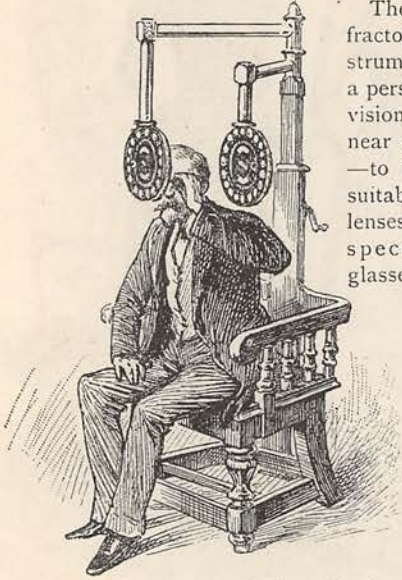


THE GATHERER:

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.

An Eye-Tester.



The Ophthalmic Refractometer is an instrument for enabling a person with defective vision—that is to say, near or short sighted—to be fitted with a suitable lens or set of lenses in the form of spectacles or eye-glasses. It consists of an armchair as shown in the figure, in which the patient seats himself, and looks at a series of test types or objects of vision on the opposite wall. He obscures

one eye by a spectacle-frame having a black glass in it, and looks with the other. At the sides of the chair are frames for holding lenses which are adjusted to the eye. One after another the lenses to be tried are brought between the eye and the object until a proper fit has been obtained.

A Pair of Household Novelties.

An ingenious use of superheated steam in cooking is made in a simple steamer, patented only recently. The steamer consists of a cone of tin, at whose apex is a tiny crater closed by a marble. Above this cone is the grating upon which are placed the potatoes or other articles to be cooked. When the steamer is placed in the saucepan the water is, of course, at the same level inside the cone and outside it. But, naturally, the water inside it reaches boiling point much sooner than the other, and quickly generates steam that lifts the marble at the top of the cone, and reaches the articles to be cooked in a powerful, continuous volume. This steamer is well worth a trial. Another household novelty that we have just seen for the first time is a self-straining coffee-jug, to the metal lid of which is fixed a fine strainer which passes completely down the back of the spout, and thus serves to clear the coffee as it is poured out. The advantage of this plan is obvious, especially to those who hold, as many people do, that coffee should never be made in a metal vessel, but always in one of earthenware. The

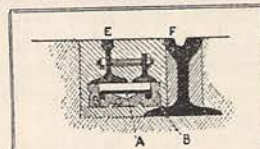
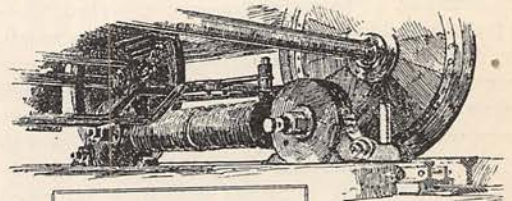
strainer is in such a position that it can be most readily cleaned. All coffee-drinkers will join in the wish that these coffee-jugs, or the principle which governs them, may meet with universal adoption.

The Niagara Commission.

With the view of utilising part of the water-power of Niagara, a syndicate has been formed in the United States, and a considerable tract of land bought on the southern side of the Niagara River, above the Falls. The "head" of water, or actual fall of level, at Niagara is 200 feet, and it is estimated that if 4 per cent. of the water is utilised at a head of 140 feet, some 120,000 horse-power will be available for turning mills on the spot, or generating electricity to convey the power to a distance—for example, Buffalo, eighteen miles distant. In order to carry out the idea in the best manner, a commission of famous electricians has been appointed, which includes such names as Sir William Thomson, President; Professor Mascart, member of the French Institute; and Colonel Turretini, director of the St. Gothard Tunnel works. Plans are also invited from certain engineering firms, and these will be submitted to the judgment of the commission.

The Lineff Electric Tramway.

