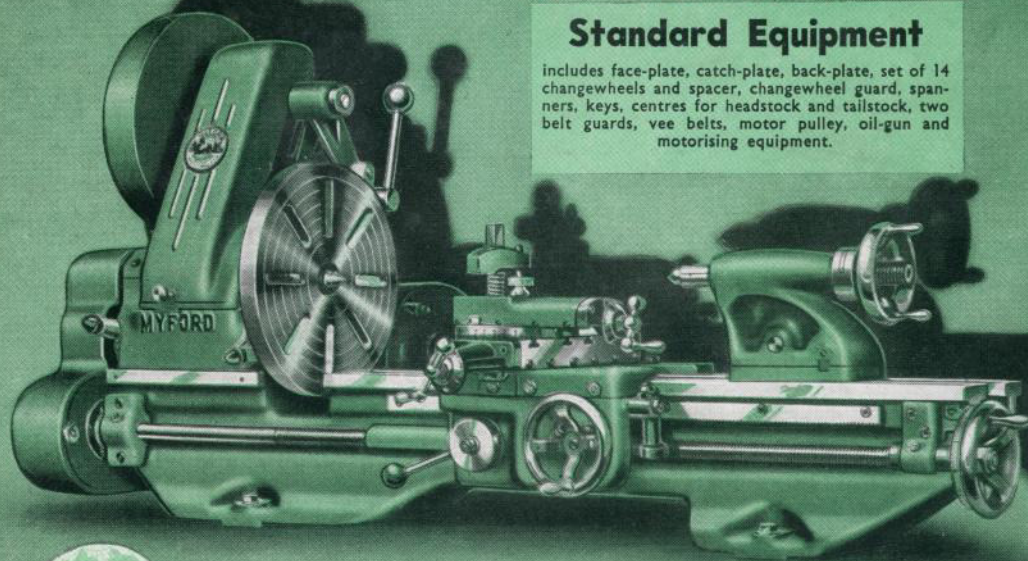


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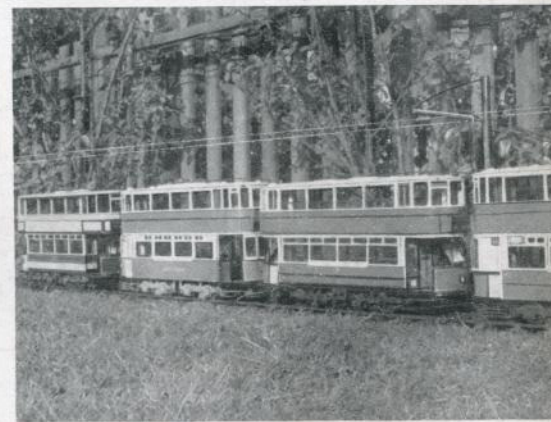
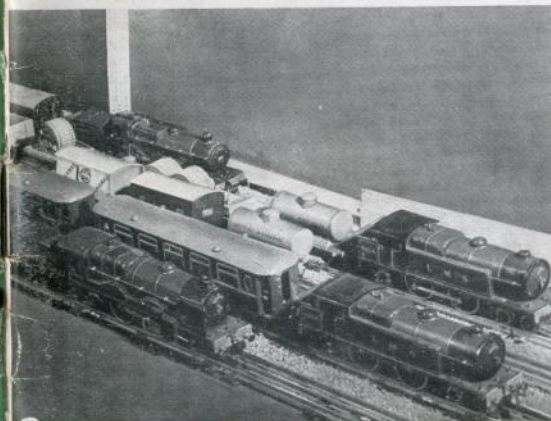
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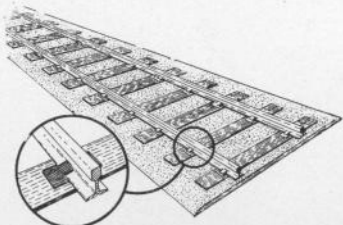
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Cruiser Design : Radio Control for Models : Daniels on Tuning up a Yacht : Vane Gear
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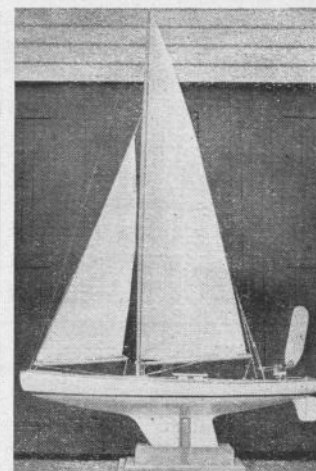
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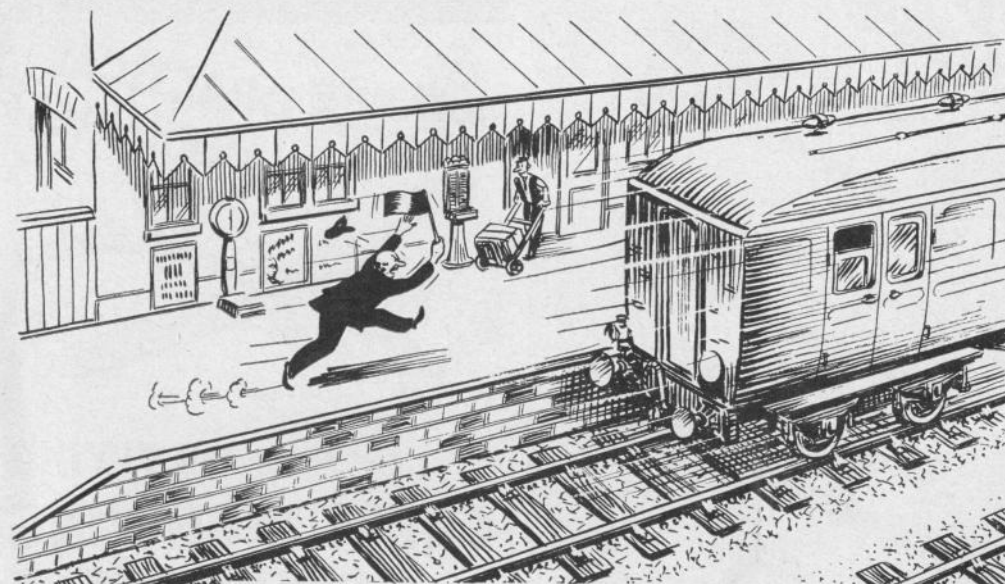
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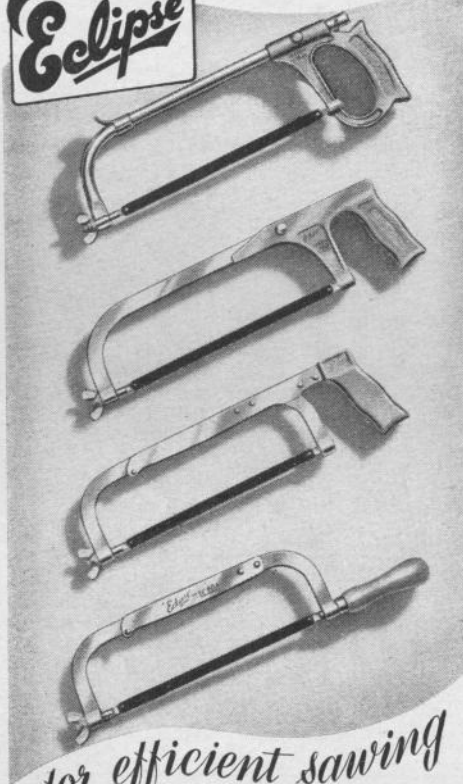
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FOR ALL MODEL MAKERS

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VOLUME 2 No. 17

APRIL 1952

"Model Maker Requests the Pleasure . . ."

FOR the first time since Model Maker appeared in its present form, now some seventeen issues ago, we are happy to announce that we shall be participating in an Exhibition. And what more suitable venue could be chosen for our public debut than the Model Railway Exhibition—that well-known climax of the Model Railway year—which will be taking place once again at the Central Hall, Westminster. The Exhibition opens on Tuesday afternoon, 15th April, and continues until 9 p.m. on Saturday, 19th April.

As befits a newcomer to the Model Railway World our stand will be modest in size, and unadorned with superb masterpieces of the modelling art. We are not there to sell our readers anything—except perhaps an odd back number they may have missed—but rather to meet them in their thousands, learn their likes and dislikes at first hand, and make innumerable notes on the things we must do in the future to provide them with even more of the mixture they have so generously approved.

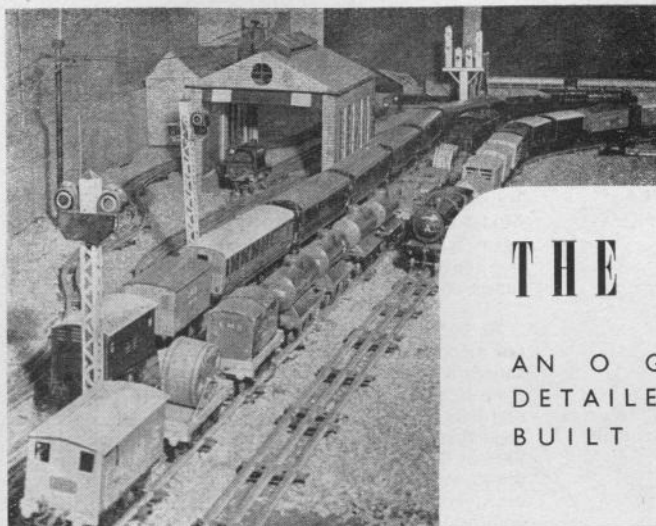
Quite apart from the pleasure of meeting our readers in the flesh, and cementing many friendships that have blossomed in a wide interchange of letters, we would urge all those who can possibly manage it to make a trip to London during this show. It is one of the few important exhibitions in the Metropolis organised by a club solely for the benefit of enthusiasts without a profit motive beyond making ends meet, and we are, frankly, very proud to have been allotted a stand where we shall be cheek by jowl with the finest amateur made railway models in the land—if not in the world!

At the same time as we have been enthusing about model railways, we have also been devoting our attention to extending the value and variety of the fare offered to other groups of readers. In this issue we provide the first instalment of a new and highly promising 10-rater design, a new cabin cruiser eminently suitable for radio control, the beginning of a series on the radio control equipment to instal, two car prototype drawings, and the conclusion of our M.G. Midget, again with plan. In the model car section—which numbers some of our keenest supporters, we can promise new and exciting designs in the near future, including a 5 c.c. racing car and a design for a rail racing car, both from the boards of famous record holders, plus a wealth of real practical material.

ON THE COVER . . .

Top right: Magnificent scenic background modelling by P. R. Wickham — only the divided backcloth proves the model! Centre left: G. H. Deason's Le Mans MG nearing completion. Centre right: Some of the Tram & Light Railways Society's models on display. Bottom left: Some of A. R. Casebrook's Stanton Railway rolling stock ready to go to work. Bottom right: J. A. Lewis has a trial board with "Halceyon" his new 10-rater described in this issue.

KINDLY MENTION "MODEL MAKER" WHEN REPLYING TO ADVERTISEMENTS



THIS EXTENSIVE LAYOUT WHICH AS SHOWN IS LAID OUT ON 'TINPLATE' BUILDING WITH BRASS RAIL AND WOOD SLEEPERS—AT THE SAME TIME WILL BE INCORPORATED.

OWN IS LAID OUT ON 'TINPLATE' BUILDING WITH BRASS RAIL AND WOOD SLEEPERS—AT THE SAME TIME WILL BE INCORPORATED.

THE STANTON "CENTRAL"

AN O GAUGE RAILWAY REMARKABLE FOR ITS DETAILED SIGNALLING SYSTEMS ALL DESIGNED BUILT AND OPERATED BY A. R. CASEBROOK

THE "Stanton Central" occupies the entire floor-space of the two attics at Mr. Casebrook's private residence which have been converted into a first-class model room. It was most impressive to see what could be done with the use of three-ply, cardboard, distemper and a little ingenuity.

The layout consists of four oval-shaped tracks, constituting the four main lines. Some 150 ft. of track is hidden from view owing to the fact that it occupies the smaller attic; entrance and exit to this are so designed to give the appearance of a tunnel mouth.

The fast and slow tracks are operated on the four main lines; from these additional tracks are taken across rejoining on the opposite side making loop lines for the diversion of traffic should the occasion arise. There are many sidings and loops which provide accommodation for locomotives and goods depots. Stations are situated at various points, the most important of which are Stanton Central, Wolverton and Barriertown, where accommodation is provided for the larger types of locomotives. At old Stanton there is a large goods depot. Here all types of goods traffic is handled and manoeuvred into positions for further duties. The down slow passes through the stations of Lower Brad, Far Point and Bradville. Many sections of the layout are named for the purpose of simplifying the movement of stock. At these points, through stations will be provided at a later date.

We noted that some locomotives and rolling stock were finished in plum red with gold lettering which are the new "Stanton" colours, and will apply to the whole of the rolling stock in the near future. At present the greater part are finished in the old

L.M.S. colours. Plans have been drawn for the rolling stock to Mr. Casebrook's own design, and some are now in production in his workshop.

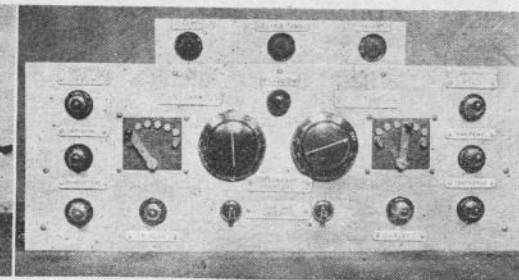
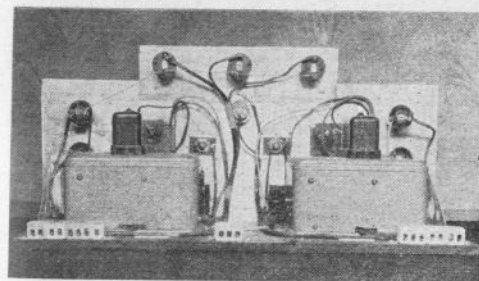
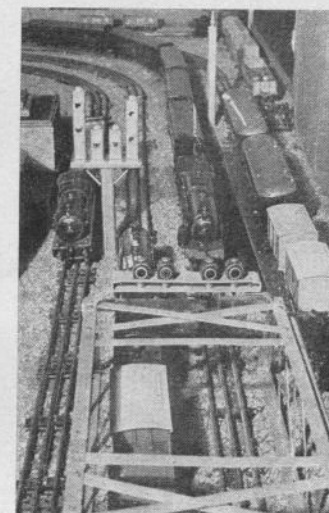
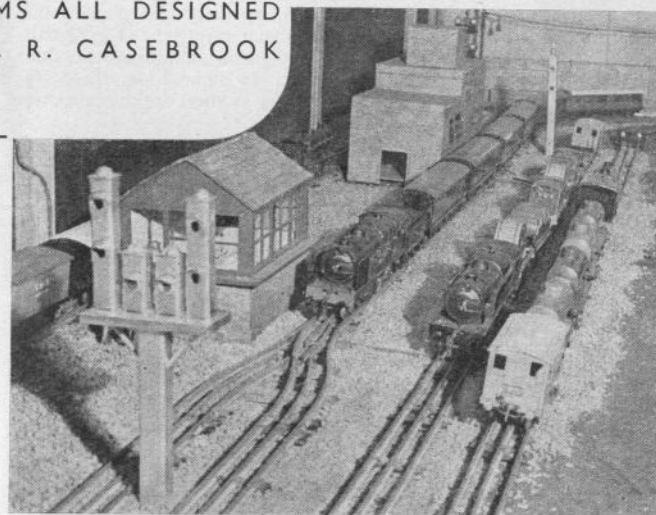
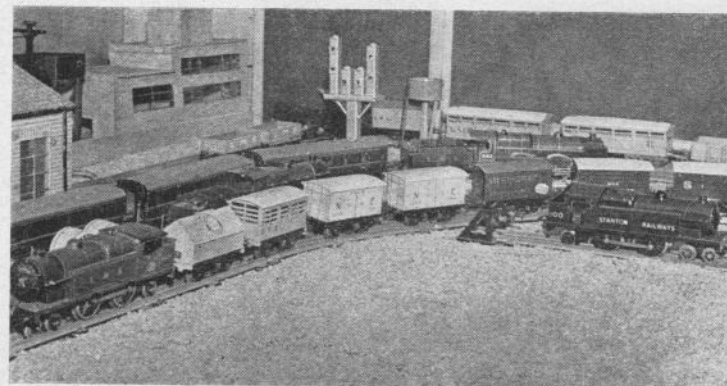
The "Stanton Central" is unique in many ways, particularly the method of controlling, this being one-man operated from a central control panel. This is built in the form of a cabinet which houses the control units.

For the most part the track is of three-rail tinplate, centre rail being power (20 volts), which in the near future tinplate track will be replaced with brass rail on wood sleepers.

Cross-over roads are used to allow trains travelling in either direction to be reversed at any point of the layout. The two inner tracks are provided with a four-track terminus. It will be seen by this method both continuous and point-to-point operations are possible.

All locomotives are fitted with automatic mechanism; this enables trains to be reversed at any point of the layout. Coaches, vans, etc., are fitted with die-cast Mansell wheels, wagons and open trucks being fitted with spoked wheels. These are slightly larger than the former. Both types run in grease-filled axleboxes. This, no doubt, plays a big part in the smooth running qualities of the railway. The greater part of the rolling stock is fitted with automatic couplings; stock constructed by Mr. Casebrook have a type as used on the British Railways.

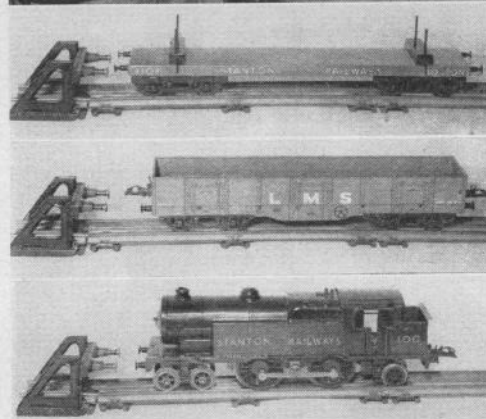
To enhance the operation of the railways were sound effects. These are produced and transmitted to the model room by means of a relay system using sound equipment. Two records are used—one to give weather effect, and the other to give train effects. The time of arrival and departure of trains



The illustrations on these two pages serve to give some impression of the variety of rolling stock in service on the Stanton Central Line. At the moment both Stanton and L.M.S. colours are in use: eventually all will be in Stanton livery. As a "signalman's Paradise" this line would be difficult to equal, particularly in view of the multiplicity of safety devices which permit the varied tyro to do his worst. The front and back of the simple control panel serves to show how much has been condensed into a comparatively simple arrangement of knobs and switches.



Top left: A. R. Casebrook at work on the lathe perfecting another item for the Central Line—while in the pictures below may be seen typical examples of Stanton rolling stock. The layout drawing is not to scale, and is intended purely as a diagrammatic picture of the extent of the track—curves are not necessarily either as sharp or as regular as portrayed.



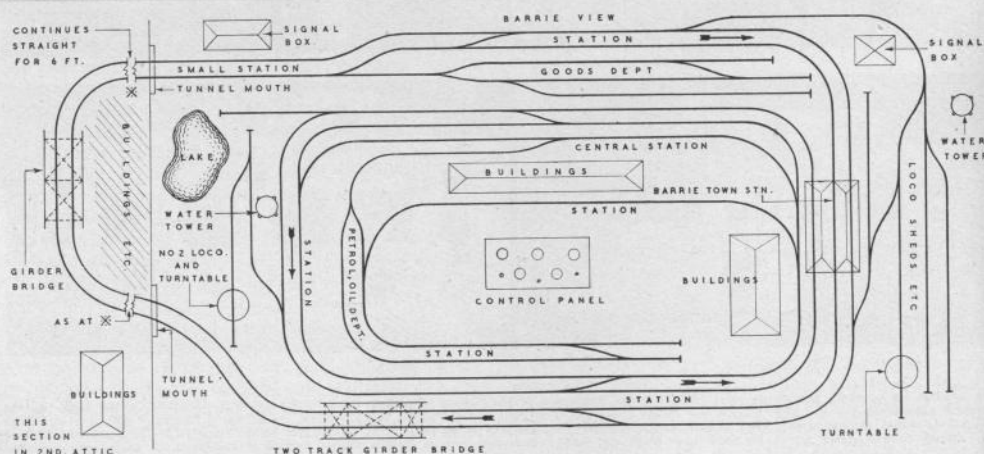
can be announced through the loudspeakers.

The layout is divided into sections that can be controlled separately, when any one section is occupied it is shown on the panel by a coloured light on which is marked the name of the section concerned. Should a light fail an audible signal is given.

A system of colour light signals are in use, some of these are fully automatic. Signals are operated by lever control and are coupled with the point changing equipment and track power supply. By this method train control is almost foolproof. Signals out of sight of the operator are fitted with repeaters on the control panel. Should a lamp fail this is indicated by a corresponding colour light showing the name and location of signal involved. The signals are constructed of tinplate and aluminium. Illumination is by 2.5 bulbs. In some cases these are housed in miniature lamps. Others are concealed in the body of signals.

Point (switches) control is by the push-pull rod method. These are operated by levers on a separate frame, and these levers automatically lock when in correct position. Should a point fail or rod break it is indicated on the control panel by a coloured light showing the name of point concerned. At the same time power to the track is switched off before the effected point. All points are spring-loaded to ensure correct position. Two-way screw adjustments can be made on each rod to take up any error.

Locomotive control is effected by a stud controller with five positions (off and for speed). In connection with this is a secondary control using resistance controllers. By this method any desired speed can be obtained.



Locomotive supply is 20 volts, wired through circuit breakers. On a short circuit, breaker is tripped and at the same time a coloured light shows the operator which line is involved. Other transformers supply power for floodlights, buildings, signals and indicator lights, each being shown on the control panel by a coloured light giving name and voltage supply.

Each section of the control system is built in separate units, being constructed on the radio chassis principle. This method reduces fault finding to the minimum, each unit being removable from the cabinet without dismantling other units. All wires are coloured and have a number which is marked on a chart of the layout.

The complete railway is operated from the mains through transformers. These are housed in a separate compartment at the base of control cabinet, and from these coloured wires connect with the various control units.

We were invited to take over the control of an express freight hauled by a "Compound Class" locomotive. This train was made up of 16 four-wheel vans containing perishable goods. Before we could answer yes or no our guide pointed out that our train had been given the right of way. A signal repeater flickered on the control panel—this indicated that a signal out of sight had changed to green. The locomotive responded immediately to the power control. We noticed the absence of the jerking movements so often seen in model railroading.

As our train approached the first set of points we noted a rapid reduction of speed, followed by a complete stop. We were puzzled by this owing to our signal being in green with caution yellow. Our guide pointed out that this was in order—we had failed to change the point ahead. This is a feature of the "Stanton": no train can pass this type of signal until the corresponding point is changed to the correct position. On changing the point the signal shows green only, and gives right of way.

Should a point or signal fail this is indicated on the control panel by a coloured light showing name and point or signal concerned, and at the same time power is switched off from the track. Under no circumstances can a train pass a signal at red. Our attention was drawn to the control panel by the loud ringing of the indicator bell. This was accompanied by a flickering green light on which was marked the word "Caution". This meant we were approaching another set of signals and a station. This was immediately followed by a repeated "on and off" of a blue light showing the name of the station.

As we approached the caution signal we reduced speed accordingly, and on nearing the station a green signal indicated "all clear". At this point we overtook a "Standard Compound" class locomotive No. 1185, hauling the "Wolvertown Special" which was

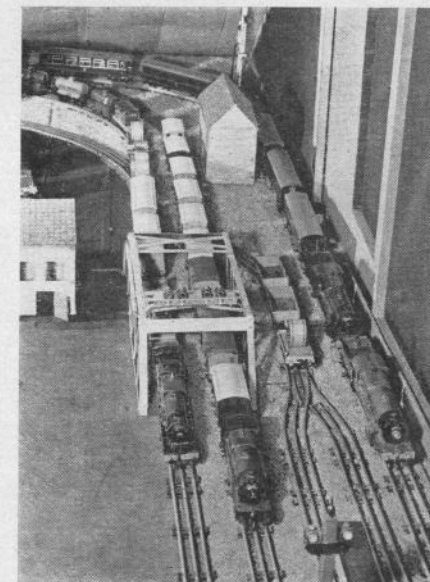
awaiting clearance on the Up Fast. This locomotive is one of the most attractive on the "Stanton", being very powerful and capable of hauling heavy loads on steep gradients. Coach formation is made up of six saloon coaches and one brake composite with guard's compartment between passenger and luggage portions. These are realistic and perfectly modelled to the latest standard steel panelled stock as used by the British Railways. These coaches are connected with telescopic gangways. This train makes the journey to Wolvertown stopping at Lakeside and Brandon.

From this point to Waterford we had an open road, and for a short time had the thrill of handling our train at full speed. This, however, was short-lived—a caution signal indicated reduce speed.

And so, goodbye to the Stanton Central for the present. . . .

Rolling stock and equipment in use on the Stanton:—

One "Princess Elizabeth" locomotive	...	Hornby	4-6-2
Two Standard Compound No. 1185	...	Hornby	4-4-0
Two Royal Scot class locomotive	...	Hornby	4-4-2
Three Tank locomotives	...	Hornby	4-4-2
Two Tank locomotives, Hornby, modifications to own design and repainted plum red with Stanton Railways in gold letters.			
120 assorted Vans, Wagons, and Trucks		Pre-war Hornby,	
18 Saloon and Corridor Coaches		with	
10 Bogie-type Wagons and Trucks		modifications	
Timber wagons and trolley wagons, etc., designed and constructed in the workshop. These are lettered Stanton Railways. All buildings, signals, bridges and accessories are built in the workshop.			



Another shot of a corner of the layout showing the girder bridge.

ANOTHER LINESIDE FEATURE FOR 7mm. BY P. R. WICKHAM

YES, it is based on an actual prototype, in case you are wondering! The photograph from which the model was made portrayed, if memory serves me aright, a scene on an Australian narrow-gauge railway. I couldn't resist making a model, and, in the hope that others may share my feelings, the drawings are presented. Like my model, they are to 7 mm. scale, but a 4 mm. model would also be most delightful, and the drawing could easily be scaled down by using a 7 mm./4 mm. scale rule; though the tower might need to be soldered up from metal strip, in the smaller scale, rather than built in wood.

Perhaps you are wondering how the finished model

would fit in with your layout plans. Well, mine would eventually be very happily established in the loco yard of my "narrow-gauge" Westcliff-Bayness Railway; and of course, for a narrow-gauge line it has just the right atmosphere. It would be equally appropriate on a "standard-gauge" line where a "light railway" atmosphere is in order, while anyone modelling an American small loco depot would find it ideal.

The actual construction is not too difficult, although it does call for a certain amount of delicacy, especially in building up the "trestled" supporting tower.

The principal materials required are:

Stripwood (hardwood, *not* balsa) in $\frac{1}{8}$ in. x $\frac{1}{8}$ in., $\frac{1}{8}$ in. sq. and $\frac{1}{8}$ in. x $\frac{1}{16}$ in. sizes.

Fine pins, entomological pins obtainable from naturalists' suppliers).

$\frac{1}{8}$ in. wood or hardboard.

$\frac{1}{4}$ in. wood.

Thin card (about $\frac{1}{16}$ in. thick and of reasonably good quality).

Three-sheet Bristol board (obtainable from artists' suppliers).

Scraps of dowelling, strip and sheet metal, wire, etc., as noted on drawing sheet.

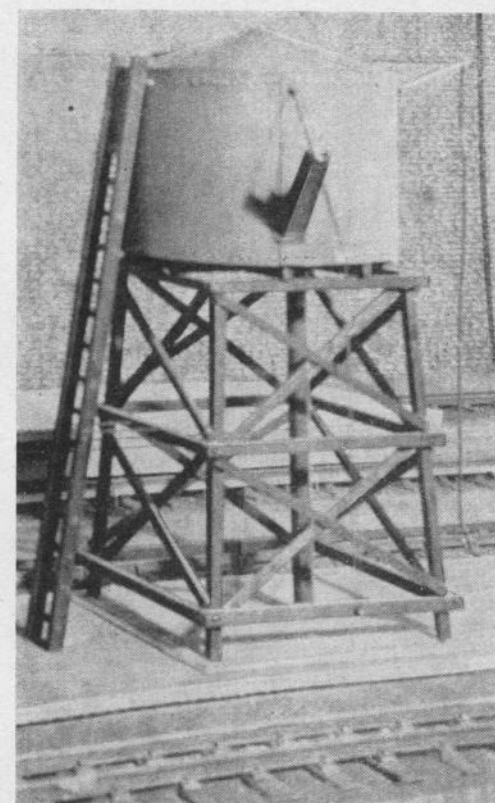
Begin by cutting at the base and drilling a $\frac{1}{8}$ in. hole at each point indicated. Give this a coat of "concrete colour" paint and lay aside to dry while you begin work on the side frames. Sides A are first built, the lengths of the various stripwood parts being taken off direct from the drawing. The corner posts (2) are first laid on the drawing and held in place with drawing pins (clamping them down by the heads, *not* of course trying to push the pin through the strip) while the cross-members (3, 4 and 5) are glued and pinned on, followed by the braces (6 and 7). By thus building over the drawing, you will be sure of getting the frames assembled "square" and

WATER TOWER

flat. Lift the frame off the drawing and build the second side A to the same stage. Then turn both frames over and fit in the braces (8 and 9) from behind (Fig. 1). These two completed, sides can now be erected on the base, but *not* yet glued in place. Cross-strips (10, 11 and 12) of side B can now be cut (again taking off dimensions from the drawing) and fixed in place, taking care to keep the structure "square", followed by the braces (13 and 14, Fig. 1). The base should now be gently removed, and the remaining braces (15 and 16) fixed in place inside. This is the trickiest part of the operation, since it is difficult to get at these parts to pin them, and you may have to rely on glue alone to hold them in position.

