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FOR CRAFTSMEN OF ALL AGES

6^p



Now that all danger of frosts has passed, it is safe to bring out tender plants for outdoor displays. Zonal pelargoniums (geraniums), and begonias particularly, make a wonderful show in pots or boxes. With geraniums you can choose the ivy-leaved, for hanging baskets, or the brightly flowered kinds for vivid splashes of colour. Good use, too, can be made of the variegated, or scented kinds.

For added splashes of colour such plants as verbena, phlox drummondii, petunia, lobelia, alyssum and nasturtium can be used to good advantage. For greenery use ivies, either trailing or trained-up miniature trellis.

Fuchsias are invaluable, too, for effective displays. They can be used as standards on a leg of any length, bushes, or trailers. For the latter, use a variety such as Cascade.

The sketches show a number of ways in which really attractive displays can be made. For instance, a pump and trough forms a good subject if placed on crazy paving. The pump can be made from a split log and the handle bent from an iron bar. The trough, of course, forms the plant holder, and is knocked up from any odd timber available. All timber should be treated with a suitable wood preservative, but NOT creosote, which is damaging to plant life.

The gate-way is often a focal point of a house or bungalow, and a display at one or both sides of the gate looks particularly attractive. Make use of the cheap polystyrene containers that are available, and make the holder to suit them.

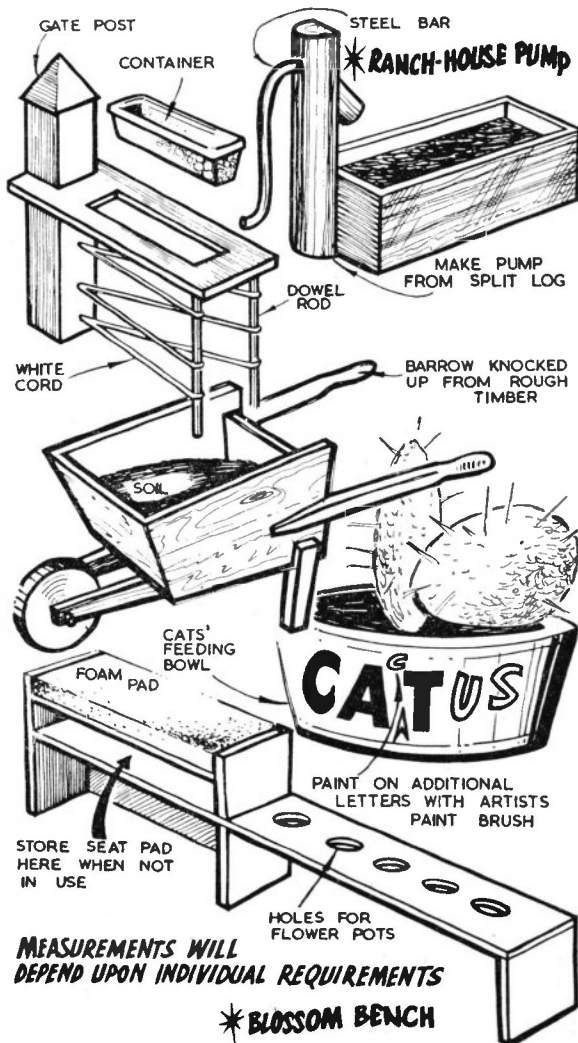
One often sees old wheelbarrows pressed into service as plant holders, and they can look very colourful when filled with a choice selection of plants. Failing an actual barrow, it is comparatively easy to fashion a rough imitation from odd pieces of wood and hardboard. Any wheel, even a blank cut

from a log, will do. When planted up, the effect will be quite as good as the real thing.

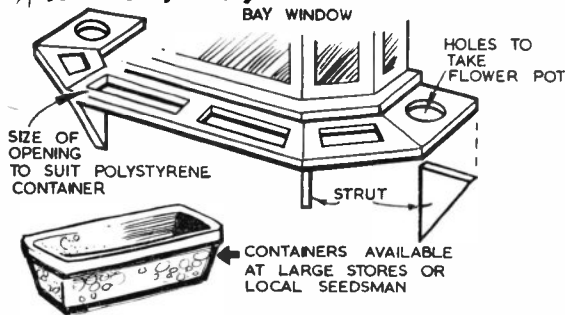
A novel effect in miniature, is obtained by planting cacti in a cat's bowl, as shown. Most cacti will do well outside during the summer months.

A seat and bench can be constructed from 1 in. thick timber, and provision made for flower pots, as shown. The boards are halved together at the centre joint, and the rest butted. Fill in the back of the seat portion with a piece of exterior grade plywood. The seat itself is a foam pad, covered with a polythene bag.

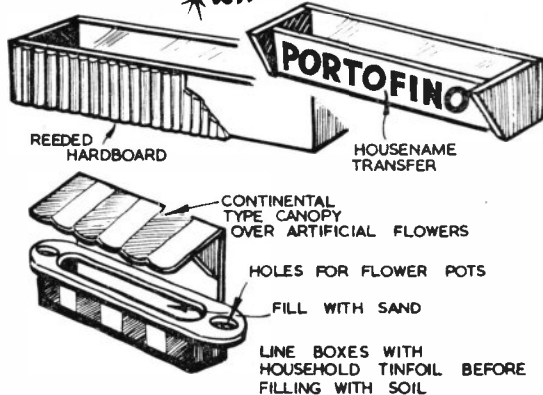
The floral balcony is constructed from exterior grade plywood or oil tempered hardboard, fixed to struts of 1 in. thick deal. The exact method of fixing will, of course, depend upon the construction of the bay window. Here again, cheap light-weight containers can be used, or holes can be cut to take specific sizes of pots.



* FLORAL BALCONY



* WINDOW BOX WIZARDRY



Ordinary window boxes may be fashioned from planed deal, drilling holes in the bottom for drainage. The fronts can be decorated by painting or by covering with reeded hardboard or any such material available.

Good use can be made of plastic numerals and letters, or Decorette transfers, to provide a house name or number on the front of the window box. Transfers can be protected by giving a coat of clear varnish.

Artificial flowers can also be used for decoration in conjunction with one or two pot plants. A window box filled with sand serves as a base for the flowers, and a canopy made from

painted hardboard or from striped deck canvas gives a continental effect.

Make sure that the bottoms of the window boxes are covered by a good layer of crocks before planting. Pots may be put into the boxes, and covered with soil, sand or peat, or alternatively plants may be set out directly into soil. A John Innes No. 2 potting compost will be suitable. (M.h.)

BATH SAFETY RAIL

A SAFETY rail for the bath is a must where the household includes an invalid or an elderly person. Such an aid makes getting in and out of the bath so much easier, and less

dangerous. All too seldom are handles fitted in the bathroom.

The rails are very simple to make even if you have not done any pipe bending before. Of course you can, if you so desire, get the local electrician to supply the few feet of conduit piping, and bend it to your requirements. But if you are a D.I.Y. fan you will want to bend your own pipes.

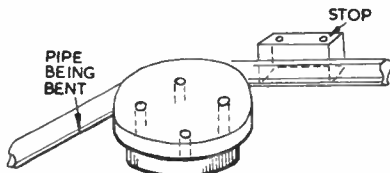
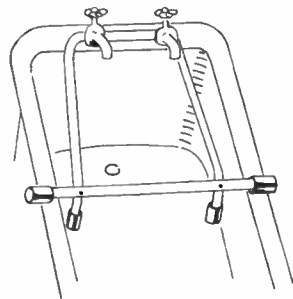
Obtain one 6 ft. length and one 2 ft. 6 in. length of 1 in. outside diameter conduit piping, and six $\frac{1}{4}$ in. bolts of sufficient length to pass through the top of the work bench, plus 2 in.

For bending the pipe you will need a special former, and this you can make. Without the former the pipe would flatten before bending, and would look very unsightly indeed. Cut two discs of plywood or chipboard, one about $1\frac{1}{8}$ in. thick and 6 in. diameter, the other $7\frac{1}{2}$ in. diameter and $\frac{1}{2}$ in. thick. Clamp them together concentrically, and drill four holes $\frac{1}{8}$ in. diameter through both pieces. Drill the same holes through the top of the work bench in a suitable position, and fix the former to the bench top with the four bolts screwed up tight.

With the other two bolts fix a stop 1 in. thick to the bench top in the position shown, and all is ready for bending.

Bend the longer pipe into shape as indicated by slipping one end between the former and the stop, and bending round the former till the correct shape is obtained. Cut the ends to make them the same length, and drill a $\frac{1}{2}$ in. clearance hole right through at both ends. Also drill the short length of pipe with the same drill, after cutting to a suitable length, and bolt firmly together.

No dimensions are given as baths vary so much in shape and size. Paint to match the bathroom decoration, and bind the ends with electrician's tape, and furnish with rubber stops to prevent damage to the enamel surface of the bath. In use just slip the loop over the taps, and allow the cross members to rest on the top of the bath. (E.M.)



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LABYRINTHS AND MAZES

IN a previous issue we promised to consider the construction and solutions of mazes. It will already have been recognised that the basic feature is a maximum length of pathway in a minimum amount of space. The area itself may be of any shape and so we have unlimited latitude in planning the puzzles.

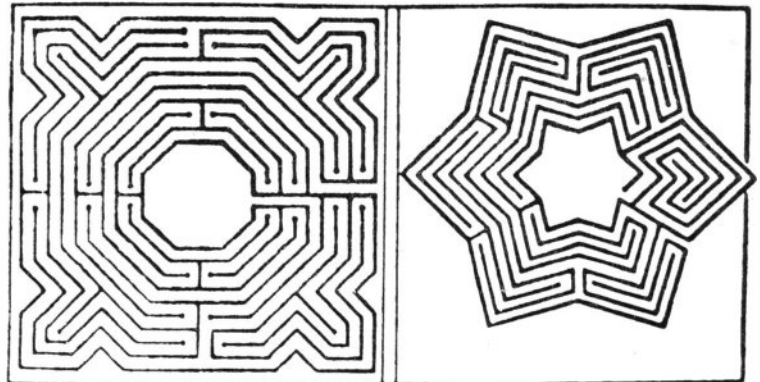
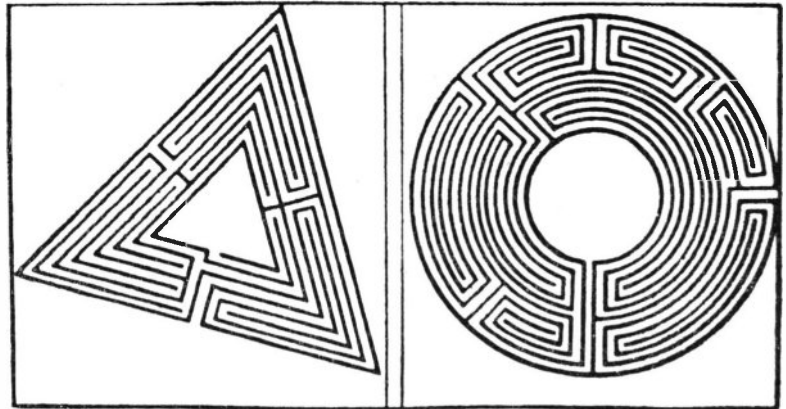
Some of the simplest games are related to the maze, having impediments or obstructions to encounter on the journey. Snakes and ladders is a good example but to make the game, or maze, interesting it is usual to have a goal worthy of the players' efforts. It might be 'treasure' or a monster but that can be left to you.

The design itself may become complex from a simple start, perhaps with one pathway with a multiplicity of turnings, branches and junctions yet apparently having a symmetrical appearance. This pathway should be continuous and connect the outer entry with a centre goal. There is no reason why there should not be 'islands' here and there or a few cul-de-sacs but the route should neither be too long nor too short. It is also wise to avoid long stretches of straight, tedious pathways. For your information I would mention that the one-path maze, e.g., Hampton Court, is usually termed a *unicursal* maze.

We can make mazes a little more complex by having two or more pathways or branching paths which may be simple or sub-divided and it is customary to refer to these as *multicursal*. In theory, but impossible to do on paper, we could also produce mazes on more than one level with steps in different directions at the junctions and which would become very complex indeed.

Perhaps it will be easiest to demonstrate the construction of a maze by using concentric circles as shown in Fig. 3 and 4. In the former you will see that a direct line has been drawn from the entry to the goal and passages allowed alternately. This straight line should however, be cut at each crossing and the 'wall', or impediment pushed backwards either to the right or left. In Fig. 4 cross connections have been made.

A similar arrangement can be devised with oblongs or squares, using the shortest route to the goal as the base and then re-arranging this to make obstructions as desired. In fact, there is just as much fun in preparing a maze as in solving one. Some of the mazes devised by G. A. Boeckler so long ago as 1664



Geometrical mazes by G. A. Boeckler, 1664

are interesting and you may study these examples as well as try your skill at following the pathway.

When we speak of a solution we really mean the discovery of the correct path which leads to the goal. While there can be no set formula for every maze we can explain a method which proves successful.

The Hampton Court maze is quite simple to solve if after entering one keeps the right hand to one hedge and follows this to the goal. At one point one does in fact re-trace one's steps but this is the easiest solution to explain. I should mention that this solution is possible because Hampton Court maze is so constructed that it consists of one continuous hedge plus others which may be regarded as 'islands'. If you refer to the diagram in the previous issue and make

a coloured line around this continuous hedge you will see how the islands have been fitted.

We cannot use reels of thread unless we are in an actual maze and this can become tangled among hedges but when confronted with printed mazes we can use a simple method. In the following the term *node* is used to indicate a junction or point of branching. On arrival at a node make three marks. Should you see that there are marks on other paths at this junction you immediately recognise that you have been at this point previously. Mark your arrival path with one mark only. If all the paths before you are marked it can only mean that you have already travelled this section and have no alternative but to return. If there are one or more unmarked paths select one

and as you enter mark with two marks.

If you observe the rule that on arrival at a node you never take a path with three marks unless there are no paths unmarked or one mark only, you can be certain that every path has been tested. When a one mark path is entered add a further two marks which should always be made when leaving and it then becomes a three mark path.

This may sound rather more complicated than in actual practice but if you are trying to follow a maze printed on paper using a pencil it is a simple matter to mark dots at the nodes.

Once you know how mazes are constructed you can make your own. The easiest way is to make a plan on paper as shown with geometrical shapes. On the beach you can scratch out the paths with your spade or if you have a garden you may use stones or canes for the dividing walls.

In some parts of the country there were quite a number of turf mazes made on the ground, the turf being raised to form walls, leaving the channels for the

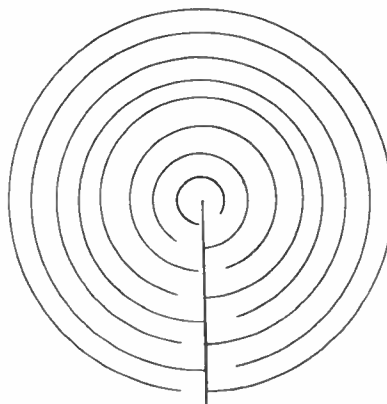


FIG 3

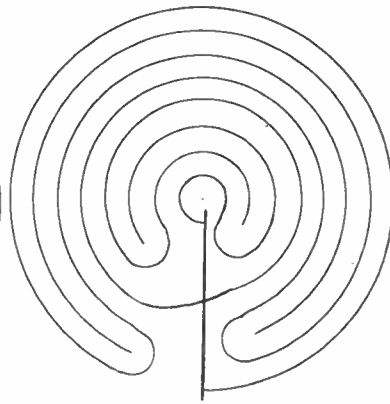
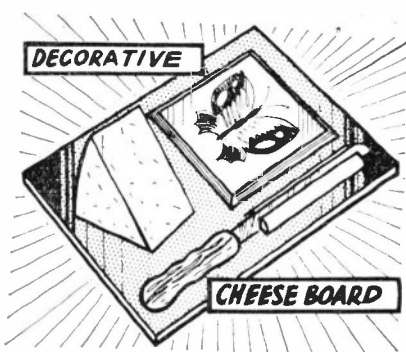


FIG 4

pathways.

