

The newest sleeves come almost to the knuckles, and the mitten sleeve of black lace fitting the arm and almost concealing the hand is quite novel. Large wired jet ruffs are placed on both high and low bodices, and are faithful copies of those worn in the sixteenth century.

A dark gown may be furbished up and made to look smart with velvet sleeves and velvet yoke, back and front outlined with jet. For this purpose the rich mandarin colour and red heliotrope are worn. Brunettes are ordering this deep yellow freely, and the result is a most effective costume.

Flowers are not so fashionable a trimming for

evening dresses as feathers, which are extraordinarily large; but when employed small blooms form a trellis-work and fringes round the hem of skirts and the basques of bodices, for all basques would seem to be trimmed either with a flounce of lace or chiffon, or with flowers. The advent of paniers is near at hand, and they threaten to revive hoops, which we must all devoutly hope will be delayed. How sensible women could submit to the nuisance of large crinolines is surprising; but in all ages the fair sex has followed the dictates of Fashion blindly, and no higher education, no teaching, no preaching, have produced any contrary effect.

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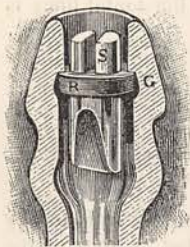
## THE GATHERER:

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 Siphon Stopper.

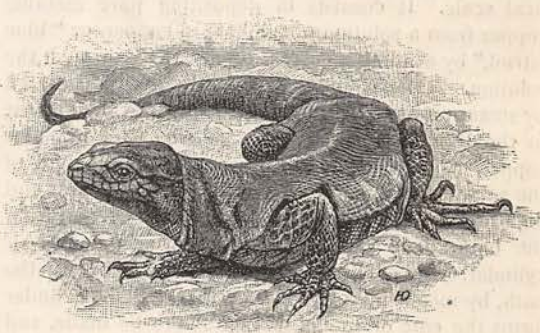
Our engraving shows a new stopper for bottles containing aerated waters, which, being on the siphon principle, allows of a part of the contents to be drawn at a time, without injury to the remainder. The stopper, S, of glass, has a ring or washer of india-rubber, R, which fits into a groove, G, in the neck of the bottle. The pressure of the gas on the stopper prevents its escape until the stopper is forcibly pressed down, either by hand or by a simple contrivance for the purpose. So long as it is kept down the water discharges itself; but when it is let go, the bottle is closed again.



### A New Lizard.

The reptile-house at the Zoological Gardens now contains two lizards of species never before exhibited. One—Simony's Lizard (*Lacerta Simonyi*)—is especially interesting as confirming a tradition that had long existed as to the occurrence of large lizards on the island of Ferro or the rocks lying off the east end of the island. More than 400 years ago, when the chaplains of Messire Johan de Bethencourt wrote their account of his subjugation of the Canaries to the power of Spain, they spoke of lizards in Ferro "as large as cats, but harmless, although very hideous to look at." Their story was considered a mere "traveller's tale," till Fritsch visited the island in 1862-3, and was asked by the people if he had seen such animals, which they called "chameleons." But naturalists knew nothing of them till very recently, when they were scientifically described from specimens preserved in

spirit and sent to Europe. Some little time since, Canon Tristram visited the island and brought away some specimens from the rocks of Zalmo, at its eastern extremity, which are only accessible in fine weather when the water is smooth. The animal measures about eighteen inches, of which the tapering tail is nearly one-half; the general colour on the upper surface is dark brownish grey with two rows



of round yellowish green spots on each side; the under surface is yellowish or greenish blue. Great interest attaches to this animal, which has so long escaped scientific observers, and which has a habitat so different from other members of the order. The people of Ferro say that these lizards live on crabs, but although these were provided in plenty, the specimen in the Gardens refused to touch them, and appears to thrive on a mixed diet of raw fish and meat, with a few grapes and pieces of banana.

### The Columbian World's Fair.

Our illustration represents the American Government building of the forthcoming World's Fair at Chicago

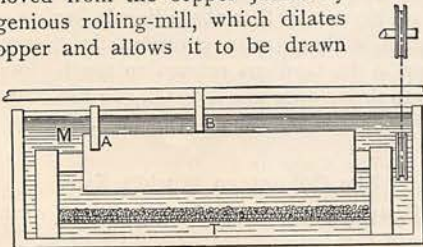


THE COLUMBIAN WORLD'S FAIR.

in 1893. The Exhibition is to be held in Jackson Park. The building in question will be 420 feet long and 320 feet deep, with a central dome 120 feet in diameter. It will contain the Governmental exhibits, including those of the Agricultural, War, and Interior Departments, as well as of the Fish Commission, the Smithsonian Institute, the Treasury, and Post Office. Of these the Interior Department is likely to attract many visitors of all classes.

