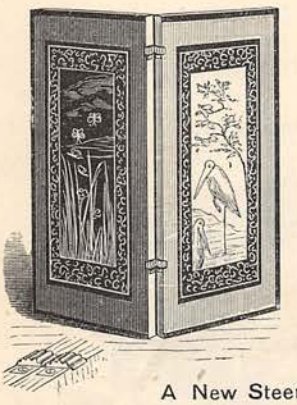
THE GATHERER:

AN ILLUSTRATED RECORD OF INVENTION, DISCOVERY, AND SCIENCE.

Correspondents are requested, when applying to the Editor for the names and addresses of the persons from whom further particulars respecting the articles in the GATHERER may be obtained, to forward a stamped and addressed envelope for reply, and in the case of inventors submitting specimens for notice, to prepay the carriage. The Editor cannot in any case guarantee absolute certainty of information, nor can he pledge himself to notice every article or work submitted.



A New Hinge for Screens.

The leather straps and webbing formerly used for hingeing clothes-horses and folding screens have been conveniently superseded by the semi-revolving hinge which is depicted in our illustration. This hinge is made in several sizes to suit the screen or clothes-horse.

A New Steering Balloon.

Commandant Renard, who designed the controllable balloon "La France," has constructed another and better one called "General Menuisier," which is to be tried early in the spring. It is cigar-shaped and about 100 mètres long. The car of bamboo and steel is in the shape of a platform, in the middle of which is a cabin, holding a gasoline engine and the appliances for navigation. The engine drives a fan propeller at the rear of the car, and the rudder is mounted in front of the car. The balloon has been constructed with great care at the military balloon works of the French Government.

An Ethnographical Survey.

A committee of the British Association have undertaken to conduct an ethnographical survey of the United Kingdom, and Mr. Francis Galton, author of "Hereditary Genius," and chairman of the committee, has issued a circular to this effect. It is proposed to select a number of typical villages throughout the country, and institute, by means of private volunteers and others, certain observations on the physical types of the inhabitants, historical evidence as to continuity of race, the monuments and other remains of ancient culture still extant, as well as the current beliefs and traditions. We still persist in calling ourselves "Anglo-Saxons;" but it is well-known to anthropologists that such a term is only a partial truth, referring to a single element in our blood by no means so large as has been supposed, and not necessarily the highest and best, although in England there has been a natural tendency to consider it so. The British race is a very mixed one, drawing its sources from the entire western sea-board of Europe and further afield; old manners and customs of the country, as well as the old legends and monuments partake of this diverse origin, and the proposed survey will help to clear up many obscure points, and destroy many popular errors at present existing on the subject. While upon this theme we may advert to the recent discovery of a "lake-dwelling" near Glastonbury, Somerset, and its examination by Doctor Robert Munro, the well-known authority on Scotch lake-dwellings. The ruined huts were unearthed in a level ground, where old maps show the existence of a "pool," or mere, which was doubtless a vestige of the ancient lake. It also appears that the district was originally inhabited by Belgæ. Dr. Munro thinks that the dwellings, with their bronze weapons and other articles, belong to what he calls the "Late Celtic" period which followed the Bronze Age, as the superiority of the articles mark the influx of a more highly-cultivated race.

A Revolving Sprinkler.

Fig. 1 illustrates a new water sprinkler for extinguishing fires, the special feature being the revolving arms which scatter the jets all round. The internal construction of the device will be understood from Fig. 2, which is a section through it. The valve, A, is a hollow ball of india-rubber fixed on the inner

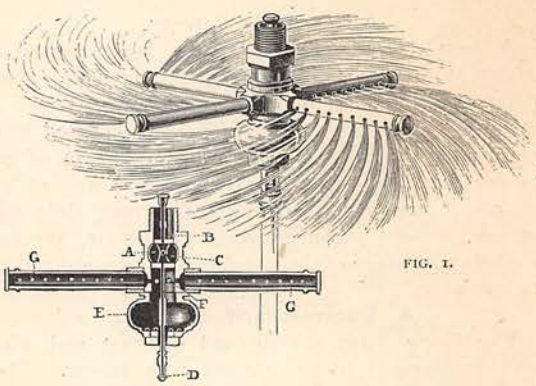


FIG. 1.

FIG. 2.

tube marked B, which communicates with it by a hole marked C. The water under pressure enters the ball by this hole and distends it so as to fill the pocket in which it rests. The lower end of the tube, B, is closed with a cap of fusible metal, D, which melts when a fire breaks out. The pressure in the ball valve is now reduced, and it collapses, allowing the water under pressure to escape by the holes, F, into the arms, G, which rotate on the principle of Baker's mill and whirl the water on the burning material underneath. The device can also be used as a fixed sprinkler by simply removing these arms.

