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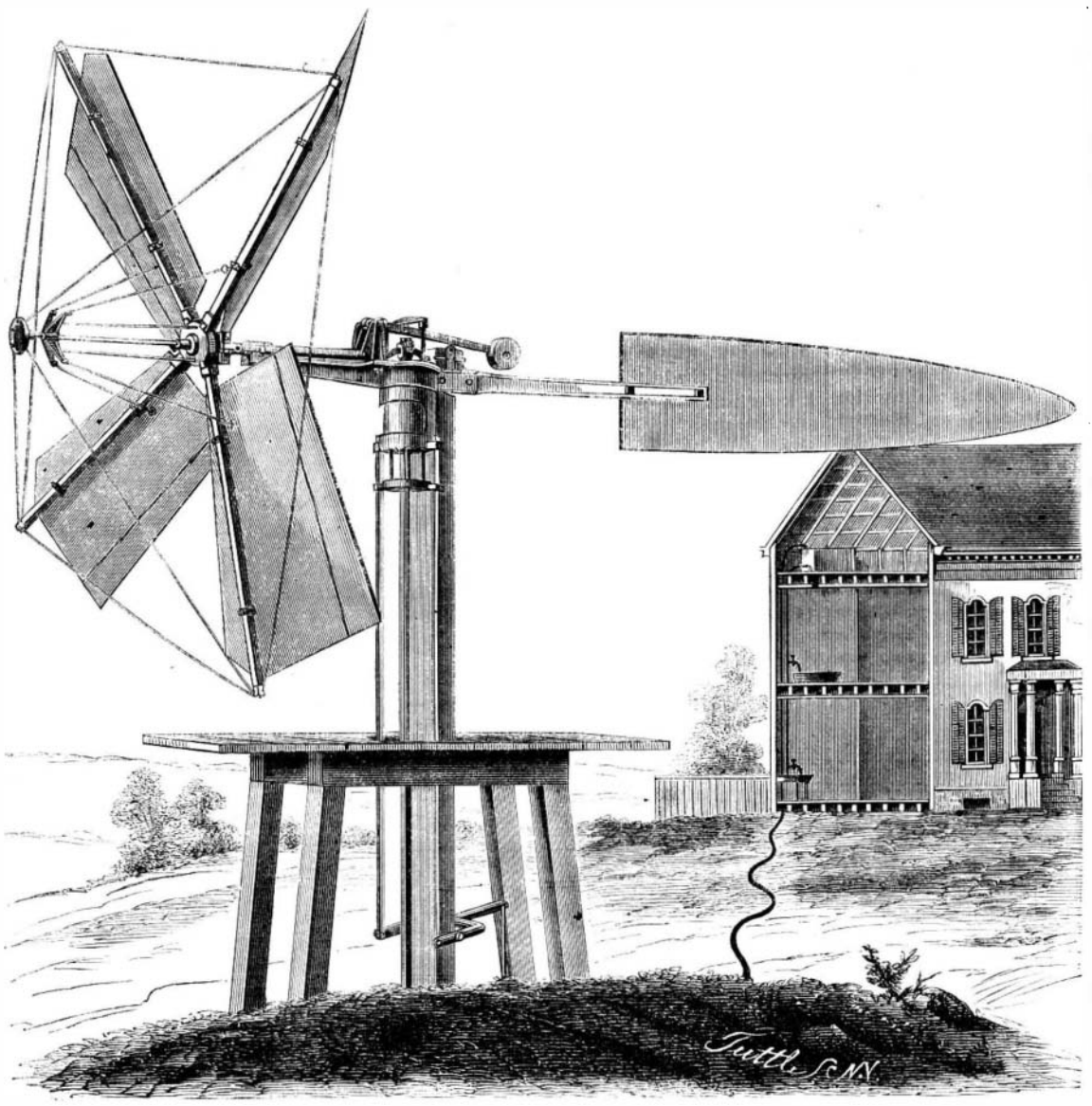
Improved Wind Mill.

It must have been at a very early period when the attention of men was first directed to the employment of the wind as a motor. Its force being so evident to the senses, there is little doubt but it was one of the first means which man employed as his servant. The lack of regularity in its motion, and the entire failure of motion in a calm has however driven it from competition with steam or water, as a motor for manufacturing purposes where steadiness and reliability are requisites. Still, for some purposes and in some situations, the wind mill is cheaper and as useful as any other motor. The attacks of prejudiced advocates of mechanical progress on this old-fashioned machine have proved as futile as those of Don Quixotte, and the wind mill still holds its own as a valuable adjunct of man's efforts. The dyked level of Holland is thickly studded with these machines employed in raising water, and for this purpose, the wind mill deservedly continues to hold a high position. In this work continuity of operation or steadiness of motion is not very important, as the results of the work performed when the wind blows can be stored up for a season of calm.

