

THE GATHERER :

AN ILLUSTRATED RECORD OF INVENTION, DISCOVERY, LITERATURE, AND SCIENCE.

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Photographing the Walk.



FIG. 1.

The instantaneous photograph is now a recognised aid in science and art for the study of animal, vegetable, and even mineral motions. The unassisted eye is unable to follow the different phases of rapid translation—for example, the track of a lightning flash, the beating of a bird's wings in flight, the movements of a horse's legs in running, the whirling of leaves, or the splashing of water. The instantaneous photograph has

already enabled us to discover among other things that the conventional zig-zag flash of lightning does not exist, and therefore it is already disappearing from works of art. Moreover, it appears that artists hitherto have been misled by the eye in drawing running horses; the positions of the legs as often represented by them are, in fact, impossible. Science has come to the help of art, and it would be foolish for an artist to disdain her teachings if only for this reason, that when the spectator of a work of art is sufficiently educated to detect a fault in it contrary to Nature, his pleasure in the work is marred, and in some cases destroyed. Mr. Ruskin has inveighed against the cultivation of science by artists, as if it would prove their ruin; but it seems to us that he is only in part right. It is possible for an artist to become so steeped in science as to grovel and thus lose his artistic sense of the beautiful; but, on the other hand, a regard for science by correcting

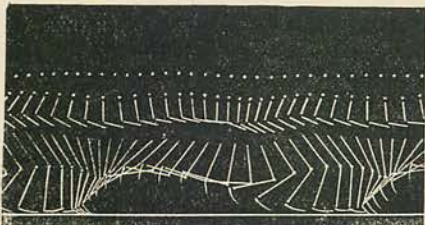


FIG. 2.—A RUNNER.

his imagination and judgment will keep him true to Nature, and prevent him from blemishing his work with errors. The proper course, as usual, seems to lie in the golden mean. As the world gets more scientific the necessity for truth to Nature will become more incumbent on the artist who desires his works to last. In portraying the human walk by a stride with both feet on the ground, the artist has not erred, because at the beginning and end of both steps the feet rest on the ground for a time long enough to leave a distinct impression on the eye. When one foot swings past the other we do not get so distinct an impression, and moreover, if this moment were chosen by the artist, and the act faithfully rendered, the person—as first shown by the brothers Weber in 1836—would seem to stumble over his own feet. Of late, M. Dumeny, a disciple of M. Marey, the well-known photographer of animal movements, has been making a complete study of the movements of a man in walking, by means of small incandescent lamps attached to his dress, which was tight and of black cloth, as shown in Fig. 1. By photographing these lamps as the man walked or ran against a dark background, the various positions of the body and limbs were observed. Fig. 2 shows the successive images

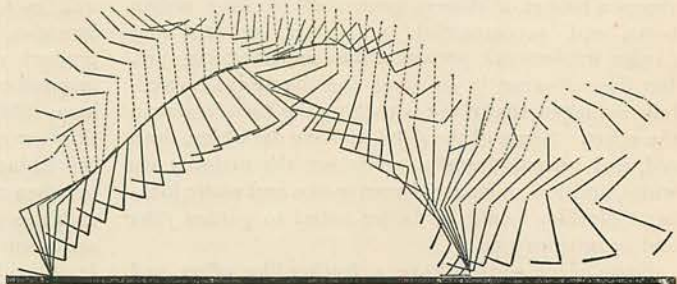


FIG. 3.—THE HIGH JUMP.

obtained in this way from a runner; the white dots and lines indicating the attitudes of his chief members. Fig. 3 is the analysis of a running high jump, obtained on a fixed plate by means of twenty-five images in a second. The diagram is somewhat eccentric, not to say demoniac, and reminds us of the *dissecta membra* of Mr. Maskelyne's living skeleton in the dark *séance*; but it is possible to make something of it. Obviously the skeleton gymnast is preparing to leap on the right, and from the manner in which his spider limbs are drawn up at the middle, he is probably clearing the bar. The curve of descent is plainly visible on the other side, although the arms have certainly taken a peculiar turn. This nice "derangement of photographs" would probably surprise a professional



A NEW CART.—FIG. 1.

jumper, who cannot be expected to realise the absurd figure which he cuts in the air; but, of course, the zoëtropé by combining the several views would harmonise the whole.

