

self a name. I have returned to England, and finding the firm at Manchester, in which I had been, fallen into some difficulties, I have been able to lend it a large sum of money, which will be the means of saving it from failure. Now you know the whole of my story—what do you say? Will you take one with so blemished a character—one on whose conscience lies such a disfiguring scar?"

Then, still without a word, Ruth drew the kerchief from her face, and exposed the sadly marked neck.

"Oh, Michael!" she said, "look at me—at my scar."

Instantly he had her in his arms, his lips on the poor, maimed, disfigured neck, and kissed the scar passionately.

"Dearest, noblest Ruth," he said, "I know all—how that was *won*—yes, won! A mark of glory to be proud of, a badge of your own perfect unselfishness and self-devotion."

"And your scar, Michael! I love it," she said—trembling, throbbing in his arms. "For your wound is healed, and marks the man who, though wounded, has had strength to recover."

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.

Parlour Gymnastics.



Our contributor, "A Family Doctor," writes: "Mr. R. Parke has lately introduced a new form of parlour gymnastics, which bids fair to be of considerable service in those cases of spinal curvature where there is no actual disease. Two weighted poles moving on pivots on a foot-board constitute the whole apparatus. One feature of the system is certainly novel—the motions are gone through to music, and are, therefore, less monotonous."

A Submarine Ram.

A sunken vessel, which runs flush with the water-line and carries a powerful ram or piston driven by a steam cylinder for the purpose of ramming an enemy's vessel, has been designed in the United States. The ram will be driven by a force of 150 tons, which is sufficient to pierce the side of an iron-clad. The speed of the vessel will be about 20 knots an hour.

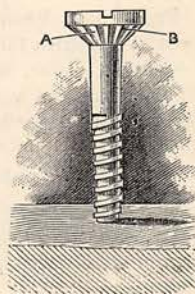
A Hybernating Swallow.

At a recent meeting of the French Society of Naturalists, M. Leroux exhibited a live swallow wrapped in a deep sleep in which it had been since last

October, when it was disabled from flight by a coachman's whip. As it was insensible at the time, a child picked it up and put it fast in a box among wadding. After a discussion on the possibility of swallows hibernating, the swallow was awakened in presence of the Society and set at liberty.

A Self-Countersinking Screw.

The figure illustrates a screw-nail, which is fitted with cutting teeth on the under side or bevel of the head. The teeth, when the screw is driven home, cut into the wood, and thereby enable the head to countersink itself. They are so formed as to allow the sawdust to escape by the channels between them to the top of the head. For this purpose the channels, B, and the teeth, A, are both wider in going from the shank towards the top of the screw.

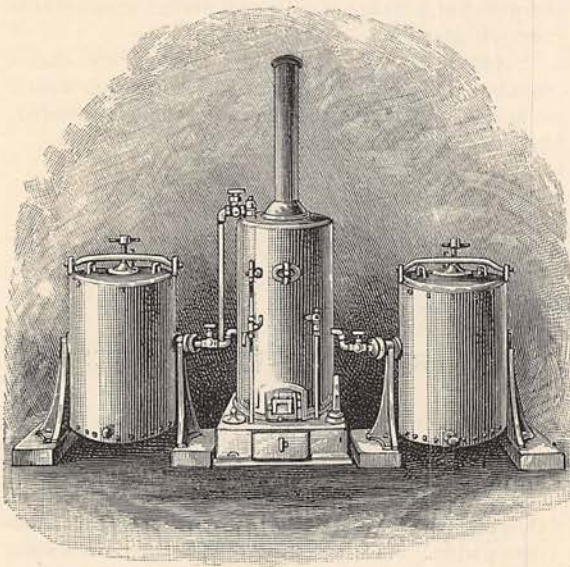


Another Music Turn-over.

Another very simple and easily-applied music turn-over has just been issued. It consists of a long strip of stout paper with one side gummed, which is to be pasted down the outer edge of the music folio, and then cut away in accordance with the printed lines upon the ungummed side. These lines divide the slip into equal lengths, and by cutting away one for the first leaf, two for the second, and three for the third, there can be no difficulty about turning over the exact page required, especially as the strip has the double effect of making the turning over easy and strengthening the edge of the folio.

