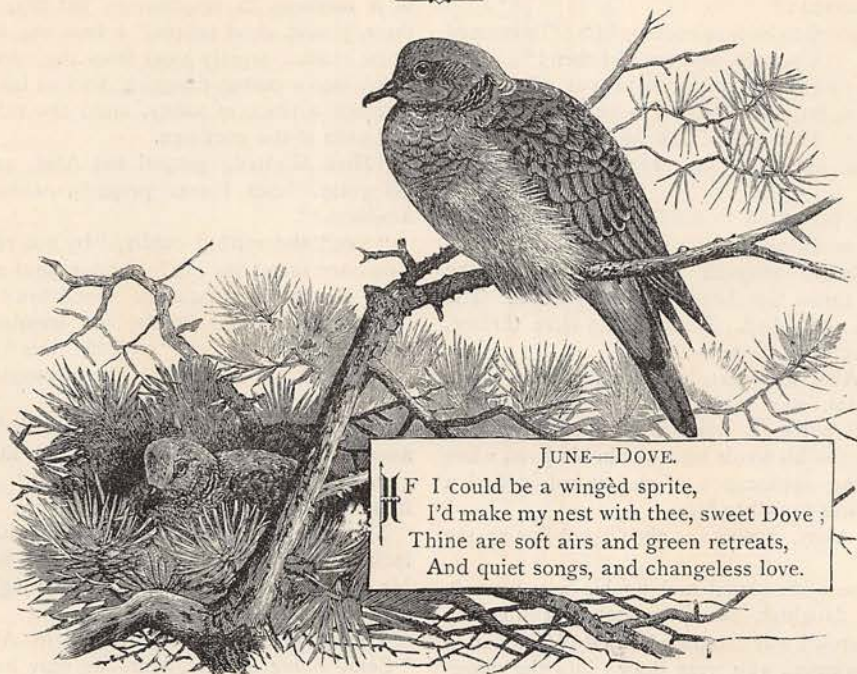


BIRDS OF THE MONTHS.

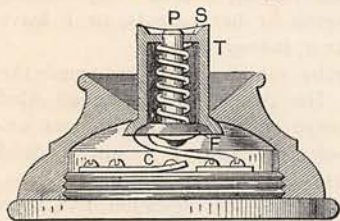


THE GATHERER :

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 Self-Acting Fire-Alarm.



The fire-alarm here illustrated in section consists of a thimble, *T*, enclosing a spiral spring, *S*, surrounding a metal pin, *P*, which has a flat foot or circular flange, *F*, around its lower end. The pin is soldered to this flange by a fusible alloy melting at a temperature of 150° Fahr., and the thimble thus provided is placed in an ordinary electric bell contact piece, *C*, as the push-button. It serves the purpose of a push-button under ordinary circumstances ; but if fire breaks out in the room where it is placed, the fusible solder melts, and the flange is separated from the pin, allowing the spiral spring to press down and complete the contact, *C*, thus ringing the bell.

Coca.

A very useful article has recently appeared on the history and properties of "coca," the remarkable South American plant which yields the anæsthetic cocaine. Three hundred years ago a Spanish traveller described its use by the Indians, who chew a paste made from the leaves, in order to keep off hunger and thirst while on their journeys, and enable them to undergo fatigue. At present the plant is largely cultivated in the Andes, from the Argentine Republic to New Grenada, the chief depôt being at Las Paiz, in Bolivia. Nearly all the produce is consumed in South America. It grows best in the mild and moist climate of the lower mountains at a height of 2,000 feet to 5,000 feet above sea-level. Two or three crops of the leaf can be gathered in the year ; and the largest leaves are preferred, as containing most of the alkaloids, which make the virtue of the plant. The leaves have an odour of blended hay and chocolate when broken, and are of a rare green colour.

