

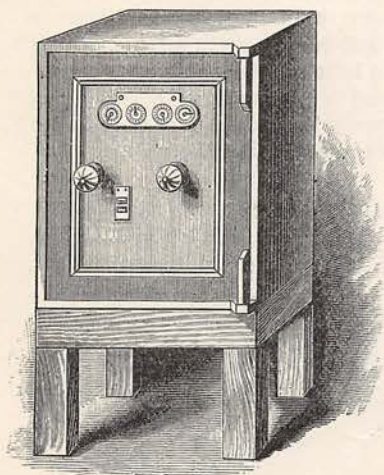
## THE GATHERER :

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 Cypher Safe.

Mr. Stuart C. Munro has devised a safe which is intended to be proof against any unauthorised opener



who may be provided with the proper key or a duplicate. The keyhole cover is made with a catch inside which engages with mechanism within the door and is held fast. This mechanism connects with the pointers of four dials, seen in our illustration, and the cover cannot be removed to allow the door to be opened until

the pointers have been set at the figures of a pre-determined cypher. When the cypher is indicated, the handle on the right is turned and the keyhole thus uncovered. Should the cypher be forgotten the cover can be cut open and a duplicate, supplied with the safe, substituted. The safe is fireproof and admits of 160,000 cypher combinations.

### Ships and the Telephone.

Experiments made in Madras harbour have been quite successful in establishing telephonic connection between the Central Exchange of the town and ships at moorings. A drum of insulated wire was fixed on the pier and the end paid out to a buoy, and from thence drawn on board the *Clan Macarthur*. The instruments were then connected up, and the other end of the wire being joined to the Exchange, conversation was carried on between the vessel and the offices of the company to which she belongs. It is proposed to attach a telephone cable to each buoy in port.

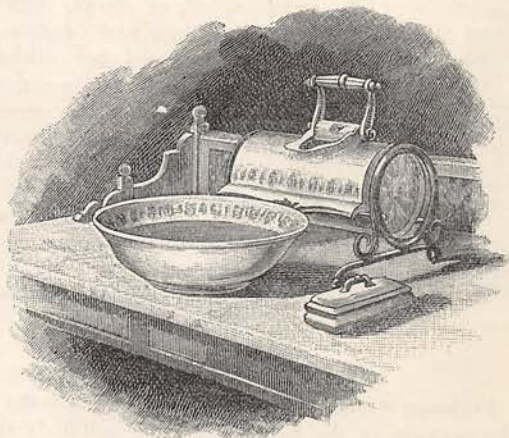
### The Irish Tunnel Scheme.

The proposed tunnel between Great Britain and Ireland is intended to run from Whitehead, Ireland, to Goblins in Wigtonshire, connecting by rail with Stranraer. The heaviest gradient would be 1 foot in 75 feet, and according to Professor Hall of the Geological Survey the strata through which the tunnel would pass are not likely to offer any serious obstacle. It is estimated that the entire work would cost eight

millions. Were it finished, the journey from Glasgow to Belfast, a distance of 153 miles, would occupy only four hours. The project is to be brought before the Government.

### Naval Balloons.

Some interesting experiments were recently made in the French fleet at Toulon to adapt the captive balloons now employed in the French army for use at sea. The idea of utilising these aerial observatories in the fleet is due to Lieutenant Serpette, and the balloon employed was made at Chalais-Meudon, the shell being of silk with a capacity of 11,300 cubic feet of pure hydrogen, and capable of sustaining a single observer at a height of 1,200 or 1,500 feet. A silk rope was used to hold it, and after being tugged to the man-o'-war *St. Louis* by a torpedo boat, it was raised to the top of the after mast or tower by proper tackle. From this point frequent ascents were made, the balloon being manœuvred from the bridge of the vessel. The whole country for thirty miles round was visible, and the bottom of the sea could be discerned to a depth of 80 feet. Moreover, the movements of the submarine boat *Gymnote* could be distinctly traced under the water. M. Serpette also ascended without the use of the captive rope, and descended near the surface of the sea, then threw out his conical anchor, which held the balloon until a boat came to relieve him.