A New Farm Steamer.

Our figure represents a new steaming apparatus for the use of farmers, in which to steam corn, grain, roots, and so forth, for stock purposes. The arrange-



ment consists of a steam boiler, two steaming pans, and a water tank, which is not shown. The iron pans are mounted on trunnions, so as to be turned over and emptied with ease. The arrangement is likely to be useful in districts where the breeding and rearing of sheep is carried on to a large extent.

Waxed Paper Bags.

Paper bags lined inside with paraffin wax are now used in America for holding articles of various kinds—such as coffee, flour, furs, fruit, and confections. They are air and water-tight, and cost little more than the ordinary paper bag.

Steel Props for Mines.

The figures illustrate one of the steel stays which have been introduced as props for mines by a Leeds firm of steel merchants. They are said to be stronger and more durable than timber props; and, being



made of rolled steel, they cannot be so easily broken as cast-iron ones. The prop we illustrate is of angle steel, with the flanges turned over at top and bottom. The smaller figure shows a cross-section of the prop.

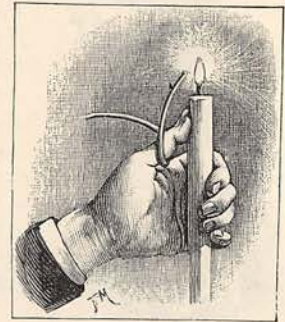
Floor-Deafening and Health.

Floor-deafening usually consists of coarse mortar and smithy ashes; but in some cases it is of a more questionable character, and as it is much used for preventing the noise of one floor reaching to that below, Professor Carnelly and Miss Etta Johnstone have

undertaken to investigate its sanitary properties. They procured a number of samples from various classes of houses in Dundee. The results show that the insanitary qualities of deafening, as indicated by the percentage of chlorine, nitrogenous organic matter, and combustible ingredients, run parallel with the class of house, being worst in one-roomed houses, and best in the largest houses. The deafening of ordinary middle-class homes is in almost all cases practically free from nitrogenous organic matter and chlorides, as well as noxious odours, so that no objection can be taken to it. In the poorer houses of three rooms or fewer, organic matter and chlorides are always present, the percentage being higher in the older houses. In many cases, too, the odour is objectionable. It would, therefore, appear that the air in such houses may give rise to ill-health. Professor Carnelly and others have shown that the air is more impure in one or two-roomed houses than in three or more roomed houses, especially as regards micro-organisms. The present investigation shows that the sanitary condition of floor-deafening similarly corresponds. The deafening, in fact, is a suitable medium for the growth of micro-organisms, and gives off fœtid gases from putrefaction, provided the necessary factors of moisture, warmth, and nitrogenous organic matter are present.

A Magnesium Burner.

At a recent meeting of the French Academy of Sciences, MM. Guebard and Rangué described a new method of burning magnesium wire. The apparatus consists of a small tube, 10 centimetres (practically 4 inches) long, and 0.4 centimetres (about $\frac{5}{32}$ of an inch) in diameter inside, twisted to form a loop, as shown in the accompanying figure. At one end a small quantity of magnesium "photo-powder" is introduced: two-tenths of a gramme serving for the object-



glass of a photographic camera of 2 centimetres ($\frac{2}{32}$ of an inch) aperture, and 10 centimetres (4 inches) focal length, when the light is at a distance of three metres (9.840 feet) from it. At the other end of the tube is attached a small india-rubber bulb, such as is used in ejecting liquid from a bottle in the form of spray. The loop of the tube is then inserted over the thumb, while the hand holds a lighted candle, as shown in the figure. The open end of the tube is thus obliquely presented to the largest part of the flame. A flash is thereby produced, giving a richly actinic light, lasting long enough for the purposes of photography. The device is so new that we are unable to say whether or not it is made for the market; but it is so simple that an amateur can readily make it for himself.

A Sand and Salt Shedder.

