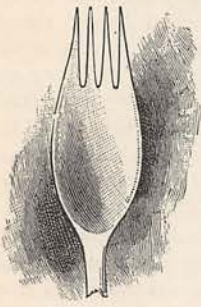


THE GATHERER:

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 Combined Spoon and Fork.



A Sheffield manufacturer has just introduced a new table-fork, which combines some of the advantages of the spoon with those of the ordinary four-pronged fork. It is intended primarily to meet the difficulty ordinarily attending on the eating of such vegetables as peas and the like, but it is easy to see that there are many circumstances under which this combination might prove useful. Our illustration shows the head of this new table accessory.

"Influenza Colds and Whooping Cough."

With reference to the Family Doctor's article under the above title, in our April number, we are informed that the result of the combination of oil of vitriol and common salt (suggested on page 273) would be the production of muriatic acid, or spirits of salt, a gas whose antiseptic properties are very feeble. The most powerful antiseptic or germicide known is chlorine, and this may be produced by treating a mixture of common salt and binoxide of manganese with oil of vitriol. Sulphurous acid—the germ-killer mentioned by our author—is readily prepared by burning a little sulphur

A Magazine Indicator.

An indicator for the use of public libraries, and other institutions having numbers of magazines in circulation, has just been devised by Mr. Alfred Cotgreave, the librarian of the Guille-Allès Library, Guernsey. It consists of a frame like that of the ordinary library indicator, and filled with a large number of minute shelves. A certain number of blocks bearing the titles of the various publications are arranged in alphabetical order about the frame, in such a manner that as many divisions are left after each title as experience shows will correspond with the number of back parts of the publication in circulation. A large number of small slates in metal frames are supplied to fit the shelves of the indicator, and these slates are lettered, at one end in red and the other in blue, with the names of the various months. If the blue lettering is exposed the number for that particular month is known to be "in." And if the librarian gives it out, he makes a note on the block of the borrower and date, and reverses the slate so that the red lettering is exposed to show inquirers that the number is "out." When the magazine is returned

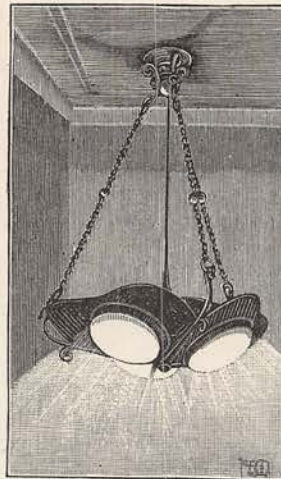
the record is easily rubbed off the slate, and the blue label exposed again. A great advantage that this system seems to offer is that the arrangement of the indicator can be varied to meet any demands for an unusually prolonged circulation of a particular number of a publication.

The Bell Rock Fog Signal.

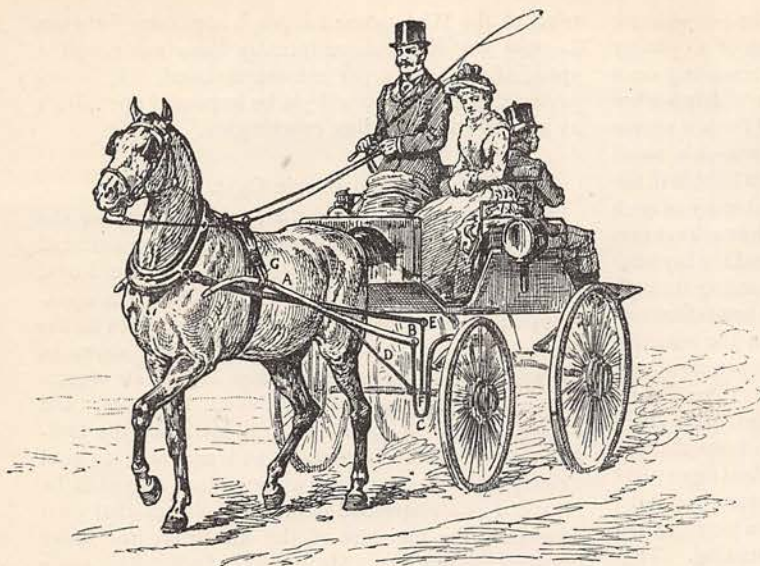
The Bell Rock Lighthouse which lies off Arbroath, far in the North Sea, has two bells which ring in foggy weather; but recently an explosive signalling apparatus has been added. A metal rod having a hook at the end, and rising 18 feet above the lantern of the tower, is the firing point. By a simple mechanical arrangement the rod can be bent over, and the hook provided with an explosive cartridge of tonite or gun-cotton. The rod is then restored to its upright position, and the cartridge fired by means of the electric spark. A signal is fired every ten or fifteen minutes during fogs.

