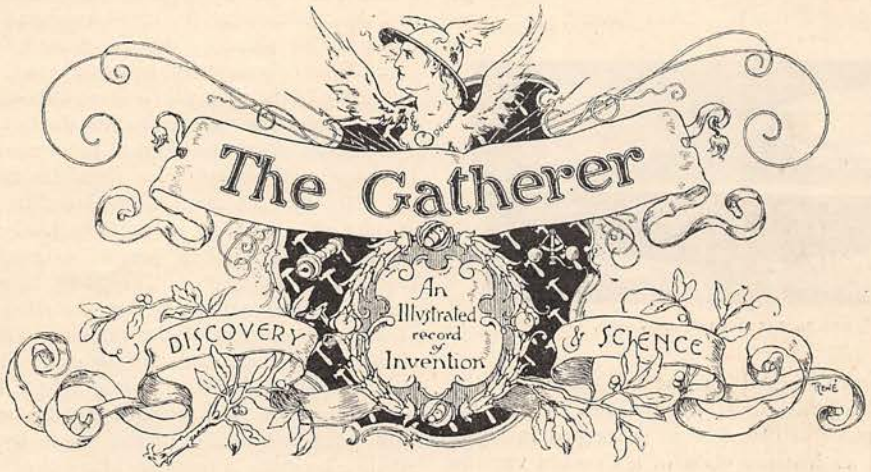


Correspondents are requested, when applying to the Editor for the names and addresses of the persons from whom further particulars respecting the articles in THE GATHERER may be obtained, to forward a stamped and addressed envelope for reply, and in the case of inventors submitting specimens for notice, 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 Globe Castor.

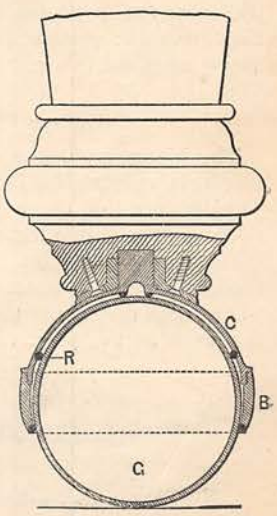
A good castor for the feet of tables, chairs, desks, and so on, is desirable for many reasons. The ordinary wheel castors are apt to break off or work loose, as the weight of the furniture does not bear directly on them, and the wheels go awry, thus making it a trouble to move a chair or table having them. The new globe castor, which we illustrate in section, is, perhaps, as nearly perfect as can be made. It consists of a hollow ball of metal, G, held in a socket by the band, B, and working on a cup, C, and a ring, R, of antifriction metal. Its large size and the ingenious socket enable it to roll in all directions without scoring the floor or making a noise. These castors are made in sizes from one inch to eight inches in diameter, to suit the furniture, and they can either be half covered by the wood of the leg or the metal case ornamented.

A New Postal Wrapper.

A new postal-wrapper has recently been patented, and is being used largely for the covering of newspapers, magazines, and music. Parallel to the lines of the address on the wrapper is a line of perforations, indicated plainly by a "tab," and all that is necessary to bring about the speedy and safe opening of the roll is to pull the tab in the direction of this line. The advantage of this new wrapper will be appreciated by all readers who are in the habit of receiving printed matter by post.

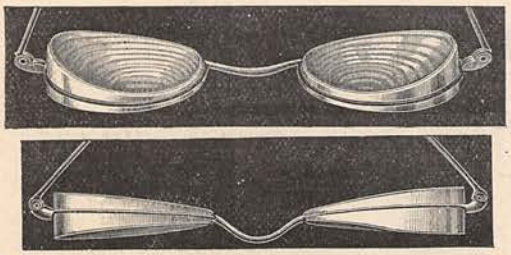
Liquid Air and Phosphorescence.

