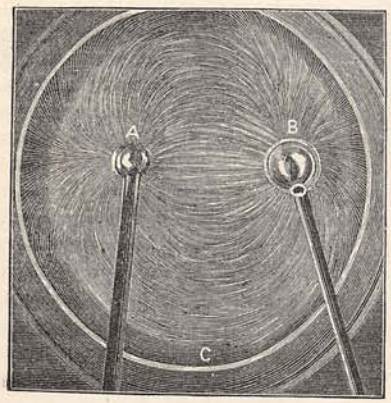
THE GATHERER:

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.

Electrical Images.

It is well known that the "lines of magnetic force," or induction, between the poles of a magnet can be rendered visible to the eye by strewing iron filings on the poles and in the space between them; but, although similar lines of electric force have been supposed to exist between the poles of an electric machine or a voltaic battery, they have not been shown to the eye until recently. A method of exhibiting them, proposed by Mr. Chapman, of Adelaide University, South Australia, has been successfully practised by M. Hospitalier, a French electrician of note. It consists in mixing acicular crystals of sulphate of quinine in the pure essence of terebinthine until the latter becomes milky to the view. A thin layer of the liquid is then placed in a glass vessel, and the poles of a Wimshurst electrical machine are brought to the sides of the vessel, as shown in the figure, where A and B are the poles and C the vessel. The electric forces between these poles arrange the crystals into curving lines, very similar to the curving lines of the iron filings between the poles of a magnet. These lines are visible in our illustration, which is taken from a photograph. Powdered talc and coffer-dam, mixed with benzine, will also show them; and M. Mascart, the celebrated French electrician, is able to produce them by placing a sheet of glass between the two poles, A, B, of the machine, and dropping very small pieces of fine wire upon it. In this case the wire corresponds to the iron filings used in the experiment with the magnet. It is believed that the ether between the poles is under a strain which reveals itself to the eye by these arrangements.



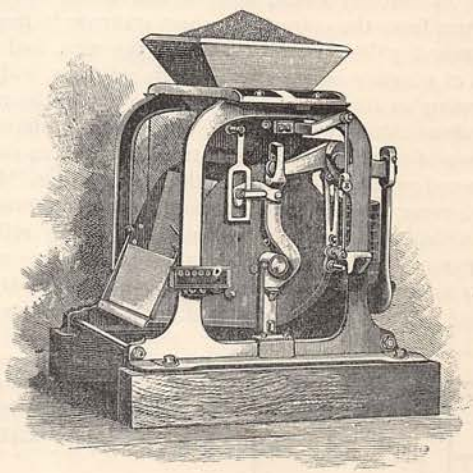
A Jointed Diving-dress.

Colonel W. Carey, C.B., late of the Royal Artillery, has devised a new diving-dress on the model of the crustacean, or in homelier phrase, the crab and lobster. These animals can either lie or crawl on the bottom of the sea, and if they are closely observed, it will be seen that in crawling they put out one claw after another, a mode of progression which enables them to keep close to the ground and not to rise in the water. The new dress is made in plates of rigid material jointed together so as to be watertight, and as the diver in wearing it will be relieved of the heavy load of the ordinary dress as well as the water pressure, he will be able to work far better under water.

A Cure for Snake-bites.

Dr. Mueller, of Yackandandah, Victoria, has been highly successful in administering nitrate of strychnine in cases of snake-bite. One part of nitrate is dissolved in 240 parts of water containing a little glycerine, and 20 minims of the solution are injected hypodermically at intervals of from 10 to 20 minutes according to the violence of the attack. Almost any part of the patient's body will serve, but Dr. Mueller chooses a spot near the bite itself. The strychnine is antagonistic to the poison and its own virulence is neutralised until the venom is killed. In some instances a grain of strychnine has been administered by Dr. Mueller within a few hours. The first independent action of the drug is evinced by slight spasms of the muscles, and the injections under the skin should then be discontinued unless after a time the snake poison re-asserts its power. Out of a hundred patients treated in this way, Dr. Mueller had only one failure due to premature stoppage of the injections.

A Grain Scale.



The "Chronos" Grain Scale, which is illustrated herewith, is automatic in its action, and weighs the grain led to it without the aid of a workman or driving

power while registering the result on a dial, so that the total quantity weighed can be read off at any time. It has the properties of the ordinary scale beam with equal arms, and balances when empty as well as full. Should it require adjustment, a sliding weight is provided for the purpose. Moreover it adapts itself to a quicker or slower feed of the unweighed grain, and to a free or hindered flow of the weighed grain.

