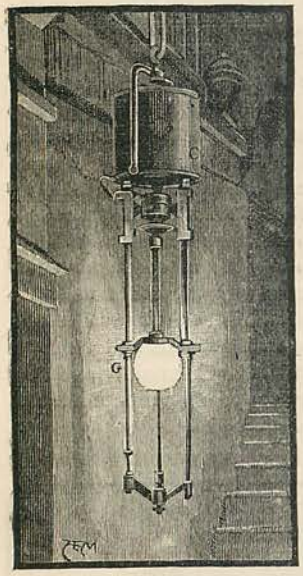
THE GATHERER:

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.

The Midget Arc Lamp.



This very small and compact electric arc lamp is shown in the figure, and will be found useful for lighting shops or small areas. It is of 250 candle power, and takes a current of five ampères at a pressure of forty-five volts. The carbon lasts six hours, and the arc is regulated by clockwork mechanism. The globe, G, is only three inches in diameter, and the effect is good. As glow lamps are so much more expensive than arc lamps, this midget lamp should be found very useful.

Wire Pillows.

Pillows of woven wire have been introduced for sanitary reasons. The pillow is springy and as the air circulates through it the head is kept cool. It is made of separate spirals of woven wire, united together, but each forming a spring in itself.

Photographing Speech.

M. Demeny, an assistant of M. Marey, who has analysed the movements of running horses and flying birds by means of chronophotography, hopes to introduce a new way of teaching and entertaining deaf mutes by means of a magic-lantern. He first photographs the lips of a person speaking, say a teacher or a lecturer, and then combines the successive pictures by the Zoëtrope so as to reproduce all the motions of the mouth on the screen. The deaf mutes, accustomed to read what a person says by the movement of his lips, are able to do the like from the photographic images.

A Colony of Moss Animals.

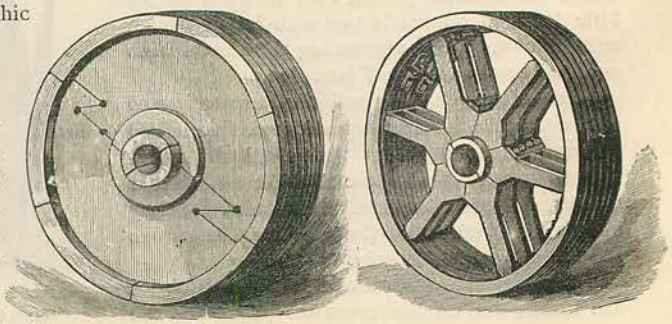
Moss animals—or Bryozoa, to give them their scientific name—are tiny aquatic creatures, forming branching or tree-like colonies. The fresh water species are usually found on the stems of milfoil or water-crowfoot, or spreading over submerged stones or brickwork. Generally speaking, the life of a colony begins in the spring: a statoblast—a minute lentil-shaped horny case, containing a bud—gradually opens and the free-swimming form partially emerges. When it finds a suitable place it settles down, and becomes the starting point of a new colony. The outer layer hardens, and forms a protecting tube, from the mouth of which the tiny occupant projects a waving crown of tentacles, and into which it can retire when it has captured its prey or on the approach of danger. The motion of the tentacles and of the minute hairs with which they are fringed creates a miniature whirlpool, down which the luckless animalcules are swept. No sooner is one individual fully developed than it commences to multiply by sending out a bud, the perfect double of itself; and the process is carried at the margins, even though some of the inner and older cells or tubes may have lost their occupant by death. But before the life-cycle is complete nearly all the fresh water species develop the statoblasts spoken of above, which are only set free by the decay or rupture of the tube of the parent-animal, and rarely develop till the following spring. One colony of Plumatella we have heard of which established itself on the side of a small aquarium early in September—probably owing to the warm weather. So far as we know, there is no similar case on record.

An Electromagnet for the Eye.

The electromagnet for removing iron sparks from the eye which we described in our October GATHERER (p. 699) is, we are desired to say, by a pure coincidence similar to the one introduced by Mr. Snell, of Sheffield, eleven years ago. The projecting collar of soft iron is stated to increase the attraction of the magnetic probe or point for the iron splint embedded in the eyeball.

