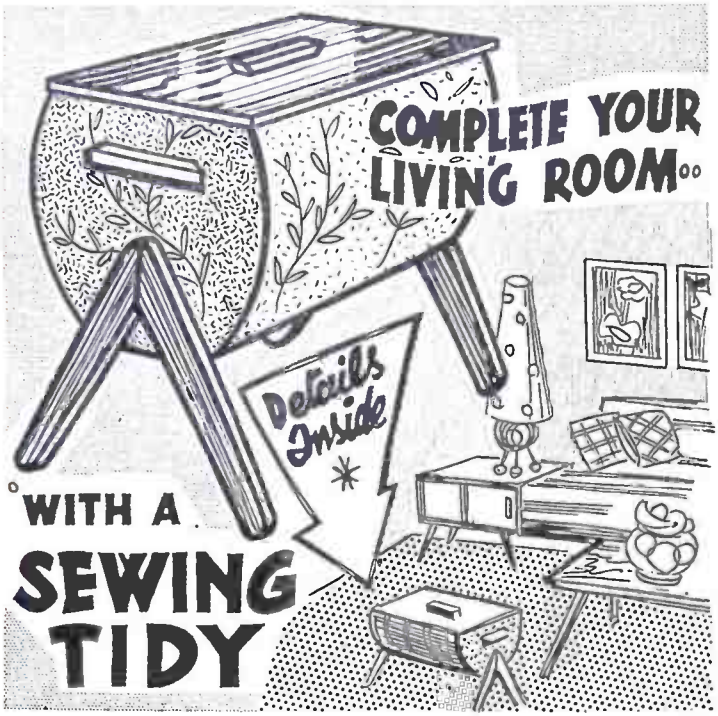
HOBBIES weekly

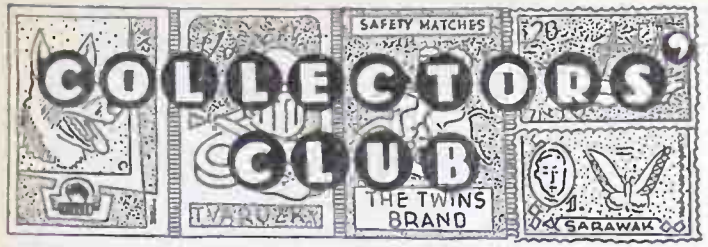
18th SEPTEMBER 1963 VOL. 136 NUMBER 3536



Hobbies

FOR CRAFTSMEN OF ALL AGES

6D



PAPUA AND NEW GUINEA

THREE new stamps for Papua and New Guinea have just been issued.

On 3rd July, a three-colour photogravure £1 stamp featured a portrait of Her Majesty Queen Elizabeth II in brown on a green background, with gold lettering, and was printed by Harrison and Sons, London. It will form part of the definitive series.

Two commemorative stamps were issued on 14th August, to mark the Territory's participation in the South Pacific Games held in Suva, 29th August —7th September. Denominations are 5d. and 1s. The design common to both stamps was based on the official Games emblem originated by Mrs. P. M. Prescott, of Port Moresby.

The stamps will be on sale for approximately three months.

ON the occasion of the inauguration of the University of East Africa (Kenya, Uganda and Tanganyika) two stamp values of 30 cents and Sh. 1/30, were issued. The design, which is common to both values, shows three silhouetted figures wearing mortar board

and gown together with an open book bearing the legend 'University of East Africa 28th June 1963'. The stamps are in multi-colour.

* * *

TONGA 'FIRST GOLD COINAGE'

A SPECIAL issue of stamps in commemoration of the first gold coin of Polynesia was placed on sale throughout the Kingdom of Tonga during the week commencing June 17th. The issue comprises 13 values, each featuring the obverse or reverse of one of the coins, in actual size and colour, embossed on gold foil backed by gummed and tinted security paper. The replica of the coin is surrounded by a coloured border on which is embossed in gold the inscription 'Tonga The Friendly Islands Commemorating the First Gold Coinage of Polynesia' and the value.

* * *

Special Shakespeare Stamps

A SPECIAL stamp issue will be made next year on 23rd April to mark the commemoration of the four hundredth anniversary of the birth of William Shakespeare. The stamps will be double the normal size.

NOTE TO CORRESPONDENTS

All correspondence on any subject covered in this magazine *must* be addressed to: The Editor Hobbies Weekly, Dereham, Norfolk. If a reply is required, queries should be accompanied by a stamped addressed envelope and reply coupon inside back cover.

For those holiday snaps

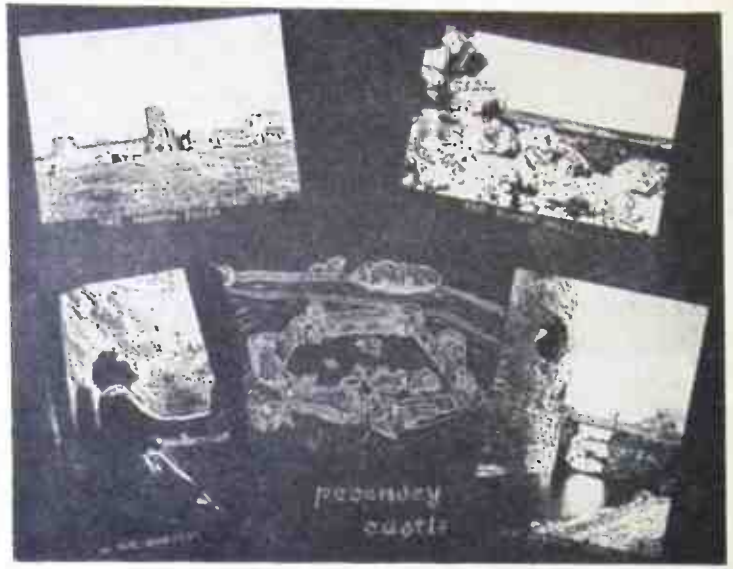
AN ALBUM THAT IS DIFFERENT

THIS year, don't just paste your holiday snapshots squarely into a book. Add a few extras and a little decoration to obtain a record that is both attractive and unusual.

You will, of course, need some sort of book and one with dark pages is preferable. For only a few shillings, a rigidly bound album specially made for the job is obtainable from well-known multiple chemists and some photographic dealers. Get one with a fairly large page size, as this will give you more scope in laying out the contents of the book.

The basic idea is capable of many variations, according to taste. For example, you can keep the contents in date order so that your record of the holiday will appear just as the various events happened. Alternatively, you can arrange the photographs so that all those concerned with one type of subject are near to each other.

Mixing colour and black-and-white prints gives a pleasing appearance and, as the former are generally supplied in enprint size, it is as well to order the same size when you have your black-and-white films developed and printed.



A sketch gives an attractive effect

Even a single line can help to balance the picture arrangement

For really special pictures, there is no reason why you should not have larger prints made and, perhaps, mount those singly on their own pages. Use a good-quality photographic mountant, or the prints will stain after some time. Angle the pictures in various directions, as this all helps to give a sense of variety. Put in titles, decorative lines and curves and other ornamentation with a white pencil or with poster paint.