Weldless Chains.

FIG. 2.

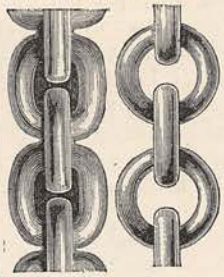


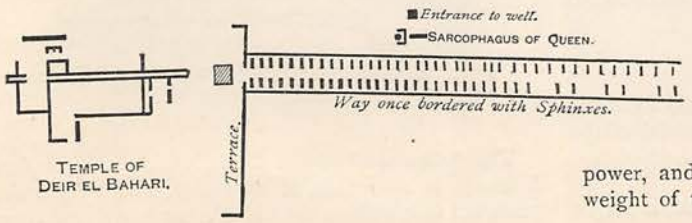
FIG. 3.

FIG. 1.

Chains of steel without a weld in the links are now produced by a very ingenious process. The links are stamped out of steel bars having a cross-section such as is shown in Fig. 1, which illustrates this form of metal with holes punched in it to determine the size of the links. After a series of punching operations we have a form shown in Fig. 2, and after a continuance of the process the finished chain, as shown at Fig. 3. These links are of great strength, being capable of standing a stress of twenty tons on the square inch of their cross-section.

New Discoveries in Egypt.

Our diagram illustrates the recent discovery of M. Grébaut at the temple of Deir el Bahari, Thebes. Some 40 metres north of the long causeway leading to that temple, M. Grébaut found the sarcophagus of a queen, and beside it, the opening of a square well filled with stones, and on removing these he came upon a straight passage at a depth of 15 metres. This passage led towards the north, and was about 2 metres high. Proceeding along it, the explorer came upon a pile of mummy cases, and beyond these, about 90 metres from the entrance, a short staircase in front of a second gallery running towards the west, and also full of mummy cases. Beyond this staircase, and still keeping to the north, he found two small chambers communicating with each other. These contained a group of royal mummies, and two large figures carved in wood; one of Isis, and the other of Nephthys. Mixed with these were mortuary statuettes and representations of Osiris in wood, hollow, and containing rolls of papyrus. There were no less than 163 mummy cases, 110 boxes with statuettes, and 77 effigies of Osiris. Sandals, play-balls, palm-leaf fans, one painted to resemble the lotus earthenware plates, with remnants of a funeral feast, dry dates and seeds, fruits of the doum palm, and morsels of bread were also found; and in the chambers, withered garlands of delphinium, lotus flowers, and bouquets were lying on the floors. According to M. Maspero, the great Egyptologist, most of the remains date from the tenth and seventh centuries before our era. We may add that during the past season the great temple of Rameses II., the Pharaoh of the Oppression, at Luxor, has been all but cleared, and a fine sculptured head of the monarch laid bare. But the most interesting of recent Egyptian discoveries is one due to Mr. Flinders Petrie. Examining the mummy cases that came from Gurob, in the Fayoum, he noticed that, instead of being made of wood, they were constructed of a kind of papier-maché of papyrus, much of which had evidently been written upon. Patience and ingenuity enabled Mr. Petrie, and the scholars who worked with him, to separate and cleanse the fragments of papyrus. Professors Mahaffy and Sayce were the leaders of the band of experts to whom the fragments thus rescued were submitted. Eaten away by age and lime as they were, they were very difficult to piece together. But at length they proved to be made up largely of legal and official documents which served to fix the age of the manuscripts. From internal evidence they were assigned to the reigns of the earlier Ptolemies, or about the middle of the third century before our era. These legal documents were of themselves valuable for the flood of light they shed on the social life of that distant age. But with them were found literary fragments, evidently of even greater age, and disclosing parts of a lost play by Euripides and the Phaedo of Plato. Their interest to scholars may be gathered from the fact that our received texts of Plato and Euripides are based upon manuscripts that are at best only Post-Alexandrian (*i.e.*, at least 600 years later), when they are not, as is the rule, late mediæval, whereas these fragments are almost contemporaneous with the authors.



TEMPLE OF DEIR EL BAHARI.

A Steam Kite.

