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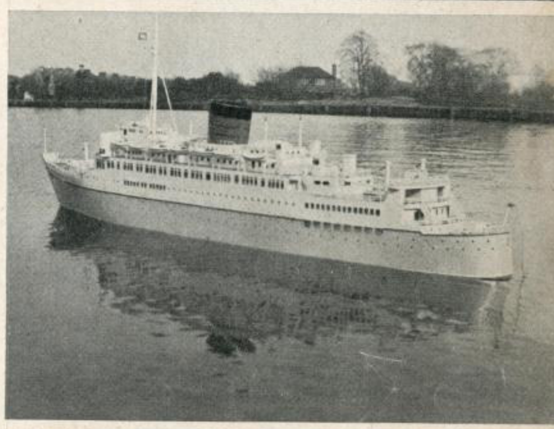

VOLUME 2 NUMBER 24 NOVEMBER 1952

IN THIS ISSUE : Scale Model Tug "Cullamix" : Making a Model Liner : 5 cc. Speed Model Car : 10-Rater Championship Report : Radio Control at Blackpool : Victoria Park Regatta Pictures : Rights and Wrongs of Tinplate Track : Model Railroad Scenery : Model Yacht Design : New Series on Model Photography : Scale Model Cars for Competitions : Stentor Special Model Car : 5 cc. XK120 Jaguar : Prototype - H.W.M. Formula 2 : Latest Speed Records : Traction Engines-Fairground Memories : Model Yacht Club Notes : Electrostatic Machine Pt. II : Plastic Yachts

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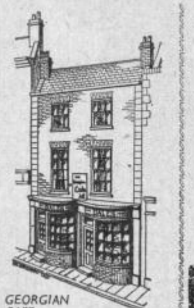

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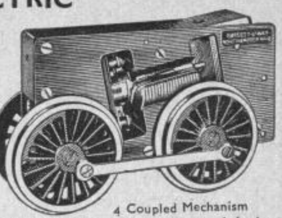

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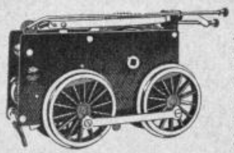

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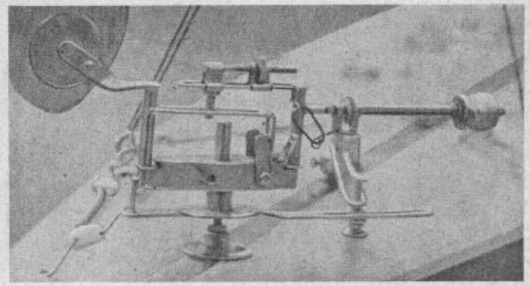

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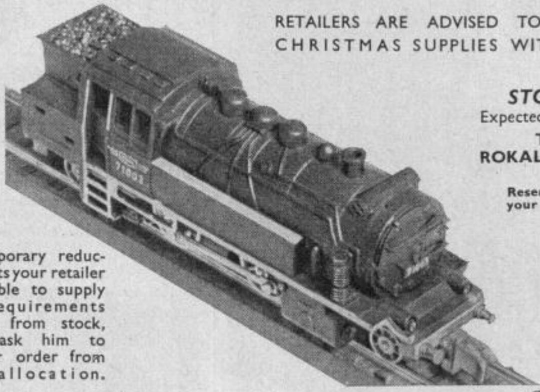

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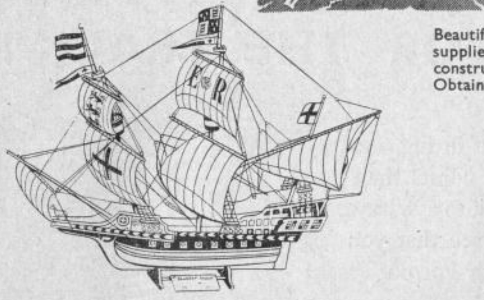

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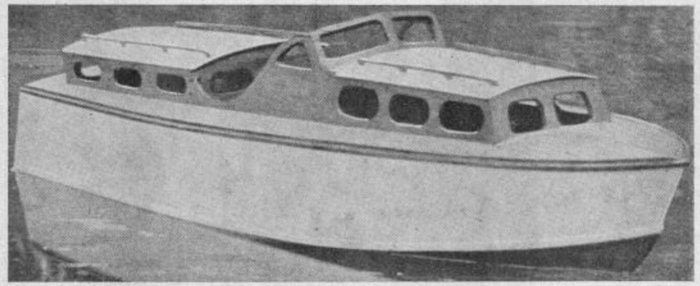

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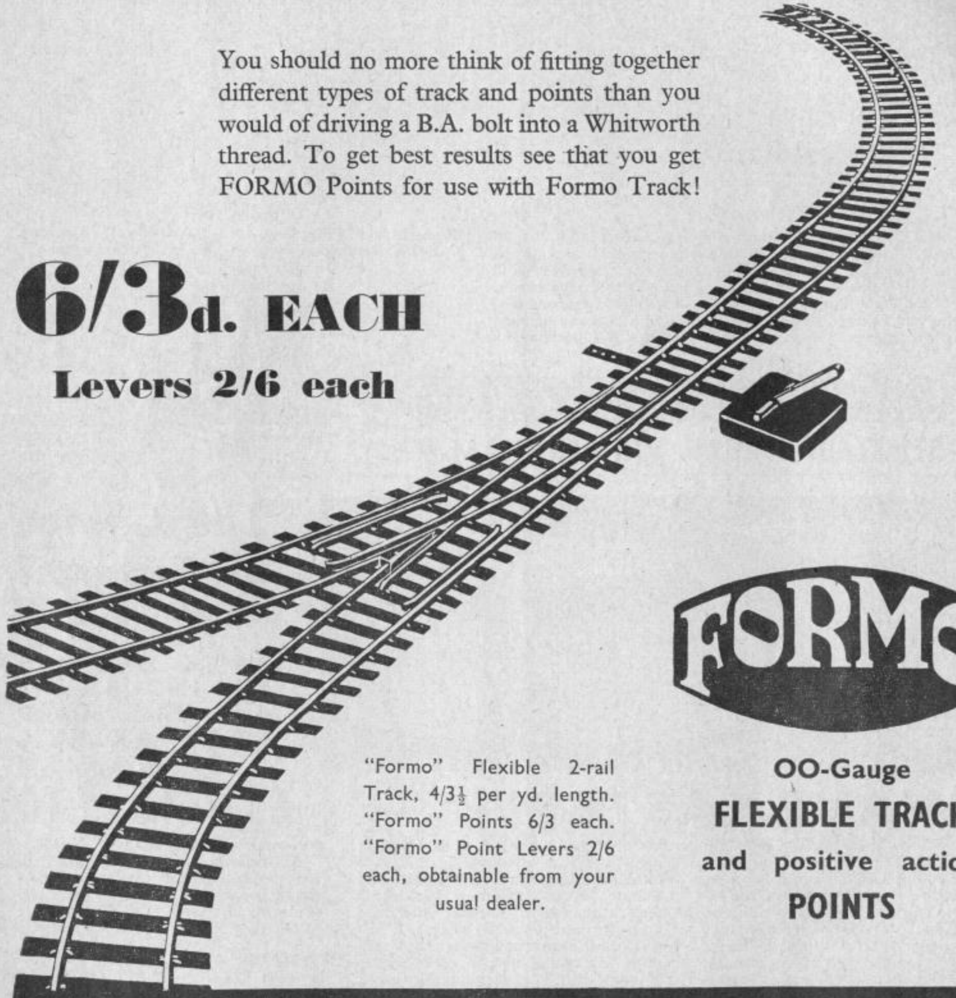

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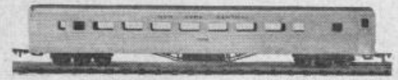

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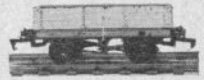

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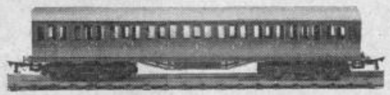

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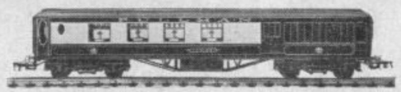

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VOLUME 2 No. 24 NOVEMBER 1952

Trade Winds . . .

WE have recently had an opportunity of studying a fairly voluminous circular distributed to the retail trade by one of the leading manufacturers and wholesalers that approached the usual object of such a circular, that of promoting more business, from a somewhat unusual angle.

Whether model traders will jump at this offer or not we do not know—probably not at once, for our model trade is not one to be easily swayed by circulars, special offers and the like for, in the main, it is made up of many one-man businesses with little time to read long offers, or study market analyses, intent only on getting out the week's vital correspondence during the Sunday lull in welcome postal and shop business.

But it is really such a good scheme so well suited to modern trading conditions that we hope traders will give it another thought, and will gladly pass on any letters we receive from those who would like to hear more of it.

Adam Smith's basic theory in his "Wealth of Nations" published nearly 200 years ago still holds good today in all businesses, that continuing *prosperity is controlled by the size of the market.* If a model trader finds he has not enough buyers to make a livelihood, then somehow he must get more by creating a new demand. He can do this by an attractive window display if he has a good site, by starting a model club, by circularising local people, by advertising and so on. All of which requires that he has a good range of stock when he has attracted the custom—and it is here that our manufacturer-wholesaler friend steps into the picture by extending his credit.

We know from experience that model makers tend to buy from the shop with the most stock, the most competent staff and a cheerful air of prosperity. If their local shop does not measure up to this standard then more and more they tend to deal with shops farther afield even if it means a bus, train, or bicycle journey, or a wait while goods are despatched. We hope traders will recognise this writing on the wall and rub it out before it can possibly apply to their shop or their customers.

ON THE COVER . . .

Top: Fresh Fish! Four Borden Specials lined up at Edmonton, the property, two and two, of Jim Dean and Joe Shelton. Centre left: Winner, right of 10-rater Championship starting one of the last boards. Centre right: A model of R.M.S. *Caronia*, whose construction is described in this issue. Bottom left: Four-manual concert organ by A. W. Wilson, Bury. Prizewinner at a recent exhibition. Saccharin tablets are used for its 130 stops. Bottom right: Model railway scenery by Boyce Martin, see article.

"CULLAMIX" HALF-INCH SCALE TUG

BY BERNARD REEVE

PART I DEALS WITH THE HULL OF A NEW TUG EQUALLY SUITABLE FOR STEAM, I.C., OR ELECTRIC PROPULSION AND IDEAL FOR RADIO CONTROL INSTALLATION

THE *Cullamix* is a typical example of a diesel-engined tug operating on the tidal waters of the Thames and other estuaries. Built by Robert Dunston Ltd. this vessel has an overall length of 79 ft. 6 in., a beam of 19 ft. 6 in. with a maximum draft of 9 ft. 9 in. and is powered by an Atlas diesel engine of 750 B.H.P. driving a single screw.

Cullamix is one of a fleet of similar vessels owned by The Associated Portland Cement Manufacturers Ltd. and is engaged in the transportation of Blue Circle cement from the Company's Thames-side works to wharves and depots up river; her name being derived from one of the coloured cements marketed by the Company.

Due to the courtesy of the owners, I was privileged to make two extended trips on this vessel to enable me to make sketches and take photographs for the purpose of these articles.

During these trips I was amazed at the skill of the skipper and his crew in handling the tow. From a tier of some twenty lighters, we had to take out three. Our skipper, once a sailing barge master, nosed his way in, with his original tow of three steel lighters attached, first ahead then astern, no fuss, no shouting, just quiet purposeful efficiency, until we pulled out with our increased tow of six, not pigmies by any means, but great steel fellows each capable of loading 600/700 tons of cement. To me a superlative feat of seamanship, to the tug master just another day's work successfully concluded.

As imagination plays an important part in the make-up of all true craftsmen, may I be allowed to digress for a moment to trace, quite briefly, the history of the tug.

As far as my research goes, the first mention of the word "tug" appears as an entry in the "Annual Shipping Register" under the date, 1817, where a vessel appropriately named *Tug* had been built for the express purpose of towing ships from Leith to Grangemouth. Prior to this date, in 1802 Symmington's *Charlotte Dundass* although not specially built for this work towed two barges along the Firth of Clyde canal, a distance of twenty miles in six hours.

These early vessels were paddle driven and with their tall smoke stacks bore little resemblance to the modern squat-funnelled diesel-engined craft. But some of these earlier ships reached a point of seaworthiness and efficiency not greatly improved upon today, even judged by the standard of the recent epic of the salvage tug *Turmoil.*

To support this statement, let me quote the rescue of the survivors of the Liverpool vessel *Lockwoods.* On the morning of January 8, 1839, a whole gale of unprecedented force was raging; the local lifeboat made several attempts to put to sea but was driven back time and again until she was forced to abandon her humane attempt. Captain Eccles of the paddle tug *Victoria* volunteered to endeavour to reach the *Lockwoods* and he was successful in his herculean task, reaching the wreck and taking off her passengers and crew; a splendid feat of seamanship under almost impossible weather conditions, and a worthy tribute to the sea-keeping qualities of the ubiquitous tug and the tenacity and pluck of the men who man them.

Having, I hope, fired your imagination let us now get down to the practical side.

For the purpose of the model, I have selected a scale of $\frac{1}{2}$ in. to 1 ft. as being most suitable. This gives an overall length of $30\frac{3}{4}$ in. with a beam of 10 in. The depth amidship on the fore and aft centre line is $5\frac{7}{8}$ in. with a maximum draft of $4\frac{7}{8}$ in. It will thus be seen that there is ample machinery space and, provided an internal combustion or electric prime mover is installed, plenty of room for a radio control unit.

The selection of a suitable propulsion unit is a matter of personal choice and there is no reason whatsoever why a steam plant should not be used; an engine $\frac{3}{4}$ in. bore $\times$ $\frac{3}{4}$ in. stroke with a centre flue boiler would steam this model quite well.

If you fit an electric motor, please test for current consumption. Some commercial motors consume anything up to 4 amps. and a motor of this type can be very expensive to run indeed. 1 amp. should be the permitted maximum voltage for battery economy.

Hull Construction

The system I shall describe will be the well-tried "bread and butter" method, but to those who are more familiar with either the all-metal hull or the rib and plank system I would suggest they use their favourite style of construction. I shall not describe either of these systems as their adherents will be already capable of working without further instructions.

Obechi is the wood selected and on Sheet 2 will be found a list of materials from which it will be observed that only three planks need be purchased, the others are the offcuts or centres of the three main planks.

So much has already been written on the actual procedure of building layer hulls that I do not think it necessary to repeat such instructions in detail. I would, however, stress the point that care be observed in setting out the cutting lines so as to confine the purchase of wood to planks numbered 3, 4 and 5.

There is one precaution to be observed when working obechi. This wood has a definite "run" of grain, i.e. when sanded one way it will finish dead smooth, in the other direction the grain will rough up; it is, therefore, important to arrange your planks before any marking out is done with the grain running in the same direction, a pencilled arrow on the end of each plank will fix this point.

Marking Out

The first procedure is to draw fore and aft centre lines on both top and bottom faces of the main planks carrying the marks over the ends of each plank. Then with a try square, draw the cross section lines 0-10 to the exact spacing as shown on the lines plan; continue these down the sides of the planks also, these being the guide lines which must register when gluing up.

The next step is the marking out of the curved cutting lines which are plotted from the body plan. When planks 3, 4 and 5 are cut to their outer profiles, re-pencil the vertical station lines which have now been cut away. On the resultant off-cuts you plot the outer cutting lines of planks 6, 7 and 8 respectively and cut them out. This gives you three new planks upon which you mark your vertical station lines as before and upon which you mark inner cutting lines except No. 8, which being the bottom plank must obviously be left solid. This plank is also only $\frac{3}{4}$ in. thick, but it is easier to plane off this excess when the pack has been glued up.

Finally, the two planks Nos. 1 and 2, which go to make up the sheer are obtained from the off-cuts of 6 and 7.

Glueing Clamps

It is not necessary to purchase special clamps for this part of the work—home-made ones are quite as good. Fig. 1 shows a type which I made many years ago and which is still giving efficient service. You will require six for a 40 in. model, but make sure you use hard wood for the cross-pieces and when in use, see that the tension bolts are close to the hull sides, otherwise you get bowed cross-arms with consequent distorted pressure.

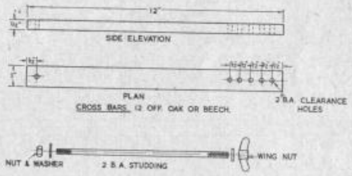


FIG. 1 GLUEING CLAMP 6 OFF.

Glues

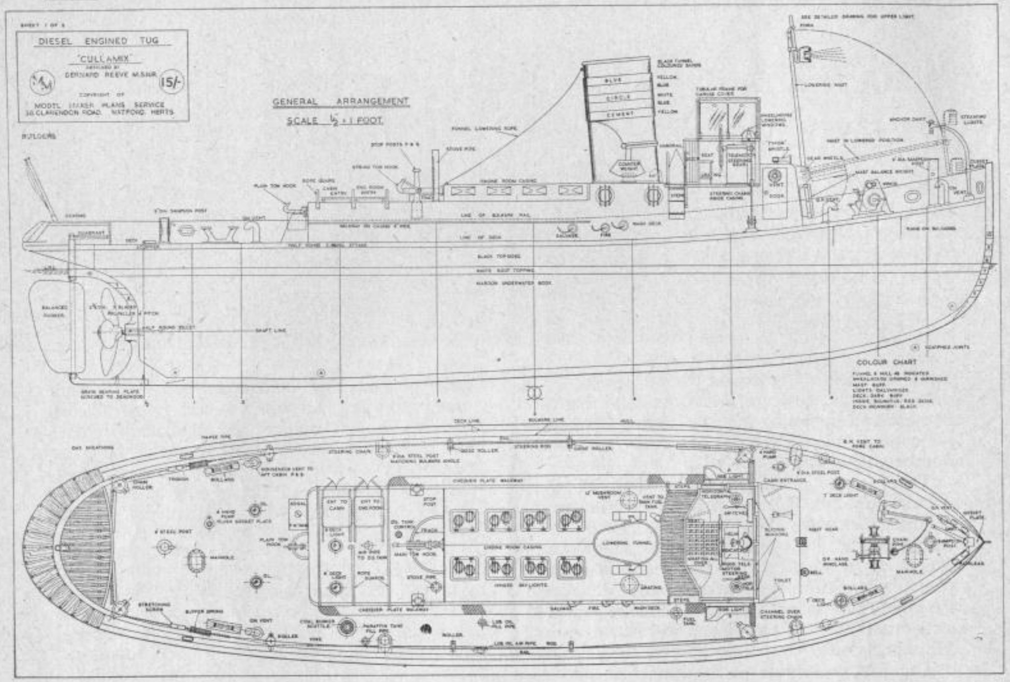
As this is a working model, the use of a waterproof glue is imperative, on no account use the old fashioned Scotch glue. A casein product, such as Casco, Jefferies' spar glue or Laitzo XXX are good, or you may prefer one of the two solution adhesives which are completely waterproof.

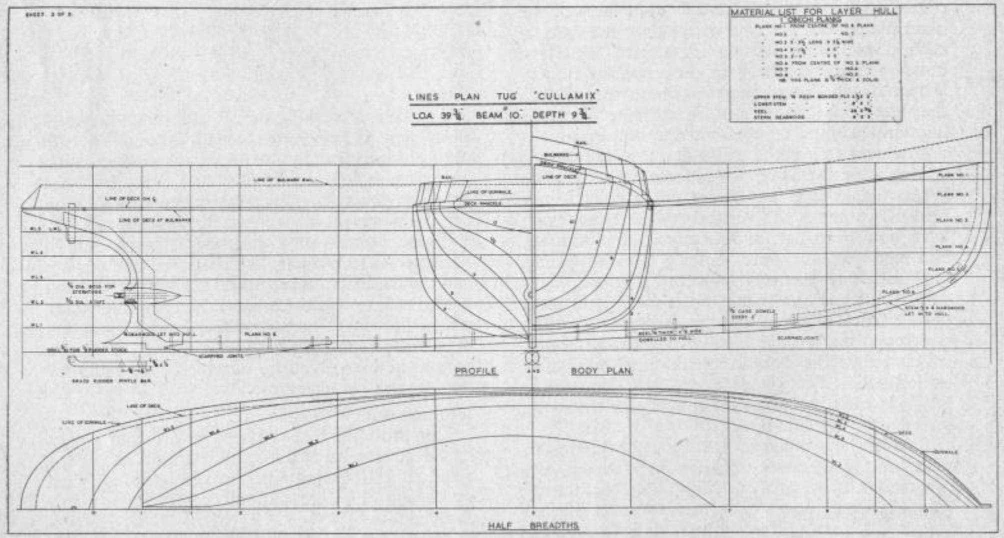
These consist of a primary adhesive and a hardener. The primary is spread on one surface and the hardener on the other; upon the two being brought into close contact the bonding takes place. For small constructional work, I pin my faith to Le Pages glue in tubes, you may, of course, have your own favourite in which case continue with its use by all means.

Glueing-up

I am assuming that you have sanded your planks to a dead smooth surface and that you have pencilled in the section lines on the sides of each plank and the fore and aft centre lines down each end.

The planks are glued up in the following order, clamping each pack together for 24 hours :—





FULL-SIZE WORKING DRAWINGS ON THREE SHEETS COMPRISING THE TWO ABOVE AND A THIRD SHEET OF DECK FITTINGS ARE AVAILABLE FROM "MODEL MAKER PLANS SERVICE" PRICE 15s. POST FREE

No. 3 to No. 4. No. 5 to No. 6 Nos. 3 and 4 to Nos. 5 and 6. No. 7 to No. 8. Then Nos. 3, 4, 5, 6 to Nos. 7 and 8.

The planks Nos. 1 and 2 which to make up the sheer can be glued together and added to the pack. Make sure that the vertical section lines and the fore and aft centre lines are in register when clamping down. Finally plane down the top layers Nos. 1 and 2 to the sheer line.

I find it a good plan to cut the slot for the $\frac{1}{4}$ in. keel and dead-wood before the layers are assembled and for this purpose I cut the bow with a square end thus giving a wider margin for the saw cut than provided by a pointed stem.

