

HOBBIES WEEKLY

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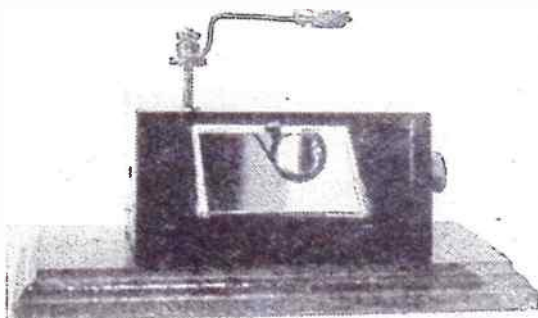
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Full instructions for making

A SIMPLE MICROSCOPE

By F. G. Rayer



THE term 'simple microscope' is applied to those instruments which have a single lens magnifier, to distinguish them from 'compound microscopes', which have several lenses in the magnification system. The simple microscope is used when a large field of view is required, with maximum brilliance, and moderate magnification. The magnification is usually about 5X to 20X, and may easily be modified by employing a range of lenses.

Though the microscope illustrated was made for examining minute detail in photographic negative copies, it is very suitable for all purposes where a magnification of more than about 20X is not required.

A base about 2ins. by 3½ins. and ½in. thick is suitable, and a small three-sided box of ½in. wood is fitted to this with fret nails. The sides of this box may be about 1½ins. by 1½ins. high, and the back can be 1½ins. by 2½ins. A small sheet of glass is placed on top of this frame, as illustrated, to form a stage for supporting the objects to be examined.

Light from Below

A piece of wood about 1½ins. by 1½ins. by ½in. thick is pivoted underneath the stage. A small mirror is secured to this, and can be turned to an angle, as shown in Fig. 1, to direct light from a window or lamp upwards through the object. For viewing by

transmitted light, the microscope should be so placed that when the mirror is adjusted the object on the stage is strongly illuminated from below. The mirror is pivoted on an axle to which a small knob is fitted, as shown in Fig. 2. By turning this knob the angle of the mirror can be adjusted. If an axle is not available, two small nails may be used, passing through clearance holes drilled in the side members.

A threaded rod is clamped to the back piece, this being accomplished by a suitably shaped strip of metal secured with two small screws. Nuts or terminal heads are run up or down the threaded rod to find the correct focusing distance for the lens, when in use. Supports for the lenses may be made from 12 S.W.G. wire, or may be cut from aluminium or other thin metal.

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*For Modellers, Fretworkers
and Home Craftsmen*

4^D

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The magnification of the lens will depend on its focal length, and may be found by dividing the focal length, in inches, into 10. For example, a lens of 1in. focus will have a 10X magnification, and will require to be about 1in. from the object examined. A 2ins. focus lens would be of about 5X, and a ½in. focus lens of about 20X. The lens only needs to be of small diameter—say, ½in. For average purposes, 10X is a good magnification.

Plain glass lenses may be purchased readily, in all focal lengths, and may be mounted according to the facilities available. A turned brass ring is best, but satisfactory mounts can be made from thin wood, strong card, etc., the lens being held in place by a touch of varnish or gum.

In use, the head is bent so that the eye

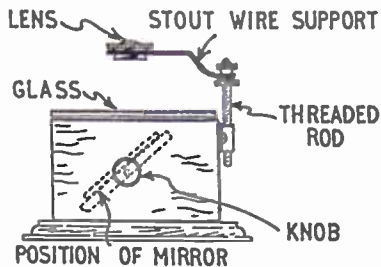


Fig. 1—Side view

is as near as possible to the lens. The height of the latter is then adjusted until the object is in sharp focus. The loss of illumination which arises in compound microscopes is avoided,

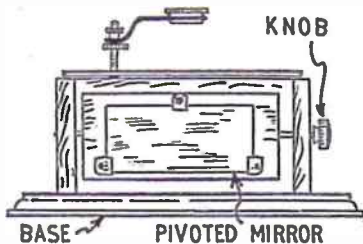


Fig. 2—Front view

giving a brilliant image, and the field of view is much larger. Achromatic eye-pieces may also be purchased, and with these results will be of very high standard, equalling those from quite expensive equipment.

USEFUL ARTICLE

A Shoe Cleaner for the Gardener

WHILE he is busy pottering about among his flowers or vegetables the gardener is happy, but muddy boots or shoes are not at all welcome in the house, and it is, therefore, wise to remove as much dirt as possible before entering!

What is wanted is something that will do the job efficiently and quickly and with the least amount of trouble; it is not necessary at this point to give the

By A. F. Taylor

Below this trough and fastened on to the side of the supports is a brush for removing any mud from the sides of the footwear or the instep. A brush may be fastened on to each side, and if these are of different grades of stiffness, the usefulness of the cleaner will be increased.

The supports will need to be fairly

the supports with two stout screws at each end. Cut a semi-circular piece out of the tops of the supports in which to place the trough.

A household hair broom or a fibre yard broom that has been discarded would be suitable, provided the hairs are not less than 1in. long. Semi-circular pieces must also be cut in the sides of the supports if the brushes have rounded backs (Fig. 2).

If you are having a brush on each side, one should be placed lower down than the other, so as not to weaken the main supports too much. Stout screws in each end will be sufficient to hold them securely.

Good Quality Paint

Oak will generally withstand the weather quite well, but it is advisable to give the woodwork two coats of good quality paint, and this will also improve its appearance. No harm will be done to the iron trough if it also has some paint.

It is essential that the cleaner is fixed in the ground securely and the supports should be made long. Ram the earth down well round the posts, or for a better job concrete can be run in the holes instead of filling up with earth.

It is a good idea to fix a post close by the cleaner to hold on to. A stout stake, say, about 3ft. or 4ft. long, driven firmly into the ground will save you from overbalancing while cleaning up.