Since the discovery of cocaine the leaves have been exported to Europe ; but the sea-voyage is found to rob them of the alkaloids, and therefore it is the custom now to extract these in South America, and then export them for the manufacture of cocaine. So much interest has been aroused concerning the fortifying properties of the plant that it is to be hoped the trade will increase, and the benefits of the leaf, hitherto confined almost exclusively to South America, will be extended to the Old World.

years of its "Expositions" Paris puts on its gayest dress ; and when, in a limited period, over twelve million visitors pay to enter an Exhibition (as was the case in 1878), and many of these come from afar, even the broad boulevards show some addition to the numbers of those of many climes who throng them. This year Paris is to outdo itself in the display at its Exhibition ; and from the "overtopping tower" of M. Eiffel to the pagoda-like Indian section of the Exhibition, from the magnificent locomotive our Midland Railway sends,



A MOVABLE SCIENTIFIC STATION.

A Movable Scientific Station.

A movable station for biological work in the field has been adopted in Bohemia after the designs of Dr. Ant. Fritsch. Our illustration shows the hut, which contains one room, suitable for four naturalists engaged on the fauna of ponds and lakes. The building consists of eighty movable pieces, which can be put together in two and a half hours. The work of this Bohemian survey consists in examining the living products of the lakes and ponds, and taking the temperatures of their waters at different depths.

How to Go to the Paris Exhibition.

The excursion of the year will, unquestionably, be to the Paris Exhibition, and it will be useful as well as interesting to many to learn something as to the chief methods of reaching the gay city, and the cost of the journey thereto. Paris is, at any time, full of attractions, and to its usual charms there are this year added those of the Universal Exhibition, the huge Eiffel Tower, and the vast masses that will be drawn there. To the dweller in London, Paris is now nearer in point of time than Edinburgh. The preparations which have been made by some of the chief railways for transit have been on a scale of great magnitude ; trains are to be expedited ; new and quicker steamships are to be put on the routes ; harbours have been improved ; and there can be little or no doubt that the traffic between the nations of Great Britain and France will be unexampled in extent. In the

to the collection of municipal flags, there is variety enough to provoke the quotation of that verse of the laureate's, in which he describes the—

—“Polar marvels, and a feast
Of wonders from the west and east.”

Coming, however, back to England, the question of how to get to the Exhibition may be put.

The chief routes to Paris, taking London as the starting-point, are those of the South-Eastern Railway, London, Chatham, and Dover, and London, Brighton, and South Coast. The Folkestone and Boulogne, the Dover and Calais, and the Newhaven and Dieppe routes, may be taken as another method of describing these three. The old route to Paris is that well-known one by Folkestone and Boulogne, and this the South-Eastern Railway describes with a parent's partiality as “the quickest and best route.” The “Express Daily Fixed Service” occupies eight hours only, the cost being—first class, single, £2 17s. 6d. ; return, £4 18s. 3d. ; and second class, single, £2 3s. 6d. ; return, £3 18s. 3d. The route in England is well known—it is by Tunbridge, Ashford, and Shorncliffe, to Folkestone, where the fast steamers are taken for Boulogne, whence the railway runs *via* Amiens and Creil to Paris, through a country not very picturesque. A second route is that of the London, Chatham, and Dover, by Dover and Calais. Through the scenery of Kent, by Canterbury, Dover is reached, and the *Invicta*, *Empress*, *Victoria*, or other steamship, quickly “ferries” the passenger over the Channel ; it being claimed that the sea-passage is

"sixty minutes only." Entering the "Nord" train, when on French soil, there is little of interest until Boulogne is reached, when the route becomes that to Paris just referred to. The "Express Service" fares are—first class, single, £3 1s. 6d.; return, £4 18s. 3d.; second class, single, £2 6s. 6d.; return, £3 18s. 3d.; and the total time taken by the journey by this express service is $8\frac{1}{4}$ to $9\frac{1}{2}$ hours, according to the train chosen, a midday train being the quickest. The third route, that by Newhaven and Dieppe, is one which has been much expedited of late years. Passing Croydon and Lewes, Newhaven, the port of departure, is reached, and well-furnished passenger steamers await the trains. From Dieppe the route is by Rouen, Acheres, and through the forest of St. Germain, and thus on to Paris. The fare by this route is—first class, single, £1 14s. 7d.; return, £2 16s. 3d. The time is not stated, but it is much the longer route.