A number of wind mills of varying construction have been introduced, but some of them have been planned apparently by men whose ideas on the action of the wind were somewhat crude, and their machines have been in some cases cumbrous or complicated and more or less liable to get out of order. The mill shown in the engraving is the production of a mechanical engineer who has devoted many years to the study and construction of wind mills, and it appears to have been planned on sound mechanical and scientific principles. It is conceded by good authority that the vertical wheel, like that in the engraving, gives out a much larger amount of power than one of the horizontal style does for the amount of surface exposed to the action of the wind; and this is, therefore, the plan of the "Sancho Panza."



HEWITT'S SANCHO PANZA WIND MILL.

The arms carrying the wings are seated in a cast iron hub and braced at their extremities by rods passing from one to the other, and also by others to a collar on the end of the horizontal shaft. From the wings extend other rods which connect with the arms of a "spider" turning loosely on the shaft and made to slide on it. The wings are pivoted to the radial arms so that they can be turned to present their surfaces at angle more or less acute according to the force of the wind. From the "spider" pass rods parallel to the shaft, connected to a collar on the shaft to which connections are pivoted which, by vertical bars, are attached to a lever having a shifting weight. From this lever, rods extend down the upright and connect with another lever and rope, by pulling upon which the sails may be set to any angle desired or directed with their edges to the wind to stop the machine. By means of a crank, motion is given to a pump rod or to any other machinery.

The engraving represents a wind mill forcing water from a well into the upper story of a dwelling, filling a tank from which the water can be led to a bath tub, sink, or any other receptacle for domestic uses. The sails are at all times presented to the wind by the vane.

This mill was patented Feb. 19, 1867, by Frederick Hewitt, of Newark, N. J.

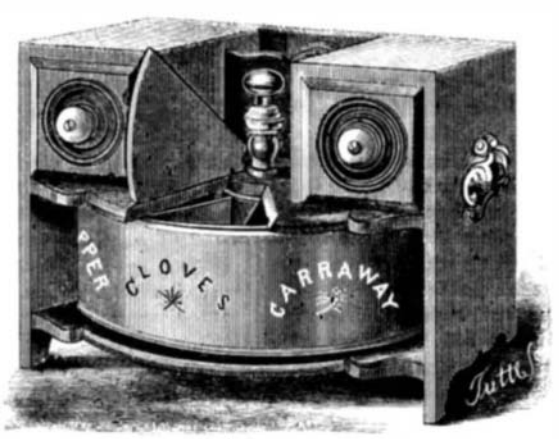
It is very strongly built, is cheap, and always under perfect control. There is no portion of it which cannot be repaired or replaced by any ordinary mechanic. It may be seen at J. D. West & Co's, 40 Courtlandt street, New York city, who will answer all inquiries relative to it.

A Curious Formation.

A London paper states that at a certain point in the Thames where an eddy accumulates a shoal of sand, agglutinating springs rise from beneath and progressively convert the sand into rock, which has to be removed, from time to time, by blasting. Bourne, the engineer, conceived from this circumstance the idea of turning quicksands to firm foundations by a similar process, and actually proposed to do this for the railway bridge over the Soane in India. Quicksands at this point as deep as borings had been made, were to be converted into rock by injecting them, through perforated pipes, with sufficient iron water, from a hill of iron pyrites near at hand, to stick together the whole mass. The line of the road was eventually altered, and the bridge was built at another point; but Mr. Bourne still believes that an expedient of this kind will become a valuable feature in engineering.

WALKER'S IMPROVED SPICE BOX.

The prudent housekeeper is a lover of compactness and of conveniences for storing. The engraving herewith presented is that of an elegant combination cabinet for keeping the



spices and similar condiments used in the culinary art. It needs scarcely any description, as the engraving gives an excellent representation. A case of mahogany, black walnut, or other ornamental wood is provided with drawers at the sides under which is a rotating tin box in the form of a cylinder divided by radial partitions into eight compartments, each having the name of the spice it contains painted on its front. The cover has but one opening, that in the front, and the receptacle is rotated by the knob on the top of the stud on which the box turns. It is neat, handy, and convenient and will commend itself to every housewife.