Some people find it more convenient to have the brushes tilted up somewhat, and this can be easily arranged, if required.

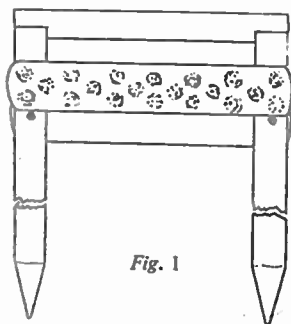


Fig. 1

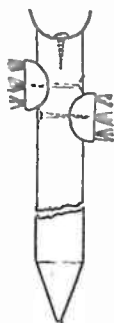


Fig. 2

boots or shoes a thorough clean and polish. In any case the gardener is probably too tired to want to do much cleaning, and he will welcome the cleaner described in this article.

The top part of the gadget (Fig. 1) is a scraper, but instead of being the usual type with a single iron bar, it has a semi-circular trough. This enables the dirt to be collected and not scattered around on the ground, making an untidy mess.

substantial to withstand somewhat rough treatment. Two pieces of oak about 18ins. to 24ins. long, 3ins. wide and 2ins. thick will be about right, or you can use logs in their natural state with or without the bark on and about 3ins. to 4ins. in diameter.

The scraper on the top is a length of ordinary house troughing and is fixed to

Comfort in the garden with

A FULL-LENGTH LOUNGE

A GARDEN lounge such as shown here should appeal to those who have a small grass lawn. The lounge is designed to fold in the middle, making it convenient to carry about and to store.

It is 5ft. 6ins. long and 24ins. wide, and at the head end it stands 12ins., while at the foot it is 9ins. off the ground. There are two distinct frames which must be strongly made and these are hinged together with strong strap hinges.

Following Figs. 1 and 2, the plan and side view respectively, it should be a

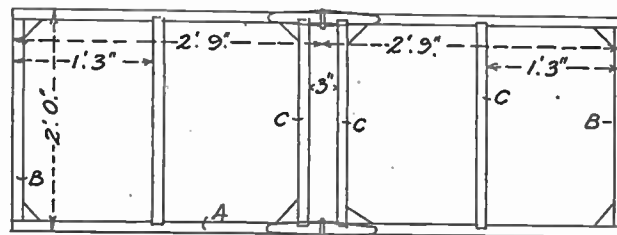
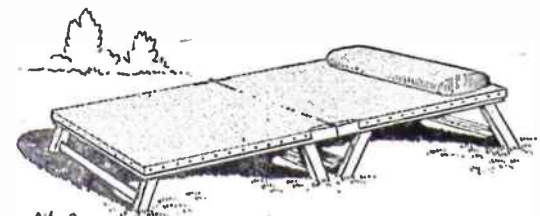


Fig. 1

simple matter to set out the various parts. The side rails (A) are cut from wood 2ins. to 2½ins. wide by 1½ins. thick, while the cross-rails are of same section and are framed to the side rails in the manner shown in Fig. 3. The cross-rails (C) are housed in and held firmly by hard-wood dowels driven through the rails (A) and later cleaned off flush. Glued angle blocks may be

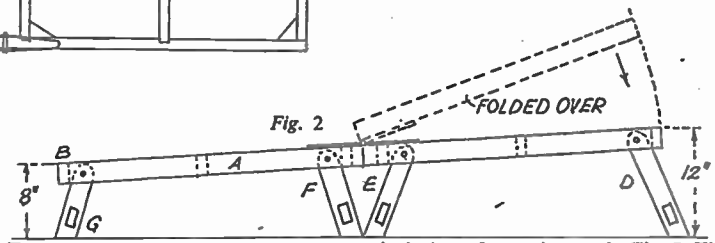


Fig. 2

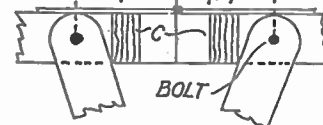
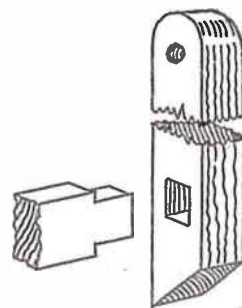


Fig. 5

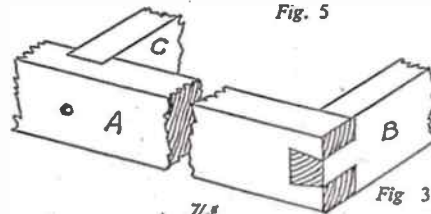


Fig. 3

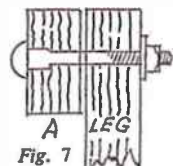


Fig. 7

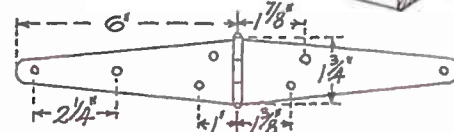


Fig. 6

added to further strengthen the framing if necessary.

In Fig. 6 is shown the type of hinges to use. Four leg frames are required as D, E, F and G, and each consists of two shaped legs framed to a cross-rail which is tenoned each end as shown in Fig. 4. Each leg will have a bolt hole to take a ½in. diameter bolt for attachment to the side rails, the bolt being run through from the outside and nutted up, with the

inclusion of a washer, as in Fig. 7. The bolt holes for legs F and E are carefully arranged as in Fig. 5, so that when they are folded into the framework they lie flat and even.

The legs will require carefully setting out for length, and the following length measurements should be helpful. Legs D, 13ins.; E, 11ins.; F, 10½ins.; and G, 8½ins. Note how the tops of the legs are rounded.

Keep the legs square at the lower ends until after they are bolted to the rails, then lay the frames out with the legs uppermost and with them opened out. Now stretch a piece of string tightly from the outer corners of legs D and G, and mark where the string crosses on the legs E and F, and finally cut on the line with a tenon saw.

