

## THE WATCH—ITS INVENTION AND HISTORY.

In our last issue we gave an account of the history of the invention of the watch; and this week we resume the subject, but confining ourselves more to its introduction into society and describing some of the more remarkable specimens now in existence.

In the early days of watchmaking, from their comparatively high price, watches were great rarities, and were found only in the hands of the very wealthy, but it soon became the rage among those who could indulge in such a luxury to make collections of them, and among others Charles V., who, it is said, after retiring from his throne to a monastery, spent much time in trying to make a lot of watches all keep time alike, which he could not do, from which he sagely drew the conclusion that he must have been a great fool to spend so much blood and treasure as he had done to make men all think the same way, when he could not even make a few watches agree. The story further states that one of the monks entering the king's cell accidentally upset the table on which the watches were placed, upon which the king remarked that the monk had easily accomplished what he himself had vainly tried to do—to make the watches all go together.

Diana of Poitiers, the mistress of Henry II., being a widow, the courtiers of the period, to ingratiate themselves in her favor, used to present her with watches in such shapes as coffins, skulls, etc., and it became the fashion to have them made in this lugubrious style. Mary, Queen of Scots, is said to have had several such, and she gave one to Mary Letoun in 1587, which is still in existence. It was made by Moyse, of Blois, France, and has been thus described: The watch has a silver casing in the form of a skull, which separated at the jaws so as to expose the dial, which is also of silver, occupying about the position of the palate, and is fixed in a golden circle with the hours in Roman letters. The movement appropriately occupies the place of the brains, but is enclosed in a bell, filling the hollow of the skull, which bell is struck by the hammer to sound the hours. The case is highly ornamented with fine engravings, showing on the front of the skull Death standing between a cottage and a palace; in the rear is Time devouring all things; on one side of the upper part of the skull are Adam and Eve in the Garden of Eden with the serpent tempting Eve; on the opposite side is the crucifixion. Inside on the plate or lid is the Holy Family in the stable, with the infant Jesus in the manger and angels ministering to him. In the distance are the shepherds with their flocks, etc. The works are said to be in good order and to perform astonishingly well.

Many of the watches of this period, besides being made of the peculiar shapes before mentioned, were set in crystal cases, so that their works might be seen in motion; others were set in perfume and snuff boxes, saddle pommels, canes, and at a later period in finger-rings, shirt studs, bracelets, and other articles of personal wear; and it is said that a striking watch, small enough to be mounted in a ring, was made by an Italian goldsmith as long ago as 1542.

Queen Elizabeth had a large number of watches, many of which were presented to her by her favorites, or those who wished to become so. There is a list extant of over a score of these articles which she owned. Many of these are mentioned as "clocks," but it is evident from the context that most of them were watches.

Lady Fitzgerald, an English lady who has several remarkable watches of different periods, has one of Elizabeth's time which is in the form of a silver duck, with the feathers in chased work. The lower part opens to expose the dial plate, which is of silver encircled with a gilt design of floriated scrolls and angels' heads. At the back of the neck is a ring to which a chain is attached. The same lady has one representing Jupiter and Ganymede, with the movement contained in the body of the bird. It is so made that, when not suspended to the girdle by a ring in the bird's beak, it will stand on its claws. She has also a cruciform watch of about 1700, covered with elaborate engravings of a delicate character. The center of the dial plate has a representation of Christ's agony in the garden, the outer compartments being occupied by the emblems of the passion and the lowermost by a figure of Faith.

A watch said to have been made by Hans John, of Königsberg, about the 17th century, is stated to have the earliest known instance of a chain on the fusee, and it is peculiar in other respects, as it has a small wheel-lock pistol to serve as an alarm.

Watches were such a rarity in 1630 that it is said a Dr. Allan, who had the reputation of being a wizard, happening to leave his watch in a bedroom in a house where he was visiting in the country, came near losing it because the chambermaid who found it thought it was the doctor's "familiar spirit." She therefore took it up with a pair of tongs and threw it out of the window into the moat "to drown the devil;" but as "one who is born to be hanged cannot be drowned," the watch, when search was made for it, was found hanging on a bush growing on the bank of the moat, on which it had accidentally caught in its flight through the air. This failure in her attempt only the more confirmed the girl in her idea, and she could not be prevailed upon to touch the watch. Thirty-five years after this Pepys, in his diary (December 22, 1665), made the following entry, which shows that even then the sight of the internal mechanism of a watch was so much of a curiosity that he was "mightily pleased and satisfied with it." "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."