The tank-bearers (17 and 18) are now cut and assembled, "egg-box" fashion, and pinned to the top of the tower (Fig. 2) when the whole can be given a coat of matt-black paint, before permanently fixing on the base. This completes the first stage of the job, and should encourage you to go ahead with the tank.

The tank is based on a wood substructure, consisting of the top and base (19) and the cross-plates (20 and 21), all cut from $\frac{1}{4}$ in. wood and assembled as shown in Fig. 3. Round this go two tank-wrappers, cut from thin card and curved to shape. You will probably find that your card will curve one way without cracking, but not the other, so make a test on an odd piece first, then cut the wrappers with the "grain" running the right way. Roll the wrappers around a round object rather smaller in diameter than the tank. If you still fail to get a smooth curve, damp the card slightly. You will need to trim the wrappers after bending to get them to fit to an exact butt joint. Deal with the lower one first, trim it to fit then glue round the substructure seeing that the vertical joint coincides with the edge of one of the cross-plates, and slip on two or three strong rubber bands to hold it until it sets. But if the edges at the joint show signs of springing outwards while setting, take off the bands and drive in a few small pins each side of the joints. When the first wrapper is set, the second can be fitted in the same way, but with the joint well removed from that of the first layer. The outer tank-wrapper is cut from Bristol board, and rivet impressions made along the top and bottom edges, as shown in the elevation. To do this, mark the position of the rivets on the reverse of the wrapper, then lay it face down on a folded newspaper or magazine (but *not* your nice new copy of *Model Maker*, for it will not emerge unmarked from the ordeal) and press in the rivets with a blunt pointed tool. If no suitable punch is at hand, you can improvise one in a few minutes by filing up the end of a bit of steel rod. This outer wrapper can

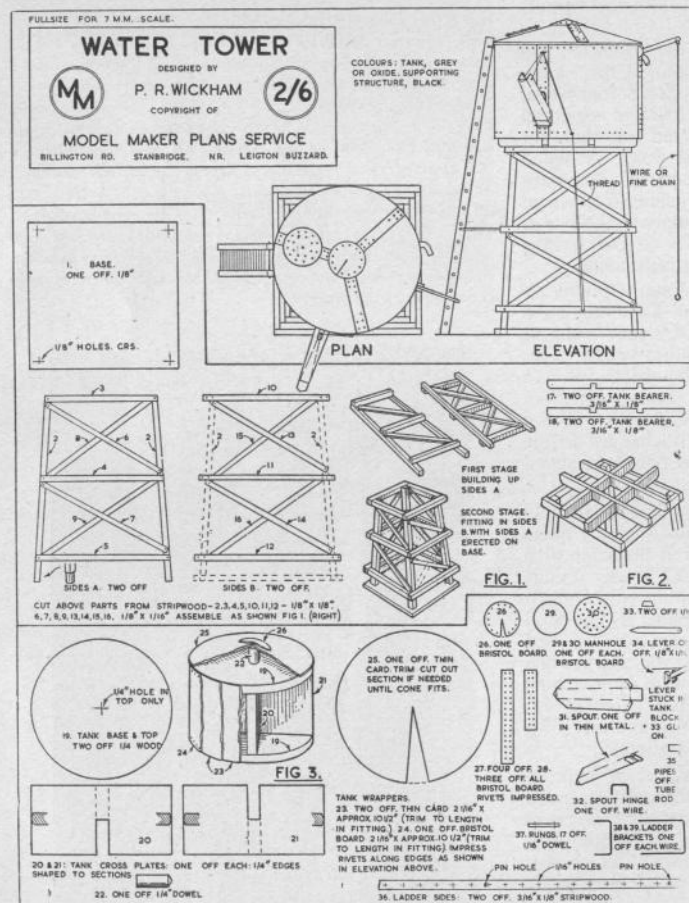


now be glued round the tank, and again "rubber-banded" and left to set.

The coned top can now be made (Fig. 3). First insert the stub of dowel (22) which supports the cone, in its hole. Now cut the actual cone (25) from the thin card. The cut-out section will probably need trimming a little to get it to fit down exactly to the tank, and you may need to damp the card in order to get a really smooth curve. When properly shaped, it should be glued in place and a few fairly wide rubber bands slipped on "cross-wise". When it is set, the cap (26) and rivet strips (27 and 28) can be made, in Bristol board with rivets impressed as before, and glued on; one of the strips serving to conceal the joint in the cone. Refer to the plan and elevation for the spacing of the rivet strips. The manhole cover can then be made and fitted as shown in the plan.

We now come to the fittings. The spout (31) is cut from thin sheet-metal and bent up as shown in the perspective sketch. It is hinged to the tank by a little wire staple (32). The lever is an odd length

(Continued on page 280)



The Rokal Points

THERE always has been, and probably always will be, controversy about the best form of electrification for miniature railways. To some extent, of course, the type of railway we are modelling determines our choice.

For example, a good deal of the S.R. track in this country is provided with an outside third rail and is used to carry both steam and electric trains. Therefore if our model purported to represent a section of the S.R. track that is electrified, we should be in order in laying a three-rail track, and provided we concealed, as far as possible, the fact that our steam outline locos were picking up off the live rail, convention would not be outraged.

But apart from aesthetic questions of looks, there is the practical working aspect of a pick-up system to be taken into account. For a long while the two-rail system for model railways was frowned upon on practical grounds. First, it required insulation between the two wheels on any axle, not only on the loco but throughout the train. Second, special pre-

cautions had to be taken to keep rails carrying opposite polarity from coming into contact at points and crossings. Moreover, not only must such rails themselves be kept from touching, but they must not be liable to a short circuit by a metal object on the train—for instance, a passing wheel flange, rubbing against an open point blade while the tread of the wheel was running on the adjacent (and oppositely polarised) stock rail.

However, these objections carried more weight in the days when they were first raised than they do today. The enormous advances made in the science known as Plastics have robbed the short circuit bogey of much of its former terror.

Wheels made of one or other of these plastic compounds can be cast and mounted on axles so as to run dead true, to preserve correct back-to-back measurements, and to give excellent rail-holding qualities, even if to achieve these advantages they may demand slight indulgences in the matter of flange thickness and depth.

Such wheels, being of insulating material, cannot cause short circuits at points, nor can they conduct current to the axle or frame of the vehicle. These are the wheels that have been adopted by the Rokal system—which, of course, runs on a two-rail track—and the Rokal points have been designed with these advantages in view.

The actual operation of the point can be either manual or electro-magnetic; the manner in which movement of the point affects the electrical connections to the track is the same in either case. It works out as follows:—

The switch blades pick up polarity from the stock rails by means of wedge-shaped phosphor bronze springs. Throwing the point towards one stock rail or the other forces the spring wedge into recess cut in the base of the stock rail, whilst at the same time withdrawing the wedge on the opposite switch rail from contact with its stock rail. The switch rails are permanently cross-connected to the frog rails in the normal manner. The frog rails, therefore, rely for their polarity upon the contact made by the spring wedge on the switch rails. The switch rail whose wedge is withdrawn from contact with a stock rail is, therefore, dead and so also is the frog rail wired thereto.

This means that only that road for which the point is set is electrically alive. Rokal points are normally sent out from the factory arranged in this manner, whereby the throwing of the point selects the road both mechanically and electrically. This system can be put to many ingenious and useful applications when wiring up a layout as will be seen.

Meanwhile operators will appreciate that it is not always desirable for the points to give electrical

selection. In other words, it may be desired to have both the branch road and the straight road electrically alive whichever way the point is set. The Rokal point makes provision for this contingency and is supplied with a neat and ingenious commutator switch on the under side of the point unit.

As will be seen from the photograph, the under plate is cut away so as to allow access to the commutator at all times. By this means a point can be lifted out of circuit, changed from one type of wiring to another—there are three possible variations as will shortly be explained—and replaced in position in the matter of seconds.

The method of connections is as follows: The switch rails, in addition to being cross wired to the frog rails, are electrically connected to spring tongues T1 and T2. C1, C2 and C3 are three double-ended spring-loaded contact strips of the type shown in Fig. 1.

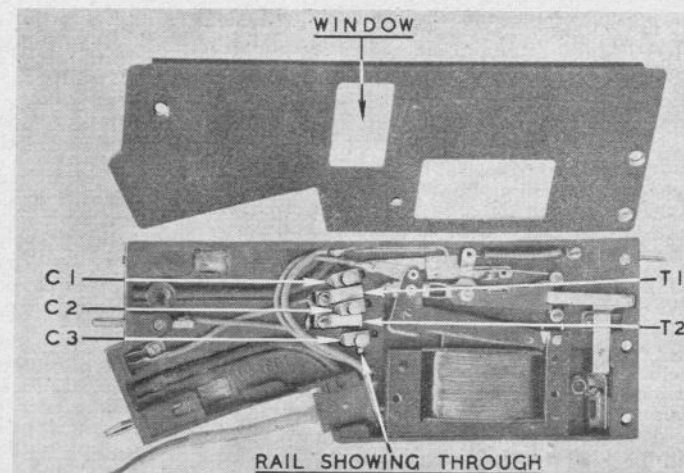
In their normal or "fore-and-aft" position the tips of these contact strips rest in depressions in the moulding of the point unit and are held firmly there by the spring-loading. In this position they perform no function at all. They can, however, be pulled up against tension of the spring, twisted thwartships and released.

If contact C2 were so twisted round, for instance, its ends would rest on the two tongues T1 and T2, thus short-circuiting them (see Fig. 0). If, however, contacts C1 or C3 were so twisted, one end of each would rest on the nearest tongue, while the other would rest on an exposed portion of the under side of the stock rail—thus electrically connecting the switch rail through its tongue to its adjacent stock rail irrespective of whether the point was open or closed.

We therefore have three possible positions for the contacts:

1. When all three are fore and aft.
2. When the middle one only is turned.
3. When the two outside ones are turned and the middle left normal.

Position I.—When all three contacts are in normal position we have the situation depicted in Fig. 2a, where the switch rails are wired to the frog rails and energise only one of them, depending upon which way the point is set. The tongues T1 and T2 are not touching any of the contacts C1, C2 and



C3, and so the point acts as a simple electric switch, cutting off all current from one or the other of the roads. Note that the Rokal wheels are made of insulating material and so the passing flange cannot energise the open switch rail as might happen were the wheels of metal.

Position II.—Here (see Fig. 2b) the two outer contacts C1 and C3 have been turned so that one end of each bears on a tongue (T1 and T2), and the other end of each clips into a hollow, at the bottom of which is an exposed section of the stock rail.

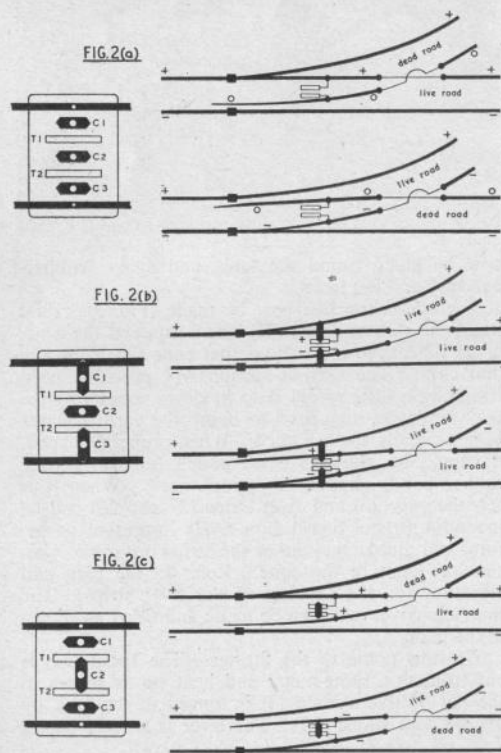
The effect of this is that both frog rails remain energised whether the point is open or closed and there is thus no question of any section of track, whether connected to the curved or to the straight part of the point, being isolated.

In this case the switch rail and its adjacent stock rail are at the same polarity and are not, therefore, liable to suffer short circuits from metal wheels.

Position III.—(See Fig. 2c.) In this case the outer contacts C1 and C3 are left unchanged and the middle one C2 has been turned round so as to bear on both tongues T1 and T2.

It will be observed that this arrangement short circuits the two switch blades and, therefore, brings both switch rails and both frog rails to the polarity of one or other of the stock rails. The open stock rail carries the opposite polarity. This arrangement has a special application where reverse loops are concerned.

Meanwhile, it is clear that these three methods of connecting up the switch rails of the point when used in various "combinations and permutations" open up all manner of intriguing possibilities and when to this we add several methods of sectioning, we can make our Rokal trackway versatile within very wide limits.



R. WATKINS PITCHFORD'S REGULAR FEATURE FOR OO ENTHUSIASTS HAS SUGGESTIONS ON MAKING THE GRADE

ONE might suppose that the answer to a Civil Engineer's dream would be a dead straight and dead level roadway running right from one terminal to the other without a suspicion of a bend or grade. A railway laid on this plan would certainly have much to commend it from an operating cost point of view, but it would be mighty dull.

Taken together, the ruling grade and the ruling radius exercise a profound influence over the design of locos and, to some extent, over that of the rolling stock which is permitted on the section of line in question. It has often been the case that the acquisition of additional capital or working rights have enabled a grade to be shaved down or a curve to be eased, with resulting facilities and profits out of all proportion to the cost of the undertaking.

Generally a grade on main line work is an anathema to the CE, to be avoided like the plague, but there are cases, on some underground railways for instance, where grades are deliberately introduced so that the train approaches the station on an up-grade that abets braking and leaves on a down grade that aids acceleration. In the case of model railways, grades can be employed either as a purely scenic feature, or as an artifice for securing a long run between terminals without using up too much square footage of baseboard space in doing so.

In the purely scenic type it might be decided, for instance, to lay down a station or a goods yard slightly above mean baseboard level—say $1\frac{1}{2}$ in. higher. Such a high level might be approached up a bank having a retaining wall and arches and some of the arches might be boarded in and supplied with small doors and windows to suggest occupation.

Such a grade would provide opportunities for scenic work as mentioned, and also it might serve the purpose of raising the station or goods yard to a level where it not only received more prominence in the picture as a whole, but—of even greater importance—was more accessible for coupling and uncoupling manipulations.

But if we are going to use a grade not solely for scenic and convenience purposes, but also as a space-saver, then this will imply passing one track over another and the height to which our trains must climb for this purpose is no longer the $1\frac{1}{2}$ in. that sufficed for scenic purposes, but an amount necessary to clear the loading gauge of the train on the track that is being crossed.

In OO gauge the bare loading gauge clearance from rail level will be $2\frac{1}{4}$ in. This will have to be increased to $2\frac{1}{2}$ in. for safety and to that we must add the thick-

ness of the road bed and the rail height. We shall not get out of it much under $2\frac{1}{2}$ in.

Now if we are going to raise our road bed by $2\frac{1}{2}$ in. we have to consider two factors that are difficult to reconcile. If we make the gradient too steep we limit its use. Contrarywise, as Tweedledum would say, if we ease down the grade to a point where even the heaviest train can be hauled up with power in hand, it may be so lengthy that we cannot get in it.

It is not essential, of course, that an entire gradient should be laid on a straight section of track—part of it may be on a curve. But if the curve be at all sharp, the added drag will be the equivalent of a steeper grade, so the broad rule should be "avoid grades on sharp curves".

Assuming then that we are considering only straight grades, we reflect that if we can accommodate a bank 9 ft. long, it will give us a steady grade of 1 in 43, if a 10 ft. run is available, however, it will bring our grade to 1 in 48. Now to get in a grade of 1 in 43 in these conditions we should need in all about 15 ft. to 16 ft.: 9 ft. for the grade itself, and 3 ft. or so for the curves at the top and bottom. And a grade of 1 in 43 is already on the steep side if it is to form a regular part of the main line run, which every train in and out of the terminus must traverse.

Conversely, if we ease the grade down to 1 in 50 or so—which is a more humane figure—we must find a run of 17 to 18 ft. and this, for most of us is out of the question. And yet the advantages both scenic and spatial of including a gradient and a high level station are so real that it is worth while considering some of the ways in which this forbidding problem can be tackled.

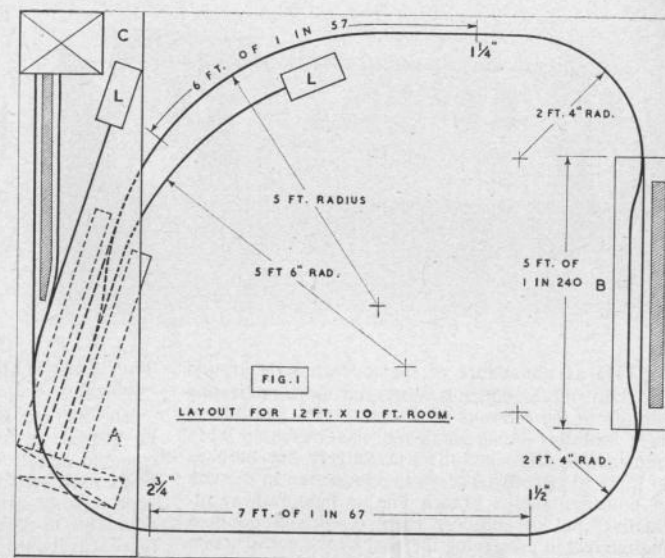
One of the first questions, it seems, is "What traffic is my gradient to be used for?" For example, in Fig. 1 we have a room measuring 12 ft. x 10 ft. There are three stations A, B and C. A is a terminal at mean baseboard level, i.e. 0 in. From A to B we have a 6 ft. run of 1 in 57, most of it on a gentle curve of 5 ft. radius and at a gradient of 1 in 57. The curve approach to station B is level at $1\frac{1}{4}$ in. above zero. The curve leaving B is also level, but the 5 ft. of straight track in station B is at a gradient of 1 in 240 (which should be considered permissible in model work, since uncoupled stock, unless very free running, would be unlikely to take charge on such a grade). This slight grade, however, brings us to $1\frac{1}{2}$ in. up, leaving a climb of 7 ft. of 1 in 67 to bring us to the $2\frac{1}{4}$ in. level of station C.

... On the Right Track

In this instance the entire traffic from one terminal to the other would take the grade.

However, this is nowhere sharper than 1 in 57 and on a grade of this sort a model loco of average power and adhesion should be capable of hauling trains at least commensurate with the platform lengths. The sketch shows the layout only in outline form and refinements such as turntables and sidings have been omitted as they do not—or need not—affect the essential design. However, such a layout serves merely a point to point line. Possibly a continuous track at zero level could be incorporated for long runs and there might also be an intermediate "low level" station at B. If such an arrangement were possible we should probably find the layout interesting and workable, particularly since the continuous track on zero level could be saved from the monotony of "chasing its tail" by concealing it behind hills and trees in the foreground. In this case then, we have overcome the gradient problem by splitting the grade up between three banks, none of which is in any way severe.

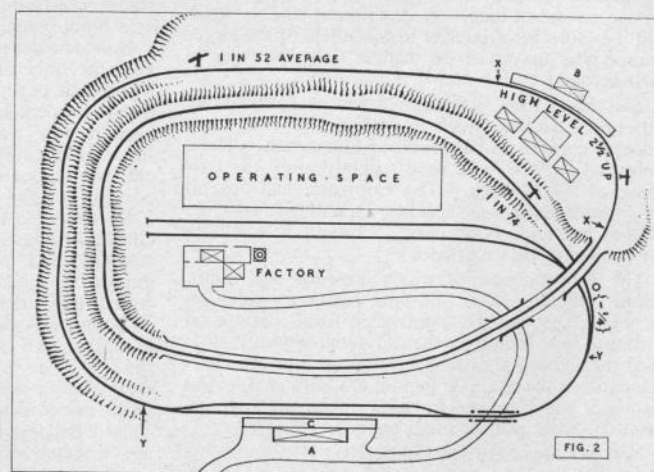
Fig. 2, although making no pretence at scale accuracy, represents an inverted figure of eight layout, which has been tried by several constructors with success. Here it will be seen that the only level parts of the main line are those xx and yy in the vicinity of the stations A and B. For the most part the rest of the main line is on curve and grade at the same time. However, it will be seen that the sharp curves, namely just before the bridge and just before station B, are on the level. The remaining curves are fairly generous and should not add greatly to gradient drag. Note that the general grade can still further be eased on a layout of this kind by arranging for the road bed where it passes under the bridge to be slightly below (say $\frac{1}{4}$ in.) mean baseboard level. In open type tables this is easily arranged. For solid type tables a slat can be cut out and the road bed built on

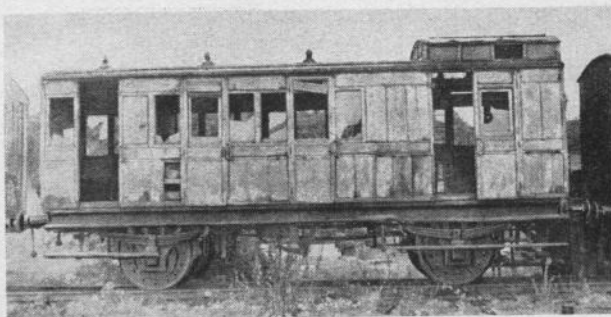


metal hanger brackets.

While it is true that such a layout enables a long continuous circuit to be put down in a relatively small space, each constructor must decide for himself whether or not this advantage outweighs the switchback effect observed where running continuously for long periods.

There are other ways of tackling the gradient problem to which we may return at some future time.





BUILDING 4mm. SCALE PASSENGER STOCK

EAST KENT

PART I ON E.K.R. 4-

BY A. H.

E.K.R. Coach No. 9 as it existed at Shepherdswell in 1949.

WITH an abundance of the modern style around him, the modeller is more and more interesting himself in the railways of the past. The number of light railways being modelled has increased at a tremendous rate since the war, largely due perhaps to force of circumstances. The reduction in the size of houses makes a branch line or light railway attractive, but in addition, there is without doubt a big interest in preserving the past by the construction of models. Even the most modern minded among us will not deny that the old locomotives and rolling stock had a beauty that is absent today. Streamlining has removed much of the odds and ends which go to make an attractive prototype to model.

It is because of this interest that, during the next few articles in this series, it is proposed to describe the construction of some of the passenger stock of the East Kent Railway, which is ideal for the branch line or light railway modeller.

As with so many of our smaller private railways, much of the stock was purchased from the larger companies, usually after it had been taken out of service as out-of-date. A description of this stock will therefore be of interest to modellers of the larger groups who may wish to include old prototypes in their layout.

The East Kent Railway owned a considerable variety of rolling stock including the two four-wheeled coaches to be described this month. These were ex-L.N.W.R. and used regularly until the purchase of bogie stock. The Company had several six-wheeled and bogie coaches, including one of the famous Pickering bogie cars. Some of these will be the subject of future articles.

The two coaches for which drawings are reproduced, embody many old-time features, while, in the main, they can be constructed from commercial castings. For example, the old style of panelling is used throughout and the special lamp tops are characteristic, while the axle guards are very simple and standard van type can be used. The under-frame detail is easily put in, using commercial parts.

Now for the constructional details.

The Four-Wheeled Four-Compartment Coach No. 7

The method of construction to be described can be altered to suit the ideas of the builder. The essential details will be similar. This type of stock lends itself well to wood or card construction. A good quality card is ideal for modelling and very adaptable to panelled stock. Select card (not cheap faced cardboard or the edges will not cut cleanly) and, when glueing parts together use the minimum amount of adhesive. Much of the poor quality of card-built stock is due to smears of adhesive which completely spoil the paint finish. For this reason, it is not advisable to use the quick-drying cellulose cements which are popular for model work (particularly model aircraft). They invariably impart a glossy surface to the paint.

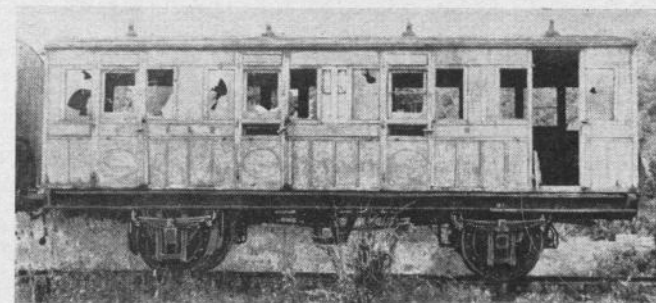
Cut the sides and ends out of the card, and also the inside partition between the four compartments. These must all be very accurate. Cut the windows. All cutting should be done with a razor blade, or one of the special modelling tools employing surgical blades which are now available. Never use scissors or a blunt blade, or bad edges will be the result.

Now add the panelling to the sides. This is probably the only difficult part, so take care. I have found that paper of the type used for photographic prints, is ideal for this job. It can be stripped up very narrow without any trouble and retains its shape after cutting. Each window frame should be cut out in one piece, but this will not be found possible for the wood panelling on the lower part.

Do the same on the ends, and glaze the windows. Glazing windows has been the subject of many discussions, and there is no doubt it requires some thought. Celluloid is the easy way out, but never really "looks right". One trouble is that this material is invariably scratched when bought, and as such, its appearance is spoilt. A better material is "Perspex", if it can be obtained thin enough. Here again, every care must be taken to avoid scratching. I much prefer the use of microscope cover slip glass. This is delicate material and the finished coach will not withstand rough treatment, but with care all

ROLLING STOCK OF THE EAST KENT RAILWAY WHEEL COACHES DADD, B.Sc.

E.K.R. Coach No. 7 at the same time.
(Photos by author)



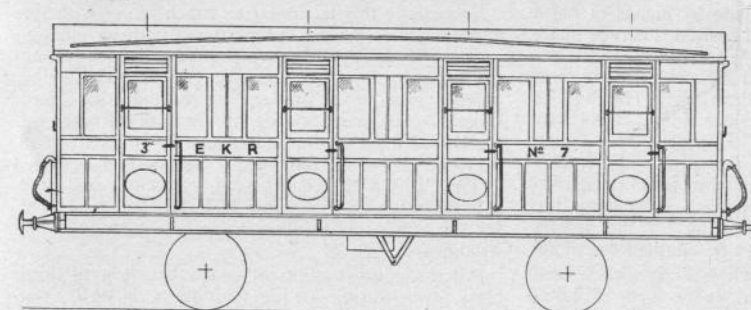
should be well. It can be obtained in large pieces and several thicknesses. The thickest, known as No. 2, is the one to use. Glue this to the back of the windows.

The bodywork is now ready for assembly. Make

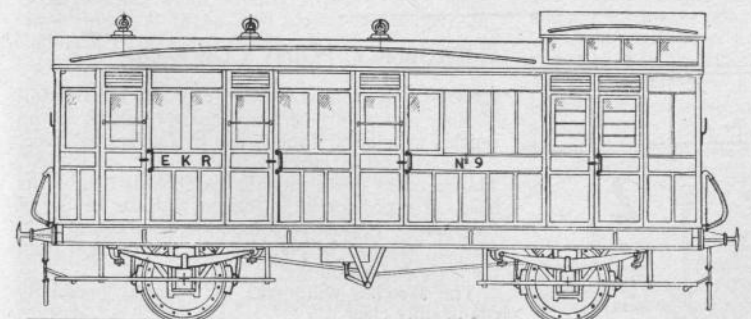
sure everything is squared up and don't forget the partitions. Wood is most suitable for the floor. This makes it easy to fix the axle guards. Glue in position and add the internal details—bench seats, racks, etc. When complete, paint the inside as desired.

E.K.R. 4 WHEEL COACHES

No 7



No 9



Now complete the underframe. This is as shown for coach number nine, but without the step boards. First the axle guards. As mentioned earlier, van type can be used, and these are available on the market in sets of four. Glue and screw these to the floor of the coach making sure that the correct height for the running boards is maintained. The wheels are standard coach type of 3 ft. 6 in. diameter. You will notice that the tyres are thin on the prototype. This and the other detail will have to be added to the standard product if a perfect reproduction is required. If 16.5 mm. gauge is being used, it is necessary to set the axle guards closer together than that shown on the drawing, as the latter is drawn for a scale of 4 mm. to the foot. The axles will give the desired width.

The rest of the underframe detail is straightforward. Tanks and V-hangers can be bought if desired, or made up from 30 s.w.g. brass sheet and strip. The frames are standard channel which is easily bent up from 36 s.w.g. brass or tin sheet.

The buffers are round with round bases. They are very similar to present-day types which, in most cases, will be found satisfactory.

