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PRACTICAL MECHANICS

9D.

EDITOR : F. J. CAMM

APRIL 1949

A COMBINED FOLDING TABLE AND FIRE SCREEN (See page 200)

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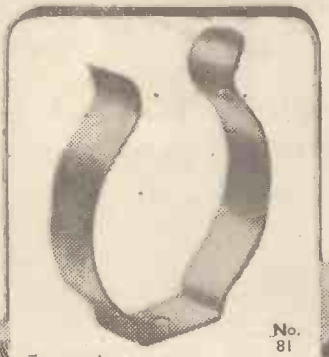

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Owing to the paper shortage "The Cyclist," "Practical Motorist," and "Home Movies" are temporarily incorporated.

Editor: F. J. CAMM

VOL. XVI APRIL, 1949 No. 186

FAIR COMMENT

By THE EDITOR

Rotating Wing Activities in Germany

THE B.I.O.S. Overall Report No. 8, prepared by Captain R. N. Liptrot of the Ministry of Supply, which has just been published by His Majesty's Stationery Office, deals with rotating wing activities in Germany, and will be of interest to all those interested in aircraft. The Report deals with the activities of well-known German firms in the world of autogiros and helicopters, such as Focke-Achgelis, Flettner, Doblohoff, Nagler & Rolz, and A.E.G.; many interesting details are described of construction, flight controls, tests, engine installations, etc. Seldom perhaps has the complete field of rotating wing activities been so concisely and clearly reviewed as in this present publication, and it may well serve as a textbook in so far as German work in this field is concerned.

The "Heliofly"

The two most spectacular developments which are described in this B.I.O.S. Overall Report are the A.E.G. electric helicopter and the "Heliofly"; the former consisted of an electric motor of 200 h.p., two counter rotating blades at 450 r.p.m., and an observation platform mounted centrally above the axis of the rotating blades. The intention was to use it either for observation purposes or as an aerial, using the tethering ropes for this. The complete outfit was stowed in trucks, and is mobile.

Even more revolutionary is the invention of the "Heliofly," by the Austrian engineer Baumgartl. It might well be called the "aerial bicycle" and "aerial motor-bicycle" respectively. The small autogiro, only weighing 38lb., is strapped on the back of the person using it, who would start the blades rotating by hand and could safely fly off a roof-top. The "motor-bicycle" has two tiny engines added to the rotor-blades, otherwise it was exactly the same as the other type of "Heliofly." The "de luxe" model was constructed around a simple frame which does not allow the folding together of the whole equipment as is done in the case of the other two models. Photographs and drawings in the B.I.O.S. Overall Report give a vivid picture of this ingenious design. Details of designs of many other types of autogiros and helicopters are given, together with extensive diagrams. In addition, the Report is fully illustrated, contains 73 pp., a full bibliography and a subject index. The price is 3/-. By post 3/2.

Control-line Flying

LAST month I wrote a paragraph dealing with this latest development in model aeronautics, when I expressed the view that little was to be learned from it. That is a view which is held by many of those who, like myself, have been associated with model aircraft for many years. Some correspondents have written to express their views on control-line flying. The fact that I invited Col. Bowden to contribute articles on the subject should indicate that I preserve an open mind on the matter. The advantages claimed for control-line flying are: that there are less repairs, less danger to the public (a fact I dispute), more realistic models can be "flown," and aero modellers living in large towns or in places where there are no large spaces find that tethered flying is a suitable relaxation and expression of their hobby, without having to undertake a long journey to an aerodrome and perhaps a long chase after a badly trimmed model. My paragraph, of course, made these points clear. I have no doubt that control-line flying will continue, but I do not withdraw my criticism that it can be dangerous, both to the participants and to the spectators.

I was one of the first to experiment with tethered flying, and as the one responsible for the formation of the S.M.A.E. I can fairly claim to have its well-being at heart.

Apprenticeship Schemes

THE Ministry of Labour's Central Youth Employment Executive has circulated information about arrangements agreed in certain sections of industry for improved national schemes of recruiting and training for young persons in six industries. These are additional to the 10 apprenticeship and training schemes announced last year. The new industries include glazing, gun making, musical instrument making, paper making and board making, perambulator and toy industries, and surgical dressings.

Notwithstanding the advance of technical knowledge, the introduction of scholarships, training schemes, the development of evening classes and Government sponsored schemes, there is still a shortage of youths willing to become apprenticed to the crafts. There will continue to be a shortage of skilled labour until the apprenticeship scheme returns to this country.

Mr. E. W. Twining

THE article in last month's issue on the early days of model flying must have carried many readers' minds back to those days when few people had seen a full-size aeroplane fly. Mr. E. W. Twining is one of the pioneers of aircraft in this country, and he was one of my earliest contributors. His versatility is remarkable. His knowledge ranges from astronomical telescopes to stained glass window making, underground railways, bridges, scale modelling, engineering, locomotives and science. He commenced his business career in the city of Bristol, where he became apprenticed in the workshops of the Western Counties and South Wales Telephone Company, which was shortly afterwards absorbed by the National Telephone Company. He passed through the workshops, the drawing office, the general offices, and, finally, was assistant engineer for Underground Construction. During those years he studied art at the Bristol Fine Art Academy, in the rooms of which institution his pictures were hung at most of the spring exhibitions. He was an enthusiastic model-maker, particularly of locomotives, but followed other hobbies as well, particularly photography and astronomy. He built his own telescopes. In 1901 he moved to Glasgow to take up a position as district superintendent and engineer in the rapidly developing telephone system of the corporation of that city. Three years later he came to London as assistant to the well-known telephone engineer, the late A. R. Bennett, to illustrate a scheme for the building of a new bridge across the Thames, which bridge was to provide a site for the new County Hall. One of his drawings in water colours was exhibited by Mr. Twining in the Royal Academy. Later he ran a studio in commercial art, continuing model-making as a hobby.

He had always believed in the possibilities of mechanical flight, and after the Wright Bros. had achieved success with gliding and flying in America, he was one of the first in this country to manufacture flying models, full-size gliders and several full-sized aeroplanes. His contributions to the science of aeronautics are numerous and profound.

You have read of his success in model-flying competitions, but his work in designing and executing stained glass and other ecclesiastical decorations are not so well known. As a writer and author he has been a very old contributor to journals with which I have been, and am, associated.

Your Car Radio

WHEN a radio set is fitted to a car a separate wireless licence is required. This is not fully understood by motorists, many of whom are under the impression that if they have taken out a licence in respect of their home radio set this also covers the use of another wireless apparatus in a car. I mention this fact because I learn that the G.P.O. has instituted an intensive drive in order to detect unlicensed car radios. You would be wise, therefore, if you possess a car radio, to take out a licence forthwith. For even though the receiver is out of action you are still liable for the licence money.

A Modern Folding Table

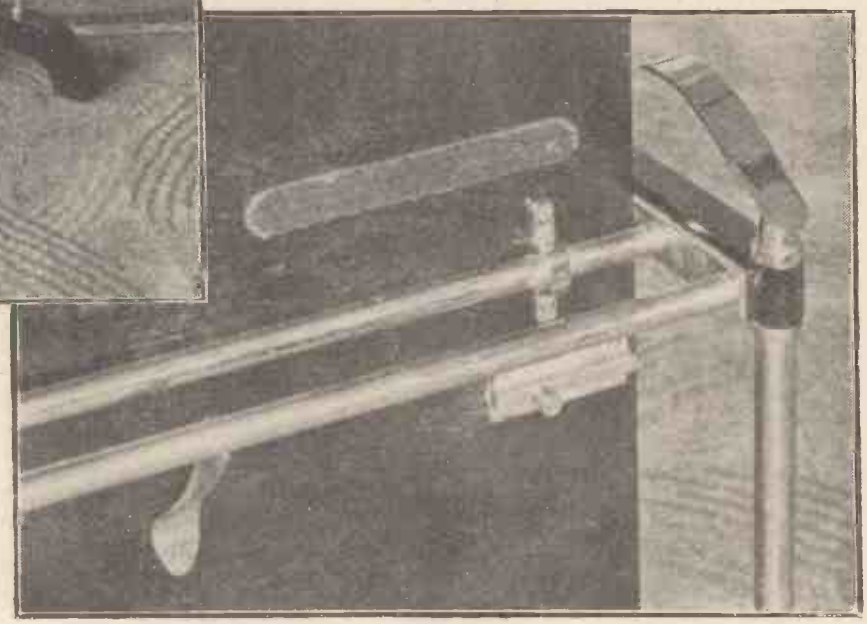
Constructional Details of a Dual-purpose Appliance for the Home

By L. C. MASON

The completed folding table in use.

THE chief advantage of a folding table is that it saves space when not in use as a table. The one now described has that virtue, but in addition it is so designed that when folded the attractive glass top is presented for use as a firescreen.

The construction is quite simple, the materials consisting of some lengths of brass rod and tubing and a few pieces of wood. The legs are made up as two complete units and assembled together with the bottom rail and top bars to form a framework on which the top is mounted. The top pivots on a bar across the middle, and when in use as a table is held by two bars right across from side to side, and two small bolts locking it in position.



Underside of table, showing the arrangement of pivot bars, etc.

Construction:

The Legs

The legs are lengths of light-gauge brass tubing having turned end plugs sweated in. The ends are turned so that some ½in. is inside the tube, while their outside diameter continues the tube shape into a radiused flange. The ends are drilled right through and tapped ¼in. Whit. The drawing, Fig. 1, shows suitable dimensions. The tapped holes in the end plugs are for attaching the legs by screws to the feet at the bottom and by studs to the bar and lifting handles at the top.

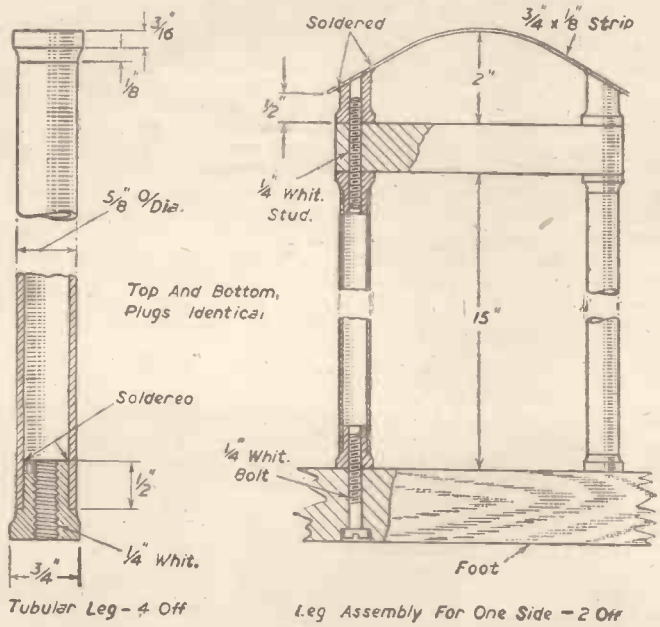


Fig. 1.—Details of leg assemblies.

For the feet and wooden bars, pieces of close-grained hard wood are best, cut to the dimensions shown in Fig. 2. The feet are drilled through ¼in. from above and counter-bored underneath to clear the heads of the ¼in. cheese-head screws fixing the legs.

Each woooden top bar has its ends radiused to match the top flange on the brass leg, and is drilled through ¼in. clear. After shaping the wooden parts and completing the drilling, they are stained ebony black and polished. Small felt pads can be glued under the feet, if desired.

Each side handle consists of three pieces of brass sweated together—a curved strip for the top, with two short columns sweated on underneath, in line with the tops of the tubular legs (Fig. 1). The curved handle top can be bent to shape by eye, and the columns for it then sawn and filed to the appropriate angle so that their bases lie flat on the wooden bar when the pieces are soldered together. These columns are also drilled and tapped ¼in. Whit. The complete leg unit is then assembled in the following order: a 1¾in. length of ¼in. screwed rod is screwed into each handle column, and the projecting ends are then passed through the wooden bar, which should leave some ¼in. of each stud projecting from the underside of the bar. On these are screwed the top ends of two of the tubular legs, and these should be screwed up fairly tightly to clamp the whole top assembly solid. Screws are then passed through the holes in the feet from below to engage the bottoms of the legs. A stout washer is placed under each screw head and these screws, too, are pulled up tightly enough to ensure that the whole unit is rigid.

The bottom rail is the same as each leg, except that the end caps are turned from 1in. diam. bar, so as to give a slightly larger flat area in contact with each foot. These ends are drilled and tapped ¼in. Whit. and drilled ¼in. clearing for about 3/16in. in from the end. The rail can be attached rigidly to the feet by a way which shows no fixing at all, as follows: procure two wood screws about 2in. long having the plain part of the shank ¼in. diam. (No. 14). Mark on each foot where the rail end is to come and drill the spot a tight fit for the screw. Drive a screw in each foot only as far as the end

of the thread, then cut off each head at its junction with the shank. The resulting plain stud is then screwed ¼in. Whit., screwing as close up to the foot as possible. If hard wood has been used for the feet the studs will not move during this operation. The rail is now screwed on to one stud, and the other foot screwed on to the other end of the rail. It is more than likely that when the two feet are screwed tightly on to the rail they will be at a decided angle to each other. If this is so, do not try to force them into line, but remove one foot and withdraw the stud from the foot half a turn or so. It will probably be tight, but two nuts locked on the ¼in. threaded shank will move it. Reassemble and try again. It will be apparent that due to the difference in pitches between the ¼in. Whit. and the wood screw threads, it will require only a small movement of the screws to provide a position where everything pulls up tight and square.

Top Bar Assembly

The two top bars which locate the table top are assembled with end plates as one unit for fitting between the small wooden bars under the handles. Two ½in. diam. brass rods are cut to length so that they just fit between the wooden bars when the legs are square and vertical. Each end of both bars is turned down to ⅜in. for a distance of ⅛in. from the end, leaving a sharp cornered shoulder, and is sweated into a ⅜in. hole drilled in a brass plate for screwing to the inner side of the wooden bar (Fig. 3). If desired, a felt strip can be glued to the underside of the top where it rests on the outer bar, or a covering of rubber tubing or something similar provided on the bar itself. If this is done allowance for its thickness must be made in locating the bar in the end plate or the table top will not lie flat.

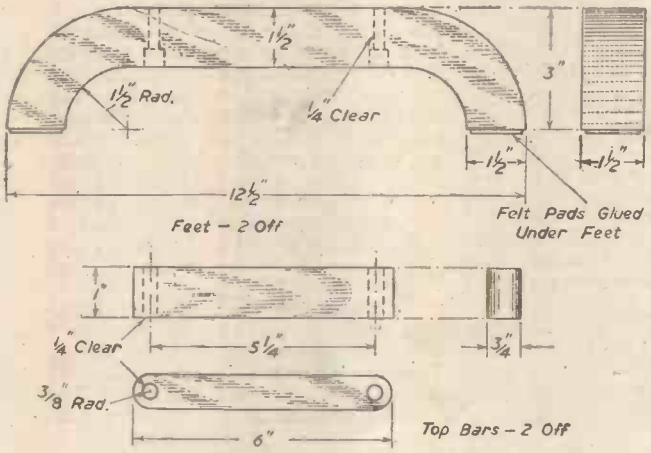


Fig. 2.—Details of wooden feet and top bars.

Each end plate also has a hole into which a small locking bolt engages and four screw holes for attaching to the wooden bar. The ⅛in. holes in the end plates are countersunk on the outside, and a fillet of solder runs in around the bar ends to hold them securely.

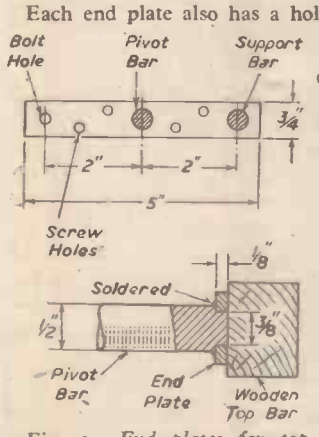


Fig. 3.—End plates for top bars.

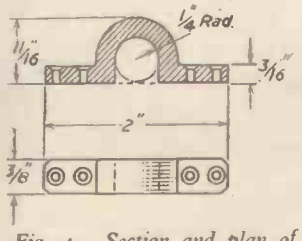


Fig. 4.—Section and plan of saddle pieces.

The drawing, Fig. 3, shows the spacing between the bars and the location of the various holes. Two small plated door bolts are fitted to the underside of the table top in such a position that when the top is lying flat the bolts can engage holes in the end plates. The position for these holes can be marked off for distance from the pivot bar, but their position from the top edge of the plate will depend on the actual bolts chosen.

The saddle pieces attaching the top to the pivot bar are filed up from ⅜in. x ¼in. brass bar, as shown in Fig. 4 drawing. When these are attached to the top and embracing the bar, centralise the top on the bar and mark on the bar where the inner sides of the saddle pieces come. The bar is now drilled and tapped 4 B.A. for two cheese-head screws, acting as stops to prevent the top sliding sideways along the bar. With this much assembled lay the top face downwards and swing the bars over to the horizontal position, locate the bolts on the underside of the top and mark off on the end plates where the holes will be needed for the bolts. The bar assembly is best removed from the top to drill these holes.

The Table Top

The top in the table shown is of ½in. plywood finished to the dimensions given in Fig. 5. If plywood is not obtainable there is no reason why a slightly thicker top should not be built up, either with tongued and grooved boards or with boards glued edge to edge and screwed to strips across each end. The strips would not be conspicuous if placed a few inches in from each end.

When vertical, the top is held in position by a stop made from a piece of the same strip brass as the handles. A ½in. hole is drilled a little way in from one end, and this end is shaped to make the hole into a fork end to engage the outer top bar. The other end of the strip is drilled for the fixing screws, given a 90 deg. twist in the vice, and bent up so that the fork end engages the bar snugly when the fixed end is lying flat on the underside of the top (Fig. 6). Screw positions for the stop are located by trial when the top is swung over to the vertical.

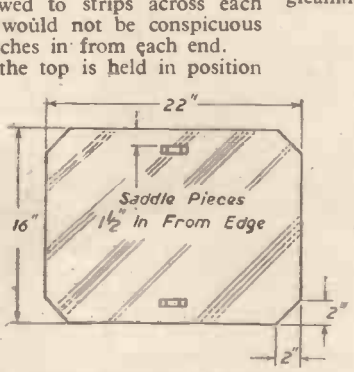


Fig. 5.—Details of table top.

The folding table in use as a firescreen.

Plate Glass Top Surface

The top surface is ⅛in. plate glass, with corners and edges ground. It is advisable to leave cutting out the wooden top till the glass is obtained, as if this should prove to be a fraction out of square the wooden top can be shaped to match. The wood is given a good undercoat on both sides and two coats of black paint, the top coat being either a high gloss paint or enamel. The underside of the glass is also given at least one coat of paint. When the glass is laid in position, the effect should be one of black gleaming surfaces everywhere. The glass is

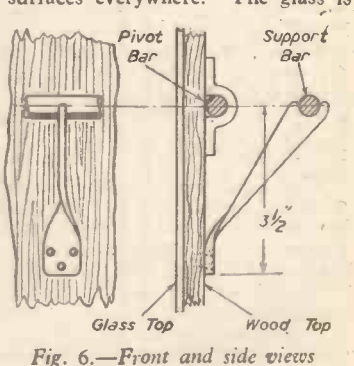


Fig. 6.—Front and side views of the swinging stop.

retained in position by a small clip at each corner. These are filed up out of ¾in. x ¾in. x 1/16in. angle brass, and drilled for two small fixing screws (Fig. 7). Where the clips bear on the glass a small piece of thin black rubber sheet is interposed between clip and glass. The ideal material for this is sheet rubber cycle tube patching. Cut pieces slightly larger than required, peel off the linen backing and place on the glass, prepared surface downwards. Press the clip tightly on top, mark off for the screw holes, drill lightly and screw home. When all four are fixed, the excess rubber can be trimmed off with a sharp knife or razor blade run round the top of the clip.

Finishes

All metal parts of the table shown are chromium plated, including visible screws. The wooden parts, as has been said, are glossy black, but there is no reason why any other colour should not be used. The result would no doubt look very effective carried out in a colour to match the room furnishings. In this case the stained and polished finish on the woodwork would have to give place to enamel, and a good quality hard gloss enamel should be chosen, allowing it to dry thoroughly hard before handling to assemble. Where the table may be used in different rooms with contrasting colour schemes, the black and chrome finish has much to recommend it.

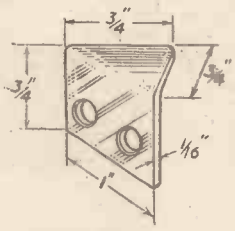


Fig. 7.—Corner clip.

If the coat of black paint is omitted from the underside of the glass top this could then very well cover a design or picture stuck to the surface of the wooden top. If a picture top is adopted, care should be taken in assembly to see that the picture is presented the right way up when the top is swung into the vertical position.

Mathematics as a Pastime

Simple Logarithms

By W. J. WESTON

WHEN a person declares himself unable to master logarithms it is a pity, for he deprives himself of a labour-saving device well-nigh indispensable for advanced calculation; and he is probably unduly diffident. Let him wrestle a while with these same logarithms as he does with his crossword clues and a clear knowledge of the theory will herald facility in their use.

A logarithm—which means "ratio-number"—tells us what relation one number has to another. The common logarithm, the one in the usual tables, expresses the relation to the number 10: it tells you *what power of* 10 is equal to the particular number. Look at these two statements; they are two ways of expressing the one truth:—

$$N = a^x$$
$$x = \log N_a$$

You interpret the first: the number N is equivalent to the number a multiplied by itself x times.

You interpret the second: x is the power to which a must be raised in order to produce N[$10^x = N$].

If a is always to be taken as 10, then 10 is our particular number.

You can express the relation exactly for a few numbers—a few only. Thus you know that 10^0 is equal to 1, you know that 10^1 is equal to 10, that 10^2 is equal to 100, and that 10^{-1} is equal to $\frac{1}{10}$.

Well, do this on a piece of squared paper. So doing, by actually calculating and showing the logarithms to your base 10, the whole theory will become familiar to you. Along the horizontal line place numbers: probably 12 is as far as you can go, as indicated in the accompanying diagram. The log of 1 is 0 whatever base you take; that is $10^0 = 1$. The point for log 1 is therefore *on* the horizontal line, neithe above nor below. No difficulty about that.

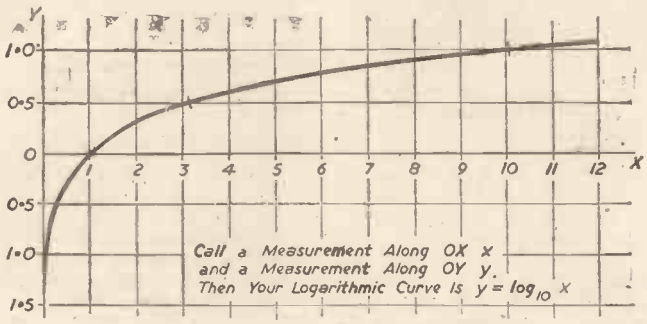
The log of 10 is 1: that is $10^1 = 10$. The point for log 10 is therefore 1 above the line.

Now we know that $1 : \sqrt{10} :: \sqrt{10} : 10$. That is, $10^{\frac{1}{2}} = \sqrt{10}$. Now $\sqrt{10}$ is 3.16; the point for log .5 is therefore 3.16 along the horizontal.

Below the horizontal you can hardly continue the curve beyond the log of $\frac{1}{10}$. $\frac{1}{10}$ is 10^{-1} and the log of $\frac{1}{10}$ is therefore -1.

Now join the four ascertained points: the log of $\frac{1}{10}$, of 1, of 3.16, and of 10.

Judge the degree of your skill in plotting a curve by measuring other logarithms, say 5 and 8. On your curve the log of 5 should be almost .7 (and .699 are the first three figures in the logarithm table): log 8 is almost .9 (and the first three figures in the logarithm table are 903).



Method of plotting a logarithmic curve

Now consider what logarithm you should have for $\frac{1}{50}$. It will be less than -1; for -1 is the logarithm of $\frac{1}{10}$. It will be more than 2, for -2 is the logarithm of $\frac{1}{100}$. That is to say, it will be -1 less a fraction or -2 plus a fraction. It is the more convenient way to have the fraction always a plus; you will find in the tables, therefore, for $\frac{1}{50}$ a *plus* fraction and its logarithm will be 2.6990. The minus sign is placed over the 2.

You see, in the tables we are told only the fractional part of the logarithm. Whether your number is 7 or 70 or 700 the figure in your table will be the same. You must supply the rest of the logarithm. That is, you assign the *value* of the figures. Thus, you read opposite 70 in your tables 8451. The logarithm of 7, therefore, is .8451 (for 7 is more than 0 but less than 10); for 70 it is 1.8451 (for 70 is more than 10 but less than 100); for 700 it is 2.8451; for .7 (which is less than 0 but more than .1) the logarithm is $\bar{1}.8451$; for .07 it is $\bar{2}.8451$.

As you readily see, this graphic way of finding a logarithm admits of only a very limited scope. For the line indicating the plus logarithms rapidly approaches a horizontal; and the line indicating the minus logarithms rapidly approaches a vertical. And you may say that playing with this particular graph is too closely parallel to a surgeon conducting an operation under which his patient is pretty certain to die: "It is true that the patient died under the treatment, but we have the consolation of knowing that he died cured." Still, the graph does make matters clearer.

Anti-logarithms

Accompanying your table of logarithms is a table of anti-logarithms. This latter tells you the number for which a logarithm stands. Thus the anti-logarithm of .8451 would be 7. You will find .84 in the anti-logarithm table; 5 spaces along you find 6998. That gives you the number for the logarithm 845. In the 1 space to the right you find 2; this added to 6998 gives 7000.

Ten minutes' practice will give you proficiency in translating numbers into logarithms and logarithms into numbers.

Take, for instance, the number 1769. Look down the left-hand column of the logarithm table where you have in each space (usually in heavy type) a pair of figures. You find 17. To the right you have two sets of spaces from 1 to 9. The first set guides you to the logarithm of your first three figures. Looking under 6 you find 2455; that is the logarithm of 1.76. Further to the right you have, again from 1 to 9, numbers that you are to add in order to get your fourth figure. Under 9 you find 23 and this added to 2455 is the logarithm of the sequence of figures 1769; that is .2479 is the fractional part whether the sequence is 1769 or 1769000 or .01769, the complete logarithm being 3.2479, 6.2479, and $\bar{2}.2479$.

