MECCANO® Magazine

SEPTEMBER 1971

15p

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SAILING THE HiBALL ★

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MECCANO® Magazine

SEPTEMBER 1971 VOLUME 56 NUMBER 19

Meccano Magazine, founded 1916

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MAP **HOBBY MAGAZINE**

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FRONT COVER

Our test HiBall in action. There was a shortage of wind on the first day sunny enough to photograph it on the water, but life's like that.

NEXT MONTH

Full-size plans to build a control-line stunt trainer, 28 in. span, for 1 to 1½ cc engines, are a main feature in Octobers' M.M., published Sept. 3rd.

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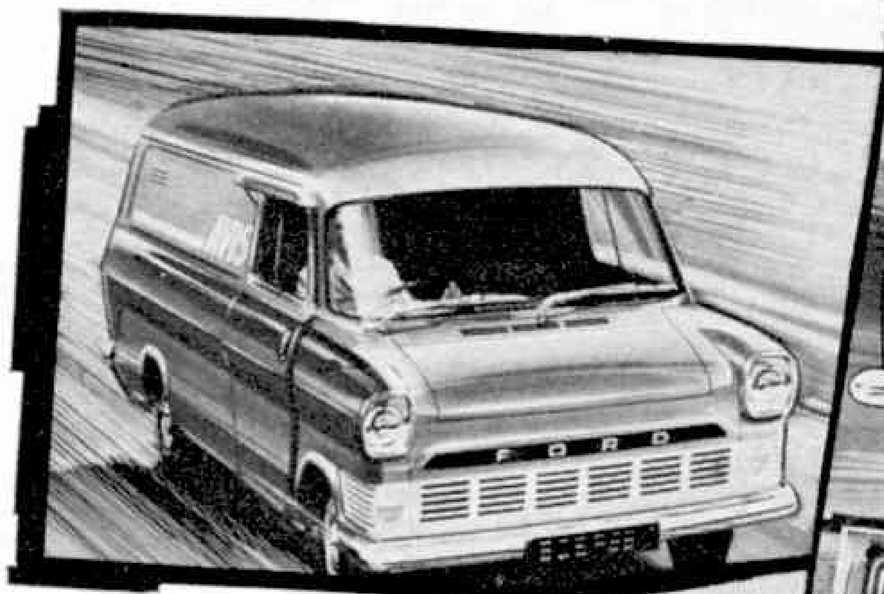

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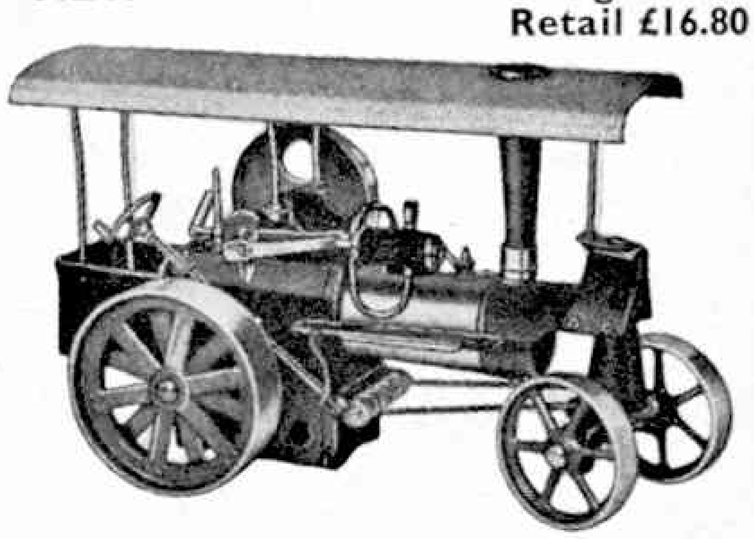

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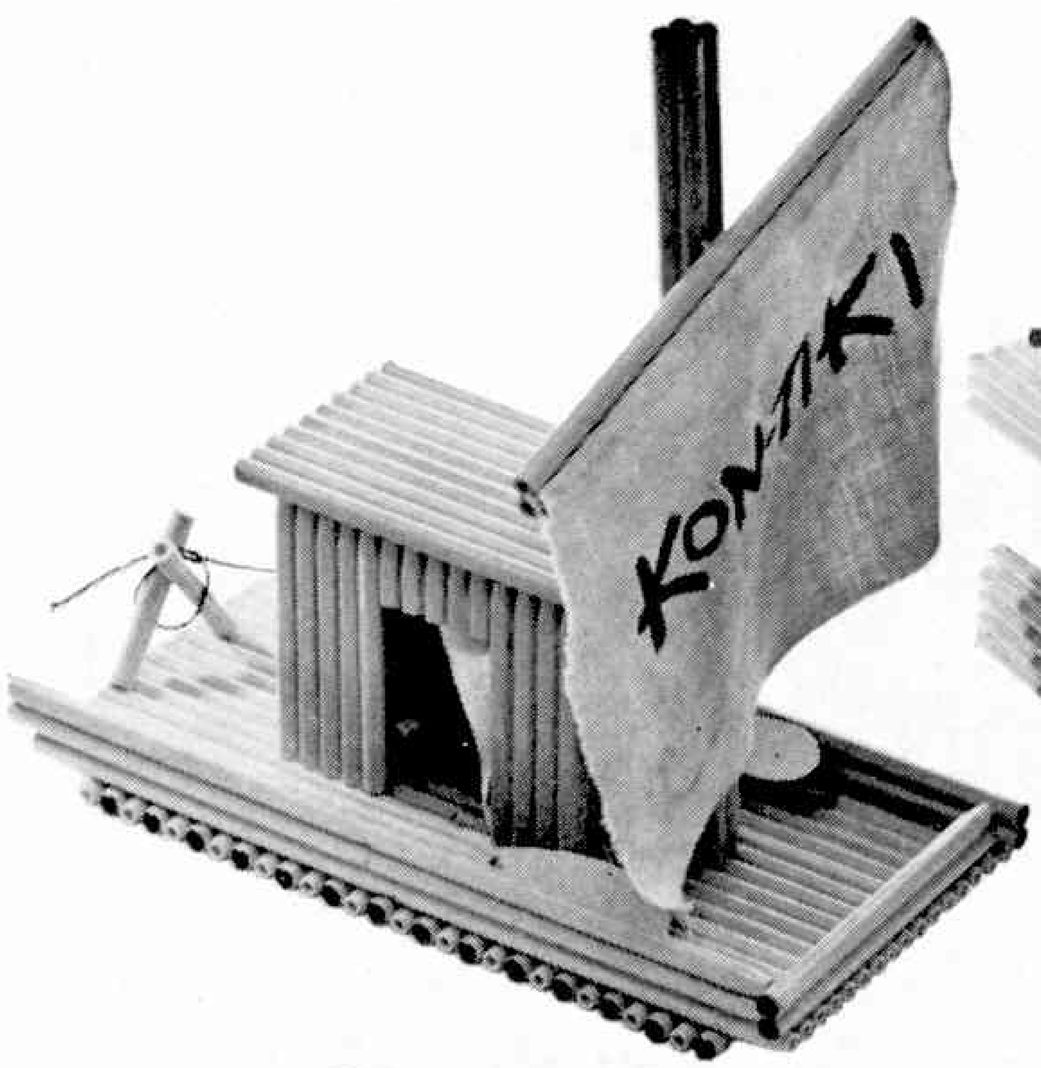

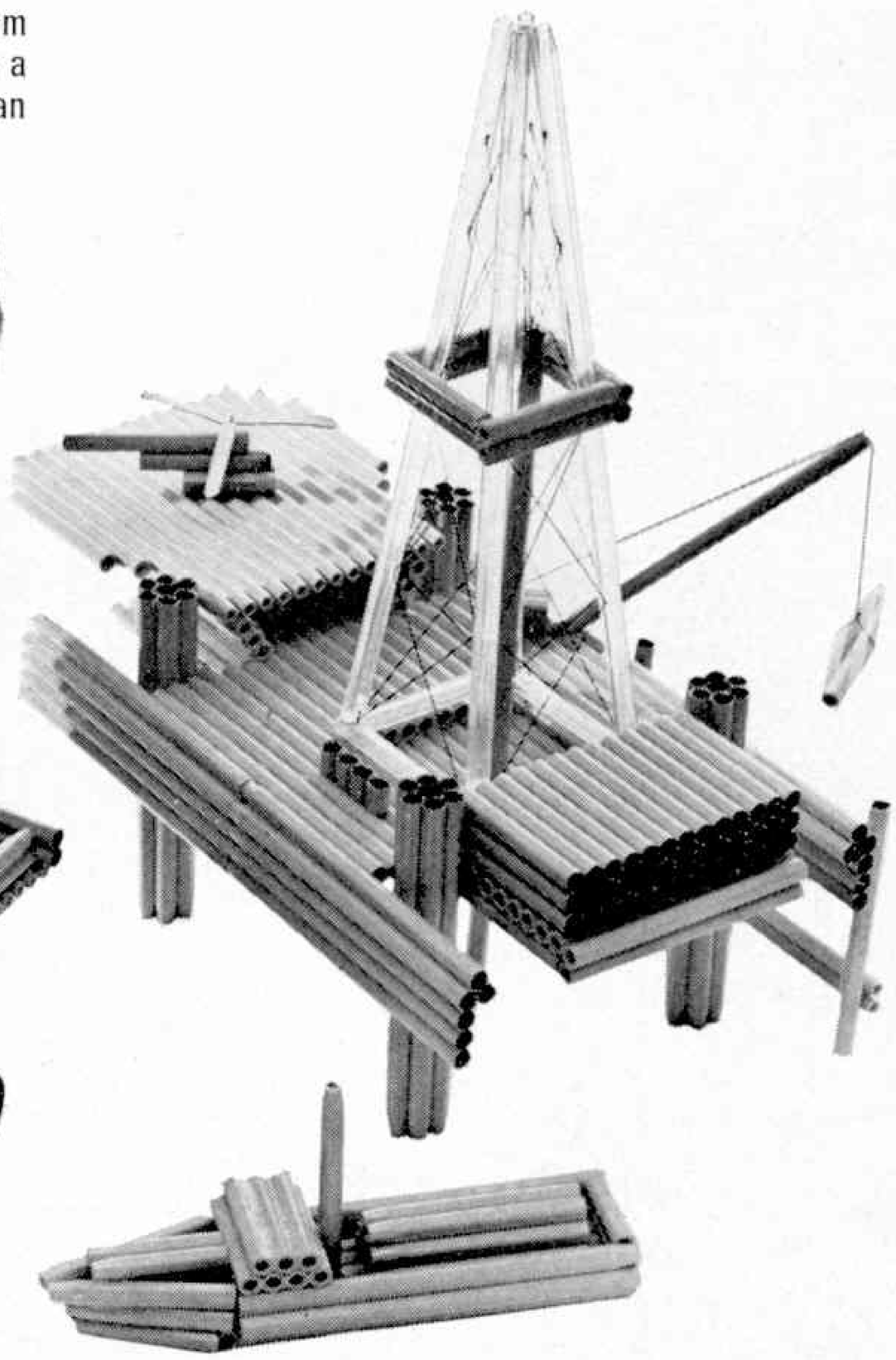

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Model Making Competition

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1 The participants of the Bic Model Making Competition will be judged on their originality and technical model-making expertise.

2 The competition will be divided into two parts:
Junior: Participants, either sex, under the age of 16 at time of entry. Within this group no heat or flame technique for moulding may be used, but any other form of adhesion may be utilized.
Senior: Participants, either sex, over 16. Within this group, any form of adhesion is accepted. Heat to bend or shape the pens may be used.

3 Entries for the competition must be accompanied by the official entry form below.

4 Any number of BIC Ballpen barrels may be used. All models must be constructed utilising any part of BIC Crystal Fine (Yellow) and Medium (Transparent) ballpens.

5 BIC Crystal barrels may be cut to shape or size, but each barrel must clearly show the Registered trade name BIC (as imprinted on the barrel). Where models are moulded by heat, there must be at least 10 parts where the BIC Registered trade mark is clearly shown.

6 Accessories other than BIC parts may be used *only* to make the model functional or to infer final design, i.e., wheels, transfers, cotton, string, paper, etc.

PRIZES

7 Prizes will be awarded to competitors who, in the opinion of the panel of judges, produce the most creative, unusual or skilful entry for each quarterly competition.

8 **Quarterly prizes will be awarded as follows:**
Senior section—first prize £25.
second prize £15.
third prize £10.
10 consolation prizes of £5 each.
Junior section—first prize £15.
second prize £10.
third prize £5.
10 consolation prizes of £2 each.

9 Models winning any of the three prizes in either Junior or Senior levels of any of the quarterly competitions will automatically be entered in the BIC National Championship Competition and the individual competitor whose model is selected by the judges to be of greatest merit will receive an additional cash prize of £250 together with the 1971 BIC Model-Making Trophy.

10 **Entrants should send their models to:**
The BIC Model-Making Competition,
c/o Montague House, 23 Woodside Road,
Amersham, Bucks.
Should a model be considered delicate for conventional postage, then a photograph (colour or black and white) may be despatched beforehand. This will be used for preliminary judgement. Entry forms should be clearly attached to each model or photograph entered.

11 No responsibility can be taken for the damage in transportation of any model received. Judges will, however, take into account such unfortunate circumstances and the model will still be eligible for participation within the contest.

12 Should participants require a model returned, then return postage must be included by way of enclosing the appropriate stamps.

RESULTS

13 The 1971 competition will be held during 3-monthly periods and results will be announced during August 1971, November 1971, February 1972.

14 Participants should ensure that their models are despatched to arrive by 1st June (for August judging), 1st September (for November judging) and 1st December (for February judging).

15 Any model received after this date will not be eligible for the relevant Quarter but will qualify for the next Quarter's competition.

16 Any prize winning model will become the property of Biro-Bic Ltd., and may be used in any way they think fit.

17 Employees, relatives or direct associates of Biro-Bic Ltd., Model and Allied Publications Ltd., as well as their advertising agents will not be eligible for this competition.

18 The decision of the Judges is final and no correspondence can be entered into in relation to prizes awarded or decisions made.

I understand and abide by the Rules

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(BLOCK LETTERS PLEASE)

Address.....

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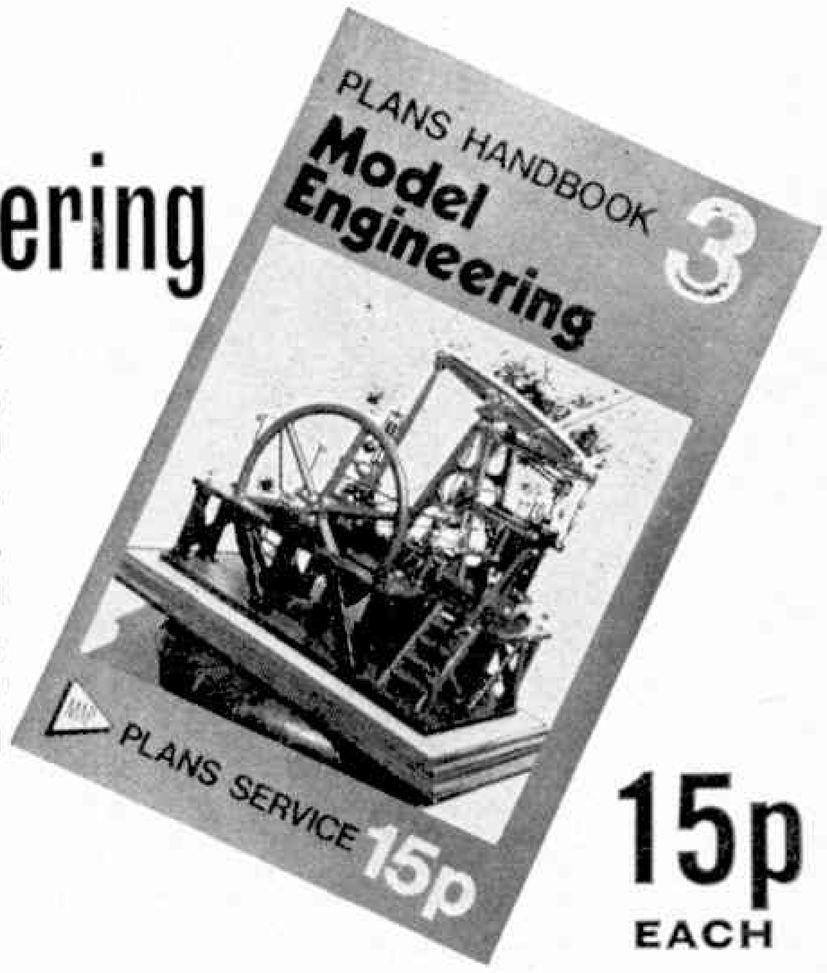

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ON THE EDITOR'S DESK

Pocket Meccano

Like so many good ideas, Pocket Meccano is one of those things that is so obviously right that people wonder why it wasn't thought of before. Its hows and whys are explained by Spanner in our pages this month, so we do not need to cover the same ground, but we would like to draw readers' attention to the competition based on this new mini-set, which is quite a challenge to ingenuity. Basically, you have simply to make a model of your own design from one Pocket Meccano set; the contents of the Set are:

Part No.	Description	Qty.
10	Fishplate	2
12	Angle Bracket, 12 × 12 mm. (½" × ½")	4
23	Pulley plastic, 12 mm. (½")	4
34	Spanner	1
34a	Spanner/Screwdriver	1
37a	Nut	27
37b	Bolt, 5 mm. (7/32")	15
51	Flanged Plate, 60 × 38 mm. (2½" × 1½")	1
111	Bolt, 19 mm. (¾")	1
111a	Bolt, 12 mm. (½")	4
125	Reversed Angle Bracket, 12 mm. (½")	1
126a	Flat Trunnion	2
194	Blue Plastic Plate, 60 × 38 mm. (2½" × 1½")	2
235d	Narrow Strip, 115 × 9 mm. (4½" × 11/32")	2
—	Length of Cord 914 mm. (36")	1
—	Instruction Leaflet	1

Aimed at under 15s, this competition should cause some head-scratching and give quite a lot of fun.

Original " Spanner "

It is with deep and sincere regret that we must again report the death of a well-known Meccano personality, Mr. Norman G. Tudor, who had a life-long association with the Meccano system and who played a major role in its development.

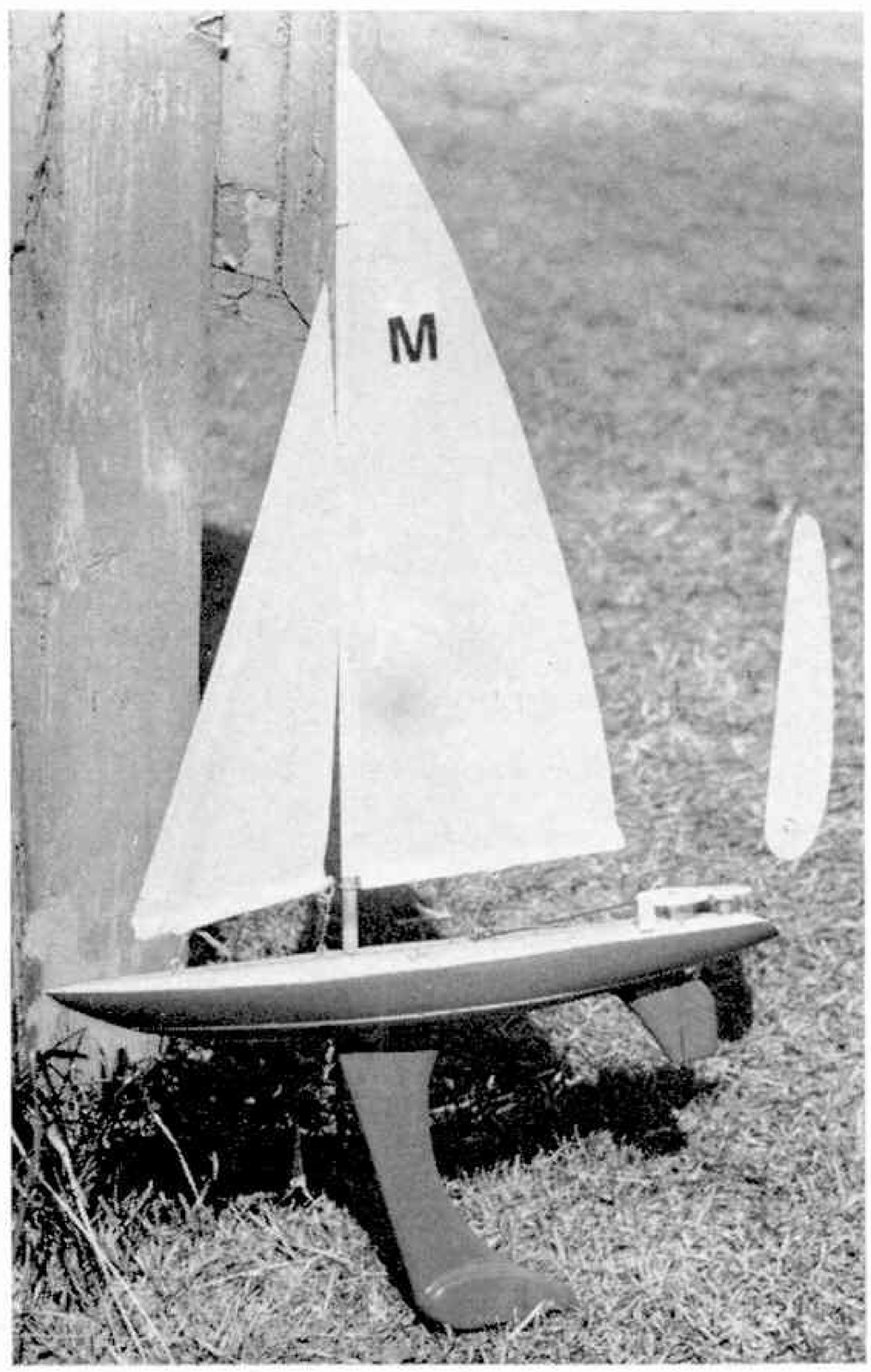
Mr. Tudor, who served his time as an engineer, joined Meccano Limited in April 1928 as a staff writer for Meccano Magazine and it was in this capacity that his natural talents were fully developed. He was the original "Spanner" of the M.M., injecting a high degree of technical accuracy and professionalism into all his articles, and he was also responsible for the majority of building instructions manuals published by the Company.

His innate knowledge of, and interest in, the Meccano system enabled him to contribute greatly to its development with the introduction of many new parts, new ideas and new policies. Through his writing he instilled into the Meccano enthusiast an interest in all aspects of the hobby and when he retired from the Company in 1963 he did so with the pleasant knowledge that he, personally, was largely responsible for the tremendous world-wide popularity of both the product and the Magazine.

Mr. Tudor, who was 69, was living in Oxton, Birkenhead at the time of his death. He is survived by a son, but he will also be well remembered by the many people at the Meccano factory with whom he worked for so many years.

Air News

John Taylor's "Air News" is always of interest, but we were particularly amused by the Vought item this month. To find any odd tools or parts left lying loose in the aeroplane during construction, they have a rig which turns it upside down. This may seem an unnecessarily elaborate precaution, but we have sympathy. Once, when rolling a Hawker Hart (gosh, that dates us!) we were struck under the chin by a large pair of pliers which we glimpsed as they continued on earthwards past our pained expression. On a later occasion, flying a Spitfire inverted, a hefty screwdriver arrived in the canopy over our head. Odd nuts, wire, lumps of mud etc. were common whenever negative G was applied; perhaps they should have aircraft inverters on every aerodrome! The thought of odd tools jamming in control leads is no joke, though, and anything which makes an aeroplane safer is to be commended.



We have seen and built a lot of models, but it is some time since one gave us as much satisfaction as *Splinter*. Everyone who has seen it has been charmed by it; it sails extremely well, it is really quite simple to build, and its cost is very moderate. Full-size plans are included in this issue, and we think that there will be a lot of people tempted to build it.

Sailing the HiBall

Tips on sailing the simple and inexpensive dinghy we built last month

THE "maiden voyage" of any boat is always rather an exciting business, even if it is a mass-production craft like the HiBall. For the first time, the boat is going to get wet and the skipper is going to have to feel out how to sail it. Because of this, it is desirable to make the first trials under good conditions, and for a small sailing dinghy this means not too much wind and not in choppy water, especially if the skipper is inexperienced.

As a sailing dinghy, the HiBall is happiest as a one-man boat, though it will easily take two once the skipper has got the idea of handling it. The problem with two aboard is movement, as there isn't an enormous amount of space and the boat is quite lively, so that on going about the crew needs to move smartly from one side to the other. Two people both unsure of when and how to move complicates matters; this is not so important where there is plenty of water, but on an inland lake, with perhaps a number of other boats about, you can't always pick the ideal time to change tack. So, wait for a calmish day for both wind and water, and sail the boat singlehanded for the first trip, however keen everyone is to get afloat.

Check that you have everything needed before setting out. For the boat, this means hull, mast, boom (with clew fitting), sail, dagger board, rudder and pintle pin—not very much to check off. You would be unwise to sail without some form of paddle and a bailer; a crude paddle can be made quite easily by screwing a ply shape (say about 7 × 15 in.) firmly to a piece of timber a full 1 in. square. Nailing it is not good enough, and glue plus screws should be used. The boat is very easy to move, and with two up and two paddles, can be made to travel surprisingly fast. A bailer can be any plastic container; the best thing is a square sand-castle bucket.

If you are sailing on the sea a small anchor (even a large stone) and three or four fathoms of rope should be kept aboard. This is useful for mooring clear of shingle for short periods but might also help if arranged so that if you are tipped out, so is the anchor; the HiBall is so light that if it righted itself, it would be likely to blow downwind faster than you could swim.

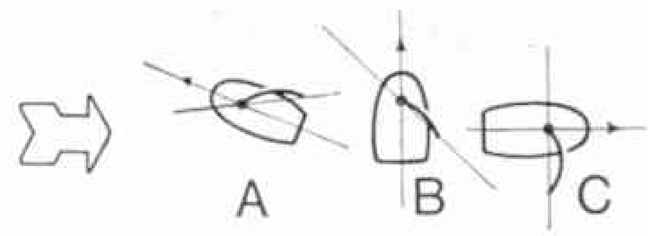
Which brings us to lifejackets. You may think these an unnecessary extravagance, especially if you are a strong swimmer, but (a) most inland water authorities insist on them (to British Standard Specifications) and (b) it is not difficult to be knocked out by the sail boom in the act of capsizing. Or, as mentioned, you may be tipped out and be unable to catch the boat if it didn't capsize completely. Most tragedies occur when people think it can't happen to them. This is not to say that the HiBall is any riskier than most sailing dinghies—if anything it is safer—but if it is your first venture into sailing, you need to have these things pointed out.

In case you are wondering about the absence of jackets in our heading pictures, it should be said that the people in them are all expert dinghy sailors and that there was always another boat within a few yards. If it had been windier, or at sea, they would certainly have worn jackets.

Back to our sailing trials. The boat can be fully rigged on land and then lifted into the water. Always rig with the bow pointing in the general direction of the wind, so that the sail "streams" downwind and exerts no significant force on the boat. The dagger board can be lodged at an angle in the top of its box, but the rudder cannot be shipped until the boat is afloat. Unless you sail from a jetty or on a lake with steep-to sides, you can't avoid wet feet; don't ever wear gum-boots in case you go in—they fill with water and make it almost impossible to climb back on board.

We found that the most comfortable and efficient way to sail HiBall solo was to sit back to bow (see cover picture) which enables a rapid shift to be made from one side to the other when going about. Seeing where you're heading is no more of a problem than when rowing a boat. When settled on a long tack, sitting on the floor aft gets the best out of the boat. With two up, one on the floor aft and one on the centre thwart is best, the one on the thwart having the job of sitting on the high side and switching quickly when going about.

Pictures opposite show three experts trying out HiBalls. Left and centre are beating, right reaching; note the bow wave on the last. White line from boom to mast heel is kicking strap, which prevents boom lifting and allowing sail to spill air. Wendy (centre) was subsequently sailing on the run standing in the boat with the tiller between her ankles!



Incidentally, with two (or more) in a boat, the helmsman warns of a change in tack by calling "Ready about", and as he puts the helm over calls "Lee-oh".

Whenever you don't want the boat to sail, or if you get in a jam, let the sheet out so that the sail swings downwind, and/or apply helm to bring the boat's nose the shortest way into wind. This takes the pressure off the sails and gives you time to sort things out.

The three basic courses are beating (into wind) reaching (across wind) and running (downwind), and the approximate sail position for each of these is shown at A, B, and C respectively in the small diagram. You must train yourself to be aware of the wind direction all the time.

With the sail lying downwind, climb in and push off—it may be push off and climb in—and settle yourself on the thwart. Grasp the sheet and the tiller, pull in on the sheet to adjust the sail position to the appropriate position, and use the rudder to turn on to the desired course. Push the dagger board down. Experiment with the sheet until the minimum amount of rudder is needed for the course you wish to make.

If there is an offshore breeze, don't run for miles before bringing the boat round and checking how it behaves on beating and reaching; the main concern with all sailing is getting too far to leeward (downwind) and finding it hard to beat back to windward.

The best definition of HiBall is that it is a "fun boat". It really is enormous fun, and it sails very well. However, there are bound to be limitations with a small boat and a simple rig, and it cannot be expected to sail as efficiently as a proper 12 or 14 ft. racing dinghy. Similarly, because it is small, things can happen quickly in a gusty wind or rough water, so get a little experience before risking blustery conditions.

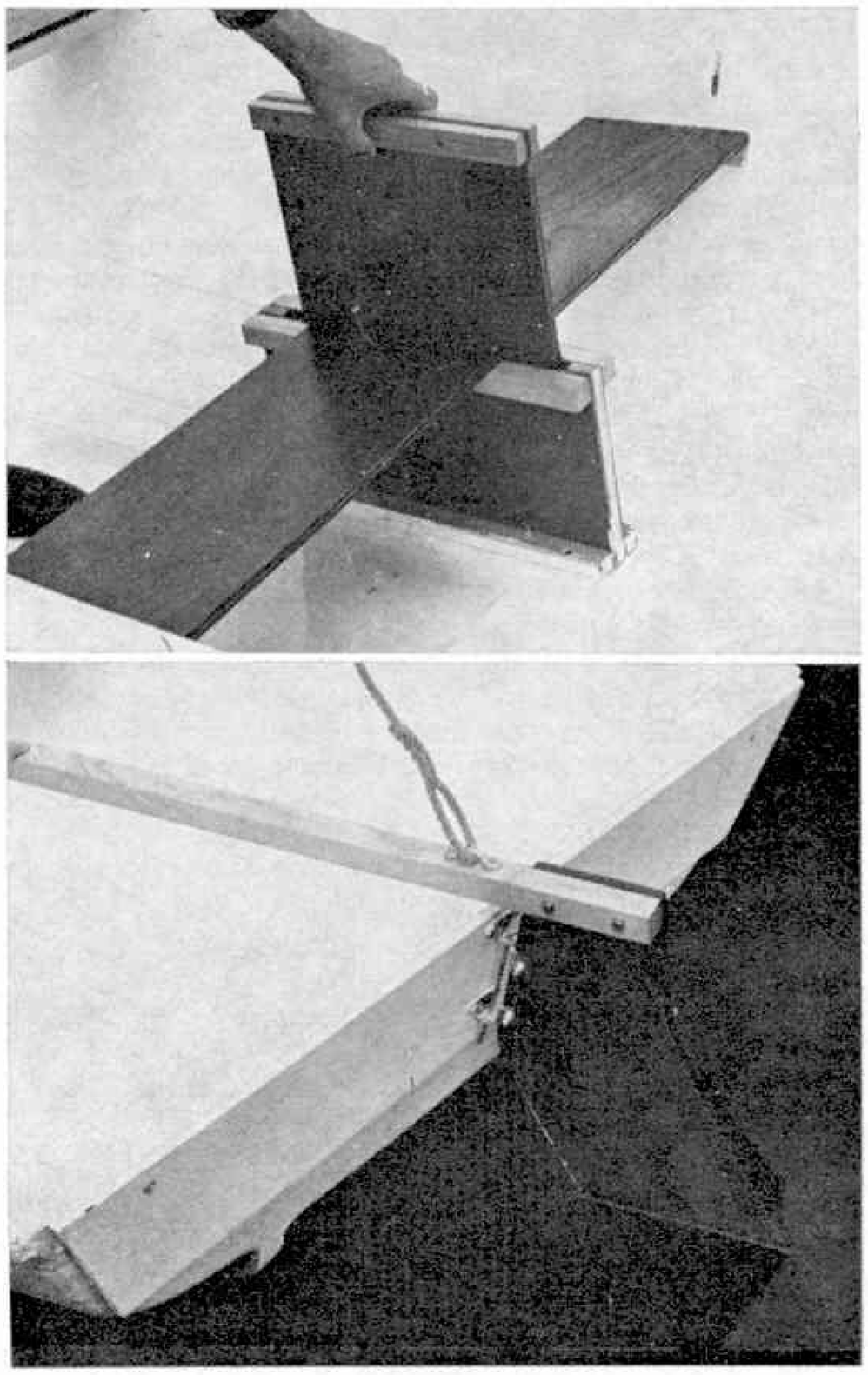
Conventional reefing to reduce sail area is not possible with a pocket luff sail, but it is possible to roll the sail round the mast. Provided you then wedge the mast to prevent it rotating (and hence unrolling the sail) it is possible to sail with only a few square feet of sail area.

The first time we tried ours we had an unfortunate combination of circumstances in that the only spot we could launch from was a gently shelving lakeside with the wind blowing directly onshore. This meant that by the time we had pushed off and leapt in, before we could get way on the boat the rudder grounded. We sailed off on the sail alone, hanging over the transom trying to get the pin in the rudder pintles (try it if you think it's easy!) and shortly after succeeding discovered that this particular lake had shallow patches anyway . . . .

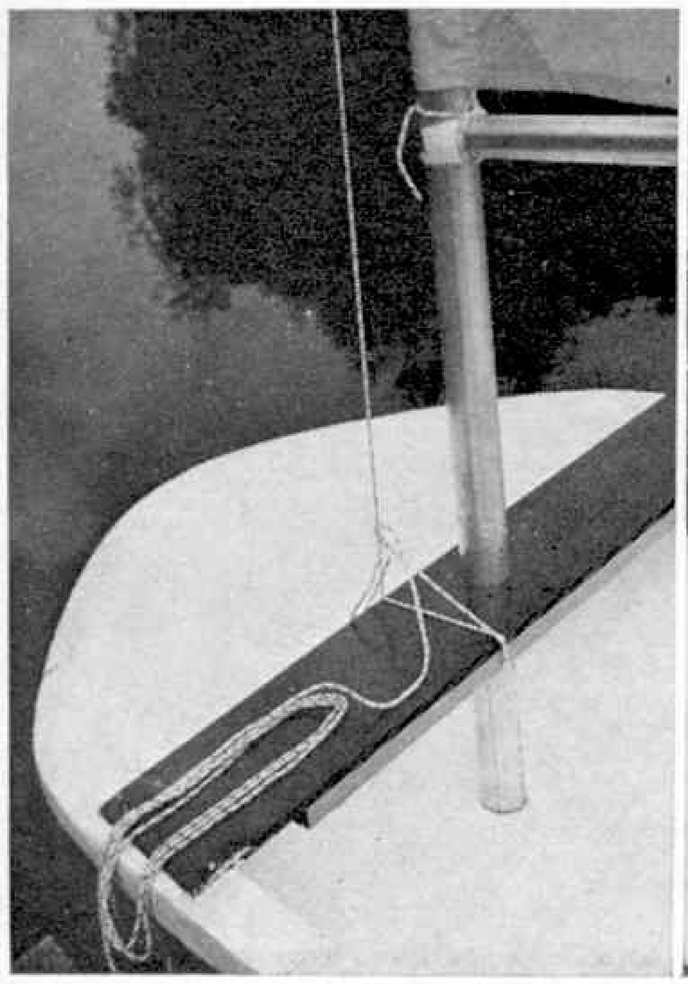
The answer to this is to make the rudder into a kick-up type, and the sketch shows the idea. The rudder is cut at an angle and the after top corner radiused. Two ply cheeks are glued and screwed to the upper piece, and the blade bolted through these at the centre of the cut radius. Its own buoyancy will cause it to float up (as dotted) and to bring it to the normal sailing position brass screw-eyes are fitted and a nylon cord tied to the bottom one and passed through the others. Pulling the cord lowers the blade, and the cord is then made off on the tiller in a knot which can slip if the rudder strikes anything head-on.

