

highly novel original patents of Mr. Ottmar Mergenthaler, though many valuable practical features, embraced in other inventions, are now embodied in it. The principal factory of the Company is in Brooklyn, and is a large fire-proof structure containing a great amount of very valuable machinery and tools, specially invented and designed to make the various parts of the machine with precision and economy. The general offices of the Company are in the Tribune building, New York, Mr. Philip T. Dodge being the President and general manager, and Mr. Frederick J. Warburton, Secretary and Treasurer. Mr. W. H. Randall is the Superintendent of the Brooklyn factory.

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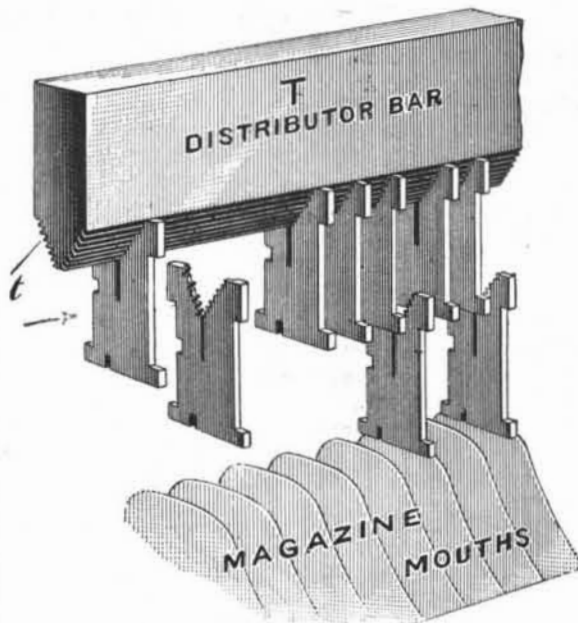
Medicine as Practiced by the Lower Animals.*

It would seem as if man were surrounded by danger, seen and unseen, throughout his entire life. From the cradle to the grave it is a struggle. In the vegetable kingdom also the same struggle for existence is seen. Every flower has its destroying insect; for every shrub there is a worm, and for the ripening watermelon the little colored boy lies in wait. But if disease threatens man on every hand, equally close at hand is the remedy with healing power, and not only do the so-called inferior human races appear to recognize this, but even dumb animals, and it would seem as if the latter, in an empirical way of course, practiced medicine.

Animals instinctively choose such food as is best suited to them, and to a certain extent the human race also shows this instinct, and medical men are sometimes at fault in not paying sufficient respect to the likes and dislikes of their patients. Women, as a rule, are more often hungry than men, and they do not like the same kinds of food; nevertheless, men and women are generally put on precisely the same regimen, especially in public institutions. Infants scarcely weaned are given a diet suitable to adults, which they dislike, and which disagrees with them. Some years ago De-launay investigated this question in the different asylums of Paris, and ascertained that children, although they will generally eat it, do not like meat before they are about five years of age. People who like salt, vinegar, etc., may generally be allowed to satisfy their tastes, within moderation. Lorain always taught that, with regard to food, people's likings are the best guide.

A large number of animals, such as elephants, stags, birds, and ants, wash themselves and bathe. Launay lays down as a general rule that there is not a species of animals which voluntarily runs the risk of inhaling emanations arising from their own excrement. If we turn to the question of reproduction, we find that all mammals suckle their young, keep them clean, wean

has a wounded leg or arm hanging on, it completes the amputation by means of its teeth. A dog on being stung in the muzzle by a viper was observed to plunge its head repeatedly for several days into running water. The animal eventually recovered. A sporting dog was run over by a carriage. During three weeks in winter it remained lying in a brook, where its food was taken to it; the animal recovered. A terrier dog hurt its right eye; it remained lying under a counter, avoiding light and heat, although habitually it kept close to the fire. It adopted a general treatment, rest and low diet. The local treatment consisted in licking the upper surface of the paw, which it applied to the wound.



