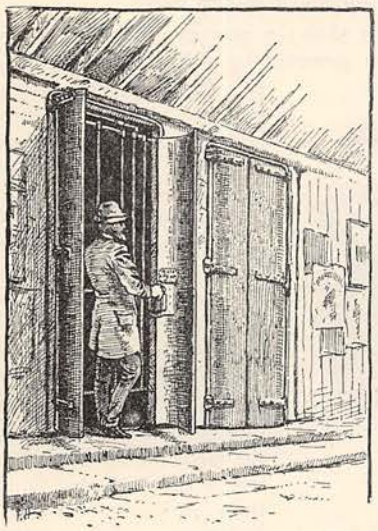
THE GATHERER:

AN ILLUSTRATED RECORD OF INVENTION, DISCOVERY, LITERATURE, AND SCIENCE.

Correspondents are requested, when applying to the Editor for the names and addresses of the persons from whom further particulars respecting the articles in the GATHERER may be obtained, to forward a stamped and addressed envelope for reply, and in the case of inventors submitting specimens for notice, to prepay the carriage. The Editor cannot in any case guarantee absolute certainty of information, nor can he pledge himself to notice every article or work submitted.

An Automatic Door.



A door which opens automatically on putting a coin into a slit has recently been brought out. Obviously there are a number of uses for such a contrivance. The door is made double, each half being of L shape, seen in the plan, and hinged at the angle. They are closed and held fast by a lock, which unlocks when the coin actuates it, and the door opens. The door closes again after the person enters. A turnstile on the same principle has been fitted up at Charing Cross Station.

The Great Stave of Eleven.

Teachers of musical theory constantly complain of the difficulty that besets them in their endeavour to instruct their young pupils in the mysteries of "the great stave," and the derivation of the various clefs used in musical notation. Various contrivances have been designed on paper with the view of simplifying the matter; but we know of no device so successful as the one now before us, which Madame Roeckel, a professor of music, has recently invented. The "pamphonia" is a neatly-constructed wooden model with movable notes and clef signs, so managed as to enable the teacher to collect the lines of any stave, and to teach the positions of the notes to a single pupil, or to a class of fifty or more at a time. The "pamphonia" is very light and portable, and every teacher of theory should become possessed of one.

The Decimation of the Osprey.

A correspondent writes to us from Clevedon, Somerset, as follows:—"In reading your interesting and useful Magazine, I am sorry to find in the article on dress in the December number that the fluffy plume from the osprey is recommended to adorn the fashionable bonnet. I cannot help thinking that most ladies would shrink from wearing this questionable ornament if they knew how cruelly it is obtained. My nephew, writing from Florida, says—'The graceful osprey will soon be extinct, if not speedily protected by law, as they are slaughtering them by waggon-loads to send to Europe for the sake of that little plume which the parent birds only have in the nesting season, therefore the young are all left to perish!'"

Lettering Ivory.

A process of lettering bone or ivory, by sinking the letters into the material in a permanent fashion, has recently been introduced. These ivory plates are taking the place of engraved metal plates for signs, checks, badges, and so on. Electrical engineers have also adopted the new plates, which can likewise be applied to organs and pianofortes.

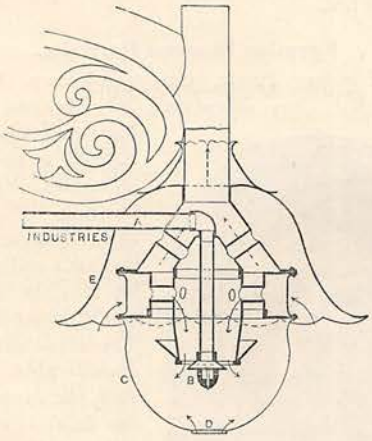
A Phosphorescent Storm.