You can even transfer sketches from guide books and similar publications by impressing them on to the album pages with a sharp pencil. Run over the outlines, then lift off the sketch and fill the impression on the album page with crayon or paint.

Don't throw away those tickets, menu cards, luggage labels, prospectuses and various other items accumulated from the holiday. These can all be mounted in the book, either alongside the photographs or in a separate section at the end. They help bring back pleasant memories and complete the visual record of the holiday.

Why not try the scheme out with this year's holiday snaps? It costs very little to produce an impressive album, and this is far better than having your holiday photographs lying jumbled up in a drawer or box. (A.E.B.)

How they work on Television

ROD PUPPETS

PUPPETRY is a somewhat neglected art in Britain, but in many countries of the world it holds a status equal to that of ballet or the legitimate stage. The State-aided puppet theatres of Poland and the U.S.S.R. probably lead the world both artistically and technically. New types of puppets and mechanisms are constantly being evolved, many quite different to the traditional stringed marionette or the hand puppet.

By C. C. Somerville

The rod puppet, though of ancient origin, represents the greatest field of experimentation today. Great advances in realism of movement have been made and many outstanding examples are now seen on television. The simple rod puppet described in this article has remarkable versatility and forms a basis for further mechanical innovations. The construction, though simple, requires care if the figure is to work with precision.

The head shown in the illustrations is simply a turned wooden ball with a diameter of about 3 ins. The usual techniques of carving, papier mâché modelling, or plastic wood casting may be used to construct rod puppet heads, but the ball head is quite adequate for a prototype. In fact such heads can be given a great deal of character with the addition of cork nose, button eyes and fur hair, as suggested in Fig. 2.

Fig. 1 shows the full skeleton figure which is basically a shoulder piece and two arms, mounted on a 20 in. length of 1 in. dowel rod. This is glued for a distance of 1½ ins. in a hole drilled into the ball head.

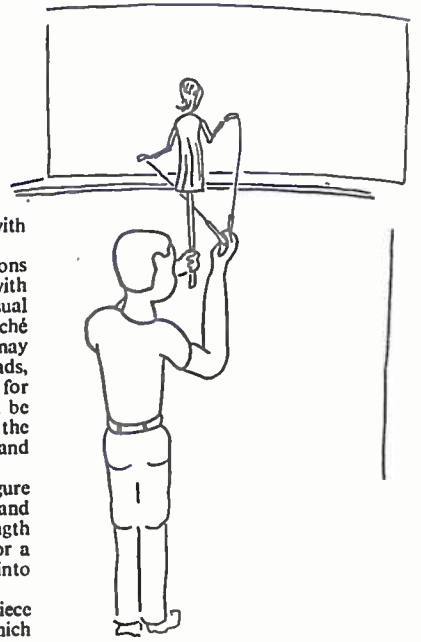
The shoulder piece B starts as a piece of softwood 4 in. by 2 in. by 1 in. which is rounded at the corners and sloped to form the shoulders. This has a 1¼ in. hole drilled through it so that it swivels freely on the centre dowel. It is supported by a wooden stop 'D' which is drilled and glued firmly to the dowel.

The arms, which are of ¾ ins. dowel, are hinged at the centre and at the shoulder. The loose shoulder joint is of strong flexible leather tacked to the shoulder and glued into a saw cut in the upper arm. The elbow joint is a brass hinge.

The hands can be either flat shapes fretted out of ¼ in. plywood and rounded with glasspaper (Fig. 3A) or carved in a close grained hardwood (3B). They are attached to the lower arm by the linked screw eye arrangement shown in Fig. 3.

Once this basic skeleton is constructed the rods or wires must be attached to the figure's hands. Unlike the stringed marionette, this figure is supported from below by the main dowel held in one hand while the other controls thin wires which move the arms. These wires are usually made from thin welding wire, available from a garage, but the ribs from a discarded umbrella make excellent substitutes.

These wires are looped at one end and this loop is engaged with a tiny brass screw eye set into the figure's hand. This joint must be very free in all directions. At the other end of the manipulating wire either a large loop is formed or alternatively a wooden dowel handle is attached. The assembly is illustrated in Fig. 3.



Method of operation

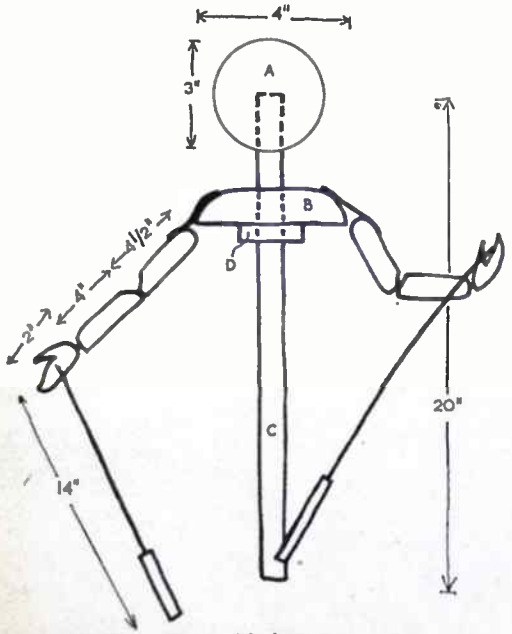


Fig. 1—The basic figure

Fig. 2—Adding features to a head

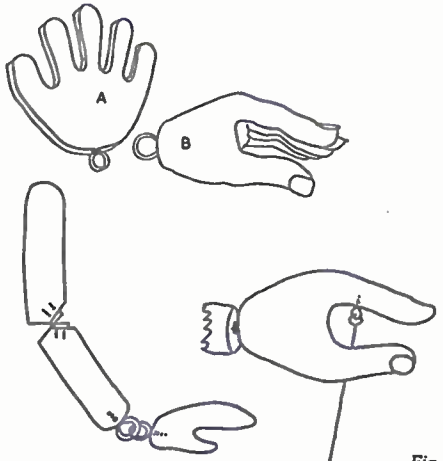


Fig. 3—Hands, arms and animation rod

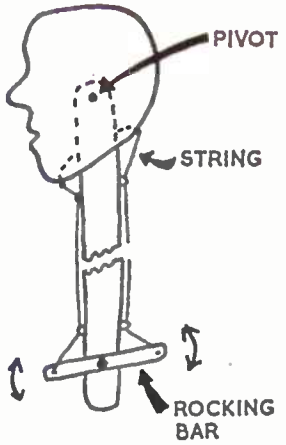


Fig. 5—A hollow head allows additional movement

The clothing of the figure can be as simple or elaborate as your resources allow, but a simple basic garment (Fig. 4) of some stiff material gives body to the puppet and a base for elaboration and ornament.

