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 Sewer Gas Destroyer.

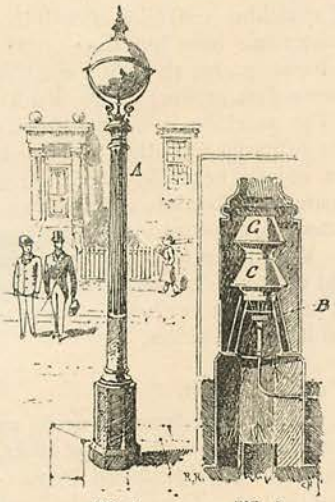


FIG. 1. FIG. 2.

Sewer gas ventilation ordinarily takes place by openings in the form of gratings or hollow shafts; but the delivery of polluted air in this manner into the atmosphere is obviously not satisfactory. A civil engineer has therefore introduced this gas destroyer, which "purifies the sewer air before it is delivered to the atmosphere." It consists in placing an air gas burner in the base of the ornamental iron column, A, Fig. 1, serving for a delivery shaft, and, at the same time, as a lamp-post if need be. The burner, B, Fig. 2, is surrounded by a conical iron casing, and surmounted by two conical iron chambers, C C. These are heated by the flame, and the sewer gas being sucked through is burnt in its passage, and all the germs destroyed. The first cone has a temperature of 620° F., or that capable of melting lead. The destroyer has been favourably reported on.

Steel Lace.

Fine lace of rolled steel has recently been made in Pittsburg, United States. It is said to be so light that it can almost be blown away by a breath. The pattern is stamped out of an unbrittle kind of steel, and not woven as in ordinary thread lace. A variety of qualities, light and heavy, have been made for the market; and if the new lace can be guarded from rusting it may become an article of wear.

The "City of New York."

The *City of New York* is, since the *Great Eastern* was withdrawn, the largest vessel afloat. She was recently built on the Clyde, for the Inman and International Company, and is designed for the safety and comfort of her passengers, as well as for speed. Her length is 560 feet; breadth, 63¼ feet; depth below the upper deck, 43¼ feet. Above the upper deck is a promenade deck, supported on stanchions, and running the whole length of the ship. There are fifteen water-tight compartments, separated by steel bulk-heads, extending from the keel to the upper deck, that is to say, 16 feet above the water-line. Two of these compartments could be knocked into one without rendering the vessel unseaworthy. The boilers are separated into three groups by two of these compartments, and the engines are so arranged that if a breakdown occur at any time to either engines or screw-shaft, the vessel can proceed at three-quarters speed. She is a twin-screw vessel, and is capable of making about 20 knots an hour. The main saloon is in the form of a dome, 22 feet high, and fitted up in a very elegant style. There is also a drawing-room and library, as well as state-rooms and berths, lighted by electricity. The rudder and steering gear is entirely below water, a provision intended for the eventuality of the ship being used as an armed cruiser. The cargo is worked by twelve hydraulic derricks, working without noise—a convenience to the passengers. In short, the *City of New York* is an important advance in shipbuilding, in the direction of safe and comfortable travelling at sea. She is designed for the Atlantic passage.

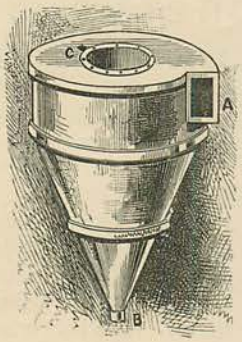
Brazing by Gas.

Mr. Thomas Fletcher, of Warrington, the well-known chemist, has introduced a new method of welding by means of compressed oxygen and coal gas, and found that with a half-inch gas supply pipe a joint could be brazed in a two-inch wrought-iron pipe in about a minute. Welding was also performed by this method, using a small blow-pipe. The cost of oxygen made by Brin's process is inconsiderable, and the oxygen blast renders welding possible, whereas with the air blast it is impossible, owing to the formation of magnetic oxide on the surface to be welded.