During a recent voyage of the Anchor Line steamer *Anchoria*, she ran into a dense fog about 350 miles east of the American coast and on the borders of the Gulf Stream. The water became suddenly luminous under the fog, and a school of fish darting round the vessel created a turmoil of light. The foam was dashed back from the bows in masses of brilliant violet, which illuminated the entire ship's rigging. A storm of wind coming on increased the effect by tearing off the crests of the illuminated waves. The whole horizon-line had the appearance of an immense belt of light blue fire.

Egyptian Mummy Portraits.

Mr. Flinders Petrie, the well-known Egyptian archæologist, has discovered at Hawara, in the Fayoum district of Egypt, a number of mummies which have portraits of the deceased inmates painted on thin wooden panels let into the front top of the mummy-case. These portraits show considerable artistic skill, the expression of the dead being faithfully rendered. They are painted with wax for a medium instead of oil, and the suggestion is that the mummies were kept in the homes of their

surviving relatives for many years—presumably until a new generation having less interest in them had sprung up. Then the mummies were taken out and buried. They belong to the Roman period, and date back 1,700 years ago or more. One of the most interesting is a portrait mummy of one Artemidorus, who appears to have been a poet or philosopher, a man of note. His head in the portrait is crowned with bay or myrtle, if not olive, the gilt leaves being small enough for myrtle, which grew in Egypt. Samples of these mummy-cases were exhibited by Mr. Petrie in the Egyptian Hall, Piccadilly, a few months ago. They included persons of various ages and quality, some of the female portraits showing signs of wealth and personal comeliness. Among other interesting articles exhibited were the fragments of one of the seated colossi seen by Herodotus at the Lake Mœris, and many relics of Egyptian life in that period, such as domestic utensils, shoes, dolls for children, a model of a Sedan chair, jewels, clothing, and so on. It should also be mentioned that Mr. Petrie has discovered and brought home an interesting papyrus of the second book of Homer's Iliad, dating from the first century B.C. It was found buried in the ground under a skull which retained a lock of the dark hair of the dead owner. Mr. Petrie, we understand, will resume his excavations next season. While upon this subject we may mention that a company has been formed in Philadelphia to bore into the pyramids by means of the diamond rock-drill. It is hoped in this way to penetrate the mystery of these enormous structures. We trust, however, that if the project is carried out, it will be accomplished in a reverent and scientific spirit. We may add that another company has been raised to explore the old Inca burial-grounds in the Province of Cuzco, in Peru, and a concession has been granted for the purpose.

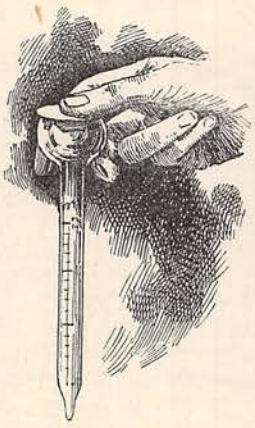


The "Sunflower" Lamp.

A recuperative lamp, giving a steady and brilliant light, is shown in section in the accompanying figure, where A is a pipe supplying gas to the burner, B, from which it issues in a cup-like flame of great power. The air to support the combustion enters the lamp, and traverses it in the direction shown by the small arrows. A shade of ruby glass, E, covers the mechanism, and C is an enclosing globe of glass. In order to keep this globe free of soot an opening, D, covered with wire gauze, is provided in the globe, to allow the air to pass up in the direction of the arrows. This arrangement does not disturb the flame, and supplies more oxygen to the burner.

An Improved Minim Glass.

Our illustration shows a new minim glass which has recently been patented by a Yorkshire chemist, Mr. C. C. Vevers. It is intended for using with homœopathic medicines where a few drops only are required, and where it is important that only the prescribed infinitesimal quantity shall be used. The method of using it is very simple. It is merely to press the caoutchouc at the top of the thistelled tube, and then insert the tube in the bottle, when the medicine will naturally rise in the graduated tube, from which it may be driven drop by drop, by slight pressure upon the caoutchouc. The tube is graduated up to twenty minims, so that the required quantity of the tincture may be found without the slightest difficulty. The tube might either be kept in the medicine, or any surplus carefully returned from it to the bottle by continuous pressure on the rubber, but we need hardly caution those of our readers who are in the habit of using homœopathic medicines that it would be necessary to carefully cleanse the tube after using one tincture before employing it with another.