Watches after this period and during the eighteenth century came gradually into use among the wealthier people, but they were still of great cost, which was further increased by excessive ornamentation and by many of them being made as repeaters, which were then the fashionable watches. Another style of watch was also then in vogue, called "touch watches," with which the time could be felt in the dark. These watches were made of different styles, one of the best of which had projections on the back corresponding to the different hours on the face, and a movable or independent hand which could be turned round with the finger until it was opposite the hour hand, when it could be moved no further.

In 1769 George II. had a watch presented to him of which one hand took a year to make a revolution, and was used to point out the month and day of the month. It also had a brilliant to represent the sun, set on a plate which regularly revolved to perform its apparent diurnal revolution. On the plate was a movable horizon to show the variation of the days according to the season of the year.

In the same year Ranzonet, a Lorraine watchmaker, made a watch of the common size containing a musical instrument that played an air *en duo*, and none of the parts of the musical mechanism interfered with the time works.

In the Museum of Dover, England, is a watch of about the same date as above, of an oval shape, like the Nuremberg eggs, having two movable dials, one having the numerals of the month, etc., and near the center are the signs of the zodiac; the fixed part around which it revolves has the abbreviated names of the months. The outer dial has merely the hours upon it. There is also a revolving plate below the surface bearing upon it the days of the week. Other apertures show the month and the day of the month, and another the moon's position. The hands move in the opposite direction to those of the watches of the present day.

During the reign of Catherine II. of Russia, Kalutin, a peasant, made a musical repeating watch about the size of an egg, which had within it a representation of Christ's tomb with sentinels on watch. On pressing a spring the stone would be rolled from the tomb, the sentinels fall down, the angels appear, the holy women enter the sepulchre, and the same chant which is sung in the Greek church on Easter eve accurately performed. It is now in the Academy of Sciences at St. Petersburg.

About 1770 it became the fashion to wear two watches. In a rhyming receipt of this date, "To Make a Modern Pop," appear the lines:

"A lofty cane, a sword with silver hilt,  
A ring, two watches, and a snuff-box gilt."

The ladies soon adopted this fashion, but as watches were still very expensive, mock watches were often substituted, some being of costly materials while others were cheap imitations. The Chinese of the present day wear two watches when they wear any at all, for the reason "spose one makee sick and die" the other one "still lives." Chinese time-keepers have twenty-four hours shown on the dial.

Keyless watches now so much worn have long been known but have not been used much until of late years. Napoleon I. possessed one that at every step he took caused a weight to act on the end of a lever having a weak spring under it, which was attached to a click working into a ratchet wheel on the barrel arbor and so wound up the main spring. In the Kensington Museum in London there is a pedometer, operated in a similar manner, combined with a watch, so that the same instrument tells the time and also the distance walked by the wearer during the day. A watch in the United States Patent Office is wound up by closing the case after looking at the face to see the time. It has an attachment to throw the winding device out of gear when the spring is wound up.

Among the remarkable watches may be cited one on exhibition in New Haven, Conn., which is thus described by Mark Twain:

"I have examined the wonderful watch made by M. Matile, and it comes nearer to being a human being than any piece of mechanism I ever saw before. It knows considerable more than the average voter. It knows the movements of the moon and tells the day of the week, the month, and will do this perpetually; it tells the hour of the day, the minute, and the second, and splits the seconds into fifths, and marks the divisions by stop hands; having two stop hands, it can take care of two race horses that start one after the other; it is a repeater, wherein the voter is suggested again; musically chimes the hour, the quarter, the half, the three-quarter hour, and also the minutes that have passed of an incompleting quarter hour—so that a blind man can tell the time of day by it to the exact minute. Such is this extraordinary watch. It cyphers to admiration. I should think one could add another wheel and make it read and write; still another and make it talk; and I think one might take out several of the wheels that are already in it, and it would still be a more intelligent citizen than some that help to govern the country. On the whole I think it is entitled to vote—that is, if its sex is of the right kind."