The roof is next, and I recommend the use of card shaped as described in an earlier article (Eastern Region Electric Stock) made by means of balsacement on the inside only. If desired it can be made from wood. A strip about $\frac{3}{8}$ in. thick will be required, and the shaping must be controlled by templates cut according to the drawings. This will be stronger than card, and to reduce weight, the inside can be hollowed out.

Add the guttering and remaining odds and ends—door handles, ventilators and lamp tops, rails, running boards, pipes and couplings. The lamp top details are shown on the drawing for the second coach. Commercial parts can be adapted for these.

Before painting give the whole bodywork a coat of shellac. This is purchased in the form of flakes which are dissolved in methylated spirit. When painted on the card, it penetrates, thus filling up the pores and leaving a perfect surface for the application of paint.

As mentioned in previous articles, I do not find

cellulose quick-drying paints satisfactory. Good quality paint, thinned with turpentine, is the best.

The points to remember are: get the paint thinned to the correct consistency and apply thinly so as not to obscure detail. Thinning correctly is just a case of trial and error, as is the number of coats required.

Both of the coaches described here were finished in standard L.N.W. brown. Many of the E.K.R. coaches were repainted in their own olive green (similar to the S.R. colour), but as far as I can ascertain, it was never done to these two. Lettering was white and underframes black.

Some will no doubt wish to give their models that "old" look. Unfortunately, this is not easy. What is easy, is to completely spoil the finish by overdoing it. The best way as far as I have seen by results, is to let the finished job stand out for a month or two, allowing the dust to collect. It is surprising how this works!

Most paintwork tends to go "white" after long exposure to the weather, and this appearance can be given to models by means of French chalk. Apply this thinly and evenly with a soft duster, after the paintwork has thoroughly dried. Rub in lightly and dust off.

The Third Brake No. 9

Essentially this is similar to coach No. 7 with the addition of a guard's compartment with its characteristic "Bird Cage" lookout, and construction is on the same lines. Note that the end opposite to the guard's lookout is similar, but without the "Bird Cage". The step boards are best constructed of metal and fixed to the underframe by brass strip, as they are very easily damaged if card is used.

The "Bird Cage" can be cut from card, and here it is desirable that the same material should be used for the roof so as to allow a clear view through the windows.

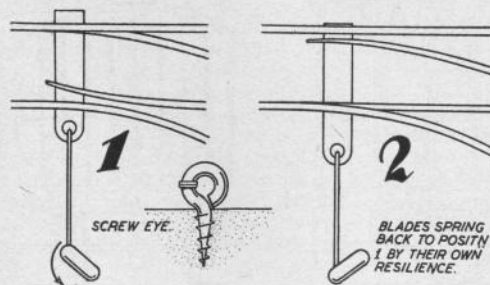
All the compartments of coach No. 9 were third class, even during its life with the L.N.W.R., but coach No. 7 was apparently altered by the E.K.R. Originally it was probably first class throughout, but the E.K.R. found this uneconomical and used it as third class. Perhaps a reader of these notes will be able to confirm, or otherwise, this statement.

EMERGENCY POINT CONTROL

SHOULD a point control wire or rod fail on running night, an emergency control can be set up quickly as follows, if the switch is of a "spring" type.

The control is effected by a large "screw-eye". This is taken down into the baseboard, right to its head, at a position in alignment with the tie bar of the blades. It must be some little distance out from the near rail and be placed at the side furthest from the springing action.

The sketches will make the "modus operandi" abundantly clear.



TEST BENCH

A REGULAR TRADE FEATURE

Peco Point Lever

OUR well over life-size illustration of this little 4 mm. scale accessory will serve to show just how it operates "below ground"—the manufacturers have already portrayed it in a lifelike scale setting. Apart from its authentic design—an important matter to the purist—we were particularly struck by its stout construction and simplicity. In a very long lifetime of use we cannot see how it can be broken or worn out, surely remarkable in an item costing only 2/8d. each, plus 7d. P.T.

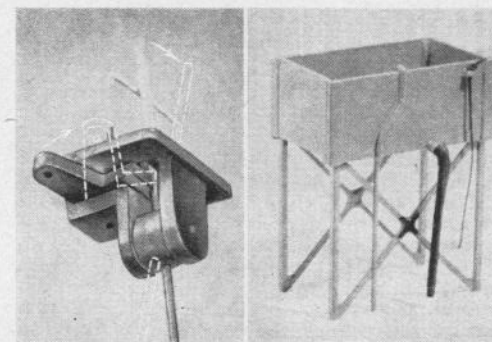
Master Models Water Tower

This little water tower formed part of the scenic background to one of our pictures last month, and shortly afterwards we received a sample from B. J. Ward Ltd., who are the wholesalers. This is another of those sturdy little accessories that will take an immense amount of hard handling to damage. It is heavy in weight and sits foursquare and rigid on its legs. Finish is in a semi-gloss grey, but could be easily repainted if desired to follow any other scheme of colouring required—or aged with rust-marks, etc. Illustration is about half full-size. Retail price is 6/6d.

Catalogue Corner

We have amassed quite a selection of catalogues this month—and but for budget fears could easily have been tempted into a buying orgy. Our old friends H. Jamieson & Co., whose Royal Scot kit we assembled last year, are still offering a wide variety of similar construction kits, that require only a soldering iron, some patience and a little know-how: with more patience they can be put together with very little of this last requirement. In addition to ambitious express locos they are now offering an ideal beginners' kit in the shape of a Freelance 0-4-0 Dockland Side Tank Shunter, and a slightly larger 0-6-0 Tanker at 19/6d. and 25/8d. respectively, including P.T. Novice 00 fans should try them, and experts will find them quite additions to their stock.

Attenborough Model Railway's Chronicle is always chock-a-block with good things, so that customers will not begrudge the necessary increase in price to 1/- when the new edition comes out. We have been browsing in the current number with a supplement covering their new 00 Turntable. This is available to suit two or three rail locos up to Pacific size, in well or flat type with GEM or Graham Farish track. Orders should state exactly what is wanted—prices go from 22/6d. to 30/-. There is really so much in this list that we can only say, send



off for one and enjoy it for yourselves.

Outside our normal scope, but full of probable good buys is List No. 500 from Aero Spares Co. of High Holborn, W.C.1. Most of their items are aeronautical and general instruments, but suitably broken up provide the home workshop with an unbelievable variety of wheels, gear trains, motors, and miscellaneous oddments that can be worked in somewhere.

Finally, there is an elegant little hand-bound die-line list from that well-known model maker P. R. Wickham, whose work enlivens our pages. He is prepared to take on all kinds of model making work particularly on the scenic side of railway modelling, and is also offering ready-made platform units at from 7/6d. for HO, EM or 00 gauges, plus 1/6d. postage. We shall be happy to pass on any enquiries.

Penguin Ocean Racer

Those who have bought a Penguin Ocean Racer following our review will have been agreeably surprised to find the price is 29/6d. not 39/6d., as shown in our article. Those with an "under thirty-bob" limit can now safely join in the fun!

Rail Racing Track Attachments

Messrs. Henri Baigent, of Hurn Airport, Christchurch, Hants, have drawn our attention to the fact that the track attachments for rail racing cars, illustrated on page 204 of our March issue, are patented by their Company, and can only be obtained through them.

They further point out that anyone infringing this patent, might find themselves liable for heavy damages, but add that as the originators of this type of miniature car racing, they are always pleased to advise or help anyone interested, and so further the sport.

Readers will, we are sure, be quick to take advantage of this friendly offer by a firm who have indeed done so very much for the promotion and establishment of rail racing as a sport.

HUSH, TREAD SOFTLY

MY main baseboard is now ready, and I feel that my layout is really under way. It has been decided that trestle legs will be the ideal support leaving the layout easily transportable, but able to be set up quickly and simply in any space available.

The room in which it has to be "housed" is a very small downstairs room which frequently has to be used as a bedroom for a relative who is not allowed to negotiate the stairs. Where to house the layout at these times was the next problem.

Small pulleys fitted to the ceiling beams, with cords to the corners of the layout, thus enabling the whole to be hoisted as near as possible to the ceiling whilst the bed is in the room seems to be the answer at the moment.

A good start has been made on the trackwork, which is being constructed by the "ELK" method.

The materials required for track construction by this method are track bases, Evans sleeper base, Peco running rail chairs, ballast and glue—the most satisfactory being Acrabond.

The method is as follows: The track bases are painted with a very thin coat of dark grey, and left to dry. A coating of Acrabond is next applied, and after leaving this a minute or so to get "tacky" the sleeper base is placed in position, and held down with some sort of weight whilst the ballast is applied good and thick, shifting the weights as necessary. Carefully press the ballast into the glue, and tip off any surplus. Put the whole under pressure and leave if possible all night.

AN UNUSUAL WATER TOWER

of $\frac{1}{8}$ in. x $\frac{1}{16}$ in. metal strip (34), the pointed end being driven into a little slot in the tank side, and the tiny bearing blocks (33) glued in place either side. The feed and overflow pipes (35) are bent up from $\frac{1}{8}$ in. tube or rod and driven into holes drilled in the tank. See the plan and elevation for the correct positioning of these parts. The tank can now be painted; my own model being finished in G.W.R. dark grey; and glued in place on top of the tower.

The ladder consists of two sidemembers (36) cut from $\frac{3}{16}$ in. x $\frac{1}{8}$ in. stripwood, and drilled to take the $\frac{1}{16}$ in. dowel rings. The best way to accomplish this is to cut two pieces of strip, rather longer than required, and pin them together by the "waste" ends. Now the holes can be marked out and drilled through both together, not forgetting the little pin-holes to take the wire brackets. The sides can now be separated and trimmed to length. Care should be taken to get all the 17 rungs (37) to the same length. They are then tapped into one side member and the other carefully pressed on to their free ends; taking care not to get the ladder twisted. The completed ladder

FURTHER NOTES BY MISS WALKER ON HER 00 LAYOUT

I use an old letter press to put mine in, and this is ideal for the purpose, although I have seen almost the entire contents of my store cupboard used as weights—jars of jam, tins of fruit and meat, packets of sugar, etc., and even milk bottles and saucepans filled with water, my electric iron, and the weights from my kitchen scales.

After this pressing any surplus ballast can be shaken off, and holes drilled for the chairs. A No. 55 drill is used to extend the holes in the sleeper base right through the track bases. The chairs can now be put in, each with a spot of glue, and when dry will be found to be quite firm. Chairing one in three is quite satisfactory, and saves both time and expense, and of course, track can be fully chaired at a later date if desired.

My design has been slightly altered from the original plan to include a double slip. "To save space" my male tormentors told me, although I am convinced they were trying to think up something which would baffle me. However, with the aid of a blue-print, a ready-made double slip to study, and I will admit with many hours of patient labour, I achieved a quite presentable finished article. I only hope that when in position it really will work.

I will not say I am fully satisfied with it, and later on, when time allows, I would like to make another, profiting by the mistakes I made when doing this one. I certainly did make mistakes, many of them, and I must have spent as much time unsoldering as I did in soldering.

(Continued from page 271)

is now painted black and fixed in place by the brackets (38 and 39).

The operating cord at the spout is fine black thread, threaded through the holes in the spout and taken down through the tiny eyelets in the tank to loop over a pin in the base of the tower, as shown in the elevation. You can then let down the spout when you want to take a photograph of an engine taking water! The operating lever should really be fitted with very fine chain, but if this is not available (as it was not when I made my model) a length of stiff wire bent as shown will serve quite well.

Finally, if you want a really striking touch of realism, try the following. Get a tube of Indian Red oil-colour, and squeeze a little into a tin lid. Add just enough turpentine to the paint to moisten it, and with a fine brush, run a little of this paint into each joint of the tank, and along both edges of each rivet strip. Wipe off immediately with a rag so as to "blend" the red into the grey. The result, if carefully done, is exactly that of the tank having rusted where the paint has rubbed off.

WE are pleased to report the receipt of several club fixture lists, and hope that all clubs will oblige during the next few weeks. We cannot, of course, publish these lists in our columns for considerations of space alone, but their possession will often enable us to pay a casual visit to club waters when something is "on"—an opportunity that might otherwise have been missed. We were recently in Bournville to take pictures of our new 10-rater design *Halceyon*, from the able board of John A. Lewis, who is, incidentally, Official Measurer for the Midlands, and enjoyed a very pleasant afternoon—though wind non-existent—at Valley Parkway Pool, and here captured our heading picture of M.Y.A. Racing Secretary "Mac" Fairbrother with his trusty 36 in. Restricted *Mickey*. This boat, built before the war to a design of the late W. H. Davey by S. C. Langford, has been putting some more modern craft to shame in Mac's able hands. Last year in five outings it picked up four trophies and a second. Mac is almost willing to match it against all-comers, but for the existence of one "dark horse" right in the club boathouse... but, bar one...

Y.M. 6-m Owners' Association

Hon. Secretary N. D. Hatfield provides us with a list of this club's Open Race Fixtures for 1952, to be held at the Rick Pond, Hampton Court. All events start at 10.30 a.m.

May 11th: The Metropolitan and Southern District A Class Championship. Three boats per club; 10/- per boat. (Closing date of entry, April 18th.)

July 6th: Glenham Cup. Three boats per club; 5/- per boat.

Sept. 7th: Serpentine Cup. Three boats per club; 5/- per boat.

Oct. 5th: Gosnell Trophy. Three boats per club; 5/- per boat.

This should give 6-m enthusiasts plenty of scope for their activities, and prove that the Southern followers can provide just as exciting racing in this class as the more numerous following over the border in Scotland.

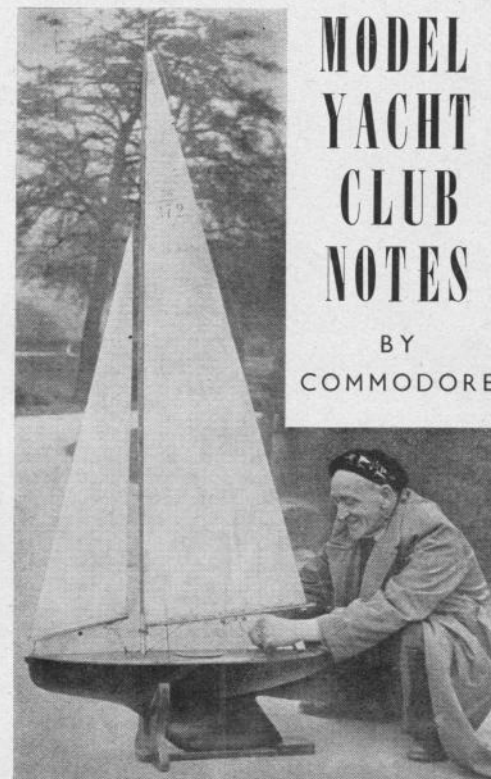
Bournville M.Y. & P.B.C.

Whit Monday, June 2nd, will see the 28th Annual Whitsuntide Regatta on the Valley Parkway Pool at Bournville, together with a National Power Boat Competition and Display. Power Boat secretaries are urged to get in touch with Hon. Secretary M. Fairbrother, sending particulars of number of boats in 30, 15 and 10 c.c., hydroplanes, and prototypes of all classes for steering contests. Catering will be by the Civic Authority, and will be assisted by stating numbers of visitors and supporters accompanying competitors. Start is at 10.30 a.m.

Bournville Club Sailing events will be arranged for Saturday, May 31st.

M.Y.A. Open Championship M. Class

This event will be contested on Birmingham's



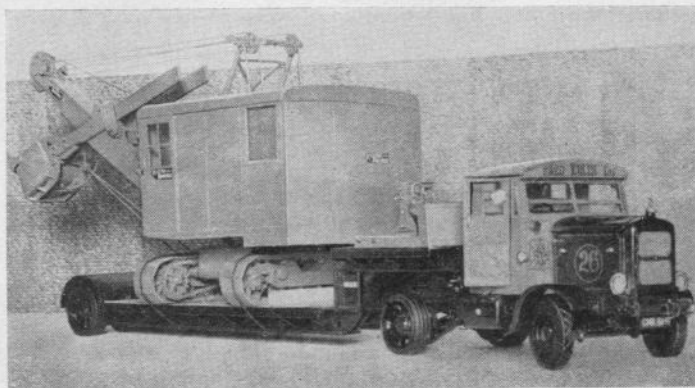
MODEL YACHT CLUB NOTES

BY
COMMODORE

Sailing Water at Witton Lakes, Erdington, on May 31st, June 1st, 2nd and 3rd (last date of entry May 3rd). As the first of the season's National Open events it should provide an excellent holiday outing for all enthusiasts whether or not they are skilful enough—or fortunate enough—to be actually competing. As there is also a good programme at nearby Bournville, it might be a wonderful opportunity to have an "all boats" Whitsun, covering the M Class start on Saturday and Sunday, then nipping across the city to the Power Boats on Whit Monday, and back to Erdington for the last Marblehead day on June 3rd. I understand it is about twenty miles by the Ring Road round Birmingham between these two venues. This double coverage is—at any rate—what *Model Maker* proposes to attempt, so please organisers arrange for "sensations" to be neatly staggered!

To All Model Yacht & Power Boat Clubs

Hon. Secretaries and/or Publicity Secretaries are once again reminded that we want to hear from them. Notes for inclusion should be in our hands by the 1st of the month previous to date of desired issue.



THE model Scammell articulated lorry and excavator load, illustrated, were made, some years ago, to the order of the owner of a local haulage firm (this, of course, in the days before nationalisation).

Although the model was not powered, it was very fully detailed, with working steering and cab doors which open to show a fully-fitted interior. As Fig. 3 shows, the power unit and semi-trailer can be separated at will, like the prototype.

Arrangements were made for "blanks" for the eight wheels to be turned up, by a local pattern maker, in fine grained wood. As can be seen in the photographs, there are two types of wheel; the front ones being normal heavy disc type with pneumatic tyres, the rear wheels of the unit and the trailer wheels being long heavy castings with six spokes presenting a "dished" cross-section, and fitted with solid tyres. On the disc wheels, the only hard work needed was the cutting in of the diamond treads with the edge of a file. But the spoked wheels looked like presenting quite a problem. Eventually, however, a very effective reproduction was achieved by marking at the spokes, on blanks already turned to the required cross-section and carefully cutting away the spaces between with a fine saw in the fret machine. A ring of fine pins was carefully driven in around the hub to represent the fixing bolts of the original. Turned wood brake drums were fitted into recesses in the back of each wheel, these being clearly visible on the trailer wheels in Fig. 3.

Channel-section side members for the chassis of the power unit were built up from $\frac{1}{8}$ in. hard fibre sheet, this material being very freely used throughout the model, as combining rigidity and strength with "scale" thickness. These members were joined by wood cross stretchers, and the detailing of the chassis begun. Dummy springs were made up in fibre and mounted in brackets fabricated from sheet metal and pinned to the chassis, the front brackets being of a particularly complex shape, as can just

ARTICULATED LORRY & EXCAVATOR

A DETAILED HALF INCH

be seen in Fig. 1. The steering gear was built up in metal strip on more or less orthodox lines, the front wheels revolving on stub axles and being held in place by the hub caps. A solid rear axle is fitted running right across the chassis, the chain drives being dummies as sufficiently small roller chain was unobtainable. The drive in the prototype is through a large differential mounted in a casing between

the frames, just behind the cab. In the model, this was represented by a shaped wood block, through which the driving axle passes; on either end of this fit the frames which carry the chain drives with their tensioning devices, these being soldered up from metal strip and screwed rod. Sprocket wheels were made from fibre, those on the rear axle being fixed to the frames so the axle was free to revolve in them. The dummy chains (two to each drive) were made from metal strip, "squeezed" in the pliers at regular intervals to simulate the roller links.

Other chassis details include fuel tanks, dummy brake gear, towing bars at front and rear of unit, and, of course, the turntable and pivot for the trailer, clearly shown in Fig. 3. Front mudguards were made from sheet metal, shaped in two parts and soldered together with wire beading underneath.

The bonnet was built up in wood and fibre sheet, to reproduce the characteristic design which incorporates a ventilating louvre between side sheets and top (Fig. 1), hand grips on the side sheets being filed from brass bolt heads. The unmistakable Scammell radiator was first shaped as a solid wood block, the centre panel then being cut out and covered with fine copper gauze before being set back in place, and the joint concealed with card beading. Thin metal foil was used to form the embossed name plate, the letters being pressed in with a pencil from the back. The combined fill-cap and water gauge was made from a tiny screw eye soldered into a metal collar and with the eye filled with "Durofix" to represent the glazing.

The cab was built up round a wood floor, the back being fibre sheet scored for planking and with "Perspex" windows set in. "Perspex" $\frac{1}{8}$ in. thick was used for the cab sides and windscreen, with Bristol board "masks" inside and out. Cab doors were cut out with a fine fretsaw and hinged with strips of thin book cloth inside and out, the inside ones pressed into the joint (Fig. 1), these being covered, of course, by the Bristol board masks. A

MODEL SCAMMELL LORRY & RUSTON-BUCYRUS EXCAVATOR BY P. R. WICKHAM

tiny strip of folded cloth was pinned inside, across the hinge, as in the prototype, to prevent the door opening too far; and working catches were naturally fitted. Internal cab fittings included seats (fitted with padded leather seats and back rests) and all proper controls, some of which can be seen in Fig. 3. External cab fittings include screen wiper (with dummy motor inside), driving mirrors, bulb horn on front panel and side lamps.

Turning to the trailer, the shaped side frames were first built up to the section shown in Fig. 2, from fibre sheet and $\frac{1}{8}$ in. plywood; the side members having lightening holes drilled in them, which can be seen in Fig. 1. These were then joined by cross members and fibre floor and front platform fitted. Angle section and triangular brackets were then fitted under the floor edges (Fig. 3).

The main fibre floor was overlaid with $\frac{1}{8}$ in. plywood, scored for planking and drilled with drainage holes. In the prototype the rear wheels can be taken right out and the girders dropped to the ground so that wheeled loads can be driven right on to the lorry, over a ramp, from the rear. In the model the wheels were fixed, but the rear mudguard lifted off to expose the dummy jacks; made from screwed rod, nuts, and wire, and protected by "waterproof" covers made from paper soaked in black paint.

The model was painted in the colours used by the owners, a resplendent livery of red bonnet, trailer frames and wheel centres, light blue cab and gold lettering and lining including elaborate monograms on the cab front. Sad to relate, the drabness of nationalisation has now descended on the prototype.

The load is a detailed, though non-working, re-

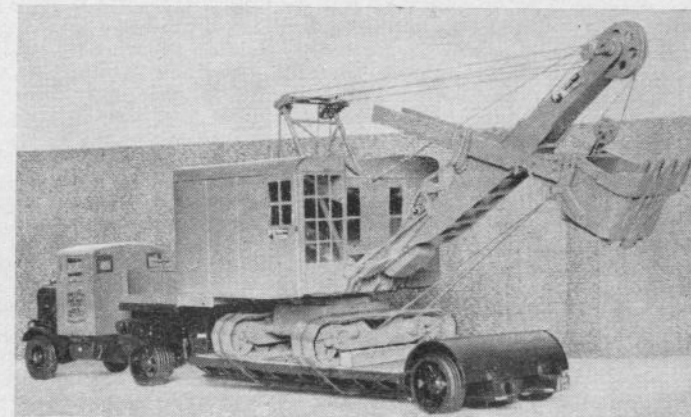
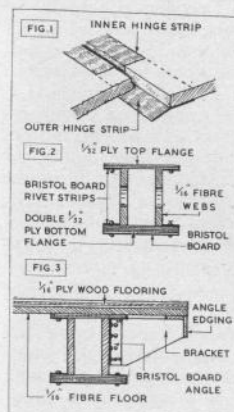
production of a Ruston-Bucyrus 24-RB Excavator

The dummy creeper units were first built up. In shaped fibre frames, the end rollers were mounted, a plain rand "idler" at one end and a nine-sided "driver" at the other. Each frame had below it five "idler" rollers to take some of the weight, these being 00 gauge coach wheels. The actual treads were made from several layers of Bristol board, glued together and scored to represent the tread joints. Each tread has over 50 teeth which take the drive from ribbed projections on the driving roller, and these were separately shaped from wood and glued in place. The solid frame on which the superstructure is fitted is supported by two fixed axles passing right across between the two tracks. The drive chains for the creepers were taken from an old time-switch mechanism fitted on fibre sprockets.

The boom, and the "A" frame which carries the pulley blocks of the boom hoisting gear, were both mounted on the heavy plywood floor of the cab, the frame being soldered up from metal rods with fibre pulleys mounted in a metal frame. The boom was built up from fibre sheet and wood to reproduce the box-girder construction of the prototype. Pulleys were again made from fibre.

One of the most difficult jobs in the whole construction was the production of the bucket, which was made from fibre sheet and shaped wood parts to reproduce the heavy and elaborately ribbed casting of the prototype. The operating mechanism of the bucket was also a matter of some complexity.

The cab was built up from wood and card with "Perspex" windows, and carefully fitted round the "A" frame. Light grey matt finish was applied with name plates in white on black.



A NEW SERIES BY F. C. JUDD (G2BCX) ON

RADIO CONTROL

THIS article is intended primarily to introduce the reader to some of the possibilities that Radio Control can afford, particularly in model ships and cars. Perhaps it is not generally realised that quite effective equipment can be produced with little or no radio knowledge and only the ability to solder and use simple tools. The writer has designed several systems suitable for home construction and it is hoped later to produce these as complete articles together with diagrams specially arranged for building radio control equipment, without special knowledge and at the lowest possible cost. There are, however, one or two very good firms producing radio control transmitters, receivers and control gear and it would be unfair to omit these since they are very simple to operate, efficient, reliable, and can be obtained at reasonable prices. Further they can be installed in models without special knowledge other than the ability to follow simple installation instructions.

The Advantages of Radio Control in a Model

If a model is to be a true working representation then it must carry out all the functions of the original. A model car may be powered with a model engine, and with some special form of control could be steered in the same way as the full-sized version. How much more effective to virtually put yourself aboard your model ship and be able to carry out full steering and engine control. Radio control can do this! What then is required?

Since the basic principle is to send a *command* from one place to another without wires, then the only possible link is radio. This must be the *only* means of conveying your commands to the model. It involves a sequence of events that are best described in block form as in the diagram below, and from which a system can be evolved, with *proper names* for each operation, and with *proper names* for each piece of equipment finally selected to complete the system. The blocks of Fig. 1 are divided into two groups, A, B and C, followed by the radio link, and blocks D, E, F and G. In any remote control system the ultimate objective is to control a flow of power in a regulated manner, from a primary source to some device, the model, so that desired operations will be performed. For a control system to become operative certain functions must take place *within the system itself*. These functions are as follows:—

- The source originating the *command*.
- The *coding* device which converts command into a signal suitable for transmission to the model.
- The *transmission* system which sends the coded command to the model.

- The *receiver* for accepting the transmission.
- The *decoder* which interprets the command and causes power to flow in.
- The *serving or servo-mechanism* or other device which converts the power into light, heat or mechanical energy.
- The source of power for the serving mechanisms.



More detailed theory and some practical designs will be given in later articles, but it should be mentioned here that complete transmitters and receivers are available as those of Messrs. E. D. (Electronic Developments Ltd.), and Messrs. E.C.C. (Electronic Components Co.), while Messrs. Flight Control specialise in equipment for home construction. All the makers advertise in the regular model publications where prices and details of their equipment can be obtained.

Decoders

Having established the command, code, and radio link, the problem now is to decode the signals picked up by the receiver and cause them to operate the serving mechanism(s). Decoders, like the coders and for that matter the transmitter and receiver, are governed entirely by the complexity of the control system as a whole, but could be just a single relay with one contact. On the other hand a decoder could be a motor driven selector mechanism with a chain of relays involving an extremely complicated layout and circuit wiring. Decoders are often referred to as *actuators* although this term is sometimes applied to simple two and four pawl escapements. This is in fact a case where the servo mechanism and decoder become a combined unit and is mentioned because confusion might arise when purchasing such units. The terms escapement and actuator are often used by makers and retailers of radio control equipment to mean one and the same thing. The makers mentioned above (Messrs. E.D. and Messrs. E.C.C.) produce two and four pawl escapements but for more complex steering arrangements it is probably better to construct your own.

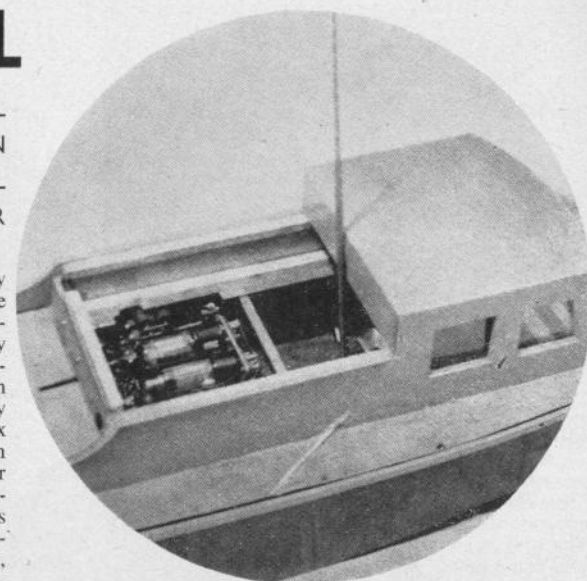
Servo-Mechanisms

Servo (Latin, meaning slave) is a motor or electromagnetic unit coupled to a mechanical device which operates the actual control as is selected, e.g. rudder, for steering—Engine, speed, stop/start—Guns, firing, aiming—Flags, raising, lowering—Sirens, whistles,

FURTHER ARTICLES WILL COVER THE CONSTRUCTION OF A SIMPLE NON-TECHNICAL TRANSMITTER AND A RECEIVER

lights, etc. Very simple servos, or as they are more frequently called, escapements, are used for steering only and consist of a magnetically operated escapement mechanically coupled to the rudder (for ships or aeroplanes). Such a device may be used with a simple single valve receiver with one relay to control the escapement. More complex servos consist of motor driven mechanism directly coupled to the control, or motor driven variable controls, e.g., a variable resistor for engine speed (where electric motors are used). Change-over switches electromagnetically operated for reverse engines, where the polarity of the supply to a "Permag" motor is changed. Simple control of lights is effected by a magnetically-operated switch(es). Guns may be fired by magnetically-operated firing pins, and flags raised and lowered by suitable motor driven pulleys. Servos are limited only by one's ingenuity and skill with suitable tools.