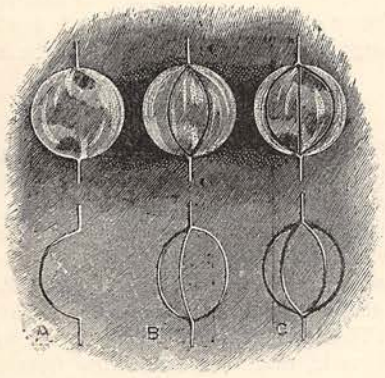
Electric Smelting.

The method of extracting aluminium and aluminous alloys direct from their ores in a crucible heated by electricity has now been introduced into England; works for the purpose having been erected at Stoke-on-Trent. The plant consists of a powerful Babcock engine of 600 horse-power to drive the dynamo supplying the electric current, which is passed through stout carbon rods within the crucible, and in the midst of the ores to be smelted. The engine has a centifrugal governor, and maintains a speed of 76 revolutions per minute. The fly-wheel is some 20 feet in diameter and weighs 30 tons. It is geared to the pulley of the dynamo by means of rope-driving gear. The spindle of the dynamo is of steel, 18 feet long, and has three bearings, one being situated on either side of the driving-pulley. The armature consists of 128 copper bars connected to form 32 conductors. Each bar is $\frac{7}{8}$ inch deep, and $\frac{3}{8}$ inch wide. They are insulated by fiburite. The commutator is 20 inches long, and has 64 parts. The currents are

collected by eight brushes. The field magnets are of the horizontal double type; the coils consisting of a few turns of copper bars 1½ inch wide by 1 inch thick, forged to fit the magnet-cores. Thin mica wedges keep the bars from touching the cores. The armature is ventilated by a Schiele fan driven by a belt from the armature spindle. At a speed of 380 revolutions per minute the armature gives a current of 5,000 amperes at 60 volts, the temperature never rising above 70° C. A current of 8,000 amperes has been obtained, but 5,000 amperes is likely to be the working current. A safety cut-out of lead plates is introduced to fuse at 8,000 amperes. The current indicator is a solenoid of nine turns through which the whole current passes. The core is connected by chains to two pointers indicating the current. This powerful dynamo is designed to feed the crucibles, of which there are six. Each consists of a long trough of fire-brick, having the ends closed by cast-iron pipes through which carbon electrodes pass, so as to be moved in or out. Lime and charcoal are used as a lining to the furnace. Each electrode consists of nine carbon rods attached to a cast-iron head, which is mounted on a copper rod passing through the cast-iron pipes. In starting the furnace the electrodes with the current joined up are brought together, then drawn apart. Pure aluminium is only supplied by the furnace in a powdery form; but as the chief commercial use of aluminium is as an alloy for other metals, this does not matter much.

An Optical Illusion.

Mr. Rapieff, a well-known electrician, has observed a curious optical illusion which is illustrated in the figure. A polished wire is taken and bent into the form shown at A. If, then, it is twirled between the thumb and fingers, it will present the appearance seen



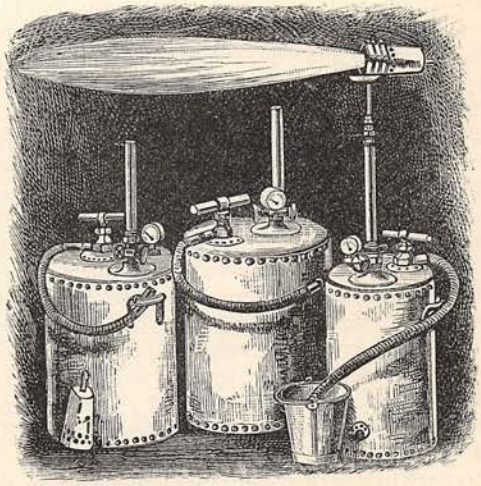
immediately above. If the wire is made as at B, the illusion above it will be seen; and if it has four loops, as at C, the figure over it is produced. The wire should be held so that the light is reflected as much as possible from the inner surface of the wire. The effect is due to the eclipsing of this bright surface.