Mr. Hiram Maxim, who is well known as the inventor of a system of electric lighting, and a destructive machine gun, has turned his attention to the questions of aerial navigation, and constructed a flying machine which is best described as a steam kite. His experimental model is 13 feet long by 4 feet wide, and is propelled through the air by means of a revolving fan, or screw, making 2,500 turns a minute. When the kite is properly slanted and the screw going at normal speed, the machine flies through the atmosphere at one level. With a higher speed of the propeller it ascends, and with a lower it descends. Encouraged by his trials Mr. Maxim is now building a kite large enough for practical use. It is to be 110 feet long and 40 feet wide, and will be driven by a screw about 18 feet in diameter. A small petroleum motor weighing 1,800 lb. will supply the power, and is capable of raising 40,000 lb. As the weight of the entire machine with two engineers is

estimated at 11,800 lb., the inventor hopes to be able to transport some 10 or 12 tons in freight or passengers through the air. In this connection we may add that M. André Duboin, a French aeronaut, has recently found that the air-pressure gauge or differential manometer of M. Kretz is exceedingly useful in ballooning for measuring the height of the balloon above the ground by the pressure of the atmosphere. It is over a hundred times more sensitive than the aneroid or mercurial barometers now employed for the purpose.

A SELF-RIGHTING BOAT.—FIG. 2.

The Phonometer.

Stanley's phonometer or chronograph is a new apparatus for enabling a person to measure distances by observing the time between the flash and the report of a gun. Sound travels at a speed of something over 1,000 feet a second (333 metres) in air and hence the distance is readily calculated if the time is known. The device will also be useful in telling how far off a flash of lightning is by noting the time between the flash and the thunderclap which follows.

A Self-Righting Boat.

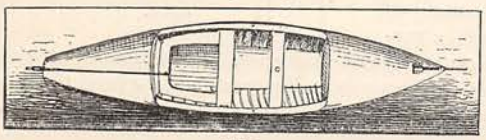
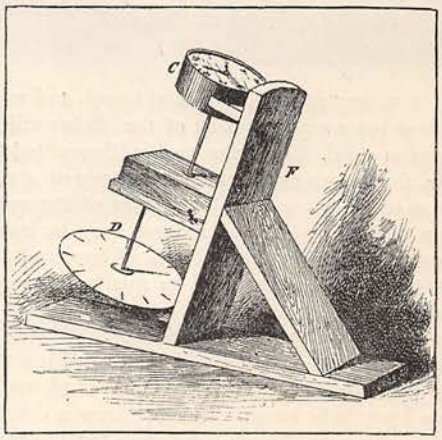


FIG. 1.

The new boat, seen in plan and elevation in our Figs. 1 and 2, is stated to be unsinkable, and to right itself instantly. The fore and after parts, Fig. 1, are hollow cones, both air and water-tight, which give a remarkable buoyancy to the craft. Looped lines, Fig. 2, run along the sides to enable persons in the water to hold on and scramble on board. Such boats will be peculiarly serviceable to novices afloat, and are well fitted for pleasure trips. They are also very promising as lifeboats at sea, for they can be thrown overboard from a large vessel without the loss of time and risk involved in the use of a lowering apparatus. They are exceedingly light; one twelve feet long and three wide, only weighing three cwt. We understand that they have undergone severe tests on the Firth of Forth.



A Clock to Show the Direction of the Earth's Motion.

A point on the earth's surface moves to the west at a velocity of 700 miles an hour owing to the daily rotation of the earth around its own axis. At the same time this point is moving along the plane of the ecliptic in a direction at right angles to the direction of the sun at a velocity of nineteen miles a second, or

68,400 miles an hour, by virtue of the revolution of the earth in its orbit round the sun. Moreover, the entire solar system, that is to say, the sun and planets with their moons, is supposed to be moving towards a point in the constellation of Hercules at a velocity of about five miles a second, or 18,000 miles an hour. To show the true motion of the earth in space, or, as he prefers to call it, through the ether, Dr. Oliver Lodge, F.R.S., a well-known physicist, has devised a clock which we illustrate in the figure. It consists of a framework F supporting a disc D, which rotates on a spindle once in twenty-four hours, and is graduated to show the dates throughout the year. It is rotated by the clock C, which keeps solar time, and its motion is such, that, on any given date the radius of the disc corresponding to that date points out the direction in which the earth is moving. By a simple modification the clock is also made to indicate the direction of the sun.

Castrography.