Roses for Fencing.

Experiments have recently been made in Austro-Hungary with various kinds of quick fencing for railways, especially with a view to keeping out snow-drifts; and it is stated that the choice has fallen on rose-plants, the Rose of Provence, or more properly "Provins," being preferred. A fence 6½ feet high and 3¼ feet thick is found sufficient to check snowdrifts. Of course the blooms of the rose are a source of profit as well, since they are marketable; and it need hardly be said that their appearance is delightful. In some parts of the Continent fruit-trees are used as fences for railways; and it is to be hoped that some attention will be given to the matter in the United Kingdom, to the end that our railway lines may be improved from a pleasing as well as a utilitarian point of view.

A Dust Collector.



The apparatus which we illustrate is an American contrivance for collecting flour or other dust in mills. It is a conical funnel of sheet-iron, into one side of which, at the top, A, the dusty air is forced by exhaust fans. The entering current of air revolves within the cone, and by centrifugal force the dust is delivered to the sides of the cone, and finally discharged at the bottom, B, while the cleaned air escapes by the orifice, C. It has been used to collect powders in chemical works, and also the sawdust or shavings from wood-working machines.

The New Mining Explosive.

A harmless explosive for mining purposes is a desideratum, and it is interesting to find that "hellhofite," a new material prepared on the Continent, has properties which render it fit for practical uses. It is a red caustic liquid formed by a combination of the nitro-products of tar oils with nitric acid. It can also be obtained in a solid form, the liquid being absorbed by the fossil earth known as "kieselguhr." The cartridges containing it may be driven forcibly into the blast-holes. They are fired by caps containing fulminate of mercury. A Royal Commission in Prussia has made a long series of experiments with it in a fiery mine, and finds it 30 per cent. more powerful than nitro-glycerine. It is also far more powerful than Nobel's gelatine dynamite. As regards its safety in mines, on one occasion there was 10 per cent. of fire-damp in the air, and although coal-dust was strewn for a distance of ten metres, no flame arose from the explosion. The products of combustion are also said to be neither dangerous nor disagreeable, and the price of the material is less than that of dynamite. Moreover, the tendency of its breaking power in a mine is rather to rift than shatter. For these considerations the new explosive seems to have a future before it in the mining world.

Pickled Tea.

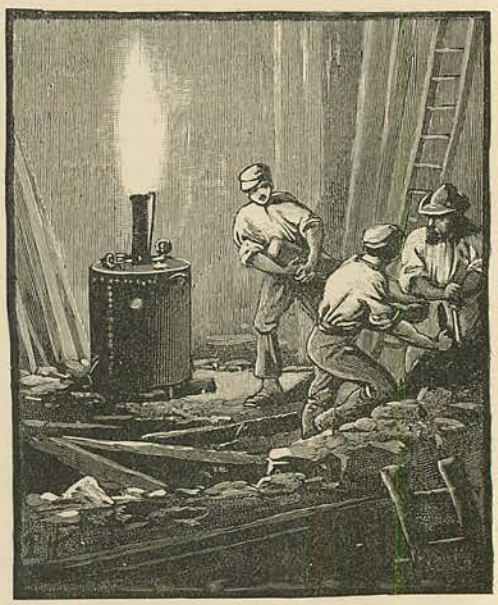
At Kawya, a village on the Chindwin River in Upper Burmah, the natives cultivate tea under the shade of high trees. The first pickings are made when the plant is three or four years old ; and when it becomes old it is cut down and the fresh suckers from the root cultivated. The leaves, after being plucked, are steeped in boiling water for a short time, then strained, kneaded, and pressed into bamboo baskets. This "pickled tea" fetches four rupees per 100 lbs. It is called "lepet" by the Burmese, and is floated down the river in hollow bamboos, under the surface of the water. Salt, sesamum oil, and other ingredients are sometimes mixed with it. The taste and smell are not agreeable to Europeans, but the Burmese are very fond of it. The district of the Chindwin River is said to be favourable for the cultivation of the tea-plant. Pickled tea reminds us of the old Scotch woman whose son, a sailor, brought her home a pound of tea from China. She boiled it a long time to make it tender, then mashed up the leaves with butter and served them hot. We may add that tea is now cultivated in Natal and Jamaica.

