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.

Mimic Lightning.

Lycopodium powder, thrown into a flame, has long been used for producing imitation lightning; but the arrangement which we illustrate is said to be an improvement, and has been introduced as such into the representations of grand opera at Paris. A lantern or box containing a lamp, L, in its lower part, is fitted with a metal grating, G, as a partition or floor above the flame, which heats it red-hot. A mixture of powdered magnesium, chlorate of potash, and lycopodium, is then poured through the funnel, F, by means of a spoon, and when it reaches the hot grating it flashes forth with remarkable brilliancy.

Shifting Latitudes.

Observations made for some time past at Berlin, Potsdam, Prague, and other cities of Europe, have shown that their geographical latitudes have decreased by $\frac{2}{10}$ of a second. It is supposed that the axis of the earth has shifted by that much in space, and in order to settle the matter, an expedition has been sent out to Honolulu, which, being the antipodes of Central Europe, will show an equal change in the opposite direction if the explanation is correct. The expedition will remain there for a year under the direction of Dr. Macuse, of the Berlin Observatory.

Connecting Telephones.

The electricians of the London-Paris telephone line found no difficulty in speaking clearly from the central

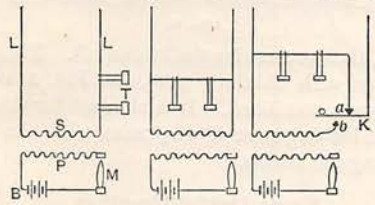
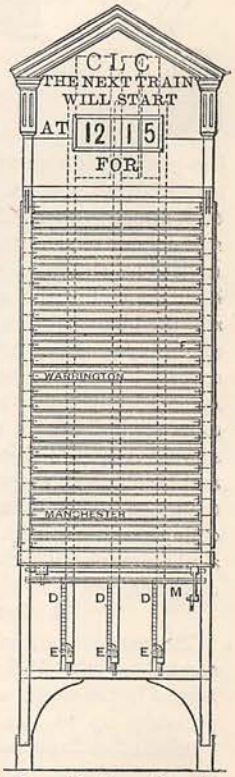


FIG. 1. FIG. 2. FIG. 3.

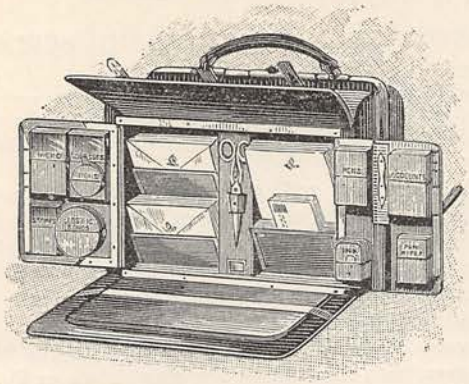
post-offices of both cities by the ordinary mode of connecting the telephone as shown in Fig. 1, where M is the microphone transmitter, B the battery, and P the primary wire of an induction coil, S the secondary wire of the same coil, and LL the going and returning wires of the line with two telephone receivers, T, in circuit. But when two subscribers having private wires were joined up, it was found that the local subterranean wires of the cities, not having been specially designed for this work, presented rather a high resistance and electrostatic capacity, which "pulled down" the talk. Hence it has been deemed advisable to depart from the ordinary method of coupling the apparatus. The arrangement of Fig. 2 gives better results than that of Fig. 1. Here the two receivers, T, are connected *between* the line wires "in derivation," as it is called. The best results have, however, been obtained by the plan shown in Fig. 3, in which each post can transmit or receive a message, but not at the same time. Each speaker has a Morse key, K, by which the connections are changed for receiving or for transmitting, as the case may be. The arrangement is identical with that of Fig. 2, except that this key is inserted as shown. It will be seen that when the lever of the key is in the position illustrated, the correspondent is free to listen on the receivers, whereas when the lever is depressed it breaks contact with its upper stop, *a*, and makes contact with its lower one, *b*, thus putting the connections in condition for speaking by the transmitter. The use of the key in this manner cuts out the high resistance of the secondary wire of the induction coil and improves the speaking.

A Train Indicator.