A patent for this device was issued through the Scientific American Patent Agency August 21, 1866, to A. J. Walker, whom address at Lowell, Mass., for additional particulars.

Cause of Milk Sickness.

This pernicious affection of domestic animals is sufficiently mysterious and important to have induced the Legislature of Illinois, some years since, to vote a handsome reward to any one who should discover its cause. The *Medical and Surgical Reporter* gives information from three separate observers (one quoted from the *Missouri Republican*) tending to throw the responsibility upon a common and hitherto unsuspected plant, *Eupatorium Ageratoidis*. It is a coincidence, that two if not three of the discoveries were originally made in the same year, 1860. Mr. Wm. Jerry, of Edwardsville, Ill., in June of that year, gathered the plant by mistake for the nettle, and (alone) partook of it as boiled greens. On the next day he was suddenly seized with the usual symptoms of milk sickness, violent trembling, prostration and faintness, accompanied on the day after by vomiting, violent retching, and a fevered state of the stomach. He did not recover from these effects in five years, during which period he took pains to make himself acquainted with the plant which had caused them, and tried it upon animals with similar results. When in bloom, animals are said to like it.

Dr. Amos Sawyer, of Hillsboro', Ill., adds his testimony to the above. Mr. R. N. Lee, of Nokomis, had given him information of a plant with which he had repeatedly produced milk sickness in animals, and supplied him with a quantity for examination. His own experiments confirmed the report of Mr. Lee, and a botanical report by Dr. McPheeters, of St. Louis, coincided with that before procured by Mr. Jerry from Mr. Enno Sanders, chemist. The following is the description: "Eupatorium Ageratoidis L. (white snake root), smooth, branching, three feet high, leaves broadly ovate, pointed, coarsely and sharply toothed, long petioled, thin (four to five inches long), corymbs compound." Mr. Jerry promises to try the plant further upon cows the coming season. Dr. Sawyer states that the milk sickness is caused only when cattle range in the woods, and that the disease is always confined within certain well defined boundaries.

[From our Foreign Correspondent.]

LAST WORDS FROM ENGLAND.

LONDON, March 23, 1867.

THE ENGLISH DOCKS—THEIR "WHY AND WHEREFORE."

This letter will be my last from England, as I shall go to Paris next week to be present at the opening of the Exhibition. There are many things, however, of great interest, and that would afford material for study, which we have not been able yet to consider. Thus, it is proper that I should say a few words about the docks so generally in use here, since we have next to nothing of the kind with us, and every body has heard the praise of the Liverpool docks at least. The use of these is rendered almost imperative from the great rise and fall of tide which prevails all over Europe, but especially in the channels by which England is surrounded. At Liverpool this amounts to 25 feet, and at places in South Wales on the Bristol Channel the daily rise is 30 feet. This of course produces a very rapid current, which, added to the inconvenience arising from such a great change of level, would render loading and unloading vessels in the open stream a matter of some difficulty. The bottom is in general soft mud, and at low tide this is exposed in large banks, and vessels are in most cases high and dry upon these, presenting rather an odd appearance. But aside from any reasons of this nature, the

use of docks affords very great facilities for receiving and discharging cargoes, besides giving an amount of accommodation that could not otherwise be obtained. It must be remembered that the extent of water frontage, with depth sufficient for large vessels, that exists in New York, is wholly exceptional, and it is quite certain that no port in Europe compares with it in this respect.

DOCK MACHINERY.

The docks are of course built of the most substantial masonry, and in general are thoroughly provided with hydraulic machinery both for opening and closing the gates and for discharging merchandise from the vessels. Sir Wm. Armstrong has made a specialty of this kind of machinery, and its efficiency is certainly admirable. The power is furnished by a large pumping engine placed at a convenient point, and the water under pressure is conveyed by pipes to the various parts of the dock at which it is to be used. Beneath the pavement are placed little hydraulic engines which are driven from this source, and by means of suitable gearing work the gates. These engines consist of a flat bed plate supporting a short and stout pinion shaft by means of two pillow blocks, the pinion and two eccentrics being placed between them. At each end of this shaft is attached an oscillating cylinder of say 2½ inches diameter by 18 inches stroke, the trunnions be being placed near the front end. The piston rod has half the sectional area of the piston, and when at work the front end is constantly under pressure, and the valve, which is detached from the cylinder, being placed directly in front of its eccentric, has only to admit and release the water to and from the back end. The throttle valve is also separate, each part being bolted independently to the bed plate and the connections made by suitable pipes. These engines are also employed in deep mines where the hydrostatic pressure is sufficient to furnish the power, and are obviously well adapted for such a purpose from their compactness and the absence of the refrigerating effect accompanying the use of compressed air.