THE LINOTYPE-DISTRIBUTION.

ed eye, again licking the paw when it became dry. Cats also, when hurt, treat themselves by this simple method of applying continuous irrigation.

Four Different Lights from Molecular Vibration.

Mr. Nikola Tesla has demonstrated that the phenomenon of light is producible in four different ways by the action of high frequency electricity upon suitable media. One of these methods is the incandescence of a solid, consisting of a small carbon button mounted upon a platinum wire in an exhausted bulb. When Mr. Tesla connected his body with one of the terminals of a high-tension transformer, and took an arrangement of this kind in his hand, the button became luminous. Next he took a highly exhausted bulb, containing a strongly phosphorescent body, above which was mounted a small plate of aluminum on a platinum wire leading to the outside; and the currents flowing through his body excited intense phosphorescence in the bulb. Thirdly he took in his hand a simple exhausted tube, and in the same manner the gas inside the tube was rendered highly incandescent or phosphorescent. Finally, he took in his hand a metallic wire, which appeared covered with a luminous film through the intensity of the electrical vibration. Mr. Tesla is now engaged upon the problem of producing these effects with less expenditure of energy than was employed in the operation as first arranged by him. Either method of converting molecular bombardment into light without heat, provided that it could be done economically, would be a considerable step forward in the direction where "the light of the future" is supposed to await its fortunate discoverer.

HISTORIC EXHIBIT OF THE WALTHAM WATCH COMPANY AT THE WORLD'S COLUMBIAN EXPOSITION, AT CHICAGO.

The Waltham Watch Company displayed over six hundred historical and antique watches at the World's Columbian Exposition, illustrating the various types

of watches and movements extending over a period from 1610 to the present time. Many makers famous in the development of the watch were represented in the collection.

The most primitive timepiece was the sun dial. This is of solid silver and was made by Le Maire, of Paris, before the year 1700. The workmanship is very perfect, and the dial is elaborately engraved and in good condition to-day. On the base is a small compass, and on the face and elsewhere are the names of Paris, Rouen, Marseilles and other cities, with the declination of each. The arm is marked with the declinations, so that the proper angle for the dial face to rest against this arm can readily be made. The instrument is so made that it can be folded up and carried in the pocket. It was brought to this country by a Frenchman who went to Oregon to live. On his decease, among his effects was this sun dial. Recently it came into the possession of Mr. H. E. Duncan, of the Waltham Watch Company.

The skull watch is a gruesome timepiece, made at a time when the skill of the watchmaker was exerted more to make a striking-looking case than an accurate time-keeping watch. This case is of silver, oxidized by age. In order to tell the time, the lower jaw of the skull is dropped to expose the dial. The movement which occupied the skull cavity is lost. The dial contains Roman numerals and is delicately engraved. This watch was made soon after the year 1600, but its maker is unknown. The feature of the engraving on the dial is a picture of the day of judgment.

The watch used by the poet Milton is shown in one of the engravings. This is an instance of a case within a case, the watch proper being inclosed in an outer case. This is what is called the Nuremberg or egg-shaped watch. The watch proper is readily removed from the outside case, which is made of silver. A raised point is placed against each hour on the dial, and this, together with a heavy hand, made it easy for the poet to tell the time approximately by the sense of touch. On the back of the inner case is the name of John Milton. The movement has no hairspring, but has the fusee with string, which in this case is a piece of catgut. The movement bears striking evidence of a high quality of workmanship upon the part of its maker, Bouguet, of London. The watch was made about the year 1600.

