fCd are equal, FH is equal to fd, therefore

$DF \cdot df = DF \cdot FH = AF \cdot aF$ (36. 3. E.) $= CB^2$ (3.).

Cor. If PF, Pf be drawn from the point of contact to the foci, the square of FD is a fourth proportional to fP, FP and CB². For the angles fPd, FPD are equal (4.) and FDP, fdP are right angles, therefore the triangles FDP, fdP are similar, and

$$fP : FP :: fd : FD :: fd \cdot FD \text{ or } BC^2 : FD^2.$$

Prop. XXVII.

Fig. 68. If from C the centre of an hyperbola a straight line CL be drawn perpendicular to a tangent LD, and from D the point of contact a perpendicular be drawn to the tangent, meeting the transverse axis in H, and the conjugate axis in h, the rectangle contained by CL and DH is equal to the square of CB, the semi-conjugate axis; and the rectangle contained by CL and Dh is equal to the square of CA, the semi-transverse axis.

Let the axes meet the tangent in M and m, and from D draw the semi-ordinates DE, De, which will be perpendicular to the axes.

The triangles DEH, CLm are evidently equiangular, therefore

$$DH : DE :: Cm : CL,$$
hence $CL \cdot DH = DE \cdot Cm$,
but $DE \cdot Cm$ or $Ce \cdot Cm = BC^2$ (10.)
therefore $CL \cdot DH = BC^2$.

In the same way it may be shewn that $CL \cdot Dh = AC^2$.

Cor. 1. If a perpendicular be drawn to a tangent at the point of contact, the segments intercepted between the point of contact and the axes are to each other reciprocally as the squares of the axes by which they are terminated.

For $AC^2 : BC^2 :: CL \cdot Dh : CL \cdot DH :: Dh : DH.$

Cor. 2. If DF be drawn to either focus, and HK be drawn perpendicular to DF; the straight line DK shall be equal to half the parameter of the transverse axis.

Draw CG parallel to the tangent at D, meeting DH in N, and DF in G. The triangles GDN, HDK are similar, therefore

$$GD : DN :: HD : DK;$$
and hence $GD \cdot DK = HD \cdot DN$.
But GD=AC (cor. 25.) and ND=CL,
therefore $AC \cdot DK = HD \cdot CL =$ (by the prop.) CB^2,
wherefore $AC : BC :: BC : DK$,
hence DK is half the parameter of Aa (def. 16.)

Definition.

Fig. 69. XVII. If a point G be taken in the transverse axis of an hyperbola, so that the distance of G from the centre may be a third proportional to CF, the distance of either focus from the centre, and CA the semi-transverse axis, a straight line HGh drawn through G, perpendicular to the axis, is called the *Directrix* of the hyperbola.

Cor. 1. If MFm, an ordinate to the axis, be drawn through the focus, tangents to the hyperbola at the extremities of the ordinate will meet the axis at the point G (9.).

Cor. 2. The hyperbola has two directrices, for the point G may be taken on either side of the centre.

Prop. XXVIII.

The distance of any point in an hyperbola from either directrix is to its distance from the focus nearest that directrix, in the constant ratio of the semi-transverse axis to the distance of the focus from the centre.

Let D be any point in the hyperbola; let DK be drawn perpendicular to the directrix, and DF to the focus nearest the directrix; DK is to DF as CA, half the transverse axis, to CF, the distance of the focus from the centre. Fig. 69.

Draw Df to the other focus, and DE perpendicular to Aa; take L a point in the axis so that AL=FD, and consequently La=Df; then CL is evidently half the sum of AL and aL, or of FD and fD, and CE half the sum of FE and fE, and because

$$Df - DF : Ff :: fE + FE : Df + DF \text{ (Trig.)}$$

by taking the halves of the terms of the proportion,

$$CA : CF :: CE : CL.$$
But $CA : CF :: CG : CA$ (def. 17.)
therefore, $CG : CA :: CE : CL$,
hence (19. 5. E.) $EG : AL :: CG : CA :: CA : CF$,
that is, $DK : DF :: CA : CF$.

Cor. 1. If the tangent GMN be drawn through M, the extremity of the ordinate passing through the focus, and ED be produced to meet GM in N, EN shall be equal to DF. For draw MO perpendicular to the directrix, then, because M and D are points in the hyperbola, and from similar triangles,

$$FM : FD :: MO : DK :: GF : GE :: MF : EN,$$

therefore FD=EN.

Cor. 2. If AI and ai be drawn perpendicular to the transverse axis at its extremities, meeting the tangent GM in I and i, then AI=AF and ai=aF.

Prop. XXIX.

If through P and Q the vertices of two semi-diameters of an hyperbola there be drawn straight lines PD, QE parallel to one of the asymptotes CN, meeting the other asymptote in D and E, the hyperbolic sector PCQ is equal to the hyperbolic trapezium PDEQ. Fig. 70.

Let CQ meet PD in G. The triangles CDP, CEQ are equal (1 cor. 14.) therefore, taking the triangle CDG from both, the triangle CGP is equal to the quadrilateral DEQG; to these add the figure PGQ,

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PGQ, and the hyperbolic sector PCQ is equal to the hyperbolic trapezium PDEQ.

Prop. XXX.

Fig. 71. If from the centre of an hyperbola the segments CD, CE, CH be taken in continued proportion, in one of the asymptotes, and the straight lines DP, EQ, HR be drawn parallel to the other asymptote, meeting the hyperbola in P, Q, R, the hyperbolic areas PDEQ, QEHR are equal.

Through Q draw a tangent to the curve, meeting the asymptotes in K and L; join PR meeting the asymptotes in M and N; draw the semi-diameters CP, CQ, CR, let CQ meet PR in G.

Because QE is parallel to CM, and KQ is equal to QL (2 cor. 13.) CE is equal to EL; and because MC, PD, RH, are parallel, and MP is equal to RN (1 cor. 13.) CD is equal to HN. Now, by hypothesis,

CD : CE :: CE : CH,
therefore NH : LE :: CE : CH;
but CE : CH :: HR : EQ (2 cor. 14.)
therefore NH : LE :: HR : EQ,
and by alternation NH : HR :: LE : EQ.

Now the angles at H and E are equal, therefore the triangles NHR, LEQ are equiangular, and NR is parallel to LQ; consequently RP is an ordinate to the diameter CQ (8.) and is bisected by it at G; and as CQ bisects all lines which are parallel to KL, and are terminated by the hyperbola, it will bisect the area PQR. Let the equal areas PQG, RQG be taken from the equal triangles PCG, RCG, and there will remain the hyperbolic sectors PCQ, RCQ equal to each other. Therefore (29.) the areas DPQE, EQRH are also equal.

Cor. Hence if CD, CE, CH, &c. any number of segments of the asymptote be taken in continued proportion, the areas DPQE, DPQRH, &c. reckoned from the first line DP, will be in arithmetical progression.

Prop. XXXI. Problem.

Fig. 72, 73. Two straight lines A *a*, B *b*, which bisect each other at right angles in C, being given by position, to describe an hyperbola, of which A *a* shall be the transverse and B *b* the conjugate axis.

First Method. By a Mechanical Description.

Fig. 72. Join AB, and in A *a*, produced, take CF, C *f* each equal to AB; the points F, *f* will be the foci of the hyperbola.

Let one end of a string be fastened at F, and the other to G the extremity of a ruler *f* DG, and let the difference between the length of the ruler and the string be equal to A *a*. Let the other end of the ruler be fixed to the point *f*, and let the ruler be made to revolve about *f* as a centre in the plane in which the axes are situated, while the string is stretched by means of a pin D, so that the part of it between G and D is applied close to the edge of the ruler; the point of the pin will by its motion trace a curve line DAD upon the plane which is one of the hyperbolas required.

If the ruler be now made to revolve about the other focus F, while the end of the string is fastened to *f*, the opposite hyperbola will be described by the moving point D; for in either case G *f*—(GD+DF), that is, D *f*—DF is by hypothesis equal to A *a* the transverse axis.

Second Method. By finding any number of points in the Curve.

Find F, either of the foci as before, draw HAK, *h a k* perpendicular to the transverse axis at its extremities, and AH and AK on each side of the vertex equal to AF, also *a h* and *a k* each equal to *a* F; join H *h* and K *k*; take E any point in A *a*, and though E draw NE *n* parallel to HK, meeting H *b* and K *k* in N and *n*. On F as a centre, with a radius equal to EN or E *n*, let a circle be described meeting N *n* in D and *d*, these will be two points in the hyperbola; and in the same way may any number of points in the hyperbola, or opposite hyperbolas, be found. The reason of this construction is obvious from cor. 1. and 2. to Prop. 28. Fig. 73.

Prop. XXXII. Problem.

An hyperbola being given by position, to find its axes. Plate CLXII.

Let HA *b* be the given hyperbola. Draw two parallel straight lines H *b*, K *k* terminating in either of the opposite hyperbolas, and bisect them at L and M; join LM, and produce it to meet the hyperbola in P; then LP will be a transverse diameter (4 cor. 8.) Let *p* be the point in which it meets the opposite hyperbola, bisect P *p* in C, the point C is the centre (2.) Take D any point in the hyperbola, and on C as a centre with the distance CD describe a circle; if this circle lie wholly without the opposite hyperbolas, then CD must be half the transverse axis (20.), but if not, let the circle meet the hyperbola again in *d*, join D *d*, and bisect it in E, join CE, meeting the opposite hyperbolas in A and *a*, then A *a* will be the transverse axis (5 cor. 8.) for it is perpendicular to D *d* (3. 3. E.) which is an ordinate to A *a*. The other axis will be found by drawing B *b* a straight line through the centre perpendicular to A *a*, and taking CB so that CB^2 may be a fourth proportional to the rectangle AE · E *a*, and the squares of DE and CA, thus CB is half the conjugate axis (19.). Fig. 74.

PART

PART IV.

SECT. I.

OF THE CONE AND ITS SECTIONS.

Definitions.

Fig. 75. I. If through the point V, without the plane of the circle ADB, a ſtraight line AVE be drawn, and produced indefinitely both ways, and if the point V remain fixed while the ſtraight line AVE is moved round the whole circumference of the circle, two ſuperficies will be generated by its motion, each of which is called a *Conical Superficies*, and theſe mentioned together are called *Oppoſite Conical Superficies*.

II. The ſolid contained by the conical ſuperficies, and the circle ADB is called a *Cone*.

III. The fixed point V is called the *Vertex of the cone*.

IV. The circle ADB is called the *Baſe of the cone*.

V. Any ſtraight line drawn from the vertex to the circumference of the baſe is called a *Side of the cone*.

VI. A ſtraight line VC drawn through the vertex of the cone, and the centre of the baſe, is called the *Axis of the cone*.

VII. If the axis of the cone be perpendicular to the baſe it is called a *Right cone*.

VIII. If the axis of the cone be not perpendicular to the baſe, it is called a *Scalene cone*.

Prop. I.

If a cone be cut by a plane paſſing through the vertex, the ſection will be a triangle.

Fig. 75. Let ADBV be a cone of which VC is the axis; let AD be the common ſection of the baſe of the cone and the cutting plane; join VA, VD. When the generating line comes to the points A and D, it is evident that it will coincide with the ſtraight lines VA, VD, they are therefore in the ſurface of the cone, and they are in the plane which paſſes through the points V, A, D, therefore the triangle VAD is the common ſection of the cone and the plane which paſſes through its vertex.

Prop. II.

If a cone be cut by a plane parallel to its baſe, the ſection will be a circle, the centre of which is in the axis.

Fig. 75. Let EFG be the ſection made by a plane parallel to the baſe of the cone, and VAB, VCD two ſections of the cone made by any two planes paſſing through the axis VC; let EG, HF be the common ſections of the plane EFG, and the triangles VAB, VCD. Becauſe the planes EFG, ADB are parallel, HE, HF will be parallel to CA, CD, and

$$AC : EH :: (VC : VH ::) CD : HF,$$

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but AC=CD, therefore EH=HF. For the ſame reaſon GH=HF, therefore EFG is a circle of which H is the centre and EG the diameter.

Prop. III.

If a ſcalene cone ADBV be cut through the axis by a plane perpendicular to the baſe, making the triangle VAB, and from any point H, in the ſtraight line AV, a ſtraight line HK be drawn in the plane of the triangle VAB, ſo that the angle VHK may be equal to the angle VBA, and the cone be cut by another plane paſſing through HK perpendicular to the plane of the triangle ABC, the common ſection HFKM of this plane and the cone will be a circle. Fig. 76.

Take any point L in the ſtraight line HK, and through L draw EG parallel to AB, and let EFGM be a ſection parallel to the baſe, paſſing through EG; then the two planes HFKM, EFGM being perpendicular to the plane VAB, their common ſection FLM is perpendicular to ELG, and ſince EFGM is a circle (by laſt prop.) and EG its diameter, the ſquare of FL is equal to the rectangle contained by EL and LG (35. 3. E.); but ſince the angle VHK is equal to VBA, or VGE, the angles EHK, EGK are equal, therefore the points E, H, G, K, are in the circumference of a circle (21. 3. E.), and HL·LK=EL·LG (35. 3. E.) $=FL^2$, therefore the ſection HFKM is a circle of which HLK is a diameter (35. 3. E.).

This ſection is called a *Subcontrary Section*.

Prop. IV.

If a cone be cut by a plane which does not paſs through the vertex, and which is neither parallel to the baſe, nor to the plane of a ſubcontrary ſection, the common ſection of the plane and the ſurface of the cone will be an ellipſe, a parabola, or an hyperbola, according as the plane paſſing through the vertex parallel to the cutting plane falls without the cone, touches it, or falls within it.

Let ADBV be any cone, and let ONP be the common ſection of a plane paſſing through its vertex and the plane of the baſe, which will fall without the baſe, will touch it, or will fall within it. Fig. 77, 78, 79.

Let FKM be a ſection of the cone parallel to VPO; through C the centre of the baſe draw CN perpendicular to OP, meeting the circumference of the baſe in A and B; let a plane paſs through V, A and B, meeting the plane OVP in the line NV, the ſurface of the cone in VA, VB, and the plane of the ſection FKM in LK; then, becauſe the planes OVP, MKF are parallel, KL will be parallel to VN, and will meet VB one ſide of the cone in K; it will meet VA the

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the other side in H, fig. 77. within the cone; it will be parallel to VA in fig. 78. and it will meet VA, produced beyond the vertex, in H, fig. 79.

Let EFGM be a section of the cone parallel to the base, meeting the plane VAB in EG, and the plane FKM in FM, and let L be the intersection of EG and FM, then EG will be parallel to BN, and FM will be parallel to PO, and therefore will make the same angle with LK wherever the lines FM, LK cut each other, and since BN is perpendicular to PO, EG is perpendicular to FM. Now the section EFGM is a circle of which EG is the diameter (2.); therefore FM is bisected at L, and $FL^2=EL\cdot LG$.

Fig. 77. CASE I. Let the line PNO be without the base of the cone. Through K and H draw KR and HQ parallel to AB. The triangles KLG, KHQ are similar, as also HLE, HKR; therefore

$$KL : LG :: KH : HQ,$$
$$\text{and } HL : LE :: KH : KR;$$
$$\text{therefore } KL\cdot HL : LG\cdot LE \text{ or } LF^2 :: KH^2 : HQ\cdot KR.$$

Now the ratio of KH^2 to $HQ\cdot KR$ is the same wherever the sections HFKM, EFGM intersect each other, therefore $KL\cdot HL$ has a constant ratio to LF^2, consequently (1 cor. 11. Part II.) the section HFKM is an ellipse, of which HK is a diameter and MF an ordinate.

Fig. 78. CASE II. Next, suppose the line ONP to touch the circumference of the base in A. Let DIS be the common section of the base and the plane FKM, the line DIS is evidently parallel to FLM and perpendicular to AB, therefore $DI^2=AI\cdot IB$,

$$\text{hence } DI^2 : FL^2 :: AI\cdot IB : EL\cdot LG.$$

But since EG is parallel to AB, and IK parallel to AV, AI is equal to EL, and

$$IB : LG :: KI : KL;$$
$$\text{therefore } DI^2 : FL^2 :: KI : KL.$$

Hence it appears (cor. 9. Part I.), that the section DFKMS is a parabola, of which KLI is a diameter and DIS, FLM ordinates to that diameter.

Fig. 79. CASE III. Lastly, Let the line PNO fall within the base; draw VT through the vertex parallel to EG. The triangles HVT, HEL are similar, as also the triangles KVT, KGL, therefore

$$HT : TV :: HL : LE,$$
$$\text{and } KT : TV :: KL : LG,$$
$$\text{therefore } HT\cdot KT : TV^2 :: HL\cdot LK : LE\cdot LG \text{ or } LF^2.$$

Hence it appears, that $HL\cdot LK$ has to LF^2 a constant ratio, therefore the section DFKMS is an hyperbola, of which KH is a transverse diameter, and FM an ordinate to that diameter (2 cor. 19. Part III.).

SCHOLIUM.

From the four preceding propositions it appears, that the only lines which can be formed by the common section of a plane and the surface of a cone, are these five. I. A straight line, or rather two straight lines intersecting each other in the vertex of the cone, and forming with the straight line which joins the points in which they meet the base a triangle. II. A circle. III. An ellipse. IV. A parabola. V. An hyperbola. The two first of these, however, viz. the triangle and circle, may be referred to the hyperbola and the ellipse, for if the axes of an hyperbola be supposed to retain a constant ratio to each other, and, at the same time to diminish continually, till at last the vertices coincide; the opposite hyperbolas will evidently become two straight lines intersecting each other in a point; and a circle may be considered as an ellipse, whose axes are equal, or whose foci coincide with the centre; so that the only three sections which require to be separately considered, are the *ellipse*, the *parabola*, and the *hyperbola*.

Of the Curvature of the Conic Sections.

SECT. II.

OF THE CURVATURE OF THE CONIC SECTIONS.

DEFINITIONS.

I. A circle is said to *touch* a conic section in any point, when the circle and conic section have a common tangent in that point.

II. If a circle touch a conic section in any point, so that no other circle touching it in the same point can pass between it and the conic section on either side of the point of contact, it is said to have the *same curvature* with the conic section in the point of contact, and it is called the CIRCLE OF CURVATURE.

LEMMA.

Fig. 80. Let PL be any chord in a circle, PX a tangent at one of its extremities, and LK a diameter passing through the other extremity: draw any chord Gg parallel to the tangent PX, meeting PL in E, and from its extremities draw GH, gh perpendicular to the diameter, meeting PL in N and n; the square of GE is equal to the rectangle contained by PE and LN, and the square of gE is equal to the rectangle contained by PE and Ln.

FROM G and g draw the straight lines GP, gP, GL, gL, and let LM a perpendicular to the diameter, and therefore a tangent to the circle at L, meet the tangent PX in M. The triangle NGE is evidently similar to the triangle LMP, and LM=MP, therefore NG=GE; hence the angles GNL, GEP are equal. Now the angle PGE is equal to the alternate angle GPX, that is, to the angle GLN in the alternate segment of the circle (32. 3. E.), therefore the triangles PGE, GLN are similar, and

$$PE : EG :: GN \text{ or } EG : NL,$$
$$\text{therefore } GE^2=PE\cdot NL.$$

In the same way it may be demonstrated that $ng=g$E, and that the triangles PgE, gLn are similar, and therefore that

$$PE : Eg :: gn \text{ or } Eg : nL,$$
$$\text{and hence } gE^2=PE\cdot nL.$$

PROP. I.

If a circle be described touching a conic section, and cutting off from the diameter that passes through

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through the point of contact a segment greater than the parameter of that diameter, a part of the circumference on each side of the point of contact will be wholly without the conic section; but if it cuts off from the diameter a segment less than the parameter, a part of the circumference on each side of the point of contact will be wholly within the conic section.

Fig. 81, 82, 83, 84.

LET Pp be the diameter of a conic section; let a circle GPg touch the section in P the vertex of the diameter, and cut off from it a segment PL, which is either greater or less than the parameter of the diameter; in the former case a part GPg of the circumference of the circle on each side of P the point of contact will be wholly without the conic section, as in fig. 81. and fig. 82. and in the latter a part GPg of the circumference on each side of P will be wholly within the section, as in fig. 83. and fig. 84.

Through L draw LK a diameter of the circle; let DEd an ordinate to the diameter of the section meet the circle in G and g, so that the points G, P, g may be on the same side of LK the diameter of the circle, and draw GH, gh, PO perpendicular to LK, the two former lines meeting LP in N and n. From L towards P place LR in the diameter equal to its parameter; then in the former case the point R will fall between L and P, as in fig. 81. and 82.; and in the latter it will fall in LP produced, as in fig. 82. and 83.

CASE I. First, let the section be a parabola (fig. 81. 83.)

Then DE^2, also $dE^2 = PE \cdot RL$ (Cor. prop. 9. of Part I.)

$$\left.\begin{array}{l}\text{Now } GE^2 = PE \cdot LN \\ \text{and } gE^2 = PE \cdot Ln\end{array}\right\}\text{(Lemma).}$$

Therefore $DE^2 : GE^2 :: LR : LN$,
and $dE^2 : gE^2 :: LR : Ln$.

Now if the ordinate Dd be supposed to approach to the tangent at the vertex, the points G, g will approach to P, the lines GH, gh to the line PO, and the points N, n to the vertex P, where they will at last coincide; hence it is evident, that the ordinate DEd may be at such a distance from the tangent that the points N, n, and the vertex P, may be all on the same side of the point R; in this position of the ordinate if the segment cut off by the circle be greater than the parameter, as in fig. 81. then LR will be less than either LN, or L n, and therefore DE^2 less than GE^2, also dE^2 less than gE^2, so that the points G, g are both without the parabola. If the ordinate be supposed to approach nearer to the tangent, as the points N, n will also approach nearer to P, the line LR will still be less than either LN, or L n, and therefore DE^2 less than GE^2, and dE^2 less than gE^2. Hence it follows, that every point in the arch GPg, which lies on each side of the point of contact is without the parabola.

If the segment cut off by the circle be less than the parameter (fig. 83.), and therefore LR greater than either LN or L n, then, reasoning as before, it will appear that DE^2 is greater than GE^2, and dE^2 greater than gE^2, so that the points G, g are within the parabola; and as the same will hold for every other position of the ordinate nearer to the tangent, the arch GPg which lies on each side of the point of contact is wholly within the parabola.

CASE II. Next, let the section be an ellipse, or an hyperbola (fig. 82. 84.) (A). Take V a point in LR, so that

$$pP : pE :: LR : LV,$$
and therefore $Pp : LR :: pE : LV :: pE \cdot EP : LV \cdot EP$.
But $Pp : LR :: pE \cdot EP : DE^2$, or dE^2 (13. Part II. and 21. Part III.),
therefore DE^2, also $dE^2 = LV \cdot EP$.

$$\left.\begin{array}{l}\text{Now } GE^2 = LN \cdot EP \\ \text{and } gE^2 = Ln \cdot EP,\end{array}\right\}\text{(Lemma.)}$$

therefore $DE^2 : GE^2 :: LV : LN$,
and $dE^2 : gE^2 :: LV : Ln$.

Now as Pp and RL are similarly divided at E and V, if the point E approach to P, the point V will approach to R, and as E may come nearer to P than any assignable line, so V may come nearer to R than any assignable line; but as in the same circumstances GH and gh approach to PO, and N and n approach to P, it is evident that the ordinate Dd may have such a position that the points N, n, and the vertex P, may be all on the same side of V, and the same thing have place for every other position of the ordinate nearer to the tangent; therefore, in these circumstances, when LP the segment cut off from the diameter is greater than LR the parameter (fig. 82.), LV will be less than either LN or L n, and consequently DE^2 less than GE^2, also dE^2 less than gE^2; thus the points G, g as well as every other point in the arch GPg which lies on both sides of the vertex are without the ellipse or hyperbola.

On the contrary, when LP is less than LR the parameter (fig. 84.), LV will be greater than either LN or L n, and therefore DE^2 greater than GE^2, also dE^2 greater than gE^2; and therefore the points G, g, as well as every other point in the arch GPg, are within the ellipse or hyperbola.

COR. 1. If a circle touch a conic section, and cut off from the diameter that passes through the point of contact a segment equal to its parameter, it will have the same curvature with the conic section in the point of

(A) As the reasoning applies alike to the ellipse and hyperbola, to avoid a number of figures, those for the hyperbola are omitted.

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of contact. For if a greater circle be described it will cut off from the diameter a segment greater than its parameter, therefore a part of its circumference on each side of the point of contact will be wholly without the conic section; and as it will also be without the former circle, it will not pass between that circle and the conic section at the point of contact. If, on the other hand, a less circle be described, it will cut off from the diameter a segment less than its parameter, therefore a part of its circumference on each side of the point of contact will fall within the conic section; and as it will be within the former circle, it will not pass between that circle and the conic section at the point of contact. Hence (Def. 2.), the circle which cuts off a segment equal to the parameter is the circle of curvature.

Cor. 2. Only one circle can have the same curvature with a conic section in a given point.

Prop. II.

Plate CLXIII.

The circle of curvature at the vertex of the axis of a parabola, or at the vertex of the transverse axis of an ellipse or hyperbola, falls wholly within the conic section; but the circle of curvature at the vertex of the conjugate axis of an ellipse falls wholly without the conic section.

Fig. 85, 86, 87, 88.

Let Pp be the axis of a parabola (fig. 85.), and $PGLg$ the circle of curvature at its vertex, which therefore cuts off from the axis a segment PL equal to the parameter of the axis; because the tangent at the vertex is common to the parabola and circle, the centre of the circle is in Pp. Let DEd an ordinate to the axis meet the circle in G and g; it may be shewn as in last proposition that

$$DE^2 : GE^2 :: LP : LE.$$

But in every position of the ordinate LP is greater than LE, therefore DE^2 is always greater than GE^2, and dE^2 greater than gE^2; therefore the circle is wholly within the parabola. Next let Pp be the transverse axis of an ellipse or hyperbola (fig. 86. 87.), or the conjugate axis of an ellipse (fig. 88.), and $PGLg$ the circle of curvature, then as in the parabola the centre of the circle will be in the axis. Draw Dd an ordinate to the axis meeting the circle in G, g; and take a point V in PL, so that

$$pP : pE :: LP : LV;$$

then it will appear as in last prop. that

$$DE^2 : GE^2 :: LV : LE.$$

Now, when Pp is the transverse axis of an ellipse, (fig. 86.) as Pp is greater than LP, and $Pp : PL ::$ PE : PV, therefore PE is greater than PV, and hence LV is always greater than LE, therefore DE^2 is greater than GE^2, also dE^2 greater than gE^2, so that the circle falls wholly within the ellipse.

Again, when Pp is the transverse axis of an hyperbola (fig. 87.), as pE is greater than pP, therefore LV is greater than LP, and consequently greater also than LE; hence DE^2 is greater than GE^2, and dE^2 is greater than gE^2, and the circle is wholly within the hyperbola.

Lastly, When Pp is the conjugate axis of an ellipse (fig. 88.), as Pp is less than LP, and $Pp : LP ::$ PE : PV, therefore PE is less than PV; hence LV is less than LE, and consequently DE^2 is less than GE^2, also dE^2 less than gE^2, therefore the circle is wholly without the ellipse.

Prop. III.

Fig. 89, 90.

The circle of curvature at the vertex of any diameter of a conic section, which is not an axis, meets the conic section again in one point only; and between that point and the vertex of the diameter the circle falls wholly within the conic section on the one side, and wholly without it on the other.

Case I. Let the conic section be a parabola, of which Pp is a diameter (fig. 89.) and PLK the circle of curvature at the vertex, cutting off from the diameter a segment PL equal to its parameter. Draw LK a diameter of the circle, and draw PO perpendicular to LK, this line will necessarily meet the circle again, let it meet the circle in I; draw IS parallel to the tangent at P, meeting the chord PL in S; then, because IP is perpendicular to LK,

$$IS^2 = PS \cdot PL \text{ (Lemma)};$$

hence (Cor. Prop. 9. Part I.) I is a point in the parabola.

Let DEd an ordinate to the diameter Pp meet the arch PLI anywhere in G; draw GH perpendicular to LK, meeting PL in N, then, because LP is equal to the parameter, as in Prop. I. Case I.

$$DE^2 : GE^2 :: LP : LN :: LO : LH.$$

But wherever the point G be taken in the arch PLI, LO is greater than LH, therefore DE^2 is also greater than GE^2; thus the arch PGLI falls wholly within the parabola.

Let the ordinate DEd now meet the arch PKI anywhere, as at g, draw gh perpendicular to LK, meeting LP in n, then it will appear as before that

$$dE^2 : gE^2 :: LP : Ln :: LO : Lh;$$

but LO is less than Lh, and therefore dE^2 less than gE^2, thus the arch $PgKI$ falls wholly without the parabola.

Case II. Let the conic section be either an ellipse or hyperbola (fig. 90.) of which Pp is a diameter, and PLK the circle of curvature at its vertex, cutting off PL equal to its parameter. Draw LK the diameter of the circle and LQ perpendicular to LK, and let pQ, a tangent to the conic section in p, meet LQ in Q. Join PQ, this line will necessarily meet the circle again; let it meet the circle in I; and draw IS, IT parallel to Qp, QL, meeting PL in S, T. Because of the parallels,

$$pP : pS :: QP : QI :: LP : LT,$$
$$\text{hence } pP : LP :: pS : LT :: pS \cdot SP : LT \cdot SP;$$
$$\text{but } LT \cdot SP = IS^2 \text{ (Lemma)},$$
$$\text{therefore } pP : pS :: pS \cdot SP : SI^2;$$

hence I is a point in the ellipse or hyperbola (13. Prop. Part II. and 21. Prop. Part III.).

Let DEd an ordinate to the diameter Pp meet the arch PLI anywhere in G, if the point L is between

Of the Curvature of the Conic Sections.

P and p, or the arch PIL, if L is in Pp produced. Let Dd meet PI in Y, draw GH perpendicular to LK meeting PL in N, and PI in Z, and draw YV parallel to GN meeting LP in V. Becaufe EY, pQ are parallel, alfo VY, LQ,

$$Pp : pE :: (QP : QY ::) LP : LV;$$

now LP being the parameter, we have, as in Cafe II. Prop. I.

$$DE^2 : GE^2 :: LV : LN :: QY : QZ;$$

but wherever the point G be taken in the arch PGI, QY is greater than QZ, therefore alfo DE^2 is greater than GE^2; thus the arch PGI falls wholly within the conic fection.

Let the ordinate DEd now meet the other arch PgI anywhere in g; draw gh perpendicular to LK meeting LP in n, and IP in z, then it will in like manner appear that

$$dE^2 : gE^2 :: LV : Ln :: QY : Qz;$$

and fince in this cafe QY is lefs than Qz, therefore dE^2 is lefs than gE^2; hence the arch PgI is wholly without the conic fection.

Prop. IV.

Fig. 91. The chord of the circle of curvature which is drawn from the point of contact through the focus of a parabola is equal to that which is cut off from the diameter; and half the radius of the circle is a third proportional to the perpendicular from the focus upon the tangent, and the diftance of the point of contact from the focus.

Let PL be the chord cut off from the diameter, and PFH the chord paffing through F the focus; draw PM the diameter of the circle, join HL, HM, and draw FK perpendicular to the tangent at P. Becaufe the lines PFH, PL make equal angles with the tangent at P (3. Part I.), the angles PHL, PLH are equal (32. 3. E), hence $PH = PL$. Secondly, the triangles FKP, PHM, being manifeftly fimilar,

$$FK : FP :: PH, \text{ or } 4PF : PM,$$
$$\text{hence } FK : FP :: FP : \tfrac{1}{4}PM, \text{ or } \tfrac{1}{2} \text{ the radius.}$$

Cor. 1. Hence the radius is equal to $\frac{2FP^2}{FK}$.

Cor. 2. The radius is alfo equal to $\frac{2FK^3}{AF^2}$, where AF is the diftance of the focus from the vertex of the parabola; for $FP = \frac{FK^2}{AF}$ (11. Part I.)

Cor. 3. Hence alfo the radius is equal to $\frac{\frac{1}{2}L\cdot FP^3}{FK^3}$, where L denotes the parameter of the axis,

$$\text{for } \frac{2FP^2}{FK} = \frac{2AF\cdot FP^3}{AF\cdot FP\cdot FK} = \frac{\frac{1}{2}L\cdot FP^3}{FK^3}.$$

Prop. V.

The radius of the circle of curvature at the vertex of any diameter of an ellipfe, or hyperbola, is a third proportional to the perpendicular drawn from the centre upon the tangent, and half the conjugate diameter; and the chord which is drawn from the point of contact through the focus is a third proportional to the tranfverfe axis, and conjugate diameter. Fig. 92.

Let PL be the chord cut off from the diameter, and PFH the chord paffing through F the focus; draw PM the diameter of the circle, and from the centre O draw OR perpendicular to PL, which will bifect PL in R; join HM, and draw the conjugate diameter QCq meeting PH in N and PM in S, then PS is equal to the perpendicular from the centre C upon the tangent. The triangles PSC, PRO are fimilar, therefore,

$$PS : PC :: PR : PO,$$
$$\text{but } PC : CQ :: CQ : PR \text{ (Def. of param.}$$
$$\text{therefore } PS : CQ :: CQ : PO.$$

Secondly, the triangles PSN, PHM are fimilar,

$$\text{therefore } PN : PS :: PM : PH;$$
$$\text{but } PS : CQ :: (CQ : PO ::) Qq : PM,$$
$$\text{therefore } PN : CQ :: Qq : PH,$$

or, fince $PN = AC$ (18. Part II. and 25. Part III.),

$$Aa : Qq :: Qq : PH.$$

Cor. 1. Hence the radius of curvature is equal to $\frac{CQ^2}{PS}$, and the chord paffing through the focus is equal to $\frac{2CQ^2}{AC}$.

Cor. 2. The radius of curvature is alfo equal to $\frac{CQ^3}{AC\cdot BC}$, for $PS = \frac{AC\cdot BC}{CQ}$ (14. Part II. and 23. Part III.).

Cor. 3. Draw FK from the focus perpendicular to the tangent, and let L denote the parameter of the tranfverfe axis; the radius of curvature is alfo equal to $\frac{\frac{1}{2}L\times FP^3}{FK^3}$. For the triangles PFK, NPS are manifeftly fimilar, therefore

$$FK : FP :: PS : PN, \text{ or } AC :: BC : CQ;$$

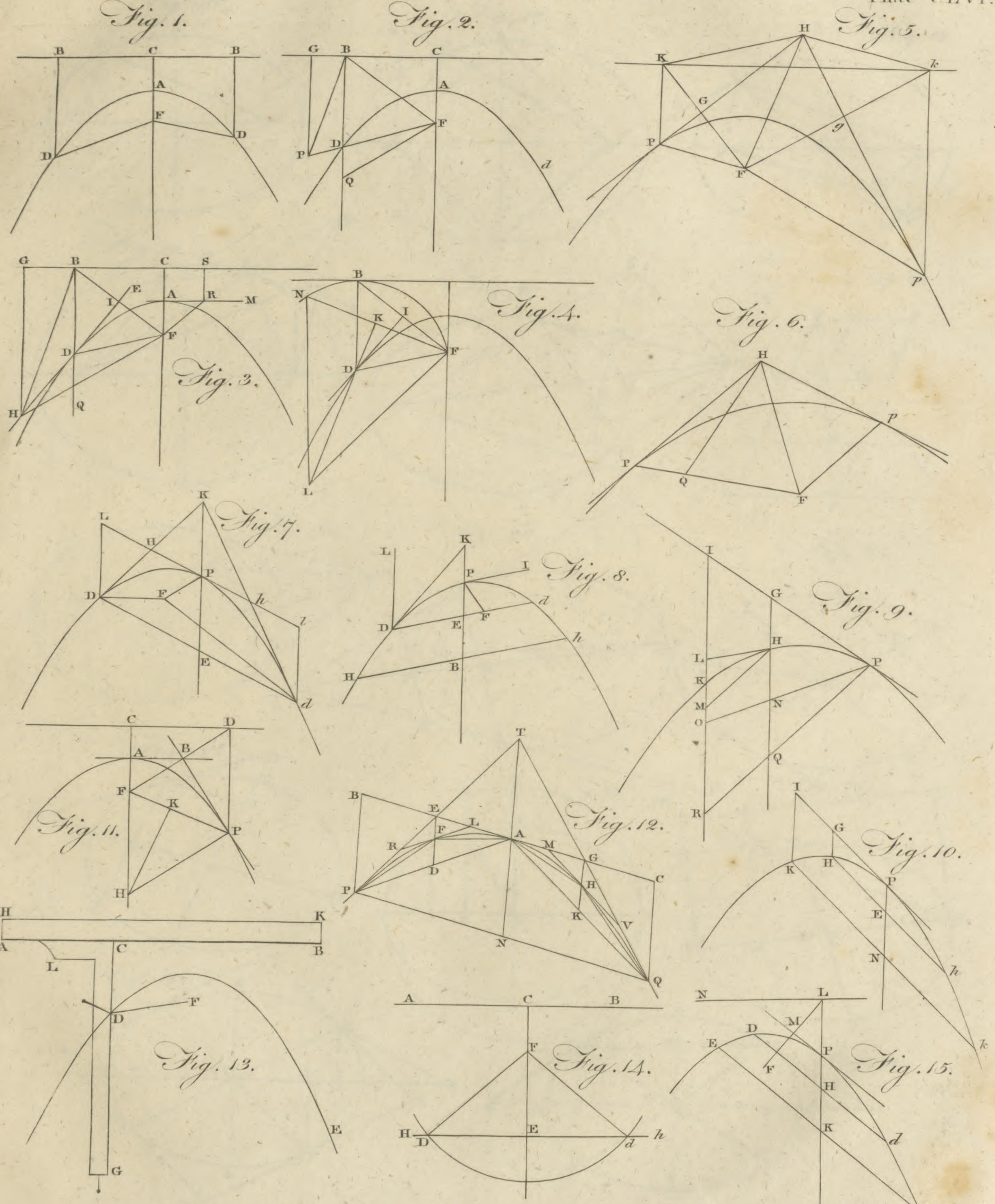
$$\text{hence } CQ = \frac{FP}{FK}\times BC,$$

$$\text{and } \frac{CQ^3}{AC\cdot BC} = \frac{FP^3}{FK^3}\times\frac{BC^2}{AC} = \frac{FP^3}{FK^3}\times\tfrac{1}{2}L.$$

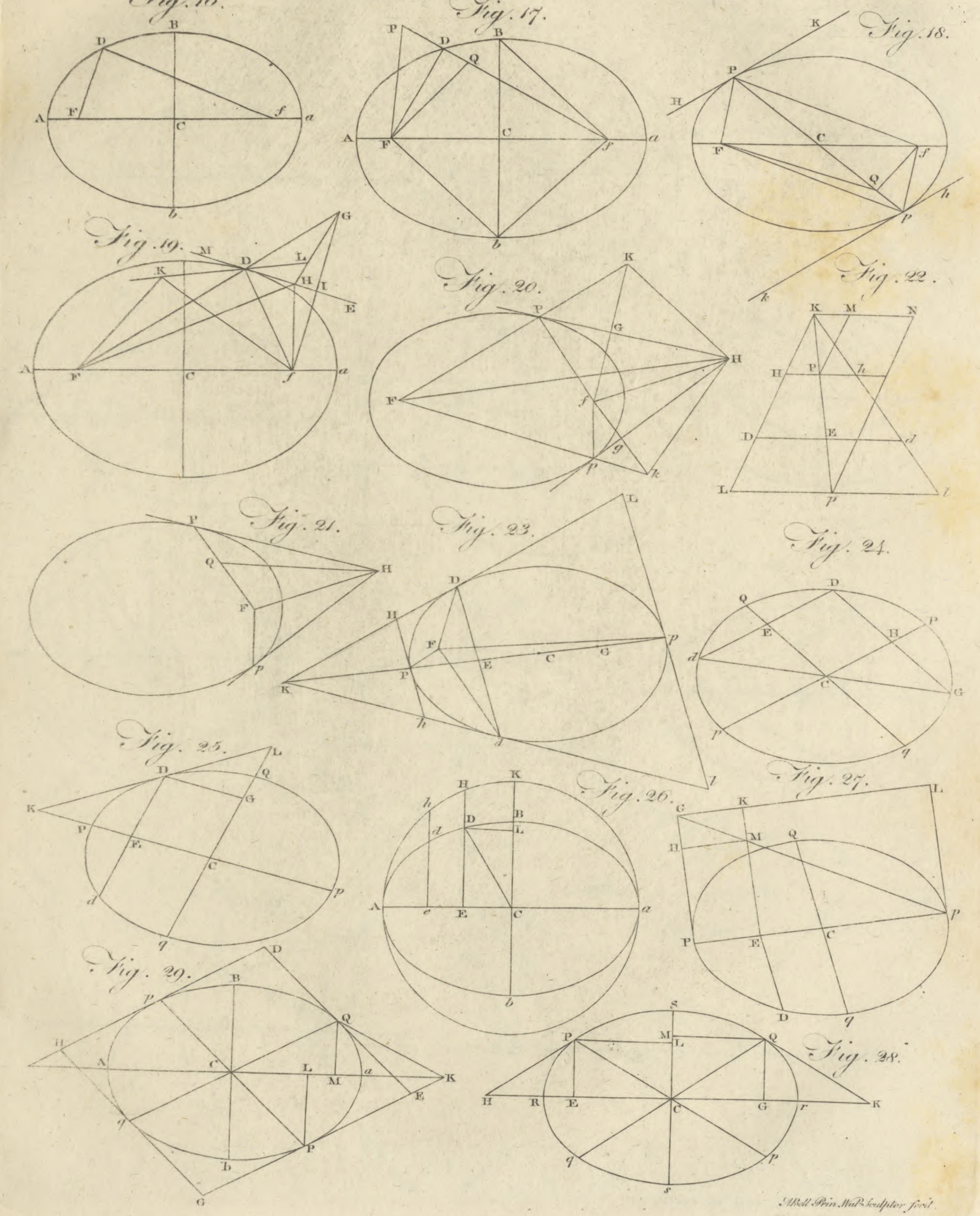
This expreffion for the radius of curvature is the fame for all the three conic fections.

CONICHTHYODONTES,

CONIC SECTIONS. Plate CLVI.



A. Bell Prin. Wal. Sculptor fecit.



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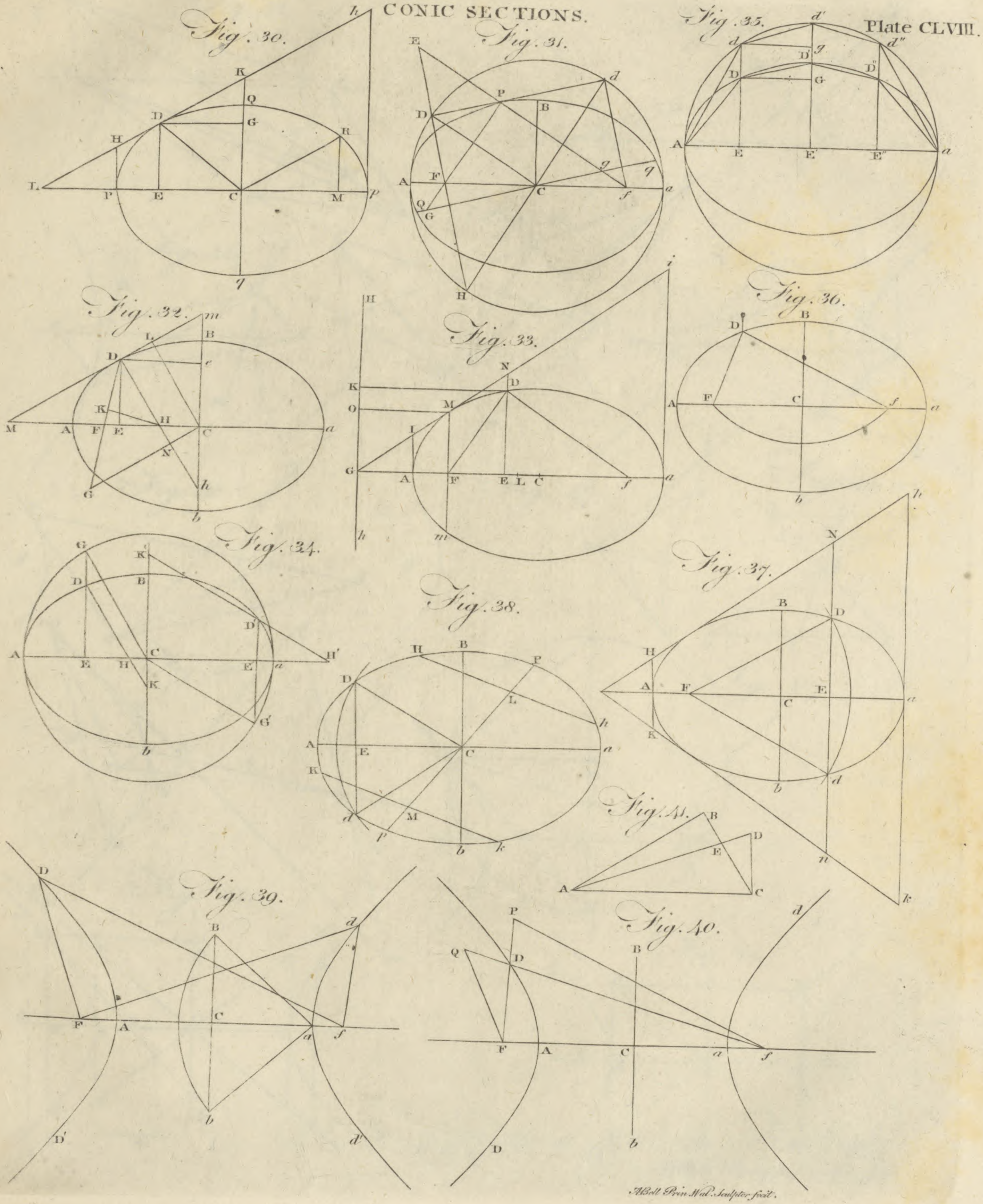
CONIC SECTIONS.

Plate CLVIII.



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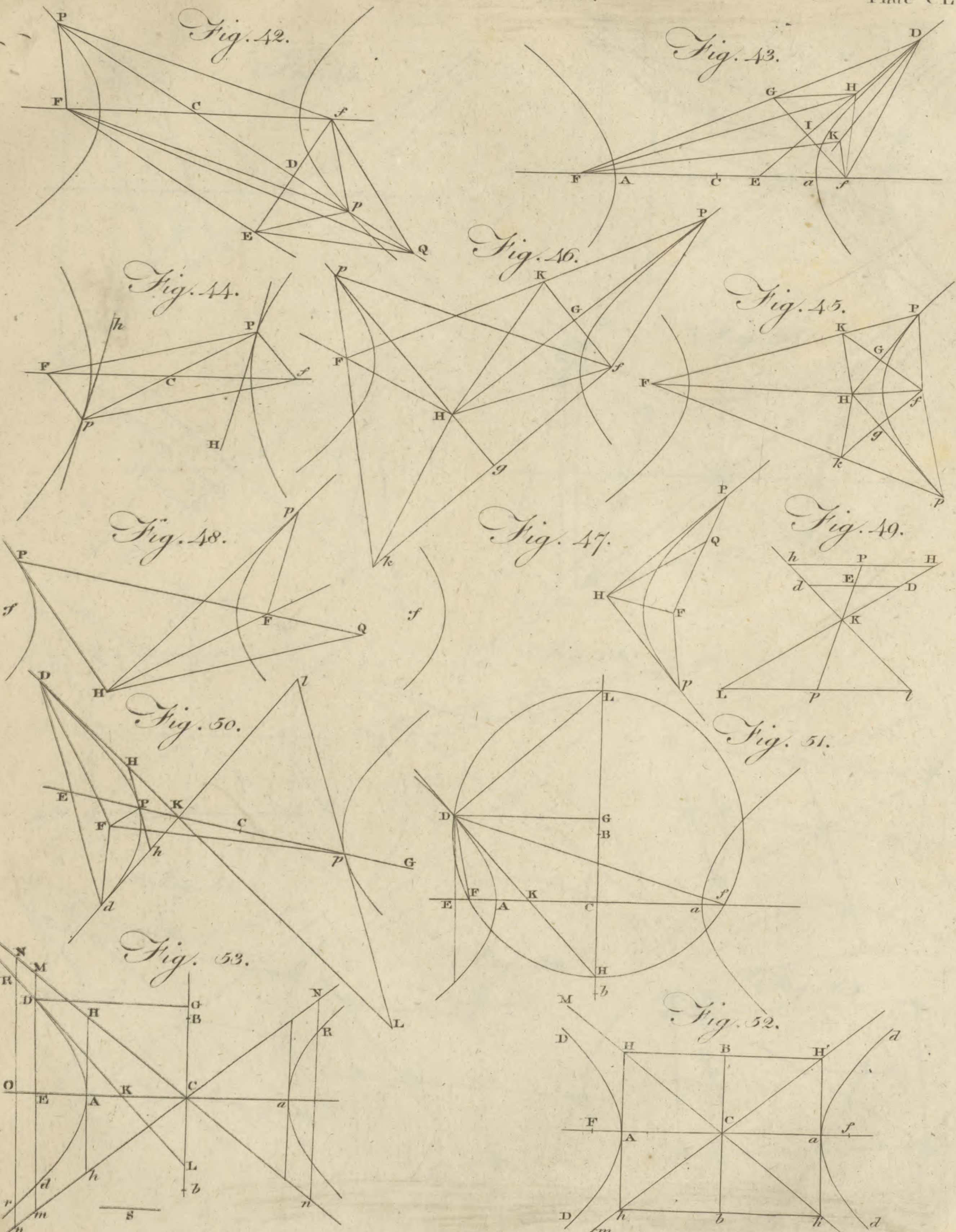

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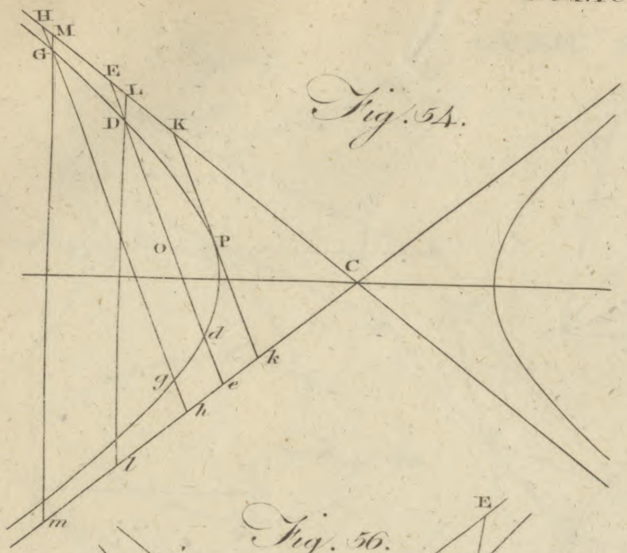


Fig. 54.

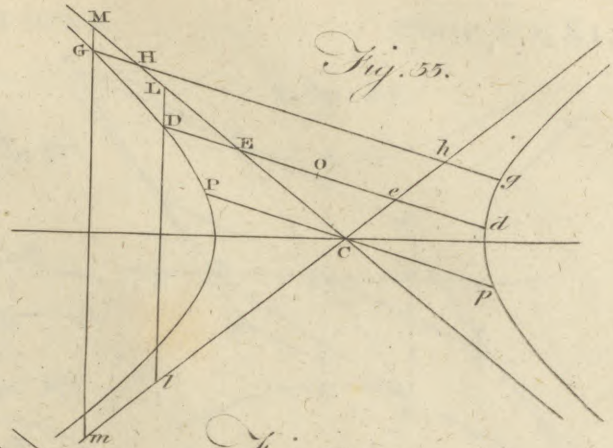
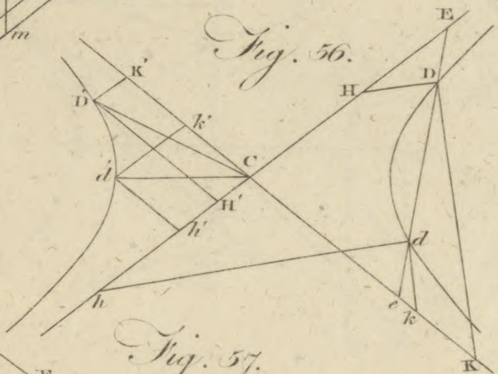


Fig. 55.



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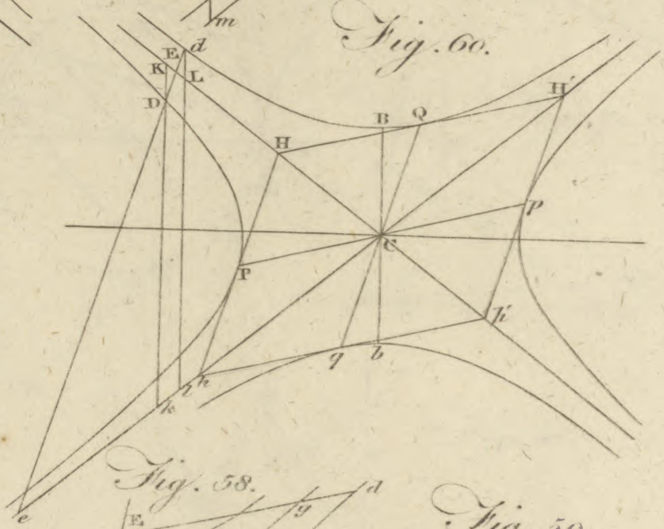

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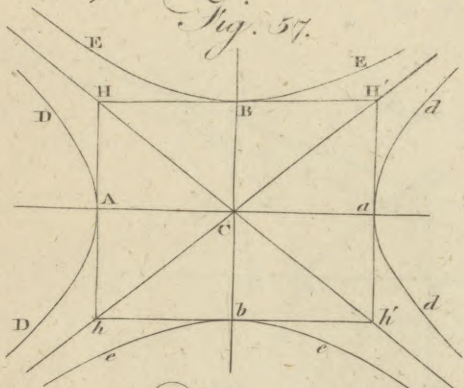

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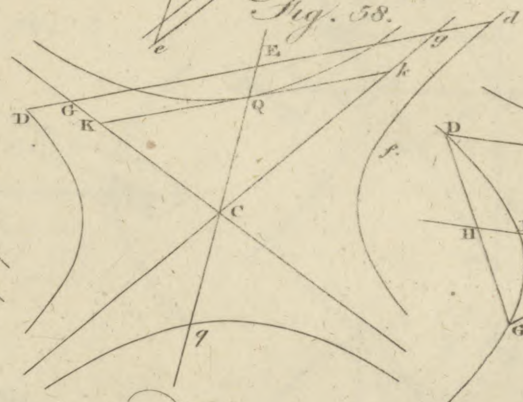

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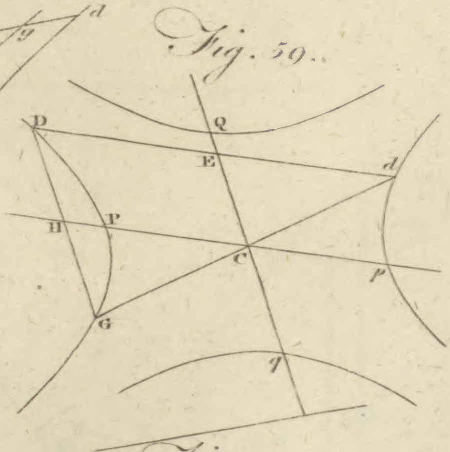

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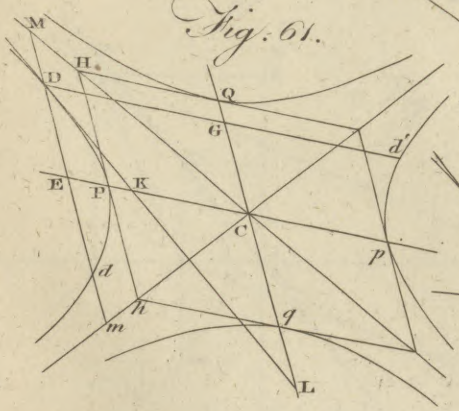

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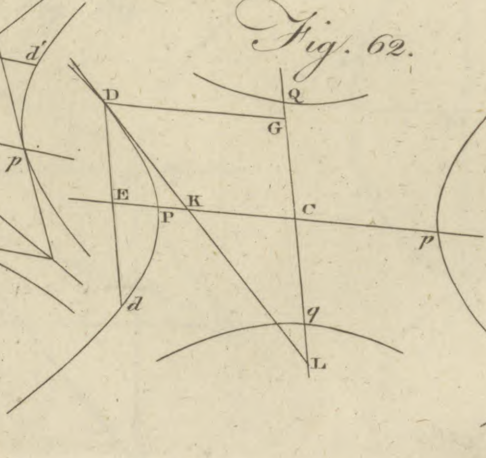

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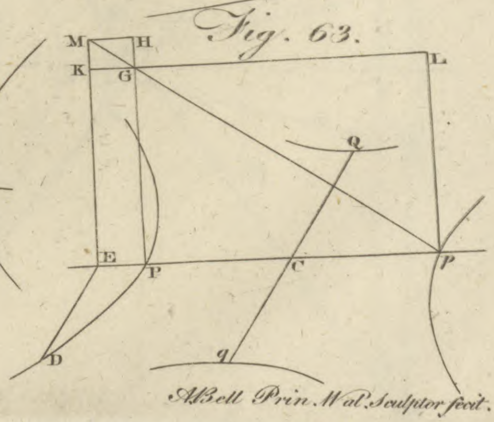
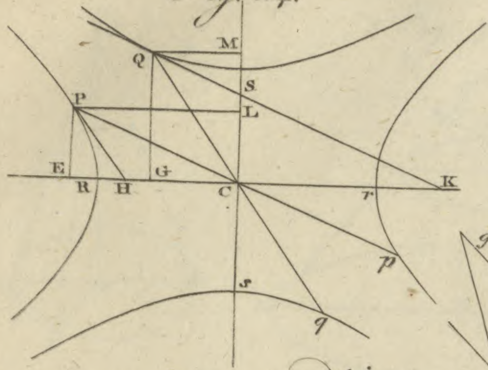


Fig. 63.

A. Bell Prin. Wal. Sculptor fecit.

Fig. 64.



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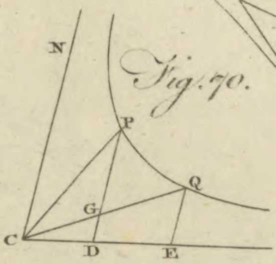


Fig. 65.

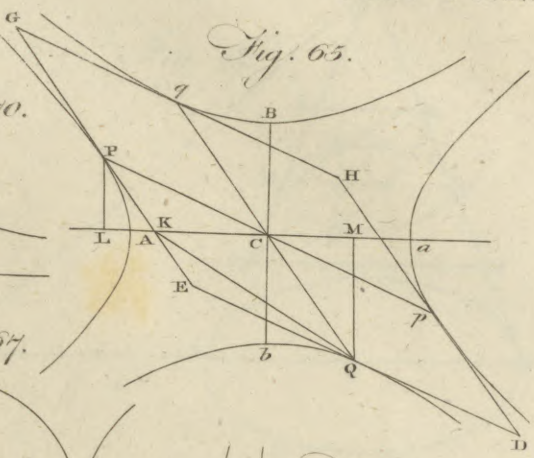
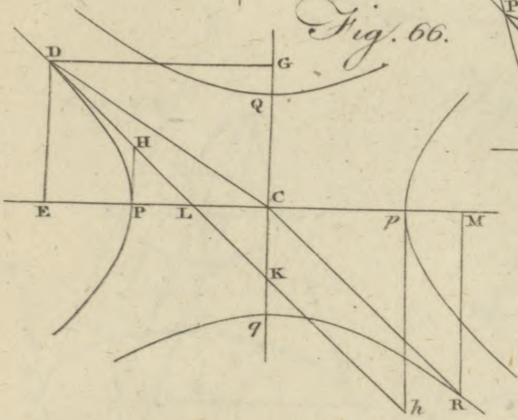


Fig. 66.



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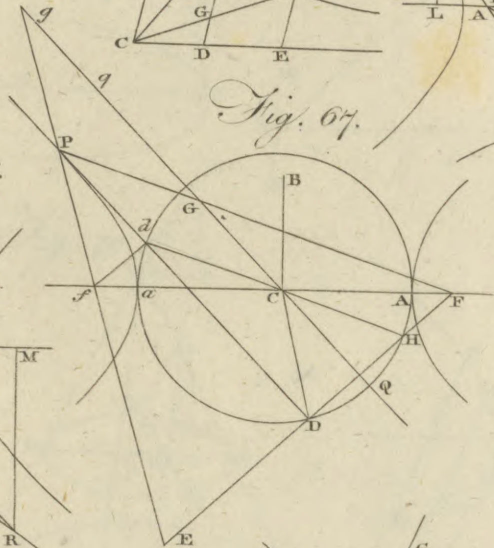

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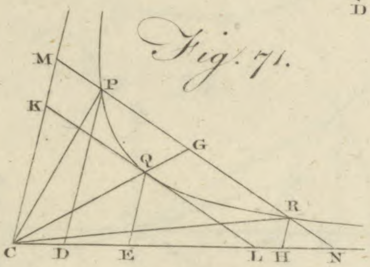

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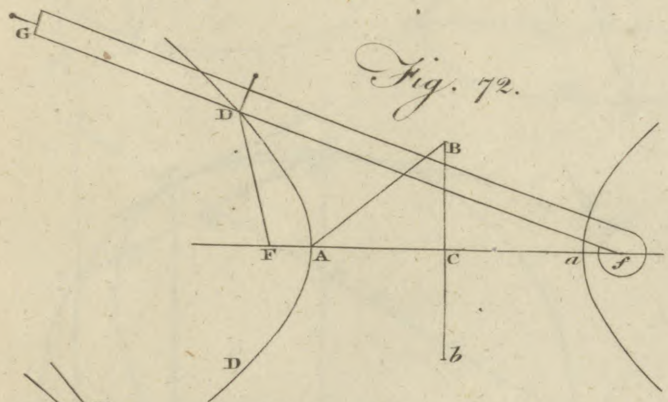
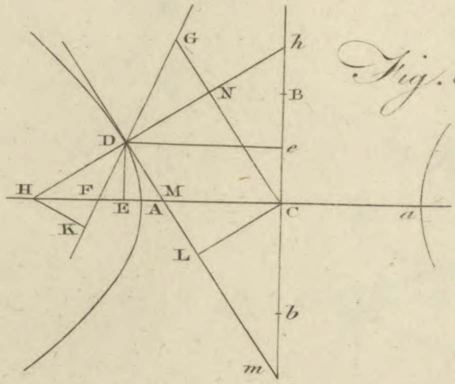


Fig. 68.



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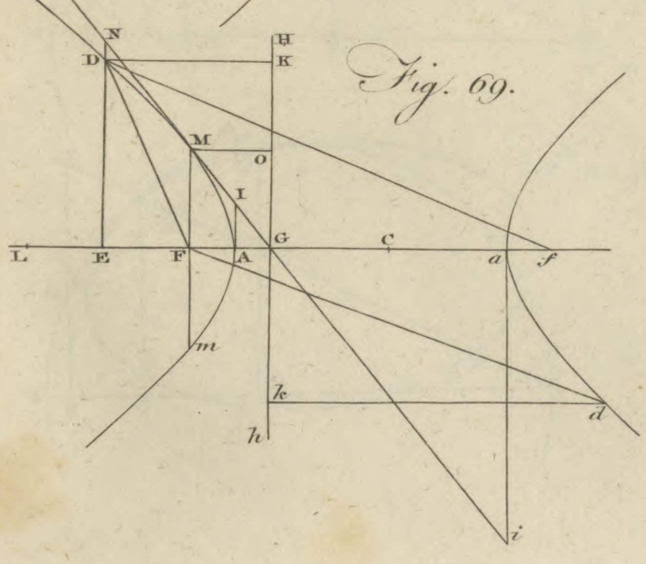

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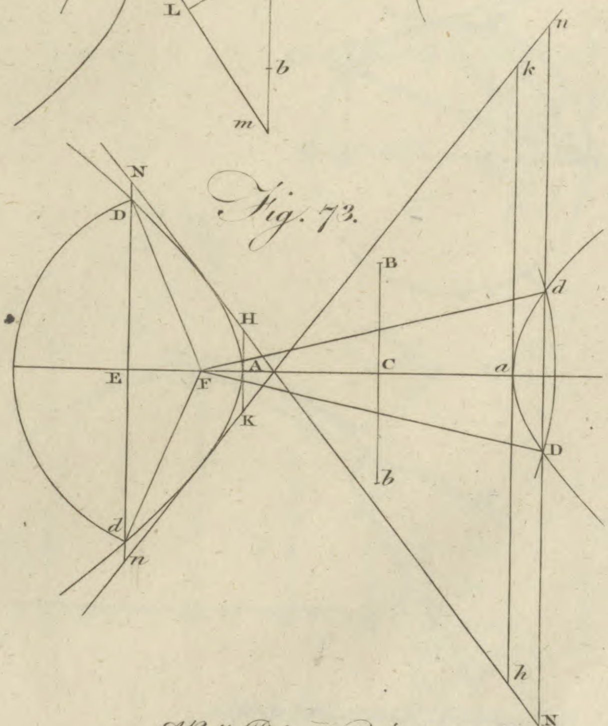

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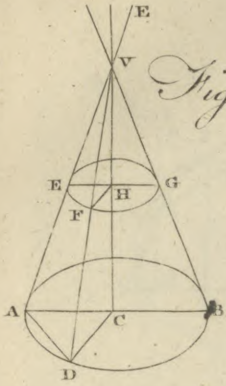
Fig. 75.



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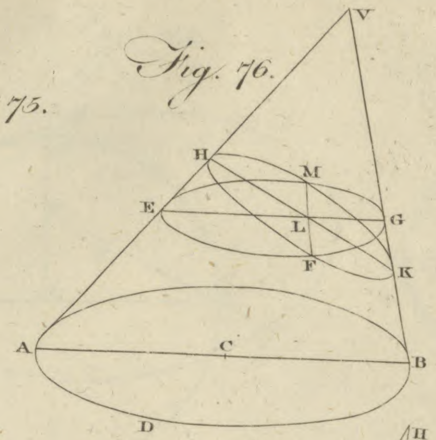

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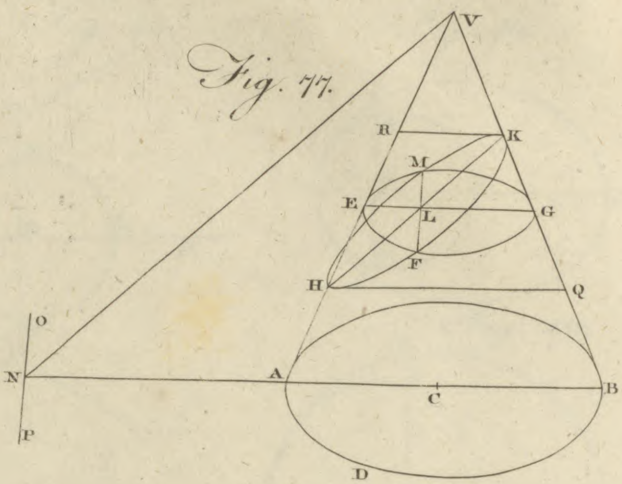

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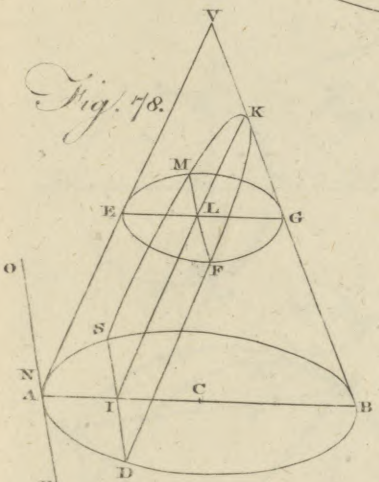

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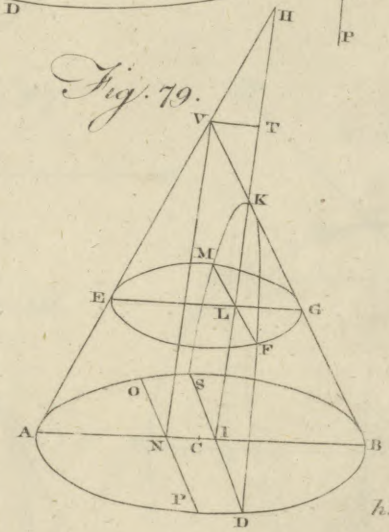

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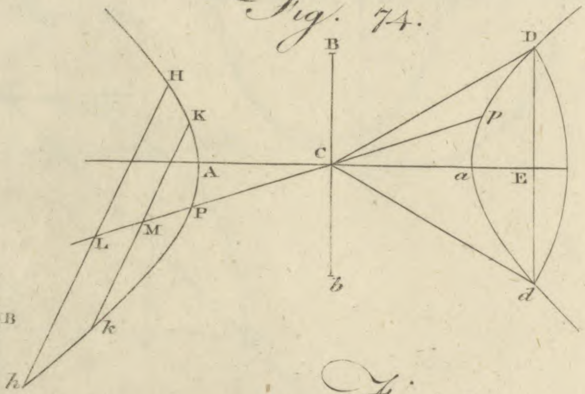

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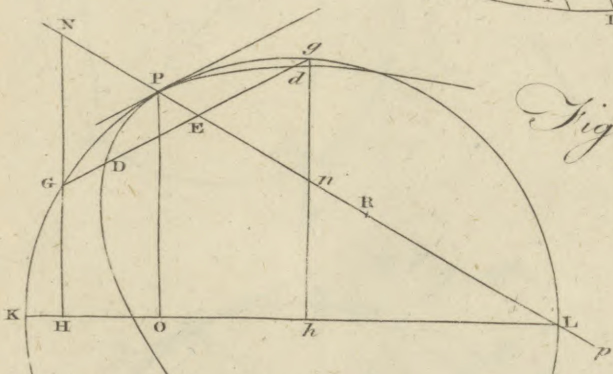

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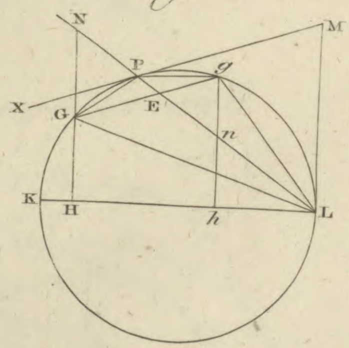

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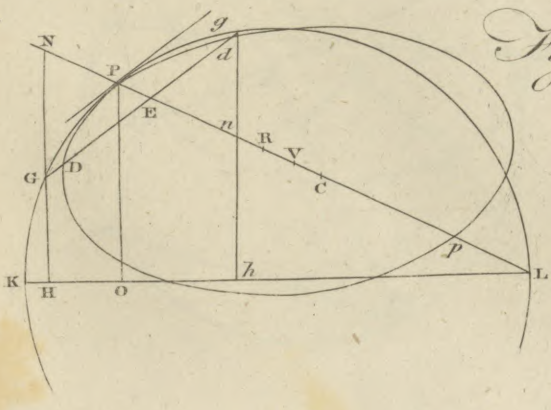

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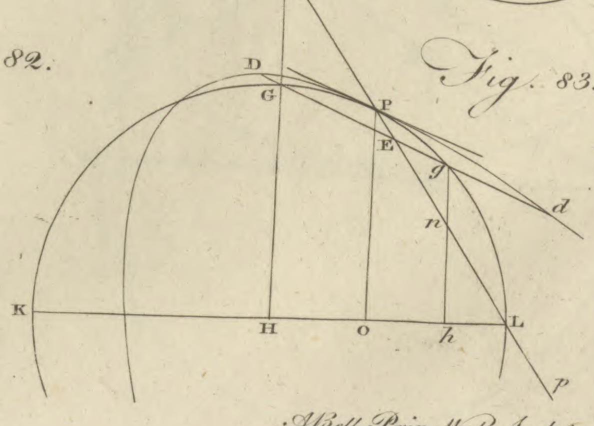

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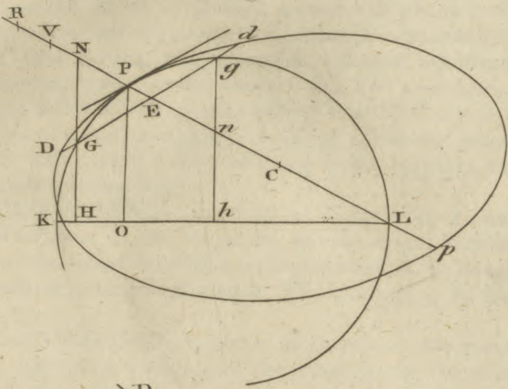

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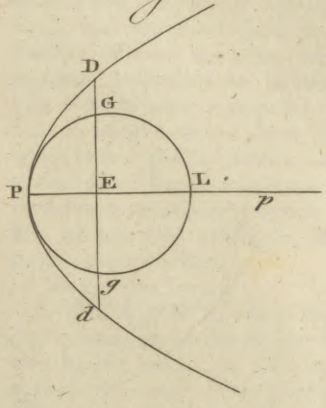
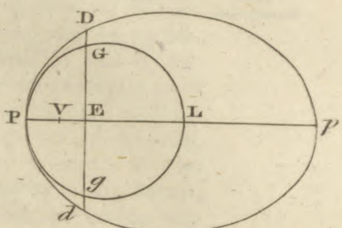


Fig. 86.



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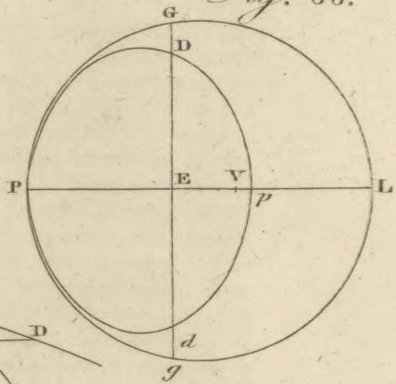

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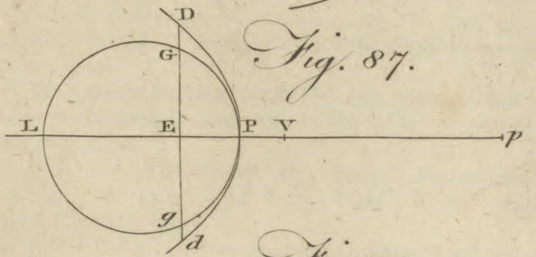
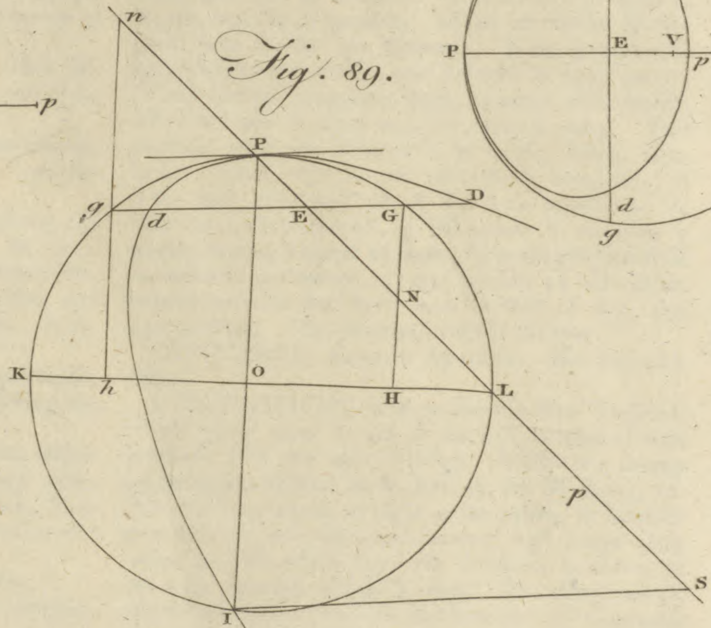


Fig. 89.



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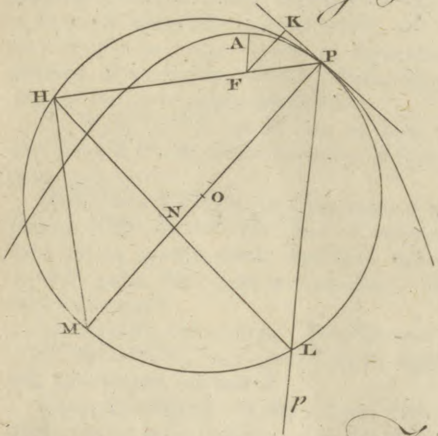

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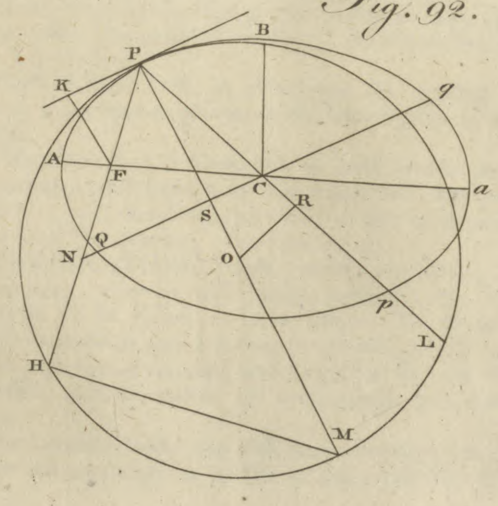
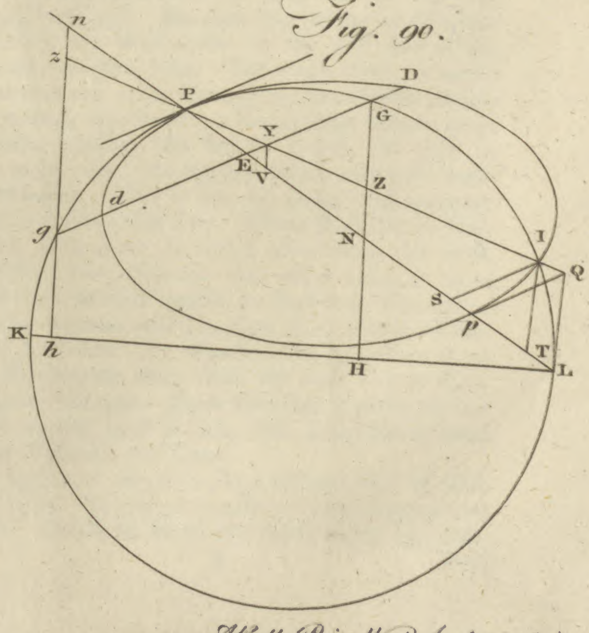


Fig. 90.



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CONICHTHYODONTES, or PLECTRONITÆ, in *Natural History*, a name by which the fossil teeth of fishes are sometimes distinguished.

CONIFERÆ, in *Botany*, an order of plants in the *Fragmenta methodi naturalis* of Linnæus, containing the following genera, viz. cupressus, ephedra, equisetum, juniperus, pinus, taxus, thuja. See BOTANY *Index*.

CONIFEROUS TREES, such as bear hard dry seed-vessels of a conical figure; consisting of several woody parts, being mostly scaly, adhering closely together, and separating when ripe.

CONIMBRICA, in *Ancient Geography*, a town of Lusitania, on the south side of the river Monda; from the ruins of which arose Coimbra, in its neighbourhood, a city of Portugal. W. Long. 9. 5. N. Lat. 40. 16.

CONINGSECK, a town of Suabia in Germany, and capital of a county of the same name, 20 miles north of Constance. E. Long. 9. 20. N. Lat. 47. 50.

CONJOINT, in a general sense, signifies united or connected.

CONJOINT Degrees, in *Music*, two notes which follow each other immediately in the order of the scale, as *ut* and *re*.

CONJOINT Tetrachords, two tetrachords, or fourths, where the same chord is the highest of one and the lowest of the other.

CONISSALÆ, an old term in natural history, signifying a class of fossils, which were said to be naturally and essentially compounded, not inflammable, nor soluble in water, found in detached masses, and formed of crystalline matter debased by earth. It included sand and gritty substances.

CONJUGATE DIAMETER, or *Axis of an Ellipsis*, the shortest of the two diameters, or that bisecting the axis.

CONJUGATION, in *Grammar*, a regular distribution of the several inflections of verbs in their different voices, moods, tenses, numbers, and persons, so as to distinguish them from one another. See GRAMMAR and LANGUAGE.

CONIUM, HEMLOCK. See BOTANY *Index*.

CONJUNCT, in a general sense, signifies conjoined, concurrent, or united.

CONJUNCT Rights, in *Scots Law*, such as are granted to two or more persons. See LAW *Index*.

CONJUNCT, or *Confidant Persons*, in *Scots Law*, such as are about the person of another, or employed by him. See LAW *Index*.

CONJUNCTION, in *Astronomy*, the meeting of two or more stars or planets in the same degree of the zodiac.

CONJUNCTION, in *Grammar*, an indeclinable word or particle, which serves to join words and sentences together, and thereby shows their relation or dependence upon one another. See GRAMMAR.

CONJURATION, magic words, characters, or ceremonies, whereby evil spirits, tempests, &c. are supposed to be raised, or driven away. The Romish priests pretend to expel devils, by preparing holy water in a particular manner, and sprinkling it over the possessed, with a number of conjurations and exorcisms.

Some authors make the difference between conjuration and witchcraft to consist in this; that the former effects its end by prayers and invocation of God's name, &c. to compel the devil to do what is desired; so that the conjuror is supposed to be at war with the devil, and that evil spirit to act merely out of constraint: whereas the latter attains its end by an immediate application to the devil himself: and the devil's complaisance is supposed to be the consequence of some compact between them, so that the devil and the witch have a good understanding together. Both these, again, differ from inchantment and sorcery; in that these latter operate secretly and slowly by spells, charms, &c. without ever calling on the devil, or having any conference with him.

CONN. See COND.

CONNAUGHT, one of the four provinces of Ireland, bounded on the east by that of Leinster, on the west by the ocean, on the north and north-west by part of the ocean and province of Ulster, and on the south and east by Munster. It is about 130 miles in length, and 84 in breadth. It has no rivers of any great note besides the Shannon. It has several convenient bays and creeks, and is fertile in many places. It had several dangerous bogs, overrun with woods, which are now in some measure cleared away. This province produces abundance of cattle, sheep, deer, hawks, and honey; but the inhabitants being lazy, it is the least cultivated of all the four provinces. It contains 1 archbishopric, 5 bishoprics, 6 counties, 7 market-towns, 8 places of trade, 10 boroughs that send members to parliament, 47,256 houses, 24 old castles, besides fortresses that have been erected of late, and 330 parishes. The principal town is Galway.

CONNARUS, CEYLON SUMACH. See BOTANY *Index*.

CONNECTICUT, a large river in New England, which gives name to one of the five colonies of that province (see the next article). It rises in a swamp on the height of land, in N. Lat. 45. 10. W. Long. 71. After a sleepy course of eight or ten miles, it tumbles over four separate falls, and turning west keeps close under the hills which form the northern boundary of the vale through which it runs. The Amonoosuck and Israel rivers, two principal branches of Connecticut river, fall into it from the east, between the latitudes 44° and 45°. Between the towns of Walpole on the east, and Westminster on the west side of the river, are the great falls. The whole river, compressed between two rocks scarcely 30 feet asunder, shoots with amazing rapidity into a broad bason below. Over these falls, a bridge 160 feet in length was built in 1784, under which the highest floods may pass without detriment. This is the first bridge that was ever erected over this noble river. Above Deerfield in Massachusets it receives Deerfield river from the west, and Miller's river from the east, after which it turns westerly in a sinuous course to Fighting-falls, and a little after tumbles over Deerfield falls, which are impassable by boats. At Windsor in Connecticut it receives Farmington river from the west, and at Hartford meets the tide. From Hartford it passes on in a crooked course, until it falls into Long Island sound between Saybrook and Lyme.

The length of this river, in a straight line, is nearly 300 miles. Its general course is several degrees west of south. It is from 80 to 100 roods wide, 130 miles

Connecti-cut. from its mouth. At its mouth is a bar of ſand which conſiderably obſtructs the navigation. Ten feet water at full tides is found on this bar, and the ſame depth to Middleton. The diſtance of the bar from this place, as the river runs, is 36 miles. Above Middleton are ſeveral ſhoals which ſtretch quite acroſs the river. Only ſix feet water is found on the ſhoal at high tide, and here the tide ebbs and flows but about eight inches. About three miles below Middleton the river is contracted to about 40 roods in breadth by two high mountains. Almoſt everywhere elſe the banks are low, and ſpread into fine extenſive meadows. In the ſpring floods, which generally happen in May, theſe meadows are covered with water. At Hartford the water ſometimes riſes 20 feet above the common ſurface of the river, and having all to paſs through the above-mentioned ſtrait, it is ſometimes two or three weeks before it returns to its uſual bed. Theſe floods add nothing to the depth of water on the bar at the mouth of the river: this bar lying too far off in the ſound to be affected by them.

On this beautiful river, whoſe banks are ſettled almoſt to its ſource, are many pleaſant, neat, well-built towns. On its weſtern bank, from its mouth northward, are the towns of Saybrook, Haddam, Middleton, Weathersfield, Hartford, Windſor, and Suffield, in Connecticut; Weſt Springfield, Northampton, Hatfield, and Deerfield, in Maſſachuſets; Guilford, Brattleborough, in which is Fort Dummer, Weſtminſter, Windſor, Hartford, Fairlee, Newbury, Brunſwick, and many others in Vermont. Croſſing the river into New Hampſhire, and travelling on the eaſtern bank, you paſs through Woodbury nearly oppoſite to Brunſwick, Northumberland, the Coos country, Lyman, Orford, Lyme, Hanover, in which is Dartmouth College, Lebanon, Corniſh, Clermont, Charleſton, or N° 4, Cheſterfield, and many others in New Hampſhire; Sunderland, Hadley, Springfield, Long Meadow, in Maſſachuſets; and in Connecticut, Enfield, Eaſt Windſor, Eaſt Hartford, Glaſtenbury, Eaſt Haddam, and Lyme.

This river is navigable to Hartford, upwards of 50 miles from its mouth, and the produce of the country for 200 miles above is brought thither in boats. The boats which are uſed in this buſineſs are flat-bottomed, long and narrow, for the convenience of going up ſtream, and of ſo light a make as to be portable in carts. They are taken out of the river at three different carrying-places, all of which make 15 miles.

Sturgeon, ſalmon, and ſhad, are caught in plenty in their ſeaſon, from the mouth of the river upwards, excepting ſturgeon, which do not aſcend the upper falls; beſides a variety of ſmall fiſh, ſuch as pike, carp, perch, &c.

From this river are employed three brigs of 180 tons each, in the European trade; and about 60 ſail from 60 to 150 tons, in the Weſt India trade; beſides a few fiſhermen, and 40 or 50 coaſting veſſels.

Connecticut, one of the five ſtates of New England in America; bounded on the north by Maſſachuſets, on the eaſt by Rhode Iſland; on the ſouth by the ſound, which divides it from Long Iſland; and on the weſt by the province of New York.

The diviſional line between Connecticut and Maſſachuſets, as ſettled in 1728, was found to be about 72 miles in length. The line dividing Connecticut from Rhode Iſland was ſettled in 1728, and found to be about 45 miles. The ſea coaſt, from the mouth of Paukatuk river, which forms a part of the eaſtern boundary of Connecticut, in a direct ſouthweſtwardly line to the mouth of Byram river, is reckoned at about 90 miles. The line between Connecticut and New York runs from latitude 41. 0. to latitude 42. 2.; 72 miles. Connecticut contains about 4674 ſquare miles; equal to about 2,960,000 acres.

Rivers. This ſtate is watered by ſeveral fine rivers, the principal of which are, *Connecticut* deſcribed in the preceding article, Houſatonik, and the Thames. One branch of the Houſatonik riſes in Laneſborough, the other in Windſor, both in Berkſhire county in Maſſachuſets. It paſſes through a number of pleaſant towns, and empties into the ſound between Stratford and Milford. It is navigable 12 miles, to Derby. A bar of ſhells, at its mouth, obſtructs its navigation for large veſſels. In this river, between Saliſbury and Canaan, is a cataract, where the water of the whole river, which is 150 yards wide, falls about 60 feet perpendicularly, in a perfectly white ſheet. A copious miſt ariſes, in which floating rainbows are ſeen in various places at the ſame time, exhibiting a ſcene exceedingly grand and beautiful.

The Thames empties into Long Iſland ſound at New London. It is navigable 14 miles, to Norwich Landing. Here it loſes its name, and branches into Shetucket on the eaſt, and Norwich or Little river on the weſt. The city of Norwich ſtands on the tongue of land between theſe rivers. Little river, about a mile from its mouth, has a remarkable and very romantic cataract. A rock 10 or 12 feet in perpendicular height, extends quite acroſs the channel of the river. Over this the whole river pitches, in one entire ſheet, upon a bed of rocks below. Here the river is compreſſed into a very narrow channel between two craggy cliffs, one of which towers to a conſiderable height. The channel deſcends gradually, is very crooked, and covered with pointed rocks. Upon theſe the water ſwiftly tumbles, foaming with the moſt violent agitation, 15 or 20 rods, into a broad baſon which ſpreads before it. At the bottom of the perpendicular falls, the rocks are curiouſly excavated by the conſtant pouring of the water. Some of the cavities, which are all of a circular form, are five or ſix feet deep. The ſmoothneſs of the water above its deſcent, the regularity and beauty of the perpendicular fall, the tremendous roughneſs of the other, and the craggy, towering cliff which impends the whole, preſent to the view of the ſpectator a ſcene indeſcribably delightful and majeſtic. On this river are ſome of the fineſt mill ſeats in New England, and thoſe immediately below the falls, occupied by Lathrop's mill, are perhaps not exceeded by any in the world. Acroſs the mouth of this river is a broad, commodious bridge, in the form of a wharf, built at a great expence.

Shetucket river, the other branch of the Thames, four miles from its mouth, receives Quinnabog, which has its ſource in Brimfield in Maſſachuſets; thence paſſing through Sturbridge and Dudley in Maſſachuſets, it croſſes into Connecticut, and divides Pomfret from Killingly, Canterbury from Plainfield, and Liſbon from Preſton, and then mingles with Shetucket. In paſſing

Connecticut. paſſing through this hilly country, it tumbles over many falls, and affords a vaſt number of mill ſeats. The ſource of the Shetucket is not far from that of Quinnabog. It has the name of Willamantik while paſſing through Stafford, and between Tolland and Willington, Coventry and Mansfield. Below Windham it takes the name of Shetucket, and empties as above. Theſe rivers are fed by numberleſs brooks from every part of the adjacent country. At the mouth of Shetucket is a bridge of timber 124 feet in length, ſupported at each end by pillars, and held up in the middle by braces on the top, in the nature of an arch.

2 Harbours. The two principal harbours are at New London and New Haven. The former opens to the ſouth. From the light-houſe, which ſtands at the mouth of the harbour, to the town, is about three miles; the breadth is three quarters of a mile, and in ſome places more. The harbour has from five to ſix fathoms water, a clear bottom, tough ooze, and as far as one mile above the town is entirely ſecure and commodious for large ſhips. New Haven harbour is greatly inferior to that of New London. It is a bay which ſets up northerly from the ſound about four miles. Its entrance is about half a mile wide. It has very good anchorage, and two and an half fathoms at low water, and three fathoms and four feet at common tides. The whole of the ſea coaſt is indented with harbours, many of which are ſafe and commodious, but are not ſufficiently uſed to merit a deſcription.

3 Climate, ſoil, and productions. Connecticut, though ſubject to the extremes of heat and cold in their ſeaſons, and to frequent ſudden changes, is very healthful. As many as one in 46 of the inhabitants of Connecticut, who were living in 1774, were upwards of 70 years old. From accurate calculation it is found, that about one in eight live to the age of 70 years and upwards; one in 13 to the age of 80 years, and one in about 30 to the age of 90.

In the maritime towns the weather is variable, according as the wind blows from the ſea or land. As you advance into the country, the ſea breezes have leſs effect upon the air, and conſequently the weather is leſs variable. The ſhorteſt day is 8 hours and 58 minutes, and the longeſt 15 hours. The north-weſt winds, in the winter-ſeaſon, are often extremely ſevere and piercing, occaſioned by the great body of ſnow which lies concealed from the diſſolving influence of the ſun in the immenſe foreſts north and north-weſt. The clear and ſerene temperature of the ſky, however, makes amends for the ſeverity of the weather, and is favourable to health and longevity. Connecticut is generally broken land, made up of mountains, hills, and valleys; and is exceedingly well watered. Some ſmall parts of it are thin and barren. It lies in the fifth and ſixth northern climates, and has a ſtrong fertile ſoil. Its principal productions are Indian corn, rye, wheat in many parts of the ſtate, oats and barley, which are heavy and good, and of late buck-wheat, flax in large quantities, ſome hemp, potatoes of ſeveral kinds, pumpkins, turnips, peaſe, beans, &c. &c. fruits of all kinds, which are common to the climate. The ſoil is very well calculated for paſture and mowing, which enables the farmers to feed large numbers of neat cattle and horſes. Actual calculation has evinced, that any given quantity of the beſt mowing land in Connecticut, produces about twice as much clear profit as the ſame quantity of the beſt wheat land in the ſtate of New York. Many farmers, in the eaſtern part of the ſtate, have lately found their advantage in raiſing mules, which are carried from the ports of Norwich and New London to the Weſt India iſlands, and yield a handſome profit. The beef, pork, butter, and cheeſe, of Connecticut, are equal to any in the world.

The trade of Connecticut is principally with the Weſt India iſlands, and is carried on in veſſels from 60 to 140 tons. The exports conſiſt of horſes, mules, oxen, oak ſtaves, hoops, pine boards, oak planks, beans, Indian corn, fiſh, beef, pork, &c. Horſes, live cattle and lumber, are permitted in the Dutch, Daniſh, and French ports. Beef and fiſh are liable to ſuch heavy duties in the French iſlands, as that little profit ariſes to the merchant who ſends them to their ports. Pork and flour are prohibited. As the ordinance making free ports in the French Weſt India iſlands extends to all foreigners, the price of molaſſes and other articles has been greatly enhanced by the Engliſh purchaſers for Canada and Nova Scotia; ſo that the trade of Connecticut with the French Weſt India iſlands is not profitable. Cotton, cocoa, indigo, and ſugars, are not permitted to be brought away by Americans. The ſeverity with which theſe prohibitory laws are adminiſtered is ſuch, as that theſe articles cannot be ſmuggled. 4 Trade.

Connecticut has a large number of coaſting veſſels employed in carrying the produce of the ſtate to other ſtates.—To Rhode Iſland, Maſſachuſets, and New Hampſhire, they carry pork, wheat, corn, and rye. To North and South Carolinas and Georgia, butter, cheeſe, ſalted beef, cyder, apples, potatoes, hay, &c. and receive in return rice, indigo, and money. But as New York is nearer, and the ſtate of the markets always well known, much of the produce of Connecticut, eſpecially of the weſtern parts, is carried there; particularly pot and pearl aſhes, flax-ſeed, beef, pork, cheeſe, and butter in large quantities. Moſt of the produce of Connecticut river, from the parts of Maſſachuſets, New Hampſhire, and Vermont, as well as of Connecticut, which are adjacent, goes to the ſame market. Conſiderable quantities of the produce of the eaſtern parts of the ſtate are marketed at Boſton and Providence.

The value of the whole exported produce and commodities from this ſtate, before the year 1774, was then eſtimated at about 200,000l. lawful money annually. Since this time no accurate eſtimate has been made, ſo that it is impoſſible to tell whether the amount has ſince been increaſed or diminiſhed.

In 1774, the number of ſhipping in Connecticut was 189; their tonnage 10,317; ſeafaring men 1162; beſides upwards of 20 ſail of coaſting veſſels, which employed about 90 ſeamen. This ſtate is not yet fully recovered from the confuſion in which it was involved by the late war; ſo that the number of ſhipping, &c. has not, at any period ſince 1774, been aſcertained with accuracy. It is probable, however, conſidering the loſſes ſuſtained by the war, the decay of the ſhip-building buſineſs, and the number of unfortunate ſhipwrecks,

Connecticut.

wrecks, and loſſes by hurricanes in the Weſt Indies, that the ſhipping and ſeamen are not now ſo numerous as in 1774.

5 Manufactures.

The number of ſhipping from the port of New London employed in 1788 in the European and Weſt India trade, was four ſhips, one ſnow, 54 brigantines, 32 ſchooners, and 45 ſloops. The number of horſes and cattle exported from the diſtrict round New London, from the 10th of January 1787, to the 10th of January 1788, was 6917; beſides jack-aſſes imported and exported, not included. From 1786 to 1787, the number was 6671; ſo that the laſt year exceeded the other 246. From March 1787 to January 1788, 1454 horſes, 780 oxen, and 23 cows, were exported from the port of Middleton.

The farmers in Connecticut and their families are moſtly clothed in plain, decent, homeſpun cloth. Their linens and woollens are manufactured in the family way; and although they are generally of a coarſer kind, they are of a ſtronger texture, and much more durable than thoſe imported from France and Great Britain. Many of their cloths are fine and handſome.

In New Haven is a linen manufactory which flouriſhes, and one for cotton is about to be eſtabliſhed. In Eaſt Hartford is a glaſs-work, a ſnuff and powder mill, and an iron-work and ſlitting mill. Iron-works are eſtabliſhed alſo at Saliſbury, Norwich, and other parts of the ſtate. At Stafford is a furnace at which are made large quantities of hollow ware and other ironmongery, ſufficient to ſupply the whole ſtate. Paper is manufactured at Norwich, Hartford, Hew Haven, and in Litchfield county. Nails of every ſize are made in almoſt every town and village in Connecticut; ſo that conſiderable quantities can be exported to the neighbouring ſtates, and at a better rate than they can be had from Europe. Ironmongery, hats of the beſt kinds, candles, leather, ſhoes, and boots, are manufactured in this ſtate. We muſt not omit to mention wooden diſhes and other wooden ware, which are made in vaſt quantities in Suffield and ſome few other places, and ſold in almoſt every part of the eaſtern ſtates. Oil mills, of a new and very ingenious conſtruction, have been erected in ſeveral parts of the ſtate.

It appears from experiments made formerly in this ſtate, that a buſhel of ſun-flower ſeed yields a gallon of oil; and that an acre of ground planted with the ſeed at three feet apart, will yield between forty and fifty buſhels of the ſeed. This oil is as mild as ſweet oil, and is equally agreeable with ſalads, and as a medicine. It may, moreover, be uſed with advantage in paints, varniſhes, and ointments. From its being manufactured in our own country, it may always be procured and uſed in a freſh ſtate. The oil is preſſed from the ſeed in the ſame manner that cold drawn linſeed oil is drawn from flax-ſeed, and with as little trouble. Sweet olive oil ſells for ſix ſhillings a quart. Should the oil of the ſun-flower ſell for only two-thirds of that price, the produce of an acre of ground, ſuppoſing it to yield only 40 buſhels of the ſeed, will be 32l. a ſum far beyond the product of an acre of ground in any kind of grain. The ſeed is raiſed with very little trouble, and grows in land of moderate fertility. It may be gathered and ſhelled, fit for the extraction of the oil, by women and children.

Connecticut.

6 Civil diviſions and population.

Connecticut is divided into eight counties, viz. Hartford, New Haven, New London, Fairfield, Windham, Litchfield, Middleſex, and Tolland. The counties are ſubdivided into upwards of 80 townſhips; each of which is a corporation, inveſted with power to hold lands, chooſe their own town-officers, to make prudential laws, the penalty of tranſgreſſion not to exceed 20s. and to chooſe their own repreſentatives to the general aſſembly. The townſhips are generally divided into two or more pariſhes, in each of which is one or more places of public worſhip.

Connecticut is the moſt populous, in proportion to its extent, of any of the thirteen ſtates. It is laid out in ſmall farms from 50 to 300 or 400 acres each, which are held by the farmers in fee-ſimple; and are generally cultivated as well as the nature of the ſoil will admit. The ſtate is chequered with innumerable roads or highways, croſſing each other in every direction. A traveller in any of theſe roads, even in the moſt unſettled parts of the ſtate, will ſeldom paſs more than two or three miles without finding a houſe or cottage, and a farm under ſuch improvements as to afford the neceſſaries for the ſupport of a family. The whole ſtate reſembles a well-cultivated garden; which, with that degree of induſtry that is requiſite for happineſs, produces the neceſſaries and conveniences of life in great plenty.

In 1759, the number of inhabitants in Connecticut was 130,611; in 1774, there were 197,856 ſouls. In 18 years, the increaſe was 67,245; from 1774 to 1782, the increaſe was but 11,294 perſons. This comparatively ſmall increaſe of inhabitants may be ſatisfactorily accounted for from the deſtruction of the war, and the numerous emigrations to Vermont, the weſtern parts of New Hampſhire, and other ſtates.

The inhabitants are almoſt entirely of Engliſh deſcent. There are no Dutch, French, or Germans, and very few Scotch or Iriſh people, in any part of New England.

7 Character, manners, &c.

In addition to what has been already ſaid on theſe particulars under New England, it may be obſerved, that the people of Connecticut are remarkably fond of having all their diſputes, even thoſe of the moſt trivial kind, ſettled according to law. The prevalence of this litigious ſpirit affords employment and ſupport for a numerous body of lawyers. The number of actions entered annually upon the ſeveral dockets in the ſtate, juſtifies the above obſervations. That party ſpirit, however, which is the bane of political happineſs, has not raged with ſuch violence in this ſtate as in Maſſachuſets and Rhode Iſland. Public proceedings have been conducted, generally, and eſpecially of late, with much calmneſs and candour. The people are well informed in regard to their rights, and judicious in the methods they adopt to ſecure them.

The clergy, who are numerous, and, as a body, very reſpectable, have hitherto preſerved a kind of ariſtocratical balance in the very democratical government of the ſtate; which has happily operated as a check upon the overbearing ſpirit of republicaniſm. It has been lamented that the unhappy religious diſputes

Connecticut. putes which have too much prevailed among ſome of the clergy, and the too great attention that others have paid to their temporal concerns, to the neglect of their flocks, and an inattention to the qualifications of thoſe who have been admitted to the ſacred office, have, heretofore, conſiderably diminiſhed their influence. It is a pleaſing circumſtance that the rage for theological diſputation is abating; and greater ſtrictneſs is obſerved in the admiſſion of candidates to the miniſtry. Their influence is on the increaſe; and it is no doubt to be attributed, in part, to their increaſing influence, that an evident reformation in the manners of the people of this ſtate has taken place ſince the peace. In regard to learning and abilities, the clergy, at the preſent day, are equal to their predeceſſors at any former period.

8 Religion.

As to eccleſiaſtical government and diſcipline, each church is a ſeparate juriſdiction, and claims authority to chooſe their own miniſter, to exerciſe government, and to enjoy goſpel ordinances within itſelf. The churches, however, are not independent of each other; they are aſſociated for mutual benefit and convenience. The aſſociations have power to licenſe candidates for the miniſtry, to conſult for the general welfare, and to recommend meaſures to be adopted by the churches, but have no authority to enforce them. When diſputes ariſe in churches, councils are called, by the parties, to ſettle them; but their power is only adviſory. There are as many aſſociations in the ſtate as there are counties; and they meet twice in a year. Theſe are all combined in one general aſſociation, who meet annually.

All religions that are conſiſtent with the peace of ſociety are tolerated in Connecticut; and a ſpirit of liberality and catholiciſm is increaſing. There are very few religious ſects in this ſtate; the bulk of the people are Congregationaliſts. Beſides theſe there are Epiſcopalians and Baptiſts; and formerly there was a ſociety of Sandimanians at New-Haven; but they are now reduced to a very ſmall number. The Epiſcopalian churches are reſpectable, and are under the ſuperintendance of a biſhop. There were 29 congregations of the Baptiſts in 1784. Theſe congregations, with thoſe in the neighbouring ſtates, meet in aſſociations, by delegation, annually.

9 Chief towns.

There are a great number of very pleaſant towns, both maritime and inland, in Connecticut. It contains five incorporated towns or cities. Two of theſe, Hartford and New-Haven, are the capitals of the ſtate. The general aſſembly is holden at the former in May, and at the latter in October, annually. See Hartford and *New-Haven*.

10 Colleges, academies, and ſchools.

In no part of the world is the education of all ranks of people more attended to than in Connecticut. Almoſt every town in the ſtate is divided into diſtricts, and each diſtrict has a public ſchool kept in it a greater or leſs part of every year. Somewhat more than one third of the money ariſing from a tax on the polls and rateable eſtate of the inhabitants, is appropriated to the ſupport of ſchools, in the ſeveral towns, for the education of children and youth. The law directs that a grammar ſchool ſhall be kept in every country town throughout the ſtate.

There is a grammar ſchool at Hartford, and another at New-Haven, ſupported by a donation of Governor Hopkins. This venerable and benevolent gentleman, in his laſt will, dated 1657, left in the hands of Theophilus Eaton, Eſq; and three others, a legacy of 1324l. "as an encouragement, in theſe foreign plantations, of breeding up hopeful youths both at the grammar ſchool and college." In 1664, this legacy was equally divided between New-Haven and Hartford; and grammar ſchools were erected, which have been ſupported ever ſince.

At Greenfield there is a reſpectable academy, under the care and inſtruction of the Rev. Dr Dwight. At Plainfield is another, under the care of the Rev. Mr Benedict. This academy has flouriſhed for ſeveral years, and furniſhed a number of ſtudents for Yale and Dartmouth colleges. At Norwich and Windham, likewiſe, are academies furniſhed with able inſtructors; each of theſe academies has 60 or 70 ſcholars.

Yale College was founded in 1700, and remained at Killingworth until 1707—then at Saybrook until 1716, when it was removed and fixed at New-Haven. See *New-Haven*.

11 Mines, minerals and foſſils.

On the bank of Connecticut river, two miles from Middleton, is a lead mine, which was wrought during the war, at the expence of the ſtate, and was productive. It is too expenſive to work in time of peace. Copper mines have been diſcovered and opened in ſeveral parts of the ſtate, but have proved unprofitable, and are much neglected. Iron mines are numerous and productive. Steel ore has been found in the mountains between Woodbury and New Milford. Talcs of various kinds, white, brown, and chocolate coloured cryſtals, zinc or ſpeltzer, a ſemimetal, and ſeveral other foſſils and metals, have been found in Connecticut.

12 Mode of levying taxes.

All freeholders in the ſtate are required by law to give in liſts of their polls and rateable eſtate, to perſons appointed in the reſpective towns to receive them, on or before the 20th of Auguſt annually. Theſe are valued according to law, arranged in proper order, and ſent to the general aſſembly annually in May.

The ſum total of the liſt of the polls and rateable eſtate of the inhabitants of Connecticut, as brought into the general aſſembly in May 1787, were as follows:

Sum total of the ſingle liſt	L. 1,484,901	6	4¾
Aſſeſſments	47,790	2	9
One quarter of the fourfolds	1,176	9	4
Total	L. 1 533 867	18	5¾

On this ſum taxes are levied, ſo much on the pound, according to the ſum propoſed to be raiſed. A tax of two-pence on the pound would raiſe 12,782l. 4s.

The ordinary annual expences of government before the war amounted to near 4000l. ſterling, excluſive of that which was appropriated to the ſupport of ſchools. The expences have ſince increaſed.

13 Mineral ſprings.

At Stafford is a medicinal ſpring, which is ſaid to be a ſovereign remedy for ſcorbutic, cutaneous, and other diſorders. At Guilford is a ſpring, whoſe water, it is ſaid, when ſeparated from the fountain, will evaporate even when put into a bottle and tightly corked.

It is difficult to ſay what is the conſtitution of this ſtate.

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14 Constitution and courts of justice.

ſtate. Contented with the form of government which originated from the charter of Charles II. granted in 1662, the people have not been diſpoſed to run the hazard of framing a new conſtitution ſince the declaration of independence. They have tacitly adopted their old charter as the ground of civil government, ſo far as it is applicable to an independent people.

Agreeable to this charter, the ſupreme legiſlative authority of the ſtate is veſted in a governor, deputy-governor, twelve aſſiſtants or counſellors, and the repreſentatives of the people, ſtyled the *General Aſſembly*. The governor, deputy-governor, and aſſiſtants are annually choſen by the freemen in the month of May. The repreſentatives (their number not to exceed two from each town) are choſen by the freemen twice a-year, to attend the two annual ſeſſions, on the ſecond Thurſday of May and October. This aſſembly has power to erect judicatories, for the trial of cauſes civil and criminal, and to ordain and eſtabliſh laws for ſettling the forms and ceremonies of government. By theſe laws the general aſſembly is divided into two branches, called the upper and lower houſes. The upper houſe is compoſed of the governor, deputy-governor, and aſſiſtants; the lower houſe, of the repreſentatives of the people. No law can paſs without the concurrence of both houſes. The judges of the ſuperior court hold their offices during the pleaſure of the general aſſembly. The judges of the county courts, and juſtices, are annually appointed. Sheriffs are appointed by the governor and council, without limitation of time. The governor is captain-general of the militia, the deputy-governor lieutenant-general. All other military officers are appointed by the aſſembly, and commiſſioned by the governor.

The mode of electing the governor, deputy-governor, aſſiſtants, treaſurer, and ſecretary, is as follows: The freemen in the ſeveral towns meet on the Monday next after the firſt Tueſday in April, annually, and give in their votes for the perſons they chooſe for the ſaid offices reſpectively, with their names written on a piece of paper, which are received and ſealed up by a conſtable in open meeting, the votes for each office by themſelves, with the name of the town and office written on the outſide. Theſe votes, thus ſealed, are ſent to the general aſſembly in May, and there counted by a committee from both houſes. All freemen are eligible to any office in government. In chooſing aſſiſtants, twenty perſons are nominated, by the vote of each freemen, at the freemen's meeting for chooſing repreſentatives in September annually. Theſe votes are ſealed up, and ſent to the general aſſembly in October, and are there counted by a committee of both houſes, and the twenty perſons who have the moſt votes ſtand in nomination; out of which number the twelve who have the greateſt number of votes, given by the freemen at their meeting in April, are in May declared aſſiſtants in the manner above mentioned. The qualifications of freemen are, maturity in years, quiet and peaceable behaviour, a civil converſation, and freehold eſtate to the value of forty ſhillings per annum, or forty pounds perſonal eſtate in the liſt, certified by the ſelect men of the town; it is neceſſary alſo that they take the oath of fidelity to the ſtate. Their names are enrolled in the town clerk's office, and they continue freemen for life, unleſs disfranchiſed by ſentence of the ſuperior court, on conviction of miſdemeanor.

The courts are as follows: The juſtices of the peace, of whom a number are annually appointed in each town by the general aſſembly, have authority to hear and determine civil actions, where the demand does not exceed four pounds. If the demand exceeds forty ſhillings, an appeal to the county is allowed. They have cognizance of ſmall offences, and may puniſh by fine not exceeding forty ſhillings, or whipping not exceeding ten ſtripes, or ſitting in the ſtocks. There are eight county courts in the ſtate, held in the ſeveral counties by one judge and four juſtices of the quorum, who have juriſdiction of all criminal caſes, ariſing within their reſpective counties, where the puniſhment does not extend to life, limb, or baniſhment. They have original juriſdiction of all civil actions which exceed the juriſdiction of a juſtice. Either party may appeal to the ſuperior court, if the demand exceeds twenty pounds, except on bonds or notes vouched by two witneſſes.

There are ſeveral courts of probate in each county, conſiſting of one judge. The peculiar province of this court, is, the probate of wills, granting adminiſtration of inteſtate eſtates, ordering diſtribution of them, and appointing guardians for minors, &c. An appeal lies from any decree of this court to the ſuperior court.

The ſuperior court conſiſts of five judges. It has authority in all criminal caſes extending to life, limb or baniſhment, and other high crimes and miſdemeanors, to grant divorces, and to hear and determine all civil actions brought by appeal from the county courts, or the court of probate, and to correct the errors of all inferior courts. This is a circuit court, and has two ſtated ſeſſions in each county annually. The ſuperior and county courts try matters of fact by a jury, or without if the parties will agree.

There is a ſupreme court of errors, conſiſting of the deputy-governor and the twelve aſſiſtants. Their ſole buſineſs is to determine writs of error brought on judgments of the ſuperior court, where the error complained of appears on the record. They have two ſtated ſeſſions annually, viz. on the Tueſdays of the weeks preceding the ſtated ſeſſions of the general aſſembly.

The county court is a court of chancery, empowered to hear and determine caſes in equity, where the matter in demand does not exceed one hundred pounds. The ſuperior court has cognizance of all caſes where the demand exceeds that ſum. Error may be brought from the county to the ſuperior court, and from the ſuperior court to the ſupreme court of errors, on judgment in caſes of equity as well as of law.

The general aſſembly only have power to grant pardons and reprieves, to grant commiſſions of bankruptcy, or protect the perſons and eſtates of unfortunate debtors.

The common law of England, ſo far as it is applicable to this country, is conſidered as the common law of this ſtate. The reports of adjudication in the courts of king's bench, common pleas, and chancery, are read in the courts of this ſtate as authorities; yet the judges do not conſider them as concluſively binding,

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ing, unleſs founded on ſolid reaſons which will apply in this ſtate, or ſanctioned by concurrent adjudications of their own courts.

The feudal ſyſtem of deſcents was never adopted in this ſtate. All the real eſtate of inteſtates is divided equally among the children, males and females, except that the eldeſt ſon has a double portion. And all eſtates given in tail muſt be given to ſome perſon then in being, or to their immediate iſſue, and ſhall become fee-ſimple eſtates to the iſſue of the firſt donee in tail. The widow of an inteſtate is entitled to a third part of the perſonal eſtate for ever, and to her dower, or third part of the houſes and lands belonging to the inteſtate at the time of his death, during her life.

15 Practice of law.

The practice of law in this ſtate has more ſimplicity, but leſs preciſion, than in England. Aſſiſtants and judges are empowered to iſſue writs through the ſtate, and juſtices through their reſpective counties. In theſe writs, the ſubſtance of the complaints or the declarations muſt be contained; and if neither of the parties ſhow good reaſon for delay, the cauſes are heard and determined the ſame term to which the writs are returnable. Few of the fictions of law, ſo common in the Engliſh practice, are known in this ſtate. The plaintiff always has his election to attach or ſummon the defendant. Attorneys are admitted and qualified by the county courts. Previous to their admiſſion to the bar, they muſt ſtudy two years with a practiſing attorney in the ſtate, if they have had a college education, and three years if they have not; their morals muſt be good, and their characters unblemiſhed; and they muſt ſuſtain an examination by the attorneys of the court of the county where they are admitted, and be by them recommended to the court. When admitted to the county court, they can practiſe, without other qualifications, in any court in the ſtate. There are upon an average about thirteen attorneys to each county, one hundred and four in the ſtate; a very great proportion for the real exigencies of the people. Yet from the litigious ſpirit of the citizens, the moſt of them find employment and ſupport. There is no attorney general, but there is one attorney to the ſtate in each county.

16 Hiſtory.

The preſent territory of Connecticut, at the time of the firſt arrival of the Engliſh, was poſſeſſed by the Pequot, the Mohegan, Podunk, and many other ſmaller tribes of Indians.

The Pequots were numerous and warlike. Their country extended along the ſea-coaſt from Paukatuk to Connecticut river. About the year 1630, this powerful tribe extended their conqueſts over a conſiderable part of Connecticut, over all Long Iſland, and part of Narraganſett. Saſſacus, who was the grand monarch of the whole country, was king of this nation. The ſeat of his dominions was at New-London; the ancient Indian name of which was Pequot.

The Mohegans were a numerous tribe, and their territory extenſive. Their ancient claim, which was ſurveyed and ſettled by commiſſioners from Queen Anne in 1705, comprehended all New London county, except a narrow ſtrip of about eight miles wide, on the ſea-coaſt, almoſt the whole of the county of Windham, and a part of the counties of Tolland and Hartford. Uncas, diſtinguiſhed for his friendſhip to the Engliſh, was the ſachem of this tribe.

The Podunks inhabited Eaſt Hartford, and the circumjacent country. The firſt ſachem of this tribe, of whom the Engliſh had any knowledge was Tatanimoo. He was able to bring into the field more than 200 fighting men.

The firſt grant of Connecticut was made by the Plymouth council to the earl of Warwick, in 1630, and confirmed by his majeſty in council the ſame year. This grant comprehended all that part of New England which lies weſt from Narraganſett river, 120 miles on the ſea-coaſt, from thence, in latitude and breadth aforeſaid, to the South ſea. The year following, the earl aſſigned this grant to Lord Say and Seal, Lord Brook, and nine others.

No Engliſh ſettlements were attempted in Connecticut until the year 1633, when a number of Indian traders, having purchaſed of Zequaſſon and Natawanute, two principal ſachems, a tract of land at the mouth of Little river in Windſor, built a houſe and fortified it, and ever after maintained their right of ſoil upon the river.

The ſame year, a little before the arrival of the Engliſh, a company of Dutch traders came to Hartford, and built a houſe which they called the *Hirſe of Good Hope*, and erected a ſmall fort, in which they planted two cannon. The remains of this ſettlement are ſtill viſible on the bank of Connecticut river. This was the only ſettlement of the Dutch in Connecticut in theſe ancient times. The Dutch, and after them the province of New York, for a long time claimed as far eaſt as the weſtern bank of Connecticut river. It belongs to the profeſſed hiſtorian to prove or diſprove the juſtice of this claim. Douglas ſays, "The partition line between New York and Connecticut, as eſtabliſhed December 1. 1664, runs from the mouth of Memoroncok river, a little weſt from Byram river, N. N. W. and was the ancient eaſterly limits of New York, until November 23. 1683, when the line was run nearly the ſame as it is now ſettled." If Douglas is right, the New York claim could not have been well founded.

In 1634, Lord Say and Seal, &c. ſent over a ſmall number of men, who built a fort at Saybrook, and held a treaty with the Pequot Indians, who in a formal manner gave to the Engliſh their right to Connecticut river and the adjacent country.

In 1635, the Plymouth council granted to the duke of Hamilton, all lands between Narraganſett and Connecticut rivers, and back into the country as far as Maſſachuſets ſouth line. This covered a part of the earl of Warwick's patent, and occaſioned ſome diſputes in the colony. There were ſeveral attempts to revive the Hamilton claim, but were never proſecuted.

In October of this year, about ſixty perſons from Newton, Dorcheſter, and Watertown, in Maſſachuſets, came and ſettled at Hartford, Wetherſfield, and Windſor, in Connecticut; and the June following the famous Mr Hooker and his company came and ſettled at Hartford, and was a friend and father to the colony to the day of his death.

The firſt court held in Connecticut was at Hartford, April 26. 1636.

The year 1637 was diſtinguiſhed by the war with the Pequots. This warlike nation had, for ſome time, been troubleſome neighbours. They ſolicited the Nar-

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raganfetts to join them in extirpating the Englifh. They had furprifed and killed feveral of the Englifh upon Connecticut river. Thefe threatening appearances and actual hoftilities induced the three colonies of Maffachufets, Plymouth, and Connecticut, to combine their forces, to carry the war into their country, and to attempt the entire deftruction of the whole tribe. Myantonomo, the Narraganfett fachem, and Uncas, fachem of the Mohegans, fent to the Englifh and offered their fervice to join with them againft the Pequots. Forces were accordingly raifed in all the colonies; but thofe of Connecticut, on account of their vicinity to the enemy, were firft in action. Captain Mafon, with 80 Englifh and 100 Indians from Connecticut river, proceeded by water to the Narraganfetts country, where 200 of that tribe joined him. On the 24th of May, they began their march for Saffacus fort on Pequot, now Thames river. They afterwards determined firft to affault Myftic fort, which was fituated between them and Pequot river. On the morning of the 26th of May the attack was made. The Indians, after a midnight revel, were buried in a deep fleep. At the moment of their approach, the centinel happened to be gone into a wigwam to light his pipe. The barking of a dog gave the alarm. The Indians awoke, feized their arrows and began their hideous yell. They were joined in their tremendous noife by the Indians in the Englifh army, who were in the rear and afraid to approach. The battle was warm and bloody, and the victory complete. The fort was taken—about 70 wigwams burnt—50 or 60 of the Indians were killed—many were wounded and taken, and the reft efcaped. Saffacus and his warriors at Pequot, ftruck with terror at the news of this defeat, demolifhed their principal fort, burnt their wigwams, and fled to the weftward. Capt. Stoughton, with 160 men from Maffachufets, had by this time arrived at Saybrook. He with his forces joined Captain Mafon and purfued the Indians, and overtook and furrounded them in a great fwamp near Fairfield. A fachem and 99 women and children came out and delivered themfelves up to their purfuers. Terms of peace were offered to the reft: but after a fhort parley they determined, that as they had lived they would die together. There were about 80 who made this refolution. Part of thefe efcaped by means of the darknefs of the night. The reft were either killed or taken. In this action the Indians had guns, which is the firft account of their having ufed them. Saffacus fled to the Mohawks, by whom it is reported he was murdered; but it is more probable that he and his company incorporated with them. Many of the Indian captives were unjuftifiably fent to Bermudas and fold for flaves. The Pequot tribe was wholly extinguifhed. This fuccefsful expedition ftruck the Indians that remained with fuch terror, as reftrained them from open hoftilities for near forty years after.

The Englifh thus obtained the country eaft of the Dutch fettlements, by right of conqueft. The purfuit of the Indians led to an acquaintance with the lands on the fea-coaft from Saybrook to Fairfield. It was reported to be a very fine country. This favourable report induced Meffrs Eaton and Hopkins, two very refpectable London merchants, and Mr Davenport, a man of diftinguifhed piety and abilities, with their company, who arrived this year (1637) from London, to think of this part of the country as the place of their fettlement. Their friends in Maffachufets, forry to part with fo valuable a company, diffuaded them from their purpofe. Influenced, however, by the promifing profpects which the country afforded, and flattering themfelves that they fhould be out of the jurifdiction of a general governor, with which the country was from time to time threatened, they determined to proceed. Accordingly, in March 1638, with the confent of their friends on Connecticut river, they fettled at New Haven, and laid the foundation of a flourifhing colony, of which Quinnipiak, now New Haven, was the chief town. The firft public worfhip, in this new plantation, was attended on Lord's day, April 18. 1638, under a large fpreading oak. The Rev. Mr Davenport preached from Mat. iii. 1. on the temptations of the wildernefs. Both colonies, by voluntary compact, formed themfelves into diftinct commonwealths, and remained fo until their union in 1665.

In 1639, the three towns on Connecticut river, already mentioned, finding themfelves without the limits of any jurifdiction, formed themfelves into a body politic, and agreed upon articles of civil government. Thefe articles were the foundation of Connecticut charter, which was granted in 1662. The fubftance of the articles, fo far as they refpect the holding of affemblies, the time and manner of electing magiftrates and other civil officers (except that in the old confederation no perfon was to be chofen governor more than once in two years), and the extent of legiflative powers, was transferred into, and eftablifhed in faid charter.

The firft church was gathered in New Haven this year, and confifted of feven members. Thefe were chofen by the fettlers after Mr Davenport had preached from the words of Solomon, 'Wifdom hath builded her houfe, fhe hath hewed out her feven pillars.' Thefe men were indeed the pillars of the church, to whom the reft were added as they became qualified. They were alfo the court to try all civil actions.

The firft fettlers in New Haven had all things common; all purchafes were made in the name and for the ufe of the whole plantation; and the lands were apportioned out to each family according to their number and original ftock.

At their firft election, in October 1639, Mr Theophilus Eaton was chofen governor for the firft year. Their elections, by agreement, were to be annual; and the word of God their only rule in conducting the affairs of government in the plantation.

In 1643, the articles of confederation between the four New England colonies, mentioned under the article New England, were unanimoufly adopted by the colonies of New Haven and Connecticut.

The Englifh fettlement on Delaware, which was under the jurifdiction of New Haven, was furprifed by the Swedes, and the people put in irons, under a falfe pretence that they were entering into a confpiracy with the Indians to extirpate the Swedes.

The general court of New Haven, this year, eftablifhed it as a fundamental article not to be difputed, That none be admitted as free burgeffes but church members, and that none but fuch fhould vote at elections.

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tions. They alſo ordained, That each town chooſe from among themſelves judges (church members) to be a court, to have cognizance of all civil actions not exceeding twenty pounds; and of criminal cauſes, where the puniſhment was ſitting in the ſtocks, whipping, and fining not exceeding five pounds. There was liberty of appeal from this to the court of magiſtrates. The court of magiſtrates conſiſted of all the magiſtrates throughout the colony, who were to meet twice a-year at New Haven, for the trial of all capital cauſes. Six made a quorum. The general court was to conſiſt of the governor, deputy-governor, magiſtrates, and two repreſentatives from each town. The annual election of officers of government was at this time eſtabliſhed, and has ever ſince continued.

The unſettled ſtate of the colony had hitherto prevented their eſtabliſhing a code of laws. To ſupply this defect, the general court ordered, 'That the judicial laws of God, as they were delivered to Moſes, and as they are a fence to the moral, being neither typical nor ceremonial, nor having any reference to Canaan, ſhall be accounted of moral equity, and generally bind all offenders, and be a rule to all the courts in this juriſdiction in their proceedings againſt offenders, until they be branched out into particulars hereafter.'

About this time a war broke out between the Mohegan and Narraganſett Indians. A perſonal quarrel between Myantonomo ſachem of the Narraganſetts, and Uncas ſachem of the Mohegans, was the foundation of the war. Myantonomo raiſed an army of 900 warriors, and marched towards the Mohegan country. Uncas by his ſpies received timely notice of their approach. His ſeat of reſidence was in ſome part of Norwich. He quickly collected 600 of his braveſt warriors, and told them, 'The Narraganſetts muſt not come into our town; we muſt meet them.' They accordingly marched about three miles to a large plain, where the two armies met, and halted within bow-ſhot of each other. A parley was propoſed by Uncas, and agreed to by Myantonomo. The ſachems met, and Uncas addreſſed his enemy as follows. 'You have a great many brave men: ſo have I. You and I have quarrelled; but theſe warriors, what have they done? Shall they die to avenge a private quarrel between us? No. Come like a brave man, as you pretend to be, and let us fight. If you kill me, my men ſhall be your's; if I kill you, your men ſhall be mine.' Myantonomo replied: 'My men came to fight, and they ſhall fight.' Uncas, like an experienced warrior, aware of the reſult of the conference from the ſuperior force of his enemy, had previouſly ſignified to his men, that if Myantonomo refuſed to fight him in ſingle combat, he would immediately fall, which was to be the ſignal for them to begin the attack. As ſoon therefore as Myantonomo had finiſhed his laconic ſpeech, Uncas dropped: his men inſtantly obeyed the ſignal, and poured in a ſhower of arrows upon the unſuſpecting Narraganſetts, and ruſhing on with their horrid yells and ſavage fierceneſs, put them to flight. Many were killed on the ſpot, the reſt were cloſely purſued, and ſome were precipitately driven down craggy precipices, and daſhed in pieces. At a place called, from this event, *Sachem's plain*, Uncas overtook and ſeized Myantonomo by the ſhoulder. They ſat down together; and Uncas with a hoop called in his men, and the battle ceaſed. Doubtful what to do with the royal priſoner, Uncas and his warriors, in council, determined to carry him to the governor and council at Hartford, and be adviſed by them. Thither he was accordingly conducted. The governor having adviſed with his council, told Uncas, that the Engliſh were not then at war with the Narraganſetts, and of courſe that it was not proper for them to intermeddle in the matter. Uncas was left to do with him as he pleaſed. Myantonomo was conducted back to the plain where he was taken, and put to death by Uncas himſelf. The tragic ſcene did not end with his death. Uncas, after the manner of the Indians, with his tomahawk cut off a large piece of fleſh from the ſhoulder of his ſlaughtered enemy, broiled and ate it, ſaying, with an air of ſavage triumph, 'It is the ſweeteſt meat I ever ate. It makes me have a ſtout heart.' His body was afterwards buried, and a pillar erected over it, the remains of which are viſible to this day.

The Narraganſetts were greatly enraged at the death of their prince, and reſolved to take vengeance on the Mohegans. The united colonies interpoſed to prevent a war between them, but in vain. The Narraganſetts reſolutely declared, they would continue the war until they had Uncas's head. But as Uncas had ever been a friend to the Engliſh, they joined him againſt his enemies, and were victorious. Such, however, was the enmity of the Narraganſetts to the Engliſh, that they afterwards ſent ſome of their men to Uncas, with large preſents, to induce him to join with them in a war with the colonies. Uncas replied, "Go tell your king, that I will go to Norwich, and adviſe with Major John Maſon and Mr Fitch; if they tell me to join him and fight againſt the Engliſh, I will join him." In the war that happened ſoon after, Uncas aſſiſted the Engliſh, and the Narraganſetts were ſubdued, and never after were formidable.

In conſideration of the ſucceſs and increaſe of the New England colonies, and that they had been of no charge to the nation, and in proſpect of their being in future very ſerviceable to it, the Engliſh parliament, March 10. 1643, granted them an exemption from all cuſtoms, ſubſidies, and other duties, until further order.

In 1644, the Connecticut adventurers purchaſed of Mr Fenwick, agent for Lord Say and Seal, and Lord Brook, their right to the colony of Connecticut, for 1600l.

The hiſtory of Connecticut is marked with traces of the ſame ſpirit which has been mentioned as characteriſtic of the Maſſachuſſets, in different ſtages of their hiſtory. Indeed, as Maſſachuſets was the ſtock whence Connecticut proceeded, this is to be expected.

The colonies of Connecticut and New Haven, from their firſt ſettlement, increaſed rapidly: tracts of land were purchaſed of the Indians, and new towns ſettled from Stamford to Stonington, and far back into the country, when, in 1661, Major John Maſon, as agent for the colony, bought of the natives all lands which had not before been purchaſed by particular towns, and made a public ſurrender of them to the colony, in the preſence of the general aſſembly. Having done theſe things, the colonies petitioned King Charles II. for

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for a charter, and their petition was granted. His majesty, on the 23d of April 1662, issued his letters patent under the great seal, ordaining that the colony of Connecticut should for ever hereafter be one body corporate and politic, in fact and in name, confirming to them their ancient grant and purchase, and fixing their boundaries as follows, viz. "All that part of his Majesty's dominions in New England, in America, bounded east by Narraganset river, commonly called *Narraganset bay*, where the river falleth into the sea; and on the north by the line of Massachusets plantation, and on the south by the sea, and in longitude as the line of the Massachusets colony, running from east to west, that is to say, from the said Narraganset bay on the east, to the South sea on the west part, with the islands thereunto belonging." This charter has ever since remained the basis of the government of Connecticut.

Such was the ignorance of the Europeans respecting the geography of America, when they first assumed the right of giving away lands which the God of nature had long before given to the Indians, that their patents extended they knew not where; many of them were of doubtful construction, and very often covered each other in part, and have produced innumerable disputes and mischiefs in the colonies, some of which are not settled to this day. Connecticut construed her charter literally, and passing over New York, which was then in possession of the subjects of a Christian prince, claimed, in latitude and breadth mentioned therein, to the South sea. Accordingly purchases were made of the Indians, on the Delaware river, west of the western bounds of New York, and within the supposed limits of Connecticut charter, and settlements were made thereon by people from, and under the jurisdiction of, Connecticut. The charter of Pennsylvania, granted to William Penn, in 1681, covered these settlements. This laid the foundation for a dispute, which for a long time was maintained with warmth on both sides. The matter was at last submitted to gentlemen chosen for the purpose, who decided the dispute in favour of Pennsylvania. Many, however, still assert the justice of the Connecticut claim. The state of Connecticut has lately ceded to Congress all their lands west of Pennsylvania, except a reserve of 20 miles square. This cession Congress have accepted, and thereby indubitably established the right of Connecticut to the reserve.

The colony of New Haven, though unconnected with the colony of Connecticut, was comprehended within the limits of their charter, and, as they concluded, within their jurisdiction. But New Haven remonstrated against their claim, and refused to unite with them until they should hear from England. It was not until the year 1665, when it was believed that the king's commissioners had a design upon the New England charters, that these two colonies formed a union, which has ever since amicably subsisted between them.

In 1672, the laws of the colony were revised, and the general court ordered them to be printed; and also, that "every family should buy one of the law books; such as pay in silver, to have a book for 12d. such as pay in wheat, to pay a peck and a half a book: and such as pay in pease, to pay 2s. a book, the pease at 3s. the bushel." Perhaps it is owing to this early and universal spread of law books, that the people of Connecticut are to this day so fond of the law. In 1750, the laws of Connecticut were again revised and published in a small folio volume of 258 pages. Dr Douglas observes, that they were the most natural, equitable, plain, and concise code of laws for plantations hitherto extant. There has been a revision of them since the peace, in which they were greatly and very judiciously simplified.

Connecticut.

The years 1675 and 1676 were distinguished by the wars with Philip and his Indians, and with the Narragansetts, by which the colony was thrown into great distress and confusion. The inroads of the enraged savages were marked with cruel murders, and with fire and devastation.

In 1684, the charter of Massachusets bay and Plymouth were taken away, in consequence of Quo warrantos which had been issued against them. The charter of Connecticut would have shared the same fate had it not been for ——— Wadsworth, Esq; who, having very artfully procured it when it was on the point of being delivered up, buried it under an oak tree in Hartford, where it remained until all danger was over, and then was dug up and reassumed.

Connecticut has ever made rapid advances in population. There have been more emigrations from this than from any of the other states, and yet it is at present full of inhabitants. This increase, under the divine benediction, may be ascribed to several causes. The bulk of the inhabitants are industrious, sagacious husbandmen. Their farms furnish them with all the necessaries, most of the conveniences, and but few of the luxuries, of life. They of course are generally temperate, and, if they choose, can subsist with as much independence as is consistent with happiness. The subsistence of the farmer is substantial, and does not depend on incidental circumstances, like that of most other professions. There is no necessity of serving an apprenticeship to the business, nor of a large stock of money to commence it to advantage. Farmers, who deal much in barter, have less need of money than any other class of people. The ease with which a comfortable subsistence is obtained, induces the husbandman to marry young. The cultivation of his farm makes him strong and healthful. He toils cheerfully through the day—eats the fruit of his own labour with a gladsome heart—at night devoutly thanks his bounteous God for his daily blessings—retires to rest, and his sleep is sweet. Such circumstances as these have greatly contributed to the amazing increase of inhabitants in this state.

Besides, the people live under a free government, and have no fear of a tyrant. There are no overgrown estates, with rich and ambitious landlords, to have an undue and pernicious influence in the election of civil officers. Property is equally enough divided, and must continue to be so as long as estates descend as they now do. No person is prohibited from voting, or from being elected into office, on account of his poverty. He who has the most merit, not he who has the most money, is generally chosen into public office. As instances of this, it is to be observed, that many of the citizens of Connecticut, from the humble walks of life, have arisen to the first offices in the state, and filled them

with

with dignity and reputation. That base business of electioneering, which is so directly calculated to introduce wicked and designing men into office, is yet but little known in Connecticut. A man who wishes to be chosen into office, acts wisely for that end, when he keeps his desires to himself.

A thirst for learning prevails among all ranks of people in the state. More of the young men in Connecticut, in proportion to their numbers, receive a public education, than any of the states. Dr Franklin and other literary characters have honoured this state by saying, that it is the *Athens of America*.

The revolution, which so essentially affected the governments of most of the colonies, produced no very perceptible alteration in the government of Connecticut. While under the jurisdiction of Great Britain, they elected their own governors, and all subordinate civil officers, and made their own laws in the same manner and with as little controul as they now do. Connecticut has ever been a republic, and perhaps as perfect and as happy a republic as has ever existed. While other states, more monarchical in their government and manners, have been under a necessity of undertaking the difficult task of altering their old, or forming new constitutions, and of changing their monarchical for republican manners, Connecticut has uninterruptedly proceeded in her old track, both as to government and manners; and by these means has avoided those convulsions which have rent other states into violent parties.

CONNECTION, or Connexion, the relation or dependence of one thing upon another.

Connection, or *Continuity*, in the drama, consists in the joining of the several scenes together.

The connection is said to be observed, when the scenes of an act succeed one another immediately, and are so joined as that the stage is never left empty.

CONNECTIVES, in *Grammar*, one of the four species under which, according to Mr Harris, all words may be included. They are of two kinds: and as they connect sentences or words, are called by the different names of *conjunctions* and *prepositions*. See Grammar.

CONNIVENT valves, in *Anatomy*, those wrinkles, cellules, and vascules, which are found in the inside of the two intestines ilium and jejunum. See Anatomy, N° 93, *et seq.*

CONNOISSEUR, a French term, of late used in English: it literally denotes a person well versed in any thing; being formed of the verb *connoitre*, "to know, understand." Hence it comes to be used in our language for a critic, or person who is a thorough judge or master in any way, particularly in matters of painting and sculpture.

CONNOR, Bernard, a learned physician, was born in the county of Kerry, in Ireland, about the year 1666. Having determined to apply himself to the study of physic, he went to France, and resided some time in the university of Montpelier. Afterwards he went to Paris; where he obtained great skill in medicine, anatomy, and chemistry. From thence he travelled to Venice, with the two sons of the high-chancellor of Poland; and then taking a tour through great part of Germany, went to Warsaw, where he was made physician to King John Sobieski. In 1695, he came to England, read a course of lectures in London and Oxford, and became member of the Royal Society and College of Physicians: afterwards, being invited to Cambridge, he read public lectures there, and made various experiments in chemistry. He has rendered himself memorable for a philosophical and medical treatise in Latin, entitled *Evangelium Medici*, i. e. "the Physician's Gospel;" tending to explain the miracles performed by Christ as natural events, upon the principles of natural philosophy. He wrote also a history of Poland; and died in 1698, aged 32.

Connor, a city of Ireland, in the county of Antrim, and province of Ulster. W. Long. 6. 30. N. Lat. 54. 50.

CONOCARPUS, button-wood. See Botany *Index*.

CONOID, in *Geometry*, a solid body, generated by the revolution of a conic section about its axis. See Conic *Sections*.

CONOIDES, in *Anatomy*, a gland found in the third ventricle of the brain, called *pinealis*, from its resemblance to a pine apple. See Anatomy *Index*.

CONON, the renowned Athenian general and admiral, flourished 394 years before Christ. See Attica, N° 162, 163. After his defeat by Lysander, he fled to Evagoras king of Cyprus: after which he put himself under the protection of Artaxerxes king of Persia; with whose army he delivered Athens from the oppression of strangers, and rebuilt its walls. In the 360th year of Rome, he beat the Lacedemonians in a sea-fight near Cnidus upon the coast of Asia, deprived them of the sovereign rule they had on sea ever since the taking of Athens, and had some other considerable advantage over them: but falling into the hands of Teribazus a Persian, who envied his glory, he was put to death.

CONOPS, in *Zoology*: a genus of insects belonging to the order diptera. See Entomology *Index*.

CONOVIUM, in *Ancient Geography*, a town of the Ordovices, in Britain. From its ruins arose, at the distance of four miles, *Aberconwey*, the mouth of the Conwey, in Caernarvonshire; and on the spot where *Conovium* stood is an hamlet, called *Caerhean*, the old town (Camden).

CONQUEST, in civil jurisprudence, is the acquisition of property in common by a number of persons.

In some countries they confound acquisition with conquest; but, according to the most general acceptation, acquisition is the gaining of unappropriated goods before the establishment of a community: whereas by the term *conquest*, is ordinarily intended whatever is acquired by a number of persons in community; or by some one for all the others. As it is more especially in the union of persons by marriage that a community of property takes place; so it is in reference to them that we frequently use the word *conquest*. There are nevertheless conquests also among other persons who are in a tacit community or society; such as obtain by particular local customs. According to this sense of the word, it has been contended by several, that William I. claimed this kingdom; that is, not by right of arms, but by right of conquest or acquest; under promise of succession made by Edward the Confessor, and a contract entered into by Harold to support his pretensions to that succession; and by old writers, *conquestus*, *acquisitio*, and *perquisitio*, are frequently used as synonymous terms.

CONQUEST, in the law of nations, is the acquisition of sovereignty by force of arms, by some foreign prince; who reduces the vanquished under his empire. The right of conquest is derived from the laws of war; and when a people is subjected, the conduct of the conqueror is regulated by four kinds of law. First, the law of nature, which dictates whatever tends to self-preservation; secondly, our reason, which teaches us to use others as we would be treated ourselves; thirdly, the laws of political society, to which nature has not assigned any precise boundary; lastly, the law which is derived from the particular circumstances attending the conquest. Thus, a state conquered by another will be treated in one of the four methods following: Either the conqueror will continue it under its own laws, and will only claim the exercise of civil and ecclesiastical sovereignty; or he will impose a new form of government; or he will destroy the frame of their society, and incorporate the inhabitants with others; or he will exterminate them.

CONRAD II. elected emperor of Germany in 1004. He was obliged to take the field against most of the German dukes who had revolted from him; and he put Ernest duke of Suabia under the ban of the empire. This being one of the earliest instances of such a proscription, the formula is inserted here for its singularity. "We declare thy wife a widow, thy children orphans; and we send thee, in the name of the devil, to the four corners of the world." It was in the reign of this prince that the German fiefs became hereditary. He died in 1039.

CONRAD III. emperor of Germany in 1338. The duke of Bavaria opposed his election, and being put under the ban of the empire, and deprived of his duchy, he could not survive his disgrace. The margrave of Austria was ordered by the emperor to take possession of Bavaria; but Welft, uncle to the deceased duke, attacked him, and was defeated near the castle of Winsburgh; the battle fought upon this occasion is famous in history, as having given rise to the party names of *Guelphs* and *Gibbelines*, afterwards assumed in Italy. The parole of the day with the Bavarians was *Welfti*, from the name of their general; that of the Imperialists *Werklingen* from a small village where Frederic duke of Suabia, their commander, had been nursed: by degrees these names served to distinguish the two parties; and the Italians, who could not accustom themselves to such rough words, formed from them their Guelphs and Gibbelines. He died in 1152.

CONRAD of Lichterau, or Abbas Uspergensis, was author of an Universal Chronology from the creation to 1229, continued by an anonymous writer to Cha. V. He collected a fine library, and died about the year 1240.

CONRADIN, or CONRAD junior, son of Conrad IV. was acknowledged emperor by the Gibbelines, who received him in triumph at Rome: but Pope Alexander IV. had published a crusade against this orphan; and Urban VII. his successor, gave the empire to Charles of Anjou, brother to Louis IX. king of France; and the unfortunate youth, though powerfully supported even by the Turks, lost a battle, in which he was taken prisoner, and was beheaded, by order of his base opponent, publicly at Naples in 1229, in the 18th year of his age. In him ended the race of the dukes of Suabia, which had produced several kings and emperors.

CONSANGUINITY, or KINDRED, is defined by the writers on these subjects to be, *vinculum personarum ab eodem stipite descendentium*; "the connection or relation of persons descended from the same stock or common ancestor." This consanguinity is either lineal or collateral.

Lineal consanguinity is that which subsists between persons of whom one is descended in a direct line from the other; as between John Stiles (the *propositus* in the table of consanguinity) and his father, grandfather, great grandfather, and so upwards in the direct ascending line; or between John Stiles and his son, grandson, great grandson, and so downwards in the direct descending line. Every generation, in this direct lineal consanguinity, constitutes a different degree, reckoning either upwards or downwards: the father of John Stiles is related to him in the first degree, and so likewise is his son; his grandsire and grandson, in the second; his great grandsire and great-grandson in the third. This is the only natural way of reckoning the degrees in the direct line; and therefore universally obtains, as well in the civil and canon, as in the common law.

The doctrine of lineal consanguinity is sufficiently plain and obvious; but it is, at the first view, astonishing to consider the number of lineal ancestors which every man has, within no very great number of degrees: and so many different bloods is a man said to contain in his veins, as he hath lineal ancestors. Of these he hath two in the first ascending degree; his own parents: he hath four in the second; the parents of his father, and the parents of his mother: he hath eight in the third, the parents of his two grandfathers, and of his two grandmothers; and by the same rule of progression, he hath 128 in the seventh; 1024 in the tenth; and at the 20th degree, or the distance of 20 generations, every man hath above a million of ancestors, as common arithmetic will demonstrate (A). This lineal consanguinity, we may observe, falls strictly within the definition of *vinculum personarum ab eodem stipite descendentium*; since lineal relations are such as descend one from the other, and both of course from the same common ancestor.

Collateral kindred answers to the same description: collateral

(A) This will seem surprising to those who are unacquainted with the increasing power of progressive numbers; but is palpably evident from the following table of a geometrical progression, in which the first term is 2, and the denominator also 2: or, to speak more intelligibly, it is evident, for that each of us has two ancestors

Consanguinity.

collateral relations agreeing with the lineal in this, that they descend from the same stock or ancestor; but differing in this, that they do not descend the one from the other. Collateral kinsmen, then, are such as lineally spring from one and the same ancestor, who is the *stirps*, or "root," the *stipes*, "trunk," or common stock, from whence these relations are branched out. As if John Stiles hath two sons, who have each a numerous issue: both these issues are lineally descended from John Stiles as their common ancestor; and they are collateral kinsmen to each other, because they are all descended from this common ancestor, and all have a portion of his blood in their veins, which denominates them *consanguineous*.

We must be careful to remember, that the very being of collateral consanguinity consists in this descent from one and the same common ancestor. Thus Titius and his brother are related; why? because both are derived from one father: Titius and his first cousin are related; why? because both descend from the same grandfather; and his second cousin's claim to consanguinity is this, that they are both derived from one and the same great-grandfather. In short, as many ancestors as a man has, so many common stocks he has from which collateral kinsmen may be derived. And as we are taught by holy writ, that there is one couple of common ancestors belonging to us all, from whom the whole race of mankind is descended, the obvious and undeniable consequence is, that all men are in some degree related to one another. For, indeed, if we only suppose each couple of our ancestors to have left, one with another, two children; and each of those children to have left, on an average, two more (and without such a supposition the human species must be daily diminishing); we shall find that all of us have now subsisting near 270 millions of kindred in the 15th degree, at the same distance from the several common ancestors as we ourselves are; besides those that are one or two degrees nearer to or farther from the common stock, who may amount to as many more (B). And if this calculation should appear incompatible with the number of inhabitants on the earth; it is because, by intermarriages among the several descendants from the same ancestor, a hundred or a thousand modes of consanguinity may be consolidated in one person; or he may be related to us a hundred or a thousand different ways.

The method of computing these degrees in the canon law, which we have adopted, is as follows. We begin at the common ancestor, and reckon downwards; and in whatsoever degree the two persons, or the most remote of them, is distant from the common ancestor, that is the degree in which they are related to each other. Thus, Titius and his brother are related in the first degree; for from the father to each of them is counted only one: Titius and his nephew are related in the second degree; for the nephew is two degrees removed from the common ancestor, viz. his own grandfather, the father of Titius: or (to give a more illustrious instance from the English annals) King

cestors in the first degree, the number of whom is doubled at every remove; because each of our ancestors has also two immediate ancestors of his own.

1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	256
9	512
10	1024
11	2048
12	4096
13	8192
14	16384
15	32768
16	65536
17	131072
18	262144
19	524288
20	1048576

A shorter way of finding the number of ancestors at any given degree, is by squaring the number of ancestors at half that number of degrees. Thus 16, the number of ancestors at 4 degrees, is the square of 4, the number of ancestors at 2; 256 is the square of 16; 65536 of 256; and the number of ancestors at 40 degrees would be the square of 1,048,576, or upwards of a million of millions.

(B) This will swell more considerably than the former calculation: for here, though the first term is but 1, the denominator is 4; that is, there is *one* kinsman (a brother) in the first degree, who makes, together with the *propositus*, the two descendants from the first couple of ancestors; and in every other degree, the number of kindred must be the *quadruple* of those in the degree which immediately precedes it. For since each couple of ancestors

King Henry VII. who ſlew Richard III. in the battle of Boſworth, was related to that prince in the fifth degree. Let the *propoſitus*, therefore, in the table of conſanguinity, repreſent King Richard III. and the claſs marked E, King Henry VII. Now their common ſtock or anceſtor was King Edward III. the *abavus* in the ſame table: from him to Edmund duke of York, the *proavus*, is one degree; to Richard earl of Cambridge, the *avus*, two; to Richard duke of York, the *pater*, three; to King Richard III. the *propoſitus*, four; and from King Edward III. to John of Gaunt (A) is one degree; to John earl of Somerſet (B) two; to John duke of Somerſet (C) three; to Margaret counteſs of Richmond (D) four; to King Henry VII. (E) five. Which laſt-mentioned prince, being the fartheſt removed from the common ſtock, gives the denomination to the degree of kindred in the canon and municipal law. Though according to the computation of the civilians (who count upwards from either of the perſons related, to the common ſtock, and then downwards again to the other; reckoning a degree for each perſon both aſcending and deſcending) theſe two princes were related in the ninth degree: for from King Richard III. to Richard duke of York is one degree; to Richard earl of Cambridge two; to Edmund duke of York three; to King Edward III. the common anceſtor, four; to John of Gaunt five; to John earl of Somerſet ſix; to John duke of Somerſet ſeven; to Margaret counteſs of Richmond eight; to King Henry VII. nine. See the Table of Conſanguinity (Plate CLXIV.), wherein all the degrees of collateral kindred to the *propoſitus* are computed, as far as the tenth of the civilians and the ſeventh of the canoniſts incluſive; the former being diſtinguiſhed by the numeral letters, the latter by the common ciphers.

CONSANGUINITY and *Affinity*, degrees of, forbidden in marriage. See MARRIAGE, and LAW *Index*.

CONSANGUINITY and *Affinity*, an objection againſt a judge or a witneſs. See LAW *Index*.

CONSCIENCE, a ſecret teſtimony of the ſoul, whereby it gives its approbation to things that are naturally good, and condemns thoſe that are evil. See MORAL PHILOSOPHY.

A man of integrity will never liſten to any reaſon, or give way to any meaſure, or be miſled by any inducement, againſt conſcience.—The inhabitants of a great town offered Marſhal de Turenne 100,000 crowns, upon condition he would take another road, and not march his troops their way. He anſwered them, "As your town is not in the road I intend to march, I cannot accept the money you offer me."—The earl of Derby, in the reign of Edward III. making a deſcent

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anceſtors has two deſcendants who increaſe in a duplicate ratio, it will follow, that the ratio in which all the deſcendants increaſe downwards, muſt be double to that in which the anceſtors increaſe upwards: but we have ſeen, that the anceſtors increaſe in a duplicate ratio: therefore the deſcendants muſt increaſe in a double duplicate; that is, in a quadruple ratio.

Collateral Degrees.	*Number of Kindred.*
1	1
2	4
3	16
4	64
5	256
6	1024
7	4096
8	16384
9	65536
10	262144
11	1048576
12	4194304
13	16777216
14	67108864
15	268435456
16	1073741824
17	4294967296
18	17179869184
19	68719476736
20	274877906944

This calculation may alſo be formed by a more compendious proceſs, viz. by ſquaring the couples, or half the number of anceſtors, at any given degree; which will furniſh us with the number of kindred we have in the ſame degree, at equal diſtance with ourſelves from the common ſtock, beſides thoſe at unequal diſtances. Thus in the tenth lineal degree, the number of anceſtors is 1024; its half, or the couples, amount to 512; the number of kindred in the tenth collateral degree amounts therefore to 262144, or the ſquare of 512. And if we will be at the trouble to recollect the ſtate of the ſeveral families within our own knowledge, and obſerve how far they agree with this account; that is, whether, on an average, every man has not one brother or ſiſter, four firſt-couſins, ſixteen ſecond-couſins, and ſo on, we ſhall find, that the preſent calculation is very far from being overcharged.

Conscience. scent in Guienne, carried by storm the town of Bergerac, and gave it up to be plundered. A Welch knight happened by chance to light upon the receiver's office. He found there such a quantity of money that he thought himself obliged to acquaint his general with it, imagining that so great a booty naturally belonged to him. But he was agreeably surprised when the earl told him, with a pleasant countenance, that he wished him joy of his good fortune; and that he did not make the keeping of his word to depend upon the great or little value of the thing he had promised.—In the siege of Falisci by Camillus general of the Romans, the schoolmaster of the town, who had the children of the senators under his care, led them abroad under the pretext of recreation, and carried them to the Roman camp, saying to Camillus, that by this artifice he had delivered Falisci into his hands. Camillus, abhorring this treachery, observed, "That there were laws for war as well as for peace; and that the Romans were taught to make war with integrity not less than with courage." He ordered the schoolmaster to be stripped, his hands to be bound behind his back, and to be delivered to the boys to be lashed back into the town. The Falerians, formerly obstinate in resistance, struck with an act of justice so illustrious, delivered themselves up to the Romans; convinced that they would be far better to have the Romans for their allies than their enemies.

It is a saying, That no man ever offended his own conscience, but first or last it was revenged upon him. The power of conscience indeed has been remarked in all ages, and the examples of it upon record are innumerable. The following is related by Mr Fordyce, in his *Dialogues on Education**, as a real occurrence which happened in a neighbouring state not many years ago. A jeweller, a man of good character and considerable wealth, having occasion in the way of his business to travel at some distance from the place of his abode, took along with him a servant, in order to take care of his portmanteau. He had with him some of his best jewels, and a large sum of money, to which his servant was likewise privy. The master having occasion to dismount on the road, the servant watching his opportunity, took a pistol from his master's saddle and shot him dead on the spot; then rifled him of his jewels and money, and hanging a large stone to his neck, he threw him into the nearest canal. With this booty he made off to a distant part of the country, where he had reason to believe that neither he nor his master were known. There he began to trade in a very low way at first, that his obscurity might screen him from observation, and in the course of a good many years seemed to rise, by the natural progress of business, into wealth and consideration; so that his good fortune appeared at once the effect and reward of industry and virtue. Of these he counterfeited the appearance so well, that he grew into great credit, married into a good family, and by laying out his hidden stores discreetly, as he saw occasion, and joining to all an universal affability, he was admitted to a share of the government of the town, and rose from one post to another, till at length he was chosen chief magistrate. In this office he maintained a fair character, and continued to fill it with no small applause, both as a governor and a judge; till one day as he sat on the bench with some of his brethren, a criminal was brought before him who was accused of murdering his master. The evidence came out full, the jury brought in their verdict that the prisoner was guilty, and the whole assembly waited the sentence of the president of the court (which he happened to be that day) with great suspense. Meanwhile he appeared to be in unusual disorder and agitation of mind, and his colour changed often; at length he arose from his seat, and coming down from the bench, placed himself just by the unfortunate man at the bar. "You see before you (said he, addressing himself to those who had sat on the bench with him), a striking instance of the just rewards of heaven, which this day, after 30 years concealment, presents to you a greater criminal than the man just now found guilty." Then he made an ample confession of his guilt, and of all its aggravations. "Nor can I feel (continued he) any relief from the agonies of an awakened conscience, but by requiring that justice be forthwith done against me in the most public and solemn manner." We may easily suppose the amazement of all the assembly, and especially of his fellow-judges. However, they proceeded, upon this confession, to pass sentence upon him, and he died with all the symptoms of a penitent mind.

* Vol. ii. p. 401.

Consciousness ‖ Consecration.

Courts of Conscience, are courts for recovery of small debts, constituted by act of parliament in London, Westminster, &c. and other populous and trading districts.

CONSCIOUSNESS. Metaphysicians, in lieu of the word *conscience*, which seems appropriated to theological or moral matters, ordinarily use that of *consciousness*; whereby they mean an inner sentiment of a thing, whereof one may have a clear and distinct notion. In this sense they say that we do not know our own soul, nor are assured of the existence of our own thoughts, otherwise than by self-consciousness. See Metaphysics.

CONSCRIPT, in Roman antiquity, an appellation given to the senators of Rome, who were called *conscript fathers*, on account of their names being all entered in one register.

CONSECRATION, the act of devoting any thing to the service and worship of God. The Mosaical law ordained, that all the first-born, both of man and beast, should be sanctified or consecrated to God. We find also that Joshua consecrated the Gibeonites, as Solomon and David did the Nethinims, to the service of the temple; and that the Hebrews sometimes consecrated their fields and cattle to the Lord, after which they were no longer in their power.

Among the ancient Christians, the consecration of churches was performed with a great deal of pious solemnity. In what manner it was done for the three first ages, is uncertain; the authentic accounts reaching no higher than the fourth, when, in the peaceable reign of Constantine, churches were everywhere built, and dedicated with great solemnity. Some think the consecration consisted in setting up the sign of the cross, or in placing a communion table in the church; and others, that no more was done than preaching a panegyrical sermon in commemoration of the founder, and that then they proceeded to prayers, one of which was composed on purpose for the church to be conse-

 crated,

crated. The Romanists have a great deal of pious foppery in the ceremonies of consecration; which they bestow on almost every thing, as bells, candles, books, water, oil, ashes, palms, swords, banners, pictures, crosses, agnus dei's, roses, children's clouts, &c.

In England, churches have been always consecrated with particular ceremonies, the form of which was left to the discretion of the bishop. That observed by Bishop Laud, in consecrating St Catharine Creed church, in London, gave great offence.

Consecration is particularly used for the benediction of the elements in the eucharist.

Consecration, among medalists, is the ceremony of the apotheosis of an emperor, or his translation into heaven and reception among the gods. On medals the consecration is thus represented: on one side is the emperor's head, crowned with laurel, sometimes veiled; and the inscription gives him the title of *divus:* on the reverse is a temple, a bustum, an altar, or an eagle taking its flight towards heaven, either from off the altar, or from a cippus: at other times the emperor is seen in the air, borne up by the eagle; the inscription always, *consecratio.* These are the usual symbols: yet on the reverse of that of Antoninus is the Antonine column. In the apotheosis of empresses, instead of an eagle there is a peacock. As to the honours rendered these princes after death, they were explained by the words *consecratio*, *pater*, *divus*, and *deus*. Sometimes around the temple or altar are put, *memoria felix*, or *memoriæ æternæ:* for princesses, *æternitas*, and *sideribus recepta:* on the one side of the head, *dea*, or Θεα.

CONSENT, in a general sense, denotes much the same with Assent.

Consent of Parts, in the animal economy, an agreement or sympathy, whereby when one part is immediately affected, another at a distance becomes affected in the same manner.

This mutual accord or consent is supposed to be effected by the commerce of the nerves, and their artful distribution and ramification throughout the body. The effect is so sensible as even to come under the physician's cognizance: thus, the stone in the bladder, by vellicating the fibres there, will pain and draw them so much into spasms, as to affect the coats of the bowels, in the same manner, by the intermediation of nervous threads, and make a colic there; and also extend their twitches sometimes as far as the stomach, and occasion grievous vomitings; the remedy, therefore, in such cases, is to regard the part originally affected, how remote and grievous soever may be the consequences and symptoms in other places.

The fifth conjugation of nerves branched to the parts of the eye, the ear, those of the mouth, cheeks, præcordia, and parts adjacent, &c. is supposed by naturalists to be the instrument of that particular and extraordinary consent between those parts. Hence it is, that a savoury thing seen or smelled excites the appetite, and affects the glands and parts of the mouth; that a shameful thing seen or heard affects the cheeks with blushes: on the contrary, if it pleases, it affects the præcordia, and excites the muscles of the mouth and face to laughter; if it grieve, it affects the glands of the eyes, so as to occasion tears, and the muscles of the face, putting them into an aspect of crying. Dr Willis, quoted by Mr Derham, imputes the pleasure of kissing, and its effects, to this pair of nerves; which being branched both to the lips and the genital parts, when the former are affected an irritation is occasioned in the latter. See Sympathy.

CONSENTES, the name which the Romans gave to the 12 superior gods, the *Dii majorum gentium.* The word signifies as much as *consentientes;* that is, who consented to the deliberations of Jupiter's council. They were twelve in number, whose name Ennius has briefly expressed in these lines,

Juno, Vesta, Minerva, Ceres, Diana, Venus, Mars,
Mercurius, Jovi, Neptunus, Vulcanus, Apollo.

CONSEQUENCE, in *Logic*, the conclusion or what results from reason or argument. See Conclusion.

The consequence is that other proposition in which the extremes or premises of a syllogism are joined, or separated; and is gained from what was asserted in the premises.

This word, in a more restrained sense, is used for the relation or connection between two propositions, whereof one is inferred from the other.

CONSEQUENT, something deduced or gathered from a former argumentation. But, in a more precise sense, it is used for the proposition which contains the conclusion, considered in itself, without any regard to the antecedent: in which sense the consequent may be true, though the consequence be false. See the preceding article.

CONSERVATOR, an officer ordained for the security and preservation of the privileges of some cities and communities, having a commission to judge of and determine the differences among them.

In most catholic universities there are two conservators; the conservator of royal privileges, or those granted by kings; and the conservator of apostolical privileges, or those granted by the pope. The first takes cognizance of personal and mixed causes between the regents, students, &c. and the latter of spiritual matters between ecclesiastics.

Anciently there were appointed conservators of treaties of peace between princes; which conservators became judges of the infractions made on a treaty, and were charged with procuring satisfaction to be made. These were usually the feudatories of the several powers. In lieu of conservators, princes now have recourse to other indifferent princes to guarantee their treaties.

Conservator of Scots Privileges at Campvere, is an officer belonging to the royal boroughs of Scotland, who takes care of the mercantile affairs of Scotland, agreable to the staple contract between them and the States-General.

Conservator of the Peace, in the ancient English customs, was a person who had an especial charge, by virtue of his office, to see the king's peace kept. Till the erection of justices of the peace by King Edward III. there were several persons who by common law were interested in keeping the same: some having that charge as incident to other offices; and others simply, or of itself, called *custodes*, or *conservators of the peace.* The chamberlain of Chester is still a conservator fervator in that county; and petty conftables are, by the common law, confervators, &c. in the firft fenfe, within their own jurifdiction: fo are alfo the coroner and the fheriff within their own country. The king is the principal confervator of the peace within all his dominions: the lord chancellor, lord treafurer, lord high fteward, lord marfhal, lord high conftable, all the juftices of the court of king's bench, by their office, and the mafter of the rolls, by prefcription, are general confervators of the peace through the whole kingdom, and may commit breakers of the peace, and bind them in recognifances to keep it.

Conservator *of the Truce, and Safe Conducts*, was an officer appointed in every fea-port, under the king's letters patent. His charge was to inquire of all offences committed againft the king's truce, and fafe conducts upon the main fea, out of the franchifes of the cinque-ports, as the admirals were wont to do, and fuch other things as are declared *anno* 3 Hen. V. cap. 6.

CONSERVATORIOS, are mufical fchools eftablifhed for the inftruction of children in the profeffion of mufic. There are four of thefe at Venice, defigned for the education of girls, and three at Naples, for the education of boys. It has been fuggefted that the operation of caftration was performed in the confervatorios; but the practice is abfolutely prohibited: and the young caftrati are brought from Lucia in Puglia: but before that operation is performed, their voices are tried in a confervatorio. The fcholars of the Venetian confervatorios have been chiefly celebrated for tafte and neatnefs of execution; and thofe of Naples have had the reputation of being the firft *contrapuntifts*, or compofers, in Europe.

CONSERVATORY, a term fometimes ufed for a green-houfe or ice-houfe.

CONSERVE, in *Pharmacy*, a form of medicine contrived to preferve the flowers, herbs, roots, or fruits of feveral fimples, as near as poffible, to what they are when frefh gathered. See Pharmacy.

CONSIGNMENT, in *Law*, the depofiting any fum of money, bills, papers, or commodities, in good hands; either by appointment of a court of juftice, in order to be delivered to the perfons to whom they are adjudged; or voluntarily, in order to their being remitted to the perfons they belong to, or fent to the places they are defigned for.

Consignment *of Goods*, in *Commerce*, is the delivering or making them over to another; thus, goods are faid to be configned to a factor, when they are fent to him to be fold, &c.; or when a factor fends back goods to his principal, they are faid to be configned to him.

CONSISTENCE, in *Phyfics*, that ftate of a body wherein its component particles are fo connected or entangled among themfelves, as not to feparate or recede from each other. It differs from continuity in this, that it implies a regard to motion or reft, which continuity does not, it being fufficient to denominate a thing continuous that its parts are contiguous to each other.

CONSISTENTES, in church-hiftory, a kind of penitents who were allowed to affift at prayers, but who could not be admitted to receive the facrament.

CONSISTORY (*Confiftorium*), fignifies as much as *prætorium*, a tribunal: it is commonly ufed for a council-houfe of ecclefiaftical perfons, or place of juftice in the fpiritual court; a feffion or affembly of prelates. And every archbifhop and bifhop of every diocefe hath a confiftory court held before his chancellor or commiffary in his cathedral church, or other convenient place of his diocefe, for ecclefiaftical caufes. The bifhop's chancellor is the judge of this court, fuppofed to be fkilled in the civil and canon law; and in places of the diocefe far remote from the bifhop's confiftory, the bifhop appoints a commiffary to judge in all caufes within a certain diftrict, and a regifter to enter his decrees, &c.

Consistory, at Rome, denotes the college of cardinals, or the pope's fenate and council, before whom judiciary caufes are pleaded. Du Cange derives the word from *confiftorium; i. e. locus ubi confiftitur;* ufed chiefly for a veftibule, gallery, or anti-chamber, where the courtiers wait for admiffion: and called *à confiftente multitudine.*

The confiftory is the firft court, or tribunal of Rome: it never meets but when the pope pleafes to convoke it: the pope prefides in it in perfon, mounted on a magnificent throne, and habited in his *pontificalia;* on the right are the cardinal-bifhops and priefts, and on the left the cardinal-deacons. The place where it is held, is a large hall in the apoftolical palace, where princes and ambaffadors of kings are received. The other prelates, prothonotaries, auditors of the rota, and other officers, are feated on the fteps of the throne: the courtiers fit on the ground; ambaffadors on the right, and confiftorial and fifcal advocates behind the cardinals.

Befides the public confiftory, there is alfo a private one, held in a retired chamber, called the *chamber of papegay;* the pope's throne here being only raifed two fteps high. Nobody is here admitted but the cardinals, whofe opinions are collected, and called *fentences*. Here are firft propofed and paffed all bulls for bifhopricks, abbeys, &c. Hence bifhopricks and abbeys are faid to be confiftorial benefices; in regard they muft be propofed in the confiftory, the annates be paid to the pope, and his bulls taken. Anciently they were elective; but by the concordat, which abolifhes elections, they are appointed to be collated by the pope alone, on the nomination of the prince.

Consistory was alfo the name of a court under Conftantine, where he fat in perfon, and heard caufes: the members of this court were called *comites*.

Consistory is alfo ufed among the reformed, for a council or affembly of minifters and elders, to regulate their affairs, difcipline, &c.

Consistory, or Court Chriftian, in the Englifh laws, is a council of ecclefiaftical perfons, or the place of juftice in an ecclefiaftical or fpiritual court. Every archbifhop and bifhop has a confiftory-court, held before his chancellor or commiffary, either in his cathedral, in fome chapel, aifle, or portico, belonging thereto; or in fome other convenient place of his diocefe, for ecclefiaftical caufes. The fpiritual court was anciently, in the time of the Saxons, joined with the county or hundred court; and the original of the confiftory court, as divided from thofe courts, is found in a law of the

conqueror,

conqueror, quoted by Lord Coke. From this court there lies an appeal to the archbishop of each province respectively.

CONSOLATION, one of the places in rhetoric, wherein the orator endeavours to abate and moderate the grief or concern of another.

CONSOLE, in *Architecture*, an ornament cut upon the key of an arch, which has a projecture, and on occasion serves to support little corniches, figures, busts, and vases.

CONSOLIDATION, in *Law*, the combining and uniting two benefices into one. The term is borrowed from the civil law; where it properly signifies an union of the possession, or occupation, with the property. Thus, if a man have by legacy *usum fructum fundi*, and afterwards buy the property, or fee-simple, of the heir; this is called a *consolidation*.

Consolidation, in *Medicine*, the action of uniting broken bones, or the lips of wounds, by means of *consolidating remedies*, as they are called; which cleansing with a moderate heat and force, taking corruption out of the wounds, and preserving the temperature of the parts, cause the nourishment to be fitly applied to the part affected.

Among the many instances of the consolidating power of blood and raw flesh, we have a very remarkable one in Bartholine's Medical Observations. A man being condemned to have his nose cut off by the hand of the common executioner, the friends, who were to be present, provided a new loaf of warm bread, which was cut in the middle, and the nose received in it as it fell from the face: the nose was after this nicely placed on the face again; and being sewed on, the whole in time consolidated, and left no other marks of the ignominy than the scar round the whole nose, and the traces of the stitches.

CONSONANCE, in *Music*. See Interval.

CONSONANT, a letter that cannot be sounded without some single or double vowel before or after it; as *b*, *c*, *d*, &c.

CONSORT, *Queen Consort*. See Queen.

CONSPIRACY, in *Law*, signifies an agreement between two or more, falsely to indict, or procure to be indicted, an innocent person, of felony.

CONSPIRATORS are, by statute, defined to be such as bind themselves by oath, covenant, or other alliance, to assist one another falsely and maliciously to indict persons, or falsely to maintain pleas.

Conspirators in treason, are those that plot against the king and the government.

CONSTABLE, according to some, is a Saxon word, compounded of *coning*, "king," and *staple* which signifies the "stay or support of the king." But as we borrowed the name as well as the office of *Constable* from the French, Sir William Blackstone is rather inclined to deduce it, with Sir Henry Spelman and Dr Cowel, from that language; wherein it is plainly derived from the Latin *comes stabuli*, an officer well known in the empire; so called, because, like the great constable of France, as well as the lord high constable of England, he was to regulate all matters of chivalry, tilts, tournaments, and feats of arms, which were performed on horseback.—The

Lord High Constable of England is the seventh great officer of the crown; and he, with the earl marshal of England, were formerly judges of the court of chivalry, called in King Henry IV's time *Curia Militaris*, and now the court of honour. It is the fountain of the martial law, and anciently was held in the king's hall. The power of the lord high constable was formerly so great, and of which so improper a use was made, that so early as the 13th of King Richard II. a statute passed for regulating and abridging the same, together with the power of the earl marshal of England; and by this statute, no plea could be tried by them or their courts, that could be tried by the common law of the realm. The office of constable existed before the conquest. After the conquest, the office went with inheritance, and by the tenure of the manors of Harlefield, Newman, and Whitenhurst, in Gloucestershire, by grand serjeanty in the family of the Bohuns earl of Hereford and Essex, and afterwards in the line of Stafford as heirs-general to them; but in 1521, this great office became forfeited to the king in the person of Edward Stafford duke of Buckingham, who was that year attainted for high treason; and in consideration of its extensive power, dignity, and large authority, both in time of war and peace, it has never been granted to any person, otherwise than *hac vice*, and that to attend at a coronation, or trial by combat. In France, the same office was also suppressed about a century after by an edict of Louis XIII.; though it has been exercised, in the command of the Marshals, by the first officer in the army.

Lord high constable of Scotland was an office of great antiquity and dignity. The first upon record is Hugo de Morvelle in the reign of David I. He had two grand prerogatives, viz. First, the keeping of the king's sword, which the king, at his promotion, when he swears fealty, delivers to him naked. Hence the badge of the constable is a naked sword.—Second, The absolute and unlimited command of the king's armies while in the field, in the absence of the king; but this command does not extend to castles and garrisons. He was likewise judge of all crimes committed within two leagues of the king's house, which precinct was called the *Chalmer of Peace*: though his jurisdiction came at last to be exercised only as to crimes during the time of parliament, which some extended likewise to all general conventions. This office was conferred heritably upon the noble family of Errol, by King Robert Bruce; and with them it still remains, being expressly reserved by the treaty of union.

Inferior Constables. From the great office of high constable is derived that inferior order, since called the *constables of hundreds and franchises*; these were first ordained in the 13th year of Edward I. by the statute of Winchester; which, for the conservation of the peace, and view of armour, appointed that two constables should be chosen in every hundred and franchise. These are what we now call *constabularii capitales*, or *high constables*; because continuance of time, and increase of people, &c. have occasioned others of like nature, but inferior authority, in every town, called *petty constables*, or *sub-constabularii*, first instituted about the reign of Edward III.

The former, or modern *high constables*, are appointed at the court-leets of the franchise or hundred over which they preside; or, in default of that, by the justices at their quarter-sessions; and are removeable by

Conftable.

by the fame authority that appoints them. The *petty conftables* have two offices united in them, the one ancient, and the other modern. Their ancient office is that of head-borough, tithing-man, or borfholder; which is as ancient as the time of King Alfred: their more modern office is that of conftable merely; which was appointed fo lately as the reign of Edward III. in order to affift the high-conftable. And in general the ancient head-boroughs, tithing-men, and borfholders, were made ufe of to ferve as petty conftables; though not fo generally, but that in many places they ftill continue diftinct officers from the conftables. They are all chofen by the jury at the court-leet; or if no court-leet be held, are appointed by two juftices of the peace.

The general duty of all conftables, both high and petty, as well as of the other officers, is to keep the king's peace in their feveral diftricts; and to that purpofe they are armed with very large powers of arrefting and imprifoning, of breaking open houfes, and the like: of the extent of which powers, confidering what manner of men are for the moft part put upon thefe offices, it is perhaps very well that they are generally kept in ignorance. One of their principal duties arifing from the ftatute of Winchefter, which appoints them, is to keep watch and ward in their refpective jurifdictions. Ward, guard, or *cuftodia*, is chiefly intended of the day-time, in order to apprehend rioters, and robbers on the highways; the manner of doing which is left to the difcretion of the juftices of the peace and the conftable: the hundred being, however, liable for all the robberies committed therein by day-light, for having kept negligent guard. Watch is properly applicable to the night only (being called among the Saxons *wach't* or *wactu*); and it begins when ward ends, and ends when that begins: for, by the ftatute of Winchefter, in walled towns the gates fhall be clofed from fun-fetting to fun-rifing; and watch fhall be kept in every borough and town, efpecially in the fummer feafon, to apprehend all rogues, vagabonds, and night-walkers, and make them give an account of themfelves. The conftable may appoint watchmen at his difcretion, regulated by the cuftom of the place; and thefe, being his deputies, have, for the time being, the authority of their principal.

There are alfo conftables denominated from particular places, as conftable of the Tower, of Dover caftle, of Windfor caftle, of the caftle of Caernarvon and many other of the caftles of Wales; whofe office is the fame with that of the caftellani, or governors of caftles.

Constables of London. The city of London is divided into 26 wards, and the wards into precincts, in each of which is a conftable. They are nominated by the inhabitants of each precinct on St Thomas's day, and confirmed, or otherwife, at the court of wardmote. After confirmation, they are fworn into their offices at a court of alderman, on the next Monday after Twelfth day. Such as are chofen into the office, are obliged to place the king's arms, and the arms of the city, over their doors; and if they refide in alleys, at the ends of fuch alleys toward the ftreets, to fignify that a conftable lives there, and that they may be the more eafily found when wanted.

Conftance || Conftancy.

Constables to Juftices of the Peace, in Scotland, are the proper officers for executing their orders. They have powers to fupprefs tumults, and to apprehend delinquents and thofe who can give no good account of themfelves, and carry them to the next juftice.

CONSTANCE, a ftrong town of Germany, in the circle of Suabia, with a bifhop's fee, whofe bifhop is a prince of the empire. It has a handfome bridge, and feveral fine ftructures, as well facred as profane. It carries on a great trade, and is well fortified: and though it pretends to be an imperial town, the Auftrians keep a garrifon here. It is famous for a council held here in 1514, when there were three popes; but they were all depofed, and Martin V. was elected in their room. The council caufed Jerom of Prague and John Hufs to be burnt, though the emperor Sigifmund had given them a fafe conduct; in purfuance of this maxim, "that no faith is to be kept with heretics." They likewife condemned the doctrine of Wickliff, and ordered his bones to be burned 40 years after he was dead. However, the inhabitants now are Proteftants. It is feated on a lake of the fame name. E. Long. 9. 10. N. Lat. 47. 38.

Constance, one of the moft confiderable and beautiful lakes of Switzerland, which feparates it from Suabia, except that part where the city of Conftance is feated on its fide. It is divided into three parts; the upper or largeft part is called Boden fee, the middle Bodmer fee, and the lower part Zeller fee. The firft is 37 miles long, and its greateft breadth 15 miles. It is deeper in fummer than in winter.

CONSTANCY, in a general fenfe, denotes immutability, or invariablenefs.—In ethics, or when applied to the human mind, the term implies refolution or fteadinefs, particularly under fufferings and the trials of adverfity.

It was the faying of a heathen philofopher, That there cannot be imagined upon earth a fpectacle more worthy the regard of the Creator intent on his works, than a brave man fuperior to his fufferings. Nothing indeed can be more noble or honourable than to have courage enough to execute the commands of reafon and confcience; to maintain the dignity of our nature, and the ftation affigned us; and to be proof againft poverty, pain, and death itfelf, fo far as not to do any thing that is fcandalous or finful to avoid them. To be thus, is to be great above title or fortune. This argues the foul of a heavenly extraction, and is worthy the offspring of the Deity.

Of this virtue the following example, related in Englifh hiftory, is here felected, as fuperior perhaps, all circumftances confidered, to any other upon record.

Sir William Afkew of Kelfay, in Lincolnfhire, had feveral daughters. His fecond, named *Anne*, had received a genteel education; which, with an agreeable figure and good underftanding, rendered her a very proper perfon to be at the head of a family. Her father, regardlefs of his daughter's inclination and happinefs, obliged her to marry a gentleman who had nothing to recommend him but his fortune, and who was a moft bigotted Papift. No fooner was he convinced of his wife's regard for the doctrines of the reformation from popery, than, by the inftigation of his priefts, Constancy. priests, he violently drove her from his house, though she had born him two children, and her conduct was unexceptionable. Abandoned by her husband, she came up to London, in order to procure a divorce, and to make herself known to that part of the court who either professed or were favourers of Protestantism; but as Henry VIII. with consent of parliament, had just enacted the law of the six articles, commonly called the *bloody statute*, she was cruelly betrayed by her own husband; and, upon his information, taken into custody, and examined concerning her faith. The act above mentioned denounced death against all those who should deny the doctrine of *transubstantiation*; or, that the bread and wine made use of in the sacrament was not converted after consecration into the *real* body and blood of Christ; or, maintain the necessity of receiving the sacrament in both kinds; or affirm, that it was lawful for priests to marry; that the vows of celibacy might be broken; that private masses were of no avail; and that auricular confession to a priest was not necessary to salvation. Upon these articles she was examined by the inquisitor, a priest, the lord-mayor of London, and the bishops chancellor; and to all their queries gave proper and pertinent answers; but not being such as they approved, she was sent back to prison, where she remained eleven days to ruminate alone on her alarming situation, and was denied the small consolation of a friendly visit. The king's council being at Greenwich, she was once more examined by Chancellor Wriothesley, Gardiner bishop of Winchester, Dr Cox, and Dr Robinson; but not being able to convince her of supposed errors, she was sent to the Tower. Mr Strype, from an authentic paper, gives us the following short account of her examination, which may not, perhaps, be unentertaining or useless to the reader: "Sir Martin Bowes (lord mayor) sitting with the council, as most meet for his wisdom, and seeing her stand upon life and death, I pray you, quoth he, my lords, give me leave to talk to this woman? Leave was granted. *Lord Mayor.* Thou foolish woman, sayest thou that the priest cannot make the holy body of Christ? *A. Askew.* I say so, my lord: for I have read that God made man; but that man made God I never read; nor I suppose ever shall read it. *Lord Mayor.* No! Thou foolish woman, after the words of consecration, is it not the Lord's body? *A. Askew.* No: it is but consecrated bread, or sacramental bread. *Lord Mayor.* What if a mouse eat it after consecration; what shall become of this mouse? what sayest thou, thou foolish woman? *A. Askew.* What shall become of her, say you, my lord? *Lord Mayor.* I say, that the mouse is damned. *A. Askew.* Alack, poor mouse!" Perceiving that some could not keep in their laughing, the council proceeded to the butchery and slaughter that they intended before they came there.—It was strongly suspected that Mrs Askew was favoured by some ladies of high rank; and that she carried on a religious correspondence with the queen. So that the chancellor Wriothesley, hoping that he might discover something that would afford matter of impeachment against that princess, the earl of Hertford, or his countess, who all favoured reformation, ordered her to be put to the rack: but her fortitude in suffering, and her resolution not to betray her friends, was proof against that diabolical invention. Not a groan, not a word, could be extorted from her. The chancellor, provoked with what he called her obstinacy, augmented her tortures with his own hands, and with unheard-of violence: but her courage and constancy were invincible; and these barbarians gained nothing by their cruelties but everlasting disgrace and infamy. As soon as she was taken from the rack, she fainted away; but being recovered, she was condemned to the flames. Her bones were dislocated in such a manner, that they were forced to carry her in a chair to the place of execution. While she was at the stake, letters were brought her from the lord chancellor, offering her the king's pardon if she would recant. But she refused to look at them; telling the messenger, that "she came not thither to deny her Lord and Master." The same letters were also tendered to three other persons condemned to the same fate; and who, animated by her example, refused to accept them. Whereupon the lord-mayor commanded the fire to be kindled; and with savage ignorance cried out, *Fiat justitia*, "Let justice take its course." The faggots being lighted, she commended her soul, with the utmost composure, into the hands of her Maker; and, like the great founder of the religion she professed, expired, *praying for her murderers*, July 16. 1546, about the 25th year of her age.

Constantia. CONSTANTIA, a district at the Cape of Good Hope, consisting of two farms, which produce the well-known wine so much prized in Europe, and known by the name of *Cape* or *Constantia* wine. This place is situated at the distance of a mile and a half from Alphen, in a bending formed by and nearly under the ridge of hills, which comes from Meuisen-mountain, and just where it strikes off towards Hout-bay. One of these farms is called *Little Constantia.* Here the white Constantia wine is made. The other produces the red. According to M. de la Cail's account, not more than 60 figgars of red, and 90 of the white, Constantia wine are made, each figgar being reckoned at 600 French pints, or about 150 Swedish cans; so that the whole produce amounts to 22,500 cans. As the company are used to keep one-third of this for themselves, the remainder is always bespoke by the Europeans long before it is made. At the Cape this wine is seldom seen at table, partly because it is dear, and partly because it is the produce of the country. The red Constantia wine sells for about 60 rixdollars the half awin; but the white is usually to be purchased at a more reasonable rate. The genuine Constantia wine is undeniably a very racy and delicate dessert wine, and has something peculiarly agreeable in the flavour of it. That its superiority, however, is not owing to any thing peculiar in the manner of preparing it, seems extremely probable; for then, without doubt, a great deal more of it would be made. In fact, Dr Sparmann informs us, that the genuine wine can only be produced from particular soils. The districts that lie next to these yield merely the common Cape wine, notwithstanding that they have been planted with vine stocks taken from this, as well as with some brought from the banks of the Rhine, whence it is supposed that the true Constantia sort originally comes; nay, even though all the vineyards about Constantia seem to have the same soil. We have instances at the Cape, as well as in

Constantina, Constantine.

in Europe, that good grapes ſometimes produce a bad wine; while, on the other hand, bad grapes will yield a good ſort of wine: therefore, towards making wine of a certain quality, beſides finer materials, there muſt be certain conditions and circumſtances, which, by a diligent and rational inveſtigation, might probably be explored to the great benefit of mankind.

Such as are appriſed in what quantities Conſtantia wine is conſumed in Europe, will perhaps think the above calculation of the produce too limited. This, however, Dr Sparmann aſſures us, is by no means the caſe; the overplus being the produce of avarice, which, goaded on by the deſire of gain, will always hit upon ſome method of ſatisfying the demands of luxury and ſenſuality. The votaries of theſe, accuſtomed to be put off with empty ſounds, do not ſeldom drink with the higheſt reliſh an imaginary Conſtantia, with which, however, this liquor has nothing in common beſides the mere name. It is therefore adviſable, even at the Cape itſelf, to take care, that whilſt one has a genuine ſample given one to taſte, one is not made to pay for a made-up red Conſtantia, which otherwiſe is in general ſold for half the price. The rich quality of this wine, is, according to Barrow, owing partly to the ſituation and ſoil, and partly to the care in the manufacture; for ripe fruit only is uſed, and always entirely freed from the ſtalks.

CONSTANTINA, a ſtrong and conſiderable town of Africa, in the kingdom of Algiers, and capital of a territory of the ſame name. It is the largeſt and ſtrongeſt place in all the eaſtern parts; and it is ſeated on the top of a great rock. There is no way to it but by ſteps cut out of the rock; and the uſual way of puniſhing criminals here is to throw them down the cliff. Here are a great many Roman antiquities, particularly a triumphal arch. E. Long. 7. 12. N. Lat. 36. 4.

CONSTANTINA, a town of Spain, in Andaluſia, and capital of a ſmall territory of the ſame name, with a caſtle ſeated on a mountain. W. Long. 5. 35. N. Lat. 37. 40.

CONSTANTINE, a kingdom of Barbary of that name, in Africa. It is bounded on the north by the Mediterranean, on the eaſt by the kingdom of Tunis, on the ſouth by Bildulgerid, and on the weſt by the river Sufegmar, which ſeparates it from the kingdom of Bugia. The country is the new Numidia of the ancients, and had its own king: but it is now a province to Algiers.

CONSTANTINE, the Great, the firſt emperor of the Romans who embraced Chriſtianity. His father, Conſtantius Chlorus, rendered himſelf famous by his victorious expeditions to Germany and Britain: upon the abdication of Diocleſian, he ſhared the Roman empire with Galerius Maximinus in 305, and was at that time at York, where he died in 306; having firſt cauſed his ſon Conſtantine the Great to be proclaimed emperor by his army, and the Engliſh. Galerius at firſt refuſed to admit Conſtantine to his father's ſhare in the imperial throne; but after having loſt ſeveral battles, he conſented in 308. Maxentius, who ſucceeded Galerius, oppoſed him: but was defeated, and drowned himſelf in the Tyber. The ſenate then declared Conſtantine chief or firſt Auguſtus, and Licinius his ſecond aſſociate in the empire, in 313. Theſe princes publiſhed an edict, in their joint names, in favour of the Chriſtians; but ſoon after Licinius, jealous of Conſtantine's renown, conceived an implacable hatred againſt him, and renewed the perſecutions againſt the Chriſtians. This brought on a rupture between the emperors, and a battle, in which Conſtantine was victorious. A ſhort peace enſued: but Licinius having ſhamefully violated the treaty, the war was renewed; when Conſtantine totally defeating him, he fled to Nicomedia, where he was taken priſoner and ſtrangled in 323. Conſtantine, now become ſole maſter of the weſtern and eaſtern empires, immediately formed the plan of eſtabliſhing Chriſtianity as the religion of the ſtate; for which purpoſe, he convoked ſeveral eccleſiaſtical councils: but finding he was likely to meet with great oppoſition from the Pagan intereſt at Rome, he conceived the deſign of founding a new city, to be the capital of his Chriſtian empire; ſee CONSTANTINOPLE. The glory Conſtantine had acquired by eſtabliſhing the Chriſtian religion, was tarniſhed by the part he took in the perſecutions carried on by the Arians, towards the cloſe of his reign, againſt their Chriſtian brethren who differed from them: ſeduced by Euſebius of Nicomedia, he baniſhed ſeveral eminent prelates; ſoon after which, he died in 337, the 66th year of his age, and 31ſt of his reign.

Conſtantine.

As to the character of Conſtantine, he was chaſte, pious, laborious, and indefatigable; a great general, ſucceſsful in war, and deſerving his ſucceſs by his ſhining valour and by the brightneſs of his genius; a protector of arts, and an encourager of them by his beneficence. If we compare him with Auguſtus, we ſhall find that he ruined idolatry, by the ſame precautions and the ſame addreſs that the other uſed to deſtroy liberty. Like Auguſtus, he laid the foundation of a new empire; but poſſeſſed of leſs political ſkill, he could not give it the ſame ſtability: he weakened the body of the ſtate by adding to it, in ſome meaſure, a ſecond head in the foundation of Conſtantinople; and tranſporting the centre of motion and ſtrength too near the eaſtern extremity, he left without heat, and almoſt without life, the weſtern parts, which ſoon became a prey to the barbarians. The Pagans were too much his enemies to do him juſtice. Eutropius ſays, that in the former part of his reign he was equal to the moſt accompliſhed princes, and in the latter to the meaneſt. The younger Victor, who makes him to have reigned more than 31 years, pretends, that in the firſt 10 years he was a hero; in the 12 ſucceeding ones a robber; and in the 10 laſt a ſpendthrift. It is eaſy to perceive, with reſpect to theſe two reproaches of Victor's, that the one relates to the riches which Conſtantine took from idolatry, and the other to thoſe with which he loaded the church.

CONSTANTINE, emperor of the Eaſt in 1002, left the care of the empire to his wife Helena, who loaded the people with taxes, and ſold all the offices in church and ſtate to the higheſt bidders; while the emperor employed himſelf in reading, writing, and the fine arts, till he became as good an architect and painter as he was a bad prince; he wrote ſeveral biographical and geographical works, which would have done honour to his name, if he had not neglected his duty to compoſe them. He died in 959.

Conſtantine, Conſtantinople.

Constantine *Dracoſes*, the ſon of Emmanuel Paleologus, was placed on the throne by Sultan Amurath in 1448. But Mahomet II. his ſucceſſor, reſolving to dethrone him, laid ſiege to Conſtantinople by ſea and land, and took it by aſſault in 1453, after it had held out 58 days. The unfortunate emperor ſeeing the Turks enter the breaches, threw himſelf into the midſt of the enemy, and was cut to pieces; the children of the imperial houſe were maſſacred by the ſoldiers; and the women reſerved to gratify the luſt of the conqueror; and thus terminated the dynaſty of the Conſtantines, 1123 years after its eſtabliſhment at Conſtantinople.

Constantine, *Robert*, a learned phyſician, born at Caen, taught polite literature in that city; and acquired great reputation by his ſkill in the Greek language, in hiſtory, and in medicine. He died in 1603, aged 103. He wrote a dictionary in Greek and Latin, and other works, which are eſteemed.

1 Removing the imperial ſeat to this city the cauſe of the decline of the weſt ern empire.

CONSTANTINOPLE, the modern name of the city of Byzantium in Thrace. It was enlarged and beautified by the Roman emperor Conſtantine the Great, in the year 330. At the ſame time he transferred thither the ſeat of the empire; and this removal is generally thought to have been one of the principal cauſes of the ſudden decline of the weſtern empire after this period.

2 Conſtantine defeats the Goths,

In the year 332, the Sarmatians implored Conſtantine's aſſiſtance againſt the Goths, who had made an irruption into their territories, and deſtroyed every thing with fire and ſword. The emperor readily granted their requeſt, and gained a complete victory. Near 100,000 of the enemy periſhed, either in the battle, or after it with hunger and cold. In conſequence of this overthrow, the Goths were obliged to ſue for peace; but the ungrateful Sarmatians no ſooner found themſelves delivered from their enemies, than they turned their arms againſt their benefactor, and

3 and the Sarmatians.

ravaged the provinces of Mæſia and Thrace. The emperor, receiving intelligence of this treachery, returned with incredible expedition, cut great numbers of them in pieces, and obliged the reſt to ſubmit to what terms he was pleaſed to impoſe.

4 Is highly reſpected.

Conſtantine ſeems to have been a prince very highly reſpected, even by far diſtant nations. In 333, according to Euſebius, ambaſſadors arrived at Conſtantinople from the Blemyes, Indians, Ethiopians, and Perſians, courting his friendſhip. They were received in a moſt obliging manner; and learning from the ambaſſadors of Sapor king of Perſia, that there were great numbers of Chriſtians in their maſter's dominions, Conſtantine wrote a letter in their behalf to the Perſian monarch.

