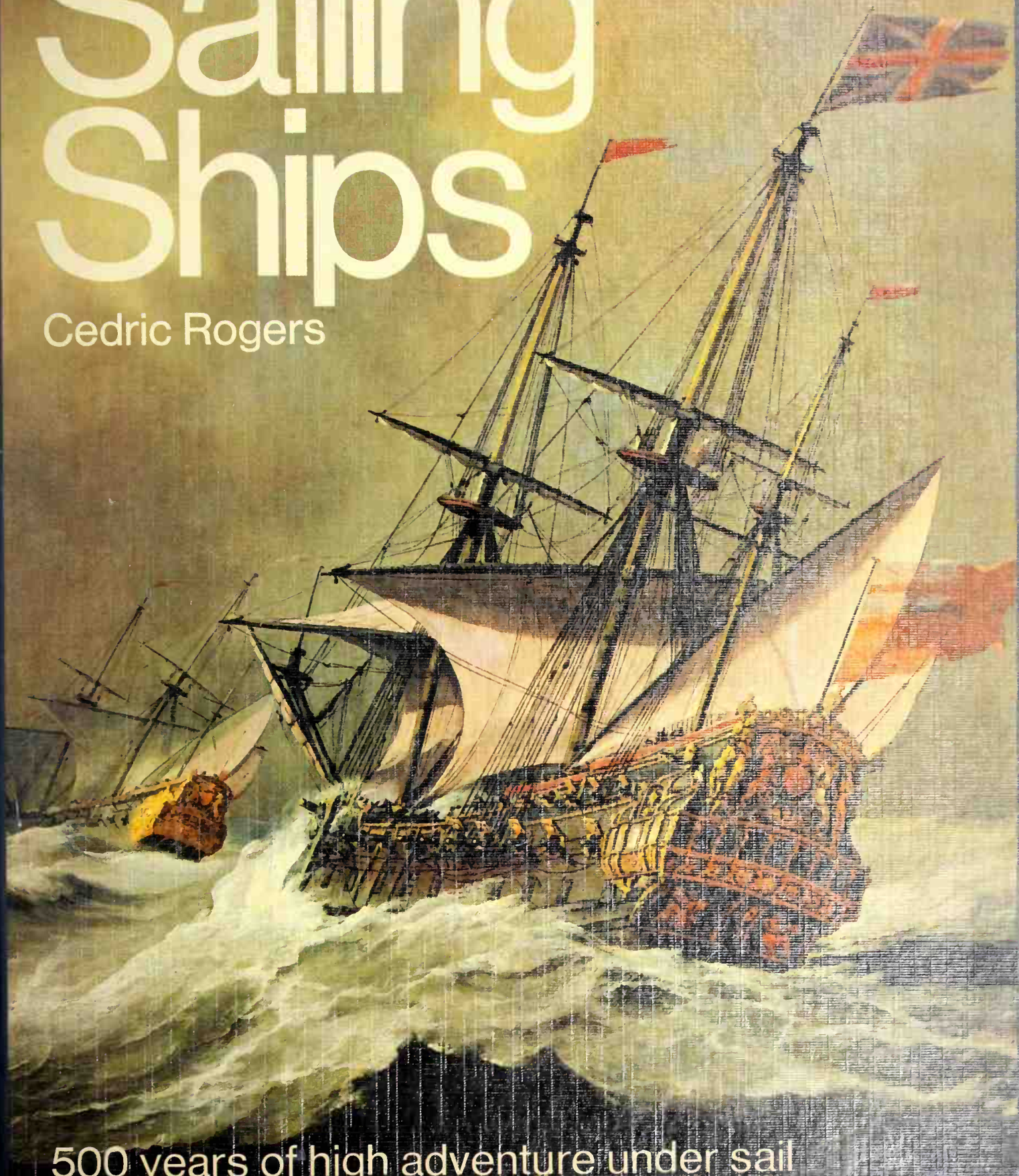
Golden Highlights Library

Sailing Ships

Cedric Rogers



500 years of high adventure under sail

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Golden Press

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Contents

Page 1 *A Venetian ship of 1697 arriving in a Mediterranean port. She was used to carry pilgrims and trade to the Holy Land, having safe conduct from the Turkish Empire, as the Jerusalem flag at the mashead shows.*

Two seals of early English seafaring towns. Below left *The Winchelsea seal showing an early medieval ship, double ended, with light fore and stern castles within the hull, about 1300.* Below right *A cog-type ship on the seal of Rye. Note the rudder mounted on a stern post and the small fore castle contrasted with a large, solidly-built stern castle, about 1400.*

Sources of our Knowledge

LIVING in an age when a twelve-year-old can look you in the eye and say that he is bored with all these space trips and moon landings, it is hard to realize that one's grandfather, at the same age, was probably being told that steam would never take the place of sail. Furthermore, just a few more grandfathers ago, the average ship was about the size of a fishing ketch, and a good deal less efficient. Columbus set out across 3000 miles of unknown water with three of these, and an hourglass by which to keep time.

Between the time of Columbus and that of our own grandfathers, sailing ships developed from relatively simple, clumsy little tubs, to huge, elegant constructions of enormous complexity. There were some large "prestige" ships even in the early fifteenth century, but they were ungainly, and Drake's highly effective flagship REVENGE, although two or three times the size of the SANTA MARIA, was only a third of the tonnage of Nelson's VICTORY.

During the sixteenth century there was something of a technological explosion in shipbuilding. By the beginning of the seventeenth century one can see what could be called the prototypes of the ships of Trafalgar.

At the same time as the sailing ship was developing so rapidly from modest origins to the grand galleons of the Spanish Armada and after, so were the records of their construction and appearance improving dramatically. While we can only guess at what the SANTA MARIA of 1492 looked like, a hundred years later we have exact and detailed plans, by a naval architect, of a ship which could well be based on the REVENGE. From then on the records become so explicit, through plans, paintings and models, that it would be possible to reconstruct many major ships, from the seventeenth century onwards almost plank for plank.

The records of the ships of the early sixteenth century were still somewhat crude, although quite a bit of detail could be discerned from paintings and engravings of the period. But the age of marine painting was still in the future, when minor masters like the Van de Veldes (father and son) could show in their pictures not only a fine degree of painting skill and feeling for a scene, but a record of nautical procedure and detail that the most pedantic sailor could not fault.

Man had been building ships long before all this, of course. We know quite a bit about them, going back as far as the ancient Egyptians, but there are big gaps in our knowledge. Much of what we do know comes from isolated revelations breaking through the general obscurity and often leaving us in the dark about the connection between one stage of development and the next.

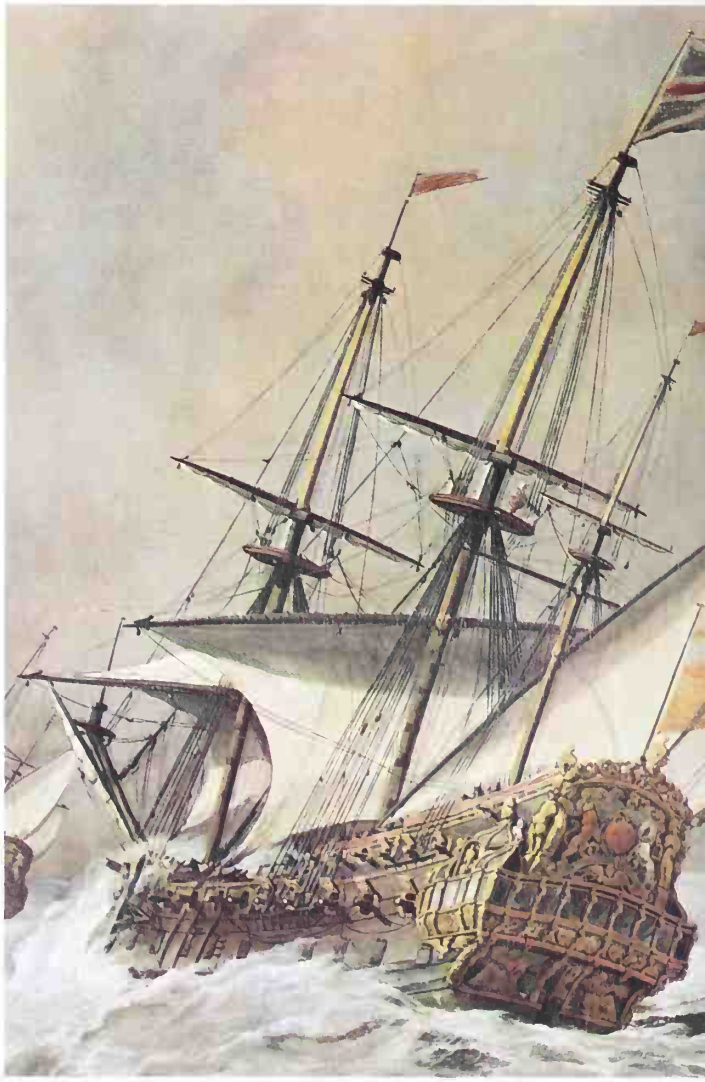
Although these ships of William the Conqueror from the Bayeux tapestry do not have the elegant sweep of the model Viking ship (page 8), this is probably the result of pictorial inaccuracy, for they were almost certainly in the direct tradition of longships.

The most detailed knowledge we have of any early period (apart from the Egyptians) is that of the Vikings. A number of well preserved remains of actual ships have been recovered. The GOKSTAD SHIP in particular gives us exact knowledge of how a Norwegian warship of around 900 AD looked and was constructed, but there is a big gap between these and the records of the sixteenth century. The best information we have, surprisingly, comes from a series of small city seals of the period. These show a distinct progression from the simple double-ended outline of the Viking ship (as seen in the Bayeux tapestry) to the structures of the fore and after castles which later became integral with the ship itself.

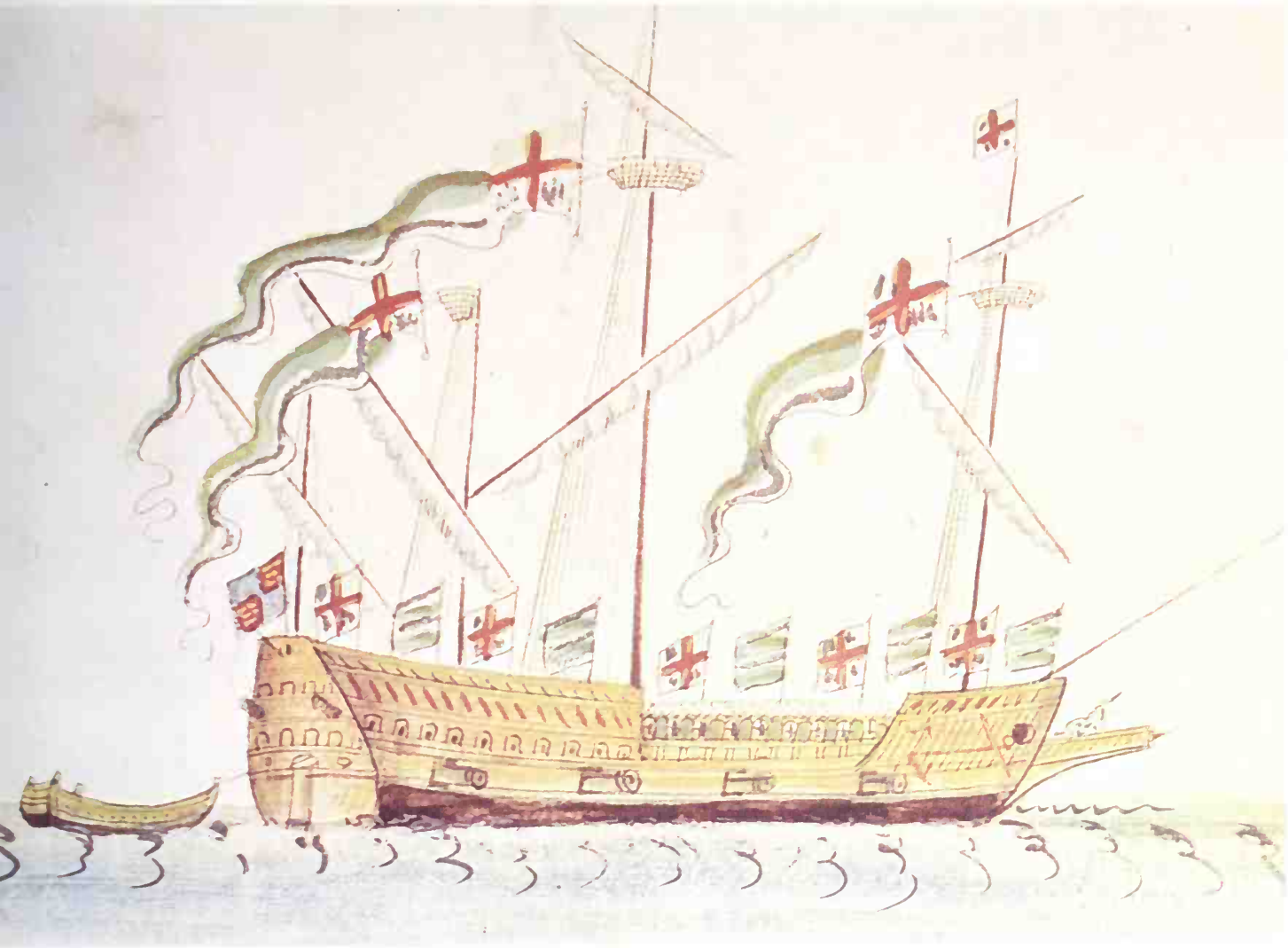
The small size and circular shape of these seals tend to cramp the design, and the ships have not been given accurate proportions. Nevertheless, the essential information is there and includes a surprising amount of pertinent detail.

Other sources of our knowledge of early ships have augmented the ones already described. Contemporary writings give glimpses of facts, such as size and tonnage, not shown in pictures. A detail from a carving or a painting may contain a piece of information about rigging or construction which would otherwise be unknown. The models of medieval ships illustrated here have been based on the city seals, but using other sources and some interpretation as well.

Many of the records of medieval ships which survive are highly inaccurate, but even these



*This representation of "*RESOLUTION *in a gale"* (opposite bottom) *by Van der Velde the Younger, was painted in 1667, less than 150 years after that of the* UNICORN (below), *a ship of Henry VIII's fleet. The latter is rather more informative than the Bayeux tapestry.*



will sometimes help to reinforce a detail of rigging or construction which had been a debatable point among naval historians.

The models of old ships which we have used for illustrations are of two kinds. Firstly there are the reconstructions, built from such information as can be sifted out from the patchy records we do have, combined with a fairly accurate picture of the evolution of shipbuilding techniques, plus a liberal helping of nautical logic. Secondly we have contemporary models, built at the time when the originals were afloat–or even before. These, on the whole, are the most reliable. But even without the help of models such as the one shown on page 8 it would not be hard to reconstruct a ship of the seventeenth century from the painting on this page by Van de Velde the younger. On the other hand, the model of HENRY GRACE A DIEU was based primarily on a drawing about as explicit as the one shown here of HMS UNICORN.

The most satisfactory records we have are naturally the relics of original ships. Apart from such relatively recent treasures which have been preserved from destruction as HMS VICTORY, USS CONSTITUTION and the CUTTY SARK, there are remains of much earlier ships, of which the Vikings have left a handsome legacy. Some of the remains are only fragments from which a great deal of deduction and prior knowledge must be used to reconstruct the original, but in a few cases the remains are so complete that there is little left to do but dot the i's and cross the t's.

The Gokstad ship is one of these. Not only is it in a reasonable state of preservation for its age (1000 years old), it is a good example of one of the more important ships of the time, and is the nearest survival we have from the great Norse longships which are recorded in the sagas. But at 70 feet long it is little more than half the length of the huge *drakkars* (dragons) which have been estimated at 150 feet or more.

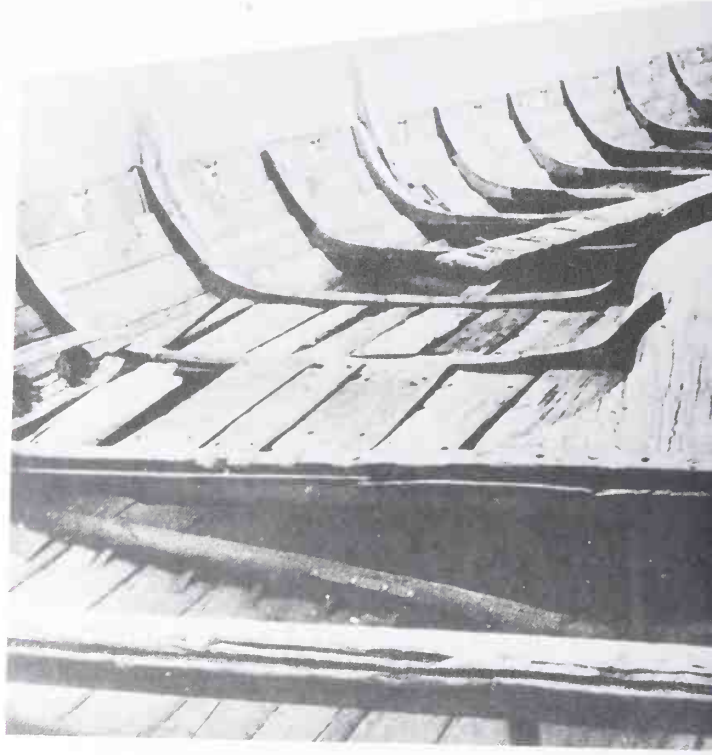
The durability of the oak of which they were built and the preservative qualities of the peaty ooze in which they have lain for centuries have resulted in a number of other interesting relics being preserved for our study, but few as remarkable as the Gokstad and one or two other ships from Scandinavian waters. One of the most interesting, from Nydam in Denmark, dates from as far back as the third century AD. Not a sailing ship, but manned by fourteen oarsmen, it already has the graceful sweeping lines of the great ships to come. The most spectacular of the mud-preserved ships, in terms of sheer mass of woodwork and detailed equipment, is a mere two-and-a-half centuries old.

On August 10th, 1628, in Stockholm harbor, a large man-of-war was ready to put to sea for the first time in her career. She was towed windward to catch the breeze and after sailing about 8 cables (less than a mile), a sharp squall sprang up from an awkward quarter and she capsized and sank almost at once. From that day, until she was relocated in 1956, her hull lay there, settling slowly into the mud. A major salvage operation, using the most modern techniques, succeeded in raising this ship five years later to be restored and housed in its own museum. This is the WASA, a splendid example of a ship of the period, and a treasurehouse of information for naval architects and historians.

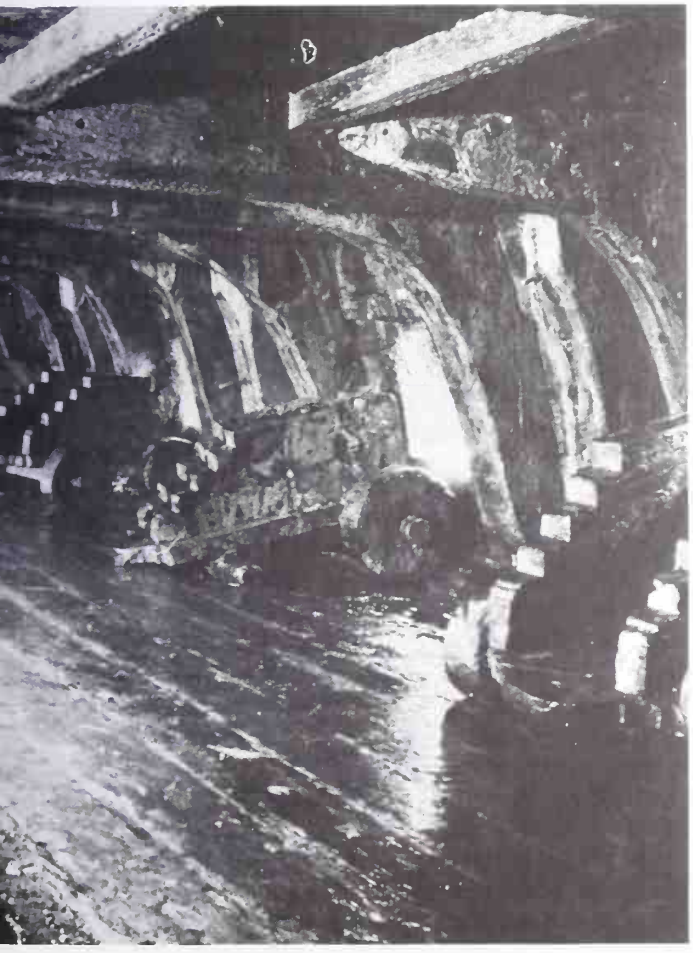
Although she came to such an abrupt and ignominious end, there is no reason to believe that there was anything inherently wrong in her design. The most prominent shipbuilders of the time were the Dutch, and it was a Dutch master-shipwright who planned and supervised her building. The disaster was the result of a series of most unfortunate and unusual circumstances: a new crew hampered by too many visitors, too little ballast and a set of sails vulnerable to the freak wind which finally tipped her over. Posterity was the beneficiary.

From the turn of the sixteenth century on, shipbuilders were beginning to make more precise records of their work. A series of plans for contemporary Elizabethan galleons of the time of the Spanish Armada by a naval architect, Mathew Baker, are still to be seen at the Pepysian Library at Magdalene College, Cambridge. From these and other data it was possible to construct the model shown on page 17 with the certainty that it is an accurate representation of a typical flagship of the time, such as the REVENGE.

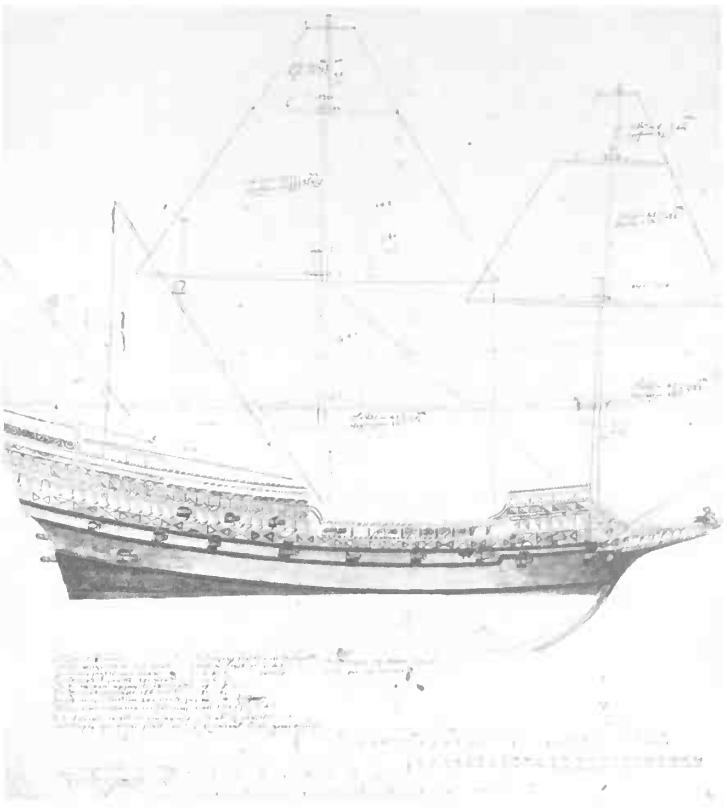
Below *The Gokstad ship provides a living record of an authentic Viking ship, showing details of construction which it would be impossible to know without the existence of this and other Viking ship remains.*

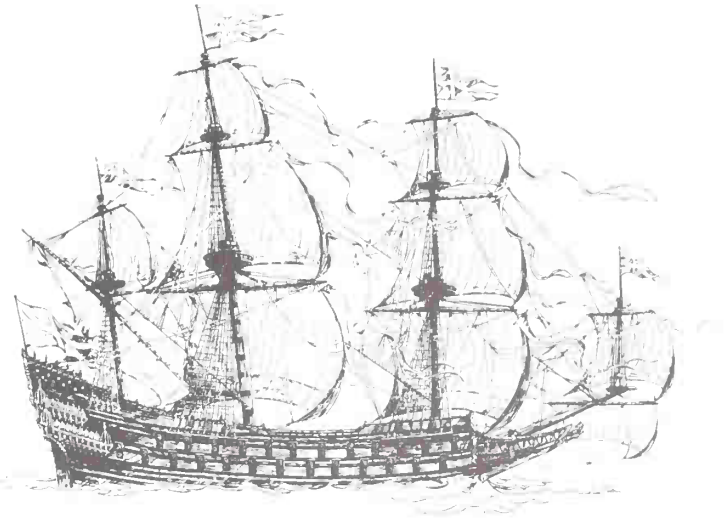


Bottom and bottom right *Two views of the* WASA, *1628. The gun deck is remarkably similar to that of the later* VICTORY *(page 53). The drawing by Nils Stϕdberg is based on Sam Svensson's reconstruction suggestions.*



Below *This plan of a late sixteenth-century galleon by Matthew Baker is an early accurate record of the construction of sailing ships.*





By the middle of the seventeenth century, another kind of record became common. Models of ships have been made as long as ships themselves, varying in construction from inaccurate to downright crude, but around 1660 the English Admiralty instigated a policy of requiring a highly detailed model to be built of any projected warship before acceptance. Many of these models are still in existence, giving us an idea of what warships of the time looked like and how they were rigged and constructed and leaving little to the imagination.

This model of the Gokstad ship shows well the graceful lines and sturdy construction of the original.

Background to the Development of Sail

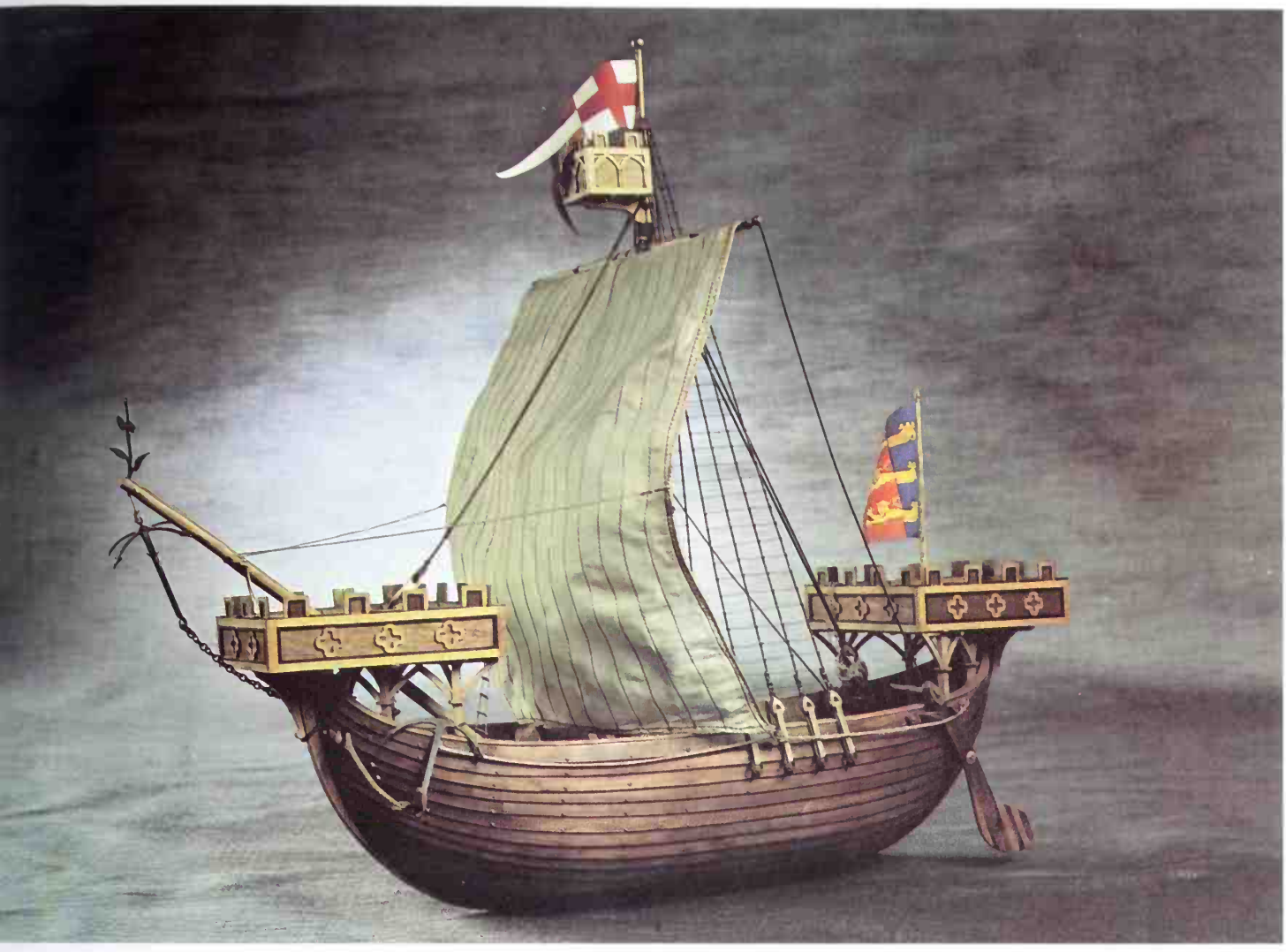
THE great age of sail can be considered as starting with sixteenth-century galleons and reaching its climax with the clipper ships of the nineteenth century. The **carracks** which preceded the **galleons** were the product of a too rapid and insufficiently planned growth in sailing ship design. Galleons were a refinement of sixteenth-century shipbuilding from which subsequent development (of warships as well as of merchant ships) was relatively gradual. At the end of the line, the clipper ship may be considered as the last of the breed to make a serious challenge to the new steamships. This is the period covered in this book.

Of course, the great carracks and galleons of 400 years ago did not spring on to the scene fully grown. A complete study of their antecedents would take us back to ancient Egypt, but it will be sufficient to take the Middle Ages as a starting point.

The typical medieval ship is a tubby, single-masted affair with one large square sail and rather flimsy-looking platforms at each end. These were preceded in northern Europe by the long reign of the Viking ships; not all of the latter were **longships,** oar-propelled by warriors to augment the sail. The majority were probably smaller and broader traders or even pleasure boats, but characteristically they were double-ended (with the same sweeping up-curve both fore and aft) and steered by a pivoted paddle or oar from the after end, on the right-hand or "starboard"(= steerboard) side.

That the longships were graceful and efficient is self-evident. That they fulfilled the needs of their predatory builders in that long period of international anarchy, the "Dark Ages", is shown by the fact that their design remained virtually unchanged for hundreds of years. However, not long after the time of the Norman conquest of England, an important

This model represents a typical double-ended ship of the early fourteenth century. Note the grapnel suspended from the bowsprit.



development took place. It was discovered that in sea battles the ships with a higher free-board (the side of the ship above the waterline) had an advantage over others, in that their weapons were more effective when wielded above the foe. Discovery of this fact was soon to lead to the building of platforms at each end of the ship (the fore-castle and after-castle), later to be followed by a smaller one at the mast head (the top-castle). This latter feature was to survive in various forms until the present century.

A model of a large English cog of the end of the fifteenth century, still clinker-built, like all those illustrated so far, and showing the sail arrangement of the three-masted ships to come. The rudder and different construction of bow and stern are now well-established.

A Mediterranean ship of the Middle Ages which shows a strong resemblance to merchant ships of ancient Rome. Note the twin steering oars, the lateen sail, and the carvel construction (flush planking) typical of Mediterranean ships.

A greater dependence on sailing power led to a deepening and widening of the hull. This was to allow for a larger sail and less likelihood of keeling over and capsizing. Also, it created more space for cargo and crew, and the need for the long, low profile went with the dispensing of oars. The two end-castles, which at first were merely afterthoughts to the main design, became more and more complicated until the sixteenth century, when they were incorporated in the design as fo'c'sle (forecastle) and the more elaborate combination of halfdeck, quarterdeck and poop (aftercastle).

The most important innovation in ship design in the early period was the introduction of the hinged rudder, aligned with the ship's keel. This was an obvious improvement on the old steering oar operated from the side, especially on a large ship. With this new feature came a new approach to building the end parts. The bows and the stern were now considered separately in the designing of the hull, as in fact was already normal in the shipbuilding of the Mediterranean.