The temperature of liquid air is 180° Centigrade below the freezing-point, or thereabouts; and hence as a means of producing intense cold its use opens up a new field of scientific inquiry. Many of the properties of matter are greatly influenced by temperature. It is found, for example, that the electric conductivity—that is to say, the power a substance possesses of conducting electricity—increases enormously at such low temperatures. The tensile strength of iron is, moreover, practically doubled by that intense cold. Chemical affinity is greatly weakened, and in many cases it seems to disappear. For instance, the metal sodium no longer burns in water, because it has lost its affinity for oxygen. Certain pigments, such as vermilion, change from a bright red to orange under the intense cold, and recover their true



A GLOBE CASTOR, SHOWING SECTION.

colour on a rise of temperature. These and other effects have been investigated by Professor Dewar, who also finds that the beautiful coloured glows and



SPECTACLES FOR DOUBLE VISION.

phosphorescence excited in vacuum tubes by the electric discharge are destroyed by cold. When, for example, a piece of cotton wool is steeped in liquid air and held against the glass of a Crookes vacuum tube containing phosphorescent samarium, the light disappears. Professor Dewar thinks the reason to be that the cold freezes out matter from the vacuum, and thus stops the passage of the electricity; for it is believed that electricity cannot pass through a perfect vacuum.

Spectacles for Double Vision.

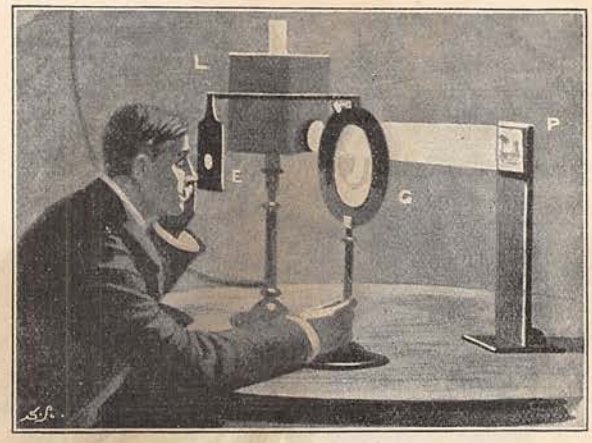
When the refraction of the eye is such as not to bring the rays to a focus on the retina, the eyes are apt to acquire a squint in order to do so; and this habit can be overcome by using spectacles such as those we illustrate, which are prismatic and remove the effect, namely, double vision, without influencing the cause.

A Pencil-Point Protector.

The figure shows a simple device for protecting the point of a pencil when not in use. A metal shield of conical shape, which can be turned backwards or forwards by means of a screw, goes over the metal holder. It is simply turned back from the point when the pencil is in use and over it when not in use.

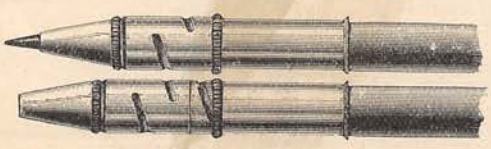
Colour Photographs.

The Lippmann colour photographs are taken by placing a reflector behind the plate and producing "interference" of the waves of light, by which the silver is reduced in a film whose thickness varies with the colour of the light. In this way irridescence is produced, which imitates the colours of Nature. It will be seen that whilst they are colour photographs, inasmuch as the plate reproduces the colours of the object without manipulation, they are so indirectly, not directly, as would be the case if no reflector were used and the colours were produced by pigments formed in the sensitive plate by the direct action of light. In fact, their colours may be compared to those of humming-birds, shot silk, and mother-of-pearl, where the texture of the material makes the tints, and not to dyed fabrics where the pigment is the source of colour. In order to obtain reflection from the mirror behind, the plate must be made transparent by reducing the amount of silver salt in the film, and the albumen ought to have one-half instead of one per cent. of bromide of potassium. The plates must also have a perfect isochromatism; in fact, the relative sensibility of different portions of the plate for different colours should be the same as that of the eye. MM. Lumière, the well-known Russian photographers, have recently taken very good photographs by the Lippmann process with gelatine-bromide plates, made by putting an alkaline bromide in presence of a salt of silver and an excess of gelatine, the emulsion containing more gelatine than bromide of silver. The isochromatism