Cover the frames with stout tent canvas, allowing in width and length for a turn-up, so that there is a double thickness for the nails, which should be spaced about 1½ins. apart. The woodwork should be well cleaned up and a couple of coats of varnish applied, or, of course, all the surfaces may receive two or three coats of paint. (S.W.C.)

DON'T FORGET

Make a Reminder Blackboard

THIS useful board will be welcome in the kitchen where the housewife can write down a list of the things she needs. There is a shallow

tray to hold chalks, and the board is attractively decorated by a cut-out elephant at the top. The inference, of course, is that an elephant never forgets.



The elephant cut-out is shown full size on the pattern page and can be adapted to suit any size board. We suggest one about 8ins. by 10ins. and

Full-size patterns are on page 111

$\frac{1}{2}$ in. thick. The words 'DON'T FORGET' are also shown full size as an overlay to be cut from $\frac{1}{2}$ in. wood. Glue them in position on the elephant's back. The tray is made up from stripwood as shown in the detail. The exact size of the stripwood is not critical.

Finish off by painting the board black and the elephant grey. Use a matt black for the board. The whole thing can be hung on the wall by means of a bracket eye fixed at the back. (M.p.)

A Remarkable Miniature House

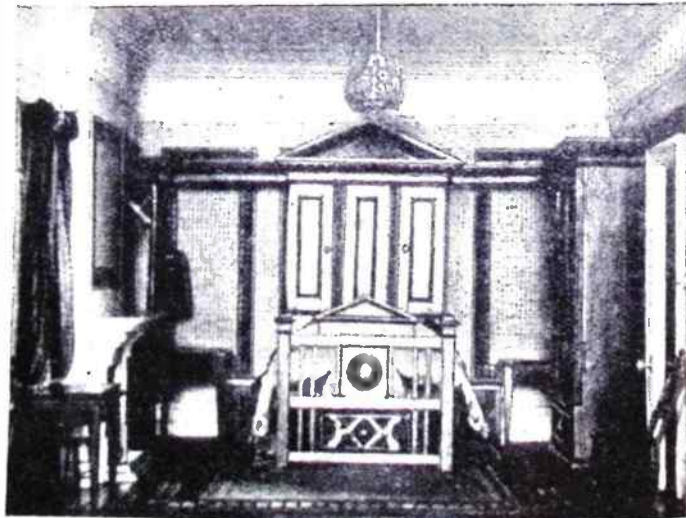
THE accompanying illustration shows the 'oak bedroom' of what is considered to be the most perfect miniature house in existence. Standing some 3ft. high, this wonderful lilliputian residence has four rooms each of which is finished with exquisite detail and taste. There is also a magnificent hall and stairway.

Some idea of the fineness of the work is given by the fact that the four carpets in the house alone took two years to make and each contains about 2,400,000 separate threads.

Parquet Floor

The drawing-room is finished in Louis XIV style and has an inlaid parquet floor. In this room there is a piano $\frac{1}{2}$ in. high the keys of which were cut from real ivory. Detail throughout the other rooms is of the same high standard.

Designed and made by Mr. Batty, of Drighlington, near Bradford, the miniature is a lifetime's work. Started as a simple doll's house to amuse his children, the enterprise became almost an obsession and eventually no pains were spared to give finer and yet finer detail.



The oak room in Mr Batty's miniature house

As time went on Mr. Batty became a past master of miniature reproduction and eventually had work accepted by royalty. His miniature house is from time to time on exhibition about the country. (H.A.R.)

HOME CHEMISTRY

Experiments with Ammonium Molybdate

AS its name suggests, ammonium molybdate contains the metal molybdenum—irreverently known in metallurgical circles as 'Molly'! Despite their flippancy, however, metallurgists have a very real appreciation of the value of this metal. For alloying with steel it is even more valuable than tungsten for making high-speed tools. It is also very much used in the electrical industry.

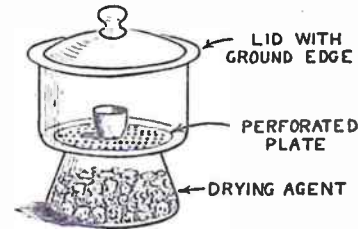


Fig. 1.—A desiccator

Its chief ore is molybdenite (molybdenum disulphide). Though there are small deposits of it in Cumberland, commercial quantities have to be imported, notably from North America and Norway. Many a prospector has missed making his pile owing to thinking it was graphite, which it greatly resembles—even to giving a grey streak on paper.

Ammonium molybdate is prepared from molybdenite by roasting the mineral to convert it into molybdenum trioxide and then treating this with ammonia. By evaporating the solution the heavy white crystals of ammonium molybdate are obtained.

In the laboratory its use is too often limited to employing it only as a test for phosphates. Yet there are a host of interesting experiments which can be done with it. There is, for instance, a molybdenum oxide which is soluble in water (unusual in a heavy metal), giving a splendid blue solution.

To prepare this oxide dissolve 2.5 grams of ammonium molybdate in 10 c.c. of hot water, cool the solution and add strong hydrochloric acid gradually. At first a white precipitate forms. When this just dissolves, add 2.5 grams of sugar and boil. The solution becomes brown.

Add small portions of this solution to one of 2.5 grams of ammonium molybdate in 10 c.c. of water. The blue oxide is precipitated. Care must be taken not to add too much of the first solution. The end point is found by filtering small portions. When one filtrate is brown

instead of blue, the addition can be stopped.

Filter off the oxide, preferably under reduced pressure, and wash it with not more than 5 c.c. of cold water. Dry the oxide in the oven. You will be left with an indigo-blue solid. On warming a portion with water you will find it dissolves to a splendid blue solution. Blue molybdenum oxide is used as a microscope stain, and has also been employed as a rubber pigment.

