

the untarnishable gold is so well worked it can be adapted to other decorative purposes when the original object is of no further use. The Empire style is the prevailing one for evening dress—scanty skirts and extremely short waists. It will have its following, but will be worn by some and ignored by others, for it is trying and requires the best of good dressmaking.

The brocaded satins are exquisite this season in design and colouring as well as in quality. The two

illustrations give an idea of the patterns most in vogue for trains for dinner and evening dresses generally. They are floral, and stand out well in relief from their sheeny satin backgrounds.

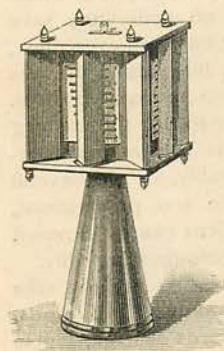
In the water-lily and bulrush brocade, the flowers float naturally as if in water, the rushes forming a graceful appropriate addition. In the white poppy brocade two full-blown flowers, with their buds and leaves, form handsome trails, producing the richest and most attractive effect.

THE GATHERER :

AN ILLUSTRATED RECORD OF INVENTION, DISCOVERY, LITERATURE, 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 Æolian Harp.



The old-fashioned Æolian harp was usually made about 4 feet high by 18 inches wide and 9 inches thick, and contained from seven to twenty-one strings, which were apt to get out of tune. In the "Æolia," as it is called, there are no strings, but eighty sensitive metallic reeds divided into harmonic chords of twenty notes each. The apparatus is shown in the engraving, and is 20 inches high by 8 inches wide and 8 inches

deep. As the upper part revolves it plays one chord after another, no matter from which direction the wind is coming. All the reeds keep in tune and sound into one common organ tube which harmonises the chords. It is intended to be hung on a tree, or fixed on a post, say in a garden or by some ruined castle.

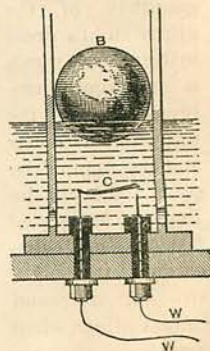
An Automatic Telephone Exchange.

An American inventor has boldly attempted to dispense with the assistance of operators in telephone exchanges, by introducing an automatic mechanism to take their place. At present when a subscriber to a telephone exchange wishes to speak by telephone to another subscriber he calls up the operator in the exchange, explains to him or her what he wants, and the operator then connects his telephone with that of the other subscriber. With the new Strowger apparatus, which is on view in New York, the subscriber can make the desired connection himself. He is provided with five keys or contact makers for opening or closing electric circuits. Four of these are marked "units," "tens," "hundreds," "thousands"; and if we suppose that the number of the subscriber he wishes to speak with is 131, he presses the unit key

once, the tens key thrice, and the hundreds key once. In so doing he transmits corresponding electric currents to the exchange where they actuate a small automatic apparatus which connects his line with that of the subscriber No. 131. The connection can be made although there are thousands of subscribers to the exchange, and when the conversation is over the subscriber, by pressing the fifth key, breaks the connection and restores the original condition of the circuits. The automatic circuit-connector is only a small instrument six inches long by four inches broad and thick; nevertheless, it can establish the connection between any two of the thousands of subscribers on the exchange, by means of wires running to it and internal mechanism, which it is unnecessary to describe. There is one for every subscriber to the exchange, and so long as these are kept in working order no staff of operators is required. If the invention satisfies practical telephonists it will effect a revolution in the present method of managing telephone exchanges.

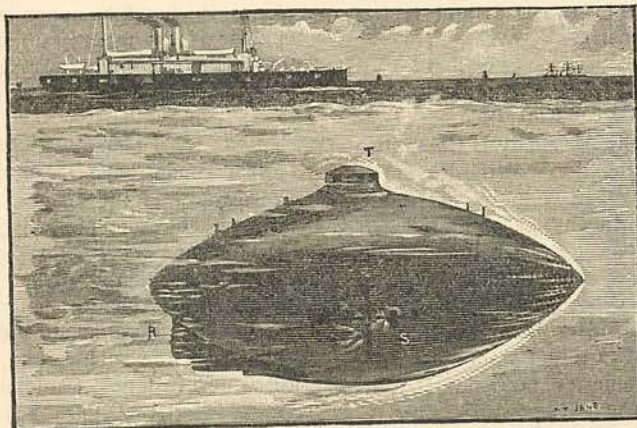
An Electric Water Level Tell-Tale.