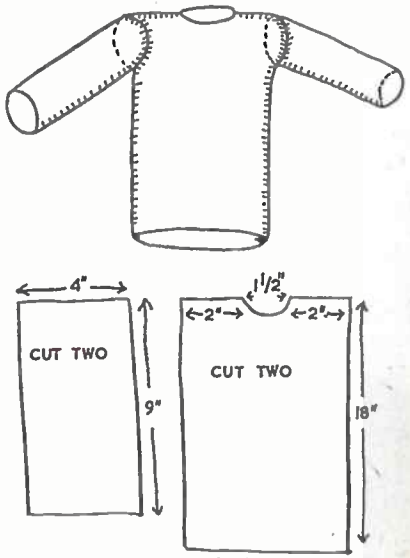


Fig. 4—A basic garment

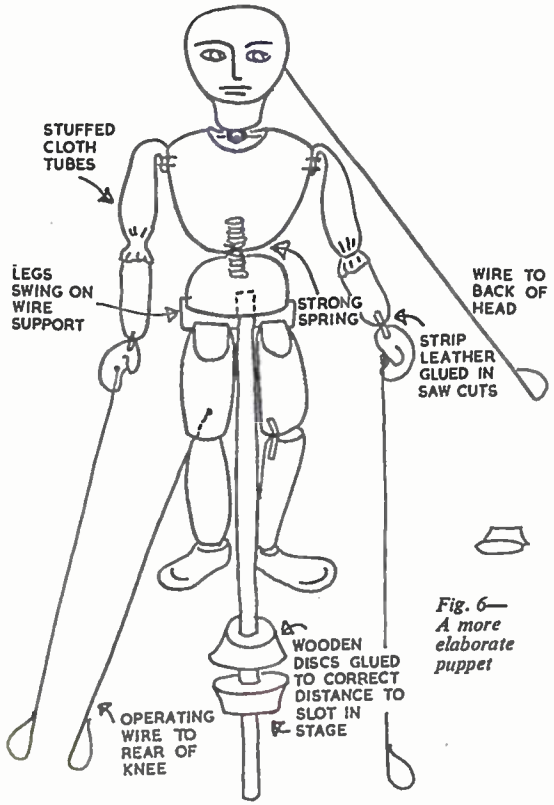


Fig. 6—A more elaborate puppet

The operating wires are painted matt black, or can be concealed in tubes of cloth the same colour as the basic garment.

Details of the position for holding the puppet are shown in the main

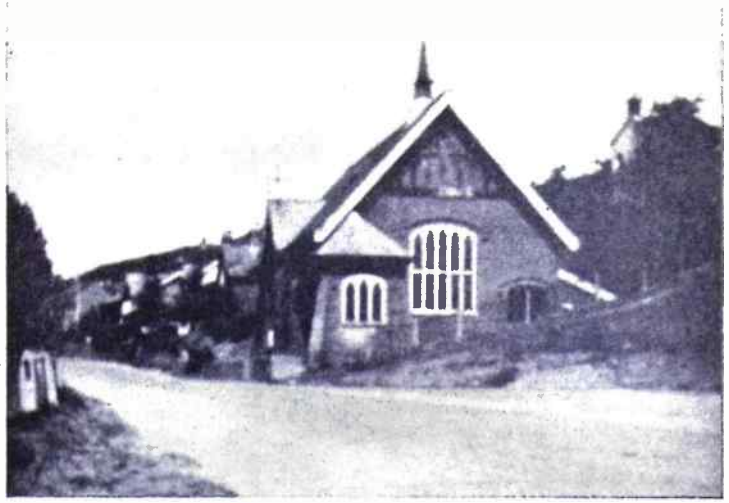
● Continued on page 375

PINHOLE COPYING CAMERA

A PINHOLE camera is an extremely simple device, and can be used to copy existing photographs, or produce photos of still objects. When copying, the new photograph may be the same size, or it may be reduced or enlarged. It is also possible to take out-door photos with a pinhole camera, but as a time exposure is needed, still subjects have to be chosen.

The pinhole camera consists merely of a light tight tin or box, and it may be square, rectangular, or round. The lid should be at least as big as the largest size film or plate which will be used. A tin 4 in. or 5 in. in diameter, or a box or tin something in the neighbourhood of 4 in. by 4 in. up to 6 in. by 6 in. or so, but not necessarily square, will be satisfactory.

By 'Photographer'



These two photographs were both taken with 1/40th in. diameter pinhole, exposure 1 second in bright sunshine

For copying existing photos or illustrations, the camera is set up as in Fig. 1. There is no need to focus the camera, because objects at all distances are reproduced in the same way. However, the relative distances A and B will govern the size of the new photograph.

Pinhole

The tin or box is placed on its side, and the pinhole is made in the centre, opposite the lid, as in Fig. 1. The size of the hole has a considerable effect on the results, and exposure needed. Extremely small holes give best definition, but make necessary very long exposures. A suitable size can be made with an ordinary small pin, or a needle of equivalent size.

If the box is tin, the hole can be made direct, by supporting the bottom on a piece of wood. If the box is cardboard, a hole made in this will not be very satisfactory. So a hole some ¼ in. or so in diameter should be cut with scissors, and a piece of strong, uncreased tinfoil is glued over this opening. The pinhole is then pricked in the centre of the tinfoil.

The inside of the box or tin should be painted dull black, to avoid reflections, which will degrade the picture. The hole is sealed by the simple method of fitting a piece of black card over it by means of adhesive tape.

Lid and film

The very sensitive films which are obtainable require the least exposure, but need handling in total darkness. Less sensitive ortho films can be handled by a dark red safelight, but lengthy exposure of the film to the safelight should be avoided.

Plates of the required size can be used. Or cut film may be preferreds This is obtained in flat packets. Plate or film to hand, for an ordinary camera, may be used. It is also quite easy to cut pieces from an ordinary roll film. The remainder of the film may be used in an ordinary camera.

The inside of the lid should also be black, and the film is held flat on the inside of the lid, by lengths of adhesive tape along the edges. The film emulsion faces the pinhole.

The lid must be light tight. If the camera is to be taken outside, especially in sunlight, a strip of black adhesive tape should be taken right round box and lid, to hold the lid on, and exclude light. Some tins have airtight lids which will be light proof. It is necessary to load and unload the camera in darkness. If no darkroom is available, it should be possible to find a dark place in a large cupboard, under the stairs, or elsewhere in the house, at night.

Reproduction size

Fig. 2 should make this clear. A is the distance from pinhole to object, and B the distance from pinhole to film (equal to the depth of the box). C is the height of the original object, such as the photo to be copied, and D is the height of the copy.

If A and B are equal, D will be the same as C, so that a same-size copy is obtained. If the copy is to be smaller, A is greater than B, as in Fig. 2. If the copy is to be enlarged, then B must be greater than A, and a fairly long tin or box is helpful.

The ratio C to D is the same as that of A to B. For example, if C were a photo 8 in. high, and the copy D is to be 4 in. high, the ratio is 2:1, so A is twice B. If the tin were 5 in. from pinhole to film, the object would thus be placed at 10 in.