A pretty art, to which the name of castrography, or the art of writing by incision has been given, has been introduced by Mr. Mills, an American. It consists in cutting with the blade of a penknife the drawing or

writing in a sheet of card, or Bristol board, and raising the incised parts with the back of the blade until they stand out in relief. When the card is illuminated from the side, the figures exhibit the appearance of a sculptured bas-relief or carving. A picture of the work is given in our engraving, and readers may be induced to practise it. Visiting-cards, bills of fare, and other fancy articles can be produced in this way as rapidly as by drawing.

Reflecting Hand-lamps.

The hand-lamps which we illustrate in Figs. 1 and 2 have powerful reflectors made in a combined circular and parabolic curve, so as to throw a diverging beam to a distance of from 100 to 200 feet. They are useful for night work, especially that shown in Fig. 2, which is made double. The reflectors are plated with silver or nickel, and are cleaned by first washing them with soap and water, and then polishing them. For use at sea, each lamp is fitted with a rubber ring at the base, to prevent it sliding. The inventor states that with these lamps print can be read by the naked eye at a distance of 140 feet, and that they give off no smell, while consuming but a pennyworth of petroleum oil in twelve hours. Captain Loftus has also devised a reflecting screen for the sidelights of ships; and he has

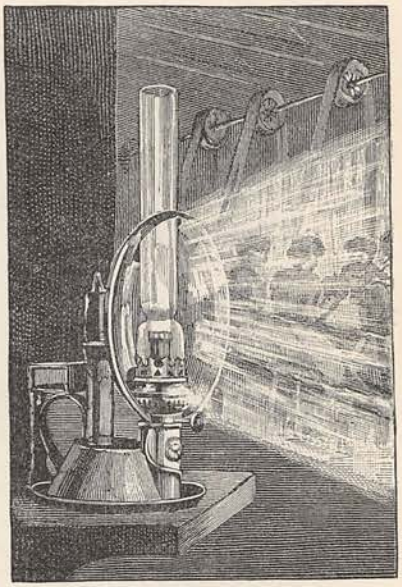


FIG. 1.

applied coloured glycerine to tinge the light of lamps used in land and marine signalling. Glycerine is unaffected by changes of temperature, and is readily coloured. When confined between curving glasses and tinted, it permits from 50 to 80 per cent. more light to pass than coloured glass. Captain Loftus is an advocate for the use of yellow glycerine on masthead and stern lamps, thereby enabling pilots and seamen to distinguish these from the phosphorescence on the crests of high waves.

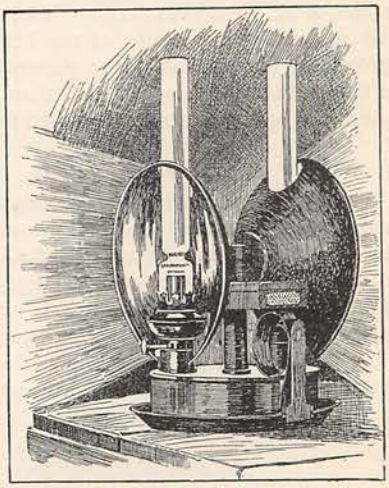


FIG. 2.

A Steam Steriliser.

Mothers' milk is sterile, that is, free from germs, and hence it is desirable to sterilise any other milk substituted for it in the feeding-bottle. Cows' milk, as sold in cities, is usually from twelve to twenty-four hours' old, and has absorbed various impurities from the air, not to speak of water which may have been

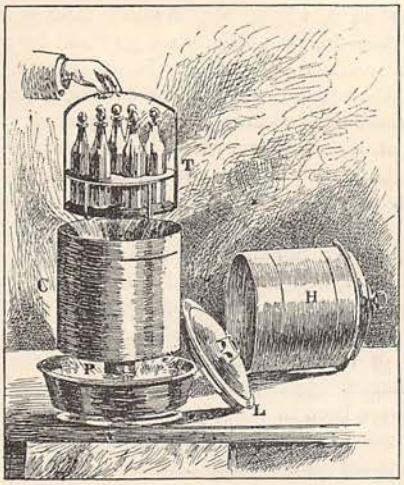


FIG. 1.

used in adulterating it, or the germs of some disease from the cow. It has been strongly recommended by the French Academy of Sciences, and many leading physicians, that all milk given to infants, or used as milk by adults, should be sterilised, a process which not only kills the germs in it, but allows it to be kept for weeks even in warm weather unchanged. Milk is sterilised in a simple manner by heating it to a temperature which destroys any germs of fermentation and disease it may contain. Mere boiling is not always effectual, and the milk thus treated is apt to produce constipation. The Arnold steam steriliser, which we illustrate, has been very successful in America, and may be recommended for the purpose.

