HOBBIES weekly

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RUSTIC 3 WAY GARDEN FITMENT

Hobbies

FOR CRAFTSMEN OF ALL AGES

6D

TOPICS FOR COLLECTORS

Prints and Pictures

FROM an early age we can become interested in collecting the old things which used to adorn the houses of our forefathers, and no wonder, because such objects can be a fascinating link with history and a bit of research about them can make life that bit more interesting. What we collect depends partly upon the skill we acquire before going about it, partly on the money we can spare, and a lot on luck.

There is such a wide variety however, that one can pay either colossal sums for a rarity that the world is after, so to speak, or a few coppers for something quaint that a dealer is glad to see the back of, but which suits you well.

Pictures are a big subject in themselves and I do not intend to say anything about the original works of art of famous painters, except that to appreciate what fine craftsmen they were helps us to compare other work with them, for they had many imitators. On the one hand therefore, spend a bit of time at your nearest art gallery just looking, and borrow books from your library, about the subjects which seem to appeal to you. Then read a bit about those clever craftsmen, the engravers, lithographers, and so on, who made it possible for ordinary folk to get lovely 'prints' of the best pictures at a fraction of the cost because they strove to copy the line and colour for faithful reproduction on the printing press. How old Caxton, early English 'importer' of the printing press, would have gaped at the great strides forward made by the clever 'copyists' during and after the mid-Victorian era in this country and elsewhere!

Antique dealers regard the prints done in early Victorian days, and before, as more valuable than later because of the considerable increase in numbers printed, so that in the interests of your pocket it is best to content yourself with the later period of Victorian picture making. And there is still a wide choice of subject and type despite the passing years taking their toll. A new collector normally likes to display his finds and so you want to centre on things that tickle your fancy and will go with the room or hall you have in mind.

Just before the last war the coloured prints issued as 'plates' with late Victorian magazines were popular. These plates were often caricatures of well known personalities of the day, dressed up in the costume of various social or sporting groups. For instance 'Spy' and 'Ape' were the signatures on such well-known groups known later to auctioneers and dealers as 'The Lawyer Series' because they were judges, counsel or solicitors; or 'The Turf Series' featuring jockeys, turf officials (even a 'turf reformer', which is one I have) or 'Literary Men', and so on. Complete series sold well.

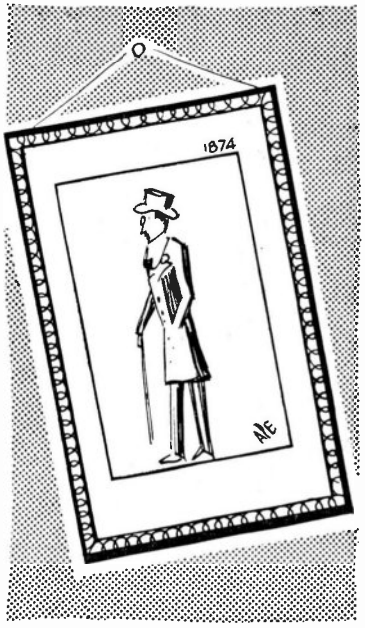
Today they are not sought after, but in the way fashions change, will have their 'day' once more. Edwardians used to frame them in dignified little carved oak frames, and they are seen like that today, measuring some 17½ in. by 11½ in. overall. Condition affects price and if it is framed, examine it for woodworm as that may mean reframing.

More important, examine the print and surround paper for 'foxing'. That is the 'trade' name for the effects of mildew. It looks like a definite or slight cigarette burn or brown stain and is due to having been stored or hung in damp conditions for a long time. It is expensive to remove and this is done only by a skilled hand with a bleaching process, after which it is only discernible to a practised eye. A 'foxed' picture should cost a good deal less than a 'clean' one.

Then there is 'fade'. If a picture has been in strong sunlight for years it is likely to be less vivid than when new. Oddly enough a good coloured old print may well owe that good point to years of dark storage — but if the store was unheated, it will show that by 'foxing'. If the staining is mainly in the surround 'white', you can mask this by a new one before hanging it in a frame, but leave the title and publication date visible if possible, as it is part of the interest. That date, printed at the top as a rule, proves the age of your 'Spy' or similar print.

Prices cannot be quoted very well, but I have known a best condition well framed print, a single one, make over £5; yet another, nearly as good, less than half that. A 'foxed' one (or one nobody else wants!) may be had for about 10s. 0d. framed, perhaps less than 5s. 0d. unframed.

Another well known series of prints of the day was 'Cries of London' showing the different street and door to door sellers. Of course modern reproductions of the old prints are made, but, colourful though they are, they do not appeal to the collector of bygone things. In contrast to the small prints, very large ones



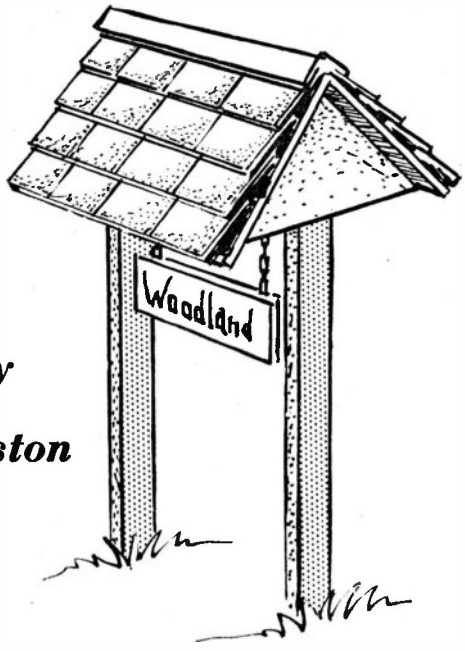
of paintings by mid-Victorian artists like T. Herring, often framed in very ornate gold coloured frames sometimes come on to the market. Herring painted sporting events of the field and turf. His horses look a bit stiff, but full of 'go' and the 'colours' of his jockeys and huntsmen are really fine. In a 'foxed' condition, but with frames and glass in order, a 'pair' might realize £10 if wanted for a big house or hall.

Finally there are the 'pot luck' chances. When an auctioneer has a house to sell up, he will pick out any picture of special value and sell the rest in lots for whatever he can get. There is a chance here to pick up several good frames with glass for a shilling or two apiece, and some of them may contain fairly old, if unpopular monochrome or coloured prints, or even an amateur's original water-colour or oil painting. You can put all these things to use, and who knows, one day rich men may be looking for that amateur's painting! But the fun is there in the collecting, and you can keep them in a drawer between tissues if you don't want to 'hang' them.

One last point about framing or making good old frames. See they are cleaned out and well covered over at the back with glued brown paper. It is surprising how stupid insects lay their eggs only for them to hatch out in a prison, because tiny creeping things seem to get in the oddest places on the front of a picture, and then die for lack of food—or is it those vivid colours?

M.W.

A RUSTIC-STYLE GARDEN FITTING



By

A. Liston

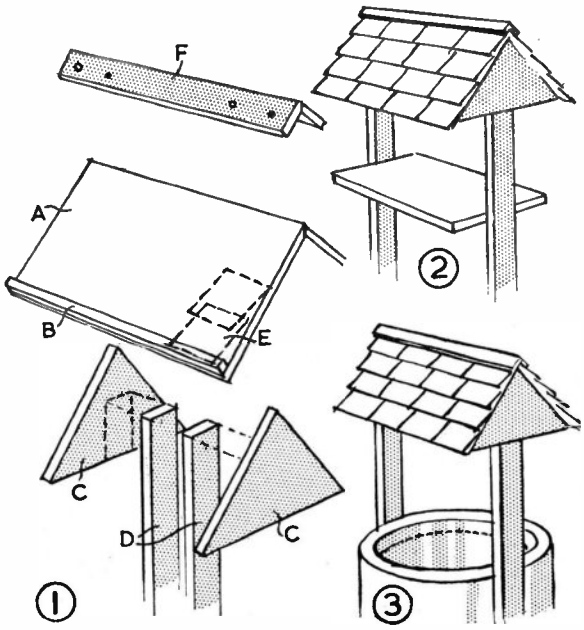
THE charming rustic-style fitting shown here, with its tiled roof and varnished woodwork, can be put to various uses in the garden. It can serve as a decorative name-board for the house, or an unusual bird-table or wishing-well rock garden.