An indicator of the starting of trains at railway stations which has been adopted on the Lancashire and Yorkshire Railway is illustrated in the figure. The times of starting and the destinations of the trains are shown—the former above, the latter below. The time is exposed by means of three wheels, shown by dotted lines in the top of the figure. These wheels have numbers on their peripheries, which are brought into view by means of rods and ratchet wheels, D, and retained in that position by the panels, E, seen at the bottom of the figure. The names of the stations are marked on triangular boards, F, which are shifted by a rocking shaft, M, and a set of vertical rods behind, which are not shown. The indicator is made either single or double, and placed so as to indicate for two separate platforms. Something of the same kind has been at work at Waterloo Station (L. & S. W. R.) for a year or two past with great success.

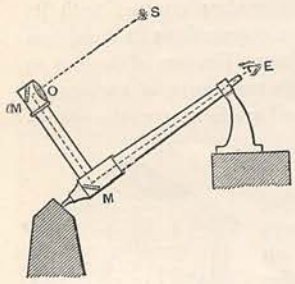
A Correspondence Bag.



The travelling bag, which we illustrate, has all the requisite materials for correspondence, while containing plenty of room for clothes, and when placed on its side, as shown, it becomes a veritable writing desk.

A Double Moon.

The powerful Lick telescope at Mount Hamilton, U.S., has enabled the astronomers there to discover that one of the satellites of Jupiter is double, consisting of a large moon with a tiny one revolving round it. We may add that a new equatorial on the "knee" principle of M. Loewy has been installed at the National Observatory, Paris. It is the largest of its kind in existence, and has an object-glass of 60 centimetres diameter, with a focal length of 18 metres. The "equatorial *coude*," has been already described in the GATHERER, but we may remind our readers that it has a tube bent at right angles, as shown in the figure. The object-glass, O, is at the end of the arm which is exposed to the sky, and the image is reflected by mirrors, M M, up the tube to the eyeglass, at which the astronomer sits under cover. The telescope is actuated by clockwork to automatically follow any star or planet from its rising to its setting, so that the observer has merely to observe. A special object-glass has also been provided for photographic purposes, and gives a direct image of the moon, 18 centimetres in diameter, with remarkable definition; but this image can be enlarged so as to give a photograph more than 1 metre (about three feet) in diameter.



A Great Manometer.

The manometer, or pressure gauge, which has been erected on the Eiffel Tower, Paris, is by far the largest in the world, and is capable of measuring fluid pressures up to 400 atmospheres. It consists of a tube 984 feet high, running up the tower by the lift and staircase, and communicating at the ground with a reservoir of mercury. The tube is made of soft steel from the barrels of old chassepot rifles, and has an inner diameter of $\frac{1}{6}$ in. (4 millimetres). At intervals of ten feet there are stopcocks communicating with vertical lengths of graduated glass tubes, with overflow pipes of india-rubber leading down to the reservoir. The latter is partly filled with mercury, and when the pressure to be measured is applied to it the liquid metal ascends the manometer tube to a height correspondent to the pressure. This height is read off on the glass tubes by opening the stop-cocks. Should the mercury run over any of these, it flows back to the reservoir by the india-rubber pipes. An assistant, armed with a telephone, ascends the tower and makes the observations in question. M. Cailletet, the inventor of this gauge, is well known for his experiments on the liquefaction of oxygen, hydrogen, and other gases, and he expects to make a good use of the gauge in other experiments which he has projected.

A New Chimney Cap.

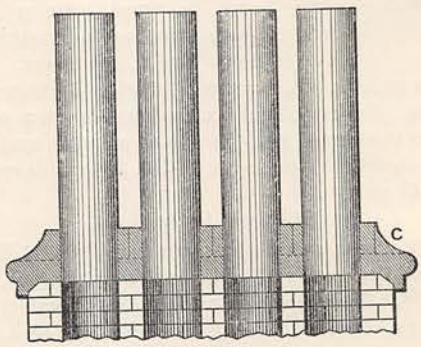


FIG. 1.

The figures illustrate sections through this new chimney-cover, C, which is made in one solid piece of earthenware, and entirely covers the top of the stack

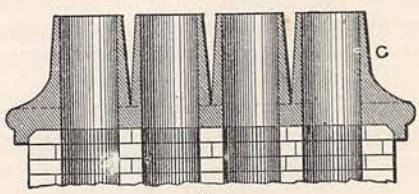


FIG. 2.

all round, thus preserving the brickwork. Fig. 1 shows a cap fitted with chimney pots, and Fig. 2 a row of caps and pots combined. It is claimed for this device that while looking neat it dispenses with the trouble of repairing the stacks.