A New Reflecting Shade.

Our engravings illustrate a new shade for electric lamps, which has been introduced from America. The shade is conical and the upper part is of clear glass



silvered to act as a reflector, while the bottom is of rounded and frosted glass, so that when the electric glow lamp is inserted the light is reflected out through the frosted base in a soft and bright beam. The glowing filament of the lamp is thus withdrawn from the eye, and the light is both agreeable and strong. Such a lamp is well adapted for desks, and will be prized by literary men, and all who have much reading or writing to do.



Good News for the Horses

A new method of attaching horses to vehicles of all descriptions, by which the labour of draught is largely reduced, has recently been introduced by Mr. T. H. Brigg. The inventor contends that draught can only be fairly and with due economy attained when a proper proportion of the weight of the vehicle is transferred on to the horse's back, whenever any gradient is met, or any obstacle encountered, which has to be surmounted by the wheels; and that as at present harnessed to all four-wheeled vehicles, a more or less serious waste of power inevitably follows, for the reason that the weight of the vehicle is improperly distributed. This principle is commonly understood by drivers of two-wheeled traps up-hill, who recognise almost by instinct that the horse is enormously relieved if the occupants sit well forward, or if part of the load be shifted forward, and that, necessarily, weight at the back of the trap is peculiarly irksome to the horse. The questions to be considered are: (1) what proportion of weight must be transferred so that draught may be most easily effected; (2) by what means transference can most easily take place; and (3) what saving of labour can be thereby obtained. The inventor claims that the first two of these questions are answered by his Draught Attachment, which acts *automatically*; and that the saving of labour is proved to be not less than 50 per cent. The transfer of weight, owing to the continual changes in the gradients traversed, must be momentarily varying, and this is effected by a combination of levers which work automatically according to the necessities of the moment. The accompanying diagram will help to make the process clear. Instead of allowing the shaft, A, B, to rotate as usual at B, the fore-carriage is so constructed as to carry the point of rotation to C. The position of C, together with the length of the shaft, is mathematically determined, so that the vertical pressure at G is in exact proportion to the power applied by the trace at E. It is this vertical

pressure which counteracts or equalises the lifting tendency of the trace, or gives a slightly increased pressure if found necessary. By this means it is obvious that the horse is exerting two forces—one horizontally through the trace, and another vertically through the combination of levers at G. These two forces cause the best inclination of trace, which is automatically determined by the load and the state of the road.

A Radial Scale Thermometer.