THE HOISTING CRANES.

The cranes are constructed with wrought iron jibs made fast to a central column which is revolved by means of hydraulic apparatus placed below ground. This consists of three horizontal cylinders of four or five feet length; two for swinging the jib and one for hoisting. The ends of the piston rods carry two or more sheaves and a chain, one end of which is fastened to the cylinder, passes over the sheaves and over corresponding ones bolted to the back end of the cylinder, and thence to the crane. The motion of the piston is thus multiplied four or more times, according to the number of sheaves, for the power required. The water discharged from the hydraulic cylinders is returned by a second set of pipes to the water tank in the engine house, to be pumped over again.

But the way these things are exposed to the weather would never do in our climate. I happened to visit the docks at Penarth, in South Wales, during one of the cold snaps which occurred this winter, and with coal fires burning around the pipes at every point they were unable to prevent them from freezing just as they did in dwelling houses and everywhere else. I have been very much astonished at the utter absence in all these arrangements of any provision to resist the effects of the cold that is always experienced at some time during the winter, a lack which gives rise to endless annoyance.

The pressure employed is very great. At Penarth the steam cylinders of the pumping engine are 18 inches in diameter and the bore of the pump 5⅛ inches, with a piston of the same size and a rod 3¼ inches diameter, or half the sectional area of the piston, the two ends of the cylinder being in connection so that the water discharged at each stroke is equal to half the contents of the cylinder. The steam is carried at 60 lbs. pressure and cut off near the end of the stroke: this must give, therefore, nearly 1,100 lbs. per square inch pressure in the water pipes. The engine remains under steam at all times but only runs when water is used at some part of the dock, starting automatically as the water is released. To maintain a constant ready pressure at all times, an accumulator is added, consisting of a long vertical ram of about 14½ inches diameter carrying a weight of 80 tuns at its upper end. This falls through a certain distance while the engine is coming to its work, and is then pumped up again by the latter till it reaches the limit of its stroke, when by a connection with the throttle valve it shuts off the steam from the engine.

Very extensive docks have been constructed within the past few years at Marseilles, and they are said to be the finest in the world, next to those at Liverpool.

THE ENGINEERING ASSOCIATIONS.

There is one exceedingly pleasant as well as useful feature of engineering as it exists here, which unfortunately does not find its counterpart in America. I refer to the societies formed among the leading engineers, at whose meetings all matters of interest are discussed. The mere statement of this will strike many, no doubt, as nothing remarkable or unknown. But it should be borne in mind that there is little more resemblance between these meetings and those of the American Institute, for example, than between daylight and darkness. It is easy enough to form a society and to hold meetings, but the interest attaching to these of which I speak is that they are composed solely of the prominent engineers, and the discussions taking place at the meetings are not in reference to somebody's patent invention which is of great interest to himself and of little to anybody else, but relate to important works in progress or embody the results of theoretical research on questions of real moment. When men like Mr. Scott Russell, Mr. Hawkshaw, Mr. Fowler and others of the same class, are regularly present at the weekly meetings it is good *prima facie* evidence that the character of the discussions is such as to make it an object for them to attend. The first place in the number of these societies is held by the Instution of Civil Engineers, whose meetings are held in London every Tuesday evening during the winter. Then there is the Institution of Mechanical Engineers, also composed of men of the highest order of ability, their meetings being held annually at different towns according to appointment, that of this year to be held in Paris. The Institution of Naval Architects is another able body, holding a meeting each spring which lasts two or three days, and besides these there are a number of less pretentious societies, which are nevertheless useful and accessible to many who could not hope for an election to one of the first named.

