MECCANO® Magazine

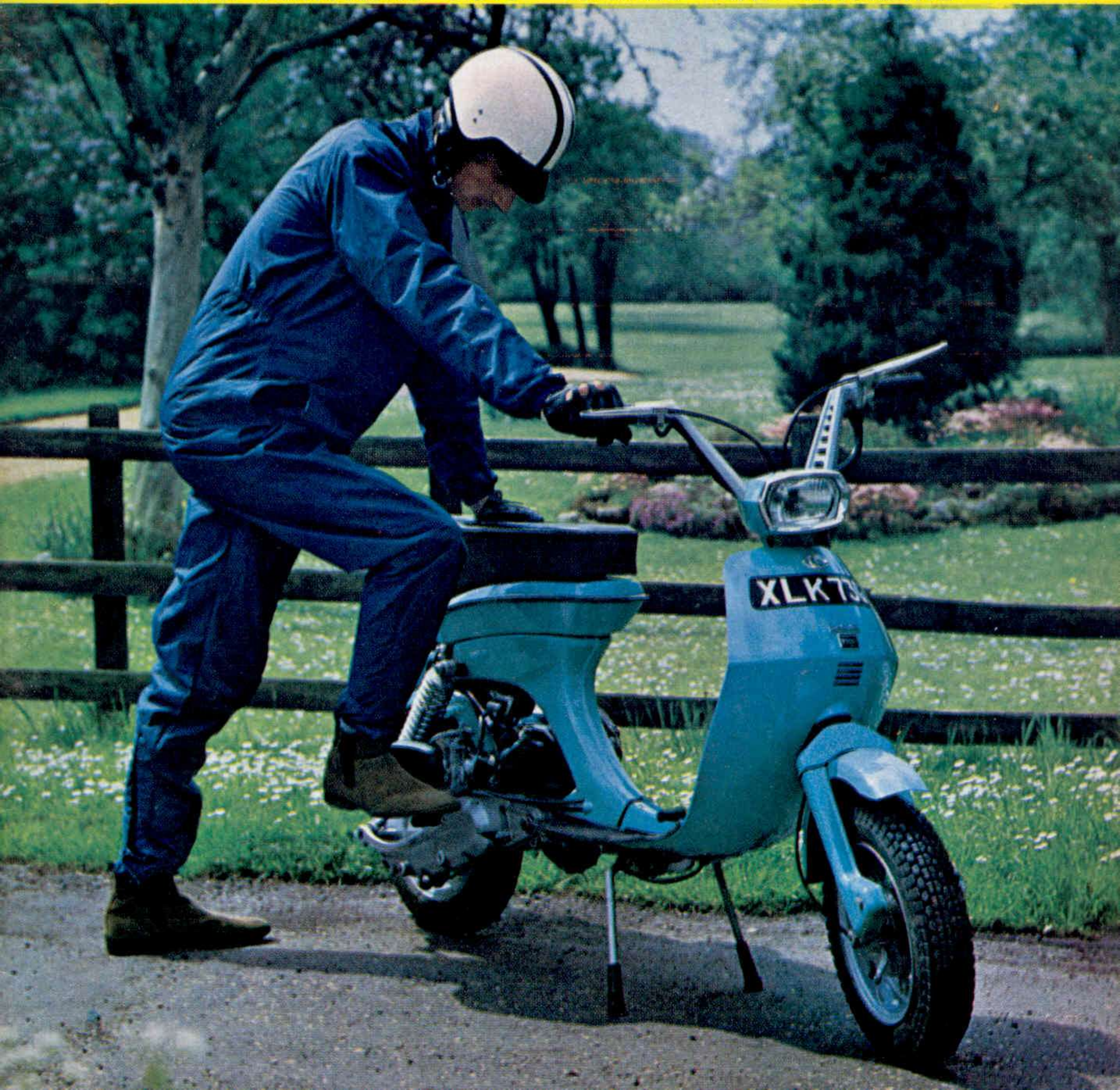
SEPTEMBER 1969

TWO SHILLINGS AND SIXPENCE
U.S.A. AND CANADA 60 CENTS.

★ BATTLE ★ SCOOTER TEST ★
★ GREAT ENGINEERS ★
★ MECCANO VETERAN CAR ★

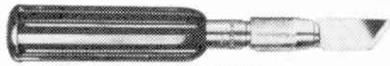
MAP HOBBY MAGAZINE

THE PRACTICAL BOYS' LEISURE TIME MAGAZINE



IMPROVE YOUR MODELLING with x-acto

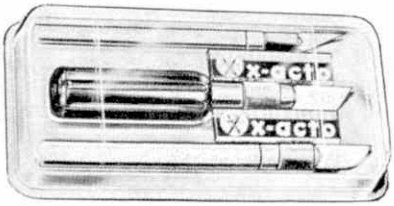
No. 1. Light aluminium handle (with blade) **4/6**



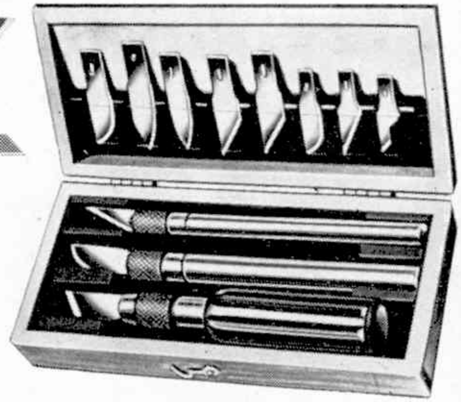
No. 5 For all heavy cutting (with blade) **8/10**

No. 2 Heavy aluminium handle (with blade) **4/9**

No. 1001 Patented lock handle, Reversible blade. **2/-**

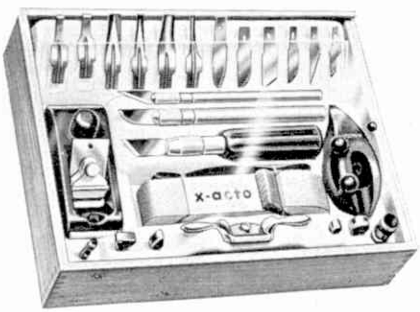


No. 81 KRYSTAL-PAK KNIFE SET Nos. 1, 2 and 5 Knives with 10 extra assorted refill blades in clear plastic case which serves as a permanent container. **27/6**



No. 82 KNIFE CHEST Contains Nos. 1, 2 and 5 Knives plus a wide assortment of blades. **37/-**

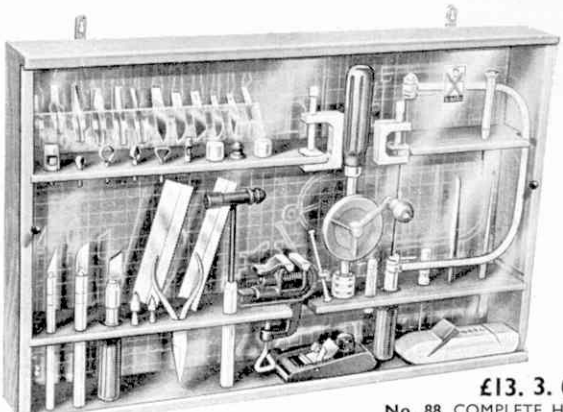
x-acto the best in tools and tool sets



No. 84 KNIFE AND TOOL SET
Contains Nos. 1, 2, 5 knives and an entire asst. of blades, gouges, routers, punches. Has X-acto planer, 1″ sander, spokeshave, balsa stripper. In wooden box, complete with see-thru cover and fitted plastic tray insert that holds and shows every tool. **£4. 7. 6**

No. 78 DE-LUXE WOODCARVING SET
Nos. 1 and 5 knife handles with 6 gouges, 4 routers, 6 regular blades and 2 3″ blades mounted on wooden base. ... **46/3**

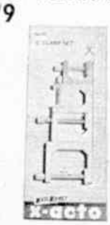
No. 86 BURLINGTON HOBBY CHEST
Complete selection of tools in fitted cabinet **£5. 3. 0**



£13. 3. 0.

No. 88 COMPLETE HOBBY CHEST
Modern, functional packing shows off the X-acto full assortment of hobby tools, knives and blades against a blueprint silhouette background of each tool, for easy replacement. Comes in a sturdy wooden fitted cabinet with new, sliding see-thru cover.

No. 46 4 CLAMPS **17/9**



No. 40 BLOCK PLANER **7/9**

No. 41 SANDER **4/-**

No. 53 RAZOR SAW 2 Blades **13/9**

X-ACTO TOOLS ARE OBTAINABLE FROM KEILKRAFT AGENTS

MECCANO® Magazine

SEPTEMBER 1969 VOLUME 54 NUMBER 9
Meccano Magazine, founded 1916.

Editorial Director
D. J. LAIDLAW-DICKSON
Editor
DAVE ROTHWELL
Consulting Editor for Meccano Ltd.
J. D. McHARD
Advertisement Manager
ROLAND SUTTON

MAP **HOBBY MAGAZINE**

FRONT COVER

A hot summer's day, and the freedom and enjoyment that can only be given by a powered two-wheeler, is all summed up in this month's colourful cover, showing the new lightweight Lambretta Vega, subject of our second article in the series "On Two Wheels" page 434. Getting ready to set off on another test ride is Editor Dave Rothwell.

NEXT MONTH

Meccano Magazine takes a look at the vital life saving work carried out by the Royal National Lifeboat Institute in the October issue, and some splendid photographs show these remarkable vessels in action. Black and white photographs do little justice to these colourful life savers, and our front cover in full colour showing one in action at sea rounds the feature up in fine style.

Radio 4-2, our popular model building feature gets well into the swing of things when another pull out supplement gives details of Radio Controlled Model Aircraft construction and flight.

For readers with an interest in powered two-wheelers, the second of our reviews of the world's best, should delight and prove of sound practical value to them.

Meccano constructors are well catered for with a variety of both simple and advanced models, which include (for the less experienced) two simple "Dragsters" out of one No. 4 Outfit which actually race. For advanced modellers, an Automated Fairground model provides a different and exciting project for followers of the more complex constructional devices.

Battle, Great Engineers, Transport Topics, plus all the other regular favourites are of course included.

Advertisement and Subscription Offices: Model & Allied Publications Ltd., 13-35 Bridge Street, Hemel Hempstead, Hertfordshire. Tel.: Hemel Hempstead 2501-2-3.

Second class postage rates paid at New York, N.Y. Registered at the G.P.O. for transmission by Canadian Post. American enquiries regarding subscriptions, news stand sales and advertising should be sent to MECCANO MAGAZINE, Eastern News Distributors Inc., 155 West 15th Street, New York, N.Y. 10011, U.S.A., U.S.A. and Canada direct subscription rates $5 including index.

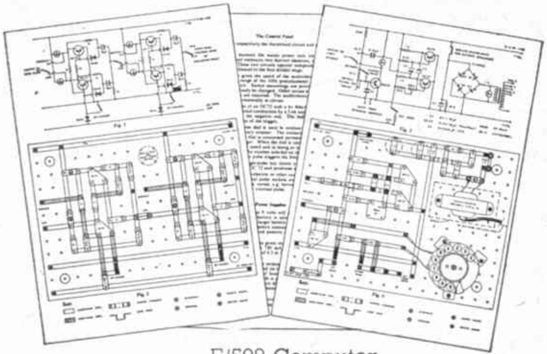
Publishers of Aeromodeller, Model Boats, Model Cars, Model Engineer, Radio Control Models, Model Railway News.

CONTENTS

MODEL & ALLIED PUBLICATIONS LTD.
13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTFORDSHIRE

RADIONIC

Learn as you build



E/508-Computer

Clear, simple, versatile, this rugged system can build almost any electronic circuit. Ideal for the experimenter; the teacher; and the complete beginner. Already used by well over 1,500 schools in the U.K.

Beautifully engineered; battery operated; no soldering; no prior knowledge needed. Results guaranteed by our technical department. People say:

"I can only describe the results as brilliant, absolutely brilliant."
"You have opened up a new world."
"Nothing could paint the picture clearer than building these sets."
"The kit has been used by my son (aged 10) with complete success."
"Most impressive—a stroke of genius whoever devised it."

No. 1 Set £7 10 0 14 Circuits (Earphone)
No. 2 Set £9 0 0 20 Circuits (Earphone)
No. 3 Set £13 10 0 22 Circuits (7 x 4in. Loudspeaker output)
No. 4 Set £18 10 0 26 Circuits (including 6 Transistor and reflex superhets)

ELECTRONICS KIT: 30 plus circuits £19-7-0. Prices (Post Free)

FULL DETAILS FROM:

RADIONIC PRODUCTS LIMITED
ST. LAWRENCE HOUSE, BRISTOL, BS1 2HF TEL: (0272) 25351

Man of action?

all you need is this A.S.I.

PARATROOPER

THE WORLD'S MOST ADVANCED AIR RIFLE
with the latest pistol grip

A.S.I. Paratrooper is the gun for the real man of action, with micro-adjustable sights, adjustable 2-pressure trigger and built-in rubber recoil pad to absorb kick-back from this powerful air rifle.

Only £12·10·0

Two more remarkable air rifles from A.S.I.

SNIPER

A real marksman's weapon, that gives spot-on accuracy. Micro-adjustable backsight allows for windage and elevation. Tunnel foresight, 2-pressure trigger and rifled barrel. Amazing value at **£8.19.6d.**

COMMANDO

A hunter's air rifle—an ideal fast-action gun with hunting sight for quick aim. Rifled barrel, 2-pressure trigger, tunnel foresight for protection in rough terrain—this is a hard working gun built to take hard use. Only **£9.5.0d.**

At all the leading gunsmiths and sports shops. Ask for colour leaflets.

A.S.I. *Importers and Wholesale Distributors*
Alliance House, Snape, Saxmundham, Suffolk. Tel. Snape 245.

LOOK IT COSTS YOU NOTHING

To find out more about the many interesting products advertised in this issue of MECCANO Magazine, just tick the squares against the name of the advertiser from whom you would like to receive more product information and post it to: Advertisement Information, Meccano Magazine, 13/35 Bridge Street, Hemel Hempstead, Herts.

SEPTEMBER COUPON

- ☐ A.S.I. Ltd.
- ☐ Beatties of London
- ☐ Keil Kraft
- ☐ Mainstream
- ☐ Meccano Ltd. (Dinky Toys)
- ☐ M. Mole & Son Ltd.
- ☐ Radio Control Supplies
- ☐ Radionic Products
- ☐ Royal Navy Recruiting
- ☐ Subbuteo Sports Games
- ☐ E. W. Vero & Co.
- ☐ Webley & Scott

Name..

Address...

....

Realistic industrial diesel, ingeniously converted from a locomotive in the Tri-ang "Big Big" range.
Scale drawings of Easingwold Railway No. 2.
Simple lineside huts.
Modelling North Eastern 0-4-0 tanks.
Constructing pointwork in gauge 1, by Maurice Shaw.
The Draycott Valley Railway—a tiny 009 Exhibition layout.

Model Railway News **On Sale 2nd Friday**

NEW FROM WEBLEY

YOUR OWN AIR GUN SHOOTING GALLERY!

£9-9-6 INC. P.T. MADE IN USA

Here's a new way to really improve your marksmanship — and to give you and your family hours of enjoyment. It's got everything: a bell target, two spin targets, and moving hare and partridge targets — all in a specially designed housing that safely traps your pellets. Every type of target, in fact, to really sharpen up your shooting skill. Every gallery includes a comprehensive instruction booklet, enabling you to erect it on a "do-it-yourself" basis together with a generous number of spare targets. Go and see it now at your local Webley dealer, or write to us and we'll send you all the details.

WEBLEY

The gallery which is made in the U.S.A. to Webley specification is for use with Air Guns only. The moving targets are operated by 240/250 A.C. motor and the connection is by 13 amp. fused 3 pin plug.

WEBLEY & SCOTT LTD

(incorporating W. W. Greener Ltd.),

Dept. MM/27/1 PARK LANE, HANDSWORTH, BIRMINGHAM 21.

THE REPLICA OF ASSOCIATION FOOTBALL

SUBBUTEO Regd. TABLE SOCCER

Here is a game where victory or defeat depends upon the skill of the player with fingertip control. COMPLETE with goals, balls etc. and teams available in all League Club colours. Played with 22 miniature men. All the thrills of real League, Cup and International Football: dribbling, corner and penalty kicks, offside, goal saves, etc.

PRICES 12/6 · 22/6 · 52/6

NEW SUBBUTEO *CONTINENTAL*

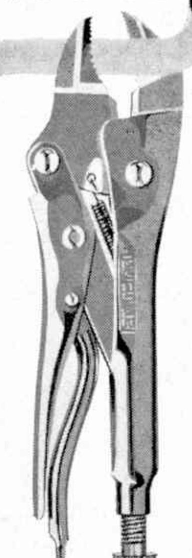
editions with 00 Scale Teams, hand painted in all League colours, on duotone coloured bases, etc.

INTERNATIONAL 125/- **CLUB 65/-**
FLOODLIGHTING 95/- **DISPLAY 32/6**

Please ask at your local Sports or Toyshop or Department Store. In case of difficulty write for literature and lists of stockists to

SUBBUTEO Dept. 5 Langton Green Tunbridge Wells, Kent

now! to aid your skill



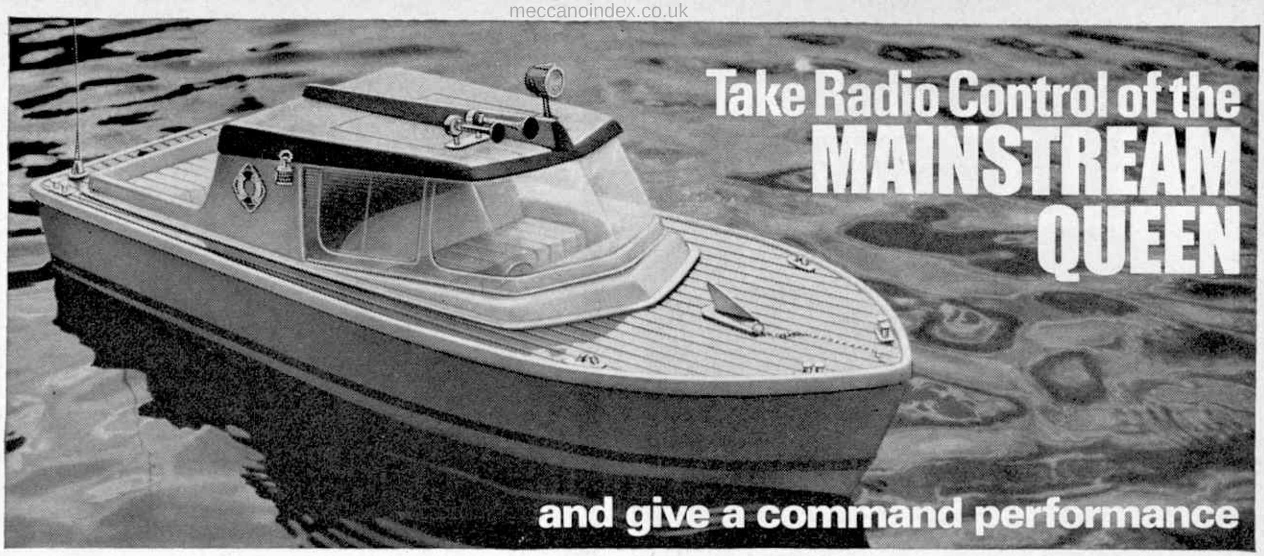
MINI MOLE

SELF GRIP WRENCH

For getting to grips with the smaller job, here's the very thing!

The pocket size MOLE Self-Grip WRENCH holds everything — round, square, flat or any odd shape — and locks on too. New on the market, it is available from hardware shops everywhere—ask for it by name. **12/6**

M. Mole & Son Ltd., Crindau Works, Albany Street, Newport, Mon.



Steer starboard, port, where you will, by simple transmitter command — over wide distances.
The Mainstream Queen is an ideal, first command for any boy (or dad); a scientific toy that simplifies control to a simple push button sequence.
She comes to you complete. Sleek, electric-powered cabin cruiser, tough, and handy in the water; control receiver and associated steerage system with batteries; and, of course, the radio transmitter with telescopic aerial, ready to switch on and bring the Queen alive. All for £22.10.0. Plus the offer of a comprehensive annual overhaul for only 15/-.
Meet Her Majesty to-day. At any good model shop.

MAINSTREAM PRODUCTIONS LTD
HALLAM STREET WORKS · HALLAM STREET · STOCKPORT · CHESHIRE · SK2 6QQ

MS10

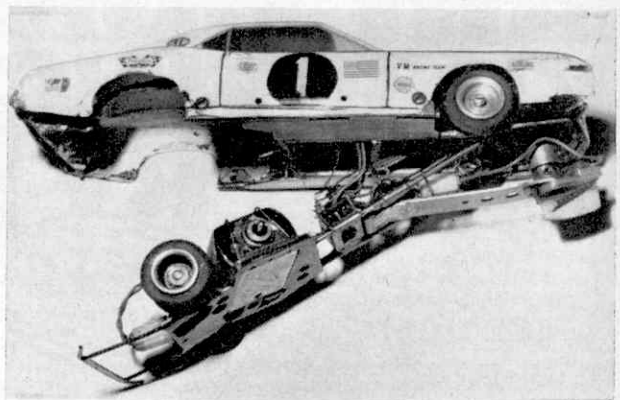
Everoak

EUROPA

This sensational internationally styled lightweight by EVEROAK is scientifically designed to be right for you in terms of safety and comfort. The EUROPA features temple protection, built-in peak, polyurethane paint finish in silver, gold or white with black/white stripes. At the competitive recommended retail price of 69'6. Approved by British Standards and now available at Halfords and local dealers everywhere.

69'6

KEEP AHEAD IN SAFETY WITH EVEROAK—other models from **65/-** *to* **110/-**
EVERITT W. VERO & CO. LTD., East Dulwich Rd., London, S.E.22



Continuing our policy of providing readers with complete details on top cars of the moment, our main feature for slot racers is a technical breakdown of the Vauxhall 24 Hours Airfix trophy winner which incorporates a multitude of ingenious time saving ideas ; features on working lights for models (in keeping with the endurance theme), Prototype Parade for the Chaparal 2G, Racing Review, and full complement of collectors' articles and features go to complete another top line number.

Model Cars **On Sale 1st Friday**

WORKBENCH

Super Model

RAY LAMB, a 28-year-old Art Director with T. B. Browne Advertising, and a military model-making enthusiast, has won for Historex the Nicholson Trophy for the best model soldier entry in the annual competition organised by the British Model Soldier Society. Using a basic Historex kit, Ray Lamb's entry was of a superbly detailed chasseur of the Guard. Hand-painted and animated, the model stands only 54 mm. high. Ray reckons that on and off he spent three months in the preparation of his entry which has excited the interest and admiration of fellow enthusiasts from all over the world.

Photographic Competition

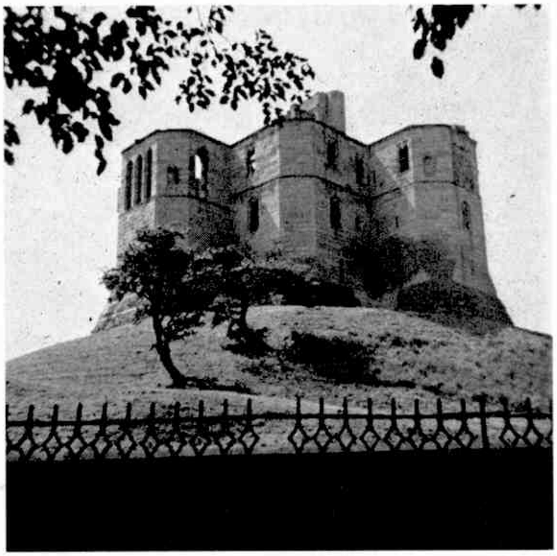
Entries for our Photographic Competition have been arriving thick and fast during the last couple of weeks, and once again the judges have been hard pressed to select a picture for our " Snap-shot of the month." Their final decision was the photograph reproduced right, taken by R. Clarke of South Shields. It shows Warkworth Castle Keep, a well preserved building at Warkworth which stands on National Trust property.

The point that finally made the judges select Mr. Clarke's photograph was the way it is " framed " by the branches at the top, and railing at the bottom. Second prize of 10s. 6d. went to Mr. Sephton of Chorley, Lancs., for his photograph of Moreton Hall, Lancs.

The prize winning HISTOREX model constructed by Ray Lamb. I think readers will agree that it is just about impossible to tell it from the real thing. Note the beautiful " dappling " effect on the rear quarters of the horse.

I mentioned earlier that the entries for our competition were good. This is in fact only a half truth ! Although entries in Group 2 (National Trust photographs) have been large, Class 1 entries (Any outdoor Activities) have been virtually non-existent ! I'm sure that many of you have some good snapshots hidden away, so why not have a look through last year's snaps, and send some along ? First prize in each class wins £2 2s. 0d. and second, 10s. 6d.

COMPETITION WINNER



Clever positioning of the camera " frames " this month's prize winning photograph of the Warkworth Castle Keep with leaves at the top and railings below. An effect which takes the eye straight to the subject.

Silly us !

Those excellent photographs which accompanyed the first " N " gauge layout *feature published in our July issue were reproduced by kind permission of PECO LTD. specialists in small scale railway modelling. Our sincere apologies for the omission of thanks.*

PRICE CHANGES

In common with the other magazines in our Hobby Group, the cover price of MECCANO MAGAZINE will be 3/- as from the October issues. Price has been held at 2/6d. since we first published in December 1967. During the past years paper, printing, block-making, postage have all gone up in price. At the same time our range of interests have extended very rapidly and it has been increasingly difficult to give adequate space to the many aspects within our cover price.

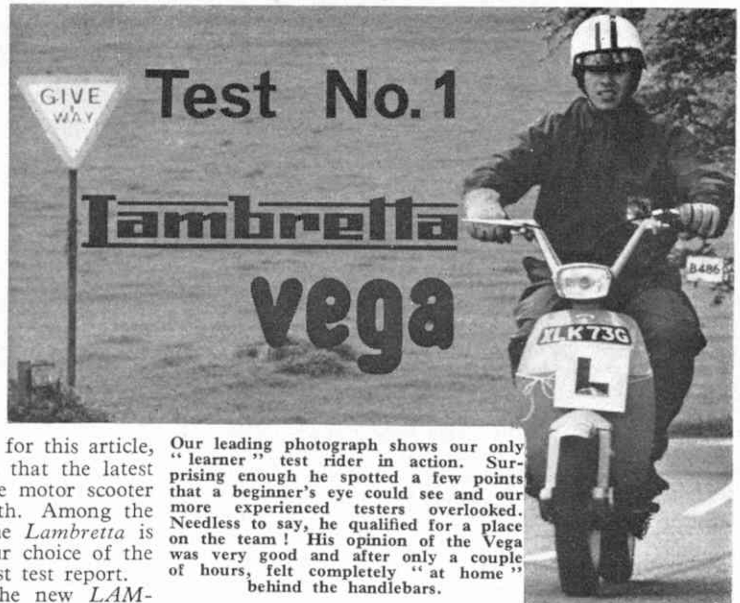
In the months to come, therefore, we hope to be able to offer readers more in their favourite departments.

Subscribers will, of course, continue to enjoy their balance of subscription at the agreed rate: new subscribers and renewals will pay at the rate of £2 1s. 0d. per annum. Dollar subscription rate remains at $5.

D.J.L.D., Editorial Director.

ON TWO WHEELS

Meccano Staff test Scooters, Mopeds, and Motorcycles



Our leading photograph shows our only "learner" test rider in action. Surprising enough he spotted a few points that a beginner's eye could see and our more experienced testers overlooked. Needless to say, he qualified for a place on the team! His opinion of the Vega was very good and after only a couple of hours, felt completely "at home" behind the handlebars.

WE THOUGHT it appropriate that for this article, the first article of a new series, that the latest means of travelling on two wheels, the motor scooter would be an ideal subject to start with. Among the producers of these machines, the name *Lambretta* is among the most well known, hence our choice of the brand new *Lambretta Vega* for our first test report.

For its engine capacity (75 ccs) the new *LAMBRETTA VEGA* is a remarkably quick little machine, and the fact that the *Vega* has no side panels, sports a large chromed silencer, and sounds remarkably like a motor-cycle tends to give it something of a dual-personality which overall we found very pleasing and gave it a definite "sporty" look.

The *VEGA* (and its sister the *COMETA*) were designed by Bertone, the Italian car design specialist and this would account for their unusual and very attractive lines. Perhaps the most "different" point that is noticed straight away, is the handlebar styling. These are cast from an alloy, and are "slotted" on the upright sections, plainly evident in our photographs.

On the handlebars are situated the horn button, engine cut-out, and lighting switches, all grouped neatly together for operation by the right hand thumb. Also on the right is the front brake lever. The left hand operates the clutch lever and twist-grip gear change (this is of course normal scooter practice). The headlamp, which contains the speedmeter and odometer (mileage recorder) is of the fashionable rectangular shape, dipped beam being excellent, but main beam tends to spread in a wide "splash" and could do with being brighter. The power for the lights etc. is supplied by magneto and therefore the faster the engine revs., the brighter the lights.

The engine

Everyone was impressed with the power this fussy little two-stroke produced. Careful use of the gears gave very nippy acceleration up to about 40 m.p.h. when it started to run out of steam. The long kick-start is a joy to use, and never failed to start the machine on the second prod, in fact first kick usually got the engine running. In the usual scooter manner the engine cooling is catered for by a ducted fan system, simple and at the same time extremely efficient.

The choke was one of the few points out testers didn't much care for. It could either be fully open, or fully closed which meant that there were no intermediate positions and therefore a rough period is created during warm up once the choke lever was released. This system, if our memories are correct, last appeared on the early "D" type Lambrettas which were discontinued 10 years or so ago.

Left: Simple, pleasing lines put the "Vega" well in front for sheer good looks.

On a rather more practical tone, note the well positioned stand, a simple device which was very easy to operate.

Above right: A low view of the powerful engine unit used on both "Vega" and "Cometa." The long lever extending from left to right is the kickstart, and the small perforated "box" above, the air cleaner.

Above, centre: Opposite side of the engine shows the large sports silencer complete with leg guard. The cooling fan and its protective casing can be clearly seen. Note easy access to the rear wheel.

The bodywork

As we said earlier, the *VEGA* has no side panels. This makes for less possible damage should it fall over, although with its excellent two-leg stand this should never occur. The leg shields are short, round slightly, and raked back around half way up. They extend rearwards too, from the footboards. The fuel tank is situated under the dual seat and holds 1⅓ gallons, enough for 130 miles!

The footbrake, although effective, was on our model, very fierce, and had to be treated with great care. It also braked unevenly, particularly noticeable when a passenger was carried. Whilst on the subject of passengers, short people may have difficulty reaching the foot boards, which tend to finish rather too far forward for short legs!

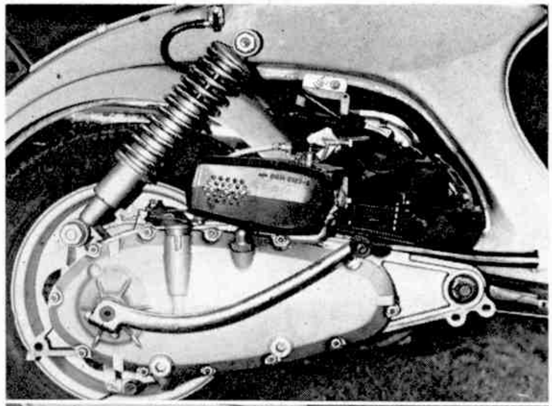
The gearbox

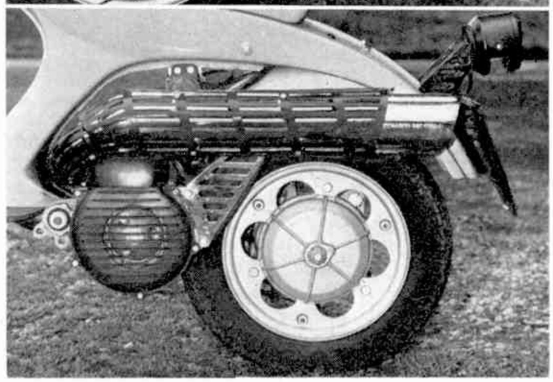
The gearbox, controlled from the handlebars, is a four speed one and worked very well on our model, although as with all cable controlled types, was rather stiff to operate and it was difficult to "feel" the gears going in. The transmission is completely gear driven and like the clutch very smooth.