John Bunyan's watch was made some years later than Milton's watch, and bears the name of Fitter, London. This watch has a second hand placed on the back of the movement, instead of on the dial. The dial is of silver and the entire watch is inclosed in a leather case ornamented with silver. On the back of the watch the following calendar is engraved:

Mar.	Nov.	1	8	15	22	29
Augus.		2	9	16	23	30
May	Jan.	3	10	17	24	31
Octob.		4	11	18	25	
Apr.	Jul.	5	12	19	26	
Sep.	Dec.	6	13	20	27	
Jun.	Feb.	7	14	21	28	

The watch is very elaborately engraved. The move-



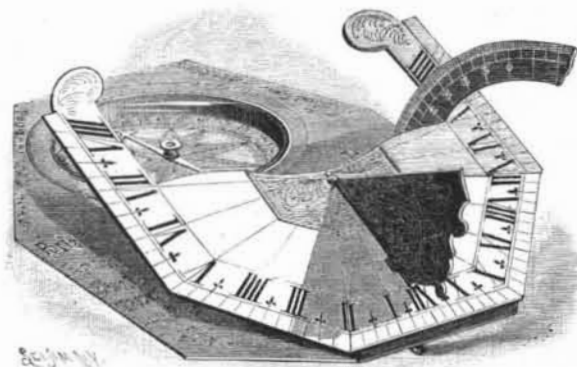
OLD TIMEPIECE OF JOHN BUNYAN.

them at the proper time, and educate them—maternal instincts which are frequently wanting or rudimentary in women even of civilized nations. In fact, man may often take a lesson in hygiene from the lower animals. Animals get rid of their parasites by using dust, mud, clay, etc. Those suffering from fever restrict their diet, keep quiet, seek darkness and airy places, drink water and sometimes even plunge into it. When a dog has lost its appetite, it eats that species of grass known as dog's grass (*chiendent*), which acts as an emetic and purgative. Cats also eat grass. Sheep and cows, when ill, seek out certain herbs. When dogs are constipated they eat fatty substances, such as oil and butter, with avidity. The same instinct is observed among horses. An animal suffering from chronic rheumatism always keeps as far as possible in the sun. The warrior ants have regularly organized ambulances. Latreille cut the antennæ of an ant, and other ants came and covered the wounded part with a transparent fluid secreted from their mouth. If a chimpanzee be wounded, it stops the bleeding by placing its hand on the wound or dressing it with leaves and grass. When an animal

* By Dr. R. E. Anderson, Rockville, Maryland, in the *Mass. Medical Journal*.



SIR ISAAC NEWTON'S WATCH.



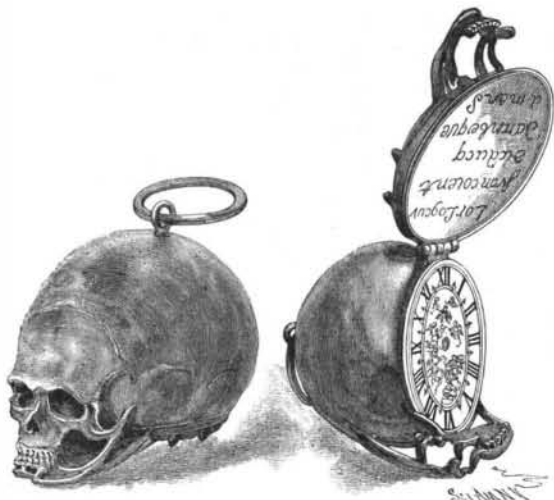
ANCIENT POCKET SUN DIAL.

ment is of the same style as the Milton watch, but is more elaborate in its workmanship.

It was evident that only the latest achievements of the watchmaker's art would satisfy Sir Isaac Newton, for his watch, which is shown on this page, is an elaborate mechanism. It was made by Girod, of Paris, in the seventeenth century, and is an astronomical watch inclosed in a shell enameled case. On the face are three dials. One is an hour dial, underneath one section of which is a little disk which tells whether it is day or night, the day being designated by the sun and rays of light and the night by the stars and moon. The dial is $\frac{5}{8}$ of an inch in diameter. The calendar dial has thirty-one gradations, one for each day in the month, and near by is a little aperture in which the name of the month is shown, with the number of days in the month. As the watch lay in the showcase, but not running, this little recorder indicated "Aug. 31." The third dial represents the lunar month and is graduated for $29\frac{1}{2}$ days. A little aperture near this dial shows the changes in the moon. The entire face of the watch is gold, while the dials are silver. The case is also of silver. The outer case is of enamel and shell, the pieces of shell being riveted by silver rivets

arranged in an artistic manner. On the back of this outer case is an enameled painting representing Paris taking leave of Helen. The movement in this watch is of the same type as the Milton and Bunyan watches.