Enriching Gas.

A new method of enriching coal gas after it has passed through the meter has been introduced. The gas on its way to the burner passes through a machine charged with gaseline—a first product of the distillation of petroleum. The machine is so constructed that there is no excess of gaseline leading to deposits in the pipes or upon objects near the flame. At a recent trial of the apparatus in London, a Bray burner, giving a light of 18 candles, consumed 4·1 cubic feet of City gas per hour. With the new Lawrence gas in question it gave a light of 25 candles with a consumption of 2·25 cubic feet of City gas per hour. The process has been adopted in several places.

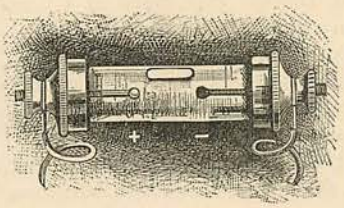
A Portable Light.

The "Doty" light, recently introduced, is useful as a portable light for construction of works, ships' decks, and out-of-door operations. It is produced by volatilising oil and burning the gas. The oil is volatilised by the heat of the flame in causing it to pass to the burner, a spiral tube surrounding the flame. The cost



is stated to be about 6d. per hour for a 500-candle light ; one supply of oil lasting 13 hours. The figure shows the oil reservoir and apparatus, with the flame issuing from the burner. So powerful is the light that a newspaper can, it is stated, be read at a distance of 135 feet from it.

An Electric Pole Indicator.



Our engraving shows a useful little instrument for electricians and other persons having to do with electric light installations. It consists of a glass cylinder, fitted at the ends with metal caps and terminals for connecting the instrument in circuit with the wires conveying the current. From these caps project two electrodes in the clear liquid with which the cylinder is filled. When the instrument is connected in circuit, a purple tinge appears in the liquid at the negative (—) electrode, thus indicating the negative pole of the circuit. When the current is interrupted, the purple is re-absorbed. The apparatus is strong, and small enough for the pocket.

Blotting Paper for Copying.

We are informed that the copying paper described on page 319 of our April issue, from particulars derived from a German journal, has been patented in this country; its manufacture is therefore protected by our patent laws.

Improved Fire-Guards.

Some new fire-guards have lately been introduced by a London firm, which combine with the advantages of the ordinary guards a novel attachment that enables them to be used for toasting, or for holding plates or dishes in front of the fire. The illustrations show the new device at work. Fig. 1 represents the simpler form of the guard, which is hung by hooks to the bars of the fireplace. Two chains are secured to these hooks, and, passing through the meshes of the brass network forming the guard, are fastened at their

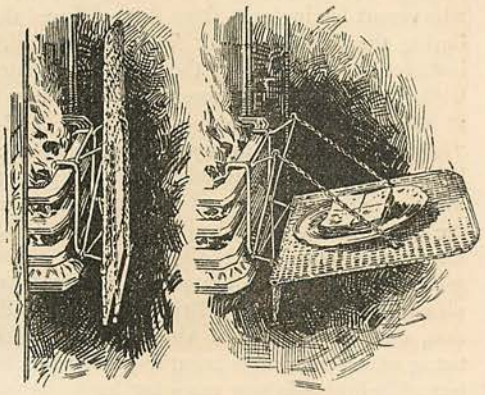


FIG. 1. FIG. 2.

other extremity to a brass rod, which is allowed to hang freely in front of the screen when the latter is in use as a fire-guard. But when the screen is to be used for holding a plate, &c., it is allowed to fall forwards until it is caught by the brass rod, as shown in Fig. 2, when it forms a perfectly secure and very handy shelf immediately in front of the fire. Fig. 3 shows a more elaborate form of the guard, intended for use on a tiled hearth, and in which the folding screen is supported, when lowered, by pins in the folding sides of