Summary

A very surefooted, lively if rather noisy scooter. Great fun to ride and very willing. Generally our test riders were very keen on it, and all would have liked to try it out across a ploughed field. (Those sporty looks again!) The VEGA costs £142 including tax and in the light of today's prices would seem to be good value for money. Still on the subject of money, both the VEGA and the COMETA are available on "no deposit" terms from all LAMBRETTA dealers, a unique service which will enable would be buyers to purchase with the minimum initial cash outlay. Our machine wasn't fully run in but we would think that the makers top speed of 60 m.p.h. + rather optimistic. We would guess that 50-55 m.p.h. would be a safe (engine wise) top speed.

Extras, supplied with the machine include a stop-light and steering column lock.





Accessories

As with all *LAMBRETTA* scooters there are a good range of extras available. Spare wheel, luggage carriers (2 types) rubber footboard mats, mirrors, crash bars and a back rest.

COMETA

The sister machine to the *VEGA* is the *COMETA* (75 ccs) with separate petrol and oil supplies. The price of the *Cometa* is £152 . 10 . 0 including tax.

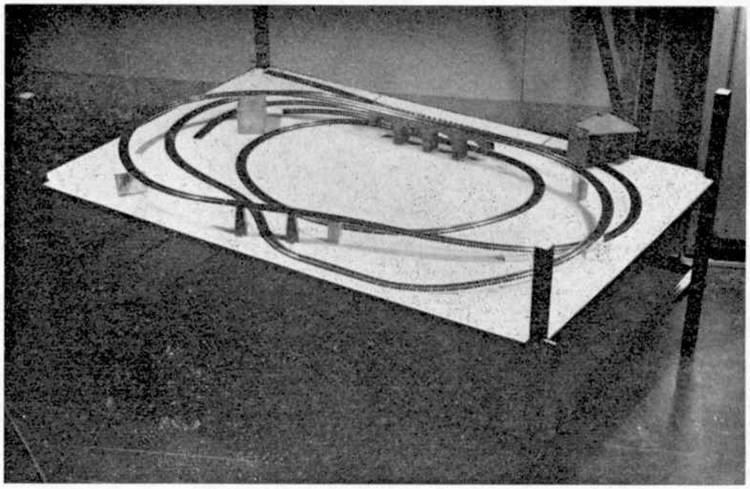
FOR THE TECHNICALLY MINDED

		VEGA & COMETA
Cubic capacity		**75**
Maximum power		**5.5 bhp**
Consumption (per gallon)		**130 miles**
Weight		**146 lb.**
Gear ratios		**1st 19.27 : 1**
		2nd 12.52 : 1
		3rd 9.29 : 1
		4th 6.90 : 1
Tyres		**3 × 10**
Lubrication	**VEGA**	**COMETA**
	Through petrol mixture at 2% of oil.	**Through "lube-matic" oil injection system.**

Commons dimensions: length 65½ in., width at handlebars 26 in., height 42½ in., seat height 31½ in., wheelbase 47½ in.

Available colours: Astral blue, Venus green, Yellow Ochre, Martian red.

BUILDING AN "N" GAUGE LAYOUT PART III

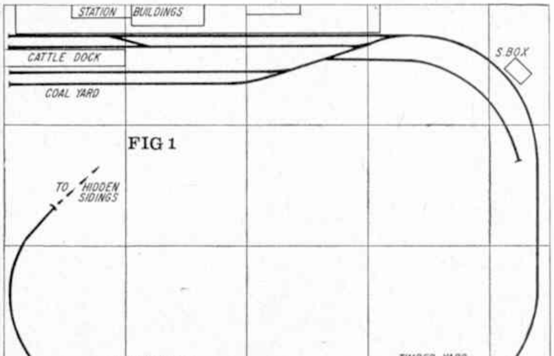


TRACK FORMATIONS

by P. Tomlinson

LAYOUTS THAT grow from train sets usually include a single oval of track with perhaps one or two points to a siding or loop. As good a way as any for you to begin, but trains can only go round chasing their own tails, and this very soon loses its appeal. You will find that it pays to sit down with paper and pencil and doodle various track plans, and what I intend to do this month is to present various track formations that you could build, together with suggestions for the operation of trains.

It is unfortunately impossible to model any ordinary station from actual life, absolutely to scale, because of the space that would be needed. An ordinary country station, for example, modelled in "N" Gauge, would probably require a length of over ten feet in itself!



Naturally, when larger stations are tackled, the area increases proportionately.

When you first try your hand at layout design, you are likely to fall into certain errors that can quite easily be avoided. In the first place, you will probably imagine you are planning for all time, and that your layout should be so perfect as to need no subsequent alteration. There is no such ideal layout, and indeed the satisfaction of re-designing your layout can occasionally be far more stimulating and rewarding than the original work. The best layouts are always those that have been improved and extended. After all, we only discover our errors by making them!

Even a small "N" Gauge layout on a 3 ft. by 4 ft. baseboard however can be equipped with a prototype track formation, and although the facilities will obviously be limited, they can nevertheless provide the basis for shunting and running movements.

A temptation that must be avoided is that of over-complicated trackwork, which may look very imposing, but which will need endless care. Another danger is that of over-crowding the layout to such an extent that it assumes the appearance of a dog's dinner! It is also a good idea to conceal some of your track in tunnels.

However simple or complicated a layout, imagination must be used in order to run the trains. In full size practice, of course, the railway conveys the traffic that is offered. On a model railway however, there are no passengers to book, and no traffic to consign. We are the passengers, the consigners, the consignees, the railway commercial department, the stationmasters,

Our heading photograph shows an "N" gauge layout in its early stages of construction.

Fig. 1: One of the simpler layouts incorporating two stations, one main line and a few sidings.

Fig. 2: A slightly more complicated layout with two main lines. A non-stop express could be run here.

Fig. 3: A more complex layout with available track for an express and branch line. The dotted lines are extensions that can be added latter, or used as alternatives.

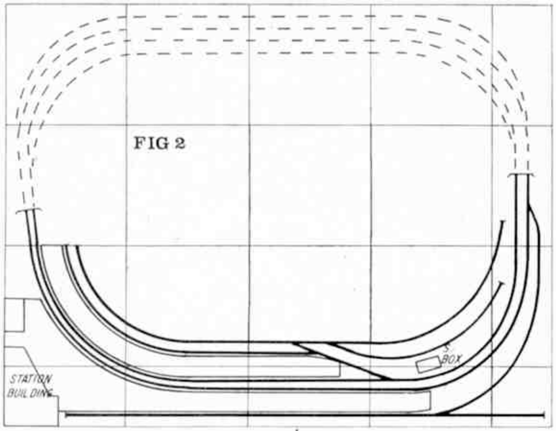
driver, signalman, shunter and porter, all rolled into one. For a model railway to be worked like a full size one, it must have a reason for its existence, which is where our imagination must be used. We have created a railway and we must create its theoretical background.

A branch line layout must have a junction with a main line so that through traffic can be worked and connections made. The junction end of the layout need not be modelled—hidden sidings inside a tunnel under a hill are perfectly adequate. A branch is most likely to serve a rural district or agricultural community—perhaps a small market town at its terminus with one or two villages between this and the junction with the main line. This is the most popular type of layout and can be worked by old engines and coaches, or diesel multiple-units. Let us assume, for the purposes of this description, that the layout is modelled on the lines set out in Fig. 1. The railway appears from the hidden sidings in the tunnel, passes through a village station and proceeds to its terminus at the market town. The village station has a siding connection which serves a nearby timber yard or milk depot, and the market town has a single platform road and a small goods yard. A large manufacturing town, represented by the hidden sidings, exists at the junction with the main line about ten miles away.

Passenger trains will therefore be needed for people working in the large town. In fact there should be enough passengers to justify running a three or four coach train to the junction in the morning and back in the afternoons. Also a two-coach train each way at mid-day would cater for people from the outlying villages. Freight traffic also has a definite pattern. Coal, foods, machinery, manufactured goods and certain perishable traffic will arrive at the market town, while outgoing traffic will consist of farm produce, livestock and timber. Extra trains will be necessary on market days, with parcels vans and horse boxes attached to the end of some of the passenger trains.

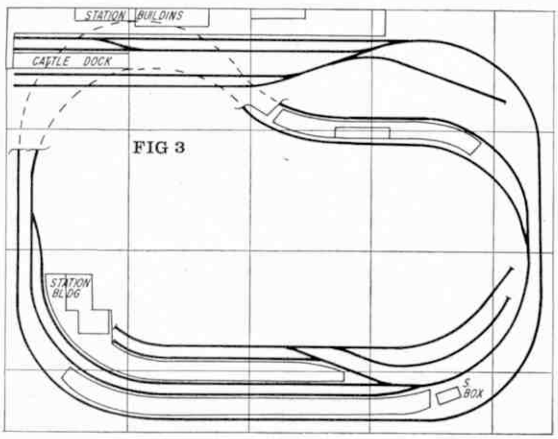
Trains themselves could consist of two-coach suburban sets, doubled at peak hours, with a spare coach available for strengthening the service on market days. One or two parcels vans and horse boxes, together with a selection of goods wagons complete the rolling stock. For locomotives, and 0-6-0T, 0-4-2T or 2-6-2T would be suitable for handling all the local traffic, while an 0-6-0 tender goods locomotive and a 2-6-0 might be useful for through traffic to the main line. On modern layouts two-car diesel multiple units and a type 1 Bo-Bo diesel would be ideal.

If you prefer running main line traffic with non-stop expresses tearing round the layout at high speed, then a main line through station would be the principal feature of the layout. It can be situated on a continuous double track main line so that trains can be run for lengthy periods, but the layout will also lend itself to prototype operation with sequence or timetable operation. Such a scheme is illustrated in Fig. 2. The station could serve an industrial town, while other towns and cities along the route are represented by storage sidings. Several express trains would operate during the day, with probably an extra two or three trains in the morning and late afternoon, forming a "rush hour." To add interest some trains could terminate at the station itself so that shunting and other movements become necessary before the train can make the return journey.



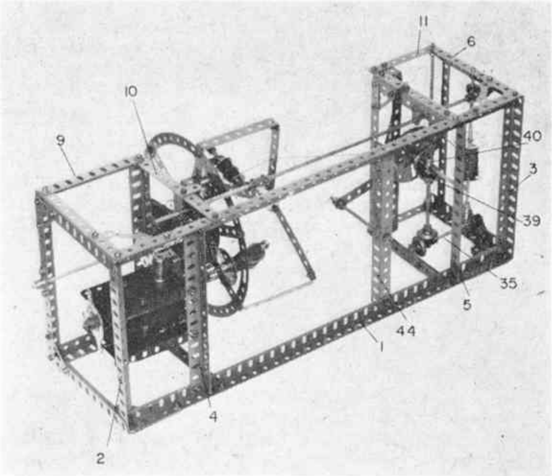
However, the operation of such a main line layout can be made far more interesting and varied by converting the through station to a branch junction and adding a complete branch line. There is endless scope for the operation of express trains on the main line through such a station. Some could call to make connection with the branch passenger trains or even to pick up through coaches from the branch. Parcels trains could be run, and freight traffic would be as varied as your rolling stock would permit. General freight trains conveying mixed loads can stop at the junction yard to exchange wagons and traffic for the branch. Motive power can also be as varied as you like. A simplified version of this type of layout is shown in Fig. 3, and this will form the basis for the "N" Gauge layout that I will begin building and describing next month.

In the meantime, those of you interested in this project might care to obtain some squared paper and draw out a scale plan of the baseboard surface, and also sketch out numerous layout designs to fit the available area. Many books and articles on scale layout plans have been published, and from these you may find a design that suits your needs best. You can however copy the design in Fig. 3 and follow my instruction if you so wish. Finally, draw out the ultimate design to as large a scale as possible and make quite certain that nothing is over-crowded or cramped in too-small an area.



TAYLOR'S ROPE-MAKING MACHINE

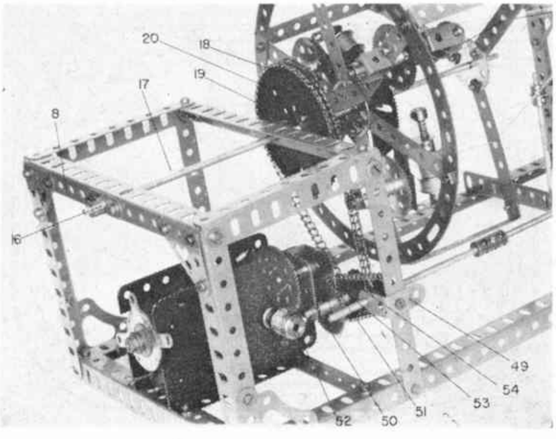
A genuine working model described by **Spanner**



IN MECCANO model-building, the term "working model" is generally used in a way which the true English scholar would regard as incorrect. We, in the hobby, use it to describe a model which incorporates movement, or one which reproduces the *actions* of the full-size machine on which the model is based, but we do not necessarily mean that it performs the actual *work* done by the original. Described here, however, is a model which does qualify as "working" in every sense of the word—a Rope-Making Machine, designed and built by Mr. Harold H. Taylor of Huddersfield, Yorkshire. Not only does this incorporate movement, but it also produces a very good, single "rope" (miniature, of course !) from half a dozen strands of thread !

As a matter of interest, regular readers of Meccano Magazine will be extremely familiar with Mr. Taylor's work, although I doubt if many of you realise it. The fact is that most of the models we feature in these pages are supplied by Mr. Taylor, who has been building models for us for many years. He never seems to run out of ideas and I should like to take this opportunity of thanking him for his invaluable assistance.

To get down to the construction of his Rope-Making Machine, however, a framework is produced from two 18½ in. Angle Girders 1, joined at one end by a 7½ in. Angle Girder 2 and, at the other end, by a similar 7½ in. Angle Girder 3. Two further 7½ in. Angle Girders 4 and 5 are also fixed between Girders 1 in the positions shown, then four 5½ in. Angle Girders 6, strengthened by Corner Gussets 7, are bolted one to each corner of the resulting framework.



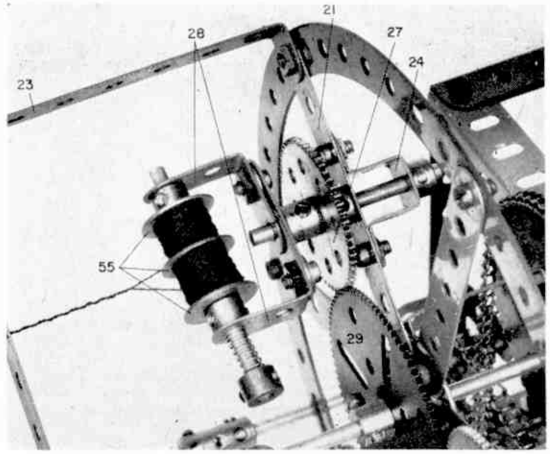
The two Girders 6 at the same end of the framework as Girder 2 are joined at the top by a 7½ in. Angle Girder 8, 1½ in. Corner Brackets being used to strengthen the join, while fixed horizontally to the top of each of these Girders 6 is a 4½ in. Angle Girder 9. The inward ends of Girders 9 are joined together by a 7½ in. Angle Girder and are also secured to corresponding Girder 1 by 5½ in. Strips 10.

At the opposite end of the framework, Girders 6 are connected through the second holes from the top by a 7½ in. Strip, whereas a 3½ in. Strip 11 is attached to the top of each Girder by an 8 in. Rod held in place by Collars. Strips 11 are themselves connected to Girders 1 by 5½ in. Strips 12, to each of which a 4½ in. Angle Girder 13 is bolted. The top holes of Girders 13 at each side are connected by a 7½ in. Strip 14, 1½ in. Corner Brackets again being used to strengthen the connections. Strips 11 at each side are themselves connected by a 7½ × 1 in. compound double angle strip built up from two 1 × ½ in. Angle Brackets joined by a 7½ in. Strip 15.

Fixed in the boss of a Double Arm Crank 16, bolted to Angle Girder 8 is an 11½ in. Rod 17 which projects forward through the centre hole of the Girder joining Girders 9. Mounted on this Rod is the revolving structure carrying the bobbins of thread from which the "rope" is wound, but it is better to build up this structure separately before fitting it to Rod 17. Two 1½ × ½ in. Double Angle Strips 18 are bolted through diametrically opposite holes to a 3 in. Sprocket Wheel 19, a 6-hole Bush Wheel 20 being bolted to the free lugs of the Double Angle Strips. Bolted, in turn, to this Bush Wheel are six radiating 3½ in. Strips 21, to the ends of which a 7½ in. Circular Strip 22 is secured, at the same time fixing a 3½ × ½ in. Double Angle Strip 23 to the end of every *second* Strip, as shown. Also bolted to the centres of these same Strips are three

Above: This model produces from six strands of thin thread, a single miniature rope. This view shows the basic assembly. Left: A view of the initial drive system. Note: the chain here must not be too tight.

Right: A close-up view of one of the thread bobbins.
Below: A close-up view of the revolving bobbin structure, on which the six bobbins are mounted.



Double Bent Strips 24, while three 3½ in. Strips 25 are secured one to the free lug of each Double Angle Strip 23. The other ends of Strips 25 are bolted to a 6-hole Wheel Disc 26.

Journalled in each Double Bent Strip 24 and respective Strip 21 is a 2 in. Rod, held in place by a Collar and a 57-teeth Gear Wheel 27. A Double Arm Crank, to which two 1 × 1 in. Angle Brackets 28 are bolted, is fixed on the Rod immediately in front of Gear 27, the bobbins of thread later being mounted between the free lugs of Angle Brackets 28. These should not be dealt with until the rest of the model is finished, however.

At this stage the structure—without the bobbins—is mounted on Rod 17, a 2½ in. Gear Wheel 29 being added to the Rod before the Rod is located in the centre hole of Wheel Disc 26. This Gear Wheel is fixed on the Rod and serves to hold the revolving assembly in position, but *note that, Sprocket Wheel 19 and Bush Wheel 20 must be free to turn on the Rod.* Gear Wheel 29 engages with Gear Wheels 27.

Take-up Roller and Drive System

Incorporated in the model is a powered take-up roller for the finished "rope" and a simple, but rather ingenious guide arm which distributes the "rope" evenly over the roller. The roller consists of a Sleeve Piece over a Chimney Adaptor and a Socket Coupling, in one side of which an 8-hole Bush Wheel 30 is fixed by a Grub Screw. All are mounted on an 8 in. Rod 31, together with a second 8-hole Bush Wheel 32, a Worm 33, a ½ in. Pinion 34 and two Collars, the latter serving to hold the Rod in its bearings, these being supplied by the centre holes in appropriate Angle Girders 6. Bush Wheel 32 is clamped against the Sleeve Piece.

In mesh with Worm 33 is a ½ in. Pinion on a 4 in. Rod 35 journalled in two 1 in. Corner Brackets 36, one bolted to nearby Angle Girder 6 and the other to nearby Angle Girder 13. Also mounted on the Rod is a fixed ⅞ in. Bevel Gear, a loose Coupling 37 and a Collar. The Rod passes through one end transverse bore of the Coupling to leave the longitudinal bore free for a 3½ in. Rod which carries two further ⅞ in. Bevel Gears 38 and 39. Bevel 38 meshes with the Bevel on Rod 35. The Rod is, of course, free to turn in the bore of Coupling 37, its other end being free to turn in the longitudinal bore of another Coupling 40, mounted transversely on a 5 in. Rod held by Collars in Strip 15 and Angle Girder 5. Another Collar holds the Coupling in place.

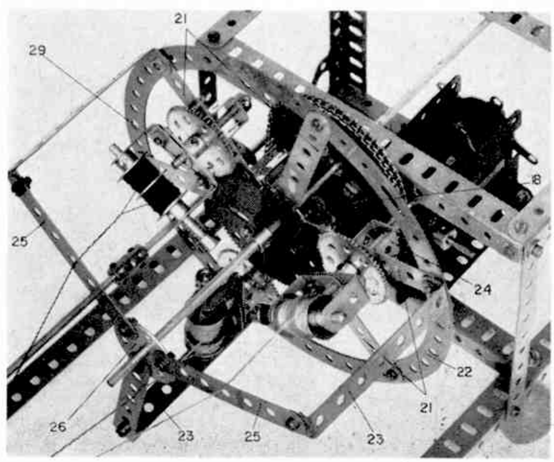
Fixed on the Rod above the Coupling is another ⅞ Bevel Gear, meshing with Bevel 39, and a Face Plate 41, in diametrically opposite holes of which two Threaded Pins are secured. In contact with these Pins is a 5½ in. Strip 42, held by Collars on a 3½ in. Rod fixed in a Rod Socket 43. This Socket is, in turn, fixed to a 7½ in. Angle Girder 44 bolted between Girders 1. A ½ in. Reversed Angle Bracket 45 is bolted to the end of Strip 42, the Strip itself being held against the Threaded Pins by a 6 in. Driving Band looped over a ⅜ in. Bolt fixed in nearby Angle Girder 13.

In mesh with Pinion 34 on the roller Rod is a Worm secured on an 11½ in. Rod 46, held by a Collar in two 1 in. Corner Brackets 47, one fixed to appropriate Girder 6 and the other to nearby Girder 13. Rod 46 is extended via a Coupling, by a 4½ in. Rod carrying a ¾ in. Sprocket Wheel 48 and is journalled in a 1 × 1 in. Angle Bracket 49.

Now bolted to Angle Girders 2 and 4 is an E15R Electric Motor, to one sideplate of which a Channel Bearing 50 is fixed. Held by a Collar in this Channel Bearing is a 1½ in. Rod carrying a ¾ in. Pinion 51 and a 57-teeth Gear Wheel 52, the latter meshing with a Worm fixed on the output shaft of the Motor. Pinion 51, on the other hand, meshes with a 50-teeth Gear Wheel on another 1½ in. Rod journalled in Channel Bearing 50, this Rod also carrying two 1 in. Sprocket Wheels 53 and 54. Sprocket Wheel 53 is connected by Chain to Sprocket Wheel 48, while Sprocket Wheel 54 is connected to Sprocket Wheel 19.

This brings us to the actual thread bobbins, two of which are incorporated in each of the three previously-described holders. Each twin-bobbin unit consists of a 2½ in. Rod carrying three ¾ in. Washers 55 and held by Collars in the free lugs of Angle Brackets 28. A Tension Spring is slipped over the projecting end of the Rod and held in place by a Collar to serve as a light friction brake, thus preventing the Rod from turning too readily. The thread should be wound in identical lengths between the first and second, and second and third Washers, each bobbin being wound separately, with a Spring Clip being used as a "stop" for the

Continued over page



Meccano Rope Making Machine

PARTS REQUIRED

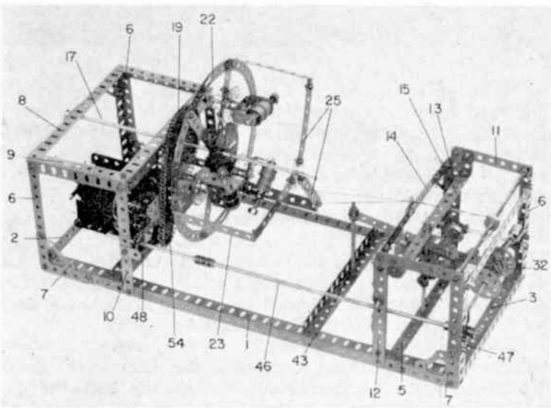
3—1b	3—16a	114—37b	1—109
5—2	3—17	30—38	1—111c
11—3	2—18a	9—38d	2—115
2—7a	1—23	3—45	3—120b
6—8b	2—24	2—48	1—125
4—9	1—24b	3—48b	4—133
7—10	1—24c	25—59	4—133a
7—12a	1—25	4—62b	1—145
2—12b	3—26	2—63	1—160
2—13	1—27	1—63d	1—163
2—13a	4—27a	1—94	1—164
1—15	1—27c	1—95b	1—171
1—15a	4—30	2—96	1—179
1—15b	3—32	1—96a	1—180a
2—16	115—37a	4—108	1 E15R Motor

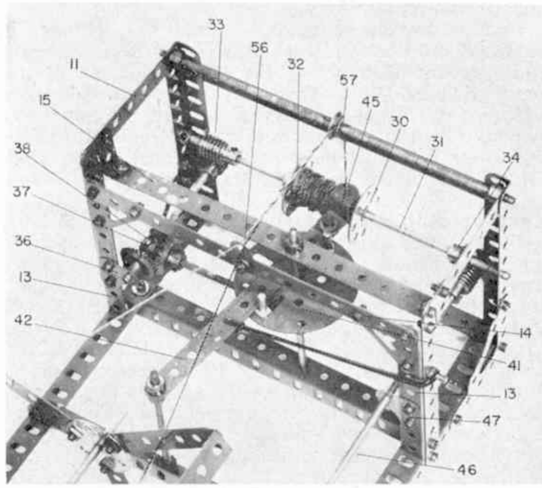
centre Washer while the first bobbin is being wound.

When all six bobbins have been wound, the threads from the two bobbins in each twin-unit are twisted together and passed through the centre hole of appropriate Strip 25. From there, the threads from all the units are threaded through the circular hole in a Fishplate 56 (bolted to the centre of Strip 14), passed over a ½ in. loose Pulley 57 on the upper Rod journalled in Angle Girders 6, threaded through the hole in the free lug of Reversed Angle Bracket 45 and are finally attached to the take-up roller to complete the model.

Below left: A general view of this amazing model.

Below: A view of the take-up roller and its drive system.





Look High... Look Low

Dinah Lawrence

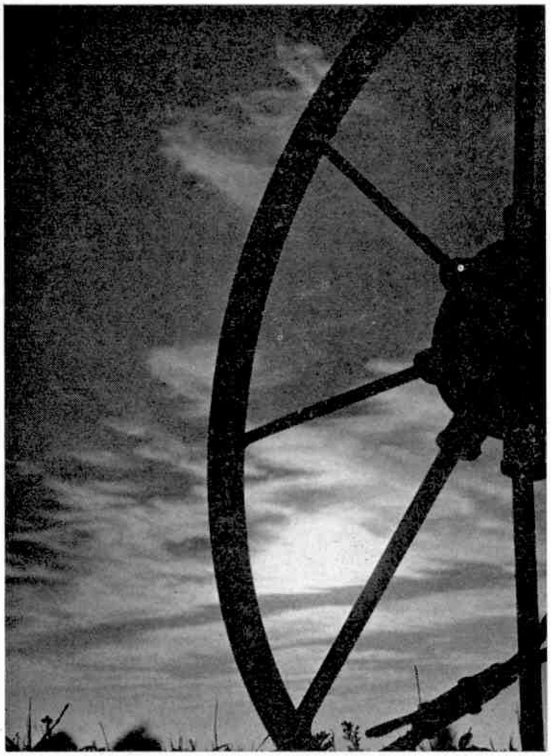
ONE OF the chief reasons for dull, ordinary pictures is due to the fact that they have been taken from a dull and ordinary viewpoint. It's only too clear that the photographer has stood a few feet or yards away from the subject, held the camera either at waist or eye level—and just fired away.

If you want your pictures to be out of the usual rut you must be adventuresome with viewpoints. Learn to look at your subject from all angles, don't be afraid to experiment, look HIGH and LOW for your pictures !

For instance, UNTIL TOMORROW was taken when I was lying flat on my stomach in a field and pointing the camera slightly upwards. I took the picture from this position because I wanted to get the dramatic effect of the wheel " towering " against a sunset sky.

This brings me to another point worth remembering, a photograph taken against the light will often give you very dramatic pictures, especially if taken with the sea or a stretch of water in the foreground.

In the case of THE LITTLE WHITE CLOUD, the camera was held above my head, with the lens pointing straight up to the sky: in the case of SUMMERTIME, the camera was again pointed upwards, but not so high, and it was held at ground level.



When taking pictures against the light, or by pointing your camera upwards, you must use a lenshood to shield the glare, or unwanted light, from your lens, and you must also be careful about the exposure time. To over-expose is all too easy, so use a fast shutter speed whenever possible, or if you prefer a smaller stop.

The use of a filter helps to add drama to the sky or clouds.

If you have an exposure meter, do use it for taking this kind of picture, but remember it may be inaccurate insomuch as the meter will measure the light reflected by the sky or sun and won't consider the subject matter in the foreground, and unless you want a silhouette type of picture as in THE LONELY SEA AND THE SKY, you must allow accordingly.

This can be done by taking two meter readings, one by pointing the meter upwards toward the sky, and the other by pointing the meter at the subject in the foreground, and then splitting the difference in the readings.

If you want the sky as the most dominant feature of your picture, then simply point the meter at the sky and take a reading in the normal way.

Apart from choosing a very high or very low viewpoint from which to take your pictures, do remember to "get in close"; it's no use standing yards away from your subject and including loads of superfluous background. Fill your negative space with all the picture you want and no more! This is much better than having a section of the negative enlarged later.

One final word: do watch backgrounds and foregrounds. Remember that whereas you will see only what you want to photograph, the camera is less discriminating: it sees everything! While you may not have noticed that odd twig or gate-post placed just behind the subject of your interest, the camera has—and worse has recorded it on the negative.

Look out, then, for branches of trees, bits of paper, cigarette cartons, bricks, lumps of wood, bottles, strands of wire, tins etc which can ruin an otherwise excellent picture.

By taking time and trouble in the first place, you will save a lot of wasted film and wasted effort.

Our heading photograph is entitled The Little White Cloud. It was taken with the camera pointing straight up to the sky.

Above left: Until Tomorrow was taken from the ground position, with the camera pointing slightly upwards.

Left: The effect on The Lonely Sea And The Sky was achieved by using a medium yellow filter.

Below: With Summertime the camera was again held at ground level and pointed slightly upwards.

WORLD-WIDE COMMUNICATIONS VIA SATELLITES

C.A.RIGBY

The story behind the equipment that enables us to communicate with other countries

THE WORLD has seen many developments in science, lately, In particular, world-wide communication employing satellites now promises to be revolutionary. In the November number of Meccano Magazine last year, I wrote about weather satellites and their uses for this purpose. I also mentioned 'probes,' including satellite balloons, and I will continue from this point, since satellites are now becoming so very important especially in world-wide communication systems.

They are also used for photographic transmissions. For example, the 'Nimbus' weather satellites also transmitted photographs of various places such as the Suez Canal, and the Western seaboard of North America. Pictures of the moon's craters have also been obtained. During July 1965, Mariner IV, never nearer than 6,000 miles, sent back the first TV pictures of Mars, each of which took eight-and-a-half hours to transmit. Mariner VI and Mariner VII were launched last February and March, respectively, to take advantage of this year's near approach (to about 60-million miles) of the Red Planet to the earth.

On July 29th this year, Mariner VI may well be approaching the planet in preparation for a fly-past mission at an altitude of 2,000 miles. In this way, scientists at Goldstone Tracking Centre, California, hope to get TV pictures of Mars as a whole, including the first close-up shots of Phobos, one of the two moons that orbit the planet. Photographs of Venus have also been attempted. Satellites are also used now for other

Our heading photograph shows Goonhilly 2, Britain's latest space communication station.
Right: The aerial structure for the Satellite Earth Station on Ascension Island.
Below: A diagram of "Telstar" showing the main features.
Photographs courtesy of The Marconi Co. Ltd.

purposes, such as guiding ships, etc.