The Keel and Dead-wood

If you can get some good $\frac{1}{4}$ in. resin bonded ply, it is permissible to use this, otherwise use $\frac{1}{4}$ in. hardwood, but make sure it is seasoned otherwise it will warp badly. Reference to the sheer plan will show that the keel and dead-wood comprise four separate pieces, each scarped to the other and dowelled together by means of $\frac{3}{32}$ in. cane dowels. These are easily made by splitting a garden cane, planing the sections between the knots down to nearly $\frac{3}{32}$ in. diameter then tapping the pieces through a $\frac{3}{32}$ in. hole drilled in a piece of $\frac{1}{8}$ in. mild steel sheet.

As you will have planed down the bottom plank to $\frac{3}{4}$ in. thick, clean out the $\frac{1}{4}$ in. keel slot, which should be approximately $\frac{1}{2}$ in. deep. The dead-wood can be made in two pieces leaving a $\frac{1}{4}$ in. gap for the stern tube. This gap acts as a drilling guide for the hole into the hull and will be covered by a pair of half-round obechi palm pieces, which are faired off in the final shaping of the hull. At this stage, make up a set of stout card templates from the body plan which you will offer to the hull as shaping proceeds.

It is a matter of choice whether you fit the keel and dead-wood before or after carving the hull. I always fit it later, but I do fit temporary stem and stern pieces to protect the slots.

Carving the Hull

Obechi does not take kindly to blunt tools, so keep the oilstone busy. My tools for this work consist of a 1 in. paring chisel, a 1 in. fairly flat gouge, 4 in. block plane, small spokeshave, a 10 in. half-round rough file, plus my faithful friend the Wolf Cub drill with its sanding attachment. This latter tool saves an enormous amount of work in the finishing stages, but don't use it in the kitchen or dining room, or you will become very unpopular indeed.

As I have already said, obechi has a definite grain and is rather prone to splitting, so keep your cutting edges keen and work with a sweeping diagonal cut.

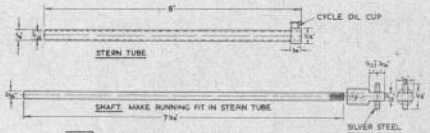


FIG. 2 STERN TUBE & PROPELLOR SHAFT

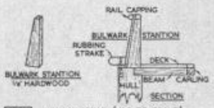


FIG. 4 BULWARK DETAIL (NOT TO SCALE)

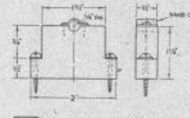


FIG. 3 BLOCK SUPPORT FOR STERN TUBE

In the absence of the Wolf sanding outfit, use the file when getting down to the finished contours, then coarse open coat garnet paper—this does not clog with wood dust like ordinary sand paper—and finish off with finer grades, making continual use of the hull templates as the work progresses. Do not give a final sanding until the interior has been carved as obechi bruises easily and the hull must be protected with plenty of padding when working on the inside.

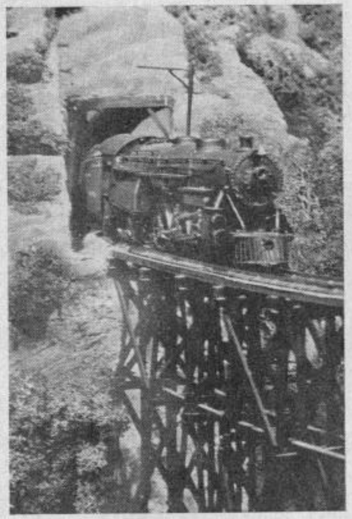
The shaping of the interior is carried out by means of sharp outside ground gouges, taking shallow short sweeping cuts. A back bent gouge is a great help when working on the turn of the bilge and great care must be exercised not to cut too far. You cannot judge progress by holding the model up to a strong light as you could with yellow pine, as obechi is far more opaque. Here again, the Wolf outfit is a tremendous help in getting the interior nice and smooth. In its absence, I can only offer sweat and hard work, but not, I hope, blood and tears.

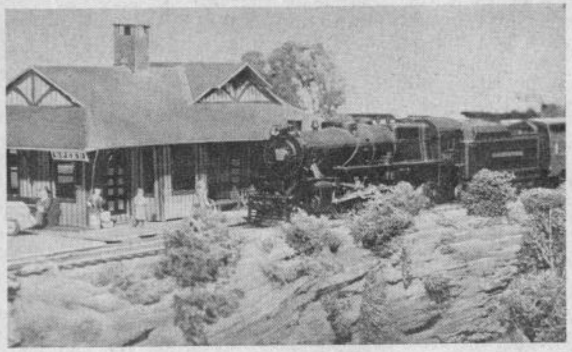
Having shaped the interior to your satisfaction you can now glue and dowel the dead-wood and keel into place. You have already made the half-round pieces to cover the stern tube slot, so make up the stern tube as shown in Fig. 2. This tube is 6 in. long with an internal diameter to give a running fit for $\frac{3}{16}$ in. stainless steel shaft. This tube should have an external diameter of $\frac{1}{4}$ in. or very close to it, so drill a $\frac{1}{4}$ in. hole in the stern, insert the tube and make up the clearance with plastic wood. Glue on the half-round palm pieces and fair off. Before doing so, plug both ends of the stern tube to keep out wood dust, paint, etc. If you have carved your hull interior to its maximum, which leaves the stern tube with an overhang, it will be essential to provide a support for the inboard end of the tube to prevent any whip at this point. Such as support is shown in Fig. 4.

(*Continued on page* 742)

Model Railroad Scenery

BY LEADING AMERICAN CONTRIBUTOR BOYCE MARTIN





The necessary tunnel must look natural; this curved trestle was modelled after a prototype. Pennsylvania K-4 Pacific in a natural setting of rock outcroppings through the vegetation

MODEL railroad scenery is the backdrop and the stage setting for our star performers, the scale models of railroad equipment and rolling stock. The scenery is not as important as the models and their operations, but scenery does contribute in important measure to the overall picture of scale model railroading. A diamond may be brilliant against a bare, stark back drop of black velvet, but a carefully detailed scale model needs the background of scenic detail to enhance its beauty. Railroad operations can be conducted on the bare boards of table supports, but only a portion of the real railroad spirit can be achieved in this manner.

Scenery is the most individualistic part of railroading for hills and valleys, trees and shrubs, can be arranged to specific tastes and preferences. In addition, the methods of construction are almost as varied as the scenery modelled. But the basic concepts are the same and the construction of scenery is fundamentally a simple matter. Consequently, it is surprising that so many model railroaders leave this aspect of construction to the last. If scenery construction is accomplished along with track construction and signal and electrical installation, the complete railroad (though not completed) can be operated, improved and expanded as an overall unit, rather than a bare skeleton of track, board and wires.

Some scenery can be constructed so that it actually contributes to the physical support of the railroad bed, or it can be constructed as a type of shell or superstructure surrounding the railroad. In all cases, it reduces the noise and roar of operations by providing boffle-type resistance to the reverberations of the model equipment. My personal preference for scenery is a type of miniature reinforced concrete, for such scenery contributes to the support of the railroad structure itself, does not crack, and provides a base for the addition or formation of rock ledges and outcroppings.

On my Osage Railroad, the scenery is constructed on a base of house screen supported by a framing made from wood scraps. Some of the framing is a temporary support used until the final scenery has gained strength itself. This strength is secured through the use of hydraulic cement mixed with short asbestos fibres. The cement can be Portland cement (which gained its name from its similarity in colour to Portland stone), natural cement, or in some countries, from hydraulic lime having cementitious qualities. The cement not only has strength, which ordinary plaster does not, and resists cracking, but its texture is fine enough to resemble earth in any gauge. After the cement begins to harden, it can be shaped into ledges and crevasses. Where the original coat is not thick enough for this shaping, additional blobs can be placed to provide a workable thickness.

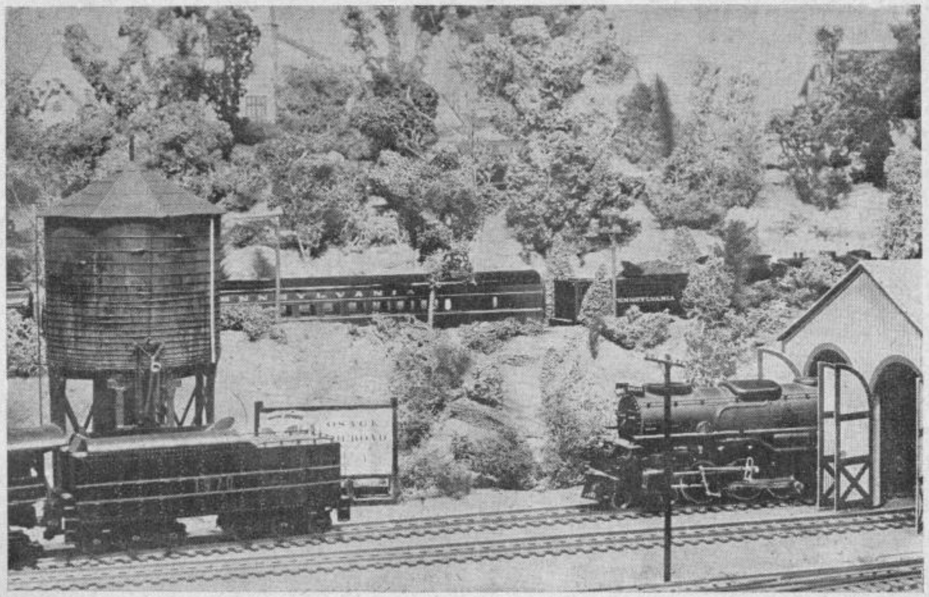
The use of asbestos fibres mixed with the cement has proven satisfactory in my experience. Others of my acquaintance have used wood-fibre plaster or fine beach sand and secured very satisfactory results. Coarse sand is not desirable for the texture is not realistic looking. Here again, however, personal preference coupled with experimentation in small quantities will provide the answer for the individual.

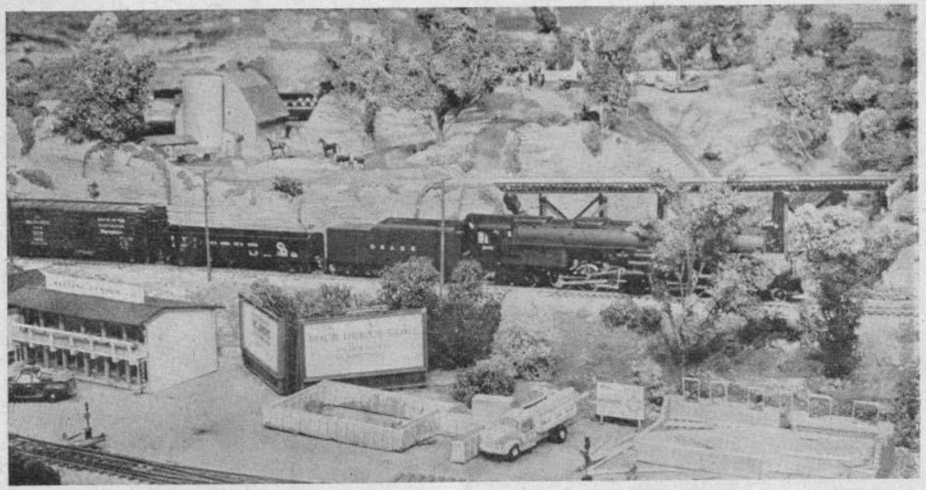
The mixture of cement and asbestos or cement and fine sand can be coloured before spreading on the screen, or it can be painted after it has hardened and set. Mortar colours, usually black and red, can be secured in many countries. These two colours will give the grey stone colour and the buff or terra cotta earth colour, but again experimentation is necessary. Variation in colour is desirable, of course, since it occurs in nature. When the material is coloured before placement, it is easier to mould ledges and rock outcroppings that appear natural, for realistic painting of these protuberances is difficult to achieve.

The wet material can be spread on the screen with a trowel, putty knife, or spatula. A thickness of one-eighth to one-quarter of an inch is usually adequate except where rock ledges are to be moulded. These ledges can be achieved by pressing in the edge of the trowel or spatula at parallel points and then brushing over these rough places with a brush dipped in water. In fact it is a good idea to work over the entire area with a lightly moistened brush to remove finger or trowel marks.

The general contours of scenery should be modelled with some specific prototype in mind, for the best effects are usually achieved after close observation of natural scenery. Of course, the requirements of the model railroad, the loops and curves, the overpasses and tunnels, will determine some of the shapes and contours. Here again, however, we should remember that the prototype railroad was built after the hills and valleys were formed, even though we are reversing this process in our construction. If the scenery appears artificial we have wasted our time, so we should observe the real thing and copy it as faithfully as

Two-level operation requires scenery to appear realistic. Here a Pennsylvania Pacific climbs a grade while other locomotives are serviced on a lower level





A 4-6-6-4 pulls a load of freight up grade through rolling countryside covered with vegetation of various types. If the scenery is blended into a painted backdrop, there is the added reality of distance

we scale down prototype motive power and rolling stock to our own models.

The prototype setting will also determine the general type of vegetation to be placed on the earth and rock base we have constructed. To model deciduous trees, I have found nothing better than tinted Norwegian lichen glued to actual twigs and small branches, preferably of boxwood. The boxwood is fine grained and strong so that even the tiniest twigs are useful and not oversize even in the smallest scales. Some of the twigs can be left bare to simulate dead branches. Small scraps of the lichen can be used for shrubs and bushes.

Some evergreens can be modelled from green sponge rubber. Others can be made from weeds of the proper conformation, which can be dyed and sprayed with lacquer to prevent shedding. Tiny bits of green sponge rubber can be glued to the sides of brick walls to simulate ivy and other vines. Other bits can be glued to rock ledges and trimmed so that some of the growth droops over the edge of the rock as it does in nature.

The model railroader should check the fields or yards around him to see if there are any weeds or growths which will serve as full-size trees or shrubs on the model railroad. Imagination is necessary here, for the weeds never have the right combination of colour and shape. With ingenuity, however, some remarkable effects are possible. It is also possible to pick the wrong one and have it disintegrate on the layout and leave only a mess to be cleaned up. That has happened to me, but we learn through experience. In scenery we have an opportunity for real individualistic treatment, but we must experiment and explore to achieve above average results.

FULL STEAM AHEAD!

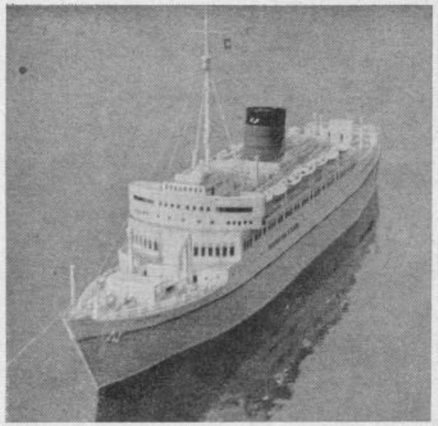
We are happy to announce that we are at last able to re-introduce a regular monthly feature on model steam locomotives. Mr. William Hart, better known perhaps as "1121," will be starting a six-part description of the construction of an O Gauge Great Eastern 0-6-0 tanker J.69 under the pleasing name of "Jerry." This will be within the skill of any lathe operating reader. Full-size working drawings will be available and, by courtesy of the author, it will also be possible to obtain commercially materials, parts and castings for the locomotive's construction.

Naturally, we cannot please everybody all the time, and hope that those who have decided views on what should follow next will write to us in good time for their suggestions to be considered.

"Jerry" starts in the Christmas-December number of MODEL MAKER.

BUILDING A MODEL LINER

PART I. W. E. BARNES DESCRIBES SOME OF THE PARTS & PROBLEMS OF HIS $6\frac{1}{2}$ FT "RMS CARONIA"



The model "RMS Caronia" at anchor after successful sailing trials. She was built as a joint venture in W. E. Barnes' Model Dockyard

DURING recent trials on the local lake of my 6 ft. 6 in. model liner, *RMS Caronia*, I often heard from interested spectators remarks such as: "You must be gifted to be able to build a model like that!" Now I would like to point out that this is definitely not true and that it is well within the compass of any one to build a model like this. Most seemingly difficult jobs require only concentration and patience, combined with a knowledge of hand tools.

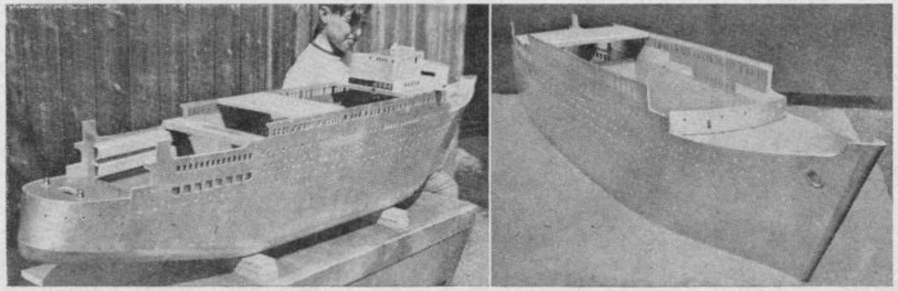
I intend with drawings and photographs of my model *Caronia* to give readers some idea how simply she was built. These drawings will help the enthusiast with any type of ship model as they are based on the more usual ship's fittings, particularly as fitted to many of our modern ships. Scrutiny of the sketches will serve to show how all these fittings and parts go together.

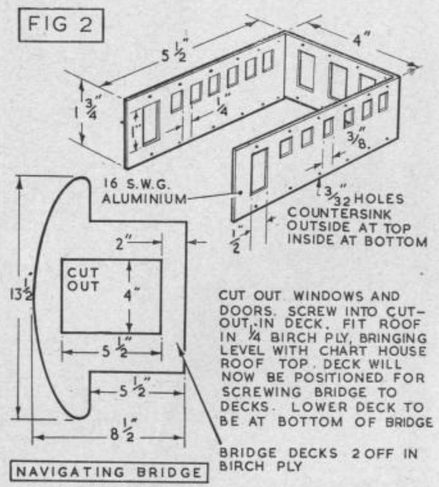
We all know that there are various methods of building hulls. A block of wood shaped and hollowed out or the bread and butter system; those two are the more usual amateur methods. After trying all the better known ways in my past models, I found a simple method, especially for large hulls. I modelled in wood up to the waterline either bread and butter or from the solid, rebating the hull along the top level and completed the hull sides by the addition of ply or metal "walls."

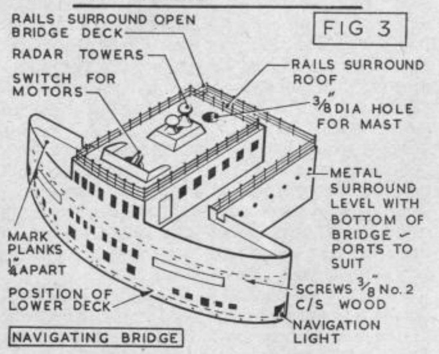
Many would like to model a true-to-scale boat, and so far as the hull goes this is fairly easy and only a matter of scaling down quite large dimensions. It is in the small detail fittings that errors creep in—all the host of little things that go to make up the ship, such as winches, bollards, capstans, fairleads, davits, boats.

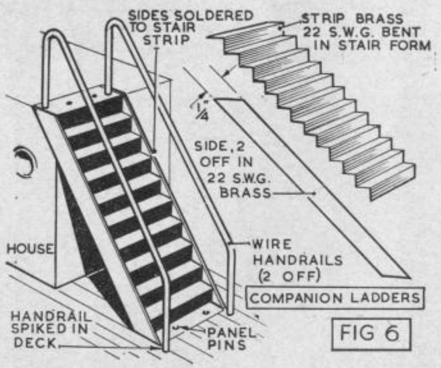
I find a good method to obtain near scale with details is to cut a piece of wood in the same scale as the hull to represent a 6 ft. "man." Then our 6 ft. "man" is placed alongside a rough drawing

One of the young helpers in Mr. Barnes' model dockyard is seen admiring progress to date on RMS *Caronia*. Solid bottom and built up sides of sheet material are well exemplified in these two shots









of objects required which soon shows us if he would go through a door or if the capstan touched his hatbrim. After the ship is finished a final check-up can be made by "walking" the "man" around the decks, standing him by all fittings and seeing that he can lean over the ship's rails without falling overboard!

It is sound policy when building a ship model to make it last "like eating a choice morsel" and not to rush along just to see it sailing on the lake long before its time. Some will join with me in thinking the "game" is more interesting in the building than in the sailing.

Items will crop up during construction which will demand great patience from the builder; the foremost of these being the finish. A really good model can be spoilt beyond repair by a bad finish. Parts ready for final painting should have the surfaces well prepared and time allowed for drying between each coat of paint. Once finished avoid handling as much as possible.

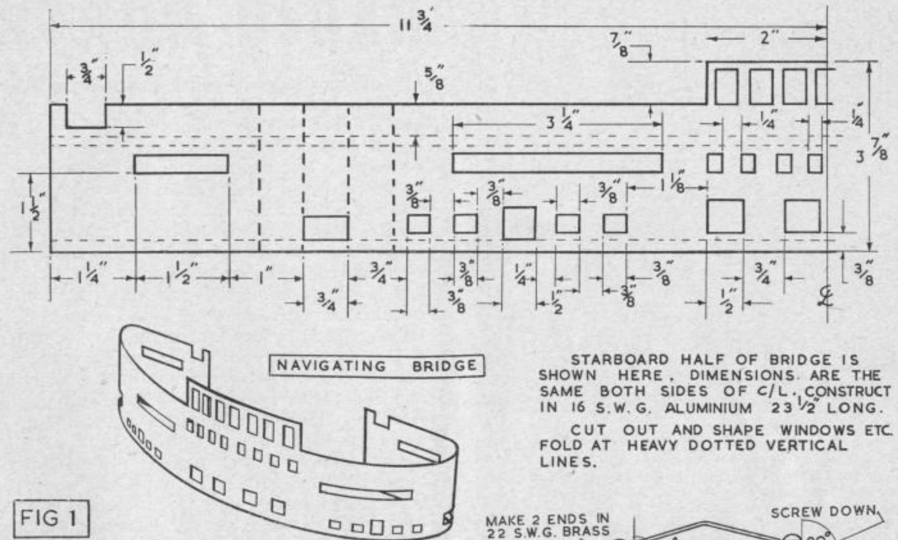
I would add a few notes on the construction of the model line *Caronia* which can be applied in the building of any model ship.