The Weather Plant.

Professor Nowack, of Vienna, contends that the weather plant (*Abeus precatorius*) is electro-magnetic, and that if it is placed with its north branches towards the north in an apparatus of his design, it can be made to foretell the weather with success forty-eight hours in advance, as well as earthquakes or subterranean disturbances. Professor Nowack has closely studied the plant for over four years. The observatory of the Austrian Tourists' Club, on the Sonnwendstein in the Styrian Alps, has adopted the plant for its weather forecasts. An earthquake at Stolac in Bosnia, on the 10th November last, was, it is alleged, foretold by the plant eight days before.

The "Wells" Light.

The "Jupiter" and "Doty" lights for use in lighting large areas, such as engineering and building



works, have already been described in the GATHERER. Another powerful light of the kind, which requires no expensive air compressor and the necessary engine to drive it, is the "Wells" light, now employed throughout the works of the Manchester Ship Canal, and many other places. The light is derived from the consumption of a special oil, and the lamps are quite portable and self-contained. They are made of various sizes, running up to lights of 4,000 candle-power. The figure represents a group of three sizes. The tank is steel, and contains air under a pressure of 25 lbs. on the square inch. The oil is pumped into the lamps from a bucket by means of a hand-pump and a hose-pipe, both shown. The burner is then heated by burning some oily waste in the cup, a valve is opened, and the oil is forced into the burner by the air pressure. When ignited it burns with a powerful flame, which is constantly fed by the ascending oil being turned into gas. The lamp can be recharged with oil or air without stopping the light. The burner can be raised aloft on a mast, and the lamp can be mounted upon a travelling carriage. A great variety of small unbreakable lamps, and burners, for domestic or industrial purposes, are also supplied by the same makers.

Colour and Words.

It has long been known that certain words or musical and vowel sounds suggest colours to some people; and the phenomenon has recently been studied. In extreme cases the hearing of the sound suggests the colour, and *vice versâ*. The names of the months, or of persons, are also associated with colours. Musical notes have been expressed by individuals as colours; and Dr. Nussbaumer, of Vienna, when a child, amusing himself with striking a fork against a glass to hear it ring, saw at the same time certain subjective colours. He afterwards met a student at Zurich to whom high notes were as bright colours, and low notes as dark shades. Another instance is that of a gentleman who, on hearing the Breton air "Au Hallaika" played on a harmonium, found it yellow; whereas if played on a clarionet it was red, and on a piano, blue. Another person found the notes of a flute red, those of a clarionet mostly yellow, those of the guitar and trumpet golden, and those of the piano white. A certain Dr. Z—— connected colours with the vowel sounds, *a* being black, *e* yellow, *i* red, *o* white, and *u* coffee-coloured. Others, however, find *u* blue and *e* grey. Of 596 subjects examined by Bleuller and Lehmann in Germany, seventy-five answered that *a* was black, *o* white, and *i* red. Professor Holden has also made some investigations which show that even the numbers and consonants appear coloured to some; one, for example, appearing black, two cream, three blue, four brown, five white, six crimson, seven pink, eight white, nine greenish, and ten brown. Again, *a* was a light straw-colour, *b* grey, *c* tan, *d* blue, *e* and *f* black, *g* straw, *k* blue, *l* black, *m* brown, *n* dark blue, *o* light red, *p* light green, and so on. Probably if some of our readers try to match these sounds with colours, they will arrive at different results. It is difficult to explain this phenomenon. Some might answer that every note of the gamut has its corresponding sound, while noises are represented by brown and impure colours. But this is by no means proved. The influence of language and association has, perhaps, something to do with the matter, which at present has not been satisfactorily elucidated.

A New Copying Apparatus.