A New Cart.

In the cart or van devised by Sergeant-Major Pepper, each wheel is slung between two springs and runs on a short iron arm attached to the springs, which are shackled to projections on the sides of the vehicle as shown in Fig 1. This arrangement allows the floor of the vehicle to come close to the ground,

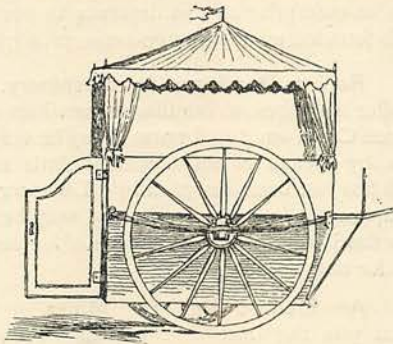


FIG. 2.

a special advantage in tradesmen's carts as well as carriages for ladies, invalids, or children. The vans are fitted up for the use of different trades, and the inventor has also devised some new kinds of vehicles, one of which is illustrated in Fig. 2.

A Magnetic Tack Driver.

A new tack driver, called the "Eureka," has recently been patented, which seems very likely to be useful with tin tacks. This simple apparatus consists of a plunger which is drawn inside a brass sheath by means of a light wire spring. In use, the sheath is pulled towards the handle of the plunger, while the

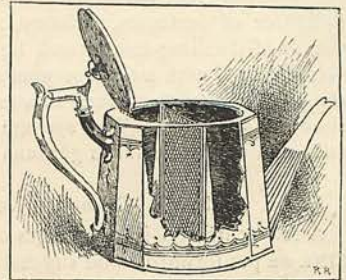
head of the latter, which is magnetised, is allowed to take up the tack for use. The sheath being then released covers the point of the tack, and all that is necessary to do is, to place the end of the sheath over the spot where the tack is required, and give a sharp blow to the handle. A little extractor is supplied with the instrument for taking out any tacks which may be wrongly placed.

A Shoal Water Tell-tale.

Obviously a sounding apparatus which would tell the captain of a vessel when he had reached a certain depth of shoal water would be of great service, and it is satisfactory to learn that such an apparatus is now in use. It consists of a sounding lead, which is submerged to the depth required and dragged by the vessel as she goes on. To keep the lead-line at a constant inclination to the bottom, an arrangement like a kite is employed, the kite sailing against the water at a certain angle, and when the lead strikes the bottom the alarm is given by the sudden slackening of the lead-line actuating a bell on board. In approaching land this device cannot fail to be useful, since it can be set to any depth.

A New Tea-pot.

In ordinary tea-pots the straining of the leaves is done at the last moment and through a small area of holes; but in the tea-pot which we illustrate the interior is divided into two compartments by a perforated sliding partition, and the leaves are placed behind it so that in the compartment next the spout there is a clear infusion



ready to pour out. The strainer has thus a large surface, and the holes being finer than ordinary arrest the small broken tea or dust. The pot is made of various designs to suit the wants of different classes. It is cleaned by withdrawing the slide and holding it under the water tap.

The Great Falls of Labrador.

Two American travellers, Messrs. Bryant and Kenaston, have recently found a magnificent cataract on the Hamilton River in Labrador; but the discovery turns out to have been forestalled by Mr. John Maclean, a Highlander, in the service of the Hudson Bay Company as far back as August, 1839. In 1849 Mr. Maclean published an account of the falls in his "Notes of Twenty-five Years' Service at the Hudson Bay Territory," but they have since been overlooked. While exploring the country for purposes of trade from his headquarters at Ungava—the establishment which is the foundation of Mr. Ballantyne's well-known tale—he descended the Hamilton River, and came upon the cataract. His account agrees very closely with that of the American travellers, who have really added very little that is new. A few miles above the falls the river contracts from about 500 to 100, and finally to fifty yards at the brink. After its leap or rather series of leaps amounting to about 500 feet, it continues to foam and roar through a cañon thirty miles long, the walls rising in some places to a height of 300 feet. The vapour of the cataract could be seen for many miles, and the rock vibrated under the shock of the descending water.



A Reservoir Syringe.

