

THE GATHERER.

A Boot and Shoe Ventilator.

Much of the discomfort of wearing boots and shoes in hot weather is doubtless due to the want of ventilation. The accompanying engravings represent a device which is intended to supply this want. It consists of a spiral coiled brass wire laid in a groove extending in and around the under side of the insole of the boot or shoe, with holes punched at close intervals immediately over the coil. The coil runs along to the heel, from whence it extends to the top of the boot or shoe, where it finishes in an eye-let-hole, and forms, when the wearer is walking, an automatic air-pump whereby pure air is continually drawn in and the foul and heated air thrown off. It is claimed for this device that it is not only beneficial in a sanitary point of view, but that besides adding to the comfort of the wearer it actually insures economy, inasmuch as boots or shoes supplied with it will last much longer than others in which the leather and uppers are apt to deteriorate from contact with the foot.



Picture-Printing.

Many attempts have been made to print a picture or design in varied colours by a single impression, but these have all proved more or less defective, owing to the blending of the pigments with each other. A new process invented recently is, however, free from this objection, and is so successful that a manufactory for carrying it out is being now erected at Passy, near Paris. The secret of success consists in employing solid colours in the form of a hard mosaic, from which the impression is made. This polychrome block is formed by making a solid matrix of the ground colour, and then cutting out the pattern by a sharp steel knife, mounted on the end of a jointed parallelogram to keep it vertical while leaving it free to move horizontally. Another way to form this intaglio mould is to indent it by a wood or steel die, on which the picture is cut in relief. The various paints are poured into the mould in a hot and liquid state, one after another, taking care always to allow the

preceding ones to cool. When the whole design is finished, and the mosaic complete, it is shaved with a keen steel knife so as to give it a flat, smooth, level surface. It is then put into a powerful press, resembling that used by lithographers; the material to be printed is laid face downwards on its slightly moistened surface, and a series of rollers are passed over it once or twice, so as to impart the picture to it. The print is then exposed for a few seconds to the heat of a hot plate in order to drive off volatile solvents and fix the colours, which are thereby rendered so permanent that they will stand exposure to the sun. Cloths painted in this way only lose the picture when their tissues wear away; and a piece of velvet boiled for eight hours in a strong potash solution still retained some of the colour. Water-colour drawings and oil paintings can be reproduced on paper by this plan so as to present the appearance of chromo-lithographs and oleographs; but there is a far wider field for the method in printing the beautiful designs of Gobelins and Arbusson tapestry on textile fabrics, so as to form pictorial screens and curtains.

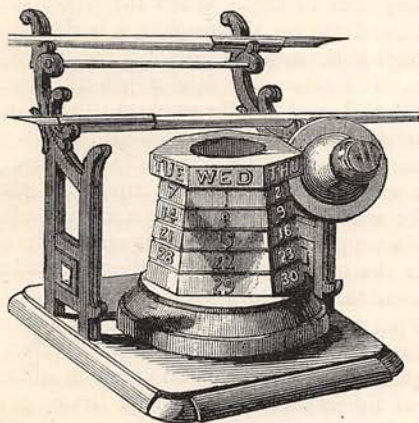
Solar Service.

M. Mouchot, the pioneer of solar industries, who amused and interested visitors to the Paris Exhibition of 1878 by cooking steaks and boiling coffee in the invisible radiance of the sun, has been extending the application of solar heat to chemistry and mechanical labour. At his laboratory in the Villa Bauer, near Algiers, he recently succeeded in calcining alum, preparing benzoic acid, purifying linseed oil, concentrating syrup, subliming sulphur, distilling sulphuric acid, and carbonising wood. The mirror which he employed for these purposes, to catch and concentrate the solar rays, was 0.8 mètre in diameter, and the temperature he obtained from 400° to 500° C. He has also constructed little solar alembics capable of distilling various essences; but his chief triumph is the performance of mechanical toil by means of a larger receiver, 3.8 mètres in diameter. In connection with it he employs a boiler, which permits the interior liquid to rest in contact with the whole of the heated surface. This larger apparatus raised 35 litres of cold water to the boiling point in eighty minutes, and in one hour and a half more created a steam-pressure of 8 atmospheres within the boiler.

The most important feat of M. Mouchot is, however, the mechanical result obtained. On the 18th of March last, he succeeded in working a pump by means of the steam-power generated in the sun-heated boiler. The pump raised at the rate of 1,200 litres of water 1 mètre per hour, and kept operating steadily from eight o'clock in the morning to four o'clock in the evening, without being sensibly disturbed by either winds or clouds.