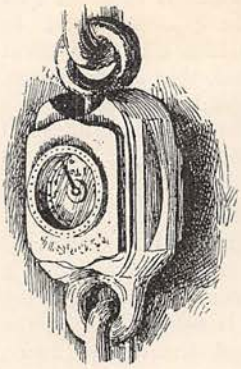
A new copying apparatus, worked upon the old "graph" plan, but in which no gelatine is used, has lately been introduced. What are the ingredients of the composition is not stated, but the result is a printing-slab of putty-like consistence, and not so sticky to the touch as the gelatine "graph." The new composition has several advantages over its predecessors, notably in the fact that the writing may be removed from its surface with great readiness by cold water, and that it is ready for use again in a few minutes. This new apparatus will give twenty or thirty copies from good bold writing in ordinary blue-black ink. We should add that the ink specially prepared for this apparatus flows remarkably well, and may be used without the slightest inconvenience.

A Miniature Type-Writer.

A type-writer, so diminutive in size as almost to justify the term "pocket type-writer," has recently been invented by Mr. A. E. Wynn. Its extreme dimensions are four inches by three inches, and its weight less than four and a half ounces. Yet it carries all the characters necessary in ordinary correspondence on the inner edge of the revolving disc which forms the principal feature of the machine. The whole frame travels across the paper, which consequently may be of any size, and a roller, to which a spacing-check is fitted, secures an absolute straightness and evenness in the line of printing. Its inventor claims for it that this is the smallest type-writer in the market, and we can recommend its use under circumstances where the more expensive and elaborate machines are not available.

A Load Indicator.

A load indicator, for use on cranes, lifts, and such apparatus, is illustrated in the annexed figure. It is specially designed to give warning of an excess load, and this it does by dropping a red disc over the dial-face; but the pointer also shows the strain upon the chain in hundredweights. It is, in fact, a form of weighing machine. In addition to showing the red disc it also sounds an alarm, which is in the form of a gong, where a gong would be audible; or in the form of a loud report produced by the explosion of a small fulminating charge. In the latter case it automatically feeds itself with a fresh charge to replace that exploded by the hammer.



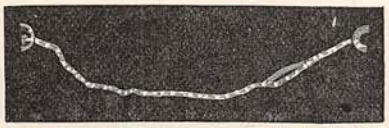
Across Greenland.

Dr. Frithiof Nansen, the snow-shoe traveller, has successfully crossed Greenland from east to west. He left Uminik, on the east coast, on August 15th, and reached Godthaab on October 3rd. For nearly three weeks he and his companions traversed the ice-fields of the interior at an elevation of 10,000 feet above the level of the sea, and encountered some heavy snow-storms. The temperature fell from 40° to 50° below zero centigrade, that is to say, below freezing-point. Dr. Nansen is understood to be engaged in writing a narrative of the journey, which will probably be published next spring.

A Natural Battery.

It has long been known that if two plates of different metals are buried in the ground and connected by a wire above the surface, an earth battery is formed and a current of electricity is found in the wire. A curious natural instance of the kind recently occurred

at Bridgewater, in Nova Scotia, whence a telephone line was run to a gold-mining district some thirty miles distant. A steady current was found to flow through the wire; and the explanation is that the mineral lodes in the neighbourhood gave rise to it. There are gold, silver, copper, lead, and iron ores there, and it is supposed that the gold, silver, copper, and lead formed the negative plate of the battery, whilst the iron formed the positive, the moist earth and rock completing the circuit with the wire. The natural current is observed to be stronger on rainy days, probably owing to the increased moisture of the earth. Being a steady current, it does not interfere with the working of the telephone. This case is evidently to be distinguished from the ordinary "earth-currents" observed in telegraph lines, when the "earth-plates" at their extremities are of the same metal; and it seems to be a real case of a natural battery formed by mineral deposits underground.



Photographing a Spark.