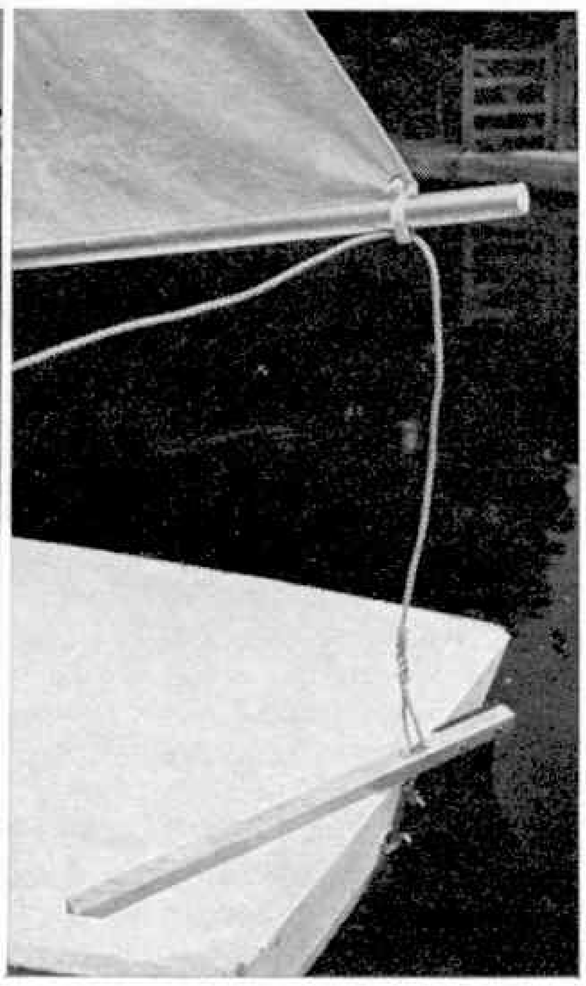
On another occasion we found a launch point in a narrow inlet where to bring the boat in we had to gybe. Novices should learn about gybing, since it is a sudden manoeuvre which can cause difficulties. Normally when sailing, to change tack (i.e. to move the sail boom to the opposite side) you go about by turning the boat's bow into and through the wind. The boom swings over fairly rapidly but can be controlled without difficulty. In a gybe, the boat changes tack while heading downwind, and the boom suddenly swings from one side to the other. The crew needs to be on the alert to change sides at the right instant. The sudden crash as the boom goes over also places quite a strain on things. In a wind, it is something to be avoided, unless you are skilled and in a race.

Should you capsize and the sail go in the water, it is likely to hold the boat on its side. This is mainly because the water over the natural belly of the sail is a tremendous weight and exerts far more leverage than you can in trying to right the dinghy. The usual procedure is to lower the sail, but with the luff pocket this cannot be done. The easiest answer is to swim round and unscrew the clew fitting (make sure you don't drop the nylon thumb-screw) which releases the sail.



Detail pictures show centre thwart and dagger board, which is simply pulled or pushed into position, and the tiller arrangement. Note pintle pin and end of main sheet eye positioned where tiller crosses transom.





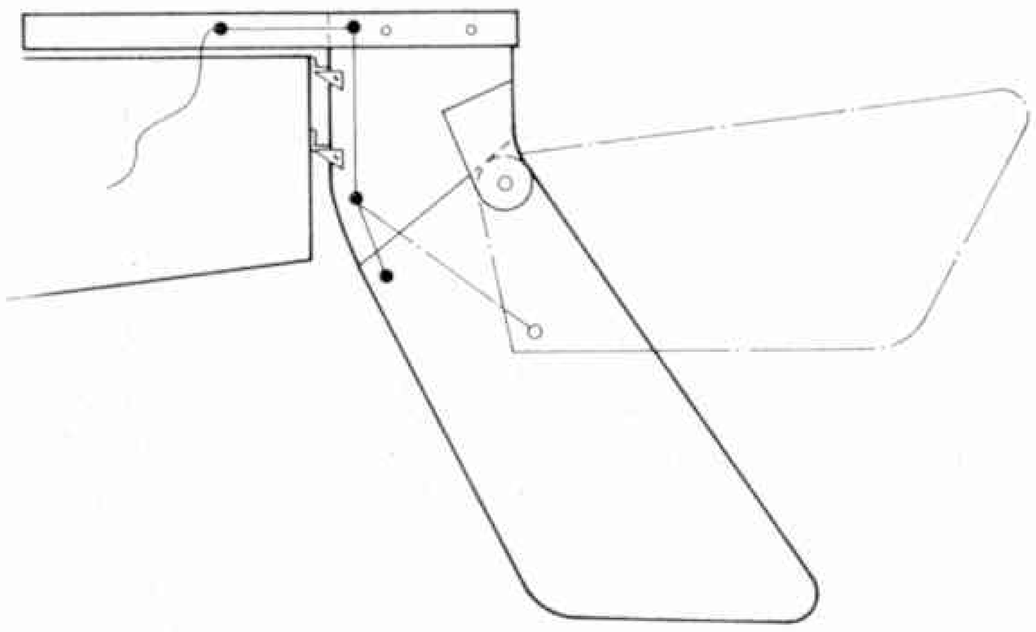
Bow thwart (stiffener visible) and sail halliard made off to it. Simple gooseneck is also clear. Right-hand picture shows clew fitting which anchors clew of sail and provides lead for mainsheet.

Then make sure the dagger board is fully down before swimming back round the hull. Grip the exposed gunwale, put both feet on the dagger board and heave, and the boat should come up. In an absolute pinch, tie the very end of the sail halliard round the thwart and pull the mast out; since mast and boom are light and corked off, they may float, but if not you can pull them up by the halliard after the boat is righted and bailed. The bailer, needless to say, should be tied to something in the boat or you'll lose it in a capsize.

Climb in the boat over the bow or stern, not the side, and get rid of as much water as possible before tidying up the rigging and sailing on. If the rudder comes unshipped it will float, but you could lose the pin. It is possible to steer after a fashion by holding the rudder, but this is tiring! We don't mean to harp on the dismal side of sailing, but you can sort out normal sailing by yourself provided you know what to do when something doesn't go right.

A trick which is sometimes useful in light winds is "pudding stirring". If you work the tiller from side to side, after three or four sweeps you will notice the boat moving, and you can in fact propel it at about 2 m.p.h. in this way. To turn it, use a slow sweep one way and a quick one the other. This can be helpful if, say, you run into a calm patch in the wind shadow of lakeside trees. The HiBall, incidentally, fitted with rowlocks, is about the easiest thing to row that we've ever tried.

Most public libraries have a selection of books on sailing, and full use should be made of these. Quite obviously we have been able only to touch on the subject; after your own trials you will know which bits you want to read up on. Once initial nervousness has worn off the fascination of sailing will become more and more apparent. Our family has been well and truly bitten to the extent that we've just got to get a bigger boat!



Maintenance

One of the attractive features of many of the new materials being used for boats is that they require very little maintenance. There is of course resistance to new materials by traditionalists—first it was the use of plywood, then glass-fibre, and no doubt expanded polystyrene will come under fire. The point is, of course, that these materials are excellent for the purpose provided that the design takes into account the limitations of the material.

Expanded polystyrene is the result of steam-heating little granules of material so that each expands into a sort of bubble. Done in a mould, the "bubbles" fill the mould; with a greater number of granules, the expansion is limited by the space in the mould and the bubbles are therefore smaller and denser, which is what high density expanded polystyrene means. Each bubble is waterproof and since the bubbles are jammed together and stick to each other, the whole mass is waterproof. Anchor a block of the stuff twenty feet under water for six months and the water absorption will be about 0·2%.

This means that you can leave a HiBall out in the garden indefinitely without any serious deterioration. It will get a little dirty and may even grow that green slime which appears on anything left lying in a garden, but it will wash off and with a fresh coat of emulsion the hull will be as good as new for next season.

The varnish on the ply will weather but the ply itself will stay sound if it is ventilated. A sand over and a new coat of varnish is all that is necessary. If the hull is inverted and blocked on bricks so that air can circulate, no harm will come to it.

Wash the sail off and dry it thoroughly, then roll it and store it somewhere clean and dry. The mast can be used to roll it round, but don't slide it through the luff pocket, as this means storing it with a sharp fold in the sail.

The other bits and pieces are all small and easily stored. When the time comes to refit, examine everything carefully for wear and chafe; the sail tack cords are nylon and will last well, but their attachment to the sail is the most likely spot for wear to show itself and this could be strictly a case of a stitch in time. In fact the stitching and the sail could well outlast the hull, but there is so little else to wear that this looks the likeliest possible trouble spot.

One point which has not been mentioned is the roof-rack. An ordinary luggage rack is not likely to be wide enough for the hull, and the simple answer is a couple of lengths of timber (about 1 × 3 in.) lashed across the rack. They need only be a couple of inches longer than the hull's beam, and with a light hull like this a true dinghy rack seems unnecessary. Of course, if you've got to buy a rack you might as well get a dinghy one, but for HiBall an existing conventional rack is adequate.

Our HiBall will be on show, by the way, at the Model Engineer Exhibition next January. We are using the smaller swimming pool at the Seymour Hall for model boat demonstrations and the HiBall will make a light and easy to use retrieval craft if any models get stuck out in the middle. So if you'd like to see it, see you there!

STRAKER'S SPECIAL

DINKY TOY NEWS

by

Frank Lomax

THE year is 1980, and over the world hangs an appalling menace from outer space—the menace of Unidentified Flying Objects, or U.F.O.'s for short. A secret, world-wide headquarters has already been established to combat these cosmic invaders. Known as S.H.A.D.O.—Supreme Headquarters Alien Defence Organisation—it recruits the best brains and the toughest on-the-spot operators that earth has to offer.

All this, of course, is not fact, but it is, as you may already know, the theme of Independent Television's latest science-fiction series, "U.F.O.", the series which has already inspired Dinky Toys to produce a model of the U.F.O. Interceptor, a fighting missile ship in the S.H.A.D.O. fleet. Such an organisation, with its communications network reaching every part of this globe and faced with the mammoth task of preventing an alein invasion, undoubtedly requires a leader, not only with intelligence, but also with physical strength and determination.

Commander Ed Straker, S.H.A.D.O. chief, certainly possesses all these attributes and it is therefore fitting that a man of his responsibility should have a special personal car to suit his position. The makers of the T.V. programme, with this in mind, have provided Ed with such a car and it is this vehicle which Dinky Toys have now released as an exciting and attractive addition to the range—Dinky Toy No. 352 Ed Straker's Car.

With a sleek, streamlined body, wedge-shaped in appearance, the model gives a good impression of rugged speed, and this aspect is further accentuated by the gently-sloping bonnet, interrupted by two air-intakes, which culminates in two slanting radiator-grilles and wing-mounted headlamp representations. The sloping fastback also includes fluted grille-work, while the slightly-curved back panel carries brake, rear and direction indicator lamp reproductions. Naturally, windows and interior moulding are fitted as standard.

Motor-powered

The attractive lines of the model really drop into the background, however, when compared to the most important feature of the new Dinky Toy—its power unit. Yes, power unit! Ed Straker's Car is actually motor-powered, driven by a uniquely designed "keyless" clockwork motor hidden inside the body! To wind it up, the model is simply reversed for a short distance until it resists any further movement and then, when the model is released, it will drive forward, gathering speed as it goes. The motor also incorporates a special free-wheel feature which lets the model go on rolling even after the motor has unwound and it also allows the model to be pushed forward by hand without damaging the motor. However, the model should not be pushed backwards, except when winding the motor, and great care must itself be taken during this operation to ensure that the motor is not overwound and broken by reversing the model past its natural resistance point. Treated well, though, this model will give endless fun and it will also make a very handsome collection piece, thanks to a really striking plated body finish, gold coloured, and set off by a pale blue interior. It certainly makes a fitting companion for the U.F.O. Interceptor.

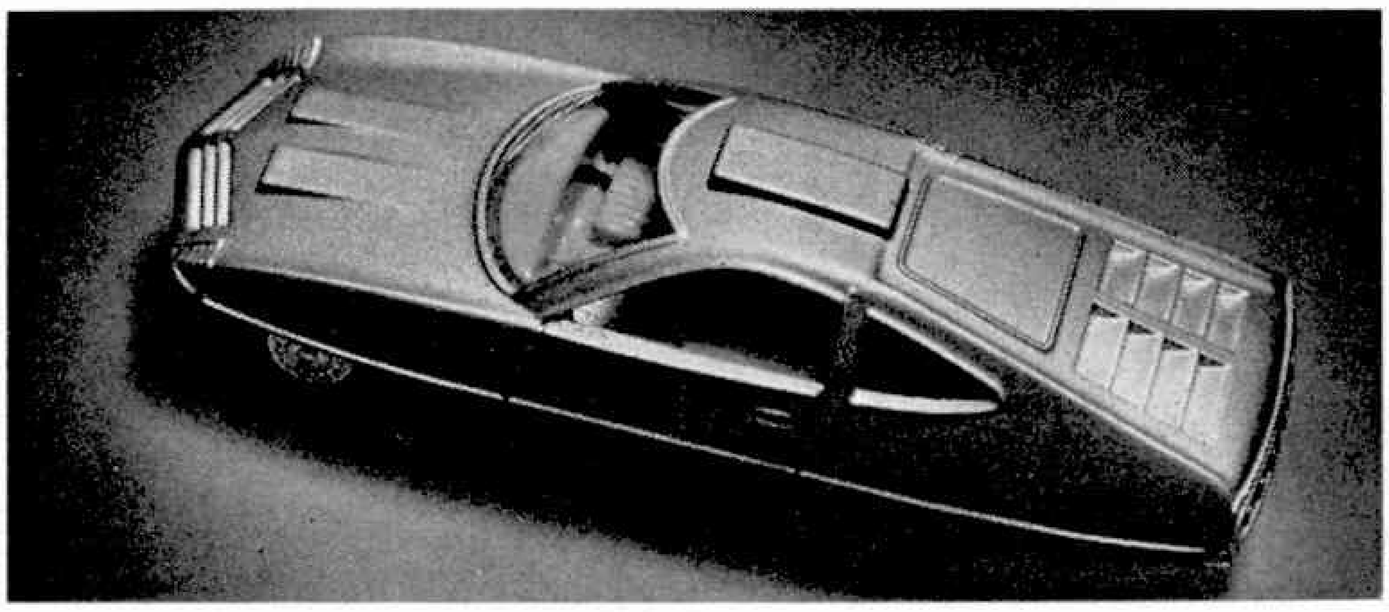
New Dinky Catalogue

Talking of the Interceptor, this is the model which is featured on the cover of the new Dinky Toy catalogue, No. 7, now available. The Dinky Toy range is illustrated in full colour over 23 pages and the booklet also includes illustrations of several future models yet to be released. Priced at 2p, it is a "must" for the Dinky fan!

Swap Meeting

Finally, an event to be held in Portsmouth during August should attract a good deal of attention from die-cast model collectors, especially those interested in exchanging their surplus items. The Portsmouth Static Model Vehicle Club have organised a "Swap Meeting", to be held at St. Nicholas Church Hall, Battenburg Avenue, Portsmouth on Saturday, August 14th from 2 p.m. to 6 p.m. All visitors will be welcome and anybody with any models to swap is cordially invited.

As far as we know, this is the first meeting of its kind to be organised, but I feel it will become a popular way for enthusiasts to compare notes and perhaps build up their collections without getting involved in heavy expenses. I wish the Meeting every success.



Dinky Toys latest release, No. 352 Ed Straker's Car, powered by a keyless clockwork motor. Indistinct in the background above is the Dinky U.F.O. Interceptor, and right is a close-up view showing the fine casting detail.

POCKET MECCANO

Great new "mini" Set introduced by Meccano Tri-ang Ltd.

by 'SPANNER'

and a new competition for juniors!

FOLLOWING last year's revision of the Meccano system, Meccano Tri-ang Ltd. have again made system history this year by introducing a brand new and entirely different idea in Meccano Sets: Pocket Meccano—a mini carry-it-anywhere outfit for the modeller who likes to keep busy in his leisure moments, wherever he might be.

Pocket Meccano is a complete, self-contained Set, small, but containing a sufficiently versatile selection of standard Meccano parts to make all sorts of intriguing little models. It comes complete in a strong cardboard pack approximately 5 in. × 2½ in. × 1 in. in size and small enough to fit into a jacket pocket. Coloured plans for no less than 25 suggested models are included with each Set, simplicity being the keynote of their design, and as with all other Meccano Sets, these suggested ideas can of course be further increased by the personal inventions of the individual Set owner.

Although a very simple outfit, as shown by the Contents List, (see page 425), Pocket Meccano could prove to be far more important than its size suggests. Its most obvious advantage, of course, lies in its "pocketability"; in the fact that its owner can carry his Set about with him to give him something to do in his spare moments. It would be ideal, for instance, for a young modeller to take on a long car or train journey, or to take on holiday with him in case bad weather should force him indoors. Any parent will agree that boredom soon sets in under such conditions of enforced idleness and Pocket Meccano would be a perfect "boredom breaker"—far more useful than the popular pocket puzzles which become useless once the puzzles have been solved.

This obvious advantage, though, is only one of Pocket Meccano's attributes. Perhaps of more importance from an overall point of view is its tremendous long-term promotional value. There are many youngsters living today who have never owned a Meccano Set and who are consequently unaware of the enjoyment which can be obtained from the hobby. Such children, or their parents, are understandably loth to spend a substantial sum of money on a standard Meccano Set "just to see if they like it" and so thousands of prospective customers have remained nothing more than "prospective". At a recommended retail price of 39p, however, Pocket Meccano is well within the reach of the "unconverted" and so the whole Meccano system should benefit as a result. Thus, Pocket Meccano will act as an introduction to the Meccano system and encourage more and more people to consider the larger Standard Sets in due course.

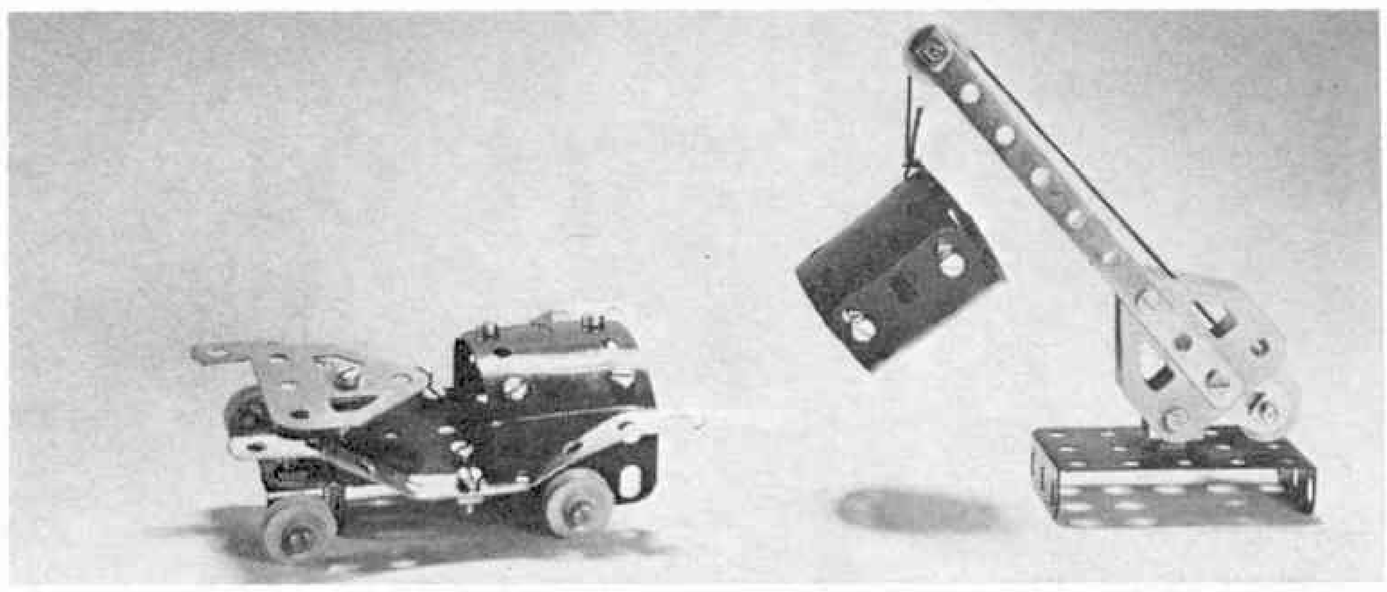
Pocket Meccano, of course, has other advantages as well. The Sets are being supplied to dealers in handy-size counter dispensers, sufficiently small to require only a little of the dealer's valuable shop space, but certainly eye-catching enough to attract attention. This will encourage dealers to display the dispenser which will serve the dual purpose not only of keeping Meccano in sight of the public all the year round, but also, when coupled with the low price of the Sets, of making Pocket Meccano an "impulse-buy".

Until now, Meccano has tended to be a planned purchase, with a customer visiting a dealer with the specific intention of buying a Meccano Set. A customer visiting a dealer with nothing particular in mind would not generally choose Meccano, either because no Sets would be on show owing to their size, or because the quality of a predominantly metal product is reflected in the prices of the Sets. Pocket Meccano changes the whole situation by being reasonably priced

The new Pocket Meccano Set: small enough to fit in a jacket pocket, but containing enough standard Meccano parts to build all sorts of intriguing little models.

Opposite, Pocket Meccano is supplied to dealers in handy-size dispensers which take up little room, yet keep the product before the public all the year round.

Right, this Mini-Moke and Wharf Crane are just two of the 25 suggested models featured in the Instructions Leaflet packed with each Set.



and small enough to be constantly displayed and it does, of course, have the added advantage of being part of a system with a first class reputation. It is therefore an extremely significant introduction and I know that the thinking behind it will be appreciated by all those interested modellers who have expressed concern at the apparent lack of exposure Meccano receives.

Great Introductory Competition

Pocket Meccano is being launched with a great introductory competition aimed at youngsters, but open to all owners of a Pocket Meccano Set aged 15 or under who live in the U.K. Three fabulous Tri-ang Bikes are being offered as the major prizes, with 30 No. 5 Meccano Sets for the runners-up.

Competition Entry Forms are available from all Meccano stockists and all the prospective entrant has to do is buy a Pocket Meccano Set, build a model *to his own design* from the parts contained in the Set and send a drawing or photograph of it, together with an Entry Form, to Meccano Tri-ang Ltd., Binns Road, Liverpool L13 1DA. There is a space on every Entry Form in which the model can be drawn, so that no extra drawing paper is needed, but the drawing could be made on a separate sheet if preferred. Any number of entries may be submitted, but each group of entries MUST be accompanied by an official Entry Form which must be signed or stamped by a Meccano Stockist to confirm that a Pocket Meccano Set has been purchased.

The competition is open only to U.K. residents who are aged 15 or under on the competition closing date and families of Meccano Tri-ang Ltd. employees and of the Company's Advertising Agents are not eligible for entry. Entries will be judged in three age groups—up to 8 years old, aged 9–12 and aged 13–15. One winner in each group will receive the bicycle, with the 10 runners-up in each group each receiving a No. 5 Meccano Set. The prizes will be awarded to those competitors who, in the opinion of the judges, build the most original and ingenious models in their age groups and the judges' decisions are final. Money cannot be given in place of prizes.

In the event of a tie, the prize will go to the entrant who, the judges feel, gives the best explanation, in not more than 25 words, of why he likes Pocket Meccano.

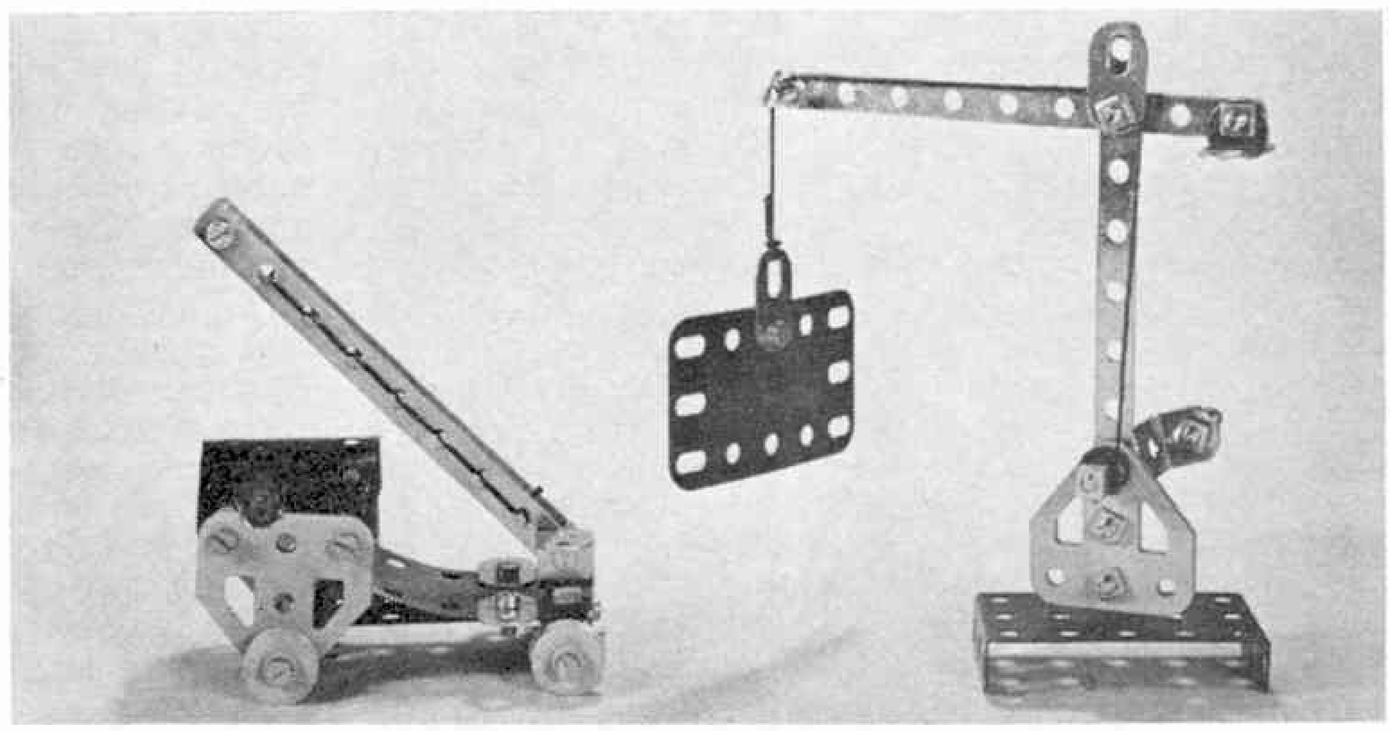
All valid entries will be carefully examined by the judges, but proof of posting cannot be accepted as proof of receipt and no responsibility can be accepted by Meccano for entries lost, delayed or damaged before or after receipt. All entries become the copyright of Meccano Tri-ang Ltd., although appropriate entries will be returned in due course if accompanied by a Stamped Addressed Envelope. The competition closes on 30th September 1971 and no entries received after that date will be accepted. The winners will be announced in the December issue of Meccano Magazine, but all successful entrants will be notified in writing before the Magazine appears.

Footnote for Meccano Historians

Developments in the Meccano world are, naturally, of interest to all modellers and, for this reason alone, the introduction of Pocket Meccano is a notable happening. There is one further point connected with the new Set, however, which will be of particular interest to the many " Meccano Historians " dotted around the globe. Pocket Meccano sees the re-introduction of a Part which was discontinued more than 30 years ago!

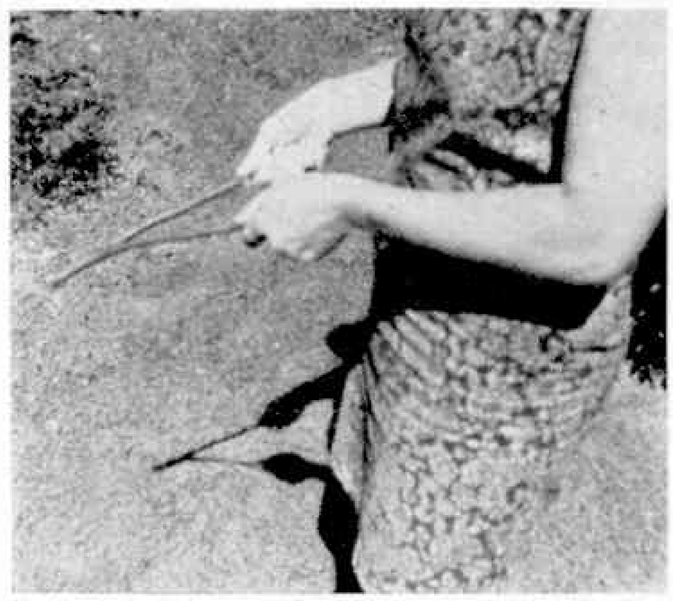
Contained in the Set is a combined Spanner/Screwdriver which many people will regard as entirely new, but which, in actual fact, is a part that was included in the old Elektron Outfits manufactured by Meccano Ltd. before the last World War. Company records show it was originally designed in 1931 as Elektron Part No. 1565—which makes it decidedly historic!

The Elektron Outfits were discontinued with the War, but, by a stroke of good fortune, the production tools for the Spanner/Screwdriver survived not only the rigours of war, but also the subsequent ravages of time to thus enable the ideal low-cost-tool for Pocket Meccano to be produced all these years later. It is worth pointing out, though, that it is only now, for the first time, that the part has been included in the *standard* Meccano system. Before the War, it was produced exclusively as an Elektron part, hence the rather strange 4-figure Part Number. Its new standard Part Number, by the way, is 34a and it is by this number it will be identified in the future.



Another two suggested models from the Pocket Meccano Instructions Leaflet are this Fire Escape and Tower Crane. Simplicity is the keynote.

The Art of Divining



By A. P. Major

DIVINING or dowsing, as it is sometimes called, for water, minerals and other objects, still retains an aura of superstitious mystery around it even today. Those who have the " gift ", which it is claimed one must have to be a successful diviner, believe in this means of discovery as genuine, but others, less easily convinced, tend to ridicule and dismiss it by considering divining a trick being played on those watching and that the demonstration was planned beforehand.

Until now, with certain methods of divining, not everyone can successfully divine for water, etc., although the number may be larger than is thought because some people have this " gift " without realising it. But the invention of " The Revealer " Detection Instrument by Mr L. J. Veale, a building contractor, which he developed and used on his own surveying work, has made it possible for *anyone*, after only a little practice and providing they can achieve a natural untense balance, to use the instrument to trace underground objects and water accurately. Most people easily acquire and quickly master the simple drill necessary to work the instrument.

" The Revealer " is non-electrical and consists of two detector cylinders of chromium plated copper, each with a 21 inch indicator rod pivoted in it at right angles. To ensure accurate location and freedom of movement, the indicator rods are mounted on ball bearings. The detector cylinders are so constructed that normally the indicator rods remain parallel but when the operator moves over any mineral deposit or service, etc., the rods swing inwards across each other, indicating the position of the object, or they both swing to the right or left if the object being traced is to the right or left of the operator. The mineral bracket attached to the right hand cylinder is used for determining the composition of the object.

Hold and balance are very important when using " The Revealer ". The cylindrical handles are grasped, one in each hand, with a firm grip, thumbs extended upwards and against the handle caps, fingers encircling the handles ensuring that the finger tips touch the palms of the hands. The handles are held perpendicularly in front of the body, approximately ten inches apart, keeping the elbows to the sides of the body with the forearms extended upwards at an angle of 45°. The indicator rods are pointed forward, parallel to each other and horizontal. Next the operator takes short, slow steps, in a normal relaxed manner, keeping the shoulders steady and all the time ensuring that the indicator rods are horizontal. An insulator badge is worn by the operator above the instrument to insulate against overhead objects.

" The Revealer " can be made to locate metallic and non-metallic objects, determine composition and their approximate depth and in the case of pipes, their approximate diameter. It is applicable for mineral prospecting and the location of underground voids such as shallow mine workings. It has been successful in detecting a buried service at a depth of 205 feet, thus making it possible to locate services, pipes and cables and other materials usually found much nearer to the surface of the ground. It is also capable of detecting vegetable matter and finding concealed underground cavities, graves, buried manhole covers, stopcocks, and springs. Running water can be detected but *not* the presence of water in pipes. The saving in surveying costs and needless digging can be considerable in large projects, on estates, developments, and building works of all kinds.

" The Revealer's " precise aerial array system built into each handle resonates with mineral emissions as encountered and thus differs radically from the " natural diviner's " twig, traditional water divining seeming to employ the same " spectrum " of radiations, but the hypersensitive diviner with this " gift " also apparently responds to neuro-muscular tensions and reflexes in their body.

The divining rod of the natural diviner consists of a forked or V-shaped piece of thick green twig or small branch of a tree, usually hazel, though other species have been used, one of my own experience being blackthorn. Other dowsers have claimed to use brass or steel wire rods. An end of the fork or V is held in each closed hand, with the knuckles up or knuckles downwards to suit the diviner for comfort. With the end of the junction of the twig slanting upwards or level with the ground, the diviner walks slowly around or across the garden, field, meadow, or whatever is being surveyed. When water is approached the twig moves and close to the water becomes almost alive, dipping and jerking downwards at the site. This is physical divining, the diviner being known as " radiesthetic sensitive " and responding to "radionic fields ".

The other kind of divining, which is probably the most difficult for the sceptic to accept, is that of the psychic dowser, who may use physical means to trace objects, but also relies on intuition and his power with the divining rod. The psychic dowser may use a forked hazel or other twig, but also a pendulum, made from anything suspended on a thread, such as a wedding ring or similar, pendant, cotton reel, etc., over a map.

To use a pendulum in this way firstly the affirmative and negative movements must be discovered because they vary in each person. This can be done by taking three coins, two coppers, pennies or halfpennies, with the same date, and one sixpence, shilling, etc. Place one of the twin coppers on the ground and hold the other one in a hand, then keeping the pendulum suspended as still as possible hold it over the coin on the ground. The pendulum then usually swings either straight up and down or in a clockwise and anti-clockwise direction. This gives the affirmative movement

Left, the hazel rod being used in the traditional way to "dowse" or divine water which may be in the area. The fork is held pointing forwards with the ends lightly held in the clenched fists. Right, the "Revealer", mentioned in the text, is distributed by J. C. Oliver (Leeds) Ltd., Water Lane, Leeds 11. The building in the picture is Burghley House, near Stamford.

and when the coin on the ground is substituted for the one of another metal, the direction will change giving the negative movement.

In this way missing persons, cattle and other animals and commodities are claimed to have been discovered, sometimes by the psychic dowser firstly handling hair, objects owned by the missing person, or pictures of them and the places they know and live in, before using the pendulum over the photographs or a map to try and discover their whereabouts.

Who first found that water and other things could be traced by using a divining rod is not known, but the practice is very ancient, being described by Cicero, the Roman orator, who died in 43 B.C. It is mentioned in the books of Moses in the Bible. All kinds of wood were used by ancient civilisations, but the hazel twig appears to have been first used in Britain in the early 16th century, because it bends but does not break. The word " dowse " is believed to be Cornish in origin.

It is possible that the early primitive tribes had this " gift " developed to a high degree and made use of it regularly in their lives. Civilisation and developing progress in the discovery, preservation and use of water by other means meant this natural physical gift was used less and less until finally not at all, but it still survives today in individual persons.

In the past diviners or dowsers were considered important people, particularly where water was scarce and sometimes crop failure or success meant life or death and depended on their skill. Neither were they thought of as fools. Most of them had highly skilled knowledge of the geological formation and stratum of each area, knowing from their own and their father's and sometimes their grandfather's experience where water and minerals were likely to be discovered. They did not just cut a twig and walk about in hit or miss fashion until they found water. Many diviners worked in co-operation with well-diggers and could sometimes state, by the strength of the twig's jerking movement, how deep the water source was situated.

