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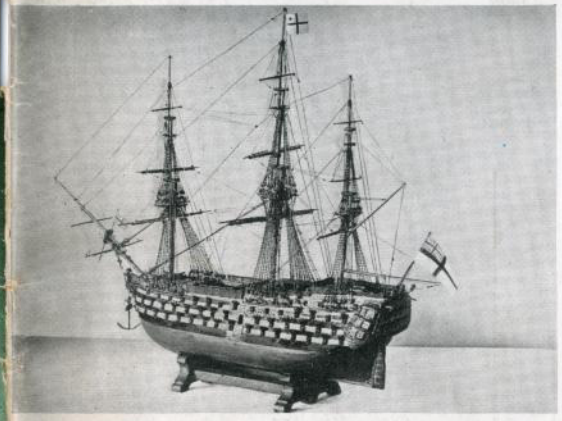

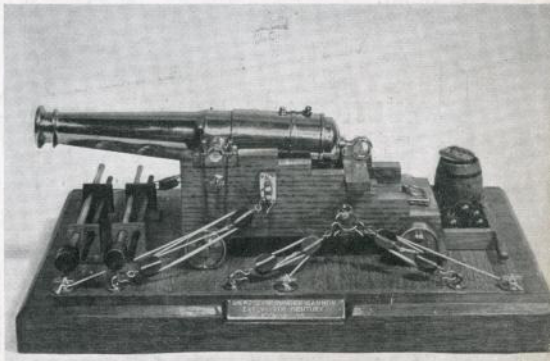

VOLUME 2 NUMBER 22 SEPTEMBER 1952

IN THIS ISSUE : Freelance Trawler : New Marblehead Yacht : Admiral's Barge for Radio Control Pt. II : 5 c.c. Racing Car Part II : Amazing Scale Bugatti : More Model Motor Cycles : Austin A.90 Saloon Model Electrically Driven : Model Maker Yacht Trophy Results All about Pinhole Cameras : International Model Car Meeting at Monza : Wooden Coach Construction Pt. II : Baseboards for TT Gauge : 0 Gauge Feature : Paints and Colours Foden Lorry Model : Light Vane Gear : Connaught Formula 2 as Prototype : Test Bench

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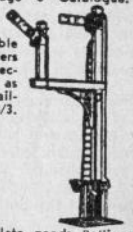

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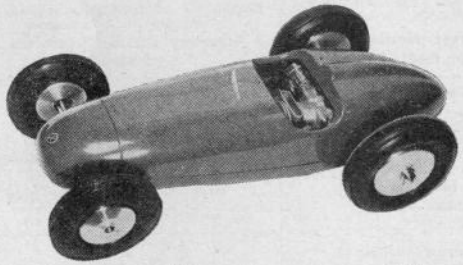

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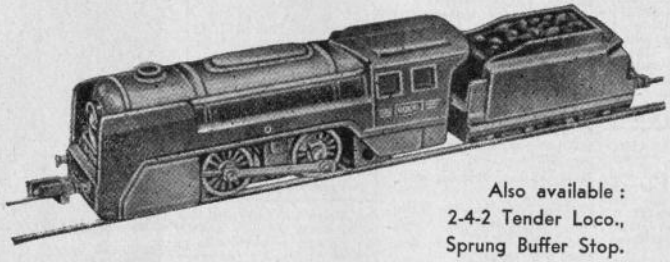

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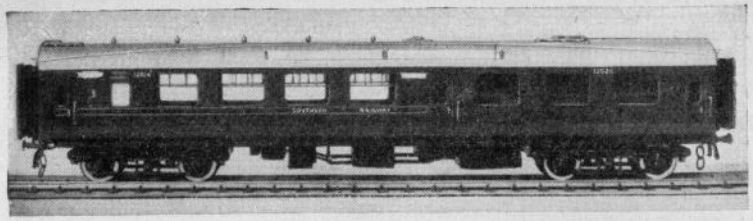

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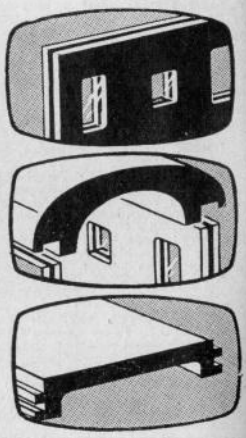

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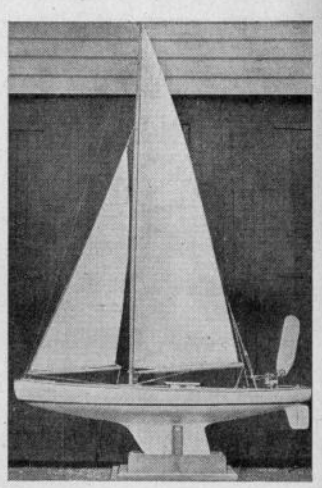

Mullett customer H. A. Grayson of New Zealand made this model of Littlejohn's Marblehead "Elusive" (Plans 12/6).

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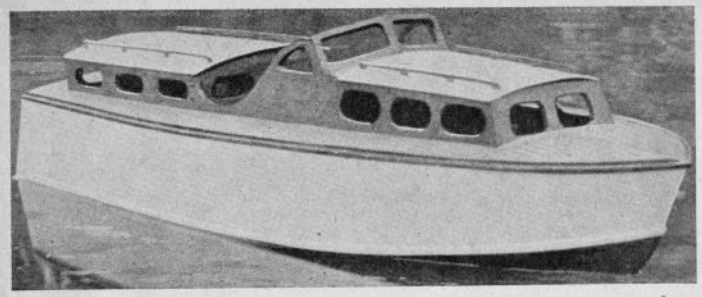

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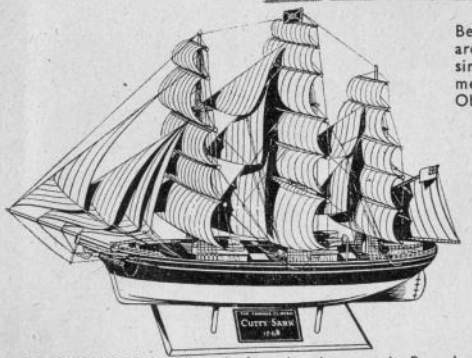

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VOLUME 2 No. 22 SEPTEMBER 1952

Contents

"Carving our Niche . . ."

ON Bank Holiday Sunday the first *Model Maker* Yacht Trophy took place at Bournville under the organisation of the Midland District Committee of the M.Y.A. We should like to pay full editorial tribute to their efforts which resulted in a really friendly contest with a most deserving winner. We feel that we are now attracting a healthy readership from amongst model yachting enthusiasts, and our postbag is now containing regular letters of appreciation, couched in the terms that *Model Maker* is the only magazine giving adequate attention to the hobby . . ." We hope we can continue to interest this group and bring in many more converts.

In much the same way the coverage we offer to Model Car enthusiasts, both racing and scale model types, must be unique in the realm of monthly model literature. Here again we have a fine body of contributors producing authoritative articles on all aspects of model cars and model vehicles in general.

When we consider our approach to Model Railways, we realise that here there is already a strong competitive field of specialist magazines devoted to various aspects. This firmly entrenched group fills a most useful service, and it has never been our thought that we should usurp any part of their activities, but rather to appeal to quite a different section of the model railway world—namely those who are graduating from "toy" or "tinplate" railways towards something a little more realistic in appearance and operation. For that reason we have concentrated on articles that are practical, simple and straightforward, and usually incorporate some named commercial parts in their building. Ancilliary model-making such as lineside architecture has also been given ample space.

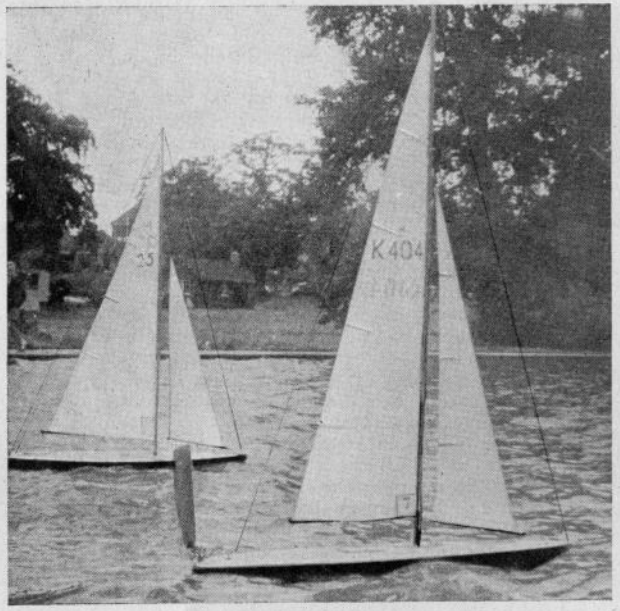
Again in the field of powered model boats, we know there are many hundreds of potential builders of the simpler kind of model that can quickly get on the water and satisfy the builder with a realistic performance. The interest aroused by such designs as Bernard Reeve's *Deglet Nour* and the little Dutch Auxiliary boat recently featured bears out our belief.

With the darker evenings shortly coming along, we anticipate that many newcomers will be building their first models ever, or seeking suitable prototypes on which to try their hands. We should like once more to extend our very hearty greetings to these new friends, and remind them that we are always ready to offer them a helping hand and words of advice if they care to drop us a line with their problems.

ON THE COVER . . .

Top: Half-inch scale 2-6-0 Locomotive, prize winner at Northern Exhibition by T. Gould of Hayfield. Centre Left: "H.M.S. Victory", Trafalgar rigged—includes 1,000 clove hitches in rigging. Built by A. L. Paling at a cost of 7/6d. Centre right: Another from the Northern Exhibition—Ship's 24-pounder Cannon by N. Downing of Timperley. Bottom left: Harold Pratley's amazing Bugatti model described in this issue. Bottom right: L. C. Mason's freelance Trawler, plans of which appear within. (Photos of Northern Exhibition—Arthur Hamer. "H.M.S. Victory" by Miss G. Pennethorpe)

First Model Maker Yacht Trophy



Sparky (rear) and Atlanta, second and first boats respectively meet in a board : honours were even in the heat.

DON Smedley's *Atalanta* proved a worthy winner of the first *Model Maker* Yacht Trophy from clubmate's sister ship *Sparky*, followed by a third Bournville boat *Cunimar*, owned and skippered by J. H. Cunningham. Lest any should think this was a "carve-up" for the local club, we would hasten to point out that winds were at their very trickiest and home ground must have been worth at least the traditional "goal start!" Strangely enough the three leading boats all dropped points during the afternoon to some of the lowest placed entrants: and were, incidentally, entered by the club in the reverse order of preference to that in which they finished.

Young Don Smedley the winner is a son of the club treasurer and the winning boat as befits a treasurer's family boat cost next to nothing to build except hard work! The plan was drawn specially by Mr. Littlejohn a couple of years ago as a gift to repay some sterling work as assistant O.O.D. by another club member. The hull was built up in three layers diagonalised of veneer offcuts that were throw-outs from the B.R. Carriage Works at Birmingham —the rest of the sheets may well be on your homeward train tonight. Sails were a joint family effort in which Mrs. Smedley played her part; so that almost the only bought items were glue, paint and rigging! This is particularly pleasing to the organisers who had hoped that a truly novice skipper would triumph, though, for the purpose of this definition, it includes any skipper who has not won an event of national status.

Sparky, the second boat, is also built to the Littlejohn lines though by conventional planking methods, and looked like being the winner until the last few boards. *Cunimar*, which marks the return to active model yachting of J. H. Cunningham after a long absence, is a modified version of *Model Maker's* Daniels-designed *Festive*. It is noteworthy in particular for its unusual vane gear, described in this issue, all metal rigging, and a number of time and trouble saving devices that we shall be illustrating later.

L. A. Garrett, who will be better known for his 10-rater activities, brought along his new Marblehead *Aquila*, built as much for Garrett Junior's sake as his own. This boat is another on *Model Maker's* Plans Service list, being the original of the yacht listed therein as *Merlin*. In its present rig it is fitted with Braine steering, which may have proved a slight handicap under the prevailing conditions. There were, however, three boats in all sporting Braine gear, including J. Lapsley's *Golden Eagle* and C. Frost's *Windmill*.

A very tricky wind was blowing in gusts across the lake, coming down from the hills, and blanketed in parts by the close trees. This left an awkward patch of dead water with fluky winds around it. In consequence there were a number of re-sails occasioned by following boards catching up with laggard boats ahead. Again, although run strictly according to M.Y.A. rules, on at least one occasion we noticed a mate—who was experienced enough to know better! —put about right in the bows of a competitor who certainly had the right of way. The umpire signalled disqualification but this was not observed by officials, and not claimed by the sufferer, who in any event won the re-sail so honour was satisfied. Similar conduct in the excitement of the moment was also noticed by novice mates who were fortunate enough in getting their boats away without contact. However, in a day when at least three legs seemed needful to get down the pool everyone managed very well. With a comparatively short fast course the safer method of letting an opponent get clear in many cases would have meant losing the board so we must forgive this fault of over-enthusiasm.

While on the subject of mates, we should like to pay tribute to one very junior young man who was seconded to the assistance of a Nottingham boat and set a splendid example of skilful and painstaking assistance to his temporary skipper.

The entry of ten boats provided almost the ideal number of heats that could be coped with comfortably in the day. Had wind been less strong it might have been a very full programme, and the organisers' decision to limit total entry was fully justified. In the matter of prizes, in addition to holding the *Model Maker* Trophy for a year, winner took home a case of dessert cutlery and servers: second man received an oven-glass casserole in silver stand and third man a silver condiment set. We must also mention the booby prize in the shape of a small yacht for bath-time sailing which was received in a jovial spirit.

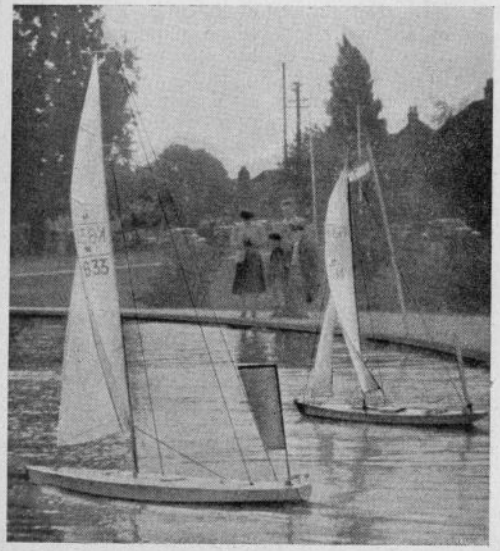
Next year the *Model Maker* Trophy Contest will be organised by the Doncaster M.Y. & P.B.C. for the Northern District, and will be for 36 in. Class Restricted Yachts, held on their National Coal Board Lake at Barrowby Dun.

THE FIRST 'MODEL MAKER' TROPHY CONTEST TOOK PLACE AT VALLEY PARKWAY POOL, BOURNVILLE, UNDER THE AUSPICES OF THE MIDLAND DISTRICT COMMITTEE ON SUNDAY, AUGUST 3rd. REPORTED BY D. J. LAIDLAW-DICKSON

RESULTS

			Pts.
1. "Atalanta"	D. Smedley	Bournville M.Y.C.	35
2. "Sparky"	L. Bagnell	"	32
3. "Cunimar"	J. H. Cunningham	"	29
4. "Aquila"	L. A. Garrett	Wicksteed M.Y.C.	26
5. "San-Ton"	H. Bach	Birmingham M.Y.C.	24
"Golden Eagle"	J. Lapsley	Nottingham M.Y.C.	24
7. "Whisk"	R. Hands	Birmingham M.Y.C.	17
"Naroda"	W. Smith	Coventry M.Y.C.	17
9. "Leslie"	H. Jones	Birmingham M.Y.C.	11
10. "Windmill"	C. Frost	Nottingham M.Y.C.	10

Left : Cunimar (foreground) leads H. Jones' Leslie. On the right: Atalanta with spinnaker set against one of the Braine boats from Nottingham, C. Frost's Windmill.



Paints & Colours for Modelmaking

VICTOR SUTTON MAKES SOME USEFUL SUGGESTIONS

I FIND one of the greatest problems of the model maker is his quest for knowledge on paints for finishing. It is true that small enamels exist, but it is also true that tins of "flat" paint are getting scarce and seldom found in the shade you need. Model aeroplane dopes are not the correct answer because they are too lumpy for fine work and not right for scenic modelling.

At the moment I contribute to over 30 leading journals on display, and in this direction I have been able to collect information on paints from firms connected with this craft. This article should help you out immensely if you follow it closely.

Water colours are ideal for touching up scenic models especially if you have used photographic mount board as I have suggested in my articles. I favour the tubes and pans at 9d. and 1/3d., but tubes are wasteful if you do not use much. The shades are absolutely permanent and there are quite 20 shades available. These can also be used for colouring photographs and lantern slides.

We next come to designer's colours, and these are a Superfine Gouache water colour. They are not cheap, but very economical in use. There are 27 shades at 1/3d. each. These are exceptionally good for poster work and can be used through an air spray. For truly neat work you can dilute the paint and use it with ruling and lettering pens. I find them ideal for touching up model buildings, lining round windows and similar jobs. There is not the "drag" which you get with oiled paints and which leads to the wobby line effect.

I do like using Process white. It so often saves you having to buy a tin of "flat" paint at probably 4/9d. (if you can get it). This paint is used by all commercial artists, and is permanent and free from lead, and you can then mix it with poster colours. Imagine the enormous advantage you have gained here in one item. I find it handy for splash-washing model walls in farm sets. It is, with a fine brush, a pleasure to use. Cost is about 11d. for ½ oz. jar and 1 oz. jar 1/4d. For larger work stock up a ½ lb. pot at 3/6d. All these lines, being essentially for schools and commercial work are well stoppered and screw-topped, so they will not dry up unless kept a very long time.

Similar to this is Process black, and here I see great hopes for the small ship modeller. This contains no blue, and therefore will photograph perfectly black. It may be diluted for pure greys, or mixed with process white for lighter tones. This can be used with the air brush. Price for ½ oz. pot is 11d. and 1 oz. 1/4d.

Another range I use is the Winsor & Newton scholastic water colour range. These are 2 in. tubes at 6d. Originally used for school use it is becoming a fast favourite with model makers who want to get wealth of colour and true shades. It gives a delicate shading and is available in 40 different shades.

I have, in my time, done large sets of miniature scenery. My fire and blitz set alone is 75 ft. long. Here, as in display, one requires larger coverage, and I cannot do better than use Waterproof Showcard colours. These will resist outdoor weather conditions and still retain their brilliance even over a period of many years. One can get them in 1 oz. glass pots at 1/2d. Here is the range which should suit any keen model maker: Lemon, yellow, orange, cobalt blue, ultramarine, violet, emerald, dark green, brown, vermilion, brilliant red, crimson, white, black. You can use these on celluloid. Brushes should be cleaned in tepid water directly after use.

Poster colours should be used far more than they are. I use them on small parts where, by using them thick they have a splendid covering surface and a good depth of shade. Being a water colour they are, most definitely, fine in use and prevent you getting unsightly bumps and uneven patches. They dry opaque and flat and several coats are better than one thick. They will not lift off any further or undercoat supplied. I always use mine with a good array of palette saucers for mixing. Pots cost about 11d., but they are very strong and economical in use. Realistic background with these becomes a pleasure. Shades available are: Blues, greens, red, browns, yellows, blacks, lemon, ultramarine, violet and white. In each of these you can get at least ten variations.

Larger scenic washes often present a problem. Distemper is too solid and not fine enough in finished treatment. I use New Art Powder Colours. These come in large screw-top tins at 1/9d. each. They mix with cold water and the shade can be determined by the amount of powder used which is a great asset when striving for scenic effects. Shades to be had are black, brilliant green, brilliant red, brown, crimson, chrome yellow, cobalt blue, emerald green, lemon, violet and white.

Model makers should make a point of going to a really good commercial stationers or art and craft shop and not so much to the oil shop for their painting materials.

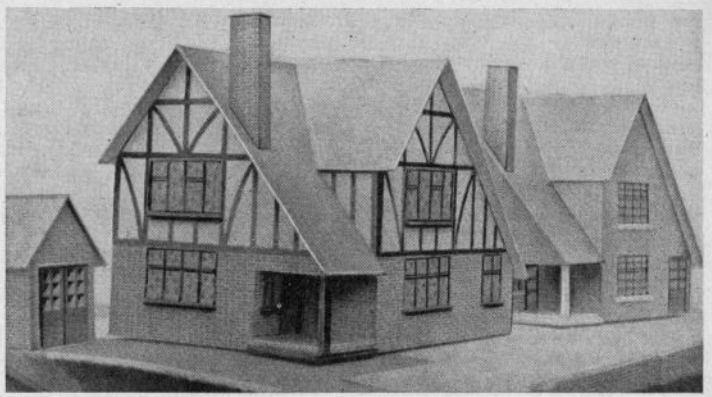
The various lines stocked for the artists are cheaper in the long run (because you can get small pots and jars), you get a very much finer material and a greater range of shades.

Here are a few more hints on these good things to be had.

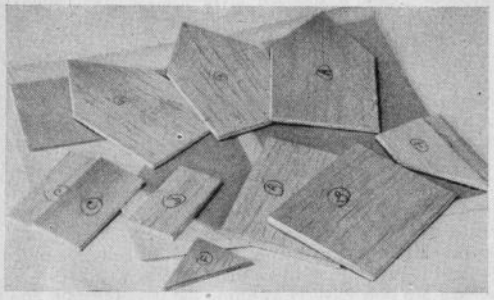
(*Continued on page 592*)

BUILDING "The Timbers"

A NEW GRAHAM FARISH LINESIDE BUILDING PACK



"The Timbers", complete with garage, and neighbouring "Red Roofs" in the background—arranged on temporary garden baseboard.



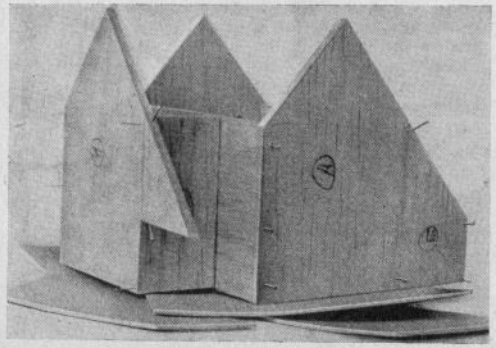
The parts cut out and labelled ready for assembly.

WE should be less than human if we did not confess to a glow of satisfaction at the results of our latest Graham Farish building enterprise. These little houses are the first of a series of "background" scenery that will be put out in kit form during the next few months, and will ultimately include a pub, shops, church and all the other necessary building for that thriving new town Brookdale, and other towns on the line.

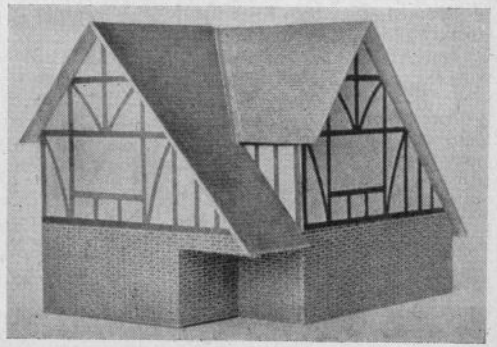
Following their now established custom the kit comprises extensive illustrated building instructions, lithographed building papers, including ready-shaped roof tiling, suitable selection of door and window papers, fencing papers, flexible tubing for down pipes and chimney pots if fitted, and even decorative material for making climbing plants on the walls in green and red. The summer awning and table canopy has even been remembered. A further sheet, laid out ready for cutting, provides the modern Tudor first floor finish of "The Timbers". The builder has only to purchase approximately 5 ft. run of 3 in. wide ⅛ in. balsa to be able to complete at least two houses and detached garages. As it happened we had enough scrap material left over from our two previous GF buildings to make any such purchase unnecessary.

Dimensioned drawings make the cutting out of the balsa parts simplicity itself: time is saved if everything is doubled up, thus providing the material for

House shell assembled, resting on cut out card parts for roof.



House roofed, with brick and timber effects added, windows to be fixed.



two houses. Everything fits together happily to make a roofless shell. Next the roof paper should be stuck with a dextrin mountant (Gripfix or similar) to a thin cardboard base. If much thicker than postcard material it will be necessary to score the under surface where they are to be folded for the ridges. These are then stuck to the house shell, and the buildings begin to take shape.

Owing to the presence of ready marked timbering papers "The Timbers" is the better house to proceed with first. Ground floor brick paper should be stuck on all round : we chose a mellow brown brick as most in keeping with the Tudor style. The timber decorations are then added to first floor. From the window papers offered we naturally chose the small leaded lights to go with the timbering. These can be put in place with the aid of the building instructions—though a slavish adherence to finishing suggestions is by no means necessary.

Small thresholds, and a support are then added to complete the front door and porch. Chimneys are cut out from scrap and added. They will be stronger if the roof covering is cut away to enable them to be glued directly to the card. Chimney pots are quite optional—red tubing is provided for them if required, but so many modern houses have the deep inset type that they are very much a matter of taste. In the same way detail fittings such as gutters and down pipes can be added. If neatly done they certainly improve the appearance, but readers intent on making a whole building estate may prefer to omit them. Window sills, on the other hand, are well worth while, adding considerably to the general appearance.

With "The Timbers" completed we turned our hand to finishing the house next door "Red Roofs". By using bright red brick paper with white window sills an entirely different appearance is achieved, which makes it necessary to look twice to be sure the outline is really exactly the same as the Tudor-style house. In this case we left some radical difference would help, and built the garage as part of the main building instead of detached as their more affluent neighbours enjoy.

While these houses would normally form back of a complete scenic layout we lacked any ready-made location for them, and therefore completed their front garden layout on a spare piece of card ready for installation later on. Small brick paper covered front walls of balsa were made and stuck in place, with a scale building line of 30 ft. As a concession to modern practice these walls were built to a scale height of 18 in. only, with brick-and-a-half pillars at suitable intervals. No front garden boundary wall was fitted between the houses, nor front gates installed—again a modern style that is increasingly prevalent in these days of building to a price limit. Green blotting paper was used to simulate the lawns, a grey undercoat provided the tarmac garage drive for "The Timbers", and pencilled crazy paving kept "Red Roofs" a little different.

Once the principle of building this type of 00 scale house has been mastered there is nothing to stop the enthusiast building a whole estate. For those who fancy a change they could always model their own house and their neighbours' to include in their layout, and might even proceed to include gardens laid out as in the full-size. Such a feature would never fail to amuse and impress visitors.

We are now eagerly awaiting the next GF building kit—and only hope it will be the pub, to remind us that model making can be thirsty work !

PAINTS & COLOURS FOR MODELMAKING (*continued from page 590*)

For preparing a glazed surface (photographs, parchment, etc.), you can use Ox. Gall (colourless) which is made in ½ oz. bottles.

Before painting woodwork one can give it a coat of prepared size which costs 10d. a ½ oz. pot and is used by all first-class artists.