#### Copper Tubes by Electricity.

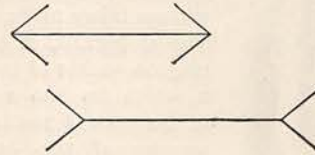
The Elmore process of making copper tubes by electricity has now been put in operation on a practical scale. It consists in depositing pure metallic copper from a solution of sulphate of copper, or "blue vitriol," by sending a current of electricity through the solution. The current is supplied by dynamos driven by steam power. The anode which brings the current to the bath is a copper tray strewed with granular copper, as shown at T, which keeps up the strength of the solution as metallic copper is reduced from it and deposited on the cathode which leads the current from the bath. The cathode is a cast-iron mandrel or cylinder, M, revolving round its axis horizontally in the bath, by means of a strap and pulleys. This cylinder forms the core or mould of the tube to be made, and the fresh copper is deposited on it. The current is led from it by a metal brush or contact, A. An agate bur-nisher, B, presses on the deposit as it is formed, and so gives a "grain" or "fibre" to the crystalline copper, and a consequent strength to the tube. The mandrel is removed from the copper jacket by an ingenious rolling-mill, which dilates the copper and allows it to be drawn



out. The tensile strength of the copper forming these pipes and tubes is said to be twenty tons per square inch. Besides its use for steam-pipes, Elmore-deposited copper is likely to be used for various household articles, such as candlesticks, boilers, and saucepans. The kettle of the future will be made by electrolysis.

#### A Simple Optical Illusion.

A new and curious optical illusion is shown herewith. The question is, which of these two horizontal lines is

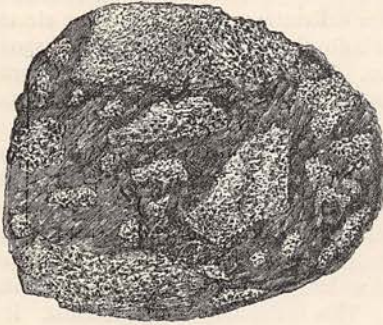


longer than the other? The answer will be found by measuring them, and it will show that, in spite of the old adage, we cannot always believe our eyes.

#### A Future Sanatorium.

The mineral springs of the far-famed Yellowstone Park, in Wyoming, U.S., have now been analysed, and are found to comprise calcareous alkaline-silicious acid, arsenical and sulphurous waters. The analyses are given in No. 47 of the Bulletins of the United States Geological Survey, and they show that these waters will in future be resorted to by invalids for drinking and bathing purposes. Norris Basin contains every variety within its bounds, and it is marked out as the site of a future sanatorium, to which the pure air and wonderful scenery will also attract many travellers. While upon this subject, we may mention that the American Government have set apart the Yosemite region in California, and also the district of the Big Trees (*Sequoia gigantea*), to be national pleasure-grounds, like the Yellowstone, for all future time. We may also mention here that Mr. Weed, a member of the United States Geological Survey, has discovered that the numerous

algæ, or water-weeds, in the hot springs and basins of the Yellowstone Park, and which by their brilliant colours add to the beauty of the pools, are also, in part at least, the architects of those wonderful fretted brims, "marble terraces," and "petrified cascades," which are the admiration of visitors. Mr. Weed shows that the calcareous and silicious deposits of hot springs are not merely caused by chemical change, the salts depositing from the waters, but are rather due to these low vegetable organisms. Travertine is secreted by them from the calcareous, and sinter from the alkaline-silicious waters.



The Meteorite of Oschansk.

The meteoric stone which was seen to fall at Oschansk, near Perm, in Russia, on August 30, 1887, has been examined by M. Stanislaus Meunier, and proves to be of exceptional interest. Our figure shows one of the fragments now in the Natural History Museum at Paris. It belongs to the type called Canellite, from a meteorite which fell at Canellas, in Spain, in 1861, and is a breccia or conglomerate of angular fragments of different rocks. One of these is an oolitic stone—that is to say, formed of roundish granules of Limerickite—of a dark violet colour. Another is a white oolitic stone which M. Meunier terms "Montréjite;" but the most remarkable fact about the meteorite is that, in the opinion of M. Meunier, it must have been formed under geological conditions like those existing on the earth.