When all these are in operation a control system is functioning. Let us now consider these components in greater detail. The *Command* source is the human operator. The commands will be limited only by the control system which the operator selects for the model. The *Coding Device* can be very simple, such as a switch having a limited number of contacts, perhaps only one: alternatively, the coding device can be complex and may actually be a prototype of the control in the full-size ship or car, etc., for example, a reproduction of the steering wheel of a ship or the joystick of an aeroplane, and so on, these in turn operating a series of switches or contacts connected to the transmission system. Coding devices may be constructed as to emulate the function of the control, e.g., a switch, with a lever attached. When the lever is moved to the left, the model moves to the left, and when the lever is moved to the right, the model moves to the right. Such a control arrangement may not always be possible, but should be used where permissible, so as to obviate having to remember a sequence of operations, as would be the case if only a simple on/off switch or press button were used as the coder. Any device which can make and break one or more circuits can be used as the control, by the operator. This would include, in addition to the simple control or coding



devices mentioned, such complicated units as the telephone dial, rotary switches, and multi-position lever-operated switches.

Ultimately the type of control you use will be determined by the *amount of control*, and the *flexibility* of control, and will depend, to some extent on the transmitting and receiving equipment used as the link between yourself and the model.

The Link

Having now an arrangement for controlling the codes of command, the next step is to transmit them to the model, find some means of receiving, and *Decoding* them, for ultimate control of the serving mechanisms.

This requires the use of a radio transmitter (at the control point), and a radio receiver of special design, in the model. The *Transmitters* used for radio control work are generally very simple, rarely using more than two or three valves, mostly only one. The theory, and a practical design will be given later. Radio control *Receivers* depend entirely on the complexity of the control system and the range at which control is desired. One or more valves in various combinations may be used, the most simple being a system using but a single valve operated as what is known technically, as a *Super-Regenerative Detector*, and under conditions such, as to control a sensitive relay in circuit with it. The relay opens or closes a pair of contacts which in turn allow power to be applied to the serving mechanism

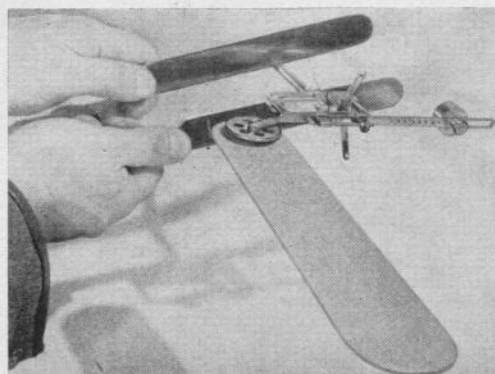


FIG. 1

SINCE the last war the revival of model yachting has seen the vane steering gear adopted almost universally in all classes but the 36 in. restricted. (This class presents physical difficulties otherwise the adoption would no doubt have been truly universal.) That this is so is the best recommendation that the gear could have.

So far as the writer is aware, literature on the gear is scanty, and what has been written is not now readily available. The gear has its own characteristics and technical problems. To the critical observer it is apparent that these are not understood by many skippers who consistently use the gear, and it is for this reason that the following notes have been written.

The first characteristic of the gear, which has no doubt led to its exceptionally rapid adoption, is that a good or bad boat fitted with vane gear steering adjusted to approximately the right position and the sheets also adjusted to approximately the ideal position will "make the course" and at not a bad speed. This is very encouraging to the novice and as it were, puts him in the running from the start. This is good for the sport. Fortunately, again for the sport, to get the most out of the boat and gear is a tricky business, and one in which the combination of a good boat, skipper and gear all working in harmony should come out on top. It is the purpose then of these notes to try to give some "clues" to that better understanding of the operation of the gear that will gain the points on the lake.

While approximate sheet and gear adjustments give a course, it cannot be too strongly stressed that speed and ability to "point" are obtained only by meticulous attention to precise adjustments giving a harmonious action between the parts and steering on the intended course. It is generally accepted that a small degree of weather helm—that is rudder to leeward—when point high is ideal. In order that this weather helm shall not steer the boat off course the sails must be set to bring the boat into the wind,

VANE GEAR

BY A. WILCOCK WELL-KNOWN

the combination giving a high pointing course which is sailed at speed. Sail plan setting is then the starting point for the most efficient trim. The recognised method is:—

1. First wait for a day with only a light breeze (this is important as many boats that will readily point with a fresh breeze are reluctant to do so in lighter airs).
2. Unship the gear and centre the rudder carefully either by stops or a taut centring line.
3. With the jib and main sheets fairly close hauled, such that the main and jib booms make equal angles to the centre line of the boat, and the kicking strap slack, adjust the mast position, remembering to maintain the rake by adjustment of the fore and back stays, until the boat will consistently just come into irons, i.e., point into the wind with the sails flapping. It is worthwhile checking that the right position has been obtained by moving the mast $\frac{1}{4}$ in. forward when she should sail steadily once again on a course 30 deg. or so off the wind. Move the mast back to the position found. Patience in finding the correct position will be amply rewarded by the performance later obtained. The gear may now be reshipped and attention paid to gear adjustment detailed below.

For serious racing and in particular to M.Y.A. rules, a self-tacking vane is a necessity. The comments will therefore primarily relate to self-tacking vanes, so much, however, is applicable to vane steering as a whole that those with non-tack vanes will find much to the point.

The three essentials to good performance with vane steering gears, in order of importance are:—

1. Freedom of movement of all moving parts.
2. Balance of the parts individually or in appropriate combinations.
3. Precision of adjustment.

Regarding (1) with vane steering, unlike Braine steering where the whole power of the main sail is available to overcome friction and any stiffness (however undesirable even in that case) the vane has relatively little power and it is most important to use it for moving the rudder against water pressure only. This question of freedom of movement is mainly a mechanical one both of design and execution, and with the Editor's permission may well be the subject of a further article. The immediate points to look at with what you already have are (a) freedom of the rudder on its pintles or bearings; (b) freedom of the rudder stock in its tube, particularly from any stickiness brought about by paint or varnish; (c) lack of binding in the linkage between the rudder

COMMENTARY

IN SOUTHERN MODEL CIRCLES

and gear whatever its type may be, gears, pin and slot or push-pull bar; (d) freedom of the vane on its pintle; (e) freedom of the self-tacking parts of the vane on their pintles or bearings, and the self-tack link, usually of the pin and slot or gear arrangement as for the rudder linkage.

Having dealt with these matters, attention can now be directed to "balance". In the author's opinion balance is the least understood and therefore most neglected aspect of vane gear application, while it affects performance most in getting that last ounce out of a boat in racing, and should therefore receive more thought and attention from all skippers.

Balancing starts with the rudder and its linkage to the vane "base" without the vane superstructure. The aim is to counter-balance the tiller or linkage so that with the hull in the water and no centring line on the mechanism the rudder remains central when the hull is heeled to port or starboard. It is necessary to adjust the counter-weight with the rudder submerged as depending upon its material and construction it may have buoyancy. The vane superstructure should be balanced separately in two ways about the point of attachment to the vane base. This can be done by using a temporary rod or tube on which the vane superstructure can be mounted for balancing. The need here is for the superstructure to balance with the vane fixed relative its counter-weight as shown in Fig. 1 for a typical mechanism. Balance is shown by the mechanism staying in any position of a revolution in which it is placed. Possible corrections to achieve this are given below. The second requirement is for the mechanism in the self-tack adjustment, i.e., unlocked, to take up equal angles to the base bar which should remain horizontal as shown in Fig. 2. In the simplest and most usual form of gear the vane and counterweight are mounted on pintles set at equal distances from the mounting hole and for the balances previously described the counterweight and its mounting should equal in weight the vane feather and its mounting. When in position on the bar the counterweight can then be adjusted by moving nearer or farther away from its pintle until the assembly balances, and it should be found that balance is achieved in either of the tests given. The vane feather must, during this process, be set at its normal vertical or near-vertical position. Changes in its angle will affect balance. A common failing is to change the feather for one of different weight and altering only the position of the counterweight, this can correct balance in only one of the tests, unbalance must occur in the other. As previously mentioned, balance is upset by altering the angle of the feather. This is

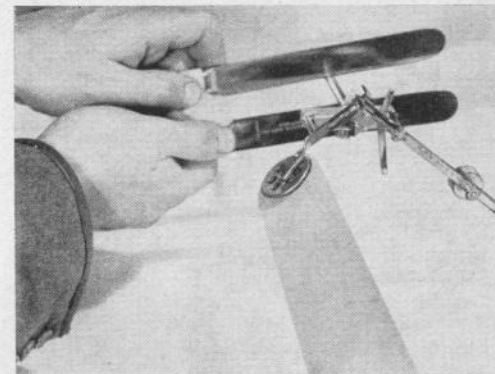


FIG. 2

bad practice, but nevertheless expert skippers frequently do this although usually only on the run where balance does not matter a great deal because there is little heeling. On other points of sailing it is very inadvisable.

The effect of balance troubles are to be noticed when a change of wind strength leading to variations in the angle of heel takes place without a change of wind direction. Under these conditions out of balance may cause the boat to point higher or fall away depending in which direction the gear is out of balance. The foulings may easily be blamed on the sail plan, angle of rake of the mast, or sail setting or hull shape, in fact almost anything but the vane gear, which may well be the cause under these conditions. While quoting the most usual vane gear assembly to illustrate balance, it is one that is most readily balanced, and this probably accounts for its popularity. Some designs are inherently impossible perfectly to balance, but discussion on the various arrangements is proper to a subsequent article.

The third essential to vane gear performance is that of precision of adjustments. It must be admitted here that this is mainly a matter of experience, but it must first be appreciated that it does matter. When beating in particular, which is the course on which most points are obtained—a few degrees make all the difference. Here the course scale on most commercial gears is not very helpful, and something larger and more precise such as a celluloid school protractor will be found a great help. The aim is a sail setting that will point the boat just a little higher than the course required, and a vane setting that will give 3 deg. to 5 deg. of weatherhelm. This keeps the sails full and drawing without undue rudder drag and a fast course is sailed. The right vane and sail combinations exist for the other points of sailing and the same arguments hold. Not too much helm and not too little, and the sails trimmed just as carefully as for Braine steering and away shoots the winner.

THIS NEW DESIGN BY JOHN A. LEWIS OFFERS ENTHUSIASTS AN OPPORTUNITY TO BUILD A FAST MODERN BOAT, DEVELOPED FROM A SERIES THAT HAVE ALWAYS PROVED ABLE TO HOLD THEIR OWN ON THEIR HOME WATERS, AND IN CAPABLE HANDS SHOULD BE WORTHY OF SAILING IN THE VERY BEST COMPANY.

DURING the next few months we shall be describing the building of a new 10-rater, and it would not be out of place to discuss firstly a few of the considerations which influenced the dimensions and hull shape of this particular design.

It is very tempting when setting out to develop a 10-rater design, to go for something different from the usual run of things and to be original. The beginner should realise, however, that it is probably more difficult to be original in yacht design than anything else, as the building of sailing boats has been one of man's occupations for many, many centuries, and all shapes and sizes have been tried out. Wind and water do not change. The biggest scope

10 - RATER

for originality lies in the choice of hull dimensions, not the shape, and in the development and application of aerodynamic theories to the sail plan.

Let us consider a few of the factors which have to be carefully blended together when commencing a 10-rater design.

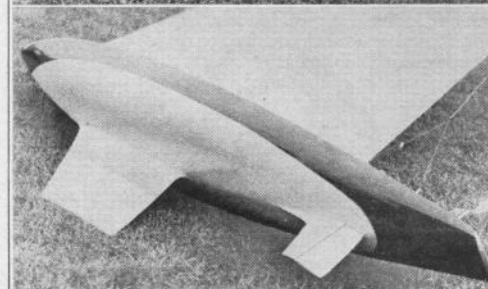
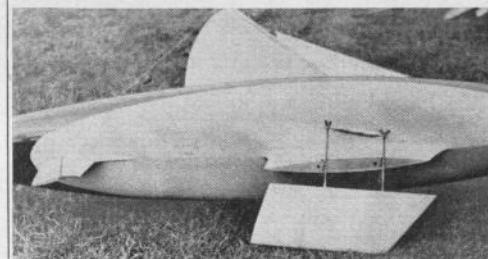
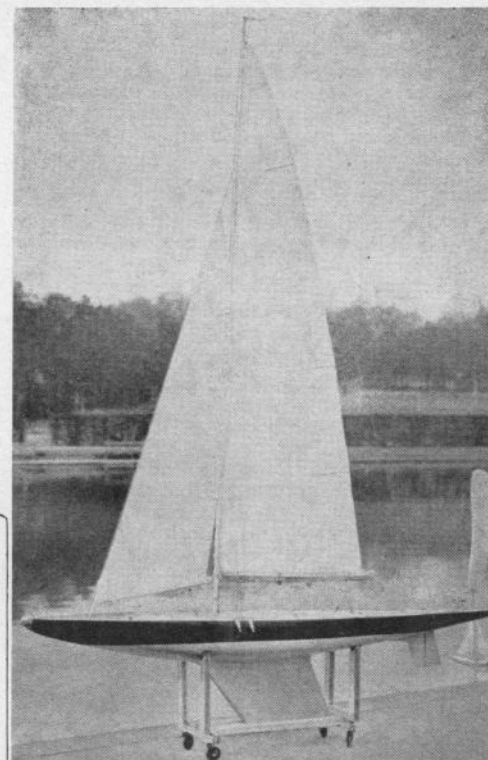
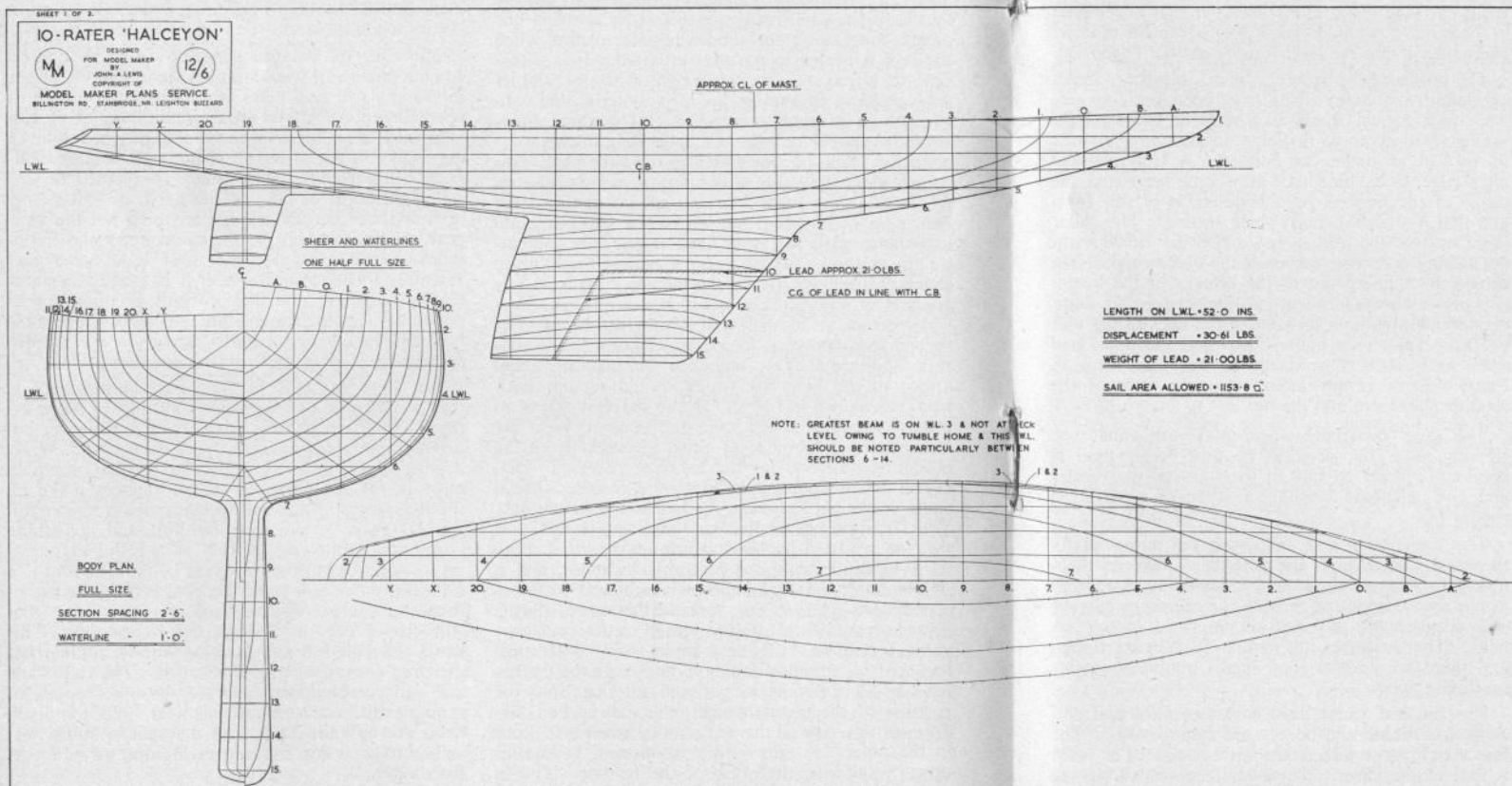
The Hull

As the rule $SA \times LWL = 10$ governs the sail area and waterline length the first decision has to be regarding the L.W.L. (load water line) length. It is well known that the longer a boat is on the L.W.L. then the faster is it capable of travelling through the water, but, with this rating rule the penalty of long

Halceyon

L.W.L. is the reduction in sail area. The loss of sail area is particularly noticed in light winds because coupled to the smaller sails is the greater wetted surface area of the longer hull; this is assuming, of course, boats of normal shape and equal displacement. Much of this disadvantage may be offset by maintaining the hull in a very smooth and polished condition as the greatest resistance to forward motion at slow speeds is skin friction.

The L.W.L. of 10-raters has increased steadily from 40 in. to 50 in. during the last 20 years. The longer boats are of more healthy shape, and the freak scow that the rule tended to produce has been dropped in favour of more consistent all-round per-



formance. Having reached a length of 50 in. L.W.L. there seems to be hesitation on the part of designers in exceeding this figure by more than a couple of inches. Having designed and built a boat of 55 in. L.W.L., paying great attention to wetted surface reduction and a fine finish on the hull, I find that the light weather performance does seem to suffer to an extent, considerably greater when compared with a boat of 50 in. L.W.L. than does the 50 in. L.W.L. boat when compared with one of 45 in. L.W.L. However, if the average conditions under which you sail your boat are of moderate to strong breezes, then by all means have the 55 in. L.W.L. or even more. For general purposes a length on the water of 52 in. seems to strike a good compromise.

Next we come to the question of choice of displacement, and there has been a good deal of argument between the "heavyweight" and the "lightweight". As with all things in yacht design a compromise offers the best way out, and I have found from experience that a displacement of between 28 lb. and 32 lb. can provide good all-round qualities. It may be taken that 30 lb. or over is tending towards the heavy end of the scale, and that 24 lb. is about the lightest it would be desirable to go.

The heavier boat need not be slow in light winds as it can be designed with an easy form of midship section giving low wetted surface and, of course, a heavier boat when once moving will continue to do so, due to its greater momentum, when the "flats" appear in the wind. The choice of displacement is made out of consideration of stability and closely related to this question is the shape of the midship section of the hull. Without delving into the theory of the subject it may be said that the shape of the hull section accounts for the initial stiffness up to say 15 deg. angle of heel, and from then on the pendulum of the lead ballast has the greater effect. I believe that it is difficult to achieve too much stability in a model provided that the period of rolling is not too short. In other words, make the hull as powerful as possible, but not such that when the wind pressure on the sails eases the model springs smartly to attention and shakes the wind out of the sails. Again we have to compromise, and the section shown on the new design is my idea of that which is desirable. To attempt to achieve the same stability with a boat of lighter displacement would mean that the beam would have to be increased, or the section made firmer, or the draught increased, or the ratio of ballast to displacement increased, or a combination of all four factors.

It will be seen that beam of the boat is very closely related to the mid-section, displacement and stability considerations and it follows that the more powerful boat will tend to have the more beam. Generally speaking, it is better to keep the beam moderate and try to get the maximum amount of lead into the keel as possible by building the hull light and saving weight on the fittings.

Typical dimensions of a modern 10-rater would lie between the following limits:—

L.W.L., 50 in. to 52 in.; Beam, 11 in. to 12 in.; Draught, 11 in. to 11.5 in.; Displacement, 27 lb. to 32 lb.; Length overall, 67 in. to 74 in.

Of course, there are many good boats that lie outside those limits and one cannot be too dogmatic about these things.

It will be seen from the above list that the overall length has been mentioned for the first time, and I do not consider this to be a prime consideration. A boat when heeled does increase its effective sailing length by immersing part of the overhangs fore and aft; this increase in length depends on the shape of the overhangs and to design them to make the fullest use of this effect can introduce some of the unwanted tendencies of the old scow type of yacht, such as slamming to windward in choppy water. I feel that the overhangs of a 10-rater should be kept as short as practicable and that a forward overhang of 7 in. and an after overhang of 8 in. are as long as can usefully be employed. There is no point in the yacht carrying wood around with it that never goes in the water. Another practicable advantage of short overhangs is that the boat is more easily transported.

The profile of the fin keel is also a subject of much argument, and many ideas have been put forward. The most logical shape is a straight leading edge raking aft at about 45 deg. and an after edge as near to vertical as makes no matter. A truly vertical after edge looks hideous. It will be seen that the shape of the fin keel on the design is of this form and that it is also of fairly thick section. This latter point enables the lead to be carried low down without having a reverse curve on the keel cross-section caused by bulging out at the bottom of the keel: it is also a convenient way of obtaining a little extra displacement without coarsening the lines of the hull proper. Tank tests have shown that the thick keel does not appreciably increase resistance, and in future designs I may attempt putting more of the total displacement into the fin.

The skeg, especially when used with vane type steering, does not need to be any bigger than is necessary, nicely to fair in the lines of the rudder and give adequate mechanical strength around the rudder post.

The dimensions and shapes so far discussed fix the basic type of hull, and it remains to blend them together. The methods and calculations employed to fair up the lines and provide the necessary balance and displacement will not be described in this article. The processes are similar to full-size design and there are several good books obtainable today on this subject.

The finished yacht must look beautiful and efficient, for yachts and beauty are synonymous. The line which most affects the appearance of a yacht is that of the sheer. There has been much written

of late about reverse or hogged sheer in full-size practice, and it is well to remember that reverse sheer is introduced in order to provide more internal accommodation in light displacement hulls and not merely to look modern. Although reverse sheer can be drawn to look attractive it has no place on model yachts. To provide adequate freeboard and yet not have an excessive amount at any point throughout the length of the hull generally means that a slightly concave sheer line is employed, where the minimum freeboard is just forward of the after waterline ending. The deck camber has the effect of reducing the apparent sheer and an effective modern and efficient sheer line can be drawn so that the centre line of the deck is flat and the maximum amount of spring in the sheer line is equal to the maximum deck camber. This amount of sheer is just sufficient to prevent the hull looking as though it has broken its back.

The Sail Plan

The sail plan of a modern Bermudian rigged yacht is considered by many people to be considerably less sightly than the old gaff rigged cutters so common a few years ago. There is no denying, however, that the modern rig is much more efficient to windward and can be the only choice for a racing yacht. Apart from the actual cutting out of the sails to allow the required flow in the cloth, there are only two main factors which worry the designer. These are:—

- The aspect ratio (i.e. the ratio of length on the foot of the sail to the length up the mast);
- The ratio of the area in the jib to the area in the mainsail.

Dealing with (a), aerodynamic tests and practical experience have proved that the efficiency of the sails increased as the aspect ratio increases. There is a limit to which it is possible to go in the direction and a ratio of 3.5 to 1.0 is about the highest at which the sails can be made to set properly. Even so the sails need to be expertly cut if they are to last.

With regard to (b) it would seem that the modern tendency is to place more and more sail area into the jib. Whilst this does improve the performance beating to windward and reaching, due to this higher efficiency of the jib, one must not forget that with a small mainsail the yacht will lose its down-wind performance. The large jib does allow a large spinnaker to be employed, and it may be thought that this fact will compensate for the reduction in mainsail area, but it must be realised that suitable conditions for carrying such a large spinnaker are not always obtainable, and in fact in light airs it may even be a handicap. For satisfactory all-round performance it is a good plan to divide the total sail area into 19 parts, putting 12 parts into the mainsail and seven parts into the jib.

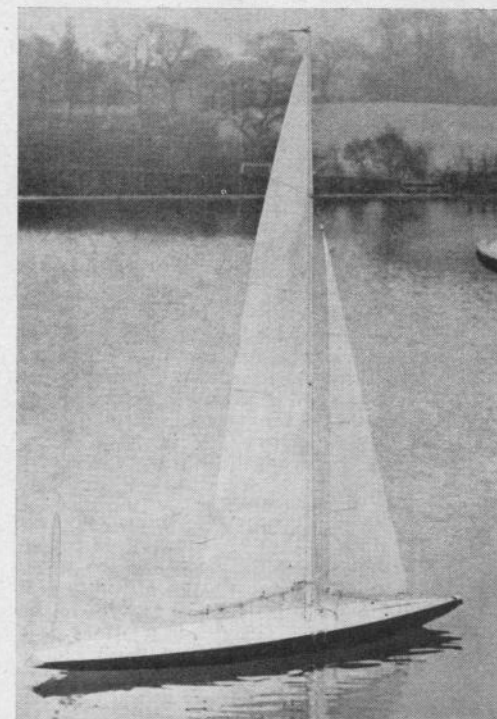
One could write at considerable length about battens, rotating masts, double luffed sails, etc., all these being allowed in the 10-rater class. In these

devices lies great scope for improving the efficiency of the sail plan and in exercising the inventive talents of the experimenter. A word of warning: if you have no experience in model yachts do try to resist the temptation to experiment until some practical experience has been obtained, as there are many hidden snags in such devices. Progress must be made, however, and I feel that the sail plan efficiency must be improved before hulls which are faster under all conditions can be developed.

I have not mentioned aerofoil sails which are rigid surfaces like aeroplane wings, and have been proved to be very efficient to windward. It is felt, however, that the penalties incurred, as the rating rules stand today, by employing such sails would completely offset any increased efficiency.

It is suggested that anyone who is contemplating building a 10-rater should obtain from the Model Yachting Association the complete set of rules governing the class. There are many small points which cannot be included in an article of this nature, and a few hours' careful study of the rules is time well spent.

"Halcyon", completed, but as yet unmeasured and unregistered, has a trial run at Bournemouth. Unfortunately winds were non-existent on this occasion so that real heeled over racing shots were impossible.



AN INFORMATIVE ARTICLE
BY W. J. DANIELSNEXT MONTH THE AUTHOR WILL DEAL WITH
GETTING READY FOR THE RACE2nd & 3rd SUITS FOR "FESTIVE" AND "LADY BETTY"
ARE PUBLISHED ON THE OPPOSITE PAGE FOR THE
BENEFIT OF BUILDERS RACING THEM THIS SEASON

IN the following article an endeavour will be thoroughly to explain the fundamental principles that a yacht must conform to before she can be tuned up to a pitch at which she will give a satisfactory performance. Unless her design is correct certain unsatisfactory effects will develop to mar her performance.

It is therefore necessary to explain firstly those things that are capable of calculation and those where only experience will guide the designer.

The volume of the underbody can be computed to enable the total weight to balance the displacement. Also the centre of buoyancy can be exactly determined so that the centre of gravity can be correct to make the yacht float on her right fore and aft trim. The centre of buoyancy when the yacht is heeled over must be worked out to ensure that the yacht neither goes down by the head or vice-versa when not upright.

The point fore and aft upon which the yacht turns can be calculated and also the centre of effort of the sails but only experience can guide you in placing them correctly.

In the full-size the experienced skipper tries to get the yacht up to a point where she will sail herself without being steered. The helmsman can still feel the helm even though the rudder is straight fore and aft as owing to the fact that there is a greater pressure of water on the lee side, effort is needed to hold the tiller dead fore and aft.

