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 Crockery Drying Rack.

A rack for drying crockery has been introduced. No wiping is required with the device, which is illustrated herewith. Hitherto, as a rule, only plates have been dried by merely draining them; but the rack in question allows a complete tea or dinner set to be treated in this manner. It is stated that over a hundred pieces or more can be dried on a rack standing upon a floor-space of one square foot. One piece cannot drip into another. The drainage is caught and carried to a receiver. Of course different sizes are made to suit different requirements.

The Welfare of London.

Some time ago we mentioned a new step in the treatment of social statistics, which had been taken by Mr. Alexander B. MacDowall, M.A., who had given, in a series of curves, a history of recent progress in Ireland. The same author has now applied his method to London, and in "Curve-pictures of London," recently published by Messrs. Sampson Low & Co., Limited, has provided the social reformer with an easy means of arriving at definite information on the increase of population, its density, the birth, death, and marriage rates, the fluctuations of crime, drunkenness, pauperism, prices, and so forth in the metropolis. Such a book is worth whole reams of hasty and superficial articles in the press, and volumes of social speculation, simply because it shows us the actual facts of the case beyond any cavil. With regard to population, Mr. MacDowall's curves and remarks indicate that it increased from 0·9 of a million in 1800, to 3·8 millions in 1881. These figures refer to the London of the Registrar-General. The Metropolitan Police District, reaching, in some parts, fifteen miles from Charing Cross, had 4·7 millions in 1881. Females preponderated over males in the proportion of 2 to 1·79 in 1881. London has now a larger population than Scotland, which in 1881 was 3·7 millions, while Paris had 2·2 millions in 1881, and New York 1·2 millions in 1880. There has been a decline in the birth, death, and marriage rate in London since 1865. Unfortunately, however, the evil of boy and girl marriages appears to be growing in London. Thus, while in 1860 3·4 per cent. of men and 13·6 per cent. of women married under twenty-one, in 1886 these proportions were 5·8 for men, and 19·3 for women. There seems to be no very decided decrease of drunkenness during recent years. Social order, however, seems to have somewhat advanced. Since 1870 there has been a fall in pauperism, owing in part to the reduction of the number of outdoor paupers by a change of system. Illiteracy is, happily, declining both in London and the provinces.

A Singular Mirage.

A curious instance of mirage is reported from Hudiksvall on the Baltic. On July 15th, 1888, at 11 p.m. at that place a mirage was seen representing an airy picture of a vessel sinking in a boisterous sea, and a boat putting off from it. The display lasted five minutes.

Compressed Fuel.

Small briquets of compressed fuel are now being made by machinery, from coal-dust and pitch, with the help of steam, which makes the mass plastic for the mould. They are 4½ inches long by 2½ inches thick, and weigh twenty ounces. The machine turns out fourteen a minute, or at the rate of five tons per day of twelve hours. It requires two horse-power to work it, and a man and two boys to attend to it, mixing the ingredients and stacking the briquets. The latter make an excellent fire, and burn with very little ash.

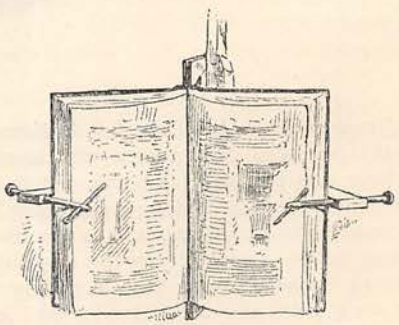


FIG. 1.—HOW THE BOOK IS HELD OPEN.

Book-Holder for Invalids.

A new device to enable invalids to read in bed, without putting them to the fatigue of holding the

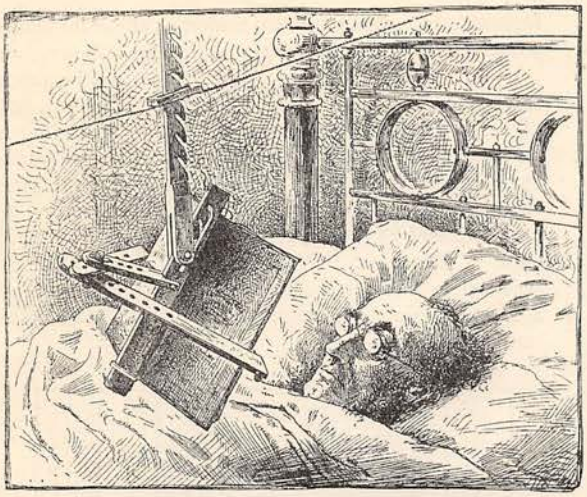


FIG. 2.—HOW THE BOOK-HOLDER ACTS.