With the launching of these, their uses as space communication stations began to take shape; and more so with the growing popularity of television and its helpmate subject, electronics. The first attempt to reflect or "bounce" signals from the moon were made before World War II in the U.S.A. by the National Research Laboratory, but these were unsuccessful. The first successful attempts which encouraged others seems to have been made in Hungary in 1946, using war-time radar equipment, and this was followed by further work in Australia, England, and the U.S.A. In 1958, 'speech echoes' were obtained by Trexler at the National Research Laboratory in the U.S.A., and then by Professor Lovell at Jodrell Bank Experimental Station near Manchester.

On May 15th, 1959, for the first time in history, speech was transmitted by radio from England to America by reflection from the moon. This historic demonstration took place when special radio transmissions were beamed from the Jodrell Bank Radio Telescope towards the moon, where they were reflected and subsequently received clearly and consistently 2½-seconds later at the U.S. Air Force Research Centre in Cambridge, Massachusetts. Again, using the same technique, on February 24th, 1961, engineers working in conjunction with scientists actually succeeded in sending messages from England to Australia.

With the successful reception of radio transmissions from various satellites, as well as the American development of bouncing radio signals from a satellite space balloon on August 12th, 1960, the principle of space communication was proved. This satellite, a 10-ft. aluminium-coated balloon with a 'skin' half as thick as an ordinary cellophane wrapping, was launched by a three-stage rocket in a container which split into two when ejected. Its skin of aluminium reflected radio

signals, and it was as bright as Vega, the brightest of all stars. This was considered the first step towards the development of a revolution in world-wide communication, enabling TV and radio programmes as well as telephone conversations to be beamed to any part on earth.

The first message was sent from New Jersey to California via the balloon 1,000 miles in space. Then a signal was transmitted from a radar site at Trinidad, West Indies, as the satellite passed overhead, and reflected back to the Air Research and Development Command's receiving station in Floyd, New York, the signal having travelled more than 4,200 miles.

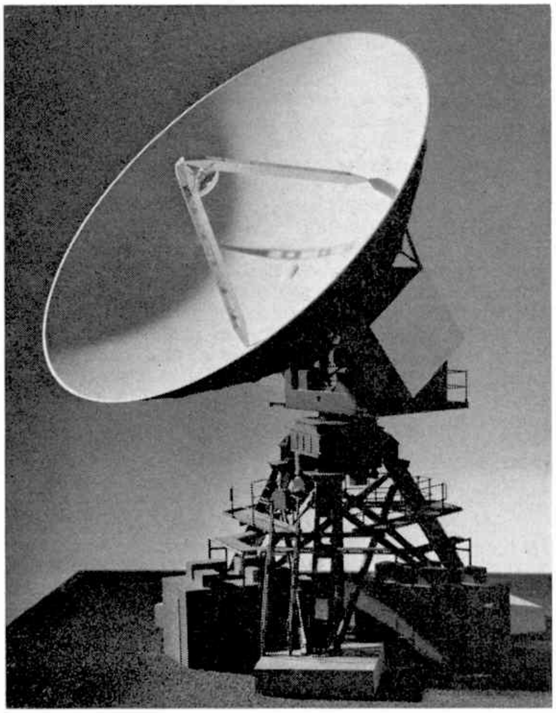
And so it was on July 10th, 1962, when another eventful use of satellites was successfully tested for transmitting TV pictures from America, thus making possible, with wider experience and application of principles, the transmission of events from other parts of the world. Since that time, 'Telstar' has helped in many TV transmissions and even made possible long-distance telephone calls, thus cutting the cost of calling countries like America and Australia. Of course, there was a great deal of work to do before this wonderful project could be completed successfully.

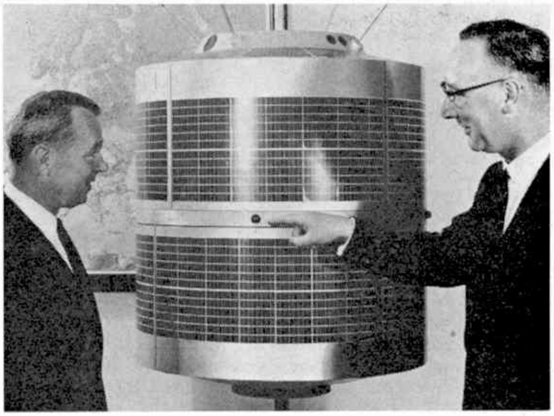
Because of the need for satellites in such a system, there were many problems to face, since they may be 'active' or 'passive' and may be placed in orbits of different height and shape. They may take up positions in 'stationary' orbit, by keeping pace with the earth's rotation, and they may use any frequency from 1,000-10,000 Mc/s. and employ a variety of bandwidths and modulation systems. And besides this, suitable ground receiving stations are required.

The site chosen for the British GPO ground station most suitable for the trans-Atlantic path, was at Goonhilly Downs in Cornwall. An 85-ft. diameter steerable radar 'dish' aerial after the style of those used in radio telescopes is in use, the rotating part weighing some 800 tons. This site was chosen because its latitude is convenient for satellites in equatorial orbits, and for other reasons. The aerial is also used for transmitting, and located in a cabin at the back is a special arrangement known as a 'maser' which amplifies signals received. Later, a more powerful transmitter was used, and the original maser was replaced with one allowing a wider bandwidth.

In the building itself, there is a great deal of complex equipment, including apparatus for generating both still and moving pictures, using British, European and American standards. Test equipment also makes possible up to 600 telephone circuits to be simulated for transmission, TV pictures being transmitted by microwave link to and from Goonhilly by the GPO network via Plymouth for subsequent broadcasting by the BBC and ITV. The station also makes use of a computer, using paper tape, to predict the satellite orbit in advance.

Telstar I was launched from Cape Kennedy (27½° N. Lat.) on July 10th, 1962, with the successful reception of transatlantic TV by both the British station at Goonhilly, and the French space receiving station at Pleumer-Bodou, near Lannion, on the Breton Coast. One of the most remarkable box of tricks ever to be launched, in an egg-shaped track 600 miles at the lowest part and its farthest 3,500 miles, and spinning 180 times a minute, it girdled the earth every 157 minutes, carrying receiving and transmitting equipment, also amplifying gear to boost signals up to 2,000 million times. Since that time two way telephone calls between the American ground station at Andover (Maine), and Goonhilly proved to be of good quality and free from noise and interference. Subsequent technical tests proved that Telstar could carry several hundred telephone calls simultaneously.





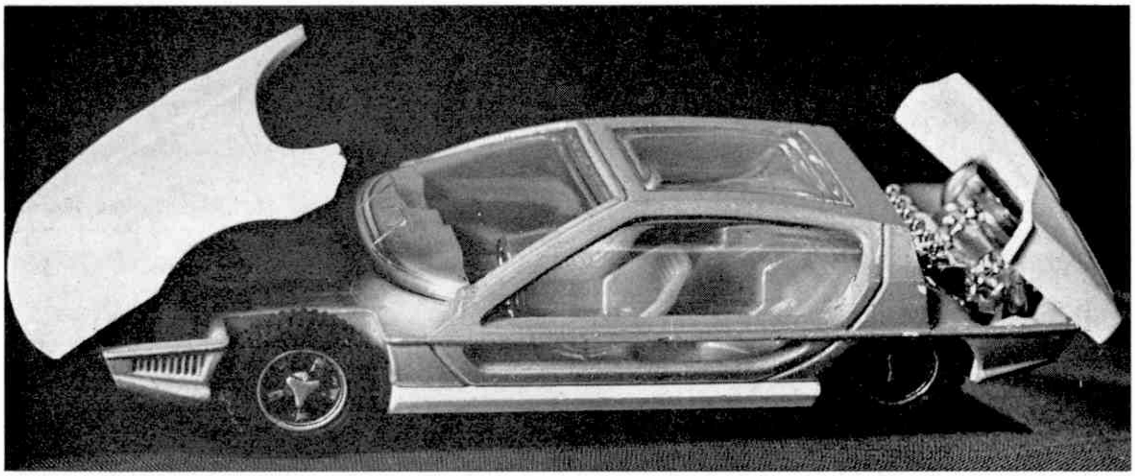
Later on, the satellites 'Relay' and 'Telstar II' were launched for testing purposes in higher orbits. With further experience, and the launching of a stationary satellite 'Early Bird' over the Atlantic in 1965, it was expected that the telephone services in Britain and France, and possibly West Germany (with a ground station at Raisting in Bavaria) with overseas countries would be extended and considerably improved. As a preliminary to this, the 'Syncomm III' communications statellite planned to relay pictures of the Olympic games from Tokio was launched into stationary orbit over the Pacific Ocean.

The British Post Office has now brought a new aerial into service at its Goonhilly ground station, less than seven years after its first spectacular experiments with Telstar. This installation, Goonhilly, 2, will maintain a leading role as an earth station in the expanding system of global communications via Intelsat III satellites in synchronous orbits over the Pacific, Atlantic, and Indian Oceans. Goonhilly I is being refurbished to communicate with countries to the East and is expected to come back into service as soon as an Intelsat III satellite is available over the Indian Ocean. Meanwhile, the new aerial will cater for a further expansion of the trans-Atlantic service. This has become possible because an Intelsat satellite has been substituted for 'Early Bird' over the Atlantic Ocean, whereas, 'Early Bird' is capable of linking together only two earth stations and handling no more than 240 telephone conversations in one TV programme, these satellites have facilities which provide flexible interconnections between a number of ground stations.

With so many advantages to be gained, ground stations are now being erected in other parts of the world, including East Africa. Even on Ascension Island, in the South Atlantic, a special earth station was erected to act as a vital link for the American APOLLO 'moon-shot' programme.

Above: The ESRO 1 Satellite first launched from the Salto di Quirra range in Sardinia on November 22nd 1968, by the European Space Organisation of a fully stabilised sounding rocket payload carried an experiment designed to probe solar storms and assess the amount of X-ray radiation emitted from them. An understanding of such storms may also enable short-wave radio blackouts to be predicted. *Photograph courtesy Standard Telephones & Cables Ltd.*

Left: A scale model of the satellite communications ground station built on Ascension Island in the South Atlantic for Cable & Wireless Ltd. to provide a vital link for the American APOLLO moon-shot programme. *Photograph courtesy The Marconi Company Ltd.*



DINKY TOY NEWS *by Chris Jelley*

COACH BUILDER Nuccio Bertone is a man known in motoring circles throughout the world for his sleek, dashing and tremendously attractive car designs. Bertone is Italian and this fact is significant as Italy tends to lead the rest of the world in car design or, at least, in car bodywork design. Many of today's really striking cars are either Italian-made or Italian-inspired, even if made elsewhere. The design of our own B.M.C. cars, for example, was revolutionised a few years ago by an Italian—Pininfarina—but of all Italian designers, Bertone has a special claim to fame. To the best of my knowledge, he is the only man who has designed a "dream car" and then seen his dream car come true! The dream car in question?—The fabulous Lamborghini Marzal!

When the Marzal was at the drawing board stage it was a sort of dream; a nameless personal exercise without any specific objective in mind. Bertone did not have any definite instructions to follow and no particular features to incorporate. He simply worked out his own ideas. No designer, however, even when "dreaming," would waste his time on something that was not practicable in real life and so Bertone, while coming up with many original features, always ensured that they would be possible in a production car. Eventually, not wishing to see the still un-named results of his talent remaining forever in the land of dreams, he asked the Lamborghini Company of Sant'Agata Bolognese to see to the mechanical side of his design. They agreed and, after due experimentation, the Lamborghini Marzal appeared in all its exotic glory.

And the Marzal is exotic. It's a real space-age car with a look of the 21st Century about it. In fact, it would be perfectly at home in one of the futuristic television puppet series, such as "Captain Scarlet" or "Joe 90," with its low, sleek, high-speed lines and especially with its "cockpit" almost entirely enclosed in glass.

This last is the feature which really sets the Marzal apart from every other car in existence today. Except for the back, the whole four-seater passenger compartment is glass-covered—the windscreen, the roof and even the doors! The only metal used in this section is for the door and windscreen frames plus a door strengthener! It looks very much like an aircraft cockpit from the outside and I should imagine that, inside, it feels like one when propelled by its powerful 1,965 c.c. six-cylinder in-line engine which develops a power output of 175 BHP at 6,800 r.p.m. to give the car a top speed of around 120 m.p.h. That's fast travelling!

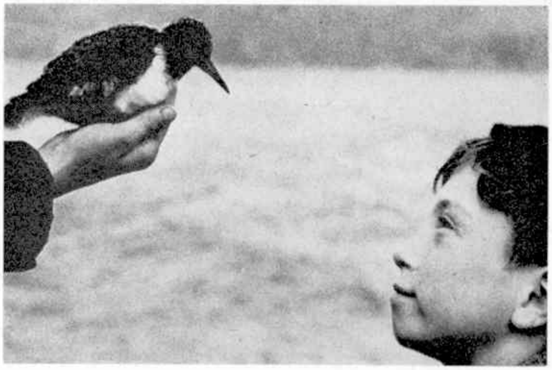
If the real car travels fast, though, a model version of it should also have a good turn of speed. Meccano Limited have just released a Dinky Toy based on the Marzal—No. 189—and I am pleased to report that it is fast, thanks to Dinky's new high-speed feature, Speedwheels. One push sends the model streaking away!

Speedwheels are not, of course, the only feature fitted to the Marzal. Also present is an opening luggage compartment lid at the front and an opening engine cover at the rear, the latter "dimpled" like the original and covering a plated "engine" sporting considerable detail. Both the luggage compartment lid and the engine cover are fitted with a special double-action hinge which allows them to be pulled outwards as well as hinged upwards. The complete glazed area of the original car is faithfully reproduced on the model, the glazing enclosing a beautifully-detailed, moulded interior incorporating four bucket seats, facial panel and simulated gear-change lever. A plated steering wheel is also present, this being on the left, the original vehicle being a left-hand drive car.

Finish is in a fluorescent green colour with red interior moulding and white base, luggage compartment lid and engine cover, although the "dimpled" area of the last is matt black. The tooth-like bumpers at the front and rear of the car are also black to simulate the black rubber from which the bumpers of the full-size car are made. The overall effect of the colour-scheme, coupled with the futuristic design of the car, is magnificent and makes the model a "must" for any collection.

THE CALL OF THE ISLES

Trevor M. Smith concludes his story of the holiday adventures of a group of young boys



Undoubtably the find of the day. A young Oyster-Catcher chick.

Ishriff, near the head of Glen More, was the most remote campsite we used on the whole expedition and we reached it late in the afternoon after traversing Glen Buie and some fine scenery. Judging by a very wind-bent tree, this, we felt, could be a very exposed site, and of course we were at the head of a pass, albeit a broad one, so we could expect the wind to come from any direction if it did come. So after pitching camp, we took the extra precaution of putting a boulder on each tent peg. As we worked, the cleg-flies were bothersome and many came to a very swift end indeed. Loch Squabain did not look safe for bathing, so we dammed the burn at a convenient point and made an excellent pool in which we were able to refresh ourselves for the remainder of our stay there. We used Ishriff as a base camp from which to make two sorties into the surrounding mountains. It was a site set amid great grandeur and we saw a pair of eagles soaring majestically above a corrie on Sgulan Beag as the setting sun tinted the surrounding summits with never-to-be-forgotten splendour.

Sunshine greeted reveille, so after our usual dip we breakfasted heartily and after having a letter writing session and getting our Log-Books up to date, we climbed to the top of the ridge of Sgulan Mor and then gained the 2,496 feet summit of Ben Talaidh. We sat in the lee of the cairn and enjoyed our raisins and biscuits and fell to discussing how the obviously new and still cardboard-covered concrete Trigonometrical Station had been placed there. Roger suggested that the Ordnance Survey men had brought up the sand and cement in rucksacks and that water had been carried up in cans, a stout cardboard tube being used as a mould. All speculation was confounded when we learned from a shepherd later in the week that a helicopter and crew had done the work: progress marches on! We studied the panorama of hazy blue peaks but gave particular attention to route planning for the next day and spotted a feasible route to the top of Mull's second highest peak. Then we retraced our previous route, but went on to Sgulan Beag and Ben Chaisgidle from which we obtained a superb view of Ben Talaidh as it swept down in gullies and screes to the glen below. We felt a glow of achievement as we stood on the ridge and looked back. It was not a Himalayan giant that we had conquered, but it had afforded us the thrill of a summit gained by honest endeavour and was wonderful experience towards making us more worthy to attempt other peaks in the future.

During the night the wind changed direction and freshened considerably. I was awakened at 3 a.m. by the feel of lightweight canvas flapping in my face. The main guy of the flysheet had pulled the tape off the alloy ring. I sat up in my sleeping bag and re-sewed the offending tape, grateful the while for the half bar of chocolate I had found in my rucksack pocket while searching for the needle and cotton, and conscious too of the contrast between the chill outside and the cosiness of my down-bag. The mending done, I knew I must go and check the other two tents in case their sleeping occupants were unaware of possible damage or loose guy lines. I remember the effort of will as I pulled on my sweater and anorak to go out into the chill of the early morning; but a treat was in store for me. The sky was absolutely cloudless. In the west, the full moon was low in the sky and its rays cut a shimmering silver path across Loch Squabain below me. Stars were unbelievably bright and clear in the half-darkness round the moon. I turned, and in the opposite direction the sky showed a slit of gold as the harbinger of the new day appeared beyond Ben Dearg. Ishriff with its wind-warped birch tree was silhouetted in sharp relief, and as I watched the dawn, the air at that moment above me was full of the drumming of a snipe. I checked the tents and retightened the guys. Suddenly I was aware of how chilled I was, and I slipped hastily back into the depths of my sleeping bag. There I pondered and dozed until full morning light flooded the glen, and there were the sounds of primus stoves roaring at the morning brew of tea and the breakfast preparations.

Using the fine west ridge we had observed the previous day, we reached the top of Dun Da Gaoithe (2,512 feet). On the climb we disturbed a large herd of deer and marvelled as we watched them running fleetly over the very rough terrain with the most apparent ease. We saw several herds of these beautiful red deer during our stay in the Island, including several "proud Monarchs of the Glen." Philip still has the antlers he found on Mull, and he carried them lashed to the top of his rucksack as a treasured souvenir. We continued to traverse Mainnir Nan Faidh and Sgurr Dearg and will long remember how we could see views ranging from the Rhum Cuillin to the mountains of Morvern and the Ben Nevis Massif plus the whole of the Sound of Mull immediately below. This day will be remembered too for the fact that Jimmy volunteered to run the last two miles of our trek back through the Glen to the site so as to have a billy of tea ready to slake our by now very anhydrous throats. That Jimmy was District Junior Cross Country Running Champion undoubtedly enabled this fourteen year old lad to succeed in his mission. Never did tea taste so delicious; and it wasn't just that it happened to be ready for the rest of the party's arrival that made it so either.

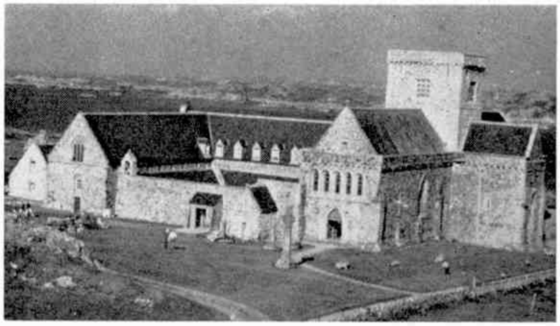
Next morning we had no sooner struck camp than it began to rain, and we trekked down Glen More towards the head of Loch Scridain with the Island in a very sombre mood. Discovery of a deserted croft at Uluvallt was the signal to bivouac for the night. It was an ideal spot from which to attempt Ben More, the highest peak on Mull, and at 3,169 feet the Island's only Munro. There was a good deal of ribaldry in the croft about who would sleep on the lone iron bed-stead. Amid much laughter I agreed to accept the privilege "because you're an old man, Sir, and need it." The final laugh before bedtime came when Barry suggested a liberal application of anti-midge cream as a precaution against marauding rats.

It was nearly mid-day. We had tidied and cleaned the croft, leaving no sign of our stay. The cloud ceiling outside was down to eleven hundred feet and the weather had not abated. I realised that time was not on our side so I abandoned the idea of climbing Ben More and we pressed on down the southern shore of Loch Scridain and headed for Fionphort and the ferry to Iona. At Pennyghael the sun suddenly came out and within minutes the whole of Ben More was smiling benignly down at us from across the Loch. Such is Scottish weather. Nevertheless we decided to leave the giant unclimbed so as to serve as an excuse for a return visit.

On the small boat that plies back and forth across the Sound of Iona, we looked eagerly at the Abbey Church of St. Mary as the craft drew ever nearer to the jetty. Iona seemed to welcome us to its shores and we were soon encamped on a terrace above a superb beach of silver sand. We collected our mail from the Post Office, and then turned in for an early night after a very strenuous day. The following day dawned with bright sunshine in a cloudless sky. I decided upon a day with no planned activities. So we spent most of the time on the silver sand beach and played games, swam in the sea, ate a picnic meal at mid-day and made sundry brews of tea when we felt like a drink.

St. Columba brought Christianity to the Isle of Iona in A.D. 563. The Benedictine Order founded the existing Abbey in 1203 under Reginald Macdonald of the Isles. In the 16th Century the Abbey was almost completely rebuilt and became the Cathedral of the Isles. Subsequently the Abbey fell into ruin and Atlantic gales did their worst. At the turn of the 19th Century, the Duke of Argyll, whose property the Cathedral now was, gave the buildings in Trust to the Church of Scotland. The Abbey Church was reroofed in 1910. The Reverend Doctor George MacLeod, as he then was, formed the Iona Community in 1938, and this Brotherhood, consisting of Ministers and laymen of the Church of Scotland, are pledged to Mission work chiefly in the industrial parishes of the Scottish mainland. The Community has been responsible for the restoration of the Abbey and they come in the summer months to labour not only manually, but also in their inner lives, the work being reinforced by a powerful Community spirit.

A Community Member took our little group round the Abbey and in a very interesting way spellbound the boys with a well-told history. The boys were interested in hearing how skeletons had been found when the cloister area had been excavated, and that archaeologists had been able to piece together certain gruesome events in a Viking Raid. In another part of the building they



The Abbey Church of St. Mary, Iona.

also remembered being told about how the necessary baulks of wood for the main roofing timbers had been salvaged from a ship wrecked on Mull, and how our guide had said that although God does indeed feed the sparrows, yet nevertheless he does not drop the food into their mouths.

We met the Leader of the Iona Community as we stood by the Cross of St. Martin in the precincts of the Abbey. He was very interested in what the boys had done and after questioning them at length, and learning that we were to return to Oban on the morrow's steamer, he then crowned a wonderful stay by inviting us all to lunch in the Refectory of the Abbey. We were to come at noon the next day. He told us he knew what it was like to make a final meal before the end of a camp and then have to dash down and catch the steamer. So this was a wonderfully understanding geature and we made our way joyfully back to the site for the last night under canvas on Iona.

Saturday dawned. We struck camp and went to say farewell and thank you to the owner of the site. Leaving our rucksacks on the jetty, we walked up to the Abbey. We were made very welcome indeed and thoroughly enjoyed a first-rate lunch cooked by the Community Members. Afterwards the boys said thank you and we went to catch the steamer for Oban. They all gathered at the stern-rail to keep the Island in sight as long as possible. Our journey was nearing its close, and each boy had given of his best. Each boy had learned much about himself and his fellows and we all had tremendous funds of worthwhile memories that will be cherished for the rest of our days.

Whenever possible, we always chose a sheltered site for our lightweight tents.

AIR NEWS

John W. R. Taylor talking about Aircraft

Fly Baby grows more wings

Two of the more interesting members of the American lightplane movement are Peter Bowers and his little 85 h.p. Fly Baby aircraft. In Britain, Peter is best-known as a writer whose name appears on standard histories of the aircraft that have served with the U.S. Navy and U.S.A.F. and those that have been built by the Boeing company. His links with Boeing go deeper than this, as he is employed by them as a research engineer. Between spells of work on their "big jets" and his writing, he manages to find time to design and build aircraft of his own.

For many years people who have wanted to construct replicas of 1914-18 War fighters have turned to Peter for help, and several Fokker Triplanes flying in the States were based on his plans. Aircraft he has built and flown personally include a replica of a 1911 Wright biplane and, of course, Fly Baby N500F.

The story of this little aircraft began when the Experimental Aircraft Association offered a $2,500 prize in a competition to find a simple, low-cost, easy-to-fly machine that could be built by inexperienced amateurs for "fun flying". Peter Bowers sketched out the Fly Baby, spent 720 spare-time hours and $1,050 building it, and flew it for the first time on 27 July 1960. Unfortunately, only one other aeroplane had been completed by the closing date, so the contest was postponed for two years.

A few months before the new date set by the E.A.A., a pilot borrowed the Fly Baby, became lost in mountainous country in bad weather and crashed. Proof of the simplicity of its structure was given when Peter built an entirely new fuselage, six inches longer than the old one, and had N500F airborne again in time for the competition. He also took the opportunity to replace the original 75 h.p. Continental A65 engine with an 85 h.p. C75.

The E.A.A. judges voted Fly Baby winner of the contest and awarded it the $2,500 prize, with the condition that plans of the little aircraft should be published in their magazine, *Sport Aviation*. At the same time, Peter drew up a highly detailed set of plans for anyone who might like to build a copy of N500F. Even he could not have foreseen that more than 2,000 sets would have been sold by the Spring of this year, when 70 Fly Babies were already completed and in the air.

Some embody design changes such as an enclosed cockpit, different engines and modified fin shape, but it has been left to Peter himself to explore the full versatility of the design. Several years ago he tested N500F as a twin-float seaplane and found that it still cruised at 97 m.p.h.—only 13 m.p.h. less than the landplane version.

Knowing that many amateurs have an urge to fly biplanes, he next decided to see how his little prototype would handle in this form. Instead of merely adding a top wing to the original monoplane, he designed and built a completely new set of wings, spanning six feet less than those of the monoplane.

First flight of the biplane Fly Baby was made on 27 March this year. In a letter which I received a week later, Peter commented: "It flies like a dream.

Heading photograph shows the small "Stitson" aircraft ready for take-off, 40 years ago.

Far left: 40 years after its first flight the plane was salvaged by a Helicopter and landed safely in Sondre, Stromfjord.

Left: The "Stitson" plane as it was discovered. Although it had turned a complete somersault it was almost intact.

Far right: Three "Fly Babies". Left to right: Square Wingtips, built by Edward M. Sampson, Belview, Minnesota. The prototype by Peter M. Bowers, Seattle, Washington. Tapered Wingtips, by Linley W. Holmes, Minneapolis, Minnesota. All these aircraft are powered by 75 h.p. Continental engines.

Upper centre: The Bowers "Fly Baby" 1A, fitted out as a Seaplane.

Lower centre: Modified "Fly Baby" with steel tube divided axle undercarriage and enclosed cockpit. Powered by a 65 h.p. Continental engine.

The Biplane version of the "Fly Baby."

With a 22-foot span, it has two feet more than the EAA Biplane, which has the longest span of the 'standard plans' biplanes. The others have less and are rather hot on landing—more like a controlled crash. Biplane Fly Baby actually has 'float' on landing; it's the most docile small biplane I've ever flown. The fact that the new wings make it look like a scaled-down Tiger Moth at a distance is no accident ! "

About the only ideas Peter Bowers has not yet tried out on N500F are converting it into an autogyro and fitting lift-jets for vertical take-off. At least, he hadn't done so last time I heard from him!

Queue for the Moon

According to Pan American World Airways, about 13,000 people have already written to them to book seats on the first commercial flights to the Moon. Most of the potential passengers applied after the successful round-the-Moon trip of Apollo 8 last December; but 100 persons had booked places even

before this event. We can only hope, for their sake, that fares will come down. At present it costs hundreds of millions of dollars to send each astronaut there and back.

Forty years on ice

On 16 August 1928, an American pilot named R. J. Hassell, with Parker D. Cramer as navigator, took off in a Stinson monoplane from Rockford, Illinois, to fly to Europe via the Polar route—today a busy airway but then unexplored. It was planned to make six stops en route, one of them on a specially-prepared strip at Lloyd Camp, near Sondre Stromfjord in Greenland.

Dense cloud and tricky winds between Labrador and Greenland caused Hassell to stray 200 miles off course. With little fuel left in the Stinson's tanks, he crash-landed 75 miles short of Lloyd Camp. Abandoning the aircraft, the crew trudged over snow and ice for two weeks before Eskimos found them, almost at the end of their strength.

For 40 years the Stinson lay on its back on the ice-cap. Then, early last year, it was located, in much the same condition as when Hassell had left it, except for the loss of its fabric covering. A ground party removed the wings and lashed them to the sides of the fuselage, so that the old aircraft could be hauled back to the U.S.A.F. base at Sondre Stromfjord by a Sikorsky S-61N helicopter of Greenlandair. The town of Rockford, which financed the 1928 flight, plans to restore the Stinson to its original condition and present it to the Smithsonian Institution, where it will join such famous aircraft as the 1903 Wright Flyer and Lindbergh's *Spirit of St. Louis*.

Aerial TV guides ice-breakers

After two years of tests, Russia will shortly equip all its ice-breakers with the *Arctica* television system, by which captains will be able to study the ice within a 30-mile radius of their ships and choose the best path through it.

In the final tests, two TV cameras mounted on an Mi-2 light helicopter transmitted clear pictures of the icefields below them to the ice-breakers *Kiev* and *Murmansk*. The captains of these vessels were quickly convinced of the superiority of the technique by comparison with the former method under which the helicopter crew had to observe the ice visually and then describe by radio what they saw. Installation of *Arctica* on the ships is made easier by the fact that it utilises standard commercial TV equipment.

Angels and Phantoms

For the first time in its 23-year history, the U.S. Navy's famous " Blue Angels " aerobatic team is not flying Grumman-built fighters this year. The switch from F-11 Tigers to F-4J Phantoms was made in March, and during these few short months the pilots have speedily mastered their new 20-ton mounts. In the basic four-plane diamond formation, they fly with wings overlapped and a three-foot gap between aircraft. Colour scheme of the Phantoms is dark blue with yellow trim. Liquid dye for coloured smoke trails is carried in dummy Sparrow missiles under the belly of the aircraft.

Mike Rickett of Meccano Liverpool, describes how . . .

MECCANO HELPS THE HANDICAPPED

IN JUST a few short years, we have seen a complete change in the attitude towards mental health generally and mental retardation in particular. There is no longer any social stigma in being mentally ill and gone are the days when mentally retarded people were simply forgotten or, at best, ignored. If anything, however, the history of those less fortunate people born with retarded minds—minds that have just not grown up—is even sadder than the insane or mentally ill. Generally speaking, there was no hope of any sort of cure and most mentally retarded people lived comparatively useless and frustrating lives.

People with retarded minds have special problems and in more recent times, we have seen the gradual understanding among teachers and social workers that sufferers of this kind can often be placed in an environment where they will be able to fulfil themselves and lead useful, constructive and happy lives. Dedicated men like Mr. Frank Davies, the Chief Training Officer of the Adult Training Centre in Moreton, Cheshire, are now able to prove that mentally handicapped people can, and are, really useful and productive members of Society given the right training and the right sort of environment. In Moreton, the specially-equipped training centre helps to give trainees that important sense of belonging and encourages them to achieve things quite undreamed of hitherto.

In centres such as that at Moreton there are not only people who have led a very sheltered and protected life outside normal society, but also many others who have been transferred from Junior Training Centres where they will already have been given instruction in basic skills. Consequently, every trainee has a different need. There is also the problem of the older trainee who is unlikely to find a permanent job for various reasons, but who has already lived successfully within the community. All these people have different problems and it is no small task for a training centre to provide for them.

120 trainees between the ages of 25 and 30 attend daily at the Centre to participate in a whole variety of training courses, including social, industrial, and pre-employment programmes that include the packing of Plastic Meccano in a room equipped similarly to the packing room at the Meccano works. In fact, a high percentage of all Plastic Meccano sets made are packed in the Training Centre at Moreton where it has been found that Plastic Meccano is an ideal subject for this sort of work in that it is neither repetitive nor monotonous to handle. Explaining why Plastic Meccano is so popular with his Centre, Mr. Davies said, "Plastic Meccano in the workroom has considerable value because of the variety it gives, because it is not too frustrating to use, and also because it gives a concept

of shapes to the trainee. It also gives an idea of basic mechanical functions like, for instance, screwing nuts and bolts together."