The construction is simple, and the dimensions depend on the size of the tile being used. In the one shown, each half of the roof was tiled with 16 tiles, each 6½ in. wide and 7½ in. high. The dimensions given here for the roof are based on this size of tile, but a variety of sizes, and colours, is obtainable from builders' merchants, and the size of the roof can be altered to suit the size of tile available.

The method of construction is shown in Fig. 1. The two sides of the roof are panels of ¾ in. thick wood, 26 in. wide and 22½ in. high, A. A 26 in. long strip of ½ in. square wood B, is screwed along the lower edge of each panel, and a 20 in. square of ¾ in. thick wood is cut diagonally to make the triangular end-pieces C, to which the roof panels are fastened with angle brackets. These end-pieces should be inset by 2 in. at each end.

The uprights D, are lengths of 2 in. by 4 in. timber which are best bolted, rather than screwed, to the inside of the end-pieces. These uprights should be about 4 feet long. After having been fitted, they are removed while the tiles are put in place.

The four tiles of the lower course are fixed in place first, with their lower edges resting on the strip B, so that they lie at the same angle as the courses above them, E. The next course is put in place with each tile overlapping the one below it by 2½ in., so that 5 in. of the lower course is showing. The third course is similarly fitted, and the top course should be flush with the top of the wood panel. The end tiles of this top course are not nailed in place, but are held by screws which also pass through a wooden capping F, made from two 26 in. pieces of 3 in. by ¾ in. wood.



A 4 in. by 15 in. piece of ¾ in. thick wood is used as a name-board, and this is suspended on lengths of chain at each end. In exposed positions, the chains should be short, and fastened to the uprights at each side.

The fitting is painted before being put in place. The capping and eaves look well in white enamel, with all the rest of the woodwork varnished. One point to watch is that the woodwork is kept a different colour from that of the tiles which are being used. Here, grey tiles and white woodwork were used to good effect.

The complete fitting is heavy, and must be firmly fixed in the ground. To ensure this, two holes, each at least 1 ft. deep and 1 ft. square, are excavated to take the uprights. When these are in place and the fitting temporarily guyed in position with lengths of rope, the holes are filled with concrete.

The same design of fitting is also effective as a bird table. In this case, a shelf of ¾ in. thick wood is fixed between the uprights with angle brackets 3.

A wishing-well pool or rock garden 4, can be made by setting a section of concrete piping, also obtainable from a builders' merchant, between the uprights. The diameter of the pipe is not critical, as any space between it and the uprights can easily be filled in with wood, or the uprights can be set inside the pipe if it is wide enough. For a pool, the base of the pipe is sealed with cement, otherwise it is filled with earth and planted out with alpines.

USING LONG FOCUS LENSES

By 'Photographer'

WHEN a long focus or telephoto lens is used with a camera, it gives an enlarged image on the film. So lenses of this kind are used to obtain large pictures of small, distant objects such as birds, architectural detail, or any other subject which cannot be approached closely.

The size of the image thrown by a lens depends on its focal length. It is quite easy to measure the focal length of a lens. To do this, hold the lens so that it produces a sharp image of a distant object on a sheet of paper. The distance from lens to paper is then the same as it would be from lens to film, if a photo were being taken, as in Fig. 1, and is the focal length. This test is readily done in a fairly dark room, and the distant object can be the sun, a street lamp, or anything more than 60–100 ft. away, and brightly lit.

The focal length of a camera lens is often marked, and is about 105 mm. or 4¼ in. for 2¼ by 3¼ in. negatives. For 2¼ in. square, a 75 mm. or 3 in. to 3¼ in. focal length is usual. A camera using 35 mm. film often has a lens of about 45 mm. or 1¾ in. focal length.

Larger image

If the focal length of the lens is increased, the size of the image thrown on the film (or white paper) is larger. If you have a number of lenses, this is easily demonstrated. The increase in size of the image is proportional to the increase in focal length. For example, if the usual lens were 4½ in., a 9 in. lens would give an image twice as large, or 2×. If the usual lens were 3 in., magnification by the 9 in. lens would be 3×.

A lens which gives a magnification of 2× or 3× is often used, but lenses providing much higher magnification are also employed.

Telephoto lens

A telephoto lens is one which gives some magnification over the usual lens, and it is assembled in such a way that its actual length is shorter than its effective focal length. For example, if a 12 in. lens of ordinary type were used, it would have to be in a long tube, so that it is 12 in. from the film. But a 12 in. focal length telephoto lens might only be 6 in. or so long. The equipment is thus more compact.

The telephoto lens is specially designed to suit the negative area, and can give very good results. But the degree of enlargement furnished by a 6 in. ordinary lens, as example, is the same as that of a 6 in. telephoto lens.

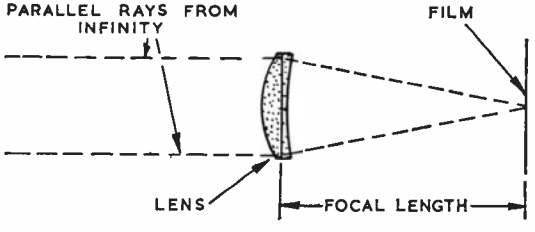


Fig. 1—The focal length of a lens

Magnification of image by binoculars. Top, taken with 7·5 cm camera lens, and below, with 6×30 binoculars from the same position.

Cameras

Simple folding and other cameras with a fixed lens do not lend themselves very easily to modification for a long focus or telephoto lens. The very old type of plate camera, with a long bellows and removable lens, can easily be used with long focus lenses. With the more expensive miniature cameras, lenses are usually removable, and telephoto lenses can be purchased to fit.

For home-made long focus lenses, a single-lens reflex camera is quite convenient. The essential parts of this type of camera are shown in Fig. 2. The image thrown by the lens is reflected up to a ground glass screen, which allows focusing and composition. When the shot is taken, the mirror swings up to the top of the camera, and the focal plane shutter immediately in front of the film opens. So the photo obtained is the same as the view originally seen on the screen.

Many second-hand cameras of this type are available, usually for 120 roll film, and with removable lenses. The effect which will be obtained with any new lens can be seen at once, on the screen.

If an old-type bellows camera is to be used, this generally has a focusing screen which can be slid in at the back. This also allows the results which will be obtained with a new lens to be seen at once.

If an ordinary roll film camera is to be used, open the back and insert a piece of ground glass in the position normally occupied by the film. The ground side should be towards the lens, and the glass can be held by an elastic band round two old spools. The camera should be on a table or tripod, and a dark cloth can be placed over the head. The results which will be obtained with a new lens can then be seen.

A visual test of this kind will save time, and wasted film. Correct focus will be shown by a sharp image. If the lenses, or the arrangement being tried, is unsatisfactory, the image may be sharp in the centre, but very blurred towards the edges and corners. If necessary, a small magnifier can be used to examine the image. All lenses show some falling off of definition towards the edges and corners of the negative area.

Should the image be sharp one side, but blurred the other, this indicates that one or more lenses is sloping slightly. This will have to be corrected, or the photographs will have the same defect.

It will be seen that stopping down the lens (described later) increases the definition, especially towards the edges and corners.

Fitting new lens

Extension tubes to place between lens and body, for close-up shots, are available for some cameras. A long focus lens can be fixed in a cardboard or metal tube which slides on such an extension tube, as in Fig. 3. This does well for a single lens reflex, which otherwise has no means of focusing.

The tube can be made from tinplate, soldered along the seam, or simply shaped to be a sliding fit, with overlapping edges. A disc of wood has a hole to take the long focus lens assembly.