In order to show what can be done in the line of handwork in these modern days, the Waltham Company exhibited a watch in a case of quartz crystal, from Brazil, ground, polished, and all the work upon it was done at the works of this company at Waltham,



THE SKULL WATCH.

an American workman being employed about two years and a half in completing the work. The lower plate is a thin sheet of agate, and as the only metal in the movement comprises the wheels and springs, the full richness of the agate is had by holding the watch to the light and looking through it. The effect is fascinating. The jewels are rubies set in recesses ground on a taper in the crystal case. The minute circle on the dial is marked with a ruby at each interval, and at every five minute period is a sapphire, while the figures and other ornamental work on the face are outlined in gold, and attached to the agate plate, giving a richly colored dial. This watch is a stem winder, the movement first quality grade, the latest achievement in American watchmaking.

The automatic machinery for making different parts of the watch movement exhibited by the Waltham Company attracted much attention. It is a fact not generally understood that one operative, with a set of this machinery, can do as much work as twenty operatives could do with the best appliances that were used in watchmaking at the time of the Centennial in 1876. The antique watches described in this article were none of them made with much less than a year's steady work by the watchmaker, while infinitely superior watches, so far as time-keeping is concerned, were shown in this exhibit that were made at the rate of about two thousand a day.

The Waltham Company had among its exhibits at the Columbian Exposition a case containing one day's output of the factory, consisting of 2,000 perfect movements, well regulated and in good running order. It

wheel embraced by the thumb and finger of the operator. The connection between the mandrel and the pulley was so delicate that when the watch was wound, the mandrel stopped. It was held by the thumb and finger of the operator while the movement was removed and another one placed in position for winding, when the frictional wheel was released and the watch wound within the space of a second.

In addition to the display of historic and recent timepieces, this company exhibited a piece of mechanism which shows that notwithstanding the improvements in watchmaking which materially modify the practice of modern jewelers and watchmakers, skillful mechanics are not wanting among them.

The exhibit to which we refer was a minute steam engine, made by Mr. A. Muller and loaned to the Waltham Watch Company. It is of the exact size of the annexed engraving, complete with boiler and governor; well proportioned and made in the same way as larger engines. This is probably the smallest power plant in existence, and yet it doubtless develops much more power than is needed to run a watch.

The Otis Elevator in Scotland.

Between Finnieston and Govan, says *Engineering*, two tunnels have been laid under the Clyde, side by side, one for vehicular traffic going north and the other for that going south. Above these two, and over the point of junction, there is a third tunnel for foot passengers. At either end of these tunnels, and close to the riverside, vertical shafts have been constructed, each 80 feet in diameter. In each of these shafts there are to be six powerful lifts, designed to lower and lift the largest vans, lorries, etc., with their horses, just as they are. On being lowered to the bottom, they will go, as on a road, through the tunnels, and be raised at the opposite end. The lifts will work at a good speed, and will thus be enabled to handle a very large traffic.

The contract for the lifts was given to the American Elevator Company, of Mansion House Buildings, 4 Queen Victoria Street, which has since become the Otis Elevator Company, Limited; the contract is being carried out by both companies conjointly.