The dimensions of the model are as follow: length 6 ft. 6 in., beam 11 in., boat deck to keel 14 in. She is built of 16 s.w.g. aluminium with a wood bottom in obechi, an easy wood to work. All decks are in $\frac{1}{8}$ in. beech-faced ply; deck planks are lined in and then two coats of good quality copal varnish are brushed on.

The model's power unit comprises two 8-volt permag electric motors, complete with reduction gears of 3 to 1 ratio. The twin propellers are $2\frac{1}{4}$ in. diameter three-bladers, set on 5/32 in. stainless steel shafts. The stern tubes are of brass complete with oiling cups. The couplings from shafts to motor spindle are of the flexible spring type. The complete power unit is controlled by a small switch concealed in the liner's bridge. I recommend electric drive for this sort of model as it assists the maintenance of that smart appearance typical of the modern liner.

A word may be of interest on the need for reduction gears between the motors and the propellers. Small electric motors run at a high speed and develop a relatively small torque. If we couple the motor direct to the propeller shaft it will not be able to drive the propeller at anything like the speed it would do unloaded, so we shall have the motor labouring round at a low speed, developing little power and using too

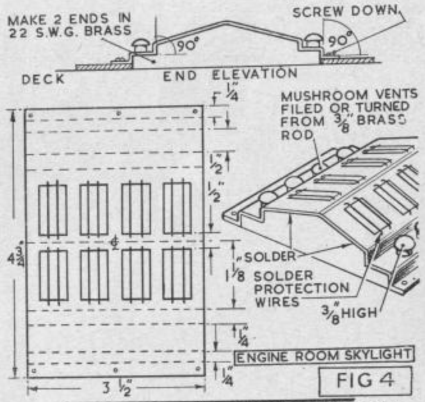
Fig. 1, *on opposite page,* **and Figs. 2 and 3,** *above,* **show step by step construction of a liner's navigating bridge in aluminium sheet and plywood. Sizes can be adapted to suit any other prototype**

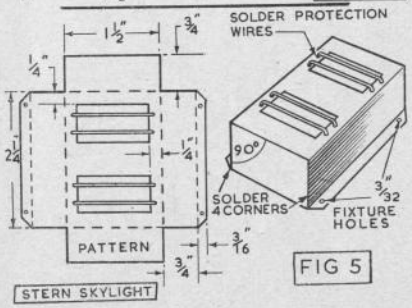


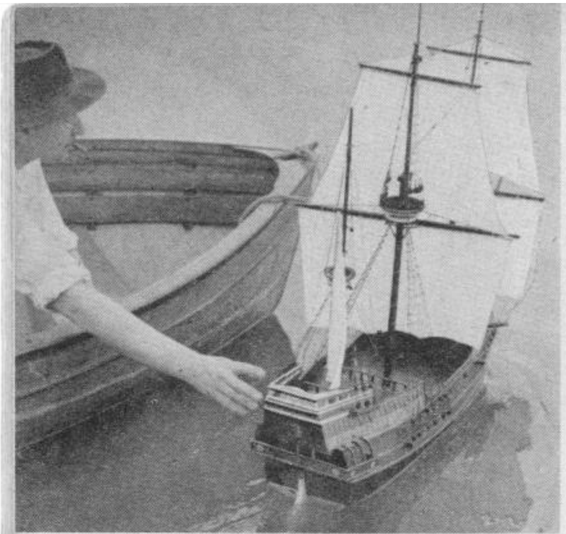
much current. To overcome this disadvantage it is almost essential to employ gears between motor and propeller, thus allowing the motor to run at high speed while the propeller rotates at a lower one, with a higher torque. The ratio of the gears should be two, three, or four to one, the smaller gear wheel is always fitted to the motor shaft. Care must be taken to align them correctly and when running they must be frequently oiled.

Most readers will be aware that the liner *Caronia* is a turbine-driven liner and so her large single funnel emits smoke. To enable the model to do the same, although electrically propelled, I have devised a method by using chemicals. A 2 in. diameter tube runs through the centre of the funnel, bottom end of which is sealed. Smoke is produced by bringing together hydrochloric acid and ammonia. Wires with small pieces of rag secured on the ends are dipped into the chemicals and then pushed down the centre tube. This operation must be done just before launching. If the tube is well enamelled on the inside that will be sufficient protection against these chemicals. The results are very satisfying to owner and spectators alike when the model is "steaming."

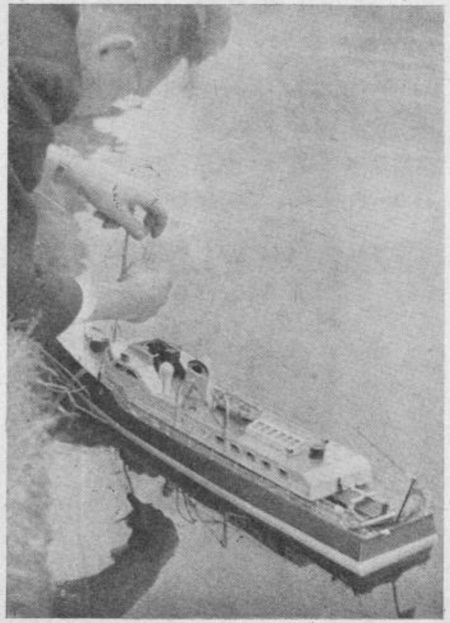
The other detail sketches in Figs. 4 to 6, while based on R.M.S. *Caronia,* **are typical of fittings that will be found on nearly all ships of this kind—companion ladders being particularly useful fittings**







(Above) A. R. Greenfield with his finely detailed model "Golden Hind" which has r/c yards and rudder. (Below) T. G. Carrington-Wood puts finishing touches to the flag-hoist on his winning boat, "Corlicker." (Top right) A handsome steam yacht entered by A. T. Trotter. (Centre) D. W. Rowe, winner of the escapement control section, with his "Wavemaster" cruiser. (Bottom right) Neat motor-driven trimming and steering gear on W. F. Armstrong's Bermudan rigged yacht



RADIO CONTROL REGATTA AT BLACKPOOL

REPORTED BY G. H. DEASON

THE International Radio Controlled Models Society held another of their R/C boat contests at Blackpool in August, using the boating lake in Stanley Park. If the entry itself could not be termed International (unless one happened to be a Scottish Nationalist!), both the quantity and the quality of the competing boats was highly satisfactory and a large audience was shown the wide and fascinating fields which this phase of model-making opens up.

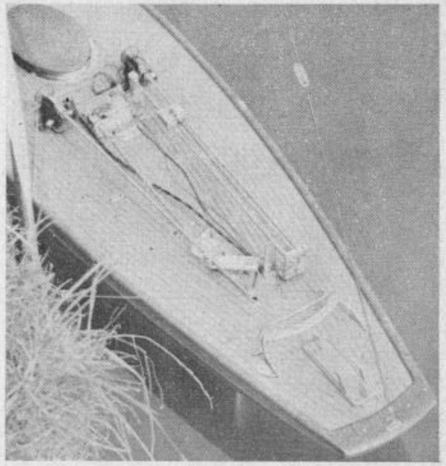
The competition was divided into three sections, for boats equipped with rudder control only, operated by escapement, the more advanced R/C power boats, and R/C yachts. Of these, the "escapement" boats performed in the morning and had the best of the day's somewhat patchy weather conditions, which later in the afternoon broke down in a thunderstorm. This class contained several of the popular "Wavemaster" launches, which were very impressive and provided the ultimate winner of this section, entered by D. W. Rowe. A. T. G. Fairbrass, running another and very rapid "Wavemaster," was somewhat misled by speed and distance and his boat rammed the opposite shore during a moment of inattention and disappeared into the vegetation. An old friend in the shape of F. G. Buck had two diesel-powered launches in this class, and placed second with his larger boat in the final results. R.J.Rowntree,Newcastle-on-Tyne,tookthirdplace.

The course, marked by buoys and flags, was in the shape of a large figure eight and each competitor, after a set time in which to commence his run, was required to steer round this course at a speed not in excess of 15 m.p.h. and to continue under control for a total of ten minutes, carrying out such evolutions as he chose which had to be nominated to the judges beforehand. These included stopping, reversing, balloon-bursting and dropping the anchor. Points were awarded on a basis of one for each minute up to ten during which the model remained under control, plus points for workmanship, design, originality, realism and accuracy of control.

In the more advanced power-boat class there were some finely constructed models, probably the most spectacular of which was I. P. Millar's large steam-driven cargo ship, *S.S. Robert Allen*, which had its radio equipment and control gear neatly concealed beneath its variety of hatches and was controlled by a miniature ship's wheel mounted on the transmitter top. A. T. Trotter's handsome steam yacht was another fine model which attracted much admiration, but it was unfortunately retired with mechanical trouble early in the proceedings. Competitors appeared to divide their choice of motive-power fairly equally between diesel and electric plants, the former being the more spectacular performers, whilst the latter had the advantage of a greater degree of control, with the ability to go ahead or astern or to manoeuvre in confined spaces at reduced speed with outstanding realism. Most boats competing were equipped with sequence or mark-space control, the only tuned reed system we found being in one of the sailing craft.

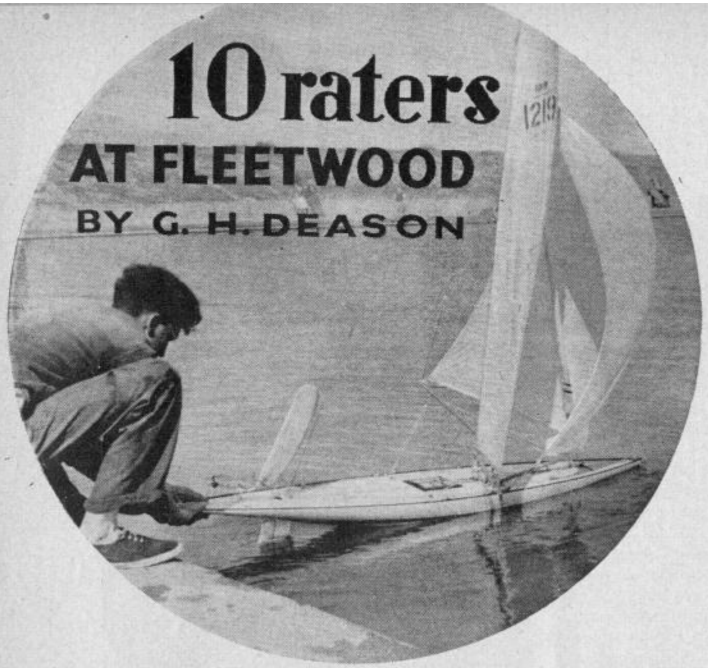
Among the electric-powered craft the most outstanding performer and ultimate winner of the *Daily Dispatch* Trophy, open to all power-boats, was T. G. Carrington-Wood's beautiful converted "Fairmile" *Corlicker*. The precision with which the owner (last year's winner, incidentally) manoeuvred his craft was most impressive and in this he was greatly aided by his expert mate who, armed with binoculars, issued accurate orders to his helmsman when the boat was in "distant waters." Another pretty electric-powered boat was P. T. Such's Delco-motored *Vipec III*, whilst among the diesel-driven contingent, A. P. Dowsey's clean-looking white launch gave a clever display of balloon-bursting at high speed, following its figure eight course, amassing sufficient points to take second place; even faster on its run was another launch of high-speed type skippered by 13-year-old G. McIntosh of Edinburgh which took third place, this crew impressing everyone with the workmanlike manner in which they handled craft and gear both on the pond-side and afloat.

The yacht section attracted only four entries, of which three actually competed. Last year's winner, a pretty cutter sailed by J. C. Hogg of Bournemouth, again took first place and the E.D. Trophy. This boat has fully proportional steering, working on a variable mark/space ratio, full control of sails and towed and cast off its dinghy as an additional attraction. W. F. Armstrong's Bermudan-rigged yacht, with neat motor-driven "traveller" gear on deck for rudder and trim, unfortunately shipped some water in the receiver during the rainstorm and retired, and third place went to A. R. Greenfield with his fascinating *Golden Hind*, a finely detailed model operated on the tuned reed principle and having two-diameter winches, to trim its yards in addition to a sequence rudder control.



10 raters AT FLEETWOOD

BY G. H. DEASON



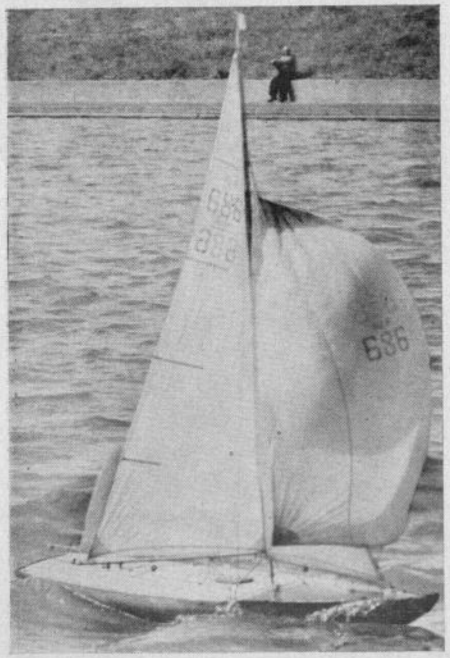
AS a sailing water for the larger class boats it would be difficult to find Fleetwood's superior. The lake is rectangular measuring 820 ft. × 210 ft., and is situated on the foreshore with the promenade bounding it on the inland side and having an open aspect. The prevailing wind is westerly and this gives a run and beat lengthwise up and down the lake which make for admirable conditions in which to sail an event such as the British "Open" Ten Rater Championship which was staged there from August 25 to 29.

The event attracted a total entry of twenty-three yachts from all parts of the country, and was sailed as a full round of twenty-two heats followed by an eight-heat final with scores carried forward. The final result, after five days of close and interesting heats, was a win for *Water Witch*, a beautiful yacht of Littlejohn design, a development of *Ger Falcon*. *Water Witch* was skippered by her owner, E. Porter of Hendon, a member of the Model Yacht Sailing Association, with L. Wareham as mate, and his victory was well deserved, being the outcome of a remarkably consistent performance throughout a week of variable weather. Second place was taken by G. Richmond's *Restive* from the Harwich, Dovercourt and District Club, a boat of totally different characteristics from *Water Witch*, whilst third place went to the Sheffield boat, *Triplane*, skippered by W. D. Waddington, another interesting design which is in fact a scaled-down version of Uffa Fox's celebrated "Flying Fifteen."

On the Monday and Tuesday moderate breezes veering from south-west to north-west allowed the fleet to carry their top suits, and at this early stage *Water Witch* was giving ample evidence of her superiority under these conditions and the other finalists were engaged in laying the foundations of their later successes. By Monday evening *Water Witch* and J. M. Fitzgerald's *Alma III* were tieing with 24 poin's apiece, second spot being shared by E. J. Blackshaw's *Flora* and G. Hardy's *Fluzi*. *Triplane* lay third with 20 points, with T. B. Eale's *Suzette* half a point ahead of *Restive*. Tuesday saw *Water Witch* sailing into a clear lead, having amassed 49 points against the 43½ of *Suzette*, whilst *Flora*, J. Anderton's *Miss Emme* and *Restive* were all within striking distance of the leader.

With Wednesday came different weather conditions and a marked change in fortunes. A strong westerly wind brought the yachts down to fourth suits, and *Restive*, a drawn-out Marblehead design with no overhang and an astonishing ability to carry canvas in a blow, really came into her own in a remarkable day's sailing, in which she scored 28 out of a possible 30 points, a state of affairs which put her seven notches ahead of *Water Witch*. The erstwhile leader, a typical Southern Ten Rater with graceful tapering lines and long overhangs which clearly bear the stamp of a Littlejohn masterpiece, was less happy under the choppy conditions of Fleetwood's comparatively open water in a blow, and her score of 14 points out of 30 was her lowest of the week. *Miss Emme*, another boat designed for "Inland" waters, managed 22 points, and *Alma III* and *Mermaid*, bluff yachts of typical northern character, scored well in these conditions, the latter, a Fleetwood boat, netting 25 points. The 1950 winner *Triplane* although being similar to *Restive* in having no overhang, has a vast beam in relation to length and is full of interest technically, being the subject of much experimental work on the part of her owner. Her only departure from the full-sized 'Flying Fifteen' is the addition of a modified flipper fin keel to compensate for the absence of a movable crew weight. She is reported to be something of a handful and decidedly sensitive to trim, but is extremely fast before the wind and under Wednesday's conditions she was timed unofficially on a downwind run of the lake in 95 seconds, the fastest run ever recorded by any class of model at Fleetwood.

This reshuffle naturally added considerably to the interest and uncertainty of the contest and the remaining two days were somewhat nerve-racking for the leading crews.



Heading picture shows Championship-winner E. Porter with his lovely yacht "Water Witch" at the start of a critical board during the final day's sailing. (Left) "Triplane," which finished third, broke the unofficial record for the Fleetwood lake with a south to north run in 95 seconds. She is a scaled-down version of a "Flying Fifteen"

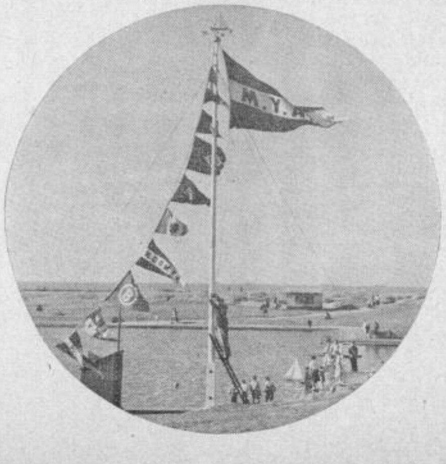
(Above right) Another view of "Water Witch" running with spinnaker, under conditions which were ideally suited to her design. (Right) J. M. Fitzgerald's "Alma III" and J. Anderton's "Miss Emme," close-hauled on the starboard tack. "Alma III" finished fourth after a tie with "Triplane"

G. Richmond's "Restive," a scaled-up Marblehead design which sailed brilliantly in heavy weather and finished second in final placings, being put about by her mate, A. J. Bell

Sailing conditions were ideal on Friday, the final day, a strong westerly breeze giving *Water Witch* a fine opportunity which her skipper grasped with both hands to finish well ahead of the fleet and with a seven-point lead on *Restive*. *Triplane* sailed off a tie against *Alma III* to finish third. The excellent week's sailing was rounded off by a dinner and prize-giving at the North Euston Hotel, presided over by the Mayor of Fleetwood.

Position	Reg. No.	Yacht	Owner	Club	DAILY SCORES Mon. a.m.	Mon. p.m.	Tues. a.m.	Tues. p.m.	Wed. a.m.	Wed. p.m.	Thurs. a.m.	Thurs. p.m.	Fri. a.m.	Fri. p.m.	Total Pts.	Position
1	1219	WATER WITCH	E. Porter	M.Y.S.A.	11	24	34	49	54	63	73	80	93	104	104	1
2	1248	RESTIVE	G. Richmond	Harwich, Dovercourt and District	9	19	27	42	52	70	70	75	88	97	97	2
3	686	TRIPLANE	W. D. Waddington	Sheffield	7	20	28	33	40	55	60	71	83	88	88*	3
4	1288	ALMA III	J. M. Fitzgerald	Bolton	9	24	29	40	45	62	63	68	78	88	88*	4
5	1205	FLORA	E. J. Blackshaw	N. Liverpool	12	21	33	42	50	54	59	64	73	83	83	5
6 }	1221	MISS-EMME	J. Anderton	M.Y.S.A.	8	18	33	41	49	56	58	67	75	78	78 }	6
}	1253	MERMAID	J. Roberts	Fleetwood	10	13	19	24	29	49	50	58	71	78	}	
8	1292	SUZZETTE	T. B. Eales	Barrow	8	19½	28½	43½	43½	54½	56½	63½	65½	70½	70½	8
	1266	LIL II	W. H. Porter	Bradford	5	11	11	26	28	48	53	56				
	967	FRANCIS	H. Atkinson	Bradford	2	9½	21½	29½	34½	50½	54½	55½				
	1107	SCHEHERAZADE	D. Hazlehurst	Bolton	8	13	22	22	32	47	47	53				* After resail to decide tie
	1012	DARIAN	J. W. Greenwood	Bradford	4	11	16	19	29	42	42	47				
	1279	FLUZI	G. Hardy	E. Hull M.Y.C.	12	21	28	32	32	36	36	46				
	1022	PLANE JANE	J. H. Snowden	S. Yorks M.Y.A.	8	16	23	30	35	40	40	44				
	1069	MARAUDER	G. Redfern	Bury	7	12	14	16	21	31	34	44				
	1201	FRISKI	F. C. Dilworth	E. Hull M.Y.C.	3	9	16	21	21	32	35	43				
	1085	VALKYRIAN	F. Dutton	Fleetwood	4	6	15	15	22	31	33	38				
	1222	EDRINA	J. T. Mandley	N. Liverpool	5	7	17	30	30	36	31	38				
	1287	SINE METU	J. Lapsley	Nottingham	10	14	16	18	18	27	29	37				
	1300	LUATH	H. Miller	Saltcoats	12	19	21	26	26	28	31	37				
	1091	CURLEY	H. Hewson	Morecambe	8	16	21	27	29	31	36	36				
	1291	URSULA	G. H. Verity	Barrow	3	6	19	31	31	33	33	34				
	1290	VITESSE	J. R. Scarth	Scarborough	—	3	3	3	3	12	Retired — broken mast					

Thursday provided a much moderated wind blowing across the lake from W.N.W., under which conditions *Water Witch* met *Restive* in the morning heat and re-established her superiority by taking all five points. From then onwards *Water Witch* never looked back and went on to consolidate her lead, whilst fortune turned against *Restive*, her day's total being five, good enough however to establish her in second place.