A Perpetual Calendar Inkstand.

An ingenious and useful form of inkstand is figured in the accompanying woodcut. The body of the stand, which is heptagonal or seven-sided in form, corresponding of course to the division of the week, has



engraved upon it in vertical parallel bands running horizontally round the stand, one column or band of figures to each side of the heptagon, the figures which compose a month, that is, from 1 up to and including 31. The pot is movable and is placed inside the stand. Round its rim it has abbreviations of the days of the week, one in each section, answering to the sections of the stand. Consequently, for example, in the event of the first day of the month falling on a Wednesday, the section of the rim of the pot containing WED. has but to be adjusted to fit the column headed 1, of the stand, to transform the concern into a calendar, that requires adjustment only at the beginning of every month to render it perpetual.

Reporting by Telephone.

There is a growing tendency among the leading members of the Houses of Parliament to deliver their speeches at very late hours, and hence it has become more and more difficult for newspapers to print them in time for the early morning trains into the country. One Editor has, however, met the difficulty by employing Edison's loud-speaking telephone for reporting the speeches direct from the House to the ear of the printer, who by means of a type-setting machine composes it immediately. The most skilful compositor can only set up about 40 lines of newspaper column per hour by hand, but with a machine he can set up 100 lines even when composing from a manuscript he has himself to read, and when composing from dictation this number can be nearly doubled. The latest foreign intelligence is thus dictated to the operator from the telegraphic slip on which it is printed by the Hughes Type-printing Telegraph Receiver. The Parliamentary reports were, however, unavoidably delayed in setting up until the reporter transcribed his shorthand notes. By the use of an Edison telephone in a room near the gallery of the

House, and another fixed near the head of the printer, the reporter at the House, or his assistant, can read his notes from the shorthand directly into his telephone, and the printer can go on setting them up as they are spoken to him by the vibrating diaphragm of the telephone. Thus some forty minutes are saved every night, and the actual business of the House reported during that extra time is fully published in the first editions. To shut out extraneous sounds, hearing-tubes come from the disc of the telephone to the ears of the printer, where they are fastened. The compositor is also furnished with a speaking telephone and a call-bell connected to the reporter's room, so that he can notify the latter if he understands the telephonic dictation, and get it repeated if otherwise. This is the first application of the telephone to reporting purposes, but it is clearly just an intermediate step to a simpler method of the future, when by means of very sensitive micro-telephone transmitters every speaker will report himself.

International Postage Stamps.

No doubt the day will yet come when there will be international postage stamps as well as international coins and measures, and a distinct step in this direction is proposed just now by France and Belgium. These two countries, which have so much in common, are negotiating together for a joint system of postage stamps which would enable the payment of small sums to be made in this way, or business letters requiring answers to be provided with the necessary stamps for reply.

Another Domestic Motor.

In the *Gatherer* we recently gave an account of two little French motors designed for household purposes, and we are now enabled to illustrate a favourite American apparatus of the same kind, known as Tyson's motor. It is simply a pigmy steam-engine,

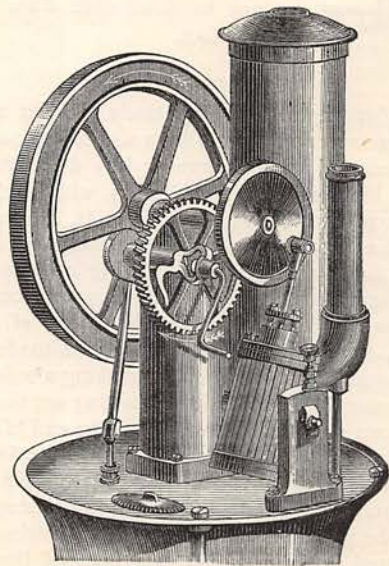


FIG. 1.



FIG. 2.

with an oscillating cylinder. The boiler is heated by gas, petroleum, or gasoline in the small models, and coke in the larger patterns. The boiler is fed automatically by the action of the machine, and as the quantity of water and steam contained in it is very small, there is little fear of accidents. Fig. 1 represents the various parts of the motor ingeniously grouped above the reservoir of water used in condensing the steam. Fig. 2 shows it engaged in driving a sewing machine. It may also be used for a variety of household work, such as grinding coffee, turning circular saws, or actuating punkahs in hot climates. The model engraved exerts a power of 1,000 foot-pounds per minute.