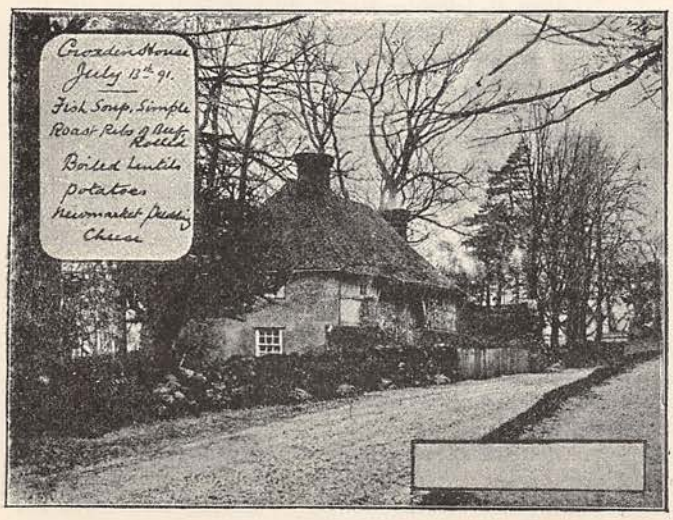
Some Useful Novelties.

An adaptation of a familiar principle as applied to tools for domestic use has just been patented. It consists in a hammer whose handle is made rather larger than usual, and hollowed to form a receptacle for no less than twelve small tools, which are fitted by means of a screw piece into the removable end of the handle, and are then always available for use. The combining of a number of tools with one handle is not new, of course, but we think the application of the principle to the fixed handle with a hammer is a useful novelty, and the screw-fitting for the loose tool bits is

on a better principle than the old-fashioned tools of this nature.—A cantilever castor which has recently been patented deserves attention, and at least a passing word of notice. The principle of these new castors is that the cradle or holder forms a pyramid of unequal sides, the base of which is divided into unequal lengths by the central pin, and the bowl is fixed at the apex, slightly out of the direct vertical line from the central pin. For chair and couch work these new castors seem likely to serve a useful purpose, and to reduce the risk of fracture of the wood and breaking of the castors to a minimum.—Cups are now being made in which the handles are placed in a position rather different from the old one, and a little nearer the bottom of the cup. At the same time they are partly sunk in the cup, and so are calculated not only to balance the cup better but to do away to a large extent with the danger of chipped handles.—A new ink-bottle which is called by its inventor, "The Ink Purifier," has just been patented by a Glasgow merchant. It is unnecessary to go into the details of its construction here. We need only say that we have given it an extended trial, and find that while it holds an unusually large quantity of ink, it presents the smallest possible surface to the air, and is so arranged as only to give a sufficiently well-filled pen to allow of continuous writing, and not to admit of blots. At the same time it is practically unspillable and very readily cleaned.—A new hair brush has just been patented for the use of those who are obliged to apply oils or other liquids to the hair. Attached to the handle of the brush is an india-rubber ejector in which the liquid is admitted by means of a brass screw. When the brush is in use all that it is necessary to do to ensure a supply of the liquid to the brush and to the hair is to gently press the rubber ejector. The flow of the liquid from the ejector to the brush may be regulated by means of a screw fixed in the head of the brush.

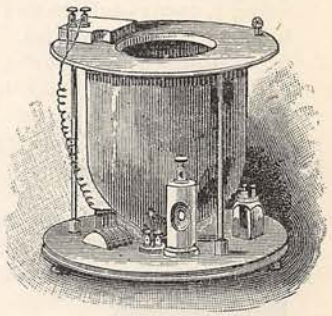
Photographic Menus.

A French amateur of photography has introduced the custom of providing his guests with a menu having a photograph of the scene of the feast, whether it be in his residence or *à la campagne*. The menu is prepared by taking a photograph of the spot and pasting two pieces of white paper over it—one in the left-hand corner, the other and smaller at the bottom. The positives are then drawn from this on suitable paper, and the list of dishes is written in the larger blank space at the corner, while the smaller space below is reserved for the name of the guest or any other name which it is desirable to add to the souvenir.



An Electrical Photometer.