The electric spark, like the lightning-flash, is known to exist for so short a time that some hold it to be instantaneous, others think its duration is measurable. Mr. J. Wimshurst has therefore photographed the spark from one of his "influence" machines, by means of a special camera, in which the sensitive plate rotated at a velocity of 2,500 revolutions per minute. The figure is a reproduction of the photograph of the spark taken under these circumstances. The spark is so clear and definite, in spite of the moving plate, that one must consider its duration as practically instantaneous.

An Invisible Lacquer.

"Ardenbrite" is a new invisible lacquer recently introduced into London. It is so strong as to withstand weather, steam, smoke, sea-air, or sea-water; and gold, silver, copper, steel, brass, or iron does not tarnish when coated with it. As it is so fine as to be unseen on the most delicate instruments, the new lacquer has an extensive field of application.

Electrified Soap-Bubbles.

Mr. C. Vernon Boys has recently made some interesting experiments with soap-bubbles, which demonstrate that while it is difficult to make two soap-bubbles burst each other by pressure or collision, they will do so readily if one has a very slight charge of electricity. The phenomenon might thus be employed as an indicator of the presence of electricity. Mr. Boys, by blowing one soap-bubble within another, also showed that there is no electric force inside a closed conductor, a well-known fact of electric science.

The Electric Light in Dredging.

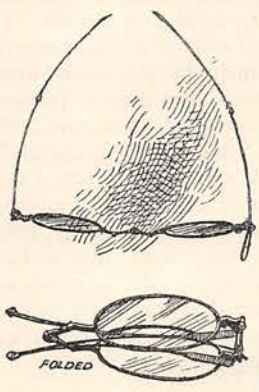
It is well known that the electric light acts as a lure for fishes, and has been used for this purpose. During a recent trip of the *Hyena*, a vessel of the Liverpool Salvage Association, some members of the Liverpool Biology Committee employed the light of a 60 candle-power Edison-Swan electric lamp to attract submarine specimens to their tow-nets. The trials took place off the Isle of Man, and it was found that the lamp when placed in the mouth of the tow-net brought abundance of crustaceans to the net. On the other hand, when the lamp was absent the net was nearly empty.

An Automatic Telephone Exchange.

In Glasgow and its district there are nearly a hundred automatic telephone exchanges at work, enabling any person to speak to any of the subscribers to the local Telephone Company. The apparatus is usually lodged in a shop at some convenient point of the city. A person intending to speak by telephone goes to the apparatus, and by means of the call-bell attached "rings up" the nearest telephone exchange with which the apparatus is in communication. His call is immediately answered by an operator at that exchange, who asks him if he is a subscriber to the Telephone Company. If he is, she tells him to put one of the "checks," with which subscribers are provided, into the slit of the automatic box beside the apparatus, and when she hears (by her telephone) the check inserted, she at once puts him into speaking communication with the person he desires. In the case of a non-subscriber she tells him to put three pennies into the slit if he desires to speak with some one in the city, and sixpence if he wishes to talk with some one in a neighbouring town to which "trunk" or long-distance lines run. The apparatus is so arranged that the operator can hear the money drop. Being automatic, no attendant is required.

Folding Spectacles.

The greater firmness of spectacle-frames, as compared with the familiar pincenez, leads many people who only require the aid of glasses occasionally to carry the somewhat awkward spectacle-case now required with the ordinary form of spectacles. But recently Mr. Stephen Dixon has invented a new form of frame which combines the firmness of the spectacle-frame in use and the convenience of the "nippers" in portability. Our illustration shows the new frame, which scarcely needs further explanation. The bridge is hinged, and the ear extensions are also made to fold, and the whole frame consequently packs away into a space little more than that occupied by the



pince now in vogue. The absence of any spring clip will render these new frames very acceptable to many persons who are obliged to have their spectacles always within reach, but who are not compelled to wear them continually.

Cocoanut Oil in Sugar-Making.

Cocoanut oil has been used for making sugar in one of the West African coast settlements. The oil is added to the sugar-pans in the proportion of about a pint to the ton, and the result is stated to be an increased yield of sugar from the "masseccuite," owing to its facilitating the operation of "striking," and preventing a too turbulent boiling at the finish.