The Elements of Mechanics and Mechanisms—18

Buoyancy—Liquid Flow Through Orifices—Velocity and Discharge

By F. J. CAMM

WHEN a body is floating at rest in a liquid it is in equilibrium and the total downwards force on it is exactly equal to the upwards force. The downwards force is due to the weight of the floating object, neglecting atmospheric pressure. Gravity tends to pull the floating object downwards, but there is a resultant upwards pressure of the liquid which negatives the gravitational pull.

This is known as the *buoyancy* of the liquid and the upwards pressure of a liquid on a floating object is exactly equal to the weight of the liquid which has been displaced by the object. This is the principle of Archimedes, which states that the weight of a body is equal to its displacement or the weight of liquid it displaces.

Liquid pressure upon a floating object acts at all points of the surface of the object. The resultant of all upward pressures on the object will act through the centre of gravity of the liquid displaced by the floating object. This is known as the *centre of buoyancy*.

A floating object must be in one of three conditions of equilibrium: *stable*, *unstable*, or *neutral*. If a boat is rocked, for example, it will gradually return to its normal position, and it is therefore in a state of stable equilibrium. If after rocking it undergoes still further displacement and heels over farther it is in unstable equilibrium.

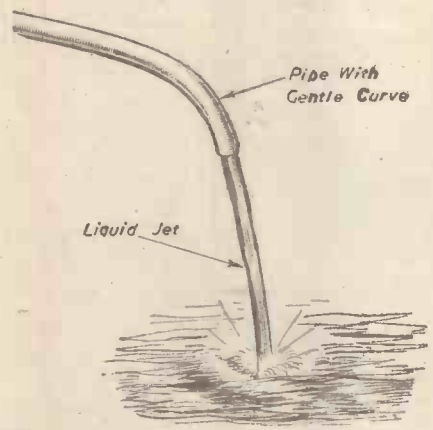
If after displacement from its normal position it remains at rest in its new position it is in a state of neutral equilibrium. Ships, of course, must be so designed that they are always in a state of stable equilibrium.

Liquid Flow through Orifices

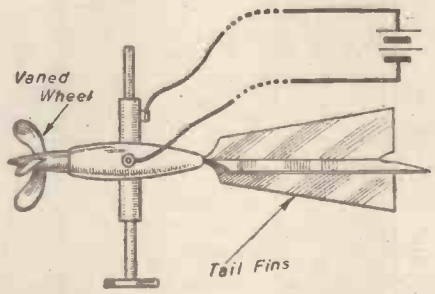
A liquid contained in a vessel at rest remains stationary. If a hole is drilled in the bottom of the vessel, gravity will cause the liquid to flow out. In this instance the particles of liquid which rest over the hole will flow out first, and their downwards motion will create a void space or partial vacuum momentarily above the hole so that the other liquid particles will at once flow into this space and discharge themselves through the orifice.

The particles flow to the orifice in all directions, and once the liquid commences to flow all of the liquid is in motion.

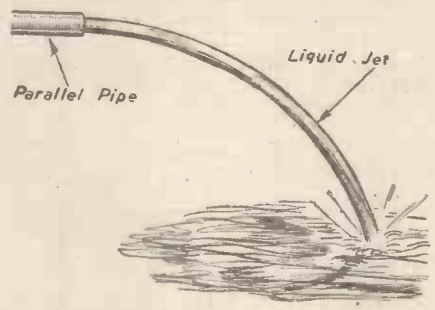
The flow of liquids to orifices was investigated by Venturi and it is an involved subject. Consider a water container having a circular hole drilled in its side and near the base, the water level of the container being maintained constant by means of a suitable ball valve, as in a cistern. If the orifice were placed in the bottom of a vessel the water will descend in a vertical stream, but when it is placed in the side of the vessel the stream describes a curve known as a *parabola*. The water, it will be observed, moulds itself to the shape of the orifice and the stream extends outwards for some distance before it finally scatters and breaks up into drops.



Illustrating the type of gentle curve necessary in order to keep fluid friction in a pipe down to a minimum.



Illustrating the principle of the electrical "current meter" for estimating the rate of flow of moving water.



Showing the trajectory or flow-path of a jet of water issuing from a parallel pipe. The water descends in a gradual curve under gravitational influence.

Vena Contracta

At the commencement, that is to say, at the point where it is leaving the orifice, the stream has exactly the same diameter as the orifice. The stream, however, immediately contracts in diameter until at a small distance from the orifice it takes upon itself parallel sides, and this is maintained for some considerable distance. This is known as the *vena contracta*. It is due to the liquid particles as they approach the orifice preceding in paths which converge beyond the orifice, so that the escaping jet or column of liquid must necessarily assume a smaller diameter a little distance away from the orifice.

The Co-efficient of Contraction

The degree of contraction depends upon the size of the orifice, its shape, and upon the liquid pressure or head in the vessel. The ratio between the area of the orifice and the area at the *vena contracta* is known as the *co-efficient of contraction*. This varies according to the dimensions and the shape of the orifice, but for small orifices it is approximately 0.64.

The formula for the co-efficient of contraction is:

$$C = \frac{\text{Areas of jet and } \textit{vena contracta}}{\text{Area of orifice}}$$

Usually the *vena contracta* occurs at a distance from the orifice equal to half its diameter, the diameter of the contracted part of the jet to the diameter of the orifice being in the ratio of 5:7.

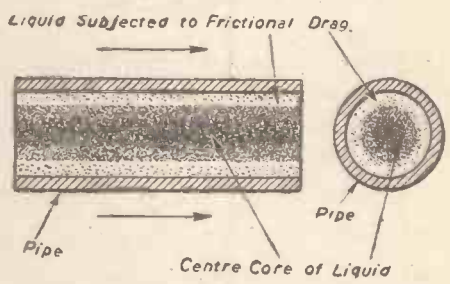
The water particles passing through the orifice undergo a reduction of velocity in so doing, but having passed through the orifice they attain a maximum velocity at the *vena contracta*.

Velocity and Discharge

The co-efficient of velocity in respect of streams issuing from orifices is the ratio between the jet velocity at the *vena contracta* and its theoretically calculated velocity. The ratio is usually of the order 0.97 to 0.98.

The co-efficient of discharge is the ratio between the amount of water discharged through an orifice in unit time and the theoretical amount which should be so discharged. Because of the contraction the actual discharge is always less than the calculated discharge. This ratio varies according to the water head or pressure and the type of jet.

The co-efficient of discharge on an average is 0.6. *(To be continued).*



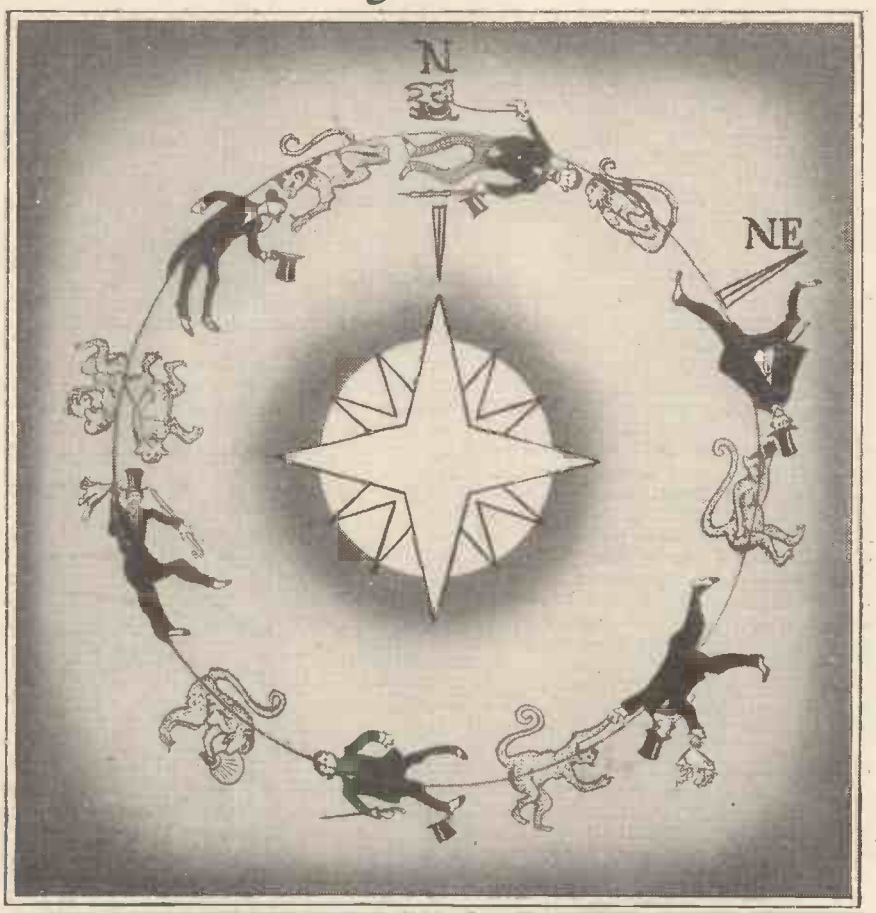
Section and elevation of a tube through which water is flowing, showing how the sides of the tube exert frictional drag on the water, thus giving rise to a central core of liquid which flows at a greater speed through the pipe.

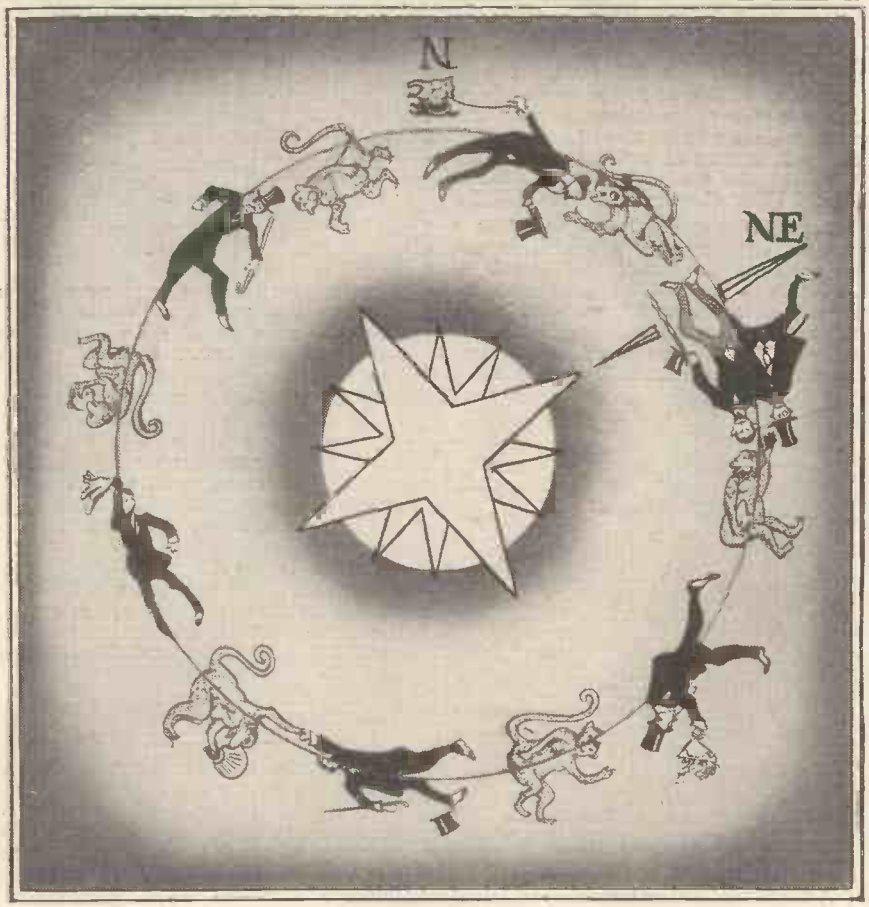
Man and Monkey Puzzle

IN our issue dated September, 1948, we published a design of the Vanishing Chinaman Puzzle, designed by Sam Loyd. On this page will be seen a puzzle employing the same principle. By rotating the inner disc a man will be seen to change into a monkey, or a monkey into a man, if you want to crack a joke about the Darwinian theory.

We do not offer a prize this time for the solution. It is published so that readers might make an amusing novelty with which to puzzle and perhaps entertain their friends. The illustrations should be stuck down on to a fairly stout piece of card, and eyeleted together. The reader will be able to make two puzzles from these diagrams. Some care, of course, is necessary in making the circular cut to separate the two parts.

In the top illustration six men and seven monkeys are seen, while in the lower illustration there are seven men, and one of the monkeys is missing!





"Bristol" Engine Achievements

"BRISTOL" engines powering civil aircraft flew 76,000,000 miles during 1948 and built up a total of 403,000 engine hours.

These remarkable figures, included in a statistical survey of last year compiled by the Bristol Aeroplane Company's engine division, do not take into account engines in military aircraft and in service with R.A.F. Transport Command.

At the head of the list of aircraft contributing to the "Bristol" record is the Vickers Viking. Aircraft of this type, powered by Hercules sleeve-valve engines, flew nearly 35,000,000 miles and completed 174,000 engine hours. Short Bros.' Hythe flying boats using the Pegasus, predecessor of the Hercules, were second on the list.

The survey also reveals interesting figures regarding the "Bristol" Theseus propeller turbine, the company's first venture in the field of gas turbines. This engine, which in 1947 became the first of its type to be successfully type tested, scored two more "firsts" last year. Its successful completion of a 500-hour endurance test in June was the signal for a series of similar tests to be undertaken by other engines, while its use in two Lincolns of R.A.F. Transport Command marked the first occasion on which Service aircraft had been powered by propeller turbines. These aircraft, incorporating two Theseus turbines in the outboard positions, and retaining the normal Merlin units inboard, completed 17 round trips between Lyneham and Fayid, Egypt, carrying varying freight loads. These journeys brought the Theseus' total flying time to 1,374 hours, running time totalling 4,779 hours.

Other highlights of the "Bristol" aero engine record in 1948 are noted below:

A Hercules 230 development engine successfully completed a 50-hour endurance test at 2,300 B.H.P. and a 25-hour endurance test at 2,400 B.H.P.

A Handley Page Hastings, powered by four Hercules engines, flew from U.K. to Australia in 42 hrs. 25 mins. flying time, average speed for the whole trip being nearly 250 m.p.h.

Hastings aircraft also entered service in the Berlin airlift and proved the fastest British aircraft in the operation.

Solent flying boats with Hercules 637 engines were put into service by B.O.A.C. on the South African route, replacing the Short flying boats with Bristol Pegasus engines after 12 years' service.

New Series

World Air News

The Future Bombers : New Trends in Supersonic Research : America Steps-up Production

By KENNETH W. GATLAND

IN 1948, it was announced that all future operational aircraft for the Royal Air Force would be engined exclusively by turbo-props or turbo-jets. Thus began a long-term development programme in the heavy-bomber class with apparently no provision for an interim type beyond the old-style "Lincoln" (Fig. 1).

While this policy is to be commended, the gap it leaves in the intervening period is, to say the least, disquieting. For some years to come, we shall have in service no bomber of modern performance; certainly nothing to compare with latest U.S. swept-wing 500-600 m.p.h. "heavies" or, by all accounts, with new Russian types already in production. One wonders how long after 1950 (it can scarcely be sooner!) aircraft of comparable standard will be in the hands of our own air crews. It has been necessary to wait until fundamental research has given its result before finally shaping the super-bombers, and it is inevitable that some time must elapse before the prototypes appear.

Fig 1.—(Left) The "Lincoln," well-tried but much outmoded by present-day standards: it is still entering service with the R.A.F.

Fig. 2—(Above) The Boeing XB-47 "Stratojet," one of several radical jet-bombers under development in the U.S.A.

The Future Prospect

When they come, these new aircraft should be "super" indeed. In keeping with improved engine performance, swept-wings will be the vogue, possibly Delta-wing shapes. Greater reliance will be placed on speed and altitude to outwit the defences, and fuselages will be streamlined, dispensing with rotating gun-turrets and other drag-causing projections.

The aim will be cruising speeds of between 500 and 600 m.p.h., with an effective ceiling of 50,000 feet and ranges of 4,000 to 5,000 miles.

Within a short while axial-flow turbo-jets of 6,000 to 7,000 lbs. static thrust should be forthcoming with the coupled possibility of more powerful bi-fuel rocket motors, both to assist take-off and to provide extra boost in flight. The improved ranges demanded and the correspondingly heavier fuel loads will almost certainly make rockets a permanent feature. It is likely, too, that for improved efficiency, the jet engines will serve to draw off boundary layer from the wing surfaces.

The American Approach

Some indication of the kind of bombers we may expect will be found in the new Boeing XB-47 "Strato-jet" (Figs. 2 and 3). Claimed to have made its first test-flight only 18 months after design began, this aircraft is clearly an outstanding triumph for its builders. Not only are swept-wing and tail-surfaces embodied but power is supplied by six turbo-jets underslung on the wings; features that provide an aeroplane which—it is said—can actually outfly many present-day jet-fighters.

The aircraft is in the same weight-class as the B-29 "Super Fortress" and will

Fig. 3.—Six turbo-jets and eighteen dry-fuel rockets combine 42,000 lbs. thrust in this spectacular take-off of Boeing's new "Stratojet."

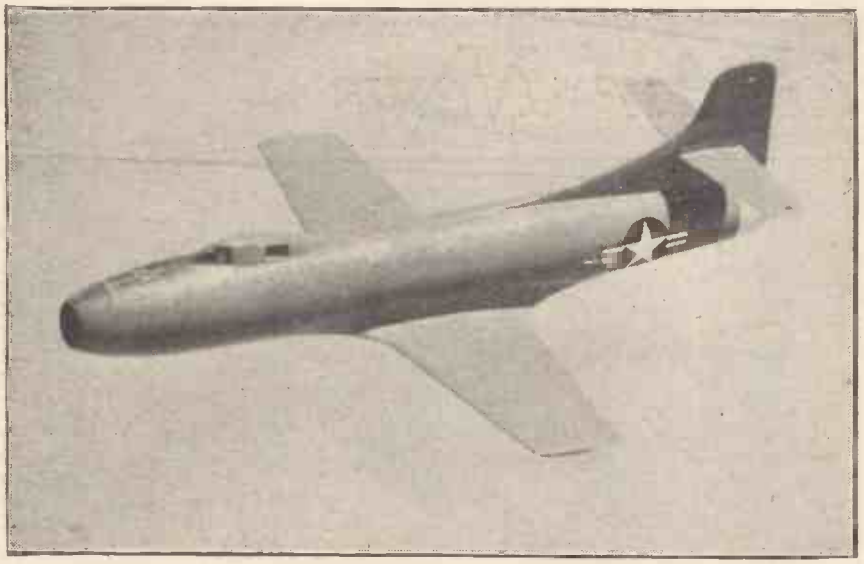


Fig. 4—The Douglas "Skystreak," transonic research 'plane and former holder of the world's air-speed record.

carry 10 tons of bombs. Its engines are Allison-built J-35-A-15s (developed from the General Electric TG-180 axial-flow unit), with a take-off rating of 24,000 lbs. thrust —4,000 lbs. apiece. Production aircraft, however, are expected to use the new General Electric TG-190 (J-47) turbo-jet of 5,000 lbs. static thrust.

In addition to the jet units, eighteen 1,000 lb. dry-fuel rockets are mounted in the sides of the fuselage to accelerate take-off. The total application of thrust, seen in Fig. 3, is therefore 42,000 lbs.

Several other types of pure-jet bombers are in various stages of development and production in the U.S., including the four-engine North American XB-45 and Convair XB-46, the six-engine Martin XB-47, and Northrop's eight-jet 100-ton flying-wing, B-49. High hopes are held of this latter aircraft which recently broke the endurance record for any jet machine by remaining aloft for nine and a half hours, flying on a shuttle course, 3,458 miles.

The "world's largest bomber," Convair's B-36A, is piston-engined (six Pratt-Whitney Wasp Majors, driving pusher propellers) and comparatively vulnerable by jet-bomber standards. Hence, the complicated protective techniques, involving "parasite" fighters carried inside the fuselage and launched from the bomber during attack (see PRACTICAL MECHANICS, November, 1948, pp. 48-49).

Supersonic Research

From wind-tunnel and actual flight research by the Bell XS-1, a more distinct picture of the conditions encountered in the range between Mach .8 and Mach 2.0 (.8 the speed of sound and twice the speed of sound respectively) has emerged. Perhaps the most interesting conclusion of all is that, contrary to widespread belief, the "straight" wing is *not* entirely outmoded: the National Advisory Committee of Aeronautics (NACA) have confirmed that at Mach 1.8, it actually becomes *more efficient than the swept-wing*. The reason is that the shock waves which shoot back from the leading edge wing roots become so acute that they move roughly at the same angle as the sweep, causing over-burdening drag.

Thus, a second compressibility "barrier" is encountered which, in some ways, may reverse the situation and re-introduce thin-section "straight" wings and aircraft generally similar in conception to the Bell XS-1. Up to this limit, sweep-back effectively delays the formation of shock-waves, allowing a sub-sonic airflow over the wings though the aircraft itself is flying at supersonic speed.

Congratulations are due to North American Aviation on the new world air-speed record of 670.9 m.p.h., set up by an F.86 (reviewed in PRACTICAL MECHANICS, November, 1948, pp. 48-49). This machine is no specially stripped and boosted research 'plane. It is a model now in production for U.S. home defence and the record-breaker was completely armed and carried a full complement of ammunition (Fig. 4).

America Steps Up Production

A further sum equivalent to £38,000,000 was recently approved by President Truman for new military aircraft and modernisation of existing types, scheduled in the 70-group rearmament plan. The great bulk of aircraft that have been in store since the end of the late war are already being brought up to first-line standard. In particular, Boeing has re-opened its Wichita factory for the modification of several hundred B-29 "Superforts"; they will emerge with improved electronic equipment, pneumatic operating bomb-bay doors, a fuel-injection system and provision for flight refueling.

Severn Bridge Wind Tunnel Tests

Aerodynamic Research on Suspension Bridges

ON behalf of the Ministry of Transport, the National Physical Laboratory, D.S.I.R., recently carried out an investigation of the oscillations of suspension bridges in wind, with particular reference to the proposed Severn Suspension Bridge. For this research numerous tests of sectional bridge models have been made in a wind tunnel at Teddington, and a special large tunnel and complete model bridge have been constructed near Bedford. A second complete model, based on a preferred design for the Severn Bridge, was made and tested. The research work was under the direction of Dr. R. A. Frazer, F.R.S., of the Aerodynamics Division, N.P.L.

History

An investigation of the aerodynamic oscillations of suspension bridges was begun early in 1946 with the object of providing guidance in the design of the proposed Severn Suspension Bridge.

Although many early suspension bridges were damaged or destroyed by wind action, the serious study of the aerodynamic oscillations of bridges dates from 1940, when the 2,800ft. span of the Tacoma Narrows Bridge in the U.S.A. broke under torsional oscillations. This disaster led to intensive American investigations and to the construction of a special wind tunnel, with a working section 100ft. wide, at Washington University (Seattle) for tests of complete model bridges.

Nature of Oscillations

Persistent and dangerous oscillations of suspension bridges in wind are due to adverse interaction between the forces due to inertia, gravity, stiffness and wind. In this respect they resemble wing flutter on aeroplanes. However, the bridge problem presents special features. Airflow past a wing is relatively smooth, whereas a bridge offers many blunt obstructions which, in some cases, produce large eddy formations, and, in others, very broken flow. Moreover, natural winds can blow from any quarter and sometimes strike the deck of a bridge at relatively large angles.

Bridge oscillations are of two main types: (a) "Vertical," with the roadway deck and stiffening girders bending up and down and the two cables moving equally and in step, and (b) "torsional," with the deck and girders twisting and the cables moving equally but in anti-phase. Each type may appear at appropriate frequencies in a variety of different wave forms. As a general rule, main span movements are accompanied by side-span and tower movements.

The behaviour of a given bridge when the wind speed is increased may be very complicated. For example, if—because the structure has unfavourable aerodynamic characteristics—a bridge is susceptible to vertical oscillations, these will usually make their first appearance in a simple wave form (e.g., 0, 1 or 2 nodes in the main span). An increase of speed may accentuate the same oscillations or it may cause vertical oscillation having another frequency and a more complex wave form to be substituted or even added to the original oscillation. Next, torsional oscillations may appear in a simple wave form, and these may well become so violent at still higher wind speeds as to cause structural failure.

Experimental Methods

For wind tunnel investigations two methods are available: (a) Sectional Bridge Models.—The first and simpler method is to use a so-called "sectional model," which is merely a rigid scale reproduction of a short length (say 300ft.) of the suspended structure. The model is suitably mounted under spring constraints in a wind tunnel, and its tendencies to develop oscillations in wind are observed. A rapid systematic study can thus be made of the effects of changes of structural form, and the results can then be used to indicate a preferred design. Numerous tests of this kind have been carried out at the N.P.L.

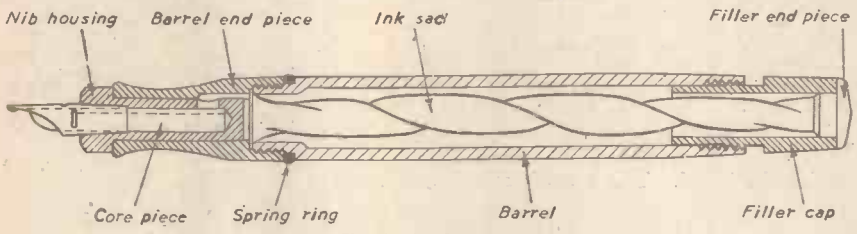
(b) Full Bridge Models.—The second method involves the construction of a dynamic scale model of the complete bridge, as well as a tunnel sufficiently large to accommodate it.

Our Fountain Pen Competition

A Further Selection of Entries Sent in by Consolation Prizewinners

THE pen described by Mr. E. F. S. Crowe is designed to the specification that (a) it shall hold ink up to two-thirds of the barrel capacity, and (b) that it must not leak

To obtain the high ink capacity required the usual spring leaf filling mechanism, operating on the rubber ink sac, has been dispensed with. It is proposed to secure filling by first turning the filler to twist up and evacuate the ink sac, and then by returning the ink sac to its normal position to produce a vacuum in the ink sac, thus drawing in a fresh supply of ink. In the sectional view showing the internal construction of the pen the ink sac is drawn in the twisted condition ready for filling.