The thermometer which we illustrate in Fig. 1 is designed for use in homes and elsewhere, and has the scales arranged like vanes radiating from the bulb, so that the temperature can be read all round the instrument. This convenience allows it to

be hung from a chandelier in the middle of the room, or any support away from the wall, which is a bad position for a thermometer since it may have a temperature different from that of the air in the room. The radial scales also serve to protect the tube from injury. Fig. 2 shows a new metal holder for the lens-fronted clinical thermometer introduced by Mr. S. G. Denton. It is made of thin metal, and the top, which pulls off, is securely fastened by a spring catch. Fig. 3 is a diagram of the thermograph now employed at Kew for recording the indications of the dry and wet bulb thermometers, and

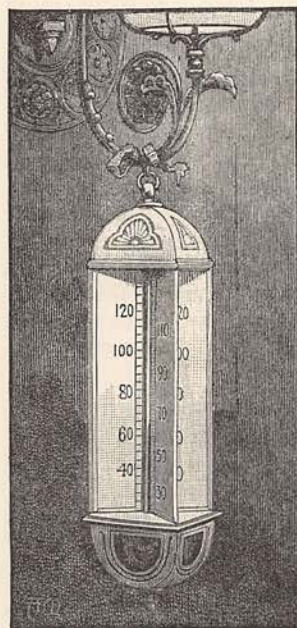


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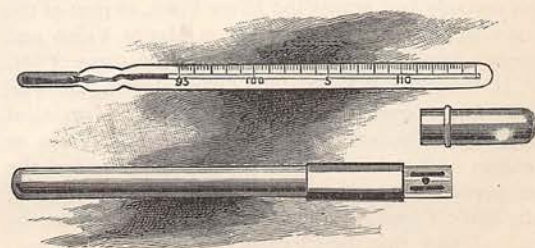
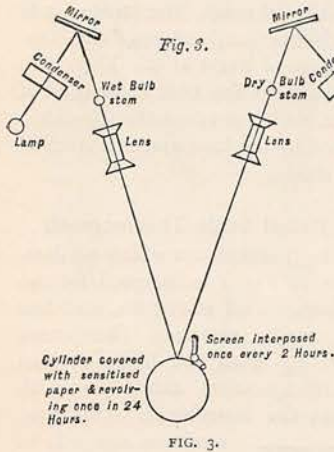


FIG. 2.

thus obtaining a continuous record of the temperature of the air and of evaporation. It consists of a cylinder covered with photographic paper and revolving once in twenty-four hours. The light from a lamp after passing through a condenser is reflected from a mirror



through a small air bubble in the mercury of each thermometer, and the ray after passing through a lens is focussed on the sensitive paper, as shown in the figure, and care is taken to keep the two photographic traces on the paper from crossing. That of the wet bulb is below that of the dry bulb.

To eliminate errors and facilitate calculations, a screen cuts off the rays for four minutes every two hours, thus making periodical gaps in the record. To tabulate the results of the record, a sheet of plate glass divided by horizontal lines into times and temperatures is laid over it, and the actual values read off by this transparent scale. The recording apparatus is all placed within the observatory, but so arranged that the bulbs of the thermometers are outside, and the stems of these are bent so as to keep the bulbs at least two feet from the face of the wall on the north side of the building and nine feet above the ground.

Zig-zag Lightning.

A study of lightning photographs reveals the fact that flashes of lightning resemble rivers of fire which meander through the sky, either downwards towards the earth or along from cloud to cloud. Meteorologists have therefore concluded that the zig-zag flash of conventional art has no real existence; but according to a recent paper of Mr. Bruce, M.A., read before the Meteorological Society, the reflection of a flash on certain cumulus clouds sometimes presents a zig-zag appearance.

A Telephone Cable.

The first submerged cable for telephonic messages was recently laid across the River Plate, as part of the new telephone trunk line between Monte Video and Buenos Ayres. It was made from the designs of Mr. W. H. Preece, F.R.S., the Post Office electrician. The whole line is over 200 miles long, and is a practical proof that telephony between London and Paris or London and Dublin is quite practicable, provided the sea portion is not too long. Indeed the question of telephonic communication with Paris is likely to be realised now that the Channel cables have come into the hands of the Government. We may also add that

trials of the Wheatstone telegraph apparatus between London and Rome have recently been made, and a speed of 120 words per minute attained. It is expected that this figure will yet be improved upon, high as it is, by dint of further experiments.