The most important oxide of molybdenum is the trioxide, for this is the parent substance of the molybdates—as we learned from the method of preparation of ammonium molybdate from molybdenite. In the laboratory it can be

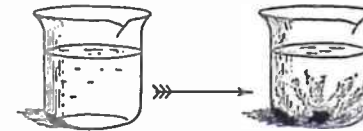


Fig. 2.—'Water' changing into 'wine'—but do not drink it!

prepared direct from ammonium molybdate.

Place some ammonium molybdate in a crucible, and heat below redness for a time. The ammonium molybdate will become first blue then white, giving off ammonia and steam. Let the crucible cool, preferably in a desiccator (Fig. 1), and weigh it. Make a note of the weight and heat and cool the crucible several times until it shows a constant weight, thus showing that no more ammonia and steam are being given off and that the reaction is complete. The product is molybdenum trioxide. This oxide is found as a mineral in small quantities and is then called molybdenum ochre.

The purpose of the desiccator in this last experiment is to prevent absorption of small quantities of atmospheric moisture during the cooling, which would interfere with attaining a constant weight if your balance is very sensitive. As Fig. 1 shows, a desiccator is a glass vessel containing a drying agent (usually calcium chloride) and fitted with a perforated plate to carry the crucible and also a lid with a ground edge to make it airtight. The ground edge should be lightly greased with Vaseline. Such a piece of apparatus has many other uses and is a sound investment for the home chemist.

Though molybdenite is the most important, another ore is much used industrially. This is wolfeinite. It consists of lead molybdate. An artificial form of

the mineral can be made quite easily. Make a solution of ammonium molybdate and add it little by little to one of lead nitrate in a beaker. A white precipitate of lead molybdate is thrown down. To find the end point of the reaction, filter occasional small portions of the mixture into a little ammonium molybdate solution in a test tube. A fresh quantity of ammonium molybdate must be used each time. When no white precipitate appears, the addition can be stopped. Filter off the lead molybdate and wash it thoroughly with several changes of water. Then dry the compound in the oven.

A splendid colour reaction of molybdenum makes a good basis for a conjuring trick. By means of it you can convert 'water' into 'wine' merely by dropping in a piece of zinc! Dissolve a crystal of ammonium molybdate in water and add pure dilute hydrochloric acid in small portions until the white precipitate which first forms redissolves. Then pour in some ammonium thiocyanate solution. Pour the water-white liquid into a beaker and add a piece of zinc. An intense red zone forms round the metal and spreads through the solution (Fig. 2). The red coloration is due to the formation of molybdenum thiocyanate. Both the 'water' and the 'wine' are poisonous and *must not be tasted*.

Another experiment involving the use of zinc and an acidified solution of ammonium molybdate gives us molybdo-molybdic hydroxide. Proceed just as in the last experiment, but leave out the ammonium thiocyanate. Hydrogen is evolved and the colourless solution becomes first blue, then brown and finally almost black, due to the formation of molybdo-molybdic chloride.

By adding an alkali hydroxide we should expect to get a precipitate of the desired hydroxide, just as we would with any other heavy metal. This is the case, but the acid in the solution has dissolved some of the zinc to form zinc chloride. The addition of an alkali hydroxide would therefore give us a mixed precipitate of molybdo-molybdic hydroxide and zinc hydroxide.

The way round the difficulty is clearly seen when we recall that zinc hydroxide is soluble in an excess of alkali hydroxide. Molybdo-molybdic hydroxide is not. Therefore add enough strong solution of sodium or potassium hydroxide until a drop of the mixture shows a strong alkaline reaction to litmus paper (red to blue). You will obtain a bulky brown precipitate of molybdo-molybdic hydroxide. Filter this

Continued on page 106

GLUES FOR HOBBY WORK

WHILE rubber-based adhesives have a more limited use for the woodworker, their possibilities in certain directions should not be overlooked. They are, for instance, widely used in industry for the laying of flooring and sub-flooring, for applying non-slip backing to rugs and mats, binding carpets, securing fabric to latex foam, etc.

One of the most useful of the rubber-based adhesives is the natural latex type. Natural rubber latex consists of minute particles of rubber suspended in

R. H. Warring concludes his articles on glues and adhesives used in hobby work by describing the rubber-base type.

be thinned by the addition of water and, in fact, are often used in this manner as an additive to wallpaper paste to make an improved adhesive which is particularly suitable for hanging heavy papers.

are more common in the United States and certain Continental European countries. A number of general purpose or 'household' type adhesives are of this kind and are particularly useful for tackling those odd jobs which no other form of cement, glue or adhesive seems to work—such as repairing damaged plaster figures, sticking metal foil to hardboard, etc.

Latex mixtures are also used to produce special types of adhesives, although these are largely trade items. A mixture of latex and Portland cement,