Next year, the Sarmatians being again attacked by the Goths, found themſelves obliged to ſet at liberty and arm their ſlaves againſt them. By this means they indeed overcame the Goths: but the victorious ſlaves turning their arms againſt their maſters, drove

5 He takes a number of Sarmatians into his army.

them out of the country. This misfortune obliged them, to the number of 300,000, to apply for relief to the Roman emperor, who incorporated with his legions ſuch as were capable of ſervice; and gave ſettlements to the reſt in Thrace, Scythia, Macedon, and Italy. This was the laſt remarkable action of Conſtantine the Great. He died on May 15. 337, having divided the empire among his children and nephews, in the following manner. Conſtantine, his eldeſt ſon, had Gaul, Spain, and Britain: Conſtantius, the ſecond, had Aſia, Syria, and Egypt; and Conſtans, the youngeſt, Illyricum, Italy, and Africa. To his nephew Dalmatius, he gave Thrace, Macedon, and Achaia; and to King Annibalianus, his other nephew, Armenia Minor, Pontus, Cappadocia, and the city of Cæſarea, which he deſired might be the capital of his kingdom.

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6 His death, and diviſion of the empire.

7 All his relations murdered except his three ſons and two nephews.

After the death of Conſtantine, the army and ſenate proclaimed his three ſons emperors, without taking any notice of his two nephews, who were ſoon after murdered, with Julius Conſtantius the late emperor's brother, and all their friends and adherents. Thus the family of Conſtantine was at once reduced to his three ſons, and two nephews Gallus and Julian, the ſons of Julius Conſtantius; and of theſe the former owed his life to a malady, from which no one thought he could recover; and the latter to his infancy, being then at moſt about ſeven years of age. The three brothers divided among themſelves the dominions of the deceaſed princes; but did not long agree together. In

8 Conſtantine invades the dominions of Conſtans.

340, Conſtantine having in vain ſolicited Conſtans to yield part of Italy to him, raiſed a conſiderable army; and under pretence of marching to the aſſiſtance of his brother Conſtantius, who was then at war with the Perſians, made himſelf maſter of ſeveral places in Italy. Hereupon Conſtans detached part of his army againſt

9 Is defeated, and killed.

him; and Conſtantine, being drawn into an ambuſcade near Aquileia, was cut off with his whole forces. His body was thrown into the river Anſa; but being afterwards diſcovered, was ſent to Conſtantinople, and interred there near the tomb of his father.

10 Conſtans ſole maſter of the Weſt.

By the defeat and death of his brother, Conſtans remained ſole maſter of all the weſtern part of the empire, in the quiet poſſeſſion of which he continued till

11 Magnentius revolts againſt him.

the year 350. This year Magnentius, the ſon of one Magnus, a native of Germany, finding Conſtans deſpiſed by the army on account of his indolence and inactivity, reſolved to murder him, and ſet up for himſelf. Having found means to gain over the chief officers of the army to his deſigns, he ſeized on the Imperial palace at Autun, and diſtributed among the populace what ſums he found there; which induced not only the city, but the neighbouring country, to eſpouſe his cauſe. But Conſtans being informed of what had paſſed, and finding himſelf unable to reſiſt the uſurper, fled towards Spain. He was overtaken, however, by Gaiſo, whom Magnentius had ſent after him with a choſen body of troops, and deſpatched with many wounds, at Helena, a ſmall village ſituated near the foot of the Pyrenees.

12 Conſtans murdered.

Thus Conſtantius acquired a right to the whole Roman empire; though one-half of it was ſeized by Magnentius after the murder of Conſtans. The former had been engaged in a war with the Perſians, in which little advantage was gained on either ſide: but the Perſians now giving no more diſturbance, the emperor marched againſt the uſurpers in the weſt. Be-

13 Three pretenders to the empire.

ſides Magnentius, there were at that time two other pretenders to the weſtern empire. Veteranio, general of the foot in Pannonia, had, on the firſt news of the death of Conſtans, cauſed himſelf to be proclaimed emperor by the legions under his command. He was a

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a native of Upper Mæsia, and advanced in years when he usurped the sovereignty; but so illiterate, that he then first learned to read. The third pretender was Flavius Popilius Nepotianus, son of Eutropia, the sister of Constantine the Great. Having assembled a company of gladiators and men of desperate fortunes, he assumed the purple on the 3d of June 350, and in that attire presented himself before the gates of Rome. The prefect Anicetus, who commanded there for Magnentius, sallied out against him with a body of Romans, who were soon driven back into the city.

14 Nepotianus makes himself master of Rome.

Soon after Nepotianus made himself master of the city itself, which he filled with blood and slaughter. Magnentius being informed of what had happened, sent against this new competitor his chief favourite and prime minister Marcellinus. Nepotianus received him with great resolution; a bloody battle ensued between the soldiers of Magnentius and the Romans who had espoused the cause of Nepotianus; but the latter being

15 He is defeated and killed.

betrayed by a senator, named Heraclitus, his men were put to flight, and he himself killed, after having enjoyed the sovereignty only 28 days. Marcellinus ordered his head to be carried on the point of a lance through the principal streets of the city; put to death all those who had declared for him; and under pretence of pre-

16 Tyranny of Magnentius.

venting disturbances, commanded a general massacre of all the relations of Constantine. Soon after, Magnentius himself came to Rome, to make the necessary preparations for resisting Constantius, who was exerting himself to the utmost in order to revenge the death of his brother. In the city he behaved most tyrannically, putting to death many persons of distinction, in order to seize their estates; and obliged the rest to contribute half of what they were worth towards the expence of the war. Having by this means raised great sums, he assembled a mighty army composed of Romans, Germans, Gauls, Franks, Bri-

17 Sends proposals of peace to Constantius.

tons, Spaniards, &c. At the same time, however, dreading the uncertain issues of war, he dispatched ambassadors to Constantius with proposals of accommodation. Constantius set out from Antioch about the beginning of autumn; and, passing through Constantinople, arrived at Heraclea, where he was met by the deputies from Magnentius, and others from Veteranio, who had agreed to support each other in case the emperor would hearken to no terms. The deputies of Magnentius proposed in his name a match between him and Constantia, or rather Constantina, the sister of Constantius, and widow of Annibalianus; offering, at the same time, to Constantius the sister of Magnentius. At first the emperor would hearken to no terms; but afterwards, that he might not have to oppose two enemies at once, concluded a separate treaty with Veteranio, by which he agreed to take him for his partner in the empire. But when Veteranio ascended the tribunal along with Constantius, the soldiers pulled him down from thence, crying out, That they would acknowledge no other emperor than Constantius alone. On this Veteranio threw himself at the emperor's feet, and implored his mercy. Constantius received him with great kindness, and sent him to Prusia in Bithynia, where he allowed him a maintenance suitable to his quality.

18 Gallus sent against the Persians.

Constantius, now master of all Illyricum, and of the army commanded by Veteranio, resolved to march against Magnentius without delay. In the mean time, however, on advice that the Persians were preparing to invade the eastern provinces, he married his sister Constantina to his cousin-german Gallus; created him Cæsar on the 15th of March; and allotted him for his share not only all the East, but likewise Thrace and Constantinople. About the same time Magnentius gave the title of Cæsar to his brother Decentius, whom he dispatched into Gaul to defend that country against the barbarians who had invaded

19 Constantius stirs up the Franks to invade Gaul.

it; for Constantius had not only stirred up the Franks and Saxons to break into that province, by promising to relinquish to them all the places they should conquer, but had sent them large supplies of men and arms for that purpose. On this encouragement the barbarians invaded Gaul with a mighty army, overthrew Decentius in a pitched battle, committed everywhere dreadful ravages, and reduced the country to a most deplorable situation. In the mean time Magnentius having assembled a numerous army, left Italy, and crossing the Alps, advanced into the plains of Pannonia, where Constantius, whose main strength consisted in cavalry, was waiting for him. Magnentius hearing that his competitor was encamped at a small distance, invited him by a messenger to the extensive plains of *Sciscia* on the Save, there to decide which of them had the best title to the empire.

20 Is defeated by Magnentius.

This challenge was by Constantius received with great joy; but as his troops marched towards Scis cia in disorder, they fell into an ambuscade, and were put to flight with great slaughter. With this success, Magnentius was so elated, that he rejected all terms of peace, which were now offered by Constantius; but after some time,

21 Magnentius defeated at Mursa.

a general engagement ensued at Mursa, in which Magnentius was entirely defeated, with the loss of 24,000 men. Constantius, though victor, is said to have lost 30,000, which seems improbable.

22 This battle fatal to the empire.

All authors however, agree, that the battle at Mursa proved fatal to the western empire, and greatly contributed to its speedy decline.

After his defeat at Mursa, Magnentius retired into Italy, where he recruited his shattered forces as well as he could. But the beginning of the following year, 352, Constantius, having assembled his troops, surprised and took a strong castle on the Julian Alps, belonging to Magnentius, without the loss of a man. After this the emperor advanced in order to force the rest; upon which Magnentius was struck with such terror, that he immediately abandoned Aquileia, and ordered the troops that guarded the other passes of the Alps to follow him. Thus Constantius entering Italy without opposition, made himself master of Aquileia. From thence he advanced to Pavia, where Magnentius gained a considerable advantage over him. Notwithstanding this loss, however, Constantius reduced the whole country bordering on the Po, and Magnentius's men deserted to him in whole troops, delivering up to him the places they had garrisoned; by which the tyrant was so disheartened, that he left Italy, and retired with all his forces into Gaul. Soon after this, Africa, Sicily, and Spain, declared for Constantius; upon which Magnentius sent a senator, and after him some bishops, to treat of a peace: but the emperor treated the senator as a spy, and sent back the bishops without any answer.—Magnentius now finding his affairs desperate,

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deſperate, and that there were no hopes of pardon, recruited his army in the beſt manner he could, and diſpatched an aſſaſſin into the eaſt to murder Gallus Cæſar; hoping that his death would oblige the emperor to withdraw his forces from Gaul, and march in perſon to the defence of the eaſtern provinces, which were threatened by the Perſians. The aſſaſſin gained over ſome of Gallus's guards; but the plot being diſcovered before it could be put in execution, they were all ſeized and executed as traitors.

23 Magnentius attempts to get Gallus murdered.

24 Magnentius defeated a ſecond time; kills all his family and himſelf.

In 353, the war againſt Magnentius was carried on with more vigour than ever, and at laſt happily ended by a battle fought in the Higher Dauphiny. Magnentius, being defeated, took ſhelter in Lyons; but the few ſoldiers who attended him, deſpairing of any further ſucceſs, reſolved to purchaſe the emperor's favour by delivering up to him his rival, the author of ſo calamitous a war. Accordingly they ſurrounded the houſe where he lodged; upon which the tyrant, in deſpair, flew with his own hand his mother, his brother Deſiderius whom he had created Cæſar, and ſuch of his friends and relations as were with him: and then, fixing his ſword in a wall, threw himſelf upon it, in order to avoid a more ſhameful death which he had reaſon to apprehend.

After the death of Magnentius, his brother Decentius Cæſar, who was marching to his aſſiſtance, and had already reached Sens, finding himſelf ſurrounded on all ſides by the emperor's forces, choſe rather to ſtrangle himſelf than fall alive into the hands of his enemies. Thus Conſtantius was left ſole maſter of the Roman empire. His panegyriſts tell us, that after his victory he behaved with the greateſt humanity, forgiving and receiving into favour his greateſt enemies; but other hiſtorians differ conſiderably from them, and tell us that Conſtantius now became haughty, imperious, and cruel, of which many inſtances are given.

25 Conſtantius ſole maſter of the empire.

26 Many grievous calamities.

This year the empire was ſubjected to very grievous calamities. Gaul was ravaged by the barbarians beyond the Rhine, and the diſbanded troops of Magnentius. At Rome, the populace roſe on account of a ſcarcity of proviſions. In Aſia, the Iſaurian robbers overran Lycaonia and Pamphylia; and even laid ſiege to Seleucia, a city of great ſtrength; which, however, they were not able to make themſelves maſters of. At the ſame time the Saracens committed dreadful ravages in Meſopotamia, the Perſians alſo invaded the province of Anthemuſia on the Euphrates. But the eaſtern provinces were not ſo much haraſſed by the barbarians as by Gallus Cæſar himſelf, who ought to have protected them. That prince was naturally of a cruel, haughty, and tyrannical diſpoſition; but being elated with his ſucceſſes againſt the Perſians, he at laſt behaved more like a tyrant and a madman than a governor. His natural cruelty is ſaid to have been heightened by the inſtigations of his wife Conſtantina, who is by Ammianus ſtyled the *Megæra*, or "fury of her ſex:" and he adds, that her ambition was equal to her cruelty. Thus all the provinces and cities in the eaſt were filled with blood and ſlaughter. No man, however innocent, was ſure to live or enjoy his eſtate a whole day; for Gallus's temper being equally ſuſpicious and cruel, thoſe who had any private enemies took care to accuſe them of crimes againſt the ſtate, and with Gallus it was the ſame thing to be accuſed and condemned. At laſt the emperor being informed from all quarters of the evil conduct of his brother-in-law, and being at the ſame time told that he aſpired to the ſovereignty, reſolved upon his ruin. For this end he wrote letters to Gallus and Conſtantina, inviting them both into Italy. Though they had both ſufficient reaſon to fear the worſt, yet they durſt not venture to diſobey the emperor's expreſs command. Conſtantina, who was well acquainted with her brother's temper, and hoped to pacify him by her artful inſinuations, ſet out firſt, leaving Gallus at Antioch: but ſhe had ſcarce entered the province of Bithynia, when ſhe was ſeized with a fever which put an end to her life. Gallus now deſpairing of being able to appeaſe his ſovereign, thought of openly revolting; but moſt of his friends deſerted him on account of his inconſtant and cruel temper, ſo that he was at laſt obliged to ſubmit to the pleaſure of Conſtantius. He advanced, therefore according to his orders; but at Petavium was arreſted, and ſtripped of all the enſigns of his dignity. From thence he was carried to Fianona, now *Fianone*, in Dalmatia, where he was examined by two of his moſt inveterate enemies. He confeſſed moſt of the crimes laid to his charge; but urged as an excuſe the evil counſels of his wife Conſtantina. The emperor, provoked at this plea which reflected on his ſiſter, and inſtigated by the enemies of Gallus, ſigned a warrant for his execution, which was performed accordingly.

27 Tyranny of Gallus.

Conſtantinopolitan hiſtory.

28 He is put to death.

All this time the emperor had been engaged in a war with the Germans: he had marched againſt them in perſon; and though he gained an advantage, the barbarians thought proper to make peace with him. This, however, was but ſhort-lived. No ſooner was the Roman army withdrawn, than they began to make new inroads into the empire. Againſt them Conſtantius diſpatched Arbetio with the flower of the army; but he fell into an ambuſcade, and was put to flight with the loſs of a great number of men. This loſs, however, was ſoon retrieved by the valour of Arinthæus, who became famous in the reign of Valens, and of two other officers, who falling upon the Germans, without waiting the orders of their general, put them to flight, and obliged them to leave the Roman territories.

29 War with the Germans.

The tranquillity of the empire, which enſued on this repulſe of the Germans, was ſoon interrupted by a pretended conſpiracy, by which in the end a true one was produced. Sylvanus, a leading man among the Franks, commanded in Gaul, and had there performed great exploits againſt the barbarians. He had been raiſed to this poſt by Arbetio; but only with a deſign to remove him from the emperor's preſence, in order to accompliſh his ruin, which he did in the following manner: One *Dynames*, keeper of the emperor's mules, leaving Gaul, begged of Sylvanus letters of recommendation to his friends at court; which being granted, the traitor eraſed all but the ſubſcription. He then inſerted directions to the friends of Sylvanus for the carrying on a conſpiracy; and delivering theſe forged letters to the prefect Lampidius, they were by him ſhown to the emperor. Thus Sylvanus was forced to revolt, and cauſe himſelf to be proclaimed emperor by the troops under his command.

30 Sylvanus betrayed by Arbetio.

31 He is forced to revolt.

In

Conſtantinopolitan hiſtory.

In the mean time, however, Dynames having thought proper to forge another letter, the fraud was diſcovered, and an inquiry ſet on foot, which brought to light the whole matter. Sylvanus was now declared innocent, and letters ſent to him by the emperor confirming him in his poſt; but theſe were ſcarce gone, when certain news arrived at the court of Sylvanus having revolted, and cauſed himſelf be proclaimed emperor. Conſtantius, thunderſtruck at this news, diſpatched againſt him Urſicinus, an officer of great integrity, as well as valour and experience in war; who

32 Is murdered.

forgetting his former character, pretended to be Sylvanus's friend, and thus found means to cut him off by treachery.

33 Gaul ravaged by the barbarians.

The barbarians, who had been hitherto kept quiet by the brave Sylvanus, no ſooner heard of his death, than they broke into Gaul with greater fury than ever. They took and pillaged above forty cities, and among the reſt Cologne, which they levelled with the ground. At the ſame time the Quadi and Sarmatians entering Pannonia, deſtroyed every thing with fire and ſword. The Perſians alſo, taking advantage of the abſence of Urſicinus, overran, without oppoſition, Armenia and Meſopotamia; Proſper and Mauſonianus, who had ſucceeded that brave commander in the government of the eaſt, being more intent upon pillaging than defending the provinces committed to their care. Conſtantius not thinking it adviſable to

34 Julian created Cæſar.

leave Italy himſelf, reſolved at laſt to raiſe his couſin Julian, the brother of Gallus, to the dignity of Cæſar. Julian ſeems to have been a man of very extraordinary talents; for though before this time he had been entirely buried in obſcurity, and converſed only with books, no ſooner was he put at the head of an army than he behaved with the ſame bravery, conduct, and experience, as if he had been all his life bred up to the art of war. He was appointed governor of Gaul; but before he ſet out, Conſtantius gave him in marriage his ſiſter Helena, and made him many valuable preſents. At the ſame time, however, the jealous emperor greatly limited his authority; gave him written inſtructions how to behave; ordered the generals who ſerved under him to watch all his actions no leſs than thoſe of the enemy; and ſtrictly enjoined Julian himſelf not to give any largeſſes to the ſoldiery.

Julian ſet out from Milan on the firſt of December 355, the emperor himſelf accompanying him as far as Pavia, from whence he purſued his journey to the Alps, attended only by 360 ſoldiers. On his arrival at Turin he was firſt acquainted with the loſs of Cologne, which had been kept concealed from the emperor. He arrived at Vienne before the end of the year, and was received by the people of that city and the neighbourhood with extraordinary joy.

35 He ſets out for Gaul.

In 356, the barbarians beſieged *Autun*; to relieve which place, Julian marched with what forces he could raiſe. When he came there, he found the ſiege raiſed: on which he went in purſuit of the barbarians to Auxerre, croſſing with no ſmall danger thick woods and foreſts, from Auxerre to *Troies*. On his march he was ſurrounded on all ſides by the barbarians, who moved about the country in great bodies; but he put

36 Defeats the barbarians.

them to flight with a handful of men, cut great numbers of them in pieces, and took ſome priſoners. From Troies he haſtened to Rheims, where the main body of the army, commanded by Marcellus, waited his arrival. Leaving Rheims, he took his route towards Decempagi, now *Dieuze*, on the Seille in Lorrain, with a deſign to oppoſe the Germans who were buſy in ravaging that province. But the enemy attacking his rear unexpectedly, would have cut off two legions, had not the reſt of the army, alarmed at the ſudden noiſe, turned back to their aſſiſtance. A few days afterwards he defeated the Germans, though with great loſs to his own army; the victory, however, opened him a way to Cologne. This city he found

37 Repairs the fortifications of Cologne.

abandoned by the barbarians. They had neglected to fortify it: but Julian commanded the ancient fortifications to be repaired with all poſſible expedition, and the houſes to be rebuilt; after which he retired to Sens, and there took up his winter-quarters. This year alſo Conſtantius entered Germany on the ſide of Rhætia, laid waſte the country far and wide; and obliged the barbarians to ſue for peace, which was

38 Idolatry declared capital by Conſtantius.

readily granted. The ſame year he enacted two laws; by one of which it was declared capital to ſacrifice, or pay any kind of worſhip, to idols; the other, granting the effects of condemned perſons to belong to their children and relations within the third degree, except in caſes of magic and treaſon; but this laſt one he revoked two years after.

In the beginning of the year 357, the barbarians beſieged Julian a whole month in Sens; Marcellus, the commander in chief, never once offering to aſſiſt him. Julian, however, ſo valiantly defended himſelf with the few forces he had, that the barbarians at laſt retired. After this, Conſtantius declared Julian commander in chief of all the forces in Gaul; appointing under him one *Severus*, an officer of great experience, and of a quite different diſpoſition from Marcellus. On his arrival in Gaul, Julian received him with great joy, raiſed new troops, and ſupplied them with arms which he luckily found in an old arſenal. The emperor, reſolving at all events to put a ſtop to the terrible devaſtations committed by the barbarous nations, chiefly by the Alemans, wrote to Julian to march directly againſt them. At the ſame time he ſent Barbatio, who had been appointed general in place of Sylvanus, with a body of 25 or 30,000 men, out of Italy, in order to incloſe the enemy between two armies. The Leti, however, a German nation, paſſing between the armies, advanced as far as Lyons, hoping to ſurpriſe that wealthy city; but meeting with a warmer reception than they expected, contented themſelves with ravaging the country all round it. On the firſt notice of this expedition, Julian detached ſtrong parties to guard the paſſages through which he knew the

39 The Leti cut off by Julian.

barbarians muſt return. Thus they were all cut off except thoſe who marched near the camp of Barbatio; who was ſo far from cutting off their retreat, that he complained by a letter to Conſtantius of ſome officers for attempting it. Theſe officers, among whom was Valentinian afterwards emperor of the weſt, were by the orders of Conſtantius, caſhiered for their diſobedience. The other barbarians either fortified themſelves in the countries which they had ſeized, ſtopping up all the avenues with huge trees, or took ſhelter in the iſlands formed by the Rhine. Julian reſolved firſt to attack the latter; and with this view demanded ſome boats of Barbatio: but he, inſtead of complying

complying with his juſt requeſt, immediately burnt all his boats, as he did on another occaſion the proviſions which had been ſent to both armies, after he had plentifully ſupplied his own. Julian, not in the leaſt diſheartened with this unaccountable conduct, perſuaded ſome of the moſt reſolute of his men to wade over to one of the iſlands. Here they killed all the Germans who had taken ſhelter in it. They then ſeized their boats, and purſued the ſlaughter in ſeveral other iſlands, till the enemy abandoned them all, and retired to their reſpective countries with their wives and what booty they could carry. On their departure, Barbatio attempted to lay a bridge of boats over the Rhine; but the enemy, appriſed of his intention, threw a great number of huge trees into the river, which being carried by the ſtream againſt the boats, ſunk ſeveral of them, and parted the reſt. The Roman general then thought proper to retire; but the barbarians falling unexpectedly upon him in his retreat, cut great numbers of his men in pieces, took moſt of his baggage, laid waſte the neighbouring country, and returned in triumph loaded with booty. Elated with this ſucceſs, they aſſembled in great numbers under the command of *Chnodomarius*, a prince of great renown among them, and ſix other kings. They encamped in the neighbourhood of Straſburg. Here they were encountered by Julian; who put them to flight, with the loſs of 6000 or 8000 of their men ſlain in the field, and a vaſtly greater number drowned in the river; while Julian himſelf loſt only 243 private men and four tribunes. In this action Chnodomarius was taken, and ſent to Rome, where he ſoon after died.

40 He forces the barbarians to abandon the iſlands of the Rhine.

41 Entirely defeats them at Straſburg.

42 He enters Germany and concludes a truce with the barbarians.

After the battle, Julian advanced with all his army to Mayence, where he built a bridge over the Rhine and entered Germany, having with difficulty prevailed upon his army to follow him. Here he ravaged the country till the time of the autumnal equinox, when being prevented by ſnow from advancing any further, he began to repair the fort of Trajan, by ſome ſuppoſed to be the caſtle of Cromburgh, about three or four leagues from Frankfort. The barbarians were now ſo much alarmed, that they ſent deputies to treat of a peace; but this Julian refuſed to grant them upon any terms. He conſented, however, to a truce for ſeven months, upon their promiſing to ſtore with proviſions the fort he was building in their country. This year Conſtantius made ſome remarkable laws. By one he puniſhed with confiſcation ſuch as renounced the Chriſtian for the Jewiſh religion; and by another, addreſſed to Felix biſhop of Rome, he exempted all merchandiſing eccleſiaſtics, with their wives, children, and domeſtics, from every impoſition ordinary and extraordinary: ſuppoſing the gains they made to be applied by them to the relief of the poor.

43 Remarkable laws of Conſtantius.

44 Julian conquers the Franks.

In 358, as ſoon as the ſeaſon was fit for action, Julian took the field againſt the Franks, with a deſign to conquer them before the truce he had concluded with the Alemans was expired. The Franks were at that time divided into ſeveral tribes, the moſt powerful of which were the Salii and Chamavi. The firſt of theſe ſent deputies, intreating that he would ſuffer them to remain as friends to the empire in the country they poſſeſſed. But Julian, without paying any regard to this deputation, entered their country, and obliged them to ſubmit; after which he allotted them lands in Gaul, incorporating great numbers of them into his cavalry. He next marched againſt the Chamavi, whom he defeated and obliged to retire beyond the Rhine. Afterwards he rebuilt three forts on the river Meuſe, which had been deſtroyed by the barbarians; but wanting proviſions in a country ſo often ravaged, he ordered 600 or 800 veſſels to be built in Britain for the conveying corn from thence into Gaul. Julian continued in the country of the Chamavi till the expiration of his truce with the Alemans; and then laying a bridge of boats over the Rhine, he entered their country, putting all to fire and ſword. At laſt two of their kings came in perſon to him to ſue for peace: which Julian granted, upon their promiſing to ſet at liberty the captives they had taken; to ſupply a certain quantity of corn when required; and to furniſh wood, iron, and carriages, for repairing the cities they had ruined. The priſoners whom he at this time releaſed, amounted to upwards of 20,000.

45 Grants a peace to the Germans.

46 Expedition of Conſtantius againſt ſome German nations.

Soon after the vernal equinox of this year 358, Conſtantius marched in perſon againſt the Quadi and Sarmatians, whoſe country lay beyond the Danube. Having croſſed that river on a bridge of boats, he laid waſte the territories of the Sarmatians; who thereupon came in great numbers, together with the Quadi, pretending to ſue for peace. Their true deſign was to ſurpriſe the Romans; but the latter ſuſpecting it, fell upon them ſword in hand, and cut them all in pieces. This obliged the reſt to ſue for peace in good earneſt, which was granted on the delivery of hoſtages. The emperor then marched againſt the *Limigantes*, that is, the ſlaves who, in 334, had driven the Sarmatians out of their country, and ſeized it for themſelves *. They uſed the ſame artifice as the Sarmatians and Quadi had done, coming in great numbers under pretence of ſubmitting, but prepared to fall upon him unexpectedly if opportunity offered. The emperor, obſerving their ſurly looks, and diſtruſting them, cauſed his troops ſurround them inſenſibly while he was ſpeaking. The Limigantes then diſpleaſed with the conditions he offered them, laid their hands on their ſwords: on which they were attacked by the Roman ſoldiers. Finding it impoſſible to make their eſcape, they made with great fury towards the tribunal, but were repulſed by the guards forming themſelves into a wedge, and every one of them cut in pieces. After this, the emperor ravaged their country to ſuch a degree, that they were in the end obliged to ſubmit to the only condition he thought proper to allow them, which was to quit their country, and retire to a more diſtant place. The country was then reſtored to the Sarmatians, who were its original poſſeſſors.

* See N° 5.

47 He expels the Limigantes.

48 Haughty embaſſy from Sapor king of Perſia.

This year is alſo remarkable for a very haughty embaſſy from Sapor king of Perſia. The ambaſſador, named *Narſes*, brought a letter, in which the Perſian monarch ſtyled himſelf "king of kings, brother of the ſun and moon," &c. He acquainted the emperor, that he might lawfully inſiſt on having all the countries beyond the river Strymon in Macedon delivered up to him; but leſt his demands ſhould ſeem unreaſonable, he would be contented with Armenia and Meſopotamia, which had been moſt unjuſtly taken from his grandfather Narſes. He added, that unleſs juſtice was done him, he was reſolved to aſſert his right

right by force of arms. This letter was preſented to Conſtantius wrapped up in a piece of white ſilk; but he, without entering into any negociation with the ambaſſador, wrote a letter to Sapor, in which he told him, that as he had maintained the Roman dominions in their full extent, when he was poſſeſſed only of the eaſt, he could not ſuffer them to be curtailed now when he was maſter of the whole empire. In a few days, however, he ſent another letter, with rich preſents; being very deſirous at leaſt to put off the war till he had ſecured the northern provinces againſt the incurſions of the barbarians, that he might then employ all the forces of the empire againſt ſo formidable an enemy. This embaſſy proved unſucceſsful, as did alſo another which was ſent ſoon after. The laſt ambaſſadors were impriſoned as ſpies, but afterwards diſmiſſed unhurt.

49
A law againſt magicians, &c.

By a law of Conſtantius dated in 358, all magicians, augurs, aſtrologers, and pretenders to the art of divination, were declared enemies to mankind; and ſuch of them as were found in the court either of the emperor or of Julian, he commanded to be put to the torture, and ſpecified what torments they were to undergo.

In 359, Julian continued his endeavours for relieving the province of Gaul, which had ſuffered ſo much from the incurſions of the barbarians. He erected magazines in different places, viſited the cities which had ſuffered moſt, and gave orders for repairing their walls and fortifications properly. He then croſſed the Rhine, and purſued the war in Germany with great ſucceſs, inſomuch that the barbarians ſubmitted to ſuch terms as he pleaſed to impoſe.

50
Treachery of the Limigantes.

In the mean time, the emperor, having received intelligence that the Limigantes had quitted the country in which he had placed them, haſtened to the banks of the Danube, in order to prevent their entering Pannonia. On his arrival he ſent deputies, deſiring to know what had induced them to abandon the country which had been allotted them. The Limigantes anſwered, in appearance with the greateſt ſubmiſſion imaginable, that they were willing to live as true ſubjects of the empire in any other place; but that the country he had allotted them was quite uninhabitable, as they could demonſtrate if they were but allowed to croſs the river, and lay their complaints before him. This requeſt was granted; but while he aſcended his tribunal, the barbarians unexpectedly fell upon his guards ſword in hand, killed ſeveral of them, and the emperor with difficulty ſaved himſelf by flight.

51
They are all cut off.

The reſt of the troops, however, ſoon took the alarm, and ſurrounding the Limigantes, cut them all off to a man.

52
The heathens cruelly perſecuted.

This year Conſtantius inſtituted a court of inquiſition againſt all thoſe who conſulted heathen oracles. Paulus Catena, a noted and cruel informer, was diſpatched into the eaſt to proſecute them; and Modeſtus, then count of the eaſt, and equally remarkable for his cruelty, was appointed judge. His tribunal was erected at Scythopolis in Paleſtine, whither perſons of both ſexes, and of every rank and condition, were daily dragged in crowds from all parts, and either confined in dungeons, or torn in pieces in a moſt cruel and barbarous manner by racks, or publicly executed.

53
The Perſians begin hoſtilities.

In 359, Sapor king of Perſia began hoſtilities, being encouraged thereto by the abſence of Urſicinus, whom the emperor had recalled, and appointed in his room one Sabinianus, a perſon very unfit for ſuch an office. During this campaign, however, he made very little progreſs; having only taken two Roman forts, and deſtroyed the city of Amida, the ſiege of which is ſaid to have coſt him 30,000 men. On the firſt news of the Perſian invaſion, Conſtantius had thought proper to ſend Urſicinus into the eaſt; but his enemies prevented him from receiving the ſupplies neceſſary for carrying on the war; ſo that he found it impoſſible to take any effectual means for ſtopping the progreſs of the Perſians. On his return, he was unexpectedly charged with the loſs of Amida, and all the diſaſters that had happened during the campaign. Two judges were appointed to inquire into his conduct; but they, being creatures of his enemies, left the matter doubtful. On this Urſicinus was ſo much exaſperated, that he appealed to the emperor, and in the heat of paſſion let fall ſome unguarded expreſſions, which being immediately carried to the emperor, the general was deprived of all his employments.

54
Conſtantius marches in perſon againſt them.

Conſtantius reſolved to march next year in perſon againſt the Perſians; but in the mean time, dreading to encounter ſo formidable an enemy, he applied himſelf wholly to the aſſembling of a mighty army, by which he might be able fully to cope with them. For this purpoſe he wrote to Julian to ſend him part of his forces, without conſidering that by ſo doing he left the province of Gaul expoſed to the ravages of the barbarians. Julian reſolved immediately to comply with the emperor's orders; but at the ſame time to abdicate the dignity of Cæſar, that he might not be blamed for the loſs of the province. Accordingly he ſuffered the beſt ſoldiers to be draughted out of his army.

55
Julian proclaimed emperor.

They were, however, very unwilling to leave him, and at laſt proclaimed him emperor. Whether this was done abſolutely againſt Julian's conſent or not is uncertain; but he wrote to the emperor, and perſuaded the whole army alſo to ſend a letter along with his, in which they acquainted Conſtantius with what had happened, and entreated him to acknowledge Julian as his partner in the empire. But this was poſitively refuſed by Conſtantius, who began to prepare for war. Julian then, deſigning to be before-hand with the emperor, cauſed his troops take an oath of allegiance to himſelf, and with ſurpriſing expedition made himſelf maſter of the whole country of Illyricum, and the important paſs ſeparating that country from Thrace. Conſtantius was thunder-ſtruck with this news; but hearing that the Perſians had retired, he marched with all his force againſt his competitor. On his arrival at Tarſus in Cilicia, he was ſeized with a feveriſh diſtemper, occaſioned chiefly by the uneaſineſs and perplexity of his mind.

56
Conſtantius marches againſt him, but dies.

He purſued his march, however, to Mopſucrene, a place on the borders of Cilicia, at the foot of Mount Taurus. Here he was obliged to ſtop by the violence of his diſorder, which increaſed every day, and at laſt carried him off on the 13th of November 361, in the 45th year of his age.

57
Julian reſtores the heathen religion.

By the death of Conſtantius, Julian now became maſter of the whole Roman empire without a rival. He had been educated in the Chriſtian religion; but ſecretly apoſtatized from it long before, and as ſoon as he ſaw himſelf maſter of Illyricum, openly avowed his apoſtaſy, and cauſed the temples of the gods to be opened.

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opened. When the messengers arrived at Naissus in Illyricum, where he then was, to acquaint him with his being sole master of the empire, they found him consulting the entrails of victims concerning the event of his journey. As the omens were uncertain, he was at that time very much embarrassed and perplexed; but the arrival of the messengers put an end to all his fears, and he immediately set out for Constantinople. At Heraclea he was met by almost all the inhabitants of this metropolis, into which he made his public entry on the 11th of December 361, being attended by the whole senate in a body, by all the magistrates, and by the nobility magnificently dressed, every one testifying the utmost joy at seeing such a promising young prince raised to the empire without bloodshed. He was again declared emperor by the senate of Constantinople; and as soon as that ceremony was over, he caused the obsequies of Constantius to be performed with great pomp.

58
Condemns some of the late emperor's ministers.

The first care of Julian was to inquire into the conduct of the late emperor's ministers. Several of these having been found guilty of enormous crimes, were condemned and executed; particularly the noted informer Paulus Catena, and another named *Apodamus*, were sentenced to be burnt alive. Along with these, however, was put to death one Ursula, a man of unexceptionable character, and to whom Julian himself was highly indebted. He had been supplied with money by Ursula, unknown to the emperor, at the time when he was sent into Gaul with the title of Cæsar, but without the money necessary for the support of that dignity. For what reason he was now put to death, historians do not acquaint us. Julian himself tells us, that he was executed without his knowledge.

59
Reforms the court.

The emperor next set about reforming the court. As the vast number of offices was in his time become an intolerable burden, he discharged all those whom he thought useless. He reduced, among the rest, the officers called *agentes in rebus*, from 10,000 to 17; and discharged thousands of cooks, barbers, &c. who by their large salaries drained the exchequer. The *curiosi*, whose office it was to inform the emperor of what had passed in the different provinces, were all discharged, and that employment entirely suppressed. Thus he was enabled to ease the people of the heavy taxes with which they were loaded: and this he did by abating a fifth part of all taxes and imposts throughout the kingdom.

60
Recals the philosophers, magicians, &c.

As to religious matters, Julian, as before observed, was a Pagan, and immediately on his accession to the throne restored the heathen religion. He invited to court the philosophers, magicians, &c. from all parts; nevertheless, he did not raise any persecution against the Christians. On the contrary, he recalled from banishment all the orthodox bishops who had been sent into exile during the former reign; but with a design, as is observed both by the Christian and Pagan writers, to raise disturbances and sow dissensions in the church.

61
Marches against the Persians.

As the Persians were now preparing to carry on the war with vigour, Julian found himself under a necessity of marching against them in person. But before he set out, he enriched the city of Constantinople with many valuable gifts. He formed a large harbour to shelter the ships from the south wind, built a magnificent porch leading to it, and in another porch a stately library, in which he lodged all his books. In the month of May, A. D. 362, he set out for Antioch; and on the first of January renewed in that city the sacrifices to Jupiter for the safety of the empire, which had been so long omitted. During his stay in this city, he continued his preparations for the Persian war, erecting magazines, making new levies, and above all consulting the oracles, aruspices, magicians, &c. The oracles of Delphi, Delos, and Dodona, assured him of victory. The aruspices, indeed, and most of his courtiers and officers, did all that lay in their power to divert him from his intended expedition; but the deceitful answers of the oracles and magicians, and the desire of adding the Persian monarch to the many kings he had already seen humbled at his feet, prevailed over all other considerations. Many nations sent deputies to him offering their assistance; but these offers he rejected, telling them that the Romans were to assist their allies, but stood in no need of any assistance from them. He likewise rejected, and in a very disobliging manner, the offers of the Saracens; answering them, when they complained of his stopping the pension paid them by other emperors, that a warlike prince had steel, but no gold; which they resenting, joined the Persians, and continued faithful to them to the last. However, he wrote to Arsaces king of Armenia, enjoining him to keep his troops in readiness to execute the orders he should soon transmit to him.

62
Crosses the Euphrates.

Having made the necessary preparations for so important an enterprise, Julian sent orders to his troops to cross the Euphrates, designing to enter the enemy's country before they had the least notice of his march; for which purpose he had placed guards on all the roads. From Antioch he proceeded to Litarba, a place about 15 leagues distant, which he reached the same day. From thence he went to Beræa, where he halted a day, and exhorted the council to restore the worship of the gods; but this exhortation, it seems, was complied with but by few. From Beræa he proceeded to Batnæ; and was better pleased with the inhabitants of the latter, because they had, before his arrival, restored the worship of the gods. There he offered sacrifices; and having immolated a great number of victims, he pursued the next day his journey to Hierapolis, the capital of the province of Euphratesiana, which he reached on the 9th of March. Here he lodged in the house of one for whom he had a particular esteem, chiefly because neither Constantius nor Gallus, who had both lodged in his house, had been able to make him renounce the worship of his idols. As he entered this city, 50 of his soldiers were killed by the fall of a porch. He left Hierapolis on the 13th of March; and having passed the Euphrates on a bridge of boats, came to Batnæ a small city of Osrhoene, about 10 leagues from Hierapolis; and here 50 more of his soldiers were killed by the fall of a stack of straw. From Batnæ he proceeded to Carrhæ; where, in the famous temple of the moon, it is said he sacrificed a woman to that planet.

63
Invades Persia.

While Julian continued in this city, he received advice that a party of the enemies horse had broke into the Roman territories. On this he resolved to leave an army in Mesopotamia, to guard the frontiers of the empire

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empire on that ſide, while he advanced on the other into the heart of the Perſian dominions. This army conſiſted, according to ſome, of 20,000, according to others, of 30,000 choſen troops. It was commanded by Procopius, and Sebaſtian a famous Manichean who had been governor of Egypt, and had perſecuted there, with the utmoſt cruelty, the orthodox Chriſtians. Theſe two were to join, if poſſible, Arſaces king of Armenia, to lay waſte the fruitful plains of Media, and meet the emperor in Aſſyria. To Arſaces Julian himſelf wrote, but in the moſt diſobliging manner imaginable, threatening to treat him as a rebel if he did not execute, with the utmoſt punctuality, the orders given him: and at the concluſion told him, that the God he adored would not be able to ſcreen him from his indignation.

There were two roads leading from Carrhæ to Perſia; the one to the left by Niſibis; the other to the right through the province of Aſſyria, along the banks of the Euphrates. Julian choſe the latter, but cauſed magazines to be erected on both roads; and, after having viewed his army, ſet out on the 25th of March. He paſſed the Abora, which ſeparated the Roman and Perſian dominions, near its conflux with the Euphrates; after which he broke down the bridge, that his troops might not be tempted to deſert, ſeeing they could not return home. As he proceeded on his march, a ſoldier and two horſes were ſtruck dead by a flaſh of lightning; and a lion of an extraordinary ſize preſenting himſelf to the army, was in a moment diſpatched by the ſoldiers with a ſhower of darts. Theſe omens occaſioned great diſputes between the philoſophers and aruſpices: the latter looking upon them as inauſpicious, adviſed the emperor to return; but the former refuted their arguments with others more agreeable to Julian's temper.

64 Lays waſte Aſſyria.

Having paſſed the Abora, Julian entered Aſſyria, which he found very populous, and abounding with all the neceſſaries of life; but he laid it waſte far and near, deſtroying the magazines and proviſions which he could not carry along with him; and thus he put it out of his power to return the ſame way he came; a ſtep which was judged very impolitic. As he met with no army in the field to oppoſe him, he advanced to the walls of Cteſiphon, the metropolis of the Perſian empire; having reduced all the ſtrong holds that lay in his way. Here, having cauſed the canal to be cleared, which was formerly dug by Trajan between theſe two rivers, he conveyed his fleet from the former to the latter. On the banks of the Tigris he was oppoſed by the enemy. But Julian paſſed that river in ſpite of their utmoſt efforts, and drove them into the city with the loſs of a great number of their men, he himſelf, in the mean time, loſing only 70 or 75.

65 Advances to Cteſiphon.

66 Begins his retreat, but is diſtreſſed for want of proviſions.

Julian had now advanced ſo far into the enemy's country, that he found it neceſſary to think of a retreat, as it was impoſſible for him to winter in Perſia. For this reaſon he made no attempt on Cteſiphon, but began to march back along the banks of the Tigris, ſoon after he had paſſed that river. In the mean time the king of Perſia was aſſembling a formidable army, with a deſign to fall upon the Romans in their march; but being deſirous of putting an end to ſo deſtructive a war, he ſent very advantageous propoſals of peace to Julian. Theſe the Roman emperor very imprudently rejected; and ſoon after, deceived by treacherous guides, he quitted the river, and entered into an unknown country totally laid waſte by the enemy; and where he was continually haraſſed by ſtrong parties, who in a manner ſurrounded his army, and attacked him ſometimes in the front, and ſometimes in the rear. A ſtill worſe ſtep he was perſuaded to take by the treacherous guides already mentioned: and this was to burn his fleet, leſt it ſhould fall into the hands of the enemy. As ſoon as the fleet was ſet on fire, the whole army cried out, that the emperor was betrayed, and that the guides were traitors employed by the enemy. Julian ordered them immediately to be put to the rack, upon which they confeſſed the treaſon; but it was too late. The fleet was already in flames; they could by no means be extinguiſhed; and no part was ſaved except 12 veſſels, which were deſigned to be made uſe of in the building of bridges, and for this purpoſe were conveyed over land in waggons.

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The emperor thus finding himſelf in a ſtrange country, and his army greatly diſpirited, called a council of his chief officers, in which it was reſolved to proceed to Corduene, which lay ſouth of Armenia, and belonged to the Romans. With this view, they had not proceeded far when they were met by the king of Perſia, at the head of a very numerous army, attended by his two ſons, and all the principal nobility of the kingdom. Several ſharp encounters happened, in which, though the Perſians were always defeated, yet the Romans reaped no advantages from their victories, but were reduced to the laſt extremity for want of proviſions. In one of theſe ſkirmiſhes, when the Romans were ſuddenly attacked, the emperor, eager to repulſe the enemy, haſtened to the field of battle without his armour, when he received a mortal wound by a dart, which, through his arm and ſide, pierced his very liver. Of this wound he died the ſame night, the 26th of June 363, in the 32d year of his age, after having reigned ſcarce 20 months from the time he became ſole maſter of the Roman empire.

67 Is mortally wounded in a ſudden attack by the Perſians.

68 Jovian raiſed to the empire.

As Julian had declined naming any ſucceſſor, the choice of a new emperor devolved on the army. They unanimouſly choſe Jovian, a very able commander, whoſe father had lately reſigned the poſt of *comes domeſticorum*, in order to lead a retired life. The valour and experience of Jovian, however, were not ſufficient to extricate the Roman army from the difficulties in which they had been plunged by the imprudence of his predeceſſor. The famine raged in the camp to ſuch a degree, that not a ſingle man would have been left alive, had not the Perſians unexpectedly ſent propoſals of peace. Theſe were now received with the utmoſt joy. A peace was concluded for 30 years; the terms of which were, that Jovian ſhould reſtore to the Perſians the five provinces which had been taken from them in the reign of Diocleſian, with ſeveral caſtles, and the cities of Niſibis and Singara. After the concluſion of the treaty, Jovian purſued his march without moleſtation. When he arrived at Antioch, he revoked all the laws that had been made in the former reign againſt Chriſtianity and in favour of Paganiſm. He eſpouſed alſo the cauſe of the orthodox Chriſtians againſt the Arians; and recalled all thoſe who had been formerly baniſhed, particularly Athanaſius,

69 Concludes a peace with the Perſians.

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ſius, to whom he wrote a very obliging letter with his own hand. It is generally believed alſo that Athanaſius, at the deſire of Jovian, now compoſed the creed which ſtill goes by his name, and is ſubſcribed by all the biſhops in Europe. But this emperor did not live to make any great alterations, or even to viſit his capital as emperor; for in his way to Conſtantinople he was found dead in his bed, on the 16th or 17th of February 364, after he had lived 33 years, and reigned ſeven months and 40 days.

70 His death.

71 Valentinian choſen emperor, chooſes Valens for his partner.

After the death of Jovian, Valentinian was choſen emperor. Immediately on his acceſſion, the ſoldiers mutinied, and with great clamour required him to chooſe a partner in the ſovereignty. Though he did not inſtantly comply with their demand, yet in a few days he choſe his brother Valens for his partner; and, as the empire was threatened on all ſides with an invaſion of the barbarous nations, he thought proper to divide it. This famous partition was made at Mediana in Dacia. Valens had for his ſhare the whole of Aſia, Egypt, and Thrace; and Valentinian all the Weſt; that is, Illyricum, Italy, Gaul, Spain, Britain, and Africa.

72 Procopius revolts.

After this partition, Valens returned to Conſtantinople; where the beginning of his reign was diſturbed by the revolt of Procopius. a relation of Julian. On the death of that emperor, he had fled into Taurica Cherſoneſus for fear of Jovian; but not truſting the barbarians who inhabited that country, he returned in diſguiſe into the Roman territories, where having gained over an eunuch of great wealth, by name *Eugenius*, lately diſgraced by Valens, and ſome officers who commanded the troops ſent againſt the Goths, he got himſelf proclaimed emperor. At firſt he was joined only by the loweſt of the people, but at length he was acknowledged by the whole city of Conſtantinople. On the news of this revolt, Valens would have abdicated the ſovereignty, had he not been prevented by the importunities of his friends. He therefore diſpatched ſome troops againſt the uſurper; but theſe were gained over, and Procopius continued for ſome time to gain ground. It is probable he would finally have ſucceeded, had he not become ſo much elated with his good fortune, that he grew tyrannical and inſupportable to his own party. In conſequence of this alteration in his diſpoſition, he was firſt abandoned by ſome of his principal officers; and ſoon after defeated in battle, taken priſoner, and put to death.

73 Is defeated and put to death.

74 War with the Goths.

This revolt produced a war betwixt Valens and the Goths. The latter, having been ſolicited by Procopius, had ſent 3000 men to his aſſiſtance. On hearing the news of the uſurper's death, they marched back; but Valens detached againſt them a body of troops, who took them all priſoners notwithſtanding the vigorous reſiſtance they made. Athanaric, king of the Goths, expoſtulated on this proceeding with Valens; but that emperor proving obſtinate, both parties prepared for war. In 367 and 369, Valens gained great advantages over his enemies; and obliged them to ſue for peace, which was concluded upon terms very advantageous to the Romans. The reſt of this reign contains nothing remarkable, except the cruelty with which Valens perſecuted the orthodox clergy. The latter ſent 80 of their number to him, in order to lay their complaints before him; but he, inſtead of giving them any relief, determined to put them all to death. But the perſon who was ordered to execute this ſentence, fearing leſt the public execution of ſo many eccleſiaſtics might raiſe diſturbances, ordered them all to be put on board a ſhip, pretending that the emperor had ordered them only to be ſent into baniſhment; but when the veſſel was at ſome diſtance from land, the mariners ſet fire to it, and made their own eſcape in the boat. The ſhip was driven by a ſtrong wind into a harbour, where it was conſumed and all that were in it. A perſecution was alſo commenced againſt magicians, or thoſe who had books of magic in their cuſtody. This occaſioned the deſtruction of many innocent perſons; for books of this kind were often conveyed into libraries unknown to the owners of them, and this was certainly followed by death and confiſcation of goods. Hereupon perſons of all ranks were ſeized with ſuch terror that they burnt their libraries, leſt books of magic ſhould have been ſecretly conveyed in amongſt the others. In 378, the Goths, whom Valens had admitted into Thrace, advanced from that province to Macedon and Theſſaly, where they committed dreadful ravages. They afterwards blocked up the city of Conſtantinople, plundered the ſuburbs, and at laſt totally defeated and killed the emperor himſelf. The day after the battle, hearing that an immenſe treaſure was lodged in Adrianople, the barbarians laid ſiege to that place: but being quite ſtrangers to the art of beſieging towns, they were repulſed with great ſlaughter; upon which they dropped that enterpriſe, and returned before Conſtantinople. But here great numbers of them were cut in pieces by the Saracens, whom Maria their queen had ſent to the aſſiſtance of the Romans; ſo that they were obliged to abandon this deſign likewiſe, and retire from the neighbourhood of that city.

75 Eighty orthodox eccleſiaſtics put to death.

76 Magicians perſecuted.

77 Valens defeated and killed by the Goths.

78 Gratian takes Theodoſius for his partner.

By the death of Valens, the empire once more fell into the hands of a ſingle perſon. This was Gratian, who had held the empire of the Weſt after the death of Valentinian. He repulſed many barbarous nations who threatened the empire at that time with diſſolution; but finding himſelf preſſed on all ſides, he ſoon reſolved to take a colleague, in order to eaſe him of ſome part of the burden. Accordingly, on the 19th of January 379, he declared Theodoſius his partner in the empire, and committed to his care all the provinces which had been governed by Valens.

Theodoſius is greatly extolled by the hiſtorians of thoſe ages on account of his extraordinary valour and piety: and for theſe qualifications has been honoured with the ſurname of *the Great*. From the many perſecuting laws, however, made in his time, it would ſeem that his piety was at leaſt very much miſguided; and that if he was naturally of a humane and compaſſionate diſpoſition, ſuperſtition and paſſion had often totally obſcured it. He certainly was a man of great conduct and experience in war; and indeed the preſent ſtate of the empire called for an exertion of all his abilities. The provinces of Dacia, Thrace, and Illyricum, were already loſt; the Goths, Taiſali, Alans, and Huns, were maſters of the greateſt part of theſe provinces, and had ravaged and laid waſte the reſt. The Iberians, Armenians, and Perſians, were likewiſe up in arms, and ready to take advantage of the diſtracted ſtate of the empire. The few ſoldiers who had

79 Miſerable ſtate of the empire on his acceſſion.

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had survived the late defeat, kept within the strong holds of Thrace, without daring so much as to look abroad, much less face the victorious enemy, who moved about the country in great bodies. But notwithstanding this critical situation, the historians of those times give us no account of the transactions of the year 379. Many great battles indeed are said to have been fought, and as many victories obtained by Theodosius; but the accounts of these are so confused and contradictory, that no stress can be laid upon them.

In the month of February 380, Theodosius was seized with a dangerous malady, so that Gratian found himself obliged to carry on the war alone. This emperor, apprehending that the neighbouring barbarians might break into some of the provinces, concluded a peace with the Goths, which was confirmed by Theodosius on his recovery. The treaty was very advantageous to the barbarians; but they disregarding all their engagements, no sooner heard that Gratian had left Illyricum, than they passed the Danube, and breaking into Thrace and Pannonia, advanced as far as Macedon, destroying all with fire and sword. Theodosius, however, drawing together his forces, marched against them; and, according to the most respectable authorities, gained a complete victory; though Zosimus relates, that he was utterly defeated.

80 The Goths defeated by Theodosius.

The following year, Athanaric, the most powerful of all the Gothic princes, being driven out by a faction at home, recurred to Theodosius, by whom he was received with great tokens of friendship. The emperor himself went out to meet him, and attended him with his numerous retinue into the city. The Gothic prince died the same year; and Theodosius caused him to be buried after the Roman manner with such pomp and solemnity, that the Goths, who attended him in his flight, returned home with a resolution never to molest the Romans any more. Nay, out of gratitude to the emperor, they took upon them to guard the banks of the Danube, and prevent the empire from being invaded on that side.

81 Gratian murdered by Maximus.

In 383, one Maximus revolted against Gratian in Britain; and in the end, having got the unhappy emperor into his power, caused him to be put to death, and assumed the empire of the West himself. Gratian had divided his dominions with his brother Valentinian, whom he allowed to reign in Italy and West Illyricum, reserving the rest to himself. Maximus, therefore, immediately after his usurpation, sent deputies to Theodosius, assuring him that he had no designs on the dominions of Valentinian. As Theodosius at that time found himself in danger from the barbarians, he not only forbore to attack Maximus after this declaration, but even acknowledged him for his partner in the empire. It was not long, however, before the ambition of the usurper prompted him to break his promise. In 387, he passed the Alps on a sudden; and meeting with no opposition, marched to Milan where Valentinian usually resided. The young prince fled first to Aquileia; and from thence to Thessalonica, to implore the protection of Theodosius. The latter, in answer to Valentinian's letter, informed him, that he was not at all surprised at the progress Maximus had made, because the usurper had protected, and Valentinian had persecuted, the orthodox Christians. At last he prevailed on the young prince to renounce the Arian heresy which he had hitherto maintained; after which Theodosius promised to assist him with all the forces of the East. At first, however, he sent messengers to Maximus, earnestly exhorting him to restore the provinces he had taken from Valentinian, and content himself with Gaul, Spain, and Britain. But the usurper would hearken to no terms. This very year he besieged and took Aquileia, Quaderna, Bononia, Mutina, Rhegium, Placentia, and many other cities in Italy. The following year he was acknowledged in Rome, and in all the provinces of Africa. Theodosius, therefore, finding a war inevitable, spent the remaining months of this and the beginning of the following year in making the necessary preparations. His army consisted chiefly of Goths, Huns, Alans, and other barbarians, whom he was glad to take into the service in order to prevent their raising disturbances on the frontiers. He defeated Maximus in two battles, took him prisoner, and put him to death. The usurper had left his son Victor, whom he created Augustus, in Gaul, to awe the inhabitants in his absence. Against him the emperor despatched Arbogastes, who took him prisoner after having dispersed the troops that attended him, and put him to death. The victory was used afterwards by Theodosius with great clemency and moderation.

82 Who invades the dominions of Valentinian.

83 His success.

84 Defeated and put to death by Theodosius.

85 The temples in Alexandria, and throughout all Egypt destroyed.

In 389, Theodosius took a journey to Rome; and, according to Prudentius, at this time converted the senate and people from idolatry to Christianity. The next year was remarkable for the destruction of the celebrated temple of Serapis in Alexandria; which, according to the description of Ammianus Marcellinus, surpassed all others in the world, that of Jupiter Capitolinus alone excepted. The reason of its being now destroyed was as follows. Theophilus, bishop of Alexandria, having begged and obtained of the emperor an old temple, formerly consecrated to Bacchus, but then ruined and forsaken, with a design to convert it into a church, the workmen found among the rubbish several obscene figures, which the bishop, to ridicule the superstition of the Heathens, caused to be exposed to public view. This provoked the Pagans to such a degree, that they flew to arms; and falling unexpectedly upon the Christians, cut great numbers of them in pieces. The latter, however, soon took arms in their own defence; and being supported by the few soldiers who were quartered in the city, began to repel force by force. Thus a civil war was kindled, and no day passed without some encounter. The Pagans used to retire to the temple of Serapis; and thence sallying out unexpectedly seized on such Christians as they met, and dragging them into the temple, either forced them by the most exquisite torments to sacrifice to their idol, or, if they refused, racked them to death. As soon as they expected to be attacked by the emperor's troops, they chose a philosopher named *Olympus* for their leader, with a design to defend themselves to the last extremity. The emperor, however, would not suffer any punishment to be inflicted upon them for the lives of those they had taken away, but readily forgave them; however, he ordered all the temples of Alexandria to be immediately pulled down, and commanded the bishop to see his orders put in execution. The Pagans no sooner heard that the

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emperor was acquainted with their proceedings than they abandoned the temple, which was in a short time destroyed by Theophilus; nothing being left except the foundations, which could not be removed on account of the extraordinary weight and size of the stones. Not satisfied with the destruction of the Alexandrian temples, the zealous bishop encouraged the people to pull down all the other temples, oratories, chapels, and places set apart for the worship of the Heathen gods throughout Egypt, and the statues of the gods themselves to be either burnt or melted down. Of the innumerable statues which at that time were to be found in Egypt, he is said to have spared but one, viz, that of an ape, in order to expose the Pagan religion to ridicule. On his return to Constantinople, Theodosius ordered such temples as were yet standing to be thrown down, and the Arians to be everywhere driven out of the cities.

86 Valentinian murdered by Arbogastes, who raises Eugenius to the empire.

In 392, Valentinian, emperor of the West, was treacherously murdered by Arbogastes his general; who, though he might afterwards have easily seized on the sovereignty himself, chose to confer it upon one Eugenius, and to reign in his name. This new usurper, though a Christian, was greatly favoured by the Pagans, who were well apprized that he only bore the title of emperor, while the whole power lodged in Arbogastes, who pretended to be greatly attached to their religion. The aruspices began to appear anew, and informed him that he was destined to the empire of the whole world; that he would soon gain a complete victory over Theodosius, who was as much hated as Eugenius was beloved by the gods, &c. But though Eugenius seemed to favour the Pagans, yet in the very beginning of his reign he wrote to St Ambrose. The holy man did not answer his letter till he was pressed by some friends to recommend them to the new prince; and then he wrote to this infamous usurper with all the respect due to an emperor. Soon after his accession to the empire, Eugenius sent deputies to Theodosius; and they are said to have been received by him in a very obliging manner. He did not, however, intend to enter into any alliance with this usurper, but immediately began his military preparations. In 394, he set out from Constantinople, and was at Adrianople on the 15th of June that year. He bent his march through Dacia, and the other provinces between Thrace and the Julian Alps, with a design to force the passes of these mountains, and break into Italy before the army of Eugenius was in a condition to oppose him. On his arrival at the Alps, he found these passes guarded by Flavianus prefect of Italy, at the head of a considerable body of Roman troops. These were utterly defeated by Theodosius, who thereupon crossed the Alps and advanced into Italy. He was soon met by Eugenius; and a bloody battle ensued, without any decisive advantage on either side. The next day the emperor led his troops in person against the enemy, utterly defeated them, and took their camp. Eugenius was taken prisoner by his own men, and brought to Theodosius, who reproached him with the murder of Valentinian, with the calamities he had brought on the empire by his unjust usurpation, and with putting his confidence in Hercules, and not in the true God; for on his chief standard he had displayed the image of that fabulous hero. Eugenius begged earnestly for his life; but while he lay prostrate at the emperor's feet, his own soldiers cut off his head, and carrying it about on the point of a spear, showed it to those in the camp, who had not yet submitted to Theodosius. At this they were all thunderstruck; but being informed that Theodosius was ready to receive them into favour, they threw down their arms and submitted. After this, Arbogastes, despairing of pardon, fled to the mountains; but being informed that diligent search was made for him, he laid violent hands on himself. His children, and those of Eugenius, took sanctuary in churches: but the emperor not only pardoned, but took the opportunity of converting them to Christianity, restored them to their paternal estates, and raised them to considerable employments in the state. Soon after this, Theodosius appointed his son Honorius emperor of the west, assigning him for his share Italy, Gaul, Spain, Africa, and West Illyricum. The next year, as he prepared for his return to Constantinople, he was seized with a dropsy, owing to the great fatigues he had undergone during the war. As soon as he perceived himself to be in danger, he made his will; by which he bequeathed the empire of the east to Arcadius, and confirmed Honorius in the possession of the west. He likewise confirmed the pardon which he had granted to all those who had borne arms against him, and remitted a tribute which had proved very burdensome to the people; and charged his two sons to see these points of his will executed. He died at Milan on the 17th of January 395, in the 16th year of his reign and 50th of his age.

87 Eugenius defeated, taken prisoner, and put to death.

88 Arbogastes lays violent hands on himself.

89 Theodosius dies.

From the time of Theodosius to the time when the Roman empire in the west was totally destroyed by the Goths, we find but very little remarkable in the history of Constantinople. At this time the eastern empire was usurped by Basiliscus, who had driven out Zeno the lawful emperor; being assisted in his conspiracy by the empress Verina his sister. Zeno fled into Isauria, whither he was pursued by Illus and Trecondes, two of the usurper's generals; who having easily defeated the few troops he had with him, forced the unhappy prince to shut himself up in a castle, which they immediately invested. But in a short time Basiliscus having disobliged the people by his cruelty, avarice, and other bad qualities, for which he was no less remarkable than his predecessor had been, his generals joined with Zeno, whom they restored to the throne. After his restoration, Zeno having got Basiliscus into his power, confined him in a castle of Cappadocia together with his wife Zenonides, where they both perished with hunger and cold. This happened in the year 467, after Basiliscus had reigned about 20 months. During the time of this usurpation a dreadful fire happened at Constantinople, which consumed great part of the city, with the library containing 120,000 volumes; among which were the works of Homer, written, as is said, on the great gut of a dragon 120 feet long.

90 Empire usurped by Basiliscus.

91 Is starved to death.

92 Great fire at Constantinople.

The misfortunes which Zeno had undergone did not work any reformation upon him. He still continued the same vicious courses which had given occasion to the usurpation of Basiliscus. Other conspiracies were formed against him, but he had the good fortune to escape them. He engaged in a war with the

Constantinopolitan history. the Ostrogoths, in which he proved unsuccessful, and was obliged to yield the provinces of Lower Dacia and Mœsia to them. In a short time, however, Theodoric their king made an irruption into Thrace, and advanced within 15 miles of Constantinople, with a design to besiege that capital: but the following year, 485, they retired in order to attack Odoacer king of Italy; of which country Theodoric was proclaimed king in 493. The emperor Zeno died in the year 491, in the 65th year of his age, and 17th of his reign.

93 Decline of the Roman empire, to what owing. The Roman empire had now for a long time been on the decline: the ancient valour and military discipline which had for such a long time rendered the Romans superior to other nations, had greatly degenerated; so that they were now by no means so powerful as formerly. The tumults and disorders which had happened in the empire from time to time by the many usurpations, had contributed also to weaken it very much. But what proved of the greatest detriment was the allowing vast swarms of barbarians to settle in the different provinces, and to serve in the Roman empire in separate and independent bodies. This had proved the immediate cause of the dissolution of the western empire; but as it affected the eastern parts less, the Constantinopolitan empire continued for upwards of 900 years after the western one was totally dissolved. The weak and imprudent administration of Zeno, and Anastasius who succeeded him, had reduced the eastern empire still more; and it might possibly have expired in a short time after the western one,

94 It revives under Justin and Justinian. had not the wise and vigorous conduct of Justin, and his partner Justinian, revived in some measure the ancient martial spirit which had originally raised the Roman empire to its highest pitch of grandeur.

Justin ascended the throne in 518. In 521 he engaged in a war with the Persians, who had all along been very formidable enemies to the Roman name. Against them he employed the famous Belisarius; but of him we hear nothing remarkable till after the accession of Justinian. This prince was the nephew of Justin, and was by him taken as his partner in the empire in 527; and the same year Justin died, in the 77th year of his age and 9th of his reign. Justinian being now sole master of the empire, bent his whole force against the Persians. The latter proved successful in the first engagement; but were soon after utterly defeated by Belisarius on the frontiers of Persia, and likewise by another general named *Dorotheus* in Ar-

95 Justinian's war with the Persians. menia. The war continued with various success during the first five years of Justinian's reign. In the sixth year a peace was concluded upon the following terms: 1. That the Roman emperor should pay to Cosrhoes, the king of Persia, 1000 pounds weight of gold. 2. That both princes should restore the places they had taken during the wars. 3. That the commander of the Roman forces should no longer reside at Daras on the Persian frontiers, but at a place called *Constantina* in Mesopotamia, as he had formerly done. 4. That the Iberians, who had sided with the Romans, should be at liberty either to return to their own country or to remain at Constantinople. This peace, concluded in 532, was styled *eternal;* but in the event proved of very short duration.

About this time happened at Constantinople the greatest tumult mentioned in history. It began among the different factions in the circus, but ended in an open rebellion. The multitude, highly dissatisfied with the conduct of John the *præfectus prætorio*, and of Tre- 96 Great tumult in Constantinople.
bonianus then questor, forced Hypatius, nephew to the emperor Anastasius, to accept the empire, and proclaimed him with great solemnity in the forum. As the two above-mentioned ministers were greatly abhorred by the populace on account of their avarice, Justinian immediately discharged them, hoping by that means to appease the tumult: but this was so far from answering the purpose, that the multitude only grew the more outrageous upon it; and most of the senators joining them, the emperor was so much alarmed, that he had thoughts of abandoning the city and making his escape by sea. In this dilemma the empress Theodora encouraged and persuaded him rather to part with his life than the kingdom; and he at last resolved to defend himself to the utmost, with the few senators who had not yet abandoned him. In the mean time, the rebels having attempted in vain to force the gates of the palace, carried Hypatius in triumph to the circus; where, while he was beholding the sports from the imperial throne, amidst the shouts and acclamations of the people, Belisarius, who had been recalled from Persia, entered the city with a considerable body of troops. Being then apprised of the usurpation of Hypatius, he marched straight to the circus; fell sword in hand upon the disarmed multitude; and with the assistance of a band of Heruli, headed by Mundus governor of Illyricum, cut about 30,000 of them in pieces. Hypatius the usurper, and Pompeius another of the nephews of Anastasius, were taken prisoners and carried to the emperor, by whose orders they were both beheaded, and their bodies cast into the sea. Their estates were confiscated, and likewise the estates of such senators as had joined with them; but the emperor caused great part of their lands and effects to be afterwards restored, together with their honours and dignities, to their children.

Justinian having now no other enemy to contend with, turned his arms against the Vandals in Africa, and the Goths in Italy; both which provinces he recovered out of the hands of the barbarians *. But before his general Belisarius had time to establish fully the Roman power in Italy, he was recalled in order to carry on the war against Cosrhoes king of Persia, who, in defiance of the treaty formerly concluded in 532, entered the Roman dominions at the head of a powerful army. The same year, however, a peace was concluded between the two nations upon the following conditions: 1. That the Romans should, within two months, pay to the Persian king 5000 pounds weight of gold, and an annual pension of 500. 2. That the Persians should relinquish all claim to the fortress of Daras, and maintain a body of troops to guard the Caspian gates, and prevent the barbarians from breaking into the empire. 3. That upon payment of the above-mentioned sum, Cosrhoes should immediately withdraw his troops from the Roman dominions. The treaty being signed, and the stipulated sum paid, Cosrhoes began to march back again; but by the way plundered several cities as if the war had still continued. Hereupon Justinian resolved to pursue the war with the utmost vigour; and for that purpose dispatched

* See *Barbary* and *Goths*.

97 Another war with the Persians.

Conſtantinopolitan hiſtory.

patched Beliſarius into the eaſt. But ſoon after he was obliged to recal him in order to oppoſe the Goths who had gained great advantages in Italy after his departure. The Perſian war was then carried on with

98 Peace concluded.

indifferent ſucceſs till the year 558, when a peace was concluded upon the emperor again paying an immenſe ſum to the enemy. The ſame year the Huns, paſſing the Danube in the depth of winter, marched in two bodies directly for Conſtantinople; and laying waſte the countries through which they paſſed, came, without meeting the leaſt oppoſition, within 150 furlongs of the city. But Beliſarius marching out againſt them with a handful of men, put them to flight; the emperor, however, to prevent them from invading the empire anew, agreed to pay them an annual tribute, upon their promiſing to defend the empire againſt all other barbarians, and to ſerve in the Roman armies when required. This was the laſt exploit performed by Beliſarius, who on his return to Conſtantinople was diſgraced, ſtripped of all his employments, and confined to his houſe, on pretence of a conſpiracy againſt the emperor *. In the year 565 a real conſpiracy was formed againſt Juſtinian, which he happily eſcaped, and the conſpirators were executed; but the emperor did not long ſurvive it, being carried off by a natural death in 566, in the 39th year of his reign.

* See *Beliſarius.*

During the reign of Juſtinian, the majeſty of the Roman empire ſeemed to revive. He recovered the provinces of Italy and Africa out of the hands of the barbarians, by whom they had been held for a number of years; but after his death they were ſoon loſt, and the empire tended faſt to diſſolution. In 569 Italy was conquered by the Lombards, who held it for the ſpace of 200 years. Some amends, however, was made for the loſs by the acquiſition of *Perſarmenia*; the inhabitants of which, being perſecuted by the Perſians on account of the Chriſtian religion which they profeſſed, revolted to the Romans. This produced a war between the two nations, who continued to weaken each other, till at laſt the Perſian monarchy was utterly overthrown, and that of the Romans greatly reduced by the Saracens †. Theſe new enemies attacked the Romans in the year 632, and purſued their conqueſts with incredible rapidity. In the ſpace of four years they reduced the provinces of Egypt, Syria, and Paleſtine. In 648 they were alſo maſters of Meſopotamia, Phœnicia, Africa, Cyprus, Aradus, and Rhodes; and having defeated the Roman fleet, commanded by the emperor Conſtans in perſon, they concluded a peace on condition of keeping the vaſt extent of territory they had ſeized, and paying for it 1000 nummi a-year.

99 Decline of the empire after Juſtinian.

† See *Arabia.*

100 Unſucceſsful expedition againſt the Lombards.

An expedition againſt the Lombards was about this time undertaken, but with very little ſucceſs, a body of 20,000 Romans being almoſt entirely cut off by one of the Lombard generals. In 671 the Saracens ravaged ſeveral provinces, made a deſcent in Sicily, took and plundered the city of Syracuſe, and over-ran the whole iſland, deſtroying every thing with fire and ſword. In like manner they laid waſte Cilicia; and having paſſed the winter at Smyrna, they entered Thrace in the winter of the year 672, and laid ſiege to Conſtantinople itſelf. Here, however, they were repulſed with great loſs: but next ſpring they renewed their attempt, in which they met with the ſame bad ſucceſs; many of their ſhips being burnt by the *ſea fire*, as it was called, becauſe it burnt under water: and in their return home their fleet was wrecked off the Scyllæan promontory. At laſt a peace was concluded for 30 years, on condition that the Saracens ſhould retain all the provinces they had ſeized; and that they ſhould pay to the emperor and his ſucceſſors 3000 pounds weight of gold, 50 ſlaves, and as many choice horſes.

101 Conſtantinople beſieged by the Saracens.

102 Empire invaded by the Bulgarians.

This peace was ſcarce concluded, when the empire was invaded by a new enemy, who proved very troubleſome for a long time. Theſe were the Bulgarians: who breaking into Thrace, defeated the Roman army ſent againſt them, and ravaged the country far and wide. The emperor conſented to pay them an annual penſion, rather than continue a doubtful war; and allowed them to ſettle in Lower Mœſia, which from them was afterwards called *Bulgaria*. In 687, they were attacked by Juſtinian II. who entered their country without provocation, or regarding the treaties formerly concluded with them. But they falling ſuddenly upon him, drove him out of their country, and obliged him to reſtore the towns and captives he had taken. In 697, this emperor was depoſed; and in his exile fled to Trebelis king of the Bulgarians, by whom he was kindly entertained, and by whoſe means he was reſtored to his throne; but ſoon forgetting this favour, he invaded the country of the Bulgarians, with a deſign to wreſt from them thoſe provinces which he had yielded to them. He was attended in this expedition by no better ſucceſs than his ingratitude deſerved, his army being utterly defeated, and he himſelf obliged to make his eſcape in a light veſſel to Conſtantinople. The Bulgarians continued their inroads and ravages at different times, generally defeated the Romans who ventured to oppoſe them, till the year 800, the ſeventh of the reign of Nicephorus, when they ſurpriſed the city of Sardica in Mœſia, and put the whole garriſon, conſiſting of 6000 men, to the ſword. The emperor marched againſt them with a conſiderable army: but the enemy retired at his approach; and he, inſtead of purſuing them, returned to Conſtantinople. Two years after, he entered Bulgaria at the head of a powerful army, deſtroying every thing with fire and ſword. The king offered to conclude a peace with him upon honourable terms; but Nicephorus, rejecting his propoſals, continued to waſte the country, deſtroying the cities, and putting all the inhabitants, without diſtinction of ſex or age, to the ſword. The king was ſo much affected with theſe cruelties which were exerciſed on his ſubjects, that he ſent a ſecond embaſſy to Nicephorus, offering to conclude a peace with him upon any terms, provided he would quit his country. But Nicephorus diſmiſſing the ambaſſadors with ſcorn, the Bulgarian monarch attacked unexpectedly the Roman camp, forced it, and cut off almoſt the whole army, with the emperor himſelf, and a great number of patricians. His ſucceſſor Michael likewiſe engaged in a war with the Bulgarians; but being utterly defeated, he was ſo grieved that he reſigned the empire. After this the Bulgarians continued to be very formidable enemies to the empire, till the year 979, when they were attacked by Baſilius II. The Bulgarians were at that time governed by a king named *Samuel*; who having ravaged the Roman territories,

103 They defeat Juſtinian II.

104 Their country cruelly ravaged by Nicephorus.

105 Who is cut off with his whole army.

106 Their country invaded by Baſilius II.

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tories, as was the common practice of his nation, Basilius sent against him one Nicephorus Uranus at the head of a powerful army. Uranus, leaving his baggage at Lariffa, reached by long marches the Sperchius, and encamped with his whole army over against the enemy, who lay on the opposite bank. As the river was greatly swelled with the heavy rains that had lately fallen, Samuel, not imagining the Romans would attempt to pass it, suffered his troops to roam in large parties about the country in quest of booty. But Uranus having at length found out a place where the river was fordable, passed it in the dead of the night without being perceived. He then fell upon the Bulgarians who were left in the camp, and lay for the most part asleep; cut great numbers of them in pieces; took a great number of prisoners, with all their baggage; and made himself master of their camp. Samuel and his son were dangerously wounded; and would have been taken, had they not all that day concealed themselves among the dead. The next night they stole away to the mountains of Ætolia, and from thence made their escape into Bulgaria. The following year the emperor entered Bulgaria at the head of a numerous and well-disciplined army; defeated Samuel in a pitched battle, and took several strong cities. The emperor himself, however, at last, narrowly escaped being cut off with his whole army; being unexpectedly attacked by the Bulgarians in a narrow pass. From this danger he was relieved by the arrival of Nicephorus Xiphias, governor of Philippopolis, with a considerable body of troops; who falling upon the enemies rear, put them to flight. Basilius pursued them close; and having taken an incredible number of captives, caused their eyes to be pulled out; leaving to every hundred a guide with one eye, that he might conduct them to Samuel. This shocking spectacle so affected the unhappy king, that he fell into a deep swoon, aud died two days after. The Roman emperor pursued his conquests, and in the space of two years made himself master of most of the enemies strong holds. He defeated also the successor of Samuel in several engagements; and having at last killed him in battle, the Bulgarians submitted themselves without reserve. The vast treasures of their princes were by Basilius distributed among his soldiers by way of donative. Soon after, the widow of the late king, with her six daughters and three of her sons, surrendered themselves to the Roman emperor, by whom they were received with the utmost civility and respect. This obliging behaviour encouraged the three other sons of the late king, and most of the princes of the blood, who had taken shelter in the mountains, to submit, and throw themselves on the emperor's mercy.

107 His monstrous cruelty.

108 The country subdued.

109 Ibatzes alone holds out.

Ibatzes, however, a person nearly allied to the royal family, who had distinguished himself in a very eminent manner during the whole course of the war, refused to submit, and fled to a steep and craggy mountain, with a design to defend himself there to the last extremity. Basilius endeavoured to cause him submit by fair means, but he equally despised both threats and promises. At last Eustathius Daphnomelus, whom Basilius had lately appointed governor of Achridus, the chief city of Bulgaria, undertook to secure him by a most desperate and improbable scheme. Without communicating his design to any, he repaired, with two persons in whom he could confide, to the mountain on which Ibatzes had fortified himself. He hoped to pass undiscovered among the many strangers who flocked thither to celebrate the appreaching feast of the Virgin Mary, for whom Ibatzes had a particular veneration. In this he found himself mistaken; for he was known by the guards, and carried before the prince. To him he pretended to have something of importance to communicate; but as soon as Ibatzes had retired with him into a remote place, Daphnomelus threw himself suddenly upon him, and with the assistance of the two men whom he had brought with him, pulled out both his eyes, and got safe to an abandoned castle on the top of the hill. Here they were immediately surrounded by the troops of Ibatzes; but Daphnomelus exhorting them now to submit to the emperor, by whom he assured them they would be well received, they congratulated Daphnomelus on his success, and suffered him to conduct the unhappy Ibatzes a prisoner to Basilius. The emperor was no less surprised than pleased at the success of the bold attempt; and rewarded Daphnomelus with the government of Dyrrhachium, and all the rich moveables of his prisoner. After this, having accomplished the entire reduction of Bulgaria, he returned to Constantinople with an incredible number of captives; where he was received by the senate and people with all possible demonstrations of joy.

110 He is taken by a stratagem.

All this time the Saracens had at intervals invaded the Roman dominions, and even attempted to make themselves masters of Constantinople. Their internal divisions, however, rendered them now much less formidable enemies than they had formerly been; so that some provinces were even recovered for a time out of their hands; though the weak and distracted state of the empire rendered it impossible to preserve such conquests. But in 1041, the empire was invaded by an enemy, not very powerful at that time indeed, but who by degrees gathered strength sufficient to overthrow both the Roman and Saracen empires. These were the Turks; who having quitted their ancient habitations in the neighbourhood of Mount Caucasus, and passed the Caspian straits, settled in Armenia Major, about the year 844. There they continued an unknown and despicable people, till the intestine wars of the Saracens gave them an opportunity of aggrandizing themselves. About the year 1030, Mohammed the son of Sambrael sultan of Persia, not finding himself a match for Pisaris sultan of Babylon, with whom he was at war, had recourse to the Turks, who sent him 3000 men under the command of Tangrolipix, a leading man among them. By their assistance Mohammed defeated his adversary; but when the Turks desired leave to return home, he refused to part with them. Upon this they withdrew without his consent to a neighbouring desert; and being there joined by several discontented Persians, began to make frequent inroads into the sultan's territories. Against them Mohammed immediately dispatched an army of 20,000 men; who being surprised in the night, were utterly defeated by Tangrolipix. The fame of this victory drew multitudes to him from all parts; so that in a short time Tangrolipix saw himself at the head of 50,000 men. Upon this Mohammed marched against them in person,

111 The empire invaded by the Turks.

112 Account of them.

ſon, but was thrown from his horſe in the beginning of the engagement, and killed by the fall; upon which his men threw down their arms, and ſubmitted to Tangrolipix.

After this victory the Turkiſh general made war upon the ſultan of Babylon; whom he at length ſlew, and annexed his dominions to his own. He then ſent

113 They defeat the Romans.

his nephew, named *Cutlu-Moſes*, againſt the Arabians; but by them he was defeated, and forced to fly towards Media. Through this province he was denied a paſſage by Stephen the Roman governor; upon which Cutlu-Moſes was obliged to force a paſſage by encountering the Roman army. Theſe he put to flight, took the governor himſelf priſoner, and without any further oppoſition reached the confines of Perſia, where he ſold Stephen for a ſlave. Returning from thence to Tangrolipix, he excuſed, in the beſt manner he could, his defeat by the Arabians; but at the ſame time acquainted him with his victory over the Romans in Media, encouraging him to invade that fertile country, which he ſaid might be eaſily conquered, as it was inhabited by none but *women*, meaning the Romans. At that time Tangrolipix, did not hearken to his advice, but marched againſt the Arabians at the head of a numerous army. He was, however, attended with no better ſucceſs than his nephew had been; and therefore began to reflect on what he had told him. Soon after he ſent Aſan his brother's ſon with an army

114 A Turkiſh army entirely cut off.

of 20,000 men to reduce Media. Purſuant to his orders, the young prince entered that country, and committed everywhere dreadful ravages; but being in the end drawn into an ambuſh by the Roman generals, he was cut off with his whole army.

115 They again invade the empire.

Tangrolipix, no way diſcouraged by this misfortune, ſent a new army into Media near 100,000 ſtrong; who, after having ravaged the country without oppoſition, laid ſiege to Artza a place of great trade, and therefore reckoned the moſt wealthy in thoſe parts. Not being able to reduce it by any other means, they ſet it on fire; and thus in a ſhort time it was utterly deſtroyed: the buildings being reduced to aſhes, and 150,000 of the inhabitants periſhed either by the flames or the ſword. After this Abraham Halim, half-brother to Tangrolipix, hearing that the Romans, reinforced with a body of troops under the command of Liparites governor of Iberia, had taken the field, marched againſt them,

116 An obſtinate engagement.

and offered them battle; which they not declining, the two armies engaged with incredible fury. The victory continued long doubtful; but at length inclined to the Romans; who nevertheleſs did not think proper to purſue the fugitives, as their general Liparites was taken priſoner. The emperor, greatly concerned for the captivity of Liparites, diſpatched ambaſſadors with rich preſents, and a large ſum of money to redeem him, and at the ſame time to conclude an alliance with Tangrolipix. The ſultan received the preſents; but generouſly returned them together with the money to Liparites, whom he ſet at liberty without any ranſom; only requiring him, at his departure, never more to bear arms againſt the Turks. Not long after, Tangrolipix ſent a perſon of great authority among the Turks, with the character of ambaſſador, to Conſtantinople; who having arrogantly exhorted the emperor to ſubmit to his maſter, and acknowledge himſelf his tributary, was ignominiouſly driven out of the city.

Tangrolipix, highly affronted at the reception his ambaſſador had met with, entered Iberia while the

117 The Turks beſiege Mantzichierta.

emperor Conſtantine Monomachus was engaged in a war with the Patzinacæ, a Scythian nation. Having ravaged that country, he returned from thence to Media, and laid ſiege to Mantzichierta, a place defended by a numerous garriſon, and fortified with a triple wall and deep ditches. However, as it was ſituated in an open plain country, he hoped to be maſter of it in a ſhort time. But finding the beſieged determined to defend themſelves to the laſt extremity, he reſolved to raiſe the ſiege, after he had continued it 30 days. One of his officers, however, named *Alcan*, prevailed on him to continue it but one day longer, and to commit the management of the attacks to him. This being granted, Alcan diſpoſed his men with ſuch ſkill, and ſo encouraged them by his example, that, notwithſtanding the vigorous oppoſition they met with, the place would have probably been taken, had not Alcan been ſlain as he was mounting the wall. The beſieged, knowing him by the richneſs of his armour, drew him by the hair into the city, and cutting off his head threw it

118 The ſiege raiſed.

over the wall among the enemy; which ſo diſheartened them, that they gave over the aſſault and retired. The next ſpring Tangrolipix returned, and ravaged Iberia with the utmoſt cruelty, ſparing neither ſex nor age. But on the approach of the Roman army he retired to Tauris, leaving 30,000 men behind him to infeſt the frontiers of the empire. This they did with great ſucceſs, the borders being through the avarice of Monomachus unguarded. Till the time of this emperor, the provinces bordering on the countries of the barbarians had maintained, at their own charge, forces to defend them; and were on that account exempted from paying tribute; but as Monomachus exacted from them the ſame ſums that were paid by others, they were no longer in a condition to defend themſelves.

119 The empreſs Eudocia forced to ſwear that ſhe will never marry.

In 1062 died the emperor Conſtantine Ducas, having left the empire to his three ſons, Michael, Andronicus, and Conſtantine; but as they were all very young, he appointed the empreſs Eudocia, regent during their minority, after having required of her an oath never to marry; which oath was with great ſolemnity lodged in the hands of the patriarch. He likewiſe obliged the ſenators ſolemnly to ſwear that they would acknowledge none for their ſovereign but his three ſons. No ſooner, however, was he dead, than the Turks, hearing that the empire was governed by a woman, broke into Meſopotamia, Cilicia, and Cappadocia, deſtroying all with fire and ſword. The empreſs was no way in a condition to oppoſe them, the greater part of the army having been diſbanded in her huſband's life-time, and the troops that were ſtill on foot being undiſciplined, and altogether unfit for ſervice. The concern which this gave the empreſs was aggravated by the ſeditious ſpeeches of a diſcontented party at home, who repeated on all occaſions that the preſent ſtate of affairs required a man of courage and addreſs at the helm, inſtead of a weak and helpleſs woman; and as they imagined the empreſs would never think of marrying, in conſequence of the oath ſhe had

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had taken, they hoped by theſe ſpeeches to induce the people to revolt, and chooſe a new emperor. This Eudocia was aware of; and therefore determined to prevent the evils that threatened herſelf and her family, by marrying ſome perſon of merit who was capable of defeating her enemies both at home and abroad. At this time one Romanus Diogenes, a perſon of a moſt beautiful aſpect, extraordinary parts, and illuſtrious birth, being accuſed of aſpiring to the empire, tried and convicted, was brought forth to receive ſentence of death. But the empreſs, touched with compaſſion at his appearance, gently upbraided him with his ambition, ſet him at liberty, and ſoon after appointed him commander in chief of all her forces. In this ſtation he acquitted himſelf ſo well, that the empreſs reſolved to marry him if ſhe could but recover the writing in which her oath was contained out of the hands of the patriarch. In order to this, ſhe applied to a favourite eunuch; who going to the patriarch, told him that the empreſs was ſo taken with his nephew named *Bardas*, that ſhe was determined to marry and raiſe him to the empire, provided the patriarch abſolved her from the oath ſhe had taken, and convinced the ſenate of the lawfulneſs of her marriage. The patriarch, dazzled with the proſpect of his nephew's promotion, readily undertook to perform both. He firſt obtained the conſent of the ſenate by repreſenting to them the dangerous ſtate of the empire, and exclaiming againſt the raſh oath which the jealouſy of the late emperor had extorted from the empreſs. He then publicly diſcharged her from it; reſtored the writing to her; and exhorted her to marry ſome deſerving object, who being entruſted with an abſolute authority, might be capable of defending the empire. The empreſs, thus diſcharged from her oath, married a few days after Romanus Diogenes; who was thereupon proclaimed emperor, to the great diſappointment of the patriarch.

120 The empreſs determines to break her oath.

121 She recovers the writing in which it was contained,

122 and marries Romanus Diogenes.

As the new emperor was a man of great activity and experience in war, he no ſooner ſaw himſelf veſted with the ſovereign power, than he took upon him the command of the army, and paſſed over into Aſia with the few forces he could aſſemble, recruiting and inuring them on his march to military diſcipline, which had been utterly neglected in the preceding reigns. On his arrival in that continent, he was informed that the Turks had ſurpriſed and plundered the city of Neocæſarea, and were retiring with their booty. On this news he haſtened after them at the head of a choſen body of light-armed troops, and came up with them on the third day. As the Turks were marching in diſorder, without the leaſt apprehenſion of an enemy, Romanus cut great numbers of them in pieces, and eaſily recovered the booty; after which he purſued his march to Aleppo, which he retook from them, together with Hierapolis, where he built a ſtrong caſtle.

123 He paſſes over into Aſia.

124 He defeats the Turks.

As he was returning to join the forces he had left behind him, he was met by a numerous body of Turks, who attempted to cut off his retreat. At firſt he pretended to decline an engagement through fear; but attacked them afterwards with ſuch vigour when they leaſt expected it, that he put them to flight at the firſt onſet, and might have gained a complete victory had he thought proper to purſue them. After this, ſeveral towns ſubmitted to him; but the ſeaſon being now far ſpent, the emperor returned to Conſtantinople. The following year he paſſed over into Aſia early in the ſpring; and being informed that the Turks had ſacked the rich city of Iconium, beſides gaining other conſiderable advantages, he marched in perſon againſt them. But the Turks, not thinking it adviſable to wait his coming, retired in great haſte. The Armenians, however, encouraged by the approach of the emperor's army, fell upon the enemy in the plains of Tarſus, put them to flight, and ſtripped them both of their baggage and the booty they had taken. The ſpring following the emperor once more entered Aſia at the head of a conſiderable army which he had raiſed, and with incredible pains diſciplined during the winter. When the two armies drew near to each other, Axan, the Turkiſh ſultan, and ſon of the famous Tangrolipix, ſent propoſals to Romanus for a laſting and honourable peace. Theſe were imprudently rejected, and a deſperate engagement enſued, when, in ſpite of the utmoſt efforts of the emperor, his army was routed, and he himſelf wounded and taken priſoner. When this news was brought to Axan, he could ſcarcely believe it; but being convinced by the appearance of the royal captive in his preſence, he tenderly embraced him, and addreſſed him in an affectionate manner: "Grieve not (ſaid he), moſt noble emperor, at your misfortune; for ſuch is the chance of war, ſometimes overwhelming one, and ſometimes another; you ſhall have no occaſion to complain of your captivity; for I will not uſe you as my priſoner, but as an emperor." The Turk was as good as his word. He lodged the emperor in a royal pavilion; aſſigned him attendants, with an equipage ſuitable to his quality; and diſcharged ſuch priſoners as he deſired. After he had for ſome days entertained his royal captive with extraordinary magnificence, a perpetual peace was concluded betwixt them, and the emperor diſmiſſed with the greateſt marks of honour imaginable. He then ſet out with the Turkiſh ambaſſador for Conſtantinople, where the peace was to be ratified; but by the way he was informed that Eudocia had been driven from the throne by John the brother of Conſtantine Ducas, and Pſellus a leading man in the ſenate, who had confined her to a monaſtery, and proclaimed her eldeſt ſon, Michael Ducas, emperor. On this intelligence, Romanus retired to a ſtrong caſtle near Theodoſiopolis, where he hoped in a ſhort time to be joined by great numbers of his friends and adherents. But in the mean time John, who had taken upon him to act as guardian to the young prince, deſpatched Andronicus with a conſiderable army againſt him. Andronicus having eaſily defeated the ſmall army which Romanus had with him, obliged him to fly to Adana a city in Cilicia, where he was cloſely beſieged, and at laſt obliged to ſurrender. Andronicus carried his priſoner into Phrygia, where he fell dangerouſly ill, being, as was ſuſpected, ſecretly poiſoned. But the poiſon being too ſlow in its operation, John ordered his eyes to be put out; which was done with ſuch cruelty that he died ſoon after, in the year 1067, having reigned three years and eight months.

125 Gains a ſecond victory.

126 They are again defeated.

127 The Romans defeated and the emperor taken.

128 Eudocia depoſed and confined in a monaſtery.

129 Romanus put to death.

Axan was no ſooner informed of the tragical end of his friend and ally, than he reſolved to invade the empire

130 The Turks again invade the empire.

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empire anew; and that not with a deſign only to plunder as formerly, but to conquer, and keep what he had once conquered. The emperor diſpatched againſt

131 him Iſaac Comnenus, with a conſiderable army; but

They defeat the Romans.

he was utterly defeated and taken priſoner by Axan. Another army was quickly ſent off under the command of John Ducas the emperor's uncle. He gained at firſt ſome advantages, and would probably have put a ſtop to their conqueſts, had not one Ruſelius, or Urſelius, revolted with the troops he had under his command, cauſed himſelf to be proclaimed emperor, and reduced ſeveral cities in Phrygia and Cappadocia. Againſt him John marched with all his forces, ſuffering the Turks in the mean time to purſue their conqueſts; but coming to an engagement with the rebels,

132 his army was entirely defeated and himſelf taken priſoner.

They gain a ſecond victory.

Notwithſtanding this victory, Ruſelius was ſo much alarmed at the progreſs of the Turks, that he not only releaſed his priſoner, but joined with him againſt the common enemy, by whom they were both defeated and taken priſoners. Axan, however, was for ſome time prevented from purſuing his conqueſt by Cutlu-Moſes, nephew to the late Tangrolipix. He had revolted againſt his uncle; but being defeated by him in a pitched battle, had taken refuge in Arabia, whence he now returned at the head of a conſiderable army in order to diſpute the ſovereignty with Axan. But while the two armies were preparing to engage, the caliph of Babylon, who was ſtill looked upon as the ſucceſſor of the great prophet, interpoſed his authority, He repreſented the dangers of their inteſtine diſſenſions; and by his mediation, an agreement was at laſt concluded, on condition that Axan ſhould enjoy undiſturbed the monarchy lately left him by his father, and Cutlu-Moſes ſhould poſſeſs ſuch provinces of the Roman empire as he or his ſons ſhould in proceſs of time conquer.

133

They conquer ſeveral provinces.

After this agreement, both the Turkiſh princes turned their forces againſt the empire; and before the year 1077, made themſelves maſters of all Media, Lycaonia, Cappadocia, and Bithynia, fixing the capital city of their empire at Nice in the latter province. During all this time, the emperors of Conſtantinople, as well as their ſubjects, ſeemed to be in a manner infatuated. No notice was taken of the great progreſs made by theſe barbarians. The generals were ambitious only of ſeizing the tottering empire, which ſeemed ready to fall a prey to the Turks; and, after it was obtained, ſpent their time in oppreſſing their ſubjects, rather than in making any attempts to repulſe the enemy.

134

Alexius Comnenus ſtops their progreſs.

At laſt Alexius Comnenus, having wreſted the empire from Nicephorus Botoniates, in 1077, began to prepare for oppoſing ſo formidable an enemy. But before he ſet out, as his ſoldiers had committed great outrages on his acceſſion to the empire, he reſolved to make confeſſion of his ſins, and do open penance for thoſe he had ſuffered his army to commit. Accordingly he appeared in the attire of a penitent before the patriarch and ſeveral other eccleſiaſtics, acknowledged himſelf guilty of the many diſorders that had been committed by his ſoldiers, and begged of the patriarch to impoſe upon him a penance ſuitable to the greatneſs of his crimes. The penance enjoined him and his adherents by the patriarch was to faſt, lie upon the ground, and practiſe ſeveral other auſterities for the ſpace of 40 days. This command was religiouſly obeyed, and the emperor then began to prepare for war with ſo much vigour, that Solyman, the Turkiſh ſultan, ſon and ſucceſſor to Cutlu-Moſes, diſpatched ambaſſadors to Alexius with propoſals of peace. Theſe were at firſt rejected; but the emperor was at laſt glad to accept them, on certain advice that Robert Guiſchard, duke of Puglia and Calabria, was making great preparations againſt him in the weſt. 135

Robert Guiſchard's expedition againſt the emperor.

To this expedition Robert was incited by Michael Ducas. That prince had been depoſed by Nicephorus Botoniates, and towards the end of the uſurper's reign fled into the weſt, where he was received by Robert, who was prevailed upon to favour his cauſe. For this purpoſe, Robert made great preparations; and theſe were continued even after the depoſition of Botoniates. He ſailed with all his forces from Brundusium; and landing at Buthrotum in Epirus, made himſelf maſter of that place, while his ſon Bohemond with part of the army reduced Aulon, a celebrated port and city in the country now called *Albania*. From thence they advanced to Dyrrhachium, which they inveſted both by ſea and land; but met with a 136

He paſſes over into Epirus and beſieges Dyrrhachium.

moſt vigorous oppoſition from George Paleologus, whom the emperor had entruſted with the defence of that important place. In ſpite of the utmoſt efforts of the enemy, this commander held out till the arrival of the Venetian fleet, by whom Robert's navy, commanded by Bohemond, was utterly defeated, the admiral himſelf having narrowly eſcaped being taken priſoner. After this victory, the Venetians landed without loſs of time, and being joined by Paleologus's men, fell upon Robert's troops with ſuch fury, that they deſtroyed their works, burnt their engines, and forced them back to their camp in great diſorder. As the Venetians were now maſters at ſea, the beſieged were ſupplied with plenty of proviſions, while a famine began to rage in the camp of the enemy; and this calamity was ſoon followed by a plague, which in the ſpace of three months is ſaid to have deſtroyed ten thouſand men. Notwithſtanding all theſe diſaſters, however, Robert did not abandon the ſiege: having found means to ſupply his famiſhed troops with proviſions, he continued it with ſuch vigour, that the courage of the beſieged began at laſt to fail them; and Paleologus ſent repeated meſſages to the emperor, acquainting him that he would be obliged to ſurrender unleſs very ſpeedily aſſiſted. On this Alexius marched in perſon to the relief of the city, but was defeated with great loſs by Robert. The whole right wing of Alexius's army, finding themſelves hard preſſed by the enemy, fled to a church dedicated to St Michael, imagining they would there find themſelves in a place of ſafety; but the victorious army purſuing them, ſet fire to the church, which was burnt to aſhes with all who were in it. The emperor himſelf with great difficulty made his eſcape, leaving the enemy maſters of his camp and all his baggage. Soon after this defeat, the city ſurrendered; and Alexius being deſtitute of reſources for carrying on the war, ſeized on the wealth of churches and monaſteries, which gave much offence to the clergy, and had like to have occaſioned great diſturbances in the imperial city. At the ſame time, Alexius entering into an alliance with Henry emperor of Germany, perſuaded

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perſuaded him to invade the dominions of Robert in Italy. At firſt Henry met with great ſucceſs; but was ſoon overcome, and driven out of that country by Robert. Bohemond, in the mean time, reduced ſeveral places in Illyricum; and, having defeated Alexius in two pitched battles, entered Theſſaly, and ſat down before Lariſſa. This place, being defended by an officer of great courage and experience in war, held out

137 The city ſurrenders.

till the emperor came to its relief. Soon after his arrival, he found means to draw a ſtrong party of Bohemond's men into an ambuſcade, and cut them off almoſt entirely. However, in the battle which was fought a few days after, Bohemond had the advantage; but his troops mutinying and refuſing to carry on the war, he was obliged to return to Italy. Alexius taking advantage of his abſence, recovered ſeveral cities; and being informed that Robert was making great preparations againſt him, he had recourſe once more to the Venetians. By them he was aſſiſted with a powerful fleet, which defeated that of Robert in two engagements; but being ſoon after ſurpriſed by him, they were defeated with the loſs of almoſt their whole navy. Robert is ſaid to have uſed his victory with great barbarity, putting many of his priſoners to death with unheard-of torments. The Venetians equipped a ſecond fleet; and joining that of the emperor, fell unexpectedly upon Robert's navy, who were riding without the leaſt apprehenſions in Buthrotum, ſunk moſt of his ſhips, and took a great number of priſoners, his wife and younger ſons having narrowly eſcaped falling into their hands. Robert made great preparations to revenge this defeat; but was prevented

138 The war ended by the death of Robert.

by death from executing his deſigns; and, after his deceaſe, his ſon Roger did not think proper to purſue ſo dangerous and expenſive a war. He therefore recalled his troops, and the places which had been conquered by Robert and Bohemond ſubmitted anew to the emperor.

139 The Scythian war.

This war was ſcarce ended, when the Scythians paſſing the Danube laid waſte great part of Thrace, committing everywhere the greateſt barbarities. Againſt them the emperor diſpatched an army under the command of Pacurianus and Branas. The latter inſiſted upon engaging the enemy contrary to the opinion of his colleague; and his raſhneſs cauſed the loſs of the greater part of the army, who were cut off by the Scythians together with the two generals. *Talicius*, an officer who had ſignalized himſelf on many occaſions, was appointed to command the army in their room. He fell upon the enemy as they lay ſecurely in the neighbourhood of Philippopolis, cut great numbers of them in pieces, and obliged the reſt to retire in great confuſion. The following ſpring, however, they returned in ſuch numbers, that the emperor reſolved to march againſt them in perſon. Accordingly he ſet out for Adrianople, and from thence

140 The Romans defeated.

to a place called *Lardea*. Here, contrary to the advice of his beſt officers, he ventured a battle; in which he was utterly defeated with the loſs of vaſt numbers of his men, he himſelf eſcaping with the utmoſt difficulty. The next year he was attended with no better

141 They at laſt defeat the Scythians.

ſucceſs, his army being entirely defeated with the loſs of his camp and baggage. In the year following, 1084, the emperor retrieved his credit; and gave the Scythians ſuch an overthrow, that very few eſcaped the general ſlaughter. Notwithſtanding this diſaſter, however, they again invaded the empire in 1093. To this they were encouraged by an impoſtor called *Leo*, who pretended to be the eldeſt ſon of Romanus Diogenes. The young prince had been ſlain in a battle with the Turks; but as the Scythians only wanted a pretence to renew the war, they received the impoſtor with joy. By a ſtratagem, however, Leo was murdered; and the Scythians being afterwards overthrown in two great battles, were obliged to ſubmit on the emperor's own terms.

142 The Holy War.

Since the year 1083, the war had been carried on with the Turks with various ſucceſs; but now an aſſociation was formed in the weſt againſt theſe infidels, which threatened the utter ruin of the Turkiſh nation. This was occaſioned by the ſuperſtition of the Chriſtians, who thought it a meritorious action to venture their lives for the recovery of the Holy Land, poſſeſſed at that time by the Turks and Saracens. Had the weſtern princes been properly aſſiſted by the emperors of the Eaſt in this undertaking, the Turks had undoubtedly been unable to reſiſt them; but ſo far from this, the Latins were looked upon by them as no leſs enemies than the Turks; and indeed whatever places they took from the infidels, they never thought of reſtoring to the emperors of Conſtantinople, to whom they originally belonged, but erected a number of ſmall independent principalities; which neither having ſufficient ſtrength to defend themſelves, nor being properly ſupported by one another, ſoon became

143 Dreadful fire at Conſtantinople.

a prey to the Turks. In the year 1203 happened a dreadful fire at Conſtantinople, occaſioned by ſome Latin ſoldiers. Theſe had plundered a moſque, which the Turks reſiding in Conſtantinople had been ſuffered to build there. For this reaſon they were attacked by the infidels; who being much ſuperior to them in number, the Latins found themſelves obliged to ſet fire to ſome houſes, in order to make their eſcape with ſafety. The flame ſpreading in an inſtant from ſtreet to ſtreet, reduced in a ſhort time great part of the city to aſhes, with the capacious ſtore-houſes which had been built at a vaſt expence on the quay. The late emperor Iſaac Angelus, who had been reſtored to his throne by the Latins, died ſoon after their departure from Conſtantinople, leaving his ſon Alexius ſole maſter of the empire. The young prince, to diſcharge the large ſums he had promiſed the French and Venetians for their aſſiſtance, was obliged to lay heavy taxes on his ſubjects; and this, with the great eſteem and friendſhip ſhowed to his deliverers, raiſed a general diſcontent among the people of Conſtantinople, who were ſworn enemies to the Latins. This encouraged John Ducas, ſurnamed *Murtzuphlus*, from his joined and thick eyebrows, to attempt the ſovereignty. Unhappily he found means to put his treacherous deſigns in execution; and ſtrangled the young prince

144 Murtzuphlus ſtrangles the emperor.

with his own hands. After this he preſented himſelf to the people; told them what he had done, which he pretended was in order to ſecure their liberties; and earneſtly intreated them to chooſe an emperor who had courage enough to defend them againſt the Latins that were ready to oppreſs and enſlave them. On this he was inſtantly ſaluted emperor by the inconſtant multitude; but this uſurpation proved the ruin of the city. The Latins immediately reſolved to revenge the

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the death of the young prince; and, as they had been ſo often betrayed and retarded in their expeditions to the Holy Land by the emperors of Conſtantinople, to make themſelves maſters of that city, and ſeize the empire for themſelves. In conſequence of this reſolution they muſtered all their forces in Aſia, and having croſſed the ſtraits, laid ſiege to Conſtantinople by ſea and land. The tyrant, who was a man of great courage and experience in war, made a vigorous defence. The Latins, however, after having battered the walls for ſeveral days together with an incredible number of engines, gave a general aſſault on the 8th of April 1204. The attack laſted from break of day till three in the afternoon, when they were forced to

145 The city taken and plundered by the Latins.

retire, after having loſt ſome of their engines, and a great number of men. The aſſault was nevertheleſs renewed four days after; when, after a warm diſpute, the French planted their ſtandard on one of the towers; which the Venetians obſerving, they quickly made themſelves maſters of four other towers, where they likewiſe diſplayed their enſigns. In the mean time three of the gates being broken down by the battering rams, and thoſe who had ſcaled the walls having killed the guards, and opened the gates between the towers they had taken, the whole army entered, and drew up in battle array between the walls. The Greeks fled up and down in the greateſt confuſion; and ſeveral parties were by the Latins diſpatched to ſcour the ſtreets, who put all they met to the ſword, without diſtinction of age or condition. Night put a ſtop to the dreadful ſlaughter, when the princes ſounding the retreat, placed their men in different quarters of the city, with orders to be upon their guard, not doubting but they ſhould be attacked early next morning. They were ſurpriſed, however, at that time by the entire ſubmiſſion of the Greeks; to whom they promiſed their lives, but at the ſame time ordering them to retire to their houſes, they gave up the city to be plundered by the ſoldiers for that day. They ſtrictly enjoined their men to abſtain from ſlaughter, to preſerve the honour of the women, and to bring the whole booty into one place, that a juſt diſtribution might be made according to the rank and merit of each individual. The Greeks had undoubtedly concealed their moſt valuable effects during the night; many perſons of the firſt rank had eſcaped, and carried along with them immenſe treaſures; the ſoldiers had probably, as is uſual in all ſuch caſes, reſerved things of great value for themſelves, notwithſtanding all prohibitions to the contrary; and yet the booty, without the ſtatues, pictures, and jewels, amounted to a ſum almoſt incredible. As for Murtzuphlus, he made his eſcape in the night; embarking in a ſmall veſſel with *Euphroſyne*, the wife of *Alexius Angelus* a late uſurper, and her daughter *Eudoxia*, for whoſe ſake he had abandoned his lawful wife.

146 The Latins expelled.

Conſtantinople continued ſubject to the Latins till the year 1261, when they were expelled by one *Alexius Strategopulus*. He was a perſon of an illuſtrious family; and, for his eminent ſervices, diſtinguiſhed with the title of *Cæſar*. He had been ſent againſt Alexius Angelus deſpot of Epirus, who now attempted to recover ſome places in Theſſaly and Greece from Michael Paleologus, one of the Greek emperors, that ſince the capture of Conſtantinople, had kept their court at Nice; and to try whether he could on his march ſurpriſe the imperial city itſelf. Alexius, having paſſed the ſtraits, encamped at a place called *Rhegium*, where he was informed by the natives that a ſtrong body of the Latins had been ſent to the ſiege of *Daphnuſa*, that the garriſon was in great want of proviſions, and that it would be no difficult matter to ſurpriſe the city. Hereupon the Greek general reſolved at all events to attempt it: in which he was encouraged by ſome of the inhabitants, who, coming privately to his camp, offered themſelves to be his guides. He approached the walls in the dead of the night, which ſome of his men ſcaled without being obſerved; and, killing the centries whom they found aſleep, opened one of the gates to the reſt of the army. The Greeks ruſhing in, put all they met to the ſword; and at the ſame time, to create more terror, ſet fire to the city in four different places. The Latins, concluding from thence that the enemy's forces were far more numerous than they really were, did not ſo much as attempt either to drive them out or to extinguiſh the flames. In this general confuſion, the emperor Baldwin, quitting the enſigns of majeſty, fled with Juſtinian the Latin patriarch, and ſome of his intimate friends, to the ſea-ſide; and there, embarking in a ſmall veſſel, ſailed firſt to Eubœa, and afterwards to Venice, leaving the Greeks in full poſſeſſion of Conſtantinople. When news of this ſurpriſing and altogether unexpected ſucceſs of Alexius were firſt brought to Paleologus, he could ſcarce give credit to it; but receiving ſoon after letters from Alexius himſelf, with a particular account of ſo memorable an event, he ordered public thanks to be returned in all the churches, appeared in public in his imperial robes, attended by the nobility in their beſt apparel, and ordered couriers to be diſpatched with the agreeable news into all parts of the empire. 147

Soon after, having ſettled his affairs at Nice, he ſet out for Conſtantinople with the empreſs, his ſon Andronicus, the ſenate, and nobility, to take poſſeſſion of the imperial city, and fix his reſidence in that place that had originally been deſigned for the ſeat of the eaſtern empire. Having paſſed the ſtraits, he advanced to the *golden gate*, and continued ſome days without the walls, while the citizens were buſied in making the neceſſary preparations to receive him with a magnificence ſuitable to the occaſion. On the day appointed, the golden gate, which had been long ſhut up, was opened, and the emperor entering it amidſt the repeated acclamations of the multitude, marched on foot to the great palace. He was preceded by the biſhop of *Cyzicus*, who carried an image of the Virgin Mary, ſuppoſed to have been done by St Luke, and followed by all the great officers, nobility, and chief citizens, pompouſly dreſſed. Public thanks were again returned in the church of St Sophia, at which the emperor aſſiſted in perſon, with the clergy, the ſenate, and nobility. Theſe exerciſes were ſucceeded by all ſorts of rejoicings; after which the emperor carefully ſurveyed the imperial city. This ſurvey greatly allayed his joy. He ſaw the ſtately palaces and other magnificent buildings of the Roman emperors lying in ruins; the many capacious buildings that had been erected by his predeceſſors, at an immenſe charge, deſtroyed by fire, and other unavoidable accidents of war; 148

Entry of Michael Paleologus into the city.

He reſolves to reſtore it to its former grandeur.

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war; several streets abandoned by the inhabitants, and choaked up with rubbish, &c. These objects gave the emperor no small concern, and kindled in him a desire of restoring the city to its former lustre. In the mean time, looking upon Alexius as the restorer of his country, he caused him to be clad in magnificent robes; placed with his own hand a crown on his head; ordered him to be conducted through the city, as it were in triumph; decreed that for a whole year the name of Alexius should be joined in the public prayers with his own; and to perpetuate the memory of so great and glorious an action, he commanded his statue to be erected on a stately pillar of marble before the church of the Apostles. His next care was to re-people the city, many Greek families having withdrawn from it while it was held by the Latins, and the Latins now preparing to return to their respective countries. The former were recalled home; and the latter, in regard of the great trade they carried on, were allowed many valuable privileges, which induced them not to remove. The Greeks were allowed to live in one of the most beautiful quarters of the city, to be governed by their own laws and magistrates, and to trade without paying customs or taxes of any kind. Great privileges were likewise granted to the natives of Venice and Pisa, which encouraged them to lay aside all thoughts of removing; and the trade they carried on proved afterwards highly advantageous to the state.

It was not long, however, before these regulations were altered. The emperor being soon after informed that Baldwin, lately expelled from Constantinople, had married his daughter to Charles king of Sicily, and given him, by way of dowry, the imperial city itself, he ordered the Genoese, who were become very numerous, to remove first to Heraclia, and afterwards to Galata, where they continued. As for the Pisans and Venetians, who were not so numerous and wealthy, they were allowed to continue in the city. Paleologus, though he had caused himself to be proclaimed emperor, and was possessed of absolute sovereignty, was as yet only guardian to the young emperor John Lascaris, then about 12 years of age. But having now settled the state, and having gained the affections both of natives and foreigners, he began to think of securing himself and his posterity in the full enjoyment of the empire; and for this reason cruelly ordered the eyes of the young prince to be put out, pretending that none but himself had any right to the city or empire of Constantinople, which he alone had recovered out of the hands of the Latins.

149 Great disturbances occasioned by the treachery of Paleologus.

This piece of treachery and inhumanity involved him in great troubles. The patriarch immediately excommunicated him; and he would in all probability have been driven from the throne by a combination of the western princes, had he not engaged Pope Urban IV. to espouse his cause, by promising to submit himself and his dominions to the Latin church. Thus, indeed, he diverted the present storm; but this proceeding caused the greatest disturbances, not only in Constantinople, but throughout the whole empire, nor was Paleologus able to reconcile his subjects to this union.

150 Union of the Greek and Latin churches.

151 Dissolved.

In 1283 Michael died, and was succeeded by his son Andronicus. His first step was to restore the ancient Greek ceremonies, thinking he could not begin his reign with a more popular act. But thus he involved himself in difficulties still greater than before. Though Michael had not been able fully to reconcile his Greek subjects to the Latin ceremonies, yet he had in some degree accomplished his purpose. The Latins had got a considerable footing in the city, and defended their ceremonies with great obstinacy; so that the empire was again thrown into a ferment by this imprudent step.

152 War with the Turks.

All this time the Turks had been continuing their encroachments on the empire, which, had it not been for the crusades published against them by the pope, they would in all probability have made themselves masters of before this time. They were now, however, very successfully opposed by Constantine the emperor's brother: but his valour rendered him suspected by the emperor; in consequence of which he was thrown into prison, along with several persons of great distinction. On the removal of this brave commander, the Turks, under the famous Othoman, made themselves masters of several places in Phrygia, Caria, and Bithynia; and, among the rest, of the city of Nice. To put a stop to their conquests, the emperor dispatched against them Philanthropenus and Libadarius, two officers of great experience in war. The former gained some advantages over the enemy; but being elated with his success, caused himself to be proclaimed emperor. This rebellion, however, was soon suppressed, Philanthropenus being betrayed by his own men; but the Turks taking advantage of these intestine commotions, not only extended their dominions in Asia, but conquered most of the islands in the Mediterranean; and, being masters at sea, infested the coasts of the empire, to the utter ruin of trade and commerce.

From this time the Roman empire tended fast to dissolution. After the revolt of Philanthropenus, the emperor could no longer trust his subjects, and therefore hired the Massagetes to assist him: but they, behaving in a careless manner, were first defeated by their enemies, and afterwards turned their arms against those they came to assist. He next applied to the Catalans, who behaved in the same manner; and having ravaged the few places left the emperor in Asia, returned into Europe, and called the Turks to their assistance.

153 Their first appearance in Europe.

This happened in the year 1292, and was the first appearance of the Turks in Europe. This enterprise, however, was unsuccessful. Having loaded themselves with booty, they offered to depart quietly if they were allowed a safe passage, and ships to transport them to Asia. To this the emperor, willing to get rid of such troublesome guests, readily consented, and ordered the vessels to be got ready with all possible expedition. But the Greek officers observing the immense booty with which they were loaded, resolved to fall upon them in the night, and cut them all off at once. This scheme, however, was not managed with such secrecy but that the Turks had notice of it, and therefore prepared for their defence. They first surprised a strong castle in the neighbourhood, and then found means to acquaint their countrymen in Asia with their dangerous situation. Their brethren, enticed with the hopes of booty, were not long in coming to their assistance; and having crossed the Hellespont in great numbers, ravaged

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ravaged the adjacent country, making excurſions to the very gates of Conſtantinople. At laſt the emperor determined to root them out; and accordingly marched againſt them with all his forces, the country people flocking to him from all quarters. The Turks at firſt gave themſelves over for loſt; but finding the Greeks negligent of diſcipline, they attacked their army unexpectedly, utterly defeated it, and made themſelves maſters of the camp. After this unexpected victory, they

154 They are all cut in pieces or taken.

continued for two years to ravage Thrace in the moſt terrible manner. At laſt, however, they were defeated; and being afterwards ſhut up in the Cherſoneſus, they were all cut in pieces or taken.

Soon after new commotions took place in this unhappy empire, of which the Turks did not fail to take the advantage. In 1327 they made themſelves maſters of moſt of the cities on the Mæander; and, among the reſt, of the ſtrong and important city of Pruſa in Bithynia. The next year, however, Othoman, who may juſtly be ſtyled the founder of the Turkiſh monarchy, being dead, the emperor laid hold of that opportunity to recover Nice, and ſome other important places, from the infidels. But theſe were loſt the year following, together with Abydus and Nicomedia; and in 1330 a peace was concluded upon condition that they ſhould keep all their conqueſts. This peace they obſerved no longer than ſerved their own purpoſes; for new commotions breaking out in the empire, they purſued their conqueſts, and by the year 1357 had reduced all Aſia. They next paſſed the Helleſpont under the conduct of Solyman the ſon, or, as others will have it, the brother of Orchane, the ſucceſſor of Othoman, and ſeized on a ſtrong caſtle on the

155 Adrianople taken by the Turks.

European ſide. Soon after the Turkiſh ſultan died, and was ſucceeded by Amurath. He extended the conqueſts of his predeceſſors, and in a ſhort time reduced all Thrace, making Adrianople the ſeat of his empire. Amurath was ſlain by treachery in a little time after, and was ſucceeded by his ſon Bajazet. This prince greatly enlarged his dominions by new conqueſts. In a ſhort time he reduced the countries of Theſſaly, Macedon, Phocis, Peloponneſus, Myſia, and Bulgaria, driving out the deſpots or petty princes who ruled there. Elated with his frequent victories, he began to look upon the Greek emperor, to whom nothing was now left but the city of Conſtantinople and the neighbouring country, as his vaſſal. Accordingly he ſent him an arrogant and haughty meſſage, commanding him to pay a yearly tribute, and ſend his ſon Manuel to attend him in his military expeditions. This demand the emperor was obliged to comply with, but died ſoon after, in the year 1392.

Manuel no ſooner heard of his father's death than he haſtened to Conſtantinople, without taking leave of

156 Bajazet beſieges Conſtantinople.

the ſultan, or acquainting him with the reaſon of his ſudden departure. At this Bajazet was ſo highly offended, that he paſſed with great expedition out of Bithynia into Thrace, ravaged the country adjoining to Conſtantinople, and at laſt inveſted the city itſelf both by ſea and land. In this extremity Manuel had recourſe to the weſtern princes; who ſent him an army of 130,000 men, under the command of Sigiſmund king of Hungary, and John count of Nevers. But though the weſtern troops proved at firſt ſucceſsful, they were in the end defeated with great ſlaughter by Bajazet, who then returned to the ſiege with greater vigour than ever. As he found, however, that the citizens were determined to hold out to the laſt, he applied to John, the ſon of Manuel's elder brother, who had a better title to the crown than Manuel himſelf. With him he entered into a private agreement, by virtue of which Bajazet was to place John upon the throne of Conſtantinople; on the other hand, John was to deliver up the city to the Turks, and remove the imperial city to Peloponneſus, which the ſultan promiſed to relinquiſh to him and his poſterity. At the ſame time, he ſent deputies to the inhabitants of Conſtantinople, offering to withdraw his army, and ceaſe from further hoſtilities, provided they expelled Manuel and placed John upon the throne. This propoſal rent the city into two factions; but Manuel prevented the miſchiefs which were ready to enſue, by a voluntary reſignation, upon condition that he ſhould be allowed to retire to whatever place he thought proper with his wife and children.

With this condition John readily complied; and Manuel having received him into the city, and conducted him to the palace, ſet ſail for Venice. From thence he went to the courts of all the weſtern princes, to ſolicit their aſſiſtance againſt the Turks, whoſe power was grown formidable to all Europe. He was everywhere received with the greateſt demonſtrations of eſteem, and promiſed large ſupplies; all Chriſtendom being now alarmed at the progreſs of the infidels.

In the mean time, Bajazet did not fail to put John in mind of his promiſe; but the citizens refuſing to comply with ſuch a ſcandalous treaty, the ſiege was renewed, and the city aſſaulted with more fury than ever. When it was already reduced to the laſt extremity, news were brought the ſultan that Tamerlane, the victorious Tartar, having overrun all the eaſt with incredible celerity, had now turned his arms againſt the Turks, and was preparing to break into Syria. Bajazet, alarmed at the danger that threatened him, raiſed 157

the ſiege in great haſte, and advanced againſt Tamerlane with a very numerous and well diſciplined army; but the Tartar totally defeated and took him priſoner, after having cut moſt of his men in pieces: and thus Conſtantinople was preſerved for the preſent.

He is defeated and taken priſoner by Tamerlane.

158 Amurath beſieges Conſtantinople.

But this relief was of ſhort duration. In 1424 the city was again beſieged by Amurath II. The inhabitants defended themſelves with great bravery; but muſt in the end have ſubmitted, had not the emperor prevailed upon the prince of Caramania to countenance an impoſtor and pretender to the Turkiſh throne. 159

This obliged Amurath to raiſe the ſiege, and march with all his forces againſt the uſurper, whom he ſoon reduced. Having then no other enemies to contend with, he entered Macedon at the head of a powerful army; and having ravaged the country far and near, he took and plundered Theſſalonica, as he did alſo moſt of the cities of Ætolia, Phocis, and Bœotia. From Greece he marched into Servia; which country he ſoon reduced. He next broke into the dominions of the king of Hungary, and beſieged the ſtrong city of Belgrade; but here he met with a vigorous repulſe, no fewer than 15,000 Turks being ſlain by the Chriſtians in one ſally, which obliged the ſultan to drop the enterpriſe and retire.

The ſiege raiſed.

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In his retreat he was attacked by the celebrated John Hunniades, who cut great numbers of his men in pieces, and obliged the rest to fly with precipitation. Not long after he gained a still more complete victory over the enemy in the plains of Transylvania, with the loss of only 3000 of his own men, whereas 20,000 of the Turks were killed on the field of battle, and almost an equal number in the pursuit. Amurath, who was then at Adrianople, sent an army into Transylvania far more numerous than the former; but they were attended with no better success, being cut off almost to a man by the brave Hungarian. He gained several other victories no less remarkable; but was at last entirely defeated in 1448; and with this defeat ended all hopes of preserving the Roman empire. The unhappy emperor was now obliged to pay an annual tribute of 300,000 aspers to the sultan; and to yield up to him some strong holds which he still held on the Euxine sea. However, as he doubted not but Amurath would soon attempt to become master of the city itself, he renewed the union between the Greek and Latin churches, hoping that this would induce the western princes to assist him in the defence of the city against the Turks. This union produced great disturbances, which the emperor did not long survive, but died in 1448, leaving the empire, now confined within the walls of Constantinople, to his brother Constantine.

160 Success of John Hunniades against the Turks.

161 He is at last defeated.

Amurath the Turkish sultan died in 1450, and was succeeded by his son Mohammed. In the beginning of his reign he entered into an alliance with Constantine, and pretended a great desire to live in friendship with him and the other Christian princes; but no sooner had he put an end to a war in which he was engaged with Ibrahim king of Caramania, than he built a strong fort on the European side of the Bosphorus, opposite to another in Asia; in both of which he placed strong garrisons. These two castles commanded the straits; and the former being but five miles from the city, kept it in a manner blocked up. This soon produced a misunderstanding between him and the emperor, which ended in the siege of the city. The siege commenced on the sixth of April 1453, Mohammed's numerous forces covering the plains before it on the land-side, and a fleet of 300 sail blocking it up by sea. The emperor, however, had taken care to secure the haven, in which were three large ships, 20 small ones, and a great number of galleys, by means of a chain drawn across the entrance. Mohammed began the siege by planting batteries as near the city as he could, and raising mounts in several places as high as the walls themselves, whence the besieged were incessantly galled with showers of arrows. He had in his camp a piece of ordnance of prodigious size, which is said to have carried a ball of 100 pounds weight made of hard black stone brought from the Euxine sea. With this vast piece the enemy made several breaches in the walls; which, however, were repaired with incredible expedition by the besieged. But Mohammed, the better to carry on the siege, caused new levies to be made throughout his extensive dominions, by which his army was soon increased to near 400,000 men; while the garrison consisted only of 9000 regular troops, viz. 6000 Greeks and 3000 Genoese and Venetians. As the enemy continued to batter the walls day and night without intermission, a great part of them was at last beaten down; but while the Turks were busy in filling up the ditch, in order to give the assault, a new wall was built. This threw the tyrant into a prodigious rage, which was greatly heightened when he saw his whole fleet worsted by five ships, four of which were laden with corn from Peloponnesus, and the other with all manner of provisions from the isle of Chios. These opened themselves a way through the whole Turkish fleet; and, to the inexpressible joy of the Christians, at last got safe into the harbour.

162 Constantinople besieged by Mohammed.

The Turks attempted several times to force the haven; but all their efforts proving ineffectual, Mohammed formed a design of conveying 80 galleys over land for the space of eight miles into it. This he accomplished by means of certain engines, the contrivance of a renegado; and having then either taken or sunk all the ships contained in it, he caused a bridge to be built over it with surprising expedition. By this means the city was laid open to an assault from that side likewise. The place was now assaulted on all sides; and Constantine being well apprised that he could not long hold out against such a mighty fleet and so numerous an army, sent deputies to Mohammed offering to acknowledge himself his vassal, by paying him yearly what tribute he should think proper to impose, provided he raised the siege and withdrew. The tyrant answered that he was determined at all events to become master of the city: but if the emperor delivered it up forthwith, he would yield up to him Peloponnesus, and other provinces to his brothers, which they should enjoy peaceably as his friends and allies: but if he held out to the last extremity, and suffered it to be taken by assault, he would put him and the whole nobility to the sword, abandon the city to be plundered by his soldiers, and carry the inhabitants into captivity.

163 He conveys 80 galleys over land into the haven.

This condition was rashly rejected by the emperor; who thereby involved himself and all his subjects in the most terrible calamity. The siege was renewed with more vigour than ever, and continued till the 25th of May; when a report being spread in the Turkish camp that a mighty army was advancing in full march to the relief of the city under the conduct of the celebrated John Hunniades, the common soldiers, seized with a panic, began to mutiny, and press Mohammed in a tumultuous manner to break up the siege. Nay, they openly threatened him with death, if he did not immediately abandon the enterprise and retire from before the city, which they despaired of being able to reduce before the arrival of the supposed succours. Mohammed was upon the point of complying with their demand, when he was advised by Zagan, a Turkish officer of great intrepidity, and an irreconcileable enemy to the Christian name, to give without loss of time a general assault. To this he said the soldiery, however mutinous, would not be averse, provided the sultan solemnly promised to abandon the city to be plundered by them. As such an advice best suited the humour of Mohammed, he readily embraced it; and caused a proclamation to be published throughout the camp, declaring, that he gave up to his soldiers all the wealth of that opulent city, requiring to himself only the empty houses.

164 A mutiny in the Turkish camp.

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The desire of plunder soon got the better of that fear which had seized the Turkish army; and they unanimously desired to be led on to the attack. Hereupon Constantine was summoned for the last time to deliver up the city, with a promise of his life and liberty; but to this he answered, that he was unalterably determined either to defend the city or to perish with it. The attack began at three in the morning on Tuesday the 29th of May; such troops were first employed as the sultan valued least, and designed them for no other purpose than to tire the Christians, who made a prodigious havock of that disorderly multitude. After the carnage had lasted some hours, the Janizaries and other fresh troops advanced in good order, and renewed the attack with incredible vigour. The Christians, summoning all their courage and resolution, twice repulsed the enemy: but being in the end quite spent, they were no longer able to stand their ground; so that the enemy in several places broke into the city. In the mean time Justiniani, the commander of the Genoese and a select body of Greeks, having received two wounds, one in the thigh and the other in the hand, was so disheartened, that he caused himself to be conveyed to Galata, where he soon after died of grief. His men, dismayed at the sudden flight of their general, immediately quitted their posts and fled in the utmost confusion. However, the emperor, attended with a few of the most resolute among the nobility, still kept his post, striving with unparalleled resolution to oppose the multitude of barbarians that now broke in from every quarter. But being in the end overpowered with numbers, and seeing all his friends lie dead on the ground, "What! (cried he aloud) is there no Christian left alive to strike off my head?" He had scarce uttered these words, when one of the enemy, not knowing him, gave him a deep cut across the face with his sabre; and at the same time, another coming behind him, with a blow on the back part of his head laid him dead on the ground. After the death of the emperor, the few Christians that were left alive betook themselves to flight; and the Turks, meeting with no further opposition, entered the city, which they filled with blood and slaughter. They gave no quarter, but put all they met to the sword, without distinction. Many thousands took refuge in the church of St Sophia, but they were all massacred in their asylum by the enraged barbarians; who, prompted by their natural cruelty, the desire of revenge, and love of booty, spared no place nor person. Most of the nobility were, by the sultan's orders, cut off, and the rest kept for purposes more grievous than death itself. Many of the inhabitants, among whom were some men of great learning, found means to make their escape while the Turks were busied in plundering the city. These embarking on five ships then in the harbour, arrived safe in Italy; where, with the study of the Greek tongue, they revived the liberal sciences, which had long been neglected in the west. After the expiration of three days, Mohammed commanded his soldiers to forbear all further hostilities on pain of death: and then put an end to as cruel a pillage and massacre as any mentioned in history. The next day he made his public and triumphal entry into Constantinople, and chose it for the seat of the Turkish empire, which it has continued to be ever since.

165 A general assault given.

166 Bravery of the emperor.

167 He is killed.

168 The town plundered, and the inhabitants massacred.

Constantinopolitan history, Constat.

169 Present state of the city.

This city is now called by the Turks *Istampol*, and by the Greeks *Istampoli* or *Stampoli*. It is seated at the eastern extremity of Romania, on a small neck of land which advances towards Natolia, from which it is separated by a channel of a mile in breadth. The sea of Marmora washes its walls on the south, and a gulf of the channel of Constantinople does the same on the north. It is delightfully situated between the Black sea and the Archipelago, from whence it is supplied with all necessaries. The grand seignior's palace, called the *Seraglio*, is seated on the sea-side, and is surrounded with walls flanked with towers, and separated from the city by canals. It is said the harbour will easily hold 1200 ships. The number of houses must needs be prodigious, since one fire has burnt down 30,000 in a day, without greatly changing the aspect of the city. However, in general, they are but mean, especially on the outside, where there are few or no windows; and the streets being narrow, gives them a melancholy look. They reckon that there are 3770 streets, small and great; but they are seldom or never clean; and the people are infested with the plague almost every year. The inhabitants are half Turks, two-thirds of the other half Christians, and the rest Jews. Here are a great number of ancient monuments still remaining, and particularly the superb temple of Sophia, which is turned into a mosque, and far surpasses all the rest. The street called *Adrianople* is the longest and broadest in the city; and the bazars, or besteins, are the markets for selling all sorts of merchandise. The old and the new are pretty near each other; and are large square buildings, covered with domes, and supported by arches and pilasters. The new is the best, and contains all sorts of goods which are there exposed to sale. The market for slaves, of both sexes, is not far off; and the Jews are the principal merchants, who bring them here to be sold. There are a great number of young girls brought from Hungary, Greece, Candia, Russia, Mingrelia, and Georgia, for the service of the Turks, who generally buy them for their seraglios. The great square, near the mosque of Sultan Bajazet, is the place for public diversions, where the jugglers and mountebanks play a great variety of tricks. The circumference of this city is by some said to be 15 miles, and by Mr Tournefort 23 miles; to which if we add the suburbs, it may be 34 miles in compass. The suburb called *Pera* is charmingly situated; and is the place where the ambassadors of England, France, Venice, and Holland, reside. This city is built in the form of a triangle; and as the ground rises gradually, there is a view of the whole town from the sea. The public buildings, such as the palaces, the mosques, bagnios, and caravansaries for the entertainment of strangers, are many of them very magnificent. E. Long. 29. 20. N. Lat. 41. 4.

CONSTAT, in *Law*, the name of a certificate which the clerk of the pipe and auditors of the exchequer make at the request of any person who intends to plead or move in that court for the discharge of any thing; and the effect of it is, the certifying what does *constare* upon record touching the matter in question.

—A

—A conſtat is held to be ſuperior to a certificate; becauſe this may err or fail in its contents; that cannot, as certifying nothing but what is evident upon record.

Alſo the exemplification under the great ſeal of the inrolment of any letters patent is called a *conſtat*.

CONSTELLATION, in *Aſtronomy*, a ſyſtem of ſeveral ſtars that are ſeen in the heavens near to one another. Aſtronomers not only mark out the ſtars, but, that they may better bring them into order, they diſtinguiſh them by their ſituation and poſition in reſpect to each other; and therefore they diſtribute them into aſteriſms or conſtellations, allowing ſeveral ſtars to make up one conſtellation: and for the better diſtinguiſhing and obſerving them, they reduce the conſtellations to the forms of animals, as men, bulls, bears, &c.; or to the images of ſome things known, as of a crown, a harp, a balance, &c.; or give them the names of thoſe whoſe memories, in conſideration of ſome notable exploit, they had a mind to tranſmit to future ages.

The diviſion of the ſtars by images and figures is of great antiquity, and ſeems to be as old as aſtronomy itſelf: for in the moſt ancient book of Job, Orion, Arcturus, and the Pleiades, are mentioned; and we meet with the names of many of the conſtellations in the writings of the firſt poets, Homer and Heſiod.

The ancients, in their diviſion of the firmament, took in only ſo much as came under their notice, diſtributing it into 48 conſtellations; but the modern aſtronomers comprehend the whole ſtarry firmament, dividing it into three regions. See ASTRONOMY *Index*.

CONSTERNATION is defined by ethical writers to be an exceſs of horror, owing to the ill government of our admiration and fear: or ſuch an immoderate degree of fear as confounds the faculties, and incapacitates a perſon for conſultation and execution.

CONSTIPATION, in *Medicine*, a hardneſs of the belly, with great coſtiveneſs. See COSTIVENESS.

CONSTITUENT PART, in *Phyſiology*, an eſſential part in the compoſition of any thing, differing little from what is otherwiſe called *element* or *principle*.

CONSTITUTION, in matters of policy, ſignifies the form of government eſtabliſhed in any country or kingdom.

CONSTITUTION alſo denotes an ordinance, deciſion, regulation, or law, made by authority of any ſuperior, eccleſiaſtical or civil.

Apoſtolical CONSTITUTIONS, a collection of regulations attributed to the Apoſtles, and ſuppoſed to have been collected by St Clement, whoſe name they likewiſe bear.

It is the general opinion, however, that they are ſpurious, and that St Clement had no hand in them. They appeared firſt in the 4th age, but have been much changed and corrupted ſince that time. They are divided into eight books, conſiſting of a great number of rules and precepts, relating to the duties of Chriſtians, and particularly the ceremonies and diſcipline of the church. Mr Whiſton, in oppoſition to the general opinion, aſſerts them to be a part of the ſacred writings, dictated by the Apoſtles in their meetings, and written down from their own mouth by St Clement; and intended as a ſupplement to the New Teſtament, or rather as a ſyſtem of Chriſtian faith and polity. The reaſon why the Conſtitutions are ſuſpected by the orthodox, and perhaps the reaſon alſo why their genuineneſs is defended by Mr Whiſton, is, that they ſeem to favour Arianiſm.

CONSTITUTION, in a phyſical ſenſe, ſignifies the particular temperature of the body.

It is curious to obſerve, ſays Dr Percival, the revolution which hath taken place, within this century, in the conſtitutions of the inhabitants of Europe. Inflammatory diſeaſes more rarely occur, and, in general, are much leſs rapid and violent in their progreſs than formerly (A); nor do they admit of the ſame antiphlogiſtic method of cure that was practiſed with ſucceſs 100 years ago. The experienced Sydenham makes 40 ounces of blood the mean quantity to be drawn in the acute rheumatiſm; whereas this diſeaſe, as it now appears in the London hoſpitals, will not bear above half that evacuation. Vernal intermittents are frequently cured by a vomit and the bark, without veneſection; which is a proof that at preſent they are accompanied with fewer ſymptoms of inflammation than they were wont to be. This advantageous change, however, is more than counterbalanced by the introduction of a numerous claſs of nervous ailments, in a great meaſure unknown to our anceſtors; but which now prevail univerſally, and are complicated with almoſt every other diſtemper. The bodies of men are enfeebled and enervated; and it is not uncommon to obſerve very high degrees of irritability, under the external appearance of great ſtrength and robuſtneſs. The hypochondria, palſies, cachexies, dropſies, and all thoſe diſeaſes which ariſe from laxity and debility, are in our days endemic everywhere; and the hyſterics, which uſed to be peculiar to the women, as the name itſelf indicates, now attack both ſexes indiſcriminately. It is evident that ſo great a revolution could not be effected without a concurrence of many cauſes; but amongſt theſe (according to Dr Percival), the preſent general uſe of tea * holds the firſt and principal rank. The ſecond place may perhaps be allowed to exceſs in ſpirituous liquors. This pernicious cuſtom, in many inſtances at leaſt, owes its riſe to the former, which, by the lowneſs and depreſſion of ſpirits it occaſions, renders it almoſt neceſſary to have recourſe to ſomething cordial and exhilarating. And hence proceed thoſe odious and diſgraceful habits of intemperance, with which many of the ſofter ſex are now, alas! chargeable.

* See *Tea*.

CONSTRICTOR, an appellation given to ſeveral muſcles,

(A) The decreaſe in the violence of inflammatory diſeaſes may perhaps in part be aſcribed to the preſent improved method of treating them. Moderate evacuations, cool air, aceſcent diet, and the liberal uſe of ſaline and antimonial medicines, are better adapted to check the progreſs of fevers, than copious bleedings, ſtimulating purgatives, and profuſe ſweats excited by theriaca and mithridate.

muscles, on account of their constringing or closing some of the orifices of the body.

CONSTRUCTION, in *Geometry*, is the drawing such lines, such a figure, &c. as are previously necessary for making any demonstration appear more plain and undeniable.

Construction of Equations. See Equations.

Construction, in *Grammar;* syntax, or the arranging and connecting the words of a sentence according to the rules of the language. See Grammar and Language.

The construction is generally more simple, easy, and direct, in the modern tongues than in the ancient: we have very few of those inversions which occasion so much embarrassment and obscurity in the Latin; our thoughts are usually delivered in the same order wherein the imagination conceives them: the nominative case, for instance, always precedes the verb, and the verb goes before the oblique cases it governs.

The Greeks and Latins, M. St Evremont observes, usually end their periods, where, in good sense and reason, they should have begun; and the elegance of their language consists, in some measure, in this capricious arrangement, or rather in this transposal and disorder of the words. See Language.

Construction of Statutes, among lawyers. See Law *Index*.

CONSUALIA, in antiquity, feasts which were held among the ancients, in honour of the god Consus i. e. Neptune; different from those other feasts of the same deity called *Neptunalia*. They were introduced with a magnificent cavalcade, or procession on horseback; because Neptune was reputed to have first taught men the use of horses; whence his surname of Ἱππιος, *Equestris*.

Evander is said to have first instituted this feast: it was re-established by Romulus, under the name of *Consus;* because it was some god under the denomination of Consus that suggested to him the rape of the Sabines. It is said, that it was with a view to this rape that he made that establishment. This, however, is certain, that it was to this feast all his neighbours were invited; when, taking advantage of the solemnities and sacrifices, he seized the women. To draw the greater concourse of people, he gave out, that he had found an altar hid under ground, which he intended to consecrate, with sacrifices to the god to whom it had been originally erected. Those who take upon them to explain the mysteries of the heathen theology, say, that the altar hid under ground is a symbol of the secret design of Romulus to seize his neighbours wives.

The consualia were of the number of feasts called sacred; as being consecrated to a divinity.—Originally they were not distinguished from those of the circus; whence it is, that Valerius Maximus says, that the rape of the Sabines was effected at the games of the circus.

Plutarch observes, that during the days of this solemnity, horses and asses were left at rest, and were dressed up with crowns, &c. on account of its being the feast of Neptunus Equestris. Festus says, the cavalcade was performed with mules; it being an opinion, that this was the first animal used to draw the car.

Servius gives us to understand, that the consualia fell on the 13th of August; Plutarch, in the life of Romulus, placed them on the 18th, and the old Roman kalendar on the 21st of that month.

CONSUBSTANTIAL, in *Theology*, a term of like import with co-essential; denoting something of the same substance with another. The orthodox believe the Son of God to be consubstantial with the Father.

The term ὁμουσιος, *consubstantial*, was first adopted by the fathers of the councils of Antioch and Nice, to express the orthodox doctrine the more precisely, and to serve as a barrier and precaution against the errors and subtleties of the Arians; who owned every thing excepting the consubstantiality.

The Arians allowed, that the word was God, as having been made God; but they denied that he was the same God, and of the same substance with the Father: accordingly they exerted themselves to the utmost to abolish the use of the word. The emperor Constantine used all his authority with the bishops to have it expunged out of the symbols; but it still maintained itself, and is at this day, as it was then, the distinguishing criterion between an Athanasian and an Arian.

Sandius will have it, that the word consubstantial was unknown till the time of the council of Nice; but it is certain it had been before proposed to the council of Antioch, wherein Paulus Samosatenus had been condemned; though it had there the fortune to be rejected. Curcellæus, on the other hand, maintains that it was an innovation in doctrine in the council of Nice, to admit an expression, the use whereof had been abolished by the council of Antioch.

According to St Athanasius, the word consubstantial was only condemned in the council of Antioch, inasmuch as it implied the idea of a pre-existent matter, prior to the things formed thereof; now, in this sense, it is certain, the Father and the Son are not consubstantial, there having been no pre-existent matter.

CONSUBSTANTIATION, a tenet of the Lutheran church with regard to the manner of the change made in the bread and wine in the eucharist. The divines of that profession maintain, that after consecration, the body and blood of our Saviour are substantially present, together with the substance of the bread and wine, which is called *consubstantiation*, or *impanation*.

CONSUL, the chief magistrate of the Roman commonwealth, invested with regal authority for the space of one year. They were two in number, called consuls *à consulendo*, and annually chosen in the Campus Martius. The two first consuls were L. Jun. Brutus, and L. Tarquinius Collatinus, chosen in the year of Rome 244, after the expulsion of the Tarquins. In the first times of the republic the two consuls were always chosen from patrician families or noblemen, but the people obtained the privilege in the year of Rome 388, of electing one of the consuls from their own body, and sometimes both were plebeians. The first consul among the plebeians was L. Sextius. It was required that every candidate for the consulship should be 43 years of age, called *legitimum tempus*. He was always to appear at the election as a private man without a retinue,

retinue, and it was requisite before he canvaffed for the office to have difcharged the functions of quæftor, edile, and prætor. Sometimes thefe qualifications were difregarded. Val. Corvinus was made a conful in his 23d year, and Scipio in his 24th. Young Marius, Pompey, and Auguftus, were alfo under the proper age, when they were invefted with the office, and Pompey had never been quæftor or prætor. The power of the confuls was unbounded, and they knew no fuperior but the gods and the laws; but after the expiration of their office their conduct was minutely fcrutinized by the people, and mifbehaviour was often punifhed by the laws. The badge of their office was the *prætexta*, a robe fringed with purple, afterwards exchanged for the *toga picta* or *palmata*. They were preceded by 12 lictors carrying the *fafces* or bundles of fticks, in the middle of which appeared an axe. The axe, as being the characteriftic rather of tyranny than of freedom, was taken away from the *fafces* by Valerius Poplicola, but it was reftored by his fucceffor. They took it by turns monthly to be preceded by the lictors while at Rome, left the appearance of two perfons with the badges of royal authority fhould raife apprehenfions in the multitude. While one appeared publicly in ftate, only a crier walked before the other, and the lictors followed behind without the fafces. Their authority was equal; yet the Valerian law gave the right of priority to the older, and the Julian law to him who had moft children; and he was generally called *conful major* or *prior*. As their power was abfolute, they prefided over the fenate, and could convene and difmifs it at pleafure. The fenators were their counfellors; and among the Romans the manner of reckoning their years was by the name of the confuls, and by *M. Tull. Cicerone et L. Antonio Confulibus*, for inftance, the year of Rome 689 was always underftood. This cuftom lafted from the year of Rome 244 till the 1294, or 541ft year of the Chriftian era. In public affemblies the confuls fat in ivory chairs, and held in their hand an ivory wand called *fcipio eburneus*, which had an eagle on its top as a fign of dignity and power. When they had drawn by lot the provinces over which they were to prefide during their confulfhip, they went to the capitol to offer their prayers to the gods, and intreat them to protect the republic; after this they departed from the city arrayed in their military drefs and preceded by the lictors. Sometimes the provinces were affigned them without drawing by lot, by the will and appointment of the fenators. At their departure they were provided by the ftate with whatever was requifite during their expedition. In their provinces they were both attended by the 12 lictors, and equally invefted with regal authority. They were not permitted to return to Rome without the fpecial command of the fenate; and they always remained in the province till the arrival of their fucceffor. At their return they harangued the people, and folemnly protefted that they had done nothing againft the laws or intereft of their country, but had faithfully and diligently endeavoured to promote the greatnefs and welfare of the ftate. No man could be conful two following years; yet this inftitution was fometimes broken, and we find Marius re-elected conful after the expiration of his office during the Cimbrian war. The office of conful, fo dignified during the times of the commonwealth, became a mere title under the emperors, and retained nothing of its authority but the ufelefs enfigns of original dignity. Even the duration of the office, which was originally annual, was reduced to two or three months by J. Cæfar; but they who were admitted on the firft of January denominated the year, and were called *ordinarii*. Their fucceffors during the year were diftinguifhed by the name of *fuffecti*. Tiberius and Claudius abridged the time of the confulfhip; and the emperor Commodus made no lefs than 25 confuls in one year. Conftantine the Great renewed the original inftitution, and permitted them to be a whole year in office.

Consul, at prefent, is an officer eftablifhed by virtue of a commiffion from the king and other princes, in all foreign countries of any confiderable trade, to facilitate and difpatch bufinefs, and protect the merchants of the nation. The confuls are to keep up a correfpondence with the minifters of England refiding in the courts whereon their confulate depends. They are to fupport the commerce and the intereft of the nation; to difpofe of the fums given and the prefents made to the lords and principals of places, to obtain their protection, and prevent the infults of the natives on the merchants of the nation.

CONSUMMATION, the end, period, or completion of any work. Thus, we fay, the *confummation* of all things, meaning the end of the world. By the incarnation, all the prophecies are faid to be *confummated*. See Prophecy and Accomplishment.

Consummation of Marriage, denotes the laft act of marriage, which makes its accomplifhment; or the moft intimate union between the married pair, &c.

CONSUMPTION, in *Medicine*, a word of very extenfive fignification, implies all diforders that bring any decay or wafte upon the conftitution; but is moft commonly ufed for the *phthifis pulmonolis*. See Medicine *Index*.

Consumption, in *Farriery*. See Farriery *Index*.

CONSUS, the pagan god of counfel. He had an altar under ground in the great circus at Rome, to fhow that counfel ought to be kept fecret. See Consualia.

CONTACT, is when one line, plane, or body, is made to touch another; and the parts that do thus touch are called the *points* or *places of contact*.

CONTAGION, in *Phyfic*, the communicating a difeafe from one body to another. In fome difeafes it is only effected by an immediate contact or touch, as in fyphilis; in others it is conveyed by infected clothes; and in others it is fuppofed to be tranfmitted through the air at a confiderable diftance, by means of fteams or effluvia arifing from the fick, as in the plague and other peftilential diforders, in which cafe the air is faid to be contagious, though this has been difputed.

No attempts which have yet been made to inveftigate the nature of contagion, or to afcertain the properties of contagious matter, have proved fuccefsful. But from the means which have been effectually employed either to abate its virulence or to deftroy it entirely, this matter may be fairly inferred to be of a chemical nature. We have already detailed the effects of the fumes of muriatic acid in purifying the cathedral of Dijon, which were fuccefsfully ufed by Morveau in 1773.

1773. Purſuing this hint, no doubt, Dr Carmichael Smyth propoſed the fumes of nitric acid. This was tried on board different ſhips at Sheerneſs about the year 1796; and being found to anſwer the purpoſe of deſtroying the contagion which then prevailed, Dr Smyth afterwards received a liberal reward from government for his diſcovery. Theſe experiments were conducted on board the Union hoſpital ſhip by Mr Menzies ſurgeon of the Diſcovery, and Mr Baſſan ſurgeon of the Union. The wards at this time were very much crowded with patients; and of 200 ſick on board, 150 were in different ſtages of a malignant, contagious fever, which made a very rapid progreſs, and produced very fatal effects on the attendants and ſhip's company.

The materials and apparatus employed in the proceſs were the following: A quantity of fine ſand, two dozen quart earthen pipkins, as many common tea-cups, ſome long ſlips of glaſs to be uſed as ſpatulas, a quantity of concentrated ſulphuric acid, and a quantity of ſaltpetre (nitrate of potaſh).

The proceſs was conducted in the following manner: 1ſt, All the ports and ſcuttles were ſhut up; the ſand, previouſly heated in iron pots, was ſcooped out into the pipkins with an iron ladle; and in this heated ſand, in each pipkin, a ſmall tea-cup was immerſed, containing about half an ounce of ſulphuric acid, to which, after it had acquired a proper degree of heat, an equal quantity of nitrate of potaſh in powder was gradually added, and the mixture ſtirred with a glaſs ſpatula till the vapour aroſe from it in conſiderable quantity. The pipkins were then carried through the wards by the nurſes and convaleſcents, who kept walking about with them in their hands, occaſionally putting them under the cradles of the ſick, and in every corner where any foul air was ſuſpected to lodge. In this manner they continued fumigating, until the whole ſpace between decks, fore and aft, was filled with the vapour, which appeared like a thick haze.

The vapour at firſt excited coughing among the patients, which gradually ceaſed as it became more generally diffuſed through the wards: part of this effect, however, was to be attributed to the inattention of thoſe who carried the pipkins, in putting them too near the faces of the ſick; which cauſed them to inhale the ſtrong vapour as it immediately iſſued from the cups.

The body-clothes and bed-clothes of the ſick were, as much as poſſible, expoſed to the nitrous vapour during the fumigation; and all the foul linen removed from them was immediately immerſed in a tub of cold water, afterwards carried on deck, rinſed out, and hung up till nearly dry, and then fumigated before it was taken to the waſh-houſe: a precaution extremely neceſſary in every caſe of infectious diſorder. Proper attention was alſo paid to cleanlineſs and ventilation.

Three hours were at firſt found neceſſary to fumigate the ſhip. In about an hour after, the vapour having entirely ſubſided, the ports and ſcuttles were thrown open for the admiſſion of freſh air. It could plainly be perceived that the air of the hoſpital was greatly ſweetened even after this firſt fumigation. The proceſs was repeated again next morning; and the people employed, being now more expert, finiſhed the whole in about an hour's time. In an hour afterwards, the vapour having entirely ſubſided, the freſh air was freely admitted into the hoſpital as before. Fewer pipkins were employed for the evening fumigations than for thoſe of the mornings, as the freſh air could not be admitted ſo freely after the former as the latter.

The pleaſing and immediate effect of the fumigation in deſtroying the offenſive and diſagreeable ſmell, ariſing from ſo many ſick crowded together, was now very perceptible, even to the attendants; the conſequence of which was, that they began to place ſome degree of confidence in its efficacy, and approached the cradles of the infected with leſs dread of being attacked with the diſorder: thus the ſick were better attended, and the duty of the hoſpital was more regularly and more cheerfully performed.

From the 26th of November 1795, when the fumigation was firſt reſorted to, till the 25th of December, not a perſon on board was attacked with the fever, though, in the three months preceding, more than one third of all the people in the ſhip had been ſeized with the diſtemper, and of theſe more than one in four were carried off by it; and the probability is, that the ſickneſs and mortality would have gone on, increaſing in proportion to the diffuſion of the contagion, and to the increaſing deſpondency of the people, who conſidered themſelves as ſo many devoted victims.

The advantage of the fumigation was not felt by the ſhip's company and attendants alone, whom it preſerved from the baneful effects of the fever: the ſick and convaleſcents derived almoſt an equal benefit from it. The ſymptoms of the diſeaſe became milder, and loſt much of their malignant appearance; and the advantage of a pure and ſweet air to convaleſcents muſt be obvious.

Great confidence is always dangerous. It proved ſo on the preſent occaſion. On the 17th of December they imagined themſelves ſo ſecure, that they diſcontinued the cuſtom of fumigating morning and evening, thinking that once a day was ſufficient. On the 25th, one of the nurſes ſuffered a ſlight attack; and on the 26th a marine, who, for a week before, had been in a ſtate of intoxication, was ſeized with the fever, and died. Theſe two accidents gave immediate alarm: they returned again to the practice of fumigating twice a day; and from that time to the extermination of the diſorder, there was not an inſtance of a perſon ſuffering from contagion on board the ſhip.

The ſucceſs of the experiment was not confined to the Union: the power of the nitrous vapour to deſtroy contagion was equally diſplayed on board ſome Ruſſian ſhips then in the Downs. The ſafety, too, with which it may be employed, in any ſituation, without inconvenience or riſk of fire, is another great recommendation in its favour.

It will not be difficult from this deſcription to employ this kind of fumigation. It is only neceſſary to obſerve, for the ſake of thoſe who may not be verſant in chemical purſuits, that the ingredients ought to be pure, and neither metal veſſels nor rods ſhould be uſed. Any kind of metal getting among the ingredients would cauſe the vapour to be very noxious inſtead of ſalutary. The fumes that riſe ſhould be white; if they are of a red colour, there is reaſon to ſuſpect the purity of the ingredients.

The importance of this diſcovery need not be inſiſted on;

on: it is equally applicable to every ſpecies of putrid contagion, even to the plague itſelf. It ſhould therefore be uſed in all hoſpitals and pariſh workhouſes; and ſhould be conſtantly reſorted to by the proprietors of all large works, on the firſt appearance of infectious diſeaſe among the people employed in them:—indeed, it ſhould be employed even as a preventive in all ſituations where a number of people, from the nature of their buſineſs, are obliged to be crowded together, or where, from local circumſtances, there are reaſons for ſuſpecting that the purity of the air is injured by noxious exhalations or other cauſes. If there be any circumſtances in which its utility may be called in queſtion, it can only be in caſes of inflammatory diſeaſes: for, in ſuch, ſuper-oxygenation has been found hurtful.

CONTEMPLATION, an act of the mind, whereby it applies itſelf to conſider and reflect upon the works of God, nature, &c.

CONTEMPORARY, or COTEMPORARY, a perſon or thing that exiſted in the ſame age with another. Thus, Socrates, Plato, and Ariſtophanes, were contemporaries.

CONTEMPT, in a general ſenſe, the act of deſpiſing, or the ſtate of being deſpiſed.

CONTEMPT, in *Law*, is a diſobedience to the rules and orders of a court, which hath power to puniſh ſuch offence; and as this is ſometimes a greater, and ſometimes a leſſer offence, ſo it is puniſhed with greater or leſs puniſhment, by fine, and ſometimes by impriſonment.

CONTENT, in *Geometry*, the area or quantity of matter or ſpace included in certain bounds.

CONTESSA, a port-town of Turkey in Europe, in the province of Macedonia, ſituated on a bay of the Archipelago, about 200 miles weſt of Conſtantinople. E. Long. 25. 0. N. Lat. 41. 0.

CONTEXT, among divines and critics, that part of Scripture or other writing which lies about the text, before or after it, or both. To take the full and genuine ſenſe of the text, the context ſhould be regarded.

CONTEXTURE, a word frequently uſed in ſpeaking both of the works of nature and art; and denoting the diſpoſition and union of the conſtituent parts with reſpect to one another.

CONTI, a town of Picardy in France, with the title of a principality. It is ſeated on the river Seille, in E. Long. 2. 17. N. Lat. 49. 54.

CONTIGUITY, in *Geometry*, is when the ſurface of one body touches that of another.

CONTIGUOUS, a relative term underſtood of things diſpoſed ſo near each other, that they join their ſurfaces, or touch. The houſes in ancient Rome were not contiguous as ours are, but all inſulated.

CONTINENCE, in *Ethics*, a moral virtue, by which we reſiſt concupiſcence. It ſhould ſeem that there is this diſtinction between chaſtity and continence, in that it requires no effort to be chaſte, which reſults from conſtitution; whereas continence appears to be the conſequence of a victory gained over ourſelves. The verb *continere*, in the Latin, ſignifies "to reſtrain." The term, however, is moſt uſually applied to men; as *chaſtity* is to women. See CHASTITY.

Continence is a virtue that makes but an inconſiderable figure in our days. However, we ought not to loſe our ideas of things, though we have debauched our true reliſh in our practice: for, after all, ſolid virtue will keep its place in the opinion of the wiſe and ſenſible part of mankind. And though cuſtom has not made it ſo ſcandalous as it ought to be to inſnare innocent women, and triumph in the falſehood; ſuch actions as we ſhall relate muſt be accounted true gallantry, and riſe higher in our eſteem the farther they are removed from our imitation.

1. Scipio the younger, when only 24 years of age, was appointed by the Roman republic to the command of the army againſt the Spaniards. His wiſdom and valour would have done honour to the moſt experienced general. Determined to ſtrike an important blow, he forms a deſign of beſieging Carthagena, then the capital of the Carthaginian empire in Spain. His meaſures were ſo judiciouſly concerted, and with ſo much courage and intrepidity purſued, both by ſea and land, that notwithſtanding a bold and vigorous defence, the capital was taken by ſtorm. The plunder was immenſe. Ten thouſand free-men were made priſoners; and above 300 more, of both ſexes, were received as hoſtages. One of the latter, a very ancient lady, the wife of Mandonius, brother of Indibilis king of the Ilergetes, watching her opportunity, came out of the crowd, and throwing herſelf at the conqueror's feet, conjured him, with tears in her eyes, to recommend to thoſe who had the ladies in their keeping to have regard to their ſex and birth. Scipio, who did not underſtand her meaning at firſt, aſſured her that he had given orders that they ſhould not want for any thing. But the lady replied, "Thoſe conveniences are not what affect us. In the condition to which fortune hath reduced us, with what ought we not to be contented! I have many other apprehenſions, when I conſider, on one ſide, the licentiouſneſs of war; and on the other, the youth and beauty of the princeſſes which you ſee here before us; for as to me, my age protects me from all fear in this reſpect." She had with her the daughters of Indibilis, and ſeveral other ladies of high rank, all in the flower of youth, who conſidered her as their mother. Scipio then comprehending what the ſubject of her fear was, "My own glory (ſays he), and that of the Roman people, are concerned in not ſuffering that virtue, which ought always to be reſpected wherever we find it, ſhould be expoſed in my camp to a treatment unworthy of it. But you give me a new motive for being more ſtrict in my care of it, in the virtuous ſolicitude you ſhow in thinking only of the preſervation of your honour, in the midſt of ſo many other objects of fear." After this converſation, he committed the care of the ladies to ſome officers of experienced prudence, ſtrictly commanding that they ſhould treat them with all the reſpect they could pay to the mothers, wives, and daughters, of their allies and particular friends. It was not long before Scipio's integrity and virtue were put to the trial. Being retired in his camp, ſome of his officers brought him a young virgin of ſuch exquiſite beauty, that ſhe drew upon her the eyes and admiration of every body. The young conqueror ſtarted from his ſeat with confuſion and ſurpriſe; and, like one thunderſtruck, ſeemed to be robbed of that preſence of mind and ſelf-poſſeſſion ſo neceſſary in a general, and for which

Livy, Val. Maximus, &c.

Continence. which Scipio was remarkably famous. In a few moments, having rallied his ſtraggling ſpirits, he inquired of the beautiful captive, in the moſt civil and polite manner, concerning her country, birth, and connections; and finding that ſhe was betrothed to a Celtiberian prince named Allucius, he ordered both him and the captive's parents to be ſent for. The Spaniſh prince no ſooner appeared in his preſence, than, even before he ſpake to the father and mother, he took him aſide; and, to remove the anxiety he might be in on account of the young lady, he addreſſed him in theſe words: "You and I are young, which admits of my ſpeaking to you with more liberty. Thoſe who brought me your future ſpouſe, aſſured me, at the ſame time, that you loved her with extreme tenderneſs; and her beauty left me no room to doubt it. Upon which reflecting, that if, like you, I had thought on making an engagement, and were not wholly engroſſed with the affairs of my country, I ſhould deſire that ſo honourable and legitimate a paſſion ſhould find favour, I think myſelf happy in the preſent conjuncture to do you this ſervice. Though the fortune of war has made me your maſter, I deſire to be your friend. Here is your wife: take her, and may the gods bleſs you with her. One thing, however, I would have you be fully aſſured of, that ſhe has been amongſt us as ſhe would have been in the houſe of her father and mother. Far be it from Scipio to purchaſe a looſe and momentary pleaſure at the expence of virtue, honour, and the happineſs of an honeſt man. No; I have kept her for you, in order to make you a preſent worthy of you and of me. The only gratitude I require of you for this ineſtimable gift is, that you would be a friend to the Roman people." Allucius's heart was too full to make him any anſwer; but throwing himſelf at the general's feet, he wept aloud. The captive lady fell into the ſame poſture: and remained ſo, till the father burſt out into the following words: "Oh! divine Scipio! the gods have given you more than human virtue! Oh! glorious leader! Oh! wondrous youth! does not that obliged virgin give you, while ſhe prays to the gods for your proſperity, raptures above all the tranſports you could have reaped from the poſſeſſion of her injured perſon?"

The relations of the young lady had brought with them a very conſiderable ſum for her ranſom: but when they ſaw that ſhe was reſtored to them in ſo generous and godlike a manner, they intreated the conqueror, with great earneſtneſs, to accept that ſum as a preſent; and declared, by his complying, that new favour would complete their joy and gratitude. Scipio, not being able to reſiſt ſuch warm and earneſt ſolicitation, told them that he accepted the gift; and ordered it to be laid at his feet: then addreſſing himſelf to Allucius, "I add (ſays he) to the portion which you are to receive from your father-in-law this ſum; which I deſire you to accept as a marriage-preſent."

If we conſider that Scipio was at this time in the prime of life, unmarried, and under no reſtraint, we cannot but acknowledge, that the conqueſt he made of himſelf was far more glorious than that of the Carthaginian empire: and though his treatment of this captive prince was not more delicate and generous than what might juſtly be expected from a perſon endowed with reaſon and reflection; yet conſidering how few there are in his circumſtances who would have acted as he did, we cannot but applaud his conduct, and propoſe him as a ſuitable example to future ages. Nor was his virtue unrewarded. The young prince, charmed with the liberality and politeneſs of Scipio, went into his country to publiſh the praiſes of ſo generous a victor. He cried out, in the tranſports of his gratitude. "That there was come into Spain a young hero like the gods; who conquered all things leſs by the force of his arms than the charms of his virtue and the greatneſs of his beneficence." Upon this report all Celtiberia ſubmitted to the Romans; and Allucius returned in a ſhout to Scipio, at the head of 1400 choſen horſe, to facilitate his future conqueſts. To render the marks of his gratitude ſtill more durable, Allucius cauſed the action we have juſt related to be engraven on a ſilver ſhield, which he preſented to Scipio, a preſent infinitely more eſtimable and glorious than all his treaſures and triumphs. The buckler, which Scipio carried with him when he returned to Rome, was loſt, in paſſing the Rhone, with part of the baggage. It continued in that river till the year 1665, when ſome fiſhermen found it. It was, before the revolution, in the king of France's cabinet.

2. The circumſtance which raiſes Alexander the Great above many conquerors, and, as it were, above himſelf, is the uſe he made of his victory after the battle of Iſſus. This is the moſt beautiful incident in his life. It is the point of view in which it is his intereſt to be conſidered; and it is impoſſible for him not to appear truly great in that view. By the victory of Iſſus he became poſſeſſed of the whole Perſian empire; not only Syſigambis, Darius's mother, was his captive, but alſo his wife and daughters, princeſſes whoſe beauty was not to be equalled in all Aſia. Alexander, like Scipio, was in the bloom of life, a conqueror, free, and not yet engaged in matrimony: nevertheleſs, his camp was to thoſe princeſſes a ſacred aſylum, or rather a temple, in which their chaſtity was ſecured as under the guard of virtue itſelf; and ſo highly revered, that Darius, in his expiring moments, hearing the kind treatment they had met with, could not help lifting up his dying hands towards heaven, and wiſhing ſucceſs to ſo wiſe and generous a conqueror, who could govern his paſſions at ſo critical a time. Plutarch informs us more particularly, that the princeſſes lived ſo retired in the camp, according to their own deſire, that they were not ſeen by any perſon except their own attendants; nor did any other perſon dare to approach their apartments. After the firſt viſit, which was a reſpectful and ceremonious one, Alexander, to avoid expoſing himſelf to the dangers of human frailty, made a ſolemn reſolution never to viſit Darius's queen any more. He himſelf informs us of this memorable circumſtance, in a letter written by him to Parmenio, in which he commanded him to put to *Plutarch.* death certain Macedonians who had forced the wives of ſome foreign ſoldiers. In this letter was the following paragraph: "For as to myſelf, it will be found that I neither ſaw nor would ſee the wife of Darius; and did not ſuffer any one to ſpeak of her beauty before me."

3. Iſocrates informs us, that Nicocles, king of Salamin, gloried in never having known any woman beſides

fides his wife; and was amazed that all other contracts of civil society should be treated with due regard, whilst that of marriage, the most sacred and inviolable of obligations, was broken through with impunity; and that men should not blush to commit an infidelity with respect to their wives, of which, should their wives be guilty, it would throw them into the utmost anguish and fury.

4. Henry VI. king of England, though unhappy in his family and government, was nevertheless possessed of many virtues. He was so remarkable for his chastity, that before his marriage he would not allow any lady of a suspicious character and unguarded conduct to frequent the court: and having observed one day some ladies with their bosoms uncovered, he turned away his eyes from the indecent object. and reprimanded them smartly in the simple dialect of the times; "Fy, fy (said he), for shame; forsooth ye be to blame." *Rapin.*

5. In the reign of King Charles II. when licentiousness was at its height in Britain, a yeomen of the guards refused the mistress of a king. The lady, who was dissatisfied with her royal lover, had fixed her eyes upon this man, and thought she had no more to do than speak her pleasure. He got out of her way. He refused to understand her; and when she pressed him further, he said, "I am married." The story reached the king, with all its circumstances; but they who expected an extravagant laugh upon the occasion were disappointed. He sent for the person: he found him a gentleman, though reduced to that mean station; and "Odds fish, man (says he), though I am not honest enough to be virtuous myself, I value them that are." He gave him an appointment, and respected him for life.

6. In many parts the poorest people are the most virtuous and honest in this respect. In the Swede's dominion, towards the pole, there is no name for adultery. They thought it an offence man could not commit against man; and have no word to express it in their language. The unpolished Lapland peasant, with these thoughts, is, as a human creature, much more respectable than the gay Briton, whose heart is stained with vices, and estranged from natural affection; and he is happier. The perfect confidence mutually reposed between him and the honest partner of his breast, entails a satisfaction even in the lowest poverty. It gilds the humble hearth, and lights the cabin; their homely meal is a sacrifice of thanks, and every breath of smoke arises in incense. If hand be laid upon hand, it is sure affection; and if some infant plays about their knees, they look upon him and upon each other with a delight that greatness seldom knows, because it feels distrust.

CONTINENT, in general, an appellation given to things continued without interruption; in which sense we say, *continent fever*, &c.

CONTINENT, in *Geography*, a great extent of land not interrupted by seas, in contradistinction to island and peninsula, &c. See GEOGRAPHY. Sicily is said to have been anciently torn from the continent of Italy; and it is an old tradition, which some of our antiquaries still have a regard to, that Britain was formerly a part of the continent of France.

The world is usually divided into two great continents, the old and the new. Whether there exists in the southern hemisphere another continent, or the whole be only an immense watery region, is a question that for near three centuries has engaged the attention of the learned as well as the commercial world, and given rise to many interesting voyages and discoveries; concerning which, see the article *South Sea*.

CONTINGENT, something casual or unusual.—Hence future contingent denotes a conditional event which may or may not happen, according as circumstances fall out.

CONTINGENT, is also a term of relation for the quota that falls to any person upon a division. Thus each prince of Germany in time of war is to furnish so many men, so much money, and munition, for his contingent.

CONTINUED, or CONTINUAL, in a general sense, means incessant, or proceeding without interruption.

Continued Fever, is such a one as sometimes remits, but never intermits or goes entirely off till its period.

Continued Bass, in *Music*, thus called, says Rousseau, because it is continued through the whole piece. Its principal use, besides that of regulating the harmony, is to support the voice, and preserve the tone.—They pretend that it was one Ludovico Viana, of whom a treatise still remains, who towards the end of the last century first put the continued bass in practice.

Continued Proportion, in *Arithmetic*, is that where the consequent of the first ratio is the same with the antecedent of the second; as $4:8::8:16$; in contradistinction to discrete proportion.

CONTINUITY, is defined by some schoolmen the immediate cohesion of parts in the same quantum: by others, a mode of body, whereby its extremities become one; and by others, a state of body resulting from the mutual implication of its parts. There are two kinds of continuity, mathematical and physical. The first is merely imaginary, since it supposes real or physical parts where there are none. The other, or physical continuity, is that state of two or more particles, in which their parts are so mutually implicated as to constitute one uninterrupted quantity or continuum.

CONTINUO, in *Music*, signifies the thorough bass, as *basso continuo* is the continual or thorough bass, which is sometimes marked in music-books by the letters B. C.

CONTOBABDITES, a sect in the sixth century. Their first leader was Severus of Antioch; who was succeeded by John the grammarian surnamed Philoponus, and one Theodosius whose followers were also called *Theodosians*. Part of them, who were willing to receive a book composed by Theodosius on the Trinity, made a separate body, and were called *Contobabdites*, from some place, which Nicephorus does not mention, but which must apparently have been the place where they held their assemblies. The Contobabdites allowed of no bishops; which is the only circumstance given us concerning them.

CONTOR, CONDOR, or CUNDUR, the American name

name of a ſpecies of VULTURE. See ORNITHOLOGY *Index*.

CONTORSION, in general, ſignifies the action of twiſting or wreſting a member of the body out of its natural ſituation. Rope-dancers accuſtom themſelves to contorſions of their limbs from their youth, to render the fibres of their articulations lax, and ſupple to all kinds of poſtures.

CONTORSION, in *Medicine*, has many ſignifications. 1. It denotes the iliac paſſion. 2. An incomplete diſlocation, when a bone is in part, but not entirely, forced from its articulation. 3. A diſlocation of the vertebræ of the back ſidewiſe, or a crookedneſs of theſe vertebræ. And, 4. A diſorder of the head, in which it is drawn towards one ſide, either by a ſpaſmodic contraction of the muſcles on the ſame ſide, or a palſy of the antagoniſt muſcles on the other.

CONTORTÆ, the name of the 30th order in Linnæus's Fragments of a natural method, conſiſting of plants which have a ſingle petal which is twiſted or bent to one ſide. This order contains the following genera, viz. echites, cerbera, gardenia, genipa, microcnemum, nerium, periploca, rawolfia, tabernæmontana, vinca, apocynum, aſclepias, comeraria, ceropegia, cynanchum, plumeria, ſtapelia. See BOTANY *Index*.

CONTOUR, in *Painting*, the outline, or that which defines a figure.

A great part of the ſkill of the painter lies in managing the contours well. Contour, with the Italian painters, ſignifies the lineaments of the face.

CONTOURNE, in *Heraldry*, is uſed when a beaſt is repreſented ſtanding or running with its face to the ſiniſter ſide of the eſcutcheon, they being always ſuppoſed to look to the right, if not otherwiſe expreſſed.

CONTOURNIATED, a term among antiquaries applied to medals, the edges of which appear as if turned in a lathe. This ſort of work ſeems to have had its origin in Greece; and to have been deſigned to perpetuate the memories of great men, particularly thoſe who had borne away the prize at the ſolemn games. Such are thoſe remaining of Homer, Solon, Euclid, Pythagoras, Socrates, and ſeveral athletæ.

CONTRA-HARMONICAL *Proportion*, is that relation of three terms, in which the difference of the firſt and ſecond is to the difference of the ſecond and third, as the third is to the firſt. Thus, for inſtance, 3, 5, and 6, are numbers contra-harmonically proportional; for 2 : 1 : : 6 : 3.

CONTRA-*Mure*, in *Fortification*, is a little wall built before another partition wall, to ſtrengthen it, ſo that it may receive no damage from the adjacent buildings.

CONTRABAND, in *Commerce*, a prohibited commodity, or merchandiſe bought or ſold, imported or exported, in prejudice to the laws and ordinances of a ſtate, or the public prohibitions of the ſovereign. Contraband goods are not only liable to confiſcation themſelves, but alſo ſubject all other allowed merchandiſe found with them in the ſame box, bale, or parcel, together with the horſes, waggons, &c. which conduct them. There are contrabands likewiſe, which, beſides the forfeiture of the goods, are attended with ſeveral penalties and diſabilities.

CONTRACT, in a general ſenſe, a mutual conſent of two or more parties, who voluntarily promiſe and oblige themſelves to do ſomething; pay a certain ſum, or the like. All donations, exchanges, leaſes, &c. are ſo many different contracts.

CONTRACT is particularly uſed, in common law, for an agreement or covenant between two, with a lawful conſideration or cauſe. As, if I ſell my horſe for money; or covenant, in conſideration of 20l. to make you a leaſe of a farm; theſe are good contracts, becauſe there is *quid pro quo*.

Uſurious CONTRACT, is a contract to pay more intereſt for money than the laws allow. See USURY.

Thoſe contracts are ſaid to be *null* which the law prohibits the making of; ſuch are all contracts between perſons incapable of contracting, as minors, religious, lunatics, wives without conſent of their huſbands, &c.

CONTRACT is alſo uſed for the inſtrument in writing, which ſerves as a proof of the conſent granted, and the obligation paſſed between the parties.

Among the ancient Romans, contracts, and all voluntary acts, were written, either by the parties themſelves, or by one of the witneſſes, or by a domeſtic ſecretary of one of the parties, whom they called a *notary*, but who was no public perſon as among us.

The contract, when finiſhed, was carried to the magiſtrate, who gave it a public authority by receiving it *inter acta*, into the number of acts under his juriſdiction; giving each of the parties a copy thereof, tranſcribed by his clerks or domeſtic regiſters, and ſealed with his ſeal. Which practice paſſed into France, where it obtained a long time.

CONTRACTILE FORCE, that property or power inherent in certain bodies, whereby, when extended, they are enabled to draw themſelves up again to their former dimenſions.

CONTRACTION, in *Phyſics*, the diminiſhing the extent or dimenſions of a body, or the cauſing its parts to approach nearer to each other; in which ſenſe it ſtands oppoſed to dilatation or expanſion.

CONTRACTION is frequently uſed by anatomical writers, to expreſs the ſhrinking up of a fibre, or an aſſemblage of fibres, when extended.

Convulſions and ſpaſms proceed from a preternatural contraction of the fibres of the muſcles of the part convulſed. On the contrary, paralytic diſorders generally proceed from a too great laxneſs of the fibres of the parts affected; or from the want of that degree of contraction neceſſary to perform the natural motion or action of the part. In the firſt, therefore, the animal ſpirits are ſuppoſed to flow, either in too great a quantity, or irregularly; and, in the laſt, the animal ſpirits are either denied a free paſſage into the part affected, or the tenſion of the fibrillæ is ſuppoſed inſufficient to promote the circulation.

CONTRACTION, in *Grammar*, is the reducing of two ſyllables into one, as *can't* for *cannot*, *ſhould'ſt* for *ſhouldeſt*, &c.

CONTRADICTION, a ſpecies of direct oppoſition, wherein one thing is found diametrically oppoſite to another.

CONTRADICTORY PROPOSITIONS, are oppoſite sites, one of which imports a mere and naked denial of the other.

Seeming contradictories is when the members of a period quite disagree in appearance and sound, but perfectly agree and are consistent in sense: thus,

> Cowards die many times before their death:
> The valiant never taste of death but once.
> *Shakespeare.*

CONTRAFISSURE, in *Surgery*, a kind of fracture, or fissure, in the cranium, which sometimes happens on the side opposite to that which received the blow, or at least at some distance from it.

CONTRAINDICATION, in *Medicine*, is an indication which forbids that to be done which the main scope of a disease points out.

Suppose, e. gr. in the cure of a disease a vomit were judged proper; if the patient be subject to a vomiting of blood, it is a sufficient contraindication as to its exhibition.

CONTRARIETY, an opposition between two things, which imports their being contrary to one another; and consists in this, that one of the terms implies a negation of the other, either mediately or immediately; so that contrariety may be said to be the contrast, or opposition of two things, one of which imports the absence of the other, as love and hatred.

CONTRAST; opposition or dissimilitude of figures, by which one contributes to the visibility or effect of the others. See RESEMBLANCE.

CONTRAST, in *Painting* and *Sculpture*, expresses an opposition or difference of position, attitude, &c. of two or more figures, contrived to make variety in a painting, &c. as where, in a group of three figures, one is shown before, another behind, and another sidewise, they are said to be in contrast.

The contrast is not only to be observed in the position of several figures, but also in that of the several members of the same figures: thus, if the right arm advance farthest, the right leg is to be hindermost; if the eye be directed one way, the arm to go the contrary way, &c. The contrast must be pursued even in the drapery.

CONTRAST, in *Architecture*, is to avoid the repetition of the same thing, in order to please by variety.

CONTRATE-WHEEL, in watch-work, that next to the crown, the teeth and hoop whereof lie contrary to those of the other wheels, from whence it takes its name. See *Watch-Making.*

CONTRAVALLATION, or *the Line of Contravallation*, in *Fortification*, a trench guarded with a parapet, and usually cut round about a place by the besiegers, to secure themselves on that side, and to stop the sallies of the garrison. See FORTIFICATION.

CONTRAVENTION, in *Law*, a man's failing to discharge his word, obligation, duty, or the laws or customs of the place.

CONTRAYERVA. See DORSTENIA, BOTANY *Index.*

CONTRE, in *Heraldry*, an appellation given to several bearings, on account of their cutting the shield contrary and opposite ways: thus we meet with contre bend, contre-chevron, contre-pale, &c. when there are two ordinarics of the same nature opposite to each other, so as colour may be opposed to metal, and metal to colour.

CONTRIBUTION, the payment of each person's quota of the part he is to bear in some imposition, or common expence. See CONTINGENT, &c.—Contributions are either involuntary, as those of taxes and imposts; or voluntary, as those of expences for carrying on some undertaking for the interest of the community.

CONTRIBUTIONS, in a military sense, are impositions paid by frontier countries to secure themselves from being plundered and ruined by the enemy's army. The peasants till their ground under the faith of contributions, as securely as in time of profound peace.

CONTRITION, in *Theology*, a sorrow for our sins, resulting from the reflection of having offended God, from the sole consideration of his goodness, without any regard to the punishment due to the trespass, and attended with a sincere resolution of forsaking them. The word is derived from the Latin *conterere*, to break or bruise.

CONTROL is properly a double register kept of acts, issues, &c. of the officers or commissioners in the revenue, army, &c. in order to perceive the true state thereof, and to certify the truth, and the due keeping of the acts subject to the enregisterment.

CONTROLLER, an officer appointed to control or oversee the accounts of other officers; and, on occasion, to certify whether or not things have been controlled or examined.

In Britain we have several officers of this name; as controller of the king's house, controller of the navy, controller of the customs, controller of the mint, &c.

Controller of the Hanaper, an officer who attends the lord chancellor daily, in term and in seal-time, to take all things sealed in leathern bags from the clerks of the hanaper, and to mark the number and effect thereof, and enter them in a book, with all the duties belonging to the king and other officers for the same, and so charge the clerk of the hanaper with them.

Controller of the Household, the second officer under the lord steward. The name of his office comes from the French word *contrerouler*. His office is to control the accounts and reckonings of the Green Cloth, of which board he is always a member. He carries a white staff, and is always one of the privy-council. He has 107l. 17s. 6d. a-year wages, and 1092l. 2s. 6d. board wages.

Controller of the Pipe, an officer of the exchequer, who makes out a summons twice every year, to levy the farms and debts of the pipe. See PIPE and EXCHEQUER.

Controllers of the Pells, two officers of the exchequer who are the chamberlain's clerks, and keep a control of the pell of receipts and goings out.

CONTUMACY, in *Law*, a refusal to appear in court when legally summoned, or the disobedience to the rules and orders of a court having power to punish such offence.

CONTUSION, in *Medicine* and *Surgery*, any hurt of the body that is inflicted by a blunt instrument. See SURGERY.

CONVALESCENCE, in *Medicine*, the insensible recovery of health; or that state in which, after the cure of a disorder, the body which has been reduced, has not yet regained its vigour, but begins to resume its powers. Proper aliments conduce to the re-establishment of the languid faculties; but as the tone of the bowels is weakened, the digestive faculty is not equal to its office, which is shown by light sweats over the whole body; and the smallest excess in this respect is oftentimes the occasion of dangerous relapses. A person in this state is like a taper relumined, which the least degree of wind is sufficient to extinguish.

CONVALLARIA, or LILY *of the* VALLEY, in *Botany*, a genus of plants, belonging to the hexandria class; and in the natural method ranking under *Sarmentaceæ*. See BOTANY *Index*.

CONVENARUM URBS, or *Lugdunum*, in *Ancient Geography*, a town of the Convenæ, a people of Gallia Narbonensis, at the foot of the Pyrenees. Its origin was owing to the Sertorian war, Pompey compelling the robbers of the Pyrenees and fugitive slaves to settle there, (Pliny). It stood near the head of the Garonne. Now St Bertrand, in Gascony. E. Long. 30. Lat 43 15.

CONVENTICLE, a diminutive of convent; denoting, properly, a cabal, or secret assembly, of a part of the monks of a convent, to make a brigue or party in the election of an abbot. From the ill use of these assemblies, the word is come into disrepute; and now stands for any mischievous, seditious, or irregular assembly. F. Doucine observes, the occidentals always esteemed the fifth general council an unlawful conventicle.

The term conventicle is said, by some, to have been first applied in England to the schools of Wickliff, and has been since used to signify the religious assemblies of all in that country who do not conform to the established doctrines and worship of the church of England.

By 22 Car. II. cap. 1. it is enacted, That if any persons of the age of 16 years, subjects of this kingdom, shall be present at any conventicle, where there are five or more assembled, they shall be fined 5s. for the first offence, and 10s. for the second; and persons preaching incur a penalty of 20l. Also suffering a meeting to be held in a house, &c. is liable to 20l. penalty. Justices of peace have power to enter such houses, and seize persons assembled, &c. And if they neglect their duty, they shall forfeit 100l. And if any constable, &c. know of such meetings, and do not inform a justice of peace, or chief magistrate, &c. he shall forfeit 5l. But the 1st W. and M. cap. 18. ordains, that protestant dissenters shall be exempt from penalties: though, if they meet in a house with the doors locked, barred, or bolted, such dissenters shall have no benefit from 1 W. and M. Officers of the government, &c. present at any conventicle, at which there shall be ten persons, if the royal family be not prayed for in express words, shall forfeit 40l. and be disabled (Stat. 10 Anne, cap. 2.)

CONVENTION, a treaty, contract, or agreement between two or more parties.

CONVENTION is also a name given to an extraordinary assembly of parliament, or the estates of the realm, held without the king's writ. Of this kind was the convention parliament which restored Charles II. This parliament met above a month before his return, and sat full seven months after his restoration, and enacted several laws still in force, which were confirmed by stat. 13 Car. II. c. 7. and c. 14. Such also was the convention of estates in 1688, who upon the retreat of King James II. came to a conclusion that he had abdicated the throne, and that the right of succession devolved to King William and Queen Mary; whereupon their assembly expired as a convention, and was converted into a parliament.

CONVENTION *of Estates*, in Scotland, was partly of the nature of a parliament; but differing in this, that the former could only lay on taxes, while parliament could both impose taxes and make laws.

CONVENTUAL, something belonging to a convent or monastery. See MONASTERY, and COENOBITE.

CONVENTUAL, is particularly used for a religious who actually resides in a convent; in contradistinction to those who are only guests, or are entertained there, or are in possession of benefices depending on the house. See MONK.

CONVENTUS JURIDICI, were courts of justice established in the Roman provinces; with a resort or extent of jurisdiction, circumscribed and confined within certain limits of district, whither all who were of the resort were to repair for justice. The unseasonable affectation of changing forms of war into forms of civil courts, proved the ruin of Varus and of three legions in Germany, (Florus). *Conventum agere*, is to hold a court of justice.

CONVERGING or CONVERGENT *Lines*, in *Geometry*, are such as continually approach nearer one another, or whose distances become still less and less. These are opposed to divergent lines, the distances of which become continually greater: those lines which converge one way, diverge the other.

CONVERGING *Rays*, in *Optics*, those rays that, issuing from divers points of an object, incline towards another, till at last they meet and cross, and then become diverging rays.

CONVERGING *Series*, a series of terms or quantities that always decrease the farther they proceed, or which tend to a certain magnitude or limit: in opposition to diverging series, or such as become continually larger and larger.

CONVERSATION, or DISCOURSE, signifies an interlocution between two, or among more persons: with this distinction, that conversation is used for any general intercourse of sentiments whatever, whereas a discourse means a conversation limited to same particular subject.

There is no part, perhaps, of social life, which affords more real satisfaction than those hours which one passes in rational and unreserved conversation. That conversation, however, may answer the ends for which it was designed, the parties who are to join in it must come together with a determined resolution to please, and to be pleased.

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In the conduct of it, be not eager to interrupt others, or uneasy at being yourself interrupted; since you speak either to amuse or instruct the company, or to receive those benefits from it. Give all, therefore, leave to speak in turn. Hear with patience, and answer with precision. Inattention is ill manners; it shows contempt; and contempt is never forgiven.

Trouble not the company with your own private concerns, as you do not love to be troubled with those of others. Yours are as little to them as theirs are to you. You will need no other rule whereby to judge of this matter.

Contrive, but with dexterity and propriety, that each person may have an opportunity of discoursing on the subject with which he is best acquainted. He will be pleased, and you will be informed. By observing this rule, every one has it in his power to assist in rendering conversation agreeable; since, though he may not choose, or be qualified, to say much himself, he can propose questions to those who are able to answer them.

Avoid stories, unless short, pointed, and quite *a-propos*. He who deals in them, says Swift, must either have a very large stock, or a good memory, or must often change his company. Some have a set of them strung together like onions; they take possession of the conversation by an early introduction of one, and then you must have the whole rope; and there is an end of every thing else, perhaps, for that meeting, though you may have heard all twenty times before.

Talk often, but not long. The talent of haranguing private company is insupportable. Senators and barristers are apt to be guilty of this fault; and members who never harangue in the house will often do it out of the house. If the majority of the company be naturally silent, or cautious, the conversation will flag, unless it be often renewed by one among them who can start new subjects. Forbear, however, if possible, to broach a second before the first is out, lest your stock should not last, and you should be obliged to come back to the old barrel. There are those who will repeatedly cross upon and break into the conversation with a fresh topic, till they have touched upon all and exhausted none. Economy here is necessary for most people.

Laugh not at your own wit and humour; leave that to the company.

When the conversation is flowing in a serious and useful channel, never interrupt it by an ill-timed jest. The stream is scattered, and cannot be again collected.

Discourse not in a whisper, or half-voice, to your next neighbour. It is ill-breeding, and, in some degree, a fraud; conversation-stock being, as one has well observed, a joint and common property.

In reflections on absent people, go no farther than you would go if they were present. "I resolve (says Bishop Beveridge) never to speak of a man's virtues to his face, nor of his faults behind his back:"—A golden rule! the observation of which would, at one stroke, banish flattery and defamation from the earth.

CONVERSE, in *Mathematics*. One proposition is called the *converse* of another, when, after a conclusion is drawn from something supposed in the converse proposition, that conclusion is supposed; and then, that which in the other was supposed, is now drawn as a conclusion from it: thus when two sides of a triangle are equal, the angles under these sides are equal; and, on the converse, if these angles are equal, the two sides are equal.

CONVERSION, in a moral sense, implies a repentance for a temper and conduct unworthy our nature, and unbecoming our obligations to its Author, and a resolution to act a wiser and a better part for the future.

Conversion, in *War*, a military motion, whereby the front of a battalion is turned where the flank was, in case the battalion is attacked in the flank.

Conversion of Equations, the same with reduction of equations by multiplication. See Algebra.

CONVERT, a person who has undergone a conversion.

Convert is chiefly used in respect of changes from one religion, or religious sect, to another. Converts with relation to the religion turned to, are denominated *apostates* with regard to that they have relinquished.

The Jews formerly converted to Christianity in England, were called *conversos*. Henry III. built them a house in London, and allowed them a competent subsistence for their lives; which house was called *domus conversorum*. But the number afterwards increasing, they grew a burden to the crown; upon which they were distributed among the monasteries: and after the expulsion of the Jews under Edward III. the *domus conversorum* was given for keeping of the rolls.

Converts, in a monastic sense, are lay-friars, or brothers, admitted for the service of the house; without orders, and not allowed to sing in the choir. Till the eleventh century, the word was used for persons who embraced the monkish life at the age of discretion; by which they were distinguished from those devoted in their childhood by their parents, called *oblati*. But in the eleventh century, when they began to receive into monasteries illiterate persons, incapable of being clerks, and only destined for bodily labour, the signification of the word was necessarily changed. F. Mabillon observes, that it was John first abbot of Vallombrosa who first introduced these brother-converts, distinguished by their state from the monks of the choir, who were then either clerks or capable of becoming so.

CONVEX, an appellation given to the exterior surface of gibbous or globular bodies; in opposition to the hollow inner surface of such bodies, which is called *concave*; thus we say, a convex frieze, lens, mirror, superficies, &c.

CONVEXITY, the exterior surface of a convex, i. e. gibbous and globular thing; in opposition to concavity, or the inner surface, which is hollow or depressed. See Concave.

The word is of particular import in catoptrics and dioptrics: where it is applied to mirrors and lenses.

A convex mirror represents its images smaller than the objects; as a concave one represents them larger: a convex mirror reflects the rays from it, diverging; and therefore disperses and weakens their effect: as a concave one reflects them converging; so as they concur in a point, and have their effect increased: and by how much the mirror is a portion of a smaller sphere, by so much does it diminish the objects, and disperse the rays the more. See MIRROR.

A convex lens is either convex on both sides, called a *convexo-convex;* or it is plain on one side and convex on the other, called a *plano-convex;* or concave on one side and convex on the other, called a *convexo-concave*, or *concavo-convex*, as the one or the other surface prevails, i. e. as this or that is a portion of a smaller sphere. All convex lenses inflect the rays of light in their passage, i. e. send them out from their convex surface converging, so as that they concur in a point or focus. Hence all convex lenses magnify, i. e. represent their images larger than their objects; and this the more as they are portions of smaller spheres.

CONVEYANCE, in *Law*, a deed or instrument that passes land, &c. from one person to another.

CONVICT, in common law, a person that is found guilty of an offence by the verdict of a jury. See the following article.

CONVICTION, in *Law*. When a jury has given a verdict upon trial, finding the prisoner guilty, he is said to be *convicted* of the crime whereof he stands indicted. See TRIAL.

