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NEW AMERICAN CLOCKS.

IN connection with this interesting subject, it is our intention to present some new facts which, we conceive, will be of benefit to our country if acted upon with an enterprising spirit. As an introduction having a bearing upon this topic, it will be quite appropriate to our arrangement to give a brief history of some of the most wonderful clocks.

The remote ancients were unacquainted with clocks; their only means of keeping a record of daily time was by sun-dials and hour-glasses. The first clocks of which we have anything like an authentic account were moved by drops of falling water, and were known to the Greeks in the days of Demosthenes. The Arabs—now so degenerate—were at one period the most learned and skillful people in the world; and, as far back as the ninth century, it is recorded that the famous Caliph Haroun al Rashid—the hero of the "Arabian Nights' Entertainments"—sent to Charlemagne, the conqueror of Western Europe, a water-clock which astonished all France. It was so constructed that; whenever it struck the hour of 12, a number of small figures rode out on horse-back and paraded around the dial-plate, then entered their tents. When the art of clock-making was introduced and first practiced in Europe is not very clear; but the most extraordinary clock ever made is the one now in the Strasburgh Cathedral, manufactured in the 14th century. It is furnished with a celestial globe that exhibits the motion of the moon, earth and the planets; and it has a perpetual almanac, on which the days of the month are pointed out by a figure. The first quarter of each hour is also struck by the figure of a child with an apple, the second by a youth with an arrow, the third by a man with the tip of his staff, and the last by an old man with a crutch; and the full hour is then struck by a figure representing an angel, which opens a door and salutes the Virgin Mary. Near the first angel stands a second, which holds an hour-glass that is turned in its hand as soon as the hour ceases striking. In addition to these figures and movements, there is a golden cock, which, on the arrival of every successive hour, claps his wings, stretches forth his neck, and crows twice.

American mechanics early exhibited great skill and ingenuity in clock-making. Long prior to the Revolution, the very distinguished David Rittenhouse, of Philadelphia, constructed an astronomical clock that exhibited several of the motions of the heavenly bodies; and it gained for him the highest consideration, both at home and abroad. It was presented to the college at Princeton, N. J., and for many years it was an object of wonder and admiration. The British army when they invaded that seat of learning—to their credit be it spoken—sacredly protected this contribution of American ingenuity, as was also the case with the Patent Office in Washington. It has long since ceased to perform its regular avocations, but its fame belongs to the history of our country, and will be perpetuated.

The colony of Connecticut early became somewhat noted for its steady, clock-going habits; and let it not be forgotten that John Fitch, the inventor of steamboats, was, by trade, a clock-maker. So well has Connecticut improved upon her early propensities that it may be justly asserted that no equal space on the globe produces so large a number of clocks at the present day; and here is the point to which we wish to divert from the historical to the commercial and mechanical views of the question.

Nearly all the clocks manufactured in this country are of a very common character, and there has not been a new principle of action added to them in a hundred years. A number of improvements have been made in several of their parts; but no very original mode of action has been applied. Besides this, most of our American parlor-clocks are what may be styled "common;" almost all the superior fancy qualities are still imported from France. We surpass the English in making clocks, but the French surpass us in beauty of design, if not in accuracy of workmanship. The London *Mechanics' Magazine* states that, during the year 1859, nearly a quarter of a million of clocks were imported from France into England. Now, if our clock-makers made more beautiful and cheaper clocks than the French, we should have all this trade in our own hands, and this would amount to a vast sum annually. Can we not do it? There is nothing new in the arrangement of the parts of a French clock; the Parisian makers have long sought for some original mode of action whereby they might be able to produce more new designs and introduce a greater variety; but they have always failed. But what has not been accomplished in France has recently been achieved in New York. Three small and neat mantel clocks have been exhibited for some time at the office of the Cooper Institute, having a principle of operation different from any that we have ever heard of, or seen. The common mantel clock is operated by the tension of an unwinding steel spring, like that of a watch; other clocks are operated by gravity in the form of a descending weight, the gradual fall of which is regulated by a pendulum. The new American clock (which is the invention of James Tuerlingx, of this city) has no operating spring, cord, pulley or pendulum. In the center of a common mantel clock vase, there is a vertical fixed steel screw extending from top to bottom. Over this is slipped a round weight with a hole in its center, but no thread cut on it. On the upper surface of this weight is a small roller, set on edge, and placed at such an angle that it takes into the thread of the screw, and the weight thus descends, revolving slowly around the screw rod, like a nut moving round by its own weight—a principle of mechanism which we have never seen carried out before in any machine. This is its principle of action; the revolving weight descends in a circuit of its own diameter. Two guide rods are attached to the descending weight, on the feet of which is the large wheel that is regulated by the escapement. It has only one wheel to connect it with the escapement and regulator, which are otherwise similar to those of a compensation chronometer. On the top of the guide rods, the motions are given to the hands of three dials by a train of gears. The length of time in which a clock is kept moving is regulated by the length of the screw, which is 14 inches for an eight-day clock, having 14 threads to the inch. We have thought that, from the very novel mode of operation embraced in these clocks, they are eminently adapted to take the place of those fancy clocks which are so extensively imported; they have attracted much attention from those who are curious in ingenious mechanism, and they may lead to the introduction of an entirely new class of American clocks.