Split-Wood Pulleys.

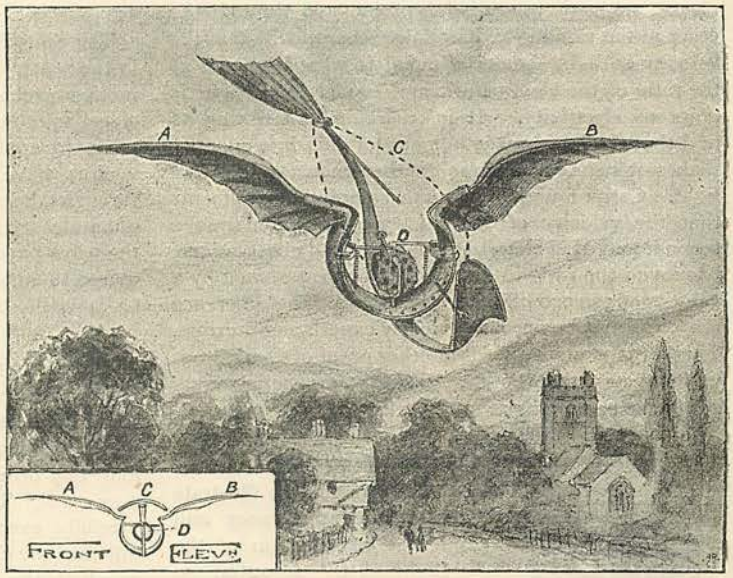
The pulleys shown in our engraving are coming into general use in America. They are built of maple-wood, the rims being composed of segments glued and nailed together. The bush grips the shaft so firmly that keys and set-screws are not wanted, and the pulley can be transferred to shafts of different dia-



meters. These "Gilbert" pulleys, as they are called, are only half the weight of iron pulleys, and are said to transmit from 30 to 50 per cent. more power with the same width of belt than iron pulleys.

A new Flying Machine.

The new flying machine, or "aviateur," recently brought before the Académie des Sciences, Paris, by M. Gustave Trouvé, is highly ingenious, and a new departure in aëronautics, but is only in its experimental stage. M. Trouvé believes that none of our existing motors—whether of steam, electricity, or compressed air—are capable of propelling a vehicle through the air, without the support of balloons or aëroplanes such as Mr. Maxim is now working at. In order to devise such a motor, he took up the principle of the Bourdon tube, which is employed as a manometer or pressure gauge. This tube is of a horseshoe form, and when filled with the gas whose pressure is to be measured, the points of the tube approach to or recede from each other according as the pressure of the gas falls or rises. M. Trouvé saw that he could transform the tube into a motor, by filling it with an inflammable mixture of hydrogen gas and common air, and exploding the mixture with proper cartridges fixed on a revolving barrel. At each explosion the pressure of the gas in the tube would fall, and the points of the tube approach, while on refilling the tube with gas between the explosions the points would recede. In this way a reciprocating motion of the points would be obtainable as long as the supply of hydrogen and the exploding cartridges lasted. To utilise this motion, he fastens an expanded artificial wing to each point of the tube; and these wings rise and fall as the points approach or recede, thus beating the air like a bird's wings. The aviateur or aviator is illustrated in Fig. 1, where the wings, A B, are seen attached to the points of the curving Bourdon tube; D is a reservoir of compressed hydrogen, and C is a small aëroplane, shown by dotted lines, and intended to act as a parachute, but which is removable. Fig. 2 represents a small model starting on its flight. The model is suspended by a cord from a bracket, and held in the position 1°, until the restraining tie A is burnt through by the flame of a candle. It then swings to the position 2, where the sustaining cord is also burnt through by the flame B. By this time the series of 12 cartridges with which it is provided have begun to explode at regular intervals, and the Bourdon tube to act. The aviator is now able to support itself in the air by the action of its wings, and even to mount upwards in its flight. The dozen cartridges are able to propel it from 75 to 80 mètres with air in the tube containing 25 per cent. of hydrogen. Only the hydrogen needs to be carried, the air being available all round. In practice, M. Trouvé proposes to make the tube of aluminium, which is a very light metal, and strong enough to resist the explosions.