When the offender is thus convicted, there are two collateral circumstances that immediately arise. 1. On a conviction in general for any felony, the reasonable expences of prosecution are by statute 25 Geo. II. c. 36. to be allowed the prosecutor out of the country-stock, if he petitions the judge for that purpose; and by statute 17 Geo. II. c. 3. poor persons, bound over to give evidence, are likewise entitled to be paid their charges, as well without conviction as with it. 2. On a conviction of larceny in particular, the prosecutor shall have restitution of his goods by virtue of the statute 21 Hen. VIII. c. 11. For by the common law there was no restitution of goods upon an indictment; because it is at the suit of the king only; and therefore the party was enforced to bring an appeal of robbery, in order to have his goods again. But, it being considered that the party prosecuting the offender by indictment, deserves to the full as much encouragement as he who prosecutes by appeal, this statute was made, which enacts, that if any person be convicted of larceny by the evidence of the party robbed, he shall have full restitution of his money, goods, and chattels, or the value of them out of the offender's goods, if he has any, by a writ to be granted by the justices. And the construction of this act having been in great measure conformable to the law of appeals, it has therefore in practice superseded the use of appeals of larceny. For instance, as formerly upon appeals, so now upon indictments of larceny, this writ of restitution shall reach the goods so stolen, notwithstanding the property of them is endeavoured to be altered by sale in market overt. And though this may seem somewhat hard upon the buyer, yet the rule of law is, that *spoliatus debet ante omnia restitui*, especially when he has used all the diligence in his power to convict the felon. And, since the case is reduced to this hard necessity, that either the owner or the buyer must suffer; the law prefers the right of the owner, who has done a meritorious act by pursuing a felon to condign punishment, to the right of the buyer, whose merit is only negative, that he has been guilty of no unfair transaction. And it is now usual for the court, upon the conviction of a felon, to order, without any writ, immediate restitution of such goods as are brought into court, to be made to the several prosecutors. Or else, secondly, without such writ of restitution, the party may peaceably retake his goods wherever he happens to find them, unless a new property be fairly acquired therein. Or, lastly, if the felon be convicted and pardoned, or be allowed his clergy, the party robbed may bring his action of trover against him for his goods, and recover a satisfaction in damages. But such action lies not before prosecution: for so felonies would be made up and healed: and also recaption is unlawful, if it be done with intention to smother and compound the larceny; it then becoming the heinous offence of *theft-bote*.

It is not uncommon, when a person is convicted of a misdemeanour, which principally and more immediately affects some individual, as a battery, imprisonment, or the like, for the court to permit the defendant to *speak with the prosecutor*, before any judgement is pronounced; and if the prosecutor declares himself satisfied, to inflict but a trivial punishment. This is done to reimburse the prosecutor his expences, and make him some private amends, without the trouble and circuity of a civil action. But it is surely a dangerous practice; and, though it may be entrusted to the prudence and discretion of the judges in the superior courts of record, it ought never to be allowed in local or inferior jurisdictions, such as the quarter-sessions: where prosecutions for assaults are by this means too frequently commenced, rather for private lucre than for the great ends of public justice. Above all, it should never be suffered, where the testimony of the prosecutor himself is necessary to convict the defendant: for by this means the rules of evidence are entirely subverted; the prosecutor becomes in effect a plaintiff, and yet is suffered to bear witness for himself. Nay, even a voluntary forgiveness by the partly injured, ought not, in true policy, to intercept the stroke of justice. "This (says an elegant writer who pleads with equal strength for the *certainty*, as for the lenity of punishment) may be an act of good nature and humanity, but it is contrary to the good of the public. For although a private citizen may dispense with satisfaction for his private injury, he cannot remove the necessity of public example. The right of punishing belongs not to any one individual or particular, but to the society in general, or to the sovereign who represents that society; and a man may renounce his own portion of this right, but he cannot give up that of others."

CONVICTION, in *Theology*, expresses the first degree of repentance, wherein the sinner becomes sensible of his guilt, of the evil nature of sin, and of the danger of his own ways.

CONVOCATION, an assembly of the clergy of England, by their representatives, to consult of ecclesiastical matters. It is held during the session of parliament, and consists of an upper and a lower house. In the upper sit the bishops, and in the lower the inferior clergy, who are represented by their proctors; consisting of all the deans and archdeacons, of one proctor for

for every chapter, and two for the clergy of every diocese, in all 143 divines; viz. 22 deans, 53 archdeacons, 24 prebendaries, and 44 proctors of the diocesan clergy. The lower house chooses its prolocutor; whose business it is to take care that the members attend, to collect their debates and votes, and to carry their resolutions to the upper house. The convocation is summoned by the king's writ, directed to the archbishop of each province, requiring him to summon all bishops, deans, archdeacons, &c.

The power of the convocation is limited by a statute of Henry VIII. They are not to make any canons or ecclesiastical laws without the king's license; nor when permitted to make any, can they put them in execution, but under several restrictions. They have the examining and censuring all heretical and schismatical books and persons, &c. but there lies an appeal to the king in chancery, or to his delegates. The clergy in convocation, and their servants, have the same privileges as members of parliament.

Since the year 1665, when the convocation of the clergy gave up the privilege of taxing themselves to the house of commons, they seldom have been allowed to do any business; and are generally prorogued from time to time till dissolved, a new one being generally called along with a new parliament. The only equivalent for giving up the privilege of taxing themselves, was their being allowed to vote at elections for members to the house of commons, which they had not before.

CONVOLUTION, a winding motion, proper to the trunks of some plants, as the convolvulus, or bindweed; the claspers of vines, bryony, &c.

CONVOLVULUS, BIND-WEED: A genus of plants of the pentandria class, and in the natural method ranking under the 20th order, *Campanaceæ*. See BOTANY and MATERIA MEDICA *Index*.

CONVOY, in naval affairs, one or more ships of war, employed to accompany and protect merchant ships, and prevent their being insulted by pirates, or the enemies of the state in time of war.

CONVOY, in military matters, a body of men that guard any supply of men, money, ammunition, or provisions, conveyed by land into a town, army, or the like, in time of war.

CONUS, a CONE, in *Botany*: a species of fruit or scaly seed-vessel, so termed by Tournefort and other botanists. Linnæus has substituted STROBILUS in its place.

CONUS, the *cone-shell*, a genus of shells. See CONCHOLOGY *Index*.

CONVULSION, a preternatural and violent contraction of the membranous and muscular parts of the body. See MEDICINE *Index*.

CONWAY, a market-town of Caernarvonshire in North Wales, situated near the mouth of a river of the same name, 15 miles west of St Asaph. W. Long. 3. 50. N. Lat. 53. 20.

CONYZA. *Fleabane*: A genus of plants of the syngenesia class, ranking under the 49th natural order, *Compositæ*. See BOTANY *Index*.

CONZA, a town of the kingdom of Naples in Italy, situated on the farther principate, on the river Offanto, 50 miles south-east of the city of Naples. E. Long. 16. 0. N. Lat. 41. 0. It is the see of an archbishop.

COOK, SIR ANTHONY, descended from Sir Thomas Cook lord mayor of London, was born in 1506, and supposed to have been educated at Cambridge. He was so eminent for his learning, piety, and prudence, that the guardians of King Edward VI. appointed him to be his chief instructor in learning, and to form his manners. He had four daughters; and being resolved to have sons by education, lest he should have none by birth, he taught his daughters those lessons by night that he had instilled into the prince by day: he was happy in his endeavours, as they proved learned in Greek and Latin, and equally distinguished by virtue, piety, and good fortune. Mildred was married to the great Lord Burleigh; Ann to Sir Nicholas Bacon, lord keeper of the great seal; Elisabeth to Sir John Russel, son and heir of Francis earl of Bedford; and Catharine to Sir Henry Killigrew. He lived in exile during the Marian persecution; and returning on the accession of Queen Elizabeth, spent the rest of his days in peace and honour, dying in 1576.

COOK, *Captain James*, one of the ablest and most celebrated navigators of any country, was the son of James Cook, a labourer or servant in husbandry, and supposed to have been a native of the county of Northumberland, and was born on the 27th of October 1728, at the village of Marton in the north riding of Yorkshire. He was one of nine children, all of whom are now dead except a daughter, who married a fisherman of Redcar. He received the first rudiments of education from the schoolmistress of the village; and afterwards, on his father's removal to Great Ayton, he was put to a day-school, at the expence of Mr Skottow, his father's employer, where he was instructed in writing and in a few of the first rules of arithmetic. Before the age of thirteen he was bound apprentice to Mr W. Sanderson, a haberdasher or shopkeeper at Straiths, about ten miles from Whitby: but some disagreement taking place between him and his master, he indulged his own inclination in binding himself apprentice to Messrs Walkers of Whitby, who had several vessels in the coal trade; and after serving a few years longer in the situation of a common sailor, he was at length raised to be mate of one of Mr Walker's ships. During all this period it is not recollected that he exhibited any thing peculiar either in his abilities or conduct.

Early in the year 1755, when hostilities broke out between France and England, Cook entered on board the Eagle of sixty guns, to which vessel Sir Hugh Palliser was soon after appointed, who soon distinguished him as an active and diligent seaman; and his promotion was forwarded by a letter of recommendation which was written by Mr Osbaldeston, member for Scarborough, at the request of several neighbours, in Mr Cook's favour. On the 15th of May 1759, he was appointed master of the Mercury, which soon after sailed to America, and joined the fleet under Sir Charles Saunders at the memorable siege of Quebec. His interest with the admiralty appears even then to have been very strong; for on Mr Osbaldeston's letter he was appointed master of the Grampus sloop; but the proper master having unexpectedly returned to her,

Cook.

her, the appointment did not take place. Four days after he was made master of the Garland; when upon inquiry it was found that he could not join her, as the vessel had already failed: and the next day, May 15th 1759, he was made master of the Mercury. On this occasion he was recommended by Captain Pallifer to a difficult and dangerous service, viz. to take the soundings of the river St Lawrence, between the island of Orleans and the north shore, which he performed in the most complete manner; and soon afterwards he was employed to survey the most dangerous parts of the river below Quebec: these were his first efforts with the pencil. After this expedition he was appointed, on the 22d of September, master of the Northumberland, stationed at Halifax, where he first read Euclid, and applied to astronomy and other branches of science. In the year 1762 he was with the Northumberland, assisting at the recapture of Newfoundland; and in the latter end of the same year he returned to England, and married, at Barking in Essex, Miss Elisabeth Batts. Early in 1763, when Admiral (then Captain) Greaves was appointed governor of Newfoundland, Mr Cook went out with him to survey the coasts of that island. At the end of the season he returned to England; but in the beginning of 1764, Sir Hugh Pallifer being appointed governor of Newfoundland and Labradore, Mr Cook accompanied him in the same capacity of surveyor, and had the Granville schooner to attend him on that business: in this situation he continued till 1767.

While Mr Cook remained on this station, he had an opportunity of exhibiting publicly a specimen of his progress in the study of astronomy, in a short paper printed in the 57th volume of the Philosophical Transactions, entitled "An observation of an eclipse of the sun at the island of Newfoundland, August 5. 1766, with the longitude of the place of observation deduced from it." Mr Cook's observation was made at one of the Burgeo islands near Cape Ray, in N. Lat. 47° 56′ 19″; and by the comparisons of it made by Mr Mitchel, with an observation of Dr Hornsby at Oxford, it appeared to have been accurately done: and Mr Cook at that time obtained the character of an able astronomer.

In the mean time a spirit for geographical discoveries, which had gradually declined since the beginning of the 17th century, began to discover itself anew. Two voyages of this kind had been performed in the reign of George II. the one under Captain Middleton, the other by Captains Moore and Smyth, with a view to discover a northwest passage through Hudson's Bay to the East Indies. Two others, under Captains Byron, Wallis, and Carteret, had been undertaken soon after the conclusion of the peace in 1763 by order of his present majesty; and before the return of these navigators, who were ordered to sail round the world, another voyage was resolved upon for astronomical purposes. It having been calculated that a transit of Venus over the sun's disk would happen in 1769, a long memorial to his majesty was presented by the Royal Society; in which they set forth the great importance of making proper observations on this phenomenon, the regard that had been paid to it by the different courts of Europe; and intreating, among other things, that a vessel might be fitted out, at the expence of government, for conveying proper persons to some of the Friendly islands, in order to make the necessary observations. This being complied with on the part of his majesty, Alexander Dalrymple, Esq. an eminent member of the Royal Society, was appointed to take the command of the bark appropriated for the purpose. In the execution of the project, however, an unexpected difficulty occurred. Mr Dalrymple, sensible of the impossibility of guiding a vessel through unknown and dangerous seas without any proper command over the crew, demanded a brevet commission as captain of the vessel, in the same manner as had formerly been granted to Dr Halley in a voyage of discovery made by him. This commission Sir Edward Hawke absolutely refused to sign; declaring, when pressed upon the subject, that he would rather suffer his right hand to be cut off than trust any of his majesty's ships to a person who had not been properly bred to the service; and in this proceeding he seemed to be justified by the mutinous behaviour of Dr Halley's crew; who, denying the legality of his authority over them, had involved him in a very disagreeable dispute, and which was attended with pernicious consequences. Mr Dalrymple, on the other hand, being equally determined in his refusal to proceed without the authority in question, there was a necessity for finding out some person of science who might also be free from the objection made by Sir Edward Hawke. Mr Cook therefore was proposed by Mr Stephens; and his recommendation being seconded by Sir Hugh Pallifer, he was immediately appointed to direct the expedition; and on this occasion was promoted to the rank of lieutenant in his majesty's service.

Mr Cook's commission as lieutenant was dated May 25. 1768; a vessel of 370 tons, named the *Endeavour*, was provided for him; and while the necessary preparations were making for the voyage, Captain Wallis returned. It having been recommended to this gentleman to fix upon a proper place for making the astronomical observations, he had accordingly chosen the island named by him *George's Island*, but since known by the name of *Otaheite*; judging also that Port Royal harbour in it would afford an eligible situation. This proposal being accepted, directions for the purpose were accordingly given to Mr Cook, with whom Mr Charles Green was joined in the astronomical part; the latter having been assistant to Dr Bradley in the royal observatory at Greenwich, and thus judged to be every way qualified for the office. The lieutenant was likewise accompanied by Mr Banks, now Sir Joseph Banks, Dr Solander, &c. The principal design of the voyage was, as has already been hinted, to make observations on the transit of Venus; but this being done, Mr Cook was directed to make further discoveries in the Pacific ocean; and on the 30th of July 1768 he set sail on his expedition. An account of the voyage, and the discoveries made during the time of it, is given in the next article; here it is sufficient to observe, that throughout the whole Mr Cook approved himself an able seaman; and from his behaviour both to his own people and to the savage nations he occasionally met with, showed a most exact regard to the rules both of justice and humanity. On his first arrival at Otaheite, the following regulations were drawn up for his people, which he took care should be punctually obeyed: 1. To

1. To endeavour, by every fair means, to cultivate a friendſhip with the natives, and to treat them with all imaginable humanity. 2. A proper perſon or perſons to be appointed to treat with the natives for proviſions, fruits, &c. and no other perſon belonging to the ſhip to do ſo without leave. 3. Every perſon on ſhore to attend punctually to his duty, and to pay proper attention to his tools or arms; and if loſt through negligence, to have the full value charged againſt his pay, with ſuch farther puniſhment inflicted as occaſion might require. 4. The ſame penalty to be inflicted on every one who ſhould embezzle, trade with, or offer to trade with, any part of the ſhip's ſtores; and, 5. No iron to be given in exchange for any thing but proviſions. His rigid adherence to theſe rules was manifeſted in ſeveral inſtances, particularly by ſeverely puniſhing the ſhip's butcher, who had threatened the life of a woman, wife to one of the chiefs of the iſland, for refuſing a ſtone hatchet on the terms he propoſed. On erecting their obſervatory, in order to go through the aſtronomical operations, an accident happened which had like to have diſconcerted the whole ſcheme. This was the loſs of their quadrant, which had been ſtolen by ſome of the natives; but, chiefly through the exertions of Mr Banks, it was recovered, and the obſervations made accordingly. Scarce was this accompliſhed, however, before another theft of the natives demanded the moſt ſerious conſideration of the commander. Some of them taking advantage of the attention of the officers being otherwiſe engaged, took the opportunity of breaking into one of the ſtore-rooms, and ſtealing from thence a bag of ſpike nails of no leſs than an hundred weight. This was a moſt important affair; for as thoſe nails were of great eſtimation among the Indians, the poſſeſſion of ſuch quantity muſt undoubtedly have much leſſened their value, and thus rendered proviſions of every kind greatly dearer on the iſland than before. One of the thieves therefore being diſcovered, was puniſhed with 200 laſhes; notwithſtanding which he obſtinately refuſed to diſcover any of his accomplices. Repeated thefts committed afterwards required all the wiſdom and reſolution of Mr Cook to conduct himſelf in a proper manner. After due conſideration, he judged it to be a matter of importance to put an end to theſe practices at once, by doing ſomething which might engage the natives themſelves to prevent them for their common intereſt. This, however, he was not at preſent able to accompliſh; nor indeed did it ſeem poſſible to prevent them without uſing fire-arms, which from motives of humanity he ſtill determined to avoid. At laſt, after a ſtay of three months, when preparing to take his leave, the moſt diſagreeable adventure took place that he had hitherto met with. This was the deſertion of two of his people, who having married young women of the country, determined to take up their reſidence in it. Mr Cook was now obliged to ſeize ſome of the chiefs, and to inform them that they could not obtain their liberty unleſs the deſerters were recovered. This at laſt produced the deſired effect; the deſerters were given up, and Mr Cook ſet ſail, along with Tupia (who had formerly been the prime miniſter to Oberea, a princeſs of the iſland) and a boy of 13 years of age, both of whom were deſirous of accompanying him to England.

While Mr Cook proceeded to viſit others of the South ſea iſlands. Tupia occaſionally ſerved as an interpreter. On his arrival in New Zealand, Mr Cook found the people extremely hoſtile and inſolent. At their very firſt meeting, one of the natives having threatened to dart his lance into the boat, was ſhot dead. Another, having carried off Mr Green's hanger was fired at with ſmall ſhot; and upon his ſtill refuſing to reſtore it, was fired at with ball and killed. This, however, produced very little effect on the reſt, who offered to make an attack upon them, till ſeveral muſkets were fired with ſmall ſhot, which wounded three or four more. Next day the commander, having determined to force ſome of the natives on board, in order to conciliate their affections by kind treatment, directed his men to follow two canoes whom he perceived under way before him. One made her eſcape, but the other, not obſerving the boats in purſuit, was overtaken; on which the ſavages plied their oars ſo briſkly, that the ſhip's boats were not able to keep up with them. Tupia, whoſe language the New Zealanders underſtood, called to them to return, with aſſurances that no hurt ſhould be done them; but they continued their flight without minding him. A muſket was then fired over their heads with a view to intimidate them, but upon this they prepared to fight; and on the coming up of the boats began the attack with ſo much vigour, that the lieutenant's people were obliged to fire upon them with ball, by which four out of ſeven that were in the boat were killed, and the other three jumped into the water, and were taken on board.

This part of Mr Cook's conduct ſeems inconſiſtent with that humanity for which he was in general ſo eminently diſtinguiſhed; he was aware of the cenſure, and makes the following apology. "Theſe people certainly did not deſerve death for not chooſing to confide in my promiſes, or not conſenting to come on board my boat, even if they had apprehended no danger; but the nature of my ſervice required me to obtain a knowledge of their country, which I could no otherwiſe obtain but by forcing into it in an hoſtile manner, or gaining admiſſion through the confidence and good will of the people. I had already tried the power of preſents without effect; and I was now prompted by my deſire to avoid farther hoſtilities, to attempt to get ſome of them on board; the only method we had left of convincing them that we intended them no harm, and had it in our power to contribute to their gratification and convenience. Thus far my intentions certainly were not criminal; and though in the conteſt, which I had not the leaſt reaſon to expect, our victory might have been complete without ſo great an expence of life; yet in ſuch ſituations, when the command to fire has once been given, no man can pretend to reſtrain its exceſs, or preſcribe its effect."

Notwithſtanding the diſaſter juſt mentioned, to which the three New Zealanders, who were taken on board, had been witneſſes, they were ſoon conciliated, and began to ſing with a degree of taſte that ſurpriſed the Engliſh gentlemen. They were boys, the oldeſt about 19 and the youngeſt about 11; but no kindneſs which

which could be ſhown them was in any degree effectual to bring about a reconciliation with the reſt. On the contrary, having perceived the ſhip in ſome diſtreſs, they inſtantly ſhowed a diſpoſition to make an attack; and from this they were only prevented by the firing of a four-pounder charged with grape-ſhot. Even this did not produce any permanent effect; another attack was determined upon, and would undoubtedly have been made, had not Tupia informed them, that if they perſiſted in the attempt, the arms of their adverſaries, like thunder, would deſtroy every one of them. This was enforced by the fire of another four-pounder with grape-ſhot, which ſpreading wide in the water, terrified them to ſuch a degree that they began to paddle away as faſt as poſſible. Notwithſtanding this, however, ſome intercourſe began to take place; but in every inſtance the New Zealanders manifeſted their hoſtility and treachery in ſuch a manner as ſhowed that they were not to be gained by fair means. At laſt an attempt to carry off Tayeto, Tupia's boy, rendered it abſolutely neceſſary to fire upon them in order to reſcue him from certain deſtruction, ſome of the ſavages having got him into a canoe, where they held him down by violence. In conſequence of this one of the ſavages was killed on the ſpot, and ſeveral more wounded, by the diſcharge of muſkets from the boats; Tayeto recovered his liberty, jumped into the water, and ſwam to the ſhip. Some partial intercourſe again took place: but ſtill it appeared that the innate rancour of theſe ſavages was not to be ſubdued by any fair means; and it was only by the powerful arguments of cannon and muſketry that they could be kept from attempting to do miſchief.

From the account of this voyage publiſhed by Dr Hawkeſworth, indeed, it appears, that a conſiderable number of ſavages periſhed in a manner ſimilar to that above mentioned, and they ſeem to have manifeſted a more hoſtile behaviour than afterwards: on thoſe melancholy occaſions, however, it is obſerved to the honour of Mr Cook, that his humanity was eminently conſpicuous beyond that of the common people, who all along ſhowed as much inclination to deſtroy the Indians as a ſportſman does to kill the game he purſues.

While Mr Cook coaſted the iſlands of New Zealand, he was ſometimes in the moſt imminent danger of being ſhipwrecked. In the latitude of 35° ſouth, and in the midſt of ſummer in that climate, he met with ſuch a gale of wind as he ſcarce ever experienced before; ſo that he was no leſs than three weeks in getting ten leagues to the weſtward, and two more before he could get 30 leagues farther. Fortunately, however, they were all this time a conſiderable way from land, otherwiſe it is probable that the ſtorm muſt have proved fatal.

Mr Cook having ſpent ſix months in circumnavigating and fully exploring the iſlands of New Zealand, he ſailed from thence on the 31ſt of March 1770. It muſt be obſerved, however, that the extreme hoſtility manifeſted by the inhabitants in that part of the iſland where he firſt arrived, was not univerſally diffuſed, but that a friendly intercourſe was for a long time maintained with thoſe about Queen Charlotte's Sound. From New Zealand he proceeded to New Holland, and on the 28th of April came in ſight of Botany Bay. Here all their endeavours to induce the natives to have any intercourſe with them proved ineffectual, though happily there was no blood ſpilt in any quarrel.

During their navigation round New Holland, the coaſts of which are full of dangerous rocks and ſhoals, our navigators were brought into a more perilous ſituation than ever; and from which the eſcape was ſo extraordinary, that it deſerves a particular relation. This happened on the 10th of June 1770, as they purſued their courſe from Trinity Bay, and nearly in the latitude aſſigned to the iſlands diſcovered by Quiros. At that time they had the advantage of a fine breeze and a clear moonlight; and in ſtanding off from ſix till near nine o'clock, the ſhip had deepened her water from 14 to 21 fathoms; but while the navigators were at ſupper, it ſuddenly ſhoaled to 12, 10, and 8 fathoms in the ſpace of a few minutes. Every thing was then ready for putting the ſhip about, when they ſuddenly got into deep water again, and continued in 20 and 21 fathoms for ſome time, ſo that the gentlemen went to bed in perfect ſecurity. A little before eleven, however, the water ſhoaled at once from 20 to 17 fathoms; and before the lead could be heaved again, the ſhip ſtruck, and remained immoveable, excepting as far as ſhe was heaved up and down, and daſhed againſt the rocks by the ſurge. The alarm was now univerſal, and not indeed without the greateſt reaſon. It appeared that the veſſel had been lifted over the ledge of a rock, and lay in a hollow within it, where there were in ſome places from three to four fathoms water, and in others ſcarcely as many feet: the ſheathing boards were disjoined, and floating round the ſhip in great numbers; and at laſt the falſe keel alſo was deſtroyed, while the rock kept grating her bottom with ſuch force as to be heard in the fore ſtore-room. It was now neceſſary to lighten the ſhip as much as poſſible: and this was done with all expedition to the amount of more than 50 tons. In the morning of the 11th of June they diſcovered the land at about eight leagues diſtance, without any iſland between, on which, they could have been ſent aſhore in the event of the ſhip going to pieces, that ſo they might have been carried to the main land by turns. To add to their diſtreſs, the ſhip drew ſo much water, that it was with difficulty kept under with three pumps. Laſtly, it appeared, that even the riſing of the tide, on which they had ultimately depended for relief, was inſufficient to anſwer the purpoſe as the day-tide fell conſiderably ſhort of that in the night-time. Having therefore lightened the ſhip ſtill farther, by throwing out every thing that could poſſibly be ſpared, they waited with patience for the next tide; when, after incredible exertion, the ſhip righted, and they got her over the ledge of the rock into deep water. By continual labour, however, the men were at laſt ſo much exhauſted, that they could not ſtand to the pumps more than five or ſix minutes at a time; after which they threw themſelves flat on the deck, though a ſtream of water between three and four inches deep ran over it; and in this ſituation, they lay till others, exhauſted as well as themſelves, took their places, on which they ſtarted up again, and renewed their exertions. In this dreadful extremity, Mr Monkhouſe, a midſhipman, propoſed the expedient of fothering the ſhip, as it is called,

called, by which means he ſaid that he had ſeen a merchant ſhip brought from Virginia to London after ſhe had ſprung a leak that admitted more than four feet water in an hour. The expedient being approved of, it was put in execution in the following manner. He took a lower ſtudding-ſail, and having mixed a large quantity of oakum and wool together, ſtitched them down by handfuls as lightly as poſſible; the whole being afterwards ſpread over with the dung of the ſheep and other filth. The ſail was then hauled under the ſhip's bottom by means of ropes which kept it extended. When it came under the leak, the wool and oakum, with part of the ſail, were forced inwards by the preſſure of the water, which thus prevented its own ingreſs in ſuch an effectual manner, that one pump, inſtead of three, was now ſufficient to keep it under. Thus they got the ſhip into a convenient port on the coaſt of New Holland, where they had an opportunity of repairing the injury. Here they diſcovered that their preſervation had not been owing entirely to the expedient above mentioned; for one of the holes was in a great meaſure filled up by a piece of rock which had broken off and ſtuck in it; and this hole was ſo large, that had it not been filled up in the manner juſt mentioned, they muſt undoubtedly have periſhed notwithſtanding all the aſſiſtance that could have been derived from the pumps.

The dangers they ſuſtained in navigating this coaſt were innumerable, inſomuch that for very near three months they were obliged to have a man conſtantly in the chains heaving the lead. They were always entangled among rocks and ſhoals, which could not have failed to deſtroy a leſs experienced navigator; and even Mr Cook, with all his ſagacity, could not ſometimes have extricated himſelf, had it not been for the favourable interpoſition of ſome natural events, which no human penetration could foreſee or have the leaſt dependence upon. Of this we ſhall only give the following inſtance. Having at laſt, as they thought, got ſafely over the vaſt reefs of ſunk rocks with which the coaſt of New Holland is ſurrounded, they flattered themſelves that all danger was paſſed, and the vaſt ſwell of the water convinced them that they were now in the open ocean. The remembrance of former dangers, however, induced them frequently to take the precaution of ſounding; notwithſtanding which, in the latitude of about $14\frac{1}{2}°$ S. they found themſelves one morning only about a mile diſtant from the moſt hideous breakers, though the ſea all around was unfathomable. Their ſituation was rendered the more dreadful by its being a dead calm, at the ſame time that they were carried towards the rock with ſuch rapidity, that by the time they had got the ſhip's head turned by means of the boats, ſhe was ſcarcely 100 yards diſtant from it. Their only reſource then was to tow the ſhip, if poſſible, by means of the boats and pinnace, out of a ſituation ſo very perilous; but all their efforts would have been unſucceſsful, had not a breeze of wind ſprung up, which, though too light to have been noticed at any other time, was found to ſecond their efforts ſo effectually, that the ſhip began to move perceptibly from the reef in an oblique direction: during the time that this breeze laſted, which was not more than ten minutes, they had made a conſiderable way. A dead calm ſucceeding, they began to loſe ground, and in a little time were driven within 200 yards of the rocks: but fortunately the breeze returned, and laſted ten minutes more; during which time a ſmall opening was perceived in the reef at the diſtance of about a quarter of a mile. The mate being ſent out to examine this opening, reported that it was not more than the length of the ſhip in breadth, but that there was ſmooth water within. On this it was determined to puſh into it by all means. The attempt failed of ſucceſs; as, juſt when they had brought the ſhip with great labour to the mouth of the opening, they found a current ſetting out from it by reaſon of the tide now beginning to ebb. But though their hopes were diſappointed in getting through the opening, they were, by the current ſetting out from it, driven in a very ſhort time to the diſtance of a quarter of a mile from the rocks; and by dint of towing and other exertions, they were got by noon to the diſtance of two miles. This temporary deliverance, however, afforded but ſmall proſpect of being ultimately relieved. They had ſtill no other expectation than of being forced back into their former ſituation by the return of the tide; but happily they now perceived another opening about a mile to the weſtward. Mr Hicks the lieutenant being ſent to examine this opening, returned with an account of its being narrow and hazardous, but capable of being paſſed. To this place therefore the ſhip was directed by every poſſible means; and a light breeze happening to ſpring up, they fortunately reached it, and were inſtantly hurried through with great rapidity by the current of the returning tide; which, had it not been for this opening, would undoubtedly have daſhed them to pieces againſt the rocks.

From the time they quitted the coaſt of New Holland till their arrival at Batavia in the iſland of Java, our navigators met with no other danger but what is common in ſea-voyages. They were obliged to ſtay for ſome time at this place to repair their damages; and on viewing the condition of the ſhip, found they had more reaſon than ever to admire the manner in which they had been preſerved. Both the falſe-keel and main-keel were greatly injured; great part of the ſheathing was torn off; ſeveral of the planks were much damaged, and among theſe there were two, and half of another, which for ſix feet in length were not above the eighth part of an inch in thickneſs, beſides being penetrated with worms quite to the timbers. Here the crew were exceſſively annoyed by ſickneſs, which obliged them to remain much longer than they would otherwiſe have done: and it is worthy of notice, that every one of the crew was ill excepting the ſail-maker, an old man between 70 and 80 years of age, and who was drunk every night. Poor Tupia, with his boy Tayeto, fell ſacrifices to the unhealthineſs of the climate, as well as the ſurgeon, three ſeamen, and Mr Green's ſervant. Nor did the evil ſtop here; for on their ſetting out from Batavia, the ſeeds of diſeaſe which had been received there broke out in the moſt violent and fatal manner, inſomuch that in the courſe of about ſix weeks there died one of Mr Banks's aſſiſtants, by name Mr Sporing, Mr Parkinſon his natural hiſtory painter, Mr Green the aſtronomer, the boatſwain, carpenter, and mate; Mr Monkhouſe the midſhipman, the corporal of the marines, two of the carpenter's

Cook.

carpenter's crew, and nine ſeamen. Even the jolly old ſail-maker could now hold out no longer; but whether his death might not in ſome meaſure be attributed to his being leſs plentifully ſupplied with liquors than formerly, might have deſerved inquiry. Theſe unfortunate events probably made a conſiderable impreſſion on Mr Cook's mind; and perhaps induced him to direct his attention to thoſe methods of preſerving the health of ſeamen which he afterwards put in execution with ſo much ſucceſs. After touching at St Helena, they continued their voyage for England, where they arrived on the 11th of June 1771: and on the 29th of Auguſt the ſame year, his majeſty teſtified his approbation of Mr Cook's conduct by appointing him a captain in the navy. On this occaſion Mr Cook wiſhed to have been advanced to the rank of poſt-captain, which, though not more profitable than the other, is more honourable; but this being inconſiſtent with the rules of preferment in the navy, the earl of Sandwich, at that time at the head of the admiralty, could not agree to it.

Captain Cook was not allowed to remain long inactive. The idea of a ſouthern continent had long been entertained, and Mr Dalrymple had renewed the attention of the public towards the queſtion, by his hiſtorical collection of voyages to the Pacific ocean, publiſhed in two quarto volumes, one in 1770, the other in 1771. To determine the matter finally, Captain Cook was again ſent out: and the object of this voyage was not merely to ſettle the queſtion juſt mentioned, but to extend the geography of the globe to its utmoſt limits. That the undertaking might be carried on with the greater advantage, it was determined to employ two ſhips, on the choice and equipment of which the utmoſt attention was beſtowed. The ſucceſsful voyage which had already been made in the Endeavour, ſuggeſted the idea of that ſhip being a proper model for the two which were to be ſent out; and the opinion of Lord Sandwich concurring with the general idea, two veſſels, conſtructed by the ſame perſon who had built the Endeavour, were purchaſed for the voyage. Theſe were about 14 or 16 months old at the time they were purchaſed; and, in the opinion of Captain Cook, were as fit for the purpoſe as if they had been but newly built. The larger of the two, of 462 tons burden, was named the *Reſolution*; the ſmaller, of 336 tons, had the name of the *Adventure*: the complement of men on board the former, of which Captain Cook was commander, being 112; on the latter, commanded by Mr Tobias Furneaux, 81. In their equipment, every article that could be ſuppoſed neceſſary, however much out of the common line, was procured, and every circumſtance that could be ſuppoſed to contribute to the ſucceſs of the voyage was attended to in the moſt ſcrupulous manner. Beſides the uſual ſtores and proviſions, all of which were of the beſt kinds, the ſhips were furniſhed with malt, ſour-krout, ſalted cabbage, portable ſoup, ſalop, muſtard, marmalade of carrots, beer, and inſpiſſated wort. Mr Hodges, an excellent landſcape painter, was engaged to make drawings and paintings of ſuch objects as required them. Mr John Reinhold Forſter, with his ſon, were both engaged, in order to explore and collect the natural hiſtory of the countries through which they paſſed; and laſtly, that nothing might be wanting to render the voyage as complete as poſſible, Mr William Wales and Mr William Bayley were engaged by the board of longitude to make celeſtial obſervations. They were furniſhed with the beſt inſtruments of every kind, and among the reſt with four time-pieces; three conſtructed by Mr Arnold, and one by Mr Kendal on Mr Harriſon's principles.

At Plymouth Captain Cook received his inſtructions; which were not only to ſail round the globe, but to ſail round it in high ſouthern latitudes, and to make ſuch traverſes as might finally reſolve the queſtion concerning the ſouthern continent. In purſuance of theſe inſtructions he ſet ſail on the 13th of July 1772, and on the 29th of the ſame month reached the Madeiras. As he proceeded afterwards in his voyage, he made three puncheons of beer from the inſpiſſated wort carried out along with him, and found it excellently to anſwer the purpoſe, provided the material could have been kept without fermentation in its inſpiſſated ſtate; but as this was found impoſſible, the expedient ſeems to have failed. In this voyage, however, the captain uſed with the greateſt ſucceſs ſuch methods as appeared likely to contribute to the preſervation of the health of his men. In rainy weather, he took care that the ſhip ſhould be aired and dried by means of fires made between the decks, the damp places were ſmoked, and the people were ordered to air their bedding, and waſh and dry their clothes, whenever an opportunity offered. Thus he reached the Cape of Good Hope without having a ſingle man ſick. Having left it and kept on his courſe to the ſouthward, he ſoon began to meet with cold and ſtormy weather, by which he loſt almoſt the whole of his live ſtock of ſheep, hogs, and geeſe. The bad effects of this ſtormy weather upon the men were guarded againſt by an addition to their clothing, and giving them a dram on particular occaſions. On the ſixth of December, being in the latitude of 50° 40′, he fell in with iſlands of ice, and continued among them in various latitudes till the 17th of January 1773; when he ſet ſail for New Zealand, which he reached on the 27th.

The reception of our navigator by the New Zealanders was now much more friendly than in the former voyage, ſo that there were no conteſts with the natives; nor did Captain Cook obſerve any one of thoſe whom he had ſeen before, neither was there the ſmalleſt remembrance of former hoſtilities. Having ſtaid in this country till the 7th of June, our navigators ſet ſail for Otaheite; but during the voyage the crews of both ſhips were attacked by the ſcurvy. Thoſe of the Adventure were in a very ſickly ſtate; the cook was dead, and 28 of her beſt men incapable of duty. On board the Reſolution matters were much better; and the only reaſon that could be conjectured for the difference was, that the people of the Adventure had been in a habit of body more inclined to the ſcurvy than thoſe of the Reſolution, and had eaten fewer vegetables. Here it was obſerved, that the averſion of ſeamen to a change of diet is ſo great, that it can only be overcome by the ſteady and perſevering example of a commander. While he remained at New Zealand, the captain had diſcovered a tree which greatly reſembled the American black ſpruce. Perſuaded, therefore, that it would be attended with effects equally

equally ſalutary on the health of the people, he employed them in brewing beer from it. This was done while they continued at Duſky Bay, in order to ſupply the want of vegetables, which were not to be procured there; but on removing to Queen Charlotte's Sound, they were more fortunate. Captain Cook himſelf went to look out for antiſcorbutic vegetables; and returned in a very ſhort time with a boat-load of ſcurvy-graſs, celery. &c. Theſe were boiled with the peas and wheat; and though ſome of the people diſliked them at firſt, they ſoon became ſo ſenſible of their good effects, that they cheerfully followed the example of the reſt: and the freedom of the crew from the ſcurvy and other diſtempers was by every one attributed to the New Zealand ſpruce beer and vegetables. From this time forward the captain had ſcarce occaſion to give orders for gathering vegetables when they came to any land.

During this voyage Captain Cook experienced another narrow eſcape from ſhipwreck. Being becalmed at the diſtance of half a league from a reef of rocks near Oſnaburgh iſland, it was found neceſſary to order out the boats to tow off the ſhips; but this was found impoſſible. The calm continuing, and the ſituation of our navigators becoming every moment more dangerous, the captain attempted to get through an opening in the reef which he had judged practicable; but on approaching it, found that there was not ſufficient depth of water; at the ſame time that the draught of the tide through it forced the ſhip thither in a manner ſcarce to be reſiſted. One of the warping machines, with about 400 fathoms of rope, was then ordered out, but did not produce any effect. They were within two cables length of the breakers, and no bottom could be found for caſting anchor. Having no other reſource, however, they did drop an anchor; but before it took hold, the Reſolution was in leſs than three fathoms water, and ſtruck at every fall of the ſea, which broke violently cloſe under her ſtern, threatening deſtruction to every one on board. At laſt the tide ceaſing to act in the ſame direction, the boats were ordered to try to tow off the veſſel; in which being aſſiſted by the land-breeze, which fortunately ſprung up at that inſtant, they with much labour ſucceeded.

Having ſpent a conſiderable time in the South Sea iſlands, Captain Cook returned to New Zealand, and from thence ſet ſail for the ſouthern part of the continent of America. Here he explored all the iſlands in the neighbourhood, and then returned to England, where he arrived in ſafety on the 30th of July 1774, having been abſent three years and 18 days; and in all that time loſt only one man, who died of a conſumption probably begun before he ſet out on the voyage.

The reception our navigator now met with was ſuited to his merit. He was immediately raiſed to the rank of poſt-captain, and ſoon after unanimouſly elected a member of the Royal Society; from whom he received the prize of the gold medal for the beſt experimental paper that had appeared throughout the year. It was the cuſtom of Sir John Pringle, at the delivery of this medal, annually to make an elaborate diſcourſe, containing the hiſtory of that part of ſcience for which the medal was given; and, as the ſubject of Captain Cook's paper (the means of preſerving the health of ſeamen) was analogous to the profeſſion of Sir John Pringle himſelf as a phyſician, he had the greater opportunity of diſplaying his eloquence on the occaſion. The ſpeech he made was in the higheſt degree honourable to Captain Cook. He remarked, that the ſociety had never more meritoriouſly beſtowed the medal than on the perſon who now received it. "If (ſays he) Rome decreed the civic crown to him who ſaved the life of a ſingle citizen, what wreaths are due to the man who, having himſelf ſaved many, perpetuates in your Tranſactions the means by which Britain may now, on the moſt diſtant voyages, preſerve numbers of her intrepid ſons, her mariners; who braving every danger, have ſo liberally contributed to the fame, to the opulence, and to the maritime empire of the country?" Theſe honourable teſtimonies of the public regard, however, Captain Cook did not receive, being already embarked on another voyage, from which he never returned.

The third voyage of this celebrated navigator was not undertaken by any expreſs command of his majeſty. Captain Cook had already done ſo much, that it was thought but reaſonable he ſhould now ſpend the remainder of his life in quiet; and in order to enable him to do this in a more comfortable manner, beſides his rank of poſt-captain in the navy, he was alſo made a captain in Greenwich. Still, however, there were ſome points in the ſcience of geography which had very much engaged the attention of the public, and were indeed of ſuch importance as to become a national concern. Theſe were to diſcover the connection between Aſia and America, and to determine whether there was not a poſſibility of ſhortening the paſſage to the Eaſt Indies by ſailing round the northern parts of the continents of Europe and Aſia. Many attempts, indeed, had already been made by various navigators of different nations; but all of them had failed, and, what was worſe, had left the point ſtill undetermined. An act of parliament had been paſſed in 1745, by which a reward of 20,000 l. was held out to the ſhips of any of his majeſty's ſubjects for accompliſhing this important voyage, but without mentioning any thing of thoſe belonging to his majeſty; and this reward was further confined to the finding out of the north-weſt paſſage to the Eaſt Indies through Hudſon's bay. In the year 1776, however, both the errors juſt mentioned were corrected. It was now enacted, "That if any ſhip belonging to any of his majeſty's ſubjects, or to his majeſty, ſhall find out, and ſail through, any paſſage by ſea between the Atlantic and Pacific oceans, in any direction or parallel of the northern hemiſphere, to the northward of the 52d degree of northern latitude; the owners of ſuch ſhips, if belonging to any of his majeſty's ſubjects, or the commanders, officers, and ſeamen, of ſuch ſhip belonging to his majeſty, ſhall receive, as a reward for ſuch diſcovery, the ſum of 20,000l.

It was not, as has already been hinted, now deemed proper to ſolicit Captain Cook to undergo freſh dangers by undertaking a voyage of this kind; nevertheleſs, as he was univerſally looked upon to be the fitteſt perſon in the kingdom for the purpoſe, the eyes of every one were tacitly fixed upon him: he was conſulted on every thing relating to it, and ſolicited

Cook. cited to name the person whom he judged most proper to conduct it. To determine this point, Captain Cook, Sir Hugh Palliser, and Mr Stephens, were invited to the house of Lord Sandwich to dinner; where, besides the consideration of the proper officer for conducting the expedition, many things were said concerning the nature of the design. They enlarged upon its grandeur and dignity, its consequences to navigation and science, and the completeness it would give to the whole system of discoveries; until at last Captain Cook was so much inflamed by the representation of the importance of the voyage, that he started up, and declared that he would conduct it himself. This was what the parties present had desired, and probably expected; his offer was therefore instantly laid before the king, and Captain Cook appointed commander of the expedition by the 10th of February 1776. At the same time it was agreed, that on his return from the voyage, he should be restored to his place at Greenwich; and if no vacancy occurred during the interval, the officer who succeeded him was to resign in his favour. The instructions he now received were, that he should attempt the high latitudes between the continents of Asia and America, and if possible return to England along the northern coasts of Asia and Europe. This was most probably the result of the captain's own deliberations, and what had been suggested by him to Lord Sandwich and other people in power. He was particularly desired to sail first into the Pacific ocean through the chain of newly discovered islands which he had lately visited. After having crossed the equator, and passed into the northern parts of the ocean just mentioned, he was then to hold such a course as might tend to settle many interesting points of geography, and produce some intermediate discoveries, before he arrived at the main scene of operation. With regard to this principal object, he was ordered, immediately on his arrival on the coast of New Albion, to proceed northward as far as the latitude of 65 degrees, without losing any time in exploring creeks or rivers previous to his arrival in that latitude; and for his further encouragement, the act of 1745, offering a premium for the discovery of the passage, was amended in the manner above mentioned. That nothing might be wanting which could promote the success of the grand expedition, Lieutenant Pickersgill was sent out, in 1776, with directions to explore the coasts of Baffin's bay; and the next year Lieutenant Young was commissioned not only to examine the western parts of that bay, but to endeavour to find a passage on that side from the Atlantic to the Pacific ocean. Nothing, however, was performed by either of these gentlemen which in the least could promote Captain Cook's success. Two vessels were provided as in the former voyage, viz. the Resolution and the Discovery; the command of the former being given to Captain Cook, and of the latter to Captain Charles Clerke. The only thing in which the appointment of the Discovery differed from that of the Resolution was, that the former had no marine officer on board. Every degree of attention was bestowed, as in the former voyage, upon the proper victualling and other necessaries for the two ships; and that the inhabitants of those countries which our navigator intended to visit might derive some permanent benefit from the intercourse they had with him, it was determined to send abroad a breed of domestic animals, and likewise a quantity of useful seeds, to be left in proper places. With this view, a bull, two cows with their calves, and several sheep, with hay and corn for their subsistence, were taken on board; and it was likewise proposed to take in others at the Cape of Good Hope. A large assortment of iron tools and trinkets was also sent out; and, in short, every thing that could be judged proper either to conciliate the good will of the natives or to prove serviceable to them, was provided for the voyage, as well as every convenience for the ships companies. In the former voyage Captain Cook had brought along with him a native of one of the South Sea islands, named *Omai*, who resided in England during the interval between the second and third voyages, and was now happy at getting an opportunity of returning to his own country. Though he could by no means complain of the entertainment he had met with in England, the idea of returning home loaded with treasure, which might enable him to make a figure among his countrymen, soon overcame all uneasy sensations which the leaving of his English friends might excite. His majesty had taken care to furnish him with every thing that could possibly be of use when he came to his native country; and he had besides received several valuable presents from Lord Sandwich, Sir Joseph Banks, and several ladies and gentlemen of his acquaintance; so that nothing was omitted which could possibly be done to convey, by his means, to the inhabitants of the South Sea islands, an idea of the British power and greatness.

Every thing being prepared for the voyage, our navigator set sail from the Nore on the 25th of June 1776; but by reason of some delay in receiving his instructions, did not leave Plymouth till the 12th of July. He had not been long at sea before he began his operations for preserving the health of his people; which were found equally efficacious in this as in the former voyage. Finding his stock of provender for the animals on board likely to run short, he touched at Teneriff, in order to procure a supply, having judged that to be a more proper place than Madeira for the purpose. On sailing from thence he ran a great risk of running upon some sunk rocks on the island of Bonavista; but in this, as well as on other occasions of danger, he behaved with the same judgment, coolness, and presence of mind, that distinguished him throughout the whole course of his life. On the 12th of August he arrived before Port Praya, in one of the Cape de Verd islands named *St Jago*; but not finding it necessary to go in there, he continued his voyage to the southward. The weather now becoming gloomy, and rainy, required a continuance of the methods he had already practised for preserving the health of his people; and, as formerly, they were attended with the greatest success. In this voyage, the effect of these precautions was the more remarkable, as at this time the seams of the vessel were opened to such a degree as to admit the rain, so that scarce any person on board could lie dry in his bed; and all the officers in the gun-room were driven out of their cabins by the water which came through the sides. Such was the humanity of the commander, however, that while the ships continued at sea, he would not trust

truſt the workmen over their ſides to repair the defects, though caulkers were employed in the inſide as ſoon as ſettled weather returned. On the 1ſt of September our navigators croſſed the equator, and on the 18th of October anchored in Table bay at the Cape of Good Hope. Here they met with a violent tempeſt, the effects of which were felt both on ſea and land. It laſted three days, and the Reſolution was the only ſhip in the bay that rode out the ſtorm without dragging her anchors. On ſhore the tents and obſervatory were deſtroyed, and the aſtronomical quadrant narrowly eſcaped irreparable damage. The Diſcovery, which had been ſome time later in ſailing from England, was driven off the coaſt, and did not arrive till the 10th of November.

While they remained in this place, a diſaſter happened which threatened the loſs of moſt of their live ſtock. The bulls and two cows had been put aſhore to graze among other cattle; but Captain Cook had been adviſed to keep the ſheep, 16 in number, near the tents, where they were penned in every night. Some dogs having got in among them in the night-time, killed four, and diſperſed the reſt. Six of them were recovered the next day, but the two rams and two of the fineſt ewes in the flock were miſſing. The captain applied to Baron Plettenberg the governor; but all his endeavours were unſucceſsful, until he employed ſome of the meaneſt and loweſt of the people, fellows whoſe character was, that for a ducatoon they would cut their maſter's throat, burn the houſe over his head, and bury him and his whole family in aſhes. This is mentioned as an inſtance how far the boaſted policy of the Dutch government at the Cape of Good Hope falls ſhort of its alleged perfection. After all, two of the fineſt ewes in the flock were miſſing, and never could be recovered. The captain, therefore, to repair this loſs, and to make an addition to his original ſtock, purchaſed two young bulls, two ſtone horſes, two mares, two heifers, two rams, ſeveral ewes and goats, with ſome rabbits and poultry; when, having finiſhed all his buſineſs, he ſet ſail on the 30th of November, though it was not till the 3d of December that he got clear of land. Soon after his putting to ſea, he had the misfortune to loſe ſeveral of the goats, eſpecially the males, together with ſome ſheep; and it was with the utmoſt difficulty that the reſt of the cattle were preſerved, by reaſon of the ſhip toſſing and tumbling about in a very heavy ſea. Having explored ſome deſolate iſlands in the ſouthern ſeas, Captain Cook ſet ſail for New Zealand. During this part of the voyage, our navigators were involved in ſo thick a fog, that, according to the authors of Captain Cook's life, "they ſailed 300 leagues in the dark." The firſt land they afterwards reached was New Holland; where having remained till the 30th of January 1777, they ſet ſail for New Zealand, and on the 12th of February they anchored in Queen Charlotte's Sound. Here the people were ſhy and timorous, on account of their having formerly deſtroyed 10 of Captain Furneaux's people, who had been ſent aſhore to gather vegetables. The cauſe of the quarrel could not be known, as none of the party were left alive to tell the news. Lieutenant Burney, who went aſhore in queſt of them, found only ſome fragments of their bodies; from which it appeared that they had been killed and eaten by the ſavages. It was not the intention of Captain Cook, at this diſtance of time, to reſent the injury; he even refuſed to put to death a chief named *Kahoora*, who, as he was informed by the natives themſelves, had killed Mr Rowe the commander of the party. He was, however, particularly careful that no opportunity ſhould now be given the ſavages of committing ſuch an action with impunity; and with this view a boat was never ſent on ſhore without being well armed, and the men under the command of ſuch officers as could be depended upon. The New Zealanders were no ſooner aſſured of Captain Cook's pacific diſpoſition, than they threw aſide their fears and ſuſpicions, and entered into a commercial intercourſe with the people. It would have been the leſs excuſable in Captain Cook to have revenged at this time the maſſacre of Mr Rowe's party, as he was aſſured that the quarrel originated from ſome petty thefts of the ſavages, which were too haſtily reſented on the part of the Britiſh; and had it not been for this, no miſchief would have happened.

On the 25th of February our navigator left New Zealand, taking with him, at the requeſt of Omai, two boys, the eldeſt about 18 and the youngeſt about 10. Theſe were ſoon cured of their paſſion for travelling, being both violently ſea-ſick; but as it was then too late to repent, they expreſſed their grief in loud and almoſt continual lamentation; and this in a kind of ſong which ſeemed to conſiſt of the praiſes of their native country, whence they were now to be ſeparated for ever. By degrees, however, the ſea-ſickneſs abated, their lamentations became leſs frequent, and at laſt ceaſed entirely; their native country was forgotten, and they appeared to be as firmly attached to their new friends the Engliſh as if they had been born among them.

So much time was now ſpent in ſailing up and down in the Pacific ocean, where ſeveral new iſlands were diſcovered, that Captain Cook judged it impoſſible to accompliſh any thing for this year in the high northern latitudes; for which reaſon he determined to bear away for the Friendly iſlands, in order to ſupply himſelf with thoſe neceſſaries which he had found impoſſible to be got at any of the iſlands which he had juſt diſcovered. In his run thither ſeveral new iſlands were viſited; and in proſecuting theſe diſcoveries our navigator once more narrowly eſcaped being ſhipwrecked. The danger at this time aroſe from a low ſandy iſland, which the Reſolution was very near running upon. From this ſhe was only ſaved by the circumſtance of all the men having been accidentally called upon deck to put the veſſel about, and moſt of them being at their ſtations when the danger was diſcovered. Soon after this both ſhips ſtruck upon ſome ſunk coral rocks, but happily were got off without damage.

After a ſtay of between two and three months, Captain Cook took leave of the Friendly iſlands on the 13th of July 1777; and on the 12th of Auguſt reached Otaheite, where he introduced Omai to his country people, and whoſe reception by them is particularly related under the next article. Here the captain found the people of Otaheite ready to engage in a war with thoſe of Eimeo; but though ſtrongly ſolicited by the former to aſſiſt them in an expedition againſt

against their enemies, he refused to take any concern in the affair, alleging, by way of excuse, that the people of Eimeo had never offended him. This seemed to satisfy most of the chiefs; but one, named *Towha*, was so much displeased, that Captain Cook could never regain his favour. He even threatened, that as soon as the captain should be gone, he would make war upon Otoo, one of the princes of these islands whom he knew to be in strict friendship with him; but from this he was deterred by the captain's threatening to return and chastise him if he made any such attempt. As a mark of Otoo's friendship, he gave our navigator a canoe, which he desired him to carry to the king of Britain, having nothing else, as he said, worth his acceptance.

From Otaheite Captain Cook proceeded to Eimeo, where, on account of some thefts committed by the natives, he was obliged to commence hostilities, by burning a number of their war canoes, and even some houses. These transactions gave him much concern; and the more that he had been so much solicited to make war on these people by his friends at Otaheite, to whose intreaties he had refused to listen. From Eimeo he proceeded to Huaheine, where he saw Omai finally settled, and left with him the two New Zealand youths already mentioned. The youngest of these was so much attached to the English, that it was necessary to carry him out of the ship and put him ashore by force. During his stay on this island, the captain was obliged to punish a thief with greater severity than he had ever done before, viz. by causing his head and beard to be shaved, and his ears cut off. Some other disagreeable transactions took place, particularly the desertion of two of his people, who were not recovered without the greatest difficulty. In the course of his exertions for their recovery, he found it necessary to detain the son, daughter, and son-in-law, of the chief of an island named *Otaha*. This had almost produced very serious consequences, the natives having formed a plot for carrying off Captain Cook himself, as well as Captain Clerke and Mr Gore. With regard to the commander, they were disappointed by his own caution and vigilance; but Messrs Clerke and Gore were in particular danger: and it was only owing to the circumstance of one of them having a pistol in his hand as they walked together on shore, that they were not seized.

Having left the Society islands, and discovered a new group, which in honour of his patron the earl of Sandwich, our commander named the *Sandwich Isles*, he set out on the 2d of January 1778 on his voyage northward. In this he was very successful, ascertaining the vicinity of the continents of Asia and America, which had never been done, or but very imperfectly, before. From these desolate regions he returned to the island of Oonalashka; whence, having refitted and taken in provisions, he returned to the southward, and on the 26th of November reached the Sandwich islands, where he discovered a new one named *Mowee*, and on the 30th of the same month another of much larger extent, named *O-why-hee*. Seven weeks were spent in exploring the coasts of this island; and during all this time he continued to have the most friendly intercourse with the people, who, however, appeared to be much more numerous and powerful than those of any island our navigators had yet touched at. Several of the chiefs and principal people had attached themselves greatly to the commander, and in general the people appeared to be much more honest in their dispositions than any whom he had ever visited. But by the time he had finished his circumnavigation of the island, and cast anchor in a bay called *Karakakooa*, matters were greatly altered. An universal disposition to theft and plunder had now taken place; and in this it was evident that the common people were encouraged by their chiefs, who shared the booty with them. Still, however, no hostilities were commenced: the greatest honours were paid to the commander; and, on his going ashore, he was received with ceremonies little short of adoration. A vast quantity of hogs and other provisions were procured for the ships; and on the 4th of February 1779, they left the island, not without most magnificent presents from the chiefs, and such as they had never before received in any part of the world. Unluckily they met with a storm on the sixth and seventh of the same month; during which the Resolution sprung the head of her foremast in such a manner that they were obliged to return to Karakakooa bay to have it repaired. As they returned, Captain Cook had an opportunity of showing his humanity to the people, by the relief he afforded to some of their canoes which had suffered in the storm. The same friendly intercourse which had formerly been held with the natives now commenced, and Captain Cook was treated with the usual honours; but on the 13th of this month it was unhappily broken off on the following account. One of the natives being detected in stealing the tongs from the armourer's forge in the Discovery, was dismissed with a pretty severe flogging; but this example was so far from being attended with any good effect, that in the afternoon another, having snatched up the tongs and a chissel, jumped overboard with them and swam for the shore. The master and midshipman were instantly dispatched in pursuit of him; but he escaped on board a canoe, which paddled away so quickly that the cutter could not come near it. A chief named *Pareah*, who was at this time on board the Resolution, understanding what had happened, promised to go ashore and get back the stolen goods; but before this could be done the thief had made his escape into the country. Captain Cook, who was at that time ashore, had endeavoured to intercept the canoe when it landed, but was led out of the way by some of the natives who pretended to be his guides. The tongs and chissel, however, were brought back to the master as he advanced to the landing place; but he being now joined by some of the rest of the people in the pinnace, could not be satisfied with the recovery of the stolen goods, but insisted upon having the thief or the canoe which carried him by way of reprisal. On his preparing to launch this last into the water, he was interrupted by Pareah, who insisted that it was his property, and that he should not take it away. As the officer paid no regard to his remonstrances, Pareah, who seems to have been a very strong man, seized him, pinioned his arms behind, and held him fast by the hair of the head. On this one of the sailors struck the chief with an oar; on which, quitting the officer, he instantly snatched the oar out of the man's hand,

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hand, and broke it in two acrofs his knee. The Indians then attacked the failors with ftones, and foon drove them to their boats, to which they were forced to fwim, as they lay at fome diftance from the fhore. The officers who could not fwim retired to a fmall rock, where they were clofely purfued by the Indians; and here the mafter narrowly efcaped with his life, till Pareah returned and obliged the Indians to give over their attacks. The gentlemen, fenfible that Pareah's prefence alone could protect them, entreated him to remain with them till they could be brought off in the boats. On his refufal, the mafter fet out to the place where the obfervatories had been erected, for farther affiftance; but Pareah, who met him, and fufpected his errand, obliged him to return. In the mean time the multitude had begun to break in pieces the pinnace, after having taken every thing out of her that was loofe: on the return of Pareah, however, they were again difperfed, and fome of the oars reftored, after which the gentlemen were glad to get off in fafety. Before they reached the fhip Pareah overtook them in a canoe, and delivered the midfhipman's cap which had been taken from him in the fcuffle; he alfo joined nofes with them in token of friendfhip, and defired to know whether Captain Cook would kill him on account of what had happened. They affured him that he would not, and made figns of reconciliation on their part. On this he left them and paddled over to the town of Kavaroah; and that was the laft time that he was feen by the Englifh. In the night-time the fentinels were much alarmed by fhrill and melancholy founds from the adjacent villages, which they took to be the lamentations of the women. Next day it was found that the large cutter of the Difcovery had been carried off in the night-time; on which Captain Cook ordered the launch and fmall cutter to go under the command of the fecond lieutenant, and to lie off the eaft point of the bay in order to intercept all the canoes that might attempt to get out, and if neceffary to fire upon them. The third lieutenant of the Refolution was difpatched to the weftern part of the bay on the fame fervice; while the mafter was fent in purfuit of a large double canoe already under fail, and making the beft of her way out of the harbour. He foon came up with her, and by firing a few fhots, obliged her to run on fhore, and the Indians to leave her. This was the canoe belonging to a chief named *Omea*, whofe perfon was reckoned equally facred with that of the king; and to the neglect of fecuring him we may attribute the fucceeding difafter. Captain Cook now formed the refolution of going in perfon to feize the king himfelf in his capital of Kavaroah; and as there was reafon to fuppofe that he had fled, it was his defign to fecure the large canoes, which on that account he caufed to be hauled up on the beach. With this view he left the fhip about feven o'clock in the morning of Sunday the 14th of February, being attended by the lieutenant of marines, a ferjeant, corporal, and feven private men. The crew of the pinnace, under the command of Mr Roberts, were alfo armed: and as they rowed towards the fhore, the captain ordered the launch to leave her ftation at the oppofite point of the bay, in order to affift his own boat. Having landed with the marines at the upper end of the town, the Indians flocked round him, and proftrated themfelves before him. No fign of hoftility, nor even much alarm, appeared; the king's fons waited on the commander as foon as he fent for them, and by their means he was introduced to the king, who readily confented to go on board; but in a little time the Indians began to arm themfelves with long fpears, clubs, and daggers, and to put on thick mats which they ufe as defenfive armour. This hoftile appearance was greatly augmented by an unlucky piece of news which was juft now brought by a canoe, viz. that one of the Indian chiefs had been killed by the people in the Difcovery's boats. On this the women, who had hitherto fat on the beach converfing familiarly, and taking their breakfafts, removed, and a confufed murmur ran through the crowd. An old prieft now appeared with a cocoa-nut in his hand, which he held out as a prefent to Captain Cook, finging all the while, and making a moft troublefome noife as if he meant to divert the attention of the captain and his people from obferving the motions of the Indians, who were now everywhere putting on their armour. Captain Cook beginning to think his fituation dangerous, ordered the lieutenant of the marines to march towards the fhore, as he himfelf did, having all the while hold of the king's hand, who very readily accompanied him, attended by his wife, two fons, and feveral chiefs. The Indians made a lane for them to pafs; and as the diftance they had to go was only about 50 or 60 yards, and the boats lay at no more than five or fix yards diftance from land, there was not the leaft apprehenfion of the cataftrophe which enfued. The king's youngeft fon Keowa went on board the pinnace without the leaft hefitation, and the king was about to follow, when his wife threw her arms about his neck, and, with the affiftance of two chiefs, forced him to fit down. The captain might now have fafely got aboard, but did not immediately relinquifh the defign of taking the king along with him. Finding at laft, however, that this could not be accomplifhed without a great deal of bloodfhed, he was on the point of giving orders for the people to reimbark, when one of the Indians threw a ftone at him. This infult was returned by the captain, who had a double-barrelled piece, by a difcharge of fmall fhot from one of the barrels. This had little effect, as the man had a thick mat before him; and as he now brandifhed his fpear, the captain knocked him down with his mufket. The king's fon, Keowa, ftill remaining in the pinnace, the detaining him would have been a great check upon the Indians; but unluckily Mr Roberts, who commanded the pinnace, fet him afhore at his own requeft foon after the firft fire. In the mean time another Indian was obferved in the act of brandifhing his fpear at the commander; who thereupon was obliged to fire upon him in his own defence. Miffing his aim, however, he killed one clofe by his fide: upon which the ferjeant obferving that he had miffed the man he aimed at, received orders to fire alfo, which he did, and killed him on the fpot. This repreffed the foremoft of the Indians, and made them fall back in a body; but they were urged on again by thofe behind, and difcharged a volley of ftones among the marines, who immediately returned it by a general difcharge of their mufkets; and this was inftantly followed

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ed by a fire from the boats. Captain Cook expreſſed his aſtoniſhment at their firing, waved his hand to them to ceaſe, and called to the people in the boats to come nearer to receive the marines. This order was obeyed by Mr Roberts; but the lieutenant who commanded the launch, inſtead of coming nearer, put off to a greater diſtance; and by this prepoſterous conduct deprived the unfortunate commander of the only chance he had for his life: for now the Indians, exaſperated by the fire of the marines, ruſhed in upon them and drove them into the water, leaving the captain alone upon the rock. A fire indeed was kept up by both boats; but the one was too far off, and the other crowded with the marines, ſo that they could not direct their fire with proper effect. Captain Cook was then obſerved making for the pinnace, carrying his muſket under his arm, and holding his other hand on the back-part of his head to guard it from the ſtones. An Indian was ſeen following him, but with marks of fear, as he ſtopped once or twice ſeemingly undetermined to proceed. At laſt he ſtruck the captain on the back of the head with a club, and then precipitately retreated. The latter ſtaggered a few paces, and then fell on his hand and one knee, and dropped his muſket. Before he could recover himſelf another Indian ſtabbed him with a dagger in the neck, though ſtill without putting an end to his life. He then fell into a pool of water knee-deep, where others crowded upon him: but ſtill he ſtruggled violently with them, got up his head, and looked towards the pinnace as if ſoliciting aſſiſtance. The boat was now above five or ſix yards diſtance; but ſuch was the confuſed and crowded ſtate of the crew, that no aſſiſtance could be given him. The Indians then got him under again, but in deeper water, though he ſtill continued to ſtruggle, and once more got his head up; but being quite ſpent he turned towards the rock as if to ſupport himſelf by it, when a ſavage ſtruck him with a club, which probably put an end to his life, as he was never ſeen to ſtruggle any more. The ſavages hauled his lifeleſs body upon the rocks, and uſed it in the moſt barbarous manner, ſnatching the daggers out of one another's hands, in order to have the pleaſure of mangling it. If any thing could add to the misfortune of this celebrated navigator's death, it was, that even his mangled remains were not ſaved from the hands of the barbarians. The lieutenant already mentioned, who, by his removing to a diſtance when he ought to have come on ſhore, ſeemed to have been the occaſion of his death, returned on board without making any attempt to recover his body; though it appeared from the teſtimonies of four or five midſhipmen who arrived ſoon after at the fatal ſpot, that the beach was almoſt deſerted by the Indians, they having at laſt yielded to the continual fire from the boats. The officer alleged in his own excuſe for removing at firſt from the ſhore, that he miſtook the ſignals; but be this as it will, the complaints againſt him were ſo many and ſo great, that Captain Clerke was obliged publicly to take notice of them, and to take the depoſitions of his accuſers in writing.—Theſe papers, however, were not found, and it is ſuppoſed that the captain's bad ſtate of health had induced him to deſtroy them. After all, we are informed that, in the opinion of Captain Philips who commanded the marines, it is very doubtful whether any effectual relief could have been given to the commander, even if no miſtake had been committed on the part of the lieutenant. The author of all the miſchief was Pareah, the chief already mentioned, who had employed people to ſteal the boat in the night-time. The king was entirely innocent both of the theft and the murder of Captain Cook; but the latter was perpetrated by ſome chiefs who were his near relations. The chief who firſt ſtruck him with a club was named *Karimans raha*, and he who ſtabbed him with the dagger was called *Nooah*. The latter, Mr Samwell, from whoſe narrative this account is taken, obſerves, was ſtout and tall, had a fierce look and demeanour, and united in his perſon the two properties of ſtrength and agility more than he had ever obſerved in any other perſon.—Both of them were held in great eſtimation by their countrymen on account of the hand they had in his death.

By reaſon of the barbarous diſpoſition of the Indians, it was found impoſſible to recover Captain Cook's body after the firſt opportunity already mentioned was loſt. By dint of threats and negociations, however, ſome of the principal parts were procured with great difficulty; by which means the navigators were enabled to perform the laſt offices to their much reſpected commander. Theſe being put into a coffin, and the ſervice read over them, were committed to the deep with the uſual military honours on the 21ſt of February 1779. Soon after his death a letter was iſſued by M. de Sartine, ſecretary to the marine department of France, and ſent to all the commanders of French ſhips, importing, that Captain Cook ſhould be treated as the commander of a neutral and allied power; and that all captains of armed veſſels who might meet with him, ſhould make him acquainted with the king's orders, but at the ſame time let him know, that on his part he muſt refrain from hoſtilities. This humane and generous proceeding, with regard to France, originated from M. Turgot; but the thought ſeems firſt to have ſtruck Dr Franklin. Thus much at leaſt is certain, that the doctor, while ambaſſador from the United States, wrote a circular letter to the American naval commanders ſomething to the purport of that already mentioned; but in this he was not ſupported by Congreſs; for an edict was inſtantly iſſued, that ſpecial care ſhould be taken to ſeize Captain Cook if an opportunity of doing it occurred. The Spaniards proceeded in the ſame manner, and both acted on a principle equally mean and abſurd, that the obtaining a knowledge of the weſtern coaſt of America, or of a northern paſſage into the Pacific ocean, might be attended with ſome bad conſequence to their reſpective ſtates.

Captain Cook was a man of plain addreſs and appearance, but well looked, and upwards of ſix feet high. His head was ſmall, and he wore his hair, which was brown, tied behind. His face was full of expreſſion; his noſe exceedingly well ſhaped; his eyes, which were ſmall and of a brown caſt, were quick and piercing; his eyebrows prominent, which gave his countenance altogether an air of auſterity. Notwithſtanding this, it was impoſſible for any one to excel him in humanity, as is evident from the whole tenor of his behaviour both to his own people and the many

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many savage nations with whom he had occasion to interfere. This amiable property discovered itself even in the final catastrophe of his life; his utmost care being directed to the preservation of his people, and the procuring them a safe retreat to their boats. And it cannot be enough lamented, that he who took so much care of others, should have perished in such a miserable manner for want of being properly supported by them. The perseverance with which he pursued every object which happened to be pointed out as his duty was unequalled. Nothing ever could divert him from what he had once undertaken; and he persevered in the midst of dangers and difficulties which would have disheartened persons of very considerable strength and firmness of mind. For this he was adapted by nature, having a strong constitution, inured to labour, and capable of undergoing the greatest hardships. His stomach bore without difficulty the coarsest and most ungrateful food; and he submitted to every kind of self-denial with the greatest indifference. To this strength of constitution he joined an invincible fortitude of mind, of which the circumnavigation of New Holland, and his voyage towards the South Pole, furnish innumerable instances. He was master of himself on every trying occasion; and the greater the emergency, the greater always appeared his calmness and recollection: so that in the most dangerous situations, after giving proper directions to his people, he could sleep soundly the hours that he had allotted to himself. That he possessed genius in an eminent degree cannot be questioned; his invention was ready, and capable not only of suggesting the most noble objects of pursuit, but the most proper methods of attaining them. His knowledge of his own profession was unequalled; and to this he added a very considerable proficiency in other sciences. In astronomy, he became so eminent, that he was at length enabled to take the lead in making the astronomical observations during the course of his voyages. In general learning he likewise attained to such a proficiency as to be able to express himself with clearness and propriety; and thus became respectable as the narrator, as well as the performer, of great actions. He was an excellent husband and father, sincere and steady in his friendship, and possessed of a general sobriety and virtue of character. In conversation he was unaffected and unassuming; rather backward in pushing discourse, but obliging and communicative to those who wished for information: and he was distinguished by a simplicity of manners almost universally the attendant of truly great men. With all these amiable qualities, the captain was occasionally subject to a hastiness of temper, which has been set forth in its utmost extent, if not exaggerated by some, though but few, who are not his friends: but even these, as well as others, when taking a general view of his character, are obliged to acknowledge that he was undoubtedly one of the greatest men of his age.

Captain Cook is distinguished as an author by an account of his second voyage written by himself. His first voyage, as well as that of several other navigators, had been recorded by Dr Hawkesworth; but on the present occasion it was not judged necessary to have recourse to any other than the pen of the author himself; and his journal, with a few occasional alterations, and being divided into chapters, was sufficient for the purpose. The style is clear, natural, and manly; and it is not improbable, that even a pen of more studied elegance could not have made it appear to more advantage. When it appeared, which was not till some time after the author had left England, the book was recommended by the accuracy and excellency of its charts, and by a numerous collection of fine engravings done from the original drawings of Mr Hodges.

We cannot conclude this article without taking some notice of the honours paid to our celebrated navigator after his death, both by his own countrymen and those of other nations. Perhaps indeed it may be said with justice, that foreigners hold his memory in an estimation unequalled even in this country; a remarkable proof of which occurs in the eulogy upon him by Michael Angelo Gianetti, read in the Florentine academy on the 9th of June 1785, and published at Florence the same year. It is said also, that one of the French literary academies proposed a prize for the best eulogium on Captain Cook; and many poetical testimonies of his merit appeared in our own language. The Royal Society of London resolved to testify their respect to him by a medal, for which purpose a voluntary subscription was opened. A gold medal was given to such of the fellows as subscribed 20 guineas, and a silver one to those who subscribed smaller sums; and each of the other members received one of bronze. Those who subscribed 20 guineas were, Sir Joseph Banks president, the prince of Anspach, the duke of Montague, Lord Mulgrave, and Messrs Cavendish, Peachey, Perrin, Poli, and Shuttleworth. Many designs were proposed on the occasion; but the following was that which was actually struck. On one side was the head of Captain Cook in profile, with this inscription round it, JAC. COOK OCEANI INVESTIGATOR ACERRIMUS; and on the exergue, REG. SOC. LOND. SOCIO SUO. On the reverse is a representation of Britannia holding a globe, with this inscription round her, NIL INTENTATUM NOSTRI LIQUERE; and on the exergue, AUSPICIIS GEORGII III. One of the gold medals struck on this occasion was presented to the king, another to the queen, and a third to the prince of Wales. Another was sent to the French king on account of the protection he had granted to the ships; and a second to the empress of Russia, in whose dominions they had been treated with every expression of friendship and kindness. Both these great personages condescended to accept of the present with marks of satisfaction. The French king wrote a handsome letter to the Society, signed by himself, and undersigned by the marquis de Vergennes; and the empress of Russia commissioned Count Osterman to signify to Mr Fitzherbert the sense she had of the value of the present, and that she had caused it to be deposited in the museum of the Imperial Academy of Sciences. As a further testimony of the pleasure she derived from it, the empress presented to the Royal Society a large and beautiful gold medal, containing on one side the effigies of herself, and on the other a representation of the statue of Peter the Great. After the general assignment of the medals, which took place in 1784, there being a surplus of money still remaining, it was resolved by the president and council, that an additional number of medals should be thrown off, to be dis-

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posed of in presents to Mrs Cook, the earl of Sandwich, Dr Benjamin Franklin, Dr Cook, provost of King's College Cambridge, and Mr Planta. At the same time it was agreed that Mr Aubert should be allowed to have a gold medal of Captain Cook, on his paying for the gold, and the expence of striking it, in consideration of his intention to present it to the king of Poland.

During the two visits of the ships at Kamtschatka, Major Behm, the commandant of that province, had bestowed, in the most liberal manner, every kind of assistance which it was in his power to bestow; and such was the sense entertained by the lords of the admiralty of the kindness he had showed, that they determined to make him a present of a magnificent piece of plate, with an inscription expressive of his humane and generous conduct. The inscription was drawn up by Dr Cook, and afterwards submitted to the opinion and correction of some gentlemen of the first eminence in classical taste.

Sir Hugh Palliser, who had all along displayed an uncommon respect and kindness for Captain Cook, likewise displayed his regard for his memory in a most eminent manner. On his estate in Buckinghamshire he constructed a small building with a pillar, containing the character of Captain Cook, which is given at the end of the introduction to the last voyage. This was drawn up by the honourable Admiral Forbes, admiral of the fleet, and general of the marines, to whom Captain Cook was known only by his merit and extraordinary actions.

Amidst all these expressions of unavailing praise, it was not forgotten to show some essential service to the widow and family of our celebrated navigator. A memorial for a pension of 200l. per annum was given in to the king from the commissioners of his admiralty, and signed by the earl of Sandwich, Mr Butler, the earl of Lisburne, Mr Penton, Lord Mulgrave, and Mr Mann. His majesty complied with the request of the memorial, and the grant was passed through the usual forms with all possible speed. By this 200l. per annum were settled on the widow during life; and 25l. a-year on each of her three sons. After her death the 200l. was to be divided between her children; a fourth was allotted to Captain King, and the remaining fourth to Mr Bligh and the representatives of Captain Clerke.

The last honour paid to the memory of Captain Cook was the granting a coat of arms to the family, which was done by patent on the 3d of September 1785: and of this we have the following description. Azure, between the two polar stars: Or, a sphere on the plane of the meridian, north pole elevated, circles of latitude for every ten degrees, and of longitude for every 15; showing the Pacific ocean between 60° and 240° west, bounded on one side by America, and on the other by Asia and New Holland; in memory of the discoveries made by him in that ocean, so very far beyond all former navigators. His track thereon is marked with red lines; and for crest, in a wreath of the colour is an arm imbowed, vested in the uniform of a captain of the royal navy. In the hand is the union jack, on a staff proper. The arm is encircled by a wreath of palm and laurel.

Cook's Discoveries.—The number of countries discovered by Captain Cook, and which had never before been visited by any European, is very considerable; but it was a remarkable property of our celebrated navigator, that, wherever he touched, every thing relative to the place was determined with such accuracy and precision, that all former accounts seemed to go for nothing, and the discovery to belong entirely to Captain Cook. Thus it was not unusual with him to make discoveries in places already well known; and thus his voyages have conveyed a vast fund of knowledge perfectly original. Though the accounts of the different places, therefore, at which he touched, are particularly given under their names in the order of the alphabet, we shall in this article endeavour to join the whole together in such a manner as to give the reader some idea of the benefit which has accrued to science from voyages attended not only with much expence and labour, but even with the loss of the celebrated navigator's life.

Cook's Discoveries.

1 Madeira, a volcanic island.

When he set out in the Endeavour in the year 1768, the first place he touched at was Madeira. Here Mr Banks and Dr Solander, besides some additions to the science of botany, discovered undoubted marks of the island having a volcanic origin. On leaving this place, they found it necessary to touch at Rio de Janeiro for provisions, and, during the run thither, the commander had an opportunity of determining the cause of the luminous appearance of the sea. On the 29th of October they observed that the water frequently emitted flashes like lightning, though much smaller; but such was their frequency, that eight or ten of them were visible almost at the same moment. This appearance they found, both at this time and afterwards, to arise from a small kind of animal with which the water abounded. Whilst staying at Rio de Janeiro, a melancholy observation was made of the prodigious waste of human lives with which the working of the Portuguese gold mines was attended, no fewer than 40,000 negroes being annually imported for this purpose, none of whom, it seems, survive the labour of the year; and our navigator was informed, that in 1766 this number was so far short, that they were obliged to draught 20,000 more from the town of Rio itself. Proceeding from thence to the southern coasts of America, he had an opportunity of determining a question of great importance to navigation, viz. whether, in sailing to the Pacific ocean, it is better to pass through the straits of Magellan, or to double Cape Horn and sail through those of Le Maire? From Captain Cook's voyage it appears, contrary to the opinion of former navigators, that the latter is the preferable passage. Through this he was only 33 days in coming round the land of Terra del Fuego from the east entrance of the strait of Le Maire till he had advanced about 12 degrees to the westward, and three and a half to the northward of Magellan's straits. During all this time the ship scarcely received any damage, though if he had passed the other way he could not have accomplished his passage in less than three months, besides immense fatigue to his people and damage to the ship. In these stormy regions, however, he experienced the same inconveniences felt by other navigators; such a sea being met with off Cape Diego, that the ship frequently pitched her bowsprit under water. Here also the excessive cold and mutability of weather in these southern

2 Luminous appearance of the sea occasioned by animals.

3 Vast number of negroes destroyed by the working the gold mines.

4 Best passage into the Pacific ocean through the straits Le Maire.

5 Excessive storms and cold in the southern regions.

ſouthern regions was experienced in ſuch a manner as had nearly proved fatal to ſome of the gentlemen who ſailed along with him. Dr Solander, Mr Banks, Mr Monkhouſe the ſurgeon, and Mr Green the aſtronomer, with their attendants and ſervants, ſet out on a botanical expedition while the ſhip lay at anchor in the bay of Good Succeſs. It was then the middle of ſummer, and the morning on which they ſet out was as mild and warm as it uſually is in the month of May in England: but having aſcended a mountain for the purpoſe of botanizing, they were ſurpriſed by ſuch ſtorms of ſnow and hail that they could not get back that night. Dr Solander, who warned them of their danger, that people when about to periſh with cold were ſeized with a violent inclination to ſleep, was the firſt who ſeemed likely to fall a victim to it; and it was not in the power of his companions to keep him from ſitting down for that purpoſe. He was awakened in a few minutes; but during this ſhort interval his feet had become ſo much diminiſhed by the contraction of the veſſels, that his ſhoes fell off from them when he was again made to riſe.

6 Miſerable ſtate of the natives.

Even theſe dreary regions, however, are not without inhabitants, whom our voyagers juſtly concluded to be the loweſt of the human ſpecies. Indeed, conſidering the little convenience they have, it is wonderful how they can reſiſt the ſeverity of the climate, for they are almoſt without clothing; they dwell in miſerable hovels, which admit both the wind and ſnow or rain; and they have not any utenſil for dreſſing their food. Neverthleſs, theſe miſerable creatures, as they appeared to our navigators, ſeemed to have no wiſh to poſſeſs more than they enjoyed; and they were abſolutely indifferent about every thing that was offered them, except large beads which they would take as ornaments. Hence Dr Hawkeſworth, who wrote the account of the voyage, concludes, that theſe people may be on a level with ourſelves with reſpect to the real happineſs they enjoy.

7 Iſlands diſcovered between Cape Horn and Otaheite.

On the 26th of January 1769 our navigators left Cape Horn; and from that time to the firſt of March, during which they run no leſs than 660 leagues, met with no current by which the ſhip was affected. Hence it is probable, that during all this time they had never been near any land, the currents of the ocean being uſually met with in the neighbourhood of iſlands. Several iſlands, however, were diſcovered before they reached Otaheite, on which they beſtowed the names of Lagoon Iſland, Thrumb-cap, Bow Iſland, the Groups, Bird Iſland, and Chain Iſland. All theſe ſeemed to be inhabited, and were covered with a moſt delightful verdure; which appeared to the greater advantage, as our navigators had for a long time ſeen no land but the dreary hills and waſtes of Terra del Fuego.

8 Tranſit of Venus obſerved.

Having arrived at Otaheite, they ſet about obſerving the tranſit of Venus over the ſun, which indeed was the main purpoſe for which the voyage had been undertaken. The anxiety which they underwent when the time of the expected phenomenon approached may eaſily be imagined, as the whole depended on the circumſtance of a clear ſky, which though more readily to be expected in that climate than one more to the northward, was ſtill a matter of uncertainty. In conſequence of ſome hints which had been given by the earl of Morton, Captain Cook determined to ſend out two parties to different places to make the obſervations; by which means there would be a chance of ſucceſs, even if thoſe at Otaheite ſhould fail. For this purpoſe he ſent Mr Gore in the long boat to Eimeo, a neighbouring iſland, along with Mr Monkhouſe, Mr Banks, and Mr Sporing, who were furniſhed with proper inſtruments by Mr Green the aſtronomer. Meſſrs Hicks, Clerke, Pickerſgill, and Saunders, were ſent in the pinnace to a convenient ſpot to the eaſtward of the main obſervatory, where they were likewiſe ordered to make obſervations with ſuch inſtruments as they had. The day on which the tranſit happened was the 3d of June 1769, when they had the ſatiſfaction to ſee the ſun riſe without a cloud; and as the weather continued equally clear throughout the day, there was the beſt opportunity of making the obſervations in a proper manner. All of them ſaw an atmoſphere or duſky cloud round the planet, which diſturbed their obſervation, and probably cauſed them to differ from each other more conſiderably than they would otherwiſe have done. According to Mr Green, the times of ingreſs and egreſs of the planet were as follow:

Morning.	h.	min.	ſec.
Firſt external contact, - -	9	25	42
Firſt internal contact, or total immerſion,	9	44	4
Afternoon.			
Second internal contact, - -	3	14	8
Second external contact, or end of the tranſit, - - -	3	32	10

From theſe obſervations the latitude of the obſervatory was found to be 17° 29′ 15″ S. and the longitude 149° 32′ 30″ W. of Greenwich. Several curious remarks were made both on the country itſelf and on the inhabitants.

9 Otaheite a volcanic iſland.

Mr Banks, in an excurſion up the country, diſcovered many traces of volcanic fire; the ſtones, like thoſe of Madeira, had evidently the appearance of being burnt, and the very clay on the hills had the ſame appearance.

10 Account of the natives.

The natives, though addicted to thieving, appeared in general harmleſs and friendly, and very ready to ſupply the ſhip with neceſſaries in exchange for ſuch things as they wanted. The articles on which they ſet the greateſt value were hatchets, axes, large nails, ſpikes, looking-glaſſes, and beads. They were alſo fond of fine linen, whether white or printed; but an axe of the value of half a crown would buy more proviſions than a piece of cloth of the value of 20 ſhillings. They are very fickle and inattentive; ſo that it was not poſſible to engage them to pay any regard to the worſhip of the Deity which they ſaw performed before them; nor would they attend to any explanation of it that was given them. They are not, however, deſtitute of a religion of their own; and are particularly careful of the repoſitories of the dead, which they will not allow to be violated on any account. Of this Captain Cook had an inſtance, when ſome of his people offered to take down an incloſure of one of theſe repoſitories. They were violently oppoſed by the natives, who ſent a meſſenger to acquaint them that they would never ſuffer any ſuch thing; and the only inſult that ever was offered to an Engliſhman by the people of this iſland was on a ſimilar account. From Otaheite our navigators carried

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with them Tupia, formerly high priest of the country, and prime minister to Queen Oberea. From his practice it appeared, that the priests of Otaheite, as well as elsewhere, take care to place themselves a step nearer the Deity than the common people, and to use the deceptions too frequently put in practice, by such mediators. While on board the Endeavour, he frequently prayed to his god *Tane* for a wind; and according to his own account never failed of success. This, however, he took care to ensure; for he never began his prayers till he perceived the breeze already on the water, and so near that it must reach the ship before they could well be ended. It was observed likewise of the people of Otaheite, that they had their bards or minstrels, who went about the country with musical instruments. The band whom they saw at this time consisted of two players on flutes and three drummers; the latter accompanying the flutes with their voices. Their songs were made extempore, and the English themselves were generally the subject.

11 Society Islands discovered.

From Otaheite our navigators sailed towards a neighbouring island named *Tethuora*; but finding it small, low, and without any settled inhabitants, the captain chose rather to direct his course towards Huaheine and Ulietea, which he was informed were well inhabited. These had never been visited by any European ship: but the inhabitants, though peaceable and friendly, were very slow and cautious in trading, so that the captain was obliged to bring out his hatchets to market; a commodity which he had hoped might have been concealed from those who had never seen an European ship before. On his arrival at Ulietea he found by the discourse of Tupia, that the inhabitants of a neighbouring island named *Bolabola* were of such a martial disposition as to be the terror of those of Huaheine, Ulietea, and others, insomuch that he apprehended great danger to our navigators should they touch at an island which the Bolabola men had lately conquered. This, however, had so little effect upon Captain Cook, that he not only landed on the island already mentioned, but took possession, in his majesty's name, of Bolabola itself, together with Ulietea, Huaheine, and another named Otaha, which were all visible at once. During their stay here they paid a visit to Opoony, the formidable monarch of Bolabola; whom, to their surprise, they found a feeble wretch, withered and decrepid, half blind with age, and so stupid that he seemed scarce to be possessed of a common degree of understanding. About these islands they spent six weeks, bestowing upon them the name of the *Society Isles*, on account of their being so near to each other. They are six in number, Ulietea, Huaheine, Bolabola, Otaha, Tubai, and Maurna. The smaller ones in their neighbourhood are Tethuora, Eimeo, Tapoamanao, Oatara, Opururu, Tamou, Toahoatu, and Whennuaia.

12 Wretched appearance of the king of Bolabola.

13 Oheteroa island discovered.

Leaving the Society Islands, which are situated between Lat. 16. 10. and 16. 55. S. and between 150. 57. and 152. W. from the meridian of Greenwich, they fell in with the island of Oheteroa, situated in S. Lat. 22. 27. and W. Long. 150. 47.; but this was found to be destitute of any harbour or safe anchorage, and the disposition of the inhabitants so hostile that they could not by any means be conciliated, so that no attempts were made to land. From Tupia Captain Cook learned that there were several islands in the neighbourhood, which our navigator conjectured to be Boscawen and Keppel's islands, discovered by Captain Wallis; but without spending more time in exploring these, he set sail to the southward in search of a continent.

14 Comet of 1769 observed.

Our voyagers left Oheteroa on the 15th of August 1769, and on the 30th had a view of the comet which appeared that year; its tail subtending on an angle of 42 degrees. This proved a new source of apprehension to Tupia, who instantly cried out, that as soon as it was seen at Bolabola, the people of that country would attack those of Ulietea, who would undoubtedly be obliged to fly with precipitation to the mountains to save their lives. On the 6th of October they discovered land, which from its size, and the enormous mountains observable on it, was supposed by the gentlemen on board to be part of *Terra Australis incognita*; but on farther examination it was found to be part of New Zealand. Here the inhabitants were found to speak a dialect of the language of Otaheite, so that they could understand Tupia, and he them; yet so extremely hostile were their dispositions, that not the smallest intercourse could be held with them; nor could any thing necessary for the ships be procured excepting wood: so that the name Captain Cook thought proper to bestow on this part of the country was *Poverty Bay*. By the natives it is called *Taoneroa*, and lies in S. Lat. 38. 42. and W. Long. 181. 36. During the time of his stay in this part of the world the captain circumnavigated almost the whole country of New Zealand, which he found to consist of two islands separated from each other by a narrow strait, which, from its discoverer, has obtained the name of *Cook's Strait*. In some places the disposition of the inhabitants was as favourable as could be wished; so that Dr Solander, Mr Banks, and other gentlemen, had an opportunity of exploring the country in some degree, with a view to discover its natural productions. In one of their excursions, as they passed through a valley, the hills on each side of which were very steep, they were suddenly struck with the sight of a very extraordinary natural curiosity. It was a rock perforated through its whole substance, so as to form a rude but stupendous arch or cavern, opening directly to the sea. This aperture was 75 feet long, 27 broad, and 45 in height, commanding a view of the bay and the hills on the other side, which were seen through it; and opening at once on the view, produced an effect far superior to any of the contrivances of art. On that part of the coast, which, from having observed a transit of Mercury, they named *Mercury Bay*, oysters were found in such plenty, that they might have loaded not only their boats, but even their ship with them. They were about the same size with those met with in this country; and on account of their being found in such plenty, and likewise that the adjacent country abounds with conveniences, Captain Cook was at great pains to point out the situation of the place. By his observations, the latitude of Mercury bay is 36. 48. 28. S.

15 They arrive at New Zealand.

16 Rock of an extraordinary shape.

17 Natural products of the country.

Leaving this bay our commander proceeded to explore other parts of the country, which by their account seems to abound with rivers. Two large ones were met with in Mercury bay; one of which, from the

Cook's Discoveries. the abundance of oysters found at its mouth, was called *Oyster river*; the other they named *Mangrove river*, from the number of mangrove trees growing there. A third, which they called *Thames*, was met with in that part called the Bay of Islands, up which they sailed 14 miles. Its banks were everywhere adorned with lofty trees, which they had likewise observed in other parts of the country. They were too heavy for masts, but would make the finest planks imaginable; and as they resembled the pitch pine, the timber of which is lightened by tapping, the carpenter was of opinion that they might thus be rendered more proper for masts than any European timber. One of these trees measured 19 feet 8 inches in circumference at the height of six feet from the ground, and was no less than 89, with very little taper, to the branches; so that the lieutenant supposed it must contain 356 feet of solid timber. In Queen Charlotte's Sound the country was little other than one vast forest, with plenty of excellent water, and the coast abounding with fish. As the ship lay at the distance of only a quarter of a mile from the shore, they were agreeably entertained with the singing of an infinite number of small birds, which formed a melody greatly superior to any thing they had ever heard before. The music of these little choristers seemed to be like small bells, most exquisitely tuned, though probably the distance and intervention of the water had a considerable effect in heightening it. They began to sing about two in the morning, and continued their song till sunrise, after which they were silent all the day, resembling in this respect the nightingales of our own country.

18 General description of the country.

The time which Captain Cook spent in exploring the coasts of New Zealand was not less than six months. By his researches it was shown to consist of two large islands, the most northerly of which is called *Eaheinomauwe*, and the most southerly *Tovy* or *Tavai Poenammoo*; though it is not certain whether the whole southern island or only a part of it is comprehended under this name. This island seems to be barren and mountainous, but *Eaheinomauwe* has a much better appearance; and it was universally believed by the gentlemen on board, that all kinds of European grain, as well as garden plants and fruits, would flourish in the greatest abundance and perfection; and from the vegetables found here it was concluded that the winters are not more severe than those of England, and it was known by experience, that the summer was not hotter, though the heat was more equal than in this country. Here are no quadrupeds except dogs and rats; and the latter are so scarce, that they escaped the notice of many on board. The birds are not numerous, and the gannet is the only one of the European kind that was observed. The insects are equally scarce; but the sea makes abundant recompense for this scarcity of land animals; every creek swarms with fish, equally delicious with those in this country. The forests are of vast extent, and filled with excellent timber trees; the largest, straightest, and cleanest that Mr Cook had ever seen. There is here one plant which answers the purposes of both hemp and flax, and excels all others of the kind that have been met with in any other part of the world. If the settling of New Zealand therefore should ever be deemed an object worthy of the attention of Great Britain, Captain Cook was of opinion, that the best place for establishing a colony would be either on the banks of the Thames or in the bay of Islands; each of these places having the advantage of an excellent harbour. Settlements might be extended, and a communication made with the inland parts of the country by means of the river; and vessels easily constructed of the excellent timber with which the country everywhere abounds.

19 Proper place for settling a colony there.

20 Account of the inhabitants.

The inhabitants of New Zealand are in a very barbarous state, and have a degree of ferocity unknown to the inhabitants of the South sea islands, though they seem to have the same origin. During their residence there, our navigators had the most convincing evidences of their being cannibals, and accustomed to devour the bodies of their slain enemies. Notwithstanding these barbarous practices, however, they seemed to enjoy a state of uninterrupted health. In all the visits made to their towns, none was ever perceived who had the least bodily complaint, not even the slightest eruption on the skin. This extraordinary degree of health was likewise manifested by the ease with which their wounds were healed without the smallest application, as well as by the number of old men with which the island abounded. Many of these, by the loss of their hair and teeth, seemed to be extremely old, but none of them were decrepid; and though inferior in strength to the young men, they came not behind them in the least with regard to cheerfulness and vivacity. The universal and only drink of the New Zealanders is water.

21 Discoveries at New Holland.

Our navigator had now explored three-fourths of that part of the globe where the southern continent was supposed to lie, without being able to find it; and his voyage had demonstrated, that the lands seen by former navigators could not have been parts of such a continent, though, as he had never proceeded farther to the southward than 40 degrees, the arguments for it were not as yet entirely overthrown. Mr Cook, however, did not at this time proceed farther in the search of such a continent, but sailed from New Zealand to the coast of New Holland, where he anchored in Botany Bay on the 20th of April. Here he found a few savage inhabitants more barbarous and degenerate than any that had yet been observed. Their language was harsh and dissonant, totally unintelligible even to Tupia: they appeared to have little curiosity, and set no value upon any present that could be made them. The most remarkable circumstance in this country seems to be its extreme scarcity of water; not a single stream of any consequence having ever been observed by any navigator. Some were of opinion indeed, that Moreton's bay, in S. Lat. 26. 59. and W. Long. 206. 28. opens into a river; though the only reason they had for this opinion was, that the sea looked paler in that part than usual, and the land at the bottom part of the bay could not be seen. At this time, however, the matter could not be determined by experiment, on account of the wind being contrary. The scarcity of water here is the more surprising, on account of the vast extent of the country, and likewise its having abundance of tolerably high hills. In this island there were found many curious plants and animals; and it was found, that in several places the magnetical needle was affected to such a degree, as to vary its position even to 30 degrees. At one time it varied no less than

22 Magnetic needle surprisingly affected.

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than two points on being removed to the distance of only 14 feet. Some of the loose stones being taken up and applied to the needle produced no effect; but Mr Cook was of opinion that the whole phenomenon was to be ascribed to iron ore in some of the mountains, and of which traces had been already met with. This irregularity continued in some degree even at sea; for when the ship was close under Cape Upstart, the variation of the needle in the evening of the 4th of June was 9°. east, and next morning only 5°. 35′.; and this was in like manner accounted for from iron ore, or some magnetical matter below the surface of the ground. The great island has many other small ones round it, several of which were visited by our navigators. One of them, named *Eagle Island*, seemed to be inhabited by a monstrous kind of birds, the nest of one of which measured no less than 26 feet in circumference, and two feet eight inches in height; and in the Philosophical Transactions, vol. xx. there is an account of one of these nests still larger; but the bird to which it belonged was not seen. That which our navigators saw was built of sticks, and lay upon the ground.

23 Birds nests of an immense size.

24 Vast extent of the country.

The country which goes by the name of *New Holland* is by far the largest island in the world. Its eastern part, called *New South Wales*, now first explored by Captain Cook, extends upwards of 2000 miles in length, if the coast were reduced to a straight line. Though inhabited, as we have already said, by very barbarous savages, their number appears to bear no proportion to the extent of their territory. The intercourse they had with our navigators was so small, that they could pick up but a few words of their language. As a British settlement is now made in that country, there is no doubt that much more exact accounts will soon be obtained than even the diligence and attention of Captain Cook could collect on such a transient visit.

25 Separated by straits from New Guinea.

In this voyage our navigator, besides exploring the eastern part of the island, which had never been done before, discovered that it was separated from the island of New Guinea, to which it had formerly been thought to join. The two countries are separated by a strait to which the commander gave the name of *Endeavour Strait*. The north entrance of this lies in S. Lat. 10. 39. and W. Long. 218. 36.; the passage is formed by the main land and a congeries of islands to the north, on which our navigator bestowed the name of *Prince of Wales's Islands*. These are very different both in height and extent; and the captain was of opinion, that several passages might be found out among them.

26 Cockles of vast size, sea-scum, &c.

On the coast of New Holland opposite to New Guinea are found cockles of an immense size; some of them being as much as two men could move, and containing 20 pounds of good meat. In these seas, as well as on the coasts of Brazil, our navigators found the surface of the water covered with a kind of scum called by the sailors *sea-spawn*. It was examined by Mr Banks and Dr Solander; but they could determine nothing farther than that it was of vegetable origin.

27 Unaccountable method of the natives of letting off fires.

The natives of New Guinea were so hostile that no discoveries of any consequence could be made. They resembled the New Hollanders in stature, and having short cropped hair. Like them too they were absolutely naked, but somewhat less black and dirty. They had a surprising method of letting off a kind of fires, exactly resembling the flashes of fire-arms, but without any explosion. It was not known in what manner this was done, as they were never near enough to make a particular observation. Those who discharged them had a short piece of stick which they swung sidewise from them, from which there issued the fire and smoke just mentioned. This seems to have been intended as a defiance; for they had no effect as offensive weapons, and others were armed with bows and arrows. The country appeared extremely pleasant and fertile. The place at which they touched lies in S. Lat. 6. 15.

As the condition of the Endeavour was now very much shattered by having sailed so long in these dangerous seas, the commander determined to make the best of his way for Batavia in order to refit. In this voyage he first passed two unknown islands without touching at either of them. They were supposed to belong to the Aurora islands; but if this be the case, the latter must be laid down at too great a distance from New Guinea. The Weasel Isles, laid down by former navigators at about 28 or 25 leagues from the coast of New Holland, were not seen; for which reason Mr Cook is of opinion that they are erroneously laid down.

Passing by the islands of Timor, Timor-lavet, Rotta, and Seman, they next arrived at the island of Savu, where a settlement had lately been made by the Dutch. In this voyage they had the satisfaction of observing the aurora australis, which here seemed to differ in some respects from that in the northern hemisphere. It consisted of a dull reddish light extending about 20 degrees above the horizon; and though it varied sometimes in extent, it was never less than eight or ten degrees. From this general mass of light there sometimes issued rays of a brighter colour, which vanished and were renewed like those of the aurora borealis, but without any of that tumultuous motion observed in the aurora borealis. The body of the light bore S. S. E. from the ship, and continued without any diminution of its brightness from 10 to 12 at night.

28 Aurora australis.

29 Excellent character of the inhabitants of Savu.

The middle part of the island of Savu lies in 10. 35. south, and 237. 30. west longitude, and afforded a most beautiful prospect from the ship. The people are remarkable for the purity of their morals, which are said to be irreproachable, even on the principles of Christianity. Though no man is allowed to have more than one wife, instances of illicit commerce betwixt the sexes are scarcely known among them. Instances of theft are likewise very rare; and so far are they from revenging a supposed injury by murder, that when any differences arise among them, they are immediately and implicitly referred to the determination of the king. They will not even make it the subject of private debate, lest they should be provoked to resentment and ill-nature; and the delicacy and cleanliness of their persons are said to be proportionable to the purity of their morals.

30 Good effects of the electrical chains in preserving from the effects of lightning.

On the arrival of the Endeavour at Batavia, our navigator had an opportunity of observing the good effects of the electrical chains applied to ships in securing them from the effects of lightning. A dreadful storm of thunder happened one evening, during which the main-mast

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main-mast of one of the Dutch East Indiamen was split and carried away close by the deck, the main-top-mast, and top-gallant-mast being shivered to pieces. This ship lay so near the Endeavour, that the latter would probably have shared the same fate, had it not been for the conducting chain which fortunately was just put up. The explosion shook her like an earthquake, the chain at the same time appearing like a line of fire. The stroke seemed to have been directed to the Dutch vessel by an iron spindle at the mast head: which practice our commander discommends, but strongly inculcates the use of the electrical chain.

31 Death of Tupia.

On their landing at Batavia, Tupia was confined by sickness, so that he appeared quite lifeless and dejected when put into the boat: but on his arrival at land recovered his spirits surprisingly. The scene, to him so new and extraordinary, seemed to produce an effect similar to what is produced by enchantment. His attention was particularly engaged by the various dresses of the people: and being informed that at Batavia every one appeared in the dress of his own country, he expressed a desire of likewise appearing in the garb of Otaheite. Having therefore been furnished with South sea cloth from the ship, he equipped himself with great quickness and dexterity. After the first flow of spirits had subsided, however, he soon began to feel the fatal effects of the climate; and his boy Tayeto, whose spirits had been still more elevated on his arrival, was attacked with an inflammation of the lungs, and in a little time fell a victim to the disease. Tupia himself did not long survive him, and his death was not attributed solely to the unwholesomeness of the climate. Having been accustomed from his infancy to subsist chiefly upon vegetable food, and particularly on ripe fruit, he had soon contracted the disorders incident to a sea life, and could scarce have been expected to reach England, even if the unwholesome climate of Batavia had been out of the question.

32 Prince's island, a proper place for ships to touch at.

The Endeavour left Batavia on the 27th of December 1770, and on the 5th of January 1781 reached Prince's island. This place had been formerly much frequented by the India ships, but of late entirely deserted on account of the supposed bad quality of the water; but this our navigator has discovered to be a mistake; and that, though the water near the sea is brackish, it may be had of excellent quality by going a little way up the country. He is of opinion, that this island is a more proper place for ships to touch at than either North Island or New Bay, because neither of these can afford other refreshments which may be had at Prince's island.

The rest of the voyage affords but little interesting matter. The Cape of Good Hope, which was their next stage, has been so fully described by former navigators that there was little room for addition. At St Helena the commander made some remarks on the rigorous treatment of the slaves, which was represented as worse than that of the Dutch either at Batavia or the Cape of Good Hope. In the account of his second voyage, however, this accusation was retracted.

33 Second voyage.

Captain Cook's second voyage was undertaken in an especial manner to determine finally the question concerning the existence of a southern continent. It commenced in the year 1772; and, as in the former, he proceeded first to Madeira. From thence he proceeded to St Jago, one of the Cape de Verde islands; where an opportunity was taken of delineating and giving such a description of Port Praya, and the supplies to be there obtained, as might be of use to future navigators. On the 8th of September he crossed the line in 8° west longitude, and had the satisfaction to meet with good weather, though he had been informed that he had sailed at an improper time of the year, in consequence of which he would probably be becalmed. From his account, however, it appears, that though in some years such weather may be expected, it is by no means universally the case. In this part of the ocean he had also an opportunity of observing the cause of the luminous property of sea-water, which in his former voyage had been attributed to insects. Mr Forster being of a different opinion, the matter was again particularly inquired into, but the result was entirely conformable to the former determination. Some buckets of water being drawn up from alongside the ship, were found to be filled with those insects of a globular form, and about the size of a small pin's head. No life indeed could be perceived in them; but Mr Forster was thoroughly convinced of their being living animals when in their proper element.

34 Calms not always to be feared near the equinoctial.

35 Luminous quality of sea water further determined.

36 Ice islands.

Proceeding southward in quest of a continent, they fell in with ice islands in S. Lat. 50. 40. and two degrees of longitude east from the Cape of Good Hope. One of these was so much concealed by the haziness of the weather, that it could not be seen at the distance of more than a mile. Captain Cook judged it to be about 50 feet in height and half a mile in circumference; its sides rising in a perpendicular direction, and the sea breaking against them with great violence. Two days after, they passed six others, some of which were two miles in circumference and 60 feet in height; yet such was the strength and violence of the waves that the sea broke quite over them. On the 14th they were stopped by a vast field of low ice, of which they could perceive no end. In different parts of this field there were seen islands, or hills of ice like those already described, and some of the people imagined that they saw land over them; but upon a narrow examination this was found to be a mistake. On getting clear of the field of ice they again fell in with loose islands; and as it was a general opinion that these are only formed in bays and rivers, our navigators concluded that they could not be at a great distance from land. They were now in the latitude of 55° 40′ south; and as they had sailed for more than 30 leagues along the edge of the ice without finding any opening, the captain determined to run 30 or 40 leagues farther to the eastward, in hopes of then getting to the southward. If in this attempt he met with no land or other impediment, his design was to stretch behind the ice altogether, and thus determine the matter at once. In a short time, however, it became evident that the field of ice along which they had sailed so long, did not join with any land; and the captain now came to a resolution of running as far to the west as the meridian of Cape Circumcision. In the prosecution of this design he met with a very severe storm, which was rendered the more dangerous by the pieces of loose ice among

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among which they were ftill entangled, and a vaft field of which they could not perceive the boundaries about three miles to the northward. Of this they could not get clear without receiving fome fevere ftrokes; and after all, when they arrived at the place where they ought to have found Cape Circumcifion, it could not be difcovered; fo that the captain concluded that what Bouvet took for land could have been nothing but ice.

37 Ice not always found in the vicinity of land.

During this run the fallacy of the general opinion had been difcovered, that the ice with which the polar regions abound has been formed in the vicinity of land. It was found likewife, that the water produced from the melting of ice, even though formed in the ocean, was perfectly fweet and well tafted. Of this circumftance the captain took advantage to fupply himfelf with water; and gave it as his opinion that it was the moft expeditious method of watering he had ever known. He had likewife an opportunity of detecting another popular error, *viz.* that penguins, albatroffes, and other birds of that kind, never go far from land. This indeed may be the cafe in open feas, but in fuch as are covered with ice it is very different; for they then inhabit the ice iflands, and float out with them to fea to a great diftance.

38 Irregularity of the magnetic needle.

When in the latitude of 49. 13. S. fome figns of land were perceived; but as the wind did not admit of any fearch being made in the direction where it was fuppofed to lie, the captain proceeded in his voyage to the eaftward. A very remarkable alteration in the direction of the needle was now perceived, and which could not be fuppofed owing to the vicinity of any magnetic matter, as it happened while the fhips were far out at fea. The circumftance was, that when the fun was on the ftarboard fide of the fhip the variation was leaft, but greateft when on the oppofite fide. An aurora auftralis was again obferved, which broke out in fpiral or circular rays, and had a beautiful appearance; but did not feem to have any particular direction, being confpicuous at various times in different parts of the heavens, and diffufing its light over the whole atmofphere.

39 Extreme cold of the fouthern feas.

The extreme cold and ftormy weather which now began to take place, determined Captain Cook not to crofs the antarctic circle a fecond time as he had once defigned. His obfervations confirmed the accounts of former navigators, that the cold of the fouthern feas is much more intenfe than in equal latitudes in the northern hemifphere; but at the fame time it fhowed that this cold cannot be owing to the vicinity of a continent, as had been formerly imagined. On the contrary, it was now determined beyond difpute, that if any fuch continent exifted in the eaftern part of the fouthern ocean, it muft be confined within the latitude of 60 degrees. No farther difcoveries therefore being practicable in higher latitudes, as the winter feafon was approaching, the commander fteered for New Zealand, where he anchored in Dufky Bay on the 25th of March, having been at fea 117 days without once coming in fight of land. Here the time was fpent in procuring proper refrefhments for the people, and exploring the fea-coaft and country for the benefit of future navigators. Nor was our commander unmindful of the inhabitants. Here he left the five geefe which yet remained, choofing for them a place where there were no people at the time to difturb them; and as they had there great plenty of food, he had no doubt of their breeding, and in a fhort time fpreading over the country. Some days after a piece of ground was cleared by fetting fire to the topwood, after which it was dug up and fowed with garden feeds. Dufky Bay is fituated in the weftern ifland of New Zealand, called *Tavai Poenammoo*, which, as has already been faid, is lefs fertile than the other. The inland part is full of rugged mountains of a vaft height: but the fea-coaft is covered with trees, among which is the true fpruce, which was found to be of great ufe. It was remarked, that though a vaft quantity of rain fell during the time of refidence here, it was not attended with any bad effects on the health of the people: which furnifhes an additional argument for the healthinefs of the place. Dufky Bay is reckoned by Captain Cook to be the moft proper place in New Zealand for the procuring of refrefhments, though it is attended with fome difagreeable circumftances, particularly being infefted with great numbers of black fand-flies, which were troublefome to an extreme degree. The natives feen at Dufky Bay were apparently of the fame race with thofe feen in other parts of the country, and led a wandering life, without any appearance of being united in the bonds of fociety or friendfhip.

40 Farther account of New Zealand.

41 Water fpouts.

From Dufky Bay the captain proceeded to Queen Charlotte's Sound, where he met with the Adventure, which had been feparated from the Refolution for above 14 weeks. In his paffage thither he had an opportunity of obferving fix water fpouts, one of which paffed within 50 yards of the Refolution. It has been a common opinion, that thefe meteors are diffipated by the firing of a gun, and the captain was forry he had not made the experiment; but he acknowledges, that though he had a gun ready for the purpofe, and was near enough, his attention was fo much engaged in viewing them, that he forgot to give the neceffary orders.

42 Difcoveries of Captain Furneaux.

Having planted another garden in this part of the country, and left two goats, two breeding fows and a boar, in as private a fituation as poffible, that they might be for fome time out of the reach of the natives, the captain fet fail for Otaheite. During the long abfence of the Adventure, Captain Furneaux had vifited the coaft of New Holland, and difcovered that there was no probability of Van Diemen's land being feparated from it by ftraits: he had likewife found additional proofs that the natives of New Zealand were accuftomed to eat human flefh. Captain Cook alfo remarked with concern, that the morals of the New Zealanders were by no means mended by the vifit he had formerly paid them. At that time he looked upon the women to be more chafte than thofe of moft of the nations he had vifited; but now they were ready to proftitute themfelves for a fpikenail, and the men to force them to fuch an infamous traffic, whether agreeable to the inclinations of the females or not.

In the run from New Zealand to Otaheite, our commander paffed very near the fituation affigned by Captain Carteret to Pitcairn's ifland, difcovered by him in 1767, but without being able to find it, though a fight of it would have been ufeful for correcting its longitude as well as that of others in the neighbourhood;

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43 New islands discovered. and named by him the *Dangerous Archipelago*. To four of these Captain Cook gave the names of *Resolution*, *Doubtful*, *Furneaux*, and *Adventure Islands*. Resolution Island is situated in S. Lat. 17. 24. W. Long. 141. 39. Doubtful Island in S. Lat. 17. 20. W. Long. 141. 38. Furneaux Island in S. Lat. 17. 5. W. Long. 143. 16. and Adventure Island in S. Lat. 17. 14. and W. Long. 144. 30.

44 Mistake concerning the women of Otaheite. No discovery of any great consequence was made at the island of Otaheite or those in its neighbourhood, excepting that the captain had an opportunity of correcting the opinion, which till now had prevailed, of the excessive dissoluteness and immodesty of the women of Otaheite; and which had been enlarged upon by Dr Hawkesworth more than seemed to be consistent with decency. The charge, however, according to the accounts of this second voyage, is far from being indiscriminately true, even of the unmarried females of the lower class. Some additions were made to the knowledge of the geography of those islands; and from Huaheine Captain Furneaux took on board of his ship one of the natives of Ulietea named *Omai*, afterwards so much spoken of in England. Captain Cook at first appeared dissatisfied with his choice of this youth, as being inferior in rank to many others, and having no particular advantage in shape, figure, or complexion; however, he had afterwards reason to be better pleased. During the captain's residence at Otaheite, he used his utmost endeavours to discover whether the venereal disease was endemic among them, or whether it had been imported by Europeans: but in this he could not meet with any perfectly satisfactory account, though it was universally agreed, that if it had been introduced by Europeans, it must have been by the French under M. Bougainville.

45 Harvey's island discovered. Captain Cook having left Ulietea on the 17th of September 1773, directed his course westward, with an inclination to the south. In this course he discovered land in S. Lat. 19. 8. and W. Long 158. 54. to which he gave the name of *Harvey's Island*. From thence he proceeded to the island of Middleburg, where he was treated in the most hospitable manner possible. To such an excess did the people carry their generosity, that they seemed to be more fond of giving away their goods than in receiving any thing for them; insomuch that many, who had not an opportunity of coming near the boats, threw over the heads of others whole bales of cloth, and then retired, without either waiting or asking for any thing in return. From Middleburg he proceeded to Amsterdam island, where the beauty and cultivation of the island afforded the most enchanting prospect. There was not an inch of waste ground; the roads were no wider than what was absolutely necessary, and the fences not above four inches thick. Even this was not absolutely lost; for many of these contained useful trees or plants.

46 South sea islands generally surrounded with coral rocks. It is observable of the isles of Middleburg and Amsterdam, as well as of most others in the South sea, that they are guarded from the waves by a reef of coral rocks, which extend about one hundred fathoms from the shore. Thus they are effectually secured from the encroachments of the ocean; by which they would probably soon be swallowed up, as most of them are mere points in comparison of the vast quantity of water which surrounds them. Here he left a quantity of garden vegetable seeds and pulse, which it was not doubted would be taken care of by the industrious inhabitants. In the last mentioned islands our navigators found no animals but hogs and fowls; the former being of the same kind with those usually seen in the other islands of the South sea; but the latter greatly preferable, equalling those of Europe in their size, and even preferable in respect of the goodness of their flesh.

On the 7th of October, Captain Cook left the island of Amsterdam, with a design to pay another visit to New Zealand, in order to take in wood and water for his voyage in quest of a southern continent. The day after he left Amsterdam he fell in with the island of Pilstart, formerly discovered by Tasman, and situated in S. Lat. 26′. W. Long. 175. 59. thirty-two leagues distant from the east end of Middleburg. On his arrival at New Zealand, he exerted himself as much as possible to leave a proper assortment of vegetables and animals for the benefit of the inhabitants. One of the first things he did, therefore, was to make a present to a chief, who had come off in a canoe, of a quantity of the most useful garden seeds, such as cabbage, turnips, onions, carrots, parsneps, and yams; together with some wheat, French and kidney beans and pease. With the same person also he left two boars, two sows, four hens, and two cocks. This present, however valuable in itself, seems to have been but indifferently received; for the chief was much better satisfied with a spikenail half the length of his arm than with all the rest; notwithstanding which, he promised to take care of the seeds, and not to kill any of the animals. On inquiring about those animals left in the country in the former part of his voyage, the captain was informed, that the boar and one of the sows had been separated, but not killed. The other he saw in good condition, and very tame. The two goats, he was informed, had been killed by a native of the name of Gaubiah. The gardens had met with a better fate; all the articles being in a very flourishing condition, though left entirely to nature, excepting the potatoes. Captain Cook, however, still determined to supply these islanders with useful animals, put on shore a boar, a young sow, two cocks, and two hens, which he made a present of to the adjacent inhabitants. Three other sows and a boar, with two cocks and hens, he ordered to be left in the country without the knowledge of the Indians. They were carried a little way into the woods, and there left with as much food as would serve them for 10 or 12 days, in order to prevent them from coming down to the coast in quest of it, and thus being discovered.

47 Another visit to New Zealand.

48 Voyage in quest of a southern continent. A second separation from the Adventure had now taken place; notwithstanding which, Captain Cook set out alone with his vessel in quest of a southern continent; and such was the confidence put in him by the sailors, that all of them expressed as much satisfaction and alacrity as if not only the Adventure, but ever so many ships had been in company.

On the 26th of November the captain set sail from New Zealand; and on the 12th of December began to fall

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fall in with the ice, but confiderably farther to the fouthward than they had met with it in the former part of his voyage; being now in the Lat. of 62. 10. S. and 172° W. Long. As they proceeded fouthward, the number of ice iflands increafed prodigioufly; and in Lat. 67. 31. and W. Long. 142. 54. they all at once got in among fuch a clufter of thefe iflands, that it became a matter of the utmoft difficulty and danger to keep clear of them. Finding it impoffible, therefore, to get any farther to the fouthward at prefent, the captain determined to explore a confiderable tract of fea to the north of his prefent fituation, and then again to ftand to the fouth. But in this he was ftill unfuccefsful; no land being difcovered either in failing northward, eaftward, weftward, or fouthward; though he proceeded as far in the laft direction as
49 Is ftopped by ice. 71. 10. S. Lat. and 106. 54. W. It was now impoffible to proceed; and the opinion of the captain himfelf, as well as of moft of the gentlemen on board, was that the ice by which they were now ftopped extended as far as the pole. As there was ftill room, however, in parts of the ocean entirely unexplored, for very large iflands, our commander determined not to abandon the purfuit in which he was engaged until there fhould not be any poffibility of doing more: and befides the poffibility of making new difcoveries, he was confcious that many of the iflands already difcovered were fo obfcurely known, that it was of confequence to pay them a fecond vifit. With this view he propofed to go in queft of Eafter or Davis's ifland; the fituation of which was known with fo little certainty, that none of the attempts lately made to difcover it had been fuccefsful. He next intended to get within the tropic, and then to proceed to the weft, touching at any iflands he might meet with, and fettling their fituations, until he fhould arrive at Otaheite, where it was neceffary for him to make fome ftay in order to look for the Adventure. It was part of his defign alfo to run to the weftward as far as Terra Auftral del Efpiritu Santo, difcovered by Quiros, and which M. Bougainville had named *The Great Cyclades*. From this land he propofed to fail to the fouthward, and from thence to the eaft between the latitude of 50° and 60°. In the execution of this defign, he determined if poffible to reach Cape Horn, during the enfuing November, when he would have the beft part of the fummer before him to explore the fouthern part of the Atlantic ocean.

In purfuing his courfe to the northward, it had been part of his defign to find out the land faid to have been difcovered by Juan Fernandez in about the latitude of 38°; but he was foon convinced, that if any fuch land exifted, it could only be a very fmall ifland; but the profecution of the defign was for fome little time interrupted by a violent bilious diforder by which the
50 Nutritive property of dog's flefh. captain was attacked. In this, when he began to recover, as there was no frefh meat on board, he was obliged to have recourfe to dog's flefh; and a favourite animal belonging to Mr Forfter was facrificed on the occafion. The captain was able to eat not only of the broth made of this, but likewife of the flefh, when his ftomach could bear nothing elfe. On the 11th of March they arrived at Eafter Ifland, before which time the captain was tolerably recovered. Here they made but few difcoveries farther than determining the fituation of it to be in S. Lat. 27. 5. 30. and W. Long. 109. 46. 20. The ifland itfelf was found barren and defolate, having every appearance of being lately ruined by a volcanic eruption; without either wood, fuel, or frefh water worth taking on board. The 51 Vifit Eafter ifland,
inhabitants were few in number; and the women in very fmall proportion to the men, but remarkable for their lewdnefs. A number of gigantic ftatues were obferved, which had alfo been taken notice of by Commodore Roggewein, and the origin of which could not be accounted for.

On leaving Eafter Ifland, Captain Cook was again attacked by his bilious diforder; but happily recovered before he reached the Marquefas, which they 52 and the Marquefas.
did on the 6th and 7th of April. One of thefe, being a new difcovery, received the name of *Hood's Ifland*, from the young gentleman by whom it was firft obferved. Thefe are five in number; fituated between 9 and 10 degrees of fouth latitude, and between 138. 47. and 139. 13. of weft longitude. They were difcovered by Mendana a Spaniard; and their names are, La Magdalena, St Pedro, La Dominica, Santa Chriftina, and Hood's Ifland. The inhabitants are, without exception, the fineft race of people in the South fea, furpaffing all others in that part of the world in the fymmetry of their perfons and regularity of their features. Their origin, however, from the affinity of language, was evidently the fame with that of Otaheite. It was in St Chriftina that our commander anchored; and he has left particular directions for finding a particular cove in Refolution bay in that ifland, which is the moft convenient for procuring wood and water.

In the paffage from the Marquefas to Otaheite, our navigators paffed feveral low and fmall iflands connected together by reefs of coral rocks. One of thefe, named by the inhabitants *Tiookea*, was vifited by Lieu- 53 Ifland Tiookea.
tenant Cooper. It was difcovered and vifited by Captain Byron; and is fituated in S. Lat. 27. 30. W. Long. 144. 56. The inhabitants are much darker in their complexions, and feem to be of a fiercer difpofition than thofe of the neighbouring iflands. They have the figure of a fifh marked upon their bodies; a very proper emblem of their profeffion, deriving their fubfiftence almoft entirely from the fea. Paffing by St George's iflands, which had been alfo difcovered and named by Captain Byron, our commander now difcovered four others, which he named *Pallifer's* 54 Pallifer's iflands.
Iflands. One of thefe is fituated in S. Lat. 15. 26. and W. Long. 146. 20. another in S. Lat. 15. 27. and W. Long. 146. 3. They were inhabited by people refembling thofe of Tiookea, and like them were armed with long pikes. Here our navigator obferves, that from W. Long. 138° to 148° or 150°, the fea is fo full of fmall low iflands, that one cannot proceed with too much caution.

On his arrival in Otaheite, provifions were met with 55 Arrival at Otaheite.
in great plenty; and they were now very acceptable, by reafon of the long time the fhip had been at fea without obtaining any confiderable fupply. Two goats which had been given by Captain Furneaux to a chief named *Otoo*, appeared to be in a very promifing fituation. The female had brought forth two kids, which were almoft large enough to propagate; and as fhe was again with kid, there was little doubt that the ifland

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iſland would ſoon be ſtocked with theſe uſeful animals; though it was otherwiſe with the ſheep, all of which had died except one. On this occaſion, alſo, the captain furniſhed the natives with cats, of which he gave away twenty; ſo that there was little danger of the ſtock of theſe animals decaying. During his reſidence at this time, he had an opportunity of making ſome computation of the number of inhabitants on the iſland, which he ſuppoſed to be no leſs than 200,000.

56 Huaheine, Ulietea, Howe iſland, &c.

Huaheine and Ulietea iſlands were next viſited, but without any remarkable occurrence. From the latter our commander ſet ſail on the 5th of June 1774; and next day came in ſight of Howe iſland, diſcovered by Captain Wallis, and ſituated in S. Lat. 16. 46. and W. Long. 154. 8. On the 16th a new iſland, named *Palmerſtone Iſland*, was diſcovered in S. Lat. 18. 4. W. Long. 163. 10.; and, four days after, another was obſerved in S. Lat. 19. 1. W. Long. 169. 37. As it was evidently inhabited, the captain determined to land; but found the people ſo extremely hoſtile, that no intercourſe could be had: nay, he himſelf was in danger of loſing his life by a lance thrown by one of the natives, which paſſed cloſe over his ſhoulder. From the extreme hoſtility of the people of this iſland, it was named by Captain Cook *Savagè Iſland.* It is of a round ſhape, pretty high, and has deep water cloſe to the ſhore, but has no good harbour.

57 Rotterdam iſland.

Paſſing by a number of ſmall iſlands, Captain Cook next anchored at that of Anamocka or Rotterdam, diſcovered by Taſman. It is ſituated in 20. 15. S. Lat. and 174. 31. W. Long. Its form is triangular, each ſide extending about three and a half or four miles. From the north-weſt to the ſouth it is encompaſſed by a number of ſmall iſlands, ſand-banks, and breakers; of which no end can be ſeen from the iſland on the northern ſide, and may poſſibly be as far extended as Amſterdam or Tongataboo. While the captain remained on this iſland, he learned the names of more than 20 of the adjacent iſles, ſome of which were in ſight between the north-weſt and north-eaſt. Two of theſe, which lie more to the weſtward than the others, are named *Amattafoa* and *Oghoo.* They are remarkable for their height; and from a great

58 Suppoſed volcano.

ſmoke viſible about the middle of Amattafoa, it was ſuppoſed to have a volcano. The iſland of Rotterdam, Middleburg, or Eaoowe, with Pilſtart, form a group extending about three degrees of longitude, and two of latitude. The whole group was named *The Friendly Iſles* by Captain Cook, on account of the friendſhip which ſeemed to ſubſiſt among the inhabitants, and their courteous behaviour to ſtrangers. The people of Rotterdam iſland are ſimilar to thoſe of Amſterdam; but the iſland is not in ſuch a ſtate of high cultivation as Amſterdam, nor do its fruits come to ſuch perfection. It is alſo inferior in the articles of cloth, matting, &c. which are accounted the wealth of theſe parts.

59 New Hebrides viſited.

From Rotterdam iſland our navigator continued his courſe to the weſtward, where he firſt diſcovered a ſmall iſland in S. Lat. 19. 48. W. Long. 178. 2. It was named Turtle iſland, from the great number of theſe animals found upon it. Sixteen days after he fell in with the cluſter of iſlands named by M. Bougainville the *Great Cyclades.* The firſt iſland on which he landed was Mallicollo, where, though the people were at firſt very hoſtile, they were ſoon conciliated, and a friendly intercourſe took place. The language of theſe people is conſiderably different from that of the other South ſea iſlands; they are diminutive in their perſons, and of ugly features; their hair black or brown, ſhort and curling, but leſs ſoft than that of the negroes. They had no name for a dog in their language, and had never ſeen the animal; ſo that they were extremely found of a dog and bitch, of which Captain Cook made them a preſent. The harbour in this iſland, in which the ſhip came to an anchor, was named Sandwich harbour, and lies on the north-eaſt ſide, in S. Lat. 16. 25. 20. E. Long. 167. 57. 53. It is very commodious for the carrying on any operations at land, having a good depth of water, and many other advantages.

60 Shepherd's iſles.

The next diſcovery was that of the group named *Sheepherd's Iſles*, in honour of Dr Shepherd, Plumian profeſſor of aſtronomy at Oxford. Numbers more were every day obſerved; of which one peaked rock, named the *Monument*, was uninhabited, being apparently inacceſſible to any other creature but birds. Sandwich iſland is of a conſiderable extent, and exhibits a moſt beautiful proſpect. It is ſurrounded with other ſmaller iſlands, the principal of which were named *Montague* and *Hinchinbrooke.* At Erromango they found the people hoſtile and treacherous; and from a ſkirmiſh they had with them near a promontory on the north-eaſt point of the iſland it was named *Traitor's Head.* Its ſituation is in S. Lat. 10. 43. E. Long. 169. 28.

61 Tanna iſland.

From Erromango our navigator proceeded to Tanna, an iſland they had formerly diſcovered at a diſtance, and which is ſurrounded by ſome others, three of which are named *Immer*, *Footoona* or *Erronan*, and *Anatom.* At Tanna they ſtaid for ſome time, on account

62 Volcano.

of their wanting ſome quantity of wood. A volcano was ſeen about the middle of this iſland, which burned with great violence, particularly in moiſt and wet weather; but notwithſtanding the friendly terms on which they were with the natives, the latter would never allow them to approach this mountain. There were ſome ſpots on the ſea-coaſt which emitted an hot and ſulphureous ſmoke; and the people alſo expreſſed much uneaſineſs when theſe were approached or meddled with. The port which the ſhip entered in this iſland was named *Reſolution Harbour*, and is ſituated in S. Lat. 19. 32. 25½. E. Long. 169. 44. 35. It is a ſmall creek three quarters of a mile long, and about half as broad. It is extremely convenient, having plenty of wood and water cloſe to the ſhore. Among the vegetable productions of this iſland, there is reaſon to ſuſpect the nutmeg tree to be one, a pigeon having been ſhot, in the craw of which was a wild nutmeg. The inhabitants are two diſtinct races of people, and ſpeak two different languages; one that of the Friendly iſlands, the other peculiar to Tanna and

63 Dexterity of the inhabitants in the uſe of their lances.

thoſe in the neighbourhood. The people are very expert in the uſe of their weapons; on which Mr Wales makes the following remarks: "I muſt confeſs I have often been led to think the feats which Homer repreſents his heroes as performing with their ſpears, a little too much of the marvellous to be admitted in an heroic poem, I mean when confined within

within the ſtrait ſtays of Ariſtotle; nay, even ſo great an advocate for him as Mr Pope acknowledges them to be ſurpriſing; but ſince I have ſeen what theſe people can do with their wooden ſpears, and them badly pointed, and not of an hard nature, I have not the leaſt exception to any one paſſage in that great poet on this account. But if I ſee fewer exceptions, I can find infinitely more beauties in him, as he has, I think, ſcarcely an action, circumſtance, or deſcription of any kind whatever relating to a ſpear, which I have not ſeen and recogniſed among theſe people; as their whirling motion and whiſtling noiſe as they fly; their quivering motion in the ground when they fall; their meditating their aim when they are going to throw; and their ſhaking them in their hand as they go along."

The Archipelago, in which Captain Cook had now remained a conſiderable time, is ſituated between 14. 29. and 20. 4. S. Lat. and between 166. 41. and 170. 21. E. Long. extending 125 leagues in the direction of N. N. W. $\frac{1}{2}$ W. and S. S. E. $\frac{1}{2}$ E. The principal iſlands are the Peak of the Etoile, Terra del Eſpiritu Santo, Mallicollo, St Bartholomew, the iſle of Lepers, Aurora, Whitſuntide iſle, Ambrym, Paoom, Apee, Three Hills, Sandwich, Erromango, Tanna, Immer, and Anatom. They were firſt diſcovered in 1606 by Quiros, who ſuppoſed them to be part of a ſouthern continent; nor were they viſited from that time till the year 1768, when M. Bougainville beſtowed upon them the name of the *Great Cyclades*, as already mentioned. This gentleman, however, beſides landing in the iſle of Lepers, only diſcovered that the country was not connected, but conſiſted of iſlands. Captain Cook examined the whole in ſuch an accurate manner, aſcertaining the ſituation of many of the iſlands, and diſcovering ſuch numbers of new ones, that he thought he had an undoubted right to impoſe a new name upon them, and therefore called them the *New Hebrides*.

64 New Caledonia diſcovered. From the New Hebrides Captain Cook ſet ſail for New Zealand, in order to proſecute his voyage in ſearch of a ſouthern continent, but in three days diſcovered a large iſland, which he named *New Caledonia;* and which, next to New Zealand, is the largeſt in the Pacific ocean. It lies between 19. 37. and 22. 30. S. Lat. and between 163. 37. and 167. 14. E. Long. lying N. W. $\frac{1}{2}$ W. and S. E. $\frac{1}{2}$ E. extending about 87 leagues in that direction, though its breadth does not anywhere exceed 10 leagues. The natives are ſtrong, active, well made, and ſeem to be a middle race between thoſe of Tanna and the Friendly iſles; and the women were more chaſte than thoſe of the iſlands farther to the eaſtward. The iſland afforded a conſiderable variety of plants for the botaniſts, and ſome excellent timbers of the ſpecies of the pitch pine, for maſts and ſpars. The wood is cloſe-grained, white, and tough; and very fit for the purpoſe. One of the ſmall iſlands ſurrounding the large one was named the *Iſle of Pines*, from the quantity of theſe trees found upon it; and another, from the number and variety of plants it afforded, had the name of *Botany iſland.* The coaſt, however, was ſo dangerous, that our navigator, having no more time to ſpare, was obliged to leave ſome part of it unexplored, though the extent was determined, as has been already related. Mr Forſter was of opinion, that the language of this people is totally different from that of any of the other South Sea iſlands.

Proceeding from New Caledonia, our navigator next fell in with an iſland about five leagues in circumference, and of a good height, ſituated in S. Lat. 29. 2. 30. and E. Long. 168. 16.; on which he beſtowed the name of *Norfolk Iſland.* It was entirely uninhabited. Various trees and plants common at New Zealand were obſerved here, particularly the flax plant, which is more luxuriant in this iſland than in any part of New Zealand. The chief produce of the iſland is a kind of ſpruce-pine, many of the trees of which are 10 or 12 feet in circumference. The palm-cabbage likewiſe abounds here; and the coaſts are well ſtocked with excellent fiſh. On the 18th of October they arrived at Queen Charlotte's Sound in New Zealand; the ſituation of which was now aſcertained by Mr Wales with the utmoſt accuracy, its latitude being found 41. 5. 56$\frac{1}{2}$. S. and its longitude 174. 25. 7$\frac{1}{2}$ E. On examining the gardens which had been made, it was found that they were in a thriving condition, though they had been entirely neglected by the natives. Some of the cocks and hens were ſuppoſed to be ſtill in exiſtence, as a new laid hen's egg was found, though none were ſeen. 65 Norfolk iſland. 66 Arrival at New Zealand;

On the 10th of November Captain Cook ſet ſail from New Zealand in ſearch of a ſouthern continent; but having traverſed a vaſt extent of ſea for 17 days, from S. Lat. 43. 0. to 55. 48. he gave up all thoughts of finding any more land in this part of the ocean, and therefore determined to ſteer directly for the weſt entrance of the ſtraits of Magellan, with a deſign of coaſting the ſouthern part of Terra del Fuego quite round Cape Horn to Le Maire's Straits. As the world had hitherto received but very imperfect accounts of this coaſt, he thought a ſurvey of it would be of more advantage to navigation and geography than any thing he could expect to meet with in a higher latitude. On the 17th of December he reached the coaſt of Terra del Fuego, and in three days more anchored in a place to which he gave the name of *Chriſtmas Sound.* The land appeared deſolate beyond any thing he had hitherto experienced. It ſeems to be entirely compoſed of rocky mountains, without the leaſt appearance of vegetation. Theſe mountains terminate in horrid precipices, the craggy ſummits of which ſpire up to a vaſt height; ſo that ſcarcely any thing in nature can have a more barren and ſavage proſpect than the whole of the country. In the courſe of his voyage along this coaſt, he could not but obſerve, that at no time had he ever made one of ſuch length where ſo little occurred of an intereſting nature. Barren and dreary, however, as the coaſt was, it was not totally deſtitute of accommodations about Chriſtmas Sound. Freſh water and wood for fuel were found about every harbour; and the country everywhere abounds with fowl, particularly geeſe.—A conſiderable number of plants were alſo found upon it, almoſt every ſpecies of which was new to the botaniſts. In paſſing by Cape Horn, it was wiſhed to determine whether it belonged to the land of Terra del Fuego, or to a ſmall iſland ſouth from it; but this was found impracticable on account of the foggy weather and dangerous ſea. Its latitude was now 67 at Terra del Fuego. 68 Remarks on a voyage round Cape Horn.

now determined to be 55. 58. S. and its longitude 67. 46. W. The coaſt appeared leſs dreary here than on the weſtern ſide of Terra del Fuego; for though the ſummits of ſome of the hills were rocky, the ſides and valleys ſeemed covered with a green turf and wooded in tufts. In paſſing this cape a remark was made by the captain, that if he were on a voyage round Cape Horn, to the weſt, and not in want of wood or water, or any other thing which might make it neceſſary to put into port, he would ſail a conſiderable way to the ſouthward, ſo as to be out of the reach of land altogether. By this method he would avoid the currents, whoſe force, he was of opinion, would be broken at 10 or 12 leagues diſtance from the ſhore, and farther off would be entirely deſtroyed. The extent of Terra del Fuego, and conſequently of Magellan's Straits, was found to be leſs than what is commonly laid down in maps and charts, and the coaſts, in general, leſs dangerous than has been uſually repreſented; though this muſt undoubtedly have been owing in a great meaſure to the weather, which happened to be remarkably temperate.

69
Surpriſing concord of the animals in theſe parts.

In one of the ſmall iſlands near Staten Land, and which from their being diſcovered on new year's day, were called *New Year's Iſles*, a remarkable harmony was obſerved among the animals of different ſpecies with which theſe deſolate regions abound. The ſea-lions occupy the greateſt part of the ſea-coaſt; the bears occupy the inland; the ſhags are poſted in the higheſt cliffs; the penguins in ſuch places as have the beſt acceſs to and from the ſea; and the other birds chooſe more retired places. Occaſionally, however, all theſe animals were ſeen to mix together like domeſtic cattle and poultry in a farm yard, without one attempting to hurt the other in the leaſt. Even the eagles and vultures were frequently obſerved ſitting together on the hills among the ſhags, while none of the latter, either old or young, appeared to be diſturbed at their preſence. It is probable, therefore, that theſe birds of prey ſubſiſt by feeding on the carcaſes of the animals which die naturally or by various accidents, and which muſt be very numerous, from the immenſe quantity exiſting on the iſland.

70
Farther diſcoveries in the ſouthern regions.

Our navigator now ſet out in queſt of that extenſive coaſt laid down in Mr Dalrymple's chart, and in which is marked the gulf of St Sebaſtian; but when he came into the place where it is ſuppoſed to lie, neither land nor any certain ſigns of it could be met with. Some iſlands, however, were diſcovered, particularly Willis's iſland, in S. Lat. 54. 0. W. Long. 38. 23.; another named *Bird Iſland* and *South Georgia*, ſituated between 53. 57. and 54. 57. S. Lat. and between 38. 13. and 35. 34. W. Long. All theſe were covered with ſnow and ice to a great height. Not a tree was to be ſeen, not even a ſhrub, nor were there any rivulets or ſtreams of water: the only vegetables to be met with were a coarſe ſtrong-bladed graſs, wild burnet, and a kind of moſs. A conſiderable quantity of ſeals and penguins were met with, whoſe fleſh, though very coarſe, was preferred by the ſhip's company, even by Captain Cook himſelf, to the ſalt proviſions, which were now greatly decayed. The moſt ſoutherly land diſcovered by our navigator was that on which he beſtowed the name of *Southern Thule*, and which is ſituated in S. Lat. 59. 13. 30. W. Long. 27. 45. This was ſtill more deſolate than South Georgia, being forſaken even by the ſeals and penguins which abounded on it. Not a ſingle herb of any kind was ſeen upon it, but vaſt high and barren mountains, the tops of ſome of which reached above the clouds; and it may be remarked, that this ſeems to be the only part of the world, hitherto diſcovered, entirely unfit for the ſupport of animal life.

71
Of the exiſtence of a ſouthern continent.

Southern Thule was diſcovered on the 31ſt of January 1775; and from this to the 6th of February ſeveral other iſlands were diſcovered, and named *Cape Briſtol*, *Cape Montague*, *Saunders's Iſles*, *Candlemas Iſles*, and *Sandwich's Land*. With regard to this laſt, Capt. Cook was undetermined whether it was a group of iſlands or part of a continent lying near the pole, as after all his diſappointments, he was ſtill inclined to think that ſuch a continent has an exiſtence, on account of the vaſt quantity of ice met with in the ſouthern ſeas; and which from its great height appears to be formed in bays and gulfs of the land, and not in the ocean itſelf. The greateſt part of the ſouthern continent, however, if it has any exiſtence, muſt be within the polar circle, where the ſea is ſo incumbered with ice, that the land muſt be inacceſſible. So great is the danger in navigating theſe ſouthern ſeas, that Captain Cook aſſerts on the moſt probable grounds in the world, that ſuch lands as lie to the ſouthward of his diſcoveries could not be explored; and that even no man would venture farther than he had done. Thick fogs, ſnow-ſtorms, intenſe cold, and every thing that can render navigation difficult or dangerous, muſt be encountered; all which difficulties are greatly heightened by the inexpreſſibly horrid aſpect of the country itſelf. It is a part of the world doomed by nature never once to feel the warmth of the ſun's rays, but to be buried in everlaſting ſnow and ice. Whatever ports there may be on the coaſt, they are almoſt entirely covered with frozen ſnow of a vaſt thickneſs. If, however, any of them ſhould be ſo far open as to invite a ſhip into it, ſhe would run the riſk of being fixed there for ever, or of coming out in an ice iſland. To this it may be added, that the iſlands and floats on the coaſt, the great falls from the ice-cliffs in the port, or a ſudden ſnow-ſtorm, might be attended with equally fatal effects. For theſe reaſons our commander determined to abandon the purſuit of a land whoſe exiſtence was ſo equivocal, but whoſe inutility, if it ſhould be diſcovered, was certain.

72
Voyage in queſt of Bouvet's land.

One thing only remained to complete what he wiſhed to accompliſh, and that was to determine the exiſtence of Bouvet's land. n this inquiry he ſpent 16 days; but having run for 13 of theſe directly in the latitude aſſigned to that land, and found no appearance of it or of Cape Circumciſion, he concluded, that neither of them had any exiſtence, but that the navigators had been deceived by the appearance of ice-iſlands. Two days more were ſpent in queſt of ſome land which had been obſerved more to the ſouthward, but with the like bad ſucceſs; after which our commander abandoned all farther thoughts of ſouthern diſcoveries, and prepared for returning to England.

73
Of the iſles of Denia and Marſeveen.

On his way home, however, he determined to direct his courſe in ſuch a manner as to fall in with the iſles of Denia and Marſeveen. Theſe are laid down in Dr Halley's variation chart in latitude 41. 30. S. and about 4. 0. E. from the meridian of

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of the Cape of Good Hope. None of these islands could be found; and therefore our commander, having very little time to spare either in searching for them or attempting to disprove their existence, made the best of his way to the Cape of Good Hope, and from thence to England. In his passage thither, he visited the isles of St Helena, Ascension, and Fernando de Noronha. An experiment was made on the use of the still for procuring fresh water at sea; the result of which was, that though the invention was useful upon the whole, yet it would not by any means be advisable to trust entirely to it. Provided indeed that there was not a scarcity of fuel, and that the coppers were good, as much might thus be procured as would support life; but that no efforts would be sufficient to procure the quantity necessary for the preservation of health, especially in hot climates. He was likewise convinced that nothing contributes more to the health of seamen than having plenty of fresh water. His last stage in this second voyage before his arrival in England was at Fayal, one of the Azores islands; and his only design of stopping here was to give Mr Wales an opportunity of finding the rate of the watches going, that so he might be enabled to find the longitude of these islands with the greater certainty.

74 Of the usefulness of distilling sea-water.

75 Third voyage.

In our commander's third voyage he touched at the island of Teneriffe instead of Madeira, looking upon the former to be a better place for procuring refreshments; and was convinced of the justness of his conjecture by the facility with which provisions of all kinds were obtained. The air of the country is exceedingly healthy, and proper for those subject to pulmonary complaints. This was accounted for by a gentleman of the place from the great height of the island, by which it was in the power of any person to change the temperature of the air as he pleased; and he expressed his surprise that physicians, instead of sending their patients to Nice or Lisbon, did not send them to Teneriffe. From the same gentleman it was learned, that the tea shrub grows in that island as a common weed, which is constantly exterminated in large quantities. The Spaniards, however, sometimes use it as tea, and ascribe to it all the qualities of that brought from the East Indies. They give it also the name of tea, and say that it was found in the country when the islands were first discovered. Another botanical curiosity is the fruit called the *impregnated lemon*, which is a perfect and distinct lemon inclosed within another, and differing from the outer only in being a little more globular.

76 Visits the isle of Teneriffe.

77 Tea-shrub.

78 Impregnated lemon.

79 Prince Edward's islands discovered.

From Teneriffe Captain Cook proceeded to the Cape of Good Hope, and from thence to the southward, where he fell in with two islands, the larger of which is about 15 leagues in circuit, and the smaller about nine; their distance from one another being about five leagues. The one of these islands lies in S. Lat. 46. 53. and E. Long. 37. 46.; the other in S. Lat. 46. 4. E. Long. 38. 8. As the ships passed through between them, they could not discern either tree or shrub upon any of them, even with the assistance of their best glasses. The shore seemed to be bold and rocky, their internal parts full of mountains, whose sides and summits were covered with snow. These two, with four others, which lie from 9 to 12 degrees of longitude more to the east, and nearly in the same latitude, had been discovered in the year 1772 by Captain Marion du Fresne and Crozet, two French navigators, in their passage from the Cape of Good Hope to the Philippines. As no names had been assigned to them in a chart of the Southern ocean communicated to Captain Cook in 1775, the two larger ones were by him distinguished by the name of *Prince Edward's islands*, in honour of his majesty's fourth son; the other four, with a view to commemorate the discoverers, were called *Marion's* and *Crozet's islands*.

From these our commander steered to the southward in search of Kerguelen's land, which he had been instructed to touch at, in order to discover, if possible, a good harbour there. In his passage to it several new islands were discovered; one, to which Kerguelen had given the name of the *Island of Rendezvous*, Captain Cook, on account of its shape, changed to that of *Blight's Cap*. It is situated in S. Lat. 48. 29. E. Long. 68. 40. and is a high round rock, inaccessible to all creatures but birds. Next day he fell in with Kerguelen's land, at first thought to be a part of the southern continent, but afterwards found by Kerguelen himself to be an island. The extent of it, however, was not determined either by the French navigator or by Captain Cook. The former reckons it at 200 leagues in circumference, but Captain Cook estimates it at much less. Our navigator could not get any extensive view of it on account of the foggy weather; but as far as could be discovered, it was barren and desolate, insomuch that there was neither food nor covering for cattle of any kind, so that they would inevitably perish if any were left. Even the sea-coasts were in a great measure destitute of fish; but the shore was covered with innumerable multitudes of seals, together with penguins and other birds; all of which were so void of fear that any quantity whatever might be killed without any difficulty. Not a single tree nor shrub could be seen, nor a piece of drift wood on the shore; and herbage of every kind was likewise very scarce. A prodigious quantity of the sea-weed called by Sir Joseph Banks *fucus giganteus*, was found in one of the bays. The whole variety of plants found in this island did not exceed sixteen or eighteen species. The harbour in which our navigator made his longest stay on this desolate coast was named *Port Pallisser*, and is situated in S. Lat. 49. 3. E. Long. 69. 37. In this voyage our navigator undoubtedly displayed superior nautical abilities to those of M. Kerguelen, who in two voyages to the place had never been able to bring his ships to anchor on any part of the coast.

80 Voyage in quest of Kerguelen's land.

81 Description of that island.

82 Of Van Diemen's land.

From Kerguelen's land our navigator proceeded to the coast of New Holland, where he now touched at the southern part called *Van Diemen's Land*, where he anchored in Adventure bay. Here they found plenty of wood and water, with abundance of grass, coarse indeed, where they went first ashore, but afterwards much finer and proper for the cattle. Here, as everywhere else, the latitudes and longitudes were settled with the greatest exactness. The bottom of Adventure bay was found to lie in S. Lat. 43. 21. 6.; E. Long. 147. 29. The inhabitants visited them in a friendly manner, but seemed as stupid and insensible as those they had formerly seen. They seemed to be totally ignorant of the use of iron, and set no value upon any thing in the ornamental way excepting beads;

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beads; nor did they seem to be acquainted even with the use of fish hooks. Here they found the stories of the ancient fauns and satyrs living in hollow trees realized. Some huts covered with bark, and of a most wretched construction, were indeed found near the shore; but the most commodious habitations were afforded by the largest trees. These had their trunks hollowed out by fire to the height of six or seven feet; and there was room enough in one of them for three or four persons to sit round a hearth made of clay; and it may justly seem surprising, that notwithstanding the extreme violence offered to the vegetative powers of the tree by forming this habitation, it still continued to flourish in consequence of one side being left entire. The people, notwithstanding their extreme barbarity, were supposed to proceed from the same stock with those of the South sea islands. As in one of their visits the natives had seized upon two pigs which had been brought ashore, apparently with an intention to kill them, the commander determined to make them a present of these animals; though from their excessive stupidity and inattention there was no probability of their allowing them to propagate, if they had been put directly into their hands. To prevent this, Captain Cook ordered the two they had attempted to seize, being a boar and a sow, to be carried about a mile within the head of the bay, and saw them left by the side of a fresh water rivulet. He was prevented from leaving any other species by a consideration of the barbarity of the inhabitants.

83 Visit to New Zealand.

From New Holland our navigator proceeded to New Zealand, where he arrived on the 12th of February 1777, and anchored in Queen Charlotte's sound. Here he was desirous of leaving a further supply of animals; but the inhabitants had hitherto shown such carelessness about those which had been left, that he durst not venture to leave any other than two goats, a male and a female with kid, and two hogs, a boar and sow. He was informed, however, that one chief had several cocks and hens in his possession, so that there was some probability of these animals being allowed to multiply; and as ten or a dozen hogs had at different times been left by Captain Cook, besides those put on shore by Captain Furneaux, it seems also to be likely that this race of creatures will increase either in a wild or domestic state, or both. The gardens had still been almost totally neglected, and some of them destroyed. Those which remained, however, produced cabbages, onions, leeks, purslain, radishes, and a few potatoes. These last had been brought from the Cape of Good Hope, and were so greatly meliorated by the change of soil, that with proper cultivation they seemed to bid fair for excelling those of other countries.

Our navigator's next course was towards the island of Otaheite; in the run to which he discovered the island of Mangea, situated in S. Lat. 22. 57. E. Long. 201. 53. From thence he proceeded to Wateoa, where Omai, now on his way home, recognised three of his countrymen, natives of the Society islands, who had arrived here by the following accident. About 12 years before, 20 of the natives of Otaheite had embarked in a canoe, in order to visit the neighbouring island of Ulietea. A violent storm arose, which drove them out of their course, and they suffered in-

84 Extraordinary preservation of some of the natives of Otaheite.

credible hardships by famine and fatigue, so that the greatest part of them perished. Four men continued hanging by the side of the vessel for four days after it was overset, when they were at last brought within sight of the people of this island. The latter immediately sent out their canoes, and brought them ashore, treating them afterwards with so much kindness, that the three who now survived expressed no desire of returning to their own country, though they had now an opportunity, but chose rather to remain where they were. This island is situated in S. Lat. 20. 1. E. Long. 201. 45. and is about 6 leagues in circumference. The inhabitants are said to be equally amiable in their persons and dispositions.

Visiting a small island named *Wenooa-ete*, or *Otakootaia*, situated in S. Lat. 19. 15. and E. Long. 201. 37. our commander found it without inhabitants, though there were undoubted marks of its being occasionally frequented. Harvey's island, which in his former voyage had been destitute of inhabitants, was now found to be well peopled; but the inhabitants showed such an hostile disposition that no refreshments could be procured; for which reason it was determined to steer for the Friendly islands, where there was a certainty of meeting with an abundant supply. In his way thither he touched at Palmerstone island, from a small isle near which a supply of 1200 cocoa nuts was obtained, besides abundance of fish and birds of various kinds. Had the island been capable of furnishing water, the captain would have preferred it to any of the inhabited ones for the purpose of procuring refreshments, as they could be had in any quantity without molestation from the petulance of the inhabitants. As water at this time happened to be a scarce article, our navigator was obliged to supply himself from the showers which fell, and which afforded as much in an hour as he could procure by distillation in a month.

85 Palmerstone island a proper place of refreshment, but without water.

During the time of residence at the Friendly islands, our navigator visited one named *Hepaee*, at which no European ship had ever touched before. Here he was entertained in a friendly manner, supplied with refreshments, and left some useful animals. Great additions were made to the geography of these islands, and many curious remarks made on the inhabitants and natural products. It was observed by Mr Anderson, that the people had very proper notions of the immateriality and immortality of the human soul; and he thought himself authorized to assert that they did not worship any part of the visible creation.

Passing by a small island named *Toobouai*, about five or six miles in extent, and situated in S. Lat. 23. 25. E. Long. 210. 37. our navigator now arrived at Otaheite. Here Omai met with his relations, some of whom received him with apparent indifference; but his meeting with an aunt and a sister was marked with expressions of the most tender regard. It was Huaheine, however, that was destined for the place of Omai's final residence, and thither the captain repaired on purpose to settle him. The affair was conducted with great solemnity; and Omai brought with him a suitable assortment of presents to the chiefs, went through a great number of religious ceremonies, and made a speech, the subject of which had been dictated to him by Captain Cook. The result of the negociation was, that a spot of ground was assigned him,

86 Reception of Omai at Otaheite.

87 He is settled at Huaheine.

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him, extending about two hundred yards along the ſhore of the harbour, with a proportionable part of an adjacent hill. The carpenters of both ſhips were then employed in conſtructing a houſe for him, in which he might ſecure his European commodities. At the ſame time a garden was made for his uſe, in which were planted ſhaddocks, vines, pine-apples, melons, and ſeveral other garden vegetables. Here he met with a brother, ſiſter, and ſiſter-in-law, by whom he was very affectionately received; but it was diſcovered with concern, that none of his relations were able to protect him in caſe of any attack on his perſon or property; ſo that there was too much reaſon to fear that he would be plundered immediately on the departure of the Engliſh. To prevent this, if poſſible, Captain Cook adviſed him to conciliate the favour and engage the patronage and protection of ſome of the moſt powerful chiefs by proper preſents; at the ſame time that he himſelf took every opportunity of letting the inhabitants know that it was his intention to return to the iſland again, and if he did not find Omai in the ſame ſtate of ſecurity in which he left him, thoſe by whom he had been injured would certainly feel the weight of his reſentment. About a fortnight after leaving Huaheine, the captain had a meſſage from Omai; in which he informed him that every thing went well, only that his goat had died in kidding, for which he deſired another might be ſent; and accompanied this requeſt with another for two axes, which were ſent along with a couple of kids,

88 Remarks on the Society iſlands.

male and female. On taking his final leave of the Society iſlands, Captain Cook obſerves, that it would have been far better for theſe poor people never to have known the ſuperiority of the Europeans in ſuch arts as render life comfortable, than after once being acquainted with it to be again abandoned to their original incapacity of improvement; as, if the intercourſe between them and us ſhould be wholly diſcontinued they could not be reſtored to that happy ſtate of mediocrity in which they were found. It ſeemed to him that it was become in a manner incumbent on the Europeans to viſit theſe iſlands once in three or four years, in order to ſupply them with thoſe conveniences of which they have taught them the uſe. It is indeed to be apprehended, that by the time the iron tools which were then among them are worn out, they will have forgotten the uſe of their own; as in this laſt voyage it was obſerved that the uſe of their former tools was almoſt totally aboliſhed.

89 Chriſtmas iſland diſcovered.

Having left the Society iſlands, Captain Cook now proceeded to the northward, croſſing the equator on the 22d and 23d of December; and on the 24th diſcovered a low uninhabited iſland about 15 or 20 leagues in circumference. Here the longitude and latitude were exactly determined by means of an eclipſe of the ſun. The weſt ſide of it, where the eclipſe was obſerved, lies in N. Lat. 1. 59. E. Long. 202. 30. From the time of its diſcovery it obtained the name of *Chriſtmas Iſland*. Plenty of turtle was found upon it, and the captain cauſed the ſeeds of the cocoa-nut, yams, and melons, to be planted.

90 Sandwich iſles.

Proceeding ſtill to the northward, our navigator next fell in with five iſlands, to which he gave the general name of *Sandwich iſles*, in honour of his patron. Their names in the language of the country are Woahoo, Atooi, Oneeheeow, Oreehoua, and Tehoora. They are ſituated in the latitude of 21. 30. and 22. 15. North, and between 199. 20. and 201. 30. E. Long. The longitude was deduced from no fewer than 72 ſets of lunar obſervations. The largeſt of theſe iſlands is Atooi, and does not in the leaſt reſemble the other iſlands of the South ſea formerly viſited by our navigator, excepting only that it has hills near the centre, which ſlope gradually towards the ſea-ſide. The only domeſtic animals found upon it were hogs, dogs, and fowls. Captain Cook deſigned to have made the inhabitants of this iſland a preſent of ſome others; but being driven out of it by ſtreſs of weather, he was obliged to land them upon a ſmaller one named *Oneeheeow*. They were a he-goat with two females, and a boar and ſow of the Engliſh breed, which is much ſuperior to that of the South ſea iſlands. He left alſo the ſeeds of melons, pumkins, and onions. The ſoil of this iſland ſeemed in general to be poor: it was obſervable that the ground was covered with ſhrubs and plants, ſome of which had a more delicious fragrancy than had been experienced before. The inhabitants of theſe iſlands are much commended, notwithſtanding their horrid cuſtom of eating human fleſh. In every thing manufactured by them there is an ingenuity and neatneſs in an uncommon degree; and the elegant form and poliſh of ſome of their fiſhing-hooks could not be exceeded by an European artiſt, even aſſiſted by all his proper tools. From what was ſeen of their agriculture alſo, it appeared that they were by no means novices in that art, and that the quantity and goodneſs of their vegetable productions might with propriety be attributed as much to their ſkilful culture as to the fertility of the ſoil. The language of the Sandwich iſles is almoſt identically the ſame with that of Otaheite.

91 American coaſt diſcovered.

Proceeding farther to the northward, our navigators diſcovered the coaſt of New Albion on the 7th of March 1778. Its appearance was very different from that of the countries with which they had hitherto been converſant. The land was full of mountains, the tops of which were covered with ſnow; while the valleys between them, and the grounds on the ſea-coaſt, high as well as low, were covered with trees, which formed a beautiful proſpect as of one vaſt foreſt. The place where they landed was ſituated in N. Lat. 44. 33. E. Long. 235. 20. At firſt the natives ſeemed to prefer iron to every other article of commerce; but at laſt they ſhowed ſuch a predilection for braſs, that ſcarcely a bit of it was left in the ſhips except what belonged to the neceſſary inſtruments. It was obſerved alſo, that theſe people were much more tenacious of their property than any of the ſavage nations that had hitherto been met with, inſomuch that they would part neither with wood, water, graſs, nor the moſt trifling article, without a compenſation, and were ſometimes very unreaſonable in their demands; with which, however, the captain always complied as far as was in his power.

92 Nootka found.

The place where the Reſolution was now anchored was by our navigator called *St George's Sound*, but he afterwards underſtood that the natives gave it the name of *Nootka*. Its entrance is ſituated in the eaſt corner of Hope Bay, in N. Lat. 49. 33. E. Long. 233. 12. The climate, as far as they had an opportunity of obſerving it, was much milder than that on the eaſtern coaſt

93 Mildneſs of the climate.

Cook's Discoveries. coast of the American continent in the same parallel of latitude; and it was remarkable that the thermometer, even in the night, never fell lower than 42°, while in the day-time it frequently rose to 60°. The trees met with here are chiefly the Canadian pine, white cypress, and some other kinds of pine. There seemed to be a scarcity of birds, which are much harassed by the natives, who ornament their clothes with the feathers, and use the flesh for food. The people are no strangers to the use of metals, having iron tools in general use among them; and Mr Gore procured two silver spoons of a construction similar to what may be observed in some Flemish pictures, from a native who wore them round his neck as an ornament. It is most probable that these metals have been conveyed to them by the way of Hudson's bay and Canada: nor is it improbable that some of them have been introduced from the north-western parts of Mexico.

94 Natives acquainted with the use of metals.

While Captain Cook sailed along this coast, he kept always at a distance from land when the wind blew strongly upon it; whence several large gaps were left unexplored, particularly between the latitudes of 50° and 55°. The exact situation of the supposed straits of Anian was not ascertained, though there is not the least doubt, that if he had lived to return by the same way in 1779, he would have examined every part with his usual accuracy. On departing from Nootka sound, our navigator first fell in with an island in N. Lat. 59. 49. E. Long. 216. 58. to which he gave the name of *Kay's Island*. Several others were discovered in the neighbourhood; and the ship came to an anchor in an inlet named by the captain *Prince William's sound*. Here he had an opportunity of making several observations on the inhabitants, as well as on the nature of the country. From every thing relative to the former, it was concluded, that the inhabitants were of the same race with the Esquimaux or Greenlanders. The animals were much the same with these met with at Nootka, and a beautiful skin of one animal, which seemed to be peculiar to the place, was offered to sale. Mr Anderson was inclined to think that it was the same to which Mr Pennant has given the name of the *casan marmot*. The alcedo, or great king's-fisher, was found here, having very fine and bright colours. The humming bird also came frequently, and flew about the ship when at anchor; though it is scarce to be supposed that it can live throughout the winter on account of the extreme cold. The water-fowl were in considerable plenty; and there is a species of diver which seemed to be peculiar to the place. Almost the only kinds of fish met with in the place were torsk and holibut. The trees were chiefly the Canadian and spruce pine, some of which were of a considerable height and thickness. The sound is judged by Captain Cook to occupy a degree and a half of latitude and two of longitude, exclusively of its arms and branches, which were not explored. There was every reason to believe that the inhabitants had never been visited by any European vessel before; but our navigator found them in possession not only of iron but of beads, which it is probable are conveyed to them across the continent from Hudson's bay.

95 Prince William's sound.

96 Cook's river.

Soon after leaving Prince William's sound, our navigators fell in with another inlet, which it was expected would lead either to the northern sea or to Hudson's or Baffin's bay; but upon examination it was found to end in a large river. This was traced for 210 miles from the mouth, as high as N. Latitude 61. 30. and promises to vie with the most considerable ones already known, as it lies open by means of its various branches to a very considerable inland communication. As no name was given by our commander to this river, it was ordered by Lord Sandwich to be named *Cook's river*. The inhabitants seemed to be of the same race with those of Prince William's sound; and like them had glass beads and knives; they were also clothed in very fine furs; so that it seemed probable that a valuable fur-trade might be carried on from that country. Several attempts have accordingly been made from the British settlements in the East Indies to establish a traffic of that kind; but little benefit accrued from it except to the proprietors of the first vessel, her cargo having greatly lowered the price of that commodity in the Chinese market. It must be observed, that on the western side of the American continent, the only valuable skins met with are those of the sea-otter; those of the other animals, especially foxes and martens, being of an inferior quality to such as are met with in other parts.

Proceeding farther to the northward, our navigators now fell in with a race of people who had evidently been visited by the Russians, and seemed to have adopted from them some improvements in dress, &c. In the prosecution of this part of their voyage, it appeared that they had been providentially conveyed in the dark through a passage so dangerous, that our commander would not have ventured upon it in the day-time. They were now got in among those islands which had lately been discovered by Captain Beering and other Russian navigators, and came to an anchor in a harbour of Oonalashka, situated in N. Lat. 53. 55. E. Long. 193. 30. Here it was remarked that the inhabitants had as yet profited very little by their intercourse with the Russians; so that they did not even dress the fish they used for their food, but devoured them quite raw.

97 They fall in with the islands discovered by the Russians.

From Oonalashka our navigator proceeded again towards the continent, which he continued to trace as far as possible to the northward. In N. Lat. 54. 48. E. Long. 195. 45. is a volcano of the shape of a perfect cone, having the crater at the very summit. On the coast farther to the north the soil appears very barren, producing neither tree nor shrub, though the lower grounds are not destitute of grass and some other plants. To a rocky point of considerable height, situated in N. Lat. 58. 42. E. Long. 197. 36. our commander gave the name of *Cape Newnham*.

98 A volcano.

Here Mr Anderson, the surgeon of the Resolution, died of a consumption, under which he had laboured for more than twelve months. Soon after he had breathed his last, land being seen at a distance, it was named *Anderson's island*; and on the 9th of August the ship anchored under a point of the continent, which he named *Cape Prince of Wales*. This is remarkable for being the most westerly point of the American continent hitherto known. It is situated in N. Lat. 65. 46. E. Long. 191. 45. It is only 39 miles distant from the eastern coast of Siberia; so that our commander had the pleasure of ascertaining the vicinity of the two continents to each other, which had only been imperfectly

99 Cape Prince of Wales.

100 Vicinity of the continents of Asia and America.

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fectly done by the Ruſſian navigators. Setting ſail from this point next day, he ſteered to the weſt and north, when he ſoon fell in with the country of the Tſchutſki, which had been explored by Beering in 1728. Here he had an opportunity of correcting M. Stœhlin's map, who had placed in theſe ſeas an imaginary iſland, on which he beſtowed the name of *Alaſchka*. Being convinced that the land he had now reached was part of the Aſiatic continent, our commander directed his courſe eaſtward, in order to fall in with that of America; and on the 17th reached the latitude of 70. 33. and E. Long. 197. 41. Here they began to perceive that brightneſs in the horizon called by mariners the *blink of the ice*; and in 70. 41. they had got quite up to it, ſo that no farther progreſs could be made. Next day they made a ſhift to get as far as 70. 44; but the ice was now as compact as a wall, and about ten or twelve feet in height. Its ſurface was extremely rugged, and farther to the northward appeared much higher. Its ſurface was covered with pools of water; and great numbers of ſea-lions lay upon it, whoſe fleſh they were now glad to uſe as food. Our commander continued to traverſe the Icy ſea till the 29th; but the obſtructions becoming every day greater and greater, it was thought proper to give over all further attempts of finding a paſſage to Europe for that year. He did not, however, omit the inveſtigation of the Aſiatic and American coaſts until he had fully aſcertained the accuracy of Captain Beering's accounts as far as he went, and corrected the errors of M. Stœhlin. Great additions were thus made to the geographical knowledge of this part of the globe; and Mr Coxe obſerves, that "it reflects no ſmall honour upon the Britiſh name, that our great navigator extended his diſcoveries much farther in one expedition, and at ſo great a diſtance from the point of his departure, than the Ruſſians accompliſhed in a long ſeries of years, and in parts belonging or contiguous to their own empire."

101 Their progreſs northward ſtopped by ice.

102 Arrival at Oonalaſhka.

An end of this celebrated navigator's diſcoveries, however, was now at hand. From Beering's ſtraits he ſailed for Oonalaſhka, where he arrived on the 2d of October, and ſtaid for ſome time in order to repair his ſhips. While the carpenters were employed in this work, one-third of the people had permiſſion to go on ſhore by turns, in order to gather berries, with which the iſland abounds, and which, though now beginning to decay, were of great ſervice, in conjunction with the ſpruce-beer, to preſerve the people from the ſcurvy. Such a quantity of fiſh was likewiſe procured, as not only ſerved to ſupply the ſhips for the preſent, but likewiſe allowed a great number to be carried out to ſea; ſo that hence a conſiderable ſaving was made of the proviſions of the ſhips, which was an article of very conſiderable conſequence. On the 8th of the month our commander received a very ſingular preſent from ſome perſons unknown, by the hands of an Oonalaſhka man named *Derramouſhk*. It conſiſted of a rye-loaf, or rather a ſalmon-pye in the form of a loaf, and highly ſeaſoned with pepper. This man had the like preſent for Captain Clerke, and each of them was accompanied with a note which none on board could underſtand: a few bottles of rum, with ſome wine and porter, were ſent in exchange: it being ſuppoſed that ſuch a preſent would be more acceptable than any other thing that could be ſpared. Corporal Lediard of the marines, an intelligent man, was at the ſame time directed to accompany Derramouſhk, for the purpoſe of gaining a more ſatisfactory account of the country. On the tenth of the month he returned with three Ruſſian ſeamen or furriers, who with ſeveral others reſided at Egoocſhac, where they had a dwelling-houſe, ſome ſtore-houſes, and a ſloop about 30 tons burden. One of theſe people was either maſter or mate of the veſſel, and all of them were very ſober and decent in their behaviour. The greateſt difficulty aroſe from the want of an interpreter; for which reaſon the converſation was carried on by ſigns. However, the captain obtained a ſight of two ſea-charts, both of which he was allowed to copy. One of them included the ſea of Penſhinſk, part of the coaſt of Tartary down to the latitude 41°; the Kurile iſlands, and the peninſula of Kamtſchatka. The other comprehended all the diſcoveries that had been made from the time of Captain Beering to the year 1777; but theſe were found to be very trifling. Indeed our navigator was aſſured by all the Ruſſians whom he had occaſion to ſee, that they knew of no other iſlands than thoſe laid down in the charts juſt mentioned, and that none of them had ever ſeen any part of the American continent excepting what lies oppoſite to the country of the Tſchutſki. With regard to the natives of Oonalaſhka, they are to appearance the moſt inoffenſive and peaceable people in the world, not to be in a ſtate of civilization; though perhaps this may be owing in ſome meaſure to the connexion they have long had with the Ruſſians. From the affinity obſerved between the language of the Eſquimaux Greenlanders, and thoſe of Norton's ſound in N. Lat. 64. 55. there is great reaſon to believe that all thoſe nations are of the ſame extraction; and if that be the caſe, there is little reaſon to doubt that a communication by ſea exiſts between the eaſtern and weſtern ſides of the American continent; which, however, may very probably be ſhut up by ice in the winter time, or even for the moſt part throughout the year.

103 Character of the inhabitants.

104 A communication probable betwixt the eaſt and weſt coaſts of America.

105 Conſequences of Captain Cook's diſcoveries.

The return of Captain Cook to the Sandwich iſlands, with the lamentable cataſtrophe that enſued, have been already related under the former article. We ſhall now briefly enumerate the conſequences of his diſcoveries with reſpect to the advancement of ſcience. Theſe are principally his having overthrown the hypotheſis of a ſouthern continent of immenſe extent, uſually ſpoken of under the name of *Terra auſtralis incognita*; his demonſtration of the impracticability of a northern paſſage either by Aſia or America to the Eaſt Indies; and his having eſtabliſhed a ſure method of preſerving the health of ſeamen through the longeſt ſea-voyages. It is remarked by the biſhop of Carliſle, that one great advantage reſulting from the late ſurveys of the globe, is the refutation of fanciful theories, too likely to give birth to impracticable undertakings. The ingenious reveries of ſpeculative philoſophers will now be obliged to ſubmit, perhaps with reluctance, to the ſober dictates of truth and experience; nor is it only by diſcouraging future unprofitable ſearches that the late voyages are likely to be of ſervice to mankind, but likewiſe by leſſening the dangers

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dangers and distresses formerly experienced in those seas which are within the actual line of commerce and navigation.

The interests of science, as well as of commerce, are highly indebted to the labours of our illustrious navigator. Before his time almost half the surface of the globe was involved in obscurity and confusion: but now such improvements have been made, that geography has assumed a new face, and become in a manner a new science; having attained such completeness as to leave only some less important parts to be explored by future voyagers. Other sciences besides geography have been advanced at the same time. Nautical astronomy, which was in its infancy when the late voyages were undertaken, is now brought to much greater perfection; and, during Captain Cook's last expedition, many even of the petty officers could take the distance of the moon from the sun or from a star, the most delicate of all observations, with sufficient accuracy; and the officers of superior rank would have been ashamed to have it thought that they did not know how to observe for, and compute, the time at sea; a thing before hardly mentioned among seamen. It must, however, be remembered, that a great part of the merit in this respect is due to the board of longitude. In consequence of the attention of that board to the important object just mentioned, liberal rewards have been given to mathematicians for perfecting the lunar tables and facilitating calculations; and artists have been amply encouraged in the construction of watches, and other instruments better adapted to the purposes of navigation than any that formerly existed.

A vast addition of knowledge has been gained with respect to the ebbing and flowing of the tides; the direction and force of the currents at sea; the nature of the polarity of the needle, and the cause of its variations. Natural knowledge has been increased by experiments on the effects of gravity in different and very distant places; and from Captain Cook's having penetrated so far into the southern regions, it is now ascertained, that the phenomenon usually called the *aurora borealis*, is not peculiar to high northern latitudes, but belongs equally to all cold climates, whether north or south.

No science, however, perhaps stands more indebted to these voyages than that of botany. At least 1200 new species of plants have been added to those formerly known; and every other department of natural history has received large additions. Besides all this, there have been a vast many opportunities of observing human nature in its different situations. The islands visited in the middle of the Pacific ocean are inhabited by people who, as far as could be observed, have continued unmixed with any different tribe since their first settlement. Hence a variety of important facts may be collected with respect to the attainments and deficiencies of the human race in an uncultivated state, and in certain periods of society. Even the curiosities brought from the newly discovered islands, and which enrich the British museum and the late Sir Ashton Lever's (now Mr Parkinson's) repository, may be considered as a valuable acquisition to this country, and affording no small fund of instruction and entertainment.

There are few inquiries more generally interesting than those which relate to the migrations of the various colonies by which the different parts of the earth have been peopled. It was known in general, that the Asiatic nation called the *Malayans* possessed in former times much the greatest trade of the Indies, and that their ships frequented not only all the coasts of Asia, but even those of Africa likewise, and particularly the large island of Madagascar; but that from Madagascar to the Marquesas and Easter island, that is, nearly from the east side of Africa till we approach the west coast of America, a space including almost half the circumference of the globe, the same nation of the oriental world should have made their settlements, and founded colonies throughout almost every intermediate stage of this immense tract, in islands at amazing distances from the mother continent, is a historical fact that before Captain Cook's voyages could not be known, or at least but very imperfectly. This is proved, not only by a similarity of manners and customs, but likewise by the affinity of language; and the collections of words which have been made from all the widely-diffused islands and countries visited by Captain Cook, cannot fail to throw much light on the origin of nations, and the manner in which the earth was at first peopled.

Besides this, information has been derived concerning another family of the earth formerly very much unknown. This was the nation of the Esquimaux or Greenlanders, who had formerly been known to exist only on the north-eastern part of the American continent. From Captain Cook's accounts, however, it appears, that these people now inhabit also the coasts and islands on the west side of America opposite to Kamtschatka. From these accounts it appears also, that the people we speak of have extended their migrations to Norton sound, Oonalashka, and Prince William's sound; that is, nearly to the distance of 1500 leagues from their stations in Greenland and the coast of Labradore. Nor does this curious fact rest merely on the evidence arising from the similitude of manners; for it stands confirmed by a table of words, exhibiting such an affinity of language as must remove every doubt from the mind of the most scrupulous inquirer.

From the full confirmation of the vicinity of the two great continents of Asia and America, it can no longer be supposed ridiculous to believe, that the latter received its inhabitants from the former; and by the facts recently discovered, a degree of further evidence is added to those which might formerly be derived from nature concerning the authenticity of the Mosaic accounts. It is not indeed to be doubted, that the inspired writings will stand the test of the most rigorous investigation; nor will it ever be found, that true philosophy and Divine Revelation can militate against each other. The rational friends of religion are so far from dreading the spirit of inquiry, that they wish for nothing more than a candid and impartial examination of the subject, according to all the lights which the improved reason and enlarged science of man can afford.

Another good effect of the voyages of Captain Cook is, that they have excited in other nations a zeal for similar undertakings. By order of the French government, Mess. de la Peyrouse and de Langle sailed from Brest in August 1785, in the frigates Boussole and Astrolabe, on an enterprise, the purpose of which was to

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to improve geography, aſtronomy, natural hiſtory, and philoſophy, and to collect an account of the cuſtoms and manners of different nations. For the more effectual proſecution of the deſign, ſeveral gentlemen were appointed to go out upon the voyage, who were known to excel in different kinds of literature. The officers of the Bouſſole were men of the beſt information and firmeſt reſolution; and the crew contained a number of artificers in various branches of mechanics. Marine watches, &c. were provided, and M. Dagelet the aſtronomer was particularly directed to make obſervations with M. Condamine's invariable pendulum, to determine the difference in gravity, and to aſcertain the true proportion of the equatorial to the polar diameter of the earth. It has likewiſe been made evident, that notwithſtanding all that has been done by Captain Cook, there is ſtill room for a farther inveſtigation of the geography of the northern parts of the world. The object accordingly was taken up by the empreſs of Ruſſia, who committed the care of the enterpriſe to Captain Billings an Engliſhman in her majeſty's ſervice. We ſhall only make one obſervation more concerning the benefits likely to accrue from the voyages of Captain Cook, and that is relative to the ſettlement in Botany bay. Whatever may be ſuppoſed to accrue to the nation itſelf from this ſettlement, it muſt undoubtedly give the higheſt ſatisfaction to every friend to humanity to be informed, that thus a number of unhappy wretches will be effectually prevented from returning to their former ſcenes of temptation and guilt, which may open to them the means of induſtrious ſubſiſtence and moral reformation. If the ſettlement be conducted with wiſdom and prudence, indeed it is hard to ſay what beneficial conſequences may be derived from it, or to what height it may ariſe. Rome, the greateſt empire the world ever ſaw, proceeded from an origin little, if at all, ſuperior to Botany bay. For an account of this ſettlement ſee the article *New-Holland*.

One other object remains only farther to be conſidered with regard to theſe voyages, and that is the advantages which may reſult from them to the diſcovered people. Here, however, it may perhaps be difficult to ſettle matters with preciſion. From the preceding accounts, it muſt be evident that the intentions of Captain Cook were in the higheſt degree benevolent; and if at any time the people were the ſufferers, it muſt have been through their own fault. In one inſtance indeed it might be otherwiſe, and that is with reſpect to the venereal diſeaſe. The evidence in this caſe cannot be altogether ſatisfactory. Mr Samwell, who ſucceeded Mr Anderſon as ſurgeon of the Reſolution, has endeavoured to ſhow, that the natives of the lately explored parts of the world, and eſpecially of the Sandwich iſlands, were not injured by the Engliſh; and it was the conſtant care and ſolicitude of Captain Cook to prevent any infection from being communicated to the people where he came. But whether he was univerſally ſucceſsful in this reſpect or not, it is evident that the late voyages were undertaken with a view exceedingly different from thoſe of former times. The horrid cruelties of the Spaniſh conquerors of America cannot be remembered without concern for the cauſe of religion and human nature; but to undertake expeditions with a deſign of civilizing the world, and meliorating its condition, is certainly a noble object. From the long-continued intercourſe betwixt this country and the South ſea iſlands, there cannot be any doubt that ſome degree of knowledge muſt already have been communicated to them. Their ſtock of ideas muſt naturally be enlarged by the number of uncommon obſervations which has been preſented to them, and new materials furniſhed for the exerciſe of their rational faculties. A conſiderable addition muſt be made to their immediate comfort and enjoyment by the introduction of uſeful animals and vegetables; and if the only benefit they ſhould ever receive from Britain ſhould be the having obtained freſh means of ſubſiſtence, this of itſelf muſt be conſidered as a valuable acquiſition. Greater conſequences, however, may ſoon be expected. The connexion formed with theſe people may be conſidered as the firſt ſtep towards their improvement; and thus the bleſſings of civilization may be ſpread among the various tribes of Indians in the Pacific ocean, which in time may prepare them for holding an honourable place among the nations of the earth.

106 Account of Captain Clerke's voyage.

As a ſupplement to this account of the diſcoveries made by Captain Cook himſelf, we ſhall here ſubjoin a narrative of the ſubſequent part of the voyage by Captain Clerke, &c. until the return of the ſhips to England. At the time of Captain Cook's death, the great point of a north-weſt paſſage remained in ſome meaſure to be ſtill determined: for though, by the event of the former attempt, it had been rendered highly improbable that they ſhould ſucceed in this, it was ſtill reſolved to try whether or not, at certain ſeaſons of the year, the ice might not be more open than they had hitherto found it. The firſt object that naturally occurred, however, was the recovery of Captain Cook's body; for which Mr King was of opinion that ſome vigorous meaſure ought inſtantly to be purſued. His motives for this, beſides the perſonal regard he had for the captain, were to abate the confidence which muſt be ſuppoſed to enſue on the part of the natives, which would probably incline them to dangerous attempts; and this the more particularly, as they had hitherto diſcovered much leſs fear of the fire arms than other ſavage nations were accuſtomed to do. Mr Samwell alſo takes notice of the intrepidity of the natives in this reſpect; but aſcribes it, in the firſt inſtance, to ignorance of their effects; and in the next, to a notion, that as the effects of theſe arms were occaſioned by fire, they might be counteracted by water. For this purpoſe they dipped their war-mats in water; but finding themſelves equally vulnerable after this method had been purſued, they became more timid and cautious.

107 Methods taken for the recovery of Captain Cook's body.

As matters ſtood at preſent, there was even reaſon to dread the conſequences of a general attack upon the ſhips: and therefore Mr King was the more confirmed in his opinion of the neceſſity of doing ſomething to convince them of the prowefs of their adverſaries. In theſe apprehenſions he was ſeconded by the opinion of the greater part of the officers on board; and nothing ſeemed more likely to encourage the iſlanders to make the attempt than an appearance of being inclined to an accommodation, which they would certainly attribute to weakneſs or fear. Captain Clerke, however, and thoſe who were in favour of conciliatory meaſures, urged

Cook's Discoveries. urged, that the mischief was already irreparable; that the natives, by reason of their former friendship, had a strong claim to the regard of the English; and that the more particularly, as the late calamitous accident did not appear to have taken its rise from any premeditated design: they urged also the ignorance of the king concerning the theft, and the mistake of the islanders who had armed themselves on a supposition that some attempt would be made to carry off the king. To all this was added, that the ships were in want of refreshments, particularly water; that the Resolution's foremast would require seven or eight days before it could be properly repaired; and as the spring was fast advancing, the speedy prosecution of the voyage to the northward ought now to be the only object; that a vindictive contest with the natives might not only justify an imputation of needless cruelty, but would occasion great delay in the equipment of the ships.

In consequence of the prevalence of these sentiments lenient measures were adopted, though the behaviour of the natives continued to be very insolent. A great body still kept possession of the shore; many of whom came off in their canoes within pistol-shot of the ships, and provoking the people by every kind of insult and defiance. A train of negociations for Captain Cook's body took place; in which the natives showed the most hostile and treacherous disposition, and, as afterwards appeared, had cut the flesh from the bones and burnt it. A piece of about ten pounds weight was brought by two natives at the hazard of their lives, who gave information that the rest had been burnt, and that the bones were in the possession of the king and some of the principal chiefs. Information was given, at the same time, that the chiefs were very desirous of war, in order to revenge the death of their countrymen.

Thus it appeared that the pacific plan had answered no good purpose. No satisfactory answer had been given to the demands made of the bodies of the slain; nor was any progress made in the great work intended, viz. a reconciliation with the natives; they still remained on shore in an hostile posture, as if determined to oppose any endeavours that might be made by our people to land; at the same time that a landing was become absolutely necessary, in order to complete the stock of water. Had this spiritless conduct been persisted in, there is not the least doubt that neither this purpose or any other could have been effected. The insolence of the natives became every day greater and greater: insomuch that one of them had the audacity to come within musket shot of the Resolution, and, after throwing several stones, waved Captain Cook's hat over his head, while his countrymen on shore were exulting and encouraging his audacity. By this insult the people were so highly enraged, that coming on the quarter-deck in a body, they begged that they might no longer be obliged to put up with such reiterated provocation, but might be allowed to make use of the first opportunity of revenging the death of their captain. The necessity of more vigorous measures,
108 therefore, being now apparent, a few discharges of the
His remains at last obtained. great guns, with the burning of a village and some other acts of severity, at last produced the mangled remains of Captain Cook. They were wrapped up in a bundle, in which were found both his hands entire, which were easily known by a scar in one of them dividing the fore-finger from the thumb the whole length of the metacarpal bone. Along with these was the skull, but with the scalp separated from it, and the bones of the face wanting; the scalp, with the ears adhering to it, and the hair cut short; the bones of both the arms, and the skin of the fore-arms hanging to them; the bones of the thighs and legs joined together, but without the feet. The ligaments of the joints were observed to be entire; the whole showing evident marks of being in the fire, except the hands which had the flesh remaining upon them, and were cut in several places and crammed with salt, most probably for the purpose of preserving them. The skull was not fractured; but the scalp had a cut in the back part of it. The lower jaw and feet were wanting, having been seized by different chiefs.

Having accomplished the purposes of their stay in this place, Captain Clerke set sail from Karakakooa bay in O-why-hee towards Mowee, with a design to explore the coasts of that island more fully than had been done, but were unable to accomplish their purpose: nor indeed was it in their power to accomplish any discovery of consequence among these islands. The only intelligence worth mentioning which they were able to procure was, that wars had ensued about the property of the goats which were left by Captain Cook on the island of Oneeheow, as has been already mentioned, and that during the contest all these poor animals, who had already begun to multiply, were destroyed; so that the benevolent attempts of our illustrious navigator in favour of these islanders had proved abortive. 109 Unsuccessful attempts to make farther discoveries.

On quitting the island of Oneeheow, our navigators set sail for another named Modoopappa, which they were assured by the natives lay within five hours sailing of Tahoora, a small island in the neighbourhood of Oneeheow. In this they proved unsuccessful; on which it was determined to steer for the coast of Kamtschatka. In the passage thither they arrived at the place where De Gama is said to have discovered a great extent of land; but of this they could discover no appearance. This imaginary continent is said to have been discovered by a navigator called John de Gama, but who seems also to have been imaginary, as no person can find out either the country where he lived, or the time when he made the discovery. We are informed by Muller, that the first account of it was published by Texeira in a chart of 1649, who places it between the latitude of 44 and 45 degrees, and about 160. east longitude, and calls it "land seen by John de Gama, in a voyage from China to New Spain." By the French geographers it is removed five degrees farther to the east. When they arrived at Kamtschatka they were entertained in the most hospitable manner, and furnished with every thing that could be procured in that desert and barren region. "In this wretched extremity of the earth (says the narrator of the voyage), beyond conception barbarous and inhospitable, out of the reach of civilization, bound and barricaded with ice, and covered with summer snow, we experienced the tenderest feelings of humanity, joined to a nobleness of mind and elevation of sentiment which would have done honour to any 110 Their favourable reception at Kamtschatka.

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climc or nation." From Major Behm, in particular, they received so many and so great obligations, that an handsome acknowledgment was made him by the Royal Society, as has been already observed. Even the sailors were so struck with gratitude, that they voluntarily requested that their allowance of grog might be with-held, in order to compliment the garrison of Bolcheretsk with the spirits; saying, that they knew brandy was extremely scarce in that country, the soldiers on shore having offered four roubles a bottle for it. The officers, however, would not allow them to suffer by their generosity in this inclement country and season of the year (the month of March not being yet expired); but in room of the small quantity of brandy which Major Behm consented to accept, substituted an equal quantity of rum.

111 Tschutski submit to the empress.

It is worth observing, that the kindness with which the empress had ordered the British navigators to be treated in this part of her dominions was amply rewarded, even with no less than the addition of a new kingdom to the Russian empire, which hitherto her arms had not been able to subdue. Among the northern Asiatics none had been able to maintain their independence except the Tschutski, who inhabit the north-east extremity of the continent. No attempt to subdue these people had been made since the year 1750, when the Russian forces had at last been obliged to retreat, after having lost their commanding officer. The Russians afterwards removed their frontier fortress from the river Anadyr to the Ingiga, which runs into the northern extremity of the sea of Okotsk, and gives its name to a gulf to the west of the sea of Penshinsk. On the day that Captains Clerk and Gore arrived at Bolcheretsk, Major Behm received dispatches from this fort, acquainting him that a party of the Tschutski had been there with voluntary offers of friendship and a tribute. That on asking the reason of such an unexpected alteration in their sentiments, they had acquainted his people that two large Russian boats had visited them towards the end of the preceding summer; that they had been shown the greatest kindness by the people who were in them, and had entered into a league of amity with them; and that, in consequence of this, they came to the Russian fort in order to settle a treaty upon terms agreeable to both nations. This incident had occasioned much speculation, and could never have been understood without the assistance of those who were now present: the large *Russian boats* having been in truth no other than the Resolution and Discovery, under Captains Cook and Clerke.

112 Vast quantity of fish.

About the middle of May the snow began to melt very fast in this inhospitable region, and the ships being now on their passage northward, met with an excellent opportunity of supplying themselves with fish. The beach was cleared of ice on the 15th of the month; from which time vast quantities came in from every quarter. Major Behm had ordered all the Kamtschadales to employ themselves in the service of the English ships; so that often they found it impossible to take on board the quantities that were sent. They chiefly consisted of herrings, trout, flat fish, and cod. These fish were here found in such plenty, that once the people of the Discover surrounded such an amazing quantity with the seine, that they were obliged to throw out a very considerable number, lest the net should have been broken to pieces; and the cargo was still so abundant, that, besides having a stock for immediate use, they filled as many casks as they could conveniently spare for salting; and after sending on board the Resolution a tolerable quantity for the same purpose, they left behind several bushels on the beach.

113 Spirituous liquors pernicious in the sea-scurvy.

While they remained in this country an opportunity offered of observing the pernicious effects of spirituous liquors in producing the sea-scurvy. All the Russian soldiers were in a greater or lesser degree afflicted with that disorder, some of them being in the last stage of it; and it was particularly observed that a serjeant, with whom our people had kept up a most friendly intercourse, had, *in the course of a few days*, brought upon himself the most alarming scorbutic symptoms, by drinking too freely of the liquors with which he had been presented by the English. Captain Clerke soon relieved them, by putting them under the care of the surgeons of the ships, and supplying them with sour-krout, and malt for sweet-wort. In consequence of this a surprising alteration was soon observed in the figures of most of them: and their speedy recovery was principally attributed to the sweet wort.

114 Eruption of a volcano.

On the 12th of June they began to proceed northward along the coast of Kamtschatka, and three days after had an opportunity of observing an eruption of one of the volcanoes of that peninsula. On the 15th before day light, they were surprised with a rumbling noise like distant thunder; and when the day appeared, found the decks and sides of the ships covered near an inch thick with fine dust like emery. The air was at the same time loaded and obscured with this substance; and in the neighbourhood of the volcano itself it was so thick that the body of the hill could not be discovered. The explosion became more loud at 12 o'clock, and during the afternoon, being succeeded by showers of cinders, generally of the size of pease, though some were as large as hazel-nuts. Along with these there also fell some small stones which had undergone no alteration from the action of the fire. In the evening there were dreadful claps of thunder, with bright flashes of lightning, which, with the darkness of the sky, and the sulphureous smell of the air, produced a most awful and tremendous effect. The ships were at this time about 24 miles distant from the volcano; and it appeared that the volcanic shower had been carried to a still greater distance, as they next day found the bottom of the sea to consist of such small stones as had fallen upon the decks of the ships. The mountain was still observed to be in a state of eruption on the 18th.

115 Voyages to the northward.

For some time Captain Clerke kept the coast of Kamtschatka in view, with a design to make an accurate survey of it; but in this he was disappointed by foggy and squally weather; however, he determined the position of some remarkable promontories, and at last finding the season too far advanced to accomplish his design, set sail for Beering's straits, chiefly with a view to ascertain the situation of the projecting points of the coast.

On the 3d of July our navigators came in sight of the

Cook's Discoveries. the island of St Lawrence, and another which was supposed to lie between it and Anderson's island. The latter being entirely unknown to Captain Clerke, he was inclined to have approached it, but was unable to effect his purpose. All these islands as well as the coast of the Tschutski on the continent were covered with snow, and had a dismal appearance.

In the preceding year Captain Cook had determined the situation of the islands of St Diomede to be in 65° 48′ latitude; but now being somewhat at a loss to reconcile this with the position of the continent, they stood for some time over to the latter, till fully convinced of the accuracy of the former observation. At this time they approached within two or three leagues of the eastern cape of Asia, which is an elevated round head of land extending abgut five miles from north to south, and forms a peninsula connected with the continent by a narrow isthmus of low land. It has a bold shore, and three lofty detached spiral rocks are seen off its northern part. It was still encompassed with ice, and covered with snow. Here they found a strong current setting to the northward, which at noon had occasioned an error in the computation of the latitude of no less than 20 miles. A similar effect had been observed the preceding year in passing this strait. On steering to the north-east the weather cleared up, so that they had a view of the eastern cape of Asia, Cape Prince of Wales on the western coast of America, with a remarkable peaked hill on the latter, and the two islands of St Diomede lying between them. Here they met with great numbers of very small hawks, having a compressed bill rather large in proportion to the body; the colour dark brown, or rather black, the breast whitish, and towards the abdomen of a reddish hue.