Gum Arabic can be had in 8d. bottles. Mixed with water this is used where you want to get a high gloss.

Glass Medium No. 1 is used for a first colouring and broad washes. Mixed with water this medium enables the colours to lie flat and smooth so that the added shades will tone in well.

Many materials get into model making and here perhaps the worker will like to know of Turck's Aquarella Medium. It is in 2 oz. bottles at 3/-. This preparation is used for water colour painting on silk, gauze, wood or ivory. It prevents the colour from spreading, cracking and peeling. It is well worth the model maker knowing this.

Purified linseed oil is always hard to get, but the chances are that you will get it at the stationers or art shop; 1 oz. bottles cost 11d. and 2 oz. bottles 1/5d., and it is purified and bleached entirely by natural means. It is an excellent dryer, and is rendered unusually brilliant by the treatment applied in its production.

English distilled turpentine is another asset to the model maker and comes in 1 oz. and 2 oz. bottles.

Many has been the time that I have used Chinese Map Varnish with splendid results. Small bottle costs 1/3d., and will bring any paper or cardboard up to a very high gloss.

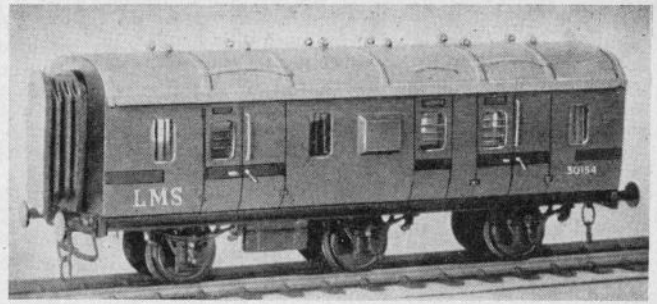
For quick-drying varnish one cannot do better than use Picture Copal Varnish. It is a pale varnish which gives a smooth surface. It must not be used

Winton Matt varnish gives a dull matt gloss and can be used with poster and oil colours. Unlike most heavier varnishes it does not darken the tone of the colours previously used.

PART II. MODEL MAKER COMPLETES THE

C.C.W. VAN & HORSE BOX

WITH A S.R. RESTAURANT COACH AS AN ENCORE !



Approach to Finishing

THERE is an old maxim on finishing models, no matter of what, about not making the job look like a Christmas tree ! In other words do not cram on the details at the expense of spoiling the general appearance. A good way of testing what should go on is to screw up the eyes when looking at the prototype and include what can still be seen.

It is advisable, however, to have as much documentation on the models as possible, in the shape of scale drawings, photographs, and most valuable of all personal notes on types seen. Our own notes on the horsebox read somewhat as follows:—

2.6.6.52. Horseboxes seen at Cheddington, loading Lord Rosebery's horses (? Newmarket, check runners). Luggage compartment doors very plain, no decoration, flush fitting, double doors, centre opening, door furniture right-hand side only. No lining on boxes in yellow. Name and number small, dull yellow, query cream. Planking not very obtrusive, hinges Midland red as main painting. Ventilators in roof—no set pattern. Five boxes seen in three styles. Mainly torpedo type, along top line, with one each side additional over horse compartment. One only as Skinley drawing.

Unless very rare and unusual stock are being made, a sight of the prototype should be possible, and certainly adds to the pleasure of construction. We got quite a kick out of seeing so many horseboxes, and felt infinitely superior to the expert Mr. Skinley, in knowing we had chapter and verse for departing from his prototype drawing, which, incidentally, will by no means prevent our religiously building to his excellent drawings in the future—indeed, we wonder what the railway modelling fraternity would do without them !

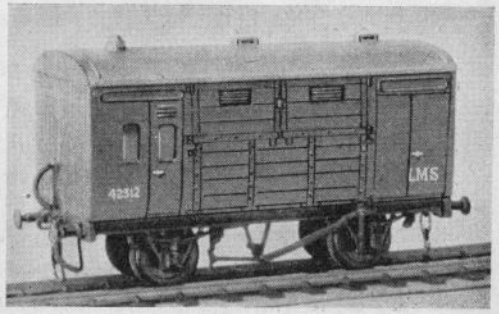
Painting, Lettering and Lining

Our horsebox had a total of six coats of Midland Red oil colour before we were satisfied. Roof had the same number of grey coats, again in oil colour. It was then detached with a razor blade for the insertion of the clear "Perspex" window glass, and finally glued permanently in place.

A little stopping was needed to disguise the joints of ends and roof, and finally two more coats completed that part of the job.

Lettering is work that is beyond the skill of the average model maker if he desires a finish that looks really professional. Unfortunately, care and patience just will not substitute for skill and, in small 00 sizes, it is virtually impossible to cut out stencils through which colour can be applied—though in 0 gauge this is quite practical. The only answer is transfers, fortunately available in a variety of sizes and styles to meet most requirements. Advice to those who have not used these waterslide transfers before is to buy a job lot—your local dealer will have a few shop soiled ones to dispose of at give-away prices, we expect—and practice applying them on odd bits of wood until you have got the knack of it. This will avoid spoiling the ones you are using on the great work—usually on a Sunday afternoon, when you cannot nip out and buy another ! Most common trouble is that letters get out of alignment—and stick crooked. For a very short time after application they can be moved around with the point of a modelling knife very delicately applied. Where a complete word such as "Midland" is being applied remember that as soon as the transfer leaves its base each letter is separate and can assume any number of crooked positions—so work warily !

Lining is another matter that requires care and



Above : The L.M.S. Brake Van. Note that S.R. type corridor connection was used and modified to Midland shape.
Right : The finished Horse Box. The reproduction process does not do full justice to these little models as red is a bad photographic colour.

skill if approached simply with a brush. Even professionals are reluctant to go in for much ultra fine lining—but there is one way that gives even the unskilled an opportunity to shine. For this some scotch tape—the usual self-adhesive type available under such trade names as "Sellotape" or "Scotch Boy" is required. If possible get a *coloured* tape rather than transparent and stick firmly over the area to be lined. Pencil the required lines on the tape, and then with a sharp razor blade, broken off to a point, cut along the pencil marks, using a flexible straight edge as a guide. We use a little 6 in. pocket rule of steel for this work. Then cut a second line about $\frac{1}{16}$ in. below the first cut, and with the point of the razor blade lift up the sliver of tape cut away. Curves must be cut in the same way, but freehand, and again practice makes perfect. Making sure the tape is still adhered well, add colour over the tape, and then peel back before it is dry. Usually a delightfully neat line will result; sometimes if the paint is too thick part of your line will come away with the tape. Then rub down and start again—using a little more thinners in the paint next time!

Other Details

Other details will include vacuum pipes where appropriate. These are bought shaped rather like a P, the straight part being plain metal and the curve simulating the vacuum pipe. If the coiled wire "piping" is secured to the inner wire with a touch of solder the straight part can be cut away where necessary to provide a much better looking finish.

The brake van was finished very much in the same way as the horsebox. The small guard's ducket was simply a piece of obechi cut to shape and stuck on. More particular modellers can buy these in "Perspex" when the actual side window opening can be made, the balance being painted over. Problem with this van was the barring of windows. Actual bars of thin wire were considered, let into the window openings, but with the addition of paint they would have appeared like policemen's truncheons, so they were lined in on the window glass with a quite convincing effect.

CCW 3rd Class S.R. Restaurant Coach completed. The window sash bars are already incorporated in the window glass supplied—and in this instance the green and gold finish proves more photogenic.

S.R. Restaurant Coach

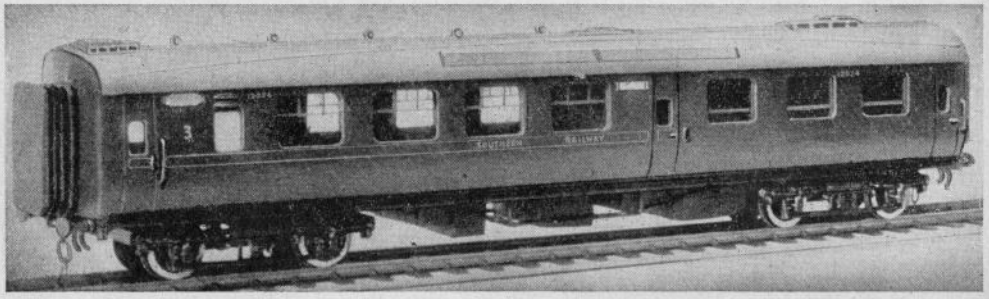
We had hardly finished these two little additions to our line when C.C.W. gave us an opportunity of inspecting their factory—which is happily situated in Watford—after suitable pledges of secrecy had been extracted. We can only say they have some lovely machinery, capable of doing practically anything to wood that their ingenious works manager can devise. However, we came away with the first prototype kit of their new S.R. 3rd Class Restaurant Car to make up.

This we have now finished, and use to illustrate this article. It is offered not as a brilliant piece of model making, but as the product of a week in bed! Everything with the exception of final transfers was done while we were on the sick list.

Contrary to our usual custom of ordering exactly what we wanted, we dropped a line to E.R.G. at Bournemouth and said send us all we need to make up the coach. They responded splendidly, providing all the colours in cellulose to our abiding joy, suitable transfers, their own special working spring buffers, couplings, ventilators, vacuum pipes, and even remembered those tricky things for home construction, the corridor connections, and, of course, Mr. Skinley's usual drawing. Finally, they put in a pair of S.R. bogies which saved a lot of hard work at the bench.

Construction followed traditional lines already discussed, with one or two exceptions. First of all, there are so many windows that we thought it as well to paint the whole of the inside in a neutral brown to avoid unfinished wood showing through, and for the same reason inserted the corridor wall to prevent a straight view appearance to this section. The C.C.W. people provide accessories for those intent on finishing the interior with seats and tables, but on this occasion we were content with exterior veracity only. Later, we will probably have the roof off and add the fittings, including kitchen equipment.

We have now lunched on this coach, and would report for the benefit of lazy would-be constructors that it is painted throughout in malachite green, with *no* lettering whatever on it—so, if you want to dodge the transfers, you will be strictly accurate!



A LIGHT *Vane* GEAR

BY J. H. CUNNINGHAM

THE design was greatly influenced by the acquisition of some $\frac{3}{16}$ in. dia. stainless steel tubing, ex W.D. kites. It can be silver or soft soldered, does not lose its hardness in silver soldering and is very light. The whole gear including feather weighs $2\frac{1}{4}$ ozs. and is strong enough for A class yachts. Due to the distance apart of the bearings, there is an almost entire absence of sloppiness usual in getting the bearings free enough to allow vane to work easily.

A prior gear was made using stainless steel sheet, 25 i.w.g. bent into channel section, the weight of the whole was only a little more than the gear shown.

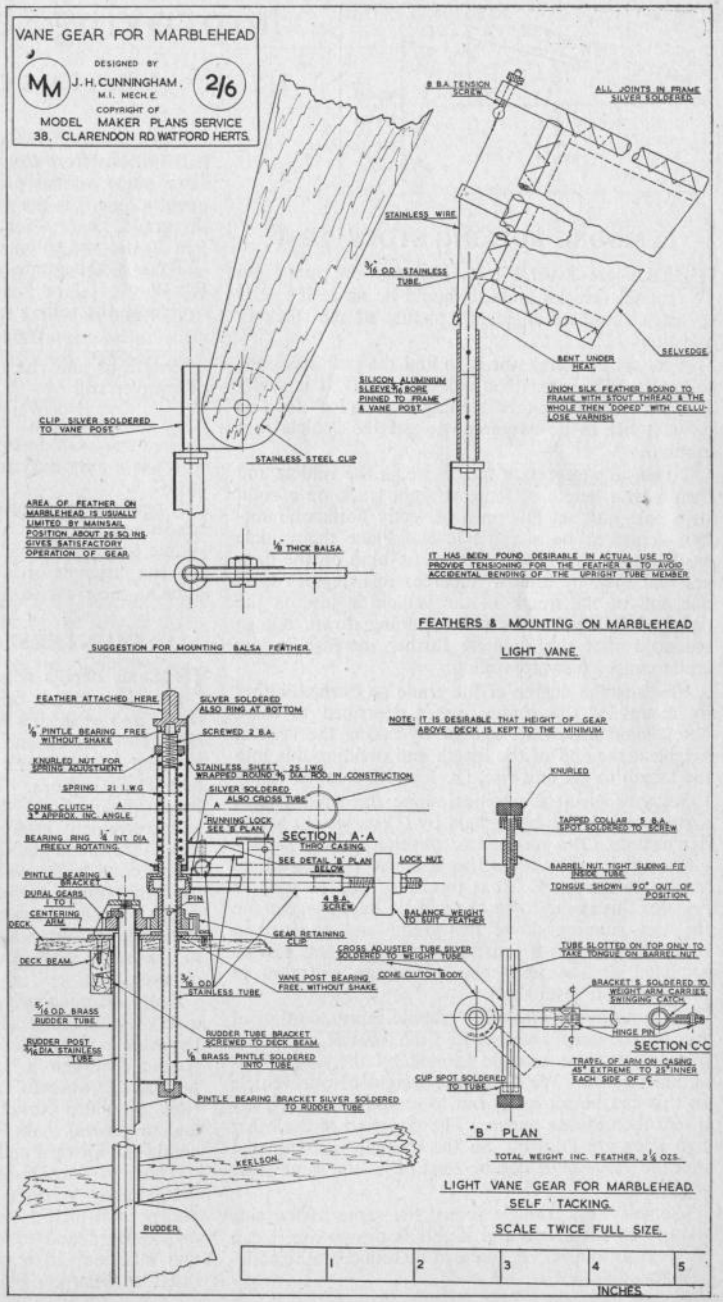
The gear as drawn carries a number of refinements necessitating the use of a lathe, but by a little adaption alternatives can be used without any loss of efficiency.

In place of the cone clutch a friction screw or wedging bolt bearing on the inner spindle is quite effective, it will be necessary however to reinforce the spindle by a liner to avoid crushing.

The cross adjuster tube and fittings which are a somewhat tricky job can be replaced by a 4 B.A. screwed rod carrying tapped discs with a lock nut to each to prevent unintentional movement.

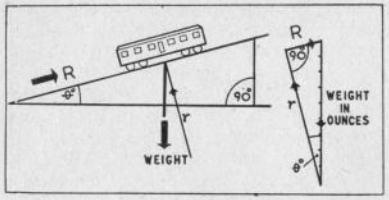
If the position of vane directly against the rudder is unsuitable or if gears are not available levers on vane and rudder with a light connecting link work satisfactorily.

(*Continued on page 624*)



Improving the Miniature Railway Layout

H. A. ROBINSON'S REGULAR FEATURE FOR 00 ENTHUSIASTS



A MODEL ROLLING STOCK TEST

THERE are several tests that can be made on model vehicles, indeed should be made if one is to get a complete engineer's picture of the stock in question.

A most interesting one is to find the pull necessary to produce movement on a level track. It is really the same as finding the "Rolling Resistance" for this is what has to be overcome to get the vehicle into motion.

To get this important factor, weigh the vehicle and then take a length of loose straight track on a solid strip base and set this on a perfectly horizontal surface—checked by a spirit level. Place the vehicle easily on this, that is so there is no bind on the flanges and then by almost imperceptible degrees raise one end of the track till the vehicle is just on the point of rolling, not actually running down, but so balanced that the slightest further increase in the grade causes forward rolling.

Measure the degree of the grade so formed, either by means of the simple meter described in these notes some little time ago or by taking the vertical height at the end of the length and dividing this into the length to get unit rise, i.e. 1 in 30, 1 in 40, etc.

Set thus on at the critical slope the vehicle is in a state of balance, being held by (1) its weight acting downwards, (2) a reaction or pushing up at right angles to the track, and (3) a force R pushing along level with the track. It is this last force we wish to find for this is the force the vehicle has to overcome to start running down the grade and so it is a measure of its own resistance to rolling and can be accepted as the resistance an engine will find in moving it on level track.

Without going into the "graphic representation of forces" too deeply we can find the force R by simply drawing out the triangle formed by the weight, reaction and R. We know the weight of our vehicle so this can be set easily out to scale (see figure), say a half inch to one ounce. The direction of the other two lines are known. So the triangle is completed and the value of R can be read off to the same scale as W.

Actually this triangle is just the same as the side picture of the grade and if this is drawn out it can be used to find R. R can also be found mathematically thus:—

From the triangle we see that R = W Sine Ø. But it is obvious from elementary geometry that Ø is the same angle as that produced by the grade. Consequently Sine Ø is the same as the fraction formed by the grade, i.e. $^1/_{40}$ for a slope of 1 in 40, $^1/_{30}$ for a 1 in 30 rise and so on.

Thus if the grade is 1 in 40 we can say that R = W $\times$ $^1/_{40}$ or simply that the pull required to overcome the rolling resistance of the vehicle =

$$\frac{\text{Weight of vehicle}}{\text{length of unit rise of grade to produce rolling}}$$

or simpler still

$$\frac{\text{Weight of vehicle}}{\text{Grade to produce rolling}}$$

which is a very easy formula both to remember and apply.

It perhaps does not seem that there should be any connection between weight and a length but this simple formula is made possible by the coincidence that the "triangle of forces" works out to exactly the same as the cross section of the critical grade.

A SHUNTERS' TRUCK IS USEFUL

IN goods depots where much locomotive shunting takes place (as opposed to capstan and hump work) and especially where there are long lengths of sidings to run up and down it is a popular practice to keep a "shunter's truck" permanently coupled before the engines. This is a stubby short wheel-based vehicle fitted with running-boards either side and convenient grab-rails. Thus as lengthy movements are made shunters can ride instead of having to be continually walking, or more often trotting, over the rough surface that surrounds marshalling tracks. The special truck also discourages the rather dangerous practice of jumping for "lifts" on to the small and often slippery steps of the locomotives.

From the modeller's point of view a shunter's truck is a very useful vehicle, for with its short wheel-base and the wide buffers that can be fitted it forms an ideal contact between a locomotive and vehicles being pushed. It absorbs any overhang of the locomotive front on sharp curves, which can cause derailment, and in general makes a better propelling agent than would the forward end of the engine itself.

There is considerable lattitude in the details of these handy vehicles as the various old-time companies, of which they are a legacy, turned out their own designs and to help both ease of construction and efficiency in a model "dumb" buffers can be fitted as shown. The truck as described (which is for gauge 0) will be found mechanically very sound riding well on sharp curves, cutting out derailments and in addition looking quite attractive.

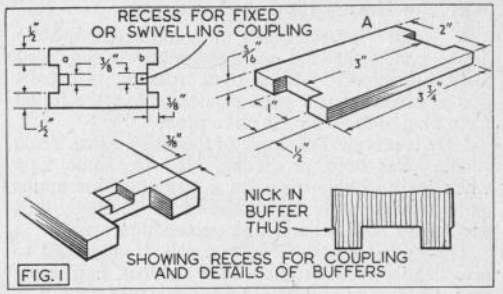


FIG. 1

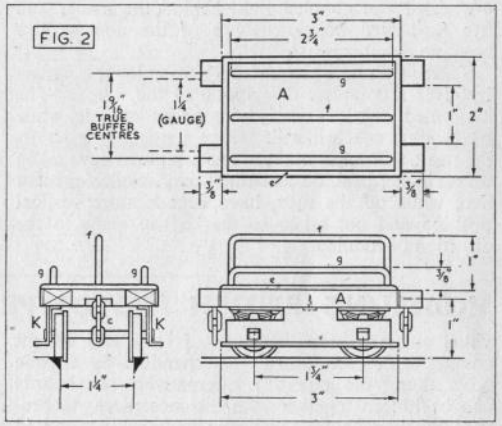


FIG. 2

First cut the main body (A) from a close-grained rectangle of $^5/_{16}$ in. wood, $3\frac{3}{4}$ in. x 2 in. The shape and other dimensions to aim for are shown in Figures 1 and 2 and the grain of the piece must run from end to end, not across. The "dumb" buffers are incorporated in the body which saves a considerable amount of work, and to give a rather better effect from the anti-locking aspect they are extended further inward than outward from their own centres. This liberty is not noted in the finished model, however, and is allowable being in the interests of "good engineering". Note too that the buffers are emphasised by finally cutting them in a little on the outsides, from the main body.

On what will be the underside of the piece cut away the recesses (a) and (b), $\frac{3}{8}$ in. wide, a shade over $\frac{1}{8}$ in. deep and as far back as required by the coupling they are to accommodate. These latter can be any of the standard commercial types, either fixed or swivelling. Also they can be of the correct three-link variety or of the single-link, less exact kind. To get the full buffering effect from the dumb buffers a three-link chain should be used.

The upper side of the rectangle forming the deck of the truck has the small beading (e) running round its edge and it is completed with the grab irons (f) and (g). The beading is glued-on strips of thin wood while the grab irons are shaped from lengths of stiff wire, the ends being pushed into holes drilled in (A). With the holes made tight-fitting the wires will hold by friction alone. Leave the final fitting of the wires, however, until the rest of the model is completed.

Wheels, axle-boxes and guards are of the standard commercial types and are fitted in the usual way to the underside of the main frame. Care must be taken to see that the buffer centre is just 1 inch (for a gauge 0 truck) above rail level. If necessary shallow channels should be cut in (A) to bring about this condition.

The axles are set $1\frac{3}{4}$ in. apart.

Now make and fit the running boards (K). These are cut from one piece of material as (B) Fig. 3. Zinc or tin can be used and the whole piece is held by screws on the underside of (A). Care must be taken in the bending but alignment of the step is assured by the four openings (p) which fit over the axle boxes. The whole aim should be to spring the piece into position when finally being put on, so that the sides are pressing up to the axle guards. Use square nosed pliers for the bending and help the lower crease (the one between the step and upright) by filing slightly along the line.

The vehicle is now completed bar fitting the grab irons and painting. In colour there is again some latitude but most shunters' trucks are in dark grey. Paint the sides of (A) and uprights of steps with this colour. Light grey for the top of (A) and tread of steps look well, while the buffer beams should be in red. The couplings and grab iron if in bright wire can be left as they are.

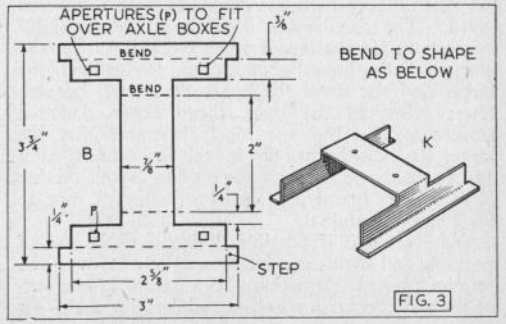


FIG. 3

Why Not Have a Court of Inquiry ?

A "court" is best called on some actual mishap on the system that has come about during combined track operations. Model track running is usually not so perfect that a good disaster cannot be found from time to time into which to probe.

Here is a typical example of the whole idea. Train running has been proceeding well for some time when for no obvious reason a terminus-to-terminus express piles up at the middle of its journey. It is decided to hold a court and proceedings start.

The operator at "X" is first called and asked to give details of the train. This he does, explaining that it was made up of a 4-4-0 tender locomotive, a 4-wheeled van coupled right behind the tender and five 8-wheeled bogey coaches of the non-corridor type (no detail is missed).

Then someone who has been chosen for this capacity gives a complete description of the wreck. The 4-wheeled van, he says, is lying on its left side, while the leading coach has slewed to a right angle across the track. Coaches number two and three have taken up a zig-zag position and tilted over, while four and five, while off the rails, have kept a more vertical position and not taken so marked an angle to the direction of running.

With regard to the locomotive, this is still upright but the tender has been dragged from the metals to an angle. While, however, the four driving wheels have left the rails and dropped to the sleepers, the bogey, curiously, is still on the track.

If the system is signalled now comes the evidence of the signalman as to how they set the tracks for the train, accepted it, etc. Should the system not be signalled, then the evidence of members who saw the train pass is taken. Mr. A observed nothing amiss, but Mr. B, a moment or so later, noticed that the light van between the locomotive and coach was oscillating rather badly—other people will have noted other things.

Everyone must be helped along, of course, by leading questions by the "Board of Trade Inspector" who is taking the enquiry.

The verdict being arrived at, comes the question as to whether any new rule covering the marshalling of vans shall be added to the "Book of Rules" that all good clubs should have. If so, the ruling should be correctly phrased and duly entered. Also, if there is any "blame" it should be apportioned, but be careful here. "Blame" will come more into the picture if the line is signalled and some faulty signalling has caused the crash under discussion.

MODELLING BRITISH PROTOTYPES IN 2½ m.m.

(*Continued from page 599*)

vided one can keep them out of close and violent contact with each other when handled by anyone other than "the expert"; alternatively two boards can be hinged together with distance pieces to prevent the two halves touching when they are closed up. The main disadvantage of this comparatively open type of storage is that scenery and lineside buildings have very little protection and are all too liable to damage.

This can be overcome by adopting the "closed box" type of baseboard, where the track is laid in a shallow box which folds in half and completely protects both track and scenic effects. Of necessity such boards are heavier than the open framework ones, but one cannot have all the advantages on one side and all the drawbacks on the other. In Fig. 4 the general constructional details of such a box are given. The size chosen depends on the available space both for the layout when erected and for the storage of the boxes when closed. In general, the larger and the fewer the boxes the better, because fewer joints in the track mean fewer potential trouble spots; but one must remember that the larger the box the heavier it will be — and that it will probably be no use having one's layout on one huge folding board if it takes an army of men to erect and dismantle it.

Quite often it is possible to combine the use of portable and permanent baseboards in a layout; the terminus board can perhaps be a fixture in one out-of-the-way corner or recess, whilst the main- or branch-line track is on portable boards which can be erected when running is to begin, and dismantled when the room has to be surrendered for its proper use. Such an arrangement is better than an all-portable layout, because the permanent section provides suitable storage space for the rolling stock.

There are many other ways of fitting layouts into awkward or strange places. Some modellers have made bookcase fitments along one wall of their living rooms, building their line in a hollow box on the top; others suspend their baseboards from pulleys in the garage roof, lowering it to working height when they wish to operate the line. A good idea I heard of recently is sketched in Fig. 3. Here a recess on one side of the fireplace in the living room has been filled in with a shallow cupboard. The door of this cupboard, instead of opening in the normal way, pivots out about 2 ft. 6 in. from the floor, and the layout is actually fixed to the inside of the door. Even the cupboard under the stairs, usually used for brooms and general junk, could house the permanent part of a layout, with extension boards in the hall to provide length of run.

I hope the sketches will give some idea of the many possible ways of fitting a layout into the rapidly diminishing space which everybody has to live in these days. Whatever method you adopt, be it portable or permanent, never forget the basic principles of levelness and rigidity; your layout can then be built on such a foundation with every prospect of success.

Modelling British Prototypes in 2½ mm.