You may also draw them out on paper for use as puzzles and a quick way is to draw a continuous line, turning in different directions to the central

goal, adding islands and branches to confuse. Lots of toys can be similarly constructed by gluing cardboard walls to a baseboard and having a ball bearing for the pathfinder. (S.H.L.)



type, 6 in. by 6 in. china, cement, plastic or any other hard material. One with a burnt-in design or picture looks best, especially if it has an eggshell finish.

Fix the tile with a contact glue, and fix a quarter round moulding with glue and panel pins to hold the tile in place. The moulding should not project above the surface of the tile. Mitre the corners neatly, and don't forget to use the glasspaper.

The knife holder is made of two

pieces of quarter moulding about $\frac{1}{8}$ in. by $\frac{1}{8}$ in. and $4\frac{1}{2}$ in. long, glued and pinned in place. This is best done by fixing one piece first and when the glue has set fixing the remaining piece with the knife blade firmly held between them.

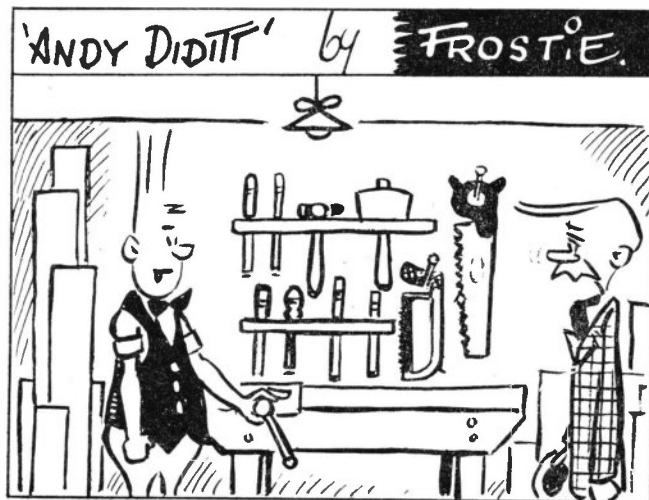
Any kitchen knife will do but a special cheese knife is better. An old fashioned horn-handled dinner knife looks well against the walnut board.

Your dinner table will be enhanced by the beauty of a well made cheese board. (E.M.)

CHEESE boards are becoming very popular. They can be had in all manner of shapes, sizes, and materials. But the best are always made of wood, the traditional material for cheese boards, bread boards, and butter plates, etc. It seems to add something to the cheese to cut it on a board of nicely grained and polished timber. One imagines that it adds some piquancy to the flavour. Blue cheese definitely looks well against a piece of hard wood polished to a satin finish.

For the board shown you will need one piece of walnut, beech, mahogany or oak about $\frac{7}{8}$ in. or 1 in. thick, about 9 in. wide and 12 in. long. Glasspaper all over till absolutely smooth, finishing off with the finest glasspaper. Then finally polish with a beech wood block that has been similarly glasspapered. Rub hard all over, following the grain till a nice satin sheen is obtained on the board.

Choose a gaily coloured tile of any



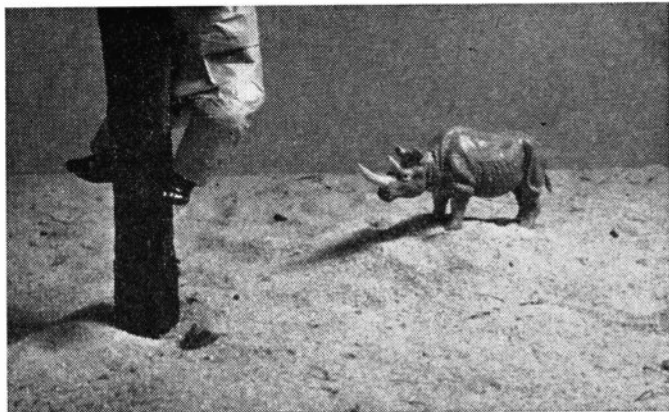
"I'M SORRY THE WORKSHOP'S IN SUCH A MESS — MA'S BEEN TIDYING UP THE PLACE!"

scenes, or fantastic ones if you prefer to put it that way. Now look at Fig. 3 and you will see just how table top photography can be adapted to simulate real-life action. Humorous or serious themes can be recorded with equal ease and a little ingenuity entirely replaces the need for elaborate 'props'.

In this picture, the rhinoceros is a small plastic toy obtainable for a few pence from any chain store. The man hurriedly climbing the tree to get out of harm's way is a little celluloid doll which has been dressed in a safari suit made from brown paper. To suggest shoes, the feet of the doll were blackened with indian ink. The tree itself is just a stout branch a few inches long, attached at the base to a square of cardboard by means of a drawing pin pressed up from underneath. When sand was sifted all around the foreground, this cardboard base was completely hidden.

The legs of the doll were bent into a natural position and it was secured to the branch by sticky tape situated well out of view of the camera. Dramatic quality lighting was called for in a picture of this nature, and it was supplied

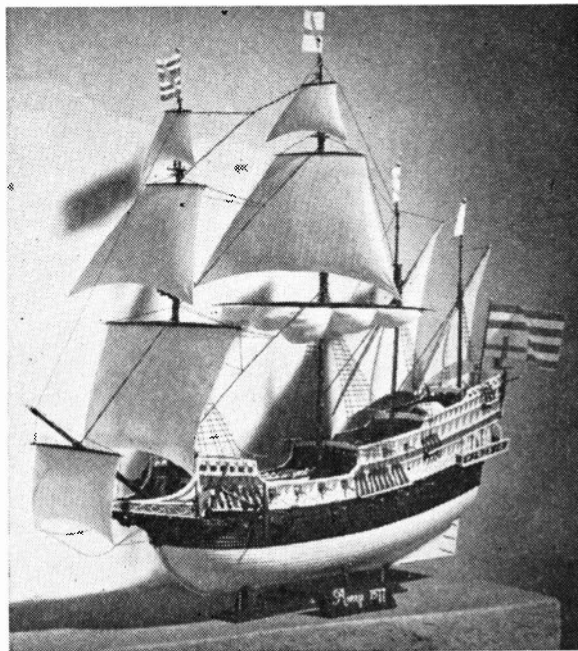
*Fig. 3—
Dramatic
lighting
for a
dramatic
subject
with a
touch of
humour*



by having a 100 watt pearl bulb to the right of the scene and a little to the rear. To supplement this basic light, a 60 watt pearl bulb was placed alongside the camera and adequately illuminated the front of the scene.

All the exposures were made at a

camera lens aperture of $f/16$ and the times varied from $1/25$ th. of a second for Fig. 1 to $\frac{1}{2}$ second for Fig. 3. The film used was a conventional medium speed panchromatic material such as one would normally employ for regular outdoor photography. (A.E.B.)



ONE hundred and fifty five pieces go to make up the constant scale construction kit from Airfix, Sir Francis Drake's *Revenge*, which costs 15s.

Sails, ratlines, flags and 36 guns are all included in the highly detailed and

intricate model, which measures more than 16 in. in length. Four impressive anchors, miniature 25 ft. barge, stern lantern and detailed engraved decorative work along the sides and round the stern transom add the final touches of realism to this splendid model.

ANOTHER AIRFIX WINNER

Stand and nameplate are provided, allowing builders to make the model into a display piece.

The most prolific fighter on either side in the Second World War was the German Me Bf 109 which was produced from 1935 to 1946 in many different versions. Joining the Airfix range is the 109 G-6 — the major production version — which comes as a 40 piece kit with choice of armament for only 2s.

Full instructions are provided for modellers to build either the home defence or tropical versions of the aircraft, with armament that includes either 20 mm. cannon in gondolas, a single bomb, or twin 21 cm. rocket missiles.

The Grumman Wildcat — the first American plane in British service to shoot down a German aircraft — is another 2s. constant scale kit from Airfix. The model contains 33 pieces and details include armament of six rockets and twin drop tanks, pitot tube, and undercarriage which may be built in lowered and raised position.

Parts, transfers and instructions for no less than five different versions are included in the Airfix kit for the Junkers, JU 52 which costs 7s. 6d. The 109 piece kit includes sets of optional transfers and full painting instructions for each version.

Airfix kits are available from all Hobbies branches.

Sir

Francis

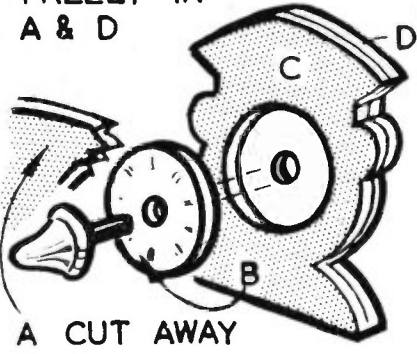
Drake's

'REVENGE'

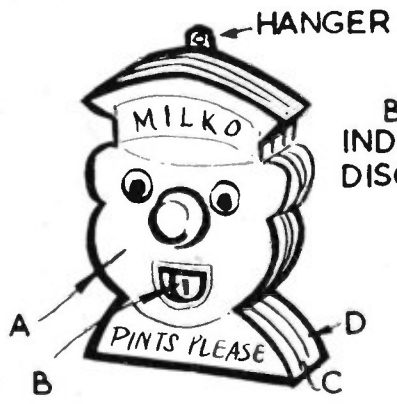
MILKO

NOVELTY MILK INDICATOR

AXLE FITS TIGHT
ON B AND WORKS
FREELY IN
A & D

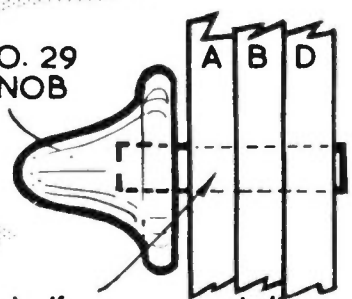


A CUT AWAY

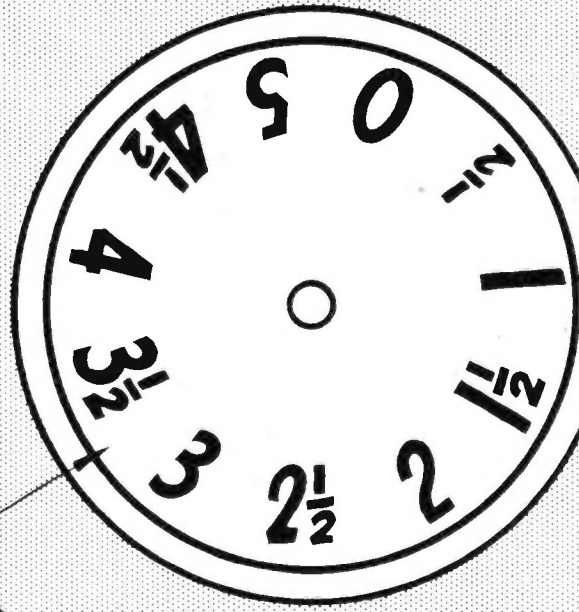


B INDICATOR
DISC $\frac{3}{16}$ "

NO. 29
KNOB

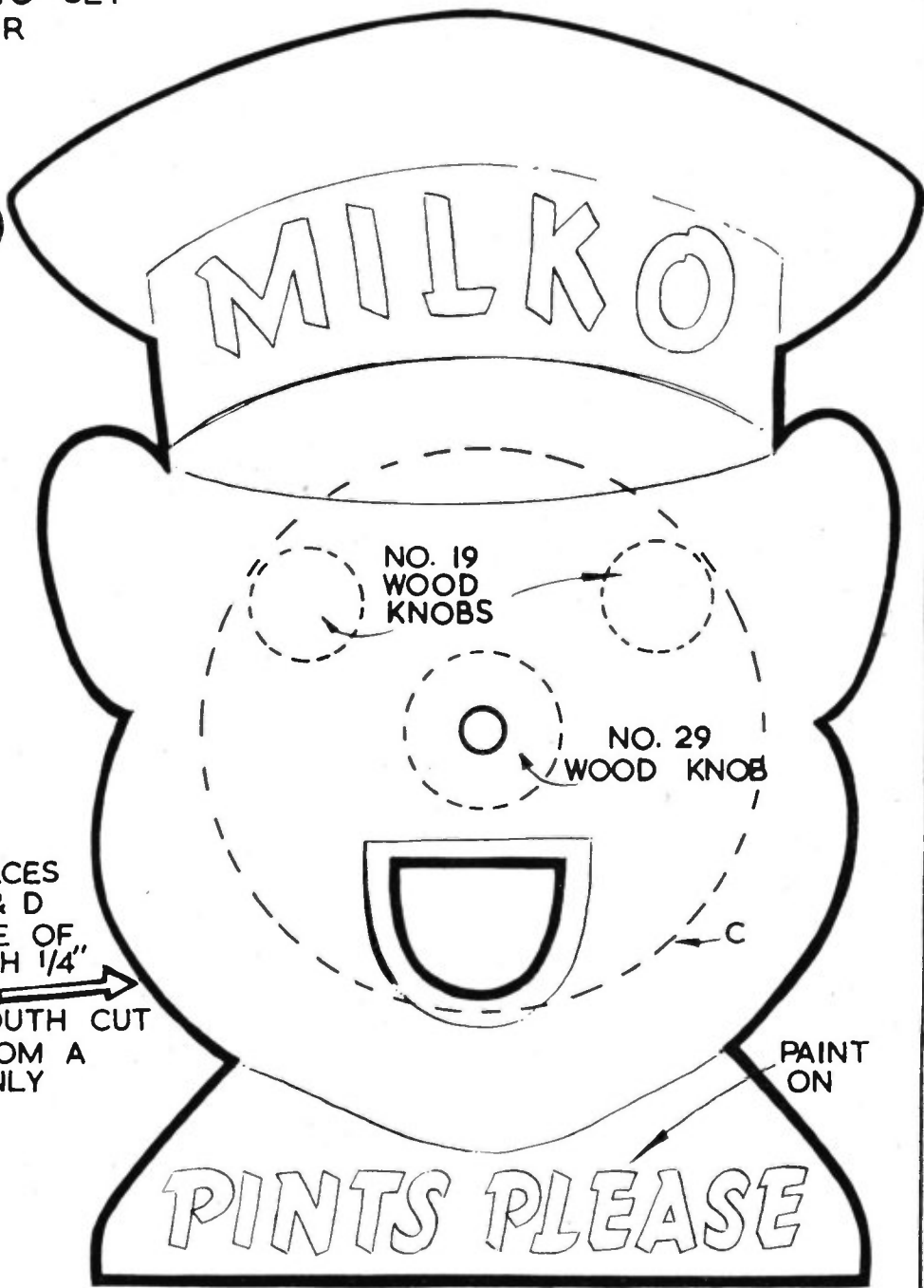
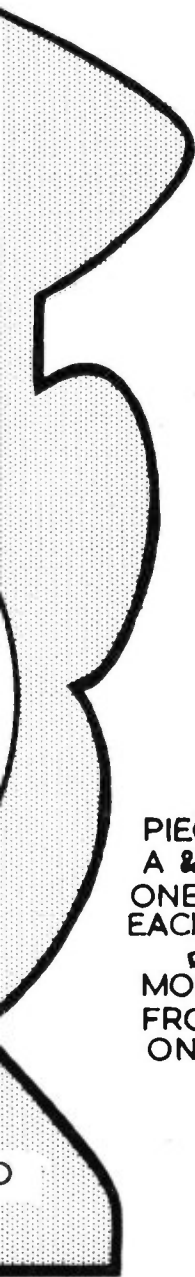


$\frac{1}{4}$ " DOWEL - $1\frac{1}{4}$ " LONG



PIECE C SHADED
CUT ONE $\frac{1}{4}$ "
GLUE BETWEEN A &

N NOSE TO SET
INDICATOR



PIECES
A & D
ONE OF
EACH 1/4"

→
MOUTH CUT
FROM A
ONLY

PAINT
ON



MAKE YOURSELF A GARDEN POOL

ALTHOUGH the edges of the pond may be very slightly raised above ground level, the really well-built pool must have some form of overflow to deal with excessive rainfall, etc. Similarly, there must be some way of emptying the pool for cleaning.