A dowsing superstition that does not seem to have much basis in fact is that the seventh son of a seventh son definitely has the " gift " highly developed and thus make the best diviners. Scientific tests have not so far proved why one person can have this " gift " but another person does not. But one curious fact about divining is that, compared with men, far fewer women have the sensitive " gift ". Successful men diviners out-numbered women by ten to one in tests.

TULIPS DROVE A NATION CRAZY

BY PETER M. SMITH

THE dictionary definition of a tulip is that of a genus of bulbous herb which formerly inhabited the warmer parts of Asia Minor, but which is now extensively cultivated in Holland. The dictionaries do not state, however, the strange story of the years when " Tulip Mania " swept Holland.

The first bulbs were introduced to Europe in about 1560 by a Turkish diplomat returning to Austria. A Dutch botanist, Carolus Clusius, obtained some which he took to Holland where he built up a stock. Every year, the tulip bulbs become even more important until a man's wealth was measured by the number of tulip bulbs he possessed.

Before long, the whole country went tulip mad, and in the years between 1634 and 1637 people pawned their belongings, sold estates, mortgaged houses, all to get money to buy bulbs. In Haarlem, there once stood a house known as the Tulip House, because it had been bought with a single bulb.

A delightful scene, typical of the Keukenhof Flower Gardens in Holland—and this is only part of one of 78 prize gardens at this site!

Another lovely view in Keukenhof Flower Gardens. You can walk fifteen miles surrounded by views such as this.

As the " tulipomania " reached its peak, the rarer the variety of bulb, the greater the price became. By 1636 there were only two specimens of the " Semper Augustus " variety left in all Holland. One was exchanged for 12 acres of valuable farming land, whilst the other specimen of this brown and yellow striped bulb was sold for 4,600 florins, about £575, together with a new carriage complete with two dapple grey horses and new harnesses.

Shortly afterwards, another bulb of the Semper Augustus variety figured in a strange story. A sailor, recently returned from the East, delivered a parcel of silk to a rich merchant for his captain. For his trouble, the sailor received a fine red herring as a tip, and as he left the building he noticed what appeared to be an " onion " lying on a shelf. This he took to eat with his herring.

A few minutes later, the merchant saw that his precious bulb, which had cost him £375, had disappeared. The warehouse was searched from floor to roof, the merchant became more and more angry until suddenly he remembered the sailor. A great chase followed until finally they found the sailor sitting by the quayside quietly eating his herring and throwing away what he said was a " rotten onion ". Unfortunately, his ignorance was not accepted as an excuse, and he spent the next five months in prison.

Another unfortunate person who didn't know the true value of bulbs at the time was an Englishman who visited Holland and who was wandering round the gardens and greenhouses of a wealthy Dutchman. He saw a bulb lying about and began peeling layers from it with his penknife. When the owner saw what was happening, he was furious, and the poor Englishman was soon imprisoned until he could find £600, the market value of the bulb he had damaged.

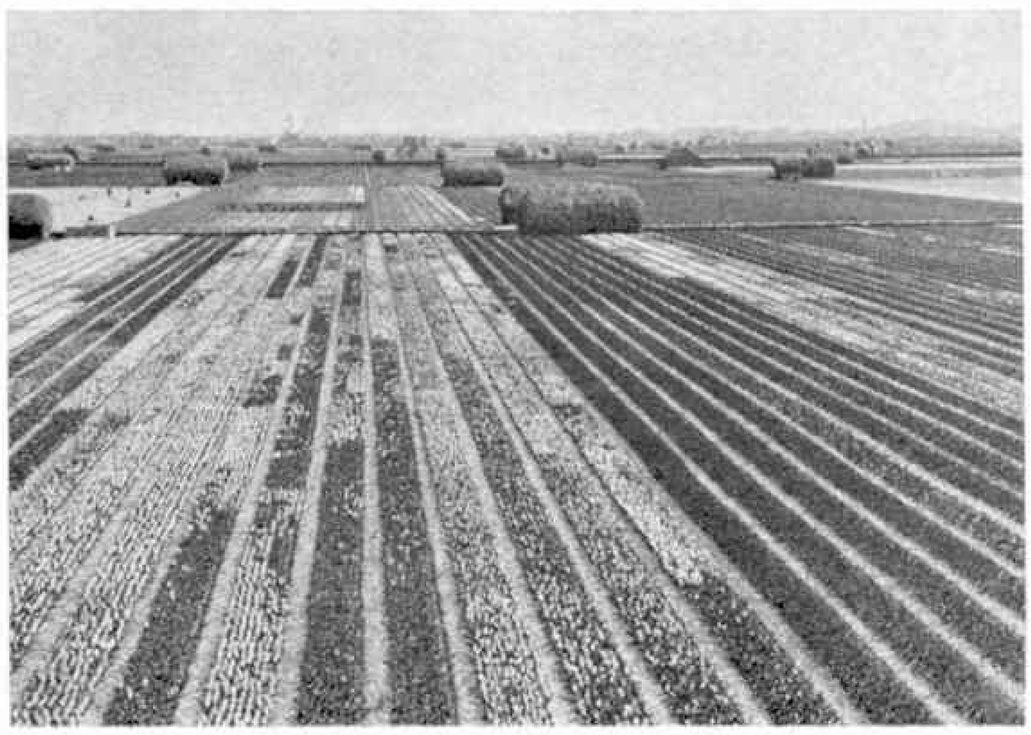
Yet again, one man was willing to give two loads of wheat, four loads of rye, four oxen, twelve sheep, eight pigs, a hundred and twenty five gallons of wine, two barrels of butter, a thousand pounds of cheese, a suit of clothes, a bed, all his furniture, and a silver cup—all for a single bulb.

Gradually, some people realised that this wild speculation would have to end, and as rich people began selling their bulbs instead of buying, prices began to fall. Within days, rich men were reduced to paupers, and contracts were not honoured. So much ill feeling arose that the Government were forced to take action. It was decreed that all contracts for the sale of bulbs agreed before November 1636 should be declared null and void, and anyone who had made a contract after that date could be freed from it by paying only 10% of the agreed purchase price.

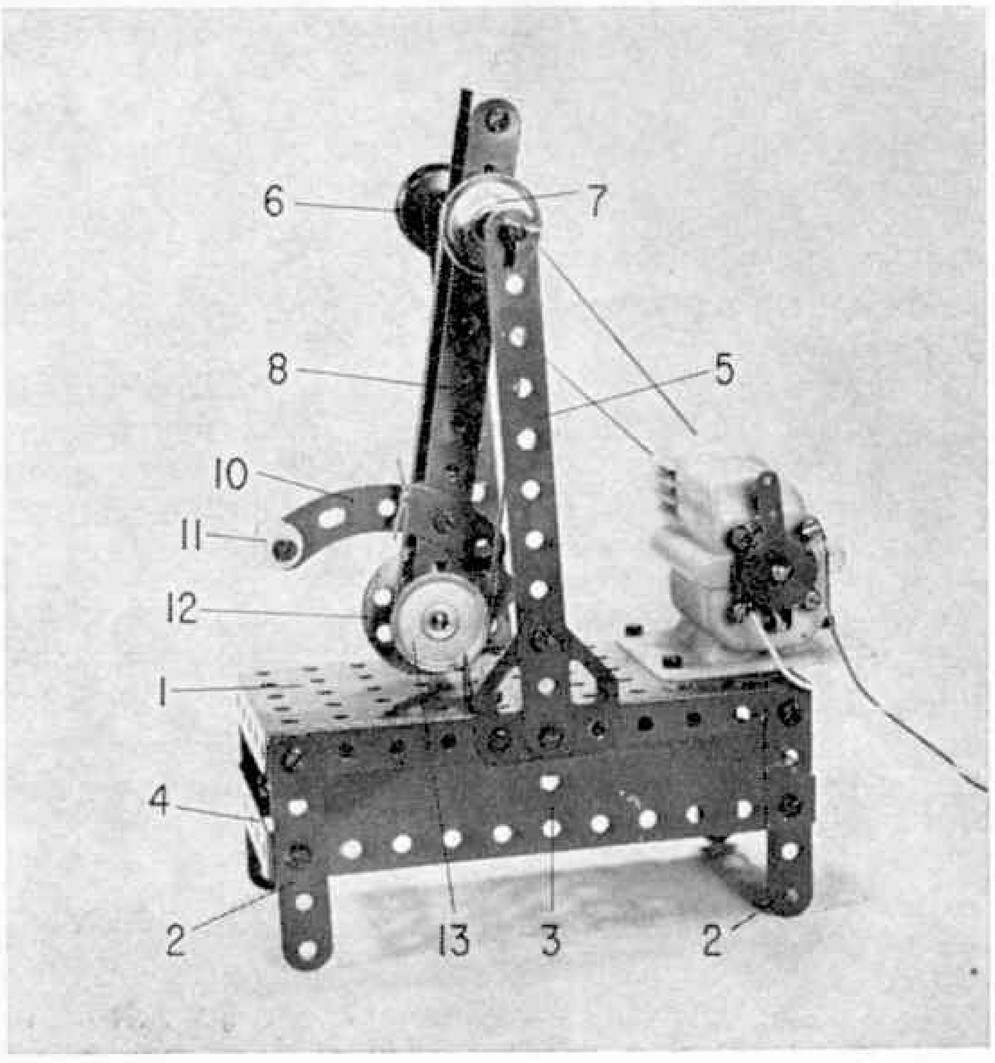
Once this craze had died out, the bulb industry was put on a firm foundation and, throughout the years, the Dutch have established themselves as the world's leading bulb growers. They managed to save their basic stocks during the last war and, despite a shortage of fertilizer, the industry forged ahead until at the present time some 95,000 tons of bulbs are produced annually, a total of 4,000,000,000 individual bulbs.

Today, the shop window of the Dutch bulb industry is to be found at the fabulous " Keukenhof " at Lisse, near Haarlem in the heart of the bulb growing area. Here are no less than 78 prize gardens all in one single 62 acre site, which was once the private hunting ground of the Countess Jacoba van Beyeren, one of whose husbands was a former Duke of Gloucester. The ten million gay and colourful spring bulbs set in gracious lawns, rockeries, idyllic streams and, naturally enough in Holland, a whirring windmill, make a walk along the fifteen miles of pathways little short of the experience of a lifetime.

In addition to the millions of outdoor blooms, there are two giant greenhouses with flower arranging exhibitions. The Information Bureau will gladly deal with queries from amateur gardeners, and there are ample guides. The Keukenhof Post Office even has its own unique postmark. Few would argue with the title the park has so aptly been given, that of the " most colourful show on earth ".



Bulb fields near the Keukenhof National Gardens, stretching as far as the eye can see.



Mechanical Logging Saw

'Spanner' describes a simple model for owners of a No. 2 Meccano Set

INDUSTRIAL machinery, as I have mentioned before, is often an ideal source of ideas for the Meccano modeller. There are many different branches of industry and each branch has various items of equipment which have been developed to meet its own particular needs. Generally speaking, this equipment lends itself splendidly to reproduction in Meccano.

When speaking of Industry, the obvious branch which usually springs to mind first is heavy engineering—ship-building, motor manufacturing, etc.—but on this occasion we are interested in something entirely different, namely the Logging Industry. This may conjure up exciting pictures of tough, burly lumber-jacks, working for months on end deep in the heart of a vast forest, felling giant trees to warning roars of "t-i-m-b-e-r", but it is still Industry and is recognised as such.

Today, the isolated logging camps which once rang to the sound of chopping axes now vibrate to the roar of power-driven saws—small hand held machines to cut down the trees and lop off the branches and large bench saws to split the remaining trunks into logs and planks. It is one of these bench or Logging Saws which we have chosen for the new Meccano model featured here. Easy to build, it is produced from a No. 2 Meccano Set and is powered by the 4½ volt Reversible Electric Motor, separately available.

As far as construction of the model is concerned, the saw bench itself is built up from a 5½ × 2½ in. Flanged Plate 1, to each side flange of which two 2½ in. Strips 2 are bolted, one at each end, the securing Bolts also fixing a 5½ × 1½ in. Flexible Plate 3 to the flange, as shown. The lower corners of this Flexible Plate are also bolted to the centre of the 2½ in. Strips, the securing Bolts in this case also fixing two 2½ × ½ in. Double Angle Strips 4 between the Strips at each side to brace the legs of the bench.

Two Flat Trunnions, each extended eight holes upward by a 5½ in. Strip 5, are now bolted, one to the centre of each side flange of Plate 1. Journalled in the upper end holes of the Strips is a 3½ in. Rod held in place by a 1 in. Pulley 6 and a Spring Clip. Mounted free to pivot on the centre of the Rod is the saw assembly, this also being held in position by a Spring Clip and a 1 in. Pulley 7.

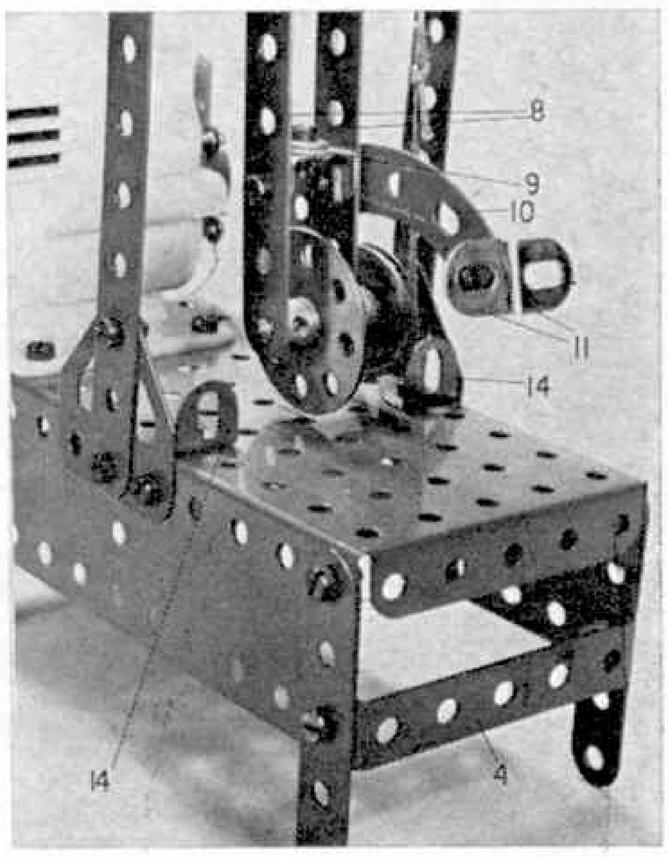
The saw assembly is built up from two 5½ in. Strips 8 connected together at their upper ends by a Double Bracket and through their third holes from their lower ends by a compound double bracket 9 supplied by two Angle Brackets bolted together. Note that one of the Bolts fixing this compound double bracket in place also fixes a 2½ in. Stepped Curved Strip 10 to the Strip, the Bolt passing through the second hole in the Curved Strip. Two Angle Brackets 11 are bolted to the end of the Curved Strip to serve as a handle.

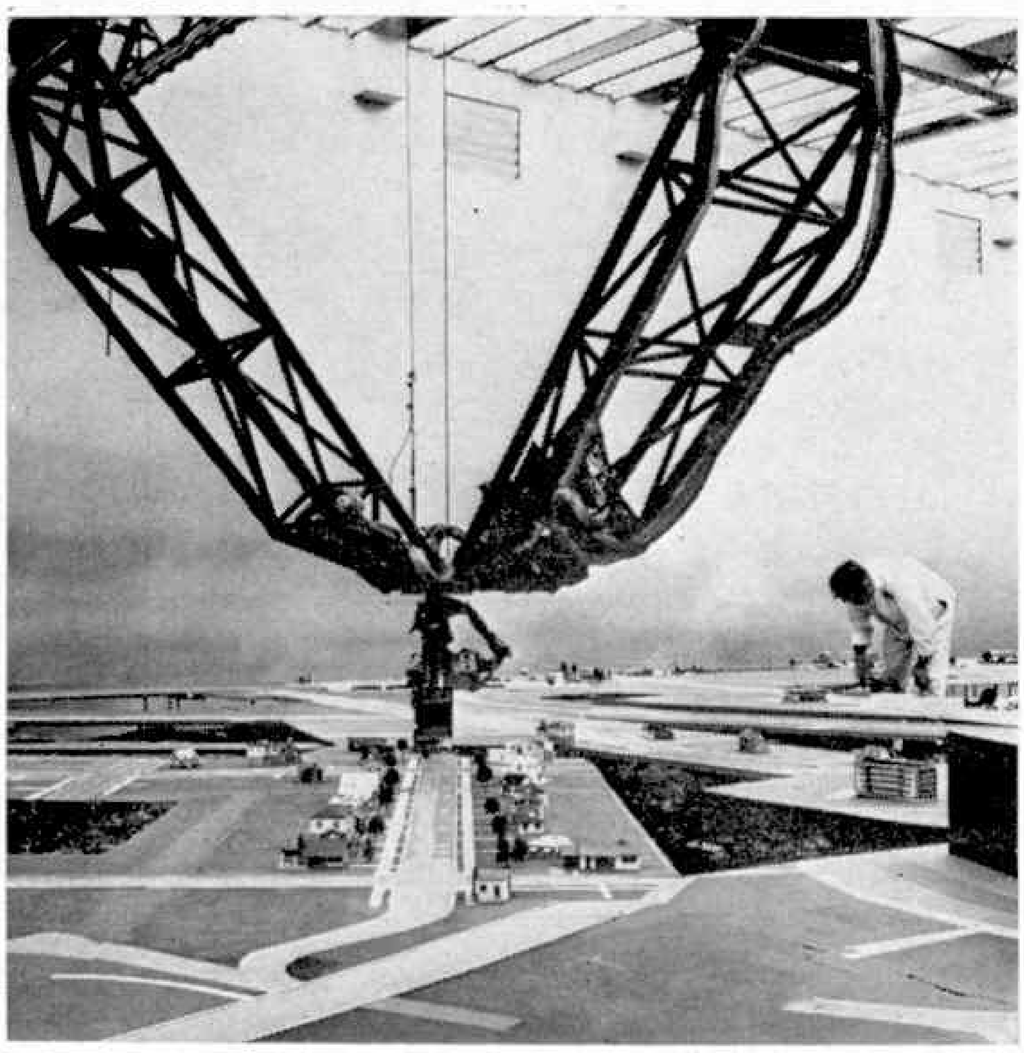
Journalled in the lower end holes in Strip 8 is a 1 in. Rod on which are fixed an 8-hole Bush Wheel 12 and a 1 in. Pulley 13, the Bush Wheel being positioned between the Strips, and the Pulley being fixed on the outside end of the Rod. Note that the side of the Bush Wheel without the boss is spaced from nearby Strip 8 by three Washers to ensure that the face of the Bush Wheel remains centrally positioned between the two Strips. The Bush Wheel, of course, represents the saw cutting blade. Two guides for the logs to be cut are represented by two Angle Brackets 14 bolted to the top of Flange Plate 1 in the positions shown.

Finally, the 4½ volt Reversible Motor is also secured to the top of the Flanged Plate towards one end, then a ½ in. Pulley on the Motor output shaft is connected by a Meccano Cord driving band to Pulley 6. Pulley 7 is connected by another Cord driving band to Pulley 13 and it will be found that this driving arrangement enables the saw to be moved backwards and forwards on its pivoted arm while the saw blade is operating. The model will not actually cut anything, of course, but it does show the principle of a real machine very well indeed.

PARTS REQUIRED

4—2	1—18b	26—37b	1—126
4—5	3—22	4—38	2—126a
1—11	1—24	2—48a	2—189
6—12	2—35	1—52	1—4½ volt Reversible Motor
1—16	26—37a	1—90a	





In a Lilliputian setting, representing part of Washington, a technician arranges cars for a test.

Robot Pilots for Motorists

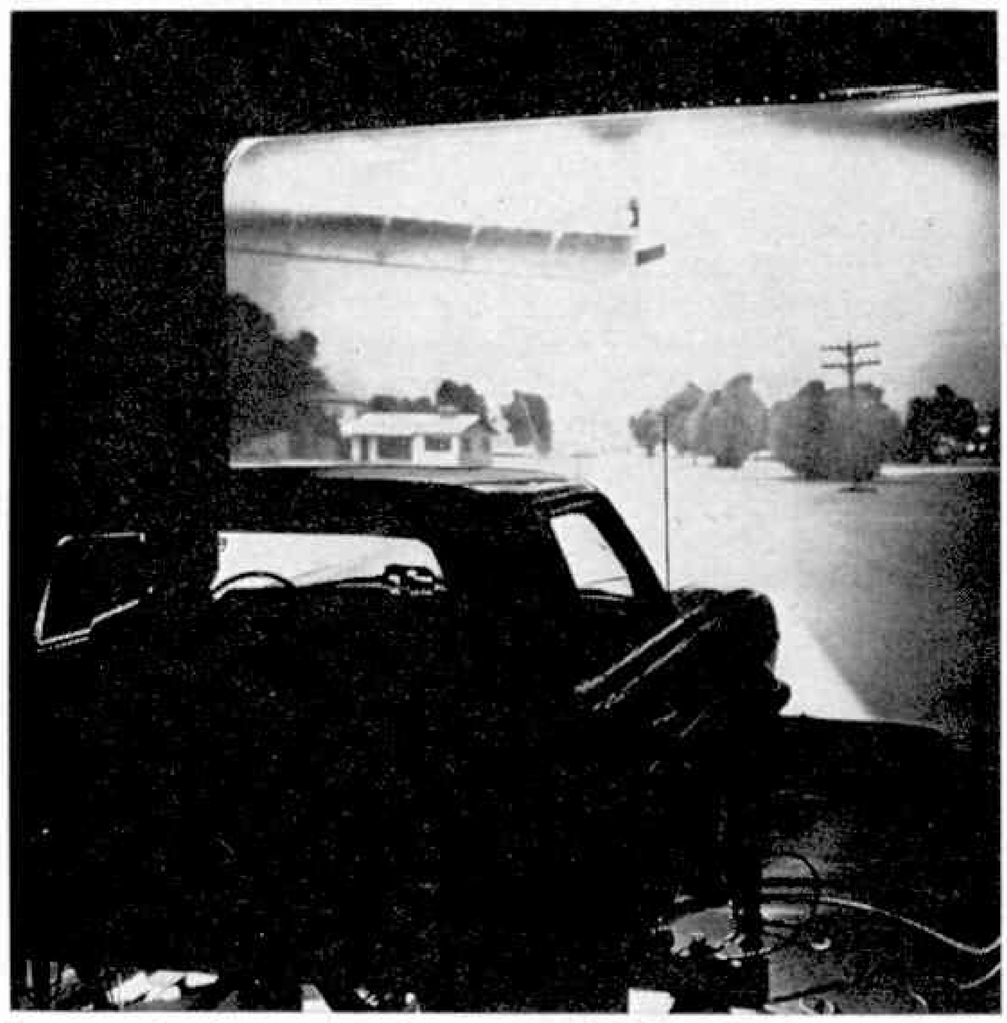
A revolutionary system of route guidance is being developed for motorists. It abolishes the use of maps, and directs drivers by means of roadside computers which relay signals to a dashboard screen.

By Arthur Gaunt

THANKS to advancements in electronics, tomorrow's motorists may find road maps unnecessary, even when travelling in unfamiliar areas. Instead they will be kept on the right route by ERGS (Electronic Route Guidance System), already undergoing practical tests in the U.S.A.

Some 50 vehicles and about 100 intersections in Washington are being fitted with a device which makes this miracle possible. When the installation programme is completed it is to be followed by a period of tests and evaluation to discover and overcome any actual or potential snags.

A driver using the system will dial a code into a control box below his dashboard before setting out, the code differing according to the place he wants to reach. Along the route will be roadside computer units containing receiving and transmitting equipment, together with a decoder.

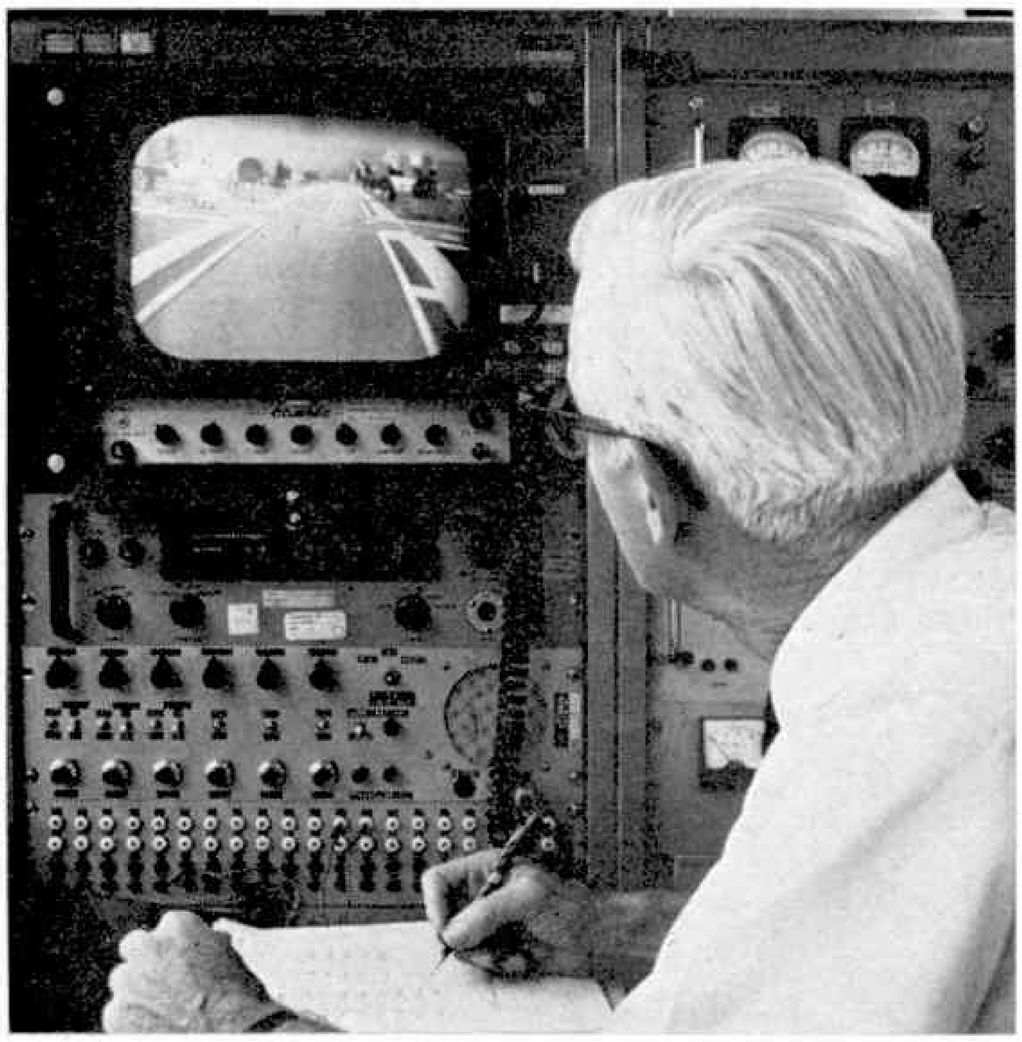


A motorist in a simulator car "drives" down a street projected on a screen by closed circuit television.

Then, as the driver approaches each crossroads or diversion, his vehicle will trigger off a wire connection in the roadway, in much the same way as road surface pads activate vehicle-operated traffic signals. This action immediately causes a radio impulse to be transmitted from the computer to the control box in front of the motorist, and the appropriate route instructions are flashed on a small screen in front of the windscreen.

For instance, the unit may tell the driver to turn left at the next junction, and to continue along that road until it forks. He is to take the right-hand road at that point, and turn left again at the intersection half a mile ahead. The instructions are made clear by a combination of words and arrows that light up on the screen.

To put if briefly another way, the motorist notifies his destination to the computer, and his route is automatically programmed. All he has to do is to follow the



The results of a simulated drive are carefully recorded and tabulated by a staff expert.

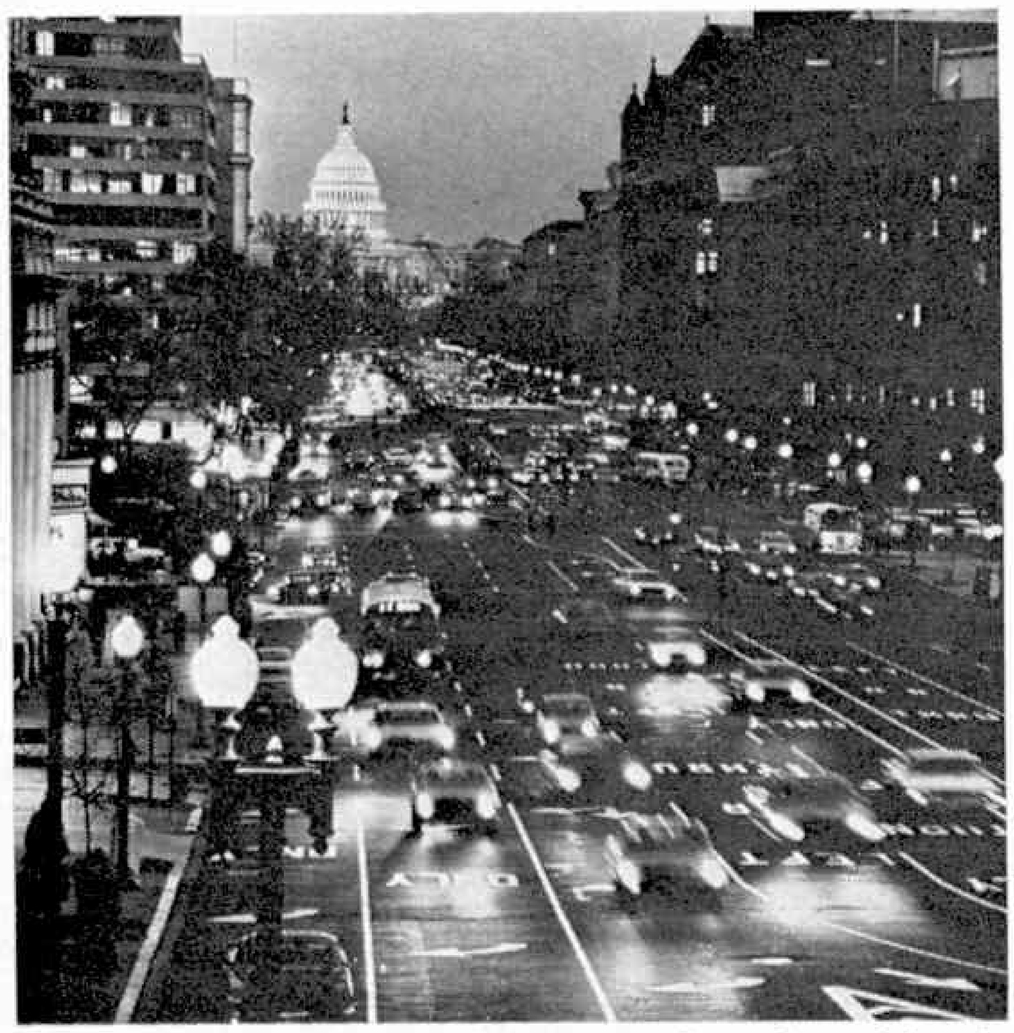
A roadside computer like this, which feeds direction signals to drivers, costs about as much as traffic lights.

arrow-word directions, which escort him to his destination.

The development of this system was begun in the early 1960's when the U.S. Bureau of Road Research set out to discover what drivers needed most to help them in making full use of highway networks. A recent survey has confirmed that one of the biggest problems is inadequate or confusing direction signs. Yet to increase the number of signs would itself create difficulties by distracting motorists' attention.

The " Dial a Destination " system, as it is now being called, is the most promising answer. America already has some read-the-signs-as-you-go systems, but they rely on signs on the road. ERGS is the first to bring route directions right into the car.

Oddly, the innovation owes a lot to space flights, the research in driver-assistance routines having been undertaken by one of the leading companies con-



Multi-lane combinations of arrows and words and jungle-jumbles of signs tend to confuse rather than direct drivers.

cerned with rocket and missile guidance and control. They have applied aerospace technology to promote better use of America's vast highway network.

To iron out the snags, an elaborate Lilliputian city has been built, complete with hundreds of scale model plastic houses, cars, roads, trees, telegraph poles, and other features of a normal street scene. The model represents a part of Washington where there are 22 intersections, and covers nearly four miles of roads 87 times smaller than the real thing.

A driving simulator is also being used to perfect the route guidance system. A car without wheels, but with all the ERGS electronics, is sent on a " run " in a laboratory, a closed circuit television camera being moved along the streets of the model. The image picked up is flashed on a screen in front of the driver in the lab, so that he seems to be driving through Washington although his car never moves.

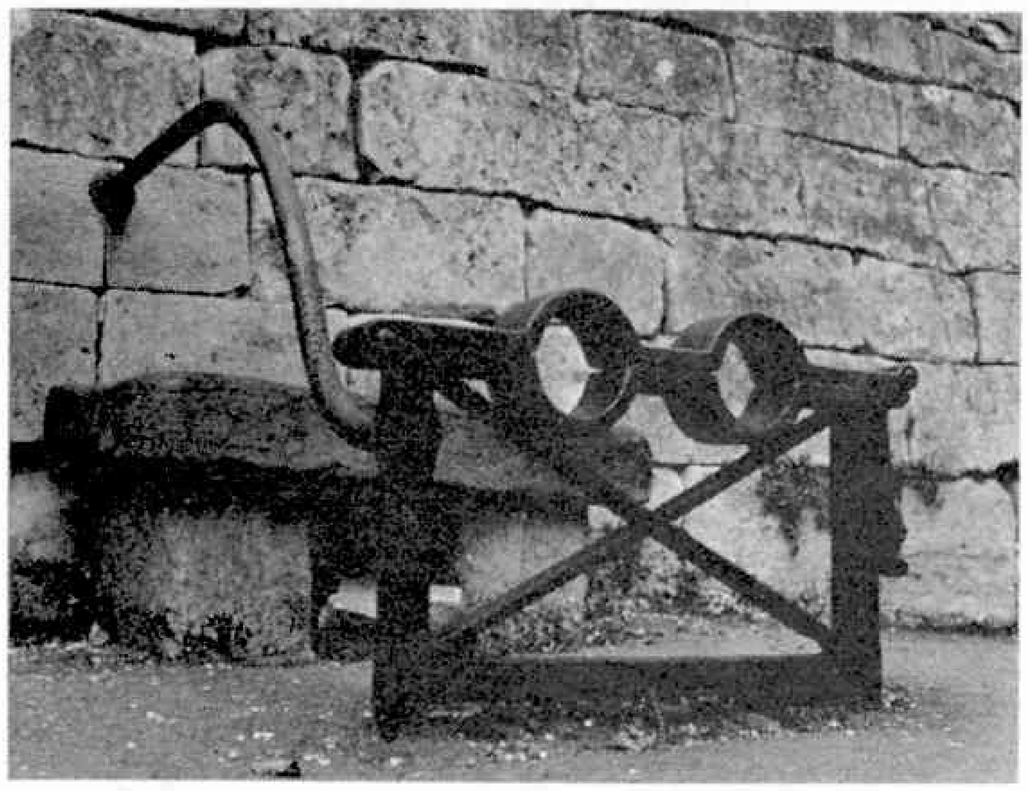
He accelerates, slows down, stops, changes gear, steers and turns just as he would in real traffic. In this way drivers' reactions to " Dial a Destination " are being scientifically assessed. The motorist's heart rate and stress levels are measured, too, and the data is helping road experts to make the new system as efficient and as safe as possible.

In fact, it is thought that widespread use of computerised route guides would make roads safer. Statistics already show that accidents often occur at approaches to intersections, morotists having to divide their attention between driving and looking for direction signs when travelling through an unfamiliar locality.