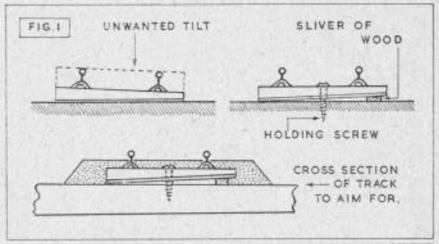


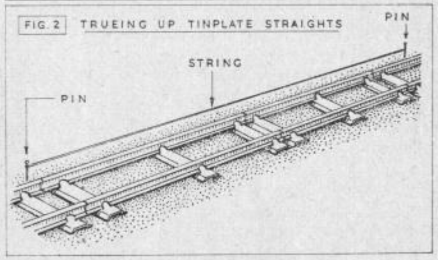
Closing scenes at Fleetwood on the last day of the 10 Rater Championships, as the M.Y.A. flag and burgees of the competing clubs are hauled down at sunset

PHOTOGRAPHS appearing in MODEL MAKER from time to time suggest that a fair amount of use is still made of tinplate track, so some thoughts on this, the oldest of commercial permanent ways, may not come amiss here.

There is a tendency for more advanced workers to look down their noses at this kind of rail, but make no mistake about it tinplate track from a purely engineering point of view is a sound proposition. It is stiff vertically and horizontally, keeps its gauge and alignment well, is excellently jointed, will stand up to any amount of hard use and its running qualities are good. Also compared with scale products it is inexpensive and easy to lay.

The main technical disadvantage is that tinplate is only manufactured in a few set and unalterable curves, which means that the happy flexibility of track-laying with scale strips is entirely lacking. But it is in appearance that untouched tinplate fails most dismally from the modeller's point of view, for with its outscale height and three or four sleepers only per length, it can by no stretch of imagination be said to look like the real thing.





RIGHTS AND WRONGS OF TINPLATE TRACK

USEFUL HINTS AND TIPS FROM H. A. ROBINSON

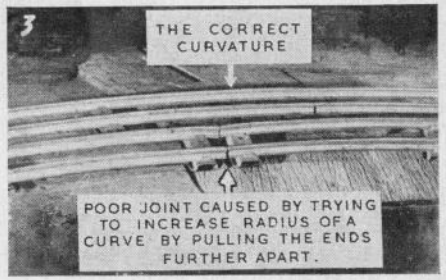
Consequently as the model railroader advances tinplate is slowly scrapped and replaced by some form of track approaching true miniature proportions.

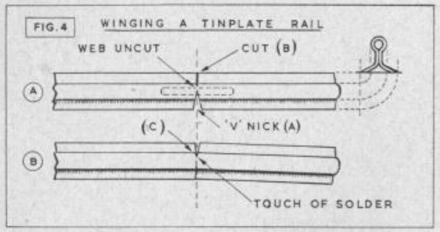
While tinplate is down, however, it is worth trying to get the ultimate out of it both in running properties and looks, and below are outlined some of the ways that it can be improved and points to observe for best results, which can be applied when laying new track or during a tuning-up process on track already in service.

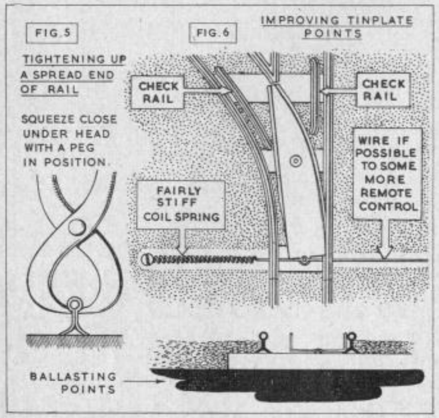
Tinplate switches, of course, leave much to be desired, more than the ordinary sections, as they do not function according to full-sized practice; but here again a little treatment can bring them a trifle nearer the real thing in appearance and action.

But to deal with lengths of track first of all. Tinplate should always be fixed to the base board. This is done by drilling an occasional sleeper and running a fine screw through to the wood below. Quite a light hold satisfies and anything like heavy screwing which can cause distortion must be avoided.

Before finally screwing down, alignment must be checked and also the side-to-side level. It is often overlooked that the sleepers of some tinplate straights are made wedge-shaped, being thinner at one side than the other. This is with an idea of their easy fitting into ovals in which the end curves are already super-elevated. For oval running it was found better to keep a fast train continually on a slight tilt than to make it run from the level to the sudden super-elevation of a bend. With tinplate this would have meant that the train would be well out on a curve before the elevation was







attained and probably by then derailed. Hence the practice of putting apparently unwanted wedge sleepers on straights.

However, on straight stretches of any length this tilt is not required and a sliver of wood should be placed under each sleeper at the narrow end which in conjunction with the screws holding the track down will stay in place nicely.—*See* Fig. 1. There is no need to try to hide the strips for later they will be out of view under ballast.

As suggested, tinplate track within its own lengths is of good alignment, but this does not necessarily ensure the perfect alignment of a long stretch of straights end to end and it is best to true such with cotton between two long pins pushed into the base board. (Fig. 2.)

It is hard to get perfect alignment by eye alone, and if one looks at rail level along track laid solely by judgment one will be surprised at the angle the sections have taken one to another. The string method of truing, however, gives an accurate straight and the screws holding the track to the base should be taken home with the string still in position, so that any side slipping that may tend to come about as the screwing proceeds can at once be rectified.

Care must be taken, too, to see that all the peg joints are pushed well home. With these observations a length of straight track should now be in dead alignment, perfectly level transversely and solidly fastened down. The difference of all this in the running of the trains as against loosely pegged lengths is very marked.

With regard to curves it is perhaps rather stressing the obvious to say always put in the largest radius possible. Never try to increase curvature by pulling the ends of a curve wider apart as this will only result in a kink at one or more of the joints as Fig. 3 and this will be a continual cause of derailment. Joints on curves should be taken home particularly tightly. It is rather hard to "check rail" tinplate curves with rail of its own kind as tinplate cannot be bent and so the necessary winging at the ends becomes difficult, as also the accurate sitting to the rail being guarded. The only way a winged angle can be obtained is to carefully file right through one side as (*a*) Fig. 4 and cut through the foot as (*b*) on the other side. The rail can then gently be bent on its web as (*b*), the small opening (*c*) being given a touch of solder and smoothed. This, of course, forms a definite angle, but if slight the purpose of safely guiding the wheel into the flange-way is served. Rail for check-railing has to be the outer rail of a discarded section, which means that it fits the inner rail with a slightly narrower flange-way in the middle than at either side. The check rail is soldered to the sleepers and, incidentally, tinplate track takes solder very well.

Despite all these drawbacks, tinplate check rails can be put in with good effect as I can personally testify, and thev certainly make all the difference where a curve has perforce to be continually entered at a rather high speed. At points, too, they are useful.

A general effect of a larger sweeping curve can be given to tinplate by introducing a small length (actually a quarter cut in two) between each section. This takes away from the absolute smoothness of the curves, but places a greater distance between the entrance tangents as would be the case with a larger radius curve. Curves must again be screwed down as this ensures full advantage being taken of the super-elevation and the straight section pegged to each end should have an inward tilt.

When pegging and unpegging lengths the receiving end of the joint can become a little spread causing anything from a slight jolt to actual derailment if it is on a curve. To repair insert a peg and then gently tap all round it. If the spread is pronounced then a squeeze with pliers under the head as shown, Fig. 5, a peg being in position, may be helpful. A final touch up with a fine file worked

parallel to the rail-head will assist, but be very sparing with this treatment as you are only dealing with thin tin and it is easy enough to file right through to the peg with disastrous results.

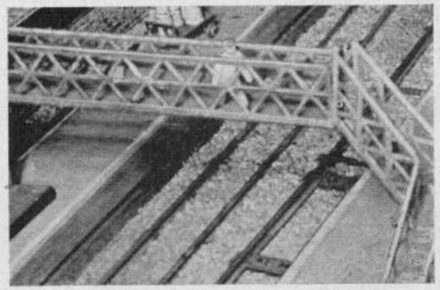
Making "tinplate" *look* real is a question of cunningly placed ballast. The improved appearance obtained by ballasting track of this kind has been mentioned on numerous occasions, but the fact cannot be overstressed. The aim is to camouflage the disproportionate height and unrealistic sleeper layout with ballast to such a depth that only the rail head is showing. This produces an appearance not unlike the real thing, for when a full-sized line is viewed from a height equivalent to that of an observer over a model track the sleepers and chairs are quite lost, the general impression being that the rails are laid straight on to a smooth surface.

To do the ballasting requires a good quantity of material, far more than with scale track and it is best if it is "self held" like tarmac on the road, for then it can be built up to the desired height and it will remain there without the danger of its shaking down by the vibration that is set up by passing trains. This self-holding property is obtained by dipping the ballast in bulk into a very thin solution of glue. Stir till a mass like concrete is secured and then lay this quickly, pressing the top of the layer down with a small block of wood. Fig. 1 (*lower sketch*) shows the cross-section of ballast to be aimed for. As well as levelling, the pressing sends the material under the rails which gives it a firm hold.

If for any reason you wish to use dry ballast only, then there must be some kind of retaining strip at either side as the chippings will definitely shake down and look unsightly. Only a small amount of glue is used for the dipping solution and there is no question of making the ballast into a concrete-like block. When perfectly dry it will be found that the weak solution has been sufficient to hold the individual pieces in place, but that they can be easily broken down to loose chippings again should it be desired to make changes at any later period.

The ballast itself can be broken down sandstone, but I have had excellent results with small cork bits that come in certain fruit barrels. These look well and hold together excellently with the very superficial gluing. The great secret of successful ballasting of this kind is to have plenty of the glued material to hand. Anything like skimped work can ruin the whole effect.

With regard to points, these cannot be ballasted right up as the movable section has to slide on the front sleeper and swivels on the middle one. Ballast should, therefore, be taken only to the level of the sleeper between the rails, but up to the



Ballasting track: Comparison of sleepers wholly sunk in ballast and exposed (on right)

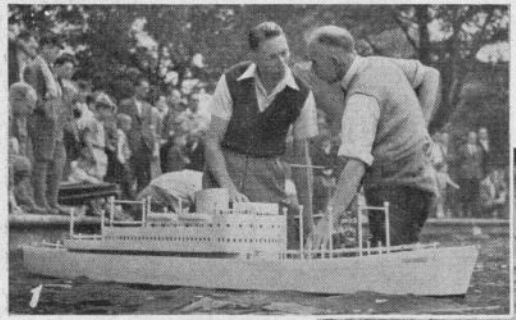
surrounding high on the outside. The inside sleepers can then be toned down with a little suitable paint.

Tinplate points invariably are operated by a lever at the side. This is usually a stiff affair and a better effect can be secured if the point is made to work from a more remote control which pulls the blades in one direction and lets them settle back in the other by the force of a coil spring. This means undoing the channel under the front of the blades and lifting out a spring found there. The blades, which are in one piece, now move freely from side to side. Next fit a coil spring to one side of the point head and take a wire to your control from the other. By this method the switch can be made to work from a distance which gives a much more realistic action than throwing over a stiff side lever. To get perfect contact when the pull is on the control wire side it is good to introduce a strip of rubber at some point in the length. Thus the blade can be taken up tightly by the wire and then any extra pull absorbed by the rubber. It is better to have the wire over-pulling than underpulling and the rubber allows for this. To counteract any danger of derailment, and to improve the appearance of a tinplate switch, check rails can be put in as suggested (*vide* Fig. 6—which also shows the spring arrangement).

Thus we see that it is possible with care to take tinplate track over into the realm of the true model, superficially at least, where for a time it may well hold its own. But this does not mean that it should not be replaced by scale as soon as feasible, points being the first items to be made in the latter material. As the tinplate and scale are both screwed to the base, joining up is simple. No fish-plates are needed, the ends being just brought into alignment and fastened down. Levels are the only things to cause trouble and to correct these it may be necessary to temporarily raise the scale products.

VICTORIA PARK REGATTA

ED. STOFFEL CAMERAPORTS FOR "MODEL MAKER"

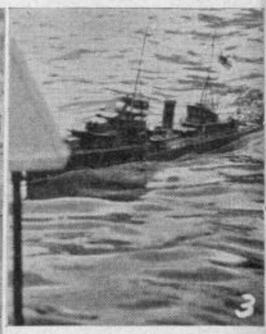


1. Mr. Greenop's model "Zampa," 7 ft. 7½ in. long 12½ in. beam, treble diagonal built over 18 stringers on ply formers. Powered by Stewart Turner Double Ten

2. Mr. R. L. Allen's "Conservator" opened up to show the beautifully finished interior and the Stewart-Turner D.10 engine (petrol fired by blowlamp)

4. "Conservator" at anchor

6. The starter, Mr. Baker, informs the Judges that the next entrant is ready for the Nomination competition, whilst Mr. Squires gives his model K.12 a final inspection before releasing her



3. Realistic cruiser heads for the marker flags

5. "Kenvera" built by W. H. Phillips of Victoria Club

7. A B.O.A.C. launch makes for the steering course markers

8. A twenty-seven year-old model of the Aquitania held by her present owner, R. Freeth of Tynemouth Club

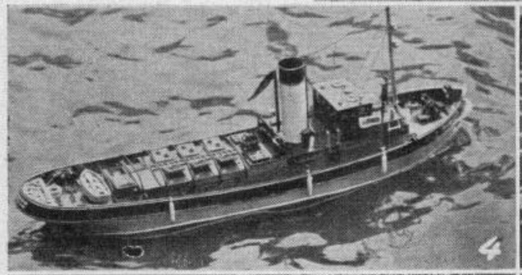
9. Models at anchor awaiting their turn. "Scarlet Runner," a 30 in. long free running speed boat and "Silver Foam," a Canadian river launch. Both built by A. E. Newcombe of Victoria

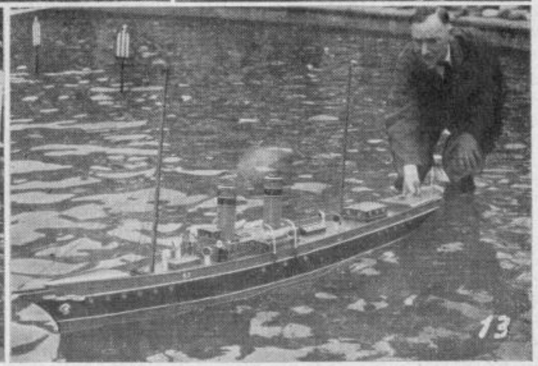
10. Mr. A. E. Perman (West London) and his model, "Smoky," London. 5 ft. 3 in. o/all, 12 in. beam. Burns 1 lb. of best coal per hour

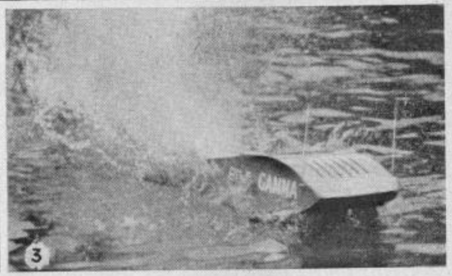
11. Mr. Skingley—Secretary of Victoria Club gives his freelance design "Josephine" a run before he commences his full day's work, time-keeping and recording
Model is 4 ft. long and is powered by a 30 cc. 4-stroke engine built by himself

12. Mr. W. Hood (Swindon Club) prepares his 5 ft. semi-scale model for its run in the Steering competition in which he placed second

13. Bill Butler (West London) with his forty year-old model, "Mary Dean"

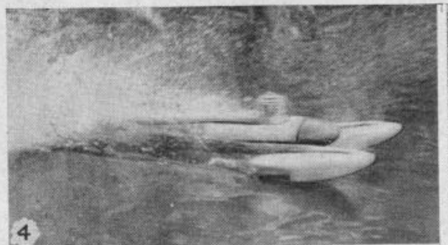


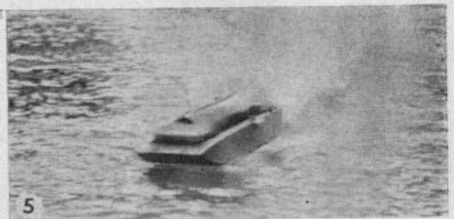


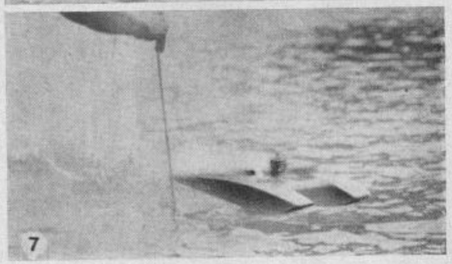


Speedboats at Victoria Park Regatta

(1) The model has been caught clear of the water in this 1/1,000th sec. shot, 10cc. entry by Mr. Phillips of South London Club.
(2) Mr. Phillips launches his 2 ft. model powered by a 10 cc. engine of his own design.
(3) A Twin-screw, single engine (own design) model ("GAMMA"), Class "C" by R. Mitchell of Runcorn (Liverpool) Club.
(4) "SPLASH!" K. J. Hyder launches his McCoy Series 20 powered model in the Class "C" (Restricted) event.
(5) Impression of speed. An r.t.p. model in the Class "A" competition shows its paces.
(6) H. Collier (Coventry) launches his speed model C.U.7.
(7) Mr. Baker of Victoria Park attempts to stop a speed model after it has completed its speed laps.







5cc SPEED MODEL CAR

PART 4: FUEL TANK, SHUT-OFF VALVE AND PAN HANDLE

BY IAN W. MOORE

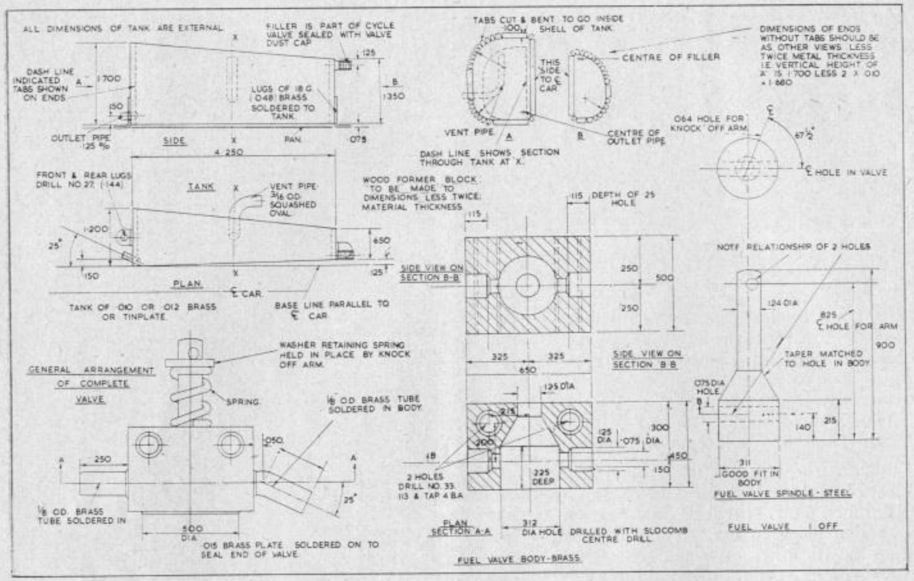
Author Ian Moore prepares to push off one of his speed models. Note "electrics" in the pusher, necessary in the case of glow-plug operated engines (*Model Maker* photo

IF you wish to see the car on its wheels you can now drill the necessary holes in the pan which are used for the screws holding down the engine bracket and front axle, and assemble it temporarily.

As a change from machining, we'll now get out the tin snips and soldering iron and make the

FUEL TANK—This is made from .010 or .012 thick brass sheet or, if this is not available, .010 tinned plate. It will be found easiest to make a wooden block to the drawing dimensions less twice the thickness of metal, first: wrap a sheet of thick paper or thin card round this, overlapping $\frac{3}{16}$ in. to $\frac{1}{4}$ in. along the joint at the bottom and trimming the ends flush with the block. This pattern can then be marked out on the brass, leaving an extra $\frac{1}{16}$ in. at the ends. Cut out the brass and wrap round the block and solder along the overlapped joint after tinning the two appropriate faces. The ends can be made a number of different ways, I usually mark out a piece of brass, using the block as a guide, and cut out about .100 in. bigger all round, then snip in as far as the line radially and bend the resulting tabs in at nearly right angles so that a flange is formed which fits inside the tank. The inside of the tank end and the flange are now tinned and the end inserted, leaving the spare $\frac{1}{16}$ in. of the tank side projecting, and the soldering iron run round so that the whole lot sweats together firmly. The extra $\frac{1}{16}$ in. is then trimmed back flush. Alternatively, a piece the size of the inside of the end can be cut out and positioned $\frac{1}{16}$ in. inside the end and a good fillet of solder run around it. In this case the $\frac{1}{16}$ in. spare is left on so that there is plenty of area for solder and no danger of leaks. The front can be soldered in position whilst still on the block, but the rear should be left open until some of the pipes are in position. At the front top corner nearest the centre line of the car a hole can now be punched, using a scriber to start it and enlarging with a suitable nail punch. This will result in a "flange" on the inside which will give a larger area for the filling tube to adhere to. This filling tube is made from a bicycle valve inside piece (the piece which carries the valve rubber). The two projections on the side are filed off and the thin end cut off, leaving the thread plus $\frac{1}{4}$ in. of the body. A .100 drill is now run through it and it is pushed into the hole in the tank and soldered. The dust cap of the valve is used to blank off this hole when the tank has been filled and whilst running. This same hole is used for emptying the tank.