116 Are stopped by the ice.

On the 6th of July, at 12 o'clock, the ships were in N. Lat. 67. 0. E. Long. 191. 6. when having already passed many large pieces of ice, and observed that in several places it adhered to the continent of Asia, they were suddenly stopped about three in the afternoon by an extensive body, which stretched towards the west. By this their hopes of reaching any higher latitude than what had been attained last year were considerably diminished; but finding the course obstructed on the Asiatic side, they proceeded to the north-eastward, in order to explore the continent of America between the latitudes of 68 and 69°; which had last year been found impracticable on account of the foggy weather; but in this also they were partly disappointed; for on the 7th, about six in the morning, they met with another large body of ice stretching from north-west to south-east; but not long afterwards, the horizon becoming clear, they had a view of the American coast at the distance of about ten leagues, extending from north-east by east, to east, and lying between N. Lat. 68° and 68° 20′. As the ice was not very high, the view extended a great way over it, so that they could perceive it exhibiting a compact solid surface, and apparently adhering to the land. Soon after the weather became hazy, so that they lost sight of the land; and it being impossible to get nearer, they continued to steer northward close by the side of the ice. This course was continued till next morning, during which time the ships passed some drift wood; but the morning following, the wind shifting to the north, they were obliged to stand to the westward. At two in the afternoon they were again close to an immense expanse of ice; which from the mast-head seemed to consist of very large compact bodies, united towards the exterior edge, though in the interior parts some pieces floated in the water; it extended from west-south-west to north-east by north. There was now a necessity for steering towards the south, as the strong northerly winds had drifted down such numbers of loose pieces, that they had encompassed the ships for some time, and it was impossible to avoid very severe strokes while sailing among them. Thus, however, they reached the latitude of 69. 12. and E. Long. 188. 5; but having now sailed almost 40 leagues to the west along the edge of the ice without perceiving any opening, Captain Clerke determined to bear away south by east, the only quarter which was clear at present, and to wait till the season was somewhat farther advanced before any further attempts were made. The intermediate time he proposed to employ in surveying the bay of St Lawrence, and the coast situated to the southward of it; as it must be a great satisfaction to have an harbour so near in case of the ship's receiving any damage from the ice; and the captain was also desirous of paying another visit to the Tschutski, especially in consequence of the accounts of them that had been given by Major Behm. In this navigation they killed several sea-horses, and had an opportunity of observing the strength of parental affection in those monstrous animals. On the approach of the boats towards the ice, all of them took their young ones under their fins, and attempted to make their escape with them into the sea. Some whose cubs were killed or wounded, and left floating upon the surface of the water, rose again, and carried them down, sometimes just as they were on the point of being taken into the boat; and could be traced bearing them to a considerable distance through the water, which was stained with their blood. They were afterwards observed bringing them at intervals above the surface, and again plunging under its surface with an horrid bellowing; and one female, whose young one had been killed and taken on board, became so furious, that she struck her tusks through the bottom of the cutter.

117 Remarkable affection of the sea-horses towards the young.

118 The ships finally stopped by ice.

Our navigators still found themselves disappointed in their attempts. On approaching the coast of the Tschutski they met with a large and compact body of ice, extending to the north-east, south-west, and south-east, as far as the eye could reach; so that they were again obliged to sail back to the northward. Here also their course was soon stopped; for, on the 13th, being in N. Lat. 69. 37. and about the middle of the channel between the two continents, they once more fell in with a compact body of ice, of which they could perceive no limit. Captain Clerke therefore determined to make a final attempt on the coast of America, the passage northward having been found last year practicable much farther on that than the Asiatic side. Thus they attained the latitude of 70. 8. at the distance, as was supposed, of 25 leagues from the coast of America; and some days after got about three minutes farther to the northward, about the distance of seven or eight leagues from the Icy Cape. This, however, was the utmost limit of the voyage to the north-east; and they were soon obliged to relinquish

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quish all hopes of proceeding farther on the American side. Another effort was still resolved on to try the practicability of a north-west passage; and for this purpose our navigators altered their direction on the 21st of July, passing through a great quantity of loose ice. About ten at night the main body was discovered at a very small distance, so that they were obliged to proceed to the southward. During this perilous navigation, the Discovery, after having almost got clear out from the ice, became so entangled by several large pieces, that her progress was stopped, and she immediately dropped to leeward, falling broadside foremost on the edge of a considerable body of ice, on which she struck with violence, there being an open sea to windward. At length the mass was either broken or moved so far, that the crew had an opportunity of making an effort to escape. But unluckily, before the ship gathered way sufficient to be under command, she fell to leeward a second time upon anoother piece of ice; and the swell rendering it unsafe to lie to windward, and finding no prospect of getting clear, they pushed into a small opening, and made the vessel fast to the ice with hooks. Here the Resolution for some time lost sight of her consort, which occasioned no small uneasiness in both vessels; but at length, on a change of wind, the Discovery, setting all her sails, forced a passage, though not without losing a considerable part of her sheathing, and becoming very leaky by reason of the blows she had received.

119 Dangerous situation of the Discovery.

Thus the two vessels continued to make every effort to penetrate through the immense quantities of ice with which those seas are filled winter and summer, but without success. Captain Clerke therefore finding that it was impossible either to get to the northward, or even to reach the Asiatic continent, the ships being also greatly damaged, determined to proceed southward to the bay of Awatska, on the Kamtschadale coast, to refit, and afterwards take a survey of the coasts of Japan before the winter should set in.

120 Of the extent of the Asiatic continent to the northward.

During this navigation, two general conclusions were adopted relative to the extent of the Asiatic coast, in opposition to the opinion of Mr Muller. One is, that the promontory, called the *East Cape*, is in reality the most easterly point of Asia; and that no part of that quarter of the globe extends farther than the longitude of 190° 22′ E. The other conclusion is, that the latitude of the most north-easterly point of Asia does not exceed 70°. N. but is rather somewhat below it. As the present discoveries, however, were terminated on the Asiatic side in the 69th degree of latitude, the probable direction of the coast afterwards can only be conjectured. The only sources of knowledge in this case are the Russian charts and journals; and these in general are so defective and contradictory, that the particulars of their real discoveries can scarce be collected. Hence the Russian geographers are greatly divided in their opinions concerning the extent and figure of the peninsula of the Tschutski. Mr Muller, in a map published 1751, supposes it to extend northeast as far as the latitude of 75°, and E. Long. 19° ending in a round cape, which he calls *Tschukotskoi Noss*. To the southward of this cape he supposes the coast to form a bay to the west, bounded in the latitude of 67° 18′ by Serdze Kamen, the most northerly point observed by Beering in his expedition in 1728. A new form is given to the whole peninsula in a map published by the academy at Petersburgh in 1776. Here its most north-easterly extremity is placed in N. Lat 73°. E. Long. 178. 30.; and its most easterly point in N. Lat. 65. E. Long. 189. 30. All the other maps vary between these two situations: and the only thing in which all of them agree is the position of the East cape in N. Lat. 66. The form of the coast, however, is verry erroneous in the map published by the academy, and may be entirely disregarded. In Mr Muller's map, the northern part of the coast has some resemblance to that laid down in Captain Cook's and Clerke's survey, as far as the latter extends; only that Mr Muller does not make it trend sufficiently to the west, but supposes it to recede only five degrees of longitude between the latitudes of 66° and 69°; whereas it really recedes almost ten.

We must next examine Mr Muller's authority for supposing the coast to bend round to the north and north-east in such a manner as to form a large promontory. Mr Coxe, whose accurate researches into this matter must give great weight to his opinion, thinks, that the extremity of the promontory was never doubled by any person except Deshneff and his party; who sailed, in the year 1648, from the river Kovyma, and are imagined to have got round to the river Anadyr. The account of this voyage, however, gives no geographical delineation of the coast, so that its figure must be determined by other circumstances; and from these it evidently appears, that the Tschukotskoi Noss of Deshneff is in reality the East cape of Captain Cook. Speaking of this noss, he says, that a person, with a favourable wind, may sail from the isthmus to the Anadyr in three days and three nights. This agrees entirely with the situation of the East cape, which is about 120 leagues from the mouth of the river Anadyr; and there being no other isthmus to the north between that and the latitude of 69°, it seems evident, that by this description he certainly means either the East cape or some other situated to the southward of it. In another place he says, that opposite to the isthmus there are two islands upon which some of the Tschutski nation were observed, having pieces of the teeth of sea-horses fixed in their lips; and this exactly coincides with the two islands that lie to the south-east of the East cape. Our navigators indeed did not observe any inhabitants upon these islands; but it is by no means improbable, that some of those of the American coast, whom the above description perfectly suits, might have accidentally been there at the time, and been mistaken for a tribe of Tschutski.

Other circumstances, though less decisive than those just mentioned, concur in the same proof. Deshneff says, that in sailing from the Kovyma to the Anadyr, a great promontory, which projects far into the sea, must be doubled; and that this promontory extends between north and north-east. From these expressions, perhaps, Mr Muller was induced to represent the country of the Tschutski in the form we find in his map; but if he had been acquainted with the position of the East cape as determined by Captain Cook, and the striking agreement between that and the promontory or isthmus in the circumstances above-mentioned, it it is moſt probable that he would not have deemed theſe expreſſions of ſufficient weight to authorize his extending the north-eaſtern extremity of Aſia either as far to the north or to the eaſt as he has done.

Another authority uſed by Mr Muller ſeems to have been the depoſition of the Coſſack Popoff, taken at the Anadirſkoi Oſtrog in 1711. Popoff was ſent by land, in company with ſeveral others, to demand tribute of the independent Tſchutſki tribes, who inhabited the country about the Noſs. In the account of this journey, the diſtance betwixt Anadirſk and Tſchukotſkoi Noſs is repreſented as a journey of ten weeks with loaded rein-deer. From ſuch a vague account, indeed, we can judge but very little: but as the diſtance between the Eaſt cape and Anadirſk does not exceed 200 leagues, and conſequently might be accompliſhed in the ſpace above mentioned at the rate of 12 or 14 miles a day, we cannot reckon Popoff's account of its ſituation inconſiſtent with the ſuppoſition of its being the Eaſt cape. It may likewiſe be obſerved, that Popoff's route lay along the foot of a rock named *Matkol*, ſituated at the bottom of a ſpacious gulf, which Muller ſuppoſes to have been the bay he lays down between the latitudes of 66° and 72°; and he accordingly places the rock Matkol in the centre of it; but it ſeems more probable that it might be a part of the gulf of Anadyr, which they would undoubtedly paſs in their journey towards the Eaſt cape.

But what ſeems to put the matter beyond all doubt, and to prove that the cape which Popoff viſited cannot be to the northward of 69° Lat. is that part of his depoſition which relates to an iſland lying off the Noſs, from whence the oppoſite coaſt might be diſcerned; for as the oppoſite continents, in the latitude of 69°, diverge ſo far as to be upwards of 100 leagues diſtant, it is highly improbable that the Aſiatic coaſt ſhould again trend eaſtward in ſuch a manner as to come almoſt in ſight of that of America. As an additional proof of the poſition in queſtion, we may obſerve, that the Tſchukotſkoi Noſs is conſtantly laid down as dividing the ſea of Kovyma from that of Anadyr; which could not poſſibly be the caſe if any large cape had projected to the north-eaſt in the higher latitudes.

The next queſtion to be determined is, to what degree of latitude the northern coaſt of Aſia extends before it inclines directly weſtward? Captain Cook was always ſtrongly inclined to believe, that the northern coaſt of this continent, from the Indigirka eaſtward, has hitherto been uſually laid down above two degrees to the northward of its true ſituation; for which reaſon, and on the authority of a map that was in his poſſeſſion, as well as from intelligence received at Oonalaſhka, he placed the mouth of the Kovyma in the latitude of 68°. Should he be right in his conjecture, it is probable that the coaſt of Aſia does not anywhere extend beyond the latitude of 70° before it trends to the weſt; and conſequently our navigators muſt have been only one degree from its northern extremity. This ſeems to be confirmed by the ſilence of the Ruſſian navigators concerning any extent of continent to the northward of Shelatſkoi Noſs; nor do they mention any remarkable promontory, except the Eaſt cape between the Anadyr and the Kovyma. Another particular which Deſhneff relates may perhaps be deemed a farther confirmation of this opinion, viz. that he met with no obſtruction from ice in ſailing round the northern extremity of Aſia; though he adds, that this ſea is not at all times ſo free of it, which indeed appears evidently to be the caſe. That part of the continent which lies between Cape North and the mouth of the Kovyma is about 125 leagues in extent. A third part of this ſpace, from Kovyma eaſtward, was explored in the year 1723 by Feodot Amoſſoff, who informed Mr Muller that its direction was eaſterly. Since that time it has been ſurveyed with ſome accuracy by Shalauroff, whoſe chart makes it trend north-eaſt-by-eaſt as far as Shelatſkoi Noſs, which he places at the diſtance of about 43 leagues eaſt of the Kovyma. The ſpace therefore, between the Noſs and Cape North, ſomewhat more than 80 leagues, is the only part of the Ruſſian dominions now remaining unexplored. But if the Kovyma be erroneouſly laid down in point of longitude as well as latitude, a ſuppoſition far from being improbable, the extent of the undiſcovered coaſt will be conſiderably diminiſhed.

The following are the reaſons why it may be ſuppoſed that the mouth of the Kovyma is placed too far to the weſtward in the Ruſſian charts: 1. Becauſe the accounts that have been given of the navigation of the Frozen ocean from that river round the north-eaſtern extremity of Aſia to the gulf of Anadyr, do not agree with the ſuppoſed diſtance between thoſe places. 2. Becauſe the diſtance from the Anadyr to the Kovyma over land is by ſome Ruſſian travellers repreſented as a journey of no very great length, and eaſily performed. 3. Becauſe the coaſt from the Shelatſkoi Noſs of Shalauroff appears to trend directly ſouth-eaſt towards the Eaſt cape. From all which it may be inferred, with ſome degree of probability, that only 60 miles of the northern Aſiatic coaſt remain to be explored.

121 Impracticability of a north-weſt or north-eaſt paſſage into the Pacific ocean.

With regard to a north-weſt paſſage from the Atlantic into the Pacific ocean, it is highly probable that no ſuch thing exiſts to the ſouthward of the 56th degree of latitude. If, in reality, it exiſts anywhere, it muſt certainly be either through Baffin's bay, or by the north of Greenland in the weſtern hemiſphere, or in the eaſtern, through the Frozen ſea to the north of Siberia; ſo that in whichever continent it is ſeated the navigator muſt paſs through Beering's ſtraits.

All that remains now to be conſidered therefore is, the impracticability of penetrating into the Atlantic ocean through theſe ſtraits. From the voyages of our navigators it appears, that the ſea to the northward of Beering's ſtraits is more free from ice in Auguſt than in July, and perhaps may be ſtill more ſo in ſome part of September. But after the autumnal equinox the length of the day diminiſhes ſo faſt, that no farther thaw can be expected; and it would be unreaſonable to attribute ſo great an effect to the warmth of the laſt fortnight of September as to imagine it capable of diſperſing the ice from the moſt northern part of the American coaſt. Even admitting this to be poſſible, it muſt at leaſt be allowed that it would be highly imprudent to endeavour to avoid the Icy cape, by running to the known parts of Baffin's bay, a diſtance of about 1260 miles, in ſo ſhort a time as that paſſage can be ſuppoſed to be open. On the ſide of Aſia there appears ſtill leſs probability of ſucceſs, as appears from the

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the testimony of the Russian as well as the English navigators. The voyage of Deshneff indeed proves the possibility of circumnavigating the north-eastern extremity of Asia; but even this affords a very slender foundation to hope for any great benefit, as no person besides himself appears to have succeeded in the attempt, though more than a century and a half has now elapsed since the time of his voyage. But even supposing that, in some very favourable season, this cape might be doubled, still the cape of Taimura remains, extending as far as the 78th degree of latitude, and round which none pretend ever to have sailed.

These arguments seem conclusive against any expectation of a north-west or north-east passage to the East Indies, unless on the supposition of an open sea very near the polar regions. The probability of getting into the polar seas is considered under the article POLE; and indeed from what has already been advanced must appear very little. Waving this subject therefore at present, we shall return to the remarks made by our navigators during their second voyage.

122 Remarks during the voyage of Captain Clerke towards the Icy sea.

In this they did little more than confirm what had been observed during the first: for it never was in their power to approach the continent of Asia in any higher latitude than 67°, nor that of America in any part, excepting a few leagues, between 68° and 68° 20′, which they had not seen before. In both years the ice was met with sooner on the Asiatic than the American coast; but in 1779 they met with it in lower latitudes than in 1778. As they proceeded northward, the ice was found universally more compact and solid, though they were ascertained at the same time that the greatest part of what they met with was moveable. Its height on a medium was estimated at eight or ten feet; though some of the highest might be about 16 or 18. The currents were generally at the rate of one mile in the hour, and more generally set from the south-west than from any other quarter. Their force, however, was so inconsiderable, whatever their direction might be, that no conclusion could possibly be drawn from them concerning the existence or non-existence of a northern passage. With regard to the temperature of the weather, July was found much colder than August. In the former, the thermometer was once at 20°, and very frequently at 30°; whereas during the last year it was very uncommon in August to have it as low as the freezing point. High winds were experienced in both seasons, all of which blew from the south-west. The air was foggy whenever the weather became calm; but the fogs were observed to accompany southerly winds much more than others.

The straits, in the nearest approach of the continents to each other, in the latitude of 66°, are about 13 leagues over; beyond which they diverge to N. E. by E. and W. N. W.; so that in the latitude of 69°, their distance from each other is about 300 miles. A great resemblance is observed betwixt the continents on both sides of the straits. Both are destitute of wood; the shores are low, with mountains further inland, rising to a great height. The soundings in the mid way between them were from 29 to 30 fathoms, gradually decreasing as either continent was approached; with this difference, however, that the water was somewhat shallower on the coast of America than that of Asia, at an equal distance from land. The bottom, towards the middle, was a soft slimy mud; and near either shore was a brownish sand intermixed with a few shells and small fragments of bones. There was but little tide or current, and what there was came from the west.

123 Death of Captain Clerke. See *Clerke*.

Before the ships could reach the peninsula of Kamtschatka, Captain Clerke expired; in consequence of which the command of the Discovery devolved upon Mr King, Captain Gore being now the superior officer. On the return to Kamtschatka, Captain Clerke was buried in the spot on which a church was to be erected; it having been his own desire to be interred in the church.

124 Return to Kamtschatka, with a description of the bay of Awatska.

By the time they arrived at this peninsula, the face of the country was greatly improved; the fields being covered with the most lively verdure, and every plant in the most flourishing state. The eruption of the volcano which they had observed on their last departure from Kamtschatka, had done little or no damage notwithstanding its violence. Several stones had fallen about the size of a goose's egg, but none larger. At this visit it was observed by our navigators, that the complexions of the Russians seemed to be much more unhealthy and sallow than when they saw them formerly; and the Russians made the same observation upon the complexions of their guests. As no certain cause for this alteration could be perceived, the blame was by both parties laid on the verdure of the country; which, by contrasting itself with the colour of the people, made the latter appear to disadvantage.

Having repaired as well as they could the damages sustained by the ships among the ice, our navigators now began to proceed on their voyage southward; but the shattered condition of their vessels, with the little time they had now to spare on voyages of discovery, after having been so long at sea, now rendered them much less successful than formerly. Before leaving the peninsula, however, they took care to give such a description of the bay of Awatska as must be of great service to future navigators. This bay lies in 52. 51. N. Lat. and 158. 48. E. Long. in the bight of another bay formed by Cape Gavareea to the south, and Cheeponskoi Noss to the north. The latter of these bears from the former N. E. by N. and is 32 leagues distant. From Cape Gavareea to the entrance of Awatska bay the coast takes a northerly direction, and extends about 11 leagues. It consists of a chain of ragged cliffs and rocks, and in many parts presents an appearance of bays or inlets; but on a nearer view, low grounds were perceived by which the headlands were connected. From the entrance of Awatska bay, Cheeponskoi Noss bears E. N. E. distant 17 leagues. The shore on this side is flat and low, with hills behind gradually rising to a considerable height. The latitude of Cape Gavareea is 52. 21. By this remarkable difference of the land on both sides the cape, navigators may be directed in their course towards it from the southward. When they approach it from the northward, Cheeponskoi Noss becomes very conspicuous; it being a high projecting headland, and united to the continent by a large extent of level ground lower than the Noss: and presents the same appearance

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appearance whether viewed from the north or south. Should the weather happen to be sufficiently clear to admit a view of the mountains both on the sea coast and in the neighbourhood, the situation of Awatska bay may be known by the two high ones to the south of it. That nearest the bay is in the form of a sugar loaf, the other flat at top, and not quite so high. Three very conspicuous mountains appear on the north side of the bay; of which that to the west appears to be the highest; the next, being a volcano, is readily known by the smoke which it emits; the third is the most northerly, and might properly be called a cluster of mountains, as it presents several flat tops to view. When got within the capes, the entrance of the bay of Awatska to the north is pointed out by a light-house on a perpendicular headland. Many sunken rocks lie to the eastward of this headland, stretching two or three miles into the sea; and which with a moderate sea or swell will always show themselves. A small round island lies four miles to the south of the entrance, principally composed of high pointed rocks, one of which is very remarkable. The entrance into the bay is at first about three miles wide, and one and an half in the narrowest part; the length is four miles in a north-west direction. Within the mouth is a noble bason about 25 miles in circumference; in which are the harbours of Rakoweera to the east, Tarcinska to the west, and St Peter and St Paul to the north.

125 Account of the voyage from the time of leaving Kamtschatka.

On leaving Kamtschatka, it was unanimously judged improper to make any attempt to navigate the seas between the continent of Asia and Japan. Instead of this, it was proposed to steer to the eastward of that island, and in the way thither to sail along the Kuriles; examining particularly those that are situated nearest to the northern coast of Japan, which are said to be considerable, and neither subject to the Russians nor Japanese. In case they should have the good fortune to meet with some secure and commodious harbour in one of these islands, it was supposed that they might prove of considerable importance, as convenient places for shelter for subsequent navigators, who might be employed in exploring these seas, as the means of producing a commercial intercourse among the adjacent dominions of the two above-mentioned empires. The next object was to take a survey of the coasts of the islands of Japan; after which they designed to sail for the coast of China as far north as possible, and then sail along it southward to Macao.

In pursuance of this plan, they sailed along the coast of Kamtschatka, till they came to the southern point called *Cape Lopatka*, whose situation they determined to be in Lat. 51. 0. E. Long. 156. 45. To the north-west they observed a very lofty mountain whose summit was lost in the clouds; and the same instant the first of the Kurile islands, named *Shoomska*, made its appearance in the direction of west, half south. The passage betwixt the southern extremity of Cape Lopatka and the island of Shoomska, though only one league in breadth, is extremely dangerous, both on account of the rapidity of the tides, and of the sunk rocks which lie off the cape. In the course of this voyage, they had occasion to observe, that a violent swell from the north-east frequently took place, though the wind had been for some time in the western quarter; a circumstance for which they seem to have been altogether unable to account.

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The tempestuous weather which now occurred, prevented any discoveries from being made among the Kurile isles; however, they again sailed over the space assigned to the land of De Gama, without being able to find it; and from comparing several accounts of the Russian navigators with one another, it was judged extremely probable, that the land of Jeso, so frequently laid down in former maps, is no other than the most southerly of the Kurile isles. On coming in view of the coast of Japan, they had the mortification to find that they could not approach the land by reason of the tempestuous weather and bad state of the ships; the coasts of these islands being extremely dangerous. Passing from thence in quest of the Bashee islands, they found amazing quantities of pumice-stone floating in the sea; so that they seemed inclined to believe, with Mr Muller, that if there had formerly been any part of the continent, or large island, called the *Land of Jeso*, it must have disappeared in a volcanic convulsion; which also must have been the case with that called the *Company's Land* and *Staten island*. Though they had not the good fortune to find the Bashee islands, they discovered one in 24. 48. N. Lat. 141. 20. E. Long. which from its appearance, and the sulphureous smell emitted by it, they named *Sulphur island*. After this nothing remarkable occurred till their arrival at Canton in China, where, having staid for some time in order to put their ships in repair, they at last set sail for Britain; but through stress of weather were driven as far north as Stromness in Orkney. From thence Captain Gore sent a dispatch to the lords of the admiralty to inform them of his arrival; and on the 4th of October 1780 the ships reached the Nore, after an absence of four years, two months, and twenty-two days.

COOKERY. the art of preparing and dressing victuals for the table: An art in its simplest and ordinary modes, sufficiently familiar to every house-keeper; and, in its luxurious refinements, too copiously detailed in manuals and directories published for the purpose, to require any enlargement here, were it even a topic that at all deserved consideration in a work of this nature.

COOLERS, in *Medicine*, those remedies which were supposed to produce an immediate sense of cold, being such as have their parts in less motion than those of the organs of feeling; as fruits and all acid liquors. Or they are such as were supposed, by a particular viscidity or grossness of parts, to give the animal fluids a greater consistency than they had before, and consequently retard their motion, having less of that intestine force on which their heat depends: this property was ascribed to cucumbers and similar substances.

COOM, a term applied to the soot that gathers over an oven's mouth; and also to the black, greasy substance, which works out of the wheels of carriages.

COOMB, or Comb, *of corn*, a dry measure containing four bushels, a half or quarter.

COOP, in *Husbandry*, a tumbrel or cart enclosed with boards, and used to carry dung, grains, &c.

Coop, is also the name of a pen, or enclosed place

where

where lambs, poultry, &c. are ſhut up in order to be fed.

COOPER, an artificer who makes caſks, coops tubs and barrels, and all kinds of wooden veſſels which are bound together with hoops. It would appear, that the art of the cooper is of great antiquity, and ſoon attained all the perfection which it at preſent poſſeſſes.

But although this art is very ancient, there are ſome countries in which it is yet unknown; and in other countries from the ſcarcity of wood, or from ſome other cauſes, earthen veſſels and ſkins lined with pitch are uſed for containing liquors. The Latin word *dolium*, is uſually tranſlated "caſk"; but it was employed by the Romans to denote earthen veſſels uſed for the ſame purpoſes. The word *dolare*, to "plane, or ſmooth," from which dolium is derived, and the word *dolarius*, a "cooper," may be naturally enough applied, the former to the conſtruction of caſks, which are made of ſeveral pieces of the ſame tree planed and fitted for joining together, and the latter to the artificer himſelf.

Pliny aſcribes the invention of caſks to the people who lived at the foot of the Alps. In his time hey lined them with pitch. From the year 70 of the Chriſtian era in the time of Tiberius and Veſpaſian the art of conſtructing veſſels of different pieces of wood ſeems to have been well known. Indeed, previous to this period, Varro and Columella, in detailing the precepts of rural economy, ſpeak diſtinctly of veſſels formed of different pieces, and bound together with circles of wood or hoops. The deſcription which they have given accords exactly with the conſtruction of caſks. The fabrication of caſks, on account of the great abundance of wood, was probably very early introduced into France. When this art was firſt practiſed in Britain is unknown; but it ſeems not improbable that it was derived from the French.

The figure of a caſk is that of two truncated cones, or rather conoids, joined together; for the lines are not ſtraight, as in the cone, but are curved from the vertex to the baſe. As the place where the junction ſeems to take place is the moſt capacious, it is commonly called the belly of the caſk. In the choice of wood, old, thick, and ſtraight trees are preferred, from which thin planks are hewn which are to be formed into ſtaves. In France, the wood is prepared in winter; the ſtaves and bottoms are then formed, and they are put together, or, in the language of the artificer, the caſk is mounted, in ſummer. Planing the ſtaves is one of the moſt difficult parts of the work; and it is at the ſame time one of the moſt important in the fabrication of caſks. In dreſſing ſtaves with the plane, the workman is directed to cut acroſs the wood; the reaſon of which is probably to prevent the inſtrument following the courſe of the fibres, which may not always be in the ſame plane with the ſurface of the ſtave, and thus render it of unequal thickneſs.

In the formation of the ſtaves, it ought to be recollected, that each is to conſtitute part of a double conoid. It muſt therefore be broadeſt at the middle, and muſt gradually become narrower, but not in ſtraight lines, towards the extremities. The outſide of the ſtave, acroſs the wood, muſt be wrought into the ſegment of a circle; and it muſt be thickeſt near the middle, growing gradually thinner towards the ends. Great experience, it is obvious, muſt be requiſite for the nice adjuſtment of the different curves to the ſize and ſhape of the caſk. Leſs attention, as it is leſs neceſſary, is paid to the rounding or dreſſing of the inſide of the ſtave.

After the ſtaves are dreſſed and ready to be arranged in a circular form, it might be ſuppoſed neceſſary for the purpoſe of making the ſeams tight, to trim the thin edges in ſuch a manner, that the contiguous ſtaves may be brought into firm contact throughout the whole joint, or ſloped ſimilar to the arch-ſtones of a bridge. But this is not the practice which is uſually followed by the artificer. Without attempting to ſlope them, ſo that the whole ſurface of the edge may touch in every point, he brings the contiguous ſtaves into contact only at the inner ſurface; and in this way, by driving the hoops hard, he can make a cloſer joint than could be done by ſloping them from the outer to the inner ſide. In this, perhaps, with giving the proper curvature to the ſtaves, conſiſts the principal part of the cooper's art.

Cooper, *Anthony-Aſhley*, firſt earl of Shafteſbury, a moſt able ſtateſman, was the ſon of Sir John Cooper, Bart. of Rockburn in Hampſhire, and was born in 1621. He was elected member for Tewkeſbury, at 19 years of age, in the ſhort parliament that met April 13. 1640. He ſeems to have been well affected to the king's ſervice at the beginning of the civil wars; for he repaired to the king at Oxford with offers of aſſiſtance: but Prince Maurice breaking articles to a town in Dorſetſhire that he had got to receive him, furniſhed him with a pretence for going over to the parliament, from which he accepted a commiſſion. When Richard Cromwell was depoſed, and the Rump came again into power, they nominated Sir Anthony one of their council of ſtate, and a commiſſioner for managing the army. At that very time he had engaged in a ſecret correſpondence for reſtoring Charles II. and, upon the king's coming over, was ſworn of his privy council. He was one of the commiſſioners for the trial of the regicides; was ſoon after made chancellor of the exchequer, then a commiſſioner of the treaſury; in 1672 was created earl of Shafteſbury; and ſoon after was raiſed to the poſt of lord chancellor. He filled this office with great ability and integrity; and though the ſhort time he was at the helm was in a tempeſtuous ſeaſon, it is doing him juſtice to ſay, nothing could either diſtract or affright him. The great ſeal was taken from him in 1673, 12 months after his receiving it; but, though out of office, he ſtill made a diſtinguiſhed figure in parliament, for it was not in his nature to remain inactive. He drew upon himſelf the implacable hatred of the duke of York, by ſteadily promoting, if not originally inventing, the famous project of an excluſion-bill. When his enemies came into power, he found it neceſſary to conſult his ſafety, by retiring into Holland, where he died ſix weeks after his arrival, in 1683. While his great abilities are confeſſed by all, it has been his misfortune to have his hiſtory recorded by his enemies, who ſtudied to render him odious. Butler has given a very ſevere character of him in his Hudibras.

Cooper, *Anthony Aſhley*, earl of Shafteſbury, was ſon of Anthony earl of Shafteſbury, and grandſon of Anthony

Cooper. Anthony first earl of Shaftesbury, lord high chancellor of England. He was born in 1671, at Exeter-house in London, where his grandfather lived, who from the time of his birth conceived so great an affection for him, that he undertook the care of his education; and he made so good a progress in learning, that he could read with ease both the Latin and Greek languages when only 11 years old. In 1683, his father carried him to the school at Winchester, where he was often insulted on his grandfather's account, whose memory was odious to the zealots for despotic power: he therefore prevailed with his father to consent to his desire of going abroad. After three years stay abroad, he returned to England in 1689, and was offered a seat in parliament in some of those boroughs where his family had an interest. But this offer he did not now accept, that he might not be interrupted in the course of his studies, which he prosecuted five years more with great vigour and success; till, on Sir John Trenchard's death, he was elected burgess for Pool. Soon after his coming into parliament, he had an opportunity given him of expressing that spirit of liberty by which he uniformly directed his conduct on all occasions. It was the bringing in and promoting "the act for regulating trials in cases of high treason." But the fatigues of attending the house of commons in a few years so impaired his health, that he was obliged to decline coming again into parliament after the dissolution in 1698. He then went to Holland, where the conversation of Mr Bayle, Mr le Clerc, and several other learned and ingenious men, induced him to reside a twelvemonth. During this time, there was printed at London, in 8vo. an imperfect edition of Lord Ashley's Inquiry concerning Virtue. It had been surreptitiously taken from a rough draught, sketched when he was no more than 20 years of age. His lordship, who was greatly chagrined at this event, immediately bought up the impression before many books were sold, and set about completing the treatise, as it afterwards appeared in the second volume of the Characteristics. Soon after Lord Ashley's return to England, he became, by the decease of his father, earl of Shaftesbury. But his own private affairs hindered him from attending the house of lords till the second year of his peerage, when he was very earnest to support King William's measures, who was at that time projecting the grand alliance. So much was he in favour with King William, that he had the offer of secretary of state; but his declining constitution would not allow him to accept it. Though he was disabled from engaging in business, the king consulted him on matters of very high importance; and it is pretty well known that he had the greatest share in composing that celebrated last speech of King William, December 31. 1701. On Queen Anne's accession to the throne, he returned to his retired manner of life, being no longer advised with concerning the public; and was then removed from the vice-admiralty of Dorset, which had been in the family for three generations. In 1703, he made a second journey to Holland, and returned to England the year following. The French prophets, soon after this, having by their enthusiastic extravagancies made a great noise throughout the nation, and, among different opinions, some advising a prosecution, the lord Shaftesbury apprehended that such measures tended rather to inflame than to cure the disease. This was the origin of his Letter concerning Enthusiasm, which he sent to Lord Somers, then president of the council; and which being approved of by that nobleman and other gentlemen to whom it was shown, was published in 1708, though without the name of the author, or that of the person to whom it was addressed. His Moralist, a philosophical Rhapsody, being a recital of certain conversations on natural and moral subjects, appeared in January 1709; and in the May following his *Sensus Communis*, an essay upon the freedom of Wit and Humour, in a Letter to a Friend. It was in the same year that he entered into the marriage state with Mrs Jane Ewer, the youngest daughter of Thomas Ewer, Esq. of Lee in Hertfordshire. By this lady, to whom his lordship was related, he had an only son, Anthony the late earl of Shaftesbury. In 1710, his Soliloquy, or Advice to an Author, was published at London in 8vo. While he was thus employing himself in literary composition, his health declined so fast, that it was recommended to him to seek assistance from a warmer climate. Accordingly, in July 1711, he set out for Naples, and pursuing his journey by way of France, was obliged to pass through the duke of Berwick's army, which at that time lay encamped near the borders of Piedmont. Here he was entertained by that famous general in the most friendly manner, and every assistance was given him to conduct him in safety to the duke of Savoy's dominions. Our noble author's removal to Italy was of no service to the re-establishment of his health; for after having resided at Naples about a year and a half, he departed this life on the 4th of February, O. S. 1712-13, in the 42d year of his age. The only pieces which he finished after he came to this city, were the Judgment of Hercules, and the Letter concerning Design, which last was added to that impression of the Characteristics which appeared in 1732. It was in 1711 that the first edition was published of all the Characteristics together, and in the order in which they now stand. But this publication not being entirely to his lordship's satisfaction, he chiefly employed the latter part of his life in preparing his writings for a more elegant edition; which was given to the world in 1713, soon after his decease. The several prints that were then first interspersed through the volumes were all invented by himself, and designed under his immediate inspection; and for this purpose he was at the pains of drawing up a most accurate set of instructions, the manuscript of which is still preserved in the family. That no mistakes might be committed, the earl did not leave to any other hands so much as the drudgery of correcting the press. In the three volumes of the Characteristics of Men, Manners, Opinions, and Times, he completed the whole of his works which he intended for the public eye. Not long before his death he had formed a scheme of writing a discourse on painting, sculpture, and the other arts of design, which, if he had lived to have finished it, might have proved a very pleasing and useful work, as he had a fine taste in subjects of that kind: but his premature decease prevented his making any great progress in the undertaking. The earl of Shaftesbury had an esteem for the works of the best English divines; one remarkable instance of which was displayed in his writing a Preface to a volume of Dr Whichcot's

Whichcot's Sermons, publiſhed in 1698. Copies of theſe ſermons had been taken in ſhort-hand, as they were delivered from the pulpit; and the earl had ſo high an opinion of them, that he not only introduced them to the world by his preface, but had them printed under his own particular inſpection. In his Letters to a Young Man at the Univerſity, he ſpeaks of Biſhop Burnet and Dr Hoadly in terms of great applauſe, and has done juſtice to the merits of Tillotſon, Barrow, Chillingworth, and Hammond, as the chief pillars of the church againſt fanaticiſm. But whatever regard his lordſhip might have for ſome of our divines, it was to the writings of antiquity that his admiration was principally directed. Theſe were the conſtant objects of his ſtudy, and from them he formed his ſyſtem of philoſophy, which was of the civil, ſocial, and theiſtic kind.

Of Lord Shafteſbury's character, as a writer, different accounts have been given. As one of his greateſt admirers, may be mentioned Lord Monboddo; who, ſpeaking of his Rhapſodiſt in particular, does not heſitate to pronounce it not only the beſt dialogue in Engliſh, out of all degree of compariſon, but the ſublimeſt philoſophy; and, if we will join with it the Inquiry, the completeſt ſyſtem both of morality and theology, that we have in our language, and, at the ſame time, of the greateſt beauty and elegance for the ſtyle and compoſition.

Even ſeveral of the authors who have diſtinguiſhed themſelves by their direct oppoſition to many of the ſentiments which occur in the Characteriſtics, have nevertheleſs mixed no ſmall degree of applauſe with their cenſures. "I have again peruſed, with freſh pleaſure and freſh concern (ſays Mr Balguy, in his Letter to a Deiſt), the volumes of Characteriſtics—I heartily wiſh the noble author had been as unprejudiced in writing as I was in reading. If he had, I am perſuaded his readers would have found double pleaſure and double inſtruction. It ſeems to me, that his lordſhip had little or no temptation to purſue any ſingularities of opinion by way of diſtinction. His fine genius would ſufficiently have diſtinguiſhed him from vulgar authors in the high road of truth and ſenſe; on which account his deviations ſeem the more to be lamented. The purity and politeneſs of his ſtyle, and the delicacy of his ſentiments, are and muſt be acknowledged by all readers of taſte and ſincerity. But nevertheleſs, as his beauties are not eaſy to be overlooked, ſo neither are his blemiſhes. His works appear to be ſtained with ſo many groſs errors, and his fine thoughts are ſo often mingled with abſurdities, that however we may be charmed with the one, we are forced to condemn the other." Mr Balguy hath farther obſerved, with regard to the Inquiry concerning Virtue, which is the immediate object of his animadverſion, that though he cannot agree in every particular contained in it, he finds little more to do than to tell how much he admires; and that he thinks it indeed, in the main, a performance ſo juſt and exact as to deſerve higher praiſes than he is able to give it.

Dr Brown, in his eſſay on the Characteriſtics, obſerves, that the earl of Shafteſbury hath in that performance mingled beauties and blots, faults and excellencies, with a liberal and unſparing hand. At the ſame time, the doctor applauds that generous ſpirit of freedom which ſhines throughout the whole. Another direct antagoniſt of the earl of Shafteſbury, Dr Leland, has obſerved, that no impartial man will deny him the praiſe of a fine genius. "The quality of the writer (continues the doctor), his lively and beautiful imagination, the delicacy of taſte he hath ſhown in many inſtances, and the graces and embelliſhments of his ſtyle, though perhaps ſometimes too affected, have procured him many admirers. To which may be added his refined ſentiments on the beauty and excellency of virtue, and that he hath often ſpoken honourably of a juſt and good Providence, which miniſters and governs the whole in the beſt manner; and hath ſtrongly aſſerted, in oppoſition to Mr Hobbes, the natural difference between good and evil; and that man was originally formed for ſociety, and the exerciſe of mutual kindneſs and benevolence; and not only ſo, but for religion and piety too. Theſe things have very much prejudiced many perſons in his favour, and prepared them for receiving, almoſt implicitly, whatever he hath advanced." Dr Johnſon, as we are informed by Sir John Hawkins, bore no good-will to Lord Shafteſbury; neither did he ſeem at all to reliſh the cant of the Shafteſburian ſchool, nor inclined to admit the pretenſions of thoſe who profeſſed it, to taſtes and perceptions which are not common to all men; a taſte in morals, in poetry and proſe writing, in painting, in ſculpture, in muſic, in architecture, and in government! A taſte that cenſured every production, and induced them to reprobate every effort of genius that fell ſhort of their own capricious ſtandard.

The grand point in which our noble author has rendered himſelf juſtly obnoxious to the friends of religion, is his having interſperſed through the Characteriſtics a number of inſinuations that appear to be unfavourable to the cauſe of revelation. There have not however been wanting many among his admirers, who have thought that he ought not to be reckoned among the deiſtical writers. The author of animadverſions upon Dr Brown's three Eſſays on the Characteriſtics, obſerves, that it is "imprudent, to ſay no worſe, in ſome ſincere advocates for Chriſtianity, to reject the friendly advice and aſſiſtance of ſo maſterly a writer as the lord Shafteſbury, and to give him up to the Deiſts as a patron of infidelity." But it is matter of fact, and not conſiderations of prudence or imprudence, that muſt determine the queſtion. In ſupport of his lordſhip's having been a believer in our holy religion, may be alleged, his Preface to Whichcot's Sermons, and his Letters to a Student at the univerſity: in both which works he conſtantly expreſſes himſelf in ſuch language as ſeems to indicate that he was really a Chriſtian. And with regard to the letters, it may be remarked, that they were written in 1707, 1708, and 1709, not many years before his lordſhip's death. Nevertheleſs, there are in the Characteriſtics ſo many ſceptical paſſages, that he muſt be conſidered as having been a doubter at leaſt, if not an abſolute diſbeliever, with reſpect to revelation. But if he muſt be ranked among the Deiſts, we agree with the obſervation of one of his biographers, that he is a very different Deiſt from numbers who have appeared in that character; his general principles being much leſs exceptionable.

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The ſtyle of Lord Shafteſbury's compoſitions is alſo a point upon which various and contradictory ſentiments

ments have been entertained. But for the fulleſt and moſt judicious criticiſm that has appeared upon that ſubject, we may refer the reader to Dr Blair's Lectures on Rhetoric and Belles Lettres, vol. i. p. 192, 193, 207, 208, 234, 263, and 396—398.

Cooper, *Samuel*, a very eminent Engliſh miniature painter, born in 1609, and bred under the care of his uncle John Hoſkins. He derived, however, his principal excellence from a ſtudy of the works of Vandyck, in whoſe time he lived; inſomuch that he was commonly ſtyled "Vandyck in little." His pencil was chiefly confined to the head, in which, with all its dependencies, eſpecially the hair, he was inimitable; but if he deſcended lower his incorrectneſs was notorious. He died in 1672; and his pieces are univerſally admired all over Europe, ſelling for incredible prices.—He had a brother, Alexander, likewiſe a good miniature painter, who became limner to Chriſtina queen of Sweden.

Cooper, *Thomas*, a pious and learned prelate in the reign of Queen Elizabeth, was born at Oxford about the year 1517. He was educated in the ſchool adjoining to Magdalene college, of which he was a choriſter, where alſo, in 1539, he was elected probationer, and fellow in the following year. About the year 1546, quitting his fellowſhip, he applied himſelf to the ſtudy of phyſic, in 1556 took the degree of bachelor in that faculty, and practiſed as phyſician at Oxford. Being inclined to the Proteſtant religion, probably this was only a prudent ſuſpenſion of his final intentions during the popiſh reign of Queen Mary; for, on the acceſſion of Elizabeth, he reſumed the ſtudy of divinity, became a celebrated preacher, was made dean of Chriſt-church, and vice-chancellor of the univerſity, having accumulated the degrees of bachelor and doctor in divinity. In 1569 he was made dean of Glouceſter; and, the year following, biſhop of Lincoln: whence, in 1584, he was tranſlated to the ſee of Wincheſter, in which city he died on the 29th of April 1594, and was buried in the cathedral there, on the ſouth ſide of the choir. The ſeveral writers who have mentioned Dr Cooper, unanimouſly give him the character of an eloquent preacher, a learned divine, and a good man. He had the misfortune, while at Oxford, to marry a lady whoſe gallantries became notorious: nevertheleſs he would not be divorced from her; knowing that he could not live without a wife, he did not chooſe "to charge his conſcience with the ſcandal of a ſecond marriage."—He wrote, 1. The Epitome of Chronicles from the 17th year after Chriſt to 1540, and thence after to 1560. 2. *Theſaurus linguæ Romanæ et Britannicæ*. This dictionary, which is an improvement upon Elyot's, was much admired by Queen Elizabeth, who thenceforward determined to promote the author. 3. A brief expoſition of ſuch chapters of the Old Teſtament as uſually are read in the church, at common prayer, on Sundays throughout the year. 4. An admonition to the people of England. 5. Sermons.

Cooper, *John Gilbert*, a polite writer of the preſent age, was born in 1723; and was deſcended from an ancient family in the county of Nottingham, whoſe fortune was injured in the laſt century by their attachment to the principles of monarchy. He reſided at Thurgarton priory in Nottinghamſhire, which was granted by King Henry VIII. to William Cooper, one of his anceſtors. This manſion Mr Cooper inherited from his father, who in 1639 was high ſheriff of the county; and tranſmitted it to his ſon, who filled the ſame reſpectable office in 1783. After paſſing through Weſtminſter ſchool under Dr John Nicoll, along with the late Lord Albemarle, Lord Buckinghamſhire, Major Johnſon, Mr George Aſhby, and many other eminent and ingenious men, he became in 1743 a fellow-commoner of Trinity-college, Cambridge, and reſided there two or three years; but quitted the univerſity on his marriage with Suſanna the daughter of William Wrighte, Eſq; ſon to the lord keeper of that name, and recorder of Leiceſter 1729—1763. In the year 1745 he commenced author by the publication of The Power of Harmony, a poem in 4to; and in 1746 and 1747 he produced ſeveral Eſſays and Poems under the ſignature of Philalethes, in a periodical work called *The Muſeum*, publiſhed by Mr Dodſley. In the ſame year he came forward as an author, with his name, by a work which received much aſſiſtance from his friend the Reverend John Jackſon of Leiceſter, who communicated ſeveral learned notes, in which he contrived to manifeſt his diſlike to his formidable antagoniſt Mr Warburton. It was entitled The Life of Socrates, collected from the Memorabilia of Xenophon, and the Dialogues of Plato, and illuſtrated farther by Ariſtotle, Diodorus Siculus, Cicero, Proclus, Apuleius, Maximus Tyrius, Boethius, Diogenes Laertius, Aulus Gellius, and others, 1749, 8vo. In this work Mr Cooper gave evident marks of ſuperior genius; warm, impetuous, and impatient of reſtraint. In 1754, Mr Cooper publiſhed his Letters on Taſte, 8vo; an elegant little volume, on which no ſmall ſhare of his reputation is founded; and in 1755, The Tomb of Shakeſpeare, a Viſion, 4to; a decent performance, but in which there is more of wit and application than of nature or genius. In 1756 he aſſiſted Mr Moore, by writing ſome numbers of the World; and attempted to rouſe the indignation of his countrymen againſt the Heſſians, at that juncture brought over to defend the nation, in a poem called the Genius of Britain, addreſſed to Mr Pitt. In 1758, he publiſhed Epiſtles to the Great, from Ariſtippus in Retirement, 4to; and The Call of Ariſtippus, Epiſtle IV. to Mark Akenſide, M. D. Alſo, A Father's Advice to his ſon, in 4to. In the Annual Regiſter of the ſame year is his Tranſlation of an Epiſtle from the King of Pruſſia to Monſieur Voltaire. In 1759, he publiſhed Ver Vert; or the Nunnery Parrot; an Heroic Poem, in four cantos, inſcribed to the Abbeſs of D***; tranſlated from the French of Monſieur Greſſet, 4to; reprinted in the firſt volume of Dilly's Repoſitory, 1777; and, in 1764, Poems on ſeveral ſubjects, by the Author of the Life of Socrates; with a prefatory Advertiſement by Mr Dodſley. In this little volume were included all the ſeparate poetical pieces which have been already mentioned, excepting Ver Vert, which is a ſprightly compoſition. Mr Cooper died at his father's houſe in May Fair, after a long and excruciating illneſs ariſing from the ſtone, April 14th 1769.

CO-ORDINATE, ſomething of equal order, rank, or degree with another.

COOT. See Fulica, *Ornithology Index*.

COPAIBA, or *Balſam of* Copaiba, a liquid reſinous

nous juice, flowing from incisions made in the trunk of the copaifera balsamum. See MATERIA MEDICA *Index*.

COPAIFERA, in *Botany*: A genus belonging to the decandria class of plants. See BOTANY *Index*.

COPAL, improperly called *gum copal*, is a gum of the resinous kind brought from New Spain, being the concrete juice of the *Rhus Copallinum*. It is employed as a varnish. See VARNISHING and CHEMISTRY *Index*.

COPARCENARY, the share or quota of a coparcener.

COPARCENERS, (from *con* and *particeps*, "partner;"), or PARCENERS; such as have equal portions in the inheritance of their ancestor.

Coparceners are so either by law or custom. Coparceners by law, are the issue female; which, in default of a male or heir, come equally to the lands of their ancestors. Coparceners by custom, are those who, by some peculiar custom of the country, challenge equal parts in such lands; as in Kent, by the custom of gavelkind. The crown of England is not subject to coparcenary.

COPE, an ecclesiastical ornament, usually worn by chanters and subchanters, when they officiate in solemnity. It reaches from the shoulders to the feet. The ancients called it *Pluviale*.—The word is also used for the roof or covering of a house, &c.

COPE is also the name of an ancient custom or tribute due to the king or lord of the soil, out of the lead-mines in some part of Derbyshire; of which Manlove saith thus:

Egress and regress to the king's highway,
The miners have; and *lot* and *cope* they pay;
The thirteenth dish of ore within their mine,
To the lord for *lot*, they pay at measuring time;
Sixpence a load for *cope* the lord demands,
And that is paid to the *burghmaster's* hands.

This word by doomsday-book, as Mr Hagar hath interpreted it, signifies a hill: and *cope* is taken for the supreme cover, as the *cope of heaven*.

COPEL. See CUPEL.

COPENHAGEN, the capital of the kingdom of Denmark, situated on the eastern shore of the island of Zealand, upon a fine bay of the Baltic sea, not far from the strait called the *Sound*. E. Long. 13. 0. N. Lat. 55. 30.

The precise date of the foundation of this city is disputed; but the most probable account is, that it took its rise from a castle built on the spot in the year 1168, as a protection against the pirates which at that time swarmed in the Baltic. The conveniency of the situation, and the security afforded by the castle, soon induced a number of the inhabitants of Zealand to resort thither: but it was not distinguished by the royal residence until 1443, during the reign of Christopher of Bavaria; since which period it has been gradually enlarged and beautified, and is become the capital of Denmark.

Copenhagen is the best built city of the north; for although Petersburgh excels it in superb edifices, yet, as it contains no wooden houses, it does not display that striking contrast of meanness and magnificence; but in general exhibits a more equable and uniform appearance. The town is surrounded towards the land with regular ramparts and bastions, a broad ditch full of water, and a few outworks; its circumference measures between four and five miles. The streets are well paved, with a foot-way on each side, but too narrow and inconvenient for general use. The greatest part of the buildings are of brick; and a few are of free-stone brought from Germany. The houses of the nobility are in general splendid, and constructed in the Italian style of architecture: the palace, which was erected by Christian VI. is a large pile of building; the front is of stone, and the wings of brick stuccoed; the suite of apartments is princely; but the external appearance is more grand than elegant.

The busy spirit of commerce is visible in this city, which contains about 80,000 inhabitants. The haven is always crowded with merchant ships: and the streets are intersected by broad canals, which bring the merchandise close to the warehouses that line the quays. This city owes its principal beauty to a dreadful fire in 1728, that destroyed five churches and 67 streets, which have been since rebuilt in the modern style. The new part of the town, raised by the late king Frederic V. is extremely beautiful, scarcely inferior to Bath. It consists of an octagon, containing four uniform and elegant buildings of hewn stone, and of four broad streets leading to it in opposite directions. In the middle of the area stands an equestrian statue of Frederic V. in bronze, as big as life, which cost 80,000l. The Royal Museum, or Cabinet of Rarities, merits the attention of travellers. This collection, which was begun by Frederic III. is deposited in eight apartments, and ranged in the following order: animals, shells, minerals, paintings, antiquities, medals, dresses, arms and implements of the Laplanders.

Part of Copenhagen, which is called *Christianshafen*, is built upon the Isle of Amak, which generally attracts the curiosity of foreigners; (see AMAK). From this place, to which the main city is joined by a bridge, the markets are supplied with fowl, beef, mutton, venison, corn, and culinary vegetables, which are produced here in the greatest abundance.

COPERNICAN, in general, something belonging to COPERNICUS. Hence

COPERNICAN *System* or *Hypothesis*, that system of the world wherein the sun is supposed to rest in the centre, and the planets, with the earth, to move in ellipses round him. See COPERNICUS.

COPERNICUS, NICOLAUS, an eminent astronomer, was born at Thorn in Prussia, Jan. 10. 1472. He was taught the Latin and Greek languages at home; and afterwards sent to Cracovia, where he studied philosophy and physic. His genius in the mean time was naturally turned to mathematics, which he pursued through all its various branches. He set out for Italy when he was 23 years of age; but staid at Bononia some time, for the sake of being with the celebrated astronomer of that place, Dominicus Maria: whose conversation, however, and company, he affected, not so much as a learner, as an assistant to him in making his observations. From thence he passed to Rome, where he was no sooner arrived than he was considered as not inferior to the famous Regiomontanus; and acquired, in short, so great a reputation, that he was chosen professor of mathematics, which he taught for a long time with great applause. He also made

made ſome aſtronomical obſervations there about the year 1500. Returning to his own country ſome years after, he began to apply his vaſt knowledge in mathematics to correct the ſyſtem of aſtronomy which then prevailed. He ſet himſelf to collect all the books which had been written by philoſophers and aſtronomers, and to examine all the various hypotheſes they had invented for the ſolution of the celeſtial phenomena; to try if a more ſymmetrical order and conſtitution of the parts of the world could not be diſcovered, and a more juſt and exquiſite harmony in its motions eſtabliſhed, than what the aſtronomers of thoſe times ſo eaſily admitted. But of all their hypotheſes none pleaſed him ſo well as the Pythagorean, which made the ſun to be the centre of the ſyſtem, and ſuppoſed the earth to move not only round the ſun, but round its own axis alſo. He thought he diſcerned much beautiful order and proportion in this; and that all that embarraſſment and perplexity from epicycles and excentrics, which attended the Ptolemaic hypotheſis, would here be entirely removed.

This ſyſtem, then, he began to conſider, and to write upon, when he was about 35 years of age. He employed himſelf in contemplating the phenomena carefully; in making mathematical calculations; in examining the obſervations of the ancients, and in making new ones of his own; and after more than 20 years chiefly ſpent in this manner, he brought his ſcheme to perfection, and eſtabliſhed that ſyſtem of the world which goes by his name, and is now univerſally received, (ſee Astronomy *Index*). His ſyſtem, however, was then looked upon as a moſt dangerous hereſy; for which he was thrown into priſon by Pope Urban VIII. and not ſuffered to come out till he had recanted his opinion; that is, till he had renounced the teſtimony of his ſenſes. He died the 24th of May 1543, in the 70th year of his age.

This extraordinary man had been made canon of Worms by his mother's brother, Lucas Wazelrodius, who was biſhop of that place. He was not only the greateſt of aſtronomers, but a perfect maſter of the Greek and Latin tongues; to all which he joined the greateſt piety and innocence of manners.

The following is the account of the diſcoveries of Copernicus by Dr Smith, in his *Eſſays on Philoſophical Subjects*.

"The confuſion (ſays Dr Smith) in which the old hypotheſis repreſented the heavenly bodies, was, as Copernicus himſelf tells us, what firſt ſuggeſted to him the deſign of forming a new ſyſtem, that theſe, the nobleſt works of nature, might no longer appear devoid of that harmony and proportion which diſcover themſelves in her meaneſt productions. What moſt of all diſſatisfied him was, the notion of the equalizing circle, which, by repreſenting the revolutions of the celeſtial ſpheres as equable only when ſurveyed from a point that was different from their centres, introduced a real inequality into their motions; contrary to that moſt natural, and indeed fundamental idea, with which all the authors of aſtronomical ſyſtems, Plato, Eudoxus, Ariſtotle, even Hipparchus and Ptolemy themſelves, had hitherto ſet out, that the real motions of ſuch beautiful and divine objects muſt neceſſarily be perfectly regular, and go on, in a manner as agreeable to the imagination as the objects themſelves are to the ſenſes. He began to conſider, therefore, whether, by ſuppoſing the heavenly bodies to be arranged in a different order from that in which Ariſtotle and Hipparchus had placed them, this ſo much ſought for uniformity might not be beſtowed upon their motions. To diſcover this arrangement he examined all the obſcure traditions delivered down to us, concerning every other hypotheſis which the ancients had invented, for the ſame purpoſe. He found, in Plutarch, that ſome Pythagoreans had repreſented the earth as revolving in the centre of the univerſe, like a wheel round its own axis; and that others, of the ſame ſect, had removed it from the centre, and repreſented it as revolving in the ecliptic like a ſtar round the central fire. By this central fire he ſuppoſed they meant the ſun; and though in this he was very widely miſtaken, it was, it ſeems, upon this interpretation that he began to conſider how ſuch an hypotheſis might be made to correſpond to the appearances. The ſuppoſed authority of thoſe old philoſophers, if it did not originally ſuggeſt to him his ſyſtem, ſeems at leaſt to have confirmed him in an opinion which, it is not improbable, he had beforehand other reaſons for embracing, notwithſtanding what he himſelf would affirm to the contrary.

"It then occurred to him, that if the earth was ſuppoſed to revolve every day round its axis, from weſt to eaſt, all the heavenly bodies would appear to revolve, in a contrary direction, from eaſt to weſt. The diurnal revolution of the heavens, upon this hypotheſis, might be only apparent; the firmament, which has no other ſenſible motion, might be perfectly at reſt; while the ſun, the moon, and the five planets, might have no other movement beſide that eaſtward revolution which is peculiar to themſelves. That, by ſuppoſing the earth to revolve with the planets round the ſun, in an orbit, which comprehended within it the orbits of Venus and Mercury, but was comprehended within thoſe of Mars, Jupiter, and Saturn, he could, without the embarraſſment of epicycles, connect together the apparent annual revolutions of the ſun, and the direct, retrograde, and ſtationary appearances of the planets; that while the earth really revolved round the ſun on one ſide of the heavens, the ſun would appear to revolve round the earth on the other; that while ſhe really advanced in her annual courſe, he would appear to advance eaſtward in that movement which is peculiar to himſelf. That, by ſuppoſing the axis of the earth to be always parallel to itſelf, not to be quite perpendicular, but ſomewhat inclined to the plane of her orbit, and conſequently to preſent to the ſun the one pole when on the one ſide of him, and the other when on the other, he would account for the obliquity of the ecliptic; the ſun's ſeemingly alternate progreſſion from north to ſouth, and from ſouth to north; the conſequent change of the ſeaſons, and different lengths of days and nights in the different ſeaſons.

"If this new hypotheſis thus connected together all theſe appearances as happily as that of Ptolemy, there were others which it connected together much better. The three ſuperior planets, when nearly in conjunction with the ſun, appear always at the greateſt diſtance from the earth; are ſmalleſt, and leaſt ſenſible to the eye; and ſeem to revolve forward in their direct motion with the greateſt rapidity. On the contrary, when in oppoſition to the ſun, that is, when in their meridian about midnight,

midnight, they appear nearest the earth, are largest, and most sensible to the eye, and seem to revolve backwards in their retrograde motion. To explain these appearances, the system of Ptolemy supposed each of these planets to be at the upper part of their several epicycles in the one case, and at the lower in the other. But it afforded no satisfactory principle of connection, which could lead the mind easily to conceive how the epicycles of those planets, whose spheres were so distant from the sphere of the sun, should thus, if one may say so, keep time to his motion. The system of Copernicus afforded this easily; and like a more simple machine, without the assistance of epicycles, connected together, by fewer movements, the complex appearances of the heavens. When the superior planets appear nearly in conjunction with the sun, they are then in the side of their orbits, which is almost opposite to, and most distant from, the earth, and therefore appear smallest and least sensible to the eye. But as they then revolve in a direction which is almost contrary to that of the earth, they appear to advance forward with double velocity; as a ship that sails in a contrary direction to another, appears from that other to sail both with its own velocity and the velocity of that from which it is seen. On the contrary, when those planets are in opposition to the sun, they are on the same side of the sun with the earth, are nearest it, most sensible to the eye, and revolve in the same direction with it; but as their revolutions round the sun are slower than that of the earth, they are necessarily left behind by it, and therefore seem to revolve backwards; as a ship which sails slower than another, though it sails in the same direction, appears from that other to sail backwards. After the same manner, by the same annual revolution of the earth, he connected together the direct and retrograde motions of the two inferior planets, as well as the stationary appearances of all the five.

"Thus far did this new account of things render the appearances of the heavens more completely coherent than had been done by any of the former systems. It did this, too, by a more simple and intelligible, as well as more beautiful machinery. It represented the sun, the great enlightener of the universe, whose body was alone larger than all the planets taken together, as established immoveable in the centre, shedding light and heat on all the worlds that circulated around him in one uniform direction, but in longer or shorter periods, according to their different distances. It took away the diurnal revolution of the firmament, whose rapidity, upon the old hypothesis, was beyond what even thought could conceive. It not only delivered the imagination from the embarrassment of epicycles, but from the difficulty of conceiving these two opposite motions going on at the same time, which the system of Ptolemy and Aristotle bestowed upon all the planets; I mean, their diurnal westward, and periodical eastward revolutions. The earth's revolution round its own axis took away the necessity for supposing the first, and the second was easily conceived when by itself. The five planets, which seem, upon all other systems, to be objects of a species by themselves, unlike to every thing to which the imagination has been accustomed, when supposed to revolve along with the earth round the sun, were naturally apprehended to be objects of the same kind with the earth, habitable, opaque, and enlightened only by the rays of the sun. And thus this hypothesis, by classing them in the same species of things, with an object that is of all others the most familiar to us, took off that wonder and uncertainty which the strangeness and singularity of their appearance had excited; and thus far, too, better answered the great end of philosophy.

"Neither did the beauty and simplicity of this system alone recommend it to the imagination; the novelty and unexpectedness of that view of nature which it opened to the fancy, excited more wonder and surprise than the strangest of those appearances, which it had been invented to render natural and familiar, and these sentiments still more endeared it. For though it is the end of philosophy to allay that wonder which either the unusual or seemingly disjointed appearances of nature excite, yet she never triumphs so much as when, in order to connect together a few, in themselves perhaps inconsiderable objects, she has, if I may say so, created another constitution of things, more natural indeed, and such as the imagination can more easily attend to, but more new, more contrary to common opinion and expectation, than any of those appearances themselves. As in the instance before us, in order to connect together some seeming irregularities in the motions of the planets, the most inconsiderable objects in the heavens, and of which the greater part of mankind have no occasion to take any notice during the whole course of their lives, she has, to talk in the hyperbolical language of Tycho Brahé, moved the earth from its foundations, stopt the revolution of the firmament, made the sun stand still, and subverted the whole order of the universe.

"Such were the advantages of this new hypothesis, as they appeared to its author when he first invented it. But though that love of paradox, so natural to the learned, and that pleasure which they are so apt to take in exciting, by the novelty of their supposed discoveries, the amazement of mankind, may, notwithstanding what one of his disciples tells us to the contrary, have had its weight in prompting Copernicus to adopt this system; yet when he had completed his Treatise of Revolutions, and began coolly to consider what a strange doctrine he was about to offer to the world, he so much dreaded the prejudice of mankind against it, that, by a species of continence of all others the most difficult to a philosopher, he detained it in his closet for thirty years together. At last, in the extremity of old age, he allowed it to be extorted from him, but died as soon as it was printed, and before it was published."

Copernicus, the name of an astronomical instrument, invented by Mr Whiston, to exhibit the motion and phenomena of the planets, both primary and secondary. It is built upon the Copernican system, and for that reason called by his name.

COPHTI, Cophts, or Copti, a name given to the Christians of Egypt, who are of the sect of Jacobites.

The critics are extremely divided about the origin and orthography of the word; some write it Cophti, others Cophtites, Cophtitæ, Copts, &c. Scaliger derives the name from Coptos, an anciently celebrated town of Egypt, the metropolis of the Thebaid. Kircher refutes this opinion, and maintains, that the word originally signifies "cut" and "circumscribed;" and was

Cophti. was given these people by the Mahometans, by way of reproach, because of their practice of circumcising: but P. Sollier, another Jesuit, refutes this opinion. Scaliger afterwards changed his opinion, and derived the word from Αιγυπτος, the ancient name of Egypt, by retrenching the first syllable: but this opinion, too, P. Sollier disputes. John de Leo and others say, that the Egyptians anciently called their country *Elchibth*, or *Cibth*, from Cibth their first king, whence Cophtite, &c. others say from Cobtim second king of Egypt. Vansleb derives the word Copht from Copt, son of Misraim, grandson of Noah. All these etymologies P. Sollier rejects, on this principle, that were they true, the Egyptians ought all equally to be called *Cophti*; whereas, in effect, none but the Christians, and among those none but the Jacobites, bear the name, the Melchites not being comprehended under it. Hence he chooses to derive the word from the name *Jacobite*, retrenching the first syllable; whence Cobite, Cobea, Copta, and Cophta.

The Cophts have a patriarch who resides at Cairo, but he takes his title from Alexandria: he has no archbishop under him, but 11 or 12 bishops. The rest of the clergy, whether secular or regular, is composed of the orders of St Anthony, St Paul, and St Macarius, who have each their monasteries. Besides the orders of priests, deacons, and subdeacons, the Cophts have likewise archimandrites, the dignity whereof they confer with all the prayers and ceremonies of a strict ordination. This makes a considerable difference among the priests; and besides the rank and authority it gives them with regard to the religious, it comprehends the degree and functions of archpriests. By a custom of 600 years standing, if a priest elected bishop be not already archimandrite, that dignity must be conferred on him before episcopal ordination. The second person among the clergy, after the patriarch, is the titular patriarch of Jerusalem, who also resides at Cairo, because of the few Cophts at Jerusalem; he is, in effect, little more than the bishop of Cairo: only he goes to Jerusalem every Easter, and visits some other places in Palestine near Egypt, which own his jurisdiction. To him belongs the government of the Cophtic church, during the vacancy of the patriarchal see.

To be elected patriarch, it is necessary the person have lived all his life in continence: it is he confers the bishoprics. To be elected bishop, the person must be in the celibate; or, if he has been married, it must not be above once. The priests and inferior ministers are allowed to be married before ordination; but are not obliged to it, as Ludolphus erroneously observes. They have a great number of deacons, and even confer the dignity frequently on children. None but the lowest rank among the people commence ecclesiastics; whence arises that excessive ignorance found among them; yet the respect of the laity towards the clergy is very extraordinary. Their office is longer than the Roman office, and never changes in any thing: they have three liturgies, which they vary occasionally.

The monastic life is in great esteem among the Cophts: to be admitted into it, there is always required the consent of the bishop. The religious Cophts make a vow of perpetual chastity; renounce the world, and live with great austerity in deserts: they are obliged to sleep in their clothes and their girdle, on a mat stretched on the ground; and to prostrate themselves every evening 150 times, with their face and breast on the ground. They are all, both men and women, of the lowest class of the people; and live on alms. The nunneries are properly hospitals; and few enter but widows reduced to beggary.

Cophti, Cophtic.

F. Roderic reduces the errors and opinions of the Cophts to the following heads: 1. That they put away their wives, and espouse others while the first are living. 2. That they have seven sacraments, viz. baptism, the eucharist, confirmation, ordination, faith, fasting, and prayer. 3. That they deny the Holy Spirit to proceed from the Son. 4. That they only allow of three œcumenical councils; that of Nice, Constantinople, and Ephesus. 5. That they only allow of one nature, will, and operation, in Jesus Christ, after the union of the humanity with the divinity. For their errors in discipline, they may be reduced, 1. To the practice of circumcising their children before baptism, which has obtained among them from the 12th century. 2. To their ordaining deacons at five years of age. 3. To their allowing of marriage in the second degree. 4. To their forbearing to eat blood; to which some add their belief of a baptism by fire, which they confer by applying a hot iron to their forehead or cheeks. —Others palliate these errors, and show that many of them are rather abuses of particular persons than doctrines of the sect. This seems to be the case with regard to their polygamy, eating of blood, marrying in the second degree, and the baptism of fire; for circumcision, it is not practised as a ceremony of religion, nor as of any divine appointment, but merely as a custom which they derive from the Ishmaelites; and which, perhaps, may have had its origin from a view to health and decency in those hot countries.

The Cophts, at different times, have made several reunions with the Latins; but always in appearance only, and under some necessity of their affairs. In the time of Pope Paul IV. a Syrian was dispatched to Rome from the patriarch of Alexandria, with letters to that pope; wherein he acknowledged his authority, and promised obedience; desiring a person might be dispatched to Alexandria, to treat about a reunion of his church to that of Rome; pursuant to which, Pius IV. successor to Paul, chose F. Roderic, a Jesuit, whom he dispatched in 1561, in quality of apostolical nuncio. But the Jesuit, upon a conference with two Cophts deputed for that purpose by the patriarch, was made to know, that the titles of father of fathers, pastor of pastors, and master of all churches, which the patriarch had bestowed on the pope in his letters, were no more than mere matters of civility and compliment; and that it was in this manner the patriarch used to write to his friends: they added, that since the council of Chalcedon, and the establishment of several patriarchs independent of one another, each was chief and master of his own church. This was the answer the patriarch gave the pope, after he had received a sum of money remitted to him from Rome, by the hands of the Venetian consul.

COPHTIC, or Coptic, the language of the Cophts, the ancient language of the Egyptians, mixed with a a great deal of Greek, the characters it is written in being all Greek. It has a form and construction peculiar to itself: it has no inflections of the nouns or verbs; but expresses number, case, gender, person, mood, tense, and possessive pronouns, by letters and particles prefixed.

F. Kircher is the first who published a grammar and vocabulary of the Cophtic. There is not known any book extant in the Cophtic, except translations of the Holy Scriptures, or of ecclesiastical offices; or others that have relation thereto, as dictionaries, &c.

The ancient Cophtic is now no longer found but in books; the language now used throughout the country is Arabic. The old Cophtic, which Kircher maintains to be a mother tongue, and independent of all others, had been much altered by the Greeks: for besides that it has borrowed all its characters from the Greek, with a very little variation, a great number of the words are pure Greek. Vossius, indeed, asserts, that there was no Cophtic language till after Egypt became subject to the Arabs. The language, according to him, is a mixture of Greek and Arabic: the very name thereof not being in the world till after the Arabs were masters of the country. But this, M. Simon observes, proves nothing; except that what was anciently called *Egyptian*, has since by the Arabs been called *Cophtic*, by a corruption of speech. There are, it is true, Arabic words in the Cophtic; yet this by no means proves but that there was a language before that time, either Cophtic or Egyptian. Pietro de la Valle observes, that the Cophts have entirely lost their ancient tongue; that it is now no longer understood among them; that they have nothing extant therein but some sacred books; and that they still say mass in it.

All their other books have been translated into Arabic, which is their vulgar tongue; and this has occasioned the originals to be lost: it is added, that they rehearse the epistles and gospels in the mass twice; once in Arabic and once in Cophtic. Indeed, if we believe F. Vansleb, the Cophts say the mass in Arabic, all but the epistles and gospels, which they rehearse both in that and Cophtic.

Cophtic *Bible*. See Bible.

Cophtic *Liturgies* are three; one attributed to Basil, another to St Gregory, and the third to Cyril: they are translated into Arabic for the use of the priests and people.

COPIATA, under the western empire, a grave-digger. In the first ages of the church there were clerks destined for this employment. In the year 357 Constantine made a law in favour of the priests copiatæ, i. e. of those who had the care of interments; whereby he exempts them from the lustral contribution which all other traders paid. It was under him also that they first began to be called *copiatæ*, q. d. clerks destined for bodily labour, from κοπος, or κοπτω, *scindo, cedo, ferio*, "I cut, beat," &c. Before that time they were called *decani* and *lecticarii*; perhaps because they were divided by decades or tens, each whereof had a bier or litter for the carriage of the dead bodies. Their place among the clerks was the next in order before the chantors.

COPING *of a wall*, the top or cover of a wall, made sloping to carry off the water.

Coping over, in *Carpentry*, a sort of hanging over, not square to its upright, but bevelling on its under side till it end in an edge.

COPIST, in diplomatic science, signifies a transcriber or copier of deeds, books, &c.

COPPA, in *Law*, a cop or cock of grass, hay, or corn, divided into titheable portions; as the tenth cock, &c. This word in strictness denotes the gathering or laying up the corn in cops or heaps, as the method is for barley or oats, &c. not bound up, that it may be the more fairly and justly tithed: and in Kent they still retain the word, a *cop* or *cap* of hay, straw, &c.

COPPEL. See Cupel.

COPPER, one of the metals, called by the alchemists *Venus*, on account of its facility of uniting with a great number of different metallic substances. Its colour, when pure, is pale red, and its specific gravity from 8.7 to 9.3, which depends not only on its degree of purity, but also on its condensation by hammering. See Chemistry *Index*.

COPPERAS, a name given to the factitious sulphate of iron. See Chemistry *Index*.

COPPERPLATE. See Engraving.

COPPICE, or Copse, a little wood, consisting of under-woods, or such as may be raised either by sowing or planting.

COPTOS, in *Ancient Geography*, a famous trading town of the Thebais, inhabited by Egyptians and Arabs, some distance from the Nile; others place it in a small island in the Nile, on which, however, it had a port. Here Isis, on hearing of the death of Osiris, cut one of her locks and put on mourning; and hence the name *Coptos*, signifying privation. A proof this of the antiquity of the place. And for this reason the Isiaci, or priests of Isis, were bald, according to Juvenal.

COPULATION, the act of generation, or the congress of the male and female, otherwise called *coition*. See Generation.

COPY, in a law sense, a transcript of a writing or instrument, made for the use and satisfaction of some of the parties concerned, or in order to preserve the memory thereof.

Copy is also used for an imitation of any original work; particularly a painting, draught, figure, &c.

Copy, among printers, denotes the manuscript or original of a book given to print from.

Copy-Hold, a tenure for which a tenant has nothing to show but the copy of the rolls made by the steward of the lord's court.

It is called a base tenure; because the tenant holds the land at the will of the lord. However, it is not simply at the will of the lord, but according to the custom of the manor by which such estate is descendible, and the tenant's heirs may inherit it; and a copy-holder, so long as he does his services, and does not break the custom, cannot be ejected by the lord; and if he be, he shall have trespass against him. See the articles Tenure and Villenage.

Copy-Holder, one who is admitted tenant of lands or tenements within a manor, which time out of mind, by use and custom of the manor, have been demisable, and demised to such as will take them in fee-simple or fee-tail, for life, years, or at will, according to the custom of the manor by copy of court-roll; but is generally where the tenant has such estate either in fee or for three lives.

Copy-Right, the right which an author may be supposed to have in his own original literary compositions; so that no other person, without his leave, may publish or make profit of the copies. When a man by the exertion of his rational powers has produced an original work, he has clearly a right to dispose of that identical work as he pleases; and any attempt to take it from him, or vary the disposition he has made of it, is an invasion of his right of property. Now the identity of a literary composition consists entirely in the sentiment and the language; the same conceptions, clothed in the same words, must necessarily be the same composition: and whatever method be taken of conveying that composition to the ear, or to the eye of another, by recital, by writing, or by printing, in any number of copies, or at any period of time, it is always the identical work of the author which is so conveyed; and no other man (it hath been thought) can have a right to convey or transfer it without his consent, either tacitly or expressly given. This consent may perhaps be tacitly given when an author permits his work to be published without any reserve of right, and without stamping on it any marks of ownership; it is then a present to the public, like the building of a church, or the laying out a new highway: but in case of a bargain for a single impression, or a total sale or gift of the copy-right; in the one case the reversion hath been thought to continue in the original proprietor; in the other the whole property, with its exclusive rights, to be perpetually transferred to the grantee. On the other hand, it is urged, that though the exclusive right of the manuscript, and all which it contains, belongs undoubtedly to the owner before it is printed or published; yet from the instant of publication, the exclusive right of an author or his assigns to the sole communication of his ideas immediately vanishes and evaporates; as being a right of too subtile and unsubstantial a nature to become the subject of property at the common law, and only capable of being guarded by positive statute and special provisions of the magistrate.

The Roman law adjudged, that if one man wrote any thing, though ever so elegantly, on the paper or parchment of another, the writing should belong to the original owner of the materials on which it was written: meaning certainly nothing more thereby than the mere mechanical operation of writing, for which it directed the scribe to receive a satisfaction: especially as, in works of genius and invention, such as a picture painted on another man's canvas, the same law gave the canvas to the painter. We find no other mention in the law of any property in the works of the understanding, though the sale of literary copies, for the purposes of recital or multiplication, is certainly as ancient as the times of Terence, Martial, and Statius. Neither with us in Britain hath there been (till very lately) any final determination upon the right of authors at the common law. It was determined in the case of *Miller* v. *Taylor* in *B. R. Pasch.* 9. Geo. III. 1760, that an exclusive copy-right in authors subsisted by the common law. But afterwards, in the case of *Donaldson*, v. *Becket*, before the house of lords, which was finally determined 22d February 1774, it was held, that no copy-right subsists in authors, after the expiration of the several terms created by the statute 8 Ann. c. 19. This statute declares, that the author and his assigns shall have the whole liberty of printing and reprinting his works for the term of 14 years, and no longer; and also protects that property by additional penalties and forfeitures; directing farther, that, if at the end of that term, the author himself be living, the right shall then return to him for another term of the same duration.

COQUES, Gonzalo, an esteemed painter of portraits and conversations, was born at Antwerp in 1618, and was a disciple of the old David Ryckaert; under whose direction he applied himself diligently to cultivate those promising talents which he possessed; not only by practising the best rules administered to him by his instructor, but also by studying nature with singular attention. He was a great admirer of Vandyck; and fixing on the manner of that great artist as his model, had the happiness of so far succeeding, that next to him he was esteemed equal to any other painter of his time. In the school of Ryckaert he had been accustomed to paint conversations, and he frequently composed subjects of fancy like Teniers, Ostade, and his master; and by that habit he introduced a very agreeable style of portrait-painting, in a kind of historical coversation, which seemed much more acceptable to persons of taste than the general manner of painting portraits, and procured him great reputation and riches. In that way he composed several fine pictures for King Charles I. and likewise several for the archduke Leopold, and the prince of Orange; which latter prince, as a mark of respect, presented Coques with a rich gold chain, and a gold medal, on which the bust of that prince was impressed. He died in 1684. He had an excellent pencil; his portraits were well designed, with easy natural attitudes; he disposed the figures in his composition so as to avoid confusion or embarrassment: he gave an extraordinary clearness of colour to his heads and hands; and his touch was free, firm, and broad, a circumstance very uncommon in works of a small size.

COQUIMBO, a port town of Chili, in South America, situated at the mouth of a river of the same name, which discharges itself into the Pacific ocean. W. Long. 75. 10. N. Lat. 30. 8.

COR caroli, in *Astronomy*, an extra-constellated star in the northern hemisphere, situated between the *Coma Berenicis* and *Ursa major*, so called by Dr Halley in honour of King Charles.

Cor-Hydræ, a fixed star of the first magnitude, in the constellation of Hydra.

Cor-Leonis, in *Astronomy*, a fixed star of the first magnitude in the constellation Leo.

Cor-meille, a noted plant, common in the highlands of Scotland. Its roots dried are the support of the highlanders in long journeys, amidst the barren hills destitute of the supports of life; and a small quantity, like the alimentary powders, will for a long time repel the attacks of hunger. Infused in liquor it is an agreeable beverage, and, like the nepenthe of the Greeks, exhilarates the mind. From the similitude of of found in the name, it seems to be the same with chara, the root discovered by the soldiers of Cæsar at Dyrrhachium, which steeped in milk was such a relief to the famished army. Or we may reasonably believe it to have been the Caledonian food described by Dio, of which the quantity of a bean would prevent both hunger and thirst; and this, says the historian, they have ready for all occasions.

CORACIAS, the ROLLER, a genus of birds of the order of picæ. See ORNITHOLOGY *Index*.

CORACO-BRACHIALIS, in *Anatomy*, the name of a muscle in the arm, serving to raise it upwards.

CORACOIDES, in *Anatomy*, a small short process of the scapula. See ANATOMY *Index*.

CORACOMANTES, in antiquity, persons who foretold events from their observations on crows.

CORALLINA, or CORAL, in *Zoology*, a genus belonging to the order of vermes zoophyta. See HELMINTHOLOGY *Index*.

CORAL FISHERY. Red coral is found in the Mediterranean, on the shores of Provence; from Cape de la Couronne to that of St Tropez; about the isles of Majorca and Minorca; on the south of Sicily; on the coasts of Africa; and, lastly, in the Ethiopic ocean, about Cape Negro.

CORAL-Stone, a name for a kind of red and white agate which breaks in veins, and is found in Italy and some parts of Saxony. That of Rochlitz in Saxony is the most celebrated, and is found in globules which have a kind of crust about them.

CORALLINES, a genus belonging to the vermes zoophyta. See HELMINTHOLOGY *Index*.

CORALLODENDRON. See ERYTHRINA, BOTANY *Index*.

CORALLOIDES (FRUTICES). See ESCHARA and KERATOPHYTA.

CORAM, *Captain* THOMAS, a gentleman remarkably distinguished by his humanity, was born about the year 1668, and spent the early part of his life in the station of master of a vessel trading to our colonies. Afterwards residing in the eastern part of the metropolis, among sea-faring peole, where business often obliged him to come early into the city, and return late, he frequently saw young children exposed in the streets through the indigence or cruelty of their parents. This excited his compassion, and induced him to project the foundation of an hospital for foundlings. In this humane design he laboured with indefatigable diligence for seventeen years; and by his application procured a number of the nobility and gentry to patronize and carry the scheme into execution, and at length obtained the royal charter for it. He was also highly instrumental in promoting the trade of America, by procuring a bounty upon naval stores imported from our colonies. He was likewise eminently concerned in setting on foot the colonies of Georgia and Nova Scotia. His last charitable design, in which he lived to make some progress, was a scheme for uniting the North American Indians more closely to the British interest, by an establishment for the education of Indian girls. In short, he spent the greatest part of life in labouring for the public, and experienced a fate too common in those who devote their talents to such laudable purposes; being at last indebted for subsistence to the voluntary subscriptions of some public-spirited persons, at the head of whom was the late Frederic prince of Wales. Captain Coram died in 1751; and was interred, at his own desire, in a vault under the chapel of the Foundling Hospital.

CORAN, or ALCORAN. See ALCORAN.

CORAX, the trivial name of a species of CORVUS. See ORNITHOLOGY *Index*.

CORANICH, among the Scotch and Irish, the custom of singing at funerals, anciently prevalent in those countries, and still practised in several parts. Of this custom Mr Pennant gives the following account. "I had not the fortune to be present at any in North Britain; but formerly assisted at one in the south of Ireland, where it was performed in the fulness of horror. The cries are called by the Irish the *ulogohne* and *hullulu*; two words very expressive of the sound uttered on these occasions; and being of Celtic stock, etymologists would swear to be the origin of the ὀλολυγων of the Greeks and *ululatus* of the Latins. Virgil is very fond of using the last whenever any of his females are distressed; as are others of the Roman poets, and generally on occasions similar to this. It was my fortune to arrive at a certain town in Kerry at the time that a person of some distinction departed this life; my curiosity led me to the house, where the funeral seemed conducted in the purest classical form.

> *Quodcunque aspiceret luctus, gemitusque sonabant,*
> *Formaque non taciti funeris intus erat.*

In short, the *conclamatio* was set up by the friends in the same manner as Virgil describes that consequential of Dido's death;

> *Lamentis, gemituque, et fœmineo ululatu*
> *Tecta fremunt.*

Immediately after this followed another ceremony, fully described by Camden in his account of the manners of the ancient Irish; the earnest expostulations and reproaches given to the deceased for quitting this world, where she enjoyed so many blessings, so good a husband, and such fine children. This custom is also of great antiquity, for Euryalus's mother makes the same address to her dead son.

> ——*Tunc illa senectæ*
> *Sera meæ requies? potuisti relinquere solam,*
> *Crudelis?*

But when the time approached for carrying out the corps, the cry was redoubled,

> *Tremulis ululatibus æthera complent;*

a numerous band of females waiting in the outer court to attend the hearse, and to pay in chorus the last tribute of their voices. The habit of this sorrowing train, and the neglect of their persons, were admirably suited to the occasion; their robes were black and flowing, resembling the ancient palla; their feet naked, their hair long and dishevelled: I might truly say,

> *Ut qui conducti plorant in funera, dicunt*
> *Et faciunt prope plura dolentibus exanimo.*

The corpse was carried slowly along the verge of a most beautiful lake, the ululatus was continued, and the

the whole proceſſion ended among the venerable ruins of an old abbey."

CORBAN, in Jewiſh antiquity, were thoſe offerings which had life, in oppoſition to the *minchah*, or thoſe which had not. It is derived from the word *karab*, which ſignifies "to approach;" becauſe the victims were brought to the door of the tabernacle. The corban were always looked upon as the moſt ſacred offerings. The Jews are reproached with defeating, by means of the corban, the precept of the fifth commandment, which enjoins the reſpect due to parents. For when a child had no mind to relieve the wants of his father or mother, he would ſay to them, "It is a gift (*corban*) by whatſoever thou mighteſt be profited by me;" i. e. "I have devoted that to God which you aſk of me, and it is no longer mine to give."

Corban is alſo a ceremony which the Mahometans perform at the foot of Mount Arrafat in Arabia, near Mecca. It conſiſts in killing a great number of ſheep, and diſtributing them among the poor.

CORBEILS, in *Fortification*, little baſkets about a foot and a half high, eight inches wide at the bottom and twelve at the top; which being filled with earth, are frequently ſet one againſt another upon the parapet or elſewhere, leaving certain port holes, from whence to fire upon the enemy under covert without being ſeen by them.

CORBEL, in *Architecture*, the repreſentation of a baſket, ſometimes ſeen on the heads of caryatides. The word is alſo uſed for the vaſe, or tambour, of the Corinthian column; ſo called from its reſemblance to a baſket, or becauſe it was firſt formed on the model of a baſket.

Corbel, or *Corbil*, is alſo uſed, in building, for a ſhort piece of timber placed in a wall, with its end ſticking out ſix or eight inches, as occaſion ſerves, in manner of a ſhouldering-piece. The under part of the end thus ſticking out is ſometimes cut into the form of a boultin; ſometimes of an ogee, and ſometimes of a face, &c. according to the workman's fancy; the upper ſide being plain and flat.

Corbel is alſo uſed by ſome architects for a niche or hollow left in walls for images, figures, or ſtatues to ſtand in.

CORBET, Richard, biſhop of Norwich, and an eminent poet, was born at Ewell in Surry, toward the latter end of the 16th century; and educated at Oxford, where he was eſteemed one of the moſt celebrated wits of the univerſity. Entering into holy orders, he became a popular preacher, and was made chaplain to King James I.: when, after ſeveral preferments in the church, he was, in 1629, made biſhop of Oxford; and, in 1632, was tranſlated to the ſee of Norwich. He was very hoſpitable, and always a generous encourager of public deſigns. He died in 1635. There have been ſeveral editions of his poems publiſhed under the title of *Poemata Stromata*.

CORBEY, a town of Picardy in France, with a famous abbey of Benedictine monks. It is ſeated on the river Somme, 10 miles eaſt of Amiens, and 75 north of Paris. E. Long. 2. 35. N. Lat. 49. 55.

CORCELET, in *Natural Hiſtory*, that part of the fly-claſs which is analogous in its ſituation to the breaſt in other animals. Many have called it the breaſt in theſe alſo, but improperly; becauſe the breaſt of other animals is the place of the lungs and trachea, but theſe organs are in the fly-claſs diſtributed through the whole body.

CORCHORUS: A genus of plants belonging to the polyandria claſs; and in the natural method ranking under the 37th order, *Columneæ*. See Botany *Index*.

CORCULUM, a diminituve from *cor* "the heart," little heart; the eſſence of a ſeed, and principle of life of the future plant, attached to and contained within the lobes. It conſiſts of two parts, termed by Linnæus Plumula and Rostellum. The former is the *radicula* of Grew and other naturaliſts. The corculum is in fact the embryo of the future vegetable; and is attached by two trunks of veſſels to the lobes at their union. The firſt of its two parts mounts upward, and becomes the trunk. The other ſtrikes into the ground, and is the rudiment of the root. The lobes and heart of the ſeed are diſtinctly viſible in the bean, and other ſeeds of that claſs, eſpecially after remaining ſome time in water or earth.

The principle of life is ſeated either at the ſummit or baſe of the ſeed. From this circumſtance are conſtructed the two firſt claſſes in Cæſalpinus's method, containing trees and ſhrubs only.

CORCYRA, in *Ancient Geography*, an iſland in the Ionian ſea, oppoſite to Theſprotia, a diſtrict of Epirus, called *Scheria* and *Phæacia* by Homer. In Callimachus it is called *Drepane;* its moſt ancient name, according to the Scholiaſt, from the curvity of its figure. Famous for the ſhipwreck of Ulyſſes and the gardens of Alcinous. Now *Corfu*.

Corcyra, a cognominal town of the iſland; formerly powerful, and capable of coping with mighty ſtates; ſituated about the middle of the eaſt ſide of the iſland, called *The Town of the Phæacians* by Homer. Now *Corfu*, from the Κορυφω of the middle age, the name of the citadel. It was a colony of the Corinthians. *Corcyræi*, the people. E. Long. 19. 48. Lat. 39. 50.

Corcyra *Nigra*, an iſland in the Adriatic, on the coaſt of Dalmatia (Pliny); called *Melæna* by the Greeks, to diſtinguiſh it from the iſland in the Ionian ſea. The epithet *Nigra* was added, from its woods of tall trees with which it is almoſt covered. Now *Curzola*.

CORD, or Chord, an aſſemblage of ſeveral threads of hemp, cabled or twiſted together by means of a wheel. See Cordage. The word comes from the Greek χορδη, which properly ſignifies an inteſtine or gut, of which cords may be made. See Chord.

Magical Cord, an inſtrument in great uſe among the Laplanders, and by them ſuppoſed to be endued with a number of virtues. It is a cord or rope with three knots tied in it. They uſe many magical rites and ceremonies in the tying of this cord; and, when thus prepared, it is ſuppoſed to have power over the winds; and they will ſell, by means of it, a good wind, or at leaſt the promiſe of one, to a ſhip. If they untie only one of theſe knots, a moderate gale ſucceeds; if two, it is much ſtronger: and if three, a ſtorm is ſure to follow.

Cord *of Wood*, a certain quantity of wood for burning,

ing, ſo called becauſe formerly meaſured with a cord. The dimenſions of a ſtatute cord of wood are eight feet long, four feet high, and four feet broad.

Cord-*Wood*, is new wood, and ſuch as, when brought by water, comes on board a veſſel, in oppoſition to that which is floated.

CORDAGE, a term uſed in general for all ſorts of cord, whether ſmall, middling, or great. See Rope.

The naval cordage of the earlier ages was in all probability only thongs of leather. Theſe primitive ropes were retained by the Caledonians in the third century. The nations to the north of the Baltic had them in the ninth or tenth centuries: and the inhabitants of the weſtern iſles of Scotland make uſe of them at preſent; cutting the ſkin of a ſeal, or the raw and ſalted hide of a cow, into long pieces, and faſtening the plough to their horſes with them, or even twiſting them into ſtrong ropes of 20 or 30 fathoms length. But theſe, in the ſouth of our iſland, and on the continent, were early ſuperſeded by the uſe of iron chains. The very maritime and commercial nation of the Veneti, that were ſo intimately connected with the Belgæ of Britain, uſed iron chains for their cables in the days of Cæſar. But in the more diſtant and refined countries of the ſouth, both thongs and theſe had long given place to the uſe of vegetable threads and the arts of combining them into ſtrength. In this manner the Greeks appear to have uſed the common ruſhes of their country, and the Carthaginians the ſpartum or broom of Spain. And as all the cordage of the Romans was made of theſe materials at their laſt deſcent on our iſland, ſo the art of manufacturing them would be neceſſarily introduced with the Roman ſettlements among the Britons. Under the direction of Roman artiſts their thongs of leather would naturally be laid aſide, and the junci, or ruſhes of the plains, worked up into cordage. And what remarkably coincides with this opinion is, that the remains of old cables and ropes are ſtill diſtinguiſhed among the Britiſh ſailors by the name of *old junk*.

The nations of Roman Britain, and the tribes of Caledonia and Ireland, had inherited, from their earlieſt anceſtors, many of the ruder arts of navigation. Their ſhips were large open boats, framed of light timbers ribbed with hurdles and lined with hides. Theſe were furniſhed with maſts and ſails. The latter were formed of hides, as the tackle was of thongs. They were actually of hides among the Veneti as late as the days of Cæſar; and they were never furled, but only bound to the maſt. But theſe ſlight ſea-boats, and their rude furniture, would ſoon be diſmiſſed by the provincials for the more ſubſtantial veſſels and more artificial ſails of the Romans. The Roman ſails, which were compoſed of flax in the days of Agricola, were afterwards made of hemp; and our own are therefore denominated *cannabis* or *canvas* by our mariners at preſent. And about the ſame period aſſuredly did the junk of the Britiſh cordage give way to the ſame materials; the uſe of hempen ropes upon land, and of hempen nets for hunting, being very common among the Romans in the firſt century.

CORDATED, an appellation frequently given by naturaliſts to things ſomewhat reſembling a heart.

CORDED, in *Heraldry*. A croſs corded, ſome authors take for a croſs wound or wrenched about with cords: others, with more probability, take it for a croſs made of two pieces of cord.

CORDELERAS, mountains of South America, otherwiſe called Andes.

CORDELIER, a Franciſcan, or religious of the order of St Francis. The Cordeliers are clothed in thick grey cloth, with a little cowl, a chaperon, and cloak of the ſame; having a girdle of rope or cord tied with three knots: whence the name.—They are otherwiſe called *Minor Friars*, their original name. The denomination *Cordelier* is ſaid to have been firſt given them in the war of St Louis againſt the infidels; wherein the Friars Minor having repulſed the barbarians, and that king having inquired their name, it was anſwered, they were people *cordeliez*, "tied with ropes." The Cordeliers are to a man profeſſed Scotiſts.

CORDEMOI, Geralde, a learned philoſopher and hiſtorian, born at Paris, made himſelf known to M. Boſſuet, who placed him about the dauphin in the quality of reader. He inſtructed that young prince with great aſſiduity; and in 1675 was received into the French academy. He wrote a general hiſtory of France during the firſt races of the French kings, in two vols; and ſix diſcourſes on the diſtinction between Body and Soul, which were printed together in 1702 in quarto. He died in 1684. M. Cordemoi followed the principles of Deſcartes.

CORDIA: A genus of plants belonging to the pentandria claſs, and in the natural method ranking under the 41ſt order, *Aſperifoliæ*. See Botany *Index*.

CORDIAL, in *Medicine*, whatever raiſes the ſpirits, and gives them a ſudden ſtrength and cheerfulneſs; as wine, ſpirits, the effluvia of flowers, fruit, and many other ſubſtances.

CORDON, in *Fortification*, a row of ſtones, made round on the outſide, and ſet between the wall of the fortreſs which lies aſlope, and the parapet which ſtands perpendicular, after ſuch a manner, that this difference may not be offenſive to the eye; whence the cordons ſerve only as an ornament, ranging round about the place, being only uſed in fortifications of ſtone-work: for in thoſe made with earth the void ſpace is filled up with pointed ſtakes.

CORDUBA, in *Ancient Geography*, an illuſtrious city of Bætica, on the right or north ſide of the Bætis. Built by Marcellus, according to Strabo; but which Marcellus is not ſo clear. It was the firſt colony ſent into thoſe parts by the Romans; and ſurnamed *Patricia*, becauſe at firſt inhabited by principal men, both of the Romans and natives. It is mentioned by Sil. Italicus in the ſecond Punic war; and hence it is probable the firſt Marcellus was the founder, and not the Marcellus engaged in the civil war between Cæſar and Pompey. It was famous for the birth of the two Senecas and of Lucan (Martial), and for its rich produce in oil (Statius, Martial). Still retaining its name a little altered. W. Long. 5. Lat. 37. 45.

CORDOUA, or Cordova, a city of Andaluſia in Spain, ſituated on the river Guadelquiver, in a very extenſive plain. The circumference is large; but it is not peopled in proportion to its extent, for there are a great many orchards and gardens within the walls. There are many ſuperb ſtructures, palaces, churches, and religious houſes; particularly the cathedral, which is very magnificent: It was formerly a moſque when the Moors poſſeſſed the town; for which reaſon it ſtill retains the name of *Mezquita*, which has the ſame meaning. The cathedral is very rich in plate; four of the ſilver candleſticks coſt 850l. a-piece. The revenue of the ſee amounts to 3500l. *per annum*; but as the biſhops cannot deviſe by will, all they die poſſeſſed of eſcheats to the crown. The ſquare called the *Plaza Major* is ſurrounded with very fine houſes, under which are piazzas. The trade is flouriſhing on account of the river; and conſiſts of wine, ſilk, and Cordovan leather. In the neighbourhood of this place are a vaſt number of orange and lemon trees, which renders their fruits exceeding cheap. The beſt horſes in Spain come from hence.

Cordova was the ancient *Corduba* mentioned in the preceding article. After the fall of the Roman empire, it was ſubjected to the dominion of the Goths; but in the eighth century it was raiſed by the Mooriſh princes to a ſtate of ſplendor unequalled in any other part of the world. In the year 755, Abdoulrahman, only heir-male of the Ommiad line, having paſſed over from Africa at the head of a few deſperate followers, found means to raiſe a rebellion in Spain; when, after a battle fought on the banks of the Guadelquiver, in which he overthrew the lieutenant of the Abaſſid caliph of Damaſcus, he became king of all the Mooriſh poſſeſſions in the ſouth of Spain, and in 759 fixed his royal reſidence at Cordova. Then began thoſe flouriſhing ages of Arabian gallantry and magnificence which rendered the Moors of Spain ſuperior to all their co-temporaries in arts and arms, and made Cordova one of the moſt ſplendid cities of the world. Agriculture and commerce proſpered under the happy ſway of this hero; and the face of the country was changed from a ſcene of deſolation, which the long wars and harſh government of the viceroys had brought on, into a moſt populous flouriſhing ſtate, exceeding in riches, number of inhabitants, activity, and induſtry, any prior or ſubſequent era of the Spaniſh hiſtory. He added new fortifications to the town, built himſelf a magnificent palace with delicious gardens, laid cauſeways through the marſhes, made excellent roads to open ready communication between the great towns, and in 786 began the great moſque, which he did not live to finiſh.

During the courſe of two centuries, this court continued to be the reſort of all profeſſors of the polite arts, and of ſuch as valued themſelves upon their military and knightly accompliſhments; whilſt the reſt of Europe was buried in ignorance, debaſed by brutality of manners, or diſtracted by ſuperſtitious diſputes. England, weakened by its heptarchy, was too inconſiderable even to be mentioned in the political hiſtory of the times. France, though it had a gleam of reputation under Charlemagne, was ſtill a barbarous unpoliſhed nation: and Italy was in utter confuſion; the frequent revolutions and change of maſters rendering it impoſſible for learning, or any thing good to acquire a permanent footing in ſo unſtable a ſoil: Greece, though ſtill in poſſeſſion of the arts and luxury of ancient Rome, had loſt all vigour, and ſeemed abſorbed in the moſt futile of all purſuits, viz. that of ſcholaſtic argument and religious ſubtilities.

The reſidence of the Ommiad caliphs was long conſpicuous for its ſupreme magnificence, and the crowds of learned men who were allured to it by the protection offered by its ſovereigns, the beauty of the country, the wholeſomeneſs of the climate, and the variety of pleaſures that returned inceſſantly in one enchanting round.

Cordova became the centre of politeneſs, induſtry, and genius. Tilts and tournaments, with other coſtly ſhows, were long the darling paſtimes of a wealthy happy people; and this was the only kingdom in the weſt where geometry, aſtronomy, and phyſic, were regularly ſtudied and practiſed. Muſic was no leſs honoured; for we find, that in 844 a famous muſician called *Ali Zeriab* came to ſettle at Cordova, and formed ſeveral pupils, who were ſuppoſed to equal the moſt celebrated performers that were ever known even in the Eaſt. That architecture was greatly encouraged, we need no other proof than the great and expenſive fabrics undertaken and completed by many of theſe Spaniſh monarchs. Whatever faults may be juſtly condemned in their manner by the connoiſſeur, accuſtomed to the chaſte noble graces of the Grecian proportions, certainly nobody can behold what remains of theſe Mooriſh edifices, without being ſtrongly impreſſed with a high idea of the genius of the artiſts, as well as the grandeur of the prince who carried their plans into execution.

Theſe ſultans not only gave the moſt diſtinguiſhed protection to arts and ſciences, and to the perſons learned in any of them, but were themſelves eminently verſed in various branches of knowledge. Alkahem II. collected ſo immenſe a quantity of manuſcripts that before the end of his reign the royal library contained no leſs than 600,000 volumes, of which the very catalogue filled 40 huge folios. The univerſity of Cordova was founded by him, and under ſuch favourable auſpices roſe to the higheſt pitch of celebrity.

Abdoulrahman was ſucceeded by his ſon Hiſſem, whoſe paſſion for glory and architecture was not in the leaſt inferior to that of his father. He put the finiſhing hand to the moſque, which the plunder of the ſouthern provinces of France enabled him to complete in the courſe of a few years. The bridge over the Guadelquiver was a work of Hiſſem's after his own plan.

Alkahem ſucceeded Hiſſem.

Abdoulrahman II. was alſo paſſionately fond of building. He was the firſt that brought the ſupplies of water to Cordova by means of leaden pipes laid upon aqueducts of ſtone. The quantity was ſo conſiderable, that every part of the palace, the moſques, baths, ſquares, and public edifices, had all of them their fountains conſtantly playing. A great many of theſe works ſtill ſubſiſt. He paved the whole city, and erected ſeveral moſques.

After him reigned Mahomet Almundar, Abdallah, and Abdoulrahman III. who ſurpaſſed all his predeceſſors in ſplendor, riches, and expence. His ſubjects vied with each other in profuſion and magnificence. This monarch was ſucceeded by his ſon Alkahem II. who left a minor to ſucceed him, and the kingdom to be governed by the famous viſir Mahomet Abenamir, ſurnamed

Corduan || Corea.

named *Almanzor*, or "the defender," from his great victories and wise conduct. His descendants inherited from him the visirship, and a power as absolute as if they had been caliphs, until the weakness of the sovereigns encouraged, and the insolence of the ministers provoked, the grandees to disturb the state with their jealousies and dissensions. These broils occasioned such a series of civil war and anarchy, as overthrew the throne of Cordova, and destroyed the whole race of Abdoulrahman. Thus the glorious edifice, founded by the valour and prudence of that conqueror, and cemented by similar virtues in many of his successors, sunk into nothing as soon as the sceptre devolved upon weak enervated princes, whose indolence and incapacity transferred the management of every thing to a visir. Many petty kingdoms sprung up out of the ruins of this mighty empire; and the Christians soon found opportunities of destroying, by separate attacks, that tremendous power, which when united had proved an overmatch for their utmost force.

New CORDOVA, a considerable town of South America, in the province of Tucuman, with a bishop's see, 175 miles from St Jago. W. Long. 62. 5. S. Lat. 32. 10.

CORDUAN, a famous pharos or light-house of France, in Guienne, at the mouth of the river Girond. The architecture is extremely fine; and it is placed there to hinder vessels from running on the sand-banks at the mouth of the river. W. Long. 1. 9. N. Lat. 45. 36.

CORDUS, VALERIUS, a learned botanist, was the son of Ericius Cordus, a physician and poet of Germany. Having learned the languages, he applied himself to the study of botany, in the prosecution of which he examined the mountains of Germany, and travelled into Italy; but being wounded in the leg by the kick of a horse, died at Rome in 1554. He wrote Remarks on Dioscorides, and other works.

CORDWAINERS, or CORDINERS, the term whereby the statutes denominate *shoemakers*. The word is formed from the French *cordonnier*, which Menage derives from *corduan*, a kind of leather brought from Cordoua, whereof they formerly made the upper leathers of their shoes. Others derive it from *corde* "rope," because anciently shoes were made of cords; as they still are in some parts of Spain, under the name of *alpargates*. But the former etymology is better warranted; for, in effect, the French workmen who prepare the corduas are still called *cordouanniers*.

In Paris they have two pious societies under the titles of *freres cordonniers*, "brothers shoemakers," established by authority towards the middle of the 17th century; the one under the protection of St Crispin *, the other of St Crispianus, two saints who had formerly honoured the profession. They live in community, and under fixed statutes and officers; by which they are directed both in their spiritual and secular concerns. The produce of their shoes goes into a common stock, to furnish necessaries for their support; the rest to be distributed among the poor.

* See *Crispin*.

COREA, a peninsula lying to the north-east of China, between 99 and 109 degrees of E. Long. and between 32 and 46 of N. Lat. It is divided into 8 provinces, which contain 40 cities of the 1st rank, 51 of the 2d, and 70 of the 3d. The capital of the whole is Han-ching, where the king resides. The Jesuits say, the people are well made, of a sweet and tractable disposition, and fond of learning, music, and dancing, and in general resemble the Chinese. Their houses are mean, being covered with thatch; and they have no beds, but lie on the floor. They have little silk, and therefore make use of linen cloth in its room. Their trade consists in white paper, pencils, ginseng, gold, silver, iron, yellow varnish, fowls whose tails are three feet long, horses no more than three feet in height, sable skins, castor, and mineral salt. In general it is a fertile country, though abounding in mountains. It is tributary to China.

M. Grosier relates an observation concerning the natural history of Corea, which, in his opinion, furnishes a new proof of the revolutions which the surface of our globe has undergone. An ancient Chinese book asserts, that the city where Kipe, the king of Corea, established his court, was built in a place which forms at present a part of the territories of *Yong-ping-fou*, a city of the first class in the province of Petcheli. "If this (says he) be admitted as a fact, we may from thence conclude, that these territories formerly belonged to Corea; and that the gulf of Lea-tong, which at present separates this kingdom from the province of Petcheli, did not then exist, and that it has been formed since; for it is not probable that the sovereign would have fixed his residence without the boundaries of his kingdom, or in a place where he was separated from it by a wide and extensive sea. This conjecture is confirmed by certain facts admitted by the Chinese. Thus when *Yu*, surnamed the *Great*, undertook to drain and carry off the waters which had inundated the low grounds of several provinces, he began by the river Hoang-ho, the overflowing of which caused the greatest devastation. He went in search of its source to the bosom of Tartary, from whence he directed its course across the provinces of Chan-si, Chen-si, Honan, and Petcheli. Towards its mouth, in order to weaken the rapidity of its waters, he divided them into nine channels, through which he caused the river discharge itself into the eastern sea near the mountain of *Kie-che-chan*, which then formed a promontory. Since that time to the present, that is, about 3950 years, the river Hoang-ho has departed so much from its ancient course, that its mouth at present is about six degrees farther south. We must also remark, that the mountain Kie-che-chan, which was formerly united to the main land of Yong-ping-fou, stands at present in the sea at the distance of about 50 leagues to the south of that city. If the sea has been able to cover with its waters that extent of territory which at present forms part of the gulf of Lea-tong, may we not be allowed to suppose that like inundations may have formed successively the whole of that gulf, the ancient existence of which seems so ill to agree with the residence of the kings of Corea in the territories of Yong-ping-fou? It is true, the Chinese history makes no mention of so considerable a physical revolution: but it is equally silent with regard to the 500 *lys* (50 leagues) extent of ground which is at present covered by the sea beyond the mountains of Kie-che-chan. Besides, of all the changes which the surface of our globe experiences, those only are

Corea.

are mentioned in hiſtory which happen ſuddenly, and which conſequently make more impreſſion on the minds of men.

Corea chiefly produces wheat, rice, and ginſeng, with a kind of palm tree which yields a gum capable of producing a yellow varniſh little inferior to gilding. Hence alſo are exported caſtor and ſable ſkins; alſo gold, ſilver, iron, and foſſil ſalt; a kind of ſmall bruſhes for painting, made of the hair of a wolf's tail, are likewiſe manufactured here, which are exported to China and highly eſteemed there. The ſea coaſts abound in fiſh, and great numbers of whales are found there every year towards the north-eaſt. Several of theſe, it is ſaid, have in their bodies the harpoons of the French and Dutch, from whom they have eſcaped in the northern extremities of Europe; which ſeems to indicate a paſſage from the European into the Aſiatic ſeas round the continents of Europe and Aſia.

A conſiderable quantity of the paper of Corea is annually imported into China; indeed the tribute due to the emperor is partly paid with it every year. It is made of cotton, and is as ſtrong as cloth, being written upon with a ſmall hair-bruſh or pencil; but muſt be done over with alum-water before it can be written upon in the European manner. It is not purchaſed by the Chineſe for writing, but for filling up the ſquares of their faſh-windows; becauſe, when oiled, it reſiſts the wind and rain better than that of China. It is uſed likewiſe as wrapping paper; and is ſerviceable to the tailors, who rub it between their hands until it becomes as ſoft and flexible as the fineſt cotton cloth, inſtead of which it is often employed in lining clothes. It has alſo this ſingular property, that if it be too thick for the purpoſe intended, it may be eaſily ſplit into two or three leaves, each of which is even ſtronger than the beſt paper of China.

The Coreans are well made, ingenious, brave, and tractable; are fond of dancing, and ſhow great docility in acquiring the ſciences, to which they apply with great ardour, and which they honour in a particular manner. The northern Coreans are larger ſized and more robuſt than thoſe of the ſouth; have a taſte for arms, and become excellent ſoldiers. Their arms are croſs-bows and long ſabres. Men of learning are diſtinguiſhed from other claſſes of people by two plumes of feathers in their caps; and when merchants preſent the Coreans with any books for ſale, they dreſs themſelves in the richeſt attire, and burn perfumes before they treat concerning the price.

The Coreans mourn three years, as in China, for a father or mother: but the time of mourning for a brother is confined to three months. Their dead are not interred until three years after their deceaſe; and when the ceremony of interment is performed, they place around the tomb the clothes, chariot, and horſes of the deceaſed, with whatever elſe he ſhowed the greateſt fondneſs for while alive; all which they leave to be carried off by the aſſiſtants. Their houſes, as in China, conſiſt only of one ſtory, and are very ill built; in the country being compoſed of earth, and in cities generally of brick, but all thatched with ſtraw; the walls of their cities are conſtructed after the Chineſe manner, with ſquare turrets, battlements, and arched gates. Their writing, dreſs, religious ceremonies, and creed, as well as the greater part of their cuſtoms, are borrowed from the Chineſe. Their women, however, are leſs confined, and have the liberty of appearing in public with the other ſex, for which they are often ridiculed by their neighbours. They differ from the Chineſe alſo in their ceremonies of marriage, and in the manner of contracting it; the parties in this country taking the liberty to chooſe for themſelves, without conſulting the inclinations of their parents, or ſuffering them to throw any obſtacles in their way.

Corea ‖ Corelli.

COREIA, in antiquity, a feſtival in honour of Proſerpine, named *Core*, Κορη, which, in the Moloſſian dialect ſignifies a beautiful woman.

CORELLI, Arcangelo, the famous Italian muſician and compoſer, a native of Fuſignano, in the territory of Bologna, was born in 1653. He entertained an early propenſity to the violin; and as he advanced in years, laboured inceſſantly in the practice of that inſtrument. About the year 1672, his curioſity led him to viſit Paris, probably with a view to attend the improvements which were making in muſic under the influence of Cardinal Mazarine, and in conſequence of the eſtabliſhment of a royal academy; but notwithſtanding the character which he brought with him, he was driven back to Rome by Lully, whoſe jealous temper could not brook ſo formidable a rival as this illuſtrious Italian. In the year 1680 he viſited Germany, and met with a reception ſuitable to his merit from moſt of the German princes, particularly the elector of Bavaria; in whoſe ſervice he was retained, and continued for ſome time. After about five years ſtay abroad, he returned again to Rome, and there purſued his ſtudies with great aſſiduity.

The proficiency of Corelli on his favourite inſtrument the violin was ſo great, that the fame of it ſpread throughout Europe. The ſtyle of his performance was learned, elegant, and pathetic; and his tone firm and even. Mr Geminiani, who was well acquainted with, and had ſtudied it, uſed to reſemble it to a ſweet trumpet. A perſon who had heard him perform ſays, that, whilſt he was playing on the violin, it was uſual for his countenance to be diſturbed, his eyes to become as red as fire, and his eye-balls to roll as in an agony.

Corelli was highly favoured by that great patron of poetry and muſic, Cardinal Ottoboni. Creſcembini ſays, that he regulated the muſical academy held at the palace of his eminence every Monday afternoon. Here it was that Mr Handel became acquainted with him; and in this academy a ſerenata of Mr Handel, entitled *Il Trionfo del Tempo*, was performed, the overture to which was in a ſtyle ſo new and ſingular, that Corelli was confounded in his firſt attempt to play it.

During the reſidence of Corelli at Rome, beſides thoſe of his own country, many perſons were ambitious of becoming his diſciples, and learning the practice of the violin from the greateſt maſter on that inſtrument the world had then heard of. Of theſe it is ſaid the late Lord Edgecumbe was one: and that the fine mezzotinto print of Corelli by Smith was ſcraped from a picture painted by Mr Hugh Howard at Rome for that nobleman.

Corelli died at Rome in 1713; and was buried in the church of the Rotunda, otherwiſe called the Pantheon,

theon, in the firſt chapel on the left hand of the entrance. Over the place of his interment is a ſepulchral monument to his honour, with a marble buſt thereon, erected at the expence of Philip William, count palatine of the Rhine, under the care and direction of Cardinal Ottoboni.

For many years after his deceaſe, this excellent muſician was commemorated by a ſolemn muſical performance in the Pantheon, on the anniverſary of his death. In the year 1730 an eminent maſter, now living, was preſent at that ſolemnity, who relates that at it the third and eighth of his concertos were performed by a numerous band, among whom were many who had been the pupils of the author. He adds, that theſe two pieces were performed in a ſlow, diſtinct, and firm manner, without graces, and juſt as they are wrote; and from hence concludes, that this was the manner in which they were played by the author himſelf.

He died poſſeſſed of about 6000l. ſterling. He was a paſſionate admirer of pictures, and lived in an uninterrupted friendſhip with Carlo Cignani and Carlo Marat: theſe two eminent painters were rivals for his favour; and for a ſeries of years preſented him at times with pictures, as well of other maſters as of their own painting. The conſequence was, that Corelli became poſſeſſed of a large and valuable collection of original paintings; all which, together with the ſum abovementioned, he bequeathed to his dear friend and patron Cardinal Ottoboni, who reſerving the pictures to himſelf, generouſly diſtributed the reſt of his effects among the relations of the teſtator.

Corelli is ſaid to have been remarkable for the mildneſs of his temper and the modeſty of his deportment; nevertheleſs, he was not inſenſible of the reſpect due to his ſkill and exquiſite performance. Cibber, in the Apology for his Life, p. 340. relates, that when he was playing a ſolo at Cardinal Ottoboni's, he diſcovered the cardinal and another perſon engaged in diſcourſe, upon which he laid down his inſtrument; and being aſked the reaſon, gave for anſwer, that he feared the muſic interrupted their converſation.

The compoſitions of Corelli are celebrated for the harmony reſulting from the union of all the parts; but the fineneſs of the airs is another diſtinguiſhing characteriſtic of them: the allemand in the 10th ſolo is as remarkable for ſpirit and force, as that in the 11th is for its enchanting delicacy: his jigs are in a ſtyle peculiarly his own: and that in the 5th ſolo was never equalled. In the gavot movements in the 2d and 4th operas, the melody is diſtributed with great judgment among the ſeveral parts. In his minuets alone he ſeems to fail; Bononcini, Mr Handel, and Guiſeppe Martini, have excelled him in this kind of airs.

It is ſaid there is in every nation a ſtyle both in ſpeaking and writing, which never becomes obſolete; a certain mode of phraſeology, ſo conſonant and congenial to the analogy and principles of its reſpective language, as to remain ſettled and unaltered. This, but with much greater latitude, may be ſaid of muſic; and accordingly it may be obſerved of the compoſitions of Corelli, not only that they are equally intelligible to the learned and unlearned, but that the impreſſions made by them have been found to be as durable in general. His muſic is the language of nature; and, for a ſeries of years, all that heard it became ſenſible of its effects: of this there cannot be a ſtronger proof than that, amidſt all the innovations which the love of change had introduced, it continued to be performed, and was heard with delight, in churches, in theatres, at public ſolemnities, and feſtivities, in all the cities of Europe for near 40 years. Men remembered, and would refer to paſſages in it as to a claſſic author; and even at this day, the maſters of the ſcience do not heſitate to pronounce of the compoſitions of Corelli, that, of fine harmony and elegant modulation, they are the moſt perfect examplars.

COREOPSIS, TICKSEEDED SUNFLOWER: A genus of plants belonging to the ſyngeneſia claſs; and in the natural method ranking under the 49th order, *Compoſitæ*. See BOTANY *Index*.

CORFE CASTLE, a borough-town in Dorſetſhire in England. It takes its name from a ſtrong caſtle, belonging to the crown, that ſtood there, but is now in ruins. It ſends two members to parliament. W. Long. 2. 8. N. Lat. 50. 33.

CORFU, an iſland in the Ionian ſea, at the mouth of the gulf of Venice, formerly called *Corcyra* and *Phæacia*, famous for the gardens of Alcinous. It belongs at preſent to the Venetians; and forms the bulwark of Chriſtendom againſt the Turks, who have often attempted to reduce it, but without ſucceſs. It is well fortified, and has 50 caſtles; and the number of the inhabitants is ſaid to be about 50,000. The inhabitants are of the Greek church; and the Venetians ſend them a governor and magiſtrates, which are changed every two years. The ſoil is very fruitful, and produces a great deal of wine, olives, and ſeveral other fruits, particularly figs, which are exceedingly good. The chief city is likewiſe called *Corfu*: ſee the following article.

CORFU, a city of the iſland of that name, belonging to the Venetians. It is a large place, ſtrongly fortified, and defended by a garriſon of about 10,000 men; which, however, in the opinion of a late traveller, do not appear adequate to the extent of the fortifications. A number of very excellent braſs and iron cannon are mounted on the different forts, which, he obſerves, are ſo divided, that it would take treble the number of their garriſon to defend them. However, the republic of Venice is generally at peace with the different European nations, and the ancient power of the Turks being much decayed, they have little to apprehend; though to prevent any ſudden ſurpriſe, the Venetians keep a formidable ſquadron in the harbour of Corfu, and the works have been much improved by Major General Paterſon.—In the late war they had with the Turks, this town was attacked by an army of 80,000 men, and attempted to be ſtormed ſeveral times by the enemy; but the garriſon, which conſiſted of 12,000 men, under the command of Count Schulenburg, made ſo brave and gallant a defence, that they always repulſed them, and obliged them to raiſe the ſiege, and abandon the place with conſiderable loſs. For this piece of ſervice the republic has cauſed a magnificent ſtatue to be erected in memory of the count, with an elegant Latin inſcription, ſetting forth the many eminent ſervices of his military atchievements. The circumference of the city is about four miles; the number of inhabitants

inhabitants on the whole iſland is computed at about 50,000, the greateſt part of whom are Greeks.

This iſland is the reſidence of the governor general, whoſe juriſdiction extends over all the iſlands ſubject to the republic of Venice, in the Levant ſeas, and is conſidered as one of the greateſt honours they can confer on a ſubject. He is always a nobleman of the firſt rank, and has his appointment for three years only, in which time he makes a tolerable addition to his fortune, and on his return to Venice is generally advanced to the honours of the ſenate. In the city are many handſome Greek churches, the principal of which is that of St Speridione, or the cathedral. It is embelliſhed with ſome excellent paintings, and moſt ſuperbly ornamented. The body of the ſaint from whom it was named, is preſerved entire in a rich ſhrine within the church. The Greeks are moſt of them ſuch fanatics as to be continually offering their devotions at this ſhrine, believing that through the interceſſion of the ſaint they will obtain all their wants; and that by offerings of money their ſins will be forgiven them; by which means the church has amaſſed an immenſe treaſure. The relic of the ſaint is depoſited in a ſilver coffin, richly decorated with precious ſtones. It is in an amazing ſtate of preſervation; he having died in the iſland of Cyprus upwards of 700 years ago; and after remaining 400 years there, was tranſported to this place.—Beſides the grand fleet, the Venetians have another of galleys, that are manned by convicts whoſe crimes are not of ſuch a nature as to merit death. The chief diverſions of this place in the winter are operas; they have always a company of comedians for the ſeaſon from Naples. In the ſummer they paſs their time in walking upon the ramparts; few except the governor and great officers of ſtate are permitted to keep carriages. The Corfu people perfectly reſemble the Zanteots in their manners (ſee Zante); though it muſt be obſerved, in praiſe of the former, that aſſaſſinations are uncommon among them, their laws being too ſevere to permit ſuch practices with impunity. E. Long. 19. 48. N. Lat. 39. 50.

CORIA, a town of Spain, in the kingdom of Leon and province of Eſtremadura, towards the confines of Portugal, with a biſhop's ſee. It is ſeated on a little river called *Alagon*, in a very fertile plain. There is nothing remarkable but the cathedral church, except at a little diſtance a river without a bridge, and a bridge without a river. This was cauſed by an earthquake, which turned the river another way. W. Long. 6. 46. N. Lat. 39. 59.

CORIANDRUM, coriander: A genus of plants belonging to the pentandria claſs; and in the natural method ranking under the 45th order, *Umbellatæ*. See Botany *Index*.

CORIARIA, *Tanner's* or *Myrtle-leafed* Sumach: A genus of plants belonging to the diœcia claſs; and in the natural method ranking under the 54th order, *Miſcellaneæ*. See Botany *Index*. This plant is much uſed in the ſouth of France, where it grows naturally, for tanning of leather, whence its name of *tanner's ſumach*. It alſo dyes a beautiful black colour.

CORIDOR, or Corridor, in *Fortification*, a road or way along the edge of the ditch, without-ſide; encompaſſing the whole fortification. The word comes from the Italian *coridore*, or the Spaniſh *coridor*.

It is alſo called the *covert-way*, becauſe covered with a glacis, or eſplanade, ſerving it as a parapet.—The coridor is about 20 yards broad.

Coridor is alſo uſed in architecture for a gallery or long aiſle around a building, leading to ſeveral chambers at a diſtance from each other, ſometimes wholly incloſed, and ſometimes open on one ſide.

CORINNA, a Grecian lady, celebrated for her beauty and poetic talents, was born at Theſſu, a city of Bœotia, and was the diſciple of Myrtis another Grecian lady. Her verſes were ſo eſteemed by the Greeks, that they gave her the name of the *lyric muſe*. She lived in the time of Pindar, about 495 years before Chriſt; and is ſaid to have gained the prize of lyric poetry from that poet; but Pauſanias obſerves that her beauty made the judges partial.

CORINTH, a celebrated city of antiquity, for ſome time the moſt illuſtrious of all the Greek cities. It is ſaid to have been founded 1514 years before Chriſt, by Siſyphus the ſon of Molus, and grandfather of Ulyſſes. Various reaſons are given for its name, but moſt authors derive it from *Corinthus* the ſon of Pelops. It was ſituated on the ſouth part of the iſthmus which joins the Peloponneſus, now the Morea, to the continent. It conſiſted of a citadel built upon an eminence, and thence named *Acrocorinthus;* beſides which it had two maritime towns ſubject to it, named *Lecheum* and *Cenchrea*. The whole ſtate extended ſcarce half a degree in length or breadth; but ſo advantageouſly were the above-mentioned ports ſituated, that they might have gained the Corinthians a ſuperiority, if not a command, over all Greece, had not their advantageous ſituation inclined them to commerce rather than war. For their citadel was almoſt impregnable; and commanding both the Ionian and Ægean ſeas, they could eaſily cut off all communication from one half of Greece with the other; for which reaſon this city was called one of the fetters of Greece.

But as the genius of the Corinthians led them to commerce rather than martial exploits, their city became the fineſt in all Greece. It was adorned with the moſt ſumptuous buildings, as temples, palaces, theatres, porticoes, &c. all of them enriched with a beautiful kind of columns, which from the city were called *Corinthian*. But though the Corinthians ſeldom or never engaged in a war with a view of enlarging but rather of defending their little ſtate, they did not forget to cultivate a good diſcipline both in time of peace and of war. Hence many brave and experienced generals have been furniſhed by Corinth to the other Grecian cities, and it was not uncommon for the latter to prefer a Corinthian general to any of their own.

This city continued to preſerve its liberty till the year before Chriſt 146, when it was pillaged and burnt by the Romans. It was at that time the ſtrongeſt place in the world: but the inhabitants were ſo diſheartened by a preceding defeat, and the death of their general, that they had not preſence of mind enough even to ſhut their gates. The Roman conſul Mummius, was ſo much ſurpriſed at this, that at firſt he could ſcarce believe it: but afterwards fearing an ambuſcade, he advanced with all poſſible caution. As he met with no reſiſtance, his ſoldiers had nothing to do but de-

Corinth. ſtroy the few inhabitants that had not fled, and plunder the city. Such of the men as had ſtaid were all put to the ſword, and the women were ſold for ſlaves. After this the city was ranſacked by the greedy ſoldiers, and the ſpoils of it are ſaid to have been immenſe. There were more veſſels of all ſorts of metal, more fine pictures and ſtatues done by the greateſt maſters, in Corinth, than in any other city in the world. All the princes of Europe and Aſia who had any taſte in painting and ſculpture furniſhed themſelves here with their richeſt moveables: here were caſt the fineſt ſtatues for temples and palaces, and all the liberal arts brought to their greateſt perfection. Many ineſtimable pieces of the moſt famous painters and ſtatuaries fell into the hands of the ignorant ſoldiers, who either deſtroyed them, or parted with them for a trifle. Polybius the hiſtorian was an eye witneſs to this barbariſm of the Romans. He had the mortification to ſee two of them playing at dice on a famous picture of Ariſtides, which was accounted one of the wonders of the world. The piece was a Bacchus, ſo exquiſitely done, that it was proverbially ſaid of any extraordinary performance, "It is as well done as the *Bacchus of Ariſtides*." This maſterly piece of painting, however, the ſoldiers willingly exchanged for a more convenient table to play upon; but when the ſpoils of Corinth were put up to ſale, Attalus king of Pergamus offered for it 600,000 ſeſterces, near 5000l. of our money. Mummius was ſurpriſed at ſuch a high price offered for a picture, and imagined there muſt be ſome magical virtue in it. He therefore interpoſed his authority, and carried it to Rome, notwithſtanding the complaints of Attalus. Here this famous picture was lodged in the temple of Ceres, where it was at laſt deſtroyed by fire, together with the temple. Another extraordinary inſtance of the ſtupidity of Mummius is, that when the pictures were put on board the tranſports, he told the maſters of the veſſels very ſeriouſly, that if any of the things were either loſt or ſpoiled, he would oblige them to find others at their own coſt; as if any other pieces could have ſupplied the loſs of thoſe ineſtimable originals, done by the greateſt maſters in Greece. When the city was thoroughly pillaged, fire was ſet to all the corners of it at the ſame time. The flames grew more violent as they drew near the centre, and at laſt uniting there made one prodigious conflagration. At this time the famous metalline mixture is ſaid to have been made, which could never afterwards be imitated by art. The gold, ſilver, and braſs, which the Corinthians had concealed, were melted, and ran down the ſtreets in ſtreams, and when the flames were extinguiſhed, a new metal was found, compoſed of ſeveral different ones, and greatly eſteemed in after ages.

The town lay deſolate until Julius Cæſar ſettled there a Roman colony; when, in moving the rubbiſh and digging, many vaſes were found of braſs or earth finely emboſſed. The price given for theſe curioſities excited induſtry in the new inhabitants. They left no burying-place unexamined; and Rome, it is ſaid, was filled with the furniture of the ſepulchres of Corinth.

Strabo was at Corinth ſoon after its reſtoration by the Romans. He deſcribes the ſite as follows. "A lofty mountain, in perpendicular height as much as three ſtadia and a half (near half a mile), the aſcent 30 ſtadia ($3\frac{1}{4}$ miles), ends in a pointed ſummit called *Acrocorinthus*. Of this the portion to the north is the moſt ſteep: beneath which lies the city on a level area at the foot of the Acrocorinthus. The circuit of the city alone has been 40 ſtadia (5 miles), and as much of it as was unſheltered by the mountain has been walled about. Within the incloſure was comprehended alſo the Acrocorinthus, where the mountain was capable of receiving a wall; and as we aſcended, the veſtiges were plain; ſo that the whole circumference exceeded 85 ſtadia (near 11 miles). On the other ſides, the mountain is leſs ſteep, but riſes very high, and is viſible all around. Upon the ſummit is a ſmall temple of Venus; and below it the ſpring Pirene, which does not overflow, but is always full of pellucid and potable water. They ſay it unites with ſome other hidden veins, and forms the ſpring at the mountain foot, running into the city, and affording a ſufficient ſupply for the uſe of the inhabitants. In the city is plenty of wells, and in the Acrocorinthus, as they ſay, for we did not ſee any. There they relate the winged horſe Pegaſus was taken as he was drinking, by Bellerophon. Below Pirene is the Siſypheum, ſome temple or palace of white ſtone, the remains not inconſiderable. From the ſummit is beheld to the north Parnaſſus and Helicon, lofty mountains covered with ſnow; and below both, to the weſt, the Criſſean gulf bounded by Phocis, by Bœotia and the Megaris, and by Corinthia and Sicyonia oppoſite to Phocis. Beyond all theſe are the mountains called the *Oneian*, ſtretching as far as Bœotia and Cithæron from the Scironian rocks on the road to Attica." Strabo ſaw likewiſe Cleon from thence. Cenchreæ was then a village. Lechæum had ſome inhabitants. Corinth.

New Corinth had flouriſhed 217 years when it was viſited by Pauſanias. It had then a few antiquities, many temples and ſtatues, eſpecially about the Agora or market-place, and ſeveral baths. The emperor Hadrian introduced water from a famous ſpring at Stymphalus in Arcadia; and it had various fountains alike copious and ornamental. The ſtream of one iſſued from a dolphin, on which was a brazen Neptune; of another, from the hoof of Pegaſus, on whom Bellerophon was mounted. On the right hand, coming along the road leading from the market-place toward Sicyon, was the Odeum and the theatre, by which was a temple of Minerva. The old Gymnaſium was at a diſtance. Going from the market-place toward Lechæum was a gate, on which were placed Phæton and the Sun in gilded chariots. Pirene entered a fountain of white marble, from which the current paſſed in an open channel. They ſuppoſed the metal called *Corinthian braſs* to have been immerged while red hot in this water. On the way up to the Acrocorinthus were temples, ſtatues, and altars; and the gate next Tenea, a village with a temple of Apollo, ſixty ſtadia, or ſeven miles and a half diſtant, on the road to Mycenæ. At Lechæum was a temple and a brazen image of Neptune. At Cenchreæ were temples; and by the way from the city a grove of cypreſs trees, ſepulchres, and monuments. Oppoſite was *the Bath of Helen*, water tepid and ſalt, flowing plentifully from a rock into the ſea. Mummius had ruined ed the theatre of Corinth, and the munificence of the great Athenian Atticus Herodes was displayed in an edifice with a roof inferior to few of the most celebrated structures in Greece.

The Roman colony was reserved to suffer the same calamity as the Greek city, and from a conqueror more terrible than Mummius, Alaric the savage destroyer of Athens and universal Greece. In a country harassed with frequent wars, as the Peloponnesus has since been, the Acrocorinthus was a post too consequential to be neglected. It was besieged and taken in 1459 by Mahomet II.; the despots or lords of the Morea, brothers of the Greek emperor who was killed in defending Constantinople, refusing payment of the arrears of the tribute, which had been imposed by Sultan Morat in 1447. The country became subject to the Turks, except such maritime places as were in the possession of the Venetians; and many of the principal inhabitants were carried away to Constantinople. Corinth, with the Morea was yielded to the republic at the conclusion of the war in 1698, and again by it to the Turks in 1715.

Corinth retains its old name, and is of considerable extent, standing on a high ground, beneath the Acrocorinthus, with an easy descent toward the gulf of Lepanto; the houses scattered or in parcels, except in the Bazar or market-place. Cypresses, among which tower the domes of mosques, with corn-fields, and gardens of lemon and orange trees, are interspersed. The air is reputed bad in summer, and in autumn exceedingly unhealthy. Wheler relates, that from the top of the Acrocorinthus or citadel, he enjoyed one of the most agreeable prospects which this world can afford. He guessed the walls to be about two miles in compass, inclosing mosques, with houses and churches mostly in ruins. An hour was consumed in going up on horseback. It was a mile to the foot of the hill; and from thence the way was very steep with many traverses. The families living below were much infested by corsairs, and on every alarm flocked up to the castle.

According to Dr Chandler, Corinth has preserved but few monuments of its Greek or Roman citizens. The chief remains, he informs us, are at the south-west corner of the town, and above the bazar or market; 11 columns supporting their architraves, of the Doric order, fluted, and wanting in height near half the common proportion to the diameter. Within them, toward the western end, is one taller, though not entire, which, it is likely, contributed to sustain the roof. They have been found to be stone, not marble; and appear brown, perhaps from a crust formed on the outside. The ruin he judges to be of very remote antiquity, and a portion of a fabric erected not only before the Greek city was destroyed, but before the Doric order had attained to maturity. He suspects it to have been the Sisypheum mentioned by Strabo. North of the Bazar stands a large mass of brickwork, a remnant, it may be conjectured, of a bath, or of the Gymnasium.

The inhabitants are most of them Christians of the Greek church, who are allowed liberty of conscience by the Turks. E. Long. 28. 13. N. Lat. 38. 14.

Corinth, *the Isthmus of*, in the Morea, is a neck of land which joins the Morea to Greece, and reaches from the gulf of Lepanto to that of Egina. Julius Cæsar, Caligula, and Nero, attempted to cut a channel through it, but in vain; and they therefore afterwards built a wall across it, which they called *Hexamilium*, because it was six miles in length. This was demolished by Amurath II. and afterwards rebuilt by the Venetians, but was levelled a second time by Mahomet II.

CORINTHIAN, in general, denotes something belonging to Corinth: thus we say, Corinthian brass, Corinthian order, &c.

Corinthian *Brass*. See Brass and Corinth.

Corinthian *Order*, in *Architecture*, the fourth order of architecture, according to Scamozzi; but M. Le Clerc makes it the fifth, being the most noble and delicate of all the five. See Architecture, N° 47.

CORIO, Bernardine, an historian, born of an illustrious family at Milan, in the year 1460. He was secretary of state to that duchy; and Lewis duke of Sforza appointed him to write the history of Milan. He died in 1500. The best edition of his history is that of 1503, in folio. It is printed in Italian, and is very scarce.

CORIOLANUS, C. Marcius, a famous Roman captain, took Corioli a town of the Volsci, whence he had his surname: at last, disgusting the people, he was banished Rome by the tribune Decius. He went to the Volsci, and persuading them to take up arms against the Romans, they encamped within four miles of the city. He would not listen to proposals of peace till he was prevailed upon by his wife Veturia, and his mother Volumnia, who were followed by all the Roman ladies in tears. He was put to death by the Volsci as a traitor that had made them quit their conquest: upon which the Roman ladies went into mourning; and in the same place where his blood was spilled there was a temple consecrated to feminine virtue.

CORIS, a genus of plants belonging to the pentandria class. See Botany *Index*.

Coris is also used in the East Indies for a kind of shells which pass for money.

CORISPERMUM, tickseed: A genus of plants belonging to the monandria class, and in the natural method ranking under the 12th order, *Holoraceæ*. See Botany *Index*.

CORITANI, in *Ancient Geography*, a people of Britain, occupying widely the inland parts, as Northampton, Leicester, Rutland, Lincoln, Nottingham, and Derbyshires (Camden).

CORK, the bark of a tree of the same name, *Quercus Suber*, Lin. See Quercus, Botany *Index*.

To take off the bark, an incision is made from the top to the bottom of the tree, and at each extremity another round the tree, perpendicular to the first. When the tree is 15 years old, it may be barked for eight years successively; and the quality of the bark improves with the age of the tree. When stripped from the tree, which does not therefore die, the bark is piled up in a pond or ditch, and loaded with heavy stones to flatten it, and reduce it into tables: hence it is removed to be dried; and when sufficiently dry, put in bales for carriage. If care be not taken to strip the

Cork.

bark, it ſplits and peels of itſelf; being puſhed up by another bark formed underneath.

The cork-tree, as well as the uſes to which the bark is applied, was known both to the Greeks and Romans. Pliny informs us that the Romans employed it to ſtop all kinds of veſſels; but the uſe of it for this purpoſe does not appear to have been very common till the invention of glaſs bottles, of which, according to Profeſſor Beckman, there is no mention before the 15th century.

Other vegetable productions have been ſometimes employed inſtead of cork. The *Spondias Lutea*, a tree which grows in South America, particularly in moiſt places, and which is there called *monbin* or *monbain*, is ſometimes brought to England for the purpoſe of ſtopping veſſels. The roots of liquorice are applied to the ſame uſe, and on that account, this plant is much cultivated in Sclavonia, and exported to other countries. A tree called *nyſſa*, which grows in North America, has been found alſo to anſwer as a ſubſtitute for cork.

The chief uſe of cork is, to put in ſhoes, ſlippers, &c. and to ſtop bottles. The Spaniards burn it to make that kind of light black called *Spaniſh black*, which is uſed by painters. The Egyptians made coffins of cork; which being lined with a reſinous compoſition, preſerved dead bodies uncorrupted. The Spaniards line ſtone walls with it, which not only renders them very warm, but corrects the moiſture of the air.

Foſſil Cork, a name given to a kind of ſtone which is a ſpecies of amianthus, conſiſting of flexible fibres looſely interwoven, and ſomewhat reſembling vegetable cork. It is the lighteſt of all ſtones; by fire it is fuſible, and forms a black glaſs. It poſſeſſes the general qualities of amianthus. See that article.

Cork, in Latin *comitatus Corcagienſis*, a county of the province of Munſter in Ireland. It is the moſt populous and conſiderable county of the kingdom next to that of Dublin, containing near a million of acres, and being divided into 15 baronies. It is bounded on the north-eaſt by the county of Waterford; on the weſt by Kerry; by Limeric on the north; and by the ſea on the ſouth and ſouth-eaſt. Including Deſmond it is 85 miles in length and 50 in breadth: but is very unequal both ways. Though a conſiderable part of the country is foggy, mountainous, and barren, yet by the induſtry of the inhabitants it is pretty well cultivated and improved, and contains ſeveral good towns and harbours.

Cork, a city of Ireland, and capital of the county of that name. It is an epiſcopal ſee, and is the largeſt and moſt populous of any in the kingdom, Dublin alone excepted. It is ſituated on the river Lee, 15 miles from its mouth. It is a place of great trade, the harbour here being one of the fineſt in the world. Though ſmaller veſſels can come up to the quay, yet the larger generally ride at a place called *Paſſage*. This city, together with its liberties, makes a county. It was built or rather fortified by the Danes, in the ninth century. The greateſt part of it ſtands on a marſhy iſland ſurrounded by the river Lee, which alſo runs through the city, and divides it into ſeveral canals. On this account ſome have thought the air very moiſt and unwholeſome. Complaints have alſo been made againſt the water as impure; but, from comparing the bills of mortality with thoſe of other cities, it appears that the city of Cork is far from being unhealthy. This hath been accounted for from the influx of the tide, by which a ſtagnation of air is prevented. The firſt charter of Cork was beſtowed by Henry III. and afterwards ratified by Edward I. Edward II. and Edward III. Edward IV. granted a new charter; and the city received many favours from the ſucceeding monarchs. King James I. gave the citizens a new and ample charter; and King Charles I. what is called the Great Charter, by which, among others, a clauſe in King James's charter was enforced, making this city a county of itſelf. The ſee of Cork is reputed worth 2700l. a-year. The chapter conſiſts of a dean, chanter, chancellor, treaſurer, archdeacon, and twelve prebendaries. The church is dedicated to St Barr or Finbarr; and the dioceſe is divided into five deaneries. There is very little to be found in ancient writers concerning the foundation of the cathedral of Cork; yet it is generally aſcribed to St Barr in the ſeventh century. Many of its biſhops have been great benefactors to it. Through length of time the church became quite ruinous; but it hath lately been completely rebuilt, and is now an elegant modern ſtructure. To defray the expence, the parliament laid a tax on all coals conſumed in the city of Cork. The deanery is reputed to be worth 400l. a-year.

Cork is much improved and enlarged, ſeveral broad ſtreets have been lately added, by filling up the canals that formerly ran through them, and are now built up with elegant houſes: the parade is very ſpacious, and is adorned with an equeſtrian ſtatue of King George II. It hath the largeſt export in the kingdom, particularly of beef, hides, tallow, butter, fiſh, and other proviſions. It is partly ſituated on ſeveral iſlands, formed by the river Lee, which are banked and quayed in, ſomewhat like the towns in Holland; and partly on riſing grounds, on the north and ſouth ſides of the river. The earl of Marlborough beſieged and took it from King James's army in 1690; when the duke of Grafton, who ſerved as a volunteer, was ſlain in the attack. It contains about 8600 houſes, and upwards of 70,000 inhabitants. It hath twelve companies of foot quartered in the barracks. Beſides a ſtately cathedral, built from the foundation, between 1725 and 1735, by the produce of a duty upon coals, as above noticed, it is adorned with ſeveral handſome pariſh churches. It has alſo an elegant exchange for the merchants, a new and beautiful cuſtomhouſe, a town-hall, ſeveral fine hoſpitals, and various other public ſtructures. The city poſſeſſes an annual revenue of about 1300l. out of which the mayor enjoys for his ſalary and the ſupport of his dignity 500l. The wealth and grandeur of Cork ariſe from its capacious and commodious haven, where almoſt any number of ſhips may lie with eaſe and ſafety. According to ſome accounts, when there has been no war, 1200 veſſels have reſorted hither in a year. Ships from England, bound to all parts of the Weſt Indies, take in here a great part of their proviſions; and on the ſame account the haven of Cork is viſited by thoſe alſo of moſt other nations. The ſlaughtering ſeaſon continues from the month of Auguſt to the latter end of January; in which ſpace it has been computed, that they

they kill and cure ſeldom fewer than 100,000 head of black cattle. The reſt of their exports conſiſts of butter, candles, hides raw and tanned, linen cloth, pork, calves, lambs, and rabbit ſkins, tallow, wool for England, linen and woollen yarn, and worſted. The merchants of Cork carry on a very extenſive trade to almoſt all parts of the known world; ſo that their commerce is annually increaſing. The produce of the cuſtoms ſome years ſince exceeded 60,000l. and the number of ſhips that they employ is double to what it was forty years ago. The only thing that ſeemed to be wanting to the ſecurity of the port of Cork was ſupplied in the earl of Cheſterfield's memorable adminiſtration, by building a fort on the great iſland, to command the entrance of the haven. The outlets of Cork are cheerful and pleaſant. The country around the city, on both ſides of the river, is hilly and picturesque; and the harbour called the *Cove*, is one of the beſt in the world; the entrance is ſafe, and the whole navy of England might ride in it, ſecure from every wind that blows. Ships of burden, however, are obliged to unload at Paſſage, five miles and a half from Cork, the channel not admitting veſſels of above 150 tons.

CORK *Jacket* or *Waiſtcoat*, is an invention of one Mr Dubourg, a gentleman very fond of ſwimming, but ſubject to the cramp, which led him to conſider of ſome method by which he might enjoy his favourite diverſion with ſafety. The waiſtcoat is compoſed of four pieces of cork, two for the breaſts and two for the back; each pretty near in length and breadth to the quarters of a waiſtcoat without flaps; the whole is covered with coarſe canvaſs, with two holes to put the arms through; there is a ſpace left between the two back-pieces, and the ſame betwixt each back and breaſt-piece, that they may fit the eaſier to the body. Thus the waiſtcoat is only open before, and may be faſtened on the wearer with ſtrings; or, if it ſhould be thought more ſecure, with buckles and leather ſtraps. This waiſtcoat does not weigh above 12 ounces, and may be made up for about five or ſix ſhillings expence. Mr Dubourg tried his waiſtcoat in the Thames, and found that it not only ſupported him on the water, but that two men could not ſink him, though they uſed their utmoſt efforts for that purpoſe. If thoſe who uſe the ſea occaſionally, and eſpecially thoſe who are obliged to be almoſt conſtantly there, were to have thoſe waiſtcoats, it would be next to impoſſible that they ſhould be drowned. It would alſo be of vaſt ſervice to thoſe that, for the ſake of health, bathe in the ſea; and even the moſt delicate and timorous young lady might by the help of one of theſe jackets venture into a rough ſea. See *AIR-Jacket*, and *BAMBOO-Habit*.

CORMANDEL. See COROMANDEL.

COR-MASS, the name of a grand proceſſion, ſaid to have been eſtabliſhed at Dunkirk during the dominion of Charles V. and renewed on St John's day, the 24th of June. After the celebration of high maſs, the proceſſion, conſiſting of the ſeveral tradeſmen of the town, begins. Each perſon has a burning taper of wax in his hand: and after each company comes a pageant, followed by the patron-ſaint, uſually of ſolid ſilver, richly wrought and adorned. The companies are followed by muſic; and after the muſicians, the friars in the habits of their order, the ſecular prieſts, and then the abbot magnificently adorned, and preceded by the hoſt. Machines likewiſe of various fantaſtical forms and devices, and as variouſly accoutred, form a part of the ſhow on this occaſion; which is deſcribed as one of the moſt ſuperb and magnificent in the world, by an eye-witneſs, in 1755.

CORMORANT, a corruption of corvorant. See PELICANUS, ORNITHOLOGY *Index*.

CORN, the grain or ſeeds of plants ſeparated from the ſpica or ear, and uſed for making bread.

There are ſeveral ſpecies of corn, ſuch as wheat, rye, and barley, millet and rice, oats, maize and lentils, peaſe, and a number of other kinds; each of which has its uſefulneſs and propriety.

Europe, in every part of it; Egypt, and ſome other cantons of Africa, particularly the coaſts of Barbary; and ſome parts of America cultivated by the Europeans, particularly New England, New France, and Acadia, are the places which produce corn. Other countries have maize and rice in lieu of it; and ſome parts of America, both in the iſlands and continents, ſimple roots, ſuch as potatoes and minioc.—Egypt was anciently the moſt fertile of all other countries in corn; as appears both from ſacred and profane hiſtory. It furniſhed a good part of the people ſubject to the Roman empire, and was called the *dry nurſe of Rome and Italy*. Britain, France, and Poland, ſeem now in the place of Egypt, and with their ſuperfluities ſupport a good part of Europe.

For the firſt diſcovery and culture of corn, authors are much divided; the common opinion is, that in the firſt ages men lived on the ſpontaneous fruits of the earth; as acorns, and the nut or maſt produced by the beech; which, they ſay, took its name *fagus*, from the Greek φαγω, *I eat*. It is added, that they had not either the uſe of corn, or the art of preparing or making it eatable.

Ceres has the credit of being the firſt that ſhowed the uſe of corn, on which account ſhe was placed among the gods; others gave the honour to Triptolemus, others ſhare it between the two, making Ceres the firſt diſcoverer, and Triptolemus the firſt planter and cultivator of corn. Diodorus Siculus aſcribes the whole to Iſis; on which Polydore Virgil obſerves, he does not differ from the reſt; Iſis and Ceres being in reality the ſame. The Athenians pretend it was among them the art began; and the Cretans, or Candiots, Sicilians, and Egyptians, lay claim to the ſame. Some think the title of the Sicilians beſt ſupported, that being the country of Ceres: and authors add, ſhe did not teach the ſecret to the Athenians, till ſhe had firſt inſtructed her own countrymen. Others ſay, Ceres paſſed firſt into Attica, thence into Crete, and, laſt of all, into Sicily: many of the learned, however, maintain it was in Egypt the art of cultivating corn firſt began; and it is certain there was corn in Egypt and the Eaſt long before the time of Ceres.

Corn is very different from fruits, with reſpect to the manner of its preſervation; and is capable of being preſerved in public granaries, for preſſing occaſions, and of being kept for ſeveral centuries.—A little time after the ſiege of Metz, under Henry II. of France, in the year 1578, the duc d'Eſpernon laid up vaſt ſtores of corn in the citadel; which was preſerved in good plight to the year 1707, when the French

French king and his retinue, paffing that way, ate bread baked thereof.

The chief thing that contributes to the prefervation of corn is a cruft which forms on its furface, by the germination of the grain next underneath, to the thicknefs of an inch and a half. On that at Metz people walked, without its giving the leaft way. At Sedan was a granary cut in a rock, wherein a heap of corn was preferved a hundred and ten years: it was covered with a cruft a foot thick.

For the prefervation of corn, the firft method is to let it remain in the fpike; the only expedient for conveying it to the iflands and provinces of America. The inhabitants of thofe countries fave it in the ear, and raife it to maturity by that precaution: but this method of preferving it is attended with feveral inconveniences among us; corn is apt to rot or fprout, if any the leaft moifture is in the heap; the rats likewife infeft it, and our want of ftraw alfo obliges us to feparate the grain from the ear. The fecond is to turn out and winnow it frequently; or to pour it through a trough or mill-hopper, from one floor to another; being thus moved and aired every 15 days, for the firft 6 months, it will require lefs labour for the future, if lodged in a dry place: but if, through neglect, mites fhould be allowed to flide into the heap, they will foon reduce the corn to a heap of duft: this muft be avoided by moving the corn anew, and rubbing the places adjacent with oils and herbs, whofe ftrong odour may chace them away; for which garlic and dwarf-elder are very effectual; they may likewife be expofed to the open fun, which immediately kills them. When the corn has been preferved from all impurities for the fpace of two years, and has exhaled all its fires, it may be kept for 50 or even 100 years, by lodging it in pits covered with ftrong planks clofely joined together; but the fafer way is to cover the heap with quicklime, which fhould be diffolved by fprinkling it over with a fmall quantity of water; this caufes the grains to fhoot to the depth of two or three fingers; and inclofes them with an incruftation, as above mentioned, through which neither air nor infects can penetrate.

Indian Corn, or *Maize*. See Zea, Botany *Index*.

Corn-Butterfly, method of deftroying it. See Agriculture *Index*.

Corn-Crake. See Rallus, Ornithology *Index*.

Corn-Mill, a water-engine for grinding of corn. See Mechanics.

Corn, in *Farriery*. See Farriery *Index*.

CORNS, in *Surgery*, hard excrefcences, confifting of indurations of the fkin arifing on the toes, and fometimes on the fides of the feet, where they are much expofed to the preffure of the fhoes. By degrees they prefs themfelves farther down between the mufcular fibres on thefe parts, and by their irritation occafion extreme pain. Many cures have been prefcribed, but the total removal of them is always found to be attended with great difficulty. It has been recommended to foften them with plafters, and then to pull them up by the roots, to apply cauftic, &c. but the beft cure is to bathe them frequently in warm water, and pare away as much as poffible of the indurated fkin without drawing blood.

CORNAGE, an ancient tenure, the fervice whereof was to blow a horn when any invafion of the Scots was perceived. This tenure was very frequent in the northern counties near the Picts wall; but by ftat. 12 Car. II. all tenures are converted into free and common focage.—An old rental calls cornage, *newtgeldt*, q. d. *neat-geld*. Lord Coke fays, in old books it is called *horngeld*.

CORNARISTS, in ecclefiaftical hiftory, the difciples of Theodore Cornhert, an enthufiaftic fecretary of the ftates of Holland. He wrote at the fame time againft the Catholics, Lutherans, and Calvinifts. He maintained that every religious communion needed reformation; but he added, that no perfon had a right to engage in accomplifhing it without a miffion fupported by miracles. He was alfo of opinion, that a perfon might be a good Chriftian without being a member of any vifible church.

CORNARIUS, or Haguenbot, *John*, a celebrated German phyfician, born at Zwickow in Saxony. His preceptor made him change his name of Haguenbot to that of Cornarius, under which he is moft known. At 20 years of age he taught grammar, and explained the Greek and Latin poets and orators to his fcholars; and at 23 was licentiate in medicine. He found fault with moft of the remedies provided by the apothecaries; and obferving, that the greateft part of the phyficians taught their pupils only what is to be found in Avicenna, Rhafis, and the other Arabian phyficians, he carefully fought for the writings of the beft phyficians of Greece, and employed about 15 years in tranflating them into Latin, efpecially the works of Hippocrates, Aetius, Eginetes, and a part of thofe of Galen. Meanwhile he practifed phyfic with reputation at Zwickow, Frankfort, Marpurg, Nordhaufen, and Jena, where he died of an apoplexy in 1558, aged 58. He alfo wrote fome medicinal treatifes; publifhed editions of fome poems of the ancients on medicine and botany; and tranflated fome of the works of the fathers, particularly thofe of Bafil, and a part of thofe of Epiphanius.

CORNARO, Lewis, a Venetian of noble extraction, memorable for having lived healthful and active to above 100 years of age by a rigid courfe of temperance. By the ill conduct of fome of his relations he was deprived of the dignity of a noble Venetian; and feeing himfelf excluded from all employments under the republic, he fettled at Padua. In his youth he was of a weak conftitution; and by irregular indulgence reduced himfelf at about 40 years of age to the brink of the grave, under a complication of diforders; at which extremity he was told that he had no other chance for his life, but by becoming fober and temperate. Being wife enough to adopt this wholefome counfel, he reduced himfelf to a regimen of which there are very few examples. He allowed himfelf no more than 12 ounces of food and 14 ounces of liquor each day; which became fo habitual to him, that when he was above 70 years of age, the experiment of adding two ounces to each by the advice of his friends, had like to have proved fatal to him. At 83 he wrote a treatife which has been tranflated into Englifh, and often printed, entitled, "Sure and Certain Methods of attaining a Long and Healthful Life;" in which he relates his own ftory, and extols temperance to a degree of enthufiafm. At length the yolk of an egg became fufficient for a meal, and fometimes for two, until he died with much eafe and compofure in 1566. The writer of the Spectator, N° 195, confirms the fact from the authority of the Venetian ambaffador at that time, who was a defcendant of the Cornaro family.

CORNAVII, (Ptolemy), a people of Britain beginning in the very heart of the ifland, and extending to Chefter. Now *Warwick*, *Worcefter*, *Salop*, *Stafford* and *Chefhire* (Camden).

CORNEA TUNICA, in *Anatomy*, the fecond coat of the eye; fo called from its fubftance refembling the horn of a lantern, in Latin *cornu*. See ANATOMY *Index*.

CORNEILLE, PETER, a celebrated French poet, was born at Rouen in the year 1606. He was brought up to the bar, which he attended for fome little time; but formed with a genius too elevated for fuch a profeffion, and having no turn for bufinefs, he foon deferted it. An affair of gallantry occafioned his writing his firft piece, entitled *Melite;* which had prodigious fuccefs. Encouraged by the applaufe of the public, he wrote the Cid, and the other tragedies that have immortalized his name. In his dramatic works he difcovers a majefty, a ftrength and elevation of genius, fcarce to be found in any other of the French poets; and, like our immortal Shakefpeare, feems better acquainted with nature than with the rules of critics. Corneille was received into the French academy in 1647, and died dean of that academy in 1684, aged 78. Befides his dramatic pieces, he wrote a tranflation, in French verfe, of the "Imitation of Jefus Chrift," &c. The beft edition of his works is that of 1682, in 4 vols 12mo.

CORNEILLE, *Thomas*, brother of the former, was a member of the French academy and of that of infcriptions. He difcovered in his youth a great inclination to poetry; and at length publifhed feveral dramatic pieces in 5 vols 12mo, fome of which were applauded by the public, and acted with fuccefs. He alfo wrote, 1. A tranflation of Ovid's Metamorphofes, and fome of Ovid's Epiftles; 2. Remarks on Vauglas; 3. A Dictionary of Arts, 2 vols folio; and, 4. An Univerfal Geographical and Hiftorical Dictionary, in 3 vols folio.

CORNEILLE, *Michael*, a celebrated painter, was born as Paris in the year 1642; and was inftructed by his father, who was himfelf a painter of great merit. Having gained a prize at the academy, young Corneille obtained a penfion from Louis XIV.; and was fent to Rome, where that prince had founded a fchool for young artifts of genius. Having ftudied there fome time, he gave up his penfion, and applied to the antique with great care. He is faid to have equalled Carache in drawing, but in colouring he was deficient. Upon his return from Rome, he was chofen profeffor in the academy of Paris; and was employed by the above prince in all the great works he was carrying on at Verfailles and Trianon, where are ftill to be feen fome noble efforts of his genius.

CORNEL-TREE. See CORNUS, BOTANY *Index*.

CORNELIA, daughter of Scipio Africanus, was the mother of Tiberius and Caius Gracchus. She was courted by a king, but fhe preferred being the wife of a Roman citizen to that of a monarch. Her virtues have been defervedly commended, as well as the wholefome principles fhe inculcated in her two fons. When a Campanian lady made once a fhow of her jewels at Cornelia's houfe, and entreated her to favour her with a fight of her own, Cornelia produced her two fons, faying, "Thefe are the only jewels of which I can boaft."

CORNELIA Lex, *de civitate*, was enacted, in the year of Rome 670, by L. Corn. Sylla. It confirmed the Sulpician law, and required that the citizens of the eight newly elected tribes fhould be divided among the 35 ancient tribes.—Another, *de judiciis*, in 673, by the fame. It ordained, that the prætor fhould always obferve the fame invariable method in judicial proceedings, and that the procefs fhould not depend upon his will.—Another *de fumptibus*, by the fame. It limited the expences which generally attended funerals.—Another *de religione*, by the fame, in 677. It reftored to the college of priefts the privilege of choofing the priefts, which by the Domitian law had been lodged in the hands of the people.—Another, *de municipiis*, by the fame; which revoked all the privileges which had been fome time before granted to the feveral towns that had affifted Marius and Cinna in the civil wars.—Another *de magiftratibus*, by the fame; which gave the power of bearing honours, and being promoted before the legal age, to thofe who had followed the intereft of Sylla; while the fons and partizans of his enemies, who had been profcribed, were deprived of the privilege of ftanding for any office in the ftate.—Another, *de magiftratibus*, by the fame, in 673. It ordained, that no perfon fhould exercife the fame office within ten years diftance, or be invefted with two different magiftracies in one year.—Another, *de magiftratibus*, by the fame, in 673. It divefted the tribunes of the privilege of making laws, interfering, holding affemblies, and receiving appeals. All fuch as had been tribunes were incapable of holding any other office in the ftate by that law.—Another, *de majeftate*, by the fame, in 670. It made it treafon to lend an army out of a province or engage in a war without orders, to influence the foldiers to fpare or ranfom a captive general of the enemy, to pardon the leaders of robbers or pirates, or for the abfence of a Roman citizen to a foreign court without previous leave. The punifhment was *aquæ et ignis interdictio*.—Another by the fame. It gave the power to a man accufed of murder, either by poifon, weapons, or falfe accufations, and the fetting fire to buildings, to choofe whether the jury that tried him fhould give their verdict *clam* or *palam*, *viva voce*, or by ballot. Another by the fame, which made it *aquæ et ignis interdictio* to fuch as were guilty of forgery, concealing and altering of wills, corruption, falfe accufations, and the debafing or counterfeiting of the public coin. All fuch as were acceffory to this offence were deemed as guilty as the offender.—Another, *de pecuniis repetundis;* by which a man convicted of peculation or extortion in the provinces was condemned to fuffer the *aquæ et ignis interdictio*.—Another, by the fame; which gave the power to fuch as were fent into the provinces with any government, of retaining their command and appointment without a renewal of it by the fenate, as was before obferved.—Another by the fame; which ordained, that the lands of profcribed perfons fhould be common, efpecially thofe about Volaterræ and Fefulæ in Etruria, which Sylla divided among his foldiers.—Another by C. Cornelius tribune of the people, in 686. It ordained, that no person should be exempted from any law according to the general custom, unless 200 senators were present in the senate; and no person thus exempted could hinder the bill of his exemption from being carried to the people for their concurrence.—Another, by Nassica, in 582, to make war against Perseus, son of Philip king of Macedon, if he did not give proper satisfaction to the Roman people.

CORNELIAN. See CARNELIAN.

CORNER, in a general sense, the same with ANGLE.

CORNET, in the military art of the ancients, an instrument much in the nature of a trumpet; which when it only sounded, the ensigns were to march alone without the soldiers; whereas when the trumpet only sounded, the soldiers were to move without the ensigns. The cornets and buccinæ sounded the charge and retreat; and the cornets and trumpets sounded during the course of the battle. See Plate CLXIV.

CORNET, in modern military economy, denotes an officer in the cavalry who bears the ensign or colours of a troop.

The cornet is the third officer in the company, and commands in the absence of the captain and lieutenant. He takes his title from his ensign, which is square; and is supposed to be called by that name from *cornu*, because placed on the wings, which form a kind of points or horns of the army. Others derive the name from *coronet;* alleging, that it was the ancient custom for these officers to wear coronets or garlands on their heads.

CORNEUS, the name by which Linnæus calls a kind of tin ore, found in black columns, with irregular sides, and terminating in prisms.

CORNICHE, CORNISH, or CORNICE, in architecture, the uppermost member of the entablature of a column, as that which crowns the order. See ARCHITECTURE, Chap. I. and the Plates.

CORNICHE, is also used, in general, for all little projectures in masonry or joinery, even where there are no columns, as the corniche of a chimney, beaufet, &c.

CORNICHE Ring, in a piece of ordnance, is that next from the muzzle-ring, backward.

CORNICULARIUS, in antiquity, an officer in the Roman army, whose business was to aid and assist the military tribune in quality of a lieutenant.

The *cornicularii* went the rounds in lieu of the tribune, visited the watch, and were nearly what the aids major are in the French army.

The denomination *cornicularius* was given them from a little horn, called *corniculum*, which they used in giving orders to the soldiers: though Salmasius derives it from *corniculum*, the crest of a head-piece; it being an observation of Pliny, that they wore iron or brass horns on their helmets; and that these were called *cornicula*.

In the *Notitia Imperii* we find a kind of secretary or register of the same name. His business was to attend the judge, and enter down his sentiments and decisions. The critics derive the word, in this sense, from *corniculum*, a little horn to put ink in.

CORNICULUM, in *Ancient Geography*, a town of the Sabines, to the east of Crustumerium, towards the Anio. It was burnt down by Tarquin; but restored again, after the expulsion of the kings, (Florus). Now in ruins, called *il Monte Genaro*, (Holstenius).

CORNISH DIAMOND, a name given by many people to the crystals found in digging the mines of tin in Cornwall. See CORNWALL.

CORNIX, the trivial name of a species of CORVUS. See CORVUS, ORNITHOLOGY *Index*.

CORNU. See HORN.

CORNU Ammonis, in *Natural History*, fossil shells, called also *serpent-stones*, or *snake-stones*.

They are found of all sizes, from the breadth of a sixpence to more than two feet in diameter, and some even larger; some of them rounded, others greatly compressed, and lodged in different strata of stones and clays; some again are smooth, and others variously ridged, their striæ and ridges being either straight, irregularly crooked, or undulated. See *SNAKE-Stones*.

CORNU Cervi. See HARTSHORN.

CORNUCOPIA, among the ancient poets, a horn out of which proceeded plenty of all things; by a particular privilege which Jupiter granted his nurse, supposed to be the goat Amalthea. The fable is thus interpreted: That in Libya there is a little territory shaped not unlike a bullock's horn, exceeding fertile, given by King Ammon to his daughter, Amalthea, whom the poets feign to have been Jupiter's nurse.

In *Architecture* and *Sculpture* the cornucopia, or horn of plenty, is represented under the figure of a large horn, out of which issue fruits, flowers, &c. On medals, F. Joubert observes, the cornucopia is given to all deities.

CORNUCOPIÆ, in *Botany*, a genus of plants belonging to the triandria class; and in the natural method ranking under the 4th order, *Gramineæ*. See BOTANY *Index*.

CORNUS, CORNEL TREE, CORNELIAN CHERRY, or DOG-WOOD: A genus of plants belonging to the tetrandria class; and in the natural method ranking under the 47th order, *Stellatæ*.

CORNUTIA, a genus of plants, belonging to the didynamia class, and in the natural method ranking under the 40th order, *Personatæ*. See BOTANY *Index*.

CORNWALL, the most westerly county of England, bounded by the English channel on the south, St George's channel on the west, the Bristol channel on the north, and on the east by the river Tamar, which separates it from Devonshire. Its name is supposed by some to be compounded of *carn*, signifying "a rock" in the British language, and *Gauls* or *Waules*, the name the Saxons gave to the Britons. Others, however, think it is derived from the Latin *cornu*, or the British *kern*, "a horn;" on account of its running out into the sea somewhat in the form of a horn. Hither the ancient Britons (as well as in Wales) retired on the intrusion of the Saxons, where they opposed their further conquests. In this part of the island they formed a kingdom that existed for many years after under different princes, amongst whom were Ambrosius Aurelius, and the justly celebrated Arthur; nor were they subdued till the middle of the 7th century, from which time Cornwall was considered as subject to the West Saxon kings, who begun their sovereignty in 519, and continued it till 828, under 18 sovereigns, the last of whom was the great Egbert, who subdued

Cornwall. ſubdued all the others; and by uniting them, formed the kingdom of England, when this country was included in the county of Devon, then the 9th diviſion; and that accounts for Alfred's not mentioning Cornwall, which, on forming the circuits after the Norman conqueſt, is included in the weſtern circuit. In 1337, Edward III. erected it into a dukedom, and inveſted with it *Edward the Black Prince*. But this, according to the expreſs words of the grant, is limited to the firſt born ſon and heir, on which account Richard II. was created duke of Cornwall by charter. So was Henry V. by his father Henry IV. Henry VI. delivered the duchy to his ſon Prince Edward, and Edward IV. created his ſon Edward V. duke of Cornwall, as did Henry VII. his ſon, afterwards Henry VIII. upon the death of his elder brother Arthur. James I. created his ſon Henry duke of Cornwall, which title on his deceaſe came to his brother Charles. The eldeſt ſons of ſucceeding kings have enjoyed this title by inheritance. Theſe not only appoint the ſheriff, but all writs, deeds, &c. are in their name, and not in the king's; and they have alſo peculiar royalties and prerogatives diſtinct from the crown, for which they appoint the officers. This county is 80 miles long, 40 broad, and 250 in circumference; containing 960,000 acres, and 126,000 inhabitants. It is divided into 9 hundreds; has 27 market towns, viz. Launceſton, Truro, Falmouth, Helſton, Saltaſh, Bodmyn, St Ives, Tregony, Camelford, Fowey, St Germains, Penryn, Callington, St Auſtle, Eaſt Looe, Padſtow, St Columb, Penſance, Grampond, Leſkard, Leſtwithiel, St Mawes, St Michael, Newport, Market Jew, Stratton, and Redruth; 1230 villages, 191 pariſhes, 89 vicarages: provides 640 men to the militia, and pays 8 parts of the land-tax. Its chief rivers are the Tamar, Fale Cober, Looe, Camel, Fowe, Haile, Lemara, Kenſe, and Aire. Its principal capes or head lands are the Land's-end, the Lizard, Cape Cornwall, Deadman's-head, Rame-head, &c. and a cluſter of iſlands, 144 in number, called the *Scilly iſles*, ſuppoſed formerly to have been joined to the main land, though now 30 miles diſtant; abounding with antiquities, particularly druidical.

As Cornwall is ſurrounded by the ſea on all ſides except the eaſt, its climate is ſomewhat different from that of the other parts of Britain. The reaſons of this difference will be eaſily underſtood from what is obſerved concerning the climate of America. The ſummers in Cornwall are leſs hot, and the winters leſs cold, than in other parts of England, and the ſpring and harveſt are obſerved to be more backward. High and ſudden winds are alſo more common in this than in other counties of England. The county is rocky and mountainous; but the mountains are rich in metals, eſpecially tin and copper. The valleys are very pleaſant and fertile, yielding great plenty both of corn and paſture. The lands near the ſea-coaſt are manured and fertilized with ſea-weed, and a kind of ſand formed by the particles of broken ſhells as they are daſhed againſt each other by the ſea. Cattle of all ſorts are ſmaller here than in the other counties of England; and the wool of the ſheep, which are moſtly without horns, is very fine, and the fleſh, both of them and the black cattle, extremely delicate. The county is well ſupplied with fiſh from the ſea and the many rivers with which it is watered. The moſt noted of the ſea-fiſh is the pilchard; of which prodigious quantities are caught from July to November, and exported to different parts, eſpecially to Spain. It is ſaid that a million have been ſometimes taken at a ſingle draught. The natives are remarkable for their ſtrength and activity, as well as their dexterity in wreſtling, in which exerciſe the Corniſh hug is highly extolled. Cornwall.

This county abounds in mines of different metals and ſemimetals; but the principal produce is tin. The Phenicians early viſited theſe coaſts for this article, ſome think 400 or 450 years before Chriſt; and the mines continued to be wrought with various ſucceſs at different periods. In the time of King John they appear to have yielded no great emolument; the right of working them being wholly in the king as earl of Cornwall, and the mines farmed by the Jews for 100 merks; and according to this proportion the 10th of it, 6l. 13s. 4d. is at this day paid by the crown to the biſhop of Exeter. In the time of Richard king of the Romans and earl of Cornwall, the tin-mines were immenſely rich; the Jews being farmed out to him by his brother Henry III. what intereſt they had was at his diſpoſal. The Spaniſh tin-mines being ſtopped by the Moors, and none diſcovered in Germany, the Malabar coaſt, or the Spaniſh Weſt Indies, Cornwall and its earls had all the trade of Europe for it. The Jews being baniſhed the kingdom, 18 Edw. I. they were again neglected till the gentlemen of Blackmore, lords of ſeven tithings beſt ſtored at that time with tin, obtained of Edmund earl of Cornwall, ſon of Richard king of the Romans, a charter under his own ſeal, with more explicit grants of privileges, courts, pleas, parliaments, and the toll-tin or $\frac{1}{15}$th of all the tin raiſed. At this time too the right of bounding or dividing tin-grounds into ſeparate partitions for the encouragement of ſearching for it ſeems to have been firſt appointed, or at leaſt adjuſted. This charter was confirmed 33 Edward I. and the Corniſh ſeparated from the Devonſhire tinners. Their laws, particularly recited in Plowden's Commentaries, p. 237, were further explained 50 Edw. III. confirmed and enlarged by parliament, 8 Rich. II. 3 Ed. IV. 1 Ed. VI. 1 and 2 P. and M. and 2 Eliz. and the whole ſociety divided into four parts under one general warden to do juſtice in law and equity, from whoſe ſentence lies an appeal to the duke of Cornwall in council, or for want of a duke of Cornwall to the crown. The lord-warden appoints a vice-warden to determine all ſtannery diſputes every month: he alſo conſtitutes four ſtewards, one for each of the precincts before mentioned, who hold their courts every three weeks, and decide by juries of ſix perſons, with an appeal reſerved to the vice-warden, lord warden, and lord of the prince's council. In difficult caſes the lord-warden, by commiſſion, iſſues his precept to the four principal towns of the ſtannery diſtricts, who each chooſe ſix members; and theſe twenty-four ſtannators conſtitute the parliament of tinners. Each ſtannator chooſes an aſſiſtant, making a kind of ſtanding council in a different apartment to give information to the prince. Whatever is enacted by the body of tinners muſt be ſigned by the ſtannators, the lord-warden, or his deputy, and by the duke or the king, and thenceforward has with regard to tin affairs all the authority of an act of the whole.

whole legiſlature. Five towns are appointed in the moſt convenient parts of the county for the tinners to bring their tin to every quarter of a year. Theſe are Leſkard, Leſtwithiel, Truro, Helſton, and Penſance, the laſt added by Charles II. for the conveniency of the weſtern tinners. In the time of Henry VIII. there were but two coinages at Midſummer and Michaelmas; two more at Chriſtmas and Lady-day were added, for which the tinners pay an acknowledgment called *Poſt groats*, or 4d. for every hundred of white tin then coined. The officers appointed by the duke aſſay it; and if well purified ſtamp it by a hammer with the duchy ſeal, the arms of Richard earl of Cornwall, a lion rampant G. crowned O. within a bordure of bezants S; and this is a permiſſion to the coiner to ſell, and is called *coining the tin*. Every hundred of white tin ſo coined pays to the duke 4s. The tin of the whole county, which, in Carew's time, in the laſt century, amounted to 30,000l. or 40,000l. yearly, has for 24 years laſt paſt amounted one year with another to 180,000l. or 190,000l. ſterling. Of this the duke of Cornwall receives for his 4s. duty on every hundred of white tin above 10,000l. yearly: the bounders or proprietors of the ſoil about $\frac{1}{8}$th at a medium clear, or about 30,000l. yearly; the remainder goes to the adventurers in the mine, who are at all the charge of working. Tin is found collected and fixed in lodes and floors, or in grains and bunches in the natural rock, or looſe and detached in ſingle ſeparate ſtones called *ſhodes* or *ſtreams*, or in a continued courſe of ſuch ſtones called the *beuheyl* or *living ſtream*, or in an arenaceous pulverized ſtate. It is moſt eaſily diſcovered by tracing the lodes by the ſcattered fragments of them called *ſhodes*, by leave of the lord of the ſoil or the bounder. The tin being divided among the lords and adventurers, is ſtamped and worked at the mill; and being thus dreſſed is carried under the name of *black tin* to the melting-houſe, where it is melted by Welch pit-coal, and poured into blocks of 320lb. weight, and carried to the coinage town. Mundic, a ſcarce metal or mineral ore, of a white, braſſy, or brown colour, is found in large quantities, intermixed with tin, copper, and lead, and ſometimes by itſelf. Iron ore is found in Cornwall, but the working it does not anſwer. There is no richer copper, nor a greater variety any where than in this county. Silver, if really found here in the reigns of Edward I. and II. has been rarely found ſince, nor do the lead mines anſwer. Very late diſcoveries have proved that Cornwall has more gold than was formerly imagined. What is called the *Corniſh diamond* is a figured cryſtal generally hexagonal and pyramidical, or columnar, or both, of a fine clear water, and of all our baſtard diamonds in this nation eſteemed the beſt, and ſome of different colours, black, yellow, &c. The clearer theſe are, the better they will bear engraving for ſeals.

In privileges and language Cornwall ſeems to be another kingdom. By 21 Elizabeth it was ordered that all duty on Corniſh cloth exported ſhould be remitted to every Engliſhman within the duchy of Cornwall. This was firſt granted by the Black Prince, in conſideration of their paying 4s. for the coinage of every hundred of tin; whereas Devonſhire pays no more than 8d. They have alſo by grant from Richard earl of Cornwall, confirmed 25 Henry III. freedom to take ſand out of the ſea and carry it through the country for manure; whereupon in the following reign, on an inquiſition made, we find a complaint that Saltaſh had lately taken 12s. yearly for each barge that carried ſand up the Tamar; whereas nothing ought to have been demanded. They ſtill continue this ancient method of improving their land, carrying it ten miles up into the country, and great part of the way on horſes backs. Mr Ray ſuppoſes the virtue of this ſand depends chiefly on the ſalt mixed with it, which is ſo copious that in many places ſalt is boiled up out of a lixivium made of the ſea ſand; and the reaſon why ſand when it has lain long in the ſun and wind proves leſs enriching and uſeful is, that the dews and rain evaporate great part of its ſalt. They had likewiſe a privilege of trading to all parts of the world, granted them by Charles I. in recompenſe of their loyalty.

The number of boroughs in this ſmall county was ſurpriſingly increaſed by Edward VI. who added ſeven to the original ſix, Mary two, Elizabeth ſix, making in all 21, ſending 40 members beſides the county two. Eight of theſe boroughs had an immediate or remote connection with the demeſne lands of the duchy; the reſt belonged to religious houſes, or powerful families, or were old boroughs, which had legal immunities granted to them by their princes or lords.

The Corniſh language is a dialect of that which till the Saxons came in was common to all Britain, and more anciently to Ireland and Gaul; but the inhabitants of this iſland being diſperſed before thoſe conqueſts, and driven into Wales and Cornwall, and thence into Bretagne, the ſame language, for want of frequent intercourſe, became differently pronounced and written, and in different degrees mixed with different languages. Hence came the Welſh, the Corniſh and the Armoric dialects, whoſe radicals are ſo much alike that they are known and admitted by the inhabitants of either country; but the grammar ſo varied that they cannot converſe. The Corniſh is reckoned the moſt pleaſing of the three. It was ſpoken ſo generally here down to the reign of Henry VIII. that Dr John Moreman, vicar of Mynhinet, is ſaid to have been the firſt who taught his pariſhioners the Lord's prayer, the creed, and ten commandments in Engliſh, and at the Reformation the natives deſired the ſervice in Engliſh. The older people in ſome pariſhes retained their original language to the middle of the laſt century: and the laſt ſermon was preached in it in 1678. When Mr Ray was here, 1662, he could find but one perſon who could write this language; and it is now ſo nearly extinct, that Mr Barrington, in 1768, could only find one old woman who could ſcold in it, and ſhe is ſince dead.

CORODY. See Revenue.

COROLLA, among botaniſts, the moſt conſpicuous part of a flower, ſurrounding the organs of generation, and compoſed of one or more flower-leaves, moſt commonly called *petals*, to diſtinguiſh them from the leaves of the plant; according as there is one, two, or three of theſe petals, the corolla is ſaid to be monopetalous, dipetalous, tripetalous, &c.

COROLLARY is a conſequence drawn from ſomething already advanced or demonſtrated: thus, it being demonſtrated that a triangle which has two equal ſides,

sides, has also two angles equal; this corollary will follow that a triangle which has three sides equal, has also its three angles equal.

COROLISTÆ, a name by which Linnæus distinguishes those systematic botanists who have arranged vegetables from the regularity, figure, number, and other circumstances, of the petals, or beautiful coloured leaves of the flowers. The best systems of this kind are those of Rivinus and Tournefort. The former proceeds upon the regularity and number of the petals; the latter, with much more certainty, on their regularity and figure.

COROLLULA, a term used by botanists to express the little partial flowers which make up the compound ones.

COROMANDEL, the eastern coast of the peninsula on this side the Ganges in Asia. It is bounded on the north by Golconda, on the east by the bay of Bengal, on the south by Madura, and on the west by Bisnagar. This coast so much resembles that of Orixa, that the Abbé Raynal chooses to consider them as one, and gives to both the general name of *Coromandel.* Here an excessive heat reigns from the beginning of May to the end of October. It begins at nine in the morning, and continues till nine in the evening. During the night it is allayed by a sea-breeze from the south-east; and most commonly this refreshing gale begins at three in the afternoon. The air is less inflamed during the rest of the year, though in all seasons it is very hot. It rains almost continually during the months of November and December. This immense tract is covered with a parched sand for the extent of two miles, and sometimes only one mile along the coast.

This country was at first neglected by the Europeans for many reasons. It was separated by inaccessible mountains from Malabar, where these bold adventurers endeavoured to settle themselves. Spices and aromatics, which were the principal objects of their attention, were not to be found there. In short, civil dissensions had banished from it tranquillity, security, and industry. At that period the empire of Bisnagar, to which this vast country was subject, was falling to ruin. The governors of Visapour, the Carnatic, Golconda, and Orixa, threw off their dependence, and assumed the title of kings. Those of Madura, Tanjore, Mysore, Gingi, and some others, likewise usurped the sovereign authority, though they retained their ancient title of *Naick.* This revolution had just happened when the Europeans appeared on the coast of Coromandel. The foreign trade was at that time inconsiderable; it consisted only of diamonds from Golconda, which were carried to Calicut and Surat, and from thence to Ormus or Suez, whence they were circulated through all Europe and Asia. Massulipatan, the richest and most populous city of these countries, was the only market that was known for linens; they were purchased at a great fair annually holden there by the Arabian and Malayan vessels that frequented that bay, and by caravans arrived from distant parts. The linens were exported to the same places with the diamonds. The fondness for the manufactures of Coromandel, which began to prevail here, inspired all the European nations trading to the Indian seas with the resolution of forming settlements there. They were not discouraged either by the difficulty of conveying goods from the inland parts of the country, where there was no navigable river; by the total want of harbours, where the sea at one season of the year is not navigable; by the barrenness of the coasts, for the most part uncultivated and uninhabited; nor by the tyranny and fluctuating state of the government. They thought that silver would be industriously sought after; that Pegu would furnish timber for building, and Bengal corn for subsistence; that a prosperous voyage of nine months would be more than sufficient to complete their ladings; and that by fortifying themselves they should be secure against the attacks of the weak tyrants that oppressed these countries.

The first European colonies were established near the shore. Some of them obtained a settlement by force; most of them were formed with the consent of the sovereigns; and all were confined to a very narrow tract of land. The boundaries of each were marked out by a hedge of thorny plants, which was their only defence. In process of time fortifications were raised; and the security derived from them, added to the lenity of the government, soon increased the number of colonists. The splendor and independence of these settlements several times raised the jealousy of the princes in whose dominions they were formed; but their attempts to demolish them proved abortive. Each colony increased in prosperity in proportion to the riches and the wisdom of the nation that founded it. None of the companies that exercised an exclusive privilege beyond the Cape of Good Hope had any concern in the trade of diamonds. This was always left to private merchants, and by degrees fell entirely into the hands of the English, or the Jews and Armenians that lived under their protection. At present this grand object of luxury and industry is much reduced. The revolutions that have happened in Indostan have prevented people from resorting to these rich mines; and the anarchy in which this unhappy country is plunged leaves no room to hope that they will be again attended to. The whole of the commercial operations on the coast of Coromandel is confined to the purchase of cottons. The manufacturing of the white cotton brought there differs so little from ours, that it would be neither interesting nor instructive to enter into a minute description of it. The process used in making their printed cottons, which was at first servilely followed in Europe, has since been rendered more simple, and brought to greater perfection by our manufacturers. The painted cottons which are brought there we have not yet attempted to imitate. Those who imagine we have been prevented from undertaking this branch merely by the high price of labour among us, are mistaken. Nature has not given us the wild fruits and drugs necessary for the composition of those bright and indelible colours which constitute the principal merit of the Indian manufactures; nor has she furnished us with the waters that serve to fix them. The Indians do not universally observe the same method in painting their cottons; either because there are some niceties peculiar to certain provinces, or because different soils produce different drugs for different uses. We should tire the patience of our readers were we to trace the slow and painful progress of the Indians in the art of painting their cottons. It is natural to believe that they owe it to length of time, rather than to the fertility of their genius. What seems to authorise this conjecture is, that they have stopped in their improvements, and have not advanced a single step in the arts for many ages; whereas we have proceeded with amazing rapidity. Indeed, were we to consider only the want of invention in the Indians, we should be tempted to believe, that, from time immemorial, they have received the arts they cultivate from some more industrious nation; but when it is remembered that these arts have a peculiar dependence on the materials, gums, colours, and productions of India, we cannot but be convinced that they are natives of that country. It may appear somewhat surprising that cottons painted with all sorts of colours should be sold at so moderate a price, that they are almost as cheap as those that have only two or three. But it must be observed, that the merchants of the country sell to all the companies a large quantity of cottons at a time; and that the demand for cottons painted with various colours makes but a small article in their assortments, as they are not much esteemed in Europe.

Though cottons of all sorts are in some degree manufactured through the whole country of Indostan, which extends from Cape Comorin to the banks of the Ganges; it is observable, that the finest are made in the eastern part, the common ones in the centre, and the coarse ones in the most western parts. Manufactures are established in the European colonies, and upon the coast: they are more frequent at the distance of five or six leagues from the sea, where cotton is more cultivated, and provisions are cheaper. The purchases made there are carried 30 or 40 leagues farther into the country. The Indian merchants settled in the European factories have always the management of this business. The quantity and quality of the goods wanted are settled with these people: the price is fixed according to the patterns: and at the time a contract is made, a third or fourth part of the money agreed on is advanced. This arrangement is owing to the necessity these merchants themselves are under of advancing money to the workmen by the partners or agents who are dispersed through the whole country: of keeping a watchful eye upon them, for fear of losing what they have advanced; and of gradually lessening the sum, by calling for the cottons as fast as they are worked off. Without these precautions, nothing could be depended on in an oppressive government, where the weaver cannot work on his own account, either because his circumstances will not permit, or because he dares not venture to discover them for fear of exactions. The companies that have either success or good management, constantly keep the stock of one year in advance in their settlements. By this method they are sure of having the quantity of goods they have occasion for, and of the quality they choose, at the most convenient time: not to mention that their workmen, and their merchants, who are kept in constant employment, never leave them. Such nations as want money and credit cannot begin their mercantile operations till the arrival of their ships. They have only five or six months at most to execute the orders sent from Europe. The goods are manufactured and examined in haste; and they are even obliged to take such as are known to be bad, and would be rejected at any other time. The necessity they are under of completing their cargoes, and fitting out their vessels before hurricanes come on, leaves no room for nicety of inspection. It would be a mistake to imagine that the country agents could be prevailed upon to order goods to be made on their account in hopes of selling them with a reasonable advantage to the company with whom they are engaged. For, besides that the generality of them are not rich enough to embark in so large an undertaking, they would not be certain of finding their account in it. If the company that employ them should be hindered by unforeseen accidents from sending the usual number of ships, these merchants would have no vent for their commodities. The Indians, the form of whose dress requires different breadths and lengths from those of the cottons fabricated for our use, would not purchase them; and the other European companies would be provided, or certain of being provided, with whatever the extent of their trade required, and their money enabled them to purchase. The plan of procuring loans, which was contrived to remedy this inconvenience, never has nor can be useful. It has been a custom, time immemorial, in Indostan, for every citizen who borrows money to give a written instrument to his creditor. This deed is of no force in a court of judicature, unless it is signed by three witnesses, and bears the day of the month and the year when it was made, with the rate of interest agreed upon by the parties. If the borrower fails to fulfil his engagements, he may be arrested by the lender himself. He is never imprisoned, because there is no fear of his making his escape. He would not even eat, without obtaining leave of his creditor. The Indians make a three-fold division of interest: one kind they call *vice*; another neither *vice* nor *virtue*; and a third, they say, is *virtue*. The first is four *per cent.* a month; the second two; and the third one. The last is, in their opinion, an act of beneficence that only belongs to the most heroic minds. Yet, though the Europeans, who are forced to borrow, meet with this treatment, it is plain they cannot avail themselves of the indulgence without being involved in ruin.

The foreign trade of Coromandel is not in the hands of the natives. In the western part, indeed, there are Mohammedans known by the name of *Chalias*, who, at Naour and Porto-Nuovo, send out ships to Acheen, Merguy, Siam, and the eastern coast. Besides vessels of considerable burden employed in these voyages, they have smaller embarkations for the coasting trade for Ceylon and the pearl-fishery. The Indians of Massulipatan turn their attention another way. They import from Bengal white callicoes, which they dye or print, and sell them again at the places from whence they had them, at 35 or 40 *per cent.* advantage. Excepting these transactions, which are of very little consequence, the whole trade is vested in the Europeans, who have no partners but a few Banians and Armenians settled in their colonies. The quantity of callicoes exported from Coromandel to the different ports of India may be computed at 3500 bales. Of these the French carry 800 to Malabar, Mocha, and

and the iſle of France; the Engliſh, 1200 to Bombay, Malabar, Sumatra, and the Philippine iſlands; and the Dutch 1500 to their different ſettlements. Except 500 bales deſtined for Manila, each of the value of 100 guineas, the others are of ſuch an ordinary kind that they do not exceed 30 guineas at prime coſt; ſo that the whole number of bales does not amount to more than about 150,000l.

Coromandel furniſhes Europe with 9500 bales; 800 of which are brought by the Danes, 2500 by the French, 3000 by the Engliſh, and 3200 by the Dutch. A conſiderable part of theſe callicoes are dyed blue, or ſtriped blue and red for the African trade. The others are fine muſlins, printed callicoes, and handkerchiefs from Maſſulipatan, or Paliacate. It is proved by experience that each of theſe bales coſts only about 42l. ſterling; conſequently they ought to bring in to the manufactory where they are wrought near 360,000l. The payments are not entirely made in ſpecie, either in Europe or Aſia; we give in exchange, cloths, iron, lead, copper, coral, and ſome other articles of leſs value. On the other hand, Aſia pays with ſpices, pepper, rice, ſugar, corn, and dates. All theſe articles taken together may amount to about 210,000l.; and from this calculation it follows, that Coromandel receives annually from Europe about 300,000l. in money. The Britiſh, who have acquired the ſame ſuperiority on this coaſt that they have elſewhere, have formed on it ſeveral ſettlements.

CORONA, among anatomiſts, denotes that edge of the glans penis where the preputium begins.

Corona, or *Halo*, in *Optics*, a luminous circle, ſurrounding the ſun, the moon, the planets, or fixed ſtars. Sometimes theſe circles are white, and ſometimes coloured like the rainbow. Sometimes one only is viſible, and ſometimes ſeveral concentric coronas make their appearance at the ſame time. Thoſe which have been ſeen about Sirius and Jupiter were never more than three, four, or five degrees in diameter; thoſe which ſurround the moon are alſo ſometimes no more than three or five degrees; but theſe, as well as thoſe which ſurround the ſun, are of very different magnitudes, viz. of 12° 0′, 22° 35′, 30° 0′, 38° 0′, 41° 2′, 45° 0′, 46° 24′, 47° 0′, and 90°, or even larger than this. Their diameters alſo ſometimes vary during the time of obſervation, and the breadths both of the coloured and white circles are very different, viz. of 2, 4, or 7 degrees.

The colours of theſe coronas are more dilute than thoſe of the rainbow; and they are in a different order, according to their ſize. In thoſe which Newton obſerved in 1692, they were in the following order, reckoning from the inſide. In the innermoſt were blue, white, and red; in the middle were purple, blue, green, yellow, and pale red; in the outermoſt, pale blue and pale red. Mr Huygens obſerved red next the ſun, and a pale blue outwards. Sometimes they are red on the inſide and white on the outſide. M. Weidler obſerved one that was yellow on the inſide and white on the outſide. In France, one was obſerved in 1683, the middle of which was white; after which followed a border of red; next to it was blue, then green, and the outermoſt circle was a bright red. In 1728, one was ſeen of a pale red outwardly, then followed yellow, and then green, terminated by a white.

Theſe coronas are very frequent. In Holland, M. Muſchenbroeck ſays, 50 may be ſeen in the day-time, almoſt every year; but they are difficult to be obſerved, except the eye be ſo ſituated, that not the body of the ſun, but only the neighbouring parts of the heavens can be ſeen. Mr Middleton ſays, that this phenomenon is very frequent in North America; for that there is generally one or two about the ſun every week, and as many about the moon every month. Halos round the ſun are very frequent in Ruſſia. M. Æpinus ſays, that from the 23d of April 1758, to the 20th of September, he himſelf had obſerved no leſs than 26, and that he has ſometimes ſeen twice as many in the ſame ſpace of time.