A NEW FLYING MACHINE.—FIG. 1.

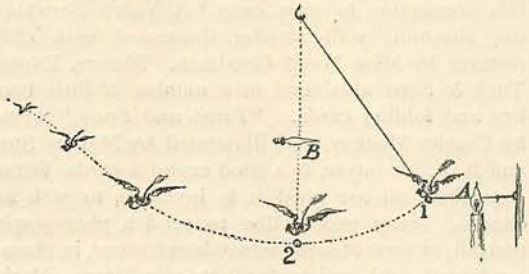


FIG. 2.

Electro-magnetic Photography.

Herr von Dobrynnski has discovered another confirmation of the electro-magnetic theory of light, or, in other words, that light and electro-magnetism are effects of a disturbance or wave-motion in the ether. He has found that waves of electro-magnetism, set up by the discharge of induction coils after the manner of Dr. Herz, are capable of affecting a sensitive plate and producing a photographic action like the waves of light. Dry plates of bromide of silver and gelatine, exposed to these electro-magnetic disturbances for three hours, were developed by ferric oxalate and hyposulphite, and found to be marked with bright and dark bands. When the plates were covered with tinfoil the effect was also obtained. If these electro-magnetic waves could be made small enough, they would, in all probability, be light itself. Light and

electro-magnetic waves being propagated through the ether at the same rate, it follows theoretically that the velocity of light should be equal to what is known as the ratio of the electrostatic and the electro-magnetic units of electricity. It is, therefore, interesting to find that the latest measurement of this last quantity makes it nearly the same as the known velocity of light. Cornu found by the most careful experiments that the velocity of light is 300,300 kilomètres a second, and M. Pellat, by equally careful observations, has found the ratio in question to be represented by a velocity of 300,900 kilomètres a second. The difference is such as may be accounted for by experimental errors. This measurement affords another proof of Clerk Maxwell's theory that light and electro-magnetic waves are of the same nature.

A Speed and Pressure Recorder.

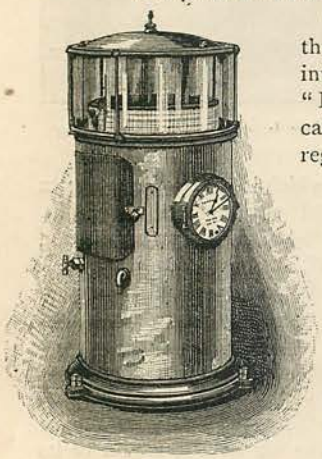


FIG. 1.

Our Figs. 1 and 2 illustrate the general appearance and internal construction of the "Lighthouse" recorder, so called from its shape. It registers on paper the fluctations of speed and steam pressure in an engine. As will be seen from Fig. 2, the paper is mounted on a drum, A, curved at the upper end of a spindle, B, sliding vertically, and rotating at a given speed by means of a wheel, C, and an arm, D. A cylindrical roller, E, has fixed on it a star wheel, F, formed with seven teeth, so that at each revolution of the wheel, C, it rotates through one-seventh of a revolution by means of a peg, G, fixed in C. On E a stepped rack is formed, with which a peg fixed to the spindle, B, engages, and the length of each of the steps is such that it corresponds with the depth to each day on the paper. The writing pen, H, is of glass and marks the paper in contact with it, being actuated by a lever, J, and the ball-float, L, supported in the vessel, M. The level of the water is varied according to the speed of the engine by a small fan driven from the latter and blowing on the water. The steam pressure is also registered in a similar way by means of a Bourdon tube actuating a second pen.

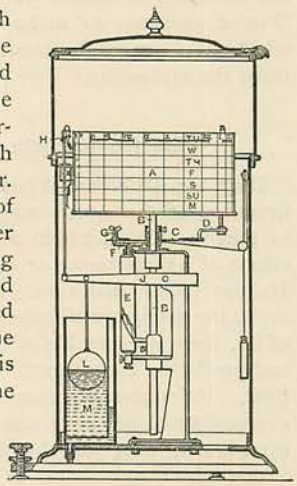


FIG. 2.