PART II : BASEBOARDS

BY H. E. BRYANT

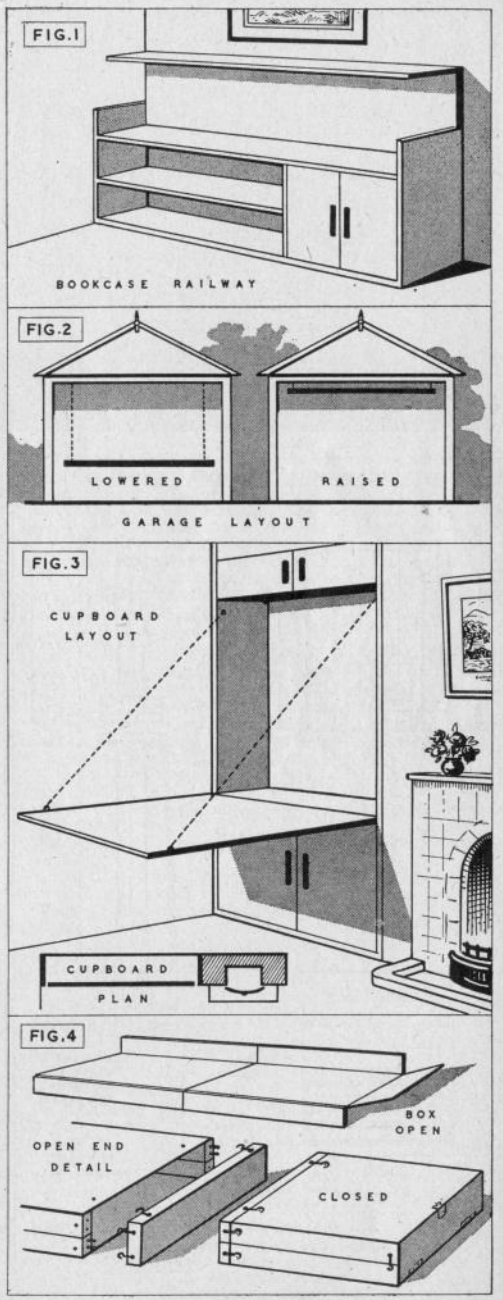
ONE of the basic differences between a toy railway and a scale layout lies in the method of laying the tracks. Sooner or later the owner of a Dublo or Rokal set starts looking round for some suitable material on which to lay the track permanently or semi-permanently—and, often unconsciously, has taken the first step in transforming his toy into a slice of the real thing in miniature. So long as the rails are laid on the living room floor or the kitchen table, there can be no real atmosphere; put the track on some form of baseboard and the lineside details start to grow round it—and there is the start of a real layout.

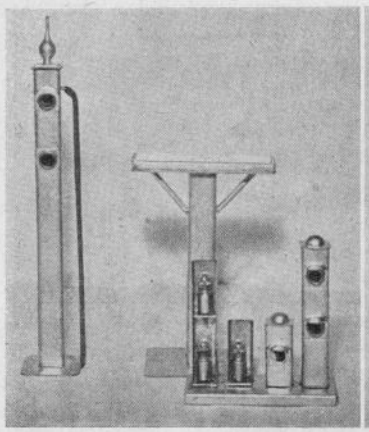
Perhaps because such a step is taken so easily, many people, I think, start off on the wrong foot, and all sorts of snags and unaccountable misdemeanours in the later running of the layout can be traced to faulty conception or slip-shod workmanship in the construction of the base on which the whole thing is built. The smaller the scale in which you are working the greater the need for care; faulty track alignment in 7 mm. scale will have less chance of causing trouble than it will in 2½ mm.—a displacement of 1 mm. in 2½ mm. scale will cause a whale of a derailment; in 7 mm. it might only cause a bad "bounce".

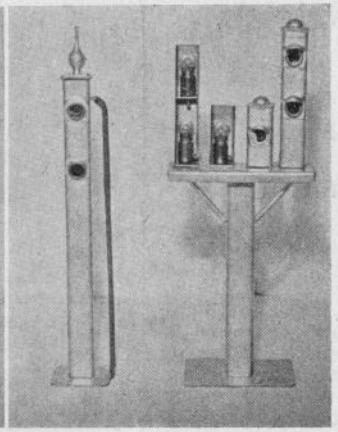
Baseboards can be broadly divided into two types —Portable and Permanent. Usually, the latter can only be used where there is a spare room which can be set aside for the model railway, or where the railway will not interfere with the room's normal use—circumstances which arise these days for too infrequently. For those who have such space at their disposal, much has already been written in the model railway press—by such authorities as Edward Beal, John Ahern and P. B. Denny, to mention only a few, and there is little point in going over the ground again here except to emphasise that whatever method is used, accuracy in construction and rigidity in use are essential to good running.

In portable baseboards these two are even more vital, and are of course somewhat harder to achieve. Fortunately in 2½ mm. scale a good-sized layout can be housed in a comparatively small number of boxes —or even one large one if circumstances and one's plans allow. Portable track boards can be stacked against a wall out of the way when not in use, pro-

(*Continued on page 598*)







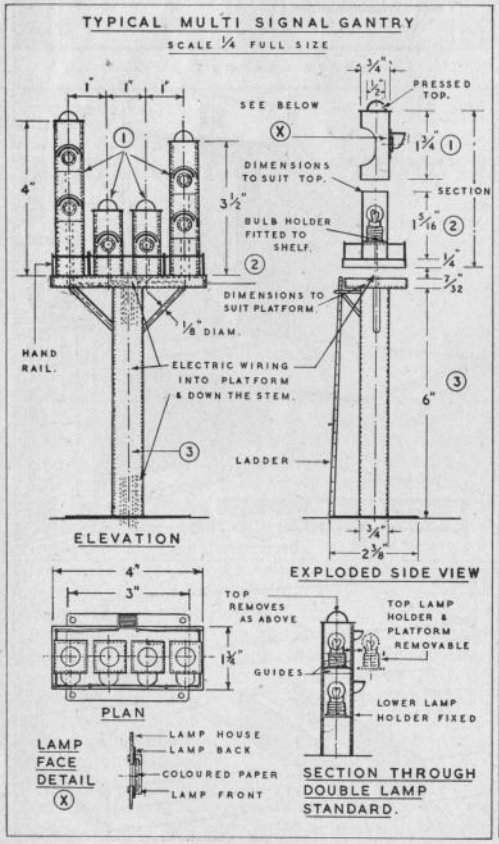
THE STANTON RAILWAY

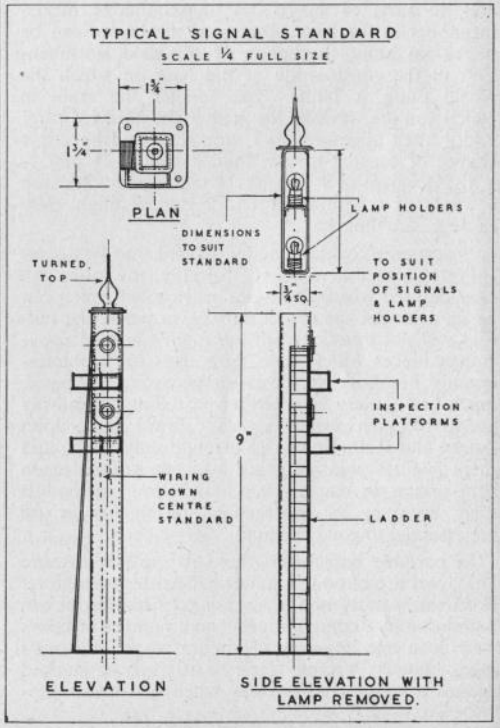
CONSTRUCTIONAL DETAILS

(I) SIGNALS

BY A. R. CASEBROOK

Recent publication of details of the Stanton Railway produced so many enquiries regarding details illustrated on this ambitious "tin-plate" layout that we are offering occasional pages of drawings which should be self-explanatory without text. Future pages will deal with typical rolling stock, point control, and buildings.





MODEL YACHT CLUB NOTES

BY "COMMODORE"

WE are happy to welcome to these notes reports of activities "North of the Border" from Mr. D. M'Pherson, Hon. Sec. of the Scottish Model Yacht Association, and are sure readers will not begrudge their unabridged publication.

"M" Clubs' Scottish Championship

Under most unfavourable weather conditions officials of the Scottish Model Yacht Association, the National Authority controlling the sport in Scotland, conducted the competition for "M" Class models at Eldir Park, Goran, on Saturday, May 17th. The Scottish Championship for this class was at stake and the winner holds the M'Pherson Cup for one year. This cup, 14 in. high, is a handsome silver trophy, presented by the present Scottish organising secretary, Mr. D. M'Pherson, and is of pre-war German silver, having been won by the donor about 50 years ago at Maxwell Park, Pollokshields, Glasgow, with his 10-Rater *Bluebell*. The race, due to start at 12.30 p.m., had to be postponed for half an hour owing to the lack of wind. When the first pair of boats were sent off on a reach conditions were no better and it took two hours to sail the first two heats on one of the smallest Scottish model yacht ponds on which organised racing takes place. After a break of three quarters of an hour for afternoon tea, racing continued till 8.15 p.m., during which time a slight and intermittent breeze helped to speed up the proceedings a little.

A new boat *Zephyr* by Mr. A. McCallum of Alexandra Club sailed very consistently by the owner's son with Mr. Tom Porter, Scottish Registrar as an experienced and capable mate, ultimately proved the winner with 30 points out of a total of 36. *Lady Jean* built in 1951 by the Scottish Commodore, Mr. David Leggat of Paisley, represented the Scottish "A" Class Club, and proved a formidable opponent during the race and finished only four points behind the winner. Three boats, representatives of Victoria—West of Scotland Club, Queen's Park and Dennistown Clubs, tied for third place, and in the sail-off *Mariella*, owned by Mr. Wm. Bowman of Dennistown, proved the winner.

An interesting point of the sailing was apparent in the light weather conditions when one after the other of the competitors stripped their vane gear and reverted to Braine.

Mr. E. H. Brooks of Edinburgh, Vice-President of the S.M.Y.A., was Officer of the Day.

Largs Designer Produces Scottish Champion

The annual competition for the Championship of Scotland for models of "A" Class rating was held at Cowdinknowes Dam, Greenoch, on Saturday, May 3rd. Seven clubs entered and the race was keenly contested in a moderate to fresh easterly breeze which gave a beat and a run back to the finishing flags. The winning boat was Mr. Alex. McGraer's *Fiona*, of Helmsburgh Club, for the second year in succession. The possible score was 30 points and after losing the first two boards, Mr. McGraer found correct trim, and did not lose another point throughout the competition. *Fiona* is Mr. McGraer's second attempt at "A" Class building. She was built at the McGraer's yacht building yard at Clynder where the second and third generations are now established in a good going family business. *Fiona* is of traditional building construction insofar that she is planked and framed but *without fastenings of any kind*, the planks being held to the frames with patent glue, a unique method of building. She is from the board of Mr. Wm. Smith of Largs, being of improved *Elma* design. The second prize went to *Scotinn*, owner Mr. Wm. Macpherson of Miniature Club, Glasgow, an old boat built by the present owner's father and three times Scottish champion in pre-war years. She was designed as a *full keel boat* by Mr. P. G. MacGregor of Victoria—West of Scotland Club, but after her second season she was *altered to fin-and-skeg* under-water formation. The third prize was won by *Shua*, owned by Mr. George Scott of Alexandra Club, Glasgow, a foreman shipwright, and also Scottish champion three years in succession.

Barrow Model Yacht Club

The junior members had a race to themselves on the club's sailing water on June 26th, for a Silver Cup presented by Mrs. Louise Paris for competition by junior members only. The juniors had to "skipper" their boats, and senior members acted as mates, their names being put in a hat and drawn for by each skipper. Six yachts were entered and some very good sailing was witnessed. The cup was won by *Vanessa*, skipper Harvey Willetts, and second place was gained by *Britannia*, skipper Ian Sharpe.

The club's race for the "Eunice Trophy" for "M" Class yachts was held on June 29th, and was run on Walney Yachting Pool. The pool is really too small for racing this size yacht, but it is the only pool open to public view. There was a large assembly of spectators interested in the racing, and two boards each of seven heats were run. The trophy was won for the second time in succession by *Sue*, owned and skippered by E. R. Eales; second place was gained by *Eunice*, skippered by Ian Sharpe and third place by *Vanessa*, skippered by Harvey Willetts. The race started with a reach and second suits, the wind changing later to a top suit breeze. Miss M. P. Coade presented the trophy to the winner and W. Gillespie acted as O.O.D.

Poole M.Y. & P.B.A.

The Poole Model Yacht and Power Boat Club will hold a Radio Controlled Regatta for R/C Yachts and Power Boats on their water in Poole Park Lake, Dorset, on Sunday, 28th September, 1952.

The club boathouse is available to store boats and equipment on Saturday night, as it is expected competitors will wish to practise and "tune up" on Saturday, 27th.

The following events will be run and will be open to any individual.

Event I.—Steering Competition round triangular course, for Power Boats.

Event II.—Race round triangular course, speed limit 15 m.p.h.

Event III.—Radio Controlled sailing yacht race round triangular course.

Regatta will start at 2.30 p.m., 28th September. Entry fee, 2/6d. per boat. All entries, and for further information, please send to the Commodore, Mr. R. P. Simpson, 87 Orchard Avenue, Parkstone, Dorset.

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

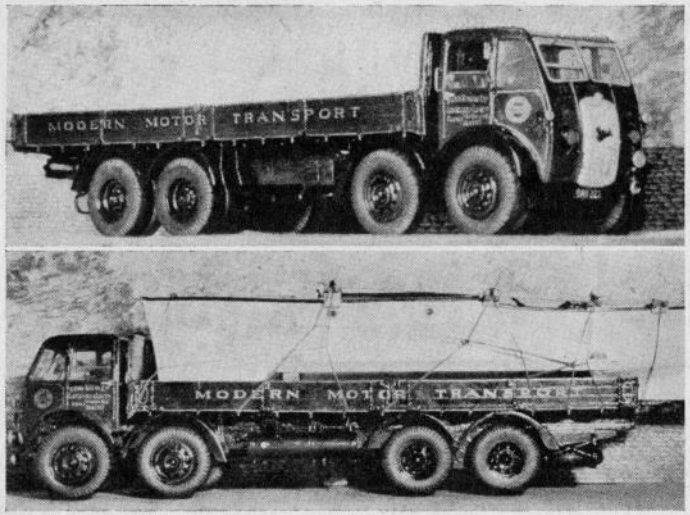
Midland District Committee Six Metre Class Model Yacht Championship.—During the weekend 19th July, yachts entered by City of Birmingham, Nottingham and Bournville Clubs, sailed two rounds to decide this year's winner of the trophy, a 1793 antique, presented in memory of that great model yachtsman, Mr. W. H. Davey.

A moderately fresh N.W. wind provided good sport for the first round of five heats, but for the second round of equal heats the wind dropped and veered N.N.W., changed at times to N.E., backed to N.W. and then to S.W. These fluctuations set a puzzle to the skippers, even to those of long experience, requiring many a change of trim and tactics.

After much patient and thoughtful effort and by the virtues of well designed and well built ships, vital points were obtained, and the winner emerged to give pride to Bournville Club. The successful skipper was Ron Harris,

(*Continued on page* 607)

"OUT OF GAUGE" TRANSPORT



P. R. WICKHAM PROVIDES ANOTHER OF HIS EXERCISES IN INGENUITY IN THIS DELIGHTFUL MODEL OF A FODEN LORRY BEARING AN ENORMOUS LAUNCH WHICH SERVES AS A "COMPANION PIECE" TO HIS SCAMMELL ALREADY DESCRIBED

I FEEL that I owe some apology to the boat-building fraternity among our readers for portraying a perfectly respectable motor launch caught by the camera (literally) "out of its element". But the photograph gave a remarkable demonstration of the capabilities of the modern heavy transport vehicle, so I was asked by the lorry's owners to build a ½ in. scale model of vehicle and load, as a "companion piece" for the "Scammell" recently described.

The lorry is a standard "Foden" eight-wheeled, oil-engined vehicle and, like the "Scammel", the model was made from plans kindly loaned by the builders and from notes and sketches made from the actual lorry.

The chassis was first built up using built-up channel section side girders joined by cross-stretchers drilled and fretted out to clear lay shaft, brake rods, etc. The driving gear of the prototype, with a universally jointed lay shaft running from the gearbox behind the cab to the twin differential drive units on the rear axles, was all carefully reproduced in dummy form, also the brake gear, exhaust system, battery boxes, fuel tanks and other auxiliaries. Dummy fibre leaf springs were fitted throughout, the rear axles having a special equalising arrangement, parts of which can be seen in the photographs. The four front wheels were pivoted on stub axles and linked up by a modified form of working steering gear. Wheel blanks were turned up for me from fine grained wood and then drilled out, and treads filed in the tyres by hand.

The elaborately shaped double mudguards over each pair of wheels were made in two parts—a shaped fibre front profile and a curved fire "top"—cemented together, and fixed to metal brackets on the chassis.

Of all the problems met with in this model, the cab was undoubtedly the most troublesome. A standard "Foden" cab is one of those objects calculated to rise up in a model maker's nightmare! The body builder employed by the firm owning the prototype was called on to restore a damaged cab at about the time I was making the model, and I cannot do better than record his comment—"there isn't a straight line in it". A first attempt to make the sides wholly in "Perspex" (as in the "Scammel" model) failed because once the material was heated to bend the side to shape is proved impossible to keep the actual window surfaces flat. So the sides were eventually made from two thicknesses of fibre sheet, the inner one cut away to form rebates into which flat "Perspex" windows were cemented. Even then I had to abandon my original intention of making the doors to open, as the very thin rails between windows would have made the job too fragile to withstand ordinary handling. The front and back were made similarly to the sides, and the cab assembled round the wood floor on which interior fittings had already been built up. These included bonnet cover, bucket seats, fire extinguisher, steering column and all controls—windscreen wiper motor, lamps, pocket for route map, etc. The curved fibre roof ("beaded" with fine paper strips to represent the original ribbed metal) was then set in. Head, side and fog lamps were all shaped from "Perspex" with rims painted on, and the lead-in cables represented by bent wire.

Hardly less of a problem than the cab was the effective reproduction in so small a scale of the distinctive "Foden" radiator. Eventually it was made by winding fine sewing cotton on to a curved former, cementing on wire cross rods, adding a card frame, and painting the whole in aluminium paint with the emblem in red.

The body proved a comparatively simple job in wood and fibre, with dummy fastenings, hinges, etc., in wood and Bristol board. Anyone who is modelling a "Foden" lorry, incidentally, should not overlook the specially shaped bearers which give such a distinctive appearance to the underside of the body.

The finished lorry was painted in blue and red, and carefully lined out in gold, including the Customs licence discs on the cab side panels.

I now faced the task of building the launch, practically my first attempt at anything of the kind, to be frank. A "skeleton" structure of ply bulkheads slotted into a ply "keel plate" cut away for the cockpit, was first built on more or less orthodox lines. I then found that no thin ply was available for planking the hull (this was just after the war), so an attempt was made to plank it in balsa. Now I do not know whether there is some deep-seated natural antipathy between balsa and myself, but I am far from emulating the wonderful achievements of some of our aero- and ship-modelling friends in this cork-like material. To cut a sad story short, after wrecking nearly enough balsa sheet to plank the "Kon-Tiki" raft, I decided to try a cardboard-skinned hull. I had some experience of this, as I once started to make a galleon hull by this method and it turned out quite well until I suspected the accuracy of the plans I was working to, got discouraged, and handed it on to a schoolboy acquaintance to finish off. For the launch hull I used a thin white card, damped to follow the curves of the hull, applying two layers of "planks" with joints "staggered" between the two layers. A couple of layers of smooth cartridge paper strips were then applied to give a really smooth surface, which was achieved after the hull had been given several coats of shellac varnish and well sanded down. Several coats of good quality white paint finished off the hull satisfactorily.

The fitting out of the cockpit with gratings in the floor, upholstered seats, etc., caused me no special worries. The foredeck was planked with stained and polished wood.

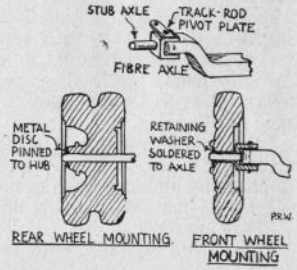
The completed launch was mounted in a "cradle" built up from stripwood to reproduce as closely as possible the rough temporary erection shown in the prototype photograph. A rough framework of battens was also laid over the top of the hull, in the prototype, to avoid the ropes damaging it, and this too was reproduced in stripwood in the model. Great care was taken, in roping down the load, to see that the ropes were placed as nearly as possible to the positions shown in the prototype picture.

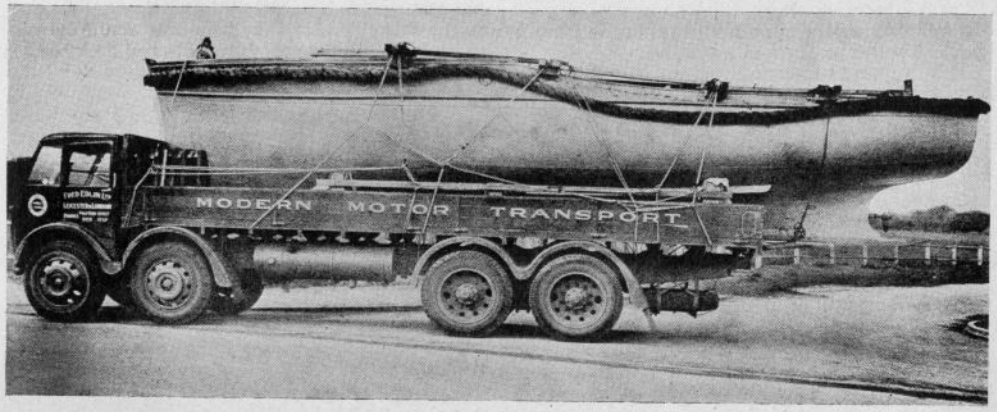
The photographs of the model, incidentally, were posed against a back scene roughly drawn in carbon pencil on cartridge paper with a strip of stone paper glued across the base to suggest a wall.

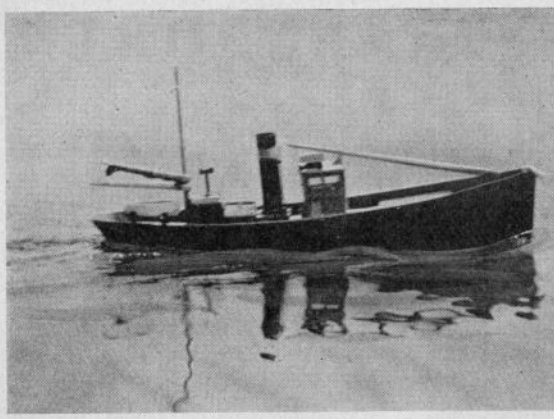
Heading pictures two views of the completed model with and without load.

Below we see the prototype vehicle and its full-size load.

Without the appropriate captions we would defy readers to tell which was which.







A FREE LANCE TRAWLER

PART ONE

BY L. C. MASON

AS a result of links connecting both sides of the family with Norfolk, schoolboy summer holidays were automatically spent on the East Coast. On these occasions, one of the best features—when the family allowed—was wandering round the quays with father looking at trawlers.

One year we discovered the dry dock, and the intriguing fact that the fat red undersides of trawlers had nearly as nice lines and curves as the top. And they *are* nice lines. Their well-known qualities as sea boats owe a lot to their very pronounced sheer. It sweeps in a grand unbroken line from a very high stem to quite a graceful counter stern, cutting the freeboard at its lowest point to about a fifth of the stem height.

Last year we went back to look at the trawlers—and I was father. The son of the family, aged nine, responded with enthusiasm to my spur of the minute suggestion that we try and build a model of one.

"How big?"

"Oh, about so big", with the hands some 2 ft. apart.

"Will it be steam or petrol?"

"Well, the park people don't like either very much so it had better be electric."

Thus we were committed, and we started in there and then by taking lots of photographs—general views and deck details.

Back home, these were translated into roughish full-sized drawings, with questions of battery stowage well in mind. A papier-maché hull was considered for a long time and then abandoned on the score of the amount of work involved in carving the wooden mould to shape. That amount of work might as well go into shaping the final hull, bread-and-butter fashion.

Having bought a plank of 1 in. obechi directly we got home, we eventually made a start by roughing this out for the two bottom planks and glueing them up. Then an idea for yet a third method of construction dawned, and a look at the drawings confirmed its possibility. This is probably well-known to experienced ship builders, but was new to us. The idea suggested that it ought to be possible to build a hull on the bread-and-butter principle *only* where the shape curved in two planes, filling in the simpler portions with thin plywood panels. The photographs show the various stages in working this out. The bottom was carved to shape and hollowed out to about $\frac{5}{16}$ in. thickness all over, except in the bows and stern. With the stem and skeg slotted and glued in, all ready for "plating", the weight was only 15 oz. Overall dimensions were to be: length 27 in.; beam 6 in.; height of stem $5\frac{1}{2}$ in.; draught at stern $2\frac{1}{2}$ in.

Stem and skeg are both from a scrap of old mahogany. The hole for the $\frac{1}{4}$ in. stern tube was drilled first in a thick piece, then this was planed down either side till it fitted its slot in the hull. After glueing in place the hole was continued through the hull into the "engine room" and the stern tube fitted. The hole for the rudder tube was drilled from each end, with much sighting along drills and checking progress with comic cardboard gauges.

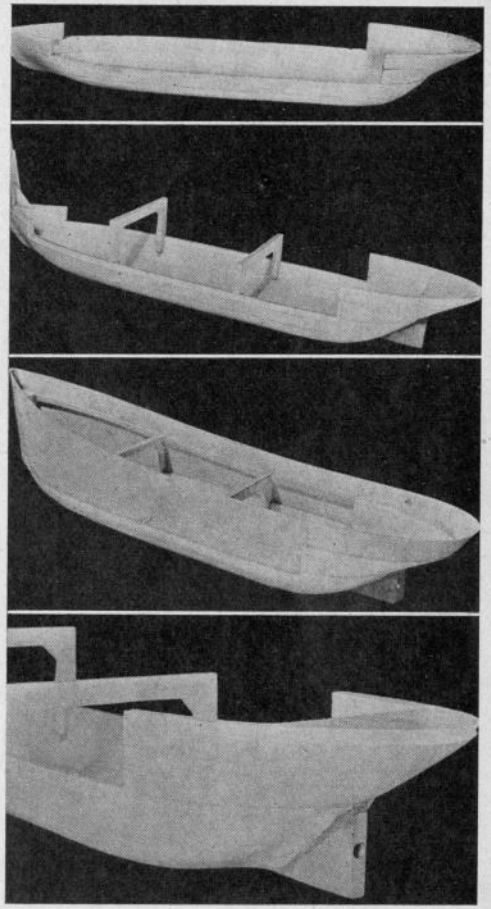
The next step before the hull sides were fixed was to cut out and fit the combined ribs and deck beams, and carving a $\frac{1}{16}$ in. deep debate around all the edges where the $\frac{1}{16}$ in. thick plywood panels would fit. These were then cut to shape and glued and pinned in place. The counter stern turned out very well, by forming the upper part from a curved strip of the ply, 1 in. wide. This, in the flat, is almost exactly the shape of a boomerang, and was cut to agree with a stiff paper pattern. The forward ends are glued to the after edges of the side panels where they stand up above the deck line, and a halved joint was made here each side, overlapping the two half-thicknesses $\frac{3}{8}$ in. This cutting, and most of the rebating round the obechi part of the hull was done with a $\frac{1}{8}$ in. chisel, with part-time assistance from a penknife. This completed, the bare hull weighed 1 lb. 10 oz.