We illustrate herewith a new vehicle for distributing salt and sand on roadways whenever the weather demands it. The body of the machine consists of a large hopper containing a cubic yard of sand. A slide at the bottom regulates the rate of delivery, and a roller is placed underneath the opening. This roller is made up of loose rings on the shaft, and the sand falls in an even sheet on the distributing sieve. It is driven directly from the wheels. The machine is made in two sizes—one for a common road, the other for a tramway.



A SAND AND SALT SHEDDER.

A Japanese Plum.

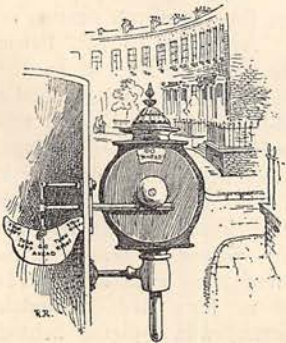
The Japanese fruit-shrub, known as the Kelsey plum, has been introduced into the south of England. It bears a heart-shaped plum, attaining to nine inches in circumference, yellow in colour, tinged with red on the sunny side, and very luscious to the palate.

Sugar-Cane Paper.

The stalk of the sugar-cane makes very good paper, and as much of the crushed fibre, called "megass," is burnt in the crushing mills for fuel, there seems to be an opening here for a new industry. The sugar-planters of the West Indies are not in flourishing circumstances, and the recent exhibition of cane paper in New Orleans may turn their attention to the matter.

A Cab Signal.

It is desirable to have a means of signalling between the fare and driver of a cab or hansom. This is provided by the apparatus we illustrate. It consists of a dial with a pointer in the cab, the dial showing directions, such as "Stop," "Turn to the left," &c. When the pointer is moved to one of these directions, a bell rings, and an indicator at the back of the lamp presents a corresponding direction to the driver.



A Word-Building Slate.

A little slate for use in the teaching of very young children or in Kindergarten classes has quite recently been patented. Into a groove at the top of the slate, blocks, upon which are printed various letters, may be inserted, and by their means children may be very quickly taught the changes which the addition or subtraction of a letter makes in the building up of words. A row of beads sliding on a rod in the frame of the slate serves also as a miniature counting frame, so the children may be taught other lessons than simple spelling by means of this slate.

A Light Pyrometer.

A new pyrometer, based on the colour of heated iron at different temperatures, has been introduced into France. Iron changes from red to orange, and then to white, as its temperature is raised. The eye, however, cannot distinguish the different shades without

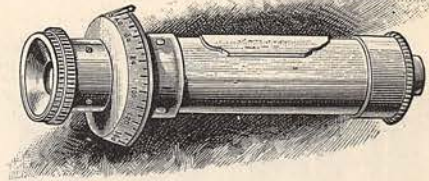


FIG. 1.

assistance, and hence it is aided by a telescope fitted with two Nicol prisms, one on each side of a plate of quartz. The light from the iron in passing through the first prism is polarised, and the plane of polarisation is turned in the quartz plate through an angle

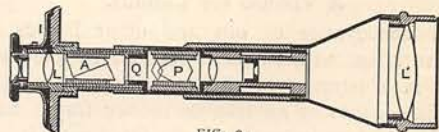


FIG. 2.

proportional to the wave-length, that is to say, the colour of the light. The second prism is used to measure this angle, and thus determine the colour of the iron. It is carried by a tube fitted with a graduated

head, and the graduations indicating the angle through which it turns correspond to the colours of the light. The apparatus is illustrated in Figs. 1 and 2, where *L* is an objective lens receiving the light, *P* the first Nicol prism, *Q* a quartz plate, *A* the second Nicol prism, *L* the eye-lens, and *I* the graduated head which measures the angle. This pyrometer is now used at some of the largest ironworks in France.

What is Lanoline ?

Among recent discoveries for the preservation of the skin, "lanoline" deserves attention. This substance has been calling forth considerable inquiry in scientific circles; so much so, indeed, that the well-known Professor Leibreich, of Berlin, took the matter up, and embodied the results of his investigations in a paper, which was read last year before the British Medical Association. The use of lanoline in its various forms, the professor declares, is scientifically proved to be highly conducive to the preservation of the health of the skin, for this reason—lanoline returns to the skin the emollient and stimulant which is often lost in the course of ablution. This it does from its power of easily penetrating and being readily absorbed by the skin. Soaps, chiefly composed of glycerine fats, cannot do this to the same degree. Lanoline, on the other hand, consists of cholesterine and cholesterine fats. As a basis for ointments, therefore, it is spoken of most highly by scientific men; and if experience should prove that Professor Leibreich's estimate of its powers is justified, lanoline will earn for itself a widely useful future.