Atmospheric Dust.

Mr. John Aitken, the well-known authority on the action of dust in the atmosphere, has communicated the results of his latest observations to the Royal Society of Edinburgh, where he exhibited the apparatus which is to be used for dust researches at the Observatory on Ben Nevis. Mr. Aitken shows in his paper that the quantity of dust in the air diminishes, as a rule, when the wind increases, and augments during calms. As dust increases the radiating power of the atmosphere, and causes it to cool quickly, the consequence is a fog, which may thus be regarded as a suspended dew. He believes that dust condenses the moisture of the air before the latter becomes saturated. Mr. Aitken finds that some elevated parts of Switzerland, such as the Righi, exhibit very few dust particles in the air. In the wilder parts of Argyleshire, too, the proportion is as low as about 200 particles per cubic centimetre; whereas in Paris and London it rises sometimes to nearly 200,000 particles per cubic centimetre.

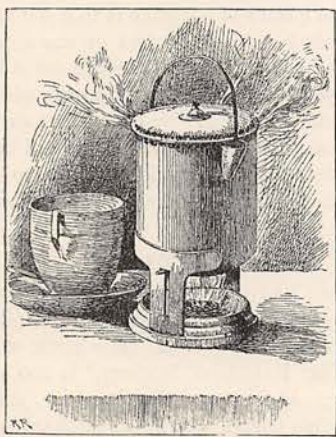
Transliteration from the Russian.

The following notes of English and Russian equivalents have been compiled, with the help of Madame de Novikoff and Mr. N. W. Tchakowsky, for the use of students and men of science in translating from Russian into English, or *vice versa*, and have been approved by the directors of some of the leading museums. It should be remarked that *gh* has been adopted in preference to *g* for the letter Г since this letter is also the equivalent for *h*. The semi-vowels 'b and b must be indicated when present by the sign ' placed above the line, except at the end of a word. Where proper names have been Russianised, it is desirable to keep them in the Russian form. This system is to be adopted at once in several important catalogues—for instance, that of the Natural History Museum—and the proceedings of learned societies such as the Royal Society, the Institution of Civil Engineers, and the Agricultural Society.

Fragrant Ferns.

At a recent meeting of the Royal Botanic Society, a sweet-scented fern grown in the Society's gardens was exhibited by the secretary, who remarked that it might be cultivated for its perfume, which resembles that of new-mown hay, and continues after the fronds are dried. This specimen was a little-known exotic; but at Mussorie, in the North-West Provinces of India, during or after the rainy season, the oaks and rhododendrons are covered with ferns, one of which resembles the "hart's tongue," and emits from its spores behind the leaf a delicate scent like that of new-mown hay. A correspondent in Folkestone has identified it

as the *Phymatodes normalis*. Scented ferns are also to be found in this country—for example, the *Nephrodium æmulum*, or “hay-scented buckler fern,” sometimes classified as the *Lastrea recurva*, owing to the pinnules being bent back. It is found in Devonshire—for instance, near Totnes. On rubbing the frond the scent is very perceptible. We may add that a species of club moss in Mexico has the power of reviving, after it is apparently dry and dead, by exposure to moisture. Some specimens of it sent home by Mr. A. Gudgeon, after being several months in the dried state, became green and flourishing in a moist place. The *Poly-podium incanum* of Arkansas, in the United States, has the same property, which indeed is already familiar to us through the plant known as the Rose of Jericho.



WITH THE LAMP LIGHTED.

A New Spirit Kettle and Lamp.



LAMP EXTINGUISHED.

Our illustrations show a new spirit kettle and lamp, which has just been patented, and is admirably adapted for bedroom use or under other circumstances when hot water or food is required at short notice. It scarcely needs explanation. When the contents of the kettle have been heated to the required point, all that it is necessary to do is to press down the kettle upon the lamp, which is then extinguished without danger. With reasonable care this kettle-lamp should prove very serviceable.