The type of north-European ship most typical of this period, which lasted from about 1200 to 1400, was the **cog**. Its characteristics were much as those just described in the last development of design. It was equipped with a rudder, a different profile fore and aft, and castles built solidly onto the hull. The single mast and large square sail at first remained as before with some improvements in the rigging, but later cogs may have two, or even three masts with the equivalent addition of sails.

So far, we have only looked at ship development in northern Europe, although Mediterranean shipping had been flourishing for a good deal longer. Since the conditions for sailing in the North Sea and north Atlantic are very different from those to be found in the landlocked Mediterranean, there was a number of differences in the approach to ship design in the two areas. For one thing, the warship propelled by oars survived in the south long after it had been abandoned in the north. The **galley** of the Latins and the Arabs was still a major weapon of offense even to the battle of Lepanto, which preceded the Spanish Armada by only seventeen years. Indeed the Spaniards included **galleasses** (a cross between a galley and a galleon) in the war fleet with which they planned to invade England.

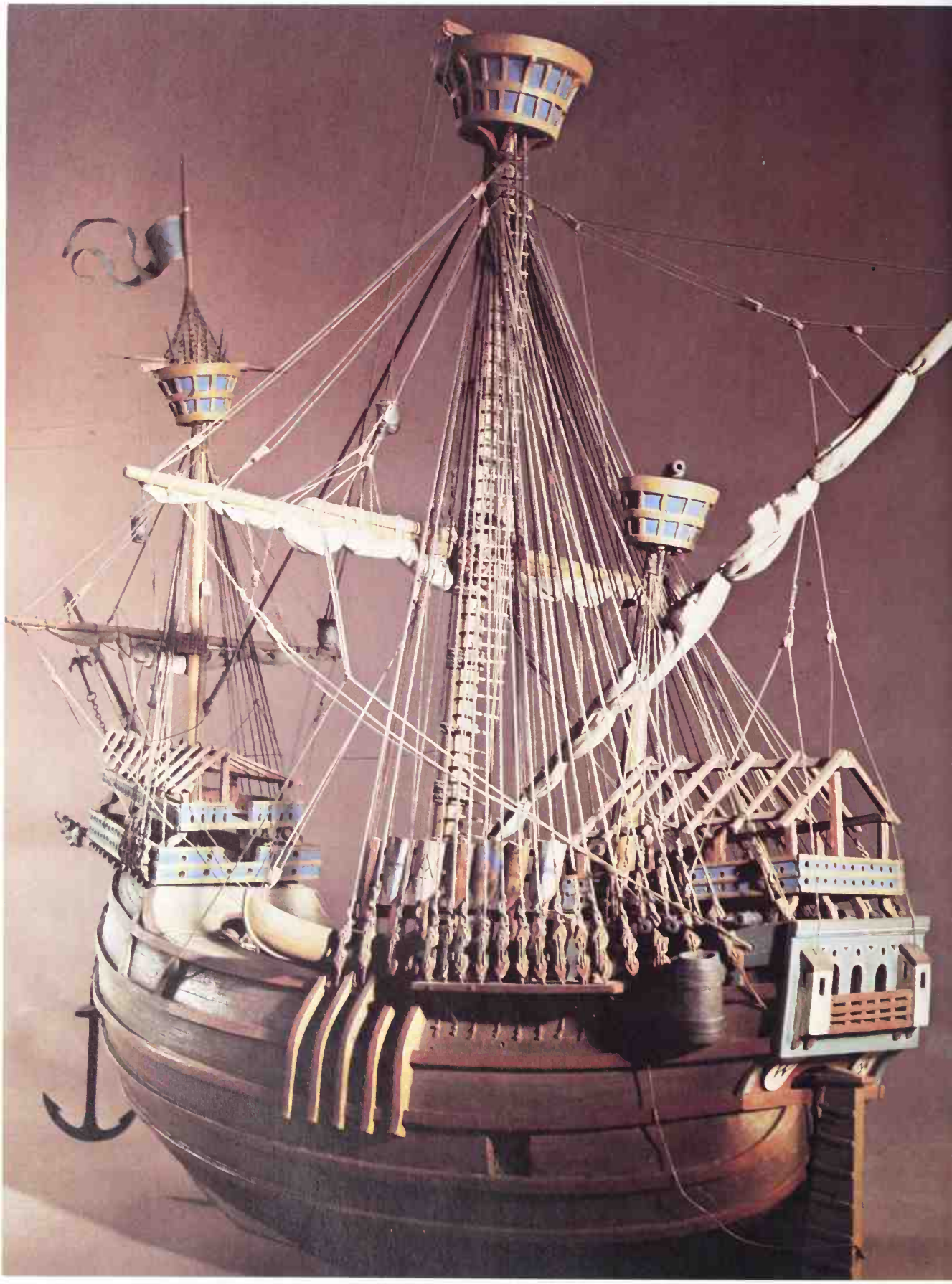
Two major contributions which the southern shipbuilders made to the overall development of ship design were the **lateen sail** and the **carvel** method of hull construction. The type of hull used by the north from the earliest times had been that known as **clinker** (or clincher) built. This consists of planks which are laid in such a way that one edge overlaps the next, making a series of ridges running the length of the hull. With carvel construction the planks are laid flush to each other, edge to edge. Both systems have advantages, and clinker building is still used in many small boats, but for very large ships and those needing extra strength (such as withstanding the shock of cannon being fired), carvel building is much superior.

The rig most characteristic of the Mediterranean, even to this day, is the triangular lateen (Latin) sail. This is a most effective type for sailing close to the wind and, when combined with the square (driving) sail of the northern cogs, produced a far more maneuverable ship than before. The combination of rigs worked both ways. In the north, a small lateen sail came to be added on an extra mast (the **mizzen**) at the stern of the ship, to aid in steering (as on the English cog on page 9). In the south, where two and three masts were already commonplace, the advantages of the square sail as a driver were recognized by adding them, first of all, to the foremast (see the caravela on page 13), later to other masts.

From the age of Homer onward, we have plenty of evidence of the hazards faced by the seamen of ancient times, and if the waters between Gibraltar and Suez might seem a little tame compared with the Bay of Biscay and points north, they can still be treacherous, the more so for ships not designed for the wilder waves of the Atlantic.

I can remember crossing the Atlantic on the AQUITANIA during a January in the 1930s. The once-proud old Cunarder was near the end of her career but was still one of the largest around. At one point of the crossing the seas were heavy enough to force the 45,000-ton sea-borne hotel, with its hundreds of pampered guests, to heave to and ride out the gale. I can still experience the mixture of fascination and horror as I watched the prow bury itself in one huge cliff of water after another, which completely submerged the foredeck, and treated this mass of steel like a piece of flotsam. If one thinks of the Phœnician traders leaving the sanctuary of their sunny sea for the possibility of that sort of treatment in their quest for tin, one realizes that it is risky to generalize about the relative dangers faced by northern and southern European sailors.

A Flemish carrack, about 1480. The heavy lines of a typical carrack are well shown here. After a detailed engraving by the contemporary artist WA.



This graceful caravel anticipates the lines of later galleons. Note the square-rigged foremast, and the rest lateen rigged.

Transition

THE fifteenth century was a key one in the history of ship design. What was to become the basic rig for all big ships during the next four centuries was not yet in practice in 1400. It was more or less standard by 1500.

One ship of this period is noteworthy as something of a freak. It has been mentioned that clinker building is unsuitable for large ships, and cogs, which were characteristic of this method, had a natural limitation to their size. There was a cog, built in 1418 for Henry V, of which there are records and whose remains lie in the mud of the river Hamble, near Southampton, England. This cog, the GRACE DIEU (not to be confused with the carrack HENRY GRACE A DIEU seen on page 16), is estimated to have been as large as the VICTORY, and was certainly the largest clinker-built ship of all time. Excavations have revealed how construction of this monster was possible. The planks were each laid in triplicate, three layers thick. However, it is considered unlikely that it ever left the Hamble, for it was intended as a prestige vessel, to strike awe into the hearts of friends and foes without needing to strike a blow in anger.

This curiosity is less important for any place it might have in the development of the ship, than for showing a trend for the future. It was not until the age of the Tudors, starting with Henry VII, that the English navy was firmly established, but the GRACE DIEU was a portent of what was to come.

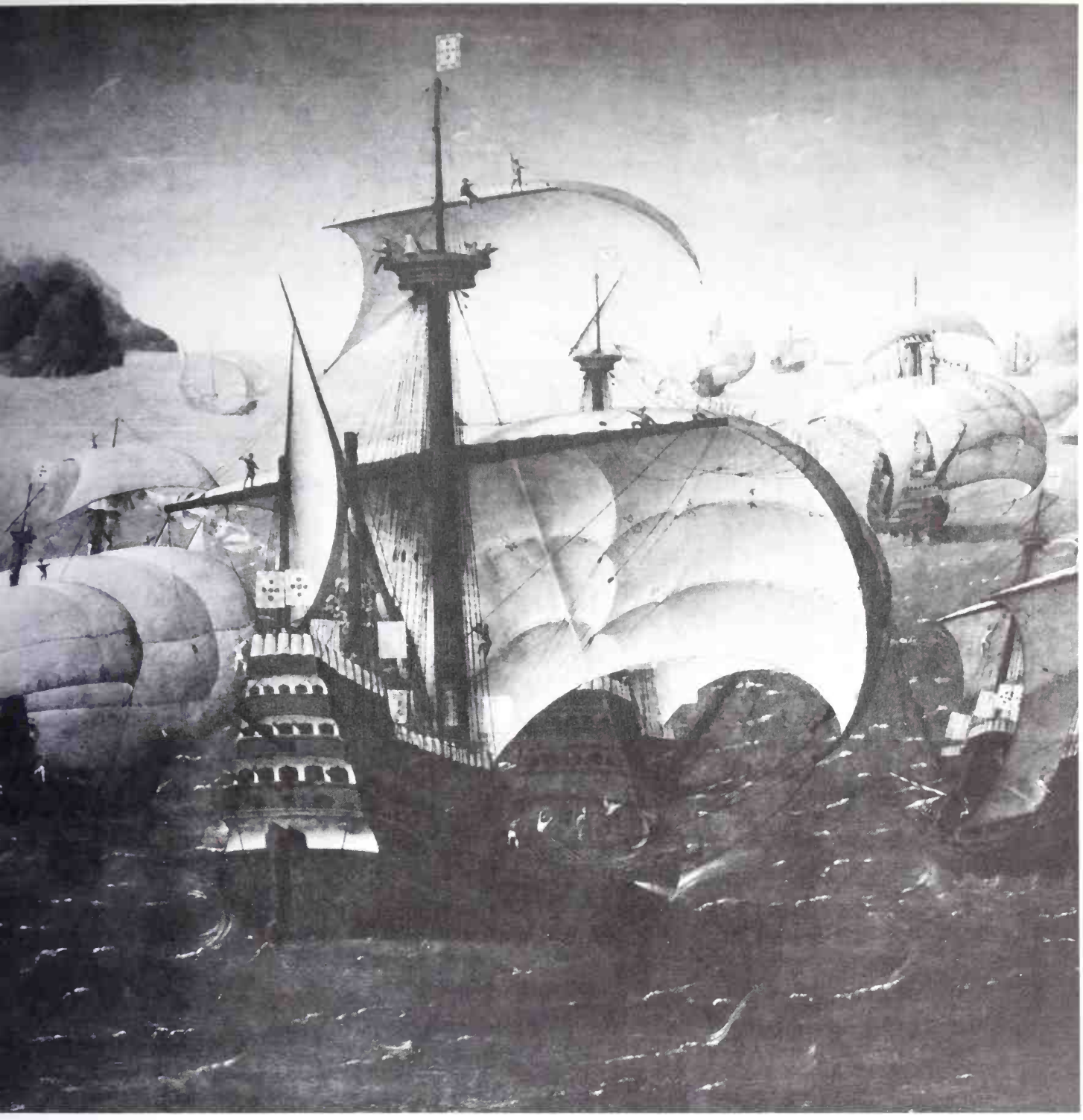
The next stage in ship construction came with the type which was to be known as the **carrack.** It was carvel-built and with a triangular lateen sail on the mizzen mast. The example of a Flemish carrack here has three masts, each with well-equipped topcastles. The rigging and general construction is highly sophisticated by comparison with earlier ships of the carrack type, and far more complex than that of the average cog of the previous century. The external bracing of the hull by horizontal wales and vertical skids is an interesting example of how the increasing need for strength in building bigger ships was tackled. It could hardly have improved its handling qualities.

This modern model is based on unusually accurate engravings of the period, by an artist known only by the initials *WA*. The wealth of detail in the reconstruction was possible because of the clear statement of the same in the engravings. *WA* was obviously not only an accurate observer, but understood his subject. The massive masts were typical of the later carracks and were probably built up of many pieces of timber, rather than from one tree trunk. What it would be like to be stationed in the main topcastle in a heavy sea hardly bears thinking about.

The **caravel** was a southern development which was the workhorse of the early voyages of discovery instigated by Prince Henry the Navigator of Portugal. From what little we know of this type, we can guess that it was evolved from the lateen-rigged fishing boat still to be seen in the Mediterranean in various forms. Although they tended to be smaller than the average carrack of the period, they must have had good sailing qualities and their lines show an elegance missing in the latter. Two of Columbus's ships, the NINA and the PINTA, were caravels (the SANTA MARIA being a carrack). The model of a caravel shown in the illustration is of a late type and larger than usual. The lines of the hull are strongly suggestive of the galleons which were arriving on the mid-sixteenth-century scene, although the external bracing one associates with carracks is still in evidence.

The First of the Great Ships

THE first effective large ships in the modern sense were probably carracks, which originated in the Mediterranean. At first the features which distinguished them from the cog were the carvel build and the mizzen mast with a lateen sail (to be adopted by later cogs). Later carracks differed from galleons in their clumsier lines and a topheavy look about their superstructures, especially the forecastle which overhung the bows. At first, the rig was very simple, a small square sail on the foremast, a large square sail on the main mast and a small lateen sail aft for steering. By the time the HENRY GRACE A DIEU (nicknamed the "Great Harry") was built for Henry VIII, there was an extra mast behind the mizzen (the **bonaventure**), both of which were lateen-rigged. All four masts had topsails, the first three having yet another one above that–the top gallant. A square sail out in front, slung beneath the bowsprit, made a full suit of twelve sails.



Around this time, it had become common practice for any seafaring nation with pretentions to power to build at least one showpiece ship, as an expression of pomp and circumstance and a symbol of naval might. In 1418, nearly a hundred years before the launching of the HENRY GRACE A DIEU, the victor of Agincourt had had his own prestige ship, the GRACE DIEU mentioned earlier. This had been a forerunner of the breed of which Henry VIII's ship was one of the best-known. A later one, Charles I's SOVEREIGN OF THE SEAS, will be discussed later.

Opposite page *The last great naval battle fought entirely with galleys and galleasses was at Lepanto. This detail from a painting of the battle shows both types of ship.*

Above *A giant carrack of the type used by the Portuguese in their early colonizing of Africa, South America and the East: a detail from a painting attributed to Cornelis Anthoniszoon, about 1530. Note the vast mainsail and monolithic main mast typical of the carrack.*

HENRY GRACE A DIEU, *a model of Henry VIII's prestige carrack based on a drawing from the same series as that of* HMS UNICORN.

One of the most bizarre of the prestige ships was built in France as a direct answer to the HENRY GRACE A DIEU. This was the GRANDE FRANÇOISE of 1533. The big ship of his English rival had clearly impressed Francis I. His own version, among other extravagances, included a built-in windmill for grinding wheat for the crew's bread. However, her career was brief and ignominious–she capsized in a gale soon after launching, a misleading portent for the seventeenth and eighteenth centuries, when French ship design was acknowledged throughout the world as the best by a good margin.

To give some idea of how ambitious was the conception of the "Great Harry", a few facts would be in order. At a time when 500 tons was considered a large tonnage for a ship, she was over twice that (74 years after her launching, the best of the English galleons which defeated the Armada are estimated at around 500 to 600 tons). From 1536 to 1539, she was completely rebuilt to the form shown in our model. The armament now consisted of 21 heavy bronze guns and 230 iron guns.

She might have taken part in the defense of England in 1588 had she not been accidentally burned in 1553. But in fact the "Great Harry" would have been obsolete to the degree that the Spanish great ships were when matched against the magnificent smaller galleons of Howard and Drake.

Valuable lessons were learned in the building of such monsters, lessons which made possible not only efficient ships on a more modest scale, but paved the way for those which would eventually dwarf them. It is rather tempting to make a comparison with Concorde, the giant prestige airplane. Is it not possible that one day in the future, heavier-than-air craft that are two or three times the size of Concorde may be considered perfectly normal?

Carracks to Galleons

THE stage has now been set for the development of the fully-rigged ship, a type of rig which was to be more or less standard for all medium and large vessels for three hundred years. The classic type has three masts, with square sails on all, and with a fore-and-aft sail on the mizzen mast as well. At first, this was a lateen sail, but before long it was found convenient to dispense with that corner of the

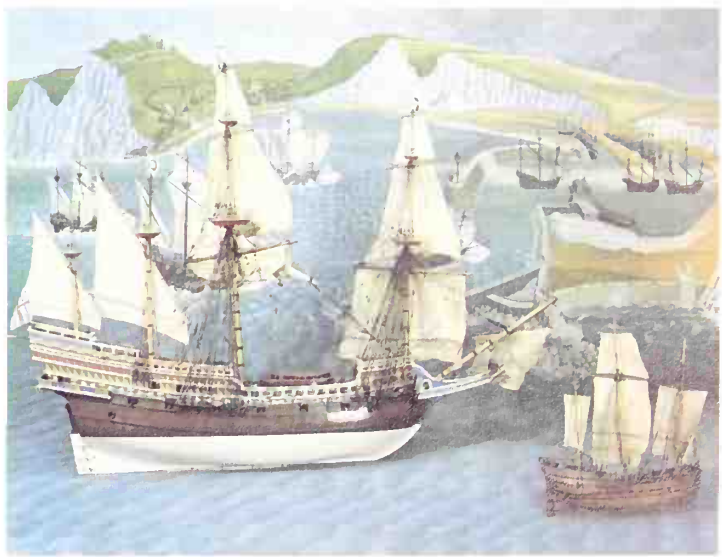
triangular projecting forward of the mast, leading to the familiar quadrilateral sail known as the spanker.

Every major ship from the middle of the seventeenth century until the age of the clipper-ship followed this basic sail plan. The earlier ones also had a square sail under the bowsprit and even a little mast at the end of the bowsprit to support another. Later, these square head sails were converted to triangular sails attached to the forestays (bracing ropes between the bowsprit and the foremast). But whether it was a first rate ship-of-the-line or a frigate, an East Indiaman, a whaler, or a clippership, the rig was always the same. Even smaller ships, corvettes and sloops, and even some yachts, were to be ship-rigged. The only important disadvantage of the full rig was the need for a large crew to handle it and the expense of the equipment.

But this is getting ahead of ourselves. Ships of the sixteenth century had still not reached this formula, and the larger ones had four masts (square sails on fore and main masts, lateen on the mizzen and bonaventure masts). In fact, at this time the term "full rigged" could refer simply to three masts and three sails (two square, and one lateen) as on the English cog (page 9).

The sixteenth-century galleon reached a plateau of development, and only minor changes and modifications broke the continuity of its line of descent to the great wooden walls of Trafalgar. The carrack, as we have seen, came in many different sizes and guises (compare the pictures of carracks on pages 12, 15 and 16) and evolved from small two-masters very like cogs to huge floating castles of wood like the "Great Harry."

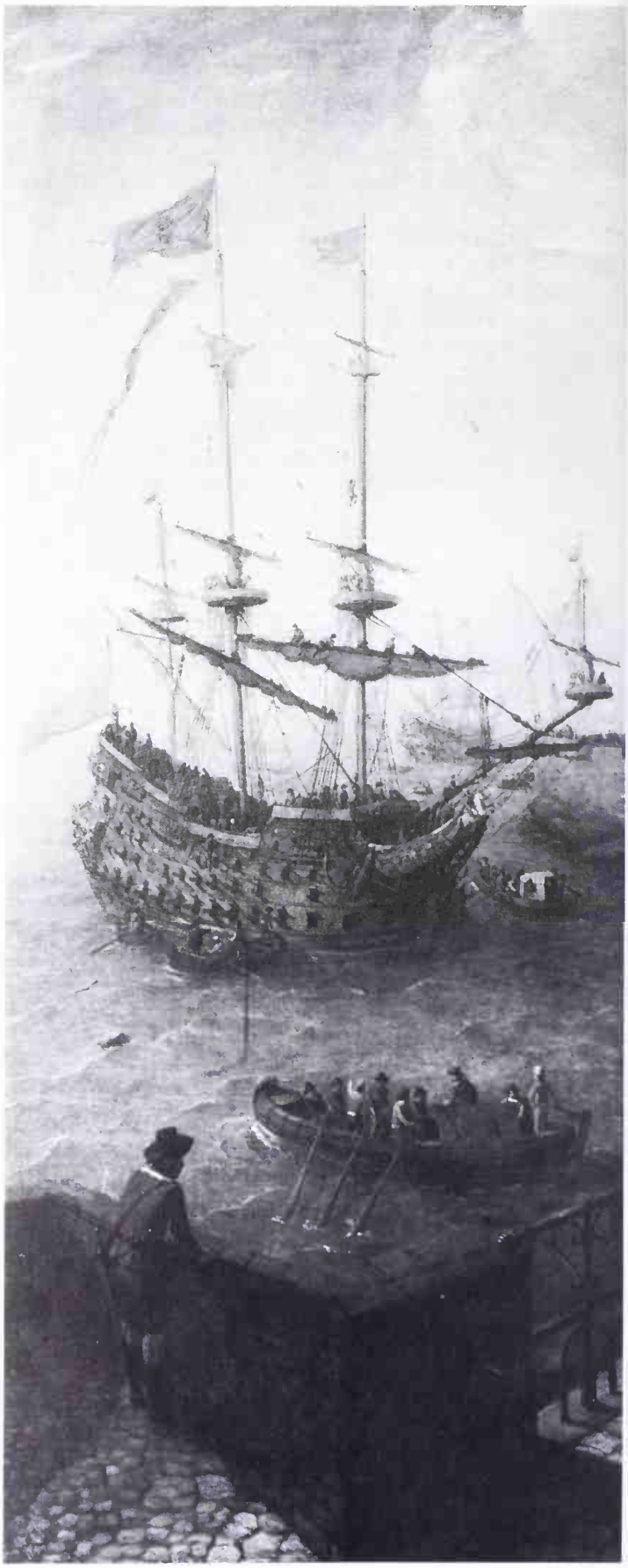
The debt owed to the later carrack by the galleon can be seen in the models illustrated here. The rig is essentially the same, though the lines of the galleon are much cleaner and seem to be closely related to the elegant caravela (page 13), which suggests that it was a fusion of the two types, the carrack and the caravel, which produced the galleon. It now only remained for the two lateen-sailed mizzen masts to be welded into one, carrying both square and fore-and-aft sails, for the evolution of the full rigged ship to be complete. One of the first of these can be seen in the picture left.



Above *A model of an Elizabethan galleon, late sixteenth century, based on the plans of Matthew Baker. The herring buss gives an idea of its size.*

Left SOVEREIGN OF THE SEAS, *the seventeenth-century prestige ship of Charles I. For the next two centuries, changes in design were only minor.*

A Spanish three-decker at Naples, about 1650, showing the transition from the galleon form to the man-of-war. Painting by Abraham Willaerts.



Although she was also one of the last of the "prestige" ships built to bolster the vanity of a monarch (Charles I), she was nevertheless no ill-conceived monstrosity, but a formidable and efficient weapon. So far ahead of her time (which was 1637), was she, that she could have held her own with Nelson's ships at Trafalgar, 118 years later. The only extravagance which would have made her look out of place was the abundance of gilt carving on the hull, and particularly around the stern, which earned her the nickname of "the Golden Devil" from her Dutch adversaries. The practice of elaborate decorative carving, which can be seen in models and paintings of the period, went out of favor later in the century, but there are interesting comparisons to make between this picture and the architectural detail to be found on many houses of the time.

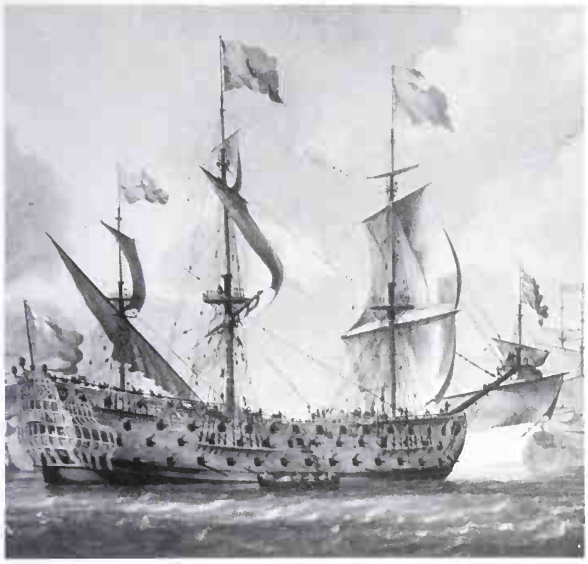
The Wooden Walls

THE next two centuries of ship development seem rather tame after the two rather hectic ones which preceded them. Various factors had forced the evolution of seagoing vessels from clumsy little tubs, whose crews preferred to hug the coast, to the versatile, seaworthy craft with which Columbus and Magellan could dare the challenge of unimaginable dangers that might be encountered thousands of miles from the nearest land, and culminating in the splendid galleons of the Spanish Armada. It was, of course, the period of the Renaissance, when man's natural curiosity and thirst for knowledge had burst the bonds of the Middle Ages.

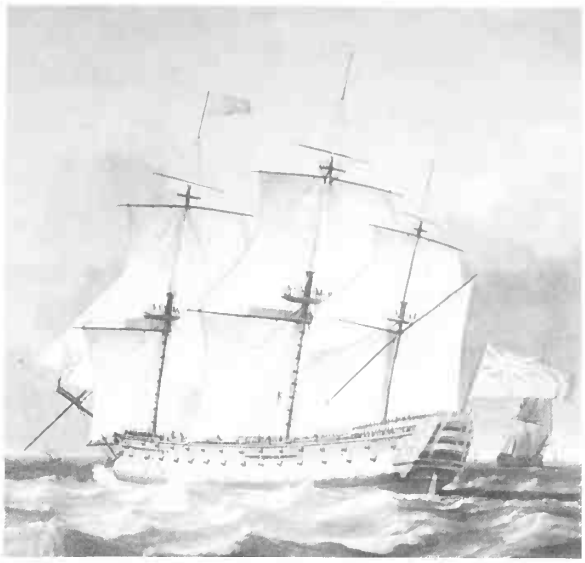
Technical and philosophical advances were being made which were mutually stimulating, and the same forces which were at work driving men to build bigger, more efficient ships, were affecting the arts. Painters and engravers had for centuries been content to repeat an endless succession of formalized pictures of religious events. Now they started to look outwards, and record the world around them, which included the boats and ships of their day. The point where our records of ship development reached a peak coincides with a peak in the development itself.

This is not to say that nothing happened between the establishment of the formula for the full-rigged ship in the early seventeenth century and the coming of steam, but sometimes the changes are superficial, and at other

The ROYAL PRINCE, *1670, played a prominent part of the Dutch wars. Painting by Jan van Beecq.*



This is the VICTORY *before her major re-fitting of 1803, much as she looked when first launched in 1765. Painting by Monamy Swaine.*



times they do not show on the surface. There is a bigger difference between the ROYAL PRINCE of 1670 and the VICTORY (constructed in 1759–65), as seen in this picture of 1793, than meets the eye. In fact, the eye can detect a far bigger difference between the earlier VICTORY and the same ship as she appeared at Trafalgar, twelve years later, but in each case the differences are trivial compared with those which could take place during a single decade in the sixteenth century.

The chief reasons for this apparent stagnation are twofold–the first being that, having reached a formula which appeared to be as effective as the limits of wind power allowed, there was not much left to do but turn inwards and simply refine the details. Another reason, at least with the British navy, was a conservatism on the part of the Lords of the Admiralty which led to rather rigid rules and limitations laid down for the specification of future ships.

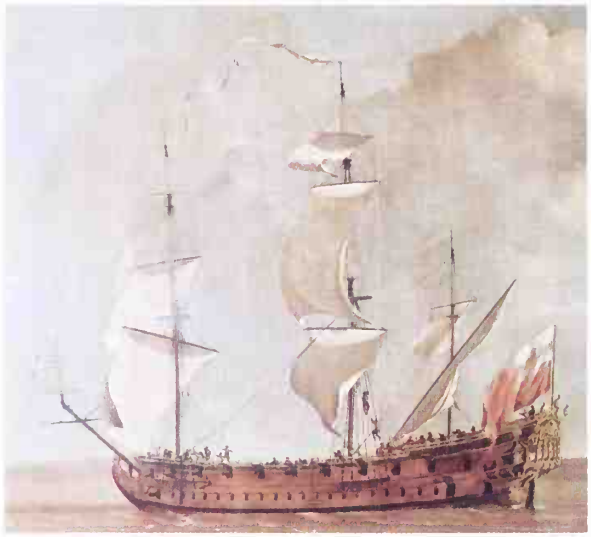
Having found the best formula for general ship design and rig, attention was now turned to such matters as improving the warship as an instrument of attack and defense. A greater weight of cannon needed reinforcement of the hull structure to withstand the shock of recoil. And, just as later battlewagons like ironclads, tanks and aircraft, introduced armor plating for protection, so the old wooden ships increased the thickness of their planking to resist the impact of cannonballs, whose weight was also increased proportionately. The operative word nowadays is escalation.

Be that as it may, the sides of the VICTORY were up to three feet thick in places, of the best British oak, and a medium-sized shot fired at close range would simply lodge in the side like an air rifle pellet in a door. The classic broadside's effect was cumulative, a massive jolt administered by forty or fifty iron balls of twenty to thirty pounds each with plenty of momentum behind them. Any hull which could take this sort of treatment deserved the title of "wooden wall", which is how the ships of this period came to be known. A second meaning to the phrase was the ancient Greek analogy of wooden ships as the country's wall against the foe. All this required a prodigious amount of oak, and it is a fact that the face of rural England was drastically altered by the erosion of its oak forests to feed the dockyards.

When Nelson took over the VICTORY, he was to be in charge of a ship nearly as old as himself, since her keel had been laid down only a year after his own birth. She had, however, been refitted twice. The first refitting was a minor affair which did not noticeably alter her original appearance. The second amounted to a major rebuilding operation, as can be seen by comparing the picture on this page with the photograph on page 53. Apart from the greater sail area (note the long lateen yard on the earlier version, which has been lopped off to become a gaff in the later one), the shape of the hull was altered, losing the graceful sweep from stem to stern (the sheer line), giving her the rather slab-sided look so typical of the last of the great sailing ships-of-the-line. The checkerboard effect is only superficial paintwork, but the stern has been completely rebuilt, omitting the open galleries of the seventeenth- and eighteenth-century first and second raters.

It is interesting to observe how the Spanish

Below *The* CHARLES, *an early seventeenth-century frigate built for dealing with Mediterranean pirate galleys.*



threedecker of the early seventeenth century (page 18) still displays the lines of a sixteenth-century galleon, but with the addition of awesome tiers of guns and the classic rig of the three-masted ship. Spain clearly did not intend to make the same mistake again.

Lesser Warships

SO far, we have concentrated on warships, since it was these which made the most striking advances in development. And until the nineteenth century most larger ships were half warships, even if their objective was exploration and trade. The high seas were a

Opposite bottom "BRITANNIA *entering Portsmouth, 1835" She was among the last of the jumbo sailing warships.*

Below *HM Frigate* TRITON, *1796, a good example of the type of smaller warship from the period. Painting by Nicholas Pocock.*

kind of free-for-all for anyone with adventurous inclinations, whether under the guise of privateering (relieving any of one's monarch's enemies of their treasure ships) or piracy (helping oneself to anything going). Before leaving the subject of the pure man-of-war, we should take a look at some of the lesser of these.