A garden syringe with a reservoir attached is illustrated herewith, and forms an excellent distributor of vermin-destroying fluids, as well as a plant waterer or a diffuser of perfumes, moisture, and disinfectants, in the air of dwelling-rooms and hospitals. The reservoir is closed with a tight stopper and the pump forces the liquid from the nozzle in a fine spray or a strong shower as desired. The syringe has a neat appearance and will be useful in gardens as well as homes.

A Novel Co-operative Society.

A few years ago in the pages of CASSELL'S MAGAZINE we put forward some suggestions for co-operation in various social and business schemes. These papers, written by Mr. Henry Frith, have, apparently, been instrumental in aiding several associations, notably

the Residential Club; but another and perhaps more ambitious effort is now being made with every prospect of success in Tasmania. This is a "Co-operative Timber Company, Limited," which will be entirely managed and worked by shareholders in the concern. Already the plant for saw-mills has been purchased, to fell, cut up, and convey the timber by steam-power to the mill from the acquired territory. This land is purchased from the Crown; and, when cleared, will be available for farming and grazing purposes. Meantime the value of the timber is considerable, and land is steadily rising in value. The novel feature in this enterprise is the employment of the shareholders in the business of clearing and farming. Nearly the whole of the mill-work will be done by them, and as such work is often done by gentlemen in the Colonies, it involves no loss of social status. Thus, by machinery and co-operative labour, the savings will be very great. Each shareholder will be paid not less than six shillings a day for his work, and when the working expenses have also been satisfied the balance will be available for dividends. There are no "directors"; a manager has already arrived at Port Sorell with the first contingent of shareholders, each of whom must take at least ten shares (£100), but cannot have more than thirty (£300) in the venture. The cost of living is very small; there are many healthful amusements, and the climate is perfect. Already many young gentlemen of superior standing in London have cast in their lot with the promoters, and will find very healthful as well as remunerative employment. No "drones" will be permitted to remain in the hive. Those who will not, or cannot, work, will be voted out, and will have their money returned, if required. Such an enterprise as this deserves to succeed; it seems founded upon common-sense principles.

Rolling Bandages by Machinery.

Roller bandages, so familiar to members of Ambulance Corps and to all nurses, may be very easily made by means of an ingenious little machine which has just been designed by a Leicester maker. The apparatus is very simple, and may be temporarily fixed to any table by means of a clamp supplied for that purpose.

An Electric Bell for Mines.

In coal pits the dust often deranges an ordinary electric bell, and hence in that which we illustrate the works are enclosed in a cast-iron air-tight case, C, to which the current is led by insulated wires, W. The gong, G, is supported on a metal bracket, and the hammer, H, which strikes inside it is attached to the middle of a flexible

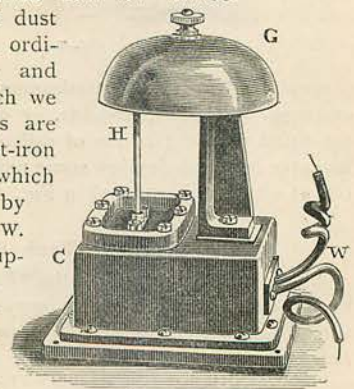


FIG. 1.

iron diaphragm which allows it to swing freely while superseding the pivots and springs of ordinary electric bells. Both single stroke and trembling bells are made

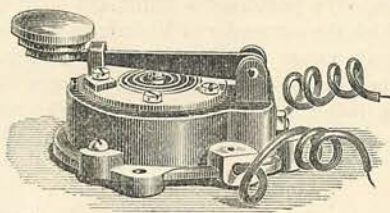


FIG. 2.

on this principle. The key for ringing these bells is shown in Fig. 2, and in it the contacts are also enclosed in an air-tight case, the stroke being communicated through a flexible diaphragm.

Assurance against Blindness.

When blindness is the result of accident, it may be said that schemes of insurance against its consequences are already at work under the operation of the various Accident Assurance Societies. But, after all, these cases bear only a very small proportion to the terrible sum total of those to whom knowledge at this one entrance is quite shut out. How often do we hear of professional and literary men, teachers and students being rendered helpless by gradual loss of sight! Yet there has hitherto been no organised system of provision against this calamity. Now we hear that Mr. J. Cuthbert Goulding is the founder of a society in which one may insure against blindness, and whose "tables" are based upon the latest authorised statistics. No doubt the actuarial calculations will present new but not insuperable problems, but the scheme is interesting as an attempt to provide otherwise than by charity against the results of a most crippling calamity.