Oxygen in Gasworks.

Mr. Valon, gas engineer to the Ramsgate Corporation, has introduced a new mode of purifying gas with the oxygen obtained by the Brin process. The oxygen is employed to revive the oxide purifiers which are used to absorb sulphuretted hydrogen from freshly manufactured gas. When the oxygen is mixed with the crude gas, before it passes into the purifier, the reviving process accomplishes itself there and then. Oxygen also

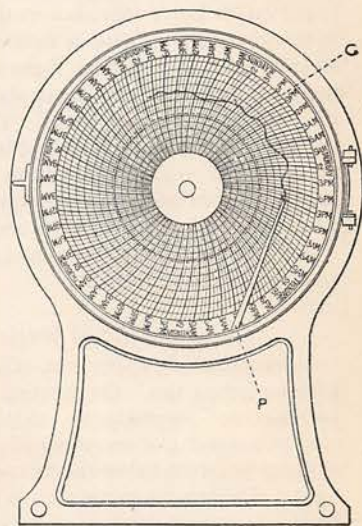
enables lime purifiers to absorb sulphuretted hydrogen as well as carbonic acid. The latter is oxidised, and the spent lime has no evil odour. The improvement also enables a less extensive plant to be adopted.

An Inclined Plane Railway.

The Cincinnati Inclined Plane Railway has its main terminus in the centre of the city, and is worked by electricity. From the central station the cars, to the number of seventeen, run by means of electricity to the base of a steep incline. They are hoisted to the top of this incline by an elevator, and again connected to the electric circuit, after which they travel to the other terminus at the Zoological Gardens, six miles out of the city. Some of the grades on the line are very heavy. A steam-engine of 150 horse-power works the whole system by means of Edison dynamos. The consumption of coal is about $3\frac{1}{2}$ tons a day. In a small town of California they have another curious tramway with some heavy grades. Two mules draw the car up these grades, but in going down the mules are mounted on a stable-tender attached to the car, which runs to the bottom by means of gravity.

Another New Heat Indicator.

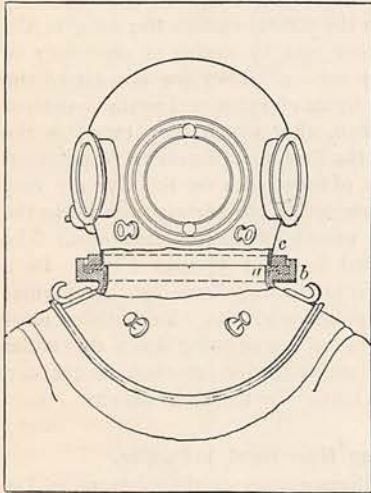
The recording thermometer or thermograph of Dr. Daniell-Draper, of America, of which a front view is given in our illustration, consists essentially of a bimetallic thermometer—that is to say, a slip of two different metals which, by their unequal expansion with change of temperature, curve more or less to one side. This sensitive member is the penholder, P, of the thermograph. A pen filled with glycerine ink, which does not readily freeze, is attached to its point and draws a line on a dial of the graduated paper, G, turning before it by clockwork. As the pen is moved more or less by the changes of temperature during day and night, a wavy line is marked upon the paper, which, being in reality a scale, shows the temperature at any time during the twenty-four hours.



A New Diving-Dress.