Photographing in Colours.

Professor Lippmann, a well-known *savant*, and Professor of Physics at the Sorbonne, Paris, has made a certain advance towards the solution of the problem of photographing natural objects in colours. It has been thought that the most direct way of doing so would be to discover a sensitive film which would be so influenced by the rays of light from the image, that it would secrete red matter where the red rays fell, yellow matter under the yellow, and blue under the blue rays. Professor Lippmann has attained this end by a different way. He has not discovered a new sensitive medium, or a process of development. He uses the old collodion and iodide or bromide of silver film, taking care, however, that the film shows no traces of a granular texture even under the microscope. The glass plate G, Fig. 1, having a dry collodion film, is clamped on a dark slide of india-rubber, C, C, which is

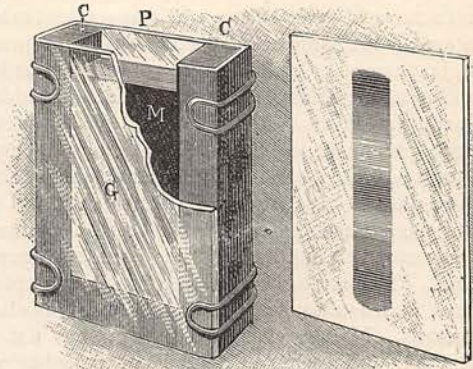


FIG. 1.

made hollow and filled with mercury, M, so as to form a liquid reflecting surface, or mirror, in contact with the film. This slide, which has a glass back, P, to contain the mercury, is placed in the focus of a camera, and the image of the object received on the film, in the ordinary way. On being developed as usual the photograph is seen to be coloured. When the coloured light of a stained glass window or the prismatic spectrum is taken in this way, the reproduction is very brilliant. On the right of Fig. 1 a spectrum thus taken is represented. At the time of our writing M. Lippmann had not perfected the method for blended colours such as appear in natural objects. The theory which he offers of the process is to the effect that the colours of the plate are due to the silver being reduced by the light in the form of thin plates or laminae at regular distances from each other through the thickness of the sensitive film. The colours in fact are similar to those of thin plates of oxides on ancient glass and tempered metals. The silver is made to deposit in layers by the device of the reflector, which reflects the light from the lens back on itself and causes "interference" of its rays within the film. At every half-wave length there is a dark line and a bright line where the waves cancel or swell each other.

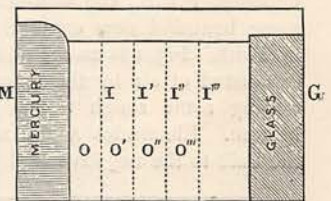


FIG. 2.

No silver is deposited in the dark space, but a film of it is reduced in the bright space: There are several of these "beats" and "swells," to borrow the terms of music, in the thickness of the film, the waves of light being very minute. Fig. 2 shows their arrangement on a distorted scale, M representing the mercury, G the glass, and the intervening space the section of the film. As will be seen, it is divided into half-wave lengths, and O, O', O'', O''' are the dark spaces, while the dotted lines I, I', I'', I''' are the bright bands where the silver laminae are formed. Since the wave length of light varies with the colour of the ray, being smallest at the blue end of the spectrum, the thickness of the plates varies accordingly, and hence, when seen by light reflected from them, the interference caused by

the reflections from their front and rear surfaces makes them appear the same colour as the rays which formed them, just as a soap-bubble shows red or green or blue according as the thickness of the bubble is capable of producing interference of these rays. When viewed by light coming from behind the plate, the complementary colours are seen. Unfortunately the sensitive films we possess are not equally sensitive to all the rays of the spectrum, and to bring out the colours a long exposure varying from half an hour to two hours is required. This might be overlooked in photographing pictures and landscapes, but is a serious drawback to portraits. Moreover, as M. Lippmann has not yet tried, it is doubtful whether the delicate mixed colours of objects will come out well. A film equally and more sensitive to all the rays is required to improve the process.

#### Molecular Light and Shade.

During his inaugural address as President of the Institution of Electrical Engineers, Mr. William

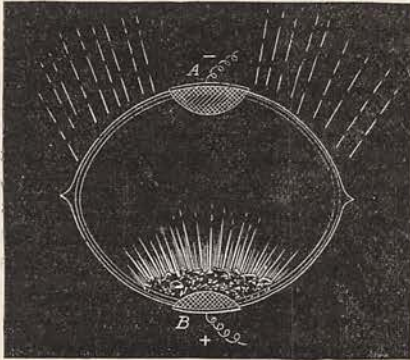


FIG. 1.