book, has recently been brought out. Its construction may best be seen from the accompanying illustrations, which show the book-holder in use. The arms that hold the book open are provided with a number of holes, so that by moving the position of the peg the grip may be increased or diminished. By a very simple device the apparatus may be inclined to the one side or the other to catch the light, while the toothed rack immediately behind the book makes it possible to incline the work at any angle towards the reader. The pages may very easily be turned with one finger, if the volume has been properly adjusted in the holder. In cases of accident, where the patient is obliged to lie in a recumbent position, this device should be extremely useful.

A Forked Palm.

There is a bifurcated palm-tree at Cayenne, French Guiana, and several at Rio Janeiro. These belong to the genus *Areca*, and are known colloquially as *palmeira bambu*. Professor Haeckel, of Jena, was also shown a forked cocoa-nut palm in Ceylon, so that, it would appear, bifurcated palm-trees are not so rare as most people imagine.

Curious Lightning-Strokes.

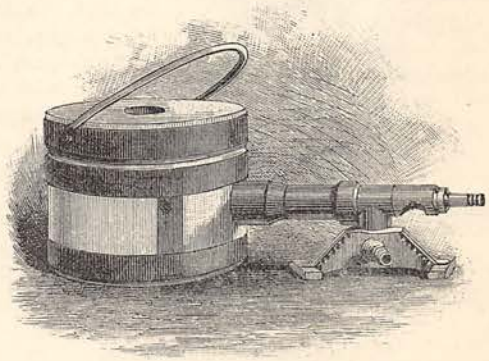
A narrow escape from lightning is reported from De Funiak, in Florida. Mr. John Chisholm, a merchant of the town, took shelter in the porch of a drug store, used as a post office, and "protected" by a lightning-rod fastened to the house by glass insulators in the old-fashioned way. The lightning struck two tall pines about 100 feet back from the house, and leaped to the rod, then ran along the comb of the roof and down the gable by a corner. Mr. Chisholm only remembers a sensation like a "heavy blast of hot air" striking him between the shoulders. He was thrown on his face and picked up for dead. His person was "blistered," especially from the knees down, and on regaining consciousness, he complained of a feeling of suffocation and "heartache." For four months he was helpless, suffering from aching bones and stinging sensations, as though a "thousand" needles were being stuck into him. A more singular case was also recently reported by a Wolverhampton newspaper, and has not, we believe, been contradicted. During a thunderstorm occurring in July last, a coal-miner named Bates, who had lost his eyesight by an accident, and wore spectacles to conceal the disfigurement, was being led to his home, when a flash of lightning was "reflected" on the spectacles. After the thunder Bates complained of a severe pain in the head, and to his surprise found that he had regained his eyesight. Obviously, however, this may have been a coincidence, and not a consequence of the flash. During one of the July thunderstorms, too, a fire-brigade station in the Old Kent Road, London, was roused by the electric alarm ringing, and a fire-engine started with an escape to the supposed scene of the fire, only to find that the alarm had been sounded by the electricity of the atmosphere. Two telegraphists also suffered severe shocks — one while working his apparatus, the other while standing close to it; but neither was killed.

A Railway to Bokhara.

The railway built by the Russians in their Central Asian possessions is now open as far as Bokhara, so that it is possible for an Englishman to travel by rail from Charing Cross to Bokhara, with the exception of the Channel and two other short sea-passages—namely, Odessa to Batoum, and Baku to Michaelovsk. In less than a year it is expected that the line will be in close contact with the Indian railway system, so that the "overland route" is likely soon to be revived in another sense.

An Oxygen Furnace.

Our figure shows a new oxygen furnace brought out by Mr. Fletcher, the well-known inventor of laboratory appliances. In the furnace compressed oxygen is used along with coal-gas. A jet of the oxygen, mixed



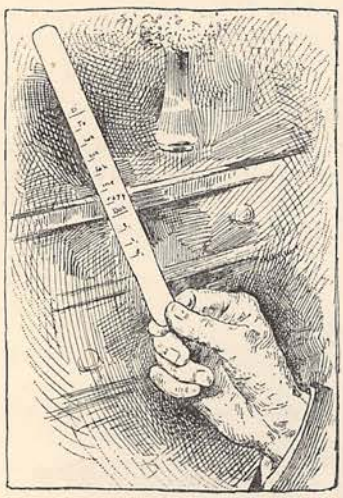
with air as it goes, is burnt with the gas, producing an intense heat. The power of the furnace is regulated by the gas supplies, and can be adjusted from a dull red light to a fervour capable of melting refractory

substances. Brin's compressed oxygen is employed along with the coal-gas ; the pipes in the figure show how the gases are supplied.