An Electric Life-boat.

The Sims-Edison torpedo is launched and propelled in the water by electricity, which is supplied to the motive mechanism by insulated wires, payed out from a reel as the torpedo advances. Mr. Edison now proposes to apply this principle to life-boats. The inventors have designed a boat which can be sent through the surf for miles up and down a coast by means of an electric motor on board, supplied with current by the wires payed out behind it. Only two men are required to steer the craft, which is as buoyant as the ordinary life-boats.

Some New Cards.

The largest Christmas card we have seen this season is a panel published by Messrs. Raphaël Tuck & Sons, and entitled "The Little Choristers." Mrs. Brundage is the artist, and she shows us four tiny little girls, barefooted, singing their Christmas carol. The panel is very prettily coloured and carefully executed. In the other cards issued by this firm the chief novelties are the "nodding" series, in which the principle, familiar from its application to Chinese figures, is brought into play again in cardboard. If space were available, it would be impossible to enumerate all the varied shapes that Messrs. Tuck & Sons' cards have been made to take this season. But, whatever the shape or size, the designs are always well chosen and admirably reproduced. As in former years, we must say a word in praise of the decorative and artistic little "Art Gem Calendars"; and it would be hardly fair in this connection to pass over "A Year's Sunshine," the charming wall-calendar illustrated with child-pictures by Miss Maud Goodman. Messrs. Raphael Tuck & Sons also send us a number of little booklets and folding cards. "Frost and Snow," written by Charles Mackay, and illustrated by Marcus Stone and R. F. McIntyre, is a good example of the former. But where all are good it is invidious to pick and choose. Many people like to send a photographic portrait, or view of some remembered scene, in place of a coloured card, and to facilitate this Messrs. Marion & Co. have reintroduced their mounts with appropriate mottoes, some of which are fitted with an ingenious arrangement for holding a mounted photograph.

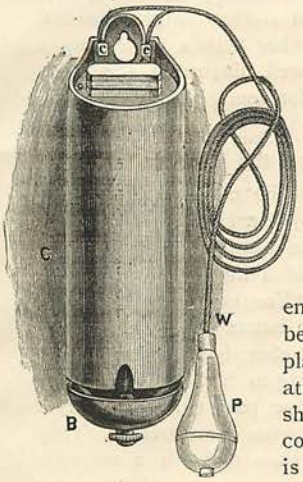
A New Train Signal.

A device for preventing engine drivers from running their trains in defiance of a signal set against them through carelessness or foggy weather has been introduced by an Edinburgh architect. It consists of an electric bell on the locomotive which rings when the signal is so set, and continues to ring until the danger signal is lowered. The bell is actuated by a current derived from a conductor laid along the line. A brush or rolling contact on the engine leads the current to the bell, and the current is sent into the conductor by the signalman in the act of setting the signal to "Danger." When the signalman lowers the signal the current is cut off, and the bell ceases to ring. By this arrangement the driver has no excuse for not applying the brakes in time.

Sanitary Handwriting.

The Supreme Council of Hygiene, in Austria, have been studying the relative advantages of upright or slanting characters in handwriting, and they have recommended that an upright hand should be taught in schools, because it is healthier for the penman. The slanting style causes the body and neck to twist, and is apt to produce spinal curvature.

A Dry Cell and Electric Bell.



Dry batteries are very useful in households, inasmuch as they do not require to be replenished with water from time to time, like the older liquid cells; hence some well-known German electricians, have introduced the combination which we illustrate. The cell, C, is enclosed in a case which can be fixed in any convenient place; and the bell, B, is attached to the bottom as shown. The bell-push, P, or contact for ringing the bell, is connected in the circuit of the battery and bell by a length of silk-covered copper wire, W, of tasteful appearance.

Christmas Cards and Gift Books.

