THE JEWELER'S CIRCULAR

DEVOTED EXCLUSIVELY TO THE INTERESTS OF THE WATCH, A MONTHLY JOURNAL OF CLOCK AND JEWELRY TRADE OF AMERICA

ROBINSON, Publisher, Pearl St., New York. VOL. V.—No. 4. NEW YORK, MAY 15TH, 1874. YEARLY SUBSCRIPTION, $1.00

VACHERON & CONSTANTIN,

Celebrated Geneva Watches

CHARLES VACHERON & Co., Successors,

J. A. ABRY,

Sole Importer,

63 Nassau Street,

Up Stairs, NEW YORK

The ONLY PRIZE MEDALS AWARDED FOR WATCH PENDULUM SPRINGS & WIRE.

International Exhibition 1862. Coventry Exhibition 1867.

GANEVAL & CALLARD, Watch Pendulum Spring and Wire Manufacturers, 27 Alfred Street, Islington, London. Best Lever Springs, £1 per gross; Verge Springs, 12s. per gross; Hardened and Tempered Breguet Springs, 18s. per dozen; Marine Chronometer Springs and Pocket Chronometer Springs; Watch Spring Wire, 8d. per bobbin; Pocket Chronometer Wire, 2s. 6d. and Box Chronometer Wire, 10s. per bobbin.

N.B.—Dealers in Watch Material will find a quick sale for Ganeval & Co.'s Lever Springs.

Hardened and Tempered Springs (our own make) sixpence each. Gold Pendulum Springs.

Hair Spring Wire in Spools, from 36 yards to 1000 yards, price 4s. per spool of 36 yards.

HAACK & DIOLOT,

Manufacturers of

Fine Jewelry,

Lockets, Necklaces,

Bracelets & Patent Scarf-Ring,

8 & 10 JOHN STREET,

NEW YORK.

KROEBER & MAGERHANS,

Manufacturers of

Rich Jewelry

OFFICE and FACTORY:

No. 19 John Street,

NEW YORK.

A Large Stock of Fine Onyx Goods constantly on hand.

Goods sent, on approval, to dealers in all parts of the country, on receiving from them satisfactory reference to N. Y. houses.

VULCANITE JEWELRY CO.

MANUFACTURERS OF

WHITBY JET,

Combination Whitby Jet and Vulcanite,

Byron's Patent, May 18, 1869,

...o. 191 BROADWAY, N. Y.

...Agents for the NEW RUBBER WATCH CASES, ...all American Movements.

...ERNARD & BONET,

CAMEO

...TTERS,

New York.

Solid Gold Rings---a Specialty.

WM. H. ELY,

SOLID GOLD RINGS

MANUFACTURER,

Viz., Plain, Chased, Engraved, Enameled, Engine Turned, Shield & Scale. *All qualities Warranted*

Orders Promptly Executed.

58 Nassau St., N. Y.

REMOVAL!

☞ Antique Musical & Striking Clocks restored to their original condition

THOMAS REYNOLDS,

ENGLISH & FRENCH

Clock Maker,

50 West 4th Street, N. Y.

☞ New Parts of ALL KINDS of CLOCKS MADE TO ORDER.

Platinum

APPARATUS, VESSELS, SHEET, WIRE, &c., &c.

FOR ALL

Laboratory and Manufacturing Purposes.

H. M. RAYNOR,

25 Bond Street, N. Y.

Native Platinum, Scrap, &c., purchased.

G. M. BODINE,

Importer and Dealer in

WATCHES & JEWELRY

AMERICAN AND IMPORTED.

Gold and Silver Watches,

Gold Chains, Plain and Seal Rings, Lockets, &c.

Gold and Silver Watch Cases made to order.

Also, Agent for

BARD & BROTHERS,

GOLD PENS and PENCILS of all styles

22 Maiden Lane, New York

ROBERT SNEIDER,

Engraver,

Printer & Stationer,

37 JOHN STREET, N. Y.

Wedding & Visiting Cards

FINE STATIONERY,

MONOGRAMS AND INITIALS.

Special attention given to Letterheads, Business Cards and Labels for Jewelers.

A. SIRIOS,

Watch Maker,

75 & 77 Nassau Street,

NEW YORK.

Complicated Watches a Specialty.

THOS. LEDBETER,

Engraver of Jewelry,

Fine Sets Cut for Enamel & Engraved

DIAMOND RINGS, &c.

No. 83 Nassau Street, N.Y.

[ROOM 26.]

☞ Designing, Piercing and Engraving Monograms a Specialty, with Neatness, Dispatch and Moderate Terms.

ALBERT LANDSBERG,

Importer and Manufacturer of

Optical Goods,

No. 36 MAIDEN LANE,

Near Nassau Street, NEW YORK.

Sole Agent for

BLACK'S PATENT

Interchangeable Spectacles,

AND

EYE GLASSES.

Jewelers and others who keep spectacles for sale will please observe that, with these PATENT SPECTACLES, it is only NECESSARY to have a full *Complete Assortment of Lenses and Pebbles*, which being all of a UNIFORM SIZE, will FIT either the Gold, Silver, or Steel Frames, of which but a few of each kind are wanted; an advantage which will give a complete assortment of the finest Spectacles, for one-sixth the capital invested in a like assortment of the same quality goods of the old style frames.

For Particulars, price lists, &c., address

A. LANDSBERG,

Post Office Box 3993. **New York.**

Established 1826.

Fellows, Holmes & Clapp,

Successors to Robert Schell & Co.

Late Louis S. Fellows & Schell.

IMPORTERS AND JOBBERS OF

Diamonds, Watches,

Jewelry, Cutlery & Fancy Goods,

21 MAIDEN LANE, N.Y.

Robt. Fellows, Wm. Holmes, Sam'l D. Clapp. } AGTS. FOR { JAS. HODDELL & Co. T. F. COOPER, M. I. TOBIAS. } London

Waltham, Elgin, and Other American Watches.

☞ Particular attention paid to orders.

JAMES F. WESTON,

Stone Seal Engraver,

AND

Incruster of Precious Stones,

32 John Street, New York.

N. B.--JAMES F. WESTON begs respectfully to inform the Trade that he makes a specialty of **Incrusting with Gold**, and that after much experimenting in the making of incrusting gold, he has succeeded in producing a **preparation of Gold** whereby he is able to offer the **Best Incrusting** in the trade. The gold being **Hard, Easy to work**, warranted not to come out, and capable of being set by and ordinary Diamond Setter

---

PHILIP WEBER,

No. 50 Barclay Street,

Importer of

FRENCH

GLASS

Shades

Round, Oval and Square.

To Cover Clocks, Statues, Flowers, Wax Work, &c.

Pure Oleine.

A PERFECT LUBRICATOR FOR WATCHES, MARINE CHRONOMETERS, and And ALL TIME-KEEPING INSTRUMENTS.

Is refined by a new process. It is fine enough for low temperature, and yet has sufficient "body" to resist the wearing action of the pivots, and will not spread at 120° above zero.

TESTIMONIAL.

"Having suffered very severely for the past five years from the use of inferior Watch Oil, we requested Mr. J. H. Gerry, the Supt. of our Watch Factory, to give the subject his attention, and the result is an oil superior to any we have ever tested (which we are now using exclusively) and we can recommend its use to the Trade without hesitation.

E. HOWARD, TREAS."

☞ For Sale by Dealers in Watch Materials.

MANUFACTURED BY J. H. GERRY & CO.

Wholesale Depot,

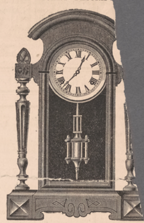
Howard Watch and Clock Co.,

15 MAIDEN L...E, N.Y.

F. KROEB...

Clocks and Regu...

OF EVERY DESCRIP...



No. 10 Cortlandt Street,

New York.

☞ Send for Catalogue.

SHOW CASES!

FREDERICK KRUSE,

Manufacturer of all Sizes and Styles of

Show Cases,

IN METAL and WOOD,

Warerooms, { *175 Chatham Street,* *19 North William St*

NEW YORK.

J. F. LUTHER,

Manufacturing Jeweler,

79 Nassau Street, N.Y.

HEADQUARTERS

FOR

Masonic, Odd Fellows, K. of P. O. U. A. M., Eastern Star, Keystone Marks, Knights Templars' Crosses, 14th, 18th, 32d and 33d Degrees Rings and Jewels; Society Badges, Regimental, Skating, BoatClub, ...

Fine Presentation Jewel...

Constantly on hand, and Made to Order ... short notice, upon the most reasonable ... Orders by mail promptly at... ...d to... ...and designs...

ositions of Clocks and Watches.

N THE EARLIEST TIME.

By Edward J. Wood.

Continued from April Number.

"Item, one clock of gold curiously wrought with flowers and beasties, with a queene on the toppe on th'one side; and on the other side a beare and a ragged staff of encrases of diamondes fair furnished with diamonds and rubies of sundry sortes and bignes; one emerode under it, a faire table diamond in a ragged staff in the foyle there thereof, and a faier ruble under it squared; and a pearle pendant on either side of the clocke.

"Item, one clocke of golde, wrought like beasties and paunseye, garnished with little sparkes of diamonds, rubies, and emerodes, eight small pearles on the border, and a pendant acorne.

"Item, one clocke of gold curiously wrought with small sparkes of stones, having on th'one side a horse bearing a glove with a crowne over it.

"Item, one clocke of golde with a George on both sides, garnished with sparkes of diamondes and a great of opalls.

"Item, a little watche of christall slightly garnished with golde.

"Item, one little clocke of golde, th'one side being made with a crosse on the toppe and heddes round about it.

"Item, one litle watche of golde garnished on the border with very small sparkes of rubies and emerodes with christall on both sides, and a pearle pendant garnished with golde like a flesh flye.

"Item, one rounde clocke of golde enameled with a man on horsebacke, and divers antes about it.

"Item, a watche of golde garnished with three small diamondes and eight sparkes of rubies with a verye little pearle.

"Item, one litle clocke of golde, enameled of the Hunte's Tume.

"Item, a litle watche of golde, th'one side with a frogge on the topp, th'other side garnished with small garnets like a pomegranate.

"Item, one litle clocke set in elitropie and garnished with golde.

"Item, a litle watche of golde enameled with sundry colors on both sides the case.

"Item, a litle watche of chistall slightlye garnished with golde, with her Ma'ties picture in it.

"Item, one diall of christall slightly garnished with golde.

"Item, one faier flower of golde fully garnished with rubies and diamondes enameled on the backside with a scripture about him, having a watch in it and a pearl pendant.

"Item, one flower of golde fully garnished with emerods of soudie bignes, and sparkes of emerods and rubies, with three antique women and five little perles with a watch or clocke therein.

"Item, a watch of agatte made like an egg garnished with golde.

"Item, one clocke garnished with golde, beinge round and sett with 6 table diamondes and 6 rubies in the same border, and garnished with vj diamondes on th'one side and 8 diamonds and one ruble on th'other side lacking two yearles.

"Item, an hower glass sett in golde with 6 emerods, 3 turquesses, two rubies, and xv small diamondes and 6 perles."

In the library of the Royall Institution is a watch that is reputed to have belonged to Queen Elizabeth. The works are enclosed in crystal, set in gold, which together with the dial is elegantly enamelled. In the Ashmolean Museum at Oxford is a circular watch, which is said to have been worn by the same queen; but as is in many other instances, this "is said" is undoubtedly a fiction, because the watch bears the name of Edward East as maker, and he was a famous horologist in the time of Charles I., several years after the period of Elizabeth. The article in question is one that we should now call a hunting-watch; it is of gold, shaped like a melon, studded with large and fine turquoises, and having a gold chain formed of lockets, with braids of hair and other momentos.

At a meeting of the British Archæological Association, held on June 13th, 1864, Mr. Luxmore exhibited a lady's watch, which was said to have been made at the close of Elizabeth's reign, and worthy of having been her property. It was one inch and three-sixteenths in diameter, and rather under three-quarters in thickness. The gold case was set with two hundred turquoises arranged in eight concentric circles, with a single one in the middle. In the centre of gold face was a Tudor rose of crimson and green translucent enamel, and on the margin were crimson and blue leaves, and fruit of the same colours. The hours, in Roman numerals, were of black enamel; no minutes were indicated; and the barbed hand was of steel. The plates, wheels, and pillars were of brass; and the axis and balance-wheel of steel, the latter being protected by a foliated gilt cock. It had a catgut cord instead of the more modern chain. On this curious trinket was engraved the maker's name, J. H. Ester, who appears to have been one of eminence in his trade, as a pendant watch of parcel-gilt silver, also made by him, was in the Bernal Collection; and Lady Sophia des Vœux has a small gold jewelled and enamelled watch, of which he was the maker. The case is set with four large cut garnets, bordered with white enamel. The collets are diamonds. Inside the cover is inlaid with an enamelled bird. Ester seems to have had a relative in the same art as himself, for Fayolles has a gold tulip-shaped watch, with three chrystal faces, silver rims, and engraved silver dials, of about the same age as the foregoing, Henry Ester; and in the South Kensington Museum is a clock-watch in the form of a duck, two inches and five-eighths long, bearing the same name. He is said to have been a German artist. Lady O. Fitzgerald has a watch in the form of a duck, the feathers of which are chased on the silver. The lower part opens, and the dial-plate, which is likewise of silver, is enriched with a gilt ornamented design of floriated scrolls and angels' heads. The wheelwork is on small rods. This article is believed to be of the time of Elizabeth. Lady Fitzgerald has also a watch which was formerly in the Bernal Collection, and represents the classic story of Jupiter and Ganemede. The figures are contained in the body of an eagle, which opens across the centre, and displays the dial-plate, richly engraved with scrolls and flowers on a ground of niello. This watch is so constructed that when not suspended to the girdle by a ring in the centre of the bird's beak, it can stand on the claws wherever it may be placed.

In the city of London Library at Guildhall is a watch of the time of Elizabeth. It is of gilt metal, oblong in shape, and six-sided. The face is protected by a perforated plate in lieu of a glass.

Lady Fellows has a circular gilt pedestal alarum-watch, with a dial on the top, but the bell is wanting. Inside are the initials H. S. T. A., and the date 1581. Also a large oval metal watch, engraved with female figures of Justice and Fortitude. It has an engraved dial, and a coat-of-arms inside the cover. The maker was Glyzis Van Gheele, and the date is 1625. Also a round gilt pedestal alarum-watch, engraved with flowers, and the bell falling over the dial-plate. It is of the seventeenth century. Also a circular steel watch-case of the same date, with a chased pattern of circles, a rosette in the centre, and an engraved brass hinge and hasp.

At a meeting of the Archæological Institute, held on November 5th, 1852, Mr. Wilbraham exhibited an oval-shaped striking-watch, of about the year 1600, with a curiously engraved dial, showing the movements of the stars, and a perpetual almanac. It was made by Gribelin, at Blois, and was found in Delamere House, Cheshire. In the South Kensington Museum is another oval engraved watch, inscribed "Gribelin, Blois, and of the year 1614. Its size is three inches by one inch and three-quarters. It was purchased for the Museum for 3*l.* 10*s.* In the same collection is a tulip-watch in an oviform case of rock-crystal, mounted in silver and gilt bronze; it is of French make, about the year 1600, and is marked "Senebier." Its height is about one inch and three-quarters, and its width one inch and a quarter.

To be Continued.

PRIZE ESSAY

Balance Spring and its Chronal Adjustments.

By H. P. Palmer.

s now suppose that we have a leter all ready for adjustment,* nd the chain on the fusee full up setting up the spring, we then lin barrel-hook into the barrel, and the main spring sufficient to make 5 or eight hours; we set it to time, atch it going and compare it with ck. After it has been going four we note the difference between them memorandum. We then set up the spring so as to increase the rate of ion, and compare it after another ours, noting down the difference, and , each time setting up the main g still farther to make the arc of ation larger, until the chronometer has itself down. We then compare the s we have taken. If the difference en the regulator and the chronometer nd the same every time of comparis- he isochronism is perfect, and no ment is necessary; but this is not to be, we shall most likely find that larger vibrations have been slower the smaller ones, which is caused by increased resistance in the unlocking e escapement, through the increased e of the main spring causing increased ure of the escape tooth upon ewel stop in the detent. The remedy his is to shorten the supplementary this adjustment should be made before cut- ne ring of the balance.

TABLE VIII.

gles of Motion.....	8	6	4	2	0	2	4	6	8	12	10	8	6	4	2
sion of Spring....	0	1	2	3	4	3	2	1	0	5	4	3	2	1	0
omentum of Spring....	0	1	2	3	4	3	2	1	0	1	2	3	4	5	6
	4	4	4	4	4	4	4	4	4	6	6	6	6	6	6

TABLE IX.

	12	10	8	6	4	2	0	2	4	6	8	10	12		
	6	5	4	3	2	1	0	1	2	3	4	5	6		
	0	1	2	3	4	5	6	5	4	3	2	1	0		
	6	6	6	6	6	6	6	6	6	6	6	6	6		

For illustration let us put before us the ove two cases, in which the force of the pulse given to the balance by the es- pement is represented by the numbers and 6 respectively. We must first emise, what is evident in the vibration the balance and balance spring, that gen the tension of the spring is at its aximum the motion of the balance is at s maximum, and vice versa as may be en see by adding the rows together the

TABLE X.

gles of Motion.....	0	1	2	3	4	5	6	7	8	9	10
tional force of Spring.	0	2	4	6	8	10	12	14	16	18	20

That formula is, as the force is to the thing, so is the space moved through in the time of the motion through that space. The mass of the balance in a watch or chronometer is constant, we will represent it by the constant number 30. Then

Force.	Mass.	Arc of Vibn.	Time of Vibn.
As 2	30	1	15
As 4	30	2	15
As 6	30	3	15
As 8	30	4	15
As 10	30	5	15
As 12	30	6	15
As 14	30	7	15
As 16	30	8	15
As 18	30	9	15
As 20	30	10	15

Perhaps we ought here to explain our reasons for introducing "the theory of measuring time by mechanical motion, or the dynamics of chronometry," into this essay on the balance spring. Let us first ask why should the "Ut tensio sic vis" of Dr. Hooke be made the boundary of the principles of horology? so far as horology relates to the balance spring. This maximum will not tell us what determines the time of vibration of the balance, it will not tell us why two balances of equal masses and unequal diameters, or other two balances of equal diameters and unequal masses, will require springs of different strengths to make them vibrate in the same equal times, and unless the horolo- can determine these and other similar he cannot be, he is not, master principles which are the foundation of the art of horology. And we ask from whatever books on the theory can be found these principles? We have searched many such books for them, but in vain; it is true that we find here and there a stray sentence which bears on them, but in no book on the art that we know of is there an answer full and complete to the question, why is it possible to measure time by a mechanical motion? Many watchmakers would be nonplussed if they were asked the question, what is the use of a balance in a watch. The dynamics of chronometry tell us this and every particular connected with the motion, and variation of motion, in the balance and spring, it will explain to us if we will only put to it for an explanation. It is of no use to us unless it is constantly applied in practice, and then it is of the greatest utility. Before we formed the habit of referring every question on timekeeping that required explanation to this theory, we were frequently falling into error on the smaller points of the art; but now everything is clear and plain to be understood, and the benefits which we have derived from it we would extend to others. We have seen these little errors, too, in others than ourselves. Some years ago a celebrated chronometer-maker read a paper on the isochronism of the balance spring to the Institution of Civil Engineers; that paper is printed in the *Horological Journal* for November and December, 1871; and it contains the erroneous statement that an increase of friction, or an increase of resistance caused by the works becoming dirty and the oil viscid, will only affect the arc of vibration and not the time of vibration of the balance, if it is moved by an isochronal spring, and this is a very popular sum of each pair of numbers is a constant number, and that the higher the number representing the impulse, the more extended will be the range of numbers, so that the greater the force of the impulse the greater will be the arc of vibration of the balance.

In our "theory of measuring time" the formula at the end can be exemplified by these isochronal numbers in the most perfect manner:—

the condition of the oil we
y, and the proportion between
er of the pivot and the holes;
produce more or less friction.
are not able to abolish the
the pivots, we can at least
h measures we will render this
pivotant and unchangeable as

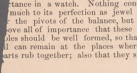
These measures are as follows:
pivots to be made as thin as
ngth will allow, for, as the fric-
he pivots is in proportion to their
smaller diameters produce less

e pivots to be perfectly smooth,
lished, and very hard, so that they
ain their polish.

he pivots to work in jewels of the
stone, as sapphire or Oriental ruby.
the ends of the pivots to work upon
of hard steel or stone; and in the case
chronometer, or other timepiece,
is always in a horizontal position,
ad of the balance pivot should run
a good flat and well-polished disc

The pivots must have oil, in order
minish the friction and avoid wear
rust.

he greatest possible freedom of the
ement of the balance and consequently
he friction which takes place and which
cannot avoid, are of the highest im-
tance in a watch. Nothing contributes
much to its perfection as jewel holes
the pivots of the balance, but it is
ove all of importance that these jewel
oles should be well formed, so that the
il can remain in the places where the
arts rub together; also that they should



retain their smoothness. Fig. 14 shows jewel hole with its end piece; *a* is the stone in the middle of which the pivot hole is drilled; this stone is fastened in a brass setting *d*, the stone *a* is convex upon that side which is in contact with the end piece *b*, and this end piece is also in a brass setting, as is shown at *c*. The flat side of the jewel hole is furnished with a sink for the oil, and the hole itself is very short; it is not much deeper than it is wide. This hole is not quite cylindrical, but narrower in the middle than at each end, as is shown on a larger scale in Fig. 15.

By these means the oil which has lost its fluidity, and the dirt which might gather at the holes would not be so great a hindrance, and the edges of the holes, being formed solid not only to carry pivots, as happens sometime when the holes are cylindrical and the sharp edges are but slightly rounded off. The upper side of the stone does not require a counter sink, it is all sufficient if the edge of the hole is rounded off a little. The end stone *b* must nearly touch the convex side of the jewel hole *a*. Between the jewel hole and the end piece there must be but very little space. In this way the oil, which is between the end piece and the convex side of the jewel hole will by capillary attraction be retained in its place ready to enter the pivot hole as the oil in the counter sink dries up. The oil has a great influence upon the regularity of the watch. One kind of oil will become thick and dry up; another will injuriously act upon the metals; and in both cases the effects are bad. Attempts have been made to improve the oil, and I have tried a great number of these preparations, but the result is, I have come to the conclusion that pure natural oil, such as we obtain from very ripe olives by making them and without pressing them much, is the very best that can be employed for the purposes of horology. This I would recommend above all other oils, but it is easy to get. For pocket and marine chronometers oil is not necessary for the pivots, and this is a great gain, only these must be carefully oiled; and if those of the balance and escape wheel are made very fine, and the preceding rules are attended to, the action of the oil will be reduced, so that, even if we have not the very best oil, that which we are compelled to use will affect in a less degree the regular performances of the timepiece. Above all, when it is impossible entirely to avoid an evil a great deal is won if we are able to diminish its injurious influence.

It is, as we have remarked, necessary that the balance pivots should be well finished; that is, sufficiently hard and highly polished. The most suitable form for these pivots is that which we see in Fig. 16, where is shown a portion of a balance axis ending in a pivot. The axis and the pivot are in this figure considerably enlarged, in order more clearly to show their right shape. The pivot has no shoulder, but its greatest diameter is equal to that of the axis (balance staff), and it becomes slender from that part to the point, which works in the jewel hole, and which is almost cylindrical. This pivot is not quite conical, but somewhat hollowed out, as is shown in the figure. If we finish the pivot in this manner we make it very strong, however fine may be the part which works in the jewel hole. It is of great importance to make the diameter of the pivot less than that of the hole, so that the oil, which sooner or later will become less fluid, shall not interfere with the free movement of the pivot in the jewel. The general rule, which has the most useful results, for the ratio of the diameter of the small pivots to the size of the hole is, that the diameter of the pivot should be one-sixth less than that of the hole.

When the pivots are larger, as in marine chronometers, a play of one-seventh of the diameter of the hole will be sufficient.

The balance spring might interfere with the free motion of the balance if it were applied in such a way as to press the pivots against the sides of the holes. In order to avoid this we must take care that the centres of the balance spring and of the balance are in exactly the same place, and that the balance spring, when fastened in the stud, retains its natural form, and neither presses to the one side or the other. It is only the skilful and practical artist that is able properly to apply a balance spring—a thing which is of the greatest importance—for the balance spring, as we shall presently see, may be held to be the soul of the watch.

Hints to Watchmakers and Others.

TO CLOSE CRACKS IN CORAL.

Warm coral very carefully, and with a pencil-brush cover the crack with watch oil; when cool the seam will not show.

TESTING.

The acid to be used is nitric, slightly diluted, with the addition of a small quantity of salt. You should have two or three gradations in the fluid of different strength; for 22 to 18 use the above; for lesser grades dilute with more water. After a little practice a good observer can arrive within half a carat of the quality.

CHARCOAL ASSAY.

By this process an assay accurate enough for small quantities, can be made in a short time. Suppose you have some pure refined some gold filings, you now have the gold, and wish to know the carat. Try it on the "touch stone" and approximate its quality. Weigh *very* carefully 12 grains; reduce this by means of fine silver to 8 k, or a little less; melt this into a shot and flatten on a clean piece of charcoal, then anneal and roll into a thin ribbon, coil it loosely like a watch spring, then anneal and put in a glass retort; cover with nitric acid one-half, water one-half; boil for 10 minutes, then pour off the solution, and use three-fourths acid and one-fourth water, boil as before 10 minutes, pour off the solution again, rinse well and then boil for five minutes in pure nitric acid; rinse several times with hot water. Dry the gold and melt it into a shot, then weigh this shot. Twice the weight will be the carat of the metal. It is unnecessary to say that the utmost care must be taken as to weight and the manipulations to succeed in arriving at accurate results by this process.

error; that statement is supported by illustration drawn from practical experience and several enthymemic propositions. A reference to the dynamics of chronometry will expose this error and explain that apparent anomaly in the practical instances given. If then the empirical law "U tensio sic vis" does not teach us all we wish to know, it is, if we can, go a little deeper and expand the boundaries of horological principles. Let us follow the law of nature on which all must depend—that will teach us more than U tensio sic vis—that law expressed in the words "All motion is exactly proportional to the force which produces it."

THE MANNER OF MAKING THE BALANCE SPRING.

The fine steel wire from which balance springs are made is oblong in section, and is drawn through drawplates just as other wire is drawn. It is wound in lengths of a few yards on small wooden bobbins or reels and in this state is ready for use. The simplest method of coiling up the spiral spring is with a coiling pin or with a pair of coiling tweezers. The coiling pin may be a small screwdriver, a round brooch, a joint pusher, or any other similar tool. The tweezers used for coiling the spring are similar to an ordinary pair of tweezers except that the inside surface of the points is not flat, but the one surface is concave and the other is convex. The manner of coiling up a spiral with either of these tools is as follows: a sufficient length of wire is taken from the bobbin, and it is straightened out by drawing it out between the thumb and fingers.

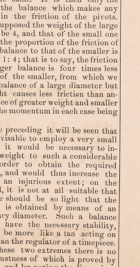
The coiling pin or tweezers, whichever may be the tool used, is taken in the right hand and the wire is held between the thumb and fore-finger of the left, about half an inch of wire is directed to the tool, and the end is taken between the points of the tweezers or between the pin and the thumb, and the end is bent into a curve, which is the inner turn of the spring, another quarter of an inch or so is then taken up by the tool, and thus little by little the whole length is gradually coiled up into the spiral form. Every quarter of a turn or so the spring is held edgeways up to the eye to see that it is quite flat, if it is not, the coils must be pressed down or up as is required. The spring is now ready for hardening, or, if it is to be used soft, for blueing. Spiral springs are blued in a tool called the blueing-pan, which is only a circular piece of sheet brass with a long and handle fitted to it, a three armed cross-wheel exactly like the balance of a watch, falls on the centre of the pan and is pressed down by a spring, the hair spring is put in the centre of the pan and the wheel presses it down close, it is then held over the flame of a spirit lamp or gas and held there until it is blue, then it is thrown off to cool. The spiral spring can be hardened by screwing it very tight between two flat pieces of brass, which should be steady pinned together, it then can be made red hot and cooled by plunging it into oil or water as may be considered best. After that it may be polished by slipping a rod of brass or iron wire through the centre and rolling it to and fro on a polishing block of tin or bell metal on which some red stuff has been spread, after it is polished it can be blued in the blueing-pan like the soft spring. In hardening a spring a great point is to get it of the same temper all throughout, in this respect it is probable the soft springs have the advantage of the hard springs; soft though they are their temper is equable from beginning to end. The blueing very much improves the appearance of the spring, it slightly helps to resist oxidation and no doubt has the effect to some extent of normalizing the forces of its atoms. In hardening a Breguet spring a small bit of brass must be slipped between the small upper coil and the spring itself and the whole then must be screwed together.

To be Continued.

Friction on Pivots and Means of Reducing it to the Lowest Degree.

In a late number of the *British Horological Journal* we were much pleased to see that Mr. George Mayer is continuing his translation of Jurgensen's "Higher Horological Art," which was stopped for a number of months. We make the following extract of Friction on Pivots, &c., from this translation which will doubtless be of interest to our readers, and especially to those readers of the late *American Horological Journal* who took an interest in the friction controversy so long maintained in that journal.

Before I give the appropriate methods for reducing the balance pivots to the lowest possible degree it is necessary to make clear what we understand by the term momentum. In the motion of the balance we have two subjects to consider; the one is the mass, or the weight of the balance; the other is the velocity. The mass multiplied by the square of the velocity gives the momentum. This momentum must be as great as possible, in consideration of the frictional resistance of the pivots. It is by means of the momentum of the balance that the friction of the balance pivots is overcome. We can in two different ways cause the balance to have the same momentum—either by giving it a great weight and small diameter or a larger diameter and less weight or mass. The diameter determines the velocity of a point in the circumference of the balance, and this point would have a velocity twice as great as a point in another balance, whose diameter would be half the diameter of the first balance, and which would vibrate through the same number of degrees as the first one. We obtain thus express the velocity by the diameter. If we suppose that the weight of a balance be 16, and that the velocity be also 16, then we shall have as the momentum, $16 \times 16^2 = 4{,}096$. If we further suppose the weight of another balance be equal 4, and the velocity 32, we should then still have the same momentum, $4 \times 32^2 = 4{,}096$. We know that the friction is in proportion to the surface upon which a body moves multiplied by its mass or weight. If we suppose that both the large and the small balance oscillate through 360°, then the motion of the pivots in their holes would in each case be the same, and so far the friction would also be the same. It is then only the weight of the balance which makes any difference in the friction of the pivots. We have supposed the weight of the large balance to be 4, and that of the small one 16, and so the proportion of the friction of the larger balance to that of the smaller is as 4 : 16, or 1 : 4; that is to say, the friction of the larger balance is four times less than that of the smaller, from which we see that a balance of a large diameter but small weight causes less friction than another balance of greater weight and smaller diameter, the momentum in each case being the same.



From the preceding it will be seen that it is not advisable to employ a very small balance, as it would be necessary to increase its weight to such a considerable degree in order to obtain the required momentum, and would thus increase the friction to an injurious extent; on the other hand, it is not at all suitable that the balance should be so light that the momentum is obtained by means of an extraordinary diameter. Such a balance would not have the necessary stability, and would be more like a fan acting on the wind than the regulator of a timepiece. Between these two extremes there is to mean, the justness of which is proved by experiment, and by noting the dimensions of the balances of those timekeepers whose performances is the best we have an easy and certain guide.

The greater or less friction of the pivots of the balance depends not alone upon the weight of the balance, but also upon the condition of the pivots themselves and the holes in which they work. The thickness of the pivots, their hardness, polish and length; the materials of which the holes

Jewelry and Fans.

Of all the simpler varieties of jewelry the most popular are black onyx, English or Whitby jet, French cut jet, and tortoise shell. The onyx is susceptible of very beautiful carving and setting, and is made elegant and effective by combination with seeds, pearls or gold of different colors.

Whitby jewelry is a mineral, very brilliant when highly polished, and is usually cut in a great number of facets, and is light and pleasant to wear. The most fashionable necklaces of this consist of from three to four rows of round, cut beads, varying in size from three-fourths of an inch in diameter in the middle to the size of a small pea at the end of the strand. They are showy, and wonderfully lighten a sombre or grave dress.

Of tortoise shell there are not only necklaces, lockets, brooches, bracelets, and ear-drops, but combs, hair pins, fans; cigar, match, and jewel cases. The handsomest tortoise shell is carved in cameo, in heads, boquets of flowers, or other devices, and finished with smooth or carved pendants. The most valuable is the amber or clear yellowish shell, which, when as pure as it is sometimes seen, is almost as costly as gold. The high-back tortoise-shell or cut jet combs are still worn, but of less towering proportions than those of a few months ago. Some of the most novel and elegant fans of late importation to our market are of cocks' feathers and fine small ostrich-tips mounted on sticks of red-clouded tortoise-shell.

Of the jewels more appropriate to full dress or evening wear the most popular consists of settings of very small or seed turquoises, in devices similar to those effected by seed pearls, or bright yellow or frosted gold. The handsomest sets have very little of the gold to appear, pale greenish blue is particularly fashionable just now.

Next in favor at the present time among the medium grades of jewels is coral, which is valuable mainly in reference to its peculiar color. The most highly prized is of blush, or clear rose color delicately veined. The finest sets are of oval or round pieces, and when complete, comprising the necklace, bracelet, ear drops, comb and buttons.

Lockets of stone cameo are worn, but very rarely are other ornaments of stone cameo called for at this season of the year. Those who like precious stones sometimes purchase amethysts and topazes, but they cannot be said to be in fashion; and when set at all, are generally surrounded by seed pearls or small diamonds.

For general purposes, however, there is no jewelry so popular as that made wholly of gold; and of this a great number of elegant devices are effected from various alloys, copper giving the reddish hue, and silver with gold the greenish, while silver and platina in the pure state are also used in imitation of flowers and for tracery and monograms. Cable neck-chains are now the most fashionable. Pairs of gold bracelets are generally bought, while a single bracelet of gems or fine stones is the rule. Brooches are in less favor than lockets, though the brooch may be made a locket as well by a loop or ring, which can be removed ar restored at pleasure. Ball ear-rings are still popular, and double balls connected by links are fashionable for cuff and collar buttons. The opera chain with the slide and tassel for the watch is still worn, as is the leontine chain, though there is an increasing demand for the long, double guard. Ornamental watches are worn with a chatelaine at the left side; watches for use rather than ornament are very simply chased, and worn under the belt or in a pocket intended specially for the purpose. Stem-winding watches are prefered to those with a key detached—in fact key-winders are becoming a thing of the past. The fancy for chrystal watches is declining—indeed all watch cases in which the ornamental idea has precedence of the useful.

In consequence of financial distress there are perhaps fewer gems than usual sold this season, but in the taste for them there is assuredly no diminution—diamonds, rubies, sapphires, emeralds, opals, and pearls being in as decided favor as ever before. In the setting of diamonds there is no change particularly noticeable, unless that the gem is given greater prominence by cumbering it with as little gold as possible. Other gems, unless very large, are usually set with diamonds to surround them or point at the sides. Solitaire gems, if of good quality and exceeding three-fourths of a carat in weight, are much more valuable and considered in much better taste than the more showy clusters of smaller stones. The conventional engagement ring is set with a fine solitaire diamond. The finest necklaces are of large diamonds, set singly, and connected by a tiny ring or bead of gold, though much more frequently we see the necklace of a single string of fine, round Oriental pearls, from which is suspended a locket of diamonds, or some other gem surrounded by diamonds. The favorite ear-jewels are of solitaire diamonds with the oblong or pear-shaped pendant, though instead we much more frequently see the pendant of finely cut black onyx.

Fans are as much subjected to the caprices of fashion as any other article of personal adornment, and although sere may be the coloring of the leaf, and frosty the morning atmosphere, the fan is as much in fashionable demand as if Zephyr, not Boreas, was the deity presiding over winter. A novel and pleasing style is produced by sea eagle plumage; curled and inclined away from the middle toward either side is in demand. The plumage of the black cock, which betrays lines of white on the edges of its sombre feathers, is selected for *demi* mourning, the exceeding lightness of these fans is one of their conspicuous attractions. The frames of all the present styles are of finely carved and perforated pearl, ivory, or tortoise-shell, or else of Russian leather, or buff morocco, with gilding and embossing in profusion. Delicate and beautiful fans are also made of white ostrich feathers, with gray tips artistically curled, while in others the vivid eye of peacock's tails furnish the leading materials. The exterior of these styles are in toitoise-shell, filagree, or in Russian leather. In opera, wedding and full dress fans, monograms appear upon the expanded surfaces of such as are made wholly of Russia or morocco.

Fans, entirely of tortoise-shell, or very tastefully perforated, and in larger sizes, are much in favor. For convenience, the "telescope" fan is commendable. It is in satin, silk and Russia, harmonizing with the dress. Ivory fans, richly carved, are exceedingly beautiful and very expensive, as large sections of ivory cannot be had, such fans are necessarily small, though the demand for them is quite extensive. In Europe, fans of blue silk or satin, with black figures grouped as silhouettes on the tissues. The Chatelaines which attaches the fan and other female weapons to the waist, come in plain oxydized silver or are gilt, belts to sustain these trifles are of plain, embossed, or gilded Russia or morocco, fastened by oxydized clasps, or large double-tongued buckles, or aigraffes. The cherubic countenances displayed on most of them have the preference, though Grecian and Egyptian reliefs are scarcely less prized.

Another pretty ornament, which, however, does not rank among the latest novelties, is the Amber Necklace. It is composed of faceted amber beads about as large as pigeon's eggs; these beads are either semi-transparent, or clouded, but in either event are pretty and tasteful. The lemon-colored cloudy amber is the rarest, and therefore has the preference—in fact, the Asiatics, who are much addicted to amber ornaments, place no value whatever on the translucent kinds. These elegant ornaments come in sets consisting of a coronal, necklace, pin, and ear-rings.

Whitby jet retains its popularity, and, in fact, is more widely demanded than ever. Reticules, work-bags, satchels, of Russia and Turkey morocco, are overlaid with mountings oxydized or gilt. Girdle-belts and pouches for shopping are mostly found in black morocco, with heavy oxydized mountings. The pouch may be detached and carried in the hand, and when restored to the belt is retained by an ingenious fastening, which bids defiance to thieves. "Necessaires," or work-cases for the girdle, are made to correspond with the "pouch" just described.

THE

[Je]weler's Circular,

[A Journ]al devoted to the interests of the Watch
[and Je]welry Trade of America, and the organ of
[commu]nication betweer. all buyers and sellers in
[this pa]rticular branch of business

[The] Journal will be forwarded to any address
[in the] United States and Canada, for $1.00 per
[annum], payable in advance.

[Corr]espondence solicited from all parts of the
[country], on subjects pertinent with the aim and ob-
[ject of t]he paper.

[All co]mmunications should be addressed

[D. H.] HOPKINSON, 269 Pearl St., N.Y.

[Mr.] George Newman, 79 Cheapside,
[London], our sole agent for the Jeweler's
[Circul]ar in England, is authorized to re-
[ceive su]bscriptions and advertisements for
[the Jour]nal.

NEW YORK, MAY 15, 1874.

Goldsmith's Hall Prizes.

[Eve]ry movement to encourage technical
[educat]ion should win the heartiest encour-
[ageme]nt of the entire trade. We are es-
[pecial]ly glad, therefore, to refer to the de-
[termi]nation of the Goldsmith's Company,
[of Lo]ndon, to establish a valuable series of
[prize]s, to be awarded each year "with a
[view] to the encouragement of Technical
[Educ]ation in the design and execution of
[Work]s of Art in the Precious Metals," as

[An a]nnual Prize of 50*l.* for the best De-
[sign for] some Article in Gold or Silver,
[which, w]hen manufactured, shall exceed 30
[ounces i]n weight.

[An a]nnual Prize of 25*l.* for the best
[Design fo]r some such Article as aforesaid,
[An a]nnual Prize of 25*l.* for the best
[execution] and workmanship of some such
[Article as] aforesad.

[Three a]nnual prizes of 25*l.* each for (1st)
[the best De]sign; (2d) the best Model; and
[(3d) the be]st execution and workmanship
[of an Art]icle in Gold and Silver, which,
[when manu]factured, shall be less than 30
[ounces in wei]ght.

[Annua]l Prize of 25*l.* each for the
[best specimen]s of (1st) chasing or repousse
[(2d) en]graving; and (3d) Enamell-
[ing in Prec]ious Metals.

[Besides these n]ine prizes, a still more use-
[ful one is e]stablished, in a Traveling
[Studentship of] 100 *per annum*, which may
[be given by th]e Wardens to a Student
[who shows] exceptional talent, and
[has obt]ained a Prize for Design
[for thre]e years, in order to en-
[able him to stud]y Art in the Precious
[Metals on the Conti]nent of Europe.

[The prizes will be] awarded in November
[and all works fo]r competiton must be
[sent to Mr. W. P]rideaux, clerk of the
[Goldsm]ith's Hall, in the
[month] of October. Origi-
[nality, it is n]ecessary to state, is
[a condition of an]y of the prizes, no
[...]n to the competion
[... p]rizes. Objects of
[... pe]rsonal ornaments,
[...] object sent must
[... mon]ogram or private
[... ad]dress being sent

in a sealed envelope similarly marked which shall not be opened until after the award. *The competitors must be British subjects.*

These liberal offers are to be hailed with earnest satisfaction. While it is true that a true workman or artist will do his best regardless of such incentives, yet it is well to encourage these men by public recognition of their excellence, while the prizes will prove a stimulus to very many rising men, whose progress will be hastened by their aid. We have only one exception to make to these conditions, that to the one we have italicized. Art knows no country. In fact one of the greatest benefits to national art is the opportunity to profit by that of other nations. Why should not the present offer be put on a broad international basis? The British workman should hope to hold his own, and if some of the prizes should be taken by other countrymen, it would inspire better work for the next year. Let Britain, America and the Continent compete for these prizes and the results would be to the advantage of each.

Association in Chicago.

The movement of the Jewelry houses of Chicago, of which we spoke in our last issue, has now taken definite and practical shape in the formation of a trade association, the adoption of a Constitution and By-Laws, and the election of a Board of Officers, as stated in another column. Three meetings of organization have been held since our last report, at each of which from fifteen to twenty houses were represented. We shall give the features of the Constitution and By-Laws more fully in a future number, but we may now refer to the wide scope of the association and its promised usefulness to the trade. It proposes to do away with underselling, to encourage fair dealing with other members of the trade and with the public, advisory counsel and arbitration in case of trade difficulties, the aid and protection of members of the trade, strangers or not, who are in trouble or sickness, and other good works of this sort, as well as the cultivation of sociability and friendly feeling. Wisely conducted, it can not but be of great benefit both to the local trade and to the trade at large, and its success will do much to wipe out the ill reputation that the action of some houses in the trade had brought upon Chicago.

In regard to underselling, strong position is taken. An improvement in this respect is already evident, and it is provided hereafter, that members of the association who shall be found to be 'cutting under' or who shall be found guilty of any unbusiness like or unfair methods of sale, shall be fined $50 and their names exposed. A committee is provided to investigate complaints in this line.

We look to the association for such wise and far-sighted action as shall dispose of any cry that it is a combination against the public. Especially must it be on its guard against such as may seek membership for the purpose of breaking the By-Laws, and making expulsion the pretext for an advertising hue and cry that they are so treated just because they are selling goods cheap. Every man is entitled to a fair profit on his work, and the result of undue competition is too frequently to the great harm of the public, as when unscrupulous houses do not hesitate to impose inferior or light weight goods on the plea of cheapness. We trust the public and the trade will be equally protected by the new organization, and are very glad to see that it is on so wise a basis as to include jobbers and retailers, and, in fact, all in any way connected with the trade.

All this winter we have certainly illustrated the old saying that "charity begins at home," in our liberal consideration for the "Poor of New York." But now it would appear that we are going to let our charity "end at home," for certainly we are doing much less as a community for the distressed localities of the Southwest than we should; and, what is worse, much less than is being done by other cities far below us in population and wealth. It would appear that the inhabitants of the unfortunate districts now flooded with water might have just cause for complaint if they are to be thus neglected by the City which is most beholden to them for their rich products. The New York Chamber of Commerce is strangely silent under the circumstances. This body became suddenly dumb after its lavish promises of December 23d to the Centennial Commission There is no other body of men in the city that could collect as much money in a day as this for a charitable purpose. It is the duty of the Chamber of Commerce to move in this matter, and relieve New York from what is beginning to be a deserved stigma.

We learn from recent European advices that the South African diamond mines are rapidly giving out, and that great destitution exists among the miners. The London and Paris diamond markets have been visibly affected by the intelligence, and dealers are holding desirable goods for an anticipated advance. The American market has been influenced by these advices, and its actual condition presents an extraordinary contrast from the highly colored diamond story which has been going the rounds of the press, predicting a ruinous depreciation of diamonds.

A Trade Presentation.

When a man has spent a long and happy life in the service of mankind, whether by making jewelry for them or otherwise, when the snows of middle age have succeeded to the greenness of Spring, and when in the words of the immortal Declaration of Independence, in life, liberty, and the pursuit of happiness and greenbacks, he has arrived at that age when he no longer expects to be a President of the United States or an Inspector of the Penitentiary, it is only just and proper that his fellow citizens should give him a testimonial. In the words of the poet, honor to whom honor is due. These were the sentiments of the Lane, in presenting to a well-known and worthy member of the trade the sumptuous and excruciatingly artistic testimonial on the occasion of which we are about to begin to commence to write.

Scarcely less well-known than the worthy gentleman himself was the historic hat which had shaded his silver locks from the early days of infancy—if, indeed it was not worn by his grandfather before him—down to the memorable occasion before mentioned, and of which as we said, we are about, etc., etc. The oldest inhabitant of the Lane testifies that when he was an infant in his mother's arms, this hat was old, and he had often seen its worthy and even then distinguished owner waiting for fifty cents while being blockheaded by the great-grandfather of Knox. This hat had covered the heir of all the ages, and it was truly an historic tile. Should it not be saved to posterity, even if its size required a special crystal palace in which it should be displayed? These thoughts suggested to the ardent testimonializers the shape which their gift should take.

The moment the rumor of the approaching event began to spread abroad, the Lane was stirred to its very depths—and there is a great deal of mud in it; a committee sprung into being, like Minerva full-panoplied from the hat of Jove, and everybody at once began to take stock, nothwithstanding the disastrous fate of Northern Pacific.

With wise fore-sight, and to provide against ticket speculation in the hoped-for supper, no one was allowed to take more than ten cents worth of stock in the coming hat. Under these circumstances the stock at once became the object of speculation, and was quoted on the street, under the bully feeling that prevailed, at from 20 to 75 per cent above par. To be sure nobody ever saw the scrip, but this is quite the usual thing in stock dealing. The directory utterly refused to water the stock. Many of those who desired to invest—in the expected collation—were thus left out in the cold, and all their gnashing of teeth was to no purpose.

The excitement culminated as the eventful day drew near. The president of the company had intimated to the testimonialee that a party of gentlemen desired to wait on him at his residence, to tender him some slight token of their esteem and passion, and requested him to "name the day." The surprised object of their tender regard suggested a fit and proper time for the visitation, and on that evening some forty-five or fifty of our leading jewelers proceeded in a body and the railroad train to the elegant residence of the testimonialee on Spruce street, Newark.

The company was received in the brilliantly lighted parlors, when took place an affecting scene forever to be remembered in the annals of our country's history and the Jewelry trade. In the presence of their assembled friends and the family of the testimonialized, the spokesman of the invaders boldly confronted the gentleman with his few remarks. He did not mention that this was the happiest day of his life, but he said he had been delegated by the friends present and some who were not there, to express their high estimate of his character as a gentleman and friend. He came not with mere words but with a substantial token, expressing as words could not their estimate of his worth—a token as useful also, as substantial. After thorough canvass, an eminently proper decision had been reached. Knowing the delapidated condition of the tile which he had worn for so many years, they had concluded to present him a new one without regard to expense. When the subscription was started, hundreds, nay he might say thousands, were anxious to assist, but only known friends were allowed to participate, and by the investment of ten cents, to clear by the elegant dollar supper which they expected would be provided, a clear balance of ninety cents a head. Could he question the generosity, the manly magnanimity of his friends? And he presented him with no common hat; it was of no common style, but a rare specimen, to be worn only on State occasions, say Fourth of July or Emancipation Day, or when visiting distinguished friends. They hoped it might be handed over from generation to generation, that his children's children might prize and admire it.

Here the spokesman, observing the ill-repressed and eager anxiety of the testimonialee, uncovered the hat, holding up

the beauty with appeals to all to admire its style, color, and workmanship. It was in this position that Messrs. John Quincy Ward and Thomas Nast, Special Artists on the spot of the Jeweler's Circular, took the admirable and speaking picture herewith presented as a premium to all subscribers. It is almost as handsome as life, and we must confess the hat is a bit flattered. The testimonial is of virgin white, we mean verging on white, in color; of noble proportions in height, but with not too much brim to obscure the face of the heavens from the countenance of the wearer; beautifully shaggy in texture, and of an historic style. It was presented with all the grace and lofty grandeur that Wendell Phillipps and P. T. Barnum taken together could assume.

The spokesman went on to say that they had taxed the skill and taste of the country to produce this work of art. He called attention to the fine ornamentation on the crown (a beautiful example of the finest moth-work), to produce which had taken weeks, if not months. He begged him to accept it as the gift of friendship, and respectfully urged that while wearing it, he should never place himself in such a condition as not to distinguish between himself and the hat, like the eminent gentleman who after dinner, having found his card placed in a hat too small for him, concluded that he must be somebody else after all.

The testimonialee was duly unaware of the nature of the gift, and therefore the valuable present was a surprise to him,

ROCEEDINGS OF HOROLOGICAL CLUB.

stinguished Body of Watch and Clock Makers.

Discussion, Communicated by the Secretary.

nctually to the hour this impecuni- yet dignified, body of horologists met the eighth time. The first business ght before their notice was the follow- nteresting queries connected with the pensation of balances:

tary of the Horological Club:

s it is well understood, and generally con- d, that accurate adjustment to tempera- is impossible to be obtained by means of the inary expansion balance, with or without an iliary acting in extremes, I would solicit the nion of your distinguished club on the follow- questions connected with this perplexing ject.

First. If the compensation load, or mass of the lance, is carried well back from the free open- in the rim, will the deflection in extremes of nperature be as likely to throw the watch out beat as if the weights were massed near the ening?

Second. Is there any advantage gained in ex- emes of temperature by massing the load as far m the opening in the rim as possible?

Third. Is it more difficult to adjust to temper- ure a balance of as large a diameter as is used the Jurgensen lever-watch?

Fourth. Does the elastic force of the hairspring increase in a temperature as low as 30° in the same proportion as the resistance of the balance is increased by the deflection of the rim?

Fifth. Does a balance of large diameter and weight meet with as much resistance in the unlocking as one smaller and of less weight?

I have many other queries, but will propound no more at present. E. D. Root.

Forrestville, Conn., April 30.

Mr. Horologer then rose and said that it gave him much pleasure in talking on questions of this nature, and indirectly communing with gentlemen whose queries gave evidence of such deep thought. In regard the first query he would state that a watch will not be thrown out of beat in extremes of temperature by placing the masses any special distance from the opening in the rim, providing that the masses be placed at equal distances from the opening, and both sides of the balance be equally sensitive to changes of temperature. If, however, the masses on each side of the balance be placed at unequal distances from the openings in the rim, or if both sides of the rim of the balance be affected unequally by changes of temperature, then the one mass will move farther or quicker than the other, and the balance will be thrown out of poise, which in some instances is equivalent to the watch being out of beat. His opinion was that this result would not be so liable to occur when the masses were placed as far back from the opening as possible, because when this was the case, the compensating arms were shorter and less liable to irregularities of the nature which he had mentioned.

In regard to the second query it was his opinion that there was no real advantage gained which was likely to be beneficial in extremes of temperature by massing the load as far from the opening as possible. In order to obtain a perfect compensation in extremes it was necessary for the weight or load of the balance to move in a constantly and uniformly decreasing ratio, as the temperature fell, say from 90° to 30°, and to move in a constantly increasing ratio as the temperature increased from 30° to 90°. It was therefore plain that this result could not be obtained in even the most minute degree by massing the load of the balance as far from the opening in the rims as possible.

With reference to the third query he considered that practically a balance of the size used in the Jurgensen lever watch was easier adjusted than a smaller one, because being larger, the different manipulations were easier executed correctly than they were in a very small balance.

The fourth question had reference to the balance spring, and was intimately connected with the second query, but as his friend, Hairspringtwister, was showing mptons of uneasiness, he would make remarks on this subject very brief. variation of the elastic force of the spring proceeds uniformly in pro- o the changes in the temperature, be represented by a straight line divided into degrees of temperature, but the inerta of a compensation balance of the common construction cannot be made to vary uniformly according to the temperature, but more rapidly in cold than heat. It will, therefore, be seen that the elastic force of the hair-spring cannot increase in the same proportion in low temperatures, as the resistance of the balance is increased by the deflection of the rim.

As to the fifth query he considered that a balance of large diameter and weight met with the same resistance in unlocking the escapement as a smaller balance of less weight, but the momentum of a large and heavy balance being greater than a smaller and lighter one, its motion was less disturbed by the resistance it encountered in unlocking the escapement.

Several other members were called upon to give their views on the subject, but those familiar with the principles embodied in the various questions, considered it unnecessary to say more on the subject for the present. Mr. Hairspringer felt thankful their honorable body had come to such a sensible conclusion, for he considered that there had been quite enough of cussed nonsense spoken about this thing already.

EXPANSION OF METALS, &C.

The following query, S. D. L., Elkhorn, Wis., was then read by the Secretary:

What are the relative degrees of expansion by heat of—

Steel and iron,
Steel and brass,
Steel and zinc,
Steel and wood,
Steel and lead,
Steel and mercury?

I am more particular about the steel and wood than the others.

The Secretary continued to say that he had consulted the results obtained by a number of experiments of the effects of heat on the *linear* expansion of these substances, and although all observers did not exactly agree, the one with the other, still he thought the following proportion was as near as could be obtained.

Length of a rod at 212° Fah., whose length at 32° Fah. is 1.000000.

Wood—white deal	1.000024
Cast steel—untempered	1.000800
Cast steel—tempered yellow	1.001240
Soft iron—forged	1.001220
Soft iron—drawn	1.001235
Brass—hammered	1.001855
Brass—English plate	1.001893
Lead	1.002848
Zinc	1.002976
Mercury—cubical expansion	1.018018

The differences between the results obtained by different observers, and even of those of the same observers, when estimating the expansion of different specimens of the same substance may be due to two causes. In the first place substances which bear the same name are not always of the same chemical composition. Very often, too, a comparatively small impurity causes a very great alteration in some of the properties of a substance. In the next place it ought to be observed that two solids may have precisely the same chemical composition, while yet their molecular condition may be different, owing to a difference in the treatment which they have received. Thus steel heated and suddenly cooled, is a different substance from steel which has not been treated in this manner; and consequently we find that while steel tempered yellow has for its expansion .001240, soft steel has .001080.

The linear expansion and contraction of most kinds of wood was exceedingly small, yet although small the expansion and contraction varied considerably under different conditions, and even under the same conditions it could not be depended upon to give precisely the same results two times in succession when the same amount of heat or cold was applied. Watch and clockmakers had abundant opportunities of observing this fact when wood was used for the pendulum rod of a regulator. There was probably no substance better adapted for pendulum rods than wood, when the clock was designed for purposes requiring only a moderate degree of precision. Yet for astronomical purposes and in all cases where tenths of seconds had to be measured, wood had always been found to be an unsuitable material for the pendulums of such clocks.

FAT AND LEAN MEN'S WATCHES.

The following communication, signed B., Malone, N. Y., was then read:

I see in a late meeting of your club that the influence of magnetism on the balances of watches was freely discussed. I would like to enquire why a watch will run different in one man's pocket than another's; for example, a very thin lean man and one that is fleshy and full of blood and heat?

Mr. Watchwright suggested that animal magnetism, or the same force which produces table-turning and other phenomenon of a like nature, might have something to do with the results observed by their correspondent.

Mr. Uhrmacher remarked that he had never heard of table-turners moving a metal table, and could not see how animal magnetism could effect the running of a watch. He considered that before any definite conclusion could be reached, or opinion expressed on the subject, it was necessary for them to know whether the watch carried by the lean man, and afterwards by the fat man, was a fine watch accurately adjusted to temperature, positions and isochronism. An ordinary watch that had not these adjustments perfect would vary considerably when worn by two persons of the same bodily constitutions, it their manner of walking and the nature of their business was different, or from any reason that caused the watch to be shaken more by the one person than the other.

Mr. Chalkbrusher was perfectly sure that shaking a watch did it no harm. In some instances he thought that it kept it from stopping. It was the misfortune of one of his customers to have one of his legs much shorter than the other, and his watch was shaken up a good deal when he was walking, yet this watch went better than any he knew of.

AUTOMATIC WATCH POCKET.

Mr. Clerkenwell desired to call the attention of the club to the subject of Automatic Watch Pockets. No doubt those members who were in the habit of reading the trade papers regularly would have already noticed that such a contrivance was proposed by a gentleman in Pennsylvania. He would like to hear the opinion of their honorable body expressed on the subject, and if there was anything practicable considered to be in the idea he thought that the inventor should be encouraged in the developement of his invention.

Mr. Waltham was surprised that his friend, Clerkenwell, would introduce this subject for serious consideration. There was something so mysterious and incomprehensible about the whole question, that he really could not look upon the arguments published in its favor in the light of anything else than a series of philosophical conundrums. Suppose a machine was to be constructed by which we could at will shake a watch either slightly or violently in every conceivable position it could possibly be placed in. Such a machine that without imparting any side motion, would produce a circular or a partly circular motion without any other kind of disturbance, what practical advantage would be gained? The causes from which watches change their rates in different positions have long been understood, and of late years this question has been very fully discussed. Suppose a watch to be under adjustment for positions and shaken in this pocket, what more could be done to equalize the friction on the balance pivots, &c., than can be accomplished by the methods usually practised? In what manner can the isochronous properties of the balance spring be tested better than by decreasing the vibrations of the balance by letting down the mainspring to its weakest point, and afterwards increasing the vibrations by winding up the mainspring to its strongest point. He considered that the original idea of this watch pocket was due to those eccentricities of genius which are often characteristic of talented men.

Mr. McFuzee said that a number of years ago Mr. Muma challenged the watch and chronometer makers in the country through the colums of the *Scientific American* to produce a chronometer that would run better than one he had made. The conditions connected with this challenge being that the trials were to be conducted on horseback. A chronometer to be used in equestrian exercise could not be one of the usual construction. He thought that till such times as Mr. Muma was pleased to explain this point more fully than he has yet done, no proper estimate could be made of the utility of his watch pocket, for from his writings in other papers it appeared to him that the watch pocket was to be used in connection with chronometers such as he made the challenge about. Another incomprehensible point was that the watch pocket was to be worked by steam power. At first he was inclined to think that the pocket might consist of some arrangement to be worn on the person to neutralize the effects of shaking, but since the fact had been developed that steam power was to be used in connection with it, he was lost in amazement. He moved that further consideration of the subject be dismissed for the present.

The Adjuster of the French School then stood up, placed his hand on his heart, and said that it burned with indignation to hear the slighting remarks which had been made concerning one of the greatest inventions that had ever been made in connection with watches, ever since the days of Julius Ceasar. Oh, members may laugh, but he believed that the day was at hand when watch pockets worked by steam engines would be required in every establishment that wished to secure the patronage of an exacting public. He was perfectly clear on the necessity of such an arrangement, and thought of making one himself. He had often noticed that when a watch was subjected to internal motion and simple shakes at the same time, and *visa versa*, that the isochronal properties of the timeing screws would not alter the center of gyration of the hair-spring, to an extent sufficient to counteract the normal pressure on the hair-spring collet. And also in extreme cases the centripetal force of the balance staf, totally destroyed the isochronism of the pivots, which was always followed with disastrous results on the running of the watch, especially if it was deficient in "rate power." Now if all this could be avoided by the use of a watch pocket, why not use it? It was true that it had not yet been used, for the inventor had met with some difficulties in consruct- ing the machine. He did not desire to go against nature, as had been intimated by some, he was simply trying to get a head of it. In an invention of this magnitude it was not to be wondered that difficulties should be encountered in perfecting it. Here a member suggested that Mr. Chalbrusher's customer with the short leg, might serve as a good model, from which to constuct a machine for shaking watches. Mr. Chalkbrusher considered this remark an insult to his customer and himself, and demanded a retraction. The Adjuster of the French School claimed to have the floor, and continued to wax more eloquent on automatic watch pockets, and adjusting watches to temperature by the new and beautiful process of cremation. Several members on both sides of the house were startled, and interrupted the speaker by asking an explanation of the details of this method of adjusting watches to temperature. Mr. Chalkbrusher insisted on the retraction of the obnoxious suggestion regarding his customer, and as everybody was talking at the same time, indescribable confusion ensued, such as nobody would ever expect in an assemblage so unusually staid and sedate. The chairman surveyed the scene and looked as angry as the man on the new ten-cent stamp. After he had succeeded in restoring order he addressed the meeting as follows:

Gentlemen, I am surprised and ashamed at your conduct on this occasion. You now see what arises from mixing up horological conundrums with horological science and practice. I declare this meeting adjourned till our usual time for assembling next month. Gentlemen take your stovepipe hats and gingham umbrellas and go home.

The honorable body although temporarily excited, gracefully submitted to constitutional authority and dispersed, some of the gentlemen, however, on this occasion, walked round the corner to "see a man" and chew a clove.

Rising immediately to the dignity of the occasion, however, he said :

"My dear brothers in trade, and all of you who have contributed so largely to this magnanimous gift: Should I give way to my feelings at this more than important crisis, my tongue would lie dormant, my speech would utterly fail me. But no! Rouse ye not only my tongue and speech but all my powers, that I may show to this assembly that a heart beats *loud here*, larger, yes, I say *larger* than this magnificent hat with which you have made me so happy to-night, or I may say even than the head for which it has been blocked."

But, why, he continued, should he be surprised at such a demonstration? He had known them long, and knew, too, that to undertake to suppress this benevolence of theirs would be worse than folly. He referred feelingly to the provisions for his

dear family, made in case of his disablement, by their unheard-of generosity. He knew that these dear friends of the husband and father would never see them left shelterless or in want of a hat.

"Their brains shall never be exposed, *no never*, I say, to the inclemency of winter's cold. Consolation this! I tell you, gentlemen, none can know what it is to wear their own brains in bared wise just such waves of consolation as mine."

In conclusion, after expressing himself in a labyrinth of wild gratitude, he begged to introduce a scene not down in the original programme, and his friend, the Hon. D. B., who would "rise and explain."

That gentleman explained, to wit :

"Sir: I am directed by this sorrowing family to bestow on you the most striking evidence of their esteem and remembrance. Knowing you to be distinguished for your affection for, and appreciation of those mementoes of by-gone times, which serve as links between the past and present generations of men, a trait of character indicative of high culture and refinement in its possessor, they have chosen you as the honored recipient of this precious relic. It came down you freighted with their sighs and bedewed with their tears.

Standing before you in the mute eloquence of its venerable antiquity, I scarcely need refer to the many memories it must awaken. It is an epitome of their family history. When this old hat was over the head of its wearer only was it crowned with locks auburnal. Behold the change! Now it is a trackless desert, bare as the ancient billiard ball! Deeming it worthy to descend to posterity, they charge you to deposit it for safe keeping among the treasures of the New Jersey Historical Society. Being also convinced that this is a moment marking the progress of the race, and one in which coming generations will be deeply interested, they have caused this scene to be transferred to canvas by one of the first artists of our age. This also, they intrust to your keeping, with the strict injunction to cause the same to be placed among the great historical paintings in the rotunda of your country's capitol. Believing you to be worthy so great a charge, in their name I ask your acceptance of these priceless evidences of their confidence and esteem.

The old hat was then brought forward and delivered to the custody of testimonial alee No. 2—a sort of double back action testimonial—as is seen in the picture in which we have had transferred to wood by several of the most experienced woodcutters in the country, and which is herewith presented to any subscriber to the JEWELER'S CIRCULAR who will bring in one or more new subscribers for the ensuing year. Any one else is bound in honor not to look at the picture.

Testimonialee No. 2 replied :—

"To say that I am surprised, does not express my astonishment, and you know right well that this, unlike most surprises, is genuine. It grieves me to be the innocent cause of sorrow to this weeping family, but your peremptory commands must be obeyed. I accept this hat, which has been the subject of my sarcasm, now turned against me to my chagrin, and I acknowledge myself to be the worst sold man in this party. You mentioned the sobs and sighs of this distressed family; the size of this hat is quite as overcoming as you can yourself now observe."

Here the hat was placed on the recipient's head and fell to his eyes.

"This truthful sketch," he continued, "shall be as you wish, preserved in the archives of—" Here the subject of the surprise was entirely overcome by his feelings, at the precise moment of the sketch as witnessed to by the tableaux of the weeping family before him. The original

picture framed in solid pine, may be seen over the gentleman's desk in the office of the firm of which he is a member.

General hilarity and sociability then became the order of the evening, and the hospeded-for supper was provided in elegant shape, fit for kings and jewelers. The absence of any intoxicating liquors was a feature which we are glad to note; nevertheless everybody was in the best of spirits. The host told many of those capital stories for which he is famous in the trade, and the evening proved one of the most pleasant ever spent by any of those present. It was late when the party returned.

The best of it is that many a true word is spoken in jest. The compliments paid to the host's worth and popularity, though said in joke, were echoed in all earnestness by every one present for the testimonialee's standing in the trade, both as a business man and friend, is of the highest. The occasion was a pleasant one for showing those accustomed to meet only in business relations the brighter side of them displayed in social life, and it really did much to promote cordial feeling throughout the New York trade.

At a meeting held May 11th, 1874, the Chicago Jewelers' Association was organized by the adoption of a Constitution and By-Laws, and the following officers were elected :—

President.

Wm. A. Giles,.....(Giles Bros. & Co.)

1st Vice President.

Wm. E. Higby,.....(Matson & Co.)

2d Vice President.

Otto Young,.....(Wm. B. Clapp & Co.)

Secretary.

James S. Hamelton,.....(Hamelton, Rowe & Co.)

Treasurer.

Wm. M. Mayo,.....(W. M. Mayo & Co.)

Committee of 5.

Chas. D. Peacock,

J. S. Rosebury,.....(Rosebury & Talch.)

Thos. Clegwell,.....(Clegwell, Webber & Co.)

Thos. Wendell,.....(Wendell & Bynam.)

J. R. P. S Shirley.

Among the passengers which sailed in the steamer Holsatia, we notice the names of Mr. J. Eugene Robert, wife and family, Mrs. Stewart, the accomplished wife of W. W. Stewart of the firm of Aikin, Lambert & Co., Mr. and Mrs. Saltmann, Mrs. L. A. Martin and Mr. Iselin, of the firm of Richard Iselin & Co.

REDUCTION IN PRICES

OF

John Bliss & Co.'s Transit Instrume

FOR OBTAINING CORRECT TIME.

NO. 4.

Base plates 5 inches in diameter. Fixed Level attached to the lower part of the bronzed Iron frame, through which frame, passes a Thumb Screw for levelling the instrument.

The frame is supplied with brass Y bearings, on which rests the axis of the telescope.

Brass Telescope, polished and lacquered, eight inches long, of high power, furnished with one fine silver wire line in centre of field of view. Right angled prism eye piece and the necessary colored glass sun shades.

Transit observations of the Sun, taken with this instrument, are guaranteed to give correct time within from 3 to 10 seconds, which will be sufficiently accurate for watchmakers using the ordinary Swiss or cheap American Regulators.

Price reduced from $65 to $55.

NO. 6.

Base plates 6½ inches in diameter. Bronzed Iron frame, supplied with Levelling Screw and Horizontal or Tangent Screw, with *movable* brass **Y** block, for more delicate adjustment of the centre line of the telescope upon the range mark.