Some Household Novelties.

Towels and dusters that are hung upon nails are very apt, as all housewives know, to be spoiled by rust, or to be torn through being carelessly put in their places. A new invention has lately been patented, which provides a ready means of tidily disposing of such things without going to the trouble of putting up rollers. It consists of a loop of strong plated wire hung on a little screw, which can be let in anywhere. The bottom of the loop is carried to a point, so that the duster or towel is held firmly if it is once pulled into its place towards the bottom of the loop.—A new spanner and pipe-wrench has lately been patented, which seems to us to supply a want. Instead of the screw-sliding loose arm of the more expensive forms, this spanner is made in two parts, which are secured by a stud fixed in one arm, and fitting into any one of four holes in the other arm, thus securing the tool from any danger of slipping, while providing a ready means of adjustment.—A granulated form of black-lead has lately been introduced, which is said to give very good results indeed when properly used. Some persons objected to the trouble of reducing the nickel-silver black-lead in ordinary use to powder, as was necessary, but in this new form they will be able to reap the advantages of its use without this labour.

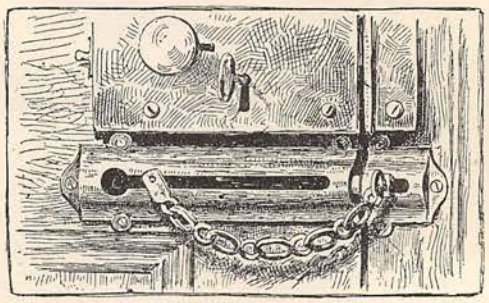
A Musical Paper-Knife.



An ingenious Frenchman writes to a French contemporary pointing out that a paper-knife can be used to play tunes. The knife is struck against a hollow piece of furniture, the angle of a desk for example, and by experiment all the sounds of the gamut can be produced. The annexed figure shows the manner in which this is accomplished. Various airs can be played after some practice with this primitive instrument.

Making Dark Rays Visible.

Dr. Lommel, the well-known authority on optics, has demonstrated that a focus of the dark or ultra-red rays of the spectrum can be rendered visible by means of a phosphorescent substance. Dr. Tyndall has, on the other hand, shown their heating power when focussed, by setting fire to tinder. The "luminous paint" of Balmain, or better still, a phosphorescent calcium sulphide, prepared by Dr. Lommel, becomes brightly phosphorescent in the focus of these ultra-red rays. If a transparent screen is made by spreading a layer of this substance between two plates of glass cemented at the edges, the ultra-red region of the spectrum is shown as greenish-blue phosphorescence near the end of the spectrum both on the front and back of the glass. When the dark focus alone is received on this screen, it appears as a bright spot on a feebly luminous ground, which by-and-by changes into a black spot.

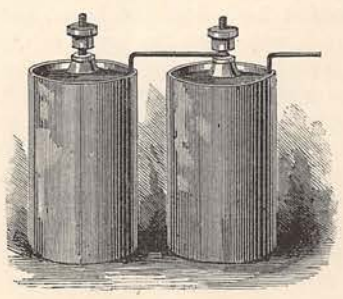


A Safe Door-Chain.

The ordinary door-chain is not altogether free from the drawback of being opened from outside ; and the new chain we illustrate is designed to prevent such an occurrence. It consists of a bolt with its case screwed to the jamb of the door ; and the ordinary chain-case fixed on the back of the door. One end of the chain is fixed to the bolt in such a manner that the bolt must be pushed home into its socket in the door-case before the other end of the chain can be released and dropped. It follows that securing a door by this chain also bolts it ; and that the chain can only be taken off when the door is bolted. At the same time, once the chain is on, the bolt can be withdrawn, and the door partly opened for ventilation if desired.

A Dry Battery.