"Lady Brassey's Last Voyage."

There is a melancholy interest attaching to the record of "Lady Brassey's Last Voyage," which Messrs. Longmans have just published. Before the *Sunbeam* had completed her voyage, the writer who had made the yacht so famous, died and was buried at sea. The voyage was a singularly interesting one, including, as it did, visits to India, Siam, Borneo, Australia, and New Guinea. Lady Brassey's notes have been worked up for her by a former helper of hers, and Lord Brassey contributes a touching memoir of his well-known wife, and his own journal of the voyage after her death. Unfortunately the volume comes to us just as we are going to press, and we cannot, on that account, give it quite such detailed attention as it deserves. The descriptions of Sarawak and the Australian colonies strike us as even more interesting than the rest of this eminently readable book. The illustrations, from drawings by Mr. Pritchett, claim something more than a mere passing word, and some of them are among the finest specimens of wood-engraving we have seen. Certainly the last of Lady Brassey's books is not behind its predecessors in attractiveness, and we predict for it an equal popularity.

Five Centuries Ago.

The fourth volume of Professor Morley's "English Writers" has now been issued by Messrs. Cassell. It is occupied by the first part of a survey of the literature of the fourteenth century, which the Professor hopes to complete in his next volume. The present portion deals with the "Romaunt of the Rose," and quaint old John Gower, as well as with "Maundevilie's Travels" and "Piers Ploughman." We have not reached the full consideration of Chaucer's work and its effects, which Professor Morley promises us, but he tells us in the "last leaves" of this volume that it has seemed best to him to postpone the account of Chaucer until it can be read in a true light, gained by study of the other authors of his time. This series loses none of its interest as it grows.

Richard IV.

Apparently Professor J. F. Hodgetts does not believe the generally accepted story of the murder of the two Plantagenet princes in the Tower, by order of their cruel uncle. He has based his last story, "Richard IV." (Whiting & Co.), partly upon his own rendering of the history of this period, and partly upon evidence which he believes he has discovered of the existence of a son of Richard of Gloucester, born before his father rose to greatness. The story tells how the son, Richard IV., as he is called, became ultimately Caxton's apprentice at Westminster, and Professor Hodgetts would have us believe that the English printer who produced Tyndall's New Testament at Wittenberg, was none other than this same Richard Plantagenet. We cannot say that we are convinced that Professor Hodgetts has rightly rendered the history of this period, but his story is full of life and interest, and is well worth reading. Of course, it is intended mainly for boys.

OUR AMATEUR FREE UNIVERSITY.

LITERARY COURSE.—"DESCRIPTIVE LETTER" COMPETITION.

The Prize of Half-a-Guinea is awarded to Mr. J. BROWNBILL, 32, Windsor Road, The Brook, Liverpool.

CERTIFICATES OF HONOUR.

Name.	*Address.*
Crabtree, Alfred	Spalding.
Duffett, Bessie E.	Redhill.
Gibbons, Alice	Brierley Hill.
Lewis, James G....	Canterbury.
Sizer, Kate T	Gt. Bentley.

CERTIFICATES OF MERIT.

Name.	*Address.*
Addison, Wm.	Newcastle-on-Tyne.
Bell, Effie E.	Swaffham.
Creswell, B. F.	Teignmouth.
Daniel, M. N.	Athlone.
Dawson, Mary L.	Portadown.
Dornled, Ruth	Hathern.
Dowson, Julia A.	Brentwood.
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Hazell, Ada K.	Farnham.
Hazell, Caroline M.	Farnham.
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Sharpe, Mary C.	Spilsby.
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Stanley, Katherine	Chipping Campden.
Walker, Ethel M. S.	Rugby.
Wise, Mary L. C.	Ripon.
Young, Ernest	Dudley.

The successful candidates may have their Certificates posted to them, on their sending to the Editor a fully-addressed label, together with two penny postage stamps, to defray cost of postage and roller. The Editor cannot be responsible for loss or damage to Certificates in the post.