Crookes, F.R.S., the well-known chemist, performed some beautiful new experiments, which we illustrate herewith. Fig. 1 is an egg-shaped bulb of glass, highly exhausted of air by the mercurial air-pump, but containing some rough rubies and pure yttria in the bottom. Electrodes A and B connect the outside of the bulb to the negative and positive terminals of an induction coil. When the current is started in the coil the gems and yttria are seen to glow with a ruddy phosphorescence. Only non-conductors, such as glass and gems, appear to have this property.



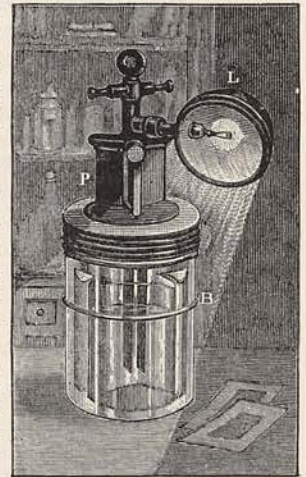
FIG. 2.

Fig. 2 represents another exhausted bulb having a small cross of mica in its centre. The electrodes, A and B, are connected to the coil as before, and

when the induction current is excited the residual particles of gas in the bulb stream across from the negative electrode, A, and strike the opposite wall of the bulb, causing it to phosphoresce like the rubies in the preceding experiment. In the midst of the illuminated space, the dark shadow of the cross is clearly marked. It is to be noted that in both of these cases the electrodes are on the outside of the glass. In all Mr. Crookes' former experiments they penetrated to the interior through the glass, and Dr. Pului, a foreign man of science, has for this reason declared the results to be due to particles of the electrodes torn away by the current, and not to the gaseous corpuscles left in the bulb after exhaustion. By keeping the electrodes outside the bulb altogether, Mr. Crookes disposes of this objection. These experiments have a bearing on the constitution of the chemical atom, and, according to Mr. Crookes, it is being acknowledged by chemists and physicists that what we call the atom is really not a simple indivisible body, but a stable combination or harmonic group of still smaller bodies called meta-elements. In course of time, under certain conditions of temperature, the meta-elements gather into clusters, each of which is durable and has a definite atomic weight. This is the atom of the chemist. If we could resolve the atoms of one substance, say lead, into its meta-elements, and recombine these into another atom, say of gold, we should be able to perform the great crux of the alchemist, namely, the transmutation of metals; but we cannot do this any more than we can transform a horse into a cow.

#### A Photographer's Electric Lamp.

The red glass lantern employed by photographers in developing their plates is apt to smoke or burn low; hence M. Radiguet, a well-known electrician of Paris, has introduced the electric lamp, which we illustrate, and which may be used for other purposes. The lamp itself is a small incandescent bulb fitted in a reflector, which is covered by a movable pane of glass, red, or another colour if desired. The lamp, L, is attached to the plates, P, of a bichromate battery, B, containing three separate cells joined in series to give an electro-motive force of 5 volts. The plates are pulled up from the exciting solution when the light is not required; and the intensity of the light is regulated by the depth to which the plates are immersed in the solution.



#### A Stinging Primrose.

The beautiful China primrose (*Primula obconica*), so much admired for its winter blossoms, has the

objectionable property of stinging the skin and poisoning the blood of some people, producing an inflammation resembling eczema. Not long ago a number of workmen in an American greenhouse were poisoned in this way, and care is needful in keeping the plant, lest a person in touching it should be stung by the leaves.

**New Electric Light Fittings.**

Fig. 1 represents a combined standard-bracket and hook for an electric lamp, that cannot fail to be useful.

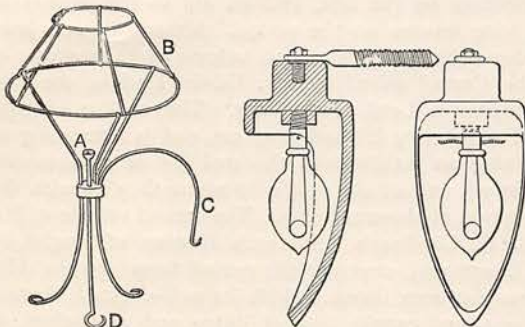


FIG. 1.

FIG. 2.