The Gasner "dry" battery, which comes to us from America, is a novelty in its way, and may be useful for domestic electric bells. It is illustrated in the figure, and has this practical advantage over the ordinary cells, that the outer case, or containing jar, is made of zinc, and is therefore less liable to break than the ordinary jars. There is, moreover, no solution inside, the necessary moisture being in a state of chemical combination. According to the statement



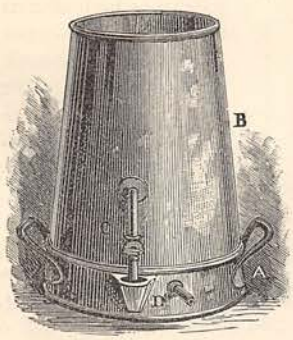
of the English agent, the cell consists of a carbon cylinder packed round with a solid and porous mass of oxide of zinc and gypsum, the whole being contained in the zinc jar, which forms the zinc pole of the combination. The charging mixture is not liable to spill or freeze, and the battery may be placed in any position. The electromotive force is about the same as that of the Leclanché (1·48 volt), and the internal resistance of a cell 7 inches high and 3 inches in diameter is about 0·6 ohm. When exhausted the cell recovers itself greatly on resting, and it can be regenerated by having the current from a dynamo passed through it.

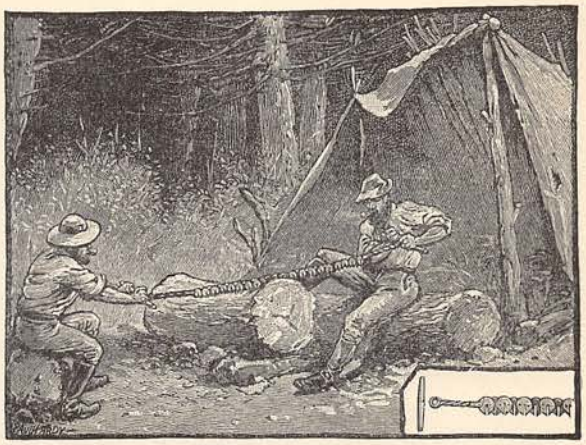
The Eye as a Source of Light.

At the recent meeting of the British Association, Mr. Friese Greene, the well-known photographer, read a paper on an experiment he had made which appears to show that the eye is, to a certain extent, capable of storing light, in the manner of luminous paint. He had stared at a 3,000 candle-power electric arc lamp in Piccadilly, at a distance of 3 feet, for 15 seconds, then closed his eye and brought it very quickly over a sensitive photographic plate, 1 inch from the film. In this way he had obtained a faint yet distinct image of the electric arc with the carbons. The arc would seem to produce a bright spot on the retina, which remains luminous for a short time. A weaker source of light, such as a gas-lamp, failed to produce the effect.

An Automatic Water-Still.

The accompanying figure illustrates a still for distilling water which will be useful in the household, or to druggists and photographers. The lower part, A, of the apparatus is the boiler, which has an annular trough inside. Into this fits the upper part or reservoir, B. The tap, C, from the upper reservoir, dips into a lip communicating with the boiler. A projecting tube, D, from the inner trough, forms the delivery jet. Cold water is placed in the upper reservoir to serve as a condenser. The steam from the water in the boiler below rises into a hollow cone in the heart of the condenser above, and is there chilled into water, which trickles down the cone and into the trough, escaping by the pipe C. In order to keep up the supply of water automatically the tap, D, is turned on, thereby allowing the water from the condensing reservoir to feed the boiler. The apparatus will work when placed over a fire or stove, a petroleum burner, or a gas-jet.





A Portable Saw.

The woodcut shows a new saw for cutting down trees or other purposes, which can be packed in a leather case, and slung over the shoulder or attached to a belt round the waist. It only weighs 1¾ lbs., and makes a case 8 inches by 3½ inches by 1¾ inches in size. Nevertheless, it is said to be equivalent to a 6-foot cross-cut saw, and to be capable of cutting down a live tree 12 inches in diameter in five minutes. The figure illustrates the nature of the saw with its handles. It is formed of hardened steel plates, riveted together in a double series, in such a manner that the rivets are sufficiently loose to form joints. Each plate or link in the chain, so to speak, is so shaped on one side as to form a pair of saw-teeth, one tooth cutting in an opposite direction to the other. The cross-handles are withdrawn when the saw is packed up. Inaccessible trees can be cut by it, if ropes are attached to the ends in place of the handles. The saw promises to be useful. Sappers or emigrants may find it handier than the ordinary kinds.

Purifying Zinc.

Mr. Alexander Watt has brought out a serviceable process for purifying crude zinc, or extracting the metal from its ores, by means of the electric current. This is done by using a solution of commercial acetic acid in an electrolytic bath. The crude zinc forms the anode to the current, and a sheet of good zinc forms the cathode. When the current is passed from the anode to the cathode through the solution, the crude zinc is dissolved, and the pure metal deposited on the sheet-zinc. The impurities fall to the bottom of the bath as mud, which is cleared away. When ore is reduced, it is first ground and sifted, and mixed with the acetic solution. The current is then passed through it from a carbon or platinum anode, and the metallic zinc is deposited as before on a sheet-zinc cathode.