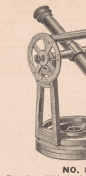
Brass Telescope, polished and lacquered, ten inches long, of high power furnished with one fine silver wire line in centre of field of view.

Right angled prism eye piece and the necessary colored glass sun shades.

Independent riding level, with graduated scale, very accurately made and adjusted, and capable of being reversed upon the axis of the telescope, whereby greater accuracy is obtained in levelling than in No. 4.

Transit observations of the Sun, taken with this instrument, are guaranteed to give correct time within from 2 to 3 seconds.

Price reduced from $90 to $80.



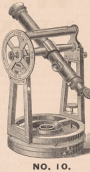
NO. 8.

Base plates 6½ inches in diameter. Iron frame nicely filed and bronzed, supplied with Levelling Screw and Horizontal or Tangent Screw with *movable* brass **Y** block.

Brass Telescope, polished and lacquered, ten inches long, high power, with five lines delicately engraved in glass diaphragm, the middle line being placed in centre of field of view. These lines are only about one tenth the width of the lines in Nos. 4 and 6. Right angled prism *lens* eye piece and the necessary colored glass sun shades. Independent Riding Level, with graduated scale, the same as furnished with No. 6.

Object glasses very accurately corrected for spherical aberration, bringing them to the highest degree of excellence for sharpness of definition. This instrument is not only useful in observing the Sun, but correct time may also be obtained by Transit observations of stars so small as the third magnitude, and for this purpose a Declination Circle is attached to the axis of the telescope, to facilitate finding particular stars in the heavens. When desired, we furnish special instructions for taking time by observations of stars. The Instrument is also furnished with a Brass Lamp and Stand, Hollow Axis, and Reflector within the Telescope, for illuminating the field of view at night. Transit observations of the Sun or Stars, taken with this instrument, are guaranteed to give correct time within one second.

Price past six years, $125, reduced to $105.



NO. 10.

This instrument is of the same size and pattern as No. 8, but has the two base plates and frame made of *yara aretted brass*, the turning, filing and fitting being of the finest description, and the whole handsomely polished and lacquered.

The telescope has attached to its side, in addition, a Thumb Screw with rack and pinion adjustment, for delicately and quickly adjusting the focus of the object glass, instead of focalizing as in No. 8, by moving the eye piece tube in or out with the hand. This arrangement adds greatly to the convenience in observing, and as it tends to increased accuracy, we strongly recommend this instrument for general use, being well worth the additional cost.

Many parties desiring to exhibit and explain the method of using the Transit to their friends and customers, order this instrument on account of its superior finish, and for the reason that the bed plates being of brass, will not rust.

Price for past six years, $150, now reduced to $130.

Marine Chronometer

We have been established since
in the extensive manufacture of M
Chronometers, and by our long e
of the principles involved in accu
time keeping, and experience in
practical application, have arrive
the greatest success in making our
struments perform with wonderful
cision, many of them being little s
of *absolute perfection*.

Watchmakers frequently labor un
the difficulty of not having a tim
keeper sufficiently accurate to presen
correct time, or, by which to compa
fine performing watches. In such cas
our Chronometers will supply this
quisite.

There can be no doubt that Marin
Chronometers, as a class, are much su
perior in time-keeping qualities to an
other kind of time-pieces, costing even
much higher sums.

All Chronometers sold by us are
guaranteed for three years to perform
satisfactorily, failing which, we agree
to make them run well without charge
or exchange for another guarantee
Chronometer, of equal value.

Price, in rosewood cases, $255.

Second band Chronometers, fro
$125 to $200, according to size, st
and excellence of performance.

IMPORTANT NOTICE.

These Transits are readily set in position without the aid of strictly correct time as a basis for that purpose. Printed instructions, easily understood, accompany each Instrument, and no calculations are required preliminary to setting in position.

As a trial only, is required to insure unqualified approval, we are induced to make the following

LIBERAL OFFER.

On receipt by us of satisfactory references, and 10 per cent. of the price, we will send any one of the forgoing Transit Instruments, on hire or trial, for one month, with full printed instructions for setting up and using the same, and if purchased after trial, we will allow the whole hire to apply in part payment, and sell the instrument on approved note at four months for the balance.

Special terms for payment by installments, after trial, on application.

We do not make this offer merely to hire these instruments, but to insure a trial with a view to sales, the hire received being only sufficient to cover the cost of repolishing in case they are returned.

JOHN BLISS & CO.,
110 Wall Street, New York

AMERICAN WATCH CO.

OF WALTHAM, MASS.

tem Winding Watches

No. 1 BOND STREET, NEW YORK.

NEW SIZES !

lew Stem Winders. (Ladies.)

The Movement represented above, named "Amn. Watch Co." Waltham, Mass. is a Stem Winder and Setter (ladies' size), introduced by us some two years ago, and is now one of the most popular in the country. These goods are made in two new grades, named, "Amern. Watch Co." Riverside, with expansion balance accurately adjusted, and are offered at very low prices.

New Full Plate Stem Winder and Setter.

The "Appleton, Tracy & Co." movements are made with winding and setting mechanism, similar to the "Crescent Street," so well and favorably known.

New Full Plate Stem Winder and Setter.

The "Wm. Ellery" movements are now made with winding and setting mechanism, similar to the "Crescent Street," so well and favorably known.

LATEST IMPROVEMENTS !

The above is a fac-simile of our **Guarantee**, which accompanies every 18 karat case of our manufacture, and is as reliable as the Stamp of the Philadelphia Mint.

New Full Plate Stem Winder & Setter.

The "P. S. Bartlett" movements are now made with winding and setting mechanism, similar to the "Crescent Street," so well and favorably known.

Nw K ey Winder, Ladies' Size.

The "Wm. Ellery," (Ladies' size) of similar model to "Appleton, Tracy & Co." Ladies size movements, are made in two grades and are the lowest price American (Ladies) watches ever offered.

NEW MODELS !

New S. W. & Setter, Cent's 14 Size.

The new model above is a 14 English size, movement, SPECIALLY adjusted full and center jeweled, winds and sets at the figure XII, named "Amn. Watch Co." Waltham, Mass. Is also made in two low price grades, named "Amern. Watch Co." Riverside. This is the only American made movement that can be properly cased as an open faced watch. For full particulars see price lists.

New Full Plate S. W. & Setter.

The "Waltham Watch Co." movements are now made with winding and setting mechanism, similar to the "Crescent Street," so well and favorably known.

New Full Plate Stem Winder.

The "Home" movement is now made as a substantial stem winder.

New Price List forwarded to the address of dealers ONLY, on application. Applicants must in all cases enclose business card, or some satisfactory proof of their being in business.

We are prepared to execute orders for Cases in any quality of gold, and variety of patterns, and are confident that our facilities for the Manufacture of Gold Cases are unsurpassed.

Buyers' Directory.

A Guide to the prominent Wholesale Houses in the Watch, Clock, Jewelry and kindred branches of Trade in New York.

Clock Companies.

Kroeber, F., Clocks and Regulators of every description, 70 Courtland Street, N. Y.

United States Clock Co —Henry Terhune & Son, 3 Cortlandt street, N. Y., Manufacturers of Fine Regulators and American Clocks.

Waterbury Clock Co.—M. Bailey, Treasurer, Manufs. and Jobbers, No. 4 Cortlandt Street, N. Y., No. 160 Clark Street, Arcade Building, Chicago.

Wood, James—Manufacture, Importer and Dealer of Fine Regulators and Clocks of every description, 6 Courtlandt street, N. Y.

Corals and Coral Jewelry.

Bergmann, Adolph—Importer of Corals, Mounted and Unmounted, Precious and Imitation Stones, No. 64 Nassau Street, N. Y.

Errico, Andrea—Established 1850—Importer of Coral Jewelry, 19 John street, N. Y. Manufactory, 39 St Catarina a Chiaja, Naples, Italy.

Lawson & Greaberry...Manufacturer Fine Gold & Coral Jewelry ; Coral Jewelry altered, refinished and repaired, No. 63 Nassau St., N. Y.

Cameo Cutters, Etc.

Bernard & Bonet—Cameo Cutters, Likenesses Cut on Shells and Precious Stones, 599 Broadway, New York.

Lerrethon, Jules—Cameo Likenesses cut on Stone and Shell for Pins, Earrings, Studs, Studs &c Fancy Cameos, 643 Broadway, N Y.

Chronometers.

Miss. John A. Co.—Standard Marine Chronometers. Transits for Watchmakers' Use, No. 110 Wall street, N. Y.

Diamonds.

Bernhard, A. & Co.—Manufacturing Jewelers & Importers of Diamonds, Fine Jewelry, &c. 189 Broadway, Silver building, N. Y.

Bissinger, E—Importers of Diamonds, No. 182 Broadway, N. Y.

Fero, Henry—Importer of Diamonds, No. 9 Maiden Lane, N. Y.

Morch, Jacob—Importer of Diamonds, Pearls, French & Italian Stone Cameos, Amethysts, Onyxes, and Precious Stones generally, No. 23 Maiden Lane, N. Y.

Diamonds and Diamond Jewelry.

Smith & Hedges—Importers of Diamonds Exclusively, and Manufacturers of Fine Diamond Jewelry, 1 Maiden Lane, cor. Broadway, N.Y.

Taylor, Cantrell & Taylor, Importers Diamonds and Diamond Jewelry, 9 Bond street, N. Y.

Diamond Setters, Etc.

Friend, S. & Co.—Manufacturers of Fine Jewelry, and Diamond Setters, 35 John street, N. Y.

Hayden. E. B.—Manufactur of Fine Jewelry and Diamond Setter, No. 81 Nassau street, N. Y. N. B.—Particular attention paid to repairing in all its branches.

Dolbey & Wood—Engravers & Incrusters of Precious Stones, 169 & 171 Broadway, Room 23, New York.

Enamelers, Etc.

Bishop, J. L. & A.—Enamelers on Gold & Silver, also Manufacturers & Importers of Enamel, 20 Nassau Street. Room 10, rear.

Orr, Jas. C.—Enameler on Fine Jewelry, Flowers, Birds, &c., Enamel in colors, Hand Bracelets (a specialty), 77 Nassau Street, N.Y.

Engravers and Die Sinkers.

Packner, Edward—Carver, Engraver and Chaser on Jewelry, Monograms, Lettering, &c. No. 19 John street, N. Y.

Henning, Albert J.—Die Sinker & Engraver, 217 Centre street, N. Y. Dies for Jewelers and Silversmiths, Embossing Plates, Seals, &c.

Knapp, Charles—Engraver, Die Sinker and Designer for Jewelry, 14 and 16 N. Church St. and Heads for Rings, &c., 41 Maiden L., N.Y.

Park, Wm.—Stone Seal & Cameo Engraver, and Die Sinker. Masonic Devices and Engraving for Regalia, 302 Broadway, N.Y. Room 1415.

Schaffer, A.—Stone, Seal, and Cameo Engraver, No. 61 Nassau street, N.Y.

Schieber, C.—(successor to Wm. Eck), Die Sinker. Engraver, Chaser and Tool Maker 193 William street, N. Y.

Schuller, J. Dan'l.—Stone Seal Engraver, Arms, Crests, Initials and Monograms engraved on Stone Seals, &c., No. 71 Nassau Street, N. Y.

Schoenfeld & Strebel—Engravers, Chasers and Enamelers of Fine Jewelry, particular attention paid to Bracelets, 43 Maiden Lane, N. Y.

Weston, James F.—Stone Seal Engraver, Enameler of Precious Stones, &c., 32 John street, cor. Nassau, N. Y.

Electro Platers.

Climax Electro Plate Co.—Nickel and Silver Plating, Gilding, Bronzing, &c., A. W. Ladd, Manager, 5 Dey street, Room 7, N. Y.

Jesselson, P. & Son—Gold and Silver Electro Platers & Fire Gilders, Coloring Etruscan and Gold Jewelry specialty, 71 Nassau St., N. Y.

Jesmont, P. A.—Gold and Silver Electro-Plater and Etruscan Colorer, Gilding and Repairing Watch Cases a specialty, 65 Nassau street.

Normandeau, P. A.—Electro Gold & Silver Nickel Plater. Coloring Gold and Silver work a specialty, No. 109 Nassau Street, N. Y. Sole Agent of New York Nickel Plating Company. Licensed by United States Company.

Scherrer E. & Co...Electro Nickel Plaers on all metals by the Improved method. Plating fire apparatus a specialty, 42 Dey St.

Fancy Goods, Clocks, Bronzes, Etc.

Hayes, Alex. M. & Co.—Importers of London, Paris and Vienna Fancy Goods, Clocks, Bronzes, Musical Boxes, Diamonds, Watches, Jewelry, etc., 23 Maiden Lane, N. Y.

Magnin, Vv J. Guedin & Co.—Importers of Clocks Bronzes, Musical Boxes & Rich Fancy Goods etc., 659 Broadway.

Shepard, Le Boutillier & Co—Importers of Fancy Goods, Clocks, Bronzes, &c., No. 10 Maiden Lane, N. Y.

Gold Chains, Etc.

Andres, P. & C.. Manufacturers of Gold Chains and Chain Bracelets, 208 John street, New York, N. Y.

Beck, J. & Son—Manufacturers of Fine Gold Chains and Chain Bracelets, 10 Liberty Place, near Maiden Lane, N. Y.

Falkenau & Pollak .Manufacturers of Gold Chains with Patent Safety Swivel Attachment, No. 4 Maiden Lane, N. Y.

Kaufmann Bros.—Manufacturers of Gold Chains, and Chain Bracelets, 20 John street; Factory, 713 5th street, N. Y.

Newlin, E. C.—Manufacturer of Gold Chains, 412 Locust street, Philadelphia, Pa. Gold and silver bought.

Robinson, P. & Co.—Manufacturers of Fine Gold Chains and Chain Bracelets, No. 13 Maiden Lane, N. Y.

Smillie, Dorrance & Edge—Manufacturers of the Celebrated Woven Fabric Gold Chains and Chain Bracelets, 9 Maiden Lane, N. Y.

Wallach, A. & Co.—Manufacturers of Gold Chains, No. 11 Maiden Lane, N. Y.

Wynn, Geo.—Manufacturer of Gold Chains and Jewelry, 17 John street (rear), N. Y.

Gold and Silversmith.

Cooper, P. W.—Silver and Goldsmith, No. 125 McDougal street, N.Y. Waiters, Pitchers, Tea Sets, Communion Service, &c.

Gold Pens, Etc.

Aikin, Lambert & Co.—Manufacturers of Choice Gold Pens, Cases, Holders, Toothpicks, etc., 14 & 16 Maiden Lane, N. Y.

Hawken, George F.—Manufacturer of Fine Gold Pens, Gold, Silver and Rubber Pencil Cases, 60 Nassau street, N. Y.

Koller Kurtz & Co.—Manufacturers of Gold Pens, 1 Maiden Lane, N.Y.

Todd, Edward & Co.—Manufacturers of Gold Pens, Pencil Cases, Tooth Picks, &c., 602 Broadway, N. Y. Factory, Brooklyn.

Hair Jewelry.

Francke, H. C.—(late Charles Francke & Co.) Hand Hair Jewelry of Every Description, Importer of Alloying Copper. Sample books always on hand, 165 & 167 Broadway.

Menge, Chas. Th.—Manufacturer Fine Jewelry and Ornamental Hair Work, and Importer of Watches, No. 39 John Street, N. Y.

Miller, H.—Artist in Hair, and Jeweler, 189 Broadway, up stairs, N. Y. Established 14 years.

Peckham, Charles V.—Importer Human Hair, Manufacturer of Hair Jewelry & Hair Pictures, 687 Broadway, near Astiy street, N. Y.

Jewelry Cases, Fancy Boxes, Etc.

Altenberg, G. & Co.—Importers of Russian and Morocco, Jewelry and Silverware Cases, Fancy Goods, etc., 4 Bond street, N. Y.

Braun, Chr. E.—Manufacturer of Jewelry Boxes, Trays for Show Cases, &c., 62 Chatham street, N. Y.

Dahlem, W.—Manufacturer of Cases for Jewelry and Silverware, 34 Maiden Lane, N. Y. Show Case Trays, &c., #1 the shortest notice.

Jackson, Samuel C.—Manufacturer of the newest Fancy Boxes and Cases, for Silverware, Jewelry, Watches, &c., 189 Broadway, N.Y.

Kock Henry—Manufacturer of Jewelry Cases, also Boxes for Surgical & Mathematical Instruments, 2 Dunan street, up-stairs, N. Y.

Steinle & Hoensler—Manufacturer of Fancy Boxes for Jewelry and Silver Ware, 14 Dey street, Patentee of the Celebrated Adjustable Boxes.

Sturm, L.—Manufacturer and Importer of Cases for Jewelry, Watches, Silverware, etc., 15 John street, N. Y.

Wiggers & Froelick—Manufacturers of Fine Morocco Cases for Jewelry, Silverware, Trays and Porcelain Ring Trays, &c. No. 60 Nassau Street, N.Y.

Jewelry—Fine.

Aikin, Lambert & Co.—Manufacturers. General stock of Reliable Jewelry, 14 and 16 Maiden Lane, N. Y.

Ball & Barnard—Manufacturers of the Self-Adjusting Band Bracelet Guard, (Bracelets a Specialty), No. 9 John Street, N. Y.

Bissinger, E.—Importer of Fine Jewelry, Lockets, Crosses, Neck Chains, &c., No. 182 Broadway, New York.

Brown, Cook & Co.—Manufacturers of Fine Gold, Enameled and Plain Lockets, No. 191 Broadway, N. Y.

Burch, DeMott & Coughlin.—Manufacturing Jewelers, 9 John street, N. Y.

Carter, Howkins & Dodd.—Manufacturing Jewelers, 1 Bond Street, N. Y.

Coe, Adams & Stevens—Manufacturers of Fine Jewelry, Lockets and Bracelets, a specialty. Office old No. 9 Maiden Lane, N. Y.

Fitch & Chatterton—Successors to Merrill, Fitch & Allin—Manufact'rs of Fine Gold Jewelry, Chains, Band and Chain Bracelets, No. 19 John street, N. Y.

French, F.—Manufacturer and General Dealer in Fine Gold and Roll-Plate Jewelry. Studs a specialty. No. 14 John street, N. Y.

Greason, Holmes & Co.—Manufacturers of Fine Jewelry, Band Bracelets, &c., 21 John street, N. Y. Factory, Newark, N. J.

Griffith, H.—Manufacturer of Fine Jewelry, Studs and Buttons a specialty, jobbing attended to, Nutry Alley, Adams street, Brooklyn, N. Y.

Hartmann, P.—Manufacturer & Importer of Fine Gold, Diamond and Filigree Silver Jewelry, No. 36 Maiden Lane, N. Y., P. O. Box 2,454.

Hess, Adolph & Co.—Importers of Jewelry. Lockets, Charms and Crosses a specialty. 39 Maiden Lane, N. Y.

Kimball & Kittle—Manufacturers of Fine Gold Jewelry, 28 Bond street, N. Y.

Kinscherf, William—Manufacturing Jeweler, 18 Ann street, New York.

Krebs, George—Manufacturing Jeweler, 28 Bond street, New York.

Kuhn & Doerflinger—Manufacturers of (14 and 18 kar. and Roman Gold) Band Bracelets, and Importers of Lockets, 18 John street, N. Y.

Kyle, John J.—Manufacturer of Fine Gold and Etruscan Jewelry, No. 684 Broadway, N. Y.

Lennon, John D.—Manufacturing Jeweler, 150 Fulton street, N. Y. Flat and Half-round Gold Bracelets a specialty.

McMurray, Daniel E. D—Successor to Kinscherf, Dellere & Co., Manufacturer of Fine Enameled Jewelry, 148 Fulton Street, N. Y.

Mulford, Hale & Cottle—Manufacturers of Rich Jewelry, Waltham Building, 1 Bond steeet, N. Y.

Oliver, Richard. . Manuf. Jeweler. Odd and intricate articles of Fine Jewelry made to order, repairing done for the trade, 11 John St., N.Y.

Oppe & Kleinfelder—Manufacturers of Seal Rings, Studs & Sleeve Buttons, 50 Bond street, N.Y. Orders promptly attended to.

Oskamp, Clemens—Wholesale Jeweler, 175 Vine street, Cincinnati, Ohio.

Rose, S. & Son—Importers & Dealers in Jewelry, Watch Materials, Watch Glasses and Spectacles, 67 Nassau Street, New York.

Soule H. & G. & Co.—Manufacturers of Fine Jewelry, Patent Self-locking Bracelets a specialty, 17 Maiden Lane—factory, Jersey City.

Spadone, Rood & Co.—Manufacturers of fine Jewelry, Chains, etc. Importers of Watches, etc., 658 Broadway.

Swinnerton Bros. & Co.—Manufacturers of Jet and Fine Gold Jewelry, Office, 196 Broadway, N.Y. Factory, Newark, N. J.

Thoma, Ernest—Manufacturer of Fine Gold Sets and Childrens' Earrings, 173 Broadway, N.Y Factory, Hackensack, N J.

Wheeler, A.—Manufacturer of Diamond and Fine Jewelry, Masonic Jewels, Badges, Emblems, &c., 35 John street, N. Y.

Wiener Brothers—Manufacturers of Gold Chains and Fine Jewelry, 128 Fulton Street, N. Y.

Woglom & Miller. . Manufacturers Fine Jewelry, Black Onyx work a specialty, 32 John Street, N. Y.

Jewelry—Shell, Gilt, Jet, etc.

Cohen William—Importer of Jewelry, Fancy Goods, Whitby Jets, Gilts, Tortoise Shells, &c., &c., No. 4 Maiden Lane, N. Y.

Cullinan, Paul J. & Co.—Manufacturers of Horn and Gilt Plate Jewelry, No. 437 Broadway, Factories Attleboro, Mass. & Brooklyn, N. Y.

Decker & Barclay.—Manufacturing Jewelers, 201 Broadway, N. Y. Factory, Jersey City. Bracelets a specialty.

Hedstrom, Claes G.—Manufacturer of Shell Black and Rubber Jewelry, No. 96 Walker street, N. Y., Entrance 103 Elm street.

The Thayer Manufacturing Jewelry Co.—Successors to O. S. Thayer & Co., Manufacturing Jewelry, Specialty: Jet and Plated Bracelets, No. 181 Broadway.

Jewelers' Tools and Findings.

Dennison & Co.—Manufacturers of Jewelers' Findings, Paper Boxes, Cards, Tags, Cottons, Tissue Papers, &c., 202 Broadway, N. Y.

Frasse & Co.—Importers of Stubs, French, Swiss, German and Sheffield Tools, Files and Steel Wire for Watchmakers, Jewelers, etc., 62 Chatham street, N. Y.

Swift Mfg. Co.—Manufacturers of Wood Boxes for Mailing, and Expressing Jewelry, Precious Stones, etc., 16 Courtlandt street, N. Y.

Lapidaries.

Fox, M., & Co—Practical Lapidaries and Importers of Precious Stones, Pearls, Cameos, &c., Agate Mortars, No. 1 Maiden Lane, N. Y.

Kordmann & Michel—(Successors to A. Tournier & Co.) Lapidaries, Importers of Precious Stones, &c., No. 53 Nassau Street, N. Y.

New York Steam Lapidary Works.—T. F. More, Importer of Stones, and Manufacturer of Stone, Glass & Jet Work, 42 Ann St., N. Y.

Masonic and Odd Fellows' Jewels.

Luther, J. F.—Masonic & Odd Fellow's Jewels' Charms and Emblems a specialty; also, Pins manufactured for all secret orders. 79 Nassau street, N. Y.

Musical Boxes, Etc.

Paillard, M. J. & Co.—Importers and Dealers in Musical Boxes. Boxes carefully repaired. 680 Broadway, N. Y.

Opticians.

Burbank, Bond & Co.—Manufacturers of Spectacles and Eye Glasses of all descriptions, in gold, silver, etc., 14 Maiden Lane, N. Y.

Landsberg, A. . . Successor to L. Black & Co., Importer and Manufacturer of Optical Goods, 36 Maiden Lane, Box 3993, N. Y.

Ruding, Walter—Repairing Spectacles, Eye Glasses, &c., punctually attended to. Pebbles on hand set to order, No. 81 Nassau St., N. Y.

Straubel, Richard—Manufacturer of all kinds of Gold Eye Glasses and Spectacles, No. 37 Maiden Lane, N. Y.

Suttie, Wm. J.—Manufacturer of Eye Glasses and Spectacles, in gold, silver, steel and shell, also, Fine Jewelry, 39 Maiden Lane.

Oxidized Jewelry.

Barthman & Straat—Manufacturers of Fine Jewelry. Oxidized Jewelry a specialty. Orders promptly attended to. 41 Maiden Lane, N.Y.

Rings and Shanks.

Burbank, Bond & Co.—Manufacturers of Solid Gold Rings, 14 Maiden Lane, N. Y.

Bryant & Bentley. . Manufacturing Jewelers, 350 Patterns Hard Solder Rings, 12 Maiden Lane, N. Y.

Knapp, C.—Manufacturer of 14 and 18 karat Gold Shanks and Heads for Rings, 41 Maiden Lane, New York.

Silverware.

Gorham Manufacturing Co.—1 Bond street, N.Y.

Whiting Silverware Manufacturing Co.—Manufacturers of Sterling Silverware, No. 181 Broadway, N. Y.

Silver Plated Ware.

Manhattan Plating Co., 24 John street, N. Y.—Fine Nickel Silver and White Metal Plated Ware. Repairing & re-plating on the premises.

Meriden Britania Co.—Manufacturers of Silver-plated Ware, 550 Broadway, N. Y.

Show Cases, Etc.

Becker, John—Manufacturer of Show Cases, Jewelry Trays always on hand, 19 Howard street, N. Y.

Heil & Sum—Manufacturers of all kinds of Show Cases, 153 Chatham street, N. Y.

Henderson & Terhune—Show Cases of White Metal, Silver, Rosewood, Blackwalnut, etc. 276 Canal street, N. Y.

Hollacher, M. & Frasch—Manufacturers of all kinds of Show Cases, 10 North William street, N. Y.

Kelly, P. J.—Manufacturer of all kinds of Show Cases, Counters and Refrigerators, 49 New Bowery & 22 Oliver street, near Chatham Sq.

Kraft & Hoffmeister—Manufacturers of Metal Show Cases, Jewelry Trays always on hand, 8 & 13 North William street, N. Y.

Kruse, Frederick—Manufacturer of all Sizes and Styles of Show Cases in Metal & Wood, 175 Chatham st. & 19 North William st., N.Y.

Reeves, M.—Manufacturer of Metal and Wood Show Cases, also Plated Sash Bars, 205 Hudson street, N. Y.

Spectacle Case Manufacturers.

Richardson, Wm.—Manufacturer of Spectacle Cases in all Branches, 40 Fulton street, Up Stairs, N. Y.

Koenen, A. & Bro. Manufacturers of Leather Spectacle & Eye Glass Cases, 81 Nassau street, N. Y.

Thermometers Etc.

Tagliabue, Giuseppe—Thermometer, Barometer and Hydrometer Manufacturer, 302 Pearl street, near Beekman, N. Y.

Thimble Manufacturers.

Burbank, Bond & Co.—Manufacturers of Gold & Silver Thimbles, 14 Maiden Lane, N. Y.

Ketcham Bro. & Co.—Improved Gold and Silver Thimbles, Nos. 4 and 6 Liberty Place, near Maiden Lane, N. Y.

Watch Companies.

American Watch Co.—Robbins & Appleton, Agents, Waltham Building, Bond St., N. Y.

Howard Watch & Clock Co.—E. Howard & Co., Proprietors, No. 15 Maiden Lane, N. Y.

New York Watch Co.—Factory, Springfield, Mass. John F. Krugler, Agt., 180 Broadway, New York.

The Philadelphia Watch Co.—No. 618 Chestnut Street, Philadelphia.

Watch and Chronometer Jeweler.

Queen, James—Watch and Chronometer Jeweler and Pallet Maker, 83 Nassau street. Pivots inserted in Pinions, Balance, Staffs, &c.

Watch and Clock Springs.

Brochon & Banvard.—Manufacturers of Watch, Clock, Chronometer and Musical Box Stock Springs, 77 Nassau street, N. Y.

Watch Importers, Etc.

Abry, J. A.—Importer of Watches, No. 63 Nassau Street, N. Y. Sole Importers of Vacheron & Constantin celebrated Geneva Watches.

Aikin, Lambert & Co.—Importers of Watches. Sole Agents for Paul Breton & Chas. Latour, Geneva. A general line of reliable Swiss Watches. Watch Cases of all styles made to order. 14 & 16 Maiden Lane, N. Y.

Bartens, Chas. . . Watch and Chronometer Maker. Dealer in and Importer of Fine Watches, No. 3 John Street, N. Y.

Bodine, G. M.—Importer of Watches and Jewelry of every description, No. 22 Maiden Lane, N. Y.

Bourquin Brothers—Importers of Watches from their own manufactory at Bienne, Switzerland, 20 Maiden Lane, N. Y.

Brunner, J.—No. 28 Maiden Lane, N.Y., Importers of Watches; sole Agents of the Humbert Watches; Stem Winders constantly on hand.

Bynner, T. B. & Co.—Importers of Watches and Dealers in Diamond and Fine Jewelry, 527 Broadway, N.Y.

Conover David F. & Co.—American Watches, Wholesale Salesroom, southeast corner 7th and Chestnut streets, Philadelphia.

Cross & Beguelin—Importers of Watches, Watch Tools and Materials, dealers in American Watches, No. 21 Maiden Lane, N. Y.

Courvoisier, Wilcox & Co.—No. 12 Maiden Lane, N. Y., importers of Watches. Agents for Chas. F. Tessot & Son, and Jules Huguenin, Locle Suisse.

Droz, Henry E.—Importer of Watches and Watch Case manufacturer. Agent for the "E. Perregaux" Watch, and jobber in American Watches, No. 92 Fulton Street, N. Y.

DuBois, Francis & Co.—36 Maiden Lane, N. Y., Importers of Watches and Manufacturers of Watch Cases.

Freund, Goldsmith & Co. . . Importers of Watches and Jewelry, also Watch Materials, Tools, &c., &c., No. 8 Maiden Lane, N. Y.

Haldimann, E. A.—Importer of Watches, Tools and Materials, 66 Nassau street, N. Y.

International Watch Co.—F. H. Mathez, General Agent, 5 Maiden Lane, N. Y.

Kahn, L. & M.—Importers of Watches, No. 10 Maiden Lane, New York.

Lutz, L. A.—(Successor to Lutz Bros.)—Importer and Manufacturer of Watches—fine movements a specialty, factories in Locle & Geneva, 71 Nassau street, N. Y.

Maguin, Ve J. Guedin & Co.—Importers and Agents of the Nardin Watch, No. 652 Broadway, N. Y.

Mathey, L. & A.—Importers of Fine Watches and Sole Agents for the **H. L. Matile's** Watches, No. 119 Fulton Street, N. Y.

Piaget, Henry F.—Importer, Manufacturer and Repairer of Fine Watches and Movements, No. 85 Nassau Street, New York.

Priest, Fuller & Lawrence.—Importers of Watches, Diamonds, Jewelry, Gold Chains, etc. No. 15 Maiden Lane, N. Y.

Quinche & Krugler.—Agents for the Borel & Courvoisier Nickel Movements, 15 Maiden Lane, N. Y.

Stein & Brother—Importers and Jobbers of Swiss and American Watches, Chains, Jewelry, &c. 66 Nassau street, N. Y.

Stern Brothers & Co.—Importers of Swiss Watches and wholesale dealers in American Watches, &c., No. 63 Nassau Street, N. Y.

Taylor, Olmsted & Taylor—Importers of Watches No. 5 Bond street, N. Y.

Waaser, F.—Importer of Watches, Materials, Tools, &c., Sole Agent for Ducommun's Main Springs, 52 Nassau street, N. Y.

Watch Cases.

Brown, J. A. & Co.—Manufacturers of The L[...] Patent Stiffened Gold Watch Cases, [...] 11 Maiden Lane, N. Y. Factory, 58 Ed[...] street, Providence, R. I.

Guerber, A.—Manufacturer of Gold and Sil[...] Silver Watch Cases, 33 & 35 John St. N. [...]

Jennings, Wm. C.—Manufacturer of Watch Cas[...] No. 33 John Street, New York.

Laurent, J.—Watch Case Manufacturer, Gold a[...] Silver American Watch Cases constantly [...] hand. 17 John street, (rear building,) N.Y.

The Dueber Watch Case Manufacturing Co. 131 W. Fourth street, Cincinnati, Ohio.

Virow & Sturges—Manufacturers of Gold a[...] Silver Watch Cases, 189 Broadway, N. [...] top floor.

Watch Case Repairers.

Chemidlin & Cordier—Watch Case Repairer[...] 77 Nassau street, rear building, room 20, N. [...] Manufacturers of Silver Cases.

Tarbox, Hiram—Watch Case Repairing, Spring[...] ing, Polishing and Engine Turning, 79 Nassa[...] street, (room 22), N. Y.

Watch Dials

Gold, John T.—(Successor to the late T. Gold) Enamel Watch Dial Maker, No. 81 Nassa[...] Street, New York.

Watch Keys.

Clark, A N.—Manufacturers of Light Metallic Goods, Watch Keys, Watch Case Springs, Combination Watch Keys, &c., Plainville, Ct

Watch and Clock Repairers.

Egler Bro's—Repairers of Watches and Clocks of every description—Special attention paid to French Clocks, 37 John street, N. Y.

Watch Glasses, Shades, Etc.

Berger, Albert, & Co.—Importer of Watch Glasses, Spectacles, Opera Glasses, Telescopes, &c., &c., No. 47 Maiden Lane, N. Y.

Hill, Robert S.—Manufacturer of Watch Glasses, &c., dealer in Imported glasses, flat glasses a specialty. 75 & 77 Nassau street, N. Y.

Walter, A., & Co.—Importers and manufacturers of Watch Glasses, Spectacles, Clocks, Musical Boxes, &c. No. 40 Maiden Lane, N. Y.

Weber, Philip—Importer of French Glass Shades for covering Wax Work, Flowers, Clocks, Statues, &c., No. 50 Barclay Street, N. Y.

Watch, Pendulum, Spring and Wire Manufacturers.

Ganneval & Callard.—27 Alfred St., Islington, London. Hair spring wire in spools, 36 yds. to 1000 yards; 4s per spool of 36 yards.

Prospectus.

The JEWELER'S CIRCULAR is a Monthly Journal published in the interest of the Watch, Clock and Jewelry Trade, and the organ of communication between the wholesale dealer and the interior buyer.

It is a chronicle of current events, supplying information carefully gathered and skilfully condensed, upon every topic concerning which knowledge is requisite to the importer, the manufacturer, the workman, and the country dealer.

Its subscription price has been placed at

$1.00 Per Annum,

and the Advertising Rates as low [...] is possible, consistently with the [...]pense of conducting such a publica[...] with enterprise and ability.

All communications should [...] addressed to

D. H. HOPKINSO[...]

269 Pearl St[...]

THE

JEWELER'S CIRCULAR

DEVOTED EXCLUSIVELY TO THE INTERESTS OF THE WATCH, CLOCK AND JEWELRY TRADE OF AMERICA

A MONTHLY JOURNAL

D. H. HOPKINSON, Publisher, 369 Pearl St., New York.

VOL. V.—No. 10. NEW YORK, NOVEMBER 16th, 1874. YEARLY SUBSCRIPTION, $1.00

PRIZE ESSAY.

On the Compensation Balance,

AND ITS ADJUSTMENTS IN CHRONOMETERS AND WATCHES.

By W. B. CRISP.

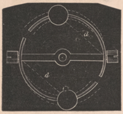
From the British Horological Journal.

CHAPTER III.

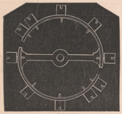
On the various Modes of Adjusting for Extremes of Temperature by means of Auxiliary Compensation or otherwise.

In my last chapter, describing the method of adjusting a chronometer at 45° and 85°: supposing the same to be going to mean time at each of these points of the thermometer, on trying the instrument in an intermediate temperature of 65° it will be found to gain 1·5 seconds.

Ordinary Compensation Balance.



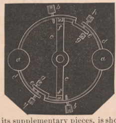
Ordinary Compensation Balance with Screws.



This error is perfectly well known to chronometer makers as the "Middle Error Temperature," and the greater this error is as the chronometers are tried at higher or lower degrees of temperature. Thus, if a chronometer is tried at 30° and 90°, its error at 60° will be 2·7 seconds, or at 30° and 100°, its error at 65° will be 3·8 or 4 seconds. This calculation is taken from results of the performance of upwards of one hundred chronometers.

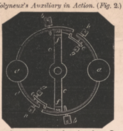
In an essay of this description it will be impossible for me to describe the number of auxiliary compensation pieces invented and made by Mr. Eiffe and Mr. Molyneux; the descriptions of their improvements are published and well known to chronometer makers. But, for the purpose of explaining the mode of correcting this error, it will be necessary for me to select those applications tried by myself, and best adapted to the purpose. I now select one of Mr. Molyneux's, which was patented by him, and, to use Mr. Molyneux's own words, "Having in the usual manner, compensated the balance, so that its vibrations shall be equal at the temperatures of 30° and 55° Fahrenheit, it will be found that, if the temperature be raised to a greater heat, such balance will vibrate so that the chronometer will lose its time or decrease its rate; but by this invention I am enabled to compensate for the loss in the following manner:—In Fig. 1 the balance,

Compensation Balance, with Molyneux's Auxiliary (Fig. 1.)



with its supplementary pieces, is shown in the position it assumes at the temperature of 55°, its rim being then considered circular, and the middle projecting portions of the supplementary pieces banked in contact with the rim. Now if the temperature be raised, the balance rim, with the supplementary compensating pieces, will come into the position shown in Fig. 2, in which, from the increase of heat, the

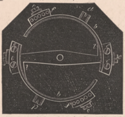
Molyneux's Auxiliary in Action. (Fig. 2.)



balance has ceased to be circular. Its free ends, to which the adjusting screws are attached, having approached nearer the centre of the balance, and with them carried the free ends of the supplementary compensating pieces, so that their middle projecting portions no longer bank on, or are in contact with, the inner side of the balance rim, and thus, by a proper adjustment of the length, position, and weight of the supplementary compensating pieces, I am enabled to compensate for temperatures above that at which the balance has been adjusted, while the adjustment for temperatures of 30° and 50°, to which the balance had been before adjusted, remains unimpaired.

The second modification consists of a compensation for lower temperatures, the chronometer having been adjusted in the usual manner at 55° and 85°.

Eiffe's Balance, with Compound Centre Bar.



A third modification is described by an auxiliary compensation, screwed on to the arm of the balance, and acting independently of the action of the balance-rim. It is intended for an auxiliary adjustment acting in cold, the balance being adjusted in the usual manner for high and intermediate temperatures.

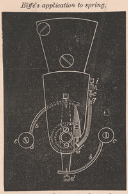
Chronometers with this first modification were tested at the Royal Observatory, Greenwich, in the year 1840, and stood a very long range of temperature. In the year 1840 a chronometer, No. 1839, was on trial for thirty weeks, at a temperature ranging from 18° to 110°, its error during that time being 11·4 seconds difference between the greatest and the le st; and 4·3 seconds the greatest difference between one week and the next—a wonderful performance; and it becomes very questionable, in so long a range of temperature of 92°, if the performance can be surpassed. In trials of this description, every 5° of temperature is a matter of great consideration, and, when the wonderfully close performances are published, temperature, the cause of all error, must be looked upon in the fairness of comparison between the performance of one chronometer and another, as chronometers, tested with a range only of 60° of temperature, will give very different results in so long a range as 92°.

The patent having expired, many chronometer makers having used this auxiliary with great success, and their chronometers have performed well at the Greenwich trials. The delicacy of its application, and ability required in the adjustment of it, are quite sufficient to render the auxiliary useless in unskilled hands.

Mr. Eiffe speaks very highly of an application affixed to the side of the cock, as it is usually called, or the strong bar of the chronometer. It consists of a piece of compensation lamina, so fitted and adjusted that the point of a screw is made to act upon the pendulum spring. This also is a very beautiful application, and very taking in theory, but it is questionable if the general good performance of the

chronometers to which it may be applied will be benefitted thereby. The pendulum spring must be perfectly free from any

Eiffe's application to spring.

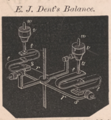


banking or restraint upon it, to insure its requisite fine performance.

At the time Molyneux patented his application of auxiliary compensating pieces to the balance in 1840, many chronometer makers, (although very much taken with the idea of auxiliary compensation) were of an opinion that a balance of a different form must be constructed, for the purpose of overcoming the difficulty of losing in extremes of temperature, whilst others were trying auxiliary compensation and check-pieces, of almost every conceivable shape, to effect the same purpose.

The late Mr. E. J. Dent patented a balance of the following description :—A compensation diameter-bar fixed on the balance axis, composed of brass and steel, the steel being uppermost. This bar, carrying a weight upon an upright rigid support, was the only compensating power hitherto employed. Two blocks were attached to the ends of the bars to receive the secondary compensation pieces, which were so

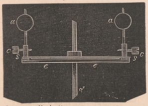
E. J. Dent's Balance.



arranged that the weights should be carried upwards in heat, or tilted, as it were, into the centre, so that, by this means, the weights should always move in a line, nearly parallel to the axis of the balance. On the elevation of temperature the distance between each staple is increased in height, and, by this means, the compensation weights are lifted from the balance-bar. Under these circumstances, the primary compensation is enabled to carry the weight over a greater space, and with accelerated velocity towards the centre of motion, the reverse effect taking place on a decrease of temperature.

This balance was evidently a great improvement upon a compensation balance invented and made by Hardy, who received a reward of thirty guineas in January, 1804, from the Society of Arts for his invention. Hardy, in the description of his

Hardy's Balance.



balance, calls it "a permanent compensation balance for a timekeeper," and describes it as a great improvement upon the two balances then in use. Hardy rejected these altogether, and contrived a mode of applying the direct expansion of metals, which he found by experience to be constant and permanent. Hardy's balance consisted of a flat steel bar, which formed its diameter; beneath this steel bar were two metallic bars, one of brass, and the other of steel, secured to the first steel bar by a stud, this bar being weakened so that it should carry in towards the centre of motion two brass globes fixed upon upright standards. The first steel bar was weakened at each end, so that the compound bars had the effect of carrying the upright standards to and from the centre in heat, and the contrary effect in cold; so that the idea at that time was to have a balance so constructed that the weights should approach the centre with greater rapidity in heat, and recede slower in cold, the weights acting in a straight line to the centre. Mr. Dent remarks that "This variation of velocity to and from the centre of motion could not possibly be brought about if the weights were placed on the before-mentioned rigid immovable supports at the extremities of the balance-bar, as is usually done in ordinary balances of this description."

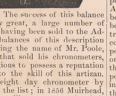
There can be no doubt that Mr. E. J. Dent's balance was a great improvement upon the balance of Hardy, as any balance depending or acting upon leverage or springs for the entire compensation is not suitable for a chronometer. Doubtless, from this cause Hardy's balance never came into general use. About the same time Mr. Loseby made and patented another improvement in the compensation balance, by the applicatian of curved glass tubes containing mercury, in addition to the ordinary compensation, the tubes being arranged in such a position as to cause the mercury, on expanding by an increase of temperature, to approach the centre of the balance at an accumulating force, corresponding to the law of alteration in the elastic force of the spring. Many very excellent chronometers with balances of this description were tried at Greenwich during the years 1845-6.†

† The reader must bear in mind that the Greenwich trials are annual competitive trials, and in all cases commencing in the first week of the new year, extending over a period of 28 to 30 weeks; and that the difference between the greatest and the least is the whole error of the chronometer during such time of trial. The greatest difference between one week and the next explains itself, and its error is inclusive.

In the year 1847 a chronometer, by E. J. Massey, headed the list at Greenwich, showing a variation of 7·7 seconds difference between the greatest and the least, and 3·5 seconds, the greatest difference between one week and the next, the thermometer ranging from 32° to 86°, whilst many of the chronometers were exposed to extremities of heat and cold from 27° to 109°. In 1848 Loseby again heads the list, with variations of 8·7 and 4·6 seconds, E. J. Massey second, and Loseby third; the thermometer ranging from 28° to 87°. In 1849 Eiffe heads the list, Poole second, Loseby third. In 1850 Loseby once more stands first, Eiffe second, Dent third. In 1851 Loseby again comes first on the list, with a variation of 16·5 and 4·3 seconds; the thermometer in this year being 34° minimum, and 102° maximum. In 1852 Loseby again heads the Greenwich list, Massey second, Dent third. In 1853 Loseby's chronometer stands fourth, and, after this year. the name of Loseby appears no more on the Greenwich trials. His application of glass tubes containing mercury is correct in principle, but the application by anyone but himself has not been attempted since the time of Le Roy, glass and mercury being about two of the worse substances where solidity is so much required, as in the compensation balance of a chronometer. In the year 1854 a chronometer by Poole stood at the top of the Greenwich list, showing the difference between the greatest and the least to have been 8·6 seconds, the difference between one week and the next 4·5 seconds; the range of temperature being from 35° to 104°. This chronometer was not beaten until 1870, and was fitted with an auxiliary compensation, now known in the trade as Poole's auxiliary. The drawings of it were exhibited at the International Exhibition of 1862. Two brass abutments are screwed on the ends of the balance, the screws carrying the meantime screw passing through its centre. Through

these abutments or check-pieces are two screws acting upon the main compensation to compel it to act in a more limited de-

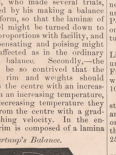
Balance, with Poole's Auxiliary.



gree in cold. The success of this balance has been very great, a large number of chronometers having been sold to the Admiralty with balances of this description not only bearing the name of Mr. Poole, but of firms that sold his chronometers, who were anxious to possess a reputation attributable to the skill of this artisan. In 1855 an eight day chronometer by Lawson heads the list; in 1856 Muirhead, with Poole's auxiliary compensation balance, and, in 1857, a chronometer by Hornby, with a new description of balance, invented by Mr. Hartnup, of the Liverpool Observatory. From the large number of chronometers sent to the Liverpool Observatory to rate, Mr. Hartnup, by a series of experiments, soon found the defective state of the ordinary compensation balance for a long range of temperature, and further experiments led him to conclude that, for a range of temperature of 90°, this error may be confined to very narrow limits in a well adjusted balance.

The balance I am now about to describe was made by Mr. Wm. Shepherd, a skilful chronometer maker of Liverpool, who, in combination with Mr. Hartnup, agreed that the result of their experiments should be made known for the benefit of the public. The results of the discussion with Mr. Shepherd, who made several trials, were concluded by his making a balance of a circular form, so that the lamina of brass and steel might be increased to the requisite proportions with facility, and that the compensating and poising might be as easily affected as in the ordinary compensation balance. Secondly,—the balance must be so contrived that the compensating rim and weights should move towards the centre with an increasing velocity in an increasing temperature, whilst in a decreasing temperature they must recede from the centre with a gradually diminishing velocity. In the engraving, the rim is composed of a lamina

Hartnup's Balance.



of brass and steel, united as in the ordinary balance, the steel of which is bevelled or turned at an angle of 45° or thereabouts. The bar A, A, with the bars A, B, A, B, and also the bars B, C, are composed of brass and steel united as in the rim A, A, has the brass uppermost, and B, C, B, C, have the steel uppermost, and they are firmly joined at B, B. The compensating weights slide upon the rim as in the ordinary balance. Now the effect of the inclined position of the rim is thus:—The different expansion of the two component strips, carries the weights to and from the centre, and also up and down in a slanting direction, owing to the bevelled form of the rim. The slant takes off from the action of the rim, but this is increased to the proper amount at mean temperatures by setting the weights more forward so that the balance is compensated for small changes. So far the new construction acts exactly as the ordinary compensation balance. To show how the balance acts in extreme temperatures, first take the case of extreme heat—the ends of the bar A, A, bend downwards, and the ends of the bars C, B, curve upwards; and the compound effect of these two curvatures is to set the bevelled rim more nearly perpendicular to the plane of the balance, whence the effect of the compound rim in bringing the weights towards the centre is greater than it would have been in its more inclined position. Now, this tends to shorten the time of vibration of the balance. In the ordinary construction, a chronometer loses in extreme heat; the new construction, therefore, tends to compensate the losing rate in extreme heat. Again, in extreme cold, the ends A, A, bend upwards, and the ends of B, A, B, C, bend downwards, from the unequal contraction of the brass and steel strips which compose the bar. The effect of this compound action is to set the rim flatter or more nearly parallel with the plane of the balance. Hence the effect of the compound rim will be less effective in removing the weights from the centre than in the ordinary construction, and the balance will move more quickly. Hence, whilst in the ordinary construction loses in extreme cold, hence the new balance tends to compensate the error.

Mr. Hartnup found by experiments that chronometers furnished with the new balance are sufficiently compensated in all degrees of heat and cold, and for a great of which tables are given containing the rates of three chronometers to which these new balances were applied. The temperature ranging from 31° to 105°, the chronometers were tested for two months in mean and extreme temperatures of heat and cold, with scarcely any variation. These three chronometers were afterwards tried at Greenwich, and one of them (No. 228, Wm. Shepherd) was purchased by the Admiralty. The chronometer by Hornby in 1857, was tested in temperature from 31° up to 105°. The large chronometer by Blackie headed the list, with a new auxiliary compensation (description unpublished); and two chronometers of Poole's auxiliary compensation stood second and third, with a range of temperature from 23° to 95°.

In 1859, a chronometer by Campbell, of Liverpool, stood top of the list, with an unpublished alteration of the balance, Frodsham and Baker second, Dent third, with a range of temperature from 31° to 102°.

In 1860, a chronometer by Birchall stands first, with an alteration of the balance (unpublished), W. F. Birchall second, Muirhead, with Poole's auxiliary, third, with a range of temperature from 23° to 100°.

In 1861, McGregor, with Poole's auxiliary, heads the list, Webb second and third, with an unexplained auxiliary to the balance; a range of temperature from 27° to 104°.

In 1862, two chronometers with Kullberg's balances, the first one bearing the names Simpson and Roberts, the second one the name of the maker, Mr. Kullberg, the third, fourth and fifth chronometers were with Poole's auxiliary compensation; range of thermometer 21° to 104°.

In the year 1863, a chronometer by Fletcher, with auxiliary compensation, heads the list, Kullberg second, Webb third; the temperature ranging from 38° to 97°.

In the year 1864, a chronometer by Kullberg first, McGregor second, with Poole's auxiliary; range of temperature 32° to 97°.

In 1865, a chronometer by Webb first, Lister and Son second, with Poole's auxiliary, Dent third; temperature 32° to 100°.

In the year 1866, a chronometer by McGregor stands top of the list, Cairns second, Poole third, all with auxiliary compensation; temperature 31° to 101°.

In 1867, a chronometer by Sewell heads the list, Gowland second, with auxiliary compensation; range of temperature 30° to 95°.

In the year 1868, Birchall first, Fletcher second, with auxiliary compensations; temperature 36° to 96°.

In the year 1869, Fletcher first, Whiffen second; range of temperature from 39° to 100°.

In the year 1870, a chronometer by M. F. Dent heads the list, Chittenden second; temperature 38° to 95°. The small error of M. F. Dent's chronometer, in this year of trial, was noticed by the Astronomer Royal to have been the finest chronometer that had ever been on trial, it having made but the small error of 5·5 seconds as the difference between the greatest and the least, and 3·8 seconds the greatest difference between one week and the next, during a range of 62°. No description of the balance having been given in the published tests, the writer supposes it to have been a balance similarly constructed to the one exhibited by this firm at the Exhibition of 1862, of the following description:—M. F. Dent's new compensation balance, with outside auxiliary bows made much thinner than the ordinary lamina of the balance, the steel being outside and the brass within, reversing the metals for the auxiliary compensation-pieces or bows; this gives an increased error which the primary compensation is intended to compensate. The general effect of the balance is that the compensation power is greatly increased in high temperatures. The outside bows are quite free from bankings or check pieces acting upon the balance, which is the principal objection to compensation curbs.

In the year 1871, a chronometer by Charles Frodsham leads the list, with a new reversed balance, performing very nearly equal to M. F. Dent's chronometer in the previous year; temperature ranging from 36° to 94°.

In 1872, a chronometer by Kullberg takes the first place, with a flat rim balance without auxiliary, Hennessy second, McGregor third; these two chronometers having auxiliary compensation to the balance. Temperature 34° to 95°, a range of temperature of 51° only.

In the year 1873, a chronometer heads the list by Wiechert, with Kullberg's flat rim balance without auxiliary, showing the very small error of 3 seconds during any week of trial, and 5·1 seconds as the greatest difference between the greatest and the least. The second was a chronometer by Usher and Cole, Mr. Kullberg's being third; three very fine chronometers, the range of temperature was from 35° to 95°, a range of 60° only.

The balance of Mr. Kullberg is a modification of Mr. Hartnup's and Mr. E. J. Dent's balances, or a very great improvement on the principle of the balances invented by those gentlemen. It is composed of a compensated disc, the rim and centre-bar being all in one piece, thus doing away with the slotted centre-bar as in the Hartnup balance, and is so constructed that the weights shall act in a straight line to the centre, and that, as at the present time, performed better than any other chronometer at the Royal Observatory, Greenwich. The range of temperature has of late years not been so great, and this accounts for the beautiful performance of the selected few chronometers mentioned. No doubt there is not *appear* so difficult to make as the Hartnup balance, but it is far harder to construct, and will cost about treble the price of the balance of ordinary construction. How these balances will act in other parts and in higher ranges of temperature, remains to be seen before it can be said that chronometers with these balances shall surpass all others, as was the case in the last year of trial; the balance with an ordinary compensation performing nearly equal to the first, and surpassing the third chronometer in the last-due balance.

In concluding this Chapter, I must say that I can give no suggestions for trying the last delicate finish, to the compensation by any means acting upon the spring, which, for the sake of giving lasting good performance, must be perfectly free and undisturbed.

To be continued.

[I notice that in Example 2, Chapter II, by a slip of the pen, it is said that by shifting the weights backward they will be "*more* influenced," &c.; it should be, of course, "*less* influenced." I think the error is too obvious to mislead.—W. B. C.]

Personal Adornment.

"Extremes meet," and this proverb secures a broad illustration in the common use, by both barbarians and civilized nations, of articles of personal decoration.

Precious stones and precious metals are seized upon by both alike and pressed into an ostentatious use. And if the savage is behind the European in the heightened effect which art bestows upon the elements in question, he is not a whit behind in the vanity which they evoke. 3000 years ago the Egyptian wore his diamond "in the rough," while the civilization of the 19th century not only exacts it "cut," but is hypercritical upon the minutiæ of the cutting, and counts angles must not be departed from by a hair's breadth. The Indian appropriates the feather as plucked—the Parisian must needs have his "manufactured," and the length increased by a privy splicing and the curl exaggerated by manipulation. The first cannot ever find the costume "laid on too thick." The belle of civilization uses just that little which admits of but a "suspicion" of color, art to conceal art," but the mutual complacency is all the same.

Fashion which must needs assert her dictum in matters of pure adornment, as well as in dress, seems to have more than a fickle in so far as the precious metals and certain of the precious stones are concerned, but has always approved of their use.

Pre-eminently has she shown a tolerance for the diamond—its use she has never shown. Hence its commercial value is universally recognised, and especially so in these United States. Indeed it is something curious to see the unanimous recognition of a great value here by 40 millions of people. And it is this, which engenders the enormous consumption of diamonds we are witness to, and this cause will, we trust, ultimately perpetuate the same free use, increased indeed by larger population and greater wealth. And in this case the gratification of vanity secures a result of no mean practical character; for an apparent extravagance becomes a prudent investment, and while money would have slippers, the diamond perished gems are held on to, and in a moment of need are found convertible, and that even with profit, while the other replaces have become faded, worn and worthless.

Let us then encourage an expenditure, where pleasure and profit are found united.

"An Ethiop's Jewel."

The largest diamond yet found in the African mines, weighs 288½ carats. It is of the first water, perfection, slightly tinged and will lose no more than half its weight in cutting. It was picked up by a boy who was working for the——, and who felt himself compensated by a present of little value. £10,000 was often refused for the stone in the mines. At present it is not offered for sale.

In color it is a pale straw tint, and apparently there are no flaws or spots in it.

While no standard, it is impossible to define the real value of this enormous gem.

The gold price of silver bullion has again got so low that the fractional silver coins of the United States are not worth any more in gold than greenbacks. Nowish, standing the much ridicule a year ago of Secretary Richardson's proposal to issue greenbacks in silver half dollars it is desirable to have silver fractional coins in circulation instead of the postal currency, if possible. The low price of silver in Europe promises to be permanent, and in this connection two new silver coins for immediate circulation are talked of as likely to be authorized at the next session of Congress, one a twelve and a half-cent piece, and the other a twenty cent piece. In fact, an attempt was made at the last session of Congress to get the last mentioned coin authorized, and the recommendation was favorably reported upon, but in the hurry of the close of the session the bill was neglected and was not passed.

Selections from Saunier's Traite d'Horlogerie.

Translated for The Jeweler's Circular.

BY A. SIBON.

THE CYLINDER ESCAPEMENT. THE CHORD OF THE ARC OF THE INCLINE SHOULD PASS THROUGH THE CENTRE OF THE CYLINDER.

Every watchmaker is aware that shocks are causes of wear, and loss of power. They also know the injurious influence of drops on the extent of the vibrations, and how difficult it is to obtain a correct performance with an escapement having heavy drops, especially when the outside one is the greatest. The outside drop has more influence on the performance of an escapement than the inside one, for two reasons, First, it is made on the extreme of a longer lever of resistance. Second, the friction on the point of the tooth at the moment of contact is of the kind which may be called backward friction, the resistance of which is more powerful than that produced on the inside. This backward friction and heavy drop explains why a cylinder always wears quicker on the outside rest than it does on the inside one.

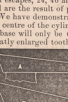
To avoid all drops, except the amount necessary for safety of action, it is strictly necessary that the centre of the straight inclined plane should correspond with the centre of the cylinder, the outside drop will always increase as we deviate on either side of this line. It is spoken of here as the straight plane, because it represents the diameter of the cylinder, and it is evident that the curved plane will be a little beyond, as may be seen at H, Fig. 17.

The old masters made the centre of the straight plane to pass a little beyond the centre of the cylinder so as to have the point of rest on the tangent, but their successors found that they were wrong, that they lost more by the increase in the outside drops, than they gained by causing less friction on the rests. At the present day some men have pretended that they obtain a greater regularity of action by having the centre of the plane of impulsion a little to the one side of the centre of the cylinder. Such results were frequent enough when the cylinders were not sufficiently opened, and showed that the proportions of the escapement were defective, since it was necessary to increase the intensity of the friction in order to establish a proper relation between the power and the resistance, and which was simply counteracting one defect by the introduction of another. The most favorable position of the tooth of the wheel on the cylinder is when the line drawn from the back of the tooth to its point passes through the centre of the cylinder, and in escapements so made, when the vibration of the balance is impeded or is not sufficiently extended, we must look for some defect in construction, or unequal proportion between the different parts in relation to the motive power. With very few exceptions, we have found that by having the incline beyond the centre, the total vibration was seldom increased in proportion to the number of degrees added to the angle of escape, and that such escapements were more sensible to the variations occasioned by oil, &c., and by having the incline to the one or the other of the centre of the cylinder, many degrees of vibration were lost if the cylinder was too much opened.

THE HEIGHT OF THE INCLINED PLANE AND THE ANGLE OF ESCAPE.

Different authors disagree concerning the angle to be formed by the base of the tooth and its inclined plane. Wagner says that it must only be 6 degrees. Leroy and Le Moinet, near 10 degrees, and Tavan says it should be 12 degrees. Each of these quantities representing the half of the escape on each side, or the quarter of the total real escape. By reason of the geometrical position which demonstrates that all angles having their summit at the centre of a circumference, have for their measure the arc intercepted between them, while the angle having its summit at the circumference has for measure the half of the same arc, we can see that if the angle R S N, Fig. 17, is 12 degrees, the angle R M N will only be one half, or 6 degrees. Consequently, the angle formed by the inclined plane of a tooth of a cylinder scape wheel and its base, is always equal to the half of the angle of escape on one side only, or what is the same thing, to the quarter of the real total escape. Then we will have for the various total real escapes, 24, 40 and 48 degrees. Such contradictions exist only with some authors and are the result of principles falsely applied.

We have demonstrated that the centre of straight inclined planes must pass through the centre of the cylinder, but then it happens that the angle formed by the plane and its base will only be 6 degrees if the escapement is to be tangent. A, Fig. 18, is a greatly enlarged tooth of a cylinder scape wheel, formed after the rule which prescribes the rest on the tangent. B, is the same tooth formed after the rules adopted in practice. it is clearly seen at first sight that it is impossible to obtain good performance with cylinder wheel teeth formed as in A. Manufacturers in Geneva, not very long ago, had concluded that the cylinder escapement could perform better by reducing the height of the incline to its lowest minimum. Nearly all the watches so constructed performed badly. Watch repairers unanimously declared that as soon as the oil thickened, those watches lost their vibration, although they had an escape of 30 degrees. They also required very powerful mainsprings and had to be cleaned very often.



ACCELERATING AND RETARDING FORCES.

The action of the cylinder is double during the escape, the motive power accelerates the motion of the balance, and during the rest this same force retards its motion. We will call these two forces accelerating and retarding. The extent of the motion of the balance depends entirely on the proportion between these two forces, and when once determined with a given motive force, this proportion must vary with every change in the motive force. We all know that if we press on the centre wheel of a cylinder watch, the vibration of the balance wheel will at first increase considerably, and then diminish suddenly, and finally it will stop altogether. This is due to nothing else than the accelerating force predominating at first, which is soon overcome and completely annulled by the retarding force, or the pressure of the scape teeth on the cylinder.

THE HEIGHT OF THE PLANES OF IMPULSION VARIES WITH THE DIFFERENT SIZES OF WATCHES.

The proportion between a large and a small watch being taken into consideration, the height of the plane of impulsion must be higher in the small watch than in the large one. small balances have a quicker angular motion than large ones. They fly more promptly under the touch of the wheel, hence the necessity to have less teeth in the wheel, or increase the hight of the inclined planes. In opposition to the quicker motion of the balance the angular motion of the scape wheel, or rather its facility of starting seems to be in an inverse ratio to the size of the watch, and which must be attributed to the resistance produced by friction, and from the thickening of the oil, resistances which are very sensibly felt in consequence of the small amount of power which actuates the last wheel in the train of a small watch. The weight of the balance must also be taken into account in connection with the hight of the inclined planes, but this is generally admitted by all at the present day. We have seen many small watches with scape wheel teeth formed as in A, figure 18, which could not be regulated till the scape wheels were replaced by others having their teeth formed with a higher incline, like B, figure 18

INFLUENCE OF THE WEIGHT OF THE BALANCE ON THE HIGHT OF THE INCLINED PLANE.

The force of inertia of bodies is in the ratio of their weight. If we take two pendulums of the same length, one having a heavy ball and the other a light one, and suspend them properly and well insolated the one from the other, we will observe that on being put in motion, the pendulum with the light ball will stop first, while the other with the heavy ball will continue to vibrate for some time longer, If we now take two balances without hairsprings, or banking pins, and with pivots of equal size, in face alike in every particular, except that one balance has a much heavier rim than the other, we will notice that on starting them, the light balance will stop in a few seconds, while the heavier one will continue in motion some time longer. The same effect will be produced if the two balances be provided with proper hairsprings. These results are in accordance with the known laws of inertia, and domonstrates that (325) with a light balance, (that is one having very little weight as those of very small watches for instance), it is necessary. First, That the impulsion be repeated more frequently. Second, That the accelerating power be proportionately greater. Third, That the friction on the rest be reduced.

326. The balances of large watches having by their size a certain weight, they require in proportion to the small balance. First, A greater force to put them in action. Second, Less power to maintain this motion. Third, An impulsion not so often repeated since a heavier balance maintains its motion longer. Increasing the hight of the inclined planes in small escapements is the alteration required by the Second and Third proposition. Paragraph 325. As for the First, every watchmaker has experienced that it is impossible to regulate small watches, unless the balance has a considerable number of vibrations, more than large watches have. Finishing the hight of the inclined plane in large escapements is the alteration required by the First and Second propositions in paragraph 325, since it makes the start easier while requiring less force. As for the Third proposition, it is known that if small watches have 19,000 vibrations, it is necessary that watches of ordinary size have 18,000, and that 17,000 and even 16,000 is sufficient for large cylinder watches. We have always understood, that if in small watches there was a necessity to increase the number of vibrations in one hour, and if the balance has oscillation less extended than in the large watches, it is on account of lightness of these small balances which have only a very small power to overcome the resistance of air, oil friction, &c. From observations and experiments we have made, and which would be too long to enumerate here, we have completed the following table which gives the proper hight of the inclined plane of cylinder scape wheels, for various sizes of watches.

The hight of the angle of the incline must produce.

	About	20	degrees	of escape on one side.
For large watches	"	40	"	of total real escape.
	"	35	"	of apparent escape.
	"	25	"	of escape on one side.
For medium size	"	50	"	of total real escape.
	"	40	"	of apparent escape.
	"	30	"	of escape on one side.
For small size	"	60	"	of total real escape.
	"	55	"	of apparent escape.

These figures are not to be considered as strictly correct, for whatever care may be bestowed on the execution of two watches, we may be almost certain that the scape wheels of both watches will not be actuated with the same force, but as the difference cannot be great in well executed work it will always be an excellent guide. As a general rule there will always be less inconvenience with an incline a little higher than one lower. It is very essential to remember this last remark, especially as regards many cylinders made at the present day. Being mostly made from poor steel and with lips only half polished, and with cylinder wheels whose teeth are sometimes not polished at all, the friction on the rests is very considerable, and it is indispensible if we want such escapement to perform well, to have a higher incline plane.

THE OPENING OF THE CYLINDER.

As we have already seen, various authors have a diversity of opinion regarding the opening of the cylinder, which varies from 180 to more than 200 degrees. In the practice of our life time, we have adopted a little less than 200 for the part left whole. With a cylinder much cut, or as is commonly called much opened, the vibrations of the balance is shorter. With a cylinder not enough cut, that is more closed, the surface of the rest being more extended, the escapement will feel the effects of oil, &c. more readily. These two extremes have both their inconveniences, and we must find some intermediate point. This point cannot be particularly stated, for it is a consequence of the resistance occasioned by the pressure of the scape wheel teeth on the rests of the cylinder. If the friction has certain amount of roughness, we must lessen its extent, and do the contrary in the other case. In watches made at the present day, the opening of the cylinder generally 200 degrees power is sufficient, the arc of vibration of the balance is not under 265 degrees. With the dimensions of balance now in use such an oscillation is necessary and produces good performance in the watch.

Let us take one of those watches and cut its cylinder so as to have only 185 degrees. Everything except the opening remaining in the same condition, the impulse given to the cylinder being represented by the hight of the inclined plane, will remain with the opened cylinder what it was before it was opened. It is not necessary to demonstrate that if the impulsions are equal in the two cylinders with openings of 185 and 200 degrees respectively, the infallable result will be that the supplementary ares on one side will terminate from 6 to 8 degrees sooner, which makes about 15 degrees to be deducted from the total vibration of the cylinder with the greatest opening, which decrease of vibration we must certainly not disdain. We must not forget that we must always have the largest vibration possible, because a large vibration can only give to the balance the power necessary to overcome all the resistances to which it is subjected, a fact of which the advocates of cylinders with large openings, do not seem to realize.

To be Continued.

Hints to Watchmakers and Jewelers.

COLORING GOLD.

Wet color for Etrusean gold jewelry, French color.—8 ozs. saltpetre, 8 ozs. salt, 8 muriatic acid, 2 soft water.

American color is almost alike :—8 ozs. saltpetre, 4 ozs. salt, 2 ozs. sal. am. 4 ozs. muriatic acid, 2 ozs. water. Same treatment as before.

This is sufficient for 6 ozs. jewelry. The work which has been annealed, boiled in sulphuric or muriatic acid pickle, and washed with fine pearlash in water until it is thoroughly free from dirt or grease etc., should be connected in five or six clusters loosely, by means of thin silver wire, then annealed and left black. Take a piece of strong silver wire, make a circle a little less in diameter than the top of the black lead crucible (which should hold about a quart,) and make a bail to it about a foot high, suspend the clusters on the circle. The work is now ready to dip.

