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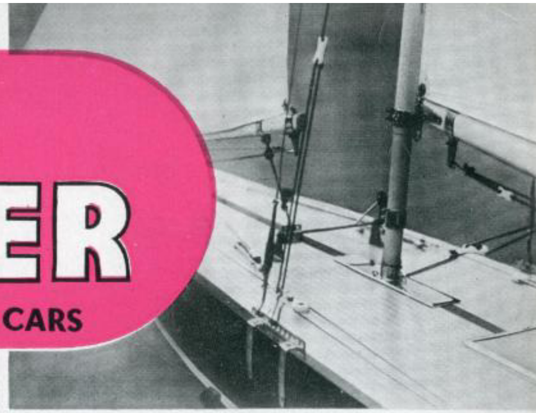

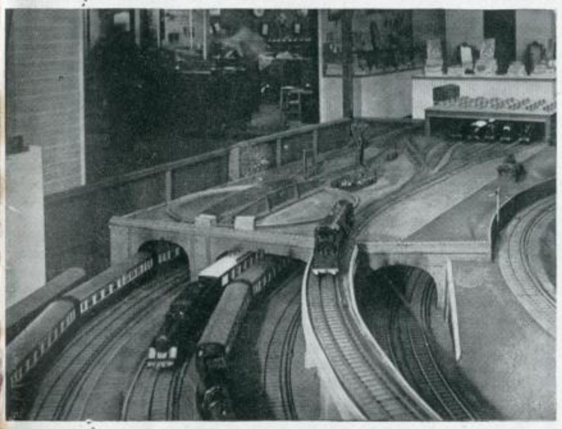

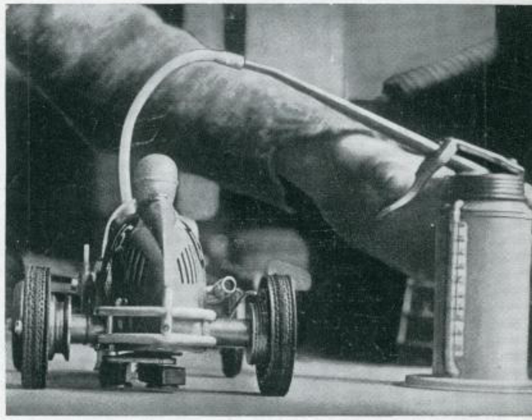

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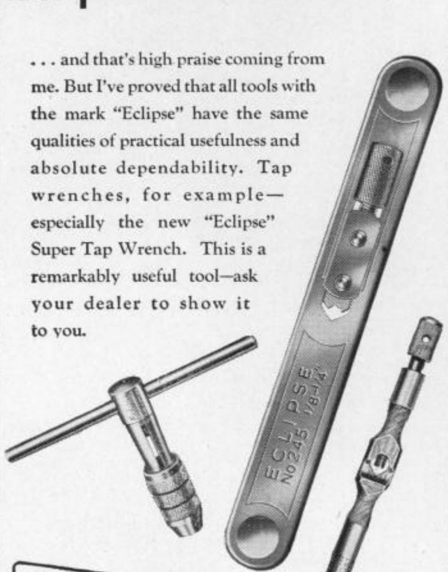

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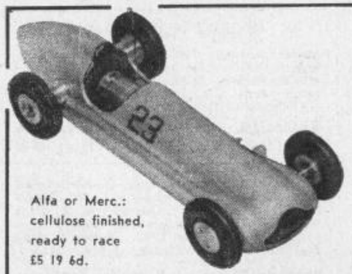

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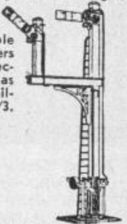

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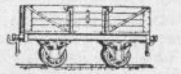

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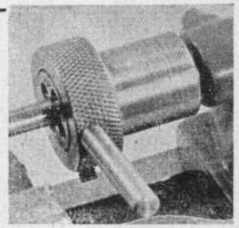

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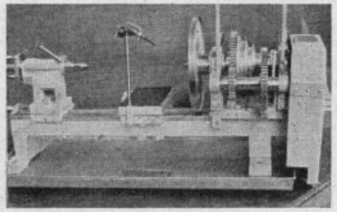

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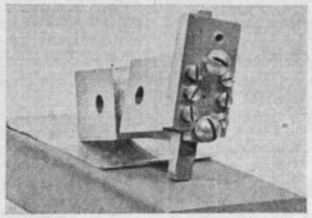

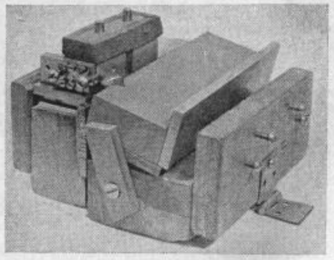

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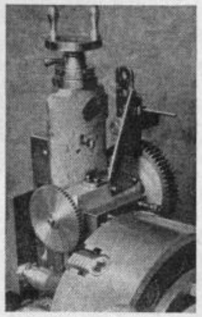

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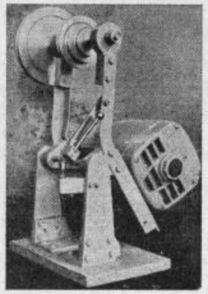

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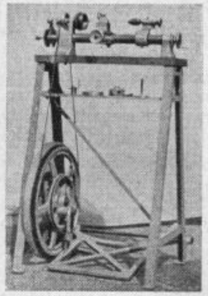

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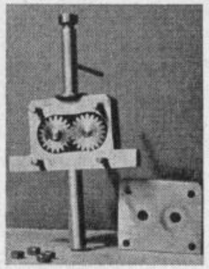

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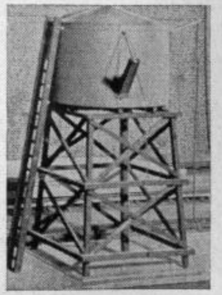

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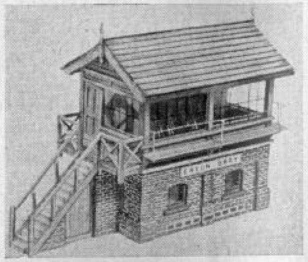

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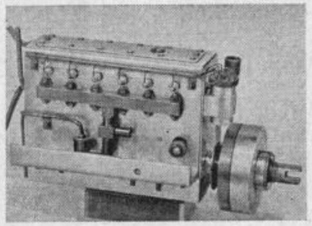

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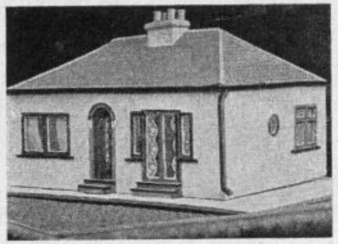

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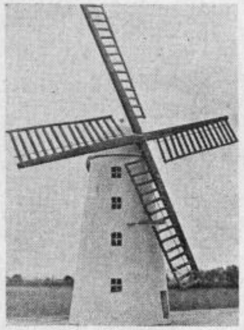

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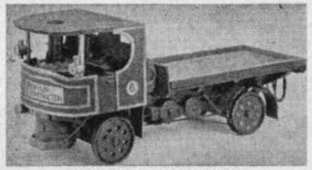

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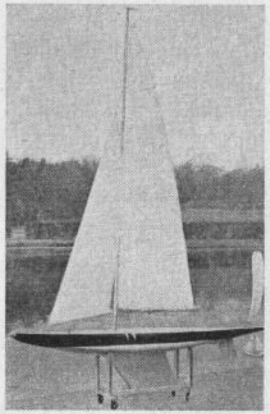

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Contents

"Spring Cleaning . . ."

THE more observant of our readers will have noted that our April issue contained a change of address for our Editorial and Advertisement Offices. We are happy to announce that we are now comfortably esconced in our new quarters at Watford along with *Model Maker Plans Service* together with our associate magazine *Aeromodeller* and *Aeromodeller Plans Service*. Some slight delay in dealing with current correspondence will, we hope, be excused, but this has by now been rectified, and the accumulation of orders on our two Plans Services despatched.

Spring is the traditional time for spring cleaning and this move enabled us to review much of our office property with a critical eye, so that our offices are rapidly approaching a spick and span appearance that we have long desired but felt presented too much of a major problem to attempt without the stimulus of a move. It has, too, taught us some of those difficulties that attend any move—the change in size of rooms, variations in electrical voltages in different parts of the country, but most of all the vast amount of lumber that is accumulated in a comparatively short time. Readers who have moved and had the task of setting up their workshops again will sympathise with us and know just the sort of problems we have encountered.

The expansion of our organisation is most happily served by this nearer approach to London, and should prove beneficial not only to ourselves, but also to readers and advertisers, for it will enable our Editorial and Advertising staff to make more frequent business trips without losing so much valuable time at the office, thus assisting us to keep in even closer touch with model making events and personalities than was possible in the country.

We are all creatures of habit, and we would therefore make a special point of adding once again that our new address for all communications is: —

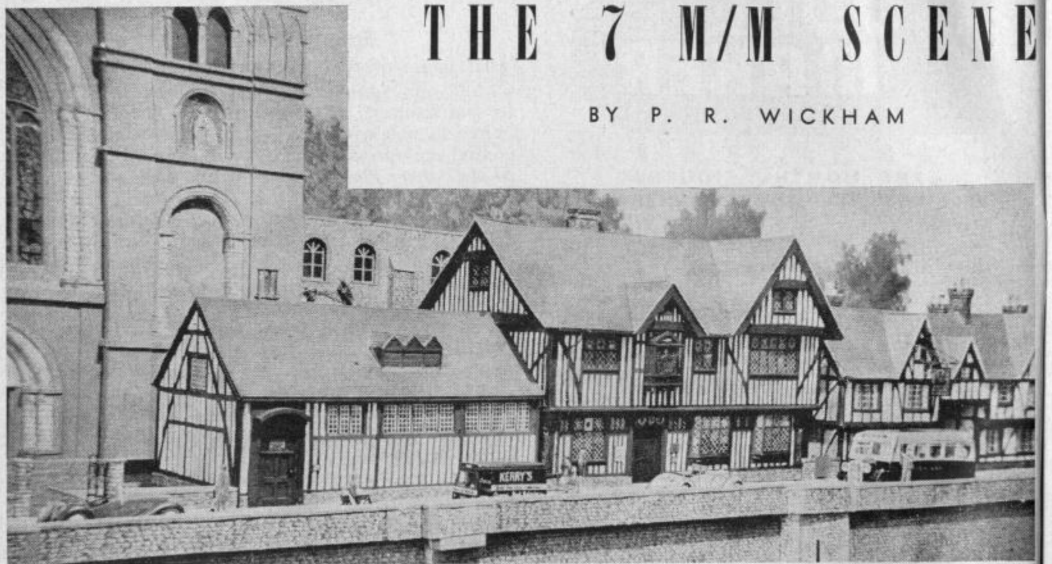
38 CLARENDON ROAD, WATFORD, HERTS.

In addition to our change of abode, certain reorganisation of administration has also occurred, Mr. D. A. Russell, M.I.Mech.E., having ceased to be Managing Editor of *Model Maker* and *Aeromodeller*, and he has left the board of Model Aeronautical Press Ltd.

In the months to come we look forward confidently to the continued expansion of *Model Maker* amongst an ever-widening circle of readers, and trust that our present readers will continue to assist us with advice and criticism and do that valuable and much appreciated work of encouraging new enthusiasts for, the larger our circulation, the more we can offer in both contents and advertisement response.

ON THE COVER . . .

Top right : Close-up of mainmast and rigging on John A. Lewis's "Halceyon" 10-rater, which has now scored its first contest success. Centre left : The sheds on British Railways' 0 gauge layout seen at Olympia and the Model Railway Exhibition. Centre right : Quick re-fueling from a recent circuit racing meeting run by the Meteor Club. Bottom left : Model "Comet" Tank by Richard Larn, shortly to appear in Model Maker. Bottom right : John Morris's "Menang" airdriven Hydroglider featured in this issue.



THE 7 M/M SCENE

BY P. R. WICKHAM

THE AUTHOR DEMONSTRATES THAT ELEGANT SCENIC DISPLAY IS NOT INCOMPATIBLE WITH A SMALL SPACE 0 GAUGE LAYOUT

IN submitting the enclosed photographs of my 7 mm. narrow-gauge "Westcliff-Baynes Railway", I am not venturing on any general description of the line. The time for that is not yet, as the work of track-laying is still in its early stages (unlike most modellers I have preferred to follow the natural order of things by establishing the town first and building the railway to serve it afterwards, but that is another story). My present purpose is to suggest—in these days when railway modelling scales seem to be pursuing a gradual descent into invisibility—that it is quite possible to build up an effective scene to the comparatively enormous scale of 7 mm. to a foot, without excessive demands on space.

Leaving aside, for the present, the question of the space required by the railway proper (and admittedly the adoption of narrow gauge, to some extent, gives one the best of both worlds—0 and 00 gauges) there is no reason why even the smallest 0 gauge railway should not present an effective scenic picture. In fact, the section of "Westcliff" pictured in the photographs measures only a little over 5 ft. 6 in. long by 1 ft. 6 in. wide. Neither is this space lost from the operating viewpoint, for the street is built up over the concealed "return sidings" and turntable, which will receive trains from the passenger station on the other side of the room and return them after a decent interval for completion of their (supposed) journey to Bayness or other destinations. Unless I adopted a continuous "tail-chaser" layout (a subject on which I perhaps sufficiently expressed my opinion in "The Pictorial Approach" in the July 1951 *Model Maker*) those return sidings *had* to be there and *had* to be concealed in some way. A similar situation must occur on many other small 0 gauge layouts, whose owners have possibly never realised that here is space for scenic treatment at no further cost to already restricter operating possibilities!

By no standards, I feel, can 5 ft. 6 in. by 18 in. be considered an excessively large area; yet within that space we have four largish buildings represented, together with the gateway and Southgate Street and its traffic; and I do not feel that the scene can be considered to appear at all overcrowded.

As space, or rather the lack of it, is the eternal enemy of all railway modellers (and not only 7 mm. scale ones of course), I feel that some description of the way in which this effect has been achieved may not be without interest. I present these ideas in no spirit of one who "knows all the answers"; (I don't even wish I did—I can imagine no state of life more boring), or as one wishing to impose my own particular view of modelling as the only or even the best!

The classic recipe for jugged hare is said to begin with rare practicality, "first catch your hare"! Likewise the modeller must first "catch" his prototype. We can here leave aside the comparatively few modellers who choose to reproduce an actual length of railway complete with its setting. The fact that for most of us there is no *actual* prototype for our setting merely means that we must "create" one for ourselves. How far we choose to go in this direction will be a matter of personal taste. Many, perhaps most, will be content with a little thought and a few rough notes; others may find pleasure in going more deeply into "documentation". My own model town of "Westcliff", and the Island of Kildene of which it is the capital, are being pretty fully documented, as I find a peculiar fascination in this work.

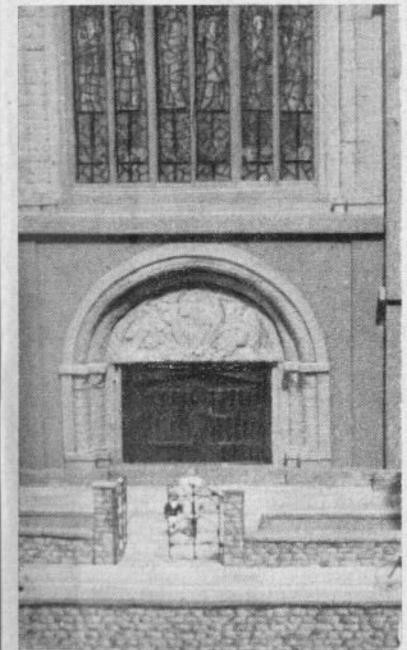
For all that, I think, it is a demonstrable fact that a model setting which is backed by detailed and imaginative documentation can achieve a "life" of its own, over and above the actual quality of the modelling work involved. For that reason, readers will perhaps bear with patience with a brief outline of Westcliff's "history" especially as it affects the section of the town shown in the photographs.

Kildene is an island to the south of the Isle of Man, some 32 miles long by 26 miles wide.

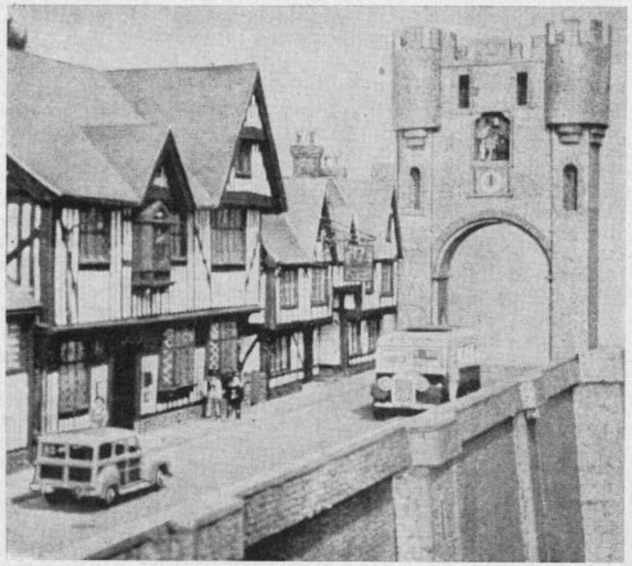
Westcliff, today, is a town of some 50,000 inhabitants, grouped round the deep inlet of the bay. On the east side, part of the old sea walls survive (and are seen in the photographs). The railway enters, in cutting and tunnel, from the east and circles the head of the bay, at low level, to enter the passenger station on the west side; on the site of the old dock-side buildings and quays. "New" docks (now used for the Liverpool sailings and served by a W.B.R. branch) were built at the beginning of the 19th century, to the south-east. Westcliff is the centre of government of Kildene and the seat of the Island Parliament, also the centre of religious and cultural life in the island. There are some light industries, but the island's main industrial town is Eastborough, to the north.

The first inhabitants of what is now Westcliff were apparently monks, from either Iona or Ireland who, in the 7th and 8th centuries A.D. converted the Celtic inhabitants of the island to Christianity. After the Saxon invasion of Kildene in the 9th century (by the forces of one Dilra who, after a short but fierce struggle, established Lordship of the Island with his headquarters at Dilston—Dilra's *ton*, or place) Benedictine monks, from the Kingdom of Mercia, were granted lands on the Westcliff site, and began building their Abbey where the Cathedral now stands.

Westcliff, in medieval and Tudor times was completely walled with seven gates, of which only two (one of which, the Southgate, is seen in Photo 3) remain. About 1390, the Guild of Corpus Christi began to build its Guildhall (left of Photo 1), and this Guild and the later Guild of Merchant Venturers



Left : Cathedral entrance with stained glass windows.



Heading shows the Cathedral behind Tudor period dwellings in foreground, and the old city wall.
On the right is a continuation of this street ending in the Castle Gate, only remaining part of the castle.

(whose hall adjoins the Corpus Christi hall in Photo 1) were for centuries to play a large part in city affairs. The Golden Hind Inn (right of Photo 1) dates from Elizabethan times, and according to local legend was built by a retired seaman who had sailed round the world with Francis Drake. By 1700 the power of the Guilds had waned (the Corpus Christi Guild having been dissolved in 1554, its hall passing into the hands of the Merchant Venturers) and the Guildhalls passed to the city authorities and were used as the Town Hall until 1770, when the present fine Georgian Town Hall was built during the period of Westcliff's greatest prosperity as a port.

A 1 in. scale map of the island is in preparation, also other appropriate documents, but from the point of view of the model, the "key" document is a large-scale plan of the central area of Westcliff. In the preparation of this care was taken to see that the area around the station, which was to form the actual model, fitted comfortably and without distortion into the confines of the railway-room. Whether this plan or the layout plan proper came first is as insoluble a problem as the similar question about the hen and the egg! In fact they (the plans, not the hen and egg), were prepared side by side, with much revision and "cross-revision" to ensure the most effective plan basis for the model which would at the same time form a convincing part of the whole town plan.

To turn from plans to their translation into concrete three-dimensional form, a study of the photograph, especially Photo 1, will help to show how this has been carried out. If readers' arithmetic is equal even to my own inconsiderable standard, they will already have realised that there must be some subterfuge in relation to the cathedral in view of the fact that the total depth of the scene is only 18 in. Actually, only the west front is modelled, and this only to a depth of some 2 in., fitted flat against the wall. However, as I think Photo 2 shows clearly, a quite considerable effect of depth is achieved, by the modelling of all detail in full relief, by the backing of all openings in the towers with black card, and (after dark) by the illumination of the stained glass window from behind. The cloister building is only $\frac{1}{2}$ in. deep, being in fact little more than a flat wall with glazed windows backed with black card. This is very much more effective than flat-painted features, slight though the relief is. The trees behind the buildings are painted scenery, and the method of carrying this out calls for a little comment. A separate backscreen has been dispensed with, instead the walls of the room are distempered a flat "sky-blue" and the "scenery" and cloud effects painted directly on them with oil colour. The blue is carried up over the ceiling giving a notable increase in the apparent spaciousness of the room, while one can take photographs from any viewpoint without the usual obtrusion of "the top edge of the sky".

There is no subterfuge so far as the Guildhalls and Inn are concerned. These are fully-detailed, complete, models; the Guildhalls being fully interior-fitted; the Corpus Christi hall as a museum of local antiquities and the Merchant Venturers' hall as a library on the ground floor, with a small concert room (complete with string quartet and pianist and audience) above.

The sea walls serve to conceal the return sidings below, while the Southgate "closes the prospect" at what is, in fact, the end of the layout. This gate is chiefly remarkable, incidentally, for the clock with its two wooden figures which strike the hours (these being worked by an electrical mechanism, remotely-controlled from a push-button on the control desk).

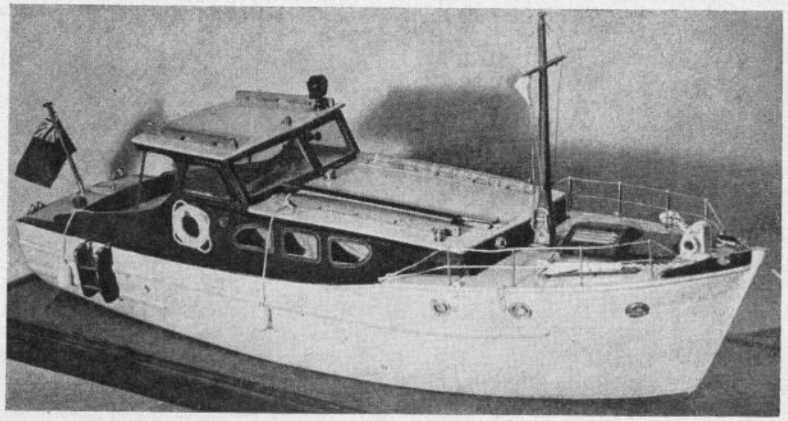
Apparently trivial points can have quite a considerable effect on the *apparent* space (a very different thing to the *actual* space) in a model setting, as I accidentally proved to myself over that cathedral pathway. Originally it was surfaced with a powdered cork "ballast" substance, rather dark in tone, but this showed an unfortunate tendency to scatter into the most inaccessible parts of the layout every time the base was shaken, so recently I replaced it with a "stone flag" paving (made from Essex board, scored and painted a light stone colour). The result was a quite remarkable gain in spaciousness and an apparent recession of the cathedral. I afterwards noticed a similar effect when a narrow roadway elsewhere on the layout was repainted in a lighter shade. The moral is obvious: avoid dark shades for ground surfaces wherever possible.

In these notes, I have concentrated on trying to prove my contention that effective scenic settings are just as practicable in 7 mm. scale as in the smaller standards. About the very real *advantages* of scenic modelling in the larger scale I have so far said nothing. Yet there is much to be said. For one thing, looking at a 7 mm. scale setting, one gets a much stronger feeling of being able to "walk into the scene" than a small-scale setting, however good, can give.

As to the advantages of detail inclusion which the larger scale gives, the accompanying photographs and those previously published in *Model Maker* in connection with my series of designs for 7 mm. scale lineside effects may give some idea of the scope.

Finally, I should like to make it clear that I am not deriding the possibilities of 4 mm. scale for the production of scenic settings, or in any way belittling the fine work produced in the smaller standards. My only purpose is to encourage the 7 mm. modeller to pay more attention to the setting of his line, and to suggest that if he does so, the result will be commensurate with those enjoyed by our 4 mm. friends. I have, myself, done a good deal of work in 4 mm. scale, in the course of my professional activities, but in my own work where I am free to choose I continue to work in 7 mm. scale because of the satisfaction which I derive from having, so to speak, room to expand!

PART II OF BERNARD REEVE'S SERIES ON A ONE - TENTH SCALE CABIN CRUISER SUITABLE FOR RADIO CONTROL DEALS WITH COMPLETION OF THE HULL, PRELIMINARY DECKING AND SOME CABIN DETAILS.



Heading picture shows another view of the author's award winning waterline model of Deglet Nour exhibited at last year's M.E. Exhibition.

CABIN CRUISER "DEGLET NOUR"

IF you have carried out the work as described in the first article you will now have a completed hull shell with the inside as smooth as successive grades of glass paper can make it. Particular attention should be paid to the outer surface, sanding down to a satin smooth finish, as this will have an important bearing on the ultimate appearance of the paint work. Remember that paint will not compensate for skimped sanding, but rather tends to accentuate any roughness or blemishes owing to reflected light.

The next step is to glue on the two pairs of rubbing strakes in the positions shown on Sheet I. For these you will require some $\frac{3}{16}$ in. square hardwood strip wood obtainable from most model shops. The upper pair are 2 ft. $6\frac{1}{2}$ in. long and the lower pair $8\frac{1}{4}$ in. long; they should be sanded smooth before fitting with their leading edges faired off towards the hull. You need not round off the outer edges at this stage; leave this operation until they are fixed in position.

I eschew the use of brads for such fixings where ever possible, using $\frac{1}{16}$ in. cane dowels instead; once you have used these I do not think you will want to use nails.

As you cannot buy cane dowelling you will have to make your own by means of a simple die plate. Take a piece of steel $\frac{1}{8}$ in. thick, its size is unimportant, and drill a $\frac{1}{16}$ in. hole in it. Now procure an ordinary garden bamboo and cut this into lengths by cutting either side of the knots, split the resultant lengths into thin strips and plane roughly $\frac{1}{16}$ in. round. These strips are tapped gently through the hole in the die plate and then cut into $\frac{1}{2}$ in. lengths.

Returning to the rubbing strakes, drill a series of $\frac{1}{16}$ in. holes along each length at 2 in. intervals, starting and finishing $\frac{3}{8}$ in. from each end. Mark the position of each strake on the hull by measuring down from the gunwale, taking care to see that each side is symmetrical. Now get an assistant to hold each strake in position in turn, and using the holes already drilled as a jig, pass the $\frac{1}{16}$ in. drill through into the hull. Coat each strake with glue, position it on the hull, dip a dowel in glue and tap gently home. The dowels will go right through the hull, but do not worry, for when the glue is set you can cut off the surplus and sand down flush. When painted you will not see the heads, and this cannot be said for brads, unless you punch them home, fill the cavity with stopping, and file off the points, a tedious procedure at the best of times.

When the glue has set plane down the corners and sand smooth.

At this stage it is advisable to plate the transom with mahogany veneer to cover the end grain. This veneer seems to be in good supply, for my model stockist has it at quite a reasonable figure—I bought a piece 3 ft. long by 6 in. wide for 6d. This material will be used quite a lot on this model, as I will explain later.

For the transom piece you can hold the veneer against the model and run a pencil line round as a cutting guide. Scissors will cut this material quite well and the final trimming with a razor blade left until it is fixed in place, which operation is best left for the time being. In this connection I rather tripped up with my own model of this cruiser. You see the transom carries the vessel's name and port of registry, and I did not find it at all easy writing this with the transom plating in position. My advice, therefore, is to french polish—or varnish—the piece of veneer before fixing so that it can lie flat on the

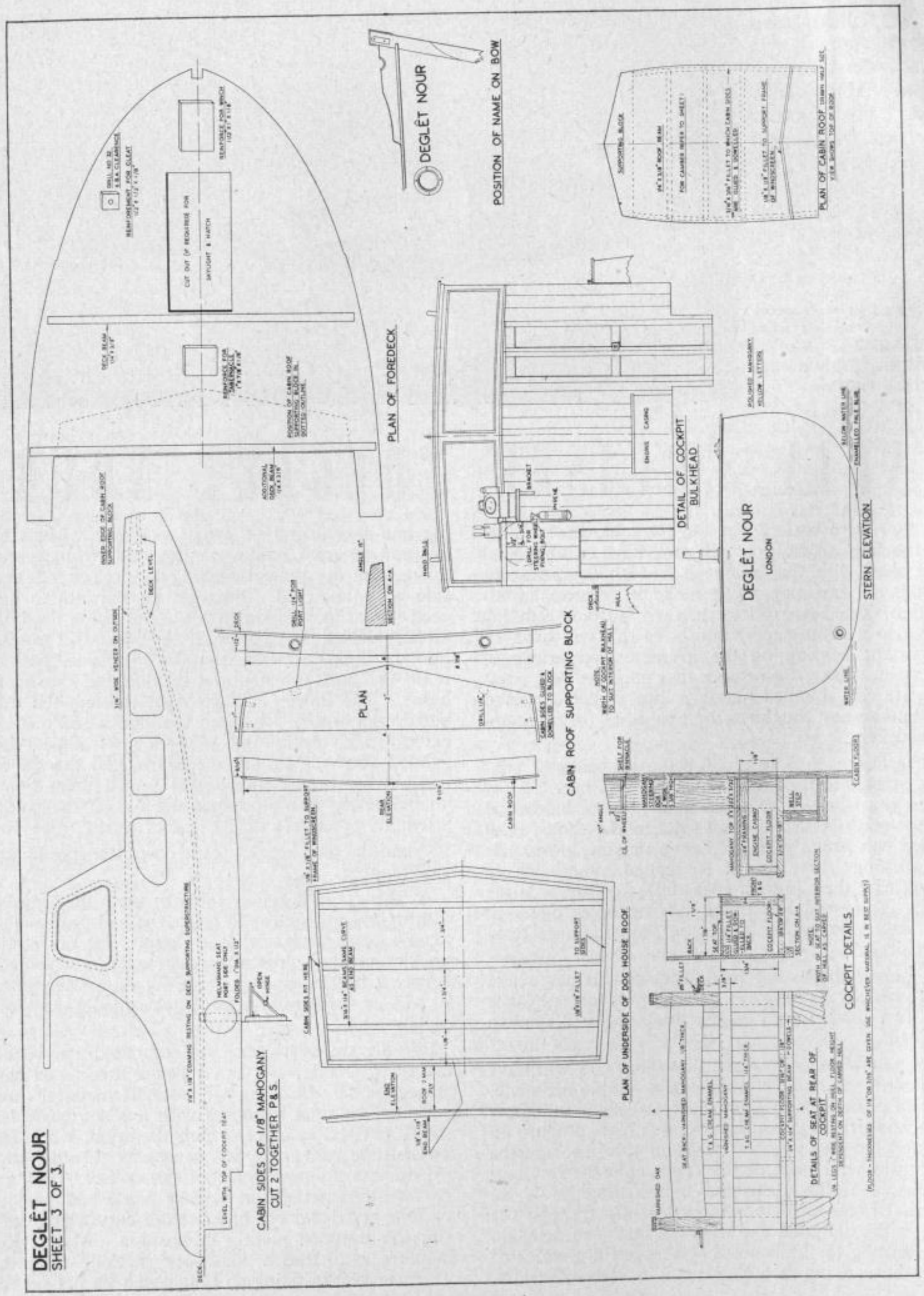


table. Write the name with light yellow enamel, using a No. 00 sable brush, black shading each letter if you are a clever sign writer, in the style and size given on Sheet 2, then glue it in place. To do this coat the stern with glue and using two pieces of smooth hard scrap wood as sandwiches, piece over the veneer, and at the end of the cockpit clamp the whole together with a pair of D-clamps.