In supplying electricity to a tram-car by means of a conductor laid along the street, it is very important



Under-side of Car showing magnet with wheel by wire-brush contacts.

to seclude the wire from the surface traffic, or from wet due to dirt and rainfall. But obviously the wire must at the same time be hidden in such a way that the current can be drawn from it at any point of the line while the car travels, so that the motor may run continuously at a regular speed, if required. Sometimes this is done by laying the conductor in a channel under the roadway, and getting access to it by a narrow slot through which passes a contact projecting from the car. The slot, however, is apt to let in water

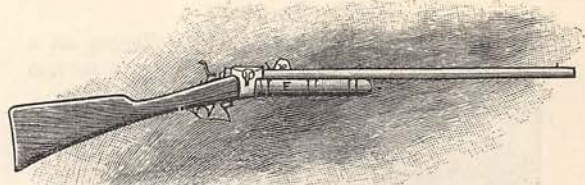
and dust; therefore Mr. Lineff has brought out a system in which there is no slot, and the conductor is entirely covered in. Along the conductor lies a loose strip of iron, which may be regarded as a movable part of the conductor; and above these runs a rail which is ordinarily insulated from them. But it will be understood that if the strip of iron be raised up into contact with the rail through the attraction of a powerful electro-magnet on the car the electricity will charge the rail, and if there is a connection by a travelling brush or contact with the motor on the car, the motor will be actuated by the current. This, in fact, is what is done. The car is provided with an electro-magnet which lifts the iron strip into contact with the inner rail, and a metal brush from the car in circuit with the motor is thus able to convey the current from the secluded conductor. In the sectional figure, F is one of the tramway rails on which the wheels of the car run, and E is the insulated contact rail which runs parallel to it; G is an insulating base on which rest two copper conductors, B, charged with the current, and upon these lies the iron strip, A. The chamber is covered above and entirely insulated from the surface, except when the magnet on the car lifts the strip, A, into contact with the rail, E, and allows a brush or wheel contact travelling on the latter to tap the current. The contact rail, E, is divided into short sections for the better insulation of the current, so that only a short length is electrified at a time. Mr. Gilbert Kapp, a well-known electrician, has reported very favourably on the new system.

A Circulating Filter.

The filter which we illustrate herewith combines the two advantages of subjecting the water to a long-continued action of the filtering material and an effective aëration. The figure represents a section through one form of the apparatus. Water is supplied at the top of the jar, A, into the chamber, C, G, and passes down through the perforations, F, F, into the filtering cells, H, H, as shown by the arrow, then up through the cells, H', H', and down again through the central chamber, J, which is filled with granular carbon. It collects in the bottom, B, B, and is drawn off by the tap on the left. Air is admitted to the cells by the open neck, E. The filtering medium is patent manganous carbon; but any other may be used if preferred. The apparatus, which is made of different patterns and sizes, has been very highly recommended by many eminent authorities, and, after exhaustive trials, adopted in the army and navy.

A Gas-Gun.

According to the *Revue Industrielle* (Paris), M. Paul Giffard, a joint inventor of the well-known boiler injector, has brought out a new firearm in which gunpowder or other explosives are replaced by the

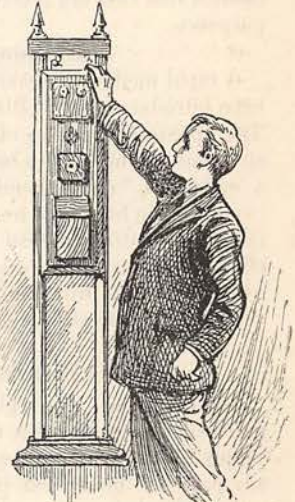


A GAS-GUN.

expansive power of liquefied carbonic anhydride (CO₂). The weapon is illustrated in the figure, where F is a steel cylinder containing the liquefied gas under pressure. The gas can be liquefied by a pressure of 36 atmospheres, and when this pressure is withdrawn it will suddenly expand behind the bullet and force it from the barrel with great velocity. This is done by pulling a trigger, which opens a valve in the rear of the reservoir and allows a certain quantity of the liquid to expand into the barrel behind the bullet and drive it out. M. Giffard states that a sufficiency of liquid for several hundred shots can be stored in the reservoir. The bullet is placed in the barrel by the breech, and the whole mechanism is so simple that the gun can be made, it is said, for twenty shillings. A military rifle on this plan designed for the French Government weighs only 4½ lbs. There is no smoke, little recoil, and a feeble report.

An Adjustable Telephone.