It is well known that if the radiation from a lamp fall on a blackened surface, the latter experiences a rise of temperature, which is due, not only to the dark, but to the light, rays absorbed by the surface. It is also known that the electric resistance of a wire increases with a rise of temperature. Mr. R. C. Richards has applied these principles in designing a new photometer. He causes the light of the lamp to fall on an iron wire coated with soot, and forming one side of a Wheatstone balance for measuring electric resistances. The radiation from the lamp heats the wire and raises its electric resistance by an amount which is indicated on the balance. Certain corrections, given by experiments, are applied to the result, and the illumination of the lamp is obtained. The figure shows the device he employs for directing the light of the lamp on the sensitive wire. It may be simply described as two concentric vessels of glass with a concentrated solution of alum between them. The inner vessel is of ground glass, and the outer is covered with a winding of iron wire coated with soot. The alum cuts off the heat rays as far as possible, leaving the light rays to affect the resistance of the wire, which is joined up by the connections shown, as one arm of the Wheatstone balance. The beam from the lamp strikes the inside of the vessel, and passes through the solution to the wire without. Obviously this arrangement has, at least, the merit of being independent of the eye as a gauge of the illumination. It is an attempt to reduce photometry to something like the accuracy of electric measurements.

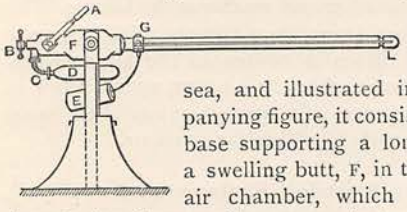


Groundsel as Forage.

An English lady being struck with the fact that delicate canaries thrive well on common groundsel, and finding, moreover, that live stock ate the weed with relish, has cultivated it, and found it an excellent fodder for cattle. Perhaps others will give the experiment a trial.

A Line-throwing Air-Gun.

The pneumatic gun of Commander J. D'Arcy Irvine, R.N., is intended to assist in saving life from fire and flood by throwing a life-line to those in jeopardy. As shown at the Naval Exhibition, Chelsea, and illustrated in the accompanying figure, it consists of a strong base supporting a long barrel with a swelling butt, F, in the form of an air chamber, which is connected through the pipe, C, with a reservoir, D, containing air at a pressure of 2,400 lbs. per square inch. A screw valve, B, opens or closes this communication when the firing lever, A, is operated. The projectile, L, is connected through the collar, G, with a life-line contained in the holder, E, and thus carries the means of succour. We understand that Captain Irvine is also engaged in bringing out a line-throwing gun to be fired from the shoulder, with the help, not of compressed air, but of gunpowder.



A Light Adjuster.

The trichord adjuster shown in the figures is designed to throw the light of an electric lamp in any direction so as to illuminate a work of art, a book, or a dark passage. It can be fitted to any incandescent lamp, and consists of a brass boss, having three radial arms, which screws on the neck of the lamp as shown. A small block is fixed above the lamp on the conducting wires, and the boss, together with the lamp and its opaline reflector, is suspended from this block by an endless silk cord running through holes in the ends of the arms. The device will be useful, not only in houses, but in workshops and show rooms. It is represented shedding the light horizontally in Fig. 1 and vertically downwards in Fig. 2.

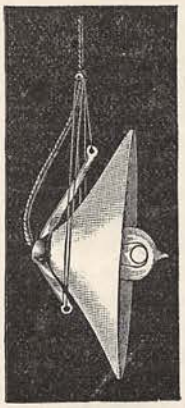


FIG. 1.

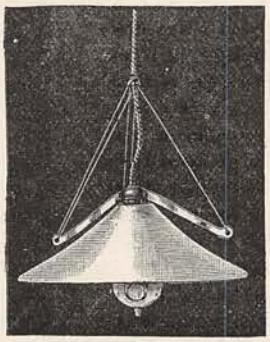


FIG. 2.

The Snow Leopard.

One of the best examples of adaptation to environment—in other words, to the circumstances under which an organism lives—is seen in the Snow Leopard, or Ounce (*Felis uncia*), one of the great cats very rarely brought to Europe. Just as, in pre-historic times, the mammoth among elephants was clothed with wool and hair as a defence against the cold, so the Ounce in the present day is a leopard specially adapted to live in a rigorous climate. Unlike the true leopard (*Felis leopardus*), it is confined to Asia, and is seldom found much below the snow line of the central highland region of that continent, though it has been found as far west as Smyrna. The adult male is from four to four and a half feet long, exclusive of the tail, which is about a yard, and is clothed in long, dense fur, which protects it from the effects of the low temperature of its *habitat*. The fur is pale yellowish-grey, with small irregular dark spots on the head, cheeks, back of neck, and limbs, and with dark rings on the back and sides ; the under surface is whitish, with some large dark spots about the middle, and the rest unspotted. The ounce has never been known to attack man ; it preys on wild and domesticated sheep and goats, and, like the true leopard, is extremely fond of dog flesh. A young specimen—the first brought alive to England—was recently exhibited at the Zoological Gardens, Regent's Park, but it unfortunately died a few weeks after its arrival.