A stand will now be required to hold the model for subsequent operations; nothing elaborate is needed as it will be scrapped later. Sections 2 and 8 on the body plan will give you the contours for the upright members.

Before proceeding further it is advisable to paint the interior of the hull. Two coats of pink priming, two coats of white undercoating, and one coat of enamel will give a clean finish. Regarding these materials, I have been using those manufactured by International Paints Ltd., of Grosvenor Gardens House, London, S.W.1, who specialise in yacht finishes. Their metallic pink primer is sold in 1 pint tins, dries in 6-10 hours, is very hard and water resisting. It costs 7/- per pint. Their undercoating is excellent, but any first-class brand is suitable. For enamel I have used Robbiallac Synthetic finishes with excellent results.

While this paintwork is drying the decks may be prepared. These are in three sections.

1. The Fore Deck

The ideal material is $\frac{1}{16}$ in. resin bonded aircraft ply. As I do not suppose you will be able to procure this wide enough for the complete deck one or more strips will have to be used, but as the deck will ultimately be covered with canvas this is immaterial. One deck support beam will be required at Section 8, and this is cut from a piece of $\frac{1}{4}$ in. thick hardwood, and is $\frac{3}{8}$ in. wide; Sheet II gives a drawing of this beam. Make a halved joint with the gunwale (do not cut a piece out of the gunwale to take it) and glue and dowel it into place.

Cut the deck from the plan (Sheet II) reinforcing the underside with a piece of $\frac{1}{16}$ in. hardwood 1 in. x 1 in. glued on to take the 8 B.A. bolts holding the mast tabernacle in place. If you decide to cut an opening for the skylight and hatch to drop in instead of fitting it flush on the deck you will have to move the deck beam slightly aft.

If in your carving of the interior you have left sufficient wood under the winch to carry the fixing screws well and good; if on the other hand you have been generous in the use of your gouges you will have to reinforce this point also.

The deck being a permanent fixture can be glued and dowelled into place as soon as the interior paintwork is finished. Two dowels in the beam are sufficient, and one every 2 in. at the side will, with the aid of casein glue, firmly fix the deck. A word of warning—when near the bow incline your drill so as to avoid the drill point penetrating the hull sides where the bow flares out.

Next the side deck planks, or cat-walk, are cut $\frac{3}{4}$ in. wide from the same material. These are carried right through to the transom using the same fixing technique, i.e., glue and cane dowels, to fix them in place.

Finally, the stern deck is cut and fitted between the cat-walk planks. Careful cutting here should result in a join which is practically a hairline.

When cutting all deck planks be generous with the outside cutting lines so that you can plane them down after fixing to give the $\frac{1}{16}$ in. overlap.

In order to achieve maximum accessibility to the interior, especially when radio control is to be installed, it is essential that as much of the superstructure as possible be detachable. For this reason I have arranged for the whole of the cabin top and sides, together with the cockpit assembly, to be made as one unit and capable of being lifted clear of the hull, leaving the cabin floor, to which will be attached the motor and radio control receiver, *in situ*.

This arrangement is detailed on Sheet II of the plans from which it will be observed that the centre cabin bulkhead has been omitted. With regard to the fixed floor it will, in all probability, be more convenient to mount the motor and radio receiver thereon, making all necessary electrical connections, before this floor is screwed down to the hull bottom. I cannot give you a template for this floor as its shape will depend upon the contour of the hull sides after hollowing out.

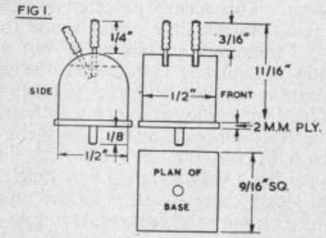
Now make up the cockpit-cabin bulkhead, using $\frac{1}{16}$ in. mahogany if you can get a piece $9\frac{1}{2}$ in. x 8 in., if not use a piece of hardwood and plate the cockpit side with mahogany veneer, scoring to represent the 4 in. t and g planks used in the prototype.

Finish this bulkhead right off by adding the steering box. This is best cut from a solid block of mahogany, scored as for the bulkhead.

Referring to the deck plan (Sheet I), you will find details of the block housing the throttle and clutch controls and instrument panel. These must be made now and fitted as they cannot be set up after the dog-house is in place. Figs 1-4 give details of these together with dimensioned drawings of the binnacle and its bracket, and the Pyrene fire extinguisher fitted to the side of the casing.

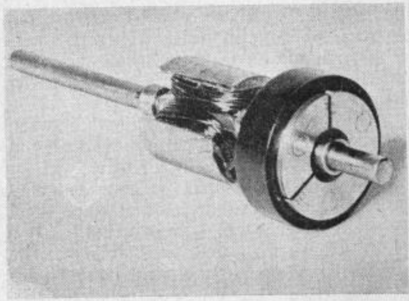
Drill a hole in the position shown for the 6 B.A. screw in the boss of the steering wheel using a No. 43 drill — this is 6 B.A. tapping size. Do not fix this steering box assembly to the bulkhead at this junc-

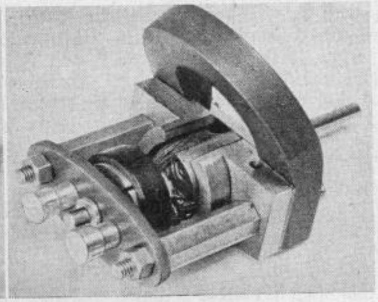
FIG I.



THROTTLE & CLUTCH CONTROL BOX.
FINISH: BOX. VARNISHED OAK.
CONTROL HANDLES: BLACK.

(*Continued on page* 338)





THE STORY OF THE AUTHOR'S "TRIAL AND ERROR" ADVENTURES IN ATTEMPTING TO CONSTRUCT A SMALL ELECTRIC MOTOR WITHOUT AUTHORITATIVE DATA, AND THE EVENTUAL SUCCESS OF HIS EFFORTS.

'SMALL FRY' . . . BY L. C. MASON

THERE seems to be a growing use of sub-sub-miniature electric motors for various model purposes. Electrically operated model railways are being developed in smaller and smaller sizes; remote-control model cars, propelled and controlled electrically have appeared, and in the larger radio controlled models several small motors are frequently used to power various movements.

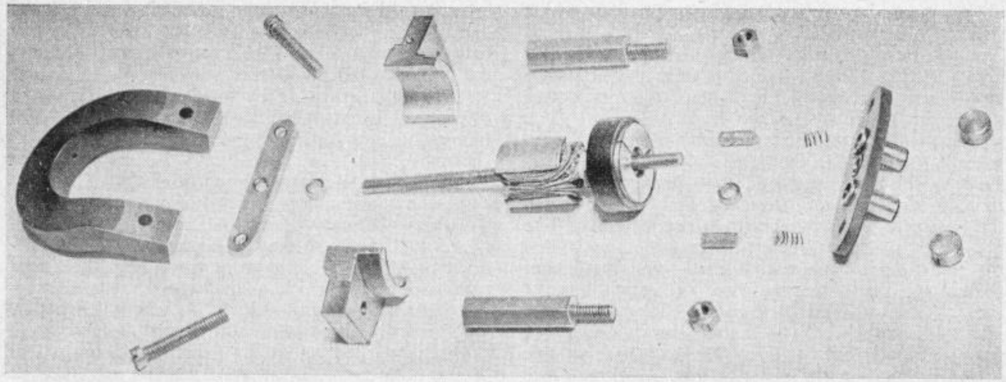
These little motors are rather intriguing to make, and reasonably careful workmanship is required when dealing with some of the very small components. The one shown is intended to serve eventually as a rudder motor for a small radio controlled boat. It was taken in hand while awaiting supplies of material for other parts.

For most model purposes, a permanent magnet field is to be preferred for the ease of reversing. You can buy small high efficiency magnets, but there is some advantage in using one that has come from some other piece of apparatus. The poles are generally machined truly flat, and they are very often drilled. This makes it much easier to adapt such a magnet for other purposes. The one used in this case is slightly larger than the smallest Eclipse horse-shoe magnet, and came from a gramophone pick-up. It has drilled pole-pieces $\frac{5}{16}$ in. x $\frac{3}{8}$ in. in section, with a parallel gap of $\frac{13}{16}$ in. between them. This seemed to offer possibilities for designing a compact little motor round the magnet.

"Designing" sounds good, but actually it was a "try it and see" procedure throughout, trying to adapt recommended larger practice to this small size. The text books grudgingly admitted mild steel as material for pole-pieces, so these were machined, both in one, out of a piece of $\frac{3}{4}$ in. x $\frac{3}{4}$ in. mild steel bar. A $\frac{1}{8}$ in. step was machined at each end to locate them squarely on the magnet poles. It is rather a curious business, trying to get a fit between the poles of a magnet—it "fits where it touches", literally! A keeper across the magnet curbed its enthusiasm somewhat, and something of a fit was achieved. The piece was then mounted in the four-jaw chuck and the armature tunnel bored out $\frac{19}{32}$ in. to give $\frac{1}{64}$ in. air gap round a $\frac{9}{16}$ in. armature. At the same time a few cuts were taken off the face round the tunnel, to reduce the mass of metal round the poles a bit. We probably crippled a couple of lines of force by so doing, but the weight was important, too. Finished and complete, the motor weighs $4\frac{1}{2}$ oz. The two pole-pieces were left in one chunk till the very last. When bolted up, the piece acts as a good keeper and short circuits the magnetic drag on the armature which makes it hard to feel the fit and adjustment of bearings and brushes.

A tripolar armature was decided on, as offering the biggest winding space in a self-starting armature. Soft iron laminations are the "done thing', of course, for armatures, but schoolday memories of small and quite lively motors having roughly cast solid armatures prompted the adoption of a solid one here, in spite of what the book said. So a $\frac{9}{16}$ in. x $\frac{9}{16}$ in. mild steel cylinder was turned up, drilled and reamed centrally $\frac{1}{8}$ in., and divided into three by marks on the end. The three pole shape was sawn and filed by hand to a template. Two odd scraps of $\frac{1}{32}$ in. mild steel strip were bolted together, marked out for one pole, filed to outline and case-hardened. The armature blank was bolted between them through its own shaft hole, and after lining up one dividing mark on the jig, one pole sawn and filed to shape. Two more repetitions at the other marks produced a reasonable looking body. The central pole webs were filed back at the ends to make a symmetrical winding space on each pole. The shaft is a short length of $\frac{1}{8}$ in. silver steel rod, and the armature is fixed in position by a tiny fillet of solder at each end. At this, all the text books turned their backs on us completely.

Small commutators can be tricky, but the simple procedure adopted for this one worked out very well. Each segment is held by only one screw, to which connection is made, yet is trapped immovably. The segments were turned up together as a brass washer $\frac{5}{8}$ in. dia., $\frac{3}{32}$ in. thick, and having a $\frac{1}{4}$ in.

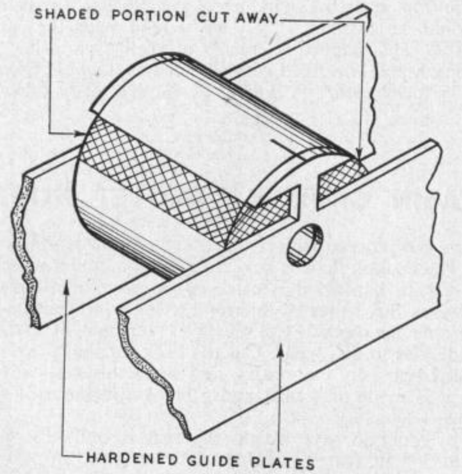


hole. The body is a $\frac{3}{4}$ in. dia. disc of $\frac{1}{4}$ in. thick ebonite, drilled and reamed to press tightly on the shaft. The disc was recessed $\frac{1}{16}$ in. deep on its face to take the brass washer snugly, and divided into six. A 6 B.A. tapping hole was then drilled through both ebonite and brass at three of the points, and the other three marked on the washer for cutting into segments. The washer holes were tapped, the ebonite holes opened up to 6 B.A. clearing, the washer sawn up and the three pieces screwed in their bed in the ebonite. Cutting the screws back and taking a very light skim over the face completed the commutator.

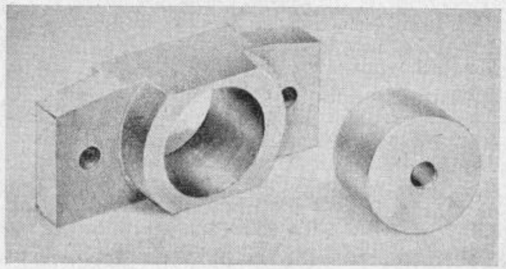
Bearing plates are $\frac{1}{4}$ in. x $\frac{1}{8}$ in. brass strip at the drive end, and $\frac{3}{32}$ in. paxolin at the other. Using this material simplifies the business of insulating brush-holders. The shaft bearing is a small brass bush pressed in a $\frac{3}{16}$ in. hole in the paxolin. The drive end bearing bar clamps under the pole-piece screws, next the magnet, and the paxolin strip is screwed to the ends of two $\frac{1}{4}$ in. hex. brass columns, $\frac{7}{8}$ in. long, held by the same two pole-piece screws. The bearing positions were jigged from the armature tunnel. A round brass plug was turned up a tight push fit in the tunnel, and drilled and reamed $\frac{1}{8}$ in. One end bar was assembled and the bearing hole drilled in it by passing the drill through the brass plug. The other end bar was then attached, and the drill passed through the first hole and the plug to drill the second. This positioned everything exactly.

Brush holders are long $\frac{3}{16}$ in. dia. bushes, pressed into holes in the paxolin strip like the bearing bush. Each has a little brass cap, split across the skirt to press finger tight on the outer end to hold the light brush springs. Brushes are little tightly rolled plugs of copper gauze. The number you lose ensures plenty of practice at "rolling your own"!

Winding the armature became largely a matter of guess-work. There appears to be little or no literature dealing with winding specifications for tiny permanent magnet motors. One book said ". . .



Heading left: Rewound armature, showing face of commutator. Right: The completed miniature motor, approximately fullsize. Above: The complete set of parts, again about fullsize, laid out ready for assembly. Line drawing shows method of shaping armature core. Below: Field magnet pole pieces before dividing, with jig piece for locating bearings from armature tunnel.



always use as heavy gauge of wire as possible, which will make for an efficient motor." Bearing in mind "ampere-turns" considerations, and the extremely heavy section of the conductors on a 6 volt starter motor armature, from the point of view of power output this statement seemed reasonable.

The smallest specified motor windings for 6 v. used 28 g. All right, then, this should be 28 g. However, a well-meaning friend then produced a commercial miniature job, designed for 4 v., in which the armature was wound with wire that looked like about 40 g. Now we've always understood—and the book more or less confirmed—that the higher the voltage, the thinner the wire. Yet a slightly larger motor for 12 v. used 24 g. in the book. *Are* there any rules about it? The matter was finally settled for us by finding a partly used reel of 30 g. double cotton covered in the electrics box. Seeking some slight encouragement in the book to use this, the book said ". . . always use enamel and silk covered wire for armature winding. . . . Shellac varnish should be avoided." So we wound with the 30 D.C.C. and slapped on plenty of shellac varnish.

Each pole was filled with as much as it would take —45 turns each. A doping of varnish every other layer set the whole lot solid. Shellac varnish leaks like anything while it is wet—it has to be quite dry to be anything of an insulator. On first winding, the coils showed 2,000 ohms down to earth, so we "stoved" the armature by leaving it in the hearth overnight. Next morning the meter said 15,000 ohms, and in a further day or two no reading at all showed.

Although the motor proportions looked about right, the consumption was just on 4 amps. at 6 v. ! This was obviously impossible, as a fair proportion of the total watts seemed to be used in merely producing a comfortable glow of warmth in the armature. So we invested in a small reel of 34 g. enamelled and rewound with that. This was much better. The thinner gauge wire with negligible insulation thickness packed on to the armature to the extent of 100 turns per coil. Without seeming to affect the power much, the consumption dropped to 1 amp. and a bit on 6 v.

This is still pretty heavy for small battery operation, but as the motor is intended to run intermittently for only a few seconds at a time off the main 6 v. boat accumulator, we thought consumption acceptable for the sake of the power.

CABIN CRUISER "DEGLET NOUR" (*Continued from page* 335)

ture, but proceed with the rest of the sub-assemblies.

The cockpit floor is next for attention, and a piece of 3/16 in. hardwood is used, cut to your own template as the degree of interior carving will again determine its shape. Cut the well step and fit floor and sides to this well. Cut the back for the cockpit seat from 1/8 in. mahogany, and score this vertically as it is made of 4 in. t and g planks on the prototype.

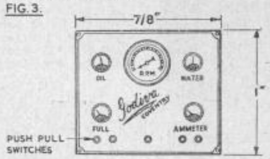
In order to save weight the seat is built up on 1/4 in. x 1/4 in. framing and the seat top glued in position after cutting the sampson post slots. These posts are of oak 4/10th in. square shaped as shown, with brass wire cleats and brass plate tops fixed on with brads. They are not fitted into place until the cabin sides are in position. The last item to be made is the engine casing. Here again 1/4 in. x 1/4 in. framing is used and the sides and top are of 1/8 in. mahogany.

All the various cockpit sub-assemblies are now built up in the floor, which in turn is attached to the bulkhead by glueing and screwing a 1/4 in. x 1/4 in. batten to both floor and bulkhead. The bilge pump is a dummy ; this is of brass and is a push-fit into a block under the floor.

This all sounds somewhat disjointed, but if read in conjunction with the detailed sub-assembly shown on Sheet II of the plans the whole will tie-up and become clear.

In my next article I shall deal with the cabin sides, roof, dog house, etc. I had hoped to include these items in this article, but space forbids.

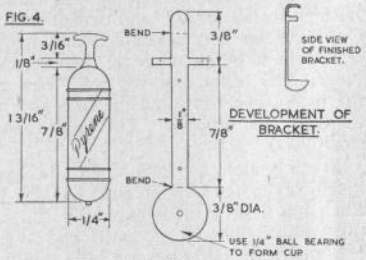
FIG. 3.



INSTRUMENT PANEL.

FINISH: EBONITE
DIALS: BLACK
RIMS: CHROMIUM
NAME: WHITE

FIG. 4.



PYRENE FIRE EXTINGUISHER

FINISH: LAQUERED BRASS

A SET OF THREE FULL-SIZE WORKING DRAWINGS FOR ONE-TENTH SCALE CABIN CRUISER "DEGLET NOUR" IS AVAILABLE FROM THE PUBLISHERS. PRICE 15/- POST FREE (OR 16/6 UNFOLDED AND ROLLED IN STOUT TUBE)

PART II

RADIO CONTROL

A 27 MC/S TRANSMITTER

BY F. C. JUDD (G2BCX)

BEFORE continuing with a design for a Radio Control Transmitter some points on frequency allocation must be made. There are two frequencies for radio control and these are allocated, licence free, by the Post Office (Radio Section), and International Agreement. *Under no circumstances must other than these frequencies be used.* Neither must the *power input* to the final valve or valves in the transmitter exceed 5 watts. (This is calculated by multiplying the anode voltage by the current taken by the valve or valves. (V x C = P in watts.) Great care must be maintained in order to avoid interference to other services, as neighbouring television receivers, etc., and should a complaint be made the transmitter or other offending apparatus must be switched off immediately. You have no priority in this respect. Operation off frequency, or interference to other services might easily result in the entire loss of the facility. The frequency allocations are as follows:

27 mega-cycle band : 26.96 to 27.28 mega-cycles.
465 mega-cycles band: 464 to 465 mega-cycles.

The equipment described in these articles will be for operation on 27 mc/s. A simple frequency meter will be described. This will be sufficient to check the transmitter and receiver.

A Transmitter for 27 mc/s Radio Control

The transmitter, once calibrated, may be regarded as a frequency standard to which the receiver may be tuned as well as tested. For this reason the transmitter is being described first since the receiver cannot be tested without it in any case.

Based on the Ultraudion oscillator, this transmitter uses two valves and will operate to the maximum input of 5 watts. It is advisable to use as much power input as possible, say 4 to 5 watts, since maximum range with the receiver will be obtained, as well as certain operation. It should also be remembered that all the self-excited oscillators, such as are used for radio control transmitters, are only 50 per cent efficient, that is, for an input of 5 watts only 2.5 watts (or less) of radio frequency power will be available. This cannot be avoided as it is a circuit peculiarity and applies to any self-excited transmitter. There are also losses in the aerial and its associated coupling to the transmitter. Nevertheless, the power that is actually radiated from the aerial is more than enough to maintain reliable operation with even the simplest radio control receiver.

The whole transmitter is assembled on a paxolin base which may be mounted on wooden blocks in a suitable case capable of carrying the high tension and low tension batteries as well. The case can be constructed of either wood or metal, but if of the latter it must be earthed along with the transmitter H.T. negative common lead (illustrated in the aerial wiring diagram). The valves selected are the Brimar 3D6 beam power tetrodes which have equivalents known as the 1299 or 1299a, obtainable from some of the ex-Government surplus supply stores (radio). Watch out for faulty valves when buying from these sources. Base diagrams are given in the drawings, but full details of the characteristics of these valves may, if desired, be obtained from Messrs. Standard Telephones & Cables, Ltd., the makers.

LIST OF COMPONENTS

No. off	Component	Maker or supply
2	Brimar 3D6 valves (or ex-Govt. equiv.) ...	Brimar valves
1	Paxolin sheet 6 in. x 4 in. x 1/8 in. thick ...	Surplus stores
1	Base mounting coil former 3/4 in. dia.	Flight Control
1	30 pfd Beehive Tuning condensor	Surplus stores
2	B8G Loctal Valveholders	Radio shops or Flight Control
2	50 pfd ceramic condensors	" "
2	20 K ohm 1/4 watt resistors	" "
2	3-way Tag Strips (1 fixing)	" "
1	On/off switch (toggle type)	" "
1	M2 plug and socket for Coder switch ...	" "
1	0.05 mfd paper condensor	" "
Qty.	22 swg wire for coil (approx. 1 yd.) ...	" "
Qty.	18 or 22 swg insulated wire (link coil) 1 ft. ...	" "
1	Length insulated sleeve 2 mm. for wiring, also 22 swg wire for same. Nuts and bolts 6 BA and two solder tags 6 BA or 4 BA ...	" "
2	Keying chokes	Flight Control

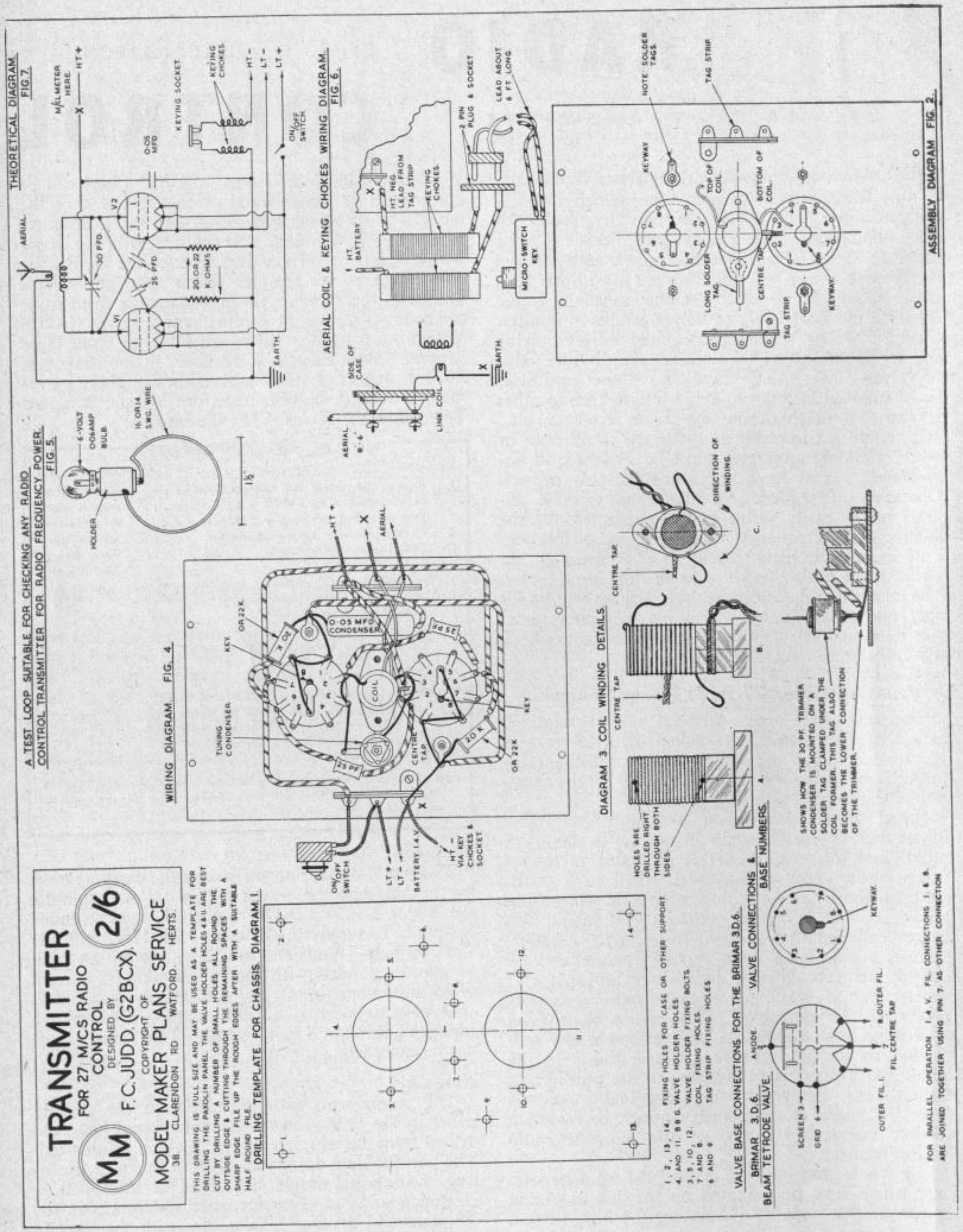
And coloured flex for connecting batteries, aerial, coder switch, etc. Approx. 3 yds. (twin) will be sufficient. This can be split for single wires.

Batteries

These will depend on the size of the carrying case, the pocket, and the power required. As examples the Vidor L5050 1.5 volt battery is recommended for the L.T. supply in any case. For H.T. batteries the Eveready "Winner" 120 volt will permit an input of approx. 3 watts with the valves taking a current of 25 milli-amps (total), or the Eveready Portable 73 .147 volts at approx. 33 milli-amps will permit an input of approx. 4.8 to 4.9 watts. This voltage must not be exceeded.

Assembly

The components are assembled on the paxolin panel in the order shown, after the panel has been drilled from the template of Fig. 1 which is full-sized. The valveholders are standard B8G Loctal 2 in. fitting. All holes should be drilled at least 4 B.A. clearance so as to allow for small differences in the template and drilling. Take care with the paxolin



as this material is brittle. Note the solder tags, one under each of the valveholder fixing nuts and bolts. Mount the valveholders and tag strips as per the assembly diagram of Fig. 2. Note that the valveholders are mounted with the keyways in opposite directions. Both these, the solder tags and tag strips, are all mounted with respect to the centre tap on the tuning coil, which should be used as the reference point for assembly.

Winding the Coil

This must be done before assembly, and the illustration of Fig. 3 shows clearly the method of winding with 22 s.w.g. wire (tinned copper). Make sure there are no kinks in the wire. Wind on very tightly in the grooves of the former (these special threaded formers can be obtained from the suppliers as per the components list), as follows: From the lower hole, leaving a few inches for connecting, wind on four complete turns to the centre and one half turn, so that the centre tap may be formed directly above the connecting end of the wire (not where the winding starts). The tap is made by forming a small loop in the wire. This should be twisted two or three times, and forms a tag for soldering. Continue the winding with a half-turn and four more complete turns to the top where the wire is threaded through the former, to come out, as the connecting wire (3 or 4 in.) *opposite* the centre tap. The diagram of Fig. 3 shows how the winding is made. The link coil, consisting of two turns of insulated wire, is wound *over* the main winding, by the centre tap, as per the illustrations.

Wiring

When assembly is complete the wiring may be carried out, with 18 or 22 s.w.g. wire and sleeving. Use a clean and well-tinned soldering iron, preferably electric, and use *only* resin cored solder. Spirit flux will, in time, corrode soldered copper wire. Follow the wiring diagram marking off the wires and small components as they are completed. Take care with the wire-ended parts, as the resistors, and small condensors; don't overheat them with the soldering iron and watch out for dry joint. The valveholder tags are numbered as per the makers and British radio standards. When the wiring is completed, carefully check two or three times with the diagram and test for dry joints. Make sure the wiring lays as that in the diagram. Good clean layout, mechanical rigidity is important if the transmitter is to be stable and efficient. Build it as you would your model! Wiring diagram Fig. 4.

Testing and Tuning

Having checked the wiring, etc., connect up *only* the L.T. battery and switch on. You can just see the valve filaments glowing. If this is satisfactory the H.T. may be applied. For checking and tuning a 0-50 or 0-100 milli-amp meter is required, and this is inserted in series with the H.T. positive lead. If the transmitter has been correctly wired the meter will read, and indication of radio frequency power may be made as follows. Make a loop of stiff copper wire about 1½ in. dia. with a 0.06 amp. bulb fitted at the centre of the loop. A bulb holder can be used or the bulb may be soldered directly to the loop. The diagram of Fig. 5 illustrates the arrangement. Such a loop when held over the top of the tuning coil will absorb radio frequency power and the lamp will light. A check on transmitter loading may be made this way by observing the anode current reading on the meter. As the loop is brought near the tuning coil and the bulb starts to light, the meter reading will increase. This is a good indication that the transmitter is working correctly. The transmitter may now be tuned to the correct frequency. This can only be done with (a) a receiver which is accurately calibrated, (b) a hetrodyne wave-meter and receiver, or (c) an absorption frequency meter.