At this stage the suggestion was made (nay, urged!) that we "see if it would float", so we fitted a dummy prop. shaft and did a ceremonial launch. Draught was about $\frac{1}{2}$ in., and we began to wonder how many flat irons we should have to borrow to ballast it down to the designed waterline. It looked about right with the motor and $7\frac{1}{2}$ lb. of assorted junk aboard, so we began to think in terms of accumulators rather than dry batteries. The hull at this stage seemed beautifully stiff and strong (yes, it *does* bounce!) and is probably lighter than most other types of wooden construction.

The motor it was intended to use if possible, was a G.45 aerial camera motor. This is designed for 12 v., but has reasonable power and speed for boat purposes on 6 v. It is nice and compact, light, and takes $1\frac{1}{4}$ amps. or so. It has a built-in 3 : 1 reduction gear by means of steel and fibre gear wheels, and a governor. The governor mechanism—by which a resistance is switched in at excessive speed—was stripped out, as it would never be needed on 6 v. An extension shaft with a boss to take the fibre gear wheel was turned up and mounted in a long bronze bush as an outrigger bearing. This is supported by stiff brass columns held in place by the motor's own clamping bolts. A simple pin and disc coupling to the $\frac{3}{16}$ in. silver steel shaft looks after the drive; the photos show the whole layout.

Propeller design was a matter of estimating all through, the only fixed factors being the diameter and the number of blades. Hull shape and dimensions fixed the diameter at $1\frac{3}{4}$ in., and we decided on three blades. These were cut from stiff sheet brass and slotted and soldered in a $\frac{3}{8}$ in. dia. turned brass boss, screwed tightly on the prop-shaft. Blade angles were arranged to give about 3 m.p.h. at 1,000 r.p.m., allowing a pessimistic percentage for slip. It was hoped the motor would turn it at about the speed, and it probably does nearly enough, as the speed is perhaps a little less than 3 m.p.h., giving a nice scale rate of progress.

Research into the battery question eventually led us to Varley dry accumulators. These are obtain-



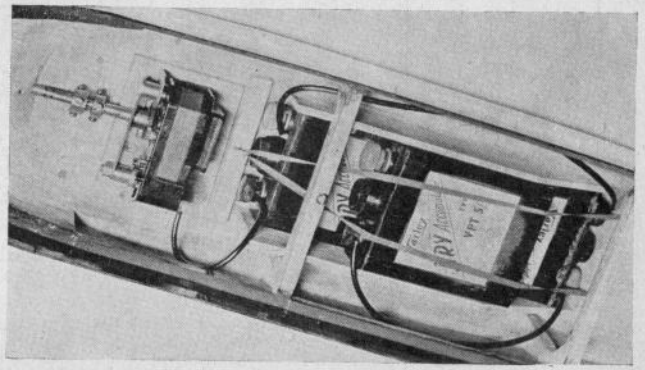
Heading picture : The completed Trawler at full scale speed (about 3 m.p.h.) in mid-pond. Above right : Start of the "bread-and-butter" composite hull.

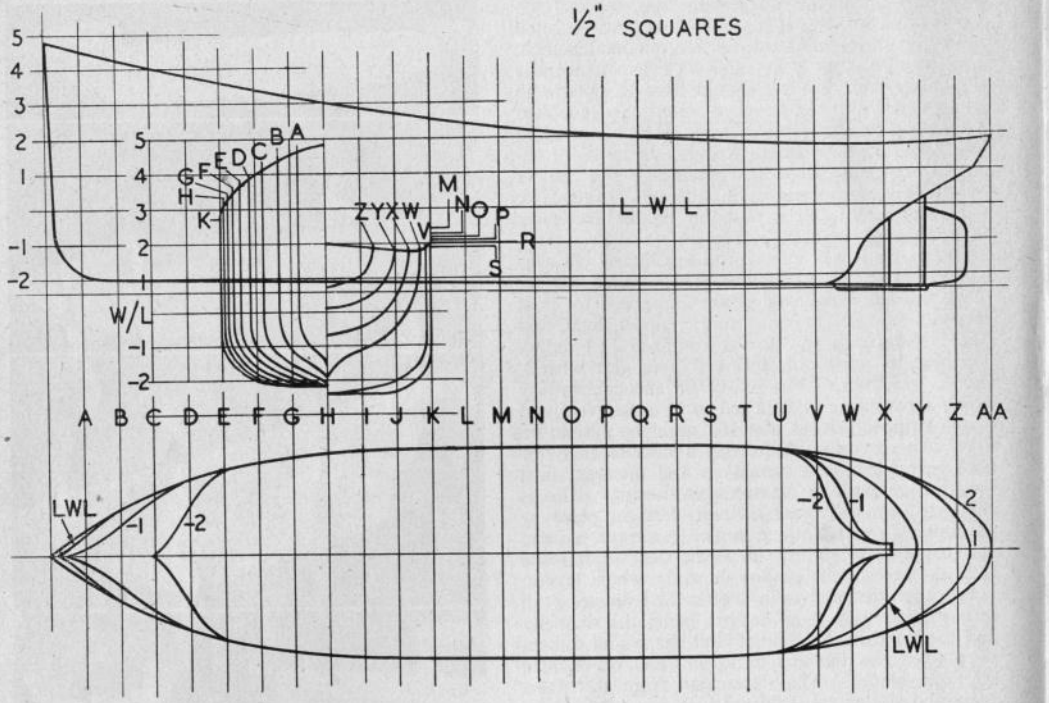
Below : "Bread-and-butter" foundation of hull with stem post, deck bearers and side members glued in place.

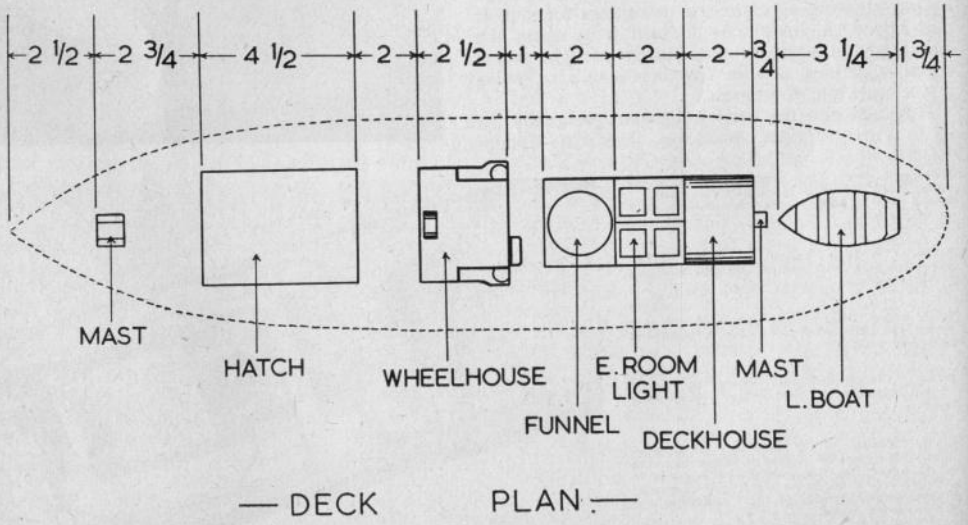
Below centre : Hull roughly completed with side panels and strip forming the counter glued and pinned in position.

Below : Close-up of stern, where the thickest "bread-and-butter" construction occurs—four layers.

Right : Stowage of the three two-volt accumulators. The top one is free to move fore and aft to adjust the trim. Connection is made to a switch in the deckhouse via a lead connected to the vacant terminal of the top accumulator and the motor frame.

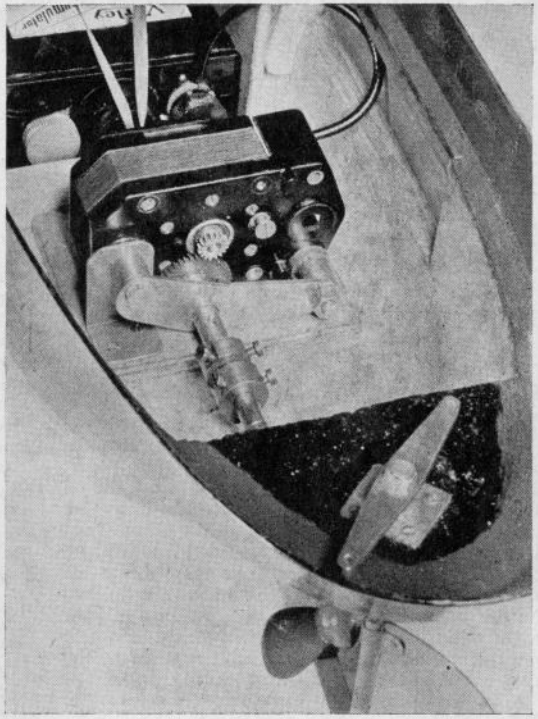






— DECK PLAN —

Right : Close-up of motor, showing built-in gearing, additional outrigger bearing, and pin coupling to prop shaft.



able in various sizes, are unspillable, and can be made up into multi-cell batteries of any voltage by the manufacturers at no extra charge, if required. We chose to have our 6 v. in three separate cells, to facilitate stowing and to simplify trimming by adjusting the position of one of them. After obtaining the batteries, a "pen" was built in for them, locating everything snugly. These three weigh 3¾ lb., leaving around 3 lb. for deck fittings and (maybe) radio control gear. A wooden bar glued across each end of the battery compartment locates the two bottom ones lying flat, while a stout rubber band positions the third one fore and aft lying on the other two.

The motor switch is an ex-Service biscuit switch, mounted inside the after deckhouse. As many contacts as possible were connected in parallel to give a good area on the contacts, and its movement restricted to two positions only—on and off. It is mounted in the usual one-hole way, and its operating spindle cut down to ½ in. long and capped with the galley chimney. A generous flat was filed on the spindle, and the chimney of thin ¼ in. bore brass tube has a shallow "D" section strip of brass sweated inside, providing a flat to match the switch spindle. The complete chimney just pushes on tightly. The thin switch-nut is enamelled black to represent the flanged chimney base.

Some liberties have been taken with hull proportions for the sake of producing a sturdy boat that will stand up to lake-side handling, and for the same reason deck details and rigging have been kept down to the barest minimum sufficient to suggest this type of vessel.

The comments of pond-side spectators suggest that this has been achieved. By omitting all the deck trawl hauling gear for the sake of simplicity, the general appearance is more that of a drifter.

FULLSIZE WORKING DRAWINGS OF THIS MODEL TRAWLER WILL SHORTLY BE AVAILABLE FROM MODEL MAKER PLANS SERVICE PRICE 5/- POST FREE

MODEL YACHT CLUB NOTES

(*continued from page 601*)

who with his mate Don Smedley sailed *Ethel*. The next highest points were won by S. C. Langford and mate A. Thornhill, City of Birmingham Club, followed by J. Lapsley and mate J. Lapsley Jnr., Nottingham Club.

Arrangements for the contest were in the capable hands of Mr. M. Fairbrother, Honorary Racing Secretary of the M.Y.A. and Honorary Secretary of the Bournville Club. The Officer of the Day was W. H. Ray, Commodore of the B.M.Y. and P.B.C., assisted by F. Pitt, G. Leeds, R. Nelson, J. Ames and Miss Betty Waters.

LEADING SCORES

1. *Ethel*—R. Harris, Bournville 30 pts.
2. *Dorrie*—S. C. Langford, City of Birmingham 27 pts.
3. *Elaine*—J. Lapsley, Nottingham 20 pts.

Ryde M.Y.C.

As might be expected from a Solent situated club in the heart of the yachting tradition of the Isle of Wight, Ryde has a strongly supported M.Y.C. with their own special traditions. Such a one is the annual inter-club tournament with the M.Y.S.A. from Kensington. This year the visitors holders of the Marblehead Cup, retained the trophy with 90 pts. against Ryde's 70 pts. But even more than the racing it is the social side of these friendly events that means so much. Amongst the visitors were L. W. Wareham whose *Doris H* led the entry with 36 pts., and A. W. Littlejohn, second place man with *Kittiwake II* (25 pts.). Best of the home side was G. Stay's *Playmate* (21 pts.).

Y.M.6m.O.A.

It was good to learn that "Bill" Daniels was fit enough to act as O.O.D. for the Glenham Cup at the Rick Pond on July 6th, after a long bout of indifferent health which has rather spoiled his 1952 competition activities. However, he was able to see R. S. Hawgood's *Jane*, from Danson M.Y.C., take a creditable second place to the all-conquering *Fantasy*, owned and skippered by Hon. Sec. N. D. Hatfield, who has now made a clean sweep of all the club's trophies except the handicap Victory Cup.

Jane is a replica of Daniels' *Zenith* which had such aggravating vane trouble in the National event at Fleetwood last year, and we are informed actually carries *Zenith's* original lead in her keel. W. G. V. Blogg's *Sharma* helped to keep the home club flying in third place.

First Steps in MODEL YACHT DESIGN

PART II BY H. E. ANDREWS

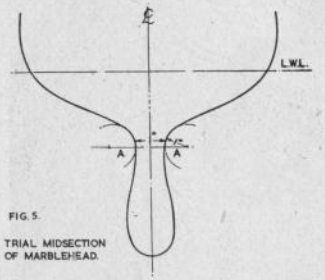


FIG. 5.
TRIAL MIDSECTION OF MARBLEHEAD.

WE HOPE THIS SERIES WILL DO MUCH TO ENCOURAGE THE YOUNGER SCHOOL OF MODEL YACHTSMEN TO TRY THEIR HAND AT DESIGNING THEIR OWN MODEL.

Commencing the Drawing

HAVING considered our rating rule and required proportions we can now start work on our trial mid-section. On a separate piece of graph paper, strike in a vertical centre line and a L.W.L., and on this drawing mark in the depth of hull, maximum draught, and freeboard, and beam on L.W.L. and beam on deck which you have decided will give you the mid-section you want. Strike in the waterline representing the junction of the hull and the fin, and on this line mark in the proposed thickness of your fin at this point. If designing a Marblehead, which must conform to the garboard limit required by the rule, scribe in the 1 in. dia. circles (Fig. 5a).

Now sketch in your first trial line passing through all the points you have marked, taking care to make it nicely fair. If it looks a reasonable shape we must check to see if it is likely to give us the displacement we want.

To do this, count the squares in the space enclosed between the L.W.L. and the junction of the hull and the fin. We now turn to a simple formula:

$$\frac{\text{Area of midsection} \times \text{L.W.L.} \times 0.55}{27.65} = \text{lb. displacement.}$$

Supposing your square count gives 24 sq. in. and your proposed L.W.L. is 49 in., then

$$\frac{24 \times 49 \times 0.55}{27.65} = 22.6 \text{ lb.}$$

To this you must add an approximate amount for the displacement of the fin, and for a Marblehead about 3 lb. will be right, so 22.6 lb. plus 3 lb. equals 25.6 lb.

If this is about the displacement you have in mind, leave the mid-section for the time being. If it is not enough, re-draw the section, filling it out a bit, but still making a fair curve. The re-calculate and see what you get. If it is too much, re-draw a third time and again re-calculate, but make sure each time that you keep a nice fair curve.

When you have obtained the right answer you must check the metacentric height. To do this, first draw a heeled L.W.L. as at 1 in. (Fig. 6a). Then through the axis of the drawing raise a vertical to the heeled L.W.L. (the Welch axis). Then make a tracing or carbon copy of all the section underneath the heeled L.W.L. Cut out and balance this tracing on a knife edge, keeping the knife edge parallel to the "Welch" axis as shown in the drawing (6b). Where it balances, draw the line of balance on the tracing, transfer it to your section drawing and extend it until it cuts the centre line. This intersection is your metacentric height for this angle of heel.

Now draw a second heeled L.W.L. and repeat the process. If your two resulting intersections coincide you have drawn a stable mid-section which is a good start for a balanced hull. If a wide difference in the intersections exists you must re-draw the mid-section and try again while still keeping the area you require for your displacement.

I may say that Fig 6 only illustrates the method, and your actual metacentric height will be lower than shown in the sketches.

Drawing the Lines

When the mid-section is to your satisfaction you can make a start on the main drawing. It is usual to put the sheer plan at the top of the sheet with the half-breatdh plan underneath it, and the body plan on the right-hand side.

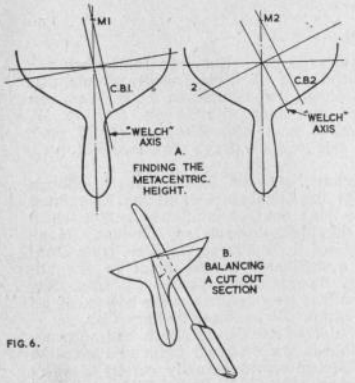


FIG. 6.

FULLSIZE DIELINE DRAWINGS OF "POLARIS" COMPLETE WITH HALF-SIZE SAIL PLAN CAN BE OBTAINED FROM THE PUBLISHERS PRICE 7/6 POST FREE. IF REQUIRED ROLLED IN TUBE PLEASE REMIT ADDITIONAL 1/6d.

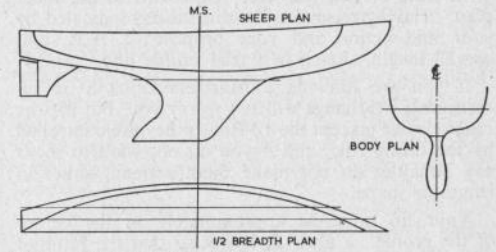


FIG. 7. LINES - 1ST. STAGE.

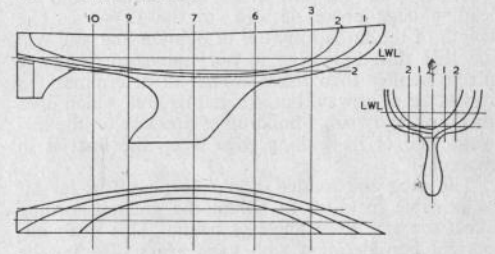
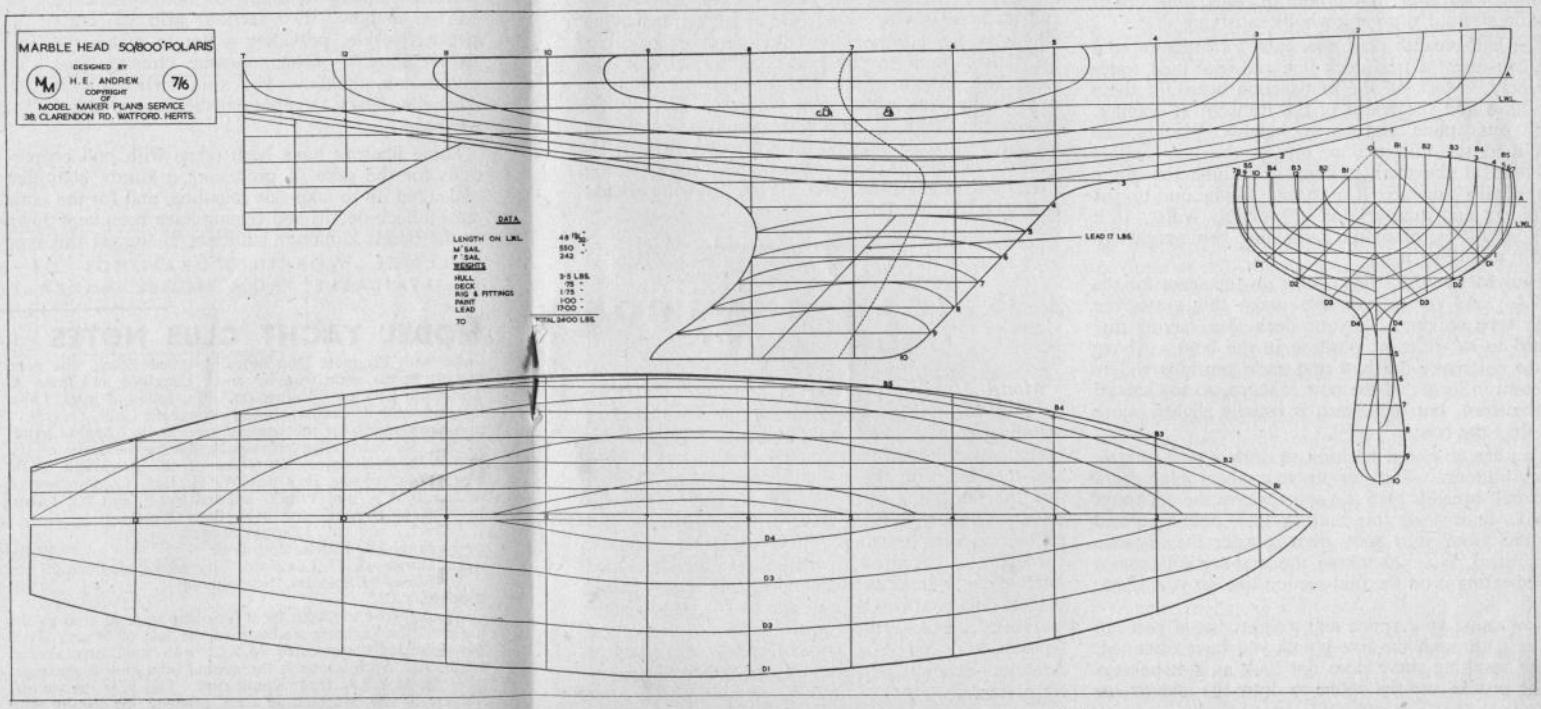


FIG. 8. LINES - 2ND. STAGE.



Start with the body plan. Strike in a centre line and L.W.L. and draw in your proved mid-section on a scale of half full-size. Now turn to the sheer plan. Having regard to the dimensions indicated by your mid-section and your proposed L.W.L. and overall length, sketch in a trial profile line.

If you are drawing a Marblehead or a 36 in. restricted, overhangs will not worry you, but for the other classes (except the 10-Rater) they are controlled by the rating rule, and if you do not want to incur any penalties do not make them extreme either in length or shape.

Your fin must be approximately in the centre of the profile. I always place it so that the forefoot is about 1 in. forward of the mid-section with its leading edge about 45 deg. to the L.W.L. The length of the fin is a matter of opinion and you will see that this dimension in our published design is much smaller than usual. The fin determines the resistance to leeway, but it is not its area which does this but the dynamic build-up of pressure on the leeward side of its leading edge when the boat is in motion.

The skeg and rudder should be placed as far aft as possible in order to obtain the greatest turning effect for any given angle of helm. This is an important consideration with vane gears. Do not be satisfied with your first profile drawing, but amend it in detail until you get a wholly satisfying shape.

The half-breadth plan now calls for attention and you can insert a trial deck line and trial load water line here. Mark off the mid-section beam for these two lines and the width of the transom at counter. Use your spline and three weights, placing one weight at the mid-section, one at the bow ending and one at the stern ending. Examine the curve you obtain and see if it needs filling out in the shoulders and quarters (as it probably will). If it does, adjust it, place the remaining two weights to hold it and draw it in.

Thus for the deck line; now do the same for the L.W.L. As far as possible make this curve the same type of curve as your deck line, having due regard to its different position in the boat. Above all do not make the bow and stern portions widely different in form; if the bow is sharp, so too should be the stern, but then stern is usually slightly more full than the bow.

You are now in a position to draw a trial quarter beam buttock. Transfer to your sheer plan from your half-breadth plan the spots where the deck and L.W.L. lines cross this buttock line, both fore and aft, and from your body plan transfer the distance from the L.W.L. to where the mid-section crosses it, indicating it on the mid-section line on your sheer plan.

Now using your spline and weights, see if you can spring it through the five points you have obtained. If the resulting curve does not look as if it belongs to the profile, use the spline to draw the underwater portion and for the time being sketch in the top sides portions freehand. Make sure that the whole line is fair however, and that it matches the profile line. Your drawing should now look like Fig. 7.

Except for the mid-section all these lines are tentative but you now have a working skeleton. Now you must start to fill it in. On *Polaris* we started this by filling in trial sections on No. 3 and No. 10 stations. From the sheer and half breadth plans, transfer to the body plan all the intersections you have shown for these sections. Sketch in trial lines through the marks you have indicated. If both lines show a family likeness to the mid-section and to each other you are progressing favourably. If not, you must re-draw the trial sections until they do look as if they belong to the mid-section, but have regard to the natural change of form as the ends of the hull are approached. Probably only slight alterations are necessary.

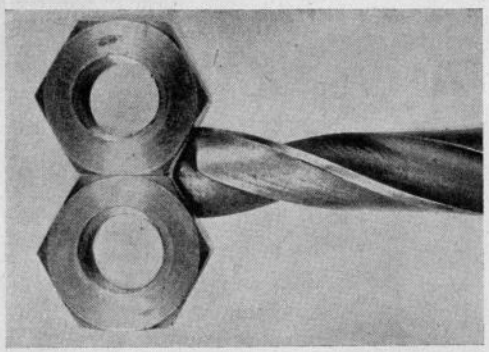
Having got these section lines to your liking, transfer the new intersections back to the sheer plan and the half-breadth plan and re-draw your L.W.L. and quarter-beam buttock. You will probably find that although they matched up before, they look much better now.

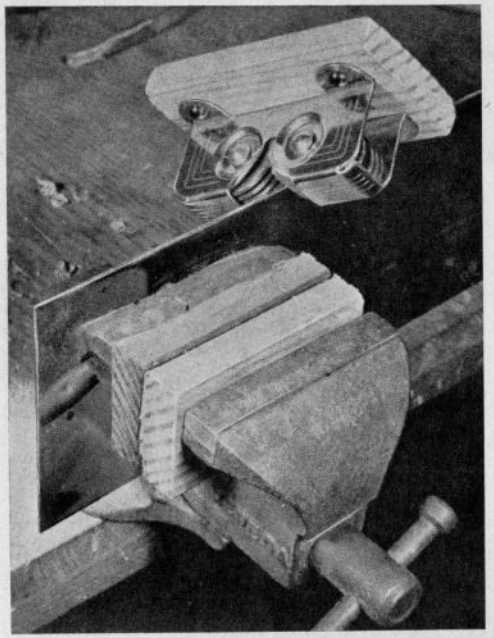
Having done this, proceed on the same lines with sections 5 and 9, and when you have faired the drawings to this point you can try a No. 2 waterline, and an inner buttock line. Do this by transferring all the relevant intersections, to the sheer plan for the buttock and to the half-breadth plan for the water line. Draw in the lines through the resulting spots using your spline and weights. Fair up as before, but make as small alterations as possible to get the desired result, and do not forget that an alteration in one drawing necessitates corresponding alteration on the other two. Your drawing should now look like Fig. 8.