By the eighteenth century, it was normal for the largest ships to have three gundecks with a total of 100 guns or more. These were the first raters. A standard of rating for men of war was devised, which graded down from this according to the number of guns they carried. Second raters had about 90 guns or more; a third rater averaged between 64 and 84. These all qualified as ships of the line, which could be expected to enter the mêlée of a major naval encounter. Smaller ships than this would be used for convoy duties–fourth raters, of 50 to 60 guns, fifth raters of 30 to 40 guns (for scouting duties), while the sixth raters, 20 to 28 guns, would be for patrolling.

The sizes of the smaller fighting ships were more pleasingly expressed in their names. The **frigate** was a most important class. The equivalent of the cruiser, well-armed but fast, it was a single decker (the guns all on one deck). Under the rating system it was usually a fourth rater, averaging around 50 guns. **Corvettes** and **sloops** were the small fry (roughly fifth- and sixth-rate respectively) but with vital work to do such as reconnaissance, convoying,

privateering (licensed piracy), smuggler chasing and so on. The names "corvette" and "sloop" were revived in World War II to apply to small destroyers used for submarine chasing, and convoy work.

There were smaller naval ships than these of course. The **brig** (a fully-rigged ship with only two masts) was also employed as a man-of-war, generally of the sloop class. But the frigate was without doubt the most versatile of all the warships, and while it would not normally take part in a slam-bang showdown like the battle of Trafalgar, it was not only to be found in countless minor engagements, but was also dominant in the efforts to control piracy. Later frigates could even lay some claim to a part in the ancestry of the clipper ship.

Merchant Ships, Trade and Travel

ALTHOUGH the men-of-war are, on the whole, the more glamorous of sailing ships, it was the merchant ships which changed the face of the earth as we know it today. It is sometimes difficult to realize that the vast redistribution of European peoples through colonization and emigration was done almost entirely in sailing ships. By the time the steam boat was taking over the job the new shape of nations was more or less complete. Furthermore, the majority of ships (if they can be dignified with the title) were of a sort that most of the pampered travelers of this century, who may fret over an hour's delay on a seven-hour flight across the Atlantic, would not care to board for a trip around the bay. At various periods of history, warships and merchantmen have been hard to tell apart. Of course, the small coastal boats whose business, such as fishing or carrying unglamorous cargo (for example, coal), would not attract the predators of the sea, could develop on utilitarian lines. But in the period of untrammeled adventuring on the world's oceans, any ship was on its own, and might switch rôles from explorer or trader to policeman or even pirate. So the merchantmen of the sixteenth, seventeenth and eighteenth centuries all look at first glance like men-of-war bristling with cannon, and built on the lines of the ships which have proved to be most efficient in the various conditions to be met on long voyages.

It is interesting to note that the model of the MAYFLOWER, the most famous of all emigrant ships, was based on the typical merchantman of the period, which looked very much like a small galleon of the type which sailed with Howard and Drake in 1588 against the Spanish Armada. Many of the English fleet on that occasion were, in fact, simply armed merchantmen.

By the nineteenth century, the difference was becoming more obvious. The clipper ships had a new defense against piracy, speed. Also, the overt piracy of preceding centuries was less in evidence due to concerted efforts of maritime nations to control it.

The minor merchant ships on the whole followed traditional lines, and when a satisfactory design was evolved there was little pressure for it to be changed. The lesser vessels are outside the compass of this book, so we must draw a line somewhere here, but it may be worth observing that the smaller boats seem to have reached a level of efficiency at an early date, so that any development has been almost imperceptible in some cases.

The **herring-buss** illustrated here is a model based on drawings decorating a map of 1584. This type of large fishing boat, found in the North Sea, is known to have changed hardly at all from that time to the eighteenth century, from which period onward we have detailed plans.

In the Mediterranean, the pot-bellied shape

of Roman trading vessels seems to have persisted until at least the Middle Ages, and it may well have been from these that the carrack evolved. The cog of northern waters was essentially a trading ship, although when adapted for warfare it proved to be superior at close fighting to the longships.

Certainly, one tends to think of the old merchant ships as being tubbier and with less elegant lines than the fighting ships, although in the nineteenth century, among the larger ones, the reverse was true.

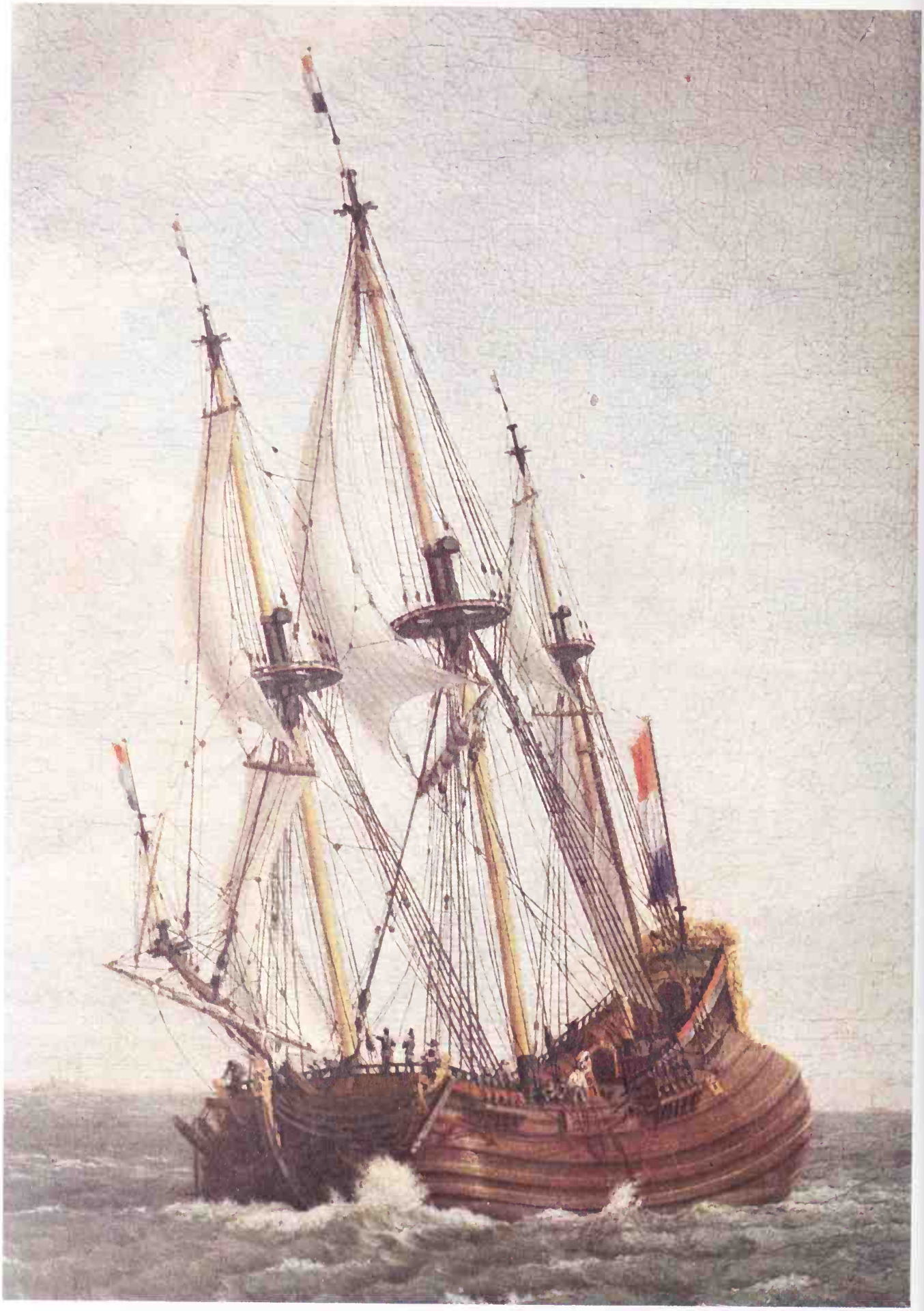
Around the seventeenth century, certain ships can be identified as being specifically non-belligerent. Apart from the obviously peaceful herring-buss, there is a type known as the **collier brig** which came into general use about that time for carrying coal from the north of England, where it was mined, to London. These square-looking, clumsy tubs were not without character (see page 35). Their lines were rather similar to those of the timber bark illustrated here. **Barks** (or barques) and brigs were commonly used as smaller merchant ships, since they had fewer square sails than a full-rigged ship and therefore could be handled by a smaller crew (see pages 38–9 for rig).

The Dutch were dominating the northern seas by the beginning of the seventeenth century, and their ships were usually quite distinctively their own, none more so than the rotund **fluyt** (or flute). Its curiously bloated appearance was the direct result of a design intended to circumvent taxation laws enforced in the Baltic, which were based on deck area. This design, like that of the cat boat, proved moreover to be efficient in terms of seaworthiness and was put to use in other fields, such as whaling, as our illustration shows.

The **cat boat** also referred to a hull construction rather than a rig. It was broad and rugged, with a shallow draft, capable of being run aground or stranded by the tide without being damaged. The colliers of various rigs were of this type, and a very famous cat-built ship, Captain Cook's HMS ENDEAVOUR, was, in fact, a converted collier.

Opposite top *"Shipping off the English Coast", showing early seventeenth-century types. Painting by S. de Vlieger.*

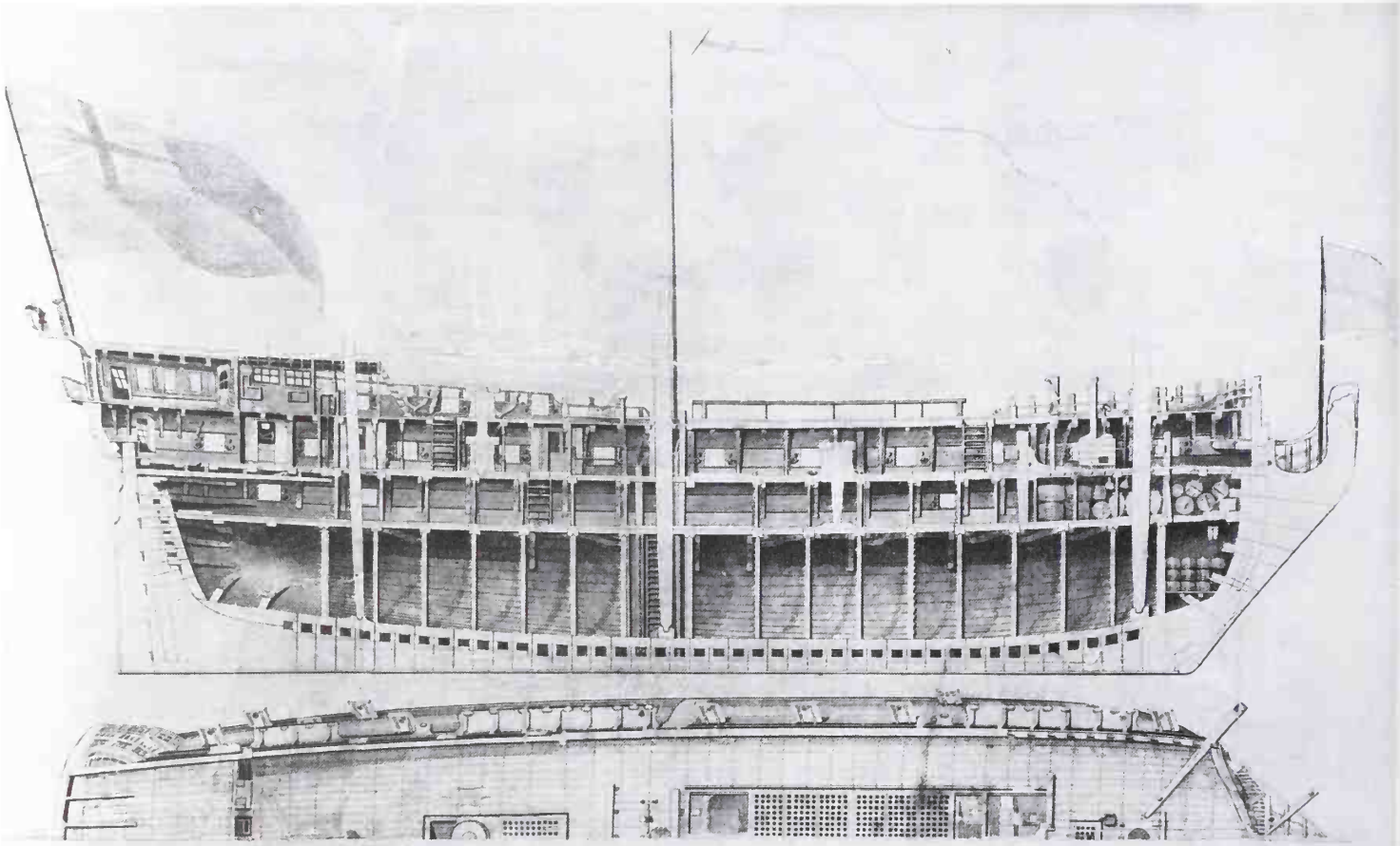
Left *Records of lesser merchant ships, and fishing boats, are few. This herring-buss design remained much the same over at least three centuries.*



Opposite page *Dutch whaler, close hauled. This ship has the typical swelling hull and pinched-in upper part of the fluyt. Painting by J. C. Rietschoof.*

Above *Small trading brig entering the Bristol Avon, 1838. Compare the lines of this with the more ponderous timber bark. Painting by Joseph Walter.*

Left *Timber bark of the mid-eighteenth century. The bluff lines of the hull are characteristic of early coastal cargo ships. Compare with photograph of Whitby colliers. page 34, and Captain Cook's ship, page 46. For some reason the artist, Samuel Scott, has painted the figures only half size to the scale of the ship.*



A SECTION *and* PLAN *of the* FALMOUTH *Built at* BLACKWALL *Anno* 1752

East Indiamen

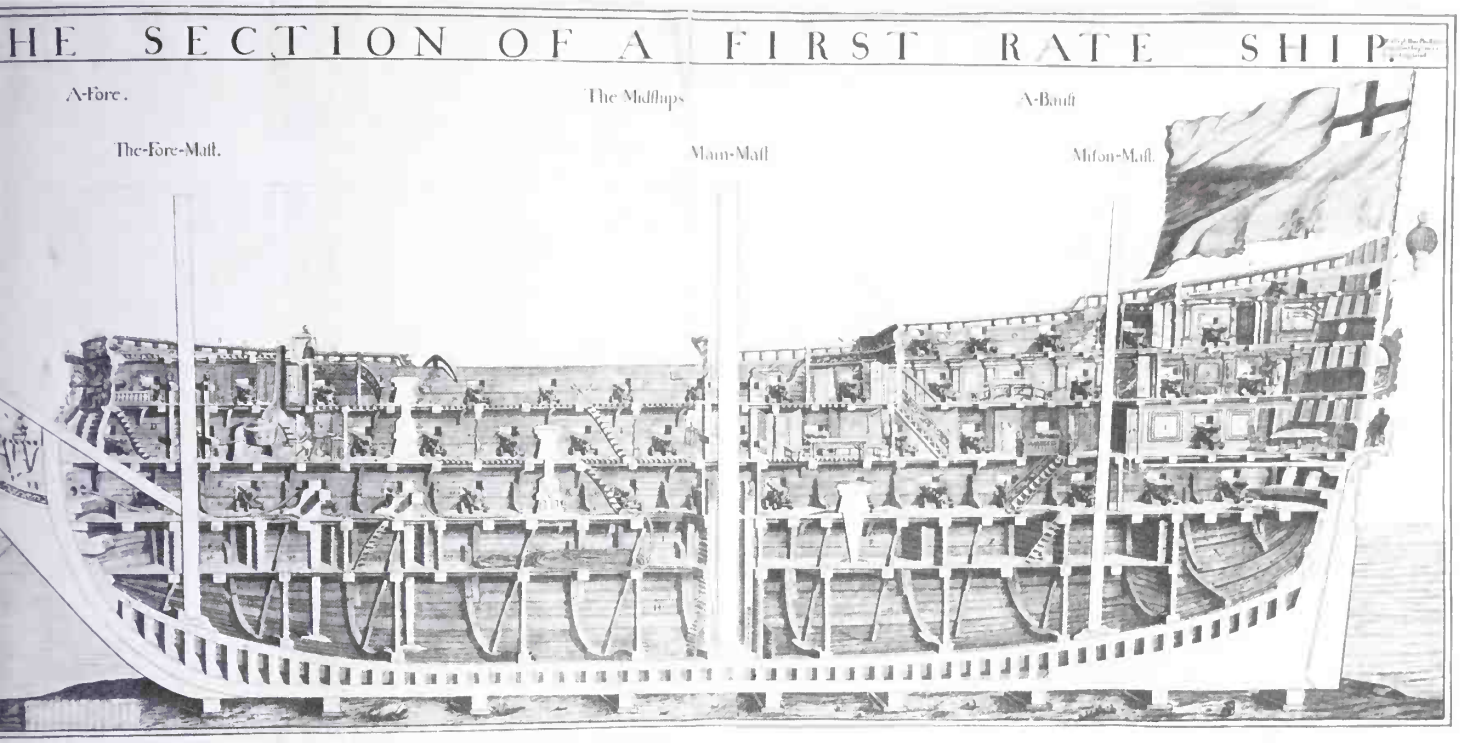
THE most remarkable of all the merchant ships of the seventeenth and eighteenth centuries were, for many reasons, the ones known as East Indiamen. Many countries had their fleet of East Indian traders–France, Portugal, Sweden and so on. It was, however, the Dutch and the British who were to dominate the scene.

Westward, the newly discovered lands invited colonization, being relatively under-populated. Eastwards, with old civilizations well entrenched, the first attraction was trade. Goods which can now be bought quite reasonably in any grocery store were then highly prized and expensive. Tea, spices, silks and other exotic cargoes from the orient had to be sailed for thousands of miles over periods of four or five months on an average passage, up to nine on a bad one. This also meant running the gauntlet of pirates and privateers at almost any point along the route. During periods of declared hostilities between countries they would be liable to capture by the enemy at any time.

It was hardly surprising that the voyages undertaken by these ships were organized like military operations and that the East Indiamen themselves were almost indistinguishable from men-of-war from the outside. The bigger ones were the equivalent of the smaller ships of the line, although their lower row of gun ports were, in fact, dummies. A comparison of the interiors of a first rater and an Indiaman, shown here, is interesting. Although the two ships are from the seventeenth and eighteenth centuries respectively and the warship is in a bigger class, one has to look closely to find the differences. The merchantman has more storage space of course. The warship has more ornamentation (partly because it dates from the period of heavy ornamental detail). The drawing of the merchantman does not show

Left *Section drawing of the Indiaman* FALMOUTH, *1752. Passengers were accommodated in the after part of the ship, in the poop and on the main deck.*

Below *Section of a first rate man-of-war of the seventeenth century, as described on the opposite page.*



the guns, which would be concentrated on one deck.

Not only did they look like warships, they could tackle and even rout the real thing. This happened in 1804, the year before Trafalgar, when a squadron of East Indiamen returning from the Far East encountered a squadron of French men-of-war. The English ships, on being attacked, countered to such effect that the warships had to flee with the merchantmen at their heels!

These East India Company ships were also a means of human transport, as well as carrying cargoes of wines, manufactured goods and other western commodities in exchange for sugar and spice, opium, ivory and silk. The passage may sound very romantic in retrospect, and may have had its moments of delight, but on the whole life on a long sea voyage, notoriously rough for the seaman, must have seemed diabolical to a soft-living landsman, even though he might enjoy privileges and consideration that were denied to the sailor.

These advantages had to be paid for, of course, and considering their nature were little consolation for the stinking unventilated air (which could even be smelled on deck), the monotonous, unappetizing food, and the inevitable rats. All this combined with the motion of the ship which, except at times of unwelcome calm (when the heat of the tropics would take over the torment), was continuous. And one was always on a sloping floor, the unavoidable condition of a ship under sail.

Much has been written about the rancid, weevil-infested food on the old sailing ships, the brackish water and the hopelessly unbalanced diet. It was not until Captain Cook instituted the custom of enforcing a ration of limejuice to his crew in the 1770s (hence the term 'limey' for a British sailor) that the problem of scurvy at sea was overcome. This sickness, often fatal, had until then been accepted as one of the inevitable hazards of long voyages.

"Ships trading in the East". These represent a very early expedition of East Indiamen. Painting by H. C. Vroom (1556–1640).

The East India Trade

THE story of the East India trading ships begins in the sixteenth century. The Portuguese, who had got a head start on the other nations in eastern exploration, were the first to make settlements in the East. The Dutch were soon to follow, taking advantage of the humbling of the might of Spain and her declining influence on the high seas. A fleet of Dutch ships made the return voyage, around the Cape of Good Hope (where Van der Deiken, the "Flying Dutchman", was doomed to sail for ever) shortly after the débâcle of the Spanish Armada. They arrived back home on May 29th, 1599. The following year saw the incorporation of the English East India Company. In 1602, the Dutch officially established their own company. Other countries (for example, France and Sweden) also established East India companies, but the field was dominated by the two countries who were to expend much of their energy in the seventeenth century contesting each other's supremacy at sea–Britain and Holland.

At first, the objectives were purely commercial, a means of contributing to the wealth of the home country–not to mention the wealth of the merchants themselves. The captain of a successful Indiaman could make up to £6000 in one voyage, a lot of money in those days. His prestige was extremely high and he was entitled to privileges and honors comparable with a naval VIP.

Serious colonizing, which was to come later, hardly entered into the consideration of the companies involved, and what settlements there were were hardly more than trading posts. After all, the lands of the orient were already well and truly occupied, and there was plenty of room in the Americas for that sort of thing. Furthermore, the Dutch, being a small nation, were not pressing to leave home. The religious and ideological movements at

"A fleet of East Indiamen at sea". Pirates could well be excused for seeking easier game. Painting by N. Pocock (1741–1824).

work among the British – movements which inspired such colonists as the Pilgrim Fathers – did not encounter the same official hostility in Holland.

The rivalry in the east between the two countries resolved itself eventually with the Dutch concentrating on Malaysia and Indonesia (as they are called today), while British influence became dominant in the continent of India itself. While all this may seem to be mainly political and economic history, it was all directly affected by the sailing ship and its development. The ships whose activities were confined to the Atlantic had relatively shorter journeys, to lands which were becoming increasingly familiar and well charted. Activities in the Atlantic consisted of conflict between European countries trying to gain dominance in various sections of the American continents, much privateering and piracy, a certain amount of one-way traffic in colonists (and, later, in slaves), a coming and going of soldiery and, of course, trade.

The ships that went to the Indian and Pacific oceans from Europe had first of all to negotiate the length of both Atlantics, north and south. Once there, they were faced with a much less known quantity. Until Captain Cook's time, these oceans, particularly the Pacific, were largely uncharted. It was Cook who finally disproved the supposition of a *Terra Australis Incognita* on his second voyage (1772–1775). Before Cook, Australia and New Zealand were swallowed up on the maps of the time by an enormous continent which was believed to cover not simply these two countries and the actual continent of Antarctica, but a large part of the Pacific and Indian oceans. Magellan, Drake and other early circumnavigators had sailed to the north of the area and any large body of land seen to the southward was assumed to be part of this mythical continent.

It is astonishing to realize how little was known about the world, even 250 years after the first circumnavigation by Magellan's ship. So it is easy to see how Jonathan Swift could write about the islands of Lilliput, Brobdingnag, Laputa, etc., in *Gulliver's Travels,* without needing the spaceships of modern science fiction writers, to reach lands remote enough for them to be peopled with fantasy beings.

The Clipper Ship

IF the East Indiaman was the glamor ship of the seventeenth and eighteenth-century merchantmen, the queen of the nineteenth century was the **clipper ship**. Not only was this the swiftest and most graceful of all the full rigged sailing ships, but the design had reached a point where it is difficult to imagine where it could have gone to from there. There were later modifications to shipbuilding after the era of the clipper, but these were largely concerned with constructional

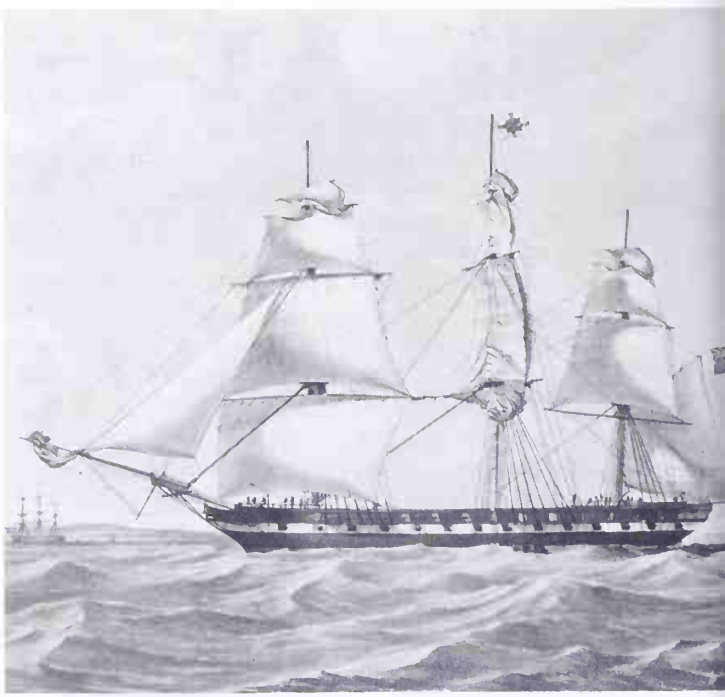
methods in use of iron and steel.

The ships that had been used in the service of the East India Company had, on the whole, a poor reputation for their lack of speed and maneuverability. The advantages of speed in delivering the goods were beginning to become apparent to a few farsighted shipowners. At Blackwall, on the Thames, there were shipyards which had experience in building naval frigates, as well as East Indiamen. Adaptations of this type for commercial needs produced the *Blackwall frigate*, which although only a frigate in name, might at a distance, with its painted gun ports, easily deceive a pirate into doing an about-turn. These swift merchantmen were forerunners of the clipper ships, but the origin of the latter's design is probably American. The lines came from a lean and rakish design belonging to the Baltimore schooner or "clipper" of the early nineteenth century. The first true clipper ship was named the RAINBOW, launched in 1845.

The reign of the clipper was brief, the first ten years being the most glorious. After that her ability to compete with the upstart steamship declined, and the opening of the Suez Canal in 1869 altered the patterns of the trade routes from the east. The spur to the exciting races between individual ships was the premium paid on the first shipments of tea to be brought to London after the season's first crop. Perhaps the most epic of these races was between the TAEPING and the ARIEL in 1866. After sailing 16,000 miles for 99 days, they were level in the English Channel. TAEPING drew ahead and won by twenty minutes.

There were many famous clippers, but in America none is remembered with more pride and affection than the FLYING CLOUD. England has been particularly favored in having her own darling mercifully preserved by fate for an age that is prepared to cherish her for her own sake: the CUTTY SARK, considered by many to have been the swiftest and most beautiful of all, now restored in all her original finery in a permanent dry dock at Greenwich, where she is visited by over a quarter of a million visitors a year.

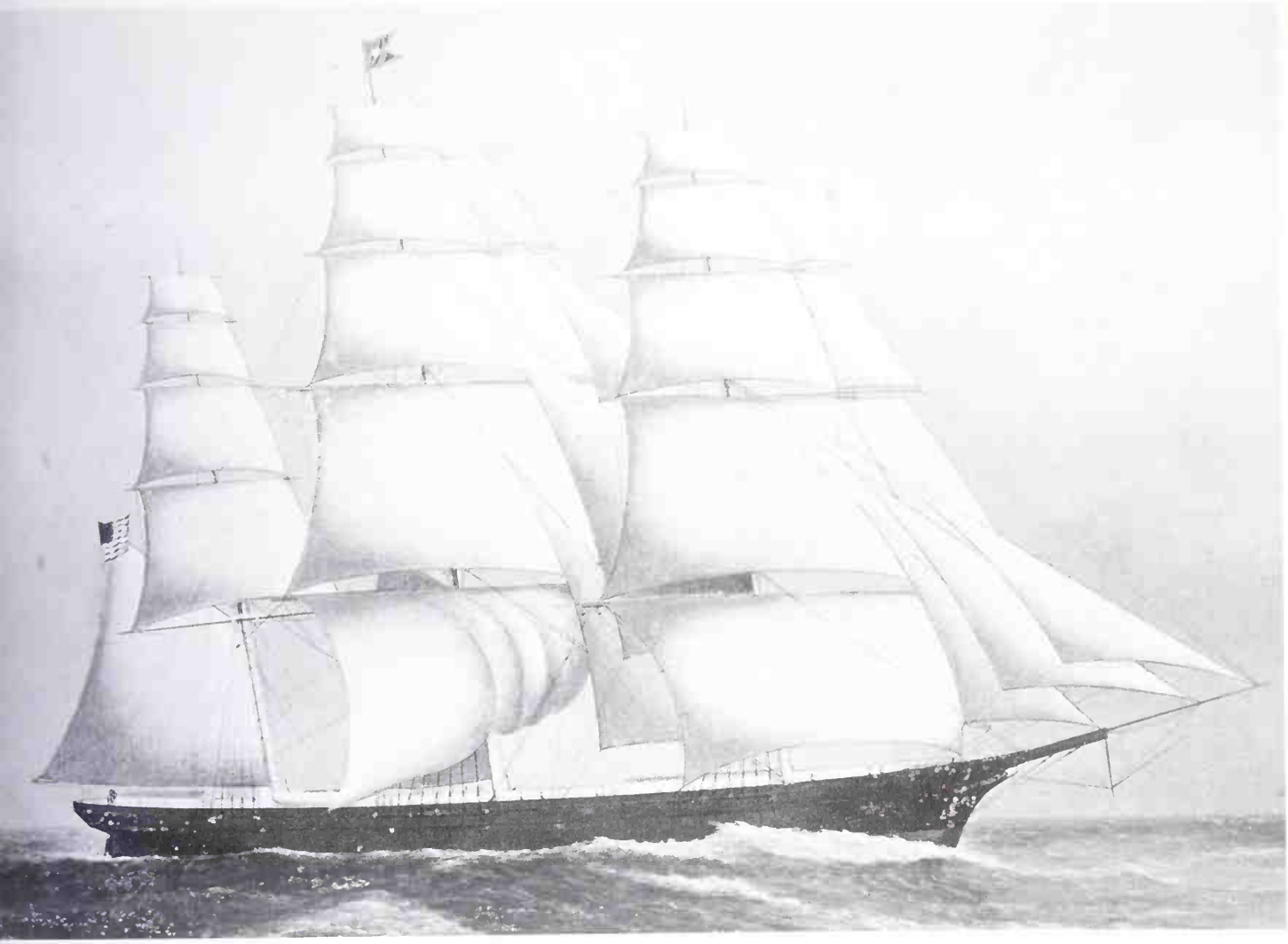
Re-rigged in her full glory, the CUTTY SARK *towers over old Greenwich, the Thames-side town with a long maritime history.*