Choose a case large enough to take the transmitter and batteries, and strong enough to bear the weight of both the aerial, which may be fixed to the side, and the batteries. The aerial, which may be made up from lengths of dural or aluminium tube, or constructed from the many whip aerials that are available on the surplus radio market, is 8 ft. 6 in. long and mounted on two stand-off insulators or any other suitable insulating block and mounting which can be made from paxolin, tufnol, or thick "Perspex" or distrene. Porcelain stand-off insulators can also be purchased quite cheaply on the surplus radio market. The aerial is connected to the main tuning coil, otherwise known as the "tank" coil, through the medium of the two-turn "link" coil. Connections are made as per the diagram of Fig. 6, which also shows how the "keying chokes" are connected. These chokes can be wound as per the instructions in the diagram or purchased ready wound,

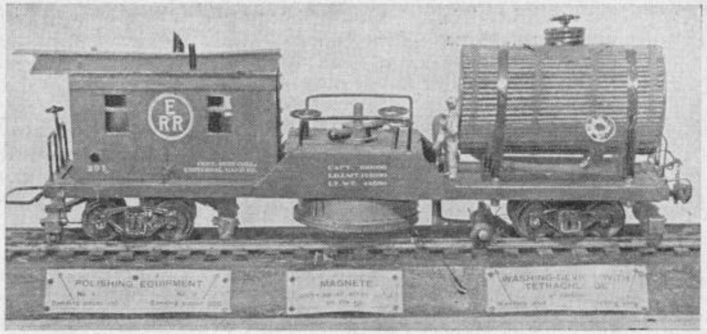
The anode current will be higher with the aerial attached showing that the transmitter is loaded, but should not be allowed to exceed 30 to 33 milli-amps, especially if the maximum H.T. is 140 to 150 volts. Tuning is best done with a trimmer tool so as to avoid touching the condensor. This can be made from a short length of paxolin tube cut to fit the top of the condensor, or a piece of ¼ in. square balsa wood also will do the job in the same way. The milli-amp meter may be wired permanently in the H.T. positive lead and mounted on the carrying case. It serves as a good indicator that the transmitter is working as well as showing when the batteries are failing, since the current will, of course, decrease.

If it is properly constructed, this transmitter is quite stable and will give years of unfailing service. It is also suitable for commercially made radio control receivers operating on the carrier only principle. Such receivers are made by Electronic Developments, Electronic Components Co., and there is one supplied in kit form by Flight Control.

R. WATKINS PITCHFORD'S MONTHLY ARTICLE FOR 00 ENTHUSIASTS

. . . On the Right Track

IN RESPONSE TO REQUESTS FROM READERS THE QUESTION OF HOMEMADE RESISTANCE CONTROLLERS IS DISCUSSED



On the right : Winner from Sweden seen at the Northern Models Exhibition. Rail cleaning car by K. A. I. Lindeburg, Swedish-American Railroad Socy.) Stockholm. (Photo : A. Hamer)

LET'S take a look this month at some of the problems that we come up against in the matter of controlling our trains—of making them start away from a station, accelerate, slow down and stop with something approaching realistic performance.

Now if a man went to a pet store and bought a puppy he would not, unless he were an incorrigible optimist, expect that on the very first day his dog would "come to heel", "take it on the mat", "fetch the slippers", or do other tricks that call for long and patient training.

By what reasoning, therefore, should we expect a model loco to perform faultlessly from the moment it is first set down on the track ?

Even the prototype on which our model is founded is allowed its little whims and fancies and is petted and humoured for quite a while before best performance is expected. And even when it has been in the collar for some time, it has its unaccountable off days as any engineman will tell you.

There are many and various factors which govern the successful running and sensitive response of a miniature electric loco, and we have already touched upon some of these, such as the evenly laid, well cleaned track, sound electrical connections and suitable type of power pack.

But, assuming these matters to have received due attention, there is another very important item we must take into account and that is the controlling resistance.

Now readers have written in from time to time either to ask for instructions on how to make a controller, or else to say that they have tried their hand at making one and have "come unstuck".

At first sight it seems that it should be so simple to take a length of resistance wire and wind it on some sort of former—a bit of a broom handle for instance!—and then arrange a sliding contact that will cut the resistance in and out as it is moved. But there is a bit more to it than that. In the first place, our resistance wire would probably heat up and char the wooden former, causing it to shrink so that the turns of resistance wire became pulled along by the sliding contact until they touched each other and made a short circuit. The antics of our favourite loco under such control would be wonderful to behold.

"Well", you say, "why not wind our resistance wire on asbestos or porcelain, or other material that will stand heat?" Agreed. But we are not out of the wood yet. We want to know how much wire to use and of what thickness. And that brings us straight away to the question of what kind of results we are aiming at. For example, some locos are so free moving that on straight track and running light they will roll along at a scale speed of 20/30 m.p.h. on a mere "wiff" of current, say .15 of an amp.

Well, assuming that we are talking in terms of 12 volt mechs and applying the reasoning of old father Ohm, we get $.15 = \frac{12}{x}$, giving us a total value for x of 80 ohms to be shared between the loco mech and the resistance.

At the other end of the scale we may have a surly (but otherwise beloved) loco which is reluctant to move at anything under .5 of an amp., and the requirements of such a sluggard might be met by a resistance of $.5 = \frac{12}{x}$ or 24 ohms. So that in the one case, having wound a resistance of 60 ohms or so, we should find that even this would not stop, whereas, if we used such a resistance on the sluggish fellow, only about the last quarter of it would ever be needed. Now it may well happen that our loco stud contains specimens representing both these types—and some in between. Obviously then, in the matter of ohmic resistance we must either provide a sufficient range to meet all normal contingencies, or else agree to compromise.

There is, however, another matter to be considered, namely, the gauge of wire to use. If we use very fine wire, we can include a coil having considerable resistance range within quite compact dimensions. But in that case, when the contact arm is near the "on" end of the coil, the full current of the loco will be passing through just one or two turns of wire and we must expect that these will then get very hot—in fact, they may burn out altogether.

Conversely, if we use a wire of gauge so heavy that it will not burn out or overheat, then we shall have to use a considerable amount of wire to secure the required range of control and, consequently, the rheostat as a whole will be bulky and cumbersome. Again a compromise is called for.

All this may sound rather negative and discouraging. Such is not the intention. The point at issue is that whereas anyone can build up a controlling rheostat of a sort, it requires considerable knowledge of the principles involved to make one which will control several locos of different characteristics with that "vernier" adjustment that makes shunting and general operating such a delight.

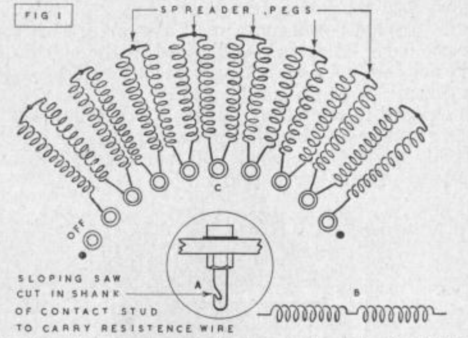
Our "trade" offers several types of controlling rheostats or resistances either separately or built into a complete controller unit. The cost is reasonable and the performance excellent. For those, however, who would like to try their hands at making up a resistance for themselves, the following hints may be of assistance.

Controlling resistances are generally of two kinds, namely, those in which an arm moves over a series of studs, cutting in or out the resistance in "chunks" of several ohms at a time, and those in which a sliding or rotating arm makes a wiping contact direct on to the resistance wire itself, such wire being wound on some kind of a former. The first type is fairly simple to make and there is very little to wear out or go wrong.

You merely mark out a piece of sheet fibre or ebonite of 1/4 in. to 3/8 in. thickness with a circle, semicircle, or segment, decide on the number of studs you are going to have, centre pop at equal spacings round the scribed circumference and drill the holes for the studs. Ordinary brass cheesehead 4 B.A. screws of 1/2 in. length make good studs. If you don't like the look of the screw slots you can turn them down in the lathe, or file them down, but if you do this be careful to get all the stud heads the same thickness, or the contact arm won't ride evenly. Thread a washer on to the shank of each screw and tighten up with a nut. See that consecutive washers or nuts don't touch. There are two methods of attaching the resistance wire to the shanks of the studs. One is by taking a turn round the shank and clamping with a nut, and the other (preferable) is to make a saw-cut in the end of the shank, lay the wire in it and solder. By making the saw-cut, as shown in Fig. 1a, the wire will not drop out should temperature rise to the melting point of solder. As regards the amount of wire to use, the gauge thereof and the amount of resistance to be included between each stud, these are matters that can only be decided by knowing the requirements of the case.

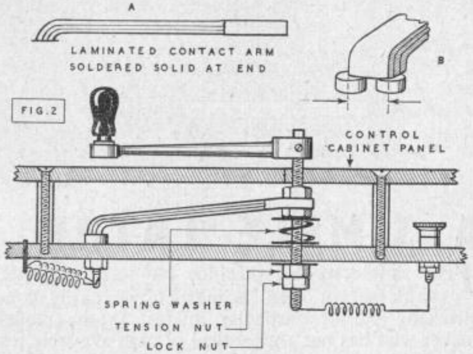
For instance, if you wanted a total resistance of 24 ohms, this would need about 6 yds. of 28 s.w.g. Eureka wire. If you had a 10 stud resistance, you could leave one blank (to form an Off position) and then divide your resistance wire out among the remaining 9, i.e., eight banks of about 3 ohms each.

Of course, it is not essential for each of the eight banks to be of the same resistance value, but with this stud type of controller it will be seen that if you make some of the steps smaller, then the others will have to give correspondingly bigger jumps, in order for the total required resistance value to be included.



A convenient way to wind up the resistance wire is in coils alternating with short straight lengths. Each coil could contain 12 to 13 in. of wire (which would wind up on a round pencil to a coil about 1 in. long), and each straight piece could equally be 1 in. long. Fig. 1b shows the idea.

If now the coils are hung on spreader pegs, as shown in Fig. 1c, it will be seen that there is a length of approx. 27 in. in each bank. A necessary precaution is to space the banks out so that if the coils sag or become distorted when they heat up, they do not touch each other.



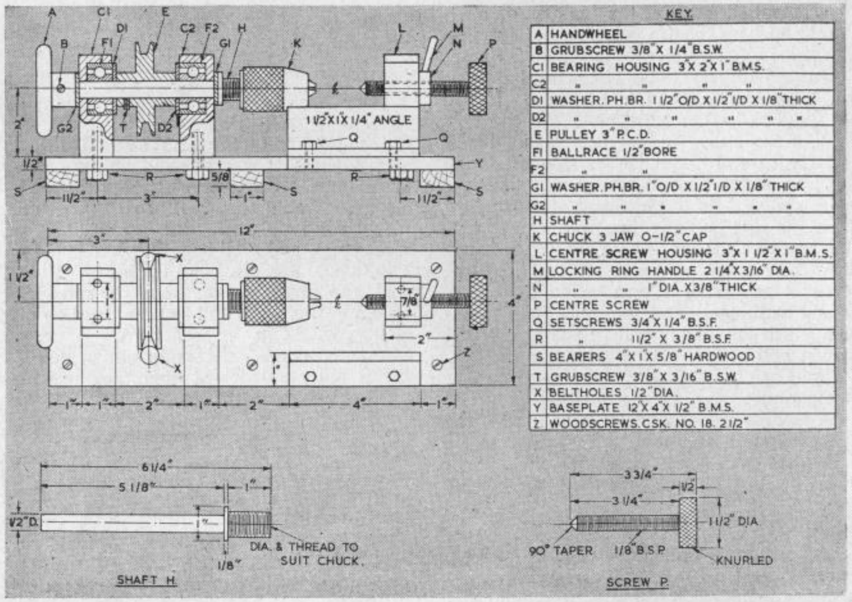
Whilst on the subject of heat generated, remember that this varies as the square of the current—three times the current, nine times the heat sort of thing.

The best stuff to make the contact arm out of is springy brass or phosphor bronze shim stock of $1\frac{1}{2}$ to 2 thous. thickness. Cut out six to eight laminations and bend up at an angle at one end (about $\frac{1}{8}$ in. to $\frac{3}{16}$ in.), Fig. 2a. Nest the laminations together and solder up solid for 1 in. Trim up with a smooth file and drill for the spindle. Note that the leading and trailing edges of the arm, where it contacts the studs, should be rounded or chamfered off so that they do not catch in the stud heads as the arm is turned. Also the width of the surface (after the chamfering) should be equal to the pitch circle centres of the studs, so that the contact cannot sink down between consecutive studs (Fig. 2b). Clamp arm to spindle with nuts, insert a spring washer for tensioning. Solder a flexible lead to the spindle—do not rely upon a rubbing contact. Fig. 2c gives a general "hook up" of the idea.

I prefer to mount my resistance vertically and to have an arm and handle control in place of a round knob—it makes the whole job more like a loco regulator and less like a radio set.

With a single resistance of this kind, reversal of polarity must be done with a separate switch. But if you wish to reverse your loco by putting the handle either to the right or to the left of a central "off" position, then two sets of resistance must be wound up and two lots of studs supplied. The regulating spindle is then fitted with a simple commutator so that in turning it from one bank of resistance to the other, the direction of current is automatically reversed.

Of course, it must be appreciated that really sensitive control over the loco is not possible with a controller that cuts in and out resistance in lumps of several ohms at a time. To secure this it is necessary to wind the resistance wire on some sort of a former and arrange for a contact arm to bear on the wire itself, thereby selecting one turn of the resistance coil at a time. It is a further advantage to have the former of conical rather than of cylindrical shape so that resistance is cut out in big coils at the "start" end and in progressively smaller coils as "full load" is approached. It is on this "differential" form that most professionally-made controllers are wound.



KEY.

A	HANDWHEEL
B	GRUBSCREW 3/8" X 1/4" B.S.W.
C1	BEARING HOUSING 3" X 2" X 1" B.M.S.
C2	" " " "
D1	WASHER. PH.BR. 1 1/2" O/D X 1/2" I/D X 1/8" THICK
D2	" " " " " "
E	PULLEY 3" P.C.D.
F1	BALLRACE 1/2" BORE
F2	" "
G1	WASHER. PH.BR. 1" O/D X 1/2" I/D X 1/8" THICK
G2	" " " " " "
H	SHAFT
K	CHUCK 3 JAW 0–1/2" CAP
L	CENTRE SCREW HOUSING 3" X 1 1/2" X 1" B.M.S.
M	LOCKING RING HANDLE 2 1/4" X 3/16" DIA.
N	" " 1" DIA. X 3/8" THICK
P	CENTRE SCREW
Q	SETSCREWS 3/4" X 1/4" B.S.F.
R	" 1 1/2" X 3/8" B.S.F.
S	BEARERS 4" X 1" X 5/8" HARDWOOD
T	GRUBSCREW 3/8" X 3/16" B.S.W.
X	BELTHOLES 1/2" DIA.
Y	BASEPLATE 12" X 4" X 1/2" B.M.S.
Z	WOODSCREWS. CSK. NO. 18. 2 1/2"

A SIMPLE LATHE

BY R. G. ILSTON

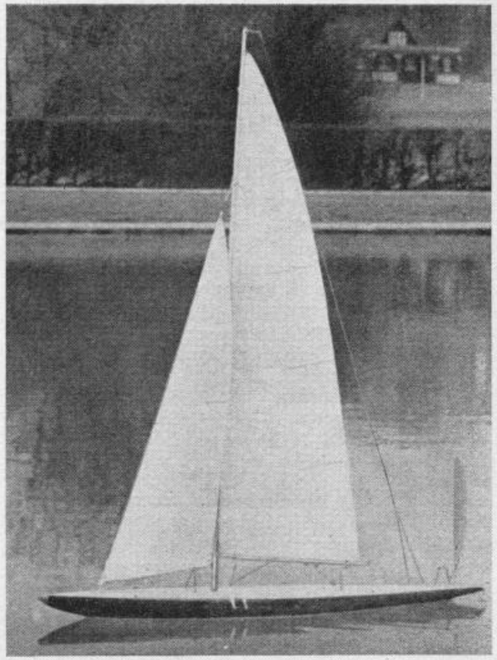
THE simple turning machine for small diameter work shown here, is inexpensive, easily constructed, and of particular interest to the model maker who has not a great deal of cash available for workshop.

The sketches are self-explanatory, and provided close limits are observed during construction, it will prove a sturdy and accurate addition to the small workshop.

Halceyon

10 - RATER

IN PART II JOHN A. LEWIS DEALS IN DETAIL WITH HULL CONSTRUCTION. NEXT MONTH HE WILL COVER PAINTING AND FINISHING WITH NOTES ON COLOUR SCHEMES.



THE "bread and butter" method of building the hull of a yacht is about the easiest for the amateur builder, and as there are several advantages over the planked-up method we will choose this way of building *Halceyon*.

Diagrams 1 and 2 show that the hull is laminated up in layers of wood which are, in this case, 1 in. thick. Some builders prefer to have the lamination running vertically, and this offers some economy in wood. The method to be described combines this advantage and the fact that it is easier to appreciate the final shape of the hull when built with horizontal layers. The principle being that the hull is built up in two halves with one vertical layer running through the centre fore and aft. This vertical layer is cut to the profile of the design, and if a centre line is scribed down its length, we have a permanent datum line on to which the keel and skeg can be lined up. The section spacing can be marked off and will not be lost until the final sandpapering of the carved hull is started.

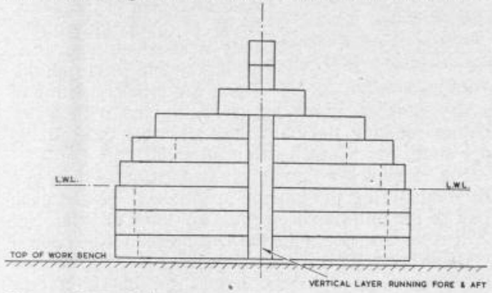


FIG. 2. END VIEW OF GLUED UP HULL LAYERS.

Obviously, the first job is to find some suitable timber. The best wood to use is either yellow pine or white pine. Unfortunately these are almost impossible to obtain today. There is an imported hard wood, free of licence, called obechi, which makes a good substitute and is in plentiful supply. It is light in weight and easy to work, but is not suitable for a varnished boat, as there are often dark streaks in the grain. It is well worthwhile to have the timber machine-planed down to 1 in. thickness, which means that the planks will have to be about $1\frac{1}{4}$ in. thick in the rough state. You will require also, two pieces of obechi planed smooth to $\frac{1}{8}$ in. thick, 6 in. wide, by 6 ft. long for making the deck.

Marking out the timber is the next job, and should be carefully done. Mark the layers directly on to the timber by plotting the required dimensions direct off the full-size body plan. The use of paper templates is tempting, but can lead to considerable errors. As we are building the hull in two halves, it is only necessary to mark out the layers for one half as these can be used as templates for the other half when they are sawn out.

Draw a datum line on the timber and mark off section lines at right angles at a distance of 2.6 in. apart. Measure off the distances from the centre line on the body plan to the edge of the particular waterline at each section, and transfer all the dimen-

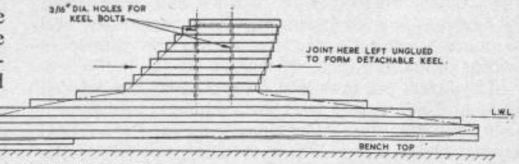


FIG. 1. SIDE VIEW OF GLUED UP HULL BEFORE CARVING.

sions to the section lines on the timber. Join up all the points obtained with a fair curve, and we have the outer edges of one layer. As each layer down to the one below W.L. No. 6 is to have the inside cut away, we must plot this inside line next and ensure that sufficient timber is left to provide adequate thickness for the finished hull. It is obvious that section widths for the inside line will follow that of the W.L. immediately below, less the allowance for hull thickness. The easy way of obtaining the correct width is to mark on the W.L. of the body plan a spot where the inside surface of the hull would cross it. The width from the centre line to this spot being the required dimension. This need only be done for every third or fourth section. The marked-out layer should look something like Fig. 5. The thickness of the finished hull should be about 1/5th in. increasing to $\frac{3}{8}$ in. at the centre line, except at the stem and stern, where 2 in. and $1\frac{1}{2}$ in. respectively is required to obtain the necessary strength.

In order to preserve the shape of the layers during glueing-up a minimum width of 1 in. should be used. This will apply particularly to the layers above the load water line. Notice also that where there is tumble home of the topsides, extra width must be allowed on the upper layers to enable this to be carved (see Fig. 3).

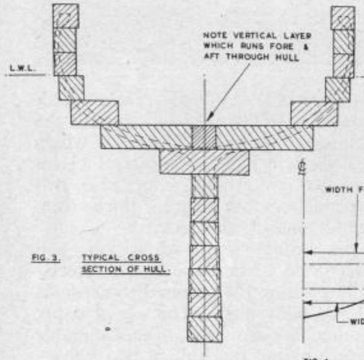


FIG. 3. TYPICAL CROSS SECTION OF HULL.

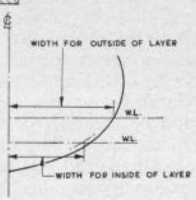


FIG. 4.

The above procedure is carried out for all the layers in the hull, but note that from W.L. No. 7 the layers are complete and not in two halves, the vertical layer only extending down this far.

Allowance has to be made for the vertical layer and $\frac{1}{2}$ in. is accurately cut off each half layer parallel to the datum line. The vertical layer is marked out in a similar manner to the others. It will be seen that considerable economy in wood can be achieved by nesting the half layers one inside the other, and is made more effective by buying the timber in widths of about 9 in.

The layers are sawn out $\frac{1}{8}$ in. clear of the marked lines and the section lines are continued round each face of the layers. The outer edge of the vertical layer can be planed down to within $\frac{1}{32}$ in. of the

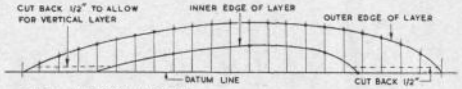


FIG. 5 MARKED OUT HALF LAYER

marked profile, and a centre line scribed down its length.

Glueing Up

There are several suitable glues obtainable, and these are of two basic types: (a) the casein glues; (b) the resin based glues.

It is recommended that resin glues are used as they are more durable in damp conditions. Of the resin glues the gap-filling cold-setting type is most desirable, and there are several manufacturers. These glues usually consist of the glue and a hardening agent which, when added to the glue, starts a chemical action, hardening off the glue in normal room temperatures.

The glue may be applied to one surface of the joint and the hardener to the other surface; on cramping up, the hardener will meet the glue and the necessary chemical action will start. Alternatively the hardener may be added to the glue before application. Where a good glue line can be achieved it is better to use the separate application method, thus saving wastage due to mixing an excessive quantity, and there is more time to get correct alignment of the joints. Most of these glues have only a short storage time, usually two to three months. There is a type consisting of a dry powder which has to be mixed with water before meeting the hardener, and this type, in its dry state, has a much extended shelf life.

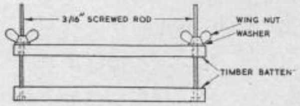


FIG. 6. CRAMP FOR GLUEING UP 3 REQUIRED.

Fig. 6 shows a simple type of cramp which can be used during the glueing-up process. When each half of the hull has been built up down to W.L. No. 7, it is necessary to glue the two halves to the central vertical layer. This will be simplified if small wooden blocks are glued to the halves so that G-cramps can be applied across the central layer. These blocks can be carved off when shaping the outside of the hull.

The layer between the W.L.s 7 and 8 is now glued to the main hull. The remaining layers can be glued up after the hull has been carved. The actual carving is quite easy and only requires a certain amount of patience. The few essential tools are a block plane about 8 in. long, a 1 in. paring chisel, a $\frac{1}{2}$ in. outside ground gouge, and lots of glasspaper.

The initial rough work on the outside of the hull can be done rapidly with the 1 in. chisel. The block plane is used for most of the shaping, and when the strips on the hull have almost gone templates made of stiff cardboard should be applied to the hull to check the shape. With the plane set very fine it is possible to obtain a remarkably fair hull, but the

final shaping must be done with glasspaper. I find it convenient to wrap the paper round a cork pad about 3 in. wide x 6 in. long x $\frac{1}{2}$ in. thick. It is advisable to shape the hull at a constant rate all over rather than finish off one side at a time or even try to get one template to fit at a time. When nearing the final shape, view the hull from a distance at all angles in daylight and the unevenness of the surface will be more apparent than if viewed at close quarters under artificial light.

Cutting the sheer is the next job, and this can be marked out by using one of the waterlines as a datum and measuring the required heights off the plans. The point to notice is that $\frac{1}{8}$ in. must be subtracted from these heights to allow for the thickness of the deck.

Hollowing out the interior of the hull must now be tackled. The first requirement is that the work should be securely held, and I find that one of the easiest ways of doing this is to drive two large screws through the bottom of the hull into the bench and fix packing pieces under each end of the hull for additional support. The principal tool used is the $\frac{1}{2}$ in. gouge. It is usually more convenient to use a narrow tool rather than a wide-bladed one, as the former is much easier to control and requires less effort to cut the wood. Note that extra thickness is allowed at the gunwale to enable the deck beams to be matched in (see Fig. 3). Finishing off the inside of the hull may be done with a small round soled "fiddle" plane, but failing this tool, glasspaper can be used. The weight of the hull at this stage should be about $3\frac{1}{2}$ lb.

The hull and the remaining unglued layers may now be drilled for the keel bolts. The position for the holes will be $2\frac{1}{2}$ in. fore and aft of the C.B. marked on the plans. The keel can be made detachable from W.L. 10, in which case the holes above this W.L. should be $\frac{1}{4}$ in. dia., and the holes below should be $\frac{3}{16}$ in. dia. Brass tubes 3/16th in. bore are fitted in the upper part of the keel, and project about 1 in. into the interior of the hull. Oak spacing pieces are slipped over the projecting tubes and glued into place. The keel bolts are made from $\frac{3}{16}$ in. brass or stainless steel rod with a nut screwed on the lower end and a wing nut on the upper. The keel layers may now be glued together using the keel bolts as a cramp. The carrying handle can be made of $\frac{1}{2}$ in. dia. aluminium tube flattened at each end and drilled to fit over the upper ends of the keel bolts.

The keel is shaped in a similar manner to the hull and the lead line marked out. The pattern for the lead is cut off with a fine-bladed saw. If you have never cast a keel then I would advise you to have it done at a foundry or by someone who has some experience. With the present high cost of lead the actual casting charge is very small, and I have never bothered to cast my own keels since my first horrific attempt many years ago! The point to insist on is that the holes for the keel bolts are cored, as drilling

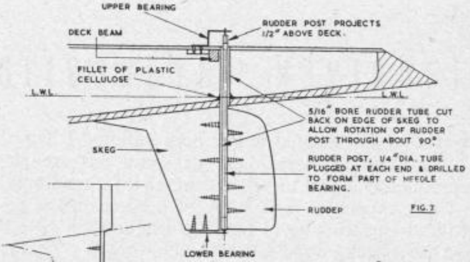
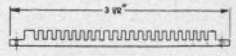


FIG. 7



1/4" SQ. BRASS TUBE OR BAR
FIG. 8. MAST STEP

these holes afterwards is an extraordinarily laborious process.

While the keel is being cast the deck beams should be made and glued into the hull. The amount of camber to be allowed is $\frac{5}{16}$ in. amidships and reduced proportionately as the beams become shorter towards the ends of the hull. Beams should be arranged to come in the following positions: fore and aft of the hatch, fore and aft of the mast slot; just forward of the rudder tube, and intermediate positions near the bows and aft of the hatch.

At this stage the rudder tube and skeg should be fitted. The skeg is simply butt-jointed and glued to the hull, and the brass rudder tube will provide quite adequate strength. The rudder post itself should not be less than $\frac{1}{4}$ in. o.d. brass tube, and the tube must be large enough to allow perfectly free movement of the rudder post, say, $\frac{5}{16}$ in. i.d. minimum.

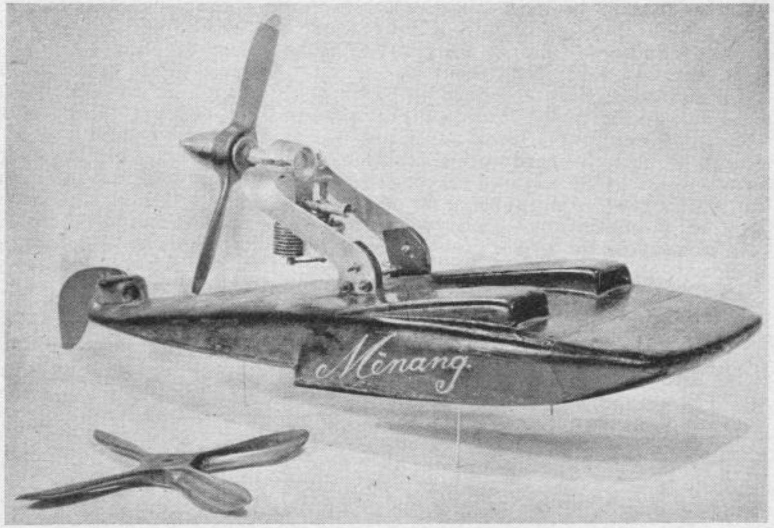
The deck is a straightforward job, but do not forget to glue blocks of hardwood to the underside in way of the main deck fittings. The mast slot should be about 3 in. long by $\frac{3}{4}$ in. wide, reinforced down the sides, and the hatch can be about 3 in. wide by $4\frac{1}{2}$ in. long. The deck and the inside of the hull should be given at least three coats of good yacht varnish, the first coat being 50 per cent turpentine. The mast step is now fitted and the deck screwed or pinned into place whilst the last coat of varnish is still wet.

By now the keel casting should have arrived and can be cleaned up as necessary. In *Halceyon* it will be seen that if the keel is made detachable, as recommended, it is necessary to secure part of the deadwood to the after face of the lead. This is done by screwing a $\frac{3}{8}$ in. square strip of hardwood to the lead, brass screws, of course, cutting a $\frac{3}{8}$ in. groove in the deadwood and then glueing the wood into position. This has proved satisfactory in the prototype, but perhaps there are better ways of doing the job. Incidentally, lead may be planed quite easily if the plane is lubricated with turpentine.

The hull can now be sanded down with a very fine grade paper and made ready for painting.

AIRDRIVEN HYDROGLIDERS *Menang & M-8*

MANY READERS HAVE ASKED US TO PROVIDE DESIGNS FOR AIR DRIVEN HYDROGLIDERS WHICH OFFER ALL THE THRILLS OF FAST WATERBORNE CRAFT WITHOUT THE POSSIBLE COMPLICATIONS OF PROPELLER TUBES AND UNDERWATER SEALING. AUTHOR JOHN MORRIS HAS DEVOTED CONSIDERABLE RESEARCH TO THESE TWO FINE MODELS.