Both outlets can be arranged by passing a short length of suitable narrow bore pipe through the shuttering, and across the width of the wall, leaving these in position while the concrete is poured and rammed. (It is advisable to temporarily block both ends of each pipe to ensure that no concrete gets into the tube and partially blocks it.) When the pool is completed a piece of fine galvanised wire mesh is put over the inside of the overflow pipe to prevent the passage of leaves and small fish, while the outlet pipe must be fitted with a suitable plug or stopper. The plug needs to be firm enough to prevent its being dislodged by accident, or by inquisitive small children.

In the case of the drain pipe the ground is going to be saturated when the plug is pulled free. The ideal solution is to

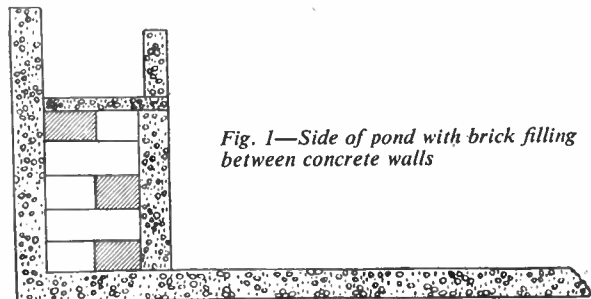


Fig. 1—Side of pond with brick filling between concrete walls

connect the outlet pipe direct to a drain pipe, but this is not usually possible, though a small rubber hose-pipe can often be attached to the outlet, when necessary, to divert the water into the nearest drain.

Remembering the importance of overflow and drain pipes (which should be fitted to all but the very smallest pools), we can return to the building of the type of pool being described.

The concrete of the walls must be allowed to initially set

Part 2

CLEANING OUT

before the shuttering boards are removed, when they may be covered with damp sacking until curing is complete. In very hot weather it may be necessary to sprinkle the sacks with a watering can to keep them moist. If possible, all four walls should be cast at the same time.

Inner walls

Work can then proceed on the casting of the inner walls that make the step for the shallow rooting aquatics. The top of this can finish about 9 in. below the top of the pond, and can be 9 in. to 1 ft 6 in. or more wide, according to the size of the pool.

Although the front wall of this needs to be strong enough to resist the water thrust, there is no reason why the entire step

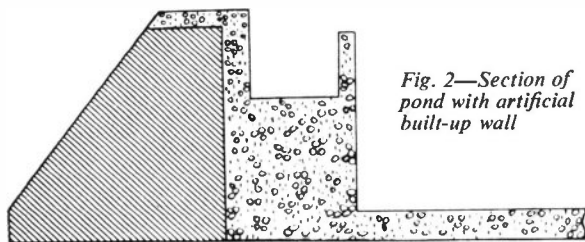


Fig. 2—Section of pond with artificial built-up wall

should be of concrete. The front wall should be cast in the same way as the main walls, and the space between them filled with brickwork, with a concrete capping piece, as shown on the sectional view at Fig. 1. Alternatively, the space can be filled with unwanted garden stones or broken concrete, rammed well down, and finished off with concrete at the top.

Note that if the intention is to keep only fish or floating aquatic plants in the pool, the step can be omitted, which greatly simplifies the building.

When all the concrete has dried, the exposed surfaces are given a smoothing coat of waterproof cement or a mixture of one part of cement to three of sharp sand.

The instructions so far given apply to a pool of regular, rectangular shape, but some differences are necessary for an informal pool.

Any kind of shuttering must be of a flexible material, but firmly braced, so that it will not move under the thrust and ramming of the concrete. The profile of the pool where it touches the earth is usually of little importance provided that the thickness of the lining is adequate for strength. Steps for shallow rooting aquatic plants tend to be small and non-continuous, the base for them usually being in the form of a large stone set in the side of the pool. Much of the profile of the pond may have to be worked as the rendering coats are put on.

Although the small informal pool is not, usually, as easy to build as the rectangular pattern, the work is well within the average handyman's scope. Perhaps the chief point to watch is the overall shape of the sides, for if these have a slope too closely approaching the vertical, the thrust may be greater than for a properly built cast vertical wall. Gently sloping sides offer a chance of spreading cement and concrete with the minimum of shuttering.

The last type of pool with which we need concern ourselves is the built-up pattern.

This is usually of simple rectangular shape, and has the advantage that it calls for the minimum amount of digging. Its chief disadvantage is that usually it must be kept rather shallow, which means that fish cannot always be kept in safety during the winter months, though if they can be

transferred to indoor tanks over this period the difficulty can be overcome. It might be important to remember that fish living in pools tend to grow bigger than those kept in an indoor tank, so adequate living space may be difficult to arrange if the fish are numerous.

Built-up tank

For the simplest form of built-up tank the ground is excavated to a depth of about 7 in., and the base is laid to a depth of 6 in. of concrete in the normal way. The walls are then erected on this base, using the shuttering method as before, but as there is no supporting earth to take the side thrust, the walls need to be from 4 in. to 6 in. thick. Outlet and drain pipes must be provided as before, with steps for shallow rooting aquatics.

Fig. 2 shows, in section, an alternative form of construction. With this the pool is built in the way described above, but an artificial grassed bank is put round all sides of it, allowing for a greater depth of pool with safety, and giving a better bearing surface for the sides. Much of the required slope can be made up from broken brick, smashed concrete, boulders, and other non-rotting rubbish that accumulates in most gardens. If required, a paved surround can be laid round such a pool.

(N.W.)

CHEMISTRY

AT HOME

2—BROMINE EXPERIMENTS

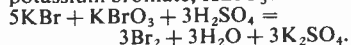
By *L. A. Fantozzi*

IN the article on Bromine, Br, we saw how some of its properties could be studied by using it as bromine water.

Some bromine compounds, in fact, can be prepared without even using bromine water. The bromine reacts almost as soon as it is formed and so only appears momentarily in the free state. This particularly applies to bromo-derivatives of some organic compounds and which are used in analysis to detect certain substances whose bromo-compounds have characteristic melting points.

A case in point is that of phenol, C_6H_5OH , which reacts with bromine to form tribromophenol, $C_6H_2Br_3OH$, and hydrobromic acid, HBr :

$C_6H_5OH + 3Br_2 = C_6H_2Br_3OH + 3HBr$.
The necessary bromine is generated in the same manner as for making bromine water. Namely, by adding dilute sulphuric acid, H_2SO_4 , to a mixed solution of potassium bromide, KBr , and potassium bromate, $KBrO_3$:



By dissolving the phenol in the bromide/bromate solution before acidifying the tribromophenol is readily produced.

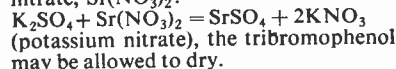
Dissolve 2.78 grams of potassium

bromate and 9.91 grams of potassium bromide in 100 ml. of hot water and let the solution cool. To this add a solution of 1.56 grams of phenol in 50 ml. of water. Phenol blisters the skin; should any come in contact with the fingers swab freely with methylated spirit and then wash with soap and warm water.

Now stir in 50 ml. of 10 per cent sulphuric acid. The mixture turns milky at once and soon a curdy yellowish precipitate of tribromophenol separates. Allow the whole to stand for two hours for the reaction to complete itself. From start to finish only a barely perceptible odour of bromine will be noted.

Filter off the tribromophenol, wash it well on the filter so as to free it from potassium sulphate. When one wash water gives no white precipitate of

strontium sulphate, $SrSO_4$, when tested by addition of a solution of strontium nitrate, $Sr(NO_3)_2$:



For the purpose of taking its melting point it must be further purified by recrystallization from warm isopropyl alcohol, $(CH_3)_2CH.OH$. Put the tribromophenol into a flask fitted with a condenser on a water bath Fig. 1. Add very small amounts of isopropyl alcohol through the top of the condenser until the tribromophenol is all in solution taking care that each lot of solvent boils before adding more. Remove the apparatus from the water bath, disconnect the condenser and gradually add to the solution small amounts of water until the solution grows turbid. Refit the condenser and replace the flask on the water bath.

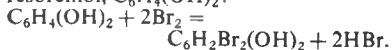
As it heats up again the solution clears. Filter it hot and let the filtrate stand a few hours. Pure tribromophenol crystallizes out. Filter it off and let it dry.

To take its melting point you will need to make a special tube from a short length of glass tubing. Soften the middle section of the tubing in a spirit lamp or gas flame and then draw it out so as to have a length of capillary tubing of about 1 to 2 millimetres bore Fig. 2. Cut the centre with a file and then seal the capillary by touching it to the flame.

Grind a very little of the dry tribromophenol and put it into the capillary to a depth of about 2 millimetres, tapping well to compact the powder. Fasten the melting point tube to a

thermometer with a rubber band and partially immerse it in a flask containing medicinal liquid paraffin, shown Fig. 2. Slowly heat the liquid paraffin. When the tribromophenol suddenly becomes transparent this indicates the melting point. Immediate reference to the thermometer will show it to be at or close to 95 degrees Centigrade, thus indicating that the substance is in fact tribromophenol. Complete proof of its identity can be had by mixing a known specimen of tribromophenol with that obtained experimentally and taking a mixed melting point, when no change in the melting point will be observed. Two different chemical compounds melted together show nearly always a markedly lower melting point.

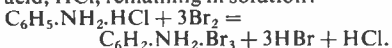
Another bromo-compound easily prepared by this method is dibromoresorcinol, $C_6H_2Br_2(OH)_2$, from resorcinol, $C_6H_4(OH)_2$:



Dissolve 1.83 grams of resorcinol in 35 ml. of water. In 65 ml. of hot water dissolve 1.85 grams of potassium bromate and 6.6 grams of potassium bromide, let the solution cool and add it to the resorcinol solution. Now stir in 3.5 ml. of 10 per cent sulphuric acid.

During the next few minutes the liquid grows turbid and on keeping for two hours the liquid is nearly filled with tiny silky prismatic crystals of flesh-coloured dibromoresorcinol. Filter off the dibromoresorcinol and free it from potassium sulphate by washing with water until one wash water gives no white precipitate when tested with strontium nitrate. Then let it dry at room temperature. Purify by recrystallization from isopropyl alcohol in the same way as for tribromophenol, dry it and then take its melting point. Dibromoresorcinol melts at 112 degrees Centigrade and the melting point obtained should be close to this. The knack of correct melting point determination is very slow heating as the melting point is approached.

Tribromaniline, $C_6H_2.NH_2.Br_3$, too, can be prepared similarly. Dissolve 2.78 grams of potassium bromate and 9.91 grams of potassium bromide in 100 ml. of hot water, let the solution cool and add to it a solution of 2.16 grams of aniline hydrochloride, $C_6H_5.NH_2.HCl$, in 50 ml. of cold water. Stir in 50 ml. of 10 per cent sulphuric acid. The liquid becomes milky at once and a precipitate begins to appear in a few seconds. This is tribromaniline, hydrochloric acid, HCl, remaining in solution:



After standing two hours filter off the tribromaniline, wash it on the filter until it is shown to be free from potas-

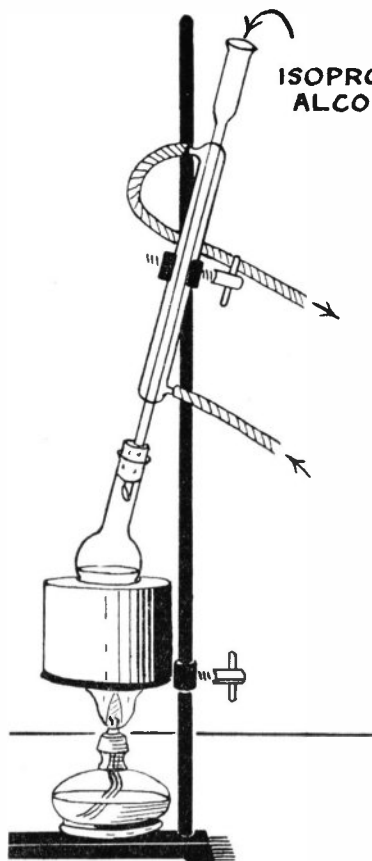


Fig. 1—Purifying tribromophenol

sium sulphate by one wash water not giving a white precipitate with strontium nitrate solution and then let it dry. Recrystallize it from methylated spirit using the same apparatus as for tribromophenol, but in this case do not add water, simply adding methylated spirit gradually down the condenser until the solid is dissolved. Filter the solution hot. On cooling and standing minute red-buff needles of almost pure

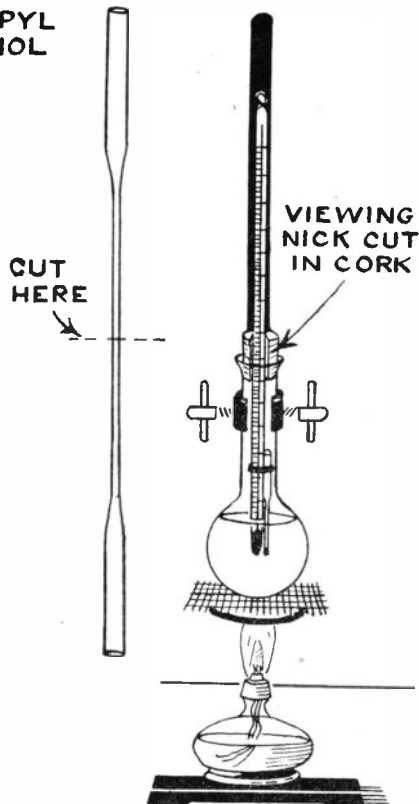


Fig. 2—Melting point determination apparatus

tribromaniline separate. Filter them off, let them dry and then take the melting point as before. It should be close to 120 degrees Centigrade, which is the melting point of the pure compound.

It will be apparent that this method can be of general application in preparing bromo-compounds and is worth trying out where the parent compound is soluble in water and the bromo-compound is insoluble.