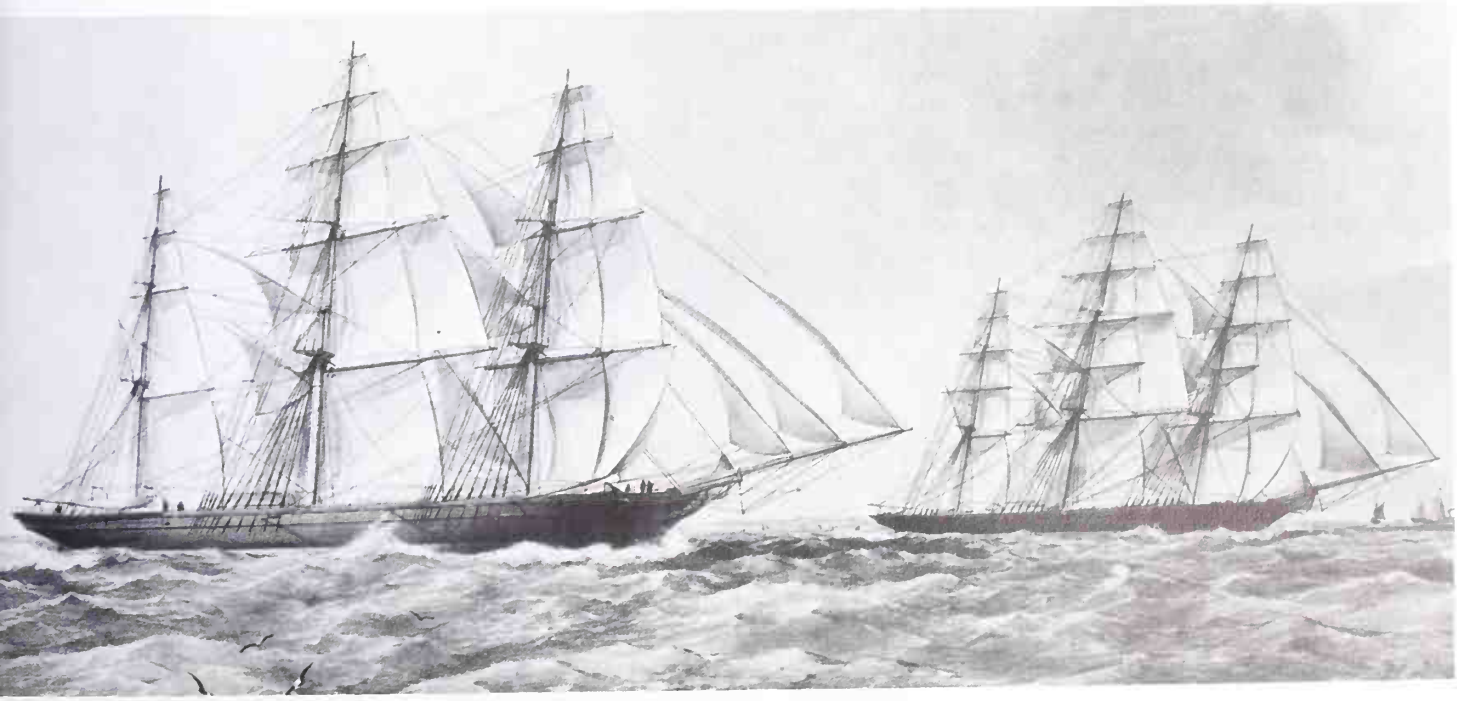


"A Blackwaller, or Blackwall frigate SERINGAPATAM*" heaving to, by backing her main topsail and topgallant. Print by T. G. Dutton.*

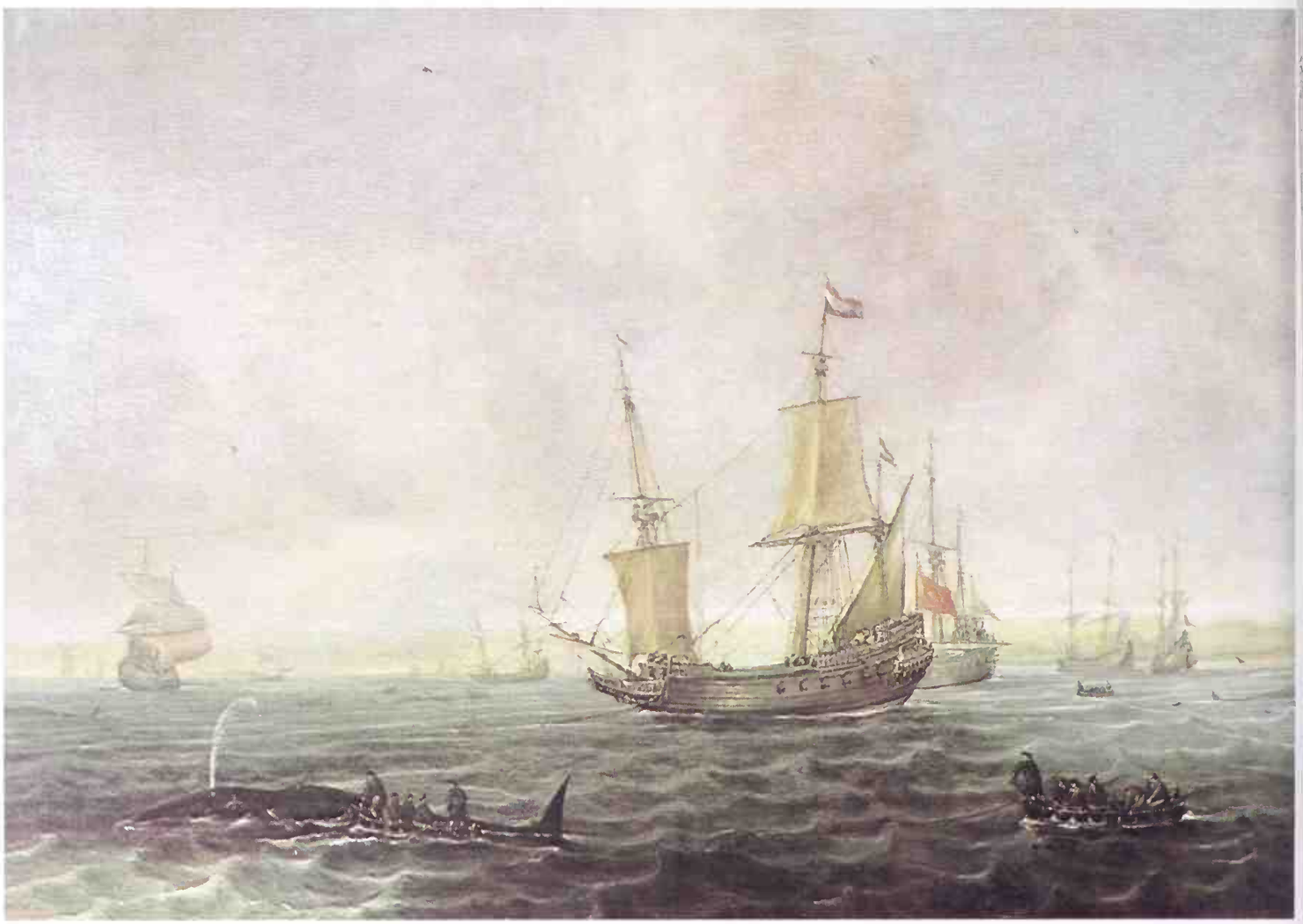
Below FLYING CLOUD, *the clippership as much revered by the American public as the* CUTTY SARK *was in Britain.*

Bottom *Dramatic finish of a classic race between the China Tea clippers* TAEPING *and* ARIEL *in 1866. Print by T. G. Dutton.*





"Dutch whaling fleet", mid-seventeenth century. At this early period whalers were hardly specialized. Painting by Jacob F. de Vries.



Whalers

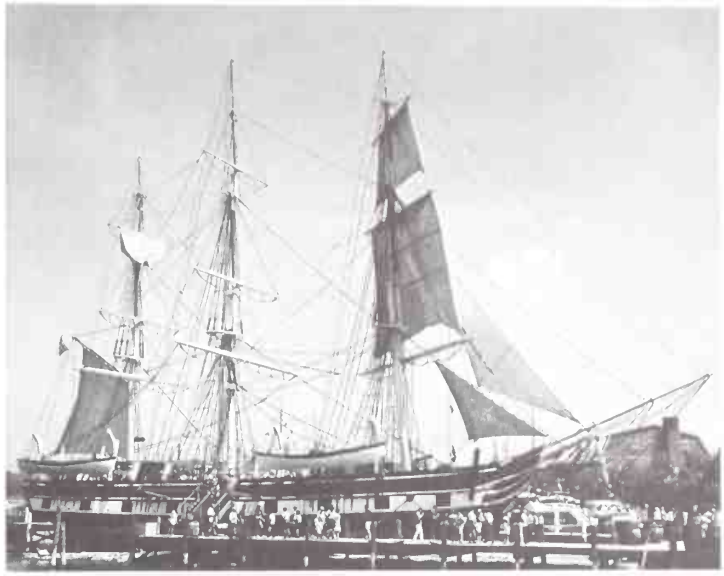
IF clipper ships are the swans of the world of sail, then whalers are certainly ugly ducklings. The history of whaling goes back at least to the sixteenth century and scenes of whaling fleets in action were favorite subjects with the early Dutch marine painters.

Today there is widespread concern about the destruction of whales. These fascinating and intelligent creatures run a serious risk of becoming extinct, due to ruthless hunting with modern mechanical devices which leave little to chance. In the days of sail, the odds were rather better for the whale, which has been known to smash in the side of a whaling ship and sink it. As for the cockleshell longboats from which they were pursued, their life-expectancy was nil if the whale were to turn on its tormentors.

The life of the whalerman, immortalized in Herman Melville's *Moby Dick*, was probably the hardest and most dangerous of any at sea, apart from actual warfare. It was totally unlike fishing of any kind–for the quarry is not a fish at all. The largest whales are the size of a small ship, and were pursued in rowboats whose lines suggest a descent from the Viking longship, even to a long steering oar. This, in a small boat, gives the swift maneuverability vital in whaling. With one man to steer and four or five on the oars the vital member of the crew was the harpooner. The hazards involved in this sort of operation are only too easy to imagine when one considers that whales, once harpooned, must be "played" like some monstrous game fish.

A single voyage undertaken by a whaling ship could take up to three years. The hunting grounds were frequently in the Arctic and Antarctic seas, which offered an extra hazard in the shape of ice floes, but the pursuit of whales might take one to any ocean on earth. Much of the Pacific was charted by the captains of whalers who would spend months and years following a seemingly haphazard course all over the map.

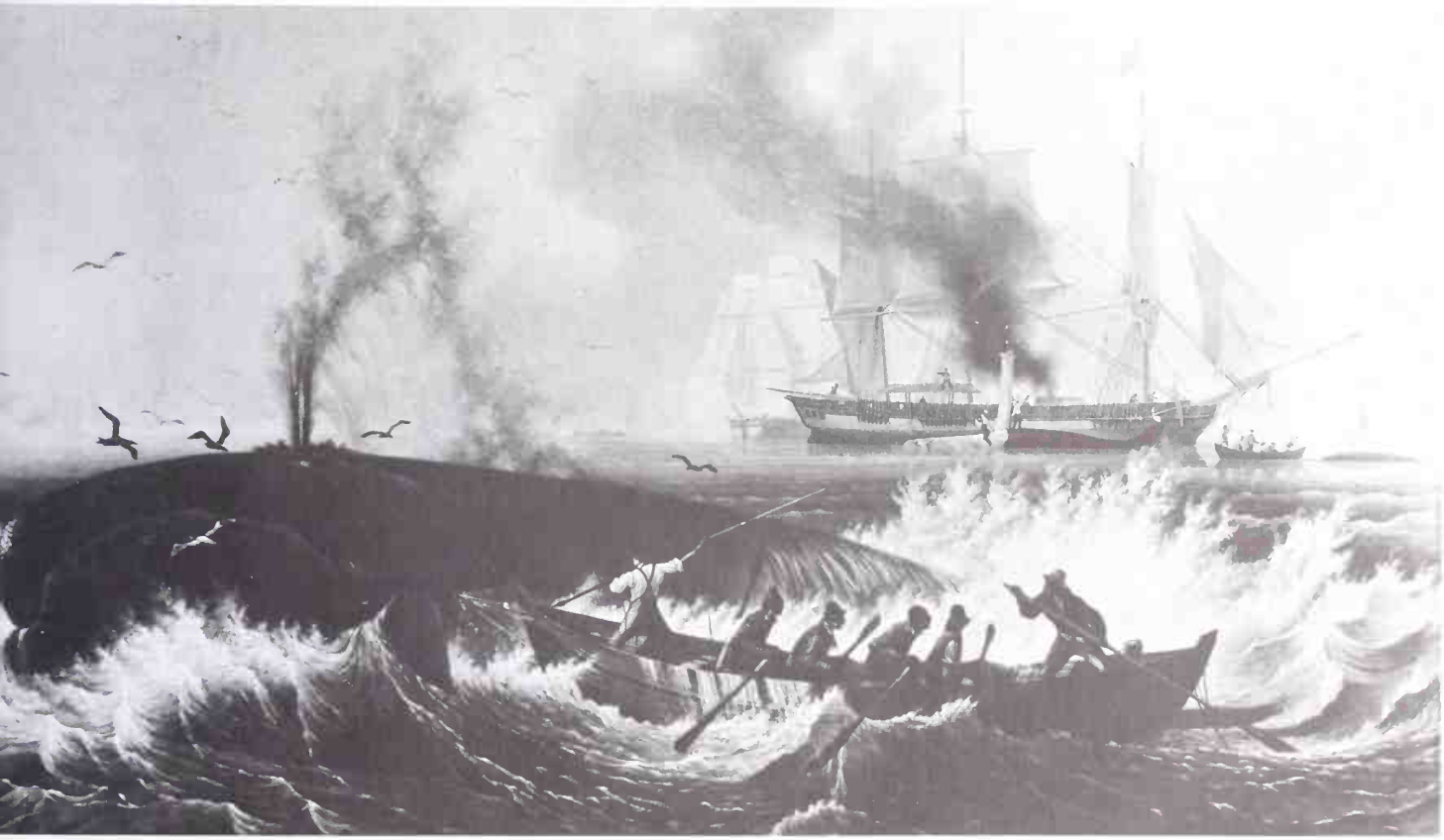
The CHARLES W. MORGAN, *a perfect example of a nineteenth-century whaler preserved at the old seaport of Mystic, Connecticut.*



The ships themselves were severely functional. Speed was of little concern. Blubber rendered down into oil was the end product (plus whalebone from certain species) and whalers had to have facilities for doing this at sea. They had to have storage space for the barrels of oil, and would normally stay at sea until this was completely full. Needless to say, the rewards were great or nobody in their right mind would have chosen the life. The stink of blubber and the smoke-stained sails from the brick try works, where it was converted to oil, were the trade marks of all whalers.

Most of them had square lines arrived at as being the most practical for the purpose. By comparison, the fluyts used by early Dutch whalermen were models of elegance. One hazard of the sea which hardly bothered them was piracy. Pirates could find more appealing goods than blubber to plunder.

Most maritime countries had their whaling fleets, but probably the most active were the American whalers operating out of New England ports, notably Easthampton, Nantucket and especially New Bedford. This is all in the past of course, but a delightful relic of these days survives at the little Connecticut seaport of Mystic. The *piéce de résistance* here is a famous whaler, the CHARLES W. MORGAN, which made thirty-seven expeditions in her active career before retiring, like the VICTORY, the CUTTY SARK and "Old Ironsides" (USS CONSTITUTION) to an honorable resting place.



South Sea whaling, early nineteenth century, immortalized in Herman Melville's Moby Dick. *Painting after Louis Gameray.*

The Nineteenth-century Scene

HOWEVER much a painting may re-create and describe a scene, often more vividly than photography, the camera has a way of observing that may elude the artist. The casual way that the camera will pick out details that the human eye has unconsciously censored as irrelevant gives a photograph a veracity of its own—a sense of having been there, which the viewer can share.

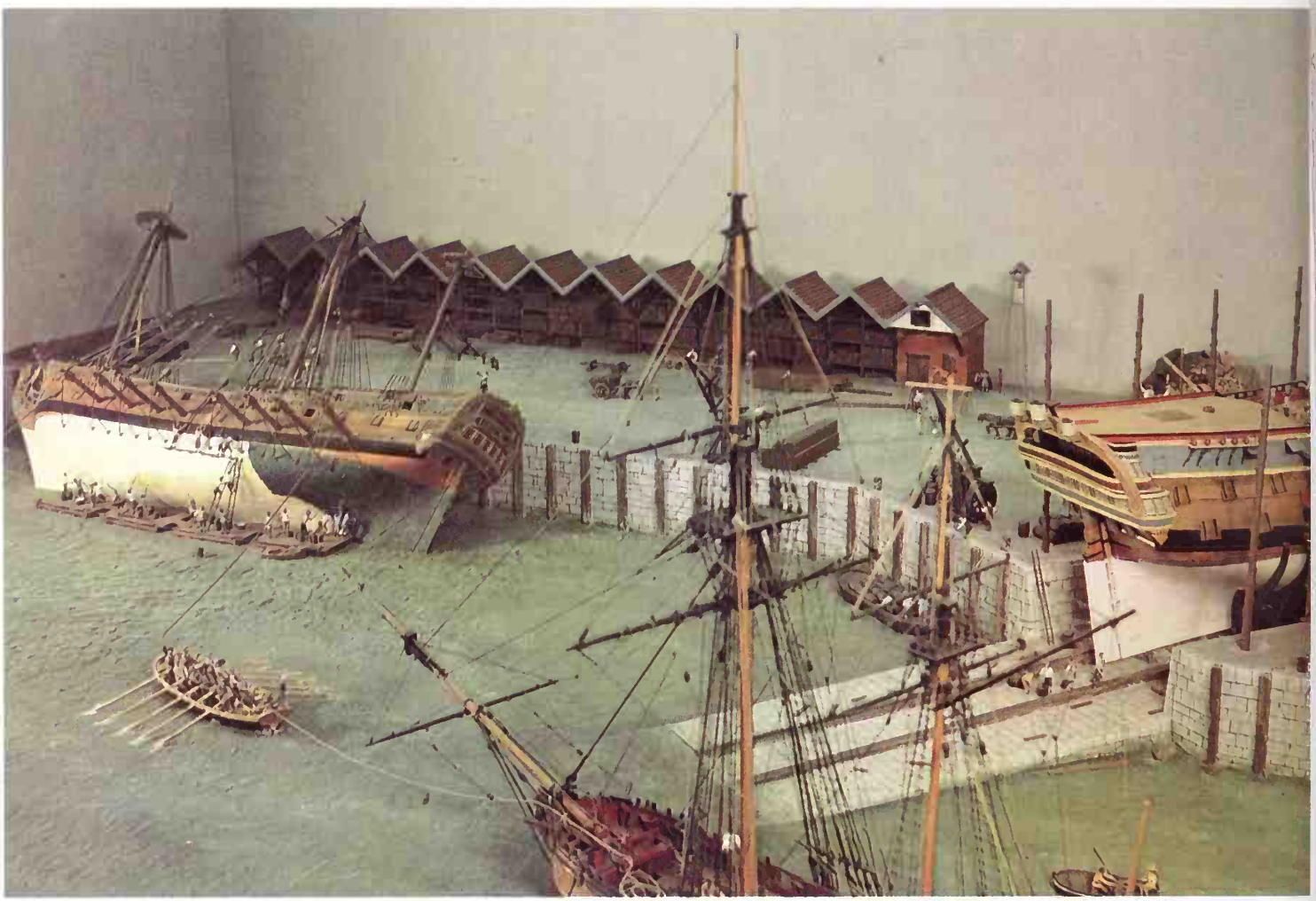
It is very fortunate that the camera was invented in time to make its own inimitable record of what the last days of sail were really like. Particularly fascinating is the photo of the Whitby colliers. Apart from being pleasing simply as a picture, it manages to evoke a scene, almost a memory, of something one has not actually experienced. Also interesting are the colliers, since they constitute a photographic record of a traditional type of ship related to cat boats, and could be called second cousins to the ships of Captain Cook.

The sea and its ships have such a relentless hold on the romantic imagination that even their mundane and seamy aspects take on an aura of romance. A painting may show the rotting wood of an old wreck but not the rotting gull beside it. Looking at the photographs, one does not forget that along with the salty tang to the air there may be an undertone of old fish and the occasional whiff of sewage. Such photographs provide a touch of flavoring which might otherwise be missed.

One of the vivid scenes from the age of sail preserved through photography is the "forest of masts", once commonplace in seaports.

These ships at Whitby in Yorkshire are of a traditional and highly functional design. The photograph speaks for itself.

Scene from an eighteenth-century shipyard recreated as a model and showing some typical activities. The ship on the left has been careened (heeled over on her side), to give access to her hull, which needs de-fouling. Another is being built on the slipways.



Docks and Shipyards

MANY of today's busiest European seaports have an unbroken history of shipbuilding covering the whole age of sail, through to the present day. Amsterdam, Hamburg and Toulon, for example, have been building ships for centuries, continuing into the age of steam and oil. Other shipyards–London's in particular–have been casualties of the Industrial age. Although London is still a major seaport, the shipbuilding trade has moved north. When iron took over from wood, the richest source of iron ore in the British Isles was found to be in the north-western corner of England, over 300 miles from London by land (rail was still in its infancy) and nearly 1000 miles by sea. So a new shipbuilding industry emerged next door to the iron mines and steel mills, while the dockyards of the lower Thames faded into oblivion.

In the early part of the nineteenth century, this section of London River would have been very similar to Amsterdam, Hamburg or Toulon of the same period. Today, if one takes a water-bus from Tower Bridge down the Thames to Greenwich, one passes run-down wharves and rusty dredgers. The famous old riverside pub, "The Prospect of Whitby", is a reminder that Whitby colliers once tied up nearby, but apart from that there is little left to remind us of what it was like 150 to 200 years ago.

A trip down the river in the age of sail would present a very different picture. The *amount* of shipping might cause some surprise, because in the days before the juggernauts of road transport, or even of the railroad, ships were by far the most efficient way of carrying goods of any kind. Instead of the odd police launch here, the tug-boat there and the occasional cargo ship arriving or leaving on the tide, one would be struck by the number of small boats busy on some errand or other, ferrying people or supplies. The larger ships would dominate the scene, of course.

Today much of the shipping is almost out

Below *"The* ROYAL GEORGE *off Deptford", by Clevely the Elder. The occasion is the launching of another ship of the line.*

Bottom *"Shipbuilding at Porto San Stefano"— a timeless scene of shipbuilding in the days of sail. Painting by Renier Nooms (Zeeman).*

of sight in docks carved in the bowels of the city. Then, the ships would be moored in docks which were simply fingers of water pointing into the embankment. Other large ships would be anchored in the river itself. There must have been quite a sense of overcrowding at times, and it is remarkable that the bigger ships had room to maneuver at all in the confines of the river. Before the days of steam tugs, the only way to move a large ship in a dead calm was to tow it with a large rowing boat. This must have been a not uncommon sight at the time.

In the eighteenth century this stretch of river was well equipped to cater for the needs of wooden ships. Each bank was lined with a succession of shipwrights and timber yards, not to mention chandlers, block, sail and chain makers, anchor smiths and so on. Farther down river one's eye would be caught by the sight of great hulls under construction, often looming up against the sky, in splendid isolation beside the small surrounding buildings. At some building yards there might be a row of

these hulls in various stages of construction, laid out on their slipways, from which they would eventually be launched.

The first stage was simply to lay the keel from which the ribs started to sprout, for all the world like the bones of a giant fish. A feature of all those shipyards were the great stacks of timber which had to season over many months before it could be shaped. The logs themselves were selected and graded for their curvature to match the curves they must eventually follow on the ships.

Of course, the larger timbered units had to be built up of smaller ones. Even masts were often built up in this way in an elaborate system of interlocking parts, reminiscent of Chinese wooden puzzles. The tools used for cutting and shaping the wood were the same as those used by shipbuilders centuries before. The picture of a shipyard at Porto Santo Stefano in Tuscany by the Dutch painter of the mid-seventeenth century, Renier Nooms, presents a timeless scene which, apart from a few details, could have represented a shipyard almost anywhere in the world over a span of a thousand years.

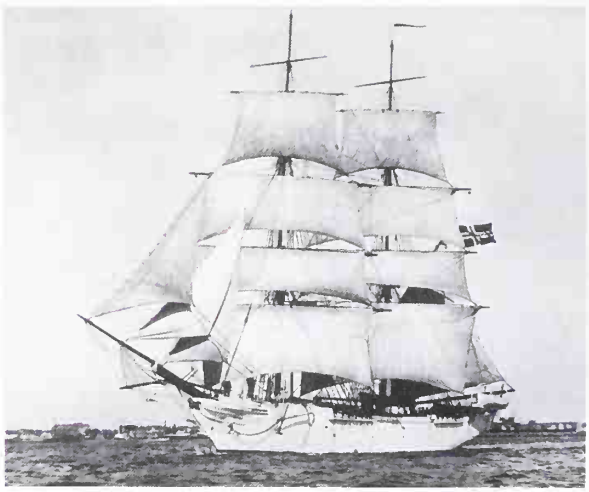
Continuing down the Thames past Greenwich, whose National Maritime Museum is a treasurehouse of shipping history and the source of much material for this book, we make our salaams to the CUTTY SARK and pass on to Blackwall. Today this stretch of river is a jungle of power stations, gas works and nameless constructions which look like colossal pieces of surrealist plumbing. It is hard to associate this with the place where once one might have seen nothing above ground level but a row of East Indiamen on the stocks, the home of the Blackwall frigate and many other fine ships.

Rig

IN discussing ships, it is impossible not to refer to the various types of rig from time to time, and it is an interesting enough subject in itself. Some basic information is essential for appreciating and enjoying a study of the sailing ship, and without becoming technical, these two pages are intended to clear up a few points about sails, rigging and rig (the arrangement of sails on a given number of masts).

The rigging itself consists of the ropes (sheets, shrouds, stays, halyards, buntlines, bowlines and so on) by which the masts are

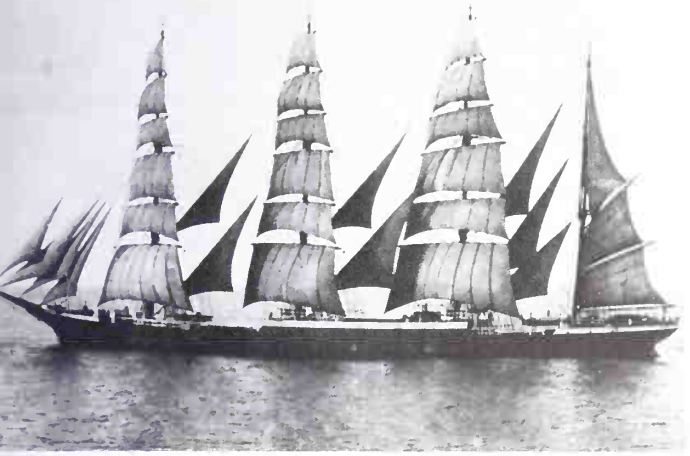
Below *A barque, The* FRED OF FINLAND, *built 1920, and* (bottom), *a brig* STATSRAAD ERICHSEN *of Norway, built 1858.*

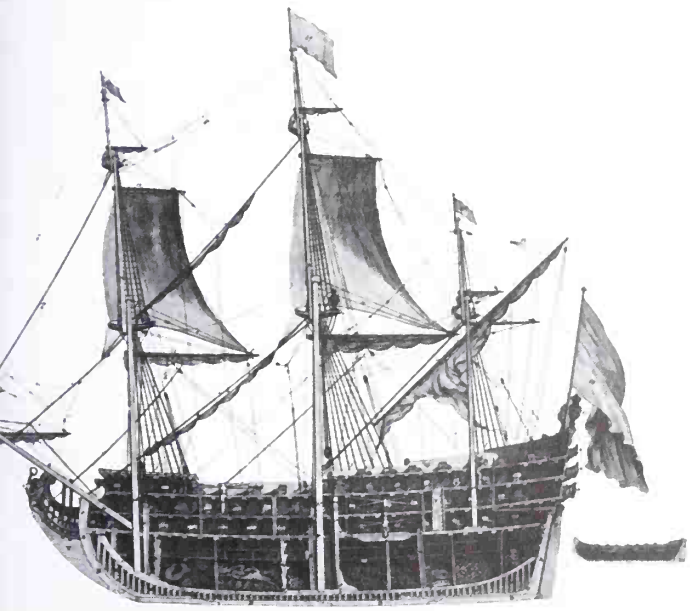


braced and the sails are controlled. The wooden poles which act as a framework for the rig are known as **spars** (which includes the masts, gaffs, booms, yards and bowsprit).

When one looks at the cobweb maze of cables and ropes that go to make up the rigging of a large ship, the landsman is liable to wonder whether it is all really necessary, and whether a sailor can actually sort out one from the other. Of course, the answer is affirmative to both questions, and not only that but every last piece of cordage has its own name. But for our purposes it is enough to say that there are two kinds of rigging. **Standing rigging** is that which holds the masts steady (rather like the guy ropes of a tent pole) and does not move itself. **Running rigging** is the kind that sailors haul on to hoist or lower a sail, or set the angle of a yard. **Stays** are the heavy ropes which brace the masts: forestays sloping downwards and forewards between the masts, and between the foremast and bowsprit; backstays leading backwards from the masts to the sides of the ship. **Shrouds** are the cluster of

Below *A barquentine,* WATERWITCH, *of Britain, built 1871, and* (middle), *a four-masted barque,* MAGDALEN VINNEN, *of Germany, built in 1921.*





Sectional drawing of a seventeenth-century French full-rigged ship. The yards and square sails are shown in half-section to avoid confusion.

backstays leading from the mastheads (where the fighting top is seen on warships) to the sides of the ship. **Ratlines** are ropes running across the shrouds and making a broad ladder.

Sails are usually divided simply into "square" and "fore-and-aft" although fore-and-aft sails have a wider range of application. Square sails are rarely square in the geometrical sense, at the best being rectangular, but the meaning is clear enough. Square sails are attached at the top to yards which, in turn, are attached at the center to the mast (or the bowsprit, which is the "mast" sticking out of the bows at a flattish angle). Square sails supply the best driving force in good wind conditions. The natural position for a square sail is at right angles to the line of the ship. With a wind from astern, this provides the most efficient driving force.

"Fore-and-aft" means that the sail (at rest) is in line with the fore and aft axis of the ship. All modern yachts and small boats as well as ketches, yawls and schooners are fore-and-aft rigged. The photograph of the four-masted barque clearly shows the fore-and-aft sails on a basically square-rigged ship. The triangular lateen-shaped sails between the masts are **staysails,** the front two leading to the bowsprit are **jibs.** In this ship, the **spanker** is in two halves, upper and lower for ease of handling; above them is the **jigger topsail.**

The advantages of fore-and-aft sails are found in maneuvering and in sailing close to the wind. Since they can be managed by fewer hands, the ship with more of these and fewer square sails can manage on a smaller crew. So rig has a lot to do with economics.

Briefly, the commonest square riggers are:
The full rigged Ship (or simply "ship")–usually has three masts but can have more–square rigged on all masts, with a spanker on the mizzen as well.
The barque–as with a ship except on the mizzen mast, which is fore-and-aft rigged only.
The barquentine–has three or more masts but is square-rigged only on the foremast.
The brig–has only two masts (no mizzen), is square rigged on both and also carries a spanker on the main.
The brigantine–like a brig but without square sails on the main mast, it carries a fore-and-aft topsail over the large spanker.
Other smaller ships with square sails, such as **hermaphrodite brigs** and **topsail schooners** can be confused with brigs and brigantines.

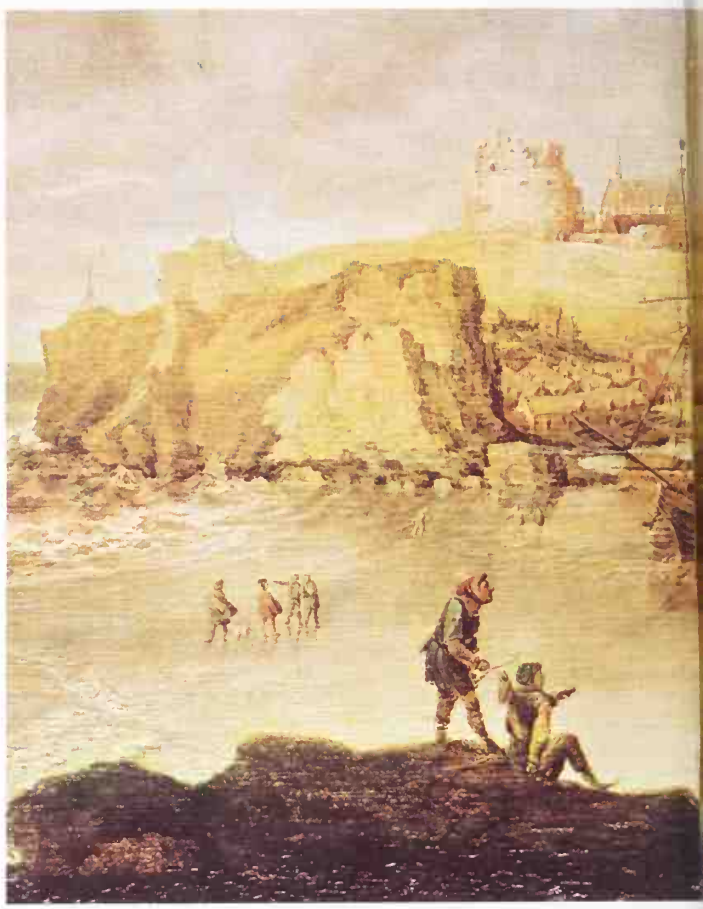
The Far Corners of the World

ONCE the sailing ship had reached a level of efficiency where it could dare any ocean in the world, there was nothing to hold it back but imperfect navigational techniques, and the imagination of its captain. The world became its oyster in fact. Northern sailors were no strangers to the arctic seas even in the Dark Ages, as the colonization of Iceland and Greenland can bear witness. Whaling carried out in the sixteenth century reached northwards into waters where packice was commonplace.