WHEN I first started model boat building I had of necessity to keep them as small as possible. Consequently I had to restrict myself to a maximum of 1 c.c. capacity. The study of a book on the design and construction of model power boats by Hobbs gave me a background to start from.

I built a very small test boat for observation. It was of all ply "kipper box" construction, LOA 9.6 in., beam 3 in., fore plane area 15 sq. in., aft plane area 13.8 sq. in., fore plane angle 1:7, aft plane angle 1:36. Step $\frac{1}{8}$ in. deep, vented all across its width and positioned 5 in. from the bows. The sides were parallel. It was powered by a crude form of rocket.

The performance indicated to me the value of step vents for a quick getaway, the value of a high polish on the planes and that parallel sides are liable to run wet, thus giving unwanted skin resistance.

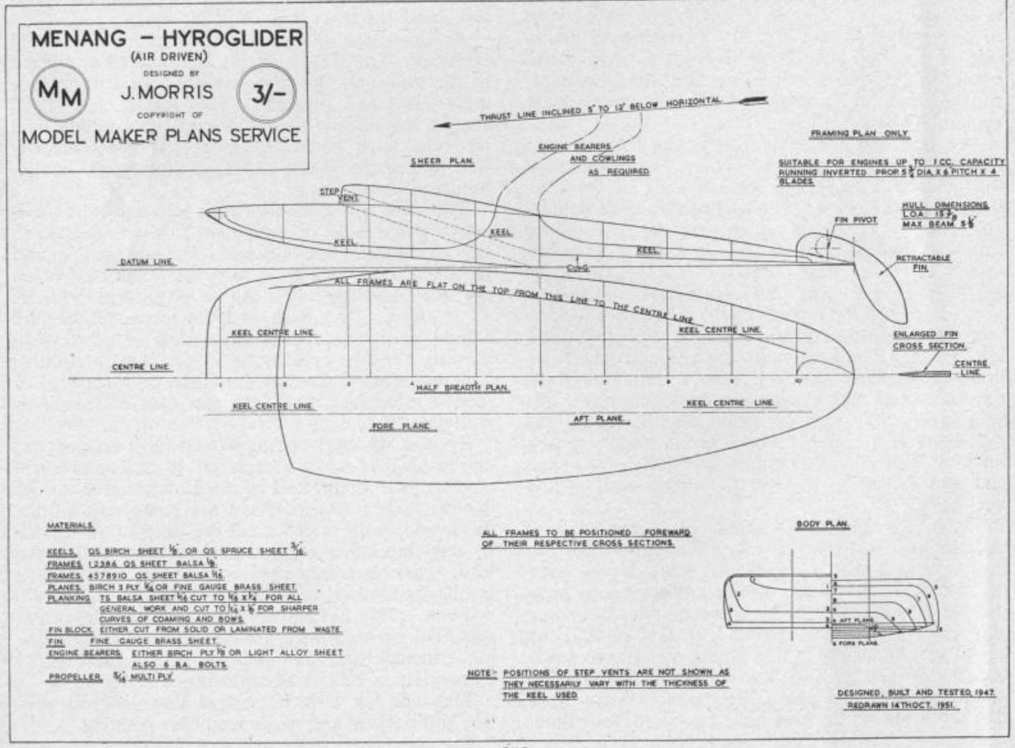
With these points in mind I designed the *Ménang*. The trouble of parting water at the bows is a waste of effort, so I decided to have my maximum beam where the water first touched the hull. I only wanted water to touch where it would do useful work providing lift. Thus the stern was rounded off in plan view, and sides moulded into the coaming which also reduced the weight and enabled me to completely streamline the hull.

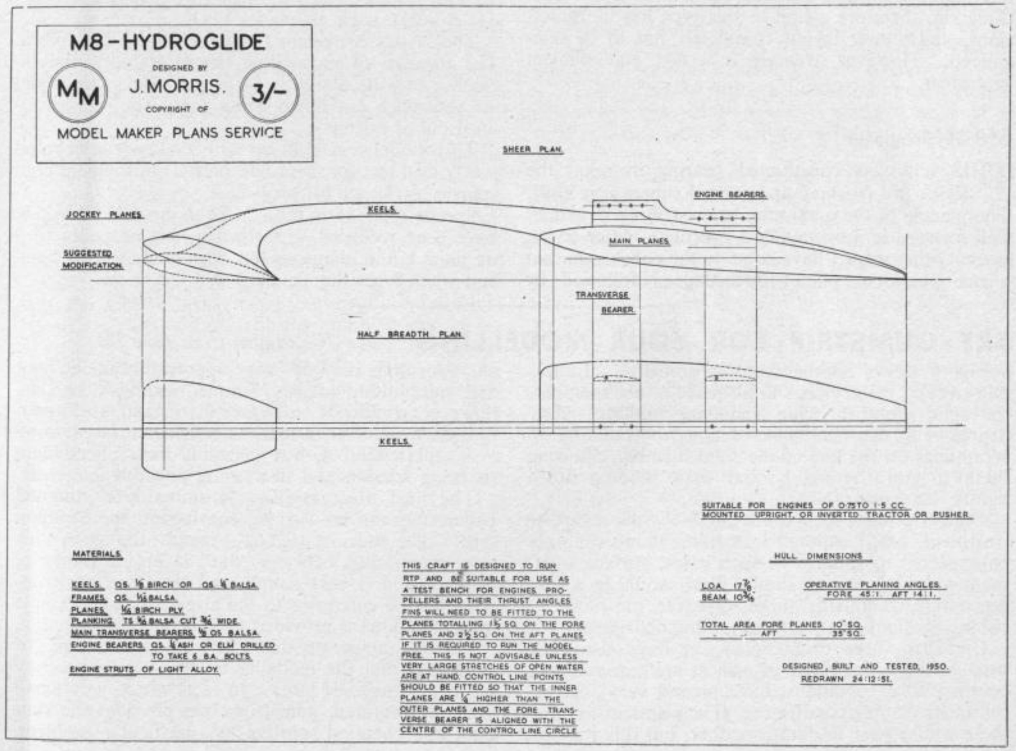
Dimensions were as follows: LOA 15$\frac{3}{8}$ in., Maximum beam 5$\frac{1}{8}$ in., fore plane angle 1: 12.5, aft plane angle 1: 25.

The engine was a diesel of 1946 vintage with a capacity of 0.9 c.c's. and which was as heavy as a full size job in its construction. Nevertheless it was a good plodder and always started well when mounted inverted which was as it was required to run.

A propeller of 5$\frac{3}{4}$ in. pitch and diameter with four blades was fitted.

The hull was constructed of hardwood for the twin keels, $\frac{3}{32}$ in. ply for the planes, and $\frac{1}{16}$ in. balsa





for the rest except the engine bearers which were of $\frac{3}{16}$ in. ply.

Great attention was paid to the polishing of the planes until they really were like mirrors.

The performance was far beyond my expectations and I ran her often on the open sea at Lee-on-Solent when it was really calm. One day I took her to Gosport to run on the pond when a local club meeting was due, I set her off down the course from one end, and the catchers missed her at the other. Never again will I consider running even such small craft on a straight course again. The experience was bitter and the lesson will not be readily forgotten.

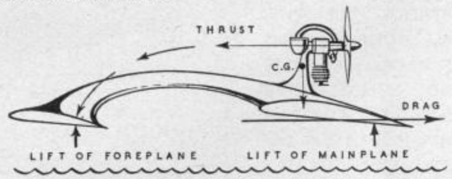
A little while ago I started rebuilding the hull, and using the old bits I have nearly finished it. The ply engine bearers have been replaced by dural sheet ones, and an up-to-date 1 c.c. engine fitted. The planes have to be polished but other than that practically all the paintwork is still original, and she looks very much the war horse.

The limitations of the design are obvious. The broad bows and general lines of the hull aerodynamically have a great lift tendency and shallow porpoising is evident when *Ménang* comes into the wind. This can only be countered to a degree by alteration of weight distribution and engine thrust direction, therefore a hull of this type has its limitations, and a new layout completely has to be considered. However *Ménang* is a fast and efficient performer.

M8 Hydroglider

THIS hull was constructed bearing in mind the lessons of *Ménang* and several subsequent hulls. The placing of the maximum beam of hulls or planes well forward is now standard practice. After trying several other ways I have come to the conclusion that a mainplane, or planes, preceded or followed by jockey planes of far smaller size is likely to be most efficient.

Jockey planes, such as fitted to M8, are small enough not to be picked up by the air and the craft overturned, provided that the angle if incidence is not too great. If the extreme sterns of the jockey planes are brought down to a zero angle of incidence they will be found to keep to the surface of the water very closely, and the main planes must inevitably follow. The main planes in this can carry all the load and thus would need to go very fast indeed before they lift. The jockey planes take the effect of the leverage between the points of resistance and thrust as shown here.



This craft was built in my case of all balsa for lack of better materials. The scantlings are: LOA $17\frac{7}{8}$ in., beam $10\frac{3}{16}$ in., area fore planes 10 sq. in., area aft planes 35 sq. in., angle fore planes 4.5: 1 (reduced later), angle aft planes 14: 1.

The layout is evident from the photos and plans. The troubles of reconciling lateral stability and incidence of wide planes is easily achieved, weight and air resistance cut down, steps and vents are developed out of existence.

This model was built up with these ideas in mind partly as a test for them and partly to provide a convenient test bench for propellers.

Speeds of 25.85 m.p.h., 22.80 m.p.h., 22.50 m.p.h. have been recorded so far but a new propellor of 9 in. pitch x 8 in. diameter has been made for the boat, and when I get the chance I will test it out.

TRY GUMSTRIP FOR YOUR MODELLING

(*Continued from page* 351)

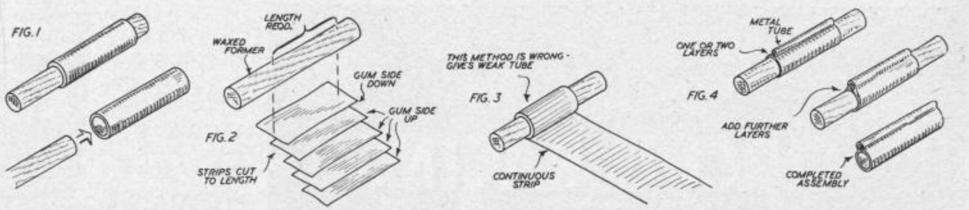
Fig. 6 shows another use for gumstrip. In this one circular member has to fit inside a tube member, the solid member being undersize initially. Any degree of fit can readily be obtained by building up wrappings on the end of the solid member, allowing these to dry thoroughly and then sanding down lightly, if necessary.

Gumstrip tubes seem quite durable without further treatment, but if exposed to extreme damp can only be expected to suffer. In such cases, surface treatment with lacquer or a similar finish would be a wise precaution. Gumstrip tubes, however, are more resistant to damp than ordinary untreated paper.

Gumstrip tubes of telescopic fit have also been used where sliding bearing surfaces are required and, contrary to expectations, have proved very successful under varying conditions. It was anticipated that these would bind in damp weather, but this was not so. Nor does the "fit" vary appreciably under light and intermittent loads. Simple bearings like this, however, could not be expected to stand up to continuous wear. When used as bearing surfaces, however, lubrication with a pencil is most effective in reducing friction and decreasing any possible wear.

The final diagram (Fig. 7) shows how gummed paper strip can be used for bearings of the trunnion type. The bearing itself is a metal tube again, this time sandwiched between "flat" layers of gumstrip. Construction is very simple and the complete trunnion can be cut down to the size required. Ample cementing area is provided to attaching the trunnion.

An advantage of this type of construction, of course, is that the modeller is not restricted to any particular range of sizes. In fact, where very small sizes are required, gumstrip often provides the simplest and cheapest solution to a particular problem.



TRY GUMSTRIP FOR YOUR MODELLING

MODELLERS often overlook the immense possibilities of ordinary gumstrip—glue coated brown paper, such as sold in rolls for sealing packages, etc. — which, besides being readily "moulded" or formed to a variety of shapes can also be very strong and fully capable of being used for stressed parts Properly used, in fact, its weight and strength can often be compared directly with that of thin metal. It then has the simple advantage of being much easier to work than metal.

Possibly the most widespread application of gumstrip in modelling is in making small paper tubes. These tubes, of course, can be made to exact size by winding over a prepared former which, for circular tubes, is nothing more than a length of dowel (or a metal tube), Fig. 1. Gumstrip does not contract on drying so there is no difficulty in removing the formed tube when dry. It is always advisable to leave the wound tube on the former until properly dry as otherwise it may distort.

The best method of making tubes of this type is first to lightly wax the former, such as by rubbing it with a candle, and then cut a number of strips slightly longer than the length of the required tube. Each strip is then applied successively to the former, after wetting *both* sides of each strip.

The first strip should be laid on the former so that the gummed side faces outwards. Succeeding layers are then laid on with the gummed side facing inwards, or towards the former. Much of the accuracy and success of the finished tube depends on how the first strip is wrapped on the former. It must be wide enough to wrap completely round the former and overlap. It must also be pulled on *tight* and true. Once the first strip is properly in place, no difficulty should be experienced in wrapping on the other strips accurately.

Drying can be speeded by heat treatment, such as light baking, or laying the "wet" tube in front of the fire. Rapid drying, however, sometimes leads to wrinkling and should be avoided, if possible. Drying under normal conditions, at least 24 hours should be allowed before removing the tube from the former, when it will be quite rigid and can be sawn, cut with a knife and sandpapered.

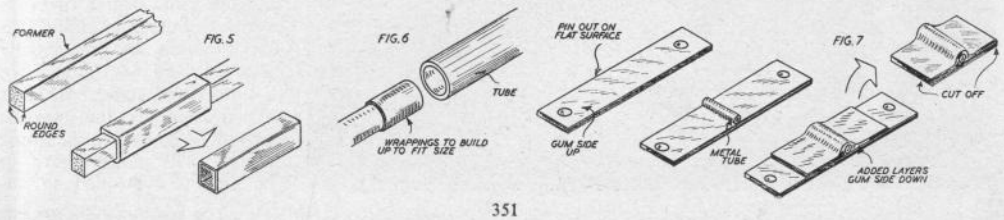
The *wrong* way to wind a tube is to wrap it from one continuous strip of paper, as shown in Fig. 3. Actually this tube would be satisfactory for most purposes, but if used for a stressed part would be more likely to buckle than a tube wound the proper way. Winding a long tube by spiralling the wrappings from end to end would give a tube with little final strength. The "long" way—winding from layers of individual strips—is best.

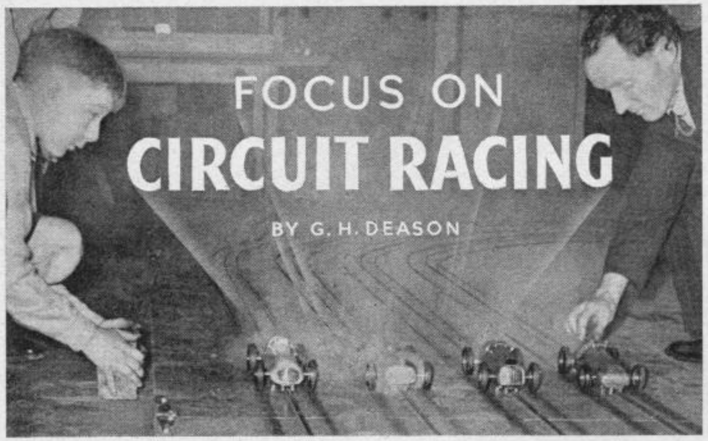
One of many ways in which rolled tube can be adapted to various modelling needs is shown in Fig. 4. This particular fitting is, in fact, a hinge member. The hinge wire (not shown) is retained in a metal tube and this tube is itself formed in a wound paper tube.

Construction is quite straightforward. The main tube is made on a suitable former. One or two layers of gumstrip are wound in place, according to the strength required, and the metal tube then placed in position. Further layers of gumstrip then bond the metal tube in an extremely strong, rigid final assembly. Again this can be worked by normal tools, if necessary.

Of course, all tubes need not necessarily be round ones. Square and rectangular tubes have their uses and these can be wound from gumstrip just as readily as round ones (Fig. 5). Exactly the same method should be used. If enough layers of gumstrip are used the resulting tube will be rigid enough to reproduce I-beam members if split down the middle. Other similar applications to modelling needs will be obvious, with both round and rectangular tubes.

(*Continued on page* 350)





FOCUS ON CIRCUIT RACING

BY G. H. DEASON

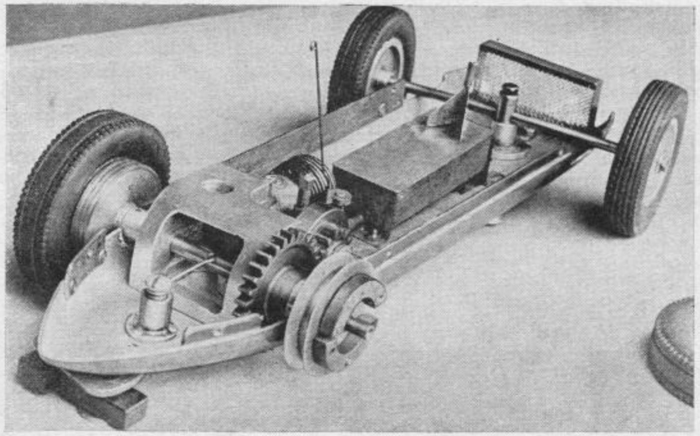
MODEL MAKER FOLLOWS UP F. G. BUCK'S RECENT ARTICLE WITH A PICTORIAL SURVEY

Ten seconds to go! A scene at the start of a 14 lap race on the Meteor Club's Grand Prix circuit. The operator on the left pulls back the chocks to release the cars.

IN the March issue an authoritative article from the pen of F. G. Buck gave some very illuminating comments on rail-track racing, which were the fruits of twelve months' experience of operating the Meteor Club's track under normal conditions, plus the findings of much experimentation. This article has aroused much interest amongst readers who are attracted to the new branch of the hobby, and many letters have been received on the subject. Shortly after the article appeared an opportunity was afforded by the Meteor Club to visit the track on the occasion of a Club day, to witness the developments which had come about since our visit to the unofficial opening early in 1951. This we hastened to do, in order to see for ourselves how the scheme was faring, and to take some pictures of the small details referred to earlier by F. G. Buck, which are adding to its success.

Principal interest somewhat naturally centred round the braking problem, about which so much has been written and discussed. Gerry Buck clearly explained the conditions which were required to be fulfilled in his article, and at the same time gave details of his own simple but practical solution, so this was the first item to come under examination. To re-cap briefly for new readers, this scheme simply substitutes two blocks of Ferodo or other friction material for the rear pair of rollers, thus causing the car to slow on corners due to increased friction on the rail. Chief drawback, theoretically, is the fact that the retarding action doesn't start until the car is well into the bend, whilst the advanage lies in the fact that the faster the car enters the corner, the greater the friction and thus the slowing effect.

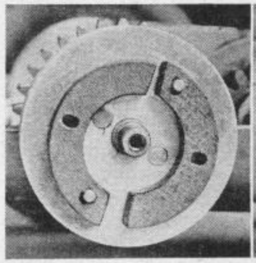
Examining the braking device we were rather surprised to find that the blocks were arranged to pivot, having had the idea that they were fixed to the plate, a state of affairs that would obviously cause a much greater binding effect on the rail as the tail of the car swung over for the bend. Examination of a pair of blocks that had had some considerable running showed little or no signs of wear. The question of standardisation was discussed, with a view to ensuring the same degree of braking for all cars, assuming that this system is universally adopted, and we were shown a number of standard blocks as supplied by the makers. Length of block and the fitting thereof will plainly have to be closely controlled to ensure equity, but this is merely a matter for routine scrutineering, and should present little difficulty, once standards and dimensions are laid down.

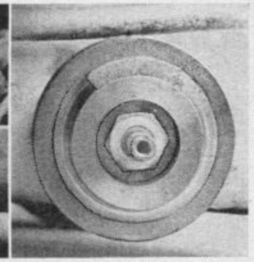


In practice the system worked well, and was instructive to watch in action. The fastest car running on the day of the meeting was an Elfin-engined B.R.M. of F. G. Buck's, fitted with 2: 1 gear reduction, and this car was slowed visibly on all the corners but one, accelerating away on release in most spirited fashion. The exception, oddly enough, was the tightest corner on the course, an acute hairpin, which had not the slightest effect on the car's speed! Why this should have been, nobody was able to explain.

In the original article Gerry Buck placed great emphasis on the function of the clutch or clutches as factors of success, and this was amply demonstrated. This problem is closely tied up with the question of gearing and gear ratios, but even with the lowest ratio at present employed, 2: 1, and with the clutches running at half-engine speed since they are situated on the axle ends, any hesitation on the part of the clutch shoes to free instantly on the slower corners resulted as often as not in a stalled engine. To a newcomer watching the racing for the first time the reason for this stalling was not at first apparent, for there are no outward or audible signs of the engine labouring, merely an immediate stoppage. This is no doubt due, as was pointed out earlier, to the fact that even with the 2: 1 ratio the engines are running so far below peak r.p.m. as to be developing far less than maximum power. For our own part, we wonder whether for this type of racing some form of belt-drive might not be employed with advantage, as the additional flexibility might assist things, provided that sufficient contact arc and distance between centres could be contrived.

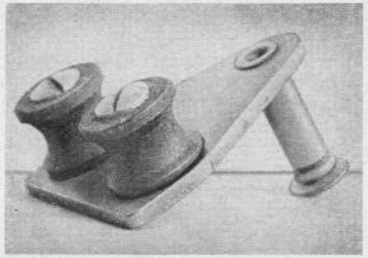
We were shown a variety of clutch arrangements, ranging from full pairs of leading shoes, trailing



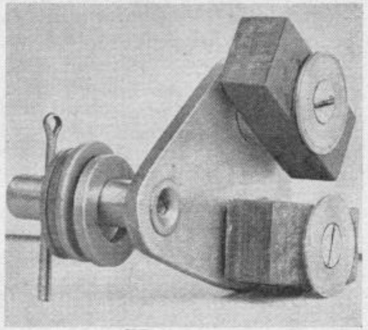


Above: Centrifugal clutch arrangement with two-leading-shoe action, giving maximum grip. Shoes can be reversed to give trailing action.

Above right: In some cases only a segment of a single shoe is used, located by a peg in its groove, allowing higher engine revolutions.



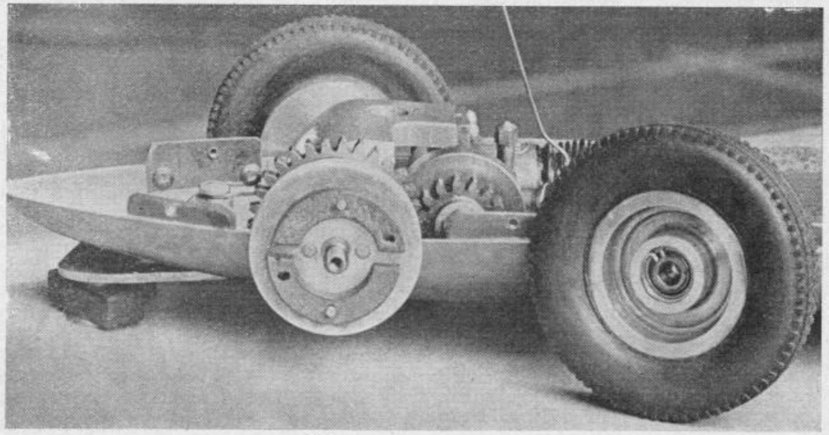
Top centre: A rear swinging guide plate, in this case fitted with two flange-type rollers of Tufnol, which have proved satisfactory in action.



Right: A rear guide-plate fitted with brake-blocks in place of rollers, which is used to slow the cars through the bends.

Opposite page: General view of an Elfin powered circuit-racing chassis, fitted with braking attachment and 2 : 1 step-down drive through spur-gears.

Right: Close-up shot of centrifugal clutch, showing shoes pivoted centrally with elongated holes, and details of wheel-drum and ball-race housing.



shoes and shoes pivoted at their centres with elongated holes for the pivot pins, to a single shoe running loose, but located by a stop-pin, and having a contact area of less than a quarter of the drum's circumference. This latter arrangement, running at half-engine speed, seems unlikely to be so successful in theory, but in practice is the most successful of the lot.

A factor which is no doubt contributing to the clutch problem is the increasing use of the short-stroke, high-performance engine in preference to the long-stroke "high torque at low revs." type which was previously used universally. We had the opportunity during the meeting of operating one of the "babies", a direct drive 0.75 c.c. Mills-engined job with the drive on one wheel only, and this little mite proved most reliable and free from vices. On the other hand John Parker was airing two new and untried models, one powered with a Frog 150 and the other with an Elfin of similar capacity, both "hot" motors and both driving direct on one wheel, and at anyrate on the outings we witnessed, both functioned quite happily with this arrangement, so it must not be inferred that clutch trouble is prone to mar the performance to any serious extent. Certainly the day's racing was in no way affected adversely by this, and some excellent impromptu events were staged.

The question of wear on the single flange type of guide roller was also inspected with interest, and samples we saw had certainly some signs of the running they had done, due to the line contact with the rail, although there was insufficient wear on the specimens we saw to cause trouble. We were also shown a pair of experimental rollers of double-flange type made of Tufnol, which had, up to date, proved entirely satisfactory. These small diameter rollers obviously revolve at very high speed, and require fairly frequent inspection. The rear rollers take the heaviest load, and the pins on which the rollers revolve must be very securely attached. In this connection John Parker asks us to correct an error in the description of his Cooper model which appeared in the March issue. The guide plates are in fact made from stainless steel and *not* mild steel as stated, and the screw securing the drive wheel is not, as originally stated, tapped direct into the Frog engine shaft, but a special adaptor is used.

Talking of the Cooper, this attractive little car went very well and looked very much the part on the track, whilst the Ackerman steering operated from the front guide plate worked most satisfactorily. Another new car from the Parker stable, the clever little converted plastic Offenhauser, described elsewhere in this issue, was also having its first track tests, and performed excellently.

So far as the actual racing was concerned, this had improved greatly since last we saw it, and there would seem to be little to prevent the staging of a full-scale Grand Prix, run ofl in all the authentic trappings of heats and finals, once there are a sufficient number of cars constructed and developed to a degre of reliability, to form the entry. By way of an initial try-out, a fifty-lap race between four cars was staged during our visit. The distance was originally intended to be 100 laps, but shortage of fuel and time made the shorter distance adviseable. The four fastest and most reliable cars competed, but even so it took some little time to marshall all four on the starting grid ready for the "Off", as one or two proved tricky, and stalled several times at the critical moment. Once away, however, the race proved really exciting, and it became apparent that races of this type are not lost until they are won. Gerry Buck's well-prepared B.R.M. led from the start and built up quite a commanding lead, despite the handicap of its braking system, but was chased energetically by two Ferraris, of Harry Howlett and Stan Robinson, the yellow Maserati proving temperamental and only appearing in spasms. The B.R.M. ran faultlessly through to its refuelling pit-stop on lap 37, and the refill and restart were rapidly handled. In the closing stages, however, the second Ferrari closed up and more than held its own, visibly making ground on the corners and losing to the B.R.M. on the straights, the two cars a mere yard or so apart. There is no doubt that with four cars as well matched as were these two in the closing laps, the spectators would be yelling themselves hoarse. As it was, the B.R.M. ran through to win in 8 min. 5 secs., over a distance of approx. two miles with one pit stop. Should any reader feel that these speeds are not very thrilling, we can assure him that this is far from the case, and with even the smallest cars with 0.75 c.c. motors, an evenly matched race can provide a real thrill. Actual speed is entirely forgotten in the strong competitive atmosphere, with the uncertainty of fuel consumption and restarting to add to the fun.

Reverting to the practical side, it would seem that for long-distance racing there must be adequate provision for starting the engines, as a highly excited queue shouldering each other round a single starter motor might well lead to trouble. Plainly, also, a starting time limit is necessary, those with baulky motors being left at the line to join in the fray as and when they can. And finally there is the question of lap counting. We understand that certain highly technical gentlemen are deeply engaged at present in evolving a mechanical counter, which can take care of four cars at once.

Summing up, we were deeply impressed with the possibilities of circuit racing as it is being developed, and feel sure that it will make a strong appeal to other clubs who have the enterprise to build themselves a track, and we look forward with even greater enthusiasm to seeing this form of racing out-of-doors, with the addition attraction of the natural rise and fall of gradient and the benefits of fresh air to mitigate the effect of an overdose of exhaust gases!

Electric GRANDFATHER CLOCK

PART I BY A. M. COLBRIDGE

AN INTERESTING PROJECT ON STRICTLY "MODELMAKING" LINES THAT CAN BE EASILY MADE WITHOUT ANY KNOWLEDGE OF ELECTRICS AND WILL PROVIDE A HANDSOME AND USEFUL PIECE OF FURNITURE FOR THE HOME.

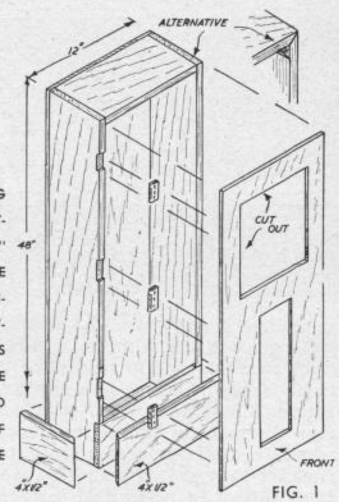


FIG. 1

STRICTLY speaking this is not a model making project—the ultimate result is not a model but a full-size working "grandfather" clock. However, it *is* a subject which any competent modeller can tackle with success—and perhaps justify himself in the eyes of the female members of his family for the amount of time he spends in his workshop. Furthermore, the project is designed on model making lines rather than a true example of the art of clockmaking. If you can make a model work, then most certainly you should be able to make this clock work, and keep very regular time.

The clock is of the true pendulum type. That is, the pendulum drives the "works" rather than the works driving the pendulum. The electric action is based on the Hipp movement — just about the simplest and the most fascinating type of electric clock which has so far appeared. It is so simple and, once correctly adjusted, quite foolproof. There is virtually nothing to go wrong, and all the power required can be supplied by a single $1\frac{1}{2}$ volt dry battery which will last, probably, for two or three years before it requires changing.

The "power" movement, in fact, is nothing more than an electro magnet at the base of the pendulum. This electro-magnet, the dry battery and a suitable switch are in a simple electrical circuit. The switch itself consists of two contact points mounted on a cross beam just in front of the pendulum and somewhat below the face of the clock. The upper moving contact is shaped with a V-notch across which sweeps a small trigger attached to the pendulum. As long as the pendulum has sufficient swing the trigger continually sweeps across the notch without engaging it, but as soon as the pendulum swing starts to decrease in amplitude there comes a point where the trigger no longer passes across the top of the notch, but engages in the notch. This forces the moving contact down, engaging the second (fixed) contact point and completing the electrical circuit. The electro-magnet is thus energised and gives an impulse to the bottom of the pendulum, thus boosting its swing once more.