Pound the saltpetre and salt fine ; mix them well together by means of the 2 ozs. water, and place the pot on the fire in the forge. When the mixture simmers add the acid, which will immediately commence to boil. Now dip the work and move gently up and down for three minutes, then remove it from color, plunge it in a basin of hot water (the basins should be earthenware) ; plunge again in another basin of hot water, then dip again from half a minute to one minute in the color, then rinse until entirely free from acid. Should any black spots show on the soldered parts, add 2 ozs. hot water, and dip half a minute more, and rinse as before ; after this place the work in water sufficient to cover it, and add to the water about an ounce of liquid ammonia, let it remain about ten minutes. Then dip in alcohol and dry in boxwood saw-dust. The pot should be emptied in an earthenware vessel and saved for another time.

In all these recipes, unless otherwise expressed, the constituents named will always mean fine gold, fine silver, and refined copper, unless the contrary is stated.

No. 1, 17k.—Gold 15 dwts ; silver 1 dwt 10 grs ; copper 4 dwts, 17 grs.

No. 2, 18k.—Gold 1 oz ; silver 4 dwts., 16 grs ; copper 2 dwts., 6 grs.

No. 3, 18k.— old 15 dwts ; silver 2 dwts., 4 grs ; copper 2 dwts., 19 grs.

No. 4, 18k.—Gold 15 dwts ; silver 2 dwts., 18 grs ; copper 2 dwts., 18 grs.

No. 5, 18k.—Gold 1 oz., 6 grs ; silver 3 dwts., 10 grs ; copper 4 dwts, 12 grs.

No. 6, 19k.—Gold 1 oz ; silver 2 dwts., 6 grs ; copper 3 dwts., 12 grs.

No. 7, 20k.—Gold 1 oz ; silver 2 dwts ; copper 2 dwts., 4 grs.

No. 8, 22k.—Gold 18 dwts ; silver 12 grs ; copper 1 dwt., 3 grs.

Or, Take English sovereigns, which are 22k. fine, but they have too little copper to wear well.

SOLDER FOR ABOVE ALLOYS.

In making gold solder for the foregoing alloys, take of the alloyed gold which you are using 1 dwt ; silver 6. grs. Or, Gold, alloyed as before, 1 dwt. ; silver 3 grs. ; copper 1 gr.

ALLOY FOR DRY-COLORED RINGS. 17 K.

Gold 1 oz. ; silver 4 dwts., 6 grs. ; copper 4 dwts., 6 grs.

SOLDER FOR THE ABOVE.

Scrap gold 2 ozs. ; silver 3 dwts. ; copper 3 dwts.

OF DRY-COLORING THE FOREGOING ALLOYS.

This is done as follows:—Having your work well polished, take of saltpetre, alum, and salt in proportion to the work to be colored ; ray for 2 oz. of work, as under, viz.—Saltpetre 8 oz. ; alum 4 oz. ; salt 4 oz. Procure also a blacklead pot, four or five inches high, or an iron pot cast from a blacklead pot ; one or two sizes will be useful. To perform the process of Dry-Coloring, you must have a thin iron bar to stir your color when dissolving. Your work cannot be too well polished ; it is then cleaned with soda, soap, and hot water, and dried in box-sawdust. It must be afterwards covered with a thin layer of borax ; annealed and boiled out, and again dried in box-sawdust ; and finally hung on platinum, or fine silver wire. When the color is in the pot, it is placed in the fire on a forge, and blown with bellows ; it soon boils up. The heat cannot be too strong. When it assumes a brown-yellow flame, the work is dipped in the fire two or three seconds, and quenched in hot water diluted with muriatic acid, which removes any color that may adhere to the work. This ought to produce the color required; if it does not come, the same process must be followed again ; but the work must be well dried before going into the color, otherwise it will fly about, the burn or scald from which is very severe. Indeed, it is recommended to wear an old glove to save the hand. The color-pot must be emptied immediately upon the forge, so that it may be ready if required again. In this process ot coloring it is necessary to be very quick, whereas in Wet-coloring it takes time. The waste color may be thrown into the sweep, as the gold lost is trifling.

WET COLORED GOLD ALLOYS.

No. 1, 15k.—Gold 1 oz ; silver 3 dwts., 12 grs ; copper 2 dwts 9 dwts.

No. 2, 14k.—Gold 1 oz ; silver 4 dwts; copper 0 dwts., 12 grs.

No. 3, 14k.—Gold 1 oz ; silver 4 dwts., 12 grs.; copper 10 dwts.

No. 4, 13k.—Gold 1 oz ; silver 4 dwts., 12 grs ; copper 10 dwts., 12 grs.

GREEN GOLD FOR FANCY WORK.

No. 5, 18k.—Gold 1 oz ; silver 6 dwts., 16 grs.

GREEN GOLD.

No. 6, 20k.—Gold 10 dwts ; silver 2 dwts., 2 grs.

GREEN GOLD.

No. 7, 19k.—Gold 5 dwts ; silver) dwt, 12 grs.

RED GOLD FOR FANCY WORK.

No. 8, 16k.—Gold 5 dwts ; copper 2 dwts., 12 grs.

RED GOLD.

No. 9, 19k. (20 k so-called)—Gold 5 dwts ; copper 1 dwt., 6 grs.

To make gold solder for the foregoing alloys, take of the alloyed gold you are using, 1 dwt ; silver 6 grs. Or, 5 grs., of silver and 1 gr. of copper may be used.

ANOTHER SOLDER.

Gold alloyed 1 dwt. ; silver 5 grs. ; pinchbeck 1 gr.

This solder is good for repairing, and will not disturb the solder first mentioned. It will color well.

ALLOY.

No. 10, 15k.—Gold 1 oz., 18 dwts ; silver 12 dwts., 12 grs ; copper 10 dwts.

No. 11, 14k.—Gold 1 oz ; silver 8 dwts.; copper 4 dwts.

No. 12, 14k.—Gold 1 oz ; silver 6 dwts; copper 8 dwts.

No. 13, 13k.—Gold 1 oz ; silver 4 dwts., 12 grs., copper 10 dwts., 12 grs. This is usually employed by the London jewelers for their 14k work.

VERY FINE COLOR.

No. 14, 16k.—Gold 1 oz ; silver 6 dwts.; copper 4 dwts.

GOLD SOLDER FOR THE ABOVE.

Gold scrap 1 oz. ; silver 3 dwts.

METHODS OF REDUCING ENGLISH SOVEREIGNS TO LOWER FINENESS.

No. 1, 14k.—Coins 1 oz.; gold 8 oz. ; silver 2 oz.; copper 4 oz., 14 dwts.

No. 2, 14k.—Coins 1 oz ; gold 2 oz ; silver 13 dwts ; copper 1 oz., 11 dwts.

No. 3, 14k.—Coins 2 oz ; gold 5 oz. ; silver 1 oz., 9 dwts., 12 grs., copper 11 dwts., 12 grs.

No. 4, 13k.—Coins 2 oz. ; gold 5 oz. ; silver 1 oz., 14 dwts ; copper 4 oz., 2 dwts

No. 5, 13k.—Coins 2 oz. ; gold 8 oz. ; silver 2 oz., 3 dwts ; copper 5 oz., 3 dwts.

No 6, 15k.—Coins 4 oz. ; gold 6 oz. ; silver 2 oz., 2 dwts ; copper 5 oz., 2 dwts.

To be Continued.

Curiosities of Clocks and Watches.

By Edward J. Wood.

The English watchmakers had by the reign of Charles I. risen to such importance, that in the year 1631 they gained a charter of incorporation under the name of the Master, Wardens, and Fellowship of the Art of Clockmaking of the City of London, and by which charter all foreign clocks, watches, and alarums were forbidden to be brought into the country. David Ramsey, who had been clockmaker to James I., was, as we have before stated, appointed the first Master; and watches made by him, and by Edward East, David Bouquet, John Midnall (about 1650) Robert Grinkin (who made the watch attributed to Cromwell, in the British Museum), Benjamin Hill, and other early members of the company, are still extant. Some of their watches are round and others oval, for the latter form continued to be occasionally employed until towards the close of the seventeenth century. The journals of the Company show that in 1635 a brass watch was of the value of forty shillings, and in the following year another watch was of the value of 4*l.* Respecting the early prices of watches little is known; but in 1643, 4*l.* were paid to redeem a watch taken from a nobleman killed in battle.

In Hollar's interesting set of plates of the 'Four Seasons,' dated 1641, the lady representing Summer has an egg-shaped watch on her left side, depending from her girdle. And Mr. Whelan had a small silver watch of the same form, and but little subsequent in date. The dial was engraved on a flat plate of silver,; it had Roman numerals, with a stud at the base of each; and the steel hand terminated in a fleur-de-lis. On the plate at the back was engraved the maker's name, "Phillipe Grebay á Londres," which told that it was the work of a Frenchman. Probably the works had been renewed at comparatively late period, for a chain took the place of the more primitive catgut. The cover was provided with a stout concave-convex glass, set in a steel rim, and held in its place by three studs. The keyhole was protected by a crescent-formed plate moving on a pivot. At a meeting of the British Archæological Association, held on March 26th, 1855, Dr. W. V. Pettigrew exhibited an oval silver watch of about the middle of the seventeenth century, very similar to the one belonging to Mr. Whelan, and described above, and which also was exhibited to the same Association, in 1855. Within the circle of Roman numerals was engraved a view with a pedlar and dog crossing a bridge; and outside the circle the plate was adorned with rich foliage in niello work. The interior of the watch was well finished, but catgut was used instead af a chain. On the back plate was inscribed the maker's name and address, "Hans Conrad Elchinger fec. Amsterdam.

At a meeting of the Archæological Institute, held on April 13th, 1855, Mr. O. Morgan exhibited a gold enamelled hunting-watch, of about 1630 or 1640. The four subjects on the front, back, and inner side of the lid and case, represented the chief incidents in the Episode of Tancredi and Chlorinda, in the 'Gierusalemme Liberata' of Tasso. At a meeting of the same Institute, held on February 6th, 1863, Lord Torphichen exhibited a curious clock-watch striking the hours, and of skilful construction, with the name of the maker, Samuel Aspinwall, engraved upon the works. It had then lately been found at Lord Torphichen's seat, Calder House, Mid Calder, with other objects of value, in an old cabinet, which had not,been opened for nearly a century. The outer case of the watch was of steel, wrought in openwork studded with silver; the inner case was of silver, likewise of openwork, and among the ornamental details were an eagle, a rose, and a lily. The dial was of silver beautifully engraved, the subject being the Accusation of Susannah by the Elders. There was only an hour-hand; the hours were struck on a fine-toned bell, serving as an inner case within the pierced work. The watch measured about two-and-a-half inches in diameter, by one inch in thickness. There were two seals appended, one of steel, the other of jasper, engraved with the armorial bearings of the Torphichen family. The date of this watch was about 1650 or 1660. The silver pierced work of floral designs was much in vogue in the time of Charles I. It had a hair-spring and regulator, also a very fine chain, which might have been added in place of the original catgut about 1675. The name of Samuel Aspinwall is uncommon, but in 1675 Josiah Aspinwall was admitted a brother of the Clockmaker's Company,

In the South Kensington Museum is a gold enamelled watch, with the subjects of the Holy Family, after Rubens, and the Virgin and Child, after Mignard, on the exterior. The inner sides of the case contain respectively portraits of Louis XIII. and of Cardinal Richelieu. It is of French work, about 1640–50. The diameter is two inches and a quarter. It was purchased for 20*l.* At a meeting of the Society of Antiquaries of London, held on June 5th, 1862, Mr. Frederick Ouvry exhibited two watches bearing portraits and arms. These watches were the work of a Frenchman named Venus Martin, of the time of Louis Quinze.

Lady Fitzgerald possesses a gold enamelled watch, manufactured by order of Louis XIII. as a present to our Charles I., which may rival a modern work for its smallness. It is oval, measuring about two inches by one inch and a half across the face, and is an inch in thicknes. The back is chased in high relief with the figure of St. George and the Dragon. The motto of the garter surrounds the case, which is enriched with enamel colors.

A silver alarm clock-watch of circular form, which belonged to Charles I., and was usually placed by him at his bedside, is now in the possession of Mr. W. Townley Mitford. It was presented by the king to his faithful and attached servant. Mr., afterwards Sir, Thomas Herbert, on his way to execution at Whitehall, on January 30th, 1649. "It came into possession of my family," says Mr. Mitford, "by intermarriage with the Herberts, about a century ago. Since that time it has remained in our possession." Parts of the interior mechanism of the watch were modernised about 50 years ago, and the original catgut cord was replaced by a metal one. The outer case of fine perforated work, enclosing two silver bells, on which the hours and quarters are struck, remains unaltered. "Edward East, London," is engraved inside. His name is among those of the ten assistants of the Clockmakers' Company on its first incorporation in 1631; and he gave by deed of settlement, dated June 20th, 1693, the sum of 100*l.* to the Company, in trust to pay annually to five poor laboring workmen of the art or mystery of clockmaking, who were freemen of the City of London, or to the widow of each of such workman the sum of twenty shillings. Lady Fellows has an octangular crystal-cased watch, with an engraved dial of a recumbent female figure holding an hour-glass. The maker was Edward East. Another watch by the same maker belongs to Mr. W. A. Sanford. It is of silver, in the form of a cross, and has a crystal face, the dial being engraved with the Crucifixion and angels. It has a plain outer case of the same form. He is mentioned as the king's watchmaker, living in Fleet Street, in the 'Memoirs of the two last Years of the Reign of that unparalleled Prince, of ever blessed memory, King Charles I., by Sir Thomas Herbert, 1702. These memoirs contain a very particular account of the various articles presented by Charles just previous to his decapitation, and also many allusions to the relic now possessed by Mr. Mitford. It appears that the King had two watches, one of gold and the other of silver, which he customarily wound up before going to bed; and they were placed before a lamp on a stool near his bedside. On the morning of his execution, as he went from his palace, he bade Sir Thomas Herbert bring him the silver clock that hung by the bedside. In the park he asked him what the time was, and then, taking the watch in his own hand, he gave it to Herbert, and told him to keep it in memory of him. This watch, which is beautifully chased and engraved, is about three inches in diameter, and about one inch and a quarter in thickness. The back and front of it are engraved in the "Sussex Archæological Collections," vol. iii. p. 103; and in the 'Archæological Journal,' or 1850.

A Superb Work in Silver.

True art work in solid silver marks a high development of art, and we have reason to congratulate ourselves that there are so many American houses that are turning out work in this department which may challenge comparison with any in the world. The well-known Whiting Manufacturing Company, of No. 181 Broadway, is fortunate in having in its employ a designer who has one of the rarest gifts for this sort of work at his command, his line. There is now on exhibition at their warerooms, a superb piece of work by this gentleman, Mr. Charles Osborne, which has been manufactured by the company, not for sale, but as a specimen of their work. The splendid triumph of the silversmiths' art illustrates the fairy story of the sleeping beauty, as retold by Tennyson, in his beautiful "Day Dream." It is a centre-piece, with outer stands as receptacles on either side. The body of the piece represents the couch of the sleeping princess, a rich canopy, crowned with a tilt-taff, above her, and by her side the knightly prince, kneeling to give the awakening kiss. The figure of the princess is very lovely, as she lies with shut eyes and outstretched life, the long hair growing to her feet, and in the accessories the art of the cunning worker in silver has been exhausted. The variety of finish is remarkable. By the use of different mattings, of parts of gilt, of the satin finish, and of various processes of oxidation, the very texture of every part is given with wonderful success. The rich drapery above, the "silk star-broidered counterpane," the *coulence*, the cloth of gold carpet which leads from the couch, and falls gracefully to connect this part of the design with the base below the tesselated pavement, and all these are copied with the most exact impicturing in such a distinctive dowler in the sleeping palace.

"Here sits the butler with a flask;
Between his knees half-drained; and there
The wrinkled steward at his task;
The maid of honor blooming fair;
The page who caught her hand in his:
His eyes are severed as to speak:
His arm, pat posted to a kiss:
The blush is fixed upon her cheek."

These dishes are surrounded by a border of griffins in full relief, which is very rich and ingenious. The entire consistency of the design is very noticeable, and the designer has succeeded wonderfully in telling so completely, with such limited means as the lack of color allows the pleasant tale. One year's work has gone into this splendid show-piece, the chasing alone occupying six months, and costing about a thousand dollars. This work, after being designed carefully on paper, must be molded in wax, a sand mold taken from this, from which a brass model is cast. This is finished in every detail, and a second matrix made in sand from which the silver work itself is cast for the chaser. It is estimated that 85,000 worth of material and labor has gone into this piece. The exquisite beauty and thorough unity of its design, the perfection of its figure work, the richness of invention in details, and the wonderful variety of finish certainly makes it one of the finest specimens of silver-working art that can be seen on this side the Atlantic.

J. F. Fradley, manufacturers of fine gold and silver-headed walking canes, are making an almost endless variety of these goods for the approaching holiday trade. Mr. Fradley is a very excellent workman and his goods have a high reputation.

Mr. Solomon Rice, formerly with Messrs. Freund, Goldsmith & Co., has recently established himself, as an importer of diamonds, watches and jewelry, at No. 11 Maiden Lane. Buyers are invited to inspect his carefully selected stock.

The Growing Demand for Fine Diamonds.

Threatened as we are by the brilliant epidemic of the diamond fever, an estimate of the supply and demand of this article may be found interesting.

Before the diamond discoveries in Africa, the total amount of rough diamonds was estimated by competent authority at $40,000 carats per annum in the rough—or when cut, 120,000 carats. The annual demand for diamonds is of course difficult to estimate. There are the following great cities in the world where diamond setting is carried on to a large extent, and we give in a table the estimated amount set of worked into ornaments during each week:—

	Carats.
Paris	2,000
London	1,000
Vienna	500
New York and Brooklyn	500
Berlin	300
St. Petersburg	200
Frankfort	200
Florence	100
Philadelphia	100
Constantinople	200
Moscow	100
Birmingham	100
Boston	100
Rio Janeiro	100
Havana	50
Lima	50
Total	6,150

To this must be added amount set in India, 1,000 And total in the rest of the world . . . 1,000

Grand total per week	8,150

—or a total demand per annum for setting and working diamonds into ornaments, 423,800 carats.

As the above estimate is extremely moderate, there is no exaggeration in assuming that the annual requirements for diamonds exceeded the supply before the African discoveries. It is even doubtful whether the 240,000 carats of rough diamonds produced before the African discovery really yielded more than 100,000 carats of cut or polished brilliants. Since the discoveries of diamonds in Africa the total amount of yield per annum has been augmented by at least 240,000 carats in the rough state. The total annual production at present would therefore be:—Rough diamonds, 440,000 carats, which, when reduced by cutting and polishing, would yield 220,000 carats as brilliants.

The startling question arises, how can a demand of 423,000 carats have been supplied five years ago, by say 120,000 carats brilliants produced? Or, how can even now a demand of 423,000 carats of brilliants be adequately supplied by 220,000 carats of production?

Our readers must bear in mind that the diamond is indestructible. Gold, for instance, is perishable, as it is calculated that ten per cent. of the annual production of gold, to use a quaint term, evaporates, in gilding, mixing with other metals, etc. This does not include gold used in ornament or watches, inasmuch as this portion is in a collectable state of existence.

Diamonds, on the other hand, are indestructible, and their accumulation is therefore enormous.

Since 1774, a period of 100 years, the mines in Brazil have yielded an average of 150,000 carats per annum in the rough, or say 75,000 carats net cut brilliants, or a total of 7,500,000 carats. Of this vast amount perhaps not 500,000 carats have been destroyed, as the destruction of a diamond can only take place in a total loss at sea or river. It is therefore perfectly intelligible that of the vast amount of diamonds used annually in ornaments, the greater portions are simply reset, and have existed for ages.

Rich families become poor, and their diamonds are thrown on the market—dynasties fall, and their diamonds go to the auctioneer's shop. The Bonaparte family alone threw on the market £250,000 worth of diamonds. When young Bomba of Naples was driven away by Garibaldi in 1860-61, he sold over a million dollars' worth of diamonds. In short, if by some impossibility the whole amount of diamonds now existing could be kept in the owners' possession for one short year, the scarcity of diamonds owing to the demand of new purchasers would run up the price of brilliants to three times their present value.

A great revolution in the demand for diamonds has taken place since 1850. The great gold discoveries in California and Australia, the immense accumulation and diffusion of wealth that has followed the numerous new started industries, has had the effect of making the diamond a popular possession and almost a necessity.

In short, the comparatively few rich exclusive wearers and possessors of diamonds before 1850 has been augumented by the pleebian millions, or, where thirty years ago only fifty people in a community indulged in the ornamentation of diamonds, 10,000 have risen, who, on a much smaller scale (very true), have taken to wear them.

Nature, too, ordained it so that of the diamonds found very few comparatively are of a fine white color. And it is no doubt owing to this very fact everybody is anxious to get a fine white diamond.

Artificial Diamonds.

Here it is again, another new process has been invented, we are told, for the manufacture of pure artificial diamonds from benzine—not the kind meant in our police reports when we say a man has imbibed too much benzine, but the genuine article. Benzine is introduced into a glass shell about six inches in thickness, and capable of standing enormous pressure. Another substance having a strong affinity for hydrogen, but the name of which is kept secret, is introduced with it. The poles of a moderately strong battery are also introduced, and the whole hermetically sealed. As decomposition takes place slowly, the hydrogen unites with the substance for which it has an affinity, and pure, colorless carbon is set free, and in course of time forms in the shape of diamonds of various sizes on the interior sides of the glass shell. The only question is, if the hydrogen unites with the secret substance introduced, for which it has an affinity, and the carbon set free, whence is derived the enormous pressure which is claimed to be essential to the success of the process? Unless, perchance, this substance is also decomposed and sets free another gas which has no affinity for carbon.

Enterprise.

There is, perhaps, no other commercial undertaking which requires more careful management, and judicious enterprise to ensure success, than the manufacture of jewelry. It ranks, so to speak, among the creative *metiers*, requiring taste, originality, assiduous watchfulness in manufacture, and, with all civilized nations as competitors in the market, a constant study of the world's production is requisite to keep well posted on the never-ceasing introduction of novelties, both as regards working machinery and designs.

The manufacturing jeweler who neglects to cultivate this taste will soon be left behind, and should his fame be ever on the wane it is almost hopeless for him to regain the lost ground. We take great pleasure in referring our readers to the advertisement of Messrs. Miller Bros., a firm who began their business career more than twenty years ago, who, by strict integrity, promptness and commercial ability, which marks all their business transactions, have attracted a good connection and established a sound business. Their manufactory contains an almost unrivaled selection of the very best machinery, and a host of ingenious mechanical contrivances of their own invention, which gives them an advantage over the slow and expensive processes usual among less ingenious manufacturers.

Messrs. Miller Bros., confine their efforts to one of the most important branches of the goldsmith's art. The manufacture of *initial goods*, and kindred articles of personal adornment, of which they have an almost endless variety of designs, suitable for all classes of buyers.

Success.

We desire to call the attention of our readers to the advertisement of Samuel C. Jackson, the well-known manufacturer of artistic boxes and trays for watches, jewelry and silverware. By patient industry, and conscientious workmanship, Mr. Jackson has established a sound and prosperous business, and it would be exceedingly hard to find a more attractive assortment of goods than he offers. Mr. Jackson is constantly introducing the most artistic and novel designs in ebony show tray cases for watches, jewelry; silverware, etc., which reflects great credit on his enterprise and skill, and we are glad to state that such praiseworthy enterprise has met with its just reward.

THE

Jeweler's Circular,

A Journal devoted to the interests of the Watch and Jewelry Trade of America, and the organ of communication between all buyers and sellers in this particular branch of business

This Journal will be forwarded to any address in the United States and Canada, for $1.00 per Annum, payable in advance.

Correspondence solicited from all parts of the country, on subjects pertinent with the aim and object of the paper.

All communications should be addressed

D. H. HOPKINSON, 269 PEARL ST., N.Y.

Mr. George Newman, 79 Cheapside, London, our sole agent for the JEWELER'S CIRCULAR in England, is authorized to receive subscriptions and advertisements for this journal.

The Philadelphia Watch Co. have kindly consented to receive subscriptions for this journal, back numbers can be had on application at the Company's offices, No 618 Chestnut Street, Philadelphia.

NEW YORK, NOVEMBER 16, 1874.

Notice to Subscribers.

Our subscribers in the United States will please not pay their postage on this paper beyond January, 1875, the new Postal law recently imposed by Congress, requires the pre-payment on all mail matter at the office of publication. Subscribers will therefore please take notice that on and after January, 1875, the annual subscription of this journal will be increased to $1.25, which will include postage. The Jewelers Circular will be forwarded regularly every month, to any address in the United States and Canada on receipt of price.

The Business Outlook.

The great "cash squeeze" which some timid men predicted as sure to come this autumn, has not been heard of. Consistently with their theory, greenbacks have been kept "well in hand," lest at any moment there should come a glorious chance for big shaves. Therefore, investments of any kind, longer than sixty or ninety days, was out of the question, and so the banks have been crammed with musty promises to pay, from which, to be sure, there has been a partial relief within the last four weeks, while the crops are moving. Surveying the situation, there is the same langour, the same state of waiting; but there is improvement in this respect, that the "panic" which some had reasoned themselves into believing was periodical, is now a thing in the indefinite future, if not wholly vanished. There ought, therefore, to be a return of confidence, and a new start given to the wheels of trade.

A confidential circular, just issued by one of the commercial agencies, says—the depression in business, dating back anterior to the panic of last fall, and still prevailing, has left many merchants without sufficient employment for their capital. A number who had heretofore confined themselves to a regular trade, finding the accustomed profits resulting from investments in what are usually recognized as legitimate commercial adventures, had been denied to them, have yielded to temptation, and gone into speculative enterprises, which, though appearing well, and promising profitable results, have generally ended in losses, more or less severe. The fact that, when legitimate business is prostrate and non-productive, outside operations are extra hazardous, appears to have been lost sight of, or entirely ignored. The facts in our possession warrant the statement that not many of the heavy failures which have occurred recently, have been of a strictly commercial character. They have been chiefly due to outside operations.

Shortening Credits.

It is not so much how many goods are sold, but how much money is got back for them that tells the story when the merchant balances his books at the end of the year. Perhaps the cry of dull times this season means less than a good many croakers seem to think. In fact, our jewelers have this year brought out almost, if not quite as many novelties as ever, and although trade has been somewhat slow during the early part of this season, our merchants, we believe, will find when they count up the books, that the year's work has been quite as satisfactory as that of 1873. The dullness complained of has had the direct effect of shortening credits, and the general disposition in this direction has rid the trade of so many light paper men who have heretofore bought goods and not paid for them, that if the sales do not foot up so largely this year, the losses will prove disproportionately small. Many of our strongest houses have taken part in this movement against the chronic compromisers, and their action has had a thoroughly wholesome effect. These compromisers have at last come to the conclusion that they must pay as they go or go out of the trade and seek other fields and pastures for the exercise of their peculiar talents.

It has been customary to speak of jewelry as a luxury which people do without in hard times. The facts, however, do not confirm this now. It is curious that there has been very little falling off in the sale of the higher classes of goods, a fact which we have from the best authorities in the trade; and there is excellent promise that this year's trade, especially when the results of the Christmas season come to be reckoned in, will quite startle those who have been so fond of croaking. Our manufactures have become so well known also in other countries that we have no longer to depend entirely upon the home market for trade, and taking all in all, the American jewelry trade is entitled to be considered comparatively stable through whatever financial complications the country must pass.

There is, perhaps, no line of business in which credit has been more easily obtained than in the jewelry trade. Its very cheapness, and the leniency of dealers in giving credit and accommodation, seems to have encouraged dishonesty and built up a class of chronic compromisers such as no other trade is so much afflicted with, if we may judge from the number of dishonorable failures which have of late brought discredit upon the trade by their alarming frequency. In other trades, buyers who come to town are required to give satisfactory securities or at least references, but until very lately, even the larger houses in the jewelry business have pursued in this respect a weak minded policy which has done very much harm. Knowing that if they did not sell, other would, they have hesitated to investigate at all the purchaser's business and credit, and the result has been what was to have been expected. We believe that the times has at last come when all this will be changed. The general disposition is to shut down upon this sort of people without mercy, is another promise of the outlook on which too much emphasis cannot be placed, and there is reason to hope that the jewelry business of 1875 will be conducted on a safe basis and with real profits that shall redeem the trade from the old imputations which its black sheep have cast upon it.

The Mayoralty.

The tidal wave of the 3d instant swept into office a good many leading members of the jewelry fraternity. Our new mayor, Mr. W. H. Wickham, son of the well-known diamond importer of 24 Maiden Lane, the trade, knowing him through and through, are ready, whether they be democrats or republicans, to congratulate New York on the excellent selection it has made for its chief magistrate. Mr. David Dodd, of the firm of Carter, Howkins & Dodd, has been sent to the New Jersey legislature by his fellow-citizens of Orange, and the application of his well-known commercial ability to the service of the state will no doubt produce results of which his constituents will be proud. Mr. F. G. Whitney, of Whitney & Co., the well-known jewelers of Attleboro, Mass., will occupy a chair in the next General Court of Massachusetts, as the old Bay States curiously calls its legislature. It is not to be suspected that there will be any danger of rings from the election of so many members of the jewelry trade, notwithstanding what abominable punsters may say about them.

Early Closing.

A movement is on foot among the clerk's of the wholesale jewelry establishments of this city, to endeavor to induce their employers to close their stores at three o'clock on Saturdays, except during the one busy month of the year. The members of the trade have received this petition with general favor, and a large number of leading firms have given their sanction to this movement, provided its success proves to be general. Indeed, a number of them announce definitely that their stores will be closed at three o'clock on Saturday. We are very glad to see this movement in the part of the wholesale employers, for these last few hours of the week are those in which very little business is done in the wholesale houses, while it afford the clerks an opportunity for recreation and improvement which makes them better workers for the rest of their time. It is hoped that the example of those who have taken the lead in this matter will be followed by the rest of the wholesale jewelers, so that all those concerned in the wholesale trade will be afforded this opportunity for intellectual improvement and recreation.

Our Trade with Paris.

The Consul General of the United States at Paris will shortly publish a statistical extract of the export trade of Paris with the United States, for the year ending 30th September, 1874. Pending the appearance of this document, it may be useful to recall to our recollection some of the leading features of the report for the year commencing September, '72, and finishing September, '73. During that year the exports from Paris, compiled on the basis of the customary declarations made by exporters, amounted to thirty-six millions of dollars. The exports from Germany to the United States during the same period did not exceed thirty-seven millions of dollars. It will be observed that the trade of Paris is therefore on the par with that of the entire German Empire, with the United States. If we analyse our Consul General's statement, we find that nineteen millions of dollars out of the thirty-six, or more than half, consisted in *nouveautes*, and ladies' dresses. Silks figured in the statistical report for about two millions of dollars; and fancy goods, jewelry, hats, buttons, cloth, etc., made up the balance. What have been the exploits of the American fair sex in 1874 it is not easy to divine; but we think we may safely assume that the contribution they have levied on the sterner sex, and expended in Paris, will bear favorable comparison, as regards amount, with preceeding years. The average value of the trade between Paris and the United States, inclusive of sums expended by American visitors to Paris, may be roughly estimated at seventy-five millions of dollars per annum.

Editorial Jottings.

There is no need for alarm because of a few failures that occur naturally at this season of the year. Most of them are the far-reaching result of last year's panic. While the volume of trade is not so large as in former years, it is sound and healthy. Business is done on a cash basis, and on this foundation it is growing slowly but very steadily. Our merchants look for a continuance of the Fall trade until late in the season, and do not anticipate any serious reverses. The exercise of a little common sense will silence the croakers.

On the 3d of November, William Cullen Bryant completed his eightieth year. In the joy with which his fellow-citizens contemplate the advance of his serene and glorious age there is no tinge of sadness. No one who sees the hale poet in his daily walks ever looks forward to the day when the grand career will be ended. We are forced to disobey the precept of the Greek sage and call this life a happy one before it closes. There are no chances readily discernable, even to the eye of fancy, which can dim the tranquil beauty of the long and rosy evening promised to this great poet and good citizen. His birthdays are kept as holidays in the hearts of all who know him, and every succeeding one grows dearer and more sacred.

We have the pleasant duty of chronicling the tin wedding of Mr. Augustus K. Sloan, the well-known partner in the opulent firm of Carter, Howkins & Dodd, of Bond Street, which was celebrated at his residence No. 63 Lefferts Place, Brooklyn, on Tuesday evening, 27th ult., and proved one of the finest affairs ever given in our sister city. The invitations were sent out on tin-foil paper, and the whole entertainment was consistent with its occasion. The friends of Mr. Sloan, including many members of the trade, gathered in force, and the presents, of which there were nearly a houseful, were very noticeable. They included several tin watches, 18 carat cases, and the Amn. Watch Co. movement, with 10 carat tin chains; a tin hat in the very latest style of fashion, and other articles of bijoutry and virtue too numerous to mention. We heartily congratulate Mr. Sloan on the happy occasion, and the happy way in which it was celebrated.

The New York Assay Office furnishes some very interesting statistics in regard to our production of gold and silver. Thirty million dollars gold (bullion) were operated upon in the last eighteen months and $7,500,000 silver. The shipments of silver from New York to Philadelphia amount to several tons a month. Last year there past through the laboratory 40 tons of gold worth $20,000,000 dollars—as a ton, or 2,000 pounds of gold is 32,000 ounces, which at $16 per ounce, would be about $500,000 per ton of gold. Most silver carries gold, and the presence of gold is especially noticed in the silver ores of Utah and Nevada. The Assay office does not receive crude ores of any kind, only bullion, which signifies either coin or bars. Many of the jewelers sends samples of their goods to the Assay office in order to test their value. A few days ago a magnificent golden chalice from a Mexican convent was thrown into the crucible, and old family plate generally meets the same fate. During the last twenty years gold bars to the amount of over $219,000,000 and silver bars to the amount of $15,000,000 were manufactured in the New York Assay Office.

American Bronzes.

The manufacture of objects of art in this country has within the last ten years increased with a rapidity that surprises those who had hoped most for our art industries. We are not only supplying other countries with watches and jewelry, but we are beginning to produce American bronzes which compare favorably with the French importations which have heretofore held the market. Among the houses which have engaged in this branch of business, one of the largest and most successful, is that of the Archer & Pancoast Manufacturing Company, in whose large establishment, running from No. 70 Wooster to No. 67 Greene streets, all the processes are

concentrated, and the work carried through from the melting part to the finishing room. A visit to this establishment is one of the most interesting uses to which an afternoon can be put, and we have to acknowledge the courtesy of Mr. Pancoast in affording us opportunity to lay before our readers some description of the process of manfacture, and the novelties they are now introducing to the jewelry trade.

At their large establishment are produced chandeliers and gas fixtures of all sorts, of varied and beautiful styles, both patterned from imported work and from their own designs, and varied lines of goods in both imitation and real American bronze. The first work of course, is done in the artist's room, a quiet nook shut off from the busy hum of the rest of the building, and in which an artist of rare inventive powers, and most exquisite taste, is employed the year round in making new designs for the house, or in adapting them from imported goods. From here the designs go into the pattern room, where the molds are to be made. It is here a matter of the nicest delicacy to decide in how many parts a design must be worked out in the molds, or a French pattern divided. On our visit this room was busy at a pair of fine large figures for newel posts, after French originals. which pair took twenty-four different molds, and required for the casting of these molds something like eight hundred pounds of metal. The molds, including the cost of the material, and of the labor which must be put upon it, come to something over a dollar a pound—so that the original outlay for this pair of figures will be about a thousand dollars before a single copy is cast.

The molding and casting rooms are at the top of the building, the work of manufacturing imitation and real bronze goods being carried on in different departments. For the former spelter is used, that from the Lehigh or Passaic regions being most in favor. After being melted, it is slushed into brass molds which afterwards come to pieces, leaving the part complete and ready to be soldered together with the others into a complete figure for the bronze finish. The real bronze, in which copper is the chief constituent, is cast in sand, from a pattern in plaster or in bronze itself. This is used, however, more in the details of gas fixtures than for figure pieces and the like, which become too costly for the ordinary market. The artificial bronze or spelter figures, after being carefully put together, are then ready for the bronze finish. The real bronze finish is put on by electrotype, and in this room the chemist of the company has invented a new finish which must prove very popular in the trade. It is called the steel finish, and gives the dark, rich color of the finest steel, with a polish which is mirror-like in its brilliancy. In contrast with gilt or color, the new finish produces the richest effects. The artificial bronze finish is put on the spelter goods with the brush, bronze powder being used in the first place for the color, and in the second place for the green rust with which they are usually provided. The finishing room practically tests the gas fixtures, and sees that the bronze figure goods are turned out in proper shape, and they pass thence to the warerooms.

Here we find, besides the multiplicity of chandeliers and brackets and newel posts for gas, a wide range of goods suitable for the jewelry, and especially for the holiday, trade. The list of novelties is long and interesting. We find here, for instance, a beautiful full length girlish figure of "May," with the arms held up and dropping flowers, which, in real bronze finish, is a superb centre piece, or table statuette. A very pretty pair about ten inches in hight are of a falconier of the olden time, and a picturesque dancing girl with tambourine. A bronze bust of a young girl in modern style, a piece about ten inches in hight, is also very beautiful. A mate pair of children, the figures about eight inches in hight, a boy and girl, the one with a cat, the other with a dog on the shoulder,—two laughing merry little people, are very happy in design and beautiful in execution. There are busts of Dante, Homer, Ariosto, and others of the poets, in small bronzes, and we notice also a military subject, a militia soldier, standing at ground arms, which is already proving very popular. There are several beautiful card tables, of original design, in bronze, and the card receivers are exceptionably tasteful. A tripod, in the real steel finish of which we have spoken, is among the most noticeable of these. Another card receiver, in dark bronze, is supported by a sphinx; a third, which is quite new, and from one of the firm's own designs, is a griffin, very odd and grotesque.

The trade throughout the country will find in the goods of this house a variety of subject and style, and a beauty of finish which commend them to customers whenever seen, and they will do well to send to the company for their price list and catalogues. Put alongside of the French goods, these bronzes, so carefully are they finished, compare most favorably with the originals; and, indeed, it would take an expert to decide as to which of the two are of home and which of foreign production. We heartily congratulate the company on the perfection which they have attained in these goods, and it is something to be proud of as Americans, that they have succeeded so thoroughly in their work.

Trade Cossip.

The jewelers are introducing elaborate designs for garter clasps, which are becoming quite fashionable.

Messrs. Smillie, Dorrance & Edge are introducing the most attractive novelties in their woven fabric chains.

A black diamond, believed to be of great value, has been found in South Africa. Stones of this color are very rare.

Mr. Rein, formerly of the firm of Bishop & Rein, is missing. Domestic troubles and business difficulties are said to have disturbed his brain.

Mr. F. A. Jones, director of the International Watch Co., has returned to Schaffhausen, Switzerland, where he expects to find the new factory of the company ready for occupancy.

Professor S. S. Delatot, of Paris, has undertaken to galvanize the corpse of our gratitude by coating raw castings with gold and silver in a marvellously expeditious manner.

Bracelets are now worn upon the upper part of the arm as well as the lower, the upper bracelet consist of two broad bands placed a little distance apart, and connected with lower band by a gold chain.

John Bliss & Co., the well-known chronometer and transit instrument makers, are over-run with work in the repair department in converting fine key winding watches into stem winders and setters—many of these are of Waltham maker.

The price of silver in London is said to be lower than at any time within twenty-five years. What a chance for Secretary Bristow to carry out the magnificent $5 resumption scheme of his great predecessor!

The new style of necklaces are oblong squares of roman gold connected by slender leaves between each link, having real gold balls cut in diamond facets, plain gold crosses will be very fashionable this winter.

That watch importer in Maiden Lane who sold to a friend a valuable watch, with the understanding that it should be paid for when General Dix was elected governor, will please rise and state his views on things in general.

The factory of Adams, Hallock & Co., manufacturers of the celebrated Cryptochylon Ice Pitchers, was destroyed by fire on the morning of the 20th ult. The loss ($35,000) is covered by insurance.

A fop once bothered one of the Rothschilds by boasting of a set of malachite studs he had just bought, and asked the banker if he did not admire them. "Oh, yes," said Rothschild, "very pretty, indeed. I've got a mantel-piece like that at home."

Brick vaults and safes are now manufactured so that any attempt to reach their interior breaks sundry bottles filled with sulphuric acid into powdered carbonate of lime. This produces instantaneously carbonic gas enough to suffocate a regiment of burglars.

The British Museum recently became posessed of a jasinth, a precious stone of exceeding rarity. The specimen is no larger than a pea, and, says the London *Times*, "flashes and glows with a lustre which seems to denote the presence of fire and flame." It cost $3500.

In honor to Mr. William Cullen Bryant, and to fittingly commemorate his eightieth birthday, the members of the Century Club have ordered to be prepared a vase, on which representions of the most prominent incidents of his life will be engraved and molded. This when finished will be placed in the Metropolitan Museum of Art as a lasting memorial of their esteem and affection.

Errico Bros. are the only exclusive importers of coral jewelry in this country, they have, without any exception, the finest selection of artistic goods imported this season. This enterprising firm have recently introduced a very unique improvement in the mountings which add greatly to the strength and beauty of the object, and is highly spoken of by the trade generally

PROCEEDINGS OF

THE HOROLOGICAL CLUB.

A Distinguished Body of Watch and Clock Makers.

Fourteenth Discussion, Communicated by the Secretary.

The regular business of the fourteenth meeting of this honorable body was opened by the reading of the following communication from Mr. E. D. Root, on the subject of

COMPENSATION BALANCES.

To the Members of the Horological Club.

Since the publication of my last article, I have received from V. Kullberg of London, a report of the rate of two chronometers, Nos. 1488 and 1489, tested in high and low temperatures at the Royal Observatory, Greenwich. The greatest error made during a trial of six months was 39 one hundredths of a second in their daily rates in temperatures of 72 and 100 degrees Fahrenheit. This remarkable rate which borders close to perfection, he attributes to the superiority of his new flat rim balance. Of the ordinary compensation balance he says: "If it is adjusted to go mean time in 32 and 100 degrees Fahrenheit, it will gain two seconds or more daily in 65 degrees, or if adjusted to go on mean time at 65 and 100 degrees, will loose 4 seconds daily in 32 degrees." I wrote to Mr. Kullberg, requesting him to send me one of his flat rim balances, suitable for a 20 line lever watch, but he declined sending one, probably for the reason he thought it would not perform as well if adjusted for a different class of watch than of his own manufacture. He referred me however, to the prize essay on compensation now in course of publication, which he thought would help me out of my trouble. Has any member of your distinguished body seen one of his new balances. If so, will he please give me his opinion of its merits or superiority over the ordinary balance?

As Messrs. Horologer, Uhrmacher and Clerkenwell have so completely exploded the utility of my proposed expansion checks to act in cold, and as Mr. Reniecke has seen them attached to a balance, and alleges that they were formerly used and abandoned as useless, I shall devote my energies to perfect the plan of a new balance which I have for a long time had in view. I dare not submit a diagram for your consideration at present, but shall wait till my plans shall have become fully developed and matured.

Why does an adjusted balance with an isochronized spring in a newly cleaned watch, invariably change the rate to slow? Is it caused by a continual strain upon the hairspring? Has any member ever seen a watch, however costly and highly finished, that would after having been brought to mean time, run one year without a change of rate? Does not dirt and the changed condition of oil cause a change of rate? Is any credence to be given to the published records of some watch manufacturers, who claim such a rigid performance of their watches, some not altering more than two seconds in a year? Would it not require more faith to accredit such statements, than to believe in a corporeal resurrection of a defunct body, that had undergone decomposition and disintegration? Was there ever any astronomical clock or regulator, that has or can produce such a rigid computation?

One query, the disturbance of a balance by shakes (which I have forgotten to ask in the proper place), and I will no longer weary you with questions. Will a heavy balance of large diameter, recover from a sudden shock as readily as a small one? Is not the motion of a small balance more alert and not so easily disturbed or broken up by shocks, as one of large diameter?

E. D. ROOT,

Forrestville, Conn., October 30th, 1874.

Mr. Horologer then rose, and said that he had always heard Mr. Kullberg's balance favorably spoken of. He had seen two marine chronometers having these balances, and he was favorably impressed with their construction, but he had never seen them applied to pocket watches, and was inclined to think that their use for that purpose was limited, probably on account of the extra expense entailed in their construction. It was worthy of remark, however, that although some marine chronometers having these balances run remarkably well, other chronometers having movements and balances apparently the same did not give any better results than chronometers with the ordinary compensation balance. Mr. Kullberg's claim that two of his marine chronometers had an error of less than a half a second a day for a period of six months, when exposed to a temperature ranging from 72 to 100 degrees, was certainly good running, and was within the bounds of possibility, but the claim put forth by some manufacturers that some of their watches varied only two seconds in a year was one which could not be entertained for an instant by practical men. The most costly astronomical clock could not be depended on to run for any length of time closer than one or two-tenths of a second in a day, and it was nonsense to talk about pocket watches running with greater accuracy.

As regards a watch having an adjusted balance, and isochronal hairspring, invariably changing its rate to slow on being newly cleaned, he would state that all who handled fine watches would have observed this to be a fact, especially when a lever escapement was used. This phenomenon was generally attributed to mechanical imperfections inseparably connected with this escapement. The friction of the scape wheel teeth on the pallets, and the roller on the fork, varied as the watch was clean or dirty, and produced the results mentioned.

He considered that a heavy balance of large diameter was not so easily disturbed by external motion as a small one, but the small balance recovered itself from the effects of external motion quicker than the large one did.

Mr. Clerkenwell desired to make a remark concerning one of the tricks of the trade, practiced in London in connection with the Greenwich trials: If a chronometer had been successful in the competition the makers were sometimes blamed for changing the number on the dial, and sending in the identical chronometer for trial a second year. Of course no maker who had a reputation for integrity would stoop to such trickery, but the peculiar condition of the trade in London, where the real makers of chronometers were seldom the competitors, presented opportunities for frauds of this description to be sometimes practiced.

The Adjuster of the French school thought it ungentlemanly for any member of the grand art of watch-making to throw discredit on the achievements of other members of the trade, simply because they were unable to produce the same results themselves. He would modestly inform them that he was the humble individual who had adjusted the watches for the company that did not vary more than two seconds in a year, or, to be more correct, fourteen months. In reply to an impertinent member, he said that it was the watch, and not the company, that had kept within two seconds in the time specified. These results were easily obtained if people only knew how. He did not consider the balance to be of so much consequence if proper attention was only given to the invisible properties of the balance, and care taken that the centre of gyration of the inside coil of the hairspring was on a tangent with the scape wheel teeth. A watch adjusted was lately returned to him for comparison, and after allowing for the error of the clock and the transit instrument, and the variation in the motion of the sun, produced by the attraction of the pole star, the watch showed no perceptible variation after running 72 weeks, 10 days, 91 minutes and four-ten-thousandth parts of a second, siderial time. The subject then dropped.

CLEANING WATCHES.

A communication, signed B., Halifax, N. S., was then read, enquiring for information as to the methods of cleaning watches.

Mr. Chalkbrusher could not understand why the time of their honorable body should be occupied in the consideration of a subject which every person should know all about already. There was nothing better for cleaning watches than chalk—and plenty of it. He thought he could give Mr. B. a wrinkle concerning the cleaning of clocks. When he wanted to shine up the movements good he always used bath brick and oil, but when the customer would not pay for getting his clock well done in the above manner he put the movement in a can of kerosene oil, and allowed the going and striking part of the clock to run down while immersed in the oil. This plan worked very well with Yankee clocks, but did not do so well for French clocks or watches.

Mr. Rubypin then rose and said, as usual, he had to take exceptions to every statement made by his friend Chalkbrusher. There was scarcely anything worse than chalk for cleaning gilt watches, and if used at all it had to be with judgment and caution. Every watchmaker knows, or ought to know, the tender nature of some kinds of gilding, and its liability to removal by the slightest abrasion, or by brushing the different parts of the watch. Among many repairers at the present day—the brush, with chalk, whiting, or burnt bone, is entirely discarded—the theory being that there is no use piling dirt on to take dirt off.

In lieu of a brush the workman provides himself with a small dish containing benzine. This fluid in a purified state, prepared expressly for the use of watchmakers, may be obtained from most of the dealers in watch materials. He must also provide himself with a piece of soft cotton or linen, the softer and the more worn it is the better for this purpose. Armed with these, and his peg wood, he proceeds to take the movement from the case, remove the hands, dial and dial wheels, presuming it is an ordinary Swiss lever that he is at work on. The dial wheels, cannon pinion, and the centre wheel staff, are thrown into the benzine. He next lets down the mainspring and removes the balance and pallet. From this he proceeds to start all the screws, turning them out in rotation in some certain direction, from right to left, or the contrary. With his tweezers he takes out the screws one after another, and places them on the bench, or in a box made for the purpose, in precisely the same order he takes them out. The object of this careful procedure is: first, by turning out all the screws at once he safes himself the duplicate motion in laying down the tweezers and screw-driver alternately, and, by preserving the systematic order of the screws, he avoids the chance of having to try a screw to see if it fits the hole. The screws having been thus arranged, the cocks and train are lifted out and thrown into the benzine, together with the lower plate, after the end stones have been taken off. The barrel and bridge is now dissected, and the parts also placed in the benzine. The mainspring is then cleaned and laid aside. The hairspring stud is then pushed out, the end stone and regulator taken off the cock and consigned to the benzine, together with the cock itself.

While these parts are soaking in the benzine the balance is cleaned thoroughly, as is also the pallet. The escapement having been cleaned, we commence with the parts laying in the benzine, in this order: first, the balance cock, taking it out of the benzine, it is dropped into the cloth held in the left hand, and wiped dry. If any of the fibres of the cotton, or linen, are left they may be removed by a puff of the breath, or a fine brush may be used merely to brush, not rub, it off. The end stone setting and the regulator are now cleaned and replaced on the cock, and, if satisfied with the work, the hole is oiled with the least amount of oil that will fill the hole. The balance is then replaced, the studs set well in, and care must be taken to place it so that the coil of the hairsprings falls equally between the regulator pins. The other cocks are taken out one by one and cleaned in a like manner, and placed in order opposite the screws belonging to them. After cleaning, the barrel is sprung, and the bridge cleaned. The steel work is then taken out and wiped dry with the cloth, care being taken not to touch with the finger any piece that has been wiped, as when the benzine has been removed it is almost chemically clean, and correspondingly sensitive to being marked. The barrel bridge is now mounted with its steel work and we proceed to clean the train. Here the brush is necessary, but it must be used sparingly, only enough to remove any little particle of dirt which the benzine has not removed from the teeth. The pinions are best cleaned with the thin edge of a piece of peg wood. The plate may be brushed hard with a soft brush, provided the brush is wet with benzine at the time. After brushing, however, it should be dipped in the benzine and wiped dry with the cloth. The holes being pegged out, the watch is ready to be put together. This, however, requires no comment, except to say that you commence in the reverse order to the taking down, putting in the whole train, setting the cocks home, and replacing the screws in their order before taking up a screw-driver.

Mr. Horologer then rose and said that he had practiced the method of cleaning watches with benzine for some time and had generally found it to work well. Benzine was preferable to alcohol for this purpose as it dissolved grease better, and did not act upon shellac. In some instances, however, he found that a little brushing was indispensible, and when carefully done did not injure most kinds of gilding. It was not to be denied, however, that a brush in careless or unskilful hands was an instrument of destruction in watches, and should never be used when it could be avoided, cyanide of potassium dissolved in water, was frequently used to take the tarnish of polished wheels or to remove stains in gilding. Ammonia, or spirits of hartshorn was preferable to the cyanide of potassium for some kinds of gilding. He might state, before sitting down, that damaskened nickel movements were cleaned in the same manner as described for fine gilt work.

SMALL DETAILS OF THE TRADE.

The secretary then submitted the following communication:

To the Members of the Horological Club.

I am desirous of making a contribution to the Club, and may send another communication on some other occasion. Meantime my humble opinion is, that every other meeting might be confined to the little things of the trade, which are at times so very valuable to those not living in large cities and who are not every day coming in contact with their fellow workmen. For instance, the best known method of making a very fine drill extremely hard, yet not easily broken, or the best way of holding a watch case, not to disfigure the same while refitting the case spring.

J. E. T., Mechanicsville, N. Y.

With reference to the first portion of this communication the chairman remarked that he was in perfect unison with their correspondent regarding the great importance of the small details of the business generally. It was not to be denied, however, that both himself and those members who were the mainstay of their club, evinced for the most part a greater interest for the higher questions in connection with the profession than they did for those more simple, although of less importance. The questions which were brought before them for consideration were generally either those uppermost in the minds of the members, or their correspondents. Some fault had been found with them in certain quarters for giving so much attention to minor matters as they had done, but personally he felt convinced that simple practical information, such as could be brought into daily use was the kind required by the greatest number of persons. They were always ready and willing to exchange ideas with the trade generally, or impart any required information to their fellow workmen situated in secluded localities. All connected with the trade were cordially invited to communicate with them on any pertinent question, either of an abstruse or simple character.

Mr. McFurzee then said that he remembered there was something said at their seventh meeting about hardening small drills and boring hard steel, yet the subject was by no means exhausted, and doubtless much more might be added. With regard to the protection of watch cases while being handled when fitting a new spring, etc., he said that either silver, gold, or enameled cases might be preserved from scratches during the operation by pasting a piece of tissue paper on the case. Shellac varnish was also used for the purpose. It consisted simply of shellac dissolved in alcohol, and applied with a brush, care being taken to prevent any from getting into the joints. When the case was repaired, the varnish was led off with alcohol.

The honorable body then decided to adjourn. Communications from A. E. R., A. D. L. Warren, Ill., being unavoidably left over to another meeting. A communication from Hardin Co., Ohio, could not be understood. Correspondents who can express their ideas in the French or German languages better than in English, are invited to write their communications in any of these languages, and they would be transacted by some member of their honorable body.

WALTHAM

SILVER CASES!

Trade  Mark.

The above Trade Mark is stamped on all Genuine Waltham Silver Cases.

In the early days of watch-making, and indeed up to the advent of the American machine-made watch, each movement had its case made expressly for it, and the one manufacturer was responsible for both. Each made up the complete watch, and the maker's name guaranteed both the excellence of the movement and the quality of the case. American watch-making has changed all that. The manufacturer of movements and of cases is now divided between entirely separate branches of business. They are held separately by their manufacturers, and are put together to make a watch by the dealers—usually the retail dealers.

In many respects this is undoubtedly a great improvement. It has enabled the consumer to reap the advantages of having both parts of his watch made in quantity at the low prices which can only be afforded by manufacturing on a wholesale scale. But it has also had its drawbacks. The trademark of the Waltham Company, for instance, guaranteed the movement beyond peradventure, but as to the case, the buyer was likely enough quite in the dark. If it had an imprint, it was not that of any house he knew, and unless the dealer exercised the greatest care in testing quality, he might himself be deceived and placed in bad odor with his customers, when by and by any defects of quality come to be discerned. There is also a second difficulty to be apprehended in improper fittings of the cases, which would tell badly in the running of the watch.

The Waltham Watch Company has been enabled to combine the advantage of both these systems, avoiding the drawbacks, of both. It is the only watch company which makes silver cases for its own movements, and it makes them in its own factory. It is careful to take the greatest pains that every case shall be well made, and the quality of each is guaranteed to be equal to coin. The dealer who buys these cases knows just what he is buying, and can recommend them to his customers with perfect confidence; whereas, if he buys silver cases of other makes, he may, for the saving of a shilling, be giving his customer a poorer quality of silver, besides running the risk of a bad fit, which materially interferes with the free action of the movement itself.

The dealer will easily see the desirability of gratifying his own interests, as well as his customers, by buying Waltham silver Cases for Waltham Movements.

Art in Industry.

In the most flourishing period of art in Italy it was not thought derogatory to the greatest artists to produce designs for articles of domestic use, and a few of these yet remain to attest the skill of the designers and to show with how much beauty a drinking-bowl, a salver, a vase, or a lamp may be invested by a really skillful workman. Then followed the utilitarian period, when the heavier, more angular and unmeaning in design an article could be made, the more it seemed to be appreciated by the public. But art is again assuming its rights, and asserting its ability to add to the value of every article in which ornamentation of any kind whatever takes part—and in view of the increased artistic taste which is everywhere apparent, it is important that those engaged in the manufacture of such goods should interest themselves in the artistic education of the artisan class. England has long felt that the substantial excellence of her manufactures would not alone keep them in the van, and hence we see South Kensington with its admirable Art Museum and School of Instruction. Here in America the opportunities for artistic education have been extremely limited, though it would appear that the necessity for such instruction is appreciated by the class who most require it. The large number of applicants for admission to the School of Science and Art founded by Mr. Peter Cooper, the emulation which the students exhibit, and the excellent work they produce all indicate an improved artistic feeling. The increasing numbers who visit the rooms of the Metropolitan Museum of Art as students is also proof that the taste for classic art is not dead among us, and the museum, though still but an embryo, is rapidly advancing in importance as an institution of instruction. The peculiar training required to enable even the talented artist to successfully apply ornament to useful objects is rare even in the art world of Europe, and commands abundant remuneration, and our designers and higher artisans would do well to avail themselves of every facility offered for adding their technical knowledge and familiarity with accepted classic models. In this country the advancement in art culture, as in most other directions, is greatly indebted to private mercantile enterprise. The Gorham Manufacturing Co., for example, being the largest manufacturers of artistic goods, have long maintained a department of design equal to that of any similar establishment in Europe. This opulent company employs the services of an extensive staff of trained draughtsmen, skilled designers, and artists capable of expressing individual ideas in appropriate forms, whilst Messrs. Tiffany & Co., have established in their designing-rooms a system of art instruction, where a number of talented young men are continually under training. These students receive remuneration, and the natural desire of youth to excel is fostered by the judicious award of competitive prizes. The advantages of this most practical instruction in the art of ornament, as applied to manufactures, must be apparent. Working under skilful and experienced leaders, and from the very nature of the duties imposed, feeling the direct influence of the most refined and cultivated public taste, with the accessories of a valuable art library and a collection of models, prints, and fac-similes of antique and mediæval works of art gathered during many years, the youthful student has ample opportunities to prepare himself for the broader field of usefulness which the demands of the house will open to him. The expense of maintaining so extensive a department of design is of course immense, but an inspection of the works which have been finished in the various factories from original drawings will convince the connoisseur that the result is worthy of the cost. The number and variety of designs produced in the course of a year would seem incredible; many of these are elaborate, and represent an actual outlay of hundreds of dollars, and all have as certain a money value as any article of merchandise that is sold. There would seem to be an ample field for the employment of that numerous class of young women who are incessantly complaining that the trades and professions are almost entirely closed against them. Learning the art of ornamentation should be a study very peculiarly congenial to the female mind, and one in which it might naturally be expected to excel. We have heard one of our best painters say that he could not get an artistically-designed picture-frame in New York. Surely it would be better to become a good designer, even of picture-frames, than to go on painting poor and unmeaning landscapes, or manufacturing bad busts from year to year, without a prospect of ultimate success.

Finger Rings.

Ornaments of various kinds have been worn from all ages, both by civilized and uncivilized nations, but it would probably be impossible to point to any single ornament connected with which so much interest attaches as to the finger ring. It is of great antiquity, and during centuries of years has been associated with the most important concerns of life, both in matters of ceremony and affairs of the heart. It has been used as a means of recognition, as credential, and as a form of introduction which insured hospitality to the bearer of it. Royal edicts were promulgated through its medium, and power transferred by its means.

When Pharaoh committed the government of Egypt to Joseph he took his ring from his finger, and gave it to the young Israelite as a token of the authority he bestowed upon him. So also when Ahasuerus agreed to Haman's cruel scheme of killing the Jews in all the king's provinces, he took the ring off his hand and gave it to Haman as his warrant, and afterwards, when he commanded Mordecai to write letters annulling the former decree, he ordered them to be sealed with the ring.

A ring formerly marked the rank and authority of a man, and the king's ring was as important a part of the insignia of royalty as his sceptre or his crown.

The form of the ring is emblematic of eternity and its materials of pricelessness. Lovers are united by a ring, and departed friends are often kept in remembrance by the same token of affection. All these qualities sufficiently explain the reason why in old tales and legends the power of the ring is a fruitful source of interest. The celebrated sanscrit drama which Kalidasa wrote upon the beautiful Sakuntala turns upon Dushyanta's recognition of his wife by means of a ring which he had given her; and golden rings have frequently been used by fairies and beautiful demons to seduce men from allegiance to their human loves. The known fact that fish greedily swallow any glittering object thrown into the water has been taken advantage of by old story-tellers, who never tire of relating how lost rings have been found at the proper nick of time in the stomach of a salmon or a mackerel.

In old times the motto of to-day that "nothing is so successful as success" was by no means universally held, and Polycrates the Samian was so uniformly fortunate that he himself began to fear that the gods did not love him. The wise Egyptian king Amasis persuaded him to propitiate Nemesis by making away with one of his most valued possessions, so he took the advice, and putting out to sea, threw into the gaping wave his beautiful emerald signet ring, engraved by Theodorus, the son of Telecles, a native of Samos. A fish of remarkable size snapped up the ring as it sank, and soon afterwards this fish being served up at the king's table restored to him his ring, Amasis hearing of this last proof of Polycrates' inevitable good luck solemnly renounce l his alliance. At last, however, fortune turned, and being taken prisoner by the Persians, Polycrates suffered death by impalling. In the life of Kentigern, related in the *Acta Sanotorum*, there is a legand of a recovered ring. A queen who had formed an improper attachment to a handsome soldier, gave him a ring which had previously been given her by her lord. The king finding the soldier asleep with this ring on his hand, snatched it off and threw it into the river. He afterwards went to his wife to demand

it, and she sent secretly to the soldier, who of course could not return it. She now sends in great terror to ask the assistance of the holy Kentigern, who knew the whole affair before, but to help the queen he goes to river Clyde, and having caught a salmon, takes from its stomach the missing ring, which he sends to her. She joyfully takes it to the king, who, thinking he had wronged her, swears he will be revenged upon her accuser, but she beseeches him to pardon them. As absolution for her sin she confesses it to Kentigern, and vows to the more careful of her conduct in future.

Finger rings are mentioned in the first book of the Bible, and they appear to have been worn by the Jews in all ages, as well. The ladies of Palestine adorned their hands with glittering rings, and chiefly valued those which were set with rubies, emeralds, and chrysolites.

Signet rings of gold, silver, and bronze were much worn by the ancient Egyptians, and these were frequently engraved with representations of the sacred beetle or scarabæus. This insect was venerated in Egypt when alive, and was embalmed after death. It was worshipped both as the emblem of the sun and as the symbol of the world. The rings of the lower classes of were usually made of ivory and blue porcelain.

Sir Gardner Wilkinson describes a ring in the possession of a Frenchman at Cairo which was one of the largest he had ever seen. It contained twenty pounds' worth of gold, and was of silver devices engraved upon it was the name of a king, the successor of Amunoph III., who lived about 1400 B. C., and was known to the Greeks as Memnon.

There is no reference to rings in Homer, and they do not appear to have been introduced into Greece till a later age than his. The fashion, however, soon got spread fast and in the time of Solon every freeman throughout Greece wore one signet ring either of gold, silver, or bronze. That statesman to prevent counterfeits, made a law that no seal engraving was to be kept in his possession the impression of any seal ring that he had cut for a customer. At a later period the Greeks used rings set with precious stones, and wore two or three at the same time. They were therefore considered as ornaments, and their use extended to women, who wore them of ivory and amber. Demosthenes wore many rings, and he was stigmatized as unbecomingly vain for doing so in the troubled times of the state. The Spartets took a pride in wearing plain iron rings.

The ancient Romans wore rings, and purists continued to wear them long after more precious metals were commonly used. Ambassadors wore gold rings as a part of their official dress, and afterwards the privilege was extended to senators, chief magistrates, and the equestrian order, who were also to enjoy the *jus anuuli aurei*. The emperors assumed the right of granting this distinction, which was coveted as a sort of patent of nobility. In time, however, its value declined, and the Emperor Aurelius gave the right to all the soldiers of the Empire; and in the reign of Justinian it had become so common that all citizens were entitled to it.

The introduction of sculptured animals upon the signets of the Romans is said to have been derived from the sacred symbols of the Egyptians. Afterwards, when the practice of defying princes and severe lasting heroes became general, portraits of men took the place of more ancient types; thus the figure of Hippocrates was a fashionable device at Rome in the time of Pliny. Roman rings were massive and of immoderate size, and were consequently found by the effeminate to be too hot for summer wear, so that different kinds were introduced for the various seasons,—

> 'Charged with light summer rings his fingers sweat,
> Unable to support a gem of weight.'
> —Dryden's Juvenal.

In times of sorrow the Roman changed his gold for iron rings; and when he died his rings were often burnt with his corpse.

Rings were placed upon the statues of the deities and heroes, and were put on or taken off according to the festival that was celebrated. Roman rings were often of great value; thus that of the Empress Faustina is said to have cost the immense sum of $200,000, and that of Domitia the still larger amount of $300,000.

The early Christians did not imitate the often indelicate symbols of the Romans, but took the devices connected with their faith for their rings, such as the dove, the anchor, fish, palm branch, &c. Ring making was an important branch of the goldsmith's art in the Middle Ages, and a body of artists were called by the French *orfevres*. Rich enamel work on rings often usurped for a time the place of gems, and the workmanship was often of the highest character, Benvenuto Cellini being the chief artist in bringing the art to its greatest perfection.

In our own country rings have been worn by all the races that have successively inhabited it.

> 'Lo! here is a red gold ring.
> With a rich stone.
> The lady looked on that ring,
> It was a gift for a king.'
> —Sir Degrenant.'
> (*Thornton Romances.*)

The old Celtic rings were usually of gold wire. Aildergodgh, son of Muinheamhoin, monarch of Ireland, who reigned 3070 A. M., is said to have been the first prince who introduced the wearing of gold rings in Ireland, which he bestowed on persons of merit who excelled in knowledge of the arts and sciences.

Prince Morrson tells us in his 'Itinerary' 'that the English in great excesse affect the wearing of jewels and diamonds, ascorning to weare plaine gold rings or chaines of gold.'

In one of Bishop Hall's Satires we read :—

> 'Nor can good Myson wear on his left hand
> A signet ring of letted diamond
> But he must eat his glove to show his pride,
> That his trim jewel might be seen outside.'

Modern rings owe all their beauty to their stones, for goldsmithery is not longer an art, and little attempt is made to obtain elegance of workmanship in the goldwork. In the seventeenth century sharply-pointed pyramidal diamond rings were much used for writing names and verses on glass, and those of the wits and fops of the day were without one.

Among the Jews the middle or little finger of the right hand was that upon which the ring was worn, and the signet was always upon the right hand, as appears by the passage in Jeremiah, 'As I live, saith the Lord, though Coniah, the son of Jehoiakim, king of Judah, were the signet upon my right hand, yet would I pluck thee thence.' Bishops, probably following Biblical precedent, wear their official rings upon the right hand. This, however, was opposed to the practice of the Egyptians, who considered the fourth finger of the left hand as the ring finger. Still they did not confine themselves to that finger, for there is a figure of a woman on a mummy case in the British Museum in which the fingers and thumbs of both hands are covered with rings.

Among the Romans plain rings were worn originally on either hand at option, but when gems and precious stones were added they were worn by preference on the left, and it was considered exceedingly effeminate to wear them on the right hand. At first only one ring was worn, then one on each finger, and, lastly, one on each joint. Clement, according to Martial, wore sixty rings daily, or six on each finger, and did not take them off at night, but slept in them. This was an extreme case; but rings were often worn on every finger and also on the thumbs. In Germany rings were frequently worn upon the joints, as was the Roman custom. The wife of Sir Humphrey Stafford (1450) is sculptured in Bromsgrove Church, Worcestershire, with a ring on every finger but the last one on the right hand. Massive thumb rings were supposed to tell of wealth and importance, and Falstaff declared that when young he could have crept into an alderman's thumb ring.