Hitherto we have named fares and times of first and second-class trains only. It may now be desirable to give particulars of the third-class and excursion service, and possibly the following statement will be of use :—

	SINGLE.	RETURN.
South-Eastern, night service, third class... Time about 16 hours,	£1 2s. 6d.	£1 14s. 6d.
London, Chatham, and Dover, night service, third class) Time not stated.	£1 2s. 6d.	£1 14s. 9d.

Cheap excursions on Saturdays and Mondays will also be run, the fare being—second class, £1 10s. 3d.; third class, £1 3s. 3d.

In addition to these there are already determined a series of excursions for specific classes—for members of learned, technical, and other societies, but these are varied in character, and confined in date and to the persons for whom they are organised.

It may be added that one of the chief of the firms of excursion agents quotes the special rates for hotel accommodation at eleven important hotels in Paris during the period of the Exhibition as varying from 6s. 6d. to 20s. per day, for breakfast, table d'hôte dinner, bed-room, lights, and service. The estimate of this firm is that, for the third-class railway fare by the cheap night service, hotel accommodation at one of two hotels named for four days, two days of carriage-drives in Paris, and two days' admission to the Exhibition, the inclusive cost would be £4 to £4 14s. It may be well to add that already some of the hotel-keepers, and owners of boarding-houses and furnished apartments, in the neighbourhood of and looking on to the Exhibition buildings, have greatly raised their charges. Those who desire to restrict their expenses would do well either to choose a location at some little distance from that centre of attraction, or to arrange previously by letter with the hotel-keepers as to rates of charges.

The express fares generally allow seven days for single and one month for return tickets; the cheap night services allow three days for single and fourteen days for return tickets; so there is

time to break the journey at one of several stations, and Calais, Boulogne, Amiens, or Rouen would, in either case, repay a short stoppage.

Three Useful Novelties.

Turning over the pages of song-music is a well-known difficulty with accompanists, and anything to make this easier, without disfiguring the sheets, is to be welcomed. One way of achieving this result is provided in some pretty little tassels of various colours, which are attached to the edges of the sheets of music by little slips of parchment, whose inner surface is gummed. The tassels are really ornamental in their appearance, and may be readily attached, so as to make "turning over" the simplest of simple tasks.—Many of the objections which some medical authorities have urged against cigarette-smoking are met by an improved mouthpiece which Mr. Hugh Black has recently patented. The new mouthpiece consists of a coil of chemically prepared filter-paper, which at the same time purifies the smoke and absorbs the nicotine which the unprotected cigarette passes so freely to the system of the smoker.—Cooks who roast their joints before an open fire will be glad to hear that a simple and easily-attached cinder-guard has just been patented by Mr. Alfred Thistlewood, which altogether does away with the falling of cinders into the dripping-tin and spoiling the gravy. The new guard does not interfere with the heat in the least, and indeed should rather add to than take from it, for it consists largely of copper wire, which is an admirable conductor.

A Signalling Fog-Horn.