In other words the trigger switch operates to give an additional "push" to the pendulum when necessary to keep it in motion. Electrical energy required is quite small for the contact when the electro-magnet is energised is only momentary and individual impulses are required only every thirty seconds or so. Hence the drain on the battery is very small, so it will last for years. All the time the clock will continue to maintain accurate time without adjustment.

The frequency with which the "switch" contacts engage is also a pointer as to the state of the battery. When the battery is new "switching" usually occurs about every 30 seconds, as mentioned previously. As battery power begins to die off (probably after two years or so!) "switching" will occur at much more frequent intervals. When the time interval has fallen to around five seconds then the battery should be changed before the clock stops entirely—probably in another two or three months!

So much for a general description of the movement. Now to start work on the construction. Broadly speaking the best plan is to build the case first and then establish the basic pendulum movement in it and get this working satisfactorily. The clock wheel mechanism, dial and hands can then be added, the front of the case fitted permanently and the whole assembly finished off.

A generalised view of a suitable case is shown in Fig. 1. Component parts are dimensioned in Fig. 2. There are several alternative methods of assembly and choice depends largely on one's individual skill at carpentry. Simple corner joints and plain glued and screwed or nailed assembly is recommended unless skilled in the handling of woodworking tools. An improvement would be to mitre the top corner joints of the case, possibly backing up these joints with small corner blocks or gussets glued inside.

The front inset can be fitted flush between the two sides, or let in as shown in Fig. 1. The latter is slightly stronger, but in any case these bottom joints will be hidden by the 4 in. x $\frac{1}{2}$ in. strips secured around the base of the cabinet. Corners of these pieces should be mitred for improved appearance and the top edges should be rounded.

It is not necessary at this stage that the front should be fitted, although this can be made at the

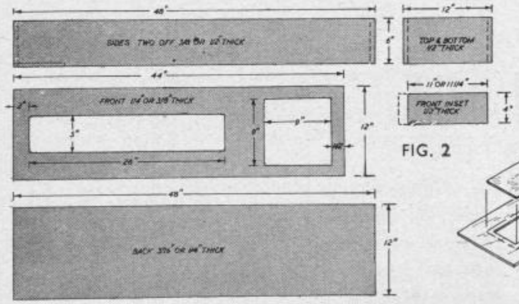


FIG. 2

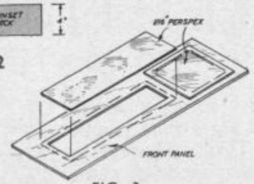


FIG. 3

same time as the rest of the case. This is a simple rectangular shape with two cut-outs, one for the clock face and one to render the pendulum movement visible. Glazing is a simple matter as these cut-out areas are covered with suitable pieces of thin "Perspex" or similar transparent plastic material which can be cemented to the inside face. This is easier than glazing with glass which will call for some sort of frame to hold it in place. As model makers we are after saving time and trouble on details, but the more meticulous workman may prefer to adopt glass, when he will have to modify the construction of the front accordingly.

Now to the pendulum movement which has to be installed in the case. This is detailed in Fig. 4. The pendulum itself is 39 in. long and is suspended from the top of the case, or rather a cross-piece of 1 in. x $\frac{1}{2}$ in. wood glued and screwed across the inside of the top. The timekeeping properties of the clock will be determined by the regularity of the swing of the pendulum and to eliminate discrepancies throughout the year, a rod of invar is probably the best pendulum material. This, however, may be difficult to obtain and, in any case, quite a suitable material for the pendulum—although this may horrify the clock experts—is good, hard, straight - grained wood, like oak. A strip of really hard, straight oak about $\frac{5}{8}$ in. or $\frac{3}{4}$ in. x $\frac{3}{8}$ in. will give very satisfactory results.

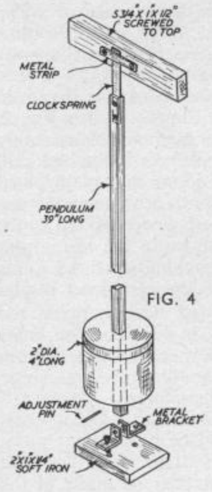


FIG. 4

The suspension employed for the pendulum is quite simple. It consists of a length of clock spring $\frac{1}{4}$ in. or $\frac{3}{8}$ in. wide, let into the top of the pendulum and secured with screws. The free end of this spring is then clamped to the cross-piece attached to the case by means of a metal strip, also secured with screws. Check that the assembled pendulum swings quite freely and evenly from side to side without any tendency to twist or rotate.

The pendulum weight or bob consists of a small metal canister or tin which is slotted to pass over the pendulum and is filled with lead shot. In the case of a metal pendulum the canister could be filled with molten lead, but the bob must in either case be free to slide up and down the pendulum so that it can be adjusted to correct the effective length of the pendulum, as necessary. Some 3 lb. of lead (shot or scrap) will be needed to fill the bob which should be of the dimensions given.

The weighted bob should be a tight sliding fit over the pendulum, and its position is determined by a locking pin which passes through the pendulum immediately beneath the bob. The pendulum can be drilled with a number of alternative holes, as close together as possible, to take the adjustment pin, or the pin can simply be stuck into the wood until the correct adjustment is found, when it can be driven right home.

The pendulum is actually a "one second" type. That is it should take exactly one second to make one complete swing. There will be just one position of the bob weight when this will occur, a position which has to be found by trial and error. Any other position of the bob will mean that the clock will run either fast or slow.

The pendulum assembly is completed by the addition of a pole piece to the lower end of the pendulum rod. This pole piece sweeps across the face of the electro-magnet, and is the part which receives the actual impulse when the magnet is energised. Assembly of the pole piece on the pendulum is not critical for adjustment is made when fitting the electro-magnet coils in place. The main thing is that the bottom of the pole piece should be true.

The pole piece itself is 2 in. x 1 in. and about $\frac{1}{4}$ in. thick, and should be cut from soft wrought

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FIG. 5

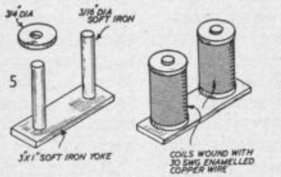


FIG. 6

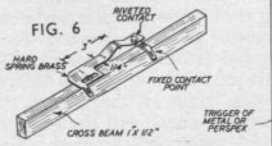
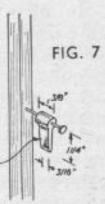
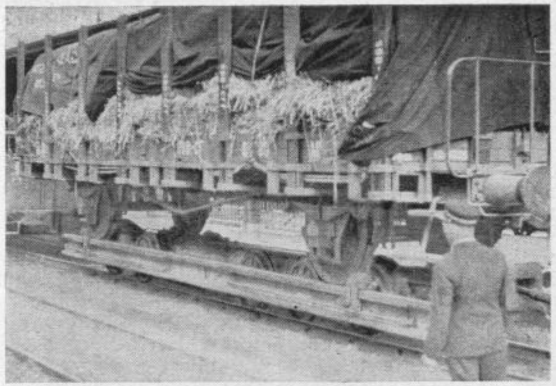
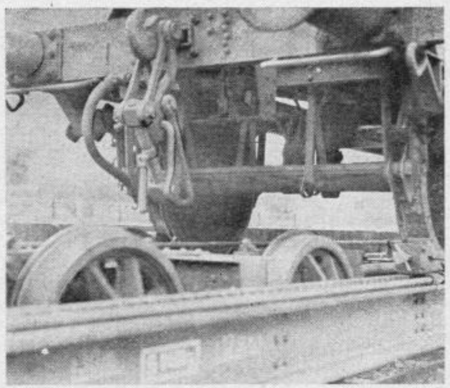


FIG. 7







MANXMAN'S TT FEATURE DEALS WITH

MIXED GAUGES

EXACTLY how did an odd figure like 4 ft. $8\frac{1}{2}$ in. come to be adopted as standard gauge for railway track? It has not even the merit of conversion into an exact equivalent in the metric system and, generally, it seems to fall in with the typically perverse British system of weights and measures along with such anomalies as $5\frac{1}{2}$ yds. to a rod, pole or perch, and the threepenny-piece which will not operate automatic coin machines.

And yet, of course, standard gauge must have had a common sense origin somewhere. Perhaps some erudite reader would care to enlighten us. No prizes offered!

But, of course, standard gauge is by no means of universal application. Not only are there countries in which the entire system is on a sub-normal gauge—such as the 3 ft. 6 in. of South Africa—but there are many countries in which the standard gauge track is supplemented by a more or less extensive narrow gauge system. In Belgium, for example, the metre gauge trackways go far and wide into the countryside and, although some may be disposed to call these tramways in the sense that their cars run through the city streets, yet they are assuredly railways—or rather perform the functions associated with railways, when they take farm produce and farm machinery in and about the outlying villages.

Well, if they can do it in full-sized practice, why should we not in our models? And why not indeed! A section of TT line runs in conjunction with a 00 gauge system opens out all sorts of intriguing possibilities.

Now in these notes we have always set our faces resolutely against the tendency to make the narrow 12 mm. gauge of TT the excuse for employing correspondingly sharp curves.

If we may be allowed for one more moment to mount our hobby horse, the right way in which to approach the TT proposition is to say, "Here at last is a gauge and a modelling scale which is small enough to enable me to put down a really pleasing and convincing miniature railway in quite a small space. For example, a platform of 490 ft. which would be 6 ft. 5 in. long in the 4 mm. scale will now be only 4 ft. 6 in. long in the 1/9th in. (*Model Maker*) scale, and all other dimensions will come down in like proportion. Therefore, 'you will continue your soliloquy' having already gained so handsomely in spacial dimensions by using this smaller scale, I am going to carry the realism a big step further and escape once for all from the tyranny of having to use a curved radius which is ridiculously sharp in proportion to the gauge. I can afford now to make my track sweep round a gentle bend something like the real thing." Well, of course, if you say this—and live up to it—you will be a wise man and you will reap satisfaction in due measure. But this business of avoiding the sharp curve is only important if what you are assumed to be modelling is a section of main or fast traffic line.

If you use TT to represent a narrow gauge railway laid down in conjunction with one of 00 or EM gauge, then your TT section can include sharp curves as required and still not violate the canons of realism.

Nine out of ten narrow gauge tracks when used in conjunction with standard gauge systems are, in fact, laid down because sharp curves are inevitable owing to the lie of the land in the locality in question.

If you have a station (whether through or terminal) in a hilly country, that station can also form the junction for a narrow gauge branch line that winds away up into the hills, thus lending variety and interesting time-table operations to the railway as a whole. There is yet another way in which the interest can be increased. Passengers with hand luggage changing from the standard to the narrow gauge tracks, or vice versa, present no difficulty—they merely walk across from one platform to the other.

But the trans-shipment of good is another matter entailing much handling and delay, unless it can be arranged that there are means of transferring trucks bodily.

Here are a couple of snaps taken in the Bernese Oberland, showing how they tackle this problem.

The standard gauge truck has been run up on to a metre gauge carrier. It contained agricultural machinery and, by means of this eight-wheel bogie carrier, the goods were consigned right through from the factory in mid-Germany to the village at the head of the narrow gauge line. One imagines that overhang on some of the sharp bends presented problems of its own kind, but the system works well enough.

If we were representing the difference between standard gauge and a metre gauge on our model, then taking our standard as 16.5 mm. (00 gauge), our metre track would work out to a gauge of 11.5 mm. So that the 12 mm. of TT is oversize, but not seriously so.

Here then, is at least the germ of an idea for breaking away from the stereotype layout and introducing some interesting effects. A realistic TT track is not difficult to lay and special tied sleeper strip is available on the market, in addition to rail of correct section.

We have already discussed the making of points with this equipment (see *Model Maker*, January, 1952), and there are on the market an assortment of bogie frames and other accessories.

Motive power of freelance design presents rather a difficulty at the moment, but it seems that some of the smaller mechs. on the market might be pressed into service. How about a diesel outline ?

TT ENTHUSIASTS ARE REMINDED THAT A FREE SCALE RULE TO THE MODEL MAKER RECOMMENDED SCALE OF 1/9th INCH TO THE FOOT IS AVAILABLE ON DEMAND FROM OUR OFFICES. PLEASE SEND STAMPED ADDRESSED LABEL MARKED "TT SCALE". WE WILL ALSO SEND INTERESTED READERS A COPY OF OUR REVIEW OF THE FIRST COMMERCIAL TT EQUIPMENT ON THE BRITISH MARKET

ELECTRIC GRANDFATHER CLOCK

(*Continued from page* 356)

iron. It is attached at right angles to the bottom of the pendulum rod by two small metal brackets, as shown. Machine screws can be used to attach the brackets to the pole piece (drilling and tapping the pole piece), whilst wood screws attach the brackets to the pendulum rod.

The next step is to make the electro-magnets. These are two simple coils wound on to cores of soft iron rod. Mount two 2 in. lengths of $\frac{3}{16}$ in. dia. soft iron rod in a suitable yoke of soft wrought iron—the same sort of material used for the pole piece on the pendulum, only this time 3 in. x 1 in. Cut four discs of bakelite, paxolin or similar material and drill so that each is a force fit over the core pieces and push into place. The bottom discs rest flush against the yoke and the top discs about $\frac{3}{32}$ in. below the top of the core pieces. Then wind both cores to capacity with 30 s.w.g. enamelled copper wire, connecting the coils in series and making off the ends at suitable terminal points. Two or more holes can then be drilled in the yoke to take hold-down screws when the assembly is finally mounted in the case.

The switch gear is made next, consisting of the contacts mounted on a cross-beam and the operating trigger pivoted to the pendulum. The moving contact strip is cut from hard, springy brass, as shown in Fig. 6. It must be very carefully shaped so that a hump is formed 3 in. from the mounting point with a notch at the crest of the hump. The easiest way to do this is to double over the strip first to form the notch and then work from either side to produce the hump and the required flats. A suitable contact point is then riveted to the free end of this strip and the other end secured by fastening down to the cross-beam. The fitting hole can be slotted, if desired, to allow for slight sideways movement for fine adjustment later.

The fixed contact strip is quite a simple affair. A suitable point is riveted on to a small strip of metal and then fastened down to mate with the position of the moving contact point. Again allowance for sideways adjustment will be helpful. Both contacts should not be mounted permanently until the cross-beam has been installed in the case, when the contacts can be lined up accurately with the pendulum.

The trigger assembly which fits on the pendulum rod is a very simple affair (Fig. 7). The trigger itself can be cut and filed from hard brass, or even "Perspex" or a similar hard plastic material. It will not receive a great deal of wear, but should be well made and smoothly finished to the dimensions given. It must also pivot freely on the pin attachment to the pendulum. A small washer may be used between the trigger and the pendulum to minimise any friction here.

(To be continued)

W. J. DANIELS DIPS INTO THE WEALTH OF HIS WIDE EXPERIENCE TO INITIATE THE NOVICE SKIPPER INTO THE ART OF RACE WINNING PREPARATION AND TACTICS

MODEL YACHT RACING TIPS

Ready for Racing

THE previous article will fortify the model yachtsman with the knowledge that he must not assume that everything is perfection to start with, and that only sailing experience is necessary for him to be successful.

The model must first be brought up to a point where she will be easy to sail. In other words she must sail equally well with the same trim of sails on every course, unless there is a shift of wind. It is consistency of performance that brings success. It must not be a matter of guessing what the strength of the wind is going to be that will determine the trim of the sails. It is obvious that the strength of the wind is very seldom the same throughout the length of the course. When once you have determined the best trim for your model to such a windward course do not try to make her sail closer because you know that your opponent's boat is very close winded.

Lee & Weather Berths

Should you be favoured with the weather berth your best chance is to hope that you will forge ahead proficiently to cut his wind, in which case you may kill his speed and pass clear, and you will have your opponent sailing in the distinct draught of your sails.

Should, however, you have the lee berth you may, if your model is sufficiently fast to enable you to keep your wind clear, nullify the partial vacuum under the lee of his sails. This will have a similar effect to that of blanketing. This is common tactics in real yachting and is a perfectly legitimate manoeuvre.

Tacking

If the course has the wind so much down the course that the models have to tack, you will find that you will be faced with having to make quick decisions according to circumstances. If you have drawn ahead of your opponent at the time when you have to go about on the other tack it will be up to your judgment to decide if you can cross the other model without touching her. If you decide you can cross safely, put the model boldly about upon the other tack so that she does not lose way. Unless you do this in a manner that will not fill the sails properly you will not only lose distance but run a risk of the other model touching you, in which case you will be disqualified. Should you decide that it is not possible to cross safely you should put about as close under your opponent's stern as is possible. You will then get the greater impulse of wind from your opponent's sails and this may make just that difference that will enable you to cross your opponent's bow when you reach the next tack.

As you near the last tack before the finish the direction of the wind will determine if it will be profitable to make a short tack or go right across. It sometimes happens that the wind suddenly gets more abeam during a course to windward than it was at the start. The angle as per sketch will show how much shorter course will have to be sailed to reach the finishing line by making a short tack than by continuing to sail the full width of the pond. The manner in which a model is made to tack is by means of a gye. This is a length of line passing from the end of the main boom to a point forward on the gunwale. Its length can be adjusted by means of a hawser. The cord should not be the full length but should have a rubber cord extension to give a slight elasticity. In earlier years when sail plans showed greater disparity between jib and mainsail areas, this was found sufficient to make the model tack, but the larger jib to mainsail proportion now makes it necessary to lead the gye back through a pulley on the gunwale to the steering quadrant, so that the rudder assists in bringing the model round to the original tack.

Beam Wind

So much for sailing with the wind ahead. It is however, sometimes possible to sail the course without tacking, but this generally cannot be done until the wind is at least 45 deg. free. In this case you will use your closest trim of sail and fit your gye to ensure the model keeping on the same tack.

Should the wind be dead abeam you will have to free off the sails and use the helm to keep the boat driving hard. The manner in which helm is applied will depend upon the type of steering that is fitted to the model. If quadrant steering is being used the running lines will be brought into play. It will be found that very little helm will be needed to keep the sails full. The pin rack can be used to check the rudder from going too far, as after a certain point is reached the increased speed of the model will make the rudder increasingly effective in keeping the boat on her course.

Sailing With Wind Dead Aft

If the course to be sailed is with the wind dead aft or nearly to the sails must be paid off, always taking care that the wind is passing across the sail from luff to leash, and never blowing directly at right angles to it. Should the model get so much off the wind that the latter occurs, the model will slow down as a cushion of dead air will build up on the sail and kill the driving force. Should the yacht set so far off the wind that the back becomes the leading edge, she will become what is known as "by the lee", and a big drop in speed will follow. If a yacht with spinnaker set gets by the lee the mainsails blanket the spinnaker. There is an idea of setting the mainsail slightly too close in order that the draught from the latter spills into the spinnaker, but the writer has not noticed any advantage from so doing.

The parachute spinnaker must be set outside or forward of the jibstay, but unless the wind is dead aft or nearly so, it will generally pay best to set a flat spinnaker inside the jib, letting the latter off sufficiently for the spinnaker and jib to form one sail. In racing it should be the aim of the skipper to keep to the lee shore rather than the weather one.

It is, of course, best to sail down the middle, but you will invariably lose the race should you go to the weather shore unless your opponent is badly off the course. In most lakes there is a stronger wind to leeward, and it is much easier to re-trim your model.

Opponent's Tactics

Unless your opponent is obviously wrong, it is generally profitable to pursue the same tactics. If the wind is inclined to set more abeat, it is better to have to make a short tack at the finish rather than risk getting up under the weather bank. Any obstruction to windward will cause wind eddies. An obstruction to leeward will cause an area of dead air that will steer the wind up and leave a calm spot.

Care should be taken to see that the sheets run truly across the travellers as many a vital heat and the race has been lost by this happening. Steering pulleys should be oiled. Nothing should be left to chance. Do not depend upon numbers marked on the booms for trimming the sails. A slight change in temperature or humidity will allow the sail cloth to stretch or shrink and alter everything. Rather set your sails by judgment. This is not difficult if you concentrate on doing so.

Constantly watch to see that the sails are hauled out on the spars just enough to take out any wrinkles. See that the main boom swings freely on the gooseneck as in light airs it will prevent the pull being taken on the mainsheet if it binds.

Away Matches

Should you have to carry your model to sail on a strange water, careful note should be made to ensure you get your mast in the same position. This is best done by noting the distance from a given point on the mast to stern head. See that your mast is straight and the jibstay as tight as possible. A sagging luff prevents the jib making a true aerofoil.

Should your mast bend the mainsail will lose its shape. There is such a little difference in the cut of a good mainsail and a bad one that a curved mast will alter it considerably. A pocket formed at the inner line of the battens is very detrimental to good performance. This is caused by an effort to get an excess of area in the outward bow of the leach. Experience shows that unless the cloth is stiffened by some doping process an outward bow of $\frac{3}{8}$ in. per foot is as much as the batten allowance will support.

Constant watching for changes of wind direction and the use of the correct suit of sails according to wind strength are very important to success.

Always sail your boat rather under-canvased than over-powered. Use your own judgment and do not necessarily copy other competitors unless they are obviously right. No yacht is doing her best if she has water on deck, so canvas her so that her gunwale is never awash.

Steering Gears

Up to this moment mention has not been made on the use of steering gears.

Until recent years the method of steering has invariably been by the pull of a steering line from the main boom to a quadrant fixed to the rudder stock. On principle this is an excellent method providing it is arranged correctly. Its success depends largely upon the nicety of balance of the pull on the running sheet, and the tension on the elastic centring line. Also the area of the rudder must not be excessive or it will be forced straight by the water, and have no steering effect at all.

The general principal of setting the correct setting is to note how the model acts. If you find that she falls away off wind directly the wind gets light it means that the centring line is not tight enough to bring the rudder back amidships. If, however, she starts to go up too much directly the wind increases the centre line is too tight. The tension should be arranged so that whilst bringing the helm amidships with no strain on the running line the slightest pull on the latter immediately starts to operate the quadrant. The amount of helm can then be adjusted by the distance out on the steering quadrant from which the pull is taken.

In 1935 the challenger from Norway for the International "A" Class Cup introduced a new form of steering. This was by means of a wind vane fitted at the stern of the model. This vane operated a lever which latter was attached to the tiller from the rudder head. It operated very well, but had one disadvantage in that it had to be readjusted for tacking which required that the model had to be stopped with resultant loss of time and distance. It was not long, however, before a method was found to make the vane setting reverse itself upon the model being put about with the result that the method of vane steering became very popular. There are, however, conditions in which the quadrant steering will give better results, and whilst with the wind steady the vane method is almost as good as a man at the helm, the average model yachting lake has so many obstructions that cause wind eddies that over-sensitive steering is not desirable.

MODEL YACHT CLUB NOTES

BY "COMMODORE"

Model Yacht Club Notes

WE have now had an opportunity of perusing the 1952 M.Y.A. Club and Fixture List. There are sixty-two affiliated clubs in England and Wales and another thirteen in Scotland. A nice round total of seventy-five, which should make the task of producing a monthly page of club news a sinecure, but alas, very many clubs have not as yet taken advantage of this offer of space to send in paragraphs. We hope these laggards have all been too preoccupied with a bumper fixture list, and can now relax long enough to tell us about themselves.

YM 6m Owners' Association

Editorial sackcloth and ashes must be donned and our house flag flown at half-mast for a misleading comment in our April issue. This old established club—which may justly claim to enjoy some of the finest boathouse and other sailing amenities in the land—is not, in spite of its title devoted to the "Wee Six" class, but derives its title from their early association with the *Yachting Monthly* 6m Trophy Races, out of which developed the present A Class, evolved by Major Heckstall-Smith and assisted by our friend W. J. Daniels, who is still producing top class designs in this and many other racing classes.

All the fixtures listed, Hon. Secretary Hatfield has hastened to point out are for A Class Yachts, and not, we repeat, *not* for 6m boats. Scotland reigns supreme as ever in this particular category !

Model Yachting Association

We have just received M.Y.A. News No. 30, dated February, 1952. It is in effect a review of last season's principal events, and contains a lament for the quality of British designs. Just why American designers are beating our best boats is hard to see. There is no *America's Cup* business of having to sail the challenger across the Atlantic. Even in our difficult financial state there are still plenty of people able and willing to find time and money to build new yachts, though there is some degree of affection for older boats that have served their skippers well since pre-war days. Is it, as M.Y.A. News suggests, a matter of a dearth of new designers? If so, what can we do to promote a re-birth of designing enthusiasm. Top class craft in the A Class do indeed cost quite a few pounds, and may take a lot of time designing, so that we feel some gesture of financial support might encourage the younger and more penurious school to try their luck. *Model Maker* is prepared to enter into negotiations to buy the design rights in this year's A Class Nationals winner, to include a constructional series of articles on its building, provided that the winning boat is a new design that has not been raced before 1951, and that it is the *original* design of skipper, mate or entrant. By original, we mean original to the designer, not an altered version of some other designer's, but may be the logical development of a series of boats by the man offering the design.

This in effect, offers the designer an opportunity to earn himself a sum in the neighbourhood of Twenty-Five Guineas, while retaining the boat and enjoying any of its future successes. We hope readers will pass this offer round to any interested non-readers.

Leicester Model Yacht Club

Following inter-club and open fixtures are announced :
Ratcliffe Trophy (10-raters) : April 12th—Inter-Club.
10-*Rater Trophy* : May 3rd—Open.
50/800 *Marblehead Cup* : June 7th—Open.
Mr. Pepper's Cup : June 21st—Inter-Club.
Mr. Marston's Cup : Sept. 20th—Inter-Club.

New officers elected are : C. Marston, Commodore ; S. R. Pepper, President ; K. C. Marston, Hon. Secretary ; T. Crewe and L. Stevenson, Club Measurers.

Amongst new boats sailing this season will be two Marbleheads and a 10-rater.

Newcastle M.Y.C.

Well off the mark with the season's sailing is Newcastle M.Y.C. with their M.Y.A., N.D.C. Marblehead Championship. Hon. Secretary Andrews provides a full report :

"Blizzard Weekend", 29th/30th March, saw the staging of this event at Newcastle-on-Tyne, the first time a race of first-class importance has been held there for many years.

Entries had been received from several Lancashire clubs; one stalwart, Mr. Smallwood, made the trip from Belfast, and there was a full entry from the local club. Mr. Andrews' newly launched *Nimrod*, from the local club, was allowed to enter when a last minute scratching would have provided a bye. Among well-known boats entered were K. N. Jones's *Gazelle* and Mrs. J. Chipchases's *Alma*, while R. Bradley's new *Black Hawk* was universally admired.

Conditions could hardly have been worse as the first pair came under starter's orders at 11.15, with a N.E. wind driving the snow across the lake. This wind gave a very tricky reach, but all hands quickly settled to conditions and some very skilful sailing was seen until completion of heats for the day at 5.30 p.m. The snow had cleared when racing was resumed the following day, but the northeaster remained as vicious as ever. Again close sailing was the order of the day, and at the conclusion no less than four boats had tied for first place with 24 points. A four-boat final was then sailed to decide the finishing order. The score sheet was :

1. 557 *Black Hawk*—R. Bradley, Bolton 24.
2. 428 *Gazelle*—K. Jones, Morecambe 24.
3. 427 *Alma*—J. Chipchase, Fleetwood 24.
4. 516 *Wildcat*—F. Smallwood, Ulster 24.
5. 551 *Nimrod*—G. Kirtley, Newcastle 20.
6. 463 *Renown*—R. Threlfell, Vale of Lune 19.
7. 528 *Leonora*—P. Dawson, Newcastle 18.
8. 509 *Veyh*—R. Patterson, Newcastle 12.
9. 163 *Valerie*—J. Shiel, Newcastle 9.
10. 189 *Sapper*—J. Woodhouse, Vale of Lune 6.

For this event the local tried an innovation which may well prove of interest to other clubs. Instead of sending visitors to hotels for the night they invited them to their homes, thus serving the dual purpose of cutting down expenses whilst encouraging greater comradeship.

Elettra Model Boat Club

We are just in time to announce the formation of a new club for Radio Controlled Boat enthusiasts. Hon. Secretary is F. C. Hird, 90 Aberdale Gardens, Potters Bar, Middlesex, and their water is Brent Reservoir (Welsh Harp), operating from the point where the Handley Page Sports Club ground joins the water.

THE ART OF SOLDERING

PART I

BY ED VAN LEER

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MODERN model railway construction seems to be rapidly becoming solderless. The average kit manufacturer is striving to satisfy the clamour for screwdriver assemblies. Thus, it might seem that soldering is to become a lost art insofar as model railways are concerned. Nevertheless, the soldering iron is still an important tool and can often supplement the so-called "screwdriver assemblies" with amazing results. And then, too, there are still hundreds of "builders from scratch" who can't possibly do a good job without soldering. Therefore, it might be well to review the subject, even though much has already been written about it.

Webster defines solder as a metal or metallic alloy used when *melted* to join metallic surfaces. There is no such thing as a "cold" solder. The so-called "liquid" or "cold" solders are usually little more than a good grade of nitrate or acetate model aeroplane cement loaded with powdered aluminium to import a metallic appearance. Their strength and durability, insofar as joining metals is concerned, are poor compared to bona fide solder. Solder can be clearly divided into two classes—hard solder and soft solder. Hard solder, usually a silver or bronze alloy and commonly called silver solder, melts at a relatively high temperature—about 1,200 deg. Fahr.—and is considerably stronger than soft solder. It is very difficult to use, requires a blowlamp—usually acetylene or the like—and is not generally suited for model railroad work. For those who have facilities for hard soldering, it offers the possibility of tacking intricate assemblies together preparatory to soft soldering. Other than that, its use is limited. Soft solder, on the other hand, melts at about 450 deg. Fahr., and is usually an alloy of lead and tin. It can be handled in a variety of ways, the most common of which is with the soldering iron. Self-generating blowlamps and jewellers' blowlamps with blowpipes are also widely used with soft solder. The most commonly used alloy is known as 50-50, or 50 per cent lead and 50 per cent tin. Soft soldering is almost unlimited in its applications to model railways; therefore, our discussion will dwell on soft soldering only.

Before we can do any soldering, we must have the necessary tools and materials. Let's list them.

1. A good electric soldering iron, preferably 150 watts or more, but not less than 100 watts.
2. Some 50-50 solder about $\frac{1}{8}$ in. diameter.
3. A good flux.
4. A blowlamp for heavy sweating jobs.
5. A sharp knife for removing excess solder.
6. Some small, coarse files for removing excess solder.
7. Some small battery clamps for holding work in position.
8. Some small pieces of $\frac{1}{4}$ in. hard felt for holding small assemblies.

First, let's talk about soldering irons. Electric types are readily available in numerous sizes and capacities ranging from about 35 watts up to several hundred watts. We'll not consider the gas-heated variety—not because it isn't a good soldering tool (many experts won't use anything *but* a gas- or coal-heated "copper") but because it is not practical in the average model railway shop, due to the need for a muffle furnace.