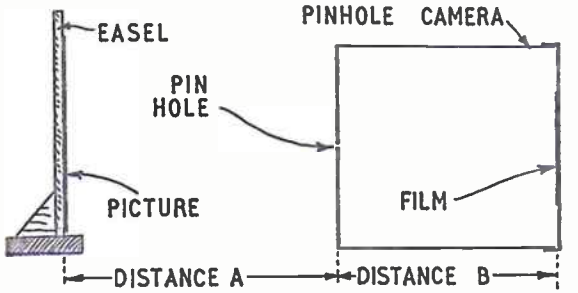


Fig. 1—Pinhole copying camera

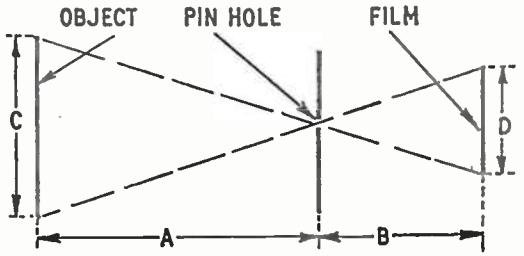


Fig. 2—Size of reduction

This can easily be calculated in the usual way — A:B : : C:D. Or a scale drawing like Fig. 2 can be made, with actual dimensions.

For same-size copies, A and B are the same, as mentioned. For out-door photos of buildings, etc, A will be extremely large, and need not be known, because C will also be very large, compared with D.

Photos or pictures to be copied can be supported vertically, or attached to a simple easel. Photos framed, and with glass, should for preference be removed from behind the glass, to copy.

Illumination

Copies can be made indoors by placing one lamp each side the camera, so that their light falls on the object. If only one lamp is used, this should be as near the camera as possible (not away to one side) or the object will be lit more strongly one side than the other.

Outside, good daylight, or sunshine, will be satisfactory. Bright sunshine, and sensitive film, permit a relatively short exposure. With slow films and poor light, the exposure will be long.

Exposures

These are not particularly critical. As a guide, they may be calculated, or taken from the following list. Or they may be found by experiment. With the latter method, lighting, film, and other data are noted, and if the negative is too dense, it is known that the exposure was too long, so it should be reduced for the next exposure under similar conditions.

To calculate the exposure, the diameter of the pinhole needs to be known. A typical small pin was found to be 0·025 in. Larger holes than this are not recommended unless the negative is larger than 2½ by 3¼ in. Ordinary 5 amp. tinned copper fuse wire (35 s.w.g.) is 0·0084 in. The working aperture of the pinhole is taken as the distance between pinhole and film, divided by the diameter of the pinhole. For example, the 0·025 in. (1/40th in.) hole, 4 in. from the film, gives F/160.

Few exposure lists or meters give apertures smaller than F/32. However, each time the aperture number is multiplied by 2, the exposure should be multiplied by 4.

For example, an outdoor scene lit by bright sunshine would require about 1/250th second at F/11, with HP3 film, as shown by a meter or the film maker's leaflet. This is 4/250th or about 1/60th, at F/22. At F/44 it is, 4/60, or 1/15th. At F/88, it is 4/15 th second, or about ¼ sec. At F/176 it is 4/4th, or 1 second. F/176 is close enough the actual hole size which was worked out as F/160. The exposure is thus 1 second, and this was given with the outdoor scene. Exposures of ½ second and 2 seconds, under the same conditions, were almost the same, due to the film and exposure latitude.

Suggested exposures for a 1/40th in. diameter hole at 4 in. are: Extremely bright sun, ½ second; bright sun, 1 second; bright hazy sun, 2 seconds; bright but no sun, 4 seconds. Other exposures can be worked out as described.

For copying or exposures by artificial light, with 32° Sch. pan. film, and one 100 watt lamp at 1½ ft. from the subject, an exposure of 1 minute can be used. If two 100 watt lamps are used, the exposure may be reduced to ½ minute.

The portrait and outdoor scene show the kind of results obtained with a 1/40th in. diameter pinhole, on 2½ by 3¼ in. film, enlarged to about 4 in. by 6 in. Smaller holes increase definition, as mentioned, but make longer exposures necessary. With still subjects there should be no objection to a longer exposure, provided the pinhole camera rests firmly on a table or other support, and is not touched while the hole is uncovered. If wished, film changing can be simplified by cementing a cut-film holder on the inside of the lid.

● Continued from page 373

ROD PUPPETS

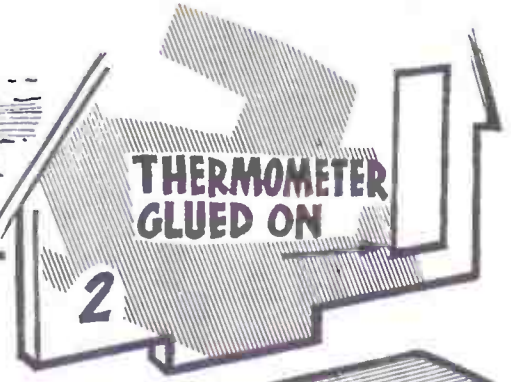
illustration. This puppet can be remarkably lifelike in movement, its hands being particularly expressive. The head operates from the centre dowel with a simple side to side movement. An elaboration with a hollow head is illustrated in Fig. 5.

The stage for rod puppets is exactly the same as that used for hand puppets, the traditional 'Punch and Judy' booth being an ideal example. In its simplest form all that is necessary is a screen behind which the operator hides and over which appears the puppet. For practice purposes a household three-fold screen or a draped clothes horse are adequate.

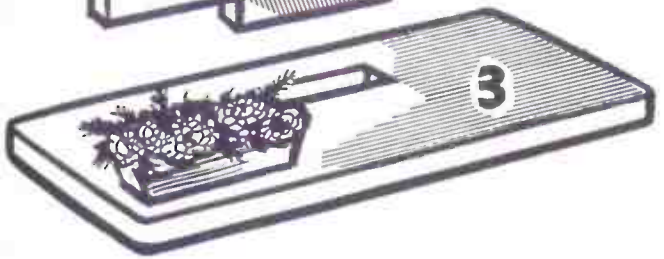
While beyond the scope of this article, a much elaborated, fully animated rod puppet is illustrated in Fig. 6, and will perhaps offer inspiration to the inventive craftsman.

"Country" THERMOMETERS

WITH NOVEL "FLOWER GARDENS"