In sailing to windward it is the wrong idea to think that a yacht that has a tendency to screw up into the wind is weatherly. The weatherly yacht is the sort that can get to a point dead to windward in the shortest time. A strong tendency to screw up requires the introduction of weather helm to keep the sails full and this is the equivalent of putting the brake on. Think, therefore, of the yacht falling away from the wind until the sails fill, and driving along a straight line at a close angle to the wind, coming about on the other tack and repeating the performance until a point dead to windward of the starting point is reached.

Getting to windward is a compromise. Under normal conditions the faster point of sailing is a beam wind. Directly the yacht is sailed closer to the wind, speed starts to fall off until at last the yacht is head to wind when there is no forward motion. The closer the yacht sails to the wind the shorter is the distance required to travel to reach a point dead to windward. Some yachts will sail closer to

TUNING UP A MODEL YACHT

the wind than others, but there comes a point with all of them at which the shorter distance sailed does not compensate for the loss of speed and there is in all a critical point.

Apart from hull design the performance to windward demands perfectly setting sails and the reduction of windage to a minimum. The diameter of the mast should be the least that is consistent with its ability to keep straight. If the mast is not man enough for the job, the sails will lose shape under pressure and this may be more harmful than the extra windage.

The designer must ensure that firstly at all angles of heeling the yacht maintains her fore and aft trim. He must next ensure that the boat is correctly immersed. If she is floating too high she will tend to lift as she heels over with the result that the wind will get under the hull and blow her to leeward. If, however, she is too greatly immersed, she will be sluggish in light winds.

If her lateral plane or the leading edge of her fin is too far forward, it will give her a tendency to gripe into the wind when heeled. This will demand that the sails must be further forward than practicable to overcome this tendency. Directly the wind falls lighter, and the yacht gets more upright, the tendency to gripe will diminish with the result that the sails are now too far forward and the craft will fall off the wind.

Should the centre of the lateral plane be too far off the yacht will start to steer off the wind directly she gathers speed. This is known as bolting. If the rig is moved aft in an effort to overcome this tendency, the result will be that directly the wind eases the yacht will sail into the wind and will remain so at a standstill. The only cure, therefore, is an alteration below the waterline.

In dinghy sailing it is easy to get perfection as the centre plate can be raised or lowered until the boat only requires the meekest touch of the fingers on the tiller to steer her. It must not be thought, however, that balance is purely a question of keel and sail position, as unless the design of the canoe body is, in the first instance, correct, any improvement that may be achieved by an alteration of lateral plane or rig position will only be a palliative.

It will therefore be seen that in attempting to give the final tuning to a model incorrect in design the imperfections of design must be eliminated.

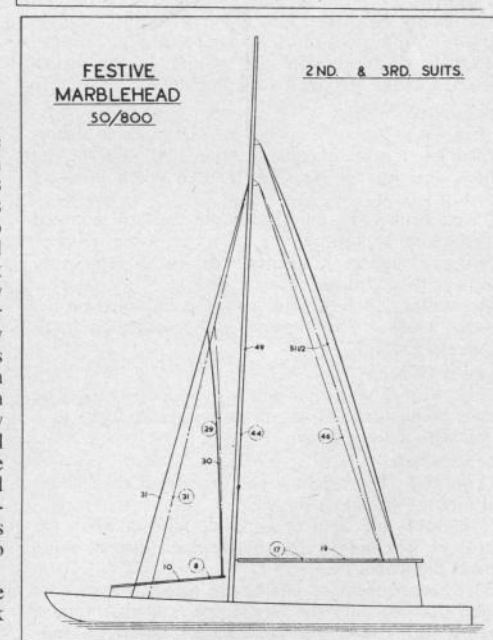
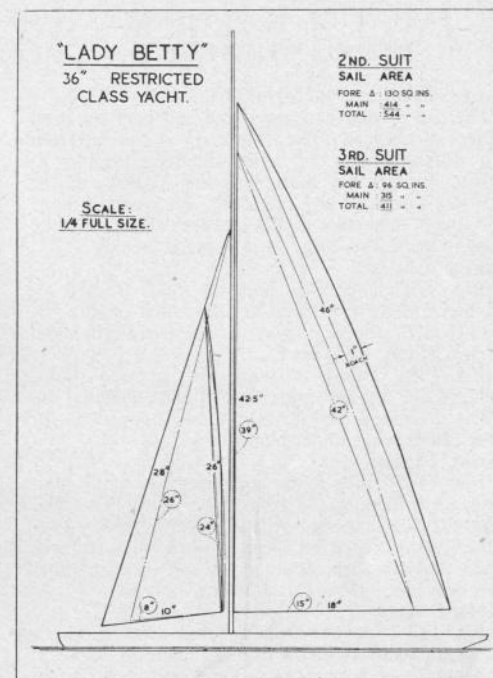
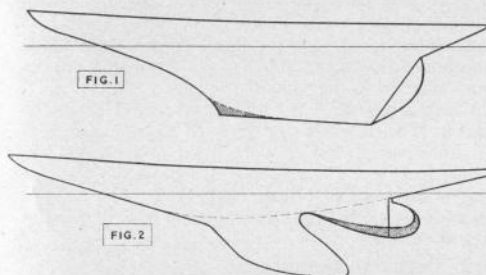
How to Diagnose Faults in Design by Test

If upon starting the model close hauled she starts to come into the wind it may be either that the rig is not far enough forward, or that the mainsail is too close for the jib setting. If upon putting the mast further forward she still persists in getting into irons it is obvious that the leading edge of the pin

is too far forward and that it has the effect of steering the model.

It is much the same action as when the right wing of an aeroplane lifts the plane steers round to the left and vice-versa. The fin of the model yacht is, however, planing in a far denser medium which makes the action much stronger to overcome.

Should the model start to steer off the wind careful note must be made as to whether it is because her rig is too far forward or the result of the lateral plane being too far aft. If the former is the fault it can, of course, be cured by moving the rig aft. If, however, the lateral plane is the cause it may be cured by reducing the area of the deadwood. In the case of a fin and skeg model the angle of the leading edge of the skeg can have a great steering effect upon the boat when heeled over. The illustrations show alterations that changed models from being unmanageable craft into perfectly docile ones.



These models were perfect in the design of the canoe body. If the canoe body is incorrect in form the subject becomes very difficult. The sport has lost many followers who after spending many hours of patient work have lost heart through working to a bad design. In one case an enthusiast abandoned a model after trying everything that he could think of in alteration to sails, etc. None of these made any difference because the model was floating above her bearings, but directly she was immersed slightly more, gave an excellent performance. Another, as per Fig. 1, required this cure, and another, as in Fig. 2, was cured by this different alteration. In Fig. 1 the model steered up into the wind directly she heeled over, and in the second case the model bolted off the wind if given steerage way at the start, but came into the wind directly the wind lightened and she became upright. After the alteration that cured her from steering off the rig was able to be put forward and cured the tendency to come head to wind if she slowed down.

The foregoing is intended to give the prospective model yachtsman a guidance of what he must look for directly he prepares a new model for racing.

PART II OF J. A. MURRELL'S MODEL MINESWEEPER

A GUIDE TO WATERLINE SHIP MODELLING

Range Finding Platform (Fig. 11)

The top of the platform is cut and bent up from a piece of tinplate. The framework is built up from two different sizes of wire soldered together as shown. In practice these supports, as those of the port and starboard gun platforms, are made of angle iron, but I think that model makers can safely make these of wire, especially in the smaller scales.

Range Finder

(Fig. 12.) The range finder is made from $\frac{1}{8}$ in. as shown. The top piece has flats filed in it. The base is made the same way as the searchlight base.

Carley Float Platform

(Fig. 13.) This is a simple job—a piece of tinplate for the top and four wire supports soldered on.

The deck is drilled to take these supports as for those of the range finder platform.

Carley Floats

(Fig. 14.) Three floats are mounted on the platform, each being made from $\frac{1}{8}$ in. wire. The wire is bent to the shape shown and the ends soldered together. A piece of bandage is sewn on to form a base. If floats are mounted on top of each other then only the top one need have a bottom.

Cable Drums

(Fig. 15.) A cable drum is fitted underneath the after gun platform. This drum is made as shown in the drawing, a piece of dowel rod with two tin end plates forms the drum. This is mounted on a tinplate support with a piece of $\frac{1}{8}$ in. wire acting as an axle.

Lengths of black wire are wound on the drums to represent the electrical sweeping cable.

Sweepwire Winch

(Fig. 16.) This winch has two large cable drums turned from a scrap end of brass and two smaller drums, the smaller ones being used when mooring the ship.

These drums run on a wire axle and are mounted on a tinplate support.

To give realism to the two drums, 5 amp. fuse wire was wound on.

A smaller winch of similar type is mounted on the wooden block. This represents the winch for hauling in the "kites".

Anchor Winch

(Fig. 17.) The anchor winch was made next. The drums being turned from brass wire and fitted to a $\frac{1}{8}$ in. wire axle as shown.

Anchors

(Fig. 18.) Two anchors were cut from sheet brass and filed to the shape shown.

The flukes are bent to an angle so that when the shank is inserted in the hawsepipe they fit snug against the ship's side.

Two small necklace chains are fitted, the anchors pulled up tight into the hawsepipe, and then chains given a turn round the winch drum, the loose ends

of the chains being let into the deck and held firm, in the position of the Naval pipes.

Boat Davits

(Fig. 19.) These were made from $\frac{3}{8}$ in. sq. wire bent to shape as shown. A piece of thin wire is soldered into the davit lower down, the other end being soldered to a rivet. The deck is drilled to take the davit arm and the rivet, the whole being glued into position. A piece of fuse wire is fixed to the deck just aft of the after davit arm, passed over both arms, a turn being taken round each and then fixed to the deck, just forward of the forward arm. This represents the guys and jack stay.

Funnel

(Fig. 20.) The funnel was made from a piece of cycle frame tubing 1 in. dia., this being squeezed to the correct oval shape.

A cap was turned from a piece of aluminium and pressed into position. The grating is made from 30 amp. fuse wire and fixed inside the funnel with a touch of glue. Six funnel guys of 10 amp. fuse wire are soldered into position. Sirens were made from small rivets and steam pipes from thin copper wire, soldered to the funnel.

A wooden plug $\frac{3}{4}$ in. high was carved to fit the funnel. This is glued and screwed to the deck. Into this four pieces of wire were fitted to represent exhaust pipes, etc. The funnel is a press fit over this plug, a smear of glue keeping it firm. The ends of the guys are pulled tight through the eyes of needles let into the deck.

Twin Oerlikon Mountings

(Fig. 21.) These were carved from wooden blocks to the shape shown. The guns were made from small nails soldered to a small piece of tin, the gun assembly being glued to the block in the position shown.

4 in. Gun and Mounting

(Fig. 22.) The mounting was too complicated to be made from tinplate so it was carved from a block of wood as shown. The gun barrel was turned from a piece of $\frac{3}{8}$ in. dia. wire, the end being drilled a little way in. The mounting is drilled and the barrel is glued into position.

This type of gun mounting is open at the back, but is fitted with a tarpaulin cover. This cover is represented by a piece of bandage stuck in position. Similarly with the tarpaulin cover over the slit in the front to allow for elevating.

A $\frac{1}{4}$ in. dia. hole is drilled in the bottom of the mounting. A piece of $\frac{1}{8}$ in. dowel is let into the deck to make a swivel pin for the mounting. A washer is placed between the mounting and the deck.

Depth Charge Rack

(Fig. 23.) Two depth charge racks are fitted and these were made as shown. A simple tin trough with

one end bent down to give the necessary lift to the forward end forms the base. A fuse wire framework is built over this base. The rack should be of sufficient size to accommodate three charges. The charges were made from $\frac{3}{8}$ in. dia. wire cut into $\frac{1}{4}$ in. lengths.

Depth Charge Thrower

(Fig. 24.) Four throwers are fitted. Each thrower consists of a piece of $\frac{3}{8}$ in. dia. wire with a shorter piece soldered on at right angles. A thin piece of wire is soldered on the thrower to give added realism. The throwers are let into holes drilled in the deck and glued.

Depth charge stowage racks are fitted and these are made from tinplate to hold six charges each.

Ship's Ladders

(Fig. 25.) Ladders are made from 30 amp. fuse wire bound round a frame as shown. The crossed wire is soldered together and when set the black portion, as shown in the sketch, is cut out, thus forming a ladder.

Rope ladders are made in a similar manner, cotton being used instead of wire.

Companion Ways

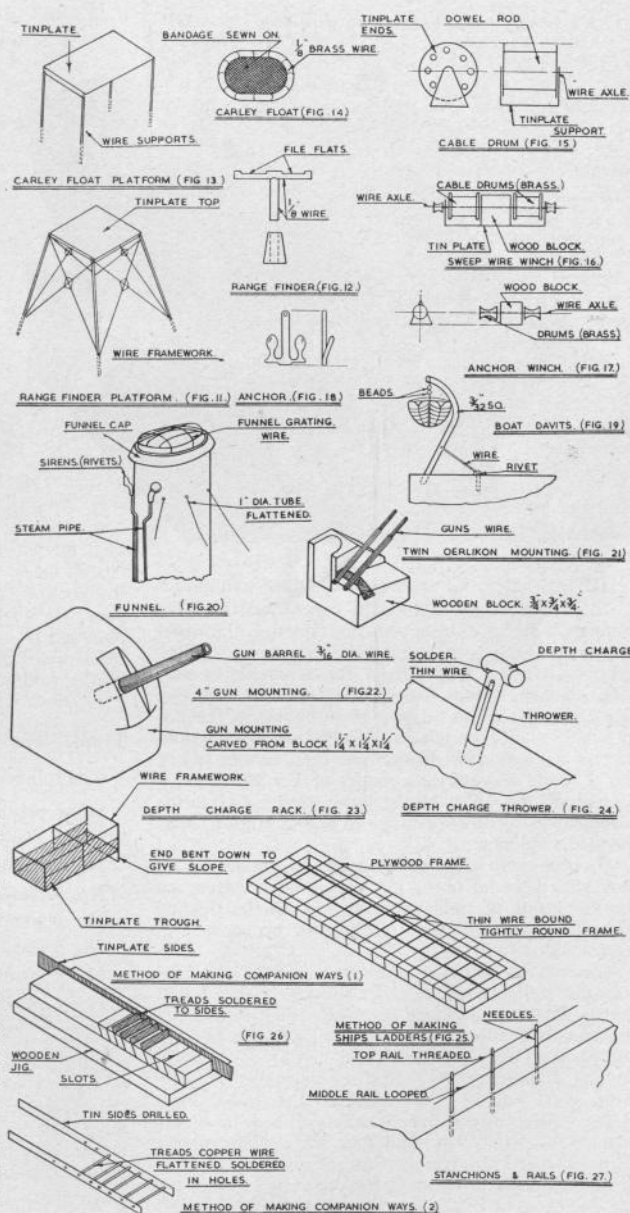
(Fig. 26.) Two methods are shown in the sketch. The first method is to cut the treads and sides from thin tinplate and fit them in the jig as shown. They can then be soldered together. Another method is to cut the sides and drill a series of holes in them. Short lengths of copper wire are then flattened, let into the holes and soldered as shown. A hand rail is bent up from fuse wire and soldered into position.

Stanchions and Rails

(Fig. 27.) The stanchions are suitable sized needles, cut off to length and hammered into the deck. A small hole was drilled in the end of a brass punch to a depth equal to the height of the stanchion. This punch was used to put the needles in, thus keeping them all the same height.

The rails are 5 amp. fuse wire, the centre rail being looped and the top one being threaded through the eyes.

(Continued on page 300)



PART I OF A SERIES
BY BERNARD REEVE,
M.S.N.R., ON A ONE-TENTH
SCALE CABIN CRUISER
FOR RADIO
CONTROL

★ The expression "Deglèt Nour" will be sometimes seen on date boxes, and is "Arabic-French for "First Choice"—a suitable name for the owner's own first boat.



SHIP modellers who visit our model exhibitions held from time to time in various parts of the country will have observed that one of the most popular exhibits is the cabin cruiser.

I have chosen *Deglèt Nour* for a number of reasons. She was built for a close friend of mine by Geo. Wilson & Sons Ltd., of Sunbury-on-Thames in 1950, and I experienced the satisfaction of watching her take shape. Her owner then commissioned me to build a water-line model of her which I exhibited at the 1951 Model Engineering Exhibition where I was fortunate enough to gain a Highly Commended Diploma.

The one-tenth scale selected gives a model 36 in. long with a beam of 11 in., providing ample space for the fitting of radio control, and articles dealing with this will run concurrently with my own constructional details.

The method of construction I used for my model was the well tried "bread-and-butter" system, and that is the method I shall describe, but if any of my constructor readers are more familiar with the rib and plank system there is no reason why they should not use it, utilising sawn ribs of "Permaply", which is in good supply from Venesta Ltd., of Vintry House, Queen Street Place, London, E.C.4, in $\frac{1}{8}$ in., $\frac{3}{16}$ in., $\frac{1}{4}$ in., $\frac{5}{16}$ in., and 1 in. sizes. This material is hard and completely weather resisting, in fact, there is no need to paint it for protection. Planking can be of $\frac{1}{8}$ in. mahogany which can be obtained

BUILDING *"DEGLÈT NOUR"

from Mr. Arthur Mullett, of 16 Meeting House Lane, Brighton.

My model was built of obechi planks 1 in. thick which I obtained from Mr. Mullett. Most modellers are familiar with this wood, but for the benefit of those who are not, let me add a word of warning. Obechi is an open-grained timber with a definite "run" of grain, so when transferring the lines to the planks prior to cutting out make sure that the grain runs one way—either forward or aft, otherwise when shaping and sanding you will find a certain roughness appears which is difficult to eliminate. Also see that your tools are razor sharp—blunt tools are apt to tear the grain rather than cut it, so make good use of your oil stone; my final edge is put on with a razor hone.

The keel is constructed of $\frac{1}{4}$ in. beech, cockpit and cabin floors of $\frac{1}{8}$ in. beech, all of which was supplied by Hobbies Ltd., of Dereham, Norfolk. The cabin cockpit bulkheads, cabin sides, which run right aft to the rear end of the cockpit, are of $\frac{1}{8}$ in. mahogany while the transom was plated with a piece of mahogany veneer obtained from a local furniture restorer. This plating is essential as it covers the end grain of the hull blocks, and gives a perfect finish.

Timber for Hull

The following is the materials list:—

- Sheer plank 1 ft. 2 in. long x $11\frac{1}{4}$ in. wide.
- No. 1 plank 1 ft. 10 in. long x $11\frac{1}{4}$ in. wide.
- No. 2 plank 2 ft. $11\frac{1}{2}$ in. long x $11\frac{1}{4}$ in. wide.
- No. 3 plank 2 ft. $11\frac{1}{2}$ in. long x $11\frac{1}{4}$ in. wide.
- No. 4 plank 2 ft. $10\frac{3}{4}$ in. long x 11 in. wide.
- No. 5 plank 2 ft. $10\frac{1}{2}$ in. long x $10\frac{3}{4}$ in. wide.
- No. 6 plank 2 ft. $9\frac{3}{4}$ in. long x 10 in. wide.
- No. 7 plank 2 ft. 5 in. long x $9\frac{3}{4}$ in. wide.
- Bottom plank 1 ft. 7 in. long x 5 in. wide.

All are 1 in. thick with the exception of the bottom plank which is $\frac{1}{2}$ in. thick. All of them with the exception of Plank No. 7 and the bottom plank have their inside portions sawn out, and No. 7 plank is obtained from the inside of No. 2, so when ordering your timber there is no need to include No. 7.

When you receive your wood you will find it is

smooth, but $\frac{1}{32}$ in. oversize on the thickness, at least that is how Mr. Mullett supplied mine. This is a good thing as it enables you to sand each surface to a dead smooth finish so essential for successful glueing.

When sanding use a cork sanding block to obtain a true flat surface, and rub down until each plank is really smooth on both faces.

Marking Out

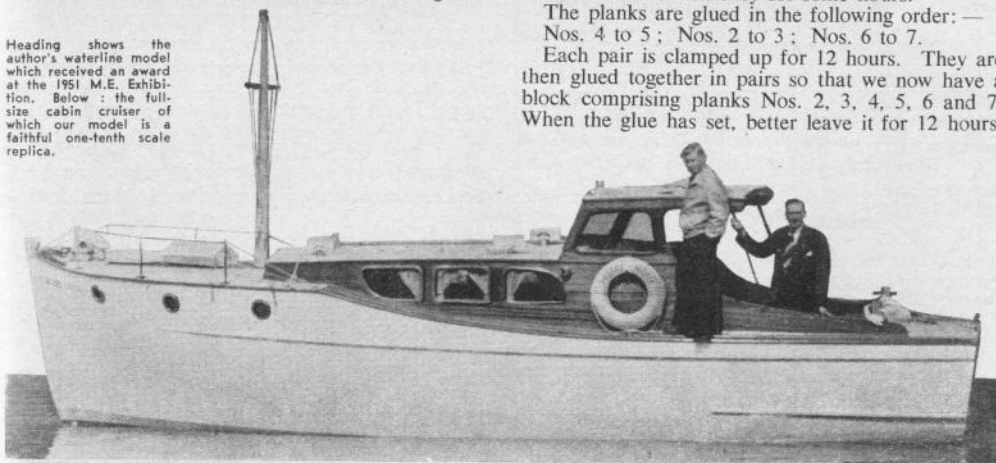
The probability is that most of my readers are already familiar with the laminated plank, or bread and butter system of construction. For the benefit of those who are not let me describe briefly the method.

On each plank rule a centre line on both faces carrying the line right around each end; then try with a try square rule in the ordinates or section lines spacing them as shown on the plan.

The next step is to mark the exterior cutting line on each plank face. To do this take a pair of dividers and starting with section 9, place one leg of the dividers upon the centre line of the body plan and the other on the curved section and transfer this measurement to the top or sheer plank on both sides of the centre line. Follow out this procedure with No. 8, and so on, until you have a series of plotted points on both sides of the centre line, then run a fair curve through these points with a batten. The second and subsequent planks are marked out in the same way, but to avoid cutting right up to the angle where the slot is cut for the stem piece run a line at a wider angle and cut to this, leaving the final shaping until the slot is cut.

The next step is to mark off the inner cutting lines

Heading shows the author's waterline model which received an award at the 1951 M.E. Exhibition. Below: the full-size cabin cruiser of which our model is a faithful one-tenth scale replica.



and here certain care is needed. Allow $\frac{1}{2}$ in. on the sides and at least $1\frac{1}{2}$ in. at bow and stern. The lines of each plank are taken from the next lower plank as when we come to the curves of the sides this curvature must be allowed for; it is, therefore, safer to take the lesser width as a guide.

Cutting Out

If you know of anyone with a power fretsaw get him to do the work for you. If not, use a coping saw, one so fitted that the blade can be turned at an angle to the frame is useful. The same tool is used for cutting out the interior of each plank. Having cut the planks to shape and cut out the inner section the section lines appearing on the top and bottom surfaces should be redrawn on outer and inner edges, this is clearly shown in the second photograph; the sheer line and the bottom curve is also drawn in as a guide for cutting to shape.

Glueing Up

Before actually commencing this part of the work you should make up six glueing clamps. These are made from any hard wood 1 in. wide, $\frac{1}{2}$ in. thick and 13 in. long, with 2 B.A. screwed rod with nuts at the bottom and fly nuts at the top. The construction is clearly shown in the second photograph. Only three clamps are used on this model as it is so much smaller. Any large ironmonger or tool supplier can supply this 2 B.A. brass studding and fly nuts.

Glue

Use one of the casein glues, there are several in general supply, Casco, Laitzo XXX, Jefferies Spar Glue, etc. These only require mixing with cold water in the advertised proportions, and they remain at a workable consistency for some hours.

The planks are glued in the following order:—

Nos. 4 to 5; Nos. 2 to 3; Nos. 6 to 7.

Each pair is clamped up for 12 hours. They are then glued together in pairs so that we now have a block comprising planks Nos. 2, 3, 4, 5, 6 and 7. When the glue has set, better leave it for 12 hours.

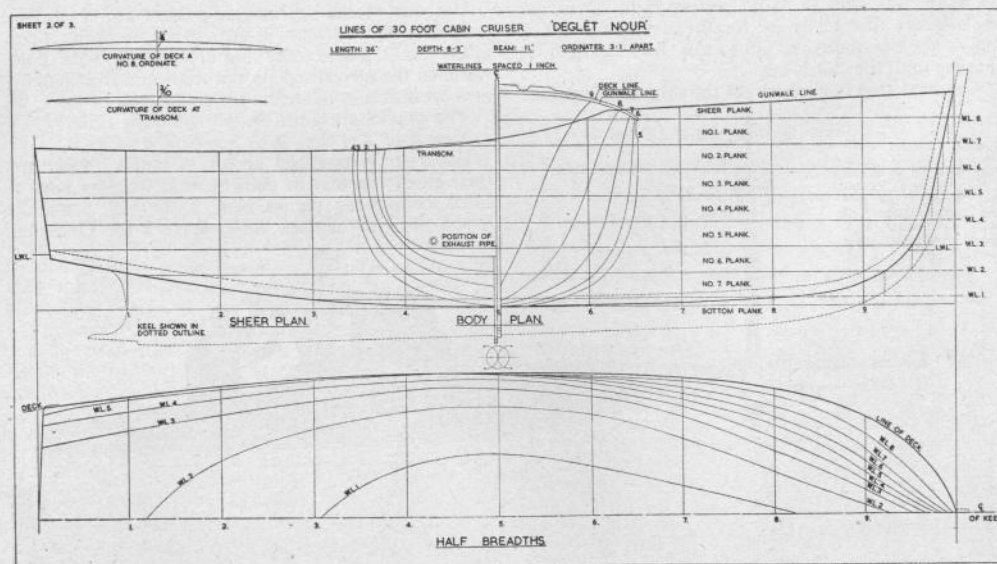
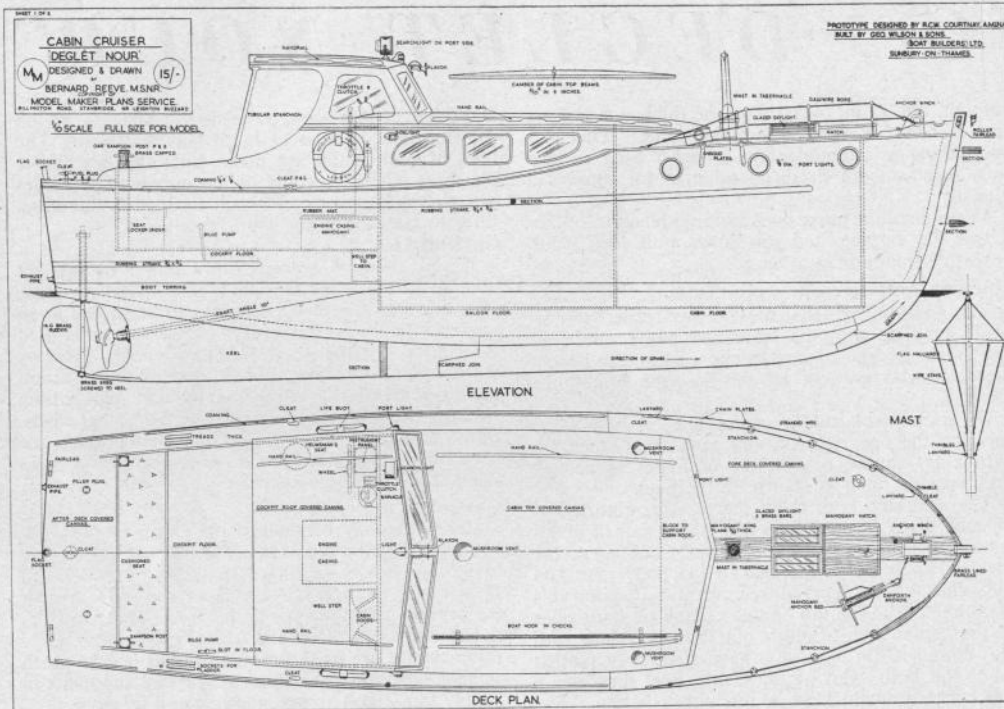


Illustration shows method of cramping planks while glueing. The cramps can be easily constructed by the builder from threaded rod, wing nuts and scrap hardwood, and are well worth the trouble.

add the bottom plank, clamp up again and add finally the sheer plank. You have already drawn in the section lines on the sides of each plank and these must register as the planks are set up.

Carving the Hull

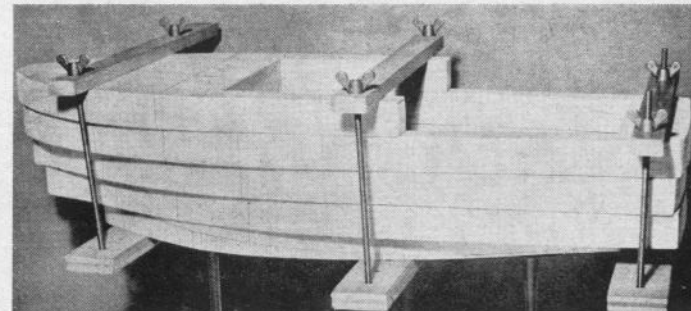
Tools I use are a small block plane, a small bullnose plane, four gouges of different sweeps, one a bent gouge for awkward places and a 1 in. firmer chisel. For roughing out I used some coarse rotary files in my Wolf Cub Drill, but as not every constructor possesses this very useful tool careful work with gouges will do the job quite well. I dispensed with a spokeshave for external work, using a 10 in. coarse file for smoothing out the gouge marks.