My first iron was a 35 watt, 2/6d. item from the local cut-rate auto supply store. It worked well for minor jobs incidental to kit construction, but was out of the question when it came to the intricate soldering required when building a coach or locomotive from scratch. I soon graduated to a 100 watt iron, for which I paid 10/6d., and this was generally satisfactory for most work. It actually saw me through two locomotives from scratch and much fancy trackwork. However, it definitely lacked the punch required for the heavier jobs, such as putting details on a locomotive boiler, so I finally acquired a 225 watt thermostatically controlled iron which I now use for everything from the most intricate valve-gear work to the heaviest body and boiler work. In my opinion, the small soldering iron has no place in the model railway workshop. I have found that small intricate work is best handled with a "big" iron, not in size, but in heat capacity. I have yet to find a job too small to handle with my 225 watt iron. Why do I say this? It's quite simple. In small intricate work, the problem is that of making one soldered joint without unsoldering several others. That natural tendency is to turn to a small iron, which, because of its low heating capacity, takes longer to heat the area to be joined and, therefore, allows much of the heat to flow to unwanted areas. The big iron supplies the heat fast, but also requires that you work fast.

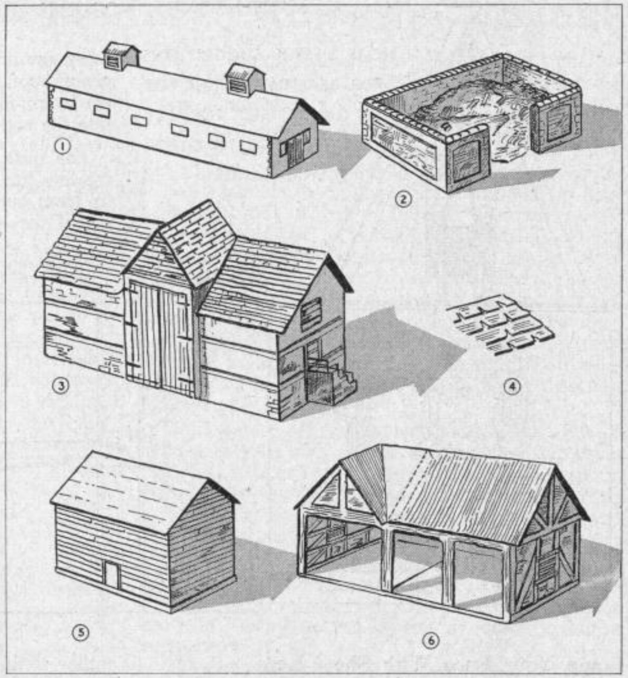
The copper *must be kept clean* whether the iron is large or small. Every iron, over a period of time, oxidizes so that periodically the point should be dressed off with an old file and retinned. How do we tin an iron? The procedure is the same whether the iron is brand new or just a cleaned and redressed old iron. Just dip the tip in soldering paste and apply solder until the tip is completely covered. Then shake off the excess. I use an old bronze wire suede shoe brush for cleaning the iron in between dressing with the file. The brush takes off the accumulation of dirt and scale that forms when the iron is in continuous use for several hours at a time.

(*To be continued*)

VICTOR SUTTON CONCLUDES

MAKING MODEL FARM BUILDINGS

FURTHER ARTICLES IN THIS SERIES WILL COVER INDIVIDUAL BUILDINGS, INCLUDING A MODERN DEPARTMENTAL STORE AND A GARAGE WITH PUMPS



TO get all the buildings one needs in a farm scene it would be best to actually visit one, but the few given in these three articles will help to make a reasonable show on any layout.

The usual milking sheds differ in many ways, but as a rule are fairly long and make a simple model from the construction angle. The one shown is about 9 in. long, $3\frac{1}{2}$ in. wide and about 5 in. high. As it has apertures along the back and front as shown it would be a good plan to make this in plywood to get a better effect. Covering could be of the creamy/grey stucco shade, or some are built in red brick. In this case Modelcraft paper could be used. A centre support would be an advantage as it is a rather long roof.

Make the roof section in thick cardboard and allow to overhang quite a bit. Most sheds have a door at the end and another in the centre. The novel little vents make an ideal finish, and could be made in thin wood or cardboard with slatted effects in them. Some are flat and others pointed. If you have the pointed version then make this in block wood shaped down in preference to cardboard which might crush.

Red tile or ordinary slate tiles would do for the roof but above all, give the old-world finish and not a slick up-to-date version.

Odd parts of the yard can be filled up by making small sets of pen affairs as shown, and which one sees all manner of material stored. Here is a chance to use up oddments of wood, and these should be 1 in. high with a rounded top and wide gate in front. Treatment of walls could be with plaster of paris and thin glue or brick. Some I have seen are a panelled design as shown in the illustration.

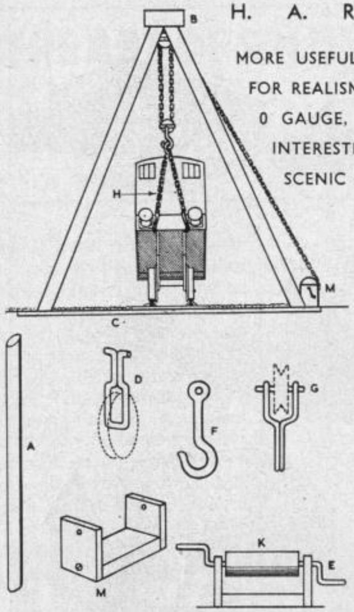
The barn in sketch No. 0 is partly for storage and equipment. Make this with the two ends in thick plywood for strength and add the house on the back which makes it more interesting to make. Here is a good chance to use a rough coat of dull brown or red paint in flat version and then scrape in the crevices and other markings as I have shown in the sketch. Note the little steps to the upper storey and the wooden hinged doors. Pick out the brickwork round the door, as shown, to make it more individual. The smaller window can be partly boarded up.

The roof is quite straightforward, and the best plan here would be to make it in strips of wood and then nip out the shapes of the tiles as shown. Then give a coat of dull red with touches of green and black in places. Obviously, such a building would not be a new one.

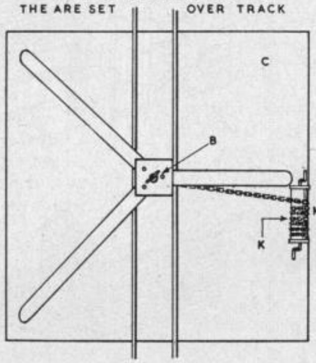
The small chicken coop can be knocked up with some odd cardboard, and I find carton cardboard handy for this because of its rough surface. A coat of dull stain will go on this well and the markings

H. A. ROBINSON'S REGULAR O GAUGE FEATURE . . .

MORE USEFUL SUGGESTIONS FOR REALISM—MAINLY FOR 0 GAUGE, BUT EQUALLY INTERESTING TO OTHER SCENIC GAUGES.



PLAN OF LEGS SHOWING HOW THE ARE SET OVER TRACK



Equip Your Loco With Sheer Legs

LOCOMOTIVE sheer legs are an accessory seldom seen on model lines. Yet sheers are particularly simple to make and quite an effective addition to a miniature depot.

In practice these legs are usually found alongside running sheds where rather advanced servicing is carried out. They stand astride a side line, near its end, and are supplied with lifting tackle of sufficient strength to be able to raise one end of an engine—say for the removal of a bogie or trailing wheels. Under certain conditions driving wheels can also be dropped out.

There is some latitude for the modeller in the design of these sheers, but broadly they are three stout baulks of timber set in the form of a tripod. They are anchored at their lower extremities to prevent spread and sinking and come together at their tops. From the apex so formed is suspended lifting gear of the "block" type from which hang chains with hooks that go under the end cross-frame member of the locomotives to be raised.

To make model sheers it is best to build them on to a base which is supplied with a length of track correctly central that can in its turn be fishplated to the end of an existing loco depot siding.

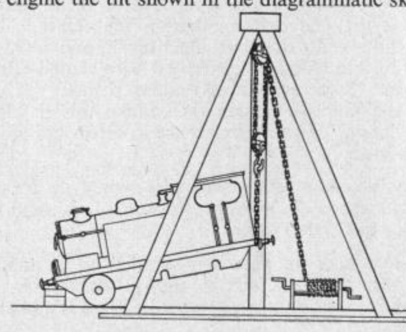
For gauge 0, $\frac{1}{2}$ in. dowelling does well for the tripod legs. They are about 10 in. long, and are bevelled top and bottom as (a). This means that when the tops are brought together a flat surface is given upon which is fastened the triangular block (b) by three fine but long sprigs that go down, one into the end of each dowel drilling first through (b).

The base (c) is a square of $\frac{1}{8}$ in. plywood, and the legs are secured to it by long thin screws taken up from below again going into the ends. Positioning of the legs relative to the track is as shown in the plan. There is no point in having the lifting tackle to actually work as the model legs do their job by being a pure "scenic effect", and to this end it is good to have the body of some discarded locomotive permanently hanging from the hook.

The impression of a "block and tackle" type of lifting gear is well given by two Meccano pulleys and length of miniature link chain. These are arranged as the diagram indicates. The chain is taken and made into a continuous band round the two pulleys by the simple expedient of opening a link, joining up and pressing it to again. The top pulley is then held firmly up in the junction of the legs with a short piece of stiff wire (d) running through its centre and through the wood (b).

A simple hook as (f) is then made by cutting two hooks from tin with vertical strips above. The actual hooked lower sections are then soldered together while the two strips above are widened out to sit either side of the pulley to which they are attached by the short wire axle (g). To prevent the wire working out, put a touch of solder on its ends.

Now add the lifting chains (h) which again are lengths of the link chain as used for the tackle above. At the ends are two further hooks which go under the back or front buffer beam of the engine being lifted. Everything must be so adjusted as to give the engine the tilt shown in the diagrammatic sketch.



Improving the Miniature Railway Layout

Often the front of the engine in real practice is supported by blocks and in making up the set pieces for a model line this could be copied. Further realism to the little scene is given by having a bogie or pair of drivers standing on the track out beyond the legs.

Engines are raised by an ordinary winch, often hand-turned, there being a crank either side. The winch in the model is made up as (m). A simple rectangle is given two vertical end-pieces, between which goes a length of dowel (k) held by the cranked wire (l). Around this is wrapped some of the link chain, an end of which is taken up and linked to the other chain at the top pulley. The winch is then screwed to the base beside the single leg.

For "finish" the legs can be painted in railway buff or black. Most of those the writer has seen are black. Generally the rails under sheer legs are cindered up with only the tops showing, and this realistic touch should be copied. This building up also hides the wooden base which is an advantage.

Let Us Talk Of Gradients

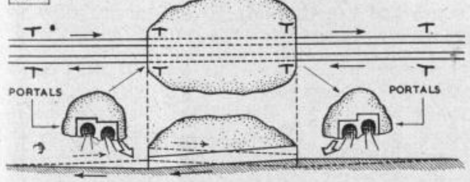
IT is somewhat paradoxical that while in theory everything should be done to avoid gradients on a model railway, a layout with no change of level loses much in interest. It would seem, therefore, that some grades at least are necessary if the best is to be got out of a line. But do not let this worry you, for if intelligently put in grades need not always be the run-shortening, train-stalling nuisances they are sometimes held out to be.

A few words about gradients in general, for they are an intriguing study in themselves. Gradients in this country are described as 1 ft. up in so many feet along, thus 1 in 50, 1 in 100, etc. In a number of other countries the percentage method is used in which the rise is always considered in terms of the 100 ft. of forward run. Here the English 1 in 50 slope would be a 2 per cent grade, 1 in 25 a 4 per cent, and so on.

On model lines 1 in 25 equals a rise of 1.45 in. in a yard, and 1 in 50 .725 in. per yard.

Now while grades are normally built to get trains to some higher or lower contour, it is interesting to note that they are at times used for other purposes. Thus they are found in marshalling yards where there is hump shunting to give trucks sufficient momentum to roll unaided into one or another of a grid of sidings.

FIG. 1



THE GRADING OF TUNNEL PORTALS IN THE DIRECTION OF TRAVEL

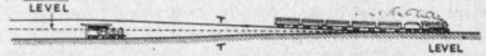
At one time there was a practice of putting them in tunnels in favour of the way the train was going (see Fig. 1). The idea was to prevent engines having to work hard in the confined space and also to help in coasting out in case of failure. Dinmore tunnel on the Leominster to Hereford line is a typical example of this method of construction. As the tunnel is approached one track of the pair climbs slightly above the other, the entrances to the two borings consequently being on different levels. On the other side of the hill the position is reversed, for the track that was high is now low and vice versa, both borings having been graded downwards in the direction of travel.

Grades, too, are sometimes found at the ends of sidings, so that cuts of wagons propelled into them automatically lose speed, while certain underground railways have a fall in grade just beyond the ends of platforms to assist acceleration when leaving and deceleration when coming in.

All this will suggest to the modeller that there is more in grades than meets the eye, and this is particularly so in miniature layouts where they can be used in "compensating" pairs as described in a moment.

The main thing for the modeller to remember is that a very small rise of one track over another is sufficient to give the impression of quite a big difference in level, especially if the illusion of varying height is boosted by retaining walls, low bridge effects, etc.

FIG. 2



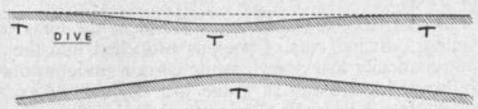
GRADE STEEPNESS NECESSARY TO GET A DIFFERENCE OF LEVEL BETWEEN TWO TRACKS CAN BE REDUCED BY DIVIDING THE GRADE BETWEEN THE TWO, ONE CLIMBING THE OTHER DROPPING

Railway engineers always keep their grades as small as possible, for nothing is more uneconomic than an engine having to work heavily against the collar, and to effect reduction they often at "fly overs" halve the grades between the upper and lower tracks, the one climbing and the other dropping, till the necessary vertical distance has been secured. This then is the second practice the modeller must bear in mind. And to these considerations he should add the primary rule of all grades that steepness can always be reduced by increasing length.

Grades do, of course, absorb energy, and most adversely affect clockwork-powered trains. Electricity is least affected and steam comes in between, the actual working results here being greatly dependent on the class of model used.

There is some difference of opinion as to what are the maximum grades for each kind of power. A certain authority states that 1 in 40 is the maximum possible grade for clockwork, but the writer has operated spring-powered trains on a much steeper grade than this. The procedure used was to keep the weight of the trains to certain prescribed limits (or to always double-head) and to have a "winding point"—a station—shortly before the climb, so that locomotives always worked up the grade fully "charged". This latter is important and the rule that no locomotive should ever leave the winding point for the grade without receiving key attention was strictly adhered to. Arrangements of this kind are quite in order and need not offend the purist, for they coincide well with the train-working condition rules and restrictions that are in force on full-sized systems.

FIG. 3

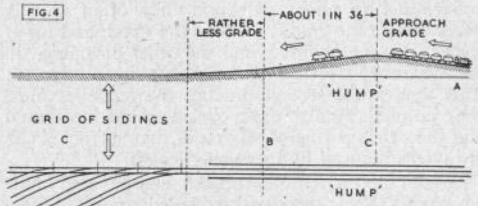


COMPENSATING GRADIENTS ARE TO BE FOUND IN A DIVE AND CREST

A way that trains on general through-running can be made to satisfactorily surmount a grade is by having a nearby compensating grade. Typical of this is the "dive" (Fig. 3). A certain strength of locomotive might or might not be able to negotiate a 1 in. 25 climb with its train from the level, but if it has just come down a 1 in 25 drop it will do so by virtue of the extra energy collected.

But the same thing applies, but rather differently, in going over a crest. Here a train may, under normal running conditions, be able to manage, say, 10 ft. of a certain grade, going slower and slower. Any more and it would stall, even to pull out on to a dead level would not do. But if at the critical point a crest is passed, the extra energy given to the engine by the now downwards tendency will haul the train behind over the rise. To be effective compensating grades of this kind need only be quite gentle. There is no need for the tracks to be like hilly roads.

FIG. 4



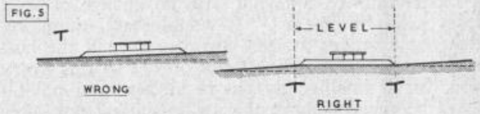
GENERAL VIEW OF GRADIENTS IN A 'HUMP' SHUNTING YARD. TRAIN IS PUSHED OVER THE HUMP BY A LOCO 'A', TRUCKS CUT FREE THEN ROLL DOWN THE INCLINE 'BC' OF THEIR OWN ACCORD & INTO ANY ONE OF THE SIDINGS 'C'

Goods yard hump gradients are quite practical on model systems and nicely break up an all-level appearance. In full-sized procedure the grade is usually about 1 in 36. Model stock, however, rolls more stiffly than its prototype, and if putting in a hump, tests should be made with your own wagons to find the slope at which they roll freely and gather a certain amount of momentum. In practice a hump may lead to a dozen or more tracks laid in gridiron formation, but the modeller can quite get the feel of the operation by laying, say, three possible sidings into which the trucks can be diverted. It helps in models if the entrances to the sidings are on a slight down grade so as to continue for a short distance the good work done by the hump.

A raised siding can also break up the monotony of a yard. It should slope gently up towards the buffer stop at a grade less than the critical rolling slope, but even so with a siding of any length there will be a marked difference in level between its end and the surrounding tracks.

Grades in the wrong places can prove fatal to good running. A steep one should never come right up against a sharp curve as the drag of the back of a train on the slope may cause the front part on the curve to "pull over" inwards. A steep grade must lead on to a straight of sufficient length to hold nearly all of a standard train.

FIG. 5



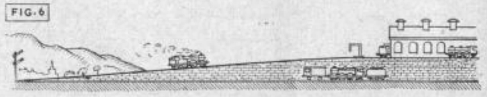
IF A STATION HAS TO BE PUT ON A GRADE, LEVEL OUT FOR THE LENGTH OF THE PLATFORM, NEVER SET IT DIRECT ON THE INCLINE

Never place a station on a marked gradient or the platform will take on an obvious slope. If a station is necessary, flatten out for the length of the platform.

Working trains over steep grades can, as suggested, be quite interesting. Double-heading is feasible in all powers, but with trains composed of vehicles where the buffering action is poor do not try "banking" from the rear as it will only result in derailment.

Where locomotives alone have to run, grades can be made much steeper than when complete trains have to pass over them. Hence engine depots can often be set higher or lower than the general level with the approach tracks at a really sharp inclination. This again has precedent in full-sized procedure and can certainly go on our list of where grades are permissible. The result (Fig. 6) too, can often be very effective.

FIG. 6



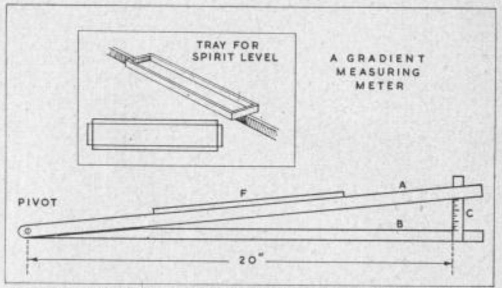
THE GRADIENT TO A RAISED LOCO DEPOT CAN BE QUITE SHARP AS IT WILL ONLY HAVE TO BE WORKED OVER BY LOCOS RUNNING LIGHT.

And speaking about really unusual grades there is one in Brazil of 1 in 10, over which standard main line stock is worked by cable and steam engine, and which might interest the model maker as a prototype.

A train leaves Santos on the coast hauled by a large express locomotive. At the foot of the grade this is uncoupled and a "steam brake van" going to the rear propels the train forward on to the slope. At the same time it grips a cable laid between the rails, and the whole unit is then pulled up the grade. At the top the steam brake van drops away and another main line express engine takes the train forward to the big terminus of Sao Paulo.

This is a type of grade which might well be copied by the modeller who wishes to work on two distinct levels but has not the space for a reasonable incline between the two. There was also, till a short time ago, a cable-assisted gradient at Cowlairs in Scotland, modern trains being helped up the slope by a steel hawser attached to the front coupling hook of the engine. So there is some precedent for cable-aided inclines, and one at least of such would be something quite new to most model railways.

The introduction of any sort of grades gives the opportunity of bringing in grade boards as line-side accessories. If these can be correctly inscribed so much the better. Most grade posts are simple uprights with arms showing the direction of the slopes and supplied with the degree of inclination as 1 in 50, etc. Sometimes a rectangular board is used upon which the slope and necessary figures appear in white. When a track is level the arm sometimes carries the word "Level" or the infinity sign, that is an eight on its side, and it is an interesting sideline on grade calculations that a level track can be



looked upon as one in infinity—which is infinity.

But how is one to gauge the slope at which a track lies for marking posts and for personal satisfaction. Here is where some form of grade-reading instrument comes in, and a simple one can be made as follows.

Obtain two strips of thin but stiff metal 21 in. long as (a) and (b) (Fig. 7). Pivot these by a small bolt at one end and at the other solder to (b) the upright (c) which is a 3 in. length from a discarded steel rule showing tenths, the distance between the pivot centre and near edge of (c) being 20 in. On the other arm solder the small tray (f) to take a spirit level.

To use, lay the lower strip along the track to be tested. Place a spirit level on the tray, bring the upper arm to the horizontal and holding (b) and (c) together read how far up the scale (b) comes. The grade is then given by dividing 20 by the reading in inches. Thus if the arm was a 5/10th in. the gradient is 20 ÷ 5/10th or 40, i.e. 1 in 40. The maximum grade the instrument will read is 1 in 10.

MAKING MODEL FARM BUILDINGS

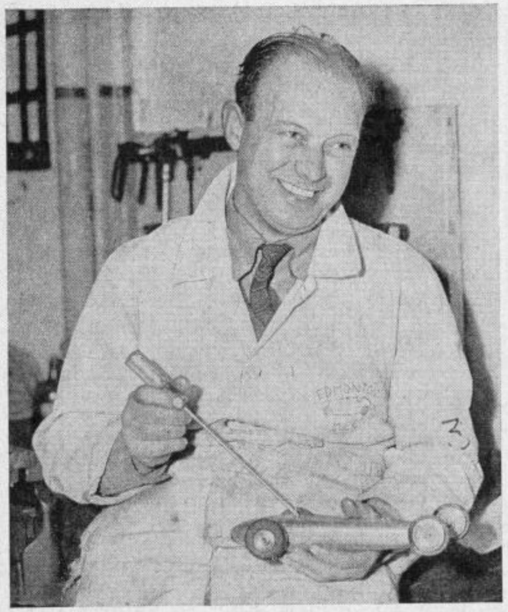
(*Continued from page* 363)

of the boards carried out with a penknife. Several of these could be used in a farm setting. Heaps of logs, strips of odd wood, tin bands representing rims off wheels, could all be made up and set out.

Long sheds for carts can be made up in sections as shown. Here you need the two ends in wood spaced at intervals of 3 in. Width of shed should be about 4 in., and the gables are added by the addition of the pointed sections with wide flaps for fixing. Note the way the roof sections are reversed so that the buildings do not look too much of a set type. Apertures are shown in sides and back, and these can be finished with slats of wood. Finish off the outside with flat strips of wood or lighter spills which look well on this surface, and the coarse graining is ideally suited to this. Paint over with poster paint in vandyke brown put on fairly thick. Streak off at the base with dark green. Some splits in the wood can be enlarged. Cover the surface with plaster powder, silver sand on thin glue or oddments of distemper. The roof can be thatched as per the instructions given in the earlier article or covered over with thick oddments of paint in fawn or brown. Plastic wood can also be used but becomes a little expensive used in this way.

Treatment of the ground should be carefully studied. Thick brown paint can be used over rough cardboard. If the model is to be an exhibition one then this should be mounted on a baseboard so that it can be raised. This would then allow you to have a realistic pond and other incidental ideas. The pond could be sunk with one bank rather abrupt, and this allows you to make the banking with plasticine with strips of coloured raffia for reeds. A small stream could be worked in and a small bridge as shown.

Sections of fences can be made up with the oddments of stripwood you may have over from other jobs. Wall parts can be made in rounded sections so that they will fit in with any scheme or layout you may have in hand and without looking too disconnected. Break up some old building brick in yellow, red and brown, and this gives handy lumps for the roadway, and the powder can be used to finish off any buildings. It will adhere quite well to a basis of Croid glue or thin cement.



Above: Happy at his work! Alec Snelling with his 1.5 c.c. record breaker. Right: John Bolster, expert motoring commentator, at the "mike" during the meeting. (Esso Photos)

DOINGS AT DEES'

ANNUAL CROYDON MEETING REPORTED BY L. MANWARING

THE third annual model car meeting held on 15th March last, at Hubert Dees' Garage, South Croydon, bid fair to rival the Meteor Open Day for the completeness of its organisation. For this year's event the proprietors had gone all-out to provide model racing de luxe, and no effort was spared to provide facilities for competitors and spectators alike.

The track, eight laps to the $\frac{1}{4}$-mile, was on the smooth granolithic garage floor, and the electric timing arrangements enabled times and speeds to be announced over the P.A. system almost before the cars had come to rest. On two sides of the track tiered seating was arranged, and on the third side were more spectator seats, all protected by massive baulks of timber and wire mesh. Well over 500 people watched the racing, and printed score cards and pencils were provided.

The racing commentary was given by well-known racing motorist John Bolster, who professed himself amazed at the speed of the models. Edmonton member and Cooper driver Jack Leary, accompanied by John Cooper, were amongst the spectators. A veteran Cadillac, a Cooper-Jap and an H.M.W. formed a small static exhibition, and during the interval a demonstration of square dancing was staged, in which John Bolster and Cyril Catchpole were noted as able performers!

Racing started at 6 p.m., with entries from Edmonton, Surrey, Pioneer, Medway and Maidenhead clubs, in all making 45 entries. With so large a field and a late start, time inevitably ran short, despite a two minute time limit on the line, so competitors running more than one car were asked to nominate a preference, in order that their other cars could be scratched if necessary. As this was the first real event of the season and many of the cars were brand new, there were many retirements, but on the whole speeds were good, and the 1.5 c.c. class provided a real eye-opener.

The principal award was the Dees Trophy, a handsome silver cup presented to the competitor who most closely approached or exceeded the National record in any class, the winner proving to be Alec Snelling, with a new car powered by an experimental version of the Oliver engine, linered down to 1.5 c.c. This little projectile on its first run buzzed round at 66.91 m.p.h., exceeding the existing class record by 12.91 m.p.h., and succeeded in bettering this performance on its second run with a quarter-mile at 69.49 m.p.h. Cyril Hart, running a scale Elfin-powered Ferrari, was second in this class at 46.1 m.p.h., winning a Frog 1.50 engine.

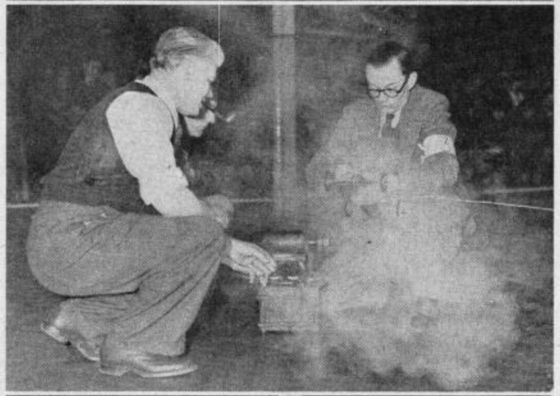
Entries in the 2.5 c.c. class totalled 18, and included such well-known cars as Alec Snelling's world-record holding streamliner, George Thornton's Lago Talbot, and Mrs. Catchpole's Oliver "Bottoms Up". Also in evidence were several "Tiger Bombs". Competition was keen in this class, which was won by Mrs. Catchpole who, operating her own car, recorded two cracking runs at 74.01 and 77.25 m.p.h. Her most serious rival, Alec Snelling, scratched his 2.5 c.c. car in the second half of the competition in favour of his 1.5 c.c. "preference" car, thus letting M. Drayson, running in his first competition, into second place. Winners received an E.D. 246 motor and a case of fuel respectively.

The 5 c.c. class saw a succession of failures, for although the entry of potentially very fast cars included Jim Dean's Borden Dooling, A. W. Bennett, George Laird, the Harris brothers and H. Bassom with Dooling specials, Eric Snelling's "Fish", Gordon Redrupp's new twin-intake Healey engined Tiger bodied special, and F. Prest and the writer with E.T.A. powered specials, only three cars actually ran. The winner was A. W. Bennett, with 89.19 m.p.h., with F. Prest runner-up.

The 10 c.c. class had its crop of failures too, for such stalwarts as Alec Snelling's fast Challenger Dooling and Jim Dean's modified Arrow failed to run. Winner was Cyril Catchpole, who after registering a no-run in the first half despite a frenzied battery-change on the line, clocked a rousing run at 120 m.p.h. on his second attempt. This speed was identical to that put up by last year's winner, Joe Shelton, who we were sorry to learn was in hospital. Second place was taken by L. Newbold, running a Dooling special, with a second run at 105.26 m.p.h., J. Herbert running him close with 105.14 m.p.h. Arthur Poyser was running his new golden-hued wide-track Dooling "Flying Banana" in this class, which exceeded the "ton" on its first run. A car which aroused much enthusiasm on the part of John Bolster was W. P. Jones's beautiful Hornet-powered Bugatti, making a welcome reappearance after an absence of two years from the track, and running on fuel also two years old! It put in two faultless and pretty runs at just under 80 m.p.h., its motor sounding as healthy as ever.

Eric Snelling had his new 10 c.c. four-cylinder o.h. rotary-valve engined Austin chassis on view, and ran the engine for the benefit of an admiring audience. It sounds uncannily quiet after the howl of the two-strokes, and has its exhaust smoke emerging from a correctly-shaped exhaust pipe. When completed this car should be a certain concours winner.

The meeting finished at 11 p.m. with the presentation of prizes by Mrs. Hubert Dees, everyone going home feeling that this had been one of the best model car meetings ever. Thank you, Hubert Dees!



Above: George Thornton and Jim Dean watch Alec Snelling at the starter with his 10 c.c. entry. Centre: Plenty of noise and smoke being emitted by Arthur Poyser's latest model, the Dooling-engined "Flying Banana". On left, keeping his fingers crossed, is R. W. Flower. Below: Jim Dean makes final adjustments to his Borden Dooling, whilst his "pusher-off" appears to wear a halo! (Esso Photos)

A REGULAR TRADE REVIEW — TEST BENCH

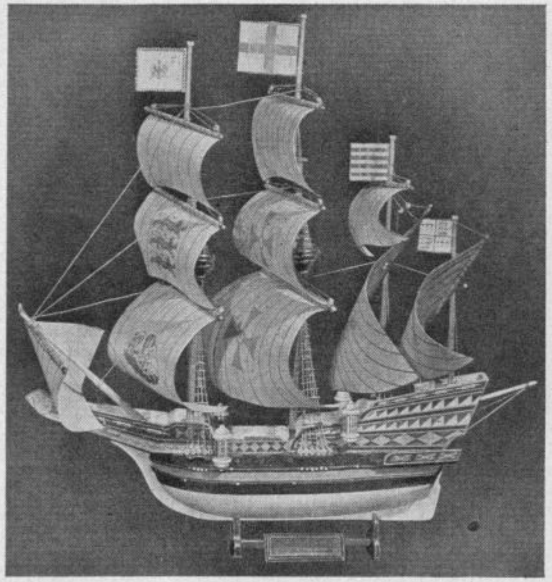


Photo : Geoffrey Chapman
Model Maker's completed version of the "Royal Oak". Engraved nameplaque, stand, detailed sails, ready shaped hull, and all necessary paints, etc. to finish were included in the kit. There is also an anchor which we should have posed hanging over the stern.