COLOUR PHOTOGRAPHS.

was perfect, as shown by the whites which came out as clean and various as in Nature. The time of exposure with these plates has been reduced from fifteen to five minutes. These photographs, which comprise landscapes, persons, stained glass windows, birds, flowers, and chromo-lithographs, cannot be obtained on paper and require to be viewed at a certain angle, but they are true to Nature and cannot be retouched with pigments. M. Lippmann has constructed a lantern for showing them in the dark, which we illustrate in the accompanying figure. It consists of a gas lantern, L, giving a parallel beam of white light which falls on the photograph, P. The observer looks at the picture through an eyehole, E, and a lens, G, as shown, but also, if he chooses, with the naked eye. When a lorgnette is employed, the illusion of looking at a real landscape is very complete. We may add that Mr. F. E. Ives, of Philadelphia, has now improved his photo-chromoscope, already described in THE GATHERER. Three or more photographic



A PENCIL-POINT PROTECTOR.

images are produced by selected rays from the object, corresponding to the fundamental colour-sensations of the eye. These images are then seen by lights similar to those by which they were taken, and superposed so as to blend in one, thus reproducing the colours of the object. The apparatus by which this is done is the photo-chromoscope, a small box fitted with lenses, colour screens, and mirrors for combining the views, and a drawer for holding the plates or chromograms. The pictures, in great variety, can be seen by night as well as day, or projected on a screen by using an electric lamp or other bright source, for example, the "Welsbach" incandescent gas light.

A NEW SPINNET.

A New Spinnet.

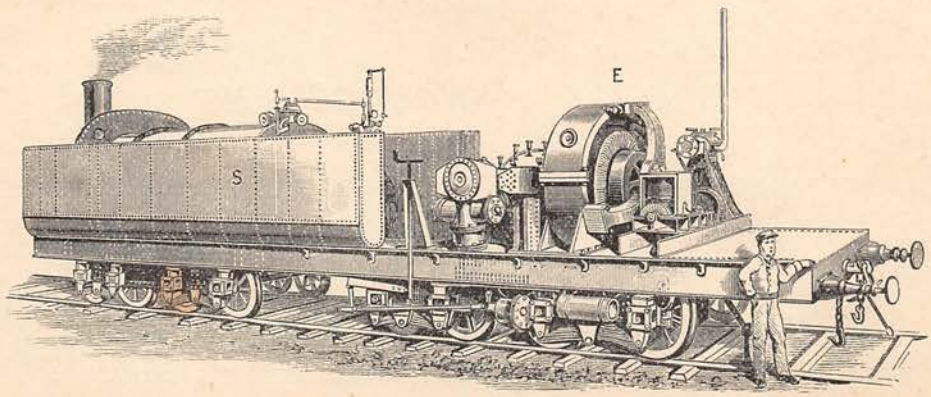
The "épinette Pieffort" is an improved form of a little spinnet played by the shepherds of the Vosges mountains. The latter is formed by a long box of cherrywood, with a head something like that of a violin, and five strings. M. Pieffort has added another string, and improved the tone of the instrument by making it of rosewood, ebony, and other woods. In playing, the spinnet is laid on a table, and the strings are sounded with a bit of reed, while their length is controlled by the forefinger of the left hand, as shown in our engraving. The instrument is easily learned even by a person ignorant of music, and it is capable of rendering popular tunes as well as pieces of a classical order.

Decimal Coinage.

Major-General G. H. Saxton, F.G.S., has published a small table on the decimal coinage for the use of schools, with explanatory notes which show very clearly how such a coinage could be introduced into this country without tampering with the present currency. He points out that a sixpenny-piece is a quarter-florin, and must therefore exchange for 25 cents. He also shows the desirability (not the necessity) of issuing a new silver coin in value $\frac{1}{10}$ florin, and that our farthings, as well as other copper coins, may continue as they are by regarding their value as 25 instead of 24, as now.