When we think of the comparatively recent origin of Christmas cards, the development indicated by Messrs. Hildesheimer & Faulkner's publications is marvellous. In range of conception and delicacy of finish they are unsurpassed. It would not be possible to find two more beautiful designs than those by the late Alice Havers, reproduced in four-fold cards, and entitled, "Rose softly blooming," and "An old garden;" Mr. W. H. Groome's clowns, and Mr. H. P. Dollman's policemen are as irresistible in their humour as Miss Bebb's kittens—which is saying a good deal. Then as to shapes, straw hats are shown, filled with flowers, old books and bindings are reproduced in miniature, and even a music portfolio of diminutive form is brought out with a genuine little setting, by Mr. C. Hoby, of words by our contributor Mr. F. E. Weatherly. But of all Messrs. Hildesheimer and Faulkner's designs, the most original are the arrangements, quaint and tasteful, of jewelled mottoes on delicately stamped or embossed white or tinted grounds. With their cards the same publishers send us several Christmas and New Year Gift-books, of which we can only find space to mention in detail one or two, as examples. "A book of Modern Ballads" is a most delightful volume illustrated in colour by the late Alice Havers, and in pen-and-ink by J. P. Sunter. It forms an admirable companion volume to one of an earlier season, but is quite able to stand alone. Mr. J. Clayton Clark has illustrated for another of these books "Some well-known characters" from the works of Dickens, for any of whose admirers this would make a most acceptable souvenir. Two booklets, tastefully bound in white and gold, corded and tasselled, and entitled "Recollections of Venice," and The City of Gondolas," owe their clever illustrations to Mr. C. Robertson, R.W.S. Two others, by different artists, are devoted to "Bettws-y-Coed," and "Stratford-on-Avon." In a clever shoe-shaped booklet Mr. F. E. Weatherly tells once again the story of "The Old Woman who Lived in a Shoe," and in another, Mr. W. S. Gilbert's popular song of the folk "who never would be missed," is accompanied by amusing illustrations by Mr. Henry Reynolds. We have not left ourselves space to speak of the rest of Messrs. Hildesheimer & Faulkner's booklets—and hardly of their new games. To these last, however, we must devote a line or two, if only to say that "Stumbling Blocks," "Flickem," and "Spottit" seem ingenious additions to our store of parlour amusements, well worthy the attention of all heads of families. Messrs. Eyre & Spottiswoode have brought out as a seasonable novelty a series of sets of note-paper and envelopes, prettily decorated with a floral vignette of lilac, carnations, wild roses, wild hyacinths or pansies, and scented by eminent perfumers. No doubt ladies will welcome this innovation.

In Readiness for 1892.

Can any man be said to have his affairs in readiness for the New Year if he has not provided himself in advance with a diary in which to enter engagements already entered into? We think not. But, whatever the nature of his engagements, he will find among the diaries published for the Letts's Diaries Co. by Messrs. Cassell something in which to record them. Be they clerical, there is the "Clerical Diary" with all manner of ecclesiastical information. If they are commercial, then there are office diaries in foolscap, quarto, or octavo size. If social, then there is the "Gentleman's Diary" or the pretty "Nonpareil," the "Card Case" or the tiny "Waistcoat-pocket Diary" in finger-form or with square pages. And, lastly, we must mention the "Ladies' Diary" and those for Housekeepers. In fact there is provision made for every probable need.

Stories for Girls and Boys.

Even these most exacting readers would be hard to please if they could find nothing to their liking among the varied stories issued by Messrs. Blackie and Son in so attractive a form. *Place aux dames!* (even among young folk) so we will say a word or two, first, of the stories for girls. "Gladys Anstruther" is a capital tale by Miss Louisa Thompson of the taming of the unruly spirit whose name gives it a title. It owes something, also, to Mr. Townsend's illustrations. Two other girls' stories from the same publishers are "Three Bright Girls: a story of Chance and Mischance," and "Marian: or the Abbey Grange," both by Miss Annie E. Armstrong, who writes well and evidently with a purpose,