Coronas may be produced by placing a lighted candle in the midſt of ſteam in cold weather. Alſo, if glaſs windows be breathed upon, and the flame of a candle be placed ſome feet from it, while the ſpectator is alſo at the diſtance of ſome feet from another part of a window, the flame will be ſurrounded with a coloured halo. And if a candle be placed behind a glaſs receiver, when air is admitted into the vacuum within it, at a certain degree of denſity, the vapour with which it is loaded will make a coloured halo round the flame. This was obſerved by Otto Guericke. In December 1756, M. Muſchenbroeck obſerved, that when the glaſs windows of his room were covered with a thin plate of ice on the inſide, the moon appearing through it was ſurrounded with a large and variouſly coloured halo; and, opening the window, he found that it aroſe entirely from that thin plate of ice, for none was ſeen except through it.

Similar, in ſome reſpects, to the halo, was the remarkable appearance which M. Bouguer deſcribes, as obſerved by himſelf and his companions on the top of Mount Pinchinca, in the Cordilleras. When the ſun was juſt riſing behind them, ſo as to appear white, each of them ſaw his own ſhadow projected upon it, and no other. The diſtance was ſuch, that all the parts of the ſhadow were eaſily diſtinguiſhable, as the arms, the legs, and the head; but what ſurpriſed them moſt was, that the head was adorned with a kind of glory, conſiſting of three or four ſmall concentric crowns, of a very lively colour, each exhibiting all the varieties of the primary rainbow, and having the circle of red on the outſide. The intervals between theſe circles continued equal, though the diameters of them all were conſtantly changing. The laſt of them was very faint, and at a conſiderable diſtance was another great white circle, which ſurrounded the whole. As near as M. Bouguer could compute, the diameter of the firſt of theſe circles was about $5\frac{2}{3}$ degrees, that of the ſecond 11, that of the third 17, and ſo on; but the diameter of the white circle was about 76 degrees. This phenomenon never appeared but in a cloud conſiſting of frozen particles, and never in drops of rain like the rainbow. When the ſun was not in the horizon, only part of the white circle was viſible, as M. Bouguer frequently obſerved afterwards.

Similar alſo to this curious appearance was one that was obſerved by Dr M'Feat in Scotland. This gentleman obſerved a rainbow round his ſhadow in the mist, when he was upon an eminence above it. In this situation the whole country round seemed, as it were, buried under a vast deluge, and nothing but the tops of distant hills appeared here and there above the flood: so that a man would think of diving down into it with a kind of horror. In those upper regions the air, he says, is at that time very pure and agreeable to breathe in. At another time he observed a double range of colours round his shadow in these circumstances. The colours of the outermost range were broad and very distinct, and everywhere about two feet distant from the shadow. Then there was a darkish interval, and after that another narrower range of colours, closely surrounding the shadow, which was very much contracted. This person seems to think that these ranges of colours are caused by the inflection of the rays of light, the same that occasioned the ring of light which surrounds the shadows of all bodies, observed by M. Maraldi, and this author *. But the prodigious variety with which these appearances are exhibited seems to show that many of them do not result from the general laws of reflection, refraction, or inflection, belonging to transparent substances of a large mass; but upon the alternate reflection and transmission of the different kinds of rays, peculiar to substances reduced to the form of thin plates, or consisting of separate and very minute parts. But where the dimensions of the coronas are pretty constant, as in the usual and larger halo, which is about half the diameter of the rainbow, they may, perhaps, be explained on the general principles of refraction only.

* *Edin. Essays*, vol. i. p. 198.

Descartes observes, that the halo never appears when it rains: from which he concludes that this phenomenon is occasioned by the refraction of light in the round particles of ice, which are then floating in the atmosphere; and though these particles are flat when they fall to the ground, he thought they must be protuberant in the middle, before their descent; and according to this protuberancy he imagined that the diameter of the halo would vary.—In treating of meteors, Gassendi supposed that a halo is the same thing with the rainbow, the rays of light being in both cases twice refracted and once reflected within each drop of rain or vapour, and that all the difference there is between them arises from their different situation with respect to the observer. For, whereas, when the sun is behind the spectator, and consequently the rainbow before him, his eye is in the centre of the circle; when he views the halo, with his face towards the sun, his eye is in the circumference of the circle; so that according to the known principles of geometry, the angle under which the object appears in this case must be just half of what it is in the other. Though this writer says a great deal upon the subject, and endeavours to give reasons why the colours of the halo are in a different order to those of the rainbow, he does not describe the progress of the rays of light from the sun to the eye of the spectator when a halo is formed by them, and he gives no figures to explain his ideas.

Dechales, also, endeavours to show that the generation of the halo is similar to that of the rainbow. If, says he, a sphere of glass or crystal, AB, (fig. 1.) full of water, be placed in the beams of the sun shining from C, there will not only be two circles of coloured light on the side next the sun, and which constitute the two rainbows; but there will also be another on the part opposite to the sun, the rays belonging to which meeting at E, afterwards diverge, and form the coloured circle G, as will be visible, if the light that is transmitted through the globe be received on a piece of white paper. The colours also will appear to an eye placed in any part of the surface of the cone FEG. Measuring the angle FEH, he found it to be 23 degrees. They were only the extreme rays of this cone that were coloured like those of the rainbow.

Plate CLXIV.

This experiment he thought sufficiently illustrated the generation of the halo; so that whenever the texture of the clouds is such, as not entirely to intercept the rays of the sun or moon, and yet have some degree of density, there will always be a halo round them, the colours of the rainbow appearing in those drops which are 23 degrees distant from the sun or moon. If the sun be at A (fig. 2.), and the spectator in B, the halo will be the circle DFE, DBE, being 46 degrees, or twice 23.

The reason why the colours of the halo are more dilute than those of the rainbow, he says, is owing principally to their being formed not in large drops of rain, but in very small vapour; for if the drops of water were large, the cloud would be so thick, that the rays of the sun could not be regularly transmitted through them; and, on the other hand, he had observed, that when the rainbow is formed by very thin vapours, the colours hardly appear. As for those circles of colours which are sometimes seen round candles, it was his opinion that they are owing to nothing but moisture on the eye of the observer; for that he could never produce this appearance by means of vapour only, if he wiped his eyes carefully; and he had observed that such circles are visible to some persons and not to others, and to the same persons at one time and not another.

The most considerable of all the theories respecting haloes, and that which has met with most the favourable and longest reception, is that of Mr Huygens. Sir Isaac Newton mentions it with respect, and Dr Smith, in his Complete System of Optics, does not so much as hint at any other. The occasion of Mr Huygens publishing his thoughts on this subject, was the appearance of a halo at Paris, on the 12th of May 1667, of which he gave an account in a paper read at the Royal Academy in that city, which was afterwards translated, and published in the English Philosophical Transactions, and which may be seen in Lowthorp's Abridgment, vol. ii. p. 189. But this article contains nothing more than the heads of a discourse, which he afterwards composed, but never quite finished, on this subject; and which has been translated, with some additions, by Dr Smith, from whom the following account is chiefly extracted.

Our philosopher had been first engaged to think particularly upon this subject, by the appearance of five suns at Warsaw, in 1658; presently after which, he says, he hit upon the true cause of halos, and not long after of that of mock suns also.

To prepare the way for the following observations, it must be remarked, that if we can conceive any kind of bodies in the atmosphere, which, according to the known laws of optics, will, either by means of reflection

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tion or refraction, produce the appearance in question, when nothing else can be found that will do it, we must acquiesce in the hypothesis, and suppose such bodies to exist, even though we cannot give a satisfactory account of their generation. Now, two such bodies are assumed by Mr Huygens; one of them a round ball, opaque in the centre, but covered with a transparent shell; and the other is a cylinder, of a similar composition. By the help of the former he endeavours to account for halos, and by the latter for those appearances which are called mock suns. Those bodies which Mr Huygens requires, in order to explain these phenomena, are not, however, a mere assumption; for some such, though of a larger size than his purpose requires, have been actually found, consisting of snow within and ice without. They are particularly mentioned by Descartes.

The balls with the opaque kernel, which he supposed to have been the cause of them, he imagines not to exceed the size of a turnip seed; but, in order to illustrate this hypothesis, he gives a figure of one, of a larger size, in ABCDEF, (fig. 3.) representing the kernel of snow in the middle of it. If the rays of light, coming from GH, fall upon the side AD, it is manifest they will be so refracted at A and D, as to bend inwards; and many of them will strike upon the kernel EF. Others, however, as GA and HD, will only touch the sides of the kernel; and being again refracted at B and C, will emerge in the lines BK, CK, crossing each other in the point K, whose nearest distance from the globule is somewhat less than its apparent diameter. If, therefore, BK and CK be produced towards M and L, (fig. 4.) it is evident that no light can reach the eye placed within the angle LKM, but may fall upon it when placed out of that angle, or rather the cone represented by it.

For the same reason, every other of these globules will have a shadow behind it, in which the light of the sun will not be perceived. If the eye be at N, and that be conceived to be the vertex of a cone, the sides of which NR, NQ, are parallel to the sides of the former cone KL, KM, it is evident that none of the globules within the cone QNR can send any rays of the sun to the eye at N. But any other globule out of this cone, as X, may send those rays, which are more refracted than XZ, to the eye; so that this will appear enlightened, while those within the cone will appear obscure. It is evident from this, that a certain area, or space, quite round the sun, must appear dark; and that the space next to this area will appear luminous, and more so in those parts that are nearest to the obscure area; because, he says, it may easily be demonstrated, that those globules which are nearest to the cone QNR exhibit the largest image of the sun. It is plain, also, that a corona ought to be produced in the same manner, whatever be the sun's altitude, because of the spherical figure of the globules.

To verify this hypothesis, our philosopher advises us to expose to the sun a thin glass bubble, filled with water, and having some opaque substance in the centre of it; and he says we shall find, that we shall not be able to see the sun through it, unless at a certain distance from a place opposite to the centre of it; but as soon as we do perceive the light, the image of the sun will immediately appear the brightest, and coloured red, for the same reason as in the rainbow.

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These coronas, he says, often appear about the moon; but the colours are so weak as to appear only white. Such white coronas he had also seen about the sun, when the space within them appeared scarce darker than that without. This he supposes to happen when there are but few of those globules in the atmosphere; for the more plentiful they are, the more lively the colours of the halo appear; at the same time also the area within the corona will be the darker. The apparent diameter of the corona, which is generally about 45 degrees, depends upon the size of the dark kernel; for the larger it is with respect to the whole globule, the larger will be the dark cone behind it.

The globules that form these halos, Mr Huygens supposes to have consisted of soft snow, and to have been rounded by continual agitation in the air, and thawed on their outsides by the heat of the sun.

To make the diameter of the halo 45 degrees, he demonstrates that the semidiameter of the globule must be to the semidiameter of the kernel of snow very nearly as 1000 to 480; and that to make a corona of 100 degrees, it must be as 1000 to 680.

Mr Weidler, in his Commentary on parhelia, published at Wirtemberg in 1733, observes that it is very improbable that such globules as Mr Huygens's hypothesis requires, with nuclei of such a precise proportion, should exist; and if there were such bodies, he thinks they would be too small to produce the effects ascribed to them. Besides, he observes that appearances exactly similar to halos are not uncommon, where fluid vapours alone are concerned; as when a candle is placed behind the steam of boiling water in frosty weather, or in the midst of the vapour issuing copiously from a bath, or behind a receiver when the air is so much rarefied as to be incapable of supporting the water it contains. The rays of the sun twice reflected and twice refracted within small drops of water are sufficient, he says, without any opaque kernel, to produce all the appearances of the halos that have the red light towards the sun, as may be proved by experiment. That the diameter of the halos is generally half of that of the rainbow, he accounts for as Gassendi did before him.

M. Mariotte accounts for the formation of the small coronas by the transmission of light through aqueous vapours, where it suffers two refractions, without any intermediate reflection. He shows that light which comes to the eye, after being refracted in this manner, will be chiefly that which falls upon the drop nearly perpendicular; because more rays fall upon any given quantity of surface in that situation, fewer of them are reflected with small degrees of obliquity, and they are not so much scattered after refraction. The red will always be outermost in these coronas, as consisting of rays which suffer the least refraction. And whereas he had seen, when the clouds were driven briskly by the wind, halos round the moon, varying frequently in their diameter, being sometimes of two, sometimes of three, and sometimes of four degrees; sometimes also being coloured, sometimes only white, and sometimes disappearing entirely; he concluded that all these variations arose from the diffe-

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rent thickneſs of the clouds, through which ſometimes more and ſometimes leſs light was tranſmitted. He ſuppoſed, alſo, that the light which formed them might ſometimes be reflected, and at other times refracted. As to thoſe coronas which conſiſt of two orders of colours, he imagined that they were produced by ſmall pieces of ſnow, which, when they begin to diſſolve, form figures which are a little convex towards their extremities. Sometimes, alſo, the ſnow will be melted in different ſhapes; and in this caſe, the colours of ſeveral halos will be intermixed, and confuſed; and ſuch, he ſays, he had ſometimes obſerved round the ſun.

M. Mariotte then proceeds to explain the larger coronas, namely thoſe that are about 45 degrees in diameter, and for this purpoſe he has recourſe to equiangular priſms of ice, in a certain poſition with reſpect to the ſun; and he takes pains to trace the progreſs of the rays of light for this purpoſe; but this hypotheſis is very improbable. In ſome caſes he thought that theſe large coronas were cauſed by hail-ſtones, of a pyramidal figure; becauſe after two or three of them had been ſeen about the ſun, there fell the ſame day ſeveral ſuch pyramidal hail-ſtones. M. Mariotte explains parhelia by the help of the ſame ſuppoſitions. See Parhelia.

Sir Iſaac Newton does not appear to have given any particular attention to the ſubject of halos, but he has hinted at his ſentiments concerning them occaſionally; by which we perceive that he conſidered the larger and leſs variable appearances of this kind as produced according to the common laws of refraction, but that the leſs and more variable appearances depend upon the ſame cauſe with the colours of thin plates.

He concludes his explication of the rainbow with the following obſervation on halos and parhelias. "The light which comes through drops of rain by two refractions, without any reflection, ought to appear the ſtrongeſt at the diſtance of about 26 degrees from the ſun, and to decay gradually both ways as the diſtance from him increaſes. And the ſame is to be underſtood of light tranſmitted through ſpherical hail-ſtones: and if the hail be a little flatted, as it often is, the tranſmitted light may be ſo ſtrong, at a little leſs diſtance than that of 26 degrees, as to form a halo about the ſun or moon; which halo, as often as the hail-ſtones are duly figured, may be coloured, and then it muſt be red within by the leaſt refrangible rays, and blue without by the moſt refrangible ones: eſpecially if the hail-ſtones have opaque globules of ſnow in their centres to intercept the light within the halo, as Mr Huygens has obſerved, and make the inſide of it more diſtinctly defined than it would otherwiſe be. For ſuch hail-ſtones, though ſpherical, by terminating the light by the ſnow, may make a halo red within, and colourleſs without, and darker within the red than without, as halos uſe to be. For of thoſe rays which paſs cloſe by the ſnow, the red-making ones will be the leaſt refracted, and ſo come to the eye in the ſtraighteſt lines."

Some farther thoughts of Sir Iſaac Newton's on the ſubject of halos we find ſubjoined to the account of his experiments on the colours of thick plates of glaſs, which he conceived to be ſimilar to thoſe which are exhibited by thin ones. "As light reflected by a lens quickſilvered on the back ſide makes the rings of the colours above deſcribed, ſo (he ſays) it ought to make the like rings in paſſing through a drop of water. At the firſt reflection of the rays within the drop, ſome colours ought to be tranſmitted, as in the caſe of a lens, and others to be reflected back to the eye. For inſtance, if the diameter of a ſmall drop or globule of water be about the 500dth part of an inch, ſo that a red-making ray, in paſſing through the middle of this globule, has 250 fits of eaſy tranſmiſſion within the globule, and all the red-making rays which are at a certain diſtance from this middle ray round about it have 249 fits within the globule, and all the like rays at a certain farther diſtance round above it have 248 fits, and all thoſe at a certain farther diſtance 247 fits, and ſo on, theſe concentric circles of rays, after their tranſmiſſion, falling on a white paper, will make concentric rings of red upon the paper, ſuppoſing the light which paſſes through one ſingle globule ſtrong enough to be ſenſible; and in like manner the rays of other colours will make rings of other colours. Suppoſe now that in a fair day the ſun ſhould ſhine through a thin cloud of ſuch globules of water or hail, and that the globules are all of the ſame ſize, the ſun ſeen through this cloud ought to appear ſurrounded with the like concentric rings of colours, and the diameter of the firſt ring of red ſhould be $7\frac{1}{4}^{\circ}$, that of the ſecond $10\frac{1}{4}^{\circ}$, that of the third $12^{\circ}\ 33'$, and according as the globules of water are bigger or leſs, the ring ſhould be leſs or bigger."

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This curious theory our author informs us was confirmed by an obſervation which he made in 1692. He ſaw by reflection, in a veſſel of ſtagnating water, three halos, crowns, or rings of colours about the ſun, like three little rainbows concentric to his body. The colours of the firſt, or innermoſt crown, were blue next the ſun, red without, and white in the middle, between the blue and red. Thoſe of the ſecond crown were purple and blue within, and pale red without, and green in the middle. And thoſe of the third were pale blue within, and pale red without. Theſe crowns incloſed one another immediately, ſo that their colours proceeded in this continual order from the ſun outward; blue, white, red; purple, blue, green, pale, yellow, and red; pale blue, pale red. The diameter of the ſecond crown, meaſured from the middle of the yellow and red on one ſide of the ſun, to the middle of the ſame colour on the other ſide, was $9\frac{1}{3}$ degrees or thereabouts. The diameters of the firſt and third he had not time to meaſure; but that of the firſt ſeemed to be about five or ſix degrees, and that of the third about twelve. The like crowns appear ſometimes about the moon; for in the beginning of the year 1664, on February 19th at night, he ſaw two ſuch crowns about her. The diameter of the firſt or innermoſt was about three degrees, and that of the ſecond about five degrees and a half. Next about the moon was a circle of white; and next about that the inner crown, which was of a bluiſh green within, next the white, and of a yellow and red without; and next about theſe colours were blue and green on the inſide of the outer crown, and red on the outſide, of it.

At the ſame time there appeared a halo at the diſtance

ſtance of about 22° 35′ from the centre of the moon. It was elliptical; and its long diameter was perpendicular to the horizon, verging below fartheſt from the moon. He was told that the moon has ſometimes three or more concentric crowns of colours encompaſſing one another next about her body. The more equal the globules of water or ice are to one another, the more crowns of colours will appear, and the colours will be the more lively. The halo, at the diſtance of 22½ degrees from the moon, is of another ſort. By its being oval, and more remote from the moon below than above, he concludes that it was made by refraction in ſome kind of hail or ſnow floating in the air in an horizontal poſture, the refracting angle being about 50 or 60 degrees. Dr Smith, however, makes it ſufficiently evident, that the reaſon why this halo appeared oval, and more remote from the moon towards the horizon, is a deception of ſight, and the ſame with that which makes the moon appear larger in the horizon.

Dr Kotelnihow having, like Dr Halley, made very accurate obſervations to determine the number of poſſible rainbows, conſiders the coloured halo which appears about a candle as the ſame thing with one of theſe bows which is formed near the body of the ſun, but which is not viſible on account of his exceſſive ſplendor.

Laſtly, M. Muſchenbroeck concludes his account of coronas with obſerving, that ſome denſity of vapour, or ſome thickneſs of the plates of ice, divides the light in its tranſmiſſion through the ſmall globules of water, or their interſtices, into its ſeparate colours: but what that denſity was, or what was the ſize of the particles which compoſed the vapour, he could not pretend to determine.

Corona, among *Botaniſts*, the name given by ſome to the circumference or margin of a radiated compound flower. It correſponds to the radius of Linnæus; and is exemplified in the flat, tongue-ſhaped petals which occupy the margin of the daiſy or ſunflower.

Corona Auſtralis, or *Meridionalis*, Southern Crown, a conſtellation of the ſouthern hemiſphere, whoſe ſtars in Ptolemy's catalogue are 13, in the Britiſh catalogue 12.

Corona Borealis, the Northern Crown, or Garland, in *Aſtronomy*, a conſtellation of the northern hemiſphere, whoſe ſtars in Ptolemy's catalogue are eight, in Tycho's as many, and in Mr Flamſtead's 21.

Corona Imperialis, in *Conchology*, a name given by ſome authors to a kind of voluta, differing from the other ſhells of that family, by having its head ornamented with a number of points, forming a ſort of crown. See Voluta, Conchology *Index*.

CORONAL, in *Anatomy*, the firſt ſuture of the ſkull. See Anatomy *Index*.

CORONALE os, the ſame with os frontis. See Anatomy *Index*.

CORONARY vessels, in *Anatomy*, certain veſſels which furniſh the ſubſtance of the heart with blood.

Coronary Arteries, are two arteries ſpringing out of the aorta, before it leaves the pericardium. See Anatomy *Index*.

Coronary Vein, a vein diffuſed over the exterior ſurface of the heart. See Anatomy *Index*.

Stomachic Coronary, a vein inſerted into the trunk of the ſplenic vein, which, by uniting with the meſenteric, forms the vena porta. See Anatomy *Index*.

CORONARIÆ, in *Botany*, the 10th order of plants, in Linnæus's Fragments of a Natural Method. Under this name, inſtead of the more obvious one *liliaceæ*, Linnæus collects a great number of genera, moſt of which furniſh very beautiful garden flowers, viz. albuca, cyanella, fritillaria, helonias, hyacinthus, hypoxis, lilium, melanthium, ornithogalum, ſcilla, tulipa, agave, aletris, aloe, anthericum, aſphodelus, bromelia, burmannia, hemerocallis, polyanthes, tillandſia, veratrum, yucca.

CORONATION, the ceremony of inveſting with a crown, particularly applied to the crowning of kings, upon their ſucceeding to the ſovereignty. See King.

CORONÆ, in *Ancient Geography*, a town of Bœotia, near Mount Helicon, and the lake Copais, ſituated on an eminence: famous for the defeat of the Athenians and Bœotians by Ageſilaus. Another Corona of Theſſaly; having Narthacium to the eaſt, and Lamia near the Sperchius to the north (Ptolemy).

CORONE, in *Ancient Geography*, a town of Meſſenia, ſituated on the ſea, giving name to the Sinus Coronæus, (Pliny); now *Golfo di Coron*. Pauſanias takes it to be the *Aepea* of Homer; but Strabo *Thuria*, and Pliny *Pedaſus*, now *Coron*, in the territory of Belvidere, in the Morea. E. Long. 22. N. Lat. 36. 30.

CORONELLI, Vincent, a famous geographer, born at Venice. His ſkill in the mathematics having brought him to the knowledge of the count d'Eſtrees, his eminence employed him in making globes for Louis XIV. With this view Coronelli ſpent ſome time at Paris, and left a great number of globes there, which are eſteemed. In 1685, he was made coſmographer to the republic of Venice; and four years after public profeſſor of geography. He founded an academy of coſmography at Venice; and died in that city in 1718. He publiſhed about 400 geographical charts, an abridgment of coſmography, ſeveral books on geography, and other works.

CORONER (*coronator*), an ancient officer in England, ſo called becauſe he hath principally to do with pleas of the crown, or ſuch wherein the king is more immediately concerned. And in this light, the lord chief juſtice of the king's bench is the principal coroner in the kingdom; and may, if he pleaſes, exerciſe the juriſdiction of a coroner in any part of the realm. But there are alſo particular coroners for every county in England; uſually four, but ſometimes ſix, and ſometimes fewer. This officer is of equal authority with the ſheriff; and was ordained, together with him to keep the peace, when the earls gave up the wardſhip of the county.

He is choſen by all the freeholders of the county court; and by the ſtatute of Weſtminſter 1. it was enacted, that none but lawful and diſcreet knights ſhould be choſen; but it ſeems now ſufficient if a man have lands enough to be made a knight, whether he be really knighted or not; for the coroner ought to have an eſtate ſufficient to maintain the dignity of his office, and anſwer any fines that may be made upon him for his

his misbehaviour; and, if he hath not enough to answer, his fine shall be levied on the county, as a punishment for electing an insufficient officer. Now, indeed, through the culpable neglect of gentlemen of property, this office has been suffered to fall into disrepute, and get into low and indigent hands; so that although formerly no coroners would be paid for serving their country, and they were by the aforesaid statute of Westminster 1. expressly forbidden to take a reward under pain of great forfeiture to the king, yet for many years past they have only desired to be chosen for the sake of their perquisites; being allowed fees for their attendance by the statute 3 Hen. VII. c. 1. which Sir Edward Coke complains of heavily, though since his time those fees have been much enlarged.

The coroner is chosen for life; but may be removed, either by being made sheriff or chosen verderor, which are offices incompatible with the other; and by the statute 25 Geo. II, c. 29. extortion, neglect, or misbehaviour, are also made causes of removal.

The office and power of a coroner are also, like those of the sheriff, either judicial or ministerial; but principally judicial. This is in great measure ascertained by statute 4 Edw. I. *De officio coronatoris;* and consists, first, in inquiring, when any person is slain, or dies suddenly, or in prison, concerning the manner of his death. And this must be *super visum corporis;* for if the body is not found, the coroner cannot sit. He must also sit at the very place where the death happened. And his inquiry is made by a jury from four, five, or six, of the neighbouring towns, over whom he is to preside. If any be found guilty by this inquest of murder, he is to commit to prison for farther trial, and is also to inquire concerning their lands, goods, and chattels, which are forfeited thereby; but whether it be murder or not, he must inquire whether any deodand has accrued to the king, or the lord of the franchise, by this death; and must certify the whole of this inquisition to the court of king's bench, or the next assizes. Another branch of his office is to inquire concerning shipwrecks; and certify whether wreck or not, and who is in possession of the goods. Concerning treasure-trove, he is also to inquire concerning the finders, and where it is, and whether any one be suspected of having found and concealed a treasure; "and that may well be perceived (saith the old statute of Edw. I.), where one liveth riotously, haunting taverns, and hath done so of long time;" whereupon he might be attached and held to bail upon this suspicion only.

The ministerial office of the coroner is only as the sheriff's substitute. For when just exception can be taken to the sheriff, for suspicion of partiality (as that he is interested in the suit, or of kindred to either plaintiff or defendant), the process must then be awarded to the coroner, instead of the sheriff, for execution of the king's writs.

CORONET. See Crown.

Coronet, or *Cornet*, of a horse, the lowest part of the pastern, which runs round the coffin, and is distinguished by the hair joining and covering the upper part of the hoof.

CORONILLA, *jointed-podded Colutea*: A genus of plants belonging to the diadelphia class, and in the

natural method ranking under the 32d order, *Papilionaceæ*. See Botany *Index*.

CORONOID, and Condyloid, processes. See Anatomy *Index*.

CORPORA cavernosa, in *Anatomy*, two spongious bodies, called also *corpora nervosa* and *corpus spongiosum*. See Anatomy *Index*.

Corpora Pyramidalia, are two protuberances of the under part of the *cerebellum*, about an inch long; so called from their resemblance to a pyramid. See Anatomy *Index*.

Corpora Striata. See Anatomy *Index*.

CORPORAL, an inferior officer under a sergeant, in a company of foot, who has charge over one of the divisions, places and relieves sentinels, and keeps good order in the corps de garde; he also receives the word from the inferior rounds, which passes by his corps de garde. This officer carries a fusee, and is commonly an old soldier; there are generally three corporals in each company.

Corporal of a Ship of War, an officer under the master at arms, employed to teach the officers the exercise of small arms, or of musketry; to attend at the gangway, on entering ports, and observe that no spirituous liquors are brought into the ship, unless by express leave from the officers. He is also to extinguish the fire and candles at eight o'clock in winter, and nine in summer, when the evening gun is fired; and to walk frequently down in the lower decks in his watch, to see that there are no lights but such as are under the charge of proper sentinels.

Corporal (*Corporale*), is also an ancient church-term, signifying the sacred linen spread under the chalice in the eucharist and mass, to receive the fragments of the bread, if any chance to fall. Some say it was Pope Eusebius who first enjoined the use of the corporal; others ascribe it to St Sylvester. It was the custom to carry corporals, with some solemnity, to fires, and to heave them against the flames, in order to extinguish them. Philip de Comines says, the pope made Louis XI. a present of the corporale whereon my lord St Peter sung mass.

CORPORATION, a body politic or incorporate, so called, because the persons or members are joined into one body, and are qualified to take, grant, &c.

Of corporations there is a great variety subsisting, for the advancement of religion, of learning, and of commerce; in order to preserve entire and for ever those rights and immunities, which, if they were granted only to those individuals of which the body corporate is composed, would upon their death be utterly lost and extinct. To show the advantages of these incorporations, let us consider the case of a college in either of our universities, founded *ad studendum et orandum*, for the encouragement and support of religion and learning. If this was a mere voluntary assembly, the individuals which compose it might indeed read, pray, study, and perform scholastic exercises together, so long as they could agree to do so; but they could neither frame nor receive any laws or rules of their conduct; none at least which would have any binding force, for want of a coercive power to create a sufficient obligation. Neither could they be capable of retaining any privileges or immunities: for,

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for, if ſuch privileges be attacked, which of all this unconnected aſſembly has the right or ability to defend them? And, when they are diſperſed by death or otherwiſe, how ſhall they transfer theſe advantages to another ſet of ſtudents, equally unconnected as themſelves? So alſo, with regard to holding eſtates or other property, if land be granted for the purpoſes of religion or learning to 20 individuals not incorporated, there is no legal way of continuing the property to any other perſons for the ſame purpoſes, but by endleſs conveyances from one to the other, as often as the hands are changed. But when they are conſolidated and united into a corporation, they and their ſucceſſors are then conſidered as one perſon in law: as one perſon, they have one will, which is collected from the ſenſe of the majority of the individuals: this one will may eſtabliſh rules and orders for the regulation of the whole, which are a ſort of municipal laws of this little republic; or rules and ſtatutes may be preſcribed to it at its creation, which are then in the place of natural laws: the privileges and immunities, the eſtates and poſſeſſions, of the corporation, when once veſted in them, will be for ever veſted, without any new conveyance to new ſucceſſions; for all the individual members that have exiſted from the foundation to the preſent time, or that ſhall ever hereafter exiſt, are but one perſon in law, a perſon that never dies: in like manner as the river Thames is ſtill the ſame river, though the parts which compoſe it are changing every inſtant.

The honour of originally inventing theſe political conſtitutions entirely belongs to the Romans. They were introduced, as Plutarch ſays, by Numa; who finding, upon his acceſſion, the city torn to pieces by the two rival factions of Sabines and Romans, thought it a prudent and politic meaſure to ſubdivide theſe two into many ſmaller ones, by inſtituting ſeparate ſocieties of every manual trade and profeſſion, They were afterwards much conſidered by the civil law, in which they were called *univerſitates*, as forming one whole out of many individuals; or *collegia*, from being gathered together: they were adopted alſo by the canon law, for the maintenance of eccleſiaſtical diſcipline; and from them our ſpiritual corporations are derived. But our laws have conſiderably refined and improved upon the invention, according to the uſual genius of the Engliſh nation, particularly with regard to ſole corporations, conſiſting of one perſon only, of which the Roman lawyers had no notion; their maxim being that, *Tres faciunt collegium;* though they held, that if a corporation, originally conſiſting of three perſons, be reduced to one, *Si univerſitas ad unum redit;* it may ſtill ſubſiſt as a corporation, *Et ſtet nomen univerſitatis.*

As to the ſeveral ſorts of corporations, the firſt diviſion of them is into *aggregate* and *ſole*. Corporations aggregate conſiſt of many perſons united together into one ſociety, and are kept up by a perpetual ſucceſſion of members, ſo as to continue for ever: of which kind are the mayor and commonalty of a city, the head and fellows of a college, the dean and chapter of a cathedral church. Corporations ſole conſiſt of one perſon only and his ſucceſſors, in ſome particular ſtation, who are incorporated by law, in order to give them ſome legal capacities and advantages, particularly that of perpetuity, which in their natural perſons they could not have had. In this ſenſe the king is a ſole corporation; ſo is a biſhop; ſo are ſome deans and prebendaries, diſtinct from their ſeveral chapters; and ſo is every parſon and vicar. And the neceſſity, or at leaſt uſe, of this inſtitution will be very apparent, if we conſider the caſe of a parſon of a church. At the original endowment of pariſh-churches, the freehold of the church, the church-yard, the parſonage-houſe, the glebe, and the tithes of the pariſh, were veſted in the then parſon by the bounty of the donor, as a temporal recompenſe to him for his ſpiritual care of the inhabitants, and with intent that the ſame emoluments ſhould ever afterwards continue as a recompenſe for the ſame care. But how was this to be effected? The freehold was veſted in the parſon; and, if we ſuppoſe it veſted in his natural capacity, on his death it might deſcend to his heir, and would be liable to his debts and incumbrances: or at beſt, the heir might be compellable, at ſome trouble and expence, to convey theſe rights to the ſucceeding incumbent. The law therefore has wiſely ordained, that the parſon, *quatenus* parſon, ſhall never die, any more than the king; by making him and his ſucceſſors a corporation. By which means all the original rights of the parſonage are preſerved entire to the ſucceſſor; for the preſent incumbent, and his predeceſſor who lived ſeven centuries ago, are in law one and the ſame perſon; and what was given to the one was given to the other alſo.

Another diviſion of corporations, either ſole or aggregate, is into *eccleſiaſtical* and *lay*. Eccleſiaſtical corporations are, where the members that compoſe it are entirely ſpiritual perſons, ſuch as biſhops, certain deans and prebendaries, all archdeacons, parſons, and vicars, which are ſole corporations; deans and chapters at preſent, and formerly prior and convent, abbot and monks, and the like, bodies aggregate. Theſe are erected for the furtherance of religion, and perpetuating the rights of the church.—Lay corporations are of two ſorts, *civil* and *eleemoſynary*. The civil are ſuch as are erected for a variety of temporal purpoſes. The king, for inſtance, is made a corporation, to prevent in general the poſſibility of an *interregnum* or vacancy of the throne, and to preſerve the poſſeſſions of the crown entire; for immediately upon the demiſe of one king, his ſucceſſor is in full poſſeſſion of the regal rights and dignity. Other lay corporations are erected for the good government of a town or particular diſtrict, as a mayor and commonalty, bailiff and burgeſſes, or the like: ſome for the advancement and regulation of manufactures and commerce; as the trading companies of London and other towns: and ſome for the better carrying on of divers ſpecial purpoſes; as church wardens, for conſervation of the goods of the pariſh; the college of phyſicians and company of ſurgeons in London, for the improvement of the medical ſcience; the royal ſociety for the advancement of natural knowledge; and the ſociety of antiquarians for promoting the ſtudy of antiquities. The eleemoſynary ſort are ſuch as are conſtituted for the perpetual diſtribution of the free alms or bounty of the founder of them to ſuch perſons as he has directed. Of this kind are all hoſpitals for the maintenance of the poor, ſick, and impotent; and all colleges, both *in* our univerſities and *out* of them: which colleges are founded for two purpoſes:

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poses: 1. For the promotion of piety and learning by proper regulations and ordinances. 2. For imparting assistance to the members of those bodies, in order to enable them to prosecute their devotion and studies with greater ease and assiduity. And all these eleemosynary corporations are, strictly speaking, lay, and not ecclesiastical, even though composed of ecclesiastical persons, and although they in some things partake of the nature, privileges, and restrictions of ecclesiastical bodies.

Having thus marshalled the several species of corporations, let us next proceed to consider, 1. How corporations in general may be created. 2. What are their powers, capacities, and incapacities. And, 3. How they may be dissolved.

I. Corporations, by the civil law, seem to have been created by the mere act and voluntary association of their members; provided such convention was not contrary to law, for then it was *illicitum collegium*. It does not appear that the prince's consent was necessary to be actually given to the foundation of them; but merely that the original founders of these voluntary and friendly societies (for they were little more than such) should not establish any meetings in opposition to the laws of the state.

Bat in England the king's consent is absolutely necessary to the erection of any corporation, either impliedly or expressly given. The king's implied consent is to be found in corporations which exist by force of the common law, to which our former kings are supposed to have given their concurrence; common law being nothing else but custom, arising from the universal agreement of the whole community. Of this sort are the king himself, all bishops, parsons, vicars, church-wardens, and some others; who by common law have ever been held (as far as our books can show us) to have been corporations, *virtute officii;* and this incorporation is so inseparably annexed to their offices, that we cannot frame a complete legal idea of any of these persons, but we must also have an idea of a corporation, capable to transmit his rights to his successors, at the same time. Another method of implication, whereby the king's consent is presumed, is as to all corporations by prescription, such as the city of London, and many others, which have existed as corporations, time whereof the memory of man runneth out to the contrary; and therefore are looked upon in law to be well created. For though the members thereof can show no legal charter of incorporation, yet in cases of such high antiquity the law presumes there once was one; and that by the variety of accidents, which a length of time may produce, the charter is lost or destroyed. The methods by which the king's consent is expressly given, are either by act of parliament or charter. By act of parliament, of which the royal assent is a necessary ingredient, corporations may undoubtedly be created: but it is observable, that most of those statutes which are usually cited as having created corporations, do either confirm such as have been before created by the king; as in the case of the college of physicians, erected by charter 10 Hen. VIII. which charter was afterwards confirmed in parliament: or, they permit the king to erect a corporation *in futuro* with such and such powers; as is the case of the bank of England, and the society of the British fishery. So that the immediate creative act is usually performed by the king alone, in virtue of his royal prerogative.

All the other methods therefore whereby corporations exist, by common law, by prescription, and by act of parliament, are for the most part reducible to this of the king's letters patent, or charter of incorporation. The king's creation may be performed by the words *creamus, erigimus. fundamus, incorporamus*, or the like. Nay it is held, that if the king grants to a set of men to have *gildam mercatorium*, "a mercantile meeting or assembly," this is alone sufficient to incorporate and establish them for ever.

The king (it is said) may grant to a subject the power of erecting corporations, though the contrary was formerly held; that is, he may permit the subject to name the persons and powers of the corporation at his pleasure; but it is really the king that erects, and the subject is but the instrument; for though none but the king can make a corporation, yet *qui facit per alium, facit per se*. In this manner the chancellor of the university of Oxford has power by charter to erect corporations; and has actually often exerted it in the erection of several matriculated companies, now subsisting, of tradesmen subservient to the students.

When a corporation is erected, a name must be given to it; and by that name alone it must sue and be sued, and do all legal acts.

II. After a corporation is so formed and named, it acquires many powers and rights, which we are next to consider. Some of these are necessarily and inseparably incident to every corporation; which incidents as soon as a corporation is duly erected, are tacitly annexed of course. As, 1. To have perpetual succession. This is the very end of its incorporation; for there cannot be a succession for ever without an incorporation; and therefore all aggregate corporations have a power necessarily implied of electing members in the room of such as go off. 2. To sue or be sued, implead or be impleaded, grant or receive, by its corporate name, and do all other acts as natural persons may. 3. To purchase lands and hold them, for the benefit of themselves and their successors: which two are consequential to the former. 4. To have a common seal. For a corporation, being an invisible body, cannot manifest its intentions by any personal act or oral discourse: it otherwise acts and speaks only by its common seal. For though the particular members may express their private consents to any act by words or signing their names, yet this does not bind the corporation; it is the fixing of the seal, and that only, which unites the several assents of the individuals who compose the community, and makes one joint assent of the whole. 5. To make by-laws or private statutes for the better government of the corporation; which are binding upon themselves, unless contrary to the laws of the land, and then they are void. But no trading company is with us allowed to make by-laws which may affect the king's prerogative or the common profit of the people, under penalty of 40l. unless they be approved by the chancellor, treasurer, and chief justices, or the judges of assize in their circuits; and even though they be so approved, still, if contrary to law, they are void. These five powers are inseparably incident to every corporation, at least to every corporation

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ration aggregate: for two of them, though they may be practised, yet are very unnecessary to a corporation sole; viz. to have a corporate seal to testify his sole assent, and to make statutes for the regulation of his own conduct.

Corporations have a capacity to purchase lands for themselves and successors; but they are excepted out of the statute of wills; so that no devise of lands to a corporation by will is good; except for charitable uses, by stat. 43. Eliz. c. 4. which exception is again greatly narrowed by the stat. 9. Geo. II. c. 36. And also, by a great variety of statutes, their privilege even of purchasing from any living granter is much abridged; so that now a corporation, either ecclesiastical or lay, must have a license from the king to purchase, before they can exert that capacity which is vested in them by the common law: nor is even this in all cases sufficient. These statutes are generally called the statutes of *mortmain*. See MORTMAIN.

Blackstone's Comment.

The general duties of all bodies politic, considered in their corporate capacity, may, like those of natural persons, be reduced to this single one; that of acting up to the end or design, whatever it be, for which they were created by their founder.

III. How corporations may be dissolved. Any particular member may be disfranchised, or lose his place in the corporation, by acting contrary to the laws of the society, or the laws of the land: or he may resign it by his own voluntary act. But the body politic may also itself be dissolved in several ways; which dissolution is the civil death of the corporation; and in this case their lands and tenements shall revert to the person, or his heirs, who granted them to the corporation; for the law doth annex a condition to every such grant, that if the corporation be dissolved, the granter shall have the lands again, because the cause of the grant faileth. The grant is indeed only during the life of the corporation; which may endure for ever: but when that life is determined to be the dissolution of the body politic, the granter takes it back by reversion, as in the case of every other grant for life. The debts of a corporation, either to or from it, are totally extinguished by its dissolution; so that the members thereof cannot recover, or be charged with them, in their natural capacities: agreeable to that maxim of the civil law, *Si quid universitati debetur, singulis non debetur; nec, quod debet universitas, singuli debent.*

A corporation may be dissolved, 1. By act of parliament, which is boundless in its operations. 2. By the natural death of all its members, in cases of an aggregate corporation. 3. By surrender of its franchises into the hands of the king, which is a kind of suicide. 4. By forfeiture of its charter, through negligence or abuse of its franchises, in which case the law judges that the body politic has broken the conditions upon which it was incorporated, and therefore the incorporation is void. And the regular course is to bring an information in nature of a writ of *quo warranto*, to inquire by what warrant the members now exercise their corporate power, having forfeited it by such and such proceedings. The exertion of this act of law, for the purposes of the state, in the reigns of King Charles and King James II. particularly by seizing the charter of the city of London, gave great and just offence; though perhaps, in strictness of law, the proceedings in most of them were sufficiently regular; but the judgment against that of London was reversed by act of parliament after the revolution; and by the same statute it is enacted, that the franchises of the city of London shall never more be forfeited for any cause whatsoever. And because by the common law corporations were dissolved, in case the mayor or head officer was not duly elected on the day appointed in the charter or established by prescription, it is now provided, that for the future no corporation shall be dissolved upon that account, and ample directions are given for appointing a new officer, in case there be no election, or a void one, made upon the charter or prescriptive day.

Corporation || Corpulency.

Corporation Act, is that which prevents any person from being legally elected into any office relating to the government of any city or corporation, unless within a twelvemonth before he has received the sacrament of the Lord's Supper according to the rites of the church of England; and which enjoins him to take the oaths of allegiance and supremacy when he takes the oath of office; otherwise his election is void.

CORPOREAL, those qualities which denominate a body. See INCORPOREAL.

CORPOREITY, the quality of that which is corporeal, or has body; or that which constitutes or denominates it such.—The corporeity of God was the capital error of the Anthropomorphites. Some authors reproach Tertullian with admitting a corporeity in the Deity; but it is manifest, by *body* he means no more than *substance*.—The Mahometans reproach the Samaritans at this day, with a belief of the corporeity of God. Many of the ancients believed the corporeity of angels.

CORPSE, a dead body.

If any one, in taking up a dead body, steals the shroud, or other apparel, it will be felony. Stealing only the corpse itself is not felony; but it is punishable as a misdemeanor by indictment at common law.

CORPS, in *Architecture*, is a term borrowed from the French, signifying any part that projects or advances beyond the naked of a wall; and which serves as a ground for some decoration or the like.

Corps de Battaille, is the main body of an army drawn up for battle.

Corps de Garde, a post in an army, sometimes under covert, sometimes in the open air, to receive a body of soldiery, who are relieved from time to time, and are to watch in their turns, for the security of a quarter, a camp, station, &c.—The word is also used for the men who watch therein. It is usual to have, beside the great, a little corps de garde, at a good distance before the lines; to be the more readily advertised of the approach of the enemy.

CORPULENCY, the state of a person too much loaded with flesh or fat.

Corpulency is the occasion of various diseases, and particularly the apoplexy. It was held infamous among the ancient Lacedæmonians.

Sennertus mentions a man that weighed 600 pounds, and a maid 36 years of age who weighed 450. Bright of Malden, who died at the age of 29 years in 1750, weighed 616 pounds. Chiapin Vitelli, marquis of Cerona, a noted Spanish general in his time, from an excessive

excessive corpulency, is said to have reduced himself by drinking of vinegar, to such a degree of leanness, that he could fold his skin several times round him.

Castile soap, in the form of a bolus, an electuary, pills, or dissolved in a gill or more of soft water, from one to four drachms taken at bed-time, is strongly recommended with a view of reducing corpulency, in a discourse on its nature, causes, and cure, by Malcolm Flemyng, M. D. Lond. 1760. See MEDICINE *Index*.

CORPUS, in *Anatomy*, is applied to several parts of the animal structure; as *corpus callosum*, *corpus cavernosum*, &c. See ANATOMY *Index*.

CORPUS is also used in matters of learning, for several works of the same nature collected and bound together.

Gratian made a collection of the canons of the church, called *corpus canonum*. The *corpus* of the civil law is composed of the digest, code, and institutes. We have also a *corpus* of the Greek poets; and another of the Latin poets.

Corpus Christi, a festival of the church of England, kept on the next Thursday after Trinity Sunday, instituted in honour of the eucharist; to which also one of the colleges of Oxford is dedicated.

CORPUSCLE, in *Physics*, a minute particle, or physical atom, being such as a natural body is made up of. By this word is not meant the elementary particles, nor hypostatical principles of chemists; but such particles, whether of a simple or compound nature, whose parts will not be dissolved nor dissipated by ordinary degrees of heat.

CORPUSCULAR PHILOSOPHY, is that way of philosophising which endeavours to explain things, and to account for the phenomena of nature, by the motion, figure, rest, position, &c. of the corpuscles, or the minute particles of matter.

Mr Boyle sums up the chief principles of the corpuscular hypothesis, which now flourishes under the mechanical philosophy in these particulars;

1. They suppose that there is but one catholic or universal matter, which is an extended, impenetrable, and divisible substance, common to all bodies, and capable of all forms. 2. That this matter, in order to form the vast variety of natural bodies, must have motion in some or all its assignable parts; and that this motion was given to matter by God the Creator of all things, and has all manner of directions and tendencies. 3. Matter must also be actually divided into parts, and each of these primitive particles, fragments, or atoms of matter must have its proper magnitude or size, as also its peculiar figure or shape. 4. They suppose also, that these differently sized and shaped particles may have as different orders and positions, whereof great variety may arise in the composition of bodies.

CORRADINI DE SEZZA, *Peter Marcellinus*, a learned civilian and cardinal, born at Sezza, in 1658, acquired the esteem and confidence of Clement XI. and died at Rome in 1743. He was the author of a learned and curious work, entitled, "Verus Latium profanum et sacrum," 2 vols folio; and a history of Sezza, in 4to.

CORRADO, SEBASTIAN, an Italian grammarian of the 16th century, taught the Greek and Latin tongues at Reggio, where he formed an academy of polite literature; and at length removed to Bologna, in order to be professor of those languages. He wrote several works, the most esteemed of which are, "*Questura in qua Ciceronis vita refertur*," an excellent performance; and, "*de Lingua Latina*." He died in 1556.

CORRECTION, in *Printing*, the act of retrenching the faults in a work; or the reading which the corrector gives the first proofs, to point out and amend the faults, to be rectified by the compositor.

The corrections are placed on the margin of each page, right against the line where the faults are found. There are different characters used to express different corrections, as D or ẟ, *dele*, for any thing to be effaced or left out. When any thing is to be inserted, the place is marked in the line with a caret ʌ, and the insertion added in the margin. When a word, syllable, &c. is to be altered, it is erased out of the proof, and that to be put in its room written in the margin; always observing, if there be several mistakes in the same line, that the corrections in the margin be separated by little bars, or strokes, |. If a space be omitted, its place is marked with a caret, and the margin with ※. If a space be wrong placed, as in the middle of a word, the two parts are connected with a cu rve, and the same character put in the margin. If a letter be inverted, it is expressed on the margin with 9. If any thing be transposed, it is marked thus: *The shortest |are the| follies| best*; for *the shortest follies are the best*; and in the margin is added *tr.* in a circle. If Roman characters are to be changed for Italic, or *vice versa*, a line is drawn under them thus, and *Roman* or *Italic* added in the margin; if to capitals, a double line. If a word or sentence is entirely omitted, the place is marked with a caret, and in the margin is inserted the word *out*. If the letters of a word stand too far asunder, a line is drawn under them, and in the margin is put a crooked line or hook, thus ‿.

Correction House, a place of confinement, where vagrants and persons guilty of crimes of an inferior degree, suffer punishment by being obliged to labour for a certain period of time, as for months or years, according to the nature of the crime. The benefit arising to society, and the reformation of offenders, from this mode of punishment, have been variously estimated by different writers, according to the views which they have taken of the effects and consequences which are supposed to follow the confinement and restraint to which the criminal is subjected. It has been regarded as one of the greatest defects of the laws of this country, that, excepting the punishment of death, there is no other which is accompanied with that degree of severity and terror to awe or restrain offenders from the commission of crimes. To this purpose are the following observations of Dr Paley. The laws of England, he says, "are not provided with any other punishment than that of death, sufficiently terrible to keep offenders in awe. Transportation which is the punishment second in the order of severity, answers the purpose of example very imperfectly; not only because exile is in reality a slight punishment to those who have neither property, nor friends, nor regular means of

Correction. of subsistence at home, but because the punishment, whatever it be, is unobserved and unknown. A transported convict *may* suffer under his sentence, but his sufferings are removed from the view of his countrymen; his misery is unseen; his condition strikes no terror into the minds of those for whose warning and admonition it was intended. This chasm in the scale of punishment produces also two farther imperfections in the administration of penal justice; of which the first is, that the same punishment is extended to crimes of very different characters and malignancy; and the second, that punishments, separated by a great interval, are assigned to crimes hardly distinguishable in their guilt and mischief."

This defect, it has been supposed might be made up by the proper management of houses of correction. For as the object of punishment is not only the amendment of the offender, but is also intended to operate as an example to others, both these objects seem to be more certainly attained by the confinement and labour to which criminals are subjected in houses of this description than by any species of punishment provided by the laws of Britain. It is greatly to be regretted that the punishments inflicted by the laws of this country, whether imprisonment or exile, pain or infamy, have rarely the effect of producing any reformation of the criminal. On the contrary he often returns to the world more hardened in crime, and more determined in his wicked courses. Houses of correction might probably in this respect be attended with more beneficial consequences. This seems to be the case with the Amsterdam house of correction, an account of which in this view will not, it is hoped, be unacceptable to our readers. It is extracted from the Journal of the Travels of M. Thouin.

The Amsterdam correction house, from the employment of the prisoners confined in it, is called the *rasping-house*, and is destined to the reception of those malefactors whose crimes do not amount to a capital offence. Their punishment cannot so properly be denominated solitary confinement as a sequestration from society during a limited term of years. The building is situated in a part of the suburbs to the north-east of the city. The exterior has nothing remarkable, either with respect to form or extent. It is detached from the street by a spacious court, which contains the keeper's lodge, together with apartments for the different servants belonging to the establishment. Over the gate, which opens from this court into the prison, are placed two statues, as large as life, representing two men in the act of sawing a piece of logwood.

The inner court is in the form of a square, round which are arranged the apartments of the prisoners, together with the necessary warehouses. One part of the ground story is divided into different chambers; the other serves as a depot for the logwood, and the implements employed in its preparation.

The keeper, whose countenance, contrary to the general custom of persons of his profession, was strongly indicative of urbanity and gentleness, introduced M. Thouin into an apartment where two prisoners were at work in sawing a large log of Campeachy wood. The saw is composed of four blades joined together, with very strong, large, and sharp teeth, which make a scissure in the wood of nearly two inches in breadth. The operation is repeated, till the pieces become too small to undergo the saw, when they are ground in mills peculiarly constructed for this purpose.

This employment requires an extraordinary exertion of strength, and is at first a severe penance even to robust persons; but habit, address, and practice, soon render it easy; and the prisoners in a short time become competent to furnish, without painful exertion, their weekly contingent of 200 lb. weight of sawed pieces. After completing this task, they even find time to fabricate a variety of little articles in wood and straw, which they sell to those who visit the prison, or dispose of, by means of agents, in the town.

M. Thouin next inspected three apartments of different dimensions, which opened into the inner court. The one was inhabited by four, the second by six, and the third by ten prisoners. The furniture of the rooms consisted in hammocks, with a mattress, a blanket, and a coverlid to each, tables, chairs, and stools, glass, &c. earthen vessels, and various other articles of convenience. Every thing in these apartments was distinguished by neatness and propriety; and notwithstanding the number of inhabitants allotted to each was fully adequate to the dimensions of the rooms, the senses were not offended with any disagreeable scent, and the air was in every respect as pure and wholesome as the surrounding atmosphere.

In an obscure part of the building are a number of cells, in which formerly those prisoners who revolted against the proper subordination of the place, or ill-treated their comrades, were confined for a few days. But the keeper assured M. Thouin that these cells had not been made use of for upwards of 10 years. They are dark gloomy dungeons, with only a small aperture for the admission of light and air. The suppression of this barbarous and coercive punishment does honour to the humanity of government.

The store-rooms are filled with various kinds of wood for the purposes of dyeing; as the *hæmatoxylum campechianum*, the *morus tinctoria*, the *cæsalpinia sappan*, &c. They are all exotics, with the exception of the *evonymus Europæus*. The warehouses were not of sufficient extent to contain the quantity of wood, which was deposited in piles in different parts of the court.

The prisoners, amounting to 76 in number, were uniformly habited in coarse woollens; wear very good stockings, large leather shoes, white shirts, and caps or hats. They are, by the rules of the house, obliged to frequent ablutions, which greatly contribute to the preservation of their health. There was only one sick person amongst them; and, what is not a little remarkable, almost all the prisoners had formerly lived in large commercial towns; very few villagers were amongst them. They had all been sentenced to imprisonment for theft; but it depends upon themselves, by reformation and good behaviour, to shorten the term of their confinement, which many of them frequently do.

The keeper, whose humanity to the unfortunate persons committed to his care entitles him rather to the title of their protector than their gaoler (and M. Thouin informs us, that the prisoners generally called him by no other name than *father*), assists them with his counsels and friendly admonitions. He registers every week, in a book appropriated to this purpose, both the instances of good and bad behaviour, which is annually submitted to the examination of the magistracy, who, from this report, abridge or prolong the term of confinement, according to the degree of indulgence which each prisoner appears to merit. Cases frequently happen where a malefactor, condemned to an imprisonment of eight years, by his good behaviour procures his enlargement at the expiration of four; and so in proportion for a shorter term. But great attention is paid to discriminate between actual reform and hypocritical artifice.

The reward of good behaviour is not, however, confined to, or withheld till, the period of actual liberation. Their restoration to society is preceded by a progressive amelioration of their lot. Their work is gradually rendered less laborious, they are accommodated with separate apartments, and employed in the services of domestic economy. The keeper even entrusts them with commissions beyond the precincts of the prison; and scarce a single instance has occurred of their abusing this indulgence. By this prudent management, a considerable saving is effected in the expence of the establishment, at the same time that it tends to wear away prejudice, and to initiate the prisoners by gradual advances into the reciprocal duties of social life.

M. Thouin made particular inquiries whether it was customary for persons after their discharge to be confined a second and third time, as is but too often the case in many countries, for a repetition of their offence. He was informed, that such instances very rarely occur; but the case is not without precedent, as he observed in the person of a young Jew, who was then in the rasping-house for the third time. The case of this man is somewhat extraordinary. During the period of his detention, he always conforms, with the most scrupulous observance, to the rules of the place, and gives general satisfaction by his exemplary conduct. But such, as he himself avowed to our traveller, is his constitutional propensity to thieving, that no sooner is the term of his imprisonment elapsed, than he returns with redoubled ardour to his lawless courses. It is not so much for the sake of plunder, as to gratify his irresistible impulse, that he follows this vicious life; and M. Thouin adds, that he recounted his different exploits with as much exultation and triumph as a veteran displays when rehearsing his warlike atchievements.

Another salutary regulation in this institution, from which the best consequences result, is the indulgence granted to the prisoners of receiving the visits of their wives and mistresses twice every week. Proper care, however, is taken to guard against the introduction of disease; and the ladies, in one sense, purchase their admission by giving a trifling sum of money at the gate, which becomes the perquisite of the aged prisoners, whose wants are of a different nature from their youthful comrades. Thus the pleasures of one class contribute to the comforts of the other; and the entrance money, trifling as it is, keeps away a crowd of idle vagabonds, who have no acquaintance with the prisoners. The ladies at their visits are permitted to eat and drink with their lovers; and when the conversation becomes too animated for a third person to be present, the rest of the company obligingly take the hint, and leave them to enjoy a *tete a-tete*.—By this prudent regulation, many hurtful consequences attendant on a total seclusion from female society are guarded against.

M. Thouin concludes his account with observing, that the rasping-house at Amsterdam bears a greater resemblance to a well-ordered manufactory than to a prison. It were to be wished, that all similar institutions were conducted upon a similar plan.

But it is probable that solitary confinement and less intercourse with their friends would have a better effect in reforming the habits of offenders than the indulgences which M. Thouin considers as so beneficial. The philosopher whom we formerly quoted observes, that "of reforming punishments none promises so much success as that of solitary imprisonment, or the confinement of criminals in separate apartments. This improvement of the Amsterdam house of correction would augment the terror of the punishment, would seclude the criminal from the society of his fellow-prisoners, in which society the worse are sure to corrupt the better; would wean him from the knowledge of his companions, and from the love of that turbulent pernicious life in which his vices had engaged him; would raise up in him reflections on the folly of his choice, and dispose his mind to such bitter and continued penitence, as might produce a lasting alteration in the principles of his conduct."

In addition to the confinement and labour which offenders undergo in houses of correction, some are subjected to whipping at certain stated intervals. The benefit arising from this mode of punishment, with regard to the reformation of the criminal, has been justly questioned. If any good effect is to be expected from this discipline, it must be inflicted in private. It has been observed by one * who knew human nature well, that punishment which deprives a man of all sense of honour will never contribute to make him virtuous; and it is generally found that the soldier who has once been whipped, becomes quite indifferent to propriety of conduct. Fasting, which is not attended with shame, promises to be a more effectual punishment of profligacy.

* *Fielding.*

CORRECTOR, in general, denotes something that mends the faults or bad qualities of others.

Corrector *of the Staple*, a clerk belonging to the staple, whose business is to write down and record the bargains that merchants make there.

Corrector, in *Medicine* or *Pharmacy*, an ingredient in a composition, which guards against or abates the force of another.

CORREGIDOR, the name of an officer of justice in Spain, and countries subject to the Spanish government. He is the chief judge of a town or province.

CORREGIO. See Allegri.

CORRELATIVE, something opposed to another in a certain relation. Thus father and son are correlatives. Light and darkness, motion and rest, are correlative and opposite terms.

CORRIGIOLA, in *Botany*: A genus of plants belonging to the pentandria class, and in the natural method ranking under the 45th order, *Miscellaneæ*. See Botany *Index*.

CORROBORANTS, or Corroborative *Medicines*. See Strengtheners.

CORROSION, in a general sense, the action of gnawing away, by degrees, the continuity of the parts of bodies.

Corrosion, in *Chemistry*, an action of bodies, by means of proper menstruums, that produces new combinations,

binations, and a change of their form, without converting them to fluidity.

CORROSIVE SUBLIMATE MERCURY. See CHEMISTRY *Index*.

CORRUGATOR MUSCLE. See ANATOMY, *Table of the Muscles*.

CORROSIVES, in *Surgery*, are medicines which corrode whatever part of the body they are applied to. Such are burnt alum, white precipitate of mercury, white vitriol, red precipitate of mercury, butter of antimony, lapis infernalis, &c.

CORRUPTICOLÆ, a sect who rose out of the Monophysites in Egypt about the year 519, under their chief Severus, the pretended patriarch of Alexandria.

Their distinguishing doctrine, whence they derived their name, was, that the body of Jesus Christ was *corruptible;* that the fathers had owned it; and that to deny it was to deny the truth of our Saviour's passion.

On the other hand, Julian of Halicarnassus, another Eutychian, a refugee, as well as Severus, in Alexandria, maintained that the body of Jesus Christ had been always incorruptible; that to say it was corruptible, was to make a distinction between Jesus Christ and the Word, and by consequence to make two natures in Jesus Christ.

The people of Alexandria were divided between the two opinions; and the partisans of Severus were called *corrupticolæ*, q. d. worshippers of something *corruptible:* sometimes they were denominated *corruptibiles;* and the adherents of Julian *incorruptibiles* or *phantasiastæ*. The clergy and secular powers favoured the first; the monks and the people the latter.

CORRUPTION, the destruction, extinction, or at least cessation for a time, of the proper mode of existence of any natural body. See PUTREFACTION.

CORRUPTION of Blood, in *Law*, one of the consequences of an attainder; and is both upwards and downwards; so that an attainted person can neither inherit lands or other hereditaments from his ancestors, nor retain those he is already in possession of, nor transmit them by descent to any heir; but the same shall escheat to the lord of the fee, subject to the king's superior right of forfeiture; and the person attainted shall also obstruct all descents to his posterity, wherever they are obliged to derive a title through him to a remoter ancestor. See ATTAINDER.

Blackstone's Comment.

This is one of those notions which our laws have adopted from the feudal constitutions, at the time of the Norman conquest; as appears from its being unknown in those tenures which are indisputably Saxon, or gavel kind: wherein though by treason, according to the ancient Saxon laws, the land is forfeited to the king, yet no corruption of blood, no impediment of descents, ensues; and on judgment of mere felony, no escheat accrues to the lord. But by the law of England, derived as above, a man's blood is so universally corrupted by attainder, that his sons can neither inherit to him nor to any other ancestor, at least on the part of their attainted father.

This corruption of blood cannot be absolutely removed but by authority of parliament. The king may excuse the public punishment of an offender; but cannot abolish the private right which has accrued, or may accrue, to individuals as a consequence of the criminal's attainder. He may remit a forfeiture in which the interest of the crown is alone concerned; but he cannot wipe away the corruption of blood; for therein a third person hath an interest, the lord who claims by escheat. If therefore a man hath a son, and is attainted, and afterwards pardoned by the king: this son can never inherit to his father, or father's ancestors; because his paternal blood, being once throughly corrupted by his father's attainder, must continue so: but if the son had been born after the pardon, he might inherit; because, by the pardon, the father is made a new man, and may convey new inheritable blood to his after-born children.

This corruption of blood, thus arising from feudal principles, but perhaps extended farther than even these principles will warrant, has been long looked upon as a peculiar hardship: because the oppressive parts of the feudal tenures being now in general abolished, it seems unreasonable to reserve one of their most inequitable consequences; namely, that the children should not only be reduced to present poverty (which, however severe, is sufficiently justified upon reasons of public policy), but also be laid under future difficulties of inheritance, on account of the guilt of their ancestors. And therefore in most (if not all) of the new felonies treated by parliament since the reign of Henry VIII. it is declared that they shall not extend to any corruption of blood: and by the statute 7 Anne c. 21. (the operation of which is postponed by the statute 17 Geo. II. c. 39.) it is enacted, that after the death of the late pretender and his sons, no attainder for treason shall extend to the disinheriting any heir, nor the prejudice of any person, other than the offender himself; which provisions have indeed carried the remedy farther than was required by the hardship above complained of; which is only the future obstruction of descents, where the pedigree happens to be deduced through the blood of an attainted ancestor.

CORSAIR, a pirate or person who scours the seas, especially the Mediterranean, with a vessel armed for war, without commission from any prince or power, to plunder merchant vessels. The word comes from the Italian *corsare*, of *corso*, or *à cursibus*, by reason of their courses, or excursions.—The name is commonly given to the piratical cruisers of Barbary, who had their rise about the beginning of the 16th century.

A *corsair* is distinguished from a *privateer* in this, that the latter does it under a commission, and only attacks the vessels of those at war with the state whence his commission is derived. The punishment of a corsair is to be hanged, without remission; whereas privateers are to be treated as prisoners of war. All corsair vessels are good prizes.

CORSELET, a little cuirass: or, according to others, an armour or coat made to cover the whole body, anciently worn by the pike-men, usually placed in the front and flanks of the battle, for the better resisting the enemy's assaults, and guarding the soldiers placed behind them.

CORSICA, an island in the Mediterranean, between 8° and 10° E. Long. and 41° and 43° N. Lat. On the south it is separated from Sardinia, by the strait of Bonifacio; to the east it has the Tuscan sea; to the north the gulf of Genoa; and to the west it is opposite the coasts of France and Spain. It is 150

 miles

miles from north to south, and from 40 to 50 in breadth. It was known to the ancient Greeks by the names of Callista and Cyrnus, and to the Romans by its present appellation. On the coast are many excellent harbours. It is mountainous, but fruitful vallies are interspersed; and it has some fine lakes and rivers. With respect to products, Corsica has nothing peculiar to itself; but from the earliest times it has been famous for its swarms of bees, and produces vast quantities of honey, which, however, is reckoned bitter, on account of the box and yew with which the country abounds. The mountains are rich in lead, iron, copper, and silver; a mine of the latter was opened in the year 1767, from which a quintal of mineral produced 18 ounces of silver. There are also mines of alum and saltpetre: the granite of Corsica is nearly equal to the oriental. Porphyries, jasper, talc, amianthus, emeralds, and other precious stones, are found scattered in the mountains; and the south coast abounds with beautiful coral. After many revolutions, this island was, for some centuries, under the dominion of the Genoese, whose tyranny was such, that the Corsicans were almost in a perpetual state of insurrection. In 1736, a German adventurer, Theodore baron Newhoff, brought some assistance to them, and, on his assurances of more powerful aid, they elected him king; but, as he could not substantiate his promises, he was obliged to leave the island. He came to England, was thrown into the Fleet prison, released by an act of insolvency (after having registered his kingdom of Corsica for the benefit of his creditors) and suffered to die in extreme indigence. The Genoese tired of the contest, sold the sovereignty to France, in 1767, and the celebrated Paoli, who had been elected to the chief command, in 1755, was obliged to abandon the island in 1769. After the French revolution, in 1789, Corsica was admitted as an eighty-third department of France, at the particular request of a deputation, of which Paoli was at the head. In consequence, however, of some events which followed the revolution of 1792, Paoli revolted; the French, by the assistance of the English, were expelled from the island; and Corsica, on the 19th of June 1794, was declared annexed to the crown of Great Britain, according to a new constitution, which had been previously formed. In October 1796, however, the English found it expedient to evacuate the island, of which the French immediately took possession, and again united it to their republic, dividing it into two departments, Golo and Liamone; of the former of which Bastia is the chief town, and of the latter Ajaccio.

CORSNED, or Morsel of Execration, a species of trial or purgation * anciently in use among us, and which probably arose from an abuse of revelation in the dark ages of superstition. It consisted of a piece of cheese or bread, about an ounce in weight, which was consecrated with a form of exorcism; desiring of the Almighty that it might cause convulsions and paleness, and find no passage if the man was really guilty; but might turn to health and nourishment if he was innocent; as the water of jealousy among the Jews was, by God's especial appointment, to cause the belly to swell, and the thigh to rot, if the woman was guilty of adultery. This corsned was then given to the suspected person, who at the same time also received the holy sacrament: if indeed the corsned was not, as some have suspected, the sacramental bread itself; till the subsequent invention of transubstantiation preserved it from profane uses with a more profound respect than formerly. Our historians assure us, that Godwin, earl of Kent, in the reign of King Edward the Confessor, abjuring the death of the king's brother, at last appealed to his corsned, "per *buccellam deglutiendam abjuravit*," which stuck in his throat and killed him. This custom has been long since gradually abolished, though the remembrance of it still subsists in certain phrases of abjuration retained among the common people: as, "I will take the sacrament upon it; May this morsel be my last;" and the like.

* See *Trial*.

CORT, Cornelius, a celebrated engraver, was born at Hoorn in Holland in 1536. After having learned the first principles of drawing and engraving, he went to Italy to complete his studies, and visited all the places famous for the works of the great masters. At Venice he was courteously received by Titian; and engraved several plates from the pictures of that admirable painter. He at last settled at Rome, where he died in 1578, aged 42. According to Basan, he was "the best engraver with the burin or graver only that Holland ever produced. We find in his prints," adds he, "correctness of drawing, and an exquisite taste." He praises also the taste and lightness of touch with which he engraved landscapes, and that without the assistance of the point. It is no small honour to this artist, that Agostino Carracci was his scholar, and imitated his style of engraving rather than that of any other master. His engravings are very numerous (151 according to Abbé Marolles), and by no means uncommon.

CORTES *of* Spain, a term purely Spanish, signifying the *courts*, i. e. the states or assembly of the states, at Madrid.

Cortes, or Cortez, *Ferdinand*, a Spanish general, famous for the conquest of Mexico, and other victories over the natives of South America; but infamous for the cruelties he committed upon the vanquished, without regard to rank, age, or sex. It probably was on this account he was but coolly received on his return to Europe by his royal master Charles V.: It is even asserted that the emperor asked him who he was? to which Cortez replied; "I am the man who gave you more provinces than your ancestors have left you towns." Died in 1554, aged 63. See Mexico.

CORTEX, in *Botany*, the rind or coarse outer bark of plants. The organization of the outer and inner barks, which differ principally in the fineness of their texture, is particularly explained under the article Plants.

Wounds of the bark, and its separations from the wood, whether naturally or artificially made, are easily cured, and made to unite again by proper care. If sections be made in the rinds of the ash and sycamore of a square figure, three sides cut, and the fourth uncut, and the whole be afterwards bound round with a pack-thread, it will all unite again, only leaving a scar in each of the three sides where it was cut. If several parts of the bark of either of these trees be cut off, and entirely separated from the tree; some shallower, leaving

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ving a part of the bark on, and others deeper, to the wood itself; these pieces being again put into their places, and bound on with a pack-thread, will not indeed unite, but a fresh bark will grow in their places, and thrust them away: but if they be first carefully laid on in the exact direction in which they originally grew, and then the whole part beyond the wound on every side covered with a large plaster of diachylon, or the like, and this bound over with pack-thread to keep all firmly in their places, the pieces of bark, whether cut off shallower or deep down to the very wood of the tree, will firmly unite themselves to the places where they originally grew. This cure will be performed in about three weeks; but the outer rind of the separated pieces will not be plump, but somewhat shrivelled; the edges also will recede somewhat from their original place; so that there remains a sort of scar all round. These experiments are best made in the spring season; for in the autumn and winter, the sap arising but weakly, the parts that should unite wither before that is brought about. The success of these experiments has made some think that the whole branch of a tree separated and bound on again might unite with the rest. But the experiments that have been made in the most favourable manner for such a trial have all proved vain, the branch cut off withering always in a few days, however well united and carefully kept on.

CORTEX *Peruvianus*. See CINCHONA, BOTANY *Index*.

CORTEX *Winteranus*. See WINTERA, BOTANY *Index*.

CORTONA, PIETRO DA. See BERRETINI.

CORTONA, a very ancient town of Italy, mentioned by many of the Roman historians. It was originally called *Corton*, and lay to the northward of the lake Thrasymenus. It still remains the name of Cortona. E. Long. 13. 0. N. Lat. 43. 15.

CORTONESE, PIETRO PALO. See GOBBO.

CORTUSA, BEAR'S EAR SANICLE: A genus of plants, belonging to the pentandria class; and in the natural method ranking under the 21st order, *Preciæ*. See BOTANY *Index*.

CORUNNA, or GROYNE, a port-town of Gallicia in Spain, situated on a fine bay of the Atlantic ocean, about 32 miles north of Compostella, and 20 south-west of Ferrol. W. Long. 9. 0. N. Lat. 43. 0.

CORUS, OMER, HOMER, or CHOMER, in the Jewish antiquities, a measure containing 10 baths or 75 gallons and five pints, as a measure of things liquid, and 32 pecks and 1 pint as a measure for things dry. The *corus* or *omer* was most commonly a measure for things dry; and the greatest that was used among the Jews. It contained, according to the rabbins, 10 ephahs or 30 sata or seahs. *Corus* is the most usual term in the historical writers, and *omer* or *chomer* among the prophets.

CORUS is also used in some of our old writers for eight bushels or a quarter; *decem* coros *tritici*, *five decem quarteria*.

CORUSCATION, a glittering or gleam of light issuing from any thing. It is chiefly used for a flash of lightning darting from the clouds in time of thunder.

There is a method of producing artificial coruscations, or sparkling fiery meteors, which will be visible not only in the dark but at noon-day, and that from two liquors actually cold. The method is this. Fifteen grains of solid phosphorus are to be melted in about a drachm of water; when this is cold, pour upon it about two ounces of oil of vitriol; let these be shaken together, and they will at first heat, and afterwards they will throw up fiery balls in great number, which will adhere like so many stars to the sides of the glass, and continue burning a considerable time; after this, if a small quantity of oil of turpentine is poured in, without shaking the phial, the mixture will of itself take fire, and burn very furiously. The vessel should be large, and open at the top.

Artificial coruscations may also be produced by means of oil of vitriol and iron, in the following manner: Take a glass body capable of holding three quarts; put into this three ounces of oil of vitriol and twelve ounces of water; then warming the mixture a little, throw in, at several times, two ounces or more of clean iron filings; upon this an ebullition and white vapours will arise: then present a lighted candle to the mouth of the vessel, and the vapour will take fire, and afford a bright fulmination or flash like lightning. Applying the candle in this manner several times, the effect will always be the same; and sometimes the fire will fill the whole body of the glass, and even circulate to the bottom of the liquor; at others, it will only reach a little way down its neck. The great caution to be used in making this experiment is the making the vapour of a proper heat: for, if too cold, few vapours will arise; and, if made too hot, they will arise too fast, and will only take fire in the neck of the glass, without any remarkable coruscation.

CORVORANT, formerly written CORMORANT. See PELICANUS, ORNITHOLOGY *Index*.

CORVUS, the RAVEN or CROW kind, a genus of birds of the order of picæ. See ORNITHOLOGY *Index*.

CORVUS (*Raven*), in *Astronomy*, a constellation of the southern hemisphere; whose stars in Ptolemy's catalogue are 7; in Tycho's as many; in the Britannic catalogue 9.

CORVUS, in Roman antiquity, a military engine, or rather gallery, moveable at pleasure by means of pulleys; chiefly used in boarding the enemy's ships to cover the men. The construction of the corvus was as follows: They erected on the prow of their vessels a round piece of timber of about a foot and a half diameter, and about 12 feet long; on the top of which they had a block or pulley. Round this piece of timber they laid a stage or platform of boards, four feet broad, and about 18 feet long, which was well framed and fastened with iron. The entrance was long-ways, and it moved about on the above-mentioned upright piece of timber as on a spindle, and could be hoisted up within six feet of the top: about this was a sort of parapet knee-high, which was defended with upright bars of iron sharpened at the end, and towards the top there was a ring, by the help of which and a pulley or tackle, they raised or lowered the engine at pleasure. With this moveable gallery they boarded the enemy's vessels (when they did not oppose side to side),

side), sometimes on their bow and sometimes on their stern, as occasion best served. When they had grappled the enemy with these iron spikes, if they happened to swing broadside to broadside, then they entered from all parts; but in case they attacked them on the bow, they entered two and two by the help of this machine, the foremost defending the foreparts, and those that followed the flanks keeping the boss of their bucklers level with the top of the parapet.

CORYATE, Thomas, a very extraordinary personage, who seems to have made himself famous by his whimsical extravagancies, was the son of a clergyman, and born at Oldcombe in Somersetshire in 1577. He acquired Greek and Latin at Oxford; and coming to London, was received into the household of Henry prince of Wales. If Coryate was not over witty himself, he got acquainted with the wits of that time, and served to exercise their abilities, having more learning than judgment. He was a great peripatetic: for, in 1608, he took a long journey on foot; and after he returned, published his travels under the following strange title: *Crudities hastily gobbled up in five months Travels in France, Savoy, Italy, Rhetia, Helvetia, some parts of High Germany, and the Netherlands*, Lond. 1611, 4to. In 1612 he set out again with a resolution to spend ten years in travelling: he went first to Constantinople; and after travelling over a great part of the East, died of a flux at Surat in the East Indies. Some of the accounts of his peregrinations are to be found in Purchas's Pilgrimages.

CORYBANTES, in antiquity, priests of Cybele, who danced and capered to the sound of flutes and drums. See Crotalum.

Catullus, in his poem called *Atys*, gives a beautiful description of them, representing them as madmen. Accordingly Maximus Tyrius says, that those possessed with the spirit of Corybantes, as soon as they heard the sound of a flute, were seized with an enthusiasm, and lost the use of their reason. And hence the Greeks use the word κορυβαντειν, *to corobantize*, to signify a person's being transported or possessed with a devil. See Enthusiasm.

Some say that the Corybantes were all eunuchs; and that it is on this account Catullus, in his Atys, always uses feminine epithets and relatives in speaking of them.

Diodorus Siculus remarks, that Corybas, son of Jason and Cybele, passing into Phrygia with his uncle Dardanus, there instituted the worship of the mother of the gods, and gave his own name to the priests. Strabo relates it as the opinion of some, that the Corybantes were children of Jupiter and Calliope, and the same with the *Cabiri*. Others say the word had its origin from this, that the Corybantes always walked dancing (if the expression may be allowed) or tossing the head, κορυπτοντες βαινειν.

CORYBANTICA, a festival held in Crete, in memory of the Corybantes, who educated Jupiter when he was concealed in that island from his father Saturn, who would have devoured him.

CORYCEUM, in antiquity, that part of the gymnasium where people undressed. It was otherwise called *apodyterion*.

CORYCOMACHIA, among the ancients, was a sort of exercise in which they pushed forwards a ball, suspended from the ceiling, and at its return either caught it with their hands, or suffered it to meet their body. Oribasius informs us it was recommended for extenuating too gross bodies.

CORYDALES, in *Botany*, an order of plants in the *Fragmenta Methodi Naturalis* of Linnæus, containing the following genera, viz. epimedium, hypecoum, leontice, melianthus, pinguicula, and utricularia.

CORYDALIS, in *Botany*. See Fumaria, Botany *Index*.

CORYLUS, the Hazle: A genus of plants belonging to the monœcia class; and in the natural method ranking under the 50th order, *Amentaceæ*. See Botany *Index*.

CORYMBIFERÆ, in *Botany*, the name of an order or division of the compound flowers adopted by Linnæus after Ray and Vaillant, in the former editions of his Fragments of a Natural Method. This title in the later editions is changed for *Discoideæ*, another name borrowed from Ray's Method, but used in a somewhat different sense.

CORYMBIUM, in antiquity, an ornament of hair worn by the women. Its form was that of a corymbus.

Corymbium: A genus of plants belonging to the syngenesia class; and in the natural method ranking under the 49th order, *Compositæ*. See Botany *Index*. —The calyx is diphyllous, uniflorous, and prismatical; the corolla monopetalous and regular; there is one woolly seed below each floret.

CORYMBUS, properly signifies a cluster of ivy berries. Among botanists, it is a mode of flowering in which the lesser or partial flower stalks are produced along the common stalk on both sides; and though of unequal lengths, rise to the same height, so as to form a flat and even surface at the top. See Botany *Index*.

CORYNOCARPUS, in *Botany*: A genus of plants belonging to the pentandria class. See Botany *Index*.

CORYPHA, Mountain Palm, or *Umbrella Tree*: A genus of plants of the order of *Palmæ*, belonging to the monœcia class. See Botany *Index*.

CORYPHÆNA, a genus of fishes belonging to the order of thoracici. See Ichthyology *Index*.

CORYPHÆUS, in the ancient tragedy, was the chief or leader of the company that composed the chorus: (see Chorus).—The word is formed from the Greek κορυφη, "tip of the head." The coryphæus spoke for all the rest, whenever the chorus took part in the action, in quality of a person of the drama, during the course of the acts. Hence coryphæus had passed into a general name for the chief or principal of any company, corporation, sect, opinion, &c. Thus Eustatius of Antioch is called the *coryphæus* of the council of Nice; and Cicero calls Zeno the *coryphæus* of the stoics.

CORYVREKAN, a dangerous whirlpool on the west coast of Scotland, between the isle of Scarba and the north point of that of Jura. It is so named from a young Danish prince, who perished in this place: its dreadful vortex extends above a mile in circuit. Many smaller whirpools and rapid currents are found in this neighbourhood; dangerous to those who are strangers to the coast.

CORYZA,

CORYZA, in *Medicine*, a catarrh of the nose. See MEDICINE *Index*.

CORZOLA, or CURSCOLA, an island in the gulf of Venice, divided from Ragusa in Dalmatia by a narrow strait. E. Long. 18. 0. N. Lat. 42. 35.

COS, or COOS, in *Ancient Geography*, a noble island on the coast of Caria, in the Hither Asia, 15 miles to the west of Halicarnassus, 100 in compass, called *Meropis;* and hence Thucydides joins both names together, *Cos Meropis;* it had a cognominal town *Cos*, but originally called *Astypalæa*, mentioned by Homer; with a port locked or walled round, (Scylax, Mela). The island was fruitful, and yielded a generous wine, (Strabo). It boasted of Hippocrates and Apelles; each at the head of his several profession. It was the country of Philetas, an excellent elegiac poet, who flourished in the time of Philip and Alexander: the preceptor of Ptolemy Philadelphus: so thin and light that he was obliged to wear lead to prevent the being blown away by a puff of wind (Ælian, Athenæus); much commended by Propertius. The *vestes Coæ*, made of silk, were famous for their fineness and colour, (Horace, Propertius, Tibullus). In the suburbs of Cos stood the temple of Æsculapius, a noble structure, and extremely rich.

COS, the *Whetstone*, in *Natural History*, a genus of vitrescent stones, consisting of fragments of an indeterminate figure, sub-opaque, and granulated.

Of this genus there are several species, some consisting of rougher, and others of smoother, or even of altogether impalpable particles; and used not only for whetstones, but also for mill-stones, and other the like purposes.

COS TURCICA, *Turkey-stone*, a species of stones of the garnet kind, belonging to the siliceous class. It is of a dull white, and often of an unequal colour; some parts appearing more compact than others. Its specific gravity is 2.598: it strikes fire with steel, and effervesces with acids. Mr Kirwan found that 100 parts of it contain 25 of carbonate of lime, and no iron. Cronstedt is of opinion that there are probably two sorts of stones known by this name, as that described by Wallerius neither gives fire with steel nor effervesces with acids. It is used as a whetstone; and those of the finest grain are the best hones for the most delicate cutting tools, and even for razors, lancets, &c.

COSCINOMANCY, the art of divination by means of a sieve. The word comes from κοσκινον, *cribrum*, "a sieve," and μαντεια, *divination*. The sieve being suspended, after rehearsing a formula of words, it is taken between two fingers only; and the names of the parties suspected repeated: he at whose name the sieve turns, trembles, or shakes, is reputed guilty of the evil in question.

This must be a very ancient practice: Theocritus, in his third Idyllion, mentions a woman very skilful in it. It was sometimes also practised by suspending the sieve by a thread, or fixing it to the points of a pair of sheers, giving it room to turn, and naming, as before, the parties suspected; in which last manner *coscinomancy* is still practised in some parts of England. It appears from Theocritus, that it was not only used to find out persons unknown, but also to discover the secrets of those that were known.

CO-SECANT, in *Geometry*, the secant of an arch which is the complement of another to 90°. See GEOMETRY.

COSENAGE, in *Law*, a writ that lies where the tresail, that is, the tritavus, the father of the besail, or great grandfather, being seized in fee at his death of certain lands or tenements, dies; a stranger enters, and abates; then shall his heir have this writ of cosenage; the form of which see in Fitz. Nat. Br. fol. 221.

COSENING, in *Law*, an offence whereby any thing is done deceitfully, in or out of contracts, which cannot be fitly termed by any especial name. In the civil law it is called *stellionatus*. See STELLIONATE.

COSENZA, the capital of the Hither Calabria, in the kingdom of Naples. E. Long. 16. 35. N. Lat. 39. 15. It is an archbishop's see.

COSHERING, in the feudal customs, a kind of right of the lords to lie and feast themselves and their followers at their tenants houses. The word *coshering* may perhaps be derived from the old English word *coshe*, a cot or cottage.

CO-SINE, in *Trigonometry*, the sine of an arch which is the complement of another to 90°. See GEOMETRY.

COSMETIC, in *Physic*, any medicine or preparation which renders the skin soft and white, or helps to beautify and improve the complexion; as lip-salves, cold creams, ceruse, &c.

COSMICAL, a term in astronomy, expressing one of the poetical risings of a star: thus a star is said to rise cosmically when it rises with the sun, or with that point of the ecliptic in which the sun is at that time: and the cosmical setting is when a star sets in the west at the same time that the sun rises in the east.

COSMOGONY, in *Physics*, signifies the science of the formation of the universe. It is formed of κοσμος, *the world*, and γινομαι, *I am born*.

In our conjectures about the formation of the world there are two principles which we ought never to lose sight of. 1. That of *creation;* for certainly matter could not give itself existence, it must have received it. 2. That of a *Supreme Intelligence* directing this creation, and the arrangement of the parts of matter, in consequence of which this world was formed. See CREATION and GEOLOGY.

COSMOGRAPHY, the description of the world; or the art which teaches the construction, figure, disposition, and relation of all the parts of the world, with the manner of representing them on a plane. The word comes from κοσμος, *world*, and γραφω, *I describe*.

Cosmography consists chiefly of two parts: *Astronomy*, which shows the structure of the heavens, and the disposition of the stars; and *Geography*, which shows those of the earth.

COSMOLABE (from κοσμος, *world*, and λαμβανω, *I take*), an ancient mathematical instrument, serving to measure distances both in the heavens and on earth. The *Cosmolabe* is in a great measure the same with the astrolabe. It is also called *pantacosm*, or the *universal instrument*, by L. Morgard, in a treatise written expressly upon it, printed in 1612.

COSMOLOGY (from κοσμος, *world*, and λογος, *discourse*), the science of the world in general. This Wolfius calls *general*, or *transcendental cosmology*, and has

has written a treatife on the fubject, wherein he endeavours to explain how the world arifes from fimple fubftances; and treats of the general principles, of the modifications of material things, of the elements of bodies, of the laws of motion, of the perfection of the world, and of the order and courfe of nature.

COSMOPOLITE, or COSMOPOLITAN, a term fometimes ufed to fignify a perfon who has no fixed living or place of abode, or a man who is a ftranger nowhere. The word comes from the Greek κοσμος, *world*, and πολις, *city*.—One of the ancient philofophers being interrogated what countryman he was? anfwered, he was a *cofmopolite*, i. e. an inhabitant or citizen of the world.

COSSACKS, a name given to the people inhabiting the banks of the rivers Dnieper and Don, near the Black fea and borders of Turkey. The word implies irregular troops of horfe. Thefe people are divided into European and Afiatic Coffacks. The firft confift of the Zaporog, who dwell below the cataract of the Dnieper, fome on the fide next to Ruffia, and others on the oppofite fide of that river; the Lower and Upper Coffacks; the Bielgorod Coffacks; and a part of the Don Coffacks. The Afiatic Coffacks are compofed of the reft of the Don Coffacks, the Grebin Coffacks, the Yaik Coffacks, and the Weftern Calmucks, who retiring from thofe that inhabited the fouth borders of Siberia under Yaiuki Can, fettled upon the Wolga, and are dependent upon Ruffia.

The Coffacks were known by that name ever fince the 948th year of Chrift. They dwelt upon Mount Caucafus, in the place now called *Cabardy;* and were reduced under the Ruffian dominion by Prince Mftiflaw in the year 1021. Many Ruffians, Poles, and others, who could not live at home, have, at different times been admitted among the Coffacks: but the latter, abftracted from thefe fugitives, muft have been an ancient and well governed nation.

Towards the beginning of the 16th century, the Zaporog Coffacks fixed their habitations on the fpacious plains that extend along the banks of the Dnieper. They had undergone confiderable hardfhips from the incurfions of the Tartars, for which they afterwards found means to avenge themfelves in an ample manner. The Poles being fenfible how ferviceable the Coffacks might be in defending them from the ravages of the Tartars, and even of the Ruffians, propofed to them terms of alliance. In 1562, they folemnly took them under their protection, and engaged to pay them an annual fubfidy; in return for which the Coffacks were to keep on foot a fufficient body of troops for the defence of the Polifh dominions. With a view to bind them ftill more ftrongly by ties of intereft, the Poles gave them the whole country between the rivers Dnieper and Neifter, and the borders of Tartary. The Coffacks applied themfelves with great induftry to the cultivation of this fertile fpot; fo that in a fhort time it was interfperfed with large towns and handfome villages. Befides, they continually haraffed the Turks, and did them great damage by their incurfions; and, in order to prevent the latter from purfuing them, or making reprifals, they poffeffed themfelves of feveral fmall iflands in the Dnieper, where they kept their magazines, &c. The hettman or general of the Coffacks was not in the leaft fubordinate to the field marfhal of Poland; but acted in concert with him as an ally, and not as a fubject of that republic. But this alliance, though of fuch manifeft advantage to both parties, was not of long duration. The Poles, feeing the vaft improvements made by the Coffacks in the country they had given up to them, became envious of them, and actually made an attempt to bring them into fubjection, as we have feen in the hiftory of Poland. In 1648 the Coffacks gained great advantages over them, and next year came to an accommodation, in which they not only preferved their old immunities, but obtained additional privileges. The refult of all was, that thefe Coffacks remained under the protection of Ruffia; and as their former country was entirely laid wafte in the late wars, they fettled in the Ruffian Ukraine, upon receiving formal affurances from the court of Ruffia, that no alteration fhould be made in their political conftitution, and that no taxes whatever fhould be laid upon them. The Coffacks, on the other hand, were always to keep in readinefs a good body of troops for the fervice of Ruffia: but in the year 1708 Mazeppa, their hettman or chief, went over from the Ruffians to the Swedes; upon which Peter I. refolved to prevent fuch revolts for the future. To this end, after the battle of Pultowa, he fent a ftrong detachment into the above-mentioned little iflands in the Dnieper, whither the Coffacks had fled with their wives and children, and all their effects; and ordered them all to be put to the fword without diftinction, and the plunder to be divided among his foldiers. He likewife fent a great number of men into their country, and caufed feveral thoufands of the Coffacks to be carried to the coafts of the Baltic, where they were put to all forts of hard labour; by which means he in a manner extirpated the whole nation.

What diftinguifhes the Zaporog Coffacks from all other people is, that they never fuffer any women in their fettlements, as the Amazons are faid not to have fuffered any men among them. The women of thefe Coffacks live in other iflands of the Dnieper. They never marry, nor have any family: all their male children are enrolled as foldiers, and the females are left with their mothers. The brother often has children by his fifter, and the father by his daughter. They know no laws but thofe which cuftom has introduced, founded on their natural wants; though they have among them fome priefts of the Greek perfuafion. They ferve in the armies as irregulars; and woe to thofe who fall into their hands.

The country of thefe Coffacks, who are an affemblage of ancient Roxelans, Sarmatians, and Tartars, is called the *Ocraine* or *Ukraine*. It lies upon the borders of Ruffia and Poland, Little Tartary, and Turkey, and was anciently a part of Scythia. By virtue of the laft treaty fettled between Ruffia and Poland, in 1693, the latter remains in poffeffion of all that part of the Ukraine which is fituated on the weft fide of the Dnieper, and is now but poorly cultivated. That on the eaft fide, inhabited by the Coffacks, is in a much better condition, and extends about two hundred and fixty miles in length, and as many in breadth. It is one continued fertile plain, watered by a great number of fine rivers, diverfified with pleafant woods, and yields fuch plenty of all forts of grain, pulfe, tobacco, honey

honey and wax, as to supply a great part of the Russian empire with those commodities. Its pastures are exceeding rich, and its cattle very large; but the inhabitants are greatly plagued by locusts, which infest this fine country. The houses in the Ukraine are, like those of the Russians, mostly built with timber.

The Cossacks are tall and well made, generally hawk-nosed, and of a good mien. They are hardy, vigorous, brave, and extremely jealous of what is most valuable in life, their liberty; fickle and wavering, but sociable, cheeeful, and sprightly. They are a very powerful people, and their forces consist wholly of cavalry.—Their dialect is a compound of the Polish and Russian languages; but the latter is the most predominant. They were formerly Pagans or Mahometans; but upon their entering into the Polish service, they were baptized Christians of the Romish communion; and now that they belong to Russia, they profess themselves members of the Greek church.

Each of their towns, with the district belonging to it, is governed by an officer called *ottomann* or *attamann*.

The Don Cossacks, so called from their residence upon the banks of the river Don, greatly resemble those already described. In the year 1559, when the Czar Iwan Basilowitz was emperor of Russia, they voluntarily put themselves under his protection, and are at this time on a pretty equal footing with the other Russian subjects. They have several towns and villages upon the banks of the Don; but are prevented from extending themselves farther up the country, by the scarcity of fresh water and wood in many places. Their chief support is grazing and agriculture, and occasionally robbing and plundering, for which they want neither capacity nor inclination. Every town is governed by a magistrate called *tamann;* and the tamanns, with their towns, are under the jurisdiction of two ottomanns, who reside at Tsherkasky. The troops of these Cossacks likewise consist entirely of cavalry. In this country all the towns and villages are fortified and encompassed with pallisades, to defend them against the incursions of the Calmucks and Kuban Tartars, with whom they are continually at war. The Cossacks, in general, are of great service to garrison towns by way of defence, or to pursue an enemy; but are not so good at regular attacks.

The Sietsh Cossacks, who are also called *Haidamacks*, have their particular hettman. They inhabit the Russian, Polish, and Turkish dominions, along the banks of the Dnieper.

The Yaik Cossacks dwell on the south side of the river Yaik; and upon the success of the Russian arms in the kingdom of Astracan, voluntarily submitted to them. In stature they greatly resemble the other Cossacks; though by their boorish manner of living, and intermarriages with the Tartars, they have not the shape and air peculiar to the rest of their countrymen. Their natural dispositions and customs are, however, nearly the same. Husbandry, fishing, and feeding of cattle, are their principal employments; and, like the other tribes, they let slip no opportunity of making depredations on their neighbours. Their continual wars with the Kara-Kalpacs and the Kasatshaia-Horda oblige them to keep their towns and villages in a state of defence. They are indeed subject to Russian waiwodes, to whom they pay an annual tribute in corn, wax, honey, and cattle; but they have also their particular chiefs, who govern them according to their ancient customs. Though the generality of the Yaik Cossacks profess the Greek religion, yet a great many relics of Mahometanism and Paganism are still found among them. Being naturally bold and hardy, they make excellent soldiers; and they are not so turbulent as the other Cossacks. They live entirely at peace with the Calmucks and their other neighbours, and even maintain a commercial intercourse with them.

COSSE DE GENISTE, an order of knightood instituted in 1234, by Louis IX. at his marriage with Margaret of Provence, The motto on the collar of this order was, *Exaltat humiles.*

COSSET, among farmers, a colt, calf, or lamb, brought up by hand without the dam.

COSTA, CHRISTOPHER, a celebrated botanist of the 16th century, was born in Africa, of a Portuguese father, and went into Asia, to perfect himself in the knowledge of simples, where he was taken prisoner, but found means to make his escape, and after several voyages, practised physic at Bourgos. He wrote, 1. A Treatise on Indian drugs and medicines. 2. His Voyages to the Indies. 3. A book in praise of Women; and other works.

COSTAL, an appellation given by anatomists to several parts belonging to the sides; thus we meet with costal muscles, vertebræ, &c.

COSTANZO, ANGELO DI, an Italian historian and poet, lord of Catulopa, was born in 1507, of a noble and ancient family of Naples, and died about 1591. He wrote, 1. A History of Naples, from 1250 to 1489; the best edition of which is that of Aquila, in 1582, in folio, very scarce. 2. Italian poems, which are esteemed, and have had several editions.

COSTA-RICCA, a province of North America in New Spain, and in the audience of Guatimala, bounded on the north-east by the Northern ocean, on the south-west by the South sea, on the north-west by Nicaragua, and on the south east by Veragua. The soil is not very fertile, though there is plenty of cattle. Carthagena is the capital town.

COSTARD, GEORGE, a clergyman of the church of England, and author of several learned works, was born about the year 1710. He was educated at Wadham college, Oxford; and took the degree of M. A. in 1733. The first ecclesiastical situation in which he was placed was that of curate of Islip in Oxfordshire. In 1747 he published, in 8vo, Some Observations tending to illustrate the Book of Job. In 1750 he published Two Dissertations: I. On the meaning of the word *Kesita*, mentioned in Job, chap. xlii. ver. 11. II. On the Signification of the word *Hermes*. In 1752 he published in 8vo, at Oxford, *Dissertationes II. Critico-sacræ, quarum prima explicatur Ezek.* xiii. 18. *Altera vero*, 2 *Reg.* x. 22. In 1755 he wrote a letter to Dr Birch, which is preserved in the British Museum respecting the meaning of the phrase *sphæra barbarica*. Some time after this he undertook to publish a second edition of Dr Hyde's *Historia Religionis veterum Persarum, eorumque Magorum;* and which was accordingly printed under his inspection and with his corrections, at the Clarendon

rendon Press at Oxford, in 4to. In 1760, Mr Costard's extensive learning having now recommended him to the notice of Lord Chancellor Northington, he obtained, by the favour of that nobleman, in June 1764, the vicarage of Twickenham in Middlesex, in which situation he continued till his death. In 1767 he published, in one volume quarto, The History of Astronomy, with its application to Geography, History, and Chronology; occasionally exemplified by the Globes. This work was chiefly intended for the use of students, and contains a full and distinct view of the several improvements made in geography and astronomy. Mr Costard has shown, "by a gradual deduction, at what time, and by whom, the principal discoveries have been made in geography and astronomy; how each discovery has paved the way to what followed; and by what easy steps, through the revolution of so many ages, these very useful sciences have advanced towards their present state of perfection. In 1778 he published, in 8vo, A Letter to Nathaniel Brassey Halhed, Esq. containing some Remarks on his Preface to the Code of Gentoo Laws. This appears to have been the last of his publications. It contains some criticisms which were intended to invalidate the opinion which Mr Halhed had conceived concerning the great antiquity of the Gentoo laws; and some arguments against a notion which had been adopted by several writers, drawn from the observation of natural phenomena, that the world is far more ancient than it is represented to be by the Hebrew chronology. Mr Costard died on the 10th of January 1782. He was a man of uncommon learning, and eminently skilled in Grecian and oriental literature. His private character was amiable, and he was much respected in the neigbourhood in which he lived for his humanity and benevolence. Besides the works already mentioned, he wrote some others; and was also the author of learned papers, inserted in the Philosophical Transactions, on astronomical and chronological subjects.

COSTIVENESS, a preternatural detention of the feces, with an unusual dryness and hardness thereof, and thence a suppression of their evacuation. See MEDICINE *Index*.

COSTMARY, the English name of a species of tansy. See TANACETUM, BOTANY *Index*.

COSTS, in *Law*, imply the expences of a suit recovered by the plaintiff, together with damages. Costs were not allowed by the common law, the amercement of the vanquished party being his only punishment; but they are given by statute *. Costs are allowed in chancery for failing to make answer to a bill exhibited, or making an insufficient answer; and if a first answer be certified by a master to be insufficient, the defendant is to pay 40s; 3l. for a second insufficient answer; 4l. for a third, &c. But if the answer be reported good, the plaintiff shall pay the defendant 40s. costs.

* *Blackst. Comment.*

COSTUME, a rule or precept in painting, by which the artist is enjoined to make every person and thing sustain its proper character, and not only observe the story, but the circumstances, the scene of action, the country or place, and take care that the habits, arms, manners, proportion, and the like, exactly correspond.

COSTUS, a genus of plants belonging to the monandria class, and in the natural method ranking under the eighth order, *Scitamineæ*. See BOTANY *Index*.

COTA, RODRIGUEZ, a Spanish poet in the 16th century, was the author of the *Tragi-comedia de Calisto y Melibea*, which has been translated into Latin by Gasper Barthius, and into French by James de Lavardin. The Spaniards set a great value on this performance.

CO-TANGENT, the tangent of an arch which is the complement of another to 90. See GEOMETRY.

COTBUS, a town of Germany in Lower Lusatia. It is a strong important place, and has been subject to the king of Prussia ever since the year 1645. It is seated on the river Spree, 60 miles south-by-east of Berlin, and 55 south-east of Wirtemburg. Here are a great number of French Protestants, who have introduced manufactures; and this place is noted for excellent beer, pitch, and the cultivation of flax. E. Long. 15. 29. N. Lat. 51. 40.

COTE, a term used in coursing, to express the advantage one greyhound has over another when he runs by the side of it, and putting before it, gives the hare a turn. See COURSING.

Cote-Gare, a kind of refuse wool, so clung or clotted together that it cannot be pulled asunder. By 13 Rich. II. stat. 1. c. 9. it is provided, that neither denizen or foreigner make any other refuse of wool, but cote-gare and villein. So the printed statute has it; but in the parliament roll of that year it is *cod-land*, and *villein*. *Cot*, or *cote*, signifies as much as cottage in many places, and was so used by the Saxons according to Verstegan.

COTELERIUS, JOHN BAPTIST, fellow of the Sorbonne, and king's Greek professor, was born at Nismes in Languedoc in 1627. He made a collection of the fathers who lived in the apostolic age, which he published at Paris in two volumes folio in 1672; all reviewed and corrected from several MSS. with a Latin translation and notes. He also published *Monumenta Ecclesiæ Græcæ*, in 3 vols; being a collection of Greek tracts out of the king's and M. Colbert's libraries, and which had never been published before; to these he added a Latin translation and notes. He intended a farther prosecution of this work; but his intense studies broke his constitution, and deprived him of life in 1686. Besides his great skill in languages and ecclesiastical antiquities, Cotelerius was remarkable for his probity and candour.

COTERELLUS, *Cotarius* and *Coterellus*, according to Spelman and Du Fresne, are servile tenants; but in Doomsday and other ancient MSS. there appears a distinction, as well in their tenure and quality as in their name; for the cotarius hath a free soccage tenure, and paid a stated firm or rent in provisions or money, with some occasional customary services; whereas the coterellus seems to have held in mere villenage, and his person, issue, and goods, were dispsoable at the pleasure of the lord.

COTERIE, a term adopted from the French trading associations or partnerships, where each person advances his quota of stock, and receives his proportion of gain; and which retains its original meaning when applied to little assemblies or companies associated for mirth and good humour, where each one furnishes his quota of pleaſantry. Here they coin new words not underſtood elſewhere, but which it becomes faſhionable for others to uſe; and they are thought ridiculous who are ignorant of them. It has been ſometimes uſed to ſignify a club of ladies.

COTES, Roger, an excellent mathematician of the 18th century. He early diſcovered an inclination to the mathematics; and at 17 years of age, was admitted a penſioner of Trinity college, Cambridge. In 1706, he was appointed profeſſor of aſtronomy in the profeſſorſhip founded by Dr Plume archdeacon of Rocheſter, being choſen the firſt in that chair for his great merit and learning. In the year 1713, at the requeſt of Dr Richard Bentley, he publiſhed at Cambridge, in 4to, a ſecond edition of Sir Iſaac Newton's *Principia*, with all the improvements which the author had annexed thereto; to which he prefixed an excellent preface. He prepared ſeveral uſeful books for the public; and wrote A Deſcription of the great Meteor which appeared on the 6th of March 1716, publiſhed in the Philoſophical Tranſactions. He lived but a little while to carry on the diſcourſes for which he was eminently qualified; dying in the prime of his age in 1716, to the great regret of all the lovers of the ſciences.

COTESWOLD, ſeveral ſheep-cotes, and ſheep feeding on hills. It come from the Saxon *cote*, i. e. *caſa*, "a cottage," and *wold*, "a place where there is no wood."

COTHURNUS, Buskin, a very high ſhoe or patten raiſed on ſoles of cork, wore by the ancient actors in tragedy to make them appear taller and more like the heroes they repreſented; moſt of whom were ſuppoſed to be giants. It covered the greateſt part of the leg, and was tied beneath the knee. Æſchylus is ſaid to have invented the cothurnus. See Buskin.

COTICE, or Cotise', in *Heraldry*, is the fourth part of the bend; which with us is ſeldom or ever borne but in couples, with a bend between them; whence probably the name; from the French *cote*, "ſide;" they being borne, as it were, a-ſide of the bend.—A bend thus bordered is ſaid to be *cotiſed, cotice*. He bears ſable on a bend cotiſed argent three cinquefoils.

COTILLON, the name of a well-known briſk dance, in which eight perſons are employed. The term is French, and ſignifies an under-petticoat.

COTRONE, a town in the Hither Calabria ſtanding on the ſite of the ancient Croton, though not occupying the ſame extent of ground: (See Croton). It is fortified with ſingle walls, and a caſtle erected by Charles V. Its private buildings are poor and ſordid, the ſtreets diſmal and narrow. Cheeſe and corn are the principal commodities. For the ſtowage of corn, there are ranges of granaries in the ſuburbs; and the annual export is about 20,000 tomoti. The cheeſe is tolerably good; but has a great deal of that hot acrid taſte ſo common to all cheeſe made with goats milk. The wine is not unpleaſant, and appears ſuſceptible of improvement by better management in the making and keeping.

COTT, a particular ſort of bed-frame, ſuſpended from the beam of a ſhip for the officers to ſleep in between the decks. This contrivance is much more convenient at ſea than either the hammocks or fixed cabins; being a large piece of canvas ſewed into the form of a cheſt, about ſix feet long, and one foot deep, and from two to three feet wide. It is extended by a ſquare wooden frame with a canvas bottom, equal to its length and breadth, to retain it in an horizontal poſition.

COTTAGE, Cottagium, is properly a little houſe for habitation without lands belonging to it; ſtat. 4 Edw I. But by a later ſtatute 31 Eliz. c. 7. no man may build a cottage unleſs he lay four acres of land thereto; except it be in market-towns or cities, or within a mile of the ſea, or for the habitation of labourers in mines, ſailors, foreſters, ſhepherds, &c. and cottages erected by order of juſtices of peace for poor impotent people are excepted out of the ſtatute. The four acres of land to make it a cottage within the law are to be freehold, and land of inheritance; and four acres holden by copy, or for life or lives, or for any number of years, will not be ſufficient to make a lawful cottage.

COTTON, in *Commerce*, a ſoft downy ſubſtance found on the goſſypium, or cotton-tree. See Gossypium, Botany *Index*.

Cotton is ſeparated from the ſeeds of the plant by a mill, and then ſpun and prepared for all ſorts of fine work, as ſtockings, waiſtcoats, quilts, tapeſtry, curtains, &c. With it they likewiſe make muſlin; and ſometimes it is mixed with wool, ſometimes with ſilk, and even with gold itſelf.

The fineſt ſort comes from Bengal and the coaſt of of Coromandel.

Cotton makes a very conſiderable article in commerce, and is diſtinguiſhed into cotton-wool and cotton-thread. The firſt is brought moſtly from Cyprus, St John d'Acre, Smyrna, and the Eaſt and Weſt Indies; the moſt eſteemed is white. Thoſe who buy it in bales ſhould ſee that it has not been wet: moiſture being very prejudicial to it.

Of cotton-thread, that of Damas, called *cotton d'ounce*, and that of Jeruſalem, called *bazas*, are the moſt eſteemed; as alſo that of the Weſt India iſlands. It is to be choſen white, fine, very dry, and evenly ſpun. The other cotton threads are the half bazas, the rames, the beledin, and gondezel; the payas and mountaſiri, the geneguins, the baquins, the joſſelaſſars, of which there are two ſorts. Thoſe of India, known by the name of Tutucorin, Java, Bengal, and Surat, are of four or five ſorts, diſtinguiſhed by the letters A, B, C, &c. They are ſold in bags, with a deduction of one pound and a half on each of thoſe of Tutucorin, which are the deareſt, and two pounds on each bag of the other ſorts. For thoſe of Fielebas, Smyrna, Aleppo, and Jeruſalem, the deduction at Amſterdam is eight in the hundred for the tare, and two in the hundred for weight, and on the value one per cent. for prompt payment.

Cotton of Siam, is a kind of ſilky cotton in the Antilles, ſo called becauſe the grain was brought from Siam. It is of an extraordinary fineneſs, even ſurpaſſing ſilk in ſoftneſs. They make hoſe of it there preferable to ſilk ones for their luſtre and beauty. They ſell from 10 to 12 and 15 crowns a pair, but there are very few made unleſs for curioſity.

The manner of packing Cotton *as practiſed in the Antilles.* The bags are made of coarſe cloth, of which the they take three ells and a half each; the breadth is one ell three inches. When the bag has been well ſoaked in water, they hang it up, extending the mouth of it to croſs pieces of timber nailed to poſts fixed in the ground ſeven or eight feet high. He who packs it goes into the bag, which is ſix feet nine inches deep, or thereabouts, and preſſes down the cotton, which another hands him, with hands and feet; obſerving to tread it equally everywhere, and putting in but little at a time. The beſt time of packing is in rainy moiſt weather, provided the cotton be under cover. The bag ſhould contain from 300 to 320 pounds. The tare abated in the Antilles is three in the hundred. Cotton being a production applicable to a great variety of manufactures, it cannot be too much cultivated in our own plantations that will admit of it.

Cotton-Spinning, the art or proceſs of reducing cotton-wool into yarn or thread.

The moſt ſimple method for this purpoſe, and the only one in uſe for a long time in this country, was by the hand upon the well-known domeſtic machine called a *one-thread wheel*. But as the demand for cotton-goods began to increaſe, other inventions were thought of for expediting this part of the manufacture. About 50 years ago, one Paul and others of London contrived an engine for a more eaſy and expeditious method of ſpinning cotton, and for which they obtained a patent; but the undertaking did not prove ſucceſsful. Some years thereafter, various machines were conſtructed by different perſons for facilitating the ſpinning of cotton; but without producing any very material or laſting advantage. At length, about the year 1767, Mr James Hargrave, a weaver in the neighbourhood of Blackburn in Lancaſhire, conſtructed a machine by which a great number of threads (from 20 to 80) might be ſpun at once, and for which he obtained his majeſty's letters-patent. This machine is called a *Jenny*, and is the beſt contrivance for ſpinning *woof* or *ſhute* that has hitherto appeared. It is now commonly conſtructed for 84 threads; and with it one perſon can ſpin 100 Engliſh hanks in the day, each hank containing 840 yards.

Carding of cotton, as a preparation for ſpinning, uſed formerly to be performed by the hand, with a ſingle pair of cards upon the knee: but this being a tedious method, ill ſuited to the rapid operations of the new ſpinning machines, other methods were contrived for affording a quicker and more adequate ſupply. The firſt improvement for this purpoſe was likewiſe made by Mr Hargrave; and conſiſted in applying two or three cards to the ſame board, and fixing them to a ſtool or ſtock; whence they obtained the name of *ſtock-cards*. With theſe, one woman could perform two or three times as much work as ſhe could do before in the common way. A ſtill more expeditious method of carding, however, by what are commonly called *cylinder-cards*, was ſoon afterwards invented, and is that which is now moſt commonly practiſed: but as ſeveral perſons lay claim to this invention, it is not eaſy to determine to whom in particular the merit of it is due.

The next and moſt capital improvements which this branch of manufacture received were from Mr Arkwright, a native of Lancaſhire, afterwards Sir Richard Arkwright of Cromford in Derbyſhire. He firſt brought forward his new method of ſpinning cotton in 1768, for which he obtained a patent in 1769. In 1775, he obtained another patent for engines which he had conſtructed to prepare the materials for ſpinning; though one of theſe patents, being challenged at law, was ſet aſide ſome years before it expired. The reſult of Mr Arkwright's different inventions and improvements is a combination of machinery, by which cotton is *carded*, *roved*, and *ſpun*, with the utmoſt exactneſs and equality; and ſuch a degree of perfection attained in ſpinning *warp*, as is not to be equalled in any other part of the world. To theſe improvements this country is entirely indebted for the great extent of its cotton manufactures; large buildings having been erected for that branch both in England and Scotland, many of which contain ſeveral thouſands of ſpindles, each driven by one or more large water wheels; and ſome of ſuch extent as to ſpin at the rate of one thouſand yards of twiſt or warp yarn in the minute.

Other machines have been invented at different times, and a variety of improvements made by different mechanics and manufacturers; one of which in particular we muſt not omit to mention. It is called a *mule*, being a kind of mixture of machinery between the *warp*-machine of Mr Arkwright and the *woof*-machine or hand jenny of Mr Hargrave; and was alſo invented in Lancaſhire. This machine bids fair to be of great uſe in ſpinning cotton-yarn for muſlins to a degree of fineneſs never before known in this country, being nearly equal in quality to thoſe uſually brought from India.

Cotton-Mills, are large buildings with peculiar machinery for carding, roving, and ſpinning cotton: (ſee the preceding article.)—Theſe were entirely unknown in this country before the different inventions and improvements of Meſſrs Arkwright and Hargrave; ſince which time great numbers have been erected in England, many in Scotland, and ſome in Ireland.

The firſt erections of the kind were by Meſſrs Arkwright and Hargrave, both in the town of Nottingham, and both nearly at the ſame time. The engines were then driven by horſes: but ſince that time they have been chiefly erected upon water-falls in different parts of the country; particularly the warp-machines, which are better adapted for being driven by water than any other. The moſt extenſive of theſe is in the village and neighbourhood of Cromford in Derbyſhire, and under the immediate inſpection of Sir Richard Arkwright. The firſt that was erected in Scotland was for Mr Peter Brotherſton, under the inſpection and direction of Mr John Hackett from Nottingham; and is in the neighbourhood of Pennycuick near Edinburgh. Since which time ſeveral have been erected in the neighbourhood of Glaſgow, Paiſley, Lanark, Perth, &c. Many are driven by ſteam-engines.

General State of the Cotton Manufactory. The facilities which the manufacturers of Great Britain had ſuddenly acquired, and the immenſe capitals which they have ſo recently laid out in expenſive machinery and other heavy eſtabliſhments for carrying on the cotton trade, are unparalleled in the annals of the world. Above 140 cotton mills are now (1787) built in Great Britain, of which nearly two-thirds have been erected within theſe ſeven years. Beſides theſe, there are above 20,500 hand-mills or jennies for ſpinning

ning the ſhute for the twiſted yarn ſpun by the water-mills.

Above a million of money was, within this time, ſunk in mills, hand-engines, and other machines, including the grounds and neceſſary buildings.

Expence of water-mills,	-	L. 715,000
Ditto of hand-jennies, houſes, buildings, and auxiliary machinery, ſuppoſed at leaſt,		285,000
	Total,	L. 1,000,000

A power had been alſo created of working nearly two million of ſpindles; and men, women, and children were trained to this buſineſs, capable of carrying the cotton manufacture almoſt to any extent. In 1787, the power of ſpindles capable of being worked was eſtimated as follows:

In the water-mills, - - -	286,000
In the jennies, - -	1,665,100
Total ſpindles,	1,951,100

In the branches applicable to muſlin and callico, it was calculated that employment was given to 100,000 men and women, and at leaſt 60,000 children; many of the latter having been taken from different pariſhes and hoſpitals in Great Britain.

The quantity of the raw material of cotton wool conſumed in this manufacture, which did not amount to 6,000,000 pounds in 1781, and was only about 11,000,000 pounds ſix years ago, had amounted in the year 1787 to the enormous height of 22,000,000 lb. and upwards; and the aſtoniſhing rapidity of this increaſe is in ſome meaſure to be attributed to the extenſion of theſe branches to the goods of India, particularly the callicoes and muſlins.

Britiſh callicoes were firſt made in Lancaſhire about the year 1772, but the progreſs was ſlow till within theſe laſt 12 years. The quantity manufactured has ſince extended from about 50,000 to 1,000,000 of pieces made in the courſe of a ſingle year.

Britiſh muſlins were not ſucceſsfully introduced until the year 1781, and were carried to no great extent until 1785, after which period the progreſs during two years became rapid beyond all example. The acquiſition of cotton wool of a ſuperior quality from Demerara and the Brazils, and the improvements made in the ſpinning fine yarns upon the mule jennies, had given a ſpring to this branch of the cotton manufactory, which extended it beyond what it was poſſible to have conceived. Above half a million pieces of muſlin of different kinds, including ſhawls and handkerchiefs, were computed to be annually made in Great Britain; while the quantity not only increaſed daily with the new acceſſion of powers that were burſting forth upon the country, but the quality was exceedingly improved; and ſince a yearly ſupply of about 300 bales of Eaſt Indian cotton has been obtained by the way of Oſtend, yarns have been ſpun, and muſlins have been wove, equal to any from India. Nothing, therefore, but a fine raw material appeared wanting to enable the Britiſh manufacturer to carry this branch to the greateſt extent: and, of all others, it is that ſpecies of cotton goods which deſerves moſt to be encouraged, becauſe of the immenſe return it makes for labour more than any other branch of the cotton manufactory. Eaſt India cotton wool has been ſpun into one pound of yarn worth five guineas; and when wove into muſlin, and afterwards ornamented by children in the tambour, has extended to the value of 15l.; yielding a return of 5,900 per cent. on the raw material.

But the ſtate of the raw materials, and the progreſſive and aſtoniſhing increaſe of this manufacture, will be beſt explained by what follows:

	Cotton Wool uſed in the Manufacture.	Suppoſed Value when Manufactured.
1781,	lb. 5,101,920	L. 2,000,000
1782,	11,206,810	3,900,000
1783,	9,546,179	3,200,000
1784,	11,280,238	3,950,000
1785,	17,992,888	6,000,000
1786,	19,151,867	6,500,000
1787,	22,600,000	7,500,000

Such was the progreſs of the Britiſh cotton manufactory till 1787; when, with eſtabliſhments and mechanical powers capable of bringing forward immenſe quantities of goods into the conſumption, this manufacture was checked by a great and ſudden reduction of the prices of Eaſt India goods of the ſame ſpecies, which were ſold above 20 per cent. on an average under the loweſt prices at which the Britiſh manufacturer can afford to ſell without loſs.

This conduct in the Eaſt India Company quickly operated to the great prejudice of the Britiſh manufactures; and there is no ſaying how far theſe might be reduced, ſhould that company be allowed to preſs goods upon the market at prices which have no relation to the original coſt, and under circumſtances where every idea of protecting duties is annihilated in the effect of the general ſyſtem.

The home-manufacture of this article, however, in all its different branches, has been greatly extended, and is likely to be carried on with greater advantage to the manufacturer than ever it was before.

Lavender Cotton. See Santolina, Botany *Index*.

Philoſophic Cotton, a name given to the flowers of zinc, on account of their white colour, extreme lightneſs, and reſemblance to cotton.

Flax made to reſemble Cotton. See Flax.

Silk Cotton. See Bombax, Botany *Index*.

Cotton-*Weed*. See Gnaphalium, Botany *Index*.

Cotton, *Sir Robert*, a moſt eminent Engliſh antiquarian, deſcended from an ancient family, was born in 1570. In his 18th year he began to collect ancient records, charters, and other MSS. Camden, Selden, and Speed, acknowledged their obligations to him in their reſpective works. He was highly diſtinguiſhed by Queen Elizabeth, and by James I. who created him a baronet. He wrote many things himſelf; but our principal obligations to him are for his valuable library, conſiſting of curious manuſcripts, &c. which he was 40 years in collecting. At his death in 1631, he left the property of it to his family, though deſigned for public uſe. A large acceſſion was made to this library by private benefactions before the death of the founder, and afterwards by the purchaſes of his heirs, and

and donations of others, who added to it a great number of books, chiefly relating to the hiſtory and antiquities of our own nation. An act of parliament was obtained, at the requeſt of Sir John Cotton, in 1790, for preserving it after his deceaſe, under the above denomination for public uſe. It is now fixed in the Britiſh Muſeum. For ſtatutes relating to it, ſee 12 and 13 W. III. c. 3. and 5 Anne cap. 30.

Cotton, *Charles*, a burleſque poet, was deſcended of a good family, and lived in the reign of Charles II. and James II. His moſt celebrated piece is *Scarronides* or *Traveſtie* of the firſt and fourth books of the Æneid. But though, from the title, one would be apt to imagine it an imitation of Scarron's famous Traveſtie of the ſame author, yet upon examination, it would be found greatly to excel not only that, but every other attempt of the ſame kind that hath been hitherto made in any language. He has alſo tranſlated ſeveral of Lucian's dialogues, in the ſame manner, under the title of *the Scoffer Scoff'd*;—and written another poem of a more ſerious kind, entitled *the Wonders of the Peak*. The exact period of either Mr Cotton's birth or his death, is nowhere recorded; but it is probable the latter happened about the time of the revolution. Neither is it better known what his circumſtances were with reſpect to fortune; they appear, however, to have been eaſy, if one may judge from the turn of his writings, which is ſuch as ſeems ſcarcely poſſible for any one to indulge whoſe mind was not perfectly at eaſe. Yet there is one anecdote told of him, which ſeems to ſhow that his vein of humour could not reſtrain itſelf on any conſideration, viz. that in conſequence of a ſingle couplet in his *Virgil Traveſtie*, wherein he has made mention of a peculiar kind of ruff worn by a grandmother of his who lived in the Peak, he loſt an eſtate of 400l. per annum; the old lady, whoſe humour and teſty diſpoſition he could by no means have been a ſtranger to, being never able to forgive the liberty he had taken with her; and having her fortune wholly at her diſpoſal, although ſhe had before made him her ſole heir, altered her will, and gave it away to an abſolute ſtranger.

COTTUS, or *Bull-head*, a genus of fiſhes belonging to the order of thoracici. See Ichthyology *Index*.

COTULA, may-weed: A genus of plants belonging to the ſyngeneſia claſs. See Botany *Index*.

Cotula, or *Cotyla*, a liquid meaſure in uſe among the ancients.

Fannius ſays, the cotyla was the ſame thing with the hemina, which was half a ſextary.

> *At* cotylas, *quas ſi placeat, dixiſſe licebit*
> *Heminas recepit geminas ſextarias unus.*

Chorier obſerves, that the cotyla was uſed as a dry meaſure as well as a liquid one; from the authority of Thucydides, who in one place mentions two cotylæ of wine, and in another two cotylæ of bread.

COTURNIX. See Tetrao, Ornithology *Index*.

COTYLEDON, navel-wort: A genus of plants belonging to the decandria claſs; and ranking under the natural order, *Succulentæ*. See Botany *Index*.

COTYLEDONES, in *Anatomy*, are certain glandular bodies, adhering to the chorion of ſome animals.

Cotyledones, in *Botany*, the periſhable porous ſide lobes of the ſeed, which involve, and for ſome time furniſh nouriſhment to, the embryo plant. See Botany *Index*.

COTYTTO, the goddeſs of all debauchery. Her feſtivals, called *Cotyttia*, were celebrated by the Athenians, Corinthians, Thracians, &c. during the night. Her prieſts were called *baptæ*, and nothing but debauchery and wantonneſs prevailed at the celebration. A feſtival of the ſame name was obſerved in Sicily, where the votaries of the goddeſs carried about boughs hung with cakes and fruit, which it was lawful for any perſon to pluck off. It was a capital puniſhment to reveal whatever was ſeen or done at theſe ſacred feſtivals. It coſt Eupolis his life for an unſeaſonable reflection upon them. The goddeſs Cotytto is ſuppoſed to be the ſame as Proſerpine.

COUCH, in *Painting*, denotes a lay, or impreſſion of colour, whether in oil or water, wherewith the painter covers his canvas, wall, wainſcot, or other matter to be painted.

The word is alſo uſed for a lay or impreſſion on any thing, to make it firm and conſiſtent, or to ſcreen it from the weather.

Paintings are covered with a couch of varniſh; a canvas to be painted muſt firſt have two couches of ſize, before the colours be laid; two or three couches of white lead are laid on wood, before the couch of gold be applied: the leather-gilders lay a couch of water and whites of eggs on the leather, before they apply the gold or ſilver-leaf.

The gold-wire-drawers alſo uſe the word *couch* for the gold or ſilver leaf wherewith they cover the maſs to be gilded or ſilvered, before they draw it through the iron that is to give it its proper thickneſs.

The gilders uſe couch for the quantity of gold or ſilver leaves applied on the metals in gilding or ſilvering. Each couch of gold is but one leaf, or two at moſt, and each of ſilver three to gild: if the gilding be hatched, there are required from eight to twelve couches; and only three or four if it be without hatching. To ſilver there are required from four to ten couches, according to the beauty of the work.

Couch-Graſs. See Triticum, Botany *Index*.

COUCHANT, in *Heraldry*, is underſtood of a lion, or other beaſt, when lying down, but with his head raiſed; which diſtinguiſhes the poſture of couchant from dormant, wherein he is ſuppoſed quite ſtretched out and aſleep.

COUCHE, in *Heraldry*, denotes any thing lying along: thus chevron-couche, is a chevron lying ſidewiſe, with the two ends on each ſide of the ſhield, which ſhould properly reſt on the baſe.

COUCHER, or Courcher, in our ſtatutes, is uſed for a factor, or one that continues in ſome place or country for traffic; as formerly in Gaſcoign, for the buying of wines. Anno 37 Edw. III. c. 16.

Coucher, is alſo uſed for the general book in which any religious houſe or corporation regiſter their particular acts. Anno 3 and 4 Edw. VI. c. 10.

COUCHING *of a* Cataract, in *Surgery*. See Surgery *Index*.

Cove, Covenant.

COVE, a ſmall creek or bay, where boats and ſmall veſſels may ride at anchor, ſheltered from the wind and ſea.

COVENANT, in *Law*, is the conſent and agreement of two or more perſons to do, or not to do, ſome act, or thing, contracted between them. Alſo it is the declaration, the parties make, that they will ſtand to ſuch agreement, relating to lands or other things; and is created by deed in writing, ſealed and executed by the parties, or otherwiſe it may be implied in the contract as incident thereto. And if the perſons do not perform their covenants, a writ or action of covenant is the remedy to recover damages for the breach of them.

Covenant, in eccleſiaſtical hiſtory, denotes a contract or convention agreed to by the Scotch in the year 1638, for maintaining their religion free from innovation. In 1581, the general aſſembly of Scotland drew up a confeſſion of faith, or national covenant, condemning epiſcopal government, under the name of *hierarchy*, which was ſigned by James I. and which he enjoined on all his ſubjects. It was again ſubſcribed in 1590 and 1596. The ſubſcription was renewed in 1638, and the ſubſcribers engaged by oath to maintain religion in the ſame ſtate as it was in 1580, and to reject all innovations introduced ſince that time. This oath annexed to the confeſſion of faith received the name of the *covenant:* as thoſe who ſubſcribed it were called *covenanters*.

Covenant, in *Theology*, is much uſed in connection with other terms; as, 1. *The Covenant of Grace* is that which is made between God and thoſe who believe the goſpel, whereby they declare their ſubjection to him, and he declares his acceptance of them and favour to them. The goſpel is ſometimes denominated a *covenant of grace*, in oppoſition to the Moſaic law. 2. *Covenant of Redemption* denotes a mutual ſtipulation, tacit or expreſs, between Chriſt and the Father, relating to the redemption of ſinners by him, previous to any act on Chriſt's part under the character of Mediator. 3. *Covenant of Works* ſignifies, in the language of ſome divines, any covenant whereby God requires perfect obedience from his creatures, in ſuch a manner as to make no expreſs proviſion for the pardon of offences to be committed againſt the precepts of it, on the repentance of ſuch ſuppoſed offenders, but pronounces a ſentence of death upon them: ſuch, they ſay, was the covenant made with Adam in a ſtate of innocence, and that made with Iſrael at Mount Sinai.

Solemn League and Covenant, was eſtabliſhed in the year 1643, and formed a bond of union between Scotland and England. It was ſworn and ſubſcribed by many in both nations; who hereby ſolemnly abjured popery and prelacy, and combined together for their mutual defence. It was approved by the parliament and aſſembly at Weſtminſter, and ratified by the general aſſembly of Scotland in 1645. King Charles I. diſapproved of it when he ſurrendered himſelf to the Scots army in 1646: but in 1650 Charles II. declared his approbation both of this and the national covenant by a ſolemn oath; and in Auguſt of the ſame year, made a farther declaration at Dunfermline to the ſame purpoſe, which was alſo renewed on occaſion of his coronation at Scone in 1651. The covenant was ratified by parliament in this year; and the ſubſcription of it required by every member, without which the conſtitution of the parliament was declared null and void. It produced a ſeries of diſtractions in the ſubſequent hiſtory of that country, and was voted illegal by parliament, and proviſion made againſt it. Stat. 14 Car. II. c. 4.

Covenant, Coventry.

Ark of the Covenant, in Jewiſh antiquity. See Ark.

COVENTRY, a town of Warwickſhire, in England, ſituated in W. Long. 1. 26. N. Lat. 52. 25. It is an ancient place, and is ſuppoſed to derive its name from a convent formerly ſituated here. Leofric, earl of Mercia, who rebuilt the religious houſe after it had been deſtroyed by the Danes, and was lord of the place about the year 1040, is ſaid, upon ſome provocation, to have loaded them with heavy taxes. Being importuned by his lady, Godina, to remit them, he conſented, upon condition that ſhe ſhould ride naked through the town, which he little imagined ſhe would ever comply with. But he found himſelf miſtaken: for ſhe accepted the offer, and rode through the town with her long hair ſcattered all over her body; having firſt enjoined the citizens not to venture, on pain of death, to look out as ſhe paſſed. It is ſaid, however, that a certain taylor could not help peeping: and to this day there is an effigy of him at the window whence he looked. To commemorate this extraordinary tranſaction, and out of reſpect to the memory of their patroneſs, the citizens make a proceſſion every year, with the figure of a naked woman on horſeback. After Leofric's death, the earls of Cheſter became lords of the city, and granted it many privileges. At length it was annexed to the earldom of Cornwall; and growing conſiderable, had divers immunities and privileges conferred upon it by ſeveral kings; particularly that of a mayor and two bailiffs by Edward III.; and Henry VI. made it, in conjunction with ſome other towns and villages, a diſtinct county, independent of the county of Warwick. But afterwards Edward VI. for their diſloyalty, deprived them of their liberties, which were not reſtored till they had paid a fine of 500 merks. By a charter from James I. an alderman is allotted to each ward, with the powers of the juſtices of the peace within the city and its liberties. The walls were ordered to be demoliſhed at the Reſtoration; and now nothing remains of them but the gates, which are very lofty. Coventry is noted for the two parliaments which were held in it; the one called the parliament of *Dunces*, and the other of *Devils*. The former was ſo called on account of the excluſion of the lawyers; and the attainders of the duke of York, the earls of Saliſbury, Warwick, and March, procured the other the epithet of *Devils*. The town-houſe of Coventry is much admired for its painted windows, repreſenting ſeveral kings and others that have been benefactors to the city. The chief manufactures carried on here are temmies and ribbands.

Coventry ſends two members to parliament, and gives title of earl to an ancient family of the ſame name.—Coventry is a biſhop's ſee. The biſhoprick is ſaid to have been founded by Oſwy king of Mercia, in the year 656 or 657; and although it hath a double name, yet, like Bath and Wells, it is a ſingle dioceſe. It was ſo extremely wealthy, that King Offa, by the favour of Pope Adrian, conſtituted it an archiepiſcopal ſee; but this

this title was laid aside on the death of that king. In 1075, Peter, the 34th bishop, removed the see to Chester. In 1102, Robert de Limsey, his immediate successor, removed it to Coventry; and Hugo Novant, the 41st bishop, removed it back to Litchfield, but with great opposition from the monks of Coventry. The dispute was finally settled in a manner nearly similar to that which is mentioned between Bath and Wells. Here it was agreed that the bishop should be styled from both places, and that Coventry should have the precedence; that they should choose the bishop alternately; and that they should both make one chapter to the bishop, in which the prior of Coventry should be the chief man. Matters continued thus till the Reformation, when the priory of Coventry being dissolved by King Henry VIII. the style of the bishop continued as before. But an act of parliament passed 33d of King Henry VIII. to make the dean and chapter of Litchfield one sole chapter to the bishop. This see hath given three saints to the church; and to the nation one lord chancellor, three lord treasurers, three presidents of Wales, one chancellor to the university of Cambridge, and one master of the wardrobe. The old church built by King Oswy being taken down by Roger de Clinton, the 37th bishop, he built the beautiful fabric that now stands in 1148, and dedicated it to the Virgin Mary and St Chad. During the grand rebellion, the church suffered much; but soon after the Restoration, it was repaired and beautified. This diocese contains the whole counties of Stafford and Derby (except two parishes of the former), the largest part of Warwickshire, and nearly one half of Shropshire, in which are 555 parishes, of which 250 are impropriate. It hath four archdeaconries, viz. Stafford, Derby, Coventry, and Shrewsbury. It is valued in the king's books at 559l. 18s. 2¼d. and is computed to be worth annually 2800l. The clergy's tenth is 590l. 16s. 11¼d. To this cathedral belong a bishop, a dean, a precentor, a chancellor, a treasurer, four archdeacons, twenty-seven prebendaries, five priest-vicars, seven lay clerks or singing men, eight choristers, and other under officers and servants.

CO-VERSED SINE, in *Geometry*, the remaining part of the diameter of a circle, after the versed sine is taken from it. See GEOMETRY.

COVERT in *Law*.—*Femme Covert* denotes a woman married, and so covered by, or under the protection of, her husband.

Covert-Way, or CORRIDOR, in *Fortification*, a space of ground, level with the field on the edge of the ditch, three or four fathoms broad, ranging quite round the half moons and other works towards the country. It has a parapet raised on a level, together with its banquets and glacis. See FORTIFICATION.

COVERTURE, in *Law*, is applied to the state and condition of a married woman, who is under the power of her husband, and therefore called *femme couvert*.

COUGH, in *Medicine*. See MEDICINE *Index*.

COUGH, in *Farriery*. See FARRIERY *Index*.

COUGH, called the husk, is a disease to which young bullocks are subject. In this disorder the wind-pipe and its branches are loaded with small taper worms. Farmers count the disease incurable; but fumigations with mercurials, as cinnabar, or with fœtids, as tobacco, might prove serviceable.

COUHAGE, or STINKING BEANS; a kind of kidney-beans imported from the East Indies, where they are used as a cure for the dropsy. The down growing on the outside of the pod is so pointed as, like a nettle, to sting the flesh, though not with so painful a sensation. This, by a corruption of the word, is called *cowitch*. See DOLICHOS, BOTANY *Index*.

COVIN, a deceitful compact or agreement between two or more to deceive or prejudice a third person: As, if a tenant for life conspire with another, that this other shall recover the land which the tenant holds in prejudice of him in reversion. Dr Skinner takes the word to be a corruption of the Latin *conventum*, and therefore writes it *coven*. See CONSPIRACY.

COVING, in building, is when houses are built projecting over the ground-plot, and the turned projecture arched with timber, lathed and plastered.

COVINUS, among the ancients, a kind of chariot, in which the Gauls and Britons used to fight in battles.

COUL, or COWL. See COWL.

COULTER, in *Husbandry*, an iron instrument, fixed in the beam of a plough, and serving to cut the edge of each furrow. See AGRICULTURE.

COUNCIL, or COUNSEL, in a general sense, an assembly of divers considerable persons to concert measures relative to the state.

In Britain, the law, in order to assist the king in the discharge of his duties, the maintenance of his dignity, and the exertion of his prerogative, hath assigned him a diversity of councils to advise with.

1. The first of these is the high court of parliament. See PARLIAMENT.

2. The peers of the realm are by their birth hereditary counsellors of the crown; and may be called together by the king, to impart their advice in all matters of importance to the realm, either in time of parliament, or, which hath been their principal use, when there is no parliament in being. Accordingly, Bracton, speaking of the nobility of his time, says, they might properly be called "consules à consulendo; reges enim tales sibi associant ad consulendum." And in the law-books it is laid down, that the peers are created for two reasons: 1. *Ad consulendum*, 2. *Ad defendendum, regem:* for which reasons the law gives them certain great and high privileges; such as freedom from arrests, &c. even when no parliament is sitting; because the law intends, that they are always assisting the king with their counsel for the common-wealth, or keeping the realm in safety by their prowess and valour.

Instances of conventions of the peers, to advise the king, have been in former times very frequent; though now fallen into disuse, by reason of the more regular meetings of parliament. Sir Edward Coke gives us an extract of a record, 5 Henry IV. concerning an exchange of lands between the king and the earl of Northumberland, wherein the value of each was agreed to be settled by advice of parliament (if any should be called before the feast of St Lucia), or otherwise by advice of the grand council of peers, which the king promises to assemble before the said feast, in case no parliament shall be called. Many other instances of this

Council. Blackstone's Comment. this kind of meeting are to be found under our ancient kings: though the formal method of convoking them had been so long left off, that when King Charles I. in 1640, issued out writs under the great seal to call a council of all the peers of England, to meet and attend his majesty at York, previous to the meeting of the long parliament, the earl of Clarendon mentions it as a new invention, not before heard of: that is, as he explains himself, so old, that it had not been practised in some hundreds of years. But though there had not for long time before been an instance, nor has there been any since, of assembling them in so solemn a manner, yet in cases of emergency, our princes have at several times thought proper to call for, and consult as many of the nobility as could easily be brought together: as was particularly the case with King James II. after the landing of the prince of Orange; and with the prince of Orange himself before he called the convention parliament which afterwards called him to the throne.

Besides this general meeting, it is usually looked upon to be the right of each particular peer of the realm, to demand an audience of the king, and to lay before him with decency and respect such matters as he shall judge of importance to the public weal. And therefore, in the reign of Edward II. it was made an article of impeachment in parliament against the two Hugh Spencers, father and son, for which they were banished the kingdom, "that they by their evil covin would not suffer the great men of the realm, the king's good counsellors, to speak with the king, or to come near him; but only in presence and hearing of said Hugh the father and Hugh the son, or one of them, and at their will, and according to such things as pleased them."

3. A third council belonging to the king, are, according to Sir Edward Coke, his judges of the courts of law, for law-matters. And this appears frequently in the English statutes, particularly 14 Edward III. c. 5. and in other books of law. So that when the king's council is mentioned generally, it must be defined, particularized, and understood, *secundum subjectam materiem*; "according to the subject matter;" and if the subject be of a legal nature, then by the king's council is understood his council for matters of law; namely, his judges. Therefore, when by statute 16 Richard II. c. 5. it was made a high offence to import into England any papal bulls, or other processes from Rome; and it was enacted, that the offenders should be attached by their bodies and brought before the king and his council to answer for such offence; here, by the expression of king's *council*, were understood the king's judges of his courts of justice, the subject-matter being legal: this being the general way of interpreting the word *council*.

4. But the principal council belonging to the king is his *privy council*, which is generally by way of eminence, called *the council*. For an account of its constitution and powers, see the article Privy-*Council*.

Aulic Council. See Aulic.

Common Council, in the city of London, is a court wherein are made all bye-laws which bind the citizens. It consists, like the parliament, of two houses; an upper, composed of the lord-mayor and aldermen; and a lower, of a number of common-council men, chosen by the several wards, as representatives of the body of the citizens.

Council, Counsel.

Council *of War*, an assembly of the principal officers of an army or fleet, occasionally called by the general or admiral to concert measures for their conduct with regard to sieges, retreats, engagements, &c.

Council, in church history, an assembly of prelates and doctors, met for the regulating matters relating to the doctrine or discipline of the church.

National Council, is an assembly of the prelates of nation under their primate or patriarch.

Oecumenical or *General* Council, is an assembly which represents the whole body of the universal church. The Romanists reckon eighteen of them; Bullinger, in his treatise de conciliis, six; Dr Prideaux, seven; and Bishop Beveridge has increased the number to eight, which, he says, are all the general councils which have ever been held since the time of the first Christian emperor. They are as follows: 1. The council of Nice, held in the reign of Constantine the Great, on account of the heresy of Arius. 2. The council of Constantinople, called under the reign and by the command of Theodosius the Great, for much the same end that the former council was summoned. 3. The council of Ephesus, convened by Theodosius the younger at the suit of Nestorius. 4. The council of Chalcedon, held in the reign of Martinus, which approved of the Eutychian heresy. 5. The second council of Constantinople, assembled by the emperor Justinian, condemned the three chapters taken out of the book of Theodorus of Mopsuestia, having first decided that it was lawful to anathematise the dead. Some authors tell us, that they likewise condemned the several errors of Origen about the Trinity, the plurality of worlds, and pre-existence of souls. 6. The third council of Constantinople, held by the command of Constantius Pogonatus the emperor, in which they received the definitions of the five first general councils, and particularly that against Origen and Theodorus of Mopsuestia. 7. The second Nicene council. 8. The fourth council of Constantinople, assembled when Louis II. was emperor of the West. The regulations which they made are contained in twenty-seven canons, the heads of which are set down by M. du Pin, to whom the reader is referred.

COUNSEL, in a general sense, signifies advice or instruction how to behave in any difficult matter.

Counsel, or *Advocates*, in English courts of law, are of two species or degrees; Barristers, and Serjeants. See these articles; also Advocate.

From both these degrees some are usually selected to be his majesty's counsel, learned in the law; the two principal of whom are called his *attorney-general*, and *solicitor-general*. The first king's counsel, under the degree of serjeant, was Sir Francis Bacon, who was made so *honoris causa*, without either patent or fee; so that the first of the modern order (who are now the sworn servants of the crown, with a standing salary) seems to have been Sir Francis North; afterwards lord keeper of the great seal to King Charles II. These king's counsel answer, in some degree, to the advocates of the revenue, *advocati fisci*, among the Romans. For they must not be employed in any case against the crown without special license; in which restriction they agree with

with the advocates of the fifc; but, in the imperial law, the prohibition was carried ftill farther, and perhaps was more for the dignity of the fovereign; for, excepting fome peculiar caufes, the fifcal advocates were not permitted to be at all concerned in private fuits between fubject and fubject. A cuftom has of late years prevailed of granting letters patent of precedence to fuch barrifters as the crown thinks proper to honour with that mark of diftinction: whereby they are entitled to fuch rank and preaudience as are affigned in their refpective patents; fometimes next after the king's attorney-general, but ufually next after his majefty's counfel next being. Thefe, as well as the queen's attorney and folicitor general, rank promifcuoufly with the king's counfel; and, together with them, fit within the bar of their refpective courts: but receive no falaries, and are not fworn; and therefore are at liberty to be retained in caufes againft the crown. And all other ferjeants and barrifters indifcriminately, (except in the court of common-pleas, where only ferjeants are admitted), may take upon them the protection and defence of any fuitors, whether plaintiff or defendant; who are therefore called their *clients;* like the dependents on the ancient Roman orators. Thefe indeed practifed *gratis*, for honour merely, or at moft for the fake of gaining influence; and fo likewife it is eftablifhed with us, that a counfel can maintain no action for his fees; which are given, not as *locatio vel conductio*, but as *quiddam honorarium;* not as a falary or hire, but as a mere gratuity, which a counfellor cannot demand without doing wrong to his reputation; as is alfo laid down with regard to advocates in the civil law, whofe *honorarium* was directed, by a decree of the fenate, not to exeed in any cafe 10,000 fefterces, or about 80l. of Englifh money. And in order to encourage due freedom of fpeech in the lawful defence of their clients, and at the fame time to check the unfeemly licentioufnefs of proftitute and illiberal men (a few of whom may fometimes infinuate themfelves even into the moft honourable profeffions), it hath been holden that a counfel is not anfwerable for any matter by him fpoken, relative to the caufe in hand, and fuggefted in the client's inftructions; although it fhould reflect upon the reputation of another, and even prove abfolutely groundlefs; but if he mentions an untruth of his own invention, or even upon inftructions, if it be impertinent to the caufe in hand, he is then liable to an action from the party injured. And counfel guilty of deceit and collufion are punifhable by the ftatute Weftm. I. 3 Edw. I. c. 28. with imprifonment for a year and a day, and perpetual filence in the courts: a punifhment ftill fometimes inflicted for grofs mifdemeanors in practice.

Blackftone's Comment.

COUNSELLOR, in general, a perfon who advifes another: thus we fay, a counfellor at law, a privy counfellor, &c.

Counsellor *at Law*, a perfon retained by a client to plead his caufe in a public court of judicature. See Advocate, Barrister, Counsel, and Serjeant.

Privy-Counsellor. See Privy-*Council.*

COUNT, (Comes), a nobleman who poffeffes a domain erected into a county. See Viscount.

Englifh and Scottifh counts we diftinguifh by the title of *earls;* foreign ones ftill retain their proper name. The dignity of a count is a medium between that of a duke and a baron.—According to the modern ufe, moft plenipotentiaries and ambaffadors affume the title of counts, though they have no county; as the count d'Avaux, &c.

Anciently, all generals, counfellors, judges, and fecretaries of cities under Charlemagne, were called *counts;* the diftinguifhing character of a duke and count being this, that the latter had but one town under him, but the former had feveral.

A count has a right to bear on his arms a coronet, adorned with three precious ftones, and furmounted with three large pearls, whereof thofe in the middle and extremities of the coronet advance above the reft.

Counts were originally lords of the court, or of the emperor's retinue, and had their name *comites, à comitando*, or *à commeando:* hence thofe who were always in the palace, or at the emperor's fide, were called *counts palatine*, or *comites à latere.* See Palatine.

In the times of the commonwealth, *comites* among the Romans was a general name for all thofe who accompanied the proconfuls and propraetors into the provinces, there to ferve the commonwealth; as the tribunes, praefects, fcribes, &c.

Under the emperors, *comites* were the officers of the palace. The origin of what we now call *counts* feems owing to Auguftus, who took feveral fenators to be his *comites*, as Dion obferves, i. e. to accompany him in his voyages and travels, and to affift him in the hearing of caufes; which were thus judged with the fame authority as in full fenate. Gallienus feems to have abolifhed this council, by forbidding the fenators being found in the armies; and none of his fucceffors re-eftablifhed it.

Thefe counfellors of the emperor were really counts, *comites*, i. e. companions of the prince; and they fometimes took the title thereof, but always with the addition of the emperor's name whom they accompanied: fo that it was rather a mark of their office than a title of dignity.—Conftantine was the firft who converted it into a dignity; and under him it was that the name was firft given abfolutely. The name once eftablifhed, was in a little time indifferently conferred, not only on thofe who followed the court, and accompanied the emperor, but alfo on moft kinds of officers; a long lift whereof is given us by Du Cange.

Eufebius tells us, that Conftantine divided the counts into three claffes; the firft bore the title of *illuftres;* the fecond that of *clariffimi*, and afterwards *fpectabiles;* the third were called *perfectiffimi.* Of the two firft claffes was the fenate compofed: thofe of the third had no place in the fenate, but enjoyed feveral other of the privileges of fenators.

There were counts who ferved on land, others at fea; fome in a civil, fome in a religious, and fome in a legal capacity: as *comes aerarii, comes facrarum largitionum, comes facri confiftorii, comes curiae, comes capellae, comes archiatrorum, comes commerciorum, comes veftiarius, comes horreorum, comes opfoniorum* or *annonae, comes domefticorum, comes equorum regiorum* or *comes ftabuli, comes domorum, comes excubitorum, comes notariorum, comes legum* or *profeffor in jure, comes limitum* or *marcarum, comes portus Romae, comes patrimonii*, &c.

Count.

The Francs, Germans, &c. passing into Gaul and Germany, did not abolish the form of the Roman government: and as the governors of cities and provinces were called *counts*, *comites*, and *dukes*, *duces*, they continued to be called so. They commanded in time of war; and in time of peace they administered justice. Thus, in the time of Charlemagne, counts were the ordinary judges and governors of the cities.

These counts of cities were beneath the dukes and counts who presided over provinces; the first being constituted in the particular cities under the jurisdiction of the latter. The counts of provinces were in nothing inferior to dukes, who themselves were only governors of provinces. Under the last of the second race of French kings, they got their dignity rendered hereditary, and even usurped the sovereignty when Hugh Capet came to the crown: his authority was not sufficient to oppose their encroachments; and hence it is they date the privilege of wearing coronets in their arms; they assumed it then, as enjoying the rights of sovereigns in their particular districts or counties. But, by degrees, most of the counties became reunited to the crown.

The quality of count is now become very different from what it was anciently; being now no more than a title, which a king grants upon erecting a territory into a county, with a reserve of jurisdiction and sovereignty to himself. At first there was no clause in the patent of erection, intimating the reversion of the county to the crown in default of heirs male; but Charles IX. to prevent their being too numerous, ordained that duchies and counties, in default of heirs male, should return to the crown.

The point of precedence between counts and marquises was formerly much controverted: the reason was, that there were counts who were peers of France, but no marquises: but the point was given up, and marquises took place; though anciently, when counts were governors of provinces, they were on a level even with dukes.

William the Conqueror, as is observed by Camden, gave the dignity of counts in fee to his nobles; annexing it to this or that county or province, and allotting for their maintenance a certain proportion of money, arising from the prince's profits in the pleadings and forfeitures of the provinces. To this purpose he quotes an ancient record, thus: Hen. II. *Rex Angliæ his verbis comitem creavit; sciatis nos fecisse Hugonem Bigot comitem de Norf, &c. de tertio denarii de Norwich et Norfolk, sicut aliquis comes Angliæ, &c.*

The Germans call a count, *graaf*, or *graff*; which, according to a modern critic, properly signifies *judge*; and is derived from *gravio* or *graffio*, of γραφω, *I write*. They have several kinds of these counts or graffs; as landgraves, marchgraves, burg-graves, and palsgraves, or counts palatine. These last are of two kinds; the former are of the number of princes, and have the investiture of a palatinate; the others have only the title of *count palatine* without the investiture of any palatinate. Some assert, that by publicly professing the imperial laws for twenty years, the person acquires the dignity of a count palatinate; and there are instances of professors in law who have assumed the title accordingly; but there are others who question this right.

Count, in *Law*, denotes the original declaration in a real action; as the declaration is in a personal one: the libellus of the civilians answers to both. Yet, count and declaration are sometimes confounded, and used for each other; as, count in debt, count in appeal, &c.

Count-wheel || Counter-passant.

Count-Wheel, in the striking part of a clock, a wheel which moves round once in 12 or 24 hours. It is sometimes called the *locking-wheel*. See *Clock-Making*.

COUNTER, a term which enters into the composition of divers words of our language, and generally implies opposition; but when applied to deeds, means an exact copy kept of the contrary party, and sometimes signed by both parties.

Counter-Changed, in *Heraldry*, the intermixture or opposition of any metal with a colour.

Counter-Flory, in *Heraldry*, is said of a tressure whose flowers-de-luce are opposite to others. See Heraldry.

Counter-Drawing, in *Painting*, is the copying a design, or painting, by means of a fine linen-cloth, an oiled paper, or other transparent matter, where the strokes appearing through are followed with a pencil, with or without colour. Sometimes it is done on glass, and with frames or nets divided into squares with silk or with thread, and also by means of instruments invented for the purpose, as the parallelogram.

Counter-Ermine, in *Heraldry*, is the contrary of ermine, being a black field with white spots.

COUNTERFEITS, in *Law*, are persons that obtain any money or goods by counterfeit letters or false tokens, who being convicted before justices of assize or of the peace, &c. are to suffer such punishment as shall be thought fit to be inflicted under death, as imprisonment, pillory, &c.

COUNTER-foil, or Counter-*stock*, in the exchequer, that part of a tally which is kept by an officer of the court.

Counter-*Guard*, in *Fortification*, is a work raised before the point of bastion, consisting of two long faces parallel to the faces of the bastion, making a saliant angle; they are sometimes of other shapes, or otherwise situated.

Counter-*Light*, or *Counter-jour*, a light opposite to any thing, which makes it appear to disadvantage. A single counter-light is sufficient to take away all the beauty of a fine painting.

Counter-*March*, in military affairs, a change of the face or wings of a battalion, by which means those that were in the front come to be in the rear. It also signifies returning, or marching back again.

Counter-*Mine*, in *War*, a well and gallery drove and sunk till it meet the enemy's mine, to prevent its effect.

Counter-*Paled*, in *Heraldry*, is when the escutcheon is divided into twelve pales parted per fesse, the two colours being counter-changed; so that the upper are of one colour and the lower of another.

Counter-*Part*, in *Music*, denotes one part to be applied to another. Thus the bass is said to be a counter-part to the treble.

Counter-*Passant*, in *Heraldry*, is when two lions are in a coat of arms, and the one seems to go quite the contrary way from the other.

Counter-

Counter-*Point*, in *Music*, a term derived from the Latin preposition *contra* and the verb *pungere;* because the musical characters by which the notes in each part are signified are placed in such a manner, each with respect to each, as to show how the parts answer one another. See Composition.

Counter-*Pointed* (*Contre-pointé*), in *Heraldry*, is when two chevrons in one escutcheon meet in the points, the one rising as usual from the base, and the other inverted falling from the chief; so that they are counter to one another in the points. They may also be counter-pointed when they are founded upon the sides of the shield, and the points meet that way, called *counter-pointed* in *fesse*.

COUNTERPOISE, in the manege, is the liberty of the action and seat of a horseman; so that in all the motions made by the horse, he does not incline his body more to one side than to the other, but continues in the middle of the saddle, being equally on his stirrups, in order to give the horse the proper and seasonable aids.

COUNTER-potent (*contre potencé*), in *Heraldry*, is reckoned a fur as well as vaire and ermine; but composed of such pieces as represent the tops of crutches, called in French *potences*, and in old English *potents*.

Counter-*Proof*, in rolling-press printing, a print taken off from another fresh printed; which by being passed through the press, gives the figure of the former, but inverted. To counter-prove, is also to pass a design in black lead, or red chalk, through the press, after having moistened with a sponge both that and the paper on which the counter-proof is to be taken.

Counter-*Quartered* (*contre-ecartelé*), in *Heraldry*, denotes the escutcheon, after being quartered, to have each quarter again divided into two.

Counter-*Saliant*, is when two beasts are borne in a coat leaping from each other directly the contrary way.

Counter-*Scarp*, in *Fortification*, is properly the exterior talus or slope of the ditch; but it is often taken for the covered way and the glacis. In this sense we say, the enemy have lodged themselves in the counterscarp. Angle of the counter-scarp, is that made by two sides of the counter-scarp, meeting before the middle of the curtain.

Counter-*Signing*, the signing the writing of a superior in quality of secretary. Thus charters are signed by the king, and counter-signed by a secretary of state, or lord chancellor.

Counter-*Time*, in the manege, is the defence or resistance of a horse that interrupts his cadence, and the measure of his manege, occasioned either by a bad horseman or by the malice of a horse.

Counter, is also the name of a counting-board in a shop, and of a piece of metal with a stamp on it, used in playing at cards.

Counter *of a Horse*, that part of a horse's forehand which lies between the shoulders and under the neck.

Counters *in a ship* are two. 1. The hollow arching from the gallery to the lower part of the straight piece of the stern, is called the *upper-counter*. 2. The lower counter is between the transom and the lower part of the gallery.

Counter, is also the name of two prisons in the city of London, viz. the Poultry and Woodstreet.

COUNTORS, Countours, or Counters, has been used for serjeants at law, retained to defend a cause, or to speak for their client in any course of law.

It is of these Chaucer speaks:

—— A sheriff had he been, and a contour,
Was nowhere such a worthy vavasour.

They were anciently called *serjeant contours*.

COUNTRIES, among the miners, a term or appellation they give to their works under ground.

COUNTRY, among geographers, is used indifferently to denote either a kingdom, province, or lesser district. But its most frequent use is in contradistinction to town.

Country-*Dance* is of English origin, though now transplanted into almost all the countries and courts of Europe. There is no established rule for the composition of tunes to this dance, because there is in music no kind of time whatever which may not be measured by the motions common in dancing; and there are few song tunes of any note within the last century, that have not been applied to country-dances.

COUNTY, in *Geography*, originally signified the territory of a count or earl, but now it is used in the same sense with shire; the one word coming from the French, the other from the Saxon.—In this view, a county is a circuit or portion of the realm; into fifty-two of which, the whole land, England and Wales, is divided for its better government and the more easy administration of justice.

For the execution of the laws in the several counties excepting Cumberland, Westmorland, and Durham, every Michaelmas term officers are appointed, under the denomination of *sheriffs*. Other officers of the several counties are, a lord-lieutenant, who has the command of the militia of the county; custodes rotulorum, justices of peace, bailiffs, high-constable, and coroner.

Of the fifty-two counties, there are three of special note, which are therefore termed *counties palatine*, as Lancaster, Chester, and Durham. See Palatine.

County *Corporate*, is a title given to several cities, or ancient boroughs, on which our monarchs have thought fit to bestow extraordinary privileges; annexing to them a particular territory, land, or jurisdiction; and making them counties of themselves, to be governed by their own sheriffs and magistrates.

County *Court*, in *English Law*, a court incident to the jurisdiction of the sheriff. It is not a court of record, but may hold pleas of debt or damages under the value of 40s. Over some of which causes these inferior courts have, by the express words of the statute of Gloucester, a jurisdiction totally exclusive of the king's superior courts. For in order to be entitled to sue an action of trespass for goods before the king's justiciars, the plaintiff is directed to make affidavit that the cause of action does really and *bona fide* amount to 40s. which affidavit is now unaccountably disused, except in the court of exchequer. The statute

tute alſo 43 Eliz. c. 6. which gives the judges in many perſonal actions, where the jury aſſeſs leſs damages than 40s. a power to certify the ſame and abridge the plaintiff of his full coſts, was alſo meant to prevent vexation by litigious plaintiffs; who, for purpoſes of mere oppreſſion, might be inclinable to inſtitute ſuch ſuits in the ſuperior courts for injuries of a trifling value. The county court may alſo hold plea of many real actions, and of all perſonal actions to any amount, by virtue of a ſpecial writ called *juſticies*; which is a writ empowering the ſheriff for the ſake of diſpatch to do the ſame juſtice in this county-court, as might otherwiſe be had at Weſtminſter. The freeholders of the county are the real judges in this court, and the ſheriff is the miniſterial officer. The great conflux of freeholders, which are ſuppoſed always to attend at the county court (which Spelman calls *forum plebeiæ juſtitiæ et theatrum comitivæ poteſtatis*), is the reaſon why all acts of parliament at the end of every ſeſſion were wont to be there publiſhed by the ſheriff; why all outlawries of abſconding offenders are there proclaimed; and why all popular elections which the freeholders are to make, as formerly of ſheriffs and conſervators of the peace, and ſtill of coroners, verderors, and knights of the ſhire, muſt ever be made *in pleno comitatu*, or in full county-court. By the ſtatute 2. Edw. VI. c. 25. no county-court ſhall be adjourned longer than for one month, conſiſting of 28 days. And this was alſo the ancient uſage, as appears from the laws of King Edward the elder; *prepoſitus* (that is the ſheriff) *ad quartam circiter ſeptimanam frequentem populi concionem celebrato; cuique jus dicito; liteſque ſingulas dirimito.* In thoſe times the county-court was a court of great dignity and ſplendour, the biſhop and the ealdorman (or earl), with the principal men of the ſhire, ſitting therein to adminiſter juſtice both in lay and eccleſiaſtical cauſes. But its dignity was much impaired, when the biſhop was prohibited, and the earl neglected to attend it. And, in modern times, as proceedings are removeable from hence into the king's ſuperior courts, by writ of *pone* or *recordare*, in the ſame manner as from hundred-courts and courts-barons; and as the ſame writ of falſe judgment may be had, in nature of a writ of error, this has occaſioned the ſame diſuſe of bringing actions therein.

COUPAR, or Cupar *of* Angus, a town of Scotland, in the valley of Strathmore, and though deſignated in Angus, by far the greater part is ſituated in the county of Perth. The town is placed on the Iſla, and is divided by a rivulet into two parts; that part which lies ſouth of this rivulet being all that belongs to the county of Angus. The ſtreets are well paved and lighted, and the town has much improved of late years; there is a town-houſe and ſteeple on the ſpot where the priſon of the court of regality ſtood. The linen manufacture is carried on to a conſiderable extent, nearly 200,000 yards of different kinds of cloth being annually ſtamped here. The number of inhabitants in 1793, amounted to 1604. Cupar is diſtant about 12 miles from Perth, and nearly the ſame diſtance from Dundee. The pariſh of Cupar extends about 5 miles in length from ſouth-weſt to north-eaſt, and is from 1 to 2 miles in breadth; it is divided lengthways by an elevated ridge: a conſiderable extent of haugh ground lies on the banks of the Iſla, which is frequently ſwelled by the rains, and lays nearly 600 acres under water. There are ſtill viſible at Cupar, the veſtiges of a Roman camp, ſaid to have been formed by the army of *Agricola* in his 7th expedition. On the center of this camp, Malcolm IV. in 1104, founded and richly endowed an abbey for Ciſtertian monks; from what remains, it muſt have been a houſe of conſiderable magnitude.

Coupar, or *Cupar of Fife*, a town in Scotland, capital of the county of Fife, about 10 miles weſt of St Andrew's: W. Long. 2. 40. N. Lat. 56. 20. It is ſituated on the north bank of the Eden, nearly in the center of the county; it boaſts of great antiquity; the thanes of Fife, from the earlieſt times of which any account has been tranſmitted to us, held here their courts of juſtice; and in the rolls of parliament, aſſembled in the beginning of the reign of King David II. may be ſeen the names of commiſſioners from the royal borough of Cupar. It is governed by a provoſt, 3 bailies, a dean of guild, and 21 counſellors. The revenue of the town amounts to 430l. ſterling per annum. Cupar has the appearance of a neat, clean, well built, thriving town. The ſtreets are well paved, and upwards of one third of the town is newly built. The church is a neat new building, and the ſpire is much admired for its light and elegant appearance. Adjoining to the town-houſe, the gentlemen of the county lately built a room for county meetings, and other apartments. The priſons are on the oppoſite ſide of the town-houſe. In Cupar, and the neighbouring country, a conſiderable quantity of coarſe linens are manufactured; about 500,000 yards are annually ſtamped, the aggregate value of which is nearly 30,000l. ſterling. Population of the town is about 3140. The pariſh of Cupar is an irregular ſquare of 5 miles, divided into two parts by the river Eden, the banks of which are covered with numerous farm houſes, and ornamented with elegant and ſtately villas. *Carſlogie*, the ſeat of Colonel Clephane, is an ancient manſion. *Garlie bank*, the property of James Wemyſs, Eſq. of Winthank, is celebrated for the treaty concluded on the 13th of June 1559, between the duke de Chattelherault, on the part of the queen-regent, and the earl of Argyll commanding the forces of the congregation. The population of the pariſh (including the town of Cupar) in 1793, amounted to 3702; in 1801, there were 4463 inhabitants in the ſame diſtrict.

COUPED, in *Heraldry*, is uſed to expreſs the head, or any limb, of an animal, cut off from the trunk, ſmooth; diſtinguiſhing it from that which is called *eraſſed*, that is, forcibly torn off, and therefore is ragged and uneven.

Couped, is alſo uſed to ſignify ſuch croſſes, bars, bends, chevrons, &c. as do not touch the ſides of the eſcutcheon, but are, as it were, cut off from them.

COUPEE, a motion in dancing, wherein one leg is a little bent, and ſuſpended from the ground; and with the other a motion is made forwards.

The word in the original French ſignifies a *cut*.

COUPLE close, in *Heraldry*, the fourth part of a chevron, never borne but in pairs, except there be a chevron between them, ſaith Guillim, though Bloom gives an inſtance to the contrary.

COUPLET, a diviſion of a hymn, ode, ſong, &c. wherein

wherein an equal number, or equal meaſure, of verſes, is found in each part; which diviſions, in odes, are called *ſtrophes*.—Couplet, by an abuſe of the word, is frequently made to ſignify a couple of verſes.

COURAGE, in *Ethics*, is that quality of the mind, derived either from conſtitution or principle, or both, that enables men to encounter difficulties and dangers. See FORTITUDE.

COURANT, a French term ſynonymous with *current*, and properly ſignifies running. See CURRENT.

COURANT, is alſo a term in muſic and dancing; being uſed to expreſs both the tune or air and the dance. Without regard to the firſt, *courant*, or *currant*, is a piece of muſic in triple time: the air of the courant is ordinarily noted in triples of minims; the parts to be repeated twice. It begins and ends when he who beats the meaſure falls his hand; in contradiſtinction from the ſaraband, which ordinarily ends when the hand is raiſed. With regard to dancing, the courant was long the moſt common of all the dances practiſed in England: it conſiſts, eſſentially, of a time, a ſtep, a balance, and a coupee; though it alſo admits of other motions. Formerly they leaped their ſteps; in which point the courant differed from the low dance and pavades. There are ſimple courants and figured courants, all danced by two perſons.

COURAP, the modern name for a diſtemper very common in Java and other parts of the Eaſt Indies. It is a ſort of herpes or itch on the arm pits, groins, breaſt, and face; the itching is almoſt perpetual; and the ſcratching is followed by great pain and a diſcharge of matter, which makes the linen ſtick ſo to the ſkin as not eaſily to be ſeparated without tearing off the cruſt. *Courap* is a general name for any ſort of itch; but this diſtemper is thus called by way of eminence. It is ſo contagious that few eſcape it. For the cure, gentle and repeated purging is uſed, and externally the ſublimate in a ſmall quantity is a good topic.

COURAYER, PETER FRANCIS, a Roman Catholic clergyman, diſtinguiſhed by great moderation, charity, and temper, concerning religious affairs, as well as by learning, was born at Vernon in Normandy, 1681. While canon regular and librarian of the abbey of St Genevieve at Paris, he applied to our archbiſhop Wake for the reſolution of ſome doubts, concerning the epiſcopal ſucceſſion in England, and the validity of our ordinations: he was encouraged to this by the friendly correſpondence which had paſſed between the archbiſhop and M. du Pin of the Sorbonne. The archbiſhop ſent him exact copies of the proper records; and on theſe he built his "Defence of Engliſh Ordinations," which was publiſhed in Holland, in 1727. This expoſed him to a proſecution in his own country; he therefore took refuge in England; where he was well received, and preſented the ſame year by the univerſity of Oxford with a doctor's degree. As it is ſomewhat uncommon for a Roman Catholic clergyman to be admitted to degrees in divinity by Proteſtant univerſities, the curious may be gratified with a ſight of the diploma, and the doctor's letter of thanks, in "The preſent State of the Republic of Letters, for June 1728." In 1736, he tranſlated into French, and publiſhed, "Father Paul's Hiſtory of the Council of Trent," in 2 vols folio, and dedicated it to Queen Caroline; who

augmented to 200l. a penſion of 100l. a-year, which he had obtained before from the court. The learned Jer. Markland, in a letter to his friend Bowyer, September 1756, ſays, "Mr Clarke has given me F. Courayer's tranſlation of the Hiſtory of the Council of Trent; with whoſe preface I am ſo greatly pleaſed, that if he be no more a Papiſt in other tenets than he is in thoſe he mentions (which are many, and of the moſt diſtinguiſhing claſs), I dare ſay there are very few conſiderate Proteſtants who are not as good Catholics as he is." His works are many, and all in French: he tranſlated Sleidan's "Hiſtory of the Reformation." He died in 1776, after two days illneſs, at the age of 95; and was buried in the cloiſter of Weſtminſter-abbey. In his will, dated Feb. 3. 1774, he declares, that he "dies a member of the Catholic church, but without approving of many of the opinions and ſuperſtitions which have been introduced into the Romiſh church, and taught in their ſchools and ſeminaries; and which they have inſiſted on as articles of faith, though to him they appear to be not only not founded in truth, but alſo to be highly improbable." And his practice was conformable to this declaration; for at London he conſtantly went to maſs, and at Ealing in the country, whither he often retired, as conſtantly attended the ſervice of the pariſh church; declaring at all times, that he "had great ſatisfaction in the prayers of the church of England."

COURBARIL. See HYMENEA.

COURIER, or CURRIER, (from the French *courir*, "to run,") a meſſenger ſent poſt, or expreſs, to carry diſpatches.

The ancients too, had their couriers. We meet with two kinds: 1. Thoſe who ran on foot, called by the Greeks *hemerodromi*, q. d. "couriers of a day." Pliny, Corn. Nepos, and Cæſar, mention ſome of theſe who would run 20, 30, 36, and in the circus even 40 leagues per day. 2. Riding couriers (*curſores equitantes*), who changed horſes as the modern couriers do.

Xenophon attributes the firſt couriers to Cyrus. Herodotus ſays they were very ordinary among the Perſians, and that there was nothing in the world more ſwift than theſe kind of meſſengers. "That prince (ſays Xenophon) examined how far a horſe would go in a day; and built ſtables, at ſuch diſtances from each other, where he lodged horſes, and perſons to take care of them; and at each place kept a perſon always ready to take the packet, mount a freſh horſe, and forward it to the next ſtage: and thus quite through his empire."

But it does not appear that either the Greeks or Romans had any regular fixed couriers till the time of Auguſtus: under that prince they travelled in cars; though it would appear that they afterwards went on horſeback. Under the weſtern empire they were called *viatores*; and under that of Conſtantinople, *curſores*: whence the modern name. See POST.

COURLAND, a duchy ſituated between E. Long. 21. 26. and between N. Lat. 56. 30. and 57. 30. It is bounded by the river Dwina, which divides it from Livonia, on the north; by Lithuania, on the eaſt; by Samogitia, on the ſouth; and by the Baltic ſea on the weſt; being 120 miles long and 30 broad. This duchy

Courfing.

duchy was formerly independent, and elected their own duke; but it is now fubject to Ruffia.

COURSE *(route)*, in *Navigation*, the angle contained between the neareft meridian and that point of the compafs upon which a fhip fails in any particular direction.

Course, in *Architecture*, denotes a continued range of ftones, level, or of the fame height, throughout the whole length of the building; and not interrupted by any aperture. It forms a parapet to the intermediate fpace between the body of the building and the wings.

Course of Plinths, is the continuity of a plinth of ftone or plafter in the face of a building; to mark the feparation of the ftories.

Course is alfo ufed for the time ordinarily fpent in learning the principles of a fcience, or the ufual points and queftions therein. Thus, a ftudent is faid to have finifhed his courfe in the humanity, in philofophy, &c.

Course is alfo ufed for the elements of an art exhibited and explained, either in writing or by actual experiment. Hence our courfes of philofophy, anatomy, chemiftry, mathematics, &c. probably fo called as going throughout or running the whole length or courfe of the art, &c.

COURSES, a name by which the principal fails of a fhip are diftinguifhed, viz. the main-fail, the fore-fail, and the mizen: the mizen ftay-fail and fore-fail are alfo fometimes comprehended in this denomination; as are the main ftay-fails of all brigs and fchooners. See Sail.

COURSING, among fportfmen. There are three feveral forts of courfes with grehounds: 1. At the hare; 2. At the fox; and, 3. At the deer.

For the *deer*, there are two forts of courfes; the one in the paddock, the other either in the foreft or the purlieu. For the paddock courfe, there muft be the grehound and the terrier, and the mongrel grehound, whofe bufinefs it is to drive away the deer before the grehounds are flipped; a brace or a leafh are the ufual number flipped at a time, feldom at the utmoft more than two brace. In courfing the deer in the foreft or purlieu, there are two ways in ufe: the one is courfing from wood to wood; and the other, upon the lawns clofe by the keeper's lodge. In the courfing from wood to wood, the way is to throw in fome young hounds into the wood to bring out the deer; and if any deer come out that is not weighty, or a deer or antler which is buck, fore, or forrel, then you are not to flip your grehounds, which are held at the end of the wood, where the keepers, who can guefs very well on thefe occafions, expect that the deer will come out. If a proper deer come out, and it is fufpected that the brace or leafh of grehounds flipped after him will not be able to kill him, it is proper to waylay him with a couple of frefh grehounds.

The courfing upon the lawn is the moft agreeable of all other ways. When the keeper has notice of this, he will lodge a deer for the courfe; and then, by coming under the wind, the grehounds may be brought near enough to be flipped for a fair courfe.

The beft method of courfing the *hare*, is to go out and find a hare fitting; which is eafily done in the fummer, by walking acrofs the lands, either ftubble, fallow, or corn grounds, and cafting the eye up and down: for in fummer they frequent thofe places for fear of the ticks, which are common in the woods at that feafon; and in autumn the rains falling from the trees offend them. The reft of the year there is more trouble required; as the bufhes and thickets muft be beat to roufe them, and oftentimes they will lie fo clofe, that they will not ftir till the pole almoft touches them: the fportfmen are always pleafed with this, as it promifes a good courfe. If a hare lies near any clofe or covert, and with her head that way, it is always to be expected that fhe will take to that immediately on being put up; all the company are therefore to ride up and put themfelves between her and the covert before fhe is put up, that fhe may take the other way, and run upon open ground. When a hare is put up, it is always proper to give her ground, or *law*, as it is called; that is, to let her run 12 fcore yards, or thereabouts, before the grehounds are flipped at her; otherwife fhe is killed too foon, the greater part of the fport is thrown away, and the pleafure of obferving the feveral turnings and windings that the creature will make to get away is all loft. A good fportfman had rather fee a hare fave herfelf after a fair courfe, than fee her murdered by the grehounds as foon as fhe is up.

In courfing the *fox*, no other art is required, than ftanding clofe, and in a clear wind, on the outfide of fome grove where it is expected he will come out; and when he is come out, he muft have head enough allowed him, otherwife he will return back to the covert. The floweft grehound will be able to overtake him, after all the odds of diftance neceffary; and the only danger is the fpoiling the dog by the fox, which too frequently happens. For this reafon, no grehound of any value fhould be run at this courfe; but the ftrong, hard, bitter dogs, that will feize any thing.

The laws of courfing eftablifhed by the duke of Norfolk, and other fportfmen of the kingdom of England, are thefe:

1. He that is chofen fewterer or letter-loofe of the dogs, fhall receive the grehounds matched to run together into his leafh as foon as he comes into the field; he is to march next to the hare-finder, or him who is to ftart the hare, until he come to the form; and no horfeman or footman is to go before or fideways, but all ftraight behind, for the fpace of about 40 yards. 2. A hare ought never to be courfed with more than a brace of grehounds. 3. The hare-finder is to give the hare three fohoes before he puts her up from her form or feat, to the end that the dogs may be prepared and attend her ftarting. 4. If there be not a particular danger of lofing the hare, fhe fhould have about twelve fcore yards law. 5. The dog that gives the firft turn, if after that there be neither cote, flip, nor wrench, wins the wager. 6. A go-by, or bearing the hare, is counted equivalent to two turns. 7. If neither dog turns the hare, he that leads to the laft covert wins. 8. If any dog turns the hare, ferves himfelf, and turns her again, it is as much as a cote, and a cote is efteemed as much as two turns. 9. If all the courfe be eqnal, he that bears the hare fhall win; and if he be not borne, the courfe fhall

Court. ſhall then be judged *dead*. 10. If a dog take a fall in his courſe, and yet perform his part, he may challenge the advantage of a turn more than he gave. 11. If a dog turn the hare, ſerve himſelf, and give divers cotes, and yet in the end ſhall ſtand ſtill in the field, the other dog, if he turns home to the covert, although he gives no other, ſhall be adjudged to win the wager. 12. If by misfortune a dog be rid over in the courſe, that courſe ſhall be adjudged void, and he that did the miſchief is to make reparation to the owner. 13. If a dog gives the firſt and laſt turn, and there be no other advantage betwixt them, he that gives the odd turn wins. 14. A cote is when a grehound goes endways by the ſide of his fellow, and gives the hare a turn. 15. A cote ſerves for two turns, and two trippings or jerkings for a cote; and if the hare turns not quite about, ſhe only *wrencheth*, in the ſportſman's phraſe. 16. If there be no cotes given by either of the grehounds, but one ſerves the other at turning, then he that gives the moſt turns wins the wager. 17. Sometimes a hare does not turn, but wrenches; for ſhe does not turn except ſhe turns as it were round. In theſe caſes, two wrenches ſtand for one turn. 18. He that comes in firſt at the death of the hare takes her up, and ſaves her from breaking; he cheriſhes the dogs, and cleanſes their mouths from the wool; he is adjudged to have the hare for his pains. 19. Finally, thoſe who are judges of the leaſh, muſt give their judgment before they depart out of the field, or elſe it is not to ſtand as valid.

COURT, an appendage to a houſe or habitation; conſiſting of a piece of ground incloſed with walls, but open upwards.

Court is alſo uſed for the palace or place where a king or ſovereign prince reſides.

Court, in a law ſenſe, is defined to be a place wherein juſtice is judicially adminiſtered. And as, by our excellent conſtitution, the ſole executive power of the laws is veſted in the perſon of the king, it will follow that all courts of juſtice, which are the medium by which he adminiſters the laws, are derived from the power of the crown. For whether created by act of parliament or letters patent, or ſubſiſting by preſcription (the only methods by which any court of judicature can exiſt), the king's conſent in the two former is expreſsly, and in the latter impliedly, given. In all theſe courts, the king is ſuppoſed in contemplation of law to be always preſent; but as that is in fact impoſſible, he is there repreſented by his judges, whoſe power is only an emanation of the royal prerogative.

Blackſtone's Comment.

For the more ſpeedy, univerſal, and impartial adminiſtration of juſtice between ſubject and ſubject, the law hath appointed a prodigious variety of courts, ſome with a more limited, others with a more extenſive juriſdiction; ſome conſtituted to inquire only, others to hear and determine; ſome to determine in the firſt inſtance, others upon appeal and by way of review. See Law, N° xcviii. xcix. c. cxli. clvi. clvii. clviii. and the reſpective articles in the order of the alphabet. One diſtinction may be here mentioned, that runs throughout them all; viz. that ſome of them are courts *of record*, others *not of record*. A court of record is that where the acts and judicial proceedings are enrolled in parchment for a perpetual memorial and teſtimony: which rolls are called the *records of the court*, and are of ſuch high and ſupereminent authority, that their truth is not to be called in queſtion. For it is a ſettled rule and maxim, that nothing ſhall be averred againſt a record, nor ſhall any plea, or even proof, be admitted to the contrary. And if the exiſtence of a record be denied, it ſhall be tried by nothing but itſelf; that is, upon bare inſpection whether there be any ſuch record or not; elſe there would be no end of diſputes. But if there appear any miſtake of the clerk in making up ſuch record, the court will direct him to amend it. All courts of record are the king's courts in right of his crown and royal dignity, and therefore no other court hath authority to fine or impriſon: ſo that the very erection of a new juriſdiction with power of fine or impriſonment, makes it inſtantly a court of record.—A court not of record is the court of a private man; whom the law will not intruſt with any diſcretionary power over the fortune or liberty of his fellow ſubjects. Such are the courts-baron incident to every manor, and other inferior juriſdictions; where the proceedings are not enrolled or recorded; but as well their exiſtence as the truth of the matters therein contained ſhall, if diſputed, be tried and determined by a jury. Theſe courts can hold no plea of matters cognizable by the common law, unleſs under the value of 40s.; nor of any forcible injury whatſoever, nor having any proceſs to arreſt the perſon of the defendant.

In every court there muſt be at leaſt three conſtituent parts, the *actor*, *reus*, and *judex*: the *actor*, or plaintiff, who complains of an injury done; the *reus*, or defendant, who is called upon to make ſatisfaction for it; and the *judex*, or judicial power, which is to examine the truth of the fact, to determine the law ariſing upon that fact, and, if any injury appears to have been done, to aſcertain, and by its officers to apply the remedy. It is alſo uſual in the ſuperior courts to have attorneys, and advocates or counſel, as aſſiſtants. See Attorney and Counsel.

Court-Baron, in *Engliſh Law*, a court incident to every manor in the kingdom, to be holden by the ſteward within the ſaid manor. This court-baron is of two natures: the one is a cuſtomary court, appertaining entirely to the copyholders, in which their eſtates are transferred by ſurrender and admittance, and other matters tranſacted relative to their tenures only. The other is a court of common law, and it is the court of the *barons*, by which name the freeholders were ſometimes anciently called: for that it is held before the freeholders who owe ſuit and ſervice to the manor, the ſteward being rather the regiſtrar than the judge. Theſe courts, though in their nature diſtinct, are equally confounded together. The court we are now conſidering, viz. the freeholder's court, was compoſed of the lord's tenants, who were the *pares* of each other, and were bound by their feodal tenure to aſſiſt their lord in the diſpenſation of domeſtic juſtice. This was formerly held every three weeks; and its moſt important buſineſs is to determine, by writ of right, all controverſies relating to the right of lands within the manor. It may alſo hold plea of any perſonal actions, of debt, treſpaſs on the caſe, or the like, where the debt or damages do not amount to 40s. Which is the ſame ſum, or three marks, that bounded the juriſdiction rifdiction of the ancient Gothic courts in their loweft inftance, or *fierding courts*, fo called becaufe four were inftituted within every fuperior diftrict or hundred. But the proceedings on a writ of right may be removed into the county-court by a precept from the fheriff called a *tolt, quia tollit atque eximit caufam e curia baronum.* And the proceedings in all other actions may be removed into the fuperior courts by the king's writs of *pone*, or *accedas ad curiam*, according to the nature of the fuit. After judgment given, a writ alfo of *falfe judgment* lies to the courts at Weftminfter to rehear and review the caufe, and not a writ of *error;* for this is not a court of record; and therefore, in fome of thefe writs of removal, the firft direction given is to caufe the plaint to be recorded, *recordari facias loquelam.*

Court-Martial, a court appointed for the punifhing offences in officers, foldiers, and failors, the powers of which are regulated by the mutiny-bill.

For other courts, fee Admiralty, Arches, Bench, Chancery, Chivalry, *Common-Pleas*, County, Duchy, Ecclesiastical, Faculty, Forest, Hustings, Leet, Legate, Mayor, Piepoudre, Prerogative, Requests, Stannary, *Star-Chamber*, University, &c.

COURTESY, or Curtesy, *of England;* a certain tenure whereby a man marrying an heirefs feized of lands of fee-fimple, or fee-tail general, or feized as heir of the tail fpecial, and getteth a child by her that cometh alive into the world, though both it and his wife die forthwith; yet, if fhe were in poffeffion, he fhall keep the land during his life, and is called *tenant per legem Angliæ*, "or tenant by the courtefy of England;" becaufe this privilege is not allowed in any country except Scotland, where it is called *curialitas Scotiæ.*

COURTESAN, a woman who proftitutes herfelf for hire, efpecially to people of fuperior rank. Laïs the famous Theban courtefan, ftands on record for requiring no lefs than 10,000 crowns for a fingle night. Of all places in the world, Venice is that where courtefans abound the moft. It is now 300 years fince the fenate, which had expelled them, was obliged to recal them; in order to provide for the fecurity of women of honour, and to keep the nobles employed, left they fhould turn their heads to make innovations in the ftate.

COURTRAY, a town of the Auftrian Netherlands, fituated on the river Lys, about 23 miles fouth-weft of Ghent, and 14 eaft of Ypres. E. Long. 3. 10. N. Lat. 50. 48.

COUSIN, a term of relation between the children of brothers and fifters, who in the firft generation are called *coufin-germans*, in the fecond generation *fecond-coufins*, &c. If fprung from the relations of the father's fide, they are denominated *paternal* coufins, if on the mother's, *maternal.*

The word is ordinarily derived from *confanguineus;* though Menage brings it from *congenius*, or *congeneus*, q. d. *ex eodem genere.*

In the primitive times, it was allowed coufin-germans to marry, to prevent their making alliances in heathen families: but Theodofius the Great prohibited it under pain of death; on pretence that they were, in fome fort, brothers and fifters with regard to each other.

Cousin, *John*, a celebrated French painter, who excelled in painting on glafs. His picture of the Laft Judgment, in the veftry of the Minims of the Wood of Vincennes, is much admired. He was alfo a good fculptor. He wrote feveral works on geometry and perfpective; and died after the year 1689.

COUSU, in *Heraldry*, fignifies a piece of another colour or metal placed in the ordinary, as if it were fewed on, as the word imports. This is generally of colour upon colour, or metal upon metal, contrary to the general rule of heraldry.

COUTANCES, a port town of Normandy, and capital of Coutantin, in W. Long. 1. 32. N. Lat. 49. 10. This town, anciently called *Conftantia* or *Cofedia*, is pleafantly fituated among meadows and rivulets about five miles diftant from the fea. By the remains of a Roman aqueduct, and other ancient ruins, it appears to be a place of great antiquity. It is the fee of a bifhop, fuffragan of Rome; and has a magnificent cathedral, efteemed one of the fineft pieces of Gothic architecture in Europe. The trade of this town is very inconfiderable, and the fortifications are quite demolifhed. They have feveral religious houfes, and two parochial churches.

COUTHUTLAUGH, from the Saxon *couth*, "knowing," and *utlaugh*, "outlaw;" he that wittingly receives a man outlawed, and cherifhes or conceals him: for which offence he was in ancient times fubject to the fame punifhment with the outlaw himfelf.

COVERT, in *Heraldry*, denotes fomething like a piece of hanging, or a pavilion falling over the top of a chief or other ordinary, fo as not to hide, but only to be a covering to it.

COW. See Bos, Mammalia *Index.*

Cow-Burner. See Buprestis, Entomology *Index.*

Sea-Cow. See Trichecus, Mammalia *Index.*

Cow-Itch, or *Couhage.* See Couhage and Dolichos, Botany *Index.*

Cow's-Lip. See Primula, Botany *Index.*

COWARD, in *Heraldry*, a term given to a lion borne in an efchutcheon with his tail doubled, or turned in between his legs.

COWEL, Dr John, a learned and eminent civilian, born about the year 1554. In 1607 he compiled a *Law Dictionary*, which gave great offence to Sir Edward Coke and the common lawyers: fo that they firft accufed him to James I. as afferting that the king's prerogative was in fome cafes limited; and when they failed in that attempt, they complained of him to the houfe of commons, as a betrayer of the rights of the people, by afferting that the king was not bound by the laws; for which he was committed to cuftody, and his book publicly burnt. He alfo publifhed *Inftitutiones Juris Anglicani*, in the manner of Juftinian's Inftitutes; and died in the operation for the ftone, in 1611.

COWES, a town and harbour on the north-eaft coaft of the Ifle of Wight, in Hampfhire. It has no market, but is the beft place for trade in the whole ifland; but as it lies low, the air is accounted unhealthy.

It

Cowl, Cowley.

It is eight miles south-east of Portsmouth. W. Long. 1. 25. N. Lat. 50. 45.

COWL, or Coul, a sort of monkish habit worn by the Bernardines and Benedictines. The word is formed from *cucullus*, by confounding the two first syllables into one, as being the same twice repeated.—There are two kinds of cowls: the one white, very large, worn in ceremony, and when they assist at the office; the other black, worn on ordinary occasions, in the streets, &c.

F. Mabillon maintains the coul to be the same thing in its origin with the scapular. The author of the apology of the emperor Henry IV. distinguishes two forms of couls: the one is a gown reaching to the feet, having sleeves, and a capuchin, used in ceremonies; the other a kind of hood to work in, called also a *scapular*, because it only covers the head and shoulders.

COWLEY, Abraham, an eminent poet, was born at London in 1618. His father, who was a grocer, dying before he was born, his mother procured him to be admitted a king's scholar at Westminster. His first inclination to poetry arose on his lighting on Spenser's Fairy Queen, when he was but just able to read; and this inclination so far improved in him, that at 13 he began to write several poems; a collection of which was published in 1613, when he was but 15. He has been represented as possessed of so bad a memory that his teachers could never bring him to retain the ordinary rules of grammar. But the fact was, as Dr Johnson notices, not that he could not learn or retain the rules; but that being able to perform his exercises without them, he spared himself the labour. In 1636 he was elected a scholar of Trinity college, Cambridge, and removed to that university. Here he went through all his exercises with a remarkable degree of reputation; and at the same time must have pursued his poetical turn with great eagerness, as it appears that the greatest part of his poems were written before he left that university. He had taken his degree of master of arts before 1643, when, in consequence of the turbulence of the times, he, among others, was ejected from the college; whereupon, retiring to Oxford, he entered himself of St John's College; and that very year, under the denomination of a *scholar of Oxford*, published a satire called the Puritan and the Papist. It is apparent, however, that he did not remain very long at Oxford; for his zeal to the royal cause engaging him in the service of the king, who was very sensible of his abilities, and by whom he was frequently employed, he attended his majesty in many of his journeys and expeditions, and gained not only that prince's esteem, but that of many other great personages, and in particular of Lord Falkland, one of the principal secretaries of state.

During the heat of the civil war, he was settled in the earl of St Alban's family; and when the queen-mother was obliged to retire into France, he accompanied her thither, laboured strenuously in the affairs of the royal family, undertook several very dangerous journeys on their account, and was the principal instrument in maintaining an epistolary correspondence between the king and queen, whose letters he ciphered and deciphered with his own hand. His poems, entitled The Mistress, were published at London in 1647; and his comedy called The Guardian, afterwards altered and published under the title of Cutter of Coleman-street, in 1650. In 1656 it was thought proper by those on whom Mr Cowley depended that he should come over into England, and, under pretence of privacy and retirement, should give notice of the posture of affairs in this nation. Upon his return he published a new edition of all his poems, consisting of four parts; viz. I. Miscellanies. II. The Mistress, or Several Copies of Love-verses. III. Pindaric Odes, written in imitation of the style and manner of Pindar. IV. Davideis, a sacred poem of the troubles of David, in four books.

Cowley.

Soon after his arrival, however, he was seized, in the search after another gentleman of considerable note in the king's party; but although it was through mistake that he was taken, yet when the republicans found all their attempts of every kind to bring him over to their party proved ineffectual, he was committed to a severe confinement, and it was even with considerable difficulty that he obtained his liberty; when, venturing back to France, he remained there, in his former situation, till near the time of the king's return. During his stay in England he wrote his Two Books of Plants, published first in 1662; to which he afterwards added four books more; and all six, together with his other Latin poems, were printed at London in 1678. It appears by Mr Wood's *Fasti Oxonienses*, that our poet was created doctor of physic at Oxford, December 2. 1657.

Soon after the Restoration he became possessed of a very competent estate, through the favour of his principal friends the duke of Buckingham and the earl of St Alban's; and being now upwards of 40 years of age, he took up a resolution to pass the remainder of a life which had been a scene of tempest and tumult, in that situation which had ever been the object of his wishes, a studious retirement. His eagerness to get out of the bustle of a court and city made him less careful than he might have been in the choice of a healthful habitation in the country; by which means he found his solitude from the very beginning suit less with the constitution of his body than with his mind. His first rural residence was at Barn Elms, a place which, lying low, and being near a large river, was subject to a variety of breezes from land and water, and liable in the winter-time to great inconvenience from the dampness of the soil. The consequence of this Mr Cowley too soon experienced, by being seized with a dangerous and lingering fever. On his recovery from this he removed to Chertsey, a situation not much more healthy, where he had not been long before he was seized with another consuming disease. Having languished under this for some months, he at length got the better of it, and seemed pretty well recovered from the bad symptoms, when one day in the heat of summer 1667, staying too long in the fields to give some directions to his labourers, he caught a most violent cold, which was attended with a defluxion and stoppage in his breast; and for want of timely care, by treating it as a common cold, and refusing advice till it was past remedy, he departed this life on the 28th of July in that year, being the 49th of his age; and on the 3d of August following, he

Cowley. was interred in Weftminfter-abbey, near the afhes of Chaucer, and his beloved Spenfer. He was a man of a very amiable character, as well as an admirable genius. King Charles II. on the news of his death, declared "that Mr Cowley had not left a better man behind him in England." A monument was erected to his memory by George Villiers duke of Buckingham in 1675.