Remove the partly finished tank from the block, and halfway along the length of the tank towards the outside of the car a hole should be punched where shown, using the scriber as before. Into this fits the vent-pipe, which faces forward outside the body and runs up almost to the top of the tank. Since it is a rather awkward shape to bend it will be found easiest to use either brass or copper tube, about $\frac{1}{8}$ in. bore, and of fairly heavy gauge wall. The shape is rather difficult to describe but is shown clearly on the drawing. This pipe should now be soldered into position, taking care to get the inner end in



the correct position and a good fillet of solder round the outside where it comes through the side of the tank. The rear end of the tank can now be made and soldered into place. A hole should be punched into the bottom corner nearest the centre line ready for the fuel pipe. In use, the tank is filled with a measured quantity of fuel, and it is therefore unnecessary, and even undesirable, to incorporate an overflow pipe to give the fuel level. The only other items needed to finish the tank are the legs which support it. These are made of 18 gauge (.048) brass, bent to L shape as drawn—one at front and one at the rear. When the tank is finished the obvious piece to make next is the

Fuel Shut-off Valve.—Any one of a number of different fuel valves of commercial manufacture can be fitted but usually present some difficulty either in getting them in the correct position or in making them accessible for easy resetting. The valve described is simple to make and has been evolved over quite a long time. It is reset by movement of the knock-off arm, but due to the incorporation of a rebound spring does not tend to bounce on again after it has been knocked off. It is based on the ordinary steam-cock, but since it does not have to deal with the same pressure, it has been possible to do away with the long slow taper used to ensure a good seal and substitute a barrel, with a steep taper used only to seal the end near the arm. The steep taper does not bind and there is no tendency for the valve to become difficult to operate or stick. This avoids the tendency of the steam cock to get knocked half off and the car engine to continue running, whilst attempts are made to hit the arm, which is nearly down, again. The diameter of the barrel is also large in relation to the fuel hole, so that the actual movement required to completely close the valve is small.

To return to the actual job. Get a piece of square brass bar, .650 in. long × .500 in. × .450 in. and mark out the centre of one, .650 in. × .450 in. side with centre lines and centre top the intersection of these. Place in the 4-jaw chuck and centre the punch mark. Put a .312 in. diameter Slocombe centre drill in the tailstock chuck and drill the brass to the depth shown. This will give a .125 in. diameter hole on the chuck side, a taper and then the main hole .312 in. diameter on the face side. Turn the brass endways in the chuck and drill right through on the centre line, .075 in. diameter, and counter bore .125 in. diameter for a depth of .115 in., both ends to take the fuel pipes. Remove from chuck and drill and tap the two 4 B.A. holes for the holding down screws. Change to the 3-jaw chuck and insert the Slocombe and use it as a gauge

for setting the top slide over for turning the barrel. This is made from .375 in. diameter steel to the dimensions shown and is inserted in the body of the valve for the .075 in. hole to be drilled, so as to ensure that this all lines up.

Another .062 in. diameter hole is drilled in the 1.25 in. diameter shank to take the actuating arm, which is of piano wire, taking care to get its relationship with the fuel hole correct.

The valve can now be assembled. Slip the barrel into the body, slip a fairly strong compression spring (about four turns of .036 in. wire) over the shank, then a small washer and finally the piano wire arm. The spring should pull the barrel tightly down on to the taper, but it will be found that it still moves quite freely. Solder the piano wire solidly into position. A piece of .015 in. brass shim, ½ in. square, can now be tinned and soldered over the large hole, taking care not to solder the barrel as well, and the ⅛ in. outside diameter full pipes soldered in.

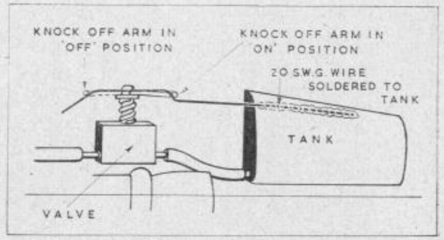
The rebound spring is fitted after everything is assembled in the car and consists of a piece of 20 gauge piano wire, soldered to the tank. This wire is shaped as in the diagram and holds the valve in the "on" position, but springs back to allow the arm to be knocked off and at the same time prevents it bouncing on again.

The top half of the car body should now be made. The original was of 18 gauge soft aluminium made in a similar manner to the underpan, but it may alternatively be made in either wood or papier-mâché. If either of the latter are used it may be necessary to alter the shape slightly, as inside clearances are rather small in one or two places. Holes should be cut out as shown for an air inlet at the front and at the cockpit.

The glow plug socket is fitted in the extreme tail and is a small ex-government surplus type. One socket is earthed to its own fastening bolt and the other runs forward to the glow plug.

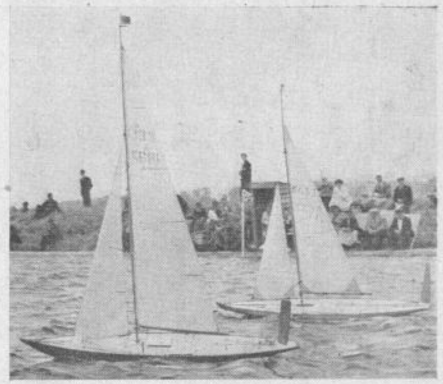
Panhandle.—This is a piece of ⅛ in. thick steel, fitted to the inside of the pan and filed to a streamlined section where it projects outside the body. It is the last item to be fitted.

Put about 2 to 2½ ozs. of fuel in the tank and find the point of balance of the car by resting it on the edge of a knife placed across and under the car. This will give the approximate position of the C.G. and when projected out at right angles to the centre line is the position of the hole for the cable in the outer end of the handle when fitted. It will probably be necessary to slope the handle in plan view to bring the inner bolts into a convenient spot in the pan. Having positioned it, drill one of the holes right through the handle and pan and insert a nut and bolt



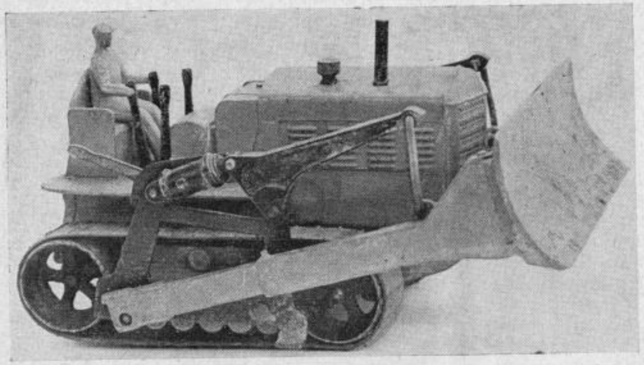
and tighten up. The car should now be suspended from some convenient item above the bench and by checking the distance of the centre line of the car, fore and aft, from the bench, the final position fixed and the remaining holes drilled. All this can be done with the handle on the outside of the pan. Now remove the handle and cut a slot in the side of the pan through which the handle can project when fitted inside. Use large mushroom-headed screws to hold it in place and keep them up tight, otherwise the holes tend to become enlarged. The complete car should again be hung up by the panhandle and the handle bent up so that the car will ride flat on the track. The approximate position can be gauged by hanging a pumb-line so that it touches the rear tyres and adjusting the amount of bend until the line touches both of them.

Final adjustment will have to be done on the track as it will vary slightly with different centre-pole heights.

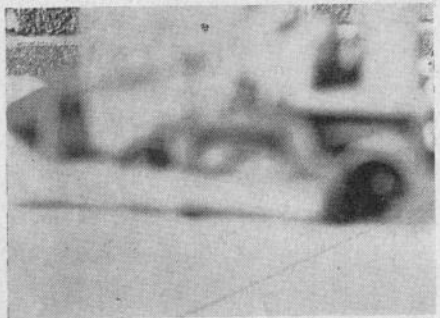


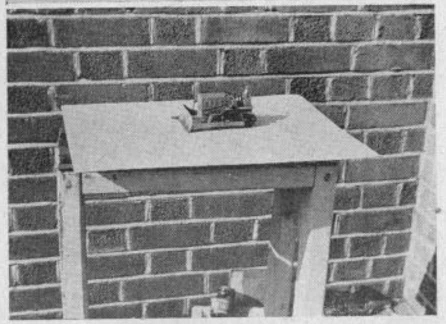
This picture from last month's A Championship should have been captioned "Lynx" and "Yeoman"—NOT "Mouette" and "Yeoman." Readers should also note that "Lynx's" sail area is only 1,360 sq. in.—and that material used is an experimental Terylene. They should definitely not try the ordinary lampshade crinothene for sailmaking!

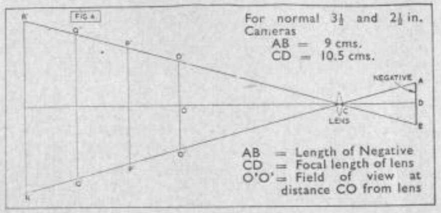
H. V. TIPPER ON . . . . Take it Easy



PART I OF A NEW SERIES ON MODEL PHOTOGRAPHY WITH AN INEXPENSIVE CAMERA — THAT SHOULD BE OF VALUE TO ALL OUR READERS (AND EVEN CONTRIBUTORS!)







Top: Fig. 3. "Super Dinky" taken at 14 in. with 2 Dioptre supplementary lens, Ferrania FP film, f22, ½ sec. Centre: Fig. 1. First effort, model at 12 in., f16, 1/50th sec. Lower centre: Fig. 2. Second effort. Model at 4 ft. 6 in. f.16 1/50th sec.

A GOOD model makes, and deserves, a good photograph. Yet how many model makers get results that fail to do justice to the patient and accurate work of their craft?

Close-up photography (and many models have to be taken at inches range) is often looked upon as a specialised field, needing special apparatus. Certainly it is easier with the tool made for the job—the double or treble extension plate or reflex—but excellent results can be obtained with the "ordinary" roll film camera of the type one normally takes on holiday. It is just a question of understanding the limitations of the camera and the various methods of overcoming them.

The "Geoffrey Porter" models illustrated in the July issue, and the illustrations to this series, were all taken with a $3\frac{1}{4} \times 2\frac{1}{4}$ folding roll film camera such as can be seen by the hundred at any seaside resort using a lens aperture equivalent to the smallest fitted to a "box."

In these articles, I hope to show how such a camera can be used for photographing all types of models; the difficulties that will be encountered, and the remedies to be employed.

The Essentials of Close-up Work

What is needed in the finished photograph? Two things above all else. The model must be sharp and clear. It must be large in the picture space. This means accurate focusing at close range and, since models are three dimensional, the depth of focus must be sufficient to include all the model. With any camera, the depth of focus decreases with the range and in most cases there is very little latitude. So close-up work means accurate calculation of focusing details and careful measurement of distance. (Let the "man with the Leica" have his coupled rangefinder. You will probably do better with your simple camera and a 2 ft. rule.)

It follows from this that the camera cannot be hand held. "Snapshotting" is OUT. A tripod or other firm support is essential. If you are a confirmed button presser you will have to tackle model work very differently from your usual methods. But if you think of all the time and accurate work put into the making of the model, you will appreciate that it is only reasonable to give equally accurate and careful consideration to the making of a first-class photograph.

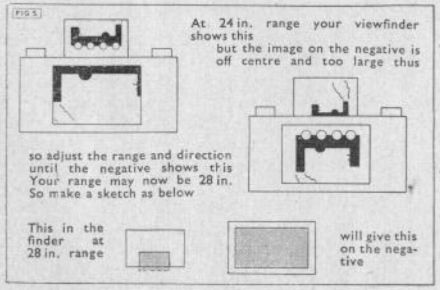
Since both model and camera are static there is no need for fast lenses. The camera with a modest 6.3 or *f*.8 will be the equal of the expensive *f*2.8 or *f*.2 lens provided, of course, that it has equal definition. In fact, the one thing that decides the standard of the finished print and over which you have no control is the *quality* of the lens, not its size.

In most cases, *f*.16 or *f*.22 will be your most often used aperture. Similarly, complex shutters are not necessary. Exposures will be of the order of ½ sec. or 1 sec., possibly up to 1 min. or longer. "T" and "B" will answer all your requirements.

The Camera's Shortcomings

What *is* essential is to know what the camera can and cannot do, where it seems to fall down, and how these shortcomings can be put right.

Since the best way to find out is to do it, suppose we take our camera and take a shot of our latest acquisition, a "Super Dinky" toy. We set up the model on a convenient table out in the sunshine, set the lens to minimum distance, aperture to *f*.16 and speed to 1/50 sec. We get the model nice and big, right in the middle of the viewfinder and press the button.



The result? Fig. 1. The background, for what it is worth, is grand but the poor 'dozer is out of focus and nearly out of the picture. Apparently, both lens and viewfinder are useless at close range. We study the lens, or the book of instructions, and note that the nearest limit of sharp focus is about 4 ft. So back we go to 4 ft. or so and try again. This time we get Fig. 2. All nice and sharp, but oh! so far away, and most of our precious film used up on bricks.

In order to get Fig. 3 we have to get over two obvious snags: (1) The camera lens will not focus sharply at the ranges we need; (2) the viewfinder is very much in error at close range. We must then consider in detail: (1) Positioning the model in the negative; (2) getting it in sharp focus and having found the answers there are two other factors: (3) Arranging suitable backgrounds; (4) deciding on correct lighting and exposure.

(1) Positioning the Model in the Negative

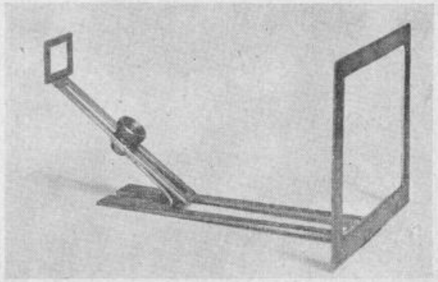
There are two reasons why the viewfinder is inaccurate at close range.

First is that it does not "see" along the same line as the lens, but along a line parallel with it some three or four inches away. At long range this does not matter, but close up those few inches make all the difference. The centre of a view seen at 14 in. may well appear at the edge of the negative or even off it altogether.

This "parallax error" is present in all cameras except those which use the taking lens for viewing, e.g. the reflex; or those fitted with specially compensated finders. Since we are using neither type we have to find another way.

The second error arises in those cameras which have the viewfinder on the body and well back

Fig. 6. Frame finder with sliding and graduated rear sight, for accurate viewfinding from 14 in. to infinity



from the lens itself. Again, this does not matter at normal ranges, but if your subject is 16 in. away, the finder may well be 20. The extra inches cause a big error; the finder will "see" more than the negative will take. Your vehicles will lose their wheels and your figures their heads.

Most probably, your camera will have both these errors and, if the finders are of the "brilliant" type, the added one that they are possibly not sufficiently large or accurate for this type of work, whatever their field of view.

Fortunately there are several fairly easy solutions. The first is to do without the viewfinder altogether; a method particularly useful when there is no room to get behind the camera. Many small workshops just haven't the space for model, camera and photographer, one behind the other!

To do this it is necessary, first of all, to know what field of view your camera will include at various distances. This is found by drawing the plan, Fig. 4. AB represents the length of the negative your camera takes. CD drawn at right angles is the distance from your lens to the plane of the film (the focal length of the lens). Draw this to scale, and continue the lines to show the field of view (*length* only) at various distances. The width will, of course, be in proportion. The size of the field of view can then be read off for any range.

Then make up a table as follows :—

Coverage at :	For 10.5 cm. lens
12 in. range	10 in. by 6½ in.
24 in. ,, ...	20 in. × 13 in.
36 in. ,, ...	30 in. × 19½ in.

Other distances are proportional, but it helps to have the table completed for all likely distances as it saves calculation on the spot when there are other things to think about.

In use, set up the camera at a range which you know will be sufficient to include all the subject and line it up by eye from the position of the model. If you can get behind the camera, sight along any part of it that is at right angles to the plane of the film. The shape of the box camera makes this particularly easy. For other cameras, a line through the centre of the base plate, or from the centre of one side across the top of the lens, will give it quite well.

Using the Viewfinder

The second method is by using the much-maligned viewfinder. This is to make a series of comparisons between the view as seen in the finder and that appearing on the negative. Fig. 5 gives the idea. Set up the camera at various distances from the subject, open the back and cover the negative rectangle with a piece of ground glass or tissue paper. Visually compare the two scenes and make comparative sketches. If you use tissue paper, the scene can more easily be traced if a light such as a candle or torch is moved about the field of view.

By using the comparative sketch for the particular range in use, the subject can be placed quite accurately in the negative, as this method automatically compensates for all errors. In fact, after some practice the sketches can be dispensed with and the amount of offset and difference in field of view estimated to quite a high degree of accuracy. Most of my close-ups are taken this way.

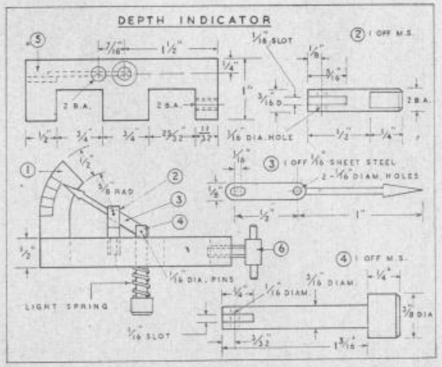
For absolutely spot-on accuracy, the finest method is to make up a frame finder with dimensions the same as the negative, and with a sliding and graduated rear sight. Fig. 6 - with the Editor's permission I will describe this in a further article.

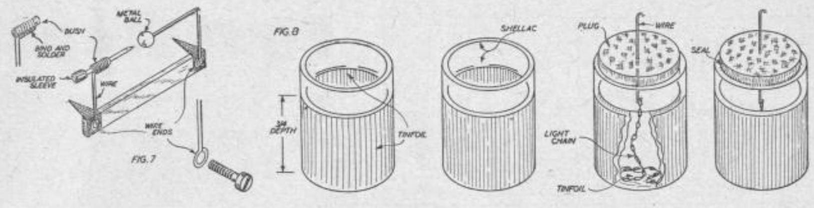
DEPTH INDICATOR

A Useful Workshop Accessory

BY R. BENNETT

The simple gauge shown is designed for use where it is necessary to obtain the same depth with every cut and so avoid risk of damage to tool or work, as for example where a blind hole is required. It is locked to the lathe bed at the end of the first cut and arranged so that the plunger is under pressure from the saddle, thereby moving the pointer to the zero mark on the scale. Subsequent cuts are then taken up to the same zero mark. Designed for use with the MODEL MAKER Lathe, but can be used on any small lathe by modification of Item 5.





PART TWO

AN ELECTROSTATIC MACHINE

THE neutralising brush must be so positioned that the brushes at each end are sweeping the *insulated* portion of the rotating disc (i.e. contacting the disc *between* the tinfoil circles) when the pick-up brushes from the static disc are sweeping the tinfoil circles. When the pick-up brushes are contacting the insulated part of the rotating disc, the neutralising brush is providing an electrical contact between opposite pairs of tinfoil circles.

The static electricity charge produced is collected by two pointed conductors attached to each end of the collecting bar. The collecting bar itself must be made of insulating material, such as ebonite, paxolin, etc. A very good material for the collectors is copper gauze, which can readily be cut to the required shape with scissors. Thin copper or brass sheet will also do.

The pointed collectors should be proportioned so that the tips come as close as possible to the rotating disc without actually touching it. Hence for best results, the mounting of this disc on its spindle wants to be free from wobble.

Having provided a means of collecting the static electricity generated as the front disc rotates, we still want to do something with this electricity when we have collected it. Hence a simple spark gap circuit is mounted directly on the collecting bar. This is simply two pieces of wire bolted to the ends of the bar, as shown in Fig. 7, with provision for varying the spark gap so formed. The method sketched consists of binding and soldering a threaded bush to one wire. A length of threaded rod fits in this bush and the distance between this and the wire connected to the other end of the collecting bar is readily adjusted. The portion of the threaded rod handled during adjustment must, however, be well insulated. An insulated sleeve screwed over the end of the rod will do quite well. To make the whole job look more "scientific," too, a small metal ball can be attached to the end of the other wire.

To work properly, all static electricity machines must be clean and dry. Damp and dust must be avoided if good results are to be obtained. On rotating the machine, static electricity will be generated and jump the gap between the wires mounted on the collecting bar, provided the actual spark gap is not adjusted too wide. Sparks of quite considerable length should be obtained when the machine is working properly. Alternatively, you can "collect" a spark with the finger tip. The shock will readily be felt, but is not harmful. Numerous other experiments of this nature can also be performed.

To increase the scope of possible experiments and demonstrations, a couple of Leyden jars should be made. These can then be charged from the machine and used as "accumulators" or "storage batteries" of static electricity. They will not, of course, hold their static charge for very long periods.

The construction of a typical Leyden jar is shown in Fig. 8. Almost any sort of glass jar will do—a tumbler or a jam jar, for example. It should first be thoroughly cleaned and dried. The whole of the inside and outside of the jar should then be covered with tinfoil to about three-quarters the depth of the jar, including the bottom, inside and out. Shellac again is a good cement.

Once the tinfoil has been cemented in place, coat the remainder of the jar with shellac and leave to dry. The top of the jar should then be plugged with a cork or suitable airtight stopper. Before finally fitting the plug in place, however, push a length of wire through it as shown and attach a length of small chain, or similar, to the lower end. This chain should be long enough to form a complete loop resting on the bottom of the jar, which again can be improved by packing with a few scraps of crumpled tinfoil. Then push the plug in place and seal.

Numerous experiments are possible with charged Leyden jars and for further details of what can be done in this respect, we would advise consulting a text book on elementary static electricity. If you have made the machine and got successful results with it we would not mind betting that you will soon be constructing further simple apparatus, such as the gold leaf electroscope, and so on.

First Steps in Model Yacht Design

PART IV BY H. E. ANDREWS CONCLUDES THIS SERIES BASED ON THE APPROACH TO DESIGN OF HIS OWN MARBLEHEAD "POLARIS"

FULL-SIZE WORKING DRAWINGS OF "POLARIS" ON TWO SHEETS ARE AVAILABLE FROM "MODEL MAKER PLANS SERVICE" PRICE 7s. 6d. POST FREE

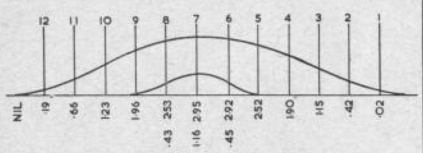


FIG. 10 CURVES OF AREAS.

NOW do the same with the figures in Col. 3, and draw your curve to start and finish on the fin water line ends already marked.

You now have two curves like Fig. 10 *and the areas bounded by these two curves added together represent the displacement of your boat in cubic inches.*

From here there are two methods of finding the displacement and the centre of buoyancy, one by counting the squares enclosed by these curves and the other by the use of a simple arithmetical rule called Simpsons Rule. As we have been counting squares all the time, we will continue this way.