The inside of the tubes *must* be matt black, or reflections will degrade the image. The baffle also helps to prevent stray light reaching the film. It is a card disc, glued in place, and painted dull black. The hole cut in its centre is of such a

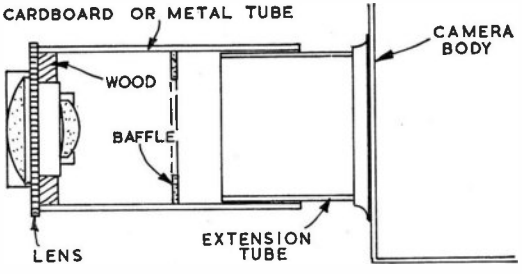


Fig. 3—Long focus lens in tube

size that the baffle is just not visible, when looking through the camera from the back, along a line from a corner of the negative opening, to the lens.

A lens fitted up in this way can be found to give very good results. If the tube is very long the corners of the negative will not be exposed. This is often not very important.

Type of lens

A lens intended for optical or photographic purposes is needed. Simple magnifying lenses will not give good definition. Numerous camera lenses are obtainable, second-

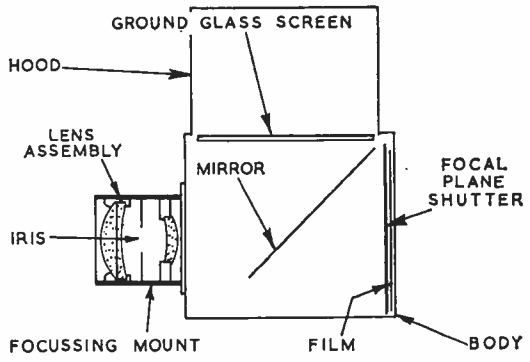


Fig. 2—A reflex camera

hand and surplus. These will usually be a complete assembly, with iris.

A magnification of about 2× to 4× is generally used. Surplus lenses of 36 in. focal length, and more, are obtainable. These need rigid, long tubes, and a tripod.

If a doublet or other lens can be borrowed from some other item, such as a telescope or binoculars, this can give reasonably good results. Its working aperture will probably have to be reduced, by stopping down. That is, place a disc of blackened card behind the lens, with a central hole. The smaller this hole, the better does definition become.

Telephoto Lens Assembly

A telephoto lens has a positive lens assembly in a tube, as in Fig. 4. At the camera end of the tube, a negative lens is placed. It is quite possible to use the ordinary camera lens as

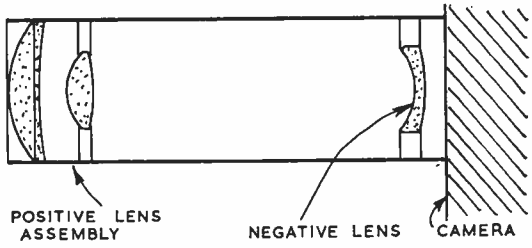


Fig. 4—A telephoto lens

the positive assembly, obtaining an enlarged image by adding the tube and negative lens.

A positive lens is one which will throw an image. It is thicker in the middle than at the edges, and its focal length can be found as in Fig. 1.

A negative lens is thicker at the edges than in the middle. It does not cast an image. Its focal length can be found by measuring its diameter, and placing a sheet of white paper behind it, so that a circle of light is cast from a distant source, such as the sun. Adjust the distance between lens and paper until this circle is twice the lens diameter. The distance from lens to paper is then the focal length. A simple method is to use compasses, set to the lens diameter, to draw a circle. This circle will then be twice the lens diameter. When this is filled, measure the distance from the lens to the paper.

A negative lens for Fig. 4 will have quite short focal length. This depends on the magnification, and positive lens, but may be some 4 in. to 6 in. or so.

The magnification obtained can be adjusted by changing the distance between positive and negative lenses, at the same time moving the whole to keep a sharp image on the ground glass. (This is how a 'Zoom' lens operates.)

One or two baffles should be added, as explained for Fig. 3, and the inside of the tube, and all mountings, etc., must be dull black.

Fixed lens cameras

In a camera with a fixed lens, parallel light rays are brought to a focus, as in Fig. 1. So if an extension tube is added, and a new positive lens, this does not give an enlarged image of a distant object.

To overcome this, the long focus positive has to be followed by a negative lens assembly, which again brings the light rays parallel, or nearly so. One or two 'add-on' telephoto lens devices of this kind have been produced for cameras. Unfortunately, there are so many lenses that light is lost, and the image is degraded. So this arrangement is not very much used.

If a telescope, or binoculars, are focussed on a distant object, rays emerging from the eyepiece can be parallel. So if a camera, with lens, is placed behind the eyepiece, a large image may be cast on the film.

The success obtained with this method depends on a careful check of focus, with the ground glass, and on the binoculars or telescope. If the binoculars are focused by looking through them in the usual way, this may well be unsatisfactory, because the eye may be in focus for a short distance. So a check on the ground glass is practically essential.

Very large images indeed may be obtained, but generally only the centre of the negative will be covered. There is no practical way of overcoming this, with a given telescope or binoculars. In general, those binoculars which have large lenses, and give only a moderate degree of magnification, will be most suitable.

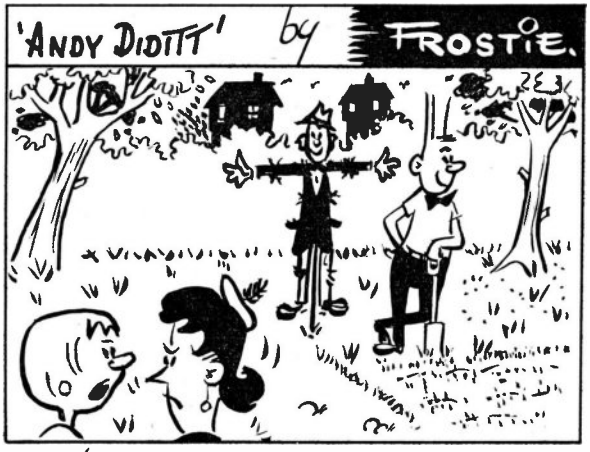
For successful photograph, camera and binoculars must be on a firm support, and no light should be allowed to reach the camera lens, except that through the binoculars. A dark cloth round the camera lens will keep light out here.

Exposure

Some idea of the working aperture of the new lens arrangement will be wanted. If a camera lens of longer than usual focal length is used, and has an iris with *f* numbers, then these are followed in the usual manner.

If an assembly is made up, with a smaller aperture stop, measure the diameter of this hole. Divide the focal length of the lens by the hole diameter. The result is the *f* number. For example, a ½ in. hole with an 8 in. lens gives *f*/16.

With binoculars, there are so many factors that an idea of the working aperture is best found by examination. View the image on the screen, noting what detail can just be observed. Then remove the binoculars and stop down the camera lens until the scene has a similar appearance, in terms of brightness. The aperture is then read from the iris setting. It will probably be very small — *f*/22, or even less.



"THAT'S MY HUSBAND — THE ONE WITH THE SPADE."

When the aperture is found, the shutter is set for a suitable exposure, in the normal way. If binoculars are used, or any home-constructed lens system, it is wise to keep a record of exposures. If any serious over or under exposure becomes apparent, it can be corrected, so that further photos are more satisfactory.

THE MIGHTY PEAS

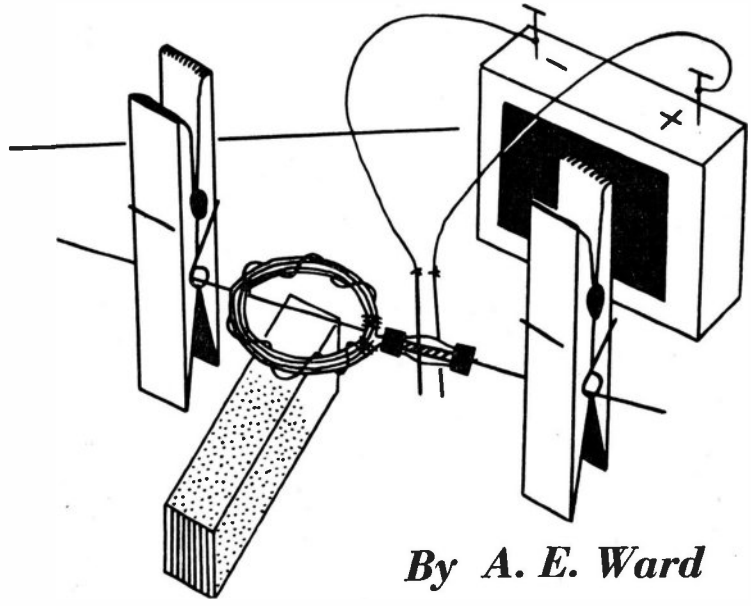
BEFORE seeds germinate or start growing they must absorb water from the surrounding soil through their tough seed coats. An impatient gardener will often soak pea or bean seeds in water overnight, prior to planting them, in the hope that their germination will be accelerated.