Postage Stamp Machines.

An automatic machine for selling postage stamps is now being tried by the Post Office. It stands about a foot and a half high by several inches square, and can be adapted to any pillar letter-box. On dropping a penny into the slot provided, a drawer comes out, containing a memorandum book with a penny stamp on the cover. Steps have been taken to guard against fraud or failure of action, and the machine, if successful in practice, will be a public convenience. It is understood that the inventors derive their remuneration from the advertisements in the memorandum book.

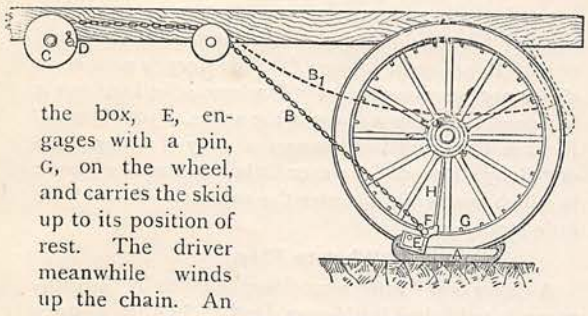
Curing the Potato Disease.

M. Girard, in France, and M. Petermann, Director of the Agronomic Station at Gembloux, in Belgium, have found that a dressing of sulphate of copper (blue vitriol) is very effective in preventing the potato disease, without injuring the weight or quality of the crop. M. Petermann employs a stronger dressing than M. Girard—namely, 50 kilogrammes of the sulplate to a hectare, together with 25 kilogrammes of lime, and 25 hectolitres of water. The dressing reduced the diseased potatoes from 30 to 7 per cent. of the whole. Sulphate of iron (green vitriol) has also been tried with success by M. Petermann, the quantity of diseased roots being about 12 per cent. of the whole. The mixture used consisted of 50 kilogrammes of the iron salt, 25 kilogrammes of lime, and 25 hectolitres of water per hectare. The latter dressing is the cheaper of the two.

A New Skid.

A new skid for blocking the wheel of a road vehicle in descending a hill is illustrated herewith. It has the advantage of being applied by the driver without dismounting from his seat. When not in use, the skid, A, is hung by the chain, B, in the position shown by the dotted lines, B^1. The driver releases it by slackening the wheel, C, by means of a split hand, D, and thus paying out sufficient chain to let the skid reach the

ground. The wheel then runs on it, and on letting go the hand, D, the wheel becomes locked. To take away the skid again, the driver pays out more chain, allowing the wheel to run off the skid, when the claw, F, of



the box, E, engages with a pin, G, on the wheel, and carries the skid up to its position of rest. The driver meanwhile winds up the chain. An arm, H, which connects the skid with the nave of the wheel has on its upper end a collar, J, which embraces the nave and allows a certain play between the skid and tire when the former is out of use.

Three Books of Lessons.

Lessons need not always be scholastic or pedagogic, as everybody knows, and we have been forcibly reminded of this fact by the sight of three volumes which lie upon our table together. First is the fifth volume of "Cassell's New Popular Educator," continuing the admirably helpful series of aids to those who would improve themselves intellectually. Bright, clear lessons are these, often illustrated by good diagrams and plates, to say nothing of the excellent maps which are also included. Next we have a Teacher's Manual of "Elementary Laundry Work" (Longmans), which we welcome not only for its clear, practical hints, but also as an evidence of the widening scope of education, and the attention that is being paid to technical points that used to be left for the scholars to acquire as best they could, when schooldays were over. Lastly we have a new edition of Mr. R. B. Swinton's "Chess for Beginners, and the Beginnings of Chess" (T. Fisher Unwin), a work which combines with some admirable hints on playing the game a series of interesting chapters on its history. The book is one we can commend to all lovers of chess.

New Music.