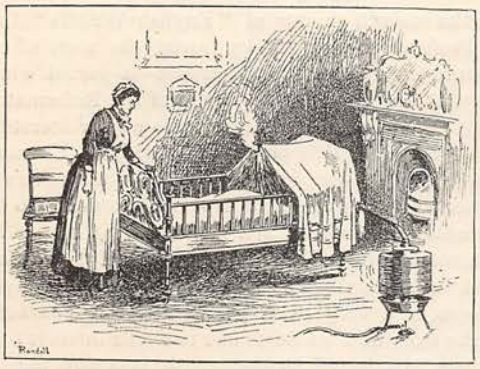
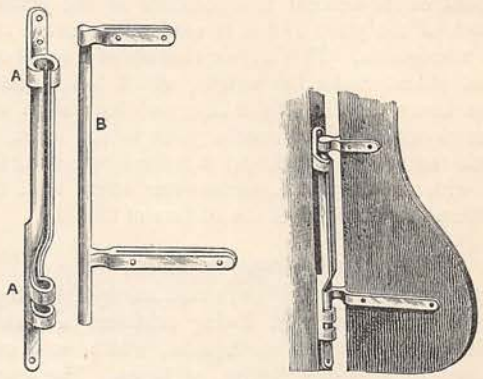


FIG. 2.

It consists of a steam chamber, C, into which a number of nursery bottles containing the milk are placed on a tray, T, then covered with the lid, L, and hood, H, as shown in Fig. 1. The reservoir or pan, P, underneath is filled with water, and the whole is then placed on a fire, or stove, or above a lamp. The steam rises from the water and circulates in the chamber, heating the milk to a temperature of 212° Fahr. After an hour of this treatment the milk is freed from germs. The steriliser can also be used for several other purposes. When the hood is fitted with an inhaler or pipe, it can be employed in cases of croup, diphtheria, and bronchial affections, as shown in Fig. 2. Moreover, it is serviceable in warming cloths for local application, heating poultices, disinfecting garments, and so forth.

A Safety Rudder.

Mr. Nixon, a retired naval officer, has invented a safety rudder, which is shown in our illustration. The details of the fittings, which are the novelty, will be understood from the first block, where A A is the slide, which is screwed to the stern-post of the boat, and B is the pintle-rod, which is screwed to the rudder. The



arrangement permits the rudder to be unshipped by hand on the darkest night and in the roughest weather, and it is next to impossible for the rudder to become unshipped accidentally, as the fittings allow it to rise and fall when the boat touches the ground, or, as in the case of river boats, passes over the rollers. Another advantage is that the rudder can be left unshipped when the boat is on deck or hanging from the davits, and when it is being towed astern.

A New Heater.

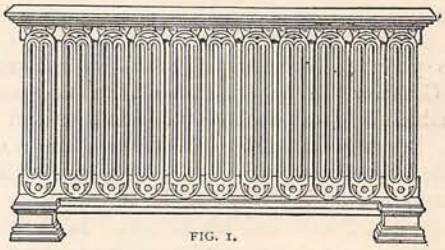


FIG. 1.

The heater shown in our engraving (Fig. 1) is not only of a good appearance but very effective, and can be used with either steam or hot water. The top and base are hollow, as will be seen from the sections, Figs. 2 and 3, and the steam or hot water circulates through the whole series of pipes and passages, while the heat radiates from an extensive surface. As shown in Fig. 3, the vertical pipes can be arranged in a double set if desired. Moreover, the heater can be used to ventilate a room like a fireplace, by running an ornamental casing (A, Fig. 2), along one side, and admitting fresh air by a pipe, B, at its bottom from the outside of the building.

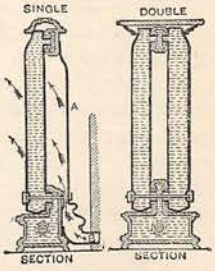


FIG. 2. FIG. 3.

Measuring the Growth of Plants.

Mr. H. Darwin, a son of the well known naturalist, has devised a simple apparatus for measuring the rate of growth of a plant. A thread is attached to the upper end of the plant, and passes over a light pulley. A weight is fastened to the lower end of the thread so that as the plant rises the weight sinks. The amount of its descent is a measure of the vertical growth of the plant and it is read off by means of a cup micrometer. This device consists of a small cup of oil placed under the weight, which has a needle point fastened to it. In taking an observation the exact position of the needle point is the index by which the scale is read, and it is fixed by raising the cup with the help of a micrometer screw until the needle point just touches the surface of the oil.