When seeds take in water, they may swell to twice their size when dormant and dry, and, at the same time, the swelling seeds can exert dramatic hydrostatic pressures.

Try an experiment: Fill a cheap 1 in. diameter glass test tube with dried peas from a grocer's, and plug the tube with a cork through which you have bored a ¼ in. diameter hole. Tie on the cork firmly with string.

Put the tube under a tap and allow water to run down into the hole and fill the spaces between the peas. Store the test tube completely submerged in a glass jar of water for about two days. Towards the end of this time the seeds will become so fat and tightly-packed that they will split the tube from top to bottom into a series of long glass splinters, like icicles. Do be careful how you dispose of the rubbish afterwards! (A.E.W.)

Toy Motor that Works



By A. E. Ward

BUILD and operate an electric motor within an hour! Form the armature by winding thin, insulated copper wire 25 times around a broom handle. Secure the flattened coil windings by binding them with the wire ends.

Impale the coil upon a thin steel knitting needle. Bind the needle with Sellotape for 1½ in., beginning where the wires leave the armature.

Scrape the insulator from the wire ends and secure the separate bare wires on opposite sides of the spindle *alongside the Sellotape*, using narrow bands of insulating tape.

Leave the wires exposed between the tape bands, to form two commutator contact points.

Suspend the spindle between the hollow springs of 2 standing clothes pegs and rest a bar magnet, crossways, under the armature.

The contact wires and armature should be set horizontally.

Connect wires to a 4½ volt bell battery and bare the ends, to form a pair of brushes.

Press the wire brushes vertically against opposite sides of the commutator. The motor should start by itself and spin fast.

Briefly, the motor works because magnetic fields originating when current flows in the armature, are repelled by the bar magnet's permanent field force.

Trial of Strength

WITHOUT a skeleton, your body would collapse into a mound of helpless quivering flesh. Bones support our bodies and give us the characteristic bearing of human beings; and, when activated by certain muscles, bones enable us to move around and perform complicated tasks. Muscles and bones working together comprise a complex organization of lever systems.

Sometimes the mechanical advantage of a particular muscle and bone group is poor; which means that a muscular effort much greater than the resistance it must overcome (or 'load') is needed for a given activity.

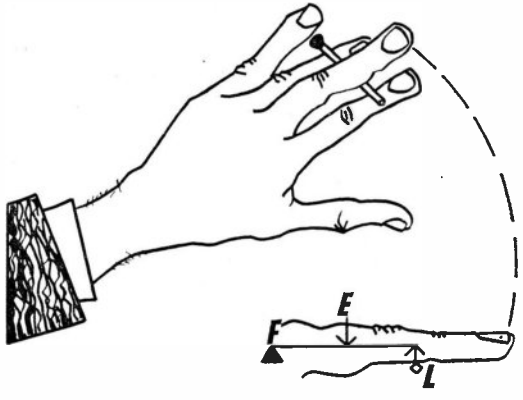
This happens when you bent your elbow in order to raise a heavy brick placed upon your outstretched palm. The biceps muscle pulls at a point between your elbow and your hand, to provide inefficient lifting power. Your arm will quickly tire if you try and support the brick for long.

Rest a matchstick across the ends of the first and third fingers of your left hand, as illustrated, while you try and break the wood by pressing down with your middle finger.

Even a professional strong man may find the feat impossible; though not because he has lost his strength, but because of the wrong sort of leverage which his finger applies.

Your knuckle is the pivot or fulcrum F, and the match represents the load L, which your muscle fingers — exerting an effort E, between the load and fulcrum — must overcome. This type of lever is of the third order or 'class'. Third order levers invariably possess impractical mechanical advantages.

However, the task will be possible if you tuck the matchstick between the lower joint of your finger and the knuckle. Now you will be able to employ your finger as a second order lever, where the load is between the fulcrum and the effort. The mechanical advantage is appreciably larger and the matchstick may be broken easily. (A.E.W.)



CHEMISTRY AT HOME

Resorcinol Experiments

By L. A. Fantozzi

THE green liquid in a spirit level owes its colour to a dye made from the white crystalline compound resorcinol, $C_6H_4(OH)_2$. This is Uranin, $C_{20}H_{10}O_5Na_2$, and it is the sodium, Na, compound of Fluoresceïn, $C_{20}H_{12}O_5$. Many other dyes are made from resorcinol and it is also used in medicine for treating skin diseases. Fluoresceïn and Uranin are quite simple to make on the small scale. Mix equal weights of resorcinol and phthalic anhydride, $C_6H_4(CO)_2O$, (about 0.2 gram of each) and heat gently in a dry test tube over a low flame for a minute or two until steam no longer condenses on the cooler parts of the test tube. Let it cool. The residue contains Fluoresceïn:

$$2C_6H_4(OH)_2 + C_6H_4(CO)_2O = C_{20}H_{12}O_5 + 2H_2O.$$

Add about 20 ml. of cold water, stir up well and then add a solution of sodium hydroxide, NaOH, drop by drop until no more of the residue appears to be dissolving. An intense yellow solution of Uranin results:

$$C_{20}H_{12}O_5 + 2NaOH = C_{20}H_{10}O_5Na_2 + 2H_2O.$$

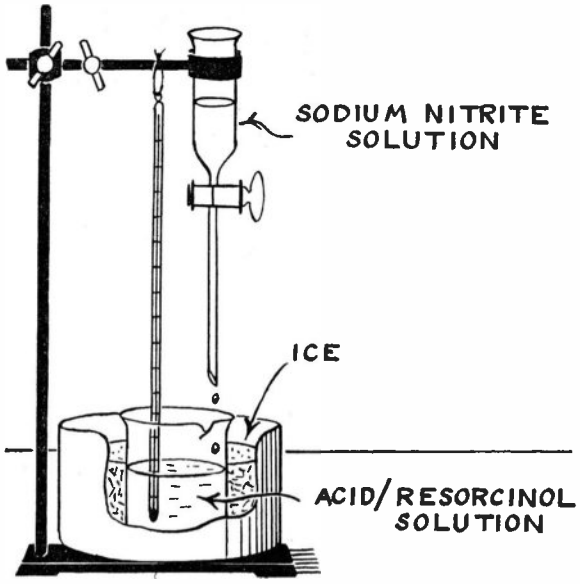
Add a drop to a beaker of water. A brilliant yellow-green fluorescence is imparted to the water. One part of Uranin will impart a distinct fluorescence to 16,000,000 parts of water. This property has been used to trace the course of partly subterranean rivers. By its means the small river Aach was proved to be connected with the Danube. As a dye Uranin is not very fast, but on natural silk it gives yellow shades with a beautiful green fluorescence.

Add bromine water, Br, to Uranin solution until a precipitate begins to form. The yellow solution turns to orange. Now add sodium hydroxide solution drop by drop until the precipitate dissolves. Pour some of this solution into water. The water acquires a pink colour with a green fluorescence. The Uranin has been converted into the dye Eosin and hydrobromic acid, HBr:

$$C_{20}H_{10}O_5Na_2 + 4Br_2 = C_{20}H_6Br_4O_5Na_2 + 4HBr.$$

Eosin is used for dyeing wool and natural silk fine pink shades.