Meat-Bread.

This prepared food is the practical outcome of the observed fact that the leavening or fermentation of flour-bread causes the digestion of meat. A beef-steak cut into small pieces and mixed with flour and yeast is found by M. Scheurer-Kestner to disappear entirely during the process of fermentation, owing to the incorporation of its substance with the bread. When he began his experiments in this direction he used raw meat, three parts of which, finely minced, he mixed with five parts of flour and five parts of yeast. Sufficient water was then added to make the dough, which in due time began to ferment. After two or three hours the meat had disappeared, and the bread was then baked in the ordinary manner. But when thus prepared the bread has a disagreeable sour taste, and it is therefore better to cook the meat for an hour in the quantity of water necessary to afterwards moisten the flour. The meat should be carefully deprived of fat, and only possess sufficient salt to bring out the flavour, as salt by absorbing damp would tend to spoil the bread. Salt lard may, however, with advantage take the place of part of the beef; and,

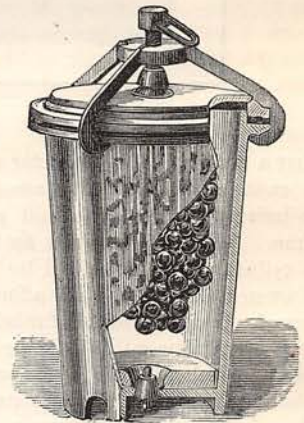
in order to insure complete digestion, the quantity of beef should not be more than one-half of the amount of flour used. Bread made with a proportion of veal is said to form an excellent soup for invalids, and as it keeps for a long time it will very likely prove serviceable in sea or land travel.

Electric Lights on Buoys.

During the last few years no name has been more prominently before public notice in connection with electric light investigations than that of Mr. Edison. Whether he is to be held responsible for all the theories with which he has been credited throughout this period may be open to question, but the latest "notion" referred to his authority is at any rate of a highly novel character. The whistling buoys now in use each weigh fifteen tons, and it is calculated that in their plunging movements even in calm weather a force of nearly 3 horse-power is evolved. Mr. Edison proposes to utilise this waste energy by employing a small dynamo machine which he has specially devised to be carried by the buoy, the current from which will sustain an electric light equal to one gas-jet. Of course, if successful, these buoys with their electric lights cannot but be of great service to sailors, but we shall be curious to see how the thing is done.

A Fruit Preserver.

The appended illustration represents a simple invention which has for its object the preservation of fruits in their natural state. This is achieved by means of a partial vacuum in a vessel designed for this particular purpose, and which is furnished with an absorbent for taking up such moisture as may be given off by the fruit. The preserver is made of glass or earthenware, and its cover (which is fastened to the vessel by an adjustable screw clamp) is provided with a packing-ring and appliance for securing the stems of the fruit. The absorbent at the bottom of the vessel consists of a ring of burnt or dried clay, and the air in the vessel is rarefied either by the use of an air-pump in the opening in the bottom or by the application of heat.



Solid Bromine.

The usefulness of bromine as a disinfectant is now well recognised, but being ordinarily a liquid it is not very portable or handy. Chlorine, a kindred substance, is readily available for disinfecting purposes in the form of chloride of lime; but no such

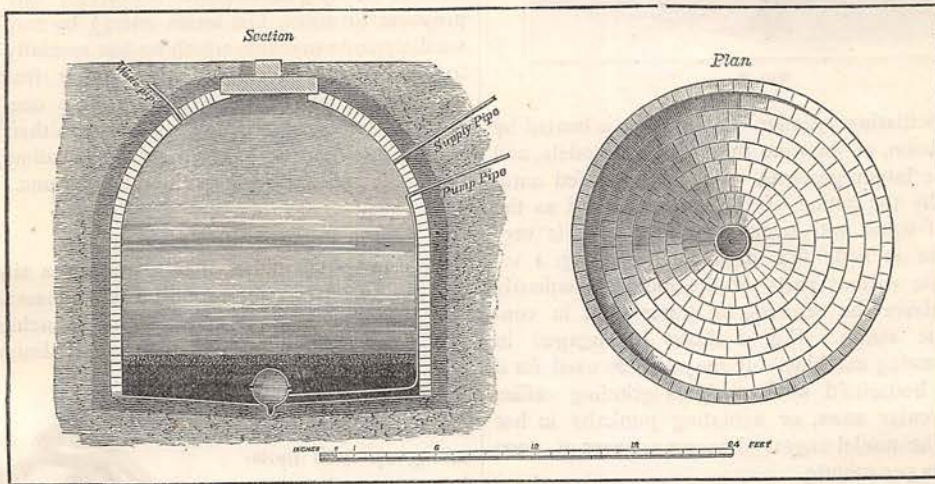
convenient chemical compound is known in the case of bromine. A German manufacturer, however, has hit upon the plan of mingling liquid bromine with the so-called "kiesel-guhr," or silicious marl, which, when mixed with nitro-glycerine, produces dynamite. The result is the disinfecting material which he has inaptly termed solid bromine.