An electric tell-tale for giving an alarm when the water in a steam boiler sinks below a certain level has been devised by Mr. M. S. Matthews, of Montreal, Canada. As illustrated in the figure, it consists of a tube or casing supported in the water and containing a ball float which rises or falls with the water. When the level of the water becomes too low the ball bears on a spring contact, C, thus completing an electric circuit, W W, in connection with a bell or gong which is thereby sounded.



A New Submarine Boat.

During the past summer a new submarine boat, invented by Mr. Baker, has been successfully tried on the Detroit River, near Detroit, U.S.A. As shown in the sketch it consists of an egg or capsule-shaped hull, built of stout oak planks and capable of withstanding the pressure of the surrounding water at a depth of eighty or a hundred feet. It is fitted with two screw-propellers, O, S, one on each side, and the rudder, R, sits close to the hull. The conning tower on the top is shown at T. When the boat rises to the surface a funnel is extruded and a steam engine inside is connected to the propellers; but when she is submerged by pumping water into her tanks, the steam engine is discarded, and an electric motor, fed by charged accumulators, is brought into gear with the screws. A speed of eight or ten miles an hour has been attained. The interior of the craft is lighted by electricity, and can accommodate several men. Only two are required to manipulate the vessel, and the hull, which is forty feet long, contains sufficient air to allow of their being under water for about three hours. While upon this subject we may mention that Captain McEvoy, a well-known British electrician, is stated to have invented an electric apparatus by which a torpedo boat cannot approach within three miles of ironclads without signalling their presence by ringing a bell on board the ironclad and even firing an alarm gun.



A NEW SUBMARINE BOAT.

An Electro-Photographic Thief Detector.

Not long ago a cigar merchant of Toledo, Ohio, U.S.A., repeatedly missed cigars from a show-case in his office, and having employed detectives to watch the premises in vain, he at last hit on the plan of photographing the thieves by an instantaneous camera and a flash light. An electric circuit was so arranged that in opening the show-case the thieves would close the circuit and send an electric current by wires to a box containing a camera directed on the case. The current, by means of electro-magnets, not only lifted the shutter of the case, thus exposing the camera for a short time, but also struck a match on a rough disc and ignited a flash light. One night after the apparatus was installed two boys entered the office, and while opening the case were promptly photographed. The picture led to their apprehension, trial, and punishment.

The Submarine Eruption of Pantellaria.

South of Sicily there is a volcanic region which breaks out now and then: for example, in 1831, when Graham's Island rose from the sea; and again in October of last year, when a submarine eruption was seen north-west of the island of Pantellaria, and telegraph cables were damaged in the vicinity. Signor A. Ricco has investigated this disturbance and has given the following particulars of it. Pantellaria is a volcanic island about ten miles long by five miles wide. It possesses hot springs, those at the lake "Bagno del Acqua" being so rich in alkalies as to make a lather and be used in washing clothes. Fumaroles or vents of carbonic acid, steam, and the hot fumes of sulphur are also found on the island. The steam is harmless to vegetation and has little effect on rocks, but the sulphur decomposes them. In the summer of 1890 earthquakes occurred in the island, the northern part of the coast was elevated, cisterns were cracked, the activity of fumaroles increased, and vineyards in old craters were injured. Three days before the eruption on October 17th last year, the earthquakes began again, the ground was cracked, certain springs dried up, and the north coast was apparently raised a little higher. Black "bombs" of scorice rose to the surface along a zone a kilometre in length from north-east to south-west, which probably indicated a volcanic fissure.

Some of the bombs ran hissing over the water under the recoil of the steam they were discharging. A number of them were hot enough inside to fuse zinc—that is to say, their temperature was 415° C., and one glowed red-hot in daylight with a temperature something under 800° C. Fragments were exploded to a height of twenty metres in the air, and then sank in the water. Visitors to the spot found the temperature of the water raised 1½° C. above that of the surrounding sea, and a smell as of gun-powder in the air. The spongy matter of the bombs emitted an odour of sulphur when hot, and bubbles of gas were seen to rise from the surface of the waters. The eruption terminated on October 25th, and the district has been quiescent ever since, in spite of telegrams in some English newspapers to the contrary.