SELECTION CHART FOR RUBBER-BASED ADHESIVES

Wood	—	2	2, 4	3	5, 2	5, 3	5, 3	5	5	5	1	1, 3	1, 4	1, 5	1, 5	1, 2, 3, 5	1, 5
Concrete	2	3	2	3	2	5, 3	3	5	5	5	1	3	5	5	1, 5	5, 2	5, 2
Plaster	2, 4	2	—	5	2, 5	5	5	5	5	5	1	1, 5	5	5	—	—	1, 5
Tiles (Clay)	3	3	5	3	5	3, 5	3	5	5	5	1, 2	3, 5	5	5	5	3, 5	5
Tiles (Plastic)	5, 2	2	2, 5	5	5	3, 5	5	5	5	5	1	5	5	5	5	5	5
Metal	5, 3	5, 3	5	3, 5	3, 5	5	3	5	5	5	1	3, 5	1, 4, 5	1	1, 4	3, 5	1, 4
Glass	5, 3	3	5	3	5	3	3	5	5	5	1	3, 5	1, 4	1	5	3, 5	5
Plastics (General)	5	5	5	5	5	5	5	5	5	5	1	5	1, 5	1	5	5	5
Sponge Rubber	5	5	5	5	5	5	5	5	4	5	4	4	4	4	4	4	4
Rubber Sheet	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	5	4
Paper	1	1	1	1, 2	1	1	1	1	4	4	1	1, 4	1	1	1	1	1
Leather	1, 3	3	1, 5	3, 5	5	3, 5	3, 5	5	4	4	1, 4	1, 4	1	1	1	1	1
Fabrics	1, 4	5	5	5	5	1, 4, 5	1, 4	1, 5	4	4	1	1	1, 4	1	1	1	1
Leathercloth	1, 5	5	5	5	5	1	1	1	4	4	1	1	1	1	1	5	1
Carpeting	1, 5	1, 5	—	5	5	1, 4	5	5	4	4	1	1	1	1	1	1	1
Linoleum	1, 2, 3, 5	5, 2	—	3, 5	5	3, 5	3, 5	5	4	5	1	1	1	5	1	5	1
Felt	1, 5	5, 2	1, 5	5	5	1, 4	5	5	4	4	1	1	1	1	1	1	1

Key:
 1—Latex
 2—Latex-Bitumen
 3—Latex-Cement
 4—Rubber Solution
 5—Rubber Cement

water, and is itself an adhesive. After collection from the rubber trees, it deteriorates rapidly on exposure to air, unless treated. Preservative treatment is simple—merely a matter of adding a small proportion of ammonia solution, which gives latex solutions their characteristic pungent smell.

The consistency of proprietary latex adhesives may range from thin, milky solutions to stiff pastes. They are white or whitish in colour and non-inflammable since they contain no special solvents (only water). They can

Other applications of latex adhesives range from the self-sealing flaps found on some types of envelopes to 'strong drying' adhesives used for fixing leathercloth to metals, where the bond strength is of the order of 25 pounds per inch width—e.g., a pull of 900 pounds would be required to strip off a yard width of leathercloth fastened down with such an adhesive.

In this country, most latex adhesives consist of natural rubber latex. Synthetic latex can also be used to produce a similar range of adhesives, but these

for instance, is used for underlays on concrete or wooden sub-flooring. They do not form a damp-proof course, but provide remarkable adhesion with rubber cements used subsequently to fix floor coverings, e.g., linoleum and rubber flooring. Rubber latex mixed with bitumen emulsions provides excellent adhesives for sticking wood blocks, linoleum or thermoplastic tiles to concrete or wooden surfaces.

In contrast, rubber solutions and rubber cements are compounded by dissolving natural or synthetic rubbers

in suitable organic solvents. Again, in this country, natural rubber solutions predominate.

A simple solution may consist of natural rubber dissolved in a solvent. On drying, the solvent evaporates off, leaving a tenacious, flexible form of rubber between the surfaces, and bonded to them, with good joint strength. Rubber solutions will stick 'difficult' materials in this way, notably those with non-porous or polished surfaces, as well as porous materials, like paper. In the latter respect, since the solution is completely free from water there is no question of the paper being distorted when coated with adhesive, which can be a significant point at times.

The bond strength of a simple rubber solution is, however, weakened by heat. The rubber begins to soften and the joint to 'give', if under stress. A stronger rubber solution of cement, therefore, contains additives which vulcanise the rubber on drying, causing the bond to set hard and the strength to remain largely independent of heat. The type of vulcanising agent used may be one which requires that the joint be cured by heating, or an air-curing type in which the vulcanising agent is added immediately before use and cures during the natural drying of the joint. Self-vulcanising rubber solutions of this type have a limited pot life (usually 8-12 hours), in a similar manner to that of the synthetic resin adhesives. Despite the fact that the bond is vulcanised, and stronger, it still retains a good degree of flexibility.

The term rubber cement is usually reserved for compounded rubber solutions to which have been added resins to increase the strength and tenacity of the resulting film. They are produced, like the rubber solutions, in normal and vulcanising types and, in addition, possess gap-filling properties.

RUBBER-BASED ADHESIVES WHICH HAVE BEEN TESTED

Name	Type	Form	Drying Time	Colour	Remarks
Rubber Gum (Cow)	Rubber Solution	Solution	Does not completely dry	Colourless	Ideal for photo mounting, etc. Strippable. Mounting of paper
Titebond A	Rubber Solution	Solution	5-15 mins.	Pale Straw	Excellent general purpose adhesive. Paper to metal, etc.
Bateman's Household Cement	Latex	Cream	1-2 hours	White	General repairs to china, etc.
Mistic	Latex	Thick Cream	1 hour	White	Similar to above
Boscotex 55	Latex	Thick Cream	2-3 hours	White	Joining metal foil to wood, paper, hardboard, etc.
Dunlop S 57/A	Rubber Solution	Liquid	Very rapid	Colourless	Similar to above
Evo-Stik 1022	Rubber Solution	Liquid	2-3 hours	Colourless	Similar to above
(Average)	Rubber Solution	Liquid	10-15 mins.	Colourless	Paper to wood, glass, metal, etc.

High duty rubber adhesives are also compounded on similar lines, designed to give exceptional bond strength under adverse working conditions, even to the extent of comparing favourably in performance with rivets for bonding friction linings to brake drums, etc. For high duty applications which involve

the answer to a tricky bonding job and in particular for the bonding on non-porous materials to other rigid or non-rigid materials. The flexibility of the resulting bond is often a great advantage, enabling seat covers to be fastened down to foam rubber cushions, for example, and thus eliminate rucking or stretching.