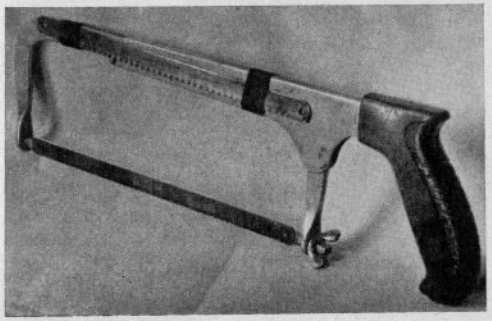
AMERICAN CHAMPION "SUN KISS"

Model Maker are proud to announce that they have made arrangements with Mr. A. R. Lassel of Wilmington, California, to publish drawings of his famous Marblehead Champion *Sun Kiss* in Gt. Britain, together with the revolutionary sliding rigging, and the designer's own notes on its use. This will be appearing in an early issue of *Model Maker*, and fullsize working drawings will, as usual, be available.

Mr. A. R. Andrew, owner-skipper of the Open Marblehead winner at Birmingham, *Floreana*, points out that his boat was to a design by Mr. Nosworthy, and does in fact differ in a number of important features from *Sun Kiss*, notably in bow and transom lines, as already remarked, and also in certain underwater lines.







3 Useful Hints

BY C. T. BOWER

Simple Drill-Grinding Gauge

THE recommended included angle to which the point of a twist drill should be ground for general use is 118 deg., but 120 deg. is near enough. Only in the case of very high pressure mass production would rigid adherence to the 118 deg. angle be practised.

A drill point grinding gauge of a very simple type is far better than no gauge at all and a handy gauge made from two hexagon nuts is shown here. It will be noted that the drill does not fit the gauge perfectly and this serves to illustrate how the angle can deviate from the ideal even when the drill has been ground by an experienced machinist using his eye as gauge.

Any suitably sized pair of nuts in good condition can be used as a gauge and can be simply held together in the fingers for use. A more permanent gauge can be made by soldering the nuts together at the two joint faces. Another way which will produce a gauge to withstand a lot of rough handling is to drill through the two nuts and rivet them together. This last form of gauge is used by some professional toolmakers.

Removing Sharp Edges from Sheet Metal

An efficient tool for the removal of sharp edges from sheet metal is the common knife sharpener now being sold in all Woolworth's stores. The sharpener is designed for screwing down to the surface of a bench, but it is better for workshop use if it is secured to a simple wooden handle which will fit neatly in the palm of the hand, as illustrated.

The sharpener comprises several loosely mounted discs of hardened steel. When the intersection of the two groups of discs is drawn along the edge of the sheet metal, the discs remove shavings and the corners of the metal are rounded off.

Metal shapes having convex radii can also be deburred by means of the knife sharpener if it is gripped in the vice and the metal drawn across the tool. This is the opposite technique to that shown in the photograph.

Storing Spare Hacksaw Blades

Model makers do not wear out or break many blades in their hacksaws, but when they want a replacement, it is often difficult to find the spare blade that was bought several months before.

Spare blades will always be ready for use if they are stored on the backbone of the hacksaw frame by securing thereto with a couple of turns of adhesive electrical tape.

When purchasing spare blades it is a good idea to buy one coarse and one with fine teeth and store them both on the saw backbone. A suitable blade will then be to hand for sawing thin sheet metal or heavy metal sections.

ADMIRAL'S BARGE

PART TWO

By E.G.COCKS

PART II DEALS WITH SKINNING OF HULL (PLY AND RAG TISSUE) COMPLETION OF UPPER WORKS DETACHABLE ROOF : STEPPING MAST : FITTINGS : PAINTING AND FINISHING

NOTE : AS AN ADMIRAL'S BARGE CONSIDERABLE FREEDOM IN COLOUR SCHEME IS PERMISSIBLE. THE FAMILIAR "GREEN PARROT" FINISH IN TWO SHADES OF GREEN IS COMMON, BUT BARGES IN MAROON ARE ALSO IN SERVICE. THIS MODEL WAS ACTUALLY FINISHED IN GREY AND RED

Skinning Hull

AFTER the installation of the power unit, the hull is skinned. For this model $\frac{1}{16}$ in. resin bonded ply was used, afterwards covered with rag tissue or good linen.

Start by skinning the bottom of the model, one side of the keel at a time. It will be found that one length can be used from the stern forward to former No. 3, on each side Carefully measure and cut these two lengths, leaving about $\frac{1}{16}$ in. on the outside and stern end for trimming, butting the other side up to the keel, and the forward end half across former No. 3. Hold ply firmly in place, then mark at 1 in. intervals along each former from Nos. 3 to 7, holes for the brass pins. Drill these holes carefully then glue skin on liberally along all formers, and bottom stringer, and half the keel at the quarter end of the model, and fix into position, pinning down firmly with the brass pins ($\frac{1}{4}$ in. pins). Fix ply other side of keel, after this making sure both halves butt perfectly together round rudder gear and top of skeg at after end of keel at centre line. The bottom of the model from former No. 6 is flat. For the forward part of the bottom skins along chine line to curve of stern part, a paper pattern may be cut and ply skins can then be cut to match, then steamed to shape, although I preferred to cut $\frac{1}{2}$ in. wide strips and plank individually from former No. 2, to the bow; one piece only is needed between formers No. 3 and 2. Glue and pin as before, using plenty of both if strips are used. Complete both sides of keel from former No. 3 to the bow, making sure all joins are filled with glue, or when set, plastic wood.

The sides of the model are completed in exactly the same way, except that instead of making a pattern first, the ply can easily be pencil marked by holding it close up to the top and bottom stringers and marking round with a pencil. Mark from *top* of top stringer (which is deck level) to bottom of lower stringer (which is the chine line). The ply when cut should butt down to the $\frac{1}{16}$ in. left over when planking the bottom. Cut accurately to fit transom or F.7 at the stern end. One length of ply may be used from stern to former No. 3, again using only half the thickness of the former. From F.3 to the bow is now individually planked with strips of ply, which, right forward at the flare, had to be steamed to shape, although if $\frac{1}{32}$ in. ply is used this would not be necessary. Glue and pin top and bottom of each plank, the centre stringer from F.3 to the bow will now hold the strips of ply at the position where they are curved. Glue well between each strip, and cut as accurately as possible. Don't worry if the ply pieces are uneven to the touch when the fingers are run over them. Next, complete the other side, and again well glue and pin. When all the glue is hard sand the hull down with a medium paper and sand until all ledges round the bow planks are even. Trim the bottom skin to the side and finish off with fine sandpaper.

Now make up patterns from the drawings plan view for the decking, from the stern to the bow, mark on to $\frac{1}{16}$ in. ply and cut out, one for each side. Allow just enough width on these to cover the side skins at deck level. Glue and pin these well down to all formers, and along top stringers. Glue four pieces of $\frac{3}{8}$ in. x $\frac{3}{8}$ in x $\frac{1}{8}$ in. wood, one under each position of the boarding stanchions for strength. Now timber the fo'c'sle deck in to fit in with the notches in the side deck pieces. Make and fit Bowman's combing. The four rubbing strakes are now

fitted, two top and two on chine line. Use $\frac{3}{16}$ in. x $\frac{3}{16}$ in. mahogany or other hard wood, as it has been proved that these have to do a good heavy job of work. Steam to shape, chine strakes first, shape off bow end, and allow $\frac{3}{16}$ in. overlay at the stern end. Glue and pin well every inch of length along the chine line, then glue and pin the lower stern strake between these two. Do exactly the same with the top rubbing strake making sure to fix well. The stern top strake has to be curved slightly to conform to shape. When all is set, sand all woods well to shape with medium paper, and finish off with fine paper.

Covering Hull With Tissue

The hull (not the decking) is covered with rag tissue. After being given one coat of clear dope the tissue is put on with dope. Cover all rubbing strakes and keel, make sure it adheres well, leave to dry. Give same area one good coat of sanding sealer, and when dry rub down with flour paper that has been used before. Now that the hull is completed it is a good thing to give it one good coat of primer paint before proceeding with the upperworks. In this case I found "Lifeguard" grey primer very suitable.

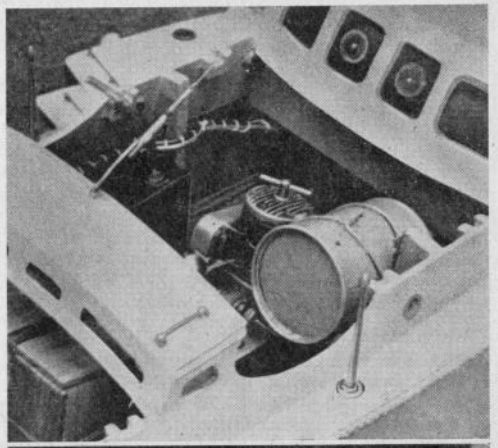
Completing the Upperworks

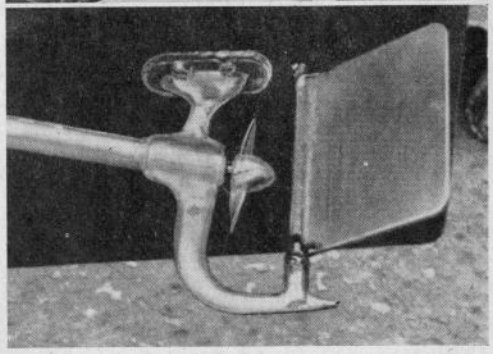
Patterns are now made from the side elevation of the drawing for the two sides. Allow in the tracing $\frac{1}{8}$ in. of extra length to make up for the curve of the sides. These sides are now cut from $\frac{1}{8}$ in. ply or other suitable material, all windows and scuttles cut out, and the whole is finished. If celluloid is to be used for the windows it is put in at this stage (for method see sketch on drawing). Make sure that the notches cut in the sides allow a tight fit on all formers. Glue both sides into place and pin through from the outside into all formers and countersink the pins. Next make cardboard patterns of the fronts of all the cabins. Cut out the wood and finish off windows, etc. These are front and forward cabin, front of lookout position, and front of wheelhouse. Glue well and pin all these into their correct positions. Fill all countersunk pin holes with wood filler.

Mast is now stepped using $\frac{1}{4}$ in. dowel tapered to $\frac{1}{8}$ in. at top, and flattened on two sides at the foot, and screwed with 6 B.A. bolt and nut between two pieces of $\frac{1}{4}$ in. ply with $\frac{1}{4}$ in. ply between the outer halves and under the foot of mast used as a spacer. The ply "tabernacle" as it is called, is glued into position and mast taken out (see sketch).

Detachable Lids

The number of lids required to lift is up to each individual maker, whether or not radio control is





Top : Close-up of engine mounting and "muffler". Plastic fuel tank will be noted on far side, and battery boxes in bottom right hand corner.
Below : Stern tube, screw and rudder. This last can be further cut down in size for less immediate response.

Another shot of the finished barge. For purists it may be remarked that this craft almost alone may fly a Union Jack in home waters.

to be used. In this case all lids take off except the one over the wheel house which is semi-detachable. This is the sliding roof and was built of $\frac{1}{4}$ in. balsa, and they as one width fit into a slot cut in the roof, and will lift off, as may be required in the unhappy event of the flywheel coming loose, if the engine backfires; my flywheel is not pinned !

All lids are a push fit into small notches made from $\frac{1}{4}$ in. ply and cut to enable whatever material is used as beams under the lids. In my case $\frac{1}{4}$ in. ply was used, and is a tight fit in these slots or notches. The notches can plainly be seen in the photograph. All detachable lids are made from $\frac{1}{8}$ in. spruce or balsa, and sanded to a camber.

Finishing the Hull

The upperworks can now be given a coat of grey primer to bring the whole model into line.

Fit all brass cleats, jack and handrail steppings on the foredeck, and ensign staff foot, on the stern, but leave the four brass boarding stanchions until after the top coat of paint has been first put on. All these items were turned out from brass rod. They could even be turned in wood if metal isn't available. They were all threaded 3 B.A. and screwed and glued into the decking, length of thread being $\frac{1}{4}$ in.

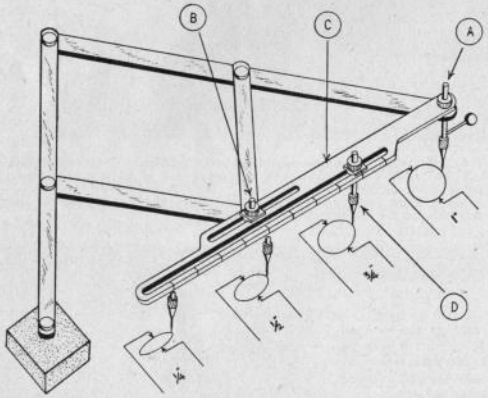
Now rub the primer coat well down with a fine pumice powder. I used "Vim", until a perfectly smooth finish is obtained, and at least two more priming coats should be given, and each rubbed down in turn. Make sure all trace of powder is wiped off the model before the top coats are put on.

The model is now turned upside down and the red underside is painted up to and including chine rubbing strake. (I used a small tin of "Robbialac" for top coats.) When perfectly dry it is rubbed down and then the final top coat is given.

The sides of the hull from deck line to top of chine rubbing strake are now painted steel grey, and again given two coats. When dry the upperworks and all round decking (cat walk), but not foredeck or sterndeck, they are given two coats of white. The fore and after deck can be stained with very light oak and varnished, so can jack staff and handrail forward, and mast and ensign staff aft. When paint is perfectly dry, fit stays to mast, and make them easily detachable, as the fore stay must be dismounted when starting the engine.

A Pantograph Attachment

BY S. E. CAPPS



PROBABLY one of the most tedious jobs for the model maker is marking out ellipses and any method whereby this job can be speeded up is to be welcomed. The author has had on many occasions jobs that required several ellipses of different sizes and made the attachment shown in the sketch to fit a pantograph to avoid the long tedious setting out with dividers and scriber. This attachment will allow an ellipse to be drawn while the stylus point traces round a circle. The sketch shows that the attachment is in the form of a slide *C* which is arranged to swivel on the stylus *A*, and to slide on centre coupling *B*. It will be seen that if the stylus is moved from east to west 1 in., the movement of the slide will be the same. If, however, the stylus is moved from south to north the same distance the centre coupling *B* will only move $\frac{1}{2}$ in. It will be obvious from this that if a pencil point *D* is fitted at position *B* on the slide *C* and the stylus point *A* traced round a 1 in. circle, the pencil point will draw an ellipse 1 in. long by $\frac{1}{2}$ in. wide. With the pencil half way between stylus *A* and centre coupling *B* the resultant ellipse will be 1 in. by $\frac{3}{4}$ in. wide. Between centre *B* and the pantograph anchorage it will by 1 in. by $\frac{1}{4}$ in. To allow movement of the pencil point to any position for various ratios the slide *C* is slotted for most of its length along which the pencil can be moved. Graduation of the front of the slide along this slot is suggested for quick adjustment of the pencil. For marking on metal the pencil is replaced by a steel scriber.

If the drawing of ellipses on paper is only required the slide can be made from transparent plastic, but if it is to be used for marking on metal or plastic or wood then it is better made of metal. Brass or aluminium is suitable and can be engraved easily. An efficient stylus plate can be made from a brass disc on which circular grooves have been cut in which the stylus point can be traced round rigidly. The attachment is a great help, and is well worth the making if many ellipses are encountered.

ALL ABOUT PINHOLE CAMERAS

BY A. M. COLBRIDGE

A PINHOLE camera is very simple to make yet can, with reservations, produce an excellent image on either a suitable screen or a photographic plate or film. The principle of the pinhole camera consists basically of a light-tight box with the screen or sensitised plate at one end and a small pinhole at the opposite end, replacing the lens in a normal camera.

Broadly speaking, the *size* of the image produced depends simply on the distance of the object from the camera and the *definition* of the image depends on the size and regularity of the pinhole. The "camera" can be either wide angle or narrow angle. as required, to cover the desired field of view. This is governed simply by the distance of the pinhole from the screen end (Fig. 1..)

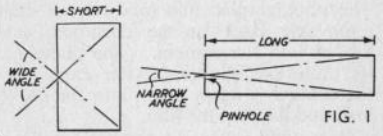


FIG. 1

The basic disadvantages, as a camera, are that long exposures are required, so that it is impossible to photograph moving objects, and also definition is not critically sharp. On the other hand, distortion is quite absent and photographs taken by a pinhole camera possess a certain pleasing softness of outline.

Actually for the best results the diameter of the pinhole should vary with the distance between the plate and the hole, the basic rule governing this (originally proposed by Sir W. Abney) being :

Pinhole diameter = $\sqrt{}$ of distance $\div$ 120.

From this it is obvious that the smaller the pinhole camera the smaller the size of pinhole required. The pinhole itself is also critical in another way. It must be perfectly circular with clean edges and the thickness of the material in which it is pierced must be considerably less than the hole diameter. In a working camera, therefore, a good plan is to pierce the required pinhole in a sheet of very thin metal, even tinfoil, mounted in the front of the camera proper (Fig. 2).

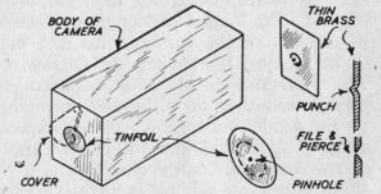


FIG. 2

The relationship between pinhole diameter and effective length of the camera is summarised in Table I. In practice, however, pinhole diameter is never as critical as this, and three "standard" sizes can be adopted. For all outdoor photographic work a pinhole diameter of 1/50th in. will be satisfactory, irrespective of the length of the camera. For closer work, both indoor and outdoor, a pinhole diameter of about 1/75th in. will be satisfactory, whilst for close detail work or copying a small pinhole of 1/100th in. diameter is recommended. The midde diameter, 1/75th in., will be a good general purpose size.

Camera length can then be selected according to the field angle required for a given size of image. Field angle increases with increasing plate or film size and decreases with increasing camera length. Typical values, related to standard film sizes, are summarised in Table II.

Fig. 3 details the construction of a simple fixed-angle pinhole camera. Virtually any material can be used for the box, provided it is lightproof. It is a good idea to paint the whole of the interior

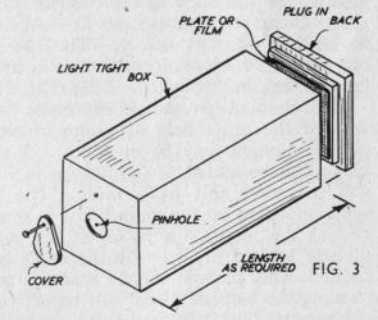


FIG. 3

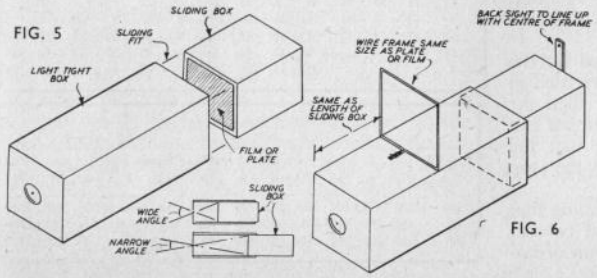


FIG. 5 FIG. 6

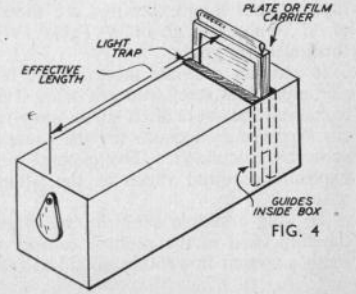


FIG. 4

matt black. Balsa wood is an excellent medium for construction, easy to cut and assemble with balsa cement. Individual parts should be treated with grain filler and sanded smooth before assembly when a smooth, matt finish can be obtained with the use of matt black cellulose dope.

The pinhole in the tinfoil diaphragm is pierced with a needle of appropriate size (1/75 in. dia.) or a length of sharpened steel wire (29 or 30 s.w.g.). Pierce the hole carefully from both sides to obviate any burr.

The simple camera as drawn is for single loading. The photographic film (or plate) is attached to the removable back in the darkroom and the back loaded into the camera. The pinhole is closed by its protective shutter. After exposure of the film the camera is again taken into the darkroom to unload and develop the film.

It is quite simple to arrange for daylight loading by making suitable light-tight carriers for individual films or plates, something after the style detailed in Fig. 4. The loaded carrier presses down into a slot in the top of the camera, this slot being carefully sealed against light when the carrier is in position. The protective envelope or mask covering the film or plate can then be withdrawn, bringing the camera to the loaded condition. After exposure the film mask is again slid into the carrier and the exposed carrier removed for developing.

An adjustable pinhole camera (varying field angle) can be constructed on much the same principle, only in this case the body of the camera consists of two parts which are a telescopic fit. Again balsa can be used, treated as before. The two parts must, however, be a close fit so that it is impossible for light to leak in through the sides (Fig. 5).

Until the first few sample exposures have been developed the exact field of vision of either type of pinhole camera may be in doubt. A simple range finder can be added, if desired, as in Fig. 6, which will overcome this basic fault. The open frame sight, mounted on the main body, is made the same size as the negative area whilst the backsight is a pinhole located in line with the exact centre of the frame. This pinhole can be made larger than that forming the camera "lens" for easier viewing.

Exposure time, too, may also be a matter of doubt. The "f" value of most pinhole cameras is extremely high so that long exposures are the rule. A range of "f" values is given in Table IV which should form a useful guide.

If you can estimate the exposure required for the particular film stock you are using if it were used in a standard camera at a given stop value, then the corresponding exposure for the pinhole camera can soon be calculated. The general rule is that the exposure required varies as the square of the stop value.

To take a simple example, we might assume that the film used in the pinhole camera would be correctly exposed in 1/50th second at f/8 on an orthodox camera. Reference to Table IV shows that the pinhole camera has a corresponding "f" value of, say, 480. Correct exposure for the pinhole camera would then be

$$\frac{480^2 \times 1/50 \text{ sec.}}{8^2} = 72 \text{ seconds.}$$

Actually the latitude possible with exposure on a pinhole camera is considerable and exposure time is seldom critical. It is better to err on the side or over, rather than under-exposure, and some simple rules can be drawn up to suit any particular camera in the light of the experience of a few trial shots.

TABLE I

Dia. of Pinhole in.	Theoretical Effective Length of Camera Reqd. in.
1/100	1¼
1/90	2
1/80	2½
1/70	3
1/60	4
1/50	5¼
1/40	9
1/30	16
1/20	36
1/10	144
.0118	2
.0144	3
.0167	4
.0186	5
.0204	6
.02205	7
.0236	8
.025	9
.0264	10
.0275	11
.0289	12
.03005	13
.03118	14
.0323	15
.0333	16

TABLE III

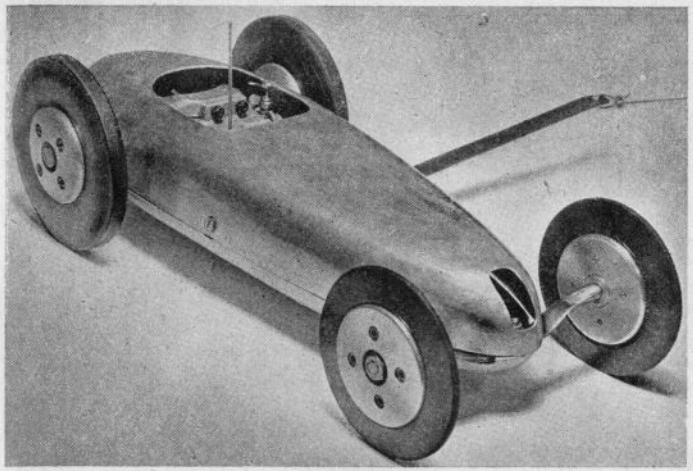
S.W.G.	S.W.G. WIRE DIAMETERS Nominal Dia. (in.)
12	.1090
13	.0920
14	.0500
15	.0720
16	.0640
17	.0560
18	.0980
19	.0900
20	.0360
21	.0320
22	.0280
23	.0240
24	.0220
25	.0200
26	.0180
27	.0164
28	.0148
29	.0136
30	.0124
31	.0116
32	.0108
33	.0100

TABLE II.—APPROX. FIELD ANGLES (Degrees)

Max. Screen Width	Effective Length of Camera (in.) 3	4	5	6	7	8	9	10	11	12	14	16	20
2¼	39	32	27	23	21	17							
3¼	50	40	32	27	25	23	21						
4¼	74	58	45	41	36	31	28	29	22	20			
5	79	64	53	45	39	35	31	28	26	24	20		
6½	97	78	62	53	50	44	40	38	33	30	26	22	
8½				70	62	56	51	46	42	39	34	30	24
9				73	65	59	53	49	44	41	36	31	25

TABLE IV.—'f' VALUES

Pinhole Dia.	Effective Length of Camera (in.) 2	4	6	7	8	9	10	11	12	16	24	36
1/100	200	400	600	700	800	900	1000	1100	1200	1600	2400	3600
1/75	150	300	450	525	600	675	750	825	900	1200	1800	2700
1/50	100	200	300	350	400	450	500	550	600	800	1200	1800



5 c.c. SPEED MODEL CAR

PART II FRONT & REAR AXLES

BY IAN W. MOORE

THE next job which can conveniently be done, working on the principle of getting the car on four wheels as soon as possible, is the

Front Axle

This is of flat streamlined section, and should be made of any suitable steel which you have available in 16 g. (.064 in.) thickness. If you have some spring steel which can be hardened and tempered after shaping, this is ideal. As an alternative, ordinary mild steel, if cyanide hardened .005 in. deep, gives quite good results. It is inadvisable to use an untreated steel or stainless, since this axle takes a quite considerable amount of "hammer" on a rough track, and will take a permanent set and have to be reset after each run if not springy.

Mark out the plate "in the flat" from the drawing dimensions, and drill the two central holes and the four end holes, then cut out and bend to shape in the front view, taking care not to make sharp bends which might be a source of weakness.

The axle ends should now be made out of $\frac{3}{8}$ in. dia. mild steel bar, or something a little better. They should be turned to the shape shown, and drilled No. 25 (.1495 in.) for a depth of not more than .350 in., and tapped 2 B.A. When parting them off, leave a small "pip" in the centre of the rounded end, which will assist in the next operation. This is to file the portion which fits the flat axle, half way across the diameter, using the pip as a guide at one end, and checking with a micrometer at the other. They can now be positioned on the axle and centre punched for the two holes which holds them, and which are drilled No. 39 (.0995 in.) and tapped 5 B.A. The outer ends of these holes should be countersunk slightly. One hole should be drilled and tapped in each end first, and the two ends lined up before drilling the remaining holes.

Leaving the ends temporarily in position, file the axle to streamlined shape outboard of the line "x—x" and blend into the ends. Remove the ends and harden and temper the axle to the correct springiness, and polish up well. The ends can now be screwed finally into position tightly, and the 5 B.A. screws riveted over into the countersunk holes and filed off flush. On the underside, soft solder should be run over the screwheads to match the top and filed up to shape. Soft solder should also be run into the corners of the top to give a nice fillet, so that the whole end gives a nice streamlined section and appears to grow out of the flat section.