Before actually commencing the work of carving make up a set of hull templates from the body plan, numbering them 1 to 9, and offer these from time to time to the hull as work proceeds at the appropriate stations. Any stout card will do and this is laid under the body plan and the contour of the particular section traced by means of carbon paper—after cutting the templates I paint them with a strong shellac varnish to toughen them as they are subject to a fair amount of handling.

The best way to hold the model during work on the exterior is to screw a piece of 2 in. x 1 in. batten to the ends of the top blocks; these screw holes will eventually be covered by the deck, and hold this in the vice, thus leaving both hands free. I found by screwing an additional 4 in. length of the same batten to the one attached to the hull, by a single 3 in. screw. I could swivel the model which proved most convenient at certain stages of the cutting and shaping process.

The only way to shape the inside—at least I found it so—was to place the hull on a cushion of sacking on the bench and work single-handed with razor edged tools. Do let me repeat that you must have all tools really sharp when working on obechi if you wish to avoid tearing the grain.

Finish off the inside with glass paper on a shaped wooden block, starting with the coarsest. Get garnet paper if you can as this does not clog like the more usual glass paper. Use finer grades for the final



rubbing down. When the inside is smooth and approximately $\frac{3}{8}$ in. thick at the sides, treat the outside in the same way; mark position of ports and carefully drill these, taking care not to tear the edges of the holes.

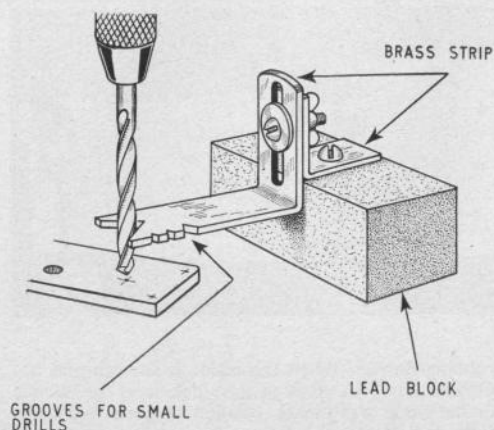
The next step is to cut the keel from $\frac{1}{4}$ in. beech or other hard wood. To preserve the run of grain from keel to stem note the scarfed joints as shown on the general arrangement plan. Now cut the slot in the hull to accommodate the keel by carefully scribing a centre line on the hull bottom and a cutting line $\frac{1}{8}$ in. on each side of it. Run a saw cut along these lines to the required depth and chisel out the intervening wood with a $\frac{1}{4}$ in. chisel. If you have left the stem head of the hull thick, as I suggested, you should now have a clean $\frac{1}{4}$ in. groove from stem to stern with parallel sides ready to receive the keel itself. Before gluing in the stern part of the keel I advise you to drill a $\frac{1}{8}$ in. hole for the propeller shaft as this is easier at this stage than when the keel is glued up, also should you not drill true. Oh, yes! I have slipped up here to my cost. It is easier to scrap a keel piece now than to chisel it out later.

Glue in the keel and shape the stem to blend with the stem piece, noting the square and taper sections as shown on the general arrangement plan, building up any deficiencies with plastic wood. I always have to do a little "fiddling" here, but you may be a better craftsman than I am and make a perfect slot.

All that remains to be done to complete this stage of the work is to drill the stern for the rudder trunk and outlets for bilge, etc.

In my next article I shall describe the cutting and fitting of decks, cabin sides and top, transom plating, cockpit roof and all similar assembly details.

THE DRAWINGS ON OPPOSITE PAGE ARE REDUCTIONS OF THE FULL-SIZE WORKING PLANS AVAILABLE TO READERS. THE COMPLETE SET WILL COMPRISE THREE SHEETS — TWO ARE READY FOR IMMEDIATE DELIVERY TO THOSE ANXIOUS TO MAKE AN EARLY START ON THEIR MODEL. THE THIRD SHEET COVERING DETAILS AND DECK FITTINGS WILL BE READY IN ABOUT TWO WEEKS. DETAILS OF PRICE, ETC., ARE GIVEN IN OUR ADVERTISEMENT PAGES.



DRILL STEADY

IT is frequently the case that when a small drill is put in the machine chuck and set revolving it wobbles. Attempts to remedy this by resetting in the chuck are only sometimes effective and a position with the least wobble has to be accepted. With this comes the problem of getting a wobbling drill started in a centre punch dent. Freedom from a small wobble is not all that important if the metal to be drilled is thin, but starting is still difficult and causes much delay and worry. To help matters in this respect the steady shown in the sketch was made by the writer. It consists of a steady arm suitably notched to bear against the revolving drill until it is started truly. This arm is adjustable for height on a lead block which can be moved about the machine table.

A GUIDE TO WATERLINE SHIP MODELLING *(Continued from page 295)*

Mast

This is of the tripod pattern, and was made in a simple wooden jig. The two legs are filed to be a snug against the main upright, and then all three are soldered together.

The yards are soldered on, and to ensure that they are square, two grooves, at right angles, are cut in a block of wood, the yard and the mast are placed in the grooves and then soldered.

The mast unit was completed before being fitted in the ship.

Ship's Boats

These were carved solid and to avoid any hollowing out it was decided to fit small canvas covers. The boats were attached to the davits by small loops of fuse wire, two small beads can be threaded on the wire to represent blocks (see Fig. 19). Gripes are fitted and were cut from thin white canvas. These, of course, hold the boat firmly against the davits.

There are numerous fittings on a vessel such as this and items such as lifebelts were made from small washers; deck lockers, signal lockers, chart tables, etc., were made from small pieces of plywood or hardboard.

The sprayguard round the bridge was built up from thin strips of plywood glued in position. The binnacle was made from a copper rivet and a piece of brass tube; voice pipes were represented by small rivets. Scramble nets were pieces of bandage bound with cotton and dyed brown.

The rigging and stays are various sizes of fuse wire, whilst the signal halyards are cotton. Navigating lights are small rivets.

A celluloid screen is fitted to the bridge, the stanchions being needles.

As much minesweeping gear as possible is fitted. Oropesa floats are turned from brass, kites are made

from tinplate. Dan buoys from thin wire and dowel rod. The elliptical buoys which go with the Dan buoys are made from small rivet heads. This equipment can be seen in the photograph showing the after end of the vessel.

When all the fittings were on, the model was painted. Two coats of light grey were applied to the superstructure and the hull. Portholes were marked by applying black enamel with the end of the boxwood stick of correct diameter. This method is quicker and neater than using a brush. The deck is painted a matt black which dried out a rather dirty dark grey, this is about the nearest we could get to an iron or bitumen covered deck, and looks quite effective. Carley floats and lifebelts, etc., were painted red and orange. Other details are picked out in black. Topmast and yards are white. Ship's name plates are two pieces of black paper with the name painted in white. A fine brush, white enamel, and a steady hand were needed for the ship's pennant number.

The model is mounted on a baseboard as shown in the photographs. This baseboard consists of a piece of wood about 3 ft. x 9 in. x $\frac{1}{2}$ in. with sides and made from $\frac{1}{2}$ in. rad. quadrant beading. A cardboard pattern of the base of the model is stuck to the baseboard and around this a plaster sea is built up. In this particular case the material used is a plastic compound, "Wall Art" (usual disclaimer) which is excellent for the job. The sea is painted in powder colour, and then varnished. The model is then placed on top of the cardboard pattern and held to the baseboard by two screws.

To complete the model a signal was hoisted and an ensign fitted, the flag and pendants being painted on cigarette paper. The flags are glued to the hal-yards and then crumpled slightly to give a more realistic appearance.

A CASCADE PRINT WASHER

BY H. A. ROBINSON

AFTER fixing, prints must be given a thorough washing so as to take away every trace of the hypo and other residues that are in the paper or emulsion. If this is not done the pictures soon begin to discolour and come out in unsightly brown patches.

To put a number of snaps into a basin and merely turn on the tap is not necessarily washing them, even if the water runs for an hour or so. Prints left thus sink to the bottom and form a solid block so that it is only those on top that are having the hypo removed. With this sort of "washing," the middle and lower prints can come out even after a really long immersion still holding as much hypo as when they went in.

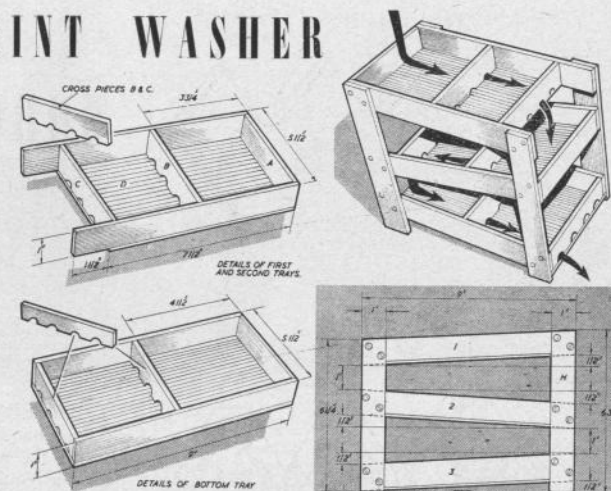
This trouble can certainly be avoided by continually turning the prints over and generally agitating them during the period, but doing this can become very tedious, to say nothing of the time it takes up. Far better if the action can be made automatic, and this is the purpose of the washer described here.

Washing is most effective at any time if the water can be made to move *sideways* over the material so that fresh approaches from one side while the hypo impregnated drains away on the other, and it will be found that the "cascade washer" does this most effectively.

To make this accessory, first construct the trays (1), (2) and (3). The side strips are 1 inch deep, 9 in. long and about $\frac{1}{4}$ inch thick, while the cross pieces (A), (B) and (C) are $5\frac{1}{2}$ in., 5 in. and 5 in. respectively. All is made rigid by the base (D) which is $7\frac{1}{2}$ in. x $5\frac{1}{2}$ in. The sections must be fitted together as perfectly as possible, but there is no need for absolute water-tightness. Small screws at intervals are used for the fastening, together with a series of sprigs along the edges of (D) up into the sides and cross pieces.

Before putting in (B) and (C), however, take out a number of holes along their lower edges to allow the used water to drain away.

The two top trays are shorter by $1\frac{1}{2}$ in. than the full length of the side strips so that the water when discharged from them falls into the tray beneath, the lower tray (3), however, is the complete length, as from here the water can, of course, just flow away down the sink. This means that the divisions of the lower tray are bigger by $\frac{3}{4}$ in. each than the upper and so can be used for larger prints, which is an advantage.



The uprights (H) are $6\frac{1}{4}$ in. x 1 in. for the lower end of the rack and $6\frac{3}{4}$ in. x 1 in. for the higher end, and are of any suitable $\frac{1}{2}$ in. material.

Assembling of the trays between the uprights is important, as each must have a half-inch drop towards the further end, the slopes being alternated as indicated in the side view. The parts are all secured together with $\frac{3}{8}$ in. or $\frac{7}{16}$ in. screws of small diameter, drilling the uprights first to prevent danger of splitting. Two screws are used at each point of connection to give rigidity and stop any tendency for the rack to 'give', although this is greatly prevented by the middle tray which acts as a tie rod.

In use, the prints are distributed evenly among the various divisions, not too many to each, and the whole frame is placed in a sink under the tap so that the water from it falls into the upper end of the top tray. The water should not be turned on too fully, the tap being adjusted so that the water flows nicely down the trays and is discharged at the bottom without flooding over the sides.

The prints left thus will be perfectly washed in about thirty minutes, but if quicker washing is desired it is good after a few minutes' running to move some of the lower prints to the top divisions, which, of course, are getting the cleaner water.

If desired, the rack can be left as it is, but a coat or two of paint or water-proofing solution will preserve the wood and prevent any tendency to warping.

The dimensions given are for the average $3\frac{1}{2}$ in. x $2\frac{1}{4}$ in. and $\frac{1}{4}$ -plate sizes, but if only V.P. prints are ever dealt with the washer can be made rather smaller, while if it is needed for P.C. or other enlargements the measurements should be suitably increased. The washer will, of course, deal with plates as effectively as prints.

FIG. 1

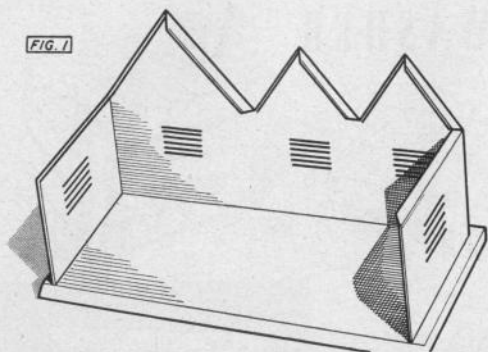


FIG. 2

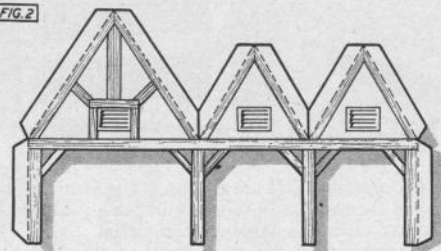


FIG. 3

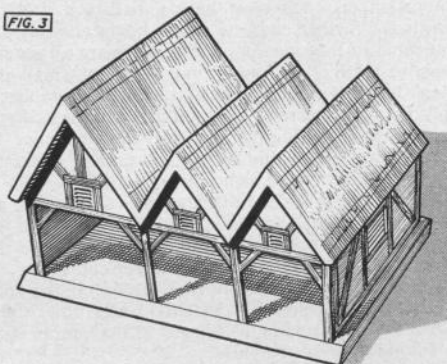
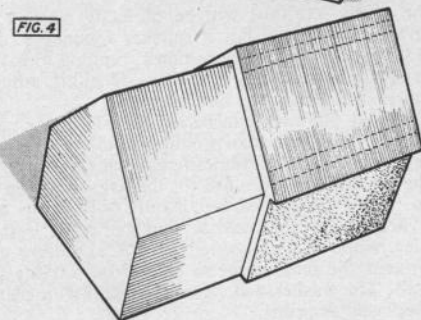


FIG. 4



MAKING MODEL BUILDINGS

AROUND THE FARM PT. II
VICTOR SUTTON DESCRIBES
HIS DUTCH BARN

Our illustration shows some of the author's farm buildings arranged—as perhaps no farm would ever be! Building on left makes extensive use of plasticine; Centre is a variant of the Dutch barn. We are indebted to Messrs. Caharbens & Co. Ltd., of Hornsey Road, N.7, for the loan of the farmyard animals and carts.

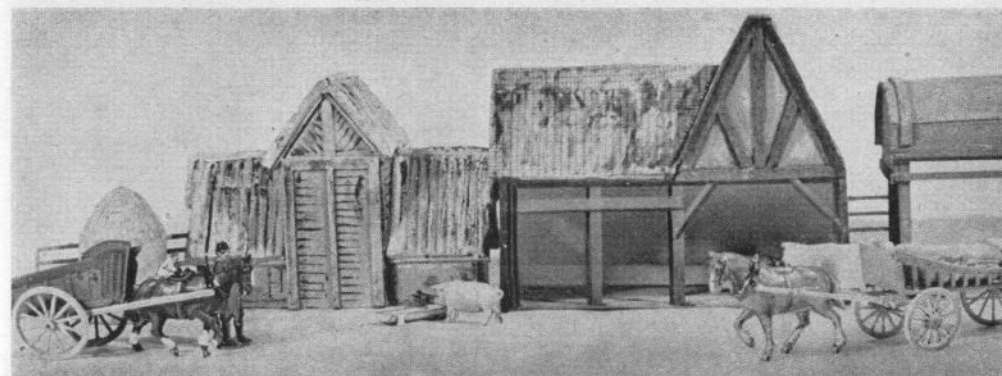
READERS may find some of the models described in this series also very useful for them to make up in the way of additions to the farm collections of their youngsters. With this in view I have planned these new ones to size and shape so that toy farm carts, tractors and other units can be used in conjunction with them. Most of these farm buildings can be made up from a collection of odd cardboard, bits of strip wood and even twigs from the garden. Paint pots, distemper scraps will all be brought into the scheme with realistic finish.

As in all my models of this type I suggest a panel of strong wood for the base. Make this 9 in. long and 5 in. deep and slope off the edge as shown so that the vehicles can run in freely. Paint this up in dull green, brown, fawn and odd streaks of colour.

Two sides and back are from stiff cardboard with two small gables and one large, which makes it a most attractive model when finished. Note the three windows or rather apertures along the back. These can be fitted with slats as seldom is glass used in these buildings. (I have mostly seen an old sack stretched over them.) Be sure that you get the fitting flaps fairly deep so that a good grip is obtained. If this is done you will avoid the unsightly buckling one often gets in a model building roof. Once buckled you can seldom get it right again. Note, also, the framework of small beams along the back and up to peaks. These should allow you to pack away when not in use without the roof caving in.

If you want to really be perfect then note the inside strips of odd wood used to make up the framework. I use $\frac{1}{4}$ in. x $\frac{1}{4}$ in. strips of wood which is too short to use for other purposes. Failing this the top boards off orange boxes strips up very easily. Do not overlook the value of any orange box from the model making angle.

FIG. 5



For a shilling they are good value.

Try out the back and sides and see that these fit well. Now for the front section.

Choose good strong cardboard for this. It corresponds with the back section along the top, but the lower part is different and allows for the open front. It is fitted at the ends with flaps. Cut out the framework as shown and then I suggest you leave it like this or make up your own very rural look beams and struts from stripwood, or I have used strips of twig cut down the centre and glued on. The small sketch shows this idea, and it is most effective. Air vents should be made along the top, and the beams here can be from stripwood.

At this stage one should paint the interior a dull cream, daubs of fawn and brown and splashings of dull green. Don't make the interior like the inside of a new building.

I have always found difficulty in making roof sections fit, especially of the gable type. However careful you are with the measurements if you try to widen a stretch something will invariably buckle. As shown, I suggest that you make No. 1 section, that is the two first gables together. Get these fitted on snugly and square. Note these overlap about $\frac{1}{4}$ in. Then you may fit the larger gable in position.

The stable is then finished, but if you want to elaborate on it you can add some of the beams as shown in the smaller sketch. Most of these sheds have a slated or a tiled roof, but one cannot quite use a standard model paper as this would spoil the whole thing. I suggest a covering of very thick dull red paint. Before dry, just scrape in the tile markings with a blunt knife. I have the spoke of an umbrella shaped down and put in an old bradawl handle. This is handy for marking and also making little jabs in plasticine or modelling paste. Create your own tools in these matters and you will concoct the finest array of contraptions imaginable.

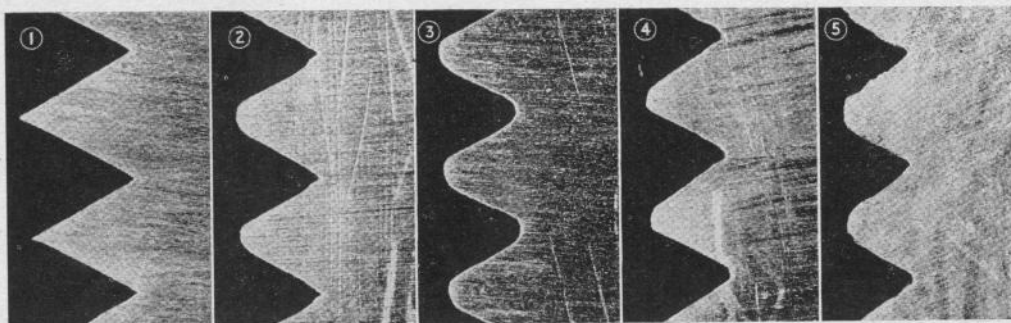
There is no reason why you should not thatch this

as I have suggested with plenty of neat bearers to take the weight. If doing this, give the cardboard roof a coating of flat grey paint and this will waterproof it, save shrinkage and help as a "key" to plasticine. Mould on in sections and then let it stand a little while. There is a sort of lacing along the top as shown in my previous article on the thatched barn. I rake my thatchings down with a fine toothed comb and larger ones with a dog's comb. Where the thatch hangs over, on the very ends, prick this in with an old wire tea strainer. Model makers, to remain popular at home, should provide these items when visiting the chain store and not augment from the household equipment.

Whilst on the matter of thatching, I will deal with the question of haystacks. Some of these are oblong, some square and other shapes may be found by wandering around the country with your eyes open. Some I have seen standing on little inverted flower pots. If you want to make a farm scene for the next exhibition (and I have never seen one yet) I suggest that you do endeavour to capture the interest of farm model buildings—it will be most fascinating and a welcome change.

The small round haystack I make up on a cotton reel wound round with some cardboard. Corrugated is the best as it forms a sort of "key". A small centre bit of reel brings up the point so that you do not have a mass of plasticine here which may lead to breakage later on. Mould the plasticine round the base and then build on the top part. Finally, streak down as I suggested.

For the other shape I suggest a good block of wood first as I have shown. Build up to the peak on this with inverted V-shape blocks. Strips of odd balsa wood stuck on as shown, however irregular, will do much to help the plastic to hold. In such model always use a wire form to get the "core". Not only does this hold it, but it makes a handy guide to your shaping and saves you getting into a muddle with your design.



FRANK HIGGINS DEMONSTRATES IMPROVED SCREWCUTTING

ALTHOUGH the screwcutting work usually undertaken in the average model maker's workshop does not require a high degree of accuracy, it is surprising how many normally careful workers accept a low standard of workmanship in this respect. This is probably due to the fact that measurement of threads is difficult and usually involves expensive equipment, and the small size of each thread renders close visual examination impracticable. Ordinary commercial taps and dies are almost invariably used in sizes up to $\frac{1}{2}$ in. dia., or even more, although the work they produce leaves much to be desired. It is, of course, difficult to cut small internal threads in the lathe, owing to the small size of tool which would have to be used, and in these cases taps and dies are the only methods available—but internal threads of about $\frac{1}{8}$ in. upwards, and external threads down to even less than this, are quite a practicable proposition for lathe work with a screwcutting lathe. Even if the lathe is used, however, most model engineers are satisfied with a thread cut by a single point tool, despite the considerable advantages to be obtained by finishing the thread with a chaser.

The Whitworth thread, which is that usually used, does not, of course, consist of sharply pointed threads; both the top and root of each thread is of round form which it is quite impossible to produce with an ordinary screwcutting tool as the latter is usually ground to a sharp point. Even if the tool point is ground to the proper form—and since this would normally have to be done by hand, inaccuracies would be unavoidable—this would still only effect the root of the thread and the top would still be a sharp point. The only practicable means of obtaining correct thread form is to use a tool which is itself shaped to that form, and which will reproduce that shape in the work. A thread chaser is a lathe finishing tool which complies with these requirements, and can be obtained either as a hand tool or for use fixed in the lathe toolholder; in practice the hand type can be used in both ways by the amateur. The

use of a chaser is of considerable benefit when making a new part to fit an existing thread, and in any case a properly formed thread is more durable and less likely to bind or seize. They are tools which are rarely found in the amateur's workshop, but possibly the photographs here reproduced will indicate that they are well worth their cost.

Fig. 1 shows a 12 t.p.i. thread as cut in the lathe on the exterior of a piece of brass rod. The rod was then cut into half along its length, the sawn face smoothed down with emery cloth and then photographed, to show the thread profile. The tool was ground in the usual way to a sharp point, and has produced a clean-cut and accurate thread, apart from the pointed threads. Fig. 2 shows the same thread—on another part of the same rod—after having the tops of the threads formed correctly by using a hand chaser. This illustrates one difficulty of hand chasers, as the tool has obviously been held incorrectly, and not exactly at right angles to the work. Fig. 3 shows the same rod, this time having been fully chased with the same hand chaser held in the lathe toolholder. The improvement in the thread form is so great as to require no emphasis.

It may be asked why go to all this trouble when the same result can be obtained by using a die, which produces the proper thread form in very much less time than that involved in setting up the lathe. Fig. 4 gives a convincing answer. This is a photograph taken in exactly the same way as the others, but showing the thread produced by a $\frac{1}{2}$ in. Whitworth die on the same brass rod; the thread form is not correct, and even the angles on each side of each thread are not equal. Fig. 5 shows how an internal thread produced by the $\frac{1}{2}$ in. Whitworth tap taken out of the same set of taps and dies as the die used to produce the thread shown in Fig. 4. In practice, these two threads should mate fairly accurately, but obviously they fit where they touch. These particular taps and dies are admittedly not brand new, but neither has been used more than about half a dozen

(Continued on page 306)

HOLDING work on the faceplate of a small lathe can be quite a problem. When the work is relatively large the fixing bolts are near the edge of the faceplate and there is often far too little room to allow satisfactory packing at the back of the clamp. If this difficulty is surmounted the truing of the work still causes trouble as an injudicious tap may collapse everything.

The set of dogs described below was designed to overcome these defects and in use has proved very satisfactory. Fig. 1 shows the dogs holding work on the faceplate.

Principle of Action

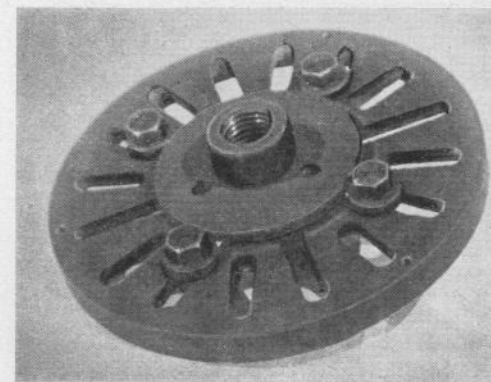
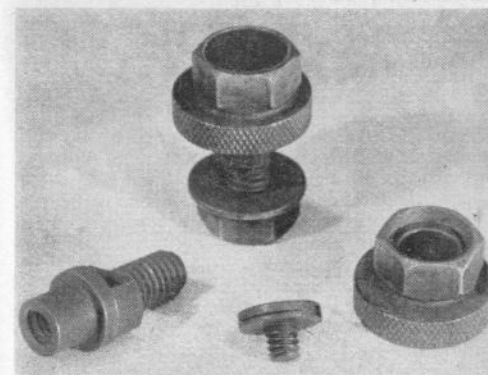
There are three parts to each dog, a central spigot on which the moving part turns, an eccentric gripping member and a retaining screw. A nut and washer is used to fix the dog to the faceplate, but no further mention of these need be made.

The gripping member has a knurled edge and can be turned by a spanner applied to the hexagonal end. When the knurl comes in contact with the work the gripping action starts. Further turning moves the work bodily. Truing up is easy because the work is under the control of all four dogs. The direction in which tightening is done is important. When the dog is toward the front of the lathe, the spanner should be pushed down to tighten. The reaction of the cut will then increase the grip. If the work is held by the inside, reverse the direction of tightening.

Removal of completed work is very simple; a sharp twitch in the forward direction will free all the dogs at once.

The sizes of the dogs are based on the use of a standard $\frac{3}{8}$ in. Whit. spanner, and a 11 in. faceplate with $\frac{3}{8}$ in. slots. The detail drawing (Fig. 2) gives all the important sizes, but the device can be increased or decreased to scale as convenient. As designed, the travel of the work is $\frac{1}{8}$ in. for 180° rotation.

Heading Fig. 1: The clamps in use on the faceplate. Fig. 2: Details of the three main parts. Fig. 3: First stages in making the eccentric. Below Fig. 4: The components and an assembled dog.



SELF-TIGHTENING FACEPLATE DOGS

BY "H.H.J."

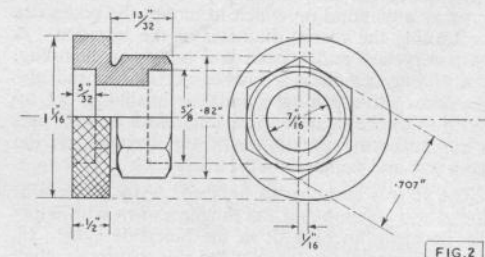


FIG. 2

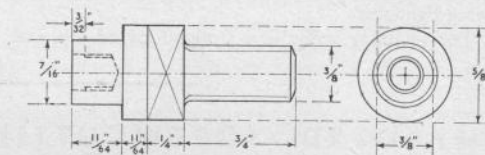
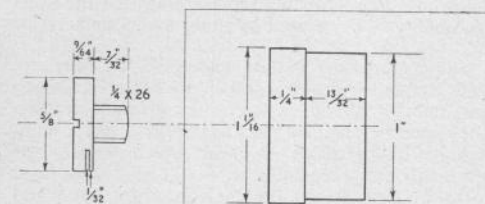


FIG. 3



tion of the eccentric; this has been found sufficient. Any considerable increase of eccentricity might cause the dog to turn under pressure and so lose grip. To allow for thick work, the gripping member is made reversible and when in this position the hexagon is between the knurled rim and the faceplate so sufficient length must be allowed to accommodate the spanner.