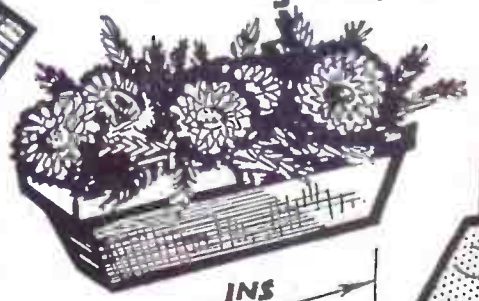


Hobbies THERMOMETER No.5016 PRICE 1/6 Postage 4½D



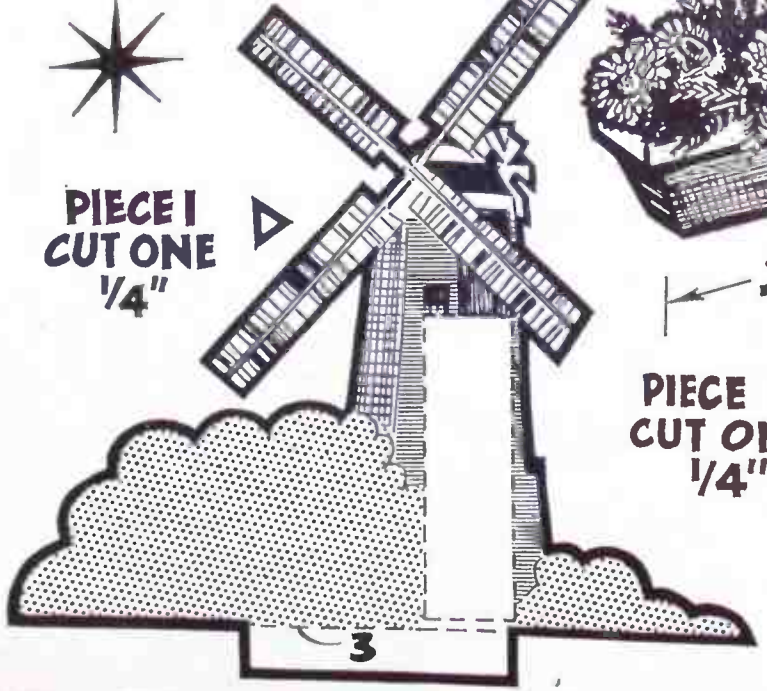
Hobbies FLOWER BOX No. 477A. PRICE 2/3 Postage 4½D

PAINT BOTH THE MILL AND HOUSE IN THEIR NATURAL COLOURS

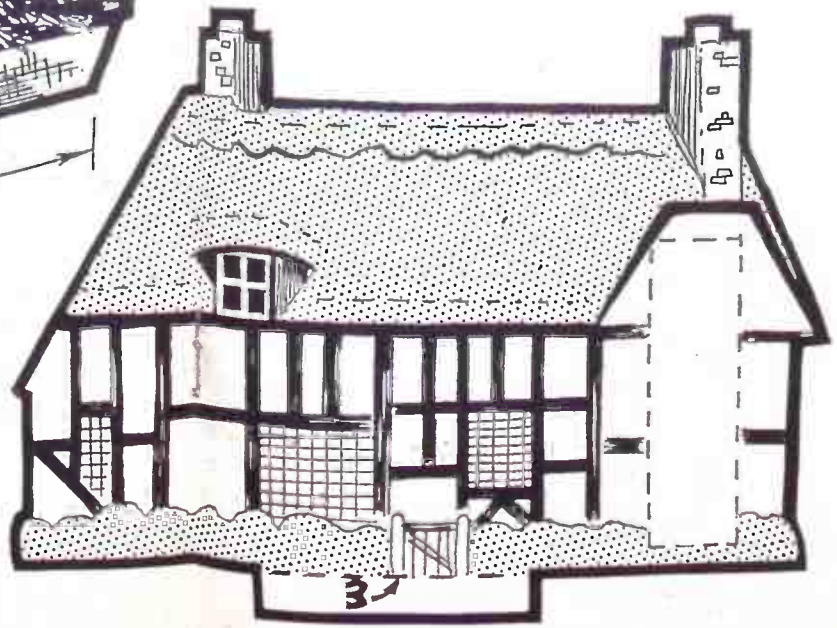


2 INS

PIECE 1 CUT ONE 1/4"



PIECE 2 CUT ONE 1/4"



YOU can't keep a good group down, especially when it is one of those solidly swinging combos from the North which have been claiming the lion's share of Hit Parade honours during the past few months.

THE HOLLIES

First it was Liverpool which established the trend. Then the spotlight turned on that other Northern city where, it is claimed, they do today what London does tomorrow. Certainly *The Hollies*, five rhythm-happy boys from Manchester, created quite an impression in London when manager Tommy Sanderson, who leads *The Sandmen* on *Easy Beat*, brought them for a recording test with Parlophone.

And their first disc (*Ain't that*) *Just Like Me*/*Hey What's Wrong With Me* (R5030) caused a stir in a different quarter. The producer of *It's All Over Town*, a film starring Frankie Vaughan, heard the waxing and immediately booked *The Hollies* for a screen test.

The Hollies, who play to capacity audiences whenever they appear at one of Manchester's many teenage haunts, sprouted when another city group, The Deltas, folded early this year.

Four members decided to re-form, but the vital link in the new group, a lead guitarist, was not easy to find. The player they wanted was 18-year-old Tony Hicks, who had already won himself a reputation locally and eventually he completed the group.

Leader Graham Nash (rhythm guitar and vocal) and Allan Clarke (lead singer) first became friends at primary school. Later at grammar school they teamed up as a singing duo, *The Two Teens*. They hold the distinction of being the youngest act to have appeared at the famed Manchester Cabaret Club — when they were 15.

After school they were together for a time in an engineering works, appearing in the evenings as *The Guytones* — later augmented to become *The Fourtones* — and also as Ricky and Dane. When *The Fourtones* disbanded, they joined Don Rathbone (drums) and Eric Haydock (bass guitar) in *The Deltas*, and the four of them later formed *The Hollies*.

GRAHAM NASH was born in Blackpool in February 1942, but went to live in Manchester when he was two. At school he wanted to take up oceanography — the study of currents and tides — as a career. But music entered his life when he chose as a present a guitar in preference to a bike. After leaving school he worked in an engineering factory and later behind a Post Office counter. Graham is 5 ft. 10½ in. tall, weighs 10 stones, has brown hair and blue eyes. His hobby is writing music. Favourite artiste — Chuck Berry. His ambition — to reward his parents for their encouragement in his career.

ALLAN CLARKE was born in Salford in April 1942. 'My main trouble is that I enjoy enjoying myself, too much. I could never settle down to a routine,' says Allan, when explaining that since leaving school he has worked as an apprentice engineer, a mill hand, a furniture salesman, a silk screen printer and a jacquard cutter. 'The last one involved cutting patterns in stencil cards which ran on to material. I enjoyed the work, but then I heard a rumour that the mill would close down and reluctantly handed in my notice. It's still operating today — but if it weren't for the rumour I'd still be there cutting stencils.' He is 5 ft. 10½ in. tall, has black hair, brown eyes and weighs 10½ stones. Although he only sings with the group, Allan's hobby is playing the guitar. With Graham Nash he wrote *Hey What's Wrong With Me*.

TONY HICKS was born in Nelson in December 1944 and has the broadest Lancashire accent in the group. He had his first guitar when he was eleven and at twelve appeared on television in a Carroll Levis Show. His parents sent him to a music teacher to give him a thorough grounding upon which to improve his talent as a guitarist. When he left school he joined a firm of electrical engineers and during off-duty hours played with *The Dolphins*, a group he had formed for dance hall work. Tony is 5 ft. 11 in. tall, weighs 10 stones, has dark brown hair and blue eyes. His hobbies are driving and collecting and maintaining musical equipment. His ambition — to manage his own string of groups.

DON RATHBONE was born in Wilmslow, Cheshire in October 1942. His early ambitions to be a drummer were encouraged by his father, a keen amateur musician. Don started playing with a group while he was still at school and such was his interest that he claims that the happiest day of his life was when he gave up his job in a drapery store to become a full-time musician. Don is the outfit's driver and his claim to notoriety is the time when he brought them all the way to Oxford for a gig and found that he had arrived a week early. Don is 5 ft. 6 in. tall, weighs 9 stones, has black hair and brown eyes. His ambition is to develop a left-hand roll like his drumming idol Joe Morello.