A Buried Amphitheatre.

A curious archæological discovery has been made at Altenburg, a town between Vienna and Presburg,

on the Danube. Professor Hauser, observing the colour of a corn-field, which varied in every part, expressed the opinion that it covered a buried amphitheatre. A drawing he made showed that the corn was richest over the orchestra, where the soil was deeper, while elliptical lines of greener corn indicated the rows of seats in the auditorium. As soon as the corn was cut the excavations began, and sure enough an amphitheatre was laid bare. The pavement is said to be in good condition, and a road leads from the theatre to the camp of Carnutum, at some distance.

FIG. 1.

A Rocket Camera.

A mode of taking photographs in the air by means of a rocket is reported from France. The camera is cylindrical, having twelve lenses at regular intervals round the circumference; the rays in each being screened from others by partitions as shown at A, in the annexed figure (2). A sensitised plate, C, is placed in the centre of the camera; and a circular shutter, B, provided with windows, for the lenses are so arranged that when the camera, after being shot aloft by the rocket, commences to fall, the shutters open and close, allowing the photographs to be taken. The complete apparatus is shown in Fig. 1, a parachute being attached to open out and support the camera, which is hauled back to earth by a cord.

FIG. 2.

Storing the Nile.

A series of surveys has shown that there is a great depression seventy-five miles south-south-west of Cairo, which communicates with the Nile when the river is a little below high water. This tract of country is the Wadi Raiyan, and is bounded by high and precipitous limestone hills. It is therefore proposed to turn it into a great reservoir for storing the flood-water of the Nile, thus enabling irrigation to be carried on during low Nile. Its capacity is such as to practically double the summer irrigation of Egypt. The works necessary to convert the basin into a reservoir could be completed in a year; but three seasons would be required to fill it. It is confidently expected that these works will ere long be carried out, and a large extension of the cultivated soil of Egypt thus effected.

Discovering Leaks in Ships.

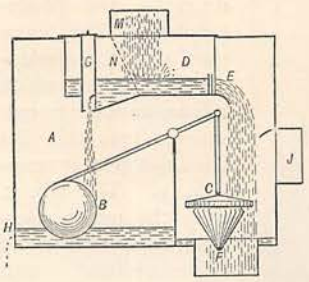
Herr Th. Thorbjörnsen, of Kragerö, has devised a simple apparatus for discovering leaks in ships while lying in the dry dock. The apparatus consists of a closed furnace placed on deck, and burning straw or bramble. The hatches of the vessel being closed, the smoke of the furnace is pumped into the hold, and any leak in the hull is then discovered by the smoke escaping from it.

Fire-Drawings.

If a saturated solution of saltpetre be used with a quill or fine brush to make a drawing or writing on white absorbent paper, keeping the lines well clear of each other, and the whole in outline, a glowing match will set fire to the lines, and a spark will run along the design, cutting it out as with a knife. The saltpetre yields oxygen to combine with the carbon of the paper, when heated to the point of ignition by the glowing charcoal of a match ignited and blown out.

Storing Clean Rain-Water.

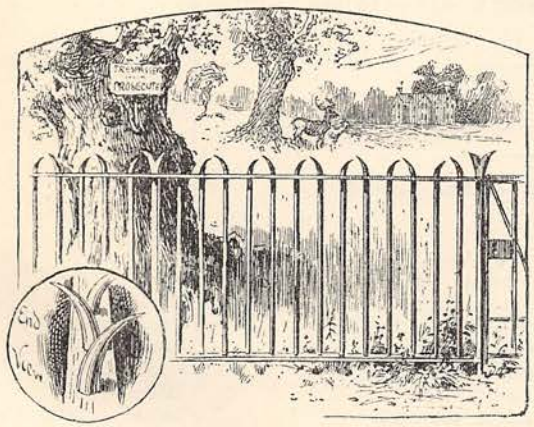
A special form of gutter, designed to prevent accumulation of dirt, has been introduced in conjunction with an automatic regulator, which diverts all the dirty rain-water from the storage-tank, and collects only the clean. The figure illustrates the interior of this regulator. The cistern, A, being empty, the weight of the float, B, keeps the valve, C, open. The dirty rain-water entering the apparatus through the pipe, M, passes through a strainer, N, and then flows along a passage, D, over a weir, E, to the foul-water pipe, F. At the same time a portion of the water enters the cistern, A, through a small tube, G, and discharges at a lower rate through the tube, H. The ball, B, rises with the water in the cistern, and closes the valve, C, thus diverting the flow of clean rain-water, after the foul has been run off, into the pipe, J, connected with the storage-tank.