Using the notebook again, we will now complete Col. 4. Count the squares forward of section 1 in the curve of areas and put the answer against "section 1" in Col. 4. Now count the squares between section 2 and section 1 and write the answer down against "section 2." Do the same for the areas between sections 3 and 2 and 4 and 3, and so on until all are done. When you come to the sections which include the fin curve, *include this on your answer as well.*

Now add the figures in Col. 4 from sections 1 to 6 inclusive and put the answer in Col. 5, and similarly for sections 8 to T, and also extend the figures for the mid-section (section 7). Having done this, total Col. 5. The answer, 41.522, is the displacement of the boat *as drawn*. But remember, you only drew her half size and you only took half section areas. As the cube of 2 is 8 and you only took half section areas, you must multiply your answer by 16 to obtain the actual displacement. Thus, $41.522 \times 16 = 666$ cubic inches.

As a cubic foot of water weighs 62.4 lb., 666 cubic inches weighs

$$\frac{666 \times 62.4}{1728} = 24 \text{ lb.}$$

This is the weight of the boat.

Now for the centre of buoyancy. Go back and look at Col. 5 of our list. You will see that the forward body contains 15.512 cubic inches and the after body contains 18.2 cubic inches, while the space between sections 7 and 6 contains 7.81 cubic inches. As 7.81 is more than the difference between 18.2 and 15.512, it is obvious that the centre of buoyancy must lie between sections 7 and 6 and our job is to divide the 7.81 cubic inches in this space, so that the forebody and the afterbody have the same volume.

To do this we proceed as follows:—

1. 18.2—15.512=2.688
2. 7.81—2.688=5.122
3. 5.122—2 =2.561
4. Add answer (3) to 18.2 (the afterbody figure)=20.761
5. Add answers (3) and (1) to 15.512 (forebody figure)=20.761

Now return to your curves of areas. Forward of section 7, and including the fin curve, count off 256 1/100th inch squares (obtained from your answer 3). The vertical line which includes the 256th square is the fore and aft position of your centre of buoyancy. Measure the distance from this spot to the forward end of your L.W.L. and mark it in on your sheer plan.

Calculating the Lead. — We now know our boat's weight and her centre of buoyancy. Now to find how much lead we need and where to put it in a fore and aft plane. First we must estimate how much our bare hull, deck, paint, spars and fittings will each weigh and where their centres of gravity will be. Designers of full-size yachts calculate the weight and centre of gravity of every piece of timber, etc., which goes into the hulls and from this calculate the combined weight and centre of gravity. Experience, or our club mates, will tell us how much each of these items should weigh, and for our purpose we can assume that all these weights will balance on our discovered centre of buoyancy. The only exception to this rule is if a heavy vane is carried right aft, in which case we shall have to make a slight adjustment.

Estimated weights for "Polaris" are as follows:

Hull: 3.5 lb.	... ...	TOTAL 7 lb.
Deck: .75 lb.	... ...	
Paint: 1.00 lb.	... ...	
Mast, Sails and Fittings: 1.75 lb.		

As her total displacement is 24 lb. we shall need 17 lb. of lead to bring her down to her marks and its centre of gravity has got to be exactly under the centre of buoyancy we have already discovered.

Now, 17lb. of lead occupies 40.5 cubic inches of space, which on our half-size drawing means

$$\frac{40.5}{8} = 5.1 \text{ approx.}$$

We have therefore to place 5.1 cubic inches with its centre of gravity under our centre of buoyancy.

To do this is always a process of trial and error, so on your sheer plan draw a lead line using your own judgment. Now on your sheer of curves of areas makes a curve of areas of the space enclosed by your trial lead line, using the method already described, and calculate its centre as if you were finding its centre of buoyancy (as indeed you are).

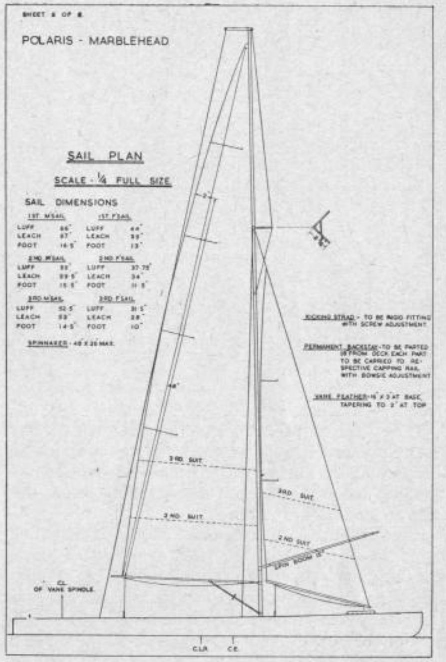
If the volume is wrong, or the centre is wrong, adjust your line and recalculate. Continue until you do get both answers right. Even with experts it usually takes three tries to get the right answer, so do not be discouraged if your first answers are wrong.

If you are planning a heavy vane, arrange your centre of gravity to be about 1/8 inch forward of your centre of buoyancy.

Final Proof.—We now come to the final proof of the balance of our hull. As explained earlier, this depends upon the boat remaining level in a fore and aft direction when heeled. A heeled curve of areas and heeled centre of buoyancy will give us this information. If the heeled centre of buoyancy is an appreciable distance away from the upright centre of buoyancy, then our hull is unbalanced, but if you did the trial metacentric check satisfactorily you will not have this misfortune.

To draw and calculate a heeled curve of areas it is easier to make full tracings of the part of each section under the heeled L.W.L. and lay them over your graph paper to count the squares, but do not forget to divide each answer by 2 in order to get the same basis of comparison as your upright curve of areas. When calculating the heeled centre of buoyancy you must include the original fin curve in your calculations.

Having found the heeled centre of buoyancy, [illegible]t on the sheer plan alongside the upright one. If everything is perfect the two marks should coincide. A discrepancy of 1% of the L.W.L. is tolerable, but if it is more than that your hull is unbalanced, and you should go right back to the stage of your trial balance and start again.



If you have got as far as this satisfactorily, you can clean up your drawing and finalise your lines using the hard pencil, the splines and the pear curves as necessary. Take care, however, to maintain all your intersection spots exactly.

The Sail Plan.—You now have to design a sail plan and accurately place it on your hull. You will, of course, have considered the general type of sail plan you intend to use and will have decided upon the general proportions of your hull accordingly; having remembered that a tall sail plan requires a more powerful hull than a low, broad one.

Before we discuss details there are two more terms to be defined. "Centre of lateral resistance" can be described as the centre of gravity of a plane surface of size and shape equal to the underwater profile of your boat. This description gives the clue as to how to find it. Using a piece of stiff paper, make a copy of the underwater profile and suspending it under a plumb line, first from one corner and then from the other; mark where the two plumb lines intersect. Where they do is the C.L.R. Measure this distance from the forward end of your L.W.L. and mark it on your main drawing. Fig. 11 illustrates this process.

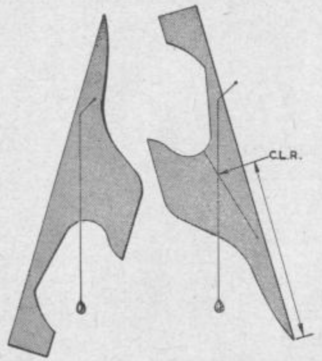


FIG. II FINDING THE C.L.R.

The "centre of effort" of the sail plan can be described in a similar way and can be found in the same manner. There are geometrical methods of finding both centres, but if accurately done, the above method is foolproof.

The trouble with both these centres is that they only "stay put" when the yacht is at rest. As soon as she moves they both move forward by varying amounts caused by the water acting on the hull and the wind upon the sails.

For the purpose of the design it is usual to place the C.E. about 5% to 7% of the L.W.L. forward of the C.L.R. and your sliding mast plate is available to provide the final adjustment.

To proceed with the drawing. On your second sheet of paper make a copy of the profile of the boat using any convenient scale. Mark thereon the position of your C.L.R. Draw in a tentative mast, sitting it approximately where the forward edge of the fin joins the hull. Allow a moderate rake aft, about 4 inches in its length for a Marblehead.

You must now decide what proportions you want between the areas of your mainsail and foresail. For modern sail plans proportions of $1\frac{1}{2}$ to 1, or 2 to 1, are usual. You must also consider if the rule to which you are designing has any restrictions on the height of mast and/or fore triangle. With these in mind work out the sizes of your sails and draw them in on your sail plan, remembering to consider also roach limits (if any) and also batten limits.

Having done this, find the centre of effort as described and check its position in relation to the C.L.R. If it is incorrect, you will have to move the sail plan either forward or aft accordingly.

When you have done this and redrawn your sail plan, recalculate your area in accordance with the rating rule, and check your whole rating calculation of the rule calls for such. If all is in order, your design is finished.

One final word of advice. If this is your first design you are probably and quite rightly proud of it, but put it away for a month before you start building to it. At the end of that time bring it out and look at it with a critical eye. You will probably find quite a lot of things you would like to alter. This is all to the good because it proves your ideas have developed.

Conclusion.—If this short series has "whetted your appetite" for this subject you will find all the answers to the questions you want to ask in two very readable books, one by Dr. Harrison Butler called *Cruising Yachts, their Design and Performance* and the other by A. A. Symonds entitled *An Introduction to Yacht Design.*

These both describe in full Admiral Turner's system of designing, and both can probably be obtained from your public library.

"CULLAMIX"—NEW TUG DESIGN (*continued from page* 715)

The next step is to make and fit the rudder trunk and its skeg bearing. A piece of the same tube as used for the stern tube, will be required for the rudder trunk—this is $1\frac{5}{8}$ in. l^ng—and a piece of $\frac{3}{16}$in. brass rod $6\frac{3}{4}$in. long for the rudder stock. The top of the dead-wood must be slotted to receive the rudder trunk and then built up with plastic wood.

The skeg bearing or pintle bar is then made but not fixed in place until the hull is finally painted and the propeller fitted. This applies also to the rudder which can now be made. This is fitted to the stock which must be split to receive it, the end of the stock being turned to a running fit in the $\frac{5}{32}$ in. hole in the pintle bar.

The hull may now receive its final sanding with flour abrasive paper. Carry on this sanding until the hull is polished as the final appearance of your model depends entirely upon work at this stage.

Give two coats of priming to protect the surface, rubbing both down really well. Finally, make up a temporary stand to hold the model during subsequent work. Chocks cut to the contours of Sections Nos. 2 and 8 and as high as W.L.3. attached to a piece of stout floor board, will hold the model firmly, but cut the slots oversize and line with some soft material—I glue on straps of an old felt hat, ladies' variety—this gives protection against bruising.

In my next article I shall deal with the making and fitting of deck and upper works generally.

MODEL YACHT CLUB NOTES

BY "COMMODORE"

RATHER full programme of reports and model yachting articles squeezed out these notes last month, but here they are again to chronicle activities from all parts.

Y.M.6-m. Owners' Association

Eleven boats desired to contest the Serpentine Challenge Cup—a trophy which was many years ago owned by the Serpentine M.Y.C., a twelfth entry having scratched. Light winds forced three more to be eliminated so that eventually only eight—four home, four visitors—faced the starter. In weather that was enlivened by a thunderstorm, *Fantasy* proved the winner, though *Estella* (R. Jurd, Gosport) made one remarkable down-wind effort with her large balloon spinnaker filling in the lightest of airs, but this was not good enough for better than fifth place. *Hesperos* (C. Whitmore, Eastbourne) was 2nd, *Highlight* (L. Davis, Gosport) 3rd.

The Gosnell Trophy, which is one of the club's most elegant pieces in the shape of a silver model of O. H. Gosnell's boat, *Herald*, attracted ten entries from all parts. In light airs, which seem to have been recurrent in recent weeks, *Arabesque* (J. Anderton, M.Y.S.A.) proved the winner by 5 points from *Vanity Fair* (J. G. Meir, Birmingham). *Arabesque* is Littlejohn's first venture into A Class design and promises very well, while *Vanity Fair* is of course a *Fantasy II* replica, built by our old friend Levison. W. G. V. Blogg's *Sharma* was third after sail off for tied second place. Altogether, the entry from six clubs was thoroughly representative.

Hove and Brighton M.Y.C.

The club had the responsibility of staging the Metropolitan and Southern District Marblehead Championship on their water, The Lagoon, Hove, on August 24. An artificial saltwater lake, this measures 700 × 300 ft. and is considered one of the best in the country.

Close racing was the order of the day in many of the heats, though winner *Jemima Duck* (D. A. Macdonald, South London) was 12 points ahead with 65 to second boat (*Troll*, N. D. Hatfield, Southend) 53. Third was local Arthur Mullett with his *Honey*. (Incidentally, we hear Arthur has recently invaded Ryde with his new M. boat *Isa* and collected some of their silverware!) Winner follows the traditional Macdonald-Tucker skipper-designer team's "Donald Duck" style that has proved so rewarding in 36 in. class racing. Another boat that shaped well was *Suzanne* (G. Walker, Danson), which came with a run at the end, winning five heats in a row.

Doncaster and District M.Y. & B.B.C.

We described this club's Barnby Dun water as ex-N.C.B. recently, when in fact it is loaned by the Ouse Catchment Board : their Coal Board lake is at Woodlands. Lucky people to have a choice of water!

Sunday, September 21, found ten boats ready to contest the Davies Memorial Open Championship for 36 in. Class restricted boats. Bradford M.Y.C. entered six, and the home club had four. Winner proved to be *Mallard* (Ken Chadwick, Bradford)—presumably a kind of Duck?—from fellow club boat, *B'jax*. *Usequebaugh* (Blamires, Doncaster) was third, a creditable effort as this is the skipper's first boat, built from a Daniels and Tucker design slightly modified. Altogether a very enjoyable race, with the hosts by no means disgraced and already making their name felt after over eighteen months of active existence.

Their members are now anxious to explore the possibilities of "Donald Duck" design and try out Vane steering for 36 in. restricted boats. Although almost exclusively 36 in. in their interests, we forecast that soon they will be spreading their sails towards bigger and more ambitious craft.

Midland District Committee

A Class Championship in squally weather was won by *Thistle* (J. Lapsley, Nottingham) from *Vanity Fair* (J. Meir, Birmingham) and *White Foam* (Ed. Hague, Birmingham). J. Meir's boat has had a very active summer and seems to be settling down as a confident winner or place boat against first-class opposition, though we are particularly pleased to see J. Lapsley in winning brackets, for he is a great enthusiast always ready to "have a go."

The M.D. 10 Rater Championship took place on Birmingham's water and resulted in a win for holder *Opal* (J. Drury, Birmingham) from *Halceyon* (J. Lewis, Bournville) who lead *Cormorant* (A. Davies, also of Bournville) by a single point.

Exeter M.Y.C.

Hon. Sec. C. B. Arnold provides news of this young club. He is another *Halceyon* fan and has just completed his version of that 10-rater. With Paignton as their hosts, the club had a pleasant 8-boat individual race for 10-raters on their Double Locks sailing water. Commodore Pinsent from Paignton eventually ran out the winner with 25 points, sailing his *Trixie*: Bob Eland, the donor of the prize, was second with his *Rose of Devon*.

At least four, perhaps five, new 10-raters are on the stocks, whilst Bob Eland after his warming-up entry to the A Championships is busy on a new A design for next year, so things are looking up down Devon way.

The club will be over to Bristol for the S.Western District 10-rater Championships later in October.

Scottish M.Y.A.

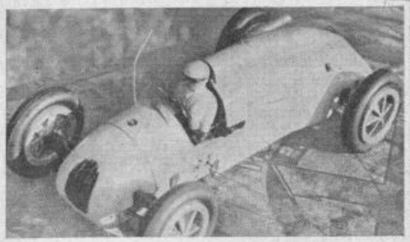
The 12-metre British Open Championship had to be concelled owing to entries below the minimum of six boats being received. This class died out in England many years ago and has survived until now only in Scotland. Its popularity has waned on account of severe draft penalties resulting from the scale of one-twelfth producing a shallow boat unable to stand up to a hard blow. Failing entries from a revised date, it will be up to the M.Y.A. to pass sentence on the class and award the trophy elsewhere.

Scottish 6 m. Championships at Elder Park, Glasgow, were won by old-timer boats of 1938 vintage, winner being *Kelvin* (Wm. Brown, Dennistoun), 2nd *Wendy* (T. Rood, Victoria and West). This contest took place on what is reputed to be the smallest boating lake in Scotland! Any other claimants forward please?

Held Over

A number of club reports have been necessarily held over until next month, following their omission in October issue.

. . Pioneers at Edmonton



REPORTED BY A. N. THORNEYCROFT 'MODEL MAKER' PHOTOS

THE Pioneer Open Meeting morning dawned murky and dark, with plenty of heavy water slashing down to harass the many enthusiastic model car operators who had seen fit to take a week-end off from their homesteads to attend. As the morning advanced, the sun broke through to warm the hearts of the aforementioned enthusiasts.

The organisers of the meeting, in anticipation of inclement weather, had taken precautions to erect a large marquee which completely covered the pit area and in consequence competitors were able to ignore the heavy water.

At the hour when racing was due to start heavy rain fell and continued for some time; the track was swept off and racing eventually got under way at 2.30 p.m., commencing with the 1.5 cc. class. The first runner, F. Drayson, with due regard to the rather pond-like conditions of the track, produced a snaky effort, to wit an Oliver Bottoms Up or, as now more politely termed, a Tiger Cub fitted with twin rear wheel drive, and put in a cracking run to return a speed of 70.86 m.p.h. The next best runner in this class was Cyril Catchpole with a speed of 66.66, followed by A. Snelling at 56.71 m.p.h. There were seven runners in this class, six of whom exceeded 55 m.p.h. in this round.

By this time the sun had broken through and had dried the track so that the 2.5's started to run under far better conditions. G. Bodley of the Bristol Club opened proceedings in this class with a very smartly executed run at 49.88 m.p.h. Due to the delayed start, competitors were restricted to two minutes on the line and it was most heartening to the organisers to find that each competitor was ready and waiting as his name was called. There were many variations of Oliver and E.D. powered cars operating. The proof of the popularity of the 2.5 C.I engine is shown by the large entry of 28.

Bill Holloway, the popular sales manager of the "Redex" oil additive manufacturers, running a very pretty Howlett Oliver "Alfa," did not find the optimum setting, but put in a neat run at 49.1 m.p.h. K. S. Butt, of Bristol, started to warm things up with a startling run at 73.77, E. Armstrong, of Sunderland, very closely following at 72.23, whilst Bill Hamilton, of Guiseley, recorded 70.64 m.p.h. A little later in the proceedings Cyril Catchpole returned a speed of 78.6 m.p.h. with his Oliver B.U. Special. Mrs. Joan Catchpole, of Pioneer, and E. Armstrong, of Sunderland, then put in identical runs of 75.31 m.p.h., followed very closely by F. S. Drayson, of Pioneer, and B. Buckett, of Medway, at 75.35 and 73.58 respectively.

Before proceeding with the 5 and 10 cc. classes the track was dusted and swept off, and it was during this operation that a very unfortunate incident occurred. Cyril Catchpole, who was deputising for the resting employees of Edmonton Borough Council, was struck by a car which was inadvertently allowed to start its run. He suffered damage to his pedal extremities and is still in pain after six days; he hopes that the accident will serve as a warning to other clubs during the running of meetings. Having returned the stretcher—which Cyril declined to use—the meeting proceeded as per programme!

The first runner in the 5 cc. class was G. H. Stevens, of Leicester, running a pretty scale Dowson lightweight, who unfortunately had to scratch due to the accident—a pity! J. Parker, of Pioneer, was next on the line and returned a speed of exactly 60 m.p.h., followed by G. C. Wheeler, of Hastings, who recorded 68.96 m.p.h. R. W. Bennett, of the Hastings Club, livened proceedings up by attaining 83.17 m.p.h., and the pace was becoming fast and furious with W. Hurn, of Bristol, returning 83.48 m.p.h., Bill Hamilton, of Guiseley, 86.95 m.p.h., and the eventual winner of Grade A, J. C. Cook, of Sunderland, with a rousing 88.66 m.p.h.

The 10 cc. class was led by L. Newbold, of Edmonton, returning 103.68 m.p.h., followed by J. Oliver (shades of C.I. engines!) running a Rowell-engined car recording 86.87. L. Williamson, of Leicester, and F. Petrie, of Sunderland, carried on the proceedings with speeds of 106.50 m.p.h. and 106.63 m.p.h. respectively.

The sands of time were fast running out and it was decided to limit the second round to one minute but, as was inevitable, time waited for none of us and, with the 1.5, 2.5, and 5 cc. classes completing their second runs, it was decided to decipher the time sheets and award the prizes.

The Class and Grade winners were as follow:

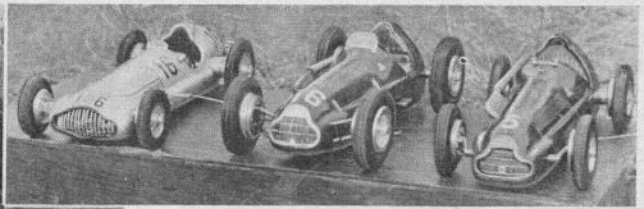
Class	Grade	Winner	Cluh	Speed m.p.h.
1.5 cc.	A	F. S. Drayson	Pioneer	70.86
1.5 cc.	B	K. Procter	Sunderland	55.45
2.5 cc.	A	C. Catchpole	Pioneer	79.08
2.5 cc.	B	K. S. Butt	Bristol	80.64
2.5 cc.	C	G. Thornton	Pioneer	59.13
5.0 cc.	A	J. C. Cook	Sunderland	88.66
5.0 cc.	B	W. Hamilton	Guiseley	86.95
5.0 cc.	C	G. C. Wheeler	Hastings	68.96
10.0 cc.	A	C. Catchpole	Pioneer	117.95
10.0 cc.	B	R. J. Cato	Edmonton	107.91
10.0 cc.	C	L. Newbold	Edmonton	118.42
10.0 cc.	D	H. Howlett	Meteor	92.97
The Sutton Trophy		E. Snelling	Edmonton	53.63

Special Trophy open to Pioneer Club members only, presented by the Wayne V. Myers Co. Ltd., Mrs. Joan Catchpole 75.56 m.p.h.

(*Above*) Diversity of starting methods! G. H. Steven's Dowson away to a clutch start, and K. Robinson's 2.5 to a powerful push!