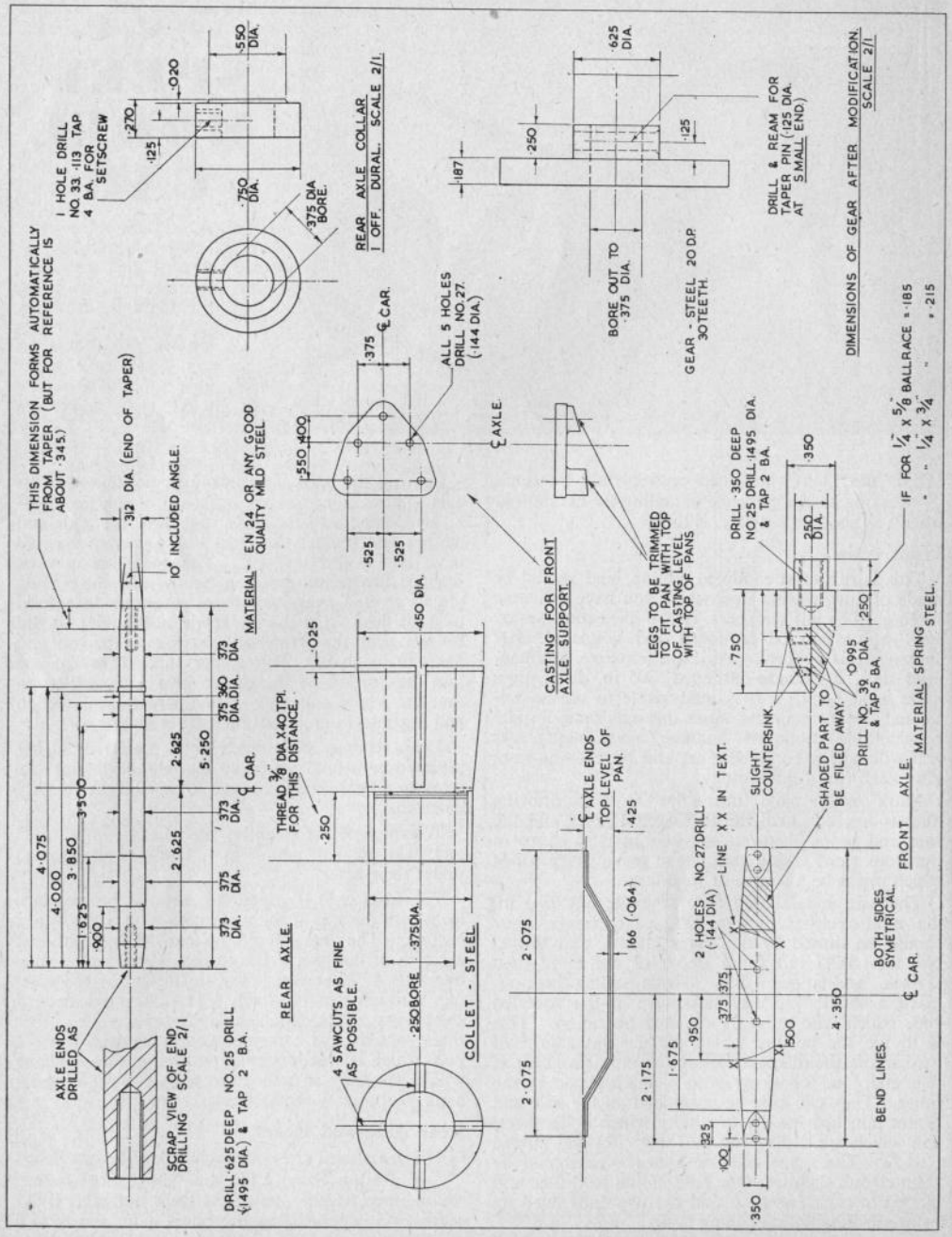
The axle may be painted or if preferred, highly polished as a final finish, so that should any cracks develop after prolonged use they will be readily detected.

To complete the assembly the wheels can be fitted and held on with two 2 B.A. screws with washers under their heads.

The front axle is supported, with its bottom face level with the top of the underpan, by a three-legged casting. The legs should be cut off by trial and error to fit the pan in the correct position, and then five 4 B.A. clearance holes are drilled in the casting, through two of which 4 B.A. hexagon headed steel bolts and locknuts hold the axle. The other three should have corresponding holes drilled in the pan, which is countersunk from the outside, and the whole assembly is held down with 4 B.A. countersunk steel screws and locknuts.

Rear Axle and Gears

THE gears used are obtainable from Messrs. Bonds of Euston Road Ltd., and are 20 D.P., steel, $\frac{3}{16}$ in. face width, one of 30 teeth and one of 15 teeth. As supplied they are bored $\frac{1}{4}$ in. and have a



hole tapped 4 B.A. for a setscrew, which is not used. Whilst you are waiting for these to arrive, we can get on with the rear axle (see Diagram).

This is quite straightforward and is made from EN24T (B.S. S95)—if this is not available any good nickel steel will do, but do not use too soft a type otherwise there is a tendency for the taper pin of the gear to elongate the hole slightly and loosen the gear.

The axle is preferably turned between centres all in one go, so that the 10° included tapers are concentric with the rest of the axle which fits the ballraces and gear. The pieces where the ballraces fit are nominally .375 dia., but should be made $\frac{1}{2}$ to $\frac{1}{4}$ a thou. down so that the ballraces are a nice sliding fit and do not have to be forced. The portions outboard of the ballraces, and between them, are turned 2 thou. down so that the ballraces will drop over them easily during assembly. The axle should be turned down to .360 diameter where shown. This is where the set-screw of the locating collar bites, and the recess obviates any jamming caused by the setscrew (which is a 4 B.A. Allen cup-ended type) raising a burr when tightened. After the tapers at the ends have been completed, the axle should be parted off to exact length, put in the chuck and drilled No. 25 (.1495) up each end for a distance of .625 in., and then tapped 2 B.A. for the wheel holding bolts. If you are using Z.N. wheels, the ends of the axle will need to be altered to suit the collet fixing used with these wheels, and care should be taken to ensure that the final track is the same, in order to comply with M.C.A. Rules as to proportions.

By the time you have finished the axle the gears will probably have arrived and a start can be made on the alterations to the larger gear (Diagram). This should be held by the boss in the 4-jaw chuck and centralised, checking from the teeth with a dial test indicator. It can now be bored out to fit the .375 dia. of the axle, a nice fit without "rock" being aimed for. The gear should now be placed on the axle in the correct position, as shown on the main drawing, and held in place temporarily with a 4 B.A. set screw in the tapped hole already in the gear as purchased. A hole .120 dia. should be drilled right through both gear and axle, choosing a point roughly 90° away from the tapped hole in the boss. (This tapped hole is too big to be drilled out and used for the taper pin, and is not used at all in the final assembly.) Great care should be taken to ensure that this hole is drilled absolutely central. It is now reamed out for a taper pin, $\frac{1}{8}$ in. dia. at the small end. The small end of the hole on the boss surface should be lightly countersunk so that the pin can be rivetted over flush on final assembly later. Take the gear off the axle and remove any burrs, and place on one side ready for cyanide hardening at the same time as the small gear, which we will modify as described later.

The rear axle locating collar (Diagram) is a straightforward job, the only critical dimension being that of the bore—.375 to fit the axle similarly to the gear. It is made from $\frac{3}{4}$ in. dia. dural bar, and can be done in the 3-jaw chuck. The bore and the face which fits to the ballrace should be done at the same setting to ensure accuracy, and the piece can then be parted off to size, and drilled and tapped 4 B.A. for the setscrew as shown.

COMPLETE FULLSIZE WORKING DRAWINGS ON TWO SHEETS ARE AVAILABLE FROM MODEL MAKER PLANS SERVICE, 38 CLARENDON ROAD, WATFORD, HERTS. PRICE 8/6, POST FREE

1 C.C. COMPRESSION IGNITION ENGINE

THE designers, Messrs. A. F. Weaver and W. W. Ransom, of the 1 c.c. C.I. engine featured in the past three issues of *Model Maker*, draw our attention to certain small errors and ambiguities as follows:—

"As this series has been published several errors have come to light in the reproduced drawings. The information in the text is correct.

1.—The cylinder seating hole in the crankcase should be 15/32 in. dia. not 15/16 in. dia.

2.—The cylinder bore is given as .400 in., this should be .408 in.

3.—The circlip is stated to be of 16 gauge piano wire. This should be no larger than 20 gauge (smaller if possible) unless your name is Hercules.

4.—The drawing of the piston shows a circlip groove of 1/16 in., this should be 1/32 in.

One of two other points seem to need clarification.

The outside diameter of the piston is given as .408 in. That, of course, is perfection size. In practice the turning size must be a few thous' over the finished lapped size of the cylinder to allow for lapping when fitting.

With regard to the cylinder the .408 in. dia. is the maximum boring size and the tolerances of plus .010 in. to plus .014 refer to lapping. Another point which has arisen is with regard to the cylinder gasket. In the exploded photograph the gasket shewn has a notch cut in the bore. This gasket was designed to serve two different engines and the notch has no use in the engine we have described. We regret that several photographs which were referred to were not published as they proved to be unsuitable for reproduction. We hope this clears up any points which have arisen. If anyone has any queries we shall be very pleased to answer them."

The Austin A.90 Saloon now appearing in happily increasing numbers on the home market. (Photos courtesy Austin Motors)

ONE-TWELFTH SCALE ELECTRIC POWERED AUSTIN A.90

RON WARRING PROVIDES STEP BY STEP INSTRUCTIONS FOR BUILDING A MODERN SALOON POWERED WITH A SMALL ELECTRIC MOTOR.

NOTHING delights the average modeller more than to be presented with a detailed scale drawing of some outstanding model. But what many enthusiasts want is a happy medium—the sort of model which is not too difficult to make, does not take up a lot of spare time, yet has sufficient "realism" to justify the title of scale model. It is, in fact, a scale *model* rather than a scaled-down *replica*.

This is the lines on which the scale Austin A.90 has been designed. It uses simple construction with the minimum of fine detail. Accurate in outline it avoids such complications as detailed windows. This particular model simply dodges the issue by having the windows painted matt black. Yet this simple solution *looks* right—for a model.

The main drawings are reproduced one-fifth full size, which means that the parts as detailed on the second sheet must be re-drawn full size. Use the grid system for duplicating the curves and direct measurement for the straight lines. The finished model is one-twelfth full size and outline shapes have been scaled down direct from works drawings kindly supplied for the purpose by the Austin Motor Company, Ltd. Some very slight departures from scale have been made in the interests of modelling. The wheels, for example, are very slightly undersize so that these conform to a "stock" model diameter of 2 in.

Base and Rear Wheels

Start by cutting a rectangular base or floor panel from $\frac{1}{4}$ in. thick pine or similar wood. Dimensions of this are $13\frac{1}{2}$ in. long and $3\frac{1}{2}$ in. wide. A rectangular portion is cut out and saved to make the motor mount. All the remaining body pieces are cut from sheet and block balsa.

Transfer the outline of part 1 on to $\frac{1}{4}$ in. sheet balsa and cut two. These are cemented to the hardwood base as shown in the second of the detail sketches. Parts 2 and 3 (two off each) are then added, cut from $\frac{3}{32}$ in. sheet balsa. Before doing this, however, it will be advisable to mount the rear wheel assembly complete.

The rear wheels (2 in. dia.) are mounted on a suitable straight axle which is located in a suitable metal bracket. The bracket can be made from dural sheet which, after bending, is screwed to the underside of the base. A disc $\frac{3}{4}$ in. dia. and $\frac{1}{4}$ in. thick is cemented to the inside of each wheel as a dummy brake drum and to act as a spacer to give the required rear wheel track. Each wheel is locked or forced on to the axle and revolve as one in the mounting bracket.

Now you can add the remaining side pieces, noting that the cut-out portions clear the rear wheels. Piece 4, when added, will have to be hollowed out slightly to clear the wheel. This is the reason for adding the wheels at this stage. The width of these wheels, incidentally, should not exceed 0.4 in. otherwise your final balsa panelling may have to bulge out of true scale cross section. If the wheels are too thick, or an excessive amount of wood has to be hollowed out of Part 4, simply reduce the track by using a thinner brake drum (spacer) disc. Side panelling is completed by adding Part 3 a of $\frac{1}{16}$ in. or $\frac{3}{16}$ in. sheet so that the whole of the wheel is then enclosed.

Installation of Motor Unit

It is a good plan at this stage whilst the whole of the top of the body is exposed to make up your motor unit and try it for assembly. A small electric motor is used for drive power, secured to the underside of the rectangular motor mount (cut out of the floor) by a suitable strap. On the end of the motor shaft lock a short length of dowel about $\frac{3}{16}$ in. dia. and fit this dowel with a rubber sleeve (a length of rubber tubing). The front end of the motor mount is locked in place by a metal tongue engaging a U-shaped metal bracket screwed to the main floor. The whole unit fits at an angle so that the rubber-covered drive shaft rests on the nearside rear wheel providing a simple friction drive with a geared-down ratio. The actual ratio is, of course, governed by the size of the dowel. If the rear wheels are also rubber tyred this drive will be very positive. The weight of the motor unit keeps it in place.

Batteries and a switch are also mounted on the detachable panel—the batteries on top, held by a rubber band, or fixed in a suitable battery box, and the switch underneath so that it can easily be reached when the motor unit is located in the model.

Block Balsa Body

The next stage in the body construction consists of cementing in a number of balsa blocks to build up a semi-solid assembly for carving. All the block sizes are given on the plan, and these should be cut accurately to dimension. Glue in place as shown in the detail sketches and when set, carve and sand down to finished contours. The lines of the front wings (Part 4) extend back to the rear bumper position and blend into the rest of the bodywork. The two bumpers, cut from $\frac{3}{32}$ in. sheet, will be most helpful as templates for shaping the ends of the body. These have to be a snug fit against the finished body, so the body is carved to suit.

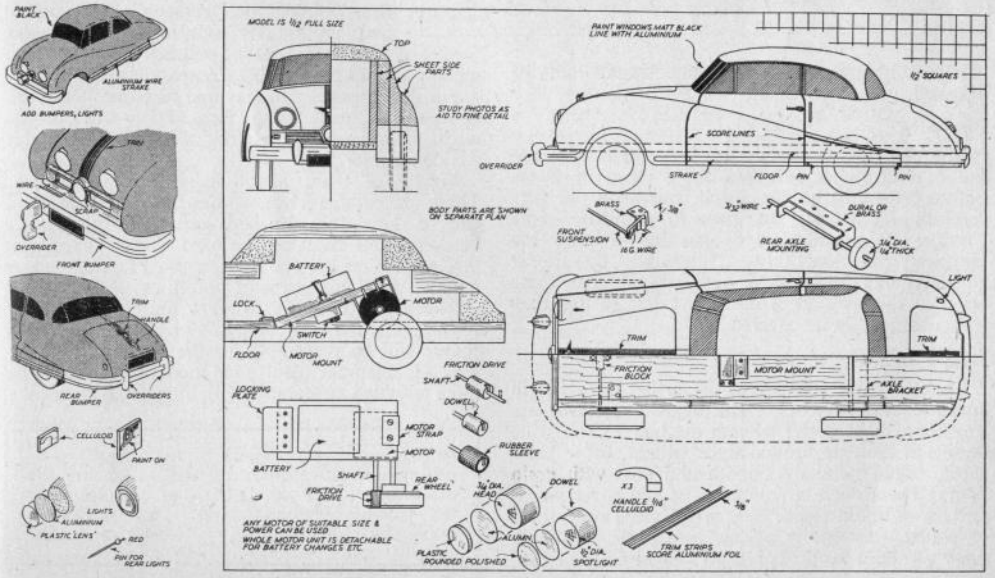
When satisfied with the outline and contours, give the finally sanded body several coats of grain filler, sanding down again lightly between each coat. This will strengthen the surface against accidental damage and also prepare it for the final colour coats.

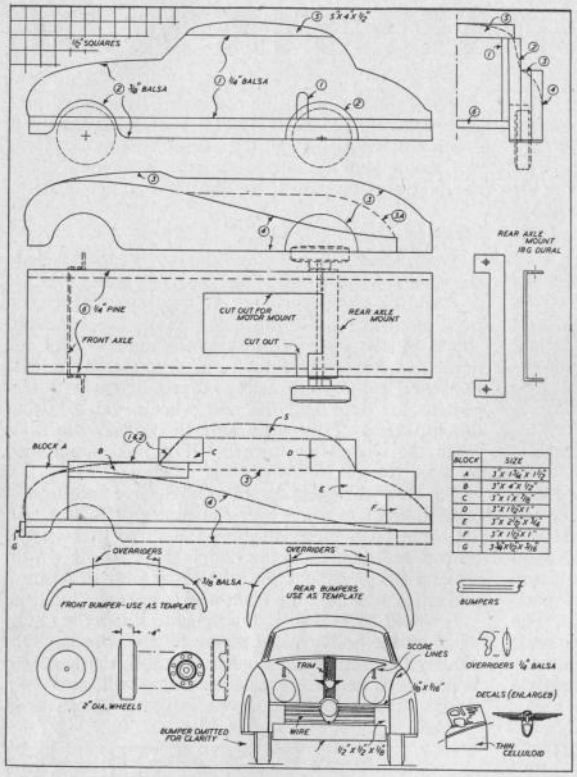
Steering

The front steering linkage should be obvious from the plan and the detail sketches. The stub axles are of 16 s.w.g. wire pivoted in brass tube which, in turn, is soldered to the brass mounting brackets. These brackets are screwed to the underside of the hardwood floor. The main points to watch are that the wheel centres are at the correct height with respect to the floor and the rear wheels and also that the top arms of the stub axle links clear the floor when the wheels are turned. The links are joined by a tie rod of 16 s.w.g. wire, as shown.

To lock the steering in any desired position a friction block is fitted over the centre of the tie rod. This can be a piece of rubber, split to fit over the tie rod and secured to the underside of the floor with a metal strap. Check the whole assembly in position and check also that the front wheels are tracking true.

It would be as well at this stage to finish the paintwork on the body, just masking off the wheels. Obviously the aim is as smooth and polished a colour finish as possible. Spray painting will give best results—or, at least, is the easiest way to get good





results, although brush painting should not be despised.

Bumpers

The bumpers themselves are best coated with tinfoil ("silver paper") before being glued in place. Before cementing on the tinfoil, smooth it out very carefully on a sheet of glass to eliminate every wrinkle. It should then be possible to cover the bumpers quite smoothly. If wrinkles do appear which cannot be worked out, arrange that these occur at the position of the over-riders so that they will subsequently be covered.

Lights and Grille

Details of the lights and the grille are given in constructional sketches. The lights themselves are short lengths of dowel let into the body. The grille outline is built up around the spotlight, using balsa sheet. Sand perfectly smooth and coat with grain filler. Then touch in painted parts and cover plated parts with tinfoil again. Bars of the grille are formed of plated wire simply pushed into place. Number plate can be a strip of thin ply, metal or even card glued to the bumper between the over-riders. The latter are carved from balsa, covered with tinfoil and cemented in place.

Rear end detail is similar, but much simpler. Bumpers, over-riders and number plates are the main requirements. The trim strip—front and rear, is best made from thin sheet or aluminium foil (or aluminium-coated paper) in a strip $\frac{3}{32}$ in. wide. This is ruled with five lines to raise. Bend carefully to shape and cement in place.

Minor Details and Finish

Minor details, such as door handles, and the Austin decals and badge are best made from thin sheet celluloid. Handles can be cut to outline shape and painted, then cemented in position. The badge itself could be drawn on paper, cut out and cemented over the trim strip. The side strake can be made of aluminium wire, notched at the front door hinge line, as indicated, polished and secured in position by turning the ends in and pressing home. Large headed pins, painted red and pushed well home into holes in the body make the rear lights.

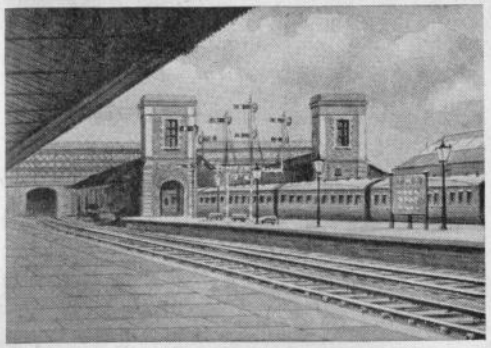
To finish off the lamps, cover the ends of the dowels with a disc of aluminium foil and cement the smaller plastic "lenses" on to this These "lenses" are discs of thin celluloid or "Perspex" sheet carved and ground or sanded to a rounded profile and then polished with abrasive metal polish to render fully transparent again.

For the hub caps you may find furniture "buttons" of suitable diameter in the local Woolworths, or you might try impressing these out of foil over a suitable wooden former.

Finally, a word about finishing the windows. These are painted black within drawn outlines. This can be done over the body colour. Alternatively black transfer sheet can be used, cut to shape over the model first by trial and error. Framing can be outlined with thin strips of tinfoil, or silver paint.

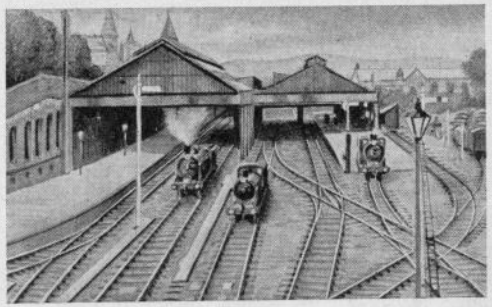
The one exception to window finishing is if black is chosen as the body colour. In this case a lighter colour will be preferable for the windows—a blue-grey for example. But your model will have a far more atractive appearance with a lighter body colour.

FULLSIZE WORKING DRAWINGS OF THE AUSTIN A.90 TO ONE TWELFTH SCALE ON TWO SHEETS, AS REDUCED SIZE DRAWINGS IN THIS ARTICLE, CAN BE OBTAINED FROM THE PUBLISHERS, MODEL MAKER PLANS SERVICE, 38 CLARENDON ROAD, WATFORD. PRICE 5/- POST FREE.



Above : Substantial "castle" type of railway station formerly found in the South. Right : Typical overall roof such as used to be seen at Exeter.

PUT *Variety* INTO YOUR RAILWAY STATIONS BY VICTOR SUTTON



I HAVE always contended that far more variety could be put into model railway buildings and thus make the subject more interesting. Has anybody ever found two stations alike? I am sure I have not, and we have to bear in mind that the railways always have to build the station to suit the locality which means it is either down in the cutting, put up on struts, out in the wilds or a mixture of both. Whatever its architectural assets it is always miles from where you want to get—or we think so.

Few people know that some stations, being built on the land of some wealthy gentry might have had special features to harmonise with the surrounding buildings. Such is the case in more than one station in Essex. There is variety to be found, and this article will give you some leads to make unusual stations for the layout or exhibition.

In Devon, Cornwall and Somerset we find quite a few mainly wooden stations which are easy to make because they can be knocked up with oddments of cardboard. Strawboard is ideal for this, and it can be scored with a blunt penknife. Colours would probably now conform to the ones used by the various branches of British Railways, but this could be found out from official sources. Tiled roof is mostly in flat grey shade and Modelcraft papers will suit here.

Reference to old stations may give you a wonderful chance to get a prize at any exhibition. Many links with the past can be found in stations. For instance at Exeter and Penzance you see the old popular practice of the overall roof which at one time was the practice in the West Country when small stations were covered completely. We may presume that perhaps this was the only time the passenger kept dry. An end elevation of Exeter station (Queen Street), is shown round about the period 1926.

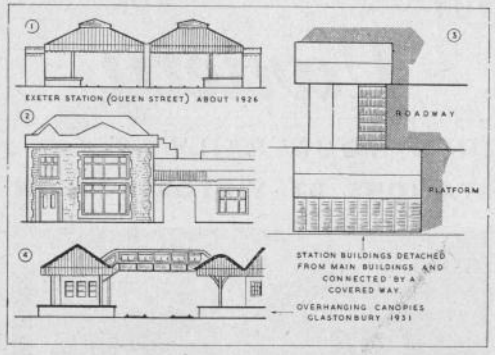
Another familiar type is the one built in weathered brown brick, similar to the paper made by Modelcraft. This looks well with corner stones and doors and the windows in thick photographic mounts pasted on to make up the relief effect. A separate sketch shows this, and these parts can be cut and designed on the table when you are not making other models. Shadings of dull cream and fawn in poster shade should be used to finish off. An underline of indian ink will always set the finish off well.

Chimney stacks on station might suggest that all the odd builder's stocks must have been used on these buildings. Study of these will show you long tall ones, short stubby ones, twisted varieties and tall ornamental styles. Quite few show the tall brick type with no chimney pots.

Variety can also be given by the inclusion of the stationmaster's house. And he, poor fellow, often had his house mixed up in the station building although I have never seen a model of this version. This means that you have a fairly lofty building attached to the station. If this idea is too large, then I suggest that you make it in two parts.

Another interesting version can be seen in Devon where the station buildings are detached from the main office buildings and connected only with a covered way. Into this the stately broughams used to wend their way. I have given a small plan of this arrangement which may appeal to some model makers.

Whether it is due to the material being available I do not know but can only conjecture, but in Devon and Somerset we do see quite a few stations which are solid and of the guard's barracks type with square recesses, heavy and large windows, and exceptionally heavy type corner brickwork. I suggest some of these are ideal for the lads keen on card-



board work. Most of these have overhanging canopies and at all times on brackets. Even the frill round the canopy is not always of the same pattern, but it is on most model railways. Note the frilly bits on the drawing showing the end of the canopy at Glastonbury in 1931. Stations were ornate in those days, but we are apt to forget in this streamlined age.

In Kent, Surrey and Sussex variety abounds in every station, and this is probably due to the type of the country. Some of the stations are quite ornamental, complete with clock-tower as at Bognor Regis. Buildings here seem to favour red brick, windows are spacious (it's a good job they don't have curtains), and in the case of Boxhill we have tall and lofty gables, obviously living rooms for the stationmaster.

In the period of 1924 Broadstairs station was very small and with a castellated water tower, round in shape with a battlement top. Why, we cannot think, unless there was a seige by irate travellers and this was the hide-out for the officials.

Strange to relate that at one time Canterbury East had an overall canopy, and that remained till 1924 which is not so many years ago.

From buildings to footbridges, and we have more variety. Still with us are plenty of the lattice type in iron and these are good to make in cardboard and painted grey. A handy job for the winter evenings. Some of these are covered with the familiar canopy fitted with sliding windows. Then we have the straight type with base and two straight sides, mostly made in iron.

We even have a station which was filmed in "The Ghost Train", and that was at Camerton, a queer little station on the Stoke and Hallatrow branch (near Bath) which was closed to passengers on September 21st, 1925.

Not all canopies are glazed, and many are lined with zinc which can be done with cardboard and a flat grey paint. Some canopies slope back from the line, others are level with separate slopes enclosed in the main structure and therefore not shown in the ends of your model, and others slope to the line. Few of the are alike in construction. Some canopies come to the edge of the platform, but quite a few do not.