With the model, the Washington team of experts are trying to determine just how far ahead of a junction a driver needs to know whether he must go straight ahead or turn left or right. Information on no less

(*continued on page* 456)

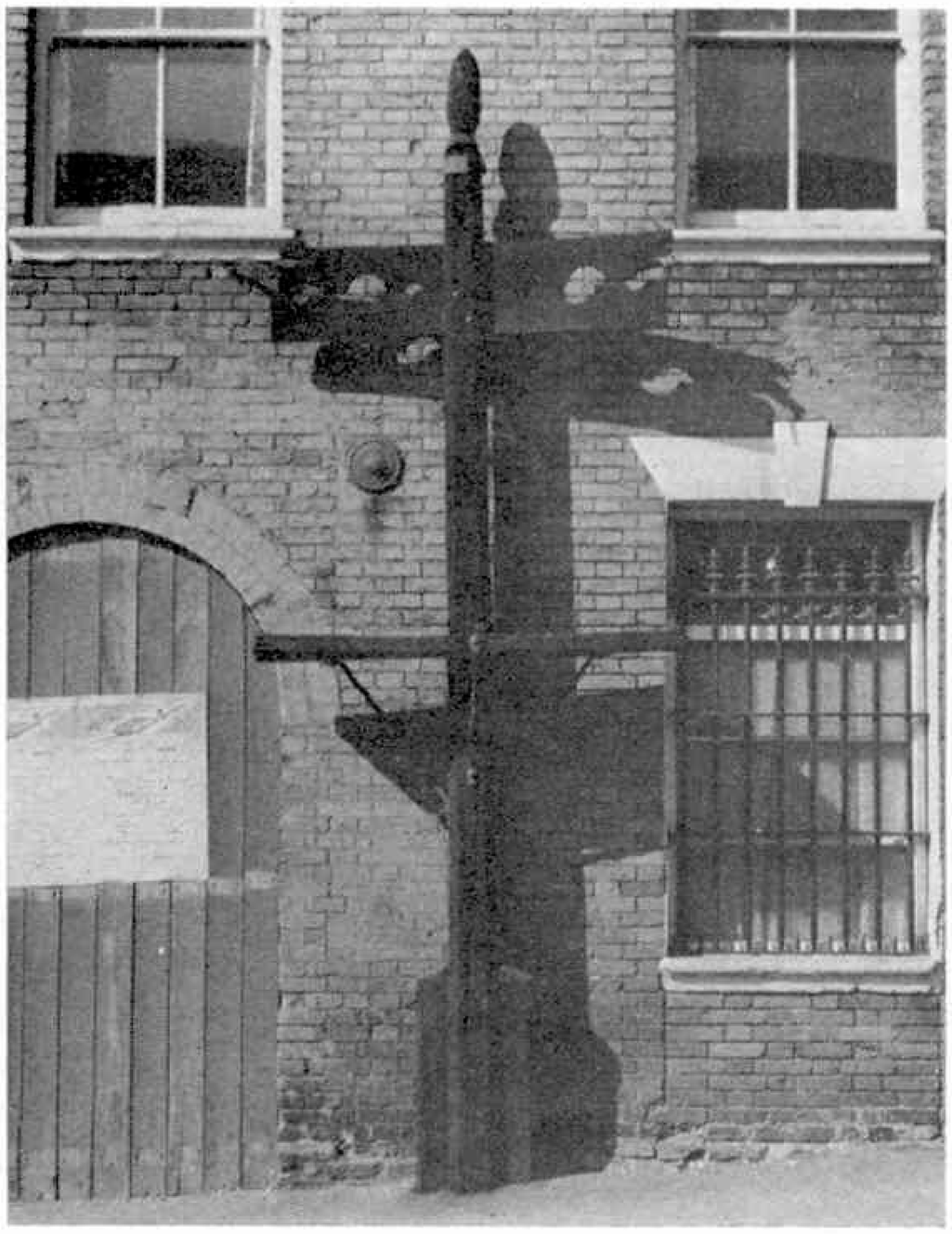
The electronic indicator on the dashboard projects signals to the driver in quickly-absorbed arrows and words.



SEARCHING FOR STOCKS

BY E. V. MALONE

Above, iron spectacle stocks at Painswick in the Cotswolds, a rare example, since wood or, occasionally, stone were the customary materials. Below, an unusual pillory at Coleshill, Warwickshire, on a raised platform. Below the platform is a whipping post.



AMONG the things we tend to take for granted which occur in abundance throughout the country are those old instruments of correction, namely pillories, whipping-posts, ducking-stools and stocks. Of these stocks are the most numerous and diverse of all.

Looking for stocks can add much interest to our tours of the countryside as, generally speaking, they have an interesting history. Records do not state, unfortunately, when they originated in Britain, although drawings showing them date from Anglo-Saxon times. However, it is known that King Edward III introduced an Act in 1350 requiring every town to provide a set and later every village to follow suit. Did you know that Parliament has never officially abolished their use and that it still behoves the local community to keep them in good order, although there is slight chance of the arm of the Law resurrecting them?

If your town or village possesses a set, examine it carefully. The instrument is, most likely, made of wood and consists of two hefty boards of strong timber, such as oak, in which semi-circular holes have been fashioned so that when the ends are closed together and padlocked, the holes will firmly secure one or more pairs of human legs.

Here the poor prisoner was held for a period of six hours as he sat perhaps on the ground or on a seat provided. If not, when released he or she was often too cramped to walk or even stand. If an unpopular person, moreover, the people would pelt the victim with missiles and it was in this way that the well-known saying, " laughing stock of the town ", originated in our language.

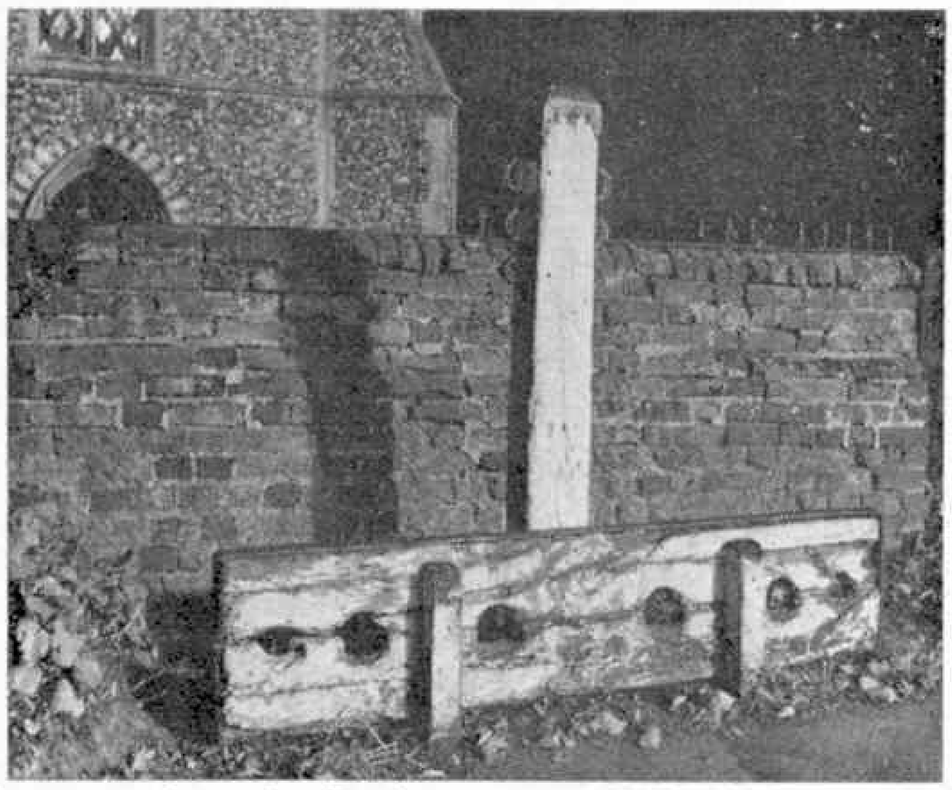
Stocks with two or four circular apertures are common enough. Sometimes there are six, as at Ufford, Suffolk and Becknoller, Somerset. Again, you may live in a place where the stocks contain five foot-holes, such as Leathley, Yorkshire; Berkswell, Berkshire; or at Foeck, Cornwall or Winchcombe in the Cotswold Hills where they have seven holes. The reason for the odd number, tradition usually maintains, was to accommodate a man with a wooden leg!

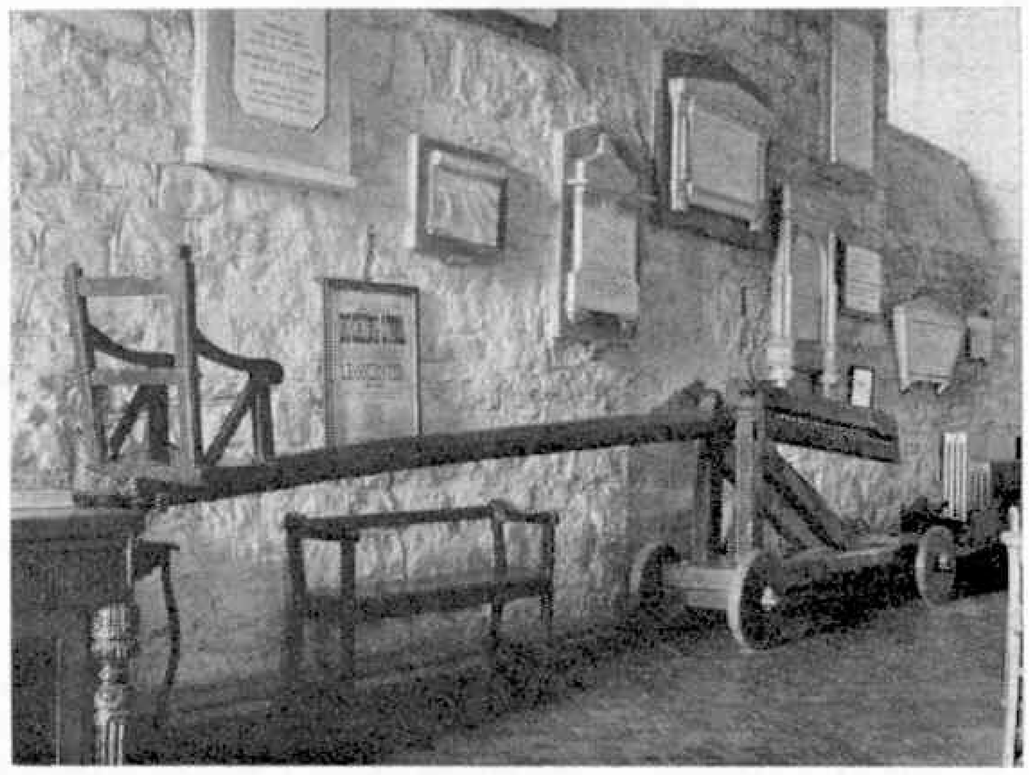
The sites chosen in which to place the stocks were, as a rule, churchyards, market-places and village greens. The reasons are not far to seek. In those far-off days the Church played a predominant part in the life of the community, for its officials were far more important persons than they are to-day. The parish clerk and churchwardens, in fact, were responsible for the proper administration of civil affairs, including the relief of poverty, the care of the sick and the prosecution of offenders against various regulations. Foremost were drinking in the " local " during the hours of worship or taking part in games of chance on Sunday. Ironically enough, such a high ecclesiastical dignitary as Cardinal Wolsey was, on one occasion, confined in the stocks for imbibing too heavily! Again, only just over a century ago a man was put in the stocks at Staningley, near Leeds, for breaking the Sabbath by gaming.

As for siting stocks in market-places, the grant of a market charter to a town or village implied that stocks were to be supplied near where it was held. This was often the churchyard, although this sacred enclosure occasionally served as the ordinary site for them even when the market was held elsewhere.

Fraudulent market traders, if caught, were sentenced to the stocks and in some areas it was customary to have the stocks situated conveniently in the market-place instead of at the churchyard gate. If you live at Oakham, Rutland, you can see a pair which were used on transgressors of the market laws, preserved beneath the umbrella-like roof of the Butter Cross there.

In order to overcome the difficulty of moving the





Above, stocks and whipping posts at Ufford, Suffolk, with different size and height arm clamps on the post. Top right. a ducking stool at Leominster, Herefordshire. Right, the finger pillory at Ashby-de-la-Zouch, Leicestershire, has a wide range of holes and slots for all sizes of fingers.

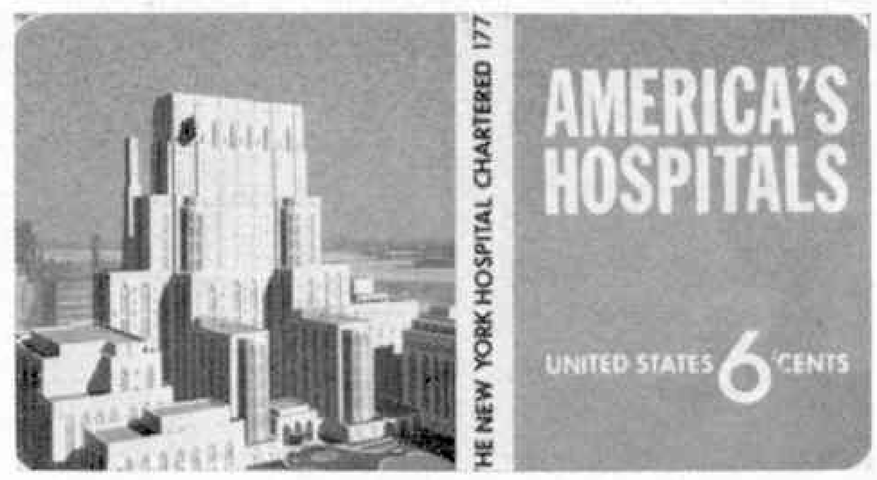
instrument from the market-place, for instance, to any other location dictated by the authorities in control of law and order, it was made mobile and mounted on four wheels so that it could be easily trundled about. Examples of this type surviving the ravages of time and the weather can be visited in at least three places: Colne, Lancashire, Bilton, Warwickshire and Much Wenlock, Shropshire.

The introduction of iron for a wide variety of uses in industry gave the makers the opportunity to use the metal instead of wood, so eliminating the chance for the prisoner to be freed by friends with a saw. One of only two such specimens known to-day (the other is at Dromore, Co. Down) occupies a secluded site at the rear of the church at Painswick, Gloucestershire. It is provided with a cold stone seat and a curved iron bar which serves the two purposes of anchoring the device to the wall, besides acting as an arm rest. For obvious reasons this type is known as " spectacle " stocks.

Another interesting set, although wooden, is preserved at Crantock, Cornwall under a shelter in the churchyard and on panels is carved an inscription recording the

(*Continued on page* 451)

Below, stocks on iron wheels enabled miscreants to be towed round the cobbled streets at Colne, Lancashire. Below right, seven-holed stocks at Winchcombe, Glos., the odd one for a regular one-legged offender, tradition says.



HOSPITALS ON STAMPS

BY JAMES A. MACKAY

It is curious, but true, that while the emergent nations have invariably depicted a hospital on their stamps at some time or another, the more affluent countries tend to take such facilities for granted, and have therefore neglected to show hospitals on stamps. Thus Britain, which has issued stamps in honour of Lord Lister (pioneer of antiseptic surgery) and Florence Nightingale (who revolutionised the nursing service), has never featured any hospital on stamps. The United States has issued a number of stamps honouring the medical and nursing professions in general (1947 and 1961 respectively) and various eminent medical men and women, but until now hospitals themselves have been overlooked. Even so, the first item specifically commemorating American hospitals was not a stamp but a stamped postcard, which was released last month. Although inscribed AMERICA'S HOSPITALS the stamp impressed on the postcard depicts the skyscraper building of the New York Hospital, the second oldest in the United States, which is celebrating its bicentenary this year. Announcing the issue of the postcard, Mr E. T. Klassen, United States Postal Service Governor, stated that this was the nation's way of saying thank you for a job well done—not only for the hospital administrator and the physicians, surgeons, nurses and aides, but also for the housekeeping staff, the business office and the many volunteers without whose co-operation the hospital system could not exist.

The theme of hospitals on stamps is rapidly expanding. Such events as the centenary of the Red Cross and the 20th anniversary of the World Health Organization in recent years have resulted in a large number of stamps depicting hospitals or aspects of hospital work. It is therefore necessary to divide the theme into various categories. The earliest hospitals were initially religious institutions where medical services were provided by the priests and members of religious orders. An example of an Oriental temple which was a medical centre in bygone times is the Wat Arun Temple, depicted, appropriately enough, on a Siamese stamp for the Leprosy Relief Campaign of 1960.

Christianity brought with it a humanising attitude towards the sick, and hospitals were founded, either in monasteries and convents, or with charitable endowments. Typical of a mediaeval hospital, with its cloistered courtyard reminiscent of a monastery, is the Hotel-Dieu at Beaune, founded in 1443 whose quincentenary was celebrated by two French stamps in 1943. The Crusaders established many hospitals in the Near East and Mediterranean areas to succour the pilgrims and treat the sick. Indeed the words hostel and hotel are both derived from the word hospital, indicating the wide range of services provided. Most famous of the Crusading orders in the field of medicine was the Knights Hospitallers of the Order of St John. The Sacra Infermeria run by the Knights of St John in Malta was the finest and largest hospital in Europe in the Middle Ages, with beds for 745 patients. It was shown on a stamp issued by Malta in 1964 to mark the First Catholic Doctors' Congress. One of the earliest hospitals in the Western Hemisphere was the Santa Casa de Misericordia (Holy House of Mercy), established at Santos in 1543. Brazil issued a stamp in 1943 to mark its 400th anniversary.

Generally speaking most hospitals depicted on stamps are modern creations, the status symbols of newly independent countries. One of the best hospitals in Africa, for example, is the 917-bed Mulago Hospital opened in 1962 and featured on a 1s stamp of Uganda, with a radiographer and patient in the foreground. The corresponding value in the Tanganyika series of 1961 depicted the Princess Margaret (now the Muhimbili) Hospital in Dar-es-Salaam. Fifty years ago the emergent nations were the Latin American countries and many of them in the intervening period have shown hospitals on their stamps.

Hospitals with special functions account for several stamps. Aspects of maternity work are to be found on stamps of Germany, Hungary and Malawi. The Joaquina Maternity Hospital in Guatemala was featured on a stamp of 1919, while the Nassau Baby Clinic appeared on a ½d stamp of the Bahamas. An Icelandic stamp publicising the social services, shows the *Barnaspitali* (children's hospital) in Reykjavik. Belgium issued a set of stamps in 1963 showing the treatment of handicapped children.

The largest single group of hospitals to receive philatelic recognition are the TB sanatoria. Before World War II Bulgaria issued stamps in aid of a special sanatorium for postmen; since 1958 the Philippines have issued numerous stamps showing TB hospitals. Other specialised hospitals on stamps include the Radium Hospital in Oslo (Norway, 1931), an eye hospital in Guinea and the Foperda Leper Hospital in the Congo, on a Belgian stamp of 1964. A mental hospital at Manisa was shown on a Turkish stamp of 1960.

Casualty clearing stations and field hospitals in times of war have been shown on stamps of the Saar and Dubai, while hospital trains and ships are to be found on stamps of Bulgaria and Denmark respectively.

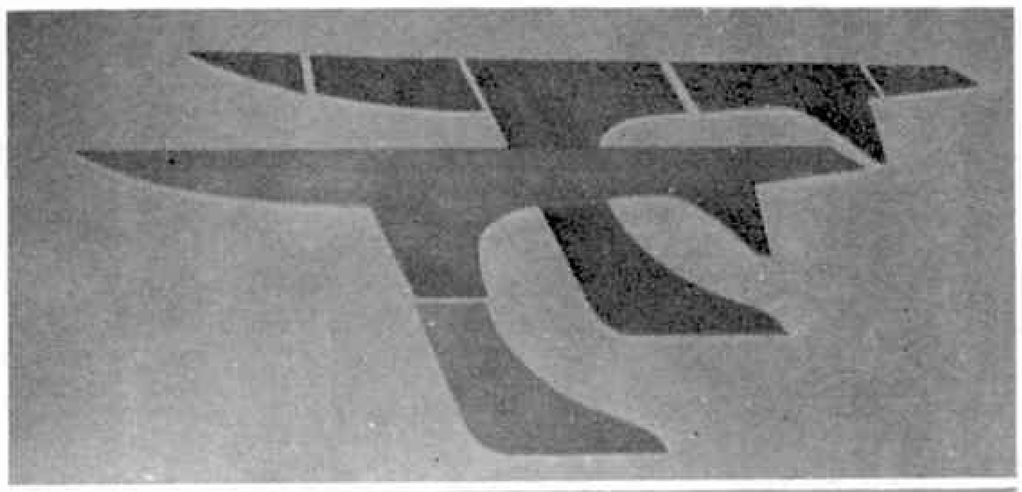
Full-size plans for a miniature racing yacht

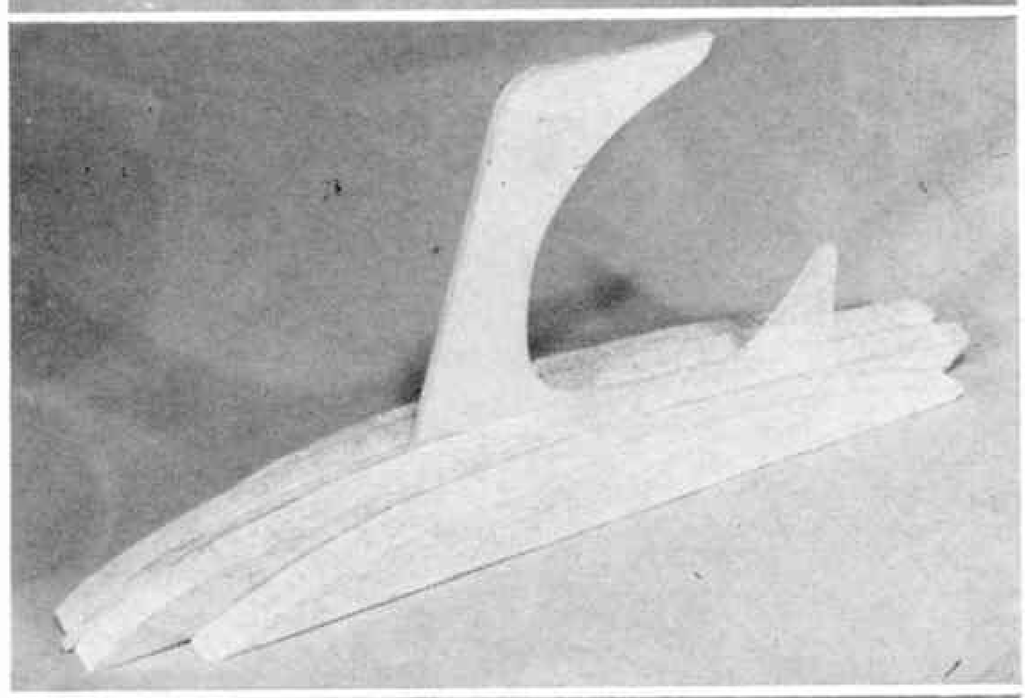
SPLINTER

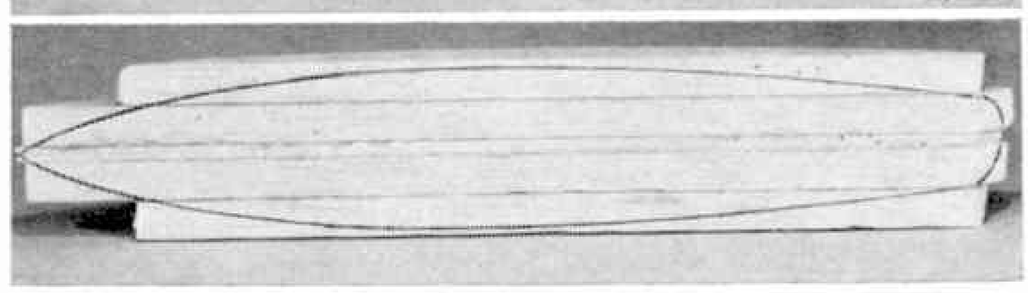
designed by Vic Smeed

Inexpensive and simple to build, this model nevertheless has excellent performance

Picture above shows the prototype sailing on a reach and moving quite fast; absence of a marked wash is indicative of a hull slipping easily through the water. Below, top, centre lamination with one of the side laminations behind; use of 3 in. wide sheet makes short pieces inevitable. Centre, balsa planks cemented to core, and, bottom, hull plan view marked out on top ready for sawing.







THIS model was designed after watching the performance of some small toy sailing boats which must have been quite a disappointment to their owners. Some toy boats are able to sail moderately well on some courses, but manufacturers cannot produce the type of sophistication needed for good performance at a price that would make the model attractive to undiscerning customers.

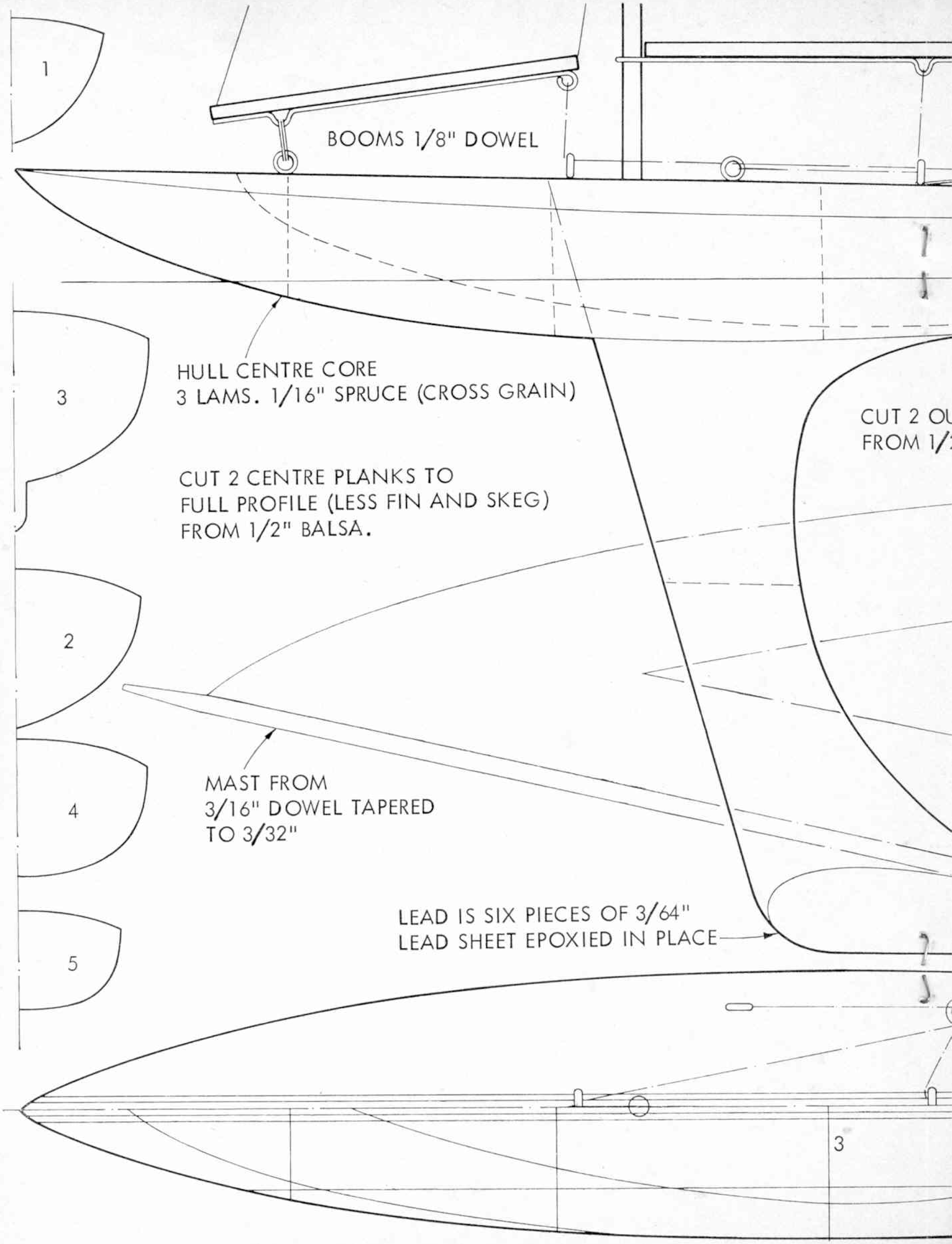
A number of older model yachtsmen have also said that you can't make a boat sail if it's under about three feet long, which is the sort of statement that we cannot believe until we've tried it!

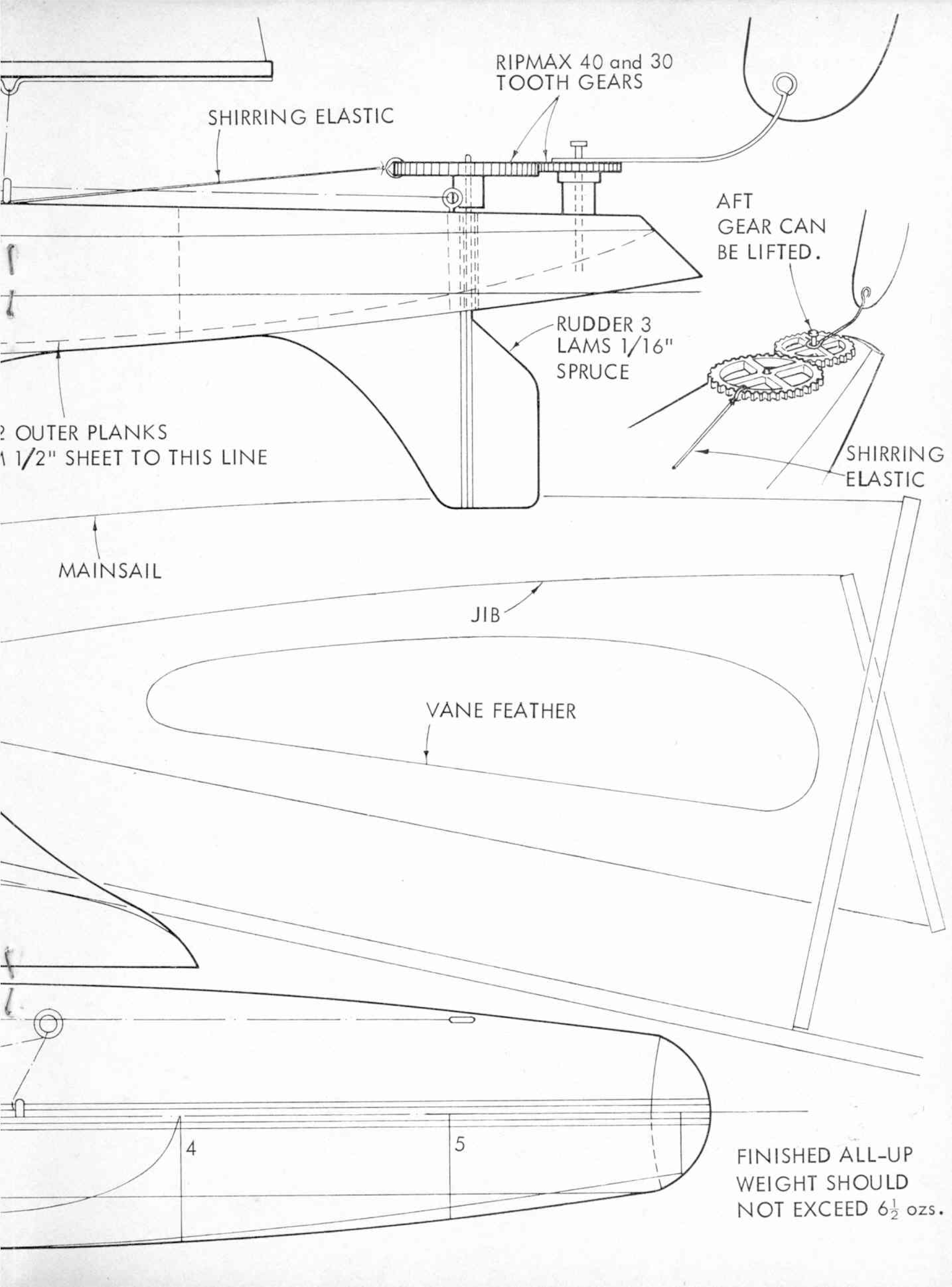
There are a couple of factors in small models which have to be taken into account. The first is the " cube law ". If you take a stable model yacht and halve its size, it will be half as long. Its sail area, however, will only be a quarter, as it is two dimensions ($\frac{1}{2} \times \frac{1}{2}$) and its displacement will only be an eighth ($\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$). Without going into a long explanation, this means that the model will be less stable and you cannot increase the lead weight because of the displacement limitations. A small yacht must therefore be different from a larger one in order to be stable.

The second factor relates to pressure. We know that the pressure on the water surface is normal air pressure, which is the weight of the column of air above the area being considered. Below the surface the pressure increases by the weight of the column of water covering the area. Obviously, pressure on an inch or two below the surface is less than that a foot or so down, so that the top " layer " of water is relatively easily disturbed. Resistance to sideways motion of, say, a yacht's keel is therefore less, so that a shallow yacht will blow more rapidly sideways, or make more leeway.

From this it is obvious that if we dispose the keel area deep and narrow we shall get a better grip on the water and the yacht will sail better. We can also put the permissible lead ballast right at the bottom so that it acts through a longer lever and the boat will therefore be more stable.

While we are considering natural factors, we might also think of wind gradient. Because of friction, the bottom of the air moving across land or water is slowed up, so that the nearer the water, the less the wind is felt.


1
BOOMS 1/8" DOWEL
HULL CENTRE CORE
3 LAMS. 1/16" SPRUCE (CROSS GRAIN)
3
CUT 2 CENTRE PLANKS TO
FULL PROFILE (LESS FIN AND SKEG)
FROM 1/2" BALSA.
2
MAST FROM
3/16" DOWEL TAPERED
TO 3/32"
4
LEAD IS SIX PIECES OF 3/64"
LEAD SHEET EPOXIED IN PLACE
5
3


RIPMAX 40 and 30
TOOTH GEARS
SHIRRING ELASTIC
AFT
GEAR CAN
BE LIFTED.
RUDDER 3
LAMS 1/16"
SPRUCE
2 OUTER PLANKS
1/2" SHEET TO THIS LINE
SHIRRING
ELASTIC
MAINSAIL
JIB
VANE FEATHER
4
5
FINISHED ALL-UP
WEIGHT SHOULD
NOT EXCEED 6½ ozs.

Thus a small model needs tall sails to reach up into the faster moving air. Wind gradient, incidentally, can be felt with a glider or light aeroplane coming in to land, and is usually the reason why a model aeroplane heading into wind will glide smoothly in and then suddenly drop the last couple of feet.

To stand the best chance of success, then, a small model yacht must have a deep and narrow fin keel with its ballast right at the bottom, and high aspect ratio sails. These are the most important points, but there are others, like keeping top weight low, which have been incorporated in this little design.

How does it sail? Well, we were surprised and delighted at its speed and ability to move on the lightest trace of breeze, as well as its ability to point, which means sailing into the wind closely. Most large yachts can sail at 40 deg. or slightly less to the wind direction, and *Splinter* can match them pretty well.

As befits what is in effect a miniature racing yacht, it incorporates a simple vane steering gear and the grand-sounding "synchronous sheeting", which means that one adjustment controls both sails and keeps them correctly set in relation to each other. How this works will be clear when we come to make it.

Construction:

There is very little weight to be saved in making a tiny model like this hollow, so the structure can be designed for strength and simplicity. It is necessary to make a strong and warp-free fin, and this is achieved by making the whole boat round a centre core of three laminations of $\frac{1}{16}$ in. spruce (it could be obeche if easier to buy). The centre lamination has the grain parallel with the top line of the deck, and those each side have it in line with the fin leading edge. The first step is to trace the complete outline on to a sheet of $\frac{1}{16}$ in. spruce 3 in. wide and cut it out accurately. This can then be used to mark out the rest of the laminations; the photographs should make it clear.

Cement the core laminations together (use balsa cement or Bostik clear adhesive) and leave to dry thoroughly on a completely flat surface with weights on top. While drying, trace the full hull outline (not the fin or skeg) twice on to $\frac{1}{2}$ in. balsa and then the dotted line of the outer planks twice, and cut out the four pieces. There is no need to use hard balsa, since we already have the core for strength.