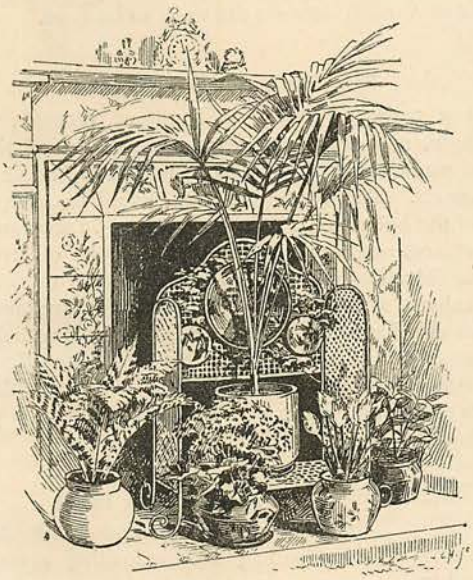


FIG. 3.

the contrivance. It will be seen that in this latter form the screen stands on feet in front of the fire, and is not suspended from the bars by hooks. These new screens are so made that in summer they can be turned to admirable account in the decoration of the fireplace, as one of our illustrations shows.

Repairing Torn Music Sheets.

All musicians know what trouble is caused by the tearing of sheets of music, particularly of song-music, along the fold between the pages. To repair the damage thus caused, a new vellum tape has lately been introduced, which promises to be a very effectual help. Down the centre of the slip is ruled a blue line, and the tape is gummed on each side of this line, almost, but not quite, up to it, so that the centre of the slip is left ungummed all the way along. In use the slip is damped and the damaged sheets are laid on it so that the torn fold just touches the centre line. The slip is then folded over and the binding is complete. This tape will be equally useful for repairing manuscript or printed folios.

A Pneumatic Chisel.

A pneumatic tool for working in all kinds of stone and metal, and for caulking steam-boilers and iron tanks, has been devised by Mr. J. S. MacCoy and others. It works on the principle of the rock-drilling machine, and consists of a rapidly reciprocating piston, working in a small cylinder, and driving by impact, through the agency of compressed air, the working

chisel or other cutter. The tool is held in the hand of the workman, and connected by tubing with a supply of air under pressure. It is started and stopped instantly by the workman, and a tool with a cylinder, 1 inch in diameter, working with air at a pressure of 40 lbs. on the square inch, delivers 15,000 strokes per minute, the noise being a kind of buzz. The tool is made of various sizes for the work to be done.

Painting by Electric Light.

At a technical school in Bradford, recently, Mr. Durham, one of the teachers, painted one of those rapid studies of the human head for which Mr. Legros is famous. The whole was done before his class by aid of the light from a Pilsen arc lamp of 2,000 candle-power, softened by passing though a globe of ground glass. Mr. Durham testifies to being able to choose his colours almost as well as if in daylight ; but he points out that there is still a desideratum, namely, a means of diffusing the light in a simple and effective manner. Of course the advantages of being able to teach painting at night are obvious in connection with workmen's classes.

FIG 1.

A New Sack Hoist.

Our woodcuts illustrate a new hoist for loading and unloading sacks of corn or merchandise, by means of a horse. It consists of a socket let into the ground, and having a post which fits into it. The post is furnished with a movable head, for meeting the load at any angle. A pulley is fixed in the head by a quadrant and pin. The first figure shows the post in detail, and the second its use in hoisting sacks from a barn to load a waggon. By this arrangement, four sacks can be hoisted in a minute, according to the statement of the inventor.

FIG. 2.

Uninflammable Wood.