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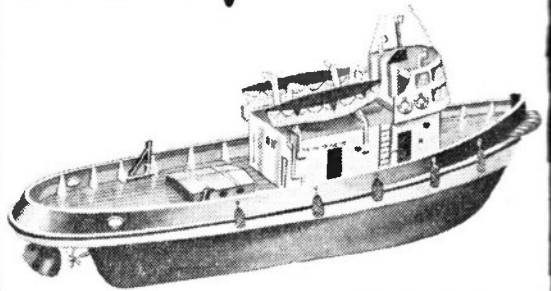
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ARE you a collector? Do you collect old paintings, old coins, rare stamps — things of beauty and value? Or, are you one of those people who will go to no end of trouble to collect wine labels, old railway time tables, beer mats and even bath taps?

Whatever we may think of these collectors there is some value in collecting things. Collectors set themselves an object which can eventually be reached. Once these people have found that rare butterfly, that ash tray from the Ritz or a menu printed in Hindustani, then according to a psychiatrist, 'Success means that there is one less problem in the world — and we are all the better for it.'

One American was much the better for it. Recently a museum paid over £1,000 for his collection of used tram tickets that came from lines which went out of existence nearly 50 years ago. Laugh at collectors if you will but there is money in the strangest things.

Its not so long ago that £10,000 was offered for a collection of menus from famous banquets.

Objects belonging to famous personalities always bring high prices. A top hat worn by American President Theodore Roosevelt brought £800. Abraham Lincoln's letters to his wife were sold for £35,000 and his personal copy of the Gettysburg address raised £18,000.

Autograph hunting has always been popular but few signatures are likely to raise more money than that of Button Gwinnet. The son of a Gloucester parson, he went to America and became one of the original signatories of the Declaration of Independence. £10,000 was the sum paid for his signature.

King of collectors

Most collectors tend to stick to smaller items such as matchbox labels. Even such small items as these can mean money for their owners. A Bristol man, Mr. Alfred J. Cruse, became £500 richer when he sold his complete collection of cigarette cards to the 'King of Collectors', the late King Farouk.

A collection of military buttons, including one from the time of Captain Dreyfus when he was drummed out of the French Army, brought £30,000 from an American millionaire to a London man.

If you need some ready cash, search your lumber room or attic, you may find a glass paperweight. If it's a genuine Victorian one it could fetch anything from £300 to £1,300.

Not all collectors sell their collections, however. Some people build up their own private libraries of the oddest things. Take, for instance, the man who devoted his life to collecting bath taps. From Paris he brought a gold plated one,

TOPICS FOR COLLECTORS

EVER THOUGHT OF BATH TAPS?

By P. Melvyn Garr

from Mexico, a wooden one. If you would like to see them they are all on view at the Parkes Sanitary Museum — and as an added attraction you can also see a fine collection of old lavatory seats!

In Birmingham there is what is probably the world's largest collection of bikinis — three hundred of them! They belong to a Midlands man who spends much of his free time writing to film stars and glamour girls asking for their cast offs. One day he intends donating his collection to a museum of dress to assist in the science of costume.

Lurid wallpaper

Yet another enthusiast found the lurid covers of paperback books very useful and far, far more decorative for papering his walls than pin up pictures. He wrote to the publishers asking them if they would let him have the covers from books at reduced prices.

Whenever Mrs. Glen Peacock entertains she brings out over two hundred and fifty spoons, but never uses them! They are her collection of spoons from North and South America, Cuba, Europe and Hawaii.

The prize spoon of the collection is a very rare one, a King Edward VIII Coronation Spoon.

This was released before his abdication was known and as soon as it was apparent that the Coronation wouldn't take place, the spoons were withdrawn.

When Mrs A. E. Mack moved house she found some old buttons in a lumber room. They fascinated her so much that she began reading all she could about the history of buttons. Today she has a collection of over 42,000 buttons, all of them antiques. Not to be outdone, her husband began a collection for himself, this time it was dolls. In the Mack house today there are the 42,000 buttons and over 100 dolls, some more than a century old.

There are, of course, those who collect big, outside curios. Mr. Bernard Delooze, for example, was refused permission to build a home for his collection. No wonder! Not only was there an armoured scout car and an amphibious jeep, but the pride of the collection was a 35 ton Sherman tank.

Traction engines and steam rollers are very popular although they are gradually becoming more difficult to obtain. Even so, people will still pay quite large sums of money to get them, like the Bexhill doctor who paid £300 for a steam roller and the naval officer who paid £85 for a traction engine.

And it's not just older folk who go in for collecting oddities. A recent survey revealed that youngsters have many strange collections — silver coins minted before 1920, toll tickets (though there are only a few tolls left), nameplates from fairground engines, old cast-iron fire grates, etc.

One Manchester schoolboy collects tramway exhibits, including a trolley wheel, whistle, overhead wire supports, pole strap, regulations book, brake handle and a steel tram tyre.

When he wants to sit and look at his collection he uses — yes, you've guessed it — a wooden tram seat.

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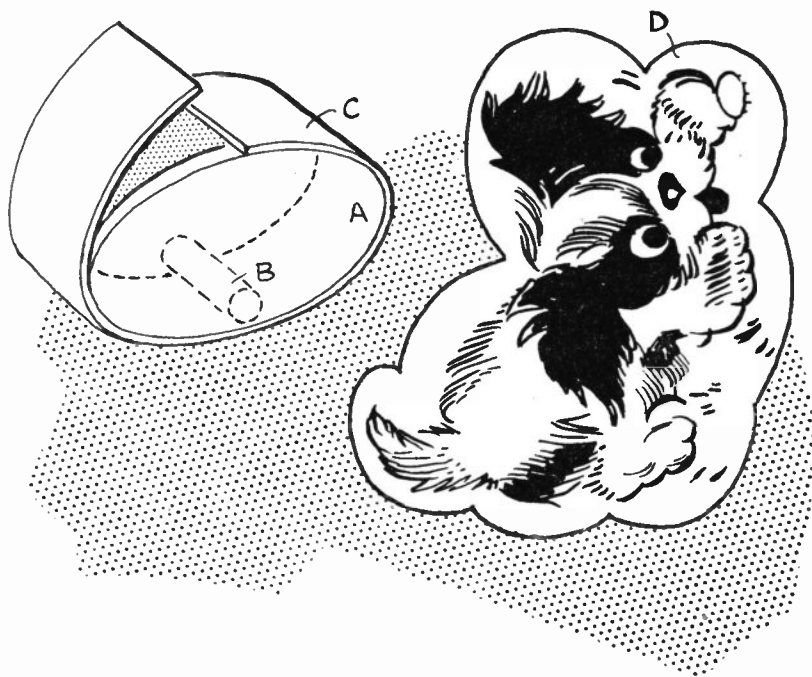
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AN AMUSING TUMBLING TOY

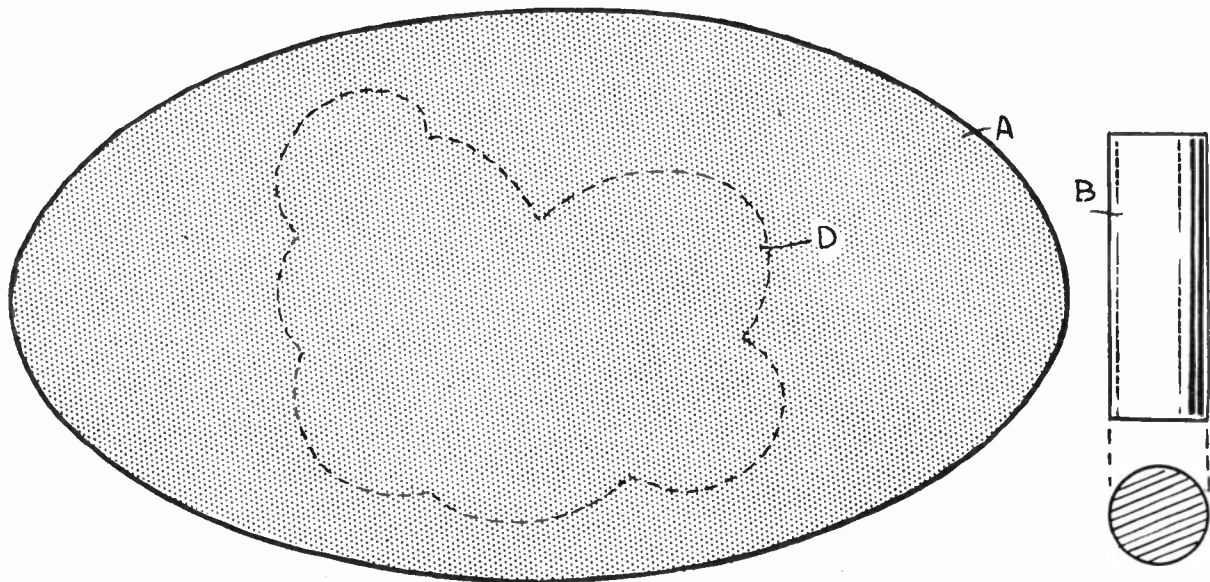
THIS amusing toy, when placed at the top of a sloping surface, will roll down head-over-heels, in a most realistic fashion. The secret is the metal roller inside, which keeps the toy on the move.

Cut two pieces A from $\frac{3}{8}$ in. wood, and a strip C of card or thin plywood about $2\frac{1}{2}$ in. wide, and long enough to go right round. Glue and pin the strip round the sides A, inserting a length of metal rod B inside. The rod should be free to roll round the interior of the toy.

Any suitable picture or transfer of a dog can be placed on the sides, or on overlays D, which can be on one or both sides of the toy. The picture shown is one from the Decorette transfer No. 212 (six on a sheet), price 2s. 3d. postage 4d. from Hobbies Ltd, Dereham, Norfolk, or from any Hobbies branch. (M.p.)



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NOMAD. 16 ft. x 6 ft. 2½ in. double-chine cabin cruiser, with full-size bunks for two and room for two more on air beds in the cockpit. Space in cabin for cooker and toilet, and ample lockers. Performs well with outboard motor of 4-10 h.p. and will plane with 18 h.p. The complete boat weighs about 6 cwt. and is easily towed and launched from a trailer. Draught 12 in. Cabin 8 ft. long and 47 in. headroom, with 34 in. over the bunks. The prototype was built single-handed in one month at a cost of £100. **Price 45/-**

DINGHIES

WENSUM. 11 ft. x 56 in. double-chine plywood sailing boat. The basic boat is an open dinghy with a gunter rig of about 66 sq. ft. Weight complete about 220 lb. Draught of hull only 6 in. and with centreboard down about 30 in. The sailing gear is easily removed to make a general-purpose dinghy for rowing or outboard use. Suitable for sailing by a crew of two or will carry four for general use. **Price 17/6**

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GREMLIN. 7 ft. 7 in. x 46 in. plywood pram dinghy of special form. This is the longest hull that can be got out of standard 8 ft. sheets of plywood. The bottom is a single sheet, split at one end and sprung to give a V forward and a curve aft. Has been built as a rowing boat for £10 and with rudder, dagger board and sailing gear for £16. Can be carried single-handed. **Price 15/-**

PETE. 6 ft. x 44 in. flat-bottom pram dinghy. The cheapest and simplest practicable boat. Can be built from one plywood sheet and may cost less than £5. Details of simple sailing gear included. Suitable for angling. Will carry two adults or three children. **Price 11/-**

CORRIB. 10 ft. x 51 in. single-chine V-bottomed plywood, general-purpose dinghy for rowing or outboard motor (3 h.p. is adequate). Simple construction, but a very shapely craft and a fine family boat. **Price 13/6**

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CANOES (Folding)

PBK24. A short single-seater of similar lines to PBK10, but with a longer cockpit. Packs into one bag. 11 ft. long, 28 in. beam, 55 in. cockpit, draught 4 in. Normal maximum load 300 lb. **Price 13/6**

CANOES (Rigid fabric-covered)

PBK10. The shortest satisfactory canoe, carrying a man and camping kit. Suitable for most waters. 11 ft. long, 28 in. beam, 48 in. cockpit, draught 5 in. Normal maximum load 300 lb. **Price 12/-**

PBK14. Roomy single for the big man or a two-seater for an adult and child or two young people. A popular tourer. Has crossed Channel as a single-seater. 14 ft. long, 29 in. beam, 76 in. cockpit, draught 5 in. Normal maximum load 500 lb. **Price 13/6**

PBK15. Fast touring single-seater, suitable for rapid rivers and the open sea in capable hands. Safe and stable. The adult enthusiast's canoe. Many Channel crossings. 14 ft. 6 in. long, 26 in. beam, 48 in. cockpit, draught 4 in. Normal maximum load 400 lb. **Price 13/6**

PBK20. Very stable and seaworthy two-seater, with sufficient beam to carry an efficient sail plan. Very roomy and popular as a tourer on most waters. 15 ft. long, 32 in. beam, 7 ft. cockpit, draught 6 in., normal maximum load 600 lb. **Price 13/6**

PBK26. Fast and stable single-seater with a shorter cockpit and a rockered keel, making it a good boat for rapid rivers. Many successes in long-distance racing. 14 ft. long, 26 in. beam, 39 in. cockpit, draught 4 in. Normal maximum load 400 lb. **Price 13/6**

CANOES (Rigid plywood skinned)

PBK16. A two-seater, flat bottomed, safe and robust. May be left afloat. 16 ft. long, 32 in. beam, 7 ft. cockpit, draught 5 in. Normal maximum load 700 lb. **Price 13/6**

PBK23. A single-seater with the same main dimensions as PBK15, but with V-bottom and hard-chine section. Roomy and stable, may be left afloat. 14 ft. 6 in. long, 26 in. beam, 48 in. cockpit, draught 4 in. Normal maximum load, 400 lb. **Price 13/6**

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26th MAY 1965

VOL. 140

NUMBER 3624



FOR CRAFTSMEN OF ALL AGES

6^p



Now that all danger of frosts has passed, it is safe to bring out tender plants for outdoor displays. Zonal pelargoniums (geraniums), and begonias particularly, make a wonderful show in pots or boxes. With geraniums you can choose the ivy-leaved, for hanging baskets, or the brightly flowered kinds for vivid splashes of colour. Good use, too, can be made of the variegated, or scented kinds.

For added splashes of colour such plants as verbena, phlox drummondii, petunia, lobelia, alyssum and nasturtium can be used to good advantage. For greenery use ivies, either trailing or trained-up miniature trellis.

Fuchsias are invaluable, too, for effective displays. They can be used as standards on a leg of any length, bushes, or trailers. For the latter, use a variety such as Cascade.

The sketches show a number of ways in which really attractive displays can be made. For instance, a pump and trough forms a good subject if placed on crazy paving. The pump can be made from a split log and the handle bent from an iron bar. The trough, of course, forms the plant holder, and is knocked up from any odd timber available. All timber should be treated with a suitable wood preservative, but NOT creosote, which is damaging to plant life.

The gate-way is often a focal point of a house or bungalow, and a display at one or both sides of the gate looks particularly attractive. Make use of the cheap polystyrene containers that are available, and make the holder to suit them.