Cement the four planks to the core, lining up the stern ends carefully, and leave under pressure to dry. When dry (and this means overnight, even with balsa cement) trace the plan view on to the block and fretsaw round it. The hull can now be carved and sanded to shape; trace the half-sections 1–5 on to post card and cut out carefully, mark the section positions on the block, and offer the templates, sanding until they fit. Make sure the hull is symmetrical—this is more important than absolute accuracy with the templates, though carve exactly to them if you can.

The fillets of the fin and skeg should be carefully streamlined and blended to the hull, using fine glass-paper wrapped round a piece of thick dowel or similar round object. Don't at this stage sand the bottom of the fin, and leave the after edge of the skeg square.

To avoid the necessity of casting a lead, buy a piece of sheet lead from a builders' merchant. You only need a piece a full 1 in. long cut from the end of a 9 in. strip of the sort of lead used for flashings; it measures under $\frac{1}{16}$ in. thick and is probably 18 swg. Trace the lead profile from the drawing and cut out. Use the paper pattern to mark six pieces on the lead and cut out with an old pair of scissors. The pieces as cut should weigh about 3 oz. or just under. Flatten them by gentle tapping or squeezing in a smooth-jaw vice, and sand their faces clean. Glue together and to the base of the fin (three each side, of course) using epoxy resin and leave under pressure to cure.

When dry, carve the lead to shape with a pen-knife (it's quite easy) and file to a smooth bulb. Mix a little more epoxy and fillet the bulb to the fin, and again when cured, file and sand everything smooth, including the fin.

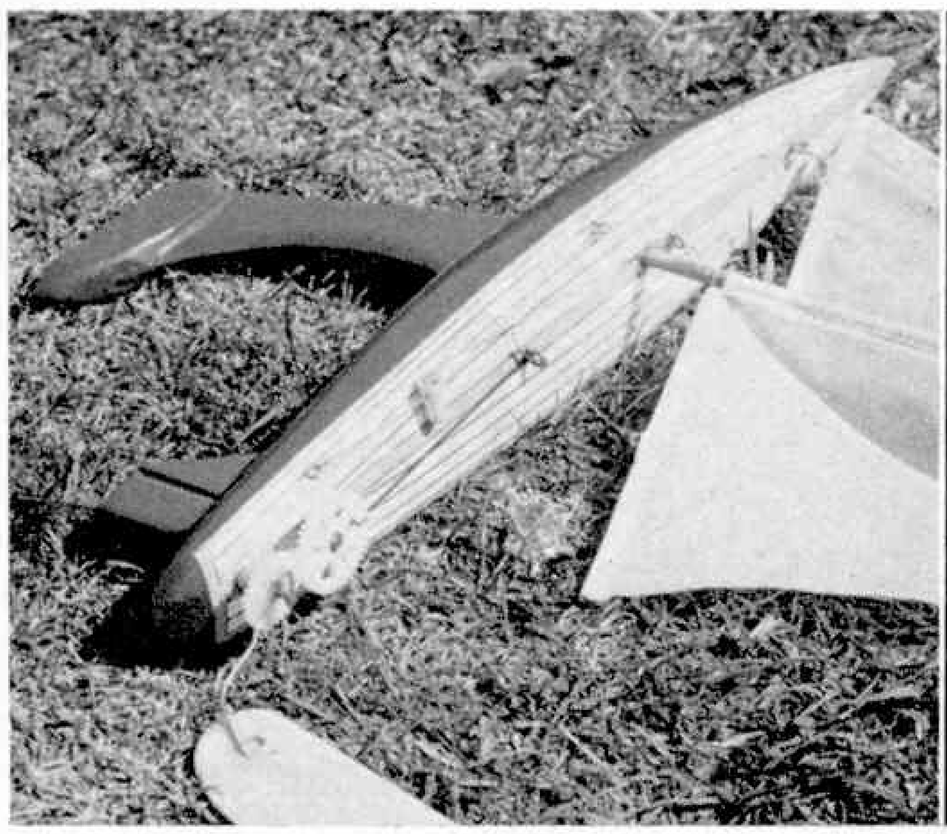
The rudder is from three scraps of $\frac{1}{16}$ in. spruce glued cross-grain and sanded to shape. If the leading edge of the centre piece is set a tiny bit back, it forms a seating for the wire or tube rudder stock. Drill carefully through the core with a $\frac{1}{16}$ in. drill, then enlarge the hole to accept a length of brass tube which is a sloppy fit on the rudder stock. A tube which fits well will stick after a time, and it is essential that the rudder moves completely freely. If you use 18g bore tube for the rudder, its outside will probably be about 14g, so the trunk, or tube through the hull, will need to be 12g. bore. Epoxy the tubes in their places; note that through the hull is only a full $\frac{3}{4}$ in. long, but the rudder stock is $2\frac{5}{8}$ in. Check that the hull tube is correctly placed with a wire etc. before the adhesive is set; the rudder must line up with the skeg. At this stage drill a $\frac{3}{16}$ in. hole $\frac{1}{2}$ in. deep for the mast, making sure it is vertical and in the right position.

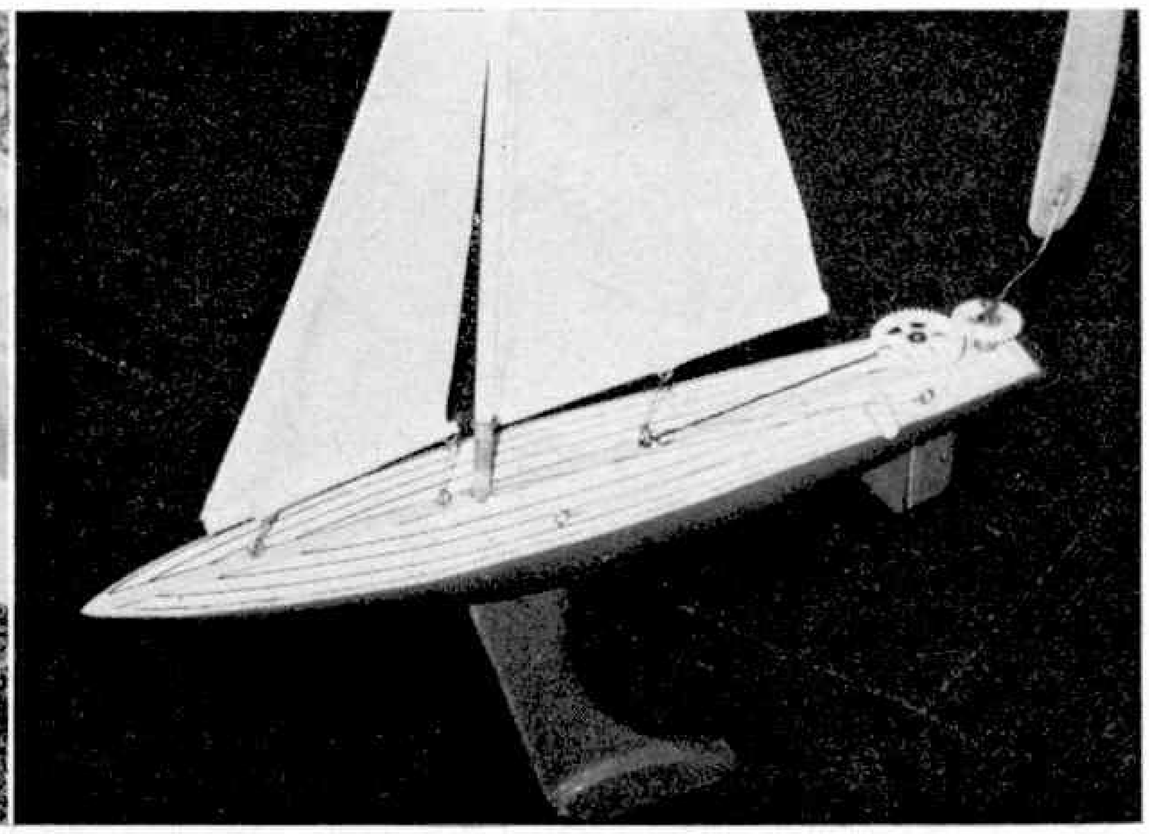
The hull can now be finally sanded and painted. If you use cellulose sanding sealer (3–4 coats) and then enamel paint, a nice finish will be achieved, but enamel will not key to cellulose and you cannot mask a water-line etc. without peeling off the paint with the masking tape, so use oil undercoat if you want a two-colour hull.

Our procedure was to seal and paint the deck white and then draw on planks using Indian ink in ink compasses, using one leg of the compasses run along the deck edge to get curved planks. The centre king plank and "cover boards" (edge planks) were painted mauve, dried, and the deck varnished. The hull (sealed at the same time as the deck) was masked and a thin mauve waterline painted in. The masking was removed and the rest of the hull painted purple, (well, aubergine is the fashionable name for the colour) cutting up to the waterline and deck-edge free-hand. Not recommended if you haven't a steady hand and a writer's brush. The paint was mixed from mid-blue and red Humbrol enamels, and part was mixed with white to get the toning mauve shade.

The mast is a length of $\frac{3}{16}$ in. dowel planed and sanded to a taper, and the booms are $\frac{1}{8}$ in. dowel. A thin brass wire (or if necessary, 24g piano wire) is cemented to each boom. The jib has a kink where shown and an eye at the aft end. The main has an eye

The hull and lead carved to shape ready for sealing and painting. It really is quite simple to carve and sand to the necessary shapes provided you don't rush it.





Two views of the finished model showing rigging and fitting details. Deck lining adds greatly to appearance but is not necessary; if not done neatly it is better simply to paint the deck.

to fit round the mast and a kink as shown. These " kinks " are important as regards position.

We used a white polythene bag (from the butcher) for sails. Lay the polythene over the plan and cut the sails with a sharp blade, not scissors. The sails can be sewn to the mast and booms, but we used white plastic insulating tape. Cut a piece as long as the main boom and make a nick in its centre for the wire kink to poke through. Place the boom centrally on the tape, coax the tape round, lay the foot of the sail in place and press the tape together, trapping the sail between. Trim off surplus tape at the ends. Do the same with the mast, taking care not to overlap the tapes at the sail tack (front bottom corner). You may make a mess of it and have to cut another sail and try again; the secret is not to stretch either the tape or sail. When satisfied, firmly glue the mast in its hole, ensuring that it is upright from front and side, and leave to dry.

Fix the jib to its boom, then cut a length of tape for its luff (fore edge) and lay flat. Lay a piece of strong thread along the centre of the tape, with a couple of knots in the thread at the bottom and a few inches spare at the top. Lay the sail in place and fold over the tape. The jib is hooked to an eye in the deck with an S hook bent from wire, or an oval of wire, or at a pinch by several long stitches of thread.

When the mast is completely dry (and don't hurry this bit) thread the loose jib thread through a needle, hook the jib in place, and sew round the mast, through the tape, at the jib hoist position, drawing the thread taut and knotting it off centrally on the mast.

Four more screw-eyes must now be screwed into the hull, one beneath the jib eye, one beneath the main kink, and two along the hull side as drawn. Now find a conical plastic screw cap off a toothpaste or similar tube and make three holes through it, equi-spaced, using a hot pin. Thread one piece of thread through two of these holes and two pieces of thread through the third; knot the inside ends of these pieces so that they cannot pull out.

Tie the ends of the single thread to the two screw-eyes on the side of the deck so that the thread is tight; the cap should slide backwards and forwards on this line, and stay put when left. If it slips easily, force a piece of rubber from an eraser inside the cap.

Slide the cap right aft and poke the two free threads through the centre deck-eyes, one through the main eye and the other through the one beneath the jib. Tie to the mainboom kink and the jib boom eye so that both booms are held central. Touch glue on all the knots and cut off the spare ends. Now when you slide the cap forward, both booms will be freed off the same amount, and since the tying points are equidistant from the pivot points, both booms will always have the same angle.

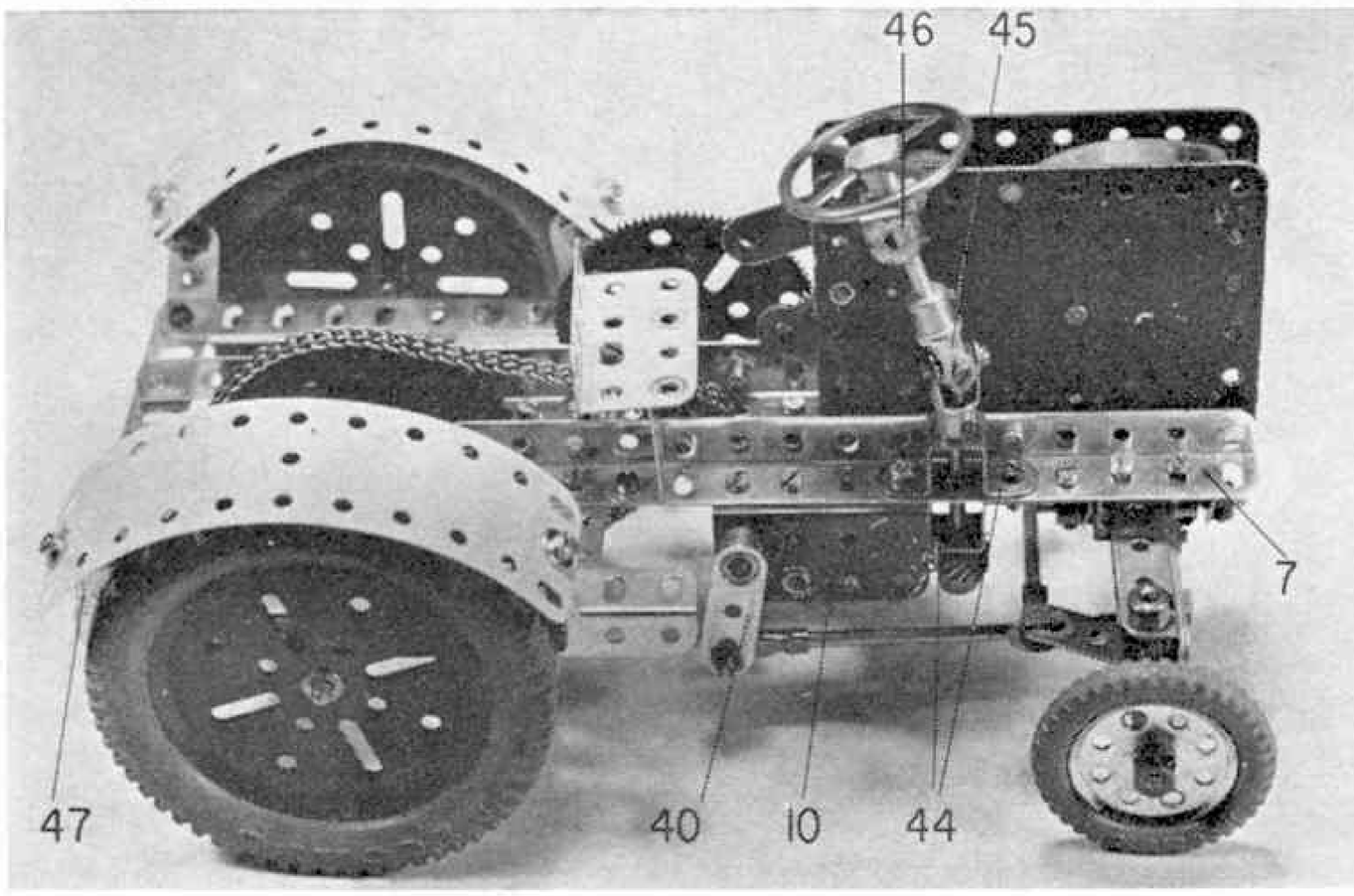
Fit a 40 tooth gear on to the rudder stock with its grub-screw and check that the rudder moves completely freely. Scrape away any paint and sand the stock to a polish until it does. Now find a brass nail which fits the 30-tooth gear and drill a hole in the deck to glue the nail in. The gear teeth must mesh easily and you must be able to lift the smaller gear high enough to turn it and drop it back in engagement. Bend a wire and epoxy it to the small gear so that it misses the pivot but comes out radially, i.e. it would go straight across the middle of the gear if you hadn't bent it to miss the pivot.

Cut a vane feather from light $\frac{1}{16}$ or $\frac{1}{32}$ in. balsa and cement it to the wire. Make sure it is upright and also radial to the gear. Now tie a piece of shirring elastic (or other very thin elastic) to the large gear and make it off with very light tension to the base of main eye. This is just to bias the rudder very lightly to centre. Slacken the grub-screw and centralise both gear and rudder, then re-tighten the screw.

You are now (at last!) ready to sail. Slide the sheet adjustment forward until the booms make an angle of about 30 deg. to the hull centre line and hold the model at about 40–45 deg. to the wind. Lift the vane and rotate till the feather is straight down-wind, then drop it into re-engagement, as close as possible. Release the model, which will maintain a constant course *relative to the wind.* If the wind changes direction, so will the model. This is a beating course, and to go on the other tack all you do is lift the vane and re-engage it at the same angle on the opposite side.

To reach (across wind) ease the sails to 45 deg. or so and set the vane out to one side; always point the model where you want it to go then line the vane up with the wind. To run, ease the sheets so that the booms are at 90 deg. to the hull and the vane feather will then be pointing forward. Try minor adjustments to the sail setting to get the best out of the boat.

We think you'll be amazed at the speed of the model and the control you have over it.



Agricultural Tractor

'Spanner' describes a working model built by reader D. R. Cowdrey

AYLESBURY in Buckinghamshire besides being famous for Aylesbury Ducks, is also a delightful little market town situated in beautiful countryside. Farming is a major industry, therefore it is reasonable to assume that Meccano modellers in the area would have an interest in agricultural equipment—an assumption which is borne out by the Agricultural Tractor illustrated here. It was designed and built by Mr David Cowdrey of Weston Turville, Aylesbury and it is, I might add, a remarkably smooth-running model. Power is supplied by a No. 1 Clockwork Motor.

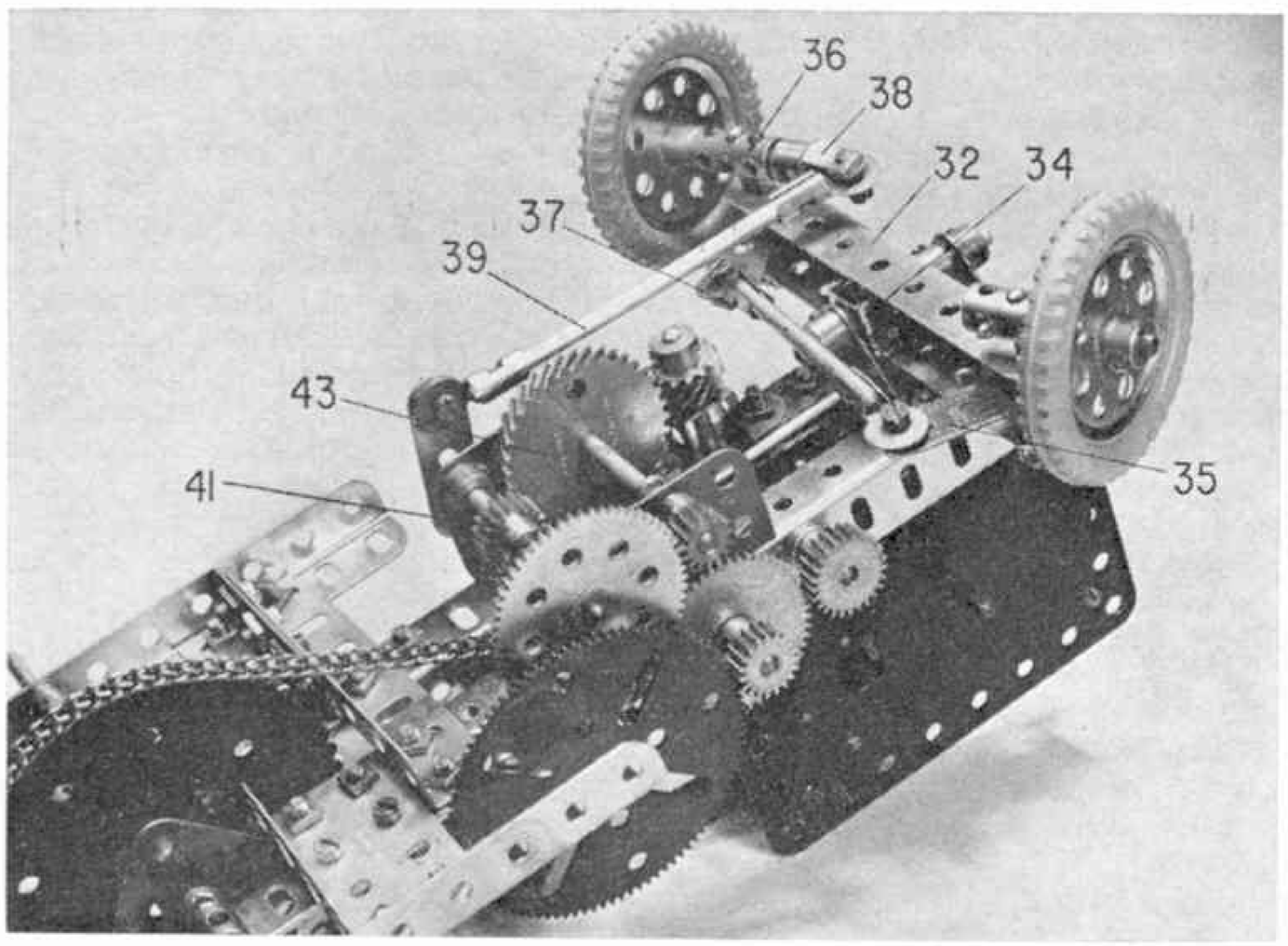
The smooth-running characteristic of the model owes a lot to the differential incorporated in the back axle. Instead of being the usual type of mechanism so often featured in these pages, it is, in fact, a spur differential, considerably different in design from the usual. Mr Cowdrey, however, hastens to disclaim all credit for this particular section, pointing out that the mechanism was originally designed by a Mr J. A. Blacklin and featured in the March 1940 issue of the M.M.

The rear chassis section is supplied by two 5½ in. Angle Girders 1 connected together at their rear ends by a 4½ in. Angle Girder 2. Attached to Girder 2 through its third hole is another 4½ in. Angle Girder 3, its forward end connected to right-hand Girder 1 by a 3½ in. Angle Girder 4 and to left-hand Girder 1 by a Girder Bracket 5.

A 7½ in. Angle Girder 6 is now bolted to Girder Bracket 5 and Angle Girder 4, as shown, another 7½ in. Angle Girder 7 being bolted to Girder 4 and to a 2 in. Angle Girder 8 secured to right-hand Girder 1. Girders 6 and 7 are separated by a distance of one hole and both project 12 holes forward beyond Angle Girder 4. At their forward ends Girders 6 and 7 are connected by two Trunnions 9, flanges together, secured through the second and third holes of the Girders. Two Girder Brackets 10 are also bolted, one to each Girder in the positions shown, these later serving as part of the gearbox mounting.

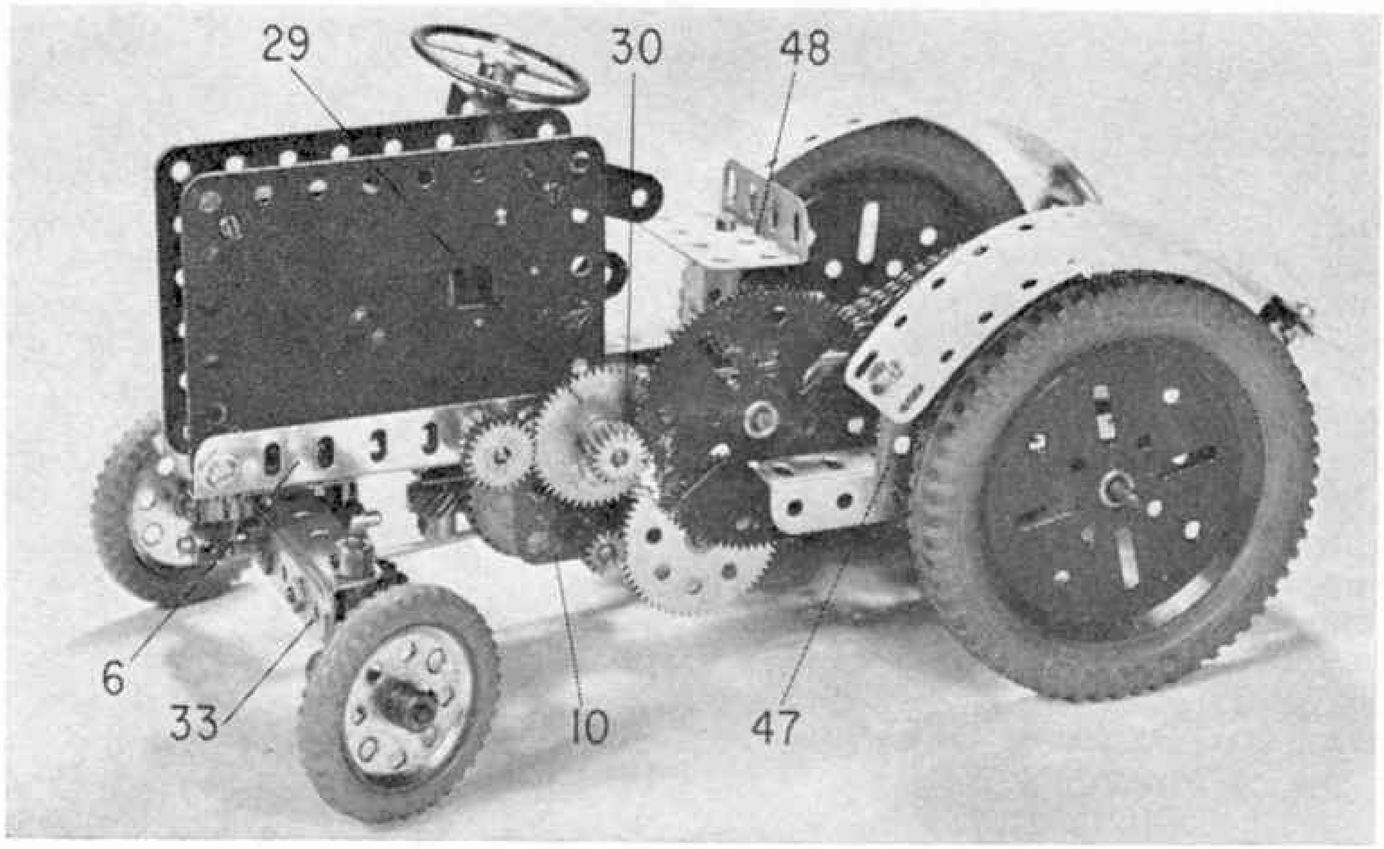
Back axle

As already mentioned, the back axle incorporates a neat and extremely smooth spur differential, as opposed to the common type of differential. This is built up on a 3 in. Sprocket Wheel 11, in diametrically opposite holes in the face of which two 2 in. Screwed Rods are each securely held by two Nuts screwed tightly against each side of the Sprocket. Note that the boss of the Sprocket is on the opposite side to the greater parts of the screwed Rods. Fixed by further Nuts on one of the Screwed Rods $\frac{3}{16}$ in. from the Sprocket are a 1½ in. Strip 12 and a 1 in. Triangular Plate 13, one on top of the other, the protruding end of the Strip being attached, together with another 1 in. Triangular Plate 14, to the other Screwed Rod again using Nuts. The two Triangular



Top, full credit for this smooth-running Agricultural Tractor goes to Mr David Cowdrey of Weston Turville, Aylesbury, Bucks. Left, in this close-up underside view of the forward section of the model the layout of the drive and steering systems is clearly shown.

Right, another general view of the Tractor showing its realistic outlines Below, two close-up views of the rear chassis sections showing the spur differential from top and bottom.



Plates are arranged so that their inner corner holes coincide with each other and with the centre hole in Strip 12. Part of the rear axle will later pass through these holes.

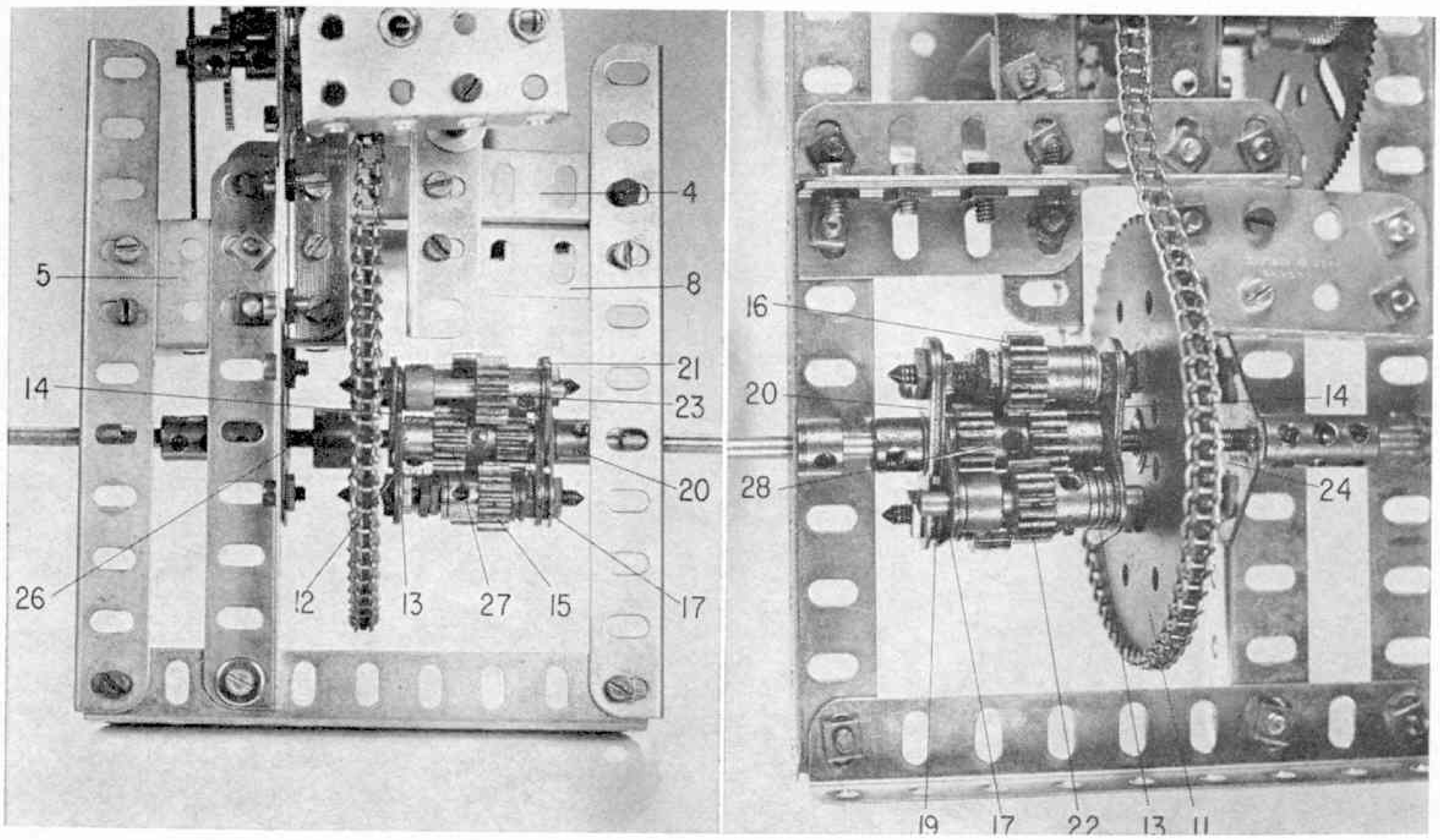
Now mounted on the first Screwed Rod in the positions shown are two lock-nuts, followed by a Washer, a loose ½ in. Pinion 15, boss pointing towards the Sprocket, three more Washers and a Nut. This Nut must not grip the other parts tightly, and so prevent them from turning, but it should, together with the lock-nuts, prevent the Pinion from moving up and down along the Screwed Rod. Mounted on the other Screwed Rod, in order, are an electrical Thin Washer, two ordinary Washers, a ½ in. Pinion 16, boss towards the Sprocket, another Washer and two further lock-nuts, the latter again preventing the Pinion from sliding on the Screwed Rod, while allowing it to revolve freely.

Added to the outside end of the first Screwed Rod are another 1 in. Triangular Plate 17, overlaid by a 1½ in. Strip 19, a Washer and a Double Arm Crank 20, the Screwed rod passing through the elongated hole of the Crank and the whole assembly locked together by the Nut already on the Rod and another Nut added to the outside. The other ends of the Crank and 1½ in. Strip are locked, together with another 1 in. Triangular Plate 21, by Nuts on the second Screwed Rod. As before, the inner corner holes of the Triangular Plates coincide with the centre hole in Strip 19, and in this case, they also coincide with the hole in the boss of the Double Arm Crank.

Journalled in the remaining corner holes in Triangular Plates 13 and 17 is a 1½ in. Rod, which carries, in order from the Sprocket end, an electrical Thin Washer, three ordinary Washers, a ½ in. fixed Pinion 22, 1 Collar and another Washer, all inside the Triangular Plates. The Collar and Pinion hold the Rod in position.

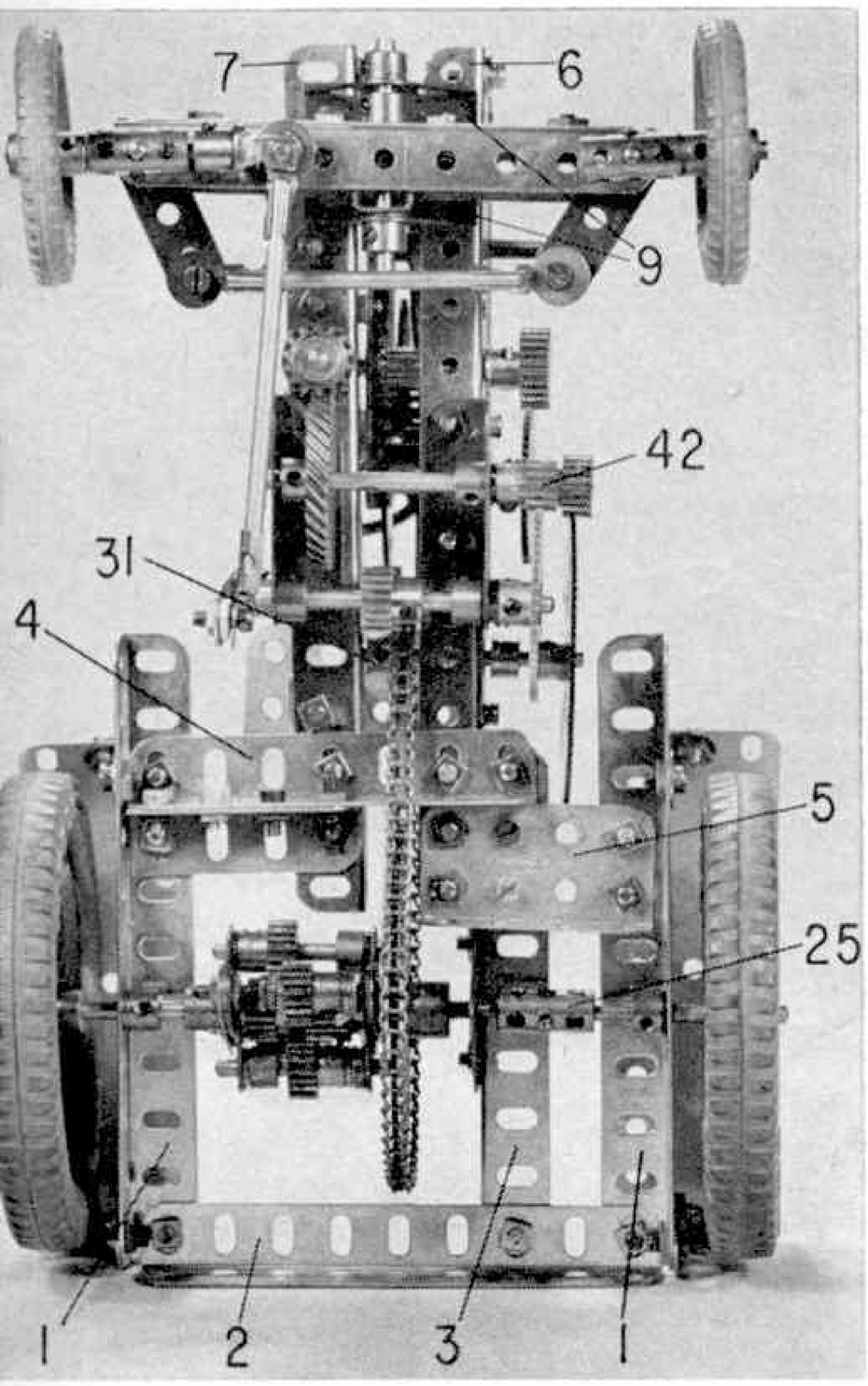
Journalled in the remaining holes of Triangular Plates 14 and 21 is another 1½ in. Rod which carries, in order from the Sprocket end, a Washer, a Collar, a further ½ in. fixed Pinion 23 and a final Washer. The Collar and Pinion again hold the Rod in position.