The annular finger is now always the fourth, counting the thumb as the first, and it is necessary to bear this in mind, or sometimes the mistake is made of counting from the forefinger.

(*To be continued.*)

COGSWELL, WEBER & CO.

105 & 107 STATE STREET, CHICAGO. ILLS.

Watches, Jewelry,

Silverware, Tools, Materials, Optical Goods.

The only house in the West carrying a general assortment, where the Retail Dealer can fit out an entire stock.

Prompt attention to Mail Orders.

No Goods sold at Retail.

A. L. HOSMER'S PATENT,

MARCH, 1874.

COMBINED

Hard and Soft Soldering Kit

STEAM BLOW PIPE, LAMPS & ALCOHOL DISH.

HOSMER'S NEW WAY.

One of the most Useful Inventions of the Age!

For Watchmakers, Jewelers, Silversmiths, Dentists Gold Pen Makers, and workers in small Metal Goods.

HOSMER'S STEAM BLOW-PIPE

Will blow harder than any living man can blow, and always keep up a steady blast so essentially necessary in Melting or Heavy Soldering. In using my Blow-Pipe, both hands are free, which will be found of great advantage to the operator.

For further information send for explanation.

Sent on receipt of Price or C.O.D.

PRICE.

No. 1,	Complete, Tin and Brass,	$3.00
No. 1,	" All Brass,	5.00
No. 1,	" Nickel Plated,	7.00

A. L. HOSMER, Cameron, Clinton County, Mo.

☞ DISCOUNT TO JOBBERS.

The attention of the Jewelry Trade is called to our line of

ARTISTIC BRONZES.

SUITABLE FOR THE

HOLIDAY TRADE.

Comprising STATUETTES in pairs—CARD RECEIVERS—CARD TABLES, VASES—BUSTS—MATCH BOXES—PAPER WEIGHTS—BIRDS, &c., &c., elegantly furnished at

LOW PRICES.

PHOTOGRAPHS AND PRICE LIST FURNISHED ON APPLICATION.

ARCHER & PANCOAST M'F'G. CO.

Manufacturers of

Gas Fixtures & Bronze Ornaments,

68, 70 & 72 Wooster St., and 67 Greene St.,

NEW YORK.

DENNISON & CO.,

MANUFACTURERS OF

JEWELERS' FINDINGS,

CONSISTING OF

Paper Boxes of Every Description,
Jewelers' Cards, Merchandise Tags,
Pink and White Cottons (Sheets & Bats,)
Tissue Papers, Chamois Skins,
Twines, Etc.

202 BROADWAY, NEW YORK.
5 Suffolk Place, Boston, Mass.
632 Chestnut Philadelphia.
51 W. 4th Street, Cincinnati.
150 South Clark St., Chicago.
110 Pine Street. St. Louis.

Borel & Courvoisier,

CELEBRATED

NICKEL

Watches.

Gents' Size.

Ladies' Size.

These justly celebrated Watches were first introduced into this country in 1850, and have become as famous for their excellency of performance as they are justly celebrated for time-keepers in all the principal cities of America. We guarantee these watches to perform with the same uniform regularity and accuracy as those made by the best manufacturers of Europe or America. They have applied all the latest improvements to their Watches, such as Full Ruby Jeweled, best of Chronometer Balances, Tempered and Hardened Breguet Hair Springs, Straight Line or Equilibrium Escapements in Key and Stem Winders. All movements are fitted with Short Levers and are equal to the best. The Messrs. BOREL & COURVOISIER were awarded the only Prize Medal granted a foreign manufacturer, at the London Exhibition, in 1862, and the Grand Prize at the recent Paris Exposition, of 1867; also the First Prize of the First Class and First Prize of the Second Class at the yearly Course of Competitors at the Cantonal Observatory, in Neuchatel, for 1870. They manufacture three grades of Movements, viz., Extra First, and Second Quality. These movements are made of a uniform size, so that they will fit any Cases made in gold or silver (corresponding with the models furnished by the undersigned on application), thus obviating the necessity of taking each Movement apart, or on the same principle of American Watches.

They manufacture all the Swiss sizes, viz.: 15, 16, 17, 18, 19, 20, and 21 lines. The 15, 16, and 17 are for Ladies' Watches; 18 and 19 Medium for Gentlemen; and 20 and 21, Large Gents'.

Extra quality Stem Winding Repeaters, Nickel Movement, Full Ruby Jeweled, Chronometer balance accurately adjusted to heat, cold and positions. Exposed Ruby Pallets, Gold End Stone Setting, Gold and Brass Wheels, Centre Hole Jeweled. Borel & Courvoisier, Neuchatel.

Extra quality Key and Stem Winder, 4th and 5th Seconds, 50 to 75 dwt. 18k.

Extra quality Independent Second Fly Back 4th Second Stem and Key Winders.

Extra quality Stem Winders, Nickel Movement, Full Ruby Jeweled, accurately adjusted to heat, cold and positions, in 55 to 75 dwt.

First quality ¼ Plate Nickel Movements, Equilibrium Escapement, with Short Lever Chronometer, compensated balance adjusted to heat and cold, Breguet Hair Spring, Chaton Jeweled.

Gold Cases from 14 to 18k. constantly on hand and made to order.

ENAMELLING and ENGRAVING of the latest designs, in monogram and otherwise, made at short notice. ☞ All Watches warranted by special certificate.

To parties who will purchase 25 Movements at first purchase and sell them as their Standard Watch (having first satisfied themselves that they are reliable and accurate time-keepers), and fully up to the standard accorded them by Professor Hirsch, of the Cantonal Observatory of Neuchatel, Switzerland, and by the annexed testimonials of dealers through the United States:

Benedict Bros., Broadway, New York.
E. Marks, Troy, "
J. A. Smith, Saratoga Springs, "
A. Becker, Jr., Syracuse, "
Hyde & Bettys, Auburn, "
E. B. Booth & Son, Rochester, "
J. A. Clark, Batavia, "
Hiram Hotchkiss, Buffalo, "
D. B. Castle, " "
Julius Walker, " "
Henry W. Strang, Elmira, "
Hoskins & Isbell, Oswego, "
Herbert Cowell, Cleveland, Ohio.
Benj. K. Chase, Rutland, Vt.
J. H. Grant, Troy, Penn.
Nichols & Isenthal, Toledo, Ohio.
G. W. Luce, Xenia. "
George Embry, Morrow, "
Charles Wyman, St. Albans, Vt.
T. & E. Dickinson, Buffalo, N. Y.
A. McHenry, Hornesville, N. Y.
Lincoln & Kelley, Fall River, Mass.
L. P. Coe, Amsterdam, N. Y.
O. B. Rudd, Ilion, N. Y.
J. S. Warner, Ogdensburg, N. Y.
Weld & Brother, Lockport, N. Y.
M. E. Tobey, Great Barrington, Mass.
Thompson & Ranger, Brattleboro, Vt.
Abner Lowell, Portland, Maine.
C. C. Shannon, Altoona, Pa.
George Hill, Canandagua, N. Y.
Le Grys & Worth, Cambridge, N. Y.
J. M. Bonnet, Zanesville, Ohio.
O. P. Dunbar, Steubenville, Ohio.
T. & E. Dickinson, Buffalo, N. Y.
A. E. Whitney, Fitchburgh, Mass.
L. Amadon, Bellows Falls, Vt.
Ferguson & Clapp, Indianapolis, Ind.
D. Furtwangler, Washington C.H., Ohio.
A. W. Ford, Freeport, Ill.
E. D. Root, Forrestville, Conn.
John J Griswold, Hartford, Conn.
Earnest Schall, " "
A. L. Burbank, Worcester, Mass.
Wm. Senter, Portland, Maine.
Walter F. Weeks, Bangor, Maine.
Theo. Gribi, Wilmington, Del.
L M. Barnes & Co., North Adams, Mass.
George Bassinger, Glens Falls, N. Y.
Chas. E. Butler, Hudson, N. Y.
Albert Lawtenslager, Albany, N. Y.
B. E. Barnes, Oswego, N. Y.
J. W. Moore & Bro., Philadelphia.
A. W. McKown, Honesdale, Pa.
Wm. H. Lyon, Newburgh, N.Y.
R. S. Peters, Philadelphia, Pa.
G.B.P. & E.H. Carpenter, Burlg'n, Iowa.
W. S. Taylor & Co., Utica, N. Y.
E. T. Adell, Lewiston Maine.
D. H. Buell & Co., Hartford, Conn.
Balliett & Weld, Waterloo, Iowa.
James B. Capron, New Milford, Conn.
L. O. Dunning & Son, Penn Yan.
Dunlap & Baker, Manchester, N H.
Evans & Manning, Binghamton, N. Y.
G. W. Fairchild, Bridgport, Conn.
Farrington & Co., Providence, R. I.
J. J. Holland, Jacksonville, Fla.
M. C. Haight, Geneva, N. Y.
N. P Kilburn, Corry, Pa
William Kirk, West Winsted, Conn.
Thomas McFadden, Jr., Pittsburg, Pa.
J. O. Robson & Co., Buffalo, N. Y.
W. P. Sedgwick, Bath, Maine.
John W. Tyler, Scranton, Pa.
R. M. Haight, Wilkesbarre, Pa.
J. B. Storer & Co., Akron, Ohio.
H. W. Preston, Albion, N. Y.
A. D. Norton, Gloversville, N. Y.
E. C. Blain, Newport, R.I.
Stanley & Ayre, Concord, N. H.
Gerish & Pearson, Portland, Me.

We will guarantee them the exclusive sale for their place, upon giving satisfactory references as to responsibility and willingness to enter into such mutual arrangements.

For further particulars address

QUINCHE & KRUGLER, only Wholesale Agents in the U.S.

SALESROOM, 15 MAIDEN LANE, NEW YORK.

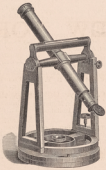
REDUCTION IN PRICES

OF

John Bliss & Co's Transit Instruments,

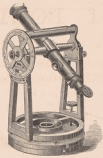
FOR OBTAINING CORRECT TIME.

NO. 4.

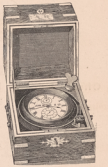


NO. 6.

NO. 8.



NO. 10.



Marine Chronometers.

IMPORTANT NOTICE.—These Transits are readily set in position without the aid of strictly correct time as a basis for that purpose. Printed instructions, easily understood, accompany each Instrument, and no calculations are required preliminary to setting in position. As a trial only is required to insure unqualified approval, we are induced to make the following **LIBERAL OFFER.**—On receipt by us of satisfactory reference, and 10 per cent. of the price, we will send one of the foregoing Transit Instruments, on hire or trial, for one month, with full printed instructions for setting up and using the same, and if purchased after trial, we will allow the whole hire to apply in part payment, and sell the Instrument on approved note at four months for the balance. Special terms for payment by installments, after trial, on application. We do not make this offer merely to hire these instruments, but to insure a trial with a view to sales, the hire received being only sufficient to cover the cost of repolishing in case they are returned. Send for Illustrated Circular giving full description.

JOHN BLISS & CO., 110 Wall Street, New York.

REED & BARTON,

Manufacturers of Fine

Silver Plated Table Ware,

Would call especial attention to the great variety of New Designs of

DINNER,

TEA

AND

Water Sets,

Epergnes,

CAKE

AND

Fruit Stands

ICE PITCHERS, SPOONS AND FORKS, ETC.

Factories, TAUNTON, Mass.

Salesrooms at Factories, and

No. 2 MAIDEN LANE, NEW YORK.

Buyers' Directory.

A Guide to the prominent Wholesale Houses in the Watch, Clock, Jewelry and kindred branches of Trade in New York.

Clock Companies.

American Clock Co.—Manufacturers of Clocks of all kinds. Salesroom, No. 881 Broadway.

Ansonia Brass & Copper Co.—19 & 21 Cliff street, New York.

Kroeber, F.—Clocks and Regulators of every description, No. 8 Courtland Street, N. Y.

United States Clock Co.—Henry Terhune & Son, 3 Cortlandt street, N. Y., Manufacturers of Fine Regulators and American Clocks.

Waterbury Clock Co.—M. Bailey, Treasurer. Manufs. and Jobbers, No. 4 Cortlandt Street, N. Y., No. 160 Clark Street, Arcade Building, Chicago.

Wood, James—Manufacturer, Importer and Dealer of Fine Regulators and Clocks of every description 6 Courtlandt street, N. Y.

Corals and Coral Jewelry.

Bergmann, Adolph—Importer of Corals, Mounted and Unmounted, Precious and Imitation Stones, No. 64 Nassau Street, N. Y.

Errico Bros.—Established 1859—Importers of Coral Jewelry, 19 John street, N. Y. Manufactory, 39 St. Catarina a Chiaja, Naples, Italy.

Lawson & Granbery—Manufacturer Fine Gold & Coral Jewelry ; Coral Jewelry altered, refurbished and repaired, No. 63 Nassau St., N. Y.

Cameo Cutters, Etc.

Bernard & Roset—Cameo Cutters, Likenesses Cut on Shells and Precious Stones, 399 Broadway, New York.

Lehrethon, Jules—Cameo Likenesses cut on Stone and Shell for Pins, Earrings, Rings, Studs, &c. Fancy Cameos, 643 Broadway, N. Y.

Chronometers.

Bliss, John & Co.—Standard Marine Chronometers, Tools, Time for Watchmakers' Use, No. 110 Wall street, N. Y.

Diamonds.

Bernhard, A. & Co.—Manufacturing Jewelers & Importers of Diamonds, Fine Jewelry, &c. 169 Broadway, Gilsey building, N. Y.

Bissinger, E.—Importer of Diamonds, No. 182 Broadway, N. Y.

Furs, Henry—Importer of Diamonds, No. 9 Maiden Lane, N. Y.

Morch, Jacob—Importer of Diamonds, Pearls, French & Italian Stone Cameos, Amethysts, Onyxs, and Precious Stones generally, No. 25 Maiden Lane, N. Y.

Nerseheimer, E. Aug.—Importer of Fine Diamonds, No. 5 Maiden Lane, New York.

Diamonds and Diamond Jewelry.

Smith & Hedges—Importers of Diamonds Exclusively, and Manufacturers of Fine Diamond Jewelry, 1 Maiden Lane, cor. Broadway, N. Y.

Taylor, Olmsted & Taylor, Importers Diamonds and Diamond Jewelry, 5 Bond street, N. Y.

Diamond Setters, Etc.

Friend, A.—Manufacturer of Fine Jewelry, and Diamond Setter, 33 John street, N. Y.

Hayden, A.—Manufacturer of Fine Jewelry and Diamond Setters, No. 65 & 67 Nassau street, N. Y. N. B.—Particular attention paid to repairing in all its branches.

Enamelers, Etc.

Bishop, J. L. & A.—Enamelers on Gold & Silver, also Manufacturers & Importers of Enamel, 80 Nassau Street. Room 10, rear.

Orr, Jas. C.—Enamelr on Fine Jewelry, Flowers, Birds, &c., Enameled in colors, Band Bracelets (a specialty), 77 Nassau Street, N.Y.

Engravers and Die Sinkers.

Dolbey & Wood—Engravers & Incrusters of Precious Stones, 169 & 171 Broadway, Room 23, New York.

Fachtee, Edward—Carver, Engraver and Chaser on Jewelry, Monograms, Lettering, &c. 182 Broadway, John street, N. Y.

Henning, Albert J.—Die Sinker & Engraver, 217 Centre street, N. Y. Dies for Jewelers and Silversmiths, Embossing Plates, Seals, &c.

Knapp, Charles—Engraver, Die Sinker and Designer for Jewelry, &c. 14 and 18 k. Shanks and Heads for Rings, &c., 41 Maiden La., N.Y.

Park, William—Stone Seal & Cameo Engraver, and Die Sinker. Masonic Devices and Engraving for Incrustation, 392 Broadway, N.Y. Room 1454.

Schaha, A.—Stone, Seal, and Cameo Engraver. No. 64 Nassau street, N. Y.

Schleicher, Ch.—(successor to Wm. Eck) Die Sinker, Engraver, Closer and Tool Maker, 193 William street, N. Y.

Schuller, J. Dan'l.—Stone Seal Engraver, Arms, Crests, Initials and Monograms engraved on Stone Seals, &c., No. 71 Nassau Street, N. Y.

Electro Platers.

Jeandheur, F., & Son—Gold and Silver Electro Platers & Fire Gilders, Coloring Strassau and Gold Jewelry specialty, 71 Nassau St., N. Y.

Jeannot, P. A.—Gold and Silver Electro-Plater and Strassau Colorer, Gilding and Repairing Watch Cases a specialty, 65 Nassau street.

Normandeau, P. A.—Electro Gold & Silver Nickel Plater. Coloring Strassau and Silver work a specialty. No. 102 Nassau Street, N. Y. Sole Agent of New York Nickel Plating Company. Licensed by United Nickel Company.

Nickel Plating.

Scherrer's—Nickel Plate Works. Plating on all metals by an improved solution. 42 Dey St.

Fancy Goods, Clocks, Bronzes, Etc.

Hayes, Alex. M. & Co.—Importers of Jewelry, Paris and Vienna Fancy Goods, Clocks, Bronzes, Musical Boxes, Diamonds, Watches, Jewelry, etc., 23 Maiden Lane, N. Y.

Hinrichs, C. P. A.—Importer and Dealer in French, English and German Fancy Goods, etc., etc. 20, 21 & 23 Park Place, N. Y.

Magnin, Ye-J. Gustin & Co.—Importers of Clocks Bronzes, Musical Boxes & Rich Fancy Goods etc., 622 Broadway.

Shepard, Le Boutillier & Co.—Importers of Fancy Goods, Clocks, Bronzes, &c., No. 10 Maiden Lane, N. Y.

Gold Chains, Etc.

Andres, P. & C.—Manufacturers of Gold Chains and Bracelets Cases, Holders, No. 619 9th Avenue, N. Y.

Bech, J. & Son, Manufacturers of Fine Gold Chains and Chain Bracelets, 10 Liberty place, near Maiden lane, N. Y.

Falkenau & Pollak, Manufacturers of Gold Chains with Patent Safety Swivel Attachment, No. 6 Maiden Lane, N. Y.

Kaufmann Bros.—Manufacturers of Gold Chains, and Chain Bracelets, 29 John street, Factory, 713 5th street, N. Y.

Smillie, Dorrance & Edge.—Manufacturers of the Celebrated Woven Flexible Gold Chains and Chain Bracelets, 9 Maiden Lane.

Wallach, A. & Co.—Manufacturers of Gold Chains, No. 11 Maiden Lane, N. Y.

Weyman, Geo.—Manufacturer of Gold Chains and Jewelry, 17 John street, N. Y.

Gold Pens, Etc.

Aikin, Lambert & Co.—Manufacturers of Choice Gold Pens, Cases, Holders, Toothpicks, etc., 14 & 16 Maiden Lane, N. Y.

Hawkes, George P.—Manufacturer of Fine Gold Pens, Gold, Silver and Rubber Pencil Cases, 66 Nassau street, N. Y.

Todd, Edward & Co.—Manufacturers of Gold Pens, Pencil Cases, Tooth Picks, &c., 052 Broadway, N. Y. Factory, Brooklyn.

Gold Rings.

Ely, W. H.—Manufacturer of Solid Gold Rings of every description. No. 58 Nassau Street, New York.

Hair Jewelry.

Francke, H. C.—(late Charles Francke & Co.) Manf. Hair Jewelry & Device Work, Importer of Alloying Copper. Sample books always on hand, 165 & 167 Broadway.

Menge, Chas. Th.—Manufacturer Fine Jewelry and Ornamental Hair Work, and Importer of Watches, No. 33 John Street, N. Y.

Miller, H.—Artist in Hair, and Jeweler, 189 Broadway, up stairs, N. Y. Established 14 years.

Jewelry Cases, Fancy Boxes, Etc.

Altenberg, C. & Co.—Manufacturers of Russian and Morocco, Jewelry and Silverware Cases, Fancy Goods, etc., 2 Bond street, N. Y.

Braun, Chr. E.—Manufacturer of Jewelry Boxes, Trays for Show Cases, &c., 62 Chatham street, N. Y.

Dahlem, W.—Manufacturer of Cases for Jewelry and Silverware, No. 85 Nassau Street, N. Y. Show Case Trays, &c., at the shortest notice.

Jackson, Samuel C.—Manufacturer of the newest styles of Boxes and Trays for Jewelry, Silverware, Watches, &c., 180 Broadway, N.Y.

Kock Henry—Manufacturer of Fine Jewelry Cases, also Boxes for Surgical & Mathematical Instruments, 2 Duane street, up-stairs, N. Y.

Steinle & Hornsler—Manufacturer of Fancy Boxes for Jewelry and Silver Ware, 66 Nassau St. Patentee of the Celebrated Adjustable Boxes.

Sturn, L.—Manufacturer and Importer of Cases for Jewelry, Watches, Silverware, etc., 15 John street, N. Y.

Wiggers & Proelick—Manufacturers of Fine Morocco Cases for Jewelry, Watches Silverware. Trays and Porcelain Ring Trays, &c. No. 60 Nassau Street, N. Y.

Jewelry—Fine.

Aikin, Lambert & Co.—Manufacturers. General stock of Reliable Jewelry, 14 and 16 Maiden Lane, N. Y.

Baldwin, Sexton & Peterson,—Manufacturers of Fine Jewelry. No. 1 Bond street, N. Y.

Ball & Barnard—Manufacturers of the Self-Adjusting Band Bracelet Guard, (Bracelets a Specialty), No. 9 John Street, N. Y.

Barthman & Straat—Manufacturers of Fine Jewelry. Seal and Stone Rings a specialty. Orders promptly attended to. 41 Maiden Lane, N. Y.

Bissinger, E.—Importer of Fine Jewelry, Lockets, Crosses, Neck Chains, &c., No. 182 Broadway, New York.

Brown, Cook & Co.—Manufacturers of Fine Gold, Enameled and Plain Lockets, No. 191 Broadway, N. Y.

Burch, DeMott & Coughlin.—Manufacturing Jewelers, 9 John street, N. Y.

Carter, Howkins & Dodd.—Manufacturing Jewelers, 1 Bond Street, N. Y.

Coe, Adams & Stevens—Manufacturers of Fine Jewelry, Lockets and Bracelets, a specialty. Office old No. 9 Maiden Lane, N. Y.

Demmert Bros.—Manufacturers and Importers of Fine Jewelry, Cameo and Onyx Lockets, Sleeve Buttons and Sets a specialty. Old No. 9 Maiden Lane, New York.

Fitch & Chatterton—Successors to Merrill, Fitch & Allin—Manufact'rs of Fine Gold Jewelry, Chains, Band and Chain Bracelets, No. 19 John street, N. Y.

French, F.—Manufacturer and General Dealer in Fine Gold and Roll-Plate Jewelry. Studs a specialty. No. 14 John street, N. Y.

Griffith, H.—Manufacturer of Fine Jewelry, Studs and Buttons a specialty, jobbing attended to, Nutry Alley, Adams street, Brooklyn, N. Y.

Hartmann, P.—Manufacturer & Importer of Fine Gold, Diamond and Filigree Silver Jewelry, No. 36 Maiden Lane, N. Y., P. O. Box 2,454.

Hess, Adolph & Co.—Importers of Jewelry, Lockets, Charms and Crosses a specialty. 39 Maiden Lane, N. Y.

Kimball & Kittle—Manufacturers of Fine Gold Jewelry, 28 Bond street, N. Y.

Krebs, George—Manufacturing Jeweler, 28 Bond street, New York.

Kuhn & Doerflinger—Manufacturers of (14 and 18 kar. and Roman Gold) Band Bracelets, and Importers of Lockets, 18 John street, N. Y.

Lennon, John D.—Manufacturing Jeweler, 150 Fulton street, N. Y. Flat and Half-round Gold Bracelets a specialty.

McMurray, Daniel E. D—Successor to Kinscherf, Dellere & Co., Manufacturer of Fine Enameled Jewelry, 148 Fulton Street, N. Y.

Miller Bros.—Manufacturers of Fine Jewelry, Lockets, Sleeve Buttons, Studs, etc., etc. 11 Maiden Lane, New York.

Mulford, Hale & Cottle—Manufacturers of Rich Jewelry, Waltham Building, 1 Bond steet, N. Y.

Oliver, Richard. . Manuf. Jeweler. Odd and intricate articles of Fine Jewelry made to order, repairing done for the trade, 11 John St., N. Y

Oppe & Kleinfelder—Manufacturers of Seal Rings, Studs & Sleeve Buttons, 50 Bond street, N. Y. Orders promptly attended to.

Oskamp, Clemens—Wholesale Jeweler, 175 Vine street, Cincinnati, Ohio.

Owen, G. & S. & Co.,—Manufacturing Jewelers. Office, No. 5 Maiden Lane, New York.

Rose, S. & Son—Importers & Dealers in Jewelry, Watch Materials, Watch Glasses and Spectacles, 67 Nassau Street, New York.

Soule H. & G. & Co.—Manufacturers of Fine Jewelry, Patent Self-locking Bracelets a specialty, 17 Maiden Lane—factory, Jersey City.

Spadone, Rood & Co.—Manufacturers of fine Jewelry, Chains, etc. Importers of Watches, etc., 658 Broadway.

Swinnerton Bros. & Co.—Manufacturers of Jet and Fine Gold Jewelry, Office, 196 Broadway, N.Y. Factory, Newark, N. J.

Thoma, Ernest—Manufacturer of Fine Gold Sets and Childrens' Earrings, 173 Broadway, N.Y Factory, Hackensack, N J.

Tingley, Sinnock & Sherrill—Manufacturing Jewelers. Amethyst, Cameo and Onyx Rings a specialty. No. 9 Maiden Lane, New York

Wheeler, A.—Manufacturer of Diamond and Fine Jewelry, Masonic Jewels, Badges, Emblems, &c., 35 John street, N. Y.

...ener Brothers—Manufacturers of Gold Chains and Fine Jewelry, 128 Fulton Street, N. Y.

...glom & Miller. . . Manufacturers Fine Jewelry, Black Onyx work a specialty, 32 John Street, N. Y.

Jewelry—Shell, Gilt, Jet, etc.

...n William—Importer of Jewelry, Fancy Goods, Whitby Jets, Gilts, Tortoise Shells, &c., &c., No. 4 Maiden Lane, N. Y.

...er & Barclay.—Manufacturing Jewelers, ...01 Broadway, N. Y. Factory, Jersey City. ...celets a specialty.

...n, Claes G.—Manufacturer of Shell ...k and Rubber Jewelry, No. 96 Walker ..., N. Y., Entrance 103 Elm street.

... C. F. A.—Importer of Amber and Spa ...ry. 29, 31, & 33 Park Place, N. Y.

...r Manufacturing Jewelry Co.—Suc... to O. S. Thayer & Co., Manufacturing ..., Specialty: Celluloid Jewelry. No. ...adway.

Jewelers' Tools and Findings.

Dennison & Co.—Manufacturers of Jewelers' Findings, Paper Boxes, Cards, Tags, Cottons, Tissue Papers, &c., 202 Broadway, N. Y.

Frasse & Co.—Importers of Stubs, French, Swiss, German and Sheffield Tools, Files and Steel Wire for Watchmakers, Jewelers, etc., 62 Chatham street, N. Y.

Swift Mf'g. Co.—Manufacturers of Wood Boxes for Mailing, and Expressing Jewelry, Precious Stones, etc., 16 Courtlandt street, N. Y.

Lapidaries.

Fox, M., & Co—Practical Lapidaries and Importers of Precious Stones, Pearls, Cameos, &c., Agate Mortars, No. 1 Maiden Lane, N. Y.

Kordmann & Michel—(Successors to A. Tournier & Co.) Lapidaries, Importers of Precious Stones, &c., No. 53 Nassau Street, N. Y.

New York Steam Lapidary Works.—T. F. More, Importer of Stones, and Manufacturer of Stone, Glass & Jet Work, 42 Ann St., N. Y.

Masonic and Odd Fellows' Jewels.

Luther, J. F.—Masonic & Odd Fellow's Jewels' Charms and Emblems a specialty; also Pins manufactured for all secret orders. 79 Nassau street, N. Y.

Musical Boxes, Etc.

Hinrichs, C. F. A.—Importer of Musical Boxes, Accordeons and Harmonicas. No. 29, 31 & 33 Park Place, N. Y.

Paillard, M. J. & Co.—Importers and Dealers in Musical Boxes. Boxes carefully repaired. 680 Broadway, N. Y.

Opticians.

Burbank, Bond & Co.—Manufacturers of Spectacles and Eye Glasses of all descriptions, in gold, silver, etc., 14 Maiden Lane, N. Y.

Landsberg, A. . . Successor to L. Black & Co., Importer and Manufacturer of Optical Goods, 36 Maiden Lane, Box 3993, N. Y.

Ruding, Walter—Repairing Spectacles, Eye Glasses, &c., punctually attended to. Pebbles on hand set to order, No. 81 Nassau St., N.Y.

Straubel, Richard—Manufacturer of all kinds of Gold Eye Glasses and Spectacles, No. 37 Maiden Lane, N. Y.

Suttie, Wm. J.—Manufacturer of Eye Glasses and Spectacles, in gold, silver, steel and shell, also, Fine Jewelry, 39 Maiden Lane.

Rings and Shanks.

Burbank, Bond & Co.—Manufacturers of Solid Gold Rings, 14 Maiden Lane, N. Y.

Bryant & Bentley . . Manufacturing Jewelers, 350 Patterns Hard Solder Rings, 12 Maiden Lane, N. Y.

Knapp, C.—Manufacturer of 14 and 18 karat Gold Shanks and Heads for Rings, 41 Maiden Lane, New York.

Silverware.

Cook, John—Manufacturer of Silver Tea Sets, Pitchers, Waiters, Cups, Goblets, Spoons, Forks, Knives, etc. 6 Liberty Place, N. Y.

Gorham Manufacturing Co.—1 Bond street, N.Y.

Whiting Manufacturing Co.—Manufacturers of Sterling Silverware, No. 181 Broadway, N. Y.

Silver Plated Ware.

Manhattan Plating Co., 24 John street, N. Y.—Fine Nickel Silver and White Metal Plated Ware. Repairing & re-plating on the premises.

Meriden Britania Co.—Manufacturers of Silver-plated Ware, 550 Broadway, N. Y.

Rogers & Bro.—Manufacturers of Reliable Silver Plated Ware. No. 203 Broadway, New York.

Show Cases, Etc.

Becker, John—Manufacturer of Show Cases, Jewelry Trays always on hand, 19 Howard street, N. Y.

Heil & Sum—Manufacturers of all kinds of Show Cases, 153 Chatham street, N. Y.

Kelly, P. J.—Manufacturer of all kinds of Show Cases, Counters and Refrigerators, 45 & 49 New Bowery & 22 James street, N. Y.

Kraft & Hoffmeister—Manufacturers of Metal Show Cases, Jewelry Trays always on hand, 8 & 13 North William street, N. Y.

Kruse, Frederick—Manufacturer of all Sizes and Styles of Show Cases in Metal & Wood, 175 Chatham street, New York.

Spectacle Case Manufacturers.

Richardson, Wm.—Manufacturer of Spectacle Cases in all Branches, 40 Fulton street, Up Stairs, N. Y.

Koenen, A. & Bro. Manufacturers of Leather Spectacle & Eye Glass Cases, 81 Nassau street, N. Y.

Thermometers Etc.

Tagliabue, Giuseppe—Thermometer, Barometer and Hydrometer Manufacturer, 302 Pearl street near Beekman, N. Y.

Thimble Manufacturers.

Burbank, Bond & Co.—Manufacturers of Gold & Silver Thimbles, 14 Maiden Lane, N: Y.

Ketcham Bro. & Co.—Improved Gold and Silver Thimbles, Nos. 4 and 6 Liberty Place, near Maiden Lane, N. Y.

Walking Canes.

Fradley, J. F.—Manufacturer of Fine Gold and Silver Headed Walking Canes. 18 John Street, New York.

Watch Companies.

American Watch Co.—Robbins & Appleton, Agents, Waltham Building, Bond St., N. Y.

New York Watch Co.—Factory, Springfield, Mass. John F. Krugler, Agt. 15 Maiden Lane New York.

The Philadelphia Watch Co.—No. 618 Chestnut Street, Philadelphia. New York Agency, L. H. Keller, 64 Nassau St.

Watch and Chronometer Jeweler.

Queen, James—Watch and Chronometer Jeweler and Pallet Maker, 83 Nassau street. Pivots inserted in Pinions, Balance, Staffs, &c.

Watch and Clock Springs.

Brochon & Banvard.—Manufacturers of Watch, Clock, Chronometer and Musical Box Stock Springs, 77 Nassau street, N. Y.

Watch Importers, Etc.

Abry, J. A.—Importer of Watches, No. 63 Nassau Street, N. Y. Sole Importers of Vacheron & Constantin celebrated Geneva Watches.

Aikin, Lambert & Co.—Importers of Watches. Sole Agents for Paul Breton & Chas. Latour, Geneva. A general line of reliable Swiss Watches. Watch Cases of all styles made to order. 14 & 16 Maiden Lane, N. Y.

Bartens, Chas. . . Watch and Chronometer Maker. Dealer in and Importer of Fine Watches, No. 3 John Street, N. Y.

Bodine, G. M.—Importer of Watches and Jewelry of every description, No. 22 Maiden Lane, N. Y.

Bourquin Brothers—Importers of Watches from their own manufactory at Bienne, Switzerland, 20 Maiden Lane, N. Y.

Bynner, T. B. & Co.—Importers of Watches and Dealers in Diamond and Fine Jewelry, 527 Broadway, N. Y.

Conover David F. & Co.—American Watches, Wholesale Salesroom, southeast corner 7th and Chestnut streets, Philadelphia.

Cross & Beguelin—Importers of Watches, Watch Tools and Materials, dealers in American Watches, No. 21 Maiden Lane, N. Y.

Courvoisier, Wilcox & Co.—No. 12 Maiden Lane, N. Y., importers of Watches. Agents for Chas. F. Tessot & Son, and Jules Huguenin, Locle Suisse.

Droz, Henry E.—Importer of Watches and Watch Case manufacturer. Agent for the "E. Perregaux" Watch, and jobber in American Watches, No. 92 Fulton Street, N. Y.

DuBois, Francis & Co.—36 Maiden Lane, N. Y., Importers of Watches and Manufacturers of Watch Cases.

Freund, Goldsmith & Co.—Importers of Watches Jewelry, and Precious Stones, No. 8 Maiden Lane, N. Y.

F. H. Mathez,—Importer of Watches. No. 5 Maiden Lane, N. Y.

Kahn, L. & M.—Importers of Watches, No. 10 Maiden Lane, New York.

Lutz, L. A.—(Successor to Lutz Bros.)—Importer and Manufacturer of Watches—fine movements a specialty, factories in Locle & Geneva, 71 Nassau street, N. Y.

Maguin, Ve J. Guedin & Co.—Importers and Agents of the Nardin Watch, No. 652 Broadway, N. Y.

Mathey, L. & A.—Importers of Fine Watches and Sole Agents for the **H. L. Matile's** Watches, No. 119 Fulton Street, N. Y.

Piaget, Henry F.—Importer, Manufacturer and Repairer of Fine Watches and Movements, No. 85 Nassau Street, New York.

Priest, Fuller & Lawrence.—Importers of Watches, Diamonds, Jewelry, Gold Chains, etc. No. 15 Maiden Lane, N. Y.

Quinche & Krugler.—Agents for the Borel & Courvoisier Nickel Movements, 15 Maiden Lane, N. Y.

Stein & Brother—Importers and Jobbers of Swiss and American Watches, Chains, Jewelry, &c. 66 Nassau street, N. Y.

Stern Brothers & Co.—Importers of Swiss Watches and wholesale dealers in American Watches, &c., No. 63 Nassau Street, N. Y.

Taylor, Olmsted & Taylor—Importers of Watches No. 5 Bond street, N. Y.

Waaser, F.—Importer of Watches, Materials, Tools, &c., Sole Agent for Ducommun's Main Springs, 52 Nassau street, N. Y.

Watch Cases.

Brown, J. A. & Co.—Manufacturers of The Ladd Patent Stiffened Gold Watch Cases, &c., 11 Maiden Lane, N. Y. Factory, 58 Eddy street, Providence, R. I.

Jennings, Wm. C.—Manufacturer of Watch Cases, No. 33 John Street, New York.

Laurent, J.—Watch Case Manufacturer, Gold and Silver American Watch Cases constantly on hand. 17 John street, (rear building,) N. Y.

The Dueber Watch Case Manufacturing Co.—131 W. Fourth street, Cincinnati, Ohio, and 14 John St., New York.

Virow & Sturges—Manufacturers of Gold and Silver Watch Cases, 189 Broadway, N. Y. top floor.

Watch Case Repairers.

Chemidlin & Cordier—Watch Case Repairers 77 Nassau street, rear building, room 20, N. Y. Manufacturers of Silver Cases.

Tarbox, Hiram—Watch Case Repairing, Springing, Polishing and Engine Turning, 79 Nassau street, (room 22), N. Y.

Watch Dials

Gold, John T.—(Successor to the late T. Gold), Enamel Watch Dial Maker, No. 81 Nassau Street New York.

Watch Keys.

Clark, A N.—Manufacturers of Light Metallic Goods, Watch Keys, Watch Case Springs, Combination Watch Keys, &c., Plainville Ct

Watch and Clock Repairers.

Egler Bro's—Repairers of Watches and Clocks of every description—Special attention paid to French Clocks, 37 John street, N. Y.

Watch Glasses, Shades, Etc.

Berger, Albert, & Co.—Importer of Watch Glasses, Spectacles, Opera Glasses, Telescopes, &c., &c., No. 47 Maiden Lane, N. Y.

Hill, Robert S.—Manufacturer of Watch Glasses, &c., dealer in Imported glasses, flat glasses a specialty. 75 & 77 Nassau street, N. Y.

Walter, A., & Co.—Importers and manufacturers of Watch Glasses, Spectacles, Clocks, Musical Boxes, &c. No. 40 Maiden Lane, N. Y.

Watch, Pendulum, Spring and Wire Manufacturers.

Ganneval & Callard.—27 Alfred St., Islington, London. Hair spring wire in spools, 36 yds. to 1000 yards; 4s per spool of 36 yards.

Providence Directory

A Guide to the prominent Manufacturing Jewelers of Providence who manufacture for the Jobbing Trade.

Bracelets.

American Bracelet Co.—Manufacturers of Thomson's Patent Telescopic Bracelets. 26 Potter street, Providence, R. I.

Fine Jewelry.

Downs, Chas. & Co.—Manufacturers of Jewelry, also of Imitation Buttons. No. 131 Dorrance street, Providence. R. I.

Irons, Chas. F.—Manufacturer of Solid Gold Jewelry. Specialty Emblems, Pins and Charms, Masonic, Odd Fellows, &c. 102 Friendship street, Providence, R.I.

Sturtly & Marcy,—Manufacturers of Jewelry. 95 Pine street, Providence, R. I.

Jewelry.--Plated.

Allen, Samuel & Co.—Manufacturers of Fine Electro Plate Jewelry. 96 Pine street, Providence, R. I.

Bride, Wm. M. & Co.—Manufacturers of Gold Plated Jewelry of all kinds. No. 116 Pine St., Providence, R. I.

Luther Bros.—Manufacturers of Fine Gilt Jewelry. Studs and Buttons a specialty, (also Lapidaries.) No. 20 Conduit St., Providence, R. I

Pierce, Willard & Co.—Manufacturers of Fine Plated Jewelry, also Gold Masonic and Odd Fellows Emblems, &c. No. 30 Page street, Providence, R. I.

Taft, W. A.—Manufacturer of Plated and Gold Jewelry. No. 193 Eddy St., Providence, R. I.

White, Foster & Co.—Manufacturers of Fine Plated Jewelry, (Sets of Jewelry, Brooches, Drops and Buttons. No. 30 Potter St., Providence, R. I.

Rings.

Haskell, W. & Co.—Manufacturing Jewelers. Finger Rings a specialty in Gold, Silver and Rolled Plate. No. 95 Pine St, Providence, R.I.

McAdam, Wilson & Co.—Manufacturing Jewelers. Gold Seal Rings a specialty. No. 193 Eddy street, Providence, R. I.

Studs, Sleeve and Collar Buttons. Gold.

Bucklin, Wm. C.—Manufacturing Jeweler. Studs and Collar Buttons a specialty. No. 38 Friendship street, Povidence, R. I.

Richardson, J. B. & Co.—Manufacturing Jewelers. Gold Sleeve and Collar Buttons a specialty. No. 26 Potter street, Providence, R. I.

THE JEWELER'S CIRCULAR

DEVOTED EXCLUSIVELY TO THE INTERESTS OF THE WATCH, CLOCK, AND JEWELRY TRADE OF AMERICA

A MONTHLY JOURNAL

D. H. HOPKINSON, Publisher, 189 Pearl St., New York. VOL. V.—No. 11. NEW YORK, DECEMBER 15TH, 1874. YEARLY SUBSCRIPTION, $1.00

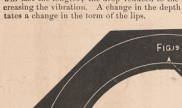
Selections from Saunier's Traite d'Horlogerie.

Translated for The Jewelers' Circular.

BY A. SIBONS.

FORM OF THE LIPS OF THE TEETH.

Watch makers must bear in mind that there are many things to consider in the search for the best form to give to the lips of a cylinder. That form must have the following advantages: the friction must be distributed so that the lips of the cylinder will last the longest; the drop reduced to the smallest possible quantity, thereby increasing the vibration. A change in the depth of the opening of the cylinder necessitates a change in the form of the lips.



INSIDE OF THE LIP.

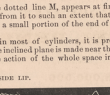
The proper form to be given to the large lip of a cylinder having 196° for the part left whole, is a flat curve such as seen in N, fig. 19. It is almost a straight line running under the inclined of the small lip D. The outside angle must be much rounded, which will have the effect of freeing the tooth sooner, and, also, lessening the outside shock. The inside angle must be very little rounded, which will only allow the drop strictly necessary. With such a form, the friction of the inclined plane of the tooth will be distributed, as much as possible, on the whole surface of the lip, which condition is very important to prevent the wear of that lip.

The second form, which is indicated by the dotted line M, appears at first sight to be very near to the form N, but it is different from it to such an extent that the whole friction of the inclined plane is made only on a small portion of the end of the curve, which will cause the lip to wear much sooner.

As to the circular form R, which is seen in most of cylinders, it is precisely the one which must be avoided. The friction of the inclined plane is made near the center of the half-circle, and the drop is increased by the action of the whole space included between the two dotted lines A and B, fig. 20.

SMALL OR OUTSIDE LIP.

The way the small lip of old cylinders is cut has always been a cause of wonder to those who have had occasion to replace them. That cut which leaves the outside end of the lip untouched, is always deeper at a point where it is either very little or not at all touched by the inclined of the tooth, as can be easily seen with a large model. This proves that the cut is chiefly produced by the point of a tooth badly rounded or polished, and also by the small drop of the wheel when it leaves its rest. Such a fact being stated, we will now explain it. With a small lip having an incline too short, the friction of the tooth is made on the center, and the back of the tooth escapes before it comes to the end of that lip, then the drop is increased the whole distance included between the dotted line lip, then the drop is increased the whole distance included between the dotted lines C and D, fig. 20. The form for the lip which will best remedy these defects is a flat curve so disposed, that the tangent to its center (the line A, fig. 19,) shall point straight to the center of the balance staff. This form corresponds to the line D I B, fig. 19. If we compare that curve to any other shorter, to the curve D V for instance, we will see that the space traveled before the shock on the lip will be diminished all the distance between the lines D I B, and the dotted curve D V. The friction of the tooth will not occur on the center of the lip, but on the outside of it, which will diminish the friction and increase the force of impulsion, since it will act on the end of a longer arm. As for this friction on the same point it is of no consequence, because the small lip of a cylinder is never cut on the outside, but always on the inside of its incline.



In a well-made cylinder, that incline have an arc of about 10 degrees on the circumference, such as the inclined D I B, fig. 19, and it we take the trouble to measure the small lips of a few well-made cylinders we will find very little difference from that quantity, if we find any at all.

It is easy to understand now, the influence which the form of the lips of a cylinder can have on the good performance of a watch.

THE DEPTH OF THE OPENING OF THE CYLINDER.

The form of the lips of a cylinder being known, it is easy to find the paper measure for the depth of the opening. To the 180 degrees representing the half of the circumference, we will add 12 degrees more, experience having demonstrated long ago that such a quantity is necessary for freedom of action. This will give 182 degrees. And now, it we add 14 degrees for the rounding of the large lip, and 10 degrees for the incline of the small one, we will have 196 degrees for the part left whole.

We must observe here that the rounding of the teeth of the cylinder wheel always brings the point of contact a little below the straight plane, or diameter, and that it is almost impossible for the points of contact to be on the same circumference, the same being the case with the backs of the teeth. If we allow for the shake of the pivots in their holes, also for the great difficulty in making a cylinder, and not go beyond the rounding, absolutely necessary for the large lip, which, even in a large model, would seem very little; and if we observe that the point of rest of the tooth will be in Z, fig. 19, we will observe how small will be the quantity Z D in the cylinder of a watch. The opening given to a cylinder which leaves 196 degrees for the part left whole is the most advantageous, the impulsion is received by the cylinder in the best conditions possible, having by the form of its lips all the advantages of a more closed cylinder, without having any of its faults, and it always increases the vibration. The length of the friction on the rests is very little different from that of a cylinder with 185 degrees, and gives a

better impulsion and less drop, while the oscillations of the balance, if not equal, are even better, and differs very little with that obtained by a cylinder of 200° made after the ordinary methods. Practice shows that there cannot be any doubt about the superiority of these proportions, and if we examine some of the cylinders made by old and skillful masters, we will find they were made according to our own principle. The depth of the opening will remain the same for all scapements having an angle of escape of 40 degrees and beyond, but we must increase the depth of this opening for large scapements having angles of escape of only 30 degrees, or else such watches will not commence to run unless we touch the balance, or shake the watch. We have made an experiment on the above facts with a cylinder and three scape-wheels having different heights of inclined planes. The opening of the cylinder was made deeper in two different instances,and the lips repolished so that the part left whole was successively 196, 192 and 185 degrees.

The action having been carefully observed after each changes we found :

1st, We loose on the arc of vibration as many degrees as we take from the diameter of the cylinder, and sometimes more.

2d, A change in the depth of the opening has less influence on the extent of the vibrations, than a change in the height of the inclined panes; which must be so, since the power of the inclined plane remains the same, or very near it, with an opening a little more or less deepened.

3d, In most cases, (except with some watches having large and heavy balances and slow vibrations), if we make the opening of the cylinder deeper, we must raise the hight of the inclined plane.

4th, If we open the cylinder as far as the center, except the projecting of the lips, (which corresponds to 185 degrees for the part left whole) and lower the inclined planes on the tangent, we loose a considerable extent of vibration.

It is a fact well known to all watch repairers, that cylinders with the opening near to the center, such as those at 185 degrees have small vibrations, and such watches give very irregular time. The lips of those cylinders ought to be very little rounded or inclined, but as in the making of them, it is very difficult not to go beyond the theoretical point, the two degrees left for safety of action are often reduced to nothing. The tooth of the wheel strikes on the very edge of the lip of the cylinder, and even on the lip itself, because the point of that tooth being round, not sharp, the point of contact is always below the line of the straight plane. Then we are never certain that the straight plane has its center towards the center of the cylinder, that the wheel is perfectly round, and even if it was, that the points of the teeth are exactly on the same circumference (the hardening and rounding being sufficient to disturb some of them), in which cases we are forced to leave the scapement with too much drop outside, or too little inside. Now, if we notice that the friction on the small lip, being made on an angle, it will wear the sooner, and that the drop on the rest, by reason of the form of the lip, is very considerable we will see that the so-called perfections are simply errors which causes the scapement to be very difficult to adjust, renders the destruction of the parts more rapid, the vibrations less extended, the regulating more difficult, etc., which is a very poor way of improving watch making.

SIZES OF THE AXIS OF THE SCAPEMENT.

By axis of scapment, we understand not ly the cylinder, but also the pinion of e scape-wheel. With too large a cylin- , which is frequently the case in small ches, no equilibrium exists between motive force, the size of the balance, the radii of the rests; all frictions are ased, and a retarding force predomi- s. Then the vibrations being shorter, ction of this scapement is very bad, s soon as the oil thickens, the watches ive very irregular time.

ith a cylinder too small, the cause of h is generally a scape-wheel with too teeth, the impulsion is very weak, se it is produced by too long a lever inclined plane being too short, passes ick, and we must raise it considerable—two things which necessitates the increase of the motive force, and we well know that an excess in that direction is a cause of irregularity and destruction. If the scape pinion is too large in proportion to the radius of the wheel, the defects of the pitching will be more felt by the scapement, and, of course, the balance will loose much of its viteration.

SIZE OF CYLINDER SCAPE WHEELS.

In manufactories, the workmen generally leave the fourth wheel too large, giving as a reason that it will admit a larger scape-wheel. The relative size of wheel must follow the decreasing progression of the motive force. The fourth wheel must rather have more teeth than not enough, and they should be finer, which will admit a pinion not too large, and yet not too small to rivet the scape wheel on to it. As for the scape-wheel, if we are forced to have it large, we can make it with one tooth more, and make it lighter. We must never forget, however, without going to extremes, that it is generally preferable to have the scape-wheel smaller, with a heavier balance, than a larger wheel with a light balance.

Amber.

The French *Revue Scientifique* publishes a report of one of the sittings of the International Congress for prehistoric anthropology and archæology held at Stockholm, from which we borrow the following particulars about amber, which, as is now generally admitted, is a fossalized vegetable pith. The trade in this article had two starting points in antiquity: the southern coasts of the Baltic and those of the North Sea. Sicily has amber to this day, especially on the Catanian and southern coasts, and seems to proceed from the tertiary beds inland. In Scandinavia it was known from the earliest periods, witness the treasure discovered not long ago at Jœnkœping, which contained upwards of 200 pieces of that material. There was very little of it in Sweden during the age of bronze; but in the subsequent age of iron it became very abundant, it would appear to have been the favorite jewel of the Vikings. From that time it was exported to a great many regions. In Italy the Etruscans knew it; it has been found also at Marzabotto and Villanova. That of Northern Italy is too rare to warrant the supposition that it was a produce of the country; it very probably came from the Baltic. Pliny s ys the Greeks and Romans derived theirs from Germany. As for the Sicilian sort, it rather belongs to modern times, since it was first mentioned in 1639. Aldrovandus mentions amber in quoting Strabo, and says it is to be found in Liguria; but there is none there now. The amber of Bologna is red, brittle, and hard to work; it exists in beds, and was escribed by Marsigli in 1666. The amber of Marzabotto and Villanova is of the same kind; at Felsina yellow specimens have been found. Hence it may be inferred that the Etruscans first used the amber of Italy, and then got the yellow sort from the North as an article of trade. At present, amber is chiefly derived from coasts of the Baltic, comprising those of Prussia, Courland, and Livonia; and also from those of Juland, the Cimbrian Chersonesus of the Ancients, which was first visited by Pytheas, the mouth of the Elbe, or Tanais, being the centre of the amber trade in those days.

MESSRS. SCHWOB BROS. & Co., manufacturers and importers of watches, No. 173 Broadway, New York, and 293 Notre Dame street, Montreal, Canada, have become general agents for the International Watch Co.'s movements Messrs.Schwob Bros., of Montreal, are an old established firm, well and favorably known throughout the Dominion. The experience and enterprise which they bring will insure the Watch Company a brilliant and prosperous career.

On an Improved Method of Constructing the Dead Escapement of Clocks.

By Benjamin Lewis Velliamy.

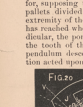
Continued from September Number.

1329. (This part is very much abridged in the translation.) To describe the angle of escapement, prolong the line, A B to F. See Fig. 19, and draw the angle,

F A G, of 5°, the point D, where the line, A G, intersects the circular face of the pallet, determines the length of the pallet; for the wheel, in passing the pallet, causes it, by its action on the inclined plane, to describe an angle of 5° to have the inclined plane, draw the line, D B, passing through the points, D and B, where the straight lines, A F and A G, which form the angle, G A F, intersect the portion of circles, D S and H T.

1330. "To draw the inclined plane, C E, it is to be observed, that, as the pallet, D B, is drawn 2° within the circle of the wheel, it follows that the pallet, C, must be situated without the same circle, and ready to come into action as the other pallet escapes from the wheel. Prolong the line, a, c to h, and draw the angle, H A I, of 5°, which will determine the measure of the inclined plane, C E; it only then remains to draw the line, C E, which passes through the points, C and E, where the straight lines, A H and A I, intersect the portions of circles, C P and E Q; thus will be given the inclined plane which is to terminate the pallet, and so situated that when the tooth, C, shall have led the pallet without the circle of the wheel, a quantity equal to an angle of 5° the pallet C E, shall also be led an angle of 5°, and within the wheel; consequently, when the tooth, R, shall have led the pallet to escape, the pallet, C, will have described an angle of 5°, whence it follows that the total lend of the escapement will be 10°."*

This is a mistake; the total quantity that the pendulum is led being an angle equal to the angle of lead of either of the pallets, (it is supposed that the angles of the two pallets are equal to one another, as they ought to be) and the pendulum is led nearly an equal angle, ascending and descending on each side of zero (or the perpendicular line on the degree plate,) by each pallet alternately; but the advance of the wheel, also consequently, the friction upon the inclined planes of the pallets, is not uniform during the ascending and descending of the pendulum at each vibration, but exists upon a greater proportion of, and is consequently greater upon, the pallets as the pendulum ascends than as it descends; for, supposing the inclined planes of the pallets divided at that point which the extremity of the tooth of the scape-wheel has reached when the pendulum is perpendicular, the portion of the inclined planes on the side the wheel acts upon, as the pendulum descends, is less than the portion acted upon as the pendulum ascends.



It is possible to make the inclined planes of the pallets so long that the angle of the total vibration of the pendulum will not exceed the angle of lead of the pallets, in which case it will be visible that the total angle the pendulum is led is only equal to the angle of one of the pallets. M. Berthoud has fallen into the same error at No. 599. To illustrate as much of the above as refers to the irregularity of the friction upon the pallets, suppose Fig. 20, the pendulum at rest, and perpendicular upon the line, X W, bisecting the angle, Y X Z (which angle is equal to the angles, B X P and D X Q, of lead of the pallets) and the lines, A B and C D, the inclined planes of the pallets; the dotted lines, E F and G H, will represent the lines of the inclined planes, when the pendulum subtending the line, X Z, is led to the extremity of the lead one way; and the dotted lines I K and L M, the inclined planes when the pendulum subtending the line, X Y, is at the extremity of the lead in the other direction (it cannot be too often repeated that the angle of lead must not be confounded with the angle of vibration), and the points, N and O, where a supposed circle, circumscribing the points of the teeth of the wheel, intersects the inclined planes, A B and C D, are the points upon one or which (determined by the points from which the wheel has last escaped) the wheel will be in contact with the pallet, when the pendulum, having advanced half the angle of lead, subtends the perpendicular line, X W. Now it is visible that the portions, N A and O D, of the lines, A B and C D; which are the parts of those lines the teeth of the wheel act upon when the pendulum ascends, are greater than the lines, N B and O C, which are the portions the teeth of the wheel act upon when the pendulum descends; consequently, the velocity with which the wheel advances is not equal during equal portions of the lead of both pallets, by altering the shape of the inclined planes of the pallets from straight lines to portions of circles, the advance of the wheel might be made nearly proportionate to the advance of the pendulum, that is, during the pendulum to subtend the perpendicular line, X W, and, consequently, to have vibrated half the angle it is led, and, if the inclined plane of the pallet, J, instead of being the straight line, D C, to be a portion, D T C, of a circle, passing through the three points, D S (where the radius, E W, bisects the arc, M G, of a supposed circle circumscribing the wheel,) and C; the consequence resulting from giving this shape to the pallets will be, that the wheel will have advanced to the point, S, half its total advance, and have acted upon very nearly half the surface of the pallet, when the pendulum has vibrated half the angle it is led; for the portion, C S, of the circular face of the pallet upon which the wheel has acted during its advance from the point, G, to the point, S, is less than the portion, S D, of the pallet upon which it must act during its advance from S to D, by the quantity, S T; which difference between the arcs, C S and S D, is very trifling, when compared with the difference between the straight lines, C O, and O D, which form the inclined plane, C D. The same effect takes place in the pallet, U, but, from the relative position of the parts, in a much less degree; the circular face of the pallet requiring to be a portion of a much larger circle; and here it is worthy of notice, that the faces of the two pallets being portions of different circles, the one is, in fact, a longer line than the other, and consequently, with circular faces as just described, there is more friction on one pallet than on the other; and more on both than when the acting faces are straight lines. The proportional advance of the wheel and pallets was probably considered by Mons. L. Berthoud (chronometer maker to the French Navy during the period of the Republic,) of great importance in the case of the dead anchor escapement, when applied to watches; he having given this shape to the pallets of some of his box marine chronometers, that I have had an opportunity of seeing. The friction is also unequal upon the rests of the pallets, without regard to the shape of the inclined planes, whether straight or curved; for the arc of vibration on each side of zero on the degree plate must necessarily subtend equal angles, and the angles of lead on each side of zero being also

equal, it necessarily follows that the angles of rest must be equal; but the rests of the pallets being at unequal distances from their centre of motion of a quantity equal to the thickness of the pallet, it also follows, that though the arcs which subtend the angles of rest subtend equal angles, yet, that one of them must necessarily be larger than the other, being a portion of a larger circle; and consequently, the friction greater upon the one than upon the other; the difference, however, is very small, and this is an evil that from the construction cannot be avoided. It is scarcely necessary to add that for the clock to be in beat it is requisite, not only that the angles the pendulum is led should be equal, but the angles of rest, on the circular faces of the pallets, should also be equal; otherwise, the total angles of vibration on each side of zero, on the dead-beat plate (which represents the perpendicular line when the pendulum is at rest), will not be equal, and consequently, not be performed in equal times. The above observations will, I believe, be found to be of universal application in this construction of the dead escapement.

111. "The escapement thus drawn will be a dead escapement, because it is formed of portions of circles concentric to the point A. (196.) but," &c.

The late Mr. Cumming, F. R. S. E., in his *Elements of Clock and Watch Work*, London, 1766, page 43, No. 176, states that Graham made his pallets take over twelve teeth. In his Plate ii., in which he represents the dead escapement drawn on a large; and in detail, Mr. Cumming places the centres at the distance of exactly one diameter of the wheel apart, and makes the pallets take over eleven teeth; and in a note, p. 44, he expresses himself thus:

"Fig. 3, Plate iii, (Cumming's Work) exhibits at one view the length of the pallet and the distances of the centre of the verge from that of the swing wheel, according to the number of the teeth of the wheel which the pallet takes in, from two to twelve. In the plate of this elementary work, the number of teeth taken in by the pallets from three to thirteen, not from two to twelve, as stated in the text, and as marked in the figures in the plate. Fig. 4, Plate v., represents the centres of pallets taking in from three to thirteen teeth, as represented in Mr. Cumming's figure. It is worthy of notice that in the pallet taking in thirteen teeth the distance between the centres, supposing the tangents drawn from the points of the teeth (see Fig. 5, Plate v.,) is not exactly one and 1 diameter of the wheel, the distance determined by the supposed rule of Graham's, but a little more. The wheel is supposed to be a wheel of thirty teeth, by which it appears that the distance of those centres is the secant, and the length of the pallets the tangent of half the angle subtended at the centre of the swing wheel by such number of teeth. "To illustrate Mr. Cumming's


FIG 22

observation respecting the secant and tangent of half the angle of the number of teeth taken over; suppose the case of the pallets taking over twelve teeth (see Fig. 4, Plate v.) D C, the distance between the centres will be the secant, and D B, the length of the supposed pallets, the tangent to the angle, A B C, which angle is half the angle subtended at the centre of the wheel by such number of teeth. Here, Mr. Cumming determines the centre of action of the pallets by tangents drawn from the points of the teeth of the wheel; which, as will shortly be shown, is not the most correct method.

To be continued.

Gold.

No. II.

ALLOYING GOLD.

In a previous article we described the various methods of refining, softening and testing the quality of gold, and in the present we design giving a few suggestions on gold alloys.

The quality of gold alloys is measured by the term karat or caret, and frequently the simple abbreviation k is used. The karat of the civilized world consists of four nominal grains which is a little lighter than four grains troy, it requiring 74 1-16 karat grains to balance 72 troy grains. In estimating or expressing the fineness of gold, the whole mass spoken of is supposed to be divided into 24 equal parts, and the number of those parts which are fine gold determines the quality. If 16 of the 24 parts are fine gold and 8 are of baser metal, the quality is 16 karat. If 22 parts of a mass are fine gold and 2 parts are base, the mass is 22 karat fine. Fine gold, that is gold chemically pure is divided into the same 24 parts, and as each part is pure gold the mass is 24 karat fine. Half the parts fine gold, and half base metal is 12 karat fine. The money value of the base metal which has been added to reduce the quality of the gold does not at all enter into the determination of the quality of the alloyed mass. Whether we add silver or copper or brass or a mixture of all of them, the number of parts of fine gold denotes the quality of the mass. Intrinsically the value of 12 karat gold, alloyed with silver only is poorer than 12 karat gold alloyed with copper, by the difference in value between silver and copper, but nevertheless both alloys are 12 karats fine. A new and very intelligible nomenclature has lately been adopted by the government assayers. Gold or silver which is chemically pure is called 1000ths fine, it being understood as consisting of 1000 parts of pure metal. If 500 parts be gold, and 500 parts be some other metal, the alloy thus formed is said to be $\frac{500}{1000}$ fine, which is equivalent to 12 karats of the old nomenclature. To reduce the quality of gold, as expressed in karats to 1000ths, it is only necessary to know that there is 41⅔ thousands of fine gold in 1 karat, and the number of karats multiplied by 41⅔ gives at once the 1000ths fine. Conversely to convert 1000ths to thousandths, it is only necessary to divide the thousandths by 41⅔.

Gold will readily unite with nearly all the metals, making numerous alloys all of more or less usefulness. Gold has a strong affinity for iron, and unites readily with it and steel. Eight per cent. iron in a pale yellow gray color, very ductile and tenacious and harder than gold, 15 to 20 per cent. iron has a gray color and takes a beautiful polish, 75 to 80 per cent. iron is so hard as to be very well adapted for cutting instruments and is nearly the color of silver. Copper has also a great affinity for gold and will unite with it readily in any proportion. A very little copper sensibly alters the color of gold and almost any desired color may be obtained by a skillful admixture of silver and copper. The maximum hardness of copper and gold alloy is attained by the use of one-eighth copper. All gold alloys are more fusible than pure gold. Silver and gold also unite in all proportions, the maximum hardness being obtained with one-third silver.

The green gold of jewelers is 79.8 gold and 29.2 silver. In order to deepen the color of gold and silver alloy the following composition is sometimes used:

1 ounce yellow wax.
2 " calcined alum.
12 " red chalk.
2 " verdigris.
2 " peroxide of copper.

All these ingredients except the wax must be ground to an impalpable powder, and mixed with the melted wax, which is moulded when plastic into sticks like sealing wax. The surface of the gold to be darkened is rubbed over with the mixture and heated till the wax is all burned off and the article is then washed in the following liquid:

1 pint water.
2 ounces ashes of calcined crude tartar.
2 " common salt.
4 " sulphur.

If designed to be bright the surface must be burnished and not polished.

Manganese 1 part and gold 88 parts form a pale yellow gray alloy of considerable lustre and hardness, but little ductility. Nickel and gold produce an alloy of brass yellow color, quite brittle. Tin and gold form an alloy more fusible than pure gold, and is somewhat ductile when cold, but crumbles easily at a red heat. Zinc in very small quantities renders gold brittle. Melted gold will absorb sufficient of the vapor of zinc to render it brittle. Lead in a quantity so minute as one five hundred thousandth part will impair the ductility of gold.

In alloying gold, when pure metals only are used, there is no possible source for error. If ten pounds ounces, pennyweights or grains of nominally pure gold be melted with fourteen pounds, ounces, pennyweights or grains of some other metal, it will produce 10 karat alloy to a certainty, but if 10 pennyweight of gold *coin* be melted with 14 pennyweight of some other metal it will not produce 10 karat alloy because the gold coin is not 24 karats fine. When alloys of various qualities are compounded with each other, the resulting mixture is a little more complex, for example melt together

11 ounces gold,		23	karats fine.
8 "	"	14	"
6 "	"	24	"
2 "	base metal.		

The resulting quality is easily found by multiplying

11 ounces × 23 253
8 " × 14.....170
6 " × 24 144
2 " × 0 000

27 ounces. 567 karats.

$\frac{567}{27}$ = 21 k. for the quality of the mass.

The complication increases somewhat when it is desired to produce an alloy of 18 karat from alloys of several different qualities, say, 12, 22, 15 and 20 karats fine. Then it becomes necessary to know exactly the *quantity* of each to be taken to produce the desired quality. The necessary rules will be given without entering upon an explanation of them. Write down the statement of the problem in this form

18 karat: 12 4
: 15 2
: 20 3
: 22 5

Link by a line any quantity of alloy *greater* than the desired quality, to one that is less, and set the difference between the given quality and the quality sought, opposite to the number to which it is linked, and it will show at once the quantity of each kind to be taken to produce the 18 karat desired. In proof that the result is correct we have

4 dwt	× 12 karat	=	48
2 "	× 15 "	=	30
3 "	× 20 "	=	60
6 "	× 22 "	=	132
15			270

270 ÷ 15 = 18 karat, the quality sought.

By the aid of these examples any person may figure out any combination of qualities and quantities which may arise in mixing of various grades of gold in order to produce the desired quality.

The Goldsmiths' Art.

FROM THE EARLIEST TIMES.

The fraternities of painters in Italy began to encle themselves in Sienna and elsewhere as early as the twelfth century. The artist, as distinguished from the skilled workman or artisan claimed no privilege of rank for many generations afterwards. Not, indeed, till intellectual distinctions had separated men, and elevated some in various walks from common employments and waste of their time, did several considerations follow, and that only in the age immediately preceding the highest development of Italian art. These fraternities or guilds consequently embraced many trades as well as the painters of pictures, who were then exclusively makers of altar-pieces and decorators; armourers and locksmiths, heraldry painters on banners and tabards, were also associated in the same brotherhood. In Florence, the painters enrolled themselves as a branch of the society of physicians and apothecaries.

But of all the different specialities associated with art, the working in gold and silver has, nearly in all ages, taken the highest place. The mysteries of enameling, and of modeling, casting, carving, chasing, graving, niello working, seal cutting, and the setting of precious stones, were all branches of his profession, and combined in the goldsmiths' workshop. The circle of his knowledge was wider than that of the previous painter or sculptor, as he required all the science of the day in refining and treating i ts metals. Thus we find his guild the richest and most important of all the corporations in the cities furthered advanced in the arts of luxury; and we do not now need to learn that some of the greatest architects, sculptors and painters, were educated as goldsmiths. Printing from engraving, one of the most important of the fine arts, originated by accident in one of his processes. The goldsmith of later times has shrunk into narrower dimensions, but still the artistic talent he commands in designing, modeling in wax and chasing, is of a more educated description than those employed in any other branch of industry, and is perhaps more highly remunerative.