Kola and Fatigue.

In June last four cyclists covered the distance between Paris and Clermont-Ferrand, 397 kilometres, in 17 hours or thereabout. The speed of the winner,

an Englishman of 18 years, was 22'802 kilomètres an hour; but he was greatly exhausted by his effort. The second was a Frenchman of 28 years, who accomplished 22'055 kilomètres an hour without fatigue. The first supported his energies on alcohol, champagne, bouillon and solution of kola; the second on bouillon, tea, and kola. The other two competitors, who did 21'957 and 19'790 kilomètres an hour, took bouillon, coffee, and wine, but no kola, a fact which is worthy of note by amateur cyclists.

A Loud Whistle.



A whistle which can sound a very loud blast with a slight expenditure of force will be useful to many, for example, cyclists, firemen, and others. The "Thunderer" whistle, which we illustrate, is of this class, and has, we believe, been adopted by the Glasgow police force.

It is made in two sizes and is by no means expensive.

Impurities of Town Air.

During the past year the Air Analysis Committee of Manchester have, in conjunction with the Royal Horticultural Society, been engaged in analysing the air of London, Liverpool, and Manchester, and have arrived at the following conclusions. In clear breezy weather the quantity of sulphurous acid in the air is less than 1 milligramme per 100 cubic feet; but during anti-cyclones it rises very considerably, and in thick fogs attains as much as 34 and 50 milligrammes respectively in the worst parts of Manchester and London. Where the population is less dense and open spaces are near, there is a marked diminution in the proportion. Smoke is the principal cause of atmospheric impurity in our large towns, in the opinion of the Committee, as it promotes fog and prevents a free diffusion of the lower into the upper strata.

An Electric Census Machine.

In Canada at the last census a machine worked by electricity was employed to enumerate the results. A series of holes punched in a card represented the desired particulars about a person, and then, on being passed through the machine, controlled the current operating an indicator which recorded the facts. Such a device is, of course, impartial so long as it works properly, and is at least a useful check on personal enumeration.

A Reading Chair.

The chair which we illustrate is an improved model of one long used by the Duke of Wellington at Walmer Castle. The back is so formed that a person can sit in the chair in the ordinary way or he can sit astride and lean his arms on the shelf with the book before



A READING CHAIR.

him. The change of position is a practical convenience which will be appreciated by many. This kind of chair is not manufactured so far as we know; but the figure will guide a maker in constructing it to order.

A Boneless Shad.

Experiments have recently been made by Mr. D. E. Crawford, of the United States Fish Commission, with the object of producing a variety of the edible shad having a small number of bones, that is, say, as few as a flounder or sole. By dint of perseverance the naturalists have at length contrived to breed a shad with only a small proportion of the number of bones in the wild variety. This method of cultivating new varieties of animals as gardeners cultivate flowers and vegetables has to all appearance a promising future before it. We may yet be able to breed stingless bees, venomless snakes, and so on. The deficiency of one variety can thus be supplied by means of another, and noxious attributes caused to disappear.

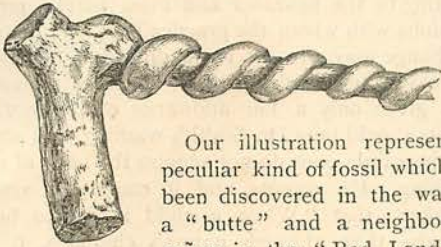
A Useful Lady-Bird.

The fruit-growers of California have suffered great losses through the ravages of a species of aphid known there as "cottony cushion scale," but a remedy for the



pest has been found in the Australian lady-bird, *Novius koebeli*, which preys on the aphid, and has been acclimatised in California. The lady-bird, when full grown, is about one-eighth of an inch in length. It is chiefly of a dark-red colour with black lines and markings, as shown in the illustration which represents the male. In the female the black medial line only extends half-way down the back.

A Corkscrew Fossil.