(*Left*) Eric Snelling with his Sutton Trophy winning Maserati, and Ted Armstrong with his very fast E.D. Special. (*Opp. page, top*) J. Parker's neat J.P. Eta 500, and a glimpse of George Thornton in the Overalls!

(*Bottom right*) Rare sight these days, G. H. Stevens wields the bootlace



WHERE ARE THE HOME-BUILT CARS?

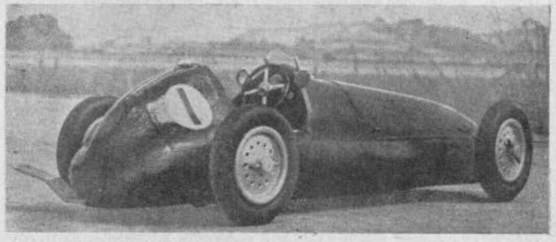
A PLEA BY G. H. DEASON FOR MORE CONTEST ENTRIES

(Left) C. B. Maycock and the author judge the home-built entries in the Percival Marshall Trophy at Nottingham. (Above) Three of the trim little masterpieces based on Oliver components, competing for the Oliver scale trophy (*Photos by Ken Crow*)

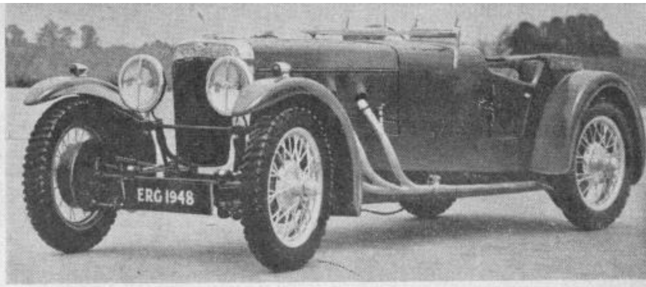
IN writing the following lines I am perfectly well aware that (a) I am treading on dangerous ground and ought to step delicately, (b) that I have said some of it before, and (c) that I shall probably consolidate the opinion held in some quarters that I am a reactionary old so-and-so with a large and slightly blunt axe to grind. To the Voice from the Back of the Hall which asks "Why go on?" let me reply that I know that my point of view has many, though less vocal, supporters and that I hope I may influence some more by the time I've finished.

Where are those home-built model cars? Within the space of the last few weeks I have been invited by the organisers to judge two competitions of national status, carrying handsome and valuable challenge trophies as their reward and having rules especially devised to attract the home builder, designer and craftsman in this branch of model-making. I have been delighted to do so and have no complaint to make of the quality of the entries lined up before me. I say "lined up before me," but in the first instance I didn't have far to walk and in the second, alas, I simply stood still. What it all boils down to is that entries for this type of affair, which not so long ago would have found practically every model at the meeting eligible, are now as scarce as Scotsmen at a flag-day. All of which is most discouraging to the organisers, disappointing for the donors of the awards and excessively bad for the hobby.

Now, if this apparent apathy represented the true state of affairs, one would simply if sadly accept the fact that designing and building and developing such models had ceased to appeal to any section of the fraternity and let it go at that. After all, model car racing has never been in a healthier state and vast entries positively embarrass the officials at most Open Meetings, which should be enough for most people, even if the bulk of the entries bear a somewhat dismal resemblance to each other and no resemblance at all to anything that ever ran on 16 in. wheels. The really regrettable thing about it all is that it does *not* represent the true picture at all, as I am in a position to know beyond doubt. MODEL MAKER's office files positively bulge with letters, snaps, sketches and information about just such models as should be contesting the competitions in question, many of which I am quite sure have never seen the light of day at any track since they were built. For all of which there must be an explanation. Let's cast around for it!



This highly realistic Maserati was built by a schoolboy of 16, but having a commercial engine would be ineligible for many competitions, although a most praiseworthy effort



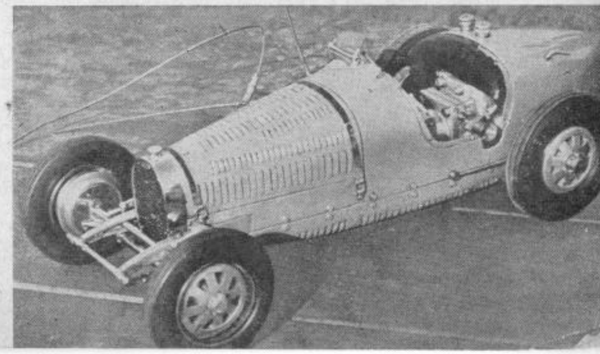
This magnificent model Frazer-Nash, built by E. R. Grose of Yeovil and photographed by the author several years ago, is the type of model which should be well up with winners in any home-built contest but, alas, how often do such entries come before the judges

I propose to pass over various obscure psychological aspects, involving shyness and reluctance to mix with those of like interests in club gatherings as, though such cases do exist, we are never likely to find a cure and the victims are unlikely to be successfully roped into the circle. Here are two more practical suggestions. (They are no more than suggestions, please remember, but somebody has got to start looking for the answers before it is too late.) In two of the national events referred to earlier the regulations stipulated that engines must be the work of the entrant. The donors of the trophies are fully justified in inserting this proviso and nobody can quarrel with it. The plain fact remains that this debarred a not inconsiderable number of otherwise finely and thoughtfully constructed models, which contained evidence of those very virtues I believe the donors intended to encourage, from entering on the spot. Several, in fact, due to misunderstanding of the position had come to the meetings in question with every intention of competing and were sadly disappointed when they found their mistake. When considering the terms of future events for the encouragement of craftsmanship, might it not be possible either to waive the home-built engine rule to admit those whose talents and interest lie in other directions or to devise a system of marking which allows really outstanding workmanship and clever design to compensate for a bought power-unit? By all means let the all-rounder who excels in both departments reap his rewards but don't lose sight of the fact that "It's Entries we're After!"

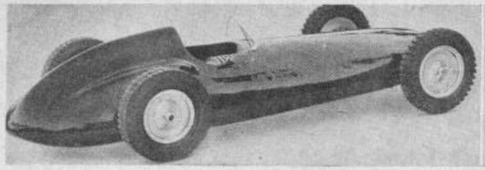
A second point to consider is the fact that although these competitions were held in populous areas with easy access and in centres of great engineering activity, they were held in conjunction with out-and-out racing meets in an atmosphere of model *sport* pure and simple, where speed is the only object, and by the very nature of things tended to be very much a side issue despite the good intentions of the officials concerned. Now your craftsman tends to be perhaps a shade more sensitive to atmosphere than the next man, and the consciousness of a large concourse of impatient enthusiasts glowering at the back of his neck and wishing he would get his bit of fun over and done with so that the main business of the day can proceed isn't perhaps the most encouraging setting for the production of his masterpiece. Admittedly the present microscopic entries hardly justify a separate event on a separate day, but it rather resolves itself into the old problem of the chicken and the egg! I don't personally believe that the craftsmanship and concours brigade would in the least mind having a small get-together all on their own, without loud-speakers, funny hats, ballyhoo or incidental music and it mightn't be all that small either if the idea caught on.

To conclude, nothing of the foregoing is in any sense a criticism of the organisers of the meetings referred to, which were admirably run but merely served to bring to light the sad state of affairs of which I have written; and to forestall any further cracks about axes, hobby-horses or old guff, let me hasten to add that I have every sympathy with the well-known racing boy who said to me, "I run my cars because I jolly well enjoy running them and I don't grumble. Yet these scale and workmanship people grumble that we don't stage events for them, and when we do, they don't turn up!"

It's your entries I'm after!



Just to remind you that it is possible to build a model which looks like the real thing and can still exceed 80 m.p.h., here is that old favourite, W. P. Jones's Bugatti. This model is a typical example of excellent craftsmanship, but fitted with a commercial (Hornet) engine



STENTOR SPECIAL

BY M. W. ELDRIDGE

THE "Stentor 6" engined car which I have recently completed was begun with just one thought in mind—to make use of an elderly Stentor engine which had been given to me. First I converted the engine to glo-plug and after a few test runs on a flywheel with no complications occurring I put it aside and began to think about the car as a whole.

Two MODEL MAKERS showed me that the layout with engine shaft parallel to the rear axle was popular; hitherto I had been thinking of clutches and bevel gears. It struck me immediately that this was the easiest at least snag-proof method. I had, I think, four tries to design the engine-rear axle assembly before I looked for material. The biggest piece of dural I could find was 2 in. × 2 in. × 3 in. and two ball races, $\frac{1}{2}$ in. diameter inside were the biggest pair to come to light, so I now began to design.

Meccano spur gears were the cheapest available to me so I thought I would try them, in spite of advice from friends with the Stress Office as their mecca! The ratio is 1.25 to 1, so with 3 in. wheels and the engine revs. at 7/8,000 I shall be disappointed if it never reaches 40 m.p.h. The engine assembly could be much lighter, but I wanted the rear wheels on the ground as long as possible. I was operating a horizontal mill at the time and after boring the block for shaft and bearings I soon cut off the surplus metal, leaving little to be filed. I bored 3-thou. down for the bearings and rammed them home; a 5/10 in. drill gave a good clearance for the $\frac{1}{4}$ in. silver steel axle on to the ends of which I cut $\frac{1}{4}$ in. Whit. threads. The silver steel was 7/10ths of a thou. up and my elders would have had a blue fit had they seen me hammering the axle into the bearings! When the 1/10 in. thick gear wheel was on the shaft it looked so puny that I bolted another to it after a lot of trouble and the result looks a bit better! I grub-screwed and soldered on the axle gear, which drew more cries from the stress fiends, and I did have a bit of trouble with it but I seem to have solved the snag now.

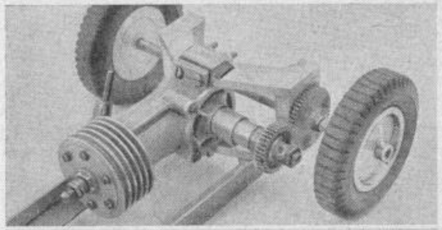
The rear wheels are of solid dural tapped $\frac{1}{4}$ in. Whit. with the first tap alone and from the inside; the axle I had cut dead size, which enabled me to put the wheels on really hard and actually the fly nuts intended as locks are mere ornaments. The tyres are by "Prestacon" and are reasonably well in keeping with the rest of the car.

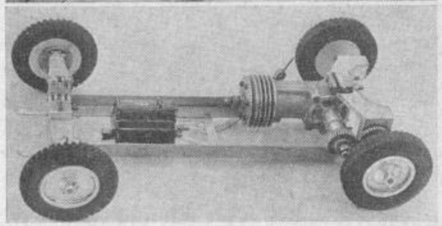
The chassis is comprised of the two wheel units, front and rear, connected by two pieces of dural extrusion simply braced by a lightened plate.

The front suspension was the worst part of the job and even now I don't like it very much. I was going to fit springs, but it would have meant that the chassis would be at an alarming angle, so it is now locked in the down position. The suspension consists of two faired links with tongues, which fit into a slotted piece of angle on the chassis and into projections on the dummy brake drums. There are 3/10 in. diameter stub axles on the brake drums, the wheels run on ball races and are kept on by the wing-nuts which tighten up, with a steel spacing bush, on the ball races. The front wheels are solid dural with Dunlop 3 in. diameter scale tyres.

The coachwork is of balsa built up on $\frac{1}{8}$ in. formers, and is in one piece, i.e. the shell lifts off and is held down by elastic bands inside. In detail, I completed the frame of the coachwork on the car making sure that it would come off. Then I put one layer of 1/16th sheet in planks shaped so that there were no gaps, after which I put another 1/16th layer on, but this time I was not too particular for I intended to sand most of this down. After sanding I applied two coats of filler composed of clear dope and face powder, mixed to an opaque but runny texture, sanding each coat. Then two more coats went on, this time composed of thinned down grey dope and coarser powder to give more body to the top finish. As no grain was showing, one coat of black cellulose sufficed and fuel proofer with 20% hardener gave a hard finish and added to the gloss.

Two views of the Stentor Special on the opposite page, show the excellent lines and finish obtained on the balsa bodywork and (right) the somewhat unconventional-looking but practical engine-mount and gearing. The gears are Meccano, mounted in pairs





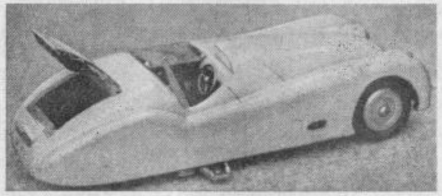
The car is tethered for running directly to the chassis, one line bolted just in front of the rear wheel, the other just behind the front wheel; giving a C G approximately 3 in. in front of the rear wheel.

I have told you of some mistakes made on the car but that which caused the biggest laugh concerns the tank. It is a piano tank of about 30 c.c. and I decided to make it round a wooden pattern. All went well as it was of brass shim, easy to solder. I finished, cleared the tools away then began cleaning the tank. I thought it was very heavy and stiff for brass shim, when I realised that I had soldered the pattern inside!

The negatives and prints are by my friends, Messrs. J. Leonard and B. Elliott.

A 5 cc XK 120 JAGUAR

BY G. A. JONES



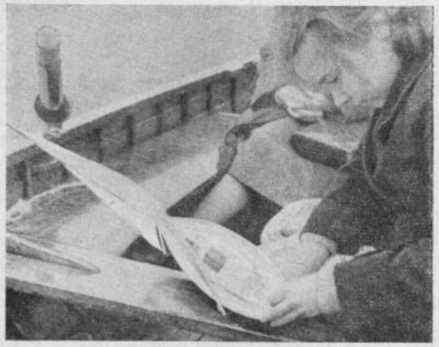
(Left and below) Two views of G. A. Jones's 5 cc. Jaguar model, which is powered by a Frog 500 engine and has balsa bodywork. Note the lifting boot to accommodate the push-stick

THE XK 120 Jaguar is certainly a popular favourite among those who want to build a scale or near-scale model which can hold its own on the track. The latest example we have seen is that built by G. A. Jones, a member of the Maidenhead M.C.C., in which there are a number of scale enthusiasts.

The chassis of this model is the usual simple pan of $\frac{1}{16}$ in. aluminium sheet, which fits in well with a model of this type. The engine chosen is a Frog 500, arranged for spur-drive, mounted in an engine bracket of $\frac{1}{16}$ in. steel. The axle shaft is of $\frac{3}{8}$ in. silver steel, turned down at its extremities to $\frac{1}{4}$ in. diameter to take the 2 in. diameter wheels, and runs in ball-races carried in the bracket. The present gear ratio, which seems to suit the engine well, is 21 to 14 teeth. It should be borne in mind that the Frog 500 is a fairly hefty engine in relation to 2 in. wheels, which permits of this step-up gearing.

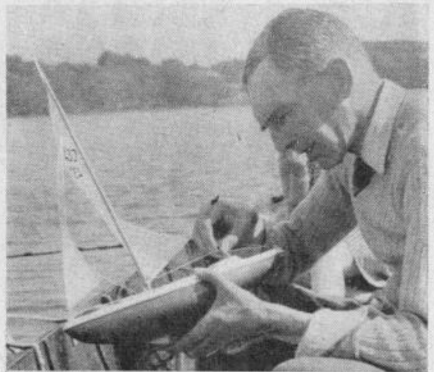
The bodywork, which is to 1/14th scale, is made from balsa block, and is 12 in. long by $4\frac{1}{2}$ in. wide by $2\frac{1}{2}$ in. in height. The body lines were drawn on graph paper, traced, and plan and profile glued to the block for cutting away. A hard undercoat was painted on to the finished shape to prevent damage during subsequent handling and hollowing out. The boot is made to open to admit the push-stick, the glo-plug leads plug in beneath the rear-light and the headlight reflectors were made of aluminium pushed out with an E.D. propeller spinner. The radiator grille is slotted dural.

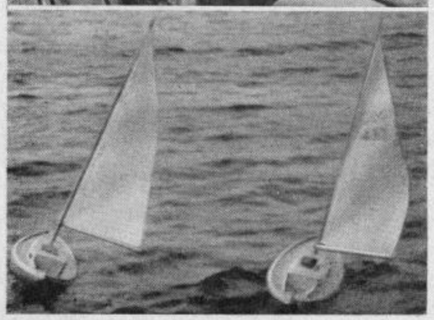
On its first outing the car did 50 m.p.h. at Woodside, so should be a very satisfying performer.



"Penguins SPREAD THEIR WINGS"

BY G. H. DEASON





"GOING to the Lakes next week? Why not take the Penguins?" Well, why not? I'd been hoping to sail them again since *Swallow*, our original blue boat, was given her initial trials on the canal last summer, and by now the fleet included *Amazon*, green and trim and as yet untried. Also my eleven-year-old daughter was dying to try her hand at some model sailing, so here was my excuse. *Amazon* was posted ahead for the modest sum of fifteen pence and *Swallow* travelled snugly under the car's bonnet.

Having demonstrated to my offspring with the aid of a cake of soap and a pair of wet hands the otherwise inexplicable phenomenon of a boat's ability to beat and reach, a start was made by borrowing a dinghy from my boat-building friend, Sid Bousfield, in Nab Wood Bay, a reasonably quiet corner of Lake Windermere. We were all set for some quiet racing, we thought. It wasn't as simple as that, however. It was rather like letting loose a couple of valuable and exuberant puppies in the park. I am no novice waterman, having spent my formative years in lake boats, but the Ocean Racers lived up to their name, being astonishingly fast, and no sooner had I retrieved *Swallow* with tremendous expense of energy than *Amazon* would be a mere white speck in the distance, saucily inviting destruction under the bows of a passenger steamer. All very exhausting, but we learnt a lot on that first morning, by the end of which we had a healthy respect for the seaworthiness of the Penguins and none at all for our own seamanship!

After investing 3d. in a packet of assorted rubber bands, the next leg of the contest was sailed on Esthwaite, a less frequented and lovely little lake some three miles long and a quarter wide. After a few experiments with the automatic steering things went much better. With careful tuning the two boats were closely matched and it was almost uncanny to see the pair gybe and go about in unison. They still retained their individuality, however, in defiance of their mass-production history, *Swallow* being definitely superior to windward and pointing up better, whilst *Amazon* would reach and run like a Ten Rater. We set them on a long beat side by side and they plugged away most impressively for three-quarters of an hour, my jubilant offspring's *Swallow* leading from the gun, and finishing some two hundred yards apart after an untouched course of about two and a half miles. You can't ask much more for 29s. 9d. than these entirely adequate little craft provide. They had many more outings in "open water" conditions and their lines were critically examined and favourably commented on by full-sized racing experts in the boat-yards.

FAIRGROUND MEMORIES

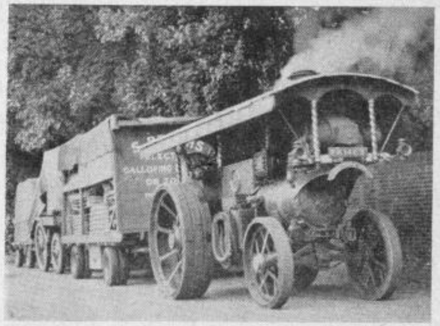
BY L. J. OLDRIDGE

CHARLES BURRELL and Sons Ltd., St. Nicholas Works, Thetford—what memories of bygone glories this name conjures up, memories of the local fair; of small boys gazing in awe-struck admiration as "Scenic Burrells," monarchs of the road, came rumbling into town; of gleaming brass and brilliant paintwork, of majestic power, and more painful memories of the parental displeasure when one arrived home later after watching this fascinating scene. Photograph No. 1, reproduced by kind permission of Mr. J. P. Mullett, another enthusiast, has captured the atmosphere of the fair coming to town far better than any words of mine can describe. The subject of this photograph is Burrell No. 2894, named Lord Fisher, ascending the steep knap to the "Pheasant" at Chalfont St. Giles in 1950. The engine is owned by Miss S. Beach, but it is not in use at the present time so far as is known. New in 1907, Lord Fisher is an 8 h.p. three-speed, compound locomotive, spring mounted, and is typical of the "Showman's Burrell."

Established in 1770, Charles Burrell and Sons manufactured hundreds of engines of all types until 1920, when the firm joined the Agricultural and General Engineers Ltd., the goodwill, drawings and patterns later being transferred to Messrs. Richard Garrett and Sons Ltd., Leiston, Suffolk. Although Burrells made many engines of the agricultural type as well as steam rollers, it is without doubt that their most spectacular product was the showman's engine.

It is difficult, in this district at least, when diesel "Scammels" practically monopolise the fairground, to find a Burrell in good enough condition to photograph. I have, however, been extremely fortunate in obtaining from Messrs. Garretts an excellent official photograph of a Burrell engine with permission for the photograph to be published.

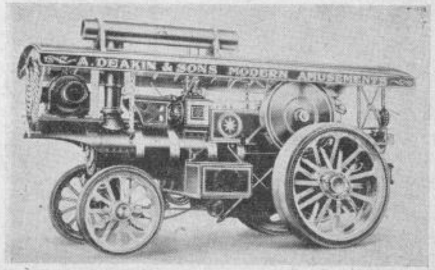
I have no details of the engine, but feel pretty sure she is No. 4092 named "Simplicity." Incidentally, what splendid names these engines carried, "King of the Belgians," "Queen Mary," "Lord Fisher," "The Gladiator," "Earl Beatty," "Morning Star," "Admiral," "Princess Mary," "King Edward VIII," to name a few; at least we cannot accuse the showman of being unpatriotic.

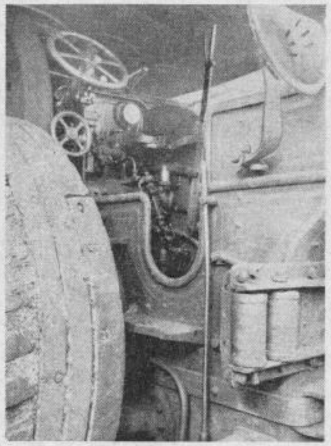


It will be seen that the engine illustrated is fitted with rubber tyres and is adorned with the usual twisted brass rods, stars, etc., so beloved by the showman. On an extension fitted to the smoke-box rests the dynamo used for generating on the showground and behind the chimney will be noticed a bracket to carry a second dynamo, or more correctly an exciter. Note should also be taken of the shields at the front and back of the chimney to protect the dynamos from heat.