Among the ancients, the precious metals were very largely employed, and personal ornaments of all descriptions were in immense request. These abound in museums, although the value of the material is fatal to sculpture in gold or silver, and to the preservation of all objects in which they are employed, so much so, that the specimens of goldsmiths' work of classic times are only those that have been preserved by accident. The same, indeed, may be said of the early works of England and of the middle ages of Europe, scarcely can even the insignia of royalty be preserved from one dynasty to another, and the vessels of the church, although accounted sacred by the priests, sooner or later are carried to the melting pot. Within the last two years, large quantities of Mecca church plate has been secured at the New York Assay Office and consigned to the crucible. Nevertheless the productions of the jeweler's skill still preserved on the Continent are sufficient to illustrate the history of his art from the earliest time, and the antiquity and universality of the love of jewely are sufficiently proved by the number of bracelets for the arms, fibulæ or buckles for the shoulders or chest; torques or necklaces to clasp the throat, an ornament worn by men; rings, ruches, and many other disused personal adornmenes, found in the soil or in graves They also show that gold has existed in large or small quantities nearly everywhere in Europe, and that it has been used as early as any metal, perhaps earlier than any other, as it presents itself in all its purity in beds of streams,

or nearly in mechanical combination with earth and earth. In England, in Scandinavia and elsewhere, quite out of the influence of Asiatic example, gold was used as the medium of exchange in various shapes. A few years ago, a number of the gold rings, or small trumpet-like shapes, used as money by the Britons were turned up in Northumberland, England, hooked together like a chain. Chinese coins are perforated in the centre and kept together on a wire or string. These British rings were connected to be carried and preserved by being hooked together; the gold being unalloyed, and consequently very ductile, they could be detached by bending.

Some of our old examples of goldsmiths' work are enamelled, and have been already mentioned. A few others, such as the pectoral cross, maniple, and other vestments, found with the bones of St. Cuthbert on the opening of his grave in Durham, in 1827, do not present much claim on our attention. Indeed, the remaining examples of the art in England of much later times are too few to illustrate any history however briefly. Even in the Tower, or at Windsor, there is little or no native workmanship. Even the time honoured regalia and sceptres were pledged by the English Kings in their necessities; and Henry VIII. went a step further, and used up such as could be spared for coinage. On the establishment of the Commonwealth, such as remained were entirely swept away. The coronation of Charles II. having attracted to it a display of want of the necessary appliances to the ceremonial. To preserve the Scottish regalia, again, which, however, are not ancient, they were hidden for many years; first by a clergyman in the floor of his church, and subsequently in a strong box in the Castle of Edinburgh. Neither is the church and corporation plate still existing of much consequence. Few, indeed, go further back than the end of the fourteenth century. The most noticeable—nearly all later than that date—are the cups, salts and a few other things, belonging to the colleges in Oxford, left to them by their founders. We must, therefore, take a general view of the working in precious metals on the continent of Europe. The large loose mantle, very much resembling the upper garment of Roman Civilians, seems to have been indispensible to both Saxon and Celt. Turning over the plates in "Strutts Dresses and Habits of the People of England;" it appears to have been generally worn except by the workman at his time. This simple drapery was clasped generally on the left shoulder, and the number of buckles for this purpose, found throughout Europe, proves the use to have been universal. Some of these, Irish and Scotch, have been imitated of late, so as to make their forms popularly known. The Saxon carved the fashion to an extreme; the shape was very fantastic, and the size very large; one found in Yorkshire, England, now in the possession of Sir W. Lawson, being nearly seven inches in length. These were, however, made of various metals, the large one being of bronze; but under the title of goldsmiths' work must be included all artistic uses of metals for ornaments of small size. The same processes and the same skill were necessary towards the production of the jewelled chalice, the parcel-gilt copper goblets, or even the pewters of later times.

The guilds of goldsmiths are more ancient than any other. In the eleventh century, in France and in England, they were divided into four classes, the buckle makers, the moneyers, the makers and mounters of cups, and workers in gold. Their art and mysteries had been preserved from the times of the Empire. Before Constantine removed the capital sent to Byzantium, he presented the Roman churches with very magnificent gifts for the altar, thereby commencing that system which so materially added to the importance of the mediæval church, and which makes it necessary to refer to it for illustrations of recondite the story of any of the decorative arts. These gifts comprehended crosses of gold weighing 200 lbs., patens of gold of large dimensions, chalices of gold and silver, crests for the wine, lamps and lustres of different forms enriched with figures of animals, baptismal fonts, altar frontals, censers, and even statues, it is said, of gold and silver.

But it was in the new Capital that the arts most flourished, especially with more purely appertaining to luxury, as the goldsmiths for the most part must be considered as doing. Simon magnificus at this department rose to a high pitch; Chrysostom preached against pride and vanity, says all the admirers of his day was reserved for the goldsmith and the wearer. About the same date we find in France some evidence of this luxury, in church plate at least, having penetrated to the west. But the earliest remaining specimens remaining are Lombard, now or lately in the Cathedral of Monza, the most interesting of which is the so called Iron Crown of Lombardy, a painted circlet or collar of gold, about three inches wide, loaded with sapphires, emeralds, rubies, and other precious stones, in an uncut condition. The iron which gives it its name is a narrow rim of that metal incrusted in the interior, traditionally related to have been forged out of one of the nails of the Cross. The chair or throne of King Dogobert, now to be seen in the museum of the Louvre, is not very much later than that in the Crown of Lombardy. It is of bronze seal, engraved and gilded, supposed to be the work of St. Eloy, Treasurer and mint-master to Dagobert till 640, when he was made a bishop. This Saint, like our Dunstan, was an adept in metals, and assembled monks skilled in all the arts in a monastery he founded near Limoges, whether actually his or not, this kingly chair is an interesting monument of that early time—two centuries before Charlemagne—if, indeed, it be not for the most part Roman. M. M. Martin and Cahier in their Mélanges Archæologiques, having nearly proved it to be a church chair, with the back and arms added; these being, in fact, the only portions that could have been the handiwork of the Saint.

Curiosities of Clocks and Watches.

By Edward J. Wood.

In Brayley and Britton's 'Description of Cheshire,' in the 'Beauties of England and Wales,' we read that at the Vale Royal Abbey, which was in 1801 the residence of Thomas Cholmondeley, and since of Lord Delamere, was a watch said to have belonged to Charles I, and to have been given by him to Bishop Juxon upon the scaffold. This watch came into the Cholmondeley family by an intermarriage with the Cowpers of Overleigh, near Chester, who were related to the Juxon family.

In Sir Harold's 'Sussex,' published in 1835, we read:—

"In the chancel of Ashburnham Church are kept, in a glass case lined with red velvet, some relics of the unfortunate Charles I. These consist of the shirt, with ruffled wrists (on which are a few faint traces of blood) in which he was beheaded; his watch, which at the place of execution he gave to Mr. John Ashburnam. * * * These articles have certainly been carefully preserved. Long were they treasured by as precious relics, fit only to be gazed upon by the devotees of the Icon Basilike. At length, however, the charm was broken by Bertram Ashburnham, Esq., who, in 1743, bequeathed them to the clerk of the parish and his successors for ever, to be exhibited as great curiosities." The correctness of the legend as to the gift of the

watch by the king may be doubted. It would seem that John Ashburnham was not near the king on the morning of his execution, and certainly not upon the scaffold with his royal master; the watch therefore could not have been given to him at the place of execution.

The late president of the British Archæological Association, Ralph Bernal, had a large silver watch, which was made by Richard Bowen of London, and is said to have been given to Colonel Hammond by Charles I. whilst at Carisbrooke. It has two cases, the outer one chased and engraved with a border of flowers, and a figure of the king praying. On the back of the inner case is engraved another praying figure of a man in a gown, with Christ above, and the following legend in a scroll: "And what I sai to you, I sai unto all, Watch." When Charles was being removed from Carisbrooke to Hurst Castle, on November 30th, 1647, he gave Mr. Worsley, who had risked his life for him, his watch, saying, "This is all my gratitude has to give." The watch is still preserved in the family. It was exhibited at a meeting of the above association when at Shorwell in 1855, at the residence of Miss Worsley, to whom it then belonged. A drawing of it was exhibited by Mr. Joseph Lionel Williams at a meeting of the British Archæological Association, held in August, 1845. It is of silver, of rather large size, and an inch in thickness; it works with catgut instead of a chain—and the face and back of the inner case are very richly engraved. It is a repeater watch, and has nineteen openings in the outer case for the escape of the sound. It has the maker's name, "Johannes Bages, Londini, fecit."

At a meeting of the Archæological Institute, held at Gloucester in July, 1860, Mr. D. I. Niblett exhibited a watch which had been given by Henrietta Maria, the queen of Charles I., to General Rudhall.

Mr. Charles Reed, of Paternoster Row, writing to 'Notes and Queries' in 1860, says, "In 1855 I received from a person who had emigrated to Australia a bracket clock, with a request that I would accept it as a token of his gratitude for some slight service I had been able to render him. The time-piece did not appear to be of any special value, but his letter informed me that the works were constructed from the 'celebrated Van Tromp's watch.' * * Upon the dial-plate I find the name of 'Booth, Pontefract.' Inside the stand I have discovered the lower half of a saucer-shaped cover of shagreen, and the works, as adapted to this clock, exactly fit into this cover. The works are evidently of foreign manufacture, the mainspring is in perfect order, and the keys are attached. The watch face was probably removed by Booth, who went to America, and died at Brooklyn, L. I. We remind our readers that the Dutch admiral, Van Tromp, sailed with his fleet through the Straits of Dover in May, 1652; and was beaten in an engagement there by the English under Blake.

In the Ashmolean Museum, Oxford, is a watch which is said to have belonged to Oliver Cromwell. Mr. J. H. Fawkes, of Farnley Hall, had a watch which is also stated to have been once owned by him. It bore the name of Jaques Cartier as the maker, and was a clock-watch, which struck the hours; the outer case was of leather, perforated, and studded with silver. In Scott's "Antiquarian Gleanings in the North of England" this watch is said to be a repeater, by which no doubt was meant a striking-watch. The repeating movement was a later date than this specimen. At Chequers Court, Buckinghamshire, the seat of Lady Frankland Russell, is a watch which once belonged to Cromwell. Messrs. Hawkesley & Co. have an ancient silver watch, with a glass covering to the face, the maker being Young, which also is said to have belonged to the same individual. In the "Gentleman's Magazine" for 1808 is an engraving representing three views of a watch which formerly belonged to him, and which he took out of his fob at the siege of Clonmell, and presented to the ancestor of Colonel Bagwell, whose it then was. The name of the maker, William Clay, was engraved on the work inside. The outer, or golden circle, indicating the day of the month, revolved one division every twenty-four hours; whereby the number of the day was opposed to the index hand above. This watch is now in a private room at the British Museum.

It is related of Charles II. that when he was present at the amusements in the Mall, his watchmaker, Edward East, used to attend him, as a watch was often the stake played for. Watches would seem at this period to have been curiosities, and their internal mechanism a marvel. We find gossiping Samuel Pepys, then Secretary to the Admiralty, visiting Lord Brouncker, and feasting his eyes with a sight of the movements of his lordship's watch. In his 'Diary' he thus records his visit, which was on December 22d, 1665: "I to my Lord Brouncker's, and there spent the evening by my desire in seeing his lordship open to pieces and make up again his watch, thereby being taught what I never knew before; and it is a thing very well worth my having seen, and am mightily pleased and satisfied with it."

In the "Mirror" for 1833 is an engraving representing a curious heart-shaped watch-key, the original of which was given by Charles II., to the Pendrell family, as a mark of his gratitude for their having been very instrumental in his preservation. It was the size of the engraving, and made of the heart of oak; it was about three-eighths of an inch thick, was faced on each side with a plate of silver, and was surmounted by an acorn of the same metal. On one side was engraved a branching oak, with the head of Charles II.; and on the other was the following inscription:—"Quercus Car. 2d. Conservatrix 1651." The pipe of the key was of brass. This relic was in possession of Mrs. Cope, of No. 3, Regent street, Westminster, who was a descendant of the Pendrell family.

To the French we are indebted for the art of painting in opaque enamels, and for the application of it to the ornamentation of watch-cases. In 1630 Jean Toutin, a goldsmith of Chateau Surr, and a great master in painting in transparent enamels, applied himself to the use of thick colors of different tints, which should melt with fire and yet retain their lustre. He succeeded; and, as he used thin plates of gold for the foundation of his work, this style of enamel painting became available for a variety of ornamental purposes. Toutin did not keep the discovery to himself, but generously told his fellow-artists of it. Dubie, a goldsmith, who worked for the king at the Louvre, was the first who distinguished himself in his new work. After him came Morliere a native of Orleans, who worked at Blois, and employed himself chiefly in painting rings and watch-cases; but he was excelled by his pupil, Robert Vanquer, of Blois, who produced works superior to his master, both in design and in color. He died in 1670. Chartiere, of Blois, was celebrated for his beautiful paintings of flowers; and Huand le Puisne, for figures.

In 1846, Mr. O. Morgan exhibited at a meeting of the Society of Antiquaries a watch, the enamel case of which was the work of Toutin; the subject of the outside painting being the "Histoire d'Apian," as an inscription near the pendant indicated. The inside of the case was painted with landscapes in enamel; the dial also was enameled, having a subject of figures in the centre, surrounded by a white circle, on which were marked the hours. This was perhaps the first instance of an enamel dial-plate, and as the date of this watch was about 1635, we may assume that watch-dials were first enameled about that time.

At a meeting of the Archæological Institute held on June 6th, 1862, Mr. Morgan exhibited the following remarkable series of watches exemplifying the application of enamel to the enrichment of personal ornaments. A watch, the case of which was ornamented with flowers in opaque and transparent enamels, the date being early in the seventeenth century. An exquisitely finished enameled watch-case, the work of Jean Toutin, the inventor, the date being between 1630 and 1640, and the subject, Nymphs bathing, after Polemberg.

To be Continued.

PRIZE ESSAY.
The Compensation Balance,
AND ITS ADJUSTMENTS IN CHRONOMETERS AND WATCHES.

By W. B. CRISP.

From the British Horological Journal.

CHAPTER IV.

is desirable that a Statement be given of the causes of error, and of the Laws that connect the changes of Temperature with the times of oscillation.

The cause of error of the compensation balance is simply this:—The balance is at rest does not quite the center fast enough to exactly compensate for the loss of the elasticity of the pendulum spring; and that in cold it recedes from the center too fast, or does not act in a geometrical ratio to exactly compensate for the spring's elongation by heat, or by its increased elastic force in cold.

The Astronomer Royal, by a series of experiments, in the year 1859, tried upon a chronometer with a plain uncompensated brass balance, by which it was shown that there was an uniform decrease of rate for equal increments of temperature measured by a mercurial thermometer, amounting to 6·71 secs. in 24 hours for each degree of Fahrenheit's scale. I believe no other authentic table was ever published in this country, although the celebrated geometrician, Daniel Bernoulli (C. Frodsham on "The Expansion of the Balance Spring,") conjectured the same in 1747. It was established as a matter of experience by Dr. Thomond in 1773, with the following result:—One of his marine watches, in passing from 0° to 32° (Reaumur), 32° (Fah.), gained; it was found that the loss per diem by—

	Seconds.
Expansion of the balance was	62
The loss of spring's elastic force 312	
Elongation of the spring	19
	Min. Secs.
	Secs. 3'30or 33

By a study of the table published by the Astronomer Royal, it will be seen that the error is the same with an uncompensated brass balance of 6·71 seconds for every degree of temperature. The change is regular and uniform, passing through heat, cold, and intermediate temperature. Many watch-makers are not aware of this great error of 6·71 secs. in 24 hours for every degree of temperature in a watch with an uncompensated balance; and before commencing the adjustments of a chronometer or watch, it will be well to consider the amount of error to be compensated for in a range of temperature of 60°, which is 6¼ minutes; and this error the ordinary compensation balance will correct to within ⅓th of a second for every degree of temperature. From what has been stated in the former Chapter, the error has been shown to be 6 seconds for 60° of temperature. Now, strictly speaking, does not take place in geometrical proportion, nor will the error be so much as one second for the first 10 degrees but its error is thus:—

	Seconds.
For 10°	0·3
" 20°	1·2
" 30°	2·7
" 40°	4·8
" 50°	7·8
" 60°	10.8 or 36

times the amount of the first error of ⅓th of a second for 10°, and so on increasing as the square. But by compensating the balance and dividing the error, the following results will be given by a chronometer timed in 60° range of temperature—

	Seconds.
At 90° =	0·0
" 60° ×	2·7
" 30°	0·0

and on the other hand, the performance of the same chronometer with all the error carried over to the cold, will be

	Seconds.
At 60° =	0·0
" 90° =	0·0
" 30°	6·1

thus proving the error to arise through the balance altering its form by the elongation of the arm by heat, and the shortening of the same by cold, carrying with it the rim; thus altering its shape, and not remaining a true or a perfect circle under all changes of temperature. The balance by its proper adjustment can be made to go accurately at two points of the thermometer, but at no other as seen by the diagram Fig. 1. The arcs of the balance, being composed of brass and steel, are so effected by heat as to curve inwards, carrying the weights upon them nearer to the center, and thus diminishing the effective diameter of the balance at the same time that the strength of the spring is relaxed. But the centre of gravity of these arcs does not approach or recede from the centre in a straight line. Excess of curvature would cause each arc to take a spiral form; and in some positions the weights approach the center more from the center than in others. Hence it is found that as the arcs straighten outwards, the amount of movement increases in a greater degree than the spring becomes strengthened. If we connect the centre of gravity of the compensation weight with the junction of the arc with the arm of the balance by the dotted line D, we shall see that a decrease of temperature, straightening the arc, increases the length of this dotted line. The amount of onward motion is therefore gradually increased as the temperature falls, and with it the inertia, and the chronometer loses. Drawings have been made and theories asserted, but I doubt any claim, by comparison of the tables given by the Astronomer Royal that the real error of the ordinary compensation balance is one tenth part of a second for every degree of temperature; and that the theory even of ordinary construction is capable of correcting, and does correct, nine-tenths parts of the whole error of 6¾ minutes for a range of 60° of Fahrenheit's thermometer.

This is the true cause of error that cannot be compensated for without the addition of auxiliary compensation or checkpieces, or by balances of similar construction to Mr. Hartnup's, Mr. E. J. Dent's, or Mr. Kullberg's—the latter, as before stated, apparently combining the principles of the other two gentlemen's inventions. But in a commercial point of view no balance for general good performance has taken the place of the ordinary constructed compensation balance, which if well and properly adjusted, its error is shown and takes place as regularly as temperature is indicated by mercury on the scale of a thermometer.

In the works of a chronometer or watch the barrel and fuse revolve so slowly that its motion is quite imperceptible; and through the teeth of this wheel is conveyed the power or force, which puts the whole instrument in motion. Again, the escape wheel revolves with great rapidity, but with so little apparent power, that a very slight opposing pressure will stop it altogether. Loss of power; from failure of the oil, friction, defective compensation, where will be the fine performance then unless the chronometer has had its horizontal and compensational adjustments carefully set to all intervals of temperature? The chronometer represents itself to be a timekeeper (with an error, it is true), which can be tabulated with a degree of accuracy almost to determine the longitude within a mile for any distance.

CONCLUSION.

In writing this essay on the Compensation Balance and its adjustments, it has been my object to adhere strictly to the conditions for which the essay was to be written, and to give as much practical information upon the subject as my humble ability permitted. I have carefully avoided all theories and probabilities, and given results obtained from practice and experience. Much has been written upon this subject before, but it has failed to give that practical information intended, and may have been mostly theoretical publications. The chronometer-maker looks to the second-hand, which tells him its true tale; and how often has this hand denoted the tale of unsuccessful plans, false theories, and great disappointment: if this essay will prevent more of this loss of time and disappointment, my task will have been well fulfilled. In every good chronometer the practical and honest artizan imparts to it a value that cannot be seen, or displayed upon its highly polished surface, or outside case, which are looked

upon by *some persons* as a thing of more importance than the intrinsic merit, or unappreciated talent bestowed upon the chronometrical adjustments. The time an' talent required in bringing instruments up to the high degree of perfection required for the especial performance of high-class chronometers, such as I have alluded to in Chap. III., is known only to those who devote their practical skill in endeavoring to attain this degree of perfection. Excessive competition and a false endeavor to please the eye have caused many men to lose sight of the requisite adjustments the ordinary compensation balanced chronometer is capable of and is actually necessary that it should receive. In an honest chronometer the springer devotes his time and talent to isochronal and compensational adjustments for which he should be paid a fair price—as what laborer is more worthy his hire than the man that really devotes his skill and experience to an instrument whose true purposes are to determine longitude at sea? That this is not done in many instances, the tables given by the Astonomer Royal and the tabulated tables of the Liverpool Observatory fully bear out my assertion. The adjustment of auxiliary or secondary compensation-pieces requires a degree of skill and care in their management, only to be given by a most practiced hand; and will always prevent their becoming generally applied to chronometers; and, s a rule, they are now only applied to chronometers placed on the annual competitive trials at Greenwich; and the performance of many of these chronometers is very bad, whilst the peculiar and difficult construction of balances, which are made with a view of removing the middle error temperature, frequently renders them less permanent in their action, and more liable to injury in the hands of a less skilful mechanic than the maker; far more so than those of the ordinary construction of balance.

Every new experiment made, every new work completed, adds somewhat to our practical knowledge in this department of horology; but so long as the materials we use vary in quality, are wanting in uniformity, and are subject to the changes which moisture, temperature, friction, and other circumstances impose upon them, so long must we remain satisfied by having the errors of chronometers properly tabulated for their variations in temperature; and we must also be prepared to make large allowance for contingencies and variations which do not always readily suggest themselves.

The heavens alone supply the navigator with an unerring chronometer, a time-piece that needs no winding up, that never gets out of order, or needs repair, nor requires readjustment, that can never be deranged by accident, nor be deteriorated by neglect. Placed beyond the reach of sublunary vicissitudes, heat and cold affect it not; storm and tempest may temporarily cloud and obscure its face, (It is here that the chronometer becomes of such service to the navigator when on the great deep, he relying alone on its performance for his safety.) but can neither disturb its mechanism or alter its rate, and we know that it will run down, only when our concerns with time are at an end.

America Sending Silverware Abroad.

Those who have noticed the rich and beautiful silverware on the tables of the Windsor Hotel, in the grand dining saloon of the steamship City of Peking, and at the fair of the American Institute, will be glad to learn something of the famous Meriden Britannia Company, which manufactures all these exquisite goods now so popular. And the public will not be surprised to learn that this company is now shipping its wares to France and other portions of Europe to fill orders. The best foreign dealers appreciate the graceful designs and good workmanship of American goods. The Meriden Britannia Company, whose New York store is at 550 Broadway, was organized some thirty years ago. At that date little was known of electro plating in this country. That process has revolutionized the trade. It has substituted for the old goods the elegant modern productions made of hard metal and coated with pure silver. The company has, however, adhered to a name made honorable by a long period of business success. That success may be approximately estimated when we state that from a small beginning it has grown until its annual sales reach three million dollars, with seven factories, the largest at West Meriden, Conn., being about seven hundred feet long. To-day it manufactures more pieces of plated ware and uses more nickel-silver annually than all other manufacturers in the United States. Its ingenious workmen have devised a method by which those portions of certain articles of table ware most exposed to attrition shall receive a much greater thickness of silver than the parts less liable to wear. Thus the points of forks and spoons and those portions which naturally come in contact with substances calculated to denude them of their precious covering, are protected by a silver film three times as thick as other parts receive. That this method of plating is practicable and successful is attested by the judges of the American Institute for 1873, who carefully examined the goods and declared that they were probably the best of their kind made in the world.

Rings a Specialty.

To the Retail Jewelry Trade.

So general is the present business depression, that it is but reasonable to suppose that the sale of the smaller and less expensive articles of jewelry, will for some time to come be much larger than usual. You can have nothing more staple or sure of sale, at a fair profit, than a well-assorted stock of moderate priced *Gold Rings*. For 20 years we have made a constantly increasing variety of *Hard Solder Rings*, which we have always warranted, and which have never disappointed any purchaser. The market has latterly been flooded with *cheap* plated hard solder and low karat Solid Rings, which many jobbers have preferred to sell you instead of ours, because they could make a larger profit on them. The result has been, in many cases, that the retailer has become disgusted with *all* hard solder rings, and no longer keeps a respectable stock of them.

We want you to know that we still make nearly 400 patterns of hard solder rings, of every variety of style for men, women and children, that they are struck from 16 karat stock with 10 karat linings, and put together with solder that is 80 per cent. coin silver, and that every ring is as well finished as the best Diamond work. They are all *stamped* and warranted to give entire satisfaction, and we ask of you to make a trial of them, assuring you that they are the BEST hard solder ring yet made, and confidently appealing to scores of the most careful dealers in the country for confirmation of our assertion.

We also offer a long line of solid 14 karat Cameo, Amethyst, Coral, Roman Enameled and Engraved sets, together with many other goods in our line, as low as any other Manufacturers in the land. Respectfully,

BRYANT & BENTLEY, Manufacturing Jewelers, 12 Maiden Lane, New York.

THE

weler's Circular,

ournal devoted to the interests of the Watch Jewelry Trade of America, and the organ of munication betweer all buyers and sellers in particular branch of business

his Journal will be forwarded to any address the United States and Canada, for $1.00 per Annum, payable in advance.

Correspondence solicited from all parts of the country, on subjects pertinent with the aim and object of the paper.

All communications should be addressed

D. H. HOPKINSON, 269 PEARL ST., N.Y.

Mr. George Newman, 79 Cheapside, London, our sole agent for the JEWELER'S CIRCULAR in England, is authorized to receive subscriptions and advertisements for this journal.

The Philadelphia Watch Co. have kindly consented to receive subscriptions for this journal, back numbers can be had on application at the Company's offices, No 618 Chestnut Street, Philadelphia.

NEW YORK, DECEMBER 15, 1874.

To the Trade.

Those of our subscribers whose term of subscriptio i expires with the January number, will be notified by circular. We shall be grateful to have every old subscriber renew, and trust that the attractions which we shall offer in the new volume for 1875, will merit the patronage of every house in the trade.

Our subscribers in the United States will please not pay their postage on this paper beyond January, 1875, the new Postal law recently imposed by Congress, requires the pre-payment on all mail matter at the office of publication. Subscribers will therefore please take notice that on and after January, 1875, the annual subscription of this journal will be increased to $1.25, which will include postage.

The JEWELER'S CIRCULAR will be forwarded regularly every month, to any address in the United States and Canada, on receipt of price.

The Jewelers' Association.

The establishment of the New York Jewelers' Association has excited very general attention and awakened much interest throughout the trade, as we have reason to know from the numerous letters which we have received from our readers asking for more detailed information concerning its aims and objects. They cover so many points, many of which must be settled in the growth and development of the association, that we can scarcely undertake to answer all the queries which have been made to us. But we desire to set before the trade again the thorough usefulness and practicability of the organization of which we speak, and in that way a vast proportion of these letters will be directly answered.

Let us say, in the first place, that the New York Jewelers' Association is not in any wise a movement against the trade or any honest members of it, but one whose purpose is for the benefit of the whole trade. The gentlemen who comprise it are men of the highest standing in the trade, and they have come together in this association for purposes which are thoroughly legitimate and which should call out the gratitude of every jeweler through the country who is interested in doing business on a business basis, and in rooting out from the trade those who ruin their opportunities by selling goods at prices which are only explained when it is found by and by that they never have been and never will be paid for. It is with a view of ridding the trade of such people as these—those who do not pay their debts, and those who, by persistent compromise, offer goods at ruinous prices—that, as we understand it, this association has been organized. We may add that no trade organization has in it the elements of success or even of continuance, that is based on any lower motives than these. The jewelry trade, we may say once for all, is too large to be controlled by any ring, and it should be understood all through the country that this movement is not a ring, but a means for accomplishing needed reform.

When the object of this association becomes fully understood by the responsible houses of the jewelry trade, we think they will find reason to offer their heartiest cooperation in the work it proposes to undertake. Indeed, if the association adheres rightly to its defined aims, they cannot afford to hesitate, once such an opportunity is presented to them. Every honest business man, in whatever trade, is directly interested in the destruction of those who make dishonesty their business principle.

There is one objection against such an organization as this, which it is worth while to treat of at once. It is claimed that the establishment of such a trade exchange, as we may call it, will tend so to equalize individual commercial ability that it will not give the brighter and more able men in the trade their proper advantage in business. In other words, it is asserted that it would be a manifest injustice to those members of the trade whose knowledge of their business, their "trade secrets," and their acquaintance with the standing of the houses with which they deal, have cost them time and money, and whose peculiar business sagacity has given them their success, to ask them to impart this knowledge to those of less experience and ability, who have all to make and nothing to lose. The first answer to this is, that these things regulate themselves. Firms that have "all to make and nothing to lose," would not, in the first place, be admitted into the association, which is to comprise only those members of the trade who can prove their responsibility.

But, more than this, it is an old and exploded notion that a trade, or the individual members of it, prosper by this "every man for himself" policy which has so long ruled. It is to the advantage of even the wisest men of the trade that improvements in the method of doing business should be made general, and no information which can be imparted will ever take the place of that sagacity which will, under any circumstances, and most under the best circumstances, give the men who are geniuses in business, the leadership to which their abilities entitle them. This answers also the further claim that he is the most successful merchant who keeps his "trade secrets" to himself. Once and for all, we do not believe this to be true. It is not the knowledge which makes the good or the bad business man, but the way in which that knowledge is used, and the leaders of the trade will be much better off when they have educated those with whom they have to deal, to the same principles which have proved successful in their own case. In other words, the trade is an association in which, within these limits, every man is served by every other. The unworthy notion that each man must be a Cain with his hand against every man and every man's hand against him, is no longer entertained by those men who know what "progress" in business, or any where else, means.

A further question asks, what is to prevert members of the association from gratifying their little personal piques by demanding from responsible firms statements of their affairs, merely to gratify such animosity, and what would be the results of refusal to comply with such requests should they be made? We think it will be safe to say that any malicious queries of this kind will hurt the people who make them much more than the people of whom they are made. Whatever can be done by innuendo and falsehood against the principal members of the trade, can be done now in the present state of suspicion, much better than it could be done under cover of any such association as this. The gentlemen who comprise the association have too high a sense of justice to permit any petty jealousy to influence their business action, as they have too much common sense also to allow such unwisdom. These gentlemen are striving to make the association cover every requirement for the protection of the whole trade, and they do not propose to introduce into it any element of discord. We may safely assert that if they thought their course would create ill-feeling or jealousy or any other difficulty in the trade, they would at once abandon the enterprise in which they are engaged. They could not afford, in fact, to lay themselves open to the imputation of combining against the rest of the trade. The association, to be sure, makes a dividing line, but it is not between the people who are in it and the people who are out of it; it is solely between those who are honest and those who are not honest. We have the best of authority for stating that the association is giving entire satisfaction to its members and to those who are acquainted with its workings; and, we may add, the recent heavy failures, suspensions, and mysterious disappearances which have been a disgrace to the trade, are the strongest proof of the necessity of such protection as this association affords.

The Canadian Treaty.

The proposed Treaty with Canada provides for the free interchange of natural products, cereals, coal, lumber, &c., and of certain manufactures. The Canadian manufacturers do not altogether like this Treaty, and new antagonism to it is developed in England. A deputation from fifty-two Chambers of Commerce has called on the Foreign and Colonial Secretaries and presented objections to the Treaty, on the ground that it really discriminated against Great Britain and in behalf of the United States. Lord Derby replied that no Treaty would be ratified that imposed differential duties against British industry. He did not believe that such provisions existed in the proposed Treaty. He added that England is bound to place no unnecessary obstacles in the way of the utmost freedom in commercial relations between Canada and the U. S. If, for any supposed interest of its own, England objected to a treaty establishing such freedom, it is perfectly clear that discontent among loyal Canadians would result.

Obituary.

Mr. William Ruhl, of the firm of William Ruhl & Co., No. 2 Maiden Lane, one of the largest importing jewelry houses in the city, died on Friday morning, Nov. 20th.

Mr. Ruhl was a native of Hanau, Germany, and for many years has been a prominent member of the trade both in Germany and here, coming to this country as the representative of five manufacturing jewelers in 1848. He soon severed that connection to associate himself in 1850 solely with Mr. L. A. Steinheuer of Hanau, the latter conducting the German branch, the former that in New York, this association continuing up to the time of Mr. Ruhl's death. His firm was enlarged last February to take in the two sons of Mr. Steinheur, Carl and William, who became partners in both houses, and who, with their father, will continue the business as heretofore. Mr. Ruhl was a man eminently respected in his business, of great integrity and moral worth, displaying throughout his business career great energy and enterprise, and his loss will be widely and deeply felt by both public and private friends.

Editorial Jottings.

The second International Exposition will be held at Santiago, Chili, in September, 1875. Extensive preparations have been made for the accommodation of the various classes of exhibits. Pamphlets, and special information concerning Chili, its roads, patents, &c., &c., will be furnished on application to us, we having been duly commissioned by the Chilian government.

As anticipated, the Board of Fire Underwriters have virtually rescinded their former action advising the withdrawal of insurance risks from Chicago. This step is taken in view of the report of the Committee appointed to visit Chicago, and of the improvements already made, and those now in progress, and of the assurances given said Committee by the authorities of Chicago that the recommendations of General Shaler in regard to the Fire Department will be carried out at the earliest practicable date.

As an item of interest to our readers in California and on the Pacific Coast, we notice the opening of a new establishment in San Francisco under the title of "The National Clock Company." The new house represents the leading clock manufacturers in Connecticut, and possesses every facility requisite for the successful and satisfactory pursuit of a large business in this line. A personal acquaintance with the members of the firm enables us to speak advisedly of its character and to commend it to the confidence and regard of the trade everywhere.

At a meeting of the retail Jewelers and Watchmakers' Association, recently held at the Germania Assembly Rooms, it was

The degree of fineness must also be plainly stated in the manufacturer's bills. The retail dealers in gold and silverware throughout the country are asked to join in this movement, in order to protect the legitimate trade and the public, and to put down fraud and deception. We will discuss this subject fully in our next issue.

We give our readers in full the very interesting article on the "The Silver Age" by Mr. Wm. C. Conant, which appeared in the December *Scribner's*, and which is considered by those most capable of judging, to be the best article on the subject which has ever appeared. This is high praise; but we think our readers will quite agree with it, while the illustrations are exquisite representations of ancient silversmiths' art, and of the modern school which is so well represented by the Gorham establishment. Our readers will find this number of the CIRCULAR, thanks not least to Mr. Conant, a capital one to take home to their families to read, although we trust they are all so prosperous that their Christmas presents to their wives and children will not be confined solely to it. Mr. Conant's description of the ideal dinner service is unique in its way, and he has carried out his clever idea with a brilliancy of diction equal to his ingenuity of method. The plate for such a dinner, it will be noticed, costs only $20,000, and we trust there are a great many subscribers to the JEWELER'S CIRCULAR who will utilize Mr. Conant's suggestions. If they are not all millionaires, they ought to be.

A watch with a history was recently presented to M. Oscar De Lafayette at Paris, by Minister Washburne, in behalf of the United States. This time-piece, which is a curious and unique affair was given to the Marquis De Lafayette by Washington, as a souvenir of the revolutionary struggle which virtually terminated by the surrender of Cornwallis at Yorktown, and in which Lafayette had borne an honorable part. When the Marquis was on his last visit to this country, in 1825, the watch was stolen from him at Nashville, Tenn. A year or two ago, it was discovered in a "second-hand shop" at Louisville, Ky., and was purchased for $75 by a gentleman who knew its historical value. Congress last summer appropriated $300 for the purchase and restoration to the Lafayette family of this interesting piece of property which now finds its resting-place with the heirs of the illustrious name of Lafayette. It is not often that an article of so small intrinsic value has so remarkable a career nor such a fitting end to a chequered history.

he Prize Essay on the Compensation Balance.

In the present number is published the ist installment of the Baroness Burdett Coutt's Prize Essay on the Compensation Balance, brought out under the auspices of the British Horological Institute, and the prize for which was awarded to Mr. W. B. Crisp, of London. For a considerable time watchmakers have been eagerly awaiting the appearance of this essay, as it was confidently expected that some new light would be thrown on this perplexing subject; but, as is frequently the case when our expectations are the highest, although we may have a reasonable foundation for our hopes, we meet with disappointment. This essay has not proved to be what was anticipated. It lacks completeness, and adds *nothing* to the practical or theoretical knowledge of this branch of Horology, more than has been previously published.

The author, while admitting his subject to be a "highly scientific problem," starts off with a determination to avoid all mathematical problems, signs and paradoxes, and endeavors to write so that the question will be understood not only by the theoretical mathematician, but also by the practical workmen. It was a wise decision to avoid the paradoxes, but how can a "highly scientific problem" be solved when mathematical signs and problems which are the only means of reaching an intelligent conclusion are discarded. It is perhaps well that an essay of this description should not be burdened with too much purely theoretical reasoning, yet although not embodied in the essay, some well established principles of mechanics and physics ought to have been referred to, in order to explain the *reason why* certain results are produced or not produced. It is not sufficient information to say that in order to avoid the necessity for a secondary compensation, the weights or load of the balance should move a greater distance, or quicker, in the one direction than in the other. We should also have the *reason why* it is so explained to us, and we certainly have reasonable grounds for expecting information on this and other theoretical points in the compensation balance, in any essay coming from the British Horological Institute.

Although this essay is designed to be pre-eminently practical, the operation of melting the brass on to the steel in making a balance is very unsatisfactorily explained. We are told that the steel is placed in a crucible and "fluxed over" with "fine" brass Well *what* is "fine" brass, and *how* is it "fluxed" over the steel? It is a well-known fact that many different qualities of brass which go under the name of "fine" brass, are entirely unsuitable for the purpose. The most skilful and experienced maker of compensation balances cannot make some qualities of fine brass adhere to the steel, and have it perfectly solid. In this particular instance, the brass cast on the steel should not be treated simply as brass, but as an alloy like hard solder, and the ingredients of the brass best adapted for the purpose given. Something concerning the best kind of flux to be used might also be added with profit, together with a few more explicit directions about melting, and the general color and appearance the molten mass assumes when it has reached the proper degree of heat. This and other points necessary to enable a practical workman, or skilled mechanic, to make a balance from beginning to end, and understand the *reason why* it is best that it should be made in some particular way is much wanted. It is by no means settled, even by the test of experience, whether it is better to cast or solder the brass on to the steel, and on this question the essay is silent.

As regards these prize essays, which have their origin in the enterprise of a few earnest men in London, there is only one thing to be said, and that is, the two recent attempts to add to horological literature have been dismal failures. It is now clearly evident that £50 is not a sufficient recompense to induce the best thinkers to participate in the competition for these prizes.

Persons qualified to do full justice to such subjects must be educated and practical workmen, and possessed of a rare combination of native talent. Such men, although scarce, are to be found not only in Great Britain but on the continents of Europe and America, yet it appears they are unwilling to compete for a prize which is barely sufficient to pay for the mere labor of writing an exhaustive essay and make the necessary drawings.

The honor of winning a prize offered by the British Horological Institute is no doubt gratifying to the successful competitor, and may be worth something to him in the light of reputation; but watch and clock makers cannot live on glory alone, and the most enthusiastic votary of any of the branches of our art cannot be expected to give away the experiences and observations of a life time for the mere honor of the thing. Let the sum of one thousand dollars be raised and offered as a prize for an essay on some important branch of the business, and perhaps it may develope ideas which will advance the science of horology and be beneficial to the trade at large.

CLYDE.

Trade Gossip.

Mr. Larmour, a prominent Baltimore Jeweler, died in that city on the 9th inst.

Chinese shawl pins are pretty devices, and can be seen in all fancy goods houses.

Mr. A. T Cross, of Providence, R. I. has been granted a patent for a very unique pencil case.

Garnet jewelry is the most stylish of all jewelry this season. It is newer than jet, and in many instances far more becoming.

Messrs. Kimball & Kettle offer a very fine collection of scarf rings, of the most artistic design, suitable for the finest trade.

Queen Isabella of Spain is about to sell her diamonds in London. Their value is estimated at about two millions of dollars.

Samuel Strauss & Co., of 8 Maiden Lane, have failed, liabilities said to be $135,000. Their creditors express much sympathy for them.

J. H. Hoes, of Milwaukie, Wis., has settled with his New York creditors for 40 cents on the dollar, in notes secured by a prominent Chicago firm.

A New York diamond broker lost a paper of diamonds, valued at $5,000, on Fulton street, Brooklyn. A reward of $1,500 is offered for their recovery.

Watches, jewelry and silverware are, by the laws of Peru, subject to duty. All letters or packages containing the same, sent by mail, are liable to confiscation.

The thief who robbed the jewelry store in Porkhill, Canada of $2000 worth of jewelry, was arrested in Forest, with $1000 worth of the stolen property on his person.

A reward of $1000 is offered in Albany, for the apprehension of the thieves who recently depredated upon the silverware and jewelry establishments, to the extent of $15,000.

The *British Horological Journal* announces the death of C. J. Kraftenberger, one of the vice-presidents of the British Horological Institute, which occurred September 19th, after a short illness.

The $25,000 worth of diamonds belonging to Pforzheimer, Dreyfus & Keller, and reported to have been stolen while in possession of the Steam ship Co., turn out to be a few thousand thalers worth of Amethysts.

William Wetzel, a resident of Prairie du Chien, a passenger in the steamship *Cimbria*, had three hundred gold and silver watches seized by the custom house authorities, which he was trying to smuggle ashore. Mr. Wetzel don't go much on Seizure-*ism* now.

A near-sighted youth stepped into a Detroit jewelry store with the intention of purchasing a diamond ring for his girl, but after sitting down on the jeweler's rat-terrier, which was lying curled up in a chair, the youth changed his mind. It is curious how the purpose of the human mind is sometimes changed by the merest trifle.

Mr. T. B. Bynner, the well-known jeweler, has been victimized out of $5000 worth of diamond rings, by a gang of sharpers, who now infest Broadway. Two of these noteworthies recently entered the store under pretence of purchasing a diamond ring; while one of them was inspecting the rings, the other drew the salesman's attention to a bronze clock asking its price. As the clerk turned to examine the tags, the one inspecting the diamonds made off with them, and in the confusion his accomplice managed to escape.

Daniel Mossart, the well-known watch inventor, has just been taken to the insane Asylum at Kalamazoo, Mich. He has been for years at work on a watch which, without being larger than usual, was to show quarter seconds, minutes, hours, days of the week, days of the month, and months of the year, and every fifth time it was opened was to wind itself. He had completed it and had received a large offer from persons in New York for the right to manufacture it. A short time ago he took the model apart to fix, and not being able to put it together again, some part having probably been lost, the intense mental application upon the difficulty has deranged his mind.

PROCEEDINGS OF

THE HOROLOGICAL CLUB.

A Distinguished Body of Watch and Clock Makers.

Fifteenth Discussion, Communicated by the Secretary.

In opening the fifteenth meeting of this distinguished body of watch and clock makers, the chairman announced that he had great pleasure in presenting a communication on trade societies for their consideration, received from Mr. Charles Hofer a highly philosophical gentleman, residing in the State of Mississippi. The communication was then ordered to be read.

TRADE SOCIETIES.

To the Members of the Horological Club.

DEAR SIRS:—While I feel privileged to hail your intelligent assembly as a brother of the profession, I take the liberty to speak to you as a brother indeed, although there may not exist any affinity of blood relation towards each other among the artisans of our calling, yet every one ought to feel the affinity which intelligence and understanding generates from the depths of a profession only intelligible to those who have learnt, practiced and followed it during many years, and thereby gained the knowledge of the art, bearing in its bosom all the principles of astromony and mathematics—surrounded by the most minute and exact mechanical contrivances known to the world, the accomplished result of which enables mankind to behold during the darkest hours of night a duplicate chart of the grand pathway of the most glorious heavenly bodies.

Being companions in art, you doubtless felt like myself the necessity of union, and have happily combined to organize a club for the diffusion of knowledge among the less fortunate of our trade—in the discussions of which I have taken much pleasure, and followed with closest attention. While I find a great deal of practical and useful information, I regret to notice so much time wasted in hairsplitting discussions, as was the case in considering the "influence of magnetism on mainsprings." In this connection I will venture the assertion that as long as vitality and its influences remain in nature-self, all the combinations of genius and arts in heaven and earth cannot resist the powerful agents of creation, which are embodied in magnetism and electricity, whose gentle as well as violent currents keep moving from one body to another, taking from one element and adding as well as imparting to another, even the very spark of vitality, be it animate or inanimate.

Reviewing the action of your Club, at the outset of which I was pleased to anticipate that some measure would be advocated, or adopted, tending towards unity of action among the practical artisans of business, in order to systematize the rules and regulations of prices for work well executed and guaranteed to perform satisfactorily. I was disappointed to find you neglectful in regard to the grand policy, pursued by other trades and industrial associations to elevate or at least to maintain their present standard of welfare. Without wishing to abate competition in our profession, yet you are aware that prices for work in our business have been lately declining, while other branches of business are suiting prices to the exorbitant figures of rent, fashion, and general expenses of life.

In my humble judgment I would suggest the organization of State Associations of Practical Watchmakers, to meet annually for their mutual benefit and protection of the profession,—these State Associations to be headed by a National Board, composed of delegates from every State, convening say every two or three years. Such organizations would certainly influence and command the attention of the people at large, and, without discussing all the advantages resulting from such a professional alliance, it would be powerful to obviate the petit frauds and second-hand competition on the part of our customers, as well as the injurious slanders and general depredations of cobblers, who reaping the best benefits by tinkering on good watches, and spoiling to ruination those that would have been easily repaired to their original condition and usefulness by the hands of a conscientious artisan.

Not wishing to enlarge this present communication, I am desirous of recommending this subject to your earnest consideration, and remain yours truly and fraternally,

CHAS. HOFER, Macon, Miss.

November 27th, 1874.

Mr. Uhrmacher felt sure that the majority present was pleased to hear from a gentleman who had such a true appreciation of the wide field embraced in the Horological art, and the respect he entertained for those engaged in the profession. There were too many persons in the business, who were disposed to view it differently and had no conception of watch and clock-work in any of its bearings outside of what they had seen with their own eyes in a rather limited field of observation, or what they may have heard of it traditionally. There was no purely mechanical business which required such a general knowledge of the principles of mechanics, physics, and even chemistry than theirs did, and there were few businesses required longer practical experience to be able to master all its different details, yet some how or other, those fully qualified were seldom appreciated by the public, and not always by the trade itself. He did not consider it to be the province of their honorable body to discriminate on the qualifications of those employed in the trade. They had organized for the purpose of diffusing knowledge to those who desired it. Their club was composed of all classes and it would be seen that there was considerable antagonism existed between the various parties. He did not know how things might eventually turn out, but he took a hopeful view of the possibility of reconciling contending parties.

Mr. Horologer fully agreed with the sentiments expressed in the communication just read. It was greatly to be desired that some organization existed in the trade throughout the country for the purpose of promoting the general welfare of its members. A movement was in progress in New York which had that purpose in view, but those who were naturally looked to as leaders, while fully approving of the proposition were too much engaged with their regular business pursuits to take an active part in organizing a society just at the present time. It was only a matter of time, however, and sooner or later such a society would be in existence in New York.

Mr. Screwsqueezer took exceptions to that part of the communication which reflected on his esteemed friend Hairspring-twister, and in the absence of that gentleman, defended him against the accusation of causing a loss of the time of their honorable body during the nights of the magnetism discussion. He was of the opinion that the true cause of the loss of time was in discussing such questions at all. He desired to hear them talk about something that was good for business, something that would bring them more money, and if the proposed trade society had that object in view, he was in for it heart and soul.

After some remarks from the chairman, a vote of thanks was awarded to Mr. Chales Hofer of Missisippi, for the communication he had been pleased to send to them.

The following communication was then read:

FASTENING HAIR-SPRINGS WITH WAX.

I saw in the proceedings of the Horological Club for October, a communication, from Oil City, on scraping hairsprings, and I must say that I should consider it botch work, but not much more so than the method you suggested for applying a new one. It appears to me as if it would be more trouble to daub a hairspring and staff with wax than it would be to pin it on properly, for I consider that any practical watchmaker that cannot fit a hairspring in five times out of six without changing, is not fit to work at the trade. I think that watchmakers, nine out of ten, weighs (in the original it is hefts) the balance with the hairspring by hooking the centre of the hairspring on the balance, and then putting in place and counting the vibrations, etc., then if it is right you have it there without any trouble.

For the benefit of our friend in Oil City, I will say that the worst botches in the country will clean a watch the quickest, that is they go through them.

McK.

Corry, Penn.

Mr. Horologer then rose and said that there was some misunderstanding existing between their correspondent and himself on this subject. He had not recommended that in fitting a new hairspring, it and the staff should be daubed over with wax, he had simply mentioned that a small piece of wax might be used as a temporary fastening while the new spring was under trial. If, however, any person thought that it was better to pin the spring there could be no objections to them doing so. It was a great mistake to say that every watchmaker who could not fit a hairspring and have it come right five times out of six was not fit to work at the trade, and that nine out of every ten watchmakers weighed the balance with the hairspring when fitting a new spring. He ventured to say that there was no person, whatever might be his skill or experience, could fit new balance springs in a miscellaneous class of watches, and have them all come right the first trial in five times out of six. Workmen having great experience on a certain class of watches, where the number of vibrations, and the size and weight of the balance were always the same could tell pretty near whether a spring was of the proper strength by fastening it on its place, and holding the outside coil of the spring with the tweezers, see how far the weight of the balance pulled it down. In a miscellaneous class of work however, this test could only lead to a mere approximation of the required strength of the spring, and the proper strength could only be determined after repeated actual tests in the watch. He had found wax very convenient as a temporary fastening while making these trials, and he protested against the practice being classed as botch work. There was nothing like a little friendly criticism for making people understand each other, and he hoped to hear more from their correspondent on this subject at another occasion.

The Adjuster of the French school was sure that if members had a correct appreciation of the invisible properties of the balance spring, they would never be at the trouble of putting on a new one at all when the old one could be scraped. There was nothing like scraping for developing the invisible properties of the hairspring, as was proved by the alteration of the running of the watch after undergoing the operation. When these properties were too much developed, and when the watch ran too slow, an equilibrium could be restored by amalgamating the hairspring with a decoction of soft solder through the agency of a hydrostatic blow-pipe used in the ordinary method for restoring broken hairsprings to their original condition.

The following communication was then brought up for consideration:

FILLING MAIN-SPRING BARRELS.

To the Members of the Horological Club.

My opinion in regard to the amount of main spring to put in a barrel is not merely to give the barrel a certain number of turns, but to put in such a length as will run the watch the greatest length of time. To do this, one-half of the area of the barrel, after deducting the area of the arbor, must be filled with the spring, and any variation from this will shorten the time of the running of the watch. To find the proper amount of spring I proceed in the following manner:—From the area of the barrel take the area of the arbor and divide the remainder by two, to which add the area of the arbor; then extract the square root and the quotient will be the diameter of the space inside of the spring when the right quantity is in the barrel. It may take only eight coils, or it may take twelve, but pay no attention to that if the spring be of the right strength. Whether the spring be thick or thin the diameter of the space will always be the same. For example, take a barrel of .6 of an inch in diameter, with an arbor of .2 of an inch in diameter. Area of barrel — 62 — 36; area of arbor — 2^2 — 04, 36, 04 — 32 ÷ 2 — 16 × area of arbor 04 — 2 square root of — 447 — diameter of space.

I find, as a general thing, that English watches have too much spring, often two or three coils. Why would it not be better to put in such an amount of spring as would cause the watch to run the greatest length of time and then we will not have to use both extremes of the spring to run it the required length of time. I have prepared a table for my own use giving the diameter of space that is required for the different sized barrels and arbors, and by measuring the barrel and arbor can tell just the amount of spring to put in. I would like to hear the opinion of the Club on this method, if it is worthy of their consideration.

A. D. L.

Warren, Ill.

Mr. McFuzee could not understand why it was that the mainspring, which caused the barrel to make the greatest number of revolutions, would not also cause the watch to run the greatest length of time. If he understood their correspondent correctly, he considered that his communication did not embrace all the points involved, but only referred to the amount of open space necessary for the action of the spring. It was a mistake to suppose, that if a certain amount of space was left in the centre of the spring, that the same number of revolutions of the barrel would be produced whether the spring was long or short, thick or thin. The length of the spring and also its thickness should be taken into consideration in connection with the amount of open space in the centre. It would be interesting for them to know if this method was designed to be equally adapted for going barrel, and fuzee watches; how springs fitted according to the rule given adjusts with the fuzee, and how it works in practice in connection with the going barrel. He hoped their correspondent would favor them with these particulars when he found it convenient to do so. There were several rules which were more or less practicable for filling a mainspring barrel which could be given on another occasion if required.

The following communication was then submitted:

CAUSE OF MAIN-SPRINGS BREAKING.

Secretary of the Horological Club.

I have read a good many articles on mainsprings breaking, but none seems to agree on the causes which lead to breaking. I do not lay the cause to oil, friction, or tight winding, but to extra heat or cold. This has been my experience during the sixteen years I have worked at the bench. I replaced a spring some time ago, I think it was in June, that had run a watch for eighteen years. I don't think the spring had ever been taken out of the barrel either to be cleaned or oiled. It was dry and bright and did not show signs of wear by friction as some do.

The other day a man (a Granger) came in and wanted to know what kind of work I did. I told him that I intended to do my work well. "Wal," says he, "that spring you put in my watch a short time ago is broke." I could not remember that I had put a spring in his watch, so I looked in my watch book and found the spring in question had been put in over three years before.

A. E. R.

Mr. Horologer thought that the incident they had just heard was a good specimen of the unreasonable customers watchmakers had often to deal with. As regards the causes which lead to the breaking of mainsprings, he had no doubt, but what both changes in the temperature and state of atmosphere produced causes which lead to their breaking. He considered that a reliable data in investigating these causes, might be obtained if their honorable body and watchmakers throughout the country generally, would be at the trouble to examine their repair books, and notice the number of mainsprings that had to be replaced each particular week during the year, and report to the Secretary of the Club. The weather reports could then be consulted and the temperature and the state of the atmosphere on the particular dates given, ascertained.

After some further conversation it was agreed that Mr. Horologer's proposition be adopted, and that each individual member of their distinguished body should examine their repair books and report the number of broken mainsprings they had during each week of the year 1874, and as many previous years as was convenient. Watchmakers throughout the United States and the Dominion of Canada, were at the same time respectfully invited to send the desired information, in order that the reports might be as numerous, and extend over as great amount of territory as possible. All communications to be addressed to the Secretary of the Horological Club, care of the JEWELER'S CIRCULAR, 269 Pearl Street, New York.

DIALS ON THE TRIBUNE BUILDING.

Mr. O'Lever desired to direct the attention of their honorable body to the dials on the tower of the new *Tribune* building now in the course of erection. He regretted that when a society like theirs existed, where there was so much information laying round loose, they had not been consulted on the subject, for if they had, such a lumininous body like the Tribune would not have been under the necessity of showing the time to the surrounding neighborhood in such an obscure and cloudy manner. They were all aware that the colors of the materials which the building and tower were composed of, were red, black, and white. A ring of white stone encircled the dials, and on this white ring the the figures were cut and afterwards gilded The practical result was, the figures could not be seen at half the distance figures on dials of such large proportions ought to be seen. If they had been made a black or red color, they would have been more in harmony with the general colors of the building, but what is of greater importance they would have been more distinctly visible, and if the figures had been raised, instead of sunk, the practical effect would have been still better. He moved that a committee of their honorable body be appointed to wait on the proper authorities and point the impropriety of placing gold sunk figures on a white ground, with a view to have the error rectified. This motion was laid on the table, and the honorable and self-sacrificing body adjourned with the understanding that each individual member would examine the dials in question as soon as convenient.

WALTHAM

SILVER CASES!

Trade  Mark.

The above Trade Mark is stamped on all Genuine Waltham Silver Cases.

In the early days of watch-making, and indeed up to the advent of the American machine-made watch, each movement had its case made expressly for it, and the one manufacturer was responsible for both. Each made up the complete watch, and the maker's name guaranteed both the excellence of the movement and the quality of the case. American watch-making has changed all that. The manufacturer of movements and of cases is now divided between entirely separate branches of business. They are held separately by their manufacturers, and are put together to make a watch by the dealers—usually the retail dealers.

In many respects this is undoubtedly a great improvement. It has enabled the consumer to reap the advantages of having both parts of his watch made in quantity at the low prices which can only be afforded by manufacturing on a wholesale scale. But it has also had its drawbacks. The trademark of the Waltham Company, for instance, guaranteed the movement beyond peradventure, but as to the case, the buyer was likely enough quite in the dark. If it had an imprint, it was not that of any house he knew, and unless the dealer exercised the greatest care in testing quality, he might himself be deceived and placed in bad odor with his customers, when by and by any defects of quality come to be discerned. There is also a second difficulty to be apprehended in improper fittings of the cases, which would tell badly in the running of the watch.

The Waltham Watch Company has been enabled to combine the advantage of both these systems, avoiding the drawbacks of both. It is the only watch company which makes silver cases for its own movements, and it makes them in its own factory. It is careful to take the greatest pains that every case shall be well made, and the quality of each is guaranteed to be equal to coin. The dealer who buys these cases knows just what he is buying, and can recommend them to his customers with perfect confidence; whereas, if he buys silver cases of other makes, he may, for the saving of a shilling, be giving his customer a poorer quality of silver, besides running the risk of a bad fit, which materially interferes with the free action of the movement itself.

The dealer will easily see the desirability of gratifying his own intrests, as well as his customers, by buying Waltham Silver Cases for Waltham Movements.

ROBBINS & APPLETON,

No. 1 Bond Street, New York.

BOSTON OFFICE, No. 8 Summer Street. CHICAGO OFFICE, No. 5 Tribune Building.

THE SILVER AGE.

BENVENUTO CELLINI.

[T]radition of poets images an Age of Gold [i]n the last faint outline of the historic hori[zon]. I have no doubt there is a sort of substance [at] the base of this gorgeous phantasm. Gold was the inevitable staple of nascent art. The Child-Man, unconscious of creative power, and ignorant of ideal beauty, poured out his soul on color and splendor as he found them. Ignorant of the power of harmony—*i. e.*, of shade as the co-efficient of light—and even of the arts that develope the rich complemental phases of such a material as silver, his barbaric eye was magnetized by a native luster which no skill can elicit, as a simple effect, from any other materials than gold and gems. Hence the predominance and profusion of gold in all the traditions of ancient glory. The primitive age was literally the Age of Gold.

The Silver Age, on the contrary—in the sense we have chosen to transfer to the figure—is an immensely advanced stage of development in art and taste. Some artists, indeed, maintain that as the Silver Age supersedes, in the development of art, the Age of Gold, so the Age of Bronze—*i. e.*, of purely ideal beauty, on a broad and common scale of representation—rises beyond them both. Prototypes of a like series of developments are traced in ancient Greece and modern Italy. But in the grand cosmic antitype, if such there be, the final Age of Bronze is in the as yet undescried future. The known and attained will rather concern us, and so we call our theme the SILVER AGE.

Primarily, gold appears to have been reserved for ornamental purposes, as the incorruptible beauty of its natural condition would suggest, and silver was used exclusively, or nearly so, in

PORTION OF ROMAN CATHOLIC CHURCH SERVICE; SILVER GILT; FLEMISH DESIGN OF A. D. 1400.

coinage, as it still is in the most antique civilizations, particularly of China and India. Moses does not mention gold as money, but only as jewelry, treasure, or as appropriated to sacred or state purposes. The succeeding Jewish chroniclers, also, usually mention silver alone as money, even in specifying the largest transactions in coin among princes.

Archæologists find evidence that silver may have been in pr mitive times worth not less, perhaps even more, than gold. Egyptian memorials indicate that the relative value of gold was adjusted by Menes, the first "Pharaoh," at two-and-a-half times that of silver. In the fifth century before Christ, silver had one-eighth to one-sixth the value of gold by weight. In the fifth century after Christ, silver had fallen in the Eastern Empire to the lowest point it has ever touched, being sold at one-eighteenth of its weight in gold. In 1800, fifteen ounces of silver were equivalent to one of gold. Since the discovery of the Nevada and other North American silver mines, it has fallen again to about two thirty-thirds the value of gold, or 16½ ounces for one. In 1848 Chevalier estimated twice as much silver as gold in the world, by value, which made thirty times as much by weight. This excessive proportion of silver, or much of it, probably dates from the earliest times, having been provided for in the creation, or at least in the present geological arrangement. Africa and Australia only yield an excess of gold, one of which probably contributed nothing, and the other very little, to the gold of the world in ancient times. As far back as Solomon, the full relative abundance of silver is directly attested. There seems to be, therefore, no way to account for the steady rise in its relative value as we ascend toward the springs of civilization, except the hypothesis already stated, viz.: That the original money was silver, gold being dedicated, as was natural, to purposes of luxury and state, and coming into currency but by slow stages, corresponding with advances in the scope of commerce, the wealth of

ANTIQUE BOWL.

society, and the reward of industry. Silver, as the common representative of the necessaries and enjoyments of life, would thus have engrossed to itself the transcendent representative value of money, while gold, depending only on its greater native beauty and rarity, and available only for the use of the few, would maintain an appreciation barely greater than the more modest and abundant, but immeasureably more active metal.

Commerce and man have conquered a great realm from personal power and privilege, wherever the daily wants and wages of the common people have risen to the denomination of silver, and, international and even domestic exchanges becoming too extensive to be conveniently carried on in silver, gold has been deposed from its regal state and set to work for mankind. Milton was not an economist, but if his genius had looked that way it could not have expressed a historic truth of political economy more aptly than in the words,

"—— or where the gorgeous East
Showers on her kings barbaric pearl and gold"

"Barbaric gold" is good—perhaps better than the poet intended. Gold as yet uncivilized, because uncoined: literally in a state of barbarism. Gold which has not found its office as a factor in

ANCIENT SILVER BEAKER VASE, FOUND NEAR HILDESHEIM, GERMANY.

an intelligent and organized universe—as unredeemed from the useless state of nature as if it lay yet in the sands of Indian or Californian streams.

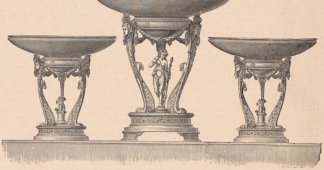
But the greater part of the gold and silver of the civilized world, once amassed in temples and ecclesiastical and royal treasure houses, has long since been converted into coin, jewelry, products of art and manufactures, and dispersed among the millions of mankind.

The measureless treasure once accumulated in the crass and stupid luxury of monarchies and hierarchies, is now distributed in indefatigable activity throughout the civilized world; building inter-oceanic canals, inter-continental steamships and continental railways,—fitting up the world with machinery for the service

TUSCAN CHALICE; SILVER GILT; FROM THE TREASURY OF THE CATHEDRAL OF PISTOIA.

of every calling and interest of men,—furnishing every dwelling, shop and farm with improved instruments of comfort and of production without end; and ministering, in fine, to the æsthetic, intellectual and moral interests of life and of immortality—"barbaric gold" no more.

Again, gold now tends to resume its sedentary dignity, though not its empty show, at the great centers of exchange. After being melted and hammered, pillaged and knocked about from kingdom to kingdom, for three thousand years, and serving an apprenticeship of many centuries as working coin, gold finds its ultimate place of power in the organization of mankind, as the reposing basis of currency. Placed in a quickening relation with great masses of more sluggish but not less genuine values, it sets them free and



SILVER FRUIT AND FLOWER SERVICE. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

[Figures, faces, etc., oxide tint; festoons, bass-reliefs and ornaments gold; bowls burnished.]

sends their monetary energy through bills of exchange, bank-notes and telegraphic transfers to the farthest corners of the earth, in volume and potency commensurate with whatever demands of commerce are justified by sound capital, and a sufficient command of coin for contingencies.

Impartial well-wishers of both the precious metals may be equally gratified with the measureless modern improvement in the position of each. Both have risen by the side of man in the scale of dignity and worth. The successive transitions of gold from useless state to monetary activity, and thence to general command of the mobilized values of the world, have opened a new destiny also to its fair sister, silver. While gold has exchanged the position of a pampered slave in palaces for a seat of beneficent power at par with kings, to say the least, the same commercial progress of which this is an exponent is also marked by a progressive demonetization and emancipation of silver from the drudgery of currency (in which coin will one day, perhaps, be quite obsolete) and by the creation of a new æsthetic sphere, in a new world of wealth and taste, where silver in art,

"—— at length,
Apparent queen, unveils her peerless light."

Her charms, requiring higher art to develop, and finer taste to appreciate, than the obtrusive splendor of gold, have begun to command due attention only at a very modern date—how modern, the reader who has not narrowly examined it will be surprised when we come to show. Comparing the two metals historically, with reference to æsthetic effects, we have already noticed that barbaric taste settled at on[ce on] the tropical glory of the yellow metal, [which] barbaric art so readily disclosed, and ha[s] wavered in attachment to a material so g[...] in itself and so independent of fine art for [...]ing effect. Only in the "fullness of time," the artist and artificer met in Benvenuto C[ellini], producing with the same hand master[pieces] at once of design, of detail and of exec[ution], could the peculiar capacity of silver for t[he ex]pression of art be suggested. And not un[til the]

THE JANE SEYMOUR SILVER CUP; BY HOLBEIN, 17TH CENTURY.

present century, or, rather the present generation, when artist and artificer meet once more, in an American workshop, have the various methods of treatment and ornament required to bring out the versatile expressiveness of this lovliest of materials become so perfected in such variety of combination, as to fix the attention of the world upon the qualities which distinguish silver as by pre-eminence the ART METAL. If we compare the rugged silverware of other generations with the exquisite works of art that now fill the warerooms of our great silversmiths, in Bond St., we can wonder neither at the preference of past ages for gold, nor at the revolution in taste which the present development of silver art has effected.

Silver exacts a combination both of art and of arts, which could scarcely have been brought about in any earlier age than ours. Form, ornament, and harmony, are all required at once in the highest perfection. The combination has been the task of ages and epochs, and the very mechanical conditions of its completion have existed but a few years. Primitive art was, of course, purely decorative, or childlike, with the precious metals for its fit and chosen material. On them the luxurious oriental taste poured itself in ornamentation, crowding every surface with dense and rich designs. The arts of enameling, chasing, embossing, engraving, and inlaying or damascening (from Damascus) were early nursed in Asia to a perfection which her best pupils have not been able in all respects to surpass.

SILVER SALT CELLAR.

[Cavity gold; oxydized bass-relief border.]

Meanwhile, the higher ele-

ment, form, waited for the development of the western genius in sculpture. The opposite impulses, to extrinsic and intrinsic beauty,—opposite as east and west,—spent themselves in divergence, maturing two antithetical art temperaments or sexes; the western, the genius of action, in forms radiant with the graces of mobility, or strung with passionate tension—the ...tal, the genius of luxury, profuse of decora... ...and in its forms contrasting full, pendent, ...us curves to the free, erectile sweep of ... outlines. Each was well adapted to ...native theme: classic art to sculpture and architecture, while oriental art suited well the sultry splendor of its favorite material, gold. Neither was able to fit a form to silver: the one was too bare, the other too heavy and lifeless. A marriage between them was necessary to the development of fine art in the precious metals, and especially to the production of forms in which the chaste expressiveness of silver could be revealed. A more difficult combination of tempers could not be conceived. A more reluctant union was never consummated. The enterprising Greeks at once colonized and imported Asia; but the harder, as usual, yielded to the softer; the sensuous overlay and smothered the intellectual. For eighteen centuries, the conquerors, Greek and Roman in turn, lay vanquished by their captives. In the sixteenth century, in the times, if we should not say the person, of Benvenuto Cellini, classic form, so long withdrawn, returned, and stooped to the embrace of ornament in her silver grotto. Since then, through many vicissitudes of adversity or alienation, the pair have remained too firmly joined, on the whole, for man to put asunder, although they have never, until the present generation, enjoyed a settled prospect of being happy together, nor seen their offspring advanced to the multitude and maturity they display in our great Bond street warehouse, or in the international expositions of Europe.

Let me not be misunderstood here. It is not the mere application of decorative art to classic form which has given art at once a new phase and a new material in silver. The product was logical, but it was indirect, not immediate, and when it came it was not classic form *plus* oriental ornament, but a third entity unknown to both. I should describe our modern silver art as a union of picture and sculpture, such as could be effected in no other material. I conceive that the reconciliation of the before conflicting demands of ornament and classic form—both of which silver eminently suits and eminently requires—involved a transformation of ornament to picture. By picture, I mean not the representation of actual subjects, but the adjustment of decoration by the great principle of harmony, the third element stated in the composite art under analysis, or, to iterate my own definition, *shade the co-efficient of light.* By this alone are forms revealed to the eye, whether in nature, sculpture, or painting; and, therefore, by the neglect of this principle, which strikes us in the former stages of silver work, all forms are more or less hidden or marred. Given the most exquisite form of a vase or chalice, for instance. If you polish it, the effect of the form is largely destroyed by the lustre. If you apply ornament without artistic regard to the relief of the form, you distort it still further. If you deaden it, the form is saved by relinquishing ornament; a dull, lifeless result, inferior to that of other and meaner materials, and not characteristically higher when the uniform dead surface is produced by a close filling ornamental design (as in Persian work) than if the vessel had been left a plain casting.