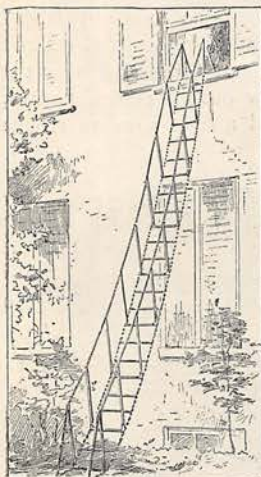
### A Toilet Water-Barrel.

Our engraving shows a new water-holder, designed to replace the somewhat inconvenient water-jug or ewer of the toilet-table. It consists of an ornamental reservoir in the shape of a barrel, which is mounted in a frame and capable of turning on an axle. When the

handle is drawn forward, the water pours out into the basin. The "Aquarius," as it is called, is certainly preferable to the jug in that there is no weight to lift.



THE NEW FIRE-ESCAPE IN USE.



HOW THE ESCAPE IS FIXED.

#### A New Fire-Escape.

The fire-escape which we illustrate is a light ladder composed of iron chain and tubing provided, as shown, with a handrail, and capable of being used by children. It is fixed inside a room by means of two screws in the floor, and is readily placed in position. The escape is the invention of a lady. Experience shows that some such apparatus as this is sorely needed in large houses.

#### The Height of Clouds.

Professor Möller, of Carlsruhe, has made a series of observations on the height of clouds, and finds that cirrus and cirro-stratus clouds have an average height of 30,000 feet, while cumulus clouds range from 4,000 or 5,000 feet at their lower surfaces, to 16,000 feet at their upper surfaces.

#### New Photometers.

Iodide of nitrogen decomposes under the action of light and gives off pure nitrogen gas. Hence M. Lion has

constructed a photometer in which equal surfaces of the iodide kept under ammonia water are exposed to the two lights to be compared. A differential manometer connects the two receptacles of the iodide, and the lights are shifted to or from the photometer until the rate of evolution of the nitrogen is equalised. The relative intensities of the lights are then proportionate to the squares of their distances from the photometer. We may add that M. Verschaffel has adapted the Crookes radiometer as a photometer. The revolving disc of the apparatus is suspended by a silk fibre and fitted with a scale and pointer, so that the angle through which it is rotated by the impinging ray of light is measured, as in the well-known torsion balance. With this photometer one light can be measured independently of another, and it is stated to be capable of measuring a luminosity equivalent to one-hundredth of that given by a standard candle.

#### Hydrophane.

Hydrophane, a singular variety of white opaque opal, has been discovered in Colorado. It absorbs water, and thus becomes transparent, revealing objects placed under it. The stone is said to be identical with the curious "tabasheer," or organic opal, sometimes found in the joints of the bamboo cane, where, like the pearl in the oyster, it is an irregularity, if not altogether a disease.

#### Buffalo Belting.

A new and strong belting for running machines from a motor was recently exhibited at the Crystal Palace Mining Exhibition. It consists, as shown in the woodcut, of a central layer or core of raw buffalo hide,



faced on both sides with stout woven cotton, the whole being sewn together and riveted with copper in the centre. As will be seen from the section represented, the edges of the hide project beyond the cotton covering as a protection to the belt when it comes in contact with the fork. The belts are warranted not to shrink, and to remain unaffected by heat or damp.

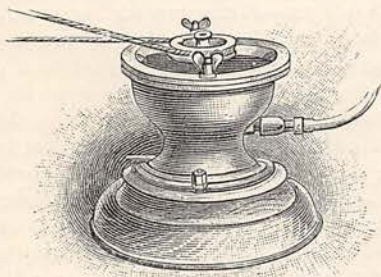
#### Ozonised Water.