The tunnels are practically completed, and the shafts are nearly so; the fixing of the lifts will shortly commence. The machinery has been constructed by Messrs. Otis Brothers & Co., of New York, and has been specially designed by Mr. Thomas E. Brown, Jr., who designed the

two elevators fixed in the Eiffel Tower in Paris, and also the very large elevators used in connection with the North Hudson Railway Company, near New York. The machinery has been completed and the safety fixtures tested; the results of the test are given in the following report by Mr. Brown:

"On September 21 we made a test at Yonkers of the safety devices for the Glasgow Harbor tunnel. For this purpose we used the testing frame got up for similar tests of safeties for the Weehawken elevators and Catskill Mountain incline. This frame is a heavily timbered gallows frame about 20 feet high, in which is suspended a temporary cage, arranged to be dropped by the pulling of a trigger. This cage was loaded with 30,221 lb. of cast iron, and the cage, with its attachments and safeties, weighed 1,630 lb., making a total of 31,851 lb.

"Two light cords were attached, one to each safety dog, in a manner to represent the action

of the governor rope, and so that while possessing strength enough to pull in the dogs, they would immediately afterward break. These cords were left slack enough to allow the cage to drop freely about 13 inches. When tested, the cage dropped a total distance of 2 feet 10 inches, at which point it came to rest. The north side of the cage fell freely 1 foot 1 1/4 inches, and was stopped in a further distance of 1 foot 8 3/4 inches; the south side fell freely 1 foot 1 1/4 inches, and was stopped in the further distance of 1 foot 8 3/4 inches; or making an average free drop of 1 foot 1 1/2 inches and an average stop of 1 foot 8 3/4

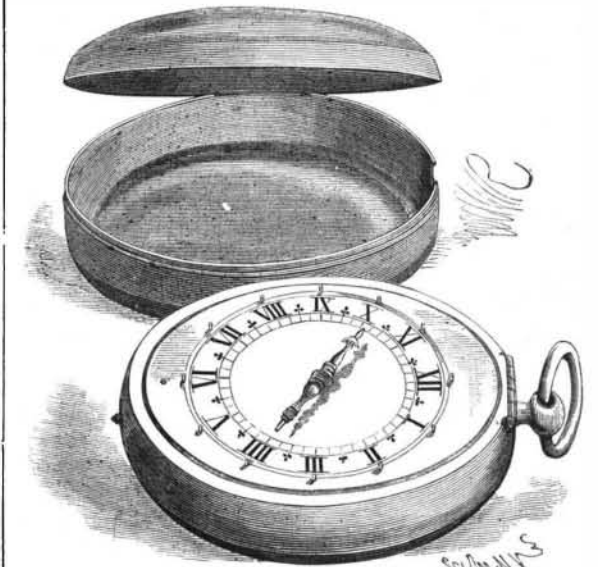
inches; total run, 2 feet 10 inches. From this it is evident that at the moment of the safety going into action the cage was traveling at the rate of about 8 1/4 feet per second.

"The work done by the falling cage was 31,851 lb. multiplied by 2.833 feet, equal to 90,234 foot pounds, which, divided by the length of stop (1.708 feet), gave a resistance for the pair of safeties of 52,830 pounds, or 26,415 pounds each.

"The safeties brought the load to rest without the slightest shock, the foreman in charge of test being upon the gallows frame when the weight fell, and reporting that he felt no jar or vibration."

The Earthquake of November 27, 1893.

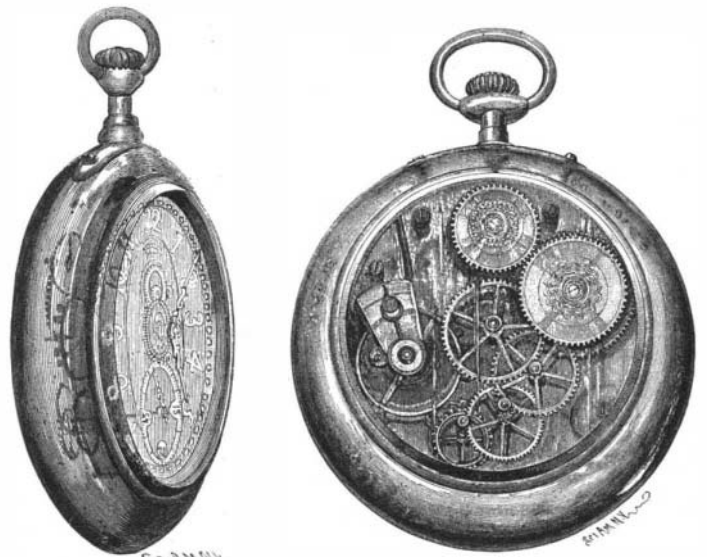
It is unusual for this portion of the country to be disturbed by shocks of earthquake, and we feel that the one of November 27 is worthy of more than passing mention. It was felt throughout northern New England and eastern Canada and was noted as far south as Taunton and Palmer, Massachusetts. The time of