ERIC HAYDOCK was born in Stockport in February 1943. At school he was an outstanding sportsman and a large collection of trophies is evidence of his ability in track events. He was an apprentice engineer in a tool making factory. But at 17 he bought a guitar and played with several local groups before joining *The Deltas*. Eric is the quiet one of the group and is the controlling influence on the wild spirits of the others. He is 5 ft. 10 in. tall, weighs 9 stones 10 lb., has black hair and brown eyes.

AN EASILY-MADE SEWING TIDY

By S. H. Longbottom

EVERY housewife sews or knits on occasion and a handy and attractive container for materials, etc, is shown in our illustration. It is easily made from simple materials while the inside can be fitted or modified to your own requirements.

You will need two end pieces shaped as shown in the diagram and cut out from ¼ in. plywood measuring 9 in. by 10 in. These two pieces may be cut out together if cramped, the edges then being smoothed with a rasp and glasspaper. Fold a suitable piece of paper in half, prepare the curved side at the open edges, cut out and on opening you will have the necessary template. Note that ¾ in. rebates are cut from the top corners for the side supports.

The base of the container is made from ¼ in. plywood measuring 16½ in. long by 5½ in. wide. This needs shaping on the outside edges to fit the curve.

Two supports for fixing at each side of the top will be required and these may be let into the endpieces where provision has been made. These supports should be 16½ in. long and are made from ¾ in. square section. The faces will again require shaping to meet the curve.

Four tapered legs each 11 in. long are prepared from 1½ in. by ½ in. material, rounded at the feet. Trim the top ends to an appropriate angle, rounding off the extremity.

The lid is made from two pieces of ¼ in. plywood glued together. These should not be cut until the container has been assembled in order that accurate measurements can be determined. Allow the top piece to overlap ¼ in. all the way round while the lower piece should fit inside the container. This top may be hinged if desired or remain a loose lid.

Handles may be fitted to the lid and at each end of the container. Wooden handles will serve the purpose admirably.

The legs are screwed to the endpieces from the inside and the base glued and screwed to the ends. Attach the side supports with glue and screws, when they may be shaped to match the curved endpieces.

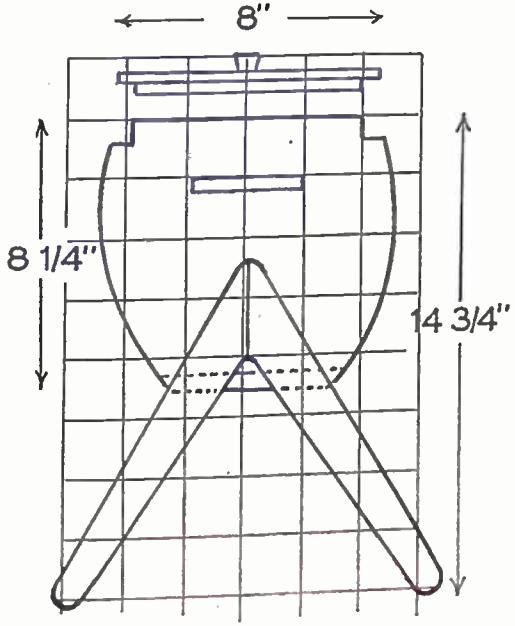
The curved sides, cut from stout cardboard, are glued and pinned to the endpieces to complete construction. The lid may now be made to fit and the handles screwed on from the inside.

The finishing makes all the difference to the sewing tidy and the following suggestions will help. The outside of the container may be covered with a self-adhesive plastic material or fabric. A fabric cover to match the curtains is ideal and this may be glued on, the edges tacked and covered with upholsterers' gimp in matching colour. Only a minimum of glue should be used for sticking the fabric to the cardboard.

The inside should be lined with plain fabric and it is a good plan to fasten strips of broad elastic inside the endpieces, tacked at intervals for holding accessories such as tapes or scissors. The lid may be provided with a fabric panel covered and padded with cotton wool to act as a pincushion.

Dependent on the type of wood used, you may either stain and polish or finish in gloss paint.

This sewing tidy can be quickly made, will house small mending or knitting besides accessories, and will be found most useful to the housewife.



EXHIBITION INCLUDES 'FLYING BEDSTEAD'

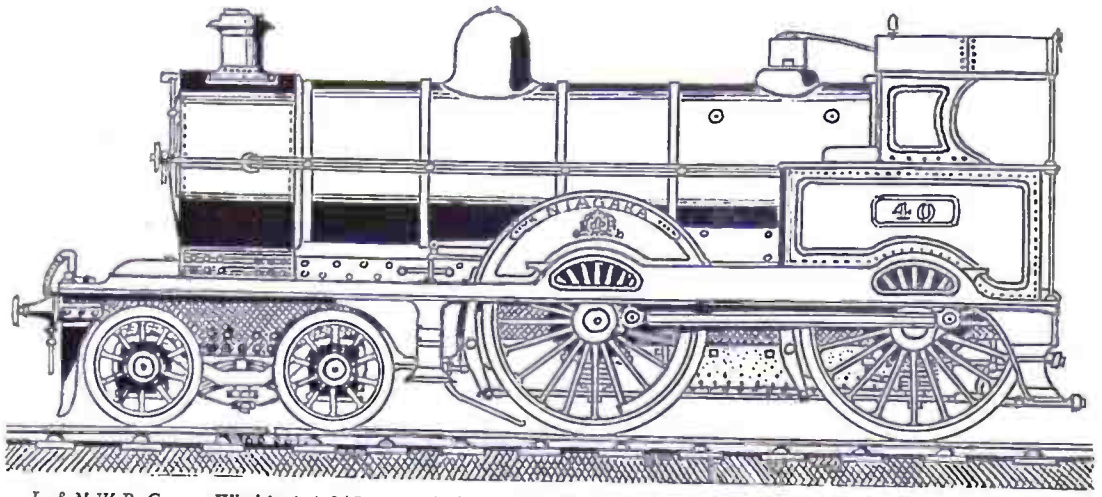
MANY new exhibits have been added to the re-opened National Aeronautical Collection in the Science Museum, South Kensington, London, where the full size aircraft are suspended from the arched roof. It would well repay a visit for modellers seeking more detail for any special projects.

More than 20 full size aircraft are on view, including the Vickers Vimy machine that made the first non-stop Atlantic flight in 1919 and both a Hurricane and a Spitfire from the Battle of Britain days. The original Rolls-Royce 'Flying Bedstead' has a place of honour and over 70 aero engines mark progress from the steam engines of Stringfellow and Maxim to the jet engine age. The popular collection of over 200 scale model aeroplanes has been re-arranged.

(E.)

Interesting Locos—No. 62

L. & N.W.R. Whale 'Precursors'



L. & N.W.R. George Whale's 4–4–0 'Precursor' class express locomotive No. 40 'Niagara'. Crewe, No. 4470, March 1905

UPON the retirement of F. W. Webb in 1903, the post of chief Mechanical Engineer at Crewe passed on to George Whale. During his term of office at Crewe Mr Webb had built over 2,500 locomotives, his final design being the thirty 4–6–0 4-cylinder Compound Goods of the '1400' class. These were under erection in the Works when Mr Whale took up office, and he completed the order for these engines.