Making Light.

Light is understood by some electricians to be an electrical vibration of the ether; and hence Dr. O. J.

Lodge, a holder of this theory, has been endeavouring to produce these waves by direct electric action without the intervention of heat. The means adopted was the oscillating discharge of a Leyden jar with a rate of vibration as high as one million per second. The waves thus obtained were about three yards long; but, according to Dr. Lodge, were light in every particular except wave-length. To reach the wave-length of light, however, they would require to be shortened from three yards to the hundred-thousandth of an inch. The electrical waves of Dr. Lodge travel through space at the same speed as light, and are refracted and absorbed by material substances according to the same laws. Hence Dr. Lodge concludes that if we can only generate electric waves sufficiently small, we may entirely revolutionise our present modes of obtaining artificial light. In connection with this subject we may refer to the important discovery which has been made by Dr. Hertz, of Vienna, to the effect that blue light is capable of starting the electric spark when it otherwise would not pass between the sparking points. That is to say, for example, that if the sparking points of an induction coil be drawn just too far apart for the spark to leap across the intervening air, a ray of violet light falling on the gap will start the spark. Dr. Oliver Lodge infers from this discovery that the mere blaze of one lightning-flash may precipitate other flashes.



A New Hurdle.

A new hurdle, or iron fence, designed to prevent climbing over, is illustrated herewith. The top spikes are curved in opposite ways so as to form hooks which catch on the dress of any would-be trespasser. The fence is made of square or rounded bars, and sometimes the hooks are formed by dividing a bar at the top and turning the points to both sides. Ordinary iron fencing with spiked tops is by no means a sure preventative of climbing, and the new hurdle appears to be a decided yet simple improvement in this respect.

Two Noble Lives.

The life-story of Robert Moffat, the veteran African missionary, and his wife, is full of interest and incident. It has been told by their son under the title "The Lives of Robert and Mary Moffat," and we are glad to see that Mr. Fisher Unwin has brought out a new edition of this work at a price which brings it within the reach of all readers. Just now, when African affairs are so much under public notice, this book cannot fail to be both interesting and useful to English readers.

"Commodore Junk"

Is the title which Mr. G. Manville Fenn gives to his latest story published by Messrs. Cassell. The story tells how Abel Dell and his friend Bart Wrigley were transported for taking the law into their own hands on a false lover of Abel's sister, Mary, and how Mary follows them to the West Indies in disguise, and ultimately succeeds in helping them to escape from the prison. Then follow numberless adventures and hairbreadth escapes, and a life of unqualified piracy for the three friends. "Commodore Junk" is the title assumed by Abel, and after his death is held by his supposed brother "Jack," who is really Mary in disguise. The story is full of life, brightly pictured and vivid in keenness, though we must confess some of the incidents and shifts are not at all to our taste. But "Dinny" is a very amusing character, and "Bart" a singularly strong one.

First Lessons in Anatomy.

For those in search of an easy introduction to the study of the human frame, Mr. William Furneaux, special teacher of Science to the London School Board, has prepared a work entitled "Animal Physiology," published by Messrs. Longmans & Co. The book, which is one of a series of elementary science manuals, is fully and very carefully illustrated, and seems to us admirably adapted to meet the wants of those for whom its author intended it.

Two Books for Women.

The author of "How to be Happy though Married," whose name is familiar to our readers, aptly calls his latest volume—"The Five Talents of Woman"—"a book for girls and women." Mr. Hardy's witty preface tells us that his pages "do not contain anything unsaid before, for woman, being one of our oldest institutions, has benefited or suffered in all ages from description and definition." The five talents, according to our author, are (1) To please people; (2) To feed them in dainty ways; (3) To clothe them; (4) To keep them orderly; (5) To teach them; and in the course of the work he explains, with a boundless wealth of anecdote, how these talents may best be acquired and developed. Mr. Fisher Unwin is the publisher of this book, which should certainly be read by all about to marry. But all women cannot marry, and many must fight the battle of life for themselves, so we are glad to welcome another and revised edition—this time at sixpence—which has just been issued by Messrs. Cassell, of Mercy Grogan's "How Women may Earn a Living."