A Fan for Rocking-Chairs.

The figure illustrates an ingenious American device by which the occupant of a rocking-chair, in swaying backwards and forwards, works a continuous rotary

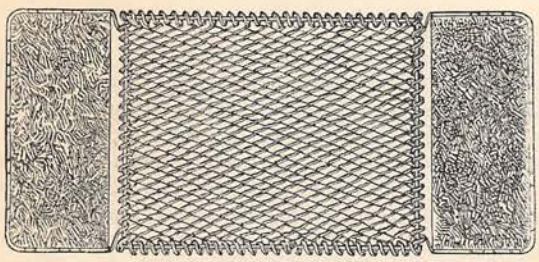
fan. It is a purely mechanical arrangement of levers and pinions which, by means of a screw, rotates a vertical shaft carrying the fan at its upper end. In hot sultry weather this device, which, we may point out, might be supplemented by a sunshade, will prove refreshing.

A New Foot-Warmer.

A new foot-warmer — by name the "Hecla" — which has recently been patented has many good points worthy of commendation. It consists of a metal cylinder, thoroughly water-tight, enclosed in a covering of natural wool, which has the effect of retaining the heat for a very long period, as well as making it possible to touch the foot-warmer, while it is in use, without inconvenience. Of course, another obvious advantage of the metal case is its non-liability to breakage.

A Doormat and Scraper.

The figure shows a combined doormat and wire scraper which is likely to meet with favour. The

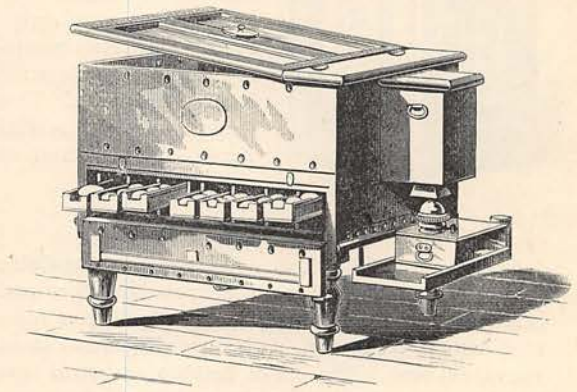


wire portion is made of galvanised iron, and the side mats of the best fibre, which can readily be renewed. Such a mat not only scrapes a boot but dries it, and is therefore a means of saving carpets.

A Railway on the Ice.

Between the Victoria tubular bridge at Montreal and the ocean there is no bridge over the St. Lawrence, and all the other railways have to pay toll to the Grand Trunk Railroad for the right of crossing it. To avoid the heavy tax one of the companies builds a railway on the ice every winter between Hochelaga and Longueil, where the river is about two miles wide. The rails are supported on strong pine timbers laid on the surface of the ice, and the ballast is broken ice, which is consolidated by pumping water from the river over it and allowing the whole to freeze.

A New Incubator.



In the egg-hatcher which we illustrate there is a large chamber with a glass lid above, in which the cold eggs are dried and warmed before they are placed in the partitions of the drawers underneath for incubation. The partitions of the drawers are of different sizes, allowing the eggs to be classed according to size. The hot air from the heating lamp travels through a pipe or flue on the right-hand side of the incubator, an arrangement which gives a large heating surface. The eggs are guarded against fumes and are only warmed by radiant heat.

A Curative Helmet.

Thomas Carlyle found the jolting of an omnibus to relieve his dyspepsia, and probably a good many find a railway journey, if not too long, a benefit to the liver. It appears, however, that the vibration of a train is also a remedy in certain nervous affections, such as the trembling palsy or Parkinson's disease, which is characterised by a trembling of the hands, a stooping of the head, and an odd manner of walking as though the subject were about to throw himself down head foremost. Acting on this hint Professor Charcot, of the Salpêtrière, Paris, has constructed an arm-chair which oscillates by means of electro-magnetism and shakes the patient in a manner which, however disagreeable to a person in good health, is welcomed by the paralytic, who feels the better for it and can enjoy his night's rest. Vibration by means of tuning-forks has also been applied to the cure of neuralgia, headache, hysteria, and sleeplessness.