Our illustration represents a peculiar kind of fossil which has been discovered in the walls of a "butte" and a neighbouring cañon in the "Bad Lands" of North-western Nebraska, U.S.A. These "fossil corkscrews," as they are called for want of a better name, are in some cases thirty to forty feet long, and they are usually found in a vertical position in the crumbling sandstone which forms their matrix or mother rock. The specimen shown in the figure closely resembles a thick vine twisting round a pole; but many are without the pole or straight upright, though all seem to have the larger branch or crutch. American geologists have not yet decided what this remarkable fossil is; but it appears to be the petrified case of some plant or animal resembling a worm. The skin or shell of the fossil is silicious, but the core is the soft sandstone of the district. We may add that a field party of students and their professors, from the State University of Nebraska, have gone to the district to procure more specimens.

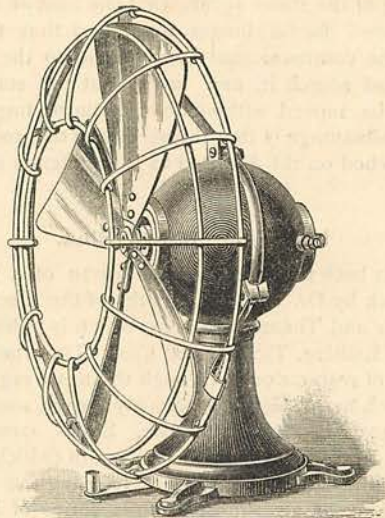
An Electric Fan Motor.

The especial merit of this electric ventilating fan and motor is its compact and self-contained character. The coil and field magnets are enclosed in the iron keeper or yoke which is all but spherical; there is no sparking at the commutator, and it runs at a speed of 900 to 1,800 revolutions a minute. There are five different sizes of the motor with its fan. That of one-twelfth horse-power runs at a mean speed of 1,150 revolutions a minute, with a current at a pressure of 110 volts.

Crystal Vision.

"Crystal gazing" or "crystal vision" is the name given by psychologists to the mental phenomenon of seeing pictures in water, mirrors, crystals, and other clear bodies, which have played an important part in the witchcraft of olden times. It is somewhat akin to seeing "faces in the fire," and some people have the gift very highly developed. Numerous examples were cited by Mr. Myers at the recent Congress of Experimental Psychologists, held in London. One lady, who has experimented with her faculty of crystal gazing for some years, once saw and read in the crystal an announcement of the death of one of her friends. On looking at the *Times* for that day the notice could not be found, but it was discovered in a prior copy of the same newspaper. The lady was unconscious of having read it there, and it is supposed that her eyesight had conveyed it to her brain without her mind being aware of it, while she happened to hold the paper up between her and the light, as she could remember

having done. From this it would appear that we derive information from the outside world without knowing it, and that information may come into our consciousness at a future time, it may be in a dream. Thus there are cases of persons dreaming where a lost article is lying and finding it there, although they had looked for it in the same place or near it without seeing it. Hypnotised subjects can also see pictures or images of stories which have been "suggested" to them. At one of the séances of the Congress Dr. Bramwell, of Goole, Yorkshire, performed some most interesting experiments on four private subjects, two young men and two young women, who had consented to appear before the meeting in furtherance of science. One of the men was put into a mesmeric sleep and told the story of Robinson Crusoe discovering the footprint in the sand. On being recalled from the sleep he stated that he had heard or seen nothing the while. Yet when the crystal was put into his hands he saw there a picture of Crusoe alarmed at the footprint, and described it in his own words. The story of Vivien beguiling Merlin, which is less common, and was probably never heard by him before, was also suggested to him, and on awakening from the trance, he, without knowing that he had been told the story, saw it enacted in the glass, and gave a crude but faithful account of the scene. As a good deal of misconception exists with regard to the safety of such experiments, we may add that Dr. Bramwell stated, and practically demonstrated before the Congress, that all his subjects have the power of exercising their free will while hypnotised, and choosing whether or not they will do what he asks them to do. In fact, a hypnotised person need not perform any act of which he or she may disapprove. At the close of the experiments he made the subjects wake up perfectly bright and happy, in full possession of all their faculties, and, as they were going home to Yorkshire the same evening by the boat, he told them not to be sea-sick, and none of them, he assured us,



AN ELECTRIC FAN MOTOR.

would be, for as hypnotism cures pain, drunkenness, hypochondriac and other fears, so is it a remedy for sea-sickness.