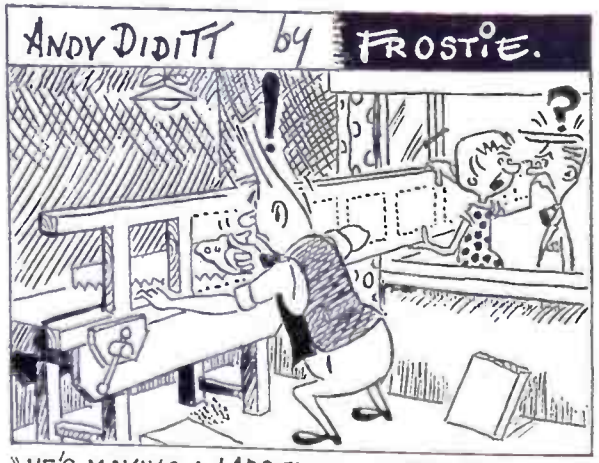
He was however not at all in sympathy with Mr Webb's Compound system, and he quickly reverted to the 2 cylinder 'Simple' engine. His first product was the well known 4–4–0 'Precursor' passenger engine of 1904. This engine, No. 513, took the name from Mr Webb's 2–4–0 engine No. 2145 of 1874 (described in an earlier article in our series). No. 513 was the precursor of the large boiler engine on the L. & N.W.R., and for a long time they were known among the enginemen as the 'Bogie Jumbo's', being considered at the time an enlarged bogie edition of Mr Webb's 2–4–0 Simple engines of the *Precedent* or *Jumbo* class. Twenty-five 'Precursor's' were built at Crewe in 1904.

Construction of the class continued until 1907, a total of 130 being built, and the Crewe diagram gives the following details. Cylinders, 19 in. diameter and 26 in. stroke; wheel diameter bogie 3 ft. 9 in., coupled 6 ft. 9 in. Heating Surface; tubes 1848·4 sq. ft., firebox 161·3 sq. ft., total 2009·7 sq. ft. Grate area 22·4 sq. ft. Working pressure 185 lb per sq. in. Weight of engine in working order: on bogie 21 tons 15 cwt, on driving wheels 19 tons and on trailing coupled wheels 19 tons, total 59 tons 15 cwt. Wheelbase coupled 10 ft. total engine 25 ft. 1½ in. Total length: engine and tender over buffers 56 ft. 7½ in. Extreme width of engine 8 ft. 3 in. Max. tractive effort at 85% pressure 18,222 lb.

The tender ran on six 3 ft. 9 in. diameter wheels, having a tank capacity of 3,000 gallons, coal space of 5 tons, and weighing full 37 tons, giving a total for engine and tender of 96 tons 15 cwt.

In later years Mr C. J. Bowen-Cooke fitted many of the class with the Schmidt Superheater and new 20½ in. diameter cylinders, thus bringing them in line with the *George the Fifth Class*.

(A.J.R.)



"HE'S MAKING A LADDER — THE HARD WAY."

Replies to Readers

Printed radio circuits

I HAVE been designing some 'printed circuits'. Could you please give me a list of the chemicals required for a copper-plated box. (R.L. — Mitcham.)

ONE supplier of materials and foil covered boards is Henry's Radio Ltd, 5 Harrow Road, London, W.2. Special means are used to bond the foil to the insulated board, and it would be difficult to do this with ordinary adhesives. The foil is typically about 0·003 in. thick. Stouter material will take a long time to etch away. The insulated board is usually $\frac{1}{16}$ in. Paxolin. Foil to be protected during etching may be painted with varnish, oil, paint, or enamel, etc. Sulphuric acid and other acids will dissolve the unprotected foil. After washing, a paint stripper or paint solvent will remove the protective material. For hand work (e.g. single boards), foil may be cut away with a sharp tool, and no chemicals are needed.

* * *

Microscope Lighting

COULD you please tell me how technicians and scientists, etc., light up opaque materials on a microscope stage? For example, if they were examining a piece of metal, what sort of lighting system would they most likely use? I am asking this because I wish to construct a lighting system for my microscope, in which opaque objects must be illuminated from above the stage. I hope you can help me. (D.S. — Argyll.)

THE illumination of an opaque object is quite a simple matter. All that is needed is a condenser on a stand, the condenser being fixed so that it may be moved in any direction. The condenser can consist of a bull's eye lens or a concave mirror. The source of light is arranged so that it passes through the lens or is reflected from the mirror. The rays are thus brought to a focus and the condenser is adjusted until the end of the light beam falls at an angle on the object. The substage mirror should, of course, be turned so that no light passes upwards, thus giving a dark background.

A Misty Lens

I MADE the episcope projector from Hobbies Weekly No. 3503, and used a hundred watt bulb with good results. I have a problem with the glass lens which, when the projector gets hot, goes misty and clouds the picture. Could you please tell me what is the matter and how I can overcome this? (S.M. — Newark.)

IF the lens is a single glass this is probably due to its having been in a cold atmosphere, and being taken to a humid, warm atmosphere. In these circumstances this may happen with any lens, but the misting should clear in a few minutes when the lens is slightly warm. If the lens is a separated pair or doublet, in a mount, moisture may be present between the lenses. If so, they may be removed and cleaned, then replaced after being left with the mount to warm slightly.

* * *

Recording Tape Eraser

HOW can I construct a unit which produces a very strong magnetic field so that on holding it over a reel of recording tape it completely erases anything which was on the tape? (B.M. — Sutton Coldfield.)

THE bulk type of eraser generally has a large laminated core, wound with 1 lb. or so of 28 s.w.g. or similar wire, and it is momentarily energized from the mains (A.C.). A large W-type transformer core could be used.

* * *

'One-way' Glass

I WOULD like a formula for treating glass so that you can see out, but a person cannot see in from the other side. (S.W. — Hayes End.)

ONE-WAY vision glass is normally made by addition of chemicals during actual manufacture. A good substitute can be produced by lacquering clear glass with clear cellulose lacquer which has been tinted by dissolving in it alcohol soluble Nigrosine. This will give a blue-black colour to the glass and whose depth may be varied by increasing or decreasing the Nigrosine content.