It is some time since we were able to say anything in these columns of new music, and now that we have an opportunity of doing so the number of sheets that claim attention is absolutely appalling. From Messrs. Hutchings & Romer alone, of whose publications we propose to speak first, we have very nearly forty separate pieces before us, though of course we cannot mention each one individually. "The Legend of Elöisa" is a clever cantata, of which the words are by Herbert Bedford and the music by R. Orlando Morgan, both well written and interesting. Another cantata, "Beauty and the Beast," by King Hall, with words by Edward Oxenford, is decidedly attractive as well as humorous. In "The Minor Choralist" series we have two four-part songs, "Come Away to the Chase," by Vincent Wallace, and "My lady is the flower of flowers," by Ciro Pinsuti (with words by F. E. Weatherly), of which, if we have any choice, we prefer the latter. Then we have three pretty and fairly taking "Vocal Trios" and a set of six "Vocal Duets," which we recommend as useful and simple melodies for school and class singing. Now we turn to music for the piano, and see "Humoresque," by Clement Locknane, which is very pretty and easy, and duet and solo versions of "La Gracieuse," by A. Thompson McEvoy, which are not quite so original as the last piece we mentioned, though the middle theme in the duet is nice. Then we have a very simple "Berceuse" by D. R. Munro, and a pair of excellent little studies under the title of "Feldblumen," by R. W. Oberhoffer. We must notice specially "Chant du Paysan" and the "Maypole Dance," both by J. Pridham, as nice drawing-room pieces for the violin and piano; and "Ave Verum," by Mozart, and "Andante" by Beethoven, which would form very nice additions to a classical *répertoire*. Of four songs which we take up next it is hardly necessary to do more than mention the titles and the names of the composers. "Silver Wings" by Lilias Green, with words by Marion Burnside, is a charming song with obbligato for violin or viola; while Ciro Pinsuti's setting of Mr. F. E. Weatherly's words "My Lady" is pretty and sure to be popular; and of "The Gates of Paradise" and "In After Years," of which both words and music are by Cotsford Dick, we must say that both are pretty, but of the two the latter is more ambitious and better written. Another very nice song is "Can you tell?" by Frank Manby, with words by Mary Gorges; and in "Young Mother Hubbard," by Suchet Champion, the taking and entertaining words are by our late friend Mr. George Weatherly. A very simple and pretty song is "Grannie's Reason," a setting by Clement Locknane of words by Edward Oxenford; while "L'Espagnola," also by Clement Locknane (with words by Hubi Newcombe), is a true Bolero. "Love will endure," by Alfred Scott Gatty, is a very good setting of words by Harold Boulton; and "The Tempest King," of which the words are by Edward Major, and the music by Morris Edwards, we have no hesitation in recommending as a very good bass song. It will be seen that there is no lack of variety in Messrs. Hutchings & Romer's publications, and it is impossible to speak too highly of the admirable way in which they are produced.

A Book about Doctors.

A pleasant little series of sketches is "My Doctors," by a Patient (Skeffington). It cleverly hits off the various divisions of the genus *medico* in a manner so good-natured that doctors will probably enjoy the book as much as their patients, for whom it is, presumably, written principally. The collection of anecdotes at the end of the work—apparently an afterthought—is very striking, and there are a good many really new stories included in it. Decidedly this is a book by whose aid any doctor might hope to cure a patient afflicted with melancholy or ennui.

New Songs and Pieces.

Mr. Alphonse Cary sends us two books of "Twelve Original Melodies" for violin and piano by J. C. Beazley, which we find fairly good. In the "Diamond Edition" this publisher is issuing a splendid set of songs and pianoforte pieces at very cheap prices, and which all amateurs should make a point of seeing. "Funny Folks" is a very fair Intermezzo by G. H. Swift; and "Mistletoe," "The Village Smithy" and "Marche Antique," which are composed by H. F. Grandinger, and included in the "Treasures of Melody" series, are to be recommended as very good pieces for young children. We have mentioned before "The Strathearn Collection of Part Songs" issued by Messrs. Paterson and Sons, of Edinburgh. Leaders of choral classes should be sure to see these as they are published, as the songs included in the series are very good for their purpose, and now that the publishers have added some sacred songs to the series, it is one to be followed with care. We have to acknowledge also the receipt of two Albums from the same publishers—"A Pastoral Album," containing six pretty two-part songs by Alfred Moffat with words by Edward Oxenford, and "Album of Six Songs" by Hamish MacCunn, which is an excellent edition of this composer's loveliest songs. A well-written semi-sacred song is Mr. McConnell Wood's setting of Mr. Oxenford's words entitled "The Abbey Portal"; and "A Lost Love" is a pretty love song by Alfred Stella, of which the words are by George Barlow. In "Fair is Love" is a beautiful melody and accompaniment by Hamish MacCunn to words by George Barlow; while "Heart in Armour," is a first-class baritone song from the same author and composer. Miss K. T. Sizer, who is the author of the "Household Sketches" which are now appearing month by month in this magazine, is also author and translator of a series of songs, intended for use by young people and in schools, and published by Messrs. J. Curwen & Sons under the title "The Concert at Home." The words are very pretty and suitable for this purpose, and the settings by Mr. K. A. Kern combine with them to make a valuable acquisition to our *répertoire*.