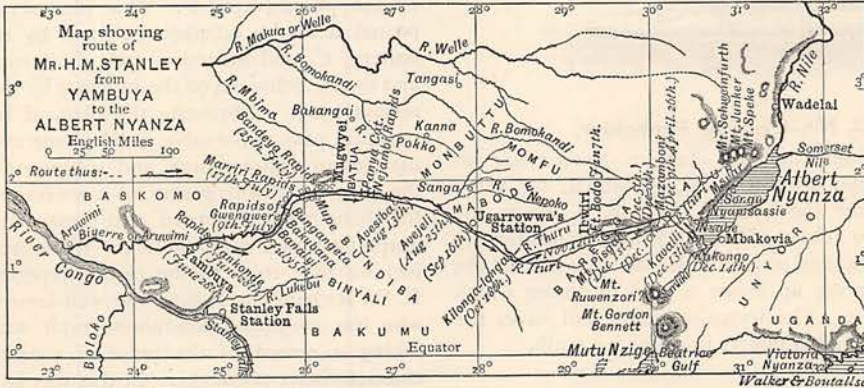
A signalling siren, or fog-horn, worked by hand, has been introduced by Herr Pfannenstiel, and is to be tried by the Trinity House authorities. In Germany it has been found capable of signalling to a distance of ten miles. The sound is produced by the vibration of three steel springs, two of equal length, and one shorter. They are connected so as to swing



together, and are actuated by the pistons shown in the illustration; the air-blast set up by the pistons escaping by the funnel-mouths. The figure shows two sirens, or horns, placed together to give two notes of different pitch. The signals of a message are produced by short and long strokes of the piston on the high-pitched siren, according to the Morse or other code of signals; and the low-pitched siren is sounded after the completion of each letter, to prevent confusion. The siren is always ready for use, and being light, simple, and requiring no mechanical driving power, it is well adapted for use on board vessels.

A Telegraph Rocket.

A new distress-signal has recently been brought out, which requires no stick. It consists of a metal cylinder containing the propelling charge, and over it is a charge of tonite composition. The rocket is placed in a phosphor-bronze socket and is fired by pulling a lanyard. Stars are thrown out as the rocket ascends to a height of 600 feet; then the tonite charge explodes with a report like that of a 6-pounder. These rockets are suitable for boats; and by arranging the coloured stars they can be made to signal on the Morse code. They are of



MR. STANLEY'S MARCH.

Mr. Stanley's March.

In the beginning of April last, news reached London that Mr. H. M. Stanley had effected a meeting with Emin Pasha on the Albert Nyanza. We give here a carefully-drawn map showing the route of the gallant explorer after he left his rear-guard at Yambuya, on the Aruwimi river, on June 28th, 1887, until he met Emin on April 29th last year, near Kakongo, on the south side of the lake. All the news we have as yet consists of Stanley's letters to the Emin Pasha Relief Committee and to the Royal Geographical Society, and one or two private friends. But this is sufficient to show that the journey has been successful, almost beyond all expectation, despite dangers and obstacles that read more like the fables of mediæval travellers than extracts from the journal of a nineteenth-century explorer. No less than 160 days were passed in traversing a region of forest of which Mr. Stanley says:—"Until we set foot on the grass land, something like fifty miles west of the Albert Nyanza, we saw nothing that looked a smile, or a kind thought, or a moral sensation. The aborigines are wild, utterly savage, and incorrigibly vindictive. The dwarfs—called Wambutti—are worse still, far worse. Animal life is likewise so wild and shy that no sport is to be enjoyed. The gloom of the forest is perpetual." After meeting Emin, Mr. Stanley returned to Yambuya, to join his rear-guard, which he found on the 17th of August, terribly depleted by death and desertions. On the 5th of September he once more set out to join the Pasha, and there is every reason for hope that by this time he is marching with him to the east coast.

different sizes, the larger being seven inches long by two inches in diameter. The National Lifeboat Institution are introducing these rockets with red stars.

An Electric Dater.

The wood-cut illustrates a device for stamping times and dates by means of electricity. It is the invention of Mr. C. A. Randall, and consists of a stamper and a clock, which, by means of a battery, shifts the time of the stamp every minute. The apparatus has been tried in the telegraph department of the Post Office, and it is admirably adapted for registering the arrival of employes in works. The stamp can be hired out, complete, for a small annual rental. The card or paper to be printed is placed under the stamp-head shown in our illustration.



Magnetising by Light.