Now journalled in left-hand Girder 1 and in a Flat Trunnion 24 bolted to Girder 3 is a 2 in. Rod which is extended, via a coupling 25, by a Flexible Coupling Unit 26. This Unit passes through the boss



of Sprocket Wheel 11, through the inner corner holes of Triangular Plates 13 and 14 and half-way into the bore of a ½ in. Pinion 27. This Pinion and the Sprocket are of course fixed on the Coupling Unit, while the 2 in. Rod is held in place by a Collar, spaced by a Washer. Running loose in the remaining half of the bore of Pinion 27 is a 2½ in. Rod, journalled in the inner corner holes of Triangular Plates 17 and 21 and in right-hand Girder 1. Fixed on the Rod, inside the Plates, is another ½ in. Pinion 28, spaced from the Plates by a Washer, the Rod being held in place by a Washer and Collar against the Girder. Note that the boss of Pinion 28 faces the 3 in. Sprocket Wheel.

Naturally, the positioning of the various Pinions in the differential is vital. With half their faces, Pinions 16 and 22 mesh with Pinion 27 on the Flexible Coupling Unit, the remaining half of Pinion 16 meshing with Pinion 23 and the remaining half of Pinion 22 meshing with Pinion 15. Part of Pinions 15 and 23 also mesh with Pinion 28 which in fact means that, when the differential is correctly assembled, each Pinion meshes with two other Pinions.



An underside view of the Tractor showing construction of the girder-built chassis.

This description may sound rather complicated, by the way, but by studying the illustrations carefully, successful completion should not be difficult. Note, however, the 7/64 in. Grub Screws, Part No. 69c, should be used to secure Pinion 15, 16, 22, 23 and 28 as standard Grub Screws will catch on the teeth of the meshing Pinions.

The rear road wheels are supplied by two 3 in. Pulleys with Motor Tyres mounted on the ends of the 2 in. and 2½ in. Rods.

Motor and Drive

The No. 1 Clockwork Motor can now be bolted between Girders 6 and 7, Nuts or Washers being used for spacing purposes, as required, and the output shaft projecting through the sixth hole of Girder 6. A ¾ in. Pinion fixed on the output shaft meshes with a 50-teeth Gear Wheel 29 mounted, along with a ½ in. Pinion 30, on a 2 in. Rod journalled in the lower rear corner holes in the Motor sideplates. Pinion 30 meshes with a 2½ in. Gear Wheel, fixed on a second 2 in. Rod held by Collars in Girders 6 and 7, a 1½ in. Strip being bolted to Girder 6 to provide an extended bearing for the Rod. Secured on the Rod, between the Girders, is a ¾ in. Sprocket Wheel 31 which is connected by Chain to Sprocket Wheel 11.

Front Axle and Steering Gear

In the case of the front axle, a 4½ in. " U "-section channel girder 32 is built up from two 4½ in. Angle Girders, with the back of the " U " being overlaid by a 4½ in. Strip 33. Bolted to the centre inside of the " U " is a Double Bent Strip 34. Two 1½ in. Rods are each held by a Collar and a Crank 35 in opposite end holes of the channel girder, the Crank being positioned between the flanges of the girder. Fixed on the lower end of each Rod is a Coupling 36, the Rod passing through the centre transverse bore of the Coupling. In the longitudinal bore of the Coupling a 1 in. Rod is secured, a loose 1½ in. Pulley with Motor Tyre being held by a Collar on this Rod to serve as one of the front Wheels. Cranks 35 at each side are connected by a 2½ in. Rod 37 held in Rod and Strip Connectors lock-nutted to the arms of the Cranks.

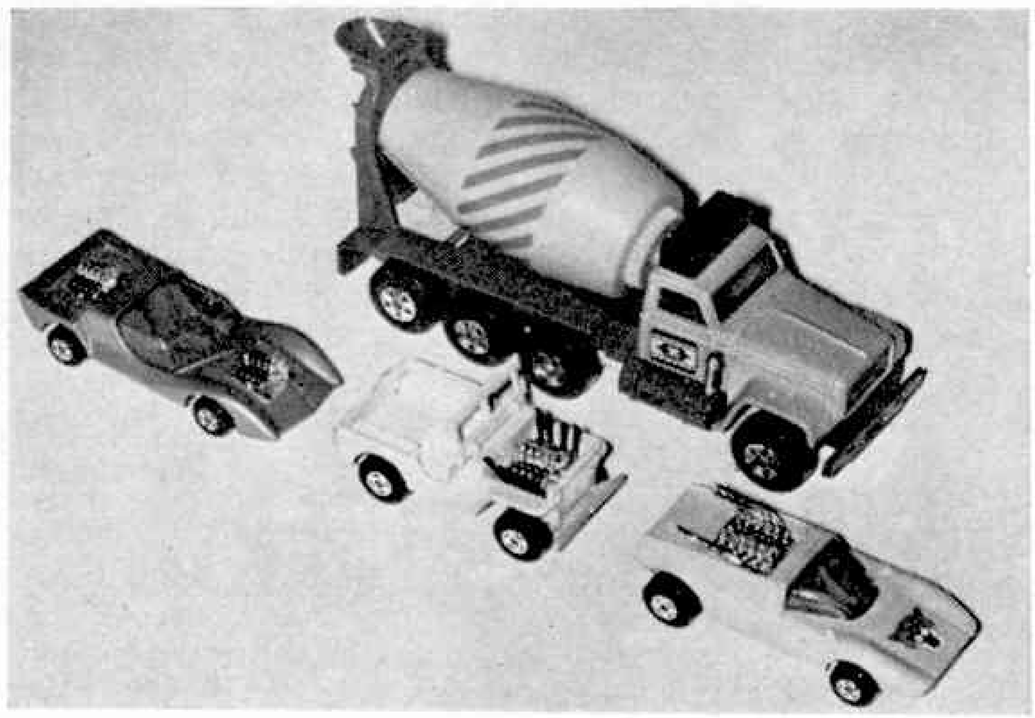
The front axle assembly can now be mounted in the chassis, this being achieved simply by a 1½ in. Rod passed through Double Bent Strip 34 and channel girder 32 and held by Collars in the apex holes of Trunnions 9. A third Collar spaces the channel girder from forward Trunnion 9. A 1 in. Rod is then fixed in the inside end of the longitudinal bore of right-hand Coupling 36 and on this Rod an End Bearing 38 is mounted. Lock-nutted to this Bearing is a Rod and Strip Connector on one end of a 3½ in. Rod 39, on the other end of which another Rod and Strip Connector is mounted. This second Connector is lock-nutted to the arm of a Crank 40 fixed on one end of a 2½ in. Rod held by a Collar in Girder Brackets 10.

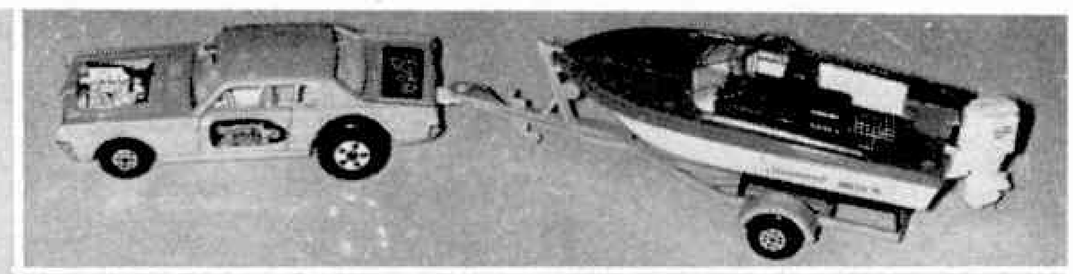
Secured on the Rod, mid-way between the Girder Brackets, is a ½ in. Pinion 41 which meshes with another ½ in. Pinion immediately below it on another 2½ in. Rod also held by Collars in the Girder Brackets. A 60-teeth Gear Wheel is fixed on the end of this second Rod and this meshes with a 7/16 in. Pinion 42 on yet a further 2½ in. Rod held by a Collar in the Girder Brackets. Also fixed on this Rod is a 1½ in. Helical Gear 43 which meshes with a ½ in. Helical Gear on the lower end of a 2½ in. Rod journalled in two Double Bent Strips 44 bolted to Angle Girder 7. A universal Coupling 45 is mounted on the upper end of the Rod, this being extended by a 2 in. Rod journalled in a Double Bracket 46 bolted to the Motor sideplate. A 1¾ in. Steering Wheel is fixed on the upper end of the Rod.

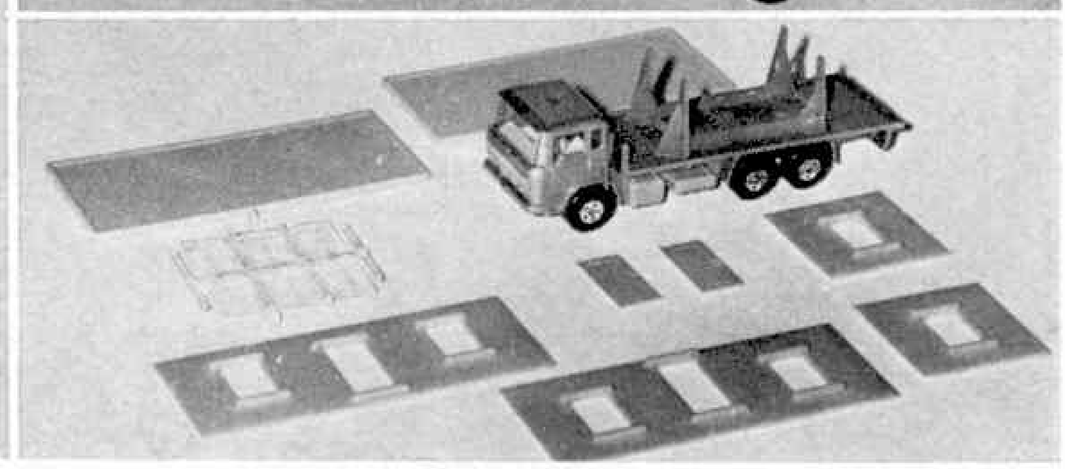
Two rear mudguards are each provided by a 5½ × 1½ in. Flexible Plate, curved to shape and attached by Angle Brackets to two 1½ in. Strips 47 bolted to nearby Angle Girders 1. Last of all, the driver's seat is supplied by a final Girder Bracket 48, attached to Angle Girder 7 by a 1½ × ½ in. Double Angle Strip bolted through the fourth hole of the rear end of the Girder.

PARTS REQUIRED

1—2a	3—18b	1—48	2—142b
8—6a	2—19b	18—59	2—142d
2—8b	2—21	3—62	4—161
2—9	1—25	1—62b	1—166
3—9a	9—26	3—63	1—175
1—9b	1—26c	4—77	2—182
1—9e	1—27	1—94	1—185
1—11	1—27c	1—95	1—211a
4—12	1—27d	1—96a	1—211b
1—16	81—37a	4—111c	4—212
7—16a	60—37b	2—126	1 No. 1
4—17	32—38	1—126a	Clock-
4—18a	3—45	1—140	work
			Motor





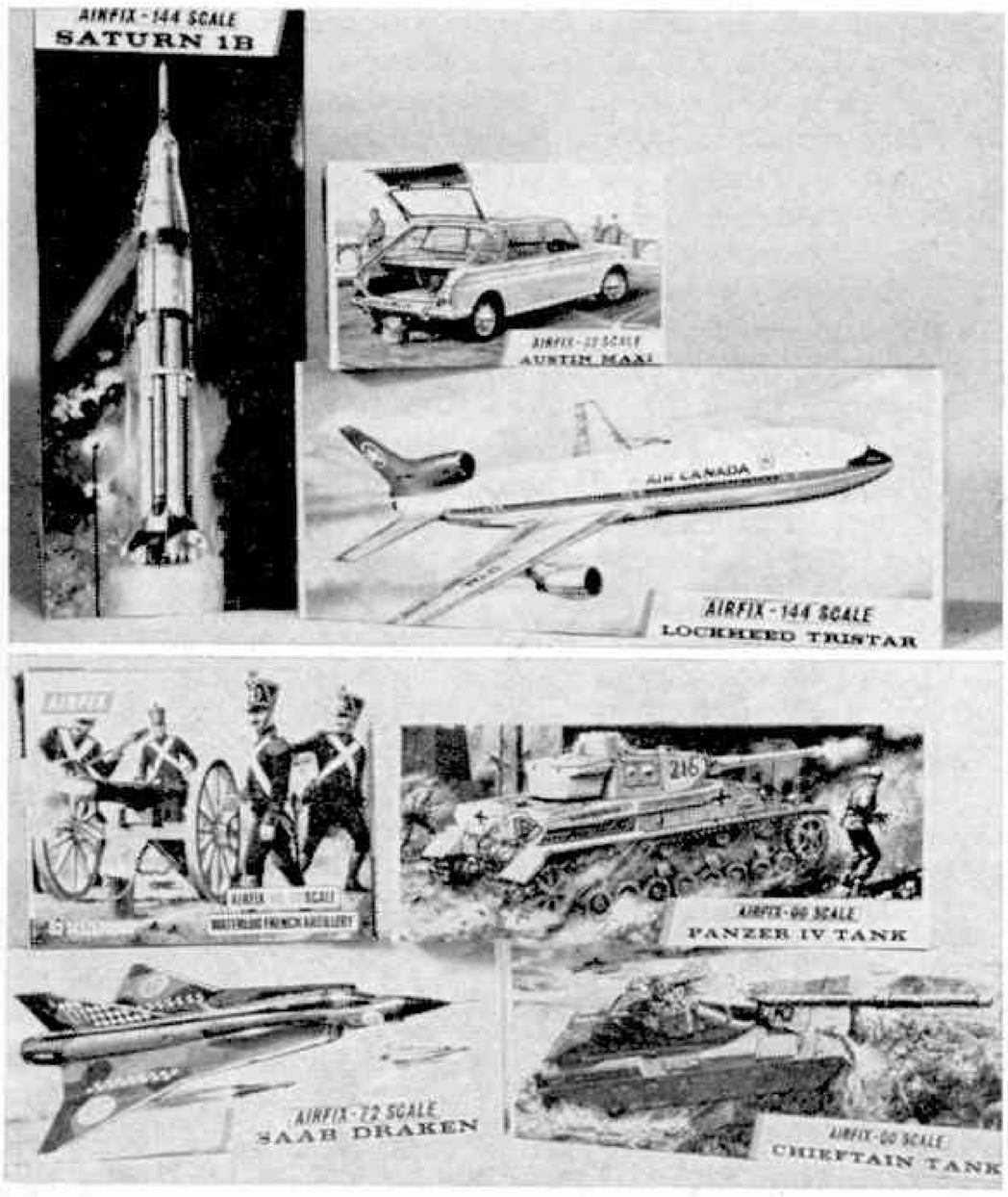


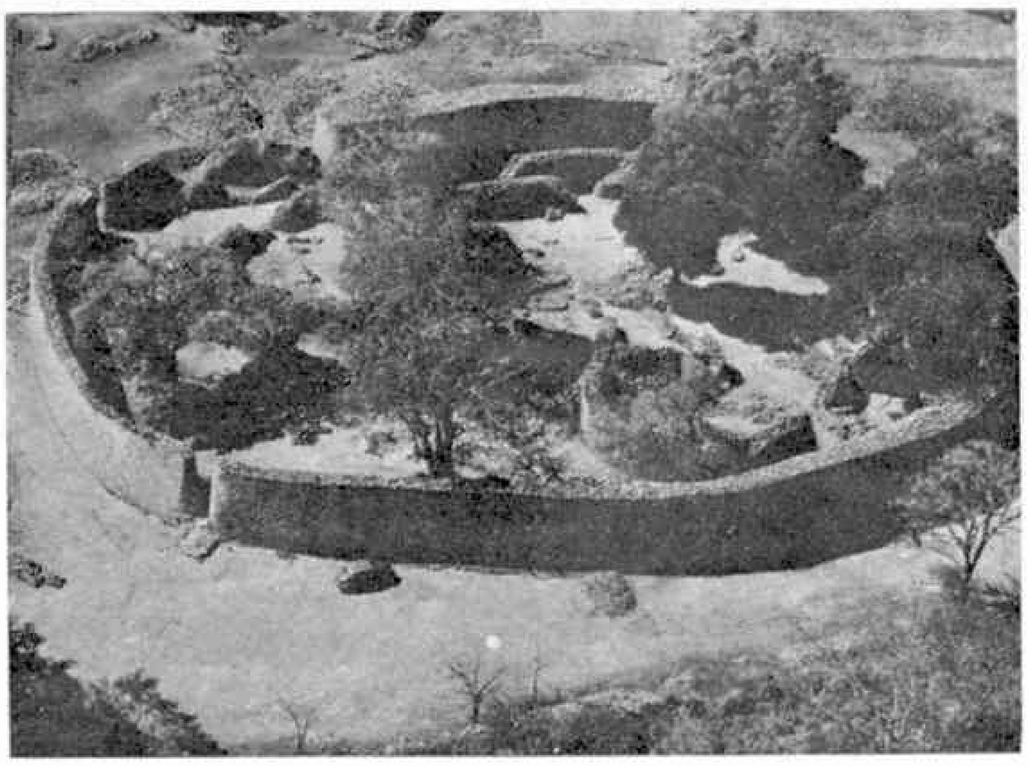
HAVE YOU SEEN?

Among recent releases in the Matchbox range are the models illustrated above. The large GMC Cement Mixer (5¾ in. long) has a drum driven from the road wheels which can be disengaged by a small lever, and is fitted with heavy duty Superfast wheels. Also in the Super Kings series is the 6 in. D.A.F. Building Transporter with a site engineer's office which erects and dismantles; has similar wheels. The three cars with the mixer are the Gruesome Twosome twin engine, the Jeep Hot Rod, and the Mod Rod, all with racing suspension. In the Speed Kings series is the king size Dodge Dragster, 4 in. long, photographed towing the king size Boat and Trailer, a most attractive 4 in. boat plus steerable outboard which unclips from its trailer for floating.

A large number of plastic kits are new on the market. Seven from Airfix (left-hand photos below) are the Saturn 1B (to the same 1/44 scale as the larger Saturn V at 19 in. high) with removable stages and lots of detail, price 85p, the 1/32 Austin Maxi with detailed engine and interior, 34p, the 1/44 Lockheed Tristar, very topical, 85p, French Waterloo Artillery at 00/H0 scale, 52 pieces at 17p, the Panzer IV tank with choice of long or short gun, 00 scale, 24p, the 1/72 scale Saab Draken double delta, 24p, and the Chieftain tank, 00 scale, 24p.

From Revell come the six in the remaining pictures—1/32 scale Hughes Cayuse with 9¾ in. dia. rotor, a super Lockheed P38-J Lightning at 19½ in. span, and an even nicer Hawker Hurricane at 15 in. span. Prices are £0.49, £1.05, and £1.40 respectively. Three new 1/25 Hot Cars are the Baja Chopper (a very unusual Volkswagen) the Gypsy Dune Buggy, and Maverick Funny Car, all at £1.80 each.





The Riddle of King Solomon's Mines

By Arthur Nettleton

AS A result of the application of modern dating techniques, Africa's greatest mystery is a step nearer solution. By measuring the amount of cosmic radiation in logs removed from the foundations of Great Zimbabwe, in Rhodesia, scientists expect to determine the age of this mysterious structure and find out whether it served as a gold-collecting centre during the forty-year reign of the fabulously rich King Solomon.

Great Zimbabwe has in fact figured prominently in efforts to find the source of the gold which he lavished on the Temple in Jerusalem and on his palaces.

He even had chariots of gold, and his soldiers carried shields beaten from this valuable metal.

It has been estimated that, to meet Solomon's demands, at least £50,000,000-worth of gold ingots were imported annually into Israel for twenty years. Yet the site of the mines which yielded this immense wealth is now uncertain, despite several expeditions in search of it.

To produce gold in the quantities needed by Solomon, incredibly rich veins of ore would be required, or the gold-field would have to be unusually extensive. Yet no mines big enough to satisfy this situation have so far been located in Africa.

The mystery deepens when it is realised that the workings must have been near the surface, for only primitive methods of mining were available in Solomon's time.

The screen covering the mystery was raised slightly in 1868, however, when a lone explorer stumbled upon an odd structure while tracking elephants seventeen miles south-east of Fort Victoria, Southern Rhodesia.

Festooned with creepers, it looked like an abandoned temple in the shape of an ellipse. Towers were spaced along the walls, and particularly mysterious were narrow passages running parallel with the curtain wall and leading to an inner walled area.

Monoliths stood within this area, and two conical towers were noted, the taller one being 32 ft. high.

The most astonishing feature was the method of construction followed in erecting the great outer wall, the maze of passages, and platforms. There was no sign of cement or mortar, the thousands of small stones having been cut neatly to uniform size and fitted together accurately.

Nor was this astonishing structure the only one in the vicinity. Nearby the solitary adventurer saw a fortress commanding the area from the summit of a 350 ft. hill.

Here again great skill had been used by the builders, for they had dovetailed the walls into the natural rock and had arranged the pathways from the base to the summit through fissures, in such a way that nobody unaware of their intricacies could reach the top without being seen.

It has been calculated that 100,000 tons of granite are contained in this stronghold, and it is a mystery how the builders managed to erect it without mechanical aids. Even today the job would give contractors almost insuperable difficulties.

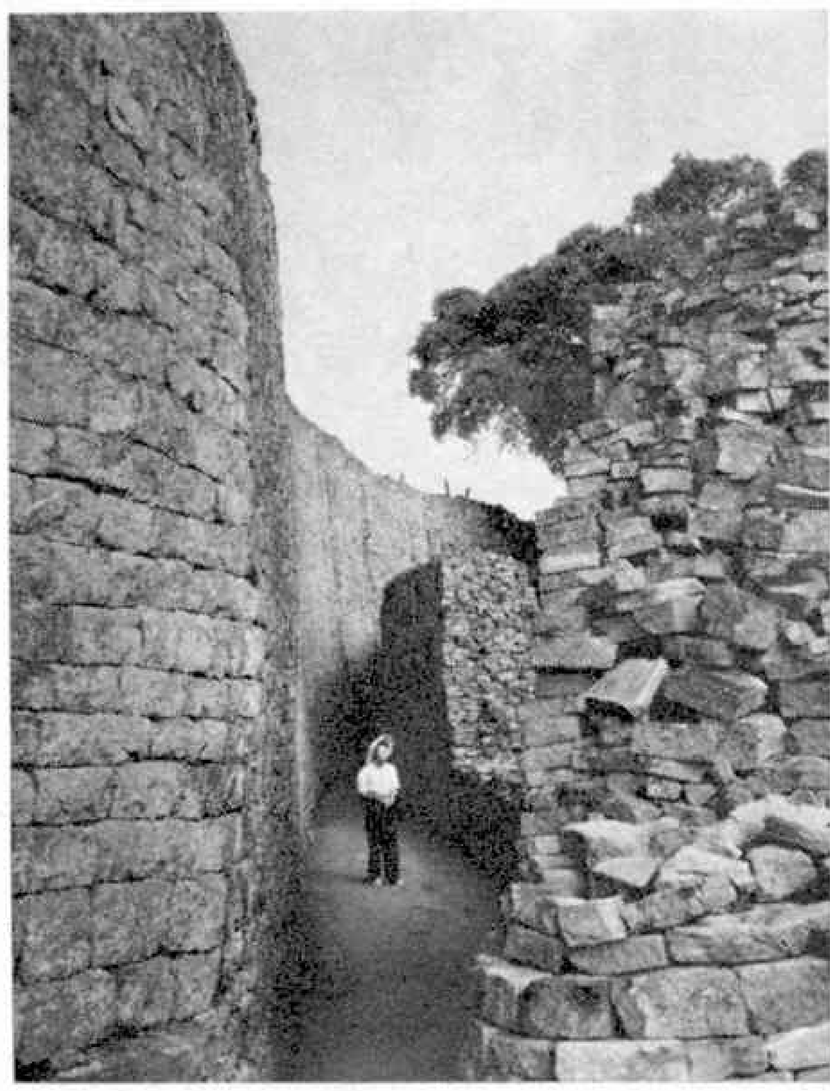
Further discoveries in the neighbourhood include the remains of a city, giving rise to the assumption that Great Zimbabwe in its hey day was an important centre of activity guarded by an Acropolis, and that the walled enclosure was used for religious rites in some distant era.

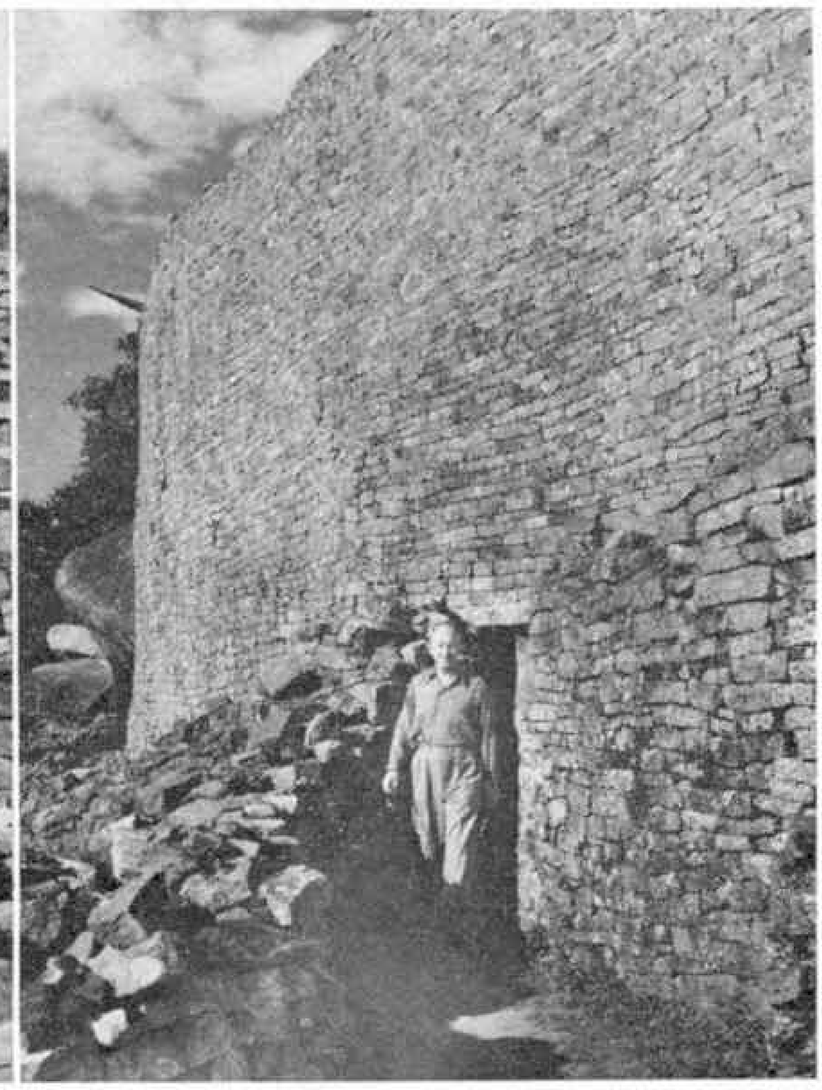
Yet it carries no inscriptions or other carvings which would support this theory.

Stranger still, there are no signs of quarrying in the vicinity. In fact, stone of the same kind is not to be found nearer than 200 miles from Great Zimbabwe!

There are, however, indications that gold ore was brought there to be turned into ornaments. Excavations in the neighbourhood have unearthed many gold trinkets.

The discovery of this jungle centre in 1868 was only





The ruined citadel of Zimbabwe is seen complete in the aerial view opposite: the conical towers and broken remains of the interior walls are shown in the other two pictures. The gigantic exterior walls (this page) are made of hand-dressed stones, but no chippings have been found nearby and where the dressing was done is unknown. If scientists can determine the age of the ruins, it may help to solve some of the riddles they pose.

the start of the quest for King Solomon's mines. It was soon followed by the finding of other similar structures, though they were on a much smaller scale.

Especially significant was the discovery of many ancient mine workings and the remains of furnaces. The man who initiated further searches was an explorer who accidentally fell down a shaft. At first he believed it to be a natural feature, but a closer examination showed that it was man-made.

Countless other expeditions were organised during the second half of the 19th century and were still being mounted 30–40 years ago, as a result of reports that veins of gold were to be found in the shafts.

This Rhodesian gold rush threw new light on the mystery of King Solomon's Mines. Today there are known to be at least 20,000 ancient man-made shafts in Rhodesia where gold has been tapped.

From these discoveries it seems likely that the Old Testament king did not obtain huge quantities of the precious metal from one concentrated source, but from innumerable small mines, and that Great Zimbabwe was the place where it was collected and guarded before it was sent to Jerusalem.

Nevertheless, a number of intriguing questions have yet to be answered. How did the gold get to its destination? History is silent about this.

Were the consignments carried northwards across Africa by long trains of porters? Or was the gold taken over the much shorter distance to the old seaport of Sofala, on the east coast of the continent, and shipped to its destination from there?

Great Zimbabwe is barely 300 miles from that port, which was used in Solomon's time by Syrian traders in ivory.

Again, whilst many structures similar to Great Zimbabwe have been found in the African jungle, they are of inferior construction and were probably built at a later time by tribes who had seen the original temple and fortress.

Clearly, Great Zimbabwe fits more closely into the conception of Solomon's "Ophir" than any of these other relics. The absence of carvings or inscriptions is puzzling, however.

The only embellishments on this imposing temple are projecting slabs of granite on one of the outer walls, in the form of a double row of triangles. There is nothing to tell the story of this citadel where religious rites must have been held long years ago.

And the most perplexing mystery of all? Nobody has yet satisfactorily explained why no human sekletons or bones have been found in the neighbourhood.

Thousands of people must have worked and worshipped in Great Zimbabwe, but no burial-places have been found there, and vultures don't eat bones.

This absence of human remains is an enigma which gives Africa the right to still be regarded as the Dark Continent, and complicates the centuries-old conundrum of the whereabouts of King Solomon's mines.

STOCKS (*continued from page* 439)
adventures of a smuggler's son, one William Tinney, who was punished for robbing a poor widow in 1817. Managing to escape from the stocks, he climbed the church tower and slid down the bell-rope before running off to sea, never to return there.

In several instances you may come across a set in which a whipping-post has been incorporated. Here one of the terminal uprights is higher than the other and to it are affixed iron clamps by which a wrongdoer was held by the wrists and given a sound thrashing for committing such crimes as blasphemy and perjury.

There exists some doubt pertaining to the last occasion on which stocks were actually used in practice. Some authorities erroneously hold that it was at Rugby, Warwickshire in 1865, whereas it actually occurred in Newbury, Berkshire seven years later, though the instrument was resurrected from cold storage for the purpose.

To-day other and what we regard as more humane means of punishment are used in this country and we can pride ourselves in the fact that in the Space Age we are now more civilized. However that may be, stocks are no less interesting from the historical point of view, showing full well how the law was administered by and to our ancestors.

The World's Most Ancient Dog

By Frank Madigan

The Australian Dingo

THE Australian dingo is regarded by scientists as the world's perfect dog. He is a distant cousin of the wolf, has very strong jaws, and averages two feet in height and five feet in length from tip to tip.

The dingo is the only native Australian animal which lives solely on flesh, and is one of the few prehistoric animals found in the country. Some archaeologists believe he is the original ancestor of all dogs, and his bones have been found with those of long extinct types of kangaroos.

He is a beautiful beast of pure breed and has a tawny coat, pointed ears and a bushy, white-tipped tail.

The male dingo chooses only one mate and will run with no other. He hunts usually at night either alone or with his mate.

To outward appearances, the dingo seems much the same as sheep and cattle dogs. However, he does not bark like the others, but rather gives yelping sounds extending into mournful howling.

The other differences are that the dingo has larger teeth, having come from wolf ancestry, and also its ears remain erect and tail rather brushy. It is believed that he descended from the Asiatic wolf or dhole, and was originally brought to Australia by the aboriginals.

The aboriginals were rather contemptuous of the white man's dog, and the name ' dingo ' was a misnomer, because it was misinterpreted to mean the " Warrigal ".

Many aboriginals are very fond of the Warrigal which they keep as pets. Amazingly enough, in spite of its ferocity, the dingo can be tamed and trained, like all members of the dog family, and, if caught as a puppy, makes a good and faithful dog.

The head is pointed like that of a fox, and the ears are short and erect. The body is covered with two different kinds of hair, a grey under-fur and longer hairs which give the body colouring. The colour varies from yellow or brownish red-to an even black, but the feet and tip of tail are often white.

The characteristic colour of the Dingo is a pale tawny yellow, but the colour is very variable, for even the early explorers referred to seeing yellowish-white, piebald, and blackish individuals.

Before white men settled in Australia and established farms and stations, the dingo lived on other wild animals, but he soon found sheep and cattle from the farms much easier to catch and kill.

This wild dog is hunted ceaselessly by the Australian farmer, of course. These days he is seen or his dismal howl is heard often in the interior, on the plateau or on the plains, in the mountains or maybe on the sandy stretches of the central desert, having been driven back from civilised areas.

The dingo is seen singly or in pairs, and, more rarely, in packs of five or six. In his native haunt he is a fine looking animal, those in the upland wooded districts being the largest, strongest and fiercest.

The dingoes are expert hunters. Kangaroos, wombats, wallabies and musk rats stand no chance against this creature, which has the bite of the wolf. His jaws come together like those of a steel trap. His cunning ability is best observed when hunting such ground birds as the parrots, grass-parrakeets and budgerigars. He stalks these, springing on them as they rise.

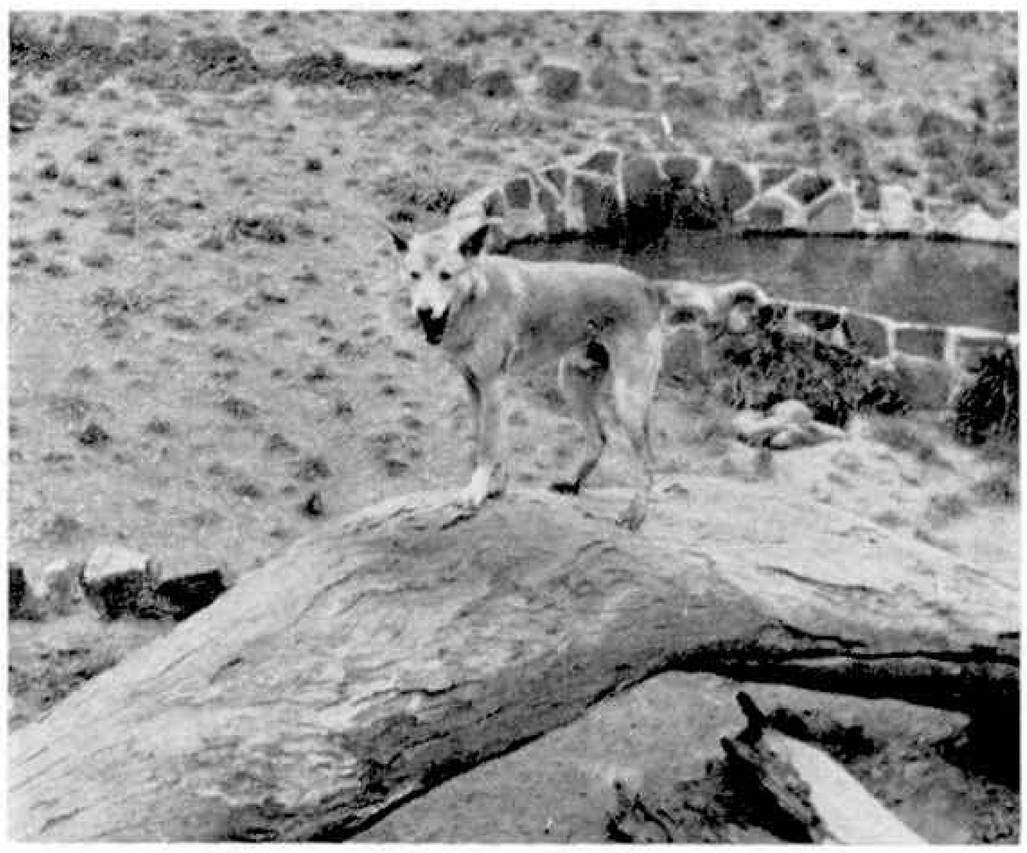
Although the farmers make war on the dingo with poison and traps, as well as with the rifle, this dog is so fleet and cunning that every year it destroys millions of dollars worth of sheep and cattle.