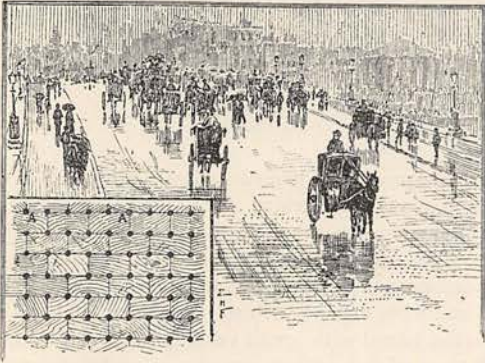
The telephone apparatus in use is not always conveniently fixed for use by different speakers of various heights, and the device which we illustrate is intended to overcome this drawback. It is simply a frame of two uprights, on which the telephonic apparatus, consisting of transmitter, receiver, bell, and battery, can slide up or down to the required level. The carriage which contains these apparatus is balanced by counterweights, like the sash of a window, and remains at any position until it is shifted by hand. While upon this subject, we may mention that experi-



ments on telephoning between two frames on the same rail have recently been made by the Baltimore and Ohio Railway Company. The conductor is an iron rod laid between the rails for the whole length of the line, and contact is made with it by means of a brush or wheel contact piece let down from the train. The necessary apparatus, including an alarm bell to call attention, is supplied to each train; and the rails act as the return conductor of the circuit.

A New Pavement.

Lead is an excellent preventative of slipping on a flat surface, and it has now been applied with success



to the tops of cover-plates, hydrant-boxes, and so forth, in our streets. These covers are apt to become greasy in wet weather, but by inserting plugs of lead at intervals, the foot is enabled to "grip" the plate. Our engraving shows how the inventor of this improvement applies the plugs to the ordinary wooden paving, a plug, A, being inserted at each corner of the joints.

Carrier Swallows.

M. Desbouvric, of Roubaix, has trained a number of swallows to return to him and perch on his finger, with a view of testing them as carriers of intelligence, instead of the pigeon. They are very intelligent, fly high, and catch food on the wing, and can be inured by practice to the French winter, therefore he is of opinion that they are preferable to pigeons for carrying purposes.

Sketching by Lens.

A rapid method of making sketches in the field has been introduced by M. Blain, a French cavalry officer. The apparatus consists of a rectilinear lens by which an image of the view to be sketched is formed within a makeshift "dark chamber," consisting of a small black curtain hung on a frame over a portable drawing-table. The draughtsman simply copies the image in pencil or water-colour on a sheet of white paper. The whole appliance, with camp-stool and table, is made very light and portable, so as to be easily carried about.

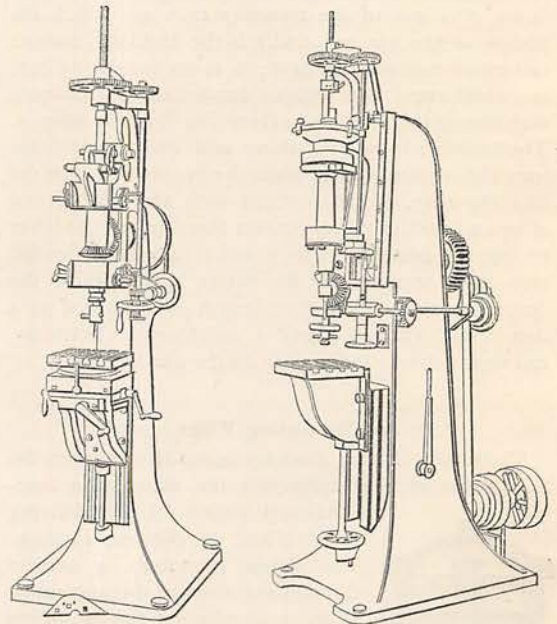
A Safety Gas-Regulator.

An improved gas-regulator has recently been patented, which gives the consumer full control of the supply to his house. The regulator may be fixed in any part of a house, but is generally attached to the supply-pipe before it reaches the meter. In appearance it is not unlike a small meter, but it has a much larger dial, and a face opening like that of a clock. The dial is divided into certain sections, graduated from "gas off" to "full on," and these sections represent increasing proportions of the full supply. On the dial are two hands, one an index-hand (like the gilt hand of a barometer), being controlled by a mechanism which can only be brought into play by someone possessed of the key to the case of the instrument, which

would, presumably, be the consumer himself. This index-hand represents the maximum proportion of the supply that can be drawn at the time; of course this may be varied to suit the convenience of the consumer, but the important feature of the instrument is that the maximum supply is absolutely under the consumer's control. The other hand is movable, by an ordinary turning key, to any point between "gas off" and that registered by the index-hand, but it cannot pass the latter. The uses of such an instrument as this are obvious, and need little explanation to any householder or manufacturer who is also a large consumer of gas.