Quick-drying Lacquer

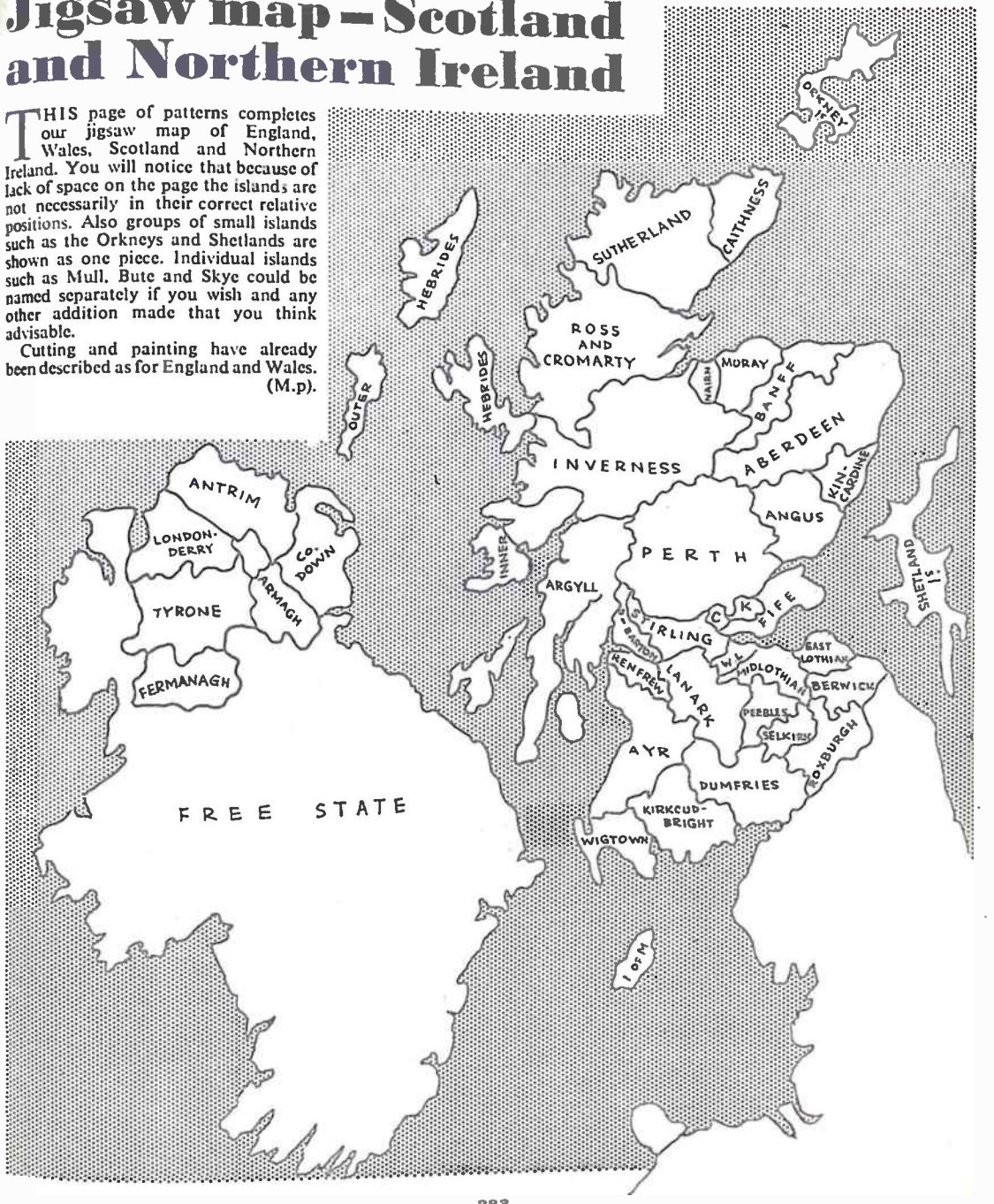
COULD you please furnish me with a formula for a quick-drying lacquer to be used in the decoration of eggs, such as for Easter? (R.K. — Cheshunt.)

THESE Continental Easter egg lacquers are aqueous solutions of dextrin tinted with dyes. If you wish just to colour a few eggs it will be economical to make up a stock solution of $\frac{1}{2}$ oz. dextrin in 5 fluid ounces boiling water, and to tint portions of the cooled solution with cake icing colours. The resulting lacquer may be thinned with water if necessary. Should you wish to make up quantities for sale, make a stock solution of 100 grams of dextrin per litre of water, and add 2·5 grams of phenol as a preservative. Phenol is corrosive to the skin in the 'raw' state, hence it should not be handled with the bare fingers. The dyes for this stock solution may be had from George T. Gurr Ltd., 136/140 New Kings Road, London, S.W.6. Make up solutions of the dyes in water, and add a little at a time until the desired depth is reached. Suitable dyes are: Blue (Methylene Blue), Brown (Bismarck Brown), Green (Brilliant Green), Orange (Orange II), Red (Fuchsine), Pink (Eosin), Violet (Methyl Violet), Yellow (Naphthol Yellow S.).

Jigsaw map — Scotland and Northern Ireland

THIS page of patterns completes our jigsaw map of England, Wales, Scotland and Northern Ireland. You will notice that because of lack of space on the page the islands are not necessarily in their correct relative positions. Also groups of small islands such as the Orkneys and Shetlands are shown as one piece. Individual islands such as Mull, Bute and Skye could be named separately if you wish and any other addition made that you think advisable.

Cutting and painting have already been described as for England and Wales. (M.p).



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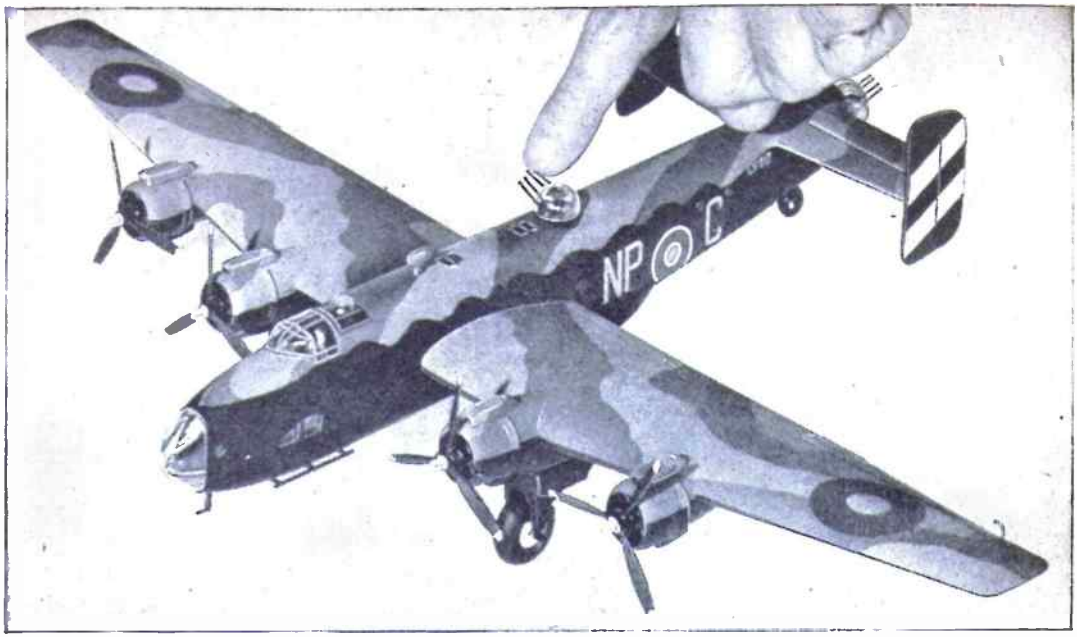
READER'S REPLY HW SEPT 1963



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