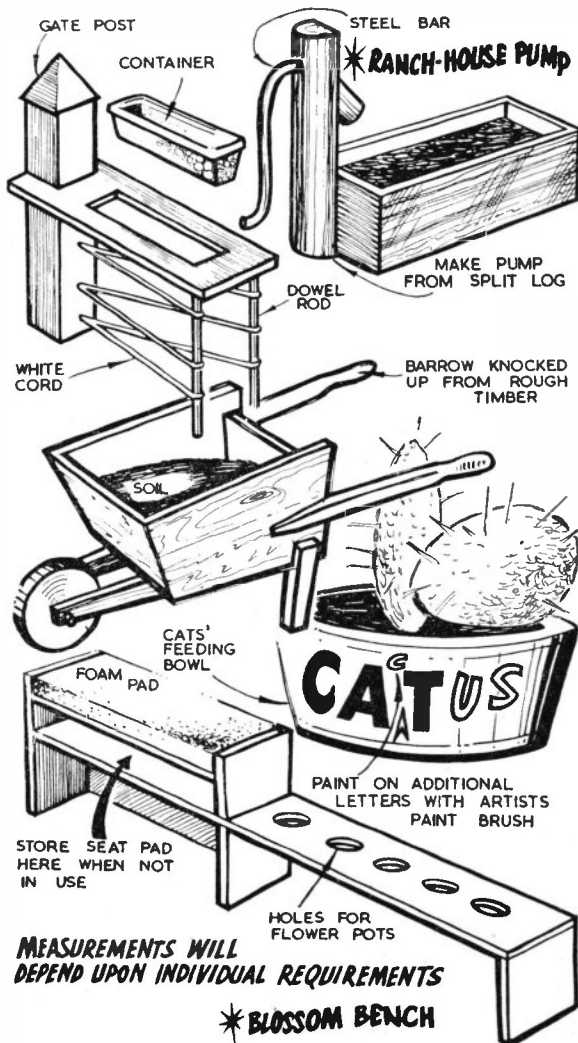
One often sees old wheelbarrows pressed into service as plant holders, and they can look very colourful when filled with a choice selection of plants. Failing an actual barrow, it is comparatively easy to fashion a rough imitation from odd pieces of wood and hardboard. Any wheel, even a blank cut

from a log, will do. When planted up, the effect will be quite as good as the real thing.

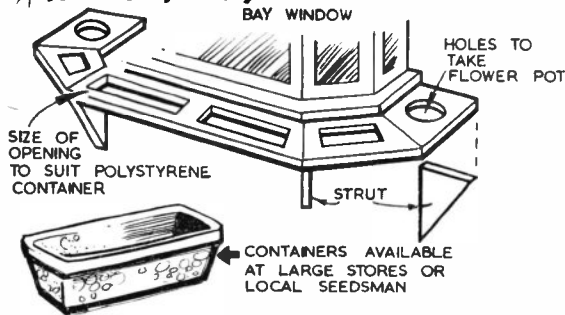
A novel effect in miniature, is obtained by planting cacti in a cat's bowl, as shown. Most cacti will do well outside during the summer months.

A seat and bench can be constructed from 1 in. thick timber, and provision made for flower pots, as shown. The boards are halved together at the centre joint, and the rest butted. Fill in the back of the seat portion with a piece of exterior grade plywood. The seat itself is a foam pad, covered with a polythene bag.

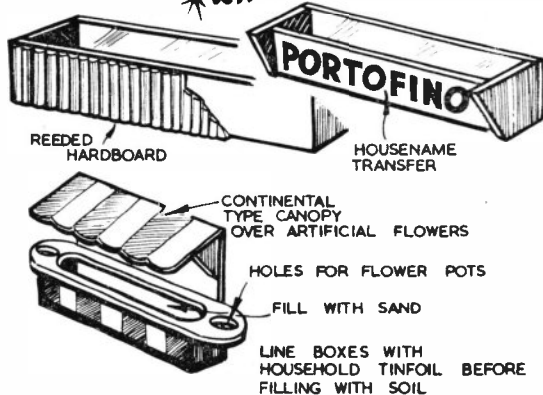
The floral balcony is constructed from exterior grade plywood or oil tempered hardboard, fixed to struts of 1 in. thick deal. The exact method of fixing will, of course, depend upon the construction of the bay window. Here again, cheap light-weight containers can be used, or holes can be cut to take specific sizes of pots.



* FLORAL BALCONY



* WINDOW BOX WIZARDRY



Ordinary window boxes may be fashioned from planed deal, drilling holes in the bottom for drainage. The fronts can be decorated by painting or by covering with reeded hardboard or any such material available.

Good use can be made of plastic numerals and letters, or Decorette transfers, to provide a house name or number on the front of the window box. Transfers can be protected by giving a coat of clear varnish.

Artificial flowers can also be used for decoration in conjunction with one or two pot plants. A window box filled with sand serves as a base for the flowers, and a canopy made from

painted hardboard or from striped deck canvas gives a continental effect.

Make sure that the bottoms of the window boxes are covered by a good layer of crocks before planting. Pots may be put into the boxes, and covered with soil, sand or peat, or alternatively plants may be set out directly into soil. A John Innes No. 2 potting compost will be suitable. (M.h.)

BATH SAFETY RAIL

A SAFETY rail for the bath is a must where the household includes an invalid or an elderly person. Such an aid makes getting in and out of the bath so much easier, and less

dangerous. All too seldom are handles fitted in the bathroom.

The rails are very simple to make even if you have not done any pipe bending before. Of course you can, if you so desire, get the local electrician to supply the few feet of conduit piping, and bend it to your requirements. But if you are a D.I.Y. fan you will want to bend your own pipes.

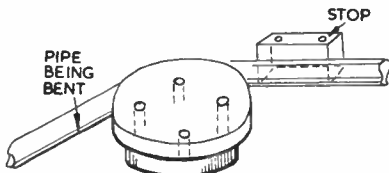
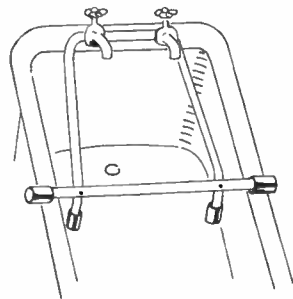
Obtain one 6 ft. length and one 2 ft. 6 in. length of 1 in. outside diameter conduit piping, and six $\frac{1}{4}$ in. bolts of sufficient length to pass through the top of the work bench, plus 2 in.

For bending the pipe you will need a special former, and this you can make. Without the former the pipe would flatten before bending, and would look very unsightly indeed. Cut two discs of plywood or chipboard, one about $1\frac{1}{8}$ in. thick and 6 in. diameter, the other $7\frac{1}{2}$ in. diameter and $\frac{1}{2}$ in. thick. Clamp them together concentrically, and drill four holes $\frac{1}{8}$ in. diameter through both pieces. Drill the same holes through the top of the work bench in a suitable position, and fix the former to the bench top with the four bolts screwed up tight.

With the other two bolts fix a stop 1 in. thick to the bench top in the position shown, and all is ready for bending.

Bend the longer pipe into shape as indicated by slipping one end between the former and the stop, and bending round the former till the correct shape is obtained. Cut the ends to make them the same length, and drill a $\frac{1}{2}$ in. clearance hole right through at both ends. Also drill the short length of pipe with the same drill, after cutting to a suitable length, and bolt firmly together.

No dimensions are given as baths vary so much in shape and size. Paint to match the bathroom decoration, and bind the ends with electrician's tape, and furnish with rubber stops to prevent damage to the enamel surface of the bath. In use just slip the loop over the taps, and allow the cross members to rest on the top of the bath. (E.M.)



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 ★*****

LABYRINTHS AND MAZES

IN a previous issue we promised to consider the construction and solutions of mazes. It will already have been recognised that the basic feature is a maximum length of pathway in a minimum amount of space. The area itself may be of any shape and so we have unlimited latitude in planning the puzzles.

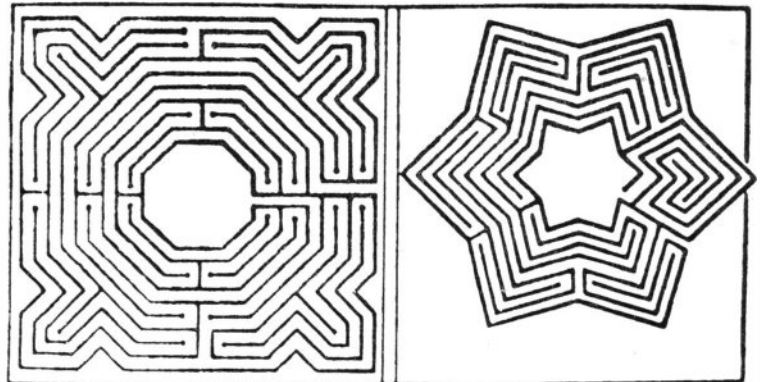
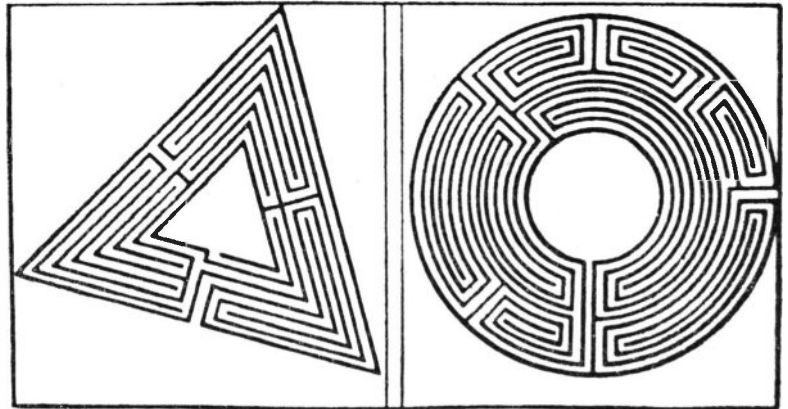
Some of the simplest games are related to the maze, having impediments or obstructions to encounter on the journey. Snakes and ladders is a good example but to make the game, or maze, interesting it is usual to have a goal worthy of the players' efforts. It might be 'treasure' or a monster but that can be left to you.

The design itself may become complex from a simple start, perhaps with one pathway with a multiplicity of turnings, branches and junctions yet apparently having a symmetrical appearance. This pathway should be continuous and connect the outer entry with a centre goal. There is no reason why there should not be 'islands' here and there or a few cul-de-sacs but the route should neither be too long nor too short. It is also wise to avoid long stretches of straight, tedious pathways. For your information I would mention that the one-path maze, e.g., Hampton Court, is usually termed a *unicursal* maze.

We can make mazes a little more complex by having two or more pathways or branching paths which may be simple or sub-divided and it is customary to refer to these as *multicursal*. In theory, but impossible to do on paper, we could also produce mazes on more than one level with steps in different directions at the junctions and which would become very complex indeed.

Perhaps it will be easiest to demonstrate the construction of a maze by using concentric circles as shown in Fig. 3 and 4. In the former you will see that a direct line has been drawn from the entry to the goal and passages allowed alternately. This straight line should however, be cut at each crossing and the 'wall', or impediment pushed backwards either to the right or left. In Fig. 4 cross connections have been made.

A similar arrangement can be devised with oblongs or squares, using the shortest route to the goal as the base and then re-arranging this to make obstructions as desired. In fact, there is just as much fun in preparing a maze as in solving one. Some of the mazes devised by G. A. Boeckler so long ago as 1664



Geometrical mazes by G. A. Boeckler, 1664

are interesting and you may study these examples as well as try your skill at following the pathway.

When we speak of a solution we really mean the discovery of the correct path which leads to the goal. While there can be no set formula for every maze we can explain a method which proves successful.

The Hampton Court maze is quite simple to solve if after entering one keeps the right hand to one hedge and follows this to the goal. At one point one does in fact re-trace one's steps but this is the easiest solution to explain. I should mention that this solution is possible because Hampton Court maze is so constructed that it consists of one continuous hedge plus others which may be regarded as 'islands'. If you refer to the diagram in the previous issue and make

a coloured line around this continuous hedge you will see how the islands have been fitted.

We cannot use reels of thread unless we are in an actual maze and this can become tangled among hedges but when confronted with printed mazes we can use a simple method. In the following the term *node* is used to indicate a junction or point of branching. On arrival at a node make three marks. Should you see that there are marks on other paths at this junction you immediately recognise that you have been at this point previously. Mark your arrival path with one mark only. If all the paths before you are marked it can only mean that you have already travelled this section and have no alternative but to return. If there are one or more unmarked paths select one

and as you enter mark with two marks.

If you observe the rule that on arrival at a node you never take a path with three marks unless there are no paths unmarked or one mark only, you can be certain that every path has been tested. When a one mark path is entered add a further two marks which should always be made when leaving and it then becomes a three mark path.

This may sound rather more complicated than in actual practice but if you are trying to follow a maze printed on paper using a pencil it is a simple matter to mark dots at the nodes.

Once you know how mazes are constructed you can make your own. The easiest way is to make a plan on paper as shown with geometrical shapes. On the beach you can scratch out the paths with your spade or if you have a garden you may use stones or canes for the dividing walls.

In some parts of the country there were quite a number of turf mazes made on the ground, the turf being raised to form walls, leaving the channels for the

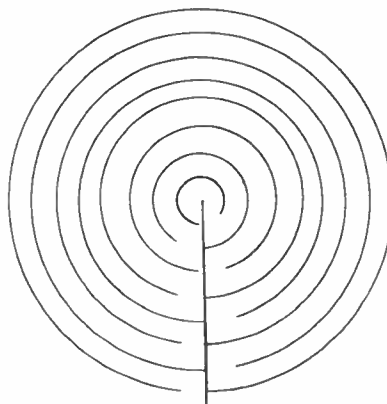


FIG 3

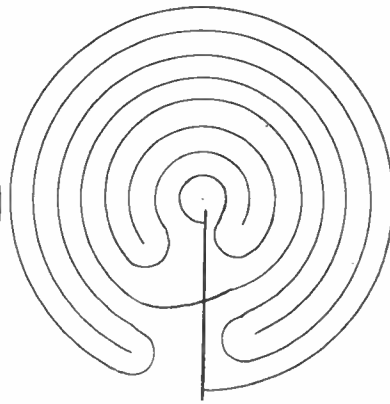
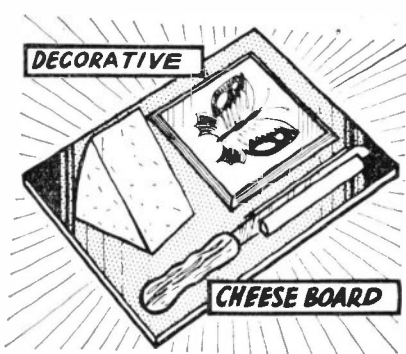


FIG 4

pathways.

You may also draw them out on paper for use as puzzles and a quick way is to draw a continuous line, turning in different directions to the central

goal, adding islands and branches to confuse. Lots of toys can be similarly constructed by gluing cardboard walls to a baseboard and having a ball bearing for the pathfinder. (S.H.L.)



type, 6 in. by 6 in. china, cement, plastic or any other hard material. One with a burnt-in design or picture looks best, especially if it has an eggshell finish.

Fix the tile with a contact glue, and fix a quarter round moulding with glue and panel pins to hold the tile in place. The moulding should not project above the surface of the tile. Mitre the corners neatly, and don't forget to use the glasspaper.

The knife holder is made of two

pieces of quarter moulding about $\frac{1}{8}$ in. by $\frac{1}{8}$ in. and $4\frac{1}{2}$ in. long, glued and pinned in place. This is best done by fixing one piece first and when the glue has set fixing the remaining piece with the knife blade firmly held between them.

Any kitchen knife will do but a special cheese knife is better. An old fashioned horn-handled dinner knife looks well against the walnut board.