New Heliostats.

The improved heliostat which we illustrate in Fig. 1, is made by Mr. Yeates, the well-known scientific instrument maker to the University of Dublin. It is adjustable for any latitude on either side of the Equator, and the mirror, M, which reflects the sun's rays in signalling, is unrestricted in its movements so that a ray can be flashed in any direction. Mr. Yeates also makes the new local heliostat of

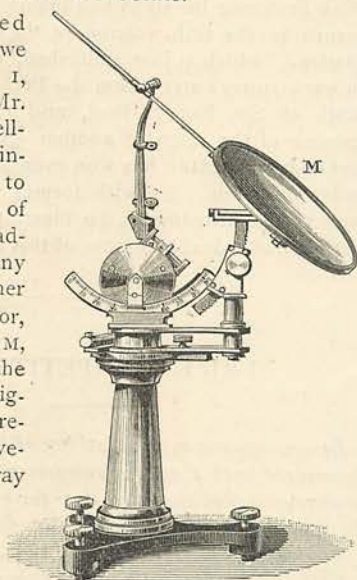


FIG. 1.

Mr. G. T. Stoney, shown in Fig. 2. It is used in the following way: Having wound up the clock and adjusted the arc, A, to the latitude, place the instrument level in the due north and south line, then turn the arm, S, towards the sun until the rays pass through the sight-hole, O, and form a bright spot in the centre of the disc, D. The mirror, M, must then be turned until the sunbeam is reflected in the direction it has to go.

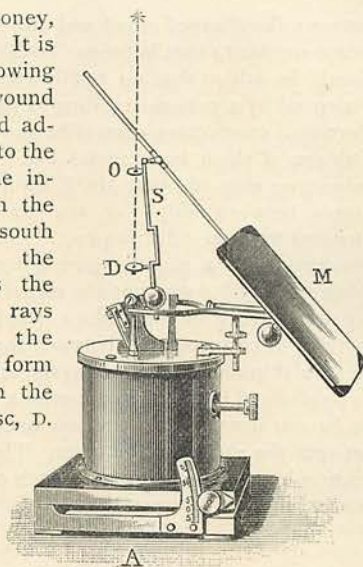


FIG. 2.

A New Mode of Electric Lighting.

In a former GATHERER we described the more important of Mr. Nikola Tesla's discoveries, but since then he has made further observations which were recently described to an extraordinary meeting of the Institution of Electrical Engineers. The currents he employs to produce the effects are obtained either from a dynamo of special construction or an induction coil through the primary circuit of which the spark from a battery of Leyden jars is passed. These currents have an enormously high "pressure," from 50,000 to over 100,000 volts, and they see-saw or change in direction 23,000 to a million or more times a second. When they are passed through a bare wire it becomes visible in the dark with a kind of violet phosphorescence; and sheets of bluish light are seen to pass from one wire to another. Vacuum bulbs placed between two wires or metal plates connected to the poles of the generator glow with a nebulous lustre, and if discs or other pieces of solid matter—such as carbon, aluminium, lime, or crystals of salts—are contained in the tubes, they become incandescent, and emit a star-like radiance in the midst of the luminous haze filling the bulb. Tubes containing phosphorescent materials when connected to one pole of the generator, become filled with phosphorescent light of the tint produced by the matter in question. Mr. Tesla explains these and other effects by supposing that the molecules of air around and between the wires are in violent agitation, thus producing the lights. The agitated air by merely beating on a solid body, such as a detached piece of metal or carbon, will heat it white hot, as in the case of the discs in the vacuum tubes. This observation helps to explain why it is that watches are sometimes fused in the pockets of the wearers during a thunderstorm, although the persons have not been injured. The lightning flash is now believed to be oscillatory like the spark from a Leyden jar or the currents of Tesla's dynamo. It follows that during a flash the air

between the charged cloud and the earth is in a condition similar to that between Tesla's conductors. It should be added that no bodily inconvenience is experienced by a person standing in the air between the electrified conductors, even if he should make contact with one of them by a metal bar. While upon this subject we may add that Mr. Edison proposes to telegraph between ships at sea by the intermittent currents from an induction coil. Each vessel is to be provided with a coil for generating the currents, a telegraph key for sending the message, and a receiving apparatus something like a telephone. A sheet of metal is to be suspended between the masts on board of each ship and connected to the telegraph key so as to be charged by the signal currents. The circuit will be formed through the water on one hand and the air between the sheets on the other. Thus two ships may telegraph news in sailing past each other without any connecting wire between them.