Drilling Square Holes.

Square or angular holes can now be drilled in metal as easily as circular ones by a new machine. In



appearance it resembles an ordinary drilling machine, as will be seen from our illustration; but the point of the cutter is caused by a series of cams to describe a square or polygon, as the case may be. The Ainley-Oakes type is employed for square holes, and the Tyler-Ellis type for holes of any outline. The latter also cuts the angles very clean. As the difficulty of cutting square holes in metal has hitherto been great, these machines are likely to be very useful.

A Vanishing Type.

The investigations of scientific ethnologists and anthropologists have, during the past few years, completely overthrown the old popular and traditional idea that the Anglo-Saxons either expelled or exterminated the ancient Britons in what is now England, and in scientific circles it is generally recognised that the British people as a whole, including the English, from the German Ocean to the Welsh border, are in reality an extremely mixed race. A modern Englishman, in the strict sense of the word, may be roundly

described as half Anglo-Saxon and half Welsh, or, in anthropological language, an Anglo-Celt-Iberian. A new type, which had better be called the "British," has grown, and is still growing, out of the blending process which is going on; and recent observations tend to show that the Anglo-Saxon, properly so called, is not the most persistent element in the nation; but, on the contrary, is dying out. Dr. Beddoe, of Bristol, a

perature may be given to the air before it reaches the plants. The vitiated air escapes by the ridge ventilators, D, and thus a current of pure air is maintained in the house.

A Coal-Gas Detector.

Spongy platinum has the property of becoming red-hot when exposed to a mixture of combustible gas and



PURE AIR FOR THE GREENHOUSE.

leading scientific authority on the races of the British Isles, has, with the help of Mr. Charles Roberts, made a large number of observations, which prove that the fair Teutonic and Danish type is vanishing by degrees, and the darker types are predominating. Light hair, it is now believed, was equally a mark of the pure "Celtic" race, and the fact has led to great confusion in history and literature, for we seldom know whether the classic authors are confounding the old Celtic-speaking with the German-speaking races or not. Dr. Beddoe finds that the people of the east coast of Scotland and the north-east coast of England show the highest percentage of fair hair in these islands. Curiously enough, Bristol and Glasgow have also a large number of fair-haired individuals. Hair darkens 55 per cent. during the first five years of life, and a further 33 per cent. up to the age of 45. The darkening is less marked in the case of women than of men. Dr. Beddoe is of opinion that fair-complexioned individuals are less able to withstand the insanitary condition of large towns than those of dark complexion, and that the law of natural selection operates against their increase.

Pure Air for the Greenhouse.

Our figure illustrates a method of ventilating a plant-house by means of purified air, which can be heated at the same time. The air passes into the house by the aperture A, and traverses a box, B, containing a purifier. This box is placed underneath a set of hot-water pipes, C, so that the required tem-

perature may be given to the air before it reaches the plants. The vitiated air escapes by the ridge ventilators, D, and thus a current of pure air is maintained in the house.

History for Young Readers.

There is a good deal to be said in favour of giving children some acquaintance with the history of other countries besides our own. Indeed, provided that British history be not neglected, we cannot see anything against this plan. So we are glad to welcome "The Story of Denmark" (Longmans), by Charlotte S. Sidgwick. It is simple and interesting in style without being babyish, and ought to attract as well as instruct young readers, especially as it is accompanied by a map and other illustrations.

Stories, New and Old.

Of new stories, one of the most pleasing we have come across of late is "Nigel Browning," by Agnes Giberne, just issued by Messrs. Longmans. It is a story that will delight girls, for it has plenty of action

and a strong love-interest, while there is a good, robust tone throughout. The two heroines—for there are two, Fulvia and Ethel—are both good characters, pleasantly and cleverly drawn. While new stories claim a hearing there are others which, though old, are, indeed, ever new. Such are the works issued in Cassell's "Japanese" series, so called from their being printed on one side only of paper of great strength, though it is very thin in texture. "Oliver Twist," "Handy Andy," "The Last Days of Pompeii," "The Yellowplush Papers," and "Jack Hinton," are among the works issued in this handy form, which is particularly adapted for the use of travellers.