M.M. Boudin and Donny, professors of Ghent University, have made a series of experiments for the Belgian Minister of Public Works on means for rendering wood non-inflammable. They conclude from these researches that while wood cannot be rendered absolutely uninflammable, it can be rendered partially so, and not apt to take fire. Of the methods now in use for treating wood, the injection of saline solutions appears to them impracticable and perhaps dangerous in timbers of large size, though applicable to small pieces of wood. A concentrated solution of phosphate of ammonia is recommended as best to use, notwithstanding its high price. In most cases, however, the method of coating the wood with a paint is the only practical solution of the problem, and the substances most recommended for this purpose are asbestos and cyanide of potassium.

Thunderbolts.

FIG. 1.

The idea of "thunderstones," that is to say, stones or missiles of similar nature thrown to the earth in thunderstorms, is a very ancient one, but has not properly been investigated. According to Mr. Symons, of the Royal Meteorological Society, thunderstones have no existence. In other words, as he points out, a flash of lightning is a discharge of electricity, and unaccompanied by solid projectiles. In a recent paper he has shown that several reputed thunderstones he has examined turn out to be very mundane articles, such as a bit of coal, a nodule of sandstone, a piece of cinder, and, in one case, a cannon-ball. The fact that such alleged thunderstones are sometimes found in the pit made by a flash of lightning in the ground, may account for the statements of those who report having seen them fall, or found them during the thunderstorm. The cannon-ball, for instance, might "attract" the flash. Mr. Symons, while believing in "meteorites" which may fall at any time irrespective of lightning, and in "fulgurites," that is to say, the vitreous track of lightning in sand, has no faith in thunderstones or thunderbolts, if both words are used to signify the same thing. "Belemnites," a fossil, have also been considered thunderstones without much reason. There are some excellent examples of fulgurites in the British Museum collection, one taken from a vineyard in Germany being of a remarkable length. The whole subject of lightning is now receiving fresh attention, and the necessity of properly protecting houses by lightning-rods, and periodically testing them, has been ably discussed. Every summer we are visited by thunderstorms, which do considerable damage to life and property. At a recent exhibition of the Royal Meteorological Society, at

25, Great George Street, Westminster, a variety of approved lightning-rods was on view. One of these, the tape form of copper rod, is illustrated in Fig. 1, with a circular band for chimney-stacks. Fig. 2 shows the pointed tip for chimney-stacks. These are considered good forms. A curious fact brought out by the exhibition is that copper rods are apt to decay in the neighbourhood of stables, owing to corrosion by the uric acid formed about the stable. The Siemens portable lightning-rod testing apparatus was also exhibited. A good conductor should not have a higher electrical resistance than 10 ohms from the point to the ground, including the "earth" contact. Exceptionally good conductors have only about 5 ohms.

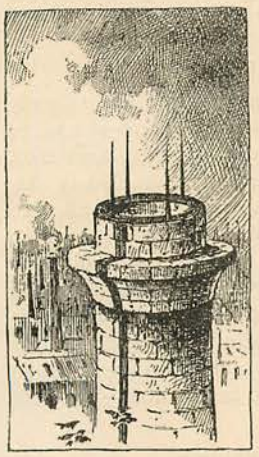


FIG. 2.

A high resistance in the rod is due either to a flaw in the conductor or a bad earth connection; and in such a case the rod may be a source of danger rather than security, since the discharge is apt to find its way through some part of the building to the ground, rather than entirely by the rod. It is, therefore, important to test lightning conductors from time to time, and the magneto-electric tester of Siemens, which we illustrate in Figs. 3 and 4, is very serviceable for the purpose, and requires no battery. The apparatus consists of a magneto-electric machine, M, which generates the testing current by turning a handle, and a Wheatstone bridge (Fig. 4). The latter comprises a ring of German silver wire, forming two branches. A contact lever, P, moves over the ring, and is used as a battery key. A small galvanometer, G, shows the indications of the testing current. A brass sliding piece, *s*, puts the galvanometer needle in and out of action. There are also several connection terminals, *b b'*, *l*, &c., and a comparison resistance, R

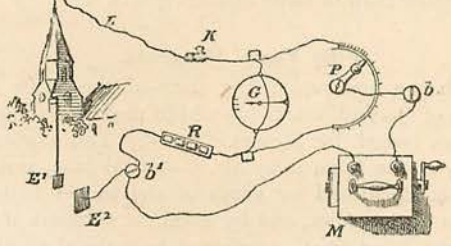


FIG. 3.