Befides the work already mentioned, Mr Cowley wrote, among other things, A Propofition for the Advancement of Experimental Philofophy; A Difcourfe by way of Vifion concerning the Government of Oliver Cromwell; and Several Difcourfes by way of Effays in Profe and Verfe. Mr Cowley had defigned alfo a Difcourfe concerning Style, and a Review of the Principles of the Primitive Chriftian Church, but was prevented by death. A fpurious piece, entitled The Iron Age, was publifhed under Mr Cowley's name during his abfence; and, in Mr Dryden's Mifcellany Poems, we find A Poem on the Civil War, faid to be written by our author, but not extant in any edition of his works. An edition of his works was publifhed by Dr Spratt, afterwards bifhop of Rochefter, who alfo prefixed to it an account of the author's life The reverend editor mentions, as very excellent of their kind, Mr Cowley's letters to his Friends; none of which, however, were publifhed.

The moral character of Mr Cowley appears, from every account of it, to have been very excellent "He is reprefented by Dr Spratt (fays Dr Johnfon), as the moft amiable of mankind; and this pofthumous praife may be fafely credited, as it has never been contradicted by envy or by faction."

As a poet, his merits have been varioufly eftimated. Lord Clarendon has faid he made a flight above all men; Addifon, in his account of the Englifh poets, that he improved upon the Theban bard; the duke of Buckingham upon his tomb ftone, that he was the Englifh Pindar, the Horace, the Virgil, the delight, the glory of his times. And with refpect to the harfhnefs of his numbers, the eloquent Spratt tells us, that if his verfes in fome places feem not as foft and flowing as one would have them, it was his choice and not his fault.

"Such (fays Mr Knox) is the applaufe lavifhed on a writer who is now feldom read. That he could ever be efteemed as a pindaric poet is a curious literary phenomenon. He totally miftook his own genius when he thought of imitating Pindar. He totally miftook the genius of Pindar, when he thought his own incoherent fentiments and numbers bore the leaft refemblance to the wild yet regular fublimity of the Theban. He neglected even thofe forms, the ftrophe, antiftrophe, and epode, which even imitative dulnefs can copy. Sublime imagery, vehement pathos, poetic fire, which conftitute the effence of the Pindaric ode, are incompatible with witty conceits, accurate antithefes and vulgar expreffion. All thefe imply the coolnefs of deliberate compofition, or the meannefs of a little mind; both of them moft repugnant to the truly Pindaric ode, in which all is rapturous and noble. Wit of any kind would be improperly difplayed in fuch compofition: but to increafe the abfurdity, the wit of Cowley is often falfe. That he had a tafte for Latin poetry, and wrote in it with elegance, the well known epitaph on himfelf, upon his retirement, and an admirable imitation of Horace, are full proofs. But furely his rhetorical biographer makes ufe of the figure hyperbole, when he affirms that Cowley has excelled the Romans themfelves. He was inferior to many a writer of lefs name in the *Mufæ Anglicanæ*. But ftill he had great merit; and I muft confefs I have read his Latin verfes with more pleafure than any of his Englifh can afford." *Effays*, vol. ii. p. 363—365. Cowley.

To Cowley's compofitions in profe Mr Knox hath paid a very honourable teftimony. He fays, that in this department he is an elegant, a pleafing, a judicious writer; and that it is much to be lamented that he did not devote a greater part of his time to a kind of writing which appeared natural to him, and in which he excelled.

Dr Jofeph Warton obferves, that it is no caricature of Cowley to reprefent him as being poffeffed of a ftrained affectation of ftriving to be witty upon all occafions. "It is painful (adds this excellent critic), to cenfure a writer of fo amiable a mind, fuch integrity of manners, and fuch fweetnefs of temper. His fancy was brilliant, ftrong, and fprightly; but his tafte falfe and unclaffical, even though he had much learning."

Dr Beattie has characterifed Cowley in the following terms. "I know not whether any nation ever produced a more fingular genius than Cowley. He abounds in tender thoughts, beautiful lines, and emphatical expreffions. His wit is inexhauftible, and his learning extenfive; but his tafte is generally barbarous, and feems to have been formed upon fuch models as Donne, Martial, and the worft parts of Ovid: nor is it poffible to read his longer poems with pleafure, while we retain any relifh for the fimplicity of ancient compofition. If this author's ideas had been fewer, his conceits would have been lefs frequent; fo that in one refpect learning may be faid to have hurt his genius. Yet it does not appear that Greek and Latin did him any harm; for his imitations of Anacreon are almoft the only parts of him that are now remembered or read. His Davideis, and his tranflations of Pindar, are deftitute of harmony, fimplicity, and every other claffical grace."

But the works of this celebrated poet have been nowhere fo amply criticifed as in his Life by Dr Johnfon. After a particular examination of the different pieces, the Doctor, in taking a general review of Cowley's poetry, obferves, that he wrote with abundant fertility, but negligent or unfkilful felection; with much thought, but with little imagery; that he is never pathetic, and rarely fublime, but always either ingenious or learned, either acute or profound." Of his profe he fpeaks with great approbation. "No author (fays he) ever kept his verfe and his profe at a greater diftance from each other. His thoughts are natural, and his ftyle has a fmooth and placid equality, which has never yet obtained its due commendation. Nothing is far fought or hard laboured; but all is eafy without feeblenefs, and familiar without groffnefs." Upon the whole, he concludes as follows: "It may be affirmed, without any encomiaftic fervour, that he brought to his poetic labours a mind replete with learning, and that his paffages are embellifhed

lifhed with all the ornaments which books could fupply; that he was the firft who imparted to Englifh numbers the enthufiafm of the greater ode and the gaiety of the lefs; that he was qualified for fprightly fallies and for lofty flights: that he was among thofe who freed tranflation from fervility, and, inftead of following his author at a diftance, walked by his fide; and that though he had left verfification yet improvable, he left likewife from time to time fuch fpecimens of excellence as enabled fucceeding poets to improve it."

So many of Cowley's productions being now efteemed fcarcely worthy of a perufal, while others of them are diftinguifhed by their beauty, Dr Hurd (the prefent bifhop of Worcefter), thought proper to make a felection of them, which he publifhed in 1772, under the title of Select Works of Mr Abraham Cowley, in two volumes; with a preface and notes by the Editor.

COWPER, William, a diftinguifhed modern poet, was born at Berkhamftead in Hertfordfhire in the year 1732. His father, who was rector of the parifh, was nephew to Lord Chancellor Cowper. Mr Cowper was educated at Weftminfter fchool; and in that celebrated feminary he acquired his claffical knowledge. But it would appear from his poem, entitled "*Tirocinium*," that the impreffions which he then received were not favourable to this fyftem of education, and gave him a permanent diflike to public fchools. Through family intereft, the honourable and lucrative place of clerk to the houfe of lords had been provided for him; he was, therefore entered at the Temple for the ftudy of the law, in order to qualify him for it. In this fituation his manners were amiable and decent; and though it is probable that he did not refufe to indulge in thofe pleafures which are ufual among young men fimilarly fituated, yet there feems no reafon to fuppofe that he had any peculiar caufes for felf-accufation. His natural difpofition was timid and diffident; his fpirits were conftitutionally weak, even to the borders of abfolute unfitnefs for worldly concerns; fo that when the time came for affuming that poft to which he had been deftined, he fhrunk with fuch terror from the idea of making his appearance before the moft auguft affembly in the nation, that, after a violent ftruggle with himfelf, he actually refigned the employment, and with it all his profpects in life. It appears to have been under the agitation of mind which this circumftance occafioned, and which threw him into a ferious illnefs, that he was led to a deep confideration of his ftate in a religious view; and from the fyftem he had adopted, this courfe of reflection excited in him the moft alarming and diftrefsful apprehenfions. In vain did his theological friends fet before him thofe encouraging views which the theory of chriftian juftification is calculated to prefent, and which to many is the fource of a confidence perhaps as exceffive as their former fears; the natural difpofition of his mind fitted it to receive all the horrors, without the confolations of his faith. We are told, that "the terror of eternal judgment overpowered and wholly difordered his faculties; and he remained feven months in a continual expectation of being inftantly plunged into final mifery." In this fhocking condition he became the fubject of medical care, and he was placed in the receptacle for lunatics kept by Dr Cotton of St Alban's, an amiable and worthy phyfician, and the author of fome well known poems. At length he recovered a degree of ferenity; but his mind had acquired that indelible tinge of melancholy by which it was ever after characterifed, and which rendered his whole life little more than a fucceffion of intervals of comfort between long paroxifms of fettled defpondency. It is unneceffary to follow him through all his fcenes of retirement. Part of his time was fpent at the houfe of his relation, Earl Cowper, at Cole-green; and part at Huntingdon, with his intimate friend the reverend Mr Unwin. After the death of the latter, he removed with his widow to Olney in Buckinghamfhire, which was thenceforth the principal place of his refidence. The affectionate intimacy he enjoyed with this lady is ftrongly expreffed in the following lines, which have probably been underftood by moft readers as expreffive of a conjugal union:

—Witnefs, dear companion of my walks,
Whofe arm this twentieth winter I perceive
Faft lock'd in mine, with pleafure fuch as love
Confirm'd by long experience of thy worth
And well-tried virtues could alone infpire—
Witnefs a joy that thou haft doubled long.

Task, Book I.

At Olney he contracted a clofe friendfhip with the reverend Mr Newton, then minifter there, and fince rector of St Mary Woolnoth, London, whofe religious opinions were in unifon with his own. When Mr Newton publifhed his volume of Hymns, called "The Olney's Collection," it was enriched with fome compofitions from the pen of Cowper, diftinguifhed by the letter C. They bear internal evidence of a cultivated underftanding, and an original genius. His time was now wholly dedicated to that literary leifure, in which the mind, left to its own operations, follows up that line of purfuit which is the moft congenial to its tafte, and the moft adapted to its powers. In his garden, in his library, and in his daily walks, he feems to have difciplined his mufe to the picturefque and vivid habits of defcription, which will always diftinguifh Cowper among our national poets. No writer, with the exception of Thomfon, feems to have ftudied nature with more diligence, and to have copied her with more fidelity. An advantage which he has gained over other men, by his difdaining to ftudy her "through the fpectacles of books," as Dryden calls it; and by his purfuing her through her haunts, and watching her in all her attitudes, with the eye of a philofopher as well as of a poet. As Mr Cowper had no relifh for public concerns, it was not fingular that he fhould have neglected the ftudy of the law, on which he had entered. That knowledge of active life, which is fo requifite for the legal profeffion, would hardly be acquired on the banks of the Oufe, and in filent contemplations on the beauties of nature. In this retreat, he exchanged for the fociety and converfe of the mufes, the ambition and tumult of a forenfic occupation; dedicating his mind to the cultivation of poetry, and ftoring it with thofe images which he derived from the inexhauftible treafury of a rich and varied fcenery, in a moft beautiful and romantic country.—The firft volume of his poems, which was publifhed by Mr Newton in 1787, confifts of of various pieces, on various ſubjects. It ſeems, that he had been aſſiduous in cultivating a turn for grave and argumentative verſification, on moral and ethical topics. Of this kind is The Table Talk, and ſeveral other pieces in the collection. He who objects to theſe poems as containing too great a neglect of harmony in the arrangement of his words, and uſe of expreſſions too proſaic, will condemn him on principles of criticiſm which are by no means juſt, if the object and ſtyle of the ſubject be conſidered. Horace apologized for the ſtyle of his own ſatires, which are, ſtrictly ſpeaking, only ethical and moral diſcourſes, by obſerving, that thoſe topics required the *pedeſtrian* and familiar diction, and a form of expreſſion, not carried to the heights of poetry. But if the reader will forego the delight of ſmooth verſification, and recollect that poetry does not altogether conſiſt in even and poliſhed metre, he will remark in theſe productions, no ordinary depth of thinking and of judgment, upon the moſt important objects of human intercourſe; and he will be occaſionally ſtruck with lines, not unworthy of Dryden for their ſtrength and dignity. His lighter poems are well known. Of theſe, the verſes ſuppoſed to be written by Alex. Selkirk, on the iſland of Juan Fernandez, are in the moſt popular eſtimation. There is great originality in the following ſtanza.

> I am out of humanity's reach;
> I muſt finiſh my journey alone;
> Never hear the ſweet muſic of ſpeech;
> I ſtart at the ſound of my own."

It would be abſurd to give one general character of the pieces, that were publiſhed in this volume: yet, this is true concerning Mr Cowper's productions; that in all the varieties of his ſtyle, there may ſtill be diſcerned the likeneſs and impreſſion of the ſame mind; the ſame unaffected modeſty, which always rejects unſeaſonable ambitions and ornaments of language; the ſame eaſy vigour; the ſame ſerene and chearful hope, derived from a ſteady and unſhaken faith in the dogmas of Chriſtianity. Mr Cowper, perhaps, does not derive praiſe from the choice and elegance of his words; but he has the higher praiſe of having choſen them without affectation. He appears to have uſed them as he found them; neither introducing faſtidious refinements nor adhering to obſolete barbariſms. He underſtood the whole ſcience of numbers, and he has practiſed their different kinds with conſiderable happineſs; and, if his verſes do not flow ſo ſoftly as the delicacy of a modern ear requires, that roughneſs, which is objected to in his poetry, is his choice, not his defect. But this ſort of critics, who admire only what is exquiſitely poliſhed, like Cuyp's pictures, theſe lovers of "gentleneſs without ſinews*," ought to take into their eſtimate, that vaſt effuſion of thought which is ſo abundantly poured over the writings of Cowper, without which human diſcourſe is only an idle combination of ſounds and ſyllables. The favourable reception which this volume experienced, produced another of ſuperior merit. His principal performance was undoubtedly "The Taſk," a poem. The occaſion that gave birth to it was trivial. A lady had requeſted him to write a piece in blank verſe, and gave him for its ſubject a thing next to her, viz. *the ſofa*. This he expanded into one of the fineſt moral poems our language has produced. It is written in blank verſe as deſired; and though in that reſpect it reſembles Milton's, it is nevertheleſs original and highly characteriſtic. It is not too ſtately for familiar deſcription, or too depreſſed for ſublime and elevated imagery. If it has any fault, it is that of being too much laden with idiomatic expreſſion; a fault which the author, in the rapidity with which his ideas and his utterance ſeem to have flowed, very naturally incurred. In this poem, his fancy ran with the moſt excurſive freedom. The poet enlarges upon his topics, and confirms his argument by every variety of illuſtration. He never however dwells upon them too long, and leaves off in ſuch a manner, that it ſeems it was in his power to have ſaid more. The arguments of the poem are various. The works of nature, the aſſociations with which they exhibit themſelves, the deſigns of Providence, and the paſſions of men. Of one advantage, the writer has amply availed himſelf. The work not being rigidly confined to any preciſe ſubject, he has indulged himſelf in all the laxity and freedom of a miſcellaneous poem. Yet he has ſtill adhered ſo faithfully to the general laws of congruity, that whether he inſpires the ſofter affections into his reader, or delights him with keen and playful raillery, or diſcourſes on the ordinary manners of human nature, or holds up the bright pictures of religious conſolation to his mind, he adopts, at pleaſure, a diction juſt and appropriate, equal in elevation to the ſacred effuſions of pious rapture, and ſufficiently eaſy and familiar for deſcriptions of domeſtic life; ſkilful alike in ſoaring without effort, and deſcending without meanneſs. He who deſires to put into the hands of youth a poem, which not deſtitute of poetic embelliſhment, is free from all matter of a licentious tendency, will find in the Taſk a book adapted to his purpoſe. It would be abſurd and extravagant auſterity to condemn thoſe poetical productions in which love conſtitutes the leading feature. That paſſion has in every age been the concernment of life, the theme of the poet, the plot of the ſtage. Yet there is a kind of amorous ſenſibility, bordering on morbid enthuſiaſm, which the youthful mind too often imbibes from the glowing ſentiments of the poets. Their genius deſcribes, in the moſt ſplendid colours, the operations of a paſſion which requires rebuke rather than incentive, and lends to the moſt grovelling ſenſuality, the enchantments of a rich and creative imagination. But in the Taſk of Cowper, there is no licentiouſneſs of deſcription. All is grave, majeſtic, and moral. A vein of ſober thinking pervades every page, and, in finiſhed poetry, deſcribes the inſufficiency and vanity of human purſuits. Not that he is always ſevere. He frequently enlivens the mind of his reader by ſportive deſcriptions, and by repreſenting in elevated meaſures, ludicrous objects and circumſtances, a ſpecies of the mock heroic, ſo admired in Phillip's *Splendid Shilling*. The hiſtorical account he has given of chairs, in the firſt book of the Taſk, is a ſtriking ſpecimen of his powers of verſification, and of his talent for humour in this latter ſtyle. The attention is however the moſt detained by thoſe paſſages, in which the charms of rural life, and the endearments of domeſtic retirement are deſcribed. The Taſk abounds with incidents, introduced as epiſodes, and interpoſing an agreeable relief to the grave and ſerious part of the poetry. His

* *Dr Spratt's Life of Cowley.*

Cowper, Cox.

Crazy Kate is a defcription of the calamity of a difordered reafon, admirably exact and affecting.

"She begs an idle pin of all fhe meets."

What poet would have introduced fo minute a circumftance into his reprefentation! and yet that minutenefs conftitutes its happy effect.

Of his talent for painting there cannot be a better fpecimen than his fketch of the melancholy man, probably fketched from what too faithful remembrance fuggefted of himfelf:

Look where he comes—In this embower'd alcove
Stand clofe concealed, and fee a ftatue move;
Lips bufy, and eyes fixt, foot falling flow,
Arms hanging idly down, hands clafp'd below,
Interpret to the marking eye, diftrefs,
Such as its fymptoms only can exprefs.
That tongue is filent now;—that filent tongue
Could argue once, could jeft or join the fong,
Could give advice, could cenfure or commend,
Or charm the forrows of a drooping friend.
Renounc'd alike its office and its fport,
Its brifker and its graver ftrains fall fhort;
Both fall beneath a fever's fecret fway,
And like a fummer brook are paft away.

Retirement.

His John Gilpin is univerfally known, and may be confidered as a fportive piece of humour, which would have done credit to many writers, but can hardly be faid to have added to Mr Cowper's reputation. His next work was a tranflation of the Iliad and Odyffey into Miltonic blank verfe. It is an unjuft piece of criticifm to compare the verfion of Mr Pope to that of Mr Cowper. The merits of each are diftinct and appropriate. Mr Pope has exhibited Homer as he would have fung had he been born in England. Mr Cowper has endeavoured to pourtray him, as he wrote in Greece, adhering frequently to the peculiarities of his original's idiom, and defiring to preferve his ftrength and energy, together with his harmony and fmoothnefs. Mr Cowper died of a fevere and lingering illnefs, at Eaft Dereham, in Norfolk, April 25. 1800.

COX, Richard, a learned prelate, and principal pillar of the Reformation, was born at Whaddon in Buckinghamfhire, of low parentage, in the year 1499. From Eaton fchool he obtained a fcholarfhip in King's college in Cambridge, of which he became a fellow in 1519: he was thence invited to Oxford by Cardinal Wolfey, and was there made one of the junior canons of Cardinal college. In 1525 he was incorporated bachelor; and the following year took the degree of mafter of arts in the fame univerfity. In this fituation he became remarkable for his learning and poetical abilities; but his attachment to the opinions of Luther rendered him hateful to his fuperiors, who ftripped him of his preferment, and threw him into prifon on a fufpicion of herefy. Being, however, foon releafed, he was chofen mafter of Eton fchool, which flourifhed remarkably under his care. In 1537 he commenced doctor of divinity at Cambridge; in 1540 was made archdeacon of Ely; and the following year prebendary of that cathedral, on its being new founded by King Henry VIII. In 1546 he was made dean of Chrift-church, Oxford. By the recommendation

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Cox, Coxwold.

of Archbifhop Cranmer and Bifhop Goodrich, to the latter of whom he had been chaplain, he not only obtained the above preferments, but was chofen preceptor to Prince Edward, on whofe acceffion to the throne he became a favourite at court, was fworn of the privy council, and made king's almoner. In 1547 he was elected chancellor of Oxford; in 1548 canon of Windfor; and the next year dean of Weftminfter. About this time he was appointed one of the commiffioners to vifit the univerfity of Oxford; in which office his zeal for reformation was fo exceffive, that he deftroyed a number of curious and valuable books, for no better reafon than becaufe they were written by Roman Catholics. On the acceffion of Queen Mary he was ftripped of all his preferments and committed to the Marfhalfea. He was, however, foon releafed, and immediately left the kingdom. Having refided fome time at Strafburg with his intimate friend Peter Martyr, on the death of Queen Mary he returned to England, and, with other divines, was appointed to revife the liturgy. He often preached before the queen; and in 1559 was preferred to the fee of Ely, which he continued to enjoy upwards of 21 years. He was, however, no favourite with the queen: the reafon affigned for which was, his zealous oppofition to her retaining the crucifix and wax-candles on the altar of the royal chapel; alfo his ftrenuous defence of the marriage of the clergy, which her majefty always difapproved. He died on the 22d of July 1581, aged 81. He was a man of confiderable learning, a zealous and rigid bulwark of the church of England, and an implacable enemy both to Papifts and Puritans. In a letter to Archbifhop Parker, he advifes him to proceed vigoroufly in reclaiming or *punifhing* the Puritans, and not to be difcouraged at the frown of thofe court-favourites who protected them; affuring him that he might expect the bleffing of God on his *pious* labours to free the church from their dangerous attempts, and to eftablifh uniformity. This zealous reformer we find had not totally loft fight of the Popifh text, *compel them to come in*; but a ftronger proof of his implacability and felf-importance appears in his letter to the lord treafurer Burleigh, in which he warmly expoftulates with the council for interpofing in behalf of the Puritans, or meddling in affairs of the church, admonifhing them to keep their own fphere. Such language from a bifhop would make a modern privy council ftare. His works are, 1. Two Latin Orations on the Difpute between Dr Trefham and Peter Martyr, Lond. 1549, 4to. 2. Liturgy of the Church of England; in compiling, and afterwards correcting which, he was principally concerned. 3. The Lord's Prayer in verfe, commonly printed at the end of David's Pfalms by Sternhold and Hopkins. 4. Tranflation of the four Gofpels, the Acts of the Apoftles, and the Epiftle to the Romans, in the new tranflation of the Bible in the reign of Queen Elizabeth. 5. Refolutions of fome Queftions concerning the Sacrament in the Collection of Records at the end of Burnet's Hiftory of the Reformation. 6. Several Letters to the Queen and others, publifhed in Strype's Annals of the Reformation. He is alfo faid to have been concerned in the declaration concerning the divine inftitution of bifhops, and to have affifted Lilye in his Grammar.

COXWOLD, a town in the north riding of Yorkfhire, ſhire, 14 miles north of York. W. Long. 1. 10. N. Lat. 54. 16.

COYPEL, Anthony, an excellent French painter, born at Paris in 1661. Noyel Coypel, his father, being choſen by M. Colbert to be director of the academy at Rome, he took his ſon with him into Italy, where Anthony Coypel formed himſelf on the works of the greateſt maſters, and on his return to France was made firſt painter to the duke of Orleans. That prince employed him in painting the grand gallery of the royal palace, and allowed him a penſion. In 1714, he was director of the Academy of Painting and Sculpture. In 1715, he was made the firſt painter to the French king, and was ennobled on account of his merit. He died in 1722. M. Coypel, his ſon, alſo excelled in the ſame art.

COZENING; tricking, or defrauding.—In law, it denotes an offence where any thing is done deceitfully, whether belonging to contracts or not, which cannot be properly termed by any ſpecial name.

COZUMEL, an iſland near the weſtern coaſt of Jucatan, where Cortez landed and refreſhed his troops before entering upon the conqueſt of Mexico. W. Long. 89. 0. and N. Lat. 13. 0.

CRAB. See Cancer, Entomology *Index*.

Crab's *Claws*, in the *Materia Medica*, are the tips of the claws of the common crab broken off at the verge of the black part, ſo much of the extremity of the claws only being allowed to be uſed in medicine as is tinged with this colour. The blackneſs, however, is only ſuperficial; they are of a grayiſh white within, and when levigated furniſh a white powder.

Crab's claws are of the number of the alkaline abſorbents; but they are ſuperior to the generality of them, in ſome degree, as they are found on a chemical analyſis to contain a volatile urinous ſalt.

Crab's *Eyes*, in *Pharmacy*, are a ſtrong concretion in the head of the cray-fiſh. They are rounded on one ſide, and depreſſed and ſinuated on the other, conſiderably heavy, moderately hard, and without ſmell. We have them from Holland, Muſcovy, Poland, Denmark, Sweden, and many other places. What are uſually met with in the ſhops are prepared by art.

Crab's eyes are much uſed both in the ſhop medicines and extemporaneous preſcription, being accounted abſorbent.

Crab *Lice*, a troubleſome kind of vermin, which ſtick ſo faſt with their claws to the ſkin as to render it difficult to diſlodge them. They are called *plactulæ*, *morpiones*, *petolæ*, and *peſſolatæ*: they uſually infeſt the arm-pits and *pudenda*. Cleanlineſs is the beſt preventative. But theſe vermin may be eaſily removed with the application of a little mercurial ointment.

Crab, a ſort of wooden pillar, whoſe lower end, being let down through a ſhip's decks, reſt upon a ſocket like the capſtern; and having in its upper end, three or four holes, at different heights, through the middle of it, one above another, into which long bars are thruſt, whoſe length is nearly equal to the breadth of the neck. It is employed to wind in the cable, or to purchaſe any other weighty body which requires a great mechanical power. This differs from a capſtern, as not being furniſhed with a *drum-head*, and by having the bars to go entirely through it, reaching from one ſide of the deck to the other; whereas thoſe of the capſtern, which are ſuperior in number, reach only about eight inches or a foot into the drum-head, according to its ſize. See Capstern.

Crab-*Yaws*, a name in Jamaica for a kind of ulcer on the ſoles of the feet, with hard callous lips, ſo hard that it is difficult to cut them. The *ungt. cærul. fort.* is their cure.

CRACATOA, the moſt ſoutherly of a cluſter of iſlands lying in the entrance of the ſtraits of Sunda in the Eaſt Indies. Its whole circumference does not exceed nine miles; and off its north-eaſtern extremity is a ſmall iſland forming a road, in which Captain Cook anchored when viſiting this iſland on his laſt voyage. On the ſouthern part of the ſmall iſland is a reef of rocks, within which is a tolerable ſhelter againſt all northerly winds, there being 27 fathoms water in the mid channel, and 18 near the reef. Between the two iſlands there is a narrow paſſage for boats. The ſhore that conſtitutes the weſt ſide of the road runs in a north-weſterly direction, having a bank of coral running into the ſea for a little way, ſo that it is difficult for boats to land except at the time of high water; but the anchoring ground is very good and free from rocks. In the inland parts the ground is elevated, riſing on all ſides gradually from the ſea, and is entirely covered with wood, excepting a few ſpots which are cleared by the inhabitants for ſowing rice. The climate is reckoned very healthy in compariſon with the neighbouring countries, but it is very thinly inhabited. There are abundance of turtle on the coral reefs; but other refreſhments are ſcarce, and ſold at an exorbitant price. Water is not plentiful: Captain Cook was obliged to ſupply himſelf from a ſmall ſpring oppoſite to the ſouthern extremity of the ſmall iſland above-mentioned. To the ſouthward is a hot ſpring, whoſe waters are uſed as a bath by the inhabitants. The road where the Reſolution anchored lies in S. Lat. 8. 6. and by obſervation, in 105. 36. E. Long. by the time-keeper in 104. 48. The variation of the compaſs one degree W. On the full and change days it is high water at ſeven o'clock in the morning, and the tide riſes three feet four inches perpendicular.

CRACKOW, or Cracow, a city of Poland, ſituated in a palatinate of the ſame name, E. Long. 20. 16. N. Lat. 50. 8. It was formerly the capital of Poland, where the kings were elected and crowned, and was once almoſt the centre of the Poliſh dominions, but is now a frontier town; a proof how much the power of this republic has been contracted.

Crackow ſtands in an extenſive plain, watered by the Viſtula, which is broad but ſhallow: the city and its ſuburbs occupy a vaſt tract of ground, but are ſo badly peopled, that they ſcarcely contain 16,000 inhabitants. The great ſquare in the middle of the town is very ſpacious, and has ſeveral well-built houſes, once richly furniſhed and well inhabited, but moſt of them now either untenanted or in a ſtate of melancholy decay. Many of the ſtreets are broad and handſome; but almoſt every building bears the moſt ſtriking marks of ruined grandeur: the churches alone ſeem to have preſerved their original ſplendour. The devaſtation of this unfortunate town was begun by the Swedes at the commencement of the preſent century, when it was beſieged and taken by Charles XII. but the

the mifchiefs it fuffered from that ravager of the north were far lefs deftructive than thofe it experienced during the late dreadful commotions, when it underwent repeated fieges, and was alternately in poffeffion of the Ruffians and Confederates. The effects of cannon, grape, and mufket fhot, are ftill difcernible on the walls and houfes. In a word, Crackow exhibits the remains of ancient magnificence, and looks like a great capital in ruins: from the number of fallen and falling houfes one would imagine it had lately been facked, and that the enemy had left it only yefterday. The town is furrounded with high walls of brick, ftrengthened by round and fquare towers of whimfical fhapes, in the ancient ftyle of fortification: thefe walls were built by Venceflaus king of Bohemia during the fhort period in which he reigned over Poland.

The univerfity of Crackow was formerly, and not unjuftly, called the mother of Polifh literature, as it principally fupplied the other feminaries with profeffors and men of learning; but its luftre has been greatly obfcured by the removal of the royal refidence to Warfaw, and ftill more by the late inteftine convulfions. In this city the art of printing was firft introduced into Poland by Haller; and one of the earlieft books was the Conftitutions and Statutes compiled by Cafimir the Great, and afterwards augmented by his fucceffors. The characters are Gothic, the fame which were univerfally ufed at the invention of printing: the great initial letters are wanting, which fhows that they were probably painted and afterwards worn away. The year in which this compilation was printed is not pofitively known; but its publication was certainly anterior to 1496, as it does not contain the ftatutes paffed by John Albert in that year. The moft flourifhing period of the univerfity was under Sigifmond Auguftus in the 16th century, when feveral of the German reformers fled from the perfecutions of the emperor Charles V. and found an afylum in this city. They gave to the world feveral verfions of the facred writings, and other theological publications, which diffufed the reformed religion over great part of Poland. The protection which Sigifmond Auguftus afforded to men of learning of all denominations, and the univerfal toleration which he extended to every fect of Chriftians, created a fufpicion that he was fecretly inclined to the new church; and it was even reported that he intended to renounce the Catholic faith, and publicly profefs the reformed religion.

Towards the fouthern part of the town, near the Viftula, rifes a fmall eminence or rock, upon the top of which is built the palace, furrounded with brick walls and old towers, which form a kind of citadel to the town. This palace owes its origin to Ladiflaus Jaghellon; but little of the ancient ftructure now appears, as the greateft part was demolifhed by Charles XII. in 1701, when he entered this town in triumph after the battle of Cliffow. It has been fince repaired. The remains of the old palace confift of a few apartments, which are left in their ancient ftate as they exifted in the laft century. This palace was formerly the refidence of the kings of Poland, who, from the time of Ladiflaus Locketec, have been crowned at Crackow. The Polifh and German hiftorians differ concerning the time when the title of king was firft claimed by the fovereigns of this country; but the moft probable account is, according to Mr Coxe, that in 1295 Premiflaus affumed the regal title, and was inaugurated at Gnefna by the archbifhop of that diocefe. He was fucceeded by Ladiflaus Locketec, who offending the Poles by his capricious and tyrannical conduct, was depofed before he was crowned; and Venceflaus king of Bohemia, who had married Richfa daughter of Premiflaus, being elected in his ftead, was in 1300 confecrated at Gnefna. Ladiflaus, after flying from his country and undergoing a feries of calamitous adventures, was at length brought to a fenfe of his mifconduct. Having regained the affection of his fubjects, he was reftored, in the lifetime of Venceflaus, to part of his dominions; and he recovered them all upon the demife of that monarch in the year 1305: he governed, however, for fome years without the title of king; but at length in 1320 was crowned at Crackow, to which place he transferred the ceremony of the coronation; and afterwards enacted, that for the future his fucceffors fhould be inaugurated in the cathedral of this city.

Since that period all the fovereigns have been confecrated at Crackow, excepting the laft king. Previous to his election a decree was iffued by the diet of convocation, that the coronation fhould be folemnized for this turn at Warfaw, without prejudice in future to the ancient right of Crackow; a provifo calculated to fatisfy the populace, but which will not probably prevent any future fovereign from being crowned at Warfaw, now become the capital of Poland and the refidence of its kings. The diadem and other regalia ufed at the coronation are ftill kept in the palace of Crackow, under fo many keys, and with fuch care, that it was impoffible to obtain a fight of them.

Adjoining to the palace ftands the cathedral, alfo within the walls of the citadel. Here all the fovereigns, from the time of Ladiflaus Locketec, have been interred, a few only excepted, viz. Louis and Ladiflaus II. who were kings of Hungary as well as of Poland, and whofe bodies were depofited in Hungary; Alexander, who died and was buried at Vilna; Henry of Valois, interred in France; and the late monarch Auguftus III. The fepulchres of the kings of Poland are not diftinguifhed by any peculiar magnificence; their figures are carved in marble of no extraordinary workmanfhip, and fome are without infcriptions.

The bifhop of Crackow is the firft in the kingdom, duke of Saveria, and very often a cardinal. His revenues are larger than thofe of his metropolitan the archbifhop of Gnefna, and are computed to amount to 40,000 dollars per annum.

CRADLE, a well known machine in which infants are rocked to fleep.

It denotes alfo that part of the ftock of a crofs bow where the bullet is put.

Cradle, in *Surgery*, a cafe in which a broken leg is laid after being fet.

Cradle, in engraving, is the name of an inftrument ufed in fcraping mezzotintos, and preparing the plate. It is formed of fteel, refembling a chifel with one floping fide, upon which are cut hollow lines very near each other, and at equal diftances. The acting part of this tool is made circular, and the corners are rounded.

rounded. After being properly tempered, it muſt be ſharpened on the whetſtone. There are various ſizes of this inſtrument.

Cradle, among ſhipwrights, a frame placed under the bottom of a ſhip, in order to conduct her ſmoothly and ſteadily into the water when ſhe is going to be launched; at which time it ſupports her weight while ſhe ſlides down the deſcent or ſloping paſſage called *the ways*, which are for this purpoſe daubed with ſoap and tallow.

CRAFT, a general name for all ſorts of veſſels employed to load or diſcharge merchant ſhips, or to carry alongſide or return the ſtores of men of war. Such are lighters, hoys, barges, prames, &c. See thoſe articles.

CRAKE, or Corn-crake. See Rallus, Ornithology *Index*.

CRAIL, or Careil, a parliament town of Scotland, ſituated on the ſea-coaſt of the county of Fife, about ſeven miles ſouth-eaſt of St Andrews. W. Long. 2. 20. N. Lat. 56. 17.

CRAMBE, Sea-cabbage, Sea-beach Kale, or Sea-colewort, a genus of plants belonging to the tetradynamia claſs, and in the natural method ranking under the 39th order, *Siliquoſæ*. See Botany *Index*.

CRAMERIA: A genus of plants belonging to the tetrandria claſs. See Botany *Index*.

CRAMOND, Over and Nether, two villages about four miles weſt of Edinburgh; of which only the laſt deſerves notice, as having been once a famous naval ſtation of the Romans. It is ſituated at the influx of the river Almond into the Forth. Three Roman roads meet at this place, which was called by them *Alaterva*, and whither they brought their grain for the ſupport of their troops. The village contains about 300 inhabitants. Here are the remains of a bath and ſudatory; and many altars, medals, &c. have been dug up.

CRAMP, a ſpaſmodic affection of the muſcles of different parts of the body, as of thoſe of the neck, arms, legs, &c. accompanied with a violent but tranſitory pain. See Medicine *Index*.

Cramp-*Fiſh*, or *Torpedo*. See Raja, Ichthyology *Index*.

Cramp-*Iron*, or *Cramps*, a piece of iron bent at each end, which ſerves to faſten together pieces of wood, ſtones, or other things.

CRAMPONEE, in *Heraldry*, an epithet given to a croſs which has at each end a cramp or ſquare piece coming from it; that from the arm in chief towards the finiſter angle, that from the arm on that ſide downwards, that from the arm in baſe towards the dexter ſide, and that from the dexter arm upwards.

CRANAGE, the liberty of uſing a crane at a wharf, and alſo the money paid for drawing up wares out of a ſhip, &c. with a crane.

CRANE. See Ardea, Ornithology *Index*.

Crane, in *Mechanics*, a machine uſed in building for raiſing large ſtones and other weights. See Mechanics.

Crane's *Bill*. See Geranium, Botany *Index*.

Crane-*Fly*, a ſpecies of Tipula. See Entomology *Index*.

CRANGANOR, a Dutch factory on the Malabar coaſt in the Eaſt Indies, ſeated in E. Long. 75. 5. N. Lat. 10. 0. See Cochin.

CRANIOLARIA: A genus of plants belonging to the didynamia claſs; and in the natural method ranking under the 40th order, *Perſonatæ*.

CRANIUM, in *Anatomy*, an aſſemblage of ſeveral bones which cover and encloſe the brain and cerebellum, popularly called the *ſkull*. See Anatomy *Index*. —The word comes from the Greek κρανιον, of κρανος, *galea*, "helmet;" becauſe it ſerves to defend the brain like a head-piece. Pezron, again, derives κρανιον, from the Celtic *cren*, becauſe of its roundneſs.

CRANK, a contrivance in machines, in manner of an elbow, only of a ſquare form, projecting out from an axis or ſpindle; and ſerving, by its rotation, to raiſe and fall the piſtons of engines for raiſing water or the like.

Crank, in ſea-language. A ſhip is ſaid to be *crankſided*, when for want of a ſufficient quantity of ballaſt or cargo, ſhe cannot bear her ſails, or can bear but ſmall ſail for fear of overſetting.—She is ſaid to be *crank by the ground*, when her floor is ſo narrow that ſhe cannot be brought on ground without danger.

Crank is alſo an iron brace which ſupports the lanthorns on the poop-quarters, &c.

CRANMER, Thomas, a celebrated archbiſhop, reformer, and martyr, was the ſon of Thomas Cranmer, Eſq. of Aſlacton in Nottinghamſhire, where our author was born in 1489. At the age of 14, he was admitted a ſtudent of Jeſus College, Cambridge, of which he afterwards became fellow; but marrying the relation of an innkeeper's wife, he loſt his fellowſhip and quitted the college. On the death of his wife he was re-admitted fellow of Jeſus College. In 1523 he took the degree of doctor of divinity, and was made theological lecturer and examiner. The plague being at Cambridge, he retired to the houſe of a relation at Waltham Abbey, where, meeting with Fox the king's almoner, and Gardiner the ſecretary, he gave his opinion concerning King Henry's marriage with Catharine much to the ſatisfaction of his majeſty. This opinion was, that inſtead of diſputing about the validity of the king's marriage with Catharine, they ſhould reduce the matter to this ſimple queſtion, "Whether a man may marry his brother's wife or not?" When the king was told of it he ſaid, "This fellow has got the right ſow by the ear." He then ſent for him to court, made him one of his chaplains, and ordered him to write in vindication of the divorce in agitation. This book having quieted the tender conſcience of the king, he was deſirous that all Europe ſhould be convinced of the illegality of his marriage with Queen Catharine; and for that purpoſe ſent Cranmer to France, Italy, and Germany, to diſpute the matter with the divines of thoſe countries. At Nuremberg Cranmer married a ſecond wife. Being returned to England, in March 1533 he was conſecrated archbiſhop of Canterbury; in May following he pronounced the ſentence of divorce between the king and queen; and ſoon after married the amorous monarch to Ann Boleyn. Being now at the head of the church, he exerted himſelf in the buſineſs of the Reformation. The Bible was tranſlated into Engliſh, and monaſteries diſſolved principally by his means.

In 1536 the royal conſcience again required the aſſiſtance of our archbiſhop: in this year he divorced the king from Ann Boleyn. In 1537 he viſited his dioceſe, and endeavoured to aboliſh the ſuperſtitious obſervation of holidays. In 1539 he and ſome of the biſhops fell under the king's diſpleaſure, becauſe they could not be brought to give their conſent in parliament that the monaſteries ſhould be ſuppreſſed for the king's ſole uſe. He alſo ſtrenuouſly oppoſed the act for the ſix articles in the houſe of lords, ſpeaking three days againſt it; and upon the paſſing of that ſtatute ſent away his wife into Germany. In 1540 he was one of the commiſſioners for inſpecting into matters of religion, and explaining ſome of its chief doctrines. The reſult of their commiſſion was the book entitled A neceſſary Erudition of any Chriſtian man. After Lord Cromwell's death (in whoſe behalf he had written to the king), he retired and lived in great privacy, meddling not at all with ſtate affairs. In 1541 he gave orders purſuant to the king's directions, for taking away ſuperſtitious ſhrines; and exchanging Biſhopſbourn for Beckeſbourn, united the latter to his dioceſe. In 1542 he procured the "Act for the advancement of true religion and the aboliſhment of the contrary," which moderated the rigour of the ſix articles. But the year following, ſome enemies preferring accuſations againſt him, he had like to have been ruined, had not the king interpoſed in his behalf. His majeſty continued afterwards to protect him from his enemies; and at his death appointed him one of the executors of his will, and one of the regents of the kingdom. In 1556 he crowned young Edward, during whoſe ſhort reign he promoted the reformation to the utmoſt of his power; and was particularly inſtrumental in compoſing, correcting, and eſtabliſhing the liturgy by act of parliament. He had alſo a ſhare in compiling the thirty-nine articles of religion.

In 1553 he oppoſed the new ſettlement of the crown upon Lady Jane Gray, and would no way be concerned in that affair (though at laſt, through many importunities, he was prevailed upon to ſet his hand to it); neither would he join in any of Dudley's ambitious projects. Upon Queen Mary's acceſſion to the throne, he was committed to the Tower; partly for ſetting his hand to the inſtrument of Lady Jane's ſucceſſion, and partly for the public offer he had made a little before of juſtifying openly the religious proceedings of the late king. Some of his friends, foreſeeing the ſtorm that was likely to fall upon him, adviſed him to fly, but he abſolutely refuſed. In the enſuing parliament, on November the 3d, he was attainted, and at Guildhall found guilty of high treaſon; whereupon the fruits of his archbiſhopric were ſequeſtered. In April 1554, he and Ridley and Latimer were removed to Oxford, in order for a public diſputation with the Papiſts; which was accordingly held there towards the middle of the month, with great noiſe, triumph, and impudent confidence on the Papiſts ſide, and with as much gravity, learning, modeſty, and convincing ſufficiency on the ſide of the Proteſtant biſhops. The 20th of April, two days after the end of theſe diſputations, Cranmer and the two others were brought before the commiſſioners, and aſked, Whether they would ſubſcribe (to Popery)? which they unanimouſly refuſing, were condemned as heretics. From this ſentence the archbiſhop appealed to the juſt judgment of the Almighty; and wrote to the council, giving them an account of the diſputation, and deſiring the queen's pardon for his treaſon, which it ſeems was not yet remitted. By the convocation which met this year, his Defence of the true and Catholic Doctrine of the Sacrament of the Body and Blood of our Saviour Chriſt was ordered to be burnt. Some of his friends petitioned the queen in his behalf; putting her in mind how he had once preſerved her in her father's time by his earneſt interceſſions with him for her, ſo that ſhe had reaſon to believe he loved her, and would ſpeak the truth to her more than all the reſt of the clergy. All endeavours in his behalf, however, were ineffectual; and the archbiſhop being degraded and moſt ignominiouſly treated, was at laſt flattered and terrified into an inſincere recantation and renunciation of the Proteſtant faith. But this triumph was not ſufficient to gratify the pious vengeance of the Romiſh Mary. On the 24th of Feb. 1556, a writ was ſigned for the burning of Cranmer; and on the 24th March, which was the fatal day, he was brought to St Mary's church, Oxford, and placed on a kind of ſtage over againſt the pulpit, where Dr Cole, provoſt of Eton, was appointed to preach a ſermon on the occaſion. While Cole was haranguing, the unfortunate Cranmer expreſſed great inward confuſion; often lifting up his hands and eyes to heaven, and frequently pouring out floods of tears. At the end of the ſermon, when Cole deſired him to make an open profeſſion of his faith, as he had promiſed him he would, he firſt prayed in the moſt fervent manner; then made an exhortation to the people preſent, not to ſet their minds upon the world, to obey the king and queen, to love each other, and to be charitable. After this he made a confeſſion of his faith, beginning with the creed, and concluding with theſe words: "And I believe every word and ſentence taught by our Saviour Jeſus Chriſt, his apoſtles, and prophets, in the Old and New Teſtament.—And now (added he) I come to the great thing that ſo much troubleth my conſcience, more than any thing I ever did or ſaid in my whole life; and that is the ſetting abroad a writing contrary to the truth, which I here now renounce as things written with my hand contrary to the truth which I thought in my heart; and written for fear of death, and to ſave my life if it might be: that is, all ſuch bills and papers which I have written or ſigned with my hand ſince my degradation, wherein I have written many things untrue. And foraſmuch as my hand offended, writing contrary to my heart, my hand ſhall firſt be puniſhed; for, may I come to the fire, it ſhall be firſt burned. As for the pope, I refuſe him as Chriſt's enemy and antichriſt, with all his falſe doctrine. And as for the ſacrament, I believe as I have taught in my book againſt the biſhop of Wincheſter." Thunderſtruck as it were with this unexpected declaration, the enraged Popiſh crowd admoniſhed him not to diſſemble. "Ah! (replied he with tears) ſince I lived hitherto, I have been a hater of falſehood and a lover of ſimplicity, and never before this time have I diſſembled." Whereupon they pulled him off the ſtage with the utmoſt fury, and hurried him to the place of his martyrdom over againſt Baliol college; where he put off his clothes in haſte, and ſtanding in his ſhirt, and without ſhoes, was faſtened with a chain to the ſtake. Some preſſing him to agree to his former recantation, he he anſwered, ſhowing his hand, "This is the hand that wrote it, and therefore it ſhall firſt ſuffer puniſhment." Fire being applied to him, he ſtretched out his right hand into the flame, and held it there unmoved (except that once with it he wiped his face) till it was conſumed; crying with a loud voice, "This hand hath offended;" and often repeating, "This unworthy right hand." At laſt the fire getting up, he ſoon expired, never ſtirring or crying out all the while; only keeping his eyes fixed to heaven, and repeating more than once, "Lord Jeſus receive my ſpirit." Such was the end of the renowned Thomas Cranmer, in the 67th year of his age.

It was noticed above, that after the paſſing of the act for the ſix articles, Archbiſhop Cranmer ſent his wife into Germany. But ſhe afterwards returned again to England; and Mr Strype informs us that "in the time of King Edward, when the marriage of the clergy was allowed, he brought her forth, and lived openly with her." Mr Gilpin ſays, "he left behind him a widow and children; but as he always kept his family in obſcurity for prudential reaſons, we know little about them. They had been kindly provided for by Henry VIII.; who, without any ſolicitation from the primate himſelf, gave him a conſiderable grant from the abbey of Walbeck in Nottinghamſhire, which his family enjoyed after his deceaſe. King Edward made ſome addition to his private fortune; and his heirs were reſtored in blood by an act of parliament in the reign of Elizabeth.

Archbiſhop Cranmer wrote a great number of books: many of them he publiſhed himſelf; and many of them ſtill remain in MSS. viz. two folio volumes in the king's library, ſeveral letters in the Cotton collection, &c.

Mr Gilpin remarks, That "the character of the archbiſhop hath been equally the ſubject of exaggerated praiſe and of undeſerved cenſure. The moſt indefenſible parts of the archbiſhop's character are the readineſs with which he ſometimes concurred in the unjuſtifiable proceedings of Henry VIII. and the inſtances wherein he ſhowed himſelf to be actuated by intolerant principles.

"He firſt recommended himſelf to Henry by the zeal which he diſplayed in promoting the king's divorce from Queen Catharine. As to this, it may be allowed, that Dr Cranmer might think the marriage wrong: but though it poſſibly might be a point of conſcience with the king, it could however be none with him; and there was manifeſtly a difference between adviſing not to do a thing, and adviſing to undo it when already done, at leaſt in a matter of ſo diſputable a nature. On the other hand, to repudiate a woman with whom the king had cohabited near 20 years as his wife, and to illegitimate a daughter, bred up in the higheſt expectations, and now marriageable, were acts of ſuch cruelty, that it ſeems to indicate a want of feeling to be in any degree acceſſary to them. To this may be added, that the notoriety of the king's paſſion for Ann Boleyn, which all men believed to be, if not the firſt mover, at leaſt the principal ſpring of his pretended ſcruples, threw a very indelicate imputation on all who had any concern in the affair. No ſerious churchman, one would imagine, could be fond of the idea of adminiſtering to the king's paſſions. It is with concern, therefore, that we ſee a man of Dr Cranmer's integrity and ſimplicity of manners acting ſo much out of character as to compound an affair of this kind, if not with his conſcience, at leaſt with all delicacy of ſentiment; and to parade through Europe, in the quality of an ambaſſador, defending everywhere the king's *pious intentions*. But the cauſe (continues Mr Gilpin) animated him. With the illegality of the king's marriage, he endeavoured virtually to eſtabliſh the inſufficiency of the pope's diſpenſation; and the latter was an argument ſo near his heart, that it ſeems to have added merit to the former. We cannot indeed account for his embarking ſo zealouſly in this buſineſs without ſuppoſing his principal motive was to free his country from the tyranny of Rome, to which this ſtep very evidently led. So deſirable an end would in ſome degree, he might imagine, ſanctify the means."

Of two of the inſtances of perſecution in which Archbiſhop Cranmer was concerned, Mr Gilpin gives the following account. "Joan Bocher and George Paris were accuſed, though at different times; one for denying the humanity of Chriſt, the other for denying his divinity. They were both tried and condemned to the ſtake; and the archbiſhop not only conſented to theſe acts of blood, but even perſuaded the averſion of the young king into a compliance. 'Your majeſty muſt diſtinguiſh (ſaid he, informing his royal pupil's conſcience) between common opinions and ſuch as are the eſſential articles of faith. Theſe latter we muſt on no account ſuffer to be oppoſed." Mr Gilpin juſtly obſerves, that "nothing even plauſible can be ſuggeſted in defence of the archbiſhop on this occaſion, except only that the ſpirit of Popery was not yet wholly repreſſed." Theſe inſtances of injuſtice and barbarity were indeed totally indefenſible, and a great diſgrace to Cranmer and to all who were concerned in them. It does not appear that he endeavoured to promote the death of Lambert; but, as Mr Gilpin obſerves, it were to be wiſhed he had rid his hand of the diſputation likewiſe. The public diſputation, in which Cranmer bore ſome part, proved the means of bringing Lambert to the ſtake.

One of the moſt honourable tranſactions of Archbiſhop Cranmer's life, was the firm ſtand that he made againſt the act of the ſix articles. This act was ſo ſtrongly ſupported by the king, that even the Proteſtants in parliament made little oppoſition to it. But Cranmer oppoſed it with great zeal and ſteadineſs. "The good archbiſhop (ſays Mr Gilpin) never appeared in a more truly Chriſtian light than on this occaſion. In the midſt of ſo general a defection (for there were numbers in the houſe who had hitherto ſhown great forwardneſs in reformation) he alone made a ſtand. Three days he maintained his ground, and baffled the arguments of all oppoſers. But argument was not their weapon, and the archbiſhop ſaw himſelf obliged to ſink under ſuperior power. Henry ordered him to leave the houſe. The primate refuſed: "It was God's buſineſs (he ſaid), and not man's. And when he could do no more, he boldly entered his proteſt. Such an inſtance of fortitude is ſufficient to wipe off many of thoſe courtly ſtains which have faſtened on his memory."

His behaviour in the cauſe of the duke of Norfolk was alſo entitled to great commendation. "The laſt act

Cranmer. act of this reign (says Mr Gilpin) was an act of blood, and gave the archbishop a noble opportunity of showing how well he had learned that great Christian lesson of forgiving an enemy. Almost without the shadow of justice, Henry had given directions to have the duke of Norfolk attainted by an act of parliament. The king's mandate stood in lieu of guilt, and the bill passed the house with great ease. No man, except the bishop of Winchester, had been so great an enemy to the archbishop as the duke of Norfolk. He had always thwarted the primate's measures, and oftener than once had practised against his life. How many would have seen with secret pleasure the workings of Providence against so rancorous an enemy; satisfied in having themselves no hand in his unjust fate! But the archbishop saw the affair in another light: he saw it with horror; and although the king had in a particular manner interested himself in this business, the primate opposed the bill with all his might; and when his opposition was vain, he left the house with indignation, and retired to Croydon."

He was indeed remarkable for the placability of his temper, and for showing kindness to those by whom he had been greatly injured. Hence it is mentioned in Shakespeare's Henry VIII. as a common saying concerning him:

———" Do my lord of Canterbury
But one shrewd turn, and he's your friend for ever."

Archbishop Cranmer was a great friend and patron of learned foreigners, who had been persecuted for their attachment to the principles of the reformation. Mr Gilpin says, " the suffering professors of Protestantism, who were scattered in great numbers about the various countries of Europe, were always sure of an asylum with him. His palace at Lambeth might be called a seminary of learned men; the greater part of whom persecution had driven from home. Here, among other celebrated reformers, Martyr, Bucer, Aless, Phage, found sanctuary. Martyr, Bucer, and Phage, were liberally pensioned by the archbishop till he could otherwise provide for them. It was his wish to fix them in the two universities, where he hoped their great knowledge and spirit of inquiry would forward his designs of restoring learning; and he at length obtained professorships for them all. Bucer and Phage were settled at Cambridge; where they only showed what might have been expected from them, both dying within a few months after their arrival. But at Oxford Martyr acted a very conspicuous part, and contributed to introduce among the students there a very liberal mode of thinking.

Of the learning of Archbishop Cranmer, Mr Gilpin remarks, that " it was chiefly confined to his profession. He had applied himself in Cambridge to the study of the Greek and Hebrew languages; which though esteemed at that time as the mark of heresy, appeared to him the only sources of attaining a critical knowledge of the Scriptures. He had so accurately studied canon law, that he was esteemed the best canonist in England; and his reading in theology was so extensive, and his collections from the Fathers so very voluminous, that there were few points in which he was not accurately informed, and in which he could not give the opinions of the several ages of the church from the times of the apostles. He was a sensible writer, rather nervous than elegant. His writings were entirely confined to the great controversy which then subsisted, and contain the whole sum of the theological learning of those times. His library was filled with a very noble collection of books, and was open to all men of letters.

Mr Gilpin, after remarking that Archbishop Cranmer preached often wherever he visited, says, " In his sermons to the people he was very plain and instructive; insisting chiefly on the essentials of Christianity. The subjects of his sermons, for the most part, were from whence salvation is to be fetched, and on whom the confidence of man ought to lean. They insisted much on doctrines of faith and works; and taught what the fruits of faith were, and what place was to be given to works; they instructed men in the duties they owed their neighbour, and that every one was our neighbour, to whom we might any way do good; they declared what men ought to think of themselves after they had done all; and, lastly, what promises Christ hath made, and who they are to whom he will make them good. Thus he brought in the true preaching of the gospel, altogether different from the ordinary way of preaching in those days; which was to treat concerning saints, to tell legendary tales of them, and to report miracles wrought for the confirmation of transubstantiation and other popish corruptions. And such a heat of conviction accompanied his sermons, that the people departed from them with minds possessed of a great hatred of vice, and burning with a desire of virtue."

He was a great economist of his time. Mr Gilpin says, " he rose commonly at five o'clock and continued in his study till nine. These early hours, he would say, were the only hours he could call his own. After breakfast he generally spent the remainder of the morning either in public or private business. His chapel-hour was eleven, and his dinner-hour twelve. After dinner he spent an hour either in conversation with his friends, in playing at chess, or in, what he liked better, overlooking a chess-board. He then retired again to his study till his chapel-bell rang at five. After prayers, he generally walked till six, which was in those times the hour of supper. His evening meal was sparing. Often he ate nothing; and when that was the case, it was his usual custom, as he sat down to table, to draw on a pair of gloves; which was as much as to say, that his hands had nothing to do. After supper, he spent an hour in walking and another in his study, retiring to his bedchamber about nine. This was his usual mode of living when he was most vacant, but very often his afternoons as well as his mornings were engaged in business. He generally, however, contrived, if possible, even in the busiest day, to devote some portion of his time to his books besides the morning. And Mr Fox tells us, he always accustomed himself to read and write in a standing posture; esteeming constant sitting very pernicious to a studious man."

Mr Gilpin also observes, " that he was a very amiable master in his family, and admirably preserved the difficult medium between indulgence and restraint. He had, according to the custom of the times, a very numerous retinue, among whom the most exact order was

was obferved. Every week the fteward of his houfehold held a kind of court in the great hall of his palace; in which all family affairs were fettled, fervants wages were paid, complaints were heard, and faults examined. Delinquents were publicly rebuked, and after the third admonition difcharged. His hofpitality and charities were great and noble; equal to his ftation, greater often than his abilities. A plentiful table was among the virtues of thofe days. His was always bountifully covered. In an upper room was fpread his own, where he feldom wanted company of the firft diftinction. Here a great many learned foreigners were daily entertained, and partook of his bounty. In his great hall a long table was plentifully covered every day for guefts and ftrangers of a lower rank: at the upper end of which were three fmaller tables, defigned for his own officers and inferior gentlemen. Among other inftances of the archbifhop's charity, we have one recorded which was truly noble. After the deftruction of monafteries, and before hofpitals were erected, the nation faw no fpecies of greater mifery than that of wounded and difbanded foldiers. For the ufe of fuch miferable objects as were landed on the fouthern coafts of the ifland, the archbifhop fitted up his manor-houfe of Beckefbourn in Kent. He formed it indeed into a complete hofpital; appointing a phyfician, a furgeon, nurfes, and every thing proper, as well for food as phyfic. Nor did his charity ftop here. Each man, on his recovery, was furnifhed with money to carry him home, in proportion to the diftance of his abode."

To conclude with the character given by Mr Hume; "Archbifhop Cranmer was undoubtedly a man of merit; poffeffed of learning and capacity; and adorned with candour, fincerity, and beneficence, and all thofe virtues which were fitted to render him ufeful and amiable in fociety. His moral qualities procured him univerfal refpect; and the courage of his martyrdom, though he fell fhort of the rigid inflexibility obferved in many, made him the hero of the Proteftant party."

CRANNY, in glafs-making, an iron inftrument wherewith the necks of glaffes are formed.

CRANTARA, among the ancient Britons, was a fort of military fignal ufed for collecting the diftant and fcattered warriors to the ftandard of their chief. A prince having immediate occafion for the affiftance of his followers to repel fome fudden invafion or engage in fome expedition, befides ftriking the fhield and founding the horn to give warning to thofe who were within hearing, he fent the crantara, or a ftick burnt at the end and dipped in the blood of a goat, by a fwift meffenger, to the neareft hamlet, where he delivered it without faying one word but the name of the place of rendezvous. This crantara, which was well underftood to denounce deftruction by fire and fword to all who did not obey this fummons, was carried with great rapidity from village to village; and the prince in a little time found himfelf furrounded by all his warriors ready to obey his commands.

CRANTOR, a Greek philofopher and poet, was born at Solos in Cilicia. He left his native country where he was admired; went to Athens, and there ftudied with Polemon under Xenocrates. He was confidered as one of the chief fupporters of the Platonic fect; and was the firft who wrote commentaries upon Plato's works. He flourifhed 270 years before Chrift.

CRAPE, a light tranfparent ftuff, in manner of gauze: made of raw filk gummed and twifted on the mill; woven without croffing, and much ufed in mourning.

Crapes are either craped, i. e. crifped, or fmooth; the firft double, expreffing a clofer mourning; the latter fingle, ufed for that lefs deep. Note, White is referved for young people, or thofe devoted to virginity. The filk deftined for the firft is more twifted than that for the fecond; it being the greater or lefs degree of twifting, efpecially of the warp, which produces the crifping given it when taken out of the loom, fteeped in clear water, and rubbed with a piece of wax for the purpofe.

Crapes are all dyed raw. The invention of this ftuff came originally from Bologna: but the chief manufacture of it is faid to be at Lyons.

Hiftory tells us, that St Bathilda, queen of France, made fine crape (*crepa*) of gold and filver, to lay over the body of St Eloy. The Bollandifts own they cannot find what this *crepa* was. Binet fays, it was a frame to cover the body of the faint: but others, with reafon, take it to be a tranfparent ftuff, through which the body might be feen; and that this was the *crepa* whence our word crape was formed.

CRAPULA, among phyficians, a term for SURFEIT.

CRASHAW, RICHARD, who was in his lifetime honoured with the friendfhip of Cowley, and fince his death by the praife of Mr Pope, who condefcended both to read his poems and to borrow from them, was the fon of William Crafhaw, an eminent divine, and educated at the Charter-houfe near London. He was then fent to Pembroke hall in Cambridge, and was afterwards of Peter-houfe, where he was fellow; in both which colleges he was diftinguifhed for his Latin and Englifh poetry. Afterwards he was ejected from his fellowfhip, together with many others, for denying the covenant in the time of the rebellion; and he changed his religion, being by catholic artifices perverted to the church of Rome; not *converted*, but rather, as Pope fays, *outwitted*. He went to Paris, in hopes of recommending himfelf to fome preferment there; but being a mere fcholar, was incapable of executing the new plan he had formed. There he fell into great diftrefs, which Cowley the poet hearing of in 1646, very kindly fought him out, gave him all the affiftance he could, and at laft got him recommended to Henrietta Maria queen of England, then refiding at Paris. Obtaining from her letters of recommendation, he travelled into Italy; and by virtue of thofe letters became fecretary to a cardinal at Rome, and at laft one of the canons or chaplains of the rich church of our lady at Loretto, fome miles diftance from thence, where he died and was buried about 1650. Before he left England he wrote certain poems, entitled, "Steps to the Temple:" "becaufe (fays Wood) he led his life in the temple of God, in St Mary's church near to his college. There, as we learn from the preface to thefe poems, he lodged under Tertullian's roof of angels. There he made his neft more gladly than David's fwallow near the houfe of God; where, like

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a primitive faint, he offered more prayers in the night than others ufually offer in the day. There he penned the faid poems called "Steps to the Temple for Happy Souls to Climb to Heaven by." To the faid Steps are joined other poems called "The Delight of the Mufes," wherein are feveral Latin poems: which though of a mere human mixture, yet they are fweet as they are innocent. He hath alfo written *Carmen Deo noftro*, being hymns and other facred poems, addreffed to the countefs of Denbigh. He was excellent in five languages befides his mother tongue, namely, Hebrew, Greek, Latin, Italian, and Spanifh.

CRASIS (from κεραννυμι, "to mix"), the temper of the blood peculiar to every conftitution.

Crasis, in *Grammar*, is a figure whereby two different letters are either contracted into one long letter or a diphthong. Such, e. g. is οφις for οφιας; αληθη for αληθεα, &c. τυχυς for τυχεος, &c. where ι and α are contracted into ι; and ε and α into η; and ε and ο into ου.

CRASSAMENTUM, in *Phyfic*, the thick red or fibrous part of the blood, otherwife called *cruor*, in contradiftinction to the ferum or aqueous part.

CRASSULA, lesser orpine, or *Live-ever:* A genus of plants, belonging to the pentandria clafs; and in the natural method ranking under the 13th order, *Succulentæ*. See Botany *Index*.

CRASSUS, M. Licinius, a celebrated Roman, furnamed *Rich* on account of his opulence. At firft he was very circumfcribed in his circumftances, but by educating flaves and felling them at a high price he foon enriched himfelf. The cruelties of Cinna obliged him to leave Rome, and he retired to Spain, where he remained concealed for eight months. After Cinna's death he paffed into Africa, and thence to Italy, where he ferved Sylla and ingratiated himfelf in his favour. When the gladiators with Spartacus at their head had fpread an univerfal alarm in Italy and defeated fome of the Roman generals, Craffus was fent againft them. A battle was fought, in which Craffus flaughtered 12,000 of the flaves, and by this decifive blow foon put an end to the war, and was honoured with an *ovatio* at his return. He was foon after made conful with Pompey in the year of Rome 682, and in this high office he difplayed his opulence by entertaining the populace at 10,000 tables. He was afterwards cenfor, and formed the firft triumvirate with Pompey and Cæfar. As his love of riches was more predominant than that of glory, Craffus never imitated the ambitious conduct of his colleagues, but was fatisfied with the province of Syria, which feemed to promife an inexhauftible fource of wealth. With hopes of enlarging his poffeffions he fet off from Rome, though the omens proved unfavourable, and every thing feemed to threaten his ruin. He croffed the Euphrates, and forgetful of the rich cities of Babylon and Seleucia, he haftened to make himfelf mafter of Parthia. He was betrayed in his march by the delay of Artavafdes king of Armenia, and the perfidy of Ariamnes. He was met in a large plain by Surena the general of the forces of Orodes king of Parthia, and a battle was fought in which 20,000 Romans were killed and 10 000 taken prifoners. The darknefs of the night favoured the efcape of the reft; and Craffus, forced by the mutiny and turbulence of his foldiers, and the treachery of his guides, trufted himfelf to the general of the enemy on pretence of propofing terms of accommodation, and he was killed. His head was cut off and fent to Orodes, who poured melted gold down his throat, and infulted his misfortunes. Though he has been called avaricious, yet he fhowed himfelf always ready of lending money to his friends without intereft. He was fond of philofophy, and his knowledge of hiftory was great and extenfive.

CRATÆGUS, wild-service tree, *Hawthorn*, &c. A genus of plants, belonging to the icofandria clafs; and in the natural method ranking under the 36th order, *Pomaceæ*. See Botany *Index*.

The oxycanthus, hawthorn, or white thorn, grows naturally all over Europe. It is fometimes cultivated as an ornamental tree, but it is chiefly propagated for the purpofe of planting as a fence. In order to propagate a quantity of quick, one method is generally practifed; namely, firft burying the haws, and taking them up to fow the October following; though, fays Hanbury, there is another way more preferable; namely, to prepare the beds, and fow the haws foon after they are gathered. Whoever purfues the former method, having gathered what quantity of haws will anfwer his purpofe, fhould in fome bye-corner of the kitchen-garden or nurfery dig a hole or pit capacious enough to receive them; fome of the earth which came out of the hole, after the haws are put in it, fhould be laid upon them; and being thus carefully covered down, they may remain there till October. Then, having ground well dug, and cleared of the roots of all troublefome weeds, and the mould being fit for working, the beds fhould be made for the haws. Four feet is a very good width of thefe beds, as they may be eafily reached over to be weeded; and if the alleys between be each one foot and a half wide, they will be of a good fize. The beds being marked out with a line, fufficient mould muft be raked out to cover the haws an inch and a half deep. This being done, and the bottom of the beds being made level and even the haws fhould be fown, and afterwards gently tapped down with the back of the fpade; and then the fine mould, which had been raked out of the beds, muft be thrown over them, covering them an inch and a half deep. In the fpring the plants will come up, and in the fummer following fhould be kept clear of weeds; though it does fometimes happen, that few of them will appear till the fecond fpring after fowing. Sometimes the young plants are planted out from the feed-beds at one, two, or three years old; but the beft plants are obtained by tranfplanting them into frefh mould the firft or fecond year, letting them remain in the nurfery two or three years longer. The practice of the London nurferymen is this: The ftrongeft of the feed-bed plants having been drawn at two or three years old for fale, they clear the beds entirely by drawing the remaining weak underling plants, and tranfplanting them into frefh beds in this manner, which they call *bedding them:* The ground having been trenched, and the tips of the plants as well as the lower fibres of their roots having been taken off with a fharp knife, they ftrain a line along one fide of the bed; and by chopping with a fpade by the fide of the line, leave a clift or drill of a depth proportioned to the length of the plants to be laid in; and drawing the loofe mould fomewhat towards them, leave the fide of the drill next to to the line with a ſmooth poliſhed face. Againſt this face the plants are ſet up, leaning towards the line, about three inches aſunder, leaving their heads about an inch above the mould, and placing their roots at ſuch a depth as to bury their ſtems from two to three inches deeper than they ſtood in the ſeed-bed. The looſe mould being returned and preſſed gently to the roots with the foot, the line is removed, and another row planted in the ſame manner about a foot from the firſt.

CRATCHES, in the manege, a ſwelling on the paſtern, under the fetlock, and ſometimes under the hoof; for which reaſon it is diſtinguiſhed into the ſinew cratches, which affect the ſinew, and thoſe upon the coronet, called *quitter-bones*.

CRATER, Cup, in *Aſtronomy*, a conſtellation of the ſouthern hemiſphere; whoſe ſtars, in Ptolemy's catalogue, are ſeven; in Tycho's, eight; in Hevelius's ten; in the Britannic catalogue, thirty-one.

Crater is alſo uſed to ſignify the mouth or opening of a volcano or burning mountain, from whence the fire is diſcharged. See Volcano.

CRATES, of Thebes, a famous philoſopher, was the diſciple of Diogenes the Cynic. It is ſaid that he threw all his money into the ſea, that he might the more freely apply himſelf to the ſtudy of philoſophy. Others aſſert that he placed it into another perſon's hands, with orders to give it to his children if they ſhould happen to be fools: For (ſaid Crates), if they ſhould be philoſophers, they will have no need of it: in which caſe it was to be given to the people. He flouriſhed about 328 years before Chriſt.

He ought not to be confounded with Crates, a famous Academic philoſopher, the diſciple and friend of Polemon. This laſt Crates had Arceſilaus and other celebrated philoſophers for his diſciples; and flouriſhed about 300 years before Chriſt.

CRATEVA, the garlic pear: A genus of plants belonging to the dodecandria claſs; and in the natural method ranking under the 25th order, *Putamineæ*. See Botany *Index*.

CRATINUS, an ancient comic poet, of whom we ſhould ſcarcely have known any thing, had not Quintilian, Horace, and Perſius, mentioned him, Eupolis, and Ariſtophanes, as the great maſters of what we call the ancient comedy. It is gathered that he died in the 87th Olympiad. Suidas tells us that he wrote 21 plays, and that he was ſplendid and bright in his characters.

CRATIPPUS, a celebrated Peripatetic philoſopher, was a native of Mitylene, where he taught philoſophy: but at length went to Athens, where Brutus and the ſon of Cicero were his diſciples. Pompey went to ſee him after the battle of Pharſalia, and propoſed to him his difficulties in relation to the belief of a Providence; when Cratippus comforted him, and by forcible arguments anſwered his objections. He wrote ſome pieces about divination: and is ſuppoſed to be the ſame with him whom Tertullian, in his book *De Anima*, has ranked among the writers upon dreams.

CRATO, a ſmall town of Portugal, in the province of Alentejo, with a rich priory. It is the chief commandery which the knights of Malta have in Portugal. W. Long. 8. 12. N. Lat. 38. 50.

CRAVEN, a town of France, in Burgundy, remarkable for its good wine, and for a battle fought there between the Engliſh and French. It is ſeated near the confluence of the rivers Cure and Yonne. E. Long. 3. 30. N. Lat. 47. 42.

CRAVEN, or Cravent, a word of reproach, uſed in trials by battel. See Battel.

CRAX, the *curaſſou*, a genus of birds, belonging to the order of gallinæ. See Ornithology *Index*.

CRAY-fish, or *Craw-Fiſh*. See Cancer, Entomology *Index*.

CRAYER, Caspar de, a celebrated painter, was born at Antwerp in 1585, and was a diſciple of Raphael Coxis, the ſon of that Coxis who had ſtudied under Raphael; but he ſoon ſhowed ſuch proofs of genius, and of an elevated capacity, that he far ſurpaſſed his maſter. Afterwards he made judicious obſervations on the particular excellencies of the moſt renowned maſters to which he had any acceſs; and taking nature for his conſtant director and guide, he formed for himſelf a manner that was exceedingly pleaſing. The firſt work which eſtabliſhed him in the favour of the court at Bruſſels, was a portrait of Cardinal Ferdinand, brother to the king of Spain, which he painted at full length, and as large as life. In that picture he ſucceeded ſo happily, that it was ſent to Madrid, and received there with ſuch concurrent approbation of the king and the whole court, that it laid the foundation of the fame and fortune of Crayer. For the king, as an acknowledgment of the painter's merit, ſent him a gold chain with a medal; and added, as a farther inſtance of his favour, an appointment for a conſiderable penſion. But nothing places the talents of Crayer in a ſtronger light, than the teſtimony of ſo excellent an artiſt as Rubens. That great man went to Antwerp particularly to viſit Crayer, and to ſee his work; and after examining attentively a picture of his painting, in the refectory of the abbey of Afflegem, he publicly declared that no painter could ſurpaſs Crayer. Nor was this maſter leſs diſtinguiſhed by Vandyck, who always expreſſed a real eſteem and friendſhip for him, and painted his portrait. He had ſomewhat leſs fire in his compoſitions than Rubens, but his deſign is frequently more correct. His compoſitions generally conſiſted of a ſmall number of figures; and with diſcreet judgment, he avoided the encumbering his deſign with ſuperfluous particulars, or loading his ſubject with any thing that ſeemed not to contribute to its elegance or probability. He grouped his figures with ſingular ſkill, and his expreſſions have all the truth of nature. There is a remarkable variety in his draperies, and an equal degree of ſimplicity in their folds; and as to his colouring, it is admirable. Of all his cotemporary painters, he was accounted to approach neareſt to Vandyck, not only in hiſtory but in portrait. He principally painted religious ſubjects, and was continually at work; and although he lived to a great age, yet his temperance and conſtant regularity preſerved to him the full uſe of all his faculties; and to the laſt month of his life his pencil retained the ſame force and freedom which it poſſeſſed in his moſt vigorous time. The ſubject of that picture which was ſo honoured by the approbation of Rubens is the Centurion alighting from his horſe to proſtrate himſelf at the feet of our Saviour. It is a capital deſign of Crayer; and although it conſiſts of a great number of figures, the harmony and union are well preſerved.

CRAYON, a general name for all coloured ſtones, earths, or other minerals and ſubſtances, uſed in deſigning or painting in paſtel; whether they have been beaten and reduced to a paſte, or are uſed in their primitive conſiſtence, after ſawing or cutting them into long narrow ſlips. In this laſt manner are red crayons made, of blood-ſtone or red chalk; black ones, of charcoal and black lead. Crayons of all other colours are compoſitions of earths reduced to paſte.

Crayon-Painting. Whether the painter works with oil colours, water-colours, or crayons, the grand object of his purſuit is ſtill the ſame: a juſt imitation of nature. But each ſpecies has its peculiar rules and methods. Painting with crayons requires in many reſpects a treatment different from painting in oil-colours; becauſe all colours uſed dry are in their nature of a much warmer complexion than when wet with oils, &c. For this reaſon, in order to produce a rich picture, a much greater portion of what painters term *cooling teints* muſt be applied in crayon painting than would be judicious to uſe in oils. Without any danger of a miſtake, it is to be ſuppoſed, the not being acquainted with this obſervation is one great cauſe why ſo many oil painters have no better ſucceſs when they attempt crayon-painting. On the contrary, crayon painters being ſo much uſed to thoſe teints which are of a cold nature when uſed wet, are apt to introduce them too much when they paint with oils, which is ſeldom productive of a good effect.

We ſhall now endeavour to give the ſtudents ſome directions towards the attainment of excellence in this art.

Of the Application of the Crayons, with ſome previous Diſpoſitions. The ſtudent muſt provide himſelf with ſome ſtrong blue paper, the thicker the better, if the grain is not too coarſe or knotty, though it is almoſt impoſſible to get any entirely free from knots. The knots ſhould be levelled with a penknife or razor, otherwiſe they will prove exceedingly troubleſome. After this is done, the paper muſt be paſted very ſmooth on a linen cloth, previouſly ſtrained on a deal frame, the ſize according to the artiſt's pleaſure: on this the picture is to be executed; but it is moſt eligible not to paſte the paper on till the whole ſubject is firſt dead coloured. The method of doing this is very eaſy, by laying the paper with the dead-colour on its face, upon a ſmooth board or table, when, by means of a bruſh, the back ſide of the paper muſt be covered with paſte; the frame, with the ſtrained cloth, muſt then be laid on the paſted ſide of the paper; after which turn the painted ſide uppermoſt, and lay a piece of clean paper upon it, to prevent ſmearing it: this being done, it may be ſtroked gently over with the hand; by which means all the air between the cloth and the paper will be forced out.

When the paſte is perfectly dry, the ſtudent may proceed with the painting. The advantages ariſing from paſting the paper on the frame according to this method, after the picture is begun, are very great, as the crayons will adhere much better than any other way; which will enable the ſtudent to finiſh the picture with a firmer body of colour and greater luſtre.

When the painters want to make a very correct copy of a picture, they generally make uſe of tiffany or black gauze, ſtrained tight on a frame, which they lay flat on the ſubject to be imitated, and with a piece of ſketching chalk trace all the outlines on the tiffany. They then lay the canvas to be painted on flat upon the floor, placing the tiffany with the chalked lines upon it, and with an handkerchief bruſh the whole over; this preſents the exact outlines of the picture on the canvas. The crayon-painter may alſo make uſe of this method when the ſubject of his imitation is in oils; but in copying a crayon-picture, he muſt have recourſe to the following method, on account of the glaſs.

The picture being placed upon the eaſel, let the outlines be drawn on the glaſs with a ſmall camel's hair pencil dipped in lake, ground thin with oils, which muſt be done with great exactneſs. After this is accompliſhed, take a ſheet of paper of the ſame ſize and place it on the glaſs, ſtroking over all the lines with the hand, by which means the colour will adhere to the paper, which muſt be pierced with pin-holes pretty cloſe to each other. The paper intended to be uſed for the painting muſt next be laid upon a table, and the pierced paper placed upon it; then with ſome fine-pounded charcoal, tied up in a piece of lawn, rub over the pierced lines, which will give an exact outline; but great care muſt be taken not to bruſh this off till the whole is drawn over with ſketching chalk, which is a compoſition made of whiting and tobacco-pipe clay, rolled like the crayons, and pointed at each end.

When a ſtudent paints immediately from the life, it will be moſt prudent to make a correct drawing of the outlines on another paper, the ſize of the picture he is going to paint, which he may trace by the preceding method, becauſe erroneous ſtrokes of the ſketching chalk (which are not to be avoided without great expertneſs) will prevent the crayons from adhering to the paper, owing to a certain greaſy quality in the compoſition.

The ſtudent will find the ſitting poſture, with the box of crayons in his lap, the moſt convenient method for him to paint. The part of the picture he is immediately painting ſhould be rather below his face; for, if it is placed too high, the arm will be fatigued. Let the windows of the room where he paints be darkened, at leaſt to the height of ſix feet from the ground; and the ſubject to be painted ſhould be ſituated in ſuch a manner, that the light may fall with every advantage on the face, avoiding too much ſhadow, which ſeldom has a good effect in portrait painting, eſpecially if the face he paints from has any degree of delicacy.

Before he begins to paint, let him be attentive to his ſubject, and appropriate the action or attitude proper to the age of the ſubject: if a child, let it be childiſh; if a young lady, expreſs more vivacity than in the majeſtic beauty of a middle-aged woman, who alſo ſhould not be expreſſed with the ſame gravity as a perſon far advanced in years. Let the embelliſhments of the picture, and introduction of birds, animals, &c. be regulated by the rules of propriety and conſiſtency.

The features of the face being correctly drawn with chalks,

chalks, let the ſtudent take a crayon of pure carmine, and carefully draw the noſtril and edge of the noſe next the ſhadow; then, with the fainteſt carmine teint, lay in the higheſt light upon the noſe and forehead, which muſt be executed broad. He is then to proceed gradually with the ſecond teint, and the ſucceeding ones, till he arrives at the ſhadows, which muſt be covered brilliant, enriched with much lake, carmine, and deep green. This method will at firſt offenſively ſtrike the eye, from its crude appearance; but in the finiſhing, it will be a good foundation to produce a pleaſing effect, colours being much more eaſily ſullied when too bright than when the firſt colouring is dull, to raiſe the picture into a brilliant ſtate. The ſeveral pearly teints diſcernible in fine complexions muſt be imitated with blue verditer and white, which anſwers to the ultramarine teints uſed in oils. But if the parts of the face where theſe teints appear are in ſhadow, the crayons compoſed of black and white muſt be ſubſtituted in their place.

Though all the face when firſt coloured ſhould be laid in as brilliant as poſſible, yet each part ſhould be kept in its proper tone; by which means the rotundity of the face will be preſerved.

Let the ſtudent be careful, when he begins the eyes, to draw them with a crayon inclined to the carmine teint, of whatever colour the iriſes are of; he muſt lay them in brilliant, and at firſt not loaded with colour, but executed lightly: no notice is to be taken of the pupil yet. The ſtudent muſt let the light of the eye incline very much to the blue caſt, cautiouſly avoiding a ſtaring white appearance (which, when once introduced, is ſeldom overcome), preſerving a broad ſhadow thrown on its upper part by the eyelaſh. A black and heavy teint is alſo to be avoided in the eyebrows; it is therefore beſt to execute them like a broad glowing ſhadow at firſt, on which, in the finiſhing, the hairs of the brow are to be painted; by which method of proceeding, the former teints will ſhow themſelves through, and produce the moſt pleaſing effect.

The ſtudent ſhould begin the lips with pure carmine and lake, and in the ſhadow uſe ſome carmine and black; the ſtrong vermilion teints ſhould be laid on afterwards. He muſt beware of executing them with ſtiff, harſh lines, gently intermixing each with the neighbouring colours, making the ſhadow beneath broad, and enriched with brilliant crayons. He muſt form the corner of the mouth with carmine, brown ochre, and greens, variouſly intermixed. If the hair is dark, he ſhould preſerve much of the lake and deep carmine teints therein; this may eaſily be overpowered by the warmer hair-teints, which, as obſerved in painting the eyebrows, will produce a richer effect when the picture is finiſhed; on the contrary, if this method is unknown or neglected, a poverty of colouring will be diſcernible.

After the ſtudent has covered over, or, as artiſts term it, has dead-coloured the head, he is to ſweeten the whole together, by rubbing it over with his finger, beginning at the ſtrongeſt light upon the forehead, paſſing his finger very lightly, and uniting it with the next teint, which he muſt continue till the whole is ſweetened together, often wiping his finger on a towel to prevent the colours being ſullied. He muſt be cautious not to ſmooth or ſweeten his picture too often, becauſe it will give riſe to a thin and ſcanty effect, and have more the appearance of a drawing than a ſolid painting; as nothing but a body of rich colours can conſtitute a rich effect. To avoid this (as the ſtudent finds it neceſſary to ſweeten with the finger), he muſt commonly repleniſh the picture with more crayon.

When the head is brought to ſome degree of forwardneſs, let the back-ground be laid in, which muſt be treated in a different manner, covering it as thin as poſſible, and rubbing it into the paper with a leather ſtump. Near the face the paper ſhould be almoſt free from colour, for this will do great ſervice to the head, and by its thinneſs give both a ſoft and ſolid appearance. In the back ground alſo, no crayon that has whiting in its compoſition ſhould be uſed, but chiefly ſuch as are the moſt brilliant and the leaſt adulterated. The ground being painted thin next the hair, will give the ſtudent an opportunity of painting the edges of the hair over in a light and free manner when he gives the finiſhing touches.

The ſtudent having proceeded thus far, the face, hair, and back-ground being entirely covered, he muſt carefully view the whole at ſome diſtance, remarking in what reſpect it is out of keeping, that is, what parts are too light and what too dark, being particularly attentive to the white or chalky appearances, which muſt be ſubdued with lake and carmine. The above method being properly put into execution, will produce the appearance of a painting principally compoſed of three colours, viz. carmine, black, and white, which is the beſt preparation a painter can make for the producing a fine crayon picture.

The next ſtep is, to complete the back-ground and the hair, as the duſt, in painting theſe, will fall on the face, and would much injure it if that was completed firſt. From thence proceed to the forehead, finiſhing downward till the whole picture is completed.

In painting over the forehead the laſt time, begin the higheſt light with the moſt faint vermilion teint, in the ſame place where the faint carmine was firſt laid, keeping it broad in the ſame manner. In the next ſhade ſucceeding the lighteſt, the ſtudent muſt work in ſome light blue teints, compoſed of verditer and white, intermixing with them ſome of the deeper vermilion teints, ſweetening them together with great caution, inſenſibly melting them into one another, increaſing the proportion of each colour as his judgment ſhall direct. Some brilliant yellows may alſo be uſed, but ſparingly; and towards the roots of the hair, ſtrong verditer teints, intermixed with greens, will be of ſingular ſervice. Cooling crayons, compoſed of black and white, ſhould ſucceed theſe, and melt into the hair. Beneath the eyes, the ſweet pearly teints are to be preſerved, compoſed of verditer and white, and under the noſe, and on the temples, the ſame may be uſed; beneath the lips, teints of this kind alſo are proper, mixing them with the light greens and ſome vermilion.

In finiſhing the cheeks, let the pure lake clear them from any duſt contracted from the other crayons; then with the lake may be intermixed the bright vermilion; and laſt of all (if the ſubject ſhould require it) a few touches

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touches of the orange-coloured crayon, but with extreme caution; after, ſweeten that part with the finger as little as poſſible, for fear of producing a heavy diſagreeable effect on the cheeks; as the beauty of a crayon-picture conſiſts in one colour ſhowing itſelf through, or rather between, another: this the ſtudent cannot too often remark, it being the only method of imitating beautiful complexions.

The eye is the moſt difficult feature to execute in crayons, as every part muſt be expreſſed with the utmoſt nicety, to appear finiſhed; at the ſame time that the painter muſt preſerve its breadth and ſolidity while he is particularizing the parts. To accompliſh this, it will be a good general rule for the ſtudent to uſe his crayon in ſweetening as much, and his finger as little, as poſſible. When he wants a point to touch a ſmall part with, he may break off a little of his crayon againſt the box, which will produce a corner fit to work with in the minuteſt parts. If the eye-laſhes are dark, he muſt uſe ſome of the carmine and brown ochre, and the crayon of carmine and black; and with theſe he may alſo touch the iris of the eye (if brown or hazel), making a broad ſhadow, cauſed by the eye-laſh. Red teints of vermilion, carmine, and lake, will execute the corners of the eye properly; but if the eyelids are too red, they will have a diſagreeable ſore appearance. The pupil of the eye muſt be made of pure lamp-black: between this and the lower part of the iris, the light will catch very ſtrong, but it muſt not be made too ſudden, but be gently diffuſed round the pupil till it is loſt in ſhade. When the eye-balls are ſufficiently prepared, the ſhining ſpeck muſt be made with a pure white crayon, which ſhould be firſt broken to a point, and then laid on firm; but as it is poſſible they may be defective in neatneſs, they ſhould be corrected with a pin, taking off the redundant parts, by which means they may be formed as neat as can be required.

The difficulty, with reſpect to the noſe, is to preſerve the lines properly determined, and at the ſame time ſo artfully blended into the cheek, as to expreſs its projection, and yet no real line to be perceptible upon a cloſe examination; in ſome circumſtances it ſhould be quite blended with the cheek, which appears behind it, and determined entirely with a ſlight touch of red chalk. The ſhadow cauſed by the noſe is generally the darkeſt in the whole face, partaking of no reflection from its ſurrounding parts. Carmine and brown ochre, carmine and black, and ſuch brilliant crayons, will compoſe it beſt.

The ſtudent having before prepared the lips with the ſtrongeſt lake and carmine, &c. muſt with theſe colours make them completely correct; and when finiſhing, introduce the ſtrong vermilions, but with great caution, as they are extremely predominant. This, if properly touched, will give the lips an appearance equal, if not ſuperior, to thoſe executed in oils, notwithſtanding the ſeeming ſuperiority the latter has, by means of glazing (A), of which the former is entirely deſtitute.

When the ſtudent paints the neck, he ſhould avoid expreſſing the muſcles too ſtrong in the ſtem, nor ſhould the bones appear too evident on the cheſt, as both have an unpleaſing effect, denoting a violent agitation of the body; a circumſtance ſeldom neceſſary to expreſs in portrait-painting. The moſt neceſſary part to be expreſſed, and which ſhould ever be obſerved, (even in the moſt delicate ſubjects,) is a ſtrong marking juſt above the place where the collar bones unite; and if the head is much thrown over the ſhoulders, ſome notice ſhould be taken of the large muſcle that riſes from behind the ear, and is inſerted into the pit between the collar bones. All inferior muſcles ſhould be, in general, quite avoided. The ſtudent will find this caution neceſſary, as moſt ſubjects, eſpecially thin perſons, have the muſcles of the neck much more evident than would be judicious to imitate. As few necks are too long, it may be neceſſary to give ſome addition to the ſtem, a fault on the other ſide being quite unpardonable, nothing being more ungraceful than a ſhort neck. In colouring the neck, let the ſtudent preſerve the ſtem of a pearly hue, and the light not ſo ſtrong as on the cheſt. If any part of the breaſt appears, its tranſparency muſt alſo be expreſſed by pearly teints; but the upper part of the cheſt ſhould be coloured with beautiful vermilions delicately blended with the other.

Of the Drapery. Dark blue, purple, black, pink, and all kinds of red draperies alſo, ſhould be firſt tinged with carmine, which will render the colours much more brilliant than any other method; over this ſhould be laid on the paper the middle teint (a medium between the light and dark teints, of which the drapery is to be painted), except the dark maſſes of ſhadow, which ſhould be laid on at firſt as deep as poſſible; theſe, ſweetened with the finger, being deſtitute of the ſmaller folds, will exhibit a maſterly breadth, which the leſſer folds when added, ought by no means to deſtroy. With the light and dark teints, the ſmaller parts are next to be made with freedom, executing as much with the crayon, and as little with the finger, as poſſible; in each fold touching the laſt ſtroke with the crayon, which ſtroke the finger muſt never touch. In the caſe of reflections, the ſimple touch of the crayon will be too harſh, therefore fingering will be neceſſary afterwards, as reflected lights are always more gentle than thoſe which are direct. With reſpect to reflections in general, they muſt always partake of the ſame colour as the object reflecting, but in the caſe of ſingle figures, it may be uſeful to make ſome particular obſervations.

In a blue drapery, let the reflections be of a greeniſh caſt; in green draperies, make them of a yellow teint; in yellow, of an orange; in orange, reflect a reddiſh caſt; in all reds, ſomething of their own nature, but inclined to the yellow: black ſhould have a reddiſh reflection; the reflection of a reddiſh teint will alſo preſent purples to the beſt advantage.

Of whatever colour the drapery is, the reflection on the face muſt partake thereof, otherwiſe the picture,

(A) The method with which painters in oils expreſs tranſparency in the lips is, by painting them firſt with light vermilion teints, and, when dry, touching them over with pure lake.

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ture, like paintings on glaſs, will have but a gaudy effect.

Linen, lace, fur, &c. ſhould be touched ſpiritedly with the crayon, fingering very little, except the latter; and the laſt touches, even of this, like all other parts, ſhould be executed with the crayon, without ſweetening with the finger.

The methods above recommended have been practiſed by the moſt celebrated crayon-painters, whoſe works have been held in public eſtimation; but the knowledge of, and ability to execute, each ſeparate part with brilliancy and truth, will be found very inſufficient to conſtitute a complete painter, without his judgment enables him to unite them with each other, by correctneſs of drawing, propriety of light and ſhadow, and harmony of colouring. In order to accompliſh this, the ſtudent ſhould carefully avoid finiſhing one part in particular, till he has properly conſidered the connection it is to have with the reſt. The neglect of this is the principal reaſon why the performances of indifferent painters are ſo deſtitute of what is termed breadth, ſo conſpicuouſly beautiful in the works of great maſters. It muſt be granted, that this obſervation relates more particularly to large compoſitions, where a diverſity of figures requires ſuch a judicious diſpoſition, that each may aſſiſt in the combination of a kind of univerſal harmony; yet, even in portrait-painting, the ſtudent ſhould be particularly attentive to obſerve this idea of breadth, if he is deſirous of acquiring that importance and dignity which conſtitutes excellence in painting.

Of the Materials. The perfection of the crayons conſiſts, in a great meaſure, in their ſoftneſs; for it is impoſſible to execute a brilliant picture with them if they are otherwiſe; on which account great care ſhould be obſerved in the preparing them, to prevent their being hard. In all compoſitions, flake-white and white-lead ſhould be wholly rejected, becauſe the ſlighteſt touch with either of theſe would unavoidably turn black.

The uſual objection to crayon-paintings is, that they are ſubject to change; but whenever this happens, it is entirely owing to an injudicious uſe of the above-mentioned whites, which will ſtand only in oils. To obviate the bad effects ariſing from the uſe of ſuch crayons, let the ſtudent make uſe of common whiting prepared in the following manner.

Take a large veſſel of water, put the whiting into it, and mix them well together; let this ſtand about half a minute, then pour off the top into another veſſel, and throw the gritty ſediment away; let what is prepared reſt about a minute, and then pour it off as before, which will purify the whiting and render it free from all dirt and grittineſs. When this is done let the whiting ſettle, and then pour the water from it; after which, lay it on the chalk to dry, and keep it for uſe, either for white crayons, or the purpoſe of preparing teints with other colours, for with this all other teints may be ſafely prepared. If the ſtudent chooſes to make crayons of the whiting immediately after it is waſhed, it is not neceſſary to dry it on the chalk, for it may be mixed inſtantly with any other colour, which will ſave conſiderable trouble. All colours of a heavy or gritty nature, eſpecially blue verditer, muſt be purified by waſhing after this method.

The ſtudent muſt be provided with a large, flexible pallet-knife, a large ſtone and muller to levigate the colours, two or three large pieces of chalk to abſorb the moiſture from the colours after they are levigated, a piece of flat glaſs to prevent the moiſture from being abſorbed too much, till the colours are rolled into form, and veſſels for water, ſpirits, &c. as neceſſity and convenience ſhall direct.

I. Reds. It is rather difficult to procure either good carmine or good lake. Good carmine is inclined to the vermilion teint, and good lake to the carmine teint. The carmine crayons are prepared in the following manner.

1. Carmine. As their texture is inclinable to hardneſs, inſtead of grinding and rolling them, take a ſufficient quantity of carmine, lay it upon the grinding-ſtone, mix it with a levigating knife with ſpirits of wine till it becomes ſmooth and even. The chalk-ſtone being ready, lay the colour upon it to abſorb the ſpirit; but be careful that it is laid on in a proper ſtate for painting. If it is levigated too thin, the crayons will be too flat; and if too thick, it will occaſion a waſte of colour, by their adhering to the pallet knife; but practice will render the proper degree of conſiſtency familiar. The ſimple colour being prepared, the next ſtep is to compoſe the different teints by a mixture with whiting; the proportion to be obſerved conſiſting of 20 gradations to one, which may be clearly underſtood by the following directions. Take ſome of the ſimple colour, and levigate it with ſpirit of wine, adding about one part of waſhed whiting to three parts of carmine, of which, when properly incorporated, make two parcels. The next gradation ſhould be compoſed of equal quantities of carmine and whiting, of which four crayons may be made. The third compoſition ſhould have one fourth carmine and three fourths whiting; of this make ſix crayons, which will be a good proportion for the reſt. The laſt teint ſhould be made of whiting, very faintly tinged with carmine, of which make about eight crayons, which will complete the above-mentioned proportion. As theſe compound teints are levigated, they are to be laid immediately upon the chalk, that the moiſture may be abſorbed to the proper degree of dryneſs for forming into crayons, which may be known by its loſing the greater part of its adheſive quality when taken into the hand; if the conſiſtency is found to be right, it may be then laid upon the glaſs, which having no pores, will prevent the moiſture from being carried off before it is convenient to form it into crayons, otherwiſe the crayons would be full of cracks and very brittle, which will be a great inconvenience when they are uſed in painting.

2. Lake. This is a colour very apt to be hard; to prevent which the ſtudent muſt obſerve the following particulars. Take about half the quantity of lake intended for the crayons, and grind it very fine with ſpirits of wine; let it dry, and then pulverize it, which is eaſily done if the lake is good; then take the other half, and grind it with ſpirits, after which mix it with the pulverized lake, and lay it out directly in crayons on the chalk. This colour will not bear rolling. The ſimple colour being thus prepared, proceed with the compound crayons as directed before, and in the ſame degrees of gradation as the carmine teints.

3. Vermilion,

3. Vermilion. The beſt is inclined to the carmine teint. Nothing is required to prepare this colour more than to mix it on the ſtone with ſoft water or ſpirits, after which it may be rolled into crayons. The different teints are produced by a mixture of the ſimple colour with whiting, according to the proportion already given.

II. Blues. 1. Pruſſian blue is a colour very apt to bind, and is rendered ſoft with more difficulty than carmine and lake. The ſame method of preparation is to be followed with this as directed with reſpect to lake, only it is neceſſary to grind a larger quantity of the pure colour, as it is chiefly uſed for painting draperies. The different teints may be made according to neceſſity, or the fancy of the painter. 2. Blue verditer is a colour naturally gritty, and therefore it is neceſſary to waſh it well. Its particles are ſo coarſe as to require ſome binding matter to unite them, otherwiſe the crayons will never adhere together. To accompliſh this, take a quantity ſufficient to form two or three crayons, to which add a piece of ſlaked plaſter of Paris about the ſize of a pea; mix theſe well together, and form the crayons upon the chalk. This blue is extremely brilliant, and will be of great uſe in heightening draperies, &c. The teints muſt be formed with whiting as directed in the former inſtances, and are highly ſerviceable for painting fleſh, to produce thoſe pearly teints ſo beautiful in crayon pictures. It is not neceſſary to mix the compounds with ſpirits, as clear water will be ſufficient.

III. Greens. Brilliant greens are produced with great difficulty. In Switzerland, they have a method of making them far ſuperior to ours. We uſually take yellow ochre, and after grinding it with ſpirits, mix it with the powder of Pruſſian blue, then temper it with a knife, and lay the crayons on the chalk, without rolling them. Inſtead of this, ſome uſe king's yellow mixed with Pruſſian blue, and others brown ochre and Pruſſian blue. The crayons made of the two laſt may be rolled. Various teints may be produced by theſe colours, according to fancy or neceſſity; ſome to partake more of the blue, and others of the yellow.

IV. Yellows. 1. King's yellow is the moſt uſeful and the moſt brilliant, levigated with ſpirits of wine, to compoſe the different teints as before directed. 2. Yellow ochre, and Naples yellow ground with ſpirits, will make uſeful crayons. 3. Orange is produced with king's yellow and vermilion ground together with ſpirits, and the teints formed as in other caſes, but no great quantity of them is required.

V. Browns. 1. Cullen's earth is a fine dark brown. After ſix or eight of the ſimple crayons are prepared, ſeveral rich compound teints may be produced from it, by a mixture with carmine, in various degrees. Black, carmine, and this colour, mixed together, make uſeful teints for painting hair; ſeveral gradations may be produced from each of theſe by a mixture with whiting. Roman or brown ochre is an excellent colour, either ſimple or compounded with carmine. Whiting tinged in ſeveral degrees with either of theſe, will prove very ſerviceable in painting. 2. Umber may be treated in juſt the ſame manner; only it is neceſſary to levigate it with ſpirit of wine.

VI. Purples. Pruſſian blue ground with ſpirits and mixed with pulverized lake, will produce a good purple. Carmine, thus mixed with Pruſſian blue, will produce a purple ſomething different from the former. Various teints may be made from either of theſe compounds by a mixture with whiting.

VII. Black. 1. Lamp-black is the only black that can be uſed with ſafety, as all others are ſubject to mildew; but as good lamp-black is very ſcarce, the ſtudent will, perhaps, find it moſt expedient to make it himſelf; the proceſs of which is as follows: Provide a tin cone, fix it over a lamp at ſuch a height that the flame may juſt reach the cone for the ſoot to gather within it. When a ſufficient quantity is collected, take it out, and burn all the greaſe from it in a crucible. It muſt then be ground with ſpirits, and laid on the chalk to abſorb the moiſture. Various gray teints may be formed from this by a mixture with whiting, as mentioned in former inſtances.—2. Vermilion mixed with carmine: this is a compoſition of great uſe, and teints made from this with whiting will be found to be very ſerviceable. 3. Carmine and black is another good compound, of which five or ſix gradations ſhould be made, ſome partaking more of the black, and others having the carmine moſt predominant, beſides ſeveral teints by a mixture with whiting. 4. Vermilion and black is alſo a very uſeful compound, from which ſeveral different teints ſhould be made. 5. Pruſſian blue and black is another good compound, and will be found of ſingular ſervice in painting draperies.

It is impoſſible to lay down rules for the forming every teint neceſſary in compoſing a ſet of crayons, there being many accidental compoſitions, entirely dependent on fancy and opinion. The ſtudent ſhould make it a rule to ſave the leavings of his colours; for of theſe he may form various teints, which will occaſionally be uſeful.

Of rolling the crayons, and diſpoſing them for painting. The different compoſitions of colours muſt be cut into a proper magnitude, after they are prepared, in order to be rolled into paſtils, for the convenience of uſing them. Each crayon ſhould be formed in the left hand with the ball of the right, firſt formed cylindrically, and then tapering at each end. If the compoſition is too dry, dip the finger in water; if too wet, the compoſition muſt be laid upon the chalk again to abſorb more of the moiſture. The crayons ſhould be rolled as quick as poſſible; and when finiſhed, muſt be laid upon the chalk again, to abſorb all remaining moiſture. After the gradation of teints from one colour is formed, the ſtone ſhould be well ſcraped and cleanſed with water before it is uſed for another colour.

When the ſet of crayons is completed according to the rules preſcribed, they ſhould be arranged in claſſes for the convenience of painting with them. Some thin drawers, divided into a number of partitions, is the moſt convenient method of diſpoſing them properly. The crayons ſhould be depoſited according to the ſeveral gradations of light. The bottom of the partitions muſt be covered with bran, as a bed for the colours; becauſe it not only preſerves them clean, but prevents their breaking.

The box made uſe of when the ſtudent paints ſhould be be about a foot ſquare, with nine partitions. In the upper corner on the left hand (ſuppoſing the box to be in the lap when he paints), let him place the black and gray crayons, thoſe being the moſt ſeldom uſed; in the ſecond partition, the blues; in the third, the greens and browns; in the firſt partition on the left hand of the ſecond row, the carmines, lakes, vermilions, and all deep reds; the yellows and orange in the middle, and the pearly teints next; and as theſe laſt are of a very delicate nature, they muſt be kept very clean, that the gradations of colour may be eaſily diſtinguiſhed; in the lower row, let the firſt partition contain a piece of fine linen rag to wipe the crayons with while they are uſing; the ſecond, all the pure lake and vermilion teints; and the other partition may contain thoſe teints which, from their complex nature, cannot be claſſed with any of the former.

CRAZE-MILL, or *Crazing Mill*, a mill in all reſpects like a griſt-mill to grind corn, and ſo called by the tin miners, who uſe it to grind their tin, which is yet too great after trambling.

CREAM, a general name applicable to all ſubſtances that ſeparate from a liquor, and are collected upon its ſurface; but more particularly applied to the following.

Cream of Lime, is that part of the lime which had been diſſolved in the water in its cauſtic ſtate, but having again attracted ſome fixed air from the atmoſphere, becomes incapable of ſolution, and therefore ſeparates from the water in the mild ſtate of chalk or limeſtone.

Cream of Milk, generally called ſimple *cream*, is the moſt oily part of the milk; which being naturally only mixed, and not diſſolved in the reſt, ſoon ſeparates from them, as being ſpecifically lighter; after which it collects on the ſurface; from which it is generally ſkimmed, to complete the diſengagement of the oily parts, for the purpoſe of making butter, from the caſeous and ſerous parts. See Agriculture *Index*. Cream of milk is not only an agreeable aliment when recent, but alſo uſeful in medicine as a lenient, when applied to tetters and eryſipelas attended with pain and proceeding from an acrid humour.

Cream of Tartar, the trivial name of the ſupertartrate or the acidulous tartrate of potaſh. It is alſo denominated *cryſtals* of *tartar*. In this ſalt there is an exceſs of the tartaric acid. See Chemistry *Index*.

CREAT, in the manege, an uſher to a riding maſter; or a gentleman bred in the academy, with intent to make himſelf capable of teaching the art of riding the great horſe.

CREATION, in its primary import, ſeems to ſignify the bringing into being ſomething which did not before exiſt. The term is therefore moſt generally applied to the original production of the materials whereof the viſible world is compoſed. It is alſo, however, uſed in a ſecondary or ſubordinate ſenſe, to denote thoſe ſubſequent operations of the Deity upon the matter ſo produced, by which the whole ſyſtem of nature and all the primitive genera of things received their form, qualities and laws.

There is no ſubject concerning which there have been more diſputes than this of creation. It is certain that none of the ancient philoſophers had the ſmalleſt idea of its being poſſible to produce a ſubſtance out of nothing, or that even the power of the Deity himſelf could work without any materials to work upon. Hence ſome of them, among whom was Ariſtotle, aſſerted that the world was eternal both as to its matter and form. Others, though they believed that the gods had given the world its form, yet imagined the materials whereof it is compoſed to have been eternal. Indeed the opinions of the ancients, who had not the benefit of revelation, were on this head ſo confuſed and contradictory, that nothing of any conſequence can be deduced from them. The freethinkers of our own and of former ages have denied the poſſibility of creation, as being a contradiction to reaſon; and of conſequence have taken the opportunity from thence to diſcredit revelation. On the other hand, many defenders of the ſacred writings have aſſerted, that creation out of nothing, ſo far from being a contradiction to reaſon, is not only probable, but demonſtrably certain. Nay, ſome have gone ſo far as to ſay, that from the very inſpection of the viſible ſyſtem of nature, we are able to infer that it was once in a ſtate of non-exiſtence. It would be impoſſible for us, however, to enter into the multiplicity of arguments uſed on both ſides; nor can we pretend to ſettle it, as the ſubject is confeſſedly above human comprehenſion.

1 What works of creation God is known to have performed.

As to the works of creation which the Deity is known to us to have performed; all other beings, beſide himſelf, are his creatures. Men and other animals that inhabit the earth and the ſeas; all the immenſe varieties of herbs and plants of which the vegetable kingdom conſiſts; the globe of the earth, and the expanſe of the ocean; theſe we know to have been produced by his power. Beſides the terreſtrial world which we inhabit, we ſee many other material bodies diſpoſed around it in the wide extent of ſpace. The moon, which is in a particular manner connected with our earth, and even dependent upon it; the ſun, and the other planets with their ſatellites, which, like the earth, circulate round the ſun, and appear to derive from him light and heat; thoſe bodies which we call fixed ſtars, and conſider as illuminating and cheriſhing with heat each its peculiar ſyſtem of planets; and the comets which at certain periods ſurpriſe us with their appearance, and the nature of whoſe connection with the general ſyſtem of nature, or with any particular ſyſtem of planets, we cannot pretend to have fully diſcovered;—theſe are ſo many more of the Deity's works, from the contemplation of which we cannot but conceive the moſt awful ideas of his creative power.

Matter, however, whatever the varieties of form under which it is made to appear, the relative diſpoſition of its parts, or the motions communicated to it, is but an inferior part of the works of creation. We believe ourſelves to be animated with a much higher principle than brute matter; in viewing the manners and economy of the lower animals, we can ſcarcely avoid acknowledging even them to conſiſt of ſomething more than various modifications of matter and motion. The other planetary bodies which ſeem to be in circumſtances nearly analogous to thoſe of our earth, are ſurely, as well as it, deſtined for the habitations of rational, Creation.

rational, intelligent beings. The exiftence of intelligences of a higher order than man, though infinitely below the Deity, appears extremely probable:—Of thofe fpiritual beings called Angels we have exprefs intimation in fcripture; (fee the article ANGELS.) Such are our notions concerning the exiftence of beings effentially diftinct from matter, and in their nature far fuperior to it; thefe, too, muft be the creatures of the Deity, and of his works of creation the nobleft part. But the limits of creation we muft not pretend to define. How far the regions of fpace extend, or how they are filled, we know not. How the planetary worlds, the fun and the fixed ftars, are occupied, we do not pretend to have afcertained. We are even ignorant how wide a diverfity of forms, what an infinity of living animated beings may inhabit our own globe. So confined is our knowledge of creation; yet fo grand, fo awful, that part which our narrow underftandings can comprehend!

2
The periods of time at which God executed his works of creation.

Concerning the periods of time at which the Deity executed his feveral works of creation, it cannot be pretended that mankind have had opportunities of receiving very particular information. From viewing the phenomena of nature, and confidering the general laws by which they are regulated, we cannot draw any conclufive or even plaufible inference with refpect to the precife period at which the univerfe muft have begun to exift. We know not, nor can we hope to afcertain, whether the different fyftems of planets circulating round our fun and the other fixed ftars, were all created at one period, or each at a different period. We cannot even determine, from any thing that appears on the face of nature, whether our earth was not created at a later period than any of her fellow planets which revolve round the fame fun. Aftronomers are, from time to time, making new difcoveries in the heavens; and it is impoffible to fay whether fome of thefe fucceffive difcoveries may not be owing to fucceffive creations.

Philofophers have, indeed, formed fome curious conjectures concerning the antiquity of the earth, from the appearances of its furface, and from the nature and difpofition of its interior ftrata. The beds of lava in the neighbourhood of volcanoes have afforded ground for fome calculations, which, though they do not fix the period of the earth's origin, are yet thought to prove that period to have been much more remote than the earlieft age of facred or profane hiftory. ‡ In the neighbourhood of Mount Ætna, or on the fides of that extenfive mountain, there are beds of lava covered with a confiderable thicknefs of earth; and at leaft another, again, which though known from ancient monuments and hiftorical records to have iffued from the volcano at leaft 2000 years ago, is ftill almoft entirely deftitute of foil and vegetation: in one place a pit has been cut through feven different ftrata of lava; and thefe have been found feparated from each other by almoft as many thick beds of rich earth. Now, from the fact, that a ftratum of lava 2000 years old is yet fcantily covered with earth, it has been inferred by the ingenious canon Recupero, who has laboured 30 years on the natural hiftory of Mount Ætna, that the loweft of thefe ftrata which have been found divided by fo many beds of earth, muft have been emitted from the volcanic crater at leaft 14,000 years ago; and confequently that the age of the earth, whatever it may exceed this term of years, cannot poffibly be lefs. Other facts of a fimilar nature likewife concur to juftify this conjecture.

‡ *Brydone's Tour through Sicily and Malta.*

But all thefe facts are as nothing in comparifon with the long feries which would be requifite to eftablifh fuch a conjecture as an incontrovertible truth. And befides, any evidence which they can be fuppofed to afford, may be very eafily explained away. The bed of lava which in the courfe of 2000 years has fcarce acquired a covering of earth, is confeffed to ftand in a fituation in which it is expofed to the fpray of the fea, and to all the violence of winds and rains. In fuch a fituation, it cannot be thought that a thick bed of earth could, in any length of time, be formed on it: we might as well expect depth of foil and vigorous vegetation on the craggy cliffs of hills. In crevices here and there over it, in which the earth has been retained, there is a depth of foil which fupports large trees. This fact, therefore, admits of no fuch inference as that which Recupero has pretended to deduce from it. The local circumftances, again, of the feven ftrata that have been pierced through, are very different. They are fituated at Jaci Reale, in a fituation where fhowers of afhes from the volcano muft frequently fall; and where whatever falls muft be naturally retained and accumulated:—fo that feven beds of earth might be formed on thefe feven ftrata of lava much fooner than one thin layer could be formed on the ftratum above-mentioned. In other places, fome of which are within the influence of the fame awful volcano, and fome adjacent to that of Vefuvius, foil is known to have accumulated on lava with the help of fhowers of afhes from the volcanoes, with fufficient rapidity to juftify this fuppofition concerning the coverings of the ftrata at Jaci Reale. From the obfervation of thefe phenomena of volcanoes, therefore, no facts have been gained that can help us to determine with any certainty the earth's age. And fo wide is the variety of circumftances to be here taken into account, that it cannot be hoped that this *defideratum* will be ever fupplied from this quarter. See further the article EARTH.

But by examining the compofition and arrangement of the interior ftrata of the globe, and by viewing the general appearance of its furface, the ingenuity of philofophers has, with better hopes, fought to guefs at the length of time during which it muft have exifted. Obferving the exuviæ of fea and land animals depofited at profound depths under ground, and accompanied with vegetable bodies in a good ftate of prefervation, as well as with oleaginous and bituminous fubftances which have in all probability been formed from vegetable bodies; and remarking at the fame time with what confufion the other materials, compofing the cruft of this terreftrial ball, are, in various inftances, not arranged, but caft together; they have concluded that the earth muft have exifted for many an age before the earlieft events recorded in facred or profane hiftory, and muft have undergone many a revolution, before it fettled in its prefent ftate. Such at leaft are the ideas which Buffon and M. de Luc, and alfo Dr Hutton ‡, feem defirous to imprefs us with concerning its changes and antiquity.—It will be only doing juftice to thefe philofophers to acknowledge, that they

‡ *Ed. Phil. Tranf.* vol. i.

Creation. they have collected, with amazing industry, almost every fact in the natural history of the earth that can serve to give plausibility to their conjectures. But still their facts, besides the inconsistency of many of them, are by far too scanty to warrant the conclusions which they have deduced from them. See the article EARTH.

3
Accounts of the antiquity of the earth from profane history.

The voice of profane history is far from being decisive concerning the age of the world; nor is it to be expected that it should. When the earth first arose into existence, we can be at no loss to conceive that mankind were not spectators of the event; and we may naturally imagine that the first human beings who occupied it, would be too much busied in furnishing themselves with the immediate necessaries and the conveniences of life, to think of curious researches into its origin, or even their own. Profane history is not, however, without accounts of the age of the earth and the origin of human society; but those accounts are various and contradictory.—Plato in his dialogue entitled *Critias*, mentions his celebrated Atalantis to have been buried in the ocean about 9000 years before the age in which he wrote. He asserts it to have been well known to the Egyptian priests and to the contemporary inhabitants of Attica. The learned world, indeed, generally agree in regarding his accounts of that island as a fiction, which the author himself did not design to be understood in any other light: some, however, are more credulous, and others go so far as to acknowledge doubts: and, if the existence of such an island, at a period so distant, be admitted as a fact worthy of any credit, the age of the world may be reckoned as at least considerably more than 12,000 years. The pretensions of the Chinese represent the world as some hundreds of thousands of years older: and we are also told* that the astronomical records of the ancient Chaldeans carried back the origin of society to a very remote period; no less than 473,000 years. The Egyptian priests reckoned between Menes and Sethon 341 generations†. But these accounts are so discordant, and so slenderly supported by evidence, that we cannot hesitate to reject them all as false; the fables of historians scarce merit so much attention as the hypotheses of philosophers.

* *Universal Hist.* vol. I. *Preface*

† *Herod.* l. ii. c. 142.

4
The era of the creation as stated in sacred history.

When from profane we turn to sacred history, we may reasonably expect more accurate and more credible information concerning the antiquity of the globe. As the authenticity of the Holy Scriptures is so incontrovertibly established, wherever they afford evidence concerning any fact, that evidence must be regarded as decisive. A fact so important as the present may be thought highly worthy of a place in them. Unfortunately, however, even the sacred writings do not fix the era of the creation with sufficient accuracy; they leave us, in some measure, at a loss whether to extend what they say concerning that era to the whole contents of created space, or to confine it to our earth and its inhabitants: different copies give different dates; and even in the same copy, different parts relating the same events, either disagree or do not speak decisively with regard to the length of the time in which they passed.—In the beginning of the sixth chapter of the first book of Kings, the time which elapsed between the departure of the children of Israel from Egypt, and the period at which Solomon laid the foundation of his temple, is said to have been 480 years: And in the book of Judges again, the age of all the patriarchs amounts to 592 years‡. The Hebrew copy of the Bible, which we Christians for good reasons consider as the most authentic, dates the creation of the world 3944 years before the Christian era. The Samaritan Bible, again, fixes the era of the creation 4305 years before the birth of Christ. And the Greek translation, known by the name of the *Septuagint* version of the Bible, gives 5270 as the number of the years which intervened between those two periods. As many other different calculations of the years contained in the same intermediate space of time, might be formed upon other dates in the sacred volume, differing in the different copies. By comparing the various dates in the sacred writings, examining how these have come to disagree and to be diversified in different copies, endeavouring to reconcile the most authentic profane with sacred chronology, and eking out deficiency of dates and evidence with conjecture; some ingenious men have formed schemes of chronology, plausible indeed, but not supported by sufficient authorities, which they would gladly persuade us to receive in preference to any of those above mentioned. Usher makes out from the Hebrew Bible 4004 years, as the term between the creation and the birth of Christ: Josephus, according to Dr Wills and Mr Whiston, makes it 4658 years; and M. Pezron, with the help of the Septuagint, extends it to 5872 years. Usher's system is the most generally received.

‡ *Universal Hist* vol. I. *Preface.*

But though these different systems of chronology are so inconsistent and so slenderly supported, yet the differences among them are so inconsiderable in comparison with those which arise before us when we contemplate the chronology of the Chinese, the Chaldeans, and the Egyptians, and they agree so well with the general information of authentic history and with the appearances of nature and of society, that they may be considered as nearly fixing the true period of the creation of the earth.

5
No information on this head to be obtained from any other source but sacred history.

Profane history cannot be expected to contain an account of the first events which passed after the creation of the substances of which the universe consists. The conjectures of ancient philosophers on this subject cannot merit attention; for vague tradition, and the appearances of nature, the only data on which they could proceed in forming their conjectures, could admit of no fair inductions concerning those events; and besides, instead of listening to tradition, or examining the appearances of nature, they generally consulted imagination, and imagination alone, on such occasions. Here, therefore, we have nothing to hope but from the sacred writings. From them we may expect historical information, not to be obtained from any other source. What they communicate is communicated on divine authority; and it is only on such authority we can receive any accounts concerning the creation.

6
Hints concerning the creation in the book of Job.

A few hints in the book of Job afford the earliest information to be found in the scriptures concerning the creation of the world. "Where wast thou when I laid the foundations of the earth, when the morning stars sang together, and all the sons of God shouted for joy*?" "Behold, he put no trust in his servants, and

* Chap. xxxviii. ver. 4. & 7.

Creation.

and his angels he charged with folly *." "And unto man, (or to Adam), he ſaid, Behold, the fear of the Lord is wiſdom, and to depart from evil is underſtanding †." Theſe paſſages rather hint at than relate facts. But it has been inferred from them, that there were ſtars in the firmament, and angels in heaven, before the formation of our globe; that angels as well as man have fallen; and that other injunctions, beſides that of abſtaining from the forbidden fruit, were laid on Adam when he was firſt placed in Paradiſe ‡. If the interpretation be admitted as juſt, the firſt of theſe facts may be conſidered as forming, as it were, a point with which our knowledge of the works of the Deity commences: the period of time at which the ſecond event took place is not ſpecified: and the precept to Adam muſt no doubt have been uttered after he was formed and inſpired with intelligence. Yet with regard to the firſt of the above quotations from the book of Job, the only one that is of importance to us at preſent, it muſt be acknowledged, that it has been differently underſtood. The morning ſtars might ſing together, and the ſons of God ſhout for joy, on account both of their own creation and of the creation of the earth at one time; and yet Job, having been himſelf made a conſcious being at a much later period, not be able to tell where he was at that era of exulting gratitude and congratulation.

* Chap. iv. ver. 18.
† Ch. xxviii. ver. 28.
‡ *Milne's Lectures*, Lect. I.

7
Moſaic account of the creation.

Moſes relates, that ‖ "in the beginning God created the heavens and the earth. And the earth (continues he) was without form and void; and darkneſs was upon the face of the deep: and the ſpirit of God moved upon the face of the waters. And God ſaid, Let there be light; and there was light. And God ſaw the light, that it was good: and God divided the light from the darkneſs. And God called the light day, and the darkneſs he called night: and the evening and the morning were the firſt day." During five ſucceeding days the work of creation was carried on. On the ſecond day, a firmament was made to ſeparate the waters, and that firmament called *heaven:* on the third day, the waters were collected into ſeas, and the land from which the waters retired cauſed to produce graſs and trees and other plants: on the fourth day, lights were made to appear in the firmament; to enlighten the earth, to divide the day from the night, and to diſtinguiſh time into ſeaſons and years: on the fifth day, the ſeas were peopled with whales and other fiſhes, and the air with fowls: on the ſixth day, the earth was furniſhed with reptiles and quadrupeds of all kinds; and on the ſame day, the firſt human pair, the progenitors of all the human race, were created in God's own image.

‖ Gen. i. 1.

8
Difficulties occurring in the above account.

Some difficulties occur in comparing this account of the creation with the laws which appear at preſent to regulate the ſyſtem of nature. We find it hard to conceive how the earth, while yet a ſtranger to the influence of the ſun, could experience the viciſſitude of day and night; and are aſtoniſhed at the rapidity with which trees and herbage firſt overſpread its ſurface. The condition of matter when the earth was without form and void, and the operation of the ſpirit of God on the face of the waters, are equally myſterious.

9
Attempts to ſolve thoſe difficulties. Dr Burnet's theory.

Some ingenious men have eagerly laboured to remove theſe difficulties. Among theſe is Dr Burnet, whoſe theory of the earth has now been long conſidered as fanciful and ill-founded. He ſuppoſes all the celeſtial bodies, even the ſun and all the other planets of the ſolar ſyſtem, to have exiſted long before the earth. The chaos on which the ſpirit of God moved, conſiſted, according to him, of the firſt principles from which all terreſtrial bodies have been formed. When thoſe laws by which the material world is regulated firſt began to operate on the maſs, he ſuppoſes that its groſſer and heavier parts would ſink towards the centre, and there form a ſolid ball. Around this ſolid ball two ſpecies of particles would ſtill float together in confuſion. Of theſe he thinks one, being more volatile, would by degrees make its eſcape from the other, would leave it ſtill recumbent on the ſolid centre, and ſpread around it in an atmoſphere. The middle ſtratum he compoſes of aqueous and oleaginous fluids; and he makes no doubt, that after the air had made its eſcape, the levity of the oleaginous fluids would enable them to riſe above the aqueous, and diſpoſe themſelves next the ſurface of the liquid maſs. On them he ſuppoſes the impure atmoſphere to have then depoſited a quantity of terrene particles, ſufficient to form, by intermixture with the oils, a thick cruſt of rich earth for the production of plants and herbage, and to afford an habitation to animals. This delicate ſhell he was careful not to furrow with ſeas or load with mountains: either of theſe would have reduced all to confuſion. Such is his earth; and after moulding it with ſo much ingenuity, and into ſo happy a form, he contents himſelf, without venturing to uſe the ſame freedoms with the remaining part of Moſes's account of the creation.

10
Objections to Dr Burnet's theory.

But Moſes affords nothing that can be with any propriety uſed in the foundation of ſuch a theory: he tells not whether the chaos conſiſted of thoſe terrene, and aqueous, and oleaginous, and aerial particles which Dr Burnet finds in it; he confines not the ſeas within a cruſt of earth; nor does he inform us that the ſcenery of nature was not diverſified by hills and vales. Beſides, the author of this theory has, without any evidence, ſuppoſed matter to have been originally under the influence of laws very different from thoſe by which it is at preſent regulated. Oil, indeed, while fluid, floats above water: but in a concrete ſtate, it ſinks in water like other ſolid bodies. If reduced into that ſtate by combination with terrene matters, ſufficient to render the mixture proper for the nouriſhment and production of vegetables; its ſpecific gravity will be ſtill greater, and it will conſequently ſink ſo much the ſooner. How a concrete ſubſtance, conſiſting of earth and oil, could float on water, appears an inexplicable enigma. But we need not here take farther pains in combating and triumphing over this theory, which has long ſince fallen and ſunk to its grave.

11
Mr Whiſton's theory.

Mr Whiſton treats both the ſcriptures and the laws of nature with greater reverence. Yet he certainly involves himſelf in no trifling difficulties in attempting to ſolve thoſe which Moſes preſents. He ſuppoſes the ſun, moon, and ſtars to be all more ancient than the earth. The chaos from which the earth was formed, he repreſents as having been originally the atmoſphere of a comet. The ſix days of the creation he would perſuade us to believe equal to ſix of our years;

years: for he is of opinion, that the earth did not revolve daily round its axis, but only annually round its orbit, till after the fall of man.

On the firſt day or year, therefore, the more ponderous parts of the chaos were, according to this theory, conglomerated into an orb of earth, the chinks and interſtices over that orb filled up with water, and the exterior part or atmoſphere rarefied, ſo as to admit ſome faint glimmering of the rays of the ſun.

On the ſecond day, the atmoſphere was diffuſed to its due extent around the earth, and reduced to a degree of rarity and purity which rendered it ſtill more ſuitable for the tranſmiſſion of light; the earth was ſtill more conſolidated; and the waters being almoſt entirely excluded from the interſtices which they before occupied, were partly ſpread over the ſurface of the earth, and partly raiſed in vapour into the atmoſphere or firmament.

On the third day, the earth's ſurface became ſo irregular, in one place riſing into hills, in another ſinking into vales, as to cauſe the waters, which were before equally diffuſed, to collect into ſeas and lakes, leaving large tracts of ground unoccupied. And no ſooner was a part of the earth's ſurface left bare by the waters, than the general influence of the ſun produced on it a rich covering of herbage, and all the different ſpecies of vegetables.

On the fourth day, the earth was rendered ſubject to the regular influence of the ſun, moon, and ſtars.

On the fifth day or year, things were ſo far advanced, that fiſhes and fowls were now produced from the waters.

On the ſixth day was the earth furniſhed with animals; and the lord of all the other animals, man, was now created.

12
Objections to Mr Wiſton's theory.

Such is Mr Whiſton's account of the phenomena of the Moſaic creation. But he likewiſe aſſumes much more than can be reaſonably granted. The atmoſphere of a comet could not well be the primitive chaos: it is not an obſcure, but a pellucid fluid; and its exterior ſtrata, if of the ſame nature with the matter of our earth, muſt be ſcorified by its near approaches to the ſun. Had the earth not begun to move round its axis till after the work of creation was completed, the immoderate degrees of heat and cold which its different parts would have alternately felt, would in all probability have proved fatal to both plants and animals. Even the moſt artful interpretation of Moſes's words cannot repreſent him as meaning to inform us that the ſun and moon were created at different periods. But philoſophy will ſcarce permit us to imagine that the moon was formed before the earth. And therefore we cannot upon good grounds agree with Mr Whiſton, that the creation of the earth was later than that of the other bodies of the ſolar ſyſtem.

15
M. de Luc's theory and objections.

Among others who have endeavoured to explain the original formation of the earth, and the changes which it has undergone, is M. de Luc. This coſmologiſt, like Mr Whiſton, thinks that the days of the creation were much longer periods of time than our preſent days. He ſeems to think that the earth had exiſted long before the Moſaic creation; but being at that era to experience new changes, and to be regulated by new laws: that all the different events deſcribed by Moſes in his hiſtory of the creation, actually took place in the order in which he relates them; but that Moſes's days are indefinite ſpaces of time, which muſt have been very long, but of which we cannot hope to aſcertain the preciſe length. Theſe are ingenious conjectures; but they do not appear neceſſary, nor are they juſtified by facts. For a fuller and more cloſe inveſtigation of this part of the ſubject, we muſt refer to the article EARTH: and ſhall now cloſe the preſent article with a ſhort explanation of what appears to us the moſt natural way of underſtanding Moſes's account of the creation.

It has been conjectured*, with great probability, that the creation of which Moſes is the hiſtorian, was neither confined to the earth alone, nor extended to the whole univerſe. The relation which all the planets of the ſolar ſyſtem bear to the ſame illuminating body countenances the conjecture, that they, together with the luminary by which they are enlightened, were all created at one period: but it would perhaps be to conceive too meanly of the benevolence, wiſdom, and active power of the Deity, to ſuppoſe that before that period theſe had never been exerted in any work of creation. Yet even here we have not demonſtrative evidence.

* *Univerſal Hiſt.* vol. i. p. 85.

On the ſuppoſition that the whole ſolar ſyſtem was created at once, which has at leaſt the merit of doing no violence to the narrative of Moſes, the creation of the ſun and the other planets may be underſtood to have been carried on at the ſame time with the creation of the earth. In that caſe, even in the courſe of the firſt day, though not longer than our preſent days, thoſe bodies might be reduced to ſuch order, and their relative motions ſo far eſtabliſhed, as to begin the diſtinction between light and darkneſs, day and night.

On the ſecond day, we may naturally underſtand from Moſes's narrative, that the atmoſphere was purified, and the ſpecific gravities of aqueous vapour and atmoſpheric air ſo adjuſted, as to render the latter capable of ſupporting the former.

On the third day the waters were firſt collected into lakes and ſeas: but in what manner, we cannot well determine. Some call in the operation of earthquakes; others tell us, that when the earth was firſt formed, the exterior ſtrata were, at different parts over its ſurface, of different ſpecific gravities; and that the more ponderous parts now ſunk nearer the common centre, while the lighter parts ſtill remaining equally remote from it as before, formed iſlands, continents, hills, and mountains. But theſe are mere fancies; and we have no facts to offer in their ſtead. On the latter part of this day vegetables were cauſed to ſpring up over the earth. Their growth muſt have been much more rapid than we ever behold it now: but by what particular act of ſupernatural power that might be effected, we ſhould in vain inquire.

On the fourth day the ſun, moon and ſtars, were made to appear. But according to the conjecture which we have mentioned as plauſible, though without aſcribing to it the evidence of certain truth, thoſe heavenly bodies are to be conſidered as having been created before this day. But they might now begin to exert their full influence on the earth in the ſame manner as they have ſince continued to do.

The creation of the inanimate world was now finiſhed, nifhed, and the earth prepared for the reception of animals. On the fifth day, therefore, were the living inhabitants of the air and the waters created.

On the fixth day the inferior animals inhabiting the earth were firft created; and after that, the whole work was crowned by the creation of a male and female of the human fpecies. To the account of the creation of the animals, nothing certain can be added in explanation of Mofes's narrative. No more but one pair of the human fpecies were at firft created: the fame economy might poffibly be obferved in the creation of the inferior animals.

CREBILLON, Prosper Joliot de, a French writer of tragedy, and ufually ranked after Corneille and Racine, was born at Dijon in 1674. He was originally deftined to the profeffion of the law, and placed at Paris with that view; but the impetuofity of his paffions rendering him unfit for bufinefs, he was urged by fome friends, who difcerned very well his natural turn, to attempt dramatic compofitions. He complied, but not till after many refufals; and gave at length a tragedy, which met with great fuccefs. He then marched on in the career he had begun, but was checked by a fit of love for an apothecary's daughter; which fit of love ended in marriage. His father, doubly enraged at his fon for thus furrendering himfelf to the two demons of Love and Poetry, difinherited him; but falling fick fome years after, in 1707, he re-eftablifhed him in all his rights, and died. Crebillon was, however, little better for his acquifitions, the greateft part being probably wafted before they came; and thus, though high in fame and at the prime of life, he ftill continued poor. He loft his wife in 1711, and fortune long frowned upon him, till at laft he obtained a place in the French academy, and the employment of cenfor of the police. He was afterwards in more profperous circumftances, which continued to the end of a long life. He died in 1762, at the age of 88, much regretted on account of his numerous virtues. He was of a temperament extremely robuft, without which he could not have held out fo long; for he ate prodigioufly, and continued to the laft fo to do. He flept little, and lay as hard as if upon the floor; not from any pious principle of mortifying, but becaufe he liked it. He was always furrounded with about 30 dogs and cats; and ufed to fmoke a good deal of tobacco, to keep his room fweet againft their exhalations. Whenever he was ill, he ufed to manage himfelf according to his own fancy and feelings; for he made a jeft of phyfic and phyficians. He was a dealer in *bons mots*. Being afked one day in full company, which of his works he thought the beft? "I don't know (fays he) which is my beft production; but this (pointing to his fon) is certainly my worft.

CRECY, Crescy, or Cressy. See Cressy.

CREDENTIALS, letters of recommendation and power, efpecially fuch as are given to ambaffadors or public minifters, by the prince or ftate that fends them to foreign courts.

CREDIBILITY, a fpecies of evidence, lefs indeed than abfolute certainty or demonftration, but greater than mere poffibility; it is nearly allied to probability, and feems to be a mean between poffibility and demonftration.

CREDIT, in *Commerce*, a mutual truft or loan of merchandife or money, on the reputation of the probity and folvability of a dealer.

Credit is either public or private. Every trader ought to have fome eftate, ftock, or portion of his own, fufficient to carry on the traffic he is engaged in: they fhould alfo keep their dealings within the extent of their capital, fo that no difappointment in their returns may incapacitate them from fupporting their credit. Yet traders of worth and judgment may fometimes lie under the neceffity of borrowing money for carrying on their bufinefs to the beft advantage; but then the borrower ought to be fo juft to his own reputation, and to his creditors, as to be well affured that he has fufficient effects within his power to pay off his obligations in due time. But if a trader fhould borrow money to the extent of his credit, and launch out into trade fo as to employ it with the fame freedom as if it was his own proper ftock, fuch a way of management is very precarious, and may be attended with dangerous confequences. Merchants ought never to purchafe their goods for exportation upon long credit, with intent to difcharge the debt by the return of the fame goods; for this has an injurious influence on trade feveral ways: and if any merchant has occafion to make ufe of his credit, it fhould always be for the borrowing of money, but never for the buying of goods; nor is the large credit given to wholefale traders a prudential or juftifiable practice in trade.

The public credit of a nation is faid to run high when the commodities of that nation find a ready vent; are fold at a good price, and when dealers may be fafely trufted with them: alfo when lands and houfes find ready purchafers; when money is to be borrowed at a low intereft; when people think it fafe and advantageous to venture large ftocks in trade; and when notes, mortgages, &c. will pafs for money.

Letters of Credit, are thofe given to perfons in whom a merchant, &c. can truft, to take money of his correfpondent abroad, in cafe he happens to need it.

Credit is alfo ufed for the currency which papers or bills have in the public or among dealers. In this fenfe credit is faid to rife, when in negociating the fhares of the company, they are received and fold at prices above *par*, or the ftandard of their firft creation. Difcredit is oppofed to credit, and is ufed where money, bills, &c. fall below *par*.

Credit was alfo anciently a right which lords had over their vaffals; confifting in this, that during a certain time they might oblige them to lend them money. In this fenfe, the duke of Brittany had credit during fifteen days on his own fubjects, and thofe of the bifhop of Nantes; and the bifhop had the fame credit or right among his fubjects and thofe of that prince.

CREDITON, a market town in Devonfhire, confiderable for a good woollen manufactory: it is fituated about 9 miles north-weft of Exeter, in W. Long. 3. 50. and N. Lat. 50. 50.

CREDITOR, a perfon to whom any fum of money is due, either by obligation, promife, or otherwife. See Debt.

CREDULITY denotes a weaknefs of mind, by reafon of which a perfon yields his affent to propofitions

tions or facts, before he has confidered their evidence.

CREECH, Thomas, eminent for his tranflations of ancient authors both in profe and verfe, was fon of Thomas Creech, and born near Sherborne in Dorfetfhire in 1659. He was educated in grammar learning under Mr Curganven of Sherborne, to whom he afterwards dedicated a tranflation of one of Theocritus's Idylliums: and entered a commoner of Wadham college in Oxford in 1675. Wood tells us that his father was a gentleman; but Giles Jacob fays, in his Lives and Characters of English Poets, that his parents circumftances not being fufficient to afford him a liberal education, his difpofition and capacity for learning raifed him up a patron in Colonel Strangeways, whofe generofity fupplied that defect. Be that as it will, Creech diftinguifhed himfelf much, and was accounted a good philofopher and poet, and a diligent ftudent. June 13. 1683, he took the degree of mafter of arts, and not long after was elected probationer fellow of All-fouls college; to which, Jacob obferves, the great reputation acquired by his tranflation of Lucretius recommended him. Wood tells us, that upon this occafion he gave fingular proofs of his claffical learning and philofophy before his examiners. He alfo took the degree of B. D. on the 18th of March 1696. He now began to be well known by the works he publifhed; but Father Niceron obferves, that they were of no great advantage to his fortune, fince his circumftances were always indifferent. In 1699, having taken holy orders, he was prefented by his college to the living of Welwynn in Hertfordfhire; but this he had not long enjoyed before he put an end to his own life. The motives of this fatal cataftrophe have been varioufly reprefented. The author of the *Nouvelles de la Republique des Lettres* informs us, that in the year 1700 Mr Creech fell in love with a woman who treated him with great neglect, though fhe was complaifant enough to feveral others. This affront he could not bear, and refolved not to furvive it. Whereupon he fhut himfelf up in his ftudy, where he hanged himfelf about the end of June 1700, and was found in that fituation three days after. The Poetical Regifter fays nothing of the particular manner of his death, but only that he unfortunately made away with himfelf in the year 1701; and afcribes this fatal cataftrophe of Mr Creech's life to the morofenefs of his temper, which made him lefs efteemed than his great merit deferved, and engaged him in frequent animofities and difputes upon that account. But from an original letter of Arthur Charlett, preferved in the Bodleian library, it has lately been difcovered, that this unhappy event was owing to a very different caufe. There was a fellow collegian of whom Creech frequently borrowed money: but repeating his applications too often, he met one day with fuch a cold reception, that he retired in a fit of gloomy difguft, and in three days was found hanging in his ftudy. Creech's principal performances are, 1. A tranflation of Lucretius. 2. A tranflation of Horace; in which, however, he has omitted fome few odes. 3. The Idylliums of Theocritus, with Rapin's Difcourfe of Paftorals. 4. A tranflation of Manilius's Aftronomicon. Befides tranflations of feveral parts of Virgil, Ovid, and Plutarch; printed in different collections.

CREED, a brief fummary of the articles of a Chriftian's belief.

The moft ancient form of creeds is that which goes under the name of the apoftolic creed: befides this, there are feveral other ancient forms and fcattered remains of creeds to be met with in the primitive records of the church. The firft is the form of apoftolical doctrine, collected by Origen; the fecond is a fragment of a creed preferved by Tertullian; the third remains of a creed is in the works of Cyprian; the fourth, a creed compofed by G egory Thaumaturgus, for the ufe of his own church; the fifth, the creed of Lucian the martyr; the fixth, the creed of the apoftolical conftitutions. Befides thefe fcattered remains of the ancient creeds, there are extant fome perfect forms, as thofe of Jerufalem, Cæfarea, Antioch, &c.

The moft univerfal creeds are, the Apostolical, the Athanasian, and the Nicene creeds. See thefe articles.

Thefe three creeds are ufed in the public offices of the church of England; and fubfcription to them is required of all the eftablifhed clergy. Subfcription to thefe was alfo required of the diffenting teachers, by the toleration act; but from which they are now relieved by 19 Geo. III.

CREEK, a part of a haven, where any thing is landed from the fea. So many landing places as there are in a harbour or port, fo many creeks there are. It is alfo faid to be a fhore or bank whereon the water beats, running in a fmall channel from any part of the fea; from the Latin *crepido*. This word is ufed in the ftat. 4 Hen. IV. c. 20. and 5 Eliz. c. 5.

CREENGLES. See Cringle.

CREEPER, See Certhia, Ornithology *Index*.

Creeper, in naval affairs, an inftrument of iron refembling a grappling, having a *fhank*, and four hooks or claws. It is ufed to throw into the bottom of any river or harbour, with a rope faftened to it, to hook and draw up any thing from the bottom which may have been loft. See Plate CL.

CRELLIUS, John, a famous Socinian, born in 1590, in a village near Noremberg. In 1612 he went into Poland, where the Unitarians had a fchool, in which he became profeffor of divinity, and minifter at Crackow, where he died in 1632, aged 42. He was the author, 1. Of a famous Treatife againft the Myftery of the Trinity; 2. Commentaries on a part of the New Teftament; and other works. All of them are fcarce.

CREMA, a city and bifhop's fee of Italy, capital of a diftrict of the Milanefe, called from it *Cremafco*; it ftands almoft in the middle between Milan and Mantua, in E. Long. 10. 15. and N. Lat. 45. 20.

CREMASTER, in *Anatomy*, the names of a mufcle of the tefticle, of which there is one on each fide. See Anatomy, *Table of the Mufcles*.

CREMATION is fometimes ufed for burning, particularly when applied to the ancient cuftom of burning the dead. This cuftom is well known to have prevailed among moft eaftern nations, and continued with their defcendants after they had peopled the different parts of Europe. Hence we find it prevailing in Greece, Italy, Gaul, Britain, Germany, Sweden, Norway, and Denmark, till Chriftianity abolifhed it.

CREMONA,

CREMONA, in *Ancient Geography*, a Roman colony, with municipal rights, settled beyond the Po, below the confluence of the Addua, on the report of Hannibal's march into Italy (Polybius): a town at this day still maintaining its name and flourishing state. It was an opulent and mercantile city; but suffered greatly in the civil wars of Augustus (Virgil). In the war with Vitellius, it was destroyed by the partizans of Vespasian; but was soon after rebuilt by the munificence of the citizens and exhortations of Vespasian, (Tacitus). Now capital of the Cremonese, in the duchy of Milan. E. Long. 10. 30. Lat. 45.

CRENATED, a term used in botany. See BOTANY *Index*.

CRENELLE, or IMBATTLED, in *Heraldry*, is used when any honourable ordinary is drawn, like the battlements on a wall to defend men from the enemies shot. This attribute belongs to the arms of such as have defended castles for their prince or country, or of such as are skilled in architecture.

CRENOPHYLAX, in antiquity, a magistrate of Athens, who had the inspection of fountains.

CREODIBA, in the customs of the middle age, a robbery and murder committed in a wood, where the body of the person killed was burnt in order to prevent any discovery of the crime. The word, says Wendelinus, is compounded of *cruy* and *diven*, that is, "wood-robbers."

CREOLES, a name originally given to the families descended from the Spaniards who first settled at Mexico in America. These are much more numerous than the Spaniards properly so called, and the Mulattoes, which two other species of inhabitants they distinguish; and are excluded from all considerable employments. It is now used in a more extensive sense, and applied to all natives of the West Indies.

CREON, king of Corinth, was son of Sisyphus. He promised his daughter Glauce to Jason, who had repudiated Medea. To revenge the success of her rival, Medea sent her for a present a gown covered with poison. Glauce put it on, and was seized with sudden pains. Her body took fire, and she expired in the greatest torments. The house also was consumed by the fire, and Creon and his family shared Glauce's fate.

CREON, son of Menœtius, was father to Jocasta, the wife and mother of Oedipus. At the death of Laius, who had married Jocasta, Creon ascended the vacant throne of Thebes. As the ravages of the Sphynx were intolerable, Creon offered his crown and daughter in marriage to him who could explain the enigmas which the monster proposed. Oedipus was happy in his explanations, and he ascended the throne of Thebes, and married Jocasta without knowing that she was his mother, and by her he had two sons, Polynices and Eteocles. These two sons mutually agreed after their father's death to reign in the kingdom each a year alternately. Eteocles first ascended the throne by right of seniority; but when he was once in power he refused to resign at the appointed time, and his brother led against him an army of Argives to support his right. The war was decided by a single combat between the two brothers. They both killed one another, and Creon ascended the throne till Leodamus the son of Eteocles should be of sufficient age to assume the reins of government. In his regal capacity he commanded that the Argives, and more particularly Polynices, who was the cause of all the bloodshed, should remain unburied. If this was in any manner disobeyed, the offenders were to be buried alive. Antigone the sister of Polynices transgressed, and was accordingly punished. Hæmon the son of Creon, who was passionately fond of Antigone, killed himself on her grave, when his father refused to grant her pardon. Creon was afterwards killed by Theseus, who had made war with him because he refused burial to the Argives.

CREPANCE, in the manege, a chop or cratch in a horse's leg, given by the spunges of the shoes of one of the hinder feet crossing and striking against the other hinder foot. This cratch degenerates into an ulcer.

CREPIDÆ, among the Romans, a kind of slippers or shoes, which were always worn with the *pallium*, as the *calcei* were with the *toga*.

CREPIS, HAWK-WEED: A genus of plants belonging to the syngenesia class; and in the natural method ranking under the 49th order, *Compositæ*. See BOTANY *Index*.

CREPITATION, that noise which some salts make over the fire in calcination, called also *detonation*.

CREPITATION is also used in surgery, for the noise made by the ends or pieces of bones, when the surgeon moves a limb to assure himself by his ear of the existence of a fracture.

CREPUNDIA, in antiquity, a term used to express such things as were exposed along with children, as rings, jewels, &c. serving as tokens whereby they afterwards might be known.

CREPUSCULUM, in *Astronomy*, twilight; the time from the first dawn or appearance of the morning to the rising of the sun; and again, between the setting of the sun and the last remains of day.

Papias derives the word from *creperus*; which, he says, anciently signified *uncertain*, *doubtful*, q. d. *a dubious light*. The crepusculum is usually computed to begin and end when the sun is about 18 degrees below the horizon; for then the stars of the sixth magnitude disappear in the morning and appear in the evening. It is of longer duration in the solstices than in the equinoxes, and longer in an oblique than in a right sphere.

The crepuscula are occasioned by the sun's rays refracted in our atmosphere, and reflected from the particles thereof to the eye. See TWILIGHT.

CRESCENT, the new moon, which, as it begins to recede from the sun, shows a little rim of light, terminating in points or horns, which are still increasing till it become full and round in the opposition. The word is formed from *cresco*, "I grow."

The term is also used for the same figure of the moon in its wane or decrease, but improperly; because the points or horns are then turned towards the west, whereas they look to the east in the just crescent.

CRESCENT, in *Heraldry*, is a bearing in form of a half moon. The Ottomans bear sinople, a crescent montant, argent.

The

The crescent is frequently used as a difference in coat armour, to distinguish it for that of a second brother or junior family.

The figure of the crescent is the Turkish symbol; or rather is that of the city Byzantium, which bore this device from all antiquity; as appears from medals struck in honour of Augustus, Trajan, &c.

The crescent is sometimes montant, i. e. its points look towards the top of the chief, which is its most ordinary representation; whence some contend, that the crescent, absolutely so called, implies that situation; though other authors blazon it montant, when the horns are towards the dexter side of the escutcheon, in which position others call it *incroissant*.

Crescents are said to be *adossed*, when their backs or thickest parts are turned towards each other; their points looking to the sides of the shield. *Crescent inverted*, is that whose points look towards the bottom; *turned crescents* are placed like those adossed; the difference is, that all their points look to the dexter side of the shield: *conturned crescents*, on the contrary, look to the sinister side: *affronted* or *appointed crescents*, are contrary to the adossed, the points looking towards each other.

Crescent is also the name of a military order, instituted by Renatus of Anjou, king of Sicily, &c. in 1448; so called from the badge or symbol thereof, a crescent of gold enamelled. What gave occasion to this establishment was, that Renatus took for his device a crescent, with the word *loz*, "praise," which, in the style of rebus, makes *loz in crescent*, q. d. *by advancing in virtue, one merits praise*.

CRESCENTIA, the calabash tree: A genus of plants belonging to the didynamia class; and in the natural method ranking under the 25th order, *Putamineæ*. See Botany *Index*.

The shells of calabashes are made use of for various purposes. At Barbadoes, besides drinking-cups and punch-bowls, there are made of them spoons, dishes, and other utensils for the slaves. Some of these shells are so large, as to be capable of holding 15 pints of water. The pulp is seldom eaten, except by cattle in the time of drought. The wood, which is hard and smooth, is made into stools, chairs, and other furniture.

CRESCIMBENI, John Maria, an Italian poet, was born at Macerata in Ancona, 1663. His talents for poetry and eloquence developed themselves early. His verses at first had too much pomp and point; but residing in Rome, and reading the best Italian poets, brought him back to nature. He not only reformed himself, but undertook to reform bad taste in general. From this motive he projected the establishment of a new academy, under the name of *Arcadia*; the members of which at first did not exceed 14, but afterwards increased much. They called themselves the shepherds of Arcadia, and each took the name of some shepherd and some place in that ancient kingdom. The founder of this society was appointed the director of it in 1690, and held this honourable post 38 years; namely, to the year of his death, which happened in 1728. Among a great number of works, in verse and prose, the principal is, A History of the Italian Poetry, very much esteemed, and reprinted, in 1731, at Venice, in six volumes, 4to. This history is accompanied with a commentary, containing anecdotes of Italian poets. He published also A History of the Academy of Arcadia, together with the Lives of the most illustrious Arcadians: and many other works.

CRESCY, or Cressy. See Cressy.

CRESS, water cress, or cresses. See Sisymbrium, Botany *Index*.

Indian Cress. See Tropæolum, Botany *Index*.

CRESSY, a port town of Picardy in France, about 44 miles south of Calais, and 27 north-west of Abbeville, remarkable on account of the victory obtained there over the French by Edward III. of England, in the year 1346. E. Long. 2. 0. N. Lat. 50. 20.

Edward having encountered and overcome many difficulties in his expedition, was at last so closely followed and harassed by the French army, commanded by the king of France in person, that he determined to make a stand at this place, and to give his pursuers a check. For this purpose he chose his ground with great judgment, on the gentle declivity of a hill, with a thick wood in his rear. He ordered deep entrenchments to be made on each flank, and waited with firmness the approach of his enemies. The king of France, dreading nothing so much as the escape of the English, began the march of his great army from Abbeville early in the morning, August 26. and continued it several hours with great eagerness, till he received intelligence that the English had halted at Cressy, and were prepared to give him battle. He was advised at the same time not to engage that day, when his troops were much fatigued with their march, and in great disorder; and he was disposed to have taken this advice. But the discipline of these times was so imperfect, that the orders given for halting were not obeyed; and one corps of this mighty host impelling another, they continued advancing till they came into the presence of their enemies in much confusion.

Edward had employed the forenoon of this important day in drawing up his army in the most excellent order, in three lines. The first line, which consisted of 800 men at arms, 4000 English archers, and 600 Welsh foot, was commanded by his young, amiable, and heroic son, the prince of Wales, assisted by the earls of Warwick and Oxford, and several other noblemen. The second line, composed of 800 men at arms, 4000 halbardiers, and 2400 archers, was led by the earls of Arundel and Northampton; the last line or body of reserve, in which were 700 men at arms, 5300 billmen, and 6000 archers, was ranged along the summit of the hill, and conducted by the king in person, attended by the lords Moubray, Mortimer, and others. When the army was completely formed, Edward rode along the lines, and by his words and looks inspired his troops with the most ardent courage and strongest hopes of victory. He then commanded the cavalry to dismount, and the whole army to sit down upon the grass, in their ranks, and refresh themselves with meat, drink, and rest. As soon as the French army came in view, they sprung from the ground, full of strength and spirit, and stood ready to receive them.

The king of France, assisted by the kings of Bohemia and Majorca, the dukes of Lorraine and Savoy, and several other sovereign princes, with the flower of the French nobility, laboured to restore some degree of order to his prodigious army, and drew it up alſo in three lines, but very indiſtinctly formed. The firſt line was commanded in chief by the king of Bohemia; the ſecond by the earl of Alençon, the king of France's brother; and the third by Philip in perſon; and each of theſe lines contained a greater number of troops than the whole Engliſh army.

The battle of Creſſy was begun about three o'clock in the afternoon, Auguſt 26. by a great body of Genoeſe croſs-bowmen, in the French ſervice, who let fly their quarrels at too great a diſtance to do any execution, and were preſently routed by a ſhower of arrows from the Engliſh archers. The earl of Alençon, after trampling to death many of the flying Genoeſe, advanced to the charge, and made a furious attack on that corps commanded by the prince of Wales. The earls of Arundel and Northampton advanced with the ſecond line to ſuſtain the prince, and Alençon was ſupported by as many troops as could crowd to his aſſiſtance. Here the battle raged for ſome time with uncommon fury; and the earl of Warwick, anxious for the fate of the day and the ſafety of the prince, ſent a meſſenger to the king, intreating him to advance with the third line. Edward, who had taken his ſtand on a wind-mill on the top of the hill, from whence he had a full view of both armies, aſked the meſſenger, if his ſon was unhorſed, or wounded, or killed? and being anſwered, that the prince was unhurt, and performed prodigies of valour. "Go then," ſaid he, "and tell my ſon and his brave companions, that I will not deprive them of any part of the glory of their victory." This flattering meſſage being made known, inſpired the prince and his troops with redoubled ardour; and the king of Bohemia, the earl of Alençon, and many other great men, being ſlain, the whole firſt and ſecond lines of the French army were put to flight. Philip, undiſmayed at the ſlaughter of his troops, and the fall of ſo many princes, advanced to the charge with the line under his immediate command. But this body ſoon ſhared the ſame fate with the other two; and Philip, after having been unhorſed, and wounded in the neck and thigh, was carried off the field by John de Hainault, and fled with no more than five knights and about 60 ſoldiers in his company, of all his mighty army, which at the beginning of the battle conſiſted of more than 120,000 men. Such was the famous victory of Creſſy, the greateſt ever gained by any king of England. After the battle, the king flew into the arms of the prince of Wales, and graſping him to his boſom, cried in an ecſtaſy of joy, "My dear ſon, you have this day ſhowed yourſelf worthy of the knighthood which you lately received, and of the crown for which you have ſo bravely fought; perſevere in your honourable courſe." The prince, as modeſt as he was brave, ſunk down on his knees, his face covered with bluſhes, and begged his father's bleſſing. Edward continued with his army at Creſſy three days, employed in numbering and burying the dead. The French had left on this bloody ſcene the king of Bohemia, 11 other princes, 80 bannerets, 1200 knights, 1500 gentlemen, 4000 men at arms, and 30,000 other ſoldiers.

CREST, in armoury, denotes the uppermoſt part of an armoury; or that part riſing over the caſk or helmet. Next to the mantle, ſays Guillim, the creſt or cognizance claims the higheſt place; being ſeated on the moſt eminent part of the helmet; yet ſo as to admit an interpoſition of ſome eſcrol, wreath, chapeau, crown, &c.

The ancient warriors wore creſts to ſtrike terror in their enemies, as the ſight of the ſpoils of animals they had killed; or to give them the more formidable mien, by making them appear taller, &c.

In the ancient tournaments, the cavaliers had plumes of feathers, eſpecially thoſe of oſtriches and herons, for their creſts; theſe tufts they called *plumarts;* and were placed in tubes, on the tops of high caps or bonnets. Some had their creſts of leather; others of parchment, paſteboard, &c. painted or varniſhed, to keep out the weather; others of ſteel, wood, &c. on which were ſometimes repreſented a member or ordinary of the coat; as an eagle, fleur-de-lys, &c. but never any of thoſe called *honourable ordinaries*, as pale, feſſe, &c. The creſts were changeable at pleaſure; being reputed no other than as an arbitrary device or ornament.

Herodotus attributes the riſe of creſts to the Carians, who firſt bore feathers on their caſks, and painted figures on their bucklers; whence the Perſians called them *cocks*.

The creſt is eſteemed a greater mark of nobility than the armoury, as being borne at tournaments; to which none were admitted till they had given proof of their nobility. Sometimes it ſerves to diſtinguiſh the ſeveral branches of a family. It has alſo ſerved, on occaſion, as the diſtinguiſhing badge of factions. Sometimes the creſt is taken from the device; but more uſually it is formed of ſome piece of the arms: thus, the emperor's creſt is an eagle; that of Caſtile, a caſtle, &c. Families that exchange arms, as the houſes of Brunſwick and Cologne have done, do not change their creſts; the firſt ſtill retain the horſe, and the latter the mermaid.

Crest, in *Heraldry*, the figure placed above the helmet in an atchievement. See Heraldry.

Crest-fallen, a fault of a horſe, when the upper part of his neck, called the *creſt*, hangs to one ſide: this they cure by placing it upright, clipping away the ſpare ſkin, and applying plaſters to keep it in a proper poſition.

CRETA, or Chalk, in *Natural Hiſtory*. See Chalk, Mineralogy *Index*.

CRETE, one of the largeſt iſlands in the Mediterranean, lying between 22 and 27 degrees of eaſt longitude, and between 35 and 36 degrees of north latitude. According to Strabo, this iſland is 287 miles in length; and according to Pliny, 270; and according to Scylax, 312. As to its breadth, it is not, as Pliny obſerves, above 55 miles where wideſt; whence it was ſtyled, as Stephanus obſerves, the *Long iſland.* It has the Archipelago to the north, the African ſea to the ſouth, the Carpathian ſea to the eaſt, and the Ionian to the weſt. Anciently it was known by the names of *Aeria*, *Chthonia*, *Idea*, *Curete*, *Macaris*, &c. but its moſt common name was that of *Crete*.

The Cretan mythologiſts, quoted by Diodorus Siculus, relate that the firſt inhabitants of the iſland were the Dactyli Idæi, who dwelt around Mount Ida; they were regarded as magicians, becauſe they poſſeſſed a variety of knowledge, and were particularly ſkilled

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led in religious myſteries. Orpheus, who diſtinguiſhed himſelf ſo highly in poetry and muſic, was their diſciple. They diſcovered the uſe of fire, iron, and braſs, and invented the art of working theſe metals in Berecynthius, a mountain near Aptera. Thoſe invaluable diſcoveries procured them divine honours. One of them, named Hercules, rendered himſelf famous by his courage and great exploits. He inſtituted the Olympic games; though poſterity, by a miſtake ariſing from his bearing the ſame name, have aſcribed that inſtitution to the ſon of Alcmena; who, indeed, trode in the ſteps of his predeceſſor, and raiſed himſelf alſo to immortality.

The Dactyli Idæi were the anceſtors of the Curetes. Theſe laſt at firſt inhabited the foreſts and caves of the mountains. Afterwards they entered into domeſtic life, and contributed, by their inſtitutions, to the civilization of mankind. They taught men to collect flocks of ſheep, to tame the ferocity of wild animals for domeſtic purpoſes, and to invite bees into hives, that they might rifle them of the fruit of their labours. They firſt prompted men to the chaſe, and taught the uſe of the bow. They were the inventors of ſwords and of military dances. The noiſe which they made, by dancing in armour, hindered Saturn from hearing the cries of Jupiter, whoſe education Rhea had entruſted to them. With the aſſiſtance of the nymphs, they brought up that god in a cave in Mount Ida, feeding him with the milk of the goat Amalthea, and with honey.

To this period mythology aſſigns the origin of the Titans; their abode near Gnoſſus, where ſtood the palace of Rhea; their travels over the whole earth; their war againſt Ammon, and his defence by Bacchus; the nuptials of Jupiter and Juno, celebrated nigh the river Therenus in Crete; the gods, goddeſſes, and heroes, who deſcended from them.

The moſt illuſtrious of thoſe heroes were Minos and Rhadamanthus. They are ſaid to have been the ſons of Jupiter and Europa, who was conveyed into the iſland on a bull. Minos becoming king, built ſeveral cities; the moſt conſiderable of which are—Gnoſſus, on that ſide of the iſland which faces Aſia, Phœſtus on the ſouthern ſhore, and Cydon on the weſtern, facing Peloponneſus. He gave to his ſubjects a code of admirable laws, which he pretended to have received from his father Jupiter in the grotto of Mount Ida.

Rhadamanthus diſtinguiſhed himſelf by the impartiality of his judgments, and by the inflexible ſeverity with which he inflicted puniſhment on the impious aud wicked. His empire extended over the chief iſles of the Archipelago, and the inhabitants of the adjacent coaſts of Aſia ſubmitted to him on account of his high reputation for probity and juſtice. Mythologiſts have conſtituted him judge in the regions below, to determine the future ſtate of the righteous and the wicked. They have conferred on him the ſame honours which were beſtowed on Minos, the juſteſt of kings.

Thus far have been followed the Cretan traditions as they are related by Diodorus; but hiſtorians differ about the truth of them. There are a variety of opinions concerning the firſt inhabitants of Crete. Strabo, who has diſcuſſed them with great erudition, ſays, after ſeveral pages on the ſubject: "I am not fond of fables; yet I have detailed theſe at ſome length, becauſe they are connected with theology. Every diſcourſe concerning the gods ſhould examine the religious opinions of antiquity, and diſtinguiſh them from fable. The ancients were pleaſed to conceal their knowledge of nature under a veil. It is now impoſſible to unfold the meaning of their enigmas. But by expoſing to light the numerous allegories which they have left us, and by examining attentively their mutual relations and differences, genius may perhaps be able to unfold the truths which are couched under them."

But leaving mythology for the more certain records and monuments of hiſtory, we find that Crete received its name from Crés, the firſt of its monarchs. He was author of ſeveral uſeful inventions, which contributed to the happineſs of his ſubjects. Prompted by gratitude, they endeavoured to perpetuate the memory of his favours, and to immortalize his name, by naming the iſland after him.

In order to diſtinguiſh the true Cretans from ſtrangers, they were named *Eteocretes*. A number of colonies, from different parts of Greece, ſettled in the iſland. The agreeableneſs of the climate, and the fertility of the ſoil, invited them to fix their habitation there. The Lacedæmonians, Argives, and Athenians, were the principal people who ſent colonies into Crete. This is what makes Homer ſay, "Crete is an extenſive iſland in the midſt of the ſtormy main. The ſoil is rich and fertile. It contains an immenſe number of inhabitants. It is adorned with a hundred cities. Its inhabitants ſpeak in various languages. We find there Achæans, valiant Eteocretes, Cydonians, Dorians, and godlike Pelaſgians." The Eteocretes inhabited the ſouthern diviſion of the iſland; they built there the city of Prœſus, and erected a temple to Dictæan Jove.

Crés was not the only monarch who reigned in the iſland of Crete. He had a ſeries of ſucceſſors. But hiſtory affords little information concerning them: only the names of a few of them are preſerved, and a ſmall number of events which happened under the reign of ſome others, but blended and disfigured with an intermixture of fable. Among thoſe monarchs we find two Jupiters, and two of the name of Minos. However, moſt writers confound them, and aſcribe to one thoſe tranſactions and exploits which ſhould be ſhared between the two.

This remark chiefly regards Minos, who was eſteemed the wiſeſt legiſlator of antiquity. The office aſſigned him in the regions below is a clear and certain proof of his having gained an exalted reputation by his juſtice. Greece, ſays Plato, has with great propriety adopted the laws of Crete; for they are founded on the ſolid baſis of reaſon and equity, and have a natural tendency to render the people, who live in ſubjection to them, opulent and happy. One of thoſe laws forbade "the Cretans ever to carry their feſtivity ſo far as to intoxicate themſelves with wine." The following was very ſuitable to repreſs the preſumptuous ardour of youth: "Let young people not canvaſs the laws with an indiſcreet curioſity; let them not examine whether the lawgiver has done right or wrong in promulgating them; but let them join unanimouſly in declaring them good, ſince they proceed from the gods. If any of the old men perceive ſomething

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thing in them meriting amendment, let him mention it to the magiſtrate, or diſcuſs it with his equals, but never in the preſence of the young people." That excellent code was engraven on tables of braſs; and Talos, chief miniſter to Minos, viſited all the towns and cities in the iſland, three times a-year, to obſerve in what manner the laws were executed and obeyed. The king of Crete, well knowing that the marvellous is neceſſary to command the belief and enforce the obedience of the people, pretended that he had received thoſe laws from his father Jupiter, in the grotto of Mount Ida. In the ſame manner, Lycurgus, before promulgating his laws, repaired to Delphos, and gave out they had received the ſanction of Apollo. A like reaſon induced Numa to pretend to an intimacy with the nymph Egeria, and Mahomet to aſcribe his doctrines and inſtitutions to the revelation of the angel Gabriel.

In contradiction to this account, others of the ancients deſcribe Minos as a prince impotently abandoned to the fury of his paſſions, and a barbarous conqueror. Falling paſſionately in love with the nymph Dictynna, who refuſed to gratify his wiſhes, he purſued her to the brink of the ſhore, and forced her to plunge into the ſea, where ſhe was ſaved by ſome fiſhermen, who received her in their nets. He was the firſt of the Greeks who appeared in the Mediterranean at the head of a naval armament. He conquered the Cyclades, expelled the Carians, eſtabliſhed Cretan colonies in thoſe iſlands, and committed the government of them to his ſon.

Being informed, while he was at Paros, that his ſon Androgeus was ſlain at Athens, he declared war againſt Egeus, and impoſed on him a diſgraceful tribute; from the payment of which Theſeus delivered his country. He took arms againſt Niſus, king of Megara, made him priſoner by the treachery of his daughter Scylla, and put him to death, together with Megarus, the ſon of Hippomanes, who had brought ſome forces to his aſſiſtance. Dædalus, who had by ſome means incurred his diſpleaſure, deſpairing of pardon from ſo ſevere and inflexible a prince, employed the reſources of his inventive genius, in order to eſcape from his power. He fled to Sicily, gained the protection of King Cocalus, and obtained an aſylum in his court. Valerius Flaccus has deſcribed his flight in a very lively and pictureſque manner. "Thus Dædalus, with the wings of a bird, aſcended from Mount Ida. Beſide him flew the comrade of his flight, with ſhorter wings. They appeared like a cloud riſing in the air. Minos, ſeeing his vengeance thus eluded, glowed with impotent rage. In vain he followed with his eyes the ſecure flight of his enemies through the wide expanſe of heaven. His guards returned to Gortynia with their quivers filled with arrows." The Cretan monarch did not, however, give up his prey. He equipped a fleet, purſued the fugitive to Sicily, and fell before the walls of Camicum.

It is plain, that thoſe actions cannot agree to the character of that juſt monarch, whoſe merits raiſed him to the office of determining, in the regions below, the unalterable fate of the righteous and the wicked. We may, therefore, reaſonably conclude, that Minos the legiſlator is a different perſon from the conqueror; that it was the former who gained a laſting reputation by his wiſdom and juſtice; and the latter who ſubdued moſt of the iſlands of the Archipelago, but being enſlaved by his paſſions, tarniſhed his glory by his cruelty and mercileſs thirſt for vengeance.

The laſt king of Crete was Idomeneus. This prince, accompanied by Merion, conducted 24 ſhips to the aſſiſtance of Agamemnon. Homer informs us of the illuſtrious exploits by which he ſignalized himſelf before the walls of Troy. At his departure, he committed the government of his kingdom to Leucus his adopted ſon, promiſing him the hand of his daughter Cliſithera if he governed wiſely in his abſence. That ambitious young man ſoon forgot the favours which had been ſo laviſhly beſtowed on him. Gaining a number of partiſans, he in a ſhort time aſpired to the immediate poſſeſſion of the crown. His impatience would not wait till he ſhould obtain it lawfully by marriage. Flattering himſelf, from the long abſence of the king, that he was perhaps fallen before Troy, he determined to mount the throne. Mida, wife to Idomeneus, and the princeſs Cliſithera, were an obſtacle to his wiſhes. But ambition knows no reſtraint, and tramples under foot the moſt ſacred obligations. The baſe wretch having ſeduced the people from their allegiance, and captivated the affections of the nobles, ſacrificed thoſe unfortunate victims in the temple. When Idomeneus, crowned with laurels, landed on the coaſt of Crete, Leucus, who had now firmly eſtabliſhed his power, attacked him with an armed force, and obliged him to reimbark. A different account is alſo given of the baniſhment of Idomeneus. Servius ſays that he had vowed, in a ſtorm, to ſacrifice to the the gods the firſt perſon that his eyes ſhould behold on the Cretan ſhore; that his ſon having met him firſt after his arrival, he fulfilled his vow, by ſacrificing him; and that the iſland, being ſoon after depopulated by peſtilence, the inhabitants looked upon that affliction as the effect of divine vengeance, and expelled the parricide; who, retiring to Italy, founded Salentum, on the Meſſapian coaſt. But that opinion appears entirely groundleſs. Hiſtory mentions no ſon of Idomeneus. If he had a ſon of his own blood, why did he adopt Leucus? Why did he intruſt to him the government of the iſland, when he promiſed him his daughter in marriage? The more probable opinion is, that the plague was introduced into the iſland by his ſhips, when he returned from the ſiege of Troy, as Herodotus aſſerts; and that Leucus artfully made uſe of that pretext to expel his lawful ſovereign from the iſland. But it appears that the uſurper did not long enjoy the fruit of his crimes. Soon after the departure of Idomeneus, monarchy was aboliſhed, and the government of Crete became republican.

The republic of Crete has been celebrated by the panegyric of Plato, ſerved Lycurgus as a model for that which he eſtabliſhed in Lacedemon, and was beheld by all Greece with reſpect and admiration. Strabo has thought it not unworthy of his pencil, and has conſecrated the leading features of its conſtitution to laſting fame in his immortal work. It was indeed a ſyſtem of legiſlature, whoſe direct tendency was to call forth the buds of virtue in the heart of infancy; to open and expand them in youth; to inſpire man, as he reached maturity, with the love of his country, of glory,

glory, and of liberty; and to comfort and ſupport the infirmities of age with the reſpect and eſteem due to the experience and wiſdom of that period of life. It laboured to form affectionate friends, patriotic citizens, and worthy magiſtrates. It made no uſe, however, of a multitude of acts and ſtatutes to produce thoſe ineſtimable advantages. They flowed all from one ſource: the public education of youth, judiciouſly directed. The virtuous examples ſet before youth in the courſe of that education, the illuſtrious deeds which were recited to them with high applauſe, the honours conferred on valour and on noble actions, the opprobrium invariably caſt on vice; theſe were the only means which the Cretan lawgiver made uſe of to form a warlike, humane, and virtuous nation.

The Cretan government, ſoon after the expulſion of Idomeneus, became ariſtocratical. The power was divided between the nobles and the people. Yet as the chief employments were occupied by the nobles, they directed the adminiſtration of affairs. Ten magiſtrates were annually elected, by a majority of voices, in the national aſſembly. Theſe were named *Coſmoi;* and their public office and character were the ſame with thoſe of the Ephori at Sparta. They were the generals of the republic in time of war, and directed all affairs of any importance. They had the right of chooſing certain old men for counſellors. Thoſe old men, to the number of twenty-eight, compoſed the Cretan ſenate. They were choſen from among ſuch as had diſcharged the office of Coſmoi, or had diſtinguiſhed themſelves by extraordinary merit and blameleſs probity. Thoſe ſenators continued in office during life, poſſeſſed a weighty influence, and were conſulted in every affair of any importance. This body was a barrier oppoſed by the wiſdom of the legiſlator againſt the ambition of the ten chief rulers. He had impoſed another reſtraint on their power, by limiting the period of their adminiſtration to one year. His foreſight went ſtill farther. The ſuffrages of the people might be obtained by bribery or perſonal influence, and of conſequence their choice might ſometimes fall on a man unworthy of ſo honourable an office. When that happened, he who had been undeſervedly advanced to the dignity of Coſmos was degraded, either in a national aſſembly, or ſimply by the voices of his colleagues. This, doubtleſs, is what Plato alludes to, when he ſays, "Neither the commonwealth, which approaches too near to a monarchical conſtitution, nor that which affects a licentious liberty, is founded on the ſolid baſis of a juſt medium between anarchy and deſpotiſm. O Cretans! O Lacedemonians! by eſtabliſhing yours on firmer foundations, you have avoided thoſe fatal extremes."

Such were the diſtribution of power and the adminiſtration of public affairs in the Cretan government. Its ſimplicity was admirable. A people who were bleſſed with the ſacred enjoyment of liberty, but poſſeſſed not ſufficient knowledge and diſcernment to direct themſelves, elected magiſtrates, to whom they delegated their authority. Thoſe magiſtrates, thus arrayed with ſovereign power, choſe ſenators to aſſiſt and direct their deliberations. Theſe counſellors could neither enact nor decide of themſelves; but they held their office for life; and that circumſtance contributed to ſtrengthen their influence and to increaſe their experience. The magiſtrates were animated by the moſt powerful motives to diſtinguiſh themſelves when in office, by unwearied activity in the public ſervice. On one ſide, they were reſtrained by the fear of degradation; on the other, actuated by the hope of becoming one day members of the national council.

Yet let us inquire what means the Cretan lawgiver uſed to form virtuous citizens. All the Cretans were ſubjected to the power of their magiſtrates; and divided into two claſſes, the adults and the youth. Men arrived at maturity were admitted into the firſt. The ſecond conſiſted of all the young men who were not below the age of ſeventeen. The ſociety of adults ate together in public halls. There rulers, magiſtrates, poor and rich, ſeated together, partook, without diſtinction, of the ſame ſimple fare. A large bowl, filled with wine and water, which went round the company from one to another, was the only drink that they were allowed. None but the old men had a right to call for more wine. Doubtleſs, that people, ſo celebrated for wiſdom, were not ſtrangers to the power of beauty; for a woman was appointed to preſide at each table. She openly diſtributed the moſt exquiſite meats to thoſe who had diſtinguiſhed themſelves by their valour or wiſdom. That judicious preference was ſo far from exciting envy or jealouſy, that it only prompted every perſon to deſerve it by brave and prudent conduct. Near where the citizens ſat, two tables were laid, which they named *Hoſpitable;* all ſtrangers and travellers were entertained at theſe; and there was alſo a particular houſe ſet apart by the public, in which they might ſpend the night.

To ſupply the public expences, every citizen was obliged to bring a tenth part of his annual income into the treaſury. The chief magiſtrates were to take care that every perſon contributed his proportion. In Crete, ſays Ariſtotle, one part of the fruits of the earth, of the produce of the flocks, of the revenues of the ſtate, and of the taxes and cuſtoms, is ſacred to the gods: the other is diſtributed among the members of the community; ſo that men, women, and children, all ſubſiſt at the public expence.

After dinner, the magiſtrates and ſenators uſually ſpent ſome time in deliberating on the affairs of the ſtate; they next recounted the noble deeds which had been done in war, celebrated the courage of their moſt diſtinguiſhed warriors, and animated the youth to heroic valour. Thoſe aſſemblies were the firſt ſchool of the youth. At the age of ſeven, the boy was permitted to handle the bow;—from that time he was admitted into the ſociety of the adults, where he continued till the age of ſeventeen. There, ſitting on the ground, and clothed in a plain and coarſe dreſs, he ſerved the old men, and liſtened, with reſpectful ſilence, to their advices. His young heart was inflamed with the recital of noble deeds in arms, and glowed with ardour to imitate them. He acquired habits of ſobriety and temperance. And being conſtantly witneſs of illuſtrious examples of moderation, wiſdom, and patriotiſm; the ſeeds of virtue were thus ſown and foſtered in his heart before he attained the uſe of reaſon.

He was early accuſtomed to arms and to fatigue, that he might learn to endure exceſſive heat or cold,

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to clamber and leap among hills and precipices, and to bear manfully the blows and wounds which he might receive amid the gymnaſtic exerciſes or in battle. His education was not confined to the gymnaſtic exerciſes; he was alſo taught to ſing the laws, which were written in verſe, with a certain ſpecies of melody; in order that the charms of muſic might diſpoſe him to learn them with more pleaſure, and might impreſs them more deeply on his heart, and that, if he ſhould ever tranſgreſs them, he might not have the excuſe of ignorance to offer. He next learned hymns in honour of the gods, and poems compoſed in praiſe of heroes. When he reached his ſeventeenth year, he retired from the ſociety of the adults, and became a member of that of the young men.

Here his education was ſtill carried on. He exerciſed himſelf in hunting, wreſtling, and fighting with his companions. The lyre played tunes of martial muſic; and he learned to follow exactly the ſounds and meaſure of the muſician. Thoſe ſports and exerciſes were ſometimes attended with danger; becauſe arms of ſteel were ſometimes uſed in them. One dance, in which the youth aſpired moſt ardently to excel, was the Pyrrhic, originally invented in Crete. The performers in that dance were arrayed in complete armour:—they wore a light ſhort coat, which did not fall below the knee, and was bound with a girdle going twice round the waiſt: on their feet and legs were buſkins; above theſe they bore their arms, and performed various military evolutions to the ſound of muſical inſtruments. "The Lacedemonians and Cretans (ſays Libanius) cultivated dancing with amazing ardour; they conſidered that their laws had directed them to practiſe it for the moſt important purpoſes; and it was ſcarce leſs diſhonourable for a Lacedemonian or Cretan to neglect the military dances, than to deſert his poſt in battle."

Thoſe Cretans who were opulent and high-born, were permitted to form ſocieties of young men of their own age. They often ſtrove, with emulation, who ſhould form the moſt numerous ones. The father of the young man who formed one of thoſe ſocieties uſually preſided in it. He had a right to educate thoſe warlike youth, to exerciſe them in running and in hunting, to confer rewards and inflict puniſhments.

Friendſhip was in high eſtimation among the Cretans; but, ſays Strabo, the manner in which they conducted the intercourſe of friendſhip was pretty extraordinary. Inſtead of mild perſuaſion, they made uſe of violence to gain the objects of their affections. He who conceived an affection for a young man of his own age, and wiſhed to attach him to himſelf by indiſſoluble bonds, formed a ſcheme for carrying him off by violence. Three days before putting it into execution, he communicated it to his comrade. They could not then interfere to prevent it; becauſe if they had, they would have appeared to think the young man unworthy of ſuch an exceſſive attachment. At the appointed day they aſſembled to protect their companion. If the raviſher appeared to them not unworthy of the object of his affection, they made at firſt a faint reſiſtance in obedience to the law—but, at laſt, joyfully favoured his enterpriſe; if, on the other hand, they thought him unworthy of the object of his choice, they made ſuch reſiſtance as to prevent him from executing his deſign. The feigned reſiſtance continued till the raviſher had conducted his friend into the hall of that ſociety to which he belonged. They did not regard him who poſſeſſed ſuperior beauty and graceſulneſs of perſon as the moſt amiable; but him who had moſt diſtinguiſhed himſelf by his modeſty and valour.

The raviſher loaded his young friend with favours, and conducted him wherever he deſired; they were accompanied by thoſe who had favoured the rape: he carried him from feaſt to feaſt, procured him the pleaſures of the chaſe and good cheer; and after uſing all poſſible means to gain his heart for the courſe of two months, brought him back to the city, and was obliged to give him up to his parents. But firſt he preſented him with a ſuit of armour, an ox, and a drinking cup; which were the uſual and legal preſents on ſuch occaſions. Sometimes his generoſity went ſtill farther; and he made more expenſive preſents; to defray the expence of which his comrades contributed. The young man ſacrificed the ox to Jupiter, and gave an entertainment to thoſe who had aſſiſted when he was carried off. He then declared his ſentiments concerning a connection with his raviſher, and told whether or not it was agreeable to him. If he had reaſon to complain of the treatment which he had received, the law allowed him to forſake a friend ſo unworthy of the name, and to demand his puniſhment.

It would have been diſgraceful, adds Strabo, to a young man who was handſome and well born, to be rejected by his friends on account of the depravity of his manners. Thoſe who had been carried off received public honours. Theirs were the firſt places in the halls and at the race. They were permitted to wear, during the reſt of life, thoſe ornaments which they owed to the tenderneſs of friendſhip; and that mark of diſtinction teſtified to all who ſaw them, that they had been the objects of ſome fond attachment.

When the youth had finiſhed their exerciſes, and attained the legal age, they became members of the claſs of adults; being then conſidered as men, they were permitted to vote in the national aſſemblies, and were entitled to ſtand candidates for any public office. They were then obliged to marry: but did not take home their wives till ſuch time as they were capable of managing their domeſtic concerns.

"The legiſlator (ſays Strabo) had conſidered liberty as the greateſt bleſſing that cities can enjoy. Liberty alone can ſecure the property of the citizens of any ſtate. Slavery either robs them of it, or renders it precarious. The firſt care of nations ſhould therefore be to preſerve their liberty. Concord ſtrengthens and ſupports her empire; ſhe flouriſhes wherever the ſeeds of diſſenſion are extinguiſhed. Almoſt all thoſe hoſtilities which prevail among nations or individuals ſpring either from an inordinate deſire of wealth or the love of luxury. Introduce, inſtead of thoſe baneful principles, frugality, moderation, and equality of conditions; you will thus baniſh envy, hatred, injuſtice, and haughty diſdain." This was what the Cretan lawgiver happily effected. And the community, which was regulated by his wiſe inſtitutions, roſe to glory, opulence, and power; and was honoured with the panegyrics of the moſt celebrated philoſophers

loſophers of Greece; but the higheſt honour it ever obtained, was that of ſerving Lycurgus as a model for the admirable form of government which he eſtabliſhed at Sparta.

The republic of Crete continued to flouriſh till the age of Julius Cæſar. No other ſtate has enjoyed ſo long a period of ſtrength and grandeur. The legiſlature, regarding liberty as the only ſure baſis of a nation's happineſs, had inſtituted a ſyſtem of laws, the natural tendency of which was, to inſpire men with an ardent paſſion for liberty, and with ſuch virtue and valour as are neceſſary to ſupport and defend it. All the citizens were ſoldiers; all of them were ſkilled in the art of war. The valiant youth of other nations reſorted to Crete, to learn the exerciſes, manœuvres, and evolutions, of the military art. "Philopœmen (ſays Plutarch) being impatient of indolence, and eager to acquire ſkill in arms, embarked for Crete. After ſpending a conſiderable time in the nobleſt exerciſes among that brave people, who were ſkilled in the art of war, and accuſtomed to an auſtere and temperate life, he returned to the Achæans. The knowledge which he had acquired made him ſo eminent among them, that he was immediately appointed general of their cavalry."

On the other hand, the legiſlator, being perſuaded that conqueſts are generally unjuſt and criminal, that they often exhauſt the ſtrength of the victorious nation, and almoſt always corrupt its manners, endeavoured to preſerve the Cretans from the ambition of conqueſt. The fertility of the iſland abundantly ſupplied their wants. They needed not that commerce ſhould introduce among them the riches of foreign countries, along with which luxury and her train of attendant vices would alſo be introduced; and he knew how to inſpire them with an indifference for ſuch acquiſitions without expreſsly forbidding them. The gymnaſtic exerciſes, which occupied the leiſure of the gallant youth; the pleaſures of the chaſe; the ardour of friendſhip; the public ſhows, at which all the different orders of the community, both men and women, uſed to aſſemble; the love of equality, order, and their country, with which he inflamed every breaſt; the wiſe inſtitutions, which united a whole nation ſo cloſely that they compoſed but one family;—all theſe ties attached the Cretans to their native iſland: and finding at home that happineſs which was the object of their wiſhes, they never thought of wandering abroad in ſearch of an imaginary glory, or of extending their empire over other nations. Therefore, from the period at which that ſtate aſſumed a republican form till the time when they were attacked by the arms of Rome, the nation was not once known to ſend a hoſtile force into the territories of any of their neighbours. This inſtance of moderation is unparalleled in hiſtory; no other nation can divide the glory of it with the Cretans. Individuals indeed might leave their country to engage in foreign armies. Thoſe princes and ſtates who knew their valour and ſkill in archery eagerly ſought to take them into their pay; all the neighbouring monarchs were deſirous of having in their armies a body of Cretan archers. Over the whole world none were more celebrated than they for bending the bow. "The arrows of Gortynia (ſays Claudian), aimed from a truſty bow, are ſure to wound, and never miſs the deſtined mark."

Though the multitude of independent cities which flouriſhed in Crete did not unite their arms to ſubjugate the neighbouring iſlands, and drench them with the blood of their inhabitants; yet they were not ſo wiſe as to live in peace among themſelves. Diſcord often ſtalked among them with her flaming torch. The moſt powerful wiſhed to enſlave the reſt. Sometimes Gnoſſus and Gortynia marched with ſocial banners againſt their neighbours, levelled their fortreſſes, and ſubjected them to their power; at other times they attacked each other with hoſtile violence, and ſaw their braveſt youth periſh amid the horrors of civil war. Lyctos and Cydon oppoſed an invincible barrier to their ambition, and preſerved their own liberty. The laſt of theſe cities had acquired ſuch ſtrength and influence, that ſhe held the balance between the rival powers of the iſland. Thoſe wars deſtroyed a number of the cities, and drenched the native country of Jupiter with blood.

To what ſource muſt we attribute thoſe inteſtine diſſenſions? One part of the iſland was occupied by the Eteócretes, the original inhabitants; the reſt was peopled with colonies from Athens, Sparta, Argos, and Samos. Perhaps the ancient grudges which had ſubſiſted among thoſe ſtrangers, being ſtill unextinguiſhed in their breaſts, were eaſily rekindled by accident or circumſtances, and inflamed with new fury. We may alſo ſuppoſe, that the moſt powerful among them, exulting in their ſuperiority, would endeavour to take advantage of the weakneſs of the reſt, and diſregard all laws but thoſe of force: beſides, the glowing ardour of the youth, trained to military exerciſes, was ever ready to fly to arms. Such, probably, were the cauſes which fomented diſcord and hoſtility among a people living under the ſame religion, cuſtoms, and laws.—Whatever theſe might be, the Cretans being perſuaded that the firm union of their ſoldiers was eſſential to victory, arrayed the braveſt youths of the army in ſplendid robes, and cauſed them to ſacrifice to friendſhip before engaging in battle. In ſome countries it would be very proper to oblige the generals on ſuch occaſions, to ſacrifice to concord. If ſuch a ſacrifice were performed with ſincerity, it might preſerve their glory unſtained, and prevent ſuch deluges of blood from being waſted without producing any advantages to the ſtate.

Their paſſion for war did not extinguiſh in the breaſts of the Cretans that exquiſite ſenſibility which is the mother and nurſe of the fine arts. "The Cretans (ſays Sozomen) gave an illuſtrious proof of their munificence to genius, by making Homer a preſent of a thouſand pieces of ſilver; and to perpetuate the memory of this act of generoſity, they recorded it by an inſcription on a public column." In Crete, adds Ptolemy, men are ſtill more deſirous of cultivating their underſtandings than of exerciſing their bodily powers. Often when diſſenſions aroſe, the voice of wiſdom and the charms of poeſy recalled them to reaſon and harmony. Thales of Gortynia, the preceptor of Lycurgus, was one of their moſt celebrated philoſophers. Being both a poet and legiſlator, he made a happy uſe of his abilities and knowledge to extinguiſh among

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his countrymen the kindling ſparks of diſcord. "His poems were moral diſcourſes in verſe, which recalled the people to concord and ſubmiſſion to the laws. Uſing a regular meaſure, he recommended the auſterity of his ſubject by the inſinuating and powerful charm of ſentiment. So powerful were the effects of his verſes, which addreſſed at once the ears, the heart, and the underſtanding of his hearers, that their rage was gradually ſoftened. Next, opening their hearts to the love of peace, the advantages of which he deſcribed in glowing colours, they forgot their inteſtine diſſenſions, and ranged themſelves around the ſtandard of concord." That ſage is ſaid to have invented tunes for the military dances and for the Cretan Pyrrhic. Men who felt ſo ſtrongly the influence of poetry and muſic could ſcarcely be enemies to pleaſure. Accordingly they had a cuſtom of diſtinguiſhing their fortunate days with white flint ſtones, their unfortunate days with black. At the end of the year they counted the number of their white ſtones, and reckoned that they had lived only ſo many days as were diſtinguiſhed for having been fortunate. They did not think mere exiſtence, without the enjoyment of pleaſure, worthy of the name of *life*. For this reaſon, they cauſed to be inſcribed on their tombs: "He lived ſo many days; he continued in exiſtence ſo long."

A paſſion for glory is eaſily awaked in a feeling and generous breaſt. The Cretans eagerly repaired to the famous ſolemnities of Greece, and were often crowned at the Olympic, Nemæan, and Pythian games; others of them were favourites of the muſes, and verſified the predictions of prophets, or celebrated the glorious deeds of their heroes. Several of them diſtinguiſhed themſelves by hiſtorical compoſitions. At the moſt ancient games, a prize is ſaid to have been beſtowed on the poet who ſung the nobleſt hymn in honour of Apollo: Chryſothemis of Crete ſung and gained the prize.

The ravages of time have deprived us of almoſt all their works; and if Pindar had not preſerved the memory of ſome of their crowns, we ſhould not know even the names of the conquerors who wore them. The temple of Diana at Epheſus, built by the Cretan Cteſiphon and his ſon Metagenes, was not proof againſt the frantic hand of the incendiary. Thoſe ingenious architects had built it on the principles of the Ionic order: to the coſtlineſs of the materials, the elegance of the architecture, the ſymmetry of the parts, and the majeſty and perfection of the whole, they had added ſolidity and ſtrength, without which the reſt muſt have been of ſmall value. Their names have deſcended to poſterity, but the pillars of that monument which has perpetuated their memory have been diſperſed or deſtroyed. Scarce a veſtige remains of that building which was eſteemed one of the ſeven wonders of the world.

Nations are effaced from the earth like the monuments of their power, and after the revolution of ſeveral ages we can ſcarcely trace in their poſterity any remains of their ancient character. Some of them exiſt longer, others ſhorter; but we may almoſt always calculate the period of their duration by the excellence of their laws, and the fidelity with which they ſupport and obey them. The republic of Crete, being eſtabliſhed on a ſolid baſis, knew no foreign maſter for a period of ten centuries. She bravely repelled the attacks of thoſe princes who attempted to enſlave her. At length the time arrived when the warlike and victorious Romans aſpired to the empire of the world, and would ſuffer none but their ſubjects or ſlaves to inhabit within the reach of their arms. Florus does not ſcruple to acknowledge, that the Romans had no other motives for invading Crete but the ambitious deſire of ſubduing the renowned native country of Jupiter. "If any perſon wiſh to know the reaſons which induced us to attack Crete (ſays he), the true reaſon was our deſire to ſubdue ſo celebrated an iſland. The Cretans had appeared to favour Mithridates, and the Romans thought proper to declare war againſt them on that pretext. Mark Antony, father of the triumvir, attacked them with ſtrong hopes of ſucceſs; but was ſeverely puniſhed for his preſumption and imprudence. The Cretans took a great part of his fleet, hung up his ſoldiers and ſailors on the maſts amid the ſails and cordage, and returned in triumph into their harbours."

The Romans never forgot nor forgave a defeat. As ſoon as the Macedonian war was brought to a happy concluſion, they again took arms againſt the Cretans to revenge their ignominy and loſs. Quintus Metellus was ſent to Crete with a powerful armament. He met with an obſtinate and vigorous reſiſtance. Panarus and Laſthenes, two experienced leaders, collecting a body of 20,000 young warriors, all eager for battle, and of determined courage, employed their arms and arrows ſucceſsfully againſt the Romans, and protracted the fate of Crete for three years. Thoſe conquerors could not make themſelves maſters of the iſland before deſtroying its braveſt warriors. They loſt a great number of troops, and bought a bloody victory at the price of many a danger and much fatigue. However, their uſual good fortune at length prevailed. The firſt care of the conqueror was to aboliſh the laws of Minos, and to eſtabliſh in their room thoſe of Numa. Strabo, that enlightened philoſopher, complains of this act of ſeverity; and informs us, that in his days the original laws of Crete were no longer in force, becauſe the Romans compelled the conquered provinces to adopt their civil code. To ſecure themſelves ſtill more fully in the poſſeſſion of the iſland, they ſent a powerful colony to Gnoſſus.

From that era to the preſent time, that is, for a period of 1900 years, the Cretans have no longer formed a ſeparate nation, or made any figure among the ſtates and kingdoms of the world: their noble and ingenuous manners, their arts and ſciences, their valour and their virtues, are no more. They have loſt theſe with the loſs of liberty. So true is it that man is not born for himſelf; and that, when deprived of that aid which Nature has deſigned to ſtrengthen and ſupport his weakneſs, the flame of genius and the ardent glow of valour are extinguiſhed in his breaſt; he becomes incapable of vigorous reſolution, and ſinks below the natural virtue and dignity of the ſpecies.