Operated entirely on factory lines, complete with clocking-in-and-out boards, work record cards, incentives and target setting, about 45 trainess are involved in this unit at any particular time. The workshop is organised into three lines, each with eight people and with a checker—himself a trainee—at each end. Emphasis is given to responsibility and no staff from the Centre are involved in the checking of sets before they leave the works. Trainees are rewarded according to the difficulty of the tasks they are asked to do and this can be as much as £2 a week, but words of praise from the staff often have more importance than money.

When a new trainee enters the Centre, his ability, aptitude and attitude are tested, and one of the tasks he will be asked to do is to sort Plastic Meccano components into trays. Special tests are continued for a period of four weeks and, at the conclusion of these, newcomers are placed into either a social training unit, with amongst other things, domestic training in the complete self-contained flat included in the Centre, or into work sections coded for pay awards. For trainees likely to remain in sheltered employment, or for those new entrants that show promise, a special pre-employment unit gives intensive training, regardless of age, background or education. As the name implies, this unit prepares them for employment in industry.

Life at the Centre begins at 9.30 a.m. with discussions of current events, television, newspapers, and indeed any other subjects the trainees want to talk about. "This forms a link between them and the staff and we always follow this with music therapy, which is most important," said Mr. Davies. "The prime purpose in beginning a day in this manner is to bring colour and interest into the life of the trainee, and to foster a spirit of goodwill and harmony in which everyone may live together for a period of 7 hours a day."

After this, trainees go to their various units to spend a proportionate amount of time in either social training, industrial training or the pre-employment unit. Where social training is involved, pupils are graded from A down to D and progress from one to the next. In the cookery class for example, grade D would involve the recognition of hot and cold water taps, the lighting of stoves, and grade A, the preparation of simple snacks. Included as part of this training is instruction in the use of a telephone kiosk, post office, supermarket, refreshment bar, and other more basic things like hygiene, the three "R's," when necessary, and money values.

An important part of the training is that covering industrial subjects, and although the Centre places great importance on the packing of Plastic Meccano, they also have facilities for teaching the use of wood cutting tools, wood-working machinery, sealing machines, sewing machines, and welding machines, as well as teaching assembling and dismantling work, packaging, and instruction in safety-first measures. In these practical spheres the school produces for sale a decorator's table, a number of domestic stools, coat hangers and a range of twelve different items made in the smithy.

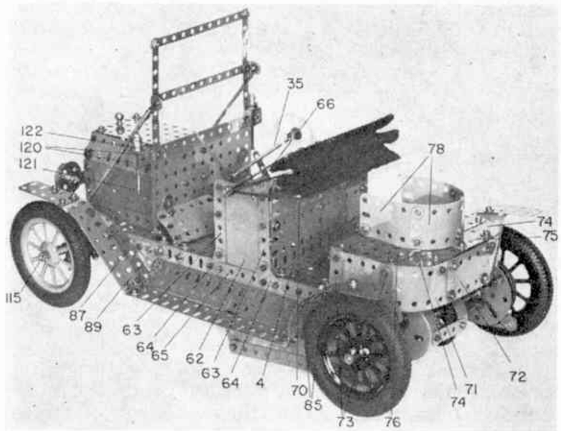
One of the final steps a trainee would take before leaving the Centre would be a period of duty in the final stage of the Plastic Meccano packing process, where more advanced trainees are allowed to work without supervision. Their latest task is to pack the most complex of Plastic Meccano sets, the Plastic Meccano Work Box. About twelve of the small number

in this section have, in fact, left for jobs in industry, and throughout, trainees in this and other sections are encouraged to feel that they are being trained for real jobs.

Mr. Davies is quite convinced that a whole new horizon has opened up for the mentally handicapped, and in his view they, "Take life very wisely and are capable of doing a great deal more than people give them credit for. It is very important for us to have work of this sort to do, and I find they have enthusiasm, drive and imagination. It gives them a sense of teamwork as well as a sense of belonging. I find them delightful people and there is a great deal they can teach me."

"TIN LIZZIE"

by Spanner

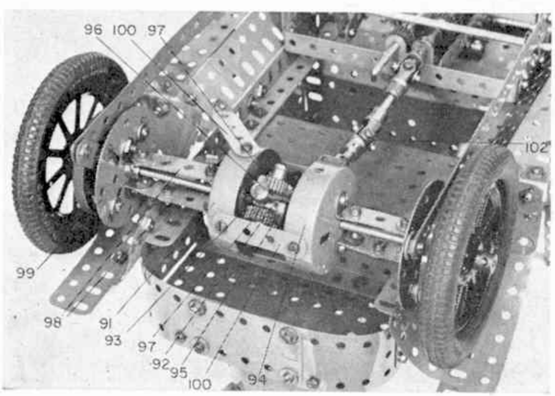


Above: Realism is one of the main features of the Meccano 1910 Model T Ford, as this view clearly shows.

A super-detailed 1910 Model "T" for the advanced builder of veteran cars

"OLDIES" OF all sorts—veteran cars, vintage cars, traction engines, steam engines—all have a tremendous following among Meccano modellers. You only need work on Meccano Magazine for a couple of months before readers' letters make this fact quite clear, but why should it be? Is it because enthusiasts see Meccano as an "old" system fit only for "old" subjects? Not a bit of it! It's simply because old subjects—particularly vehicles—are far more appealing, both visually and mechanically, than their modern counterparts. Because of this, Meccano modellers, in common with most types of modellers, like building them and what better reason could there be than that?

As far as Meccano is concerned, the popularity of old vehicles, especially old cars, is undeniable and so this month's "advanced model" spot goes to the magnificent "banger" described below. Old car enthusiasts will recognise it as a very good reproduction of one of the most renowned cars in history—the famous Model T Ford, known affectionately by all as "Tin Lizzie."



Left: A close-up view of the underside of the model showing the rear axle and differential.

The Model T was of course made for many years, during which time its appearance altered slightly, and our model is based on the 1910 version.

The parts required list for this model can be obtained by sending a S.A.E. to Meccano Magazine, Northern Office, Binns Road, Liverpool 13.

Chassis

Beginning construction with the chassis, two 15 in. compound angle girders 1 are each built up from one 12½ in. and one 4½ in. Angle Girder, overlapped four holes, the inner securing Bolt also fixing the appropriate rear spring 2 in place. Each of these springs consists of one 4½ in. Strip, one 3 in. Strip and one 2 in. Strip, suitably bent and secured one on top of the other.

Girders 1 are connected towards the rear by a 5½ × 2½ in. Flat Plate 3 overlayed along its longer sides by two 5½ in. Angle Girders 4 and 5. Another 5½ in. Angle Girder 6 is bolted between the forward ends of girders 1, two 4½ in. Angle Girders 7 being bolted, in turn, to this Girder. Two 4½ in. Strips 8 are secured between Girders 7 through their fourth and rearmost holes.

At this stage, the radiator and front laterally-mounted road spring should be added. The radiator is built up from twelve 2½ in. Strips 9 separated by Washers and mounted on four 2 in. Screwed Rods and one 3½ in. Screwed Rod 10, the latter passing through the centre holes of the Strips. The lower Strips are separated by two Washers on each Screwed Rod, while the next eight Strips are separated by three Washers. The second and third Strips are separated only by a Nut on the centre and two outside Rods, the first and second Strips being separated by a Nut on only the centre Rod 10. With the radiator finished, this centre Screwed Rod is fixed in the centre hole of Angle Girder 6, the two outside Rods also being secured to the Girder, then the front spring 11 is slipped on to the protruding end of the centre Rod and held in place by a Nut. The spring itself is simply produced from one 5½ in., one 4½ in., one 3½ in. and one 2½ in. Strip, all curved to shape and positioned one on top of the other. Two Double Brackets 12 are secured one to each end of the 5½ in. Strip.

Now fixed by Angle Brackets to the top of compound girders 1 is a 5½ × 3½ in. Flat Plate 13, to the front of which, a Power Drive Unit is fixed by Bolts screwed into four Threaded Bosses, the output shaft of the Unit pointing vertically downwards. The bonnet is then added, each side consisting of a 4½ × 2½ in. Flexible Plate 14, edged at the front by a 2 in. Angle Girder 15 and at the rear by a 2 in. Strip 16. All are bolted to the vertical flange of nearby Angle Girder 7. The upper edge of each Plate 14 is angled over and extended by a 4½ in. Flat Girder 17, to which a 4½ × 2½ in. Flat Plate 18 is attached by Obtuse Angle Brackets. The bolts fixing the front Brackets to the Plate also hold in position two ordinary Angle Brackets, to which is bolted a 2½ in. Flat Girder 19, extended at each end by a 1 in. Corner Bracket 20. Plate 18 is attached to Plate 13 by another Angle Bracket.

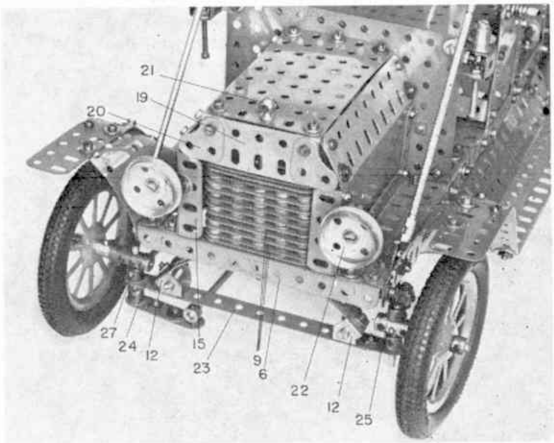
At the front of the bonnet, a radiator cap is represented by a Handrail Support 21 held in Plate 18, while two large headlamps are each supplied by a 1⅛ in. Flanged Wheel 22, fixed by a ½ in. Bolt to a Fishplate which is in turn bolted to Angle Girder 15. On the original Model T, these headlamps were powered by acetylene gas.

Steering Mechanism and Gearbox

While there is still plenty of room to work, the steering mechanism and gearbox should be added. In the case of the former, a 5½ in. Strip 23, extended at each end by a Crank 24, is secured by Double Brackets to Double Brackets 12. Fixed in the boss of the left-hand Crank is a 1½ in. Rod on which a Coupling 25 is loosely held by a Collar, the Rod passing through the centre transverse bore of the Coupling. Secured in the inside end transverse bore of the Coupling is another 1½ in. Rod on the opposite end of which a Swivel Bearing 26 is mounted.

Now mounted free in the boss of right-hand Crank 24 is yet another 1½ in. Rod, this held in place by a Collar beneath the Crank and a Coupling 27 above it. As before, the Rod passes through the centre transverse bore of the Coupling whereas a further 1½ in. Rod, carrying a Swivel Bearing 28 is fixed in the inside transverse bore of the Coupling. Swivel Bearing 28 is connected to Swivel Bearing 26 by a 4½ in. Rod.

Mounted on the lower end of the Rod in right-hand Crank 24 is another Crank, extended by a 1½ in. Strip 29. Pivotally attached to the end of this Strip is a Collar carrying a 3 in. Rod 30, the other end of which is held in a second Collar, pivotally attached to the arm of a further Crank 31. This Crank is mounted, along with a ½ in. Pinion 32, two Washers and a Collar, on a 2½ in. Rod journalled in a 1 × 1 in. Angle Bracket

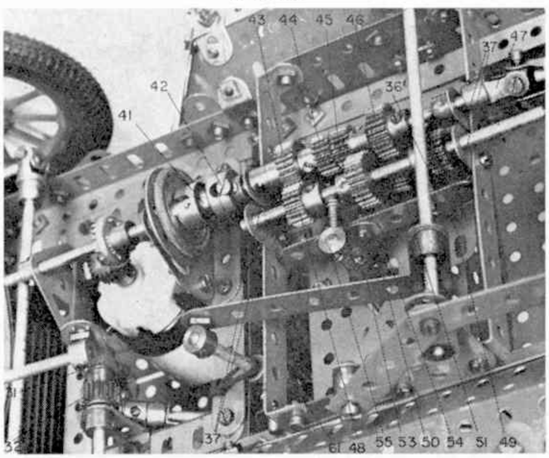


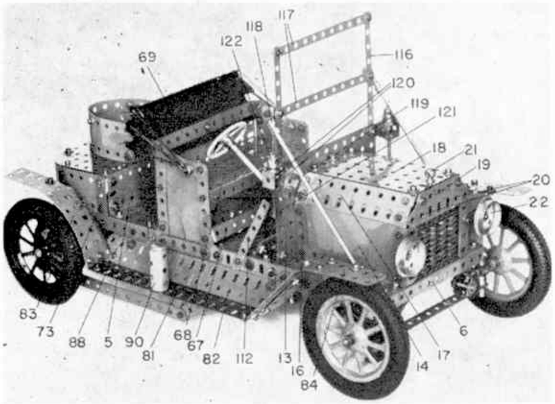
In this close-up view of the front of the Model T construction of the radiator and bonnet is clearly shown.

bolted to appropriate Angle Girder 7 and in a 1 in. Corner Bracket 33 bolted to nearby girder 1. The Washers hold the Pinion away from the Angle Bracket and allow it to mesh with a Worm 34 on a 6½ in. Rod 35 serving as the steering column. This Rod is journalled in Flat Plate 13 and in an Angle Bracket bolted to the inside of the bonnet through right-hand Angle Girder 7. A Collar and Washer against Plate 13 hold the Rod in position, while a 1¾ in. Steering Wheel is mounted on the upper end of the Rod.

In real-life the Model T did not have a conventional gearbox as we know it today, but was fitted with an unusual 2-speed and reverse box which was pedal-controlled, as opposed to the more recent lever-controlled mechanisms. In our model, however, a typical 3-speed and reverse box has been included to "fill-up the gap," details of the original unit not being available. A framework is produced from two 3 in. Angle Girders 36, the horizontal flanges of which are butt-jointed together by a 3 in. Flat Girder to form a 1 × ½ in. "U"-section girder. The securing Bolts also fix to the underside of the Girders four 1 × 1 in. Angle

An underside detail shot showing the clutch and gearbox in close-up.





Working clutch, gearbox, differential and brakes are just some of the realistic features fitted to this superb model of a 1910 Model T Ford.

Brackets 37, positioned one at each end of each Girder. Two $5\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strips joined by two 3 in. Flat Girders 37a are bolted one to each pair of Angle Brackets, the Flat Girders being bolted to girders 1.

Now journalled in the apex holes of Two Flat Trunnions 38, fixed by $1\frac{1}{2}$ in. Angle Girders to Strips 8, is a 3 in. Rod carrying a $\frac{3}{4}$ in. Contrate Wheel 39 and held in place by a Collar and an 8-hole Bush Wheel 40. Contrate 39 meshes with a $\frac{1}{2}$ in. Pinion mounted on the output shaft of the Power Drive Unit. Bush Wheel 40, on the other hand, makes contact with a Rubber Ring on a 1 in. Pulley with boss fixed in one side of a Socket Coupling 41. This Socket Coupling is free to slide on a $2\frac{1}{2}$ in. Rod, journalled in nearby Angle Bracket 37, but is prevented from turning on the Rod by a Bolt 42 screwed into one tapped bore of a Collar fixed tight on the Rod, the Bolt engaging in the slot in the free end of the Socket Coupling. A Compression Spring between the Collar and the inside of the Socket Coupling keeps the Rubber Ring hard against Bush Wheel 40.

Mounted on the Rod, inside the Angle Bracket, is a Collar followed by a $\frac{3}{4}$ in. Pinion 43 and a $\frac{1}{2}$ in. Pinion 44. The other end of the Rod is then inserted, free, part way into the bore of another $\frac{1}{2}$ in. Pinion 45, fixed on the end of a 2 in. Rod journalled in rear Angle Bracket 37. This Rod also carries a $\frac{3}{4}$ in. Pinion 46 and a Collar inside the Angle Bracket and a Universal Coupling 47 on the end of the Rod outside the Angle Bracket.

Running parallel to the gearbox input and output shafts, just described, is a sliding layshaft, supplied by a $4\frac{1}{2}$ in. Rod, journalled in remaining Angle Brackets 37. Mounted on this Rod, in the positions shown, are two $\frac{1}{2}$ in. Pinions 48 and 49, separated by a $\frac{3}{4}$ in. Pinion 50. Another $\frac{1}{2}$ in. Pinion 51 is mounted free on a $\frac{3}{4}$ in. Bolt screwed into the transverse bore of a Threaded Boss bolted to the vertical flange of nearby Angle Girder 36, but spaced from it by a Collar and two Washers on the shank of the securing long Bolt. Pinion 51 is in constant mesh with Pinion 46.

All the gears should be so arranged that, with the layshaft as far forward as possible, Pinion 49 engages with Pinion 46, *without* touching Pinion 51, to give first gear. When the layshaft is slid rearwards, these Pinions should all move out of mesh before Pinion 50 engages with both Pinion 44 and Pinion 45 to result in second gear. By moving the layshaft further back, third gear is obtained, at which time Pinion 43 meshes with Pinion 48 and Pinion 50 meshes with Pinion 45. When the layshaft is moved as far backwards as possible, Pinion 50 should move out of mesh with Pinion 45 and into mesh with Pinion 51 while Pinions 43 and 48 remain in mesh, to give reverse gear.

Control of the layshaft is by a gear-change lever supplied by a 3 in. Rod 52, carrying a Handrail Support and mounted in one transverse bore of a Short Coupling 53. This Short Coupling is itself mounted, along with a Washer, on a 2 in. Rod, held by a Collar in the apex holes of two 1 in. Triangular Plates 54, bolted one each to the vertical flanges of Angle Girders 36. Fixed on the lower end of Rod 52 is a Collar 55, in one transverse bore of which a $\frac{1}{2}$ in. Bolt is held. The head of this Bolt engages between Pinions 48 and 50 on the gearbox layshaft.

Control for the clutch comes from a $1\frac{1}{2}$ in. Rod fixed in the centre transverse bore of a Coupling 56, the lower end of the Rod engaging in the waist of Socket Coupling 41. Inserted in the longitudinal bore of Coupling 56 are a 2 in. Rod and a 3 in. Rod 57 to form a compound rod journalled in 1 in. Triangular Plates 58, fixed by Angle Brackets to the inside edge of the horizontal flanges of compound girders 1. Secured tight on Rod 57 is a Short Coupling 59, the Rod passing through the lower transverse bore of the Coupling to leave room in the longitudinal bore for a 1 in. Rod on the upper end of which a Collar is mounted. Fixed to this Collar is an Angle Bracket 60 serving as the clutch pedal.

Also mounted on Rod 57 is a Coupling 61, free to turn, but held in place by Collars, the Rod passing through the centre transverse bore of the Coupling. A 1 in. Rod, carrying a Collar is fixed in the upper end of the longitudinal bore of the Coupling, an Angle Bracket being bolted to the Collar to act as the footbrake pedal. Working brakes are incorporated in this model, but they and their linkage will not be described until later.

Bodywork

We come now to the bodywork, beginning this with the front seat. Each side consists of a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 62 bolted, along with two $3\frac{1}{2}$ in. Strips 63, two 1 in. Corner Brackets 64 and a $2\frac{1}{2}$ in. Strip 65, to compound girder 1. Note that rear Strip 63 is positioned one hole higher than front Strip 63, the tops of the Strips then being connected by a $2\frac{1}{2}$ in. Curved Strip 66. Bolted between each side of the seat is a $5\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 67 and a $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged

An underside view of the model showing the drive from the motor through the clutch and gearbox to the rear axle.

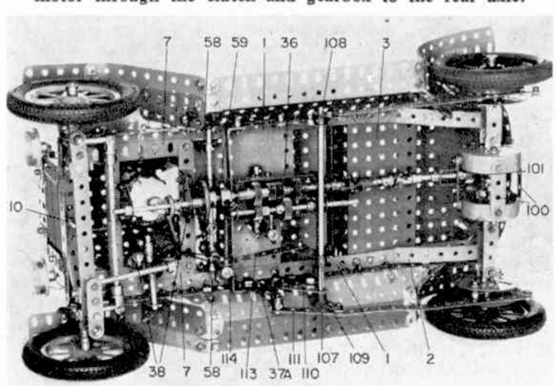
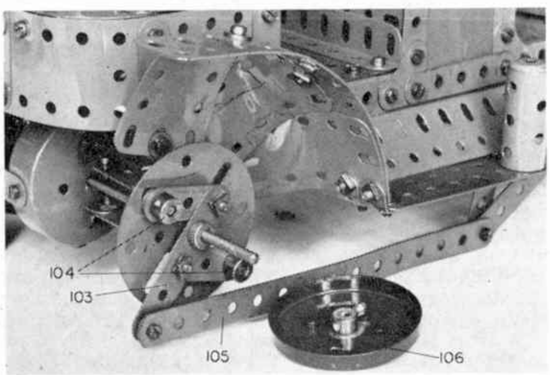


Plate 68, to the forward flange of which a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate is secured. Another $5\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 69 is fixed between the upper ends of rear Strips 63, while the back is enclosed by a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Plastic Plate 70 bolted to the back of this Double Angle Strip, and a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate bolted to the rear flange of Plate 68.

On the model illustrated, a collapsible hood was added, this being produced from a rectangular piece of black cloth sewn on to three "U"-shaped pieces of wire, the ends of which were bent to a circle and mounted on two $\frac{1}{2}$ in. Bolts, lock-nutted one to each Curved Strip 66.

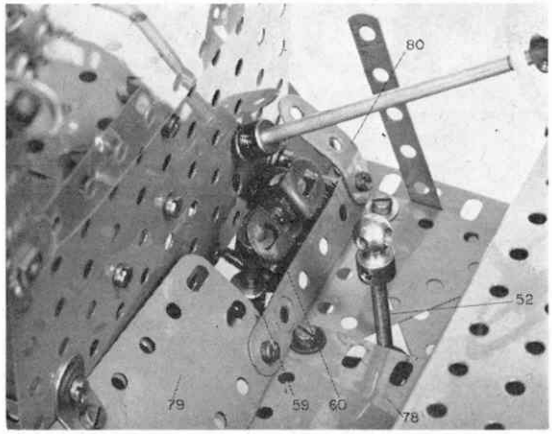
At the rear of the model, a "dickie" seat is included. This is built up from an $11\frac{1}{2} \times 1\frac{1}{2}$ in. compound plate, consisting of two $5\frac{1}{2} \times 1\frac{1}{2}$ in. Plastic Plates 71 joined by a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 72, curved to shape and bolted to four 2 in. Strips 73, secured two to each girder 1. Attached by Angle Brackets to the top of the compound plate are two Semi-circular Plates 74, a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 75 and a $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 76, the forward securing Bolts in the last case also fixing a $5\frac{1}{2}$ in. Angle Girder to the front edge of Plate 76. A $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 77 is bolted to this Girder and to Angle Girder 5, while two $5\frac{1}{2} \times 1\frac{1}{2}$ in. Plastic Plates 78, overlapped seven holes, are fixed by Angle Brackets to the top of Plates 75 and 76.



In this view of one of the brakes, the brake drum has been removed to show the expanding "shoes".

In front of the main seat, a floor is provided by a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 78, bolted to left-hand girder 1, and two $2\frac{1}{2} \times 2$ in. Triangular Flexible Plates, bolted to right-hand girder 1. The latter Plates should be so arranged as to leave a small triangular space through which the gear-change lever projects. A footboard is built up from two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plates 79, overlapped four holes and attached to Flat Plate 13 by an Obtuse Angle Bracket. Secured between this footboard and an Obtuse Angle Bracket bolted to right-hand girder 1 is a 3 in. Strip, the Bolt fixing this Strip to the Bracket also holding a bent $1\frac{1}{2}$ in. Strip 80 in place.

The two combined running board/mudguards arrangements are next each produced from a $7\frac{1}{2}$ in. Flat Girder 81 attached by Obtuse Angle Brackets to a similar Flat Girder 82, itself attached by Obtuse Angle Brackets to appropriate compound girder 1. Attached to the rear end of Girder 81 by ordinary Angle Brackets is a curved $5\frac{1}{2}$ in. Flat Girder 83, while the front end of Girder 81 is extended, via Obtuse Angle Brackets, by a shaped $6\frac{1}{2}$ in. compound flat girder 84, supplied by a $4\frac{1}{2}$ in. and a $2\frac{1}{2}$ in. Flat Girder. The rear mudguard is then completed by three



Inside the model are the operating controls—steering wheel, hand brake and gear-change levers and clutch and foot brake pedals.

$2\frac{1}{2} \times 1\frac{1}{2}$ in. Plastic Plates 85 curved to shape and bolted between Flat Girder 83 and compound angle girder 1. To complete the front mudguard two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Plastic Plates 86 are bolted between compound angle girder 1 and the upper part of compound flat girder 84, while a $2\frac{1}{2}$ in. Flat Girder 87 is bolted to the lower part of girder 84.

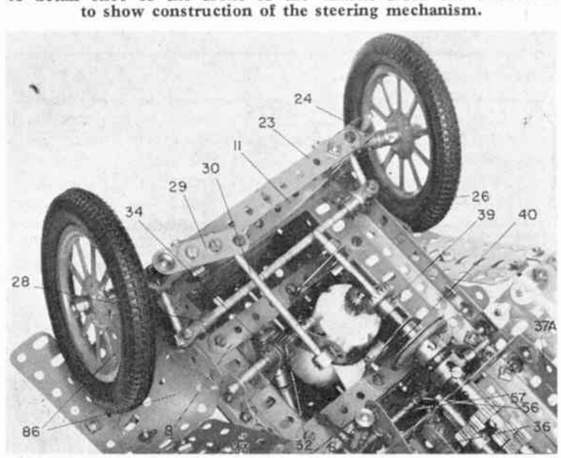
The final touches to this section are supplied by two 1 in. Corner Brackets 88 and 89, one bolted to the rear end of Flat Girder 82 and the other to compound angle girder 1, immediately forward of Flat Girder 82. An imitation acetylene gas tank 90 is produced from two Chimney Adaptors joined by a Sleeve Piece and is bolted to right-hand Flat Girder 81 in the position shown.

Rear axle assembly

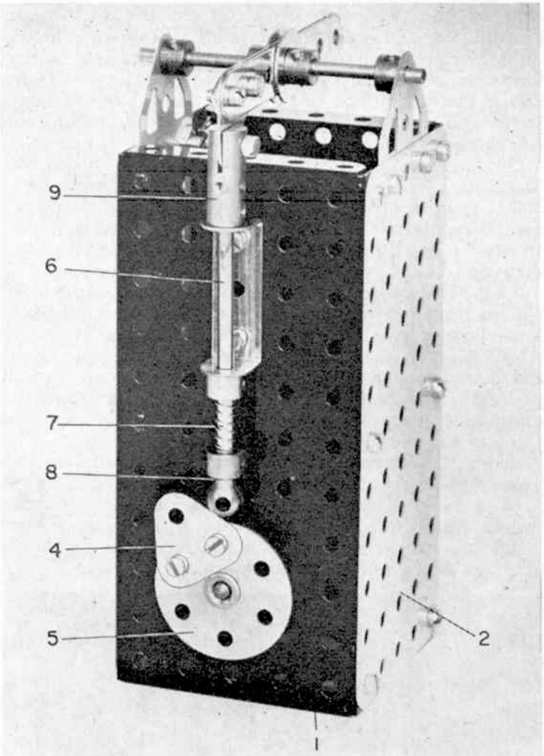
Next in line for construction is the rear axle which incorporates the usual Meccano differential. A $4\frac{1}{2}$ in. Rod, carrying a Boiler End 91 and a fixed $\frac{3}{4}$ in. Contrate Wheel inside the Boiler End, is inserted, free, part-way into the Longitudinal bore of a Coupling 92, through the centre transverse bore of which a $1\frac{1}{2}$ in. Rod fitted

Continued on page 457

A detail shot of the front of the chassis from the underside to show construction of the steering mechanism.



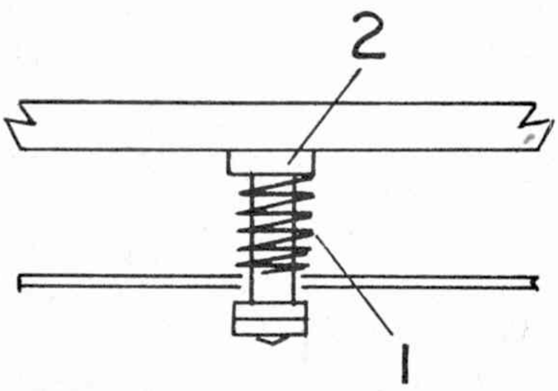
AMONG THE MODEL BUILDERS



Spanner describes some readers' Meccano ideas

Hints from Holland

I would like to start this month with a couple of very useful hints given in a letter from a Dutch reader, Mr. H. L. C. de Wijn of Hilversum, Holland. "In the Meccano Magazine, June 1968," he writes, "appeared a device for preventing sliding shafts of gearboxes from moving too easily by placing a locked



Spring Clip on the shaft. If this Clip is to be mounted on a rotating shaft, it is advisable to fit a Washer on both sides of the Clip to obtain smooth running."

Also included in the June 1968 issue of the M.M. was a self-locking lever designed for use with sliding shafts. Mr. de Wijn points out that, while this lever is perfectly adequate, it has the small disadvantage of allowing a little play. To overcome this problem, he has designed the simple device shown in the accompanying diagram which serves the same locking purpose as the original lever, but abolishes play. It consists of a short length of Compression Spring 1 mounted on the shank of an Elektrikit Contact Stud 2, lock-nutted to the framework of the parent model or mechanism. The head of the Contact Stud acts against the sliding shaft. Mr. de Wijn stresses, however, that his device can only be used with sliding shafts and not rotating shafts. He also says that it is "advisable" to use a Contact Stud in the mechanism, which means that it is not essential to do so. If necessary, it could presumably be replaced by a standard Bolt, or, as he himself points out, a Pivot Bolt, the latter being virtually as good as the Contact Stud. Our thanks go to Mr. de Wijn for his comments.

PARTS REQUIRED		
2—37a	1—120b	1—544

Our heading photograph shows a simple cam mechanism designed and built by a reader in Lancashire. Note the useful cam follower. The diagram on the left illustrates a useful locking device for sliding shafts designed by Mr. H. L. C. de Wijn of Hilversum, Holland. This mechanism cannot, unfortunately, be used with rotating shafts.

Simple Cam

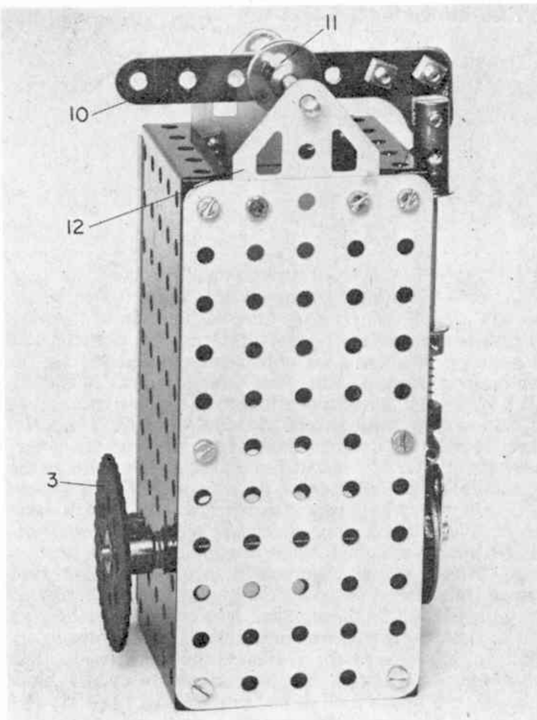
Moving on from electrical equipment to something purely mechanical, we have an idea for a simple cam mechanism supplied by a Lancashire reader. The design of the mounting would, of course, depend entirely on the model to which the mechanism was fitted, but, for our purposes, a sample mounting was built-up from two $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plates 1 connected by two $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plates 2. Journalled in Plates 1 is the camshaft, supplied by a $3\frac{1}{2}$ in. Rod on one end of which a 2 in. Sprocket Wheel 3 is fixed. Mounted on the other end of the Rod is the cam, itself, this consisting of nothing more complicated than a 1 in. Triangular Plate 4 bolted to the face of a 6-hole Bush Wheel 5.