Mr. E. F. S. Crowe's design

Two and one-half or three turns of the filler will be required to ensure complete filling, and the filler cap is threaded to ensure that it is always returned to the same position when filling. The filler and filler end piece are made separately to assist accurate positioning of the ink sac on assembly.

Normally, the pen should not be inclined to leak, but to ensure freedom from this trouble a valve is provided which is closed by giving a quarter turn to the push-on cap. This is retained by the spring ring popular with certain modern types of fountain pen, and has a fluted insert which engages a fluted portion of the nib housing acting as the valve. This nib housing has a small hole for the flow of ink, which, in the normal position for writing, communicates with a channel cut in the bore of the barrel end piece. A stop peg can be provided to locate the nib housing with the valve in the on and off position.

It is not intended that the pen should be dismantled by the user, though it would be possible to withdraw the nib housing for thorough washing if required. The screwed joint in the barrel of the pen would be cemented, both to prevent the barrel unscrewing when the valve is closed or opened, and to ensure that the ink sac is firmly held at its open end. It would, of course, be necessary to use a cement for which a solvent was obtainable, so that the pen could be dismantled at the works.

Mr. J. Tomlinson's Design

The description of the various parts and the operation of this pen is as follows:

A plastic knurled knob (A) is shrunk on to stainless steel pump rod (E) and threaded to enter the end of the barrel. When screwed home it compresses a rubber disc (C) against the pump rod, forming a leak-proof gland. Plastic discs (B and D) are screwed into the barrel each side of the rubber disc to keep latter in position. The stainless steel pump rod (E) has a slight flat on it commencing about ½in. inside disc D, this to let air past gland when withdrawing pump to fill the pen.

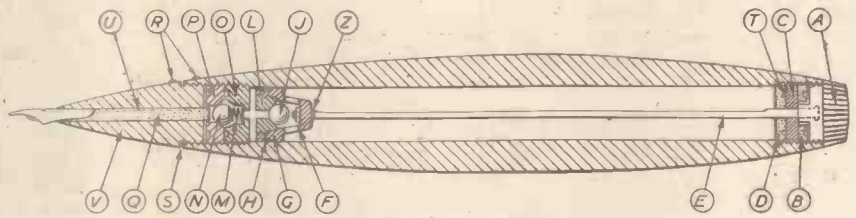
Holes (T) sunk in discs B and D and blocks O and P are provided to facilitate assembly.

The four-pronged cage (F) attached to the pump piston and pump rod is provided with slots smaller than the diameter of the stainless steel ball J.

The rod E is screwed into a tapped hole at the top of the cage at Z with a small locknut on the inside. This is to enable gland B C D to be fitted on the pump rod before attaching the piston.

The piston (G) has a screwed-in part (L) forming a seating for easy insertion and withdrawal of the stainless steel ball valve J.

A rubber or cork ring (H) is fitted round the piston. Screwed into the barrel is a plastic block (O) to hold a light stainless steel spring (M) loading the stainless steel ball (N) on to the plastic seating (P).



Mr. J. Tomlinson's design

The nib housing (V) contains the feed (Q) with a groove (U). A small gap (S) is allowed here when the nib housing is unscrewed slightly to bring the white dots (R) in line. In this position the spring-loaded ball is on its seating and *no leak can occur*. The only ink left free is the small quantity in the feed groove, which is easily dispersed by writing two or three words.

For writing, the nib housing is screwed home, gap S disappears, nib feed pushes ball N off its seating and ink flows to the nib. At writing angle the ball J falls off its seating and ink flows from upper chamber.

To fill the pen it must be held vertical so that the free ball J falls on its seating. The two white dots should be in line, so that the spring-loaded valve is on its seating. Unscrew the knurled knob A and withdraw the pump rod steadily until piston is at top of its stroke. This suction lifts the spring-loaded ball and fills the barrel below the piston. Air in the top of the barrel escapes past the gland via the flat on the pump rod.

On slowly pushing the piston down again, the action closes valve N but lets ink pass the loose ball (J) until the piston is right down, as shown in the drawing. Ink is now above piston. Finally, screw the knurled knob (A) home.

This pen is very suitable also for a stylo-type nib. The needle protruding from the writing point will be just touching ball N. Pressure on paper will then push the ball off its seating to let ink flow. In this type no adjustment of nib housing will be necessary as it will be screwed hard home all the time.

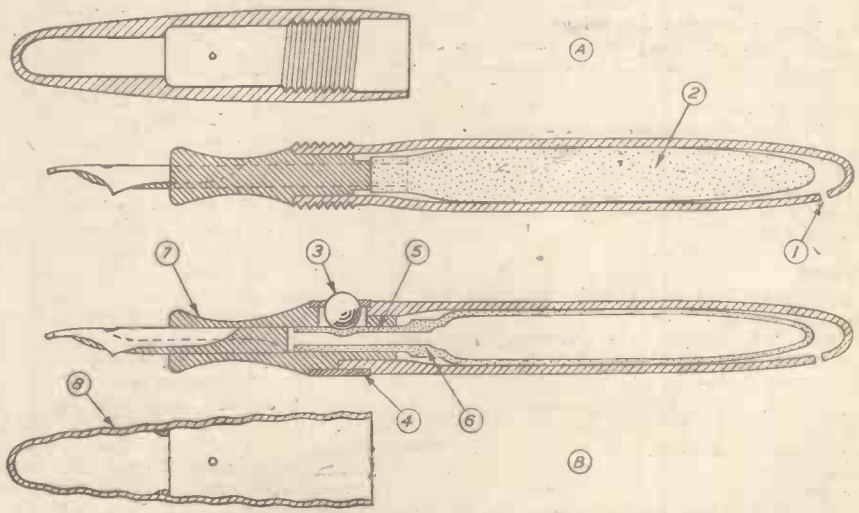
Mr. H. C. Flind's Designs

Two distinct designs are shown at A and B, but these can easily be combined, being shown separately for convenience only.

A illustrates a means of securing maximum ink capacity, with elimination of much of the usual mechanism.

B shows a system of sealing off the ink supply, operated automatically when the cap is replaced. The device includes means of retaining the cap, thus avoiding the need for a screw thread.

The pen shown at A is quite normal,



Two different designs by Mr. H. C. Flind.

except for the omission of the usual lever or stud and the formation of a minute hole (1) in the barrel.

Omission of the lever, etc., allows a large ink sac (2) to be used and this almost fills the barrel. Filling is accomplished by holding the end of the pen in the mouth (the nib being in the ink) and blowing momentarily; thereafter releasing the increased pressure and withdrawing the pen from the ink.

The blowing action results in increased atmospheric pressure between the sac and the barrel, and almost completely flattens the sac. Release allows ink to fill the sac.

The pen illustrated at B includes a device for automatically sealing off the ink space and retaining the cap.

This comprises a small ball (3) inserted between the barrel and the nib carrier (7), and retained by a metal ring (4).

The ball (3) bears against a rubber tube (5) of narrow internal diameter, which forms one end of the ink sac (6).

The outside surface of the tube (5) forms an airtight joint with the inner surface of the nib carrier (7) at each side of the ball (3).

The cap (8) is preferably of the modern corrugated metal type and the ball (3) co-operates with the corrugations to prevent accidental separation of the cap from the pen.

Pressure of the cap (8) against the ball (3) closes the narrow internal passage of the tube (5), thus preventing the escape of ink from the reservoir while the cap is in place.

The drawing B also illustrates a method of joining the barrel to the nib holder. B, as compared with A, shows how an ink sac (6) ending in a tube (5) joined internally to the nib holder (7) (instead of externally) allows a stronger joint between nib holder and barrel, with wider overlap and thicker walls. The metal ring (4) further strengthens the joint, besides retaining the ball (3).

Pen Design by Mr. W. E. Pullan

This pen comprises a barrel similar in construction to the self-filling pen of the push-button filler type. Into the bottom end of the barrel is screwed the usual type of nib holders which tapers to form a small opening (D) inside the barrel. The opening at the top end of the barrel is reduced in diameter and provided with two slots as shown in section AA.

This end of the barrel is provided with a screw-on cover B into which is cemented a rod which passes through a special washer and down the centre of the barrel. The end of this rod is fitted with a plug C, which is tapered so as to fit into D when the pen is closed, so preventing any ink leakage. The plug C is also screw as shown.

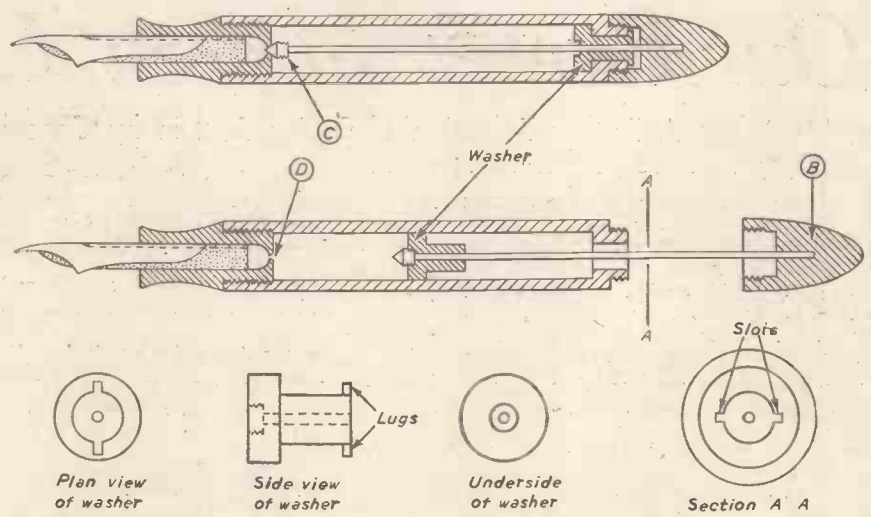
A side view and plan and underside view of the special washer are shown in the drawings. The top of the washer is provided with two lugs which are designed to pass through the two slots in the end of the barrel. The underside is recessed and tapped to allow C to screw in, as shown.

Action

The action when filling the pen is as follows: With the pen closed take hold of B with the right, while holding the barrel with the left hand.

Unscrew B from the barrel and pull out, so bringing C into contact with the washer. Give B, say, two turns to left, to screw C into base of washer, and then another half a turn to line up the lugs of the washer with the slots in the barrel end. Now push down, so expelling air; then pull out, so drawing in ink, until washer lugs protrude through end of barrel. Give B half a turn to the left, to take washer lugs out of alignment with slots in barrel; then holding washer lugs with left hand give B two turns to right, so unscrewing C from washer. Now push down again and screw B on to barrel, so sealing D with C and preventing any ink leakage.

When it is desired to use the pen for writing, unscrew B, say, half a turn so as to allow ink to flow through D. In order to make air- and ink-tight seals it might be advisable to provide the washer and the tapered portion of C with rubber bushes.



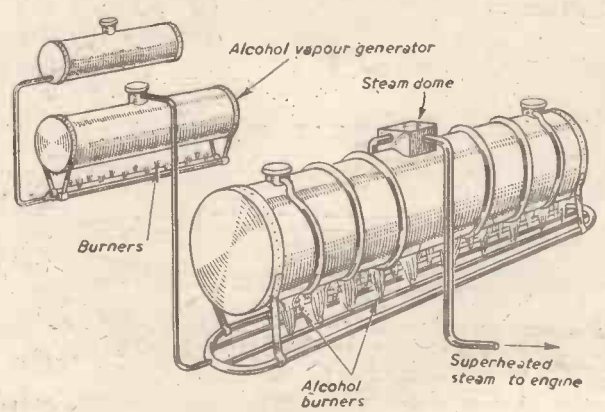
Mr. W. E. Pullan's design.

Perreaux's Steam Cycle

With Particular Reference to the Working Details of the Boiler

By A. W. NEILD

MUCH interest and wonderment were created when the Perreaux Steam Cycle was displayed at the Old Time Cycle Exhibition in Paris during the year 1946, and rightly so, as this amazing machine was built in the year 1868 after years of patient experiment and work by the inventor who took out a patent for this machine the same year. It was unfortunate that this clever inventor should bring out a machine so far advanced for those times, as this was, no doubt, one of the reasons why the steam cycle did not "catch on" with the general public. It should be remembered that the bicycle itself had only "developed" pedals some three years previously, and the idea of fitting any kind of engine to one must have seemed very futuristic indeed.



Details of the boiler and spirit burner for Perreaux's steam-driven cycle.

The Boiler

The boiler for this machine was of a very compact nature, as shown in the accompanying sketch. It will be seen that the outside cover has been removed to show details of the burner, etc. The main steam drum is surrounded by six tubes which connect to steam domes in the top of the boiler, and as these tubes would contain only steam and no water, except that from condensation after being in use, and passing, as they do, right through the centre of the burner, exceedingly dry and hot steam was delivered to the engine. A stop valve which was also the throttle was situated near the engine and also worked by hand.

The Engine

The location of the boiler, high up under the rider's saddle, was not a happy choice, particularly for the rider, but apparently the only place left to the designer, but it did allow of a short connection between boiler and engine, which is always desirable. The engine was a fine piece of work, small, yet well designed and made. Its one cylinder was arranged for single-acting only, and steam admission was controlled by a slide valve. The drive was through a balanced crankshaft which carried at either end a fly-wheel and driving pulley. Thus with the aid of a further pair of twin pulleys bolted one each side of the rear wheel and with belt drive, transmission was effected. Pedals on the front wheel, which was a feature of cycles in those days, were retained as also was the plunger type of brake on the front tyre.

Performance

Nothing much is known of the performance of this interesting machine, and, although it would be unwise to form any ideas as to its capabilities in the absence of confirmed data, it must be acknowledged that the lay-out and ingenuity shown contained more than the mere germ of things to come.

It is fortunate for posterity that this machine is preserved in a private museum, that of M. Robert Grandseigne, of Paris.

Power Model Aircraft

Stunt Control-line Flying : Small British Diesels : New Control-line Handle

By C. E. BOWDEN, A.I.Mech.E.

(*Continued from page 117, January issue*)

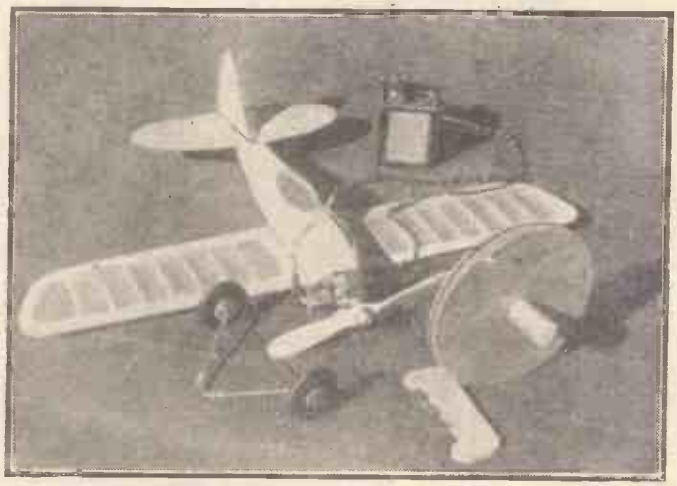


Fig. 34.—The author's model on the same lines as the Vandiver, but in this case a low wing. The drop-off undercarriage is seen in front of the model. A drum to wind off the thin steel control wires is also seen. This prevents snarling and kinking when not in use. Kinked lines break.

Stunt Control-line Model

A SMALL, cheap and easily transported stunt model which will really loop and perform other stunts reliably and easily is quite a problem. The reason is that in this country we have developed small diesels as our main line with a few small glow-plug engines. There seems to be a dearth of really "hot" medium-size engines to suit larger stunt models.

A stunt model must have a high power-weight ratio, or, to put it in another way, it should be built light and have a powerful motor for its weight and drag. It is only in the larger sizes that a model having these attributes can carry the weight of spark ignition gear and a petrol motor of around 10 c.c. The Americans have developed the latter type of engine well, and are now cutting out the ignition gear by using glow-plug ignition. This is a type of ignition which I will explain in a subsequent article. It is being introduced into this country by one or two firms at the moment, but is not yet very generally used, although I feel sure its popularity will catch on when its virtues are fully appreciated.

So at the moment the small stunt model appeals to the average British modeller because of low cost and because the engines are readily available at extremely low prices.

How can we get a light model which will look well, and stunt well, on the limited c.c. of the smaller British diesels and glow-plug motors? This has been done successfully by what may be called the "outline" model as seen in Fig. 32. But this type of model, though light, is, in my opinion and that of many other people, very ugly and scarcely bears any relation in appearance to a real aeroplane. Mr. Peter Cock won the first national stunt competition with a model on these lines and showed the importance of light weight and high power. He used a 2 c.c. "Competition Special E.D." diesel.

Last year International Model Aircraft, the makers of the well-known "Frog" engines and aircraft, introduced a stunt model called the "Vandiver," which had a built-up all balsa sheet fuselage of simple rectangular lines but having a distinct resemblance to an aeroplane, albeit retaining the rectangular symmetrical sectioned wing which I have previously explained is so popular in America for stunt models.

This little model provided our lightweight requirement, and when fitted with the larger Frog 180 diesel or the Frog 160 Red Glow glow-plug motors, it is capable of any stunt in the book, as I know from personal experience and also from watching the flying of Mr. Cathcart, Frog's general manager (see Fig. 33). The Vandiver is commercially obtainable in kit form at a very reasonable price and is simple to build.

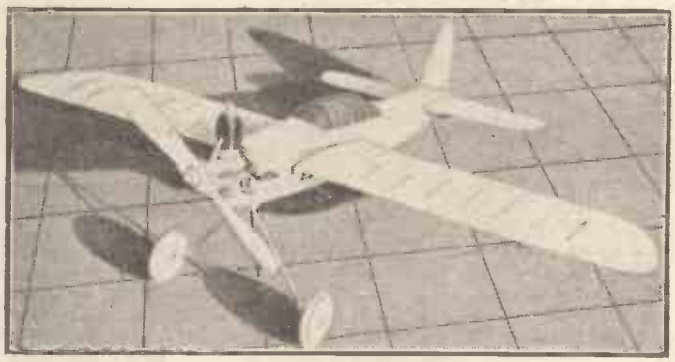


Fig. 35.—This little 23in. span Vandiver is fitted with an Arden-99 glow-plug engine. The drop-off undercarriage is plugged into two brass tubes, and falls off the model as it becomes airborne.

I consider that the lightweight built-up model, for the sake of appearance alone, is more desirable than the "outline" model now that it has proved just as good a stunt machine in the small class. I have built myself several different models on these lines in varying sizes from 23in. span to 32in. span. Fig. 34 shows a little low-wing model on these lines which has been powered by Frog engines, the baby American "hot" little Ardens shown in Figs. 35 and 36, and the exceptionally powerful little British Elfin diesel which has the Arden feature of a ring of exhaust ports completely circling the cylinder. The latter diesel is of 1.8 c.c. and has

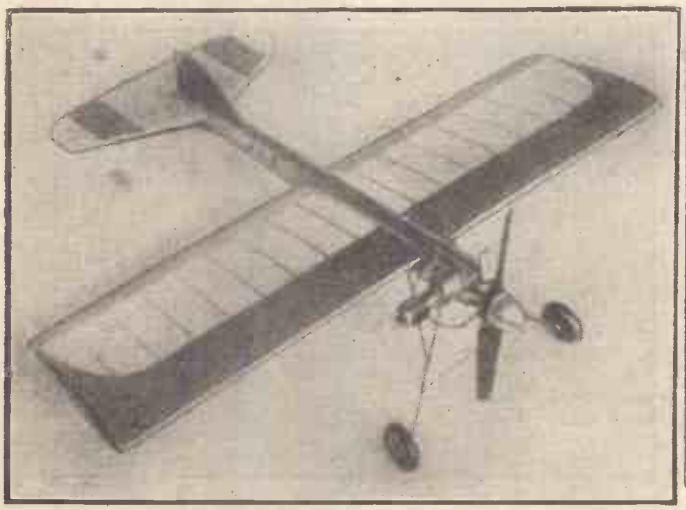


Fig. 32.—The "outline" type of lightweight stunt control-line model with flat thin fuselage gives good power-weight ratio, but is most unrealistic

Fig. 33.—The Frog Vandiver sets a new standard in the popular baby stunt C.L. model, having the ability to do stunts, due to its light weight and excellent power.

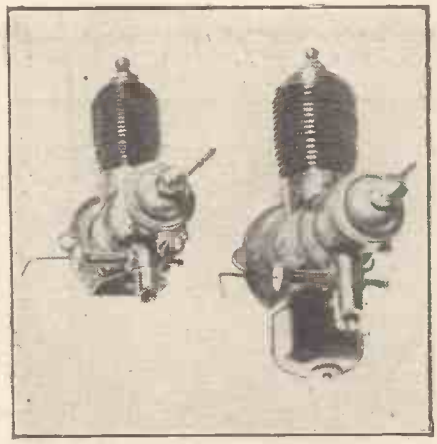


Fig. 36.—The famous American Arden engines are made in two small sizes. They possess tremendous power and can be run with glow-plug ignition to reduce weight on the model, for there is no coil or battery to be carried. The engine on the left is the baby-99 Arden, which operates best under load at 10,000 r.p.m. The motor on the right is the larger-199 Arden, which has a very high performance.

a diesel performance in a class by itself. I can think of no stunt which the enthusiast can make which cannot be performed with a Vandiver powered by either one of these Elfins or a Frog 180 diesel. If a glow-plug motor is preferred then a "Frog Red Glow" engine will provide a very exciting performance, but it must be remembered that glow-plug ignition demands careful adjustment of the fuel flow from tank and needle valve, because too rich a mixture, possibly due to a little extra centrifugal force on a C.L. model, will cause the glow plug to cool off and the motor to hesitate or even stop.

Provided a suitable stunt tank which copes adequately with the forces set up when stunting is fitted, and care is taken over setting the needle valve, a glow-plug motor is an ideal control-line model engine. On the other hand, I always feel that boys with limited experience are often better suited by a "hot" diesel.

It should be mentioned that the Vandiver also introduced the excellent feature of a drop-off undercarriage for this type of stunt model, which naturally reduces weight in flight and stunt manœuvres, and at the same time improves performance under limited engine power by reducing drag. The propeller is bolted up on the engine shaft so that it is coming up to the horizontal position against compression. Therefore when the engine cuts the propeller stops horizontally and a small light model of this type is easily landed on its belly without doing any damage. I have not yet broken a propeller when landing on any of my light-weight models having this feature. If the reader will look at Fig. 34 he will see a drop-off undercarriage lying in front of the model. This has two wire prongs which push into two brass tubes embedded in the solid balsa nose block of the model. As the prongs are a loose fit the weight of the undercarriage drops off when the model becomes airborne.

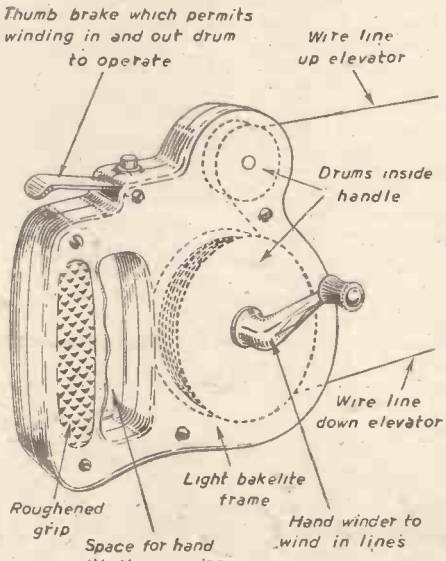


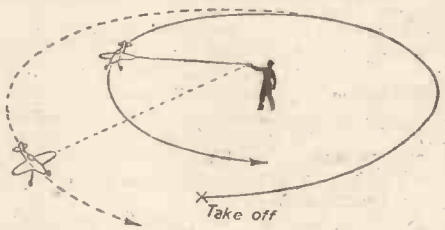
Fig. 37.—Jim Walker's "U Reely Control" drudgery out of control-line handle, which takes all the control-line flying.

These little stunt models perform best on wire lines of between 45 to 50 feet in length. Lightweight steel wire lines should be used, and these are subject to kinking unless very carefully wound off on to a separate drum as shown in Fig. 34. This drum was made from three-ply discs. Special wire is obtainable from all model shops. Longer lines are not usually advisable as they cause too much drag and are too heavy, with the result that a light model tends to come in towards the pilot when the speed goes down during certain stunts. If a very hot engine is used and speed kept really high, longer lines are admissible, for the speed will keep them taut.

An American Control-line Handle

Jim Walker, of America, was the father of control-line flying, and he seems to always keep one jump ahead of development. Fig 37 shows a sketch of his special control-line handle called the "U Reely Control." I have one of these handles by the courtesy of Mr. Walker, and I find it solves all my control-line bothers, taking away all the drudgery of winding steel wire lines on and off separate drums. With this handle one can start up the engine, release the thumb brake on the handle, and run the lines out to any amount up to about 75 feet. When the flying is over the lines are wound into the handle as one walks up to the machine by again releasing the thumb brake, but this time by winding the lines in by a small handle on the body of the machine.

Even more fun, and most imposing, is a hand start with lines wound up and a steady release of the lines as the model is flying. When it is decided that the model shall fly in a smaller circle the lines can be wound in during flight. It is therefore possible to actually fly from a small landing ground close to the operator, over some low trees or other obstacle, and when landing time arrives reel in the model as it flies. If spectators surge forward, it is possible to reel in the model to shorter lines. A secret of this handle's success is the beautiful workmanship and its light weight, because the body is made from light plastic. What a pity we are not allowed to purchase these accessories from America at the moment. It would not be beyond the capabilities of a modeller with a workshop to make up something on the same lines having light alloy side frames.



The pilot can reel in, or let out, the 'plane when it is flying, as well as winding up his wires into the handle when flying is finished.