Another dye easily prepared from resorcinol is Resorcine Green which is dinitrosoresorcinol, $C_6H_2O_2(NOH)_2.2H_2O$. Chill 135 ml. of water in a beaker surrounded by crushed ice and stir in 2 ml. of concentrated sulphuric acid, H_2SO_4, (caution, corrosive; flush off any on the fingers with water and dab on wet sodium bicarbonate, $NaHCO_3$). Dissolve in this dilute sulphuric acid 3.3 grams of resorcinol. Hang a Centigrade thermometer in the mixture (see diagram) and note the temperature. It should be close to 0 degrees. If it is 5 degrees or more add salt to the ice and wait for the temperature to fall. Meanwhile dissolve 4.2 grams of sodium nitrate, $NaNO_2$, in 12 ml. of water. Using a dropping funnel or a pipette, add this at the rate of about one drop each two seconds to the cooled resorcinol mixture, stirring constantly.



Preparing the dye Resorcine Green

An orange colour appears at first and finally a yellow precipitate. This is dinitrosoresorcinol, sodium sulphate, Na_2SO_4, remaining in solution:

$$C_6H_4(OH)_2 + H_2SO_4 + 2NaNO_2 = C_6H_2O_2(NOH)_2 + Na_2SO_4 + 2H_2O.$$

Let the whole stand for about an hour. Then filter off the precipitate, wash it with cold water until one wash does not redden blue litmus paper and then let the compound dry.

It dyes iron-mordanted cotton and wool fast dark green shades and will also dye unmordanted wool brown. Mordant a piece of woven white cotton (about 2 in. square) by immersing it in a solution of 2 grams of ferric chloride, $FeCl_3.6H_2O$, in 100 ml. of water. Stir for 10 minutes, squeeze out the cotton and immerse it in a solution of 2 grams of sodium carbonate (washing soda), $Na_2CO_3.10H_2O$. Stir for ten minutes, squeeze out the cotton and then rinse it well in water.

Dissolve enough dinitrosoresorcinol in 60 ml. of boiling water to give a full orange-brown tint. Drop in the mordanted cotton, continue boiling for about a minute and then let the liquid cool down for an hour or two, stirring occasionally. Rinse the cotton in water. It is dyed a pleasing green.

To dye unmordanted wool simply boil it in a solution of dinitrosoresorcinol for a minute and then let it cool as before. After rinsing, the wool will be found to have been dyed pale brown.

Another colouring matter obtainable from resorcinol is lacmoid. Its composition is uncertain, but is generally taken to be represented by the formula $C_{12}H_9NO_4$. Though not useful as a dye owing to its sensitivity to acids and alkalis it is used as an indicator.

To prepare lacmoid dissolve 1 gram of resorcinol in 7.5 ml. of water and add 2.5 ml. of strong ammonium hydroxide, NH_4OH, (specific gravity 0.88), stir well and then add 10 ml. of 20-volume hydrogen peroxide, H_2O_2. The mixture darkens to brown at once. After 24 hours it is an

opaque blue-black due to formation of lacmoid. Stir in dilute hydrochloric acid, HCl, until the mixture turns blue litmus paper red. Add 6 grams of sodium chloride (table salt) NaCl. Let the whole stand half an hour with occasional stirring. The lacmoid is precipitated. Filter it off, wash once with water and let it dry.

To see its sensitivity, dissolve a little in warm water. Add a solution of sodium hydroxide, NaOH. It turns blue. To this add dilute hydrochloric acid. The colour turns red. These are colour changes which make it useful as an indicator in quantitative analysis.

The analytical reactions of resorcinol are of interest. As it is a phenol ferric chloride reacts with it. To a solution of resorcinol in water add a few drops of ferric chloride solution. A violet coloration appears, but which vanishes on the addition of a few drops of ammonium hydroxide. In a test tube dissolve a little resorcinol in chloroform, $CHCl_3$, add a tiny piece of potassium hydroxide, KOH (caution, skin corrosive; any on the fingers should be flushed off with water and vinegar dabbed on). Warm the solution gently by standing the test tube in hot water. The liquid turns brownish-yellow and the potassium hydroxide red.

Add a few drops of a filtered solution of chloride of lime to resorcinol solution. A violet colour appears.

Mix solutions of silver nitrate, $AgNO_3$, and resorcinol. No change occurs, but on boiling the mixture, metallic silver, Ag, is deposited.

Solutions of resorcinol and copper sulphate, $CuSO_4.5H_2O$, produce a precipitate when mixed, but on addition of ammonium hydroxide the precipitate dissolves to form a deep black liquid.

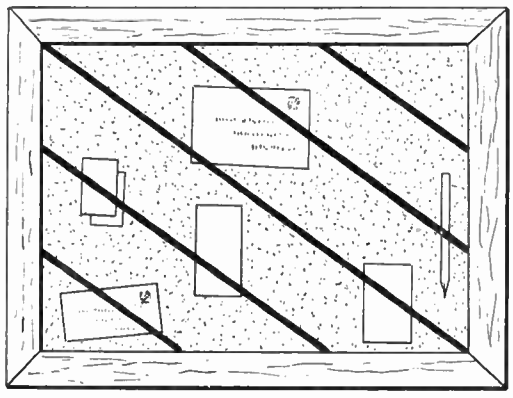
A delicate colour reaction may be seen by mixing 0.01 gram of resorcinol with 1 ml. of concentrated sulphuric acid in a test tube, then adding 0.1 gram of tartaric acid, $C_4H_6O_6$, and finally heating gently. A beautiful reddish-violet colour appears.

Reminder Board

POSTCARDS, letters, bills and other oddments appear to have a way of getting themselves lost, or are packed away into the remoteness of drawers and cannot be found just when we need them. Perhaps a letter does not demand immediate attention on receipt and is laid aside so I find a reminder board to be of real help in many ways.

This board will hold all those letters still awaiting attention as well as bills to pay, theatre tickets, telephone messages, renewals and other odds and ends I find convenient to leave for another day (or week!)

All you require is an old picture frame, the size is not important. If required for a club room where notices are to be displayed I would suggest a larger size. The only renovation needed to brighten the frame is a coat of paint. The glass is removed and a piece of hardboard or stout cardboard cut to the same size. This is covered with felt or wallpaper then ribbons or tapes fastened across diagonally. Start with the central ribbon, about ½ in. wide, taking this from corner to corner. Allow a surplus of 3 in. at each end, gluing same to the back of the board. Further reinforcement with pieces of paper gumstrip may be advisable. Dependent on the size of your board two or three more lengths of tape should be attached on both sides of the central one as shown in our sketch.



Once the tapes have been attached we replace the board in the prepared frame, fasten in position with a few brads as though we were replacing the glass and cover the back with a sheet of brown paper.

The board can now be hung on the wall, where it will be useful for holding letters still requiring your attention. It will also hold picture postcards from friends on holiday, tickets, reminders etc. You will note that a pencil tucked underneath a tape is handy for taking telephone messages.

(S.H.L.)

RIVETING FOR HOBBY WORK

In spite of the different types of bonding agent now available and simple soldering and welding techniques, riveting still plays quite an important part in many kinds of hobby work.

Rivets can be made in several different sorts of metal such as steel, aluminium, brass or copper, and can be divided into three types according to their shank. These types are 'solid', 'tubular' (sometimes called 'hollow') and 'bifurcated', which are forked. There are also different types of rivet head, the commonest being the 'round' or 'snap' head, though there are also 'flat', 'countersunk' and 'mushroom' heads.

For all normal work the solid shank rivet is used. Where the two materials to be riveted together are of very different degrees of hardness the tubular rivet is much more effective, while the bifurcated rivet may be used where it is possible to turn the legs over into a relatively soft material. This latter form of rivet is often employed in leatherwork.

A rivet must fit comfortably into its hole without too much play but it is a mistake to drill the hole in such a way that the rivet fits tightly. This is particularly important when riveting thin materials as they are likely to distort when the rivet is driven home.

Materials to be riveted must be clamped together tightly for the drilling of the holes. For leather and similar materials a leatherwork punch is quite adequate, but a hand drill and bit will be necessary for metals. In some cases it may be easier to drill pilot holes and follow these with a bit of the required final size. A file or piece of emery paper should be drawn over each face of the holes in order to 'de-burr' them, and the outside edges of the holes can be chamfered with a slightly larger drill.