About the Maories.

In the strict sense of the term, Mr. J. C. Frith's "Nation-Making" (Longmans) is not a story, but in its curious descriptions of life among the Maories of New Zealand, and their strange customs and superstitions, will be found an interest that many a "story" lacks. Mr. Frith has raised our idea of these aboriginal inhabitants of the grand islands wherein Englishmen are once more striving to work out their old problem of nation-making. In the chapters on the Maories, our author will claim deservedly the attention and interest of all his readers. But there are other chapters in the book that deal in a more or less controversial spirit with questions on which Mr. Frith seems to forget there may possibly be differences of opinion, and wherein all his readers may not feel disposed to follow him.

For Lady Readers.

As they were issued, we referred in "The Gatherer" columns to Mrs. De Salis's practical "*À la Mode*" cookery books. We are glad to notice now that Messrs. Longmans have published another work from her pen, uniform in price and appearance with this series, under the title of "Tempting Dishes for Small Incomes." The dishes are certainly most tempting and our readers will be glad to hear that the great majority of them may be procured at the cost of small outgoings, while the directions are at once simple and thorough. Much of the prejudice that still lingers round gas-cookery would be swept away if ladies would study and follow out the admirable hints given them by the author of "The Art of Cooking by Gas" (Cassell). The opening chapters are devoted to an exposition of the general principles that should guide the cook in the management of gas-heated apparatus, and these are followed by a goodly number of recipes and menus specially adapted for preparation by gas-cooking. This work does not profess to be a new cookery book in the ordinary sense of the term, but in

its own line it ought to prove a valuable addition to the library of any housewife. But, however important a part of her work cookery may be, no lady would pretend that it is the whole. So we are glad to draw attention to two new works on needlework issued by Messrs. Ward, Lock & Co. The first is on "Drawn Linen Work," or "Punto Tirato," and is by Ellen T. Masters, who deals with this attractive form of handiwork in a very practical manner, and as the book is fully illustrated by diagrams and patterns, the veriest tyro should be able to master the rules of this popular branch of needlework by its aid. The prettily got-up little work entitled "The Knitter's Note-Book," which accompanies Miss Masters's volume, and is issued by the same publishers, is equally helpful and thorough. We are glad to welcome it, if only in disproof of the fears that were expressed some time since that knitting was becoming a lost art. Its use ought to increase rather than decrease before the stimulating power of this handy little manual.

Before the Wedding—and After.

On either side the threshold of matrimony the steps of the novice are beset with difficulties. An engagement brings with it a host of new duties and fresh dangers to both the contracting parties, and to their friends also. These are not all to be lightly waved aside by "chaff," and, without a good deal of consideration all round, the young people will be exceptionally happy if they do not realise the truth of the "many a slip 'twixt cup and lip." A legion of heartburnings might be avoided or cured if "those about to marry" would take the excellent counsel which Mr. Somerville Gibney offers them, good-naturedly enough, in "Captives to Cupid" (Bowden, Hudson & Co.). Some of his chapters are purely hortatory, one or two are almost minatory, but all are practical and to the point. Let us hope that our friends will so far profit by our author's kindly offices in the rest of his work, that they will not need even to read his last chapter but one ("On being Off with the Old Love"), but will happily hear, as in his concluding chapter, the sound of "Wedding Bells." Even then, they may find that all their troubles are not ended, nor all their dangers passed. So we advise them once more to seek advice—this time from our good friend, Mr. Hardy, in "How to be Happy, though Married," of which a new and attractively dressed edition has just been issued by Mr. T. Fisher Unwin. With such excellent guidance as is here offered them, all Mr. Gibney's "Captives to Cupid" ought to be able to take rank with Mr. Hardy as "Graduates in the University of Matrimony."

STORY COMPETITIONS.

TO COMPETITORS.—*The manuscripts (nearly one hundred) in the Eight-Part Story Competition are now under consideration, and the Editor hopes to be able to make his award before the close of the year. The award in the Four-Part Story Competition will necessarily be held over until the New Year, owing to the exceptionally large number of stories requiring detailed consideration in the other Competition.*