It appears from the experiments of Mr. Ernst Fahrigh and of Mr. E. G. Clayton, F.C.S., that phosphorescence can be produced by ozonised water. If distilled water be shaken up with ozonised oxygen and some of it added to about a litre of ordinary Thames water, drawn from the river in London, a luminous phosphorescence will be observed in a dark room. It is still uncertain whether or not the effect is due to the action of the ozone or the micro-organisms of the water.

#### Steel Islands.

At the recent meeting of the British Iron and Steel Institute, in Pittsburg, Pa., U.S., Sir Nathaniel Barnaby, the well-known naval architect, expressed

the opinion that we shall yet obtain a mastery over the ocean and live more happily in a marine residence capable of steaming fifteen knots an hour than we can ever live in sea-side towns. His idea is to build enormous vessels of steel, which would be unsinkable owing to their compartments, and be safe against fire for the same reason, while their size would render them quite steady. They would be too large for any harbour, and would in fact contain their own docks, into which lighters and other craft would enter in order to load or unload the vessel. Such a craft would be a veritable floating island or town with the combined advantages of land and sea.



#### A Centrifugal Milk-Raiser.

The milk-raiser shown in the woodcut is worked on the centrifugal principle, and can be driven from the intermediate shaft of the "separator," or, indeed, any other shaft, with the aid of a cotton or hempen belt. No lubrication is required, as the milk suffices, and the apparatus can be readily taken to pieces. Its simplicity of construction is in its favour for dairy purposes.

#### A New Microscopic Glass.

The object glasses for microscopes are now made in Germany of phospho-boric glass, containing phosphoric and boracic acid. It is stated that with lenses of this material an object  $\frac{1}{820}$  of a millimetre in diameter can be distinctly seen.

#### A New Cartridge Sling.

A new cartridge sling, which ought to be very useful to sportsmen and travellers, has just been patented. The sling is made of light waterproof material, and is made to carry 24 or 48 cartridges at a time, in such a way that they cannot possibly get damp and so swollen, while, thanks to the ingenious character of the spring head to the sling, the cartridges may be readily extracted with one hand, while the other holds the gun, and that without the slightest difficulty to the wearer of the apparatus.

#### The Use of Flowers.

Darwin maintained that the chief use of the corolla of a flower was to attract insects and thereby help in cross-fertilisation of the plant; but according to a recent memoir read before the French Academy of Sciences, the corolla is before everything an agent of evaporation and respiration. Its activity in this

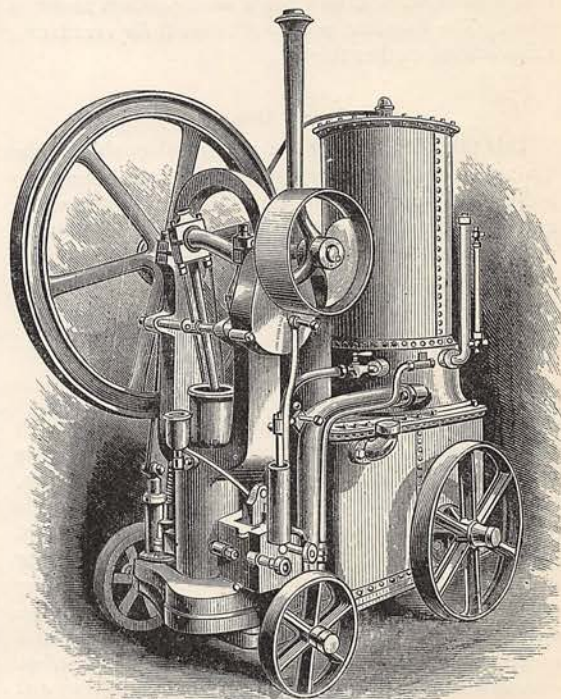
respect contributes to produce the oxidated compounds that enter into the substance of fruits. Long experiments on the flowers of the climbing *cobœa* assign to the corolla a power of evaporation double that of leaves having an equal surface.