Construction

The exact method of making the dogs will depend on the equipment available, but a good plan is to start with the eccentrics. Mount a piece of $1\frac{1}{8}$ in. dia. rod in the chuck, turn down as shown in Fig. 3, knurl the large diameter and cut off after giving a final skim to the shoulder. Four of these pieces are needed. Now mount these with the knurl outside, one at a time in the four jaw chuck (or a self-centering chuck with one jaw packed), face, drill, ream $\frac{7}{16}$ in. and counterbore $\frac{3}{8}$ in. dia. x $\frac{3}{8}$ in. deep. The slight reduction in diameter where the piece is held gives a shoulder from which to locate against the front of the chuck jaws.

Next turn, drill and tap the four spigots that fit the $\frac{7}{16}$ in. hole. The short plain part of the hole makes for easy insertion of the retaining screw, as well as avoiding trouble from the shallow threads left at the shoulder of the screw by the lead of the die. Leave the last spigot in the chuck and it will serve as a mandrel on which to mount the eccentrics for turning the corner diameter of the hexagon. A temporary bolt and washer will serve for clamping. If a milling spindle is available, set up and mill the hexagons. If a milling spindle is available, set up and mill the hexagons. The final work on this part is counterboring the inside of the hexagon to the same size and depth as in the base.

The spigots can now be finished. Any convenient thread can be used and the tongue shown will naturally be made an easy fit in the faceplate slots. Its purpose is merely to prevent the spigot turning when being tightened.

The retaining screw is a straightforward job, but

it will be noticed that there is a small slot in one side of the head. This leaves a small tongue and before the screw is hardened, this tongue is bent outwards slightly and so give a friction grip on the base of the counterbore. This is a great convenience as it makes the eccentric stiff enough to hold in place until moved.

Hardening

All parts are made from mild steel and pot hardened. The method is to pack the pieces in a tin filled with a mixture of equal parts of powdered charcoal and charred leather, also powdered. A little proprietary hardener may be added, but if so, it must be mixed thoroughly with the other constituents. Take care that the parts do not touch one another and fill the tin completely. Close the tin, put in a good fire and leave for 20 to 30 minutes after it has become red hot. Allow the work to cool, brush off any compound, reheat and harden each piece as for cast steel. After quenching, reheat until lubricating oil smokes when applied, then leave in the oil to cool.

Modifications

This pattern of dog can be made to any convenient size so long as the ratio of eccentricity does not much exceed $\frac{1}{16}$ in. per 1 in. of diameter and with larger sizes an Allen screw and spring washer could well replace the retaining screw.

Regarding the grip, it might be worth while to modify the diamond knurl. A straight knurl could be formed and then lightly screw-cut 20 to 24 t.p.i. with a tool of about 110° included angle. The thread would not be brought to a sharp edge. When applied to the work the bite of the thread would tend to force the work firmly against the faceplate. No need of this modified grip has been found but some readers may like to try it, particularly if the knurl available is rather fine pitched.

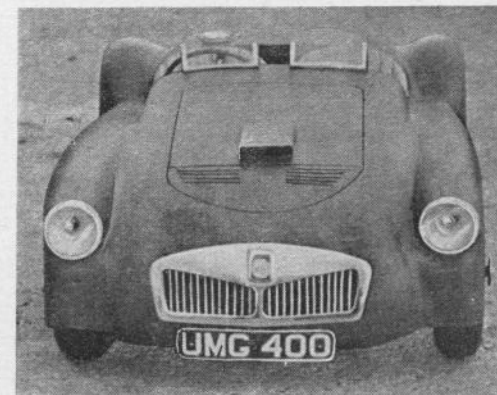
In addition to use on the faceplate the dogs will hold work very securely on the shaper and one or more bolted to the table of a drilling machine make an excellent quick-acting grip.

.75 MILLS ENGINE

LE MANS TD M.G.

G. H. DEASON CONCLUDES
HIS STEP-BY-STEP ARTICLE
ON THIS HANDSOME MODEL

Right and below: Two views of the model TD M.G., with some details still uncompleted. Note that although the prototype has been closely followed in essentials, there are few external details to suffer damage, under normal track-running conditions.



BEFORE going on to deal with the finishing of the bodywork, one or two points regarding the chassis will not be out of place. Firstly, owing to an error in the engine mount sketch the holding-down screws of the engine mount were given as 2 B.A., instead of 4 B.A., although it would in fact be possible to fit the former size. The long engine bolts are 6 B.A., and may have to be made of threaded rod if bolts of the required length are not available.

During track tests of the chassis it was found that although performance was very satisfactory on a light 35 ft. line, when the radius was decreased to 16 ft. the tank and fuel pipe position caused over-rich running, which was improved by passing the pipe direct to the carburettor through holes in the base as shown in the drawing. For maximum performance on small tracks it would probably be advisable to fit an "L" section tank ahead of the engine, but for my own part I prefer to sacrifice a little speed for the ability to fill the tank through the proper hole! The car is intended to be run anti-clockwise, and light steel tether plates are bolted to the underside of the base and cranked upwards to hub level when clear of the body. The positions of these are shown on the full-sized plan. Even with a

model of this size I do *not* recommend any attempt to attach the tether points to the bodywork direct. The engine proved an extremely easy starter, and the clutch worked sweetly and entirely satisfactorily without any preliminary adjustment. A fuel cut-off was not fitted for test purposes, but any small commercial cut-off valve can be fitted in the fuel line, with the wire arm (detachable for "looks" and transport if required) protruding from the cockpit, if the engine used has not a built-in cut-out of "air-bleed" pattern.

To return to the bodywork, this should now be finish-shaped externally with wood chisel, gouge and finally sandpaper of varying grades, wound on dowelling of different diameters to finish the various reverse curves if necessary. A really smooth finish should be obtained at this stage. Next, with the body in position on the chassis, carefully mark the position of the contra-piston screw head, and drill the hole for the Allen key to pass through. Now the rectangular aperture behind the radiator can be marked out and cut out of the nose, first by drilling a row of holes and finishing with a chisel or coping saw. The next item is the engine hatch. This is of tinplate, to facilitate the soldering on of the air

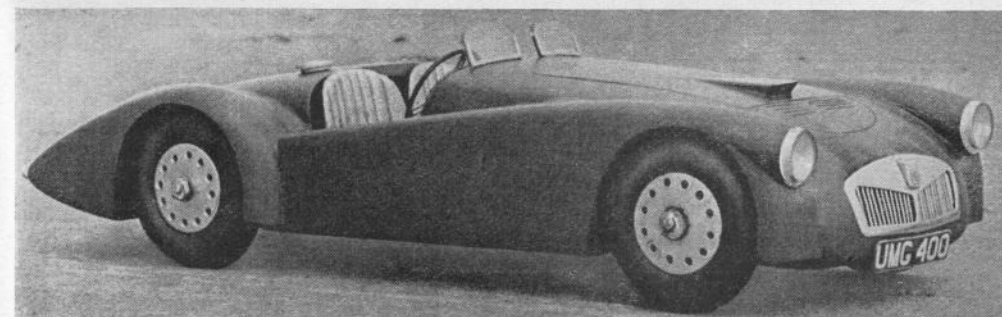
IMPROVED SCREWCUTTING

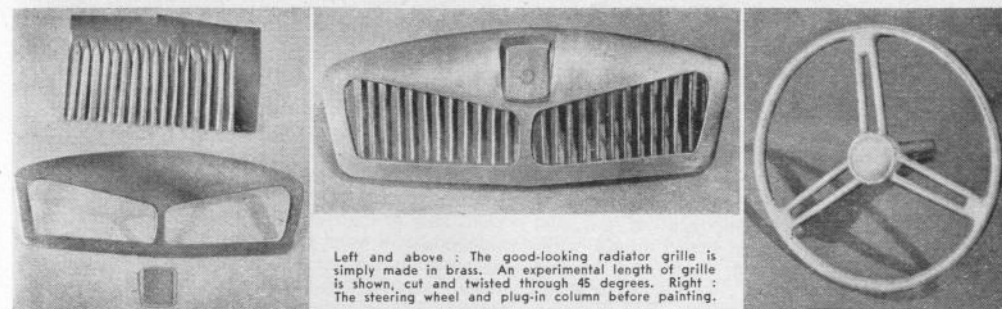
(Continued from page 304)

times, and they probably represent at least the average quality of those used by other model makers.

Chasers are not unduly expensive, as they are quite simple tools, although two are required of each size, one for internal and one for external threads. They need be obtained only as required, and a complete set for the model engineer, which would cover practically every requirement, would be a range from 10 to 24 t.p.i. (using the even numbers only) and with an internal and external chaser in each size. One chaser, of course, can be used for any diameter

of work. In use, the thread is roughed out, substantially oversize, by the usual threading tool, and the chaser can then be run over the work several times, being held either in the hand or the toolholder. It is a finishing operation, and the tool should not be expected to remove much metal each cut. A slower speed than usual is to be preferred as this facilitates disengagement of the chaser at the end of the thread, and cutting oil helps when working on steel. It is advisable frequently to try the fit when cutting the second of a matching pair of threads, or when making a thread to fit an existing part.



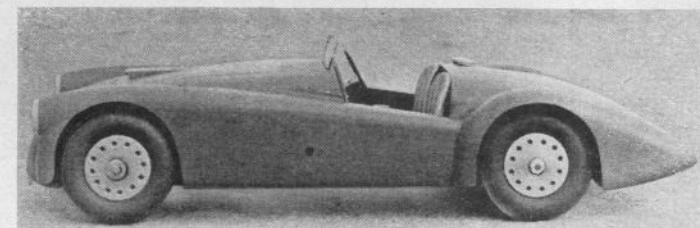


Left and above : The good-looking radiator grille is simply made in brass. An experimental length of grille is shown, cut and twisted through 45 degrees. Right : The steering wheel and plug-in column before painting.

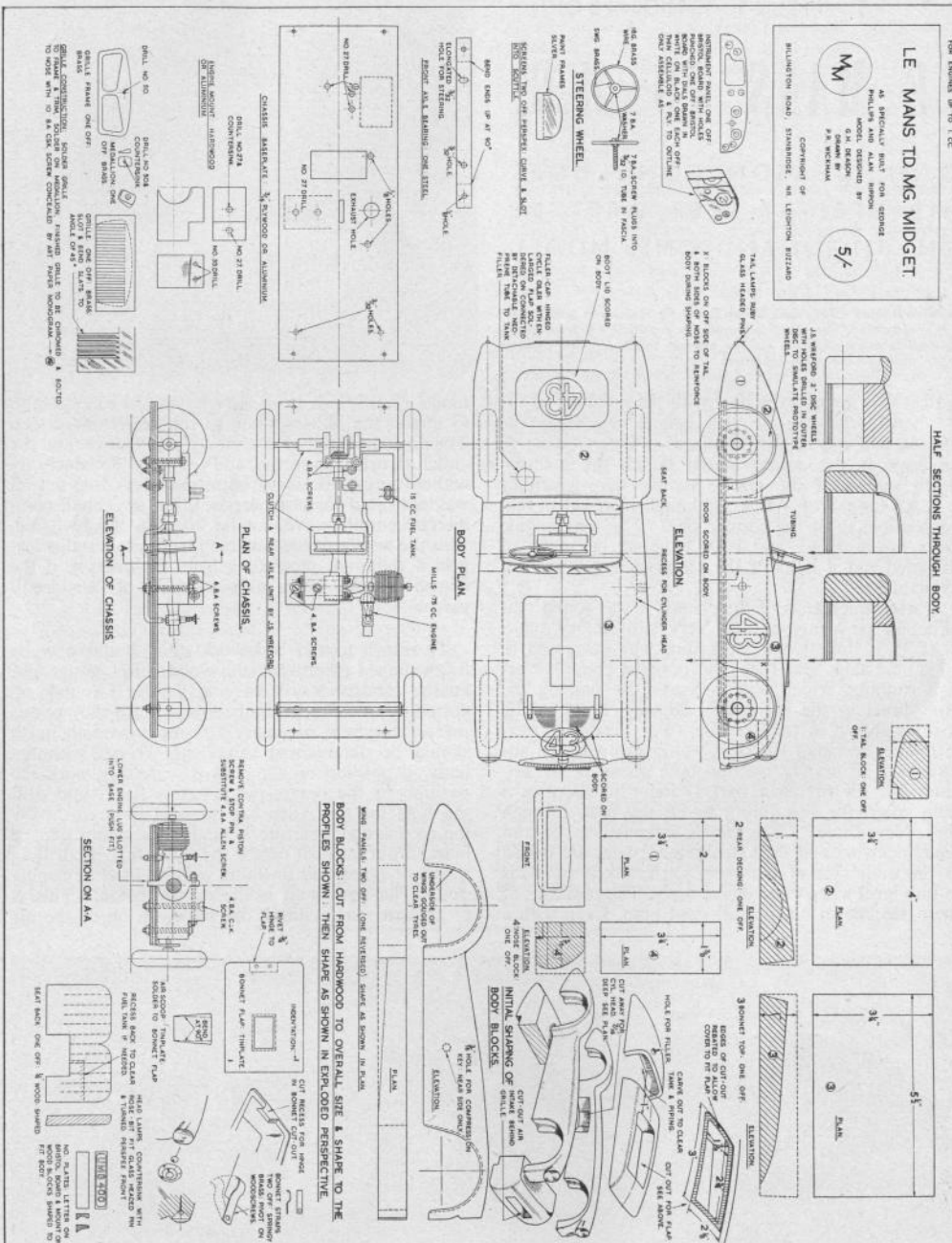
scoop as a separate piece, although those with a taste for metal-bashing could make it of aluminium, beating out the shallow scoop. In this case the hinge must be riveted in place, instead of soldered as in the prototype model. Having shaped the hatch, and before cutting out the hole for the scoop, it can be gently beaten to a very shallow curvature if you dislike an entirely flat surface, although for a beginner I recommend leaving it flat. Now place it in position on the bonnet and mark round it with a sharp pencil. Quarter of an inch inside this outline another rectangular outline is marked, and cut out completely for the necessary access to the engine. The metal cover is then carefully let in to fit flush with the top of the body, first incising the outer outline with a sharp-pointed knife and then cutting the recess with a chisel. The hinge for the cover should be of as thin material as possible, that on my own car being of the cigar box variety. This is let into the back of the opening and secured to the body with wood screws after soldering to the cover.

The body can now be hollowed out as much as is thought desirable, but this should not be overdone, as a little extra weight will not greatly affect performance. It is also necessary to gouge out about $\frac{1}{16}$ in. under the wings for the wheel clearances. With the fuel tank in the position shown, a neoprene tube must be led from the filler pipe to the filler cap on the off-side of the tail. The filler is a cycle oiler, let into the body and cemented, and having a short length of pipe soldered on to its inner end to take the flexible tube, and a brass disc soldered to the lid to bring it up to scale size. When removing the body one end of the tube is detached.

The fronts of the headlamp fairings are centred and the lamps themselves represented by drilling with a counter-sinking rose-bit. Lamp bulbs are glass-headed pins, and the fronts are "Perspex" with



A side view of the TD M.G., showing hole through which allen screw adjustment of engine is made





"... the use of first pressing
Castor Oil ..."

CONTINUED FROM
MARCH ISSUE

(b) Lubricating Oil

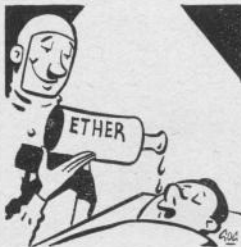
As our miniature diesel engines are invariably of the two-stroke type in operation, it becomes an essential to mix the lubricant as a component of our fuel and here I advise, without exception, the use of "First Pressing Castor Oil", for various reasons. It has excellent lubricating qualities, high viscosity, which therefore adds very considerably to the maintenance of compression particularly with well run-in engines: facilitates starting by sealing compression more effectively than is usual with the normal types of mineral oils, is considerably cleaner in running than mineral oils and keeps the formation of carbon down to a minimum, also it mixes readily with other ingredients of fuel. However, one could use some of the Castrol types of oil and they would, of course, be a lot cheaper, but whereas I would advise a 14 per cent to 16 per cent castor oil content in a fuel for a diesel engine, I would advise an increase of the lubricant content by 4 per cent to 5 per cent if the Castrol type of mineral oil is used, but, as already stated earlier, a 2½ per cent extra lubricant of either type would of necessity have to be added in addition to above, if the paraffin base oil is used in the fuel instead of auto-diesel oil.

For running in a new engine, add to start with at least another 10 per cent lubricant, slowly reducing this amount until percentages as above are reached, until the running-in process of your engine is complete, but in any case, do not add any dope of any type in any running-in fuel.

(c) Ether

Ether must be considered as a necessary evil as regards miniature diesel fuels. It has a phenomenally low S.I.T. value of 185° C. which enhances starting, in fact is the igniting component of the fuel. Also, ether has another virtue, namely its E.L. is extremely wide, 1.5 per cent to nearly 50 per cent, thus throttle settings or control are by no means critical. However, ether is more or less useless as a diesel fuel, having a comparatively low C.V. (only about 8,000 calories), as compared with 11,000 for paraffin and also, due to its really low S.I.T. it detonates and knocks very badly. Further, being — as we have

"... Ether may be considered
a necessary evil ..."



JIM DEAN ON

said—a bad diesel fuel, it is a usurper inasmuch as it displaces by its volume the main energy ingredient of a mixed fuel, i.e. one of higher C.V.s and S.I.T.s; so you must look upon ether, not as an energy producer, but as a means of ignition of base fuel and something that facilitates starting. Thus it is obvious it is of extreme importance to keep the ether component of your fuel as small as possible. My recommendations are: 30 per cent to 35 per cent (as stated by some fuel suppliers) is very excessive and soon knocks an engine to pieces, but if no dopes are used then 20 per cent to 22 per cent would suffice with paraffinic base fuels, but when a nitrate dope is used the ether content can be reduced by same percentages as of dope inclusion, i.e., if 3 per cent nitrate, then ether can be reduced from 20 per cent to 17 per cent.

Ether content can be reduced still further by using other and different additives, but I consider it wiser at this stage not to discuss this development because such additives are very expensive, much more critical in their use, and lead one into many involved consequential reactions and problems.

Now a few words about what ether to use and buy: again I say always, if possible, use the same good brand of ether and from a reliable source. If you buy either of the ethers under the following names, etc., you will be getting virtually the same thing, anyway, as far as your fuel make-up is concerned: Ethel Meth., Ether B.S.S. 579, Ether Sp. G. 720, Ethyl Ether, or Sulphuric Ether.

The above completes my diesel fuel description except for the question of "Dopes", and this point is possibly the most important of all, but please remember "Dope" affects some engines like some substances also called "Dope" affect human beings. In other words, a little under proper conditions produces good and beneficial results, but over doses bring dire and irreparable damage, so my strong advice regarding "Dopes" is "use little, and even then sparingly". There are so many chemicals one can use as dopes, and most of them are not only difficult to obtain but also usually very expensive.

Further, these dopes, like ether, are not direct energy producers, although their ultimate effect is to obtain or rather release a greater amount of energy from the base oil of the fuel mixture. My recommendation on dopes is to use "Amyl-Nitrate". This in my opinion is the most effective of them all, and



"... dope affects some
engines ..."

... FUELS FOR FANS. PT. II

requires the smallest amount added to fuel, consequently usurping the minimum quantity of base fuel. The amount that should be added should be 2 per cent for normal competition running, 3 per cent for racing and high speed work, and a maximum of 4 per cent for all-out speed and attempts upon records.

One other reaction dopes have on our miniature diesel engines is that their effect becomes progressively greater as the engine warms up, therefore, it is advisable to start your run or flight with compression on the low side, letting "comp." build up to maximum as the engine gets hot.

Before giving you some fuel formulations I would like to add a few words on what constitutes a hot engine. I have heard quite a number of people say "my engine gets terribly hot", and I have seen these so-called hot engines and believe me they are only just beginning to get warm! A small amount of smoke (actually vapour) rising off an engine cylinder seldom, if ever, indicates overheating.

Others I have seen feel their cylinders with their fingers—another most unsatisfactory method. Firstly, feel main bearing housings of crankcase—if you can just and only just bear your fingertips thereon then it is not too hot. Now to determine if the cylinder is too hot is a much more difficult job. One method is to put a drop of neat castor oil on the cylinder head before run and inspect same after run; if there is no carbonisation of the oil then the engine is running too cool; if there is only a brown stain the engine could do with slightly less cooling. If, however, there is black residue, very hard, then the engine is possibly a little overheated, but if there was no "loss of speed", or "hardening", then it was possibly just about right, so do not be misled by a little oil vapour rising off a cylinder into believing your engine is too hot. The above remarks mostly apply to diesels, although also to glow and spark ignition engines as well, but on the latter the spark plug itself can be an excellent guide.

So herewith some formulae for various fuels and their respective purposes, which I sincerely hope will prove both helpful and a means whereby that car of yours will now go like a bomb and, of course, win some prizes for you.

It should be pointed out that Formulae Nos. 3 and 4 are quite potent fuels, but will (a) tend to make the engine run rather hotter than formulae 1 and 2, and (b) will not be quite so easy to start.

One last comment before proceeding

with description of fuels for glow-plug and spark ignition engines. It is this: if you have been running your engine on a nitrated fuel then I strongly advise complete emptying of tank, then a small amount of formula No. 1 put in and start up and run for 15 to 20 seconds.



"... others feel their cylinders
with their fingers ..."

FORMULA No. 1: For New Engines and Cleaning out Runs.

1 A.	%	1 B.	%
Paraffin ...	47½	Light Auto-Diesel Oil ...	50
Castor Oil ...	30	Castor Oil ...	27½
Ether ...	22½	Ether ...	22½

FORMULA No. 2: For engine already run-in and for Normal Competition Running.

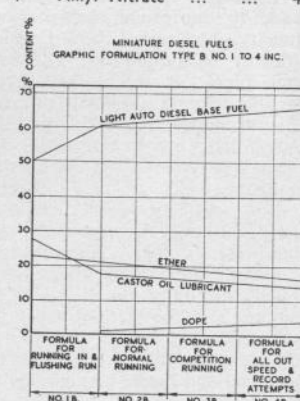
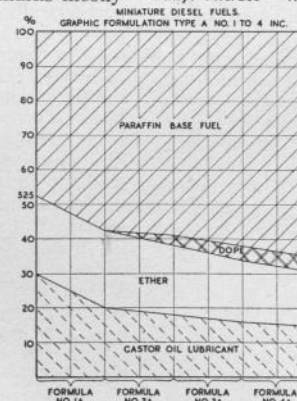
2 A.	%	2 B.	%
Paraffin ...	58	Light Auto-Diesel Oil ...	60½
Castor Oil ...	20	Castor Oil ...	17½
Ether ...	20	Ether ...	20
Amyl Nitrate ...	2	Amyl Nitrate ...	2

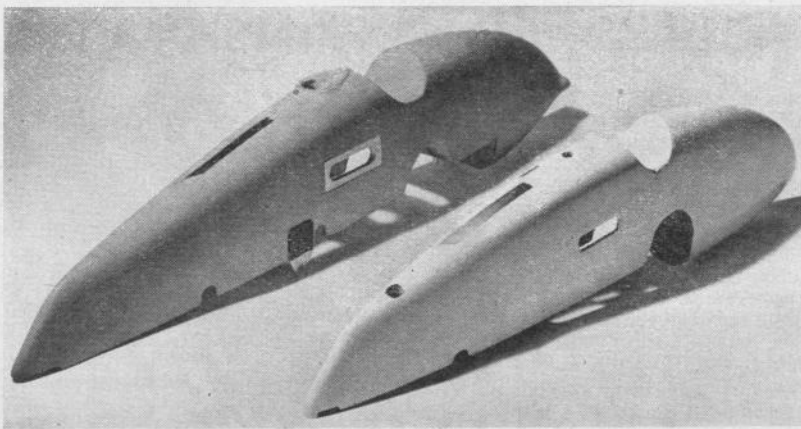
FORMULA No. 3: For High Speed Racing and keen Competition Running.

3 A.	%	3 B.	%
Paraffin ...	61	Light Auto-Diesel Oil ...	63
Castor Oil ...	18	Castor Oil ...	16
Ether ...	18	Ether ...	18
Amyl Nitrate ...	3	Amyl Nitrate ...	3

FORMULA No. 4: For All-Out Speed Competitions and attempts on records. (This fuel is not kind to engines.)

4 A.	%	4 B.	%
Paraffin ...	64	Light Auto-Diesel Oil ...	66
Castor Oil ...	16	Castor Oil ...	14
Ether ...	16	Ether ...	16
Amyl Nitrate ...	4	Amyl Nitrate ...	4





If you are building a powered model car, be it scale, semi-scale or frankly non-scale, the M.C.A. rules require that it carries a certain minimum of bodywork. The only way I know of avoiding this is to build a scale model of some stark Special, such as an early Bolster . . . and even then, you'd have to model the kitchen chair seat!

Quite a number of people, myself included, seem to dislike this bodybuilding part (Shame!—Ed.), and the two methods to be described are the results of my efforts to make it as easy as possible. Although I have illustrated the application to my own non-scale cars, it is equally adaptable to scale bodies, and just as a matter of interest I have shown the alternative method, suitable for envelope bodies, used when making my Gardner Record car, way back in '48.

Since metal beating is an art which it is difficult to conduct without annoying the neighbours, my more recent attempts at bodywork have all been of wood. There appear to be quite a number of ways of making wooden bodies, from the "one solid block" to "horizontal bread-and-butter" systems, but after trying several of them, I decided that they could probably be simplified. The main snag with the single block, or two blocks joined on a centre-line, was that I found it difficult, on my own close-cowled cars, to hollow the inside out sufficiently without finding that when I came to carve the outside shape, I had gone too far. It requires a large number of templates, which are very difficult and time-wasting to draw, and very careful carving was necessary. The bread-and-butter system was better, since the sections were so much shallower, and could be carved as separate pieces, but I was not keen on the multiplicity of joints, the difficulty of aligning all the sections, and the method generally was slow. The first move in the right direction was seen when a fellow club-member produced an all-balsa body with the bread-and-butter laminations vertical. Since the

BODY

IAN W.

car was very much narrower than it was high this reduced the number of laminations (in this case $\frac{1}{2}$ in. thick) from nine to five. This is the system shown in sketches 1 (a) and (b).

A start is made by making a card template on

the centre line of the car, which will just clear the "works". This is then placed on a sheet of hard $\frac{1}{2}$ in. balsa and marked round, and some convenient datum such as the rear axle pencilled in. A true side-view of the body is then drawn on to the same piece, either from the drawing layout of the car, or if you prefer to design as you go, round the inner profile just marked, allowing the required thickness of wall. Over the engine and tank, where space is restricted, the wall thickness can be down to $\frac{3}{8}$ in. or less finally, but in the initial marking-out it should be left at least $\frac{1}{2}$ in. At the extreme front and tail, where internal space is not at quite such a premium, a thickness of about $\frac{1}{2}$ in. can be left. Since the piece is only $\frac{1}{2}$ in. thick (or even $\frac{3}{8}$ in. on a small car) there will not be a lot of shaping laterally on this section, so that only a small allowance need be made, except near the tail, where the $\frac{1}{2}$ in. depth will take care of it. This section can now be cut out, inside profile first, then the outside. This can be done with a coarse fretsaw. Now place it in position centrally on the car, and fasten in position temporarily by transparent adhesive tape front and rear. Another layer of $\frac{1}{2}$ in. should now be offered up to each side. This section cannot easily be drawn out, but the inside will certainly need to be cut out completely where the cylinder comes, but in front of this point it will be a case of "cut and try", to clear the fuel tank, etc., at the front and the battery at the rear. In the case of glow-plug or diesel, of course, the necessity of hollowing the tail is not present, but if desired, it can be done for lightness or to adjust the weight distribution. This carving to clear the works is relatively easy, since you can see what is fouling by having only the one side at a time to deal with. The final external shape must be borne in mind, particularly at the front. This external shape can now be roughly formed, after pinning the two sections just made to the central backbone. It is

BUILDING WITHOUT TEARS

MOORE PROVIDES REALLY PRACTICAL ASSISTANCE

now fairly simple to add the two outer pieces, which will be rather smaller and have no cut-out right through, but be carved out as necessary to clear. The maximum thickness of these two layers can be adjusted to give the correct final width, which in the case of a 10 c.c. cast-pan type car will probably be between $2\frac{3}{8}$ in. and $2\frac{1}{2}$ in. The method is obviously similar with spur gear or scale cars, except that there will need to be more sections. In this case it may be found easier to make the laminations horizontal, as in normal practice. The three middle sections can now be finally glued together with whatever type of glue is preferred. I have used both balsa cement and Seccotine quite satisfactorily, whilst a resin glue such as "Aerolite" would be excellent, if it can be obtained. The final carving of the inside can now be completed, before the two outermost solid pieces are fitted, which is done next. After the whole is thoroughly dry and hard the outside can be finish-shaped with the chisel and some fairly coarse sandpaper, of about M2 grade. A high finish is not necessary at this stage. Holes as required for the cockpit, exhaust and air inlets are now made.