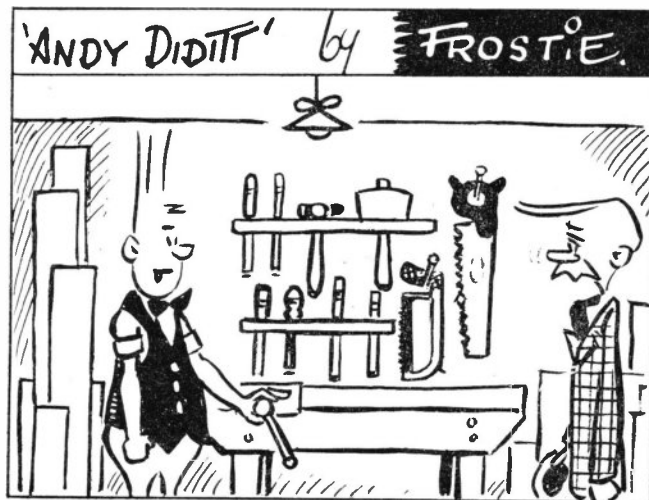
Your dinner table will be enhanced by the beauty of a well made cheese board.

(E.M.)

CHEESE boards are becoming very popular. They can be had in all manner of shapes, sizes, and materials. But the best are always made of wood, the traditional material for cheese boards, bread boards, and butter plates, etc. It seems to add something to the cheese to cut it on a board of nicely grained and polished timber. One imagines that it adds some piquancy to the flavour. Blue cheese definitely looks well against a piece of hard wood polished to a satin finish.

For the board shown you will need one piece of walnut, beech, mahogany or oak about $\frac{7}{8}$ in. or 1 in. thick, about 9 in. wide and 12 in. long. Glasspaper all over till absolutely smooth, finishing off with the finest glasspaper. Then finally polish with a beech wood block that has been similarly glasspapered. Rub hard all over, following the grain till a nice satin sheen is obtained on the board.

Choose a gaily coloured tile of any



"I'M SORRY THE WORKSHOP'S IN SUCH A MESS —
MA'S BEEN TIDYING UP THE PLACE!"

TABLE TOP PHOTOGRAPHY

ABOUT two years ago, I contributed an article to this magazine in which I set out to show how creative photography could be carried out within the limited compass of a few square feet. This present article takes the subject one stage further, giving more ideas for interesting and novel photography which can be carried out regardless of the time of day or the weather conditions which so often control normal photographic activities.

All the themes described now have one factor in common. That is, their absolute simplicity to arrange and the complete absence of expensive and intricate lighting patterns.

Silhouette effect

Fig. 1 is really an example of symbolic photography, as it suggests a subject to the mind, rather than actually portraying it. The title is 'City Skyline' and the interpretation of the picture is obvious.

Once you have got the basic idea for a shot of this kind, the execution is quite straightforward as the picture relies entirely on silhouette effect for its appeal. The principal material, from which the

ance to light passing through from behind.

The cut out card is propped up in front of a plain white background and some 2 feet in front of it. A single 60 or 100 watt pearl bulb held in a table lamp, without its shade, is arranged between the cutout and the background so as to give a nicely graduated tone to the sky

and fast depth of tone, there will be very little difference between a negative made with one exposure and another made with a much shorter or longer time.

Simple lighting

Moving on now to Fig. 2, this subject is virtually ready made and requires only the cutting out of some background

Fig. 2—Glass animals, cardboard mountains and a handful of sand are the ingredients here

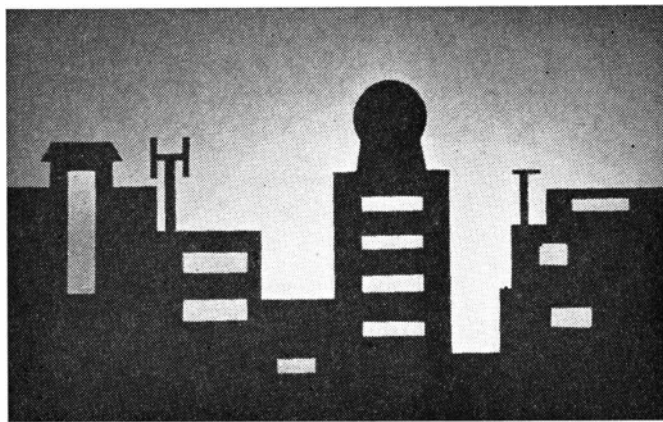
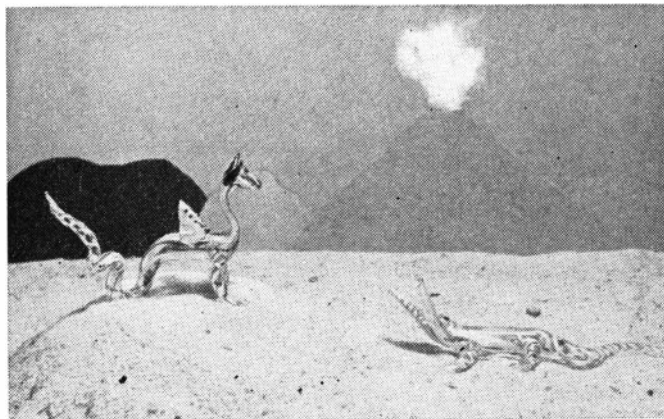


Fig. 1—'City Skyline' — a simple symbolic subject cut from black card

subject is constructed, is just a large sheet of black cardboard. Of course, any cardboard will do and this can always be darkened with indian ink to gain the required effect.

A picture of this nature relies very largely on strong lines and the complete absence of detail, so a basic design is drawn on the card and then cut out with a steel rule and trimming knife. Where windows are to be incorporated, the holes in the card may be backed with greaseproof paper to give a little resist-

without any light falling on the front of the card. This means having the bulb well down and out of sight. Use a supplementary lens on the camera to enable you to get in really close and support the camera firmly while making the exposure.

Exposure is not at all critical when making silhouette type pictures, for the black card will be unilluminated and, therefore, be rendered as clear film on the negative. Since only a graduated grey sky is required, without any hard

detail. In this case, a range of mountains has been made from card of different colours, and propped up some 18 in. behind the main subject.

The smoke coming from the top of the volcano is just a tuft of fluffed out cotton wool stuck on at the rear. The foreground is sand, a most useful material for all table top photographers and one which can be adapted to many purposes. To obtain a rise in the landscape, it is necessary only to place a small box or block of wood in the appropriate position and to sprinkle sand on and around it so that it forms a natural looking hillock.

In the present case, the two figures used for the main subject material are made from fancy glass, but pottery or carved wood subjects would do just as well. If you do not have any of your own, how about seeing what your friends and relatives can offer on loan? The lighting here is even simpler; consisting only of a single 100 watt pearl bulb suspended immediately overhead. Because of the translucent nature of the glass animals, a certain amount of the light passed through and formed only very slight shadows underneath.

Real-life action

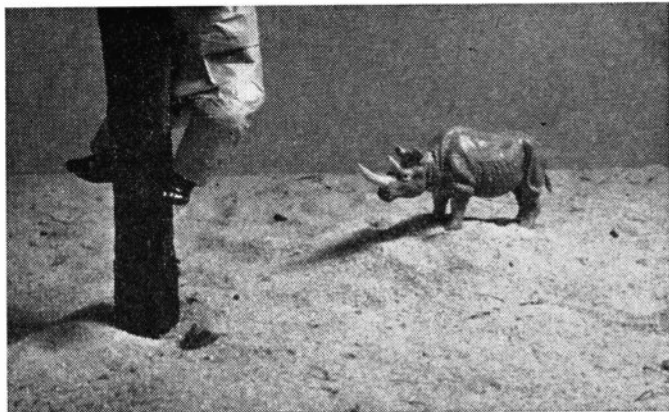
So far we have dealt only with fanciful

scenes, or fantastic ones if you prefer to put it that way. Now look at Fig. 3 and you will see just how table top photography can be adapted to simulate real-life action. Humorous or serious themes can be recorded with equal ease and a little ingenuity entirely replaces the need for elaborate 'props'.

In this picture, the rhinoceros is a small plastic toy obtainable for a few pence from any chain store. The man hurriedly climbing the tree to get out of harm's way is a little celluloid doll which has been dressed in a safari suit made from brown paper. To suggest shoes, the feet of the doll were blackened with indian ink. The tree itself is just a stout branch a few inches long, attached at the base to a square of cardboard by means of a drawing pin pressed up from underneath. When sand was sifted all around the foreground, this cardboard base was completely hidden.

The legs of the doll were bent into a natural position and it was secured to the branch by sticky tape situated well out of view of the camera. Dramatic quality lighting was called for in a picture of this nature, and it was supplied

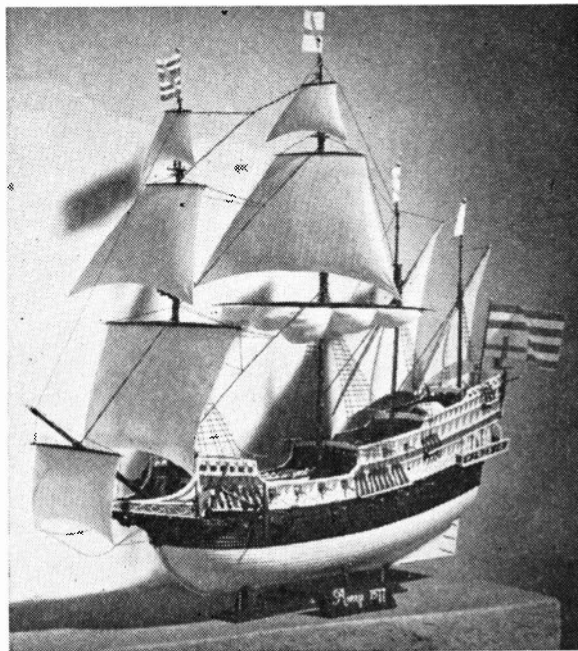
*Fig. 3—
Dramatic
lighting
for a
dramatic
subject
with a
touch of
humour*



by having a 100 watt pearl bulb to the right of the scene and a little to the rear. To supplement this basic light, a 60 watt pearl bulb was placed alongside the camera and adequately illuminated the front of the scene.

All the exposures were made at a

camera lens aperture of $f/16$ and the times varied from $1/25$ th. of a second for Fig. 1 to $1/2$ second for Fig. 3. The film used was a conventional medium speed panchromatic material such as one would normally employ for regular outdoor photography. (A.E.B.)



ONE hundred and fifty five pieces go to make up the constant scale construction kit from Airfix, Sir Francis Drake's *Revenge*, which costs 15s.

Sails, ratlines, flags and 36 guns are all included in the highly detailed and

intricate model, which measures more than 16 in. in length. Four impressive anchors, miniature 25 ft. barge, stern lantern and detailed engraved decorative work along the sides and round the stern transom add the final touches of realism to this splendid model.

ANOTHER AIRFIX WINNER

Stand and nameplate are provided, allowing builders to make the model into a display piece.

The most prolific fighter on either side in the Second World War was the German Me Bf 109 which was produced from 1935 to 1946 in many different versions. Joining the Airfix range is the 109 G-6 — the major production version — which comes as a 40 piece kit with choice of armament for only 2s.

Full instructions are provided for modellers to build either the home defence or tropical versions of the aircraft, with armament that includes either 20 mm. cannon in gondolas, a single bomb, or twin 21 cm. rocket missiles.

The Grumman Wildcat — the first American plane in British service to shoot down a German aircraft — is another 2s. constant scale kit from Airfix. The model contains 33 pieces and details include armament of six rockets and twin drop tanks, pitot tube, and undercarriage which may be built in lowered and raised position.

Parts, transfers and instructions for no less than five different versions are included in the Airfix kit for the Junkers, JU 52 which costs 7s. 6d. The 109 piece kit includes sets of optional transfers and full painting instructions for each version.

Airfix kits are available from all Hobbies branches.

Sir

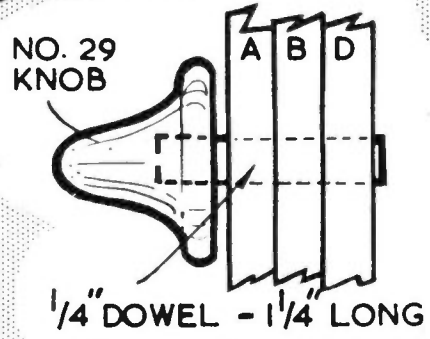
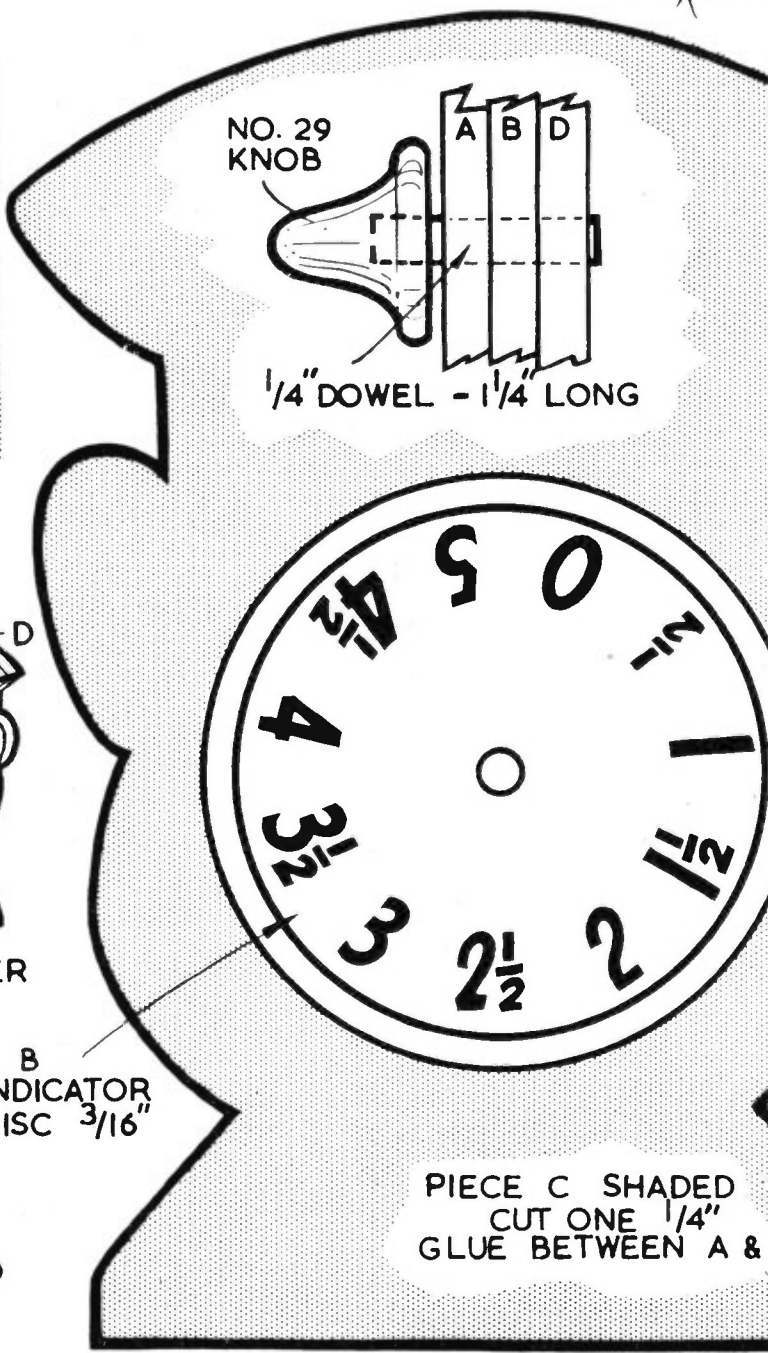
Francis