A Water-filtering Tank.

The figures illustrate the plan and section of a filtering tank designed for storing water collected from the roofs of villas and other buildings for domestic purposes. Mr. Thomson, knowing the rainfall of the Glasgow district to be about 36 inches per annum, and finding the roofing of his villa to be about 50 feet square, readily ascertained that the roof in question could collect about 46,000 gallons of rain-water in a year, or on an average 125 gallons per diem. Experience has also taught him

An Iron Farm-steading.

Those who are concerned in the movements for improving the condition of farm labourers would do well to bestow some attention upon an interesting experiment that has recently been brought to a successful issue in the island of Raasay, in the Western Highlands. The proprietor of the island is an enterprising gentleman who has endeavoured in several ways to place his tenantry upon a comfortable footing, and one of the latest additions to the buildings he has erected upon his estate is an entire farm-steading, wholly constructed of galvanised corrugated iron, suitable for a holding of about 300 acres. The buildings cover an area of nearly 45,000 square feet, and have been arranged so as to economise labour by having the various food-preparing houses contiguous to the cattle-sheds. Nor has this novel but highly desirable form of improvement stopped



A WATER FILTERING TANK.

that a tank 12 feet in diameter and the same in depth is capable of storing this amount of water, when it is being used for household purposes at the same time. A desirable position for the tank being chosen, a cylindrical cavity should be dug to the depth and diameter of 15 feet—thus affording 9 inches of thickness for puddle, 9 inches for brick-walling, and 12 feet for water. The wall should be formed of well-burned bricks, 9 inches long, 6 inches broad, and 3 inches thick, built on the arch principle for strength. The expense of the whole, including pump, need not amount to more than £20. The tank is fitted with supply-pump and waste-pipes, and a man-hole for cleansing purposes. The filter is prepared by spreading a 12-inch layer of fresh wood charcoal, broken into lumps about 1 inch across, over the bottom of the tank; over this is laid a stratum of very fine animal (or wood) charcoal dust intimately mixed with pure sand; and over this again a 12-inch layer of pure sand only. The water, when filtered, is very limpid and free from impurities, and is, moreover, as cold as well-water in the sultriest weather.

here. The builder has also erected at a convenient distance from the steading a range of iron cottages, each comprising one room and kitchen, for the occupation of the servants employed on the farm. These iron cottages are found to be very comfortable habitations, and much superior to the thatched houses so common in many parts of the North. When one recalls the wretched hovels that some agricultural labourers call their homes, one cannot help thinking that the plan of building iron cottages might be advantageously introduced a good deal farther South than the isle of Raasay.

Electricity on Board Ship.

The splendid new steamer, *Columbia*, built for the service of the Oregon Railway and Navigation Company on the west coast of America, is the first vessel which has been completely equipped with modern electrical conveniences. She is lit by the Edison electric light throughout both the saloons and state-rooms. The machines generating the current for the carbon loop lamps are placed in the engine-

room, and are under the command of the engineer ; but the lights themselves are under the control of the steward by means of a "switch-board." The state-rooms on the upper and lower decks are on separate circuits, so also are the saloons, and the lights in the saloons can thus be extinguished so as to intimate the hour for retiring, without likewise putting out those in the berths. The lamp fixture is of the same form as those used for oil lamps, and by an ingenious mechanical contrivance they are adapted to either oil or electricity, so that should the electric burner fail in any way, the oil one may be at once substituted. The electric lamp globes are thinly frosted by

lightly dipping them in hydrofluoric acid, a plan which only cuts off $\frac{1}{25}$ of the total light, instead of $\frac{1}{10}$ as when opal or thickly frosted globes are used. Besides the Edison light, all the rooms are fitted up with electric call-bells, and the smoking-rooms are connected by telephone with the steward's cabin. The captain's cabin is also connected by telephone with those of the steward, engineer, and purser ; and there is an electric tell-tale on the bridge, which enables the captain, by simply pressing a button, to tell whether the engine is going ahead or back, and at what speed, without the necessity of misleading signals from the engine-room. The head-light is supplied by a Maxim electric lamp of novel form, having its light-centre in the focus of a parabolic reflector, which may be turned in any direction so as to project a divergent cone of powerful light for several miles over the sea.