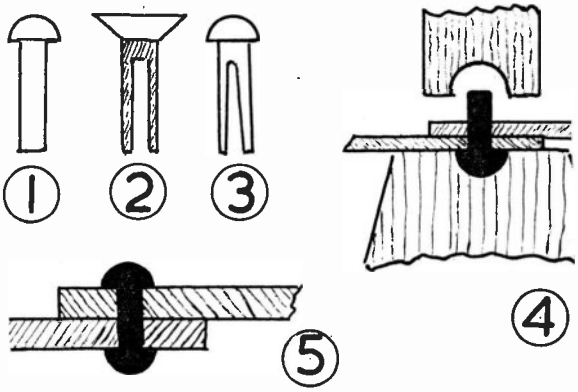
It is possible to buy special punches for closing up rivets and this is a justifiable expense if a considerable amount of riveting has to be done. In most cases, however, the older methods will be quite satisfactory for the limited amount of work required.

Bifurcated rivets are the easiest to fix. The two pieces of material to be joined are placed together over a piece of soft wood (the 'dolly') and the rivet hammered through. A chisel is used for opening the forks of the rivet and the two prongs are hammered flat into the soft material.

The member used for supporting the plates being riveted is the 'dolly' or 'hold-up' and must have a flat head for use with countersunk, flat or mushroom headed rivets, or a hollowed face for use with round head rivets. Such dollies should preferably be made of cast or mild steel though hardwood dollies will have a limited life: note, however the remarks above concerning softwood dollies for bifurcated rivets. To make a hollowed face in a steel dolly the end can be heated until it is red, and a steel ball of suitable size is hammered into the end.

Punches are also of mild or cast steel and are usually described as 'setting punches' when having a hollow head and used for solid rivets. For closing tubular rivets a splay punch is used, this being inserted into the back of the rivet and hammered so as to split the rivet and turn its end over on to the material.

It is often possible to put the dolly in a vice and so leave both hands free for the actual riveting. A round head rivet will be tapped through the holes in the material, which is



1. *Solid rivet with round head.*
2. *Section through tubular rivet with countersunk head.*
3. *Bifurcated rivet.*
4. *Section showing material and rivet on dolly, with setting punch above, ready for clenching.*
5. *Correctly riveted material, with under sides of rivet heads hard against faces of material.*

then turned upside down so that the head of the rivet rests in the hollowed part of the dolly. The top of the projecting shank is then given a couple of sharp taps with the flat of the hammer so as to swell the shank a little. The final step is to place the setting punch in position and tap down on its head so as to clench the rivet.

In a well made riveted joint the two pieces of material must be in close contact with the heads of the rivets hard against the outer faces. One of the disadvantages of drilling the preliminary holes too small is that surplus metal round the edge of the hole may be torn up and rest underneath the rivet head so that it will not bed down properly.

It is possible to clench a rivet without the use of a punch. The ball-shaped end of a 'ball-pane' (or 'ball-pein') hammer is used for doing this, tapping the top of the rivet all round with a series of angular blows.

It is also as well to know how to remove a rivet. This is best done by drilling out the rivet head so that the shank can be tapped through, but it is also possible to cut off the rivet head with a cold chisel. (F.H.T.)

THE BOY ELECTRICIAN

(By Armac)

In this book the young reader will find an outline of modern electrical and electronic theory, together with highly informative accounts of such topics as automatic telephony, electric heating and lighting, radio, television, electric railways and the principles of automation. There are full directions for more than twenty working models, constructed from readily available parts, varying from an electric motor to an amplifier for a record player, plus some amusing electrical games.

Published by George G. Harrap & Co. Ltd. Price 18s.

MUSICAL TIDDLYWINKS

THE play-board of this new game for the ever-popular tiddlywinks has a novel musical theme. The child places the tiddlywinks on a 'Keyboard' which plays a tune when the 'keys' are flicked to direct the tiddlywinks at the target.

The eight keys are different-coloured plastic ice-cream spoons, and the method of tuning them to the musical scale will be described. So start collecting the plastic spoons now — you get them with icecream cups!

The measurements of the board and layout of the components is given in Fig. 1. The board, 20 in. by 12½ in., can be of hardboard or cheap ply. Cut two strips of ¼ in. wood of 1 in. width for the 20 in. long sides (B). Between these, at the top edge of the board (A), goes the end piece (C) which is 12½ in. long and of the same width and thickness as pieces B. Use glue and panel pins to assemble the tray, and round off the ends of B at the open end of the board, as illustrated.

Refer to Fig. 2 for the 'keyboard' construction. Cut piece D from ¾ in. wood and piece E from ¼ in. ply, to the given dimensions. Bore a hole at both ends of piece E and screw the piece to D. Do not tighten up the screws fully until you have inserted the plastic spoons. Mark off the positions for the spoons, then insert them between the two pieces.

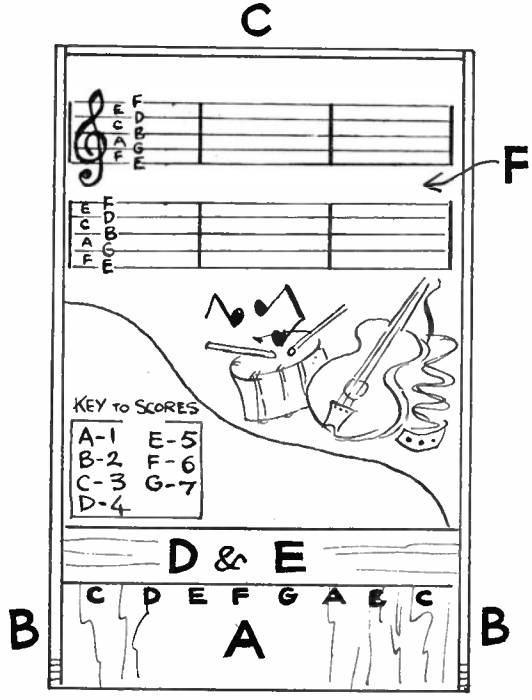
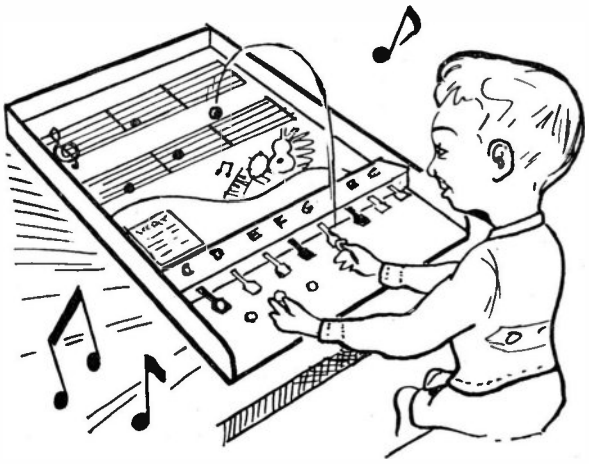


Fig. 1—Plan of the game showing the 'stave' targets and position of the 'keyboard'



Arrange the colours of the 'keys': green (do) yellow (re), blue (me), orange (fa), yellow (so), red (la), white (te), green (do). Tune the keys by 'ear' or piano, moving the spoons in or out and flicking them with a plectrum to obtain the correct note. Screw up the keyboard, and insert other small screws or panel pins between the spoon handles, so that they are all sandwiched tightly.

Paint the keyboard panel, and print on the scale figures. Position the unit on the baseboard, gluing it between the sides and 3½ in. from the edge of the base.