THE APOSTLE SPOON. STYLE OF THE 16TH CENTURY.

Now the versatile lights and shades (some old, some new) which silver assumes under the burnisher, the graver, the chaser, the stippling or satin-finishing brush, the various oxidizations, chemical baths, &c., with the applications of gold and gilding, are not only all disposed by the modern artist as mutual co-efficients, raising each to its highest power by contrast, and yielding a richness of splendor in the combined effect with which no simple surface whether of gold or gem can vie; they are moreover, so disposed as to throw into higher relief and expression every charm of outline in the form to be adorned, so that the ornament, while enhanced in itself, is also made subservient to the deeper beauty of the form, into which it breathes, as it were, the breath of life.

But the philosophy of our Silver Age is not more interesting than its economic aspect.

It was but a little before the American Revolution (about 1760) that silver table-spoons began to exclude those of wood, horn and pewter, from the tables of the quality in England, and even tea-spoons of silver are said to have been rare before the time of Queene Anne (1691 to 1713). To this day, if I am rightly informed, no spoons of solid silver, large or small, much less silver forks, are to be found in common use among the "plain people" (with rare exceptions) of any European country. In the United States on the contrary, it is unnecessary to inform the American readers of *Scribner* that, as a rule the farmer is but thriftless and the mechanic but a journeyman, whose spoons and perhaps forks are not of solid silver. The journeyman furnishes his table with plated articles of this class, or at worst brittannia, and only the rude day-laborer contents himself with tinned or pewter ware. Plated tea-services, casters, salvers, pitchers, ladles, cake and fruit baskets, etc., are too common to be noticed, unless wanting, on the tables of those in easy circumstances, and it is no rare distinction if they are of solid silver. In fact, for bridal gifts nothing less than solid silver is thought respectable, and in this way, so universal has the custom of bridal gifts become, hardly any comfortable young couple now begin housekeeping without a fair show of genuine table silver, as far at least as spoons, forks, butter, fruit, pie and fish knives, napkin-rings, and such trifles.

BASS-RELIEF PLACQUE, REPOUSSE, FOR THE SIDE OF A VASE.

[Design and wrought in Silver by Pairpoint, one of the Gorham Company's Artists. A delicate and lifelike texture of the skin in this figure is one of the effects peculiar to Silver Art.]

The beauty of the ordinary American table, with its snowy damask and china, sparkling cut-glass, and lustrous utensils of silver, all disposed in the tasteful symmetry native to the American housewife, is a power, and one that goes too near the springs of moral as well as æsthetic culture to be lightly esteemed by the most serious observer. The development of this crowning symbol of domestic refinement is worthy of our attention. A critical journal has remarked that an American lady's idea of a dinner is a handsome service of silver and china, with two or three vases of choice hot-house flowers. I suppose it was a typical American lady, among the "plain people," too, who stated to me the elements of a meal as she understood it, in the following series: First, order (including elegance and good attendance); second, intellectual conversation; and lastly, something to eat.

Plated ware originated in England about the middle of the last century, the first application having been made to small articles in 1742, by Thomas Bolsover, a Sheffield mechanic. The new elegance brought within the means and supposed proprieties of the middle class, took the name "Sheffield Plate," not from the process of plating, but from the silver ware of which it was an imitation. Plate, in this sense, is not our Saxon word cognate with *flat*, but was borrowed from the Spanish *plata* (silver,) and applied to all utensils made of the precious metals, in whatever form.

To our elderly readers "Sheffield Plate" will still have a familiar sound, for under this name the beauty of silver was first popularized in America, and to a far greater extent than even in England. Probably the Sheffield and Birmingham manufacturers of 'plated ware at one period exported more goods to this country than they sold at home.

A further and greater advance was made in 1838, by the invention of electro-plating, or rather the practical application of the method, which had been known but strangely neglected, for thirty years. At one stroke plating was greatly reduced in cost, its applications indefinitely extended, and its effects incomparably improved. Everybody in America is now familiar with the ordinary wares of our numerous electro-plating companies, and there is hardly a cottage worth two hundred dollars in the country where such wares are not found; although the rich plating of the Elkingtons in England and the Gorhams in America is too high in first cost for the strictly popular demand.

THE RAPHAEL SPOON. DESIGNED & EXECUTED BY THE GORHAM CO.

[Ornamented with die work studied from decorations by Raphael in the Vatican.]

Within half a century the business of the American silversmith was mostly confined to making spoons to order for the jewelers, who rarely purchased more than one or two dozen at a time, for particular orders. About 1825 it was noticed that the silversmiths began to venture into the manufacture of light spoons for general sale through a class of cheap jewelry peddlers, who are still well remembered by natives of the New England of that period.

The Providence manufacture had begun to be extended and brought into national relations by the enterprise of a young goldsmith, named Jabez Gorham, who adapted his work to the general requirements of the trade, and made his way with it in the Boston market by under-selling and outpushing the unmercantile mechanics of his craft. The droll account the old gentleman, who died about five years ago, used to give of his semi-annual marketing in Boston, is more expressive than a general description could be, of the very modest status of the now imposing silver trade of our chief cities:—how the Boston jewelers assembled at his lodgings, pursuant to notice, that they might be all admitted at the same moment, without partiality, to view and divide the little trunkful of new jewelry spread out upon his bed!

We observe here several distinct rudiments of character which have since grown up into one of the noblest of the representative business institutions of America. The originality and the commanding equity combined to Jabez Gorham's way of marketing his goods, the combined mechanical and managing talents attested by this singular homage of the Boston jewelers to the excellence and low price of his wares, the professional-like honor, begetting absolute confidence in the weight and standard of whatever he made; these advantages being mental and moral and transmitted by inheritance and tradition, have continued conspicuous for half a century, together with their controlling power in human nature and business. We tender this example to our aspiring young readers as a present to them from the Gorhams, infinitely richer than any they could select out of the treasures of Bond street.

In 1831 Gorham threw his energy, skill and influence into the manufacture of silver for general sale. As the silver spoon may be called the germ of the whole prodigious growth of domestic silver ware, so the little shop of Jabez Gorham, in Providence, was the acorn from which grew the main trunk of the manufacture, and the date of 1831 may be set as the era of our Silver Age. There is little to be said of it for the first half of its history, save that it grew with the gradual growth of wealth and luxury throughout the country, waxed great on the few small and popular table utensils then merchantable, and, by virtue of the mental and moral affinities gathered in the Gorham firm, concentrated the resources of the business in one great establishment, prepared, at the proper time, to employ those resources with a magnificence, both in art and enterprise, of which there has been no other example in the history of silver manufacture.

About 1850, the development passed from the spoon to the plate stage. Silver table services, in a few simple styles, became a regular line of production, increasing with the prosperity and ambition of the wealthy.

The third stage dates from the war, and is now therefore, little more than ten years advanced. In this short time, while the number of distinct varieties in the catalogue of the silversmith's regular wares or shelf-goods has increased from a dozen to hundreds, a style of art has also grown up in this country out of the best elements handed down from the masters of every age, selected, combined and improved with no inferior skill, and with vastly greater constructive resources, until there is no hazard in saying that the Gorham Company and the brilliant cluster of artists it includes, have made this a memorable decade to the future historian of art. Silversmiths on a smaller scale have profited by the influence of this academy of art and its beautiful models, but there has been hardly a dealer of importance in America who has not depended chiefly on the Gorham Company for first-class silver ware. A single notable exception, occurring as it must to every one, should not be unnoticed. The reorganization of the eminent jewelry house of Tiffany & Company, as a manufacturing corporation, for the supply of their own retail salesrooms, especially in fine silver, is an event of importance to the future development of the art. From the spur of mutual competition, public taste will receive the ultimate impulse. Their movement by narrowing materially the former mercantile outlet for the richest silver wares of the Gorham Company, was also of importance as the turning point on which the doors of the Bond street warehouse, before wholesale exclusively, opened in 1873 to the retail trade, and so to a direct intercourse and reciprocal influence between the great American silversmiths and the great American public. In other cities, however, the trade in silver ware continues on the old system, the Gorham Company supplying the market through the mercantile jewelers solely.

SILVER INK STAND. DESIGNED AND EXECUTED BY THE GORHAM CO.

SILVER PITCHER. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

The placques are allegorical half reliefs, in dead silver, *repousse.* The obverse represents Venus lighting the torches of the Loves. On the reverse she is catching and confining them in a net, "for better or for worse." The oval border or frame of the placque is gold; the concave surfaces burnished, and the convex satin finished.

WEDDING PROCESSION IN SILVER. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

Bass-relief ornament for Bridal Service or Outfit.

The statement will be as new as interesting to the general public, but there is no doubt of its truth, that both the originating and manufacturing resources of our great Providence silversmiths are unrivaled in any country or in any age. They

draw the most cultivated artists and the most skillful artificers in their line, often in one person, away from the old world by superior wages, higher social position, and better prospects for their families, and when here, they gradually Americanize them and make them capable of a hundred things they never could have turned to

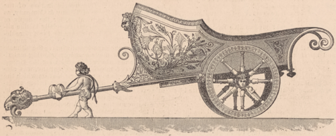
SILVER TANKARD. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

[Oxydized Bacchus on wine barrel; vine in gold; satin lustre, relieved with burnished mouldings.]

or aspired to at home. They bring the inheritance of an older and richer world to the quick and fertile genius of the new, and into that comprehensive organization of all departments under one head, which gives a capital advantage to the

ments than could be carried away in memory; apartments in long succession, occupied, some by artists and draughtsmen, some by engravers, some by chasers, some by embossers, some by die engravers, some by die hardeners, some by tool makers, some by weighers and packers, some by fancy case makers in wood, morocco, velvet, &c.; in short, after walking for half a day, and to complete exhaustion, I was congratulated on having seen a full half of the Gorham Manufacturing Company's establishment! This sketch may assist to a conception of the fact stated, that our own country contains, without exaggeration, the largest silver ware manufactory in the world, and the best appointed in men and materials.

The question naturally arises in this mammoth manufactory,—endless labyrinth as it is of buildings everywhere filled with the most precious material in all sorts of shapes and scraps, amongst four hundred and fifty employees,—how it is possible to guard against serious loss by theft? Nothing is relied on but the honesty of the men; and the nice account kept of all silver and gold, as given out from the safes and as returned to them in finished work, gives no reason, it is said, to suspect that an ounce of it is stolen in a year. This seems very singular—but may there not be some connection between this marvelous honesty of employees under constant temptation, and the austere probity for which the employers are renowned? No jeweler in the United States needs be told that the stamp of the Gorham Manufacturing Company, as a standard of pure silver, is 25-1000ths higher, and no less certain, than that of the United States coin. That is, the alloy indispensable for serviceable hardness and durable finish—75 parts in 1,000—is all that can be found in any of their goods, and is so warranted to anybody who chooses to get a specimen assayed at the Mint, under a forfeiture of the whole price of the article if found below their standard. (The alloy of coin is 100 parts in 1,000.) But this is not all. Not only are all goods bearing the Gorham stamp thus warranted pure; I am assured that no goods

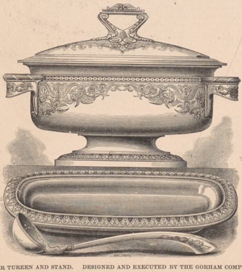


SILVER CHARIOT FOR FRUIT OR FLOWERS. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

Engraved and satin finished body; burnished shaft, &c., gold edges and rims.

American system of business. In the city of Providence, I have seen under one roof an entire block of buildings filled with shafting and belting from steam engines of the largest size, connected by steam elevators and pipes throughout, for communication, illuminating and heating gas, air blast, live steam and exhaust steam, water hot, cold, hard and soft; machines of incredible ingenuity and efficacy without number; foundries for casting in iron, brass, silver, gold, and all other metals required; machine shops for every metal, and also for woodwork; blacksmiths' shops, rolling-mills, lathes, drills, milling and planing ma-

of a debased standard ever were or ever will be made in their works under any stamp whatever—notwithstanding that a large and extremely lucrative trade is always open to them and often pressed upon them, in low and annonymous silverware for certain markets, particularly the Spanish-American. If mere love of money actuated these men, there is no doubt they would pursue a different course, and fall in with the current of conventional lying which has become so general in trade, and which so many good people (esteemed such) regard as white enough for business purposes. They might argue, as so many



SILVER TUREEN AND STAND. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

Concave and plane surface burnished; convex surfaces and satin luster; bass-relief border, and base molding gold. Lace-work engraving.

chines; shearing, punching, shaping and embossing machines; lofty shops and ponderous machines for die stamping; large rooms devoted to melting and refining furnaces; to various metallurgical processes; to electro-plating and gilding; to photography; to metal spinning; to finishing by hand and machinery, in more stages, modes and apart-

do, that nobody is cheated; that the buyer gets his money's worth, and gets what he seeks—not pure silver, but something that will answer the same purpose, at a lower price. But there are a few men left,

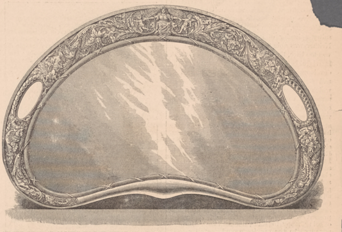
"Whose lips still speak the things they mean,"

and refuse to join in calling base metal silver, in a conventional sense, to accommodate anybody, or to make any amount of money.

It may well be that in an establishment pervaded by the honest pride of such a sterling reputation and standard of action, the humblest employee feels as if he had a share in the honor of the house, and a character to sustain, worth more to him than silver. Example is mighty, and it is probable that along with an ingredient of humbug there would have to be introduced a very sharp *vigilante* system to keep the silver from running away.

an incredibly short time, and presents results which have no counterpart elsewhere. In fact, our best plated ware is fully up, to say the least, with the requirements of the solid silver trade in other countries, in respect to that artistic style and elaboration which make up four-fifths of the cost of fine silverware itself. There are reaso[ns] worth noticing for this remarkable state of things; and examples in illustration of a fact so recent and so little known will not be out of place.

The high grade of plated ware just refer[red to] is made only by the Gorham Company (th[e]



SILVER TRAY OR SALVER IN THE STYLE OF BENVENUTO CELLINI. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

In England, all goods sold as silver must first be submitted to Government assay, and stamped with the "Hall mark," as it is called, as a guaranty of standard purity. Notwithstanding this guaranty, I have been assured by an experienced English silversmith that frauds are effected under its cover. It is matter for national pride that the stamp of an American house is acknowledged a surer guaranty of sterling purity than the stamp of the British Government

The Gorham trade-mark consists of three small shields in succession; the device on the

brated Elkington ware of Birmingham equaling it only in metallic quality), and is undistinguishable from works in pure silver by any traits of appearance or style. The makers themselves cannot tell which is which, but by technical tests. It is called for to a large amount by wealthy purchasers who use silverware in magnificent style, but who prefer not to court burglary by keeping too much in common use. Accordingly, in many cases, the richest silver services are now stored in safety vaults against social occasions, while plated substitutes, entirely worthless to the thief

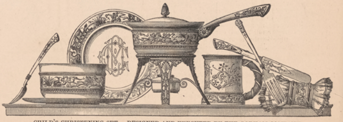
SILVER COMMUNION SERVICE. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

Satin work, oxides, and gold.

first being a lion, to signify "sterling;" on the second an anchor, the emblem of the State of Rhode Island; on the third, the cipher or initial letter "G" (Gorham), and underneath, the word "Sterling."

But not only does the American silverware market sustain the greatest manufactory on the

and receiver, and yet equally elegant with the originals, replace them to a sufficient extent for ordinary purposes. In this way, too, the exquisite lusters and tints that beautify the fine silverware of the present day will be preserved from generation to generation; being not only locked up securely, but every piece being kept,



CHILD'S CHRISTENING SET. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

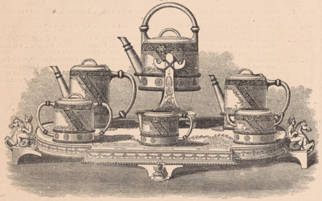
Borders in bass-relief.

globe; it is a fact still less commonly known, that it now demands a higher grade of design and workmanship than European silversmiths ordinarily have to concern themselves with. The development of American taste and fastidiousness in silverware has been very marked in

and carried to and from the treasure vault, in its satin-lined casket, or case, at all times.

This line of business ("Gorham Plate") originated indirectly from the late civil war. At that period the cost of silverware was nearly doubled by the premium on the material and th[e]

advance in wages, at the same time that the market was vastly curtailed. To meet this state of things the Gorham Company—down to that time known only to jewelers as the manufacturers of pure silverware on which they stamped only their customers' names—at once applied their great resources, machinery, patterns, artists, and all, to the production of a novel quality of plated ware, since become famous as "Gorham Plate," which should serve as the perfect substitute for silverware just described. Its base was the beautiful metal nickel, which now rivals silver so extensively for many purposes, with the least necessary alloy to reduce its refractory temper to malleability. Its patterns, ornaments and workmanship were made equal (though never identical) with those for which the Gorham pure silver had hitherto been famous in the jewelry trade. Its surface was a thick coating of silver of absolute purity; too pure, in fact, to have given the necessary strength to the body of the work; and yet, by proper management of the chemical process, rendered as hard and dense as was desirable. To these conditions add the undefinable

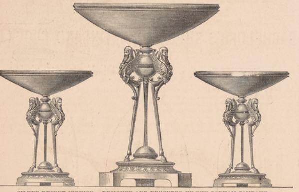


SILVER TEA SERVICE. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

Modernized Antique. Handles, covers and spouts burnished. Brilliantly engraved in Persian style; base bands and ornaments gold; surface satin luster.

air or style that distinguishes the genuine in everything, from the work of imitators, whether in silverware, coin or bank-notes, and which naturally transferred itself from the Gorham silverware to its *fac-simile* in Gorham plate, and you have a result which cannot be exactly described, but it is well illustrated by a comparison that has been often remarked. Of Messrs. Elkinton, of Birmingham, who had been the leading electro-platers of the world, and more recently commenced the manufacture of solid silver, it is said that their silverware inherited the air of plated goods; while the Gorham plate, made by silversmiths, borrows the mien of nobility from its antecedents, and cannot be distinguished from the finest style of solid silver.

I should be glad to complete this article by some exhibition of the beauty and profusion of our "Silver Age," to which description and engraving together are unequal. I have in my eye a certain dinner party, possibly not so typical of the modesty of good private taste as of the magnificence which anybody's money (if he has enough of it) can command at an hour's notice from a New York salesroom—and if I try how it will go off on paper, the guest will surely be indulgent to the difficulties of the host, and not expect too much. Without drawing the line too sharply



SILVER DESERT SERVICE. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

Egyptian style: executed in contrasts of satin luster, burnishing, gold and oxides.

between what was and what might have been done or wasting any time in ceremonious introductions, we will take the liberty of looking into the great dining-room of the ——— mansion, on Fifth avenue, at the moment when the servants have it in readiness for the announcement of dinner. Disregarding the general furniture and decorations of the hall, the table, which really fills the scene, will fully occupy our attention. It is some twelve yards long and two yards wide, and the twenty-four square yards are filled closely enough for good effect, with the "jewelry in silver" from Gorham's, that we have come to see.

The center piece, commanding and unifying the rich array, is a magnificent silver *epergne*, overtopped with calla lilies, bending from lily chalices and stems of gold that grow up in a cluster from the center of a broad circular basin heaped and overhung with a great cone of the richest flowers. From the circumference of the central basin three smaller basins, pendent at equal intervals among the drooping sprays and blossoms, are also heaped and overhung with gay flowers, like the center. The surfaces of the four basins are of the soft, lustrous "satin finish," which the reader must have seen repeatedly to imagine its beauty, deepened by the flash of narrow burnished bands and moldings. The stem supporting these gorgeous hanging gardens is a female figure, fashioned from one of the loveliest of classic models, in massive silver deadened to a pearly tint by oxydization, her feet poised lightly on the cap of a temple dome that forms a pedestal for the whole. On the dome is the consummate splendor of shaded and burnished zones in contrast, with sparkling engraved wreaths, glittering cornices, and a frieze of rich oxydized bass-relief around the base, which rests with four massive feet, as if it floated on the dazzling surface of a silver sea, or more literally a burnished "plateau," as it is called, that mirrors back the beauty I have more faintly described.

The plateau is oblong, and sufficiently extended to "float" also two graceful candelabra, one on either side of the *epergne*, with seven branches bearing tall wax candles; for gas-light, be it whispered, is too searching for the most artistic "complexions," and is therefore not admitted into superfine society.

Spaces for twenty-four guests are marked off on the white damask (I like that tasteful ignoring of the cold, dull fashion of bare mahogany, which has no motive but ostentation or exclusiveness), by the sparkling cluster of glasses, spoon, fork, and knife like a mirror, with the curved cornuform part that almost holds itself in your hand; and now the company promenade in by pairs through the double doors, and are marshaled to their places—we can hardly stop here to scan what they wear—millionaires, ambassadores, generals, admirals, authors, and the President of the United States (all in both sexes, of course); for no less distinguished company, surely, could support so princely an equipage. They have a moment to admire the display, from the indescribable beauty of the new style of tureens—their form is given in one of our engravings, but nothing of their pictured splendor can be imagined by one who has not seen them—down to the irridescent oxides and gold on the dainty little butterflies just flitting over the edges of the silver salt-cellars, and the fanciful forms of the chased pepper-bottles and salad castors ranged within reach of every hand—for the old-fashioned omnibus castor is one of the particular vanities now fashionably dispensed with.

All at once, at the secret signal of their chief, the well-trained and well-dressed attendants execute their manual of arms, as if moved by but one set of muscles; the covers of the first course vanish over their heads, like upward electric bolts, or as above the Light Brigade

"Flashed all their sabers bare,
Flashed as they turned in air,

and in another moment the silver salvers come floating down before each guest with a mirror in which the rims of soup and silver blend undefinable.

But what soup, or what nectar of Jove, is worthy to rest in that elysium of art which we profane with the name of tureen! The white glory of its interplaying sheen and shade, lit up again with dewy sparkle of cut foliage festooned to either side, then surprised by a delicate molding of gold, and reflected back on itself from the mirror-like plateau or tray beneath, with rim of pale gold bass-relief that catches and blends the chaster luster with its own in a silver-golden halo—ah, Solomon! thou wouldst never have likened the setting of a perfect apropos to apples of gold in pictures of silver, if thou couldst have seen this silver picture wreathed in golden haze.

The bread is handed on what we must call plates, but which are bass-relief land-scapes of golden grain, with Ceres and her reapers, circling around silver lakes, filled by reflection, to their depths, with snowy slices. Yet most of the symbolical works of art that hint the special purpose of every vessel and utensil they adorn, must be passed over without notice, or this description will stretch out into next month.

SILVER CASTER, EGYPTIAN STYLE. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

At the next charge of the light brigade from rear to front, the upper decks fly off from those glittering nautical models; each another silver picture, reflected in its silver sea; disclosing a mighty salmon at full length repose in the hold of each vessel. A broad acquatic leaf, with a mermaid handle clinging to its stem, divides the red-golden flesh, and aided by a barbed silver trident, distributes it to the plates. The small boat or tender alongside supplies sauce, dipped with an enameled and irridescent shell.

Once more the decks are cleared; and now the great joints and fowls revealed

"Float double, swan (?) and shadow,"

in the concave mirrors beneath them, ere their juices flow down the branching channels into the cavity prepared for them. But for this, they are removed to the sideboard, with the carvers gleaming on their silver rests, and elegant miniature tureens of gravy, that flanked them. There, too, stand the wine-coolers, truncated columns of burnished silver, twined with the cluster-laden vine, and their bases sculptured with the mythology of Bacchus.

All the vegetables of the season have their vessels, in quadruplicate, rich in luster as contrasted sheen and shade can make them. The butter bowls, with their covers and knives, are appropriate silver and gold, crowned with symbols of bucolic fatness. Water pitchers, richly engraved, chased, and embossed with fountains, lakes and oases of palm, flanked by bowls of crushed ice, rimmed with pendent icicles of frost-silver, and their bases piled with rugged Artic scenery, in blocks and bergs and polar bears—all these are so at home in the expressive metal that they seem to cool the air. The very ice spoon is perforated with an appropriate design, for the escape of water. The ample salad bowl stands conspicuous, another resplendent combination of lusters and sculptures, with the broad-pronged fork and spoon all its own. Macaroni and asparagus have resembling dishes and utensils; silver tongs, half spoon, half fork. The classic olive is in appropriate dishes; likewise the pickles, with bladed silver forks. The celery vases are tall chalices, with golden lip and zone brilliantly setting off the pale green of the succulent stalk.

At the pastry and desert at last, and thank heaven, almost through! All the foregoing load of treasure is removed, and in its stead a fresh array, still more elegant, if not so massive. The ice-cream towers on massive silver stands, sculptured with more Artic scenery, to keep it from melting, with broad mirror trays beneath, the bountiful knife-edged ice-cream spoon, and the cool frost-finished saucers. There are also large vessels in kindred styles of art for fruit ices, with plates to match. The cakes and bon-bons are on low comportiers, or ornamented plates with stem and base, and the silver cake-knife has a fine saw back to its splendid blade, to divide the frosting without fracture.

The fruit vessels are a sort of fairy barge—broad astern, where a base supports them, and with a high scrolled prow where a bushy-tailed squirrel sits aloft and sets the example with his nut-pickers. Or, where grapes are piled within and dangle over the sides, the vessels bear Pomona on the prow, and the vine must clamber from the base, around the sides, where the baffled fox clings falling from his leap at the high clusters. The grape scissors are not to be forgotten, scissors and fingers at once, that grasp the stem as they cut it off, and lift it to the plate. Where the large yellow fruit from Havana and from Northern orchards loads the garlanded and resplendent barge, it is a literal quotation—"apples of gold in pictures of silver," exactly. Passing over the dainty *bijouterie* in silver and gold for sipping strong coffee, with the elegance of the desert patterns in spoons, knives and nut-picks, and the silver knick-knacks for the passing around, lighting, and even ash-receiving, of segars, we take our last look at the coffee service, which divides our admiration with the tureens, and is an equally indescribable picture, though attempted with remarkable skill by our engraver. Whoever uses any of these pieces, uses what is fit rather for a picture-gallery, than for the vulgar service of the body.

Do you ask, Yankee-like, what might be the cost of all this? No offense; so do I, and I find that you can give such a dinner party, if you have a mind, at a day's notice and an expense of say twenty thousand dollars. Cheap, isn't it? If you should take a fancy to give twenty such dinner parties, all equally elegant in the main, but without using the same pattern of any article twice, the Gorham warehouse is able to fill the bill to-day, I judge.

I shall not pretend that sumptuous living is the right use of money in a world so full as this is of evils that money can aid to remove. But for people whose ideas of table silver *will* go beyond the line I draw at spoons and forks, it is just as well to have works of art that can delight and refine the taste, if nothing more.

In the capacity of bridal gifts, at least articles of silver appropriate to the style of the nascent family seem to be the most commendable of superfluities, even if they are not strictly necessary. Well selected silver articles for the table, particularly, are permanent keepsakes, like nothing else, almost, that can be thought of; cherished for their unchangeable usefulness, beauty, and value, as well as for their associations. The whim of going into the lines of perishable fabrics and fragile gewgaws for a variation of wedding gifts has proved as transient as it was absurd. Silver reigns in the marriage feast, and in all its after memento, perfect, matchless symbol of the permanence, preciousness, purity, beauty, and homely use, that meet in the most sacred relation of human life. And to its sequel, the christening, how wide is the homage in silver, witness not less than—shades of the magi!—two thousand varieties of mugs—I mean not human, though

SILVER VASE, REPOUSSE. DESIGNED AND EXECUTED BY THE GORHAM COMPANY.

[The obverse placque is Thorwaldsen's "Night." Stars and draperies gold; female figure light oxide tint; ground dark tint; base bass-reliefs oxydized; surface polished. The reverse placque is Thorwaldsen's "Morning" in appropriate tints of gold and oxides.]

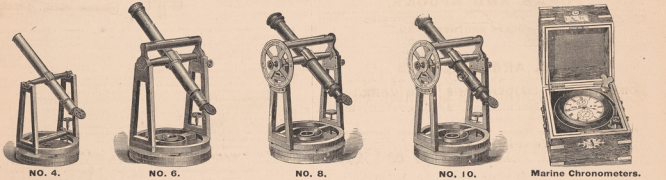
infantile, but silver mugs, from the prolific laboratories which have afforded us so many exquisite illustrations of our subject, and have done so much to justify the characterization of the present as THE SILVER AGE.—*Scribner's Monthly for December.*

REDUCTION IN PRICES

OF

John Bliss & Co's Transit Instruments,

FOR OBTAINING CORRECT TIME.



NO. 4. NO. 6. NO. 8. NO. 10. Marine Chronometers.

IMPORTANT NOTICE.—These Transits are readily set in position without the aid of strictly correct time as a basis for that purpose. Printed instructions, easily understood, accompany each Instrument, and no calculations are required preliminary to setting in position. As a trial only is required to insure unqualified approval, we are induced to make the following **LIBERAL OFFER.**—On receipt by us of satisfactory reference, and 10 per cent. of the price, we will send one of the foregoing Transit Instruments, on hire or trial, for one month, with full printed instructions for setting up and using the same, and if purchased after trial, we will allow the whole hire to apply in part payment, and sell the Instrument on approved note at four months for the balance. Special terms for payment by installments, after trial, on application. We do not make this offer merely to hire these instruments, but to insure a trial with a view to sales, the hire received being only sufficient to cover the cost of repolishing in case they are returned. Send for Illustrated Circular giving full description.

JOHN BLISS & CO., 110 Wall Street, New York.

JOHN AUSTIN & CO.,

GOLD AND SILVER REFINERS,

ASSAYERS AND SMELTERS

Fine Gold, Silver and Copper Granules, &c. ALWAYS ON HAND.

Gold and Silver Coin for the Trade.

74 CLIFFORD STREET, PROVIDENCE, RHODE ISLAND.

PRIEST, FULLER & LAWRENCE,

Importers and Dealers in

WATCHES, DIAMONDS,

Jewelry and Gold Chains,

No. 15 MAIDEN LANE, NEW YORK.

Sole Agents for

CHAS. WUILLEUMIER, Chaux-de-Fonds, Switzerland. PAUL LAVAL, St. Imier.

E. A. PRIEST, F. A. FULLER, Jr. I. S. LAWRENCE.

McLANE'S

ANTI-OXIDIZER

A Solution for Preserving and Protecting the Polish and Color of Gold and Silver while under process of Hard-Soldering

The most delicate Engraving and Chasing is perfectly Preserved from Tarnishing when treated with this Solution, and the article on which it is placed may be heated to a cherry red without fear of Discoloration.

rice 50c. per bottle. If sent by Mail 75c. For Sale by Dealers in Watch Materials.

s solution is not intended to preserve acid color, but will in a great measure protect it.

M. L. McLANE, 11 John Street,

O. Box 2171. NEW YORK.

AUTION.—In consequence of unscrupulous parties manufacturing and offering ale an Anti-Oxidizing solution, put up in style similar to mine, and even copying Label and Circular with a view to deceive the Trade. All purchasers are request- o ask for McLane's Anti-Oxidizer, and take no other. Be sure that the bottle is d and stamped McLANE'S ANTI-OXIDIZER, none are genuine without it.

A. L. HOSMER'S PATENT,

MARCH, 1874.

COMBINED

Hard and Soft Soldering Kit

STEAM BLOW PIPE, LAMPS & ALCOHOL DISH.

HOSMER'S NEW WAY.

One of the most Useful Inventions of the Age!

For Watchmakers, Jewelers, Silversmiths, Dentists Gold Pen Makers, and workers in small Metal Goods.

HOSMER'S STEAM BLOW-PIPE

Will blow harder than any living man can blow, and always keep up a steady blast as essentially necessary in Melting or Heavy Soldering. In using my Blow-Pipe, both hands are free, which will be found of great advantage to the operator.

For further information send for explanation.

Sent on receipt of Price or C.O.D.

PRICE. No. 1, Complete, Tin and Brass, ... $3.00
No. 1, " All Brass, ... 5.00
No. 1, " Nickel Plated, ... 7.00

A. L. HOSMER, Cameron, Clinton County, Mo.

☞ DISCOUNT TO JOBBERS.

Buyers' Directory.

A Guide to the prominent Wholesale Houses in the Watch, Clock, Jewelry and kindred branches of Trade in New York.

Clock Companies.

American Clock Co.—Manufacturers of Clocks of all kinds. Salesroom, No. 381 Broadway.

Ansonia Brass & Copper Co.—19 & 21 Cliff street, New York

Kroeber, F., Clocks and Regulators of every description, No. 8 Courtland Street, N. Y.

United States Clock Co.—Henry Terhune & Son, 4 Courtlandt street, N. Y., Manufacturers of Fine Regulators and American Clocks.

Waterbury Clock Co.—H. Bailey, Treasurer, Manufs. and Jobbers, No. 4 Cortlandt Street, N. Y., No. 160 Clark Street, Arcade Building, Chicago.

Wood, James—Manufacturer, Importer and Dealer of Fine Regulators and Clocks of every description 6 Courtlandt street, N. Y.

Corals and Coral Jewelry.

Bergmann, Adolph—Importer of Corals, Mounted and Unmounted, Precious and Imitation Stones, No. 64 Nassau Street, N. Y.

Errico Bros.—Established 1859—Importers of Coral Jewelry, 19 John street, N. Y. Manufactory, 39 St Catharine a Chiaja, Naples, Italy.

Lawson & Granbery, Manufacturer Fine Gold & Coral Jewelry ; Coral Jewelry altered, repolished and repaired, No. 61 Nassau St., N. Y.

Cameo Cutters, Etc.

Bernard & Bonet—Cameo Cutters, Likenesses Cut on Shells and Precious Stones, 208 Broadway, New York.

Lemarie, Jules—Cameo Likenesses cut on Stone and Shell for Pins, Earrings, Rings, Studs, &c Fancy Cameos, 643 Broadway, N Y.

Chronometers.

Bliss, John & Co.—Standard Marine Chronometers. Transets for Watchmakers' Use, No. 110 Wall street, N. Y.

Diamonds.

Bernhard, A & Co.—Manufacturing Jewelers & Importers of Diamonds, Fine Jewelry, &c. 169 Broadway, Gilsey building, N. Y.

Bissinger, E.—Importer of Diamonds, No. 182 Broadway, N. Y.

Fera, Henry—Importer of Diamonds, No. 9 Maiden Lane, N. Y.

Morris, A.—Importer of Diamonds, Pearls, French & Italian Stone Cameos, Amethysts, Onyxes, and Precious Stones generally, No. 25 Maiden Lane, N. Y.

Nevenhuizen, E. Ang.—Importer of Fine Diamonds. No. 5 Maiden Lane, New York.

Diamonds and Diamond Jewelry.

Smith & Hedges—Importers of Diamonds Exclusively, and Manufacturers of Fine Diamond Jewelry, 1 Maiden Lane, cor. Broadway, N.Y.

Taylor, Olmsted & Taylor, Importers Diamonds and Diamond Jewelry, 5 Bond street, N. Y.

Diamond Setters, Etc.

Friend, S.—Manufacturer of Fine Jewelry, and Diamond Setter, 32 John street, N. Y.

Haydon & Pensch.—Manufacturers of Fine Jewelry and Diamond Setters, No. 63 & 67 Nassau street, N. Y. N.B.—Particular attention paid to repairing in all its branches.

Enamelers, Etc.

Bishop, J. L. & A.—Enamelers on Gold & Silver, also Manufacturers & Importers of Enamel, 80 Nassau Street. Room 10, rear.

Orr, Jas C.—Enamel on Fine Jewelry, Flowers, Birds, &c., Enameled in colors, Hand Bracelets (a specialty), 77 Nassau Street, N.Y.

Engravers and Die Sinkers.

Dolbey & Wood—Engravers & Increasers of Precious Stones, 169 & 171 Broadway, Room 33, New York.

Fackner, Edward—Carver, Engraver and Chaser on Jewelry, Monograms, Lettering, &c. No. 10 John street, N. Y.

Henning, Albert J.—Die Sinker & Engraver, 217 Centre street, N. Y. Dies for Jewelers and Silversmiths, Embossing Plates, Seals, &c.

Knapp, Charles—Engraver, Die Sinker and Designer for Jewelry, &c. 14 and 18 k. Shanks and Heads for Rings, &c., 41 Maiden L., N.Y.

Park, William—Stone Seal & Cameo Engraver, and Die Sinker. Masonic Devices and Engraving for Incrustation, 209 Broadway, N.Y. Room 14½.

Schaffer, A.—Stone, Seal, and Cameo Engraver, No. 64 Nassau street, N. Y.

Schleicher, Ch.—(successor to Wm. Eck) Die Sinker, Engraver, Chaser and Tool Maker 193 William street, N. Y.

Schuller, J. Dan'l.—Stone Seal Engraver, Armorial Crests, Initials and Monograms engraved on Stone Seals, &c., No. 71 Nassau Street, N. Y.

Electro Platers.

Jeandheur, F. & Son—Gold and Silver Electro Platers & Fine Gilders, Coloring Ormolu and Gold Jewelry specialty, 71 Nassau St., N.Y.

Jennys, P. A.—Gold and Silver Electro Plater and Ormolu Colorer, Gilding and Repairing Watch Cases a specialty, 62 Nassau street.

Normandeau, P. A.—Electro Gold & Silver Nickel Plater, Coloring Gold and Silver work a specialty, No. 102 Nassau Street, N. Y. Sole Agent of New York Nickel Plating Company. Licensed by United Nickel Company.

Nickel Plating.

Scherrer's—Nickel Plate Works. Plating on all metals by an improved method, 45 and 47 St.

Fancy Goods, Clocks, Bronzes, Etc.

Hayes, Alex. M. & Co.—Importers of London, Paris and Vienna Fancy Goods, Clocks, Bronzes, Musical Boxes, Diamonds, Watches, Jewelry, etc., 32 Maiden Lane, N. Y.

Hinrichs, C. P. A.—Importer and Dealer in French, English and German Fancy Goods, Clocks, etc., 23, 25 & 27 Park Place, N. Y.

Magnin, Ve J. Gueth & Co.—Importers of Clocks Bronzes, Musical Boxes & Rich Fancy Goods etc., 652 Broadway.

Shepard, Le Boutillier & Co.—Importers of Fancy Goods, Clocks, Bronzes, &c., No. 10 Maiden Lane, N. Y.

Gold Chains, Etc.

Andres, P. & C.—Manufacturers of Gold Chains and Chain Bracelets, No. 619 9th Avenue, N. Y.

Beck, J. & Son, Manufacturers of Fine Gold Chains and Chain Bracelets, 19 Liberty place, near Maiden lane, N. Y.

Falkenau & Pollak, Manufacturers of Gold Chains with Patent Safety Swivel Attachment, No. 4 Maiden Lane, N. Y.

Kaufmann Bros.—Manufacturers of Gold Chains, and Chain Bracelets, 26 John street; Factory, 713 5th ave., N. Y.

Smillie, Dorrance & Edge.—Manufacturers of the Celebrated Woven Fabric Gold Chains and Chain Bracelets, 9 Maiden Lane.

Wallach, A. & Co.—Manufacturers of Gold Chains, No. 11 Maiden Lane, N. Y.

Weyman, Geo.—Manufacturer of Gold Chains and Jewelry, 17 John street (rear), N. Y.

Gold Pens, Etc.

Aikin, Lambert & Co.—Manufacturers of Choice Gold Pens, Cases, Holders, Toothpicks, etc., 14 & 16 Maiden Lane, N. Y.

Hawkes, George F.—Manufacturer of Fine Gold Pens, Gold, Silver and Rubber Pencil Cases, 86 Nassau street, N. Y.

Todd, Edward & Co.—Manufacturers of Gold Pens, Pencil Cases, Tooth Picks, &c., 602 Broadway, N. Y. Factory, Brooklyn.

Gold Rings.

Ely, W. H.—Manufacturer of Solid Gold Rings of every description. No. 58 Nassau Street, New York.

Hair Jewelry.

Francke, H. C.—(late Charles Francke & Co.) Maid Hair Jewelry & Device Work, Importer of Alloying Copper. Sample books sent upon hand, 185 & 187 Broadway.

Menge, Chas.—Manufacturer Fine Jewelry and Ornamental Hair Work, and Importer of Watches, No. 22 John Street, N. Y.

Miller, H.—Artist in Hair, and Jeweler, 189 Broadway, up stairs, N. Y. Established 14 years.

Jewelry Cases, Fancy Boxes, Etc.

Altenberg, C. & Co.—Manufacturers of Russian and Morocco, Jewelry and Silverware Cases, Fancy Goods, etc., 3 Bond street, N. Y.

Braun, Chr. H.—Manufacturer of Jewelry Boxes, Trays for Show Cases, &c., 31 Chatham street, N. Y.

Dahlen, W.—Manufacturer of Cases for Jewelry and Silverware, No. 85 Nassau Street, N. Y. Show Case Trays, &c., at the shortest notice.

Jackson, Samuel C.—Manufacturer of the newest styles of Boxes and Trays for Silverware Jewelry, Watches, &c., 189 Broadway, up-stairs.

Kock Henry—Manufacturer of Fine Jewelry Cases, also Boxes for Surgical & Mathematical Instruments, 3 Doane street, up-stairs, N.

Steinle & Haessler—Manufacturers of Fancy Boxes for Jewelry and Silver Ware, 66 Nassau Patentes of the Celebrated Adjustable Box

Sturn, L.—Manufacturer and Importer of Cases for Jewelry, Watches, Silverware, 15 John street, N. Y.

Wiggers & Froelick—Manufacturers of Fine Morocco Cases for Jewelry, Watches Silverware Trays and Porcelain Ring Trays, 46 & 60 Nassau Street, N. Y.

Jewelry—Fine.

ambert & Co.—Manufacturers. General k of Reliable Jewelry, 14 and 16 Maiden e, N. Y.

n, Sexton & Peterson,—Manufacturers Fine Jewelry. No. 1 Bond street, N. Y.

& Barnard—Manufacturers of the Self-djusting Band Bracelet Guard, (Bracelets a pecialty), No. 9 John Street, N. Y.

man & Straat—Manufacturers of Fine Jew-lry. Seal and Stone Rings a specialty. rders promptly attended to. 41 Maiden ane, N. Y.

nger, E.—Importer of Fine Jewelry, Lockets, Crosses, Neck Chains, &c., No. 182 Broadway, New York.

wn, Cook & Co.—Manufacturers of Fine Gold, Enameled and Plain Lockets, No. 191 Broadway, N. Y.

rch, DeMott & Coughlin.—Manufacturing Jewelers, 9 John street, N. Y.

rter, Howkins & Dodd.—Manufacturing Jewelers, 1 Bond Street, N. Y.

e, Adams & Stevens—Manufacturers of Fine Jewelry, Lockets and Bracelets, a specialty. Office old No. 9 Maiden Lane, N. Y.

emmert Bros.—Manufacturers and Importers of ine Jewelry, Cameo and Onyx Lockets, Sleeve Buttons and Sets a specialty. Old No. 9 Maiden Lane, New York.

itch & Chatterton—Successors to Merrill, Fitch & Allin—Manufact'rs of Fine Gold Jewelry, Chains, Band and Chain Bracelets, No. 19 John street, N. Y.

French, F.—Manufacturer and General Dealer in Fine Gold and Roll-Plate Jewelry. Studs a specialty. No. 14 John street, N. Y.

Griffith, H.—Manufacturer of Fine Jewelry, Studs and Buttons a specialty, jobbing attended to, Nutry Alley, Adams street, Brooklyn, N. Y.

Hartmann, P.—Manufacturer & Importer of Fine Gold, Diamond and Filigree Silver Jewelry, No. 36 Maiden Lane, N. Y., P. O. Box 2,454.

Hess, Adolph & Co.—Importers of Jewelry. Lockets, Charms and Crosses a specialty. 39 Maiden Lane, N. Y.

Kimball & Kittle—Manufacturers of Fine Gold Jewelry, 28 Bond street, N. Y.

Krebs, George—Manufacturing Jeweler, 28 Bond street, New York.

Kuhn & Doerflinger—Manufacturers of (14 and 18 kar. and Roman Gold) Band Bracelets, and Importers of Lockets, 18 John street, N. Y.

Lennon, John D.—Manufacturing Jeweler, 150 Fulton street, N. Y. Flat and Half-round Gold Bracelets a specialty.

McMurray, Daniel E. D—Successor to Kinscherf, Dellere & Co., Manufacturer of Fine Enameled Jewelry, 148 Fulton Street, N. Y.

Miller Bros.—Manufacturers of Fine Jewelry, Lockets, Sleeve Buttons, Studs, etc., etc. 11 Maiden Lane, New York.

Mulford, Hale & Cottle—Manufacturers of Rich Jewelry, Waltham Building, 1 Bond steeet, N. Y.

Oliver, Richard.. Manuf. Jeweler. Odd and intricate articles of Fine Jewelry made to order, repairing done for the trade, 11 John St., N. Y

Oppe & Kleinfelder—Manufacturers of Seal Rings, Studs & Sleeve Buttons, 50 Bond street, N. Y. Orders promptly attended to.

Oskamp, Clemens—Wholesale Jeweler, 175 Vine street, Cincinnati, Ohio.

Owen, G. & S. & Co.,—Manufacturing Jewelers. Office, No. 5 Maiden Lane, New York.

Rose, S. & Son—Importers & Dealers in Jewelry, Watch Materials, Watch Glasses and Spectacles, 67 Nassau Street, New York.

Soule H. & G. & Co.—Manufacturers of Fine Jewelry, Patent Self-locking Bracelets a specialty, 17 Maiden Lane—factory, Jersey City.

Spadone, Rood & Co.—Manufacturers of fine Jewelry, Chains, etc. Importers of Watches, etc., 658 Broadway.

Swinnerton Bros. & Co.—Manufacturers of Jet and Fine Gold Jewelry, Office, 196 Broadway, N.Y. Factory, Newark, N. J.

Thoma, Ernest—Manufacturer of Fine Gold Sets and Childrens' Earrings, 173 Broadway, N.Y Factory, Hackensack, N J.

Tingley, Sinnock & Sherrill—Manufacturing Jewelers. Amethyst, Cameo and Onyx Rings a specialty. No. 9 Maiden Lane, New York

Wheeler, A.—Manufacturer of Diamond and Fine Jewelry, Masonic Jewels, Badges, Emblems, &c., 35 John street, N. Y.

Wiener Brothers—Manufacturers of Gold Chains and Fine Jewelry, 128 Fulton Street, N. Y.

Woglom & Miller.. Manufacturers Fine Jewelry, Black Onyx work a specialty, 32 John Street, N. Y.

Jewelry—Shell, Gilt, Jet, etc.

Cohen William—Importer of Jewelry, Fancy Goods, Whitby Jets, Gilts, Tortoise Shells, &c., &c., No. 4 Maiden Lane, N. Y.

Decker & Barclay.—Manufacturing Jewelers, 201 Broadway, N. Y. Factory, Jersey City. Bracelets a specialty.

Hedstrom, Claes G.—Manufacturer of Shell Black and Rubber Jewelry, No. 96 Walker street, N. Y., Entrance 103 Elm street.

Hinrichs, C. F. A.—Importer of Amber and Spa Jewelry. 29, 31, & 33 Park Place, N. Y.

The Thayer Manufacturing Jewelry Co.—Successors to O. S. Thayer & Co., Manufacturing Jewelry, Specialty: Celluloid Jewelry. No. 181 Broadway.

Jewelers' Tools and Findings.

Dennison & Co.—Manufacturers of Jewelers' Findings, Paper Boxes, Cards, Tags, Cottons, Tissue Papers, &c., 202 Broadway, N. Y.

Frasse & Co.—Importers of Stubs, French, Swiss, German and Sheffield Tools, Files and Steel Wire for Watchmakers, Jewelers, etc., 62 Chatham street, N. Y.

Swift Mfg. Co.—Manufacturers of Wood Boxes for Mailing, and Expressing Jewelry, Precious Stones, etc., 16 Courtlandt street, N. Y.

Lapidaries.

Fox, M., & Co—Practical Lapidaries and Importers of Precious Stones, Pearls, Cameos, &c., Agate Mortars, No. 1 Maiden Lane, N. Y.

Kordmann & Michel—(Successors to A. Tournier & Co.) Lapidaries, Importers of Precious Stones, &c., No. 53 Nassau Street, N. Y.

New York Steam Lapidary Works.—T. F. More, Importer of Stones, and Manufacturer of Stone, Glass & Jet Work, 42 Ann St., N. Y.

Masonic and Odd Fellows' Jewels.

Luther, J. F.—Masonic & Odd Fellow's Jewels' Charms and Emblems a specialty; also Pins manufactured for all secret orders. 79 Nassau street, N. Y.

Musical Boxes, Etc.

Hinrichs, C. F. A.—Importer of Musical Boxes, Accordeons and Harmonicas. No. 29, 31 & 33 Park Place, N. Y.

Paillard, M. J. & Co.—Importers and Dealers in Musical Boxes. Boxes carefully repaired. 680 Broadway, N. Y.

Opticians.

Burbank, Bond & Co.—Manufacturers of Spectacles and Eye Glasses of all descriptions, in gold, silver, etc., 14 Maiden Lane, N. Y.

Landsberg, A...Successor to L. Black & Co., Importer and Manufacturer of Optical Goods, 36 Maiden Lane, Box 3993, N. Y.

Ruding, Walter—Repairing Spectacles, Eye Glasses, &c., punctually attended to. Pebbles on hand set to order, No. 81 Nassau St., N. Y.

Straubel, Richard—Manufacturer of all kinds of Gold Eye Glasses and Spectacles, No. 37 Maiden Lane, N. Y.

Suttie, Wm. J.—Manufacturer of Eye Glasses and Spectacles, in gold, silver, steel and shell, also, Fine Jewelry, 39 Maiden Lane.

Rings and Shanks.

Burbank, Bond & Co.—Manufacturers of Solid Gold Rings, 14 Maiden Lane, N. Y.

Bryant & Bentley.. Manufacturing Jewelers, 350 Patterns Hard Solder Rings, 12 Maiden Lane, N. Y.

Knapp, C.—Manufacturer of 14 and 18 karat Gold Shanks and Heads for Rings, 41 Maiden Lane, New York.

Silverware.

Cook, John—Manufacturer of Silver Tea Sets, Pitchers, Waiters, Cups, Goblets, Spoons, Forks, Knives, etc. 6 Liberty Place, N. Y.

Gorham Manufacturing Co.—1 Bond street, N.Y.

Whiting Manufacturing Co.—Manufacturers of Sterling Silverware, No. 181 Broadway, N. Y.

Silver Plated Ware.

Manhattan Plating Co., 24 John street, N. Y.—Fine Nickel Silver and White Metal Plated Ware. Repairing & re-plating on the premises.

Meriden Britania Co.—Manufacturers of Silver-plated Ware, 550 Broadway, N. Y.

Rogers & Bro.—Manufacturers of Reliable Silver Plated Ware. No. 203 Broadway, New York.

Show Cases, Etc.

Becker, John—Manufacturer of Show Cases, Jewelry Trays always on hand, 19 Howard street, N. Y.

Heil & Sum—Manufacturers of all kinds of Show Cases, 153 Chatham street, N. Y.

Kelly, P. J.—Manufacturer of all kinds of Show Cases, Counters and Refrigerators, 45 & 49 New Bowery & 22 James street, N. Y.

Kraft & Hoffmeister—Manufacturers of Metal Show Cases, Jewelry Trays always on hand, 8 & 13 North William street, N. Y.

Kruse, Frederick—Manufacturer of all Sizes and Styles of Show Cases in Metal & Wood, 175 Chatham street, New York.

Spectacle Case anufacturers.

Richardson, Wm.—Manufacturer of Spectacle Cases in all Branches, 40 Fulton street, Up Stairs, N. Y.

Koenen, A. & Bro. Manufacturers of Leather Spectacle & Eye Glass Cases, 81 Nassau street, N. Y.

Thermometers Etc.

Tagliabue, Giuseppe—Thermometer, Barometer and Hydrometer Manufacturer, 302 Pearl stree near Beekman, N. Y.

Thimble Manufacturers.

Burbank, Bond & Co.—Manufacturers of Gold & Silver Thimbles, 14 Maiden Lane, N: Y.

Ketcham Bro. & Co.—Improved Gold and Silver Thimbles, Nos. 4 and 6 Liberty Place, near Maiden Lane, N. Y.

Walking Canes.

Fradley, J. F.—Manufacturer of Fine Gold and Silver Headed Walking Canes. 18 John Street, New York.

Watch Companies.

American Watch Co.—Robbins & Appleton, Agents, Waltham Building, Bond St., N. Y.

New York Watch Co.—Factory, Springfield, Mass. John F. Krugler, Agt. 15 Maiden Lane New York.

The Philadelphia Watch Co.—No. 618 Chestnut Street, Philadelphia. New York Agency, L. H. Keller, 64 Nassau St.

Watch and Chronometer Jeweler.

Queen, James—Watch and Chronometer Jeweler and Pallet Maker, 83 Nassau street. Pivots inserted in Pinions, Balance, Staffs, &c.

Watch and Clock Springs.

Brochon & Banvard.—Manufacturers of Watch, Clock, Chronometer and Musical Box Stock Springs, 77 Nassau street, N. Y.

Watch Importers, Etc.

Abry, J. A.—Importer of Watches, No. 63 Nassau Street, N. Y. Sole Importers of Vacheron & Constantin celebrated Geneva Watches.

Aikin, Lambert & Co.—Importers of Watches. Sole Agents for Paul Breton & Chas. Latour, Geneva. A general line of reliable Swiss Watches. Watch Cases of all styles made to order. 14 & 16 Maiden Lane, N. Y.

Bartens, Chas... Watch and Chronometer Maker. Dealer in and Importer of Fine Watches, No. 3 John Street, N. Y.

Bodine, G. M.—Importer of Watches and Jewelry of every description, No. 22 Maiden Lane, N. Y.

Bourquin Brothers—Importers of Watches from their own manufactory at Bienne, Switzerland, 20 Maiden Lane, N. Y.

Bynner, T. B. & Co.—Importers of Watches and Dealers in Diamond and Fine Jewelry, 527 Broadway, N. Y.

Conover David F. & Co.—American Watches, Wholesale Salesroom, southeast corner 7th and Chestnut streets, Philadelphia.

Cross & Beguelin—Importers of Watches, Watch Tools and Materials, dealers in American Watches, No. 21 Maiden Lane, N. Y.

Courvoisier, Wilcox & Co.—No. 12 Maiden Lane, N. Y., importers of Watches. Agents for Chas. F. Tessot & Son, and Jules Huguenin, Locle Suisse.

Droz, Henry E.—Importer of Watches and Watch Case manufacturer. Agent for the "E. Perregaux" Watch, and jobber in American Watches, No. 92 Fulton Street, N. Y.

DuBois, Francis & Co.—36 Maiden Lane, N. Y., Importers of Watches and Manufacturers of Watch Cases.

Freund, Goldsmith & Co.—Importers of Watches Jewelry, and Precious Stones, No. 8 Maiden Lane, N. Y.

F. H. Mathez,—Importer of Watches. No. 5 Maiden Lane, N. Y.

Kahn, L. & M.—Importers of Watches, No. 10 Maiden Lane, New York.

Lutz, L. A.—(Successor to Lutz Bros.)—Importer and Manufacturer of Wa ches—fine movements a specialty, factories in Locle & Geneva, 71 Nassau street, N. Y.

Maguin, Ve J. Guedin & Co.—Importers and Agents of the Nardin Watch, No. 652 Broadway, N. Y.

Mathey, L. & A.—Importers of Fine Watches and Sole Agents for the **H. L. Matile's** Watches, No. 119 Fulton Street, N. Y.

Piaget, Henry F.—Importer, Manufacturer and Repairer of Fine Watches and Movements, No. 85 Nassau Street, New York.

Priest, Fuller & Lawrence.—Importers of Watches, Diamonds, Jewelry, Gold Chains, etc. No. 15 Maiden Lane, N. Y.

Quinche & Krugler.—Agents for the Borel & Courvoisier Nickel Movements, 15 Maiden Lane, N. Y.

Stein & Brother—Importers and Jobbers of Swiss and American Watches, Cha ns, Jewelry, &c. 66 Nassau street, N. Y.

Stern Brothers & Co.—Importers of Swiss Watches and wholesale dealers in American Watches, &c., No. 63 Nassau Street, N. Y.

Taylor, Olmsted & Taylor—Importers of Watches No. 5 Bond street, N. Y.

Waaser, F.—Importer of Watches, Materials, Tools, &c., Sole Agent for Ducommun's Main Springs, 52 Nassau street, N. Y.

Watch Cases.

Brown, J. A. & Co.—Manufacturers of The Ladd Patent Stiffened Gold Watch Cases, &c., 11 Maiden Lane, N. Y. Factory, 58 Eddy street, Providence, R. I.

Jennings, Wm. C.—Manufacturer of Watch Cases, No. 33 John Street, New York.

Laurent, J.—Watch Case Manufacturer, Gold and Silver American Watch Cases constantly on hand. 17 John street,(rear building,) N. Y.

The Dueber Watch Case Manufacturing Co.—131 W. Fourth street, Cincinnati, Ohio, and 14 John St., New York.

Virow & Sturges—Manufacturers of Gold and Silver Watch Cases, 189 Broadway, N. Y. top floor.

Watch Case Repairers.

Chemidlin & Cordier—Watch Case Repairers 77 Nassau street, rear building, room 20, N. Y. Manufacturers of Silver Cases.

Tarbox, Hiram—Watch Case Repairing, Springing, Polishing and Engine Turning, 79 Nassau street, (room 22), N. Y.

Watch Dials

Gold, John T.—(Successor to the late T. Gold), Enamel Watch Dial Maker, No. 81 Nassau Street New York.

Watch Keys.

Clark, A N.—Manufacturers of Light Metallic Goods, Watch Keys, Watch Case Springs, Combination Watch Keys, &c., Plainville Ct.

Watch and Clock Repairers.

Egler Bro's—Repairers of Watches and Clocks of every description—Special attention paid to French Clocks, 37 John street, N. Y.

Watch Glasses, Shades, Etc.

Berger, Albert, & Co.—Importer of Watch Glasses, Spectacles, Opera Glasses, Telescopes, &c., &c., No. 47 Maiden Lane, N. Y.

Hill, Robert S.—Manufacturer of Watch Glasses, &c., dealer in Imported glasses, flat glasses a specialty. 75 & 77 Nassau street, N. Y.

Walter, A., & Co.—Importers and manufacturers of Watch Glasses, Spectacles, Clocks, Musical Boxes, &c. No. 40 Maiden Lane, N. Y.

Watch, Pendulum, Spring and Wire Manufacturers.

Ganneval & Callard.—27 Alfred St., Islington, London. Hair spring wire in spools, 36 yds. to 1000 yards; 4s per spool of 36 yards.

Providence Directory

A Guide to the prominent Manufacturing Jewelers of Providence who manufacture for the Jobbing Trade.

Bracelets.

American Bracelet Co.—Manufacturers of Thomson's Patent Telescopic Bracelets. 26 Potter street, Providence, R. I.

Fine Jewelry.

Downs, Chas. & Co.—Manufacturers of Jewelry, also of Initial Buttons. No. 131 Dorrance street, Providence. R. I.

Irons, Chas. F.—Manufacturer of Solid Gold Jewelry. Specialty Emblems, Pins and Charms, Masonic, Odd Fellows, &c. 102 Friendship street, Providence, R. I.

Sturdy & Marcy,—Manufacturers of Jewelry. 95 Pine street, Providence, R. I.

White, Foster & Co.—Manufacturers of Fine Plated Jewelry, (Sets of Jewelry, Brooches, Drops and Buttons. No. 30 Potter St., Providence, R. I.

Jewelry.--Plated.

Allen, Samuel & Co.—Manufacturers of Fine Electro Plate Jewelry. 96 Pine street, Providence, R. I.

Bride, Wm. M. & Co.—Manufacturers of Gold Plated Jewelry of all kinds. No. 116 Pine St., Providence, R. I.

Luther Bros.—Manufacturers of Fine Gilt Jewelry. Studs and Buttons a specialty, (also Lapidaries.) No. 20 Conduit St., Providence, R. I.

Pierce, Willard & Co.—Manufacturers of Fine Plated Jewelry, also Gold Masonic and Odd Fellows Emblems, &c. No. 30 Page street, Providence, R. I.

Taft, W. A.—Manufacturer of Plated and Gold Jewelry. No. 193 Eddy St., Providence, R. I.

Rings.

Haskell, W. & Co.—Manufacturing Jewelers. Finger Rings a specialty in Gold, Silver and Rolled Plate. No. 95 Pine St, Providence, R.I.

McAdam, Wilson & Co.—Manufacturing Jewelers. Gold Seal Rings a specialty. No. 193 Eddy street, Providence, R. I.

Studs, Sleeve and Collar Buttons. Gold.

Lucklin, Wm. C.—Manufacturing Jeweler. Studs and Collar Buttons a specialty. No. 38 Friendship street, Povidence, R. I.

Richardson, J. B. & Co.—Manufacturing Jewelers. Gold Sleeve and Collar Buttons a specialty. No. 26 Potter street, Providence, R. I.

THE
JEWELER'S CIRCULAR
DEVOTED EXCLUSIVELY TO THE INTERESTS OF THE WATCH, A MONTHLY JOURNAL OF CLOCK AND JEWELRY TRADE OF AMERICA

D. H. HOPKINSON, Publisher, 303 Pearl St., New York. | Vol. V.—No. 12. | NEW YORK, JANUARY 15TH, 1875. | Subscription, $1.25. Including Postage.

Selections from Saunier's Traite d'Horlogerie.

Translated for The Jewelers' Circular.

BY A. SIROIS.

DRAWING A CYLINDER ESCAPEMENT.

One of the best methods to find the exact proportions of the different parts of a cylinder escapement and to fully understand its action, is to draw it on an enlarged scale showing it in all its different positions. In the present instance we suppose the scape wheels to have twelve teeth, because with this number the teeth will be larger, and will show our idea in a better manner.

We desire to find the proportions of an escapement having a wheel ten millimeters in diameter with twelve teeth, a plane of impulsion forming an angle of 20 degrees with its base, and the thickness of the cylinder shall being equal to one eighth of the length of the inclined plane. The diameter of the wheel having been decided upon, we draw it twenty, thirty, forty, &c. times larger, and when the whole drawing of the escapement is completed, if we desire to have the right size of all the different parts, we have only to reduce them in the same proportion they were enlarged. In the present instance we have enlarged the wheel twenty-five times. (The diagram has been reduced two thirds of its original size.) 10 millimeters multiplied by 25 gives 250 millimeters for the diameter of the wheel or 125 for its radius.

FIG. 21.

On thick drawing paper properly fastened on a drawing board, from the central point, C, Fig. 21, with the compasses opened to 125 millimeters, we describe the circle, B D E, which represents the circumference of the wheel. In a wheel having 12 teeth, the space between one tooth and the next is represented by a arc of 30 degrees or 360 divided by 12. Let us draw the radius, B C, and from the point B measure an arc, B D, of 30 degrees and continue the same all around the circumference of the wheel; or which is the same, with any accurate mathematical measuring instrument let us make the angle, B C D, of 30 degrees. This angle, B C D, will include on the circumference of the wheel, one tooth, and the space between it and the next, and each side of the angle will nearly touch the back of the teeth. The cylinder being in the position of B A when the tooth is inside and in the space, A D, when it is between two of the teeth, it is evident that the two diameters, A B and A D, have a point of contact at A, and that it is difficult to find the exact point of contact.

The angle, B A G, is composed first, of the angle of escape, and second, of the supplementary angle, H A C, which is for a wheel of 15 teeth 4 degrees, and for a wheel of 12 teeth 6 degrees. The triangle, B G A, being an equilateral triangle, the sum of the two angles, B and A, is equal to 90 degrees. Subtracting from this the angle of escape plus the small supplementary angle, H A G, that which is left is the incline in degrees of the angle, I B F, and we then draw the line, B F, which forms that angle.

To find the relative size between the exterior and interior diameters of the cylinder, we have to dispose the centre of the *compas de reduction*, (a special tool described in Saunier's "*Guide Manuel*,") in such a manner that the length of the short arms will be to that of the long ones as B is to A. From the point, B, which is the centre of motion of the short arm and from the point, D, which is the centre of motion of the long one, we vary the opening of the compasses until we have two arcs of a circle, one traced from the point, B, and the small arms, and the other from the point, D, with the long arms, the lines of which will intersect at the same point on the line, B A F, and the point, A, is thus found. By drawing a line from the point, A, towards B and D, we will have the the exact inside and outside measure of the cylinder and we will also know its two successive positions, then we draw the circumference, K U H. From the point, C, we describe the circumference, X T N Z, which passes the centre of the inclines, and the other circumference, H A R C, which passes the points of the teeth. The small circumference, K U F, will show, first, the incline of the back of the tooth, and second, the depth of the U (V U), which must pass the side of the cylinder for at least half the diameter of the cylinder itself. We draw the line, C U A, which passes the point of contact of the two diameters, A B and A D, then by marking on the circumference of the wheel the division of each angle of 30 degrees (such as was made for the angle, B C D, by the line, C A U,) we will have a faithful drawing of the escapement in each of its positions. The line, M, is drawn from the point, N, (centre of the inclined planes) perpendicular to these inclines. This first line drawn, we describe from the radius, M C, the circumference, M I J. Now it will be sufficient to draw from the centre of each incline a tangent from this circle, and we will have the lines on which to place the point of the compasses in drawing each of the curved inclines.

We must not forget, however, that this drawing does not allow for the necessary freedom of action of the escapement, therefore to the sum of the angle of escape we must add a few degrees, first, for the freedom of the teeth in the inside of the cylinder and second, for the rounding of the lip of the cylinder. All the lines in the drawing, should be first made with pencil, and before ink is applied, they should be closely verified, special attention being given to the verification of the angle of escape.

To be continued.

Communication.

new form of Balance, which gives a complete compensation for all ordinary temperatures, without auxiliary devices.

To the Members of the Horological Club.

I have been much interested in your recent de- ates on Compensation and kindred matters, and vithout venturing to sit in judgment upon the arious opinions expressed, I send you herewith ıy contribution to the stock of new ideas for dis- ussion.

It is an entirely new form of compensation ılance, having adjustable radial segments, which invented several years ago; but, having been nployed as "jour" in stores where there was enty of paying work to be done for "the boss," else in country towns where the requisite fa- lities for such investigations were lacking, I ıve never been able to put it into practical use. is based upon the proposition that we can ob- in a sufficient action from a single-curve seg- ent for all our purposes, provided we can place ıat segment in such a position that its motion ill carry the compensation load in the right di- ection. I am aware that Mr. E. J. Dent, in is paper on Secondary Compensation, in the Vautical Almanac for 1833, says: "The diminu- on of force in the spring proceeds uniformly in proportion to the increase of heat, and may there- fore be represented by a straight line inclined by some angle to another straight line, which is di- vided into degrees of temperature. But the inertia of a compound balance, such as I have described, cannot be made to decrease quite as fast as the heat decreases, and therefore its rate of variation can only be represented by a curve, and can there- fore only coincide with the straight line represent- ing the variation of the force of the spring in two points, either the two extremes or the two means, or one extreme and one mean. In other words, the compensation can only be exact for some two temperatures for which you may choose to adjust it." We now know that Mr. Dent was in error as to the uniform diminution of the force of the spring; and while I admit the correctness of his nclusions when applied to a "balance such as ave described," *i. e.*, one of the ordinary form, t I claim that by a proper arrangement of the gments the compensation can be made exact ractically speaking) for all ordinary tempera- ıres. That I have succeeded in devising a construction that will satisfy this and the other onditions of the long standing problem of com- ensation for heat and cold, I hope to convince ou by a description of my balance. Should the lea meet your approval, and any of your mem- ers wish to test and use it, I will willingly grant ermission, upon request, on the sole condition ıat they occasionally make a full report at your ıeetings, of its merits or defects in practice, giv- g details of construction, tests, results, etc. ddress C. E. FRITZ, Oneonta, N. Y.