#### A Novel School-Fitting.

An ingenious little device, called by its inventor "A Combined Black-board Inclinor and Black-board Map and Chart Hook," has just been registered, and ought to prove useful in schools. It is very simple and consists of a pair of strong spring clips coupled by a strong chain, which may be adjusted to any required length. If one spring be fixed to the top of the black-board and the other to the easel, the board may by means of the chain be held securely at any angle, while by the use of a roll on the front of each spring, maps or charts or drawing-copies may be readily suspended over the black-board, and a firm surface thus presented to the pointer, to the great advantage of the teacher, who not only has his map or copy firmly fixed, but will find it last him much longer.

#### A Portable Hydrocarbon Engine.

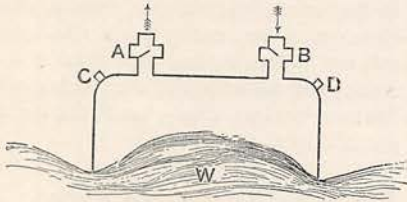
The "Griffin" portable engine which we illustrate is a combination of the well-known "Griffin" gas engine, with a generator for producing gas or vapour from hydrocarbon oils of low specific gravity, such as rectified petroleum. The gas used is formed before entering the engine, a new provision which ensures a good ignition and a minimum of attention. If necessary, a supply of the gas for heating or illuminating purposes can be drawn from a branch in the supply pipe of the engine. The gas is supplied to the engine



according to the load or work to be done, and it is maintained at a uniform temperature and richness. The oil reservoir is surrounded by a water-jacket to prevent explosion. The engine can be started in two minutes by the attendant and then continues to work automatically, generating its own gas according to its needs. It may be left to itself for hours at a time. The motor is particularly well adapted for use on tramcars, traction engines, launches, fire-engines, and so on, the gas being practically odourless.

#### A Wave Motor.

An air-pump wave motor, recently exhibited in London, aims at utilising the motion of the sea and river waves, either for working machines or ventilating



purposes. It consists essentially of an open cylinder, into which the waves surge and compress the air contained therein, forcing it through tubes fitted with inlet valves, which allow it to pass and be available for use. Other tubes communicating with the cylinder have outlet valves to prevent the passage of the air. When the wave recedes from the cylinder the inlet valves are closed, and the air in the tubes with the outlet valves enters the cylinder. The sketch will help to explain the action: A being the inlet and B the outlet tube, while C and D are safety valves, and W a wave. The inventor proposes to use it for ventilating ships amongst other things.

#### Green Onyx.

This pretty mineral is becoming fashionable in the United States for interior decoration. It is beautifully striped and mottled, and varies in colour from white and green to pink and salmon. While susceptible of a high polish, it is, unlike the onyx in general, capable of being wrought like marble. The stone is quarried from a fissure vein about 50 feet wide and over a mile in length, situated in Grant County, New Mexico.

#### Novelties for Home Use.

A new curtain carrier has just been patented, which certainly seems to offer considerable advantages as compared with the old-fashioned rings. The carrier, which can be made to work either upon narrow rods or large cornice poles as may be desired, consists of rings of metal or wood surmounted by a little roller grooved to fit the top of a rod or pole and travelling along it in every direction, as may be desired, with the excellent result that curtains may be drawn easily and quietly without fear of tearing or risk of unfastening. —A new candlestick, which is very light and very difficult to overturn (thanks to its novel shape), is called