The Development of Children.

At the Edinburgh meeting of the British Association Dr. Francis Warner read a paper on the physical deviations from the normal standard which he had observed in 50,000 children. On all the cases 13·4 per cent. of boys and 9·6 per cent. of girls deviated from the normal. Smallness of head was the principal defect amongst the girls. A greater amount of deviation was observable in the wealthier districts of London than in the poorer. Defects of the nervous system are, according to his observations, increased by taking children from their homes and putting them into institutions. The inquiry is important, but there is a danger in drawing too sweeping conclusions from insufficient data, and it may be that more extended observations will qualify or even overthrow some of these conclusions.

A Submarine Ear.

The French naval authorities are engaged in testing a submarine microphone, which may be regarded as an extension of the powers of hearing under water. The microphone is placed in a watertight case and immersed in the sea. Wires lead from it to the battery and telephone on board the vessel. When a noise is made under water, by the vibration of a distant vessel or torpedo, for example, the microphone conveys the sound to the ear of the auditor.

A New Stand for Flat Irons.

There has recently been patented a new stand for flat irons, which has much to commend it to housewives. The frame is made of wood, and this is covered by asbestos cloth or some other material of like properties, which is not a conductor of heat, and is non-combustible. In use these properties of the covering of the stand secure that the heat of the iron is retained for a longer time, and that the heat cannot be communicated by the stand to the ironing sheet and scorch it, and lastly that the stand may always be moved without fear of burnt fingers. A further advantage is that the surface of the iron cannot be scratched on the asbestos as it so often is on metal stands.

Keep your Mouth Shut.

This is both the title and the lesson of a valuable little work by Dr. F. A. A. Smith, of the Cheltenham Eye, Ear and Throat Infirmary, which is published by Messrs. Ballière, Tindall, and Cox. That the natural method of respiration is through the nasal organs is a fact which many people studiously ignore, and this to their great detriment, as Dr. Smith conclusively shows. To breathe through the mouth (which, during sleep, is the cause of snoring) is to pave the way for the entrance of an almost endless series of ills, and anyone who has contracted the bad habit should

follow our author's hints as to the best means for reverting to the healthier and more natural method. To adults with whom the practice is of long standing, the change may present some difficulty, but even in such cases there ought to be no doubt of ultimate reform, given only a fair allowance of patience. All parents should take Dr. Smith's warning, and see to it that their little ones do not acquire the habit of mouth breathing. He repeats, and it cannot be repeated too often, that "When a child begins to breathe otherwise than through nature's channels, it is in danger."

A Cheap Dictionary.

A new edition, at a reduced price, has just been published of "Cassell's English Dictionary," which, in a single volume of 1,100 pages, gives the definition of upwards of 100,000 words and phrases, clearly printed and well arranged. It is handy in size and easily used for reference, but it does not sacrifice its comprehensiveness to secure this advantage.

In Case of Fire.

In a little pamphlet recently issued by Messrs. A. Boyd and Son, under the title "Self-Help in an Alarm of Fire," Mr. R. W. Boyd has put together a few of the most prominent causes of fires in private dwelling houses, together with some admirable suggestions for securing the greater safety, both of person and property, in the dread event of an alarm of fire. One suggestion is eminently practical, and might, even with advantage, be adopted by local authorities: "Considering that fires usually result from some unknown cause, every house should be examined at least once a year to make sure that no avoidable sources of danger exist. At the same time, all life-saving apparatus should be actually tested by a competent and unprejudiced man." There is certainly a good deal to be said for this plan, seeing the risk which a fire brings upon his neighbours, as well as upon the man to whose neglect it may be due. And here is another hint, which ought certainly to be put into compulsory practice in the case of all *public* buildings, and might with advantage be adopted, at any rate, in private dwelling-houses of any size: "Unless there is a good supply of water at the top of the house, it is well to have three or more buckets standing always full of water at useful parts of the house." And many a fire which has ultimately assumed the character of a conflagration would have been extinguished before much damage had been done if people could only have been impressed with the warning, "In case of fire, keep *all doors shut* as far as possible. This greatly prevents it spreading, by stopping the draught."

Four-Part Story Competition.

The manuscripts are now under consideration and the award will be published as early as possible.

I have seen