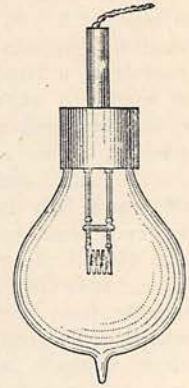


A Vehicle for Liquids.

The conveyance of oils and other liquids from street to street with safety is insured by the vehicle which is illustrated in the engraving. As will be seen, it consists of an iron or timber frame, having a number of cylindrical vessels fitted into it. The frame is readily lifted from a railway truck, and placed on a trolley, thus forming a vehicle. Both frame and carriage are provided by the makers. Two sizes are made, one capable of holding 400 and the other 800 gallons.

An Optical Electric Lamp.

When the electric incandescent lamp is used for optical purposes, with a reflector to concentrate the rays, it is an advantage to get the filament in the focus. Ordinary incandescent lamps are, however, not adapted for that, and hence the new form of Edison-Swan lamp, shown in the accompanying figure, has been introduced. It will be seen that the filament is in the form of a spiral, which makes it compact and capable of being wholly placed in the focus of a lens or reflector, when required for optical purposes.



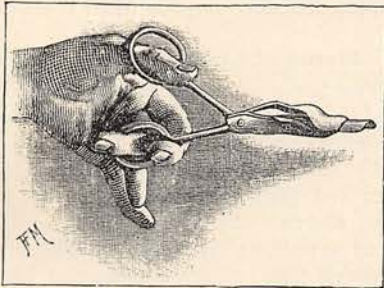
Printing Ink from Cotton Waste.

Printing ink is now made from the refuse oil extracted from cotton waste. Hitherto, when cotton refuse was cleansed, the oil was thrown away in the form of soap produced by boiling the waste in caustic soda liquor. Mr. Bastand, however, heats the waste in a close chamber, and pumps a solution of bisulphate of carbon on it. This disengages the oil and grease, and the combined bisulphate and oil are run into a second hot chamber, where the bisulphate is vaporised and collected for use again. The oil is then freed from moisture in a copper, and subsequently converted in another copper into the varnish from which printing ink is made by admixture with colouring matters.

The Blond Race of Palestine.

Professor Sayce has recently drawn attention to the fair-haired, blue-eyed people met in the mountainous parts of Palestine, and sometimes supposed to be descendants of the Crusaders, or other Europeans who found their way to the Holy Land during the Middle Ages. Recent discoveries of Mr. Petrie in Egypt have, however, thrown a new light on these peculiar folk. The ethnographic types depicted on Egyptian monuments at Abu-Simbel represent blue-eyed, red-haired persons, known as the "Shashu of Kanana," and the "Amaur." The former dwelt to the south of Hebron, and the latter are the Amorites of the Old Testament. Hence, a blond population existed in Palestine before the fourteenth century or period of the Crusades. According to Mr. Petrie there is a painting of the Chief of Kadesh on the walls of a Theban tomb, showing him to have had a white skin and light red-brown hair. Kadesh was the southern capital of the Hittites, after their invasion of Syria; but the Egyptian inscriptions describe it as being "in the land of Amaur," and that its chief was an Amorite is evident from the fact that the Hittites are depicted with yellow or orange skins, their hair being black, and their eyes dark. The Hittites, indeed, appear to have had Mongoloid features, the hair being arranged in a pigtail behind.

The Amorites, on the other hand, are represented as a tall and handsome people, with large sub-aquiline noses, a short pointed beard at the end of the chin, and long-skulled heads. The Egyptian monuments tell us that Palestine contained a white race before the arrival of the Israelites, and that it continued in the land after the Jewish conquest. Professor Sayce points out that the captives taken by Shishak from the cities of Judah in the time of Rehoboam have Amorite, not Jewish features. There is nothing in common between them and the Jewish-looking tribute-bearers of Jehu seen on the black obelisk from Nimroud now in the British Museum. Hence he infers that in the tenth century B.C. the main population of southern Judea was of Amorite origin.