When speaking of curious watches we should not forget that the commonest watch made would, if it were the only one in existence, be considered a marvellous piece of workmanship, hardly second to any of man's creation, but as every one now carries a watch, it barely excites more

curiosity than a pocket-knife. Independent of the completed watch as an automatic machine, let us consider some of the curiosities of its manufacture. Take, for instance, the small screws, some of which are so small that they look like grains of fine sand, and will require 150,000 to weigh a pound, yet all of these when examined under a microscope look like finely finished little bolts, each having a perfect thread, although so fine as to take 250 turns to measure one inch. These screws are now made by the American Watch Company by an automatic machine, which only requires to be supplied with the necessary quantity of wire and power to keep it in motion, to turn out these infinitesimal screws all complete, except tempering. If we examine the chain used in most English watches we find it to be only about six inches long, and yet it has 630 pieces in it. The hair-spring may also be considered as one of its curiosities. To the naked eye it looks like a hair, but under a glass it is shown to be a flat steel ribbon, which a suitable gage will show to be only  $\frac{3}{1600}$  of an inch thick, or about one half the thickness of a hair; and although from six to eight inches long, yet it is said that it takes about 25,000 to weigh a pound. It has been frequently cited as an instance of the value given to raw materials by manufacturing into finished articles, as a pound of finest hair springs, selling for thousands of dollars, may be made from metal which in its crude state cost but a few cents.

Leaving the component parts of the watch and considering the number of ticks the completed article will make, we arrive at some extraordinary figures. Many watches make five ticks per second, 300 each minute, 18,000 in every hour, and 432,000 per day. Thus we see that by a half dozen turns of the key once a day, occupying a few seconds, we store up a modicum of power in the spring that is cut up into near a half million of beats which are spread over the whole day, any successive two of which are precisely the same distance of time apart as any other succeeding two at any time of the day or night. If, now, we multiply the daily beats by  $365\frac{1}{4}$  we shall obtain the number of beats in a year, which are 157,788,000—a number of which we can have but a slight conception, except from some calculation of this kind, although it may help to give us some idea of our national debt. If our worthy Secretary of the Treasury should engage to pay off this debt and should detail a sufficient number of clerks to put down a dollar for every tick of a watch, night and day, it would be over thirteen years before they would get through with their job of paying off the principal—to say nothing of the interest. This, however, is a digression, and we had better return, as the French say, "to our *moutons*"—or rather, our *montres*.

Many of our elderly readers no doubt remember the printed "watch papers" that used to be put by the watchmakers, as business cards, into the bulky watches used by our grandfathers. These were sometimes enlivened with a couplet or verse, some of which seem worth preserving, for instance, this one, which hath a flavor of worldly wisdom:

"He that wears a watch, two things must do:  
Pocket his watch and watch his pocket too!"

Or this one, which savors more of heavenly things:

"I labor here with all my might  
To tell the hours of day and night;  
Therefore example take by me,  
And serve the Lord as I serve thee."

As one of the "Curiosities of Literature" connected with watches, we may cite the following, which can be seen in the churchyard at Lydford, Devonshire, England, and is something in the style of Benjamin Franklin's celebrated epitaph:

"Here lies in a *horizontal* position  
The *outside* case of  
George Routledge, Watchmaker,  
Integrity was the *main spring* and prudence the *regulator* of  
all the *actions* of his life;  
Humane, generous, and liberal,  
His *hand* never stopped till he had relieved distress;  
So nicely *regulated* were his *movements* that he never went  
*wrong*,  
Except when *set agoing* by people who did not know his *key*;  
Even then he was easily *set right* again.  
He had the art of disposing of his *time* so well  
That his *hours* glided away in one continued *round* of  
pleasure,  
Till in an unlucky *moment* his pulse stopped *beating*.  
He ran down Nov. 14, 1802, aged 57,  
In hopes of being *taken in hand* by his Maker,  
Thoroughly *cleaned, repaired, wound up, and set agoing*  
In the world to come when *time* shall be no more."

## Test for Free Sulphuric Acid in Vinegar.

The impression popularly prevails that vinegar is frequently strengthened by the addition of sulphuric acid, hence numerous tests for this acid have been proposed. Natural vinegar contains sulphates, hence chloride of barium always forms a precipitate, whether sulphuric acid has been added or not. The simplest test for free acid is that proposed by G. Witz, namely, methyl-aniline violet. Acetic acid has no effect upon this dye, but the smallest trace of free mineral acid, hydrochloric, sulphuric, or nitric, changes it to green or bluish green. To make the test he dissolves 1 part of methyl-aniline violet in 2,000 parts of water (5 centigrams to 100 c. c.) and adds a single drop of this solution to about 25 c. c. ( $\frac{1}{2}$  ounce) of the vinegar to be tested. If the slightest amount of sulphuric acid has been added to the vinegar the above mentioned change of color is noticed.