The iſland of Crete, joined with the ſmall kingdom of Cyrene, on the Libyan coaſt, formed a Roman province. It was at firſt governed by a proconſul; a queſtor and an aſſiſtant were afterwards ſent there; at laſt, as Suetonius informs us, it was put under the government of a conſul. This iſland was one of the firſt places in the world that were favoured with the light of of the gospel. St Paul introduced the Christian faith into Crete; and his disciple Titus, whom he left there to cherish and cultivate that precious plant, became the first bishop of the island. In the reign of the emperor Leo, it had twelve bishops, who were all subject to the patriarch of Constantinople. Constantine separated Crete from Cyrene in the new division which he made of the provinces of the empire. Leaving three sons, Constantius, Constantine, and Constans, he assigned Thrace and the eastern provinces to the first; to the second, the empire of the west; the island of Crete, Africa, and Illyria, to the third.

When Michael Balbus sat on the throne of Constantinople, the rebellion of Thomas, which lasted three years, caused him to neglect the other parts of the empire. The Agarenians (a people of Arabia), who had conquered the finest provinces of Spain, seized that opportunity. They fitted out a considerable fleet, plundered the Cyclades, attacked the island of Crete, and made themselves masters of it without opposition. In order to secure their conquest, they built a fortress which they named *Khandak*, "intrenchment." From that citadel the barbarians made inroads into the interior parts of the island, carrying havock and devastation wherever they appeared. By repeated attacks, they subdued all the cities in Crete except Cydon. Michael made some ineffectual efforts to expel them from Crete. The emperor Basilius, the Macedonian, was not more successful. They defeated him in a bloody battle; but being vanquished by one of his generals, they were subjected to the payment of an annual tribute. At the end of ten years, the Arabians refused the tribute. It was reserved for Nicephorus Phocas, who was afterwards emperor, to deliver this fine island from the yoke of the infidels. He landed on the island with a numerous army, boldly attacked them, and routed them in various engagements. The Saracens, no longer daring to meet so formidable a general in the field, fled for protection to their fortresses. Phocas being plentifully supplied with all the warlike machines necessary for a siege, levelled their walls, and alarmed their hearts with terror. He took their cities and fortresses, and drove them into Khandak their metropolis and last resource. In the course of nine months he subdued the whole island, took their king Curup and his lieutenant Aremas prisoners, and reunited to the empire a province which had been 127 years in the hands of the infidels. It remained under the dominion of the Romans till the time when Baldwin count of Flanders, being raised to the throne, liberally rewarded the services of Boniface marquis of Montferrat, by making him king of Thessalonica, and adding the island of Crete to his kingdom. That lord, being more covetous of gold than glory, sold it to the Venetians in the year 1194; under whom it assumed the name of CANDIA. See the sequel of its history under that article.

CRETIO, in *Antiquity*, a certain number of days allowed the heir to consider whether he would act as heir to the deceased or not; after which time, if he did not act, he was excluded from the state.

CREUX, a term in sculpture, much used by the French; though not yet, that we know of, naturalized among us: but the want of a word of equal import in English, as it has frequently put us under a necessity of using this in the course of the present work; so it pleads strongly for its admission into our language.

Creux originally signifies a *hollow*, *cavity*, or *pit*, out of which something has been scooped or dug: hence it is used to denote that kind of sculpture and graving where the lines and figures are cut and formed within the face or plane of the plate or matter engraven on. In which sense it stands opposed to relievo; where the lines and figures are embossed, and appear prominent above the face of the matter.

CREW, the company of sailors belonging to a ship, boat, or other vessel.

The sailors that are to work and manage a ship are regulated by the number of lasts it may carry; each last making two tons. The crew of a Dutch ship, from 40 to 50 lasts, is seven sailors and a swabber; from 50 to 60 lasts, the crew consists of eight men and a swabber; and thus increases at the rate of one man for every ten lasts; so that a ship of 100 lasts has 12 men, &c. English and French crews are usually stronger than Dutch; but always in about the same proportion. In a ship of war there are several particular crews, or gangs, as the boatswain's crew, the carpenter's crew, the gunner's crew, &c.

CREVIER, JOHN BAPTIST LEWIS, a Parisian, was trained under the celebrated Rollin, and afterwards became professor of rhetoric. Upon the death of his master, in 1741, he took upon him to finish his Roman History. He published other works, and was greatly serviceable to the cause of virtue and religion as well as letters. His death happened in 1765, at a very advanced age. Besides the continuation just mentioned, he published, 1. An edition of *Livius, cum Notis*, in 6 vols 4to, 1748; and afterwards another edition, better adapted to the use of his pupils, in 6 vols small 8vo. 2. *La Histoire des Empereurs de Romains jusqu'à Constantin*, 1749. 12 tom. 12mo. 3. *Histoire de l'Université de Paris*, 7 tom. 12mo. 4. *Rhetorique Francoise*, a just and useful work. 5. *Observations sur l'Esprit des Loix.* Here he ventured out of his depth; he should have kept within the precincts of the belles lettres.

CREUSA, in fabulous history, daughter of Creon king of Corinth. As she was going to marry Jason, who had divorced Medea, she put on a poisoned garment, which immediately set her body on fire, and she expired in the most excruciating torments. She had received this gown as a gift from Medea, who wished to take that revenge upon the infidelity of Jason. Some call her *Glauce*. (*Ovid. de Art. Am.* i. 335). A daughter of Priam, king of Troy by Hecuba. She married Æneas, by whom she had, among other children, Ascanius. When Troy was taken, she fled in the night with her husband; but they were separated in the midst of the confusion and tumult, and Æneas could not recover her, nor hear where she was. Some say the Cybele saved her, and carried her to her temple, of which she became priestess. *Pauf.* x. 26.—*Virg. Æn.* iii. 592.

CREX, a species of RALLUS. See ORNITHOLOGY *Index*.

CRIB, the rack or manger of a ftable, or the ftall or cabin of an ox. It is alfo ufed for any fmall habitation, as a cottage, &c.

Crib, in the Englifh falt-works, a name given to a fort of cafe ufed in fome places inftead of the *drab*, to put the falt into as it is taken out of the boiling pan.

Cribbage, a game at cards, to be learnt only by practice.

CRIBRATION, in *Pharmacy*, the paffing any fubftance through a fieve or fearce, in order to feparate the finer particles from the groffer.

CRIBROSUM os, in *Anatomy*, called alfo *os ethmoides*. See Anatomy *Index*.

CRICELASIA, the driving a ring or hoop. Driving a hoop was one of the ancient gymnaftics: this hoop was as high as the breaft of the perfon who ufed it. It was commended for rendering the limbs pliable, and for ftrengthening the nerves.

CRICETUS. See Mus, Mammalia *Index*.

CRICHTON, James, a Scots gentleman, who lived in the 16th century, and who, on account of his extraordinary endowments both of body and mind, obtained the appellation of "the admirable Crichton;" by which title he has been diftinguifhed to the prefent day. The time of this celebrated perfon's birth is faid, by the generality of writers, to have been in 1551; but according to fome he was born in Auguft 1560. There is a difference likewife between the biographers of this extraordinary man, with regard to his family, and the rank and fituation of his father. By fome is is afferted, that James Crichton's father was Robert Crichton of Clunie, in the county of Perth; and that this Robert Crichton commanded Queen Mary's army at the battle of Langfide in the year 1568. But it is faid by others, that this gentleman was of Elliock in the fame county, and that he was lord advocate of Scotland in Queen Mary's reign from 1561 to 1573; part of which time he held that office in conjunction with Spens of Condie. The mother of James Crichton was Elizabeth Stuart, the only daughter of Sir James Stuart of Beath, who was a defcendant of Robert duke of Albany the third fon of King Robert the fecond, by Elizabeth Muir or More, as fhe is commonly called; fo that when the admirable Crichton boafted (as he did abroad), that he was fprung from Scottifh kings, he faid nothing but what was agreeable to truth.

James Crichton is faid to have received his grammatical education at Perth, and to have ftudied philofophy in the univerfity of St Andrew's. His tutor in that univerfity was Mr John Rutherford, a profeffor at that time famous for his learning, and who diftinguifhed himfelf by writing four books on Ariftotle's logic and a commentary on his poetics. According to Aldus Manutius, who calls Crichton firft coufin to the king, he was alfo inftructed, along with his majefty, by Buchanan, Hepburn, and Robertfon, as well as by Rutherford; and he had fcarcely arrived at the 20th year of his age, when he had run through the whole circle of the fciences, and could fpeak and write to perfection in ten different languages. Nor was this all; for he had likewife improved himfelf to the higheft degree in riding, dancing and finging, and in playing upon all forts of inftruments.

Crichton, being thus accomplifhed, went abroad upon his travels, and is faid to have gone to Paris; of his tranfactions at which place the following account is given. He caufed placards to be fixed on all the gates of the fchools, halls, and colleges belonging to the univerfity, and on all the pillars and pofts before the houfes of the moft renowned men for literature in the city, inviting all thofe who were well verfed in any art or fcience, to difpute with him in the college of Navarre, that day fix weeks, by nine of the clock in the morning, where he would attend them, and be ready to anfwer to whatever fhould be propofed to him in any art or fcience, and in any of thefe 12 languages, Hebrew, Syriac, Arabic, Greek, Latin, Spanifh, French, Italian, Englifh, Dutch, Flemifh, and Sclavonian; and this either in verfe or profe at the difcretion of the difputant. During this whole time, inftead of clofely applying to his ftudies, he regarded nothing but hunting, hawking, tilting, vaulting, riding of a well managed horfe, toffing the pike, handling the mufket, and other military feats; or elfe he employed himfelf in domeftic games, fuch as balls, concerts of mufic vocal and inftrumental, cards, dice, tennis, and the like diverfions of youth. This conduct fo provoked the ftudents of the univerfity, that, beneath the placard which was fixed on the Navarre gate, they caufed the following words to be written: "If you would meet with this monfter of perfection, to make fearch for him either in the tavern or bawdy-houfe, is the readieft way to find him." Neverthelefs, when the day appointed arrived, Crichton appeared in the college of Navarre, and acquitted himfelf beyond expreffion in the difputation, which lafted from nine o'clock in the morning till fix at night. At length, the prefident, after extolling him highly for the many rare and excellent endowments which God and nature had beftowed upon him, rofe from his chair, and accompanied by four of the moft eminent profeffors of the univerfity, gave him a diamond ring and a purfe full of gold, as a teftimony of their love and favour. The whole ended with the repeated acclamations and huzzas of the fpectators; and henceforward our young difputant was called, "the admirable Crichton." It is added, that he was fo little fatigued with the difpute, that he went on the very next day to the Louvre, where he had a match of tilting (an exercife then in much requeft), and in the prefence of fome of the princes of the court of France, and a great many ladies, carried away the ring 15 times fucceffively.

About two years after this we find him at Rome, where he affixed a placard upon all the eminent places of the city, in the following terms; *Nos Jacobus Crichtonus Scotus, cuicumque rei propofitæ ex improvifo refpondebimus.* In a city which abounded in wit, this bold challenge, to anfwer to any queftion that could be propofed to him wihout his being previoufly advertifed of it, could not efcape the ridicule of a pafquinade. It is faid, however, that being nowife difcouraged, he appeared at the time and place appointed; and that, in the prefence of the pope, many cardinals, bifhops, doctors of divinity, and profeffors in all the fciences, he difplayed fuch wonderful proofs of his univerfal knowledge, that he excited no lefs furprife than he had done at Paris. Boccalini, who was then at Rome, gives fomething of a different relation

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relation of the matter. According to this author, the pasquinade against Crichton, which was to the following effect, "*And he that will see* it, *let him go to the sign of the Falcon and* it *shall be shown*," made such an impression upon him, that he left a place where he had been so grossly affronted as to be put upon a level with jugglers and mountebanks.

From Rome he went to Venice; where he contracted an intimate friendship with Aldus Manutius, Laurentius Massa, Speron Speronius, Johannes Donatus, and various other learned persons, to whom he presented several poems in commendation of the city and university. At length he was introduced to the doge and senate, in whose presence he made a speech, which was accompanied with such beauty of eloquence, and such grace of person and manner, that he received the thanks of that illustrious body, and nothing was talked of through the whole city but this *rara in terris avis*, this prodigy of nature. He held, likewise, disputations on the subjects of theology, philosophy, and mathematics, before the most eminent professors, and large multitudes of people. His reputation was so great, that the desire of seeing and hearing him brought together a vast concourse of persons from different quarters to Venice. It may be collected from Manutius, that the time in which Crichton exhibited these demonstrations of his abilities was in the year 1580.

During his residence at Venice, he fell into a bad state of health, which continued for the space of four months. However, before he was perfectly recovered, he went, by the advice of his friends, to Padua, the university of which city was at that time in great reputation. The next day after his arrival, there was a meeting of all the learned men of the place, at the house of Jacobus Aloysius Cornelius; when Crichton opened the assembly with an extemporary poem in praise of the city, the university, and the company who had honoured him with their presence. After this, he disputed for six hours with the most celebrated professors on various subjects of learning; and he exposed, in particular, the errors of Aristotle and his commentators, with so much solidity and acuteness, and at the same time with so much modesty, that he excited universal admiration. In conclusion, he delivered extempore an oration in praise of ignorance, which was conducted with such ingenuity and elegance, that his hearers were astonished. This exhibition of Crichton's talents was on the 14th of March 1581. Soon after he appointed a day for another disputation to be held at the palace of the bishop of Padua; not for the purpose of affording higher proofs of his abilities, for that could not possibly be done, but in compliance with the earnest solicitations of some persons who were not present at the former assembly. However, several circumstances occurred which prevented this meeting from taking place. Such is the account of Manutius: but Imperialis relates, that he was informed by his father, who was present upon the occasion, that Crichton was opposed by Archangelus Mercenarius, a famous philosopher; and that he acquitted himself so well as to obtain the approbation of a very honourable company, and even of his antagonist himself.

Amidst the discourses which were occasioned by our young Scotsman's exploits, and the high applauses that were bestowed upon his genius and attainments, there were not wanting some who endeavoured to detract from his merit. For ever, therefore, to confound these invidious impugners of his talents, he caused a paper to be fixed on the gates of St John and St Paul's church, wherein he offered to prove before the university, that the errors of Aristotle, and of all his followers, were almost innumerable; and that the latter had failed both in explaining their master's meaning, and in treating on theological subjects. He promised likewise to refute the dreams of certain mathematical professors; to dispute in all the sciences, and to answer to whatever should be proposed to him or objected against him. All this he engaged to do, either in the common logical way, or by numbers and mathematical figures, or in 100 sorts of verses, at the pleasure of his opponents, According to Manutius, Crichton sustained this contest, without fatigue, for three days; during which time he supported his credit, and maintained his propositions, with such spirit and energy, that from an unusual concourse of people, he obtained acclamations and praises, than which none more magnificent were ever heard by men.

From Padua, Crichton set out for Mantua; where there happened to be at the time a gladiator, who had foiled in his travels the most famous fencers in Europe, and had lately killed three who had entered the lists with him in this city. The duke of Mantua was much grieved at having granted this man his protection, as he found it to be attended with such fatal consequences. Crichton, being informed of his highness's concern, offered his service, not only to drive the murderer from Mantua, but from Italy; and to fight him for 1500 pistoles. Though the duke was unwilling to expose such an accomplished gentleman to so great a hazard; yet, relying upon the report he had heard of his warlike atchievements, he agreed to the proposal; and the time and place being appointed, the whole court attended to behold the performance. At the beginning of the combat Crichton stood only upon his defence; while the Italian made his attack with such eagerness and fury, that, having overacted himself, he began to grow weary. Crichton now seized the opportunity of attacking his antagonist in return; which he did with so much dexterity and vigour, that he ran him through the body in three different places, of which wounds he immediately died. The acclamations of the spectators were loud and extraordinary upon this occasion; and it was acknowledged by all of them, that they had never seen Art grace Nature, or Nature second the precepts of Art, in so lively a manner as they had beheld these two things accomplished on that day. To crown the glory of the action, Crichton bestowed the prize of his victory upon the widows of the three persons who had lost their lives in fighting with the gladiator.

It is asserted, that in consequence of this and his other wonderful performances, the duke of Mantua made choice of him for preceptor to his son Vincentio di Gonzaga, who is represented as being of a riotous temper and a dissolute life. The appointment was highly pleasing to the court. Crichton, to testify his gratitude to his friends and benefactors, and to contribute to their diversion, framed, we are told, a comedy, wherein he exposed and

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and ridiculed all the weakneſſes and failures of the ſeveral employments in which men are engaged. This compoſition was regarded as one of the moſt ingenious ſatires that ever was made upon mankind. But the moſt aſtoniſhing part of the ſtory is, that Crichton ſuſtained 15 characters in the repreſentation of his own play. Among the reſt, he acted the divine, the philoſopher, the lawyer, the mathematician, the phyſician, and the ſoldier, with ſuch inimitable grace, that every time he appeared on the theatre he ſeemed to be a different perſon.

From being the principal actor in a comedy, Crichton ſoon became the ſubject of a dreadful tragedy. One night, during the time of carnival, as he was walking along the ſtreets of Mantua, and playing upon his guitar, he was attacked by half a dozen people in maſks. The aſſailants found that they had no ordinary perſon to deal with, for they were not able to maintain their ground againſt him. In the iſſue, the leader of the company being diſarmed, pulled off his maſk, and begged his life, telling him that he was the prince his pupil. Crichton immediately fell upon his knees and expreſſed his concern for his miſtake; alleging, that what he had done was only in his own defence, and that if Gonzaga had any deſign upon his life, he might always be maſter of it. Then taking his own ſword by the point, he preſented it to the prince, who immediately received it, and was ſo irritated by the affront which he thought he had ſuſtained in being foiled with all his attendants, that he inſtantly ran Crichton through the heart.

Various have been the conjectures concerning the motives which could induce Vincentio di Gonzaga to be guilty of ſo ungenerous and brutal an action. Some have aſcribed it to jealouſy, aſſerting that he ſuſpected Crichton to be more in favour than himſelf with a lady whom he paſſionately loved; and Sir Thomas Urquhart has told a ſtory upon this head which is extravagant and ridiculous in the higheſt degree. Others, with greater probability, repreſent the whole tranſaction as the reſult of a drunken frolic: and it is uncertain, according to Imperialis, whether the meeting of the prince and Crichton was by accident or deſign. However, it is agreed on all hands that Crichton loſt his life in this rencounter. The time of his deceaſe is ſaid, by the generality of his biographers, to have been in the beginning of July 1583; but others fix it to the ſame month in the preceding year. There is a difference, likewiſe, with regard to the period of life at which Crichton died. The common accounts declare that he was killed in the 32d year of his age: but Imperialis aſſerts that he was only in his 22d year when that calamitous event took place; and this fact is confirmed by other writers.

Crichton's tragical end excited a very great and general lamentation. If Sir Thomas Urquhart is to be credited, the whole court of Mantua went three quarters of a year into mourning for him; the epitaphs and elegies that were compoſed upon his death and ſtuck upon his hearſe, would exceed, if collected, the bulk of Homer's works; and, for a long time afterwards, his picture was to be ſeen in moſt of the bedchambers and galleries of the Italian nobility, repreſenting him on horſeback, with a lance in the one hand and a book in the other. The ſame author tells us, that Crichton gained the eſteem of kings and princes, by his magnanimity and knowledge; of noblemen and gentlemen, by his courtlineſs and breeding; of knights, by his honourable deportment and pregnancy of wit; of the rich, by his affability and good fellowſhip; of the poor, by his munificence and liberality; of the old, by his conſtancy and wiſdom; of the young by his mirth and gallantry; of the learned, by his univerſal knowledge; of the ſoldiers, by his undaunted valour and courage; of the merchants and artificers, by his upright dealing and honeſty; and of the fair ſex, by his beauty and handſomeneſs, in which reſpect he was a maſterpiece of nature.

Joannes Imperialis, in his life of Crichton, ſays, that he was the wonder of the laſt age; the prodigious production of nature; the glory and ornament of Parnaſſus, in a ſtupendous and unuſual manner; and that, in the judgment of the learned world, he was the phœnix of literature, and rather a ſhining particle of the Divine Mind and Majeſty than a model of what could be attained by human induſtry. The ſame author, after highly celebrating the beauty of his perſon, aſſerts, that his extraordinary eloquence and his admirable knowledge of things teſtified that he poſſeſſed a ſtrength of genius wholly divine. "What (adds this writer) can more exceed our comprehenſion, than that Crichton, in the 21ſt year of his age, ſhould be maſter of ten different languages, and perfectly well verſed in philoſophy, mathematics, theology, polite literature, and all other ſciences? Beſides was it ever heard in the whole compaſs of the globe, that to theſe extraordinary endowments of the mind, ſhould be added a ſingular ſkill in fencing, dancing, ſinging, riding, and in every exerciſe of the gymnaſtic art?" Nay, Imperialis, in his account of Crichton's death, declares, that the report of ſo ſad a cataſtrophe was ſpread to the remoteſt parts of the earth; that it diſturbed univerſal nature; and that in her grief for the loſs of the wonder ſhe had produced, ſhe threatened never more to confer ſuch honour upon mankind. Compared with theſe extravagancies, the aſſertion of Bayle that Crichton was one of the greateſt prodigies of wit that ever lived, and the teſtimony of Felix Aſtolfus concerning his wonderful memory, may be conſidered as modeſt encomiums.

Such are the accounts which, by a ſucceſſion of writers, and particularly ſince the time of Mackenzie, have been given of the admirable Crichton. Theſe accounts are indeed ſo wonderful, that many perſons have been diſpoſed to conſider them as in a great meaſure, if not entirely, fabulous. We ſhall therefore ſubjoin from the *Biographia Britannica* the following obſervations of Dr Kippis, with a view to aſcertain what portion of faith is due to the different parts of the preceding narrative, or at leaſt to aſſiſt the reader in forming a proper judgment concerning them.

The doctor begins with obſerving, "That no credit can be granted to any facts which depend upon the ſole authority of Sir Thomas Urquhart. Mr Pennant indeed ſpeaks of him with approbation; and Dr Samuel Johnſon laid a ſtreſs on his veracity, in the account of Crichton which he dedicated to Dr Hawkeſworth, and is inſerted in the 81ſt number of the Adventurer; of which account it may be obſerved, that it is only an

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an elegant summary of the life written by Mackenzie. But with all deference to these respectable names, I must declare my full persuasion that Sir Thomas Urquhart is an author whose testimony to facts is totally unworthy of regard; and it is surprising that a perusal of his works does not strike every mind with this conviction. His productions are so inexpressibly absurd and extravagant, that the only rational judgment which can be pronounced concerning him is, that he was little, if at all, better than a madman. To the character of his having been a madman must be added that of his being a liar. Severe as this term may be thought, I apprehend that a diligent examination of the treatise which contains the memorials concerning Crichton would show that it is strictly true. But of his total disregard to truth there is incontestable evidence in another work of his, entitled, The true Pedigree and Lineal Descent of the most ancient and honourable Family of the Urquharts in the House of Cromarty, from the Creation of the World until the year of God 1652. In this work it is almost incredible what a number of falsities he has invented both with respect to names and facts. Perhaps a more flagrant instance of imposture and fiction was never exhibited; and the absurdity of the whole pedigree is beyond the power of words to express. It can only be felt by those who have perused the tract itself. Such a man therefore can justly be entitled to no degree of credit, especially when he has a purpose to serve, as was the case with Sir Thomas Urquhart. His design was to exalt his own family and his own nation at any rate. With respect to his own nation, there was no occasion for having recourse to fiction, in order to display the lustre of Scotland, in the eminent men whom it has produced in arms and literature. The pencil of truth alone would have been amply sufficient for that purpose (A).

"So far therefore as Sir Thomas Urquhart's authority is concerned, the wonderful exhibitions of Crichton at Paris, his triumph at Rome, his combat with the gladiator, his writing an Italian comedy, his sustaining fifteen characters in the representation of that comedy, the extraordinary story of the amour which is described as the cause of his death, the nine months mourning for him at Mantua, and the poems hung round his hearse to the quantity of Homer's works, must be regarded as in the highest degree doubtful, or rather absolutely false. I cannot forbear mentioning two circumstances, which show how much Sir Thomas Urquhart was destitute of prudence, as well as of scrupulosity, in his violations of truth. He says that the duke of Mantua was pleased to confer upon the young lady that was Crichton's mistress and future wife, a pension of five hundred ducats a year; and that the prince also bestowed as much upon her during all the days of his life, "which was (adds Sir Thomas) but short; for he did not long enjoy himself after the cross fate of so miserable an accident. Now it is well known that Vincenzo di Gonzaga succeeded his father in the dukedom of Mantua in 1587, and that he did not die till the year 1612; which was almost, if not entirely, thirty years after Crichton's decease. The other instance of the imprudence of Sir Thomas Urquhart in the contrivance of his fictions, occurs at the conclusion of his narrative, where he asserts that the verity of the story which he hath related concerning the incomparable Crichton, 'may be certified by two thousand men yet living who have known him.' *Two thousand men yet living*! that is, in 1652, fixty-nine or seventy years after Crichton's death, for such was the time of Sir Thomas's publication. Our author would have been sadly puzzled to collect together these two thousand living witnesses who could certify the verity of his story.

"With regard, however, to the account which is given of the prodigious exertions of Crichton, both corporeal and mental, at Paris, Mackenzie imagines that he has found a full confirmation of them in a passage produced by him from the *Disquisitiones* of Stephen Pasquier, and which he considers as the testimony of an eye-witness. But the whole of what has been built upon it by Mackenzie, and succeeding biographers, is founded on a mistake. In the quotation from the *Disquisitiones*, the name of Crichton is not mentioned, and the author doth not appear to have been personally present at the exhibitions of the extraordinary youth there described. The expressions which are supposed to carry that meaning may well be referred not to the writer himself, but to his countrymen the French, before whom the young man is said to have displayed his surprising talents. But the discussion of this point is totally needless, because the passage in question is not an original authority. The book entitled *Stephani Paschieri Disquisitiones* is only an abridgment in Latin of Pasquier's *Des Recherches de la France*. Now in this last work there is indeed an account of a wonderful youth, such as is related in Mackenzie's quotation, and from which that passage was formed. But this wonderful youth, whoever he might be, was not the admirable Crichton: for Pasquier, who does not tell his name, expressly says that he appeared in the year 1445 (B). The evidence therefore, produced by Mackenzie falls entirely to the ground. Indeed, if the story of Crichton's exploits at Paris

(A) This was probably meant as a satire, and not as a serious production.

(B) This matter has been set in a clear light by the writer of the following letter.

"SIR,

"We are informed by Sir John Hawkins, that Dr Johnson dictated from memory that account of the person vulgarly named *the Admirable Crichton*, which is to be found in one of the papers of the Adventurer.

"That account is plainly an abridgment of the life of Crichton by Dr George Mackenzie. Dr Mackenzie supposes that Pasquier, the French lawyer and antiquary, was an eye-witness of the feats performed in arts as well as in arms by Crichton. This is one of the grossest errors in biography which has occurred to me in the course of my reading: and it is an error which I perceive is gaining ground daily, and bids fair in a short time to be received as an indisputable truth.

"The

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Paris had been true, no man was more likely to be acquainted with them than Stephen Pasquier, who lived at the time, and who would be fond enough of recording transactions so extraordinary. It may farther be observed, that Thuanus, who was likewise a contemporary, and who in his own life is very particular in what relates to learned men, makes no mention of Crichton. The only authority for his having ever resided in France at all (Sir Thomas Urquhart excepted) is that of Dr John Johnston, who says *Gallia pectus excolit*. But this amounts to no proof of the truth of the transactions related by Urquhart. The whole which can be deduced from it is, that Crichton, in the course of his travels, might make some stay in France for the purpose of improvement. Even this, however, doth not agree with the narration of Imperialis, who informs us, that when troubles arose in Scotland on account of religion, and Queen Mary fell into so many calamities, Crichton was sent by his father directly from that country to Venice as a place of security.

"It is acknowledged by Sir John Hawkins, that Sir Thomas Urquhart has produced no authorities in support of his surprising narrations. But this defect, Sir John thinks, is supplied in the Life of Crichton which is given in Mr Pennant's Tour. I am under the necessity of saying, that this is by no means the case. The article in Pennant was not drawn up by that ingenious and learned gentleman, but is the transcript of a pamphlet, that was printed some years ago at Aberdeen; and which pamphlet is nothing more than a republication, with a few verbal alterations, of the Life of Crichton written by Mackenzie. It doth not, therefore, furnish a single additional testimony in confirmation of Sir Thomas Urquhart's stories, excepting in the mistaken instance from Pasquier. In other respects it only borrows facts from Sir Thomas Urquhart, without establishing them upon fresh proofs. It is observable, that the earlier biographers of Crichton had no knowledge of most of the transactions enlarged upon by this extravagant writer; for if they had known them, they would have been eagerly disposed to relate them, and to do it with every circumstance of exaggeration. How much this was the character of Thomas Dempster, with regard to his own countrymen, is sufficiently understood, and hath frequently been remarked; and yet his account of Crichton is uncommonly modest, compared with those of succeeding authors. The extravagance of Imperialis in respect to Crichton has already appeared. There seems indeed to have been an universal tendency in the writers of this young Scotsman's life to produce wonder and astonishment. Mackenzie remarks, that Imperialis could not but know the truth of all, or at least of most of, the things he has related concerning Crichton, since he lived upon the places in which they were transacted, and had them from an eye and ear witness, even his own father. It is, however, to be remembered, that Imperialis's *Museum Historicum* was not published till 1640, nearly sixty years after the events recorded by him happened; to which may be added, that the information he derived from his father was probably very imperfect. Imperialis the elder was not born till 1568, and consequently was only thirteen years old when Crichton displayed his talents at Padua. What real dependence, therefore, could there be on the accuracy of the account given by a youth of that age? He could only relate, and perhaps from inadequate intelligence, the things which were talked of when he was a boy. Besides, his authority is appealed to for no more than a single fact, and that a doubtful one, since it does not accord with Manutius's narrative: and who ever heard of the famous philosopher Archangelus Mercenarius?

"The

"The error seems to have arisen from the following circumstance: Dr Mackenzie had never read the original work of Pasquier, entitled *Recherches de la France*; what he quotes concerning *the wonderful young man* is taken from a Latin abridgment of that work; he refers to *Steph. Pasch.* Disquis. lib. v. cap. 23. and he gives his quotation in Latin; indeed it does not appear that Dr Mackenzie had ever heard of the original work. Now Pasquier, instead of saying that he was an eye-witness of the wonders exhibited by Crichton, says in the most unequivocal terms, that what he relates was taken 'from a manuscript which was occasionally used by him,' (*d'un livre ecrit à la main, dont je m' aide selon les occurrences*). And he adds, 'I will represent the story in its own simple garb, without any artificial colouring, so that my readers may be the more inclined to give credit to it,' (*vous representant cette histoire en sa simplicitè, sans y apporter aucun fard pour ce que vous y adjousteres plus de foy*). He then transcribes the narrative from the MS. which places the appearance of this phenomenon in the year 1445, a full century before the birth of our Crichton. See *Recherches de la France*, lib. vi. c. 38, 39.

"Dr Mackenzie, although he had not read the original of Pasquier, appears to have read an author who quotes the same story: 'The learned M. du Launoy (says he, in his History of the College of Navarre, finding the history of this dispute recorded in a MS. History of the College of Navarre, and the like account of a Spaniard in Trithemius, confounds the two together, and *robs* our author of the glory of this action, and places it in the year 1445; whereas it should be in the year 1571.' This charge of *robbery* is singular enough.

"Let me only add, that Pasquier transcribes some verses written by George Chastelain, a French poet in the reign of Charles VII. king of France, which allude to the same story; and that Pasquier himself was born at Paris in 1528, passed his life in that city, and was an eminent lawyer and pleader in 1571; so that it is impossible the feats of Crichton, had they been really performed at Paris, could have been unknown to him, and most improbable that, knowing them, he would have omitted to mention them; for, in the same lib. vi. c. 39. he is at pains to produce examples of great proficiency, displayed by men in a much humbler rank of life than that of philosophers and public disputants. I am, &c.*"

* Edin. Mag. 1787.

"The truth of the matter is, that, ſome ſlight circumſtances excepted, neither Dempſter nor Imperialis have produced any evidences of Crichton's extraordinary abilities beſides thoſe which are recorded by the younger Aldus Manutius. He therefore is to be regarded as the only living authority upon the ſubject. Manutius was contemporary with Crichton; he was cloſely connected with him in friendſhip; and he relates ſeveral things on his own perſonal knowledge. He is a poſitive and undoubted witneſs with reſpect to our young Scotſman's intellectual and literary exertions at Venice and at Padua; and from him it is that our account of them is given above. Nevertheleſs, even Aldus Manutius is to be read with ſome degree of caution. Dedications are apt to aſſume the ſtyle of exaggeration, and this is the caſe with Manutius's dedication of the *Paradoxa Ciceronis* to Crichton. In addition to the general language of ſuch addreſſes, he might be carried too far by his affection for his friend, which appears to have been very great: nor was the younger Aldus eminent for ſteadineſs and conſiſtency of character. It is even ſaid that by his imprudencies he fell into contempt and miſery. But independently of any conſiderations of this kind, it may be obſerved, that Manutius's narrative, previous to Crichton's arrival at Venice, could not be derived from perſonal knowledge. For that part of it (which is ſufficiently erroneous) he was probably indebted to Crichton himſelf. Neither does he appear to have been an eye-witneſs of the whole of the diſputations which were held at Padua; for ſpeaking of his young friend's praiſe of ignorance, he relates, that thoſe who were preſent told him afterwards how much they were ſtruck with that oration. However, at the other diſputation, which laſted three days, Manutius ſeems certainly to have attended; for he concludes his accounts of it with ſaying, that he was not only the adviſer but the ſpectator of Crichton's wonderful conteſts. It is evident, however, from the dedication, that his extraordinary abilities were not univerſally acknowledged and admired. Some there were who detracted from them, and were diſpleaſed with Manutius for ſo warmly ſupporting his reputation.

"As to the real cauſe and manner of our young Scotſman's death, both of them ſtill remain in ſome degree of obſcurity. That he was killed in a rencounter at the carnival at Mantua, is teſtified by too many authors to be reaſonably doubted. But whether there was that particular malignity on the part of Vincenzo di Gonzaga, which is commonly aſcribed to him, may be conſidered as uncertain.

"One important method yet remains by which we may be enabled to form a judgment of Crichton's genius, and that is from a peruſal of the four poems of his which are ſtill preſerved. It is, however, to be feared, that theſe will not exhibit him in a very high point of view. Some fancy, perhaps, may be thought to be diſplayed in the longeſt of his poems, which was written on occaſion of his approach to the city of Venice. He there repreſents a Naiad as riſing up before him: and, by the order of the Muſes and of Minerva, directing him how to proceed. But this is a ſentiment which ſo eaſily preſents itſelf to a claſſical reader, that it can ſcarcely be conſidered as deſerving the name of a poetical invention. The three other poems of Crichton have ſtill leſs to recommend them. Indeed his verſes will not ſtand the teſt of a rigid examination even with regard to quantity.

What then is the opinion which on the whole we are to form of the admirable Crichton? It is evident that he was a youth of ſuch lively parts as excited great preſent admiration, and high expectations with regard to his future attainments. He appears to have had a fine perſon, to have been adroit in his bodily exerciſes, to have poſſeſſed a peculiar facility in learning languages, to have enjoyed a remarkably quick and retentive memory, and to have excelled in a power of declamation, a fluency of ſpeech, and a readineſs of reply. His knowledge, likewiſe, was probably very uncommon for his years; and this, in conjunction with his other qualities, enabled him to ſhine in public diſputation. But whether his knowledge and learning were accurate or profound, may juſtly be queſtioned; and it may equally be doubted whether he would have ariſen to any extraordinary degree of eminence in the literary world. It will always be reflected upon with regret, that his early and untimely death prevented this matter from being brought to the teſt of experiment."

From the portraits which remain of Crichton, it appears that in his face and form he was beautiful and elegant, and that his body and limbs, though not muſcular or athletic, were well proportioned, and fitted for feats of agility. The following catalogue of Crichton's works is given by Dempſter: 1. *Odæ ad Laurentium Maſſam plures.* 2. *Laudes Patavinæ, Carmen extempore effuſum, cum in Jacobi Moyſii Cornelii domo experimentum ingenii coram tota Academiæ frequentia, non ſine multorum ſtupore, faceret.* 3. *Ignorationis Laudatio, extemporale Thema ibidem redditum, poſt ſex horarum diſputationes, ut præſentes ſomnia potius fovere quam remſe veram videre affirmarint, ait Manutius.* 4. *De Appulſu ſuo Venetias.* 5. *Odæ ad Aldum Manutium.* 6. *Epiſtolæ ad Diverſos.* 7. *Præfationes ſolemnes in omnes Scientias ſacras et profanas.* 8. *Judicium de Philoſophis.* 9. *Errores Ariſtotelis.* 10. *Arma an Literæ Præſtant, Contraverſia oratoria.* 11. *Refutatio Mathematicorum.* 12. A Comedy in the Italian language.

CRICK, among farriers, is when a horſe cannot turn his neck any manner of way, but holds it fore right, inſomuch that he cannot take his meat from the ground without great pain.

CRICKET. See GRYLLUS, ENTOMOLOGY *Index*.

CRICKET is alſo the name of an exerciſe or game, with bats and a ball.

Mole-CRICKET. See GRYLLOTALPA, ENTOMOLOGY *Index*.

CRICKLADE, a borough-town of Wiltſhire, ſituated on the river Iſis, about 26 miles ſouth-weſt of Oxford. It ſends two members to parliament. W. Long. 1. 55. N. Lat. 51. 35.

CRICOARYTENOIDÆUS, in *Anatomy*, a name given to two muſcles of the larynx. See ANATOMY, *Table of the Muſcles*.

CRICOIDES, in *Anatomy*, a cartilage of the larynx, called alſo the *annular cartilage*. It occupies the loweſt part by way of baſe to the reſt of the cartilages, and to the lower part of it the aſpera arteria adheres. See ANATOMY, *Table of the Muſcles*.

CRICOTHYROIDÆUS, in *Anatomy*, one of the five proper muscles of the larynx. See ANATOMY, *Table of the Muscles*.

CRIM-TARTARS, a people of Asia, so called because they originally came from Crimea. They rove from place to place in search of pastures, their houses being drawn on carts. There are a great number of them about Astrachan, to which place they flock in the winter-time; but they are not permitted to enter the city: for this reason, they erect huts up and down in the open fields: which are made either of bulrushes or reeds, being about 12 feet in diameter, of a round form, and with a hole at the top to let out the smoke. Their fuel is turf or cow-dung; and when the weather is very cold, they cover the hut with a coarse cloth, and sometimes pass several days without stirring out. They are generally of small stature, with large faces, little eyes, and of an olive complexion. The men are generally so wrinkled in their faces, that they look like old women. Their common food is fish dried in the sun, which serves them instead of bread; and they eat the flesh of horses as well as camels. Their drink is water and milk, especially mares milk, which they carry about in nasty leathern bags. Their garments are of coarse gray cloth, with a loose mantle made of a black sheep's skin, and a cap of the same. The women are clothed in white linen, with which likewise they dress their heads, hanging a great many Moscovian pence about them; and there is likewise a hole left to stick feathers in. As for their religion, they are a sort of Mahometans; but do not coop up their women like the Turks.

Crim-Tartary, or *Crimea*. See CRIMEA.

CRIME *and* PUNISHMENT. The discussion and admeasurement of crimes and punishments forms in every country the code of criminal law; or, as it is more usually denominated in England, the doctrine of the *pleas of the crown;* so called, because the king, in whom centres the majesty of the whole community, is supposed by the law to be the person injured by every infraction of the public rights belonging to that community; and is therefore in all cases the proper prosecutor for every public offence.

The knowledge of this branch of jurisprudence, which teaches the nature, extent, and degrees of every crime, and adjusts to it its adequate and necessary penalty, is of the utmost importance to every individual in the state. For no rank or elevation in life, no uprightness of heart, no prudence or circumspection of conduct, should tempt a man to conclude, that he may not at some time or other be deeply interested in these researches. The infirmities of the best among us, the vices and ungovernable passions of others, the instability of all human affairs, and the numberless unforeseen events which the compass of a day may bring forth, will teach us (upon a moment's reflection), that to know with precision what the laws of our country have forbidden, and the deplorable consequences to which a wilful disobedience may expose us, is a matter of universal concern.

In proportion to the importance of the criminal law, ought also to be the care and attention of the legislature in properly forming and enforcing it. It should be founded upon principles that are permanent, uniform, and universal; and always conformable to the dictates of truth and justice, the feelings of humanity, and the indelible rights of mankind: though it sometimes (provided there be no transgression of these eternal boundaries) may be modified, narrowed, or enlarged, according to the local or occasional necessities of the state which it is meant to govern. And yet, either from a want of attention to these principles in the first concoction of the laws, and adopting in their stead the impetuous dictates of avarice, ambition, and revenge; from retaining the discordant political regulations, which successive conquerors or factions have established, in the various revolutions of government; from giving a lasting efficacy to sanctions that were intended to be temporary, and made (as Lord Bacon expresses it) merely upon the spur of the occasion; or lastly, from too hastily employing such means as are greatly disproportionate to their ends, in order to check the progress of some very prevalent offence; from some, or from all, of these causes, it hath happened, that the criminal law is in every country of Europe more rude and imperfect than the civil. We shall not here enter into any minute inquiries concerning the local constitutions of other nations; the inhumanity and mistaken policy of which have been sufficiently pointed out by ingenious writers of their own *. But even with us in Britain, where our crown-law is with justice supposed to be more nearly advanced to perfection; where crimes are more accurately defined, and penalties less uncertain and arbitrary; where all our accusations are public, and our trials in the face of the world; where torture is unknown, and every delinquent is judged by such of his equals, against whom he can form no exception, or even a personal dislike:—even here we shall occasionally find room to remark some particulars that seem to want revision and amendment. These have chiefly arisen from too scrupulous an adherence to some rules of the ancient common law, when the reasons have ceased upon which those rules were founded; from not repealing such of the old penal laws as are either obsolete or absurd; and from too little care and attention in framing and passing new ones. The enacting of penalties to which a whole nation shall be subject, ought not to be left, as a matter of indifference, to the passions or interests of a few, who upon temporary motives may prefer or support such a bill; but be calmly and maturely considered by persons who know what provisions the laws have already made to remedy the mischief complained of, who can from experience foresee the probable consequences of those which are now proposed, and who will judge without passion or prejudice how adequate they are to the evil. It is never usual in the house of peers even to read a private bill which may affect the property of an individual, without first referring it to some of the learned judges, and hearing their report thereon. And surely equal precaution is necessary, when laws are to be established which may affect the property, the liberty, and perhaps even the lives of thousands. Had such a reference taken place, it is impossible that in the 18th century it could ever have been made a capital crime, to break down (however maliciously) the mound of a fishpond, whereby any fish shall escape; or to cut down a cherry-tree in an orchard. Were even a committee appointed

* As, Baron Montesquieu, Marquis of Beccaria, &c.

Blackstone's Comment.

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pointed but once in 100 years to revise the criminal law, it could not have continued to this hour a felony without benefit of clergy, to be seen for one month in the company of persons who call themselves, or are called, *Egyptians*.

It is true, that these outrageous penalties, being seldom or never inflicted, are hardly known to be the law by the public; but that rather aggravates the mischief, by laying a snare for the unwary. Yet they cannot but occur to the observation of any one, who hath undertaken the task of examining the great outlines of our law, and tracing them up to their principles: and it is the duty of such a one to hint them with decency to those whose abilities and stations enable them to apply the remedy. We now proceed to consider (in the first place) the general nature of *crimes*.

I. A crime, or misdemeanour, is an act committed, or omitted, in violation of a public law, either forbidding or commanding it. This general definition comprehends both crimes and misdemeanours; which, properly speaking, are mere synonymous terms; though, in common usage, the word "crimes" is made to denote such offences as are of a deeper and more atrocious dye; while smaller faults, and omissions of less consequence, are comprised under the gentler name of "misdemeanours" only.

The distinction of public wrongs from private, of crimes and misdemeanours from civil injuries, seems principally to consist in this: that private wrongs, or civil injuries, are an infringement or privation of the civil rights which belong to individuals, considered merely as individuals; public wrongs, or crimes and misdemeanours, are a breach and violation of the public rights and duties, due to the whole community, considered as a community, in its social aggregate capacity. As if I detain a field from another man, to which the law has given him a right, this is a civil injury, and not a crime; for here only the right of an individual is concerned, and it is immaterial to the public which of us is in possession of the land; but treason, murder, and robbery, are properly ranked among crimes; since, besides the injury done to individuals, they strike at the very being of society; which cannot possibly subsist, where actions of this sort are suffered to escape with impunity.

In all cases the crime includes an injury; every public offence is also a private wrong, and somewhat more; it affects the individual, and it likewise affects the community. Thus treason in imagining the king's death, involves in it conspiracy against an individual, which is also a civil injury; but as this species of treason in its consequences principally tends to the dissolution of government, and the destruction thereby of the order and peace of society, this denominates it a crime of the highest magnitude. Murder is an injury to the life of an individual; but the law of society considers principally the loss which the state sustains by being deprived of a member, and the pernicious example thereby set for others to do the like. Robbery may be considered in the same view: it is an injury to private property; but, were that all, a civil satisfaction in damages might atone for it; the public mischief is the thing, for the prevention of which our laws have made it a capital offence. In these gross and atrocious injuries the private wrong is swallowed up in the public; we seldom hear any mention made of satisfaction to the individual; the satisfaction to the community being so very great. And indeed, as the public crime is not otherwise avenged than by forfeiture of life and property, it is impossible afterwards to make any reparation for the private wrong; which can only be had from the body or goods of the aggressor. But there are crimes of an inferior nature, in which the public punishment is not so severe, but it affords room for a private compensation also; and herein the distinction of crimes from civil injuries is very apparent. For instance, in the case of battery, or beating another, the aggressor may be indicted for this at the suit of the king, for disturbing the public peace, and be punished criminally by fine and imprisonment; and the party beaten may also have his private remedy by action of trespass for the injury, which he in particular sustains, and recover a civil satisfaction in damages. So also, in case of a public nuisance, as digging a ditch across a highway, this is punishable by indictment, as a common offence to the whole kingdom, and all his majesty's subjects: but if any individual sustains any special damage thereby, as laming his horse, breaking his carriage, or the like, the offender may be compelled to make ample satisfaction, as well for the private injury as for the public wrong.

II. The nature of crimes and misdemeanours in general being thus ascertained and distinguished, we proceed in the next place to consider the general nature of punishments: Which are evils or inconveniences consequent upon crimes and misdemeanours; being devised, denounced, and inflicted by human laws, in consequence of disobedience or misbehaviour in those, to regulate whose conduct such laws were respectively made. And herein we will briefly consider the *power*, the *end*, and the *measure*, of human punishment.

1. As to the power of human punishment, or the right of the temporal legislator to inflict discretionary penalties for crimes and misdemeanours. It is clear, that the right of punishing crimes against the law of nature, as murder and the like, is in a state of mere nature, vested in every individual. For it must be vested in somebody; otherwise the laws of nature would be vain and fruitless, if none were empowered to put them in execution; and if that power is vested in any one, it must also be vested in all mankind; since all are by nature equal. Whereof the first murderer Cain was so sensible, that we find him expressing his apprehensions, that whoever should find him would slay him. In a state of society this right is transferred from individuals to the sovereign power; whereby men are prevented from being judges in their own causes, which is one of the evils that civil government was intended to remedy. Whatever power therefore individuals had of punishing offences against the law of nature, that is now vested in the magistrate alone; who bears the sword of justice by the consent of the whole community. And to this precedent natural power of individuals must be referred that right, which some have argued to belong to every state (though, in fact, never exercised by any), of punishing not only their own subjects, but also foreign

 ambassadors,

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ambaffadors, even with death itfelf; in cafe they have offended, not indeed againft the municipal laws of the country, but againft the divine laws of nature, and become liable thereby to forfeit their lives for their guilt.

As to offences merely againft the laws of fociety, which are only *mala prohibita*, and not *mala in fe;* the temporal magiftrate is alfo impowered to inflict coercive penalties for fuch tranfgreffion: and this by the confent of individuals; who, in forming focieties, did either tacitly or exprefsly inveft the fovereign power with a right of making laws, and of enforcing obedience to them when made, by exercifing, upon their non-obfervance, feverities adequate to the evil. The lawfulnefs, therefore, of punifhing fuch criminals is founded upon this principle, that the law by which they fuffer was made by their own confent; it is a part of the original contract into which they entered, when firft they engaged in fociety; it was calculated for, and has long contributed to, their own fecurity.

This right therefore, being thus conferred by univerfal confent, gives to the ftate exactly the fame power, and no more, over all its members, as each individual member had naturally over himfelf or others; which has occafioned fome to doubt, how far a human legiflature ought to inflict capital punifhments for pofitive offences; offences againft the municipal law only, and not againft the law of nature; fince no individual has naturally a power of inflicting death upon himfelf or others for actions in themfelves indifferent. With regard to offences *mala in fe*, capital punifhments are in fome inftances inflicted by the immediate command of God himfelf to all mankind; as, in the cafe of murder, by the precept delivered to Noah, their common anceftor and reprefentative, "Whofo fheddeth man's blood, by man fhall his blood be fhed." In other inftances they are inflicted after the example of the Creator, in his pofitive code of laws for the regulation of the Jewifh republic; as in the cafe of the crime againft nature. But they are fometimes inflicted without fuch exprefs warrant or example, at the will and difcretion of the human legiflature; as for forgery, for theft, and fometimes for offences of a lighter kind. The practice is thus juftified by that great and good man Sir Matthew Hale: "When offences grow enormous, frequent, and dangerous to a kingdom, or ftate, deftructive or highly pernicious to civil focieties, and to the great infecurity and danger of the kingdom or its inhabitants, fevere punifhment and even death itfelf is neceffary to be annexed to laws in many cafes by the prudence of lawgivers." It is therefore the enormity, or dangerous tendency, of the crime, that alone can warrant any earthly legiflature in putting him to death that commits it. It is not its frequency only, or the difficulty of otherwife preventing it, that will excufe our attempting to prevent it by a wanton effufion of human blood. For though the end of punifhment is to deter men from offending, it never can follow from thence, that it is lawful to deter them at any rate and by any means; fince there may be unlawful methods of enforcing obedience even to the jufteft laws. Every humane legiflator will be therefore extremely cautious of eftablifhing laws that inflict the penalty of death, efpecially for flight offences, or fuch as are merely pofitive. He will expect a better reafon for his fo doing than that loofe one which generally is given; that it is found by former experience that no lighter penalty will be effectual. For is it found upon farther experience, that capital punifhments are more effectual? Was the vaft territory of all the Ruffias worfe regulated under the late emprefs Elizabeth, than under her more fanguinary predeceffors? Is it now, under Catharine II. lefs civilized, lefs focial, lefs fecure? And yet we are affured, that neither of thefe illuftrious princeffes have, throughout their whole adminiftration, inflicted the penalty of death: and the latter has, upon full perfuafion of its being ufelefs, nay even pernicious, given orders for abolifhing it entirely throughout her extenfive dominions. But indeed, were capital punifhments proved by experience to be a fure and effectual remedy, that would not prove the neceffity (upon which the juftice and propriety depend) of inflicting them upon all occafions when other expedients fail. It is feared this reafoning would extend a great deal too far. For inftance, the damage done to our public roads by loaded waggons is univerfally allowed, and many laws have been made to prevent it, none of which have hitherto proved effectual. But it does not therefore follow, that it would be juft for the legiflature to inflict death upon every obftinate carrier, who defeats or eludes the provifions of former ftatutes. Where the evil to be prevented is not adequate to the violence of the preventive, a fovereign that thinks ferioufly can never juftify fuch a law to the dictates of confcience and humanity. To fhed the blood of our fellow creature is a matter that requires the greateft deliberation, and the fulleft conviction of our own authority; for life is the immediate gift of God to man; which neither he can refign, nor can it be taken from him, unlefs by the command or permiffion of Him who gave it, either exprefsly revealed, or collected from the laws of nature or fociety by clear and indifputable demonftration.

We would not be underftood to deny the right of the legiflature in any country to enforce its own laws by the death of the tranfgreffor, though perfons of fome abilities have doubted it; but only to fuggeft a few hints for the confideration of fuch as are, or may hereafter become, legiflators. When a queftion arifes, whether death may be lawfully inflicted for this or that tranfgreffion, the wifdom of the laws muft decide it: and to this public judgment or decifion all private judgments muft fubmit; elfe there is an end of the firft principle of all fociety and government. The guilt of blood, if any, muft lie at their doors, who mifinterpret the extent of their warrant; and not at the doors of the fubject, who is bound to receive the interpretations that are given by the fovereign power.

2. As to the end, or final caufe, of human punifhments. This is not by way of atonement or expiation for the crime committed; for that muft be left to the juft determination of the Supreme Being; but as a precaution againft future offences of the fame kind. This is effected three ways: either by the amendment of the offender himfelf; for which purpofe all corporeal punifhments, fines, and temporary exile or imprifonment, are inflicted; or, by deterring others by the dread of his example from offending in the like-way, "*ut pœna* (as Tully expreffes it) *ad paucos, me-*

 "*tus*

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"*tus ad omnes, perveniat;*" which gives rise to all ignominious punishments, and to such executions of justice as are open and public: or, lastly, by depriving the party injuring of the power to do future mischief; which is effected by either putting him to death, or condemning him to perpetual confinement, slavery, or exile. The same one end, of preventing future crimes, is endeavoured to be answered by each of these three species of punishment. The public gains equal security, whether the offender himself be amended by wholesome correction, or whether he be disabled from doing any farther harm: and if the penalty fails of both these effects, as it may do, still the terror of his example remains as a warning to other citizens. The method, however, of inflicting punishment ought always to be proportioned to the particular purpose it is meant to serve, and by no means to exceed it: therefore the pains of death, and perpetual disability by exile, slavery, or imprisonment, ought never to be inflicted, but when the offender appears incorrigible: which may be collected either from a repetition of minuter offences; or from the perpetration of some one crime of deep malignity, which of itself demonstrates a disposition without hope or probability of amendment: and in such cases it would be cruelty to the public to defer the punishment of such a criminal till he had an opportunity of repeating perhaps the worst of villanies.

3. As to the *measure* of human punishments. From what has been observed in the former articles, we may collect, that the quantity of punishment can never be absolutely determined by any standing invariable rule; but it must be left to the arbitration of the legislature to inflict such penalties as are warranted by the laws of nature and society, and such as appear to be the best calculated to answer the end of precaution against future offences.

Hence it will be evident, that what some have so highly extolled for its equity, the *lex talionis*, or "law of retaliation," can never be in all cases an adequate or permanent rule of punishment. In some cases indeed it seems to be dictated by natural reason; as in the case of conspiracies to do an injury, or false accusations of the innocent; to which we may add that law of the Jews and Egyptians, mentioned by Josephus and Diodorus Siculus, that whoever without sufficient cause was found with any mortal poison in his custody, should himself be obliged to take it. But, in general, the difference of persons, place, time, provocation, or other circumstances, may enhance or mitigate the offence; and in such cases retaliation can never be a proper measure of justice. If a nobleman strikes a peasant, all mankind will see, that if a court of justice awards a return of the blow, it is more than a just compensation. On the other hand, retaliation may sometimes be too easy a sentence; as, if a man maliciously should put out the remaining eye of him who had lost one before, it is too slight a punishment for the maimer to lose only one of his: and therefore the law of the Locrians, which demanded an eye for an eye, was in this instance judiciously altered; by decreeing, in imitation of Solon's laws, that he who struck out the eye of a one-eyed man, should lose both his own in return. Besides, there are very many crimes, that will in no shape admit of these penalties, without manifest absurdity and wickedness. Theft cannot be punished by theft, defamation by defamation, forgery by forgery, adultery by adultery, and the like. And we may add, that those instances, wherein retaliation appears to be used, even by the divine authority, do not really proceed upon the rule of exact retribution, by doing to the criminal the same hurt he has done to his neighbour, and no more; but this correspondence between the crime and punishment is barely a consequence from some other principle. Death is ordered to be punished with death; not because one is equivalent to the other, for that would be expiation, and not punishment. Nor is death always an equivalent for death: the execution of a needy decrepid assassin is a poor satisfaction for the death of a nobleman in the bloom of his youth, and full enjoyment of his friends, his honours, and his fortune. But the reason upon which this sentence is grounded seems to be, that this is the highest penalty that man can inflict, and tends most to the security of the world: by removing one murderer from the earth, and setting a dreadful example to deter others: so that even this grand instance proceeds upon other principles than those of retaliation. And truly, if any measure of punishment is to be taken from the damage sustained by the sufferer, the punishment ought rather to exceed than equal the injury; since it seems contrary to reason and equity, that the guilty (if convicted) should suffer no more than the innocent has done before him; especially as the suffering of the innocent is past and irrevocable, that of the guilty is future, contingent, and liable to be escaped or evaded. With regard indeed to crimes that are incomplete, which consist merely in the intention, and are not yet carried into act, as conspiracies and the like; the innocent has a chance to frustrate or avoid the villany, as the conspirator has also a chance to escape his punishment: and this may be one reason why the *lex talionis* is more proper to be inflicted, if at all, for crimes that consist in intention, than for such as are carried into act. It seems indeed consonant to natural reason, and has therefore been adopted as a maxim by several theoretical writers, that the punishment, due to the crime of which one falsely accuses another, should be inflicted on the perjured informer. Accordingly, when it was once attempted to introduce into England the law of retaliation, it was intended as a punishment for such only as preferred malicious accusations against others; it being enacted by statute 37 Edw. III. c. 18. that such as preferred any suggestions to the king's great council should put in sureties of taliation; that is, to incur the same pain that the other should have had, in case the suggestion were found untrue. But, after one year's experience, this punishment of taliation was rejected, and imprisonment adopted in its stead.

But though from what has been said it appears, that there cannot be any regular determinate method of rating the quantity of punishments for crimes, by any one uniform rule; but they must be referred to the will and discretion of the legislative power: yet there are some general principles, drawn from the nature and circumstances of the crime, that may be of some assistance in allotting it an adequate punishment.

As, first, with regard to the object of it: for the greater and more exalted the object of an injury is, the

the more care ſhould be taken to prevent that injury, and of courſe under this aggravation the puniſhment ſhould be more ſevere. Therefore treaſon in conſpiring the king's death is (in Britain) puniſhed with greater rigour than even actually killing any private ſubject. And yet, generally, a deſign to tranſgreſs is not ſo flagrant an enormity as the actual completion of that deſign. For evil, the nearer we approach it, is the more diſagreeable and ſhocking: ſo that it requires more obſtinacy in wickedneſs to perpetrate an unlawful action, than barely to entertain the thought of it: and it is an encouragement to repentance and remorſe, even till the laſt ſtage of any crime, that it never is too late to retract; and that if a man ſtops even here, it is better for him than if he proceeds: for which reaſons an attempt to rob, to raviſh, or to kill, is far leſs penal than the actual robbery, rape, or murder. But in the caſe of a treaſonable conſpiracy, the object whereof is the king's majeſty, the bare intention will deſerve the higheſt degree of ſeverity: not becauſe the intention is equivalent to the act itſelf; but becauſe the greateſt rigour is no more than adequate to a treaſonable purpoſe of the heart, and there is no greater left to inflict upon the actual execution itſelf.

Again, The violence of paſſion, or temptation, may ſometimes alleviate a crime; as theft, in caſe of hunger, is far more worthy of compaſſion, than when committed through avarice, or to ſupply one in luxurious exceſſes. To kill a man upon ſudden and violent reſentment is leſs penal than upon cool deliberate malice. The age, education, and character, of the offender; the repetition (or otherwiſe) of the offence; the time, the place, the company wherein it was committed; all theſe, and a thouſand other incidents, may aggravate or extenuate the crime (A).

Farther, As puniſhments are chiefly intended for the prevention of future crimes, it is but reaſonable that among crimes of different natures thoſe ſhould be moſt ſeverely puniſhed, which are the moſt deſtructive of the public ſafety and happineſs; and, among crimes of an equal malignity, thoſe which a man has the moſt frequent and eaſy opportunities of committing, which cannot be ſo eaſily guarded againſt as others, and which therefore the offender has the ſtrongeſt inducement to commit: according to what Cicero obſerves, *Ea ſunt animadvertenda peccata maxime, quæ difficillime præcaventur*. Hence it is, that for a ſervant to rob his maſter is in more caſes capital than for a ſtranger. If a ſervant kills his maſter, it is a ſpecies of treaſon; in another it is only murder. To ſteal a handkerchief, or other trifle of above the value of twelvepence, privately from one's perſon, is made capital; but to carry off a load of corn from an open field, though of fifty times greater value, is puniſhed with tranſportation only. And in the iſland of Man this rule was formerly carried ſo far, that to take away a horſe or an ox was there no felony, but a treſpaſs, becauſe of the difficulty in that little territory to conceal them or carry them off: but to ſteal a pig or a fowl, which is eaſily done, was a capital miſdemeanour, and the offender was puniſhed with death.

Laſtly, As a concluſion to the whole, we may obſerve, that puniſhments of unreaſonable ſeverity, eſpecially when indiſcriminately inflicted, have leſs effect in preventing crimes, and amending the manners of a people, than ſuch as are more merciful in general, yet properly intermixed with due diſtinctions of ſeverity. It is the ſentiment of an ingenious writer, who ſeems to have well ſtudied the ſprings of human action, that crimes are more effectually prevented by the certainty than by the ſeverity of puniſhment; for the exceſſive ſeverity of laws (ſays Monteſquieu) hinders their execution. When the puniſhment ſurpaſſes all meaſure, the public will frequently prefer impunity to it. Thus alſo the ſtatute 1 Mar. ſt. 1. c. 1. recites in its preamble, "that the ſtate of every king conſiſts more aſſuredly in the love of the ſubjects towards their prince, than in the dread of laws made with rigorous pains; and that laws made for the preſervation of the commonwealth without great penalties, are more often obeyed and kept than laws made with extreme puniſhments." Happy had it been for the nation if the ſubſequent practice of that deluded princeſs in matters of religion, had been correſpondent to theſe ſentiments of herſelf and parliament in matters of ſtate and government! We may further obſerve, that ſanguinary laws are a bad ſymptom of the diſtemper of any ſtate, or at leaſt of its weak conſtitution. The laws of the Roman kings, and the twelve tables of the *decemviri*, were full of cruel puniſhments: the Porcian law, which exempted all citizens from ſentence of death, ſilently abrogated them all. In this period the republic flouriſhed: under the emperors ſevere puniſhments were revived, and then the empire fell.

It is, moreover, abſurd and impolitic to apply the ſame puniſhment to crimes of different malignity. A multitude of ſanguinary laws, (beſides the doubt that may be entertained concerning the right of making them) do likewiſe prove a manifeſt defect either in the wiſdom of the legiſlative, or the ſtrength of the executive, power. It is a kind of quackery in government, and argues a want of ſolid ſkill, to apply the ſame univerſal remedy, the *ultimum ſupplicium*, to every caſe of difficulty. It is, it muſt be owned, much eaſier to extirpate than to amend mankind; yet that magiſtrate muſt be eſteemed both a weak and a cruel ſurgeon who cuts off every limb which through ignorance or indolence he will not attempt to cure. It has been therefore ingeniouſly propoſed, that in every ſtate a ſcale of crimes ſhould be formed, with a correſponding ſcale of puniſhments, deſcending from the greateſt to the leaſt. But if that be too romantic an idea, yet at leaſt a wiſe legiſlator will mark the principal diviſions, and not aſſign penalties of the firſt degree to offences of an inferior rank. Where men ſee no diſtinction

(A) Thus Demoſthenes (in his oration againſt Midas) finely works up the aggravations of the inſults he had received. "I was abuſed (ſays he) by my enemy, in cold blood, out of malice, not by heat of wine, in "the morning, publicly, before ſtrangers as well as citizens; and that in the temple, whither the duty of my "office called me."

tion made in the nature and gradations of punishment, the generality will be led to conclude there is no distinction in the guilt. Thus in France the punishment of robbery, either with or without murder, is the same: hence it is, that though perhaps they are therefore subject to fewer robberies, yet they never rob but they also murder. In China murderers are cut to pieces, and robbers not: hence in that country they never murder on the highway, though they often rob. And in Britain, besides the additional terrors of a speedy execution, and a subsequent exposure or dissection, robbers have a hope of transportation, which seldom is extended to murderers. This has the same effect here as in China, in preventing frequent assassination and slaughter.

Yet though in this instance we may glory in the wisdom of our law, we shall find it more difficult to justify the frequency of capital punishment to be found therein; inflicted (perhaps inattentively) by a multitude of successive independent statutes, upon crimes very different in their natures. It is a melancholy truth, that, among the variety of actions which men are daily liable to commit, no less than 160 have been declared by act of parliament to be felonies without benefit of clergy; or, in other words, to be worthy of instant death. So dreadful a list, instead of diminishing, increases the number of offenders. The injured, through compassion, will often forbear to prosecute; juries, through compassion, will sometimes forget their oaths, and either acquit the guilty or mitigate the nature of the offence; and judges, through compassion, will respite one half of the convicts, and recommend them to the royal mercy. Among so many chances of escaping, the needy and hardened offender overlooks the multitude that suffer: he boldly engages in some desperate attempt to relieve his wants or supply his vices; and if, unexpectedly, the hand of justice overtakes him, he deems himself peculiarly unfortunate in falling at last a sacrifice to those laws which long impunity has taught him to contemn.

As to the trials and mode of punishment, see Arraignment; Trial, and the references therefrom; Conviction; Judgment; Attainder; *Corruption of Blood*; Forfeiture; Execution; the several *Crimes* under their respective names. See Law *Index*.

Persons capable or incapable of committing Crimes; or (which is all one) of suffering the censures of the law upon the commission of forbidden acts.

All the several pleas and excuses which protect the committer of a forbidden act from the punishment which is otherwise annexed thereto, may be reduced to this single consideration, the want or defect of *will*. An involuntary act, as it has no claim to merit, so neither can it induce any guilt: the concurrence of the will, when it has its choice either to do or to avoid the fact in question, being the only thing that renders human actions either praiseworthy or culpable. Indeed, to make a complete crime, cognizable by human laws, there must be both a will and an act. For though, *in foro conscientiæ*, a fixed design or will to do an unlawful act is almost as heinous as the commission of it; yet as no temporal tribunal can search the heart, or fathom the intentions of the mind, otherwise than as they are demonstrated by outward actions, it therefore cannot punish for what it cannot know. For which reason, in all temporal jurisdictions, an *overt* act, or some open evidence of an intended crime, is necessary in order to demonstrate the depravity of the will, before the man is liable to punishment. And as a vicious will without a vicious act is no civil crime; so, on the other hand, an unwarrantable act without a vicious will is no crime at all. So that to constitute a crime against human laws, there must be, first, a vicious will; and, secondly, an unlawful act consequent upon such vicious will.

Now there are three cases in which the will does not join with the act; 1. When there is a defect of understanding. For where there is no discernment, there is no choice; and, where there is no choice, there can be no act of the will, which is nothing else but a determination of one's choice to do or abstain from a particular action; he, therefore, that has no understanding, can have no will to guide his conduct. 2. Where there is understanding and will sufficient residing in the party, but not called forth and exerted at the time of the action done; which is the case of all offences committed by chance or ignorance. Here the will sits neuter, and neither concurs with the act nor disagrees to it. 3. Where the action is constrained by some outward force and violence. Here the will counteracts the deed; and is so far from concurring with, that it loaths and disagrees to what the man is obliged to perform. Infancy, idiocy, lunacy, and intoxication, fall under the first class; misfortune and ignorance may be referred to the second; and compulsion or necessity may properly rank in the third. See Infancy, Idiocy, Drunkenness, Misfortune, Ignorance, Necessity.

CRIMEA, or Crim Tartary, anciently the *Chersonesus Taurica*, a peninsula situated directly to the south of St Petersburg, between the 51st and 55th degrees of latitude, and in 46 longitude. Its southern and western coasts lie on the Euxine, its northern and eastern on the Rotten sea and the Palus Mæotis. It is joined, however, to the continent on the north by a small neck of land not more than six miles broad. This peninsula has been known more than 3000 years since the first naval expedition of the Argonauts; a story, though mixed with fable, yet well founded in its principal facts. The mountainous parts were inhabited by the Tauri, probably a colony of Scythians; and its coasts on the west, the east, and the south, by Greeks. The Scythians were driven out by Mithridates; the Greeks by the Sarmatians; and these again by the Alani and Goths, a northern horde of Scythians. The Hungarians, the Cossacks, and Tartars, succeeded in their turn; while the Genoese in the 12th century, held a temporary and precarious possession of the seaports, which they were obliged to yield to the Turks in 1475. At the peace of 1774, the Tartars of the Crimea were declared independent; and in 1783, this peninsula was united to the Russian empire.

From the above-mentioned isthmus, on which is built the fortress of Or-kapi or Perekop, to the first rising of the hill at Karasubasar, the country is one continued flat; elevating itself, by an easy gradation, to the summit of the hill, which forms the south side of the peninsula and the shore of the Euxine sea. The surface of the soil is almost all of one kind, a reddish-gray loam; on digging, you find it more or less

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mixed with a black earth, and the hills abound with marle. The whole flat from Perekop to the river Salgir, which may be an extent of 80 miles, is full of salt marshes and lakes; from whence the neighbouring Russian governments, as well as the Crim itself, Anatolia, and Bessarabia, are supplied with salt. The most remarkable of these lakes are five in number; Koslof and Keffa, so called after the towns near which they lie, are very large; the Tusla, about 15 versts from Perekop, on the road from Keffa; the Red lake, not far from the last mentioned; and the Black lake. Besides these, there are many other swamps and lakes, from whence the inhabitants get salt for their own consumption.

The greatest part of the peninsula is so level that a man may travel over the half of it without meeting with a river, or even the smallest brook. The inhabitants of the villages, therefore, make a pit in the yard of every house for receiving the rain or the water that runs from the hills. The whole tract is bare of every kind of tree. Not a bush or a bramble is to be seen, and the herbage is extremely scanty. This, however, does not proceed so much from the unfruitfulness of the place, as from the vast herds of cattle which rove the whole year long from place to place; by which means all the grass in spring, summer, or autumn, no sooner appears through the long drought which succeeds the rainy season, but it is immediately devoured or trodden down. The universal prevalence of this custom of keeping cattle to wander up and down, joined to the slothfulness of the Tartars, with their inaptitude and aversion to agriculture, is the reason of the total neglect of that science here. Otherwise, were the land divided into portions and properly managed, there would be a sufficiency for the cattle, and the rest would be fruitful in corn and grain. By this means alone the Crim would become a fertile country, and no natural defect would be found in opposition to the welfare of its inhabitants. The truth of this is well known by their neighbours; where, of a hundred Tartars, one perhaps follows husbandry, who finds it to answer to so much profit, that he has not only enough for his own use, but wherewith to sell to the ninety-nine.

This peninsula, which is indeed but a little district, yet, from the many advantages conferred upon it by nature, may be esteemed peculiarly rich, is divided into the hilly country and the flat. The latter, which extends from Perekop to Koslof and the river Bulganap, to Karasubasar, Keffa, and Yenicali, is strewn there and there with little Tartar villages, maintained by cattle and the produce of the salt lakes. The highlands, or hilly country, form the southern part of the Crim, along the straight coast of the Black sea, and stretching westward in a right line from Keffa to the vicinity of Belbek. These hills are composed of layers of chalk; which, in the headlands and promontories, is soft, but more inland quite hard. The strata of the high hills are like those of the promontories, and take a direction from north to south. These qualities of the strata prevail not throughout the whole hills, but only in the large and lofty ones; such as the two that rise near Karasubasar, and one very high by Achmetsched, which bears the name of Aktau. The other smaller hills lie scattered and dispersed, but take the names of the greater ones, to which they seem to belong; as the great ridge of Caucasus does, which extends beyond the Donau, through Bulgaria, and are named *Palkans*.

All accounts agree in this, that nature has favoured these highland countries with great advantages, and blessed them with abundance of all things. A number of springs that flow from the mountains form the two considerable rivers Salgir and Karasu, which run into the Rotten sea. The former, which takes its rise from a cavern in a high hill near Achmetsched, falls straight into the plain below, and waters a great part of the Crim; the other commencing behind Karasubasar, falls likewise into the plain, and mingles with the Salgir. There are many other little rivers and streams, which run eastward, and either join the two fore-mentioned or fall immediately into the Rotten sea. All the streams, for the whole length of the hills, which begin at Keffa, and proceed in a chain of the same height, flow to the north or the north-east, excepting the one behind Achmetsched, where the great mountain Aktau is, which falls on the other side; this river, rising on the northern side of this mountain, flows, as was before observed, towards the north-east, to the Salgir and the Rotten sea; as likewise those which spring on the western side, take their course westward to the Bulganak, and thence straight to the Black sea; which also receives all the other little rivers that arise from these hills, as the Amma, the Katscha, the Belbek, the Kasulkioi, &c.

The mountains are well covered with woods fit for the purpose of ship-building, and contain plenty of wild beasts. The valleys consist of fine arable land; on the sides of the hills grow corn and vines in great abundance, and the earth is rich in mines. But these mountaineers are as careless and negligent as the inhabitants of the deserts; slighting all these advantages; and, like their brethren of the lowlands, are sufficiently happy if they are in possession of a fat sheep and as much bread as serves them to eat.

About 20 years ago this peninsula was uncommonly full of inhabitants and wealth. They reckoned at that time at least 1200 villages; but, from the late troubles in the Crim, it has lost more than a third part of its inhabitants, and now, wherever we turn, we meet with the ruins of large villages and dwellings. The people were composed of various nations, who lived together under the Tartars in the most unbounded freedom; but in the late Turkish war they either put themselves under the Russian government, and were transferred to that empire, or fled to Abcasia and the Tschirkassian hills.

The houses in the towns, as well as the villages, are for the most part of square timbers, having the interstices filled with brick work, if the possessor can afford it, and those of the poorer sort with turf. The chinks and crannies are made tight with clay, and then plastered within and without. The covering is commonly either of bricks or of turfs. Only the medscheds, minarets, and baths, are of stone, and a few extremely handsome of marble. They have chimneys in the chambers, at which they likewise dress their victuals; but stoves in the Russian manner none. In extreme frosts a great iron pan of charcoal is brought into the room, for making it comfortable. Their custom is, to

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to fit upon low fofas, with Turkifh coverings and cufhions, or upon a clay feat, fomewhat raifed above the earth, and fpread with a carpet. In thefe rooms are cupboards and chefts, often covered with cufhions, to ferve as feats; in which they keep their gold, filver, and valuables. Such are the inner apartments or harams, in which the women generally live; the others are not fo fine. Thefe contain only a fofa, or a bank of clay covered with a carpet, as in the chimney rooms.

The rich Tartars, and their nobility or murzas (excepting only fuch as are about the perfon of the khan), commonly dwell all the year round in the country, coming only to town when they have bufinefs there. There are but few towns in the Crim, at leaft in comparifon of its former population. The Krimfkoi Tartars have no tribunal of juftice, controverfies and quarrels being feldom heard of among them; and if a difpute fhould arife, it is immediately fettled by an appeal to the Koran. Little differences in the villages inevitably happening about property, or other matters not taken notice of in that code, are amicably adjufted by the elderman or abefes; but in the towns all weighty concerns, excepting the fingle cafe of murder or homicide, are brought before the kaimakan, or commandant, who fettles them abfolutely without appeal.

The refidence of the khans of the Crimea was formerly Bachtfchifarai, in which city they held their feat for upwards of 200 years. They went thither from Efki-Crim, or Old Crim, the capital city of the Genoefe, upon Bengli Ghirei Khan's plundering the feaports, and driving all the Genoefe from their ftations. Before Efki-Crim, and indeed upon the firft coming of the Tartars into this peninfula, the fovereign refidence was at Koflof; but here they remained not long. Under the late Khan Shagin Ghirei it was held at Keffa, the ancient Theodofia; which is ten miles diftant from Efki-Crim, faid to be the Cimmerium of the ancients.

The principal cities or towns of the Crimea are: 1. *Bachtfchifarai*, an extenfive and wealthy city, lying in a vale between two high mountains, and furrounded by a number of gardens. From this circumftance it has its name; *bachtfchi*, fignifying in the Tartarian language "a garden," and *farai*, "a palace." It formerly contained 3000 houfes, and many fumptuous medfcheds. The palace of the khans, with its gardens and ponds, was much improved under the government of Khan Kerim Ghirei, under whofe government the laft Turkifh war took its rife. In this palace is the burial-place of all the khans of Crimea, wherein all the khans that have reigned here lie interred. The fine Krimfkoi vines, with their large clufters of grapes, grow in great plenty all about this town, and a profufion of other delicious fruits, from whence the neighbouring parts of Ruffia are fupplied. 2. *Keffa*, the prefent refidence of the khans, ftands on the fhore of a large harbour in the Black fea. Its fite is on the declivity of a long ridge of mountains; and is mantled by a ftone wall, fortified by feveral towers, and encompaffed by a deep ditch. On both fides of the city formerly ftood caftles, and in the middle of them a lofty turret for the purpofe of giving fignals by fire. Before the wall were wide extended fuburbs; containing among other confiderable buildings, medfcheds, churches for the Greek and Armenian worfhip; of all which now only the veftiges remain. The caftles and towers lie alfo in ruins; and not one-third part of the houfes of the city itfelf are now remaining, and thofe chiefly built of materials taken from the aforefaid ruins. They formerly reckoned Keffa to contain 4000 houfes, including the fuburbs, with a number of medfcheds and Chriftian churches; but this number has been much diminifhed by the laft Turkifh war. The prefent inhabitants confift moftly of Tartars; who carry on a trade by no means inconfiderable, in commodities brought from Turkey. The late khan, an intelligent and enlightened perfonage, made this city the place of his refidence, and brought hither the mint from Bachtfchifarai, built himfelf a palace, and erected a divan, which affembled three times a-week, and the fourth time was held in the palace of the khan, in which he always perfonally affifted. Here is alfo a cuftomhoufe, the management of which is farmed out. 3. *Karafubafar*, likewife a very rich city in former times, ftands at the beginning of the mountains, about half-way between Keffa and Bachtfchifarai. It is a large trading town; contains a confiderable number of dwelling-houfes and medfcheds, but the greateft part of them in decay, and many fine gardens. This place is the moft famous in all the Crim for its trade in horfes, and has a market once a-week for that article of traffic; to which are likewife brought great numbers of buffaloes, oxen, cows, camels, and fheep for fale. Near this city flows one of the principal rivers of the Crim, called the *Karafu*, that is, the Black Water. Of this river they have an opinion in Ruffia, that one part of it flows upwards for feveral verfts together. But this is in fome fort true, not only of the Karafu, but of all the rivers of the Crim that have a ftrong current. The Tartars, who dwell either in the valleys or on the fides of the mountains (frequently without confidering whether the place is fupplied with water or not), dig canals either from the fource of the next river, or from that part of it which lies neareft to their particular habitation, about an arfhine in breadth, for their gardens and domeftic ufe. From thefe they cut fmaller ones through the villages, to fupply them with water, and not unfrequently to drive a mill. Thefe canals appear, to the imagination of the common people, to run in a contrary direction to the current of the river; and in fact thefe canals do lie, in many places for a verft in length, fome fathoms higher than the level of the ftream from whence they are fupplied. 4. *Achmetfled*, a pretty large city not far from Bachtfchifarai; now made the capital of all the Crimea by the regulations of Prince Potemkin in the fummer of 1785. 5. *Koflof*, formerly a very confiderable trading town, lies on the weftern fide of the peninfula, in a bay of the Black fea; which, as well as the found at Keffa, might rather be called a road than a haven. This was the firft town the Tartars poffeffed themfelves of on their firft entrance into the Crim, and eftablifhed a cuftomhoufe therein, after the example of the Genoefe, which is now farmed out.

The other remarkable places are, *Sudak*, which is built on the hills upon the fhore of the Black fea, at the fouth fide of the peninfula, and is famous for its excellent wine, refembling Champagne both in colour and ftrength; *Aluſchti*, on the fame fide, among the

hills

hills on the ſea ſhore; *Baluklava*, where there is a fine harbour, and perhaps the only one on the Black ſea, containing ample room for a very good fleet; *Inkerman* may be noticed for its commodious though not very large haven, called *Achtiar*; and *Mangup*, the old Cherſoneſus: which were all formerly very flouriſhing towns; but are now either in ruins, or dwindled into ſmall villages.

All theſe places, ſo long as the Genoeſe remained maſters of the Crim, were well fortified; but the Tartars, in taking them, demoliſhed all the works. While they were under the Turks, they left the fortreſſes of Keffa, Kertſch, and Koſlof, and built the fort Arabat on the neck of land between the ſea of Azof (or Palus Mæotis) and the Rotten ſea, where Perekop alſo is.

In *Arabat* are but few houſes; but here the warlike ſtores of the khans were kept.—*Perekop*, called by the Turks *Or-kapi*, is a fortreſs of moderate ſtrength; ſtanding about the middle of the neck of land that joins the peninſula with the continent. This iſthmus, which is at leaſt ſix miles broad, is cut through with a wide and deep ditch lined with ſtone, and reaches from the Black to the Rotten ſea. This was formerly kept without water, but now is filled from both ſeas. On the Crimean ſide a high wall of earth runs the whole length of it, ſtraight from one ſea to the other. The people paſs over the ditch by means of a drawbridge, and through the wall by a gateway. The walls of the fortreſs are ſome fathoms from the road ſide; of which the ruins are only now diſcernible, namely, large brick houſes, with a number of bomb-ſhells and cannon-balls about them, which were formerly kept in the fortreſs. At leaſt two miles from this is a pretty populous but miſerable place, which was probably the town to which this fort belonged. Near the gate is a cuſtomhouſe, where all imports and exports pay duty.

This peninſula was formerly extremely populous; the number of its inhabitants, in Tartars, Turks, Greeks, Armenians, Jews, and others, amounted to above 200,000 men. Since that, however, the greateſt part of the Chriſtians have betaken themſelves to the other parts of the Ruſſian empire, particularly the government of Azof; and many other inhabitants, particularly Tartars, have gone to Taman and Abchaſia; ſo that the preſent population of the Crim cannot now be reckoned at more than 70,000 men at moſt.

The Crim was heretofore divided into 24 kaduliks or diſtricts; namely, Yenikali, Kertſch, Arabat, Eſki-krim, Keffa, Karaſubaſar, Sudak, Achmetſched, Yalof, Bachtſchiſarai, Balaklava, Mangup, Inkerman, Koſlof, Or, Manſur, Tarkan, Sivaſch, Tiſchongar, Sarubulat, Barun, Argun, Sidſchugut, and Schirin. Several of theſe diſtricts are named after the town or village wherein the murza, their governor, dwells; and many of them are at preſent in a ſtate of total decay.

CRIMEN FALSI. See *Falsi Crimen*.

CRIMSON, one of the ſeven red colours of the dyers. See DYEING.

CRINGLE, a ſmall hole made in the bolt-rope of a ſail, by intertwiſting one of the diviſions of a rope, called a *Strand*, alternately round itſelf and through the *ſtrands* of the bolt-rope, till it becomes threefold, and aſſumes the ſhape of a wreath or ring. The uſe of the cringle is generally to contain the end of ſome rope, which is faſtened thereto for the purpoſe of drawing up the ſail to its yard, or of extending the ſkirts by the means of *bridles*, to ſtand upon a ſide wind. The word ſeems to be derived from *krinckelen* (Belg.) "to run into twiſts."

CRINUM, ASPHODEL-LILY: A genus of plants belonging to the hexandria claſs; and in the natural method ranking under the 9th order, *Spathaceæ*. See BOTANY *Index*.

CRISIS, in *Medicine*, is uſed in different ſenſes, both by the ancient and modern phyſicians. With ſome it means frequently no more than the excretion of any noxious ſubſtance from the body. Others take the word for a ſecretion of the noxious humours made in a fever. Others uſe it for the critical motion itſelf; and Galen defines a criſis in fevers, a ſudden and inſtantaneous change, either for the better or the worſe, productive of recovery or death.

CRISPIN *and* CRISPIANUS, two legendary ſaints, whoſe feſtival, as marked in the kalendar, is on the 25th of October. According to the legend, they were brethren, born at Rome; from whence they travelled to Soiſſons in France, about the year 303, to propagate the Chriſtian religion; and becauſe they would not be chargeable to others for their maintenance, they exerciſed the trade of ſhoemakers: but the governor of the town diſcovering them to be Chriſtians, ordered them to be beheaded. From which time the ſhoemakers made choice of them for their tutelar ſaints.

CRISTÆ, in *Surgery*, a term for certain excreſcences about the anus and pudenda. See MEDICINE *Index*.

CRISTA GALLI, in *Anatomy*, an eminence in the middle of the *os ethmoides*, advancing within the cavity of the cranium; and to which is faſtened that part of the dura mater which divides the brain, called *falx*. It has its name from its figure, which reſembles that of a cock's comb. In adults, this proceſs appears of a piece with the *ſeptum narium*. See ANATOMY *Index*.

CRITERION, or CRITERIUM, a ſtandard by which propoſitions and opinions are compared, in order to diſcover their truth or falſehood.

CRITHE, in *Surgery*, commonly called the *ſtye*, is a ſort of tubercle that grows on the eye-lids. When ſmall, it is ſeated on the edge of the eye-lid; but when large, it ſpreads further. When they do not ſuppurate they become wens. They are apt to diſappear and return. If there is inflammation, endeavour to ſuppurate it with the white bread poultice: if it is hard, deſtroy it with a mixture of equal parts of hog's lard and quickſilver. If the lower eye-lid is affected, the tumor is more frequently on its inſide; and then it is beſt to diſſect it, or to make way for it outwardly by applying a cauſtic on the ſkin juſt upon it.

CRITHUM, SAMPHIRE: A genus of plants belonging to the pentandria claſs; and in the natural method ranking under the 45th order, *Umbellatæ*. See BOTANY *Index*.—Its leaves are an excellent pickle uſed for ſauces, and are by many eaten raw in ſalads. It is of a ſaltiſh reliſh, palatable, and comfortable to the ſtomach. It is not very eaſily preſerved in gardens. It muſt be ſown on gravelly or rocky ground, half an inch deep; in which ſituation the plants will come up, and laſt ſome years.

CRITHOMANCY,

CRITHOMANCY, a kind of divination, performed by considering the dough or matter of the cakes offered in sacrifice, and the meal strewed over the victims to be killed. Hence, in regard they ordinarily used barley-meal in these ceremonies, this kind of divination was called *crithomancy*, from κριθη, *barley*, and μαντεια, *divination*.

CRITIAS, one of the 30 tyrants set over Athens by the Spartans. He was eloquent and well bred, but of dangerous principles. He cruelly persecuted his enemies, and put them to death. He was killed about 400 years before the Augustan age, in a battle against those citizens whom his oppression had banished. He had been among the disciples of Socrates, and had written elegies and other compositions, of which some fragments remain.

CRITICAL DAYS and SYMPTOMS, among physicians, are certain days and symptoms in the course of acute diseases, which indicate the patient's state, and determine him either to recover or grow worse. See MEDICINE *Index*.

CRITICISM, the art of judging with propriety concerning any object or combination of objects. But, in a more limited sense, the science of criticism is confined to the fine arts. The principles of the fine arts are best unfolded by studying the sensitive part of our nature, and by learning what objects are naturally agreeable and what are naturally disagreeable. The man who aspires to be a critic in these arts, must pierce still deeper: he must clearly perceive what objects are lofty, what low, what are proper or improper, what are manly, and what are mean or trivial. Hence a foundation for judging of taste, and for reasoning upon it: where it is conformable to principles, we can pronounce with certainty that it is correct; otherwise, that it is incorrect, and perhaps whimsical. Thus the fine arts, like morals, become a rational science; and, like morals, may be cultivated to a high degree of refinement.

Manifold are the advantages of criticism, when thus studied as a rational science. In the first place, a thorough acquaintance with the principles of the fine arts redoubles the entertainments those arts afford. To the man who resigns himself entirely to sentiment or feeling, without interposing any sort of judgment, poetry, music, painting, are mere pastime; in the prime of life, indeed, they are delightful, being supported by the force of novelty and the heat of imagination: but they lose their relish gradually with their novelty; and are generally neglected in the maturity of life, which disposes to more serious and more important occupations. To those who deal in criticism as a regular science, governed by just principles, and giving scope to judgment as well as to fancy, the fine arts are a favourite entertainment; and in old age maintain that relish which they produce in the morning of life.

In the next place, a philosophical inquiry into the principles of the fine arts, inures the reflecting mind to the most enticing sort of logic: the practice of reasoning upon subjects so agreeable tends to a habit; and a habit strengthening the reasoning faculties, prepares the mind for entering into subjects more difficult and abstract. To have, in this respect, a just conception of the importance of criticism, we need but reflect upon the common method of education; which, after some years spent in acquiring languages, hurries us, without the least preparatory discipline, into the most profound philosophy: a more effectual method to alienate the tender mind from abstract science, is beyond the reach of invention: and accordingly, with respect to such speculations, the bulk of our youth contract a sort of hobgoblin terror, which is seldom, if ever, subdued. Those who apply to the arts are trained in a very different manner: they are led, step by step, from the easier parts of the operation to what are more difficult; and are not permitted to make a new motion till they be perfected in those which regularly precede it. The science of criticism appears then to be a middle link, connecting the different parts of education into a regular chain. This science furnisheth an inviting opportunity to exercise the judgment: we delight to reason upon subjects that are equally pleasant and familiar; we proceed gradually from the simpler to the more involved cases: and in a due course of discipline, custom, which improves all our faculties, bestows acuteness upon those of reason, sufficient to unravel all the intricacies of philosophy.

Nor ought it to be overlooked, that the reasonings employed upon the fine arts are of the same kind with those which regulate our conduct. Mathematical and metaphysical reasonings have no tendency to improve social intercourse; nor are they applicable to the common affairs of life: but a just taste in the fine arts, derived from rational principles, furnishes elegant subjects for conversation, and prepares us finely for acting in the social state with dignity and propriety.

The science of rational criticism tends to improve the heart not less than the understanding. It tends, in the first place, to moderate the selfish affections: by sweetening and harmonizing the temper, it is a strong antidote to the turbulence of passion and violence of pursuit; it procures to a man so much mental enjoyment, that, in order to be occupied, he is not tempted in youth to precipitate into hunting, gaming, drinking; nor in middle age, to deliver himself over to ambition; nor in old age, to avarice. Pride and envy, two disgustful passions, find in the constitution no enemy more formidable than a delicate and discerning taste: the man upon whom nature and culture have bestowed this blessing, feels great delight in the virtuous dispositions and actions of others; he loves to cherish them, and to publish them to the world: faults and failings, is is true, are to him not less obvious; but these he avoids, or removes out of sight, because they give him pain. On the other hand, a man void of taste, upon whom the most striking beauties make but a faint impression, has no joy but in gratifying his pride or envy by the discovery of errors and blemishes. In a word, there may be other passions, which, for a season, disturb the peace of society more than those mentioned: but no other passion is so unwearied an antagonist to the sweets of social intercourse: these passions, tending assiduously to their gratification, put a man perpetually in opposition to others; and dispose him more to relish bad than good qualities, even in a companion. How different that disposition of mind, where every virtue in a companion or neighbour, is, by refinement of taste, set in its strongest light; and defects

defects or blemishes, natural to all, are suppressed, or kept out of view!

In the next place, delicacy of taste tends not less to invigorate the social affections than to moderate those that are selfish. To be convinced of this tendency, we need only reflect, that delicacy of taste necessarily heightens our sensibility of pain and pleasure, and of course our sympathy, which is the capital branch of every social passion. Sympathy, in particular, invites a communication of joys and sorrows, hopes and fears: such exercise, soothing, and satisfactory in itself, is necessarily productive of mutual good-will and affection.

One other advantage of rational criticism is reserved to the last place, being of all the most important; which is, that it is a great support to morality. No occupation attaches a man more to his duty than that of cultivating a taste in the fine arts: a just relish of what is beautiful, proper, elegant, and ornamental, in writing or painting, in architecture or gardening, is a fine preparation for the same just relish of these qualities in character and behaviour. To the man who has acquired a taste so acute and accomplished, every action wrong or improper must be highly disgustful: if, in any instance, the overbearing power of passion sway him from his duty, he returns to it upon the first reflection with redoubled resolution never to be swayed a second time: he has now an additional motive to virtue, a conviction derived from experience, that happiness depends on regularity and order, and that a disregard to justice or propriety never fails to be punished with shame and remorse.

For the rules of criticism applicable to the fine arts, and derived from human nature, see Architecture, Beauty, Congruity, Comparison, Grandeur, &c.

CRITO, an Athenian philosopher, flourished 400 years before Christ. He was one of the most zealous disciples of Socrates, and supplied him with whatever he wanted. He had several scholars who proved great men, and he composed some dialogues which are lost.

CRITOLAUS, a citizen of Tegea in Arcadia. He with two brothers fought against the three sons of Demonstratus of Pheneus, to put an end to a long war between their respective nations. The brothers of Critolaus were both killed, and he alone remained to withstand his three bold antagonists. He conquered them; and when at his return his sister deplored the death of one of his antagonists, to whom she was betrothed, he killed her in a fit of resentment. The offence deserved capital punishment; but he was pardoned on account of the services he had rendered his country. He was afterwards general of the Achæans; and it is said that he poisoned himself because he had been conquered at Thermopylæ by the Romans, about 146 years before the Augustan age.

CRIZZELLING, in the glass trade, a kind of roughness arising on the surface of some kinds of glass. This was the fault of a peculiar sort of glass made in Oxfordshire and some other places, of black flints, a crystallized sand, and a large quantity of nitre, tartar, and borax. The glass thus made is very beautiful, but, from the too great quantities of the salts in the mixture, is subject to crizzel; that is, the salts in the mixture, from their too great proportion, are subject, either from the adventitious nitre of the air from without, or from warm liquors put in them, to be either increased in quantity or dissolved, and thereby induce a scabrities or roughness irrecoverably clouding the transparence of the glass. This is what was called *crizzelling*; but by using an Italian white pebble, and abating the proportions of the salts, the manufacture is now carried on with advantage, and the glass made with these salts is whiter than the finest Venetian, and is subject to no faults.

CROATIA, a part of the ancient Illyricum, is bounded on the east by Sclavonia and Bosnia, on the south and south-west by Morlachia, and on the north by the Drave, which separates it from a part of Sclavonia. It is about 80 miles in length and 70 in breadth, and was once divided between the Hungarians and Turks; but now the greatest part of it is subject to the house of Austria. The Croats derive their origin from the Sclavi; and their language is a dialect of the Sclavonian, approaching very near to that of the Poles. The country is divided into two parts, viz. that under, and that beyond, the Save. In the late wars between the empress queen and the king of Prussia, no less than 50,000 men were raised out of this small territory. Both horse and foot are good soldiers, especially the former. The soil, where cultivated, is fruitful in wine and oil, &c. but being a frontier country, and much exposed to inroads, it is not so well cultivated as otherwise might be.

CROCODILE. See Lacerta, Erpetology *Index*.

Fossil Crocodile, one of the greatest curiosities in the fossil world which the late ages have produced. It is the skeleton of a large crocodile, almost entire, found at a great depth under ground, bedded in stone. This was in the possession of Linkius, who wrote many pieces of natural history, and particularly an accurate description of this curious fossil. It was found in the side of a large mountain in the midland part of Germany, and in a stratum of black fossil stone, somewhat like our common slate, but of a coarser texture, the same with that in which the fossil fishes in many parts of the world are found. This skeleton had the back and ribs very plain, and was of a much deeper black than the rest of the stone; as is also the case in the fossil fishes which are preserved in this manner. The part of the stone where the head lay was not found; this being broken off just at the shoulders, but that irregularly; so that in one place, a part of the back of the head was visible in its natural form. The two shoulder-bones were very fair, and three of the feet were well preserved: the legs were of their natural shape and size, and the feet preserved even to the extremities of the five toes of each.

Crocodile (*crocodilus*), in *Rhetoric*, a captious and sophistical kind of argumentation, contrived to seduce the unwary, and draw them speciously into a snare. It has its name crocodile from the following occasion, invented by the poets. A poor woman, begging a crocodile that had caught her son walking by the riverside to spare and restore him, was answered, that he would restore him, provided she should give a true answer to a question he should propose: the question was, Will I restore thy son or not? To this the poor woman

man, suspecting a deceit, sorrowfully answered, Thou wilt not: and demanded to have him restored, because she had answered truly. Thou liest, says the crocodile; for if I restore him thou hast not answered truly: I cannot therefore restore him without making thy answer false. Under this head may be reduced the propositions called *mentientes* or *insolubiles*; which destroy themselves. Such is that of the Cretan poet: *Omnes ad unum Cretenses semper mentiuntur*: "all the Cretans, to a man, always lie." Either, then, the poet lies when he asserts that the Cretans all lie, or the Cretans do not all lie.

CROCUS, SAFFRON: A genus of plants belonging to the triandria class; and in the natural method ranking under the 6th order *Ensatæ*. See BOTANY *Index*.

CROCUS, in *Chemistry*, denotes any metal calcined to a red or deep yellow colour.

Crocus Metallorum, an emetic preparation of antimony and nitre. See CHEMISTRY *Index*.

CRŒSUS, the last king of Lydia, remarkable for his riches, his conquests, his temporary prosperity, and the sad reverse of his fortune. He subdued the Phrygians, Mysians, Paphlagonians, Thracians, and Carians; amassed together immense riches; and became one of the most powerful and magnificent princes in the world. He drew the learned to his court, and took a pleasure in conversing with them. Thales of Miletus, Pittacus of Mitylene, Bias of Priené, Cleobulus of Lindus, and most of the other "wise men," as they are emphatically styled, who lived in that age, as well as Æsop the fabulist, and the elegant Greek poets of the times, were bountifully received at the court of Crœsus. There is still on record a memorable conversation between that prince and Solon, which seemed to predict the subsequent events of his reign, and which had a late but important influence on the character and fortune of the Lydian king. Crœsus having entertained his Athenian guest, according to the ancient fashion, for several days, before he asked him any questions, ostentatiously showed him the magnificence of his palace, and particularly the riches of his treasury. After all had been displayed to the best advantage, the king complimented Solon upon his curiosity and love of knowledge; and asked him as a man who had seen many countries, and reflected with much judgment upon what he had seen, Whom of all men he esteemed most happy? By the particular occasion, as well as the triumphant air with which the question was proposed, the king made it evident that he expected flattery rather than information. But Solon's character had not been enervated by the debilitating air of a court; and he replied with a manly freedom, "Tellus, the Athenian." Crœsus, who had scarcely learned to distinguish, even in imagination, between wealth and happiness, inquired with a tone of surprise, why this preference to Tellus? "Tellus," rejoined Solon, "was not conspicuous for his riches or his grandeur, being only a simple citizen of Athens; but he was descended from parents who deserved the first honours of the republic. He was equally fortunate in his children, who obtained universal esteem by their probity, patriotism, and every useful quality of the mind or body: and as to himself, he died fighting gallantly in the service of his country, which his valour rendered victorious in a doubtful combat; on which account the Athenians buried him on the spot where he fell, and distinguished him by every honour which public gratitude can confer on illustrious merit."

Crœsus had little encouragement, after this answer, to ask Solon, in the second place, Whom, next to Tellus, he deemed most happy? Such, however, is the illusion of vanity, that he still ventured to make this demand; and still, as we are informed by the most circumstantial of historians, entertained hopes of being favourably answered. But Solon replied with the same freedom as before, "The brothers Cleobis and Biton, two youths of Argos, whose strength and address were crowned with repeated victory at the Olympic games; who deserved the affection of their parents, the gratitude of their country, the admiration of Greece; and who, having ended their lives with peculiar felicity, were commemorated by the most signal monuments of immortal fame." "And is the happiness of a king, then," said Crœsus, "so little regarded, O Grecian stranger, that you prefer to it the mean condition of an Athenian or Argive citizen? The reply of Solon sufficiently justified his reputation for wisdom. "The life of man," said he, "consists of 70 years, which make 25,550 days; an immense number: yet in the longest life, the events of any one day will not be found exactly alike to those of another. The affairs of men are liable to perpetual vicissitudes: the Divinity who presides over our fate is envious of too much prosperity; and all human life, if not condemned to calamity, is at least liable to accident. Whoever has uninterruptedly enjoyed a prosperous tide of success may justly be called *fortunate*: but he cannot before his death be entitled to the epithet of *happy*."

The events which soon followed this conversation, prove how little satisfaction is derived from the possession of a throne. Victorious in war, unrivalled in wealth, supreme in power, Crœsus felt and acknowledged his unhappiness. The warmest affections of his soul centered in his son Atys, a youth of the most promising hopes, who had often fought and conquered by his side. The strength of his attachment was accompanied with an excess of paternal care, and the anxiety of his waking hours disturbed the tranquillity of his rest. He dreamed that his beloved son was slain by a dart; and the solicitude with which he watched his safety, preventing the youth from his usual occupations and amusements, and thereby rendering him too eager to enjoy them, most probably exposed him to the much-dreaded misfortune. Reluctantly permitted to engage in a party of hunting, the juvenile ardour of Atys, increased by the impatience of long restraint, made him neglect the precautions necessary in that manly amusement. He was slain by a dart aimed at a wild boar of monstrous size, which had long spread terror over the country of the Mysians. The weapon came from the hand of Adrastus, a Phrygian prince and fugitive, whom Crœsus had purified from the involuntary guilt of a brother's blood, and long distinguished by peculiar marks of bounty. To the grateful protection of the Phrygian, Crœsus recommended, at parting, the safety of his beloved son. A mournful procession of Lydians brought to Sardis the dead body of Atys. The ill-fated murderer followed behind.

behind. When they approached the royal preſence, Adraſtus ſtepped forward and entreated Crœſus to put him to death; thinking life no longer to be endured after killing, firſt his own brother, and then the ſon of his benefactor. But the Lydian king, notwithſtanding the exceſs of his affliction, acknowledged the innocence of Adraſtus, and the power of fate. "Stranger, your action is blameleſs, being committed without deſign. I know that my ſon was deſtined to a premature death." Adraſtus, though pardoned by Crœſus, could not pardon himſelf. When the mourners were removed, he privately returned, and periſhed by his own hand on the tomb of Atys.

Two years Crœſus remained diſconſolate for the loſs of his ſon: and might have continued to indulge his unavailing affliction during the remainder of life, had not the growing greatneſs of Perſia, which threatened the ſafety of his dominions, rouſed him from his dream of miſery. (See Lydia).—He marched againſt Cyrus with a great army, but was defeated; and retreating to his capital Sardis, was there beſieged. The city was taken by aſſault; and as a Perſian ſoldier was going to kill Crœſus, that prince's only ſurviving ſon, who had hitherto been dumb, terrified at his danger, cried, *Stop, ſoldier, and touch not Crœſus.* But though delivered by this extraordinary accident from the blind rage of the ſoldier, he ſeemed to be reſerved for a harder fate. Dragged into the preſence of his conqueror, he was loaded with irons; and the ſtern, unrelenting Cyrus, of whoſe humane temper of mind we have ſo beautiful, but ſo flattering, a picture in the philoſophical romance of Xenophon, ordered him, with the melancholy train of his Lydian attendants, to be committed to the flames. An immenſe pile of wood and other combuſtibles was erected in the moſt ſpacious part of the city. The miſerable victims, bound hand and foot, were placed on the top of the pyre. Cyrus, ſurrounded by his generals, witneſſed the dreadful ſpectacle, either from an abominable principle of ſuperſtition he had bound himſelf by a vow to ſacrifice Crœſus as the firſt fruits of his Lydian victory, or from a motive of curioſity, equally cruel and impious, to try whether Crœſus, who had ſo magnificently adorned the temples and enriched the miniſters of the gods, would be helped in time of need by the miraculous interpoſition of his much honoured protectors. Meanwhile the unfortunate Lydian, oppreſſed and confounded by the intolerable weight of his preſent calamity compared with the ſecurity and ſplendor of his former ſtate, recollected his memorable converſation with the Athenian ſage, and uttered with a deep groan the name of *Solon.* Cyrus aſked by an interpreter, "Whoſe name he invoked?" "*His,*" replied Crœſus, emboldened by the proſpect of certain death, "whoſe words ought ever to ſpeak to the heart of kings." This reply not being ſatisfactory, he was commanded to explain at full length the ſubject of his thoughts. Accordingly he related the important diſcourſe which had paſſed between himſelf and the Athenian, of which it was the great moral, That no man could be called happy till his death.

The words of a dying man are fitted to make a ſtrong impreſſion on the heart. Thoſe of Crœſus deeply affected the mind of Cyrus. The Perſian conſidered the ſpeech of Solon as addreſſed to himſelf. He repented of his intended cruelty towards the unfortunate prince, who had formerly enjoyed all the pomp of proſperity: and dreading the concealed vengeance that might lurk in the boſom of fate, gave orders that the pyre ſhould be extinguiſhed. But the workmen who had been employed to prepare it, had performed their taſk with ſo much care, that the order could not ſpeedily be obeyed. At that moment, Crœſus calling on Apollo, whoſe favourite ſhrine of Delphi had experienced his generous munificence, and whoſe perfidious oracle had made him ſo ungrateful a return; the god, it is ſaid, ſent a plentiful ſhower to extinguiſh the pyre. This event, which ſaved the life, and which ſufficiently atteſted the piety, of Crœſus, ſtrongly recommended him to the credulity of his conqueror. It ſeemed impoſſible to pay too much reſpect to a man who was evidently the favourite of heaven. Cyrus gave orders that he ſhould be ſeated by his ſide, and thenceforth treated as a king; a revolution of fortune equally ſudden and unexpected. But the mind of Crœſus had undergone a ſtill more important revolution: for, tutored in the uſeful ſchool of adverſity, he learned to think with patience and to act with prudence, to govern his own paſſions by the dictates of reaſon, and to repay by wholeſome advice the generous behaviour of his Perſian maſter.

The firſt advantage which he derived from the change in Cyrus's diſpoſition towards him, was the permiſſion of ſending his fetters to the temple of the Delphian Apollo, whoſe flattering oracles had encouraged him to wage war with the Perſians. "Behold," were his meſſengers inſtructed to ſay, "the trophies of our promiſed ſucceſs! behold the monuments of the unerring veracity of the god!" The Pythia heard their reproach with a ſmile of contemptuous indignation, and anſwered it with that ſolemn gravity which ſhe was ſo carefully taught to aſſume: "The gods themſelves cannot avoid their own deſtiny, much leſs avert, however they may retard, the determined fates of men. Crœſus has ſuffered, and juſtly ſuffered, for the crime of his anceſtor Gyges; who, entruſted as chief of the guards, with the perſon of Candaules, the laſt king of the race of Hercules, was ſeduced by an impious woman to murder his maſter, to defile his bed, and to uſurp his royal dignity. For this complicated guilt of Gyges the misfortunes of Crœſus have atoned; but know, that through the favour of Apollo, theſe misfortunes have happened three years later than the fates ordained." The Pythia then proceeded to explain her anſwers concerning the event of the war againſt Cyrus, and proved, to the conviction of the Lydians, that her words, if properly underſtood, portended the deſtruction, not of the Perſian, but of the Lydian empire. Crœſus heard with reſignation the report of his meſſengers, and acknowledged the juſtice of the Delphian oracle, which maintained and increaſed the luſtre of its ancient fame. This fallen monarch ſurvived Cyrus. The manner of his death is not known.

CROFT, a little cloſe adjoining to a dwelling-houſe, and incloſed for paſture or arable land, or any other purpoſe.—In ſome ancient deeds, *cruſta* occurs as the Latin word for a "croft;" but *cum toftis et croftis* is more frequent. Croft is tranſlated in Abbo Floriacenſis, by *prædium*, a "farm."

CROISADE, or Crusade, a name given to the expeditions

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expeditions of the Christians against the infidels for the conquest of Palestine.

These expeditions commenced in the year 1096. The foundation of them was a superstitious veneration for those places where our Saviour performed his miracles, and accomplished the work of man's redemption. Jerusalem had been taken, and Palestine conquered, by Omar the successor of Abu Becr *, who succeeded Mahomet himself. This proved a considerable interruption to the pilgrims, who flocked from all quarters to perform their devotions at the holy sepulchre. They had, however, still been allowed this liberty, on paying a small tribute to the Saracen caliphs, who were not much inclined to molest them. But, in 1065, this city changed its masters. The Turks took it from the Saracens; and being much more fierce and barbarous than the former, the pilgrims now found they could no longer perform their devotions with the same safety they did before. An opinion was about this time also prevalent in Europe, which made these pilgrimages much more frequent than formerly. It was somehow or other imagined, that the thousand years mentioned in the 20th chapter of the Revelations, were fulfilled; that Christ was soon to make his appearance in Palestine, to judge the world; and consequently that journeys to that country were in the highest degree meritorious, and even absolutely necessary. The multitudes of pilgrims which now flocked to Palestine meeting with a very rough reception from the Turks, filled all Europe with complaints against those infidels who profaned the holy city by their presence, and derided the sacred mysteries of Christianity even in the place where they were fulfilled. Pope Gregory VII. had formed a design of uniting all the princes of Christendom against the Mahometans; but his exorbitant encroachments upon the civil power of princes had created him so many enemies, and rendered his schemes so suspicious, that he was not able to make great progress in the undertaking. The work was reserved for a meaner instrument.

* See *Arabia*, N° 76.

Peter, commonly called the *hermit*, a native of Amiens in Picardy, had made the pilgrimage to Jerusalem; and being deeply affected with the dangers to which that act of piety now exposed the pilgrims, as well as with the oppression under which the eastern Christians now laboured, formed the bold, and, in all appearance, impracticable design of leading into Asia, from the farthest extremities of the west, armies sufficient to subdue those potent and warlike nations that now held the Holy Land in slavery. He proposed his scheme to Martin II. who then filled the papal chair; but he, though sensible enough of the advantages which must accrue to himself from such an undertaking, resolved not to interpose his authority till he saw a greater probability of success. He summoned, at Placentia, a council consisting of 4000 ecclesiastics and 30,000 seculars. As no hall could be found large enough to contain such a multitude, the assembly was held in a plain. Here the Pope himself, as well as Peter, harangued the people, representing the dismal situation of their brethren in the east, and the indignity offered to the Christian name in allowing the holy city to remain in the hands of the infidels. These speeches were so agreeable to those who heard them, that the whole multitude suddenly and violently declared for the war, and solemnly devoted themselves to perform this service, which they believed to be so meritorious in the sight of God.

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But though Italy seemed to have embraced the design with ardour, Martin yet thought it necessary, in order to insure perfect success, to engage the greater and more warlike nations in the same enterprise. Having therefore exhorted Peter to visit the chief cities and sovereigns of Christendom, he summoned another council at Clermont in Auvergne. The fame of this great and pious design being now universally diffused, procured the attendance of the greatest prelates, nobles, and princes; and when the Pope and the hermit renewed their pathetic exhortations, the whole assembly, as if impelled by an immediate inspiration, exclaimed with one voice, "It is the will of God! it is the will of God!" These words were deemed so memorable, and so much the effect of a divine impulse, that they were employed as the signal of rendezvous and battle in all future exploits of these adventurers. Men of all ranks now flew to arms with the utmost ardour, and a cross was affixed to their right shoulder by all who inlisted in this holy enterprise.

At this time Europe was sunk in the most profound ignorance and superstition. The ecclesiastics had gained the greatest ascendant over the human mind; and the people, who committed the most horrid crimes and disorders, knew of no other expiation than the observances imposed on them by their spiritual pastors.

But amidst the abject superstition which now prevailed, the military spirit had also universally diffused itself; and, though not supported by art or discipline, was become the general passion of the nations governed by the feudal law. All the great lords possessed the right of peace and war. They were engaged in continual hostilities with one another: the open country was become a scene of outrage and disorder: the cities, still mean and poor, were neither guarded by walls nor protected by privileges. Every man was obliged to depend for safety on his own force, or his private alliances; and valour was the only excellence which was held in esteem, or gave one man the preeminence above another. When all the particular superstitions, therefore, were here united in one great object, the ardour for private hostilities took the same direction; "and all Europe (as the princess Anna Comnena expresses herself), torn from its foundations, seemed ready to precipitate itself in one united body upon Asia."

All orders of men, now deeming the croisades the only road to heaven, were impatient to open the way with their swords to the holy city. Nobles, artisans, peasants, even priests, inrolled their names; and to decline this service was branded with the reproach of impiety or cowardice. The nobles who inlisted themselves were moved, by the romantic spirit of the age, to hope for opulent establishments in the east, the chief seat of arts and commerce at that time. In pursuit of these chimerical projects, they sold at the lowest price their ancient castles and inheritances, which had now lost all value in their eyes. The infirm and aged contributed to the expedition by presents and money; and many of them, not satisfied with this, attended

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tended it in person, being determined, if possible, to breathe their last in sight of that city where their Saviour had died for them. Women themselves, concealing their sex under the disguise of armour, attended the camp; and commonly forgot their duty still more, by prostituting themselves to the army. The greatest criminals were forward in a service which they considered as an expiation for all crimes; and the most enormous disorders were, during the course of these expeditions, committed by men inured to wickedness, encouraged by example, and impelled by necessity. The multitude of adventurers soon became so great, that their more sagacious leaders became apprehensive lest the greatness of the armament would be the cause of its own disappointment. For this reason they permitted an undisciplined multitude, computed at 300,000 men, to go before them under the command of Peter the hermit, and Gautier or Walter, surnamed the *moneyless*, from his being a soldier of fortune. These took the road towards Constantinople through Hungary and Bulgaria; and, trusting that heaven, by supernatural assistance, would supply all their necessities, they made no provision for subsistence in their march. They soon found themselves obliged to obtain by plunder what they vainly expected from miracles; and the enraged inhabitants of the countries through which they passed, attacked the disorderly multitude, and slaughtered them without resistance. The more disciplined armies followed after; and, passing the straits of Constantinople, they were mustered in the plains of Asia, and amounted in the whole to 700,000 men.

The rage for conquering the Holy Land did not cease with this expedition. It continued for very near two centuries, and eight different croisades were set on foot, one after another. The first was in the year 1096, as already observed. The princes engaged in it were, Hugo, count of Vermandois, brother to Philip I. king of France; Robert, duke of Normandy; Robert, earl of Flanders; Raimond, earl of Toulouse and St Giles; Godfrey of Bouillon, duke of Lorrain, with his brothers Baldwin and Eustace; Stephen, earl of Chartres and Blois; Hugo, count of St Paul; with a great number of other lords. The general rendezvous was at Constantinople. In this expedition, the famous Godfrey besieged and took the city of Nice. The city of Jerusalem was taken by the confederated army, and Godfrey chosen king. The Christians gained the famous battle of Ascalon against the soldan of Egypt; which put an end to the first croisade.

The second croisade, in the year 1144, was headed by the emperor Conrad III. and Louis VII. king of France. The emperor's army was either destroyed by the enemy, or perished through the treachery of Manuel the Greek emperor; and the second army, through the unfaithfulness of the Christians of Syria, was forced to break up the siege of Damascus.

The third croisade, in the year 1188, immediately followed the taking of Jerusalem by Saladin the soldan of Egypt. The princes engaged in this expedition were, the emperor Frederic Barbarossa; Frederic duke of Suabia, his second son; Leopold duke of Austria; Berthold duke of Moravia; Herman marquis of Baden; the counts of Nassau, Thuringia, Misser, and Holland; and above 60 other princes of the empire; with the bishops of Besançon, Cambray, Munster, Osnaburgh, Missen, Passau, Visburg, and several others. In this expedition, the emperor Frederic defeated the soldan of Iconium: his son Frederic, joined by Guy Lusignan king of Jerusalem, in vain endeavoured to take Acre or Ptolemais. During which transactions, Philip Augustus king of France, and Richard I. king of England, joined the croisade; by which means the Christian army consisted of 300,000 fighting men: but great disputes happening between the kings of France and England, the former quitted the Holy Land, and Richard concluded a peace with Saladin.

The fourth croisade was undertaken, in the year 1195, by the emperor Henry VI. after Saladin's death. In this expedition the Christians gained several battles against the infidels, took a great many towns, and were in the way of success, when the death of the emperor obliged them to quit the Holy Land, and return into Germany.

The fifth croisade was published, by order of Pope Innocent III. in 1198. Those engaged in it made fruitless efforts for the recovery of the Holy Land; for, though John de Nesle, who commanded the fleet equipped in Flanders, arrived at Ptolemais a little after Simon of Montfort, Reynard of Dampierre, and others; yet the plague destroying many of them, and the rest either returning, or engaging in the petty quarrels of the Christian princes, there was nothing done; so that the soldan of Aleppo easily defeated their troops in 1204.

The sixth croisade began in 1228; in which the Christians took the town of Damietta, but were forced to surrender it again. The next year the emperor Frederic made peace with the soldan for 10 years. About 1240, Richard earl of Cornwall, and brother to Henry III. king of England, arrived in Palestine at the head of the English croisade; but finding it most advantageous to conclude a peace, he reembarked, and steered towards Italy. In 1244, the Karasmians being driven out of Persia by the Tartars, broke into Palestine, and gave the Christians a general defeat near Gaza.

The seventh croisade was headed by St Lewis, in the year 1249, who took the town of Damietta: but a sickness happening in the Christian army, the king endeavoured a retreat; in which being pursued by the infidels, most of his army were miserably butchered, and himself and the nobility taken prisoners. Then a truce was agreed upon for 10 years, and the king and lords set at liberty.

The eighth croisade, in 1270, was headed by the same prince, who made himself master of the port and castle of Carthage in Africa; but dying in a short time, he left his army in a very ill condition. Soon after, the king of Sicily coming up with a good fleet, and joining Philip the Bold, son and successor of Lewis the king of Tunis, after several engagements with the Christians, in which he was always worsted, desired peace, which was granted upon conditions advantageous to the Christians: after which both princes embarked for their own kingdoms. Prince Edward of England, who arrived at Tunis at the time of this treaty, sailed towards Ptolemais, where he landed with a small body of of 300 English and French, and hindered Bendocdar from laying siege to Ptolemais: but being obliged to quit the Holy Land to take possession of the crown of England, this croisade ended without contributing any thing to the recovery of the Holy Land. In 1291, the town of Acre, or Ptolemais, was taken and plundered by the soldan of Egypt, and the Christians quite driven out of Syria. There has been no croisade since that time, though several popes have attempted to stir up the Christians to such an undertaking; particularly Nicholas IV. in 1292, and Clement V. in 1311.

Though these croisades were effects of the most absurd superstition, they tended greatly to promote the good of Europe. Multitudes indeed were destroyed. M. Voltaire computes the people who perished in the different expeditions at upwards of two millions. Many there were, however, who returned; and these having conversed so long with people who lived in a much more magnificent way than themselves, began to entertain some taste for a refined and polished way of life. Thus the barbarism in which Europe had been so long immersed, began to wear off soon after this time. The princes also who remained at home, found means to avail themselves of the frenzy of the people. By the absence of such numbers of restless and martial adventurers peace was established in their dominions. They also took the opportunity of annexing to their crown many considerable fiefs, either by purchase, or by the extinction of the heirs; and thus the mischiefs which must always attend feudal governments were considerably lessened.

With regard to the bad success of the croisaders, it was scarce possible that any other thing could happen them. The emperors of Constantinople, instead of assisting, did all in their power to disconcert their schemes. They were jealous, and not without reason, of such an inundation of barbarians. Yet, had they considered their true interest, they would rather have assisted them, or at least stood neuter, than entered into alliances with the Turks. They followed the latter method, however, and were often of very great disservice to the western adventurers, which at last occasioned the loss of their city *. But the worst enemies the croisaders had, were their own internal feuds and dissensions. They neither could agree while marching together in armies with a view to conquest, nor could they unite their conquests under one government after they had made them. They set up three small states, one at Jerusalem, another at Antioch, and another at Edessa. These states, instead of assisting, made war upon each other, and on the Greek emperors; and thus became an easy prey to the common enemy. The horrid cruelties they committed also were such as must have inspired the Turks with the most invincible hatred against them, and made them resist with the greatest obstinacy. They were such as could have been committed only by barbarians inflamed with religious enthusiasm. When Jerusalem was taken, not only the numerous garrison were put to the sword, but the inhabitants were massacred without mercy and without distinction. No age or sex was spared, even children at the breast were barbarously murdered. According to Voltaire, some Christians, who had been suffered by the Turks to live in that city, led the conquerors into the most private caves where women had concealed themselves with their children, and not one of them was suffered to escape. What eminently shows the enthusiasm with which these conquerors were animated, is their behaviour after this terrible slaughter. They marched over heaps of dead bodies towards the holy sepulchre; and while their hands were yet polluted with the blood of so many innocent persons, sung anthems to the common Saviour of mankind. Nay, so far did their religious enthusiasm overcome their fury, that these ferocious conquerors now burst into tears. If the absurdity and wickedness of this conduct can be exceeded by any thing, it must be by what follows. In the year 1204, the frenzy of croisading seized the children, who are ever ready to imitate what they see their parents engage themselves in. Their childish folly was encouraged by the monks and schoolmasters; and thousands of those innocents were conducted from the houses of their parents on the faith of these words, "Out of the mouth of babes and sucklings hast thou perfected praise." Their base conductors sold a part of them to the Turks, and the rest perished miserably.

* See *Constantinople*, N° 144.

CROISES, or CROIZES, in English antiquity, pilgrims bound for the Holy Land, or such as had been there; so called from a badge they wore in imitation of a cross. The knights of St John of Jerusalem, created for the defence and protection of pilgrims, were particularly called *croises*.

CROISIERS, a religious order founded in honour of the invention or discovery of the cross by the empress Helena. They are dispersed in several parts of Europe, particularly in the Low Countries, France, and Bohemia, those in Italy being at present suppressed. These religious follow the rule of St Augustine. They had in England the name of *crouched friars*.

CROIX, FRANCIS PETIS DE LA, secretary and interpreter to the king of France in the Turkish and Arabic languages, died November 4. 1695, in his 73d year; after having executed this employment for the space of 44 years. And it appears, that he executed it with as much integrity as abilities; for, when the Algerines sought for peace of Louis XIV. conditions were offered, by which they were required to reimburse to this monarch 600,000 franks. The terms being thought exorbitant, they had recourse to stratagem: and they offered a large sum to La Croix, who was the interpreter of all that passed, if he would put into the treaty "crowns of Tripoli," instead of "French crowns; which would have made to the Algerines a difference of more than 100,000 livres." But the integrity of the interpreter triumphed over the temptation; which however was the greater, as it was next to impossible he should be discovered. Besides the Turkish and the Arabic, the Persian and the Tartarian, he also understood the Ethiopian and Armenian languages. He is well known to the learned world by many works. He translated the "History of France" into the Turkish language. He digested the three volumes of "Voyages into the East Indies" of M. Thevenot. He made an accurate catalogue of all the Turkish and Persian books which are in the king's library. He composed two complete Dictionaries for the French and Turkish languages: and, when he was dying, he was about to present the world with the history of Jenghis Khan. He undertook this history

hiſtory by the order of M. Colbert: for this miniſter, altogether intent upon aggrandizing his maſter, was accuſtomed every week to call together, either in the king's library or his own, certain of the learned, whom, according as they excelled in their ſeveral departments in literature, he conſtantly ſet to work. This hiſtory, which coſt La Croix more than ten years labour, is uſeful, not only to the learned who are curious to know paſt events, or to geographers who had hitherto been greatly ignorant of Grand Tartary, but likewiſe to all who trade to China, Perſia, or other eaſtern parts of the world. There is a good map of northern Aſia drawn by M. de l'Iſle, accompanying the work; which M. Petit de la Croix, the author's ſon, not only reviſed, but, to render it more curious, added to it an abridgment of the lives of all thoſe authors from whom it was extracted. It was tranſlated into Engliſh, and publiſhed at London, 1722, 8vo.

CROMARTY, a town of Scotland capital of the county of the ſame name. The town is ſmall, and ſituated upon a rock or point of land, which overhangs the ſea in a romantic manner, and is much expoſed to the eaſt wind; it was formerly a royal borough, but was disfranchiſed by an act of the privy council of Scotland, in conſequence of a petition for that purpoſe preſented by Sir John Urquhart, proprietor of the eſtate of Cromarty; it is now under the baronial juriſdiction of the earl of Cromarty. The pariſh extends about ſeven miles in length, and from one to four in breadth, bounded by the frith of Cromarty on the north. On the banks of the frith the ſurface is level, and covered with verdure. A bank about two miles from the coaſt, extends the whole length of the pariſh, above which the ground is covered with heath and moſs. The ſoil is everywhere wet and mooriſh, which makes the ſeaſons late, and the crop uncertain. The coaſt towards the eaſt is bold and rocky, ſome of the cliffs being nearly 250 feet perpendicular to the ſea; the reſt is flat and ſandy. After every ſtorm a great quantity of ſea weed is thrown aſhore, which is partly uſed as a manure, and partly burnt into kelp, of which there is annually made about 10 or 12 tons. The harbour of Cromarty, inferior, perhaps, to none in Britain for ſafety, and a commodious quay, was lately built at the joint expence of government and the proprietor of the eſtate of Cromarty, where veſſels of 350 or 400 tons may lie in perfect ſecurity. A conſiderable trade in the hempen or ſack-cloth line has been long eſtabliſhed in Cromarty and the neighbourhood.

Cromarty, *County of*, in Scotland, forms a kind of peninſula, waſhed on three ſides by the friths of Cromarty and Moray, and bounded on the ſouth-weſt and ſouth by the county of Roſs. Its extreme extent in length is about 16 miles, and on an average about ſix and a half or ſeven in breadth. It was erected into a diſtinct county about the end of the 17th century, at the requeſt of Sir James M'Kenzie, earl of Cromarty, to whom it almoſt entirely belonged. The face of the country is pleaſant; a long ridge of hills extending the whole length in the middle of the county, having a fine declivity on either ſide towards the ſhores of the friths. The higher grounds are moſtly covered with heath, but towards the ſhores the ſoils are light and early. A great many plantations have been lately made out, which will ſhortly be a great ornament and ſhelter to the country. The language is generally Gaelic, but many ſpeak that broad Scotch, which is commonly called the Buchan or Aberdeenſhire dialect. Freeſtone, granite, and reddiſh-coloured porphyry, are almoſt the only minerals, if we except *topazes*, ſimilar to thoſe of *Cairngorum*, found in the pariſh of Kincardine. Fiſheries are very ſucceſsfully carried on, and pearls of conſiderable value are ſometimes found in the frith of Cromarty, where the river *Conal* falls into that bay.

Population of the county of Cromarty at two different periods.

Pariſhes.	Population in 1755.	Population in 179[illegible]—1798.
Cromarty	2096	2184
Fodderty	1483	1730
Tarbat	1584	1370
	5163	5284
		5163
	Increaſe	121

Cromarty, *Frith of*, is one of the fineſt bays in Great Britain; hence called by Buchanan *Portus Salutis*. It is divided from the Moray frith by the county of Cromarty, and waſhes the ſouthern ſhore of the county of Roſs. It is about 16 miles in length, and ſometimes three in breadth. The entrance is between two promontories or headlands, called the *Sutors of Cromarty*, which are about a mile and a half diſtant: there is the fineſt anchorage ground after paſſing the *Sutors*, for ſeveral miles up the bay, with deep water on both ſides, almoſt cloſe to the ſhore, where in moſt places the coaſt is ſo ſmooth, that ſuppoſing a veſſel to part her cables (a thing ſcarcely probable), ſhe might run aground without ſuſtaining much damage. Such is the extent of ſea room in the bay, and ſuch is the capacity, that almoſt the whole Britiſh navy might lie here in ſafety.

CROMLECH, in Britiſh antiquities, are huge, broad, flat ſtones, raiſed upon other ſtones ſet up on end for that purpoſe. They are common in Anglesey; under which article a very large one is deſcribed. See Plate CLXIV.

Theſe monuments are ſpoken of largely by Mr Rowland, by Dr Borlaſe, and by Wormius, under the name of *Ara* or altar. Mr Rowland, however, is divided in his opinion; for he partly inclines to the notion of their having been altars, partly to their having been ſepulchres: he ſuppoſes them to have been originally tombs, but that in after times ſacrifices were performed upon them to the heroes depoſited within. Mr Keiller preſerves an account of King Harold having been interred beneath a tomb of this kind in Denmark, and Mr Wright diſcovered in Ireland a ſkeleton depoſited under one of them. The great ſimilarity of the monuments throughout the north, Mr Pennant obſerves, evinces the ſame religion to have been ſpread in every part, perhaps with ſome ſlight deviations. Many of theſe monuments are both Britiſh and Daniſh; for we find them where the Danes never penetrated.

The cromlech, or cromleh, chiefly differs from the *Kist-vaen*, in not being cloſed up at the end and ſides, that

Cromwell. that is, in not ſo much partaking of the cheſt-like figure; it is alſo generally of larger dimenſions, and ſometimes conſiſts of a greater number of ſtones: the terms *cromleh* and *kiſt-vaen* are however indiſcriminately uſed for the ſame monument. The term *cromlech* is by ſome derived from the Armoric word *crum*, "crooked or bowing," and *leh* "ſtone," alluding to the reverence which perſons paid to them by bowing. Rowland derives it from the Hebrew words *carem-luach*, ſignifying a "devoted or conſecrated ſtone." They are called by the vulgar *coetne Arthor*, or *Arthur's quoits*, it being a cuſtom in Wales as well as Cornwall to aſcribe all great or wonderful objects to Prince Arthur, the hero of thoſe countries.

CROMWELL, Thomas, earl of Eſſex, was the ſon of a blackſmith at Putney, and born in 1498. Without a liberal education, but endowed with a ſtrong natural genius, he conſidered travelling as the proper means of improving his underſtanding; and to this early token of his ſound judgment he ſtood indebted for the high rank and diſtinguiſhed honours he afterwards enjoyed. He became by degrees the confidential favourite and prime miniſter of Henry VIII.; and from the moment he acquired any authority in the cabinet, he employed it in promoting the reformation, to his zeal for which he became a victim; for, the more firmly to ſecure the Proteſtant cauſe, he contrived to marry the king to Ann of Cleves, whoſe friends were all Lutherans. Unfortunately H nry took a diſguſt to this lady, which brought on Cromwell's ruin; the king, with his uſual cruelty and caprice, taking this opportunity to ſacrifice this miniſter to the Roman Catholic party, to whom he ſeemed deſirous of reconciling himſelf as ſoon as he had Catharine Howard in view. Cromwell was a great politician, and a good man; but, like moſt ſtateſmen, was guilty of great errors. In his zeal for the new religion, he had introduced the unjuſtifiable mode of attainder in caſes of treaſon and hereſy; and his enemies, who were numerous (conſiſting of two claſſes, the ancient nobility and gentry, who were enraged to ſee the higheſt honours beſtowed on a man of mean extraction, and the Roman Catholics, who deteſted him), having preferred many complaints againſt him, availed themſelves of his own law. He was attainted of treaſon and hereſy, convicted unheard, and beheaded in 1540. He was the chief inſtrument of the ſuppreſſion of the abbeys and monaſteries, and of the deſtruction of images and relics; to him alſo we are indebted for the inſtitution of pariſh-regiſters of births, marriages, and burials.

Cromwell, *Oliver*, ſtyled *Lord Protector* of the commonwealth of England, one of the moſt extraordinary perſonages mentioned in hiſtory, was the ſon of Mr Robert Cromwell of Hinchinbrooke in the county of Huntingdon. His anceſtors were of very honourable extraction; but no ways related to Thomas Cromwell earl of Eſſex, the prime miniſter and favourite of Henry VIII. He was born in the pariſh of St John, Huntingdon, where his father moſtly lived, on the 25th or 26th of April 1599, and educated at the free ſchool of that town. Little is known concerning him in his younger years, or indeed concerning his behaviour in private life. It is, however, related by authors of unſuſpected veracity, that when at ſchool he gave many ſigns of a very turbulent and reſtleſs diſpoſition. He is alſo ſaid from his early years to have been ſubject to the hypochondriac diſorder, and to many deceptions of the imagination. He had a very remarkable one while at ſchool. It happened in the day-time, when he was lying melancholy upon his back in bed. A ſpectre, as he thought, approached him, and told him that he ſhould be the greateſt man in the kingdom. His father, being informed of this, was very angry, and deſired his maſter to correct him ſeverely. This, however, produced no effect. Oliver perſiſted in the truth of his ſtory, and would ſometimes mention it, though his uncle told him "it was too traiterous to be repeated."—From this ſchool Oliver was removed to Sidney college in Cambridge, where he was admitted in 1616. His progreſs in his ſtudies is uncertain; but he ſpent much time in playing at foot-ball, cricket, and other robuſt exerciſes, at which he was very expert. His father dying after he had been about two years at college, Cromwell returned home; but the irregularity of his life gave ſuch offence to his mother, that, by the advice of ſome friends, ſhe ſent him to London, and placed him in Lincoln's-inn. This expedient by no means anſwered the purpoſe; her ſon gave himſelf up to gaming, wine, and women, ſo that he quickly diſſipated all that was left him by his father. This diſſipation, however, could be but of very ſhort continuance; for he was married, before he was 21 years of age, to Elizabeth daughter of Sir James Bouchier of Eſſex. Soon after his marriage he returned to the country, where he led a very grave and ſober life. This ſudden reformation has been aſcribed to his falling in with the Puritans; but it is certain, that Mr Cromwell continued then, and for ſome time after, a zealous member of the church of England, and formed a cloſe friendſhip with ſeveral eminent divines. He continued at Huntingdon, where he ſettled after his marriage, till an eſtate of between 400l. and 500l. per annum devolved to him by the death of his uncle Sir Thomas Stuart. This induced him to remove to the iſle of Ely where the eſtate lay, and here he embraced the puritanical doctrines. He was elected a member of the third parliament of Charles I. which met on the 10th of January 1628; and was a member of the committee for religion, where he diſtinguiſhed himſelf by his zeal againſt popery. After the diſſolution of that parliament, he returned again into the country, where he continued to expreſs much concern for religion, to keep company with ſilenced miniſters, and to invite them often to lectures and ſermons at his houſe. Thus he brought his affairs again into a very indifferent ſituation: ſo that, by way of repairing the breaches he made in his fortune, he took a farm at St Ives, which he kept five years. But this ſcheme ſucceeded ſo ill, that he was obliged to give it up; and at laſt, chagrined with his diſappointments, and made uneaſy by the treatment his party at that time received, he formed a deſign of going over to New England. In this, however, he was diſappointed; the king iſſued out a proclamation againſt all ſuch emigrations, and Cromwell was obliged to remain in England againſt his will.

In 1638, Cromwell had firſt an opportunity of getting himſelf publicly taken notice of. The earl of Bedford

Cromwell. Bedford, and some other persons of high rank, who had estates in the fen country, were very desirous of having it better drained; and though one project of this sort had failed, they set on foot another, got it countenanced by royal authority, and settled a part of the profits upon the crown. This, though really intended for a public benefit, was opposed as injurious to private property: and at the head of the opposers was Mr Oliver Cromwell, who had considerable influence in these parts. The vigour he showed on this occasion recommended him to his friend and relation Mr Hampden; who afterwards characterized him in parliament, as a person capable of contriving and conducting great designs. But for all this he was not very successful in his opposition; and as his private affairs were still declining, he was in very necessitous circumstances at the approach of the long parliament. In this critical situation he got himself elected member of parliament in the following manner. In the puritanical meetings which he constantly frequented, Oliver had most eminently distinguished himself by his *gifts* of praying, preaching, and expounding. At one of these meetings, he met with one Richard Tims, a tradesman of Cambridge. This man was so much taken with Oliver, that he took it into his head to attempt getting him chosen burgess for the approaching parliament. Being himself one of the common council, Tims imagined this design might be brought about; and with this view went to Mr Wildbore a relation of Cromwell's, to whom he communicated his intention. Wildbore agreed as to the fitness of the person; but told him the design was impracticable, because Oliver was not a freeman. Tims next addressed one Evett on the same subject, who also made the same objection. He recollected, however, that the mayor had a freedom to bestow, and a scheme was immediately laid for securing this freedom to Cromwell. On application to the mayor, however, he told them that the freedom was already disposed of to another; but this objection being obviated by promising that person a freedom from the town, the mayor being informed that Cromwell was a man of great fortune, signified his intention of bestowing the freedom upon him. Our hero being informed of the good offices of his friends, made his appearance in the court dressed in scarlet richly laced with gold, and having provided plenty of claret and sweatmeats, they were so freely circulated among the corporation, that Mr Mayor's freeman was unanimously declared to be a very civil worthy gentleman. When the election came on, the mayor discovered his mistake, but it was now too late; the party among the burgesses was strong enough to choose him, and accordingly did so at the election next year.

When Cromwell first came into parliament, he affected great plainness, and even carelessness in his dress. His attention to farming had entirely rusticated him, so that he made a very uncouth appearance. "Who (says Dr South) that had beheld such a bankrupt, beggarly fellow, as Cromwell, first entering the parliament house, with a thread-bare torn coat and greasy hat, and perhaps neither of them paid for, could have suspected, that, in the space of so few years, he should, by the murder of one king, and the banishment of another, ascend the throne, be invested with the royal robes, and want nothing of the state of a king but the changing his hat into a crown?" Cromwell was very active in promoting the famous *Remonstrance* *; which in reality laid the foundation of the civil war. He declared afterwards to Lord Falkland, that if the remonstrance had not been carried, he designed to have converted the small remains of his estate into ready money the next day, and to have left the kingdom by the first opportunity. His firmness on this occasion so effectually recommended him to Hampden, Pym, and the other leaders of the popular party, that they took him into all their councils; and here he acquired that clear insight into things, and that knowledge of men, of which he afterwards made such prodigious use. His exploits during the civil war, his murder of the king, and usurpation of the kingdom, are related under the article BRITAIN, N° 127—188.

* See *Britain.*

With regard to the character of Cromwell, Mr Hume expresses himself as follows: "The writers attached to this wonderful person make his character, with regard to abilities, bear the air of the most extravagant panegyric: his enemies form such a representation of his moral qualities as resembles the most virulent invective. Both of them, it must be confessed, are supported by such striking circumstances in his fortune and conduct, as bestow on their representation a great air of probability. 'What can be more extraordinary (it is said), than that a person of private birth and education, no fortune, no eminent qualities of body, which have sometimes, nor shining qualities of mind, which have often, raised men to the highest dignities, should have the courage to attempt, and the abilities to execute, so great a design as the subverting one of the most ancient as well as best established monarchies in the world? That he should have the power and boldness to put his prince and master to an open and infamous death? should banish that numerous and strongly allied family—cover all these temerities under a seeming obedience to a parliament, in whose service he pretended to be retained—trample too upon that parliament in their turn, and scornfully expel them as soon as they gave him ground of dissatisfaction—erect in their place the dominion of the saints, and give reality to the most visionary idea which the heated imagination of any fanatic was ever able to entertain—suppress again that monster in its infancy, and openly set himself up above all things that ever were called *sovereign* in England—overcome first all his enemies by arms, and all his friends afterwards by artifice—serve all parties patiently for a while, and afterwards command them victoriously at last—overrun each corner of the three nations, and subdue with equal facility both the riches of the south, and the poverty of the north—be feared and courted by all princes, and adopted a brother to the gods of the earth—call together parliaments with a word of his pen, and scatter them again by the breath of his mouth—reduce to subjection a warlike and discontented nation by means of a mutinous army—command a mutinous army by means of seditious and factious officers—be humbly and daily petitioned, that he would be pleased, at the rate of millions a-year, to be hired as master of those who had formerly hired him for their servant—have the estates and

Cromwell.

and lives of three nations as much at his disposal as was once the little inheritance of his father, and be as noble and liberal in the spending of them? And, lastly, (for there is no end of enumerating every particular of his glory), with one word bequeath all this power and splendour to his posterity—die possessed of peace at home, and triumph abroad—be buried among kings, and with more than regal solemnity, and leave a name behind him not to be extinguished but with the whole world; which, as it was too little for his praise, so it might have been for his conquests, if the short line of his mortal life could have stretched out to the extent of his immortal designs?

"My intention is not to disfigure this picture drawn by so masterly a hand: I shall only endeavour to remove from it somewhat of the marvellous; a circumstance which, on all occasions, gives much ground for doubt and suspicion. It seems to me that the circumstance of Cromwell's life in which his abilities are principally discovered, is his rising, from a private station, in opposition to so many rivals, so much advanced before him, to a high command and authority in the army. His great courage, his signal military talents, his eminent dexterity and address, were all requisite for this important acquisition. Yet will not this promotion appear the effect of supernatural abilities, when we consider that Fairfax himself, a private gentleman, who had not the advantage of a seat in parliament, had through the same steps attained even to a superior rank; and, if endued with common capacity and penetration, had been able to retain it. To incite such an army to rebellion against the parliament, required no uncommon art or industry: to have kept them in obedience had been the more difficult enterprise. When the breach is once formed between the military and civil powers, a supreme and absolute authority, from that moment, is devolved on the general; and if he is afterwards pleased to employ artifice or policy, it may be regarded on most occasions as great condescension, if not as superfluous caution. That Cromwell was ever able really to blind or overreach either the king or the republicans, does not appear: as they possessed no means of resisting the force under his command, they were glad to temporize with him; and, by seeming to be deceived, to wait for an opportunity of freeing themselves from his dominion. If he seduced the military fanatics, it is to be considered, that their interest and his evidently concurred; that their ignorance and low education exposed them to the grossest imposition; and that he himself was at bottom as frantic an enthusiast as the worst of them; and in order to obtain their confidence, needed but to display those vulgar and ridiculous habits which he had early acquired, and on which he set so high a value. An army is so forcible, and at the same time so coarse a weapon, that any hand which wields it, may, without much dexterity, perform any operation, and attain any ascendant in human society.

"The domestic administration of Cromwell, though it discovers great ability, was conducted without any plan either of liberty or arbitrary power: perhaps his difficult situation admitted of neither. His foreign enterprises, though full of intrepidity, were pernicious to national interest; and seem more the result of impetuous fury or narrow prejudices, than of cool foresight and deliberation. An eminent personage, however, he was in many respects, and even a superior genius; but unequal and irregular in his operations: and, though not defective in any talent except that of elocution, the abilities which in him were most admirable, and which contributed most to his marvellous success, were the magnanimous resolution of his enterprises, and his peculiar dexterity in discovering the characters and practising on the weaknesses of mankind.

"If we survey the moral character of Cromwell, with that indulgence which is due to the blindness and infirmities of the human species, we shall not be inclined to load his memory with such violent reproaches as those which his enemies usually throw upon it. Amidst the passions and prejudices of that time, that he should prefer the parliamentary to the royal cause, will not appear extraordinary; since even at present many men of sense and knowledge are disposed to think, that the question, with regard to the justice of the quarrel, may be regarded as doubtful and ambiguous. The murder of the king, the most atrocious of all his actions, was to him covered under a mighty cloud of republican and fanatical illusions; and it is not impossible but he might believe it, as many others did, the most meritorious action which he could perform. His subsequent usurpation was the effect of necessity, as well as of ambition; nor is it easy to see how the various factions could at that time have been restrained without a mixture of military and arbitrary authority. The private deportment of Cromwell as a son, a husband, a father, a friend, is exposed to no considerable censure, if it does not rather merit praise. And, upon the whole, his character does not appear more extraordinary and unusual by the mixture of so much absurdity with so much penetration, than by his tempering such violent ambition and such enraged fanaticism with so much regard to justice and humanity."

That Cromwell continued a most complete and bigotted enthusiast to the very last, appears from his behaviour in his last sickness. His disease, which at first was a kind of slow fever, brought on by the cares and anxiety of his mind, soon degenerated into a tertian ague. For about a week the disorder continued without any dangerous symptoms, insomuch that every other day he walked abroad; but one day after dinner his five physicians coming to wait upon him, one of them having felt his pulse, said that it intermitted. At this Cromwell was surprised, turned pale, fell into a cold sweat, and, when he was almost fainting, ordered himself to be carried to bed; where, by the assistance of cordials, being brought a little to himself, he made his will with respect to his private affairs. The next morning, when one of his physicians came to visit him, Cromwell asked him, why he looked so sad? and when answer was made that so it became every one who had the weighty charge of his life and health upon him, "Ye physicians (says Cromwell), think I shall die: I tell you I shall not die this bout, I am sure of it. Do not you think (said he to the physician, looking more attentively at him), do not think that I am mad: I speak the words of truth upon surer grounds than your Hippocrates or Galen can furnish you with. God Almighty himself hath given that answer, not to my

Cromwell.

my prayers alone, but alſo to the prayers of thoſe who entertain a ſtricter commerce and greater intereſt with him. Go on cheerfully, baniſhing all ſadneſs from your looks; and deal with me as you would do with a ſerving man. Ye may have a ſkill in the nature of things, yet nature can do more than all phyſicians put together, and God is far more above nature." As this phyſician was coming out of the chamber, he accidentally met with another, to whom he expreſſed his fear that the protector was turning light-headed. But the other informed him that the chaplains, being diſperſed the preceding night into different parts of the houſe, had prayed for the protector's recovery, and unanimouſly received for anſwer that he ſhould recover. Nay, to ſuch a degree of madneſs did they at laſt arrive, that, a public faſt being kept at Hampton court, they did not ſo much pray to God for the protector's health, as return thanks for the undoubted pledges they had of his recovery. On this account, though the phyſicians perceived his diſtemper increaſing every hour, they took no notice of his danger, till it became neceſſary for him to appoint a ſucceſſor while he had any breath remaining. But being then in a lethargic fit, he anſwered from the purpoſe; upon which he was again aſked whether he did not name his eldeſt ſon Richard? and to this queſtion he anſwered, Yes. Being then aſked where his will was which he had formerly made concerning the heirs of the kingdom: he ſent to look for it in his cloſet and other places, but in vain; for ſomebody had either ſtolen it, or he himſelf had burnt it. Soon after, he expired, on the 3d of September 1658, aged ſomewhat more than 59 years and four months. This day of September he had always reckoned to be the moſt fortunate for him in the whole year. A violent tempeſt, which immediately ſucceeded his death, ſerved as a ſubject of diſcourſe to the vulgar. His partizans, as well as his opponents, were fond of remarking this event; and each of them endeavoured, by forced inferences, to interpret it as beſt ſuited their particular prejudices.

It has been imagined by ſome, that Oliver Cromwell was poiſoned: but for this there ſeems to be no reaſonable foundation. His body was opened by Dr Bates. He found the brain ſomewhat overcharged with blood, and the lungs a little inflamed; but what he reckoned to have been the principal cauſe of his diſorder was a total degeneracy of the ſubſtance of the ſpleen into a matter reſembling the lees of oil. This, he thought, alſo accounted for the hypochondriac diſpoſitions to which Cromwell had from his infancy been ſubject. Though the bowels were taken out, and the body filled with ſpices wrapped in a fourfold cere cloth, put firſt into a coffin of lead, and then into one of wood, yet the corruption was ſo great that the humour wrought itſelf through the whole, and there was a neceſſity of interring the body before the ſolemnity of the funeral. A very pompous funeral was ordered at the public expence, and performed from Somerſet-houſe, with a ſplendor not only equal but ſuperior to that beſtowed upon crowned heads. Some have related that his body was depoſited in Naſeby-field; others, that it was wrapped in lead, and ſunk in the deepeſt part of the Thames, to prevent any inſult that might afterwards be offered to it. But it ſeems beyond doubt that his body was interred at Weſtminſter: as we are informed, that on the order to diſinter him after the Reſtoration, his corpſe was found in a vault in the middle aiſle of Henry VII's chapel. In the inſide of the coffin, and on the breaſt of the corpſe, was laid a copper plate finely gilt, encloſed in a thin caſe of lead. On one ſide of this plate were engraven the arms of England impaled with thoſe of Oliver, and on the reverſe the following legend: *Oliverius Protector Reipublicæ Angliæ, Scotiæ, et Hiberniæ, natus* 25. *Aprilis* 1599, *inauguratus* 16. *Decembris* 1653, *mortuus* 3. *Septembris ann.* 1658, *hic ſitus eſt.*

Cromwell
||
Cronius.

Cromwell was of a robuſt frame of body, and of a manly, though not agreeable aſpect. His noſe being remarkably red and ſhining, was often made the ſubject of ridicule. He left only two ſons, Richard and Henry; and three daughters: one married to General Fleetwood, another to Lord Fauconberg, and a third to Lord Rich. His mother lived till after he was protector; and contrary to her orders he buried her with great pomp in Weſtminſter abbey. She could not be perſuaded that ever his power or his perſon was in ſafety. At every noiſe ſhe heard ſhe would exclaim that her ſon was murdered; and was never ſatisfied that he was alive if ſhe did not receive frequent viſits from him. She was a decent woman; and by her frugality and induſtry had raiſed and educated a numerous family upon a ſmall fortune. She had even been obliged to ſet up a brewery at Huntingdon, which ſhe managed to good advantage. Hence Cromwell, in the invectives of that age, is often ſtigmatized with the name of brewer. Ludlow, by way of inſult, mentions the great acceſſion which he would receive to his royal revenues upon his mother's death, who poſſeſſed a jointure of 60 pounds a-year upon his eſtate. She was of a good family, of the name of Stuart; and is by ſome ſuppoſed to have been remotely allied to the royal family.

Cromwell, *Richard*, eldeſt ſon of Oliver Cromwell, was by his father appointed ſucceſſor to the protectorſhip, but very ſoon depoſed by the army *. They diſcharged his debts, took all the houſehold ſtuff, plate, &c. gave him a protection for ſix months, and ſo he retired. He was by no means qualified to ſupport the ſtation gained by the aſpiring talents of his father. He was of a moderate temper, and untainted with that fanatical ſpirit which his father had ſo ſucceſsfully cultivated. On the Reſtoration he went abroad; but returned in 1680 under the aſſumed name of Clark, and ſettled at Cheſhunt in Hertfordſhire, where he lived privately, and died in 1712, aged 86.

* See *Britain*, N°189, 190.

CRONENBURG, a town of Germany, in the circle of the Upper Rhine, and in the landgravate of Heſſe Caſſel, with a ſtrong caſtle. It is ſeated at the foot of a high mountain, on a fertile ſoil, and is ſurrounded with a double wall. E. Long. 8. 15. N. Lat. 50. 15.

Cronenburg, a ſtrong fortreſs of Denmark, in the iſle of Zealand, at the entrance of the Sound, where the Danes take toll of ſuch ſhips as are bound for the Baltic. It was very richly furniſhed, but pillaged by the Swedes in 1658, who took away the furniture, among which were ſome ſtatues of maſſy ſilver. It is built upon piles. E. Long. 12. 50. N. Lat. 56. 0.

CRONIUS, in *Chronology*, the ancient name of the Athenian month Hecatombæon; which was the firſt

firſt of their year, and anſwered to the latter part of our June and beginning of July.—There were feaſts called *Cronienes* celebrated at Athens in this month, in honour of Saturn, anſwering to the Saturnalia of the Romans.

CRONSLOT. See Cronstadt.

CRONSTADT, a ſea-port town of Ruſſia, where the greateſt part of the navy is ſtationed. It ſtands upon the iſland of Retuſari in the gulf of Finland; and was founded by Peter I. as being provided with the ſafeſt harbour in theſe parts, and as forming a ſtrong bulwark by ſea for the defence of the new metropolis. The only paſſage by which ſhips of burden can approach Peterſburgh lies on the ſouth ſide of Retuſari, through a narrow channel; one ſide whereof is commanded by Cronſtadt, and the oppoſite by Cronſlot and the citadel. Cronſlot, which ſtands upon a ſmall iſland of ſand, is a circular wooden building, and ſurrounded with fortifications of wood that jut into the water. It contains a garriſon of 100 men. The citadel is another ſmall wooden fortreſs, conſtructed alſo upon an adjacent ſand-bank, and capable of holding about 30 ſoldiers. All large veſſels muſt ſail between Cronſtadt and theſe two fortreſſes, expoſed to the fire of the oppoſite batteries; for the other parts of the gulf are only from one to eleven feet in depth. All theſe fortifications were, at the time of their conſtruction, eſteemed places of conſiderable ſtrength; but now they derive their conſequence more from their paſt importance than from any reſiſtance they could make againſt the attack of a powerful fleet.

Cronſtadt is built upon the ſouth-eaſtern extremity of the iſland, and is defended towards the ſea by wooden piers projecting into the water, and towards the land by ramparts and baſtions. It is a very ſtraggling place; and occupies, like all the Ruſſian towns, a larger ſpace of ground than the number of habitations ſeems to require; the houſes are moſtly of wood, excepting a few fronting the harbour, which are of brick ſtuccoed white. Among the latter are the imperial hoſpital for ſailors, the barracks, and the academy for marines and officers of the navy. That ſeminary uſually contains between three and four hundred cadets, who are clothed, maintained, and taught at the expence of the crown. They are admitted at the age of five, and are ſuffered to remain until they reach their ſeventeenth year. They learn accounts, mathematics, drawing, fortification, and navigation; and have maſters in the French, German, Engliſh, and Swediſh, languages. They are trained to naval affairs, and make an annual cruiſe in the Baltic as far as Revel.—Cronſtadt has a ſeparate haven appropriated to the men of war, and another to merchant ſhips. Cloſe to the haven for merchant ſhips is a canal and ſeveral dry docks, begun in 1719 by Peter I. for the purpoſe of refitting the men of war. This uſeful work was neglected under his ſucceſſors, and was not completed until the reign of his daughter Elizabeth. It has been ſtill further beautified and improved by the preſent empreſs; and is now applied for building as well as careening ſhips of the line. At the extremity of theſe docks is a great reſervoir 568 feet in length, which contains water ſufficient, and half the quantity over, to ſupply all the docks; which is pumped into it by means of a fire engine, the diameter of whoſe cylinder is ſix feet. The length of this work, from the beginning of the canal to the end of the laſt dock, is 4221 feet. The ſides of the docks are faced with ſtone, and the bottom is paved with granite. They are 40 feet deep and 150 broad; and are capable of containing nine men of war upon the ſtocks.

CRONSTAT, a town of Tranſylvania, near the frontiers of Moldavia, ſubject to the houſe of Auſtria. E. Long. 25. 0. N. Lat. 47. 0.

CROP, the high part or end of any thing cut off. It is particularly uſed for the corn gathered off a field in harveſt. See Agriculture *Index*.

CROSIER, or Crozier, a ſhepherd's crook; a ſymbol of paſtoral authority, conſiſting of a gold or ſilver ſtaff, crooked at the top, carried occaſionally before biſhops and abbots, and held in the hand when they give the ſolemn benedictions. The cuſtom of bearing a paſtoral ſtaff before biſhops is very ancient, as appears from the life of St Cæſarea of Arles, who lived about the year 500. Among the Greeks none but the patriarchs had a right to the croſier. The croſiers were at firſt no more than ſimple wooden ſtaves in form of a T, uſed to reſt and lean upon. By degrees they were made longer; and at length arrived at the form we now ſee them of. Regular abbots are allowed to officiate with a mitre and croſier.

Crosier, in *Aſtronomy*, four ſtars in the ſouthern hemiſphere, in the form of a croſs, ſerving thoſe who ſail in ſouth latitudes to find the antarctic pole.

CROSLET, in *Heraldry*, is when a croſs is croſſed again at a ſmall diſtance from each of the ends. Upton ſays it is not ſo often borne by itſelf in arms as other croſſes are, but often in diminutives, that is, in ſmall croſlets ſcattered about the field. See Heraldry.

CROSS, a gibbet made with two pieces of wood placed croſswiſe, whether they croſs with right angles at the top like a T, or in the middle of their length like a X. The croſs to which our Saviour was faſtened, and on which he died, was of the former kind; being thus repreſented by old monuments, coins, and croſſes; and St Jerome compares it to a bird flying, a man ſwimming, or praying with his arms extended. The puniſhment of the croſs was common among the Syrians, Egyptians, Perſians, Africans, Greeks, Romans, and Jews.

The death of the croſs was the moſt dreadful of all others, both for the ſhame and pain of it; and ſo ſcandalous, that it was inflicted as the laſt mark of deteſtation upon the vileſt of people. It was the puniſhment of robbers and murderers, provided that they were ſlaves too; but otherwiſe, if they were free, and had the privileges of the city of Rome, this was then thought a proſtitution of that honour, and too infamous a puniſhment for ſuch a one, let his crimes be what they would.

The Moſaic law ordained, that the perſons executed ſhould not be left upon the tree after ſunſet, becauſe he that is hanged in this manner is accurſed of God, Deut. xxi. 22. The Jews believe, that the ſouls of thoſe who remain upon the gibbet, and without burial, enjoy no peace, and receive no benefit from the prayers of other people; but wander up and down till their bodies are buried: which agrees with the notions that the Greeks and Romans had of this matter, as may be ſeen in *Hom. Iliad* 4. and *Virg. Æneid.* 6.

Crofs.

The form of a crofs being fuch as has been already defcribed, the body of the criminal was faftened to the upright piece by nailing the feet to it, and on the other tranfverfe piece generally by nailing the hands on each fide. Now, becaufe thefe parts of the body, being the inftruments of action and motion, are provided by nature with a much greater quantity of nerves than others have occafion for; and becaufe all fenfation is performed by the fpirit contained in thefe nerves; it will follow, as Stanhope obferves, that wherever they abound, the fenfe of pain muft needs in proportion be more quick and tender.

The Jews confefs, that indeed they crucified people in their nation, but deny that they inflicted this punifhment upon any one alive. They firft put them to death, and then faftened them to the crofs either by the hands or neck. But there are indifputable proofs of their crucifying men frequently alive. The worfhippers of Bal-peor and the king of Ai were hung up alive; as were alfo the defcendants of Saul, who were put into the hands of the Gibeonites, 2 Sam. xxi. 9.

Before crucifixion the criminal was generally fcourged with cords: fometimes little bones, or pieces of bones, were tied to thefe fcourges, fo that the condemned perfon might fuffer more feverely. It was alfo a cuftom, that he who was to be crucified fhould bear his own crofs to the place of execution. After this manner we find Chrift was compelled to bear his own crofs; and as he funk under the burden, Simon the Cyrenian was conftrained to bear it after him and with him. But whereas it is generally fuppofed that our Lord bore the whole crofs, i. e. the long and tranfverfe part both, this feems to be a thing impoffible; and therefore Lipfius (in his treatife *De Supplicio Crucis*) has fet the matter in a true light, when he tells us that Jefus only carried the tranfverfe beam; becaufe the long beam, or the body of the crofs, was either fixed in the ground before, or made ready to be fet up as foon as the prifoner came: and from hence he obferves, that painters are very much miftaken in their defcription of our Saviour carrying the whole crofs.

There were feveral ways of crucifying; fometimes the criminal was faftened with cords to a tree, fometimes he was crucified with his head downwards. This way St Peter chofe out of refpect to his mafter Jefus Chrift, not thinking himfelf worthy to be crucified like him; though the common way of crucifying was by faftening the criminal with nails, one through each hand, and one through both feet, or one through each of them: for this was not always performed in the fame manner; the ancients fometimes reprefenting Jefus Chrift crucified with four nails, and fometimes with three. The criminal was fixed to the crofs quite naked; and in all probability the Saviour of the world was not ufed with any greater tendernefs than others upon whom the punifhment was inflicted. The foldiers divided his clothes among them, and caft lots for his tunic, which is an under garment worn over the flefh like a fhirt.

The text of the gofpel fhows clearly, that Jefus Chrift was faftened to the crofs with nails; and the Pfalmift (xxii. 16.) had foretold long before, that they fhould pierce his hands and his feet: but there are great difputes concerning the number of thefe nails. The Greeks reprefent our Saviour as faftened to the crofs with four nails; in which particular Gregory of Tours agrees with them, one at each hand and foot. But feveral are of opinion, that our Saviour's hands and feet were pierced with three nails only, viz. one at each hand, and one through both his feet: and the cuftom of the Latins is rather for this laft opinion; for the generality of the old crucifixes made in the Latin church have only three nails. Nonnus thinks that our Saviour's arms were befides bound faft to the crofs with chains; and St Hilary fpeaks of the cords wherewith he was tied to it.

Crofs.

Sometimes they who were faftened upon the crofs lived a good while in that condition. St Andrew is believed to have continued three days alive upon it. Eufebius fpeaks of certain martyrs in Egypt who were kept upon the crofs till they were ftarved to death. Pilate was amazed at Jefus Chrift dying fo foon; becaufe naturally he muft have lived longer, if it had not been in his power to have laid down his life and to take it up again. The thighs of the two thieves who were crucified together with our Saviour were broken in order to haften their death, that their bodies might not remain upon the crofs on the Sabbath-day (John xix. 31, 32, 33.), and to comply with the law of Mofes, which forbids the bodies to be left there after funfet. But among other nations they were fuffered to remain upon the crofs a long time. Sometimes they were devoured alive by birds and beafts of prey. Guards were appointed to obferve that none of their friends or relations fhould take them down and bury them. The ftory of the Ephefian matron and the foldier who was fet to guard the crofs, is very well known. The Roman foldiers who had crucified Jefus Chrift and the two thieves continued near the croffes till the bodies were taken down and buried.

Croffes were ufually, in former times, erected on the tops of houfes, by which tenants pretended to claim the privileges of the Templars Hofpitallers, to defend themfelves againft their rightful lords. This was condemned by the ftatute Wil. II. c. 37. It was ufual alfo, in thofe days, to fet up croffes in places where the corpfe of any of the nobility refted as it was carried to be buried, that *à tranfeuntibus pro ejus animo deprecetur*. Croffes, &c. are forbidden to be brought into England by 13 Eliz. c. 2. on pain of a *præmunire*, &c.

Invention of the Cross, an ancient feaft folemnized on the third of May, in memory of St Helena's (the mother of Conftantine) finding the true crofs of Chrift deep in the ground on Mount Calvary; where fhe erected a church for the prefervation of part of it; the reft being brought to Rome and depofited in the church of the Holy Crofs of Jerufalem.

Theodoret mentions the finding of three croffes; that of Jefus Chrift and thofe of the two thieves; and that they diftinguifhed between them by means of a fick woman, who was immediately healed by touching the true crofs. The place is faid to have been pointed out to her by St Quiriacus, then a Jew, afterwards converted and canonized.

Exaltation of the Cross, an ancient feaft, held on the 14th of September, in memory of this, that Heraclitus reftored to Mount Calvary the true crofs in 642, which had been carried off 14 years before by Cofroes king of Perfia, upon his taking Jerufalem from the emperor Phocas.

The

The adoration of the cross appears to have been practised in the ancient church; inasmuch as the heathens, particularly Julian, reproach the primitive Christians with it. And we do not find that their apologists disclaimed the charge. Mornay, indeed, asserted, that this had been done by St Cyril, but could not support his allegation at the conference of Fountainbleau. St Helena is said to have reduced the adoration of the cross to its just principle, since she adored in the wood, not the wood itself, which had been direct idolatry and heathenism, but him who had been nailed to this wood. With such modifications some Protestants have been induced to admit the adoration of the cross. John Huss allowed of the phrase, provided it were expressly added, that the adoration was relative to the person of Christ. But however Roman Catholics may seem to triumph by virtue of such distinction and mitigations, it is well known they have no great place in their own practice. Imbert, the good prior of Gascony, was severely prosecuted in 1683 for telling the people, that in the ceremony of adoring the cross, practised in that church on Good Friday, they were not to adore the wood, but Christ, who was crucified on it. The curate of the parish told them the contrary: it was the wood! the wood! they were to adore. Imbert replied, it was Christ, not the wood: for which he was cited before the archbishop of Bourdeaux, suspended from his functions, and threatened with chains and perpetual imprisonment. It little availed him to cite the bishop of Meaux's distinction; it was answered that the church allowed it not.

Cross-Bearer (port-croix, cruciger), in the Romish church, the chaplain of an archbishop or a primate, who bears a cross before him on solemn occasions.

The pope has the cross borne before him everywhere; a patriarch anywhere out of Rome; and primates, metropolitans, and those who have a right to the pallium, throughout their respective jurisdictions.

Gregory XI. forbade all patriarchs and prelates to have it borne in presence of cardinals. A prelate bears a single cross, a patriarch a double cross, and the pope a triple one on his arms.

Cross-Bearers also denote certain officers in the inquisition, who make a vow before the inquisitors or their vicars to defend the Catholic faith, though with the loss of fortune and life. Their business is to provide the inquisitors with necessaries. They were formerly of great use; but in process of time some of their constitutions were changed, and they were called of the penance of St Dominic.

Pectoral Cross, is a cross of gold or silver, or other precious materials, often enriched with diamonds, which the bishops, archbishops, &c. and regular abbesses, wear hanging from the neck.

Order of the Cross, or *Croisade*, an order of ladies instituted in 1668 by the empress Eleonora de Gonzagua, wife of the emperor Leopold; on occasion of the miraculous recovery of a little golden cross wherein were inclosed two pieces of the true cross, out of the ashes of part of the palace. It seems the fire had burnt the case wherein it was inclosed, and melted the crystal, yet the wood remained untouched.

Maids of the Cross, a community of young women instituted in 1265 at Roye in Picardy, and since dispersed to Paris and other towns. They instruct young persons of their own sex. Some take the three vows of poverty, chastity, and obedience; others retain their liberty. They are under the direction of a superior.

Cross, in *Heraldry*, is defined by Guillim, an ordinary composed of fourfold lines; whereof two are perpendicular, and the other two transverse; for so we must conceive of them, though they be not drawn throughout, but meet by couples, in four right angles, near the fesse point of the escutcheon. See Heraldry.

This bearing was first bestowed on such as had performed, or at least undertaken, some service for Christ, and the Christian profession; and is held by divers the most honourable charge in all heraldry. What brought it into such frequent use, was the ancient expeditions into the Holy Land; and the holy war pilgrims, after their pilgrimage, taking the cross for their cognizance; and the ensign of that war being the cross. In those wars, says Mackenzie, the Scots carried St Andrew's cross; the French a cross argent; the English a cross or; the Germans, sable; the Italians, azure; the Spaniards, gules.

St George's Cross, or the red cross, in a field argent, is now the standard of England; that saint being the reputed patron of this nation.

Nor is it only in crosses that the variety is so great; the like is found in many other bearings, and particularly in lions, and the parts of them; whereof Columbiere gives us no less than 96 varieties. Leigh mentions but 46 several crosses; Sylvanus Morgan, 26; Upton, 30; Johannes de Bado Aureo, 12; and so others, whom it is needless to mention. Upton owns he dares not presume to ascertain all the various crosses used in arms, for that they are at present almost innumerable; and therefore he only takes notice of such as he had seen used in his own time.

Cross, in mining, two nicks cut on the superficies of the earth, thus +, which the miners make when they take the ground to dig for ore. This cross gives the miners three days liberty to make and set on stones. As many of these crosses as the miner makes so many mears of ground he may have in the vein, provided he set on stones within three days after making his cross or crosses. But if he make but one cross, and a stander by makes the second, and a stranger makes the third, every one is served with the next mear, according as they have first or last, sooner or later, made their cross or crosses upon the ground.

Cross, in coins, a name given to the right side or face, the other being called the *pile* or *reverse*. It has been a common error, that the reverse was meant by the cross; because at this time, with us, it is marked with figures disposed in that form: but the stamping the head of the prince in these kingdoms on the right side of the coin, was preceded by a general custom of striking on that part the figure of a cross; while the other, called the *pile*, contained the arms, or some other device.

Cross, instead of a signature to a deed, &c. is derived from the Saxon practice of affixing the sign of the cross, whether they could write or not.

Cross, in surveying, is an instrument which consists of a brass circle, divided into four equal parts by two lines crossing each other in the centre. At each extremity of the lines is fixed a perpendicular sight, with small holes below each slit, for the better discovering of distant objects. The cross is mounted on a staff or stand, to fix it in the ground, and it is found to be a very useful instrument for measuring small pieces of land, and taking offsets, &c.

Cross-Bar Shot, a bullet with an iron bar passing through it, and standing six or eight inches out at both sides. It is used at sea for destroying the enemy's rigging.

Cross-Bill. See Loxia, Ornithology *Index*.

Cross-Bill, in chancery, is an original bill, by which the defendant prays relief against the plaintiff.

Cross-Bows. See Bows and Archery.

Cross-grained Stuff, in joinery. Wood is said to be cross-grained, when a bough or branch has shot out of it; for the grain of the branch shooting forward, runs athwart that of the trunk.

In wood well grown this defect is scarce perceivable, except in working; but in deal-boards these boughs make knots. If the bough grew up with the young trunk, instead of a knot is found a curling in the stuff, very sensible under the plane.

Cross-Jack, pronounced *cro-jeck*, a sail extended on the lower yard of the mizen-mast, which is hence called the *cross-jack yard*. This sail, however, has generally been found of little service, and is therefore very seldom used.

Cross-Piece, a rail of timber extended over the windlass of a merchant ship from the knight-heads to the belfry. It is stuck full of wooden pins, which are used to fasten the running rigging as occasion requires. See Windlass.

Cross-Staff, or *Fore-staff*, is a mathematical instrument of hard wood, consisting of a square staff of about three feet long, having each of its faces divided like a line of tangents, and having four cross pieces of unequal lengths to fit on the staff, the halves of these being as the radii to the tangent lines on the faces of the staff.—The instrument was formerly used in taking the altitudes of the celestial bodies at sea.

Cross-Tining, in *Husbandry*, a method of harrowing land, consisting in drawing the harrow up the interval it went down before, and down that which it was drawn up.

Cross-Trees, certain pieces of timber, supported by the cheeks and trestle-trees, at the upper ends of the lower masts, athwart which they are laid to sustain the frame of the top.

Cross-Tree Yard, is a yard standing square, just under the mizen-top, and to it the mizen-top is fastened below. See *Cross-Jack*.

Cross-Wort. See Valantia, Botany *Index*.

Ordeal of the Cross, a species of trial frequently practised in the days of superstition. See Ordeal.

Cross, an English artist, famous only for copying, in the reigns of Charles I. and Charles II. Of this talent there is a story current, more to the credit of his skill than of his probity. He is said to have been employed by Charles I. to copy the celebrated Madona of Raphael in St Mark's church at Venice; and that, having obtained leave of the state for that purpose, he executed his piece so well as to bring away the original and leave his copy in the place of it. The deception was not detected until it was too late to recover the loss; and this piece was bought in Oliver Cromwell's time by the Spanish ambassador for his master, who placed it in the Escurial.

CROSSEN, a handsome town of Silesia in Germany, and capital of a principality of the same name. It is situated at the confluence of the rivers Bobar and Oder, in a fertile country abounding in wine and fruits. There is a bridge over the Oder which is fortified. E. Long. 15. 20. N. Lat. 52. 5.

CROSSOSTYLUS, in *Botany:* A genus of plants belonging to the monadelphia class.

CROTALARIA, Rattle-wort: A genus of plants belonging to the diadelphia class; and in the natural method ranking under the 32d order, *Papilionaceæ*.

CROTALO, an instrument of military music, like that described in the next article. The Turks were the first, among the moderns, who introduced the use of it for their troops. It is now common in Flanders and Florence, and other territories on the continent. It has only one tone; but its effect in marking time may be distinctly heard through the noise of forty drums. This is the same instrument with the ancient cymbalum.

CROTALUM, an ancient kind of castagnetta, or musical instrument, found on medals, in the hands of the priests of Cybele. The crotalum differed from the sistrum; though authors frequently confound the two. It consisted of two little brass plates or rods, which were shaken in the hand, and in striking against each other made a noise.

It was sometimes also made of a reed split lengthwise; one part whereof they struck against the other; and as this made a noise somewhat like that of a crane's bill, they called that bird *crotalistria*, a player on the crotala: and Aristophanes calls a great talker a *crotalum*.

Clemens Alexandrinus attributes the invention to the Sicilians; and forbids the use thereof to the Christians, because of the indecent motions and gestures that accompany it.

CROTALUS, or Rattle-snake, in *Zoology*, a genus belonging to the order of amphibia serpentes. See Ophiology *Index*. The following is the account given by Mr Catesby of the *crotalus horridus*, or American rattle-snake. This grows sometimes to the length of eight feet, and weighs between eight and nine pounds. The colour of the head is brown; the eye red; the upper part of the body of a yellowish-brown colour, transversely marked with irregular broad black lists. The rattle is of a brown colour, composed of several horny, membranous, cells, of an undulated pyramidal figure. These are articulated within one another in such a manner that the point of the first cell reaches as far as the basis of the protuberant ring of the third, and so on; which articulation, being very loose, gives liberty to the parts of the cells that are inclosed within the outward rings to strike against the sides of them, and so to cause the rattling noise which is heard when the snake shakes its tail. This is the most inactive and slow-moving of all the snakes, and is never the aggressor except in what it preys upon. The above gentleman is of opinion that no remedy is yet discovered for the bite of this animal. He had frequently access to see Indians bitten by it, and always thought that those who recovered were cured more through

through the force of nature, or by reaſon of the ſlightneſs of the bite, than by the remedies uſed. He tells us, that the Indians know their deſtiny the moment they are bitten; and if the bite happens to be on any of the large veins, they apply no remedies, as knowing them to be entirely uſeleſs. He believes the reports of the faſcinating power of this ſerpent, though he never had an opportunity of ſeeing it. See the articles Poison and Serpent.

CROTALYSTRIÆ in antiquity, a kind of morice dancers, admitted to entertainments, in order to divert the company with their dancing and playing on an inſtrument called *crotalum*, whence they had their name.

CROTCHET, in *Muſic*, one of the notes or characters of time, equal to half a minim, and double of a quaver.

Crotchets are alſo marks or characters, ſerving to incloſe a word or ſentence which is diſtinguiſhed from the reſt, being generally in this form [ ].

CROTO, or Croton, in *Ancient Geography*, a noble city of the Bruttii, built by the Acheans, 150 ſtadia to the north of Lacinium, and in the neighbourhood of Metapontum. It was twelve miles in compaſs before the arrival of Pyrrhus in Italy; but after the deſolation produced by that war, ſcarce half of it was inhabited. The citadel on one ſide hung over the ſea, on the other towards the land. It was naturally ſtrong from its ſituation, but afterwards walled round; on which ſide it was taken by Dionyſius by ſtratagem, by means of the rocks behind it.

Pythagoras, after his long peregrinations in ſearch of knowledge, fixed his reſidence in this place, which ſome authors think his native one, at leaſt that of his parents, ſuppoſing him to have been born in the iſle of Samos, and not at ſome town of that name in Italy. This incomparable ſage ſpent the latter part of his life in training up diſciples to the rigid exerciſe of ſublime and moral virtue, and inſtructing the Crotonites in the true arts of government, ſuch as alone can inſure happineſs, glory, and independence.

Under the influence of this philoſophy, the Crotonites inured their bodies to frugality and hardſhips, and their minds to ſelf-denial and patriotic diſintereſtedneſs. Their virtues were the admiration of Greece, where it was a current proverb, that the laſt of the Crotonites was the firſt of the Greeks. In one Olympiad, ſeven of the victors in the games were citizens of Croton; and the name of Milo is almoſt as famous as that of Hercules. The vigour of the men and beauty of the women were aſcribed to the climate, which was believed to be endowed with qualities peculiarly favourable to the human ſyſtem. Their phyſicians were in high repute; and among thoſe, Alcmeon and Democides rendered themſelves moſt conſpicuous. Alcmeon was the firſt who dared to amputate a limb, in order to ſave the life of a patient; and alſo the firſt writer who thought of inculcating moral precepts under the amuſing cloak of apologues. This invention is more commonly attributed to Æſop, as he was remarkably ingenious in this ſpecies of compoſition. Democides was famous for his attachment to his native ſoil. Though careſſed and enriched by the king of Perſia, whoſe queen he had ſnatched from the jaws of death, he abandoned wealth and honours, and by ſtratagem eſcaped to the humble comforts of a private life at Croton.—The Pythagoreans are ſaid to have diſcovered that diſpoſition of the ſolar ſyſtem, which, with ſome modifications, has been revived by Copernicus, and is now univerſally received, as being moſt agreeable to nature and experiment. Theano, the wife of Pythagoras, and many other women, emulated the virtues of their huſbands.

In thoſe fortunate days the ſtate of Croton was moſt flouriſhing. Its walls incloſed a circumference of 12 miles. Of all the colonies ſent out from Greece, this alone furniſhed ſuccour to the mother-country when invaded by the Perſians. By its avenging arms the Sybarites were puniſhed for their ſhameful degeneracy; but victory proved fatal to the conquerors, for riches, and all their pernicious attendants, inſinuated themſelves into Croton, and ſoon contaminated the purity of its principles. Indeed, the very conſtitution of human nature militates againſt any long continuance in ſuch rigid practices of virtue; and therefore it is no wonder if the Crotonites fell by degrees into the irregularities they once abhorred. Not long after the Locrians, who were leſs corrupted, defeated them on the banks of the Sagra, and reduced the republic to diſtreſs and penury. This reſtored the remaining Crotonites to their priſtine vigour of mind, and enabled them to make a brave, though unſucceſsful reſiſtance, when attacked by Dionyſius of Syracuſe. They ſuffered much in the war with Pyrrhus, and, by repeated misfortunes, decreaſed in ſtrength and numbers, from age to age, down to that of Hannibal, when they could not muſter 20,000 inhabitants. This ſmall population being incapable of manning the extenſive works erected in the days of proſperity, Croton was taken by the Carthaginians, and its citizens tranſported to Locri. The Romans ſent a colony hither 200 years before Chriſt. In the Gothic war, this city rendered itſelf conſpicuous by its fidelity to Juſtinian, and Totila beſieged it long in vain.

CROTON, wild ricinus: A genus of plants, belonging to the monœcia claſs; and in the natural method ranking under the 38th order, *Tricoccæ*. See Botany *Index*.

CROTONA, a town of Italy, in the kingdom of Naples, ſeated on the gulf of Taranto, with a biſhop's ſee and citadel. E. Long. 17. 27. N. Lat. 39. 10.

CROTOPHAGA, a genus of birds belonging to the order of picæ. See Ornithology *Index*.

CROTOY, a town of France, in Picardy, and in Ponthieu. The fortifications are demoliſhed. It is ſeated at the mouth of the river Somme. E. Long. 1. 45. N. Lat. 50. 15.

CROUCHED friars. See Croisiers.

CROUP, in *Medicine*. See Medicine *Index*.

Croup of a Horſe, in the manege, the extremity of the reins above the hips.

CROUPADE, in the manege, a leap, in which the horſe pulls up his hind legs, as if he drew them up to his belly.

CROUTE, Sour Croute, or Kroute. As this preparation of cabbage has been found of ſovereign efficacy as a preſervative in long voyages from the ſea-ſcurvy, it may not be unacceptable to give a conciſe account

account of the procefs for making it, according to the information communicated by an ingenious German gentleman.

The foundeft and moft folid cabbage are felected for this ufe, and cut very fmall, commonly with an inftrument made for this purpofe, not unlike the plain which is ufed in this country for flicing cucumbers. A knife is ufed when the preparation is made with great nicety. The cabbage thus minched is put into a barrel in layers, hand high, and over each is ftrewed a handful of falt and carraway feeds; in this manner it is rammed down with a rammer *ftratum fuper ftratum*, till the barrel be full; when a cover is put over it and preffed down with a heavy weight. After ftanding fome time in this ftate it begins to ferment; and it is not till the fermentation has entirely fubfided that the head is fitted to it, and the barrel is finally fhut up and preferved for ufe. There is not a drop of vinegar employed in this preparation. The Germans write this preparation in the following manner: *Sauer kraut*, or *fauer kohl;* that is, in their language, "four herb, or four cabbage."

CROUSAZ, John Peter de, a learned philofopher and mathematician, was born in 1663. Having made great progrefs in the mathematics and the philofophy of Des Cartes, he travelled to Geneva, Holland, and France; was fucceffively profeffor in feveral univerfities; and at length was chofen governor to Prince Frederic of Heffe Caffel, nephew to the king of Sweden. He wrote many works; the moft efteemed of which are, 1. His Logic, the beft edition of which is that of 1741, in 6 vols 8vo. 2. A Treatife on Beauty. 3. A Treatife on the Education of Children, 2 vols 12mo. 4. Several Treatifes on Philofophical and Mathematical Subjects, &c. He died at Laufanne in 1748.

CROW. See Corvus, Ornithology *Index*.

Crow, in *Mechanics*, a kind of iron lever, with a claw at one end and a fharp point at the other; ufed for heaving or purchafing great weights.

Crow's Bill, among furgeons, a kind of forceps for drawing bullets and other foreign bodies out of wounds.

Crow's Feet, in the military art, machines of iron, having four points, each about three or four inches long, fo made, that whatever way they fall there is ftill a point up; they are thrown upon breaches, or in paffes were the enemy's cavalry are to march, proving very troublefome, by running into the horfe's feet and laming them.

Crow's Foot, on fhip board, a complication of fmall cords fpreading out from a long block, like the fmaller parts which extend from the back-bone of a herring. It is ufed to fufpend the *ownings;* or to keep the top-fails from ftriking violently, and fretting againft the tops.

Crow-Net, is an invention for catching wild-fowl in the winter feafon, and may be ufed in the day-time. This net is made of double thread, or fine packthread; the mefhes fhould be two inches wide, the length about ten yards, and the depth three; it muft be verged on the fide with good ftrong cord, and ftretched out very ftiff on long poles prepared for that purpofe. When you are come to the place where you would fpread your net, open it, and lay it out at its full length and breadth; then faften the lower end of the net all along the ground, fo as only to move it up and down; the upper end of the net muft ftand extended on the long cord; the further end thereof being ftaked firft to the earth by a ftrong cord about five yards diftant from the net. Place this cord in an even line with the lower edge of the net. The other end muft be at leaft 25 yards diftant to reach into fome natural or artificial fhelter, by the means of which you may lie concealed from the fowl, otherwife no good fuccefs can be expected. The net muft be placed in fuch exact order that it might give way to play on the fowl on the leaft pull of the cord, which muft be done fmartly, left the fowl fhould prove too quick for you. This net may be ufed for pigeons, crows, or other birds, on corn-fields newly fown; as alfo in ftubble-fields, provided the ftuble conceals the net from the birds.

CROWD, in a general fenfe, fignifies a number of people affembled in a place fcarce big enough to hold them all.

To Crowd, in the fea-language, is to carry an extraordinary force of fail upon a fhip, in order to accelerate her courfe on fome important occafion; as in purfuit of, or flight from an enemy; to efcape any immediate danger, &c.

CROWLAND, a town in Lincolnfhire, feated in the fens, in a dirty foil, and had formerly an abbey of very great note. There is no coming at it but by narrow caufeways, which will not admit a cart. It has three ftreets, feparated from each other by water-courfes, whofe banks are fupported by piles, and fet with willow trees. Their chief trade is in fifh and fowl, which are in great plenty in the adjacent pools and marfhes. W. Long. 0. 10. N. Lat. 52. 40.

CROWN, an ornament worn on the head by kings, fovereign princes, and noblemen, as a mark of their dignity.

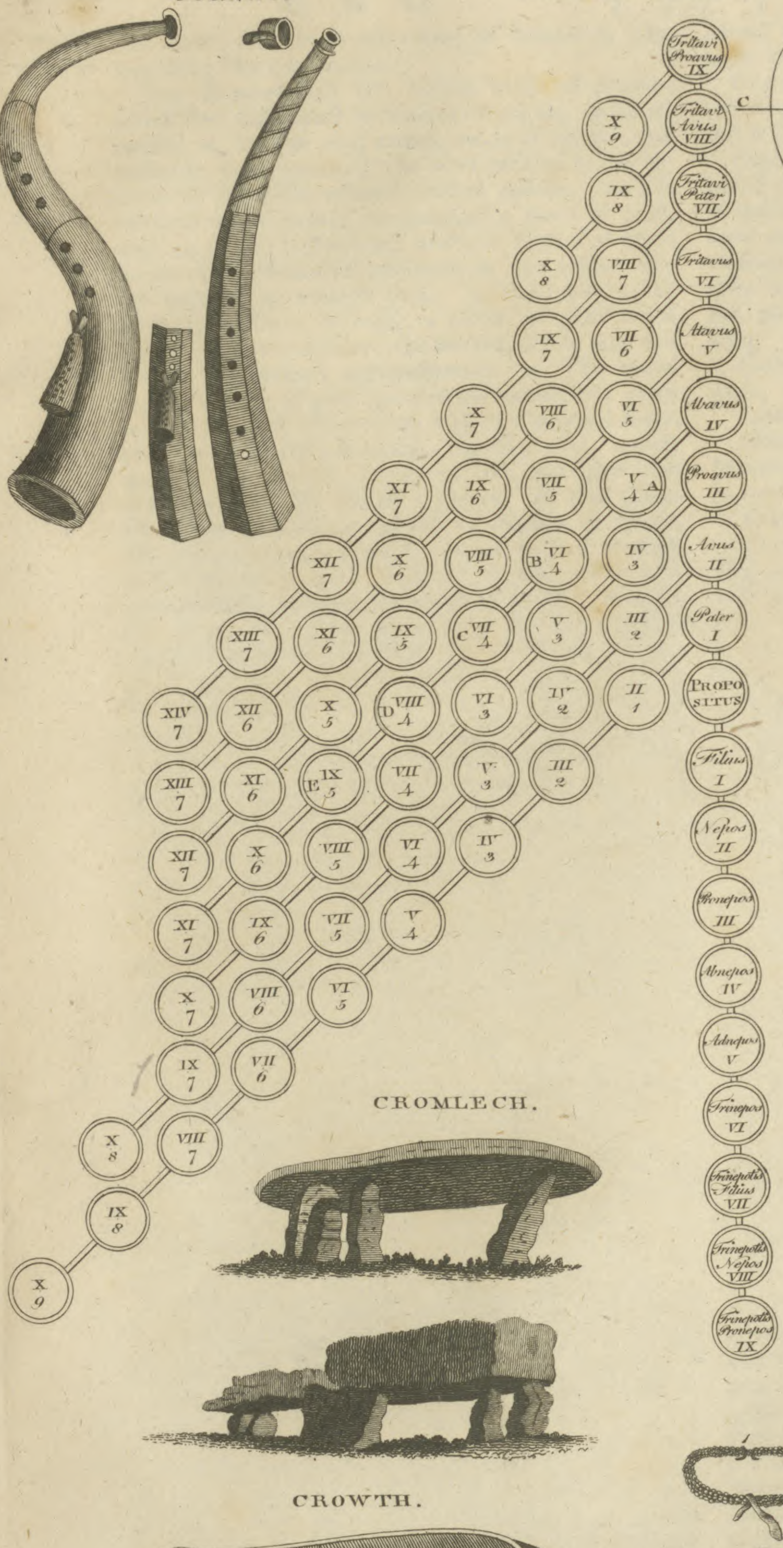
In fcripture there is frequent mention of crowns, and the ufe of them feems to have been very common among the Hebrews. The high prieft wore a crown, which was a fillet of gold placed upon the forehead, and tied with a ribbon of hyacinth colour, or azure blue. It feems alfo as if private priefts, and even common Ifraelites, wore alfo a fort of crown, fince God commands Ezekiel not to take off his crown, nor affume the marks of one in mourning. This crown was no more than a ribbon or fillet, with which the Jews and feveral people in the eaft girt their heads. And indeed the firft crowns were no more than a bandelet drawn round the head, and tied behind, as we ftill fee it reprefented on medals round the heads of Jupiter, the Ptolemies, and kings of Syria. Afterwards they confifted of two bandelets; by degrees they took branches of trees of divers kinds; at length they added flowers, infomuch that Claudius Saturninus fays, there was not any plant whereof crowns had not been made. The woods and groves were fearched to find different crowns for the feveral deities; and they were ufed not only on the ftatues and images of the gods, by the priefts in facrificing, and by kings and emperors, but alfo on altars, temples, doors of houfes, facred victims, fhips, &c.

The Roman emperors had four kinds of crowns, ftill feen on medals, viz. a crown of laurels, a radial or radiating crown, a crown adorned with pearls and precious

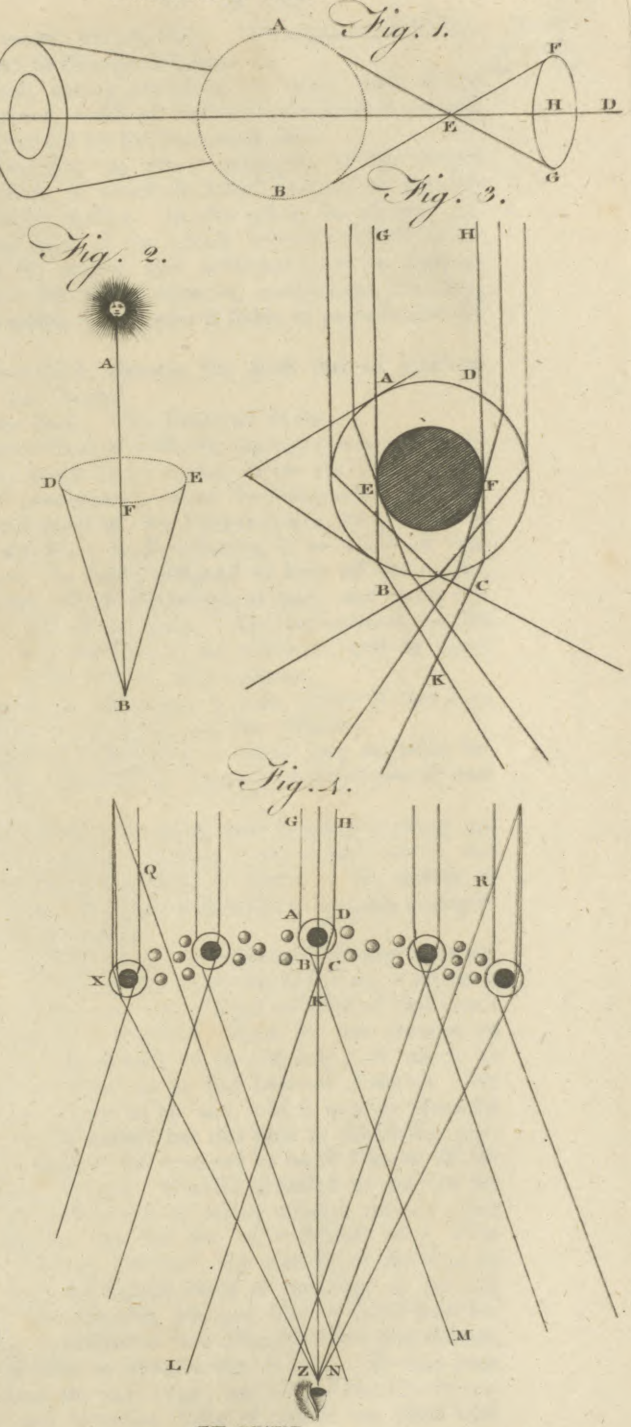
CORNET. CONSANGUINITY. CORONA or HALO. Plate CLXIV.

CORNET.

CONSANGUINITY.

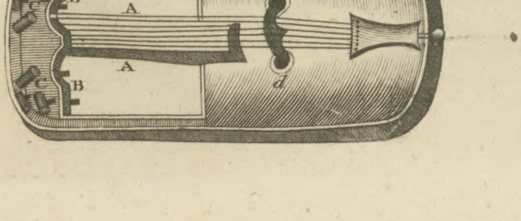


CORONA or HALO.

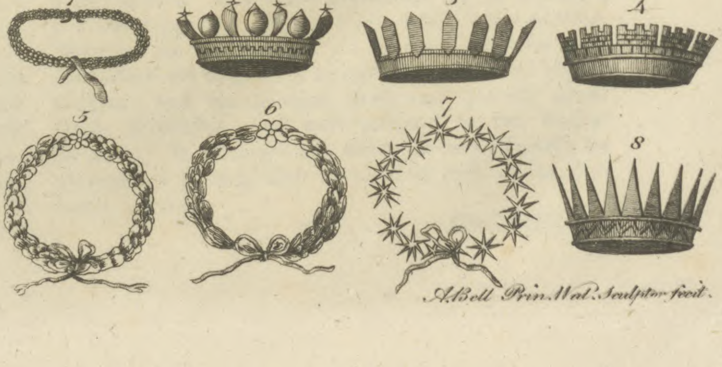


CROMLECH.