the "Pyramid." It is easily cleaned, and is provided with a special nozzle that admits of any size candle being used without paper packing, and will also allow the candle to burn to the last bit.—A safety burner for oil lamps has been invented by Mr. Postlethwaite, in which the light is extinguished by shutters which are kept open, as a rule, by a detachable cone or weight, but this weight is immediately displaced if the lamp be overturned, whereupon the extinguishing shutters come automatically into action and at once put out the flame. In some cases the burners are fitted with a lever which allows the owner of the lamp to use the extinguisher at will. As these burners may be fitted to ordinary lamps, they seem to possess great advantages.—A new tap for water service has recently been introduced, which is provided with a very ingenious attachment that enables a plumber to take the head of the tap away for repair without cutting off the water-supply from the whole house. To describe the tap in untechnical language would be a very difficult task, and we content ourselves with drawing attention to the fact of its invention, and pointing out that it seems to us admirably fitted to serve its purpose.—Carving-fork guards have a bad habit of working loose, as all carvers know, so we are glad to notice an ingenious little clip which has just been introduced to strengthen these guards where they need it. The device consists really of two small spring clips, one about twice the size of the other, and fixed at right angles to one another. The larger clip is fixed on the shank of the fork, while the smaller grips the guard and holds it in position.—Some new and well-ventilated in-soles for use in winter and damp weather have been invented by Mr. R. G. E. Lemprière. These in-soles or socks are made of felt on one side and rubber on the other, the felt side being, of course, that next to the foot. The ventilation is secured by the well-distributed punctures with which the sock is almost covered.

#### Springs for Harness.

As vehicles are now worked the draught animal is subject to sudden shocks and jars in starting or



FIG. 1.



FIG. 2.

stopping, and an inventor has therefore brought out a system of spiral springs attachable to the harness or the carriage, so as to do away with the inconvenience. Fig. 1 shows a form of spring adapted for compression or extension, which can be joined up at both ends. Fig. 2 shows a spring chain which can be used in place of the ordinary "hame" chains, and so on.



FIG. 3.

Fig. 3 shows a combination spring affixed behind the splinter-bar of a vehicle, and consists of a curving plate

spring combined with an open spiral spring at each end. By means of these appliances the jerk at the collar of a horse when starting a heavy load is much reduced.

#### A Jet Ship.

The jet-propelled vessel *Evolution*, which has been built for Dr. W. M. Jackson, an American, recently made a trip off New York, and attained a speed of ten miles an hour. She is 106 feet long by 23 feet wide, and has a displacement of 100 tons. The machinery consists of a powerful steam-engine and pump which ejects a jet of water under pressure. No screw is required, and the jet can be utilised to steer the boat, and turn her by shifting the hose or discharging pipe. The liquid jet, in fact, operates like a pole and oar.

#### Self-Locking Envelopes.

Doctors have inveighed again and again against the dangerous gum which is used on some envelopes, and mishaps have been frequent as the result of damping the gum on envelopes with the tongue. All possibility of such accidents is removed by the automatic lock envelopes which have just been patented by Mr. Hook. On the flap of the envelope are two projecting flanges, and all that it is necessary to do to close the envelope is to fold these flanges by ready-stamped lines, and insert the end of the flap thus narrowed in a slot provided, whereupon the folded flanges automatically lock themselves in the slot, and the envelope cannot be opened without tearing it. The operation sounds much more complicated than it really is in practice, for one of these new envelopes can be closed as readily as the better-known gummed envelopes.

#### Some New Cards.

Among the most striking novelties in this season's Christmas and New Year cards are the shaped ones which are published by Messrs. Hildesheimer & Faulkner. One is shaped like a kitten, and another like a puppy, and both can be made "self-supporting" with a ludicrously life-like effect. Banjos and violins are called to lend their forms, which open to disclose quaint old-world scenes or dainty landscapes. Autumn leaves, again, designed and tinted by Mr. B. D. Sigmund, are used as coverings for pretty pictures or autograph cards. The straggling purple "flag" blooms, skates, and birds are all used in their turn; and on some of the cards a very charming result is produced by a new and most delicate imitation of mother-of-pearl work, with all the iridescent sheen of the original. Quaint lines are supplied by Mr. F. E. Weatherly to a card representing the "four and twenty blackbirds" in their pie, and Mr. Rainey shows to advantage in his treatment of two or three child-subjects. Jewelled cards and souvenirs are also among Messrs. Hildesheimer's successful novelties. Whatever designs they take up—figure subjects, landscapes, sea pieces, or birds and animals—all are well and tastefully rendered. Messrs. Hamilton, Hills, & Co. aptly call their series of Christmas and New Year cards