Every paper read before one of these societies is first submitted to the council and passed by them, and having thus been pronounced of sufficient interest to be brought before the institution, it is read by the secretary and is then open to discussion by the members. When the question is one of interest, the discussion sometimes lasts over several evenings, (in the case of the Institution of Civil Engineers,) and the hall is always crowded. On occasions of special interest the most learned scientific men in the country, such as Prof. Airey, the Astronomer Royal, Prof. Forsday, etc., are often in attendance to take part in the discussion. The writer of the paper before the society is of course present and as usual in such cases has the opportunity of replying to the various remarks that have been made, at the close of the discussion. The papers are fully illustrated by drawings when required, and at the close of each year a volume of "Proceedings" is published, containing the text of the papers with the drawings and tables and a full abstract of the discussions. I suppose there is no work existing which contains such a quantity and variety of really useful matter for engineers as is contained in these annual publications. It is very difficult, however, to obtain them except through members, as it is fancied that the standard of the society is better upheld by maintaining a certain amount of exclusiveness.

These institutions are also very useful in many ways apart from their meetings. They serve as media of communication for engineers, and are of real practical benefit in this way. A foreigner, for instance, visiting England for any purpose in the scope of the profession, can obtain all the information as to the best way to accomplish his object by calling on the secretary of the institution most nearly related to his pursuit. A letter from that gentleman is an "open sesame" to almost every source of information. The rolls of these societies contain the names of many foreign engineers of eminence. I was pleased to see that Hon. W. J. McAlpine, of New York, who is at present in this country, was elected a member of the Institution of Civil Engineers at the last meeting.

There can be no doubt also that the influence of these societies is most salutary on young engineers, by in the first place showing them clearly what an engineer's profession is, what an amount of knowledge it requires and of what kind, by affording an opportunity of hearing opinions expressed and discussed by competent engineers on practical questions, from which far more is to be learned in most cases than from books, important as they may be; and further by placing before them a tangible object of ambition, for I suppose every young man entering the profession looks forward with considerable pleasure to the time when he shall be able to secure an election to one of the first-class institutions.

Something of this kind we certainly ought to have with us, but I fear it would require a deal of hard work to get it in operation, for the reason that those engineers who have knowledge and experience enough to make such an organization valuable will not give their time and attendance to it, and unless they are willing to do this it becomes but a rendezvous for men of one idea desirous of expatiating on their particular hobby. As engineering becomes more respected as a profession, and a higher grade of education becomes general among its members, we shall no doubt find the necessity for such institutions appreciated, and the want adequately supplied.

SLADE.

ODD WATCHES.

From All the Year Round.

Early watchmakers, patronizing the vegetable kingdom, adopted the forms of fruits and flowers. In the Bernal collection (a rare medley of artistic odds and ends) there was a Nuremberg watch in the shape of a pear, in parcel gilt silver. Another, shaped like a melon, was made by a Frenchman. It is only one inch and a quarter in diameter and has a key in the form of a melon-leaf. At the South Kensington Museum is a very small apple-shaped watch, about a century old, with a gold enamel case studded with seed pearls. One of the old watches of Nuremberg has the form of an acorn, and is provided with a small wheel-lock pistol, which is supposed, to have been used as an alarm. One watch, talked about by the archæologists, is in the shape of a tulip, with three crystal faces. Another having the same form, but scarcely an inch in diameter, is so constructed that the leaves or petals of the flower open a little at the bottom of the watch, disclosing a small spring which, when pressed, pushes up the lid and shows the dial face.

Mr Bernal had a watch in which the works were contained within the body of a tiny eagle; the imitative bird opened across the center and displayed a richly engraved dial plate, while the exterior was rendered classical by the story of Jupiter and Ganymede: it might either be worn suspended from the girdle by a ring or be rested on a table by means of three claws. Ducks have sometimes had a share of watchmaker's attention bestowed upon them. Witness a duck-shape watch about two inches and a half long, in the South Kensington Museum, and another in a private collection, in which the feathers of the duck are chased in silver, and the lower half when opened, exhibits a dial-face decked with jewels.

A whole class of watches were for generations known as Nuremberg eggs. One, supposed to have belonged to James I., is of a flattish egg shape, the outer case plain, the inner elaborately engraved; the face has a calendar, and wherewithal for showing the moon's age. Another, existing in a private collection, is an egg cut out of a jacinth, with the dial-face visible through the transparent jewel—a very beautiful mode of indulging in these crotchets. In the Dover Museum is a double-cased egg watch with two movable dials, one for showing the hours of the day in the usual fashion, and the other for the names and days of the month; there are also means for denoting the day of the week and the position of the sun in the zodiac; and—an oddity indeed the hands go the reverse way from those in ordinary watches, or from right to left, as if the artist's notion of time took a backward direction. In Hollar's set of four engravings of the Four Seasons, a lady is represented in the character of Summer, with an egg watch suspended from her girdle.