Moreover, a vibrating helmet has recently been introduced by Dr. Gillis de la Tourette, a pupil of Dr. Charcot. The interior of the helmet is shown in Fig. 1, and the electro-magnetic hammer for causing the vibrations in Fig. 2. The steel plates, P, in Fig. 1 are flexible and designed to keep the helmet firmly on the head. On the top of the helmet (Fig. 2) by way of crest, is mounted a small alternate-current electric motor, M, the armature of which, on being excited by an electric current, makes about 600 revolutions a minute, and produces vibration of the helmet at every revolution. The head partakes of this vibration, and after a few minutes a feeling of lassitude is experienced by the patient, which inclines him to sleep. This curative helmet is said to have proved very beneficial to sufferers from neurasthenic complaints. It has succeeded in cases of hemicrania, a disease for which no efficacious remedy has hitherto been found.

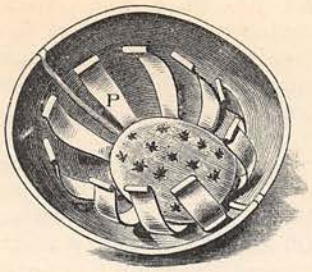


FIG. 1.

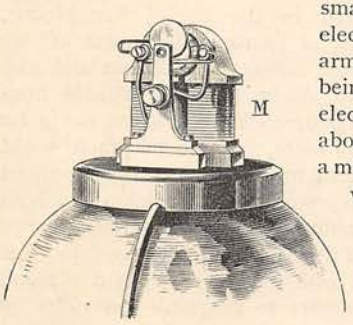


FIG. 2.

The Nansen Polar Expedition.

Reasoning from many particulars, for instance, the occurrence in Greenland waters of Siberian driftwood and diatoms, as well as flotsam from the ill-fated *Jeanette* which was wrecked off the Siberian coast, Dr. Fridthiof Nansen, who won his fame by crossing Greenland, has organised a Polar expedition which is to start this year and proceed to the New Siberian Islands with a view of reaching the North Pole or passing near it. The *Fram* or "Forward," as the ship is called, is not large for an Arctic vessel, but is very strongly built, her timbers being over four feet thick at the bows. Her hull may best be described as resembling a longitudinal section of an egg, so that she may rise to avoid being nipped by two pieces of ice. The rudder is well below the water line and the skin of the hull is formed of greenheart, a South American wood chiefly from Dutch Guiana, which is not only very hard, slippery and durable, but is not affected by marine borers, and has, therefore, been employed in harbour works. With twelve men Dr. Nansen hopes to catch the supposed current from Siberia and float with the ice across the roof of the world by or over the Pole. He takes provisions for five years and intends to have an electric arc lamp on his mast head during the long winter night. The current will be supplied by a dynamo driven by the men in taking their walking exercise or by the wind. He may also take a captive balloon for reconnoitring, and in the event of having to abandon the *Fram* and take to the ice he will have several smaller boats to trust to for getting home. The expedition is a hazardous one, and many will picture to themselves the weird electric star of civilisation amidst the frozen waste during the long Polar night.

A Gradient Indicator.

The indicator of slopes or gradients which is shown in the figure requires no calculation or levelling. It is simply placed on the slope, and the position of the bubble in the tubes gives the inclination. The longer tube indicates gradients of from one foot rise in two feet horizontal measurement to one in 200; and the shorter tube is used for vertical slopes ranging from fifteen degrees to plumb. As there are no parts to wear out or derange, the instrument is durable as well as convenient.

The Cave-Dwellings of Arizona.

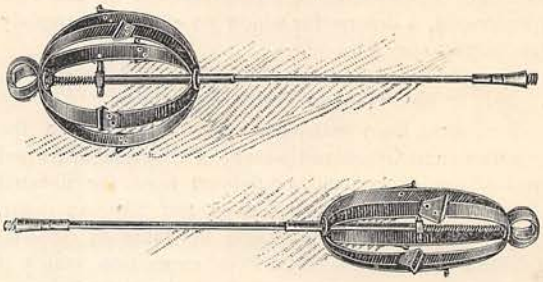
In Arizona and the south-western States of North America large numbers of cave-dwellings and buildings of sun-dried bricks or "adobes" bespeak the existence of an ancient civilisation which is still a mystery to science. No key has yet been found to the strange marks on the rocks and potsherds which remain, and the Indians, when questioned about them, only shake their heads. The valley of the Verde river, near the abandoned Fort Verde, contains many of these ruins, especially along Beaver Creek, where the cliffs rise 100 feet above the water. Halfway down the cliff is a ruin called "Montezuma's Castle," part cave, part house, which can only be reached from below by a ladder from ledge to ledge. The front is a mortarless wall built of flat limestones with openings for doors and windows. The rooms are small, about five feet high, and are generally connected by narrow openings in the partitions or ceilings. Steps are not required to pass from one room to another above or below, and the holes in the ceilings are never directly under each other, so that one cannot fall two storeys at once. The floors are of stones supported on timber cut from the neighbouring mountains. The cave has generally a large apartment in front and a small one hollowed out of the rock behind with a low partition or screen of rock between them. These black holes are now the abode of countless bats which are disturbed by the explorer. A few miles above this remarkable cave on the opposite bank of the creek is a conical hill a few hundred feet above the valley. The top is the narrow rim of a crater 300 feet in diameter, partly occupied