TYPES OF RUBBER-BASED ADHESIVES

Type	Formulation	Typical Applications
Latex	Rubber Latex in Aqueous Solution	Flexible materials to smooth, impervious surfaces additive to metal primers and wallpaper paste
Latex-Bitumen	Latex-Bitumen Emulsion	Fixing wood block floors, lino, etc. to concrete
Latex-Cement	Latex-Portland Cement	Underlay on wood, metal, concrete floors
Rubber Solution	Rubber and Organic Solvent(s) Simple and Vulcanising Types	Adhesion to porous and non-porous, rigid or flexible materials
Rubber Cement	As above with Chemical Additives for improved properties	As above. Better strength
Special Purpose	As above, properties adjusted for specific service conditions	To suit arctic or tropic conditions, metal-to-metal bonds, friction blocks to metal, etc.

high service temperatures, synthetic rubber adhesives are generally used. At the other end of the scale, natural rubbers retain their flexibility better at extremes of low temperatures.

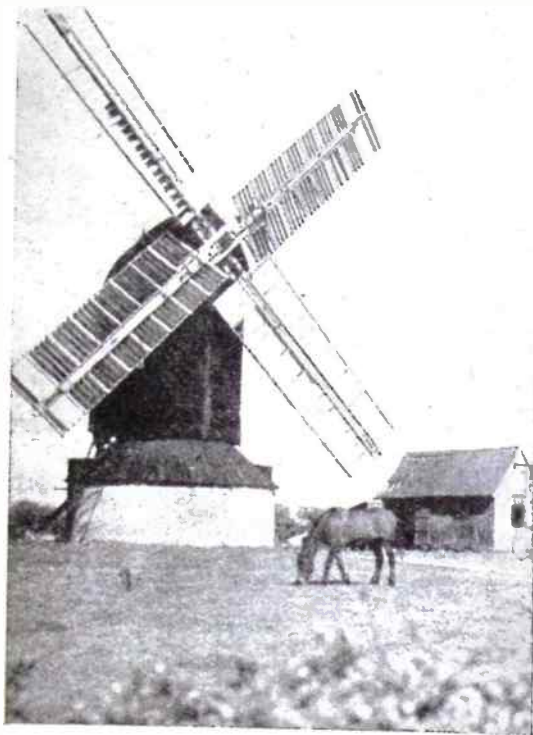
To save unnecessary wordage, typical applications of the various types of rubber-based adhesives are summarised in the main table. The shorter tables list working properties of a number of proprietary rubber adhesives. These are merely a selected list of materials with which the writer is familiar and does not include the full range of possible products available through the normal retail channels.

Main interest, from the woodworker's or modeller's point of view, is that a rubber adhesive may often prove

Apart from the simple latex types, all rubber adhesives are waterproof. The solvents employed are usually toxic and inflammable, although a limited number of rubber solutions and cements are compounded with non-inflammable solvents. The range of properties offered is enormous, from sticky non-drying rubber gums which grip firmly but can be pulled away and rubbed off clean (e.g., Cow rubber gum) to the self-vulcanising hand bonds produced in joining brake linings to metals, etc.,. In fact there is generally a suitable rubber-based adhesive available for joining most clean, dry, oil-free combinations of materials, although where absolute bond strength is required, then synthetic resin type adhesives are normally much better.

By using a filter —

You Can Improve Your Outdoor Photographs



A promising photograph having the makings of a picture, but spoiled by the bare expanse of sky. There is only a faint suggestion of cloud. A filter would have brought out these clouds and broken up the blankness of the sky.

MANY photographs are made or marred by the sky. Apart from indoor and certain specialised photographs, the sky is often an essential part of the picture; and the technical means of giving artistic expression to the sky is in using a filter. Without a filter, fascinating clouds are often lost, and the contrast between a light-toned building and the blue sky is lost. If a filter is not used, the blue sky, though patterned with white clouds, when recorded by the camera appears as a bare white expanse. It is true that with storm clouds, where there is a difference in the tones of the clouds themselves, the lights and darks of the clouds will be recorded without a filter; but where there is a difference in colour, white clouds against a blue sky, then the filter is essential.

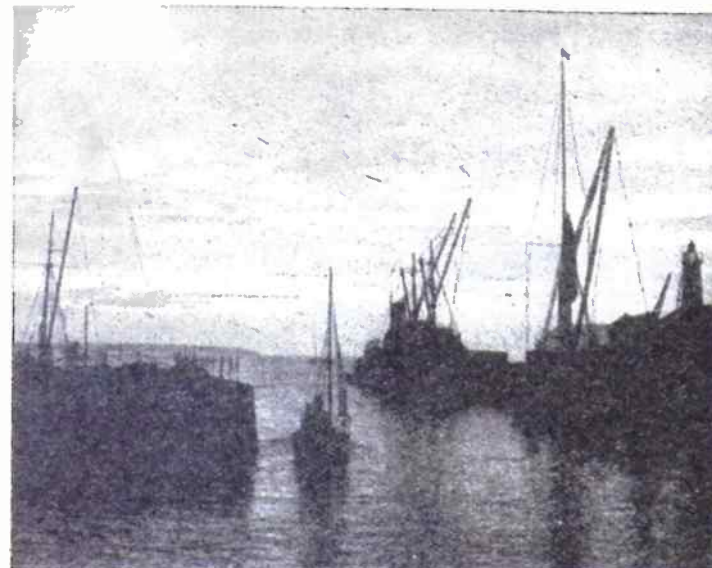
A camera costs pounds, a filter a few shillings. It is well worth the outlay for better pictures, but if a filter is to be invested in, a good class one is advisable—poor glass will affect the result.

The Yacht. Although there is a cloudless sky, a yellow filter records the tone, which serves to throw out the top of the sail. With no filter, the top of the sail would be lost against the white sky.