(Fig. 3). A small key, K, is fixed to the terminal, *l* (Fig. 4), and used to put the current on the lightning-rod or take it off at will. A leather bag, A, at one side of the wooden case (Fig. 4), holds a double conductor leading wire, which is used for connecting the magneto-electric machine to the bridge. On turning the handle of M, the current is generated, and on closing the key, K, it circulates from the terminals of the machine through the bridge and the lightning-rod joined with the latter. The needle of the galvanometer is deflected by it, until the resistance in the box, R, is adjusted to balance that in the rod. When this is so, the galvanometer needle remains at rest. In this way the resistance of the rod is told, and any change in it noted. In order to effect the test it is necessary to have two earth plates, E^1 and E^2, one (E^1) that of the rod, and the other (E^2) that for connecting to the testing apparatus by the terminal *b* (Fig. 3). The whole instrument only weighs about 9 lbs. In order to test the "earth" alone, a copper wire should be soldered to the rod at a convenient height above the ground, and terminal screws fitted to it, as shown at T (Fig. 4), so that instead of joining the whole rod in circuit with the apparatus, only that part from T downwards is connected. The Hon. R. Abercromby has recently drawn attention to the fact that there are three types of thunderstorm in Great Britain. The first, or squall thunderstorms, are squalls associated with thunder and lightning. They form on the sides of primary cyclones. The second, or commonest thunderstorms, are associated with secondary cyclones, and are rarely accompanied by squalls. The third, or line thunderstorms, take the form of narrow bands of rain and thunder—for example, 100 miles long by 5 to 10 miles broad. They cross the country rapidly, and nearly broadside on. These are usually preceded by a violent squall, like that which capsized the *Eurydice*. Mr. Abercromby has proposed a scheme for the regular observation of lightning-storms in the United Kingdom.

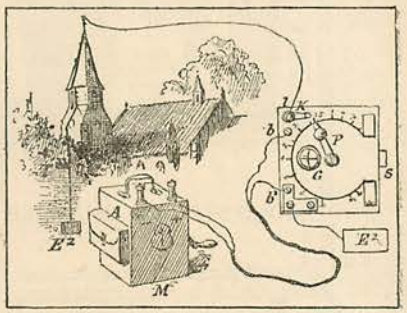
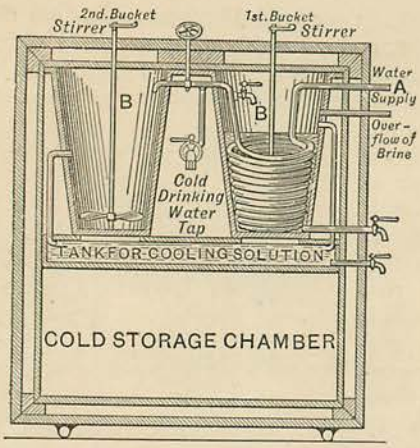


FIG. 4.

A Field Refrigerator.

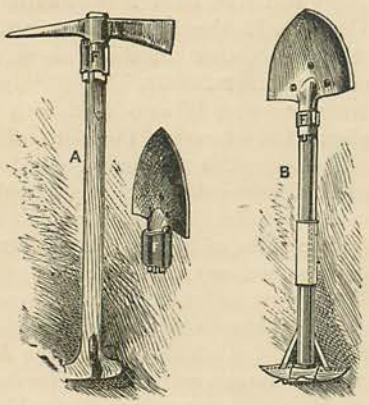
Dr. F. W. Chapin has devised a field refrigerator for use in the army, the chemical agent used being nitrate of ammonia, which rapidly cools any liquid to which it is added. The nitrate is placed in water, and recovered from it, after use, by evaporation. The apparatus, as shown in the figure, consists of two collapsible india-rubber buckets, B B, one of which contains a coil of india-rubber tubing, which is immersed in the nitrate of ammonia solution. The water flowing through the tube, A, is thus cooled for consumption. To form ice, some of this cooled water is run into the second bucket, and nitrate of ammonia added, and stirred up to form a freezing mixture, which is allowed to run into the tank below, where it cools any articles in the storage chamber underneath. The