The Hudson River Tunnel.

A great engineering feat is now being very quietly performed, and the undertaking is expected to prove of immense benefit to the commercial interests of New York. As will be seen from the accompanying rough sketch of New York city and its surroundings, the Hudson River and its continuation, North River, divide New York from New Jersey, and Jersey city. It was lately proposed to drive a tunnel under water, by which the termini of the railroads on either side might be placed in direct communication. This enterprise is now being carried towards completion. The length of

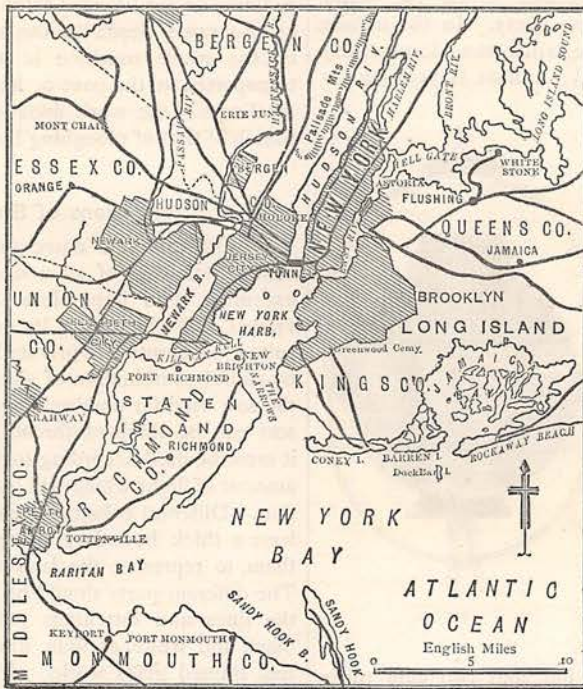
the tunnel from Fifteenth Street, Jersey city, to Leroy Street, New York, is 5,500 feet. The depth of the river varies, and as the crown of the arch of the tunnel must be kept 20 feet below the water, the gradients of the line must be severe. From the New Jersey shore the gradient is 2 in 100, it then becomes almost level, but on nearing New York reaches 3 in 100. The first suggestion was to build a double-line tunnel, but this idea has been abandoned in favour of two tunnels, a line running through each. These tunnels will be 18 feet high and 16 feet wide, and nearly round in form. As is now usual, the excavations are made by means of compressed air, which counteracts

the water pressure, and also conveys the material out of the tunnel. One feature of this excavation is an air-lock of iron which can be closed hermetically, and forms a sort of ante-chamber between the tunnel and the outer air, through which communication between the works and the upper shaft is effected. From a receiver the air enters the air-lock, and is then passed into the tunnel, when the outer gates are closed. Work is continued night and day, and considerable progress has already been made. The object of the tunnel is to obviate the great expense and delay which now accom-

pany the transfer of goods from New Jersey to the opposite shore.

The Zoogyroscope.

Readers may remember that a good deal of interest was excited here and elsewhere not very long ago, by the publication of photographs and engravings illustrating the various motions of a trotting horse. Since these instantaneous photographs were taken, an instrument called the zoogyroscope has been invented for the purpose of imparting something of a life-like character to the pictorial representations in question. Mr. Muybridge, the inventor, describes it as a circular glass having a series of photographs of the animal to be represented in motion. As the glass is turned, the photographs, which are successively illuminated by an oxy-hydrogen lantern, throw upon the screen a single continuous yet ever-changing picture, which is considered to be so admirable an imitation of the "real



MAP SHOWING THE PROPOSED HUDSON RIVER TUNNEL.

live" horse, that nothing but the clatter of hoofs and the breath of the nostrils is wanted to render the delusion complete. The zoogyroscope can, it is scarcely necessary to add, be applied to photographs of other animals besides the horse.

A Handy Shower-Bath.