Filters of many colours are obtainable, but many varieties are not necessary, except for specialist or experimental requirements. Broadly speaking, a filter is composed of transparent coloured material attached to the lens of the camera. The effect of this is that when light passes through this coloured material, the strength of light of certain colours is curtailed, while the strength of other colours passes through unhindered. Blue is, photographically, very strong, so without a filter, blue records as white as the white clouds—hence the 'cloudless' sky found in the print, which should not be, and, certainly, was not an actual fact when the photograph was taken.

With ortho. or panchromatic films a yellow filter is the most useful. A light filter is quite adequate. Dark yellow filters are not essential, and for the first



Harbour scene. An against-the-light effect taken with a sky filter.

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It is the blue colour which is overpowering in its strength, and the main reason for the use of the filter. For this reason, too, water often calls for the use of the filter, even if there is no sky included in the picture. Stretches of still water often appear too light and devoid of tones in the print. It is due to the bright reflection from the sky.

Red Filter

Although the pale yellow filter is recommended for all ordinary work, and is so essential, and sets of filters are wasteful except to specialists and experimenters, there is another filter which is very fascinating to use—the red filter. It is a filter which gives strong contrasts. It often over-corrects



Cornish Landscape. Example of a red filter giving strong contrasts. The tone of the blue sky seen between the clouds records darkly.

trials in the use of filters, are, perhaps, more of a nuisance, owing to the greatly increased exposure which is necessary. Panchromatic films are more sensitive to colour than ortho. films, but the best is not obtained, even from panchromatic films, unless at least a light filter is used. In normal daylight, a graduated

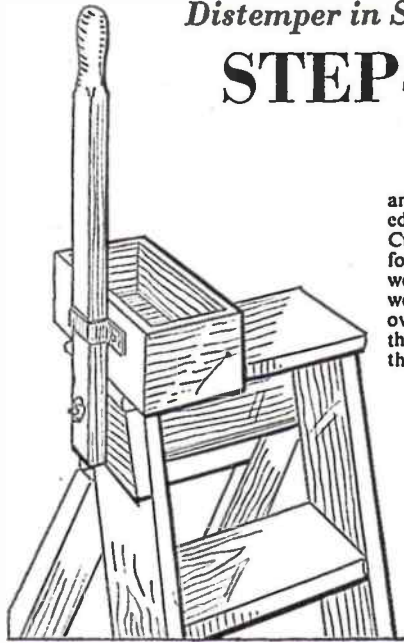
or 'sky' filter is exceedingly useful for registering the blue of the sky, thus giving the clouds a chance to show up against the tone obtained. This graduated filter has the added advantage that normal exposures can be given. As a rough guide, the light yellow filter requires double the normal exposure.

tones, but the exceptional contrasts obtained give a dramatic quality to the print. With a red filter, panchromatic film is essential. The blue of the sky records darkly, and light buildings are shown up in vivid contrast. The tones may not always be true to nature, but the pictorial effects are fine. (D.Y.G.)

Distemper in Safety with a

STEP-LADDER SUPPORT

Says *W. J. Ellson*



and then run a lead pencil over the edges of the side to crease the paper. Cut out and lay on the wood to be used for the block. Mark the shape on the wood and saw out. The thickness of the wood should be equal to the amount of overlap of the top board, plus $\frac{1}{2}$ in., so that where the block is fitted to the steps, the vertical post attached to it just clears

adjusted with the fingers.

Cut the vertical post from a stout length of wood, say $1\frac{1}{2}$ ins. square section, at least. Cut to a length suitable for the height of the room and to the person likely to use it. Don't omit the extra for attachment to the block. Place post in position, see it stands vertical, then mark its place on the block and between the lines cut a $\frac{1}{2}$ in. groove for its reception as in Fig. 3. Continue the reception hole through the post and shape up its

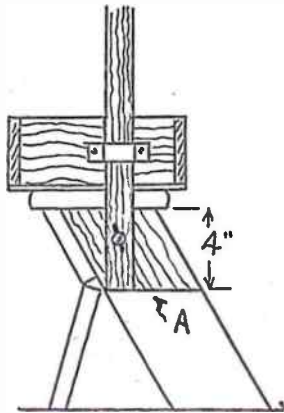


Fig. 1

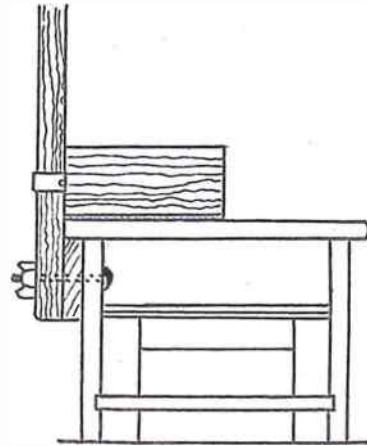


Fig. 2

the steps. Any deficiency here can be made good by gluing a piece of extra wood to the inner face of the block of the necessary thickness.

Place block in position and about central drill a $\frac{1}{2}$ in. hole through both it and the steps' side. See the top edge of the block butts up flat to the top board and when permanently fixed to the steps with an iron bolt and nut it will then be immovable. The bolt should be of a length to go through block and steps, also the vertical post. A measurement direct will determine this simple matter. Procure a wingnut instead of the common pattern, as it is more easily

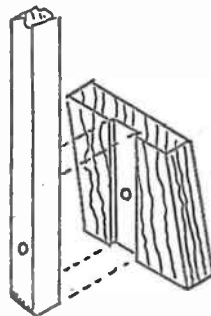


Fig. 3

top extremity to make a comfortable grip for the hand.

The height for the box arrangement for the tin to stand in need not be more than $2\frac{1}{2}$ to 3 ins. and it can be made up of deal of $\frac{1}{2}$ in. thick sides, with a plywood bottom. It is made to slide over the vertical post by screwing a bent-up piece of sheet metal to its outer side. The whole arrangement can then be fixed to the steps, when required, with a single bolt.