Archangel, even today, is inaccessible by sea during half of the year, although in May and November it is kept open by icebreakers. To reach it, a ship must sail around North Cape and into the Barents Sea. In World War II, one of the least popular of the convoy runs was along this very route. And yet Archangel was founded in 1553 to create an outlet for trade with England, which was then being built up. At the time, and until the founding of St Petersburg (Leningrad) in 1702, it was the only Russian seaport. This pioneering trade was the result of an expedition led by Sebastian Cabot (son of the Genoese navigator and explorer John Cabot), who was seeking a north-east passage to the East. The painting dating from the early 1600s gives a quite vivid picture of this harbor with contemporary merchantmen firmly held in the ice, presumably for the winter.

From Archangel to Whampoa in China is a long sail to a very different climate, and the scene presented of East meeting West is a reminder that the European civilization was not the only one to produce sailing ships of impressive size and performance. The first reports we have of the skill of Chinese boatbuilders comes from Marco Polo, who spent nearly twenty years in China in the diplomatic service of Kublai Khan. He left this to return to his native Venice in 1292. Just 200 years later Columbus set sail toward the west, hoping to arrive at some part of the Asia that Marco Polo had known so well. Most of the latter's traveling had been done overland and so he cannot be considered as a sailor, but his reports on the ships of the Chinese make a fascinating comparison with their western counterparts of the time.

These great junks had four masts and sometimes two extra ones, with up to twelve sails. They contained from 50 to 60 cabins and carried a crew of at least 200. Wooden parti-



Left *Ice-bound ships at the newly-established (founded 1553) port of Archangel. Painting by B. Peeters.*

Bottom left *In China, European adventurers found a tradition of sophisticated seamanship and shipbuilding, as shown at the port of Whampoa, China. After a painting by W. J. Huggins.*

Below CHARLOTTE OF CHITTAGONG, *a snow-rigged yacht of a type intended for the convenience of local representatives of the East India Companies. Painting by F. B. Solvyus.*

tions which anticipated the bulkhead lessened the danger of sinking in case of collision. Not only that, but the junk was accompanied by a fleet of smaller craft, ten of which it could carry slung to the sides.

About 1420 a junk was recorded as having a displacement of 3100 tons and a length estimated around 400 feet. More recent junks are known to have had a cargo capacity of up to 400 tons, and dimensions of 180 feet long by 30 feet in the beam, and although they may seem quaint to some western eyes, the larger ones have often made impressively long journeys, including one in 1848 from Hong Kong to London around the Cape of Good Hope.

The scene at Chittagong, the chief seaport of what is now Bangladesh, gives a pleasant glimpse of gracious living in what, for some at least, must have been a more leisurely age. The ship is an interesting example of its kind, being snow-rigged and used for river transport. The **snow** was a two-masted vessel almost identical to the brig except for a small auxiliary mast stepped immediately behind the main mast, to which the snowsail (equivalent of the spanker on a ship or the brig sail on a brig) was attached.

Portrait of Columbus holding an astrolabe. Print from Les vraies portraits et vies des hommes illustrés *by André Thevet, 1584.*

This map, showing the known world before the discoveries of Columbus, comes from an early atlas called Ptolemaeus Cosmographia, *1482.*

The First World Explorers

IT is difficult for us to comprehend a world where intelligent people could doubt that the world was a globe; when daring men suggested that you could arrive in the east by sailing west, they were told that they would certainly fall over the edge of the world. Columbus had no color television pictures sent from the moon to prove he was right. He had to work on much more elementary data, some of which was misleading. One error he made was in believing that the earth was a lot smaller than it was, smaller by the breadth of the whole American continent.

Even the farsighted scholars of the fifteenth century who realized that the Indies could be reached by traveling westwards had not the faintest inkling of the enormous land-barrier that lay between.

It is hardly surprising, then, that when Columbus at last, after a long journey with an increasingly restless crew, made a landfall among tropical islands peopled with brown-skinned natives, he thought he was in the Indies he had been aiming for.

Columbus' story is well known, but the part played by Henry the Navigator in setting the scene for Columbus, da Gama, Magellan and those that followed might be worth a mention. Prince Henry of Portugal, a grandson of John of Gaunt on his mother's side, was a man of remarkable vision. He was the first person in a position to do anything about it who realized that the open seas could be turned into a highway, at a time when they were thought of as a barrier. His assets, apart from his intelligence and authoritative position, were vast wealth and a tradition of seamanship among his own people.

Henry devoted the latter forty years of his life (from 1418 onwards) to working out his dream of creating a maritime power that would dominate the world. He hired the best available astronomers and cartographers to found a school of navigation. Master shipwrights were engaged to improve on the design of the little caravels of the Portuguese fishermen, fitting these graceful, sturdy craft to face the hazards of long voyages into the ocean.

Although Henry the Navigator died more than thirty years before the most spectacular

results of his groundwork were to come to fruit, his own navigators had started to reach out along the Atlantic coast of Africa and lay the foundations of a Portuguese empire which at one time appeared to be leading the field, with Spain a poor second and England nowhere. In the following century, the large carrack became a factor in this empire-building, being instrumental in carrying the very early colonists to their new homes in Africa, Brazil and India.

Looking at the map of Africa today, we may find it strange that it took so long to discover a route around the Cape. After all, it was not like turning your back on the land and heading out across an ocean where the next nearest land was nearly 3000 miles away—one at least had a coast to hug. But such were the difficulties of undertaking these long voyages that it was not until just before the epic voyage of Columbus that Bartholomew Diaz at last discovered the way to the east coast of Africa in 1487–8. Ten years later, another Portuguese navigator, Vasco da Gama, was to be the first to reach India by this route, running the gauntlet of Arab ships which had appointed themselves as toll collectors on all western routes to eastern trade.

The most famous of the Portuguese navigators was Ferdinand Magellan, the first to sail round the world. Although he was killed in a battle with natives before returning home, he had reached a point in the Philippines already known to the Portuguese and the significant part of the voyage had been completed. By rounding the tip of South America he had gone farther south than any other European, and navigated the tortuous strait which is still named after him.

The early navigator suffered from one disadvantage which was not to be resolved until 1761. That was that although he could determine his latitude at sea whenever necessary to within a reasonable limit of 30 miles, there was no way in which he could find his longitude with the instruments available—latitude being one's position in terms of the distance north or south of the equator, longitude being one's position east or west of an imaginary line from pole to pole, such as the one running through Greenwich near London. This was an arbitrary position dictated by the presence of the famous observatory there, which was founded originally for the purpose of setting standards for marine navigation, and the finding out of longitude of places.

The obstacle to finding longitude had been understood for a long time before a satisfactory solution was invented. It was simply the lack of a really accurate timekeeper. Even when good pendulum clocks were being made they could not be considered for use at sea where the least motion of the ship would upset the clock's movement. The information needed to calculate longitude was the exact time at your home port when making your calculation. The time at your point of observation could be found from the sun or the stars. The difference between the two contained the answer. Finally, in 1761, a previously unknown genius named John Harrison presented the world with a chronometer which not only dispensed with the conventional pendulum but had refinements built into it which allowed only a five-second error on a two-month voyage.

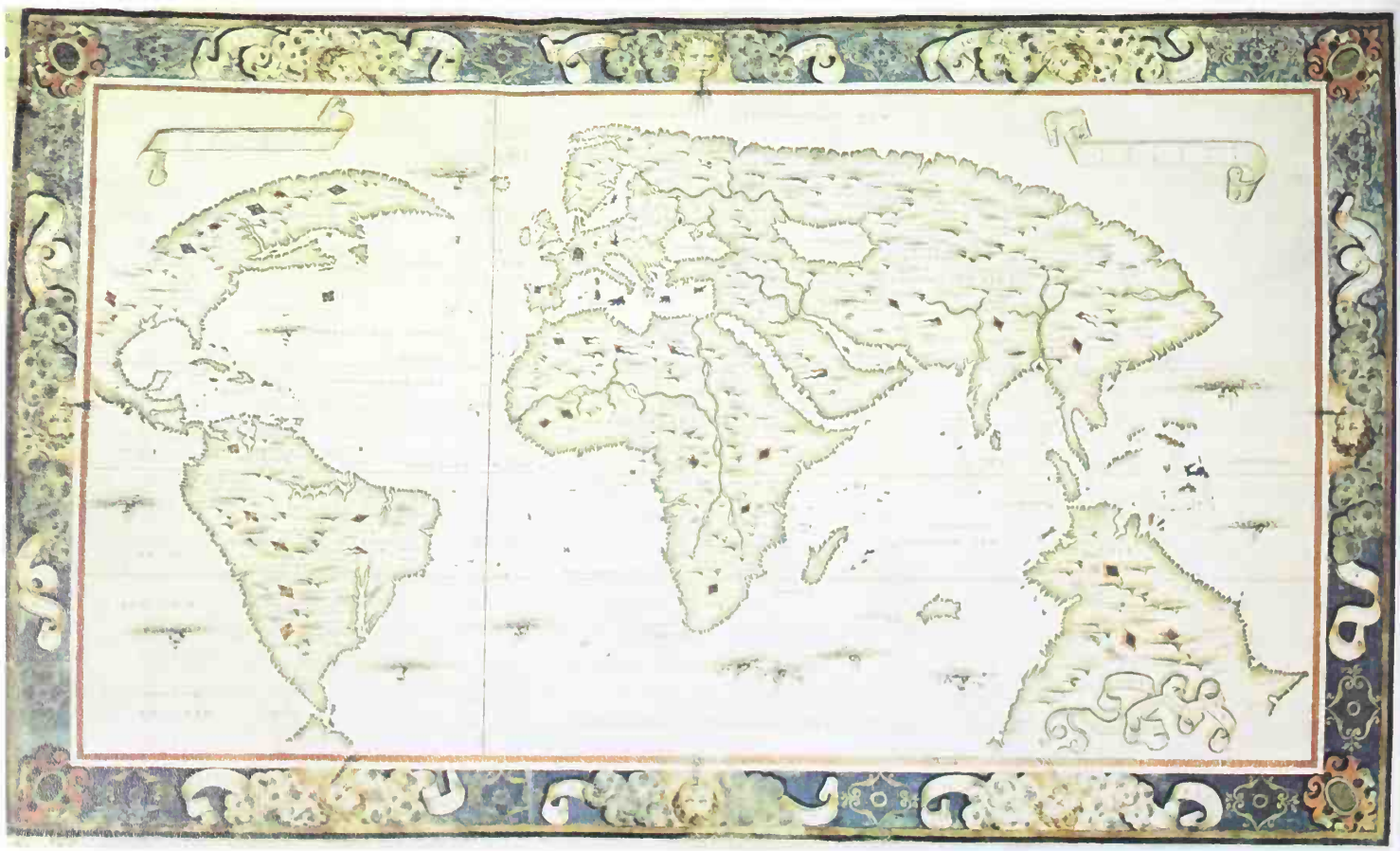
A model of the SANTA MARIA, *giving a good idea of the sort of ship in which Columbus made his historic voyage.*

Until this happened navigators had to be content for their timekeeping on the hour glass, and seamen had a rough and ready way of arriving at a known destination called "running down the latitude." This consisted of finding out the latitude of the port you were aiming for, sailing directly to this, then heading towards the goal while sticking as closely as possible to your parallel until you sighted land, which you hoped to recognize!

The first instruments which navigators depended upon were the astrolabe, the cross-staff, the back-staff and the quadrant. All were for much the same purpose, which was to determine the altitude of certain heavenly bodies above the horizon. The pole star in particular was a valuable point of reference, since it not only indicated where north lay but, by its elevation, what your latitude was. However ingenious these instruments might have been, they were difficult to sight and not accurate enough by a long way.

The invention of the sextant, using similar principles but with many refinements, and the use of modern optics put the astrolabe and cross-staff out of business, but not before many remarkable feats of navigation had already

This map of the world after Columbus had launched the great age of discovery is much more recognizable than the one on page 43, although the uncertainty about North America and North-east Asia is evident, and the assumption of a vast continent enveloping the whole of the antarctic regions and Australasia can be seen. The map was drawn with the South Pole at the top.



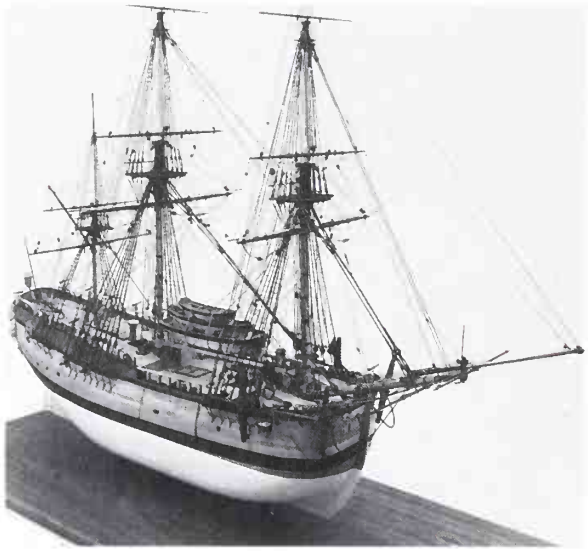
Navigation instruments in use before the eighteenth century. Included are a sand glass, a globe, dividers, and a map of the known world.

Less familiar are the mariner's astrolabe (bottom left), *a cross-staff* (center), *a backstaff* (top), *a Gunter's scale* (left) *and a sector* (bottom).

been performed. Apart from those already mentioned, there was the outrageous, insolent circumnavigation by Sir Francis Drake, who not only explored new ground in his three-year junket but conducted a private war against Spain into the bargain. His ship the PELICAN, later renamed the GOLDEN HIND, was smaller than the SANTA MARIA, which is not saying much.

Henry Hudson was another great explorer who attempted his goals without the aid of a sextant or a chronometer. All his expeditions took place in the first decade of the seventeenth century. The first, in 1607, was to discover a north-east passage to the Far East for the English Muscovy Company, without success. The second attempt was in 1608, also fruitless. The third was more memorable, since it was the voyage in the HALF MOON when the great river named after him was discovered. This was undertaken for the Dutch East India Company, which benefited from the information obtained, although the objective had been to find a north-west passage to China. The fourth voyage, also in search of a north-west passage, ended in disaster. After discovering Hudson Bay, where they wintered, there was a quarrel among the crew resulting in a mutiny. Hudson and eight others were cast adrift in a small boat and never heard of again. His successes were notable, while his failures were due to tackling impossible odds.

Model of HMS ENDEAVOUR, *showing the sturdy, practical build of Captain Cook's first ship, originally constructed for the collier trade at Whitby.*



Portrait of Captain Cook. Reputed to be an excellent likeness, it shows a man of strong character. Painting by Sir Nathaniel Dance.

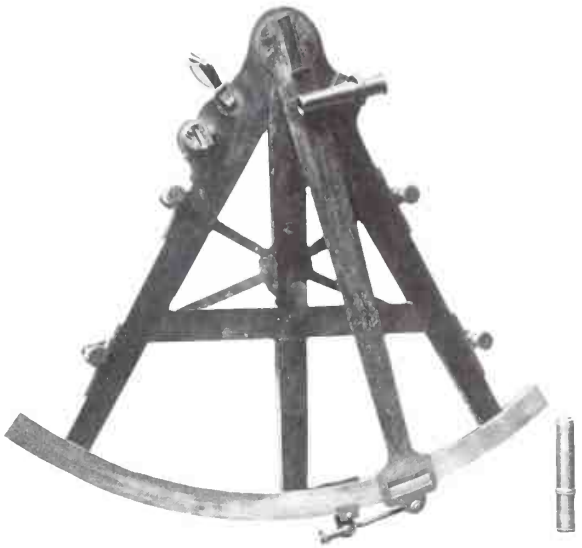
Exploration in the Seventeenth and Eighteenth Centuries

AFTER the excitements of the fifteenth and sixteenth centuries, like the development of the sailing ship itself, the great sea voyages of discovery seemed to level off in a period of consolidation. For one thing, the science of navigation made only gradual improvements for a while, and the difficulty of establishing longitude accurately was still there to plague the would-be explorer. After all, so much of the world had been revealed in a relatively short time that a good deal of stock-taking seemed to be in order.

These were the years of the great East India Companies, of the first colonizing of the Americas, and many of the energies of natural explorers and navigators turned to the shadier aspects of the roving seaman's life. Two captains who had many of the qualities of a Columbus, a Magellan or a Drake, and in different times might have been remembered for the same reasons, were William Dampier and Woodes Rogers. As it was, their voyages of exploration degenerated into privateering and even piracy which had little of the glamor of Drake's operations, and less of the justification.

One navigator of this period, the Dutchman Abel Tasman, does stand out as the one who, in 1642, established the Australian continent as being an island and not part of a *Terra Australis Incognita*. However, he still believed there was such a huge southern continent and, after discovering Van Diemensland (later to be renamed Tasmania in his honor), he sailed on to make a new landfall. This discovery became known as New Zealand, and this time Tasman was sure that he had found a tip of the southern

This sextant was used by Cook and is essentially the same instrument as those used today. Compare this with the astrolabe of Columbus (page 42).



continent. It was not for another 127 years that another great explorer was to explode the whole myth.

Captain Cook had a modest start in life as the son of a Yorkshire farm laborer, but a first rate intellect and a genius for mathematics quickly took him into a very different environment, and led in the end to his becoming the greatest navigator and explorer of this whole period, and among the greatest of all time.

His intellect was combined with a strong and conscientious temperament which was ideal for the work in hand. This and the fact that at last the navigator was to have the means of breaking the longitude barrier, set the scene for the most extensive exploration of the sailing ship era. Navigational instruments began to look like the ones in use today. Sextants had taken over from astrolabes, and, most important, chronometers from hourglasses. Cook was able, in a series of three expeditions spanning twelve almost continuous years, by crossing the Pacific and leaving a maze of trails on the map, to make volumes of scientific observations, and chart the area so thoroughly that any possibility of the existence of the great southern continent was demolished for good.

The ships used by Captain Cook were of particular interest. The best known was the first, HMS ENDEAVOUR. Originally a cat-built collier from Whitby (in Cook's native Yorkshire), it had the simplicity of handling and the ruggedness of the type which made maintenance easy, a vital requirement for the long voyages away from ports and supplies, and although small it was extremely roomy. So successful was this type for the job that he again employed converted cat boats on his later expeditions.

The First Ship Battles

AN immediate result of opening up the oceans to exploration, travel and trade was to bring widely separated powers into confrontation with each other. There were few ground rules, if any, to the exploitation of virgin territory. For some it was "finder's keepers", for others it was "might is right", but one fact was plain enough: when the Pope decided to parcel it all out between the two big Catholic powers a lot of opposition could be expected from the lusty young Protestant nations in the north. The first clash came between Spain and the mariners of England, who were at last reaching outwards after centuries of exhausting and fruitless attempts to take over France and an even more debilitating period of civil war.

So serious was the challenge from England that the point was reached where Spain had to bow to it or crush it. Annihilation seemed to be the simple answer. The way to do this was equally simple–gather together an invincible Armada of ships, sail to England with an invincible army aboard and then take over. As

The attack on the Spanish Armada, at anchor in Calais Roads, by fireships. These were unmanned but with their cannon loaded to be touched off by their own fire. The Spaniards were forced to break ranks and run for their lives. Note the Spanish galleass in the foreground.

"The four days' battle, June 1666". One of the major engagements of the seventeenth-century Anglo-Dutch wars. Painting by Abraham Storck.

everyone knows, it was not as simple as all that, and the reason had a great deal to do with the ships and perhaps a greater deal to do with the men.

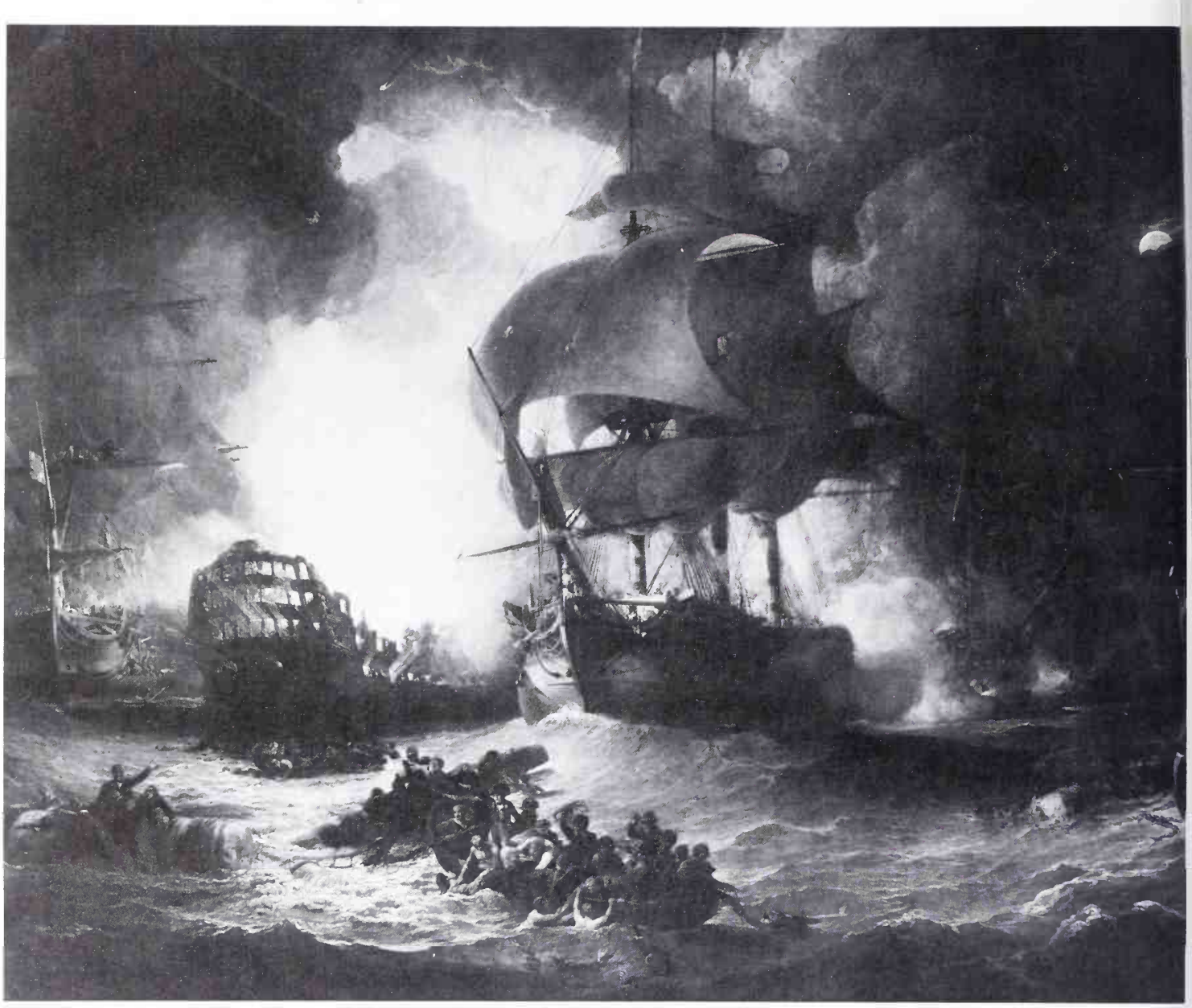
The assault on the Spanish Armada could be considered the first major naval engagement between ships, as distinct from galleys. Battles between large war vessels have been fought since the days of the Pharaohs. However, it had always been assumed that a warship could not hope to prevail with the help of wind alone; oars were the answer and the more oars the better. The last major engagement between ships which depended largely on oar propulsion was at Lepanto between a Latin Christian alliance and Moslem forces led by the Turks. The success of the Spanish galleasses led to a misleading sense of confidence in this type of ship and a number of them actually sailed to England on that ill-starred occasion.

The over-simplified reason usually given for the disaster to the Spanish cause is that the Spanish ships were too large and unwieldy and that their guns fired over the tops of the agile little English galleons, the implication being that the Spaniards had relied on out-dated, overblown carracks whereas the English fleet was a small élite group of up-to-date galleons. There is an element of fact in this version, but another fact is that the galleon almost certainly originated in Spain, and although the English version was probably a distinct improvement, the Spaniards would have had a good proportion of up-to-date ships, even if improperly designed for the occasion.

What surely was of vital importance was the attitudes of the men in these ships. While the Spaniard had not yet grasped the real pattern of war at sea, and regarded the troops in their ships as the élite, the seamen being treated as mere skilled laborers, only there to do what they were told, the English seamen were the masters of the occasion, sharing a mutual respect with their captains.

When Sir Richard Grenville in the REVENGE tried to repeat the destruction of the Armada single-handed, three years after, he might

An incident from the Battle of the Nile, a night engagement when the gunfire created most of the illumination until the magazines of the huge French flagship, L'ORIENT, *blew up. Painting by G. Arnald.*



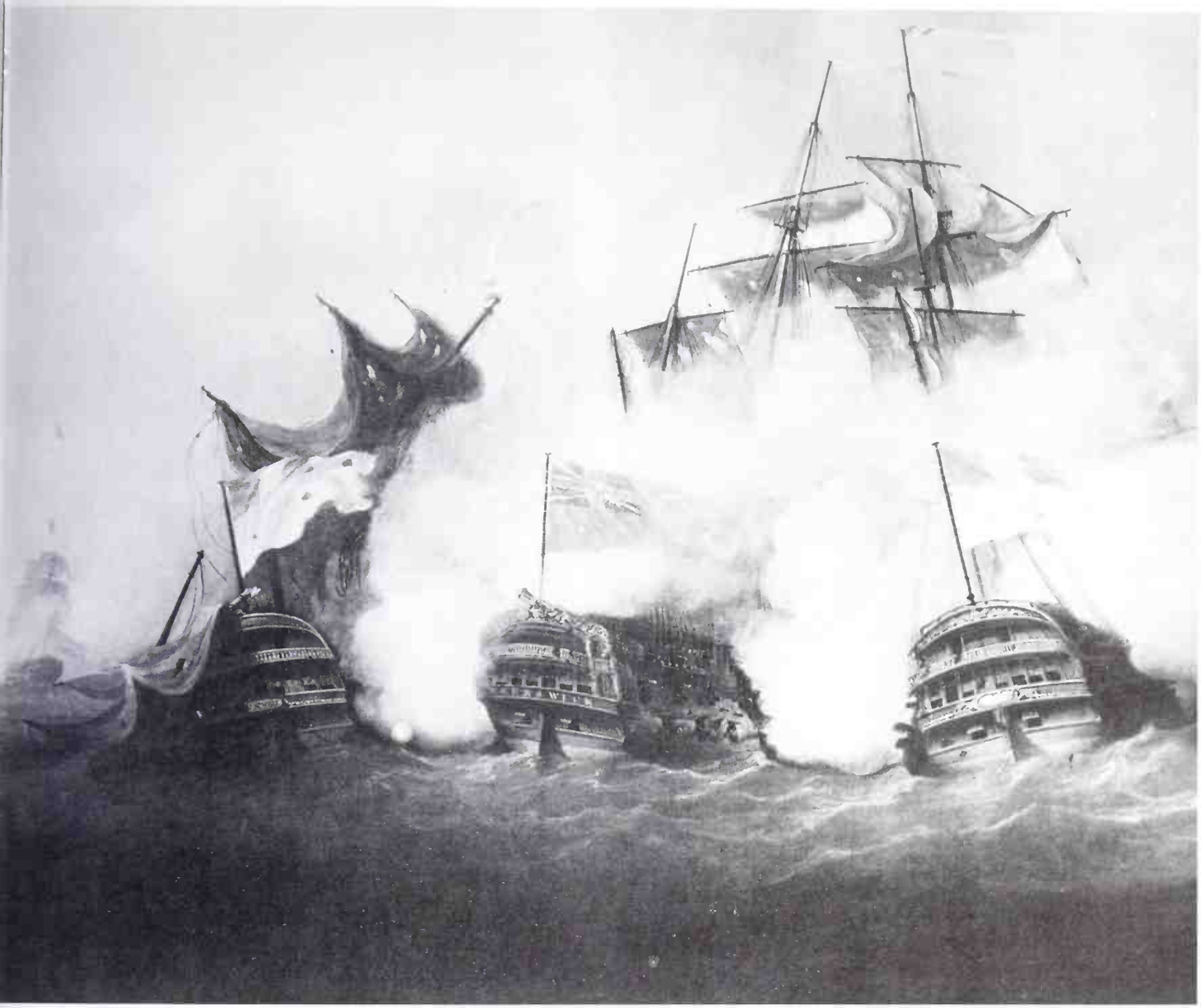
almost have got away with it. His little ship was a favorite of Drake's and a formidable fighter. The critical moment in the fight came when he lost the wind, and so control of movement, because of the great blanket of sails around him. Even so, the REVENGE wreaked havoc among the fifty-three Spaniards, quite out of proportion to the odds—but Tennyson tells the story much better than I could!

The seventeenth century saw a series of three wars between Holland and England. These were remarkable for being of a purely naval nature with no armies involved, and were entirely due to a conflict of interests. Spain had been shown where she got off by the two one-time allies, and now they were eyeball to eyeball with each other. In retrospect, there seems to have been an odd love-hate relationship between the two peoples at the time. An interesting sidelight on this is thrown by the paintings of the Dutch Van de Veldes, who seemed content to record the battles with a fine detachment from nationalistic sentiments for either side.

The English-Dutch wars are well documented by contemporary writings and paintings and represent possibly the first examples of evenly matched sailing men-of-war in conflict in the modern sense.

It was not long after the Dutch wars that the English switched their maritime belligerence back to their traditional rival, France. More struggles for power in the colonies and wars of aggression on land inevitably led to naval war,

The BRUNSWICK *exchanging broadsides with* ACHILLE *and* VENGEUR, *an incident from the Battle of the First of June 1794, one of the many naval battles with France in the eighteenth century. Painting by Nicholas Pocock.*



the result of the oceans having become the world's highways. By this time the dominance of the British at sea was making itself felt, but there was one embarrassing note: they did not build the best ships! This honor went to the contemptible frog-eating libertines on the other side of the Channel. In fact, the best ships in the British fleets were often those which they had captured from the French. Be that as it may, no one denied that the best sailors of that age were British.

Contemporary paintings of the violent encounters between these wooden walls have left us a most dramatic record of what it was like to be in the middle of one. Even allowing for a certain amount of romantic license so often taken by marine painters, one only has to use one's imagination to realize that it would be difficult to exaggerate the drama. When the magazine of the L'ORIENT blew up in the thick of the Battle of the Nile, it is said that everyone present was so stunned that all firing ceased for several minutes.

The effect of a broadside at close range in terms of noise and shock hardly bears contemplating, let alone the carnage it would create between the cramped and crowded decks. A grisly custom in the navies of those days was to paint the insides of the men-of-war bright red, so that the blood would be less conspicuous when it started to flow. The painting by Nicholas Pocock of the BRUNSWICK between VENGEUR and ACHILLE shows vividly what such a broadside was like in purely visual terms.

Horatio Nelson (1758–1805). Detail from a painting by L. F. Abbott.