A Pen Extractor.

The figure illustrates a pair of nippers designed to catch and draw out nibs from pen-holders without soiling the hands. The instrument is used like a pair of scissors, as will be seen from the cut. It will remove old and rusted pens without any trouble.

Non-Actinic Electric Light.

Electric incandescent lamps are sometimes used in the dark rooms of photographers; and, in order to render the light non-actinic, it is recommended that the bulbs should be painted over with a mixture of the red "fuschine" in negative varnish. It may be remarked that the lower the current the redder the light from an incandescent lamp is, and hence the less need there is for the paint.

New Silkworms.

The oak silkworms of China and Japan (*Attacus Peryni* and *A. Yama-mai*) have been acclimatised in Germany, by protecting them with gauze or wire nets, and changing them from branch to branch as the oak-leaves were consumed. In spite of late frosts and droughts, which proved injurious to the caterpillars in depriving them of food, considerable success has been met with. In California a new wild moth has been found on the poisonous species of *Rhamnus californicus*. Its silk is as good as that of the domesticated Bombyx. In Yucatan another wild moth has been met with which produces a silk of a bluish tint, but the gum enveloping it is difficult to remove. Mr. J. MacIntyre, a recent traveller in Manchuria, met with

several new species of silkworms. One of these fed on the Chinese pine, forming handsome cocoons of strong silk, but unfortunately mingled with the pine-needles, and therefore difficult to unwind. Another he observed on the walnut-tree, having a reticulated cocoon like a Chinese lantern. Two others were mulberry silkworms, very hardy, and capable of feeding on dandelion and lettuce leaves. One of them stayed in the same spot, the other roamed from branch to branch. It may also be mentioned that the cultivation of the Mexican *Attacus orizaba* is to be tried in France.

Tubular Solder.

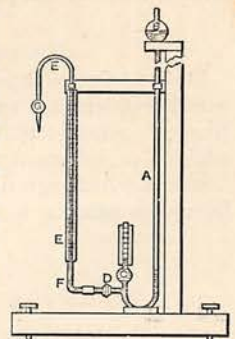
A handy form of solder has been introduced by Mr. Sinclair, a telephone engineer of Glasgow. The solder is cast in hollow tubes, which contain the resin used as a flux, so that both are melted by the soldering iron together, and the resin is kept clean. Resin, we may add, is a safe solder for electrical work, being dry and incorrosive. It is much used in connecting telephone wires.

A Sawdust Filter.

Carbonised sawdust, saturated with chemicals, has been introduced into Germany as a filtering and discolouring material. Sawdust is treated first with alum, then with sodium carbonate, and becomes impregnated with a precipitate of aluminium hydrate, which firmly adheres to it. After being washed with a solution of barium chloride until no precipitate is given, the sodium sulphate simultaneously produced is entirely removed, and the prepared sawdust is ready for use. Coloured liquids filtered with it have their colour entirely removed by the formation of lakes with the aluminium hydrates present in the filtering material. Sawdust saturated in this way with barium chloride is used for filtering liquids from which it is required to remove calcium sulphate, and a sawdust treated with magnesium sulphate and caustic soda is used to remove calcium carbonate from a solution.

A Thermo-Barometer.

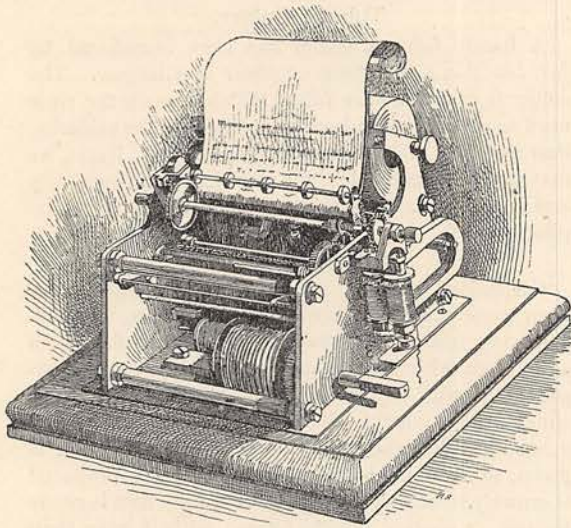
The figure illustrates a combined thermometer and barometer, G E F being the thermometer, connected with C A B, the barometer. The latter is purposely shortened in the figure by severance, the tube being too tall to show in a small figure. The scales of the two instruments are seen in their proper places; and the whole is mounted on a stand. The combination in question is recommended for hospitals, meteorological stations, and such-like places.