A diver's dress consists of the helmet, the breast-plate, and the body covering of waterproof fabric. He gets into it by the opening of the neck as though it were a sack, and the mouth is then fitted to the edge of the breastplate, which sits upon his shoulders like a

tippet. As this junction has to be watertight it is usual to hook the mouth over studs on the rim of the breastplate, and then cover the margin of the cloth with brass plates screwed up tight. But this plan is troublesome, especially in cold weather, and when the diver has to come up at frequent intervals for relief from the pressure of the water on his frame. In the



new dress of Mr. Alfred E. Stove the neck opening is made of india-rubber, and smaller than before, since it stretches to allow the man to enter. There is a projecting flange or fillet on the edge of the mouth, which fits into a corresponding groove in the collar, not the bottom, of the breastplate, so that when the helmet is put on its lower edge secures the fillet and makes a watertight joint. There is thus only one such joint, whereas in the older dress there are two, namely, one between the helmet and breastplate, and one between the latter and the waterproof. The figure illustrates the new device, the helmet and breastplate being cut away in part to show the joint in section. In this, *a* is the neck of india-rubber with its projecting fillet, which fits into a groove of the neck of the breastplate *b*, and is secured by the bottom of the helmet *c*, which screws into the breastplate.

Nickel Steel.

Steel containing 25 per cent. of nickel possesses some peculiar properties. On heating it to a dull red it becomes non-magnetisable, so that the same metal may be magnetic or non-magnetic through a range of temperature from below the freezing point up to 580° Cent. The non-magnetic steel is softer than the magnetic. It breaks with a stress of about 50 tons per square inch after elongating about 30 per cent. The magnetic steel breaks with a stress of about 90 tons per square inch after elongating about 7 per cent. The non-magnetic would, therefore, be useful as a mild steel were it not that on exposure to a hard frost it becomes a hard steel and remains so until heated to a temperature of 600° Cent.

Coldness and Weather.

The researches of M. I. Vincent, a Belgian meteorologist, show that the sensation of cold as experienced by the human body bears no constant relation to the rise and fall of the thermometer, but depends rather on the temperature of the skin. Wind produces a

cooling effect even in hot weather, as voyagers in the tropics are well aware. Again, in polar regions, so long as the air is still the cold is bearable, though insufferable when the wind rises very high. Moreover, if there is little or no wind the sunshine produces a sensation of warmth, though the temperature of the air, as shown by the thermometer, is quite low.

"Games of Patience."

It will, perhaps, surprise some of our readers to learn that there are forms of the game of "Patience" which are also games of very considerable intricacy and skill. In her little book on "Games of Patience" (L. Upcott Gill), Miss Whitmore Jones gives particulars of some seventy different games, the great majority of which are well worth trying. The great advantage of games of patience is that while there are plenty of good games for two or more players included in the classification, there are not a few which can be played by a single player, to the whiling away of what would have otherwise been a tedious hour. In the belief that many of the new forms will be welcome to our readers, we commend the book to them. It would be an armoury of recreation in a seaside home.

"Healthy, Wealthy, and Wise."

Sir Edwin Chadwick, K.C.B., is one of the greatest of living authorities on national health and all questions pertaining to sanitation. His great work on the subject, "The Health of Nations," is too serious an undertaking, and too expensive, for the general reader. So his friend, Dr. B. W. Richardson, F.R.S., has prepared an abridgment of it for popular use and instruction, under the title of "National Health" (Longmans), and the result is a manual that should be in the hands of every citizen. The construction, arrangement, and drainage of the dwelling-house and school; the prevention of epidemics and the suppression of intemperance; length of life, unhealthy employments, and the health of the future—these are only some of the topics treated of in this admirable little volume, and needless to say, treated well.

"The Adventures of a Younger Son."

Mr. Fisher Unwin has opened his "Adventure Series" with Trelawny's "Adventures of a Younger Son," edited by Mr. Edward Garnett. So far as recorded "adventures" go, it would be difficult to find a better opening for the series. But our editor gives us permission to treat a good many of them as somewhat apocryphal, to say the least of them. Making all allowances for these outbursts of a very powerful imagination, however, there is no doubt that Trelawny led a remarkably varied life in many lands, and met with many strange characters under surroundings so unusual as to give good ground for many of his stories, and an air of reality to the others. There are passages in the book that, to our thinking, the editor would have done well to omit in these days; but, apart from these, the work is very readable, and it is the first of what promises to be an interesting series.