Marinecraft Galleons

MOST model makers at some period of their hobby decide to make a galleon. It is one of those models that satisfy in providing many hours of interesting building, plus a really decorative ornament when finished. It is to this class rather than the "out and out" detailed ship modeller that the Marinecraft range, produced by Model Aerodrome Ltd., 141 Stratford Road, Birmingham 11, will particularly appeal. Less confident would-be builders have often been deterred by the vast amount of multi-coloured decorative detail that is the making of this sort of ship, and for their benefit the manufacturers have taken the original step of silk-screen printing the whole of the coloured panels direct on to the sheet wood to be used and on to the parchment sails. This process uses real oil colours of surprising brilliance and provides a ready-made finish.

It is important that builders realise the difference between a decorative galleon and a detailed ship model of the same craft. Marinecraft offer purely and simply the former : if the builder desires to add more authentic detail—with added complication, of course—there is nothing to stop him, but, built exactly as boxed, following the impressively detailed instructions, a model will result even from unpractised hands, that will be a joy and a delight. We followed a compromise course with our model, by breaking the masts in a near period fashion at the "crows' nests" and stepping them in the traditional manner. There are many other detail refinements that can be incorporated if desired—but, we insist, provided the builder is not passing off the model as detailed scale ship model they add only to building pleasure and little to the appearance of the completed model. Altogether we enjoyed our *Ark Royal* : built it entirely from materials provided, and still had enough left to make junior a "matchbox" size galleon of his own. Prices including P.T. are : *Ark Royal* (19 in. long), 62/4d. ; *Golden Hind* (24 in. long), 58/8d. ; and *Santa Maria* (19 in. long), 49/6d.

Mermaid Clockwork Cabin Cruiser

This kit is so different that we jumped at the offer to have one on test. Hull is an alloy pressing to which motor mounts are bolted, stern tube and prop. shaft installed, and sealed with Bostik compound supplied and an obechi deck finally screwed down. A detachable cabin is then built up and fits down snugly over the raised coaming surrounding the deck well.

Either electric or clockwork can be installed. We chose the latter and built our cabin as a permanent part of the structure as there would be no occasion for opening up as in the electric model to change batteries. A small hatch, not visible in the illustration was made to enable the key to be inserted.

Viewing the kit as it arrived, we confess that it did not look likely to build up into a scale sort of craft. The lip round the alloy pressing of the hull by which the deck is attached seemed odd. But a handy band-saw enabled us to cut out all the wood parts in a quarter of an hour. Another half hour saw the clockwork motor installed together with stern tube and prop. shaft (all supplied). We then fitted the deck ,and our enthusiasm mounted. That "odd look" seemed to be disappearing! An evening at home completed the cabin fitting : our old friend Sellotape enabled a quick paint job to be tackled, by which time we really liked *Mermaid*. It was a shame to cover up that shiny alloy hull, so we contented ourselves with a dark band of colour there which completed the disguise of that deck overhang which had deterred us. White enamel is a must for the cabin, for some elegant little brass portholes are provided which make the final appearance thoroughly shipshape. Also provided are bollards, navigation lights and other deck fitments.

A few experiments are desirable with the propeller pitch : it is brass sheet and easily adjustable. The clockwork motor is very powerful, and a coarse pitch will serve to slow it up in the water, giving longer power run.

Price of the launch is 50/3d. inc. P.T. : without motor for electric power 35/1d. inc. P.T. ; or similar hulls for use with everything necessary for a small sailing yacht (16 in.) 27/6d. inc. P.T., and (20in.) 36/- inc. P.T. Distributors are B. J. Ward Ltd., Westminster Bridge Rd., S.E.1.

Veron Thames Police Launch

We have known Veron's designer, Phil Smith, a long time, and cannot remember any model of his that failed to appeal, but his latest venture into a model launch kit goes even further in providing a boat that anyone who can recognise a straight line can build and finish equal to the picture on the box ! By starting the hull with the construction of a basic rectangular shape, ultimately to form the cockpit, there is no chance of any error in lining up, no jigs are required, no "eye for line" needed, and accurately marked sheet wood, plus a fully detailed plan, with scrap view progress pictures, make it just the thing for beginner and expert alike.

Our model was built comfortably seated in the usual armchair with a 3 ft. x 9 in. building board across the arms. Even the small amount of soldering required to fix the tiller into the ready-drilled rudder post was done in this posture.

Quality of materials was exceptional. Really lovely ply for skinning the balsa formers, cut generally to shape with enough to spare to allow for trimming : a fine solid block of balsa for that awkward flare in the bows that spells disaster to so many novice builders, but now is merely a matter of carving to shape ; and the more finicky detail fittings already shaped and ready to instal.

E.D. (Surrey) Ltd., kindly supplied their marine propeller, shaft and stern tube, together with fly-wheel and coupling which enables their E.D. Bee to be installed. This comes only just inside the cabin, leaving plenty of room for R.C. equipment is desired. Should builders decide to instal this it is desirable that connection to the tiller be made before skinning. There is ample room to lead connections to the rudder, quite out of sight, between the cockpit sides and the skin, following full scale practice as though to a wheel "forrard".

Price including P.T. is 44/- : the E.D. marine set costs another 20/5d., or the more expert boat builder could make up his own quite cheaply.

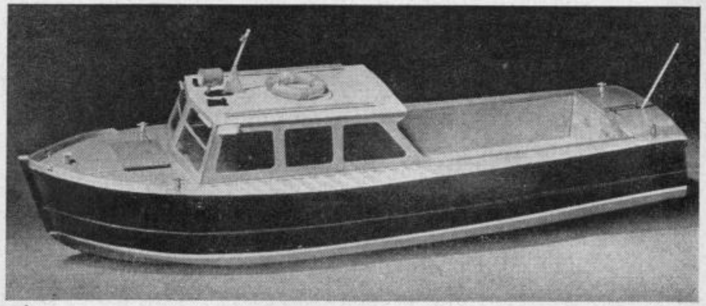
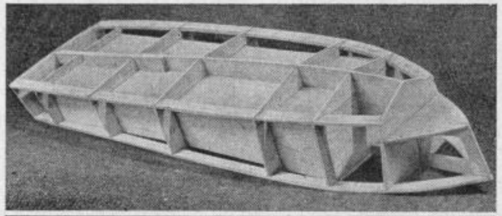
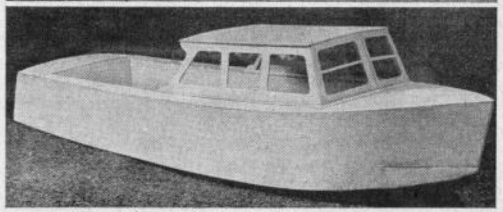
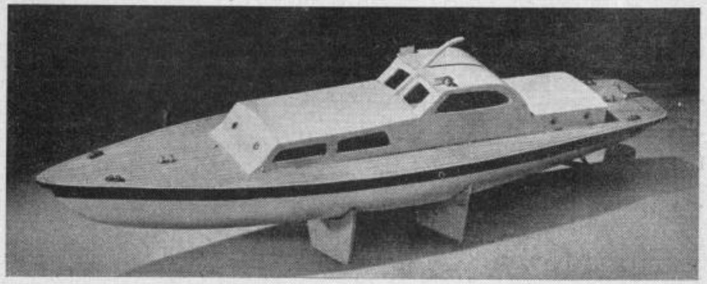


Photo : Geoffrey Chapman
Above : Our version of the Thames Police Launch kit marketed by Model Aircraft (Bournemouth) Ltd. under their well known trade mark "Veron", a model that is as pleasing to look at as it was to build. Below : Cockpit "box" with formers added ready for skinning, a simplicity feature of the kit ; and the skinned hull with cabin fitted, but before carving in flare to solid block in the bows.







Right : Finished Mermaid clockwork cabin cruiser. Strictly speaking the wheelhouse should be open, roofed only on the flat top, but a "saloon" version was ordered by the young skipper for whom it is destined. This kit is a "quickie" for those anxious to get something on the water with the least possible delay.
Photo : Geoffrey Chapman

Italian Commentary

BY FILIPPO MANCINI

NOW that our ears are no longer blasted by the vicious whine of "hot" motors, now that our hands are at last clean and no longer suffering from blisters, cuts, bruises, now that wives no longer complain about spots of oil on collars and cuffs, let us rest and look serenely at the past year.

1951 has been a year of achievement for Italian model cars, and before entering on a commentary of events, I wish to point out the most outstanding event of the year: I refer to the completion of a prominent race track in Monza, right next to the pits of the famous speedway.

The track complies with Italian A.M.S.C.I. regulations and consists of three concentric circular strips of concrete, some $4\frac{1}{2}$ ft. wide, with 7.97, 11.92 and 15.92 metre radii. The track is already surrounded by a wire mesh fence, and boasts a tall flagpole. On this pole we hope to salute in 1952 the British, Swiss, French and Swedish flags, but this is another story that will be discussed in due time.

The track was built with the financial support of the Milan Automobile Club, and was designed by Mr. Francesco Clerici, and first trials showed that the surface is perfect—not too smooth and not too rough.

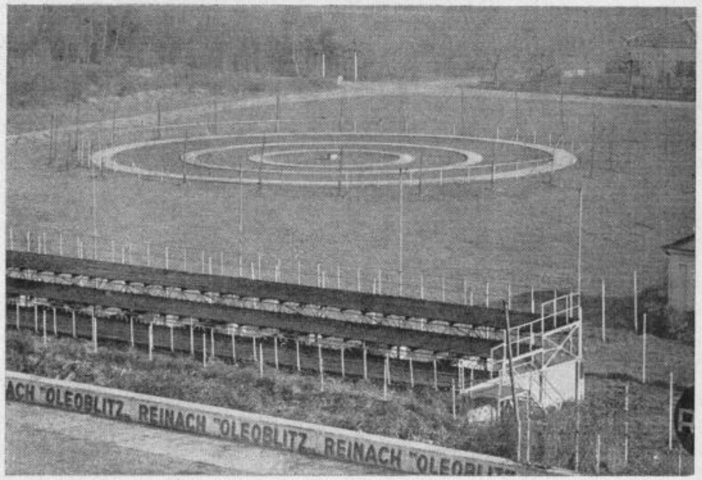
We heard rumours that the Rome Automobile Club is planning to build a permanent track there, not to be outdone by their Milanese colleagues.

I have insisted on the subject of tracks because all the 1951 season has shown the importance of this element and of its effect on the performance of model cars.

The first championship meeting was held in Milan, at the Ice Palace, on the 24th May, with a points system: in this race the first alarm sounded by an American engine was heard. Dr. Piero Prozzi of Ivrea, won the C class at 124.137 km.p.h. with a Dooling F-car, thus setting a new C class record on 1,000 metres base. This car is, of course, capable of much more, but nobody had at the time much experience with direct drive cars, and with high speed ones at that.

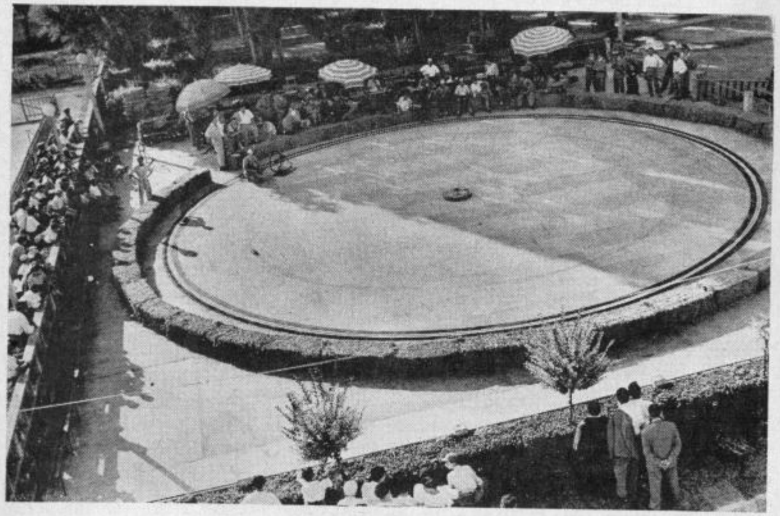
Also the B class was won by Casanova with an American Dooling 29 engine on a painstakingly built car (i.f.s. and aerodynamic body); highest speed, 98.360 km.p.h. A notable showing was put up by Clerici's belt-driven 10 c.c. car which ran one heat at 110 km.p.h. A special class was run for American-made Midgets, as an experiment. Electric timing was used and newsreel operators from Incom took scenes of the meeting. Public attendance was fair.

The second meeting was held in Turin, on the site of the Automobile Show. This race was also run on the points system. Speeds showed a marked pick-up, but the track was too smooth, and many a car was handicapped by the excess of power in relation to the adhesion. Again, the existing Italian records were bettered in all three classes. In the C class Castelbarco with a Dooling Invader did 124.567 on the 1,000 metre base, and Clerici 125 km.p.h. on the 500 metre base (always with a belt-driven car!).



Organisation was very poor for local motives, and it really was a pity, as Turin is the Italian city in which most of our automotive industry is concentrated. We hope next year things will be planned better, or else the A.M.S.C.I. will simply drop Turin as a seat of championship meetings.

The third meeting was again held at the Ice Palace in Milan, on 14th October. This time highest speed was taken for final placings. Entrants were 63 against 52 of the second race, and 49 of the first one. Again records were shattered, Rozzi doing 130.909 km.p.h. with his Dooling F in the C class, and Bordiquon of Milan putting up a nice clean 126.760 km.p.h. in the 5 c.c. class with a Dooling 29 on a car built by himself (Bordiquon is 16 years old). Clerici with his belt-driven McCoy 60 did 127 km.p.h., his beautifully constructed car showing a steady progress and fine tuning. A good showing was also put up by Valinetto of Turin, with an Italian-built car looking like a Dooling—125.876 km.p.h.

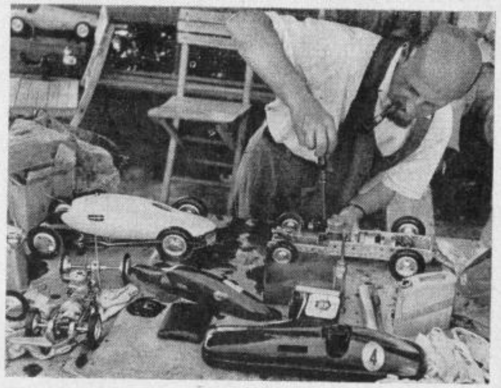


Right: Charming setting for a day's racing is provided by the Vercelli track of 8 metres radius. Centre left and right: World Champion Fangio and Gonzales take time out to inspect the models at Monza. Below: Sig. Brianzoli works on his 5 c.c. model at Vercelli. Opposite page: View of the new tracks at Monza, with the Autodrome pits in the foreground to lend atmosphere.

The last meeting took place in Rome, and it turned out a big affair with 83 entrants, very good organisation, and notable public attendance. They told me that the track was very good, being a skating rink on the Rome University site. (I was not there, my faith having been shaken after a considerable amount of bad luck in the previous races!) The Minister of Transportation was present with the President of The Rome Automobile Club.

All records were once more bettered, and I shall now give the standing situation.

CLASS A (up to 2.5 c.c.)		
300 m.	Riva Felice	103.840 km.p.h.
500 m.	Riva Felice	81.818 km.p.h.
CLASS B (up to 5 c.c.)		
500 m.	Bordiquon Abramo	133.333 km.p.h.
1,000 m.	Benaglio Elior	73.871 km.p.h.
CLASS C (up to 10 c.c.)		
500 m.	Mancinelli Elso	178.760 km.p.h.
1,000 m.	Mancinelli Elso	153.191 km.p.h.



The class C records were set with an Italian built car powered by a Dooling 61 engine, the car being of the spur gear streamlined tear-drop type.

Two more meetings were held in 1951 besides the four championship ones: one in Ivrea for 5 c.c. cars at the Olivetti Recreation Centre, and one in Vercelli for 5 and 10 c.c. cars at the Municipal Recreation Centre. Both proved quite successful despite the hurried organisation, and served well to spread interest for our sports. As a whole we can be moderately satisfied about our results, and this from every point of view.

From the technical side the increase in speeds has been considerable throughout the season and it is a promising fact that the B and C class records at the close of the year are held by Italian built cars.

For those who wonder why we Italians are not yet getting very high speeds, I think I can explain that we are still in a time of experiment, that we have very few facilities from tracks to glow-plugs, that we *like* to experiment with new and old ways, because we think this builds up a better foundation for the future of our sport, and that many of us even though they will not say it, find more fun in designing a good i.f.s. than in getting a few extra km.p.h. out of a chunk of metal. It is, of course, true that a few lectures by Mr. Howard Frank, who is also a good, if distant, friend of mine, would do us good, but maybe that is just one of the things we cannot have as yet!

Apart from this the outlook is not so gloomy on the other sides of our sport. Our Association is quite lively, and it only needs to grow out of its baby crib! The Automobile Club of Italy is helping us to a great extent, and the Milan A.C. in particular should be mentioned for the Monza track, and for its continuous practical support.

The excellence of American engines has been confirmed by this year's results; the problem of building an engine in Italy which will hold its own against Doolings and McCoys is mainly an economic one, because the cost would be too high in relation to the small quantity that could be sold. I believe that even in America things are stagnating a bit because the best results are now in the hands of a few specialists.

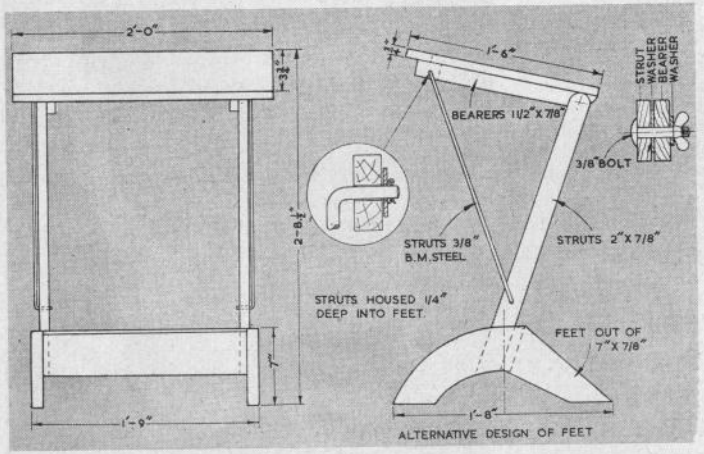
For these reasons I believe that soon model cars will register a notable deviation towards qualities other than pure speed.

Technically, in the year 1951, we have noticed that direct drive cars are gaining ground; the transition from the use of clutches is slow, chiefly because of the variability of track surfaces. Most cars have bevel gear drive, a few are spur gear, and two (to my knowledge) have belt drive. There have been attempts to launch cars by push-stick and even though they have met with little success, this seems to be the ultimate method to be employed.

Talk has started on spark plug ignition, and at the Milan October meeting a Rowell was seen. 1952 will maybe see even magnetos on the track. Tyres have given some trouble, but in general they have behaved well, particularly the Pirelli ones.

As a close to this letter I would like to say that most of us have greatly made use of British experience, and that in this field *Model Maker* has been a precious source of information and data.

For the coming season we hope to be able to meet car modellers from other nations because we think that international competitions will give new impulse to our sport.



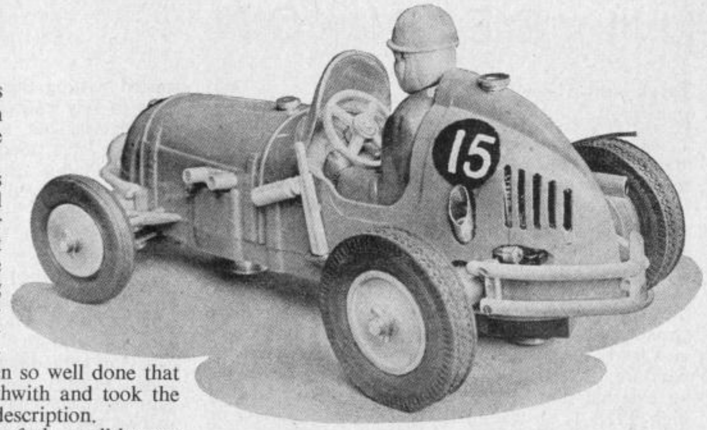
WORKSHOP DRAWING TABLE

BY A. SMITH

THE drawing table illustrated will prove invaluable in the home workshop. That odd drawing which is often found necessary, generally ends up as being either done without or else is sketched upon the back of an envelope. Lack of drawing facilities in the workshop is generally put down to shortage of space, while the bench top, from the viewpoint of cleanliness, is not the ideal place to use a drawing board.

Most model makers will sport a drawing board of one sort or another, usually of half-imperial size, that is to take paper measuring 22 in. x 15 in. Such a board may form the top of our drawing table. If not available the top may be built up from any timber. In which case a size of 24 in. x 18 in. will be more suitable.

The fully dimensioned drawing should enable readers to complete their boards: supplies of timber must remain, we fear, their problem!



AN EX-TOYSHOP RACER

CONVERSION BY JOHN PARKER

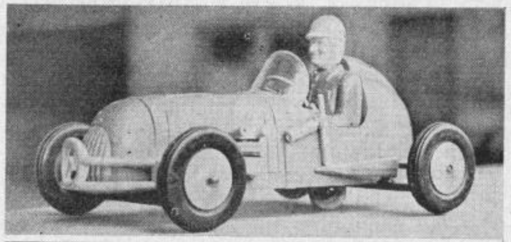
WHAT a lot of bright ideas must have originated from the laudable intention to "make something for the youngster"! We were forcibly struck by this thought when John Parker said when we arrived for the Meteor Rail Race meeting, "I've brought something along that may amuse you. I knocked it up for young Julian". "It" turned out on inspection, to be a clever conversion of a popular plastic clockwork toy, and the work had been so well done that we whipped out the camera forthwith and took the pictures which accompany this description.

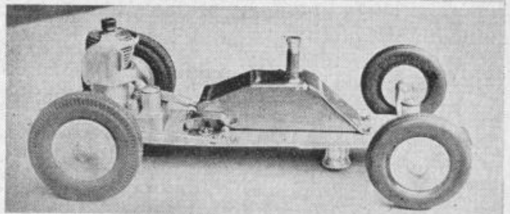
The original car is a replica of the well-known Offenhauser speedway car, made by Codega Products, and selling at 19/6d. As sold, the clockwork movement not only drives the rear wheels, but operates a long lever by means of a cam. On the rearward extremity of the lever, which is pivoted centrally, is a small wheel set at 45 deg. to the line of travel. This is depressed at fixed intervals by the cam gear, sufficiently to lift the rear wheels clear of the ground and thus cause the car to go into a lurid skid of the kind beloved of small boys and speedway fans. The superstructure of the car is both robust and reasonably accurately detailed, brake, air pump, screen, exhaust pipe, steering wheel, and bumpers being included, not to mention a tough looking driver of real "cut-'em-down" aspect. The whole car is brightly finished in blue and yellow, and real rubber tyres make it an irresistible proposition for any small boy.

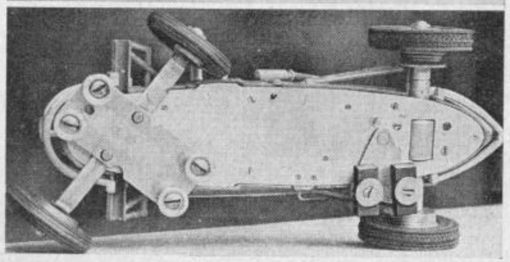
Upon this basis John Parker set out to build a rail racing model. Item one was a new base, which was made of flat dural, shaped to fit snugly into the superstructure in place of the original clockwork chassis. The power unit was to be an Elfin 1.49 c.c. engine, for which there was just room under the rather high tail. The original rear wheels were scrapped, tyres and all, and in their place special wheel centres were turned, the nearside one incorporating an engine-shaft clutch of normal pattern, similar to that fitted to the Cooper previously described. The rear wheels are fitted with the special non-stretch tyres supplied by H. C. Baigent.

In this case the engine is arranged to be mounted vertically, and a special extension, again similar to that made for the Cooper, fits into the back of the Elfin's crankcase to carry the offside rear wheel. The engine is bolted down to special mounting blocks,

(*Continued on page* 380)







The heading picture shows the Offenhauser as modified for the Elfin, and fitted with rail rollers and braking attachment. Note the neat filler caps, that at the rear exposing the contra-piston control. Below is the car as purchased, and two views of the rebuilt chassis. Note the cylinder heat-deflectors.

JIM DEAN ON . . . FUELS FOR FANS. PT. III

Spark and Glow-Plug Fuels

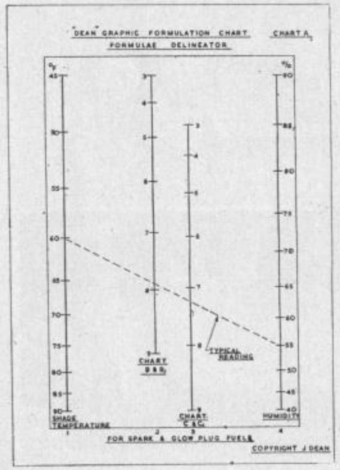
BEFORE proceeding with any description of the above fuels or their ingredients, I think it best that I should give a few details of the basic differences between diesel and spark or glow-plug engines.

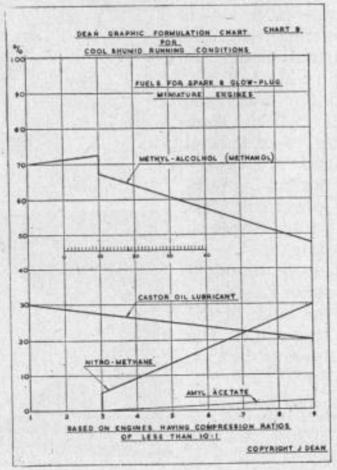
In the case of the diesel engine the firing, burning, or exploding of the fuel (in its particular vapour form and concentration) is brought about through heat; this heat is (a) generated by compression, and (b) the residual heat of the combustion chamber (heat retained from cylinder head by previous firing stroke), this degree of heat being as we have said in Part I, the S.I.T. or "spontaneous ignition temperature," but in spark ignition engines we rely upon an external means to ignite the fuel, hence a very high S.I.T. is an essential, otherwise pre-ignition or knocking will result. From the above it will be seen that a good diesel fuel would make a poor spark ignition fuel and vice versa.

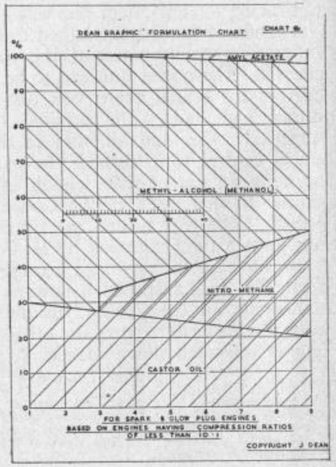
There are a multitudinous group of chemicals that can be utilised for making up fuels for spark and glow-plug engines, some of which are both difficult to obtain and expensive. Others involve intricate problems of mixing, instability when mixed, sensitivity to detonation, as well as critical carburation adjustments, and still further a host of other "could-be-troubles", one of which is that, to put in writing in an article such as this an adequate description of them, would necessitate technical phraseology, and which, as stated previously, I am making every endeavour to eliminate (and it is not easy to do so). So after much deliberation I have decided to deal only in this article with that limited number of chemicals that I advocate as ingredients of the fuels in question. Further it was my intention when I started writing this article on spark and glow-plug fuels to rely entirely upon written descriptions and formulations but, and a very big *but* at that, I find I cannot give adequate and lucid details and formulae without using technical phrases, and very long and involved detailing, and even then I feel it would only be a help to but a limited few of you. The main reason why I cannot give a written description is that, in the case of spark and glow-plug fuels, unlike diesel fuels and engines, there are many more variants under this heading, namely climatic conditions are all-important, particularly humidity and temperature. A difference of either of these calls for a modification in fuel constituent percentages. Further, we have no easily variable compression arrangements in spark and glow-plug engines, like we have with the contra-piston in diesel engines. This in conjunction with design of transfer-porting, inlet-porting and engine-volumetric efficiency, all have direct bearing on fuel formulations. There is one variable in the case of spark-ignition engines which does help to give us an important control over running, namely ignition control, but again, even this does not apply to glow-plug engines. It will thus be seen that my problem of conveying to you in some form easily understood and yet useful in enabling you to both determine correct formulae for your particular engine fuel as well as making and mixing it up is, to say the least, difficult.

However, after much consideration I have decided to use a form of graphical formulation evolved specifically for this article, and the method of using these graphs will be given later.

Now for a description of the chemicals I advocate for the constituent of these fuels.







1. Methol-alcohol or methanol

This is one of the main energy-producers of the fuel, and it is very important that only the best be used. Always ascertain that it is at least 74 per cent overproof. Such methanol contains only approximately 1 per cent of water, but even this is an unwanted inclusion, and as I promised earlier in Part I of this article, here is what I consider the best method of removing a good proportion of this water content. Place approx. 1 lb. of calcium chloride in a large-necked glass container for which you have either a screwed cap or cork. Now pour into this container your methanol until the calcium chloride is just covered, replace cap or cork to prevent any ingress of air and leave to stand for an hour or so, after which the water, or most of it, should have been absorbed by the calcium which has an affinity for water. Now uncork or unscrew cap and pour off free liquid preferably through a filtering media, and the resultant methanol should be nearly water-free. Here I must give a word of warning: methol-alcohol or methanol (the latter is only a denatured methol-alcohol), also has an affinity for water absorption so keep it well corked at all times. The calcium chloride can be used over and over again if you first remove the greater portion of the absorbed methanol and water by putting same into a linen bag and vigorously swing this at arm's length, thus removing most of the liquid by centrifugal force, and then baking the calcium chloride in an open metal tray, preferably on the top of a stove or in an oven of a domestic range (i.e. not heated by gas or electricity). There is a slight risk of the remaining small quantity of methanol catching light so leave the door of the oven ajar.

High-level Conference! The author of this series snapped at the Meteor Open Meeting, in discussion with J. S. and J. A. Oliver, who, we understand, are making arrangements to market racing fuel to his formulae.