Surely the most dismal of all watches must have been those shaped in the form of a skull or death's head, intended doubtless, as mementoes of the fleetness of time and the brevity of man's existance. Many examples of this class are contained in various public and private collections. One of these, small in size, is of silver and has a ring at the top to suspend it from the girdle; the lower jaw of the skull opens, and there displays the dial face. Another of the doleful family, made in the seventeenth century, opens at the lower jaw to show what's o'clock, and has inscriptions on the outside. When Diana of Poictiers became mistress to Henry II. of France she was a widow, and the courtiers of the sovereign, to ingraciate themselves with the favorite, wore death's-head watches as a kind of complimentary mourning. But the most celebrated death's-head watch, once belonging to Mary Queen of Scots, was that which the royal lady gave to Mary Seaton her maid of honor, and which afterward came into the possession of Sir Thomas Dick Lauder. It is of silver gilt. The forhead of the skull bears the symbols of death, the scythe and the hour-glass, placed between a palace and a cottage to show the impartiality of the grim destroyer; at the back of the skull is Time destroying all things, and at the top of the head are scenes of the Garden of Eden and the Crucifixion. The watch is opened by reversing the skull, placing the upper part of it in the hollow of the hand, and lifting the jaw by a hinge, this part being enriched by engraved representations of the Holy Family, angels and shepherds with their flocks. The works of the watch form the brains of the skull, and are within a silver envelope, which acts as a musically toned bell, while the dial plate serves as the palate. This very curious work of art, which was made at Blois, is too large to be carried as a pocket watch.

Some of the old watchmakers were remarkably smitten with a taste for astronomy, dealing with the heavenly bodies in a way which modern watches seldom aspire to. There is an oval silver watch by Dupont, with index hands to show the hour of the day, the day of the week, the day of the month, and the age of the moon, while there are other arrangements for denoting something about the constellations; and inside the cover are a sun-dial and a compass.

Jean Baptiste Duboule, of Geneva, made a large watch which denotes the four parts of the day, the hour of the day, the day of the week, the day of the month, the name of the month, the sign of the zodiac, the age of the moon, the phase of the moon and the four seasons of the year; far too complex probably, to be really reliable as an astronomical guide, seeing that the smallest disarrangement in any little wheel would throw sun, moon and earth into awful catastrophe. More practicable was a watch made by a Polish peasant, Kuhaiesky, at Warsaw, which denoted the time at different places under different longitudes—a contrivance which we have seen imitated in a modern English watch. One of these mechanical conundrums was found among the loot of the Emperor of China's Summer palace at Pekin, when captured by the English; it was at the time of Louis XVI., and is supposed to have been presented to the Son of the Sun and Moon by that sovereign: it was a telescope enriched with pearls and enamels; but when we are told that "the object glass is formed of a watch set with pearls," we confess to being puzzled.

Some good people in past times affected the wearing of watches in ways not often adopted just now. Archbishop Parker, in a will drawn up in Latin rather less than three centuries ago, said. "I give to my reverend brother Richard, Bishop of Ely, my stick of Indian cane which hath a watch in the top of it." Several other walking stick watches are still preserved in collections of *bijouterie*; while watches in rings, are still more common. One of the Electors of Saxony used to have a watch in his saddle. The Earl of Leicester gave to Queen Elizabeth, as a New Year's gift, "one armlet or shakell of golde, all over fairly garnished with rubyes and dyamondes, haveing in the closing thereof a clock,"—that is, having a watch in the clasp. The courtly dames of those times often carried a watch suspended to a chattellaine, with keys, seals, minatures, brologues, etc. Cruciform watches were much coveted by pious persons, who reverenced the symbolism embodied in them. One such, about two centuries old, is called a *montre d'Abbesse*, and is supposed to have been made for the lady superior of a religious house; its surface bears numerous scriptural designs in relief. Another, however which was in the Bernal collection, had quite as much heathenism as scripturalism about it: seeing that it was engraved with figures of Diana and Endymion. Once now and then ladies wore watches in the form of a book the cover being pierced to show the hours on the dial.

All sorts of ingenuity were exercised in selecting the materials, forms, and arrangements of watches. They were as is well known, brought into use as substitutes for the hour-glass which was wont to be carried by professors, judges, and other persons who required easy means of determining the