Mr. Shelford Bidwell, F.R.S., recently described some interesting experiments in magnetising a bar of

iron by radiation. The bar was first magnetised in a solenoid, then de-magnetised by placing it in a coil traversed by a current. This treatment produced a tendency in it to be more susceptible to a magnetising force in one direction along the bar than in the other—a condition which Mr. Bidwell thinks essential to the success of the experiment—but otherwise the bar was like an ordinary unmagnetised iron rod. When the beam from an oxyhydrogen lamp was allowed to fall upon it, a magnetometer placed near it showed that it became magnetic.



A Nib-Ejecting Penholder.

The penholder which we illustrate has a collar for the stem, fitted with a point, *g*, which, on being pressed against the butt of the nib, *h*, ejects the latter from the holder. The nib is held in position by the clamps, *a a*, and on its under-side the end of the holder, in curving up, forms a kind of spring which bears against it. The device is simple, and saves the user from soiling his fingers in changing a nib.

To Keep Away Moth.

For a long time past it has been well known that moths object to the smell of cedar-wood, and this knowledge has recently resulted in a new application of waste products, in the manufacture from cedar-wood pulp of a paper to be laid under carpets, or to be used as a preserving wrapper. A large supply of cedar chips can be obtained from the pencil manufacturers, who have hitherto found no use for this waste material.

The Telephonograph.

The idea of making a phonograph speak to a telephone, like a person, and thus transmit a verbal message, is not new, but it has recently been tried with fair success, if we are to credit the accounts received from America. At a lecture on the phonograph and other inventions of Edison, delivered lately in Philadelphia, a phonograph message from New York was received by telephone in the hall and heard by the audience. This transmission over 103 miles of telegraph wire, including six miles of underground cable, was effected by the arrangement of apparatus shown in the figure, where *P* is the sending phonograph at New York, which spoke its message to a carbon (or microphone) transmitter, *T*, in circuit with a battery, *B*, and the primary wire of an induction coil, *I*. The secondary wire of this coil was in circuit with the telegraph line, *L*, to Philadelphia. At this place, in the lecture hall, an Edison loud-speaking telephone,

or "motograph receiver," *M*₁, gave out the message, but it was too weak for the audience to hear, so it was reinforced by means of an auxiliary phonograph, *P'*, and another telephone circuit, consisting of a carbon transmitter, *T'*, in circuit with a battery, *B'*, and the primary wire of an induction coil, *I'*. The secondary wire of this coil was in circuit with a second motograph receiver, or loud-speaking telephone, *M*₂. It will be understood that the phonograph, *P*, at New York, had a message imprinted in it, which it reproduced in front of the telephone, *T*. The latter transmitted it to Philadelphia, where it was spoken out by the motograph receiver, *M*₁, and thereupon registered by the phonograph, *P'*. This phonograph then repeated it to the telephone, *T'*, and by means of the battery, *B'*, and induction coil, *I'*, it was reinforced, and finally delivered to the audience by the motograph receiver, *M*₂. Obviously the plan, if brought to a practical pass, will enable a telephone message to be dictated to a phonograph, and subsequently sent over the line, or it will permit of a message received by telephone to be recorded and preserved in a phonograph for future reproduction. While upon this subject we may refer to the recent experiments of Dr. B. W. Richardson, F.R.S., the well-known physician, who has employed the phonograph successfully in taking a record of the pulse of patients, and the characteristics of coughs. In this way he hopes to be able to compare the records of different times with one another. At present the memory is about the only guide of the doctor with regard to changes in a cough.

Spring Traces.

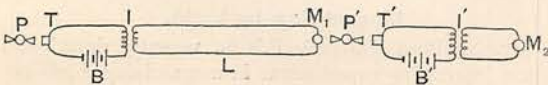
The ordinary leather and chain traces for drawing carts have been superseded on the Eastern Railway of France by chains with spiral springs, which permit the horse to gradually bring its force to bear on the vehicle in starting it. They are found more serviceable than the rigid trace.