refrigerator, when open, is 3 ft. by 2 ft. by 1 ft. 6 in. in size; but when closed, for transport, 3 ft. by 1 ft 6 in. by 10 in., and weighs under 100 lbs., with nitrate for four days' service.

A Combined Pick and Spade.

A combined pick and spade, likely to be useful in the army, and for colonists or others, is shown in our engraving. The pick or shovel blade is fastened to the haft by means of a ferrule, F, of peculiar make.



Two army kinds are made—one, A, for cavalry, and the other, B, for infantry; a wooden haft being employed in the former sort, and a hollow steel haft in the latter.

A Handy Pamphlet Case.

All book-lovers know, from painful experience, the trouble which a number of pamphlets cause in a library. It is very difficult to keep them tidily in their places, or to find any particular work with anything like ease. To remedy this, many pamphlet cases have been introduced, all more or less successful. A new one has recently been patented, which seems to us admirably adapted to answer its purpose. In external appearance it resembles a volume, and is fitted inside with a sliding case, in which pamphlets, sheets of exercises, and notes, or other papers may be placed, and readily referred to by means of the bevelled edge of the case, which admits of their being turned over without being actually withdrawn. An index sheet is provided on the inner case. Large sizes of these cases are made for holding files of magazines, one being specially adapted for holding a year's numbers of CASSELL'S MAGAZINE.

"The Way to Fortune."

A collection of essays under this title has recently been issued by Mr. Fisher Unwin. The royal road to success is marked by well-known, but often-neglected, guides, most of which are pleasantly handled in this series of chatty, anecdotal papers. Last of all, and in our opinion rightly so, comes "luck," concerning which the writer makes the following apt quotation from Sydney's "Arcadia:"—"Since a man is bound not farther to himself than to do wisely, chance is only trouble to them that stand upon chance." Those who want their young friends to find a truer way than this "chance" road, cannot do better than give them this work.

The 122nd Volume

of "Cassell's National Library" is Mr. Coventry Patmore's "Victories of Love," a sequel to the popular "Angel in the House," which has already been included in this series. Among other recent volumes of this library are Sir John Malcolm's "Sketches of Persia," Reynolds's "Discourses on Art," and Fox's "History of James the Second."

A Sixteenth-Century Minister.

Among "Twelve English Statesmen," Cardinal Wolsey's place will surely not be disputed. His strangely-varied career offers many points of difficulty to the would-be historian, and we turned with much interest to Professor Mandell Creighton's contribution on this subject to Messrs. Macmillan's series. We leave the little work with great regret. The picture that Wolsey's life and work presents is fascinating. But justice is done to Wolsey's far-reaching plans at home and abroad, their successes are noted, and their failures are not glossed over. It is as a statesman that the author deals with the Cardinal, and in this capacity his career was doubtless less open to question than in some other respects.

Fifty Years' Progress.

With pen and pencil, the story of the "Life and Times of Queen Victoria" is told in the two handsome volumes issued by Messrs. Cassell. The admirable history of the reign is by Mr. Robert Wilson, and his work is illustrated by views of the scenes and incidents he describes, and by excellent portraits of the men who have most contributed to make the *history* of the period. The events and movements of the reign are well described, without any of that party spirit which so often disfigures records of contemporary progress. In "Culmshire Folk," we have from the same publishers a re-issue, in single-volume form, of a clever story which has already achieved in three-volume form a considerable measure of success.