A cam follower is next produced from a 3 in. Rod 6 mounted loose in the legs of a $1\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip bolted to appropriate Flanged Plate 1. Loose on this Rod, beneath the lower lug of the Double Angle Strip is a Collar and a Compression Spring 7, while a Handrail Coupling 8 is fixed on the lower end of the Rod. Fixed in the upper end of the Rod is a Strip Coupling 9, in the slot of which a 1 in. Corner Bracket is pivotally secured. The rocker arm is represented by a $3\frac{1}{2}$ in. Strip 10, bolted to this Corner Bracket and mounted between two $\frac{3}{4}$ in. Washers 11 and two Collars on a 3 in. Rod held by further Collars in the apex holes of two Flat Trunnions 12, bolted one to each Flat Plate 2. In a model, of course, the particular operation to be carried out would be actuated by the movement of Strip 10.

PARTS REQUIRED

1—3	22—37a	1—48	2—70	1—120b
1—16	22—37b	2—52	1—77	2—126a
2—16b	2—38	5—59	1—95	1—133a
1—24b	2—38d	1—63b	1—111c	1—136c

Below is another view of the simple cam described in the text on this page.



Model 'T' Ford continued from page 455

with two Collars 93 is fixed. A Washer spaces the Boiler End from the Contrate. Inserted, free, into the remaining part of the longitudinal bore of the Coupling is another $4\frac{1}{2}$ in. Rod, this one also carrying a Boiler End 94 as well as a $1\frac{1}{2}$ in. Contrate Wheel and a $\frac{3}{4}$ in. Contrate Wheel 95, the last two spaced apart by three Washers. Two 1 in. Screwed Rods 96, held by Nuts in diametrically opposite holes in the face of the $1\frac{1}{2}$ in. Contrate, are screwed into the appropriate transverse tapped bores of Collars 93, then two $\frac{3}{4}$ in. Pinions 97, free to turn, are mounted on Pivot Bolts screwed into the centre transverse tapped bores of Coupling 92. These Pinions engage with the $\frac{3}{4}$ in. Contrate Wheels.

Fixed to Boiler End 91 by Angle Brackets are two 2 in. Strips 98, to the other ends of which a Face Plate 99 is fixed also by Angle Brackets. Another Face Plate is similarly fixed to two $1\frac{1}{2}$ in. Strips, themselves attached by Angle Brackets to the other Boiler End, then the two Boiler Ends are connected by four 2 in. Strips 100, one of which is spaced from the Boiler Ends by two Washers on the shanks of the securing Bolts. Journalled in this Strip and in a Double Bent Strip bolted to it is a 2 in. Rod held in place by a Collar and a $\frac{1}{2}$ in. Pinion 101, the latter meshing with the $1\frac{1}{2}$ in. Contrate Wheel. A Universal Coupling 102 is mounted on the forward end of the Rod, then the axle is bolted to the ends of the rear road springs. Universal Coupling 102 is connected to Universal Coupling 47 by a $1\frac{1}{2}$ in. Rod.

As mentioned earlier, working brakes are fitted to the model. These act on both rear wheels and both are similarly built. A $2\frac{1}{2}$ in. Strip 103 is slipped over the protruding end of each axle Rod, the Rod passing through the second hole in the Strip. Lock-nutted through the first and third holes of the Strip are two $1\frac{1}{2}$ in. Strips, to the ends of which two Collars 104 are fixed by $\frac{1}{2}$ in. Bolts passed through opposite elongated holes in the appropriate Face Plate, three Washers on the shank of each securing Bolt spacing the Strip from the Face Plate.

Lock-nutted to the free end of the $2\frac{1}{2}$ in. Strip is a $7\frac{1}{2}$ in. Strip 105, then a brake drum is produced from an 8-hole Bush Wheel, boss inwards, bolted to a Wheel Flange 106 and is fixed on the axle Rod in such a position that Collars 104 will make contact with the flanges of the Wheel Flange. Three Washers space the boss of the Bush Wheel from the Face Plate.

A $6\frac{1}{2}$ in. Rod carrying a Crank 107 and held in place by Cranks 108 and 109 is now journalled in $1\frac{1}{2}$ in. Corner Brackets 110, bolted to Flat Girders 37a. One Strip 105 is lock-nutted to Crank 108, while the other Strip 105 is lock-nutted, along with a $2\frac{1}{2}$ in. Strip 111, to Crank 109. The free end of Strip 111 is pivotally attached to a Threaded Boss fixed tightly to a $4\frac{1}{2}$ in. Narrow Strip 112 lock-nutted to compound girder 1. This Narrow Strip serves as the handbrake, but the earlier-mentioned footbrake pedal is also connected to the braking system by a $3\frac{1}{2}$ in. Strip 113, lock-nutted between Crank 107 and a Collar 114, fixed on the end of a $1\frac{1}{2}$ in. Rod secured in the lower part of the longitudinal bore of Coupling 61.

Meccano Super Tool Set

ALL MECCANO enthusiasts will be familiar with the basic " tools of the trade " in model-building, namely the Spanner and Screwdriver, but many of them will be seeing for the first time here the brand new range of Meccano tools released recently as the component parts of the MECCANO SUPER TOOL SET. This Set consists of three tools, specially designed for the Meccano model-builder—a new, superior Screwdriver, a Flexible Drive Spanner and an Automatic Nut Holder—all three coming complete in an eye-catching presentation box, shown in Fig. 1 above.

Dealing first with the Screwdriver, this has a long, strong blade fixed very firmly in a moulded thermoplastic handle which is fluted to provide a really positive grip. Fig. 2 shows how useful this tool is in dealing with a Bolt placed in an awkward position. The design of the blade, being of standard Meccano Axle Rod size, allows the Screwdriver to pass through the holes in the Flanged Plate, etc., for a direct approach to the bolt head and, in addition, the standard size of the blade also makes the tool most useful for " drifting " Perforated Strips and Plates into correct alignment.

Fig. 3 shows the Automatic Nut Holder with its magazine fully loaded. Nuts are inserted via a square " breech " hole towards the middle of the blade and they are held in place at the tip of the tool by means of a small check spring. In operation, the tool is held so that pressure applied by a finger to the slide button feeds the Nuts towards the tip of the tool. Once the end Nut has been taken up by its appropriate Bolt shank, the Holder may be withdrawn.

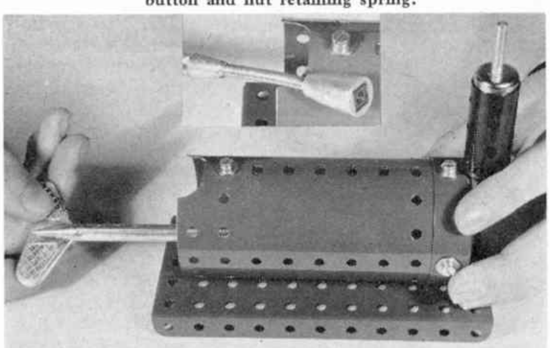
Extremely useful is the Flexible Drive Spanner, specially designed to place a single Nut deep inside a model where fingers or conventional spanners cannot reach. A typical operation is illustrated in Fig. 4 where a Nut has to be placed inside a Boiler at the centre of a Boiler End. The inset picture shows how the Nut is located in the socket of the Flexible Spanner. This socket portion, is joined to the shank of the tool by a Flexible Coupling Unit which allows the Box Spanner to be located in very awkward places but still permits the Spanner to be tightened at an angle to the axis of the Nut.

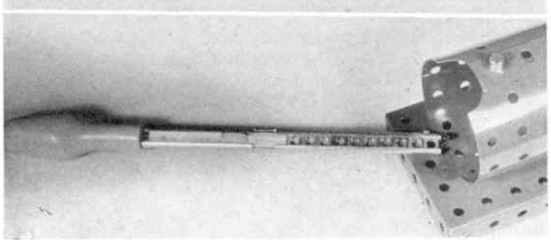
The Meccano Super Tool Set is available from all regular Meccano dealers, priced at 18s. 11d. If, by any chance, your local supplier does not have a Set in stock at the time you visit him, he will be pleased to order one for you, if requested to do so.

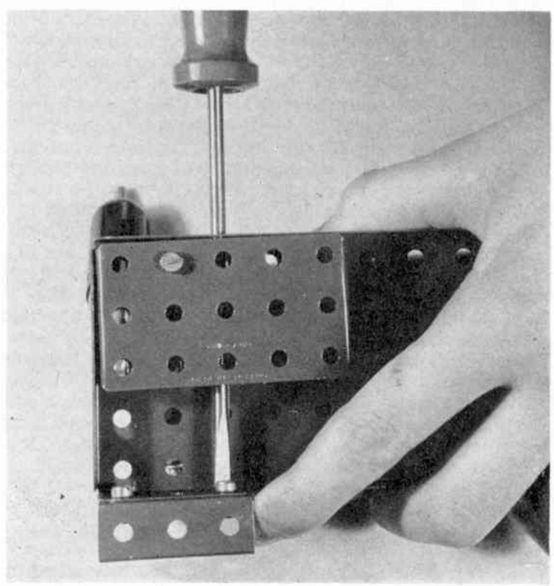
Below: The top picture, Fig. 4, shows how the Flexible Drive Spanner is used to tighten Nuts in usually innaccessible places. The inset shows the head of the Spanner. The bottom picture, Fig. 3, is the Automatic Nut Holder. Note the sliding feed button and nut retaining spring.

Above: Fig. 1 shows the Meccano Super Tool Set in its handsome display box.

Below: Fig. 2 shows the use of the new and much improved screwdriver.

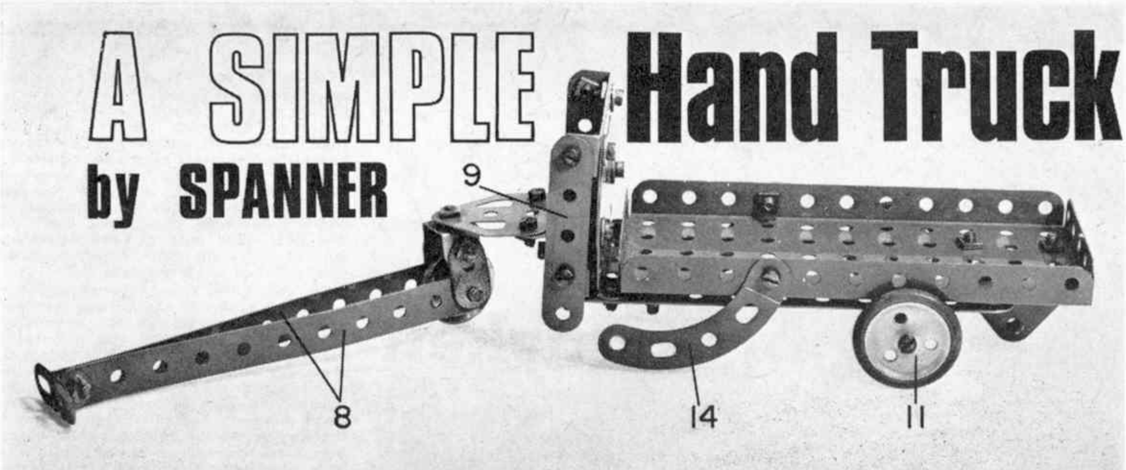






A SIMPLE Hand Truck

by SPANNER



WORKERS IN most forms of manufacturing industry are very familiar with the small hand trucks often used to transport materials around a factory or warehouse. Generally speaking, these trucks are used in conjunction with a wooden or metal pallet, on which the material is stored. The truck is simply run beneath the pallet and the load platform jacked up to lift the pallet off the ground which allows it to be moved.

There are various types of hand trucks in common use today and featured here, in model form, is a good example of one of them. It consists of a three-wheeled truck section with a detachable load platform, the latter, itself, serving as the pallet. Meccano Outfit No. 1 contains sufficient parts for its construction.

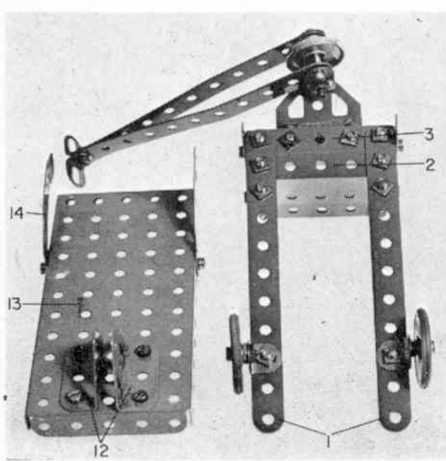
Beginning with the truck, two 5½ in. Strips 1 are joined by a 2½ in. Strip 2 and a 2½ × 1½ in. Double Angle Strip 3. Bolted to this Double Angle Strip are two Angle Brackets, to each of which another Angle Bracket is fixed to form reversed angle brackets. Secured to the upper lugs of the latter Brackets is a Flat Trunnion 4 to the apex of which a Double Bracket 5 is lock-nutted. The lugs of this Double Bracket are extended by Fishplates 6, the circular holes of which serve as bearings for a 1 in. Rod on which a 1 in. Pulley with boss 7 is held by a Spring Clip. Also mounted on the Rod are two 5½ in. Strips 8, the free ends of which are bolted together, as shown, the securing Bolt also fixing two Angle Brackets in place to serve as handles.

Two 2½ in. Strips 9 are next fixed one to each lug of Double Angle Strip 3, the securing Bolts passing through the second holes from the lower ends of the Strips. At the top, the Strips are connected by another 2½ × ½ in. Double Angle Strip to which is bolted a 2½ × 2 in. compound plastic plate 10, built up from two 2½ × 1½ in. Plastic Plates overlapped two holes. The two rear wheels are then each supplied by a 1 in. loose Pulley with Rubber Ring 11 mounted free on a ⅜ in. Bolt held by Nuts in an Angle Bracket bolted to respective Strip 1, the Bolt passing through the third hole in the Strip.

Construction of the load platform is child's play. Two Trunnions 12 are bolted to the underside of a 5½ × 2½ in. Flanged Plate 13, placed with its flanges pointing upwards, then two 2½ in. Stepped Curved Strips 14 are secured one to each side flange of the Plate to complete the model. If built correctly, the finished load platform should locate nicely on the forks of the truck section of the model without catching on the wheels. Note that, when the load platform is in position on the truck, Stepped Curved Strips 14 should clear the ground.

PARTS REQUIRED

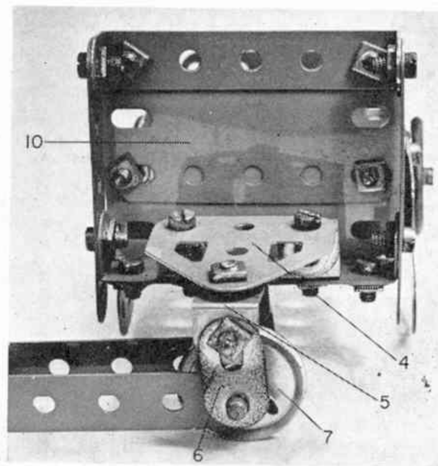
4—2	1—18b	32—37b	2—111a
3—5	1—22	8—38	2—126
2—10	2—22a	2—48a	1—126a
1—11	1—35	1—52	2—155
8—12	40—37a	2—90a	2—194



Our heading photograph shows the completed hand truck built from Meccano Outfit No. 1.

Left: An underside view of the truck and load platform.

Right: A close-up view showing the construction of the steerable front wheel and its mounting.



TRANSPORT TOPICS

by Mike Rickett

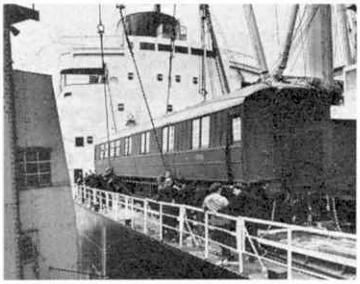
NOT EXACTLY connected with public transport, but exciting nevertheless is the journey shortly to be undertaken by "Grey Dove", a converted German E boat. It is believed that the ship, owned by a consortium of businessmen, is intended to carry ten professional divers in a search for sunken gold off the Irish coast. A North Wales businessman, Mr. Sidney Wignall, who located the wreck of the Spanish galleon "Santa Maria de la Rosa" off County Kerry last year, is taking legal action to prevent any other divers exploring for the vessel. The crew of eight aboard the "Grey Dove", berthed in Morpeth Dock, Birkenhead, expect to set sail very shortly—but the exact destination is being kept a closely guarded secret.

A journey that was by no means a secret was that undertaken by a Hawker Siddeley "Harrier" during the Daily Mail Air Race in May. The "Harrier" made history when it landed and took off from sites in the heart of both London and New York. Taking off from a disused coal yard at St. Pancras Station, the "Harrier" flew direct to downtown Manhattan where it made a vertical landing on spare ground near the United Nations Building. The pilot's overall time, from the top of the G.P.O. Tower to the top of the Empire State Building was 6 hours, 11 minutes, 57 seconds.

In many ways, I suppose, the "Harrier" represents the very beginning of an era, but recently an era of a different kind came to an end when two railway coaches from the special train used by the late General Dwight D. Eisenhower in Britain and Northern Europe during World War II, were loaded into the Cunard cargo liner "Media" in Liverpool.

Purchased by two American businessmen for the American National Railroad Museum at Green Bay, Wisconsin, the coaches were hauled from Doncaster to Edge Hill, by "Flying Scotsman", with Mr. Alan Peglar of Flying Scotsman Enterprises on board.

Eisenhower's war-time train consisted of two former L.N.E.R. sleeping cars specially converted into an office, lounge and bedroom for the General, and armour plated. He used them frequently as the planning of D-Day moved towards its climax. After the war the coaches were converted back to sleeping cars and again operated on the East Coast main line from London to Newcastle and Scotland. When they were purchased for the American Railroad Museum they were restored, except for the armour plating, to their wartime condition as used by General Eisenhower. They were formally handed over to the American Ambassador at a ceremony in London last November. Since then they have been stored with a collection of historical rail cars in the London area.



Above: General Eisenhowers coach being lifted on board the "Media" at Huskinsson Dock, Liverpool.

The former British Railways Chairman, Lord Beeching has been in the news as having opened the Dart Valley Railway in South Devon. A crowd of several thousand people watched as Lord Beeching unveiled a plaque at Buckfastleigh Station before he boarded the inaugural train for a leisurely 20 m.p.h. trip down the picturesque nine-mile branch to Totnes.

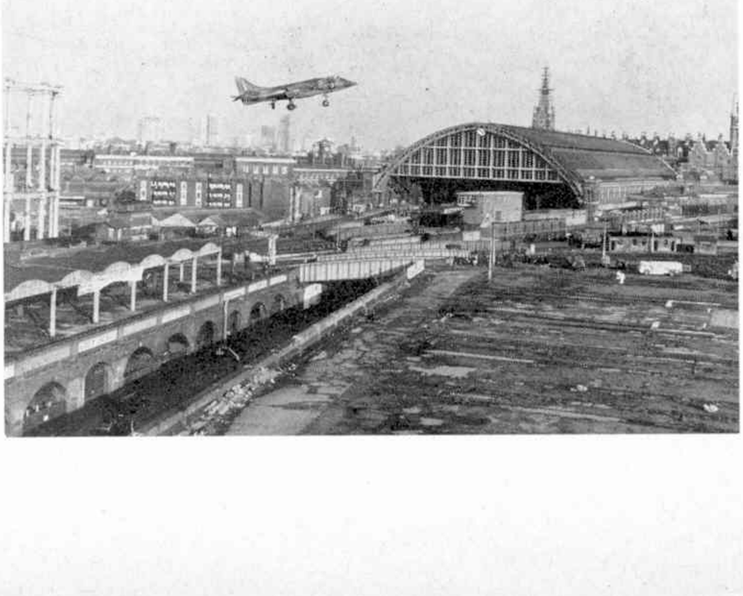
It took seven years of hard work for the Dart Valley Preservation Society to bring the railway to the required Board of Trade standard and the amount of money involved has been estimated at about £80,000. Trains will be hauled exclusively by locomotives from the former Great Western Railway and the operating Company expect to regain their investment within the first three years. Immediately after the re-opening order by the Ministry of Transport in May, traffic began to run over the line and in the space of only one month, some 30,000 passengers have used the line. The final word goes to Lord Beeching, who said: "I am more happy to open the line than I was to close it."

Do you have a pet grouse about a particular aspect of the railway service? Have you a suggestion for improving the timetable, or have you a burning question which you would like to put to a railway officer? If you have, then the new scheme to be put into effect on the Southern Region of British Rail should be of interest. Called "Open Forums", the Region intend holding public meetings, so that members of the public who have questions to ask their local railway officers may have the opportunity of doing so. Southern Region say that the first "Open Forum" will probably be held on the Region's South Western Division, which covers London's south western suburbs and the main lines through Woking to Portsmouth, Southampton, Bournemouth, Weymouth, and Salisbury in the late Autumn or early Spring.

Good news for travellers over the New Brighton to Wrexham line. Apart from the closure of Upton, Heswall Hills, Neston, Hawarden Bridge, and Shotton, the line is to remain open, and Wrexham Exchange and Central Stations reprieved. The Minister of Transport does however think that better value for money might result if these two stations were closed and trains diverted into Wrexham General Station. Fresh proposals are therefore to appear with a view to closing these two stations.

An important announcement that the Southern Region made recently was that concerning its rolling stock fleet, which it intends to replace by the end of 1972. All the remaining pre-war electric trains are involved and to take the place of the 880 coaches now used on these trains, the region is to buy 836 modern coaches at a cost of £21.3 million. The first of the new coaches are already arriving at the rate of four a week and these are part of two advance orders of 200 coaches each—mainly for the Portsmouth line.

Almost all of the 880 coaches being replaced were built between 1935 and 1938 and have run, on average, up to 2,500,000 miles each.

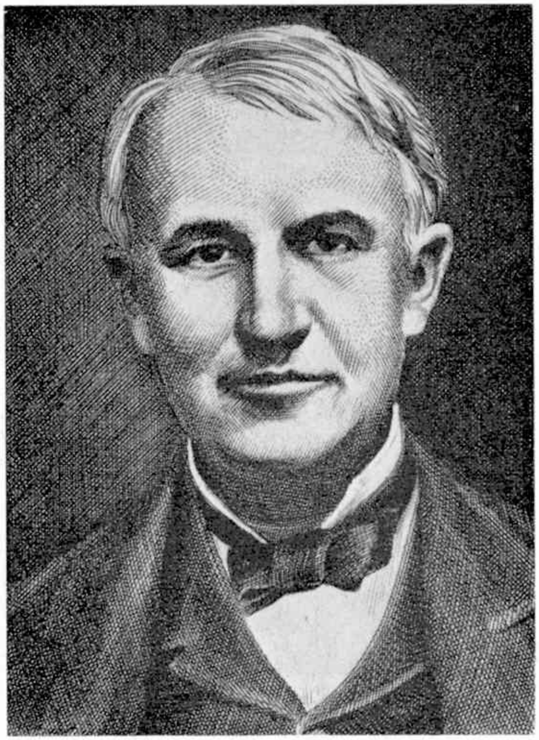


Right: A Hawker Siddley "Harrier" jet makes a vertical landing in a disused coal yard at St. Pancras, London, after flying the Atlantic on May 9th, in the Daily Mail Air Race.

GREAT ENGINEERS – No. 20

THOMAS EDISON

by A. W. NEAL

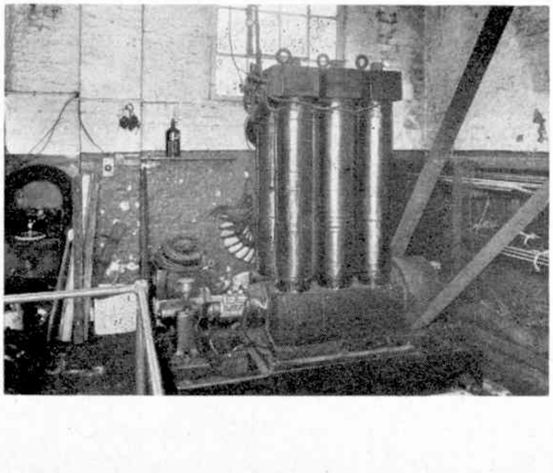


EDISON WAS born in Milan, Ohio, U.S.A., just after the telegraph line extending from New York City to Washington, D.C. was installed, and just before the first international telegraph cable was laid between England and France. The electrical era was under way, a fitting time for the self-taught practical genius to make his appearance.

In 1854, following "a collapse of the family fortunes", the Edison's resettled in Port Huron, Michigan. Thomas, one of a large family, commenced school at a one-room establishment, but he seems to have been very troublesome and was removed, his mother taking over the task of teaching him the first principles of education. Difficult as he was, he showed an early interest in all things scientific. His bedroom became a "mess", and this resulted in his banishment to a cellar. It was in this vault that he made his first telegraph in 1867. To help with his keep he had a market garden and sold newspapers locally.

The railway came to Port Huron in 1859 and Thomas travelled on the trains selling newspapers, and then he became a train boy. At the age of 16 he obtained employment as a railway telegraphist and travelled the line during the course of his duties. While in Indianapolis he rigged up a telegraphic repeating device and used it on his employers' telegraphic system without authority to do so. When it was discovered it was removed and he was severely reprimanded.

Gradually he found his feet as an inventor, and in 1868 he patented an electric vote recorder, and in 1870 a "ticker" for market reports. Then followed a whole galaxy of inventions, including his famous "Phonograph", whereby sounds were recorded on tinfoil. It was the forerunner of the gramophone that has been responsible for the huge 'disc' industry of today. He devised a loud-speaking telephone which was put on trial on a London-Norwich telephone line.



The possibility of converting electric current into illumination had eluded many engineers and scientists in the nineteenth century, but by the 1860's lighthouses began to be lit by electric arc lamps. It is not surprising that Edison entered this field with his own distinct brand of zeal. After considerable research he constructed an electric lamp with a charred brown paper filament, and in 1880, one year later, another which had a carbonised bamboo filament. One can appreciate the flutter these developments caused in the gas industry of the day. Joseph Wilson Swan (afterwards Sir Joseph) was, at the same time busy on his conception of an incandescent electric lamp, and he had a company to exploit the invention. Edison also had an organisation for the same purpose. Eventually they came together to form the Edison and Swan United Electric Lighting Company. Unfortunately, how all of this came about is far too long to quote here in detail.

Not content with these activities, Edison went on to design a shunt-wound dynamo with a drum-wound armature, and his system of electric lighting was demonstrated at the Great Exhibition in Paris in 1881. Eventually he was the author of more than 1,000 inventions

From boyhood Edison suffered from deafness, and he never really mastered spelling. These disadvantages would have crippled a lesser man, but they made no difference to Edison. Indeed, he emerges as a key figure—a physicist more than an engineer—in the development of modern technology.

This fertile and diverse inventor died on Sunday the 18th October, 1931.

BRITAIN'S MOUNTAIN MOTORWAY

A new Engineering project described by A. GAUNT

This model was used to assist in early location work. The proposed route of the new Motorway is shown running straight down the centre.

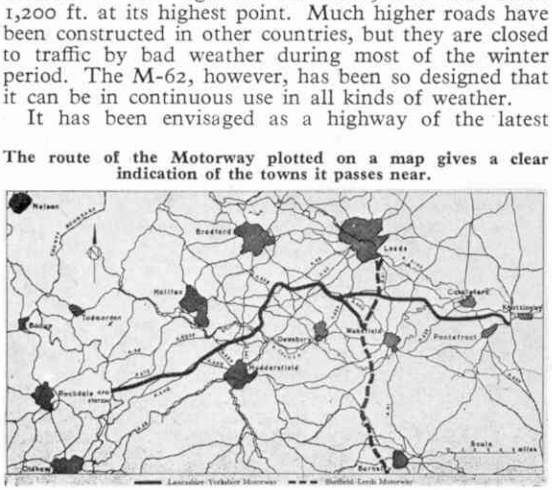
WITH THE help of meteorologists and experts in various other branches of science, civil engineers are creating a super-highway unique in Britain. It's the 54-mile M-62, more colourfully described as the Trans-Pennine Motorway.

Running right across Yorkshire and Lancashire, it will eventually be a coast-to-coast highway tailored to the standard called for by long-distance fast traffic today. Considerable sections are expected to be in use by 1971, and the whole route is scheduled to be open in 1972-1973.

The singularity of this motorway is that it will straddle the Pennine Chain, the mountain range often referred to as England's Backbone, and will reach 1,200 ft. at its highest point. Much higher roads have been constructed in other countries, but they are closed to traffic by bad weather during most of the winter period. The M-62, however, has been so designed that it can be in continuous use in all kinds of weather.

It has been envisaged as a highway of the latest type, giving complete freedom of movement for up to 100,000 vehicles a day for 365 days of the year, no matter what kind of weather occurs. The route is subjected to snow, ice, fog, and gales, yet the new highway must not be closed.

The route of the Motorway plotted on a map gives a clear indication of the towns it passes near.



Its general purpose is to provide a new artery for traffic between the industrial areas of Yorkshire and Lancashire. With other motorways now completed or under construction it will ultimately provide direct up-to-date links with the Manchester docks, the Trafford Park industrial area, and North Cheshire.

It will connect with Liverpool and the M-61 (the Manchester-Preston motorway) and the Birmingham-Preston-Carlisle motorway (the M-6). A later stage will provide connections of the same kind with the new docks at Seaforth, and a motorway from the M-6 to Blackpool has also been planned.

Meeting the abnormal weather conditions of the route has been a major consideration in planning the Trans-Pennine motorway. Two possible routes were finally worked out, one reaching 1,350 ft. and the other about 100 ft. lower at its highest point.

To obtain the necessary weather data, ten meteorological stations were set up. Manned by volunteer meteorologists they have provided information about rainfall, snowfall, wind direction, wind speed, visibilty, and temperature. Other sources were used to give a broader picture, records of weather conditions in the region for several years being studied.

The data revealed that the lower of the two routes promised to be the more suitable. It had 40 per cent less fog, 10 per cent less frost, and 20 per cent less snow than the higher one. It was also better shielded from high winds.

In addition 27 traffic census points were set up to find out how many vehicles could be expected to use the motorway. The census, carried out in conjunction with "screen lines" through which vehicles had to pass, showed clearly that dual three-lane carriage-ways along the whole length of the Pennine Motorway would be justified.

Pennine weather conditions necessitated other research to eliminate or reduce the hazards likely to be experienced on the most exposed sections. The M-62 will include several viaducts, bridges, and deep cuttings, so that the danger of traffic being blown from the carriageway will be real unless counter-measures are taken.

Thus, the motorway will cross the Scammonden Valley on a big embankment which is to serve as a reservoir dam for Huddersfield Corporation. On other stretches traffic will pass through cuttings, some of them 150 ft. deep. To find out just how motor vehicles are likely to be affected by such circumstances, models have been tested in a wind-tunnel at the National Physical Laboratory, Teddington.

From these tests it has become clear that the most dangerous points will be where traffic emerges from a cutting and is subjected to a sudden side wind.

Scientific experiments with models have proved that the risk can be substantially reduced by paring down the ends of the cuttings, thereby making the wind impact gradual.

Snow is a big hazard (though fog is a greater one), and research into the former problem is another activity carried out at the National Physical Laboratory. It has been found that the shape of an embankment affects the amount of snow deposited on the motorway.

To endorse the laboratory findings, full-scale trials have been carried out on the route of the M-62. Different types of embankments have been built to see how they influence the snow question, and several kinds of fencing have been erected, to determine the ones which keep snow from the highway most effectively, or which will be most successful in protecting vehicles from gale force winds.

Botanists have been recruited not only to landscape the route but also to reveal the influence of roadside trees on the state of the motorway. It has been found that, in addition to acting as wind-breaks, they collect and hold snow which would otherwise reach the road.

The Arctic conditions which sometimes occur on the most exposed stretches of the route are evident from this photograph, taken in February, 1963.