It is shown as a standard where A is the socket for the incandescent bulb, and B is the frame for the shade; but the feet D are so formed as to fasten on the wall, and the hook C also allows it to be hung from the back of a chair. The current is, of course, conveyed to the lamp by flexible silk-covered wires. The device is made of brass rod, in two sizes, one twelve inches and the other eighteen inches high. Fig. 2 is a front view and section of a new lamp-holder and shade made of white porcelain, which acts as a reflector. The bulb is fixed, as will be seen, in the focus of the reflector.

**A Despatch Railway.**

The continuous transport of large numbers of people is a question which is now engaging the attention of American engineers. Obviously a railway or tramway which would allow passengers to step on or off at any point without stopping the cars or necessitating the use of signals would be a great advantage. Messrs. F. L. Silsbee and M. E. Schmidt have solved the problem in a promising way by means of travelling platforms. To take a simple case, let us suppose that there are only three platforms, parallel to each other and going at different speeds along the track, which is endless—that is to say, makes a complete circuit,

so that the platforms keep ever moving round and round at given speeds. Fig. 1 represents a section of the track, and Fig. 2 an elevation. In these figures, D is the outer or fixed platform, level with the ground; C and C are two travelling platforms mounted

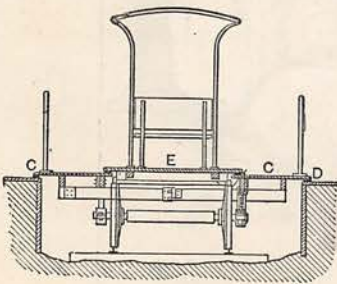


FIG. 1.

on the axles of the cars and moving at a slow speed, so that any person can step from D upon them at either side; E, is a central platform, or car proper, fitted with seats and a canopy overhead, and mounted on the periphery of the wheels A, so that it travels at a much faster

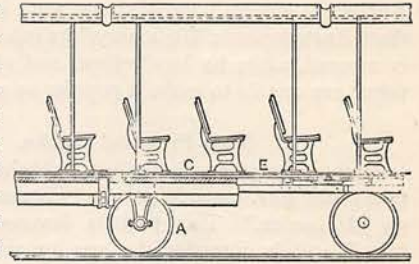
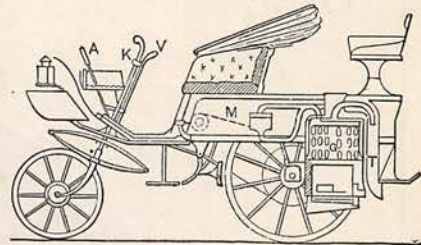


FIG. 2.

rate than the side platforms, C, C. The passenger steps from the street, D, by easy gradations to the car, E, while it is in motion, and leaves it again when he pleases. The number of moving platforms can be increased according to the speed it is desired to attain. The inventors suggest that their despatch railway should be employed in conveying visitors round the Columbia Exhibition, at Chicago, in 1893, free of charge.

**A Steam Phaeton.**

A steam phaeton propelled by the inexplosible boiler of M. Serpollet has been brought out in Paris, and is permitted to run on the streets at a speed not exceeding ten miles an hour. The illustration shows a section through the vehicle, where A is the handle for starting and stopping as well as the lever of the pump which feeds the boiler with water; M is the two-cylinder Serpollet steam motor; G is the inexplosible boiler; T is the smoke funnel discharging in the rear; K is the



steering handle; and v the lever for controlling the speed. The tank of the boiler can hold sufficient water to run twenty miles; and the bunker enough coal—preferably coke or anthracite, as they are all but smokeless—for a journey of thirty-six miles. The engine is of four horse-power, and with seven persons on board, can run the vehicle at a speed of fifteen miles an hour. The phaeton can be started in twenty minutes, and the supply of the boiler and furnace is effected automatically. The starting, stopping, slowing, and steering are all managed from the front seat by proper handles within reach.

**A Handy Dictionary.**

An English dictionary at once handy in form and comprehensive in its definitions has long been a

desideratum, and "Cassell's English Dictionary," edited by Mr. John Williams, M.A., meets the want. It covers 1,100 pages of moderate (demy 8vo) size, and contains definitions of upwards of 100,000 words, together with capital lists of phrases from modern and ancient languages, and a brief historical sketch of the English language. As this new work is based upon the "Encyclopædic Dictionary," its reliable character is assured, while its handy form and clearly printed pages are certain to make it popular as well as useful.