Nelson

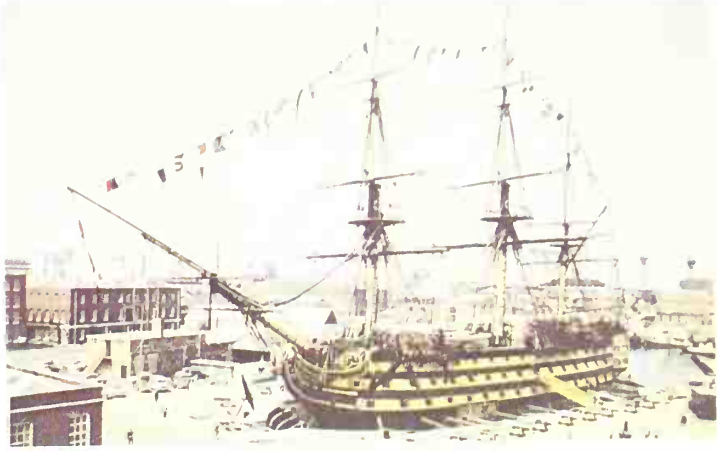
THERE were, needless to say, many excellent British admirals in the wars with the French apart from Nelson, and many famous victories beside Trafalgar. During the Seven Years War (1756–63), the outstanding engagement from the British point of view was the Battle of Quiberon Bay, 1759. The hero of this was Admiral Sir Edward Hawke, whose bold and unorthodox pursuit of the French fleet into narrow waters was in the true tradition of daring which Britannia then demanded of her subjects in order to continue her rule over the waves.

In the Battle of the Saints Passage in 1782, when the French were supporting the American revolutionary struggle, the British navy achieved one of its few victories of the period. The hero of this occasion was the aging Admiral Rodney and the result ensured the retention of Jamaica under the British flag.

The climax of the naval confrontation with France came with the Napoleonic Wars, and finally set the seal on Britannia's invincibility for over a hundred years. Although other admirals left their mark at the time, they were eventually overshadowed by a younger officer with a real genius for naval tactics and the cool but dashing temperament needed to see them through. The life and deeds of Nelson are too familiar to need repeating, yet the extraordinary thing is that the facts are almost like the script for a romantic melodrama. He was already a national hero before his triumph at Trafalgar, itself the finest example of his ability to snatch a resounding victory from an orthodox en-

VICTORY, VANGUARD *and three other ships in which Nelson flew a flag, a composite group painted by Nicholas Pocock.*

Two views of the VICTORY. Below VICTORY *in dry dock at Portsmouth, and* (bottom), *the gun deck as it appears today.*

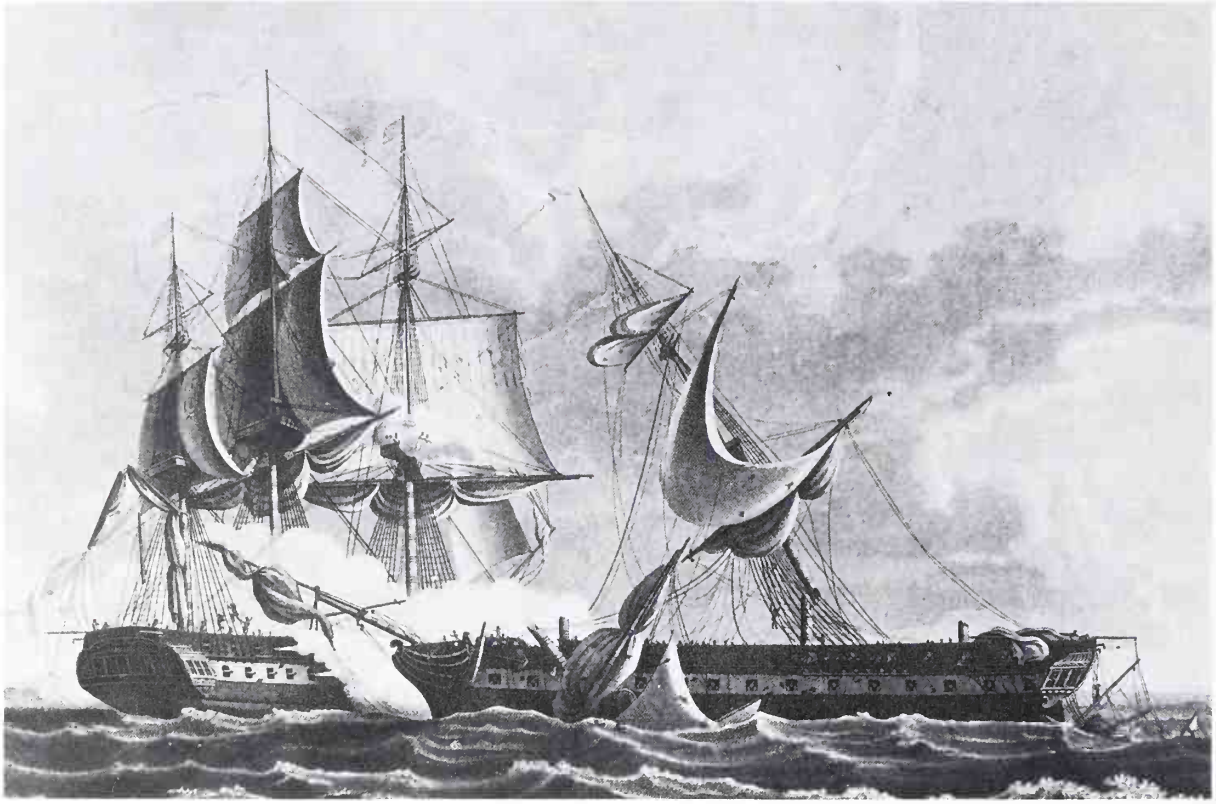


counter by unorthodox methods. The well-known love story with Lady Hamilton, and his death at the moment when he learned of his decisive victory, would seem like absurd movie-script embellishments if they did not happen to be true. Even the eyepatch and empty sleeve smack more of *Treasure Island* than of sober history.

Nelson commanded a number of different ships (which are shown together in the composite picture by Pocock). Previous to Trafalgar, his most notable victory had been the battle of the Nile, when he had HMS VANGUARD as his flagship. This battle was joined at dusk and was fought largely in the dark by the light of a moon which contributed little to the glare of the battle itself. It was here that the great flagship of the French, L'ORIENT, blew up, taking with her half a million pounds' worth of treasure looted from Malta.

Left *The deck of the* VICTORY *at Trafalgar the moment after Nelson was shot by a musket from a French sniper. Painting by D. Dighton.*

The CONSTITUTION *and the* GUERRIÈRE. *During this encounter the American frigate earned the nickname of "Old Ironsides".*



HMS VICTORY survives to this day, one of the most fascinating relics of the past in existence. So well restored is it to its original condition that the ghosts of those who manned her seem much more real than many well-publicized hauntings of ancient castles and abbeys. For the last two years when VICTORY was Nelson's command it was also his home, his castle. This was immediately after the large repair costing £71,000, resulting in what amounted to a new ship.

Nelson's quarters on board were a mixture of elegance and austerity. He slept in a swinging cot, decorated with silk hangings (partly embroidered by Lady Hamilton), which would be unslung during an action to allow the heavy guns on either side of it to be operated. The dining room in which he habitually entertained eight or nine of his officers, and the living quarters beyond had the dignity of a company board room, but with much lower ceilings, of course.

After Trafalgar, the days of the "jumbo" sailing man-of-war were numbered, although they lingered on to the middle of the nineteenth century. The advent of the screw-driven iron-clad was described as being "like black snakes among the rabbits", but before this came to happen, the frigate was to have a few hours of glory before becoming obsolete.

The Frigate Duels of 1812

ONCE the American Revolution had been won, the immediate need for a United States standing navy was limited. At that time, French-built warships had been relied on largely, and when it became time to build their own, American shipwrights had excellent models to work from. By incorporating features of the Baltimore clipper schooners, they were even able to improve on these designs.

The incentive to build at all came from the attentions of pirates to American merchant ships, which were becoming active all over the world. In particular the Barbary pirates, under the direction of the Dey of Tunis, were capturing US ships and ransoming their crews (or selling them into slavery).

The first six American frigates included two of the most famous, the CONSTITUTION and the CHESAPEAKE. In the misconceived war of 1812, the one redeeming feature was the remarkable chivalry shown on both sides, in a series of duels fought between American frigates and their counterparts from Britain. American sailors proved they had assumed the mantle of superior seamanship and fighting morale worn for so long by the British tar. The latter, in fact, was suffering from a reaction to the peak reached at Trafalgar.

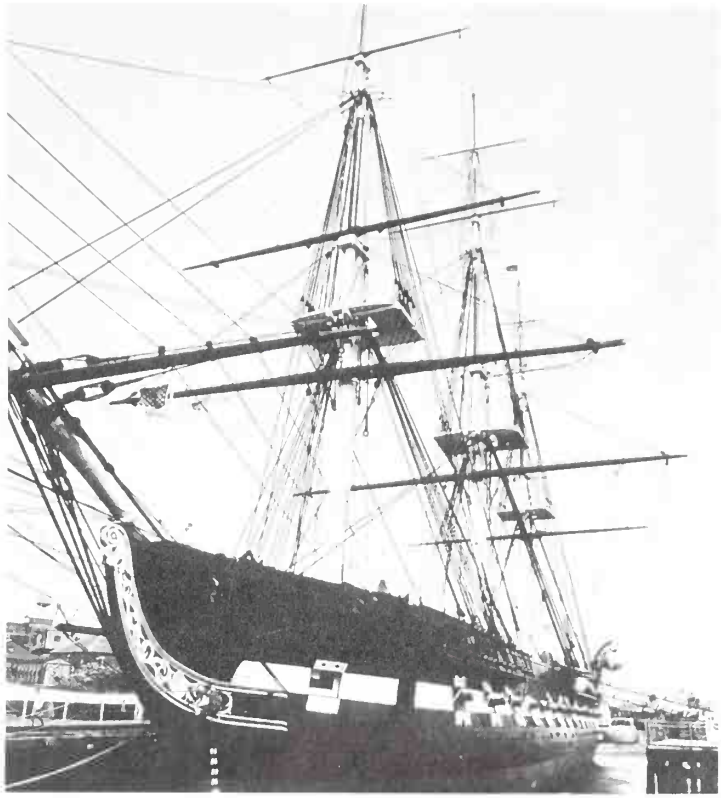
The CONSTITUTION was the victor of two encounters with British frigates, the first of which was against the GUERRIÈRE, which had been captured from the French some time previously. The GUERRIÈRE lost all her masts and was reduced to a leaking hulk with thirty shot holes below her waterline. During the battle, a dismayed British sailor, seeing that the GUERRIÈRE's broadsides were having little effect, called out "Her sides are made of iron." From that time on, the CONSTITUTION was proudly and affectionately known as "Old Ironsides."

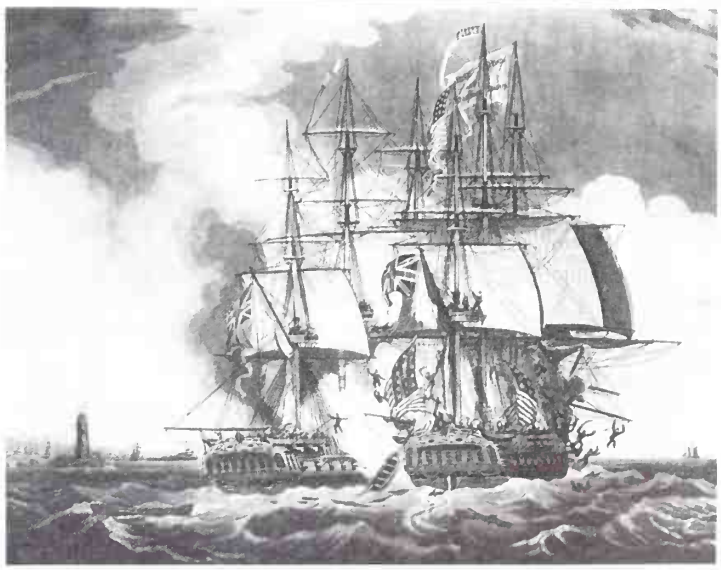
Her second engagement was with HMS JAVA. Again the British frigate was outgunned but fought gallantly until she began to sink. Both captains had been wounded, Captain Lambert of the JAVA mortally. The British crew were taken off their doomed ship. Captain Baimbridge of the CONSTITUTION had his bed brought up on deck for his dying adversary and as a mark of respect returned Captain Lambert's surrendered sword to him.

The following year, in June 1813, a British frigate was able to restore some of the Royal Navy's lost dignity in a famous encounter off Boston. The SHANNON with another frigate, TENEDOS, had been waiting outside the harbor hoping to do battle with three US frigates which were at anchor there, but during a heavy fog two of the latter slipped away, leaving behind the CHESAPEAKE. Realizing that the American would hardly be rash enough to take on two at once when there was no need, Captain Broke of the SHANNON, as senior officer, ordered the other captain to take the TENEDOS away from the scene, and so make the odds more even. He then sent Captain Lawrence of the CHESAPEAKE a most courtly note requesting him "to do me the favour to meet the SHANNON . . . ship to ship, to try the fortune of our respective flags . . ." and entreating a speedy reply, being short of provisions and water.

Captain Lawrence was already preparing to meet the challenge, and no less sportingly had evened his own advantage by leaving behind five guns to make their armament level. The fight only lasted twenty minutes of heavy gunfire at close range, and was finished off with the capture of the CHESAPEAKE by a boarding party from the SHANNON. Captain Broke of the SHANNON was wounded while Captain Lawrence was killed.

Today, we are fortunate in having the most famous of all these frigates completely preserved and still afloat. "Old Ironsides" is now public property and a fitting reminder of one of the finer hours of the young navy of the USA.

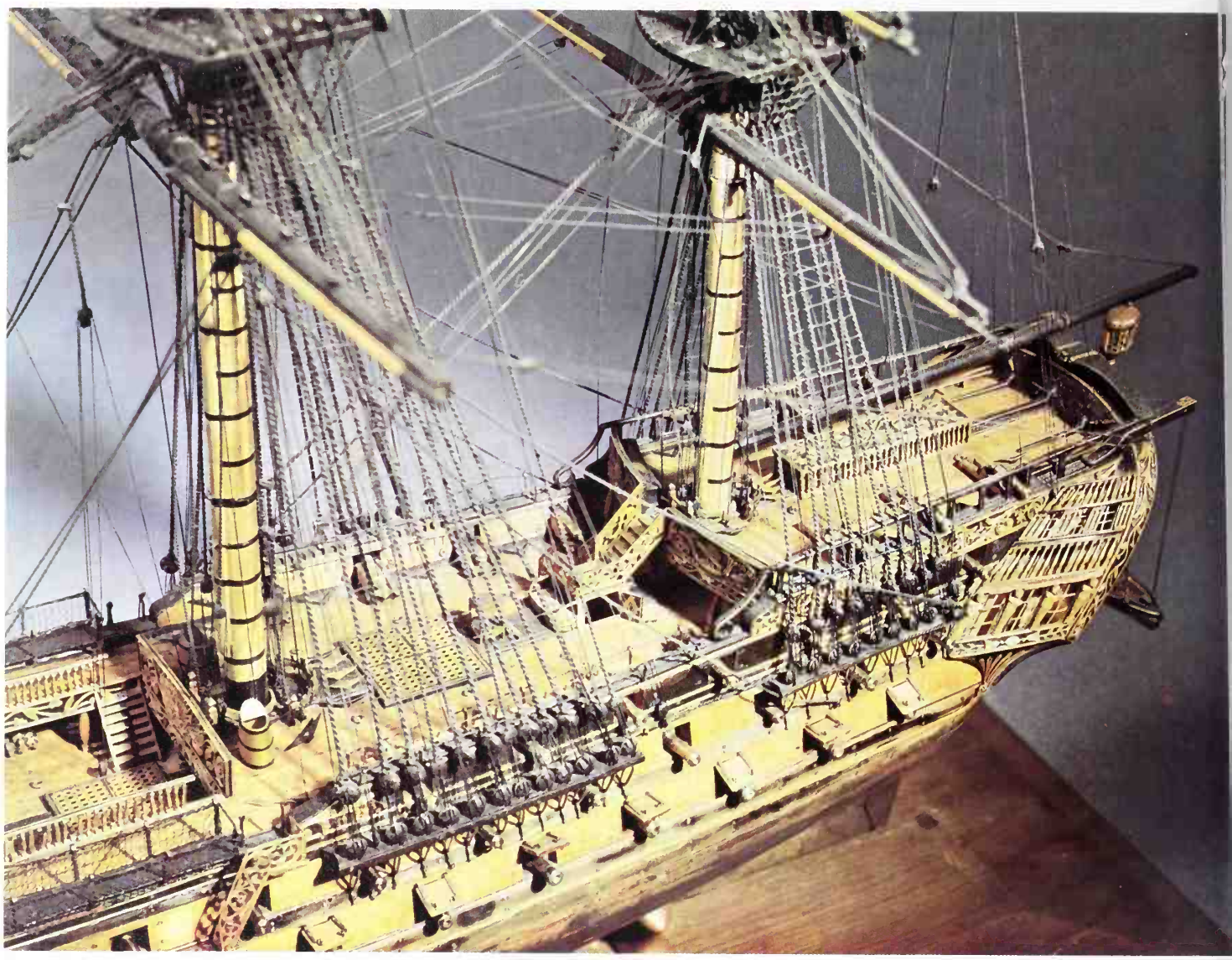




Top *The* USS CONSTITUTION, *"Old Ironsides", as she is today in Boston, preserved for the admiration of posterity, as are the* VICTORY *and the* CUTTY SARK *in England.*

Above *The engagement between the* CHESAPEAKE *and the* SHANNON, *off Boston harbor. Many pleasure boats came out to watch the engagement, confident of a home victory which did not materialize.*

A close-up view of a French prisoner-of-war model of a two-decker warship of the Napoleonic period. The fine detail of this model is remarkably well executed and gives a good idea of the ornamentation of a ship of this period.



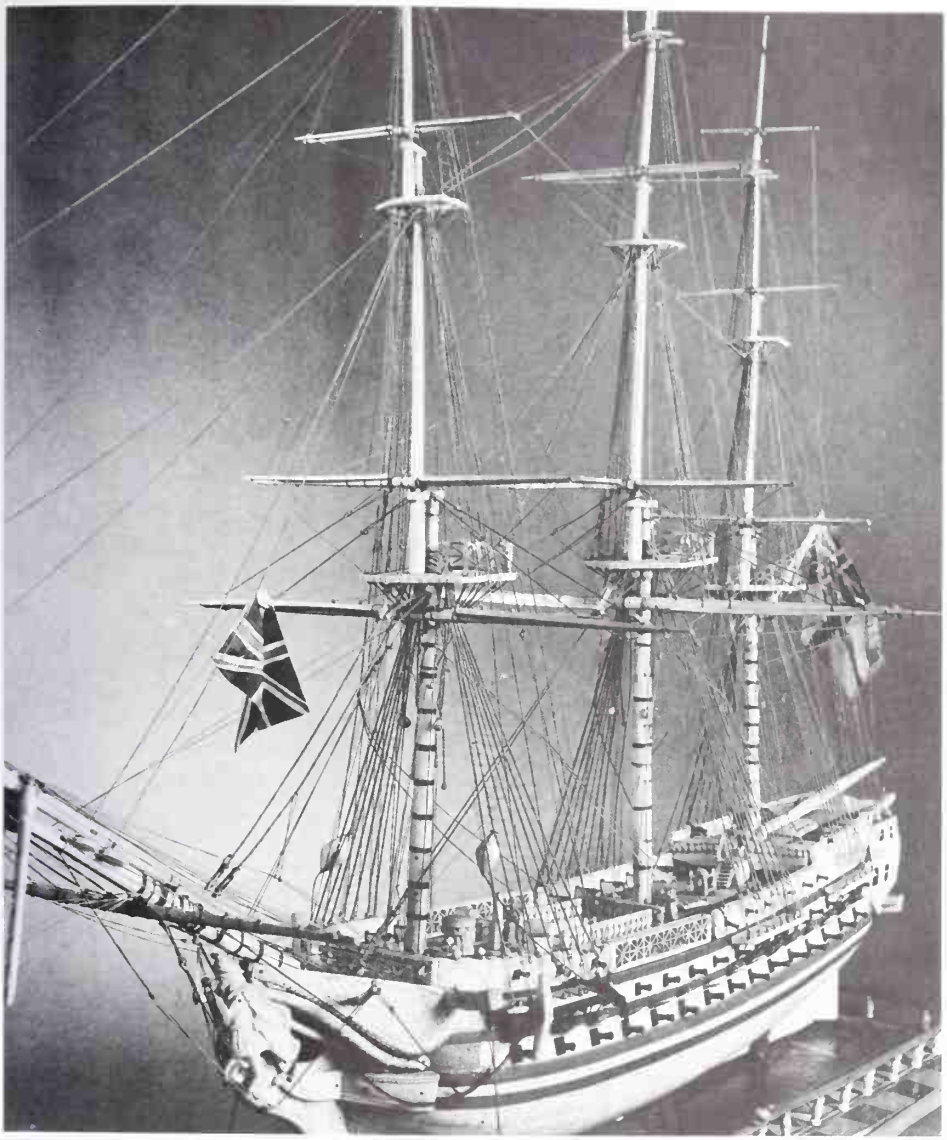
Ornament and Other Details

CARVING has always played a conspicuous part in the building of a wooden ship, as if the hand that shaped its frame and timbers felt impelled to continue cutting away after the main job was finished. The feature which first comes to mind in speaking of ship ornamentation is the figurehead. From earliest times, the builders of boats and ships have decorated the prows of their craft, if only with such a simple motif as the painted eye.

Figureheads are certainly among the most endearing oddities to be found on a ship, and when decoration began to lose favor, and was cut down for economic and practical reasons, they were the last to go. In the days of Charles I and the SOVEREIGN OF THE SEAS there was hardly a square yard of a man-of-war which did not have some kind of ornamental carving on it. The sterns of some of them were swarming with enough allegorical figures to outfit a fleet with figureheads. Eventually the absurdity of having a fortune in non-productive carving flaunted at enemy gunners sank into the minds of the authorities, and even precautions taken in battle to protect them were recognized to be a needless distraction from the business in hand (apart from being ineffectual).

The detail of a two-decker warship, shown here, is interesting on a number of counts. Not only does it show elaborate and elegant carving on the deck but it dates from a period when ornamentation, at the end of the eighteenth century, had supposedly reached a minimum. Another interesting fact is that it is a superb example of another aspect of the sailor's preoccupation with carving. This model was one of those made by French prisoners-of-war in British hands to while away their years of

Below *A good example of a French prisoner-of-war model made of bone, a common material for these models.*



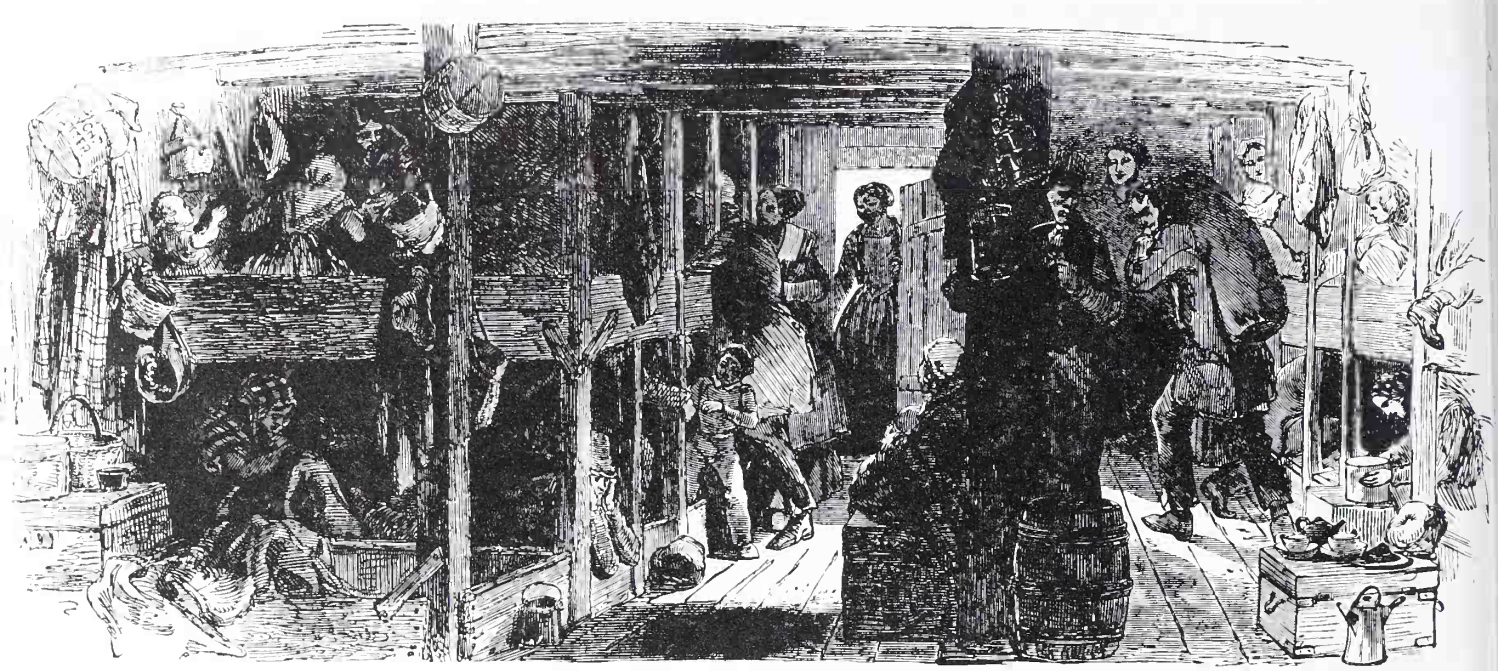
Right *A flamboyant figurehead, the Ajax, from a 74-gun ship of the early nineteenth century.*

incarceration and make a little money on the side by selling them. Since they were inevitably made from memory they rarely represented any specific ships, but examples of a quality as good as this one were not uncommon and were certainly accurate in general terms.

To return to figureheads: the biggest and most elaborate of them were to be found on large men-of-war. Often these would consist of a group of figures, usually allegorical, surrounding and glorifying a central figure. Such a one is the figurehead for the VICTORY in her original form. There is a model in the National Maritime Museum, Greenwich, made by the carver of the full-sized version, to submit to the Admiralty for approval. He had been given elaborate instructions of what figures should be where, their poses and what they were holding or doing. The figures were to include four cherubs, representing the four winds, surrounding a shield; Britannia trampling on Envy, Discord and Faction; Peace, Europa, Columbia, the British Lion and a young genius holding a bunch of flowers are also there. All this was topped off by a bust of George III.

Figureheads from the smaller ships are less daunting and generally more appealing. The CUTTY SARK takes her name from the poem by Robert Burns describing the adventure of Tam o'Shanter when he was pursued by a beautiful witch wearing only a "cutty sark" (the lowlands Scottish for a short chemise), and the figurehead represents Nannie the witch wearing this inadequate garment. Indeed, pretty women in various stages of undress were always popular subjects, and doubtless commanded the loyalty and affection of their crews in a way that a figurehead of the ship's owner could hardly be expected to do.

This drawing records the squalid conditions under which the poorer emigrants lived during lengthy voyages (1851).



Emigration

READING of the conditions under which the first colonists traveled one sometimes wonders why they bothered. Of course, the standard of life at the time could be pretty rough even for the rich who could have most of the dirty work done for them, but there were some things that nobody was immune from. Sickness of all kinds was common, and treatment for a given ailment varied from the inadequate to the barbaric. Any kind of travel was uncomfortable. Rats were a problem in the best-run houses, as were fleas and their ilk. We might find seventeenth- and eighteenth-century home cooking as unpalatable as they found the food at sea.

Nevertheless, there is no doubt that travel by sea was tedious and uncomfortable in the extreme. The first colonists and emigrants traveled in ships which were not originally intended for anything other than carrying bulk cargo such as timber, the MAYFLOWER being a typical case. When the Pilgrim Fathers decided to make their historic exodus, they took the only course open to them, which was to find whatever transport there was at hand. In fact, they hired the services of two of these merchantmen.

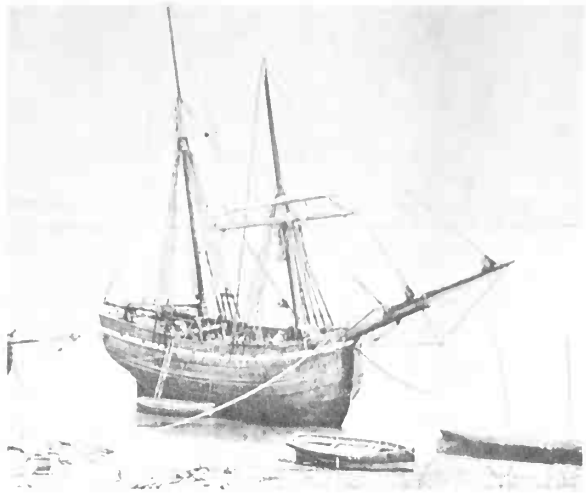
It is sometimes forgotten that when the MAYFLOWER set sail for the north coast of America in the fall of 1620, she was in company with a second ship, the SPEEDWELL. Between them they were carrying 120 emigrants, but the SPEEDWELL proved to be unfit for the task and the MAYFLOWER had to set off alone with most of the other ship's passengers as well as her own. The passage was extremely hazardous, and with such overcrowding it must have been wretched.

The long voyages to the east in the Indiamen were mostly undertaken by merchants, administrators and soldiers who expected to return, for one thing, and who took their passages with less urgency than the emigrants to North America. When the trickle across the Atlantic at last became a flood, the available transport became less able to keep up with the flow. The demand for berths was so great that the most unpromising boats were pressed into the service.

The story of the populating of the Americas is one of sailing ships of all kinds. By the time the steamship was bringing emigrants in any numbers, the process was to all intents and purposes completed. Emigrant ships were of many kinds and sizes. A well-run ship with a good master might be operated on community lines, with the passengers not only helping each other out but giving a hand with the maintenance of the ship, if any of them had special skills such as carpentry.

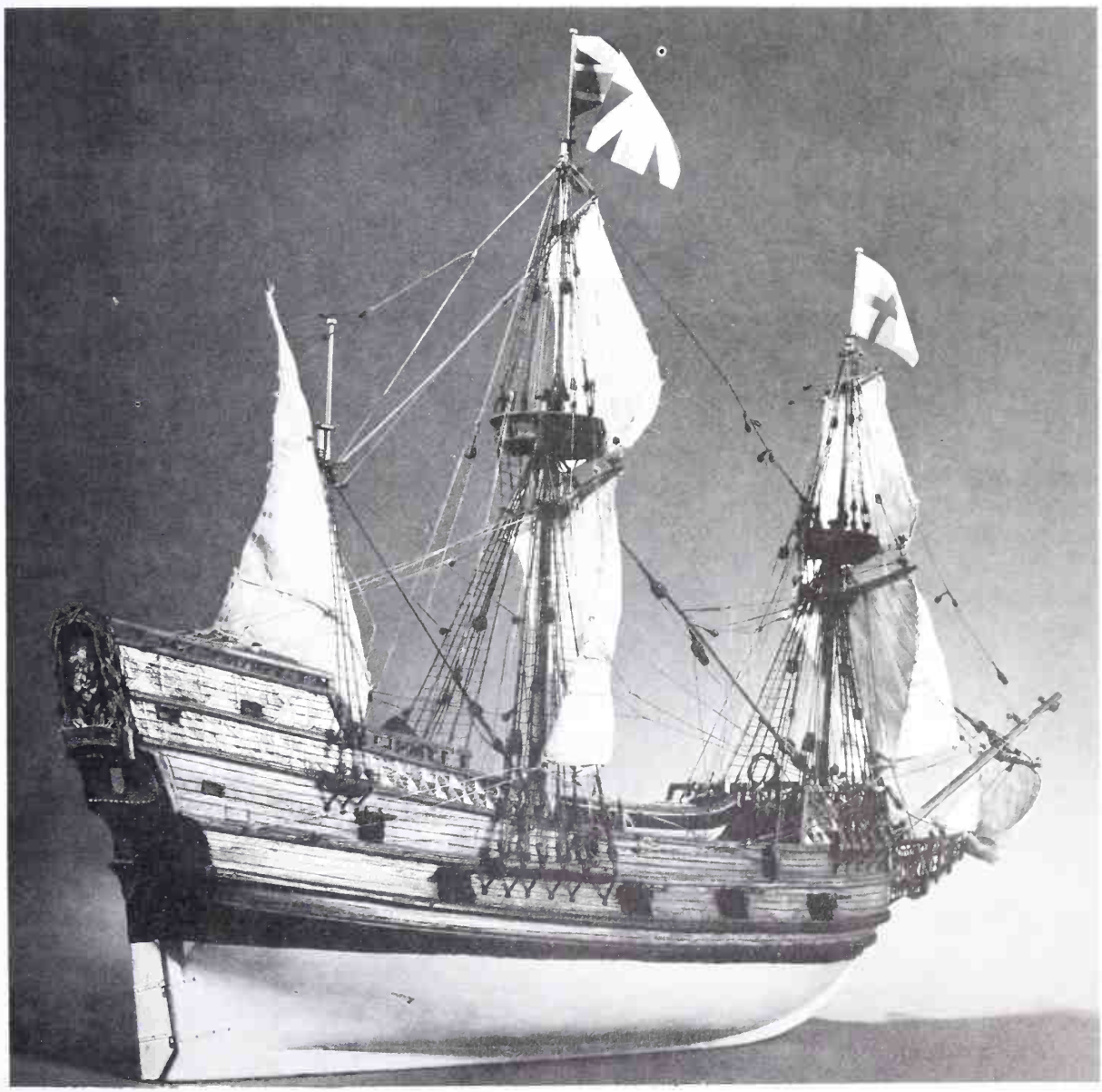
On other ships, the emigrants might be crammed into dark, squalid quarters with no sanitation, more like pens than human habitation, with rats and lice for company. In many ways, a tiny boat like the PETER AND SARAH (50 feet long, about the size of a fishing vessel) would be preferable. At least the squalor would be on a smaller scale.