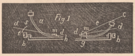
Deeming it needless to remind you of the de- cts of the ordinary compensation balance, and hich necessitate a Secondary Compensation, or the known action of compensating curves of a cular form, I will say at once that if my bal- ce is properly made its compensating load will ove, under the influence of heat and cold, on a cle which if extended will pass through the ıtre of motion of the balance, and whose plane l be parallel to its axis; and it will move vards the centre in a gradually decreasing ratio the temperature changes from cold to t, and in a gradually decreasing ratio from centre as it changes from heat to cold, s obviating the necessity for auxiliary compen- on—and *this ratio can be varied at pleasure by workman.* At the same time, it will be easily erstood, made and adjusted, by those accus- ed to the ordinary construction, and is suita- for any box chronometer or pocket watch g a cylindrical or spherical hair spring, and t thick watches with Breguet and flat spiral ıgs, but probably not for the majority of thin ches, from want of room to receive an extra k balance.

constructing it, I first make a balance with cular rim, so that it can be turned down to equisite proportions with exactness and fa- in the lathe, (the only way in which a really rm and reliable compensating bar or segment be made,) having the *laminae* of steel and of the usual proportions and thickness, d preferably by fusion, and in every respect ıme as the ordinary compensation balance, s it should be thought advisable to adopt Dent's prismatic form for the steel, but which not consider important, and which, more- would increase the difficulty and uncertain- making different rims to act alike. Having every care to produce a perfect rim, and d the necessary screw holes, etc., the rim ly to be cut into segments, and these seg- then severed entirely from the centre bar, ounted as hereafter described.

simplest method would be to cut the rim ch side, midway between the ends of the bar, then sever it from the bar, (which is ı aside,) and stake the two semi-circular nts thus formed upon the balance staff, g each other at right angles, and having n ends upwards, inclosing the hair spring cup-like cavity formed by the four ends. re many and insuperable objections to this nd I mention it merely to give at the out- ear idea of the plan of my balance.

ıd of the above, I cut the rim into four gments, cutting first as before stated, then nds of the bar. I then make a flat steel ilar to two centre bars crossing at right which is to be staked upon the balance usual. The end of each of the four arms sc carries a mean-time or "quarter screw," o, in the first instance, for correcting any slight want of poise. But if the balance is much out of poise, the cause shonld be sought out and removed. The balance is taken in the fingers by these arms, preventing danger of bending the segments while handling.

To each of these arms, *h*, at about one-fourth its length from the balance centre, and at the angle which in my judgment is best adapted to secure the proper curve, I attach one of the segments of the rim, by a screw, *m*, as is seen in the



cut. At A, the segment is shown as standing upright. This position, however, would not produce the effect we desire, with a segment of a balance made in the usual manner, but would only be useful for a quick secondary compensation for cold. At *e*, the segment is inclined more away from the balance staff, the line, *d c*, showing the angle which the open ends form with the staff. The line, *d d*, indicates the proper angle, (about 80°,) which they should have, for a complete compensation for all temperatures, in a balance of the construction I propose. It will be noticed that the segment is attached to a block, G, either loose or formed on the arm at the proper place when turning out the disc from which it is made. It is obvious that by slightly beveling this block *the segment can be caused to incline more or less from the staff*, according to the necessities of the compensation.

The effect which will be produced by this change of inclination may be seen by raising or lowering the outer end of the line *d d*, and then noting the change in the direction of the curve *s t*, relatively to the balance staff.

This curve, *s t*, represents approximately, but much enlarged, the movement or track in which the compensation weight will move under the influence of heat and cold upon the segment—towards *s* in heat, and in the opposite direction in cold. But the upper end, at *s*, should bend downwards more rapidly than the engraver has shown it in the cut.

Without stopping here to draw and explain the curves in which the compensation weight will move, compared with the theoretical ratio required, and which your own experience will enable you to trace out for yourselves, it will be evident that, in the case supposed, and within certain limits, the following rule will obtain, viz:—Inclining the segment more away from the balance staff will cause the weight to move from the centre of the balance in a slower ratio as the temperature falls, and towards the centre in a more rapidly increasing ratio as the temperature rises. *Per contra*, inclining the segment more towards the staff causes the compensation to be more rapid as the temperature falls, and less rapid in heat. The desideratum is the mean point, or medium angle of inclination, at which the inward motion of the weight will increase with sufficient rapidity in heat, and the opposite effect be produced in cold. By the word "motion" I do not refer to the distance actually traversed by the weight, but the distance it moves towards or from a vertical line passing through the centre of motion of the balance. It will not be difficult to find this mean, for the angle of inclination is easily varied, (as hereafter shown,) and trial in the watch will indicate the proper change to be made in order to obtain a perfect compensation for the watch in hand.

Perhaps I ought to explain the *reasons* for the above rule a little more fully. Strickly speaking, the effect of raising the segments is to increase the compensation in *both* extremes, and lowering the segments weakens it in both extremes. But the effect produced by any alteration is much greater in cold than in heat, as will be seen by mere inspection of the curve, *s t*. Raising or lowering the segments enough to change the gain in heat by one second will change the loss in cold by from two to five seconds, and *vice versa*. So that lowering the segments and lessening the compensation in cold to the amount of (say) three seconds will lessen it in heat only one second, and, RELATIVELY CONSIDERED, STRENGTHENS it for heat. Raising the segments enough to increase the compensation for cold three seconds, will only increase it one second for heat, so that, considered with reference to the alteration to be made, it virtually *weakens* it for heat, as stated above.

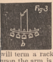
But, while the above rule is our guide as to the *proper direction* in which to *alter the inclination* in any given case, yet in carrying out this alteration we must, of course, be governed by the rate of the watch as shown by trial. For example, if a watch gains 7 seconds in heat and losses 11 seconds in cold, and we lower the segments enough to reduce the gain in heat to 6 seconds, the loss in cold will be reduced to 8 seconds. Lowering again, the gain in heat becomes 5 seconds, and the loss in cold 5 seconds. Or, if it lost 7 seconds in heat and gained 11 seconds in cold, and we raise the segments in the manner just stated, the loss in heat will become 6 and then 5 seconds, and the gain in cold 8 and then 5 seconds.

The degree of curvature of the segment is also a point worthy of consideration: whether a segment of a certain length should be the quarter of a circle, or one-third, one-sixth, or any other arc. Evidently the behavior of each would be different. From all the experiments I have been able to make, I incline to the belief that an arc of 90°, cut from a balance of a size suitable for the movement used in the trials, will practically fulfill all the conditions as well as any other form. But, as a test is easily made, it might be well to try all the different forms of segment, to ascertain the peculiar special conditions for which each is best adapted.

I have before said that I attach the segments to the arms at about one fourth their length from the centre of the balance. But they may, of course, be attached at any other point, and thus vary the diameter and effective weight of the balance, without changing its actual weight, or mass. If the old diameter of balance is to be retained, segments from a smaller rim must be used, and attached as near as possible to the centre. The usual rules for calculating the proper size for the balance will not apply to this one, from the different distribution of its mass. For the same reason, one of these balances having its centre of gyration at the same distance from the centre of balance as one of the ordinary construction, would have a greater actual diameter. A given compensation load will undoubtedly produce its best effect at some particular distance from the centre. This load is limited by the stiffness of the segment, and by the other attributes of the movement itself. Only experiment can determine the best possible proportions for the various conditions. Instead of four arms and segments, any greater or less number can be used, making a heavier or lighter balance having the same diameter, to meet any special requirements.

Fig. 2 gives an enlarged view of the means employed for holding and varying the segments. The block, G, has at one end a high, narrow ledge, and at the other a vertical set screw, N, with a tapering point, but not too sharp. The place for these screws is accurately marked while in the lathe, or with the dividers, concentric and equidistant, so that the four screws, N, shall be at an equal distance from the centre and also from each other. By turning these screws up or down we can change the inclination of the segments at pleasure. At the end of the segment where it rests on the ledge of the block, a narrow strip of the brass is removed, so that steel will bear on steel, and being fastened by a steel screw, M, the expansion and contraction of all the parts in contact will be alike, and prevent working loose from the effects of heat and cold. This is done in the cutting engine before cutting the rim, securing identically the same bearing for each segment. For the same reason a seat for the screw, N, is cut in the rim with a drill whose point is slightly less tapering than the end of the screw. These holes are properly located before the rim is cut, by means of the dividing index plate, and drilled to an equal depth in each segment, and such that the point of the drill only fairly cuts into the steel. Provision is also made against the sides of the holes crowding on the screw when the inclination of the segment is changed. This leaves the brass part of the rim almost intact, and avoids weakening the segment at the place of attachment; the entire length of the segment is also available for compensation, as will be seen by noting its action. All the screws, N, being raised to the same height, the segments will fit on alike, with very little further adjustment. Being placed on the block so that the point of N finds its seat, and the end rests on the ledge, the screw, M, and a curved washer, will secure it a firm and equal bearing on the block. This washer rests on the segment only at its ends, one end over the ledge, the other over the point of N, which allows the segment to curve or straighten under the washer as well as outside of it. The head of the screw, M, is rounded on its under side and lies in a hollow in the washer, easily conforming to changes of inclination. Of course this construction can be modified to suit the case. As the steel of the segment is comparatively soft, the screws should not be *forced* home, but only screwed up tightly enough to hold everything securely in place. The segment can be removed from the block and accurately replaced, by means of the point of screw N, which determines its distance from the centre and its inclination, and M, its direction outwards; while the flat of the ledge causes the segment to point properly upwards, as before. These four blocks, *g*, can be made separately, being turned out in the form of a small, light annular ring of steel, fitted with screws, etc., for the segments, and properly attached to the center of the disc after the latter is staked upon the balance staff.

We are able to do nearly all the work required on this balance by the aid of the lathe or dividing index plate, insuring almost mathematical accuracy and with comparative ease. When done, it can be staked upon the staff and fitted in the watch as easily as a plain one. The position of the segments in the spherical form can be tested with rigid exactness, by holding a rest at different points in their length while revolving the balance on its own bearings. Should they successively stand at an equal distance from the rest, they must stand equally distant from the centre of motion. If they do not, the screws, N, should be run up or down till they do. The height of these screws can be tested in the same way, before putting the segments on. The height of the compensation loads on the different segments may be equalized, and every other part of the balance may be subjected to the same searching test.



For the sake of simplicity we have thus far supposed each arm to carry merely its quarter-screw and each segment its compensation weight. But, in fact, both arm and segment have what we will term a rack, as shown in Fig. 3. The rack upon the arm is a part of it, being a section of steel rim turned out of the disc, tapped to receive four screws, whose united weight shall equal the supposed compensation weight, and also the "quarter screw," all placed as closely together as convenient. The rack upon the segment is a like section of the same rim, similarly tapped, and mounted on the extreme end of the segment, on its inner side, so that steel will bear on steel, with its screws standing, at mean temperature, about horizontally or parallel to the arm of the balance. The segment is "let into" the rack, which should stand parallel to its mate below, but a little further from the centre of the balance, (as shown at E, Fig. 1,) to allow the screws upon the arm rack to be turned further in than those upon the segment rack, if necessary. Although I have taken considerable space to describe a slight modification of E, Fig. 1, the only difference is that, instead of the segment and arm carrying its weight and its screw respectively, as there shown, they each carry a small strip of steel tapped to receive five screws. The appearance from the side is still much like E, while from above it is like Fig. 3. But, at the start, the four outer screws belong on the segment, while B is the quarter screw, and the only one on the arm rack.

Comparatively thick segments are preferable, as being more uniform and reliable, and free from odd freaks, while sensitive enough for our purposes. But in all cases they should be sufficiently thick and wide to prevent the least springing under the compensation load. If they carry a relatively heavy load, it may be well to provide against damage from falls, etc., by attaching the segment low on the block, and planting a thin brass screw in the arm, passing freely through a narrow slot in the middle of the segment, so that the arm below and the screw-head above would be near enough to support it from being strained by a shock, but not touch it at any other time.

It may perhaps be thought that the weight on the segment would draw it more open; or, if its position be reversed, would draw it closer; and that the effect though small would influence the rate, unless kept in one position, like a box chronometer. But this fear is groundless, as will be seen by a moment's reflection. If it were as supposed, the ordinary compensation balance would be utterly unreliable when in a vertical position; for, having a load nearly twice as heavy, on a segment nearly twice as long as mine, and not so stiff, the lower section of the rim would be sprung outwards and the upper one inwards, and throw the balance doubly out of poise, and when going in the watch it would be "bottom heavy" in a vertical position. But we know that no such effect is appreciable. So, also, when going in the horizontal position the cut rim of the ordinary balance should be thrown outwards by the centrifugal force, thus increasing its diameter according to the extent and velocity of its vibration. No doubt this does occur in some slight degree, but the error is corrected by the isochronal properties of the hair spring. But, in all the above cases, while my balance would be subject to the same influences as one of the ordinary construction, the error (if any,) would be far less in mine than in the other, because in the latter the motion of the end of the rim is almost directly inward and outward, while in mine it is chiefly upward and downward, and only very slightly inward and outward, and therefore would be practically of little or no consequence. And if we compare my balance with the best of the variations from the ordinary construction, as regards the effect of this tension upon the segments, we find that Mr. Kullberg's, claimed to be the best balance yet made, has a flat rim upon which the weight slides and which is curved in sideways to follow the circular form, thus adding torsion to tension. And this rim with its weight is attached to the extremity of the centre bar, which is itself laminated, thus doubling both torsion and tension. Mr. E. J. Dent's balance is equally objectionable, and Mr. Hartnup's is more so, having in effect three parallel laminated centre bars, the two outer ones being attached by side pieces to the extremities of the inner one, and carrying upon *their* outer extremities oblique circular or rather conical segments. So that, as compared with the three confessedly best balances yet made, mine has less tension than either, and no torsion whatever, besides all its acting parts being made in the lathe, which is an inestimable advantage.

If any one still doubts, a direct test would quickly settle the point, running the balance first in the position shown in Fig. 1, then with the opposite side upwards, thus doubling the error, if any existed; then in the vertical position, when the segments would be relieved from nearly all strain in either direction, and there should be a medium rate, if there was any difference. But if the balance is properly made, as directed, the movement in good order, adjusted to positions, (particularly the two horizontal positions,) and the hair spring isochronal, so that the balance will not be blamed for irregularities not its own, it will be found that no perceptible error will arise from the cause mentioned.

Even if it should ever be necessary, under any circumstances, to carry a load so heavy as to have a perceptible effect upon the rate, this effect could be entirely neutralized by attaching one pair of opposite segments as shown in Fig. 1, and the other pair reversed, or with the convex side upwards, altering the blocks so that the open ends would retain the proper angle with the balance staff. The proper remedy in such a case, however, would be to use stiffer segments, suited to the load to be carried, or else to use lighter loads suited to the segments, and employ six segments instead of four, each segment carrying the same number of screws as before, but lighter ones. In this case, the arm racks would form a continuous rim supported by two or more arms; while the segments would be attached to radii only long enough to receive them. The mode of adjusting, etc., would be exactly the same as is hereafter directed for a four-arm balance. But it may be considered as reasonably certain that a properly proportioned four-arm balance would not be affected by this cause, at least not enough to be detected by any test.

Having decided upon the angle of inclination for the segments, and a place of attachment to the

, for the purposes of experiment, and each ent rack having its four screws turned well e, we first test whether the segments are con- ric and uniformly inclined, as before direct- nd then whether the balance is in poise, or nearly so. We next give each arm rack its itime or "quarter screw," and poise the bal- . The staff having then received all the parts nging on it, and the whole properly poised, nay be placed in the watch and the ratio of ansion and contraction tested by actual expo- to the proper temperatures, and the inclina- s of the segments changed according to the cations of the trials. I will even venture to rt that if the balance is properly con- cted and fitted, as directed, with segments 0°, set at the angle shown by the line, DD, it y, *without any alteration of the inclination*, be once adjusted for extremes in the usual way so t it will compensate for all temperatures more osely and uniformly than the ordinary compen- tion balance can be made to do. That this as- rtion is a reasonable one, will appear to any one 10 takes the trouble to investigate the philoso- ly of this balance.

But, as we are striving to attain as near to *per- ction* as we may, we will not rest satisfied with hat, and I ask your close attention to the means of obtaining still better results.

First, we shall ascertain whether our segments all expand and contract *alike*; next, whether they are *set at such an inclination* as will enable them to come as near as they are capable of coming to the theoretically perfect ratio; and lastly, whether being correct in every other way, the compensation is too strong, or too weak, or just right.

Supposing the previous directions to have been carried out, we are ready to test whether the segments all expand and contract alike.

Adjustment for uniform action of the segments. This we shall accomplish by poising the balance at the two extreme temperatures. For if the segments do not act alike their loads will be moved to unequal distances from the centre, and the balance will be out of poise at one or both extremes. The exact temperature is not material, if it is only extreme enough to develop the character of each segment—being careful, on the other hand, not to go above 125° or 130° Farenheit, or lower than 10° or 15° below zero. If the poising tool is properly fitted up, the most minute fault will be detected.

As poising in extremes is an operation unpracticed and unknown among adjusters, I will describe the process. Pass through the wall of your adjusting oven or cold-box, at any convenient place, a wire with one inch of its inner end bent at right angles. To the end of this L, and parallel to the body of the wire, attach a stiff bristle. Now, by twisting the end of the wire that is outside, you can cause the bristle to revolve in a circle, and if your balance, placed in the notch of your poising tool, is near enough for the bristle to strike its rim, you can whirl it around at your pleasure, and test its poise without opening your oven. But as you cannot watch it from the outside of your cold-box, you wait long enough for it to come to rest, then open the door, note the position of the arms, and shut it up again. After the required temperature is restored again, repeat the process. If the same side is found down two or three times that side is heaviest in cold.

The arms of the balance should be numbered and marked so that each can be told at a glance, and when noting alterations in the adjustment book always state the exact error found and the correction made, with the number of the arm manipulated, so that you can at any time be certain of what you have previously done, and its effect. In all tests and experiments I would advise that, if it is at all convenient, 60° Fahrenheit be adopted as the mean temperature. Then a variation of 50° each way would give 10° and 110° as the extremes, which would include all the temperatures usually found in ordinary use. A further margin of 10° outside of these extremes would not produce any great error with this balance. And, although I am aware that there is no form of compensation balance now known to the trade, whether with or without auxiliary compensation, which can be relied upon to compensate correctly through this wide range of 100°, yet I am willing that this balance should be subjected to that range, and should stand or fall by that test. The intermediate temperature would then be 35° and 85°, The cold mentioned, (10°,) is easily obtained by packing the cold-box with a mixture of fine salt and pounded ice, say a quart of salt scattered in with ten pounds of ice. Packing the cold-box with ice alone will give a pretty constant temperature of 35°, or very nearly that.

We will suppose that, on our first trial, arm No. 2 is found down in cold, also in heat—for we test in both extremes before making any change. Then segment No. 2 acts too strongly (compared with the others,) in cold, and too little in heat, or, what would produce the same result, the upper segment No. 4, acts too little in cold and too strongly in heat. Evidently the *ratio* of expansion and contraction of one of these segments is incorrect, and must be corrected by altering its inclination. Now we know that we need a greater motion of the weight towards the centre in heat than we do from the centre in cold; therefore in the absence of any reason to the contrary, it will always be safest to obey the following rule: *In poising for uniformity, increase the compensation for heat and lessen it for cold.* Inasmuch as No. 4 (if wrong) is already too strong in heat and too weak in cold, we alter No. 2, by turning back the screw, N, under it, half a turn, thus inclining it further from the staff, which will produce the desired effect, as stated at the beginning. Then restore the poise at the medium temperature, and test again in heat. If not yet sufficient make it so, taking care to *restore the poise at medium, by the arm screw, after every alteration for extremes.* When correctly poised for heat, test in cold, and alter till satisfactory.

The reason for testing in both extremes before making any change, is because a segment may over compensate or under compensate, in which case it will be wrong in both extremes, although the *ratio* is correct, as is instanced below. But having guarded against the possibility of altering the ratio for a different error, we may then work in either extreme we prefer till the final tests.

If we desire to be certain which segment is in error, we can ascertain by changing them on the arms as stated below. Very likely both segments are a little out of the way, but one is more so than the other. But if we remove this *excess*, we secure the equilibrium or uniformity of action which is the object of this adjustment. We therefore deal with the error found as if it was the total error. Two adjacent segments may be down at the same time; then we alter both—the lowest being altered most.

We will now suppose that No. 2 is lowest in cold, and No. 3 in heat: this shows that No. 2 acts too strongly in cold, or else its opposite, No. 4, too little; and that No. 3 sets too little in heat, or No. 1 too much. According to our rule above, we lower segment No. 2, and raise No. 3, and the actions of the different segments thus balance each other.

Lastly, we will suppose that No. 2 is heaviest in cold and lightest or uppermost in heat: this shows that segment No. 2 compensates too strongly in both extremes, or else its opposite, No. 4, too little. To determine which is in error we change segment No. 2 to arm No. 1, and segment No. 1 to arm No. 2. Then restore the poise of the balance, (in medium,) and test in heat. If the original fault was that segment No. 2 compensated too much, arm No. 1 will not be uppermost; but if the fault was with segment No, 4, that will remain down as before, because that arm has not been changed, and being heaviest in heat before, it still is so. The remedy is either to substitute another segment that will act uniformly with the others, or to correct this one for over or under compensation, according to directions given further on.

It is possible that after we have poised as above directed, *each pair* of opposite segments may balance each other, without corresponding in action to the other pair. We may test this by changing the segments on any two adjacent arms, as just described. This breaks both pairs. After poising the balance at medium, if necessary, we can see whether the segments still harmonize by exposing them to extremes. If they do not, both pairs can be corrected at once by our first rule above If they do, the segments will certainly act alike in the watch.

The foregoing examples include all cases that can occur. I have taken pains to describe the process fully, as it is the basis of the whole adjustment. But although it is the hardest part of all, yet as you will notice, it is really very simple. A moment's reflection, with a pencil and paper, will show the proper course for each case. When we have secured that the balance remains poised at medium and at both extremes, we may be certaid that all the segments will act alike. They may all be right or all wrong, and, in the latter case, the ratio only may be wrong, or the ratio may be correct and all the segments compensate too much or too little. This is to be ascertained by trial in the watch, and when the error is found, the remedy should be applied to all the segments alike, except in the cases specially mentioned. I would suggest to my brother watchmakers that poising in extremes would often help them to solve some of the mysteries that beset the adjuster in the course of his delicate and intricate labors on the ordinary balances.

Adjustment for correct ratio of expansion and contraction. This is done by *altering the inclination* of the segments, according to the indications of the trials in the watch, and those who have followed my description of the adjustment for uniformity will need no further directions how to make alterations for ratio. The only caution I need give is how to distinguish between errors in the *ratio* and in the *strength* of the compensation. All observations are understood to be variations from the mean temperature rate. If the watch loses *the same amount* of time at 10° that it gains at 110° it is over compensated. If the reverse of this occurs, the compensation is not strong enough But if it loses and gains *unequal amounts* for a like change from mean temperature to heat or cold, or if it gains in both heat and cold, or if it *loses in both extremes*, as most compensation balances do, *the trouble is not under or over compensation, but the unsuitable ratio of expansion and contraction of the segments.* It is admirable to endeavor to correct this error by moving the compensation weights upon the rim, in the case of the ordinary balance, because there is no other way to do. But, with this balance, such a course would be simply botch work, for we are not compelled to hide such errors, but have the power to remove their cause by altering the inclination of the segments till the proper ratio is obtained. Irregular compensation should not be confounded with that which is merely too strong or too weak. In making alterations for ratio you simply do to *all the segments* what you did to single segments in adjusting for uniformity, distributing the alteration as equally as possible, and taking care to always loosen screw M, before turning up screw N.

(We have to compensate not only for the changes produced by heat and cold in the balance itself, but also for the changes in the hair spring from the same causes. In heat the spring not only increases in length, but *its elastic force diminishes*, and in an increasing ratio for a uniform increase of temperature. The opposite takes place in cold. This change in the elastic force also varies according to the temper of the spring—more with hard springs than with soft.—All of these changes must be covered by our manipula-

tion of the balance, to obtain perfect compensation for different temperatures.) And unless fully adjusted for different positions, and the hair spring perfectly isochronal, all our trials must be made with the movement in the same position (preferably horizontal,) and with the same amount of motive power and the same arc of vibration in each trial. As the *rationale* of altering the inclinations of the segments is sufficiently explained in the first rule given, I will briefly state the course to be taken in each case. If the watch gains more in heat than it loses in cold, the compensation is too strong in both extremes, and increases more rapidly in heat than it does in cold. We must *equalize* the variations by lessening the compensation for heat and increasing it for cold. We therefore raise the segments a little, according to our rule, and when it gains *the same amount* in heat that it loses in cold, it is ready to be adjusted for over compensation, as directed further on. When the watch gains less in heat than it loses in cold, we should *lower* the segments, and proceed as above.

When it loses more in heat than it gains in cold the compensation is too weak in both extremes, and the ratio differs from a correct ratio more in heat than it does in cold being more weak in heat than in cold. We strengthen it for heat and weaken it for cold, by lowering the segments till the weakness or lack of compensation is equalized, and it loses the same amount in heat that it gains in cold; then it may be adjusted for under compensation. If it loses less in heat than it gains in cold, *raise* the segments a little and proceed as just directed.

If the watch gains in both heat and cold, the compensation is too strong in heat and too weak in cold. Raise the segments considerably till the variations at the extremes are either removed or equalized, and in the latter case, adjust for over or under compensation as may be required. If a watch loses in both extremes, the compensation is too weak in heat and too strong in cold; we therefore *lower* the segments till the variations are removed or equalized, and proceed as above.

If any one thinks this is too troublesome, it will be well for him to remember that it is the great advantage of this balance that errors *can* be so *analyzed*, and so surely and closely corrected. With the ordinary balance it cannot be done at all; there is only one universal "cure all" for all sorts of errors, viz: Moving the weights forward and backward on the rim, "dividing up" the errors, and letting them go at that.

The adjustment for ratio is completed when we have equalized the two extremes by removing all irregular action; or, when the watch loses at 10° as much as it gains at 110°, or gains at 10° what it loses at 110°, or when it keeps the same rate at both extremes as at medium. The error, if any remains, is either over or under compensation. Having previously insured that the action of the different segments shall be *uniform*, or at least that their net effects shall be alike, and having now secured the proper *ratio* of expansion and contraction, the remainder of the adjustment of the compensation becomes a slight matter, and may be effected with any required degree of nicety.

I have made no reference to adjustment for the intermediate temperatures, because if the ratio is correct, and we obtain a correct rate at the extremes and at medium, the rate at the intermediates must be equally correct. Or, if there is an error at the extremes it will be only half as much at the intermediates, and any correction of the former will equally remove the latter. The final trials made in this segment will also indicate which of the subsequent adjustments is to be made and the amount of alteration needed.

Adjustment for over compensation. If the watch gains in heat and loses in cold (equally) the action of the segments is too strong. In the ordinary balance we move the compensation weight or screws back on the rim, and *lessen the extent of their "motion"* under the influence of heat and cold, and thus reduce the effect produced. To accomplish the same result with this balance we *lessen the compensation load on the segments*, by transferring one or more screws from the segment racks to the holes immediately below in the arm racks, restoring the poise, if disturbed, by the screws in the arm racks. For instance, we first transfer the left hand screws from segment racks Nos. 1 and 3 to the arm racks below. If that is not enough, we transfer the left hand opposite screws from segment racks Nos. 2 and 4; if not yet enough, take the right hand screw from segment racks Nos. 1 and 3; then from segments No. 2 and 4; then the left hand screws from segments Nos. 1 and 3, and so on till we accomplish the desired reduction of the compensation. By this proceeding we effect the compensation in two ways; positively, by lessening the compensation load, and negatively, by adding the screws to the non-compensating weight on the arm racks where they will effect another portion of the over compensation, for of course we must compensate for the entire balance.

Should the transfer of any two screws produce too great an effect, it may be lessened by removing those two screws from the balance, and substituting for each of them *two* brass screws, whose weight shall equal that of the gold screw removed —putting one of the brass ones in the segment hole, and the other in the arm rack hole, before occupied by the gold screw. This makes the change only half so great as it was before. And by the proper use of screws of aluminum, brass, gold and platinum, as is usual with the ordinary balances, any desired change may be made without altering the uniform appearance of the segments.

But if only slight changes are required, these may perhaps be more easily made by turning the screws upon the segment racks outward a little, (and, of course, alike on the four segments,) thus virtually increasing their weight—restoring the poise by turning the screws upon each arm *inward* to offset the outward movement of the segment screws. If a still smaller change will suffice the above alterations of screws need only be made on *two* opposite arms, instead of all four. Thus the slightest or greatest changes may be made without altering the rate.

All the above alterations may be made "correct to a hair," by taking care to alter one arm at a time, and to restore the poise perfectly before disturbing the others. For if any of the screws are placed too far in or out, that arm of the balance will be lighter or heavier than before, as compared with the others, and the balance will be out of poise. There could not be a more delicate test, either for detecting error, or for showing when the adjustment is completed.

But the arm screws need not necessarily be turned inward to offset the outward movement of the segment screws as just described, (although the effect upon the compensation is thereby increased,) unless the mean temperature time kept before the alterations was correct, and it is desired not to change the rate. If that is of no consequence, the segment screws above may be turned out, and the balance be poised by them, leaving the arm screws as they were, which insures an exactly equal change upon each segment. In altering the screws of the segments, lay the balance down, then take hold of the particular segment, close up to the rack with the tweezers, lifting it up but letting the other side of the balance still rest on the bench.

A very handy tool for changing screws is made by fitting a small brass hub on the shank of your screw-driver, and attaching to it two thin strips of steel, (a bit of small mainspring is about right,) with their outer ends shaped into hollow claws, one on each side of the driver. By pressing their rear or upper ends with your fingers, you spring the claws apart, then insert the driver into the slit of the screw and take your fingers off the strips, when the claws close on the head of the screw, and you can turn it out and change it to another hole with one hand, it being securely held by the claws. The hub slides on the shank of the driver, so as to project more or less beyond the point, but is tight enough to remain in position while in use, or it may be fastened by a set screw. At other times it can be slipped off the screw-driver entirely.

"Adjustment for under compensation." It is intended that the screws in the segment racks shall be heavy enough to prevent any lack of compensation. Any slight deficiency can be corrected by turning out the segment screws a little, restoring the poise as above directed.

As I have now shown, we may produce almost endless variations of the compensation, from the slightest to the most radical, without changing the total weight or mass of the balance; the weight of the racks and screws, or rim-weight; the distance of the centre of gyration from the centre of the balance; the effective diameter; the poise; or the resistance to the air, so long as a single screw remains in the segment rack. And at every stage of our work we may apply a most delicate and infallible test. I would ask any disinterested balance maker or adjuster if there is any other balance within his knowledge which is capable of being tested in so many ways or half so closely as this, or whose errors can be so certainly traced to their true causes, and so accurately and intelligently corrected?

"Adjustment for rate." As the balance is brought to time the same as the ordinary balances, you will need no directions on this point, and I shall only give a few hints because they are equally applicable to the preceding adjustments. The mean time kept during the experiments is of little consequence, provided the other conditions are suitable for testing the accuracy of the compensation obtained. And the balance may compensate perfectly although the watch should lose or gain several minutes per hour. It is correct if heat and cold produce no variation from the mean temperature rate.

Perhaps it is needless to remind you that if the hair spring collet or bar, or any other piece placed upon the balance staff, is not of such a shape as to be perfectly poised in itself, the poise of the balance should be tested after every change in the positions of the pieces upon the staff made during the adjustments. This is often neglected with the ordinary balance, but in these experiments I wish every possible source of error to be avoided.

In setting your watch to seconds, do it by stopping the balance. I have seen those who claimed to be fine workmen twisting the seconds hand forwards and backwards as if it was merely an ornament to the dial. The seconds hand when properly placed should be firmly secured upon its pivot, so that it cannot be accidently shifted. If it is loosened up for setting, it must be afterwards pressed down again, which will frequently cause an error of one or two seconds, and perhaps the watch is stopped. Or, it may go on too far, and must be pried off again, making another error, etc. The quickest and best way is to put a stiff smooth bristle in a light handle, (peg wood will do,) stop the watch when the seconds hand is just on the 60, by placing the bristle on the balance, which should be drawn around far enough to start instantly with a good motion when the bristle is raised. Then set your minute and hour hands.

All trials and observations should begin and end when the seconds hand on your regulator is at the 60, unless the seconds dial of your watch is imperfectly spaced off; if so, then at the nearest 60 upon that. I have found the following an excellent way to mark the exact time. Supposing that you have a regulator with a visible pendulum beating seconds, you place a thin diaphram, say of tissue paper in front of the pendulum, so as to obscure it somewhat, except at the very end of each vibration, when the edge comes into full view. The pendulum is plainly visible all the time, but at the end of each vibration it suddenly

appears brighter. The paper can be either inside or outside of the clock case.

You now stand facing the clock at a little distance off, holding your watch nearly in line with the pendulum. Thus while you are looking directly at your watch, the image of the pendulum will also be clearly seen, with the sudden brightening at the exact end of each swing, This is better than listening to the "tick," as that may be faint or drowned out by other noises.

But in order to know when the regulator hand is exactly at the 60, you commence at the 5th second beforehand, and count the seconds backwards thus: Looking at the clock when its seconds hand reaches 55 seconds, you say "Five;" then look at your watch, as above described, and each "brightening" marks the time of another second. Counting either aloud or mentally, you say "Five—Four—Three—Two—One—Now!" lifting your bristle at the "Now," if you are setting your watch. But it is in comparing the watch with the clock that this idea is most useful. For you can look closely at your watch, and at the same time you know the exact second upon the regulator.

If your watch has, say five beats to the second, (18,000 per hour), you can also count the beats for fractions of a second, provided your seconds dial is accurately spaced. At the "Five" you place your finger nail on the glass over the dial, drawing it steadily back as the seconds hand approaches it. At the next seconds mark you pass after the "One," you begin and count the beats between that and the "Now," then hold your finger at that spot and take your time to satisfy yourself fully of the number of the second. For instance, from the seconds mark there were three beats to the "Now," and that mark was 13 seconds. So the "Now" was at 13 3-5 seconds. This counting backwards is also useful when one person observes the clock, and another the watch, or for calling the time to a person some distance off, for the latter have constant warning of the gradual approach, as well as the arrival, of the exact instant. Always number your seconds, even if it is the last fraction of the last second, name it correctly: 59 4-5 seconds. This habit, once acquired, you are safe; put if you say so many seconds "before" or "after" the 60, you will frequently make mistakes, in spite of all your care, from being confused by customers, forgetting "which was which," counting the wrong way to the nearest figure, etc., etc.

There are many other interesting features and advantages of this balance, modifications in the form, to lessen its thickness, etc., in the adjustments, use, etc., which I will not specify; also many little details for facilitating its exact construction—as they will probably suggest themselves to any one capable of making a balance. Indeed, I fear the numerous details of principles, experiments, modes of constructing, testing, varying, adjusting and using it, comparisons with others, and other points that I have already given, in my desire to make it perfectly plain, even to those of little experience, while avoiding mathematical formulas and technical terms, and to state impartially its apparent faults as well as merits, may cause some to think my balance is very complicated and difficult.

It is really very simple. There is nothing about it any more difficult to make or adjust than the ordinary balance. There are no extra springs, bill cranks, pivots, levers, check screws, sliding or shifting parts, or auxillary contrivances of any kind. The parts are all fastened permanently together, and only a single and simple curve, whose action can be accurately determined, is employed in its construction, instead of the doubly and treble compound curve-motions sometimes proposed, which cannot be delineated, only roughly estimated, and scarcely ever imagined. While simple in principle, it requires more labor to make it than the ordinary balance. But, unless it disappoints all reasonable expectations, we may be sure that our labors will be rewarded by success; whereas, we all know that no amount of labor expended in making and adjusting the ordinary balances will ever secure a complete compensation for a wide range of temperature, because the ratio of expansion and contraction of their rims, as they are placed, is incapable of producing it, and their contraction renders it impossible to vary that ratio, although its effect may be variously modified by the addition of secondary apparatus, more or less complicated. And when the correct proportions and principles are once fixed upon, by each maker to suit his own system, a large share of the labor I have mentioned upon the experimental balance, may be dispensed with. My present diffusness will at last save me from making long additional explanations hereafter, and my readers from apparent difficulties and misconceptions that might otherwise arise. Any seeming objections, of a merely mechanical nature, you can doubtless remedy yourselves. Any others I shall be pleased to explain upon request.

I will conclude by noticing one or two points which some may consider objectionable. No doubt there are those who will say that a single segment in any position cannot give a correct ratio from medium through the intermediates to both extremes. While I have the very strongest reasons, both from experiment and calculation, for believing that it can and will, yet, as I do not know positively that it will, I shall not affirm that to be the case. Only a series of carefully conducted trials can certainly decide that point. But, even if there should be a slight error in one or both extremes, it could be removed by inclining one pair of segments so as to correct the error for heat and the other pair for cold.

Again, some will object that this balance exposes more surface to the resistance of the air than the ordinary balances. Not more, however, than some other balances proposed by the most eminent authorities. All that is required is a suitable tension of the spring. Besides, in my balance, this resistance increases and diminishes with the compensation. For it is evident that the resistance is greater or less as the compensation load is moved from or to the centre of motion of the balance, and in the same ratio. Hence, so far as regards the compensation, if it does not prove to be an assistance, it can, at least, be no detriment. Its principal effect will be felt in the adjustment of the hair spring to isochronism, as its tendency will be to make the long vibrations quicker, which is easily remedied. But as the isochronal adjustment of the hair spring does properly come within the scope of this letter, and I have already been too lengthy, I will omit any directions on that point. Besides, the same principles which govern that adjustment, with the ordinary balance, obtain equally with this, and no special instructiont are needed.

The rough sketch I send is not meant for a working drawing, but it is sufficiently correct to give a general idea of the plan of the balance.

Awaiting your comments with considerable interest, I remain, gentlemen, fraternally yours,

C. E. FRITZ.

ONEONTA, N. Y., Nov. 26, 1874.

Visitors to Europe have always a vivid remembrance of the jewelry and fancy stores of the Rue de la Pais, Rue St. Henore and the Boulevards of Paris, particularly the window displays when contrasted with those of New York. The stocks of the latter are as large and varied, but the confirmation of the show cases does not allow for a fair display. The riddle has been solved by A. M. Hays & Co., of No. 23 Maiden Lane, New York The senior partner of the firm, on his last visit to Paris, purchased an entire French window, with all its fittings complete, the size being about ten feet square, and the whole arrangement is a novelty. Plated rods, to which patent brackets are attached, pass through the window horizontally, and on these are laid plate glass shelves of peculiar construction—the size varying from two feet to ten inches—on which are laid the jewelry, &c., the show being changed each day. The arrangement is very attractive, as is proved by the crowd of onlookers. This store is one of the sights of New York, and contains an elegant stock of bijoutere and fancy goods, including several fine bronzes, such as Pandora at the Toilet, &c., Vienna novelties, the new faceted necklaces and sets, Madame Angot baskets, and a rich display of diamonds, musical boxes, &c.

A sun dial that strikes the hours has lately been invented and constructed by the Abbe Algegret. It is simply a modification of what is known as the solar counter for registering the times at which the sun shines or is obscured. To effect this, there are two balls, one black and the other yellow, fixed at opposite ends of a lever sustained by a central pivot. When the sun shines the black ball absorbs more heat than the yellow one, and the vapor of a liquid contained in the former is elevated to a higher temperature than in the latter. As the result, the vapor leaves the one ball, and being condensed in the other this becomes the heavier, disturbs the equilibrium of the system, and in so doing liberates a weight, giving motion to a clock-work attachment. In the sun dial here referred to, a pair of these balls is fixed at every hour mark. When the shadow of the gnomon reaches any particular hour mark, one of the balls is shaded, a preponderance of liquid enters the ball, the lever tilts, the mechanism is set going, and a gong sounded as many times as the number of the hour to be indicated. It is necessary, however, that the sun should shine at the time of the hour mark being passed by the shadow or the time will not be struck.

According to the Journal of *Applied Science*, the large number of amethysts that has been thrown into the market since 1872, from Brazil, has caused a great depreciation in their value. The first lots sent to Europe brought from five to six hundred dollars, per arroba, of 32 pounds weight; but as the quantity increased the price rapidly receded, and finally decreased to absolutely nothing. At present no offer can be obtained for any lots on hand.

ashionable Jewelry.

has introduced a large variety n the setting of costly stones, the shape and design of other The high setting of diamonds is ue, and this style shows to adeir great brilliancy. The cuto delicate, and the angles so that a strong light is necessary all the prismatic beauties of d; hence the present high anging the stone is very much The chain pendant is the oval locket; these are gotten ety of styles, and some of the exceedingly artistic. Red rule, and it is combined with gold pierced. There is an unique agreeable effect in this fashion, which nnot fail to gain many admirers. The evailing mode in earrings is jet, although litaires take the lead in ornaments; but st at present jets are the favorite for all rdinary toilets. The clear quartz, with ttings of gold and black enamel, are xquisite, and quite good enough for fullress occasions. All gold jewelry is popular with the young, and this style is, in fact, the only appropriate ornament for school. Higher shades are usually worn. The black onyx is chaste and dressy, without being expensive. Coral sets are always fashionable.

The pretty guard-chain is taking the place of the long opera chains. The facet gold necklace is a decided improvement on the wide collarette necklace. A beautiful pendant for a neck-chain is a black onyx locket mounted in gold. The unique design is wrought in gold, the tiny leaves and delicate flowers are most artistically finished; the latter are composed of pearls and diamonds.

Dainty things are to be found in the way of fancy ornaments and toilet articles and in this one respect it seems ahead of any past Winter. Year by year fancy goods increase in number and beauty, and toilet articles are more and more luxurious. Jewelry of a kind not sold in jewelry stores, but to be had in the variety stores in any quantity. Avoirdupois weight, is in the greatest demand, and ladies spend days in selecting lockets, chatelians, salts bottles, bracelets, chains, charms, rings and earrings, and not only these, but, in the language of *Julia* in the "Hunchback" "whole necklaces and stomachers ot gems." Chief among the precious stones sought for is garnet. The color is greatly used and the jewels came in with the recall of the shade.

It used to be a reproach to wear imitation jewelry, but jet paved the way for colored stones, and every kind of imitation is eagerly sought. Turquoise, amber, tortoise shell, mother of pearl, blue steel, steel, ebony, Japanese colored metal and many other varieties of stones and substances enter into the composition of fashionable jewelry. Filagree bone and steel supply a demand for light ornaments, such as shawl pins, buttons and hair pins, while jet answers every purpose for full dress. It even rivals more costly jewelry, and is not infrequently used in conjunction with diamonds.

There is seldom any very decided change in the best grade of jewelry, and this season offers but few variations. The latest novelty in gold sets consists of a brooch and earrings of dead gold, traced vines and flowers. This forms the setting to a convex piece of gold highly polished in facets, resembling those of a diamond. The effect is very pretty, but somewhat pronounced, when the faceted portions reflect the brilliant rays of gas-light.

Amethyst are once more in demand, and when set in dead or Roman gold form attractive ornaments, according well in that combination of antique gems in modern settings, with the "revival" mania of the present epoch. A novel arrangement in ear-drops is to attach the hook a little below the top, instead of at the extremity so that the ornament will cover the puncture in the ear.

Fashionable bracelets are either extremely narrow or very wide, there being apparently no judicious medium in this respect. Many unique contrivances are ntroduced as safety guards, the most popular appears to be the self-adjusting spring.

In medium goods the guard consists of a small chain and ring, the latter being worn on the little finger. A circlet of diamonds and another of pearls are both worn at the same time, and in cheaper articles the same distinction of style is noticed in the selection of armlets.

Jet jewelry is at present in high favor, owing to the extensive use of the material as trimming, and the fashionable requirement of harmony in all articles of dress. Black garnet and French jet are used as substitutes for Whitby jet, when the possession of the latter is denied by the limits of the purse.

American Watch Cases.

A WONDERFUL BUSINESS: FROM THE ORE TO THE WATCH.

It seems to be a peculiarly American fashion in business to concentrate under one system the entire work of production, from the crudest material to the perfect product of the nicest manufacturing processes. Indeed, probably no other establishment in the world can boast what is now to be seen in connection with the American Watch Company's, or rather Messrs. Robbins & Appleton's great business, in which the ore is mined from Virginia, and transmuted through the many processes of extracting the metal and making the gold into cases for the American (Waltham) watches, without the intervention of a single dealer or the payment of a single commission. This is a new feature of this remarkable business, the first cases from the Virginia gold, which is of very fine quality, having been put through within the month. A description of the business, in its present perfection of detail, will probably be of great interest to many of our readers.

The existence of gold in the South is no new discovery. In fact, gold exists in some shape or other in almost every part of this country, and it is only a question of whether more or less than one dollar's worth of labor has to be put into the ground to get one dollar's worth of gold out. Such excitements as that caused by the discovery of gold croppings, in a Newbury, Mass., pasture, is but a repetition of we may almost say hundreds of like furores in times past. The Essex county pasture may be worth working and may be all that is predicted for it; but the chances are that it will share the fate of the many country-side El Dorados that have become famous and "fizzled out" incontinently, time after time. In the southern part of Virginia, and thence south through North Carolina, there is, however, a rich series of deposits that can be profitably worked under a well organized system of labor. Fortunes have been lost in them before now, for the slave labor of the south was never fitted to work successfully any mining or manufacturing processes, and northern capital and labor were kept out in old times by a system which could only play dog in the manger. The Walton mine, to which we refer, is situated in Louisa county, near the line of the Ohio and Chesapeake railroad, and has been worked in a feeble sort of way for the last half century. Lately it has come into northern hands, and among those largely interested in it are Messrs. Robbins & Appleton, who are applying to it that admirable system of business enterprise and economy which has done so much to build up the world-famous business of the American Watch Co. Every indication points to the working of this vein under the better system of such business men as these, at a considerable profit, and specimens of the ore and of the gold now to be seen at the Bond street establishment will convince the most skeptical that if there are not "millions in it" there is nevertheless a good deal of money.

The ore of course will be reduced at the mine, but for the cases which have been made within the past few weeks from this Virginia gold, a considerable quantity of the crude ore was shipped directly to New York, and we are therefore enabled to describe all the processes of manufacture from the ore, as witnessed under one roof—indeed, on the one floor under the roof, in that splendid manufacturing establishment in which the jewelery trade is centered in Bond St. The ore, which contains a mingling of quartz, galena and other minerals carrying gold, is thrown first into the crushing mill, a huge circular pan of iron along whose circumference two great wheels are revolved by steam power, crushing the great chunks of ore into powder as they are swept into their track by the feeder. Hence this powder goes to the amalgamators—great tubs in which by means of revolving dashers, the ore is mechanically mixed, in water heated by steam, with the mercury, which takes up the precious metal and from its extraordinary weight sinks at once to the bottom of the tub. The dross which still remains in motion above is easily drawn off with the water, and when the amalgam left at the bottom is strained, it comes out in a silvery lump, two or three times as heavy as a cannon ball of the same size. This ball of quicksilver and gold is put into a retort, whence the quicksilver

volatilizes and distils off, leaving the large button of gold in an almost pure state. After further purifying processes with acids, and so on, the gold is left of the fineness of ·995, and is then alloyed with copper and silver by the usual alloy processes, which scarcely need description, to the requisite fineness, of usually fourteen to eighteen karats.

The process of making the case proper now begins. The gold as alloyed is rolled out through the ordinary rolling mill, which consists simply of two massive cylinders running close to each other under tremendous steam power, into plates of the requisite thickness for the watch case proper. Disks of the proper size for the plates and backs are then cut out by a die, and the other parts stamped out in like manner. This completes the work of what is known as the forging and stock department. The case in this crude shape then goes to the case-turner, who spins it into its proper thinness and evenness, with his lathe. From his hands it passes to the case-jointer, who makes the joints by which the several parts are to be fitted together. It goes next to the fitter-in of the movement, who prepares it to receive the screws and other fastenings by which the movement is held in place. The springing department has the next opportunity, and does its work in putting in the springs by which the parts are made to close together properly. Next it goes for the first time to the polishing department, where with emery wheels and the usual means of polishing metals, it is put in shape for the engine turning and the engraving departments, which are the most interesting of all.

It is a mystery to most buyers of watches and probably to many dealers in them, how the peculiar appearance known as engine turning is given to the back and front covers of watches. The lines seem to radiate out from the center in a curious spiral curve of extraordinary mathematical accuracy, which it would seem almost impossible to make with such regularity as is given to them. The explanation of this curiosity lies in the fact that there are no such lines at all on the watch, the appearance being merely a deception of the eye. The engine turning is done, not in radiating curves from the centre, but in circular lines, starting from the outside of the case, and becoming smaller and smaller toward the centre. The graver is guided by contact with what is called a rosette on that part of the lathe which holds the watch case, and is given by its saw-edged shape a jagging motion as the watch case is revolved in contact with it. The parts of the lathe are adjusted with such perfect mathematical accuracy —by means which it would take too much space to describe—that the angle of one of the jagged lines exactly meets the angle of the next, and in this way the curious effect on the eye, of lines radiating from the centre and curving out, are produced. The bearing of the watch case being on the same centre throughout the whole process, while the graver is graded nearer and nearer towards the centre of each line, the barleycorns, as they are called, of course become smaller and smaller as the centre is neared; and by this simple means the curious effect known as engine turning is produced.

The work of engraving brings in the artistic element, and with the exception of the ruling of fine straight lines as the basis of landscape engraving, which is also done in the engine turning department, all the engraving is done by hand. There are more than twenty men engaged in this department, under the competent direction of Mr. U. Jeannerett, who has been for three years at the head of this department. He designs almost exclusively the varied backs and monograms which come from this house, and his exquisite taste is only rivalled by the facility with which he turns out new designs. The specimen book of this company contains some five hundred and sixty designs now being used as occasion demands for the engraving of cases, and most of these have been designed by this gentleman within three years. Including those which are not permanently retained, it is estimated that he designs on the average, a case a day, besides many monograms; and when it is remembered that he is also the executive head of the entire engraving department, and himself puts most of these designs on the watch cases for the first time, it will be seen what remarkable industry is necessitated in such a position. Some of the designs are used only on one or two watches, and others which prove popular are run through several score, as the demand requires. A new design is usually traced first on paper, although sometimes directly on the back of the watch. If on paper, it is transferred to the polished watch case by rubbing fine black lead gently over the surface of the design. The inked lines are sufficiently prominent to catch and hold this dust, so that when the design is put face on the watch case and its back rubbed with some soft solid material the design is transferred so as to be easily distinguishable under the eye-glass through which the engraver always works. It costs usually in the neighborhood of six dollars for the engraving of a handsome watch case.

Many of the men are paid by the piece and others are on a regular weekly salary, earning usually from $40. down. The youth of many of the workmen is quite noticeable; it is the excellent business system of this house to train its workmen as far as possible from boys, who are put in to do various work about the establishment, and are gradually allowed to find their way into whatever department they are best suited for. A boy needs about three years' practice before he can do engraving work of any skill; but some of them by that time exhibit remarkable talent both in designs and in the actual work of engraving. The work of this department virtually completes the manufacture, although the case thence goes to the pinner up, as he is called, who is the critic of the establishment and fastens the joints finally together, and is thence returned to the polishing rooms, where it receives its final finish, and is turned out a case which can rival the best products of American or European manufacture.

No one can visit the gold case manufactory of the American Watch Company, which occupies the entire upper floor of the grand building on Bond street—the manufacture of movements and silver cases being done entirely at Waltham–without being impressed with the admirable business system which is everywhere pervasive and evident. Mr. Comins, the superintendent of this floor, on which, as we have said, all the processes are conducted, is a man of remarkable skill, energy, and administrative power. He knows that what is to the interest of each employee is to the interest of the employer. Every convenience is offered for the hands, but the system requires as much as it gives. Here are 103 hands, with half that number of pieces of machinery, working without a minute's cessation, and yet the room is as quiet as though it had but half a score of denizens, A watch case, we may here note, contains forty-six separate pieces, and goes through, as we have seen, at least ten or a dozen hands. Of course, in each department there are several men doing the same work. This establishment turns out over two hundred watch cases per week,—the production of last month reaching nearly a thousand, in fact—or a product equal to $11,000 or more per week. It is, probably, the only establishment, as we have said, in the world, which can boast of including all processes under one roof, and we believe also that no establishment can rival it in the business system under which it is administered.

The gold cases of the American Watch Company speak for themselves. The adoption of the system of certificates, which are ingeniously inserted in the back of the case, and guarantee its quality and excellence, over the signature of the firm, has proved a popular and admirable feature, since in this case the reputation of the house is sufficient to guarantee its statements, which, as we have said elsewhere, would not be the case under the attempted application of a karat stamp for jewelery in general. The American Watch Company is an institution which represents at its best the comprehensive and thorough-going system of American industry, and we can safely point to it as a monument of what American business enterprise can accomplish.

A goose-yoke, made by a boy who has since become the wealthiest man in Indiana, is now one of the adornments of a jeweler's store in Indianapolis, and causes people mournfully to remark, "What a pity it is that a man who could whittle goose-yokes so well, should have wasted his time in making money!"

Mr. Newberry, a Chatham street jeweler, has among his curious collection of old watches, an old-fashioned bull's eye silver watch, made by Mr. Webb in London (numbered 65,620). This is the identical watch that Lafayette wore until he was presented with another by Washington; then he sent this, as the inscription indicates, to Gen. Wayne, and it now rests in a show case at No. 50 Chatham street.

A striking instance of the power of the imagination over the human organism has just attracted some attention in Paris. A poor old watchmaker, Frederick Steibmann, who lived in the Rue des Halles, has been the prey of a singular delusion for the past few months. He imagined that his soul had passed from his body into a peculiar watch which he had invented, and upon which he had worked for twenty years. "On the day my watch stops," Steibman was wont to say, "I shall die. My life has become subordinated to that of the watch." A few days ago the watch began to run irregularly, at first too fast, then too slow." "I am very ill," said the old man, and he took to his bed. Two days later the watch stopped. Steibmann noticed the unmoving hand, he rose to a sitting position, uttered a cry and fell back dead.

C. A. W. asks: How are Callaud's and the Minotti batteries constructed? A. The Callaud battery consists of a glass vessel with a copper plate at the bottom, upon which are placed crystals of sulphate of copper. A zinc plate is suspended near the top and the jar filled with water. The Minotti battery consists of the same materials as the Callaud, and, in addition, a thick layer of sawdust is interposed between the copper plate at the bottom and the zinc plate at the top.

J. R. says: 1. Alexander Watt recommends to electroplaters, from personal experience, the following battery: A stoneware jar holding about four gallons receives a cylinder of thin sheet copper, dipping into water acidulated with 2 lbs. sulphuric acid and 1 oz. nitric acid. A solid zinc cylinder is put into the porous cell, which is filled with a concentrated solution of common salt, to which a few drops of hydrochloric acid have been added. What should be the diameter of the copper cylinder inside the stone jar? A. The diameter should be nearly as great as the jar. 2. Should it have a bottom to it? A. It is immaterial whether it has a bottom or not.

THE

Jeweler's Circular,

A Journal devoted to the interests of the Watch and Jewelry Trade of America, and the organ of communication between all buyers and sellers in this particular branch of business.

This Journal will be forwarded to any address in the United States and Canada, for $1.25 per Annum, payable in advance.

Correspondence solicited from all parts of the country, on subjects pertinent with the aim and object of the paper.

All communications should be addressed

D. H. HOPKINSON, 269 PEARL ST., N.Y.

Our Agencies.

Those who are not as yet our subscribers can obtain copies of this journal by addressing any of the following named gentlemen, who have kindly consented to receive subscriptions and advertisements for the JEWELER'S CIRCULAR:

W. W. WILCOX, Tribune Building, Chicago, Illinois.

THE PHILADELPHIA WATCH CO., 618 Chestnut street, Philadelphia, Pa.

EARL K. COOLEY, 119 Washington street, San Francisco, Cal.

SEN. ALEX. HERRERA, 20 Muralla, Havana, Cuba.

SEN. ELISCO DEFILLE, Mayaguez, Porto Rico, West Indies.

GEORGE NEWMAN, 79 Cheapside, London, E.C., England.

MANUEL, Albareda, Buenos Ayres.

NEW YORK, JANUARY 15, 1875.

SPECIAL NOTICES.

Our Sixth Volume.

With the January number, the first issue of the new year, the fifth volume of this journal closes. We cannot let pass this opportunity to return thanks to the trade for the very cordial support which we have received from the very inception of the enterprise and which has increased most gratifyingly up to the present time. This cordiality has shown that it is almost unnecessary for us to enlarge upon the usefulness of trade journalism to the trade itself, and the appreciation which we have received has been a satisfaction in one sense for which mere pecuniary returns would be small amends. The JEWELER'S CIRCULAR now represents the watch-making and jewelry trade to the ends of the earth, for we have subscribers in South America, in Europe, in Asia and in Australia. In this respect, it simply symbolizes the American spirit of business enterprise, which finds no limit till it circumnavigates the globe. We have only to trust that our future efforts will meet the approval of the trade as thoroughly as we are given reasons to believe those of the past have done, and that the JEWELER'S CIRCULAR will continue a welcome visitor to all interested in industrial progress.

In our new volume for 1875 we shall introduce many new features of salient and useful character, in the departments which we cover. It is our aim to make the CIRCULAR equally necessary to the practical workman and to the business man. In the one department we aim to convey in this journal information of all improvements of interest to the artisan, and we can point to previous volumes as embracing very much of the utmost value in this direction, of which a great part could be found in none of the books. We have also reprinted, to the satisfaction of our readers, several works of importance. The discussions of the Horological Club have met with great favor and will continue to be faithfully reported in our columns by their ingenious chronicler, and to add largely, we trust, to the interest of the paper.

For the business man, we aim to present catholic, able and useful discussions of business principles in their applications to the jewelry trade, and to cast always the full influence of this paper on the side of trade integrity and honest dealing. By keeping him posted in current events, we mean to make the CIRCULAR worth its weight in gold to him, to use a home simile, and by our personal notes, which have been found of general interest, we hope to promote a universal acquaintanceship and good feeling in the trade which shall lift it from a mere bread-and-butter calling to a pleasant and enjoyable society, as it were. In all this, we look for the support and encouragement in the future which has been so kindly rendered to us in the past, and we assure the trade that in our sixth volume, commencing with the February number, we shall continue our best endeavors to make the JEWELER'S CIRCULAR a monthly publication devoted to the highest interests of the important trade it represents.

Karat Stamps on Jewelry.

We believe in trade progress, and in every device that tends to assure and to develop the jewelery business, but it is never worth while to advance backward. The necessity of integrity as the foundation of business is a doctrine we have constantly preached in these columns. Doubtless it was with this principle in view that the "Retail Jewelers' and Watchmakers' Association," as reported in our last number, recently "resolved to give due notice to all the manufacturers of jewelry and silverware, that after January 1st, 1875, the members of the association will not buy any gold or silverware unless it bears the manufacturer's stamp showing the fineness of the metal used."

But we do not find that we can agree with the association as to the efficacy or desirability of its method of reaching the desired end of protecting the trade and the public against fraud. There are mechanical difficulties, as we may call them, in the way of this plan, and a defect of principle as well. For instance, much jewelry is made up of small individual parts. A linked watch chain is an illustration of this. To stamp each piece, or even each part which is separately manufactured, would seriously interfere with the appearance of the chain. But this is a minor point. The real question is, how far this plan would operate to prevent fraud. Our own opinion is that it would do but little. Such a stamp, which, it must be remembered, is to be imprinted not by any central authority, like the Goldsmiths' Company of London, but by the individual manufacturer, might be made to serve the very purpose of fraud. The buyer would be less likely to judge for himself and would too often accept the imprint as evidence sufficient, whereas it might be absolutely a lie. There are unscrupulous houses that would not hesitate to take direct advantage of this opportunity for profitable lying, while the respectable houses whose word is now as good as gold would be put to considerable trouble by it. In short, the important thing, in the jewelry business above all others, is character; a buyer's only security, whether he be a retail dealer, or an individual customer of that dealer, is to buy of houses whose integrity is undoubted and whose standing is unimpeached. This is the true basis of trade, and no artificial device can, after all, take its place.

The Retirement of Mr. David Dodd.

The trade will join with us in our mingled feelings of regret and congratulation over the announcement of the retirement of the Hon. David Dodd from the widely known and opulent house of Carter, Howkins & Dodd. A wider business circle than our own trade will regret to lose from commercial activity a gentleman whose industry, enterprise, ability and rectitude have won him the abiding esteem of an ever-widening circle of friends. At the same time we must congratulate Mr. Dodd that his business skill and unflinching commercial integrity have met their just reward, and that he retires to private life with a reputation of which any man may be proud.

Twenty years ago, Mr. Dodd entered the employ of the house with which his name has been so honorably associated, and served it so ably that ten years ago he was admitted as partner. Since then, he has stood at the helm, directing the course of the ship, until now he seeks rest in the tranquil haven of priv te life. We say private life, and yet in another field, Mr. Dodd proposes to remain in public relations. He will devote his energies particularly to the service of the state, representing his town of Orange in the New Jersey Legislature.

Messrs. Carter, Howkins & Sloan, as the firm will hereafter be known, has our hearty good wishes for a continuance of the success which has heretofore been so honorably won.

Collecting Debts.

While the country is rich in material wealth, and has perhaps in a greater degree than ever before the conditions of prosperity, and while call loans with good security can be had at very low rates, there is a large class of debtors who are very poor in money. They don't pay, or they pay but little at long intervals. Their indebtedness in many cases stretches back past the crash of 1873 one or two yea.s, and creditors are anxious. Even in cases in which they feel reasonably sure that these debts, will be good in the end, they are pressing, and for nearly a year have been pressing hard, to obtain payment, for they themselves need the money. Suits for small sums are multiplying in the courts, and professional collectors are unusually busy in "dunning up" debtors. How soon this will come to an end, it would not now be safe to predict. From Fall to Spring and Spring to Fall, we have looked for a revival of confidence and of trade; but it has not come, or only in a very moderate degree. Those crops that were to do so much for us have failed, at least in that end. They came plenteously, but in some mysterious manner they altogether neglected their prescribed duty of filling the poor debtors' pockets with money. And the creditors don't want corn, or hay, or cotton, or tobacco, or coal, and above all it would seem they don't want petroleum; they want money, and nobody appears to have any money to give them.

Under these circumstances it is not strange that the patience of many of the creditor class should be exhausted, and that they should call in the aid of the professional collectors and of the law. And, if by so doing, they can accomplish the desired end, no fault can be found with their action within certain reasonable limits. Debts must be paid if the debtor has wherewithal to pay them, and he cannot make his means available for their payment without calling upon the creditor to make too great a sacrifice of his own comfort, credit or convenience, he must not be surprised if the latter takes the strongest measures to expedite the matter. But there are two questions which the creditor may well consider before bringing suit; and the first is whether his debtor has really property available for the debt—property subject to execution—and which, when sold, will pay not only the debt, but sheriff's fees, costs of court, and other law expenses. If he has not such property, suing him will merely entail upon the creditor the payment of his own lawyer's bill. And yet this precautionary consideration is regarded too little. A man becomes angry at delay of payment, and instructs his lawyer to bring suit, and when the suit is decided in his favor, generally by default, he often finds himself in possession of—just nothing, the judgment record. But even when property is found to satisfy the execution, it is often the case that, except with large debts, the lawyer's fees eat up all, or nearly all the judgment; and the successful prosecutor has made an enemy, and lost, perhaps, a constant future business friend, and has gained a paltry percentage of his claim. We have heard of some cases in which the whole debt went in this way, and many in which half and three-fourths of it went to make up the lawyer's oyster. And it is a question worthy of the most serious consideration whether, in the bringing of a suit, which may be the beginning of an embarrassment that will prove ruinous to his debtor, the creditor may not, to a certain extent, at least, be killing the goose that lays his golden egg. Some of the wisest and most successful business men never bring a suit; but if they are dealing with an impoverished or embarrassed debtor of whose integrity they are satisfied, they will open a new account with him, and leave the old one to be settled afterward. Perhaps such a course is too generously wise to be expected from any men, In these times; but there are many cases in which it would be the best policy.

Tha cases in which suit may be wisely brought for the recovery of debt are (the obtaining of precautionary judgments apart) hardly more than two. First, those in which there is a dispute as to the nature or the amount of indebtedness, and which must be settled by the law or by private arbitration; secondly, those in which a debtor who has property dishonestly refuses to pay. For, however long the debt may have been due, or however irritating the circumstances of the case, of what value is a judgment against a man with no property! If he is an honorable man, and really wishes to pay his debts, legal proceeds, and even pursuit of him by professional collectors, only worry him, and make him unfit for the effective doing of business. And it will be found that the rogues, although many in actual numbers, are few in comparison with the mass of mankind. If a man does not pay his debts it is generally because he cannot; and to worry him about them is only to embarrass him in the very means which he is taking to pay them. Particularly is all this true in these times; and, therefore, although debts are incurred to be paid, we venture to counsel the utmost possible forbearance on the part of creditors in their collection.

A Word After Season.

It is a strange notion of many people in the jewelry trade as well as among human kind in general, that you can wait till the last moment and then have just as good a chance as anybody else. Perhaps such people never read the XXV chapter of Matthew. As a matter of fact, year after year the same people make the same blunder of ordering goods in the very thick of the rush, when houses have just as much as they can do to fill previous orders. One of our correspondents writes to us in a humorously pathetic vein of this difficulty, and begs us to remind the trade, contrary to the supposition that they seem to proceed on, that "we in New York are only mortal, and can't do impossibilities," and that "when all a man's customers jump on to him at once and want everything he hasn't got, and want it by 'next express,' that somebody has got to wait, and somebody must be disappointed."

While many branches of manufacturers have complained of a dull holiday season, the silver and silver ware trades have been unusually active, and were put to especial trouble by this line of action. Their customers in many cases bought very light in the Spring, and held off their Fall orders until almost the last moment. The receipt of their orders for holiday goods, at a very late day in the season, caused the manufacturers of these goods any amount of embarrassment. Even with stocks on hand as full as usual, the manual labor of packing, shipping and charging was in many instances far beyond the possibilities of the manufacturers, although working their regular force nights. In many cases additional help was put on, but this did not facilitate matters very much, as green hands are apt to make mistakes and blunders, which take time to rectify. Among the manufacturers who were rushed beyond the power of endurance, we are requested to name in particular the house of Messrs. Rogers & Bro., of 203 Broadway. This house, we understand, was obliged to decline many urgent orders, not being able to fill them in time for the holidays. Dealers should take warning by this experience and bear in mind for next year that the last month of the year is to man-

ufacturers about as trying a season as the "night before Christmas" is to the *retail* dealer, when everybody wants to be waited on *first*, and in many cases, wants what you have *just sold*. We trust the dealers will all this experience to their advantage, by in future giving their orders for the needed goods early in the season. By ordering in October or November, at the latest, they can get exactly what they want, and receive the goods in ample time for holiday sales, and also save themselves the embarrassment, disappointments and mistakes experienced by so many this year. "A word to the wise"—ought to be—"sufficient."

The Jeweler's Circular in Spanish

The Jeweler's Circular & Horological Review again presents itself to the trade of all Spanish speaking countries on this continent, as a useful means of communication between this country and our sister republics.

Since the first sending forth of our periodical we have received nearly two hundred letters from recipients in South America, Mexico, the West Indies, and the Brazilian Empire, expressing their best wishes for our success, and testifying to the sincerity of their expressions by enclosing the price of one year's subscription to the paper. These commendatory letters with the enclosure, have given us great hope for the future, and it will be our best endeavor to increase the value and the interest of the publication every time it is issued. The second number of the Spanish edition is just published and will be forwarded, postage paid, to 2,500 dealers throughout Mexico, Brazil, the West Indies and all South America countries.