And if your model looks dull, well, why not the introduction of the quaint flower beds let in the platform and tended by the station staff. I know one station where this facility is commercialised and a firm keeps the gardens going with flowers all the year round. It is the little and new ideas which makes the model, so don't get into a rut and just build a station. Build "your" station in your way, and don't forget all the little huts in which they keep lamps, tools and trucks.

Walls bounding the platform differ in various counties, and in the small sketch is a wall section drawn from Exeter station. Even lamp posts are not all modernised and look at Exeter (St. David's) in 1921, complete with most attractive towers.

LIGHT VANE GEAR

(*continued from page* 600)

To get the same direction of rotation of rudder the link crosses the centre line of boat.

In operation, for a short gye, the wringing catch is pushed forward on the side required, and for a long gye the torques on either side on the cross tube can be screwed in to the amount required.

In very light airs it has been found desirable to have a centering arm on the rudder tube. This is connected to a very light spring only just enough to start the rudder toward the centre.

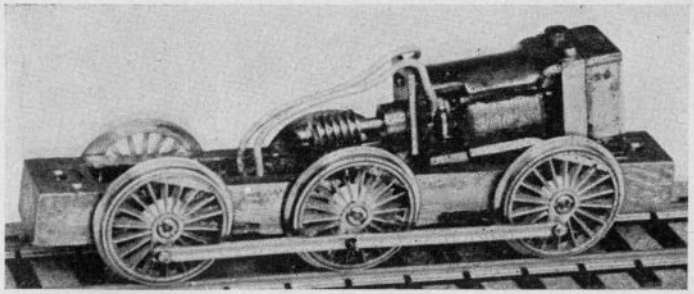
The normal use of the swinging catch is to lock the gear for down-wind work when the feather is rotated into the forward position. Experiments are being carried out at present using the feather in the forward position central, locked for beating, working against an adjustable spring on the centering arm.

From what has already been noted, this method is of use in gusty weather, the slams are neutralised by the momentary extra weather helm imparted.

CONTRIBUTORS are welcome! You need not have a famous name, you need not have a fully equipped workshop—just as long as you have something of interest to our readers we shall be pleased to hear from you. Good photographs are our lifeblood, but your diagrams can be mere sketches—we will re-draw them for publication. Not more than 1200 words for a first article. We will acknowledge all articles submitted—and be pleased to give advice on likely articles, even if not suitable as at first submitted.

TEST BENCH

A REGULAR TRADE REVIEW



The New Gem Mechanism

When first the little Gem X3 Motor was marketed about a year ago we were attracted both by its moderate price and excellent workmanship, and readers may recollect that we installed it in the "Royal Scot" which we built in our workshop and described in these pages. Many "not-so-expert" model makers, however, may well fight shy of the actual business of fitting the motor to an appropriate frame, getting the wheels lined up and running freely, and, above all, getting the electrical contacts in the right place to provide trouble-free running. As a result of our article we know that virtually the only queries we received all dealt with this aspect.

Now the Gem people have gone into manufacture of a complete mechanism using this well tried unit as the motive power. This is available both as a four- and six-coupled unit in a fantastic range of wheel spacings and five different wheel diameters. Sixteen arrangements of wheel size and spacing, four 4-coupled, twelve 6-coupled, are listed as "standard" types, normally available from stock, while a further fourteen can be ordered, and will be made up at an extra charge of 6/1d. Another service offered is to make up flangeless centre wheels for 6-coupled units where requested: in this case extra charge is the nominal one of 2/-.

Prices for the units are £3:17:0 for 4-coupled, and £4:12:3 for 6-coupled units.

We have inspected and tested a sample submitted, which forms the heading of this page, approximately fullsize, and find it bears out all that its makers claim for it. Control is pleasantly delicate, and it will pull away smoothly from the stationary position without any "un-scale" jerkiness, no matter in what position the armature has come to rest. This applies equally to reverse and forward movement. Deceleration may be controlled in the same way, and altogether it provides the railway modeller of moderate means and little skill with just the mechanism he requires.

As a result of its arrival on the market at a time when winter programmes are under review, we have every belief that a grand new band of actual builders will be making their initial efforts during the next few months. We certainly intend to offer readers a step-by-step build locomotive this Autumn.

Attenborough Model Railway Chronicle

We have just received the latest *A.M.R. Chronicle*, which provides forty-four pages size 13 x 8 ins. of catalogue for the price of 1/-. Being entirely duplicated it has the advantage of being up-to-the-minute in price and contents, without printers' necessary delays, but in spite of this modest method of preparation it is adequately illustrated with line drawings of all untoward items, so that postal buyers may know exactly what they are getting for their money.

Proprietor J. H. Gibbons is in the happy position that his company personally do not manufacture model railway specialities, and he can, therefore, stock what he pleases, and express his candid opinion of the merits of different makes without there ever being a suspicion of an "axe to grind." We are amazed at the vast stock on offer, all the principal branded goods are represented, together with a variety of normally hard to get items, that should encourage postal shoppers to try their luck if they have so far missed anything they particularly fancy. In any event, they too can have an evening's browse through the catalogue themselves if they send off that 1/- for it right away.

Catering for TT Gauge

The introduction of Michael Bryant's new series on 2½ mm. scale (TT) has brought a shoal of enquiries as to commercial components available. The basis of any such layout, unless the builder is really going the hard way and building everything, must certainly be at least a Rokal locomotive or two. Locos *can* be constructed, and will be covered in the series, but are not the ideal thing to make as a start.

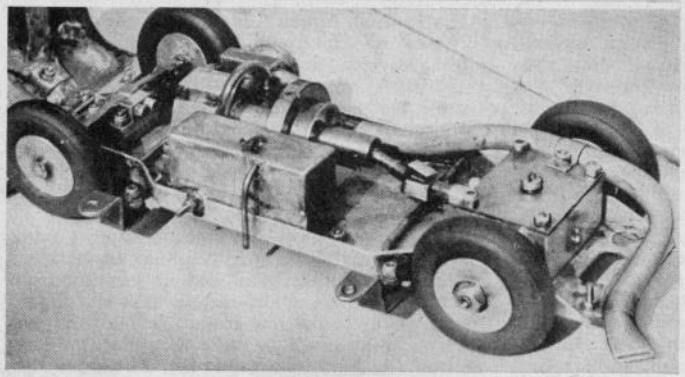
What can be made straight away, however, is track—Peco market all that is necessary here and this month's article deals with typical baseboards. Rolling stock builders can obtain Rokal bogies from True Model Co., 211 Upper Richmond Road, S.W.15; while C.C.W. have one coach in TT—a Midland type—for a start. Open wagons should not be beyond even comparative beginners, especially if they get a book on the subject, such as E.R.G.'s *Cardboard Rolling Stock*.

Finally, we still have a few of our 1/9th in. to the foot TT scales for free distribution to readers sending stamped addressed labels.

1·5 c.c. XK 120 JAGUAR

BUILT BY

H. F. MAYO



The model XK120 has excellent lines, although seen here without screen or bumpers, fitted later. Below : Body hinges forward to reveal chassis and "works". Note the dog-leg transmission line !

THE modern trend in sports car styling towards all-enveloping coachwork has several undoubted advantages and attractions for the model car constructor, who by modelling such a prototype can achieve a considerable degree of realism combined with attractive appearance, without sacrificing "track-worthiness" to any great extent. That this is being realised is apparent from the growing number of such models to be seen performing with credit alongside the purely functional types. There is no dearth of subjects from which the model maker may make his choice, the range being vastly extended almost weekly by the ever-increasing series of sleek sports cars being produced by the Continental specialist firms on high-grade chassis such as Alfa-Romeo, Ferrari, Fiat, Lancia, Simca and Delahaye, to name but a few.

It is only natural, however, that a firm favourite in this country is our own highly successful and handsome Jaguar XK120, the smooth and pleasing lines of which simply invite the enthusiast to make a start. As has already been shown, this style of body can be made very successfully in wood, but where competition models are concerned there is probably nothing to touch the beaten metal shell, which also takes a high finish fairly easily. We made the acquaintance of the model about to be described quite by chance at the recent Chiltern Open meeting, where it was a non-competitor, and was in fact spending the afternoon languishing unseen in the young builder's cycle-bag. This state of affairs is shortly to be remedied, as the builder, H. F. Mayo of Amersham intends to join a club and run the XK in regular competitions. His own description of the building of the model is given below.

Construction

"I started thinking about building the model XK back in April, 1951. After considering all the problems involved, including my lack of experience, tools and cash (a problem for many of us younger enthusiasts), I decided to "Have a Go."

The first job tackled was the chassis frame, of 18 gauge aluminium, which was of the tray type, i.e. with flanged sides. This was soon completed, the front suspension coming next on the list. Each wheel is independently sprung, by a transverse leaf spring, the spring coming from an old clockwork motor.

The original chassis frame was then scrapped and another wider one made, which tapered to narrower parallel portions at the front and back. The engine mount and gear box were hacked from a piece of rectangular bar, the method being to drill two $\frac{7}{8}$ in. holes in the bar and then work out from them, the engine mount being made as shown. (See sketch.)

The engine is an Elfin 1.49 c.c. Fitting around the cylinder is an exhaust manifold which has a large diameter dural exhaust pipe emerging from it, the pipe going to the back of the gear box and then sweeping round to the nearside, the correct side for a Jaguar.

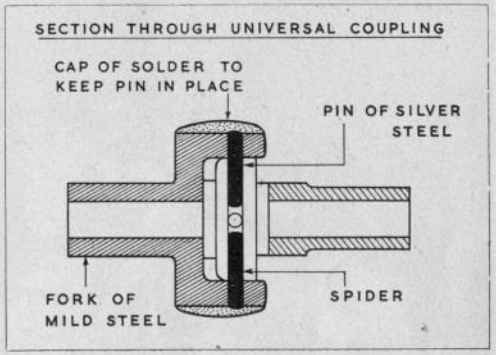
A centrifugal clutch is incorporated in the drive set-up. The drum is of mild steel, running on a hardened spindle-cum-locknut. The clutch shoes are of aluminium, with a large amount cut away from the inside of each shoe, to obviate the need for springs. The drive is taken from the clutch to the back axle via a ball-joint and universal coupling. The arrangement of the drive has been criticised by some because of the considerable offset between the engine and back axle, but so far no trouble has occurred.

The universal coupling is case hardened throughout and is constructed as shown.

The gear ratio is 1.75-1, the gears being of 40 ton steel.

The fuel tank was then made, the only point of interest being that the fuel tank passes through the sides, near the front.

The bodywork was executed in aluminium, built in three sections, each section being beaten over wooden formers, and then brazed together. The brazing was rather tricky ; the first time I tried to do it nothing happened, so I took the three parts of the jig and held them together by soft copper wire. I later regretted this, as I found that the offside wing had dropped at the rear quite considerably, resulting in a horrible warp, which I was only partly successful in removing.



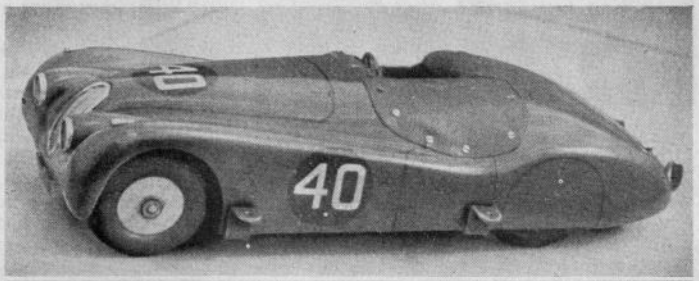
The body is hinged at the front for access to the "works", and is retained at the rear by a spring clip.

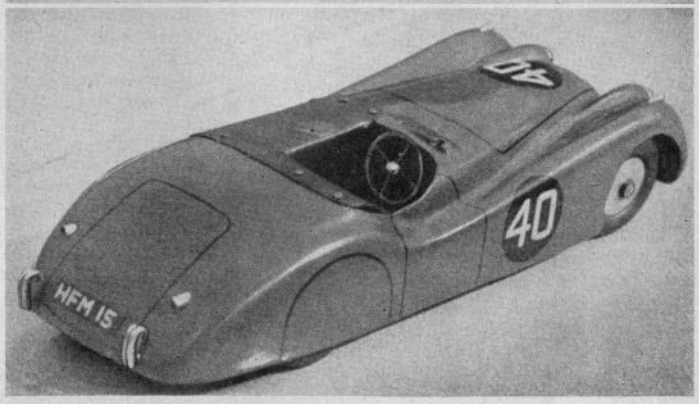
The car is painted in mid-green, with brushing Belco. The fittings such as side lamps, bumpers and so on are made of brass, and the radiator grille is of steel. There are twelve bars in the grille, but I think there should be thirteen. All the fittings are chromium plated.

The speed of the model is about 30 m.p.h., and the exhaust exerging from the exhaust pipe gives an added touch of realism.

Incidentally, I can't understand those who say that they can't "panel-bash", I made the body of my car before I was 16 years old!

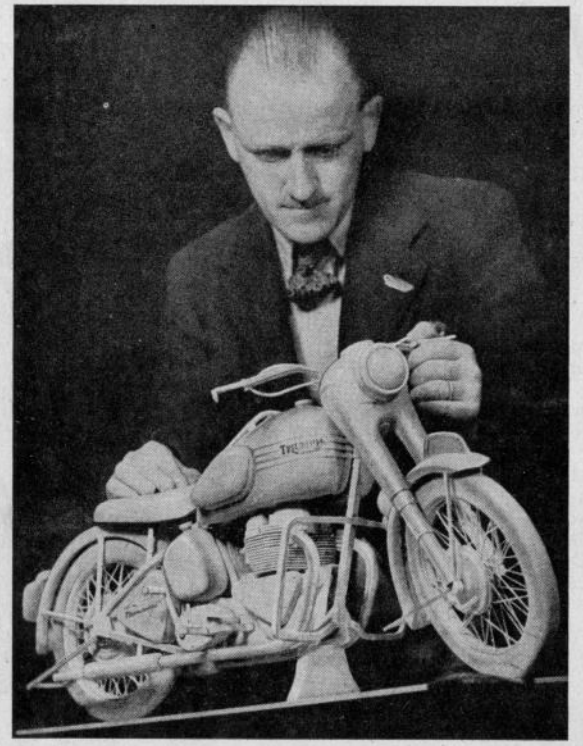
I hope that this description will have interested readers and that it may inspire some more readers to build realistic model cars."





Two further views of the Jaguar, which has painted panel joints and is finished in mid-green.

More Model Motorcycles



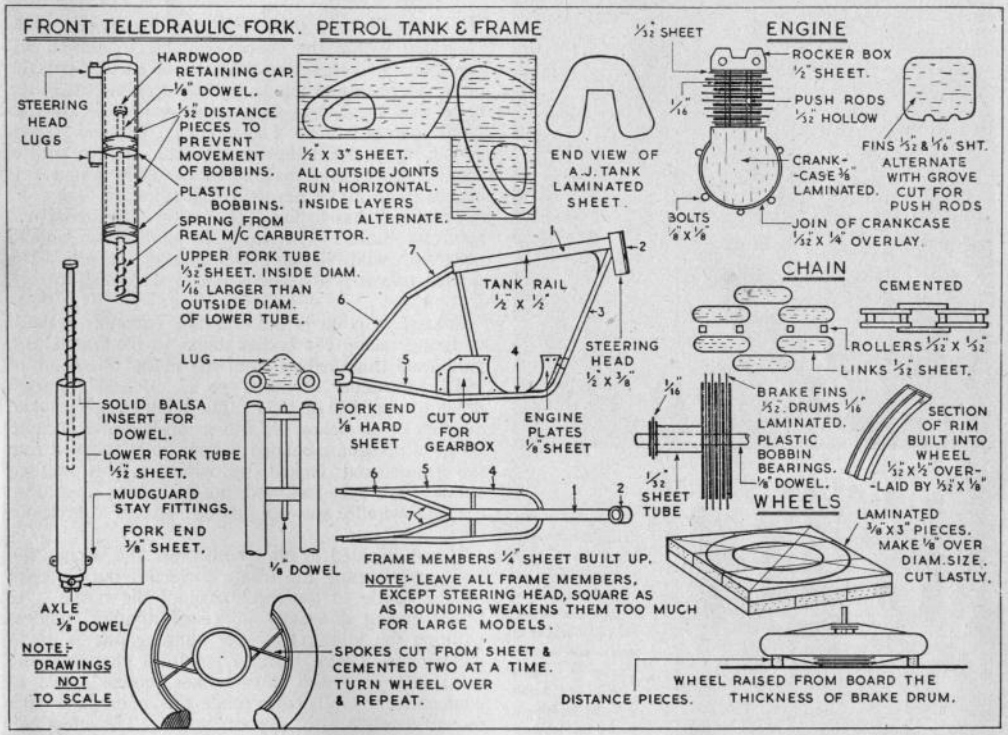
R. C. ALLSOPP DESCRIBES HIS ALL-BALSA MODEL MOTOR CYCLES

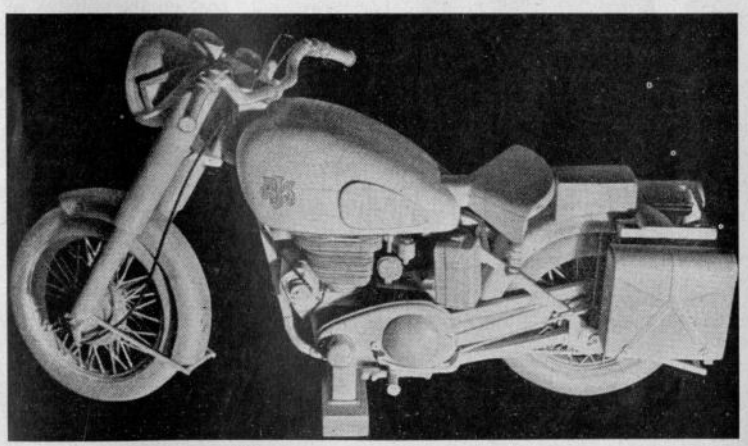
SINCE publishing the recent article on motor-cycle models, we have received numerous letters from readers on this fascinating but somewhat unusual branch of model-making; none more interesting, however, than that from R. C. Allsopp, of Shirehampton, Bristol, which was accompanied by a series of photographs, two of which are reproduced on these pages, showing some of his own handiwork in this direction.

We have always contended that great as is the fascination of the truly miniature, there is at least as great an attraction in really large models, and our correspondent has gone in for size in no half-hearted way! His occupation is that of a cinema projectionist, which allows periods of free time of approximately 20 minutes in each hour between reels, and he has made good use of this by filling in the time with model-making, many replicas of famous motor-cycles being the result.

Probably the most unusual and interesting feature of these models is the material used in their construction, which is almost entirely balsa sheet, no block being used. In order to carry out this work "on location", so to speak, tools had to be kept to the simplest, and consist of razor blades, fretsaw and glasspaper, with which humble equipment it seems hardly possible to produce such ambitious results. The pictures, however, speak for themselves. As an example of size, the Triumph Thunderbird illustrated, which incidentally is now in the possession of Barton Motors of Bristol, is 28 inches long. No plans or drawings are made, the work being done almost entirely from photographs, plus, we are sure, a very considerable knowledge of and enthusiasm for full-sized motor-cycles. The A.J.S. model, also illustrated, is even larger, being 3 ft. 6 in. in length. Mr. Allsopp also sent several pictures of a fine A.J.S. racing twin, the 1950 version, a type of which he has built several models, from 5 inches in length upwards, all being constructed on much the same principle. The models are normally left in unpainted state, the natural wood looking very effective. The accompanying sketches show methods of construction, but can give but little indication of the vast amount of work involved. All parts, including tyres, are home made, even the chains being constructed in separate links of $\frac{1}{32}$ in. balsa sheet in approximately 200 pieces! A large petrol-tank takes 18 separate pieces, a mudguard six, nothing over 3 in. wide sheet being employed. All joints are pinned with household pins with their heads cut off. The wire spokes are fitted into hub and wheel with tweezers and cemented in place. No jigs are used in making up the frames, which are built "freehand". So far no really satisfying method of producing convincing tyre-treads has been found, but further experiments are being carried out.

Such is Mr. Allsopp's industry and enthusiasm that one of these large models has been completed in the space of three weeks!



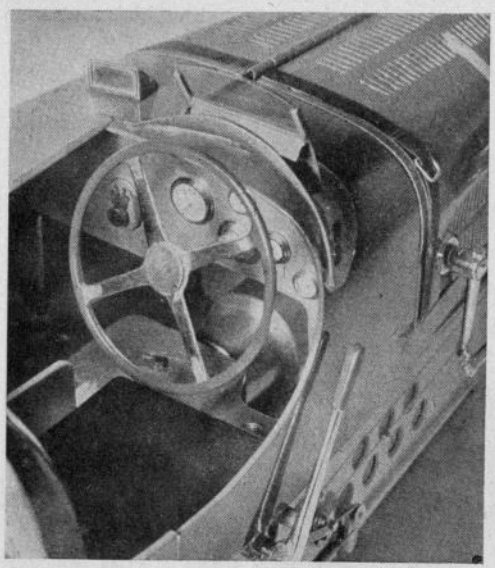


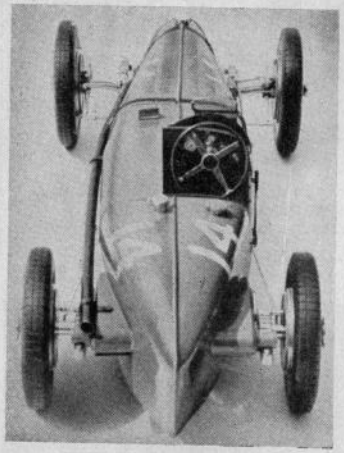
A "Bristol Evening Post" photo of Mr. R. C. Allsopp with his fine all-balsa model of the Triumph Thunderbird, which gives a good indication of the scale to which it is built.

Another of Mr. Allsopp's works of art, a 500 c.c. A.J.S., showing the effective appearance of the unpainted wood. Photo by the "Bristol Evening World".

A SUPERB MODEL BUGATTI GP 3300

FAMOUS MASTER-BUILDER HAROLD PRATLEY'S 1/12 SCALE MODEL





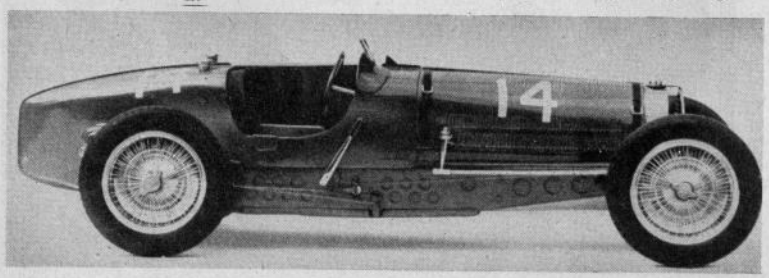
Rarely does a model stand up so well to the camera's all-too-revealing lens as this fine example, the photographs of which are entirely untouched. Some idea of the detail will be gathered from the cockpit view, which does not, however, show the pedals. Note the magneto projecting through the instrument board.

TO fully describe the building of the Bugatti illustrated within the space available would be impossible. It is therefore proposed to touch upon the more interesting problems and their solutions, in the hope that these may have a general application to model car building. The amateur, like the professional, has to decide how much detail to incorporate, the difference being that the former adds refinements according to his or her skill, regardless of time. The poor "pro." has to keep an eye on time or he will soon be broke! In any case enthusiasm should never run wild, slapping bits all over the job. The golden rule is if a detail is not to scale and correct, *leave it off*!

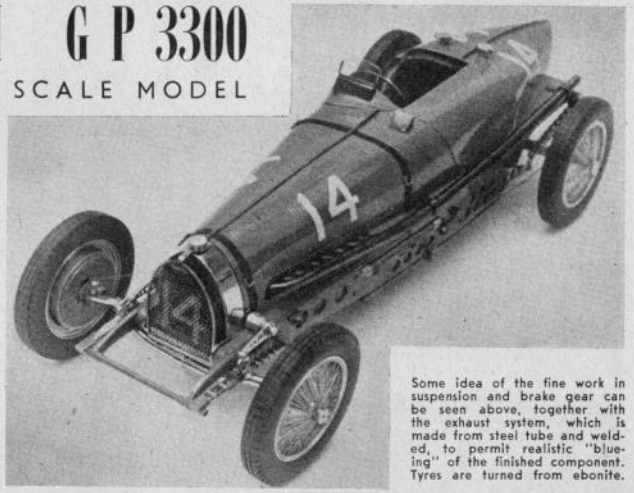
A case in point is the one-time common practice of fixing racing car bodies direct to the frame. Bugatti used this method from the Grand Prix cars of 1924, forerunner of the Type 37, 35 and 51, right down to the 3300 of 1934. The body sides are taken an inch or so below the frame top-line and secured by rows of square-headed 6 mm. bolts screwed into the frame and locked by wiring. This method should have been followed, but with bolts of .020 in. dia. *and* wired it was not practical except at fabulous cost.

It was decided to omit both bolts and wiring, the body overlapping the frame correctly, but soldered on the inside to the top flange of the frame. As often, curing one snag produced another, namely painting the joint. However cunning one is, paint *will* run in a nice fillet, a beautiful chocolate-like finish, all very well if one likes models made of confectionery! To appreciate this point look at a second rate photo of a poor model. The effect can be reduced by a minimum of colour, and *no* undercoat on the surfaces in question. As a matter of interest the Bugatti was given only one colour coat on bare metal, the only wood being inside the seat, under the leather.

The lightening holes in the side members, it will be noticed, are blanked off by a sheet of metal fitted inside the channel, and tight up against same. Here again the painting snag arose, also one of assembly. In spite of great care I have found it impossible to paint a blanked-off hole without getting a radius in the corner, formed by the paint sinking down.



(Left) Offside of the Bugatti, showing steering link and brake cables. The bodywork is of all-metal construction, mainly in brass.

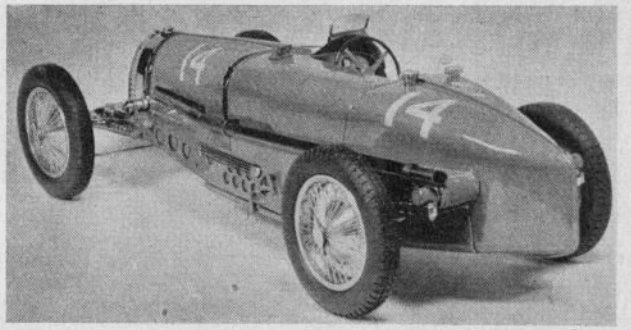


Some idea of the fine work in suspension and brake gear can be seen above, together with the exhaust system, which is made from steel tube and welded, to permit realistic "blueing" of the finished component. Tyres are turned from ebonite.

The remedy was obviously to paint the blanking plate before fitting, but soldering would obviously have messed the paint, quite apart from the fact that the writer knows of no solder for sticking aluminium to brass!