An Unbreakable Mug.

A new domestic mug of steel, enamelled inside, is shown in our woodcut. Being on steel the enamel



does not chip as on common enamelled iron utensils. The mug is also lighter and thinner than earthenware, and weighs only half a pound. It will not indent like pewter and, of course, is more easily cleaned than a pewter vessel. These mugs are made to hold a stand-

ard pint, and are thus capable of measuring liquids. While upon this subject we may refer to a new composite material of iron wire coated with glass, which has been introduced in Dresden. The adhesion of the glass to the metal is so perfect that it will stand severe fluctuations of temperature. It is expected to be useful in making chemical appliances and roof or pavement lights.

The Ginger-Beer Plant.

Professor H. M. Ward, of the Indian Engineering College, Cooper's Hill, has communicated an interesting paper to the Royal Society on the "ginger-beer plant" which is familiar to our cottagers. He finds it to consist mainly of a new species of yeast, to which he has given the name of *Saccharomyces pyriformis*, and also of a new bacterium which he calls *B. vermiforme*. Two other forms of life are largely associated with these, and in addition there is sometimes a variety of yeasts, moulds, and bacilli. The *S. pyriformis* is capable of fermenting cane but not milk sugar, and it develops large quantities of carbonic acid, the gas of the ginger-beer, but very little alcohol. The *B. vermiforme* is worm-like in shape, as its name implies, and forms the greater part of the jelly-like masses of the ginger-beer plant.

Lead Pipes and Insects.

Mr. W. E. Selleck, of Chicago, has called attention to the fact that certain insects are able to bore holes in lead pipes. He possesses a bullet cut from the tree under which the surrender of Vicksburg was arranged by Generals Grant and Pemberton, which has been pierced in several places by these borers. In fact, when the bullet was cut out of the bark one of the insects was found in it.

Under Two Queens.

Two new volumes are before us for notice this month, dealing with widely differing periods of English history. The first is Professor Beesly's "Queen Elizabeth," in the "Twelve English Statesmen" series, published by Messrs. Macmillan & Co. In his opening chapter the author gives us a character sketch of the Queen that is almost epigrammatic in its point. "With Elizabeth," he says, "the heart never really spoke, and if the senses did, she had them under perfect control. And this was why she never loved or was loved, and never has been or will be regarded with enthusiasm by either man or woman." But for all that she earned the title "Good Queen Bess," through a long reign which opened with England Roman Catholic, and closed with its Protestantism firmly established, and which was fuller than most periods of equal length of plots and cabals against the person of the sovereign. "Few rulers," says Professor Beesly, in summing up his admirable little monologue "have had to contend with such formidable and complicated difficulties as the English Queen. Few have surmounted them so triumphantly." This work is one of the brightest and most readable of the whole series, though in brilliancy it may have been surpassed by one or two of its predecessors. If it stood alone it would be worthy of high praise; we cannot give it higher than to say it is worthy of the company in which it stands. With Professor Beesly's book before us it is interesting to turn to the fifth volume of "Cassell's History of England," which is just published, and which carries on our country's story from the Peninsular War to the death of Sir Robert Peel, and thus includes the opening of the reign of another Queen, under whose sovereignty England has won even nobler laurels than under Elizabeth. As with former volumes, we must draw special attention to the illustrations, which are a distinct and valuable feature of this history.

PRIZE COMPETITIONS.

In consequence of the clashing of the date previously announced with Easter arrangements, the Editor begs to announce that the latest date for receiving MSS. in the Household Management Competition is extended from April 15th to April 20th, 1892.

Full particulars of this and other Competitions were given on page 128 of our January number.