Fig. 38.—This model was described in the October issue of PRACTICAL MECHANICS, *and is here seen speeding round under the power of a 5 c.c. ETA diesel.*

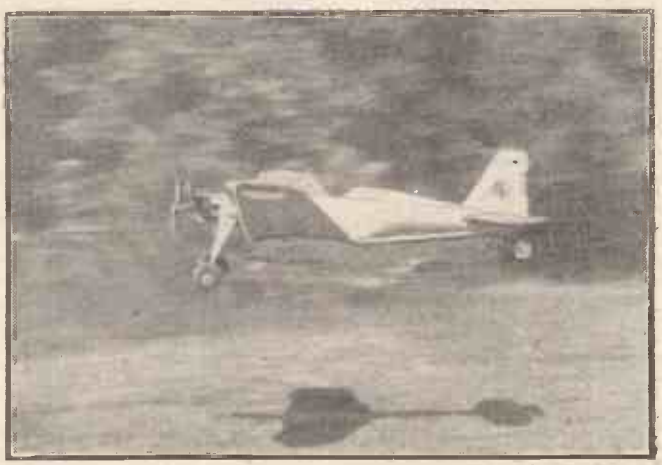


Fig. 39.—The "Goat" here seen in flight was a free-flight model of 7ft. span until it was converted to control-line slow flight. Very slow landings can be made with the aircraft at large angles of incidence due to wing tip slots. Note the interesting shadow below the model.

A thumb-operated brake of the band type is another feature. My admiration goes out to Jim Walker, who, incidentally, has introduced a most spectacular new control-line stunt called a "Sabre Dance," in which with vast engine power and a two-speed control from his handle he literally dances his model around with its nose pointed to the sky and tail to the ground. Full engine revs. makes it rise like a helicopter upwards and reduced revs. allow it to sink towards the ground. Skilful operation prevent its tail from actually touching. This must be an exciting stunt to watch, but it is, of course, nothing like the flight of an actual aeroplane. It would seem that the next development would be a real model helicopter for control-line work.

After all this about steel wire control-lines I hope that readers will remember my remarks and explanations in connection with the simple fishing lines which can be used for ordinary sport flying models like my "Bullet" described in the October and December issues of PRACTICAL MECHANICS. These lines have the merit of being easily wound on to the three-ply handle which was illustrated. When stunting, fishing lines often become sticky and interfere with free control after two or more loops as the lines become entwined. Steel wires naturally slide easily under these circumstances and permit a considerable number of loops, etc. I have recently flown a control-line flying-boat on water, and in this case I always use fishing lines, for they can be waterproofed and lightly float on top of the water before take-off. Steel wires would corrode in sea water and also offer water drag, which would ruin the take-off before the lines became taut as the model speeds up over the water.

Control-line Flight Photographs

It is a difficult feat to produce interesting photographs of models in flight when on the end of lines. They usually appear tiny specks on the negative or are not caught fair and square in the picture owing to the speed at which the model flashes by. The best plan is to get a stooge to fly the model around whilst one takes up a position inside the flight circle, well crouched down avoiding the wires overhead. This can cause some amusement, as I found out recently when I handed over the controls to a friend, and he flew my C.L. flying-boat from the water's edge whilst I waded into the water in winter weather having a new cap on my head for the sake of warmth. The second circle swept off the cherished cap into the sea water, much to the delight of the spectators, and the ruination of my new cap.

Fig. 40.—The same 7ft. model is here seen in dangerous-looking conditions rendered quite safe by being tethered on the end of control-lines.

I do not claim that the accompanying photographs of models in control-line flight are good (Figs. 38, 39 and 40), but I submit them in order to offer stimulation to fellow modellers with photographic tendencies, in the hope that someone will send me a really prize picture of genuine C.L. flight.

(To be continued)

Notes and News

New Anti-acid Boot

A NEW BOOT which resists acids and is at the same time hard-wearing has been designed at Dunlop's rubber boot works in Manchester for the use of workers on chemical plants, electro-plating plants and elsewhere. The boot has been constructed from rubber specially compounded to give the maximum resistance to acid attack. Hitherto the weakness of acid-resisting boots has been at the seams where the acid lodges and tends to build up in concentration, a disadvantage overcome in making the new boot by reversing the seams. The boot has been successfully tested at Manchester footwear laboratory with all mineral acids at a high concentration, except, of course, nitric.

Diesel-electric Defence against Power Cuts

TOWARDS the end of last May the weather was ten degrees colder than the Air Ministry forecast. A ten degree drop can affect the load on the National Grid by as much at 200,000 kW, and when a joint burnt out in a line carrying 190,000 kW, this huge load was thrown on to other circuits causing them to trip out on overload. There was a general breakdown which affected the whole of Southern England, and Lord Citrine, chairman of the British Electricity Authority, issued a warning that there would be a deficit of between a million-and-a-half and two million kW if it was very cold this winter.

Current deficits mean load shedding, with inevitable loss of production in factories which are dependent upon the grid for power, and it is for this reason the Government decided to encourage the use of independent power plants driven by diesel motors, and the Ministry of Supply has given assurance that supplies of fuel oil would be maintained. A range of compact diesel electric generators were developed during the war to be easily transported, installed and operated by Service personnel, and the Ministry of Supply has selected certain firms to manufacture and supply them for industrial use. The Electrical Engineering Construction Company, of Totnes, for example, are producing a range of "Red Devon" sets from 20 to 250 kVA capacity, which are eminently suitable for factory use.

The installation is very simple because the sets are self-contained and weather-protected, and no special power-house is necessary. An outbuilding or shed adjacent to the main buildings is all that is needed, with access to a roadway for easy refuelling. The only alteration to existing wiring is a switch to cut out the mains and cut in the generator.

Allowing for the original cost of the installation plus depreciation, cost of fuel and running expenses, the rate per unit of current works out at a fraction more than for mains supply. If the exhaust gases from the engine are utilised for heating the water for office radiators a saving is affected which makes the current cheap. The exhaust from a 57.5 kVA set, if piped through a suitable boiler, will produce as much hot water in three days' running as a ton of coal.

Gas-turbines for Ships

DETAILS of recent British developments in gas-turbines for marine propulsion, including those of a novel reversing gear for ships, were given in the 13th Parsons Memorial Lecture at Newcastle recently. The speaker was Dr. T. W. F. Brown, Research Director of Pametrada (the Parons and Marine Engineering Turbine Research and Development Association). He described the marine gas-turbine designed at Pametrada Research Station and now almost ready for the first tests, and discussed probable lines of future development of gas-turbines for both marine and industrial use.

Dr. Brown said that although Britain was leading the world in gas-turbines for aircraft, that did not necessarily mean that Britain would lead in gas-turbines for marine and industrial use. The requirements were quite different. Whereas, for instance, the gas-turbine aircraft engine at present had a life of 300 to 500 hours before complete overhaul, the marine engine had to have a life of 100,000 hours which, using the common figure of 200 days a year for full power from machinery at sea, meant twenty-one years' service. Reliability and long life were vital considerations. Manœuvring had also to be accurate and certain, and other requirements were the ability to use fuel from a variety of sources, low upkeep costs, and the work had to be of such a nature that it could be handled by ordinary repairers almost anywhere in the world.

The advantages for marine propulsion of ships was clear. Gas-turbine machinery could already be made one-third lighter than present-day steam-turbine machinery; it had greater efficiency values than steam plants so, provided it could burn fuel of the same grade, it should give a reduced fuel bill; the machinery took up less space and required fewer auxiliaries; it could start up and take up full load much more quickly, thus reducing stand-by losses. When higher turbine inlet temperatures could be accommodated it gave promise of higher efficiency than even the diesel engine.

Among the items mentioned by Dr. Brown as being carried out by a number of British firms were a 15,000 kilowatt power generating set ordered by Messrs. C. A. Parsons and Co., Ltd., for installation in the Dunston Power Station of the British Electricity Authority; a gas-turbine set using electric drive to be installed in m.s. *Auris* and now under construction by the British Thomson-Houston Co., Ltd.; the largest marine gas-turbine installation yet ordered, which is being constructed by the English Electric Co., Ltd., for the Admiralty for installation in one of the "Captain" class frigates; and a 2,500 h.p. locomotive gas-turbine under construction by Metropolitan-Vickers Electrical Co., Ltd.

The Cleaning and Restoration

Some Practical Methods and "Trade"

THE recent publicity which has been given to the National Gallery's policy of scientifically cleaning certain well-known classic paintings has to some extent focused the attentions of interested persons on the undoubted fact that, given care and a knowledge of the right methods, very great improvements can be effected to the general appearance and condition of valuable and, indeed, irreplaceable paintings and pictures of all descriptions.

An indispensable preliminary to all picture treatments—the wiping down of the picture surface with a soft cloth charged with white spirit. This gets rid of loose surface dirt.

Up and down Britain, throughout the length and breadth of our country, in humble homes as well as in those of more affluent status, there must be untold hundreds of interesting paintings and pictures which, being now blackened with age, are relegated to lumber rooms and even to outhouses, and are thus left to their own steady deterioration. Many of these pictures are not of great monetary value, yet the majority of them would be pleasing to the eye and of decorative value when properly cleaned up and restored, to say nothing of the historical and sentimental regard which may be placed on them. Any such pictures which are more than a hundred years old form part and parcel of our country's heritage, representing, as they do, lasting fragments of an age which has passed and which will never return. As such, they are all worthy of care and attention.

Painting the back of a canvas with a pure paraffin wax mixture in order to protect it against atmospheric contamination.

Picture restorers have inevitably charged high prices for their work and have made a great mystery of their art, despite the fact that many of them have operated on rule-of-thumb methods. Given, however, care, time and, above all, patience, together with an appreciation of the scientific or technical aspect of the task of picture cleaning, restoration and preservation, there is no reason whatever why the average individual who is so minded should not very successfully and cheaply bring back to something near its original state any painting on which he may happen to place a commercial, sentimental or historical value.

Confidence is Necessary

Needless to say, some amount of practice in the art of picture restoration is required.

In vital areas of a picture, the surface layer of discoloured varnish may be removed effectively by simple scraping with a scalpel.

The operator, too, must also gain a certain degree of confidence in his work, and, because every picture which is proposed for restoration presents its own individual technical problems, a modicum of experience is necessary before really good work can be turned out. But there is nothing inherently difficult in the attainment of these requirements and, although modern art gallery services may bring into use the convenient tools of X-ray and infra-red analytical methods in their methods of restoration, there is no need for the amateur to be deterred by his lack of such facilities, for, after all, the pictures which he treats are not likely to have commercial values amounting to thousands of pounds each attached to them.

Water-colour paintings are entirely different from oil paintings, and each requires very different methods of restorative treatment. In the present article only the subject of oil paintings can be dealt with.

An oil painting consists of four elements or components. In the first place, there is the *support*. That is to say, the material on which the painting is executed. Usually, this is canvas, but it may also consist of wood or metal. Laid directly on the support of the picture is the *ground*, this consisting of a thin coating of whiting and glue (with or without admixed colour) which acts as a filler for the support and forms a surface capable of being painted on. Next comes the paint layer proper and, finally, the protective varnish layer which is coated over the paint layer after the latter has been thoroughly dried.

Now, in a large number of cases a picture can be cleaned and restored merely by removing the varnish layer and replacing it with a coating of fresh varnish. It is the varnish layer which discolours and sometimes becomes almost brown and opaque, thereby successfully obliterating all the paint which lies below it. This effect, coupled with the layers of atmospheric dirt and grime which the varnish layer slowly has deposited on it, results in the gradual blackening of the painting.

Remove the varnish layer and, often enough, you reveal the picture beneath it in all its pristine colour and brilliance.

Simple enough in theory, no doubt, but always more difficult in practice. It is, indeed, in the successful removal of the varnish layer of the picture that the picture-restoration trade has found its "secrets."

Experiment First

Before any reader of this article attempts to deal with an even moderately valuable painting, let him procure a dirty old canvas from a junk shop and try his prentice hand on it. The task will give him knowledge, skill, information—and confidence.

A dirty picture should first of all be washed over with a cloth charged with white spirit. Paraffin can be used, but white spirit is better, since it is more evaporative. Oils or turpentine must NOT be used. By

Knocking in the wooden wedges of a picture stretcher in order to equalise tension on the canvas.

# of Oil Paintings

Secrets Revealed

By J. F. STIRLING

this simple process alone, quite a lot of dirt will be removed, and before the white spirit evaporates it may be possible to discern some of the fine colours and details of the painting.

The painting proper will have been executed in pigment or earth colours embedded in a medium of dried linseed oil. This medium, "oxidised linseed oil," is commonly called *linoxyn*. When thoroughly hard, as it becomes after years of standing, it is, fortunately, extraordinarily resistant to the attack of solvents, so that, in many instances it is readily possible to remove the surface varnish with a suitable solvent and to leave the linoxyn layer containing the pigments entirely unattacked.

This is the common practice of picture cleaning. With a soft cloth saturated with warm or hot alcohol, the varnish layer is gradually wiped away. Methylated spirit may be used for the purpose, and, also, iso-propyl alcohol. Normal butyl alcohol, however, is the best, since it has a higher boiling-point and can be raised to a higher temperature. In cases of obstinate resistance of the varnish a few drops of ammonia can be added to the alcohol, but great care should be taken with the ammonia content, since if it rises too high it may attack the linoxyn layer and then actually remove some of the pigments.

After the varnish layer has been removed by alcohol treatment and the surface has dried, the picture should be wiped over with paraffin and again inspected. If its colours have been satisfactorily restored, well and good. If otherwise, the linoxyn layer itself may require partial removal.

Here, of course, we have a task calling for very great care, but, given this, it is possible to remove the discoloured linoxyn layer and yet to leave the pigment more or less intact.

A continuance of the alcohol treatment is required for this purpose, and it may be made a little stronger in ammonia content. Alternatively, use may be made of solvents which partially dissolve the linoxyn layer.

"Stripping" a picture. Removing surface varnish by gentle massage of the surface by the fingers and with a cloth charged with an alcohol solvent.

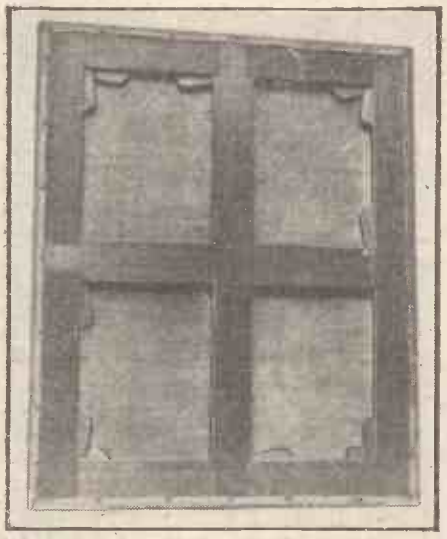
Such solvents are ethyl acetate, butyl acetate, triethanolamine and morpholine. The two latter solvents, however, should be used as sparingly as possible, for they are basic or alkaline in nature and, unlike ammonia, they are not quick to evaporate after they have been used.

At any stage of proceedings the picture may be allowed to dry, and then it may be wiped over with a paraffin rag. This will give it the appearance which it will have when revarnished.

Some restorers do not use chemical solvents. They prefer to employ a small knife, such as a surgical scapel, and, with this, actually to scrape away the brittle surface varnish. This is quite readily accomplished, although the task is tedious and calls for great patience. Furthermore, the very greatest care must be taken not to puncture the canvas with the knife.

Other restorers use a little powdered resin on their finger-tips and then gently abrade the varnish layer away by rubbing their fingers over it. Usually, this method is only partially satisfactory.

After the picture has had its varnish and, if necessary, some of its linoxyn or actual paint layer removed in this manner, it is



A reinforced picture stretcher, the crossed strips being inserted in order to give extra support to a sagging canvas.

often necessary to retouch areas of the painting with fresh paint. Artists' oil colours only must be used for this purpose, being applied with a fine hog-hair or sable brush. It is here, of course, that the artistic skill of the individual comes into play, but, usually, such retouching amounts to little more than a mere "spotting" of defects and, perhaps, the brushing of colour over a wide expanse of background.

Revarnishing

After retouching comes the revarnishing. The retouching should have been done as thinly as possible, for if any considerable amount of colour has been added to the picture it will not be possible to do the revarnishing for at least a year afterwards. This is because any fresh colour must dry out and harden most thoroughly before any varnish layer is added. If this precaution is not taken the varnish may dissolve the fresh paint and, furthermore, it may cause it to crack badly in after years.

If any retouching at all has been effected to the picture a minimum of one month must elapse before revarnishing. The longer the interval between retouching (or repainting) and revarnishing the better.

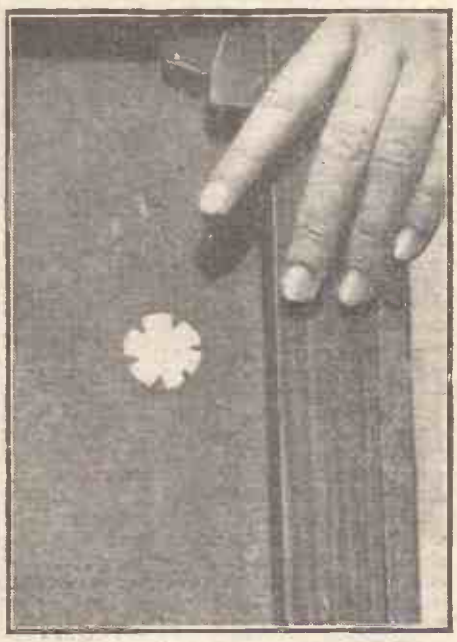
Only one type of varnish is feasible for picture work. This is mastic varnish, made by dissolving 1 part of pure gum mastic in 3 parts of turpentine. Ordinarily, turpentine is *not* pure enough for the purpose. It must be rectified turpentine, which is of water-white colour. Turpentine substitute is quite out of the question.

The mastic varnish can be dissolved by heating the gum mastic in the turpentine.

A semi-micrograph view of the surface of an old painting, showing areas from which the paint film has scaled away. Such areas can only be restored by judicious retouching with fresh and matching paint.

It is better, however, to dissolve it without heating the turpentine, since this gives a varnish which is less liable to yellow in the course of time.

(To be continued)



A linen patch applied to the rear of a picture as a backing for a small puncture in the canvas. Cut in this serrated manner, it will not give a hard outline around the area.

A Disc Combination Lock

Constructional Details of an Interesting Contrivance

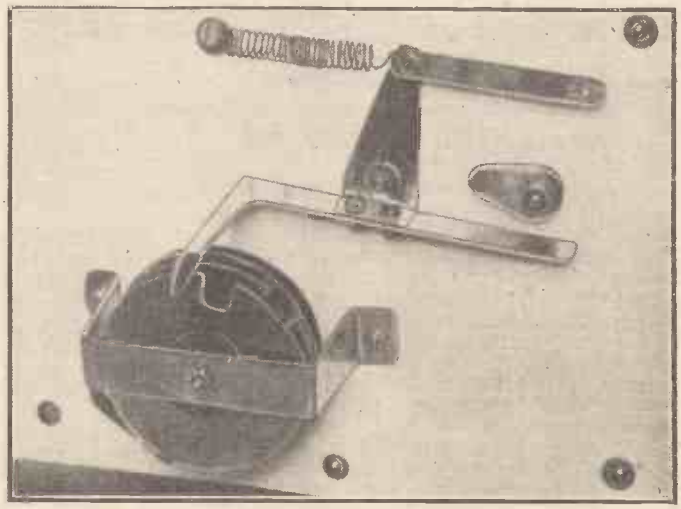
By F. G. RAYER

COMBINATION locks have a peculiar fascination; their value for locking vaults, etc., has long been recognised, and though of a simplified construction the one described here is far from easy to open when the combination is not known. Four discs, each with 24 positions, are used. If the possible combinations total 24 x 24 x 24 x 24, equalling 331,776, then it would take months to try all the possibilities.

The knob is then continued until the 1st disc has its slot upright. All slots are then in line and an arm falls, withdrawing the bolts.

The combination will depend upon the relative positions of the stop-pins. After the lock is made, one trial will show what numbers must be turned to on the dial to bring the slots in the desired positions. The combination may then be written down as follows (for example): 4/17/3/1/2/23/1/9, which means: four turns clockwise, stop at 17; three turns anti-clockwise, stop at 1; two turns clockwise, stop at 23; one turn anti-clockwise, stop at 9.

If rotation is begun in an anti-clockwise direction the whole series of numbers will turn out differently. Actually, when the lock is made up the sequence of operations will immediately become clear, and only a few seconds are required to open the door when the combination is known.



A close up view of the slotted discs and pivoted locking arm.

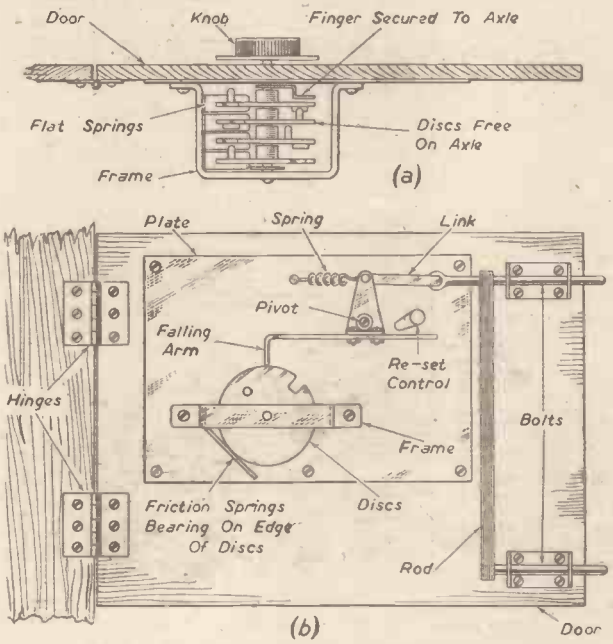


Fig. 1. Plan view of the slotted discs, and side elevation of the completed lock.

The lock can be made to screw on the inside of any door. As it only serves as an operating mechanism for the bolts the lock can be made from any thin metal. The resistance of the door to forcing will depend upon the strength of the bolts and their guides.

How the Lock Works

The door has a knob and combination dial (see Fig. 1a) which is secured to a spindle on which four slotted discs are free to rotate. Friction springs bear on the discs so that when the spindle is turned the discs remain motionless. Each disc has projections so arranged that it can turn almost a complete revolution before striking the projection on the disc behind it, thus turning the latter. The spindle has a finger which strikes the projecting pin on the first disc.

If the knob is turned several times in a clockwise direction the finger will rotate the first disc, which will turn until the second disc is also brought into motion, and so on until all four discs are turning.

The dial is then stopped at a figure which will leave the slot in the rearmost disc upright. The knob is then turned *anti-clockwise* until 1st, 2nd, and 3rd discs are brought into motion, the knob being halted at a number which leaves the 3rd disc with its slot upright.

The knob is then turned *clockwise* until the 2nd disc is brought into position with its slot upwards. *Anti-clockwise* rotation of the

Constructional Details

It is convenient to make up the lock on a metal plate about 4½ins. by 6ins. This can then be screwed on the inside of the door. The lock mechanism is separate from the bolt or bolts holding the door shut; the latter will be fixed directly to the door and can be as robust as necessary.

Fig. 2 shows how the discs are cut. Sheet brass (20 S.W.G.) is suitable, and bushes are soldered on so that the discs are free on the spindle without excessive wobble. The relationship between the pin hole, slot and bracket determines the combination, and these are best arranged at random. Each bracket strikes the pin secured to the disc behind it. The pin on the first disc is struck by the finger soldered to the axle. No bracket is required on the 4th disc.

Fig. 1 shows how the axle and discs are arranged in a frame. Washers are added to prevent excessive looseness. A flat spring cut from brass bears lightly on each disc, so that the discs only turn when they are carried round by their projections transmitting the motion from the finger.

Falling Arm

As "B" in Fig. 1 shows, an arm is so arranged that a flange at one end falls into the slots. A spring helps this action, at the same time withdrawing the bolts through a connecting link.

The small knob (see Fig. 3) is only to re-set the lock. A small finger strikes the free end of the arm, thus raising the flange out of the slots and moving the bolts into position. The combination dial is then turned at random and the lock is set. Before opening, turn this small knob so that the metal finger does not prevent the free end of the falling arm from rising.

Bolts

These should move smoothly and without undue friction, or the spring will have to be unnecessarily strong. In Fig. 1 two bolts joined by means of a rod are shown. For small boxes and cupboards a single bolt operated from the connecting link is sufficient.

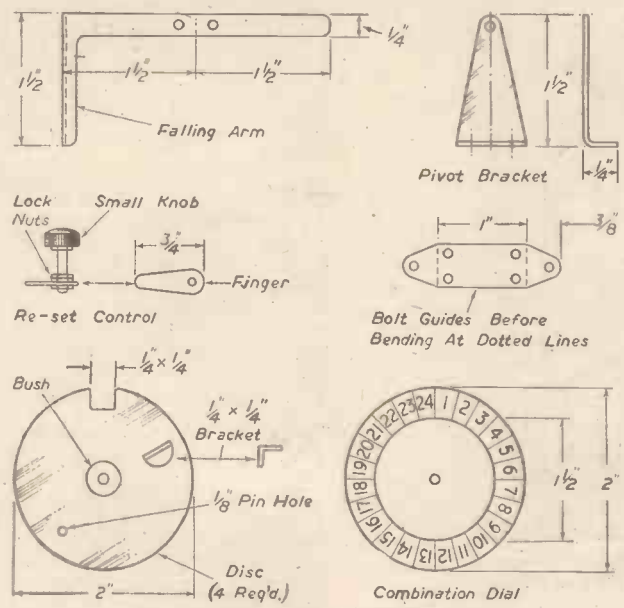


Fig. 2. Details of the various parts.

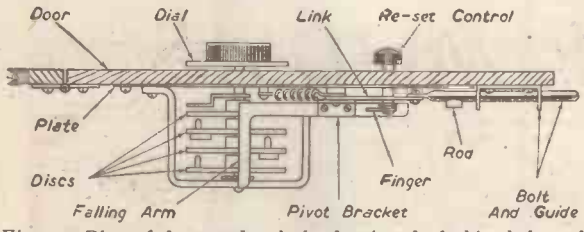


Fig. 3. Plan of the complete lock, showing the locking bolt and knob for re-setting the falling arm.

The knob and combination dial should be soldered to the axle to avoid trouble, as if the combination is lost by the knob becoming loose it will be necessary to force open the door.

To obtain a smooth action the four discs should be accurately made, and a washer-cutter will simplify this part of the work. A smear of grease should be applied to all the moving parts and to the edges of the discs.