The A640 as it is today. When extended into a Motorway, it will have three traffic lanes in both directions.

Even the kind of tree has been found to be important, some retaining more snow than others. Sycamore and spruce have been found the most suitable, because they form a dense canopy. This horizontal shield causes air turbulence and encourages the snow to fall on the trees instead of on the motorway.

Mastering the moors has confronted civil engineers with some less obvious problems. For instance, sheep graze there, but they must be prevented from straying on to the carriageways and endangering traffic.

So to fence the M-62 successfully it will be necessary to set up barriers which sheep cannot penetrate. Yet the fencing must be a type that protects the road from snow, not one which causes snow to collect and blow on to the carriageway.

A type with pylon posts and a crimped continuous mesh has been specially developed to meet these requirements.

Near Worsley, in Lancashire, it will have to cross the A-580 trunk road (known locally as the East Lancashire Road), and the lowering of that highway, so that the Pennine Motorway can pass over it, began in 1966. In the same year the Ministry of Transport authorised the construction of a viaduct to take the motorway across the Longden End Valley, near Milnrow.

One advantage of building the A-62 in sections is that the heavy vehicles carrying excavated material have a suitable route. Thus, work on the Milnrow-Rakewood section will facilitate the transportation of rock and other materials from a cutting in the Pennines. The aim is to construct the motorway with the least possible interference to other traffic using existing roads.

The whole project will cost about £40,000,000, but it will provide the first Trans-Pennine route passable in all kinds of weather—snow, fog, or frost. It is one of the most ambitious road-building schemes ever tackled, certainly as far as Great Britain is concerned.

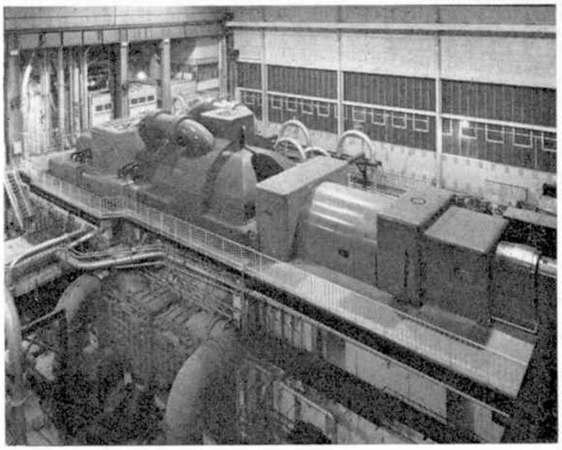
Unexpected snags have been met along some stretches of the route, such as peat beds which have threatened to swallow not only tons of road-building materials but bulldozers and other tracked vehicles as well!

The progress of the M-62 is being closely watched abroad as well as in Britain. It was discussed at the 1966 conference of the International Road Federation in London, when road experts from all over the world met to exchange ideas and hear about the latest methods of solving their problems.

It is interesting to recall that the provision of a good Trans-Pennine highway was one of the ambitions of "Blind Jack," the Knaresborough roadmaker. He did, in fact, construct some roads in the hilly parts of the West Riding. But it is unlikely that he ever foresaw the time when a motorway would connect the east and west coasts—and that it would be in regular use, no matter what the weather.

Targets were set up along the route and regular observations made, to obtain information about visibility in various weather conditions.

STEAM TURBINE BLADING

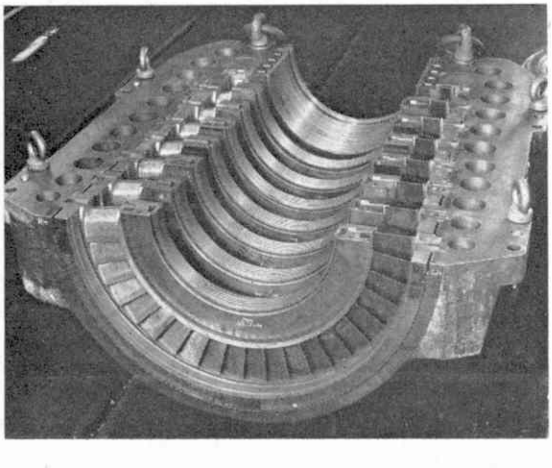


by L. J. Wilkinson, Department of Mechanical Engineering, The City University, London

THE ELECTRICITY we all use at home is generated at power stations connected throughout the country by the National Grid System. The generators, like the one shown above, are driven by steam turbines, whose function is to convert the thermal (heat) energy present in steam at high pressure and temperature into mechanical work at the shaft connecting the turbines with the generator; this conversion takes place in the turbine blade passages. In order that electricity can be produced cheaply, this conversion must take place as efficiently as possible and, as electrical energy cannot readily be stored, the turbo-generator must be capable of running continuously for long periods. The design of the turbine blading plays a major part in meeting these requirements and imposes considerable demands on the design engineer.

Blade profiles

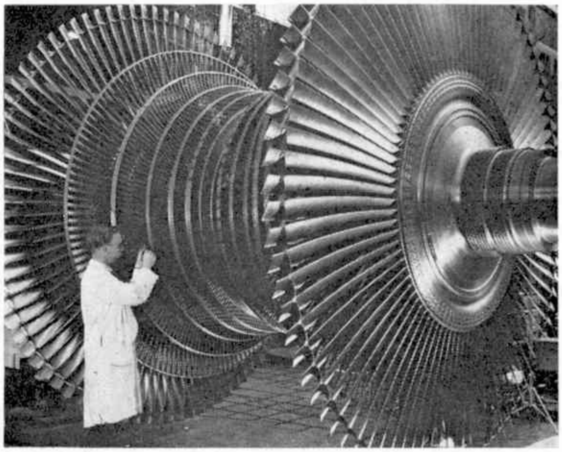
The conversion of energy in the steam to mechanical work at the turbine shaft takes place in "stages". In a large turbine driving a 500,000 kilowatt (that is 650,000 H.P.) generator there will be between forty and fifty such stages divided between four separate casings. Each stage consists of a row of fixed blades attached to the casings (below) and a row of rotating or "moving" blades attached to the shaft or "rotor" (over page). The fixed blades are arranged to form a nozzle, rather like that at the end of a hosepipe, in which the velocity of the steam is increased at the expense of its pressure and temperature. The high velocity jet of steam from the nozzles enters the moving blades where it is deflected to produce a thrust on the rotor. It is essential that the steam enters the passages between the moving blades as smoothly as possible. Because the rotor blades are moving past the fixed blades, the angle at which steam appears to approach the moving blades differs from that at which it leaves the stationary blades. This new angle is determined by constructing a "vector diagram" in which the velocities are represented in magnitude and direction by lines of appropriate length. Anyone who has attempted to row directly across a fast-flowing stream without heading upstream will appreciate the significance of this type of diagram. Because the moving blade velocity increases along the length of the blade from base to tip, the shape of the vector diagram varies throughout the blade length and the apparent inlet angle increases with blade length. This is allowed for by making the blades in a twisted form; the longer the blade the greater the amount of twist. This can be seen by comparing Figs. 3 and 4. The shape of the passages is also of prime importance and much research is carried out using wind tunnels to determine the most efficient blade profiles.



Blade materials

To achieve maximum efficiency the turbine must accept steam at as high a pressure and temperature as possible and exhaust it at as low a pressure and temperature as possible, the limits being dictated by the materials available to the engineer. In the high pressure casing of the turbine, where steam is first admitted, temperatures in excess of 500°C are encountered, and at these temperatures a phenomenon called "creep" occurs. This is the continuous growth over a long time of those parts of the turbine that are subject to stresses. As the rotating parts are highly stressed and the clearances between the rotor and casing must be kept as small as possible, this phenomenon is of

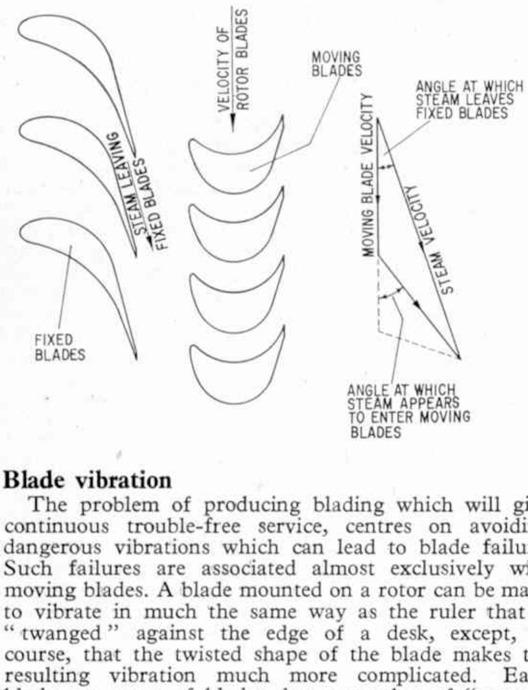
Above: A 120,000 kilowatt turbo-generator. The electric generator is on the right and the steam turbine is on the left. Left: The fixed blades are shown here mounted in their casing.



Right: One of two low pressure rotors for a 500,000 kilowatt turbo-generator.
Bottom right: The intermediate pressure, rotor for a 500,000 kilowatt turbo-generator.
Photographs courtesy of C. A. Parsons & Co. Ltd.

particular importance in the design of blading. " Creep " is confined by keeping blade stresses to within prescribed limits and using materials which are creep resistant, namely steels containing alloying elements such as chromium, molyldenum and vanadium,

At the exhaust end of the turbine where temperatures are quite low and pressures below atmospheric, the problems are quite different. The steam here is very much less dense than at inlet and consequently, to pass a given quantity of steam, blades must be much longer. On the right is a low pressure rotor where the last wheel has blades 37 inches long and an overall diameter of some 11 feet. When rotating at 3,000 rev/min each blade on this wheel exerts a pull of some 90 tons on the rotor, and the speed of the tip of the blade is supersonic! Materials for use here must withstand these high loads and in particular the rotor material must be capable of being formed into the large forgings from which the rotor is machined. Nickel is an important alloying element in these steels.

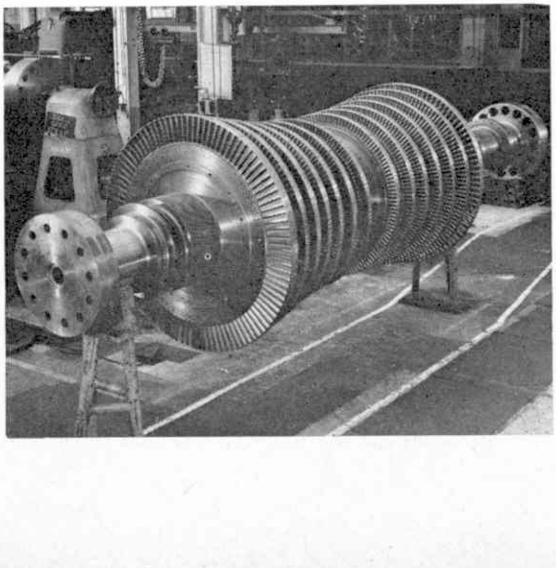


Above: The vector diagram that is used to determine the angle at which steam approaches the blades. The dotted lines show a section of the blade nearer the top where the blade velocity is higher.

Blade vibration

The problem of producing blading which will give continuous trouble-free service, centres on avoiding dangerous vibrations which can lead to blade failure. Such failures are associated almost exclusively with moving blades. A blade mounted on a rotor can be made to vibrate in much the same way as the ruler that is " twanged " against the edge of a desk, except, of course, that the twisted shape of the blade makes the resulting vibration much more complicated. Each blade, or group of blades, has a number of " natural frequencies " at which dangerously large vibrations may occur, and if the blade is forced to vibrate at one of these frequencies in the turbine the blade may break off. The consequence of such failures have been demonstrated only too well after the recent failure of blades on the Q.E.2 turbines. The source of these vibrations may be the impulses which the blades receive as they pass the fixed nozzles, or perhaps forces which arise if the rotor is unbalanced. In order that vibration due to nozzle impulses may be avoided the designer must know the natural frequencies of a given blade and also know from experience which of these frequencies are likely to give rise to blade failure. Vibrations due to rotor unbalance are kept to a minimum by careful balancing of the rotor after assembly.

Blade natural frequencies can be measured in the laboratory with strain gauges which are attached to groups of blades mounted as in the actual turbine. With information from these tests a suitable combination of fixed and moving blades may be chosen to ensure freedom from vibration troubles. In the case of very long blades, the blade cannot be considered to vibrate in isolation, and here the vibration of blade and disc together is investigated. In this case the natural frequencies of the bladed wheel are considerably affected by the speed of rotation. This effect is studied by supplying power from an external source to strain gauges attached to the blades to vibrate the wheel whilst it is rotating in a special vacuum chamber. The behaviour of these long blades in service can be investigated with strain gauges left on the blades whilst the turbine is generating electricity in the power station, as outlined by Dr. Coutts in his article " Electrical Resistance Strain Gauges " (MECCANO MAGAZINE, JULY 1968). The results from such tests will point the way to future blade design in an effort to improve blading efficiency and reliability.



BATTLE

by Charles Grant

PART XVII COMMUNICATIONS

AT THE conclusion of the first phase of the "Action at Twin Farms" (Part XVI), the commander of the RED reconnaissance group was in something of a quandry. It was obvious to him that he needed some sort of support to flush BLACK out of his defensive position, and we left him in the process of making up his mind on the question of what sort of assistance he should summon. What actively concerns us at the moment is not the composition of the follow-up force but rather the means he adopted to ensure its arrival, and this is really very obvious—he called up his base by radio and uttered his cry for help. We can ignore the dramatic dash of the motor cycle dispatch rider—a trifle out of date now.

Now this may not be quite such a simple job as switching on one's transitor, for we are speaking of radio communication under active service conditions, with transmitters and receivers being carried about in vehicles over all sorts of terrain, allowing these delicate pieces of apparatus to be bumped around in a manner calculated to do them no good at all. Generally speaking, the treatment they receive in this way as well as at the hands of an operator frequently working under extreme pressure in desperately anxious circumstances is enough to write-off even the toughest radio equipment. Anyone with wartime experience of the uncertainties of W/T communication can appreciate what a chancy thing it was to get a message through to the proper recipient and how the whole process of radio transmission and reception was a most hazardous, not to say frustrating, process.

What we have to do first is to establish rules to cover whether or not, or how soon, communication by W/T or R/T can be achieved, and also to make allowance for the possibility that the link can be severed at any time for any one of several reasons, atmospherics, technical failure and so on. As a sort of follow-up we shall decide on the composition of a signals section for the infantry organisation we have begun to build up, the start of which was the half-tracked group described in Part XV.

So, briefly to go through the chain of events, the C.O. of RED reconnaissance group instructs his operator—if the latter has not already done so—to make contact with base or command headquarters, or whatever the next highest link in the chain of command might be. This is probably the most difficult part of the operation—the 'getting through'—and once this has been done, it is much less difficult to keep up the contact. So, with the operator in position—headphones and 'mike' at the ready—we have to take an average of the possibilities and estimate what are his chances of getting through immediately. These are not really tremendous for, apart from technical difficulties, the chap 'at the other end' might be engaged with a third party, and we must allow for an initial delay which might be anything up to several minutes. We make our decision by means of a dice throw—one only being used this time—to determine whether instant contact has been made or not. It seems reasonable to say that the chances of this are about two to one against, so if, when we throw the single dice, it produces a 5 or a 6, well and good, the operator is 'through' and he can get on with relaying the message, asking for orders, seeking assistance, or making a report. This operation must be carried out only once per game move and, naturally, if the 5 or 6 be not obtained, communication has not been established, and we have to wait for the next move for a similar dice throw to be made, and so on, on every move, until the 5 or 6 has been thrown. Once the radio link has been established, it has to be maintained, and on each subsequent move, a dice throw is required to show that the W/T operator is still in touch. Nothing like the high throw required to open communication is necessary, anything but a 1 sufficing to show that contact is still loud and clear. If 1 does come up, however, then the process of obtaining the link has to be gone through again, that is, the 5 or 6 throw has to be made, once per move, until it is obtained.

All the above refers to the normal sort of communication between units—either headquarter or subordinate—but the rules also govern, as we shall see later, the more specialised role of the Artillery Forward Observation Officer, who is directing the fire of his guns by giving, over the radio, references to guide the aim of his gunners who are out of sight of the target and may indeed be miles away. Of this, more later.

Let us go on, then, to examine the composition of the radio section of the Reconnaissance Group. It could of course be included in the personnel of one of the half-tracks, but it is better to provide it with its own transport, giving it more independence of action as well as more room for the equipment than would be possible in the pretty crowded half-track, cluttered up in any case with men and their weapons. We shall require a fairly small and fast type of vehicle for the job, and what better in fact than the ubiquitous jeep—ubiquitous as far as the Allied armies were concerned, and if one has a German type army, well, then, it could be a captured one. In fact, although we are thinking in terms of World War II, I don't believe that there would be any great objection to our using a more modern type of vehicle—there are many such available in our scale—but the jeep would be more than adequate for the purpose. To signify its special function, we could, by using a spot of Evostick or other suitable glue, attach to its rear a length of thin wire to represent an aerial—and its use becomes at once apparent.

As to the crew, we first have the driver, letting him be an integral part of the vehicle—from the casualty point of view—as we did in the case of the half-tracks. Their drivers were totally enclosed and invisible, but no matter, if the jeep is destroyed, we assume the driver automatically becomes a casualty. Then there is the W/T operator himself, and we can, if we like, use a little conversion to produce this essential member of the team. We did show that the jeep was equipped with W/T by affixing an aerial, but it makes the individual function more obvious if he too has some kind of indication of his job. If the wargamer, however, thinks the jeep aerial sufficient, he need not spend too much time on the operator, and can use—just as an example, and if his army is built up on the Airfix Russians—the kneeling tommy gunner. Simply cut away—with some care—the SMG, and you have a figure which can be used as a gunner as well as the radioman we want him for at present. If you wish, he can be treated as shown in the photograph, by having a tiny block of balsa stuck to his base and by sticking to the little block a length of wire for the aerial. There you have the W/T man in action. This might indeed influence the wargamer to give the operator a sort of second chance if his vehicle—naturally plus equipment —is destroyed, and he survives himself. The set with the figure could be deemed portable equipment with which, despite the loss of his main gear he could possibly maintain contact. It's just an idea though, and entirely up to the individual wargamer.

To allow for the fact that the operator is pretty busy sending and receiving messages, there would be a third man to complete the crew. He would possibly be an officer or an N.C.O. The latter will suffice for us. As 'Signals' N.C.O. he would be occupied with the staff work of his section, and, as an experienced soldier, would be able to keep a 'look-see' at what was going on around him and to use his authority according to circumstances, particularly if the jeep, as might often be the case, was sent ahead of the main group on a scouting or roving commission.

So, to the establishment of the infantry group we described in Part XV we add the jeep and its crew of three—driver, the signals N.C.O., and the W/T operator.

Taking the last named as a starting point, it follows that we devote a few words to the next link in the chain. When seeking orders, the group commander would naturally do so from his immediate superior, this being, in our case, the officer commanding the groups making up the next formation—let us call it a battalion and stipulate that it comprises three such infantry groups as we have described. In fact, having regard to its transport, we have every right to describe it as a Motorised Infantry Battalion. It is to the Battalion Headquarters that the W/T operator would normally make his call (we'll take up the question of the overall composition of the Headquarters Group later. At this level, R/T organisation is going to be considerably more complex than it was with the Group setup, there being doubtless several radio channels, both to the component units of the battalion and to any higher command there might be. A rather larger and more elaborate installation would be required and its transport must be something larger than a jeep. If you like, it could be anything up to the size of a $2\frac{1}{2}$-ton truck—it depends on what one wants to acquire if a suitable spare vehicle is not to hand. It's better still, of course, to use a vehicle specially designed for the purpose and I think that one could use, without too much criticism for being 'out of period', the Dodge radio truck in the Minitanks range.

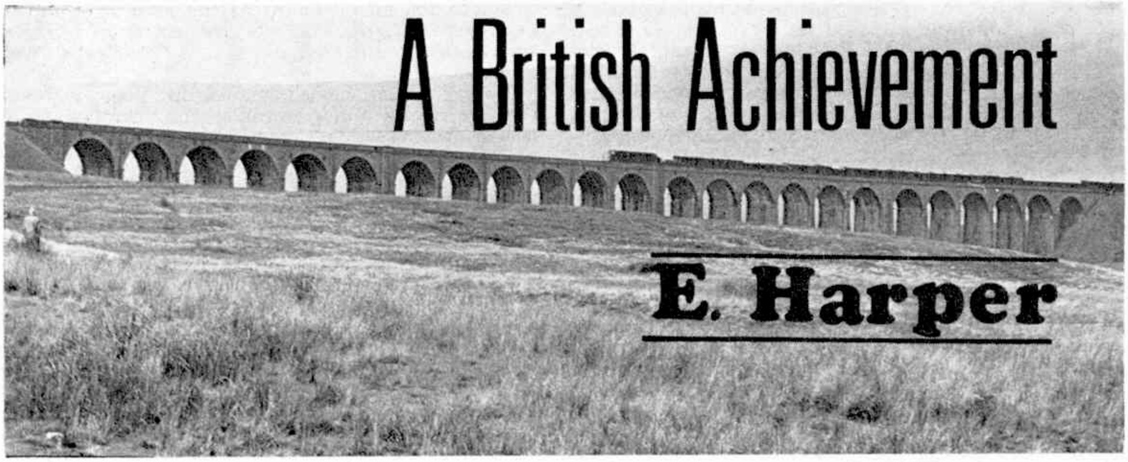
It must be assumed that rather a larger technical crew would be required for the battalion signals vehicle, and we must consider two W/T operators to be essential. In the case of the headquarters section it might not be deemed necessary to show the purpose of the figures as we did with the radioman in the infantry group and any two figures suitably positioned will be adequate—the very useful kneeling submachine gunner in the case of Russian type forces is as good as any—with, of course, the SMG carefully pruned away as was done for the other. One of the two could be graded as an NCO, this doing away with the necessity for having an additional figure to represent the 'command' element. There will be more than enough of this in the headquarters personnel anyway.

While on the subject of the Headquarters, we might as well finish by devoting a little time to the battalion commander and his transport—it will save time later. The command car can really be anything the officer in question cares to use and he will have a fairly wide latitude in his choice (indeed he may have more than one vehicle at his disposal, rather like the commander

Continued on page 469

Heading photograph shows a Battalion Command Car and Commander. The driver is (temporarily) missing.

Right: Headquarters radio truck and crew. The left-hand figure is the Sergeant Major who would properly be with the Battalion C.O. in the Command car (a slight error in setting the group up for photography !).



A British Achievement

E. Harper

The construction of a main line railway through some of the most exposed areas in England

WE MARVEL at examples of modern engineering, such as the Mont Blanc Tunnel. We enthuse over ancient Roman viaducts. Yet our own comparatively recent achievements are soon forgotten.

What, for exmple, do you know about the Ribblehead Viaduct in Yorkshire?

It started in 1869—just one hundred years ago—a vast north country construction job, destined to employ thousands of labourers and skilled technicians, and to destroy hundreds of them. A Parliamentary order, signed in the spring of that year, initiated work on the highest and most exposed main line railway in England.

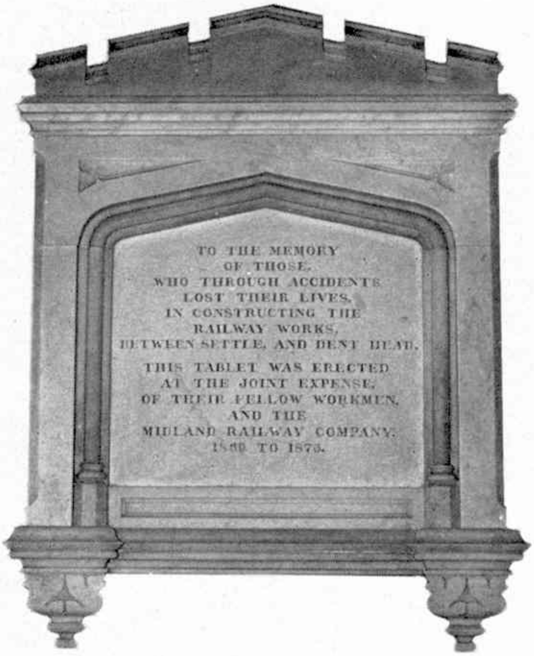
It traversed the high Fell country, channelled the high ground, spanned the Dales on gigantic viaducts and ledges. The measure of the task facing those men responsible for laying the line between Settle and Carlisle was such as to deserve a national memorial to their skill and bravery, but, as with most pioneering ventures, their story has been lost in the oblivion of time, their route is established and taken for granted—receiving only adverse publicity when deep, drifting snow, storm force winds and arctic conditions cause trains to run behind schedule, sometimes to cease entirely for days on end.

There is no national memorial to those pioneers, but every viaduct, every hand-hewn tunnel forms part of a far more realistic memorial, but, only part. The snow fences reduced to scrap as blizzards sweep the line, the signal boxes snowed up to roof level, the platform buildings at Dent, which have been known to disappear entirely during the winter; lineside telephone wires, ice-swollen to the thickness of a man's arm—these are the true memorials. They are seen by relatively few, their significance appreciated by none.

But Fell walkers, Pot-holers, and the tourist can stop for a while at Ribblehead. Here at the meeting of Ribbledale and Chapel-le-dale is the largest visible feature on the line, a viaduct with twenty-four arches constructed with every sixth pier more massive than its fellows, so that, should any single pier collapse, the overall damage will be limited to five arches. This viaduct was built over boggy ground, the highest arch more than 160 feet high. It took five years to build and stands in the path of winds which, in recent years have included bitter winter blasts of more than eighty miles an hour. To the north it leads into a tunnel which penetrates more than a mile-and-a-half through Blea Moor, five hundred feet below ground level, an unseen achievement with a story of its own.

To see a train cross the viaduct conveys a true sense of proportion. It looks like a toy train, and the viaduct, though dwarfed by the misty heights of Blea

Our heading photograph shows the Ribblehead viaduct with a train crossing its twenty-four arches.
Left: The Ribblehead Station where church services were once held.



Left: A stone plaque commemorating those who lost their lives during the construction of the line.
Below: The church of St. Leonard where some of the men are buried.

Moor, takes on a new meaning. If a gale wind is blowing, a pocket-handkerchief size tarpaulin may be seen to flutter earthwards, torn from a goods wagon. The bog, known as Batty Moss, beneath the piers, had a ghastly appetite for men, horses and building materials. Indeed a special bog-cart was invented, probably with a degree of success but it had to be drawn by luckless horses who would sink in the oozing mud and had to be dragged out by their necks. Around the viaduct, where the traveller may seek refreshment at the ever-welcoming Station Hotel, there was a shanty town, one hundred years ago.

Today there is no sign of the shanty town—it was a true shanty town, in the best tradition of American history—but before moving on, wander up the lane to Ribblehead Station. A desolate, lonely place where church services were once held in the Waiting Room, and from where the Station Master sends hourly reports to the London weather office. In August and September sheep sales are held on the approach road.

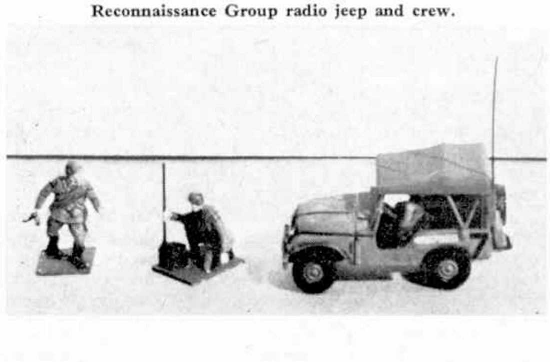
To complete the pilgrimage, move along the road to Chapel-le-dale. Here, in the tiny church of St. Leonard is a conventional memorial, a plaque on a wall commemorating those whose lives were lost during the construction of the local line. There were nameless, numberless men. Many of them are buried in the churchyard, which proved too small, so it was necessary to open an extension to the burial ground. There are at least a hundred labourers buried here, most of the graves being unmarked. Others are known to be buried on the surrounding hills.

A marble memorial is in the church, but their true memorial is the Viaduct spanning the Fells.

Battle—continued from page 467

of a certain wartime R.A.F. Station, who, I recall, had for his personal use no less than nine aircraft, ranging from a Tiger Moth to a Hawker Typhoon!). One, however, will be enough for us, but again we might be allowed to step a little out of our period and choose the Dodge command car—a first rate little model (Minitanks, that is). Our CO himself can be seen in the photograph. German army enthusiasts are lucky in having the chap with the splendid high-fronted cap —in the Airfix series, I mean, and we must have one who looks just as fine, if we can. *Our* CO is a bit of a fiddle, in fact, consisting of an Airfix German officer of 1914-18 with the head removed and replaced by a Russian helmeted one. There is no doubt as to who is the commanding officer, I feel. The choice for the second occupant of the command car is open—it can be another officer, the second in command, a sergeant-major or some such, this is up to the wargamer. For my part, I opted for a sergeant-major. Being such an important character, it was felt that he should really be represented by an officer type figure. By the judicious application of a little heat—a compass point warmed in a candle flame was enough—the right arm can be gently bent from the shoulder to be left in a less aggressive attitude—one way of identifying the individual figure is to have him in a different position. It saves having to pick him up and peer at him for microscopic ensignia. He—the sergeant-major—and the CO, plus the inevitable 'fixed' driver, comprise the occupants of the command car, which, together with the battalion W/T vehicle, form the rudimentary basis for the Headquarters Group to which further additions will be made as we find necessary.

Reconnaissance Group radio jeep and crew.



RADIO 4-2 PROJECT

Notes on Operating "CORKER"

WHAT A CORKER !

Well, here she is, and a picture of the Editor at the pondside trying her out! We are lucky to have a stretch of water just outside the editorial office, shared by a rather angry father swan, mother swan and five cygnets, plus any number of ducks, visiting swans and moorhens, so that water tests are easy . . . it is several miles to the nearest flying field. . . . This is CORKER in the picture, and we are happy to say the works went together like a dream, and the radio performed splendidly from the start. In spite of our good advice in last month's supplement our combination of motor radio gear (Orbit 505 and Mainstream Supergen) produced not a single unwanted spark of interference, so that it was unnecessary to instal any capacitors or chokes. You may well be equally lucky in your choice of combinations, but this is really the exception rather than the rule.

FOOTING THE BILL

The cost of items we have used is set out in a table. This is not the cheapest way we could have gone about it, nor is it the dearest. We have put in everything used, but in many modelling families a part of the materials used would have come from the junk box, or been material left over from other work. If you have to buy everything this time, then with your next model you too should have some bits and pieces left to draw upon.

Another little point we think should be made is that the radio equipment can be removed and put into another model. Thus we find the keen aeromodeller arriving at his flying field, but unable to fly because, say, of high winds, can then take out his receiver and fit it into his boat (which he has thoughtfully brought along too) and still enjoy a day's sport on a nearby pond. With reasonable care outfits should last indefinitely apart from replacement of batteries. Then, at long last, with some experience behind him, the r/c enthusiast can progress to a more elaborate type of radio control which this experience will qualify him to handle with much less risk of damage, and pass on his original gear to a friend or younger brother. But there will still be days when he will borrow it back again and enjoy simple radio control once again.

WHAT TO DO ON THE WATER

For the first outing or two the beginner will be well content to learn mastery of his boat. He will find it increasingly easy to judge just when to turn the rudder for a particular movement. He will find that turns where he can see the boat at an angle are the easiest; those from dead astern or straight ahead the hardest. He will also see that as the boat goes into the distance it becomes harder and harder to judge movements. According to eyesight there will be a "best area" for operation, perhaps up to about eighty yards—it may even be that the pond or pool chosen can be entirely covered without loss of sure control.

There are lots of schemes that can be tried, docking, going through a close space between buoys and so on. They are all things you would be expected to do in club or national competitions.