"Unique"—for unique they are, both in design and wording. Some of the cards show delicate little etchings reproducing well-known pictures, but most are of a humorous character, and are to be commended to those who wish for a little pleasantry in their Christmas greetings to their friends. Humorous as they are, the humour is always refined, and the most fastidious could not take objection to their fun, while their execution is at once artistic and successful. Messrs. Raphael Tuck & Son have been very fortunate in their designs for frosted cards, their latest being a lighthouse, and a series of frosted gates and other outdoor scenes. Their autograph cards, with delicate vignettes of kittens, &c., and "Gem Greeting Notes," are very pretty and well deserve to be popular. Their calendars, too, are very beautiful and would make most suitable decorations, particularly for a lady's table or room. A booklet issued by Messrs. Raphael Tuck & Son, in the shape of a large reel of thread, opens to show Hood's "Song of the Shirt," illustrated by J. W. Grey. Another booklet, shaped as a bell, is entitled "Silver Chimes," and is a collection of pretty verses and pictures. We must not forget to notice the exquisite "Gem Art Panels," which will serve as permanent mementoes of kindly thought at this season, or the excellent series of child-subjects. All alike are strong in colouring and execution.

#### Pyrogravure.

A process of engraving on wood, ivory, leather, and other materials, by means of a red-hot point which chars the lines, has been brought out by M. Manuel-Perier, of Paris, and various samples of his work exhibited at an Exhibition of Arts and Sciences in the Palais de l'Industrie in the Champs Élysées. These comprised paper knives, panels, umbrella handles, and what not, all cleverly done. The graver consists of a pencil having a curving point or beak of hollow platinum, which is kept white-hot by a supply of mingled air and the vapour of a hydrocarbon such as alcohol, wood spirit, or benzine. It has long been known that such a gaseous mixture if warmed in a platinum tube will combine with the evolution of heat sufficient to raise the metal to the incandescent state. The fact has been utilised by Dr. Pacquelin in performing the actual cautery, and now it has been applied to searing surfaces. The apparatus consists of a holder where the hydrocarbon vapour is mixed with air, and flexible pipes which convey the mixture to the graver. As long as the supply of gas is maintained, the point of the graver is kept hot. The invention promises to be useful for printing blocks and in branding cases as well as for decorative purposes.

#### Gout and Electricity.

Salts of lithium are administered in cases of gout in order to remove the concretions by forming urate of lithium. Lithium salts are, however, difficult of absorption by the tissues, and Mr. Edison, the well-known inventor, has conceived the idea of applying the salts externally, and assisting their absorption by the electric

current. He has attained a measure of success in the case of a man 73 years of age, who had gout in the little finger, which was 86 millimetres round. Edison made him put the finger and hand in an aqueous solution of chloride of lithium of 1.08 specific gravity, and the other hand in a solution of common salt, which is a good conductor of electricity. A current of 20 milliamperes from a dynamo was sent from one solution to the other through the hands of the patient, and after fourteen days of this treatment, four hours a day, the circumference of the diseased finger was reduced to 80 millimetres. Unfortunately the trial had to be discontinued, as the journey to the laboratory every day was too much for the invalid.

#### For the New Year.

Now is the time when we must take up our diaries for 1891. And, as in former years, those published by the Letts's Diaries Co. present a wide variety, in size and form. There are special issues for ladies and for gentlemen, for housekeepers and for lawyers, and in the "Nonpareil Diary" is a most handsome and useful pocket companion, beautifully arranged and printed on thin but strong paper. The "Clerical Tablet" is a handy memorandum block for the use of preachers and pastors, and the miniature "Finger" engagement book and the "Card Case Calendar" are marvels of compactness.