An Electric Locomotive.

The Heilmann electric locomotive for drawing ordinary trains is now being tried at Havre. The electricity, however, is only used to apply the steam power more effectually to the wheels and secure greater speed. To this end the steam engine works a dynamo carried by the locomotive, and generates an electric current which is sent through a number of electric motors geared to the axles of the driving-wheels. In this way the power of the engine is distributed and brought to bear on all the axles of the locomotive. It is expected that a speed of eighty or ninety miles an hour may be achieved in this way. Our illustrations



AN ELECTRIC LOCOMOTIVE.

show the new locomotive uncovered, where S is the steam engine and E the dynamo which is driven by it. The electric motors worked by the dynamo are under the body of the vehicle, attached to all the eight axles.

Spraying Fruit Trees.

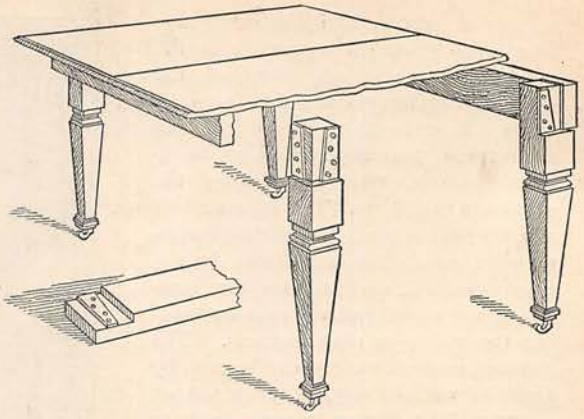
Solutions of mineral poisons are frequently used to spray fruit trees in order to kill insects, but, as experiments made at the State Agricultural College of Michigan, U.S., have shown, the practice is not free from danger, as the poison is found to adhere to the skin of the fruit, and in some instances to penetrate it. As a consequence, those who are fond of fruit may take more of the poison than is good for them. It has therefore been suggested by Dr. R. C. Kedzie that spraying should never be carried on while the fruit is ripening, and, as a rule, he says, there is no need for so much of it.

Electricity from Starlight.

Professor Minchin, a well-known Irish physicist, has just made the curious experiment of using the light of the stars to generate electricity. He is the discoverer of several forms of photo-electric batteries—that is to say, voltaic cells which are excited by a ray of light falling on the chemicals of which they are composed. The energy of the light is thus, as it were, transformed into electricity. One of these cells is composed of a plate of aluminium and a plate of selenium immersed in œnanthol. A cell of this description was recently placed under the eye-piece of a telescope in the astronomical laboratory of Westmeath, and the plates of it connected to a quadrant electrometer of the kind devised by Lord Kelvin, and modified by Clifton. When the light of the planet Venus was focussed on the cell, an electromotive force of 0·17 volt was observed on the electrometer. The experiment is interesting as a curiosity of science, but, of course, it has no practical value.

A Portable Table.

Our wood-cut shows a convenient table which, with other advantages, can easily be taken to pieces and



A PORTABLE TABLE.

carried upstairs or through narrow doorways, as well as packed away in small space. The frames are made in separate parts, and the tops are ledged to keep them from moving them from the frame. The dovetail joints consist of iron plates, and are easily fitted or unfitted with the help of a mallet. Platforms are also constructed by the same makers on similar principles.

HOLIDAY PROGRAMME COMPETITION.

The First Prize of TWO GUINEAS has been awarded to

W. ROUTH,
Shetland Grange, Bedall.

The Second Prize of ONE GUINEA to

The Rev. J. G. JONES, D.D.,
The Corse, Langharne, S. Wales.

An Extra Prize of HALF-A-GUINEA to

HARRIET E. O. MILLS,
8, Florence Terrace, Falmouth.

HONOURABLE MENTION is accorded to

A. M. ASHFORD, Swindon ;
E. R. STUBER, Harpenden ;
C. MITCHELL, Brighton.