PARTS LIST

Radio:	£ s. d.
Receiver	6.10. 0
Transmitter	6. 9. 0
Rudder Servo (1) (Mainstream ECS/3PN, ...	3.11.10
	16.10.10
Boat:	
Hull (vacuum formed plastic	12. 6
(2) Balsa (deck, etc.)	6.11
Electric Motor (Orbit 505)	6. 6
On/Off Switches (2—Rx and motor)	7. 4
(3) Battery Boxes (3—Motor, Rx, Servo)	11. 0
Rudder Assembly: (Plastic rudder, rudder tube, tiller arm YM 1010) abt.	6. 6
(4) Propshaft assembly—prop, shaft tube, neoprene coupling	1. 6
Cement, paint, misc.	6. 0
Batteries	6. 7
	3. 3.10

(1) Ours really too good! A cheaper simpler type is in preparation and will cost about 30/-.
(2) All-balsa boat costs about 16/-.
(3) Battery boxes are a luxury—you can save this and make up in scrap wood.
(4) This is very cheapest "readymade." Made up at home in metal can be very cheap, or shop prices 6/- upwards.

MECCANO MAGAZINE MODEL CLUB

On the plan supplement with this issue you will find a form to complete. This should be sent as directed with your postal order. We are sure you will find belonging to the club worthwhile. There is also another form to enable you to get a plastic ready-made hull. Many local model shops will be stocking them, but if you cannot get one at home, then send off to the makers, who can also supply anything else you may need.

HAVE YOU SEEN?

The Corgi Concorde

Very few people in the world have been fortunate enough to set their gleaming eyes on the breathtaking Concorde. Now, not only can you see one, but you can also own one, though it be only 7½ in. long, with a wing span of 3$\frac{5}{16}$ in., and costs 10s. 6d.

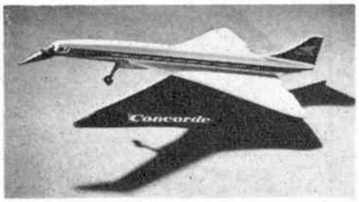
CORGI have made a very good job of producing a true-to-life model of the Sud-Aviation B.A.C. Concorde. It is finished in B.O.A.C. livery (Air France livery for marketing in France), and is supplied complete with a plinth on which the model assumes the futuristic stance of the real Concorde coming into land or taking off. The landing gear is moulded in the lowered position, but the droop-snoot can be altered into the two positions; nose-down for ground manoeuvring and nose-up for supersonic flight.

This model is very attractive and is suitable for both bedroom and lounge, on the mantlepiece or table.

Watercheck by Automents

If your dad is a car owner, tell him to read this.

Any normal car owner cannot possibly be expected to remember to check everything on his car. Things like battery, oil, tyres and radiator water level, often get neglected. Now Automents Ltd. have introduced a little gadget that could



save the car owner a great deal of time and money. "WATERCHECK" is an instrument that automatically checks the radiator water level. Although many cars are fitted with a temperature gauge, this does not usually give an alarm or sufficiently early warning of loss of water. "WATERCHECK," however, is fitted with a probe that is easily fitted into the radiator at a pre-determined level. When the water level falls to the level of the probe, it passes a signal to the instrument at the dashboard, and an amber lamp flashes warning the driver.

The instrument, finished in matt black with raised silver letters, fits easily beneath the dashboard, with self tapping screws and only 3 electrical connections. There are two models available, one for positive and one for negative earth vehicles. Both models cost £3.15.0d., which is only a small investment where a high cost engine is concerned.

Airfix Jaguar 420G

One of the latest car construction kits to be released by AIRFIX is the "Car of the Year" Jaguar 420G. This 1/32 scale kit, composed of 114 parts has been added to the AIRFIX range of Modern Cars—series 3.

Among the many features are detailed engine and exhaust system, all-round independent suspension, windows and bumpers and trafficators. A driver is also included. His arms are separate to that they can be mounted in various steering wheel positions. The steering wheel is of the true Jaguar style, and arms for overdrive and trafficators are fitted to the steering column. The seats are also well detailed, down to the small elbow rests for the driver and front passenger. No Jaguar car would be complete without the well-known radiator and boot motifs, so AIRFIX have also included these.

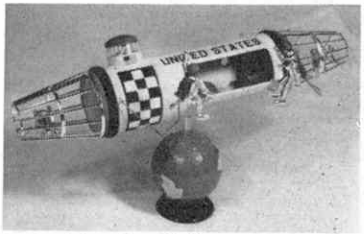
This 5s. 6d. kit is complete with assembly and painting instructions and two sets of registration plates.

Monogram's Space Buggy

One of the many problems encountered in space travel and outer space habitation is that of transporting men and materials short distances. To overcome this, the Americans have developed the Space Buggy. This is simply a metal cylinder, 22 feet long, with entrance doors at both ends and a cargo door in

the side, piloted by one man in a pressurised "tower."

Monogram's model features opening cargo door, which reveals the stored cargo inside; two space-suited astronauts are found floating about outside,



secured by wire life-lines, and the pilot can be seen through the glass in his tower. A small model of the world acts as a mount for the Space Buggy, attached to each other by a swivel pin. Colour arrangement on the globe is left to the builder's own imagination.

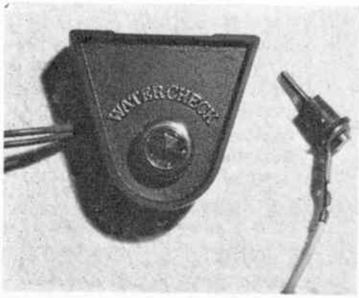
The two main halves of the model did not fit together too well, due we think to the fitting of one of the inside hatches, which seemed too big. But, on the whole the model is very pleasing, and when complete looks very authentic. Painting and assembly instructions are of course included.

Airfix Douglas Devastator

The first all metal aeroplane to serve with the U.S. Navy—the Douglas Devastator—although obsolete at Pearl Harbour, was featured in most major sea battles in the Pacific including that at Midway in June 1942.

The Airfix 1 : 72 scale kit of the Douglas Devastator is the latest addition to their Aircraft Series 2. Composed of 75 well detailed parts and costing 3/9d., the kit includes alternative main armament, a 21 inch torpedo and a heavy bomb, also alternative painting details and transfers. The undercarriage can be assembled in the lowered or raised positions, and the wings folded for deck and hangar storage. The 0.5 inch machine gun, which is mounted in the rear cockpit, can be pushed inside, and a full canopy included, or, if the gunner's canopy is omitted, it can be mounted ready for use.

The two variations of painting details and transfers for the Devastator are of VT-8 Squadron-U.S.S. Hornet, and a more colourful version of VT-5 Squadron—U.S.S. Yorktown.



Above left: The Corgi Concorde.

Above right: Monogram's Space Buggy.

Above: The Airfix Jaguar 420 G.

Left: The Automents Watercheck.

Right: The Airfix Douglas Devastator.

CLASSIFIED ADVERTISEMENTS

PRIVATE: Minimum 18 words 6s. and 4d. per word for each subsequent word.
TRADE: Minimum 18 words 12s. and 8d. per word for each subsequent word.
Box numbers count as six words when costing the advertisement. When addresses are included, these are chargeable at the same rate (4d. or 8d.) per word as the remainder of the advertisement. Copy and box number replies should be sent to the Classified Advertisement Department, MECCANO Magazine, 13-35 Bridge Street, Hemel Hempstead, Herts. Latest copy date for insertion in the October issue is August 8th.

FOR SALE

Collector's Sale: New/secondhand Hornby and Bing O gauge; new/secondhand Tri-ang, Trix, Dublo two/three rail items; obsolete mint/secondhand Dinkys, etc. Foolscap s.a.e. for lists.—Trevor Kay, 37 The Mall, London, W.5. Callers welcome by arrangement. U

Die-cast, Latest from Dugu, Rami, Norev (Moyen age), Tekno, Gama, Mercury, Politoys, Wiking. Also Dinky, Corgi, Spot-on, etc. Large s.a.e. Will be away August 6th-26th.—T. I. Jeffrey, Pitmullen House, Nr. St. Andrews, Fife, Scotland. U

700 American Comics £20 or will exchange for best Meccano set offered.—Wootton, 23 Edmund Road, Hastings, Sussex. U

(a) **Bound volumes** "Meccano Magazine" 1945, 1946, 1947, 1948, 25s. each. (b) Loose copies "Meccano Magazine," 1952 complete, 1953 complete, 1954 Jan., Feb., Mar., 1s. per copy.—A. Pearcy Jr., ARAeS. Cartrefle, 3, Ystad-y-Wenallt, Llanbedr, Merioneth, North Wales. U

For Sale. Yellow/Silver: Meccano No. 8, Power Drive Set, Mechanisms, Gears, Elektrikit, No. 1 motor. Good condition. £15 o.n.o.—21, Tuson Drive, Widnes. U

Slot and Railway Motors, most types rewound and tuned, 8s. 6d.—Geoff Layton, 59 Haven Baulk Avenue, Littleover, Derby. U

Tri-ang Hornby HO OO gauge train set various engines, stock, rails, points, transformers, etc. Base boards. Value approx. £55. No reasonable offer refused. List on request.—Bailey, 59 Nobes Avenue, Bridgemary, Gosport. U

Matchbox Labels/Booklet match covers on appro. From 1d. each.—Reeve, 128B King Street, London, W.6. S.A.E. please. U

Offers Invited for replica of parts 167a (Roller Races, Geared 192 Teeth) but without radial elongated holes, and special Pinion, 16 teeth. Make your own Channel Segments, Part 119. Complete channel section ring, 11½" radius and exact gauge, but undrilled. Can be used complete or will make seven segments. Price 30s. per ring.—D. Stokes, 33 Silverknowes Drive, Edinburgh 4EH 5LQ. U

Obsolete Dinky Toys for sale. Flying Fortress 62g; Mercury airliner (top section of Short Mayo combination) 63a: DH "Albatross" airliner: Thunderbolt racing car 23m: Hotchkiss racing car (2) 23b: "Speed of the Wind" 23e: Auto Union racer 23d: Spitfire, silver, 62a: Sports Tourer: 24h: 6-wheel Army truck 15 lb. Tractor, limber and howitzer set 162: Jeep: Leyland single deck coach: Petrol Lorry: Breakdown truck: Delivery Van: Aveling Bedford Road Roller (Supertoy). Best offer secures.—H. M. Hardaker, 41, Hospital Road, Riddlesden, Keighley, Yorkshire. U

230 M.M.s all different. 73 pre-42, 102, 43-60, 55, 61+ Offers for lot, buyer collects.—146 Kingsland Road, London, E.13. U

P/N 119 Channel Segments (improved pattern). Perfect replicas of these most useful parts available at $8.00 (Austr.) per set of 8. (Airmail $9.50).—W. R. Inglis, 219 Blackburn Road, South Blackburn, Victoria 3130, Australia. TU

Miniature Road Transport Transfers for your model Bus/Dinky models. Send stamp for list.—Mabex Products, 31 Pevensey Road, Eastbourne, Sussex. U

Hornby 2-rail OO gauge railway, over 50' track, 9 points, 5 locos. many accessories, cost over £40. Hardly used, offers.—Phone after 7 p.m. Tunbridge Wells 25244. U

36" R.A.F. Patrol Launch 3.5 c.c. Frog marine diesel engine planked bow, £12.—Mr. Walker, 193 Homerton High Street, Hackney, London, E.9. U

Collectors Sale of surplus Dinkys, Corgis, Spot-on, etc. Send to—D. Hardman, 20 Linden Road, Tunnel Hill, Worcester. U

WANTED

Collector Requires Dinky Toys 133 Cunningham, 158, 163, 178, 189, 191, 237, 238, 239, 252, 270, 432 New Casting, 455, 501 First Type, 502 Second Type, 503 Second Type, 504 First Type, 504 Second Type, 518, 535, 561, 563, 581, Single Deck Bus with Half Cab also obsolete Corgis. Write to—D Hardman, 20 Linden Road, Tunnel Hill, Worcester. U

I Wish to Purchase immediately complete collection of "Modern Wonder" commencing from No. 123 to 16th March 1940 (number unknown). Also complete collection of "Modern World," commencing with issue dated 23rd March 1940 to cessation of publication mid-1941 (exact date and number unknown). All copies must be good, clean, and intact. To expedite purchase I will gladly pay 3s. per copy (please send by sea Parcel Post) to genuine sources and senders of completed collections. Sea postage also refunded. Please send to—O. Dowling, Wimble Street, Seymour, Victoria, Australia. U

Model Cars of all sorts wanted. Good prices (or exchange) for early die-cast models, tinplate toys, obsolete kits, etc., which will be incorporated in a permanent display.—Dr. Gibson, The Green, Anstey, Leicester. U-F

Private Collector seeks M.M.'s 1916-1954, complete volumes or single issues. Please state condition and price required.—Box No. 35 (London), Meccano Offices, Hemel Hempstead, Herts. U

£50 Reward for the following Dinky toys. Must be in reasonable condition structurally. Transfers ditto. Paintwork condition superfluous. 29B, 29C, 29E, 30 HM, 30 V/A, 31D, 35C, 35D/1 or D/2, F.35 az, 38B, 38C, 139 151 a/c and d or C & D 152c, 153a, 161a, 170/1M, 258/1. 290/1, 292/A, 431/2, 432/2, 491, 503/2, 5042A & 2B, 505/1, 514B, C & D, 624, 669, 675, 903, 917, 923/B, 934, 935, 941, 943, 953, 956, 989.—D. J. Marney, 29 Crown Rise, Garston, Watford, Herts. Tel.: Garston 74877. U

Wanted. "Meccano Magazines" for new collector, any years; send prices wanted to—B. Turner, 3440 Durocher, Apartment 203, Montreal 130, Quebec, Canada. U

"Meccano Magazine" for 1925 and 1926. Any condition. High price paid.—Stokes, Scheldehof, 21, ALMELO, Holland. U

Pre-War model trains sought by Lowke, Marklin, Bing, etc. O or larger also tinplate toys.—10 Church Hill, Patcham Village, Brighton. 53940. T/C

Pre-War and Early Post-War Dinkys, Tootsietoys, Minics, etc. High prices paid.—D. Pinnock, 10 Hurstville Drive, Waterlooville, Hants. Tel.: 2958 (evenings). N-X

Coins Wanted. Mixed. World. School-boy collections. £1 per 100. No zinc or aluminium.—Williams, 41 Garnetts, Takeley, Essex. P-A

Dinky Toys, tinplate models, in fact all pre-1939 models wanted by collector. Your price paid.—73 Waterford Road, London, S.W.6. Tel.: 01-736 8124. R-W

Gauge 'O' Hornby or Bassett-Lowke, etc. trains wanted by private enthusiast. 8, Sandy Hill Road, Wallington, Surrey. Phone 01-647-1264. U-V

STAMPS

Commonwealth Foreign Discount Approvals. Free gift to new applicants.—A. Renner, Dept. MM. 57, Warwick Road, Beaconsfield, Bucks. U-Z

BOOKS

Top Wargamers read Miniature Warfare, the world's leading monthly magazine for wargamers and wargaming. For a trial copy send 4s. (65c) and a 12" x 9" s.a.e. (U.K.5d., Overseas 3 I.R.C's) to—Miniature Warfare Dept., M.M., 61 Benares Road, Plumstead, London, S.E.18, England. Trade enquiries welcome, wholesale or retail. S-D

PLANES BOATS CARS TRAINS MECCANO

MODEL SHOP DIRECTORY

These shops stock all the goods Meccano Magazine readers need.

M denotes Meccano accessory and spare parts specialists

AUSTRALIA Tel: 61-3603
HEARNS HOBBIES
Mail Order Service
303 FLINDERS STREET, MELBOURNE 3000
Suppliers of Aeromodeller Plans and Books, Model Aircraft - Boats - Cars - Railways - Engines - Accessories - R/C Equipment. Write for Price List.

BATH Tel: 60444
CYRIL HOWE'S
CHEAP STREET,
BATH, SOMERSET.
The Model Shop of the West for all your modelling requirements. Aircraft, Boats, Engines, Radio Control. Expert advice available. M.A.P., Meccano Sets, spares, etc.

BEACONSFIELD Tel: 4092
C. G. MARSHALL,
MAXWELL ROAD,
BEACONSFIELD, BUCKS.
M

BIRMINGHAM Highbury 3237
KINGS HEATH MODELS
5 York Road, Birmingham 14.
Everything for the modeller: Boats, Cars, Planes, Railways, Kits, etc. Meccano sets and reasonable stocks of spares.

BLACKPOOL Tel: Blackpool 24061
BATESON'S SPORTS DEPOT LTD.,
56 ABINGDON STREET,
BLACKPOOL.
Complete Stocks all through the Year.

BOURNEMOUTH Tel: Bournemouth 23248
BRUCES TOYS LTD.,
87-89 OLD CHRISTCHURCH ROAD,
BOURNEMOUTH.
We stock a wide range of Meccano Toys and outfits with adequate spares for expanding outfits.

BRISTOL Tel: 38534
M. H. B. DAWSON,
96 WHITELADIES ROAD,
BRISTOL, 8.
M

BRISTOL Tel: 557527
MAX WILLIAMS,
LAWRENCE HILL,
BRISTOL 5.
Meccano Model Railways, Peco Wills, Slot Racing, Hobby Kits, Dinky, Corgi and all spares.

CARLISLE Tel: Carlisle 23142
PALACE CYCLE STORES,
122 BOTCHERGATE,
CARLISLE.
Meccano Stockists for Airfix, Dinky, Matchbox, etc.

CHATHAM Tel: Medway 45215
W. PAINE & CO. LTD.,
168 HIGH STREET,
CHATHAM.
M

CREWE Tel: Crewe 55643
EVELYN WILSON,
86-88 MARKET STREET,
CREWE, CHESHIRE.
Meccano Sets — Accessories and Spares — Hornby Tri-ang Train Sets—Accessories and Spares—Frog Kits.

DORCHESTER Tel: 300
BRAGG'S SPORTS DEPOT,
15 HIGH WEST STREET,
DORCHESTER, DORSET.
Stockists for whole range of Meccano, Trains, etc., also Travel Goods, Toys and Games.

ELGIN Tel: Elgin 2569
GEO. A. SMITH,
10 BATCHEN STREET,
ELGIN.
All your Meccano and Dinky requirements are in stock always.

GLASGOW Tel: 041-332-7040
COPLANDS,
SAUCHIEHALL STREET,
GLASGOW, C.2.
Meccano Plastic and traditional sets, Playdon sets, etc.

GUILDFORD Tel: 61331
THE GUILDFORD DOLL'S HOSPITAL LTD.,
13 SWAN LANE,
GUILDFORD.
M

HEMEL HEMPSTEAD
Tel: 53691
TAYLOR & McKENNA
203, MARLOWES
M

KENT Tel: Erith 32339
DERRETT (TOYS) LTD.
52/54 ERITH HIGH STREET,
ERITH, KENT
Aircraft, Boats, Fibreglass Hulls, Tri-ang Hornby, Lima H.O., H. & M. Units, Scalextric, Airfix, Riko, Pactra, Plastic kits, Minitanks, Marquetry. Prompt Mail Order Service.

KENT Tel: Dartford 24155
MODERN MODELS LTD.
49/51 LOWFIELD STREET,
DARTFORD, KENT.
For all your modelling requirements. Radio/Control, Aircraft, Boats, Cars, Railways. All leading makes from The Shop with the Stock. Prompt mail order service.

LEEDS Tel: 0532-26611

KING CHARLES SPORTS CENTRE,
RAILWAY HOUSE,
KING CHARLES STREET, LEEDS, 1
Specialists and stockists in all model railway equipment and accessories. Tri-ang-Hornby, Trix, Fleischmann, Gem, Hammant & Morgan, Sommerfeldt.
Cat. service 25/- home, £2 overseas.

LEEDS, 1 Tel: 25739

BRADFORD MODEL RAILWAY CENTRE,
23 ALBION PLACE,
(Off Briggate).
The North's Leading Model Railway stockists in OO and N gauges. Branches at Cloth Hall Street, Huddersfield and Frizinghall, Bradford.

LEICESTER Tel: Leicester 21935

RADIO CONTROL SUPPLIES LTD.
52 LONDON ROAD.
Mail Order Specialists.
Closed Monday.
Open until 8.30 p.m. Friday.
The Showroom of the Midlands with full R/C service facilities.

LIVERPOOL Tel: 709-7562

LUCAS'S (HOBBIES) LTD.,
7 TARLETON STREET,
LIVERPOOL 1.
HOBBIES or everything the model maker requires. Aeroplanes, Cars, Chemistry Sets, Railways, Meccano Building Kits, Instructional Toys, also a selection of Games, Dolls and Soft Toys.

LONDON Tel: HOL 6285

BEATTIES OF LONDON,
112 & 112A HIGH HOLBORN,
LONDON W.C.1.

M

LONDON Tel: Lee Green 2637

LEWISHAM MODEL CENTRE
45 LEE HIGH ROAD, LEWISHAM, S.E.13
Everything for the Modeller, Aircraft, Boats, Radio Control, Railways, Cars.
Spares and Repairs our speciality.
Mail Order a pleasure.

LONDON Tel: Regent 1846

JEREMY,
16 PRINCES ARCADE,
PICCADILLY, LONDON, S.W.1.

M

LONDON Tel: CHE 4887

RADIO CONTROL SUPPLIES
154 MERTON ROAD,
WIMBLEDON S.W.19
Closed all day Monday.
Open until 8.30 p.m. Friday.
Largest R/C stockists in the country.

LONDON Tel: ISLeworth 0743

RADIO CONTROL SUPPLIES LTD.
581 LONDON RD., ISLEWORTH, MIDDX. **Mail Order Specialists**
Open each weekday and until 8.30 p.m. Fridays.
Largest R/C stockists in the country.
Own R/C service centre.

LONDON Tel: Mill Hill 2877

H. A. BLUNT & SONS LTD.,
133 THE BROADWAY,
MILL HILL, LONDON N.W.7.

M

LONDON Tel: 01-529 1250

"LEISURE TIME"
4 STATION ROAD, CHINGFORD, LONDON E.4.
Aircraft, Electric Cars, Boats, Railways and Accessories, Plastic Kits, Modelling Activities.
Secondhand models section.
All models bought, sold and exchanged.

LONDON Tel: 01-445 6531

MICHAEL'S MODELS
646-8 HIGH ROAD,
N. FINCHLEY, N.12.
Comprehensive range of kits and modelling accessories. Stockists of Fischer Technik, the new action construction toy.
Mail Order a Pleasure.
Closed all day Monday. Easy parking.

MANCHESTER Tel: Blackfriars 3972

THE MODEL SHOP
7-13 BOOTLE STREET,
OFF DEANSGATE,
MANCHESTER 2.
THE NORTH'S LEADING MODEL, HOBBY AND TOY SHOP. MECCANO SETS AND SPARE PARTS A SPECIALITY.

M

NEW ZEALAND

BUNKERS LTD.,
P.O. BOX 58,
HASTINGS
(Mail orders from all countries welcomed.)

M

READING Tel: Reading 51558

READING MODEL SUPPLIES
5 Chatham St. Car Park, Oxford Road
READING, BERKSHIRE.
BERKSHIRE'S MODEL CENTRE
You can drive right to us

ST. ALBANS Tel: 59234

BOLD & BURROWS LTD.
19-23 CHEQUERS STREET
ST. ALBANS, HERTS.
Meccano Sets and Spares

SCARBOROUGH Tel: Scarborough 3223

"WALKERS,"
15 ST. THOMAS STREET,
SCARBOROUGH, YORKS.
(Mail orders welcomed.)

M

STAFFORD Tel: 3420

JOHN W. BAGNALL LTD.,
18 SALTER STREET,
STAFFORD.

M

STOCKTON-ON-TEES Tel: 67616

LESLIE BROWN,
Super Toy and Model Store
95 HIGH STREET,
STOCKTON-ON-TEES.

M

WATFORD Tel: Watford 44222

CLEMENTS,
THE PARADE, WATFORD.
Always a comprehensive range of Meccano Sets, Accessories and Dinky Toys.

WESTON-SUPER-MARE Tel: Weston 6600

RADIO CONTROL SUPPLIES LTD.,
1 THE CENTRE,
WESTON-SUPER-MARE, SOMERSET.
Open until 8.30 p.m. Friday.
Largest R/C stockists in the country.
Own R/C service centre.

SURREY Tel: Camberley 5926

JOYLAND,
56 HIGH STREET,
FRIMLEY, SURREY.
Full range of Meccano and Spares
Triang Hornby Railways. Scalextric. Lego
Largest selection of toys and games in the area

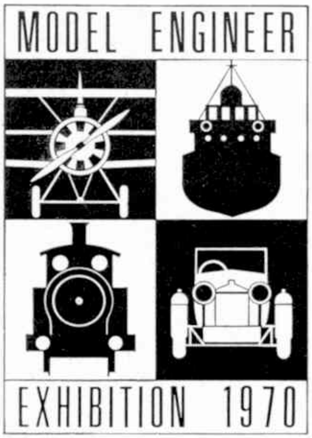
M

MODEL SHOP OWNERS

Use our Model Shop Directory

Write to Meccano Advertisement Offices: 13/35 Bridge Street,
MODEL AND ALLIED PUBLICATIONS LTD. Hemel Hempstead, Herts.

MODEL ENGINEER EXHIBITION MODEL ENGINEER EXHIBITION MODEL ENGINEER



Model Boats, Cars Aircraft, Locomotives Traction Engines

★ MECCANO MODEL COMPETITION

★ RADIO CONTROL POOL CAR RACING CIRCUIT

31st DECEMBER 1969
TO
10th JANUARY 1970

SEYMOUR HALL
LONDON W1

Enquiries for Competition Entry Forms, Trade Stands to

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

COMPETITORS
£300 in prizes; some 30 cups, trophies and other awards. Challenge cups of national status. Championship cups for permanent retention.

ENTRY CLASSES
Every form of model and model engineering activity can be entered (see separate lists) including locomotives, aircraft, cars, boats, yachts, radio control equipment . . . in fact anything you can make. Write for entry forms and details.

SEE & BUY
Full model trade support with well stocked stands. Nearly every exhibitor will be selling from the exhibition. Already taking stands: Arms & Armour Press; Beatties of London; Flying Dutchman; Historex; Kennion Bros.; Mainstream Productions; Myford; Model Racing Car Centre; Plaistow Pictorial; Traction Engine Enterprises.

SPECIAL ATTRACTIONS
Continuing a policy of change whilst retaining popular features, we shall this year have stands looking in towards a central model display system. At the entrance a small circular pool will provide an area for operation of radio controlled boats. Surrounding this a circular area will offer opportunities for further electric powered aircraft (so popular last exhibition); plus space for some radio controlled cars to show their paces.

The ever green live steam exhibit with passenger carrying of visitors of all ages behind miniature steam locomotives will again be under the direction of Mr. Bill Carter and his colleagues of the Society of Model & Experimental Engineers. A working S.M.E.E. feature will be faced by a typical model engineer's workshop.

Nearby, in the Bryanston Room *a further railway track* will offer another 75 ft. stretch, and here entries for the new LBSC Memorial Bowl competition—which demands a track test as well as beauty—will be judged. Visiting clubs will also be invited to "bring an engine" and book public demonstration time at Seymour Hall.

In the LECTURE HALL a working CAR CIRCUIT will be available for visitors to try their skill during the day and to offer exciting competitive racing each evening.

In the galleries (which also offer several hundreds of seating places for packet lunchers or tired visitors to rest and watch from above) will be displays of "junior models" which may take any form from plastics tc Meccano or to working model boats. The "boys' exhibition" last year under Commander Guffick, O.B.E., was most encouraging and will be expanded.

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

AWARDS
The cups, medals and diplomas will be forwarded to the successful competitors as early as possible after the close of the Exhibition, when names have been engraved and diplomas signed.

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 and 2nd only, or at the discretion of the judges. Prizes may take the form of Vouchers, Cash, Replica Trophies (for Challenge Trophy winners) or Championship Trophies.

ENTRIES'CLOSING DATE: All entries must be made by October 20th, 1969.

MODEL CLUB QUERY COUPON

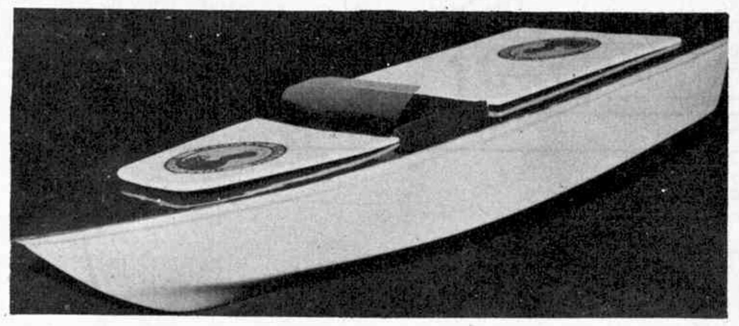
Printed in Great Britain by ELECTRICAL PRESS LTD., Maidenhead, Berks., for the Proprietors, MODEL & ALLIED PUBLICATIONS LTD., 13/35 Bridge Street, Hemel Hempstead, Herts. Published by the ARGUS PRESS LTD., 12/18 Paul Street, London, E.C.2, to whom all trade enquiries should be addressed. Registered for transmission by Magazine Post to Canada.

MM PHOTO COMP COUPON SEPTEMBER 1969


BOY! YOU SHOULD SEE THEM GO!
DINKY TOYS
BRING YOU NEW
SPEEDWHEELS
FANTASTIC FREE-ROLLING WHEELS!
FOUR NEW SUPER FAST CARS
WITH SPEEDWHEELS!
You're out in front with these new Speedwheels models from Dinky. They just keep on rolling, past all the other cars. Because these new Speedwheels have rollability – plus.
No. 189 Lamborghini Marzal
No. 174 Ford Mercury Cougar
No. 173 Pontiac Parisienne
No. 217 Alfa Romeo O.S.I. Scarabeo
No. 189
No. 174
No. 173
No. 217
Another
FIRST FROM
DINKY
TOYS
the tough, action-packed models

SUPPLEMENT AND PLAN WITH MECCANO MAGAZINE SEPTEMBER 1969

SIMPLE RADIO CONTROL FOR BOATS introducing CORKER



The Editor's finished CORKER with a very simple open cockpit superstructure.

INTRODUCTION

This month's instalment of 'Radio 4–2' is concerned with the construction and operation of the Radio Controlled Boat, and completes our introduction to simple R/C boat building. Next month sees the second phase of the series, 'How to construct a model aircraft', using the same simple basic ideas and constructional methods.

The model we are about to describe is named CORKER, a name which, with careful construction should, we hope, prove to be an apt title. There are two ways of obtaining the hull for this model; the first (which is by far the easier and also the cheaper) is to buy it ready-made from Mainstream Ltd. in vacuum-formed white plastic, or for those who enjoy building from scratch, full instructions (and of course a plan) are included in this supplement for construction of a balsa wood hull.

The following information has been made comprehensive, but at the same time simple, and to save repetition, work on the balsa hull will stop when it has reached the same stage as the plastic one, and all the installation details will be continued in the latter.

CONSTRUCTION OF A BALSA HULL

For the newcomer to boat modelling, ready-made hulls are ideal. These are usually made out of fibre-glass, or are vacuum-formed in plastic. If, however, you want your boat to be 'all your own work', a balsa hull can be constructed simply and quickly for a moderate price.

The hull we built, which incorporated a small deck, was simple and quick, and cost only 18/– including the price of the cement and pins. The balsa required was two lengths of $\frac{1}{4}$ inch by 4 inches, and 4 lengths of $\frac{1}{8}$ inch by 4 inches. This is just enough to complete construction, but if you are not sure of your ability to cut out the required parts with a minimum of waste the purchase of an extra piece of each size might be a good idea.

Before commencing, take a good look at the plan so that you understand what you have got to do, and remember to work to the inside lines. The broken lines by the way, are to indicate the hull bottom. The plan being full-size makes it very easy to cut out the pieces. Simply position the plan over the wood and pin-prick the outline of the required piece through the plan and onto the wood at $\frac{1}{8}$ inch intervals. Try and cut out the pieces as close to each other as you can, so that you get the maximum number of parts out of a sheet.