Drake's

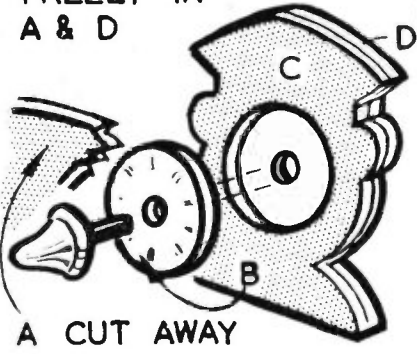
'REVENGE'

MILKO

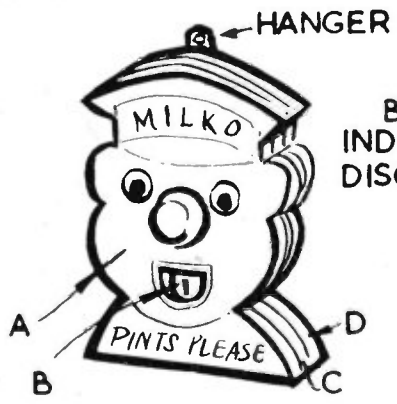
NOVELTY MILK INDICATOR



AXLE FITS TIGHT
ON B AND WORKS
FREELY IN
A & D

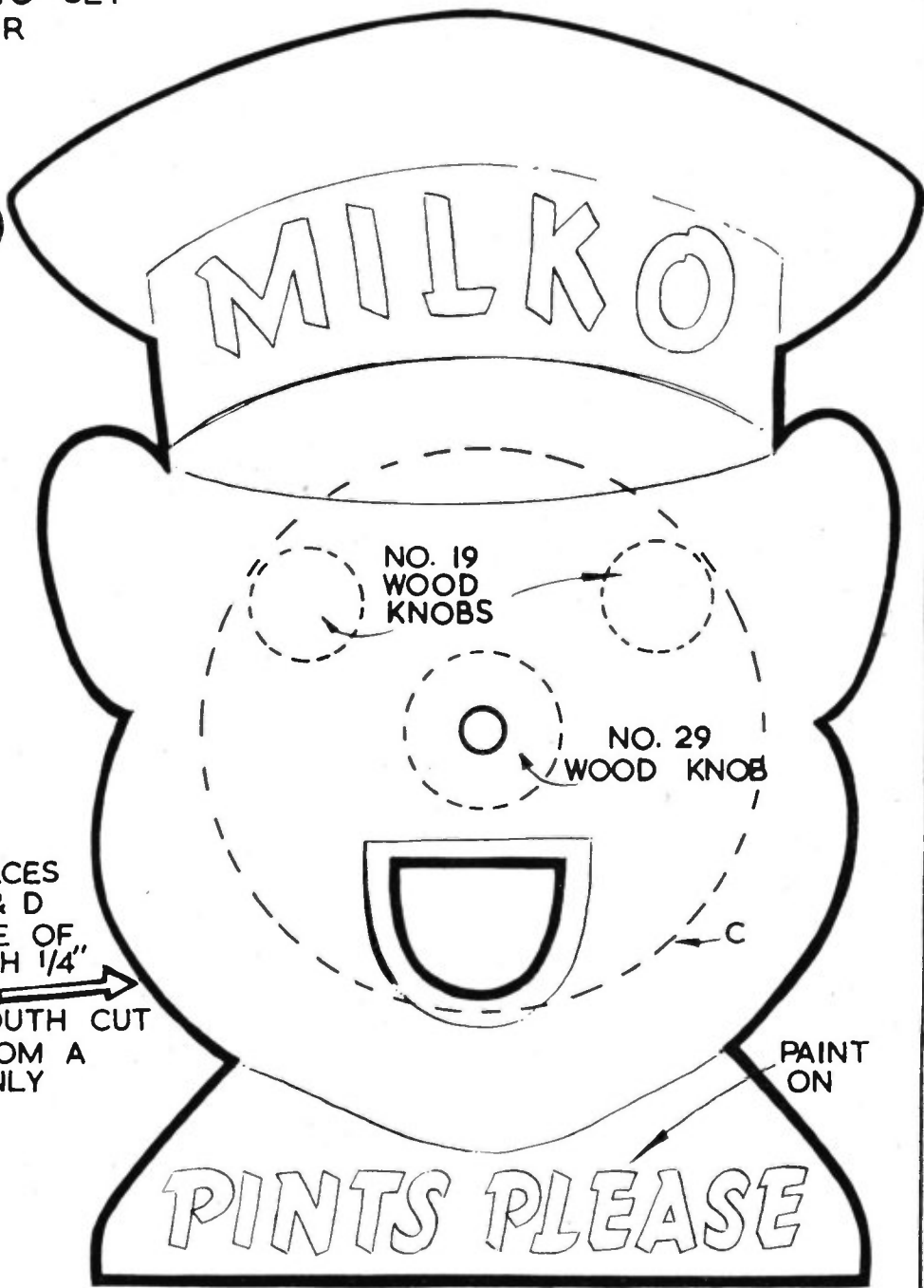
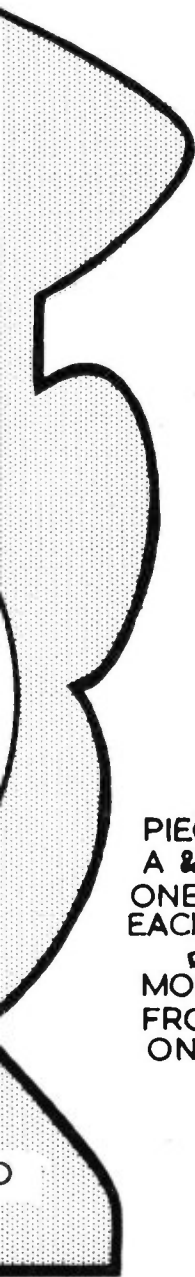


A CUT AWAY



PIECE C SHADED
CUT ONE $\frac{1}{4}$ "
GLUE BETWEEN A &

N NOSE TO SET
INDICATOR



PIECES
A & D
ONE OF
EACH 1/4"
MOUTH CUT
FROM A
ONLY

PAINT
ON



MAKE YOURSELF A GARDEN POOL

ALTHOUGH the edges of the pond may be very slightly raised above ground level, the really well-built pool must have some form of overflow to deal with excessive rainfall, etc. Similarly, there must be some way of emptying the pool for cleaning.

Both outlets can be arranged by passing a short length of suitable narrow bore pipe through the shuttering, and across the width of the wall, leaving these in position while the concrete is poured and rammed. (It is advisable to temporarily block both ends of each pipe to ensure that no concrete gets into the tube and partially blocks it.) When the pool is completed a piece of fine galvanised wire mesh is put over the inside of the overflow pipe to prevent the passage of leaves and small fish, while the outlet pipe must be fitted with a suitable plug or stopper. The plug needs to be firm enough to prevent its being dislodged by accident, or by inquisitive small children.

In the case of the drain pipe the ground is going to be saturated when the plug is pulled free. The ideal solution is to

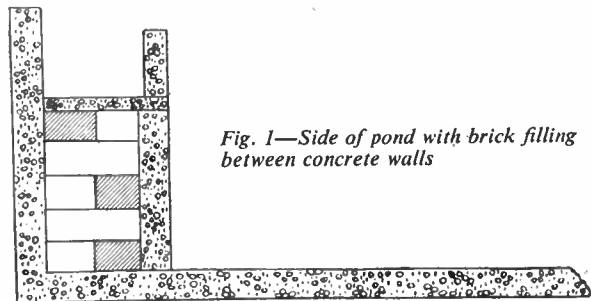


Fig. 1—Side of pond with brick filling between concrete walls

connect the outlet pipe direct to a drain pipe, but this is not usually possible, though a small rubber hose-pipe can often be attached to the outlet, when necessary, to divert the water into the nearest drain.

Remembering the importance of overflow and drain pipes (which should be fitted to all but the very smallest pools), we can return to the building of the type of pool being described.

The concrete of the walls must be allowed to initially set

Part 2

CLEANING OUT

before the shuttering boards are removed, when they may be covered with damp sacking until curing is complete. In very hot weather it may be necessary to sprinkle the sacks with a watering can to keep them moist. If possible, all four walls should be cast at the same time.

Inner walls

Work can then proceed on the casting of the inner walls that make the step for the shallow rooting aquatics. The top of this can finish about 9 in. below the top of the pond, and can be 9 in. to 1 ft 6 in. or more wide, according to the size of the pool.

Although the front wall of this needs to be strong enough to resist the water thrust, there is no reason why the entire step

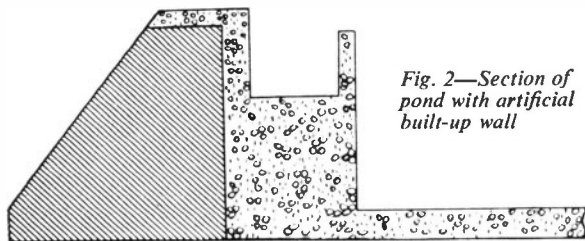


Fig. 2—Section of pond with artificial built-up wall

should be of concrete. The front wall should be cast in the same way as the main walls, and the space between them filled with brickwork, with a concrete capping piece, as shown on the sectional view at Fig. 1. Alternatively, the space can be filled with unwanted garden stones or broken concrete, rammed well down, and finished off with concrete at the top.

Note that if the intention is to keep only fish or floating aquatic plants in the pool, the step can be omitted, which greatly simplifies the building.

When all the concrete has dried, the exposed surfaces are given a smoothing coat of waterproof cement or a mixture of one part of cement to three of sharp sand.

The instructions so far given apply to a pool of regular, rectangular shape, but some differences are necessary for an informal pool.

Any kind of shuttering must be of a flexible material, but firmly braced, so that it will not move under the thrust and ramming of the concrete. The profile of the pool where it touches the earth is usually of little importance provided that the thickness of the lining is adequate for strength. Steps for shallow rooting aquatic plants tend to be small and non-continuous, the base for them usually being in the form of a large stone set in the side of the pool. Much of the profile of the pond may have to be worked as the rendering coats are put on.

Although the small informal pool is not, usually, as easy to build as the rectangular pattern, the work is well within the average handyman's scope. Perhaps the chief point to watch is the overall shape of the sides, for if these have a slope too closely approaching the vertical, the thrust may be greater than for a properly built cast vertical wall. Gently sloping sides offer a chance of spreading cement and concrete with the minimum of shuttering.

The last type of pool with which we need concern ourselves is the built-up pattern.

This is usually of simple rectangular shape, and has the advantage that it calls for the minimum amount of digging. Its chief disadvantage is that usually it must be kept rather shallow, which means that fish cannot always be kept in safety during the winter months, though if they can be

transferred to indoor tanks over this period the difficulty can be overcome. It might be important to remember that fish living in pools tend to grow bigger than those kept in an indoor tank, so adequate living space may be difficult to arrange if the fish are numerous.

Built-up tank

For the simplest form of built-up tank the ground is excavated to a depth of about 7 in., and the base is laid to a depth of 6 in. of concrete in the normal way. The walls are then erected on this base, using the shuttering method as before, but as there is no supporting earth to take the side thrust, the walls need to be from 4 in. to 6 in. thick. Outlet and drain pipes must be provided as before, with steps for shallow rooting aquatics.

Fig. 2 shows, in section, an alternative form of construction. With this the pool is built in the way described above, but an artificial grassed bank is put round all sides of it, allowing for a greater depth of pool with safety, and giving a better bearing surface for the sides. Much of the required slope can be made up from broken brick, smashed concrete, boulders, and other non-rotting rubbish that accumulates in most gardens. If required, a paved surround can be laid round such a pool.

(N.W.)

CHEMISTRY

AT HOME

2—BROMINE EXPERIMENTS

By *L. A. Fantozzi*

IN the article on Bromine, Br, we saw how some of its properties could be studied by using it as bromine water.

Some bromine compounds, in fact, can be prepared without even using bromine water. The bromine reacts almost as soon as it is formed and so only appears momentarily in the free state. This particularly applies to bromo-derivatives of some organic compounds and which are used in analysis to detect certain substances whose bromo-compounds have characteristic melting points.

A case in point is that of phenol, C_6H_5OH , which reacts with bromine to form tribromophenol, $C_6H_2Br_3OH$, and hydrobromic acid, HBr :

$C_6H_5OH + 3Br_2 = C_6H_2Br_3OH + 3HBr$.
The necessary bromine is generated in the same manner as for making bromine water. Namely, by adding dilute sulphuric acid, H_2SO_4 , to a mixed solution of potassium bromide, KBr , and potassium bromate, $KBrO_3$:

$5KBr + KBrO_3 + 3H_2SO_4 = 3Br_2 + 3H_2O + 3K_2SO_4$.

By dissolving the phenol in the bromide/bromate solution before acidifying the tribromophenol is readily produced.

Dissolve 2.78 grams of potassium

bromate and 9.91 grams of potassium bromide in 100 ml. of hot water and let the solution cool. To this add a solution of 1.56 grams of phenol in 50 ml. of water. Phenol blisters the skin; should any come in contact with the fingers swab freely with methylated spirit and then wash with soap and warm water.

Now stir in 50 ml. of 10 per cent sulphuric acid. The mixture turns milky at once and soon a curdy yellowish precipitate of tribromophenol separates. Allow the whole to stand for two hours for the reaction to complete itself. From start to finish only a barely perceptible odour of bromine will be noted.

Filter off the tribromophenol, wash it well on the filter so as to free it from potassium sulphate. When one wash water gives no white precipitate of

strontium sulphate, $SrSO_4$, when tested by addition of a solution of strontium nitrate, $Sr(NO_3)_2$:

$K_2SO_4 + Sr(NO_3)_2 = SrSO_4 + 2KNO_3$
(potassium nitrate), the tribromophenol may be allowed to dry.

For the purpose of taking its melting point it must be further purified by recrystallization from warm isopropyl alcohol, $(CH_3)_2CH.OH$. Put the tribromophenol into a flask fitted with a condenser on a water bath Fig. 1. Add very small amounts of isopropyl alcohol through the top of the condenser until the tribromophenol is all in solution taking care that each lot of solvent boils before adding more. Remove the apparatus from the water bath, disconnect the condenser and gradually add to the solution small amounts of water until the solution grows turbid. Refit the condenser and replace the flask on the water bath.

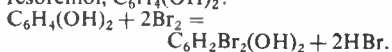
As it heats up again the solution clears. Filter it hot and let the filtrate stand a few hours. Pure tribromophenol crystallizes out. Filter it off and let it dry.

To take its melting point you will need to make a special tube from a short length of glass tubing. Soften the middle section of the tubing in a spirit lamp or gas flame and then draw it out so as to have a length of capillary tubing of about 1 to 2 millimetres bore Fig. 2. Cut the centre with a file and then seal the capillary by touching it to the flame.