Specimen numbers and rates of advertising furnished on application.

Business Reviving.

There are some indications that would lead us to the expectation of a revival of business the coming Spring. We do not look for the flowing in of any great tidal wave of commercial prosperity, but rather a gradual, natural increase, founded upon the return of confidence and a general hopeful feeling among many of our largest manufacturing and commercial houses, that they have "touched bottom" at last, and henceforward their interests necessarily must be more prosperous and encouraging. As stores that point to this change we might mention that the great silver ware manufacturers, the Gorham Company, have lately disposed of many of their most valuable and beautiful productions, such as a bridal service, a dinner service, for $5,500 ; the magnificent Cellini silver for $2,500, and other rich and valuable articles, some of which our readers will recognize as being mentioned and finely illustrated in the article entitled "The Silver Age," copied in the Circular from *Scribner's Magazine* for December. In view of the fact that at the present time there is more enquiry than usual for such articles of art and luxury, we are disposed to take a more cheerful view of the business situation, and trust that "the good time coming" is not far off.

Flight and Maskelyne have lately made some curious observations upon colored diamonds. It has for some time been known that the tints of these stones are either destroyed or modified by heating, the change being sometimes permanent. In the present case two yellowish diamonds from the Cape of Good Hope were strongly heated in an atmosphere of hydrogen in a porcelain tube, for about two hours. Upon cooling, the color of the stones was found to have vanished, but returned after exposure for only a few minutes in a diffused light. In one instance a diamond which had been discolorized by heat was kept in the dark three or four days, and remained colorless, but an ex- [illegible] six or seven minutes to the light [illegible] back its yellowish hue. [illegible] to stand in some rela- [illegible] of phosphorescence.

Trade Gossip.

Lockets and crosses in dead gold, with jewel settings, are extensively worn.

Messrs. W. Steinheuer & Co. are the successors of the old jewelry house of W. Ruhl & Co.

A silver-mounted meerschaum pipe, colored by the late Lola Montez, is on exhibition in San Francisco.

The jewelry store of W. Seaman, of Honesdale, Pa., was destroyed by fire a few days ago. Insurance not known.

Joe Werne has disposed of his entire stock of jewelry to J. D. Barnum & Co. Mr Werne retires from business.

D. D. Beiderhause, a well-known silversmith, doing business at No. 9 Bond street, died suddenly on the 30th ult.

Mayor Wickham was duly installed in office on New Years Day; he has now made his "calling and election sure."

The Commercial Travellers Association of the State of New York, held their annual meeting at Syracuse on the 11th inst.

Mr. Chas. L. Krugler, of the firm of Quinche & Krugler, has a very fine specimen of carbuncle which he desires to dispose of.

The Countess of Dudley is reported to have had a case of costly jewels stolen from her at the Great Western Railroad station in London.

There is trouble in San Francisco over an attempt to employ Chinese workmen in the Cornell watch factory, established in that city.

There are eight metals—indium, vanadium, ruthenium, rhodium, palladium, uranium, asmium, and iridium—more valuable than gold, because of their scarcity.

John Brennan's suit against Henry Goodstein to recover $24,500 worth of jewelry, stolen from him in Philadelphia some year or so ago, has been closed ; the jury failing to agree.

F. Tomes & Co., No. 6 Maiden Lane, have on exhibition exact copies in bronze of statuettes, busts, urns, vases, etc., found in the excavations of the ruins of ancient Pompeii.

Geo. Weyman, who recently absconded with a quantity of diamonds, jewelry, etc., obtained on memorandum, has been captured in San Francisco and is now lodged in the Tombs.

He lives in New Orleans now, 108 years of age, can hook a mainspring at arm's length, slept with Noah when a boy and turned a grindstone for G. W. to sharpen his little cherry cutter.

Harry Nelson, supposed to be the thief who stole a satchel containing a large quantity of jewelry from a traveler of W. Ruhl & Co. while at Poughkeepsie, has been arrested in Buffalo.

Russia is the chief producer of platinum, or "white gold," as it is sometimes called, though the last year's produce of this precious and useful metal did not much exceed four thousand pounds.

The public are hereby cautioned against base imitations of Morrison's Gold and Silver Solutions, put up by some unprincipled persons. None are Genuine without the Trade Mark. All infringements of this Patent will be prosecuted according to law.

The present crown of Great Britian was constructed in 1838 with jewels taken from old crowns, and others furnished by command of the Queen. It contains 4 large pear-shaped pearls, 273 small pearls, 147 table diamonds, 1,273 rose diamonds, 1,363 brilliant diamonds, 5 rubies, 11 emeralds, and 17 sapphires.

An Alleghany lady recently sent a clock to Terheyden's jewelry establishment on Smithfield street, Pittsburg, to be cleaned. On taking the clock apart the workmen discovered a roll of greenbacks secreted in the bottom of the case. Mr. T. has returned the clock to the fair widow, enclosing the money at the same time.

Mr. F. Waaser, importer of watchmakers tools and materials, has recently returned from Europe with a fine selection of goods. Mr. W. has visited the principal markets of the old world in search of the newest designs of reliable tools and materials. Those in search of this kind of goods would do well to consult Mr. Waaser's advertisement, which appears in another column.

Messrs. Frasse & Co., No. 62 Chatham street, the well-known dealers in watchmakers tools and materials and kindred supplies, have just issued a very useful and comprehensive catalogue and price list for the exclusive use of watchmakers, jewelers, engravers, die sinkers, and others, and will forward a copy to any address or application. Messrs. Frasse & Co., are an enterprising firm, and all orders intrusted to their care will meet with prompt and careful attention.

"Wild's American Eye Glass Holder," manufactured by Keller & Untermeyer, and illustrated in our advertising columns, should not be overlooked by the trade. Every one who uses glasses knows how very bothersome a superfluity of cord is, and how glasses dangle about on the least occasion, at the imminent risk of their bodily welfare and of things generally. This holder contains a spring which lets out just as much cord as is required and no more, and rolls the end up and holds the glasses snugly when they are off. It is very ingenious, being pinned on the coat lappel or the vest to take the place of the hook that has been generally used and is manufactured in several variety of styles, so that the masonic emblems or college societies' devices may be engraved on, thus making a badge as well. We understand that the manufacturers are already crowded with orders for this little article.

PROCEEDINGS OF

THE HOROLOGICAL CLUB.

A Distinguished Body of Watch and Clock Makers.

Sixteenth Discussion, Communicated by the Secretary.

SECONDARY COMPENSATION.

As it had been reported that able and interesting communications containing several new ideas on the all-absorbing topic of secondary compensation would be presented for the consideration of their honorable body at this meeting, a full attendance of the more advanced members assembled at an early hour. After the meeting had been duly constituted, the chairman recommended that the paper received from C. E. Fritz, of Oneonta, N. Y., on a new compensation balance, should be the first subject taken up for consideration, it being the first in order. This paper was then read, and was listened to with marked attention throughout. The able, intelligent and exhaustive manner in which the question was treated, took all the members by surprise, and the fact that any person outside of their own club should be able to understand as much about the subject as they did themselves, nonplused the honorable and distinguished body so completely, that they could only look at each other in amazement and did not offer any remarks on the merits of the communication. Finally they resolved to postpone the matter until the February meeting, so that members might have time to recover themselves and to carefully consider all the questions involved in the proposed new balance, and the paper read in its support.

Mr. Fritz's most interesting communication will be found elsewhere.

INFLUENCE OF MAGNETISM ON WOOD AND WATCHES.

Secretary of the Horological Club.

In answer to members of the Club who desire me to retire my statement that under certain circumstances chips of wood will stick together, for a moment, I have to state that proper witnesses of the fact will be produced any time the club choose to pay their expenses, to appear before their Honorable Body. I have tried to explain to myself the somewhat astonishing fact, and have come to the conclusion that in certain kinds of wood, very resinous, rosin being highly electric when rubbed, and in the case of a building, when all the steel was known to be charged with electricity, a sufficient amount of attraction may be caused to exist for a time by a chip cut with considerable pressure by a magnetized steel cutter. If this explanation does not appear plausible to the honorable club, they will have to conclude that Katie King or some other highly magnetic performer, had perchance come to look into the chips cut by our boss carpenter, and led astray your humble correspondent. GENEVA.

Mr. Uhrmacher then said that he had never for a moment doubted that the wood-shavings had stuck to each other in the manner described by "Geneva." There were two reasons why witnesses could not be called to testify in the matter. Although eminently successful in some respects, their honorable body was yet without a treasurer, and not one cent could be subscribed by them for the purpose of making an investigation. The second reason was that an investigation was entirely unnecessary. For himself he accepted friend "Geneva's" statement of the fact without any other corroboration, although he was still unwilling to admit that either electricity or magnetism was the cause of holding the wood shavings together.

Mr. McFuzee considered that it was evading the question to suggest a sorceress like Katie King as the probable cause of the mystery. Perhaps it would simplify the question to drop the wood shavings part of it and take "Katie" or some of her disciples as the cause of the change in the rate in the chronometer which was talked about, although it would be difficult for him to comprehend how such a result could take place. Terrestrial and artificial magnetism affected some kind of metals, but he was not aware that either animal or personal magnetism did so, and if metals were not influenced by personal or animal magnetism, how could they influence the motion of a watch or chronometer?

The chairman remarked that many observing and trustworthy watchmakers were of the opinion that personal or animal magnetism affected the running of a watch, but the precise manner the injurious influence was exercised was yet a mystery. He considered it a question well worthy of a searching investigation, and expressed a hope that all those who had reason to suspect that watches were influenced by this agent or force, would send them their experience stating particularly all the facts of the case. The subject then dropped.

CENTRES OF GRAVITY AND OSCILLATIOM IN A PENDULUM.

The following communication was then read:

Secretary of the Hoological Club:

There is a question over which I have studied a good deal and spent some time in experimenting on, and as yet have come to no satisfactory conclusion, and if any one can give me any light on the subject I would be very thankful. How can I find the difference between the centre of *oscillation* and the centre of *gravity* in a pendulum? We can find the centre of oscillation and the centre of gravity, but as the centre of gravity changes with the weight of the rod, how are we to find the difference? Is there no rule that will apply to rods of the same length, but different weights? It seems to me that there ought to be one, for the difference would be considerable in two pendulums although both of the same length if one was much heavier than the other.

WARREN, Ill. A. D. L.

Mr. Horologer then rose and said that the distance between the centres of oscillation and gravity in a pendulum might in some instances be determined in the following manner: Take a pendulum that is known to vibrate once in a second, and without removing the rod from the ball, place the ball on a knife edge held in the vice in such a position that the part of the pendulum on the one side of the knife edge will exactly balance the part on the other side. Then carefully mark the point where the knife edge rests, when this result is obtained, and the mark will show the center of gravity of the pendulum. Next suspend the pendulum and measure a distance about 39.2 of an inch from the exact place where the spring bends, and make another mark, which will be the center of *oscillation*. The distance between the two marks will be plainly visible in rods of the common construction. The same plan may be used with pendulums of any length, providing the number of vibrations they make in a given time are known, and the length necessary to make such numbers of vibrations is also known. This was a method by which the difference could be very nearly determined mechanically. It could also be done mathematically with greater accuracy, but a perfect knowledge of the higher branches of mathematics was necessary for a person to be able to do so. He had never heard of any simple rule that would be applicable in every case. Such a rule would be very difficult to construct, and would be of no practical value to the clock maker, because in regard to length, all pendulums must receive their final adjustments by means of the regulating screw.

It should be remarked that the plan to determine the two points mechanically, could not be applied to mercurial pendulums; and also on the knife edge the weight of the metal at the end of the suspension spring should be taken into consideration.

STOPPING IN STEEL RUST.

The following communication was then submitted:

Secretary of the Horological Club:

I have had some watches to clean that had been badly rusted by falling into salt water. I have ground all the steel as smooth as possible, boiled it in oil, but yet it is apt to rust again. Do you know of any better method? If so, you would oblige me very much to let me know.

BRIDGEPORT, Conn. A. G. B. W.

Mr. Uhrmacher said that boiling in oil was not always a sufficient preventative for stopping rust. The rusted steel should be allowed to remain in the oil for at least two weeks and exposed to the heat of the sun or some gentle artificial heat. Kerosene was said to be better than the ordinary oils for stopping the action of rust, but when kerosene was used, it was necessary to keep it in a close vessel. Rubbing the rusted part with a piece of common brass wire was also said to stop rust from breaking out again. He had never tried it himself, but however ridiculous it might appear at first sight, this plan was said to have the desired effect. Polishing was the most effective remedy when it could be applied to the parts rusted. If the rust was completely and absolutely polished out, and no mark whatever left, it would not appear again. Otherwise it was liable to spread like an ulcer on the human body.

OILING BALANCE COCK HOLES.

Mr. Secondshand then said that Mr. Rubypin in his directions for cleaning a watch had recommended that only as much oil as filled the cock jewel hole should be used. His experience had satisfied him that that quantity was not always sufficient. Some watches had end stones fitted in such a manner that the oil was taken away out of the hole in a short time by capillary attraction. His practice was to fill the hole, then wait and see if the oil remained, and if not he applied some more.

Mr. Rubypin thought that this was a good and a safe practice, and would not necessarily consume any more time in cleaning the watch. The balance cock might be cleaned and the pivot hole oiled at as early a stage as possible, and the time used in doing the rest of the work might also show whether the oil was likely to be drawn away from the hole or not.

POWDERS FOR MAKING JEWEL HOLES.

The following queries were then read:

Secretary Horological Club:

I wish to make some jewels for watches and would like a few suggestions on the different grades of powder used for different portions of the work. I have already tried the making of jewels, and have succeeded in making what I want to my own satisfaction, but I think that there may be better ways of doing things than my own ideas, which is about all I have had to go by as yet.

ELGIN, Ill. R. P. S.

Mr. Rubypin was happy to offer some suggestions which he hoped would be of benefit to their correspondent and others. Bort and diamond powder were the two agents used in making jewels. Bort was the technical name for the fragments which have been cleaved from diamonds in cutting, or diamonds which have been cut but found to be too full of flaws to be of use for ornamental purposes. This bolt is used as turning tools, the larger pieces being selected and "set" in a brass wire and used on the lathe in the same manner and with the same facility as the ordinary graver. Bort is not all of equal value. The pure, white, chrystaline in structure is altogether too brittle to endure the work. What is known as "London Smoke" which is a clouded, brownish quality, possesses the two-fold qualities of toughness and hardness.

Another form of bort comes in the shape of a small globule, sometimes the size of a pea. It is chrystallic, and when fractured generally gives very small, indeed minute pieces of a needle shape. These are carefully selected and forms the drills which the English jewel hole maker perforates the jewel. Bort is also used in the making of the laps or mills with which the jeweler reduces the stones to a condition for the lathe and subsequent operations. For this purpose such pieces as are not fit for cutting tools or drills are selected. A copper disk having been first turned in the lathe, is placed on a small anvil, and each piece of stone is separately placed on the copper and driven in with a smart blow, care being taken that there will be no place in the disk that will not present in revolution some cutting point. The rapidity with which such a lap well charged will reduce the hardest stone is somewhat marvellous.

Diamond powder is equally as important as bort, being used in nearly every stage of jewel making. The coarsest charges the "skives" or circular saws used for slitting up the stone. These skives are made from soft sheet iron, and acts on the same principle as the laps. The finer grades, when in bulk very much resemble ordinary slate pencil dust; indeed the latter is often used as an adulteration. Diamond powder is not uniform in fineness, and the jewel maker is under the necessity of separating the different grades. This is effected by a very simple process, and is conducted as follows: A certain quantity of powder, say a carat, is put into a pint of pure sperm oil contained in some such shallow vessel as a saucer. Depending on the fluidity of the oil, the mixture, after being thoroughly incorporated, is allowed to stand undisturbed for about an hour and a half. During this time, owing to their greater gravity, the largest particles are precipitated, leaving held in suspension a powder of nearly uniform fineness. The mixture is now carefully decanted into another similiar vessel, leaving the coarse powder at the bottom of the first. This coarse deposit is denominated No. 1, and is used for skives, laps, and other rough purposes. The decanted mixture in the second vessel is allowed to remain quiescent for twelve hours, when the same operation is again performed, and the third vessel now contains the most of the oil, together with the finest particles of powder. The percipitate from the second decantation is the ordinary opening powder, the finest being for polishing both the holes and outsides of jewels, and giving the final finish to the faces of pallets, roller pins, locking spring jewels, &c. The careful workman will keep the powder as free as possible from any extraneous dust, and above all to preserve the different grades from any intermixture, as a small quantity of a coarser grade would destroy a finer one, and the process of separation would have to be repeated.

GILDING WATCH MOVEMENTS.

Gentlemen of the Horological Club:

How are watch movements frosted and gilded?

DYERSBURG, Tenn. S. G. P.

Mr. Horologer then rose and said that the frosting on Swiss watches was produced by depositing silver in the chrystallic form on the surface of the brass previous to gilding. In English and American watches the brass itself was frosted. This could be produced by either chemical or mechanical action. One way was to mark the surface of the brass with a scratch brush. This brush is formed of fine brass wire, and generally a series of them is put on a lathe revolving at a high rate of speed. The plate having been first heated to render it soft, is subjected to the percussive action of the ends of the wire. While the brushes are thus striking the object, a small stream of sour beer is allowed to trickle on them, which serves to clean the plate. It is obvious, however, that were the ends of the wire to pass over the plate, they would only leave straight lines. To remedy this a block is held just in advance of the object operated on, and on striking this block the wires are bent backwards. When they pass the block the elasticity of the metal causes them to vibrate forward in advance of the circular motion, and by this means the wires strike the object nearly perpendicularly; The force of the blow causes an indentation of the surface, and the number of such blows being innumerable, the surface soon becomes uniformly matted. It is then washed in clean, cold water and placed in the gold solution for gilding.

Frosting is produced chemically by leaving it in the following solution for such a length of time as one can slowly count five. One ounce pure nitric acid, quarter ounce sulphuric acid, three penny-weights rock salt. Dissolve the salt in the sulphuric acid, then add the nitric acid slowly. The articles must afterwards be thoroughly washed in clean water. Wheels with steel pinions rivited to them must not be put in this solution.

Much of the gilding was done by the ordinary method of electro-plating. He also understood that a considerable quantity of Morrison's gold solution for plating, without a battery, was sold for this purpose.

This proved to be the most protracted session this honorable body has ... and as the majority of the ... little fagged out, and ... the meeting adjourn... although the bu... no means exh...

THE NEW

WALTHAM

STEM WINDING WATCHES!

We are now prepared to fill orders for our new line of **Stem Winding & Stem Setting Watches,** embracing all our popular grades, and our Full Plate Movements universally known as APPLETON, TRACY & CO., WALTHAM WATCH CO., P. S. BARTLETT, and WM. ELLERY, to which we have adapted a strong and serviceable Stem Winding and Setting attachment, involving an additional cost of $12, $10, $9, and $8, respectively, (Trade List). At the same time we are keeping up our usual assortment of KEY WINDERS, as heretofore. The above Stem Winders are uniform in size and interchangeable in cases. This interchangeable feature is of great importance, and a decided advantage to dealers, as it enables them to display a varied assortment from a small stock of Goods.

The Riverside grade of Stem Winders in both Ladies' and Gents' sizes are exceedingly cheap and popular movements. The Ladies' Watch is the best, for the money, made in this country. Its small size, neat appearance, and reliability, commend it to purchasers.

The Gents' size is the only American made Stem Winder that can be PROPERLY CASED as an Open Faced watch, with the figure XII of dial on a line with the pendent. The addition of these two grades to the roll of American Watches is an immense stride in the right direction, whilst their quality, price, etc., will doubtless add greatly to the increasing popularity of American Stem Winding and Stem Setting Watches.

The above movements are now in stock, and orders for them and the various grades and styles of Silver Cases, together with the newest designs of Gold Cases, bearing the manufacturer's guarantee, can be filled at once.

☞ The above Silver Cases are made of Standard Coin Siver, stamped 

on the lids.

Office, No. 1 Bond Street, New York.

BOSTON OFFICE, No. 8 Summer Street. CHICAGO OFFICE, No. 5 Tribune Building.

LONDON OFFICE, No. 16 Hatton Garden.

Finger Rings.

Rings have played an important part in the history of the world. They have been used by the kings to unite him to his kingdom, by the bishop to see, and the abbot to his monastery. Special interest attaches to the ring with which the Doge of Venice married the Adriatic on Ascension Day, when he addressed it in these words :—"We espouse thee, O Sea! as a token of our perpetual dominion over thee!"—a vaunt that has long been proved to be groundless.

We will now, before proceeding further, stop to note a few historical rings. One of the most interesting that has come down to our times is the signet ring of Mary Queen of Scots, now in safe keeping among the treasures of the British Museum. Sir Henry Ellis was of the opinion that this was Mary's nuptial ring when she was married to Darnley, and that it affords the earliest instance of her bearing the royal arms of Scotland alone after having discarded the arms of France. When Dauphiness, she and her husband had quartered the arms of England, which gave great offence to Queen Elizabeth. Within the ring is a monogram formed of the letters M and A, which is of the greatest historical interest, because Sir Henry Ellis pointed out that in a letter from Mary to Elizabeth, written just before her marriage, she used the same monogram, probably as a puzzle for the Queen of England and her councillor Burgiley. The clue was given to them when Darnley was created Duke of Albany. Another interesting ring is the one which Queen Elizabeth is supposed to have sent to the Earl of Essex, but which was never delivered to him. It is of gold, with the head of the queen cut on hard onyx, and it is now in possession of the Rev. Lord John Thynne, who is descended from Lady Frances Devereux, Essex's daughter. Anne relates Queen Elizabeth had a double ring, made with two diamonds, which formed a heart when joined. She kept one half, and sent the other to Mary Queen of Scots, as a token of her constant friendship, but, as Aubrey adds 'she cut off her head for all that.' Mary commissioned Beatoun to take back her ring to Elizabeth, when she determined to seek an asylum in England. Before dismissing the maiden queen we may mention that her coronation ring was fled off her finger a little before her death, on account of the flesh having grown over it.

In 1765 a very beautiful and perfect gold ring was found by a workman among the ruins of the Duke's House, on Bedford Bridge, when that building was pulled down. It was found on the world famed dreamer John Bunyan, was confined, and there is little doubt that it was his ring. It bears the initials, J. B., and is engraved with a death's head, and the words '*memento mori*.' The ring was sold to Dr Abbot, chaplain to the Duke of Bedford, and presented by him, in his last illness, to the Rev. C. H. Bower, perpetual curate of Elstow.

In the Londesborough Collection is the industrial ring which the Prince of Orange (afterwards William III.) gave to the Princess Mary. It is made of gold, set with diamonds, and enamelled black. Outside is engraved "Hom soit qui mal y pense," and inside is the posy "Ie vin and veux qui I'am." It is doubtful whether this ring was presented before marriage or after; if the latter the motto may be understood as referring to William understood as referring to William's design of contesting the crown of England with his wife's father.

The signet ring of Cæsar Borgia was exhibited a few years ago at a meeting of the British Archæological Association, by the Rev. C. H. Hartshorne. It is of gold, slightly enameled, with the date 1503, and the inside is the motto "Fays ceque doys avien que pourra." A box dropped into the front, having on it Borgia, in letters reversed, round which are the words "Cor unum una via." At the back is a slide, within which is related he carried the poison he was in the habit of dropping into the wine of unsuspecting guests. Hannibal carried poison about with him in a ring, and when all his hopes were gone he swallowed the poison and died. Pope Alexander VI. (Borgia) possessed a key-ring such as was used by the Romans, which contained poison. When he wished to get rid of an objectionable friend he gave him his ring to unlock a casket, and as the lock was a little hard to open, the key concealed within gave the fatal prick Rings of the same kind of womanability, but not with so deadly a design, have been common, and keys intended to open invaluable caskets were often attached to rings. In referring to these singularities, we ought not to omit the mention of a ring made with a watch in the boss, which could be so wound up that it would make a small pin prick the person who wore it at any hour he pleased.

Ladies have always been ready to give up their valuables in times of national distress, but they have perhaps never been so nobly rewarded for their devotion as during the great war of Liberation in Germany. The ladies sent their jewels and ornaments to the treasury for the public service, and they each received in return an iron ring, with the emphatic eulogy, "Ich gab Gold um Eie sen" (I gave gold for iron).

We must now turn to the consideration of some official rings. Episcopal rings are of great antiquity, and the newly made bishop of the Roman Catholic Church is invested with a ring by which he is married to the Church, as a part of his consecration. In the romance of King Athelstan, printed in Hartshorne's 'Ancient Metrical Tales,' the king says to the offending archbishop,

> "Lay down thy cross and thy staff,
> Thy mytre and thy ring that I thee guff—
> Out of my land thou flee."

In 1196 the fashion of the episcopal ring was settled by Pope Innocent III., who ordained that it should be of solid gold, and set with a precious stone, on which nothing was to be cut. The bishops usually chosen were ruby, indicating glory, emerald for immortality and happiness, and crystal for simplicity and purity. These rings were usually signets, and were sometimes used for official objects; thus in Spain and France the bishops sealed up with them the criminal fouls from the beginning of Lent to Holy Saturday.

Before the ring is conferred it is blessed, and the ceremonial of investure takes place before the pastoral staff and mitre are conferred. If a new pope is elected as a bishop, as is usually the case, he does not receive a ring, but if not one is presented to him with the usual formula. The ring was formerly worn on the index finger of the right hand when the blessing was given, and then changed to the annular finger at the celebration of mass. It is now always worn on the annular finger of the right hand. As the ring was made large enough to be worn over a glove, a guard ring was often necessary to prevent it from falling off, when worn without one.

The Pope's seal ring is not worn by him, but has been used for sealing the apostolic from the fifteenth century Prior to that period it was employed for the private letters of the popes. The ring of the fisherman, a signet ring of steel, is in the keeping of the cardinal chamberlain, or chancellor, and is broken on the death of every pope, and a new one made for the new pope. The use of the ring was granted to cardinals about the twelfth century. A cardinals' ring is set with sapphire, to denote the high

…od, and given when a title is as… to him. The gift, however, is not for the new prince of the Church to pay a large fine on receiving it. …cardinals wear their rings at all …es, but on Good Friday they lay them …le, as a sign of the mourning in …ich the Church is placed for her …use. It was the custom to bury …cardinal with his ring on his finger, …was done with the king and other …at men. When tombs have been op…ed the ring has usually been found up… the finger of the defunct. Thus it was …at Henry II, Richard II., and Matilda …fe of William the Conqueror; and in …rance the body of Childeric was discov…ed with his regalia and coronation …ng. Graves were sometimes violated …y robbers, in order to obtain the treas…res within, and assaults were even …nade upon the corpse as it was carried …o be buried. Most ornaments have at …different times come under the ban of …the religious as vanities and snares, but …rings have always been looked upon …with favor by the Church Decade …rings have sometimes been used in the …place of ordinary rosary of beads. They …were mostly made of ten, but sometimes …of more knobs. Ten knobs or bosses in…dicate the number of aves; eleven bosses, …en aves and a pater noster, the last …being marked by a larger boss than the …others. Twelve knobs were intended to …express the creed was to be repeated at …the twelfth. Reliquary rings, in which …some sacred relic was enclosed, were at …one time in common use.

To be continued.

Curiosities of Clocks and Watches.

By Edward J. Wood.

An enamelled watch, the case being finely painted by Henry Toutin, brother of the inventor, and a goldsmith and enameller at Blois, between 1630 and 1640; the subject, a series of illustrations of the story sf Tancred and Clorinda, from 'Orlando Furioso.' A watch enamelled by the same artist, date 1630 to 1640, the subject being the "Histoire d'Apian.' An enamelled watch, the case of which was beautifully ornamented with flowers raised in relief, and enriched with diamonds. The artist of this unique specimen was not known, but the movement was by D. Boquet, who was living between 1630 and 1640. A small watch-case, exquisitely painted in brilliant colors, the artist probably being either Morliére or Vanquer between 1630 and 1650. An enamelled watch, with subjects in illustration of the birth and early life of Christ, the painting being very fine, and the whole case enriched with turquoises, the date 1630 to 1650, and the artist unknown. Two enamelled watches, the cases being exquisitely painted by Huand le Puisné, in the latter half of the seventeenth century. An enamelled watch, of very fine work, the artist being I. L. Durant, who flourished in the same century, and is mentioned by Siret in his 'Dictionary of Painters.' An enamelled watch of beautiful work by an unknown artist, the date being the latter part of the seventeenth century. The chased gold watch was by H. Manby, and, together with the movement, later than the enamel. Two watches, the cases of which were enamelled on copper by a French artist named Mulsund at the end of the seventeenth or beginning of the eighteenth century. And two watch-cases of Battersea, enamel, about 1750. At the same meeting the following gentlemen exhibited the under-mentioned specimens of watch enamelling:—By the Earl Amherst, an enamelled watch of the seventeenth century; on one side was represented the Holy Family, and on the other side, St. Catharine; the movement bore the name of "Auguste Bretonneau, a Paris." By Mr. T. M. Whitehead, a beautiful cruciform gold watch, or *montre d'abesse*, elaborately enamelled in opaque colors. On the face, which was protected by a chrystal, was seen Christ, with the emblems of the Passion; and on the back, the Crucifixion. …his was by a German artist, late in the seventeenth century, and resembled the works of Dinglinger, of Dresden. The movement bore the name of "Johannes Van Ceulen, Hagae," and had a pendulum spring, a mechanicism not known before 1675. By Mr. A. W. Franks, a small enamelled watch painted by Huand the younger, and signed "Huand le Puisné fecit." By Sir Charles Anderson, Baronet, a circular enamelled plate, probably for a watch-case: it bore the arms of James IV., Duke of Lennox, K. G., Lord Warden of the Cinque Ports, and Hereditary High Admiral of Scotland, who died in 1655. In a bordure round the achievement were introduced anchors in allusion to his naval office. This was painted in colors on a white ground. By Mr. W. Russell, an exqusitely enamelled watch, the movements of which were by Nicholas Bernard, of Paris. And by Mr. Colnaghi, an enamelled watch-case, exhibiting the portrait of George II.

At a meeting of the Societies of Antiquaries, held on March 24th, 1869, Mr. Richard Frankum exhibited an oval gold watch, enamelled white, and studded with garnets. A large stone was on the back and front, which opened, and appeared originally to have concealed miniatures. The face was of gold with delicate enamelled foilage. From the lower end hung a diminutive figure of St. George and the Dragon. A similar watch is represented in a portrait of Charles I.

The Earl of Stamford and Warrington has a small egg shaped watch, the cases of which are cut out of jacinthes; the cover is set round with rose-diamonds; it has an enamelled border; the face appears through the transparent jewel. This little jewel is of the seventeenth century, and was made by David Gom, á Lyons.

In the South Kensington Museum is a watch in a rock-crystal case, the back of which is cut into facets. It has a black shagreen silver-mounted outer case. The length of the watch is one inch and five-eighths, and the width one inch and a quarter. It is of the seventeenth century, and was purchased at the Bernal sale for 11*l.* 10*s.* In the same museum is an octagonal watch in a rock-crystal case; the ides are in turquoise blue glass, with gilt metal mounting. The height is two inches and five-eighths, and the width one inch and a quarter. The makers names are Conrad and Reiger, German workmen. This watch was bought at the Bernel sale, for 4*l.* 10*s.* Also an octagonal watch, the case of which is enriched back and front with dark blue glass paste, with arabesque ornaments in gold and enamels. The heighth is one inch and three-quarters, and the width one inch and one-eighth. The maker's initials are A. B. L. This article was purchased at the Bernel sale for 5*l.* Also an oval watch in silver, with gilt metal mounts, richly engraved with allegorical figures, arabesques, and landscapes. The maker's name is "Niel Hubert, á Rouen;" and the date is the seventeenth century. The height is three inches, and the width two inches and one-eighth. This watch was bought at the Bernal sale for 5*l.* 10*s.* Also a silver watch, with pierced back and sides, and chased with flowers. The dial is of silver, engraved, the hours being enamelled in black. The maker's name is Estienne Hubert, Rouen." The length is two inches and a quarter, and the width one inch and seven-eigths. It was purchased at the Bernel sale for 6*l.* 5*s.* Also a watch enamelled in gold, painted inside and out with flowers, and marked inside "Jacques Huon, á Paris." It is of the seventeenth century; its diameter is two inches and a quarter, and it was purchased for 30*l.* Also a gold watch, the cover of which is painted in enamel on both sides with groups of Charity and Faith. On the dial is a landscape subject. The maker's name is Nicholas Bernard, of Paris. The diameter is two inches and a quarter. This watch was purchased at the Bernal sale for 15*l.* 5*s.* Also a gold watch, the case of which is richly decorated with foliated scrollwork in relief, perforated and enamelled. The maker's name is "Claude Pascal, á la Haye." The diameter is two inches. This watch was purchased at the Bernal sale for 15*l.* 15*s.* Also a gold watch, the case of which is richly decorated with foliated scroll-work in relief perforated and enamelled.

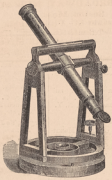
REDUCTION IN PRICES

OF

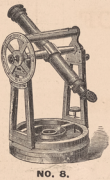
John Bliss & Co's Transit Instruments,

FOR OBTAINING CORRECT TIME.

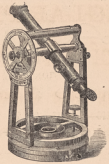
NO. 4.



NO. 6.



NO. 8.



NO. 10.

Marine Chronometers.

IMPORTANT NOTICE.—These Transits are readily set in position without the aid of strictly correct time as a basis for that purpose. Printed instructions, easily understood, accompany each Instrument, and no calculations are required preliminary to setting in position. As a trial only is required to insure unqualified approval, we are induced to make the following **LIBERAL OFFER.**—On receipt by us of satisfactory reference, and 10 per cent. of the price, we will send one of the foregoing Transit Instruments, on hire or trial, for one month with full printed instructions for setting up and using the same, and if purchased after trial, we will allow the whole hire to apply in part payment, and sell the Instrument on approved note at four months for the balance. Special terms for payment by installments, after trial, on application. We do not make this offer merely to hire these instruments, but to insure a trial with a view to sales, the hire received being only sufficient to cover the cost of republishing in case they are returned. Send for Illustrated Circular giving full description.

JOHN BLISS & CO., 110 Wall Street, New York

ESTABLISHED 1869.

SUBSCRIBE TO

And the organ of communication between the Wholesale Dealer and Country Buyer. By reference to its columns Retailers are made thoroughly acquainted with the condition of every important article in which they deal, from both mercantile and mechanical standpoints

The SIXTH VOLUME of this Journal commences with the February issue, and will contain a fund of useful information upon every topic concerning which knowledge is requisite to the Importer, the Manufacturer, the Workman, and the Country Dealer.

Subscription, **$1.25** Per Annum; Postage prepaid; sent to any address on receipt of price. Address,

D. H. HOPKINSON, 269 Pearl Street, New York

Buyers' Directory.

A Guide to the prominent Wholesale Houses in the Watch, Clock, Jewelry and kindred branches of Trade in New York.

Clock Companies.

American Clock Co.—Manufacturers of Clocks of all kinds. Salesroom, No. 581 Broadway,

Ansonia Brass & Copper Co.—19 & 21 Cliff street, New York

Cooke, Benjamin J.—Wholesale Dealer in all kinds of Clocks and Regulators, No. 137 North 3d Street, Philadelphia, Pa.

Kroeber, F...Clocks and Regulators of every description, No. 8 Courtland Street, N. Y.

United States Clock Co.—Henry Terhune & Son, 3 Cortlandt street, N. Y., Manufacturers of Fine Regulators and American Clocks.

Waterbury Clock Co.—M. Bailey, Treasurer, Manufs. and Jobbers, No. 4 Cortlandt Street, N. Y., No. 160 Clark Street, Arcade Building, Chicago.

Wood, James—Manufacturer, Importer and Dealer of Fine Regulators and Clocks of every description 6 Courtlandt street, N. Y.

Corals and Coral Jewelry.

Bergmann, Adolph—Importer of Corals, Mounted and Unmounted, Precious and Imitation Stones, No. 64 Nassau Street, N. Y.

Errico Bros.—Established 1859—Importers of Coral Jewelry, 19 John street, N. Y. Manufactory, 39 St.Catarina a Chiaja, Naples,Italy.

Lawson & Granbery..Manufacturer Fine Gold & Coral Jewelry; Coral Jewelry altered, refinished and repaired, No. 63 Nassau St., N. Y.

Cameo Cutters, Etc.

Bernard & Bonet—Cameo Cutters,Likenesses Cut on Shells and Precious Stones, 599 Broadway, New York.

Lebrethon, Jules—Cameo Likenesses cut on Stone and Shell for Pins, Earrings, Rings, Studs, &c Fancy Cameos, 643 Broadway, N Y.

Chronometers.

Bliss, John & Co.—Standard Marine Chronometers, Transets for Watchmakers' Use, No. 110 Wall street, N. Y.

Diamonds.

Bernhard, A & Co.—Manufacturing Jewelers & Importers of Diamonds, Fine Jewelry, &c. 169 Broadway, Gilsey building, N. Y.

Bissinger, E.—Importers of Diamonds, No. 182 Broadway, N. Y.

Fera, Henry—Importer of Diamonds, No. 9 Maiden Lane, N. Y.

Morch, Jacob—Importer of Diamonds, Pearls, French & Italian Stone Cameos, Amethysts, Onyxes, and Precious Stones generally, No. 25 Maiden Lane, N. Y.

Neresheimer, E. Aug.—Importer of Fine Diamonds. No. 5 Maiden Lane, New York.

Diamonds and Diamond Jewelry.

Smith & Hedges—Importers of Diamonds Exclusively, and Manufacturers of Fine Diamond Jewelry, 1 Maiden Lane, cor. Broadway, N.Y.

Taylor, Olmsted & Taylor, Importers Diamonds and Diamond Jewelry, 5 Bond street, N. Y.

Diamond Setters, Etc.

Friend, S.—Manufacturer of Fine Jewelry, and Diamond Setter, 33 John street, N. Y.

Hayden & French,—Manufacturers of Fine Jewelry and Diamond Setters, No. 65 & 67 Nassau street, N. Y. N. B.—Particular attention paid to repairing in all its branches.

Enamelers, Etc.

Bishop, J. L. & A.—Enamelers on Gold & Silver, also Manufacturers & Importers of Enamel, 80 Nassau Street. Room 10, rear.

Orr, Jas. C.—Enameler on Fine Jewelry, Flowers, Birds, &c., Enameled in colors, Band Bracelets (a specialty), 77 Nassau Street, N.Y.

Engravers and Die Sinkers.

Dolbey & Wood—Engravers & Incrusters of Precious Stones, 169 & 171 Broadway, Room 23, New York.

Fackner, Edward—Carver, Engraver and Chaser on Jewelry, Monograms, Lettering, &c. No. 19 John street, N. Y.

Henning, Albert J.—Die Sinker & Engraver, 217 Centre street, N. Y. Dies for Jewelers and Silversmiths, Embossing Plates, Seals, &c.

Knapp, Charles—Engraver, Die Sinker and Designer for Jewelry, &c. 14 and 18 k. Shanks and Heads for Rings, &c., 41 Maiden L., N. Y.

Park, William—Stone Seal & Cameo Engraver, and Die Sinker. Masonic Devices and Engraving for Incrustation, 202 Broadway, N.Y. Room 1...

Schaffer, A.—Stone, Seal, and Cameo Engraver, No. 64 Nassau street, N. Y.

Schleicher, Ch.—(successor to Wm. Eck) Die-Sinker, Engraver, Chaser and Tool Maker, 193 William street, N. Y.

Schuller, J. Dan'l,—Stone Seal Engraver, Arms, Crests, Initials and Monograms engraved on Stone Seals, &c., No. 71 Nassau Street, N. Y.

Electro Platers.

Jeandheur, F., & Son—Gold and Silver Electro Platers & Fire Gilders, Coloring Etruscan and Gold Jewelry specialty, 71 Nassau St., N. Y.

Jeannot, P. A.—Gold and Silver Electro-Plater and Etruscan Colorer, Gilding and Repairing Watch Cases a specialty, 65 Nassau street.

Normandeau, P. A—Electro Gold & Silver Nickel Plater. Coloring Gold and Silver work a specialty, No. 102 Nassau Street, N. Y. Sole Agent of New York Nickel Plating Company. Licensed by United Nickel Company.

Nickel Plating.

Scherrer's—Nickel Plate Works. Plating on all metals by an improved solution. 42 Dey St.

Fancy Goods, Clocks, Bronzes, Etc.

Hays, Alex. M. & Co.—Importers of London, Paris and Vienna Fancy Goods, Clocks, Bronzes, Musical Boxes, Diamonds, Watches, Jewelry, etc., 23 Maiden Lane, N. Y.

Hinrichs, C. F. A.—Importer and Dealer in French, English and German Fancy Goods, etc., etc. 29, 31 & 33 Park Place, N. Y.

Magnin, Ve J. Guedin & Co.—Importers of Clocks Bronzes, Musical Boxes & Rich Fancy Goods etc., 652 Broadway.

Shepard, Le Boutillier & Co—Importers of Fancy Goods, Clocks, Bronzes, &c., No. 10 Maiden Lane, N. Y.

Gold Chains, Etc.

Andres, P. & C...Manufacturers of Gold Chains and Chain Bracelets, No. 619 9th Avenue, N. Y.

Beck, J. & Son, Manufacturers of Fine Gold Chains and Chain Bracelets, 10 Liberty place, near Maiden lane, N. Y.

Falkenau & Pollak..Manufacturers of Gold Chains with Patent Safety Swivel Attachment, No. 4 Maiden Lane, N. Y.

Kaufmann Bros.—Manufacturers of Gold Chains, and Chain Bracelets, 26 John street; Factory, 713 5th street, N. Y.

Smillie, Dorrance & Edge.—Manufacturers of the Celebrated Woven Fabric Gold Chains and Chain Bracelets, 5 Maiden Lane.

Wallach, A., & Co.—Manufacturers of Gold Chains, No. 11 Maiden Lane, N. Y.

Gold Pens, Etc.

Aikin, Lambert & Co.—Manufacturers of Choice Gold Pens, Cases, Holders, Toothpicks, etc., 14 & 16 Maiden Lane, N. Y.

Todd, Edward & Co.—Manufacturers of Gold Pens, Pencil Cases, Tooth Picks, &c., 652 Broadway, N. Y. Factory, Brooklyn.

Gold Rings.

Ely, W. H.—Manufacturer of Solid Gold Rings of every description. No. 58 Nassau Street, New York.

Hair Jewelry.

Francke, H. C.—(late Charles Francke & Co.) Manf. Hair Jewelry & Device Work, Importer of Alloying Copper. Sample books always on hand, 165 & 167 Broadway.

Menge, Chas. Th.—Manufacturer Fine Jewelry and Ornamental Hair Work, and Importer of Watches, No. 32 John Street, N. Y.

Miller, H.—Artist in Hair, and Jeweler, 189 Broadway, up stairs, N. Y. Established 14 years.

Jewelry Cases, Fancy Boxes, Etc.

Altenberg, C. & Co.—Manufacturers of Russian and Morocco, Jewelry and Silverware Cases, Fancy Goods, &c., 2 Bond street, N. Y.

Braun, Chr. E.—Manufacturer of Jewelry Boxes, Trays for Show Cases, &c., 62 Chatham street, N. Y.

Dahlem, W.—Manufacturer of Cases for Jewelry and Silverware, No. 85 Nassau Street, N. Y. Show Case Trays, &c., at the shortest notice.

Jackson, Samuel C.—Manufacturer of the newest styles of Boxes and Trays for Silverware, Jewelry, Watches, &c., 180 Broadway, N.Y.

Kock Henry—Manufacturer of Fine Jewelry Cases, also Boxes for Surgical & Mathematical Instruments, 2 Duane street, up-stairs, N. Y.

Steinle & Haensler—Manufacturer of Fancy Boxes for Jewelry and Silver Ware, 66 Nassau St. Patentee of the Celebrated Adjustable Boxes.

Sturn, I.—Manufacturer and Importer of Cases for Jewelry, Watches, Silverware, e[tc.], 15 John street, N. Y.

Wiggers & Froelick — Manufacturers o[f] Morocco Cases for Jewelry, Watches, [Silver]ware. Trays and Porcelain Ring T[rays], No. 60 Nassau Street, N. Y.

Jewelry—Fine.

Aikin, Lambert & Co.—Manufacturers. General stock of Reliable Jewelry, 14 and 16 Maiden Lane, N. Y.

Baldwin, Sexton & Peterson,—Manufacturers of Fine Jewelry. No. 1 Bond street, N. Y.

Ball & Barnard—Manufacturers of the Self-Adjusting Band Bracelet Guard, (Bracelets a Specialty), No. 9 John Street, N. Y.

Barthman & Straat—Manufacturers of Fine Jewelry. Seal and Stone Rings a specialty. Orders promptly attended to. 41 Maiden Lane, N. Y.

Bissinger, E.—Importer of Fine Jewelry, Lockets, Crosses, Neck Chains, &c., No. 182 Broadway, New York.

Brown, Cook & Co.—Manufacturers of Fine Gold, Enameled and Plain Lockets, No. 191 Broadway, N. Y.

Burch, DeMott & Coughlin.—Manufacturing Jewelers, 9 John street, N. Y.

Carter, Howkins & Dodd.—Manufacturing Jewelers, 1 Bond Street, N. Y.

Coe, Adams & Stevens—Manufacturers of Fine Jewelry, Lockets a specialty. Office, old No. 9 Maiden Lane, N. Y.

Demmert Bros.—Manufacturers and Importers of Fine Jewelry, Cameo and Onyx Lockets, Sleeve Buttons and Sets a specialty. Old No. 9 Maiden Lane, New York.

Fitch & Chatterton—Successors to Merrill, Fitch & Allin—Manufact'rs of Fine Gold Jewelry, Chains, Band and Chain Bracelets, No. 19 John street, N. Y.

French, F.—Manufacturer of 18k. and Fine Stone Rings, (also Diamond Work), Jobbing attended to with dispatch. No. 14 John street, New York.

Goddard, John M.—Manufacturing Jeweler,—Seal Rings and Fine Lockets a specialty, No. 25 Maiden Lane, New York.

Griffith, H.—Manufacturer of Fine Jewelry, Studs and Buttons a specialty, jobbing attended to, Nutry Alley, Adams street, Brooklyn, N. Y.

Hartmann, P.—Manufacturer & Importer of Fine Gold, Diamond and Filigree Silver Jewelry, No. 36 Maiden Lane, N. Y., P. O. Box 2,454.

Hess, Adolph & Co.—Importers of Jewelry. Lockets, Charms and Crosses a specialty. 39 Maiden Lane, N. Y.

Kimball & Kittle—Manufacturers of Fine Gold Jewelry, 28 Bond street, N. Y.

...s, George—Manufacturing Jeweler, 28 Bond street, New York.

... & Doerflinger—Manufacturers of (14 and 18 ...r. and Roman Gold) Band Bracelets, and ...mporters of Lockets, 18 John street, N. Y.

...non, John D.—Manufacturing Jeweler, 150 Fulton street, N. Y. Flat and Half-round Gold Bracelets a specialty.

McMurray, Daniel E. D.—Successor to Kinscherf, Dellere & Co., Manufacturer of Fine Enameled Jewelry, 148 Fulton Street, N. Y.

Miller Bros.—Manufacturers of Fine Jewelry, Lockets, Sleeve Buttons, Studs, etc., etc. 11 Maiden Lane, New York.

Mulford, Hale & Cottle—Manufacturers of Rich Jewelry, Waltham Building, 1 Bond steeet, N. Y.

Oliver, Richard. .Manuf. Jeweler. Odd and intricate articles of Fine Jewelry made to order, repairing done for the trade, 11 John St., N. Y.

Oppe & Kleinfelder—Manufacturers of Seal Rings, Studs & Sleeve Buttons, 50 Bond street, N. Y. Orders promptly attended to.

Oskamp, Clemens—Wholesale Jeweler, 175 Vine street, Cincinnati, Ohio.

Owen, G. & S. & Co.,—Manufacturing Jewelers. Office, No. 5 Maiden Lane, New York.

Rose, S. & Son—Importers & Dealers in Jewelry, Watch Materials, Watch Glasses and Spectacles, 67 Nassau Street, New York.

Schæfers, Valentine—(Successor to V. W. Ramee & Co.) Manufacturer of Roman and Etruscan Jewelry, No. 25 John Street, N. Y.

Soule H. & G. & Co.—Manufacturers of Fine Jewelry, Patent Self-locking Bracelets a specialty, 17 Maiden Lane—factory, Jersey City.

Spadone, Rood & Co.—Manufacturers of fine Jewelry, Chains, etc. Importers of Watches, etc., 658 Broadway.

Swinnerton Bros. & Co.—Manufacturers of Jet and Fine Gold Jewelry, Office, 196 Broadway, N.Y. Factory, Newark, N. J.

Thoma, Ernest—Manufacturer of Fine Gold Sets and Childrens' Earrings, 173 Broadway, N.Y Factory, Hackensack, N J.

Tingley, Sinnock & Sherrill—Manufacturing Jewelers. Amethyst, Cameo and Onyx Rings a specialty. No. 9 Maiden Lane, New York

Wheeler, A.—Manufacturer of Diamond and Fine Jewelry, Masonic Jewels, Badges, Emblems, &c., 35 John street, N. Y.

Wiener Brothers—Manufacturers of Gold Chains and Fine Jewelry, 128 Fulton Street, N. Y.

Woglom & Miller...Manufacturers Fine Jewelry, Black Onyx work a specialty, 32 John Street, N. Y.

Jewelry—Shell, Gilt, Jet, etc.

Cohen William—Importer of Jewelry, Fancy Goods, Whitby Jets, Gilts, Tortoise Shells, &c., &c., No. 4 Maiden Lane, N. Y.

Decker & Barclay.—Manufacturing Jewelers, 201 Broadway, N. Y. Factory, Jersey City. Bracelets a specialty.

Hedstrom, Claes G.—Manufacturer of Shell Black and Rubber Jewelry, No. 96 Walker street, N. Y., Entrance 103 Elm street.

...hs, C. F. A.—Importer of Amber and Spa ... ...ark Place, N. Y.

The Thayer Manufacturing Jewelry Co.—Successors to O. S. Thayer & Co., Manufacturing Jewelry, Specialty: Celluloid Jewelry. No. 181 Broadway.

Jewelers' Tools and Findings.

Dennison & Co.—Manufacturers of Jewelers' Findings, Paper Boxes, Cards, Tags, Cottons, Tissue Papers, &c., 202 Broadway, N. Y.

Frasse & Co.—Importers of Stubs, French, Swiss, German and Sheffield Tools, Files and Steel Wire for Watchmakers, Jewelers, etc., 62 Chatham street, N. Y.

Swift Mf'g. Co.—Manufacturers of Wood Boxes for Mailing, and Expressing Jewelry, Precious Stones, etc., 16 Courtlandt street, N. Y.

Lapidaries.

Fox, M., & Co—Practical Lapidaries and Importers of Precious Stones, Pearls, Cameos, &c., Agate Mortars, No. 1 Maiden Lane, N. Y.

Kordmann & Michel—(Successors to A. Tournier & Co.) Lapidaries, Importers of Precious Stones, &c., No. 53 Nassau Street, N. Y.

New York Steam Lapidary Works.—T. F. More, Importer of Stones, and Manufacturer of Stone, Glass & Jet Work, 42 Ann St., N. Y.

Masonic and Odd Fellows' Jewels.

Luther, J. F.—Masonic & Odd Fellow's Jewels' Charms and Emblems a specialty; also Pins manufactured for all secret orders. 79 Nassau street, N. Y.

Musical Boxes, Etc.

Hinrichs, C. F. A.—Importer of Musical Boxes, Accordeons and Harmonicas. No. 29, 31 & 33 Park Place, N. Y.

Paillard, M. J. & Co.—Importers and Dealers in Musical Boxes. Boxes carefully repaired. 680 Broadway, N. Y.

Opticians.

Burbank, Bond & Co.—Manufacturers of Spectacles and Eye Glasses of all descriptions, in gold, silver, etc., 14 Maiden Lane, N. Y.

Landsberg, A...Successor to L. Black & Co., Importer and Manufacturer of Optical Goods, 36 Maiden Lane, Box 3993, N. Y.

Ruding, Walter—Repairing Spectacles, Eye Glasses, &c., punctually attended to. Pebbles on hand set to order, No. 81 Nassau St., N.Y.

Straubel, Richard—Manufacturer of all kinds of Gold Eye Glasses and Spectacles, No. 37 Maiden Lane, N. Y.

Suttie, Wm. J.—Manufacturer of Eye Glasses and Spectacles, in gold, silver, steel and shell, also, Fine Jewelry, 39 Maiden Lane.

Rings and Shanks.

Burbank, Bond & Co.—Manufacturers of Solid Gold Rings, 14 Maiden Lane, N. Y.

Bryant & Bentley. .Manufacturing Jewelers, 350 Patterns Hard Solder Rings, 12 Maiden Lane, N. Y.

Knapp, C.—Manufacturer of 14 and 18 karat Gold Shanks and Heads for Rings, 41 Maiden Lane, New York.

Silverware.

Cook, John—Manufacturer of Silver Tea Sets, Pitchers, Waiters, Cups, Goblets, Spoons, Forks, Knives, etc. 6 Liberty Place, N. Y.

Gorham Manufacturing Co.—1 Bond street, N.Y.

Whiting Manufacturing Co.—Manufacturers of Sterling Silverware, No. 181 Broadway, N. Y.

Silver Plated Ware.

Manhattan Plating Co., 24 John street, N. Y.—Fine Nickel Silver and White Metal Plated Ware. Repairing & re-plating on the premises.

Meriden Britania Co.—Manufacturers of Silver-plated Ware, 550 Broadway, N. Y.

Rogers & Bro.—Manufacturers of Reliable Silver Plated Ware. No. 203 Broadway, New York.

Show Cases, Etc.

Becker, John—Manufacturer of Show Cases, Jewelry Trays always on hand, 19 Howard street, N. Y.

Heil & Sum—Manufacturers of all kinds of Show Cases, 153 Chatham street, N. Y.

Kelly, P. J.—Manufacturer of all kinds of Show Cases, Counters and Refrigerators, 45 & 49 NewBowery & 22 James street, N. Y.

Kraft & Hoffmeister—Manufacturers of Metal Show Cases, Jewelry Trays always on hand, 8 & 13 North William street, N. Y.

Kruse, Frederick—Manufacturer of all Sizes and Styles of Show Cases in Metal & Wood, 175 Chatham street, New York.

Spectacle Case Manufacturers.

Richardson, Wm.—Manufacturer of Spectacle Cases in all Branches, 40 Fulton street, Up Stairs, N. Y.

Koenen, A. & Bro. Manufacturers of Leather Spectacle & Eye Glass Cases, 81 Nassau street, N. Y.

Thermometers Etc.

Tagliabue, Giuseppe—Thermometer, ...ometer and Hydrometer Manufacturer, ... Pearl street near Beekman, N. Y.

Thimble Manufacturers.

Burbank, Bond & Co.—Manufacturers of Gold & Silver Thimbles, 14 Maiden Lane, N. Y.

Ketcham Bro. & Co.—Improved Gold and Silver Thimbles, Nos. 4 and 6 Liberty Place, near Maiden Lane, N. Y.

Walking Canes.

Fradley, J. F.—Manufacturer of Fine Gold and Silver Headed Walking Canes. 18 John Street, New York.

Watch Companies.

American Watch Co.—Robbins & Appleton, Agents, Waltham Building, Bond St., N. Y.

The Philadelphia Watch Co.—No. 618 Chestnut Street, Philadelphia. New York Agency, L. H. Keller, 64 Nassau St.

The International Watch Company.—(Factory, Schaffhausen)—Agents, Schwob Bros. & Co. 173 Broadway, New York, and 203 Notre Dame Street, Montreal, Canada.

Watch and Chronometer Jeweler.

Queen, James—Watch and Chronometer Jeweler and Pallet Maker, 83 Nassau street. Pivots inserted in Pinions, Balance, Staffs, &c.

Watch and Clock Springs.

Brochon & Banvard.—Manufacturers of Watch, Clock, Chronometer and Musical Box Stock Springs, 77 Nassau street, N. Y.

Watch Importers, Etc.

Abry, J. A.—Importer of Watches, No. 63 Nassau Street, N. Y. Sole Importers of Vacheron & Constantin celebrated Geneva Watches.

Aikin, Lambert & Co.—Importers of Watches. Sole Agents for Paul Breton & Chas. Latour, Geneva. A general line of reliable Swiss Watches. Watch Cases of all styles made to order. 14 & 16 Maiden Lane, N. Y.

Bartens, Chas...Watch and Chronometer Maker. Dealer in and Importer of Fine Watches, No. 3 John Street, N. Y.

Bodine, G. M.—Importer of Watches and Jewelry of every description, No. 22 Maiden Lane, N. Y.

Bourquin Brothers—Importers of Watches from their own manufactory at Bienne, Switzerland, 20 Maiden Lane, N. Y.

Bynner, T. B. & Co.—Importers of Watches and Dealers in Diamond and Fine Jewelry, 527 Broadway, N. Y.

Conover David F. & Co.—American Watches, Wholesale Salesroom, southeast corner 7th and Chestnut streets, Philadelphia.

Cross & Beguelin—Importers of Watches, Watch Tools and Materials, dealers in American Watches, No. 21 Maiden Lane, N. Y.

Courvoisier, Wilcox & Co.—No. 12 Maiden Lane, N. Y., importers of Watches. Agents for Chas. F. Tessot & Son, and Jules Huguenin, Locle Suisse.

Droz, Henry E.—Importer of Watches and Watch Case manufacturer. Agent for the "E. Perregaux" Watch, and jobber in American Watches, No. 92 Fulton Street, N. Y.

DuBois, Francis & Co.—36 Maiden Lane, N. Y., Importers of Watches and Manufacturers of Watch Cases.

Freund, Goldsmith & Co.—Importers of Watches Jewelry, and Precious Stones, No. 8 Maiden Lane, N. Y.

F. H. Mathez,—Importer of Watches. No. 5 Maiden Lane, N. Y.

Glatz, Charles—Importer of Watches—Dealer in American Watches, Gold and Silver Cases, No. 1 Maiden Lane, New York.

Kahn, L. & M.—Importers of Watches, No. 10 Maiden Lane, New York.

Lutz, L. A.—(Successor to Lutz Bros.)—Importer and Manufacturer of Watches—fine movements a specialty, factories in Locle & Geneva, 71 Nassau street, N. Y.

Maguin, Ve J. Guedin & Co.—Importers and Agents of the Nardin Watch, No. 652 Broadway, N. Y.

Mathey, L. & A.—Importers of Fine Watches and Sole Agents for the **H. L. Matile's** Watches, No. 119 Fulton Street, N. Y.

Piaget, Henry F.—Importer, Manufacturer and Repairer of Fine Watches and Movements, No. 85 Nassau Street, New York.

Priest, Fuller & Lawrence.—Importers of Watches, Diamonds, Jewelry, Gold Chains, etc. No. 15 Maiden Lane, N. Y.

Quincho & Krugler.—Agents for the Borel & Courvoisier Nickel Movements, 15 Maiden Lane, N. Y.

Stein & Brother—Importers and Jobbers of Swiss and American Watches, Chains, Jewelry, &c. 66 Nassau street, N. Y.

Stern Brothers & Co.—Importers of Swiss Watches and wholesale dealers in American Watches, &c., No. 63 Nassau Street, N. Y.

Taylor, Olmsted & Taylor—Importers of Watches No. 5 Bond street, N. Y.

Waaser, F.—Importer of Watches, Materials, Tools, &c., Sole Agent for Ducommun's Main Springs, 52 Nassau street, N. Y.

Watch Cases.

Brown, J. A. & Co.—Manufacturers of The Ladd Patent Stiffened Gold Watch Cases, &c., 11 Maiden Lane, N. Y. ...tory, 58 Eddy street, Providence ...

Jennings, Wm. C.—Manufactu... No. 33 John Street, New Y...

Laurent, J.—Watch Case Manuf... Silver American Watch Cas... hand. 17 John street, (rear bu...

The Dueber Watch Case Manuf... 131 W. Fourth street, Cincinnati, 14 John St., New York.

Virow & Sturges—Manufacturers of ... Silver Watch Cases, 189 Broadw... top floor.

Watch and Chronometer ...

Cerf, B.—Practical Watchmake... No. 26 John street, N. Y. R... justing of Fine Watches d... All kinds of escape and stem... cut to order.

Watch Case Repairer...

Chemidlin & Cordier—Watch Case... 77 Nassau street, rear building, ro... Manufacturers of Silver Cases.

Tarbox, Hiram—Watch Case Repairi... ing, Polishing and Engine Turning... street, (room 22), N. Y.

Watch Dials

Gold, John T.—(Successor to the late T. Gold), Enamel Watch Dial Maker, No. 81 Nassau Street, New York.

Watch Keys.

Clark, A N.—Manufacturers of Light Metallic Goods, Watch Keys, Watch Case Springs, Combination Watch Keys, &c., Plainville Ct.

Watch and Clock Repairers.

Egler Bro's—Repairers of Watches and Clocks of every description—Special attention paid to French Clocks, 30 Maiden Lane, N. Y.

Watch Glasses, Shades, Etc.

Berger, Albert, & Co.—Importer of Watch Glasses, Spectacles, Opera Glasses, Telescopes, &c., &c., No. 47 Maiden Lane, N. Y.

Hill, Robert S.—Manufacturer of Watch Glasses &c., dealer in Imported glasses, flat glasses a specialty. 75 & 77 Nassau street, N. Y.

Walter, A., & Co.—Importers and manufacturers of Watch Glasses, Spectacles, Clocks, Musical Boxes, &c. No. 40 Maiden Lane, N. Y.

Watch, Pendulum, Spring and Wire Manufacturers.

Ganneval & Callard.—27 Alfred St., Islington, London. Hair spring wire in spools, 36 yds. to 1000 yards; 4s per spool of 36 yards.

Providence Directory

A Guide to the prominent Manufacturing Jewelers of Providence who manufacture for the Jobbing Trade.

Bracelets.

American Bracelet Co. — Manufacturers of Thomson's Patent Telescopic Bracelets. 26 Potter street, Providence, R. I.

Fine Jewelry.

Downs, Chas. & Co.—Manufacturers of Jewelry, also of Initial Buttons. No. 131 Dorrance street, Providence. R. I.

Irons, Chas. F.—Manufacturer of Solid Gold Jewelry. Specialty Emblems, Pins and Charms, Masonic, Odd Fellows, &c. 102 Friendship street, Providence, R. I.

Sturdy & Marcy,—Manufacturers of Jewelry. 95 Pine street, Providence, R. I.

White, Foster & Co.—Manufacturers of Fine Plated Jewelry, (Sets of Jewelry, Brooches, Drops and Buttons. No. 30 Potter St., Providence, R. I.

Jewelry.--Plated.

Allen, Samuel & Co.—Manufacturers of Fine Electro Plate Jewelry. 96 Pine street, Providence, R. I.

Bride, Wm. M. & Co.—Manufacturers of Gold Plated Jewelry of all kinds. No. 116 Pine St. Providence, R. I.

Luther Bros.—Manufacturers of Fine Gilt Jew... elry. Studs and Buttons a specialty, (also Lap... idaries.) No. 20 Conduit St., Providence, R. I.

Pierce, Willard & Co.—Manufacturers of Fin... Plated Jewelry, also Gold Masonic and Od... Fellows Emblems, &c. No. 30 Page stre... Providence, R. I.

Taft, W. A.—Manufacturer of Plated and G... Jewelry. No. 193 Eddy St., Providence, ...

Rings.

Haskell, W. & Co. — Manufacturing Je... Finger Rings a specialty in Gold, Sil... Rolled Plate. No. 95 Pine St., Provide...

McAdam, Wilson & Co.—Manufacturi... ers. Gold Seal Rings a special... Eddy street, Providence, R. I.

Studs, Sleeve and Collar Bu...

Bucklin, Wm. C.—Manufacturing... and Collar Buttons a specialty... ship street, Providence, R. I.

Richardson, J. B. & C... ...

SILVER

LICREE JEWELRY

SPLENDID SILVER BRIDAL SETS.

Tiaras, Necklaces, Perfumed Medallions and Lockets, Half-Sets, Hair Ornaments, &c.

P. HARTMANN,

MAIDEN LANE, New York.

P. O. Box 2404.

L. & A. MATHEY,

Importers of FINE WATCHES and MOVEMENTS.

WATCH CASE MANUFACTURERS,

SOLE AGENTS FOR

H. L. MATILE'S Watches

Trade Mark. Trade Mark.

Which we have in all varieties, such as independent ¼, 1-5 and split seconds, chronographs, minute repeaters, etc., in key and stem winders.

119 Fulton Street, New York.

American Watch Wholesale Salesroom.

DAVID F. CONOVER & CO.

(Successors to WM. B. WARNE & CO.)

Importers, Manufacturers and Wholesale Dealers in

Watches and Jewelry,

S. E. Corner Chestnut & 7th Sts.,

(FIRST FLOOR.)

DAVID F. CONOVER,
B. FRANK WILLIAMS,
C. EDGAR RIGHTER.

PHILADELPHIA.

A. N. CLARK,

MANUFACTURER OF

Light Metallic Goods

WATCH CASE SPRINGS,

WITH DOUBLE SEGMENT,

ich prevents the spring from striking the ement, and with a succession of screw-holes, ich greatly assists in adjusting to the case.

ombination WATCH KEY and ENVELOPE OPENER.

ith tempered cutter and pipe, in nickel and plate, has a fine appearance as a charm.

bination Watch Key, Earspoon and Tweezers, a Convenient Pocket Piece readily appreciated.

Key for the Million!

ed Stock, Tempered and Nickel Plated. adhering firmly to the fingers in winding.

bove goods are sold by the leading jobbers in the line.

SPECIALTY!

etal Case Springs, Patented May 30, 1871. Adapted to the use of Watch Case ers. Quotation and sample will be sent free on application by mail.

R. LONGMAN'S SONS,

Sweep Smelters & Refiners,

25, 27, 29 & 31 North Portland Avenue,

Brooklyn, L. I.

Office, No. 31 John Street, New York.

Jewelers' and Silversmiths' Sweeps.
Polishing, Stoning, Gold & Silver Bars, Clippings and Platers' Solutions solicited.

DEALERS IN

PURE GOLD AND SILVER FOR JEWELERS & SILVER PLATERS.

L. & M. KAHN,

Importers and Manufacturers of

WATCHES,

10 Maiden Lane, New York.

5 Rue des Alpes, Geneva, Switzerland.

Sole Agents for the JAMES KAHN, E. BOURQUIN & FILS, ALPHONSE MATILE WATCHES.

We keep a full line of these Goods in Key and Stem Winders, also, Quarter-Seconds, Chronographs, and Repeaters, constantly on hand.

RINGS A SPECIALTY.

350 Patterns Hard Solder Rings.

STAMPED & WARRANTED 16 KARATS FINE.

18 Karat Bracelets, Cameo, Coral, Roman & Engraved Sets, Masonic Jewelry, &c.

Bryant & Bentley,

MANUFACTURING JEWELERS,

No. 12 Maiden Lane, New York, Up Stairs.

Goods sent on approval to any part of the country, reference being required from parties with whom we are not acquainted. No agents employed.

ROGERS & BRO.

203 Broadway, New York

Manufacturers of

RELIABLE

Silver Plated Ware

Which they offer at close prices for Cash or approved credit.

☞Price Lists on application enclosing business card.

A NEW FEATURE.

We publish an Illustrated Catalogue of our production; but to our old customers we will send, on application by mail or telegraph, *Photographic Albums* to order from, containing *all the Newest Designs* up to the latest date, (unattainable in a printed catalogue.)

The goods are photographed on a scale, and the prices distinctly marked, so that any dealer may have the advantage of *seeing and ordering the latest styles.*

The selections to be made on receipt of Albums, and the same to be returned to us without delay.

As unknown to us may procure these albums on the same [illegible] their business card and reference.