Before actually fastening the door with the lock be sure everything is secure. It is also wise to make several trials, operating the knob without looking behind the door, to avoid any future difficulty in opening due to some error in noting down the combination.

The arm is not shown in Fig. 1a for clarity, but Fig. 3 illustrates its position.

Letters from Readers

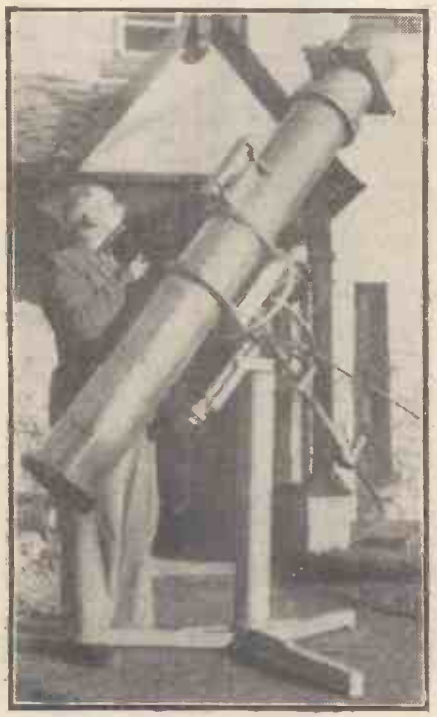
A Reflector Telescope

SIR,—Last July I wrote you for advice about the focal length of a telescope mirror I had just bought, and I thought you might be interested in the enclosed photograph of the completed telescope, the total cost of which has been between £3 and £4—apart from the mirror, optical flat, and the eyepieces which I had bought previously with a small 2½in. refractor.

The telescope tube I made from duralumin sheet and I obtained two old Morris steering-wheel assemblies for the mounting. It has a friction drive, and although it can be carried about it is reasonably rigid. I cannot mount it on a fixed pedestal since there are too many large trees in my garden.

The mirror cell has a central spring-loaded ball pivot and three adjusting screws for alignment. The telescope tube can be rotated in the mounting cradle to bring the eyepiece to a convenient viewing angle, and the eyepiece platform carries three eyepieces of different powers, which can be instantly flicked into position as required. The whole platform is raised and lowered for focusing.

The finder is an ex-Government gunsight, and cost 8s. 6d. I removed the X hairs and substituted 40-gauge copper wire in which I tied a loop (round the point of a needle). To sight the object correctly it is brought within the loop. I shall be pleased to supply any further information if required.—H. L. PUGH (Bishop's Castle).



Mr. H. L. Pugh's reflector telescope.

Model Fire-Appliance

SIR,—Being a regular reader of your valuable journal and much interested in articles on models and model making in every issue, I wonder if other readers would be interested in a model fire-appliance I have made in my spare time. It is a replica of one of Cardiff's fire-engines, made to scale from measurements received from Cardiff fire station.

The time spent in constructing the model was five months and all parts are made from scrap material.—E. J. THOMAS (Cardiff).

A model motor fire-appliance by E. J. Thomas.

Leather-Dust Flooring Composition

SIR,—On reading through your "Queries and Enquiries" section in the February issue of PRACTICAL MECHANICS, I noticed an enquiry by A. F. Burnell (Armley) asking for information on leather-dust flooring material.

I think Mr. Burnell would be interested to know that such a material is already in use. I have recently occupied a new council house and the floors in the living-room are made from a leather-dust composition, cast on to a concrete base.

This composition is known by the name of "Ritzide," and is manufactured by Messrs. Leatherflor Ltd., Finsbury Pavement House, 120, Moorgate, London, E.C.2.—C. J. SANDERS (Nottingham).

A Radio Awakener

SIR,—I have constructed the standard reading lamp and electric door chimes described in recent issues of your paper and am very pleased with them. I read with interest the letter in the February issue from Mr. J. Dunn (Glasgow) who is interested in using the chimes to awaken him, instead of using an alarm clock and electric bell. I am using my chimes for the front door, and perhaps Mr. Dunn would be interested in my "awakener," which I made from information contained in your associated journal, *Practical Wireless*.

It consists of an ordinary spring alarm clock fitted into a polished wood case which has a whole cut in the front, to show the face of the clock. The wood case is divided into two compartments open at the back. One contains the clock and the other an ordinary mouse trap and an ordinary house-lighting tumbler switch.

When the alarm operates at the specified time, the winding key turns and draws a short chain attached to it. The other end of the chain is fixed to the platform of the trap, which is pulled, so releasing the fly-over spring arm which ordinarily kills the mouse. In this case, however, it also has a short chain attached to it, and the other end of this chain is fixed to the switch on-off lever, and the spring is strong enough to pull this switch on.

This switch is wired in series with my radio set on-off switch, and this latter is left "on" overnight, with the radio tuned to Home Service for 6.30 a.m., my time for rising. An extension speaker in the bedroom completes the job, so that as the alarm clock "goes off" the radio set is switched on and the music comes on gradually stronger as the valves warm up until it is loud enough and persistent enough to awaken one.

I have found this to be the best method of awakening a sound sleeper as, instead of an irritating ringing of a bell, the music persists and causes an awakening interest in the matter being broadcast.

Across the two contacts of the "time switch" I have wired a neon lamp of the ½-watt type which is fitted behind a red bulls-eye, so that it glows if the radio set switch is "on" with the time switch "off," showing that everything is set ready, although, of course, this is not necessary.—T. LONSDALE (Burnley).

THE WORLD OF MODELS

The Construction of a ¼in. to 1ft. Scale Model of R.M.S. "Queen Elizabeth"

By "MOTILUS"

LAST winter the daily press featured many photographs of the largest ship model ever built in this country: a ¼in. to 1ft. scale model of R.M.S. *Queen Elizabeth*, made to the order of the ship-owners, Cunard White Star, Ltd. At the time there was much speculation by the uninitiated as to how long it takes to build a model of this kind, what sort of material is used and the amount of work necessary before the model can be declared ready for display. As I had the opportunity of watching progress on this particular model, I thought readers would be interested to know something of the progressive stages that are traversed from inception to finished product.

How does it all begin after the placing of the contract? The first step is the selection of suitable timber, and in this case the eventual choice fell on a fine log of obeche (African white mahogany), from a tree over two hundred years old, to be used for the hull. The log was 25ft. long, 5ft. in diameter and weighed over 6 tons, containing some 220 cubic feet of timber. During the necessary seasoning, effected by 56 days in the kiln, 110 gallons of water were extracted from the log, after which it was declared fit for its ultimate purpose.

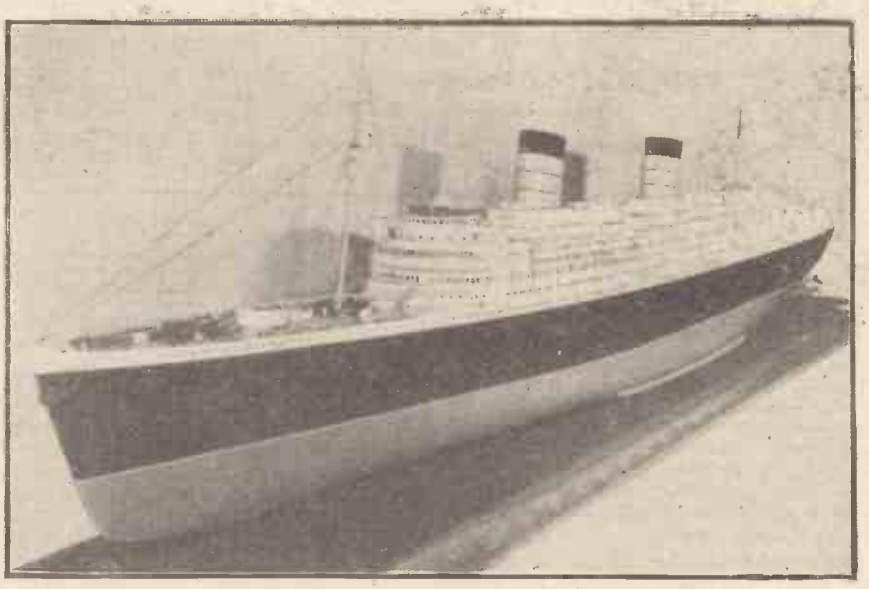


Fig. 7.—The finished model R.M.S. "Queen Elizabeth."

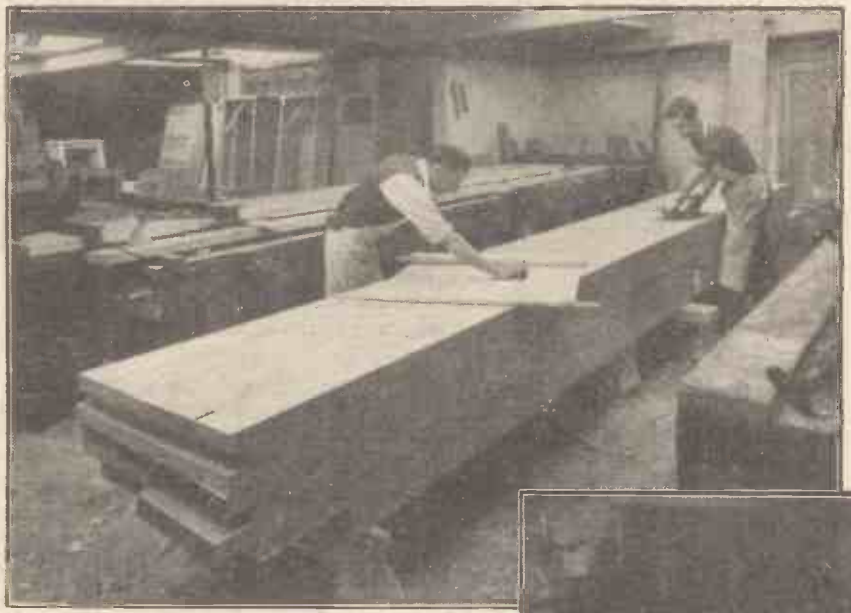


Fig. 1.—The planks for making the hull.

Laminated Hull

As the model hull is laminated, the log was first cut up into 22 planks (Fig. 1). The planks were then roughly shaped, the centre being removed from each one to leave a thickness of about 2½in., so that in bulk they began to bear some distant resemblance to a ship's hull. At this point they were firmly glued and screwed together, from keel to deck level, so that hand craftsmen, with planes and spokeshaves, could begin to shape the external lines of the hull (Fig. 2). To ensure accuracy, templates made from the drawings of the actual hull lines were used for checking progress. Both the bow and the stern required most careful attention: in addition to the sheer curves of the hull, there were the hawse-holes to be fashioned in the bows for the port and starboard and bow anchors, and at the stern there were the projecting propeller shaft bossings and the stern frame. The shaping being satisfactorily completed (Fig. 3), the exterior was rubbed thoroughly with glasspaper to eradicate every single irregularity on the surface, which had to be as smooth as silk if it was to take the extremely thin coats of paint that were applied later.

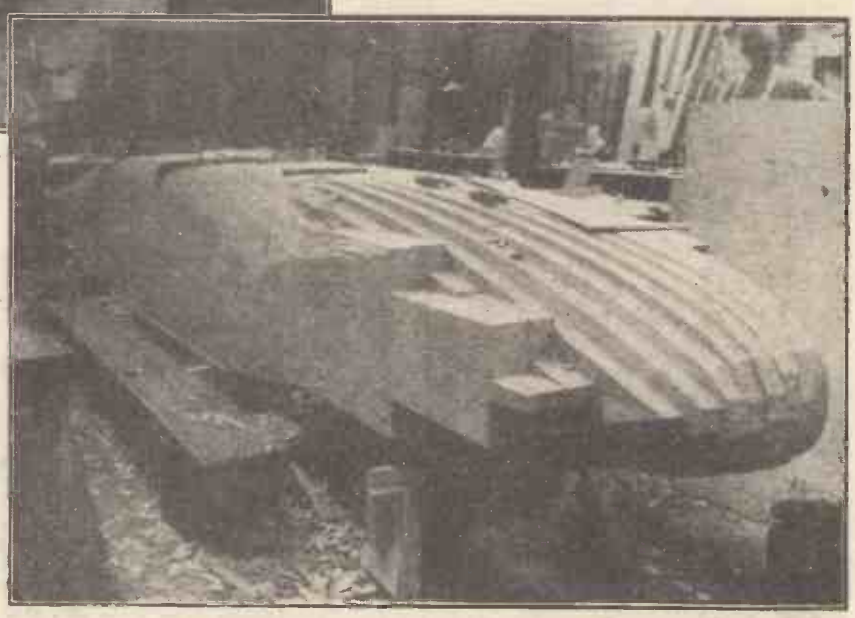


Fig. 2.—Shaping the hull.

Assembling the Superstructure

The next stage was the temporary assembly of all main superstructure, such as the bridge, deck buildings, etc., on the various decks, to ensure accurate fitting of all the parts (Fig. 4). The superstructure was removed afterwards for the painting processes, but it was essential that a perfect fit be secured before

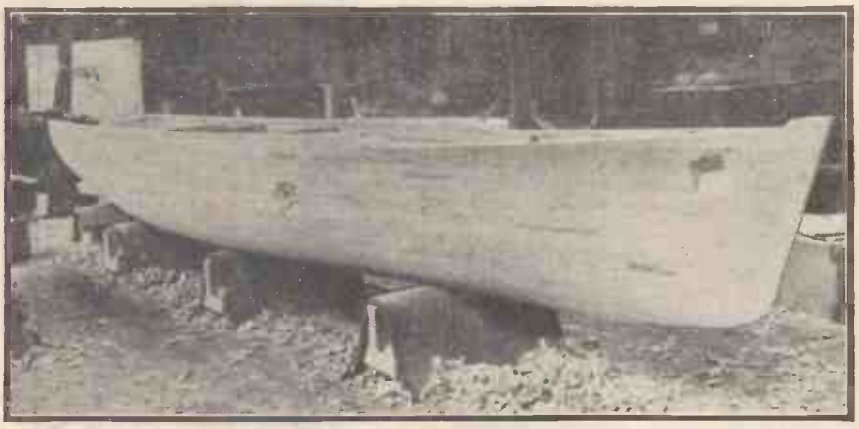


Fig. 3.—The finished hull.

painting, as alterations in later stages could not be made without a great deal of trouble and unnecessary waste of time. As all the component parts had been prepared with scrupulous care, the superstructure fitted well and only minor adjustments were required. These upper sections were made from wood, as were also the ship's 26 boats, the cargo hatches and handrails.

Painting ship models calls for rare skill, as anyone knows who has tried his hand at amateur work. Even on a large model the thickness of each coat must be infinitesimal or the ultimate result will be out of all proportion to the scale of the remainder of the work. The hull of this *Queen Elizabeth* model received twenty coats of paint in all, each coat being rubbed down to a smooth surface before the next was applied, and the whole at last being covered with a coat of thin varnish. The Plimsoll line, draft marks and white riband were all put on by hand. The plywood decks were also lined by hand, to obtain a realistic effect of planking. Painting of the superstructure was mostly in matt white except, of course, the doors, which were in brown.

Metal Deck Fittings

Meanwhile, metal workers had been preparing numerous deck fittings from sectional drawn brass rod or from sheet brass. This part of the work comprised some 900 complete items, such as funnels, masts, flagstaffs, derricks, boat-lowering davits, the rudder, propellers, anchors, accommodation ladders, etc. Many of the smaller fittings, such as bollards, were oxidised or chemically treated according to the finish required. Some, however, such as capstans and the larger pieces of deck gear, were stove-enamelled in addition to any necessary plating. Where polished brass was used on the actual ship gold plating was substituted on the model to avoid risk of tarnishing.

The final assembly of the many decks, the bridge with all its appropriate equipment, and the numerous items of deck gear and rigging, was a most fascinating process for the casual observer. The model at this stage grew rapidly in realism under the skilled hands of the craftsmen who specialise in this type of work. These men have a knowledge of modern ships, so that their models are not pieced together jigsaw fashion, or by blindly following rigid instructions: were this so they would never achieve the seaworthy atmosphere that marks the work of the expert shipmodeller.

Working to Photographs

Much of the accuracy in modelling and assembling the deck gear, etc., was the result of selective photographic work aboard the ship herself. It must be remembered that when a new ship is being built it frequently happens that modifications and alterations are made during the building which possibly were not contemplated when the drawings were originally prepared. Often such modifications are not noted on the drawings at all, so that photographs taken aboard the actual vessel can be a valuable source of information for modelmakers. In this instance, full use was made of some two hundred photographs, showing external details of R.M.S. *Queen Elizabeth*, and which were used in combination with the shipyard drawings. In addition, the craftsmen themselves had actually spent time aboard the *Queen Elizabeth*, an experience which made their work even more interesting for them,

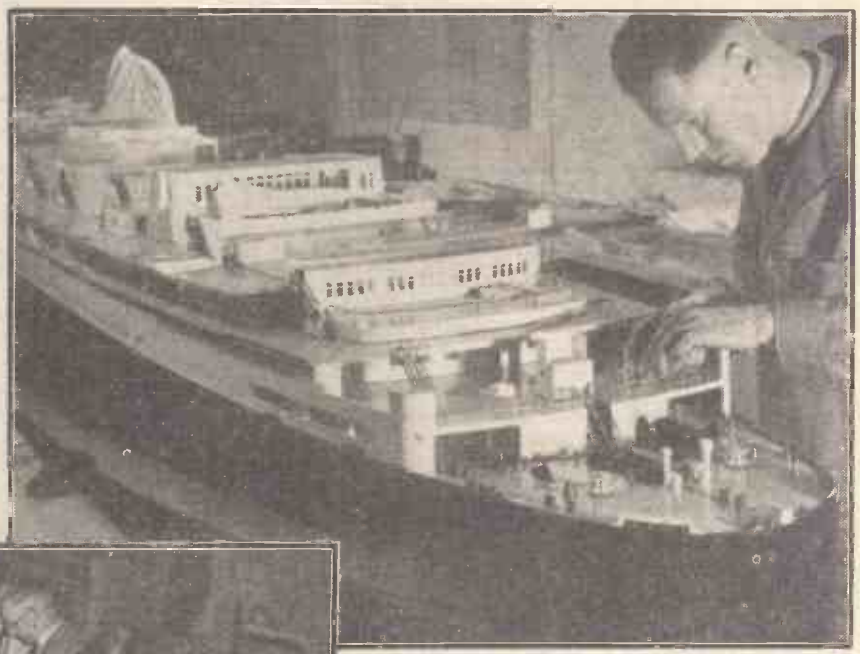


Fig. 5.—Final assembly stages—stern view.

and helped them considerably with efficient execution.

Fig. 5 is a close-up view showing the last stage in assembly work on the stern portions of the vessel, from which the reader will form some idea of the numerous deck fittings aboard this gigantic ship. When, later, the complete model was inspected by officials of Cunard White Star, Ltd., Mr. J. S. Harrison, naval architect to the company, examined the whole model minutely. Afterwards he confirmed that every external detail was accurately represented and in its correct position, which was certainly a tribute to the modelmakers' skill and efficiency.

The close-up view in Fig. 6 shows the model bridge, looking for'ard, which also gives a further impression of the amazing amount of detail work that had to be tackled. The larger the model, of course, the more detail there is to be shown. In all ships the bridge resembles a brain or nerve centre:

Fig. 4.—The first fitting of the superstructure.

and the larger the ship the more instruments and aids to navigation she has to carry, as large ships are more difficult to handle both on the journey and when docking. This model represents one of the most comprehensive bridges of any merchant ship afloat, so that a great deal of equipment had to be installed. On the highest point of the bridge is the radar apparatus and below are engine-room telegraphs, chronometers, sounding machines, fathometers, gyro pilot, voice pipes, barometers, loud hailer, electric log, clinometer and other up-to-date bridge equipment.

The finished model (Fig. 7) was a source of much wonder to all who saw it before it left England. Being the largest ship model ever constructed in this country (weighing 1 ton, 7 cwt., and measuring 21ft. 6ins. in length), it attracted considerable attention. Woodworkers, engineers, brass finishers and painters had contributed a total of 6,900 man hours for the completion of the work, spread over a period of about six or seven months.

On View in New York

On February 2nd, 1949, the Midland town where all the work had been carried out said farewell to this now-famous model *Queen Elizabeth*. A mahogany and plate glass showcase had been separately packed and sent on ahead so as to be ready for the model at its eventual destination. The model was carefully installed in its specially prepared, dustproof, lined packing case, in which it was taken by road to Liverpool. A few days later it was lowered into the hold of the new Cunard White Star liner, *Parthia*, in which the model travelled safely to New York harbour and its destined resting place in the splendid, modern New York offices of Cunard White Star, Ltd. There it is now displayed alongside a model, built in 1935, of the sister ship, R.M.S. *Queen Mary*.

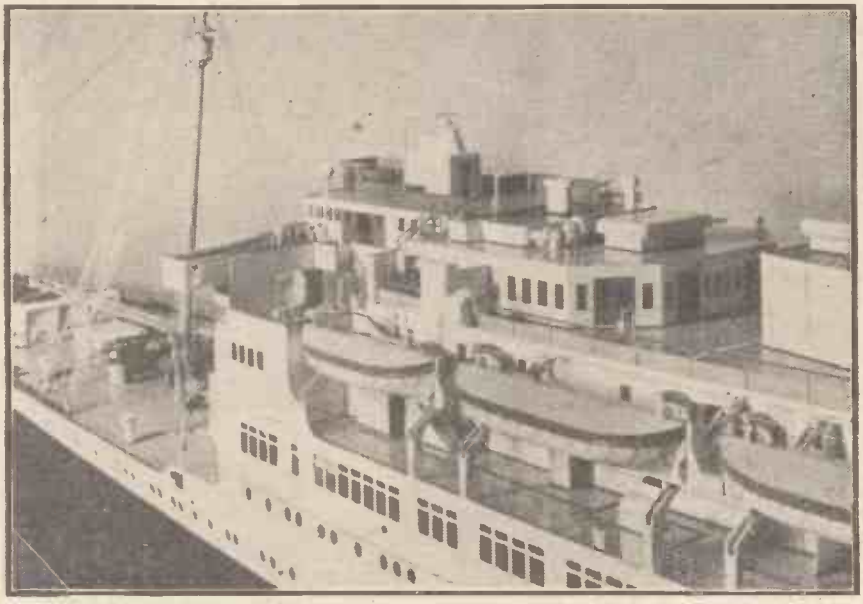


Fig. 6—Close-up view of the bridge, looking forward.

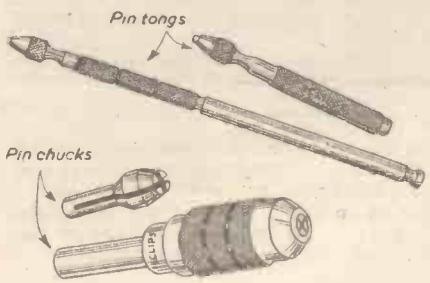
Both these magnificent models are the work of Bassett-Lowke, Ltd., Northampton. Where they now stand, in these palatial New York offices, they must surely appear as a resplendent tribute to the excellent work of British modelmakers.

Trade Notes

New "Eclipse" Tools

THE name "Eclipse," so very well known to engineers throughout the world in connection with hacksaw blades and frames, is now being presented to the trade as the same guarantee of high quality for a wide range of engineers' tools.

To the extensive range now offered are being added further new lines which bear the same distinctive features with which the name "Eclipse" is synonymous. These latest additions are a range of "Eclipse" pin tongs and the "Eclipse" pin chuck, the former being available in four sizes and the latter being supplied with three interchangeable collets of different capacities ranging from oin. to 3/32in.



"Eclipse" pin tongs and pin chucks.

"Eclipse" pin tongs are designed for use on light instrument and precision work. With specially heat-treated jaws of accurate finish they will grip securely small pins, screws, spindles, or other similar articles, and the hollow handle allows long articles and wire to be accommodated. Comfortable grip and ease of manipulation are provided by the knurling of the handle.

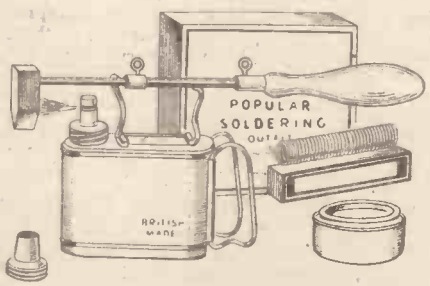
These pin tongs are packed in envelopes containing three tongs, four envelopes making up a box of one dozen which is attractively labelled. They are supplied either in sets of three or in separate capacities.

The other addition is the "Eclipse" No. 160 pin chuck which is specially designed for use on drilling machines with small drills up to 3/32in. diameter. The chuck is provided with three interchangeable collets with capacities ranging from oin. to 3/32in. By the use of a double-acting movement of the chuck and by limiting to 1/32in. the capacity through which each collet operates, the whole length of the collet jaw grips the drill, thus ensuring a firm grip on even the smallest drill. Accurate centring of the drill is ensured by the provision of upper and lower bearing surfaces between the nose and the body, the thread being used only as means of moving the nose up and down. An additional feature is the provision of a hole in the body to accommodate a tommy bar to facilitate tightening.

The "Eclipse" pin chuck is supplied in a useful rack-box either with one selected collet (No. 160 oin.—1/32in., No. 160 1/32in.—1/16 in., No. 160 1/16in.—3-32in.) or No. 160 with the full range of all three collets. "Eclipse" pin tongs and pin chucks are obtainable through tool dealers and ironmongers who stock "Eclipse" hacksaw blades. Further particulars can be obtained from James Neill and Co., Ltd., Composite Steel Works, Napier Street, Sheffield, 11.

"Britinol" Soldering Outfit

THE Britinol "popular" soldering outfit contains everything necessary for carrying out small soldering jobs successfully. Packed in a neat cardboard box the outfit comprises one tin of "Britinol" paste solder; one coil of self-fluxing wire solder; one self-blowing spirit lamp; one telescopic soldering iron, and one pair of extra wicks for the lamp, together with a small "Manual on Soldering." The spirit lamp is of the vaporising type and will give a flame from 3½in. to 4in. in length. The lamp will burn for about half an hour at one filling, giving a clean, noiseless flame. The screw cap and washer provided prevent any evaporation of the spirit when the lamp is not in use. The prices of these complete outfits or individual items are obtainable from Bi-Metals (Britinol), Ltd., St. Mary's Works, Abbey Estate, Alperton, Middlesex.