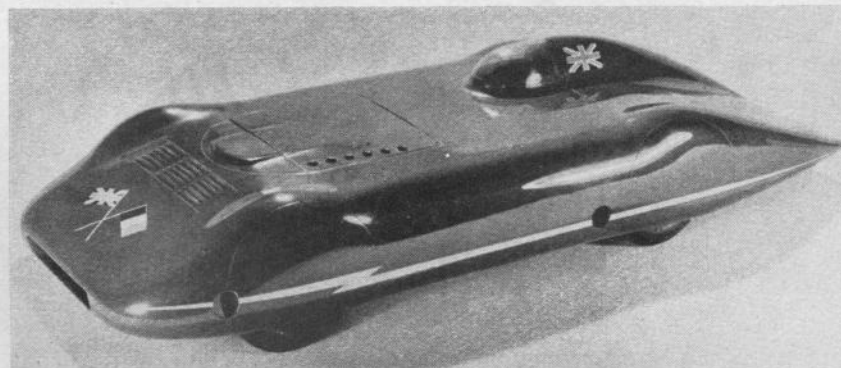
For a really good job, it is advisable to cover the body with either silk or nylon. This is not absolutely necessary, but it does make it far stronger, and does not show so many cracks after a season's use. These cracks are mainly in the paint, and are caused by slight movement of the wood, and the silk appears to hold it together better. I personally prefer the lightest available silk (ex-parachute), although I used nylon on the Gardner car. This is quite easily applied, using "Gripfix" or white photographic paste (characterised by the smell of almonds), obtainable in tubes from any photographic house at about 1/3d. Start by laying a streak of paste down the centre-line of the body and placing the silk centrally on

this. It can then be pasted right down the side, and should follow the shape fairly easily when folded down over the bonnet and tail. In doing this you will probably find that a fold of spare material occurs, most likely at the very front or near the cockpit. This can be slit up as far as is necessary, from the bottom, and the two pieces overlapped, which will in effect restore the continuity of the material. Since the silk is so thin the double thickness soon becomes lost during the painting and filling operation. The bottom edge of the material can now be trimmed and run round the bottom edge of the body and up inside for about $\frac{1}{2}$ in., and the cockpit and other holes treated similarly. After it has dried thoroughly, fill with cellulose filler and undercoat, and then finish in the desired colour, fuel-proofing if necessary.

With the extremely close-fitting bodies such as I use this system involved the reduction in wall thickness to very thin section, and with balsa the bottom edge tended to become too thin to stand much knocking about, so it was decided that a harder wood for the bottom would be an advantage; it was found that when this was incorporated it would be possible to alter the system and reduce the number of pieces still further. This is the second method to be described (Figs. 2a and 2b), and by which I have now built several bodies, finding it very easy, quick and satisfactory.

The backbone of this type is a piece of $\frac{3}{8}$ in. or 1 in. thick pine, as long and as wide as the car. On this is marked a centre-line and a plan view of the car at the greatest point. This external shape is not cut out until later, as the spare wood is convenient for gripping in the vice. The rear axle position, engine centre, etc., are marked as datums. The centre is then cut out sufficiently to clear the inside

(Above left):
"They come in all
sizes." An un-
finished 5 c.c.
body (left) and a
completed 2.5 c.c.
body built by the
methods described.



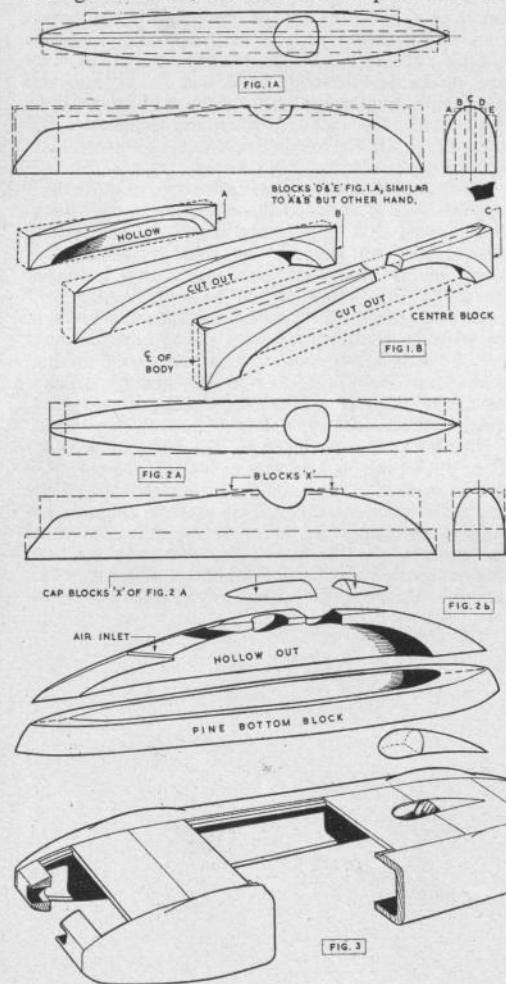
A beautiful example of scale bodywork, the author's Gardner M.G., which held 10 c.c. long distance records in addition to Concours successes.

bits as before, but this time, of course, in the horizontal plane, and the partly shaped piece fastened to the pan. We now get hold of two blocks of balsa, each half the width of the car, and about high enough to complete the body. The inside of first one and then the other is carved out and fitted temporarily. This is relatively easy to do, since you can see where it fouls, and keep on carving away until it fits up to the centre-line of the bottom (pine) block. For a start, a semi-circle the radius of the cylinder plus $\frac{1}{16}$ in. should be marked top and bottom and cut out right through, and a rough gouge taken out to clear the tank. If it is decided to admit cooling air via the now popular centre slit, or through the front, this can now be positioned and

cut out, since the face of the block is on the centre-line. It will, of course, be recessed only half the depth into each piece. The outside profiles can now be cut, both plan and side in the balsa, and plan only on the pine piece. When assembled these three pieces form the major part of the body, the only remaining piece needed being a small piece to put over the cylinder to replace that taken out for convenience. All parts can now be pinned together and the outside shaped. A final taking-apart and removal of any spare internal wood can now be done. The great advantage in this system is that it is so easy to remove the material without elaborately shaped gouges. All my bodies have been done with only two gouges, one about $\frac{1}{8}$ in. radius and the other about $\frac{1}{16}$ radius, plus a flat chisel $\frac{1}{8}$ in. wide. If possible, get hold of proper "carving" gouges, and not joiners' gouges, the difference being that the bevel in the carving gouge is on the outside, and not inside as on the joiners' variety. The blocks can now all be glued together, sandpapered off and covered with silk, and finished as before.

One point which has not been covered, and which may need to be considered before final silking is done, is the method of holding the body down on to the pan. I personally still have a preference for a brass plate let into the body and fixed, with a lug projecting below, through which two screws go into threaded holes in the pan. If this system is used, the plate should be fairly large, with two or three screws or rivets well spaced in order to spread the load as much as possible. The other popular alternative is to fit two small turned aluminium knobs on to the side of the body, and piano wire clips on the pan which can be hooked over these; rather like the hook and nail on a chicken-run gate!

The individual builder will no doubt be able to improve on my way of making bodies, but anyone who is contemplating a model of the streamlined Cooper may be interested in the following brief description of my Gardner body (Fig. 3). Two side-members were hollowed out to clear the wheels, etc. These included the bulges and all difficult curved side shapes. They were then joined across front and rear with pieces of hardwood which were cut to the appropriate shape. The top edges of the side members were rebated, and pieces of cigar box, similarly rebated at the ends, glued across. The engine access panel was cut clear and replaced by a hinged aluminium cover, whilst the cockpit hole was made and a box of $\frac{1}{8}$ in. balsa fitted, which contained the seat, steering wheel, etc., glued in position from underneath. The headrest fairing was carved and hollowed out and then glued in position. The whole body was covered in nylon and upwards of thirty coats of dope, filler, paint and fuel-proofer applied, the whole being rubbed down at intervals. Blocks were glued underneath fore and aft, and fitted with "Oddie" spring clips, which held the body in position.

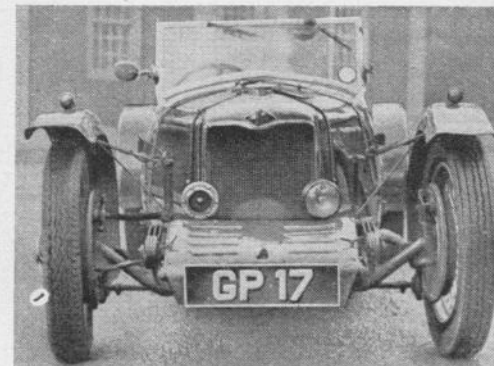


PROTOTYPE PARADE No. 36

THE
BROOKLANDS RILEY

DESCRIBED BY G. H. DEASON

Right: Purposeful front end. The low radiator is emphasised here by the temporary absence of headlamps, which are normally fitted to this model.



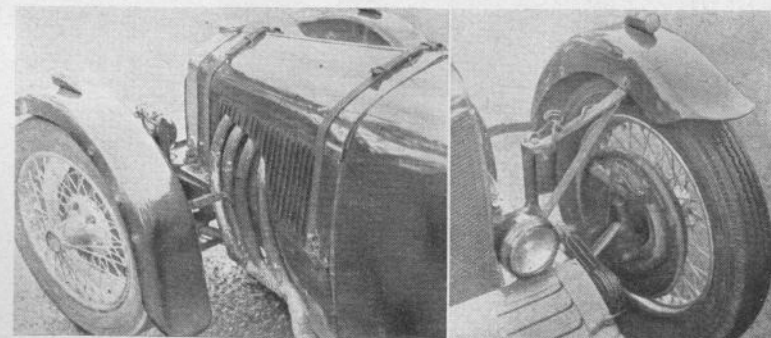
THE Riley Nine, apart from its general excellence as a normal motor car, can claim with the M.G. and the smaller unblown Bugattis to have been the "primary trainer" of more famous racing drivers than almost any other car. When in 1927 the little Nine replaced the excellent, if somewhat stodgy, s.v. models, the motor public was enchanted with its modern lines, excellent road performance and manners, and its "silent third" gearbox. Sundry gentlemen whose life work consisted of making motor cars go faster than their designers intended that they should, however, were already casting a speculative eye at the new power unit, with its clever two-camshaft, high push-rod valve gear, and 90 deg. valves in hemispherical cylinder heads, and sundry other features likely to lend themselves to their craft.

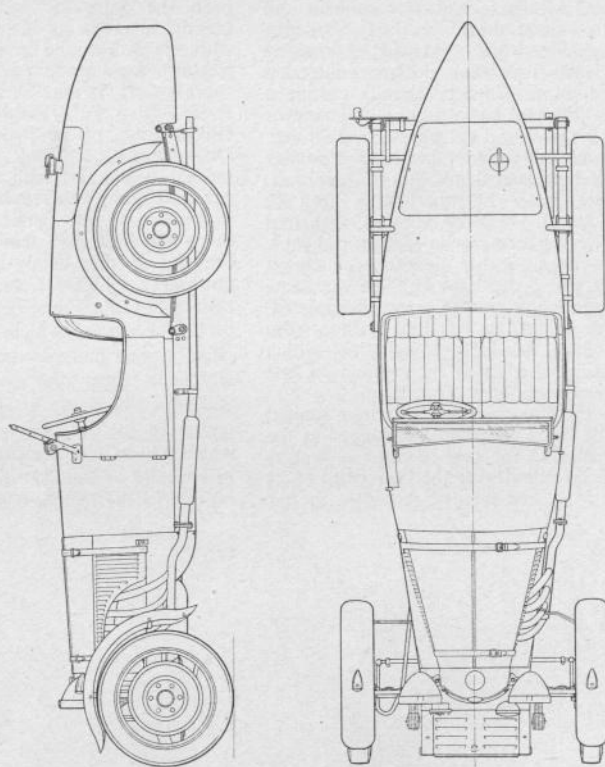
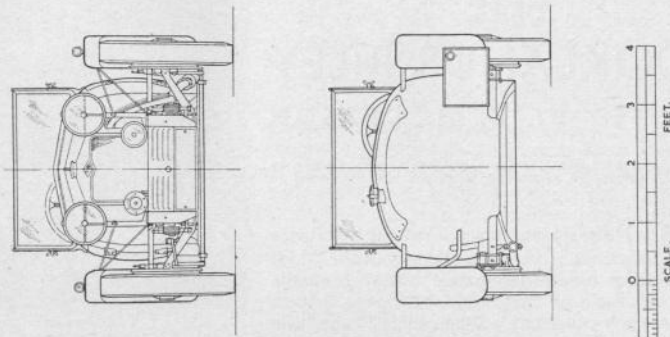
Amongst these were the uncrowned king of Brooklands, the late J. G. Parry Thomas, and Reid Railton, and it was the former who commenced work on a Riley Nine chassis with a view to producing a racing car. His tragic death at Pendine the same year occurred before the enterprise was completed, but the work was carried on by Reid Railton, who went on to produce the first racing Nine, which immediately distinguished itself by winning its first race on the Outer Circuit at 91.37 m.p.h.

Shortly after this the car was put into limited production by the Riley company, catalogued as the Speed Model, which to the best of my recollection remained its official title during the four years of its manufacture; to all and sundry, however, it has always been the Brooklands Riley. The car was an immense and immediate success with private owners, for not only was it that rare bird, an "off-the-peg" racing car, but it was obviously capable of breaking the

long domination of the 1100 c.c. class by the French *voiturettes*, the most successful of which had been the Salmsons and Amilcars. Names now famous in motoring history began to be associated with the Riley, and amongst drivers with already established reputations who drove the *marque* with success were Sammy Davis, H. W. Purdy, Capt. G. E. T. Eyston, A. F. Ashby, Cmdr. Whitcroft, Victor Gillow and, of course, the redoubtable Freddie Dixon himself. Many more rose to fame from modest beginnings with this safe and speedy little car, as I was given reason to remember when I was introduced to the perfect little specimen which is the subject of my photographs and this month's drawing, in that happy hunting ground of exciting machinery, Chiltern Cars of Leighton Buzzard. The history of G.P. 17 had been traced, and it was found to be the car on which Whitney Straight, later to make a great name in motor racing in a phenomenally short time, first essayed competition driving, and which he drove at Shelsley Walsh before graduating to the K3 Magnette and the big Maserati which gained him the hill record. The little car is in virtually original condition, with the possible exception of the front wings, which, at anyrate in the

Right: Details of the four branch exhaust system, louvers, brake back-plates and wing mountings.





THE BROOKLANDS RILEY

DRAWN BY

MAURICE J. BRETT.

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BILLINGTON RD. LEIGHTON BUZZARD. BEDS

MM

2/6



Left : One of the trimmest models of the late Vintage period, the Riley is low by modern sports-car standards. Note the doors extending into the scuttle.

a common float chamber to each pair. The Riley was one of the first cars to be sold with the now fashionable "remote" gear lever, a tiny control

placed centrally with the hand brake. The instrument panel carries its row of modest dials across its full width, and originally a rigid steering wheel was fitted, from the centre of which protruded the hand throttle and ignition levers as fitted to contemporary touring models. The fuel tank is in the tail, with an external filler, the tail also housing the spare wheel.

A number of these grand little cars are still performing with great zest in club race meetings both here and abroad, to remind us that in their heyday they were practically unbeatable in the 1100 class. Long distance Brooklands records fell to them in 1929. In the same year G. E. T. Eyston won his class in the Irish G.P., and Sammy Davis scored another class win in the Tourist Trophy, being the first unsupercharged car home, irrespective of capacity. In the 1930 T.T., another class win was chalked up, coupled with a class lap record, at 66.82 m.p.h. 1930 also saw Victor Gillow's hair-raising ride to victory at Phoenix Park in the Irish G.P., in the car which subsequently passed into Freddie Dixon's hands and achieved immortality as the "Red Mongrel". In the course of his astonishing drive at Phoenix Park, Gillow broke the unlimited lap record at 76.7 m.p.h., despite the presence of nineteen supercharged opponents. Truly the Brooklands Riley has earned its place among classic British sports cars of the past.

earlier models, were longer, and swept back as far as the scuttle. My pictures, I fear, are not as clever as they might be, my excuses being that within a couple of minutes of taking them a brisk snow storm happened, and the light matched the weather, whilst my rapidly advancing years must have thinned my blood to the point when I find motoring of this calibre in winter a perishing cold business, and chattering teeth are not conducive to a steady camera hand. Nevertheless, in my brief acquaintance with GP 17, she proved to have lost none of her powers during the years that have played havoc with my own.

The principal structural features of the Brooklands Riley as distinct from the standard model, are a considerably lower chassis of somewhat different shape, which gave what was in its day an "all-time low" in seating positions. It was said that you could place the palm of your hand on the ground when normally seated, and other less printable, if more picturesque, descriptions were applied to it also. The Riley radiator was retained in a drastically cut-down form, the radiator cap being 31 in. from the ground. A pretty long tailed two-seater body held two people side by side, provided that they left their heavy overcoats behind, and full lighting equipment, a skimpy hood and a generous windscreen, were standard fittings. Viewed from the side the early models were if anything a trifle too long in the tail, and later years produced a shortened version.

Right : A familiar view in the early 'thirties. The additional number-plate makes doubly sure that the law is complied with.



A MAN & HIS MODELS

ERIC SNELLING

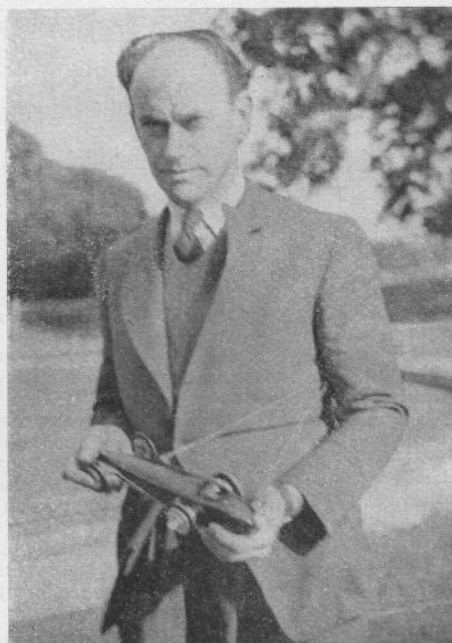
IF you have attended any of the Edmonton Model Car Club's race meetings you will have observed that our victim of this month has only to stick his nose into sight, when a bunch of members promptly make a bee-line in his direction, as from a parcel under his arm he produces a collection of model car components. An engine, a complete spur gear assembly, a machined pan for a new "proto" and other essential bits and pieces are distributed to the eager throng much in the manner of Santa Claus giving away presents, for Eric Snelling is the Club's universal provider, and many of the cars in the E.M.C.C. show signs of his handiwork. Indeed, several complete cars have been constructed by him for less fortunate members.

Eric's first bow to the model car world was in 1948 (although his first miniature engine, a two-stroke, which worked, was constructed as far back as 1938), when in company with his brother he built and operated a fearsome black device which emitted a beautiful howl but displayed a singular lack of urge due to clutch-slip. This having been remedied, the chassis was clothed in a shapely Healey saloon body, and in this form was a familiar sight in competitions. The engine and chassis were the work of Eric, whilst Alec looked after the "carrosserie".

This was followed by the Maserati, constructed entirely by Eric. The motor was a 5 c.c. unit of all-steel construction with two-ring alloy piston, running "t'other way round". The bodywork in its original state was simple and had no external details. Front suspension was by trailing arm torsion-bar units, and knife-edged wheels were used. This motor was persuaded to go very fast indeed, and gave the Dooling boys something to think about when installed in the "Fish" — a streamlined projectile — it achieved a speed of over 90 m.p.h. "Dorfi" as the Mas. was named (after Eric's wife), was much beautified during 1950, and appeared with outside exhaust, windscreen, steering wheel and realistic wheels on all four corners.

A 2.5 c.c. direct drive diesel followed next, and was the power unit for a very pretty little Lago Talbot which topped the 50-mark on the occasion of its first unofficial outing at the Horticultural Hall. Experimental streamliner bodies have been used with this unit, one modelled on Cobb's "Railton". Next on the list was the beautiful 10 c.c. B.R.M. This too has an all steel brazed-up engine, and is magneto ignited. Wire wheels, torsion bar front suspension and a cast underpan are featured, and this car is capable of speeds exceeding 90 m.p.h.

These three main projects have been interspersed with various other jobs, the "Fish" previously mentioned being built to test the streamline theory. This



car and the 5 c.c. engine were written off by a collision, at some 80-90 m.p.h., with the Edmonton safety fence during the summer. However, the motor has arisen, Phoenix-like, from the ruins, and again propelled the Maserati on its first outing towards the end of the season.

A 5 c.c. direct drive diesel was constructed in 1950 and was passed on to Alec for installation in a very streamlined car, but so far nothing has been seen of this project. A split single of 10 c.c. with a charging pump was built, and installed in another Maserati; this car and motor made one or two appearances during 1950, but the idea has been shelved for the time being. A 5 c.c. glow-plug motor was also built and run in 1951, and although identical with the power unit of "Dorfi" and the "Fish", performance was nowhere near as good. Eric has also constructed a diesel of minute proportions, which when fitted with a marine propeller will serve as an outboard motor on a launch to be constructed for his small son Alec.

The latest brain child is a 10 c.c., four-cylinder in-line air-cooled motor, with overhead rotary valve and distributor mounted at the "front" of the block. This has been test run successfully, and work is now in hand to construct a very true to scale o.h.c. Austin to accommodate this fine little unit. Knowing the way Eric works, this will not be a case of a job spreading over months and months. He hopes to have it on the track in the early part of the season.

DOPE & CASTOR

By JERRY CANN

NEW officers were elected at the Model Car Association's A.G.M. on February 24th, at Derby, which was attended by thirteen club representatives. Jack Cook of the Sunderland Club becomes the Association's Chairman, with Cyril Catchpole as Vice-Chairman, whilst the new Hon. Secretary is I. W. Moore, whose address is 2 Bridge Street, Derby. Ken Proctor becomes Hon. Records Officer to the Association, and G. W. Arthur-Brand and E. P. Zere act as Auditors.

Amongst business dealt with at the A.G.M. were the dates for Regional Elimination Trials and Final of the National Speed Trophy, which were finalised as follows: —

Regional Elimination Trials. (Date, July 6th)

South East, Edmonton; South West, Bristol (if agreeable); Midland, Nottingham; North West, Blackpool; North East, Guiseley (or Ossett if Guiseley not ready); Scotland, not yet decided.

National Finals. (July 27th)

At Nottingham, subject to committee's final approval of track. In the event of difficulties arising, Cleethorpes will be the probable alternative.

Open Meetings for 1952 were arranged as follows:

May 11th, Edmonton; May 25th, Guiseley; June 2nd, Sunderland; June 8th, Ossett; June 29th, Cleethorpes; July 6th, Regionals; July 27th, Finals; August 3rd, Cleethorpes; August 17th, Blackpool; August 24th, Surrey; August 31st, Derby and Nottingham (at Nottingham, including Percival Marshall Trophy); September 14th, Guiseley; September 21st, Pioneer.

Other points decided at the meeting were the reduction of the maximum weight limit in the 1.5 c.c. class from 3 lb. to 2 lb., and the decision to allow the organising clubs to decide on their own methods of grading or handicapping, with the proviso that full details of the methods to be used should be notified to the M.C.A. and affiliated clubs at least six weeks before the date in question.

The Edmonton Club dinner was the usual successful junket. The Mayor of Edmonton with the Lady Mayoress, were guests of honour, and during the evening presented the President's Trophy to George Laird for his services to the Club during the

year, and in particular for his good work during the construction of the track. Other speakers included J. A. Oliver and that popular journalist, Jack Peers, of *Mechanics*, who proposed the health of the Hon. Secretary, E. J. Pickard. Amongst other diversions Cyril Catchpole was presented with a luridly decorated barman's apron and justified it by winning a bottle of whisky.

Another dinner which went with a swing was the Meteor Club's bean-feast at the Crown Hotel at Stone, Staffs., where sundry model car experts showed extraordinary ineptitude in steering model cars round beer bottles as a post-prandial exercise, and Gerry Buck produced a wonderful football game in a species of chicken-coop which, played piano-fashion, three a side, caused several nervous hotel residents to take to the air-raid shelter in the basement.

On the following day a Circuit racing meeting was held at Messrs. Rists Cables' canteen, of which a fuller illustrated account will appear next month. During the course of this affair a 50-lap race was staged, between four models of similar capacity but of diverse designs, which was not only intensely interesting, but produced what must be the world's record diesel smoke-screen.

The Bristol M.C.C. is in a healthy and active state, with over thirty members, and its new Hon. Secretary is B. W. Harris, of 22 Acacia Road, Staple Hill, Bristol, who is a most enthusiastic builder of fast and finely finished models in all shapes and sizes, and an expert in the half-litre racing game as well, when not coaxing extra b.h.p. from potent motor cycles. He has made the club an electric timer, and racing takes place most Saturdays at the Downend track, built in a member's garden.

The Birmingham and Worcester Club have joined forces to take over the excellent track at Ambrose Farm, Worcester, built by G. I. Hastings, and the venue of the 1950 National Finals. The Club will henceforth be known as the Birmingham & Worcester M.R.C.C., with G. I. Hastings as president, J. Robinson as Chairman, and Dennis James of 102 Broadmeadow Lane, Kings Norton, Birmingham 30, as Hon. Secretary. Midland enthusiasts please note.

I hear that there is every likelihood of the Chiltern M.C.C.'s pleasantly situated track at Woodside, near Luton, being resurfaced for the coming season, and plans for the rail track are taking shape.

The Eel Pie Island circuit scheme, near Twickenham, is to be developed by what was originally a private company's sports association, but I learn from D. J. Roskilly, of 36 Seymour Road, Acton Green, W.4, that it is intended to form a separate club, open to public membership, in order to take full advantage of the excellent facilities of the site. The track will be in the grounds of the White Cross Hotel, and intending circuit racers in the London district should make contact without delay.

LE MANS TD M.G. MIDGET

frame for fixing to the body, the head being counter-sunk into the medallion and concealed after plating by a small art paper octagon, carrying the M.G. motif, cemented over it. Number plates can be of tinfoil, pinned to shaped wooden blocks, although I confess to photographing my own plates and enlarging the results to scale and cutting them out.

The steering wheel has a steel wire rim and double wire spokes soldered to a brass boss and column. A curtain ring could be used, of $1\frac{1}{4}$ in. dia., if one can be found thin enough. The column plugs into the dashboard, being detachable to prevent damage from the starting cord. If an electric starter is used, this is unnecessary.

The colour scheme is best described as "mid-green". (George Phillips kindly sent me samples from the original car.) This can be either brushed or sprayed, after the body has been finally rubbed down and given a good undercoat. The seats are light green, and racing numbers, if applied, are black on white circles on nose, tail and wing panels. At

(Continued from page 309)

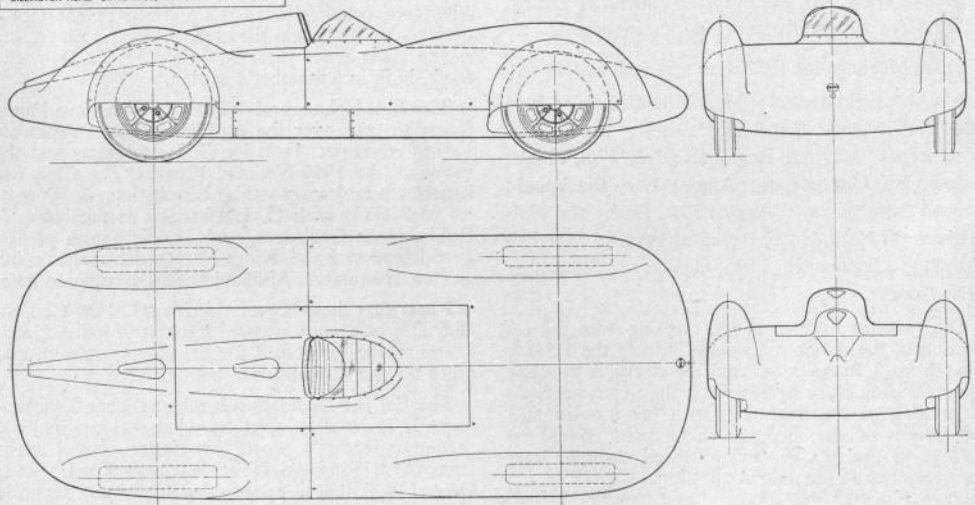
Le Mans small red, white and blue roundels were carried on the cockpit sides for identification purposes, overlapping the top curve of the wings, and a G.B. plate was fitted below the rear number plate.

Time prevented the completion of all the details on my own model before photographs were needed for this issue, so the car appears minus its bonnet clips, parking and tail lamps, racing numbers and door panels, and is, in fact, only finished in an undercoat, the final finish being applied later. It should also be stressed that a liberal coat of oil-resisting paint should be given to all interior surfaces to prevent deterioration due to fuel seepage and exhaust discharge. A picture of the final job in all its trimmings will appear in a later issue. The finished model is amply robust to stand the rough and tumble of track work, is small enough when the screens are detached to slip into an overcoat pocket, and lively enough to provide plenty of fun as a "sports" model, equally at home on small improvised tracks or full-sized 70 ft. circuits.

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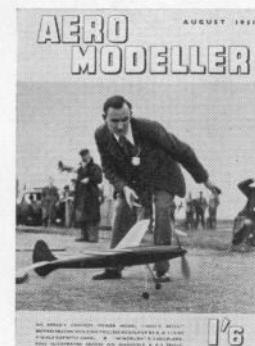
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