#### Two Practical Books.

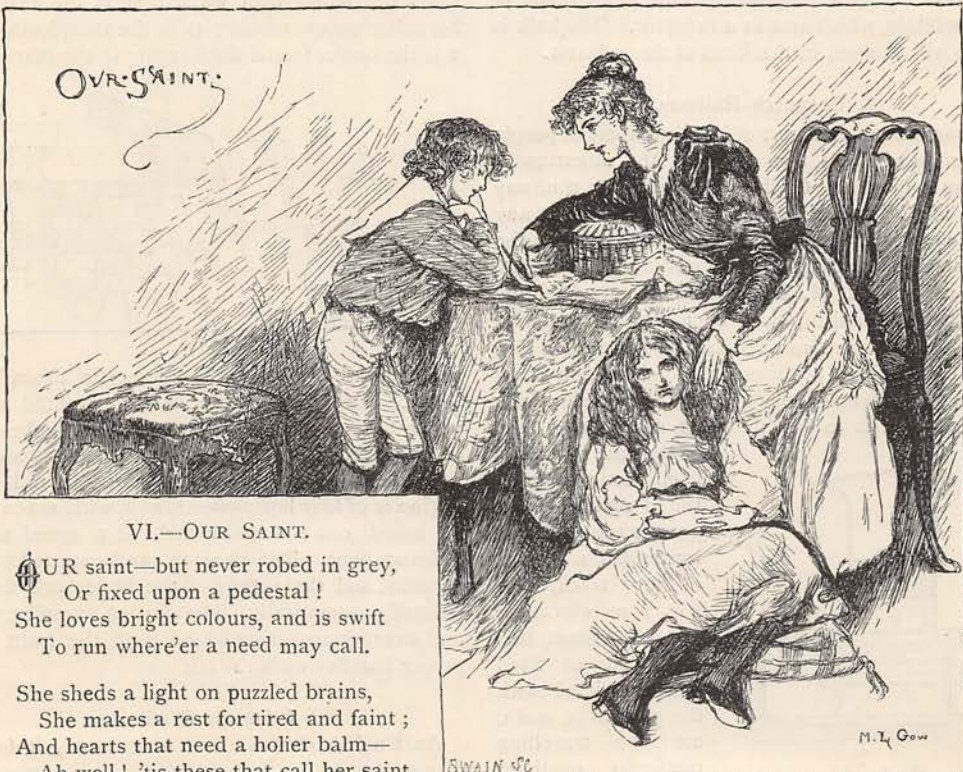
Messrs. Longmans have just published the second part of the Rev. Isaac Warren's "Elementary Treatise on Mechanics." This part is devoted to "Dynamics," and is intended for use in schools and by the junior students in Universities. So far as we have been able to test it, the work seems thoroughly practical, simple, and helpful. One excellent feature which it presents, is a large number of examples and exercises which are given for working out. Another eminently practical book from the same publishers is Miss F. Heath's "Pattern-Making from Paper-Folding," described on its title-page as being a simple method of cutting out underclothing and children's dresses. It is hardly necessary for us to say more than that the work is accompanied by

a series of very cleverly drawn plates, and that its author is Senior Examiner to the London School Board.

#### "To be Continued."

Messrs. Cassell's Jubilee edition of the "History of England" has reached its fourth volume, which covers the period from the "Fall of Marlborough to the Peninsular War," which of course includes the days of Burke and Pitt. Again we must call special attention to the illustrations, which serve as a valuable commentary on the text, and an aid to the teacher in giving lessons on the period. Messrs. Cassell have also published the second volume of "Conquests of the Cross," edited by Mr. Edwin Hodder, the biographer of Lord Shaftesbury. The work is a record of missionary life and progress, and is interesting as giving an insight into the real life of missionaries abroad, and of the people to whom they go with the support of those at home. The second volume of Mr. S. R. Gardiner's "Student's History of England" (Longmans), covering the period from 1509 to 1689, has just been issued. With its well-selected illustrations, and careful lists of dates and authorities, it ought to prove a great practical help to teachers and students. The next volume is to complete the work; but this one, including the period that the author has made especially his own, is peculiarly valuable.

### HOUSEHOLD SKETCHES.



#### VI.—OUR SAINT.

OUR saint—but never robed in grey,  
Or fixed upon a pedestal!  
She loves bright colours, and is swift  
To run where'er a need may call.

She sheds a light on puzzled brains,  
She makes a rest for tired and faint;  
And hearts that need a holier balm—  
Ah well! 'tis these that call her saint.

SWAIN SC

M. L. Cow