Grind a very little of the dry tribromophenol and put it into the capillary to a depth of about 2 millimetres, tapping well to compact the powder. Fasten the melting point tube to a

thermometer with a rubber band and partially immerse it in a flask containing medicinal liquid paraffin, shown Fig. 2. Slowly heat the liquid paraffin. When the tribromophenol suddenly becomes transparent this indicates the melting point. Immediate reference to the thermometer will show it to be at or close to 95 degrees Centigrade, thus indicating that the substance is in fact tribromophenol. Complete proof of its identity can be had by mixing a known specimen of tribromophenol with that obtained experimentally and taking a mixed melting point, when no change in the melting point will be observed. Two different chemical compounds melted together show nearly always a markedly lower melting point.

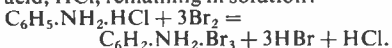
Another bromo-compound easily prepared by this method is dibromoresorcinol, $C_6H_2Br_2(OH)_2$, from resorcinol, $C_6H_4(OH)_2$:



Dissolve 1.83 grams of resorcinol in 35 ml. of water. In 65 ml. of hot water dissolve 1.85 grams of potassium bromate and 6.6 grams of potassium bromide, let the solution cool and add it to the resorcinol solution. Now stir in 3.5 ml. of 10 per cent sulphuric acid.

During the next few minutes the liquid grows turbid and on keeping for two hours the liquid is nearly filled with tiny silky prismatic crystals of flesh-coloured dibromoresorcinol. Filter off the dibromoresorcinol and free it from potassium sulphate by washing with water until one wash water gives no white precipitate when tested with strontium nitrate. Then let it dry at room temperature. Purify by recrystallization from isopropyl alcohol in the same way as for tribromophenol, dry it and then take its melting point. Dibromoresorcinol melts at 112 degrees Centigrade and the melting point obtained should be close to this. The knack of correct melting point determination is very slow heating as the melting point is approached.

Tribromaniline, $C_6H_2.NH_2.Br_3$, too, can be prepared similarly. Dissolve 2.78 grams of potassium bromate and 9.91 grams of potassium bromide in 100 ml. of hot water, let the solution cool and add to it a solution of 2.16 grams of aniline hydrochloride, $C_6H_5.NH_2.HCl$, in 50 ml. of cold water. Stir in 50 ml. of 10 per cent sulphuric acid. The liquid becomes milky at once and a precipitate begins to appear in a few seconds. This is tribromaniline, hydrochloric acid, HCl, remaining in solution:



After standing two hours filter off the tribromaniline, wash it on the filter until it is shown to be free from potas-

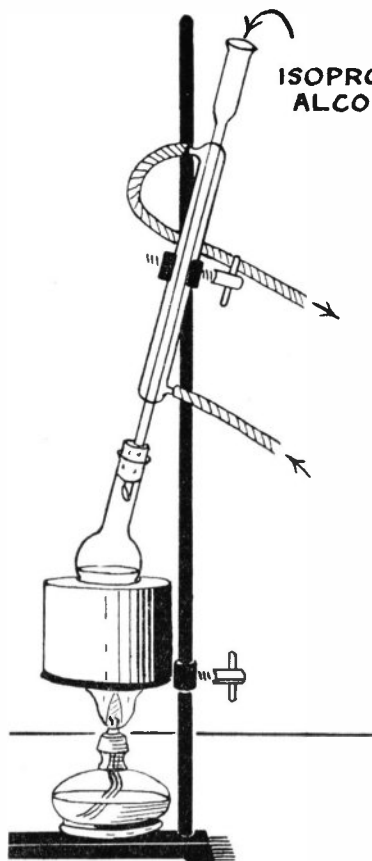


Fig. 1—Purifying tribromophenol

sium sulphate by one wash water not giving a white precipitate with strontium nitrate solution and then let it dry. Recrystallize it from methylated spirit using the same apparatus as for tribromophenol, but in this case do not add water, simply adding methylated spirit gradually down the condenser until the solid is dissolved. Filter the solution hot. On cooling and standing minute red-buff needles of almost pure

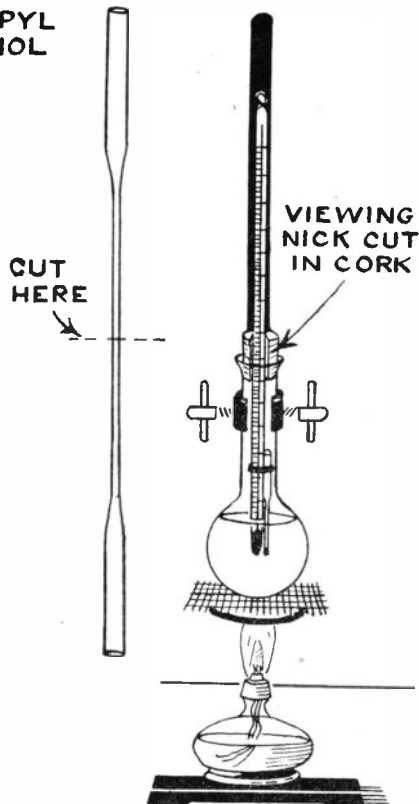


Fig. 2—Melting point determination apparatus

tribromaniline separate. Filter them off, let them dry and then take the melting point as before. It should be close to 120 degrees Centigrade, which is the melting point of the pure compound.

It will be apparent that this method can be of general application in preparing bromo-compounds and is worth trying out where the parent compound is soluble in water and the bromo-compound is insoluble.

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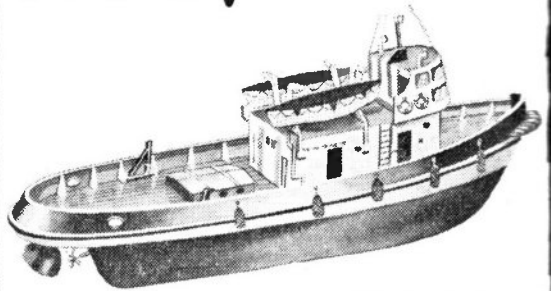
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ARE you a collector? Do you collect old paintings, old coins, rare stamps — things of beauty and value? Or, are you one of those people who will go to no end of trouble to collect wine labels, old railway time tables, beer mats and even bath taps?

Whatever we may think of these collectors there is some value in collecting things. Collectors set themselves an object which can eventually be reached. Once these people have found that rare butterfly, that ash tray from the Ritz or a menu printed in Hindustani, then according to a psychiatrist, 'Success means that there is one less problem in the world — and we are all the better for it.'

One American was much the better for it. Recently a museum paid over £1,000 for his collection of used tram tickets that came from lines which went out of existence nearly 50 years ago. Laugh at collectors if you will but there is money in the strangest things.

Its not so long ago that £10,000 was offered for a collection of menus from famous banquets.

Objects belonging to famous personalities always bring high prices. A top hat worn by American President Theodore Roosevelt brought £800. Abraham Lincoln's letters to his wife were sold for £35,000 and his personal copy of the Gettysburg address raised £18,000.

Autograph hunting has always been popular but few signatures are likely to raise more money than that of Button Gwinnet. The son of a Gloucester parson, he went to America and became one of the original signatories of the Declaration of Independence. £10,000 was the sum paid for his signature.

King of collectors

Most collectors tend to stick to smaller items such as matchbox labels. Even such small items as these can mean money for their owners. A Bristol man, Mr. Alfred J. Cruse, became £500 richer when he sold his complete collection of cigarette cards to the 'King of Collectors', the late King Farouk.

A collection of military buttons, including one from the time of Captain Dreyfus when he was drummed out of the French Army, brought £30,000 from an American millionaire to a London man.

If you need some ready cash, search your lumber room or attic, you may find a glass paperweight. If it's a genuine Victorian one it could fetch anything from £300 to £1,300.

Not all collectors sell their collections, however. Some people build up their own private libraries of the oddest things. Take, for instance, the man who devoted his life to collecting bath taps. From Paris he brought a gold plated one,

TOPICS FOR COLLECTORS

EVER THOUGHT OF BATH TAPS?

By P. Melvyn Garr

from Mexico, a wooden one. If you would like to see them they are all on view at the Parkes Sanitary Museum — and as an added attraction you can also see a fine collection of old lavatory seats!

In Birmingham there is what is probably the world's largest collection of bikinis — three hundred of them! They belong to a Midlands man who spends much of his free time writing to film stars and glamour girls asking for their cast offs. One day he intends donating his collection to a museum of dress to assist in the science of costume.

Lurid wallpaper

Yet another enthusiast found the lurid covers of paperback books very useful and far, far more decorative for papering his walls than pin up pictures. He wrote to the publishers asking them if they would let him have the covers from books at reduced prices.

Whenever Mrs. Glen Peacock entertains she brings out over two hundred and fifty spoons, but never uses them! They are her collection of spoons from North and South America, Cuba, Europe and Hawaii.

The prize spoon of the collection is a very rare one, a King Edward VIII Coronation Spoon.

This was released before his abdication was known and as soon as it was apparent that the Coronation wouldn't take place, the spoons were withdrawn.

When Mrs A. E. Mack moved house she found some old buttons in a lumber room. They fascinated her so much that she began reading all she could about the history of buttons. Today she has a collection of over 42,000 buttons, all of them antiques. Not to be outdone, her husband began a collection for himself, this time it was dolls. In the Mack house today there are the 42,000 buttons and over 100 dolls, some more than a century old.

There are, of course, those who collect big, outside curios. Mr. Bernard Delooze, for example, was refused permission to build a home for his collection. No wonder! Not only was there an armoured scout car and an amphibious jeep, but the pride of the collection was a 35 ton Sherman tank.

Traction engines and steam rollers are very popular although they are gradually becoming more difficult to obtain. Even so, people will still pay quite large sums of money to get them, like the Bexhill doctor who paid £300 for a steam roller and the naval officer who paid £85 for a traction engine.

And it's not just older folk who go in for collecting oddities. A recent survey revealed that youngsters have many strange collections — silver coins minted before 1920, toll tickets (though there are only a few tolls left), nameplates from fairground engines, old cast-iron fire grates, etc.

One Manchester schoolboy collects tramway exhibits, including a trolley wheel, whistle, overhead wire supports, pole strap, regulations book, brake handle and a steel tram tyre.

When he wants to sit and look at his collection he uses — yes, you've guessed it — a wooden tram seat.

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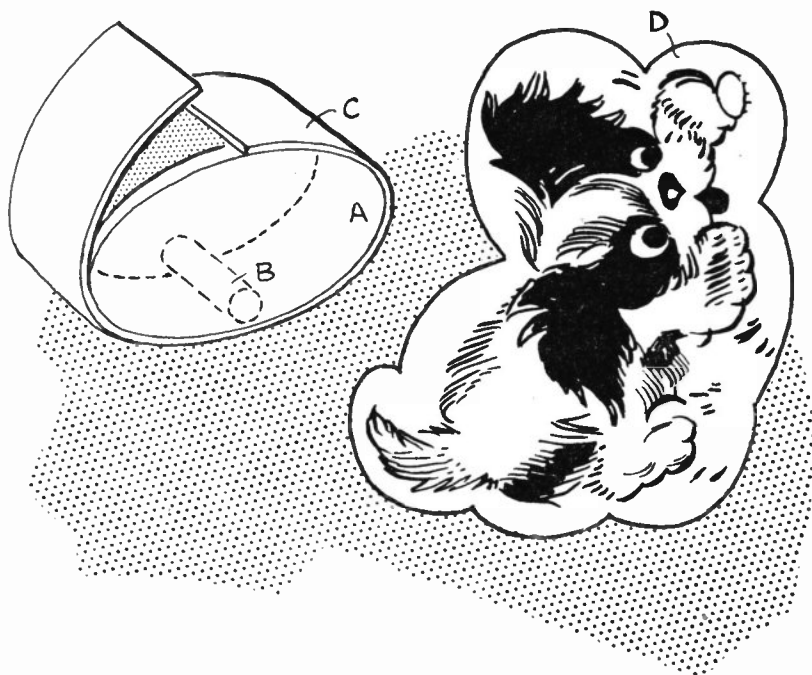
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AN AMUSING TUMBLING TOY

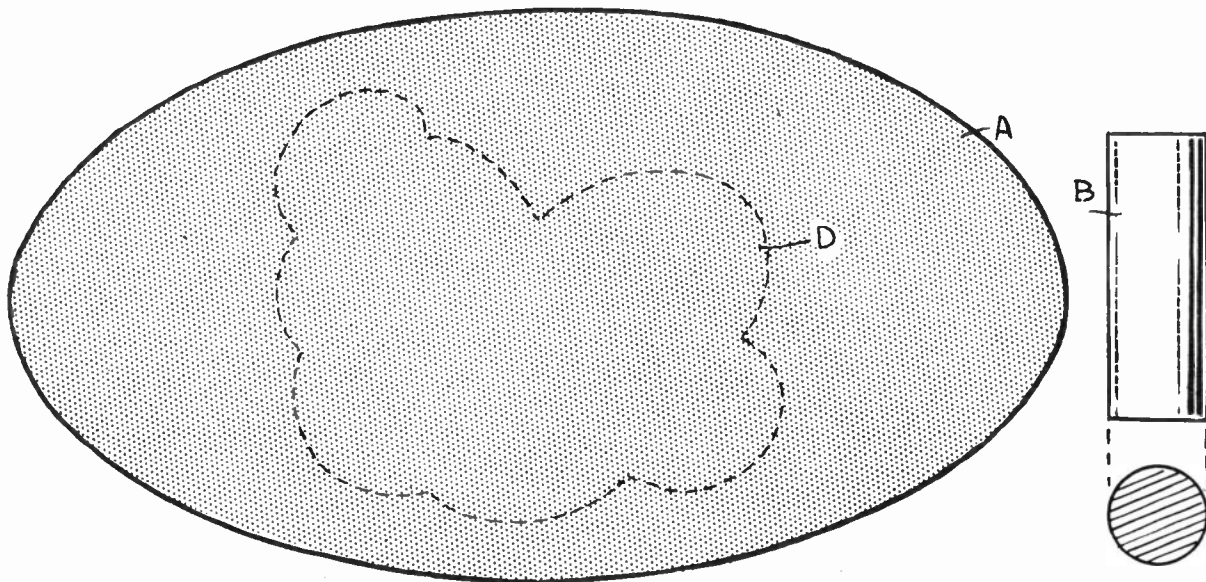
THIS amusing toy, when placed at the top of a sloping surface, will roll down head-over-heels, in a most realistic fashion. The secret is the metal roller inside, which keeps the toy on the move.

Cut two pieces A from $\frac{3}{4}$ in. wood, and a strip C of card or thin plywood about $2\frac{1}{2}$ in. wide, and long enough to go right round. Glue and pin the strip round the sides A, inserting a length of metal rod B inside. The rod should be free to roll round the interior of the toy.

Any suitable picture or transfer of a dog can be placed on the sides, or on overlays D, which can be on one or both sides of the toy. The picture shown is one from the Decorette transfer No. 212 (six on a sheet), price 2s. 3d. postage 4d. from Hobbies Ltd, Dereham, Norfolk, or from any Hobbies branch. (M.p.)



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CANOES (Rigid plywood skinned)

PBK16. A two-seater, flat bottomed, safe and robust. May be left afloat. 16 ft. long, 32 in. beam, 7 ft. cockpit, draught 5 in. Normal maximum load 700 lb. Price 13/6

PBK23. A single-seater with the same main dimensions as PBK15, but with V-bottom and hard-chine section. Roomy and stable, may be left afloat. 14 ft. 6 in. long, 26 in. beam, 48 in. cockpit, draught 4 in. Normal maximum load, 400 lb. Price 13/6

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