The PETER AND SARAH, *built in 1809, was used as transport for emigrants and was eventually lost in a great storm of 1859.*



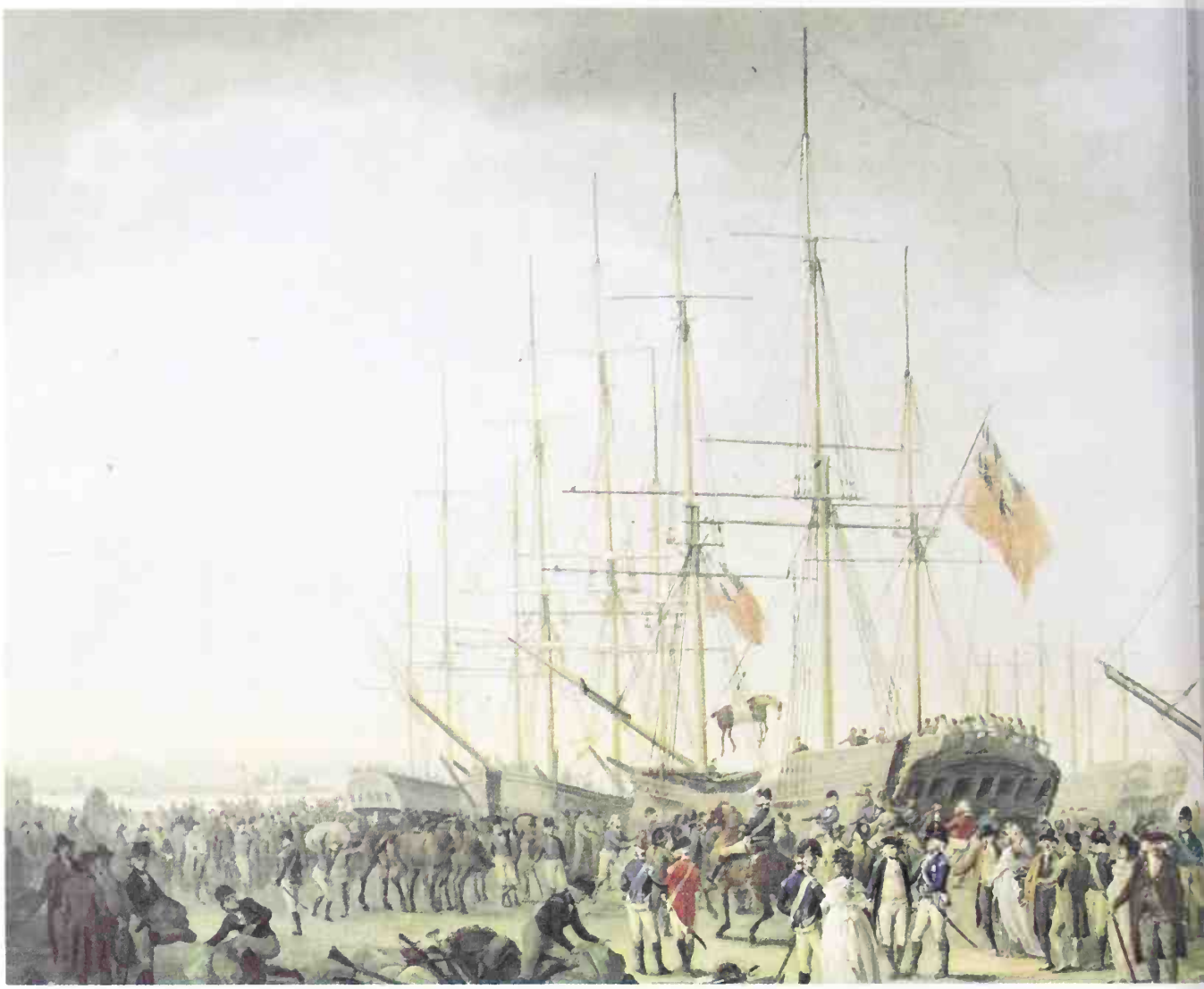
The passenger sailing ships of the class of the MACQUARIE (pages 62–3) would be beyond the means of the poorer emigrant, whose very poverty was the cause of his leaving his homeland.

In speaking of the human traveler, one is likely to forget the other kind. Chickens, pigs, goats and cows had long been part of the deck scene of sailing ships bound for distant ports. These would provide fresh eggs, milk and occasional meat throughout. Also there were those animals, horses and cattle in particular, which were themselves colonists or emigrants! These creatures were usually housed on deck and had to take the weather, fair or foul, as it came. The casualty rate was high.



The MAYFLOWER, *a model based on a typical merchant ship similar to the original.*

A busy scene of troops embarking near Greenwich in 1837. Painting by W. Anderson.



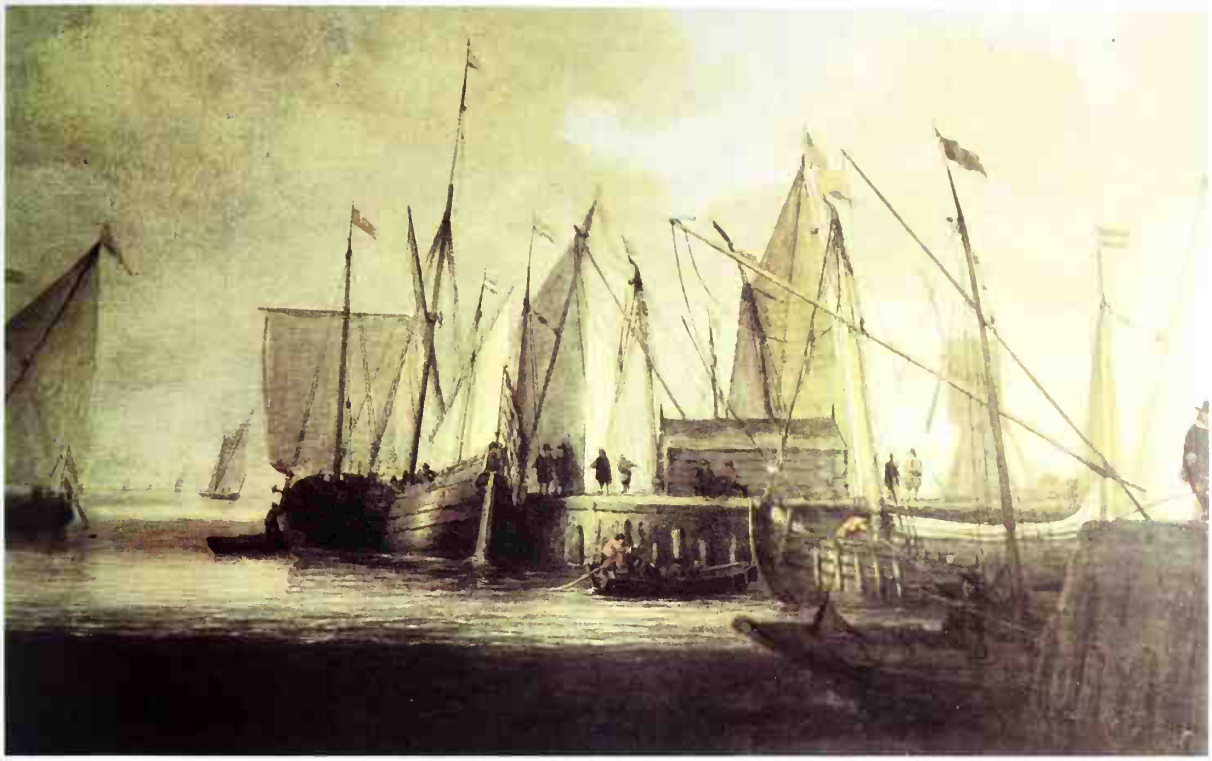
Harbors, Quayside Life

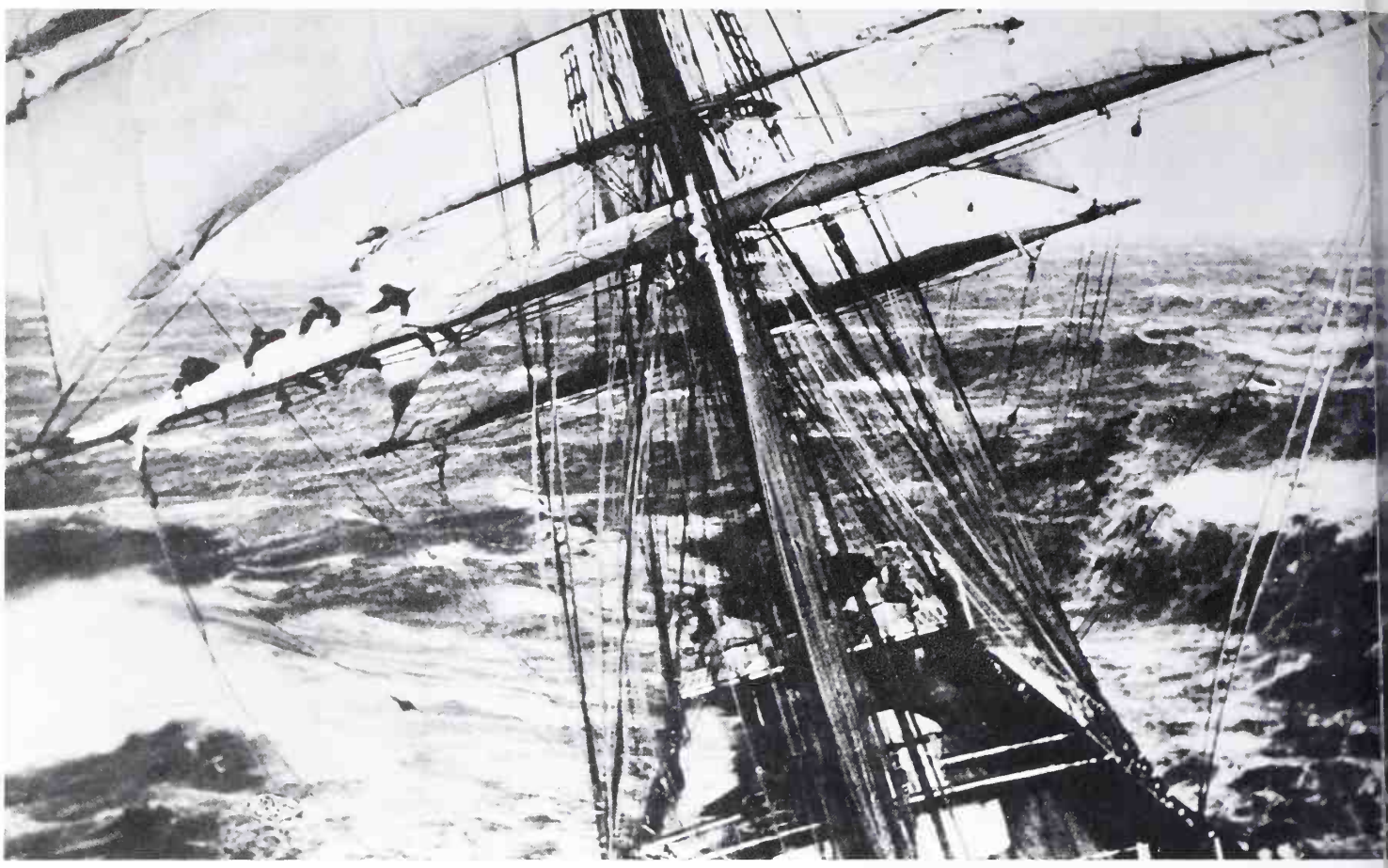
THE nearest that many people ever came to taking a sea voyage in the days of sail was in imagination, standing on a quay and watching the great white birds of wood, hemp and canvas coming from distant lands with their exotic cargoes, or heading out to who-knows-where. The bustle and excitement of a harbor has a magic even today; how much more so in the days when one could become a part of it, mingling with the sailors speaking in strange tongues and wearing strange clothes. There were no wire fences and guard dogs then, and the life on the waterfront around even the largest ships must have been much more intimate. The sense of excitement, anticipation and drama which the pictures reproduced here evoke, reminds one that one can perhaps overstress the hardships and disagreeable side of life at sea.

A very lively quayside scene with a small vessel beating its way out of harbor into a stiff breeze. Watercolor by P. J. de Loutherbourg.

Below *These smallish Dutch ships preparing for sea are clearly confined to mercantile activities. Painting by Hendrik Dubbels, 1676.*

Bottom *"Old Custom House quay", a fascinating record of a bygone era. Painting by Samuel Scott.*





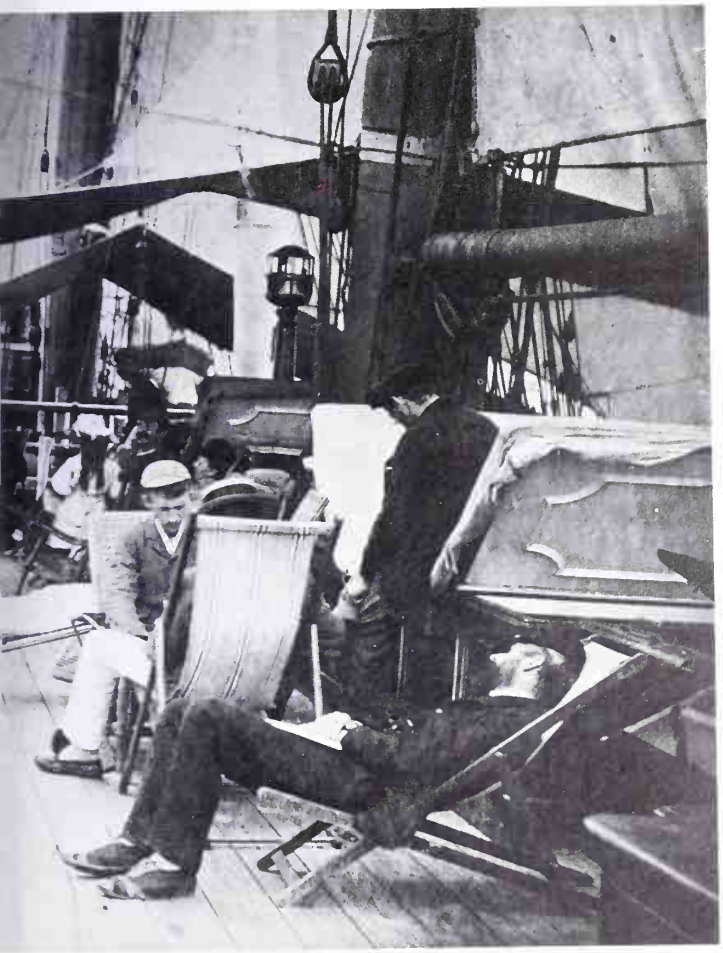
Last of the Passenger Sailing Ships

TWO of the photographs on these pages were taken of the MACQUARIE one of the last of the British passenger sailing ships. Built in 1875, she was used on the England to Australia run for many years. The deck scene is that of a sailing ship, although more spacious than most. The picture of men aloft could hardly be anything other than aboard a true sailing ship.

She is a handsome ship and, being built many years after steam had begun to be taken seriously, it is interesting to find a continuing faith in the future of sail as a serious contender for a trade which was most likely to go to the faster steamship-people. The chief virtue of the sailing ship from a passenger's point of view was that in fair weather it would ride the waves more smoothly than the powered ships, which would tend to batter their way through. A ship of the quality of the MACQUARIE would also be unlikely to suffer from the sort of ventilating condition reported on an Indiaman in 1826, when foul air coming up through the hatchway in the form of smoke prompted the captain to send someone to investigate in case it was a fire. Early steamers, on the other hand, had a way of generating oily smells which delicate stomachs sometimes found to be aggravating to an already uneasy condition,

Far left *This photograph of men aloft tells more than any words can do of the rugged life that was the daily routine of sailors, whether on a man-of-war or a fine passenger ship.*

Left *The* MACQUARIE, *a large iron-built passenger ship of 1875, and one of the last of its kind. The many photographs taken on board, one of which is shown here* (below), *appear to have come from the album of her captain. She was 1975 tons and 269 feet long.*



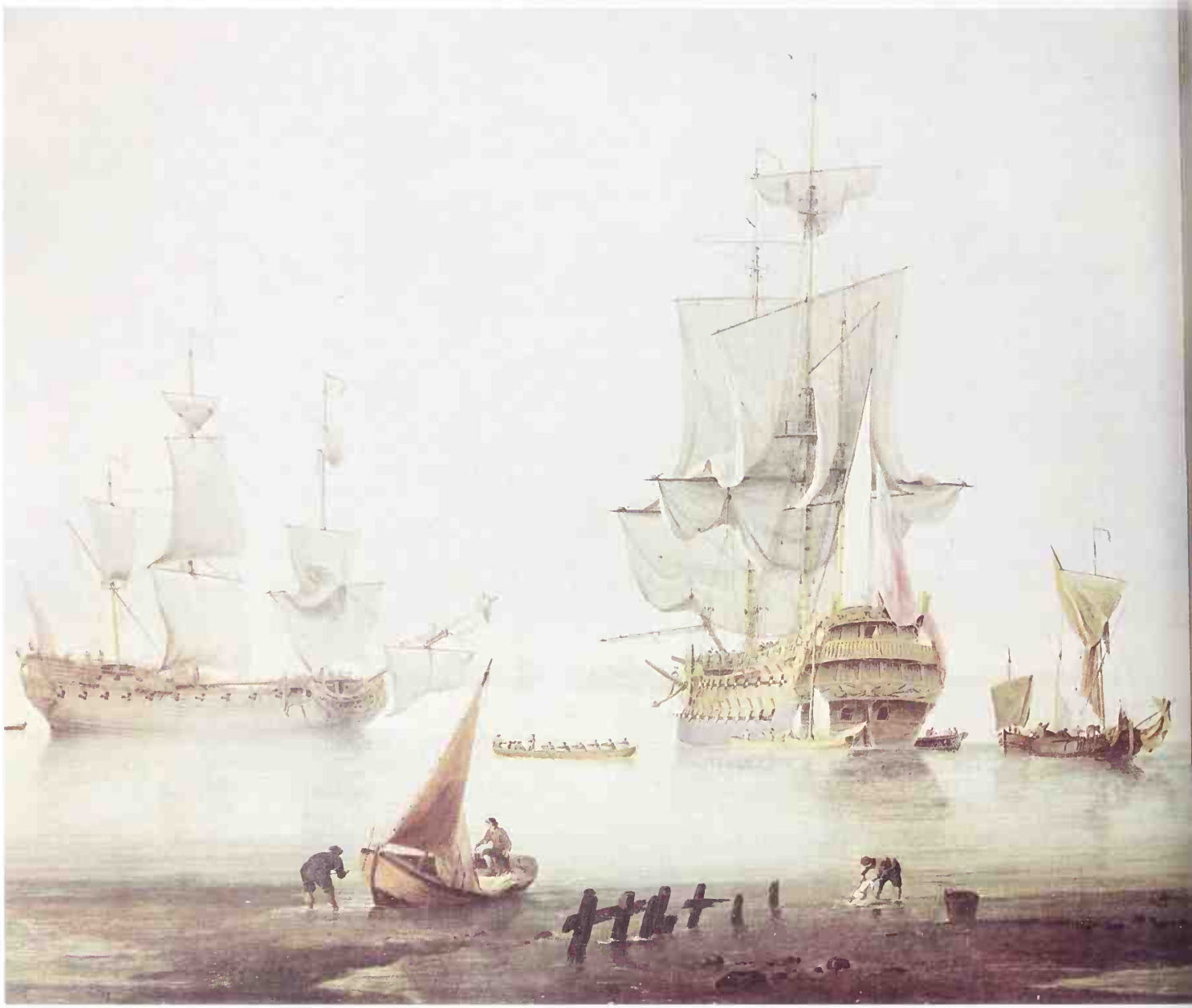
and if the wind happened to be in the wrong quarter, a stroll on deck could be spoiled by blasts of hot, sooty fumes from the funnels.

On the other hand, not only was the sailing ship being rapidly outpaced by the upstart steamer, it was also a prey to the weather, and sailing times were unpredictable. While the steamer might work to a fairly rigid timetable, the sailing ship could only give approximate dates of departure and hardly a guess at time of arrival, which could vary by weeks or months on a long trip. The advocates of sail went down fighting, however, and some of the finest of the shipbuilders' creations appeared at this time, their conservatism thrown to the winds in an effort to meet the challenge.

One interesting aspect of the use of clippers to carry passengers is that Australia and California both experienced gold rushes in full swing around the mid-point of the nineteenth century. Anyone planning to get in on either had to do so in a hurry, and the clipper was still the fastest ship afloat at that time.

The clipper ship barely had time to make its mark in the world before it became redundant. Attempts to adapt it to other uses, such as the wool and emigrant trades, were shortlived and by the end of the nineteenth century it had lost the battle.

"Shipping airing their sails in a calm".
Painting by Charles Brooking.



Weather

ABOVE all, the sailing ship is a creature of the weather: without wind there could be no sailing ships. Without wind, indeed, there would be no rain—no rain, no crops—no crops, no human race! However, it is remarkable that anything as fickle as the weather could have allowed the ship to develop to the point where it could be considered the complete mistress of the winds three times out of four. Where the gods of the winds have the last laugh is when there is too much of it, or when it is coming from the wrong direction in a confined space, or when, worst of all, there is none at all.

In the early days of long voyages, when ships were still unable to sail in anything but a wind coming from somewhere astern, it became of prime importance to know the direction of the prevailing wind in any part of the world. Since there is a pattern of winds in the different oceans which blow almost constantly in a given direction, the old seamen could utilize these and travel long distances without having to change course or attempt to sail into wind—rather like stepping onto a moving sidewalk. It might take them a bit out of their way, but if they could catch another of these moving sidewalks to their destination, it would make no difference.

One of these steady air currents is found be-

Detail of "Dutch ships running before a storm", an expressive painting of a sea storm, showing the motion of the waves lashed by howling winds and the ship being driven helplessly forward. Painting by W. Van de Velde the Younger.

tween the parallells of 40° and 60°. Here one can count on a westerly gale at almost any time of year, the winds known as the **Roaring Forties.** The **trade winds** from the easterly direction are milder and steadier, ideal if you happen to be traveling west in the right latitudes, which are from 30° N to 30° S, except for an area around the equator itself, where one is likely to run into the **doldrums** (oppressively hot, still air).

Most marine painters of any worth, particularly the Dutch, reflect the mariner's preoccupation with the weather in their pictures. The titles will often amplify this–"Third rates in a squall", "Indiamen in a fresh breeze", "Shipping airing their sails in a calm",

Beaufort Scale

0	*Dead Calm*	*under 2 mph*
1–3	*Light Breeze*	*2–12 mph*
4–5	*Moderate Wind*	*13–23 mph*
6–7	*Strong Wind*	*24–37 mph*
8–9	*Gale*	*38–55 mph*
10–11	*Storm*	*56–75 mph*
12	*Hurricane*	*above 75 mph*

"Dutch ships running before a storm" and so on. Not only this, but one can study a Van de Velde, for instance, and find that every detail has been considered–the kind of seas, the motion of the boats, the appropriate set of the sails and rig, even the right type of clouds. It is a reminder of how much the sailor controlled or was controlled by the weather. Various conditions were utilized, even calms (for drying out sails), and where possible taken advantage of.

While the early sailing ship was at the mercy of a hostile wind and might be trapped in harbor for weeks on end (as William the Conqueror had been in 1066), the later sailing ships could maneuver against any but the most implacable and persistent head wind. The internationally recognized graduating of wind velocities was devised by the British Admiral Sir Francis Beaufort in the early nineteenth century, and is known as the **Beaufort scale** (see page 65).

Shipwrecks

THERE is no more persistent theme in the paintings, writings and songs of the sea than that of "those in peril on the sea." Shipwrecks today are uncommon, and usually attributable to human error. In the days of sail, they were an everpresent possibility. At one time, the crew of a ship which was caught in a storm off a lee shore might just as well say their prayers and repent their sins. Weather forecasts were, at the best, no better than the mariner's own instinct and the feeling in his bones. The safety of a ship depended on its sailing qualities, the seamanship of the crew, and the blessings of Providence. In the days before adequate warning of storms by radio (let alone such refinements as radar and asdic), danger might strike so suddenly and unpredictably that the best-handled ships could be helplessly trapped.

The worst hazard was, of course, a rocky coast, which seems to be a natural companion to dirty weather. Speaking of paintings, it is as if this has a cobra-like fascination for the seaman, because time and again one comes across the theme of "ships off a rocky coast", even when the ships in the picture seem to be in no immediate danger!

The lee shore is the one on the side of the ship away from the direction the wind is coming from–the wrong side, of course. A

powered ship can usually escape by turning straight into the wind and going full steam ahead. In the days of cogs and carracks, the ship's master not only had to pick his wind before sailing, he was well advised to pick his seamen carefully. In November 1120, King Henry I of England, returning from a visit to Normandy, was followed by his only son and heir, Prince William, in a second chartered ship, the BLANCHE NEF, or 'White Ship", possibly of the type seen on the seal of Winchelsea (page 3). The king had unwisely pre-

Photographs of wrecks have a pathos of their own. This is the barque GLENBERVIE, *at the Lizard, Cornwall, 1902, still with some of its sails set.*

sented her captain and crew with three hogsheads of wine, and they were drunk from the moment they set sail. The "White Ship" foundered on a rock and the prince and all others on board but one were drowned. Even monarchs had to take their chance with whatever freelancing ship's masters were around.

Not all wrecks occurred on rocky coasts. An unseaworthy or mishandled ship could simply be annihilated by heavy seas and many of the ships that have set off on a voyage, never to be heard of again, must have met this sort of fate. An old ballad called *The Bay of Biscay* puts into verse exactly the feeling of helpless awe expressed in so many melodramatic paintings of storms. The first verse goes like this:

Loud roared the dreadful thunder, the rain a deluge showers.
The Heavens are rent asunder by lightning's vivid powers!
The night was drear and dark, our poor devoted bark
There she lay, on that day, in the Bay of Biscay O!

"Shipping in a storm off a rocky coast", which shows the dreadful power of a storm and the menace of a lee shore. Painting by P. Mulier.

Drama at Sea

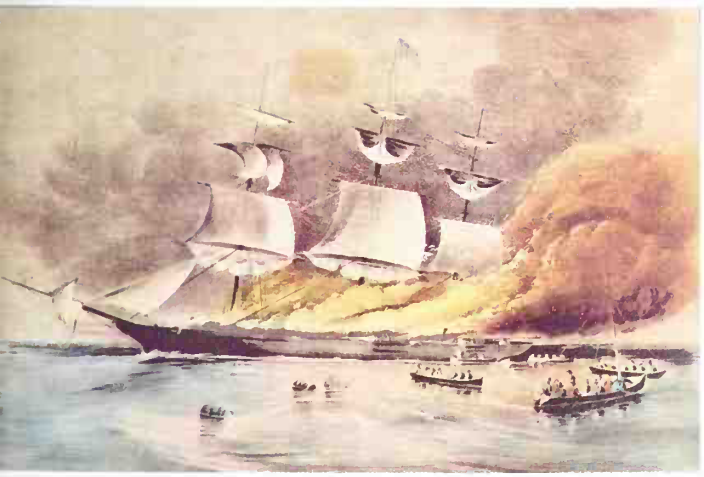
WRECKS were most often the result of the ship being crushed against rocks or capsized in a heavy sea, but there were many other hazards to contend with. The most celebrated iceberg disaster was the sinking of the luxury liner TITANIC on her maiden voyage in 1912. In fact, steam is more vulnerable in some ways than sail, since the fog that conceals the ice is in still air which would inhibit the progress of a sailing ship.

It was not fog that concealed the iceberg from the lookout of the LADY HOBART, sailing from Canada in 1803, but driving spray. She ran into foul weather and shortly after collided with the iceberg with fatal results to herself. The captain and crew with three passengers managed to get away in two small boats before the LADY HOBART sank, but suffered from exposure on the 150 miles back to St Johns.

There are few things the seaman dreads more than fire at sea. On a wooden ship this is liable to get out of control very quickly, which is usually disastrous. When fire strikes it always does so suddenly, without warning. It may well destroy any means of escape by getting to the lifeboats before they can be lowered. The water all around is no help if it cannot be poured on fast enough.

A waterspout is really the byproduct of a

Post Office packet LADY HOBART *wrecked on an iceberg. Her company were forced to take to the boats. Aquatint after Nicholas Pocock.*



"Burning of the clipper ship GOLDEN LIGHT *struck by lightning", 23rd February, 1853. She was on a voyage from Boston to California. Print by N. Currier.*

storm at sea. Captain Cook's own description of one of six he had witnessed is characteristically scientific: ". . . The diameter of the base of this spout I judged to be about fifty or sixty feet, during the time these spouts lasted which was near a hour we had light puffs of wind from all points of the Compass . . ."

Speaking of mysteries, some are very real, the most famous being that of the MARIE CELESTE. This brigantine was discovered on December 5th, 1872, sailing herself erratically between Portugal and the Azores. On being boarded she was found to be sound, her cargo untouched with no signs of violence nor any living soul aboard. The boat was missing, as was the captain's chronometer and papers. Evidence of a hasty but orderly departure was found–the last entry in the log had been ten days before–they had then been at sea for 18 days. No trace was ever found of the captain, his wife, or any of the crew.

Sailors' Dress

IT is difficult to give an account of the dress of a seaman over the period we are covering since it was not until the mid-nineteenth century that any sort of uniform became general. Of course, naval officers had long worn uniforms which were appropriate to their rank. In the seventeenth and eighteenth centuries the ordinary clothes of gentlemen were so elaborate that a military or naval uniform could seem quite severe by comparison, although often there might be little difference between them.

The color of dark blue seems to have been established quite early on as the monopoly of the mariner, but on the whole the ordinary seaman was left very much to his own devices. He wore his own clothes when he first came aboard and continued to wear them as long as they held together. Eventually they would be augmented and replaced by "slops", a sort of standardized set of workclothes which he could buy from the slop chest of the purser. The result was that although sailors had no uniform worth speaking of, there were the customary clothes that were the common attire associated with seamen of a given period.

At any period after about 1600 a sailor might be recognized as such by certain items of clothing which he wore along with standard dress of the times. In the seventeenth century, red stocking caps, blue or white shirts, petticoat breeches and blue or white neck cloths were typical sailor gear. The eighteenth century saw an improvement in the quality of the naval seaman's dress, with brass buttons and button holes stitched in gold thread on their jackets. Sailors took to wearing a sort of tricorne, with the brims of their hats tacked to the crown. Colors up to this point had been variations on red, white and blue. By the end of the century, blue predominated, especially for the jacket, breeches and waistcoat. Double-breasted jackets came into favor. Black silk neckerchiefs made their first appearance, and the tricorne (cocked hat) went out.