Calves and sheep are particularly vulnerable, and so crafty is this wily creature, that he sometimes singles out the calves from a herd, so that they will be without any protection from the parent cows.

Veal and lamb, of course, are not the only food on his menu, as he thoroughly enjoys a chicken dinner, and has been known to create enormous havoc on a poultry farm.

Dingoes in a group. English readers can see quite large packs of them in several zoos, especially Regents Park.

Dingoes can make quite a noise with yelping and howling; they do not bark.



Yet, fierce though he is, he does not attack a human being, but rather glances disdainfully, and then trots off.

Even in closely settled areas, odd dingoes still manage to create devastation at times. In 1961 three dingoes, which had killed one hundred sheep and lambs in two weeks about twenty-five miles from Melbourne, Victoria, were finally caught in traps.

The dingo is such a terrible menace for he kills often just for killing's sake, and not for food, and a female killing because of her lust for blood is able to destroy many sheep valued at thousands of dollars in only one night.

As recently as 1961 the State of Queensland offered a bounty on a dingo ' scalp ', which consisted of the central strip of skin from nose to tail-tip, and about 30,084 were paid for.

Hunting the dingo is named ' dogging ', and some have earned high wages at this work. In one year, two very skilful dingo hunters, F. H. Allen and D. Blyth, earned £15,000 each. Because of the great cunning of this creature, this is very skilled work.

In matching cunning for cunning, some dingo hunters learn to imitate the call of the wild dog, others bellow like a wounded calf, whilst others set poison baits and traps. However, if a dingo manages to free himself from a trap once, he is clever enough to keep clear of hunters in future.

One dingo actually had a price on his head. Four squatters offered $A100 as a reward for his carcase, because he had caused such havoc on their properties. " Old Snowy " was his name, and he was an albino, which is rare in the dingo.

Men supplied with food and equipment were sent to the area between Thompson and the Barcoo Rivers to capture him. He was finally shot after weeks of dodging his killers.

The men really admired the " Old Snowy ", as did others when they finally caught another clever dingo named the " Tambo Terror ".

Hundreds of sheep were killed in a district in Western Australia before a hunter, George Hunter, was clever enough to meet the cunning of the dingo he was after— " Bullockfoot ". He was given this name for his footprint was often seen, and he had lost a toe in a trap. The dingo went for some wild turkey that had been placed in a trap.

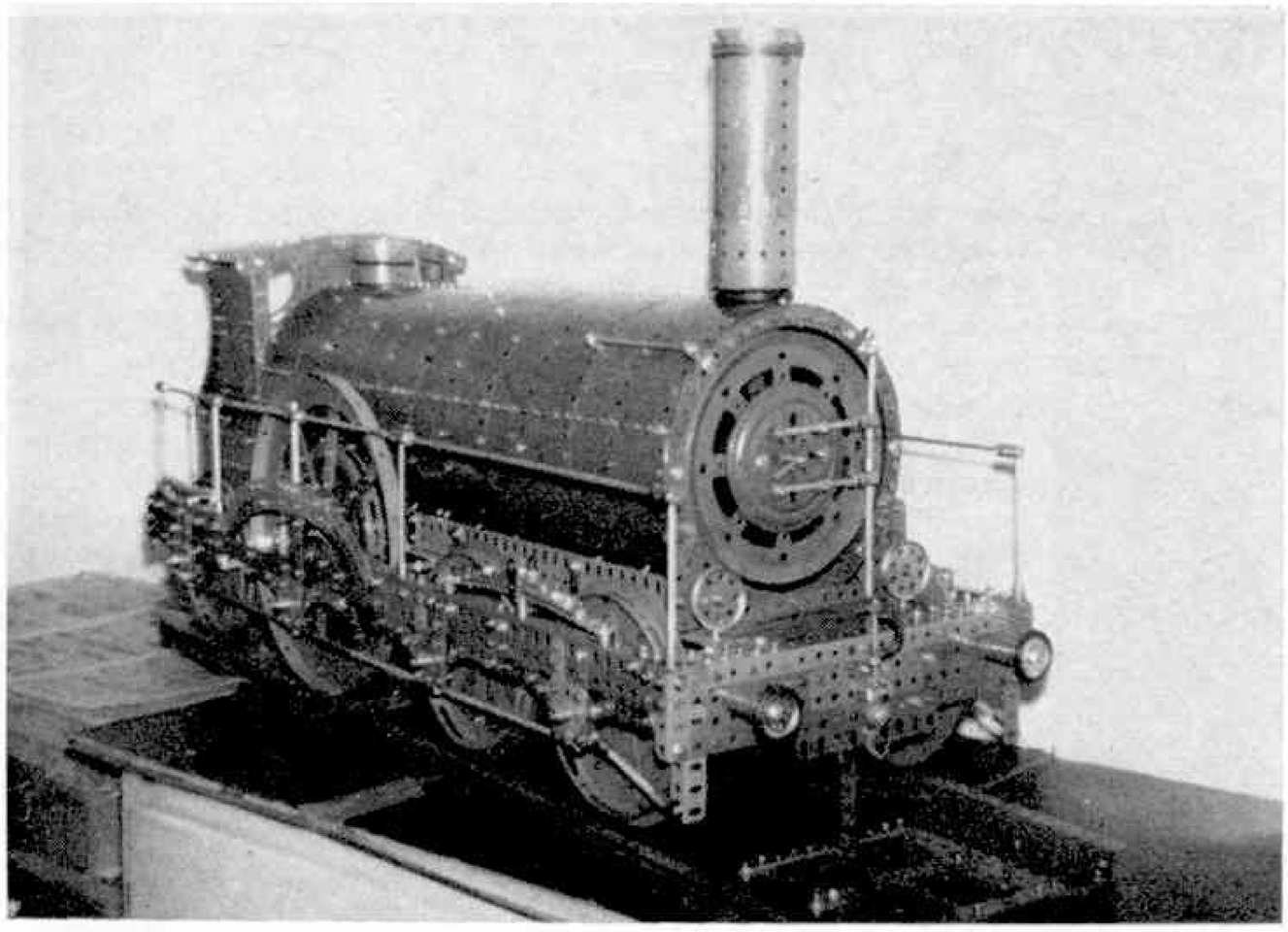
Aerial baiting is sometimes resorted to by the Vermin Board in an endeavour to destroy the wild dog, where its breeding ground is known to be rugged, inaccessible country.

Sheep raising areas are so concerned about the havoc of the dingo that they often erect dingo-proof fences. It is a fact that the longest fence in the world, measuring some 3,500 miles, is such a fence, enclosing Queensland pastoral land which carries about 20,000,000 sheep.

South Australia is also noted for a long Dog Fence, and this extends for 1,350 miles.

Yet, in spite of all the various methods men have devised, and some are costly, to rid Australian farms of the dingo, he still remains a very great menace to the graziers and the man on the land.

Most Australians would agree with Peter Allen, the greatest dogger of them all, when he says: " The dingo is the best dog God ever put on earth. When they're tamed a child could pull them to pieces without danger. They're friendly, intelligent and faithful. But they have one fault . . . they're deadly killers, and so, they have to go."



MODEL-BUILDERS (*from p.* 458) the weight. The axles were linked together by Sprocket Wheels and Chain and adequately driven by a Motor with 6-speed Gearbox, set in the 60 : 1 ratio, situated in the cab.

" The ideal size for the boiler came from a 7½ in. Circular Strip, with the smokebox door being made from a 6 in. Pulley. The boiler itself was built up from 5½ × 2½ in. Flexible Plates, strengthened by Strips, and these were bolted to Angle Brackets on the Circular Strips. The chimney was supplied by two Boilers which, again, proved ideal for size.

" Finally came the cab, together with what I call the " trimmings "— springs, handrails, etc.—to complete a model which I thoroughly enjoyed building ".

The result certainly made it worthwhile, Mr Palmer!

AIR NEWS

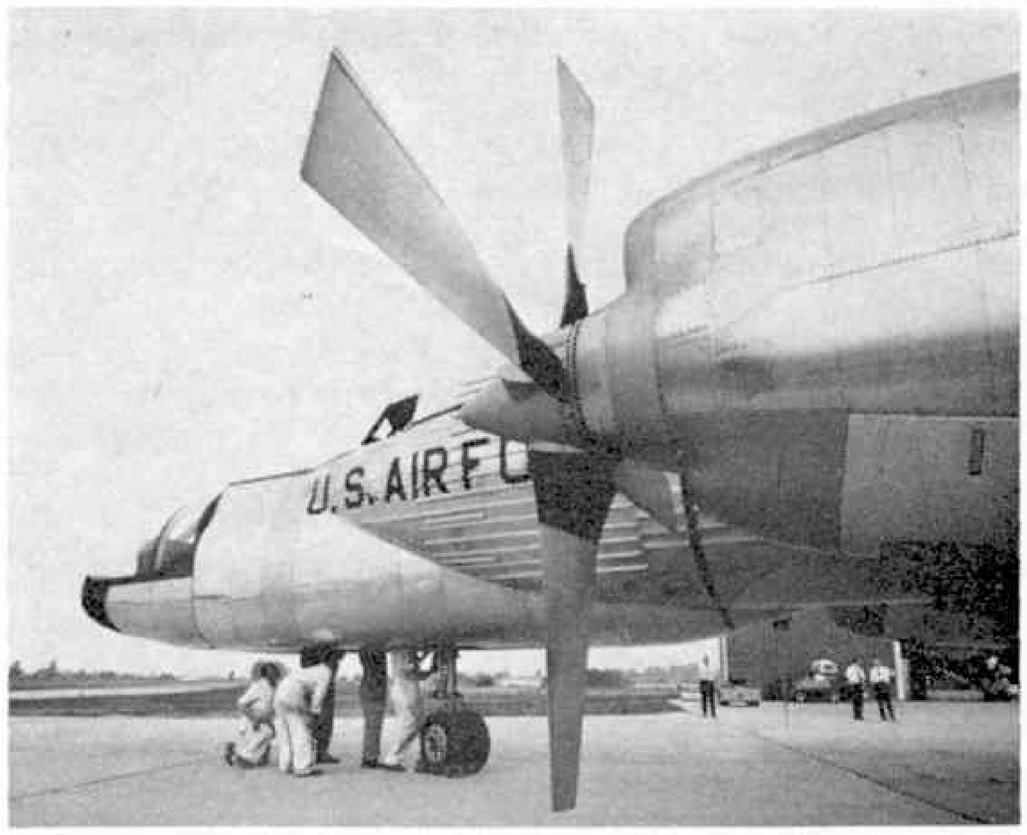
By JOHN W. R. TAYLOR

Tifs – Two Aeroplanes in one

When designers of the old Consolidated Vultee Aircraft Corporation watched the prototype of their CV-240 Convair-liner make its first test flight, on March 16, 1947, they had every right to feel proud of its neat, businesslike appearance. Nearly a quarter of a century has gone by since then, yet some airlines continue to use Convair-liners which look much the same as that first prototype.

Other operators had the original piston engines replaced with Rolls-Royce Dart or Allison Model 501 turboprops, giving big increases in performance and profitability. Military versions delivered to the USAF and US Navy introduced a few lumps and bumps, such as a weather radar in the nose and a large under belly blister fairing over a navigation radar scanner. But no spotter would have any difficulty in recognising these aircraft as variants of the basic Convair-liner.

The TIFS, illustrated on this page, is a different matter. It started out as an NC-131H, a military transport version of the Convair-liner with Allison turboprops, but its whole appearance has been altered by the addition of a huge new nose, housing a second flight deck, and a pair of unusual vertical control surfaces on the wings. The interior of the main cabin, too, is completely changed, with a big computer and panels of instruments and switches replacing the former seats for VIP passengers.



Pictures above show the Total In-flight Simulator, based on a Convair NC-131H. Note the vertical control surfaces outboard of the engines, beneath the wing, on the flying shot. Left is the French Mirage G8 in flight, with the wings fully swept.

Because of these modifications, the TIFS is two aeroplanes in one. It can, in fact, turn itself into any aeroplane in the world—even types that have not yet been built—so far as the pilots in the front cockpit are concerned.

This may sound rather startling, in view of all the different shapes and sizes of aeroplanes to be seen in the air nowadays. Yet the whole idea had its beginnings in devices as simple as the Link Trainer. As any member of the ATC, or any military or civil pilot, will know, this is a replica of an aircraft cabin in which pupils can be taught to fly " on instruments " without ever leaving the ground. As they move the Link's controls, the whole device tilts and turns in a quite realistic manner, and a moving pen traces on a map the course that the pupil would fly if he were really airborne.

The Mirage G8 coming in to land; wings are fully forward and flaps and leading edge slats extended.

Flying a Link Trainer is, of course, much less costly and safer than learning to fly in the air. It is so realistic that the Link has been followed by a variety of more elaborate devices on the same lines, known as flight simulators. Some of these cost an immense amount of money and are fitted out exactly like the flight deck of a full-size aeroplane, with the seats and all controls, instruments and equipment in exactly the right places. Every movement of the controls is reflected on the instruments. Hidden speakers produce the right degrees of engine noise corresponding to what the pilot is doing, and add sounds like tyre squeal at touch-down. Outside the dummy flight deck, an instructor or "check pilot" can follow on instruments and charts all that the pilot does, and can introduce simulated emergencies such as loss of an engine during take-off or electrical failures.

Even highly experienced airline captains can forget they are still on the ground in such a simulator when things appear to go wrong. No less important, other types of simulator enable test pilots to become familiar with the controls of a new aeroplane, and even to discover things that can be improved, long before the prototype has left the ground on its first flight.

All that is missing in such simulators is the final realism of actually being in the air and being able to test the behaviour of controls in flight. This is where the TIFS comes in, as its name stands for Total In-Flight Simulator. What it does, basically, is to take a simulator into the air, with the flight deck on the nose of a well-proven Convair-liner and with all the electronics in the main cabin. Where it scores over any other kind of simulator ever built is that it not only responds to all the control movements of the pilot in the front cabin but is fitted with a variable stability system so that it behaves exactly like the aircraft being simulated.

In other words, the front cabin can be fitted out like that of a new supersonic airliner, bomber or other type, with all the controls and instruments in the right places. And, as the pilot handles the controls, the TIFS will no longer respond like an NC-133H Convair-liner but will fly exactly like the new type it represents. The cabin section on the nose is easily removable, enabling a variety of different aircraft to be simulated, and it is expected that the TIFS will be used to investigate the handling characteristics of everything from future supersonic airliners and combat aircraft to the space shuttle vehicles that will ferry men and materials to and from space stations in a few years time.

The present TIFS was built by Cornell Aeronautical Laboratory of Buffalo, New York, and flew for the first time in 1970. It is being used first to test the approach and landing characteristics of a multi-engined supersonic jet-plane and will also simulate flight refuelling such an aircraft. Soon, other TIFS aircraft may be used to train airline and air force pilots to cope with emergencies like an engine failure in flight or swing-wings that will not spread to a forward position for landing. They will make this possible in complete safety, as the "safety pilots" in the normal cockpit of the TIFS can take over control from those in the nose cabin at any moment.

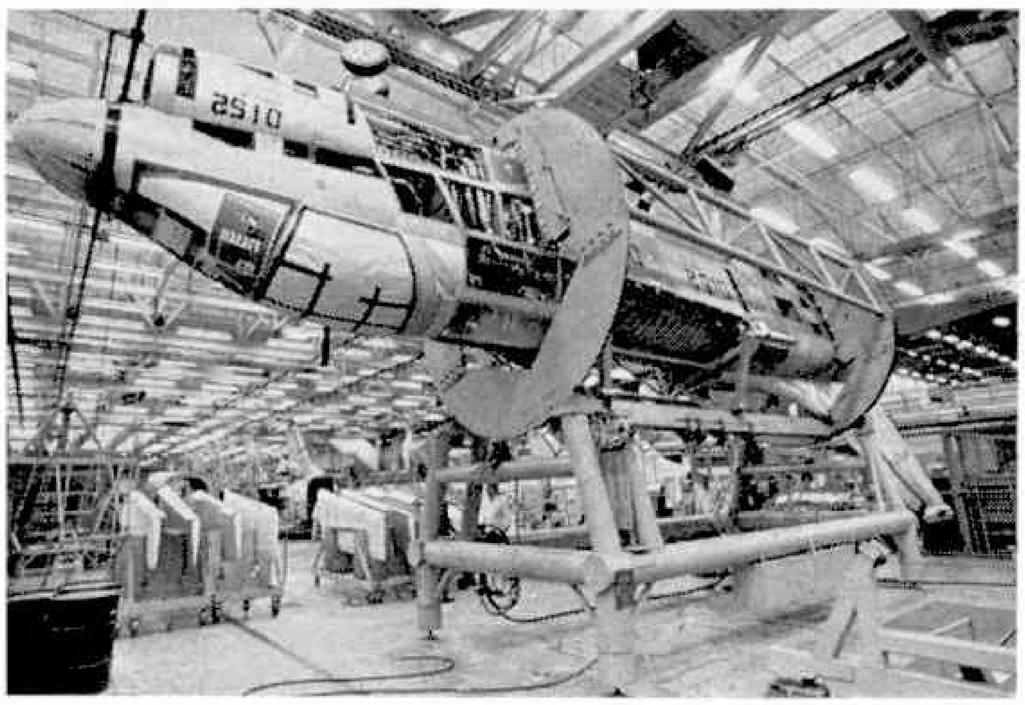
New French Swing-wing Fighter

On January 13 this year the prototype Dassault Mirage G swing-wing fighter crashed during a test flight, its pilot being saved by his ejection seat. Everyone breathed a sigh of relief when it became clear that the accident was not caused by the swing-wing gear. Other aircraft of this kind, and particularly the American F-111, seem to have had so much trouble that only the continued success of the Mirage G and the Russian Mikoyan fighter known as "Flogger" made the swing-wing idea appear to be worth all the setbacks and cost involved.

Up to the time of its crash, the Mirage had made 316 flights, totalling 400 hours, since its first take-off on October 14, 1967. It had been flown by many overseas pilots, as well as by French test and military pilots, and had proved itself excellent at all speeds from 127 m.p.h. during landing approach to two and a half times the speed of sound at high altitude.

The Mirage G was powered by a single Snecma TF306 turbofan engine, giving 20,500 lb. thrust, and had a take-off weight of about 35,000 lb. It has been followed by the first of two prototypes of a new fighter on the same lines, known as the Mirage G8. When this flew for the first time, on May 8, it was powered by two 15,870 lb. thrust Snecma Atar 09K-50 turbojets, but these will be replaced eventually by 19,840 lb. M53 Super Atars. Already the new aircraft has demonstrated its capability at the 1971 Paris Air Show. If the French Air Force decides it can afford to order the type into production, it could well have one of the world's best combat aircraft in the mid-seventies.

The range of movement on the Mirage G8's wings. Note that in the lower, fully forward, picture, the flaps and slats are also extended.



To ensure that its A-7 tactical fighters leave the assembly line without loose nuts, bolts or tools, the Vought Aeronautics Company in Dallas, a division of LTV Aerospace Corporation, simply turns the Corsair II upside down. The fuselage is placed in the roll-over apparatus and rotated, allowing any loose objects to fall out. This is just one facet of the company's A-7 debris control plan.

Fighter's Slow Roll at Ground Level

Most aircraft have to wait until they are in the air before getting themselves inverted. Even then, it takes a brave man to attempt a really slow roll close to the ground. It may come as a surprise, therefore, to learn that every A-7 Corsair II tactical fighter built by Vought Aeronautics is subjected to a slow roll, a few feet above the ground, before being delivered.

The picture on this page gives the game away. Remembering photographs of other peoples' aeroplanes discovered with everything from pairs of pliers to workmen's lunch-boxes sealed under their metal covering, Vought decided to make sure that no Corsair would ever leave the assembly line with loose nuts, bolts, tools or other " foreign bodies " inside it. Each fuselage is placed in a roll-over apparatus and rotated, so that any loose objects will fall out.

Choppers Clean Canals

Aircraft perform many unusual jobs nowadays, but one of the strangest must surely be to clear weeds from irrigation canals. According to the Soviet news agency Novosti, that is just one of the many useful tasks carried out by Aeroflot's Mi-2 and Ka-26 helicopters. Experiments in Turkmenia, Central Asia, showed that herbicides sprayed from these " choppers " could be used to destroy reeds and weeds covering the canal beds as a thick carpet, interfering with normal water supply and hastening the rate of evaporation of precious water in hot climates. Aerial spraying can clear all the weeds in six to eight months, after which the canals stay clean for up to three years.

The Aerodome is Coming

How can the owner of a small airfield pack five light aircraft, two of them twin-engined, into a hangar with only one door, and still be able to take out any one of the aircraft without removing the others? The answer, according to a company in Wichita, Kansas, is the Aerodome.

No, the type-setter has not missed out an " r ". The Aerodome is a circular dome-shaped glass-fibre building with a rotating floor. If the wanted aircraft is at the back of the hangar, the owner simply pushes a button; the whole floor turns until his 'plane is opposite the doorway and can be wheeled out. Floor and door are electrically operated, from mains or battery. Costs are saved by avoiding the need for foundations for the building or flight line personnel to move the aircraft.

The " Aerodome " is quite a nifty idea for easy accessibility of any of the aircraft stored in it. In a conventional hangar, it is remarkable what shunting is sometimes needed to get a particular aeroplane out.

ROBOT DRIVERS (*continued from page* 437)

than fourteen factors of this sort is being collected and computerised in conjunction with the midget Washington.

The electronic pilot should in time cause a considerable reduction in the number of road signs, which often form a confusing wilderness of flashing lights, traffic signals, and kerbside warnings. In such circumstances motorists nowadays frequently find it necessary to stop, holding up other road users until they know which route they must take—or risk looking out for signs while still moving, and thereby creating conditions likely to lead to accidents.

With a computer-operated route guide, all the motorist has to do is to follow the instructions displayed on the small screen in front of him.

He need not have a map-reading passenger beside him to give directions; nor will he have to brake suddenly, for instead of coming unexpectedly to a junction he will be informed well in advance if he has to turn aside there.

An important requirement of such a system is that it shall be completely reliable, and this is another aspect in which space engineering and technology is proving helpful. The roadside computers have the same built-in reliability as space ships.

The " Dial a Destination " system is not exorbitantly costly, either. A car could be fitted with the necessary equipment for about the price of automatic transmission. The roadside units cost roughly as much as traffic lights.

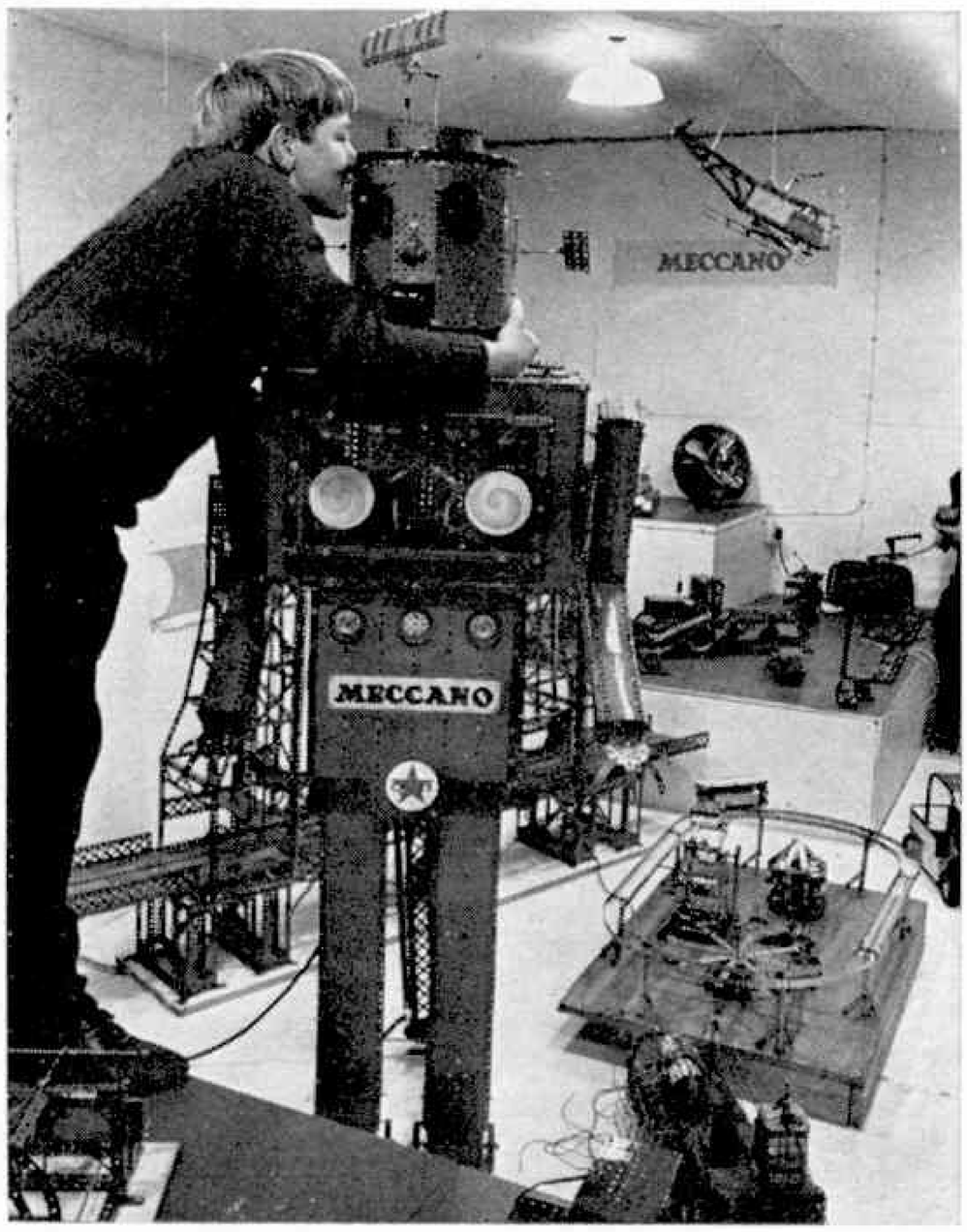
There are some problems still to be overcome, and the Electronic Route Guidance System cannot be introduced overnight. Nevertheless, progress so far made is sufficient to show that it is worth detailed examination.

Its introduction in a big way would not regiment motorists, as other route guidance would do. One of its biggest attractions is that drivers using ERGS would be able to travel at their own pace—and in greater safety.

AMONG THE MODEL-BUILDERS

with

'SPANNER'



Left, a 6 ft. high Robot, re-built from photographs by Mr Bob Boundy of Christchurch, New Zealand, on display at the 1970 New Zealand Industries Fair. (Photo reproduced by courtesy of the "Christchurch Star".) Below, this Dockside Crane was built and displayed by Mr. B. J. Oostewegel of Grey Lynn, Auckland, New Zealand.

IT makes a pleasant change occasionally, to move away from straight building instructions for new models and mechanisms and to take a general look, instead, at some of the interesting models which have been built by readers around the world.

I am sure, for example, that readers will be fascinated by the giant Robot shown in one of the accompanying pictures. It was built by Mr Bob Boundy of Christchurch, New Zealand and is pictured with a young member of the Christchurch Meccano Club on the Club stand at the 1970 New Zealand Industries Fair. The Christchurch Meccano Club usually exhibits at the N.Z.I.F. and I understand that the show the members put on always creates a tremendous amount of interest among visitors to the Fair. The Club does a great amount of good for the Hobby by publicising Meccano in this way and I would like to take this opportunity, both on behalf of Meccano Magazine and Meccano Tri-ang Limited, to thank and congratulate members for the sterling work they do.

Bob's Robot is actually based on a model which Meccano Tri-ang themselves designed and built for display at Shows in the U.K. and Ireland. No building instructions for the model were ever prepared, but Bob was supplied with a selection of photographs of Meccano's original model by a contact in this country. Using these photographs alone—without any written details of any sort—he succeeded in reproducing the model as close to the original as the equipment at his disposal would allow. In fact, he went even further and included some features not present on the original!

Judging by Bob's description, the Robot was an intriguing sight. "I had five Power Drive Motors in him" he writes. "Two were in his feet and, although he did not walk, he rolled along the ground—a movement which was a terrific success! His arms swung backwards and forwards and his head turned from side to side, while his mouth also opened and closed. Two discs inside his chest revolved around and there were 14 lights which flashed off and on automatically, controlled by a blinker box carried inside his body. Mr Norman Clark wired the Robot for me and there was certainly a maze of wires and Lamp Holders hidden in the interior. Also inside was a loudspeaker coupled to an external microphone which proved most popular. You can imagine the look on people's faces when they heard the Robot talk!"

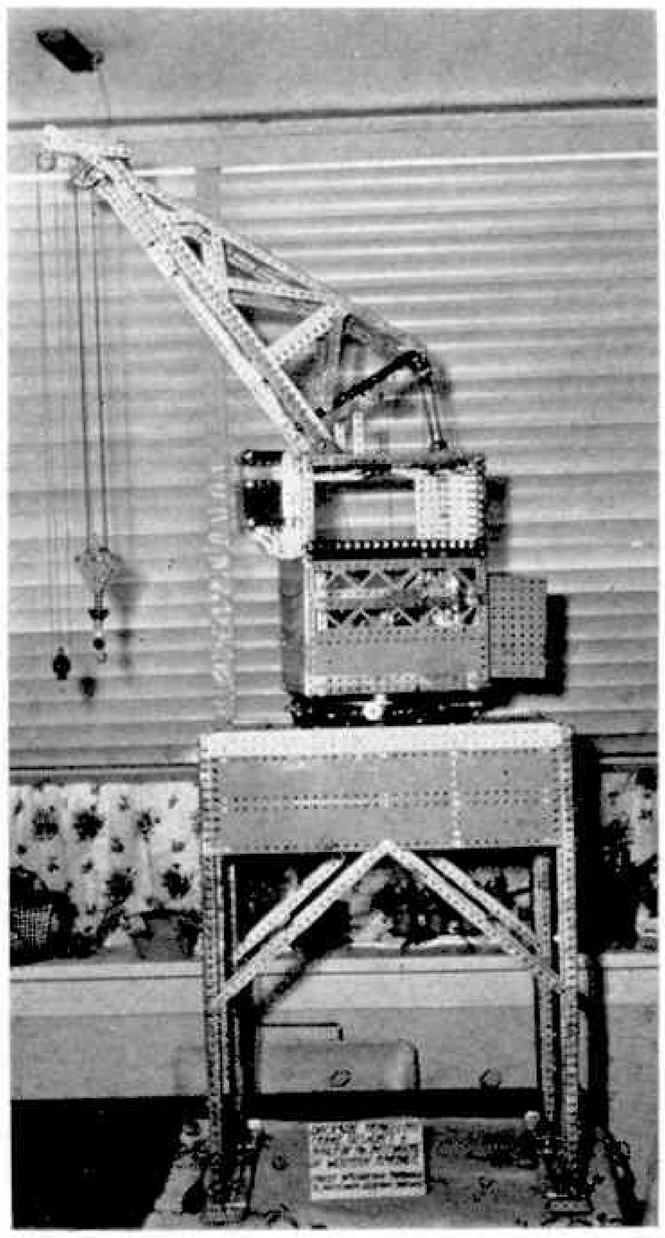
We can indeed, Mr Boundy!

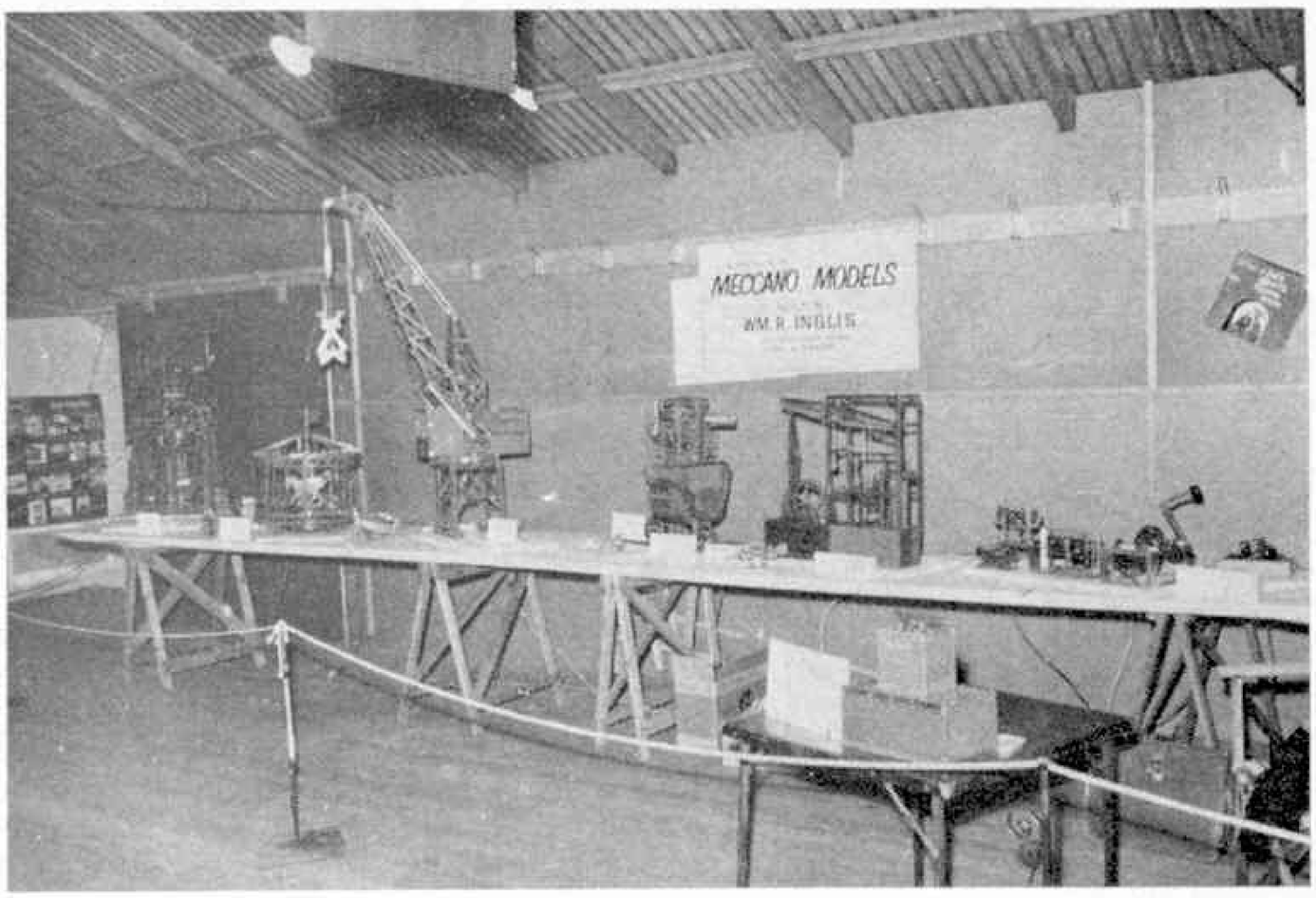
Dockside Crane

For our next item we remain in New Zealand, but move from Christchurch on South Island up to Auckland in the north of North Island. Mr Ben Oostewegel of Grey Lynn, Auckland, is a model-builder of many years experience and he has supplied me with details of the Dockside Crane, illustrated here, which he designed and built for display in an Auckland shop window.