so that one may always use her books for presents or prizes with equal confidence. As much may be said, too, of "Bab: or the Triumph of Unselfishness," by Ismay Thorn, illustrated by Mr. L. Leslie Brooke. All four deserve to be popular with girls. Of five boys' books which Messrs. Blackie send us it is almost sufficient to say of "Hold Fast for England," "Redskin and Cowboy," and "The Dash for Khartoum," that they are all from the facile pen of that true friend of all English-speaking boys, Mr. G. A. Henty. Probably he never displayed his versatility to better advantage than in this trio of volumes, for the first is a tale of the siege of Gibraltar, the second a tale of prairie life, while the third is a stirring story of the Nile campaign. Not one man in a thousand could have adequately treated three such different subjects, but Mr. Henty has succeeded in doing so to an eminent degree. "The Pilots of Pomona" is a seafaring tale of the Orkneys by Mr. Robert Leighton, with a pleasant smack of Scotch talk and character running through it. "Silas Verney," by Mr. Edgar Pickering, is a stirring story of the days of Charles II. We can safely commend all these nine stories to guardians and friends of young folk.

A Diminutive Dictionary.

This is unquestionably an age of condensation, but condensation in literature was surely never carried further than in "Bryce's Thumb English Dictionary" (D. Bryce and Son, Glasgow), which measures only about $2\frac{1}{4}$ inches, by $1\frac{3}{4}$, and is scarcely $\frac{3}{4}$ inch thick. It is said, nevertheless, to contain something like 15,000 references, and to serve as a guide to the spelling of all words in general use over which any doubt as to their orthography might reasonably be expected to hang. So far as we have been able to test it, it certainly answers to the description given of it

Reading for Children.

"The Blue Poetry Book" (Longmans) is a collection of poems, intended for reading by children, and edited by Mr. Andrew Lang, who avowedly bases his selection upon his recollection of the poems which were dear to him in his own childhood. The far-reaching influence of the verse which we read and learn in childhood is a commonplace, and it is therefore all the more important that a selection intended for inexperienced readers should be carefully made. Needless to say, Mr. Lang's collection is admirable in taste; and it is so charming in its appearance that it is sure to be popular among its *clientèle*, and, in our opinion, deservedly so. Another very striking collection of poems—but suitable for older readers as well as for children—is "Story Poems" (Cassell) edited by Miss E. Davenport, who has already achieved some success as an editor of volumes of verse. A very large proportion of the poems included in this neatly-bound book are suitable for recitation, which in itself is a strong recommendation of the work. But, apart from that, it has other claims on our readers, in the catholicity of the editor's choice and the high average of excellence she has maintained. Of the Christmas volume of "Little Folks" (Cassell), we need only say that it is an admirable collection both of stories (long and short) as well as of poems, together with a host of more practical papers—all alike well illustrated, and likely to prove attractive reading for young people.

"The Country of the Vosges."

A few months ago we had the pleasure of noticing in these columns a work by Mr. Henry W. Wolff on "The Watering-Places of the Vosges." We have now to acknowledge the receipt of a more extensive work by the same author on the "Vosges country," dealing with it from its every aspect, but as holiday and health resort particularly. English tourists know too little of the Vosges country, according to Mr. Wolff, although thousands of them skirt it or pass through it every year on their way to and from Switzerland. They might evidently do worse than make it a stopping point on a longer journey, or even an object for a special one, and travellers who think of doing so should certainly see Mr. Wolff's interesting volume, which is published by Messrs Longmans.

Two New Volumes.

Our well-known contributor, the author of "How to be Happy Though Married," has just issued a new "book for everyone" which he calls, "The Business of Life" (T. Fisher Unwin). Like all his works, this new volume is full of genial and chatty papers, that serve equally to amuse and to instruct his readers, while he gives them anecdotes galore. His friends may be forgiven if they wonder whether he is getting near the end of his store of anecdotes, or if it is, as it seems to be, absolutely inexhaustible. With all its lightness and pleasantness, the book is one with a purpose, but the pill is so nicely gilded, that no one could object to take it. From the same publisher we have received a new volume of the "Pseudonym Library" entitled, "Some Emotions and a Moral." We could wish the story had tended towards a different conclusion, but it is so clever in its style and characterization that we can forgive a good deal. The author's pseudonym is "John Oliver Hobbes."

NEW PRIZE COMPETITIONS.

Full particulars of a new and varied Series of Prize Competitions, open to all readers of CASSELL'S MAGAZINE, *will be announced in an early number.*