CROWTH.



CROWN.



A. Bell Prin. Wal. Sculptor fecit.

ous ſtones, and the fourth a kind of bonnet or cap, ſomething like the mortier.

The Romans had alſo various kinds of crowns, which they diſtributed as rewards of military atchievements; as, 1. The oval crown, made of myrtle, and beſtowed upon generals, who were entitled to the honours of the leſſer triumph, called *ovation*. 2. The naval or roſtral crown, compoſed of a circle of gold, with ornaments repreſenting beaks of ſhips, and given to the captain who firſt grappled, or the ſoldier who firſt boarded, an enemy's ſhip. 3. The crown called in Latin *vallaris*, *caſtrenſis*, a circle of gold raiſed with jewels or paliſades; the reward of him who firſt forced the enemy's entrenchments. 4. The mural crown, a circle of gold indented and embattled; given to him who firſt mounted the wall of a beſieged place, and there lodged a ſtandard. 5. The civic crown, made of the branch of a green oak, and given him who had ſaved the life of a citizen. 6. The triumphal crown, conſiſting at firſt of wreaths of laurel, but afterwards made of gold; proper to ſuch generals as had the honour of a triumph. 7. The crown called *obſidionalis*, or *graminea*, made of graſs growing on the place; the reward of a general who had delivered a Roman army from a ſiege. 8. The radial crown, given to princes at their tranſlation among the gods. We meet alſo with the corona aurea, often beſtowed on ſoldiers without any other additional term; athletic crowns, and crowns of laurel, deſtined to crown victors at the public games, poets, orators, &c. All theſe crowns were marks of nobility to the wearers; and upon competitions with rivals for rank and dignities, often determined the preference in their favour. See Plate CLXIV. For an account of modern crowns, ſee Heraldry.

Crown is alſo uſed to ſignify the poſſeſſions and dignity of a king. The crown of England, according to Sir William Blackſtone, is, by common law and conſtitutional cuſtom, hereditary; and this in a manner peculiar to itſelf; but the right of inheritance may from time to time be changed or limited by act of parliament, under which limitations the crown ſtill continues hereditary. See Succession.

Pleas of the Crown. See Pleas.

Crown, in *Commerce*, is a general name, for coins, both foreign and domeſtic, of or near the value of five ſhillings ſterling. In its limited ſenſe, crown is only applicable to that popular Engliſh coin which bears the name and which is equivalent to ſixty Engliſh pence or five ſhillings, or to ſix livres French money. But, in its extenſive ſenſe, it takes in ſeveral others; as the French ecu, which we call the French crown, ſtruck in 1641 for ſixty ſols, or three livres; alſo the petagon, dollar, ducatoon, rixdollar, and piaſtre or piece of eight.

Crown, in an eccleſiaſtical ſenſe, is uſed for the clerical tonſure; which is the mark or character of the Romiſh eccleſiaſtics. This is a little circle of hair ſhaved off from the crown of the head; more or leſs broad, according to the quality of the orders received: That of a mere clerk is the ſmalleſt; that of prieſts and monks the largeſt. The clerical crown was anciently a round liſt of hair, ſhaved off around the head, repreſenting a real crown: this is eaſily obſervable in ſeveral ancient ſtatues, &c. The religious of St Dominic and St Francis ſtill retain it.

Crown, among jewellers, the upper work of the roſe diamond, which all centres in the point at the top, and is bounded by the horizontal ribs.

Crown-Office, an office belonging to the king's bench court, of which the king's coroner or attorney is commonly maſter. In this office, the attorney general and clerk of the crown ſeverally exhibit informations for crimes and miſdemeanours at common law, as in the caſe of batteries, conſpiracies, libelling, &c. on which the offender is liable to pay a fine to the king.

Crown-Glaſs, denotes the fineſt ſort of window-glaſs. See Glass.

Crown-Scabs. See Farriery *Index*.

Crown-Wheel of a Watch, the upper wheel next the balance, which by its motion drives the balance, and in royal pendulums is called the *ſwing-wheel*.

Crown Imperial. See Fritillaria, Botany *Index*.

Crown-Work, in *Fortification*, is an out-work running into the field; deſigned to keep off the enemy, gain ſome hill or advantageous poſt, and cover the other works of the place. The crown-work conſiſts of two demi-baſtions at the extremes, and an entire baſtion in the middle, with curtains.

Crown, in *Aſtronomy*, a name given to two conſtellations, the ſouthern and the northern.

Crown, in *Geometry*, a plane ring included between two parallel or concentric peripheries of unequal circles.

Crown-Poſt, is a poſt in ſome building ſtanding upright in the middle between two principal rafters; and from which proceed ſtruts or braces to the middle of each rafter. It is otherwiſe called a *king-poſt*, or *king's-piece*, or *joggle-piece*.

CROWNE, John, a celebrated dramatic writer, born in Nova Scotia, where his father was a miniſter. Being impatient of the gloomy reſtraint of that country, he came to England, where he was reduced to enter into the ſervice of an old lady; of which he was ſoon as weary as he had been of America. He then had recourſe to his pen, which quickly procured him favour at court: but this kind of ſubſiſtence proving precarious, he ventured to ſolicit Charles II. for ſome eſtabliſhment. Charles promiſed to provide for him, but inſiſted firſt on having another comedy; and ſuggeſted to him the plan of a Spaniſh play, from which Crowne produced the comedy of *Sir Courtly Nice*: but the ſudden death of the king on the laſt day of the rehearſal, plunged him at once from his pleaſing expectations into diſappointment and diſtreſs, and left him no reſource but his wits. He died ſome time about the year 1703; and left behind him 17 tragedies and comedies, ſome of which are acted with great ſucceſs. His chief excellence lay in comedy; yet his tragedies are far from being contemptible. His plots are for the moſt part his own invention; his characters are in general ſtrongly coloured and highly finiſhed; and his dialogue lively and ſpirited, attentively diverſified, and well adapted to the ſeveral ſpeakers. So that on the whole he may aſſuredly be allowed to ſtand at leaſt in the third rank of our dramatic writers.

CROWNING, in *Architecture*, is underſtood, in the general, of any thing that terminates or finiſhes a member or decoration. Thus, a corniche, a pediment, &c. are called *crownings*. Thus alſo the abacus is ſaid to crown the capital; and thus any member or moulding is ſaid to be crowned when it has a fillet over it; and a niche is crowned when it is covered with a capital.

CROWNING, in ſea-language, denotes the finiſhing part of a knot made at the end of a rope. It is performed by interweaving the ends of the different ſtrands artfully amongſt each other, ſo as that they may not become looſened or untwiſted. They are uſeful in all kinds of ſtoppers.

CROWTH, or CRUTH. See CRUTH.

CROXAL, SAMUEL, an ingenious Engliſh divine, who in his youth wrote the celebrated poem entitled *The Fair Circaſſian*. He had the livings of Hampton in Middleſex, and the united pariſhes of St Mary Somerſet, and St Mary Mounthaw, in London; both which he held till his death in 1751. He publiſhed many other poems and tranſlations, with an entire Engliſh edition of Æſop's Fables. In conſequence of his attachment to Whig principles, he enjoyed ſome other preferments, and was chaplain in ordinary to George II.

CROYDON, a town in Surry in England. Its ſituation is low, near the ſpring-head of the river Wandel, and it is in a manner ſurrounded with hills. It is pretty large, and is chiefly noted for being the ſeat of the archbiſhop of Canterbury. It has a large handſome church, an hoſpital, and a free ſchool. W. Long. 0. 5. N. Lat. 51. 22.

CRUCIAL INCISION, in *Surgery*, an inciſion made in the form of a croſs.

CRUCIANELLA, PETTY MADDER: A genus of plants, belonging to the tetrandria claſs; and in the natural method ranking under the 47th order, *Stellatæ*. See BOTANY *Index*.

CRUCIBLE, a chemical veſſel made of earth, and ſo tempered and baked as to endure the greateſt fire. They are uſed to melt metals, and to flux minerals, ores, &c.

CRUCIFIX, a croſs upon which the body of Chriſt is faſtened in effigy, uſed by the Roman Catholics to excite in their minds a ſtrong idea of our Saviour's paſſion.

They eſteem it an eſſential circumſtance of their religious worſhip performed at the altar; and on Good Friday they perform the ceremony of adoring it, which is done in theſe words, *O crux ave, ſpes unica;* "Hail, thou croſs, our only hope." The officiating prieſt uncovers the crucifix, elevates it with both his hands, and ſays, *Ecce lignum crucis;* "Behold the wood of the croſs." The people anſwer, *in quo ſalus mundi pependit;* "on which the Saviour of the world ſuffered death." Then the whole congregation bow with great reverence, and devoutly kiſs the holy wood.

CRUCIFIXION, a capital puniſhment by nailing the criminal to a croſs. See CROSS.

CRUCIFORM, in general, ſomething diſpoſed croſs-ways; but more eſpecially uſed by botaniſts, for flowers conſiſting of four petals diſpoſed in the form of a croſs.

CRUCITA, in *Botany:* A genus of the digynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking with thoſe the order of which is doubtful. The interior calyx is tetraphyllous, the exterior calyx triphyllous; there is no corolla, and only one ſeed.

CRUDE, an epithet given to ſomething that has not paſſed the fire or had a proper degree of coction.

CRUDITY, among phyſicians, is applied to undigeſted ſubſtances in the ſtomach; to humours in the body which are unconcocted, and not prepared for expulſion; and to the excrements.

CRUISE, from the German *kruiſs*, "acroſs," ſignifies to croſs to and fro, to ſail up and down within a certain ſpace of the ſea, called the *cruiſing* latitude, in queſt of veſſels, or fleets of an enemy, &c.

CRUISERS, in the navy, are ſmall men of war made uſe of to and fro in the Channel, and elſewhere, to ſecure our merchant ſhips and veſſels from the enemy's ſmall frigates and privateers. They are generally ſuch as ſail well, and are commonly well manned: and indeed the ſafety of the trade in the Channel, and up and down the ſoundings, and other places, abſolutely requires the conſtant keeping out ſuch ſhips at ſea.

CRUMENTATA, among zoologiſts, animals furniſhed with a pouch or bag, wherein to receive their young in time of danger; as the oppoſſum. See DIDELPHUS.

CRUOR, ſometimes ſignifies the blood in general; ſometimes only the venous blood; and ſometimes extravaſated or coagulated blood: but is moſt frequently uſed for the red globules of the blood; in contradiſtinction to the limpid or ſerous part.

CRUPPER, in the manege, the buttocks of a horſe; the rump: alſo a thong of leather put under a horſe's tail, and drawn up by thongs to the buckle behind the ſaddle, ſo as to keep him from caſting the ſaddle forwards on his neck.

CRURÆUS, or CRUREUS, *Muſculus*, in *Anatomy*, a fleſhy maſs, covering almoſt all the foreſide of the os femoris, between the two vaſti, which likewiſe cover the edges of this muſcle on each ſide. See ANATOMY, *Table of the Muſcles*.

CRURAL, in *Anatomy*, an epithet given to the artery which conveys the blood to the crura or legs, and to the vein by which this blood returns towards the heart. See ANATOMY *Index*.

CRUS, in *Anatomy*, all that part of the body contained between the buttocks and the toes.

CRUSADE. See CROISADE.

CRUSADO, in commerce, a Portugueſe coin, ſtruck under Alphonſus V. about the year 1457, at the time when Pope Calixtus ſent thither the bull for a croiſade againſt the infidels. This coin has a croſs on one ſide and the arms of Portugal on the other.

CRUSCA, an Italian term ſignifying *bran*, is in uſe amongſt us to denote that celebrated academy called *Della Cruſca*, eſtabliſhed at Florence for purifying and perfecting the Tuſcan language. See ACADEMY, N° 11. The academy took its name from its office, and the end propoſed by it; which is, to refine the language, and as it were to ſeparate the bran from it. Accordingly, its device is a ſieve; and its motto, *Il piu bel fior ne coglie;* that is, "It gathers the fineſt flour thereof." In the hall or apartment where the academy

academy meets, M. Moneonis informs us, that every thing bears an allusion to the name and device; the seats are in form of a baker's basket; their backs like a shovel for moving of corn; the cushions of gray satin, in form of sacks or wallets; and the branches where the lights are placed resembling sacks. The vocabulary *Della Crusca* is an excellent Italian dictionary, composed by this academy.

CRUSTA LACTEA, in *Medicine*, the same with ACHOR.

CRUSTACEOUS FISH, in *Natural History*, are those covered with shells, consisting of several pieces or scales; as those of crabs, lobsters, &c.

These are usually softer than the shells of the testaceous kind, which consist of a single piece, and generally much thicker and stronger than the former; such as those of the oyster, scallop, cockle, &c.

Dr Woodward observes, in his Natural History, that of all the shells found in beds of all the different matters dug out of the earth, there are scarce any of the crustaceous kind: the reason he gives for it is, that these being much lighter than the rest, must have floated on the surface at the time of the deluge, when all the strata were formed; and there have corrupted and perished.

CRUTH, or CROWTH, a kind of musical instrument formerly in use among the common people in Wales. It is of the fidicinal kind, somewhat resembling a violin, 12 inches in length, and an inch and a half in thickness. It has six strings supported by a bridge, and is played on with a bow: the bridge differs from that of a violin, in that it is flat and not convex on the top; a circumstance from which it is to be inferred, that the strings are to be struck at the same time, so as to afford a succession of concords. The bridge is not placed at right angles with the sides of the instrument, but in an oblique direction; and, which is further to be remarked, one of the feet of the bridge goes through one of the sound-holes, which are circular, and rests on the inside of the back; the other foot, which is proportionably shorter, resting on the belly before the other sound-hole. Of the strings the four first are conducted from the bridge down the finger board, as in a common violin; but the fifth and sixth, which are about an inch longer than the others, leave the small end of the neck about an inch to the right. The whole six are wound up either by wooden pegs in the form of the letter T, or by iron pins, which are turned with a wrest like those of a harp or spinet. Of the tuning, it is to be remarked, that the fifth and sixth strings are the unison and octave of G; the fourth and fifth, the same of C; and the second and first, the same of D; so that the second pair of strings are a fourth, and the third a fifth, to the first. See Plate CLXIV.

Concerning the antiquity of this instrument, there is but little written evidence to carry it further back than the time of Leland; nevertheless the opinion of its high antiquity is so strong among the inhabitants of the country where it was used, as to afford a probable ground of conjecture, that the cruth might be the prototype of the whole fidicinal species of musical instruments. Another evidence of its antiquity, but which tends also to prove that it was not peculiar to Wales, arises from a discovery lately made and communicated to the society of antiquarians, respecting the abbey-church of Melrose in Scotland, supposed to have been built about the time of Edward II. It seems that among the outside ornaments of that church there is the representation of a cruth, very little different from the description above given. The instrument is now disused, insomuch that Sir John Hawkins, from whom we extract, tells us, that there is but one person in the whole principality of North Wales that can play upon it; and as he was at that time near 60 years of age, the succession of performers is probably near an end.

CRUX, or St CROIX, one of the Caribbee islands, situated about 60 miles south-east of Porto Rico, and subject to Denmark. From being a perfect desert, it has begun to flourish exceedingly, being made a free port, and receiving great encouragement from government. W. Long. 64. 0. N. Lat. 17. 30.

LA CRUZ, an excellent harbour on the north-west coast of America, which was discovered by the Spaniards in 1779. They were introduced into it by a passage which they called *Bucarelli's entrance*, and which they placed in 55. 18. N. Lat. and 139. 15. W. Long. from the meridian of Paris. The latitude of this passage as laid down by the Spaniards seems to be correct; but the editor of Perouse's voyage concludes, from the survey made by Captain Cook on the coasts adjacent to the entrance of Bucarelli, that this entrance is about 135° 20′ to the west of Paris, or near 133° west of Greenwich.

The Spaniards were not long in the harbour of La Cruz before they received a visit from the inhabitants in its neighbourhood. Bartering took place. The Indians gave their peltry, and various trifles, for glass beads, bits of old iron, &c. By this traffic the Spaniards were enabled to gain a sufficiently exact knowledge of their genius, of their offensive and defensive arms, of their manufactures, &c. Their colour is a clear olive; many among them have, however, a perfectly white skin: their countenance is well proportioned in all its parts. They are robust, courageous, arrogant, and warlike. They clothe themselves in one or two undressed skins (with the fur apparently); these are the skins of otters, of sea-wolves, of benades (a species of deer), of bears, or other animals. These dresses cover them from the neck to the middle of the leg; some, however, among them wear boots of smooth skin, resembling English boots, only that those of the Indians open before, and are laced tight with a string. They wear hats woven from the fine bark of trees, which is formed into the shape of a funnel or a cone. At the wrists they have bracelets of copper or iron, or for want of these metals the fins of whales; and round the neck, necklaces of small fragments of bones of fishes and other animals, and even copper collars of the bigness of two fingers. They wear in their ears pendants of mother-of-pearl, or flat pieces of copper, on which is embossed a resin of a topaz colour, and which are accompanied with jet beads. Their hair is long and thick, and they make use of a comb to hold it together in a small queue from the middle to the extremity; a narrow ribbon of coarse linen, woven for this purpose, serves as a ligament. They wear also as a covering a kind of scarf, woven in a particular manner, something more than a yard

 and

La Cruz. and a half long, and about half a yard broad, round which hangs a fringe something more than half a quarter of a yard deep, of which the thread is regularly twisted.

The women give proofs of their modesty and decency by their dress. Their physiognomy is agreeable, their colour fresh, their cheeks vermilioned, and their hair long; they plait it together in one long tress. They wear a long robe of a smooth skin tied round the loins, like that of a nun; it covers them from the neck as low as the feet; the sleeves reach down to the wrists. Upon this robe they put divers skins of otters or other animals to defend themselves from the inclemency of the weather. All the married women have a large opening in the under lip, and this opening or orifice is filled up by a piece of wood cut in an oval shape, of which the smallest diameter is almost an inch; the more a woman is advanced in years the more this curious ornament is extended: it renders them frightful, the old women especially, whose lip, deprived of its wonted spring, and dragged by the weight of this extraordinary jewel, necessarily hangs in a very disagreeable manner. The girls wear only a copper needle, which crosses the lip in the place where the ornament is intended hereafter to be placed.

These Indians in war make use of cuirasses and shoulder pieces of a manufacture like that of the whalebone stays among the Europeans. Narrow boards or scantlings form, in some sort, the woof of the texture, and threads are the warp: in this manner the whole is very flexible, and leaves a free use to the arms for the handling of weapons. They wear round the neck a coarse and large gorget which covers them as high as below the eyes, and their head is defended by a morion, or skull-piece, usually made of the head of some ferocious animal. From the waist downwards, they wear a kind of apron, of the same contexture as their cuirass. Lastly, a fine skin hangs from their shoulders down to the knee. With this armour, they are invulnerable to the arrows of their enemies; but thus armed, they cannot change position with so much agility as if they were less burdened.

Their offensive arms are arrows; bows, of which the strings are woven like the large cords of our best musical instruments; lances, four yards in length, tongued with iron; knives, of the same metal, longer than European bayonets, a weapon however not very common among them; little axes of flint, or of a green stone, so hard that they cleave the most compact wood without injury to their edge.

The pronunciation of their language is extremely difficult; they speak from the throat, with a movement of the tongue against the palate. The little use the women make of their inferior lip greatly injures the distinctiveness of their language. The Spaniards could neither pronounce nor write the words which they heard.

From the vivacity of spirit in these Indians, and from their attention amply to furnish the market established in the harbour, it may be concluded that they are pretty laborious. They continually brought stuffs well woven and shaded with various colours, the skins of land and sea wolves, of otters, bears, and other smaller animals; of these some were raw, and others dressed. There were to be found at this market also coverlets of coarse cloth, shaded with white and brown colours, very well woven, but in small quantities: large ribbons of the same linen which might match with that of the Spanish officers mattresses; skeins of thread such as this cloth was made of; wooden plates or bowls neatly worked; small boats, or canoes, painted in various colours, the figures of which represented heads with all their parts; frogs in wood, nicely imitated, which opened like tobacco boxes, and which they employed to keep their trinkets in; boxes made of small planks, of a cubical form, being three quarters of a yard on each side, with figures well drawn, or carved on the outside, representing various animals; the covers fabricated like Flanders etwees, with rabbeted edges, formed so as to shut into the body of the box; animals in wood, as well those of the earth as of the air; figures of men of the same material, with skull-caps representing the heads of various fierce animals; snares and nets for fishing; copper collars for the neck, and bracelets of iron for the wrist, but which they would not part with except at a very high price; beak-like instruments, from which they drew sounds as from a German flute. The principal officers took such of these merchandises as were most agreeable to them, and left the remainder to the ships crews. La Cruz.

As the Indians discovered that the Spaniards were very dainty in their fish, they did not let them want for choice: the greatest abundance was in salmon, and a species of sole or turbot three yards and a quarter long, broad and thick in proportion; cod and pilchards were also brought to market, and fishes resembling trout. From all this it may be inferred, that this gulf is full of fish; the banks too are covered with shells.

The quantity of mother-of-pearl that these Indians cut to pieces for making ear-rings awakened the curiosity of the Spaniards: they tried to discover whether these people had not in their possession, or whether their country did not produce pearls, or some precious stones: their researches were fruitless, they only found some stones which they judged to be metallic, and which they carried on board, not having the necessary means for extracting the metal they might contain.

The inhabitants of La Cruz feed upon fish, fresh or dry, boiled or roasted; herbs and roots which their mountains yield them, and particularly that which in Spain is called sea parsley; and, lastly, upon the flesh of animals which they take in hunting: the productions of the chase are undoubtedly abundant, seeing the number of dogs they keep for this purpose.

They appeared to the Spaniards to worship the sun, the earliest and most natural of all idolatrous worship; and they paid a decent respect to the remains of their dead. Don Maurelle, one of the Spanish officers, in an expedition round the gulf, found in two islands three dead bodies laid in boxes of a similar form to those which have been described above, though considerably larger, and decked in their furs. These biers were placed in a little hut upon a platform, or raised floor, made of the branches of trees.

The country is very hilly; the mountains are lofty, and their slope extends almost everywhere to the sea. The soil is lime-stone; it is nevertheless covered with an impenetrable forest of tall fir trees, very large and very straight. As these trees cannot strike very deep into the earth, the violence of the wind often tears them up by the

the roots: they rot and become a light mould, upon which grows a buſhy thicket; and in this are found nettles, chamomile, wild celery, aniſe, a ſpecies of cabbage, celandine, elder, wormwood, ſorrel; and without doubt there are other plants along the rivers.

The Spaniards ſaw ducks, gulls, divers, kites, ravens, geeſe, ſtorks, gold-finches, and other little birds unknown to them.

The commerce between the Spaniards and the Indians was quite undiſturbed; and ſo deſirous were the latter to obtain iron, cloths, and other ſtuffs, that they ſold their children for broken iron hoops and other wares. The Spaniards in this manner bought three young lads, one from five to ſix years old, another of four, and the third from nine to ten, not to make ſlaves, but Chriſtians of them; they hoped beſides to derive uſeful information from them as to the nature of the country and its inhabitants. Theſe youths were ſo contented in being with the Spaniards, that they hid themſelves when their parents came on board, from the apprehenſion of being again reſtored to them. Two young girls were alſo purchaſed with the ſame view; one very ugly, ſeven years of age; the other younger, better made, but ſickly, and almoſt at the gates of death.

At the full and change of the moon, the ſea riſes in the harbour of La Cruz ſeventeen feet three inches Engliſh; it is then high water at a quarter after 12 at noon; the loweſt tides are fourteen feet three inches; the night tides exceed by one foot nine inches thoſe of the day.

CRYMODES, among phyſicians, a kind of fever attended with a ſhivering cold, and inflammation of the internal parts of the body.

CRYPTA, a ſubterraneous cell or vault, eſpecially under a church, for the interment of particular families or perſons. S. Ciampini, deſcribing the outſide of the Vatican, ſpeaks of the *cryptæ* of St Andrew, St Paul &c. The word is formed of *κρυπτω*, *abſcondo*, "I hide;" whence *κρυπτη*, *crypta*.

Vitruvius uſes the word *crypta* for a part of a building, anſwering nearly to our cella; Juvenal for a *cloaca*. Hence *crypto porticus*, a ſubterraneous place arched or vaulted, uſed as an under-work or paſſage in old walls. The ſame is alſo uſed for the decoration at the entry of a grotto.

Crypta is alſo uſed by ſome of our ancient writers for a chapel or oratory under ground.

Cryptæ, in *Anatomy*: A name given by Ruyſch to glands ſituated on the back of the tongue, and to glands of the inteſtines.

CRYPTOGAMIA, (from *κρυπτος*, *occultus*, "concealed," and *γαμος*, *nuptia*, "nuptials"), the 24th claſs in the Linnæan ſyſtem, comprehending thoſe plants whoſe fructification is concealed, either through minuteneſs, or within the fruit. See Botany *Index*.

CRYPTOGRAPHY, the art of writing in cipher, or with ſympathetic ink. Among the methods which Ovid teaches young women to deceive their guardians, when they write to their lovers, he mentions that of writing with new milk, and of making the writing legible by means of coal duſt or ſoot; from which it appears, that the uſe of ſympathetic ink was known to the ancients.

> *Tuta quoque eſt, fallitque oculos, è lacte recenti*
> *Litera: carbonis pulvere tange; leges.*
>
> De Arte Amandi, lib. iii.

Auſonius propoſes the ſame means to Paulinus in the two following verſes:

> *Lacte incide notas; areſcens charta tenebit*
> *Semper inaſpicuas; prodentur ſcripta favillis.*
>
> Epiſt. xxiii.

But it would appear, that the commentators on this poet have miſtaken the meaning of the word *favilla*, which is uſed here to ſignify *fuligo*, or ſoot; and in the ſame ſenſe it is often employed by other poets. Columella, ſpeaking of the method of preſerving plants from inſects with ſoot, calls it *nigra favilla*. In another place he mentions the ſame practice, and ſays *fuliginem quæ ſupra focos tectis inhæret*. Other glutinous juices beſides milk may be employed for the ſame purpoſe, as they will equally hold faſt the black powder ſtrewed over them. Pliny, therefore, recommends the milky juice of certain plants, and particularly mentions that of lettuce, to produce this effect.

It is now well known that ſeveral metallic ſolutions may be employed for a ſimilar purpoſe, and being expoſed to the action of certain vapours, the characters which are written with them become viſible. This effect was perhaps accidentally diſcovered; but it does not appear to be of great antiquity. In a book *De ſecretis*, compiled by Wecker from Porta, Cardan, and ſome other old writers, and printed in 1592, there is no mention of it; nor even is it noticed by Caneparius in his book *de Atramentis*, printed in 1619. The firſt receipt given for the preparation of a ſympathetic ink is in a work by Peter Borel printed at Paris in 1653, where it is called *magnetic water which acts at a diſtance*. *Beckmann. Hiſt. of Invent.* See Chemistry *Index*, Cipher, and Ink.

CRYSTAL, in its original meaning, ſignified *ice*. It was afterwards applied to rock cryſtal, or cryſtallized ſiliceous earth; for the ancients, according to Pliny, regarded that body, as water which was congealed by the action of cold.

Crystal, a ſpecies of ſtone belonging to the quartz or ſiliceous genus. It always appears, where there has been no interruption to its cryſtallization, in hexagonal priſms pointed at both ends. It is found of different kinds and colours. 1. Opaque or ſemitranſparent, and white or of a milk colour. 2. Opaque and red, or of a carnelian colour, from Oran in Barbary. 3. Opaque and black, from the ſame place. 4. Clear. The ſpecific gravity of theſe kinds of cryſtals is from 2650 to 2700. Profeſſor Bergman extracted from them about ſix parts of argilla and one of calcareous earth per hundred weight; but Mr Gerhard found ſome ſo pure as to contain neither. 5. Clear and blackiſh brown; the ſmoky topaz, or *rauch topaz* of the Germans. It is found at Egan in Norway, and at Loviſa in Finland. Theſe cryſtals are ſaid to become clear by boiling them in tallow. 6. Clear and yellow; found in Bohemia, and ſold inſtead of topazes. 7. Clear and violet-coloured; the amethyſt from Saxony, Bohemia, and Dannemore in Upland. The moſt tranſparent of theſe are called falſe diamonds, Briſtol, Kerry ſtones, Alençon diamonds, &c. 8. Colourleſs rock cryſtal, properly ſo called, found in Bohemia, the province of Jemtland, and many other places. 9. Pyramidal cryſtal with one or two points. Theſe have no priſmatic ſhape, but either ſtand upon a baſe in cavities of quartz veins, have only a ſingle pyramid,

pyramid, and are of various colours; or they lie in clayey earths, and have both pyramids, but no priſm. They are found at Blackenburg upon the Hartz, and at Morſeroſh in the Silverland in Tranſylvania.

The coloured tranſparent cryſtals derive their tinge from an exceedingly ſmall portion of metallic oxide, but loſe them entirely when ſtrongly heated. They are called *falſe gems*; viz. the red from Oran in Barbary, falſe rubies; the yellow from Saxony, falſe topazes; the green from Dauphiny, very rare, falſe emeralds or praſes; the violet from Vil in Catalonia, falſe amethyſts; the blue from Puy in Valais in France, falſe ſapphires. There are likewiſe opal or rainbow cryſtals, the various colours of which are thrown out in zones acroſs the ſurface. They make a very fine appearance, though they never ſhine like the oriental opal.

M. Fourcroy makes a remarkable difference between the cryſtals and quartz, by affirming that the former are unalterable in the fire, in which they neither loſe their hardneſs, tranſparency nor colour; while the quartz loſes the ſame qualities, and is reduced by it to a white and opaque earth. He claſſes the rock cryſtals,

I. According to their form, viz. 1. Inſulated hexagonal cryſtals ending in pyramids of ſix faces, which have a double refraction, or ſhow two images of the ſame object when looked through. 2. Hexagonal cryſtals united, having one or two points. 3. Tetraedral, dodecaedral, flatted cryſtals; and which, though hexagonal, have nevertheleſs their planes irregular. 4. Cryſtals in large maſſes, from the iſland of Madagaſcar, which have a ſimple refraction.

II. With regard to their colour, as being either diaphanous, reddiſh, ſmoky, or blackiſh.

III. With regard to accidental changes, ſome are hollow; ſome contain water within one or more cavities: ſome are caſed one within the other; ſome are of a round form, as the pebbles of the Rhine; ſome have a cruſt of metallic calces or of a pyrites; ſome are found cryſtallized in the inſide of a cavity; while ſome ſeem to contain amianthus or aſbeſtus; and others contain ſhirls. The ſame author reckons among cryſtals the oriental topaz, the hyacinth, the oriental ſapphire, and the amethyſt. M. Daubenton has always looked upon this laſt as a quartz of a cryſtal.

When the rock cryſtals are ſemitranſparent or intermixed with opaque veins, they are called by the Swediſh lapidaries *milk-cryſtals*. When they are found in the form of round pebbles, which is occaſioned by their being toſſed about and rubbed againſt one another by floods or by the ſea, they are called by the Engliſh lapidaries *pebble-cryſtals*. They come from the Indies, Siberia, and other places.

According to Bomare, the rock-cryſtals are generally formed upon or among quartz, which ſhows their great affinity, and are to be found in all parts of the world. The greateſt quantity of them is brought from Mount Saint Gothard in Switzerland. Large pieces of theſe, weighing from 5 to 800 pounds, were found there at Grimſelberg: another of about 1200 pounds weight was found ſome years ago at Fiſbach in the Valais: and a piece ſix feet long, four wide, and equally thick, was found in the iſland of Madagaſcar, where theſe natural productions are of the moſt extraordinary ſize and perfection.

In the imperial collection at Vienna, there is a pyramidal cryſtal vaſe two ells in height, cut wholly out of one piece. It is uſual with the largeſt cryſtals of the German mountains to be full of cracks and flaws, and to be ſo conſtructed internally as to ſhow all the priſmatic colours; but the above-mentioned ones were quite free from theſe blemiſhes, and reſembled columns of the pureſt glaſs, only much clearer than any glaſs can be made. Cryſtal is alſo found in many parts of Britain and Ireland. About Briſtol it is found of an amethyſtine tinge. In Sileſia and Bohemia in Germany it is found ſtained with the colours of the ruby, ſapphire, emerald, and topaz; in which caſe jewellers take great advantage of it, ſelling it under the name of *occidental ſapphire*.

The orders of pure cryſtal are three: the firſt is perfect columnar cryſtals, with double pyramids, compoſed of 18 planes, in an hexangular column, terminated by an hexangular pyramid at each end: the ſecond order is that of perfect cryſtals, with double pyramids, without a column, compoſed either of 12 or of 16 planes, in two hexangular pyramids, joined cloſely baſe to baſe, without the intervention of any column: the third order is that of imperfect cryſtals, with ſingle pyramids, compoſed either of 12 or 10 planes, in an hexangular or pentangular column, affixed irregularly at one end to ſome ſolid body, and terminated at the other by an hexangular or pentangular pyramid.

Theſe are all the general forms into which cryſtal, when pure, is found concreted: but under theſe there are almoſt infinite varieties in the number of angles, and the length, thickneſs, and other accidents of the columns and pyramids.

When cryſtal is blended with metalline particles at the time of its formation, it aſſumes a variety of figures wholly different from theſe, conſtituting a fourth order, under the name of *metalline cryſtals*: when that metal is lead, the cryſtal aſſumes the form of a cube: when it is tin, of a quadrilateral pyramid, with a broad baſe; when iron, the cryſtal is found concreted in rhomboidal figures: theſe cryſtals are very common about mines; but the common ſpars, which are liable to be influenced in the ſame manner by the metals, and to appear in the very ſame form, are to be carefully diſtinguiſhed from them. There is one very eaſy teſt for this purpoſe, which is, that all ſpars are ſubject to be diſſolved by aquafortis, and efferveſce violently only on its touching them: but it has no ſuch effects on cryſtal.

The pebble-cryſtal is common enough in all parts of the world; but that which is formed of hexangular columns, affixed to a ſolid baſe at one end, and terminated by a hexangular column at the other, is infinitely more ſo: this is what we call *ſprig* or *rock cryſtal*, and is the ſpecies deſcribed by moſt authors under the name of *cryſtal of the ſhops*, or that kept for medicinal uſes.

With regard to the formation of cryſtals, it is certain that they muſt have been once in a ſoft ſtate, ſince ſome are found to have water in their cavities. Profeſſor Bergman obtained 13 regular formed cryſtals, by ſuffering the powder of quartz to remain in a veſſel with fluor acid for two years. Theſe were about the ſize of ſmall peas, and were leſs hard than quartz. Mr Magellan informs us, that he received from Mr Achard

Cryftal.

Achard two cryftals, one of the fparry kind, and the other as hard and tranfparent as rock cryftal. The firft he procured by means of calcareous earth, and the latter from the earth of alum, both diffolved in water impregnated with fixed air, the water filtrating very flowly through a porous bottom of baked clay. The apparatus is defcribed by the author in the *Journal de Phyfique* for January 1778 : but though the procefs was attempted by Mr Magellan, and afterwards a fecond time by Mr Achard himfelf, neither of them were able to fucceed. Mr Morveau, however, in the firft volume of the Dijon Memoirs for 1785, afferts that he has produced a very fmall artificial cryftal ; and gives the proper method for fucceeding in the procefs.

Cryftal is frequently cut ; and luftres, vafes, and toys, are made of it as of other beautiful ftones. For this purpofe it is to be chofen perfectly clear and tranfparent. It is to be tried by aquafortis, or by drawing it along a pane of glafs. The genuine cryftal will not be affected by the acid, and will cut glafs almoft like a diamond. When any piece of workmanfhip of natural cryftal is become foul and dark, the following method is to be ufed for recovering its brightnefs without hurting the polifh. Mix together fix parts of common water and one part of brandy ; boil thefe over a brifk fire, and let the cryftal be kept in it, in a boiling ftate, a quarter of an hour ; then take it out and rub it carefully over with a brufh dipped in the fame liquor ; after this it is to be wiped with a napkin, and by that means its furface will be perfectly cleaned, and rendered as bright as at firft, without any injury to the points of the cutting or the polifh of the planes or faces, which would probably have happened had the cleaning been attempted by mere rubbing with a cloth.

Natural cryftal may be reduced by calcination into a ftate proper for making glafs with alkaline falts, and thus becomes a very valuable frit. The method of doing it is as follows : calcine natural cryftal in a crucible ; when it is red hot, throw it into cold water. Repeat this eight times, covering the crucible, that no duft or afhes may get in among the cryftal. Dry this calcined mafs, and reduce it to an impalpable powder.

Colouring CRYSTAL, for the imitation of gems. See DOUBLET.

CRYSTAL is alfo ufed for a factitious body, caft in glafs-houfes, called *cryftal-glafs*, being in fact no more than glafs carried, in the compofition and manufacture, to a greater perfection than the common glafs.

The beft kind of glafs-cryftal is that called *Venice-cryftal*, made at Moran near Venice. See GLASS.

Ifland or *Iceland* CRYSTAL, a tranfparent fiffile ftone, brought from Iceland, foft as talc, clear as rock cryftal, and without colour, remarkable for its unufual refractions. It is a carbonate of lime.

It is there found in great abundance all over the country, but is particularly plentiful in a mountain, not far from the bay of Roezfiord, where the fineft and moft pellucid pieces are found on digging. The mountain lies in 65 degrees latitude, and has its whole outfide made up of it ; but though this makes a very bright and glittering appearance, it is not fo fine as that which lies at a little depth, and is met with on opening the furface. This is generally taken up out of the earth in maffes a foot long, and its corners very frequently are terminated in thefe large maffes by a fort of cryftals, very different in figure and qualities from the reft of the mafs. The ftone itfelf is of a paralellopiped figure ; but thefe excrefcences are either fingle pyramids, affixed to columns like common cryftal, or double pyramids with or without columns between. The ftone itfelf is foft ; thefe are hard, and cut glafs : the ftone calcines to lime in the fire ; thefe run into glafs : in fhort, the ftone itfelf is true fpar, and thefe are true cryftal. Befide thefe, there fometimes grows out of the end of the larger maffes a pure fine afbeftos. This likewife is the cafe fometimes in the fpar found about Bareges in France, and fhows how nearly together the formation of bodies, wholly different from one another, may happen. The general figure of the ftone is parallelopiped ; or, as fome exprefs it, rhomboide ; and it retains this not only while whole, but alfo when broken to pieces. Every fragment it naturally falls into, though ever fo fmall, being truly of that fhape. But it is remarkable, that in fome places of this mountain the fame fort of matter is found in form of triangular pyramids, all which have the fame property of the double refraction with the parallelopipids of the fame fubftance ; fo that the original error of fuppofing its qualities owing to its fhape, is refuted by this, as well as by the trials made with other pellucid bodies of the fame figure, which do not fhow this remarkable property.

The Iceland cryftal is electrical, and when rubbed will attract ftraws, feathers, and other light fubftances, in the fame manner that amber does.

The vaft maffes of white fpar which are found in the lead mines of Derbyfhire, though they are not externally of the parallelopiped figure of the Iceland cryftal, nor have any thing of its brightnefs or tranfparence in the general lump ; yet when they are broken they feparate into rhomboidal fragments, and fome of thefe are found to be tolerably pellucid ; all thofe which are fo have the property of the Iceland cryftal ; and being laid upon paper where a black line is drawn, they all fhow that line double, in the fame manner as the real Iceland cryftal does.

Iceland cryftal bears a red heat without lofing its tranfparency ; and in a very intenfe heat calcines without fufion : fteeped a day or two in water, it lofes its natural polifh. It is very foft and eafily fcratched with the point of a pin : it will not give fire on being ftruck againft fteel ; and ferments and is perfectly diffolved in aquafortis. It is found in Iceland, from whence it has its name ; and in France, Germany, and many other places. In England fragments of other fpars are very often miftaken for it, many of them having in fome degree the fame property. It has none of the diftinguifhing characters of cryftal ; and is plainly a genus of fpars, called from their figure *parallelopipedia*, which, as well as fome other bodies of a different genus, have the fame properties. Bartholine, Huygens, and Sir Ifaac Newton, have defcribed the body at large, but have accounted it either a cryftal or a talc ; errors which could not have happened, had the criterions of foffils been at that time fixed ; fince Sir Ifaac Newton has recorded its property of effervefcing with nitric acid, which alone muft prove that it is neither talc

talc nor cryftal, both thofe bodies being wholly unaffected by that menftruum. It is always found in form of an oblique parallelopiped, with fix fides; and is found of various fizes, from a quarter of an inch to three inches or more in diameter. It is pellucid, and not much lefs bright than the pureft cryftal; and its planes are all tolerably fmooth, though when nicely viewed they are found to be waved with crooked lines made by the edges of imperfect plates. What appears very fingular in the ftructure of this body is, that all the furfaces are placed in the fame manner, and confequently it will fplit off into thin plates, either horizontally or perpendicularly; but this is found, on a microfcopic examination, to be owing to the regularity of figure, fmoothnefs of furface, and nice joining of the feveral fmall parallelopiped concretions, of which the whole is compofed; and to the fame caufe is probably owing its remarkable property in refraction.

The phenomena of this ftone are very remarkable, were firft fuggefted by Bartholin, and have been examined with great accuracy by Mr Huygens and Sir Ifaac Newton.

1. Whereas in other pellucid bodies there is only one refraction, in this there are two; fo that objects viewed through it appear double.

2. Whereas in other tranfparent bodies, a ray falling perpendicularly on the furface, paffes ftraight through, without fuffering any refraction. and an oblique ray is always divided; in Iceland cryftal, every ray, whether perpendicular or oblique, becomes divided into two, by means of the double refraction. One of thefe refractions is, according to the ordinary rule, the fine of incidence out of air into cryftal, being to the fine of refraction as five to three; but the other is perfectly new. The like double refraction is alfo obferved in cryftal of the rock, though much lefs fenfibly. When an incident ray is thus divided, and each moiety arrives at the farther furface, that refracted in the firft furface after the ufual manner, is refracted entirely after the ufual manner at the fecond; and that refracted in the unufual manner in the firft is entirely refracted after the like manner in the fecond; fo that each emerges out of the fecond furface parallel to the firft incident ray. Again, if two pieces of this cryftal be placed over each other, fo that the furfaces of the one be parallel to the correfponding ones of the other; the rays refracted in the ufual manner in the firft furface of the firft, are refracted after the ufual manner in all the other furfaces; and the fame uniformity appears in the rays refracted after the unufual manner; and this in any inclination of the furfaces, provided their planes of perpendicular refraction be parallel.

From thefe phenomena Sir Ifaac Newton infers, that there is an original difference in the rays of light; by means whereof fome are here conftantly refracted after the ufual manner; and others in the unufual manner. Were not the difference original, and did it arife from any new modifications impreffed on the rays at their firft refraction, it would be altered by new modifications in the three following ones; whereas, in fact, it fuffers no alteration at all. Again, he hence takes occafion to fufpect, that the rays of light have feveral fides, endued with feveral original properties: for it appears from the circumftances, that thefe are not two forts of rays differing in their nature from each other, one conftantly, in all pofitions, refracted in the ufual, and the other in the unufual manner; the difference in the experiment mentioned being only in the pofition of the fides of the rays to the plane of perpendicular refraction. For one and the fame ray is refracted fometimes after the ufual, and fometimes after the unufual manner, according to the pofition of its fides to the cryftal: the refraction being alike in both, when the fides of the rays are pofited the fame way to both, but different when different. Every ray therefore may be confidered as having four fides or quarters; two of which, oppofite to each other, difpofe the ray to be refracted after the unufual manner; and the other two in the ufual. Thefe difpofitions, being in the rays before their incidence on the fecond, third, and fourth furfaces, and fuffering no alterations; for what appears in their paffage through them muft be original and connate.

Father Beccaria corrects the obfervations of Huygens and Newton concerning the refraction of rock or mountain cryftal. The double refraction of the latter happens when a ray paffes through two fides that are inclined to each other, and confequently iffues coloured: whereas that of the Iceland cryftal is made by the paffage of a ray through two parallel fides, and therefore it iffues colourlefs. He fuggefts, that there may be other fubftances in which there is a manifold refraction. Gravefande had a prifm of Brafil pebble, which had a double refraction at each angle, but of a different kind from one another. Mr B. Martin prepared feveral prifms of Iceland cryftal, which exhibited not only a double but a multiple refraction. A fingle prifm produced a fix-fold refraction; and by combining feveral prifms, a number of refractions was obtained equal to the product of thofe of the fingle prifms; i. e. a prifm which afforded two images applied to one of fix, produced a prifm of twelve images, &c. He farther obferves, with refpect to Iceland cryftal, that though the fides of its plane of perpendicular refraction be parallel to one another, a beam of light tranfmitted through them will not be colourlefs; in which property it differs from all other known fubftances.

CRYSTALLINE, in general, fomething compofed of or refembling cryftal. See Crystal.

Crystalline Heavens, in *Ancient Aftronomy*, two fpheres, imagined between the primum mobile and the firmament, in the Ptolemaic fyftem, which fuppofes the heavens folid, and only fufceptible of a fingle motion. See Astronomy.

Crystalline Humour. See Anatomy *Index*.

CRYSTALLINÆ, or Crystallines, in *Medicine*, are puftules filled with water, and fo called on account of their tranfparency, They are one of the worft fymptoms attendant on a gonorrhœa. They are lodged on the prepuce, without pain; and though caufed by coition, have nothing of infection attending them. The caufe is fuppofed to be a contufion of the lymphatic veffels in the part affected. Dr Cockburn, who hath defcribed this cafe, recommends for the cure a mixture of three parts of lime-water and two of rectified fpirit of wine, to be ufed warm, as a lotion, three times a day.

CRYSTALLIZATION,

CRYSTALLIZATION.

Introduction.

1 Definition.

CRYSTALLIZATION is the ſymmetrical arrangement of the particles of a body when it paſſes from the liquid to the ſolid form. This arrangement is determined by the mutual action of the ſmall ſolids of which the body is compoſed; and theſe ſolids are ſeparated from the liquid by their force of coheſion. Cryſtallization is one of the moſt remarkable effects of coheſion. The qualities of a ſolid in which the force of coheſion is more eaſily overcome in one direction than another; its brittleneſs, elaſticity, and ductility, depend on this arrangement of its particles.

2 Bodies which cryſtallize muſt be ſuſceptible of

Solid bodies are found either in irregular maſſes, or exhibit certain determinate forms by the proceſs of cryſtallization. Thoſe ſubſtances which are capable of aſſuming regular figures, uniformly affect the ſame form; ſubject, however, to certain deviations from the operation of particular circumſtances. Thoſe bodies only can aſſume the form of cryſtals which are ſuſceptible of being reduced to the fluid ſtate. This is the uſual method of cryſtallizing ſaline ſubſtances. The ſubſtance to be cryſtallized is diſſolved in a ſufficient quantity of water to retain it in ſolution. This is ſlowly evaporated; and as the bulk of the fluid is diminiſhed the particles are brought nearer to each other; they combine together by the force of coheſion, and form cryſtals. Some ſaline bodies, which diſſolve but in ſmall proportion in cold water, are found to be very

3 ſolution;

ſoluble in hot water. But when this water cools, it is no longer capable of holding them in ſolution. The particles then gradually approach each other, and arrange themſelves into certain determinate forms; or they cryſtallize. Many of the ſaline bodies which cryſtallize in this manner, combine with a conſiderable portion of water. This is called the *water of cryſtallization*. Other ſaline ſubſtances are equally ſoluble in hot and cold water. Theſe ſubſtances do not cryſtallize by cooling the fluid; they aſſume regular forms only by diminiſhing its quantity. This is effected by means of evaporation by the application of heat. In ſalts which are cryſtallized in theſe circumſtances, the proportion of water which enters into combination is ſmall.

4 or fuſion.

There are ſome claſſes of bodies which aſſume regular forms, but are not ſoluble in any liquid. Such, for inſtance, are metallic ſubſtances, glaſs, and ſome other bodies. Subſtances of this nature are cryſtallized, by being previouſly ſubjected to fuſion; and thus having combined with caloric, they are reduced to the liquid ſtate, and the particles being ſeparated from each other are left at liberty to arrange themſelves into regular forms, or to cryſtallize, as the body cools.

5 Conjectures about the cauſe.

But what is the cauſe which operates in determining the regular arrangement of the particles of bodies in theſe circumſtances? or what is the cauſe of the ſame bodies in the ſame circumſtances aſſuming regular figures? The ancient philoſophers ſuppoſed that the elements of bodies conſiſted of certain regular geometrical figures; but it does not appear that they applied this theory to explain cryſtallization. The ſchoolmen aſcribed the regular figure of cryſtals to their ſubſtantial forms; and others ſuppoſed that it depended merely on the aggregation of the particles, but without explaining to what this aggregation was owing, or the reaſon of the regular figures thus produced. According to Sir Iſaac Newton and the theory of Boſcovich, 6 Newton's.
the particles of bodies held in ſolution in a fluid, are arranged at regular diſtances, and in regular order; and when the force of coheſion between the particles and the fluid is diminiſhed, it is increaſed between the particles themſelves. Thus they ſeparate from the fluid, and combine together in groups which are compoſed of the particles neareſt to each other. If we ſuppoſe that the particles compoſing the ſame body have the ſame figure, the aggregation of any determinate number of ſuch particles will produce ſimilar figures. Bergman is of opinion that the particles of ſaline ſubſtances poſſeſs a double tendency: by the one they arrange themſelves in the form of ſpiculæ; and by the other, theſe ſpiculæ arrange themſelves at certain angles of inclination, and according to the difference of theſe angles, different forms of cryſtals are produced. Theſe effects are aſcribed by the ingenious author to the mutual attraction which exiſts between the particles, which, according to the peculiar figures of the atoms, at one time arranges them in the form of ſpiculæ, and then combines the ſpiculæ thus formed under different angles of inclination. But this arrangement of the particles, or tendency to arrangement, aſſigned by Bergman as a 7 Bergman's.
cauſe, is only explaining the phenomenon by itſelf; while the cauſe of the tendency is yet unexplained. Nor will Newton's hypotheſis be more ſatisfactory; for if the particles of a body, after being equally diffuſed in a fluid, are brought together by a general attraction, it will follow that every ſaline body ſhould cryſtallize in the ſame manner.

According to the ingenious theory which has been 8
propoſed by Hauy, the integrant particles always com- Hauy's.
bine in the ſame body in the ſame way; the ſame faces and the ſame edges are always attracted towards each other. But theſe faces and edges are different in different cryſtals; and hence originates that variety of forms which different bodies aſſuming regular figures by cryſtallization exhibit. But why are the ſame edges and the ſame faces attracted in the ſame way? This ſtill wants explanation. If it be aſcribed, as ſome have ſuppoſed, to a certain degree of polarity exiſting among the particles, it might enable us to account for the regular figures of bodies produced by the proceſs of cryſtallization. For by the effects of this agent we might ſuppoſe that different parts of the particles of bodies are endowed with different forces; one an attractive, and another a repulſive force; and by the action of theſe two forces, the ſame arrangement of the particles will uniformly take place; for when one part of a particle is attracted, the other will be invariably repelled; and thus the ſame faces and edges will always be diſpoſed in the ſame way. But it ought to be obſerved that the exiſtence of this power, however ſatisfactorily

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factorily it might account for the phenomena, has by no means been proved; and even if its existence were completely established, the difficulty still remains how this polarity is to be explained.

Without entering farther into these speculations, we propose, in the two following sections, to present our readers with a comprehensive view of the formation and structure of crystallized bodies. In the first section we shall treat of the phenomena of crystallization, the means of conducting this process to obtain the most perfect crystals, and the modifications of which each of the forms is susceptible. In the second we shall give a short view of the theory of the structure of crystals.

Sect. I. *Of the Phenomena of Crystallization, and the modifications to which it is subject.*

The most complete set of observations which has yet appeared on this branch of practical chemistry have been made by M. Leblanc; and to his ingenious memoir † we must acknowledge ourselves indebted for what we now lay before our readers that is new or interesting on this subject. This art, he observes, of managing or conducting the crystallization of salts, is in a great measure new; for it has hitherto attracted little attention. To insure success in obtaining perfect crystals, the process must be conducted in flat-bottomed vessels; and vessels of glass or porcelain are found preferable to those of any other materials for this purpose. The salt employed should be in a state of purity; and to favour the increase and regular form of the crystals, they are to be placed at a distance from each other in the vessels containing the solution. To these necessary precautions, it may be added, that the vessels in which the evaporation goes on should be at perfect rest, and that it is requisite to observe the density, or specific gravity, at which the solution begins to yield crystals.

† *Jour. de Physique*, tome lv. 300.

9 Conditions.

10 Preparation of the solution.

The particles of any saline body cannot come into contact and form crystals, as long as the force of affinity between these particles and the fluid in which they are held in solution is greater than the mutual affinity of the particles among themselves. A salt, for instance, which begins to crystallize at a certain specific gravity of its solution in water, will afford no crystals when that specific gravity is diminished; for then the particles of the salt are removed to a greater distance from each other; and while by this distance, the force of their mutual attraction is diminished, the attraction between these particles and the water in which they are dissolved is increased by the increase of the quantity of the solvent. But, on the other hand, if a solution which begins to crystallize at a certain specific gravity, is more concentrated, the crystals which are thus obtained are greatly multiplied, but they are heaped together in confused masses, exhibiting no regular forms. Thus, a solution which has been scarcely reduced to that degree of concentration at which it begins to crystallize, being poured while it is hot into the proper vessel for carrying on the process, or left at rest in the same vessel in which the solution is made, to cool slowly, will yield a small number of crystals, which will have no other defects than what are occasioned by their contact with the vessel. Even perfect crystals will be sometimes found among the smaller ones. When the concentration of the solution has not been carried too far, or not farther than what is effected by slow cooling, not only have the embryo crystals less bulk, but the particles having come into contact slowly and without confusion, they possess a greater degree of transparency. After a certain period, which varies according to the species of salt which is subjected to the operation, small crystals may be distinctly observed. These are to be carefully detached from each other, and placed in a different position. Being placed by this management on a different side, the defects occasioned by their contact with the vessel are soon repaired. From the crystals treated in this way, the finest and most perfect are to be obtained. This operation of changing the position of the crystal from one side to the other, ought to be repeated at least once every day, if we wish to obtain the completest crystals.

At the end of a certain period, the small crystals are to be removed, that the fluid may be more concentrated, either by a new evaporation, or by dissolving a new portion of the same salt. After the new solution has cooled, and the crystals which have formed in it are separated, if it has been too much concentrated, or too great a portion of salt has been added; the crystals of the first solution are then to be introduced and treated in the same way as formerly.

11 Management of the crystals,

When the crystals have acquired a sufficient volume to handle them and to choose such as we wish should increase to the largest size, either as simple or complete crystals, or as exhibiting varieties from position or particular circumstances, the individual crystals are then to be separated, and solutions are to be prepared for them and brought to such a degree of concentration as to afford crystals in a mass; which latter being removed, the single crystals are introduced into these solutions, which are now in a proper state to favour their increase. The crystals may be either previously disposed in the vessel, and then the solution may be poured on; or, having first introduced the latter, they may be afterwards distributed on the bottom of the vessel. And thus by continuing the same process, by taking care to change the position of the crystal from one side to the other frequently, and by keeping up the solution to a proper degree of strength, we may obtain crystals of any bulk we choose.

12 which decrease if left too long in the solution.

When the quantity of particles, which in a certain state of concentration continue to be mutually attracted, has diminished in consequence of their accumulation on the crystals which are formed, at a certain stage of this diminution the crystals cease to enlarge or increase in bulk; it happens, on the contrary, if they are left in the fluid, that they begin to dissolve. It is usually on the corners and angles that this decrease takes place; and in some salts it seems to go on piecemeal, so as to present distinct layers of the particles; for in this case lines parallel to the sides may be observed, and these are disposed like steps of stairs. Should the accident which is here alluded to be allowed to go on too far, it may often require a long time to repair it; but it is in general easy to avoid this inconvenience, by watching the progress of the operation and the increase of the crystals. If their corners or angles are observed to become less sharp, they must be removed till the fluid is farther concentrated, or they

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they must be introduced into a new solution of the same salt of the proper degree of strength. To prepare the new solution for the increase of the crystals, a quantity of the same salt is to be dissolved in a given portion of water, so that it shall be fully saturated. It is then allowed to cool and crystallize. The crystals being separated, the remaining solution is to be employed in such quantity as may be judged necessary to replace that in which the diminution of the crystals had commenced.

Sometimes it happens, from want of necessary precaution, that the new solution in which the process is to be conducted, either being too much saturated, or being disturbed by pouring from one vessel to another, exhibits many other points of attraction beside the crystals whose increase is proposed. In this case a great number of small crystals make their appearance, and cover the surface of the former with a kind of incrustation. The small crystals, provided they are taken in time, may be removed without injury to the others; if not, they will be unavoidably spoiled.

13
Their position must be changed.

When the crystals have reached such a size as that they may be placed one by one, without being in contact with each other, we must still continue frequently to change their position. This may be done with a spatula, a glass rod, or with any instrument which will communicate nothing to the fluid. In this way the sides of the crystal which are alternately in contact with the bottom of the vessel will increase in equal proportion, and it will always remain complete.

It is chiefly in salts which furnish elongated prisms that the influence of position may be most distinctly seen. If, for instance, a crystal before it has acquired much volume is found to rest on one of its bases as well as on one of its sides, it will be observed to be compressed in the direction from base to base; and it will appear to be only a regular segment of the crystal, which having been placed on one of its sides has obtained a great bulk. If we take a six-sided prism whose summits are obliquely truncated, and if it be placed on one of its sides, it will enlarge in a greater or less degree, but always in such a manner that the distance from one base to the other shall never be less than the distance between the sides. But if the position be on one of its bases, then its principal increase will be in the direction of the sides, and it will appear to be compressed between the bases. At first sight, a crystal treated in this way will seem different from the former. For the corners form the summit of apparent pyramids which are separated by a four-sided prism. This circumstance affords a sufficient explanation of one of the causes which produce varieties in the appearances of a crystal with regard to its relative extent; it shows that there is no foundation for the opinion of a supposed balance between the particles of the salt and that of the solvent; and it shows also, that if the force of attraction be the efficient cause of the saline particles coming into contact, the force of gravitation acts at the same time, and modifies in a greater or less degree the effects of the first.

According to these observations, and the different states in which crystallized substances are found, it has been supposed that we might conclude, that the force of adhesion between the particles of the salt and those of the solvent, varies according to circumstances which depend on the degree of tendency to combination between the bodies, and the relative weight or bulk of the parts of which these bodies are composed. If a crystal in the incipient stage of its increase be placed on one of its bases, it enlarges in the direction of its sides; but if it be reversed and placed on one of its sides, it enlarges in the dimensions of an elongated prism.

An insulated crystal, placed on one of its sides on a smooth surface, and left undisturbed to enlarge in size, presents on this part a kind of hollow, which corresponds exactly with the side which it replaces. Here the saline particles which cannot reach this surface, are distributed on the neighbouring parts with which they come in contact, with this circumstance, that the edges of the surface on which the crystal rests increase in proportion, but without allowing the liquid to have access to this surface.

The hollows which are formed at the surface of liquids differ sometimes from each other even in the same salt. If we suppose that a particle forms the incipient point of the hollow, the latter will assume a configuration corresponding to the side of the particle presented to the surface of the liquid: but the part which it touches increases also; and if by any circumstance a change of position happens, the hollow, thus necessarily formed according to the arrangement of the part which corresponds exactly to the surface of the liquid, will change its form, because the new position of the side presented differs from the first.

When a neutral salt, in a state of purity, and after being crystallized, ceases to produce any effect on vegetable blues, it is not supposed that any of its constituent principles is in excess. But if in this state it is found to combine with other bodies, in such a manner as to produce solid and well defined crystals, we must admit that there exists an affinity between the salt and the body with which it has combined. 14

This subject, Leblanc observes, of the supra-composition, or compound combination, as it might perhaps be called, of which several salts are susceptible, has not hitherto much occupied the attention of chemical philosophers. Some indeed have been pointed out by Bergman and others: but it has been remarked that these affinities are probably much more extensive than has been supposed; and not only with regard to neutral salts with each other, but also neutral salts with other bodies. Of this kind of combination is not to be reckoned that of one of the constituent parts of a salt being in excess, which frequently takes place in some salts, and is found to be more or less permanent. This circumstance seems to prove that certain salts have two different points in the combination of their constituent parts. Let us see what has been observed in this respect of the sulphate of alumina, which will perhaps explain the reason that this salt is almost always found in nature in the acidulous state. It is found that the more that alum approaches to the state of saturation by an additional portion of base, the less solid the new combination becomes; and in all cases, after a certain time, which is longer or shorter according to circumstances, the portion which was added separates. It will perhaps appear in the sequel, that this tendency to combination which is constantly in action, producing an immense multitude of different individuals, resides not only among the properties of the simple principles,

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ciples, but alfo in thofe which belong to all the compounds.

Many of the fulphates are always found in the acidulous ftate; and all of them feem to be fufceptible of combination with a new quantity of the fame bafe, till they reach the point of faturation. For example, the fulphate of copper, in the ftate in which it is ufually found, cryftallizes in eight-fided, oblique prifms, terminated by fides according to the obliquity of the prifm. But if another portion of bafe be added, the cryftals affume the form of pyramids of feveral faces, feparated by a four-fided prifm. The acidulous fulphate of zinc gives cryftals of fix-fided prifms, which are often very regular; but an addition of bafe produces a great change, for then the cryftals are in the rhomboidal form, very little different from the cube. Alum in its ordinary ftate of combination cryftallizes in the form of a regular octaedron; but in the intermediate proportions between this ftate and that of faturation, it affumes the form of a cube.

Hauy, as will be afterwards noticed, has demonftrated that the form of the primitive molecules is the fame in all cryftals of the fame falt, and he has fhown by calculation that the variations arife from the laws of decrement in the layers which furround the nucleus; but that the order according to which the fecondary forms are produced may be interrupted, whether this form be complete or not; and the cryftal may then, according to circumftances, return to its primitive form, or to fome of thofe which are derived from it. But from the experiments of Leblanc, he thinks that thefe changes always depend on new conditions in the ftate of the fluid, as a different proportion of the principles of which the falt is compofed.

15 Cryftals modified by the folution.

If a cryftal of octaedral alum be placed in a folution which forms cubic cryftals of the fame falt, the former will affume the cubic form, by giving up a feries of molecules from the fummits of the folid angles, fo that the layers continue to decreafe on the triangular faces till the cryftal has completed its new form. In this procefs, the change may be ftopped at any period, and cryftals of every modification of form may be obtained. From this it follows, that the centre of each of the faces of the octaedron correfponds to a folid angle of the cube in which it is infcribed. But if a cubical cryftal be introduced into the folution which yields the octaedron, its return to this latter form proceeds in the fame order, by the fubtraction of a feries of molecules from the folid angles of the cube. It often happens, however, at the fame time, that the fubtraction of the molecules extends to the corners of the cryftal; fo that the layers of fuper-pofition decreafe all at once, according to the order of the formation of the octaedron, and the dodecaedron with rhomboidal furfaces. This circumftance feems to fuggeft the poffibility of obtaining cryftals of alum of this latter form; but it feems to depend on a particular proportion which is not eafily determined.

Thus we learn from experiment that falts which exhibit different forms of cryftals can be made to affume each of thefe at pleafure. This phenomenon, which has not been much attended to, feems to merit particular inveftigation. The tranfition from one form to another may be explained according to the laws of diminution, by the fucceffive and regular fubtraction of feries of molecules; fo that the form actually obtained, the reftoration of the preceding form, is eafily explicable on the principle of reftitution alone. It may be obferved that during this kind of metamorphofis, both operations, namely that by which the cryftal receives on the one hand a new form, and that by which on the other hand it increafes on all its fides, conftantly take place.

16 Cryftals differently affected at different heights in the fluid.

The particles of a falt which are in folution in a fluid, are attracted by it, particle by particle, without any feparation or decompofition; but it is neceffary that there be a balance of the attracting forces between the falt and the folvent. This is demonftrated by the following experiment. A veffel two feet high and two inches in diameter was filled with a folution of a proper degree of concentration for the growth of cryftals, which were fufpended at different heights from the bottom of the veffel to the furface of the fluid; and it was obferved that the increafe of the cryftal was in proportion to its depth in the veffel, that which was neareft the bottom increafing moft rapidly. When the liquid was deprived of faline particles by their accumulation on the cryftals, by reft, and fometimes even by the influence of the atmofphere, the cryftals decreafed by fimilar gradations to thofe of their increafe; fo that it at laft reached that ftate when the cryftals near the furface of the liquid were diffolved, while thofe towards the bottom continued to increafe; and fometimes it happened that the cryftals at the bottom of the veffel continued to increafe on the furface which was in contact with it, while the oppofite upper furface was in a ftate of diffolution.

All the experiments which were made on falts of different degrees of fpecific gravity accord with this obfervation; and the difference in the degrees of faturation of the waters of the ocean, which depends on the difference of depth, feems to be in favour of this opinion. It is confirmed by the analyfis of fea-water by Bergman and others, which was taken up in different places and at different depths. It receives ftill farther confirmation from a practice of the inhabitants of Salies in Bearn in eftimating the degree of ftrength of a falt fpring. An egg is thrown into the waters of the fpring, and the whole water which covers the furface of the egg is thrown away, as it is not of a fufficient degree of concentration.

It is well known that a cold temperature is moft convenient for the cryftallization of falts. But it is not at the period when the falt begins to cryftallize that it is moft convenient to carry on the procefs; for then it fometimes happens, from too great concentration of the fluid, that the cryftallization is too rapid and confufed.

17 Two claffes of faline fubftances.

Hitherto faline fubftances which are fufceptible of regular cryftallization have been divided into two claffes, according to the peculiarities in the formation of their cryftals. The one clafs comprehends thofe cryftals which are formed by cooling the fluid in which the folution is made. The other clafs includes thofe which are produced only during the evaporation of the folution. This diftinction is no doubt well founded; but there are fome exceptions to it which are neceffary to be attended to in conducting the procefs of cryftallization. If a faline folution which is too much faturated be cooled, it furnifhes a mafs of cryftals which

which are confused and irregular, and which present no determined form except on those sides which are in contact with the liquid. If in this state the remaining liquid is poured off, it will yield another set of crystals, but in very small number; and there are some salts which continue to form crystals after being several times successively treated in this way, the number of the crystals still diminishing from the first degree of concentration. It will be found too that this will take place whether the process be carried on in the open air or in close vessels. It follows from this that the increase or the formation of crystals, in this case, depends solely on the mutual attraction of the particles, or on the attraction between the particles and the crystal; an attraction or affinity which is not destroyed by the cooling of the fluid, but is probably regulated by the distance of the particles, and the degree of force or affinity which exists between the particles and the solvent. In some saline solutions the increase of the crystals goes on in this manner for a long time. It is only in the interval between the cooling of the liquid to the temperature of the atmosphere, and that period when its degree of concentration is so diminished that the increase of the crystals ceases, that the latter proceeds with that degree of perfection of which it is susceptible.

18 Some saline solutions attract moisture.

It is not a property peculiar to dry substances to absorb moisture from the atmosphere. Liquids saturated with certain salts seem also to possess this property; for in some saline solutions, the liquids assume a solvent power which never fails to attack the crystals, and not only to prevent their increase, but to diminish the bulk which they had acquired. This accident can only be obviated by regulating the state of the atmosphere in which the evaporating vessels are placed, and preserving it free from an excess of moisture. From causes which produce a contrary effect, the evaporation becomes too rapid; this circumstance also requires to be attended to, and properly regulated, to ensure the full success of the operation.

From the preceding observations it will appear, that solutions of salts which are susceptible of crystallization have certain degrees of concentration which are necessary for the formation of crystals; and that they must be reduced nearly to that degree in which they begin to yield crystals, before it can be expected that they afford proper results. It is therefore necessary to attend particularly to the degree of concentration which each salt requires for the regular formation of its crystals, and to obtain them with that degree of transparency of which they are susceptible. We have seen that in the formation of crystals they may be removed from one vessel to another, and from one solution to another; and that in proportion to the slowness of the process they become more beautiful and more perfect. These operations, it may be added, require much patience and attention, but at the same time the observer is fully compensated for his trouble, by perceiving the progress of the crystallization, and by the interest which is excited in all its stages.

It is essential to know that neither the crystals formed during the artificial evaporation, nor those which are produced during the cooling of the solution, are proper to be made choice of for being increased and brought forward to the most perfect crystals. When a solution has become cold, that is to say, when it has acquired the temperature of the atmosphere, and it is deprived of the excess of saline particles which it held in combination during its increase of temperature, it is still in a condition to yield crystals, and as long as the distances between the particles are not too great to allow of mutual attraction. A solution saturated to excess affords on cooling a confused mass of crystals; but after the fluid is poured off, it will still produce more crystals, but in smaller number. The degree of concentration of the solution before it yielded the last product may be considered as the term of saturation most proper to be employed for the species of salt which is thus treated. But by the repetition of these operations, and the observation of their progress, it will not be difficult to discover the proper proportions between the salt and the solvent.

It seems to be a mistake to suppose, with some, that the crystals which are placed in favourable circumstances to become larger and more perfect, are injured by coming in contact with each other during their increase. It is undoubtedly better that they should be kept separate; but it does not appear that they are hurt by touching each other, if the number in the vessel be not too great, and they are not heaped or pressed together. In that crystallization which results from the cooling of a solution too much saturated, the crystals are always confused and interlaced with each other; and the molecules which are arranged in this kind of disorder experience a kind of irregular distribution; and it may be observed, that in this case the summits only of the crystals which are elevated from the kind of cake which is formed on the surfaces of the vessel containing the solution, present regular and determined forms. The mass in which these crystals are implanted is a confused heap.

No cavities have been observed on the faces of crystals, excepting those which are formed on the surface of fluids. Those which are produced on that side of a crystal which rests on the bottom of the vessel are more common in other salts. This phenomenon seems to merit more attention than has yet been bestowed upon it; as it explains easily the introduction of extraneous bodies which are sometimes detected in the interior of crystals. For when a cavity of this kind has acquired a certain depth, it is capable of receiving part of any foreign substance, and to be filled up by the change of position of the same crystal, retaining at the same time the extraneous matter. By a little art and dexterity, these fortuitous circumstances may be favoured, so that phenomena exhibited by such occurrences may be traced and observed at the pleasure of the operator. Experiments have been made with the view of ascertaining whether an extraneous substance could be substituted as the nucleus of a crystal; but from the result of these experiments, it does not appear that the particles of any salt have a tendency to combine with any foreign matter, and to form regular crystals. The portions of the salt which were attached to the extraneous substance were always separate and independent crystals.

19 Cavities on crystals.

There are some saline substances which retain in their solution an excess of particles even after cooling, and which being strongly agitated instantly deposit a great number of small crystals which render the solution

tion turbid. The introduction of cryſtals of the ſame ſalt, it is well known, as in the caſe of a ſolution of Glauber's ſalt, promotes this ſudden cryſtallization or ſeparation of the exceſs of the ſalt. If, in this ſtate of the ſolution, cryſtals are immerſed with the view of having them large and regular, they are certain of being ſpoiled by the accumulation of a great number of ſmall cryſtals on their ſurface, unleſs the precaution of immediately waſhing them with pure water when this happens is obſerved.

It may be remarked alſo that when the ſolution is diminiſhed below a certain degree of ſaturation, the cryſtals not only ceaſe to increaſe, but are alſo again in ſome meaſure diſſolved; the corners and angles reduced and rounded. And if the cryſtals in this ſtate be introduced into a ſolution of ſufficient ſtrength to promote their increaſe, ſupernumerary faces and truncatures, as they are denominated in technical language, are formed on the rounded corners and angles. But theſe faces always diſappear as the increaſe of the cryſtals proceeds, and are replaced by corners and angles which become at laſt ſharp and diſtinct.

By attention to preſerve the ſolutions of ſalt in perfect purity, we ſhall be more certain of obtaining the moſt beautiful and tranſparent cryſtals. Some fluids, after a certain time, are obſerved to depoſit ſubſtances which are foreign to the ſalt held in ſolution, and were diſſolved along with it. Theſe ſubſtances ſometimes appear in the form of earthy matters, which precipitate to the bottom of the veſſel; in other caſes they are diffuſed in the form of flakes, and ſometimes they riſe and ſwim on the ſurface. In all theſe caſes, the cryſtals whoſe formation and increaſe are going forward muſt be removed, and the liquor muſt be filtrated before they are replaced.

20 Variations in cryſtals from changes in the ſolution.

A ſaline ſubſtance, which is capable of cryſtallization, poſſeſſes, in the ſtate of minute diviſion in which it is in ſolution, or in the condition of the molecules which compoſe it, a determined property which is uniform and conſtant, in which reſides eſſentially the power of uniting in a certain ſymmetrical manner, and thus conſtructing regular ſolids. The reſults alſo are uniform and conſtant when the proceſs is carefully conducted; but it is neceſſary to diſtinguiſh with accuracy the circumſtances which accompany the operation, and may occaſion a deviation from this uniformity. The ſulphate of iron, for inſtance, uſually cryſtallizes in the form of rhomboids; but ſometimes it has been found to aſſume that of an irregular octaedron. And although it may be true that an elongated octaedron may be claſſed with priſmatic cryſtals, it does not on that account belong leſs to the octaedral form; but it ſeems probable that theſe different varieties, in the forms of cryſtals, depend on ſome changes which take place in the ſolutions themſelves. The iron in the preſent caſe is conſtantly receiving new portions of oxygen from the atmoſphere, and in this new combination it is precipitated in the fluid: this, therefore, occaſions a change in the conſtituents of the ſalt.

Several ſulphates are found to combine readily with each other: thoſe of iron and copper are of this deſcription; and the reſult of this compound cryſtal is always a rhomboid. It ſeems to be doubtful whether this ſhould be conſidered as a caſe of ſimple interpoſition of one ſalt with the other.

When a liquid, which holds ſaline bodies in ſolution, is evaporated to a certain degree, a cruſt forms on the ſurface, acquires a certain thickneſs, and when this is removed, it is renewed. The point at which the liquid exhibits this appearance is known in chemiſtry, by the appellation of *evaporation to a pellicle*. When it has reached this point, the ſolution is in a ſtate of complete ſaturation; and the ſmalleſt additional quantity of fluid cannot be withdrawn without a correſponding quantity of ſalt aſſuming the ſolid form. On this principle Robinet has attempted to account for the formation of *dendrites*, or the arboreſcent appearance and efflореſcence of ſome ſalts. Almoſt all the different ſpecies of fucus or ſea-weed, he obſerves, are covered, in drying, with an efflореſcence of white matter. In ſome ſpecies, this white matter was obſerved to poſſeſs a ſaccharine quality. A number of large roots of the *fucus palmatus* was hung up in the ſhade, and ten days had elapſed without the appearance of any thing on the ſurface. After that period it became white, and it was ſoon covered with a light downy ſubſtance, the filaments of which gradually increaſed to a conſiderable length. When this downy matter was bruſhed off with a feather, it was renewed till the plants were completely dry. This ſubſtance, it appeared on examination, was of a ſaccharine nature, mixed with a ſmall portion of common ſalt, and a great quantity of mucilaginous matter. By ſolution and cryſtallization the ſugar was ſeparated from the other ſubſtances.

21 Formation of dendrites.

In comparing the circumſtances of this efflореſcence with thoſe of the formation of the pellicle, in the progreſs of evaporation, the former ſeems to be a modification of the latter. In a veſſel which contains a liquid ſaturated with a ſalt, the ſurface ſubjected to evaporation has no ſooner aſſumed a ſolid form, than the ſurface immediately inferior is expoſed to the action of the ſame cauſes, and produces the ſame effect; and this effect continues till this cruſt has become ſo thick, or ſo compact, as to prevent the contact of air, and then the evaporation ceaſes. But, on the contrary, in the fucus, the air acting only on the ſurface of the plant, the liquid which it contains cannot undergo the proceſs of evaporation, without coming to the ſurface. The attraction of the matter of the plant tends to promote this motion; for as the liquid is equally diffuſed through its whole maſs, it riſes conſtantly to the ſurface, in proportion as this ſurface is dried by the ſurrounding air; and it would appear that this is the proceſs in the deſiccation of all thick and maſſy bodies. Now, the ſaline matter which, in the preſent caſe, is in the ſtate of efflореſcence, having the ſame power of attraction on the liquid, the rudiments of each filament conſtitute, at the inſtant of their formation, part of the whole maſs or body of the plant. They participate, therefore, of the ſame degree of moiſture as that of the plant, and it is on their ſurface that the evaporation and cryſtallization of ſaline matter chiefly take place.

The mechaniſm of the dendritical or arboreſcent form of ſaline bodies ſeems to be in this way capable of explanation. The whole ſaline maſs, which extends to the edges of the veſſel, and even redeſcends externally, is conſtantly in the humid ſtate, as long as any liquid remains in the veſſel. It may be ſuppoſed, that

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that the matter of the ſides of the veſſel determines, by its attraction, the external circle of the ſurface of the liquid to riſe above the ſurface; a phenomenon which is ſufficiently obvious, but eſpecially in narrow veſſels. This portion of liquid, which is more completely ſubjected to evaporation, gives origin to a circle of ſaline matter, which appears thus raiſed above the ſurface of the liquid, and which, being the firſt rudiments of the dendrites, contributes afterwards to its increaſe, in the way which has been already explained. Thus the vegetation of ſalts bears a ſtriking reſemblance to the proceſs of efflorefcence, or the formation of the downy matter on the ſurface of the fucus.

22 Effloreſcence.

There is yet another kind of cryſtallization which ſeems to depend on the ſame cauſe. This is the ſaline effloreſcence, which occurs in different places on the ſurface of the globe, and is frequently in ſuch quantity as to become an important object of manufacture. Without extending our obſervations to the effloreſcence of ſoda on the ſurface of the ſoil in Egypt, or that of nitre in Aſiatic countries, we may refer to the production of muriate of ſoda, or common ſalt, in different parts of Europe, in thoſe places which are covered with the waters of the ocean during high tides. The waters of the ſea with which the ſandy ſhores are twice periodically moiſtened in the courſe of the month, are far diſtant from the point of ſaturation which determines cryſtallization. They rarely contain more than 3 parts of ſalt in 100; and the ſand at the degree of moiſture in which it is left by the ſea, is not impregnated with a ſufficient quantity of ſaline matter to be worth the labour of manufacturing; but, during the interval between the tides, theſe circumſtances are greatly changed. The dry air of ſummer, by evaporating the moiſture on the ſurface, allows the matter of the ſand to attract towards the ſurface a ſimilar portion of water, which was in the lower part of the ſoil, and which always tends to diffuſe itſelf equally through the whole maſs. This liquid, carrying with it the ſalt which it holds in ſolution, increaſes the quantity of ſaline matter which exiſts on the ſurface. This proceſs continues without interruption, as long as there is no fall of rain. It reaches at laſt a certain point, at which the water ſubjected to evaporation is ſaturated with the ſalt; and this proceſs cannot proceed farther without the depoſition of cryſtals of the ſalt, which diſcover themſelves by their ſhining appearance. After ſome days, the ſand on the ſurface is collected, and about ſix times the quantity of ſaline matter is found in the ſame proportion of ſand, when it was firſt moiſtened by the ſea water (A).

23 Cruſt on the bottom of veſſels.

Another phenomenon which takes place during the proceſs of artificial evaporation, ſhould not paſs unnoticed. This is the formation of a ſaline cruſt at the bottom of the veſſels in which the proceſs is conducted. This ſeems to be the immediate effect of ebullition; for when the temperature of the liquid is kept under the boiling point, no ſuch effect is produced. This cruſt is compoſed of all the ſaline ſubſtances which are held in ſolution in the liquid; and even theſe ſubſtances are found combined in the ſame proportion in which they actually exiſt in the ſolution. Whatever be the attraction of theſe ſubſtances for water, or even if they poſſeſs a deliqueſcent property, they are not leſs diſpoſed to enter into combination during the formation of the ſolid cruſt on the bottom of veſſels in which the proceſs of evaporation is conducted with a temperature equal to the boiling point. A ſlight degree of attention will ſatisfy us, that the formation of this cruſt depends on the particular circumſtances of the evaporation in the caſe of ebullition. It muſt be obvious, that in this caſe the ſtratum of liquid which is in immediate contact with the veſſel, receives the caloric which penetrates its ſides, is charged with it beyond its capacity, changes its ſtate, and aſſumes the gaſeous form, and by this change having entirely loſt its ſolvent power, whatever ſaline matter is held in ſolution muſt aſſume the ſolid ſtate in contact with the ſides of the veſſel, and conſequently adhere to it. Thus it happens, according to a very judicious obſervation, that in different ſaline ſolutions, the reſults of which have been compared, theſe ſcales or cruſts are more abundant in proportion as the degree of ſaturation is leſs *.

* *Jour. de Phyſ.* lviii. 124.

24 Microſcopical cryſtals.

To theſe obſervations we ſhall only add a ſhort account of the phenomena of cryſtallization, as they were obſerved, with the aſſiſtance of a microſcope, by Mr Baker, and of the appearances of different ſaline bodies which he has deſcribed. This will not afford any ſcientific information to the philoſopher, but it may perhaps be the ſource of amuſement to ſome of our readers, and the means, by a minute obſervation of the phenomena, of leading to ſome uſeful diſcoveries. The method which he followed in conducting theſe experiments, is the following. The ſubſtance to be examined is to be diſſolved in a quantity of pure water, ſo as to be completely ſaturated. For ſalts of eaſy ſolubility, cold water may be employed; but for ſalts which are diſſolved with more difficulty, hot or boiling water may be found neceſſary. In preparing the ſolution, the ſame rule may be obſerved as in preparing ſolutions for obtaining large cryſtals, which has been given in the former part of this ſection. The ſolution ſhould be allowed to remain at reſt for ſome hours, ſo that the firſt cryſtallization, if too much ſaline matter has been added to the liquid, may be allowed to take place. Thus the ſolution will be always of the ſame ſtrength, and the ſame appearances may be uniformly expected.

When the ſolution is thus prepared, a drop of it may be taken up with the point of a quill, cut in the form of a pen, and placed on a flat ſlip of glaſs, ſpreading it on the glaſs with the quill till the liquid is ſo ſhallow as to riſe very little above its ſurface. It is then

(A) Common ſalt is manufactured in this way on the ſandy ſhores of the Solway Frith, in Annandale, in Scotland. Theſe flat ſhores are covered with the waters of the ocean during ſpring tides; and in the interval of theſe tides the evaporation by the heat of the ſun and the action of the air is ſo conſiderable, as to leave the ſand impregnated with a quantity of ſalt, ſufficient to defray the expence and trouble of manufacturing it by filtration and boiling.

Phenomena.

then to be held over the clear part of a moderate fire, or the flame of a candle, and ſuch a degree of heat applied as is found from experience to produce the neceſſary evaporation. This will be known by obſerving the formation of ſaline particles at the edges of the drop of fluid. The microſcope being previouſly adjuſted, and a magnifier of a moderate power being fitted on, the ſlip of glaſs is to be placed immediately under the eye, and brought exactly to the focus of the magnifier. After running over the whole drop, the attention is to be directed to that ſide on which the proceſs of cryſtallization firſt commences, and proceeds from the circumference towards the centre. The motion is at firſt ſlow, if too much heat has not been applied, but becomes quicker as the evaporation continues. In ſome cryſtallizations the configurations are produced towards the end of the proceſs with great rapidity, and exhibit an elegance, order, and regularity, which imagination only can conceive. When this rapid action has once begun, the eye muſt be kept fixed on the object, till the whole proceſs is completed, becauſe new forms appear, quite different from thoſe which were firſt produced, and which have been properly aſcribed to a quantity of different ſalts mixed with the ſubſtance to be examined, when the precaution has not been uſed of having it in a ſtate of purity. When the configurations are fully formed, and the water evaporated, ſuch ſalts as are deliqueſcent, it is ſcarcely neceſſary to obſerve, are ſoon deſtroyed by attracting the moiſture from the air; but thoſe which are more permanent, and not diſpoſed either to deliqueſce or to be deprived of their water of cryſtallization, may be preſerved, by being encloſed between glaſſes, for a long time, as amuſing objects for the microſcope. To make the liquid ſpread readily on the glaſs, the ſurface of it may be moiſtened with a little of it, and rubbed with the finger. In this way, the repulſion which ſometimes is obſerved between the liquid and the glaſs is completely removed. During the evaporation, the object-glaſs of the microſcope is ſometimes obſcured by the condenſation of the water from the ſaline ſolution on the ſlip of glaſs, and the viſion is thus rendered indiſtinct. When this happens, if the circumſtance be recollected, the glaſs muſt be wiped and replaced. In examinations of ſaline ſolutions, and in obſerving the progreſs of cryſtallization, Mr Baker recommends the light of a candle in preference to the light of day, which latter being of a whiter colour and nearly the ſame with the tranſparent cryſtals, they are leſs diſtinctly ſeen than with the brown light of a candle.

Plate CLXV.

Fig. 1. is a repreſentation of the microſcopical cryſtals of *nitre* or *ſaltpetre*. They begin to ſhoot out from the edges with very moderate heat into flat figures of different lengths, with ſtraight parallel ſides, and exceedingly tranſparent. They appear in different ſtates of their progreſs at the letters, *a*, *b*, *c*, *d*, and *e*; *a* exhibits the appearance when they firſt begin to form. When a number of cryſtals have made their appearance they ſometimes diſſolve under the eye, and diſappear entirely; but, by continuing to watch the changes which go on, the proceſs is frequently obſerved to recommence, and new ſhoots puſh out. The firſt cryſtals ſometimes become larger without undergoing any change of figure; and ſometimes form in the way which is repreſented in the figure. When the heat is too great, as might be expected the proceſs goes on with great rapidity, and numerous ramifications are formed. This ariſes no doubt from the confuſed cryſtallization.

Fig. 2. ſhews the microſcopical cryſtals of *blue vitriol* (ſulphate of copper), which appear firſt round the edges, ſhort at the beginning, but gradually increaſing, as they are repreſented at the letters *a*, *b*, *c*, which denote their difference of form, and the progreſs of their growth. Theſe cryſtals, which are tranſparent, aſſume a ſolid regular form, and reflect the light from their poliſhed ſides and angles. As the evaporation proceeds, a great number of filaments as fine as hairs make their appearance, ſome croſſing each other, as at *d*; and others exhibiting a ſtellated form with many radiations, as at *e e*. The cryſtallization of this ſalt proceeds ſlowly. Towards the end of the proceſs the regular cryſtals appear, and are finely branched as at *f*.

Fig. 3. is a view of the cryſtals of diſtilled verdigriſe, or acetate of copper. When it is immediately applied to the microſcope, the regular figures 1, 2, 3, 4, 5, 6, 7, make their appearance; but if the ſolution is allowed to remain at reſt for a few hours, and a drop of it is then heated on a ſlip of glaſs till it begins to concrete about the ſides, ſharp-pointed, ſolid figures are formed, and ſhoot forwards. Theſe cryſtals are often ſtriated obliquely, frequently ariſe in cluſters, or ſhoot from a centre. Sometimes, towards the end of the proceſs, and in the middle of the drop, they aſſume a foliated form, and have the appearance of four leaves of fern united by their ſtems.

Fig. 4. ſhews the microſcopical cryſtals of alum. Theſe are more or leſs perfect according to the ſtrength of the ſolution, and the temperature employed. To prepare this ſalt for examination, the ſaturated ſolution may remain for ſome days. In that time cryſtals will form, and if what remains liquid ſhould be found too weak, heat may be applied, which will again diſſolve the cryſtals.

In fig. 5. is a view of the cryſtals of borax, or the ſubborate of ſoda. The drop of this ſolution ſhould not be held too long over the fire, as it hardens on the ſlip of glaſs, and no cryſtals appear. A briſk heat for about a ſecond is recommended as the beſt method. It is then applied to the microſcope, and the cryſtals will form as in the figure.

Fig. 6. ſhews the microſcopical cryſtals of ſal ammoniac, or muriate of ammonia. Great numbers of thick, ſharp, and broad ſpiculæ ſhoot from the edges, and from their ſides are protruded others of the ſame form, which are parallel to each other, but perpendicular to the main ſtem. The formation of theſe cryſtals, unleſs the heat employed be very moderate, is very rapid.

Fig. 7. exhibits the appearance of the cryſtals of acetate of lead (ſugar of lead). After a little of this ſalt is diſſolved in hot water, and allowed to remain at reſt for a ſhort time, it is fit for being examined with the microſcope. A drop of it put on a ſlip of glaſs, and heat being applied, will be ſeen forming round the edge, a regular border of a clear and tranſparent ſubſtance, which with a ſtrong heat runs over the whole of the drop, and hardens on the glaſs; but when the heat employed is moderate, bundles of lines, ar-

ranged

Structure of Cryftals.

ranged in a radiated form, make their appearance. They arife from points in the interior edge of the border, and fpread out nearly at equal diftances from each other, in all directions.

In fig. 8. are reprefented the cryftals of Glauber's falt (fulphate of foda), which affume the form of ramifications, proceeding from the fide of the drop, like the growth of minute plants. Other appearances prefent themfelves in different periods of the procefs. It is indeed but of fhort duration, for when the cryftallization has once begun, it goes on with great rapidity.

The examples which we have now given will, we apprehend, be fufficient to enable thofe who are curious in microfcopical obfervations, to profecute refearches of this kind. Many more might have been given from the fame author; but as experiments on cryftallization, conducted in this way, are little fufceptible of accuracy or precifion, we wifh to avoid fwelling out the article without conveying fome ufeful information. Our chemical readers will readily perceive, that very different appearances will be the refult of a flower or more rapid cryftallization, greater or lefs purity of the falt, and different degrees of ftrength of the folution. In compound bodies, for inftance, modifications in the form of the cryftals, are produced by a difference in the proportion of the conftituent parts. The cryftals of alum, which is a triple falt, viz. a fulphate of alumina and potafh, are in the form of octahedrons. The addition of a quantity of alumina changes the form of the cryftals to that of cubes; and if a cubic cryftal of alum be introduced into a folution, the proportions of which afford octahedral cryftals, the cubic cryftal will affume the form of an octahedron, and the octahedral cryftal put into a folution which affords cubic cryftals, paffes into that of the cube. The nature of the folvent alfo, in which the cryftallization takes place, produces certain deviations in the form of the cryftals. The folution of common falt in water affords cubical cryftals, but in urine it cryftallizes in the form of octahedrons. Muriate of ammonia diffolved in water, cryftallizes in the form of an octahedron, but in urine it affords cryftals in the form of cubes. But we now proceed to confider the theory of the ftructure of cryftals, which will be the fubject of the next fection.

Sect. II. *Of the Theory of the Structure of Cryftals.*

In the former fection we have given a view of the phenomena of cryftallization. The regular forms which bodies affume by means of this procefs, have occupied no fmall fhare of the attention of naturalifts and chemical philofophers. The refearches and inveftigations of Bergman, Romé de L'Ifle, and Hauy, have been particularly directed this way. Bergman, in his 12th Differtation *, treats of the variety of the forms of cryftals, of the various figures derived from the fpathaceous form, of the ftructure of the moft minute parts, and of the different modes in which cryftals are generated. Romé de L'Ifle has arranged cryftals into fix fpecies, derived from the varieties of form. 1. Tetrahedron. 2. Cube. 3. Octahedron. 4. Parallelopiped. 5. Rhomboidal octahedron. 6. Dodecahedron. But the ingenious refearches of Hauy on this fubject have been followed by the completeft and moft fuccefsful inveftigation of the theory of the ftructure of cryftals which has yet appeared. Of this theory, an account of which the reader will find in the *Annales de Chimie* †, and in his *Traité de Mineralogie* ‡, we now propofe to give a comprehenfive view.

Structure of Cryftals.

* *Phyfic. & Chemic. Effays.*

† Vol. xvii.
‡ Vol. i.

This theory, the author obferves, cannot be fully underftood without the aid of analytical calculations. For befide the convenience of analyfis, including in the fame formula a great number of different problems, it is by means of it alone, that the theory can affume the character of abfolute certainty in arriving at the fame refults which are obtained by obfervation. But notwithftanding thefe confiderations, it feemed to be better for thofe who had not a competent knowledge of the fcience of calculation to prefer the method of fimple reafoning, but accompanied with geometrical figures, which are fo ufeful in giving a diftinct conception of the arrangement of the fmall folids which combine together to form a cryftal. This arrangement is denominated *ftructure*, in oppofition to the term *organization*, which expreffes the more complicated mechanifm of vegetables and animals. This method may perhaps be lefs direct, and lefs precife and expeditious, and it may require attention to thofe details which are paffed over in the analytical method to reach its object more fpeedily; it has, however, this advantage, that the mind by its means perceives better the connexion of the different parts under confideration, and can more eafily comprehend the facts with which it is furnifhed.

I. Mechanical Division of Crystals.

The fame mineral fubftance, it is known, is fufceptible of feveral different forms, well defined, fome of which do not appear, at firft fight, to have any common point of refemblance to indicate their relation. If, for inftance, we compare the regular hexahedral prifm of calcareous fpar with the rhomboid of the fame mineral (B), whofe large angle is about $101\frac{1}{2}°$, we

(B) The name of *rhomboid* is given by the author to a parallelopiped *a*, *e* (fig. 12.) terminated by fix equal and fimilar rhombufes. In every rhomboid, two of the folid angles, fuch as *a*, *e*, oppofed to each other, are formed by the junction of three equal plane angles; each of the fix folid angles is formed by a plane angle equal to each of the three preceding, and by two other angles of a different meafure, but equal to each other. The points *a e* are the fummits, the line *a e* is the axis. In any one of the rhombufes *a b*, *d f*, which compofe the furface, the angle *a* contiguous to the fummit, is called the fuperior angle; the angle *d* the inferior angle; and the angles *b* and *f* are the lateral angles. The fides *a b*, *a f* are the fuperior edges, and the fides *b d*, *d f* the inferior edges: *b f* is the horizontal diagonal, and *a d*, the oblique diagonal. The rhomboid is obtufe or acute, according as the angles of the fummits are obtufe or acute. The cube is the limit of the rhomboids.

we ſhould be led to believe that each of theſe two forms is quite diſtinct from the other. But this point of relation, which eſcapes notice, when we conſider only the external form, becomes ſenſible when we attend to the intimate mechaniſm of the ſtructure. Here the author gives a hiſtorical view of the progreſs of his reſearches, and traces the ſteps which led him to the diſcovery of what became as it were the key of his whole theory.

He had in his hand a hexahedral priſm of calcareous ſpar, ſimilar to that mentioned above, and which had been detached from a group of the ſame cryſtals. The fracture preſented a very ſmooth ſurface, ſituated obliquely, like the trapezium *pſut* (fig. 9.), and which had an angle of 135°, both with the remainder *abcsph* of the baſe, and with the remainder *tuef* of the plane *inef*. Obſerving that the cuneiform ſegment *psutin* which this fracture ſeparated from the cryſtal, had for its vertex one of the edges of the baſe, namely the edge *in*, he attempted to ſeparate a ſecond ſegment in that part to which the contiguous edge *cn* belonged. For this purpoſe he employed the blade of a knife, directed with the ſame degree of obliquity as the trapezium *pſut* and aided by the ſtroke of a hammer. This attempt failed; but having tried the ſame operation towards the next edge *bc* a new trapezium ſimilar to the firſt came into view. The fourth edge *ab* reſiſted the inſtrument, but the following, *ah*, readily yielded to mechanical diviſion, and preſented a third trapezium, having as fine a poliſh as the other two. The ſixth edge *ih*, it is ſcarcely neceſſary to obſerve, could not be divided, more than the fourth and the ſecond.

Proceeding then to the inferior baſe *defgkr*, it was ſoon found that the edges of this baſe, which admitted of diviſions ſimilar to the preceding, were not the edges *ef*, *dr*, *gk*, which correſponded to thoſe which could be divided towards the upper part, but the intermediate edges *de*, *vy*, *gf*. The trapezium *lqyv* ſhews the ſection made below the edge *kr*. This ſection is obviouſly parallel to that of the trapezium *pſut* and the four other ſections are in like manner parallel, two and two. Now, theſe different ſections being in the direction of the natural joints of the laminæ, it was eaſy to obtain others parallel to each of them, but it was found impoſſible to divide the cryſtal in any other direction. Following this mechanical diviſion according to the paralleliſm ſtated above, new ſections were obtained, always nearer to the axis of the priſm; and when the ſections were carried ſo far as to make the remainder of the two baſes diſappear, the priſm was transformed into a ſolid OX (fig. 10.) terminated by 12 pentagons, parallel two to two, of which thoſe of the extremities, namely, SAOIR, GIODE, BAODC, on the one ſide, and KNPQF, MNPXU, ZQPXY on the other, were the reſults of the mechanical diviſion, and had their common vertices O, P, ſituated in the centers of the baſes of the priſm, fig. 9. The ſix lateral pentagons RSUXY, ZYRIG, &c. (fig. 10.) were the remainders of the planes of the ſame priſm.

In proportion as the ſections were multiplied, always parallel to the preceding, the lateral pentagons diminiſhed in height, and at a certain term the points R, G being confounded with the points Y, Z, the points S, R with the points U, Y, &c. there remained no more of theſe pentagons, but the triangles YIZ, UXY, &c. (fig. 11.). Beyond that term the ſections coming to paſs over the ſurface of theſe triangles, diminiſhed gradually in extent, till at laſt the ſame triangles were loſt, and then the ſolid obtained from the hexahedral priſm, appeared to be a rhomboid *ae* (fig. 12.) exactly ſimilar to that which is commonly denominated *Iceland ſpar*.

So unexpected a reſult led the ingenious author to the examination of other calcareous cryſtals in a ſimilar manner, all of which yielded to mechanical diviſion in ſuch a way, as, when all the external ſurfaces had diſappeared, the nucleus which remained was always a rhomboid, of the ſame form as the firſt. All that was neceſſary was to diſcover the direction of the ſections which conducted to the central rhomboid.

To extract, for inſtance, this rhomboid from the ſpar which is uſually denominated *lenticular*, and which is itſelf a much more obtuſe rhomboid, having its large plane angle equal to 114° 18′ 56″, it was neceſſary to begin with the two vertices, and to make the ſections paſs through the ſmall diagonals of the faces. But if it is wiſhed, on the contrary, to get at the nucleus of the rhomboidal ſpar with acute vertices, the direction of the ſections of the planes muſt be parallel to the edges contiguous to the ſummits, and in ſuch a manner that each of them ſhall be equally inclined to the faces which it cuts.

Theſe reſults are the more worthy of attention, as it would ſeem at firſt, that in the proceſs of cryſtallization, after the rhomboid has been once adopted with regard to a determined ſpecies of mineral, it ought always to re-produce it with the ſame angles. But the paradox which ariſes from this diverſity of appearance, is explained by the double uſe of the rhomboidal form, which ſerves here to diſguiſe itſelf, and conceals fixed and conſtant characters under a variable external appearance.

If we take a cryſtal of a different nature, ſuch as a cube of *fluor ſpar*, the nucleus will have a different form. This will be, in the preſent caſe, an octahedron, which we ſhall obtain by taking off the eight ſolid angles of the cube. Heavy ſpar will produce for a nucleus a right priſm with rhomboidal baſes; feld ſpar, an oblique-angled parallelopiped, but not rhomboidal; apatite or beryl, a right ſix-ſided priſm; the adamantine ſpar a rhomboid, a little acute; blende, a dodecahedron, with rhomboidal planes; iron of the iſland of Elba, a cube, &c.; and each of theſe forms will be conſtant in relation to the whole ſpecies, ſo that its angles will undergo no variation which is appreciable: and if we attempt to divide the cryſtal in any other direction, we ſhall not be able to find any joint; we ſhall only obtain indeterminate fragments; it will rather be broken than divided.

Theſe ſolids inſcribed each in all the cryſtals of the ſame ſpecies, ought to be regarded as the true primitive forms on which all the other forms depend. All minerals, it is true, are not ſuſceptible of mechanical diviſion, but the number is greater than what appeared at firſt ſight; and with regard to thoſe cryſtals in which the attempts to diſcover the natural joints have failed, it has been remarked that their ſurface ſtriated in a certain direction, or the relation of their different forms,

forms, among thofe which belong to the fame fubftance, frequently prefented indications of their ftructure, and by reafoning from their analogy with other divifible cryftals, we may determine this ftructure, at leaft with a good deal of probability.

All deviations from the primitive form are called by Hauy, *fecondary forms*. The number of thefe forms has certain limits, which can be determined by theory, according to the laws which regulate the ftructure of cryftals.

The folid of the primitive form, which is obtained by means of the operation defcribed above, may be farther fubdivided in a direction parallel to its different faces. All the furrounding matter is equally divifible by fections parallel to the faces of the primitive form. Hence it follows, that the parts detached by the aid of all thefe fections are fimilar, and only differ in their volume, which continually decreafes in proportion to the extent of the divifion. Thofe, however, muft be excepted, which are near to the faces of the fecondary folid; for thefe faces not being parallel to thofe of the primitive form, the fragments which have one of their facets taken in the fame faces, cannot exactly refemble thofe which are detached towards the middle of the cryftal. For inftance, the fragments of the hexahedral prifm (fig. 9.), whofe external facets make part of the bafes, or of the planes, have not, in this refpect, the fame figure with thofe which are fituated nearer to the center, all of whofe facets are parallel to the fections *p f u t*, *l q y v*; but the difficulty which prefents itfelf at firft fight, in confequence of that diverfity, is removed by the help of the theory, and the whole are educed to a unity of form.

But the divifion of the cryftal into fmall, fimilar folids, has a certain limit, beyond which we fhould arrive at particles fo fmall, that they are no longer divifible, without deftroying the nature of the fubftance, or decompofing it. At this term, the inveftigation ftops; and to thefe fmall folids, which we might infulate if our organs and inftruments were fufficiently delicate, Hauy has given the name of *integrant* or *integral molecules*. He thinks it probable, that thefe molecules are thofe which were fufpended in the fluid in which the cryftallization took place. In general it may be obferved that with the aid of thefe molecules, the theory reduces to fimple laws the different forms of cryftals, and arrives at refults which exactly reprefent thofe of nature.

When the nucleus is a parallelopiped, that is, a folid having fix parallel faces, two to two, like the cube, the rhomboid, &c. and this folid admits of no other divifions than thofe which are made in the direction of its faces; it is obvious that the molecules which refult from the fubdivifion, whether of the nucleus, or of the furrounding matter, are fimilar to this nucleus. In other cafes, the form of the molecules is different from that of the nucleus. There are, befides, other cryftals which afford, by means of mechanical divifion, particles of different figures combined together through the whole extent of thefe cryftals. The ingenious author of the theory has thrown out fome conjectures on the manner of refolving the difficulty which thefe kinds of mixed ftructures prefent; and at any rate he obferves that it does not affect the ftability of the theory.

II. Laws of Decrement.

1. Decrements at the Edges.

The primitive form, and that of the integrant molecules being determined, after the diffection of the cryftals, we muft inveftigate the laws according to which thefe molecules were combined, to produce around the primitive form thofe kinds of coverings which terminated fo regularly, and from which refulted polyhedra fo different from each other, although originally of the fame fubftance. Now, fuch is the mechanifm of the ftructure, fubject to thefe laws, that all the parts of the fecondary cryftal fuperadded to the nucleus, are formed of laminæ, which decreafe regularly by fubtractions of one or more ranges of integral molecules, fo that theory determines the number of thefe rows, and by a neceffary confequence the exact form of the fecondary cryftal.

To have a diftinct idea of thefe laws, let us take a very fimple and elementary example. Conceive EP (fig. 13.) to reprefent a dodecahedron whofe faces are equal and fimilar rhombufes, and that this dodecahedron is a fecondary form, having a cube for its nucleus or primitive form. By the infpection of fig. 14. the pofition of this cube in the cryftal may be eafily conceived. The fmall diagonals DC, CG, GF, FD of the four faces of the dodecahedron, being united round the fame folid angle, form a fquare CDFG. Now there are fix folid angles, compofed of the four planes, namely the angles L, O, E, N, R, P (fig. 13.), and confequently, if fections are made to pafs through the fmall diagonals of the faces which compofe the folid angles, fix fquares will be fucceffively uncovered. Thefe fquares will be the faces of the primitive cube, of which three are reprefented at fig. 14. namely CDFG, ABCD, BCGH.

This cube would evidently be an affemblage of cubic integral molecules, and it would be neceffary that each of the pyramids, fuch as LDCGF (fig. 14.), which reft on the faces fhould be itfelf compofed of cubes equal to each other, and to thofe which form the nucleus. To have a more diftinct conception of this arrangement, let us compofe an artificial dodecahedron of a certain number of fmall cubes, the arrangement of which will be an imitation of the procefs of nature in difpofing the molecules in the formation of the dodecahedron.

Let ABGF (fig. 15.) be a cube compofed of 729 fmall cubes equal to each other, in which cafe each face of the whole cube will include 81 fquares, that is, 9 on each fide, which will be the external faces of as many partial cubes reprefenting the molecules. This cube will be the nucleus of the dodecahedron which is to be conftructed. On one of the faces, as ABCD, of the cube apply a fquare lamina, compofed of cubes equal to thofe which form the nucleus, but having towards each a row of cubes lefs than if it were on a level with the contiguous faces BCGH, DCGF, &c. This lamina will be compofed of 49 cubes, that is, 7 on each fide, fo that if the inferior bafe be *o n f g* (fig. 16.) this bafe will fall exactly on the fquare marked with the fame letters in fig. 15. Above this firft lamina let a fecond be applied, compofed of 25 cubes, 5 on each fide, fo that if *l m p u* (fig. 17.) reprefent its

Structure of Cryſtals.

its inferior baſe, this baſe will correſpond exactly with the ſquare marked with the ſame letters in fig. 15. If in like manner a third lamina be applied to the ſecond, which is compoſed only of 9 cubes, that is 3 on each ſide, ſo that *v x y z* (fig. 18.) being the inferior baſe, ſhall correſpond with the ſquare marked with the ſame letters in fig. 15.; and if on the middle ſquare *r* of the preceding lamina the ſmall cube *r* (fig. 19.) be placed, this will repreſent the laſt lamina.

When this operation is completed, it will appear that there is formed on the face ABCD (fig. 15.) a four-ſided pyramid, of which this face is the baſe, and the cube *r* (fig. 19.) is the ſummit. And if the ſame operation be continued on the other five ſides of the cube, we ſhall have ſix four-ſided pyramids, reſting on the ſix faces of the nucleus, which is enveloped with them on all ſides. But as the different rows of laminæ compoſing theſe pyramids project beyond each other for a certain way, as appears on fig. 20. where the parts raiſed above the planes BCD, BCG repreſent the two pyramids which reſt on the faces ABCD, BCGH (fig. 15.), the faces of the pyramids will not form continued planes; for they will be alternately re-entering and ſalient, in ſome meaſure imitating a ſtair with four ſides.

Let us now ſuppoſe that the nucleus is compoſed of a number of almoſt imperceptible cubes incomparably greater, and that the laminæ applied on the different faces, which may be called the laminæ of ſuperpoſition, continue to increaſe towards their four edges by ſubtractions of one range of cubes equal to thoſe of the nucleus, the number of theſe laminæ will be incomparably greater than in the preceding hypotheſis; and at the ſame time the cavities or furrows which they form, as they alternately become ſalient or re-entering, will be almoſt imperceptible; and indeed it might be ſuppoſed that the cubes of which the cryſtal is compoſed are ſo ſmall as to become quite imperceptible to our ſenſes, and the faces of the pyramids to be perfectly ſmooth.

Now DCBE (fig. 20.) being the pyramid which reſts on the face ABCD (fig. 15.), and CBOG (fig. 20.) the pyramid applied to the face BCGH (fig. 15.), if we conſider that every thing is uniform from E to O (fig. 20.) in the manner in which the laminæ of ſuperpoſition mutually project beyond each other, we may readily conceive that the face CEB of the firſt pyramid ought to be exactly in the ſame plane as the face COB of the contiguous pyramid, ſo that the union of theſe two faces ſhould form a rhombus ECOB. But we have, for the 6 pyramids, 24 triangles ſimilar to CEB, which conſequently will be reduced to 12 rhombuſes, from which reſult a dodecahedron ſimilar to what is repreſented in fig. 13. and 14.

The cube, before it arrives at the form of the dodecahedron, paſſes through a multitude of intermediate modifications, of which one is ſhown at fig. 21. The ſquares *p a e o*, *k l q u*, *m n t s*, &c. correſpond to the ſquares ABCD, DCGF, CBHG, &c. (fig. 14.), and form the ſuperior baſes of as many pyramids, incomplete from the deficiency of the laminæ with which they ought to terminate. The rhombuſes EDLC, ECOB (fig. 13.), by a neceſſary conſequence, are reduced to ſimple hexagons *a e* C *l k* D, *e o* B *n m* C (fig. 21.), and the ſurface of the ſecondary cryſtal is compoſed of 12 of theſe hexagons and 6 ſquares. This is the caſe with the boracic ſpar (the borate of magneſia and lime), with the exception of ſome facets which ſurmount the ſolid angles, and which depend on a different law of decrement.

If the diminution of the laminæ of ſuperpoſition proceeded in a more rapid ratio; for example, if each lamina had had on its circumference, two, three, or four rows of cubes leſs than the inferior lamina, the pyramids produced on the nucleus by this diminution being more depreſſed, and their contiguous faces being no longer on a level, the ſurface of the ſecondary ſolid would have been compoſed of 24 iſoſceles triangles, all inclined to each other. *Decrement on the edges*, is that which takes place parallel to the edges of the nucleus, and it ought to be diſtinguiſhed from another kind of decreaſe to be afterwards mentioned.

2. Examples of Decreaſe on the Edges.

Martial Pyrites, or *Dodecahedral Sulphuret of Iron.*

Geometric Character.—Inclination of any one of the pentagons, as DPRFS (fig. 27.), to the pentagon CPRGL, which has the ſame baſe PR, 126° 56′ 8″. Angles of the pentagon CPRGL, L = 121° 35′ 17″; C or G = 106° 35′ 57″ 30‴; P or R = 102° 36′ 19″.

Let us conceive again a cubic nucleus, whoſe different edges are lines of departure to the ſame number of decrements which take place at the ſame time in two different ways; that is, by the ſubtraction of two rows parallel to the edges AB, CD (fig. 15.), and of one row parallel to the edges AB, BC. Let it be ſuppoſed alſo that each lamina being only equal in thickneſs to a ſmall cube of the ſide AB and CD, is on the contrary equal to double the thickneſs of the ſide AD and BC. Fig. 22. repreſents this diſpoſition with regard to the decrements which proceed from the lines DC, BC, (fig. 15.) It is plain that on account of the more rapid decreaſe in proceeding from DC or AB, than from BC or AD, the faces produced in the firſt caſe will be more inclined to the plane ABCD, while the faces produced in the ſecond will remain as it were behind, ſo that the pyramid will no longer be terminated by a ſingle cube E, as in fig. 20. which on account of its minuteneſs ſeems to be only a point, but by the row of cubes MNST (fig. 22.) which, ſuppoſing theſe cubes to be infinitely ſmall, will preſent the appearance of a ſimple ridge. By a neceſſary conſequence, the pyramid will have for its faces two trapeziums, ſuch as DMNC, reſulting from the firſt decrement, and two iſoſceles triangles, ſuch as CNB, which will be the effect of the ſecond decrement (c).

Let

(c) Here the face which correſponds to ABCD (fig. 15.) has 25 ſquares on each ſide, as may be ſeen in fig. 22. The ſtructure of this pyramid may be imitated artificially, by regulating the arrangement and number of the cubes repreſented in the ſame figure.

Let us fuppofe farther, that with regard to the laminæ of fuperpofition, which arife on the face BCGH (fig. 15.), the decrements follow the fame laws, but in crofs directions: in fuch a way that the more rapid of the two may take place in proceeding from BC, or from GH, towards the vertex of the pyramid, and the flower decrement in proceeding from CG, or BH, towards the fame vertex. The pyramid which refults from thefe decrements will be placed in a direction oppofite to that which refts on ABCD, and will have the pofition reprefented at fig. 25. where the edge KL, which terminates the pyramid, inftead of being parallel to CD, like the edge MN, (fig. 22. and 23.), is on the contrary parallel to BC. We fhall then conceive what is to be done, that the pyramid which will reft on DC, GF (fig. 15.) may be turned as it is reprefented in fig. 24. and may have its terminating edge PR parallel to CG (fig. 15.). The pyramids which will reft on three other faces of the cube, will ftand like that which arifes on the oppofite face.

But as the decrements which produce the triangle CNB (fig. 23.) make a continuity with thofe from which refults the trapezium CBKL (fig. 25.), thefe two figures will be in the fame plane, and will form a pentagon CNBKL (fig. 26.). For the fame reafon the triangle DPC (fig. 24.), will be on a level with the trapezium DMNC (fig. 23.); and by applying the fame reafoning to the other pyramids, it will be conceived that the fix pyramids having for their whole faces 12 trapeziums and 12 triangles, the furface of the fecondary folid will be compofed of 12 pentagons, which will correfpond to the 12 rhombufes of fig. 13. but with this difference, that they will have other inclinations. This folid is reprefented at fig. 27. and with its cubic nucleus at fig. 28. where it may be feen how to proceed in the extraction of this nucleus. If, for example, a fection be made paffing through the points D, C, G, F, the pyramid which refts on the face DCGF of the nucleus will be detached, and by this fection the latter will be uncovered.

Among the cryftals belonging to the fulphuret of iron, or the arfeniate of cobalt, there is found a dodecahedron, having the faces equal and fimilar pentagons, and having for its nucleus a cube in the pofition above defcribed. But there are an infinite number of poffible dodecahedra, which may have for faces equal and fimilar pentagons, and will differ from each other by the refpective inclinations of their faces. Of all thefe dodecahedra, the one whofe ftructure would be fubjected to thefe laws, gives 126° 56′ 8″, as the angle formed by the inclination of any two of its faces DPRFS, CPRGL (fig. 27.) at the edge of junction PR, as might be fhewn by calculation. Some mineralogifts, overlooking the ufe of geometry in the confideration of cryftals, have confounded the dodecahedron of pyrites with the fame regular, geometrical figure in which all the fides and angles of each pentagon are equal; but there is a ftriking difference between thefe two dodecahedra. The regular dodecahedron gives only 116° 33′ 54″, as the inclination of its refpective pentagons, making a difference of nearly $11\frac{1}{4}$° between it and the other. And indeed the regular dodecahedron cannot be produced by any law of decrement whatever, however compound it may be fuppofed, in regard to a cubic nucleus; and, as may be demonftrated generally, for a nucleus of any form. There are then two kinds of dodecahedra, one whofe faces are rhombufes, and another whofe faces are pentagons, produced upon a cubical nucleus, in confequence of two fimple and regular laws of decrement, in a direction parallel to the edges of the nucleus. By varying thefe laws in different other ways, a multitude of new polyhedra, having the fame nucleus, may be conftructed.

Obtufe, or Lenticular Calcareous Spar, (fig. 30.).

Geometric Character.--Inclination of the rhombus $n\,a\,d'\,b'$, to the rhombus $a\,i\,f\,d'$, 134° 25′ 36″. Angles of the rhombus $n\,a\,d\,b'$; a or b'=114° 18′ 56″; n or d'=65° 41′ 4″.

This variety arifes from a decrement by a fingle row on both fides of the edges $a\,b$, $a\,g$, $a\,f$ (fig. 31.) and $e\,o$, $e\,d$, $e\,x$, contiguous to the fummits a, e, of the nucleus. An idea may be formed of its ftructure, by comparing it with that of the dodecahedron whofe planes form rhombufes (fig. 13. and 20.), originating from the cube, (fig. 15.); and by fuppofing that the laminæ, inftead of decreafing at the fame time on all the edges, decreafe only to thofe contiguous, three by three, to the angle C and its oppofite. The faces formed in that cafe will be reduced to fix, which, by prolonging themfelves, according to the law of continuity, fo as to interfect each other, will compofe the furface of a rhomboid analogous to the one which we are now treating of, excepting that it will have other angles, on account of the cubical form of its integral molecule.

From this it may be conceived, that the diagonals drawn from a to b' (fig. 30.), from a to g', from a to f', &c. on the fecondary rhomboid, will be confounded with the edges $a\,b$, $a\,g$, $a\,f$ (fig. 31.) of the nucleus, which ferve as lines of departure for the decrements; and hence to extract this nucleus, the planes of the fections muft pafs along thefe diagonals, as has been already remarked.

Common Topaz, (fig. 33.).

Geometric Character.—The inclination of the trapezoid $s\,r\,t\,m$ to the adjacent plane $r\,t\,e\,y$, 136°; of the fame plane, to $k\,r\,y\,z$, 124° 26′; of the plane $t\,m\,g\,e$, to $m\,l\,i\,g$, 93°.

The primitive form of this topaz is that of a right-angled, four-fided prifm $h\,y$ (fig. 32.), the bafes of which are rhombufes, having the angle h or r=124° 26′. According to theory, in regard to the integrant molecule, the height $r\,y$ is to the fide $r\,n$ nearly in the ratio of 3 to 2. The pyramidal fummit of the topaz refults from a decrement by two rows of fmall prifms on the edges $x\,r$, $r\,n$, $n\,h$, $h\,x$ of the fuperior bafe of the primitive form. The planes $t\,m\,g\,e$, $l\,m\,g\,c$ (fig. 33.) on one fide, and $b\,k\,z\,p$, $b\,u\,d\,p$, on the other, arife from a decrement by three rows on each fide of the edges $n\,v$, $x\,q$ (fig. 32.), which decrement remains fufpended at a certain term, and leaves four rectangles $t\,r\,y\,e$, $k\,r\,y\,x$, $l\,h\,c\,i$, $u\,h\,c\,d$, (fig. 33.), parallel to the planes of the primitive form. The effect of this decrement is fhewn at fig. 34. where the rhombus $h\,n\,r\,x$ is the fame as fig. 32; and all the fmall rhombs by which it is fubdivided, or which are exterior to it, reprefent the bafes of fo many molecules. The lines $x\,d$, $x\,z$, $n\,i$, $n\,e$, are

are directed according to the law of decrement already explained, and the lines $c\,d$, $c\,i$, $y\,z$, $y\,e$, correſpond to the planes of the priſm, which are not ſubject to this law.

3. Decrement on the Angles.

This poſition of the rhomboidal nucleus incloſed in the regular hexahedral priſm of the calcareous ſpar being diſcovered, did not directly lead to the determination of the laws of thoſe decrements of ſecondary cryſtals. More ſimple intermediate ſteps were neceſſary. To conceive the method of inveſtigating theſe new decrements, it may be remarked that the ſame ſubſtances which exhibit the dodecahedron with pentagonal planes originating from the cubes (fig. 27. and 28.), and which might aſſume the form of the dodecahedron whoſe planes are rhombuſes (fig. 13. and 14.), are found alſo under that of the regular octahedron. But if the laminæ of ſuperpoſition decreaſe only on the edges of the two oppoſite faces of this cube, as on thoſe of the ſuperior baſe ABCD (fig. 14.) and of the inferior baſe, we ſhall in general have two pyramids applied on theſe baſes. And if we ſuppoſe the effect of the law of decrements continued in the ſpace ſituated between the baſes of the cube, we ſhall arrive at an octahedron, whoſe angles will vary as there is a greater or ſmaller number of rows ſubtracted. But no law, however complicated, can give equilateral triangles as the faces of this octahedron.

On the other hand, by dividing a regular octahedron originating from a cube, the cubic nucleus will appear to be ſo ſituated in this octahedron that each of its ſix ſolid angles correſponds to the centre of one of the faces of the octahedron; but this could not be the caſe by ſuppoſing a decrement on the edges. The law of decrement accompliſhes its ends, in ſuch caſes, by a different progreſs from that which conducts to the forms already deſcribed.

Let ABCD (fig. 35.) be the ſuperior or inferior ſurface of a lamina compoſed of ſmall cubes, whoſe baſes are repreſented by the ſquares which ſubdivide the whole ſquare. The ſeries of cubes to which the ſquares a, b, c, d, e, f, g, h, i, belong, are on the diagonal drawn from A to C; and they form one ſtring, (fig. 36.) which will not differ from the ſtring of the cubes a, n, g, r', s', t', u', z', x', (fig. 35.), lying in the direction of the edge AD, excepting that in the former the cubes touch only by one of their edges, and in the latter by one of their faces. There are alſo, throughout the whole extent of the lamina, ſtrings of cubes parallel to the diagonal. The ſeries of letters q, v, k, u, x, y, z, ſhews one, and the letters n, t, l, m, p, o, r, s, ſhew another ſtring.

The laminæ of ſuperpoſition, it may be conceived, project beyond each other one or more rows of cubes in a direction parallel to the diagonal. In like manner may be conſtructed around the cubic nucleus, ſolids of different figures, by placing ſucceſſively above the different faces of this nucleus laminæ which may ariſe in the form of pyramids, and which will experience this kind of decrement. The faces of theſe ſolids will be roughened by an infinite number of ſalient angles formed by the exterior points of the compoſing cubes. This follows from the angular figure which is continually preſented by the edges of the laminæ of ſuperpoſition. But theſe points being on a level, the cubes may be ſuppoſed to be ſo ſmall that the faces of the ſolid will appear ſmooth and continued planes.

Around the cube ABGF (fig. 37.), as a nucleus, let a ſecondary ſolid be conſtructed, in which the lamina of ſuperpoſition ſhall decreaſe on all ſides by a ſingle row of cubes, in a direction parallel to the diagonals; and let ABCD (fig. 38.), the ſuperior baſe of the nucleus, be ſubdivided in 81 ſmall ſquares, repreſenting the exterior faces of an equal number of molecules. Fig. 39. repreſents the ſuperior ſurface of the firſt lamina which ought to be placed above ABCD (fig. 38.) in ſuch a manner that the point a' may correſpond to the point a, the point b' to the point b, the point c' to the point c, and the point d' to the point d. By this diſpoſition the ſquares Aa, Bb, Cc, Dd (fig. 38.) remain uncovered, which will fulfil the above law of decrement; and the borders QV, ON, IL, GF (fig. 39.) project by one row beyond the borders AB, AD, CD, BC (fig. 37.), which is neceſſary that the nucleus may be enveloped towards theſe edges. For if the edges of the lamina, repreſented (fig. 39.) as well as the following, coincided with the lines ST, EZ, YX, MU, on which ſuppoſition they would be on a level with AD, AB, CD, BC (fig. 38.), they would form re-entering angles towards the analogous parts of the cryſtal. Thus in the laminæ applied on ABCD (fig. 37.) all the edges anſwering to CD would be on a level with CDFG, of which they would form a prolongation; and in the laminæ applied on DCGF all the edges analogous to the ſame ridge CD would be on a level with ABCD, from which neceſſarily reſults a re-entering angle oppoſite to the ſalient angle formed by the two faces ABCD, and CDFG. But by the laws which determine the formation of ſimple cryſtals, re-entering angles appear to be excluded. The ſolid will then increaſe in thoſe parts to which the decrement does not extend. But this decrement alone being ſufficient to determine the form of the ſecondary cryſtal, all the other variations which intervene only in a ſubſidiary manner may be ſet aſide, excepting in the conſtruction of artificial cryſtals, and in exhibiting the the details relating to the ſtructure.

The ſuperior face of the ſecond lamina will be like A′G′L′K′ (fig. 40.), and this lamina muſt be placed above the preceding, in ſuch a manner that the points a'', b'', c'', d'', may correſpond with the points a', b', c', d' (fig. 39.), which will leave uncovered the ſquares having their exterior angles ſituated in Q, S, E, O, V, T, M, G, &c. and continuing to produce the decrement by one row. The ſolid increaſes towards the analogous edges at AB, BC, CD, AD (fig. 38.), ſince between A′ and L′, for inſtance, (fig. 40.) there are 13 ſquares, but between QV and LI (fig. 39.) there are only eleven.

The large faces of the laminæ of ſuperpoſition which were hitherto octagons QVGFILNO (fig. 39.) having arrived at the figure of the ſquare A′G′L′K′ (fig. 40.) will after paſſing that term, decreaſe on all ſides at the ſame time, and the following lamina will have for its ſuperior face the ſquare B′M′I′S′ (fig. 41.), leſs in every direction by one row than the ſquare A′G′L′K′ (fig. 40.). Let this ſquare be diſpoſed above the preceding ſo that the points c', f', g', h' (fig. 41.) may correſpond with the

the points c, f, g, h, (fig. 40.). Fig. 42. 43. 44. and 45. represent the four laminæ which ought to rise successively above the preceding, the same letters being made to correspond. The last lamina is reduced to one cube z' (fig. 46.) which should correspond with the same letter (fig. 45.).

Thus it follows, that the laminæ of superposition applied on the base ABCD (fig. 37. and 38.) produce, by the total of their decreasing edges, four faces, which in proceeding from the points A, B, C, D, incline one to another in the form of a pyramidal summit. These edges, it may be remarked, have lengths which begin by increasing as in fig. 39. and 40. and which then proceed decreasing. Thus the faces produced by the same edges increase at first, and afterwards decrease in breadth, so that they become quadrilaterals. One of these is represented at fig. 47. in which the inferior angle C is confounded with the angle C (fig. 37.) of the nucleus; and the diagonal LQ represents the edge L′G′ of the lamina A′G′L′K′ (fig. 40.), which is the most extended in the direction of that edge. And the number of laminæ of superposition producing the triangle LCQ (fig. 47.) being less than that of the laminæ producing the triangle LZQ, since there is here only one lamina preceding the lamina A′ G′ L′ K′ (fig. 40.), while there are six which follow it as far as the cube z (fig. 46.) inclusively, the triangle LZQ (fig. 47.) composed of the sum of the edges of these latter laminæ, will have a much greater height than the inferior triangle LCQ, as it is expressed in the figure.

The surface of the secondary solid, then, will be formed of 24 quadrilaterals, disposed three and three around each solid angle of the nucleus. But decreasing by one row, the three quadrilaterals belonging to each solid angle, such as C (fig. 37.), will be in the same plane, forming an equilateral triangle ZIN (fig. 48.). The 24 quadrilaterals, then, will produce eight equilateral triangles. One of these is represented at fig. 49. shewing the arrangement of the cubes that concur to form it; and the secondary solid will be a regular octahedron. This octahedron is represented at fig. 50. enclosing the cubic nucleus, so that each of its solid angles corresponds to the centre of one of the triangles IZN, IPN, PIS, SIZ, &c. of the octahedron. To extract this nucleus, it would be necessary to divide the octahedron in its eight solid angles, by sections parallel to the opposite edges. This is the structure of octahedral sulphuret of lead or galena.

Such then is an example of decrements on the angles which take place in a direction parallel to the diagonals. By this denomination may be expressed precisely the result of each decrement, by denoting the angle which serves it as a point of departure.

Acute calcareous Spar, (fig. 51.).

Geometric Character.—Inclination of $p\,z\,r\,y$ to $p\,u\,o\,y$, 78° 27′ 47′, and to $i\,r\,z\,s$, 101° 32′ 13″. Angles of the rhombus $p\,z\,r\,y$, p or r = 75° 31′ 20″; z or y = 104° 28′ 40.″ Inclination of the oblique diagonal drawn from p to r with the edge $p\,u$, 71° 33′ 54.″

Geomet. Propert.—The angles of the rhombus are equal to the respective inclinations of the faces of the nucleus, and reciprocally. The angles of the principal quadrilateral, or that which passes through two opposite oblique diagonals $p\,r$, $u\,i$, and through the intermediate edges $p\,u$, $i\,r$, are the same as on the nucleus.

To conceive the structure of this rhomboid, suppose that $a\,b\,d\,f$ (fig. 52.) represents the face of the nucleus marked with the same letters (fig. 12.) subdivided into a multitude of partial rhombuses, which are the exterior faces of so many molecules. Suppose farther, that the laminæ of superposition, applied on this face, decrease by one row towards the lateral angles $a\,b\,d$, $a\,f\,d$, in such a manner, that on the first the two rhombuses $b\,h\,k\,l$, $f\,m\,i\,n$ are uncovered; that on the second the uncovered rhombuses are those traversed by the diagonals $c\,o$, $u\,y$, on the third those traversed by the diagonals $s\,t$, $q\,z$, &c.; in which case the decreasing edges will successively correspond with these diagonals. By this law of decrement two faces will be produced; which, proceeding from the angles $b\,f$, will rise in the form of a roof above the rhombus $a\,b\,d\,f$, and will meet on a common edge situated immediately above the diagonal $a\,d$, and which will be parallel to it; and, as there are six rhombuses, which undergo like decrements on the primitive form, the faces produced will be 12 in number. But, by the law of decrement by one row, the two faces which have the same angle b, f, g, &c. (fig. 12.) for the point of departure will be in the same plane; thus reducing the 12 faces to six, and transforming the secondary crystal into an acute rhomboid $p\,i$ (fig. 51.). In this rhomboid the edges $p\,z$, $p\,y$, $p\,u$, are situated each as the oblique diagonals of the nucleus, or those which would be drawn from a to d, from a to x, from a to c, &c. (fig. 12.).

Crystals of this variety are found near Lyons in France; and the freestone of Fontainbleau, commonly called *crystallized sandstone*, which is nothing else than calcareous spar, mixed with particles of quartz, exhibits the same form. The crystals of this stone yield to mechanical division, and have their natural joinings like those of pure spar, situated in the planes parallel to the edges $p\,z$, $p\,y$, $p\,u$, &c. (fig. 51.), and which would pass at an equal distance from these edges.

Rhomboidal Iron ore, (fig. 53.).

Geometric Character.—Inclination of BCRP to BCOA or OCRS, 146° 26′ 33″; angles of the rhombus BCRP, C or P = 117° 2′ 9″; B or R = 62° 57′ 51″.

The laminæ composing this rhomboid decrease by two rows on the angles $b\,c\,r$, $o\,c\,r$, $b\,c\,o$, &c. (fig. 54.) which concur to the formation of the two solid angles $c\,n$, of a cubic nucleus. The faces produced, instead of being on a level, three and three, around these angles, as in the case of decrement by a single row, incline one to the other, and extend above the faces of the nucleus in such a manner that their diagonals are parallel to the horizontal diagonals of the same faces. The cube here answers the purpose of a rhomboid, which should have its summits in c and n, in which case there would be only one axis passing through the summits. In the dodecahedron, on the other hand, with pentagonal planes

planes (fig. 27.) the cube performs the functions of a rectangular parallelopipedon, and then three different axes may be conceived, each of which passes through the middle of the two opposite faces. When the cube begins to perform the one or the other, in regard to one species of mineral, it is observed to continue that function in all the varieties of that species.

The crystals of rhomboidal iron are found among those of the iron ore of the island of Elba. It is uncommon, however, for the law of decrement to attain to its boundary, and for the rhomboid not to be modified by facets parallel to the faces of the nucleus. If the decrement which produces the rhomboid took place at the same time on the eight solid angles of the cube, there would result a polyhedron of 24 facets, of which nature are the crystals found at the Calton hill, Edinburgh, which have been considered as zeolites.

4. Intermediate Decrements.

In some crystals the decrements on the angles do not take place in lines parallel to the diagonals, but parallel to lines situated between the diagonals and the edges. This happens when the subtractions are made by double, triple, &c. rows of molecules. In figure 55. which is an instance of these subtractions, the molecules composing the row represented by the figure, are so arranged as if, of two, one only was formed. To reduce this case under that of the common decrements on the angles, we have only to conceive the crystal composed of parallelopipeds, having their bases equal to the small rectangles *a b c d*, *e d f g*, *h g i l*, &c. The name of intermediate decrement is given to this kind of diminution.

Syntactic Iron Ore, (fig. 56.).

Geometric Character.—Respective inclination of the trapeziums *b e g o*, *n q g o* of the rising pyramids $=135^\circ\ 34'\ 31''$; of the edges *c g*, *g q*, $129^\circ\ 31'\ 16''$. Angles of the trapezium *b c g o*, *b* or $c=103^\circ\ 48'\ 35''$; *o* or $g=76^\circ\ 11'\ 25.''$

This variety of iron ore is found at Framont in Les Vosges. It commonly appears under the form of two opposite pyramids, and some groups reflect from the surface the prismatic colours. These crystals, classed by De L'Isle among the modifications of the dodecahedron with isosceles triangular planes, have for nucleus a cube performing the functions of the rhomboid. The two regular hexagons by which they are terminated, arise from a decrement by a single row of cubic molecules on the angles *c*, *n*, (fig. 54.) of the nucleus.

To comprehend the effect of this law, combined with the preceding, and which produces the lateral trapeziums, let it be supposed that *c b p r* (fig. 57.) represents the same square as fig. 54. subdivided into small squares, which are the external faces of so many molecules. Taking these molecules by pairs, so that they form rectangular parallelopipeds, having for bases the oblong squares *b n g h*, *h g m* G, &c. and imagine, that the subtractions are made by two rows of these double molecules, the edges of the laminæ of superposition will be successively ranged in lines, as PG, TL, R *p*, S *p*, *k z*, *y z*, &c. and the sum of all these edges will produce two faces, which departing from the angles *b*, *r*, will converge, the one towards the other, and will unite themselves on a common ridge, situated above the diagonal *c p*, but inclined to that diagonal. The complete result of this decrement, then, is 12 faces; and it is shewn by calculation, that the six superior faces being prolonged to the point where they meet the six lower faces, will form with them the surface of a dodecahedron, composed of two right pyramids united at their bases. By the effect of the first law, these pyramids are here incomplete, which gives the hexagon *a b c d r u* (fig. 56.) and its opposite.

5. Mixed Decrements.

The decrements in other crystals, either on the edges, or on the angles, vary according to laws, the proportion of which can only be expressed by the fraction $\frac{2}{3}$ or $\frac{1}{3}$. It may happen, for instance, that each lamina exceeds the following by two rows parallel to the edges, and that it may, at the same time, have an altitude triple that of a simple molecule. A vertical, geometrical section of one of the kinds of pyramids, resulting from this decrement, is represented at fig. 62. The effects of this decrement may be readily conceived by considering that AB is a horizontal line taken on the upper base of the nucleus *b a z r*, the section of the first lamina of superposition, *g f e n* that of the second. These are called *mixed decrements*, which exhibit this new kind of exception from the simplest laws. They, as well as the intermediary ones, rarely exist anywhere else, and they have been particularly discovered in certain metallic substances. The application of the ordinary laws, Hauy observes, to a variety of these substances, presented such errors in the value of the angles, as led him to believe that they were inconsistent with theory. But extending his theory, he arrived at results so correct as removed every doubt of the existence of the laws on which these results depended.

All the changes to which crystals are subjected depend on the laws of structure which have been explained, and others of a similar kind. The decrements sometimes take place at the same time on all the edges, as in the dodecahedron having rhombuses for its planes, or on all the angles, as in the octahedron originating from a cube. Sometimes they take place only on certain edges of certain angles. There is sometimes a uniformity between them, so that it is one single law by one, two, three rows, &c. which acts on the different edges, or the different angles. Sometimes the law varies from one edge to the other, or from one angle to the other. This happens particularly, when the form of the nucleus is not symmetrical, as, for instance, when it is a parallelopiped, whose faces differ by their respective inclinations, or the measure of their angles. In some cases there is a concurrence of the decrements on the edges, with those on the angles, to produce the same form; and sometimes the same edge or the same angle is subjected to several laws of decrement succeeding each other. The secondary crystal, in some cases, has faces parallel to those of the primitive form, and which combine with the faces produced by the decrements to modify the figure of the crystal. Simple secondary forms, are those which arise from a single law of decrement, the effect of which entirely conceals the nucleus. Compound secondary forms arise from several simultaneous laws of decrement, or from one single law not having attained to its extent; so that there remain

Structure of Crystals.

main faces parallel to those of the nucleus, which concur with the faces produced by the decrement, to diversify the form of the crystal. If, amidst this diversity of laws, sometimes insulated, sometimes united by more or less complicated combinations, the number of the rows subtracted were itself extremely variable; if, for instance, these decrements were by 12, 20, or 30 rows, or more, which is possible, the number of forms which might exist in each kind of mineral would be immense. But the power by which the subtractions are effected, seems to be very limited in its action. Its extent rarely exceeds 1 or 2 rows of molecules. Beyond four rows, only one variety of calcareous spar has been discovered. The structure of this variety depends on a decrement by six rows; but this seems to be a rare occurrence in nature. Yet, although the laws of crystallization are limited to two of the simplest, that is, those which produce subtractions by one or two rows, calcareous spar is susceptible of 2044 different forms, a number exceeding more than 50 times that of the forms at present known; and, admitting into the combination decrements by 3 and 4 rows, calculation will give 8,388,604 possible forms of the same substance, and by the operation of either mixed or intermediate decrements, this number will be greatly augmented.

The striæ observed on the surface of many crystals is another proof in favour of the theory; for they always have directions parallel to the projecting edges of the laminæ of superposition, which mutually go beyond each other, if the regularity of the process has not been disturbed. It must not, however, be supposed, that the inequalities arising from the decrements must be always sensible, if the form of the crystals be complete; for the molecules being extremely minute, the surface will appear finely polished, and no striæ would be perceptible. In some secondary crystals, therefore, they are not to be seen, while they are quite distinct in others of the same nature and form. In the latter case, the action of the causes producing crystallization, has not enjoyed all the necessary conditions; the operation has been interrupted; and the law of continuity not having been observed, there have remained on the surface of the crystal, perceptible vacancies. These deviations have this advantage, that they point out the direction, according to which the striæ are arranged in lines, and thus contribute to discover the real mechanism of the structure.

The small vacuities which the edges of the laminæ of superposition leave on the surface of even the most perfect secondary crystals, by their re-entering and salient angles, shew that the fragments obtained by division, whose external facets form part of the faces of the secondary crystal, are not like those drawn from the interior part. For this apparent diversity arises from these facets being composed of a multitude of small planes, really inclined to each other, but which being very minute, present the appearance of one plane. And if the division could reach its utmost bounds, these fragments would be resolved into molecules similar to each other, and to those situated towards the centre. It happens, too, that molecules of different figures arrange themselves in such a manner, as to produce similar polyhedra in different kinds of minerals. Thus the dodecahedron with rhombuses for its planes, which is obtained by combining cubic molecules, exists in granite, with a structure composed of small tetrahedra, having isosceles triangular faces. It exists also in sparry fluor, where there is also an assemblage of tetrahedra, but regular; that is to say, the faces of which are equilateral triangles.

Examples of Compound Secondary Forms.

Prismatic Calcareous Spar, (fig. 9.).

The bases of this prism are produced in consequence of a decrement, by a single row on the angles of the summits *b a f*, *g a f*, *b a g*, *d e x*, *d e c*, *c e x* (fig. 12.) of the primitive form. The six planes result from a decrement by two rows on the angles *b d f*, *f x g*, *b c g*, *d f x*, *d b c*, *c g x*, opposite to the preceding. Let *a b d f* (fig. 58.) be the same face of the nucleus, as fig. 12. The decreasing edges situated towards the angle of the summit *a*, will successively correspond with the lines *b i*, *k l*, &c. and those which look towards the inferior angle *d*, will have the positions pointed out by *m n*, *o p*; but as the first decrement takes place by one row, it is proved, that the face which results from it is perpendicular to the axis; and calculation shews, in like manner, that the second decrement taking place by two rows, produces planes parallel to the axis, and thus the secondary solid is a regular, hexahedral prism.

To develope farther the structure of this prism, it may be remarked, that in the production of any one *a b c n i b* (fig. 9.) of the two bases, the effect of one only of the three decrements which take place around the solid angle *a* (fig. 12.) may be considered, for example, of that which takes place on the angle *b a f*, supposing that the laminæ applied on the two other faces *f a g x*, *b a g c*, do not decrease, but to assist the result of the principal decrement which takes place in regard to the angle *b a f*. Here these auxiliary decrements are quite similar to that whose effect they are supposed to prolong.

The case will be totally different by applying the same observation to the decrements which are affected by two rows on the inferior angles *b d f*, *d f x*, *f x g*, &c. and which produce the six planes of the prism. If, for example, we consider the effect of the decrement on the angle *d f x*, it is necessary also that the laminæ applied on the faces *a f d b*, *a f x g* (fig. 12.) should experience, towards their lateral angles *a f d*, *a f x*, adjacent to the angle *d f x*, variations which second the effect of the generating decrement. Here, however, these variations are intermediary decrements by rows of double molecules.

Amphitrigonous Iron Ore. Fig. 59. shews this crystal in a horizontal projection, and fig. 60. in perspective.

Geometric Character.—Respective inclination of the triangles *g c n*, *g c d*, &c. from the same summit, 146° 26′ 33″; of the lateral triangles *b g u*, *b g q*, to the adjacent pentagons, such as *g u t m n*, 154° 45′ 39″.

This is the common form of the iron ore of the island of Elba. It results from a decrement by two rows on the angles *c*, *n* (fig. 54.) to the summits of a cubic nucleus, which produces the isosceles triangles *g c n*, *g c d*, *n c d* (fig. 59. and 60.), and of a second decrement by three rows on the lateral angles *c b p*, *c r p*, *c r s*, &c. which produce the triangles *m n r*, *r n k*, *u g b*, *g g b*, &c. These two decrements stop at a certain term, so that

that there remain faces parallel to thoſe of the nucleus, viz. the pentagons $gutmn$, $hdnkl$, &c. (fig. 59.). The firſt decrement is ſimilar to that which produces the rhomboidal iron ore. The ſecond has this property, that if its effect were complete, it would give a dodecahedron of iſoſceles triangles, or compoſed of two right pyramids united at their baſes. The triangles of the ſummits are frequently furrowed by ſtriæ parallel to the baſes gn, dn, gd, of theſe triangles, and which point out the direction of the decrement.

Analogical calcareous ſpar, (HAUY), fig. 61.

Geometric Character.—Inclination of any one, $imeh$, of the trapezoids of the ſummits to the correſponding vertical trapezoid $ecpg$, $116^\circ\ 33'\ 54''$; angles of the ſame trapezoid $i=114^\circ\ 18'\ 56''$; $e=75^\circ\ 31'\ 20''$; m or $h=85^\circ\ 4'\ 52''$. Angles of the trapezoid $ehog$, $e=90^\circ$; $o=127^\circ\ 25'\ 53''$; $g=67^\circ\ 47'\ 44''$; $h=74^\circ\ 46'\ 23''$; of the trapezoid $cegp$, $c=60^\circ$; $p=98^\circ\ 12'\ 46''$; c or $g=100^\circ\ 53'\ 37''$.

Geomet. Propert. 1. In each vertical trapezoid, the triangle ceg is equilateral. 2. The height ex of this triangle is double the height px of the oppoſite triangle cpg. 3. In the trapezoid $ehog$, and the other ſimilarly ſituated, the angle heg is a right angle. 4. If the diagonal gh be drawn, the triangle heg will be ſimilar to any one aof (fig. 12) of thoſe which would be produced by drawing in the primitive rhombus the two diagonals bf, ad. 5. If in the trapezoid $emih$, or any other ſituated at the ſummits, the diagonals ei, mh be drawn, the height el of the inferior triangle meh will be double the height il of the ſuperior triangle mih. 6. The triangle mih is ſimilar to $\frac{1}{2}$ of the rhombus of very obtuſe ſpar, divided by the horizontal diagonal, and the triangle meh is ſimilar to $\frac{1}{2}$ of the rhombus of the acute ſpar divided in the ſame manner.

The numerous analogies connecting this variety with different cryſtalline forms, whether conſidering certain angles formed by planes, or certain triangles obtained by drawing the diagonals of the trapezoids, led the author of this theory to give it the name of *analogical ſpar*. It is derived from three other varieties, viz. very obtuſe ſpar, by the trapezoids $emih$, $fiht$, &c; metaſtatic ſpar, by the trapezoids $emdc$, $ehog$, $ohtz$, &c; and the priſmatic ſpar by the trapezoids $bdck$, $cegp$, &c, which are conſequently parallel to the axis. The trapezoids $imeh$, $fiht$, &c. are often ſeparated by an intermediary ridge from the vertical trapezoids $cegp$, $gozr$, &c. In that caſe the trapezoids $cdme$, $geho$, &c. are changed into pentagons.

Icoſahedral Sulphuret of Iron, (fig. 63.).

Geometric Character.—Reſpective inclinations of the iſoſceles triangles PLR, PSR, $126^\circ\ 52'\ 11''$; of any one PNL of the equilateral triangles to each adjacent iſoſceles triangle, PLR, or LNK, $140^\circ\ 46'\ 17''$. Angles of the iſoſceles triangle PLR, $L=48^\circ\ 11'\ 20''$; P or $R=65^\circ\ 54'\ 20''$.

This variety is the reſult of a combination of the law which produces the octahedron originating from a cube (fig. 50.), with that which takes place for the dodecahedron with pentagonal planes (fig. 27. and 28.). The firſt law produces the eight equilateral triangles which correſpond with the ſolid angles of the nucleus; and the ſecond produces twelve iſoſceles triangles, ſituated two and two above the ſix faces of the ſame nucleus. If a dodecahedron ſimilar to that of fig. 28. were converted geometrically into this icoſahedron, it would be ſufficient to make the planes of eight ſections paſs through it in the following manner; viz. one through the angles P, N, L, (fig. 27.), another through the angles P, M, S; a third through the angles L, R, U, &c. By comparing the figures 27. and 63. the relation between the polyhedra will be ſeen by the correſpondence of the letters; but this is merely an artificial operation; for it may be obſerved, that the nucleus of the icoſahedra which would be obtained, would be much ſmaller than that of the dodecahedron, ſince the ſolid angles of the latter nucleus would be confounded with the angles D, C, G, &c. (fig. 28) of the dodecahedron; but the other nucleus would have its ſolid angles ſituated in the middle of the equilateral triangles MPS, NPL, URL, (fig. 63.).

The icoſahedron of the ſulphuret of iron, which is not very common, has been confounded with the regular geometrical icoſahedron which has all its angles equilateral. Theory ſhows that the exiſtence of the latter icoſahedron is equally impoſſible in mineralogy as the geometrical dodecahedron. Among the five regular polyhedra of geometry, viz. the cube, the tetrahedron, the octahedron, the dodecahedron, and the icoſahedron, the three former can only exiſt among minerals according to the laws of cryſtallization.

Polynomous Petunze (HAUY), fig. 64.

Geometric Character.—Reſpective inclination of the narrow planes, $onkm$, $cfhg$, to the adjacent planes on each ſide 150°; of the planes $ctFg$, $PomN$ to thoſe contiguous to them by the edges tF, PN, 120°; of the heptagon pG$cldez$ to the enneagon B$zebno$Prs, $99^\circ\ 41'\ 8''$; of the trapezium $dafc$ both to the plane $nbafhilk$, and to the heptagon pG$tcdez$, 135°; of the facet $deab$, or ABzp to the ſame heptagon, $124^\circ\ 15'\ 15''$.

Hauy had not obſerved the petunze cryſtallized under its primitive form. This form, ſuch as it is given by the mechanical diviſion of ſecondary cryſtals, is that of an oblique priſm of four planes (fig. 66.), two of which, ſuch as GOAD, RBHN, are perpendicular to the baſes ADNH, OGRB; the other two, viz. BOAH, RGDN, make with the former, angles of 120° at the ridges OA, RN, and angles of 60° towards the oppoſite ridges BH, GD. Theſe planes are inclined to the baſes at the place of the ridges GO, BR, $111^\circ\ 29'\ 43''$, and at the oppoſite ridges $68^\circ\ 30'\ 17''$. This form is at the ſame time that of the molecule. By theory, the two parallelograms GOAD, OGRB, as well as their parallels, are equal in extent; and the parallelogram BOAH, or its oppoſite, RGDN, is double each of the preceding. This may ſerve to explain the roughneſs of the ſections made in the direction BOAH, when compared with thoſe in the directions of the ſmall parallelograms, the latter being always ſmooth and brilliant. If, however, the diagonal OR, be drawn, it will be found perpendicular to OA and RN; or, it will be ſituated horizontally,

Structure of Cryſtals.

tally, by ſuppoſing that the ridges OA, BH have a vertical poſition.

This mineral exhibits the moſt complicated variety which the author has obſerved among this kind of cryſtals. To comprehend its ſtructure, ſuppoſe that *bpyr*, (fig. 65.) repreſents a ſection of the nucleus AR, (fig. 66.), made by a plane perpendicular to the parallelograms GOAD, BOAH, and ſubdivided into a multitude of ſmall parallelograms, which are the analogous ſections of ſo many molecules. Here the ſide *yr* (fig. 65.), which is the ſame ſection of the cutting plane as GOAD, is greater than it ought to be in regard to the ſide *cr* (fig. 65.), which is the ſame ſection as BOAH (fig. 66.). But theſe dimenſions are ſuited to thoſe of the ſecondary cryſtal, and here occaſion no difficulty, becauſe it may be ſuppoſed that the primitive form has been extended more in one direction than in another; for this form is to be conſidered only as a convenient datum for the explanation of the ſtructure, and the cryſtal conſiſts merely in an aſſemblage of ſimilar molecules; ſo that it is the dimenſions of theſe molecules, which remain invariable.

By comparing fig. 64. and 65. it will be found, 1. That the plane *fabnklih* (fig. 64.) and its oppoſite which correſpond to *mn*, *dg* (fig. 65.) are parallel to two planes of the nucleus, viz GOAD, BRNH (fig. 66.), and therefore do not reſult from any law of decrement. 2. That the plane P*om*N, and its oppoſite (fig. 64.) which correſpond to *ao*, *eg*, (fig. 65.) are alſo parallel to two of the planes of the nucleus, viz. BOAH, RGDN, (fig. 66.). 3. That the plane *onkm*, and its oppoſite (fig. 64.) which correſpond to *on*, *eg*, (fig. 65.) reſult from a decrement by two rows parallel to the ridges AO, NR, (fig. 66.). 4. That the plane *cfgh*, and its oppoſite, (fig. 64.), reſult from a decrement by four rows parallel to the ridges GD, BH, (fig. 66.), which decrement takes place on the other ſide of theſe ridges. From this it may be ſeen, that decrements different in their meaſure, give riſe to planes ſimilarly ſituated, ſuch as *onkm*, and *cfgh*, (fig. 64.), which is a conſequence of the particular figure of the molecules. With regard to the faces of the ſummit, the heptagon *p*G*tcdez*, (fig. 64.), is ſituated parallel to the baſe BRGO, (fig. 66.). The enneagon B*sr*P*onbez* (fig. 64.) is produced in conſequence of a decrement by one row on the angle OBR (fig. 66.), or parallel to the diagonal OR; which decrement does not attain to its full extent, and leaves ſubſiſting the neighbouring heptagon parallel to the baſe BRGO. It may be conceived, from what has been ſaid on the poſition of the diagonal OR, why the line *ez* (fig. 64.), which ſeparates the two large faces of the ſummit, is ſituated horizontally, by ſuppoſing that the planes have a vertical poſition.

The trapeziums *dafc*, A*p*GC, are the reſult of a decrement by one row on the ridges GO, BR (fig. 66.). The facet *deba* (fig. 64.) ariſes from a decrement by two rows parallel to the ridge BO (fig. 66.). With regard to the other facet AB*zp*, which has the ſame poſition as the preceding, in relation to the oppoſite part of the cryſtal, it reſults from an intermediary law, by a row of double molecules on the angle OBR (fig. 66.). The rhombuſes *bclh*, *klsu* (fig. 67.) repreſent the horizontal ſections of two of theſe double molecules taken in the ſame row, and whoſe relation to the reſt of the arrangement will become ſenſible, by comparing theſe rhombuſes with thoſe marked with the ſame letters in fig. 65. This variety of cryſtals is ſubject to a change of dimenſions; the faces *p*G*tcdez*, *fabnklih*, and their oppoſites, which are at right angles to each other, are elongated in the direction of their breadth, exhibiting the appearance of a quadrilateral, rectangular priſm, the ſummits of which would be formed by the faces ſituated towards the ridges PN, F*t*. Cryſtals of this variety, which are opaque, and of a whitiſh, yellowiſh, and ſometimes reddiſh colour, are found in granites; ſome are in groups, and ſome, but more rarely, are met with in ſingle cryſtals.

III. Number of Primitive Forms.

In the examples which have been given, the author of the theory has choſen the parallelopiped for a nucleus, on account of the ſimplicity of its form. He has hitherto found that all the primitive forms may be reduced to ſix. 1. The parallelopiped in general, which comprehends the cube, the rhomboid, and all the ſolids terminated by ſix faces parallel two and two. 2. The regular tetrahedron. 3. The octahedron with triangular faces. 4. The hexagonal priſm. 5. The dodecahedron with rhomboidal planes. 6. The dodecahedron with iſoſceles triangular faces.

Among theſe forms there are ſome found as nucleus, which have the meaſure of their angles the ſame in different kinds of minerals. It is to be conſidered that theſe nuclei are compoſed, in the firſt inſtance, of elementary molecules, and that it is poſſible that the ſame form of nucleus may be produced in one ſpecies by elements of a certain nature, and in another ſpecies by different elements combined in a different manner, as we ſee integrant molecules, ſome cubic, and ſome tetrahedral, produce ſimilar ſecondary forms by the operation of different laws of decrement. But it may be obſerved, that all the forms which have hitherto occurred as nuclei, on the different ſpecies, are ſuch as have a particular character of perfection and regularity, as the cube, the regular octahedron, and the dodecahedron with equal and ſimilar rhombuſes for its faces.

IV. Forms of the Integral Molecules.

The primitive form is that which is obtained by ſections made on all the ſimilar parts of the ſecondary cryſtal; and theſe ſections, continued parallel to themſelves, conduct to a determination of the form of the integral molecules, of which the whole cryſtal is the aſſemblage. There is no cryſtal from which a nucleus in the form of a parallelopiped may not be extracted, by making the limitation to ſix ſections, parallel two and two. In a great number of ſubſtances, this parallelopiped is the laſt term of the mechanical diviſion, and conſequently the real nucleus; but in ſome minerals this parallelopiped is diviſible, as well as the reſt of the cryſtal, by farther ſections made in the different directions of the faces, from which reſults a new ſolid, which will be the nucleus, if all the parts of the ſecondary cryſtal ſuperadded to this nucleus are ſimilarly ſituated. When the mechanical diviſion conducts to a parallelopiped, diviſible only by ſections parallel to its ſix faces, the molecules are parallelopipeds

ſimilar

fimilar to the nucleus; but in all other cafes their form differs from that of the nucleus. This may be illuftrated by an example.

Let *a c h s n o* (fig. 68.) be a cube, having two of its folid angles *a*, *s*, fituated on the fame vertical line; this line will be the axis of the cube, and the points *a* and *s* will be its fummits. Let it be fuppofed that this cube is divifible by fections, each of which, fuch as *a h n*, paffes through one of the fummits *a*, and by two oblique diagonals *a h*, *a n*, contiguous to the fummit. By this fection the folid angle *i* will be detached; and as there are fix folid angles, fituated laterally, viz. *i*, *h*, *c*, *r*, *o*, *n*, the fix fections will produce an acute rhomboid, the fummits of which will be confounded with thofe of the cube. At fig. 69. this rhomboid is reprefented exifting in the cube in fuch a manner, that its fix lateral folid angles *b*, *d*, *f*, *p*, *g*, *e*, correfpond with the middle of the faces *a c h i*, *c r s h*, *h i n s*, &c. of the cube; but each of the angles at the fummits *b a g*, *d s f*, *p s f*, &c. of the acute rhomboid, are $=60^{\circ}$, from which it follows, that the lateral angles *a b f*, *a g f*, &c. are $=120^{\circ}$. Befides, it is proved by theory, that the cube is the refult of a decrement which takes place by a fingle row of fmall rhomboids, fimilar to the acute rhomboid on the fix oblique ridges *a b*, *a g*, *a e*, *s d*, *s f*, *s p*. This decrement produces two faces, one on each fide of each of thefe ridges, making in the whole 12 faces; but as the two faces, having the fame line of ridge for their departure, are on the fame plane; by the nature of the decrement, the 12 faces will be reduced to fix, which are fquares, fo that the fecondary folid is a cube.

Suppofe that the cube (fig. 68.) admits, in regard to its fummits *a*, *s*, two new divifions fimilar to the preceding fix, one of which paffes through the points *c*, *i*, *o*, and the other through the points *h*, *n*, *r*. The firft will alfo pafs through the points *b*, *g*, *e*, and the fecond through the points *d*, *f*, *p* (fig. 69. and 70.) of the rhomboid; from which it follows, that thefe two divifions will each detach a regular tetrahedron *b a g e*, or *d s f p* (fig. 70.); fo that the rhomboid will be found converted into a regular octahedron *e f* (fig. 71.), which will be the real nucleus of the cube; for it is produced by divifions fimilarly made in relation to the eight folid angles of the cube. If we fuppofe the fame cube to be divifible throughout its whole extent by analogous fections, it is clear that each of the fmall rhomboids, of which it is the affemblage, will be found in like manner fubdivided into an octahedron, and two regular tetrahedrons, applied on the two oppofite faces of the octahedron. By taking the octahedron for a nucleus, a cube may be conftructed round it, by regular fubtractions of fmall complete rhomboids. If, for example, we fuppofe decrements, by a fingle row of thefe rhomboids, having *b* for the point of their departure, and made in a direction parallel to the inferior edges *g f*, *e g*, *d e*, *d f*, of the four triangles, which unite to form the folid angle *b*, there will refult four faces, which will be found on a level, and like the octahedron, with fix folid angles, fimilar decrements around the other five angles will produce twenty faces, which taken four and four will be equally on a level, making in the whole fix diftinct faces, fituated as thofe of the cube (fig. 68.). The refult will be exactly the fame as in the cafe of the rhomboid, confidered as nucleus.

In whatever way we proceed to fubdivide, either the cube, the rhombus, or the octahedron, we fhall always have folids of two forms, that is to fay, octahedrons and tetrahedrons, without being able to reduce the refult of the divifion to unity. But the molecules of a cryftal being fimilar, Hauy thinks it probable, that the ftructure was, as it were, interfperfed with a multitude of fmall vacuities, occupied either with the water of cryftallization or fome other fubftance; fo that, if it were poffible to carry the divifion to its limits, one of thofe two kinds of folids would difappear, and the whole cryftal would be found compofed only of molecules of the other form. This view is the more admiffible, as each octahedron being enveloped with eight tetrahedrons, and each tetrahedron being in like manner enveloped with four octahedrons, whichever of thefe forms may be fuppofed to be fuppreffed, the remaining folids will join exactly by their edges; fo that in this refpect there will be continuity and uniformity throughout the whole extent of the mafs. It may be readily conceived how each octahedron is enveloped with tetrahedrons. By attending to the divifion of the cube only by the fix fections which give the rhomboid, we may depart at pleafure from any two, *a*, *s*; *o*, *h*; *c*, *n*; *i*, *r*, of the eight folid angles, provided that thefe two angles be oppofite to each other. But by departing from the angles *a*, *s*, the rhomboid will be in the pofition fhewn at fig. 70. If, on the contrary, we depart from the folid angles *o*, *h*, thefe angles will become the fummits of a new rhomboid (fig. 72.), compofed of the fame octahedron as that of fig. 71. with two new tetrahedrons applied on the faces *b d f*, *e g p*, (fig. 72.), which were unoccupied on the rhomboid of fig. 70. Fig. 73. reprefents the cafe in which the two tetrahedrons repofe on the faces *d b e*, *f g p*, of the octahedron; and fig. 74. reprefents the cafe in which they would reft on the faces *b f g*, *d e p*. Hence, whatever may be the two folid angles of the cube affumed for the points of departure, we fhall always have the fame octahedron, with two tetrahedrons contiguous by their fummits to thefe two folid angles; and there being eight of thefe folid angles, the central octahedron will be circumfcribed with eight tetrahedrons, which will reft on its faces. By continuing the divifion always parallel to the firft fections, the fame effect will always take place. Each face of the octahedron, however fmall it may be fuppofed to be, adheres to a face of the tetrahedron, and reciprocally; and each tetrahedron is enveloped with four octahedrons.

The ftructure which is here explained is that of fluate of lime, or fluor fpar. By dividing a cube of this fubftance, we may at pleafure extract rhomboids which have the angles formed by their planes equal to 120°, or regular octahedrons, or tetrahedrons equally regular. In fome other fubftances, as rock cryftal, carbonate of lead, &c. which being mechanically divided beyond the term at which we fhould have a rhomboid or a parallelopiped, parts of various different forms are obtained, arranged together even in a more complicated manner than in fluor fpar. In confequence of thefe mixed ftructures, there is fome uncertainty refpecting the real figure of the integral molecules

cules which belong to these substances. It is observed, however, that the tetrahedron is always one of those solids which concur to the formation of small rhomboids or parallelopipeds that would be extracted from the crystal by a first division. But, on the other hand, there are substances, which being divided in every possible direction, resolve themselves only into tetrahedrons. Garnet, blende, and tourmaline, belong to this number.

Several minerals are divisible into right triangular prisms. Such is the apatite, whose primitive form is a regular right hexahedral prism, divisible parallel to its bases and its planes, from which necessarily result right prisms with three planes. Fig. 76. represents one of the bases of the hexahedral prism, divided into small equilateral triangles, which are the bases of so many molecules, and which being taken two and two, form quadrilateral prisms, with rhombuses for their bases.

By adopting then the tetrahedron, in the doubtful cases already mentioned, all the forms of integral molecules may be in general reduced to three, which are remarkable for their simplicity, viz. the parallelopiped, the simplest of all the solids, having parallel faces two and two; the triangular prism, the simplest of all prisms; and the tetrahedron, which is the simplest of pyramids. This simplicity may furnish a reason for the preference given to the tetrahedron in fluor spar, and the other substances which have been mentioned as examples. But the ingenious author of the theory cautiously declines to speak decisively on the subject, as the want of direct and precise observations, he observes, leaves to theory only conjectures and probabilities.

But the essential object is, that the different forms to which these mixed structures lead, are arranged in such a manner, that their assemblage is equivalent to a sum of small parallelopipeds, as has been seen to be the case in regard to fluor spar; and that the laminæ of superposition applied on the nucleus, decrease by subtractions of one or more rows of these parallelopipeds. The basis of the theory exists, therefore, independently of the choice which might be made of any of the forms obtained by the mechanical division.

With the help of this result, the decrements to which crystals are subject, whatever be their primitive forms, are found reducible to those which take place in substances, where this form, as well as that of the molecules, are indivisible parallelopipeds; and the theory has this advantage of being able to generalise its object, by connecting with one fact, that multitude of facts which, on account of their diversity, seem to be little susceptible of being brought to one common point. But what has been said, will be still more illustrated by examples of the manner in which we may reduce to the theory of the parallelopiped, that of the forms which are different from that solid.

Crystals whose Molecules are Tetrahedrons, with Isosceles Triangular Faces.

Garnet.

1. *Primitive Garnet* (fig. 76.).

Geometric Character.—Respective inclinations of any two of the faces of the dodecahedron, 120°. Angles of the rhombus CLGH, C or G=109° 28′ 16″; L or H=78° 31′ 44″.

Notwithstanding the vitreous appearance in general exhibited on the fractures of garnets of the primitive form, laminæ may be perceived on them, situated parallel to the rhombuses which compose their surface. Let us suppose the dodecahedron divided in the direction of its laminæ, and for the greater simplicity, let us suppose the sections to pass through the centre. One of these sections, viz. that which will be parallel to the two rhombuses DLFN, BHOR, will concur with a hexagon, which would pass through the points E, C, G, P, I, A, by making the tour of the crystal. A second section parallel to the two rhombuses GLPF, BEAR, will coincide with another hexagon shewn by the points D, C, H, O, I, N. And if the division be continued parallel to the other eight rhombuses, taken two and two, it will be found that the planes of the sections will be confounded with four new hexagons analogous to the preceding. But by resuming all these hexagons, it will appear that their sides correspond, some of them with the small diagonals of the rhombuses of the dodecahedron, viz. those which would be drawn from C to G, from A to I, from C to B, &c. and others would correspond with the different ridges EC, GP, PI, EA, &c.

1. The planes then of the sections passing through the sides and through the small diagonals of the twelve rhombuses, will subdivide the whole surface into 24 isosceles triangles, which will be the halves of these rhombuses. 2. Since the planes of the sections pass also through the centre of the crystal, they will detach 24 pyramids with three faces; the bases of which, if we choose, will be the external triangles that make part of the surface of the dodecahedron, and of which the summits will be united in the centre.

Besides, if we take, for example, the six tetrahedrons, which have for external faces the halves of the three rhombuses CEDL, CLGH, CEBH, these six tetrahedrons will form a rhomboid represented by fig. 77. and in which the three inferior rhombuses DLGS, GHBS, DEBS, result from three divisions which pass, one through the hexagon DLGORA, (fig. 76.); the second through the hexagon GHBANF; and the third through the hexagon BEDFPO. Fig. 77. also represents the two tetrahedrons, the bases of which make part of the rhombus CLGH. One of these is marked with the letters L, C, G, S, and the other with the letters H, C, G, S. And by applying what has been said to the other nine rhombuses, which are united, three and three, around the points F, A, H, (fig. 77.), we shall have three new rhomboids; from which it follows, that the 24 tetrahedrons, considered six and six, form four rhomboids; so that the dodecahedron may be conceived as being itself immediately composed of these four rhomboids, and in the last analysis of 24 tetrahedrons.

It may be observed, that the dodecahedron having eight solid angles, each formed with three planes, they might have been considered as the assemblage of the four rhomboids, which would have for exterior summits the four angles G, B, D, A; from which it follows that any one of the faces, such as CLGO, is common to two rhomboids, one of which would have its

its summit in C, and the other in G, and which would themselves have a common part in the interior of the crystal.

We may remark farther, that a line GS (fig. 77.) drawn from any one G (fig. 76.) of the solid angles composed of three planes, as far as the centre of the dodecahedron, is at the same time the axis of the rhomboid, which would have its summit in C (fig. 76. and 77.). The composing rhomboids then have this property, that their axis is equal to the sides of the rhombus. From which, with a little attention, we may conclude, that in each tetrahedron, such as CLGS (fig. 77.), all the faces are equal and similar isosceles triangles.

If the division of the dodecahedron be continued by sections passing between those which we have supposed to be directed towards the centre, and which should be parallel to them, we should obtain tetrahedrons always smaller, and arranged in such a manner, that taking them in groups of six, they would form rhomboids of a bulk proportioned to their own.

The tetrahedrons, which would be the term of the division, were it possible to reach it, ought to be considered as the real molecules of the garnet. But it will be seen, that in the passage to the secondary forms, the laminæ of superposition, which envelope the nucleus, really decrease by rows of small rhomboids, each of which is the assemblage of these tetrahedrons.

The sulphuret of zinc, or blende, has the same structure as the garnet. Hauy informs us that he has divided fragments of this substance by very clean sections, in such a manner as to obtain successively the dodecahedron, the rhomboid and the tetrahedron.

2. *Trapezoidal Garnet*, (fig. 78.).

Geomet. Character.—Respective inclination of the trapezoids, united three and three around the same solid angle D, C, G, &c. 146° 26′ 33″; of the trapezoids united four and four around the same solid angle u, x, r, &c. 131° 48′ 36″. Angles of any one of the trapezoids $m\,D\,u\,L$, L=78° 27′ 46″; D=117° 2′ 8″; m or u=82° 15′ 3″. The value of the angle L is the same as that of the acute angle of the nucleus of calcareous spar.

This variety is the result of a series of laminæ, decreasing at the four edges, on all the faces of the primitive dodecahedron. For the more simplicity, let us first consider the effect of this decrement in regard to the rhombus CLGH (fig. 76.). We have just seen that this rhombus was supposed to belong in common to two rhomboids, which should have for summits, one, the point C, and the other the point G. Let us suppose that the laminæ applied on this rhombus decrease towards their four edges by subtractions of a single row of small rhomboids, in such a manner that in regard to the two edges CL, CH, circumstances are the same as if the rhombus belonged to the rhomboid which has its summit in C; and that in regard to the other two edges GL, GH, the effect is the same as if the rhombus belonged to the rhomboid, which has its summit in G. This disposition is admissible here in consequence of the particular structure of the dodecahedron, which permits us to obtain small rhomboids; some of which have their faces parallel to the faces of that with its summit in C, and the rest to that having its summit in G (D).

The results of the four decrements being thus quite similar to each other, the laminæ of superposition, applied on the rhombus CLGH, and on each of the other rhombuses of the dodecahedron, will form as many right quadrangular pyramids, which will have for bases these same rhombuses. Fig. 79. represents the pyramids which rest on the three rhombuses CLDE, CEBH, CGHB (fig. 76.), and which have for summits the points m, e, s, (fig. 76.); but on account of the decrement by a simple row, the adjacent triangular faces, such as EmC, EsC of the two pyramids that belong to the rhombuses CLDE, CEBH, are on a level, and form a quadrilateral EmCs. But we had 12 pyramids, and consequently 48 triangles. These divided by two give 24 quadrilaterals, which will compose the surface of the secondary crystal. But because the rhomboidal bases of the two pyramids extend more, in proceeding from L to E, or from H to E, than in proceeding from D to C, or from B to C, the sides mE, Es of the quadrilateral will be longer than the sides Cm, Cs. And besides m E will be equal to Es, and Cm equal to Cs. Thus the quadrilaterals will be trapezoids which have their sides equal two and two. There is no crystalline form in which the striæ, when they do exist, shew in a more sensible manner the mechanism of the structure than in this variety of garnet. We may here see the series of decreasing rhombuses which form each of the pyramids CLDEm, CEBHs, &c. (fig. 79.), and sometimes the furrows are so deep that they produce a kind of stair, the steps of which have a more particular polish and brilliancy than those of the facets, which are parallel to the faces CEDL, CHBE, of the nucleus.

If the decrements stop abruptly at a certain term, so that the pyramids are not terminated, the 24 trapezoids will be reduced to elongated hexagons, which will intercept 12 rhombuses parallel to the faces of the nucleus. To this variety Hauy has given the name of *intermediary garnet*.

In the sulphuret of zinc the regular octahedron is the result of a decrement by a row around the eight solid angles, composed of three planes, viz. C, B, O, G, F, D, A, I, (fig. 76.). The same substance also assumes the form of a regular tetrahedron, by the help of a decrement by one row on four only of the eight solid angles before mentioned, such as C, O, F, A. The structure of this tetrahedron is remarkable, as it presents an assemblage of other tetrahedrons with isosceles faces.

Crystals

(D) Theory, the author observes, has conducted him to another result, which is, that the sum of the nucleus and laminæ of superposition taken together in proportion as the latter are applied one upon the other is always equal to a sum of rhomboids; though at first view it does not appear that this should be the case, according to the figure of these laminæ, which represent rising pyramids.

Cryftals whofe Molecules are Triangular Prifms.

Oriental.

Hauy has thus denominated the gem which is known under the different names of *ruby*, *fapphire*, *oriental topaz*, according as the colour is red, blue, or yellow. The different varieties of this gem have not been accurately defcribed, and the nature of the particular angles of each has not been precifely indicated, on account of the rare occurrence of regularly formed cryftals, or, when fuch have been found, on account of their being defaced by being water-worn, or otherwife injured. But from fome cryftals which were fufficiently characterifed, Hauy obtained the following refults.

1. *Primitive Oriental.*

This mineral cryftallizes in the form of a regular hexahedral prifm which is divifible parallel to its bafes. According to theory, which points out other joinings parallel to the planes, the molecule is an equilateral triangular prifm. The height of this prifm, calculated by theory, is a little lefs than three times the height of the triangle of the bafe.

2. *Elongated Oriental*, (fig. 80.).

Geometric Character.—Refpective inclinations of the triangles IAS, IBS, 139° 54′. Angles of the triangle IAS, A = 22° 54′. I or S = 78° 47′.

This form is the refult of a decrement by a fimple row of fmall quadrangular prifms on all the edges of the bafes of the nucleus. Let *q d* (fig. 75.) be the fuperior bafe, fubdivided into fmall triangles, which reprefent the analogous bafes of fo many molecules. The edges of the laminæ of fuperpofition will correfpond fucceffively to the hexagons *h i l m n r*, *e k u x y v*, &c.; from which it follows that the fubtractions take place by rows of fmall parallelopipeds of quadrangular prifms, compofed each of two triangular prifms.

3. *Minor Oriental.*

Geometric Character.—Dodecahedron formed of two right pyramids lefs elongated than thofe of the preceding variety. The triangles correfponding to IAS, IBS, are inclined to each other 122° 36′. In each of thefe triangles the angle of the fummit is 31°, and each of the angles at the bafe is 74° 30′.

The law of which this variety is the refult, differs from that which produces the preceding, as it determines a mixed decrement by three rows in breadth and two rows in height.

4. *Enneagonal Oriental*, (fig. 81.).

Geometric Character.—Inclination of each fmall triangle, fuch as *c q i*, to the adjacent bafe *a c i p l b g e d*, 122° 18′.

This is the elongated oriental, whofe fummits are replaced by two faces, parallel to the bafes of the nucleus, with the addition of fix fmall ifofceles triangles *c q i*, *l b f*, *v z m*, &c. the three fuperior of which are alternate in pofition with the three inferior. Thefe triangles are the refult of a decrement, by three rows of fmall quadrangular prifms on the three angles of the fuperior bafe of the nucleus, fuch as *b*, *d*, *g* (fig. 75), and on the intermediate angles of the inferior bafe. It may be readily conceived, that in the decrement which takes place, for example, on the angle *g*, the three rows which remain unoccupied between that angle and the correfponding edge of the firft lamina of fuperpofition, are, 1. the fmall rhombus *g o i p*, which alone forms the firft row; 2. the two rhombufes *o s t i*, *p z d i*; 3. the three rhombufes fituated on the fame line behind the two preceding.

Cryftals of this gem are chiefly found in the kingdom of Pegu. Some have been found in France, which have received the name of fapphires of Puy. They have been alfo found at a little diftance from Velay, on the banks of a rivulet near the village of Expailly, where they are mixed with garnets and hyacinths. Thefe have all the characters of the ftone which is denominated *oriental fapphire*.

V. Difference between Structure and Increment.

In what has been faid refpecting the decrements to which the laminæ of fuperpofition are fubjected, the author obferves, that it was his view only to unfold the laws of ftructure; and he adds, that he is far from believing that in the formation of a dodecahedral cryftal, or one of any other form, having a cube for a nucleus, the cryftallization has originally produced that nucleus fuch as it is extracted from the dodecahedron, by the fucceffive application of all the laminæ of fuperpofition with which it is covered. It feems proved, on the contrary, that from the firft moment the cryftal is already a very fmall dodecahedron, containing a cubical nucleus proportioned to its fmall fize, and that the cryftal afterwards increafes by degrees without changing its form, by new layers which envelope it on all fides, fo that the nucleus increafes alfo, preferving always the fame relation with the whole dodecahedron.

An example taken from a plane figure will make this more ftriking; and what is faid refpecting this figure may be eafily applied to a folid, fince a plane figure may be always conceived as a fection of a folid. Let ERFN (fig. 82.) be an arrangment of fmall fquares, in which the fquare ABCD, compofed of 49 partial fquares, reprefents a fection of the nucleus, and the extreme fquares R, S, G, A, I, L, &c. that of the kind of ftair formed by the laminæ of fuperpofition. It may be readily conceived, that the arrangement began with the fquare ABCD; and that different files of fmall fquares were afterwards applied on each of the fides of the central fquare: for example, on the fide AB, firft the five fquares comprehended between I and M, next the three fquares comprehended between L and O, and then the fquare E. This increment correfponds with that which would take place if the dodecahedron began by being a cube proportioned to its bulk, and which increafed afterwards with the addition of continually decreafing laminæ.

But on the other hand, the arrangement may be conceived to be fuch as is reprefented in fig. 84. in which the fquare *a b c d* is compofed of only nine molecules, and bears upon each of its fides only one fquare

Structure of Cryſtals.

ſquare *e*, *n*, *f*, or *r*; and that afterwards by means of the application of new ſquares arranged around the former, the aſſortment has become that of fig. 83. where the central ſquare $a' b' c' d'$ is formed of 25 ſmall ſquares, and bears on each ſide of its ſides a file of three ſquares, plus a terminating ſquare e', n', f', or r'; and that, in ſhort, by a farther application, the aſſortment of fig. 83. is converted into that of fig. 82. Theſe different tranſitions will give ſome notion of the manner in which ſecondary cryſtals may increaſe in bulk, and yet retain their form; and from this it will appear, that the ſtructure is combined with that augmentation of bulk, ſo that the law, according to which all the laminæ applied in the nucleus of the cryſtal, when arrived at its greateſt dimenſions, ſucceſſively decreaſe, in departing from this nucleus, exiſted already in the riſing cryſtal.

Such is the ingenious theory of the ſtructure of cryſtals, which the author obſerves, is in this ſimilar to other theories, that it ſets out from a principal fact, on which it makes all facts of the ſame kind to depend, and which are only as it were corollaries. This fact is the decrement of the laminæ ſuperadded to the primitive form; and it is by bringing back this decrement to ſimple and regular laws, ſuſceptible of accurate calculation, that theory arrives at reſults, the truth of which is proved by the mechanical diviſion of cryſtals, and by obſervation of their angles. But new reſearches are ſtill wanting, in order to aſcend a few ſteps farther towards the primitive laws by which cryſtallization is regulated. The object of one of theſe reſearches would be to explain how theſe ſmall polyhedrons, which are as it were the rudiments of cryſtals of a ſenſible bulk, ſometimes repreſent the primitive form, without modification; ſometimes a ſecondary form produced in virtue of a law of decrement; and to determine the circumſtances which produce decrements on the edges, as well as thoſe which give riſe to decrements on the angles.

END OF THE SIXTH VOLUME.

DIRECTIONS FOR PLACING THE PLATES OF Vol. VI.

ERRATA IN CONIC SECTIONS.

Page 527. *col.* 2. *line* 7. *from bottom, for* (Cor. 5.) *read* (1 Cor. 5.)
538. *col.* 2. *line* 14. *for* Cor. 2. Prop. *read* Cor. 2. Prop. 8.
543. *col.* 2. *line* 21. *for* and AH. *read* and take AH.
547 *col.* 2. *line* 5. *from bottom, for* pP : pS *read* pP : LP.
548. *col.* 2. *line* 26. *for* (18. Part II. and 25. Part III.) *read* (Cor. 17. Part II. and Cor. 25. Part III.)
— *col.* 2. *line* 32. *for* (14. Part II.) *read* (15. Part II.)

CRYSTALLIZATION. Plate CLXV.

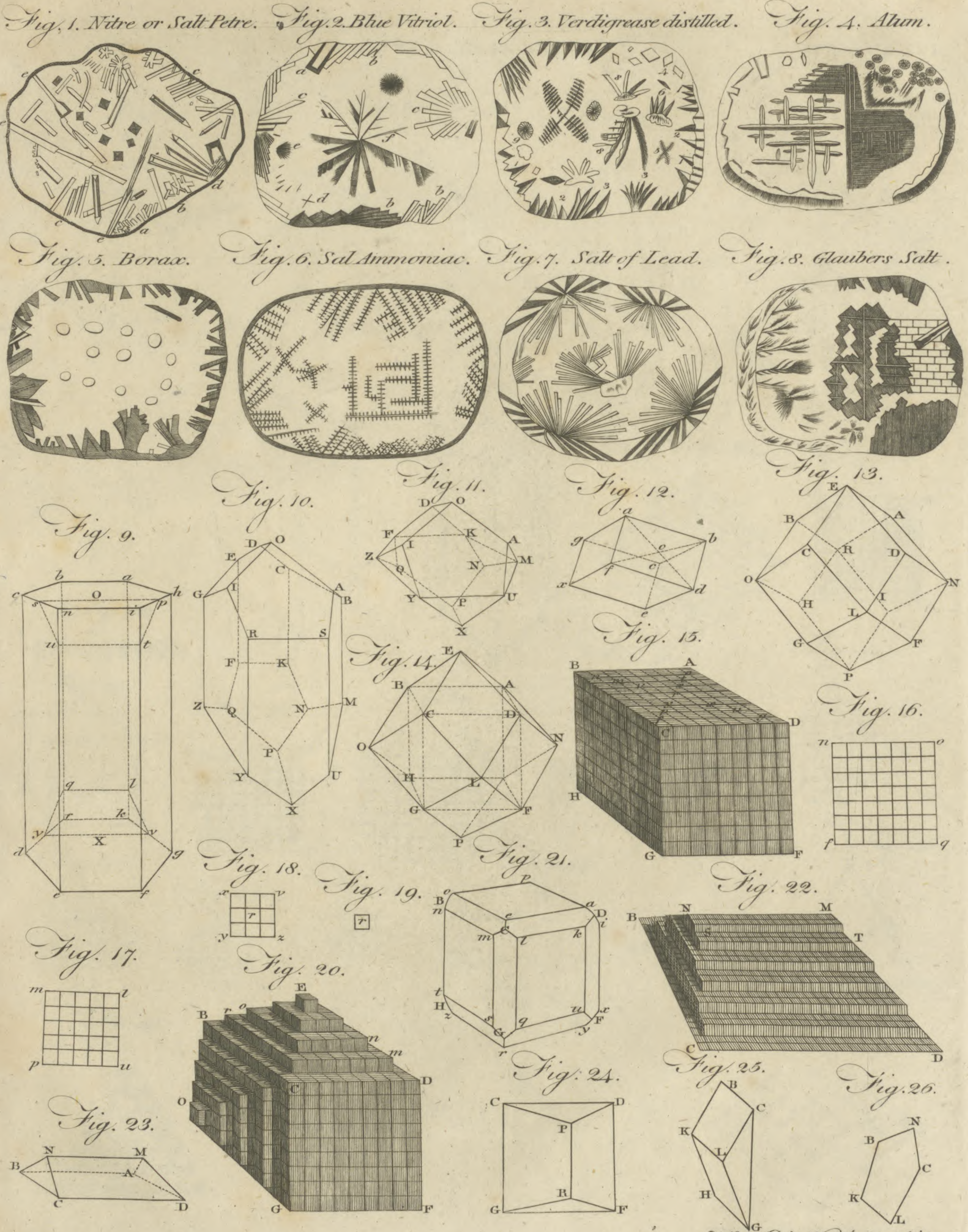

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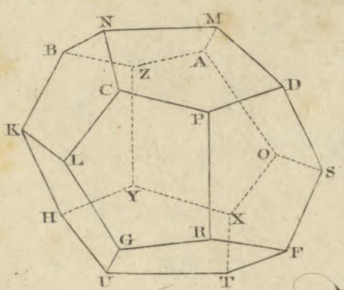
Fig. 27.



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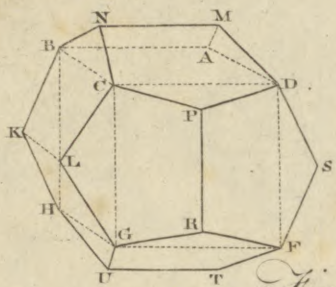

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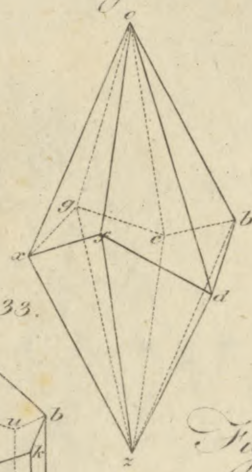

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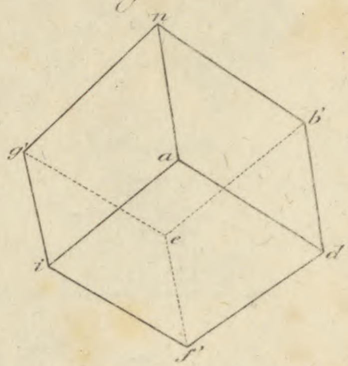

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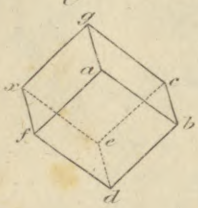

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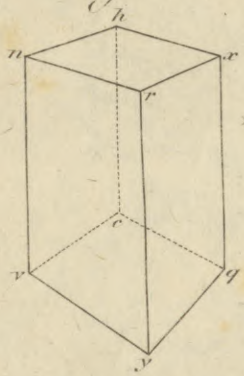

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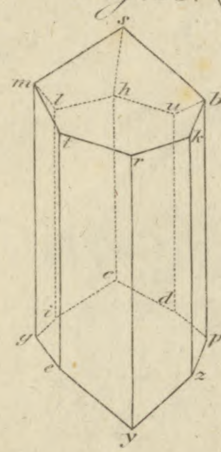

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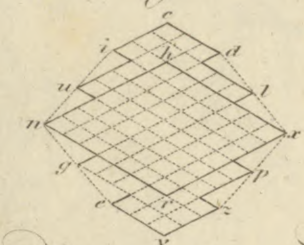

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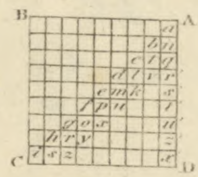

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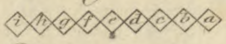

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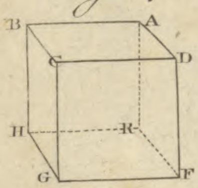

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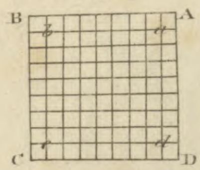

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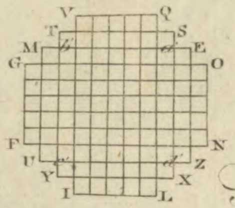

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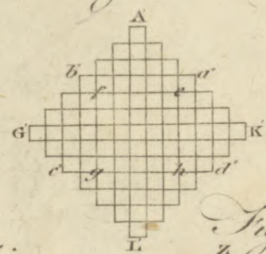

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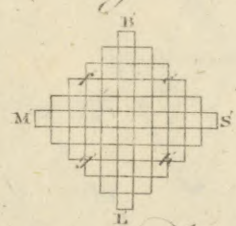

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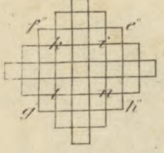

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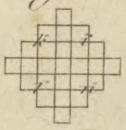

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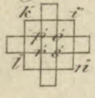
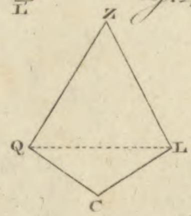


Fig. 45.

Fig. 46.

Fig. 47.



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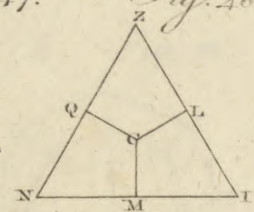

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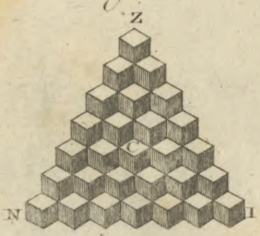

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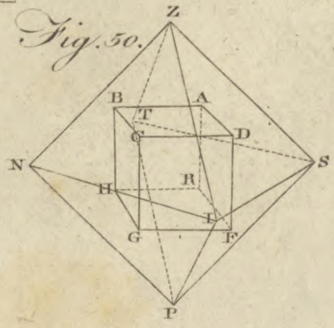

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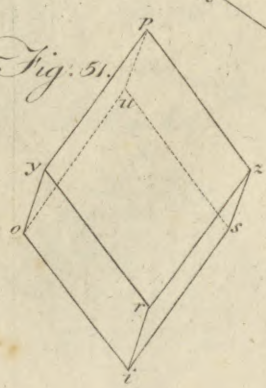

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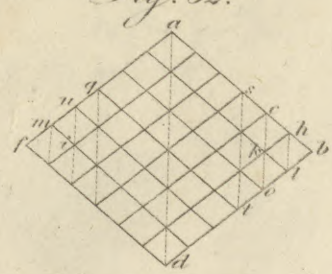

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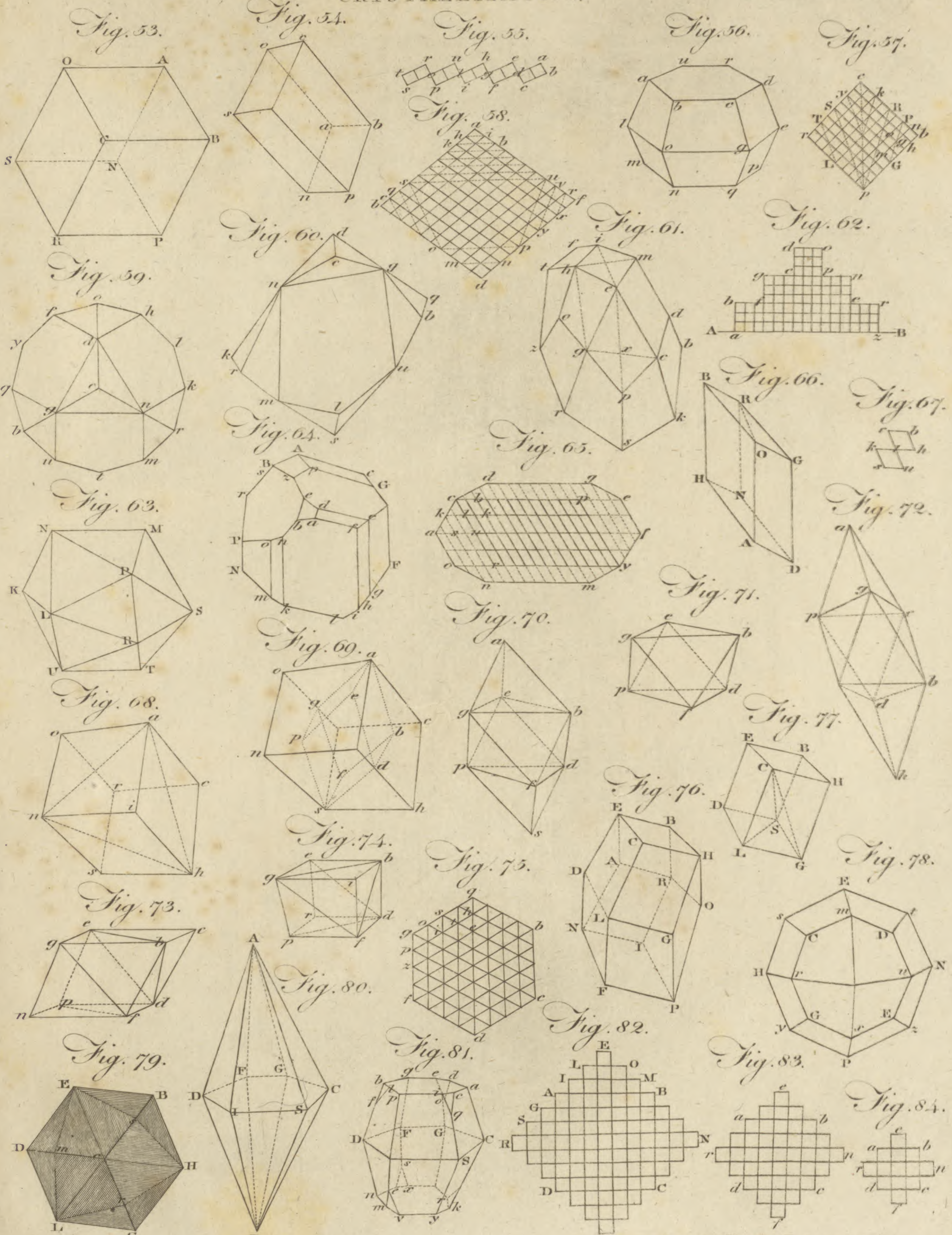

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