The "Britinol" soldering outfit.

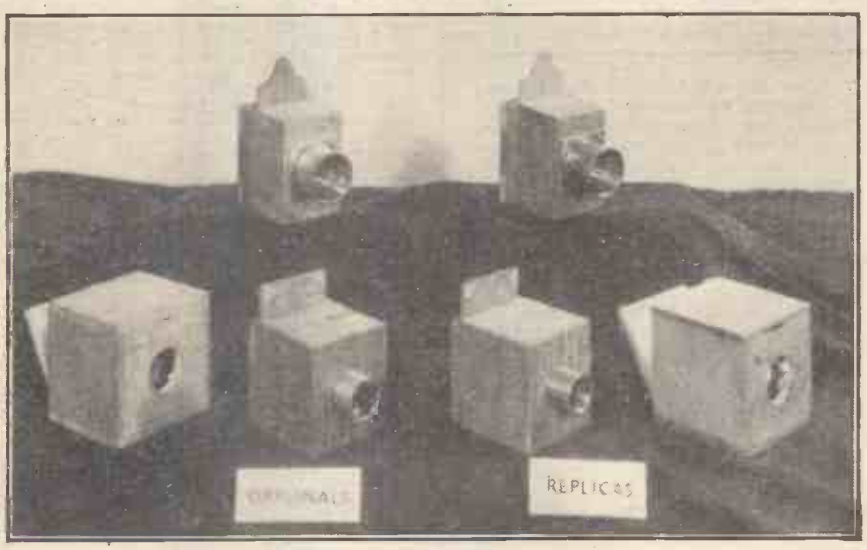
Club Reports

Kodak Society of Engineers and Craftsmen

A SMALL but enthusiastic craftsmen group of members have recently been engaged on an interesting piece of work.

What will probably be the most comprehensive museum of photographic equipment in the world is being assembled in Eastman House, Rochester, N.Y.—George Eastman's Home—but the collection lacks a Fox Talbot camera.

Much of his original apparatus used at the time of the taking of the famous Lacock Abbey window photograph is preserved in the Science Museum, South Kensington, and the Museum of the Royal Photographic Society, and, not unnaturally, neither of these bodies felt that they could part with their irreplaceable treasure.



Replicas of Fox Talbot cameras, made by members of the Kodak Society of Engineers and Craftsmen.

The alternative was the manufacture of replicas, and at the request of the Eastman Kodak Company, through Dr. Spencer, the task of making exact copies of selected items was undertaken by the K.S.E.C., and the originals were entrusted to the society for this purpose.

Fortunately, no great difficulty was experienced in obtaining a supply of suitable wood because most of the cameras were constructed for Fox Talbot by the local estate carpenter at Lacock from relatively common timber, and oak of similar age has been obtained.

Attempts to obtain suitable lens mounts failed and it was necessary to make faithful copies of the originals.

It is fitting that an amateur group of model makers should co-operate in preserving the memory of one of the most famous amateurs in the photographic field.

All communications to the secretary, Kodak Recreation Society, Wealdstone, Harrow, Middlesex.

Edgware and District Society of Model and Experimental Engineers

THE above society have just issued the first number of a news sheet which, it is hoped, will be issued quarterly, or more often should occasion demand.

By means of the news sheet the committee will be able to keep in closer contact with each of our members and give those who are unable, or find it difficult, to attend the club meetings regularly an idea of what is happening at the society's headquarters.

We intend to issue copies to our neighbouring societies, and to keep them, as well as our own members, fully informed as to our activities, and here we remind them that any of their members are invited to attend any of our meetings; conversely, we in turn are welcomed at their functions.

Amongst our recent additions to the workshop equipment we have a fine new ½in. drilling machine, for which the committee wish to thank Mr. Kenniston.

We have also been presented with a large tool box complete with trays. This has now been fitted with clasp and eye and lock, and is available for the storage of members' tools, etc. This was kindly presented by one of our new members, Mr. Hall.

By the time this note appears in print we hope to have the gas laid on in the workshop.

Once again we have been invited to participate in the Canons Park Community Association's Annual Whit Monday Fête.

Every effort will be made to complete the remaining lengths of track to its full run of 150ft. It is hoped to have two tracks in operation, together with four locomotives. All members are asked to assist us on this day, and fuller details will be announced later.

Northampton Society of Model Engineers

THE above society is holding its second exhibition at the Town Hall, Northampton, from Saturday, 23rd April, to Saturday, 30th April, 1949.

There is no entry fee for competitions, and both members and non-members are urged to show any models they may possess, either for competition or in the loan section.

The sections are as follows:

Section 1. Locomotives; 2. Marine Models; 3. General Engineering—including Marine Engines and Internal Combustion Engines; 4. Mechanically Propelled Road Vehicles and Traction Engines; 5. Model Racing Cars (self-propelled); 6. Tools and Workshop Appliances; 7a. Model Aircraft (power driven); 7b. Model Aircraft (rubber driven); 8. Solid Scale Models.

Further particulars can be obtained from the hon. sec., W. S. WELLS, The Guest House, Moulton, Northants.

Eccles and District Model Engineering Society

PROGRAMME of events, April, 1949: April 6th. Valve Gears, Design and Setting, by W. J. Thompson. An attempt to help with those problems which arise when one decides to depart from "the beaten track."

April 20th: Basic Training in Model Engineering, by W. Taylor. This talk was intended primarily for beginners, but we shall all learn something from it.

The above will take place in the School at Catherine Street, Winton, and will start at 7.30 p.m. prompt.

W. J. THOMPSON (hon. sec.), 16, Prestwood Road, Salford, 6.

Beaufoy Model Engineering Society

MEMBERS of the above society meet every Monday, Tuesday, Wednesday and Thursday at the Beaufoy Institute, 39, Black Prince Road, S.E.11. An extensive workshop is available for all members at a nominal charge. Patterns and castings are made on the building and a welding and brazing plant is available. Machine tools comprise 20 lathes, 4 milling machines (horizontal and vertical), 3 shapers, B. and S. surface grinder, B. and S. horizontal grinder, besides drilling machines and small tools.

New members are cordially invited to make use of these facilities and members of other clubs might find some use for our extensive workshops.

Secretary, A. TASKER, Beaufoy Institute, 39, Black Prince Road, S.E.11.

Books Received

Simple Working Models. By C. E. Page. Published by Percival Marshall & Co., Ltd. 54 pages. Price 3s. net.

THIS is a handbook for the young mechanic who wishes to try his hand at making a few simple working models, including a sand motor, steam jet-driven boat, garden windmill and pump, water-wheel, and a hot-air engine. All the models can be constructed with the simplest of tools from odds and ends usually found in the average home. The handbook is illustrated with numerous explanatory line drawings.

Designing and Building "00" Trackwork. By Ernest F. Carter. Published by Percival Marshall & Co., Ltd. 58 pages. Price 3s. net.

THE methods used for correctly laying out and building "00" gauge track are fully explained in this useful handbook. Commencing with the tools required for track-building, the book goes on to deal with jigs, soldering, planning curves, super-elevation, points, crossings, feeder tracks and laying tracks on battens. A feature of this book is the numerous clear-cut diagrams.

Other books recently received from Percival Marshall & Co., are:

Marking-out Practice for Mechanics. By Ian Bradley and Norman Hallows, M.A. Price 3s. 6d. net.

The Beginner's Guide to the Lathe. By Percival Marshall and Edgar T. Westbury. Price 3s. 6d. net.

Sharpening Small Tools. By "Duplex." Price 3s. 6d. net.

Small A. C. Transformers. By A. H. Avery. Price 3s. net.

QUERIES and ENQUIRIES

A stamped addressed envelope, three penny stamps, and the query coupon from the current issue, which appears on page 56 (THE CYCLIST), must be enclosed with every letter containing a query. Every query and drawing which is sent must bear the name and address of the reader. Send your queries to the Editor, PRACTICAL MECHANICS, Geo. Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2.

Bright Metallic Finishes

COULD you please give me details of where to obtain and how to apply the flamboyant metallic finishes seen on cycles, cars, etc ?—D. Dewhurst (Fleetwood).

MANY of the brightly coloured finishes to which you refer consist of anodised aluminium or aluminium alloy which has been actually dyed. During the process of anodising the aluminium is coated electrolytically with an oxide layer which is very porous and which can be dyed in a dye-bath in very much the same manner as ordinary cloth is dyed. By this means brilliant colours can be obtained on this metal and its alloys, the dyed metal being lacquered over for the sake of surface protection. Unless you have special facilities for this work you could not hope to carry it out at home.

In the case of other metals, bright finishes can be obtained by the use of metallic paints and powders or by coloured transparent lacquers. You can make up a metallic paint by grinding the metallic powder into a clear varnish or lacquer such as is obtainable from any large paint shop. The necessary metallic powders are obtainable from Messrs. Ronald Britton, Ltd., 14, Lever Street, Manchester, 1. These are mostly in various shades of gold, copper and silver.

Synthetic Marble ; Alabaster

COULD you please give me the formula for synthetic marble ? Also, where can I purchase alabaster powder ?—F. Kelly (Keighley).

ACCORDING to Bennett : "Chemical Formulæ," the following composition resembles an artificial marble :

Portland Cement ..	1 part (by weight).
Ground Quartz	2 parts "
Calcium stearate (or equal parts of stearic acid and lime)	0.3 part
Mineral colouring matter	As required.

The mixture is slaked with water and allowed to set in moulds. The colouring matter (if any) is stirred in just before allowing the mass to set and harden. The colour should not be thoroughly mixed, but should be arranged in streaks through the mass.

You may be able to obtain alabaster from Mr. A. M. MacCarthy, 37, Sandford Road, Moseley, Birmingham, 13, but we think you will have to grind it yourself.

Other suppliers are : The Carlisle Plaster and Cement Co., Ltd., Cumwhinton, Carlisle. Derbyshire Spar and Alabaster Works, Drewry Lane, Derby.

For very small quantities, you should approach a wholesale chemical supplier, such as Messrs. Reynolds and Branson, Ltd., Leeds, or Messrs. Philip Harris & Co., Ltd., Birmingham.

Making Ethylene Gas

COULD you please tell me how I can make the gas that is now being used to ripen tomatoes ? I believe it is called ethylene. I only wish to make a small amount.—G. Walton (Formby).

ETHYLENE is the gas which has been used experimentally to ripen tomatoes and other fruits, but you must bear in mind the fact that the entire procedure is as yet *only* experimental and that its mechanism is by no means understood. It has been proved that some fruits, in ripening, give off traces of ethylene and other gases, and it is said that citrus fruits, in particular, have been very successfully ripened in the holds of ships by being exposed to ethylene gas.

The actual amount of ethylene used is very small indeed, a fraction of 1 per cent., in fact. Any attempt to use the pure gas would result in the ruination of the produce.

If you want to experiment (and it can be nothing more than that at the present stage of knowledge) your better plan would be to obtain a small amount of compressed ethylene from a depot of the British Oxygen Co., Ltd. The cylinder itself would be hired to you, and would, therefore, be returnable.

On the other hand, if you wish to make your own ethylene, here is the chemical method :

Place in a large flask 25 c.cs. of rectified spirit and 150 c.cs. of strong sulphuric acid. Heat the flask to about 165 deg. C. (329 deg. F.) on an oil-bath. Ethylene gas will then be disengaged. It will, however, be mixed with a small amount of sulphur dioxide gas, to free it from which the gas should be led out of the flask through a glass tube placed in the cork and passed through a dilute solution of caustic soda.

Another and, perhaps, better way of making ethylene is to drop ethyl bromide into a flask containing a boiling solution of potassium hydroxide in rectified spirit.

These chemical methods necessitate some amount of laboratory equipment, and some chemical knowledge and skill. They are expensive methods on account of the cost of rectified spirit which carries a very high excise duty.

Ethylene is a colourless gas, with a sweet but not unpleasant smell. If you use it, remember that, in quantity, it can act as an anæsthetic.

Cleaning Greenhouse Glass

I AM replacing a wooden greenhouse, about 12ft. by 30ft., by one of galvanised steel, and I would appreciate your advice on the following points :

I am taking out the 24in. by 14in. sheets of glass from the old greenhouse to glaze the steel house. The glass is in good condition (it has been in about 8 years), but it is dirty in parts, especially where it overlaps. Washing removes a great deal of the surface dirt, but there is an ingrained dirt stain which is not removable by washing. Could you tell me how to get the old glass clean again ?—J. G. G. Davies (Tredegar).

TO clean your glass, dissolve 1 part of caustic soda in 6 parts of water. Immerse the glass sheets in this in a metal vessel (preferably iron) overnight.

Readers are asked to note that we have discontinued our electrical query service. Replies that appear in these pages from time to time are old ones, and are published as being of general interest. Will readers requiring information on other subjects please be as brief as possible with their enquiries.

This will soften the ingrained dirt, after which it can be mopped away be means of a mop tied to the end of a stick. If some of the dirt defies this treatment (which is straightforward and cheap) you will have to heat the solution slowly and keep hot for several hours.

Try not to get the caustic solution on your skin or finger nails, since it has a powerful softening effect.

After the treatment the glass will require to be washed thoroughly in water so as to get rid of all traces of the caustic.

Carbon Dioxide ; Making Nitrogen ; Hydrogen

I SHALL be glad if you will help me with a few questions on gases.

(1) I believe carbon dioxide can be made by putting marble or limestone into sulphuric acid. Is this correct ?

(2) Is there any method whereby nitrogen could be made quickly and cheaply in a small space ?

(3) When metallic sodium comes into contact with water does the hydrogen so produced come from the water or from the metallic sodium ?—J. Fletcher (Leicester).

(1) Carbon dioxide gas can be made by the action of sulphuric acid on marble or limestone, as you suggest, but this is not a good way because the insoluble calcium sulphate which is formed in the reaction coats the marble or limestone and slows down the action. A much better way is to pour on marble or limestone dilute hydrochloric acid (1 part hydrochloric acid, 3 parts water). Carbon dioxide gas will be generated abundantly, and since hydrochloric acid can be bought for about 1s. 6d. lb. you will see that this is not an expensive method of generating the gas, provided, of course, that you can obtain limestone, marble or chalk, or any other form of calcium carbonate at low cost.

(2) You can make fairly pure nitrogen by two convenient methods :

(a) By heating a strong solution of a 50 : 50 mixture of ammonium chloride and sodium nitrate ;

(b) By heating a mixture of (dry) ammonium chloride and potassium dichromate.

Nitrogen can also be made by heating a mixture of ammonium nitrate and ammonium chloride. In this instance a mixture of chlorine and nitrogen is evolved. The mixed gas is, therefore, passed through a solution of caustic soda or through milk of lime, which will absorb and retain the chlorine, leaving the nitrogen to pass on unchanged.

(3) Sodium is an element, that is to say, it is a substance which cannot be split up into any simpler substance by chemical means. Hence, when sodium and water interact, the evolved hydrogen cannot come from the sodium. Hence, it must come from the water which is a compound of hydrogen and oxygen. The sodium decomposes the water and abstracts the oxygen and half of the hydrogen from it, forming sodium hydroxide, the remaining portion of the hydrogen being liberated as a gas.

The following is the chemical equation descriptive of this reaction :

$$H_2O + Na = NaOH + H$$

Water + Sodium = Sodium hydroxide + Hydrogen

Cutting Threads on Amber

CAN you inform me of the best method to cut a thread on an amber mouthpiece for a pipe ? Using a tap generally cracks the amber, and chasing does not give an accurate thread for the ivory screw. Also, what is the method for bending an amber mouthpiece ? It does not react to heat the same as vulcanite ; the flame from a gas jet gives it a burnt appearance.—J. Christie (Belfast).

GENUINE amber, although hardly soluble in any liquid, has the property of softening under heat influence. It can be worked by taking advantage of this fact.

To cut a thread on an amber mouthpiece, warm the amber thoroughly either by placing it in a warm (not hot) oven or by immersing it in hot water. Warm the tap, also, in hot water, and then apply it to the amber, carefully cutting the thread. Leave the tool in position until the amber cools and rehardens. Do not attempt to make the tool too hot, otherwise the amber will be spoiled and given a burnt appearance.

To bend an amber mouthpiece, try softening it in hot water and then bending it. If this degree of heat is not sufficient, put the mouthpiece in a lathe or otherwise adopt some means of revolving it. Below the revolving mouthpiece (at some considerable distance away from it) put the blue flame of a bunsen burner or a spirit lamp and heat the revolving amber very cautiously until it becomes sufficiently hot to bend. Then make the bend as quickly as possible, and "hold" the bend firmly between the fingers until the amber hardens again.

It is entirely a question of getting the right degree of heat, and this will be a matter for experiment.

We presume, of course, that you are working with real amber. A good test to apply for this is to hold a small chip of it in a non-luminous flame. Substitute amber will usually burn away rapidly, but the real amber will only smoulder slowly. Furthermore, when warmed, amber substitutes (and there are many of them) will often smell of camphor, whereas the real amber will not smell at all.

Cleaning a Distemper Brush

I HAVE a distemper brush that has been used for flour paste. It has now become a sticky mass on the bristles and defies all efforts to wash it off. Is there anything that would dissolve this sticky mass and make it soluble in water ?—G. C. Johnson (Brentwood).

IT is very remarkable that ordinary flour paste cannot be removed from a brush after soaking in water, since this type of paste is one of the easiest of things to wash away. Your query makes us suspect that, unknown to you, some type of glue or other adhesive may have got into the flour paste. We presume that you have tried hot water, with, possibly, a little washing soda in the water.

If so, you will have to adopt more energetic measures.

Dissolve 1 part of caustic soda in 12 parts of water, and add to the solution sufficient ammonia to make it smell faintly. Then immerse the pasted brush in

this liquid for several hours. Finally, wash it out well in hot water. Do *not* use a solution of greater strength than the above, otherwise the bristles of the brush may be softened. Endeavour, also, to suspend the brush in the caustic solution so that only the bristles make contact with the solution, the portion of the brush where the bristles are attached being above the surface of the liquid.

Coloured Plastic Composition

I WISH to make a table-top of a plastic composition and would be grateful if you could give me the trade names of the dry colours that would enable me to turn out a cream coloured plastic and also a light green plastic. The tint of the latter that I desire is that commonly used for kitchen equipment, but it should not be a chrome colour. Also, where could I obtain such colours in small quantities ?—H. Wilson (Halesworth).

YOU do not mention the precise type of plastic composition with which you desire to make a table-top. However, it is essential that you employ permanent pigment colours. For a cream effect you will have to use a permanent white which has been toned down with a little yellow ochre. The best white is titanium oxide. After this comes zinc oxide.

By far the best green pigment is chromium oxide, which is absolutely permanent. This is not a " chrome colour " in the trade sense of the term, which latter usually signifies colours blended with lead chromates. Chromium oxide can be relied on for any type of pigmentation. It is of a quiet olive green shade. Unfortunately, it is scarce at the present time.

Since you only require small quantities of these colours, you will not be able to purchase them from wholesale colour firms, although you might try one of the smaller specialist dealers in dry colours, such as Messrs. Wilson, Colour Merchants, Accrington, Lancs.

If you only require a few pounds of the colours, your better plan would be to obtain them from dealers in laboratory chemicals. Addresses of these are below :

Griffen and Tatlock, Ltd., Kemble Street, Kingsway, London, W.C.2 ; Vicsons, Ltd., 148, Pinner Road, Harrow, Middx ; W. and J. George and Becker, Ltd., 17-29, Hatton Wall, London, E.C.1.

Floor Polish

I HAVE noted a floor polish consisting of : 1 part of turps. (or substitute) ; 1 part of linseed oil ; ¼ part methylated spirits ; ½ part vinegar, which is supposed to " feed " a polished floor. I believe it is the linseed oil which " feeds " the wood, but I can only find linseed oil substitute on the market.

Can you please inform me whether linseed oil substitute will do just as well ?—E. J. Leigh (Leeds).

GENUINE turpentine and (raw) linseed oil have undoubtedly a good effect on woods, since they penetrate the fibres, rendering them moisture-resistant, fungus-resistant and filling them with decay-resistant resin which results from the slow hardening and resinification of the oils. Methylated spirit acts as a cleaner and a fungicide, but we deprecate the use of vinegar, for this contains water and other dissolved substances which tend to split the wood and to set up moulds. If, therefore, you wish to " feed " woodwork, rely mainly on raw linseed oil, or, alternatively, on a mixture of 75 parts raw linseed oil and 25 parts of turpentine. Turpentine substitute (white spirit) is not of much use for this purpose, since it does not remain in the wood.

There is also, very unfortunately, for this requirement, no substitute for linseed oil. This nowadays scarce commodity has many synthetic substitutes in the paint trade, some of them film-forming, some of them otherwise, but we cannot honestly say that any of them would benefit woodwork, particularly furniture woodwork.

As we have said, the best " feed " for woodwork is pure *raw* linseed oil. Methylated spirit need not be used. Vinegar should not be used, except on a highly polished surface, where it cannot penetrate the wood.

We are definitely against a linseed oil substitute for your purpose, since these are of such variable (and unknown) composition.

If, therefore, you cannot get raw linseed oil, use a solution of 1 part beeswax and 1 part pale resin in 10 parts of white spirit. This will impregnate the wood and " feed " it. After drying out, the wood is polished as usual with a wax polish. Alternatively, you can use equal parts of genuine turpentine (not substitute) and the above solution. If white spirit cannot be obtained, paraffin oil may be used in its place.

Enlarger Lenses

I WISH to build an enlarger using a pair of 4in. condenser lenses and an old quarter plate camera as a focusing lens. I would be very grateful if you would give me the following details :

Would the condenser be large enough to cover a 2¼in. x 3¼in. negative ?

How far would I need to have the lamp from the condenser, and how far from the negative carrier would the condenser need to be ?—R. J. Gould (Cardiff).

WE assume that your condenser lenses are of the plano-convex type. That is to say, they have one side flat and the other side convex. A pair of 4in. lenses of this type will cover a 2¼in. by 3¼in. negative quite well, the condenser lenses being used with their convex faces just touching each other. The negative should be placed as near as possible to the flat side of the front convex lens. Usually, in commercial enlargers, the distance between condenser surface and negative surface amounts to about ¾in.

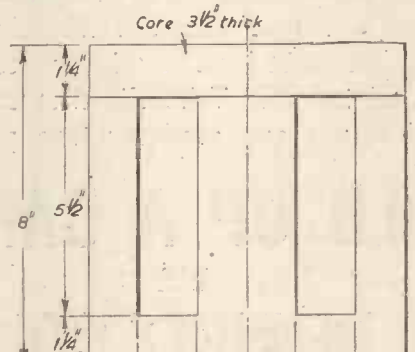
The exact position of the illuminant behind the condenser depends on its type. If it is an ordinary filament lamp, a distance of about 3in. behind the condenser will be about right, but *in all cases* some provision should be made for the centring of the light (i.e., its up and down movement) and for moving the light towards and away from the back condenser lens. This is essential in a good working enlarger.

It is also very advisable to give plenty of ventilation for the interior of the lamp-house of the enlarging lantern, otherwise the condenser may crack under heat influence. Do not permit either condenser lens to be gripped all round tightly. The glass of the condenser must be allowed space in which to expand slightly under heat influence. This precaution, added to adequate ventilation, is the best guarantee against the great (and not uncommon) annoyance of condenser cracking.

Building a Transformer

I AM desirous of building a transformer from stampings, as per sketch enclosed, of which I have sufficient to make a pack 3¼in. long.

Mains input 230 v. A.C. (15 amps available).



Dimensions of stampings for a spot-welding transformer (J. A. McKean).

Output to be approximately 1.6 v. with amps as high as possible for spot welding aluminium (approximately 26 s.w.g. to 16 s.w.g.).

Welding time is only a fraction of a second and is off for about 5 to 10 seconds.—Jas. A. McKean (Slough).

ASSUMING the supply is at 50 cycles the primary should be wound with 200 turns of 12 s.w.g. D.C.C. wire. The secondary could have 2 turns of conductor having a cross sectional area of 0.5 sq. in.

Toning Gun Barrels

I HAVE a shot gun—very good in every respect—except that the " finish " or " browning " on the barrels is wearing off, leaving a surface that has a tendency to rust if not kept oiled. I should like to treat the barrels myself, and should be glad of your advice on the best method to adopt for imparting a satisfactory finish.—G. H. Stockley (Burton-on-Trent).

A SIMPLE way of " toning " a gun barrel is to rub it over with a paste of flowers of sulphur and turpentine and then to hold the barrel in a luminous flame until the composition has burned off. The process is repeated until an even black is obtained. After this the metal is rubbed down with an oily rag. This gives a black colouration.

The more pleasing blue-black colouration may be produced in the following way :

Mercuric chloride	4 parts
Potassium chloride	3 ,,
Rectified spirit	8 ,,
Water	85 ,,

Mix the water and the spirit in a non-metallic vessel. Then dissolve the first two ingredients. The metal parts must be degreased and rubbed up to a high polish with rouge or other fine abrasive.

Then swab boiling water over the metal parts (or, better still, immerse them in boiling water) until they get hot. Dry them quickly with a hot cloth and at once immerse them in the hot solution as above.

The process can be repeated two or three times until the exact shade required is obtained. The articles should be polished lightly between each successive treatment to remove imperfections.

After the final treatment, and whilst the article is still hot, apply a thin coat of boiled linseed oil with a cloth.

You should note that the final blue-black polish will vary somewhat with the type of steel.

Note also that mercuric chloride is a Schedule 1 poison and that it will only be supplied to you if you are known personally to the retail pharmacist and on your signing his poisons book.

Cleaning and Polishing Marble

I HAVE a large marble slab which has been badly stained with oil and in one place with red ink.

Could you suggest any means of removing these stains ?

Alternatively, the reverse side of the slab is clean but requires polishing. Can you give me the correct method of doing this ?—J. M. Howe (Hunston, Sussex).

YOU do not say what kind of oil your marble slab has been stained with, but we presume that the oil is of a mineral nature.

Obtain a quantity of chloride of lime. Make it into a sloppy paste with *cold* water and spread it on the slab. Allow it to become nearly dry. Then brush it over with dilute hydrochloric acid (1 part acid, 5 parts water). If you cannot get this acid, use either diluted acetic acid (1 part acid, 5 parts water) or strong vinegar. Do this part of the process out of doors, because the application of the acid will result in chlorine gas being generated, and this has a very powerful and pungent smell, although it is not harmful in this small quantity.