A Telegraphic Type-Writer.

A drawback to the type-printing telegraphic instruments which print off the latest intelligence and market prices in clubs and exchanges, is that the

message is all in one line on the running slip of paper. Messrs. Moore and Wright have, however, recently brought out a telegraph receiver of this kind which prints the message line after line, like the page of a book, or the sheet of a type-writer. This is effected by having two trains of clockwork, one to move the type-wheel which prints the message, and the other to shift the paper up when a line is printed. These trains of clockwork are controlled by the electric current in the line, through the agency of two electro-magnets. It



would occupy too much of our space to explain the whole action of the instrument, a general idea of which will be gathered from the view we give of it. The "column" type-printing telegraph, as it is called, will be useful for private work and exchanges, in place of the ordinary type-printer. It only requires one wire to convey the current, it works noiselessly, and it gives the items of news under appropriate head-lines in the form of columns and paragraphs.

Books for Citizens.

Messrs. Cassell have just issued a new edition, which completes the 100th thousand, of their "Citizen Reader," which has been revised to date by the addition of information respecting the new County Councils. Although the work was primarily intended for use in schools, it has been found serviceable by

many who have left their school-days long behind, and in its improved form it should prove even more widely useful.—What the "Citizen Reader" does for our country, "A Ramble Round France" (Cassell & Co.) does to a large extent for our neighbours across the Channel, and teachers should find it useful for giving their young charges a correct picture of a land whose history brings it and its people so constantly in connection with our own land and people.

"Advice to Singers."

All singers, and all who would be singers, will find Mr. Frederick J. Crowest's "Advice to Singers" (of which Messrs. F. Warne & Co. have just issued a new edition) full of valuable hints and suggestions, and in the exercises with which they are accompanied a ready means of testing progress made is provided.

Stories of Love and Adventure.

In "The Secret of the Lamas" (Cassell & Co.) we have a story full of stirring adventure among the mysterious surroundings of the Lamas of Thibet. The hero, Cecil Aylward, is separated from his lover, and goes to India to join his regiment, which is, shortly after his arrival, sent to the front in an expedition against the Thibetans. Here Cecil is cut off from his men one day and lost on the hills, where he is found after some little time by a body of Thibetans and taken prisoner. He is well treated by his captors, and initiated gradually into all the mysteries of the Lamas; and in course of time acquires many of the powers of mesmerism and command over natural forces which are attributed to them. After a while he makes his escape from the Thibetans and reaches England, to find he has been given up for lost, and his lover is married to a scheming financier, who has won her hand but not her heart, through his command over her guardian. We must leave the book to tell its own story; but the reader will find in the work an abundance of marvellous adventure and keen interest.—Of "The Admirable Lady Biddy Fane," which has just been added by Messrs. Cassell to the same series as "The Secret of the Lamas," we need only say that it is a single-volume edition of a story by our contributor, Mr. Frank Barrett, which has already found many readers in another and more expensive form. We are sure that readers of CASSELL'S MAGAZINE will be glad to find Mr. Barrett's story in so accessible an edition.

EXTRA SUMMER NUMBER OF CASSELL'S MAGAZINE.

Simultaneously with this Number of the Magazine is published "THE CROWN OF THE YEAR," our Extra Summer Number for 1889, containing a Complete "One Volume" Story by the Author of "A Man of the Name of John," entitled "King or Protector?" as well as other Complete Stories and Papers. The price of the Number is Sevenpence, and it will contain the usual number of high-class illustrations by well-known artists.