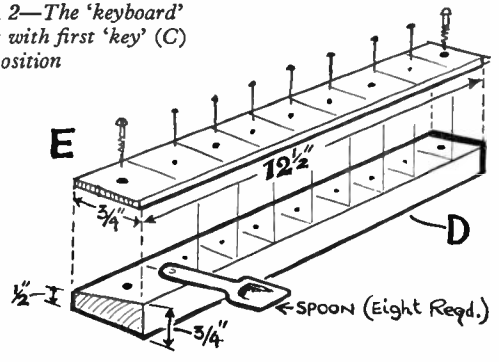
Cut a sheet of white card to fit neatly inside the tray. On this draw out the sheet-music scoring target to the pattern shown in Fig. 1 at F. Rule the 'stave' lines, and draw the other details with a black ball pen; then colour as desired with crayons or water paints.

The tray sides, etc, may be enamelled in bright colours to complete the toy. The set of tiddlywinks — which should include a large one as a 'plectrum' for the keys — are stored in a small box in the tray, and the child shown how to aim the coloured discs at the lines so that they represent notes which can then be 'read' and 'played' on the keyboard.

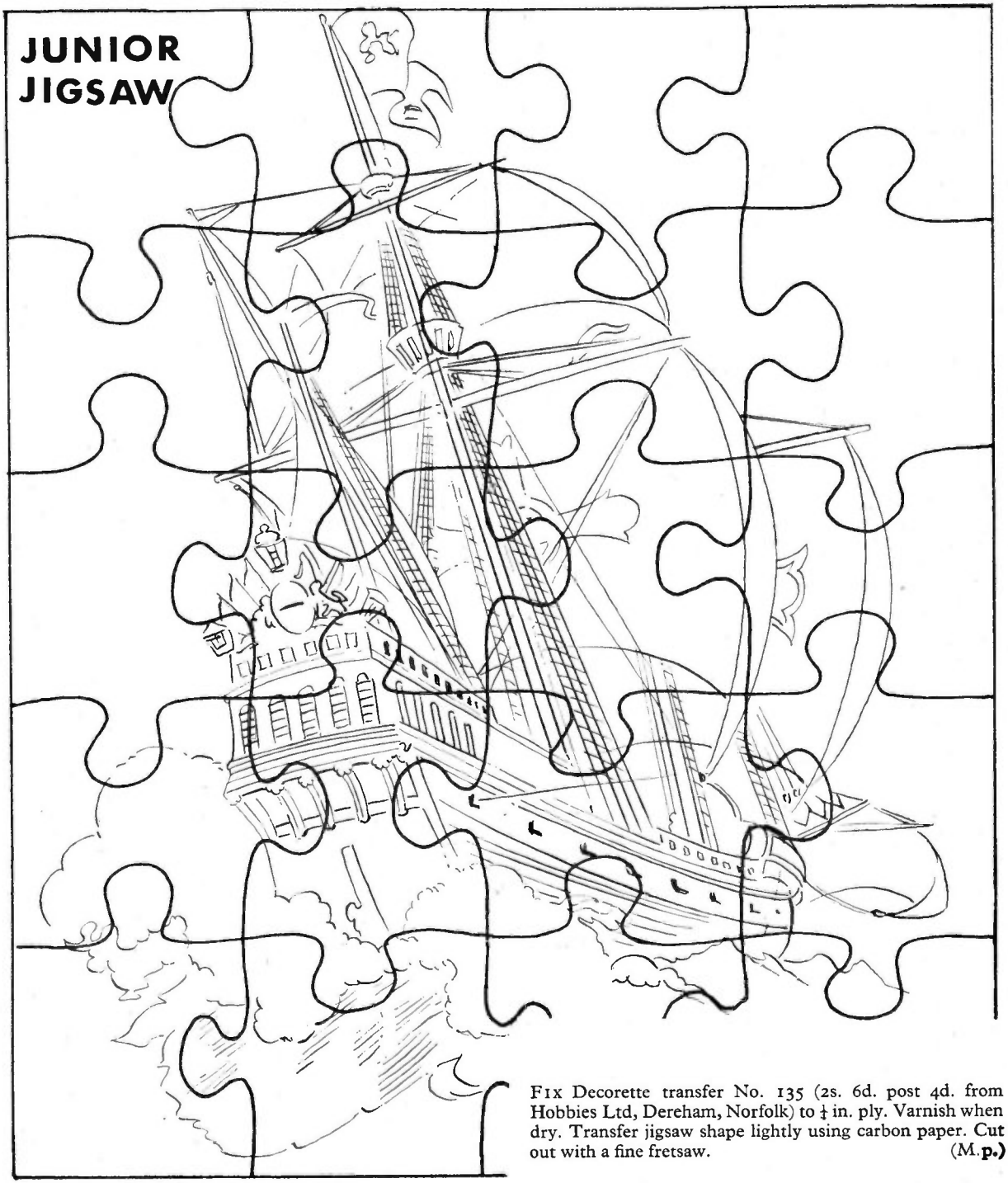
Even without playing a scoring game, a youngster will get hours of amusement just 'twanging' the tiddlywinks from the 'musical spoons.'

(T.S.R.)

Fig. 2—The 'keyboard' unit with first 'key' (C) in position



JUNIOR JIGSAW



FIX Decorette transfer No. 135 (2s. 6d. post 4d. from Hobbies Ltd, Dereham, Norfolk) to ¼ in. ply. Varnish when dry. Transfer jigsaw shape lightly using carbon paper. Cut out with a fine fretsaw. (M.**p.**)

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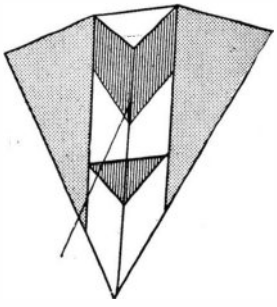
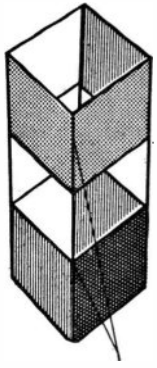
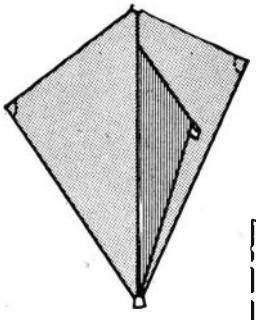




CUTTER



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BLOCK LETTERS PLEASE

Canadian 'Floral Emblems'

TWO new stamps honour the provincial flowers of the fifth and sixth provinces to enter the Canadian Confederation — Manitoba in 1870 and British Columbia in 1871. These stamps continue the floral emblem series scheduled for issue

between now and the Centennial Year of 1967.

The Prairie Crocus (Pulsatilla ludoviciana), shown on the left, was chosen as the official flower of Manitoba in 1906. The dogwood (Cornus Nuttali) became the official flower of British Columbia in 1956.

As with most of the stamps in the floral emblem series, the Manitoba and British Columbia stamps are printed in three colours.

ALONG with the present provinces of Ontario and Quebec, Nova Scotia and New Brunswick were the first of the British North American colonies to unite and bring about the Confederation, known as Canada. The two new stamps to commemorate this historic fact are included in the floral emblem series.

The stamp honouring Nova Scotia shows the arms and the floral emblem of that province, the trailing arbutus, more commonly known as the Mayflower. It is interesting to note that the Mayflower also appeared on a series of postage stamps issued by Nova Scotia during the period 1851 to 1853.

In 1936, the purple violet was officially adopted by New Brunswick as the floral emblem of the province.

Czechoslovak Space Research Commemoratives

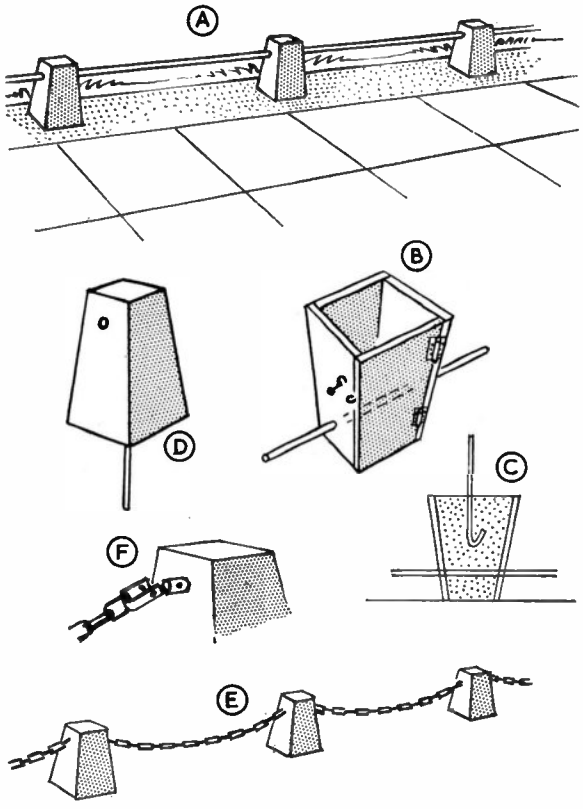
NEW Czechoslovak commemorative stamps issued this year are dedicated to space research. Chief of these is the rendezvous of two or more space ships in orbit, which will represent a further step forward in man's invasion of space. Unless this problem is solved it will not be possible to establish larger space stations in outer space nor to realize manned flights to the moon and other planets.