After you have applied the acid, wait five minutes ; then swill the whole of the paste away with water. The marble slab should then be clean. Do not allow the acid to act for longer than five minutes, otherwise it will attack the marble itself ; but if the marble slab is well covered with the chloride of lime the acid will attack the latter rather than the marble.

The process may be repeated many times if necessary.

To polish the rough side of the slab, rub it down with successively finer grades of sandpaper. Then use a paste of rottenstone powder and water. Follow this with dry whiting and, finally, with fine Tripoli powder. To get a good sheen on the marble will be a very slow and tedious process. This is usually done mechanically by means of special polishing plant.

Grain Filler ; White Mounting Paste

CAN you furnish me with the formulæ for the following substances ?

(1) Grain filler.

(2) White mounting-paste.

Could you also recommend any books on wood turning and taxidermy ?—L. Wing (Histon).

(1) THE type of grain filler which can best be used depends on the nature of the wood whose grain it is desired to fill. For general use, however, a mixture of whiting (1 part), silica flour (2 parts) and wood flour (1 part), intimately ground together and sieved through fine muslin or similar material makes an excellent medium for a grain filler. It can be coloured, if desired, by admixing traces of yellow ochre, red oxide or other mineral colours. The material can be mixed with raw linseed oil and rubbed over the woodwork. Other workers prefer to mix it with size water, but the linseed oil vehicle is the better of the two, although it is much slower drying.

(2) The type of white paste which you require can be made according to the following formula :

(a)	White dextrine	40 grams
	Water	50 c.cs.
(b)	Borax	1 gram
	Glycerine	1 c.c.
	Water	5 c.cs.

Dissolve the dextrine in the water. Dissolve the borax and glycerine in the water. Then, whilst hot, add (b) to (a). If the paste is to be perfumed, add a few drops of perfume at this stage. Stir well and pour into pots. It will set within two or three hours.

Most books on woodwork deal, in part, with wood turning, but the following volume is devoted exclusively to turning : " Wood Turning Made Easy " (Amateur Mechanic Series).

This was published at 1s. 9d. net, but is now out of print. It is, however, commonly to be had second-hand from any good bookseller, such as Messrs. W. and G. Foyle, Ltd., Charing Cross Road, London, W.C.2 ; Messrs. Wm. Bryce, Ltd., 54, Lothian Street, Edinburgh ; or Messrs. Wm. Feffer and Sons, Ltd., Petty Cury, Cambridge.

There is no standard work on taxidermy which is in print. You had best apply to any of the above booksellers for any secondhand volumes which they may have in stock.

Glycerine-litharge Cement

I HAVE seen it stated, both in British and American publications, that a mixture of litharge and glycerine will set rapidly into a rocklike mass requiring a hammer and chisel to remove it. I have obtained litharge from various sources and attempted to prepare the cement, but without success. There can be no doubt as to the correctness or purity of the last batch I tried for the glycerine was of B.P. quality and the litharge of laboratory re-agent quality. Can you suggest any reason why the cement will not set ?—M. Stewart (Inverness).

THE glycerine-litharge cement to which you refer is quite correct as to formula. Since you have used materials of standard purity, we can only suggest that you have employed too much glycerine, or that you have not sufficiently powdered the litharge. The latter should be reduced to a fine powder, and it should be just moistened with the glycerine—sufficiently so as to make it swell up and hold together when compressed slightly. Such a cement should set within half an hour, but it takes days for it to become really hard. If too much glycerine is used the cement never sets, for the glycerine attracts water from the atmosphere and renders the cement permanently hygroscopic.

THE Cyclist
Editor: F. J. CAMM

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All letters should be addressed to the Editor, "THE CYCLIST," George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2.

Phone: Temple Bar 4363
Telegrams: Newnes, Rand, London

Comments of the Month

By F. J. C.

Pedestrian Crossing Recommendations

THE costly experiment of pedestrian crossings introduced to this country from abroad by Leslie Hore-Belisha, when he was Minister of Transport, has not achieved the anticipated results. They have been under review on a number of occasions and it should now be apparent that the experiment should be discontinued. Pedestrians are not compelled to use the crossings upon which they have absolute right of way, nor do pedestrians have to obey the traffic lights. It seems, therefore, that if pedestrians are to continue to enjoy the right to cross the roads when and where they will, accidents will continue at the present high level.

Anything which moves on the road must be considered as a vehicle and it matters not whether propulsion is due to muscular efforts, such as when walking or cycling, or to petrol. If regulations and penalties are necessary in conjunction with motor-cars, motor-cycles, bicycles and public-service vehicles, it would logically seem that they also are necessary for pedestrians, since they are the most vulnerable of all road users.

The ranting criticism of the Cyclists Touring Club and the National Cyclists Union, based on the false premise that motorists *cause* the majority of road accidents, cannot be supported in the light of the volumes of evidence available from the M.O.T., the police, The Royal Society for the Prevention of Accidents, and all other independent bodies. Much evidence is also available from the motoring associations, but we discount that, because they are indicted. All the same, their evidence supports the fact that, in a majority of cases, accidents to cyclists and pedestrians are not due to the carelessness of motorists, nor to excessive speed.

Traffic lights, pedestrian crossings, island refuges, one-way streets, a plethora of road signs and warnings, courtesy cops, posters, the highway code, broadcasts and articles in the National newspapers, have failed to make much impact on the accident problem.

It would seem, therefore, that many of the devices introduced in the name of road safety, and which have reduced the speed of traffic to something approaching a farce, should be abolished.

A road safety committee, set up by the Ministry of Transport in 1947, made a recommendation to the effect that pedestrians who caused obstruction on the highways or impeded the flow of traffic should be fined. This recommendation was not adopted. The mere fact that there have been so many committees investigating the problem of the pedestrian crossing indicates that these are quite unworkable, and, as for political reasons, no Government would have the courage to penalise the largest section of the public, namely, pedestrians, so it seems that the position will remain as it is.

Road Safety Committee

Another committee on road safety has now made some recommendations regarding pedestrian crossings. It suggests, in all seriousness, that the roads are not sufficiently obstructed with islands and crossings, and wants further islands put in the middle of crossing-places. It also suggests subways and over-bridges at danger points, and warning markings near the crossings; it should be an offence for any vehicle to park within 45ft. of the crossing; pedestrians should indicate their intention to cross; further propaganda is recommended instructing pedestrians to use the crossing, thus suggesting that pedestrians are imbeciles. Other recommendations are that there should not be any uncontrolled crossings outside built-up areas, crossings over uncontrolled spur roads should be abolished, and experiments should be conducted with the object of segregating pedestrians from the highway. A possible new offence would be overtaking on a crossing.

None of these recommendations is likely to be adopted in the near future. We do not subscribe to the view that motorists are "chartered libertines," and we think that this never ending campaign of vituperation and calumny conducted by cyclists against motorists is not likely to promote that feeling of good will between road travellers, which makes for safety. It is true that the cycling organisations speak only for a tiny minority of the total, and perhaps there is a risk of attaching too much importance to their remarks, which are always tinged with acerbity. Too little is heard of the accidents which are avoided by the motorists, and of the accidents caused by pedestrians who escape scot-free. We hear plenty of criticism when a pedestrian is wounded or killed, and it is true that in such cases there is always a tendency to criticise the injured or deceased. In the case of the latter, often the only person who could offer rebutting evidence is in the mortuary and the motorist's evidence is accepted in default.

We agree that statistics can be made to prove anything, but ordinary observation of traffic streams in busy places, or on the open road, does not indicate that careless driving is so general as we are sometimes led to believe. And we must discount the criticisms of those known to be anti-motorists.

A.G.M. of the B.L.R.C.

ON December 31st, 1948, there were 1,743 members of the League, including 104 female members. This shows an increase of 250 over the previous year. Over 682 amateur, 623 junior and 48 independent licences have been issued, giving a total of 1,353. There were 73 clubs owning allegiance to the League. Five of these were disowned during the year and 19 new clubs joined, providing a total of 87 active clubs. Only about 5 minor claims have been made on the insurance company during the year, and not all of these have been incurred while racing, the premium covering everyday riding.

Dagenham Road Safety Council

AT a Council meeting of the above held last July, and attended by N.C.U. and C.T.C. representatives, the B.L.R.C. not being invited, the following resolutions were adopted:

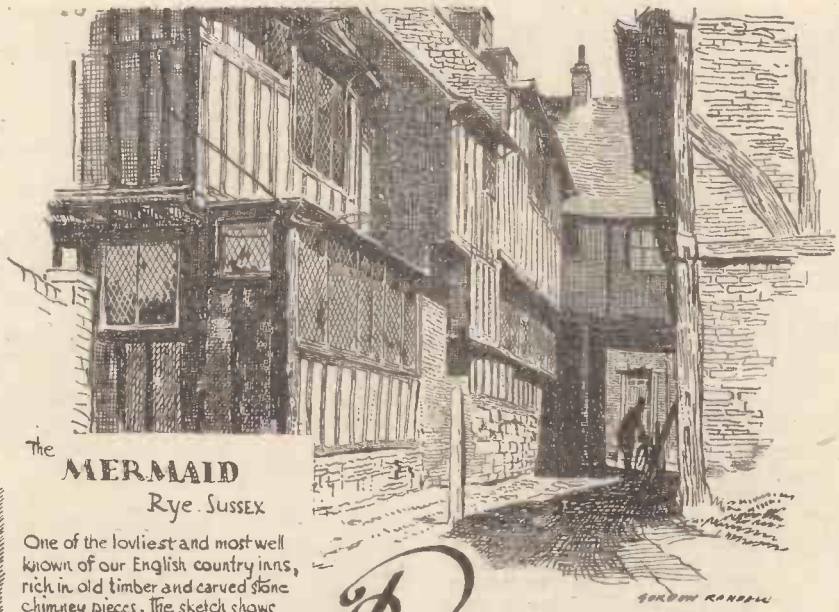
"That, in the opinion of this Road Safety Council, mass start racing on the public highway should be abolished unless the roads are closed to the vehicular traffic, and that the Ministry of Transport, the Royal Society for the Prevention of Accidents, and any other appropriate organisations, be informed accordingly."

The League naturally took up this matter, and as a result it was invited by the Town Clerk to send two representatives to state their case in public debate with the N.C.U. At this debate, a representative of the latter supported the resolutions. The final result, however, was: that the Safety Council by 22 votes to 4 rescinded its resolutions and recorded the view that mass start racing was not dangerous. This is a complete victory to the League.

R.R.A. Timekeepers

THE R.R.A. appoints a panel of timekeepers, but it does not insist that at the time of the application the applicant possesses a watch with a Kew observatory certificate which is current. We know of at least two R.R.A. timekeepers recently appointed whose watches are well outside the two years' limit—Kew A certificates only being current for that period, when they have to be resubmitted for a subsidiary A test, which takes about seven days. The original test takes forty-four days.

What is the purpose of appointing timekeepers who could not be called upon to time a record? What steps does the R.R.A. take to ensure that a timekeeper timing a record is actually using a watch with a current certificate? Should not a timekeeper be made to produce his watch and exhibit its number, which should be checked against its certificate? A record breaker might have his record invalidated (as nearly happened some years ago), if it were subsequently discovered that the timekeeper's watch did not comply with the rules. There is a difficulty now in getting watches retuned for the subsidiary test and the R.R.A. needs to be particularly watchful. It is true that some of the records, timed to the nearest elapsed minute, do not require a watch of the accuracy of a Kew A watch, but whilst the R.R.A. rules insist upon this the difficulty will remain. Few such watches retain their certified rate for more than about a year. Even so, a timekeeper may drop his watch or break a mainspring and have it repaired locally.



The MERMAID
Rye. Sussex

One of the loviest and most well known of our English country inns, rich in old timber and carved stone chimney pieces. The sketch shows the beautiful windows and the fine oak beams of the building, seen from the courtyard.

Paragrams.

Tramline Killers

ALTHOUGH Leicester's tramlines are being torn up and the trams will within the next year or so all be replaced by buses, cyclists in the city are not at all happy while the work is in progress. The tram tracks are even more dangerous than usual, if that is possible, for where the tracks are in a bad state they are being left until they are finally removed or covered up. At a recent inquest, following an accident stated to have been caused by the tramlines, very strong comments were made regarding the present condition of parts of the city's tracks.

Long Time Learning

A CYCLIST who was summoned for riding without a rear light wrote to his local Bench admitting the offence and offering his thanks to the constable who pulled him up. He said: "I realise how dangerous it is to ride without a light." The cyclist was 51 years old.

Speed-up

THE Council of the London Borough of Finchley has been considering a suggestion that one shilling a week shall be paid to every housing worker who uses a bicycle to speed up his work. A different attitude from that of a branch of the Plumbers' Union which has forbidden its members to cycle to and from jobs as their tool bags make it "unsafe."

Smoke Came First

THERE were two long strings of traffic at the Old Bridge in Huntingdon the other day; one line halted while the other moved slowly across the narrow bridge. A cyclist was riding towards the moving line of traffic when the driver of the lorry heading the line pulled up and asked him for a light. The lorry driver slowly searched in his pockets for a cigarette, lit it after two or three attempts, had a few puffs and put back the cigarette packet, while all the time more and more traffic was piling up at the back of him. Only when he was perfectly sure he was quite comfortable did he condescend to drive on and allow a few dozen other road users to move.

Boots, Boots!

TWO girl cyclists who rode round Australia, covering altogether about 11,000 miles, took with them their pet dog, which wore special boots to protect its pads. Before it finished the course the dog had worn out four sets of boots—and also most probably was an inch or two shorter. How that dog must have wished for a little dog-sized bicycle!

Not Made For Two

IN 1931, two years after his marriage, a Belfast man returned to his old love, cycling, and used to go on lengthy trips by himself; rather to the annoyance of his wife. She kept complaining so he bought a tandem and took her with him, but this did not suit, either, and she refused to go riding with him and eventually left him altogether. Now he has obtained a divorce on the grounds of his wife's desertion.

Railways Into Roads

SPEAKING in the debate in the House of Commons on the Special Roads Bill, Mr. David Renton, M.P. for Huntingdonshire, suggested: "There is great scope for converting obsolete railways into special roads, and there are places where they would make good ones." He also asked that the Great North Road and the old North Road, both of which run through his constituency, should not cease to be general purpose roads. If they did, he said, it would greatly disturb the life of his constituency.

Business Expansion

MESSRS. W. CUSWORTH (Doncaster), LTD., cycle agents, Doncaster, have extended their business by acquiring additional business premises at 7, Hall-gate, Doncaster, where they will also carry on a full repair service.

Those Errand Boys

NUNEATON Road Safety Committee have decided to act upon a suggestion of a woman member that local errand boys—keeping up the errand boy tradition too well—are reckless cyclists and cause, or are involved in, many minor accidents. The committee will give lessons in road safety to errand boys, and a scheme has been prepared with the assistance of the boys' employers.

Doncaster Out in Force

RIDERS from Doncaster and district were at the annual meeting at Blyth of the North Midlands Cycling Federation elected to the principal positions in the Federation for the coming year. Mr. F. Spencer, of Blaxton, was re-elected president, Mr. R. R. Annis (Doncaster Wheelers) became general secretary and treasurer, and two other Doncaster Wheelers men, Mr. R. A. Huckle and Mr. T. R. Snowdon, with Mr. F. Oldfield, of Conisborough Ivanhoe, were elected vice-presidents. Another member of Doncaster Wheelers, Mr. T. A. Fuller, is to organise the Federation's open "25" in August.

Up the Pole!

A BICYCLE was found the other morning decorating a weathervane on the top of Cambridge University School of Geography. In a place where so many ride bicycles it is certainly a more appropriate decoration than some of the articles which from time to time find their way up spires and on to statues.

Tricycle Skates

A CALIFORNIAN inventor, Mr. F. M. Bohler, has taken out a patent for a novel design of three-wheeled roller skates, propelled by foot-power. Each skate has three rubber-tyred wheels. The foot is strapped to a plate above the wheels, and as this plate is depressed a toothed rack moves backwards and turns a gear wheel attached to the rear wheel. As each foot is depressed each skate moves forwards, and as the foot comes back on the upward motion a clutch disengages the gear in readiness for the next downwards push.

Mass Production

ACCORDING to the report of the National Safety Council of the United States, just issued for 1947, over 25,000 cyclists were injured in road accidents during that year. And the G.I.s used to say that everyone in the States has at least one car!

And No Mistake!

SUPERINTENDENT W. J. KELLY, the new police superintendent at Loughborough, said at a recent social gathering that he was appalled at the bad road manners of the average motorist. "I have had an opportunity of watching traffic at close quarters," he said, "and I can honestly say I am appalled, to put it at its mildest, by the bad manners shown by motorists who, quite frankly, are in charge of lethal instruments." And if that is how they behave when in sight of a police officer's uniform or a police car, how does he think a cyclist enjoys himself on the road these days?

Next Time a Prize?

A CYCLIST riding through a North Lincolnshire town the other day was keeping a very careful eye on a small child who was wobbling near the edge of the pavement, but just as he drew level the child put on speed and ran into his front wheel. Off came the cyclist in a heap, the child bounced like a rubber ball, but no hurt was done to anything except the cyclist's dignity. After a few minutes along came the proud mother of the child, who explained, casually: "That's the fifth time he's been knocked down to-day!"

Rubber Roads

ANY suggestion that a new type of road just laid down at Akron, Ohio, is designed so that pedestrians will bounce when hit, is denied as slanderous by the city authorities. But this road is the first synthetic rubber road in the United States and the idea was suggested by the Goodyear Tyre and Rubber Company. The company's engineers worked out a mixture of powdered rubber, asphalt and crushed stone, which is heated and put down hot and well rolled in the ordinary way. It has been found that the new surface is safer and more waterproof and it is also claimed that it will be found longer-wearing and more resilient.

Coal Board's Cycle Shed

THE construction of a cycle shed at Donisthorpe Colliery, in Leicestershire, has rather annoyed a member of the local council, who feels that the shed is far more luxurious than it need be. He told his fellow councillors, "An ordinary bike shed would not be good enough, I should imagine," and said he would personally complain to the Ministry of Health, having regard to the difficulties which the council always encountered in its housing schemes.

New Club Proposed

PLANS are being considered for the formation of a club, with headquarters at Grantham, for the benefit of cyclists in the West Kesteven area of South Lincolnshire. It is hoped that sufficient support will be obtained to enable the club to be formed, and a full programme of racing, touring and social fixtures arranged for the coming season.

Safety Sign Too Dangerous

PRESUMABLY as a contrast to the ghastly Black Widow road-safety poster, a brightly coloured type of road-safety sign has been erected at Stretford, Lancs, by the local Road Safety Committee. Unfortunately the sign is too attractive and drivers find it distracts their attention just at the time they should be concentrating, and so, for the sake of safety, the sign has been removed.

The world's tiniest bicycle which was shown by Dunlop at the Cycle Show. The model weighs only 8 ozs., is 4½in. high and 8½in. long. The frame is of welded steel and the brake has an inner and outer cable.

Around the Wheelworld

By ICARUS

Bidlake Memorial Plaque

THE Bidlake Memorial Trust has awarded the Bidlake Memorial Plaque to Gordon H. Basham for his outstanding performance in winning the North Road 24 on August 21-22, 1948, when he covered 454 miles, thereby gaining the R.T.T.C. championship and beating the previous record by 9¾ miles.

Accompanying the announcement Sidney M. Vanheems, one of the trustees, tells me that he has resigned from the Trust after 16 years. Van, as we know him, has done an enormous amount of work for cycling. As a most active member of the Bath Road Club when it was a name to be conjured with in cycling circles, he has had a great deal to do with the organisation of club events, such as the Bath Road 100. Later, as secretary of the Roads Record Association, he achieved cosmos from the chaos which was handed over to him. It is true to say that the R.R.A., as a national body, was disgracefully run, and Vanheems on many occasions in public speeches has told the story of the mess in which the Association's affairs were.

Vanheems is still a young man in his early 70s, and he still rides a bicycle.

Retirement of Harold Eley

IT was with great regret that I learned of the retirement of my old friend and colleague, Harold Eley, the advertisement manager of the Dunlop Rubber Co., with which company he has been associated for over 40 years. I am glad to know that he will continue to contribute to these pages.

He tells me that he will now have more leisure in which to enjoy his cycling. Some years ago he wrote a most interesting book entitled "This England of Ours," and it dealt, county by county, with the charms of the English countryside, of old inns, churches, places of interest, and folk lore. I well remember also the series of articles he wrote for a journal which I also served many years ago under the title of "At the Sign of the Saracen's Head." A prominent member of the Roadfarers' Club, he has taken a keen interest in everything associated with all forms of road travel.

Old inns have a fascination for him as any reader of Harper's book on Old English Inns knows; he wrote the foreword to that classic. Mr. Eley's successor is Mr. C. L. Smith, a Birmingham man, 48 years of age, who joined Dunlop in 1923, and came to London in 1938 as an assistant to Harold Eley. He retained this position until he returned to Fort Dunlop in 1939. He has since 1945 been advertising manager of the tyre group.

Pedestrian Crossing Week

MR. J. A. A. PICKARD, Director-General, Royal Society for the Prevention of Accidents, writes:

"As National Pedestrian Crossing Week (April 3rd to 9th) is fast approaching, may I urge all walkers and drivers to prepare for it by signing a non-aggression pact now, which shall last for ever after.

"The success of the Week depends on a sincere spirit of give and take—preferably more give than take—on the part of all kinds of road users. Each should be more concerned with how he can help the other fellow, rather than with trying to put all the responsibility on him.

"Drivers and cyclists should do all they can to give pedestrians free and uninterrupted passage—after all, they are frequently pedestrians themselves. Pedestrians should not selfishly hold up traffic.

"Mutual courtesy and consideration can help to reduce accidents."

The Sliding Car Door

MR. SIDNEY W. NOBBS, of 60, Grove Walk, Norwich, has invented a sliding car door. In view of the large number of accidents to cyclists caused by the careless opening of car doors this invention should be taken up by progressive car manufacturers. It has been demonstrated on the films throughout the country. It is understood that many accident prevention committees are pressing for its use.

Mr. Harold W. Eley, who retires after 40 years with the Dunlop Rubber Co. Lecturer, author, publicity expert, our contributor Mr. Eley will intensify his cycling activities.

Is the C.T.C. Democratic?

MR. R. WATTS disagrees with my statement that the C.T.C. is not a democratic body. I stated that resolutions passed at its A.G.M. need not be acted upon for the C.T.C. Council have powers to override such resolutions. The argument advanced in favour of this undemocratic practice is that an A.G.M. of the C.T.C., according to Mr. Watts, "often comprise less than 100 members, who cannot be allowed to dictate the policy of the club."

If members of the C.T.C. are so disinterested that they do not turn up at an A.G.M. it is quite proper that any resolution passed by those who do should be acted upon. Obviously, the remainder are disinterested. The fact is, however, that there have been resolutions set aside which were passed at representative annual general meetings.

I do not agree that a group of fanatics could swamp an A.G.M. A chairman of a domestic tribunal such as this has wide powers and could easily prevent a *coup d'état*.

This reader goes on to say "we have implicit faith in our elected council, and rely on their judgment." Then why hold an A.G.M. at all? If that is democracy what is dictatorship?

"The Chartered Libertine"

ONLY one reader among the many who wrote to me in connection with my criticism of the remarks of a contributor to a contemporary disgreed with me. The others briefly said, in expressing their thanks, that it was high time the bitterness was taken out of the cycling movement, and that the constant criticisms of other road users by cyclists' representatives does not make for the amity which should be the essence of good road manners.

This reader seems to think that if the police concentrate on preventing motorists parking their cars they will be helping to avoid accidents! However, as several accidents were caused last year by stupid pedestrians walking into stationary cars perhaps there is some substance in the argument. Apparently, a motorist is dangerous when he is driving a car, and the car is dangerous when it is stationary.

If the police genuinely gave their time to the prevention of accidents instead of watching stationary cars or trapping motorists in parks I might agree with this correspondent. The fact is that crime must come before technical offences.

The Dynohub

THE days have now passed when, in order to get the dynamo on your bicycle in operation, it was necessary to dismount and juggle with an oily or muddy lever somewhere under the rear mudguard.

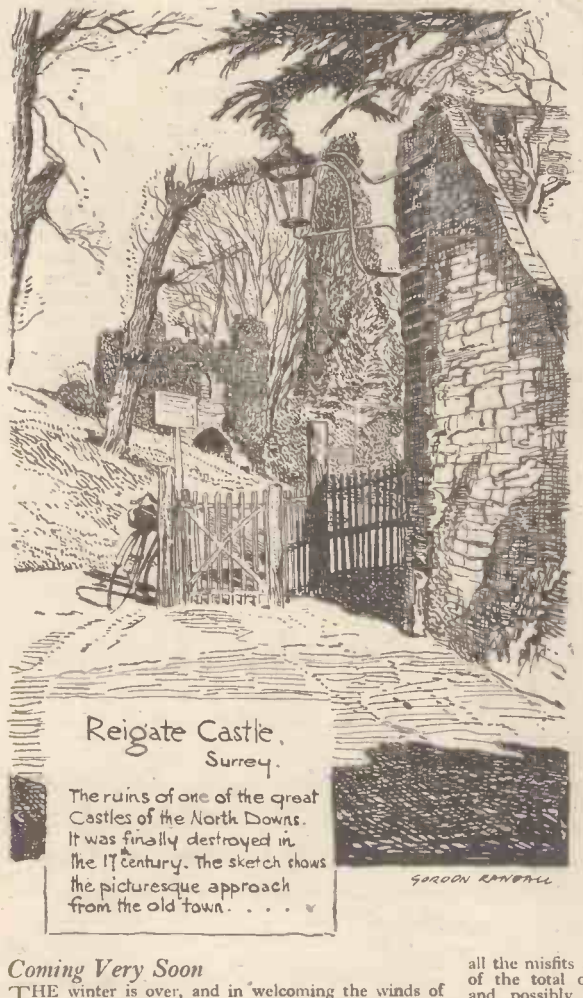
The introduction of the Dynohub saw an end to dismounting and to the other drawbacks of the old tyre-driven dynamo—wheel drag and wear and tear on the tyre. Built into the front or rear wheel, the simple principle of the Dynohub is that an armature is fixed to the hub spindle, and the magnet, attached to the hub shell, rotates around it. The specially-designed armature requires only a single coil which is wound on to a moulded bobbin and sealed against dirt or damage. The magnet encircles the armature and a chromium-plated cover plate and dust cap seal the complete dynamo from water and oil.