Standing 5 ft. 1 in. high on a 26 in. high base, the model is powered by three Motors with 6-speed Gearbox, one powering the winches, one powering the slewing movement and the other driving the ground wheels No less than 1500 parts, including Nuts, Bolts and Washers, were used in its construction, as well as 60 ft. of cord to provide the cable arrangements. The main hoist uses a sheaf of five Pulleys in the jib, with four Pulleys in the travelling block, and Mr Oostewegel tells me that this arrangement enables the Crane to easily lift a 10 lb. load.

The winches themselves are operated through spring-loaded gears with automatic brakes, while the drive to the road wheels is through gears, Sprockets and Chain. Access to the main gearing is through horizontal doors in the slewing section, with counterweights to balance heavy loads being carried in a "box" built on to the back of this section. The reach of the jib is approximately 1 ft.





A local Exhibition in Waverley, Melbourne a couple of years ago was one of the many occasions on which Bill Inglis has publicised Meccano by displaying his models. This picture shows Bill's own stand at that Exhibition. Below, Bill at work with son Paul in his specially-constructed "shed". "More like a palace," says 'Spanner'!

Overall, I would class Mr Oostewegel's Crane as a good model, capable of attracting plenty of attention on display and therefore doing much to keep Meccano alive in the eyes of the public.

Australian Paradise

Still "down under", but jumping a quick 2000 miles from New Zealand to Australia, we could end up in a veritable Meccano Paradise—the workshop of Mr Bill Inglis of South Blackburn, Victoria. A Chemical Engineer by profession and now working on the Management side of Industry, Bill has been a Meccano fan for as long as he can remember. His father bought him his first substantial Meccano Set some 34 years ago, when he was eight years old and he has never really lost the "bug" since then.

Until the War made parts unobtainable, all Bill's pocket money went on spares. Later, when school and then work took him away from home, he did not lose interest, but returned during his holidays and always managed to build up a model or two. In the early 1950's however, catastrophe struck. His parent's home was destroyed by fire, and the bulk of his Meccano collection along with it. This was something of a set-back and, in fact, what remained of the collection was packed away for several years. In the meantime, Bill had married, and in due course, he became the father of a son, Paul. As soon as Paul was old enough to take an interest, out came the collection again, but—wouldn't you know it—it was Bill, himself, who ended up with all his old passion for the hobby!

With interest revived, Bill set about re-building his collection and eventually succeeded in obtaining so much equipment and literature, old and new, that it was in danger of swamping his house—as well as alienating his wife! To keep peace in his house, he therefore built a "shed" for a workshop. He calls it a "shed"; I would call it a palace! It is a steel-framed double garage, 20 ft. × 16 ft. in size, built on concrete and clad with aluminium. Inside it is fully lined, the floor covered in vinyl and four windows fitted with venetian blinds, while lighting is supplied by four double fluorescent tubes to remove all illumination problems. It is well furnished with desk, bookcase, benches and cupboards, with Bill's "building" parts (as opposed to rare collectors' parts and Sets) being housed in properly compartmented drawers under the main workbench. This greatly helps model-building, of course, as it removes the need to search for parts.

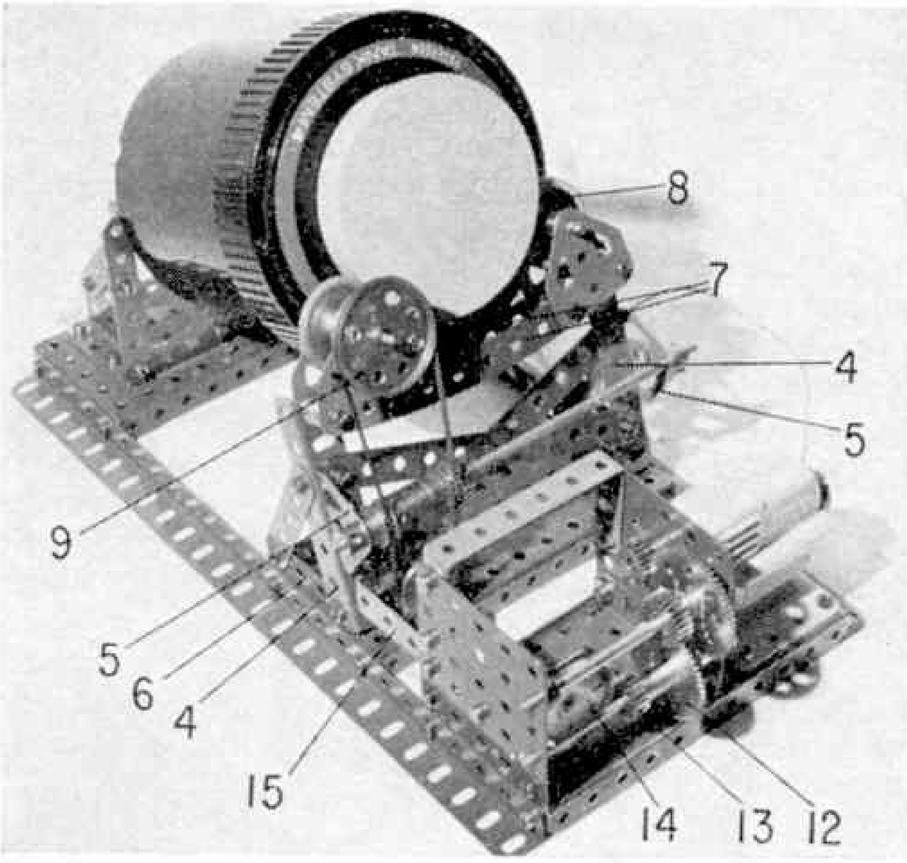
Needless to say, Bill is an enthusiastic builder and, like his New Zealand counterparts, he also does much to help the hobby by exhibiting his models in and around his local area. One of the accompanying photographs shows his own stand at an Exhibition held a couple of years ago in Waverley, a suburb of Melbourne, and the fact that he was able to show so many different models at once gives a good indication of the amount of equipment at Bill's disposal. Keep up the good work!

Locomotive from Britain

We just have enough space remaining to return to the U.K. for a quick look at the magnificent old Locomotive, also illustrated here. Based on a broad-gauge original built in the 1880's, the model is the work of Mr J. C. Palmer of Droitwich Spa, Worcestershire. who must be congratulated on an excellent reproduction.

"I started building with the chassis," says Mr Palmer, "Mounting in this the six smaller wheels, made up from Hub Discs, 6 in. Circular Plates and Bush Wheels, each pair fixed on a solid axle. The two driving wheels were built up from $9\frac{7}{8}$ in. Flanged Rings, 6 in. Circular Plates and Strips, but here I found that I had to have separate bearings for each wheel, owing to

(*Please turn to page* 453)



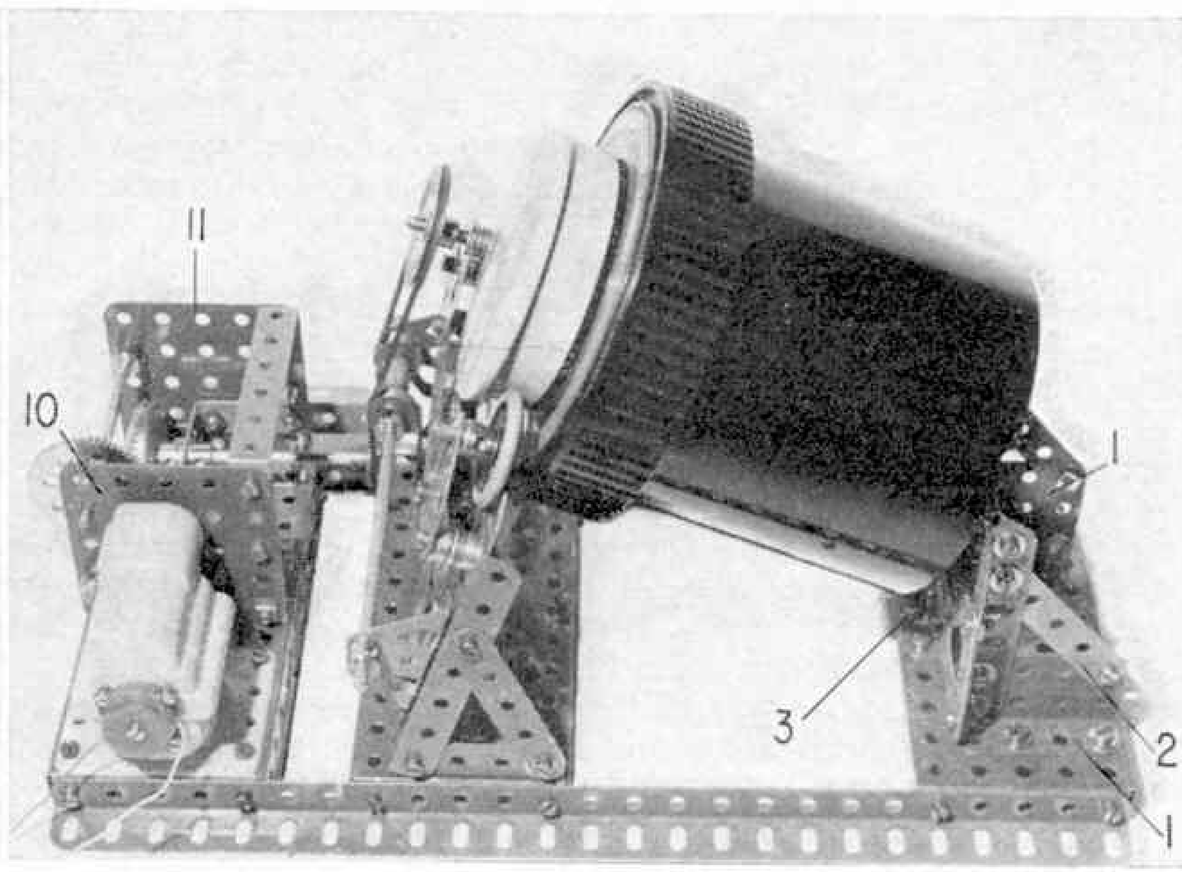


Fig. 1 (above) A side view of the Tank Agitator showing the principle constructional points of the framework.

Fig. 2 (above left) In this general view of the Agitator, the gearbox and roller drive for tank rotation are clearly shown.

A BATTERY-OPERATED PHOTOGRAPHIC TANK AGITATOR

BY ERIC JENKINS
DESCRIBED BY BERT LOVE

PRECISION scientific apparatus can cost a fortune in many cases, but the versatile qualities of Meccano have been recognised by research centres all over the world as a source of components from which very reliable and rugged apparatus may be constructed. There have been thousands of keen photographers among the readers of Meccano Magazine over the years and those who prefer to process their own films will find this excellent Tank Agitator by Eric Jenkins a first class dark-room accessory.

It is important when developing a roll film to make sure that the sensitive emulsion surface is constantly in touch with fresh developer solution. In the act of developing the film, the liquid developer rapidly exhausts itself at the point of contact on the emulsoin surface and the instructions supplied with film tanks in general call for regular agitation of the developer. This may be achieved by shaking the tank and occasionally upending it, but it must be done with care by the operator. Eric's battery-operated Tank Agitator ensures a consistency of overall film development by ensuring liquid movement, rather along the lines of the giant mobile cement mixers. This particular model is designed specifically for the Paterson Tank System 4, using the single universal tank, the nylon spiral of which will accommodate roll films from 35 mm. up to 120 size. System 4 tanks are fitted with liquid-tight seals to the screw-on top and while the model could be modified to accommodate other tanks, it is essential to ensure that no leaks come from them when they are tilted, as the caustic nature of developers in general plays havoc with paintwork, etc.

Construction is very straightforward and calls for no great building skill. Nuts and Bolts should be firmly secured, however, if the agitator is to be used on a long term basis. A start is made by bolting three $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plates between a pair of $12\frac{1}{2}$ in. Angle Girders as shown in Fig. 1. The rear tank bracket is made by setting in a pair of Girder Brackets 1 two holes from the edge of the Flanged Plate and bolting on a pair of 3 in. Angle Girders to form the uprights. These in turn are braced by $2\frac{1}{2}$ in. Perforated Strips 2 attached to the Girder Brackets and by a pair of Corner Gussets, attached to the 3 in. Girders and joined centrally by a $1\frac{1}{2}$ in. Angle Girder 3 bolted to the Flanged Plate. The top ends of the 3 in. Girders are connected by a $3\frac{1}{2}$ in. Double Angle Strip set at an angle equal to that of the tilt of the tank.

At the centre of the Double Angle Strip, a Bush Wheel is bolted on its rear side to form a bearing for the tank mandrel. This mandrel is made from a Collar, fitted with two Grub Screws, mounted on a $1\frac{1}{2}$ in. Rod which is free to revolve inside the Bush Wheel. Two or three Washers are added for packing adjustment, the Rod being held in place by a Collar at the rear. A smear of Vaseline or graphite should be applied to the mandrel before inserting it in the Bush Wheel.

Construction of the front tank bracket is clear from Fig. 2. A pair of $3\frac{1}{2}$ in. Girders 4 are joined by two crossed-over $5\frac{1}{2}$ in. Strips as shown, the fixing Bolts also being used at this point to secure a pair of Trunnions 5 which carry the idler pulley shaft. Two 2 in. Girders 6, attached to the $5\frac{1}{2}$ in. Flanged Plate, form bottom bearers for the $3\frac{1}{2}$ in. Girders which, again, are braced by $2\frac{1}{2}$ in. Strips. One drive and one idler roller are mounted at the front of the tank in Flat Trunnions at the ends of a pair of $5\frac{1}{2}$ in. Curved Strips 7, secured to the tops of Girders 4 by means of $\frac{3}{4}$ in. Bolts. Each Bolt also carries a stack of Washers to space the Flat Trunnions from the front Curved Strip to give sufficient clearance for the tank rollers, as shown in Fig. 1.

The idler roller is made from a 1 in. loose Pulley 8, fitted with a Rubber Ring and held with a Collar and Washers on a 1 in. Rod which is free to rotate between the pair of right-hand Flat Trunnions. The drive roller is supplied by a 1 in. fixed Pulley with Rubber Ring fitted to a 2 in. Axle Rod carrying a $1\frac{1}{2}$ in. Pulley 9 which receives the drive from the gearbox by means of a 10 in. Light Driving Band. To accommodate the tilt angle of the tank, the Driving Band passes over two idler pulleys supplied by $\frac{1}{2}$ in. Pulleys with boss, free to rotate on 6 in. Axle Rod held in Trunnions 5 by Washers and Collars, as shown in Fig. 2.

Gearbox

The gearbox is straightforward but the location of the drive unit—a Meccano 4½ volt Motor—is critical, requiring careful attention. A 2½ in. Angle Girder is bolted to the centre of the front Flanged Plate with its slotted holes in a vertical direction. A 2½ × 2½ in. Flat Plate 10 is fixed to the Angle Girder to form one side of the gearbox, the Motor being bolted to the Flanged Plate at the right-hand side of this plate with its shaft passing through the plate. The Motor base is bolted up securely, then the Bolts fixing the Flat Plate to the 2½ in. Girder are adjusted to make sure that there is no binding between the Motor shaft and the hole in the Plate through which the shaft protrudes.

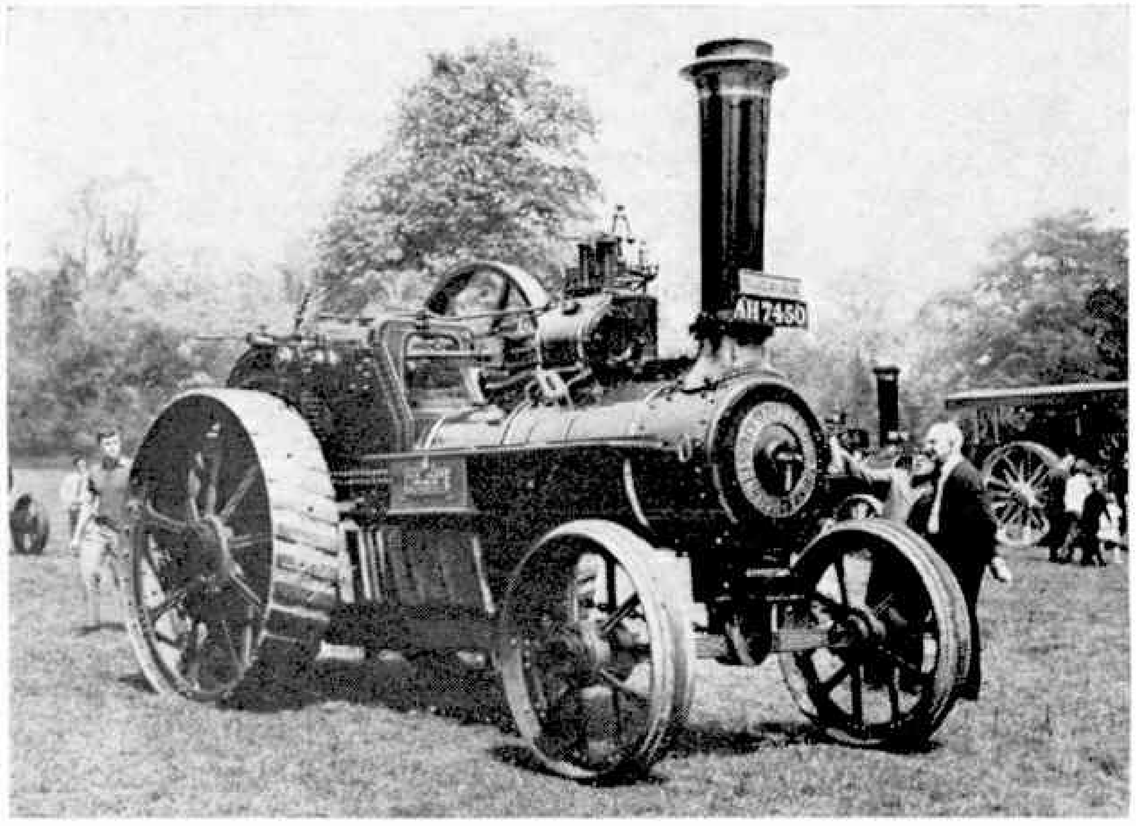
A second 2½ × 2½ in. Flat Plate 11 is bolted to a second 2½ in. Girder at the other end of the Flanged Plate, the two sides of the gearbox thus formed being braced by a 3 × 1½ in. Double Angle Strip spaced by Washers to keep the Plates parallel. The Motor shaft is fitted with a ½ in. Pinion which drives a 57-teeth Gear on a 3½ in. Rod journalled in the gearbox sides. Also fixed on this Rod is a ¾ in. Pinion which meshes with a 50-teeth Gear 12 on another 3½ in. Rod, also carrying a ½ in. Pinion 13. This Pinion meshes with a 1½ in. Contrate Wheel 14 fixed on the gearbox output shaft, supplied by a further 3½ in. Rod journalled in a second 3 × 1½ in. Double Angle Strip 15 bolted to the inside of Flat Plate 11. Collars are used on all the shafts to hold them in place, the final drive being taken from a 1 in. Pulley fixed on the output shaft immediately below the ½ in. guide Pulleys already mentioned.

Loading

When using the apparatus, make sure that the correct amount of developer, as marked on the tank, is poured in and that the tank is properly sealed. Shake the tank to ensure the release of air bubbles and then place the tank base centre (which is recessed) over the Collar on the rear mandrel and lower the cap of the tank in place against the drive and idler rollers. Do not leave the tank in this position with the motor switched off, but start the Motor as soon as the tank is properly located. Do not use a higher voltage than recommended for the Motor. Set a photographic timer to ring at the end of the development and remove the tank immediately on completion for pouring off the developer before rinsing, hardening and fixing in the usual manner. Some experimentation is advisable since the uniformity of developing speeds up the process a little. Try taking one minute off the recommended development times. Once the correct time/temperature combination is established, the Meccano Tank Agitator will give consistently good results with very evenly developed negatives. Keep the apparatus dry and free from any splashes of chemicals.

PARTS REQUIRED

2—2	1—17	1—27a	2—89
4—5	1—18a	1—28	2—108
2—8	1—18b	65—37	2—111
2—9b	1—21	2—37a	2—126
2—9c	3—22	40—38	2—126a
2—9d	2—23a	2—47a	2—155
2—9e	1—24	1—48b	2—161
1—9f	1—25	3—52	1—186a
1—14	2—26	7—59	1 4½ v. D.C.
3—16		2—72	Motor.



This issue contains reports on the Southern Federation Rally by D. E. Lawrence, the extension of the Keighley track by Northerner, and some fine photographs of the Strumpshaw Rally by Michael Warren. W. J. Hughes tells us more about his visit to Canada, and Don Young continues his constructional article on *Elaine*. There is also an article by John Haining on Undertype Engines.

Workshop articles include a Six-station turret head and an improved die and tool holder.

Model Engineer

On Sale August 6th Price 15p

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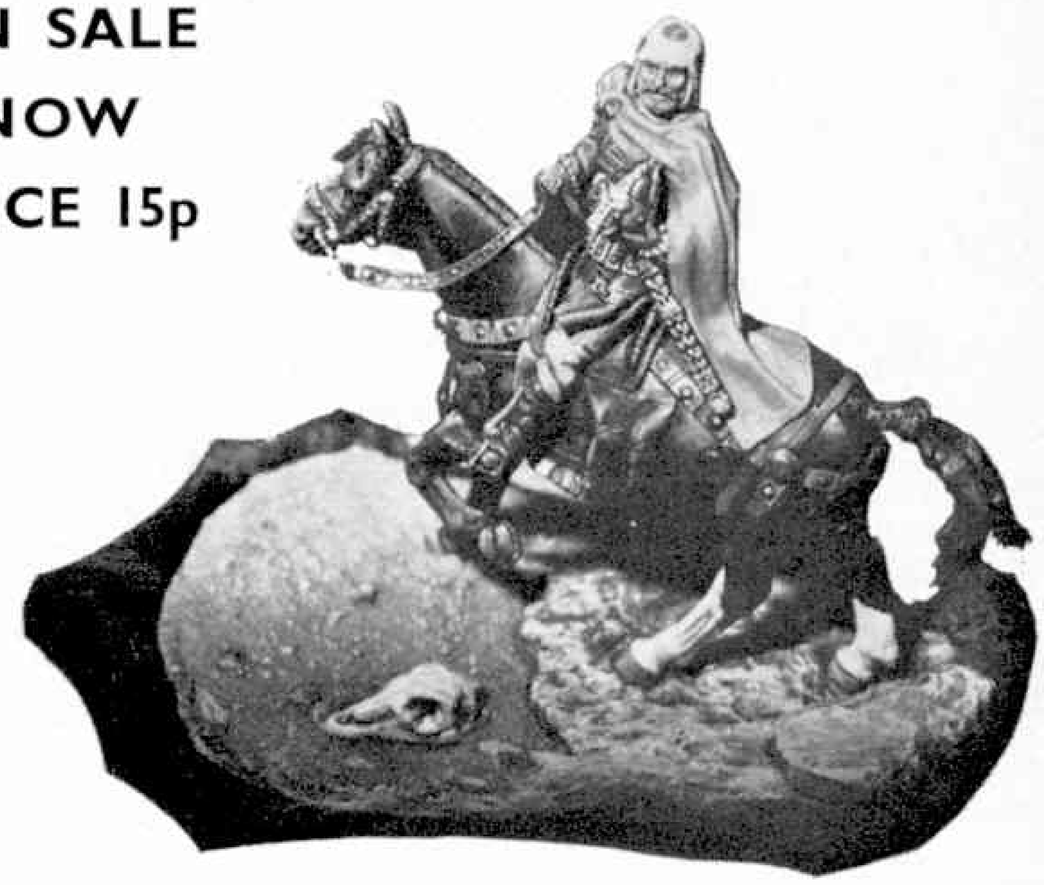
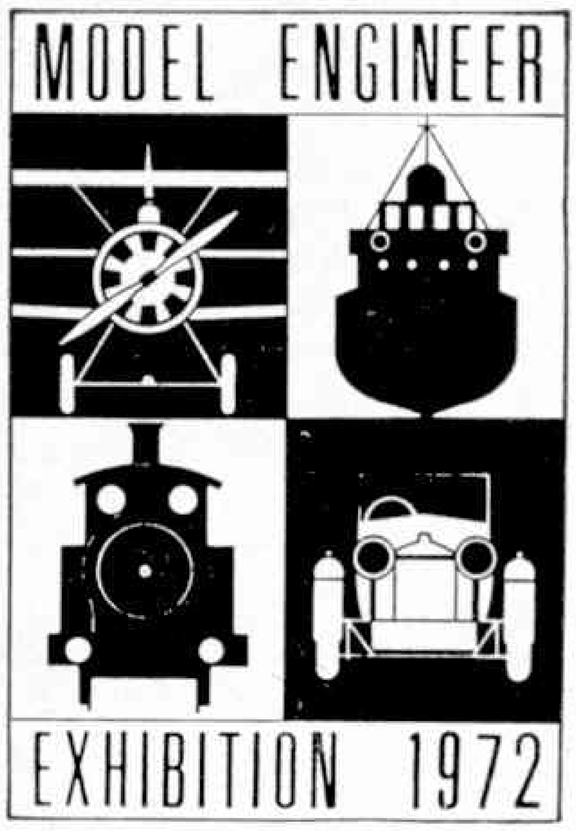


A host of plans for Military Modellers sets the scene for our August issue and 1/76th scale drawings include the Bedford Q.L. World War II Series of military trucks, plans for V.H.F. Direction Finding radio vehicles of 1945 (terrific modelling subject for dioramas), more self propelled guns with scale drawings for the American M43 and in this month's instalment of The Funnies – our series on the specialised equipment of the 79th Armoured Division – scale plans and modelling suggestions for the Buffalo Carpet Layer.

Added to this stack of plans comes construction features of Peter Wilcox's Byzantine Strategos (the chap in our photo), reviews of the Tamiya Centurion and Bandai Grasshopper together with Figure Review on Starlux, two recent competition reports, Squadron Markings, Napoleonic Wargame, Bovington Tank Museum, Books and Notice Board.

Military Modelling



41st GREAT SHOW!

SEYMOUR HALL, LONDON, W.1.

4th January — 15th January 1972

(Not Sunday)

Model Aircraft, Locomotives Boats, Traction Engines Military Models, Crafts

COMPETITORS

Your entries are now invited. Entry Forms on request. £300 in prizes . . . some 30 cups, trophies and other awards. Championship Cups for permanent retention. A win confers " Expert Status! "

ENTRY CLASSES

Examples of every form of modelmaking activity can be entered. Model engineering masterpieces such as locomotives, traction engines, aircraft, boats, cars . . . or simple plastic creations . . . there is a class for you. Classes include Military Models (six classes) and Craft entries (Furniture, glass fibre, etc.).

WHAT WILL BE ON DISPLAY

THE MAIN HALL will be laid out in a completely different manner, offering a grand " open plan " scheme with more room for models, which will be grouped under the gallery balcony and in the centre, with a WINNERS' PODIUM to display class champions. The popular S.M.E.E PASSENGER RAILWAY enjoys its usual position, but with the added feature of the immense BERKSHIRE 10¼ in. gauge locomotive based on an American Freight Locomotive and destined to operate on Lord Gretton's Stapleford Park Railway. This is nearly 19 ft long and will be on show alongside the track. Another locomotive specially built for Stapleford Park will also be on show at the entrance—The Hon. John Gretton's ROYAL SCOT—a fine scale model embodying many of his own design features.

A FLYING CIRCLE stretching right across the hall from balcony to balcony will be available for electric model aircraft flying. This will be at BALCONY LEVEL and provide splendid and spectacular sport with electric models doing nearly all that more powerful outdoor i.e. engined models do—or so we hope!

TRADE STANDS—fewer in number than before, since " club " and other special stands are in another hall—are tastefully grouped in three units, giving convenient access in the MAIN HALL.

Introduction of a MODEL ENGINEER WORKSHOP manned by the S.M.E.E. last year proved immensely popular and will be increased in size and scope, again with experts from S.M.E.E. in charge and assisted by M.E. consultants. Working models under compressed air will also be on show.

BRYANSTON ROOM will be operating as the CLUBMEN'S CORNER with stands manned by the principal governing model bodies of the country, plus club units demonstrating, and offering combined club "little exhibitions." Demonstrations of power tools will also be shown. This hall will contain the TRACTION ENGINE entries, and wall showcases of small exhibits.

LECTURE HALL will be arranged as the BATTLEGROUND with four WARGAMES TABLES for regular miniature battles, where clubs will be invited to run wargames of all popular periods, with opportunities for running commentaries. MILITARIA entries will be displayed here.

BOATING MARINA: For the first time we have taken the SMALL SWIMMING POOL to operate as a nearly 100 ft long indoor lake for boating activities. R/C boats will be demonstrated daily. Evenings will be given over to inter-club and individual contests. Pool will also be big enough for some steam powered boats to operate by arrangement.

GALLERIES will provide sitting out space, spectator room and house additional club diaplays including our favourite BOYS' EXHIBITION. Furniture and craft entries under the auspices of *Woodworker* will be on show.

SOUVENIR GUIDE

Another CHRISTMAS EXTRA issue of *Model Engineer* will be coming out 2nd Friday in December with entries, trade stands, articles galore to assist the visitor and solace the stay-at-home.

PRIZE POOL ALLOCATION

Classes attracting six or more entries will enjoy prizes to value of 1st £5; 2nd £3; 3rd £1. With over 12 entries 1st £7; 2nd £4; 3rd £2; 4th £1. Classes under six will have 1st & 2nd only, or at discretion of the judges may be combined with other classes.

ENTRIES CLOSING DATE

All entries must be made by October 18th 1971.

Enquiries for Competition Entry Forms, Trade Stands to:

EXHIBITION MANAGER,
M.A.P. Ltd. 13/35 BRIDGE STREET,
HEMEL HEMPSTEAD, HERTS.

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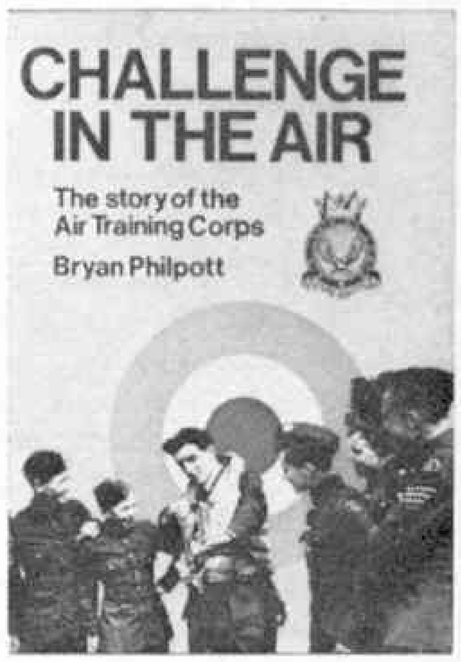
176 pages, 8¼ × 5¾ in. (International A5 size) with 2 lb. strawboard covers, bound in Balacron with gold blocking on spine. **£1.75**

156 CHALLENGE IN THE AIR



The story of the Air Training Corps from its tenuous beginnings after the 1914-18 war, when the idea of a youth organization with an aeronautical flavour formed in the minds of two young ex-servicemen – to its present position as the main source of recruits for the Royal Air Force. The story unfolds via the formation of the Air League's Air Defence Cadet Corps, through the difficult days of World War II – during which the Air Training Corps was formed – to the present day.

164 pages on antique wove paper and white glossy plates, size 6 × 8½ in., being 128 pages of text, and thirty-five pages of illustrations. Bound in Linson, with gold foil blocked title on spine and colour dust cover. **£1.75**

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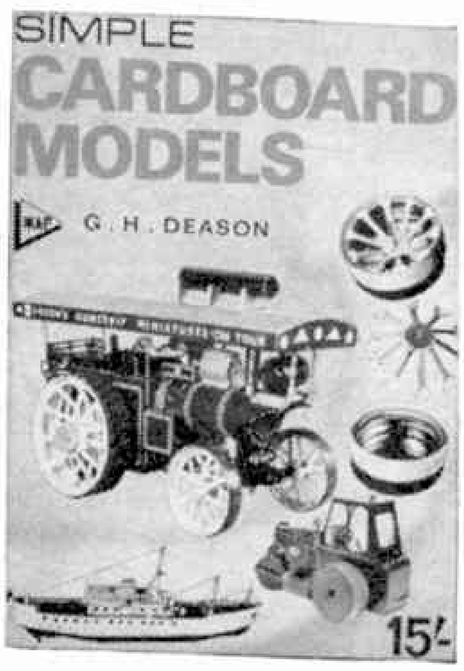
The art of science of static scale model aircraft construction demands only the modest tools and the simplest of materials so that no high initial expenditure is required to make a start.

8½ × 5½ in. 130 pages, including 50,000 words of text, 244 detailed drawings, over 30 models and art plates. Fully bound with gold-blocked title on spine. **62½p**



132 SIMPLE CARDBOARD MODELS

This magnificently-illustrated book deals with working models of Rollers, Road Engines, Ships, Cars, Tracklaying Vehicles, Rail and Tramway models and other working models including models of *RMS Scillonian* and the *Ruston Bucyrus Excavator*.

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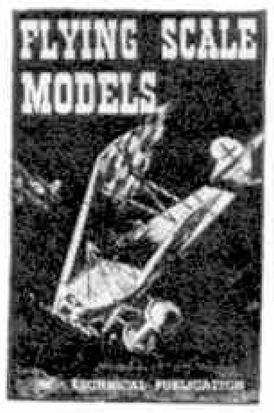

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We are happy to announce that Roy Dock has rejoined the team and will be editing MODEL RAILWAYS.

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The new MODEL RAILWAYS comes at the traditional beginning of the model railway season and we had an opportunity of taking Central Hall, Westminster, over the Bank Holiday period, so, for the first time, we are sponsoring an exhibition devoted to the smaller gauge of Model Railways.

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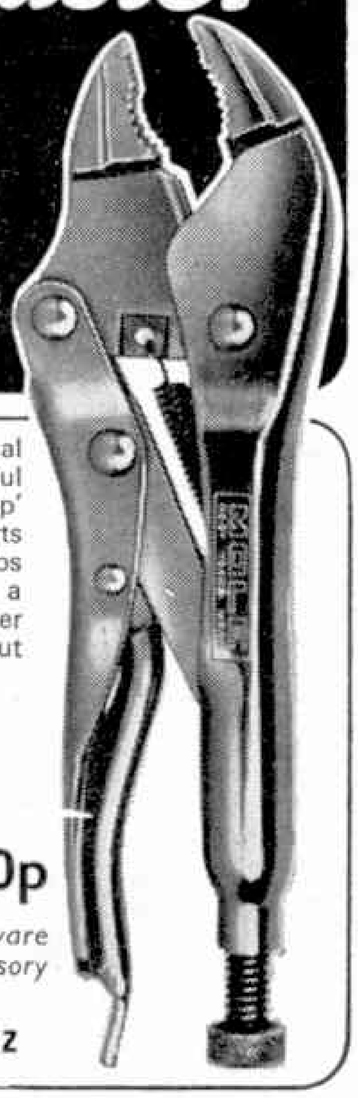

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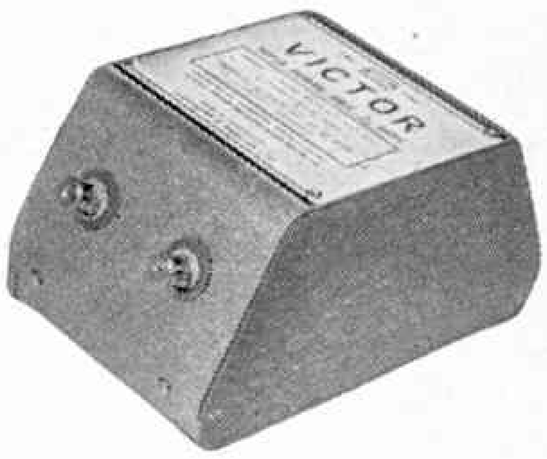

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