#### Some Christmas Gift-Books.

Poor Alice Havers (whose recent sad death we all deplore) probably never did prettier work than she gave to the illustration of "Some Old Love-Songs," (Hildesheimer & Faulkner), where her drawings are reproduced both in colour and in monotype. In "A Book of Old Ballads" (same publishers) the illustrations are by Miss Havers and Ernest Wilson, who is also lost to us, and the charming variety presented by the work of two such talented artists makes the volume a very handsome gift-book. Mr. Wilson's clever work is also seen to advantage in "The Harvest Fields," where the subject is one he had made peculiarly his own. Less ambitious works, but produced with equal care and the same good taste, by the same publishers, are seen in the new version of that old favourite of the nursery, "That Little Pig Went to Market," which Mr. F. E. Weatherly calls "A Tale in Five Curls," and "Songs in the Snowdrifts," a delicate little booklet of bird illustrations by Alice West. Others, which space will not allow us to describe in detail, are "London Sketches," "In Arcady," "Dame Pussy-Cat's School," and an amusing negro story in verse by Mr. F. E. Weatherly, entitled "Jeremi." It is safe to say that Messrs. Hildesheimer & Faulkner's list includes something to please every taste.

#### For Young Readers.

Some of the best and most popular of the old fairy tales are reproduced by Mr. Andrew Lang in the

"Red Fairy Book" (Longmans), which is a sequel to the "Blue Fairy Book" which he published about this time last year. Linked with some stories less known, we have in this volume such old friends as "Jack and the Beanstalk," "The Rat-Catcher," "The Three Dwarfs," and "The Nettle-Spinner," all splendidly told and illustrated.—There are two complete serial stories and a host of shorter stories, of fairy tales and pretty sketches, to say nothing of illustrations, large and small, coloured and in black-and-white, in the Christmas volume of "Little Folks" (Cassell & Co.) which is before us. Either of these books would make a most acceptable and seasonable gift for a young reader.

#### Great Men and Great Works.

Under the title of "Good Men and True," Dr. Alexander H. Japp has published a series of very interesting biographies of workers in the fields of beneficence and benevolence. Mr. Fisher Unwin has just sent us a copy of the second edition of this capital work, one of the "Lives Worth Living" series, and we are sure that it will find many more readers in its new form. Our friend and contributor, Mr. Henry Frith, is the author of "The Triumphs of Modern Engineering" (Griffith, Farran, & Co.), in which he sketches the difficulties which had to be overcome in the construction of the great engineering works which are the triumphs of our age, and shows how these difficulties were surmounted, and the works carried to a successful issue. Railways, tunnels, and bridges are all dealt with, lighthouses and docks are carefully described, and even drains and pipe systems have a chapter to themselves. The book is a marvellous record of perseverance under difficulties.

#### At School and Afterwards.

The teaching of English Literature in schools was certainly neglected until recent years, but the quickened interest in, and demand for, a higher culture in every direction has led to a marvellous change in this respect, and we now have Messrs. Longmans issuing a "Handbook of English Literature," by Mr. R. McWilliam, B.A., intended, as the preface tells us, to give a simple and interesting story of the great English writers to pupil-teachers and other young students. The book is admirably arranged and proportioned, and its author is exceptionally happy in the apt quotations he makes from his authors as he goes along. We have every sympathy with Mr. McWilliam's aim, and we trust it will be successfully achieved. Boys who are leaving school, or perhaps, in the first place, their parents or guardians, ought to find very useful a little volume just issued by Messrs. Cassell, entitled "Guide to Employment for Boys on Leaving School." The work gives particulars of the examinations which have to be faced on entering the various professions and public offices, and thus enables parents and guardians to gauge readily the position best within the powers of their ex-scholar.