"Tries at Truth."

Such is Mr. Arnold White's own title for his series of admirable essays on social questions, just issued by Messrs. Isbister & Co. Colonisation, socialism, strikes, sweating, drink, overcrowding, poor-law, these are *some* of the problems that confront Mr. White, as they must every worker for the amelioration of the often hard lot of the London workers. Of course we do not commit ourselves in every case to Mr. Arnold White's solution of the difficulty he is discussing, but, even when we differ from him most, or most regret that he is sometimes a little vague, we can never too highly speak of the zeal and care with which he has entered into these great questions which are crying aloud for some active brain and strong hand to take them up.

New Editions.

In this Naval Exhibition year special interest attaches to the new edition of Southey's "Life of Nelson," which Messrs. Cassell have just issued with some very good illustrations and portraits. We have also received a cheap edition of the same work as issued in the "National Library." Mr. Fisher Unwin sends us a second edition of "A Mystery of the Campagna," which, with another story by the same author entitled "A Shadow on a Wave," makes up a volume of his "Pseudonym Library." This story is neither so clever nor so pleasing as "Mademoiselle Ixe," but it has good claims to a place in the series. From Messrs. Field & Tuer we have received a copy of a new issue of "Baby's Record," a clever little memorandum book in which mothers may enter the successive feats of the little stranger.

What to Play.

A clever new "Intermezzo" for the piano by G. Bachmann is published by Messrs. Duff & Stewart, who are also the publishers of a series of "Miniature Classics" in which we have very good editions of "Dussek's Rondo," and "Haydn's Rondo," well-fingered and suitable for children. We have also to acknowledge the receipt from Messrs. Duff & Stewart of Nos. 1 and 2 of the Entr'acte to Schubert's "Rosamunde," well arranged into piano pieces, and very nice editions of "Wiegenlied," by Adolph Henselt, and "Toccata in A," by P. D. Paradies. From Messrs. Forsyth Bros. we have a "New Series of School Songs," for equal voices, in unison and in two or three parts, which are all edited by Frederic N. Löhr, and as the composer is in every case our contributor Dr. W. H. Hunt, it is hardly necessary to say to our readers that these songs are all very pretty. The London Music Publishing Company have published a cantata, "Annie of Lochroyan, by Erskine Allon, in which, although it is difficult, lies a mine of treasures. We have five more songs by Dr. W. H. Hunt to acknowledge, and this time all are published by Messrs. Weekes & Co. Of the first two "In Absence" is a very pretty setting of words paraphrased from Goethe, and "Go, Lovely Rose" is a solo setting of words by Waller which have been many times used for a duet; of "The Little Flower," "Sleep, My Little one," and "The Silver Stars in Myriad Train," we need say little except to remind our readers that they originally appeared in this magazine. Another very good song is "In Thy Dear Eyes," a setting by Adrian Girillo of words by Edmund Lee, which is published by Messrs. J. and J. Hopkinson, who have set before us a new idea in "Oranges and Lemons," a setting to pretty music by G. A. Lovell of an old rhyme. In "O Swallow, Swallow," Mr. Arthur Somervell gives us a very pretty accompaniment to Lord Tennyson's well-known words, and "Three Songs," to which the words are contributed by W. E. Henley and the music by H. F. B. Reynardson, is clever and attractive.

SHORT STORY COMPETITION.

As we reminded intending competitors last month, July 1st, 1891, is the latest day for receiving MSS. The award will be announced as soon as possible.