by a lake of dark blue water 100 feet below. The lake, which is 100 yards across and of unknown depth, is known as Montezuma's Well. In the steep sides of the crater are numerous caves, some natural, others artificial, which were formerly inhabited. The ruin is crowned with the fallen ruins of a building over 100 feet long; and down the hillside there is a spring in the rocks which forms the outlet of the crater lake, and was formerly used to irrigate portions of the valley, as, indeed, it is now used by a rancheman. Stone and cement ditches may also be seen in the valley, and last year one was unearthed twelve feet below the surface, while others are found on the top of "mesas" or mounds where there is now no water to fill them. Rows and tiers of caves in the sand and limestone cliffs occur below Fort Verde, and can be reached from the valley. The entrance is usually an arched opening four feet high by two feet wide. The cave proper is roughly circular, about twelve feet in diameter and four to six feet high. There is a bench cut in the rock all round it except at the entrance. The bench is twelve to eighteen inches high and three feet wide, sloping gently towards the centre of the room; opening from this main cave at either side or at the rear were smaller circular caves, three to five feet in diameter and about the same in height, but having their floors at a slightly lower level than the main cave. The only light they receive comes from the main cave. Occasionally two large caves are united by passages between the lateral caves, and pocket-like cavities, twelve inches in diameter and nearly spherical, have sometimes been hollowed in the rock two feet above the floor on either or both sides of the entrance. Mr. J. W. Towney, of Tucson, Arizona, whose account we have followed, thinks that the side caves were stores for grain. Broken pottery, charred embers, reed mats, and grinders were strewn amongst the rubbish of the floor in the main cave.

Telegraphing Through the Air

When the telephone was first introduced it was found extremely sensitive to the currents induced in its own circuit by telegraph and telephone currents in some neighbouring line. In fact these telegraph currents induced corresponding currents in the telephone circuit which caused a disagreeable "pattering" noise in the telephone and threatened to drown the spoken message. Moreover, the words spoken by telephone on a neighbouring line could be overheard, and this "cross-talk" was very troublesome. As good often comes out of evil in ordinary affairs so does it in matters of science. Properly investigated, this phenomenon, at first a nuisance, has been turned to profit, and is likely to prove still more valuable. Mr. Edison and Mr. Phelps have based their systems of telegraphing to and from a moving train upon this electric induction through the air, or rather ether, from one wire to another. In this case, the circuit on the train is very near the circuit along the railway, but with more powerful currents there was no reason to suppose that the induction would not take place over considerable distances, thus rendering telegraphy from wire to wire of service in crossing estuaries or communicating with inaccessible spots, such as beleaguered forts. Indeed, it was proposed some years ago to telegraph across the Atlantic by means of two circuits, one on the American, the other on the European seaboard; but this, of course, is at present a visionary project. Quite recently Mr. W. H. Preece, F.R.S., engineer-in-chief to the Post Office, has succeeded in telegraphing through the air between Lavernock Point, near Cardiff, and the island of Far Holme, a distance of three miles. A telegraph circuit was run along the shore at both places and that on the mainland was supplied with strong signal currents from a dynamo. The message sent along it was received by induction on a "sounder" telegraph instrument connected in the line of Far Holme. Such a telegraph is, of course, independent of any cable across the water, subject to accident and also thick weather. No doubt luminous signals from an electric or an oil lamp could be read as easily for a greater distance by night, but the telegraph would be feasible day and night. While upon this subject we may add that a powerful electric lamp has been installed on the summit of Mount Washington, one of the highest peaks of the White Mountains, 6,300 feet above the sea, and with this search-light it is found possible on clear nights to telegraph 100 miles by occulting the beam and thus breaking it up into signals as a telegraph current is broken up in sending by the Morse code.

A New Scraper.



The scraper for cleaning chimneys and drains which we illustrate, is made of steel hoops which are capable of changing their shape as shown in Figs. 1 and 2. This is effected by turning the thumbscrew at the end. Hence the same scraper can be used for different vents or pipes.

PRIZE COMPETITIONS.

Intending competitors in the **Photographic Portrait Competition** *are reminded that under the regulations published on page* 80 *of our December number, February 1st is the latest date for receiving entries.*

Full particulars of the first six competitions in this year's series were given in our December and January numbers.