Sanitary Whiting.

An antiseptic whiting has recently been introduced, and is recommended by the makers for hospitals, ships, stables, kennels, and so forth, in order to keep them free from insects. The compound, which appears to contain some camphor, is also useful for cleaning silver plate and articles of domestic use. The aroma is said to be not unpleasant, while the compound is non-poisonous, and will not injure colours.

Petroleum Soap.

Miss Gordon Cumming has drawn attention to the cleansing effect of petroleum on soiled clothes. The best way to employ it is to fill an average boiler, say of 14 gallons, with water, adding half a pound of soft soap, and when all is boiling thoroughly, pour in 1½ table-spoonfuls of petroleum. Then put in the clothes and boil them for half an hour, before lifting them out and rinsing them in several waters. A little more soap, water, and paraffin should be added to make up for loss as successive lots of the clothes are boiled.



In America and New Zealand kerosene, as being free from smell, is preferred to paraffin. Kerosene may also be added before the water boils, and hence blankets and flannels, which should not be boiled, can be washed with it in the same way, whereas, with paraffin, the boiling water must be used "off the boil" in separate tubs.

Refrigerator Barges.

It may be mentioned that the London and Tilbury Lighterage Company now employ cold air or refrigerated barges for the distribution of provisions brought to the Port of London in "cold rooms" on board vessels. The company in question have now a fleet of such barges transporting the thousands of tons of frozen meat which arrive on our shores. Each barge can take fifty tons of meat, and is provided with doors at each end to load and unload by. The insulated rooms are lined with charcoal, wood, and Willesden paper, and they are cooled by refrigerators on the ammonia compression system in a separate barge. It is proposed to build railway and road vehicles on a similar plan.

A Pressure Filter.

The woodcut shows a new filter for attaching to water-mains by the lower pipe. The filtering material inside consists of compressed granular carbon,



with block carbon over it, and the water, forced by the pressure of the main through these, is drawn off by the upper tap, as shown. The carbons may be readily removed from time to time and cleansed. Such a filter is suitable for hotels, restaurants, and large establishments.

The Meldometer.

The meldometer of Mr. Joly, recently exhibited at the Dublin British Association meeting, Bath, is a simple instrument for observing the behaviour of bodies at high temperatures. It fits the stage of a

microscope, and consists of a platinum strip between two clamps. An electric current heats the strip, and material laid on it is soon heated up. The temperature is regulated by a carbon resistance controlled by the operator. Quartz is easily melted by this method, which is also applicable to the examination or sublimates during and after their formation.



A Portable Tachometer.

The figure illustrates a tachometer which gives the number of revolutions of a shaft by pressing its point, seen on the left, into the central cavity of the shaft. The dial is provided with a scale ranging from 100 to 1,000 revolutions per minute, but by means of gearing the instrument can be adjusted to measure speeds under 100 or over 1,000 revolutions per minute.

Photographing a Coast.

Professor Davidson, of the American Coast Survey, has conceived a scheme for photographing the whole Pacific Coast of the United States, from stations selected ten miles apart. In addition, there would be views of headlands as seen on both sides and in front, while islands would be photographed from different points of view. The object is to supplement charts in navigation.

Protecting Propellers.

"Vindex metal" has been recommended for this use by Mr. Cormack, a Scotch engineer, as, owing to the fact that brass is electro-negative to steel, propellers in sea-water rapidly corrode unless in contact with an electro-positive metal. Such a metal is "Vindex," which could be used for the blades. We may mention that the basis of the metal is zinc, and it is sufficiently strong for the purpose.

A Book for Housewives.

All the students in our National School of Housewifery ought to possess Cassell's "Book of the Household," which is now being issued in monthly numbers. They will find that its programme is very much the same as the programme of the National School of Housewifery, but of course it is dealt with much more fully than in the limited space we have at our disposal for such a purpose. Both articles and illustrations are new and good, and the work is one which every girl should study with interest.