An Earthquake Model.

At the "Ladies' night" or second *soirée* of the Royal Society, Professor J. A. Ewing exhibited a curious model of a Japanese earthquake, which was constructed by Professor Sekiya, of Japan. The earthquake in question took place at Tokio and the motions of the ground were recorded by Professor Ewing's seismograph. By means of a bent wire Professor Sekiya has represented the peculiar motions of a particular point of the ground, but magnified about fifty times. Labels attached to the wire at intervals mark the successive seconds during which the shock lasted. The wire is bent and tangled into an object like a crow's nest: it is difficult to realise that the movements of the ground can be so complicated and on viewing the model it becomes easier to understand the sickening sensation produced by the unsteady footing.

About London and Londoners.

Two years ago—in August, 1889—we referred in "The Gatherer" to the publication of the first part of a valuable statistical work on "The Labour and Life of the People," edited by Mr. Charles Booth, and published by Messrs. Williams and Norgate. Time has amply proved the value of the researches undertaken by Mr. Booth and his helpers. In their first volume they dealt with the traditional home of poverty and misery—East London. The second volume, which is now before us, contains the results of the same principles of investigation applied to the metropolis as a whole. Still another volume is promised to complete the statement of London questions, but this present volume sets forth in sufficient fulness the main statistics which affect London as a whole, and its proportion of poverty. As it was in the first part of this wonderful work, the maps (which in this second part are accommodated in a separate case) form really a guide and index to the whole. One thing Mr. Booth's figures show most conclusively, and that is that "the East End" has not a monopoly of the poverty. He divides the population into eight classes, four of which represent varying degrees of poverty, and four similarly varying degrees of comfort. In the East End these two groups comprise 38·3 and 61·7 per cent. of the population respectively. Taking London as a whole, Mr. Booth's later researches show that the proportions are 30·7 and 69·3 per cent. The average of comfort is, of course, brought up for the whole metropolis by certain West End parishes where the percentage of poverty is very small. The registration districts where the percentage of poverty is highest are Holborn and St. George's-in-the-East, which are both credited with 48·9 in the hundred. And the three in which it is lowest are St. George's, Hanover Square, with 21·6, Lewisham and Penge with 18·1, and Hampstead with only 13·5 per cent. Another valuable series of figures is that in which Mr. Booth tabulates the particulars of the proportion of the population born outside the metropolitan district. 34·1 persons in each 100 of the population were born in other parts of the United Kingdom, and 2·6 were born abroad, giving a total proportion of persons born outside London of 36·7 per cent., or rather more than one in three of the residents. Scotland sends 1·3 in each 100 of London's population, Ireland 2·1. The counties nearest London naturally show the highest percentage, but Yorkshire sends ·8, and Lancashire ·7. It is very interesting to follow these immigrants further in Mr. Booth's pages, and note the different localities in which they settle. But for this, and hundreds of other interesting and useful bits of information, we can only refer our readers to Mr. Booth's book, for which philanthropic workers cannot be too grateful.

Some New Books.

In the seventh volume of "English Writers" (Cassell) Professor Henry Morley carries the story of our literature from Caxton to Coverdale—a period which covers, at any rate, the beginning of the Reformation struggle, that left so keen an impress on our literature, as on every other side of our national life. Erasmus, Thomas More, Colet, and Grocyn, were all writers of this period, which is one of especial interest. To the "Pseudonym Library" Mr. Fisher Unwin has added a translation of a Russian story called "A Village Priest," and described as being by Potapenko. Cyril, the hero, is a very cleverly drawn, strong character, and the story as a whole is one to excite interest from the very novelty of its theme. It is a pity, though, that the last chapter was not differently planned. "Drinks *à la Mode*" (Longmans), is Mrs. de Salis's latest contribution to her series of household manuals. It deals with beverages of every kind and degree of strength, and no reader need put it aside because he has a distaste for a particular class of liquid. The chapters on "Cooling Drinks" and "Invalid Drinks" are especially good. From the same publishers we have received "A Guide for Pianoforte Students" by Professor F. Davenport, and Mr. J. Percy Baker, of the Royal Academy of Music, and we commend it to the attention of both teachers and students.

SHORT STORY COMPETITION.

About two hundred and fifty MSS. have been received by the Editor, and are now under consideration. The award will be published as early as possible.