The first part to be cut out is the deck. This is made up of five pieces of $\frac{1}{4}$ inch, two pieces for the deck-sides (inwales), two pieces for the front (foredeck) and one piece for the rear (aftdeck). Fit these together as shown in the exploded photograph and when set, sand both sides to a smooth finish. While the deck is setting, again using $\frac{1}{4}$ inch wood, cut out the bulkheads using the pin pricking method described above. It is a good idea to first study this plan to distinguish one bulkhead from another, because if a wrongly-shaped bulkhead is fitted, the hull will be completely out of shape. Again for this reason, when fitting the bulkheads, make sure they are in their correct positions and also that the rear end (transom) is set at the right angle. *Note that only half of each bulkhead is drawn, so mark the centre line and trace both halves before cutting out each bulkhead as a single piece.* Don't forget to sand the top and the bottom of the transom at an angle so that it fits flat onto the deck and the hull bottom.

Checking the radio with the boat afloat; – next step is check with motor running. →

The hull bottom is made out of two pieces of $\frac{1}{8}$ inch balsa sheet joined at the centre. At this stage do not fit this onto the bulkheads because first it has to be bent and fitted to the keel, which is cut out of $\frac{1}{4}$ inch balsa. Make sure before doing this that the join is completely set, otherwise as you bend the bottom it will open and will be useless. You should be able to bend it quite easily but if you have any trouble soak it in water for a minute or so. Pin the two down well, as the bottom is liable to spring out and leave a gap in between.

When the above has been done, the bottom can then be fitted into the bulkheads, ensuring that it lies flat with the tops of the bulkheads and flush with the sides. Now, mark on the bottom where the bulkheads are, so that later on you know where to fit the lower bulkheads. You will notice after fitting the bottom that there is a considerable gap at the bow between the deck and the keel. The piece of wood that fits into here, the stem, must be the same width as the keel, the shape can be seen on the plan. It is best to cut this just a little oversize, so that it can be sanded down to the shape of the keel.

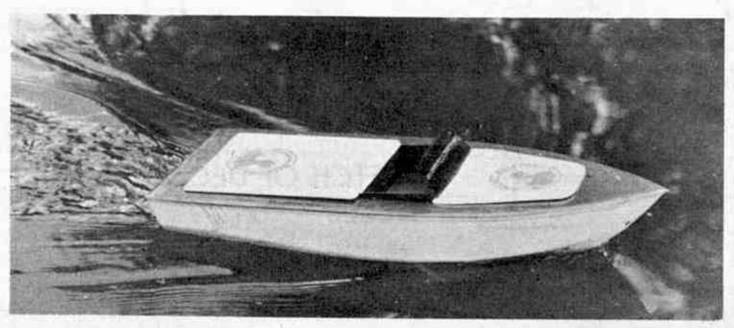
The next step is to fit the side pieces. These are cut from $\frac{1}{8}$ inch balsa, and are fitted with the grain of the wood going up, i.e. the width of the balsa sheet, cut to the appropriate length in one piece. When cutting out these pieces, work to the outside lines on the plan, the best thing to do is to judge the width of the hull, and then again cut the pieces a little oversize so that you have about $\frac{1}{8}$ inch showing above the deck, and $\frac{1}{8}$ inch showing at the bottom. This gives you plenty of room to work with, and a margin for errors. Start from the transom of the hull and work forward. As you get nearer the bow, bending the wood becomes a little difficult, so, as before, soak the wood in water to make it supple. When all the pieces have been fitted sand them down so that they lie level with the deck and the bottom.

The lower bulkhead pieces are now fitted. These are the small triangular shapes situated under the main bulkheads, one either side of the keel. From the marks you made earlier, you will know where to put these. Cut the ends to the shape of the bottom to make the final job easier.

The final job is to plank over the keel and the bulkheads. This is done in much the same way as the sides were fitted, cutting the wood across the grain and fitting it with the grain running across the width of the model.

Completion of this brings us to the same position as a ready-made hull, and as outlined in our introduction, all the installation work will be carried out in this. This work applies to either hull.

Performance is quite nippy and turns under radio comfortably tight.



RADIO AND MOTOR MOUNTINGS

In order to mount the motor, radio gear, propeller shaft and rudder assembly, it is essential that a firm wooden base be fitted to the model. This base must be in two parts, a long piece mounted on the bottom of the hull starting at the stern, for the radio gear, and another, smaller, base mounted nearer the front of the hull to take the motor. This latter section should be angled at the same line as the propeller shaft, but more of this later. Details of the exact shape and size of both mountings are clearly shown in the attached sketch. Impact adhesives such as Evo-Stik, Bostik, Diamend, etc. are most suitable for fixing these into position. Cut to shape and fix into position the rear mount, holding down with small weights until the adhesive has hardened. Turn over the model and commence marking out the centres for holes for the rudder post and propeller with a ball point pen, the exact positions being obtained by measuring from the drawing.

A suitable rudder and propeller shaft can be obtained from your local model shop. A Keil-Kraft Junior Rudder costs approximately 5/–, suitable propeller shafts (6 inches to 8 inches long) from the Ripmax or Keil-Kraft range, approximately 6/6d.

Drilling a hole to mount the rudder part is reasonably straightforward, providing that you make a small puncture in the hull to start the bit, before drilling. Before finally fixing the rudder post into position, it should be coated with adhesive at its lower end to ensure that water cannot leak up between it and the hull with obvious dire results!

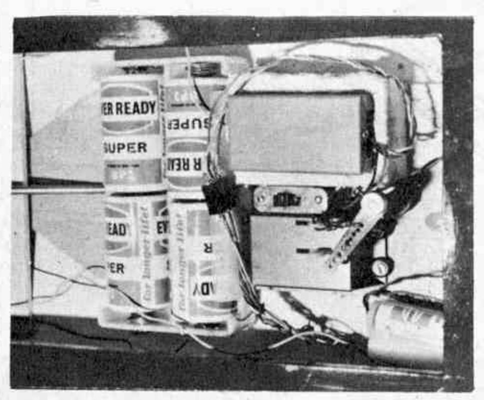
The hole for the propeller shaft is slightly more involved. Using the same method described above, drill a hole through the hull from the outside, but unlike the rudder part the hole should be drilled at an angle, and finally filed out to size. The exact angle of the propeller shaft is determined by the angle, and position of the motor, which will now be dealt with.

The size and shape of the motor mounting base is, once again, clearly shown on the drawing. When you have cut it out and sanded the edges smooth, drop it into the hull, roughly in the position shown in the photograph. It should not be glued at this stage, as its final position will be determined by the position and angle of the propeller shaft. Using the drawing as a guide, insert the shaft up into the hull from the outside.

To connect the propeller shaft to the motor shaft a device known as a 'universal coupling' must be employed. This coupling consists of two assemblies, one fitted with a small bar which fits into a small slot in its counterpart. This enables a direct drive to be obtained when, say the motor or the shaft are not in perfect alignment. Ideally of course, both motor shaft and propeller shaft should be perfectly in line, but in most cases they finish up slightly out, and this is where the universal coupling comes into its own. *Never* deliberately angle either the motor or propeller shaft and rely on the universal to drive. It should be used only as a compensator. Fit the universal part with the peg onto the motor shaft, and the unit with the slot onto the propeller shaft. (If you are using an Orbit 505 motor and a Ripmax shaft, a Ripmax coupling with a 3/32 socket and 3/32 ball will do nicely. This unit costs 6/–.) A short length of Neoprene tube can also be used as a coupling with small electric motors.

Push the propeller tube coupling up into the hull until it connects with the motor end coupling, then carefully screw the motor down onto its base, using small wood screws. The propeller shaft should then be at the correct angle and can be glued into position (once again use Evo-Stik, etc.).

Radio installation is compact; note receiver in polystyrene 'box'. Only one arm of actuator is used.



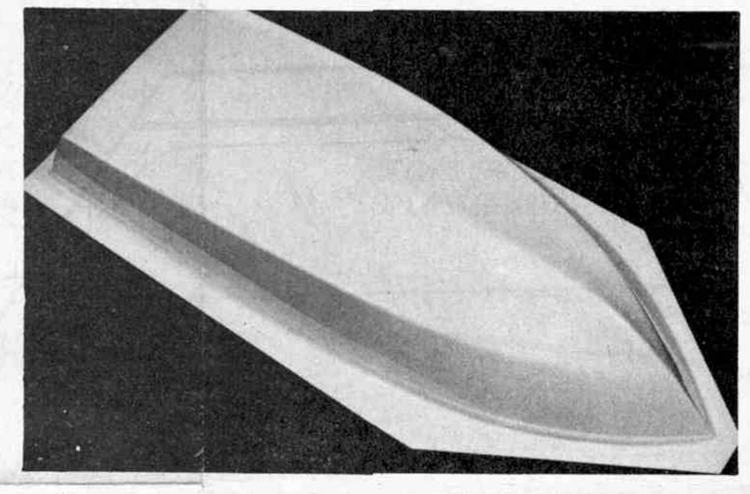
ELECTRIC MOTOR

In last month's booklet, centre page, we gave a list of suitable motors that can be fitted into *CORKER*. Our model is powered by an Orbit 505 type as supplied by Ripmax. (Similar motors include Mainstream's M664 or M663 at 9/11d. and 5/3d. respectively.)

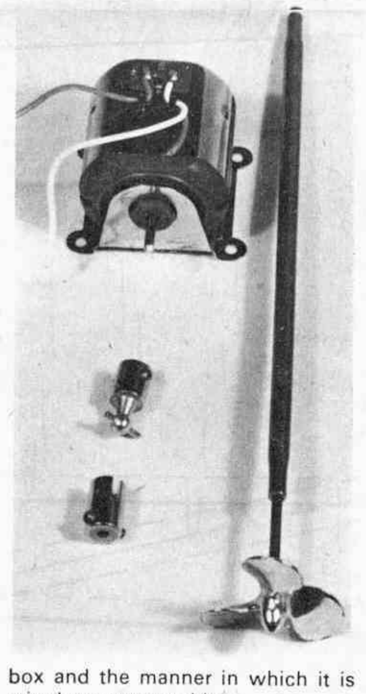
Power for the motor is provided by four U2s which are fitted into a small battery box, supplied by Mainstream. It is, of course, essential to have some sort of switch for the motor. Mainstream supplied us with one at 3/8d.

Perhaps the most important point with regard to electric as a form of power concerns the wiring up of the power supply. If a battery box is used, power can only be supplied in one way, it being impossible for instance to use larger, more powerful batteries or change the method of wiring up as the size of battery box and the manner in which it is wired-up prevent this.

The vacuum-formed hull needs careful trimming with scissors to the deck line.



Orbit motor with coupling and lightweight Ripmax prop-shaft. Johnson motors are identical in appearance.



To clarify this point a few words on the mysteries of electricity are perhaps in order. On all the motors used for model boat purposes there are two wires, usually one red and one black, one from each of the motor brushes. One wire connected to the positive end of a battery, and the other wire to the negative will cause the motor to rotate. Reversing the positions (polarity) of the wires causes the motor to revolve in the opposite direction. The inclusion of a switch in either wire naturally enables the motor to be switched on or off. Methods of installing a motor switch will be dealt with later.

It is very disappointing to put a battery in a boat and find that the motor runs quite well and then to put the boat in the water and find that after only a few yards it slows more and more until eventually it stops. The simple answer is that it was probably too small a battery, even though it was of the right nominal voltage. If you think of a little stream and a big river both moving at 3 miles per hour, it is obvious that much more water is flowing down the big river than in the stream; similarly a small battery and a big battery can both have a voltage of 3 volts but one is capable of delivering a current for a longer period.

How much current a battery can supply is expressed as the number of amps per hour it can deliver and the consumption of a motor is expressed in amps. This is quite aside from the voltage requirement. Thus, if a motor requires 2 amps, which would be typical of the type of motor in this little model, to get one hour's running it would be necessary to have a current supply able to supply 2 amps for one hour. Very few dry batteries will provide this much current. However, it is possible, by using either a very large battery or a series of small dry batteries connected up to increase the capacity of the batteries.

Batteries can be wired in two ways, in series or in parallel. If you join the positive of one battery to the negative of the next and the positive of that to the negative of the next you are wiring in series and the voltage will increase. If, for example, you wire three 3 volt batteries together in this way you have 9 volts, but you will only have the same capacity as each individual battery had. If you wire the batteries in parallel, that is the positives connected to the positives and the negatives to the negatives, you will, with the same batteries, finish up with only 3 volts but you will treble the capacity of the batteries.

There is obviously a limit to the number of batteries that can be carried in a small model and, in the case of *CORKER*, for the average motor running on dry batteries we would suggest that the No. 800 Twin-cell battery usually used in bicycle front lamps should be used. Two of these used in parallel will give 3 volts and reasonable capacity; alternatively, they can be wired in series to give 6 volts and their capacity is still enough for a reasonable amount of running with the average motor. In the prototype model a similar situation has been produced by using four $1\frac{1}{2}$ volt U2 cells in a special battery container which is supplied commercially and which the cells in series to get 6 volts; with the size of these cells there is reasonable capacity.

It is worth mentioning that if a model will run for 10 minutes at full speed on one set of batteries, it will not run at 20 minutes on half speed if the voltage is halved on the same batteries, but more likely half an hour or more, and this is one advantage of running at lower than the maximum voltage capacity of which the batteries are capable. If a builder for any particular reason wishes to use one single battery, the best type is a 6 volt lantern battery; although it may seem bulky and heavy it will in fact, have the capacity to supply 6 volts for a surprisingly long period of time. If this or any other battery is rested it will reactivate itself to some extent and what may appear to be exhausted on one day may well give a fair amount more running if allowed to recover overnight.

ASSEMBLY OF THE RADIO GEAR

The single-channel radio equipment used in our model is the 'Mainstream' gear, and consists of Transmitter, Receiver (complete with on/off switch and battery box), rudder servo, and plug and socket. A complete price list for these items is given below.

Before attempting to fit the radio gear into the hull, the equipment should be assembled and tried to ensure that everything is functioning perfectly. The first job is to solder the plug and socket to the various leads. We would mention, at this point, that an instruction leaflet, complete with diagrams, is supplied with all radio equipment, regardless of manufacturer.

The first step in fitting the plug and socket is to 'sleeve' the individual wires. Most outfits have the necessary sleeving included to achieve this, but as a precaution against loss or possible 'non-inclusion' in any particular outfit, it is very simple to make your own. All that is needed is a piece of wire slightly larger than the wires to be sleeved. Remove the centre of the wire, which will then leave a tube of plastic which can be cut up and a piece slipped over the wires to be soldered.

The plug end of the unit should be carefully soldered to the receiver/battery part of your outfit, and it is essential that each wire is soldered to its correct tag, and that none of the wires are touching. When you are satisfied with *all* connections, slide the plastic sleeving down its respective wire and over the soldered joints. Repeat the above operation for the socket.

When connecting the plug to the socket ensure that you do it the correct way round. Failure to observe this could result in damage. Some plugs and sockets can only be connected one way, others may have to be marked to prevent any chance of wrong assembly.

Connect up the necessary batteries (instructions are given in all of the sets reviewed last month), switch on the transmitter and receiver and test the equipment. Assuming the set is functioning perfectly, switch off and disconnect the plug and socket. The receiver and servos are now ready to be mounted into the hull.

INSTALLATION OF RADIO GEAR

The installation of the radio gear is a straightforward job if done in the correct manner. Before fixing anything down, collect all the necessary equipment together, batteries servo, receiver, switches. It is a good idea to have the batteries in special holders because not only do they give good contact and hold the batteries down firmly but they are also easy to screw down. Mainstream produce holders ranging from 2/8d. to 5/4d. Place the equipment in suitable positions inside the hull, remembering to keep the servo within easy reach of the rudder tiller arm. Now, put the hull in water and see how it floats. Shuffle the gear around until it floats on an even keel, with the bow slightly raised out of the water. Look at it from the transom end to ensure that it is not listing. The accompanying photographs show how the boat should float, and how we positioned our gear.

The next step is fixing the gear down. With the receiver, there were no screwholes to hold it down, so a shock absorbent mounting had to be made for it. Expanded polystyrene is ideal for this as it can be worked easily, and it can also be stuck down. Any water-based adhesive will do here, or a P.V.A. glue such as Evo-Stik or Resin W.

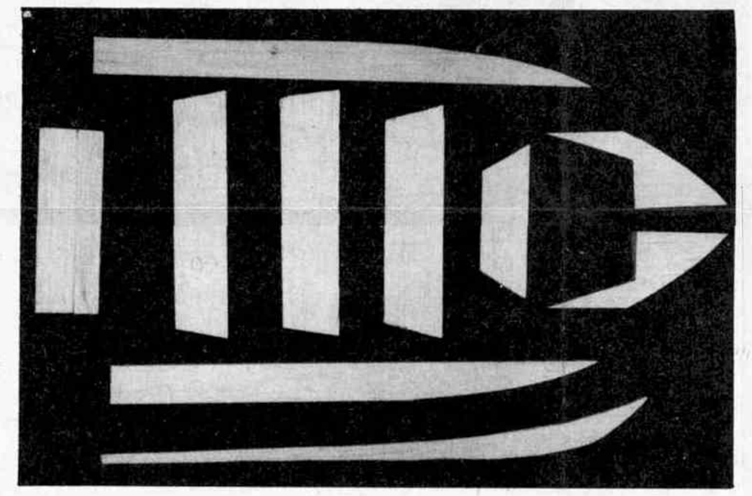
Fitting the servo is a little more straightforward. This has four screw holes all fitted with rubber grommets, so when screwing the servo down, sink the screws until their heads touch the grommets; these grommets then act as shock absorbers.

Installing the battery holder is also straightforward. These are moulded in unbreakable plastic and a couple of holes can be quite easily drilled through, screws are put in to secure it to the mounting base.

As we mentioned earlier, the connection of a switch to the motor will enable it to be switched on or off. The type of switch we used was a slide switch two-pole changeover supplied by Mainstream for 3/8d. There are six terminals on the switch, three each side, of which only two are used. To connect up, break one of the wires from the motor, or if these are not long enough use an extra piece. Connect the wire from the motor to one of the centre terminals on the switch. The other portion of the wire, or the extra piece, whichever the case may be, is then connected to one of the terminals either side of the centre, and one of the points on the batteries.

We used two methods of fitting the receiver and motor switches. With the receiver switch, we screwed on two hardboard legs and then stuck these down onto the balsa base, and with the motor switch, we cut a hole the shape of the switch in the motor mounting, so that the switch slotted into it. To secure it we put two screws through the holes.

When all this has been done, the boat is then ready to go, but for one thing, the fitting of the receiver aerial. There are two ways of doing this. You can simply lead it around the inside of the hull, or you can fit an outside aerial. This can be bought ready-made for around 13/– to 16/–, or you can make one yourself out of piano wire for no more than 1/–. A point when fitting an outside aerial, is to keep the overall aerial the same length. For example, if the outside aerial is 10 inches long, you must cut 10 inches off of the wire aerial to keep the overall length as it was before the outside aerial was fitted.



Parts cut from $\frac{1}{4}$ in. balsa include deck pieces, bulkheads, and keel (here cut in one piece).

SUPERSTRUCTURE AND FINISHING

There are quite a number of different superstructures that can be fitted onto this particular model, the simplest being a box cockpit cut in the deck and fitted with a windscreen. If the model is being built to the plan there will already be a fair-size aperture cut from the centre of the deck and this is desirable from the point of view of access. To make an open cockpit Runabout type superstructure it would only be necessary to pin a length of $\frac{1}{4}$ inch by $\frac{1}{8}$ inch balsa around the outside of the coaming and to cover the top of this with $\frac{1}{8}$ inch or 3/32 inch sheet balsa, taking care to avoid sticking it to the coaming itself. This flat hatch can then be used as a basis for a number of structures, including an open cockpit. It would be desirable, in the case of an open cockpit, to fill in the floor and side walls so that if the boat is out in rough water and water comes over the deck, the amount on board will be limited to what the cockpit could hold.

The superstructure shown on the plan is rather more elaborate and a typical Thames cabin cruiser type with a midships steering position. This does not need the flat hatch just mentioned, but can be built over the coaming, again taking care to avoid cementing to the coaming. First cut from $\frac{1}{8}$ inch sheet balsa the formers S1, 2, 3, 4 and 5 and the two sides. Notice that the sides are cracked at S2 and taper, going forward. This means that they will be very slightly longer, in actual fact, than is shown in the side profile, so leave a little bit of spare length on the forward ends. To crack these sides, mark the required line of crack and lay the side flat on the board and score it lightly across on the outside with a razor or sharp knife. Then, putting it on the sharp corner of the building board or a ruler, etc., crack gently to the approximate angle and apply a film of cement to each side. Be sure to make one left and one right-hand side.

The sides can be pinned in place on the coamings and part S4 cemented in the appropriate place on part S3. S1, 2, 3 and 5 can be slipped into place betwen the sides and cemented, using one or two pins to hold the assembly together while the cement dries. The tops can be cut from 1/32 inch ply or Plastikard, or they could even be from a good quality card such as thick Bristol board. Fit the tops into place, noting that the foretop has to be notched to fit between the sides in order to reach former S2. Do not fit the wheelhouse at this stage; instead cut two wheelhouse front screens to the approximate pattern shown on the drawing and carefully cut and trim these to fit neatly in place between the sides and on top of the fore cabin roof. When the cement has dried, sand the top lightly so that the wheelhouse cabin top, which is cemented in place next, fits neatly down all round.

When thoroughly dry, withdraw the pins and lift the completed structure off the hull; sand and dope or paint to finish to match the hull. It is usual to fit celluloid cabin windows, etc. after painting, and for the after-cabin half a dozen small chromed plastic port holes would look very neat.

There are several small sketches showing possible superstructures typical of such launches as Port of London Customs, pilot boats, etc. If the superstructure is in two pieces, it is best to make the flat hatch mentioned above and to erect the superstructure directly onto this. $\frac{1}{8}$ inch blasa should be suitable in every case with thin ply or Plastikard tops as already described.

Finishing the balsa superstructure, if fitted to a plastic hull, involves the use of sanding sealer, of which several coats should be applied and allowed to dry, each being rubbed down with very fine wet or dry abrasive paper in order to obtain a dead smooth finish. After four or five such coats the structure may be either doped with cellulose dope or painted with Humbrol enamel, or similar, to the colour of one's choice. Quite a lot of port launches etc. are seen with black hulls and white superstructures with buff-coloured tops and a natural-coloured planked deck. However, some of these boats are also seen with dark blue hulls and in some cases dark green hulls. In most cases the superstructure sides are white and the top is buff or fawn colour. It is, however, possible to paint the tops in a lighter shade of the hull side colours. In most cases, again, the hull below the water line is painted a contrasting colour and usually this is a dark red, but it can also be dark green or dark blue.

Fittings such as life-belts, searchlights, handrails, and similar, are a question of individual taste and although the model looks quite handsome without any of these fittings, there is no doubt that the use of one or two of them does enhance the appearance. Make sure that any such fittings are securely fixed so that they will not be dislodged and lost when handling the model at the waterside. It would be usual on a boat of this type to have a pair of fairleads at the bow and another one at each corner at the stern, possibly a small ratchet windlass for raising an anchor on the foredeck and a Byers or C.Q.R. type anchor with a short length of chain on the foredeck. Handrails, either bought or made from pieces of wire threaded through small split pins, would be universal on the fore and aft cabin tops and for a short distance on the sides of the wheelhouse. A searchlight and radar scanner could be carried on top of the wheelhouse and a lifebelt either each side or two or three mounted on the after cabin roof. If you are going in for this sort of detail, remember to draw on at least one side of the wheelhouse a door for access to the wheelhouse. You may also like to draw a circular screen on one of the wheelhouse forward windows to represent a Kent clear-view screen. A jackstaff at the transom would be fairly universal. This is always a very vulnerable fitting on a small model, although it does help to dress the model up effectively.

In considering painting it should be mentioned that if the vacuum-formed plastic hull is used to build the model, cellulose finishes should be avoided on this plastic. It is perfectly safe to use Humbrol enamel or other oil paint to achieve an attractive colour scheme, but cellulose will attack the plastic and ruin an otherwise attractive-looking model.

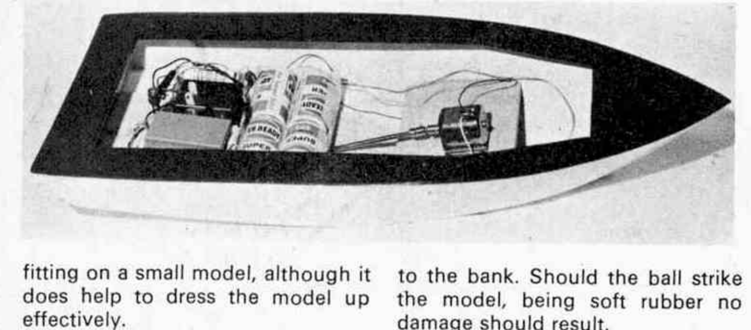
OPERATION

The first time the model is taken to the pond side it will almost certainly have new batteries in it and the radio will have been checked for working before leaving the house. The state of the batteries and the functioning of the radio should be checked every time the model is to be taken out and checked just for safety's sake at the waterside before putting the model afloat. It is usually best to check the functioning of the main drive motor in the water, since if it is run for more than a second or so in the air it can set up a surprising amount of vibration which normally the water absorbs. It will probably be found upon release that the model tends to veer in one direction or the other, and it is, therefore, necessary to adjust the rudder angle very slightly to ensure that the model runs straight. Check, too, that the model sits properly on the water without being too bow or stern down. If it balances about 8 or $8\frac{1}{2}$ inches forward from the stern, when held between the fingers, it should be reasonably close to it running trim. If it is slightly bow down it will lose speed; similarly, if it is slightly stern down the speed and turning ability will be to some extent affected, apart from the appearance being poor. If the trim is correct and the rudder bias just sufficient to make the model run straight no further adjustments should be needed unless the type of batteries, etc. used is changed.

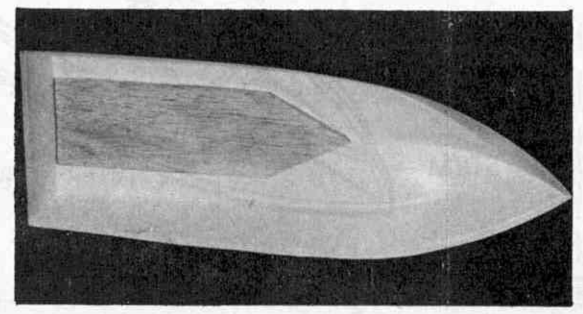
You will find the performance with the motors specified is quite nippy and a fair amount of running can be carried out before the batteries show signs of flagging. When they do appear a little tired, shown by the boat's speed slowing, if the model is taken out of the water for half an hour or so they will have a chance to recover and allow further boating. Make sure, of course, that it is not weed round the propeller that is slowing it up, but in fact the batteries giving up slightly! It is always a good idea to take a spare set of batteries along so that in the event of one set getting tired a change can be made and the model continued to operate while the first set have a chance to recover. There will be times when, due to weeding up of the propeller, or similar, your boat will stop whilst out on the pond. It is frustrating to have to stand around waiting for the model to drift within reach, so some means of speedily retrieving it would be useful. The simplest method of recovery is to buy a soft rubber ball, pierce a hole through its centre and thread a piece of string through it. Try to throw the ball over the model allowing the string to lay across the deck and thus enable you to carefully draw it to the bank. Should the ball strike the model, being soft rubber no damage should result.

After a time you will find that simply running the boat round the water and steering it more or less aimlessly it begins to pull a little and it is then a good idea to take down to the water with you a couple of buoys round which the boat can be manoeuvred. If the water is shallow and you can wade out, these buoys can be simply old *SQUEEZEY* bottles sealed up and tied to a piece of string sunk on half a brick or some similar weight, but if the water is very deep there is something of a problem in anchoring them. One way of making buoys for deep water is to connect the two polythene bottles with a wire U piece which holds the bottles at an appropriate distance apart but is far enough below water at its base to allow the model to pass over it. The bottles can either be allowed to drift with the wind or an anchor line can be attached to them. Again, a few little weights along the anchor will prevent it from floating near enough to the surface to foul the model's propeller. The more skilled one becomes at negotiating these buoys

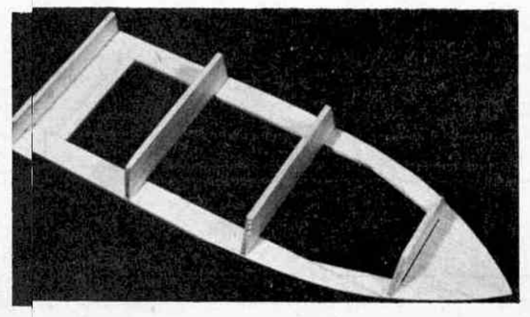
Completed test model showing radio, main batteries, and motor running.



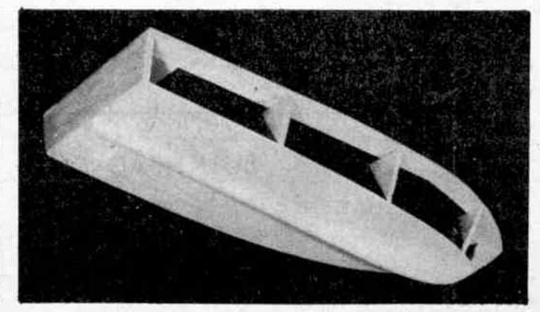
Base for radio, prop-shaft mount, etc. is a sheet of $\frac{1}{4}$ in. balsa glued in the plastic hull.



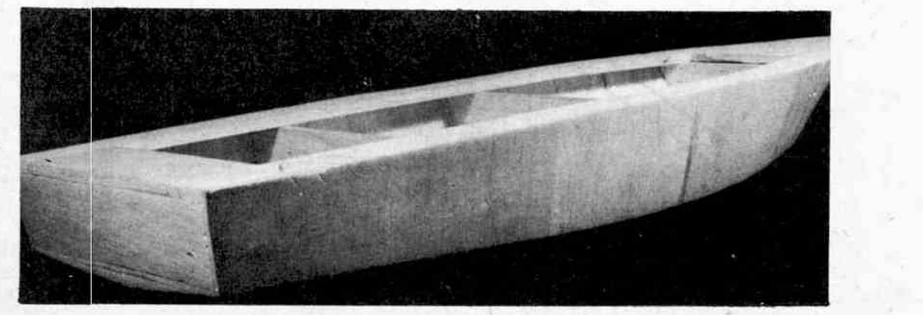
First step is cementing together of deck, followed by positioning of main bulkheads



Hull ready to receive triangular bottom bulkhead pieces (BIA etc.) before sheeting.



Completed balsa hull awaiting coaming. Note direction of sheet grain on side.



COUPON
See other side

the further away they can be set, so that after a time it becomes possible to steer the boat round and between them at a distance of perhaps 70 or 80 yards. To recover free floating buoys or buoys which have been allowed to drift on along anchor line, it is possible to fit a wire onto the model which extends one side and slightly under water, with a hook on the end. Such a wire can either be strung through a couple of small screw eyes in the deck or can even be stuck in place with a piece of waterproof insulation tape. The boat can then be put out and passed close enough to the buoys to hook them with its recovery hook and tow them back for use on another day. The same hook can be used to retrieve other models which may have become becalmed or which may have been sent out as deliberate targets for recovery. Another enjoyable sport is floating balloons on the water and fitting a needle on the bow of the boat and endeavouring to pop the balloons with the needle. If you get skilled at this it becomes rather expensive on balloons, but by this time you may already have met one or two other enthusiasts and be able to have competitions with them for steering events or similar. Almost certainly somewhere within easy reach of you there will be a club operating model boats regularly, and although many of these may be diesel or glow engine powered, their owners will not 'sniff' at you for going along with an electric boat, but rather be interested in your model and anxious to help you to get the best from it, and possibly even to progress to your next one.

Model boaters are most friendly people and always only too ready to help newcomers to the sport to enjoy their boating to the fullest extent.