The engravings represent a very ingenious form of shower-bath which has been recently patented in America. The water is contained in a round vessel, which is furnished at one end with a flat rim, to allow of the cistern being set down on the floor, while at the other end the vessel is furnished with a perforated cap, through which the water descends in a shower of fine spray. In the middle of the cap is the supply-tube, which runs down nearly to the bottom of the vessel; a float is provided to

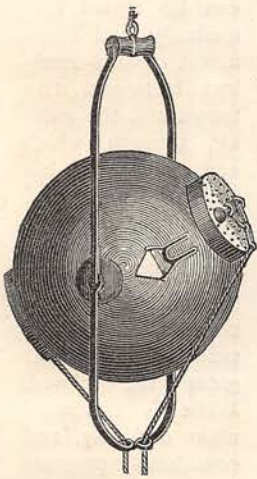


FIG. 1.

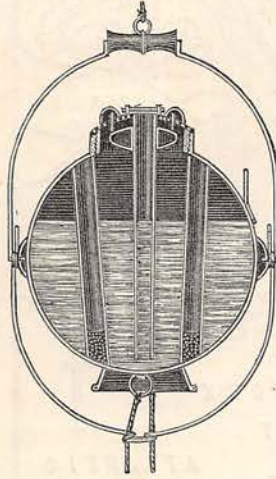


FIG. 2.

show when the cistern is full, and two side tubes carry a quantity of shot, which is employed by way of ballast to steady the vessel when in use. The cistern is pivoted in a light jointed frame, in which it moves freely when suspended from above. When the bather is ready for his shower, all that he has to do is to tip the cistern into position by pulling the attached cords until it swings round. Fig. 1 gives a perspective view of this clever appliance; Fig. 2 is a sectional view of the vessel inverted—that is, in the position opposite to that which it assumes when in use.

Digging by Steam.

The principal novelty at the Royal Agricultural Society's Show, held in Carlisle this year, was the steam-spade or digger. Since its exhibition in 1877 at the Smithfield Cattle Show, this machine has been greatly improved and simplified by the inventor. It consists of an engine, which travels slowly over the ground to be tilled, and a digger, which is dragged behind it. The engine runs on four broad wheels, set crosswise under the boiler, so that

it moves forward broadside on. The digger is formed of a broad frame running on a number of cutting discs which, as they roll, subdivide the lumps of soil delivered from the digging forks. There are three of these forks suspended from a crank-shaft behind the boiler, and they strike into a twenty-feet breadth of land one after the other. Each fork rises and falls a foot, and is canted backward a distance of two feet, the slice dug from the ground being deposited at the back of the open trench and turned over, as in ordinary digging, so that the upper face or stubble rests against the back of the preceding slice. A single-cylinder 8 horse-power engine, nominal, working with 70 lbs. pressure of steam, can in this way dig at the rate of ten acres per day, on land taking three horses to plough an acre at the same depth in the same time. The weight of the whole machine is twelve tons, and it is transported at the pace of half a mile per hour. The total cost of the work done is estimated at not more than half that of ploughing by horses.

Imitations of Stained Glass.

On this subject a correspondent writes:—"An excellent imitation of stained glass, which, if carefully executed, it is impossible to distinguish from real *vitrail*, and which from its comparative cheapness is suited for adoption in private houses, may be produced by skilful combination of sheets of coloured gelatine; the sort used for making coques will do. (A thicker sort can be obtained abroad.) Several thicknesses of it must be used according to the shade desired, or the amount of light which will penetrate it when in position. Different colours should be pieced together, and have a thick boundary of opaque paper to separate them, to represent the lead of real stained windows. The different parts should be shaped and joined, and the lines and hatchings painted in, working over a black and white cartoon drawing, just as is done in real stained glass works. If gelatine of the desired colour cannot be obtained, it may be prepared by colouring dissolved gelatine with dyes, and then pouring it out and allowing it to dry in films on a sheet of glass. The transparency when finished should be protected by being enclosed between glass."

PRIZE ESSAY ON "HOME MANAGEMENT." AWARD.

The Editor has much pleasure in announcing that, after due and careful consideration of the Essays— to the number of One Hundred and Ten—sent in for this competition, the PRIZE of £5 has been awarded to

WILLIAM J. LACEY, *High Street, Chesham, Bucks.*

SPECIAL COMMENDATION has been awarded to the Essay by AGNES H. WILSON, Rossarden, N.B.

The Prize Essay will probably appear in the October Part of the Magazine.