The Dynohub, which is made by Raleigh Industries, cannot wear out, for there are no component parts that could become worn even by continual use. There is no mechanical connection between the armature and the magnet; no brush gear as the armature is fixed; and as it is built into the wheel hub the dynamo has no bearings of its own.

Because of the type of armature used in the Dynohub it gives a good light at low speeds and improved voltage control at higher speeds, which prevents bulbs from burning out. The output at 12 m.p.h. is 2 watts, using a 6v. .3 amp. bulb in the headlamp and a 6v. .04 amp. bulb in the rear light. Both are controlled by a switch built into the front lamp.

Wayside Thoughts

By F. J. URRY



Coming Very Soon

THE winter is over, and in welcoming the winds of March we may shiver a little when the eastern draught tries to blow holes through us, but at least we shall know they cannot last much longer, but soon give way to the soft south-westerlies full of fragrance from the spicy islands. Personally, I've had quite a good winter except for the patch of snow in January when circumspection kept me from riding into town on my usual daily journey. With us the snow wasn't bad enough to be a serious menace to traffic, but it was very dirty and splashy, and I don't like being driven into gutters and then sprayed with the splashings of an urgent motorist; and, unfortunately, some drivers appear to take a delight in doing these things. Also, wet snow can be slippery, and half the people who drive cars (my estimate) seem to think they can stop as readily as on a dry surface, and they can't; and I might be one of the fellows right in front of them to take the bump. So I don't like those conditions and give them best, for I want a whole and healthy body to use for as long as the years will let me. In the old days when there were no cars, and even when they were few, it didn't matter much if we did occasionally glissade or even sit down suddenly—it was part of the fun of winter riding. But now you know the other fellow can't stop on a snow- or ice-bound surface. Then you are older and not quite so lissom, and, being older, are inclined to break more easily; so when conditions are treacherous as to road surface I am content to let other people take the risks. For spring is in the offing, and summer will follow—and oh! how I yearn to be away up the valleys and over the moorlands, to hear again the plaint of the curlew, and even the cuckoo will not be tedious when his two-note call is first heard in the land. The banks will be bosky and the brave blue sky above will be filled with laughter.

A Real Query

I HAVE had several letters lately, all from elderly riders, asking me if I consider a lightweight would suit their style of riding better than what we know as the full roadster. Practically all of them have been urged by the younger generation to change over, and they are dubious on the question of their comfort. It is very natural, for the term lightweight has been so clearly related to high-pressure tyres, skimpy saddles and deeply dropped bars; right enough, no doubt, for the young and speedy, but definitely uncomfortable for the staid rider whose touring mileages may never exceed 50 a day under the best conditions. The bicycle needs to be related to a man's years, and if this is done intelligently, then the lightweight for me every time. I am glad to get these queries because it shows that discrimination in choice of the vehicle is becoming more widespread, and that is good for the pastime, the folk who play it, and the trade. All my bicycles are of the lightweight type, and the heaviest is 31½lb. with my specification, and most of them are 68 deg. to 70 deg. frame angles. Two are more upright, but to be candid are not quite so comfortable to steer; you are conscious of guiding them at my speeds, and that means an added little strain on a long journey. My saddles are Brooks B.10, No. 2; my gears are S.A. four-speed hubs (close, medium and wide), and I have a couple of Cyclos in service. All the gears are 60in. normal, which is as high as I can use with supreme comfort, and all my tyres are 1¾in. x 26in., a combination that takes the rough stuff of town and country riding without vibrating me too violently. Bars are shallow drop, fixed with the highest position of them level with the saddle, which gives me an easy "writing-desk" position whereat I can sit in comfort all day. They are bicycles that would not suit swift young men, but in passing it is worth notice that some of them will borrow one for their touring time and leave the "speed iron" at home.

The Bicycle to the Man

AND so I can ride all day in the accepted sense of that term, and enjoy every league, mainly because I sit there in comfort and pedal action is as natural as walking, and far less tiring. It is, I suppose, the old story of adapting the bicycle to the man instead of the other way round that so often happens. The misfits on the road are more numerous than the other kind, for invariably when I see a rider—man or woman—sweeping quietly along without any apparent effort, I turn and look—and so possibly do you. Don't make a mistake in thinking all the misfits are the utility people, for quite a portion of the total of riders deliberately misfit themselves, and possibly the greater number among these are just as ignorant, but in another way. For you can be so thoroughly up to date as a lightweight rider that you are stretched uncomfortably between saddle, pedals and bar, filled with the notion that you are getting the best out of cycling by proceeding in short, sharp jerks from point to point, and never obtaining that rhythm of movement which is part of the joy of perfect cycling. I love to see the speedy lads and lasses—there is joy in them and the beautiful movement of activity—but there are also imitators who have never acquired the art of riding correctly, and appear to think that all that is needed for that perfection is to be found in the specification of the bicycle. Most old racing enthusiasts if they carry on with cycling after their athletic days are over—and far too few of them do—know how to adapt the bicycle to their touring needs; but even here there are exceptions—folk who will, for some strange reason, stick to the tall gear and the skimpy saddle, the small-section tyre, and the upright frame, when they would be far happier and more comfortable on a machine such as I have described, modified to suit their own particular tastes. When a thing is not comfortable it starts to pall, however beautiful it may look, and that is particularly so with the bicycle because it is so personal and completely dependent on you to make it alive. I am keen on this question because I know that with some people cycling has failed to please owing to the specification and equipment not conforming to the individual's make-up and purposes. And that is always a pity; far too frequently it puts an end to that person's cycling activity and adds one more voice to the ignorant multitude that say cycling is hard work.

The Harder Times

THERE are, of course, days when cycling is rough; it would lack the characteristics of a game if it did not give the player the opportunity of proving his prowess. The wind and the hills and the rain, with which the touring cyclist must live, are not always kind or go the way one would desire. It is then that experience counts, how to ride out a day of storm and enjoy the adventure without stretching the powers that are yours to the point of becoming painful. To cut your planned mileage, to feed more frequently, to remain cheerful in the thought that such days are not a personal annoyance to you but affect everyone, is advice I think will help you through these stretches of time. At periods such as these your comfortable posture, decently wide saddle and the low gears available are indeed a benediction. You may not be travelling very swiftly, but you are travelling, seeing a countryside under the impact of storm, and all the mountain rills rushing to the lower levels drunk and disorderly. And I have found that in such weather the people who cater for us by the way are more kindly disposed to do anything they can for our comfort than is the case when the sun is shining and the skies are blue. I love the fine weather, the easy conditions, the slope in my favour and the breeze abaft, but I should love them far less without the contrast, or if I lacked the knowledge that the rough day would not deter me or make me less a lover of this delightful land. The curious thing is that such days often remain in your memory as an experience you would have been sorry to miss, for in a minor sense they are a triumph of mind and muscle over Nature, and as such set a man on a slight pedestal. In the matter of personal endeavour they do us good and are a barometer of our fitness for the game both as regards man and bicycle, if we come through them cheerfully. In my view they are worthwhile days to encounter occasionally when the individual has graduated to a real cyclist, a real roamer with all the tricks of the game at his disposal.

The Ever Varied

PERSONALLY I hug these things to myself, but am prepared to give them to anyone with a desire to make life a little more tolerable by letting into it sunshine, fresh air, and that mental satisfaction inherent in love of country. There is a continuing grace in these things that keeps life at a high level where you possess the best of everything in the outdoor world. I am not the type that despises other pursuits; I like to see the movement and colour at a hunt meet, to watch a shooting party at work—and incidentally to imagine I would be a better man behind the gun than the individual in my eye—to talk with that craftsman, the hedger and ditcher, and wonder how his boundary fence grows after he has hacked it about and laid it in a geometrical line so trimly that the trick seems simple until you try; and last of all, I think, is that lazy couple of hours on a long summer day when rival village cricket teams are displaying their arts and wiles of attack and defence. These things and a thousand others are the parentheses that wrap round leisure time for the cyclist, and make it warm with beauty. And, of course, in our own right we have our adventures, that vigorous crossing of the hills when the road fades into a faint track, and the long ridge that marks the summit leans against the sky. We top it, and look into another little world with the winding river in the deep valley margined with the tinted fields running upward on the further slope until they break into rocky formations silhouetted against the blue sky. Often enough on such crossings the descent to that valley is as full of thrills as the climb, for the sheep track is rough and with brakes hard on it takes a rider of discernment to keep an even keel and make the smooth black road that straightly runs to lunch or tea. Such days are never wholly forgotten in the scheme of memory, nor are they part and parcel of the scheduled trip from place to place, which, good as it is, can frequently be perfected by turning aside for a while. The touring cyclist ought never to be in a hurry, for there is so much to see and probe and adventure in this lovely land of ours, for every county has its beauty and its history, its story and its tradition, and you—yourself—are part of its spirit and perfection, being the right type of Briton. And I reckon there are none better, as a class, in that respect than the real touring cyclist, whose maps are the index to all that is best on British soil.

Take Every Chance

ALL these are pleasant things to contemplate and, as far as we are able, to put into practice during the year. I'm going to, for having reached an age when the erstwhile limited leisure is due for an extension, my intention is to take all the holiday I can get while I'm still fit and active enough to enjoy the planned leagues and gallop anything up to eighty miles in a day in comfort and without undue exertion. But apart from holidays as such I'll have some happy week-ends, and not fewer, if shorter, evening rides. Indeed, these evening jaunts are one of the little joys of my life; to leave the works after a cup of tea, and in half an hour to be among the lanes and renew acquaintance with the haunts of my boyhood, to note the changes and still be surprised at all the loveliness existing within a few leagues of town, is a delight that never palls. These little rides to favoured spots never fail to satisfy because they are seen and sensed under such differing conditions, in calm and gloom, and sometimes in the sudden storm of thunder when the tiny brooks change their trickling treble to a full throated roar and sweep down to their parent river in brown foam of flood. Many of us make too little of these odd hours forgetting that our sojourn on earth is so short that to miss the opportunity of enjoying them is wasteful, and ought not to be tolerated.

Beneath the beautiful finish of Hercules Cycles, either in colour or gold-lined black, is the finest Bonderized steel of which bicycles can be made.

Hercules high-lustre Chromium Plating is outstanding. Your local Hercules Dealer will show you the latest models.

The famous "Kestrel" lightweight club model

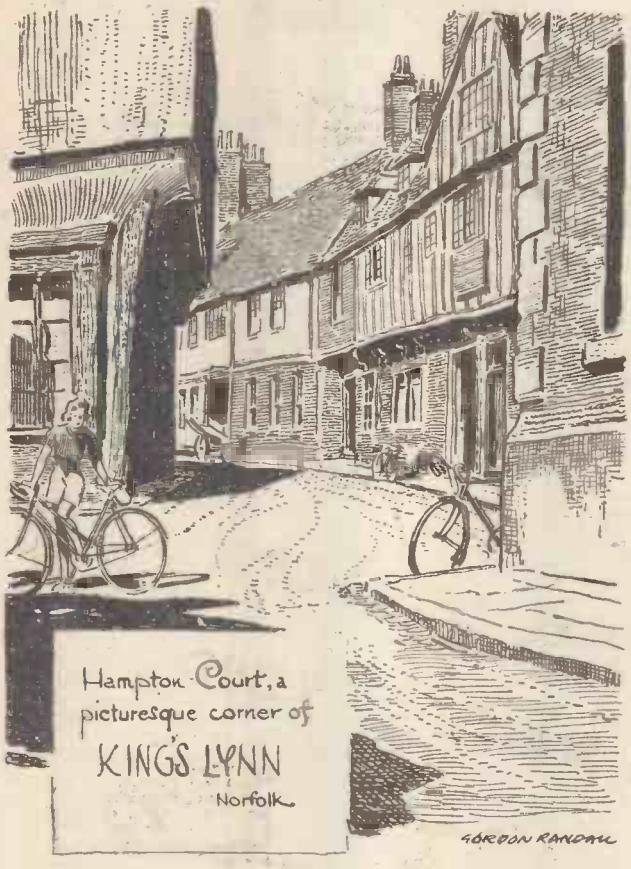
Hercules

The Finest Bicycle Built To-day

The Hercules Cycle & Motor Co. Ltd., Aston, Birmingham

CYCLORAMA

By H. W. ELEY



Smiles and Tears

COME April, and we may look for days of smiles and tears . . . the sun peeps through between the showers, and the silvery raindrops glisten on the budding hedges. In the orchards, 'neath the trees, the daffodils wave in the breeze and, as we ride through the English countryside, we know that spring has come . . . the season when, above all, it is good to get out the bike and journey along the lanes and highroads. This year, I predict, cycling will be more popular than ever, for cycles are now in good supply, and never was there greater enthusiasm for riding. The "small clubs"—attached to churches and other bodies—are flourishing, and I always like to see groups of youngsters setting off for a week-end run. I saw many in Ireland the other week . . . riding through the good and beautiful country around Glendalough, and Wicklow, and the Vale of Avoca. At the latter beauty spot I paused to look at old Tom Moore's tree, now dead, but ringed around with palings, and a centre of interest for those who love the wistful poems of this Irish writer.

"Roadfarers" Note

I NEVER feel that any apology is due for referring rather frequently to the activities of the Roadfarers' Club, for it so splendidly epitomises the immortal road and all its varied users. At the end of February I attended a good luncheon meeting, addressed by Cochrane ("Cocky"), of the International Road Federation. With the aid of an excellent map he explained the vital connection of roads with the ideals of Western Union, and the big assembly was, I am sure, enthralled by his talk. Good Secretary West, at short notice, asked me to occupy the chair, and so it became my duty to ask my fellow Roadfarers to stand in silence in tribute to the memory of Sir Malcolm Campbell and others . . . members of the Club . . . who had, since the previous meeting, passed over—taking the road Home.

The Roadfarers' Club is a grand institution and is doing much to promote a better understanding between all sections and classes of road users.

"Kuklos" Annual

AMONG the books and guides and volumes published in connection with cycling, none used to be more famous than the annual edited by the late Fitzwater Wray. It is being republished, and I have no doubt it will be welcomed by a host of riders who revered the writings of Wray, and always consulted his annual. On the shelves of many riders it was ever considered an indispensable volume . . . and it is good that it should again see the light of day.

Veteran Machines

MY recent reference to the purchase of a cycle in the summer of 1940, has brought me some letters from readers, most of whom point out that my "1940 vintage" bike is but an infant in years! One correspondent tells of a machine he bought in 1926, and which he still rides daily. Ah well! I did not intend to convey that a bike but nine years old was a true "veteran," and I am delighted to know that so many really old machines are still proving the good craftsmanship of their makers. I have said repeatedly that the British bike is a product of supreme workmanship, and as we well know, it more than holds its own in the markets of the world.

A Big "Thank You"

IT is to the many cyclists and readers of my articles who have so kindly written to me wishing me a happy retirement from the Dunlop organisation. Since I made my great decision to hand on the torch of Dunlop advertising to a younger man, I have been much touched by the expressions of goodwill I have received, and none are more precious to me than those from men in the world of cycling and cycling publicity with whom I have had contact for so many years. I go, in the next few months, to my beloved Derbyshire . . . not far from the Staffordshire border, where I shall hope to find time for much riding . . . into the glorious Peak district; around the homely villages in the Ashbourne-Uttoxeter area; and among the Weaver Hills. It will be country unknown to me since my boyhood days, and with a garden to cultivate, a stream to fish, and many books to read, I am hoping that my days of leisure will be full and active, and serene. Thank you, my good cycling friends!

More Care on the Roads

AS I move about towns and in the country I see a good deal of careless riding and, particularly, I think that the educative campaign in connection with road safety needs to be intensified among schoolchildren. Allowing much for the natural ebullience of youth, it should be a cardinal principle of education in our elementary schools to give instruction in road safety and the vital need for adherence to rules. Outside a big school the other day I saw crowds of youngsters, happy in their release from their class-room, riding dangerously, ignoring every other road user, and endangering the life and limbs of themselves and others. One knows that teachers, a harassed band, have their hands full, but some time could surely be given for a little instruction in road safety. Some authorities are much more alive and advanced in this matter than others, and it would appear that directives from the Ministry, or from County Councils are desirable.

Pilgrimage to Kent

SOME time in the spring I am under promise to a good cycling friend of the years to journey with him into the Weald of Kent. And it is a fascinating prospect, for Kent, the very bastion of England, has charms all its own. To wander through glorious Canterbury; to see again the unique charm of the Romney Marshes; to sip good Kentish ale in some little inn with villagers who recall the grim days of the Battle of Britain, possibly more vividly than any others in our island; to stroll around ancient Dover . . . these are joys to come which I shall indeed relish and enjoy. "The Garden of England" always calls with an insistent voice, which I for one am ever glad to obey. . . .

My Point of View

By "WAYFARER"

That Dog Business

IN the city where I dwell the local Accident Prevention Council recently held a special Dog Week during which newspaper appeals were made to all dog-lovers in these terms: "When walking, for safety's sake keep your dog on a lead. When motoring or cycling, for safety's sake look out for dogs." I sought in vain for the obvious and fundamental injunction, which might have been worded as follows: "If you keep a dog, for safety's sake (that is, for the safety of the dog, and of all cyclists and other wheeled road-users) take care of the animal, and don't let it wander, uncontrolled, in traffic-laden streets." To my simple mind "that, my dear Watson, is elementary."

The Useful Bicycle—Again

WE are told that a man, trying to escape after attempting to break into a flat, ran into a yard. "Two policemen just arriving for duty threw their bicycles in front of him and he fell." The handy two-wheeler has uses other than those contemplated by the inventor of a magical instrument of travel.

"Level" Crossings

MY attention was attracted the other day to something in my newspaper on the above subject, and I felt quite sure that, owing to two recent fatal accidents caused by road vehicles colliding with trains, there was bound to arise the question of abolishing all "level" crossings. I was mistaken. What the paragraph referred to did tell me, however, was that there are no fewer than 2,656 such crossings in this country. I have often wondered what the total was likely to be, especially when unthinking people get busy and proclaim that these allegedly dangerous features in connection with the public highway must be swept away. With the above figure in our minds we can work out some idea as to the cost of abolition—or we could do so if only we knew something as to the expense of each job. If the average cost were £1,000—and I cannot say whether or not that is a reasonable figure—a total expenditure of nearly £2,700,000 would be involved. I, personally, am probably much more impatient than the average man, but never would I vote in favour of pouring out money on anything like this scale just to save myself and others from being occasionally detained at a crossing. The question as to who would have to meet this expense no longer arises, having regard to the fact that the railways are now owned by the public. But what is important, it seems to me, is the physical impossibility—I use that word deliberately—of carrying out the suggested alteration in quite a number of places. An instance which springs at once to my mind is the "level" crossing at Gobowen, in Shropshire. There must be many others.

Pushing the Freight

AFTER many years' experience I remain of the opinion that the best place for a cyclist to carry his touring impedimenta—and the best method—is a suitably constructed bag suspended from the back of his saddle. In that position it is protected from the weather, and, being out of sight, is almost out of mind. I understand that a bag loaded with pyjamas and maps—especially maps—may slightly upset the balance of the bicycle, while (possibly) punishing the back tyre, and for these reasons I have often trifled with the idea of "spreading the load" (that's a current expression which comes in very conveniently!) by finding a home for my maps, at any rate, somewhere in the front of the bicycle. I have always come to the conclusion that no change is called for, and I stick to the method which has been followed, with complete satisfaction, for many years. So, I suppose, it will be to the end of my cycling career. I like the fairly modern idea of the touring bag being fitted with some sort of quick-release device, so that, instead of unpacking your pyjamas and tooth-brush in, say, a stable or outhouse, when the day's journey is ended, you detach the container and take the whole thing straight up to your bedroom at the hotel or cottage where you are staying the night. The quick-release device is thus a very good thing, although, in my experience, the accent is not always on the "quick"!

But somebody may enquire whether I do not use a rear luggage carrier: if not, what happens to the back mudguard if it has to bear the weight of touring impedimenta? I do not recall ever having possessed a luggage carrier, but all the bicycles I have had in the last 25 years have been fitted with a steel strip inside the back mudguard just at that point where the bag rests, and this very simple device has proved to be 100 per cent. satisfactory.

While "having words" on this subject of luggage, may I remind my readers of the importance of keeping the weight of their touring impedimenta well within bounds. If, during the packing process, you recall the source of the motive power which is going to carry you up hill and down dale for, probably, hundreds of miles, it may be an incentive to you to limit your freight to bare essentials. I have always been prepared to suffer the slight discomfort of doing without this, that, or the other during a tour, and that is no bad plan to follow, especially as it is the cyclist who has to push whatever he takes. There is no magic about the propulsion—though there is endless magic in connection with cycle touring. I cut my luggage to the bone. In my experience, maps are the main problem, and it would be nice—but pretty futile!—to contemplate the possibility of our some day being provided with these indispensable adjuncts to our particular form of holiday-making printed on strong tissue paper. What weight, and bulk, would thus be saved!

Cotswold Lure . . .

AS a cyclist there are two things—at least two—over which I always get excited. That delectable district known as the Cotswolds never fails to strip the years from me, and I put up quite an effective appearance as a schoolboy, revelling in the delights presented to the observant traveller by that variegated and almost unique region—the long hills, some of which (strange as it may seem!) actually possess a downward tendency; the magnificent views provided by the high places; the spaciousness of the wolds themselves, with their painted fields; the elevated ridge roads; the dainty little rivers; the incomparable architecture of the villages, mostly constructed of that lovely warm stone which "grows" in the neighbourhood, with many gables and irregular roof-lines; the pleasant woodlands; the gracious pictures of fertile valleys, constituting a kind of "Promised Land" to the traveller; the homely, friendly people. . . . There! you see what happens to me when I merely think of the Cotswolds!

. . . and Map Magic

MAPS have a corresponding age-neutralising effect on me. They *are* exciting. I have realised for years that I might be quite good at map-reading if only I possessed a little more—or shall we say a little?—mental ballast. In moments of doubt, principally when a lane-route is being used, a friend with whom I cycle regularly takes a map from his hip pocket, finds and scrutinises the right section, and we then proceed unerringly on our way. How different would be the position if the discovery of the route were left to me! Having no powers of concentration in this connection (and not desiring to cultivate any!), I could not resist the temptation to flit all over the map. In the fullness of time I might indeed discover the panel involved in our travels, but meanwhile my mind would wander away to "where the strange roads go down." I would be making minor discoveries. I would be re-fighting my battles and re-traversing my journeys until the obvious marks of impatience exhibited by my companion would bring me back to earth again, and then I might possibly—and only possibly!—have found the place on the map and absorbed the requisite information, my mind being full of other roads, which were not our immediate concern, but which were most alluring to ponder over and to think about.

Yes, maps are full of magic. Just as my preference is always for hilly country, so I go all out for those maps on which the brown paint, denoting heights, has been splashed with a prodigal hand. How very exciting, how very interesting, they are! The North Wales sheet has me in its grip, while the maps relating to the west of Scotland can hardly be left alone. Ben Nevis on the main land, the Cuillins in Skye, and Ben More in Mull—these are of the right shade, just as are Snowdon and the Glyders, etc., on the other sheet mentioned. I speak here of the half-inch maps. My maps of Ireland, being on the quarter-inch scale, do not make quite the same impression on me, but I recall that, once upon a time, when I was staying in Achill Island, a fellow-visitor at the hotel, from Dublin, produced a geological map (inch or half-inch scale) of Clare Island. Geology is a foreign language to me, but that particular map turned out to be one of the most alluring I have ever studied.

And maps will bear studying. There is so much more in them (in addition to magic!) than a cursory glance reveals.

It Might Happen to You

ONE of the periodicals lent to me the other day, during a resting-time I have just had to endure, was *Country Life*, which contained an article by Seton Gordon entitled "A Highland Cloud Burst." I read this with great interest—and visualised the grim possibilities inherent in the event. Let me briefly summarise the story, which relates to an early day of last August. The cows belonging to a certain farm on the shore of Loch More, in Sutherland, usually came down from the hills to be milked. On the day in question they departed from plan, and stayed put. Evidently they knew a thing or two. At daybreak heavy rain fell, increasing in volume as the hours passed, and being accompanied by thunder. Then a solid wall of water was seen descending the burn which flows past the farmhouse. Livestock was swept away. The farm people took refuge indoors, and the house—fortunately well-built—withstood the onslaught of the flood, which caused a noise more terrifying and more tremendous than the thunder. They saw their motor-car swept away, to be buried by seven feet of stone and rubble. Gravel and stones to the depth of three feet were piled against the house, and one of the boulders which was carried half a mile downstream was estimated to weigh 30 tons. The best grazing field on the farm was ruined by being buried under stones and earth.

What an experience—and one, probably, that happens only once in a lifetime! The thought in the forefront of my mind, however, was this: Suppose you or I had been touring through that particular part of Scotland at the time, and had been unlucky enough to encounter that "solid wall of water." It would indeed have been an unpleasant meeting, with, most probably, fatal results. And perhaps you or I, and our bicycle, would have been swept away and never heard of again.

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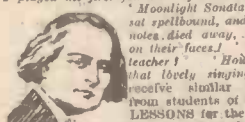

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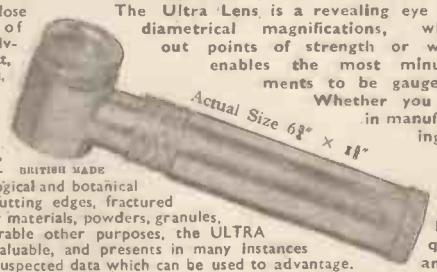

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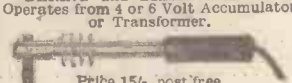

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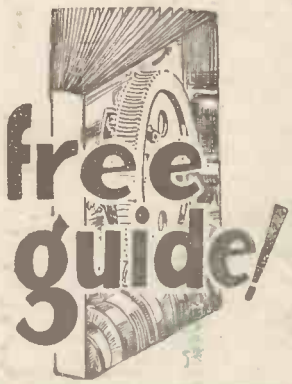

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