OUR FRIENDS.—The friends of the SCIENTIFIC AMERICAN throughout the whole country have, as the politicians would say, "nobly rallied to our standard," and we take this occasion to extend to them, one and all, our warmest thanks. There are many little incidents connected with the renewal of subscriptions, which are exceedingly pleasant to us; and but for want of space, we should like to publish them. We cannot, however, forbear to mention the fact that the city of Louisville (Ky.) continues to bear off the palm; for some years past, our friends—the Messrs. Skene, of that city—have regularly obtained for us over one hundred subscribers. One appreciative subscriber—John May, residing in Yazoo City, Miss.—has just renewed his subscription, and *paid in advance for twelve years and a half!* In short, from all sections we are receiving satisfactory evidence of the value and popularity of the SCIENTIFIC AMERICAN. We hope our friends will not relax the canvass; but carry it on with enthusiasm and vigor.

ATMOSPHERIC ELECTRICITY.

The Newark *Mercury* having published a correspondence which recently took place between Seth Boyden, Esq., and the editors of this journal, in regard to certain electrical phenomena, we are induced to devote some more particular attention to the subject, with the hope of preventing the adoption or continuance of many erroneous notions in relation to it.

And, first, we entirely dissent from Mr. Boyden's theory that, in thunder-storms, the lightning never descends from the clouds to the earth, but always passes upwards from the earth to the clouds. This is contrary to the generally-received opinion, and contrary, we believe, to the unmistakable evidence of our own senses. It is true that, in most cases, the velocity of an electrical discharge is such that it is difficult, and perhaps impossible, for the eye to determine with certainty whether it is passing in the one or in the other direction; still, in some instances that difficulty does not exist. It may be that the electrical discharge is not always downwards, but, certainly, it is not always in the contrary direction. At all events, when it is impossible to say that the lightning passes downwards, it is equally impossible to say, from observation, that it passes upwards; and where a theory of this kind is sought to be established, the burden of proof is upon the theorist.

But this theory is not only disproved by common observation, but also by the deductions of science. This subject is pretty fully discussed in an article found in the Patent Office Report for the year 1859, from the pen of Professor Henry, of the Smithsonian Institute—a name which is foremost among the men of science in this or any other country, especially upon this particular subject. Professor Henry adopts the theory of Peltier, which is that the electrical phenomena of the atmosphere are entirely due to the induction of the earth, the electricity of which is constantly negative. Now it is true that the terms positive and negative are, to some extent, arbitrary and conventional, and most of the electrical phenomena can be equally well explained upon the theory of two kinds of electricity—the vitrious and the resinous; still, the scientific world has generally fallen back upon the idea of Franklin, that all the phenomena can be best explained upon the theory of one single fluid, which, when in excess or in deficiency, operates like heat and cold in producing their different effects.

Now a thunder cloud, saturated with moisture, is a tolerably good conductor of electricity, and when suspended over the earth, which is in a state of negative electricity, the lower portion of the cloud will become positive and the upper negative, in accordance with the well-known laws of induction. We might, therefore, expect that, in all cases, the discharge would be downwards.

The terms "positive" and "negative" are merely relative, like those of heat and cold; as there is no body, however cold, which is entirely destitute of heat, and which is not a warm body as compared with one which is still colder; so there is no body, how strong soever its degree of negative electricity, which is entirely destitute of that fluid, and which is not positively electrical when brought nearly in contact with another body still more negative. It follows from this that, although the earth is negatively electrical, it will be positive in regard to a cloud which, from any cause, may have become still more highly negative. Whether such a phenomenon may not sometimes present itself, we are not prepared to say; and, therefore, cannot deny that discharges may sometimes take place from the earth to the clouds. But we are fully of the opinion that the discharges are generally made in the opposite direction.

But why, if the electricity of the clouds is positive, does it not all pass to the earth in the course of a few minutes upon the rain-drops which sometimes fall so plentifully, or by means of the powerful discharges which often follow each other in such quick succession? Doubtless such would be the case were there not some means of replenishing the supply. But in all thunder storms, causes are constantly at work which develope electricity more rapidly than it can be carried down to the earth upon the falling drops. It, therefore, accumulates in the clouds until the mutual attraction between it and the negatively electrified earth causes it to burst its way through the intervening atmosphere, which