Which brings us to a matter of finish. Where a part is made of aluminium alloy, make the model part also of this material. The writer will on no account allow a model to leave his shop with silver or aluminium paint pretending to be aluminium or dural. This rule has always applied to such items as instrument panels, etc., and has now been extended to cover all parts.

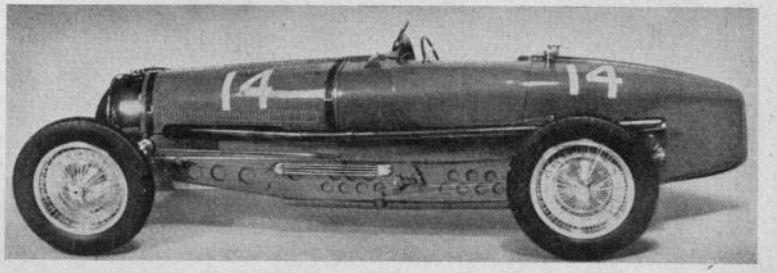
To return to the blanking plates, there are insufficient fittings bolted along the frame to provide a clamping action, so various parts in the cockpit were made to serve. The bulkhead at the forward end of the cockpit has lugs which are a snap fit between the side plates. Bugatti gearboxes have arms cast integral with the main casing—arms which in the model are used in the same way as the lugs mentioned. In the actual car these arms are bolted to the frame. Further back the seat support and oil tank provide their share of plate-locating.



Fixings for such items as control levers, pedals, etc., are provided in such a way that assembly is a matter of putting the first part in first; they will *not* go in any other way! The nuts holding the first part are hidden by the second part to be assembled, and so on, until the whole is together. Of course, the last part has to be fixed by a bolt or other means that is correct. For example, the undertray goes on last, to cover the underside and form the floor, the bolts holding same are, in fact, reproducing drain plugs, etc. It is rather maddening when people ask why a huge nut is stuck, say, on the bonnet top, to be told it's holding so and so!

The rear axle and shocker assembly required a certain amount of trickery to work out. On the axle casing is a strap (on the real car it is split and clamped) which has two lugs, to which bolt the front end of the rear quarter spring, and the link

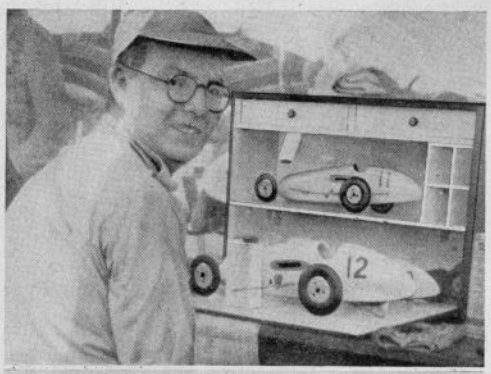
(*Continued on page 634*)

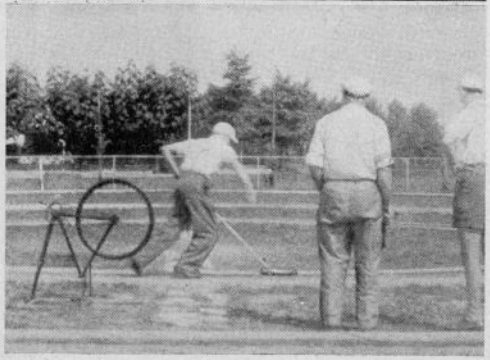


Nearside view, showing oil-cooler on the side-member. The unique "3.3" wheels are magnificently reproduced with full spoking.

IAN W. MOORE REPORTS IN WORDS & PICTURES FINE BRITISH CHALLENGE AT FIRST EUROPEAN MODEL CAR CHAMPIONSHIP

Above : Picturesque sun-umbrellas shade the pits, the French team being shown here. Below : Our reporter, I. W. Moore with his three cars, and Ted Armstrong starting his winning 2.5 c.c. model.





TOWARDS the middle of July, 1952, model-car racing enthusiasts of five nations were converging by road, rail and air on Monza, Italy—scene of many hard-fought battles between world-renowned full-size racing cars, and on July 20th and 21st to be the venue for the first International Model Car Racing Meeting to be held in Europe. Promoted and arranged by the Auto Model Sport Club Italiano, countries sending teams were Great Britain, U.S.A., Italy, Switzerland and France, each being allowed a total entry of 15 cars.

Amongst the first to arrive in Milan, the nearest large centre to Monza, were the British team, and by Friday, July 18th, all the members of this team and that of the U.S.A. had arrived, and on Saturday paid a visit to the track for practice. A few details of this, and the race rules, may be of interest. The track is situated near to the full-sized circuit, opposite to the grandstand, and has three separate tracks of approximately 17.4, 32.6, and 52.4 ft. radius for 2½, 5 and 10 c.c. classes respectively. These sizes fit in with the race distances used, which are, of course, in metres. The 2½ c.c. cars were required to do nine laps equal to 300 metres, whilst the 5 and 10 c.c. had to do eight and five laps of their respective tracks to cover 500 metres. The race was a team event, the 15 cars allowed being divided between the three classes in any desired proportion. Only the first three cars of each country in each class were counted, and points were awarded from 400 for first place, down to one point for 20th place. By English standards the tracks were rather bumpy and difficulty was expected with the 2½ c.c.s due to the smallness of the track giving greatly increased centrifugal loads, and also with the 10 c.c.s due to the great length and weight of the cable.

As there were three official runs to be made on Sunday, best of which counted, several members decided to use the first of these as practice, but quite a number of runs were made by others, from which it seemed that speeds would be lower than those obtained on the home tracks. C. M. Catchpole had the misfortune to have his 2½ c.c. car break the cable, and I. W. Moore's 10 c.c. car took to the inner country. However, by using more than a little midnight oil, and about equal quantities of wine for the "mechanics", both cars were brought to the line next day.

The first round of the race on Sunday was scheduled to start at 9 a.m., and by this hour the pits were the scene of much activity, as the competitors prepared their cars on pit-tables shaded from the blazing sun by large coloured umbrellas. The 2½ c.c. class had 15 entries—6 Great Britain, 5 Italian, 1 U.S.A., 3 Switzerland. First car on the line was the Oliver run by R. W. Flower (G.B.), which clocked 75.524 k.p.h.; this was followed by the entry of Piero Manfe, Italian record holder in the class, at 68.354 k.p.h. An entry from each country ran alternately — G.B., Italy, Switzerland — the lone U.S. competitor, J. Shelton, running 13th. Highest speed of the round was that of E. Armstrong's (G.B.) E.D.-powered car at 117.391 k.p.h.

Now followed the 5 c.c. cars—5 G.B., 5 Italian, 2 U.S.A., 5 Swiss, and 3 French—20 in all. As the track for this class was similar in size to our standard 70 ft., the only factor to cause trouble was the high temperature—90° or so. Several quite good runs resulted, but speeds were lower than on home ground. Notable speeds were: J. Shelton (U.S.A.) 146.341 k.p.h., and J. C. Cook (G.B.) at 141.732, whilst Bordignon of Italy managed a good run at 133.333 k.p.h. E. Turri, present Italian record holder, did 130.434 with his Fox-powered car.

The 10 c.c. class had the largest entry of all—21 cars—4 G.B., 5 Italian, 1 U.S.A., 3 Swiss, and 8 French. The use of a new, lighter cable, and a central platform, solved some of the difficulty of getting the cars away, and no unscheduled ploughing of the centre occurred. The first really fast run was that of J. Shelton of U.S.A., at 187.500 k.p.h. (actually, fastest run of the day) and only two other competitors managed to exceed 180 k.p.h. in this round—C. M. Catchpole (G.B.) and I. W. Moore (G.B.).

After an interval for lunch, during which discussion by sign language on model car subjects exercised the ingenuity of the competitors, the second round commenced. In the 2½ and 5 c.c. classes, the top positions did not change much, but a number of 10 c.c. competitors improved their speeds. The 10 c.c. first-round run of J. Shelton could not be bettered, but I. W. Moore moved up to 185.567 k.p.h. to tie with C. M. Catchpole for second place, whilst Felice Riva (Italy) moved into sixth place with a run at 162.162 k.p.h., and Carlo Davario (Italy) managed 156.521 with his Rowell car.

The third round really produced the fireworks in the 2½ and 5 c.c. classes, the winning run in both being made in this round—E. Armstrong (G.B.) doing 124.137 k.p.h. in the 2½ c.c., and F. J. Dean

(Below, left to right) : Carlo Davario of Italy with his Rowell car, Achille Brianzoli (Italy) with his Dooling Special, and J. Porion (France) with his Vega powered Teardrop car.

(G.B.) 152.542 in the 5 c.c., whilst Mrs. I. W. Moore's car improved to 144 k.p.h. to take third place. In the 10 c.c., A. F. Snelling improved to 181.818 to move up to fourth place, but a number of competitors did not run as it was getting rather late, so quite a few "no-runs" were recorded. At about 8 p.m. the proceedings closed and the competitors dashed back to their hotels for a quick clean-up before attending the banquet in the evening—whilst the Italian organisers were left racing the clock to get the results worked out.

At the banquet, held at a restaurant in the shadow of Milan Cathedral, full justice was done by all the competitors to a magnificent repast—certain of the British team showing signs of having spent considerable time practising the art of eating spaghetti! The President of the A.M.S.C.I. then announced the results—Britain 2,385 points, U.S.A. 744, Italy 719, Switzerland 94, France 64.5—and the beautiful trophies were presented to representatives of the National teams, and to the individual class winners. A particularly great and well-deserved ovation was given to J. A. Shelton (U.S.A.) for his terrific single-handed effort which took second place. Toasts were then proposed to the organisers, the winning team, the competitors, and the evening finished with informal conversation and more drawings of model cars.

Early next morning—Monday, July 21st—a somewhat weary group of competitors arrived at Monza for the second day's racing—an individual race run on handicap. Class speeds were multiplied by 2, 1.5, 1.3 and 1 for 1½, 2½, 5 and 10 c.c. respectively. Alec Snelling's first run with the 1½ c.c. Oliver at 99.082 k.p.h. (198.164 points) gave him a fair lead, but the remainder of the placings remained in doubt right until the last minute. Individual class winners were: 1½ c.c., A. Snelling; 2½ c.c. Piero Manfé (Italy) 124.137 k.p.h. (186.205 points); 5 c.c., F. J. Dean (G.B.) 145.161 k.p.h. (188.709 points); 10 c.c. A. F. Snelling 185.567 k.p.h. (185.567 points). When classified by handicap, the first five places were taken by A. F. Snelling (1½ c.c.), F. J. Dean (5 c.c.), J. C. Cook (5 c.c.), G. Laird (1.5 c.c.) and P. Manfé (2½ c.c.).

Prizes were presented to about the first 12 places and after further thanks being given to our Italian hosts for their wonderful hospitality (as the M.C.A. Chairman, Jack Cook, said: "The only thing we didn't have was time to sleep") the teams returned to Milan to prepare to go their various ways home next morning. And so ended the first European International Model Car Meeting.

NATIONAL PLACING

	(1) G.B.	(2) U.S.A.	(3) Italy	(4) Switzerland	(5) France
2.5 c.c.	897	13	293	28	—
5 c.c.	794	341	207	44	4.5
10 c.c.	694	400	219	22	60
	2385	744	719	94	64.5

INDIVIDUAL PLACING (Better of 2 runs)

1.5 c.c.				
1. Alec Snelling	G.B.	Oliver	99.082	92.307
2. George Laird	,,	,,	90.000	93.103
3. John Cook	,,	,,	81.203	87.096
	(4 entries)			
2.5 c.c.				
1. Piero Manfé	Italy	G.20	—	124.137
2. E. Armstrong	G.B.	E.D.	122.727	121.348
3. Enzo Dossena	Italy	G.20	—	105.883
Felice Riva	,,	G.20	105.883	92.307
	(16 entries)			
5 c.c.				
1. James Dean	G.B.	Dooling	—	145.161
2. John Cook	,,	Dooling	138.461	144.000
3. Joseph Shelton	U.S.A.	Dooling	—	140.625
	(14 entries)			
10 c.c.				
1. Alec Snelling	G.B.	Dooling	185.567	—
2. James Dean	,,	Dooling	180.000	—
3. Ian Moore	,,	,,	178.217	180.000
	(12 entries)			
Handicap Results				
1. Alec Snelling	G.B.	1.5 c.c.	Oliver	198.164
2. James Dean	,,	5 c.c.	Dooling	188.709
3. John Cook	,,	5 c.c.	Dooling	187.200
	(46 entries)			
	All speeds in k.p.h.			

STOP PRESS! . . . BRITISH NATIONALS RESULTS

10 c.c.

Competitor	1st Run	2nd Run
C. Catchpole	115.38	120.16
F. Dean	97.08	N/R
R. Eaves	102.85	99.11
L. Gawley	Scratched	
W. Hamilton	105.14	104.28
B. Hurn	N/R	N/R
I. Moore	123.96	121.62
F. Petrie	N/R	N/R
J. Riding	N/R	N/R
J. Shelton	N/R	126.4
A. Snelling	116.12	107.39
W. Warne	124.3	N/R

5 c.c.

Competitor	1st Run	2nd Run
J. Cook	N/R	N/R
F. Dean	N/R	90.45
A. Ellwood	75.37	N/R
W. Hamilton	87.46	83.1
L. Harris	Scratched	
B. Hurn	85.47	80.07
G. Moorby	85.87	88.66
Mrs. I. Moore	86.78	87.97
J. Parker	Scratched	
T. Prest	86.37	84.9
J. Shelton	90.00	88.4
J. Yates	93.75	91.37

2.5 c.c.

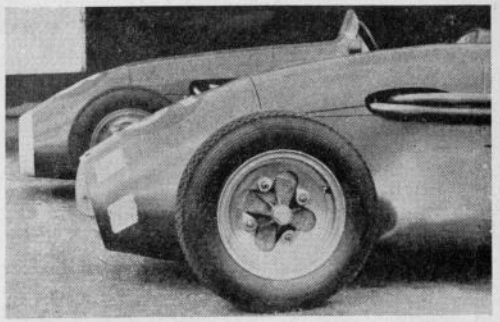
Competitor	1st Run	2nd Run
E. Armstrong	84.66	67.56
Mrs. J. Catchpole	85.14	80.78
C. Catchpole	71.37	85.3
F. Drayson	81.15	82.04
R. Flower	81.44	84.03
B. Harris	75.88	79.43
M. Hodgson	68.7	70.09
G. Laird	Scratched	
I. Moore	N/R	N/R
F. Petrie	N/R	78.74
K. Proctor	51.31	72.81
A. Snelling	74.68	78.39

1.5 c.c.

Competitor	1st Run	2nd Run
E. Armstrong	47.02	N/R
O. Bellamy	N/R	N/R
E. Bishop	50.53	N/R
C. Catchpole	70.47	67.01
F. Drayson	65.69	62.98
R. Eaves	43.1	45.05
B. Harris	N/R	58.55
C. Hart	Scratched	
G. Laird	Scratched	
K. Proctor	48.12	66.12
A. Snelling	51.42	67.61
Mrs. E. Wright	N/R	48.85
C. Dickens	45.18	45.73

Winners

1.5 c.c. C. M. CATCHPOLE (Pioneer)
2.5 c.c. C. M. CATCHPOLE (Pioneer)
5 c.c. J. YATES (Guiseley)
10 c.c. J. SHELTON (Chiltern)



PROTOTYPE PARADE No. 42

FORMULA 2 CONNAUGHT

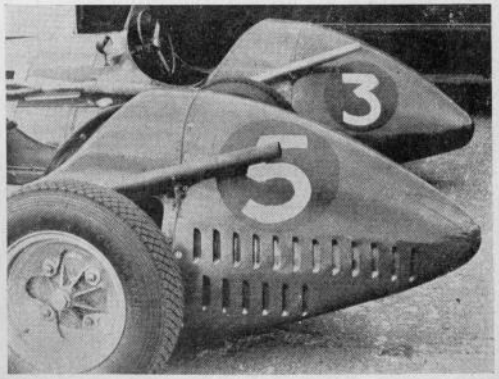
DESCRIBED BY G. H. DEASON

Left : Bird's eye view of Ken Downing's car leaving the pit, and (above) a shot which clearly reveals the difference between the profiles of the older and latest version, seen nearest camera.

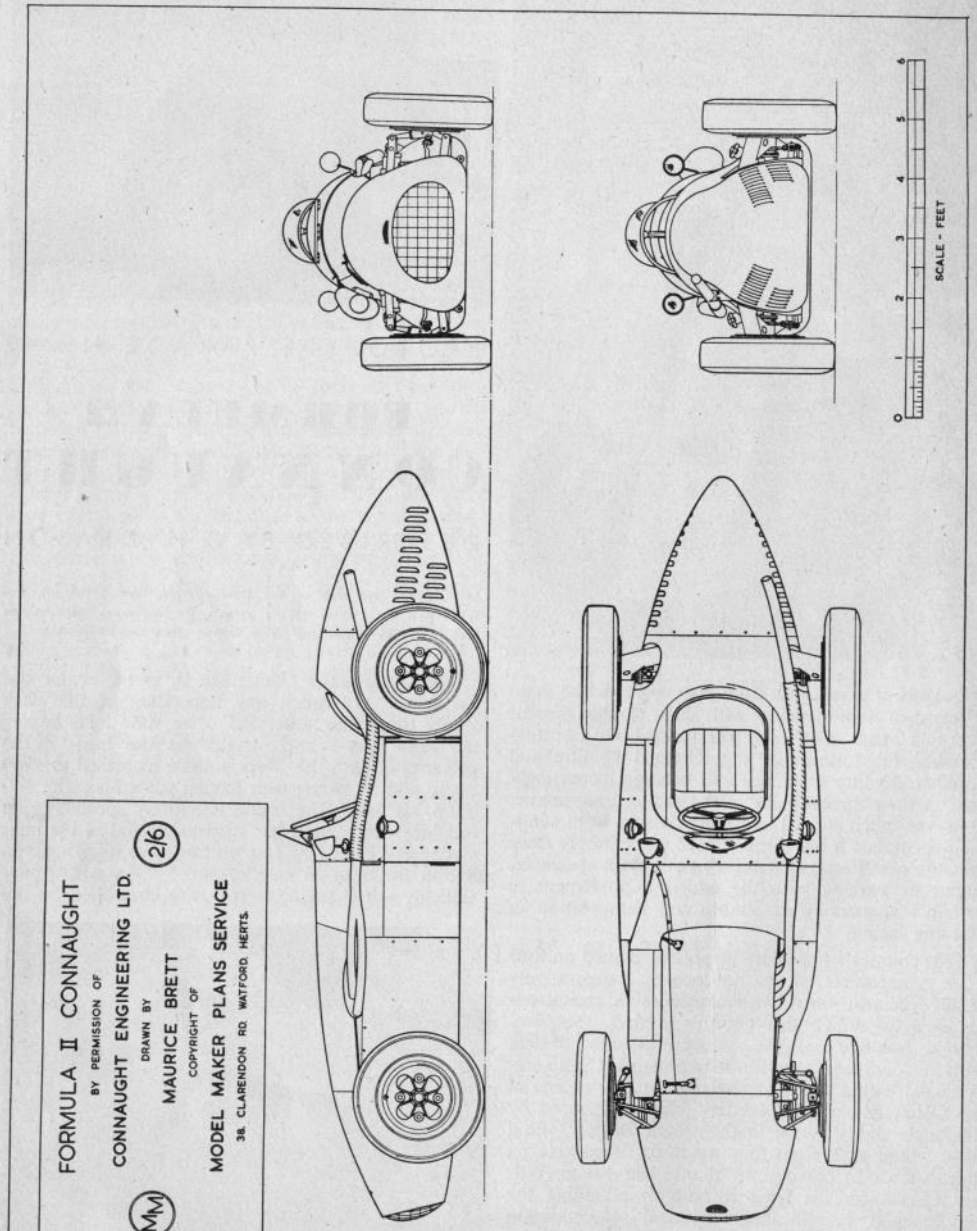
IT seems apparent that from now onwards the main focus in motor-racing will shift to the present Formula 2 cars, soon to be transformed into Formula 1, when the formidable supercharged 1½ litre and unblown 4½ litre machines will become increasingly rare in their appearances in the racing programme. However much we deplore their passing from sentimental reasons it has already been made amply clear that the new Formula will lack nothing in spectacle, colour or variety, with the added improvement in Britain's chances of re-establishing her position in first-line racing.

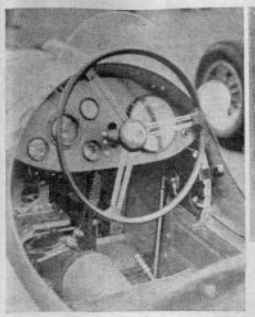
This country's hopes are at present pinned on four main protagonists, all the products of comparatively small specialist firms with considerable racing experience, of which this month's subject, the Connaught, is a fine example. It is my intention to deal with all four, together with their principal Continental rivals, within the next few months, my choice of the Connaught as an "opener" being influenced by their splendid showing in the recent British Grand Prix, where as a team they made so favourable an impression. In passing, my thanks are due to Rodney Clarke for his friendly help in obtaining the pictures and data in the bustle and preoccupation of the paddock prior to the race.

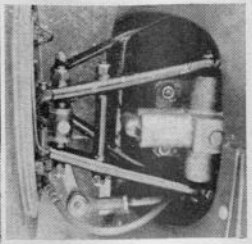
The single-seater Connaught is, in the engine department, very much the descendant of the sleek sports two-seater described some time ago, having the same Lea-Francis engine as the basis of its power-unit, with the swept volume increased to 1960 c.c.'s, and in racing trim having something like 140 b.h.p. on tap. The frame is entirely special, being tubular, with torsion bar suspension and in the later model, a de Dion rear end with massive tube, just visible in the head-on view of No. 5. An Armstrong-Siddeley self-changing gear-box is controlled by the



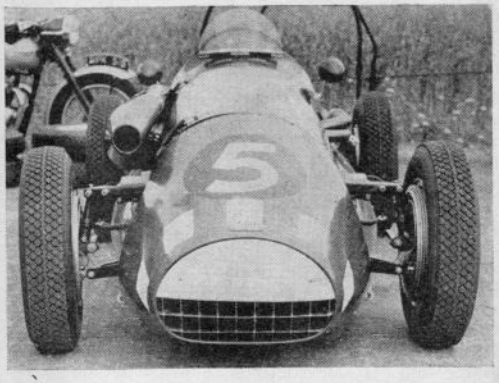
Another happily grouped comparative shot, showing the new tail-louvres and the roll-over of the cockpit back in No. 5.







(Left to Right): Cockpit close-up, showing rev. counter on right, oil pressure and temperature gauges to left of steering column, air pressure gauge left centre and water temperature extreme left, pedals and hand controls; a plan view of the front suspension, and a frontal shot of the latest model, with blanking panel in position in the grille.



lever seen on the right of the cockpit under the scuttle, operating in a large notched quadrant, top gear being the lowest position. A transfer-box is fitted behind the gearbox, enabling rapid changes of final drive ratio to be made.

Fuel is carried in two tanks, one on either side of the chassis, with individual filler caps just ahead of the scuttle. This arrangement assists in providing excellent weight-distribution, whilst carrying some 20 gallons of fuel.

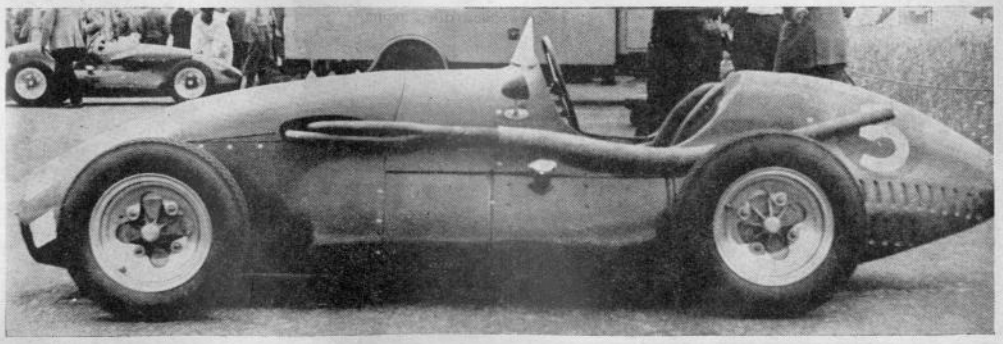
The wheels are handsome and distinctive, and will surely influence many a model-maker in his choice of the Connaught for next season's subject. These are of bolt-on type, secured by four large nuts, and are of cast elektron. The eight webs on the brake-drums will also be noticed. Tyres are 15 x 6.00 and 15 x 5.50 respectively, and the Alfin brake-drums are 12 inches in diameter.

The most pronounced body features are the steeply sloping "snouts", the latest versions having a forward-sloping grille similar to that which now appears on the Ferraris (although I believe Connaught can claim prior adoption of this feature, together with the "egg-box" grilles), and the large "ram-jet" air-intakes which house the four carburetters on the off-side of the bonnets. The team cars at Silverstone differed somewhat in detail, the latest version, Eric Thompson's No. 5 having a more curved bonnet profile and a slightly modified louvred tail, and a rolled-over cockpit back reminiscent of the Gordini. All were finished in mid-green with individual drivers' recognition colours painted Continental-fashion round the nose panels, and white racing numbers on black circles.

Cockpit furnishings include large 8,000 r.p.m. rev. counters on the right of the dash, oil pressure and temperature gauges immediately to the left of the steering column, air pressure gauge left-centre and water temperature dial on the extreme left. A horizontal parking brake is on the driver's right and the much-drilled elongated oval clutch and brake pedals are on either side of the transmission line, with "harmonium" accelerator on the extreme right.

As this month's "P.P." is unusually lavishly illustrated the usual potted history must be omitted, but the Connaught has its history mostly before it, and after its auspicious beginnings I feel sure that it will soon be speaking for itself!

The latest Connaught's somewhat "Roman-nosed" look is well emphasised in this picture, in which the panel joints are clearly shown.



SCALE BUGATTI (*Continued from page 631*)

connecting the shocker arm to the axle. The strap was made in the form of a ring, complete with lugs and dummy clamp, to which is bolted the link and rear spring. The latter is partly located by the bolt being extended outwards and passing into the brake drum backplate. The drill was to place this assembly in position and fix by nuts inside the frame. The axle casing (the final drive housing was omitted) is in three parts.

Owing to there being a flange on the outer end it could not be straight through. After passing each side casing through the ring or strap these were screwed into the third part, just a plain length of brass rod tapped 6 B.A. The backplates lightly press on to the flanges, the road wheels are retained by the hub cap, an extension of which screws into the axle side casing.

The writer must admit that he slipped up in having the wheels chromed and polished—a dull or semi-matt finish would have looked much more authentic. In future stainless steel will be used where polished steel is required, as chrome plate is rather too ornate, while tests of a paint with rather less gloss are being carried out.

JERRY CANN would inform his readers that he is on holiday, and will be resuming DOPE & CASTOR in the next issue.

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