MUCH of the annual cleaning in the house has perforce to be done on the household step-ladder and for such jobs as whitewashing a ceiling, painting and distemping, there generally is a feeling of insecurity. Steps have a tendency to wobble for one thing, and there is always a danger of knocking the paint or whitewash container over. Fitting of the easily constructed gadget illustrated will cure these troubles and lend an air of security.

As will be seen from the drawing, the aid comprises a vertical post to grip while on the steps and a wooden box arrangement for holding the paint or distemper tin in safety. A side view is given in Fig. 1 and a front view in Fig. 2. The whole can be made up from any odd pieces of wood of suitable thickness.

First cut the block A to the same angular shape as that side of the steps it is to be attached to. An easy way to get this shape is to lay a sheet of paper on the side of the steps, with one edge just under the top boards of the steps

Continued from page 101

Home Chemistry

oil and wash it on the filter until one wash water is no longer alkaline.

As this hydroxide slowly oxidises in air it must be kept under water. Therefore transfer it to a small bottle and fill up almost to the cork with water.

In conclusion, a historical note will doubtless be of interest. The remarkable Swedish chemist Scheele first pointed out the existence of molybdenum by chemical tests in 1778. The metal itself was isolated four years later.

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A Novel Fancy Dress

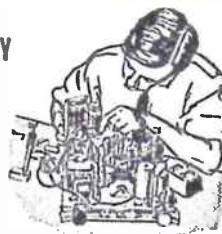
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(D.L.)



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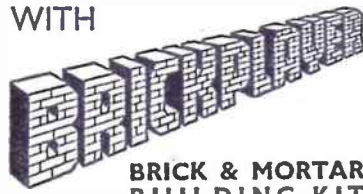
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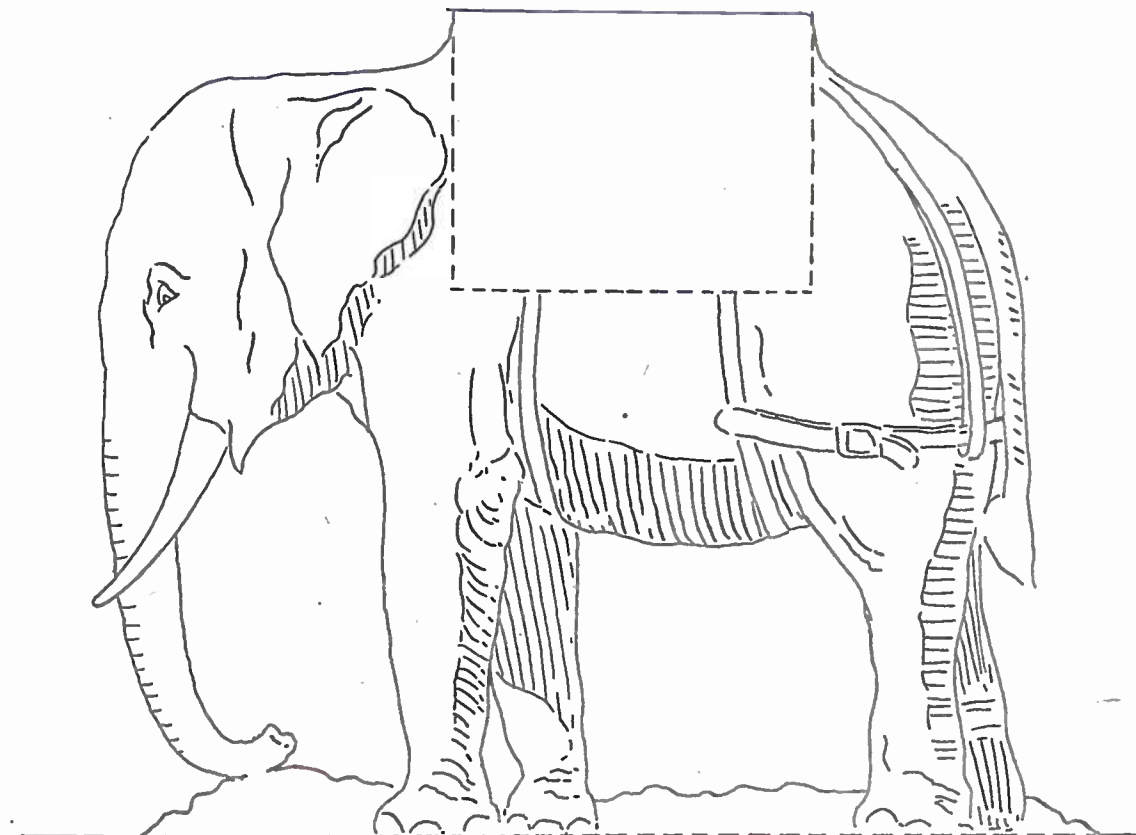
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SEE PAGE 100

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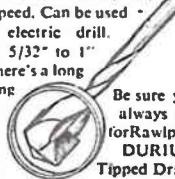


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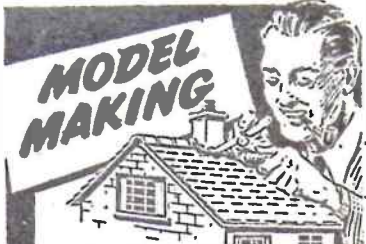
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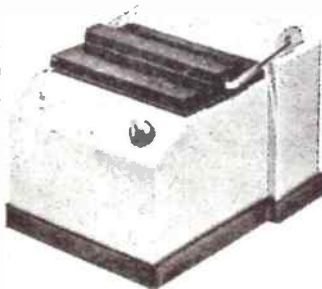
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