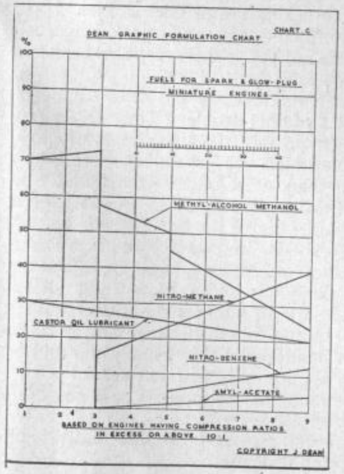
Should the methanol however ignite, the flame will be small and will soon go out if you have carried out the slinging process properly.

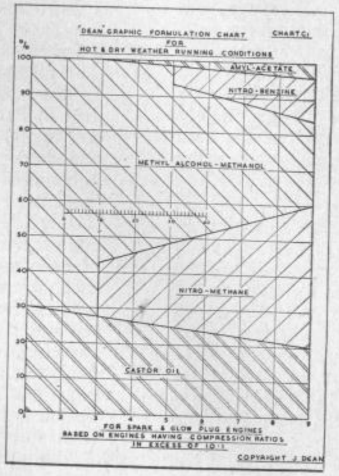
2. Nitro-methane and nitro-benzine

These chemicals are the nitro-hydro-carbon group and do form energy producers in the fuel. Their calorific value, however, is of a very low order. In fact slightly inferior to methanol, but only half that of the paraffinic hydro-carbons such as diesel oil, paraffin and petrol; they have one extremely important virtue peculiar to their group, namely their ability to release their energy very rapidly (methanol cannot boast of this virtue). It should be pointed out here as well that nitro-hydro-carbons have two other important functions in a fuel: (a) they are the means whereby an engine can accept more fuel, that is, by their inclusion in a fuel one can (in fact, one has to), open up the throttle or jets quite an appreciable amount, and the engine will accept this additional fuel and give out more power; (b) the inclusion of the N.-H.-Carbons tends to make an engine run somewhat hotter thereby—if all other things are correct—an improvement will result in thermal efficiency.

3. Amyl-Acetate

You may well wonder why I have included this apparently useless chemical (as far as fuel is concerned). Well, it is not to give the fuel a potent smell of peardrops. Oh, no! But to my mind its function is all-important. "It is the mixture stabiliser". That is, methanol, castor oil and nitro-methane when mixed together, tend to segregate again, particularly when the methanol content is small. In actual fact they do not really mix properly, resulting in erratic





running, but with a stabilising agent employed, such as amyl-acetate, consistent results can be expected, and I consider that this chemical serves this purpose better than most others, as it also constitutes a fuel, namely its C.V. is reasonably high and its S.I.T. is even higher than petrol.

4. Castor Oil

Obviously this is the lubricant, and again I say use nothing but a good vegetable oil such as castor oil for this.

Now for the graphic formulae chart. As you will see I have made up five, charts A, B, B1, C and C1.

Chart A is the formula delineator, i.e., from this you can determine the formulae from temperature and humidity that is required to be taken from the other charts, and as you see it consists of four vertical lines, the left-hand line being calibrated in degrees Fahrenheit, the right-hand vertical line in humidity percentage, and the two intermediate lines calibrated with the corresponding numbers of charts B and C. If you draw a line from the temperature to the humidity taken at the time you want to race you will find this line cuts across the B and C chart lines and this point of intersection indicates the formulation number, and in turn you can determine the constituents of your fuel.

Charts B and B1 are for engines having a compression ratio less than 10 to 1, and are numbered along the base ordinate from 1 to 9; from 1 to 3 indicates straight fuels, i.e. that required for running-in, and the numbers above this indicate an infinite variety of formulae, bearing in mind that the higher the number the more potent the fuel. C and C1 charts are similar to B and B1 except that they are based on engines of higher compression ratios, namely in excess of 10 to 1. Most Dooling .61 engines come in this class. Of course, these simple charts cannot give you the complete answer, but they do give a very accurate approximation for your formulae, and after a few trial runs you may find that your particular engine will run better if you give it a fuel that according to the chart should be for an operating temperature some 10 deg. higher than actual temperature. Should this be the case then always use a 10 deg. Fahr. uplift when using the chart and you will get consistent running.

Before finishing with the formula part of this article I would like to mention that if you want to work absolutely to these charts you will of necessity have to take the components of the fuel separately to your meetings and mix up to a specific formula on the site. It is "good sport" doing so, but should you prefer not to do so then I suggest you mix up at home three or four different formulations, say B5, 7 and 9, or C5, 7 or 9, according to your engine requirements. In case some of you cannot too clearly interpret these graphs I give herewith a few formulae extracted from them.

Formulae extracted from charts:—

B.5	B.7		C.5	C.7
%	%		%	%
24.5	22.5	Castor Oil	25.0	22.5
13.5	21.5	Nitro-methane	22.5	32.0
61.0	54.0	Methanol	51.0	34.0
1.0	2.0	Amyl-Acetate	1.5	2.5
—	—	Nitro-Benzene	—	9.0
100.0	100.0		100.0	100.0

B.9		C.9
%		%
20.0	Castor Oil	20.0
30.0	Nitro-methane	40.0
47.5	Methanol	23.5
2.5	Amyl-Acetate	4.0
—	Nitro-Benzene	12.5
100.0		100.0

B.5 and C.5 are suitable fuels for their respective engines for cool and humid running conditions such as would be experienced at the beginning and late season. B.7 and C.7 are suitable for an average summer afternoon, or alternatively, hot autumn days with a fairly high humidity, but B.9 and C.9 are for really hot and dry summer afternoon runs, though for the evenings of such days you would in all probability have to revert to something like B.7 or C.7 formulations.

In concluding this article I have three things to refer to:—

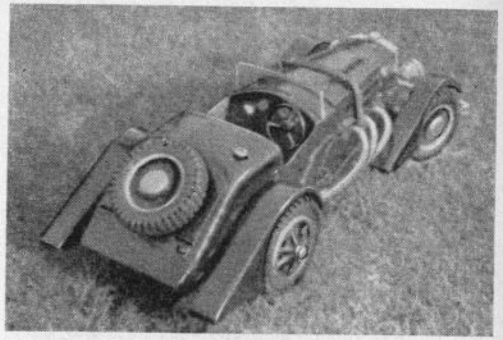
1. I have so arranged these various formulae that they are without alteration suitable for either glow- or spark-plug ignition, thus eliminating a lot of complexity from the subject.
2. If you run your engine on any of the fuels containing nitro-methane or nitro-benzene then I strongly advise thorough emptying of tanks and a short run on a mixture of B or C Nos. 1 and 2. These nitrated glow- and spark-plug fuels are even more unkind to their respective engines than nitrated diesel fuels.
3. I must make a reference to the rules I enumerated in Part I of this article. They all in general apply, but in fact the ingredients of glow- and spark-plug fuels are invariably more highly inflammable than most of the diesel fuel constituents. Further, the fuels in question after mixing are more liable to be affected by precipitation of solids, and therefore filtration is of even greater importance, and the chemicals used in making up these glow- and spark-ignition fuels are in some cases toxic, in fact particularly so and therefore great care must be exercised in handling same. Finally the rule on consistency applies only indirectly, and to get consistent running in our present case strict adhesion to formulae is important.

I trust this article proves both informative and useful without being abstruse.

BILL BAILEY MK IV

A 3.5 c.c. SPORTS CAR

BY J. C. TWOMEY



We should explain that Bill Bailey I came into being as a very "Shelsley Special" single-seater in 1948, when its designer, J. C. Twomey was 15 years of age, and the car has since passed through various stages of Kitchen Table evolution. In its original form "Bill" boasted a 19:1 final drive by worm gear, and had a maximum of 4 m.p.h. at full r.p.m.—EDITOR.

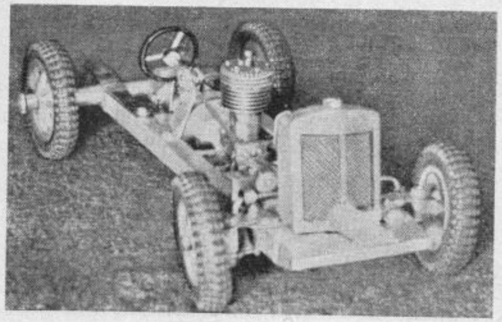
THE story of Bill Bailey's early life has already been told elsewhere, but since that article was published the car has undergone considerable development into its present state. From a 2 c.c. ED powered, Meccano-chassis car with a racing body, it became a slightly larger and heavier sports type vehicle (known as Mk. III), with functional steering, snap filler caps, mudguards, headlamps, spare wheel, and a functional exhaust pipe, and aero screens were also fitted. The louvred bonnet was hinged at the rear, and held down by a modified watch strap.

The latest model, Mk. IV, was designed as a result of the detrimental effect of combined mishaps and wear and tear on Mk. III, and also to incorporate various new ideas which occurred to me too late for inclusion in that model. The chassis is made out of U-section aluminium, braced here and there with other pieces of channel, and with thick bars. The engine, a 3.5 c.c. E.D. diesel, is mounted on a piece of $\frac{1}{8}$ in. aluminium, with a hole sawn out for the sump. At first it was spring-mounted, but the period of the springs was wrong so that they caused vibration themselves at certain speeds. Drive is transmitted through an ED centrifugal clutch, via a 1066 rear axle to the rear wheels, which unfortunately do not match the front ones, but are much stronger, and therefore more suitable for transmitting the 0.25 b.h.p.

The rear wheels are sprung by means of hacksaw blades, which act as semi-elliptics. These were the only pieces of tempered steel I could find which already had a hole punched in them, suitable for mounting purposes. Damping was effected by pieces of sponge rubber placed over the axle. The front springing is fully independent, except that the track rod is in one piece. It really does work quite efficiently, in conjunction with the steering. This is of rack and pinion type, the rack being a small, closely-fitting spring round the track rod, anchored at both ends by collars. The pinion is fixed directly on to the steering column and engages on the spring, which is sufficiently tough not to compress under the light strain. The track rod is lockable by means of a butterfly nut, for running purposes. The rear wheels themselves are of Atlas Motors' manufacture, while the front ones are considerably modified Prestacons. These were strengthened by joining the two halves with bolts, and filling most of the cavity with the invaluable plastic wood. The hub caps are "gliding castors", meant for chair legs, which give rather a good effect, I think. I intend to match them at the rear later.

To turn to bodywork, it was decided for this model to make the rear end out of wood, owing to previous difficulty in making complex curves in aluminium. A large luggage boot was incorporated, originally intended to house a silencer, but when the silencer itself was made and tested, it was not sufficiently successful to justify its position, so the space was used for the fuel tank instead, which is filled correctly through the external filler cap. A spare wheel is carried on the lid of this boot. All the rest of the body is made out of aluminium, except for the bonnet where copper was used to enable the louvres, stamped in copper, to be soldered in. The bonnet is hinged on one side only, but gives easy access to the compression screw and fuel control. The exhaust pipes which are to be seen in the photograph, are not now functional.

The radiator is made out of one piece of wood, with any gaps smoothed out with plastic wood. The headlamps are also made from this useful substance, and contain pea bulbs which are operated by a



switch on the dashboard. The other dashboard instruments are made in the usual sandwich way. Upholstery is carried out in real leather, the pleats being formed by making corrugations in plastic wood (again, I don't know how any modeller exists without it!) and glueing leather over them.

No attempt has been made to cut down weight as a scale performance, in my opinion, is preferable to all-out speed. As a result, I have not allowed the car to exceed 40 m.p.h., but I am sure it could easily do so if desired. The actual weight of the completed car, dry, is 4 lb. 11 oz. (no battery for lamps aboard).

This car, like its predecessors, is a completely "Kitchen-table" model. All tools used were simple hand tools, the most costly being a hand-drill. Of course, the engine, clutch and back axle were all bought complete.

EX-TOYSHOP RACER

(Continued from page 375)

the front one carrying the rear guide plate pivot. An Allen screw replaces the compression adjuster, and in order to protect the plastic bodywork from the heat of the cylinder an aluminium shroud is fitted round the finning, as will be seen in the chassis picture. A specially shaped "double wedge" tank sits on the base amidships, with the filler pipe positioned so as to bring it on the scuttle for convenient filling. A similar cap is fitted on top of the driver's headrest, the removal of which gives access to the contra-piston screw. The carburetter air intake comes neatly outside the tail, and the needle valve is fitted with a hexagon head and slotted to be adjusted by screwdriver if necessary, through a hole in the tail. Additional cooling slots have been cut in the tail behind the engine.

The front axle is of the plain pivoting type, fitted below the base, and a four-pulley guide plate with single flange rollers is attached. The rear guide plate is fitted with brake shoes in place of rollers.

The original front tyres are retained, fitted to specially turned aluminium wheel centres, which in turn, like the rear wheels, are fitted with ballraces.

A positive knock-off fuel tap and arm with a flat spring locking device fits alongside the tank, the arm being outside the body. The body itself is screwed to the chassis base, and all normal adjustments can be carried out with this in place. As a final touch, racing numbers have been added and the driver has been artistically decorated with a coloured crash-hat and a dirty face. The result, as demonstrated on its first outing, is a most practical little rail racer, and even if the total cost is no less than that of building a car from scratch, at least the Meteor Club's circuit is richer by one smart and colourful competitor!

DOPE & CASTOR

(Continued from page 384)

winner of any event should be compelled to offer his engine for sale at a fixed maximum price, which in our case could well be the current market figure. Thus anyone having the skill and facilities for hopping-up, say, a standard E.T.A., E.D., or Elfin to well above its maximum makers' output would think seriously before risking having to sell it within the hour for its catalogue value, merely for the sake of winning what would be after all an event of secondary importance.

An interesting letter to hand from H. Pickersgill, Hon. Sec. of the Guiseley Club, anent the Dean Handicap System hasn't a correspondence page to air itself this month, so here it is in the Cannery. "On going through the Dean Handicap System it seems fair enough until we come to Rule 10 and then up goes the balloon! 'Eliminating the really slow cars'. The slow cars were eliminated long ago, and unless I'm mistaken the reason for all this discussion, grading, handicapping, British and Open, etc., is to bring them back again. If open competition becomes the preserve of a handful of fast cars, then what is to become of the majority of model car enthusiasts? No, Mr. Dean, don't let's eliminate anybody or anything." Fair enough?

The comment below L. A. Manwaring's cartoon was in fact overheard at Simpson's in Piccadilly, during their recent exhibition of racing cars. Some string! Incidentally, our cartoonist was responsible for the potted biography of Eric Snelling last month, a fact which should have been made clear at the time, as I gather that prising facts about himself out of Eric is no mean labour, and deserves recognition!

The "90" saloon in a Surrey setting. Note the wing treatment and air-inlets flanking the radiator grille.

PROTOTYPE PARADE No. 38

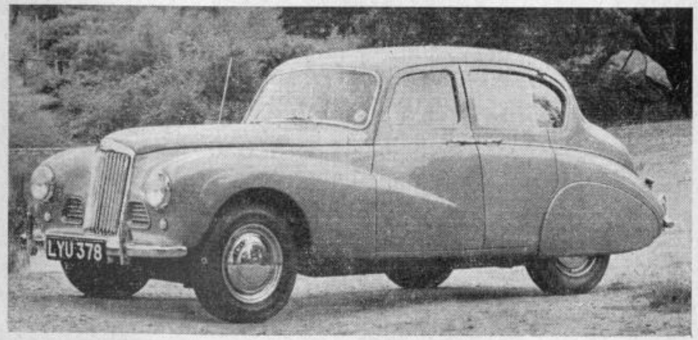
SUNBEAM TALBOT 90

THE SECOND PLACE CAR IN 1952 MONTE CARLO RALLY DESCRIBED BY G. H. DEASON

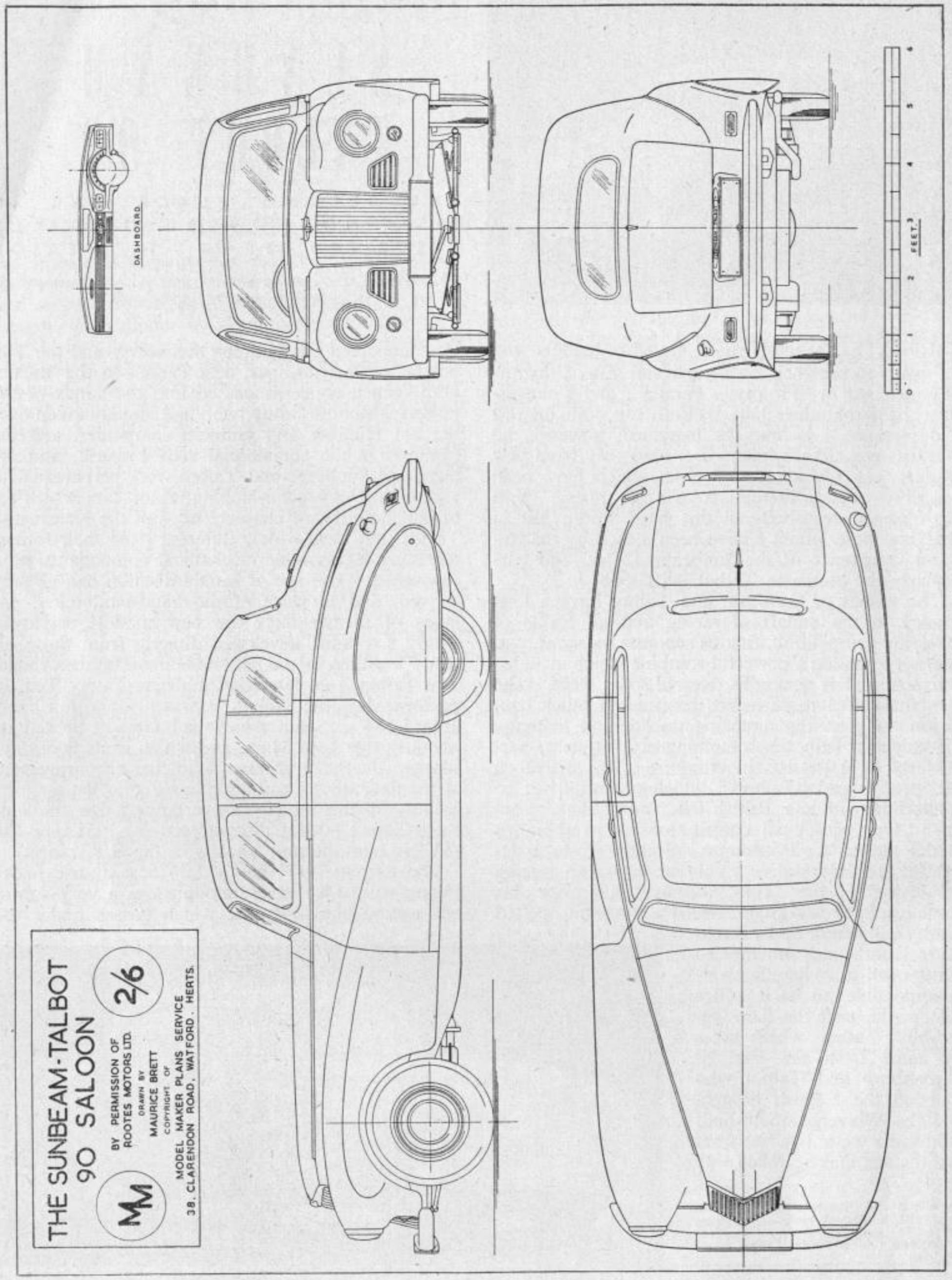
REPEATED requests reach me from readers who want to see their own particular list of favourites included in "Prototype Parade", and I can assure them that their letters afford me both interest and pleasure. As may be imagined, however, no two lists are alike, whilst some, obviously from new readers, ask plaintively for types which have been described already in this six-year-old series. You can't please everybody in this hard world, but in studying these letters I have been struck by the frequent recurrence of the Sunbeam Talbot, and particularly the Sunbeam Talbot 90 Saloon.

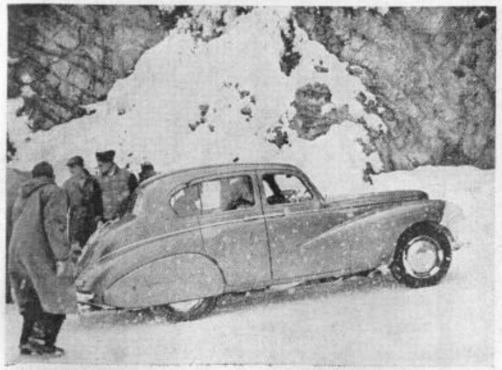
The names of Sunbeam and Talbot have a long history in the annals of racing and all forms of motoring competition, first as separate *marques*, and later representing a powerful combine which included Darracq, and is generally referred to as STD. The combination of these names has caused much confusion, to even the motoring public, and to many the name of Talbot is something of a mystery, particularly as it persists in cropping up as a French car, pronounced "Talboh", which evidently has no connection with our British machine of the present day! Our occasional contributor and well-known model maker, C. Posthumus, recently wrote a delightful and informative article in *Autosport*, tracing the history of the Talbot Darracqs, but since this alone ran to several pages, whilst a Sunbeam "potted history" in *Motor Sport* ran to several parts, any attempt to tell the full story here is plainly impossible, so let it suffice that in the past the Kensington-built Talbot, which takes its name from the Earl of Shrewsbury and Talbot who founded the English branch, and the Wolverhampton-built Sunbeam, were two separate and distinct makes, linked only by commercial ties between themselves and the Talbot factory as Suresnes, near Paris. In the 'thirties both British concerns passed into the hands of the powerful Rootes Group, who had already taken over the old Humber and Hillman companies, and the Commer in the commercial vehicle world, and the names of Sunbeam and Talbot were perpetuated in a series of very good-looking motor cars which retained the outward characteristics of the Kensington Talbot, but were widely different from their former selves so far as their mechanical components were concerned. The age of standardisation had already arrived, and in place of the hand-built o.h.v. engines of former days the new models employed sturdy s.v. units developed directly from those already existing in the Hillman and Humber range. The Talbot Ten, later the Sunbeam-Talbot Ten, in post-war days the Talbot 80, was fitted with a lively little 1,184 c.c. unit which had already proved its worth in the Aero Minx, and which in its later days adopted overhead valves. With the encouragement of the flat-rate tax and doubtless due to the undesirability of listing models of overlapping size, the Sunbeam-Talbot 80 was discontinued for 1951, and the "90" is now the only chassis in the S.T. range.

The current "90" has a 2,267 c.c. four-cylinder engine with o.h. valves, mounted in a very robust box-section chassis frame which passes under the



Restrained and conservative lines can blend with a modern look, as this view of the "90" shows. The car would make an excellent subject for the "solid" scale enthusiast.





Left : The Sunbeam Talbot seen in trying weather conditions during the 1952 Monte Carlo Rally, and below : The car and its crew after finishing second in general classification. Stirling Moss is on the left. (Photos by courtesy of "Auto Sport")

rear axle, and has boxed cross-members and I-section X-bracing. Suspension is by half-elliptics at the back, and coil springs and wish bones at the front. Hydraulic shock absorbers damp the suspension, and a transverse stabiliser and a torsion bar at back and front respectively discourage sway and roll. The wheels are of easy clean type, with large embellishing discs, and fitted with 5.50 x 16 Dunlop tyres. Wheelbase is 8 ft. 1½ in., with a front track of 3 ft. 11½ in., and a rear track of 4 ft. 2½ in. Braking is hydraulic by Lockheed, operating in 10 in. drums, which are recessed deep into the wheel discs.

In a car of this kind the bodywork and its furnishings and accessories naturally form the greatest attraction for the model maker, and here the Talbot 90 scores heavily in the matter of beautifully proportioned body-lines and luxurious interior. In an age of increasing bulbosity and mouth-organ fronts the Talbot retains much of its old individuality, and presents a radiator-shell in which it is easily possible to trace its illustrious ancestry. The car is listed in two body styles, the saloon shown, and a very handsome sports convertible coupe built by Thrupp & Maberley. The saloon version was used by the runner-up in the Monte Carlo Rally this year.

The wing treatment manages to convey all the old elegance of the long swept wing, whilst providing a maximum of protection. The rear wheels are enclosed in detachable panels, and the front wings carry the headlamps built into them. The waistline is emphasised by an unobtrusive chromed strip. Four doors are fitted to the saloon, the coupe having two wider ones. On either side of the front grille are additional vents, air being led to the air-cleaner from outside the body.

Two separate seats are provided for driver and front passenger, whilst a 55 in. rear bench seat is accommodated within the wheelbase also. Upholstery is in leather. The specially curved windscreen allows the door pillars to be set back, increasing visibility, and a similarly curved rear window is fitted. Two sun vizors are fitted, that for the passenger incorporating a mirror, and a neat rectangular clock is mounted above the screen between them.

The fascia panel is of most attractive design, the "streamlining" of the steering column being particularly distinctive. The main instrument dial is the semi-circular speedometer set in front of the three-spoked steering wheel, through the unobstructed top portion of which it can be read easily. Subsidiary dials are on either side, in rectangular frames, clock and fuel gauge on the left, and ammeter and oil pressure on the right. The instruments are all grouped on the driver's side, the centre panel carrying the lighting and ignition control knobs, whilst a large locker in front of the passenger is floodlit, and the lid forms a map-reading platform.

The four-speed synchromatic gear-control lever is situated below the wheel, the right-hand drive versions having the lever towards the left. The hand brake lies between the front seats. Radio and heater and air circulating unit complete the interior controls. The lid of the luggage boot contains a felt-lined tray in which the larger tools are fitted. The doors are fitted with recessed "Pistol-grip" type door handles.

In all cases the upholstery is in contrasting leather, and the standard colour schemes are as follows:—

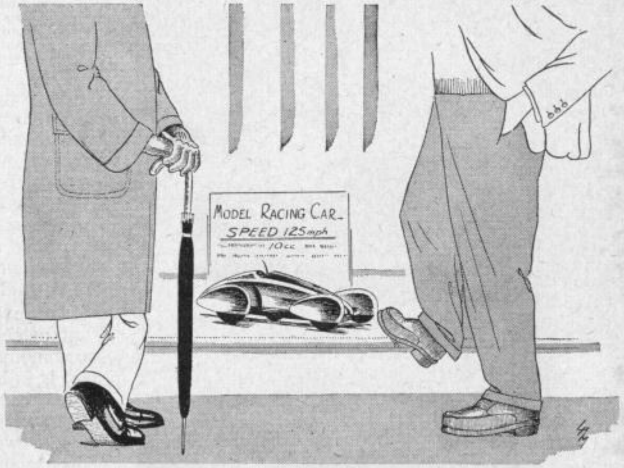
Black with red upholstery; black with light fawn; satin bronze with red; light metallic blue with fawn; gunmetal with grey; beech green with red.

So far as competition is concerned, the Talbot has made a speciality of long-distance rallies of the tougher high-speed type, and has scored repeatedly in the International Alpine Rally. Its reputation in this type of event was handsomely confirmed by its magnificent showing in the Monte Carlo Rally of 1952, when Stirling Moss, John Cooper and Desmond Scannell finished second in the event, starting from Monte Carlo, in most arduous weather conditions.

MODEL MAKER

DOPE & CASTOR

BY JERRY CANN



" Oh yes, they attach them to a piece of string . . . "

EVERYONE to whom I've spoken who attended the recent meeting at Hubert Dees at Croydon is full of praise for the fine organisation, both on the part of the model folk and their hosts, whose hospitality was handsome to a degree. I'm told that the arrangements for personal refuelling were really first-class also, and there is no truth in the story that one competitor complained that supplies were not available from pressure hoses! Altogether a good send-off for the 1952 season. Whether the idea of square dancing in the interval will spread is problematical, but we may yet see a maypole forming the centre-piece of the track at the British National Speed Championship. Ribbons on ball-bearing arms at regulations height, of course.

I hope that all registered readers have by now read and duly noted the Cannery's new address. If not, turn to page 329 and do it now. Moving an organisation such as *Model Maker* in its entirety is no light undertaking, but such is the perversity of things that, whilst my more methodical colleagues whose filing systems are ever a source of envy and despair to your scribe, lost everything for days, the Cann establishment was so well stirred up that quite a lot of mislaid correspondence came to light which would have otherwise lain undisturbed for years, not to mention several well-chewed pencils and a hardly-used cigarette of 1946 vintage. The dust has now settled, and the stall set up in good order, ready for the new racing season. I have even retained my dog-eared M.C.A. speed chart. Speaking of which, have you? If not, the M.C.A. News Letter suggests that now would be a good time to send for a new one, which will set you back a matter of ninepence, plus postage. Shop early and avoid the rush.

The new copies of M.C.A. Rules have now been distributed, but extra copies are available to individual members who wish to have them. Price to members of affiliated clubs is 2s. per copy, and as these are limited, I advise early application to Ian Moore, 2 Bridge Street, Derby. The constructional rules in particular well repay careful study by everyone who is contemplating building or running a car in competition for the first time. Weights for the various classes, and safety factors of tethering equipment are particular cases in point, as almost all cases of breakaways on the line are due to the competitor's end of the equipment and not the organising club's. Happily such occurrences are rare, but in 1952 they must be rarer.

Incidentally the 1.5 c.c. class rules call for tethering equipment capable of withstanding a load of 21 lb. per lb. weight of the car, which is given as equivalent to 60 m.p.h. on a 35 ft. diameter track, with a safety factor of 1.5. Nobody is likely to quarrel with this, as the baby class can easly be crippled by too heavy a line. All the same, Alec Snelling's latest has already clocked nearly 70 m.p.h. !

A general study of the M.C.A. rules and regulations, excellent and sensibly framed as they are, does lead one to wonder if there is any future contemplated for anything but the out-and-out speed model. After all, the Association's Constitution contains a section entitled "Objects", which refers, not to the general appearance of the models it encourages, but to the Objects of the Association. First on the list reads: "To encourage all phases of the development of model cars". Yet the only National competition organised by the Association contains no event for anything *but* the out-and-out speed model. Strange !

Yes, I know all the difficulties involved in defining scale and sèmi-scale models, and I don't propose to make any world-shaking contributions to the subject. But one thought that *does* occur to me is the possibility of running a class or classes for stock motors. And how, you say, does one ensure that stock motors are used? One answer to that was recently put forward by full-scale expert Dick Caesar in connection with Half-Litre racing, which is faced with very similar problems to our own. His scheme was on the face of it, simple but effective. The

(*Continued on page* 380)

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PLEASURES IN STORE . . .

Certain features intended for our May issue have been unavoidably held over. We would remind readers that in an early issue we shall be offering them :

MODEL RAILWAYS : A. H. Dadd's further instalment of Passenger Stock of the E.K.R. TT versus 000—the argument for the gauges.

MODEL YACHTS : H. J. Daniels' latest design for a 36in. Restricted Class Hard Chine Sharpie.

JUNE ISSUE will be as full as ever of a wide variety of model items, including a full pictorial report of the Model Railway Exhibition, and a number of new designs that simply must be built !

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