Showmen's engines were *almost* universally "compounds" and the Burrell illustrated is no exception. The more one studies traction engines the less dogmatic one becomes over these points—a while ago I should have said all showmen's engines were compounds, but I have recently seen a photograph of a Ransomes, Sims and Jefferies showman's engine of the single cylinder type—which just goes to show! Incidentally, the showman preferred the compound engine on account of its quiet running when generating as well as for its economical use of fuel; it was considered the "bark" of a single cylinder job would interfere with the pleasures of the patrons.

These engines were of the three-shaft type, that is one crankshaft, one countershaft and one main axle. A "belly tank" is fitted under the





barrel of the boiler with a cock to shut off the communication with the hind tank when going up steep hills, this additional supply of water being a great asset when undertaking long journeys.

Flywheel brake and road wheel brake were usually fitted, these being operated by highly polished brass wheels.

Photograph No. 3 which shows the footplate of Burrell No. 3711, "King of the Belgians," clearly shows the flywheel brake wheel and above it the steering wheel. Also seen in this photograph are the reversing lever, throttle change speed lever, water and pressure gauge, injector, tip up seat and fairlead. That part of the hind wheel which is shown reveals that this engine originally was fitted with iron strakes and later converted to "rubbers." I hope this photograph will bring back happy memories to many a steam enthusiast who has "dropped the driver a bob" to be allowed to sit in the tender while the engine was generating for the simple thrill of watching the motion whirling and to hear the old girl cough as one of the "rides" called for an extra effort from her.

A model of a showman's Burrell is a ambitious project and the tyro would be well advised to make a start on the simpler agricultural type engine, nevertheless for the enthusiast what a delightful model this would make, with plenty of scope for artistic ability as well as engineering skill, the painting and lining being no easy undertaking.

For those constructing or making a start on this model, here are a few leading dimensions:

Overall length ...	22 ft. 1 in.
Overall height ...	11 ft. 6 in.
Overall width ...	8 ft. 9 in.
Hind wheels ...	6 ft. 4 in. diameter
" " rims	1 ft. 10 in. wide, 20 spokes per wheel
Front wheels ...	4 ft. 1 in. diameter
" " rims... .	9 in. wide, 12 spokes per wheel
Flywheel	4 ft. 6 in. diameter, 8 in. wide at rim
Cylinder Cores ...	High pressure 6½ in., Low pressure 11¼ in. (approximately)
Stroke	12 in.

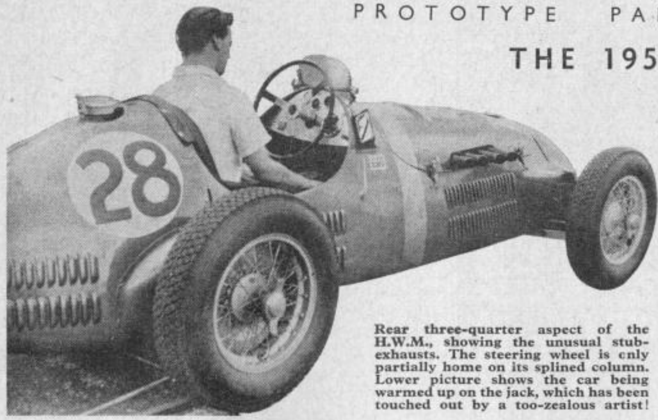
M.C.A. RECORDS STANDING AT SEPTEMBER 24, 1952

Distance Miles	Speed m.p.h.	Name	Club	Track	Date
		BRITISH AND OPEN 1½ CLASS			
¼	71.42	C. M. Catchpole	Pioneer	Edmonton	6.7.52
½ }	49.18	E. T. Bishop	Bristol and Bath	Bath	8.7.52
	65.69	K. Procter	Sunderland	Sunderland	16.8.52
1	64.88	K. Procter	Sunderland	Sunderland	16.8.52
5	50.09	E. Armstrong	Sunderland	Sunderland	18.8.52
		BRITISH AND OPEN 2½ CLASS			
¼	88.23	Mrs. J. Catchpole	Pioneer	Edmonton	25.5.52
½	88.23	Mrs. J. Catchpole	Pioneer	Edmonton	25.5.52
1	76'84	A. F. Snelling	Surrey	Surrey	12.5.51
5	66.18	J. R. S. Parker	Meteor	Edmonton	11.5.52
10	61.05	J. R. S. Parker	Meteor	Nottingham	6.7.52
		BRITISH 5 CLASS			
¼	94.64	E. V. Snelling	Edmonton	Cleethorpes	27.8.50
½	85.71	J. T. Green	Sunderland	Ossett	4.6.50
1	75.00	J. C. Cook	Sunderland	Sunderland	21.7.51
5	41.60	F. G. Buck	Meteor	Stoke	27.8.50
10	32.45	F. G. Buck	Meteor	Stoke	14.9.50
		BRITISH 10 CLASS			
¼	115.83	J. W. Riding	Blackpool	Sunderland	2.6.52
½	113.56	F. G. Buck	Meteor	Derby	3.9.50
1	105.50	F. G. Buck	Meteor	Eaton Bray	15.5.49
5	69.77	I. W. Moore	Derby	Derby	16.1.49
10	—	—	—	—	—
		OPEN 5 CLASS			
¼	99.11	J. C. Cook	Sunderland	Sunderland	2.6.52
½	94.24	C. M. Catchpole	Surrey	Eaton Bray	22.7.51
1	84.24	C. M. Catchpole	Surrey	Surrey	12.5.51
5	41.60	F. G. Buck	Meteor	Stoke	27.8.50
10	32.45	F. G. Buck	Meteor	Stoke	14.9.50
		OPEN 10 CLASS			
¼	132.35	J. S. Shelton	Edmonton	Edmonton	13.4.52
½	122.95	I. W. Moore	Derby	Derby	19.8.51
1	105.50	F. G. Buck	Meteor	Eaton Bray	15.5.49
5	69.77	I. W. Moore	Derby	Derby	16.1.49
10	57.14	P. J. E. Hugo	Derby	Chiltern	18.4.49

PROTOTYPE PARADE NO. 44

THE 1952 FORMULA 2 H·W·M

DESCRIBED BY G. H. DEASON



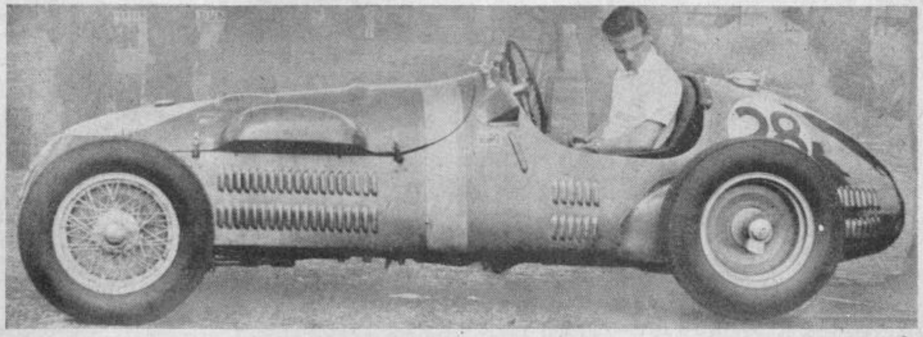
Rear three-quarter aspect of the H.W.M., showing the unusual stub-exhausts. The steering wheel is cnly partially home on its splined column. Lower picture shows the car being warmed up on the jack, which has been touched out by a too-zealous artist!

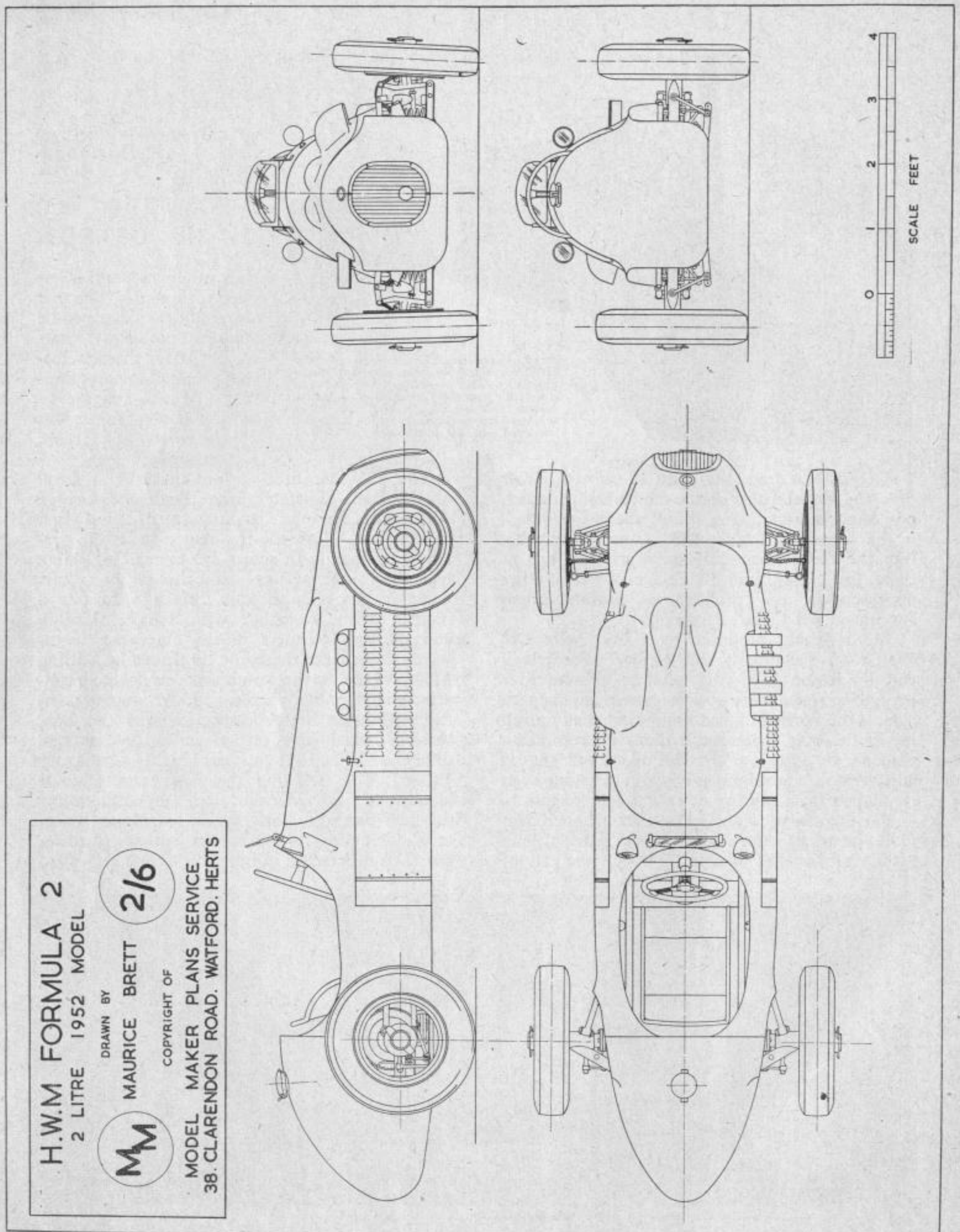
LOOKED at from the point of view of either the model maker or the motor-racing addict, one of the most exciting things about Formula 2 is the diversity of types this country is flinging into the fray. I have already dealt with two of these, and this month's choice is yet another approach to the problem of putting Great Britain on the Grand Prix map.

The H.W.M., produced by H. W. Motors of Walton-on-Thames, is the "senior" Formula 2 car, by reason of having been in existence for several seasons, having even pitted its strength against the Formula 1 giants and more than proved its mettle. It is, moreover, a thoroughbred racing machine by virtue of the fact that both chassis and engine are race-bred as opposed to having been developed from touring or sports components.

The engines used are 2-litre four cylinder twin O.H. camshaft Alta units, which have a long history of fine and reliable service in the cars of the same name, and it has been suggested of late that if any future effort is to be made to produce a "national" car for the new formula, the all-out development of this engine is worthy of the most serious consideration by those responsible.

The H.W.M. itself is produced by a small organisation, of which John Heath and George Abbecassis are the leading spirits, and first appeared as a pseudo-two-seater in 1949, participating mainly in sports-car events. In 1951 a team of single-seaters comprising four cars made its appearance, with Stirling Moss as a regular driver, together with Lance Macklin, and the two partners in the enterprise themselves. It is one of these, the car driven by Stirling Moss, which is the subject of my photographs accompanying this article and, by way of contrast, Maurice Brett's drawing shows the 1952 version which has several noticeable external differences. The 1951 cars had a highly satisfactory season, Moss winning the Madgwick Cup at Goodwood with Macklin and Abecassis filling the next two places and taking first three places at Winfield also. A Continental win eluded them, but they collected a number of second and third





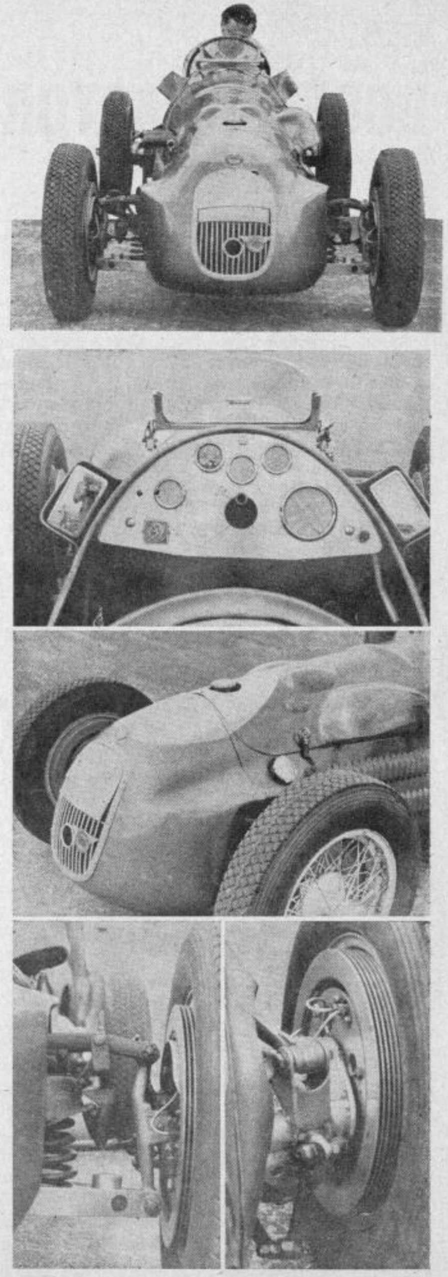
places, including a third in a Formula 1 event.

There is nothing mechanically revolutionary about the H.W.M., which is a thoroughly workmanlike job with that look of fitness for purpose which makes a thoroughbred racing car such a satisfying sight to enthusiasts' eyes. In the latest model a new frame of triangulated tube is employed and the rear suspension has been redesigned by the substitution of torsion bars, anchored under the frame, for the quarter-elliptic leaf springs previously used. The transmission has also been modified, the drive going via an Armstrong Siddeley preselective gearbox to Z.F. limited-slip differential. Principal change at the rear end, however, as sharp-eyed readers will have already noticed, lies in the moving of the brakes to an inboard position on either side of the differential housing, allowing heavy universally jointed side shafts to be used. Correctly parallel motion has been achieved in the rear suspension, which allows the large-diameter de Dion tube to be rigid. Two tubular radius arms, one above the other and anchored in Silentbloc bushes, are fitted to either side.

The front suspension, by helical springs and wishbones, remains as in the 1951 cars and braking is Girling hydraulic, with 12 in. drums at the front and 11 in. at the rear. Tyres are 5.50 and 6.00 by 16 respectively, and the track and wheelbase at 4 ft. 1 in. and 7 ft. 9 in.

Bodywork is carried in a light tubular framework and has, to my way of thinking, the pleasantest lines of any Formula 2 car. The tail is short and well-rounded and although the bonnet slopes quite steeply, the neat radiator grille happily avoids the "Dollar-Grin" look now gaining popularity. The grille is quite plain and frequently carries the top blanking-off plate, which on occasion bears the driver's identifying initial. The use of stub-exhausts is unusual, and the pair of Weber twin-choke carburettors are concealed beneath the projecting bulge on the near side. The bonnet-top bulges give clearance to the forward ends of the camshaft covers. The radiator filler-cap is external and the fuel filler supplies both rear and two auxiliary side tanks (a similar arrangement being used in the Cooper Bristol, which I omitted to mention last month!)

The H.W.Ms are normally painted in light metallic green, generally having an identifying colour-band round the body. The car in my photographs, now owned by Tony Gaze, carries the Australian emblem on the scuttle side.



Various detail pictures of the H.W.M., which should prove valuable to the scale modeller. This is the car driven by Stirling Moss in 1951, and will be seen to differ from the 1952 car shown in the drawing in certain details, notably rear brakes and suspension

MODEL MAKER

DOPE & CASTOR

By JERRY CANN

A MONTH or two ago I met Gerry Buck looking wet but cheerful at a pond-side ministering to a flock of power-boats and he told me that he had definitely retired from model car racing. A week or two later he was to be seen, dried out and still happy, in the thick of a track meeting in which two of his cars were doing nicely. He had the grace to be apologetic about it, but subsequently sent me his official "retirement notice" in writing which I must accept as valid, although it's surprising how people pop up again drawn back by the speed bug in their veins! If, however, Gerry has withdrawn for keeps, model car racing is the poorer by the loss of one of its best known figures, certainly one of the finest and most skilful builders and tuners of miniature racing engines and a real pioneer of the hobby. Customers won't need reminding of the years when he was invincible in speed events, or the many records he established, broke and broke again. His almost fanatical preaching of "all-home-construction" was based on practice and to this day his E.R.A. "Topsy" must be the fastest "own construction" model in existence. Good luck with the boats, Gerry!

The Guiseley Open meeting on September 14 despite damp and arctic weather attracted 41 entries from Sunderland, Blackpool, Cleethorpes, Sheffield and Nottingham in addition to the home club. A nice innovation, designed to spare the feelings of tender-hearted track-marshalls, was a clock whose true function was to warn the housewife of the impending ruin of the Sunday dinner set to ring into the microphone when that fatal three minutes was up. A tactful way of saying, "You've had it, chum!" High-light of the meeting was Guiseley Chairman Bill Hamilton's run with his Dooling at 121.62 m.p.h., which I am informed surprised nobody more than Bill Hamilton. Said Dooling is reported to be not entirely "All American," but the British component used is not specified so it might be the engine or it might be the H.T. lead! Jack Cook and Jack Yates tied with 91.78 m.p.h. in the 5 cc. class, but the Sunderland Chief waived his claim in favour of the home club member by reason of the latter's higher average. The M.C.A. Grading system was used at this meeting, results being as follow :—

1.5 cc.	K. Procter (Sunderland)	61.65 m.p.h.	
2.5 cc.	E. Armstrong (Sunderland)	73.77 m.p.h.	
	M. W. Hodgson (Blackpool)	72.57 m.p.h.	Grade B
	G. A. Wright (Sheffield)	66.19 m.p.h.	Grade C
5.0 cc.	J. L. Yates (Guiseley)	91.78 m.p.h.	
	J. Cook (Sunderland)	90.00 m.p.h.	Grade B
	M. Bradley (Guiseley)	85.71 m.p.h.	Grade C
	J. Bibby (Blackpool)	53.89 m.p.h.	Grade D
10.0 cc.	W. Hamilton (Guiseley)	121.62 m.p.h.	Grade B
	D. Tartellin (Grimsby)	8912 m.p.h.	Grade D

That well-known American enthusiast and record-breaker, Joe Shelton, tells me that he is likely to be returning to the U.S. early next summer. Open meeting fixtures have not yet been arranged for 1953, but those who like to plan their campaigns well ahead should note that it is hoped to put up the Dean and Shelton Speed Trophies for competition either at the first Chiltern M.C.C. or Edmonton Open meeting, whichever happens the earlier in the M.C.A. Fixture List. These events are for five and 10 cc. cars.

The model car racing fraternity are beginning to run the aeromodellers very close in the matter of specialised "track-wear." The Medway Club turned out at Edmonton in smart white overalls and dark blue long-peaked caps with their club badge thereon, and it wouldn't have been surprising to see the leading pair come out in pads and batting gloves. Then there was a magnificent pair of genu-ine blue Scuderia Ferrari overalls with zips in expected and unexpected places which, on investigation, were found to contain George Thornton, doing his usual excellent job over the P.A. George said that they were what he really went to Italy for. Well, it all adds to the fun. In America the model railroad men wear genuine engineers' caps, even when operating H.O. gauge "pikes," but let me warn the first man to appear at a model car meet wearing a crash helmet that he'll hit this page in a big way!

That hardy annual, the Meteor Club's Open Day, has been scheduled to happen on November 16, and although at the time of writing the full programme has not been worked out, customers can rest assured that it will be the usual good show with the mixture as before. A meeting of B.M.C.C. members will be held at the Meteor Club's venue on November 16 to discuss the future of the club and the disposition of trophies in the Club's possession.

Too late for inclusion in our last issue came news that the Meteor Rail Track season will open on October 19, with an invitation to all interested in rail racing to roll along and use the track if they have suitable cars available. This invitation has been passed on to the North London S.M.E's car section who are, of course, actively interested in this branch of model racing.

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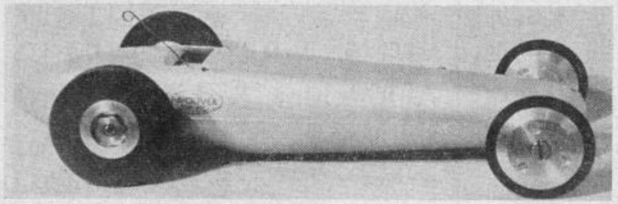

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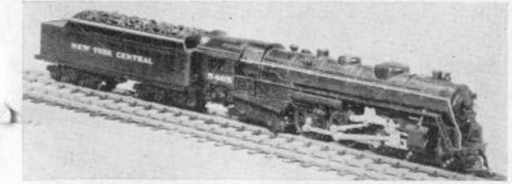

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