The set depicts further stages in the flight of space rockets to the Moon and Mars. Ever more frequent launching of interplanetary space probes is the second prerequisite for man to be able to undertake the long journey from his planet to other, unknown worlds.

Another of the stamps depicts the application of cosmic technology towards the improving and facilitating of life on earth. This primarily, concerns the establishment of a world-wide network of meteorological, transmission, navigational and geodetical satellites.

(R.L.C.)

FENCING THAT IS 'DOWN TO EARTH'



IN many gardens, especially on new housing estates where high fences or walls are either prohibited or look unsightly, marking boundaries in and around one's own territory is a problem.

One solution is to use simple but attractive fences which stand only some 12 in. high. These have many different applications in the garden, and are surprisingly easy and inexpensive to make. Constructed of metal and concrete, they are weather-proof and long-lasting.

The simplest and cheapest style A, uses concrete pillars and lengths of steel tubing, such as scrap pieces of $\frac{5}{8}$ in. diameter electrical conduit rod. Each pillar is cast in a wooden mould, which can be used over and over again.

The construction of the mould is shown at B. Four pieces of $\frac{3}{4}$ in. thick wood are used, each piece being 12 in. high and 7 in. wide at the top, tapering to a width of 5 in. at the base. The mould is bottomless, and the four sides are joined as shown, one corner being fixed rigidly with screws, the other two hinged, and the fourth held in the closed position by a hook-and-eye fastener. A $\frac{5}{8}$ in. diameter hole is drilled in two sides, 3 in. from the narrow end, and an 18 in. length of $\frac{5}{8}$ in. diameter dowel rod is inserted.

The inside surfaces of the mould are greased, and it is then placed on a polythene sheet on a flat surface. It is filled with concrete made from a 3:1 sand and cement mixture, or alternatively, ready-mixed concrete casting mixture can be used. The concrete is well tamped down to prevent cavities, and a 12 in. long metal rod, hooked at one end, is inserted C. The work should be left for at least 48 hours, after which time the wooden dowel rod should be withdrawn, using a turning motion. After a further 24 hours the mould is opened and the pillar D, carefully removed and laid on its side for a week to harden off.

Each pillar must be checked at this stage to see that the steel rod will fit easily, for it must not be forced. Enlarge the hole if necessary with an old round file used gently. At the same time, any defects in the concrete can be made good with a little of the same mixture as already used, applied with a small pointing trowel or an old knife blade. The mould should be scraped clean each time before casting the next pillar.

The completed pillars are set at 4 ft. intervals, their projecting rods being sunk in 6 in. deep holes filled with concrete. The horizontal joining rods are fitted as each pillar is put in place, the holes in the end pillars being plugged with cement. For an enduring finish, paint the rods with grey, white or black polyurethane coating.

Chains may be fitted between the pillars, if desired E. In this case, a 10 in. length of steel tube, drilled to take a bolt at each end, is inserted in the hole in the pillar, and a shackle is used to secure each end of the chain F. (A.L.)

MAGIC MIRROR

THE famous fictional detective Sherlock Holmes, wishing to discover the contents of a missing ink-written note, held up a blotter to face a mirror. Then the reversed impressions of the recently blotted words instantly became readable in the looking glass.

Plane mirrors by themselves always reflect ordinary writing backwards and make the right side of your body appear on your left. But see what happens when you look into a 'double mirror' formed by hinging together two cheap handbag mirrors, using Sellotape.

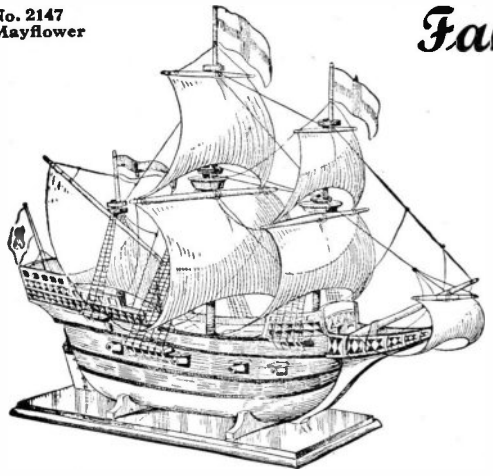
Open out the combined mirror to an angle of 90 degrees. Then look directly into it, so that the dividing line runs down the middle of your reflected nose. When you wink your left eye, it will seem very strange when the left eye of your mirror image winks back at you.

Now try reflecting a clock face and some printed words in your 'magic' mirror.

The angular mirror behaves strangely, because it reflects light rays twice. You see a double reflection of each side of your face. Light from your left is twice reflected, before returning to your right eye — and vice versa. (A.E.W.)

Printed by BALDING + MANSELL, LTD., London and Wisbech, and Published for the Proprietors, HOBBIES LTD., by HORACE MARSHALL & SON, LTD., Distribution Centre, 25, New Street Square, London, E.C.4. Sole Agents for Australia and New Zealand: Gordon & Gotch (A'sia.) Ltd. For South Africa: Central News Agency Ltd. Registered for transmission by Canadian Magazine Post.

No. 2147
Mayflower



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3164	The Warwick	**7/11**

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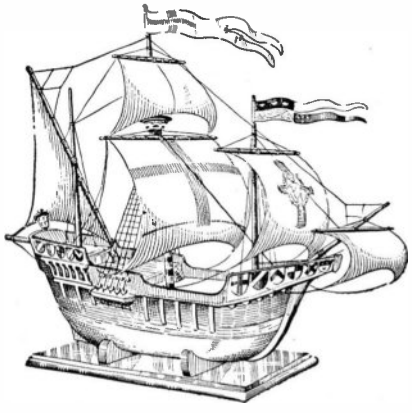

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No.	*Ship*	*Length*	*Kit Price*	*Post*
2095	Elizabeth Jonas	16 in.	**22/6**	3/-
2147	Mayflower	15 in.	**24/6**	3/3
2157	Royal Sovereign	17 in.	**27/6**	3/3
2186	Cutty Sark	21 in.	**25/6**	3/3
2262	Great Harry	19 in.	**31/6**	3/6
2337	Golden Hind	16½ in.	**29/6**	3/3
2662	Mathew	15 in.	**17/6**	3/-
2668	Santa Maria	16½ in.	**23/6**	3/3
2812	H.M.S. Bounty	11½ in.	**13/6**	2/9
3058	Nathan Ross	12 in.	**17/-**	2/9
3198	H.M.S. Victory	22 in.	**32/6**	3/6
3234	Tea Clipper	22½ in.	**26/-**	3/6
211 spcl.	Ark Royal	22 in.	**57/6**	4/6
235 spcl.	Revenge	15 in.	**25/6**	3/-
250 spcl.	Elizabeth R.	14 in.	**22/9**	3/3
252 spcl.	Royal Charles	11 in.	**27/6**	3/3

(*The Royal Charles has a partly-shaped hull and includes paint and glue*)

To HOBBIES LTD. (Dept. H.74), DEREHAM, NORFOLK.

Please send me Kit/Design No..... for which

I enclose P.O./Cheque.....

Name .....

Address .....

.....

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(BLOCK LETTERS PLEASE)