JOHN MILTON'S WATCH.

occurrence varies from 11:42 a. m. at West Milan, N. H., to 12 noon at Taunton, Mass. The center of the disturbance was probably not far from the city of Quebec, as the greatest energy was developed in that vicinity. This would appear to confirm the theory that there is a region extending from fifty to one hundred miles northeast of Quebec in which an almost extinct volcano is slowly expiring, occasionally making known its existence by some such disturbance. Some years ago an earthquake in that region was so closely localized as to leave little doubt that its center was in that vicinity.

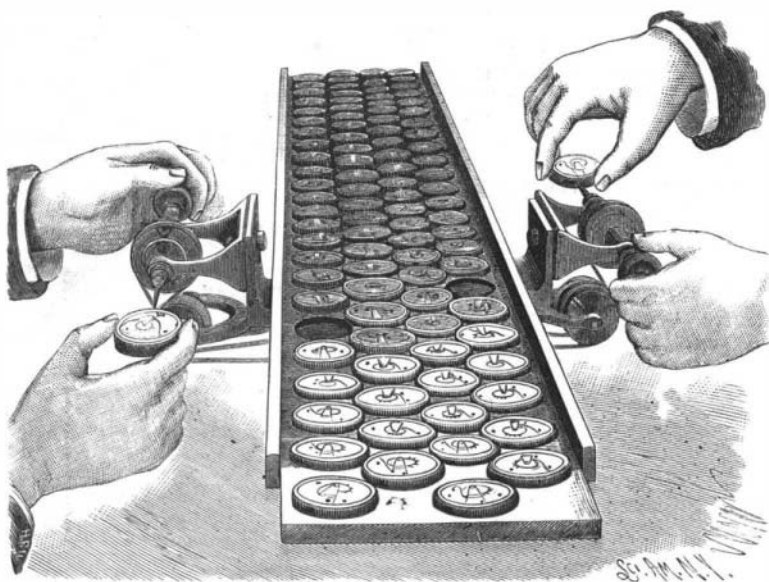
In the shock of November 27 last it is very difficult to determine the probable motion of the earth, as many widely different opinions are expressed. The majority, however, report an east to west movement or *vice versa*. Some report that the shock was accompanied by a "loud, rumbling sound," while others state that the tremor was almost imperceptible. At Malone, in north-eastern New York, the shock was like "two successive blasts of dynamite," and in other northern points similar effects were produced. In some cases panics were narrowly averted and many persons rushed into the streets, fearing the buildings would be thrown down. The duration of the vibration varied from three sec-



WATCH MADE OF ROCK CRYSTAL.

onds to one minute, with an average of about fifteen seconds.—*Bulletin N. E. Weather Service.*

NATURALISTS asserts that a healthy swallow will devour 6,000 flies every day.



METHOD OF WINDING 2000 WATCHES.

became a serious question as to how to keep this large number of movements in motion, as the winding of 2,000 watches per day is no small matter. The ingenious mechanics of the company therefore devised a winding machine by means of which two watches could be wound at once by two expert operators, each operator winding at the rate of 62 watches per minute.

As shown in the engraving, a tray containing about 100 movements was placed upon a standard between the operators, and each removed a movement and placed the winding stem in the chuck at the end of the revolving mandrel. The mandrel was carried by frictional connection with a power-driven pulley, and the back end of the mandrel was provided with a friction