By the early nineteenth century, the classic Jack Tar appears with his shiny black boater, short blue jacket, striped shirt and white bellbottomed trousers. He can be seen with friends on page 72, having a desperate affray with piratical rogues.

The series of drawings of sailors from the Nelson era by Thomas Rowlandson gives a good idea of the lack of uniformity at the time. Nevertheless, they all have the distinctive look of seamen. The sailors' clothes, while not uniform, are variations on a theme, although they are stripped for action, without hats, jackets or waistcoats. It is interesting to note that about this time sailors themselves would embellish their own clothes with braid, piping, brass buttons and hat ribbons. In some cases, captains would introduce a uniform at their own expense, for at least part of the ship's company.

Some naval types, by Thomas Rowlandson. Opposite *A midshipman.* Top left *The purser.* Top right *A sailor.* Bottom left *A ship's carpenter.* Bottom right *A cook's mate. The wooden leg might well be associated with a ship's cook, since sailors who were disabled on active service were often signed on again for duties of a less arduous nature.*

"British sailors boarding an Algerian pirate", a popular print of the early nineteenth century.

Piracy

VILLAINY seems to follow riches as night follows day, and since the ships that followed the explorers were looking for treasures of various kinds it was inevitable that the villains should follow. Not that there was anything new about pirates. They had been busy since the earliest merchants took to the sea. They came in all sizes and persuasions and might come to their profession in many ways.

Amongst the oldest hands at piracy were undoubtedly the Arabs of the North African coast. For them it was a national way of life which was not only encouraged by the authorities but was expected of them. From the fifteenth century on, this attitude to Christian traders in particular was clearly the aftermath of the Holy War. No doubt the Deys of Tunis and Algiers, who were the chief beneficiaries of their subjects' activities, felt quite as justified in their attitude as Elizabeth I felt regarding Drake, Raleigh and Hawkins. The Barbary Corsairs, as they were known, continued to plague Mediterranean ships for 300 years, until the French captured Algiers in 1830.

The Buccaneers had a different origin. They were at first a mixed bag of settlers, chiefly French, living on the island of Hispaniola– a sort of rallying point for outcasts and malcontents, of which there were quite a few in the area. The autocratic attitude of Spain, not only toward her rivals and enemies but toward her own colonists, had created exactly the explosive atmosphere on which villainy thrives. These outcasts lived off vast herds of cattle which had gone wild, curing the meat in huts called *boucans*. From this word these wild men came to be known as *boucaniers* or the Anglicized buccaneers, although they had not yet turned to piracy.

This pirate ship (right) *is a schooner. A type frequently employed by French pirates in the Channel was the lugger.*

In attempting to wipe out these undesirable neighbors, the Spanish brought a retribution on their own heads by consolidating all the various factions in the West Indies which had become hostile to Spain. Moving their headquarters to the smaller island of Tortuga, and with the help of the French in St Christophers and the British in Jamaica, they started a program of retaliation and plunder which was to snowball into proportions the original *boucaniers* would never have dreamed of. Once established, they attracted every privateer, adventurer and rascal in the area.

This is the scene for the picturesque pirates of fiction, and most of the famous pirates of fact–Henry Morgan, Captain Kidd, Blackbeard, Anny Bonney and Mary Reade, Bartholomew Roberts, and Pierre Legrand. They were not all as villainous as their reputations, although Blackbeard certainly was. A sadistic and depraved monster on the one hand, his insolent fearlessness on the other made him the archetype pirate. The fuses which he plaited into his beard and lit before battle were a theatrical but true touch that few writers would dare to introduce in a fictional pirate story.

All the oceans had their quota of pirates. The Pacific had its own privateers and an overflow of buccaneers from the Caribbean. The Chinese were old hands who kept in business until recent times. In the Indian Ocean, the local pirates were Arab corsairs again, operating in and from the Persian Gulf.

Pirate ships were for the most part captured vessels or those in the hands of renegades, and were typical of their period. For the most part the Arabs used a particularly effective craft of their own design, the **chebek** (or xebek). It had a slim yacht-like hull with three large lateen sails, and could be rowed like a galley. Its speed and comparatively heavy armament made its elegant appearance the object of dread.

Piracy was only the most spectacular of a whole series of lawless activities open to the men who sailed ships. Trading in illegal cargoes is one of the more persistent. At the time when piracy in the Atlantic was losing its grip, a new and particularly pernicious traffic came into being which was all the more deplorable for not being universally condemned, and at first not even being illegal–the slave trade. Of all atrocities committed at sea, none can compare in cold inhumanity to the way in which these wretched men and women were packed into little ships designed for the job, not even like cattle, but more like sardines in a can.

The ships themselves were designed for speed, to elude capture above all, but also to save on the food and water needed to keep them alive. A quick passage meant fewer feeding times. It is ironical that such an evil cause should foster the development of a graceful ship which anticipates the Baltimore schooner, which in turn influenced the design of the clipper ship.

On the other hand, another handler of illegal cargo, the smuggler, is less condemned on the whole. The average lawabiding person is apt to smile indulgently at the mention of smuggling. The first reaction is the thought of a nip of the strong stuff on the sly, without having to give the government five or six times its value first. All smuggling is not rum and tobacco; guns and opium are part of the same game. Yet the romantic attachment to the old smugglers persists, and the fact that half of them were pirates on the side (or vice versa) will not dim the vision of secret rendezvous by moonlight and caves stacked with brandy barrels. Every coastal village in all parts of the world has its smuggling traditions.

Another kind of lawlessness which could lead to piracy was mutiny. It is often difficult to tell which was the more aggrieved party, the mutineers or the deposed captain and his officers. In many cases it happened that the crew were a bunch of ruffians who were half way to being pirates already and intended taking it up as a full-time occupation. On the other hand, the provocation to mutiny in that age was notorious. The power invested in the captain of inflicting the most appalling punishments on the crew, put them at the mercy of any latent sadism in their commander.

The most famous of all mutinies is the Mutiny on the Bounty. This one is well enough documented to make it clear that Captain Bligh, whatever other qualities he may have had, was cruel and vindictive, and brought the mutiny on his own head. The mutineers did not turn to piracy, and they caused their captives no more anguish than necessary. They had simply reached a breaking point, even though it meant cutting themselves off from their own world for ever.

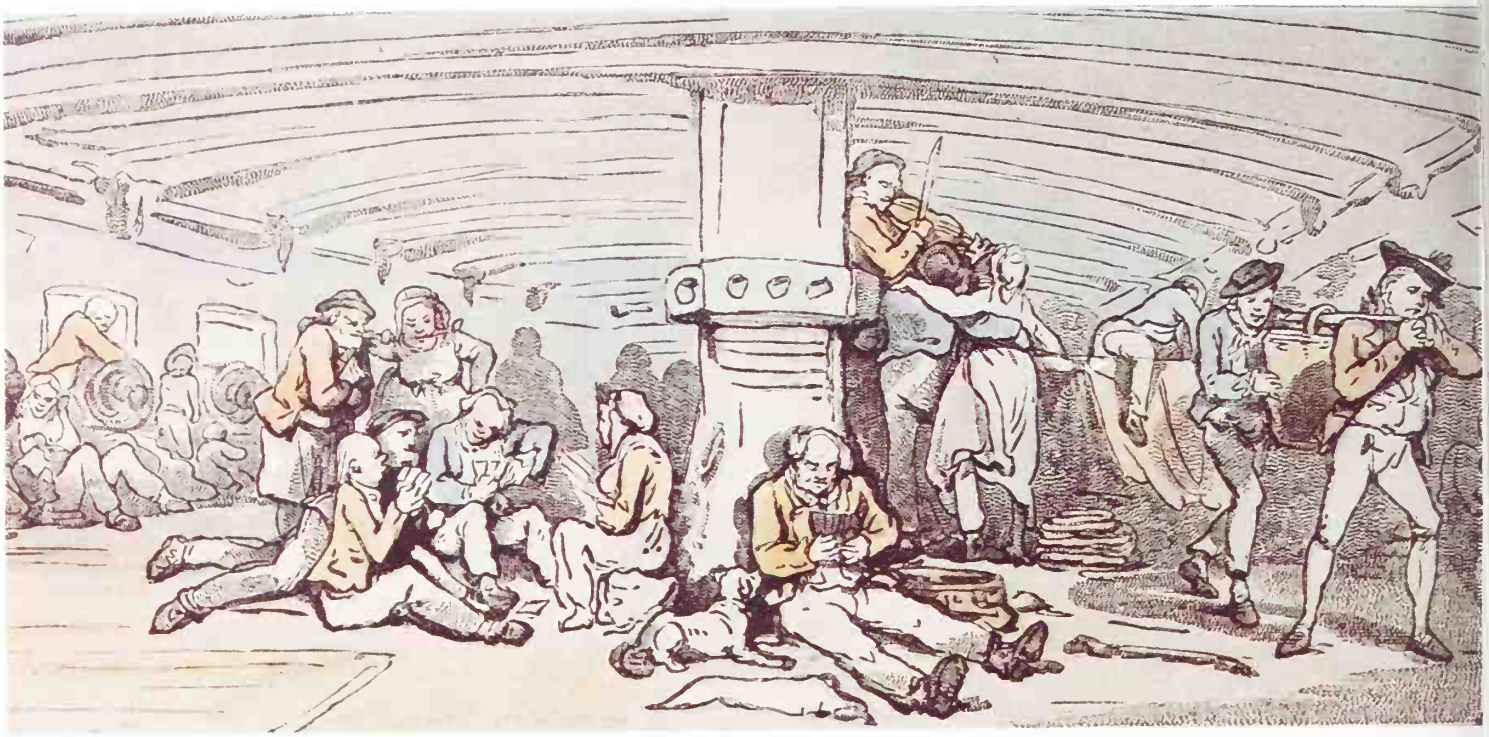
The ultimate in villainy committed against seamen is by the most despicable of all who had anything to do with the sea–the wreckers. Their activity consisted of putting up false beacon lights on the coast to lure ships to a course that would take them onto the rocks, the object being to salvage and sell any cargo washed up from the ensuing wreck.

Below *"Captain Bligh being cast adrift with officers by Mister Christian and the mutineers of the Bounty". Painting by Robert Dodd.*

Bottom *Local people salvaging the cargo and gear from a wreck. This led to the appalling practice of luring ships on to the rocks by wreckers.*

Below *The middle deck of the man-of-war,* HECTOR. *The crew are relaxing in port, entertaining family and friends.*

Bottom *"The happy ship's crew, or the nautical philosophers". A savage piece of satire on the barbaric discipline hardly imaginable today.*



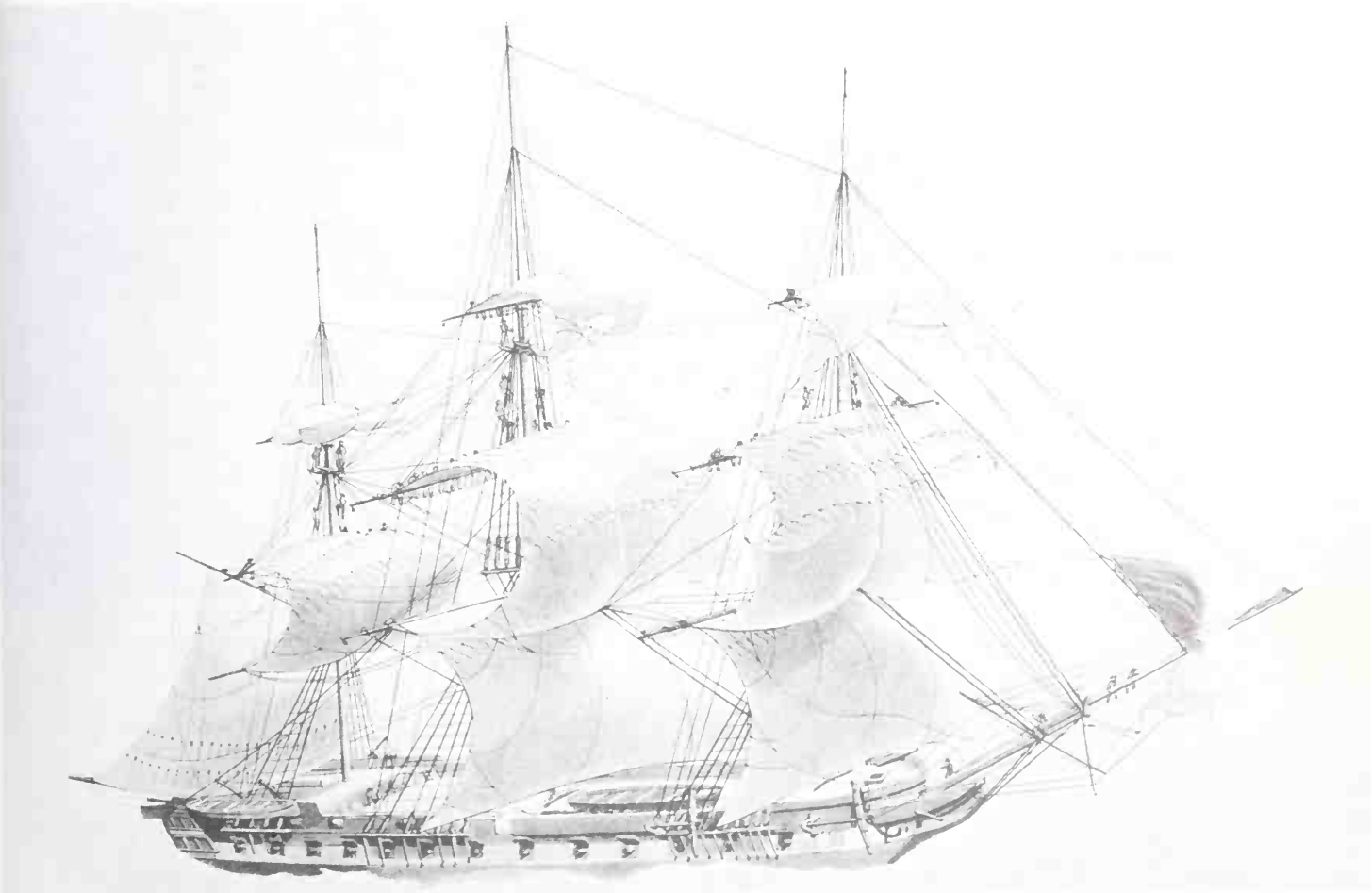
The Sailor's Life

TO a landsman, the sailor's life must seem one long paradox. For the last century and a half, the sailor's lot has been improving steadily, until at last it could be described as tolerable at the worst, and tough but agreeable at the best. The unavoidable hardship on a big square rigger in any age is the need to go aloft in all sorts of weather and reef the sails, a task which implies that a gale is blowing up.

In the bad old days, the catalog of miseries a sailor might be exposed to appears endless to a modern reader: rats, weevils, bad diet, stinking overcrowded quarters, harsh discipline, diabolical punishments, all of which may have been forced upon him by the pressgang when the farthest thought in his head was that of going to sea.

The other side of the scene hardly seems to tally with the first. Jack Tar was "jolly", everyone agrees. He danced the hornpipe to a tune which is almost insolently gay. His shanties were full of lusty humor and aggressive optimism. The ladies in his life hardly ever seem to cause him any heartache. Sailor songs are rarely melancholy and are never dirges. That he had leisure time which was passed pleasantly and fruitfully can be seen in the excellent craft work which survives. So we find that when Jolly Jack Tar has had his fill of wenching and brawling and telling tall stories he feels the itch to get back to his hard, dangerous and uncomfortable life at sea with its revolting diet of salt junk and hard tack (salt pork and ship's biscuits).

The life of the captain and his officers was a very different matter, as one would expect in an age which had barely rid itself of feudal living and retained much of its feudal thinking. The cartoon, *The Merry Ship's Crew*, cuttingly satirizes this gulf between the ranks. Numerous pictures of conditions in a captain's cabin comment on the eighteenth-century gentleman's determination to live the good life wherever he finds himself.



"Reefing topsails". This spirited drawing speaks for itself. Watercolor by W. Huggins.

The Last of the Windjammers

THE last stages of sailing ship building went through a major transition from the all-wooden construction to the all-steel. The first stage was the composite ship. The demands of wooden ships had already begun to take their toll of the available forests, and ways of utilizing iron were sought. The difficulty had been to overcome the galvanic action produced by salt water on wood and metal together. This was solved by a system of rubber insulation and screw bolts proofed against corrosion. A special advantage of the composite ship was that the iron frame gave it added strength, while the wooden planking retained its flexibility, an ideal combination. This form of construction was used for many of the later clipper ships.

The next stage was the all-iron ship which, as might be expected, was much stronger than the previous composite or wooden ships, but, of course, lacked their flexibility. Iron ships had bad habits in heavy weather when the rigidness of the construction showed to disadvantage. Steel ships, which followed, restored some of the "give" which is needed in a large sailing ship, but retained all the strength.

A new trend in the rig of large ships was the next change to be noticed. The challenge of steam had forced the sailing ship owners to find ways of cutting their operating costs. Once it became impossible to compete in terms of speed, the clipper type no longer held an advantage. The answer seemed to be to concentrate on a type of rig which combined the maximum of sail area with the minimum of crew needed to handle it. This suggested a fore-and-aft rig of some kind. And so, just at the end of the nineteenth century was conceived what in fact was an ugly monster–the multi-masted giant schooner. These might have as many as seven masts. With a tonnage of over 5000 and a length of 400 feet or more their capacity was impressive. Although many of them were built in various combinations of square and fore-and-aft sail, they were heartily disliked by sailors, who found them slow, unwieldy and dangerous.

Attempts to stave off the end were of no avail. By the first quarter of the twentieth century the big sailing ship was no longer able to compete in any of the spheres in which she had played such a major part in shaping the world, but there was one thing left which could not be taken away. Handling a sailing ship instilled into the seaman an understanding of the wind and the sea, an empathy if you like, which could never be learned on a powered ship. It made a man keenly sensitive to every mood of the weather and the slightest change in the motion of the ship. He could almost become part of the elements. This responsiveness to the natural environment must make a sailor that much better at his job. Many modern navies have appreciated this and taken over redundant barques, ships and other square riggers; and when they could not find what they wanted, they had them built. These training ships are still widely used, to instill into young would-be mariners the same skills and instincts and basic seamanship that their ancestors lived with all their lives.

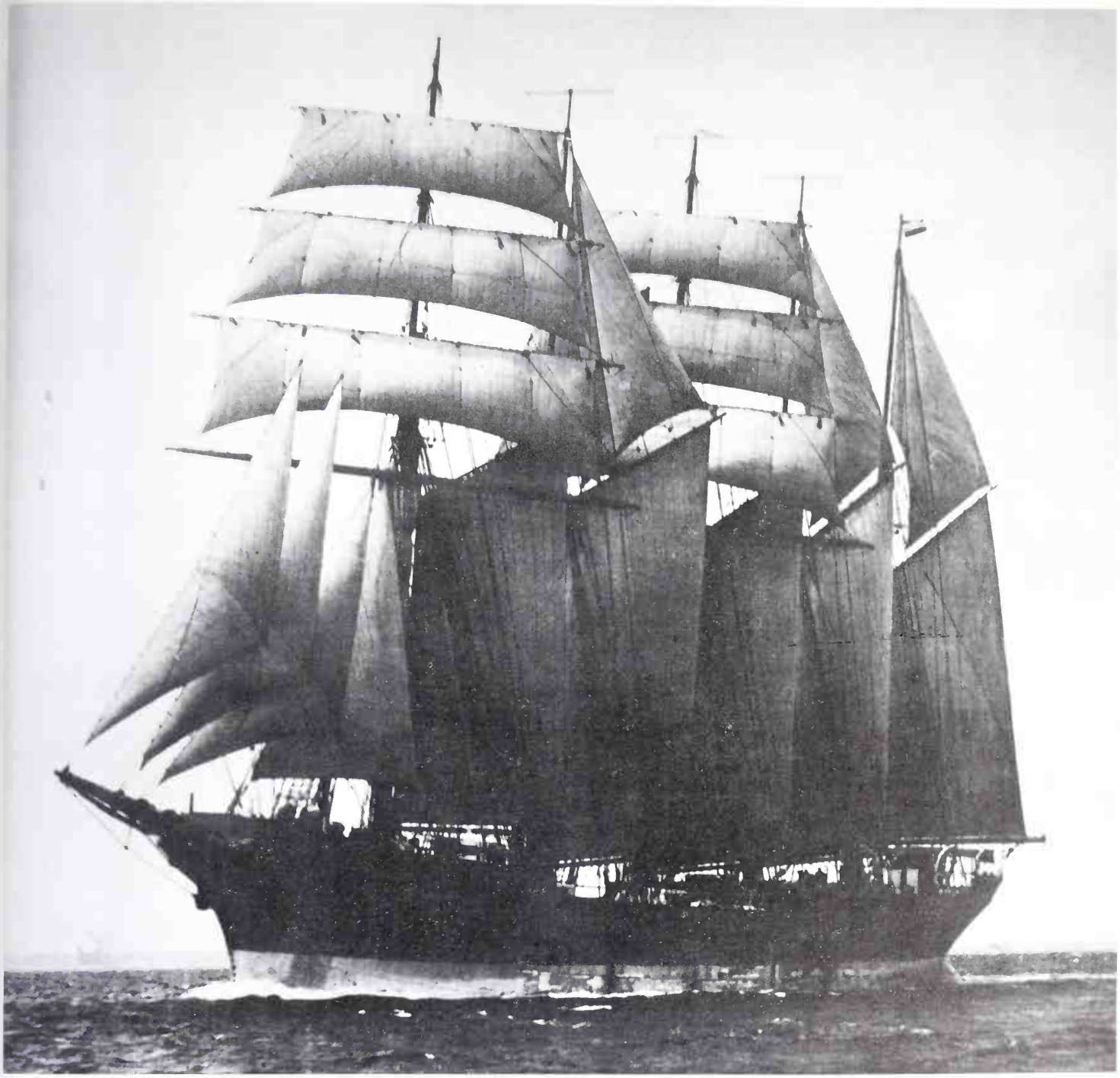
"Windjammer" is a word loosely describing any of the larger merchant sailing vessels of recent years. Of those still active as trainers, there are some thirty-five square riggers, from brigs to full-rigged ships (up to eighty, if we include schooners and ketches), the largest being the LIBERTAD of Argentina, a three-masted ship of 3765 tons–over four times the tonnage of the CUTTY SARK. Other fully-rigged training ships are DANMARK and GEORG STAGE (Denmark), AMERIGO VESPUCCI (Italy), NIPPON MARU (Japan), CHRISTIAN RADICH and SØRLANDET (Norway), DAR POMOZA (Poland), and CRISTOFORO COLOMBO (USSR, which has a total of twelve square riggers).

Some of the schooner trainers are among the largest of all. The ESMERELDA of Chile is a four-masted, topsail schooner of 3673 tons, launched in 1954, and carrying a 1500hp auxiliary diesel motor. The largest of the British trainers is the three-masted schooner SIR WINSTON CHURCHILL, built for the purpose as recently as 1965.

Many of the present-day sailing ships may be seen together from time to time competing in the Tall Ships race, an international event taking place every few years over a course which changes from race to race. Apart from these, which are still active, many other sailing ships are preserved intact, twenty-three as training schools afloat, and fourteen as floating museums–of the latter, Sweden and the USA each have four.

While this precious little core is all that is left of the great ships of the past, public interest in sailing and sailing ships is kept alive by such international events as the Americas Cup, Transatlantic, and Tall Ships races. The lone circumnavigators, from Joshua Slocum in his SPRAY (1895–98) to Sir Francis Chichester in GIPSY MOTH, and the singlehanded round-the-

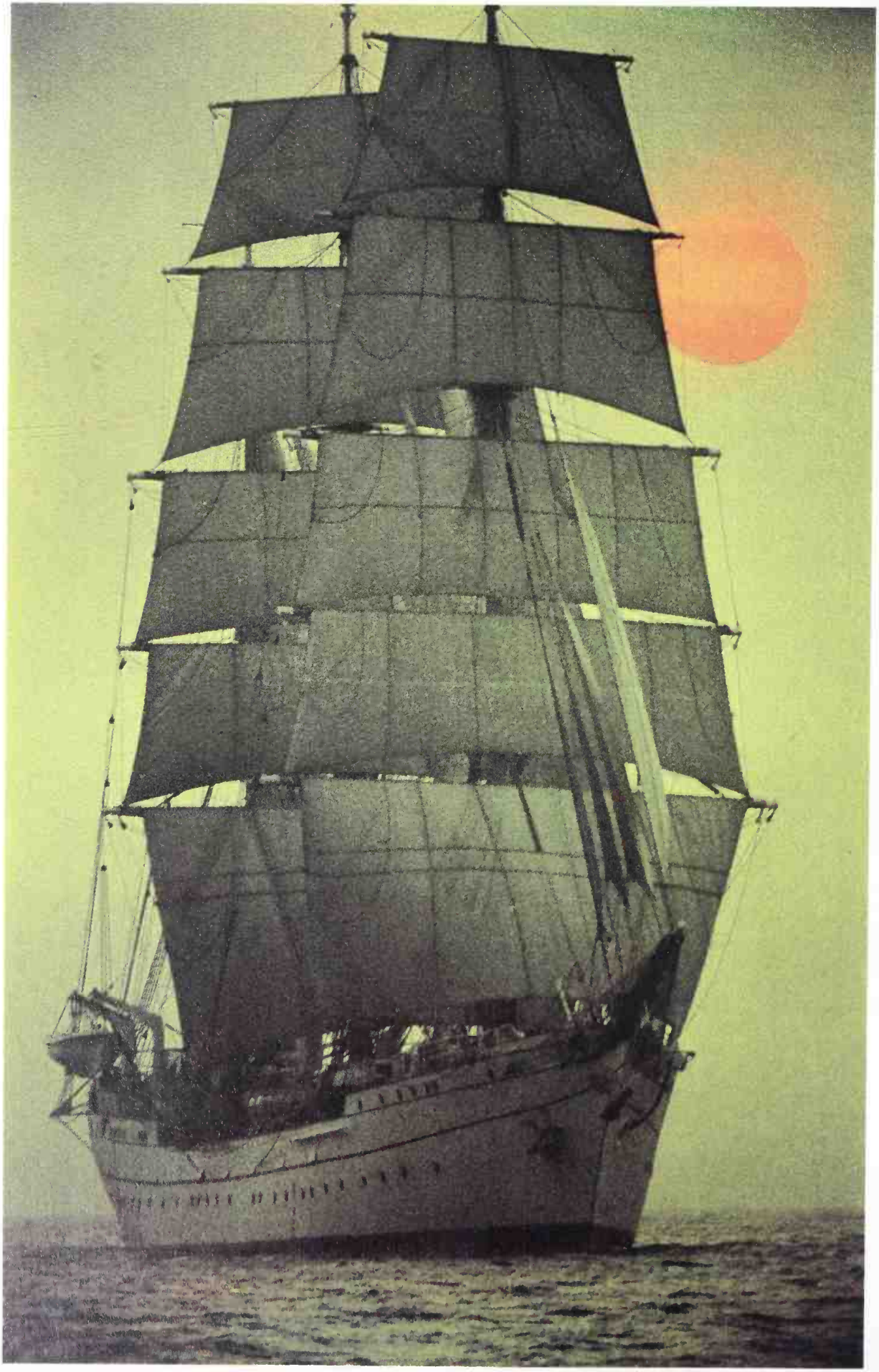
The CARL VINNEN, *built in 1922 of steel, 1827 tons and 262 feet long, a large barquentine-schooner designed for economic operating.*

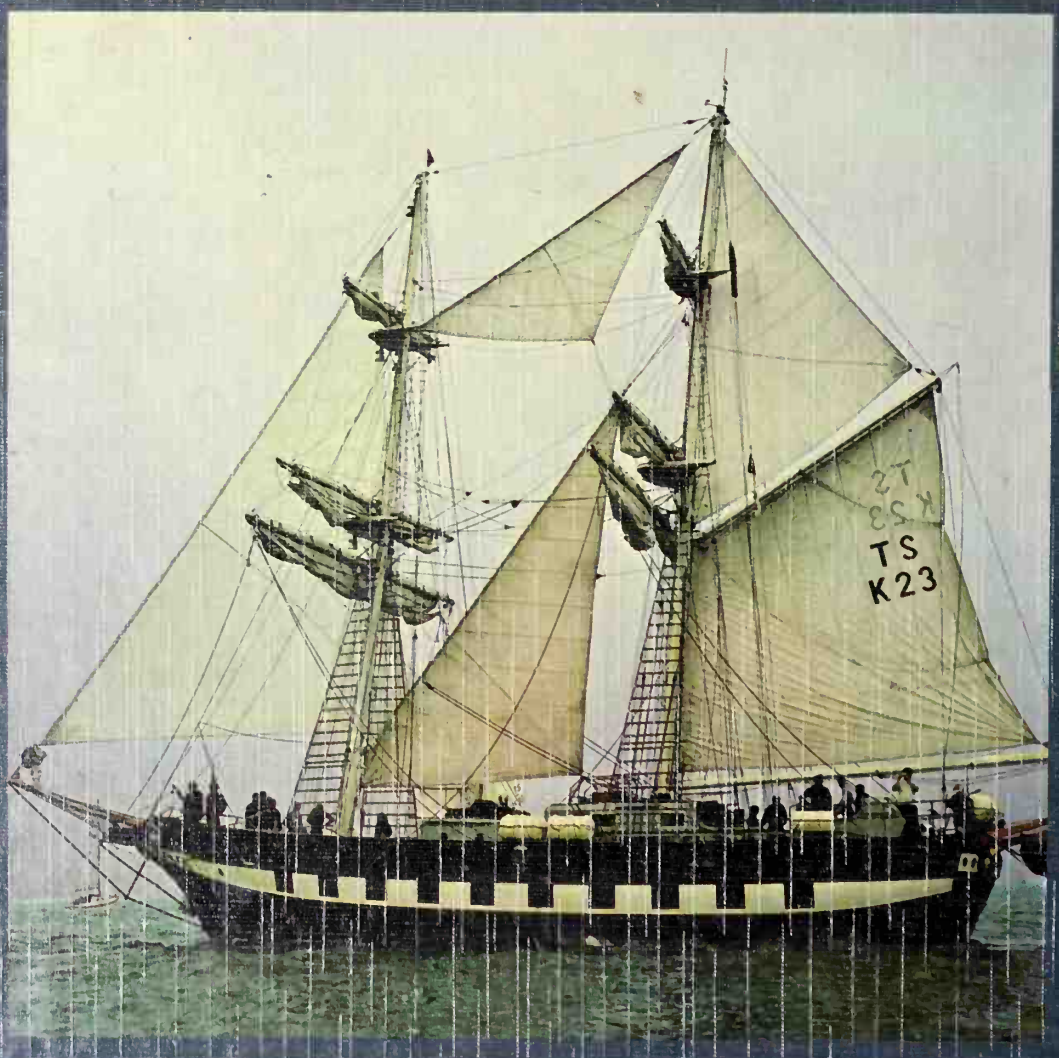


world races, have a strong hold on the public imagination, as have such experiments in nautical anthropology as the voyages of KON TIKI and RA.

The re-creations of the MAYFLOWER, the GOLDEN HIND and the SANTA MARIA (at Barcelona), even though they have been reconstructed without original plans or certain knowledge of what they really looked like, testify to the strong appeal that maritime history has even for the landlubber. The fascination that sailing has for most people is not simply vicarious, nor is it the obsession of a few lone eccentrics. The flame that burned in Slocum and Chichester is alight in thousands of men and women all over the world who have become enslaved, if only for a day or two a week, by the magic of sailing boats. Whether it be to join the crew of an ocean racer, or to potter around a flooded quarry in a cockle-shell dinghy, they belong to the sailor's world, with a language common to all.

The EAGLE *is a modern ship built for the US Coast Guard Academy. This picture was taken during the Tall Ships race of 1972.*

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