MECCANO® Magazine

NOVEMBER 1968

TWO SHILLINGS AND SIXPENCE

U.S.A. AND CANADA 60 CENTS.

MAP HOBBY MAGAZINE

THE MONORAIL STORY ★ STAMPS ★
BALSA AIRCRAFT ★ MODEL RAILWAYS ★

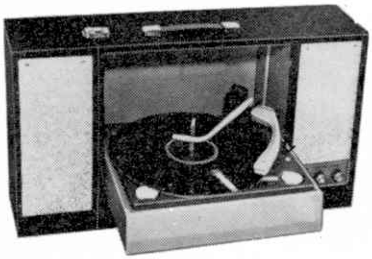
RAILWAYS PLASTICS AEROMODELLING BOATS CARS STAMPS MECCANO SCIENCE

HEATHKIT

WORLD-FAMOUS ELECTRONIC HOBBY KITS

Anyone who can understand plain English can successfully assemble any model. No other knowledge is necessary. Just follow the easy step-by-step instructions plus large size pictorials in the construction manuals.

FOR EXAMPLE



Model SRP-1

BUILD YOUR OWN **STEREO** RECORD PLAYER, SRP-1

Experience the exciting sensation of personal achievement. Play your Classical or Pop records on a record-player you've built yourself—a high quality piece of equipment which you'll be proud to own. It *automatically* plays any record, regardless of size or speed, and is designed to get the maximum performance out of *your* records! And you can build it in only a few enjoyable hours, either with a blue or a red case. If you let us know which colour you want, we'll oblige. And all this costs, in kit form, only **£28.16.0.** Pretty good value, you must admit!

OR

Model UXR-2

BUILD YOUR OWN HIGH-PERFORMANCE PORTABLE RADIO

Model UXR-1 is an excellent 6 transistor portable, covering long and medium wavebands. Big 7 in. x 4 in. loudspeaker for quality sound. Battery economiser circuit. Case in a selection of attractive mod colours navy blue, coral pink, lime green, kit **£12.12.0.** incl. P.T. Leather case kit, **£13.12.0.** incl. P.T.

Model UXR-2. Deluxe 7 transistor portable with full long and medium waveband coverage. Clean, bold sound from a 7 in. x 4 in. quality loudspeaker. Battery economiser circuit. Tape and earphone output sockets. Choice of real solid leather case, in black or brown, state choice, kit **£17.16.0.** incl. P.T.

Model UXR-1

OR

EXPLORE THE WORLD OF ELECTRONICS WITH AN ELECTRONIC WORKSHOP EW-1

NEEDS NO TOOLS · SOLDERLESS CONNECTIONS

Model EW-1

You can make up to 20 exciting and educational experiments with this informative kit:—one- or two- and three-transistor radio sets; Burglar alrms; Intercom sets; Morse Code Practice Sets; etc . . . There's a 72 page illustrated constructional manual supplied and special clips eliminate soldering. This is a really sophisticated electronics workshop which can be yours for only **£6.16.0.** incl. P.T.

SPECIAL OFFER TO MECCANO MAGAZINE READERS

FREE Tool Kit

Value £1.14.0

WITH MODELS UXR-1 UXR-2 AND SRP-1

All prices are inclusive of post and packing charges

HEATHKIT

FREE! CATALOGUE

Describes these and many more kits and ready-to-use models for Stereo/Hi-Fi, Domestic Radio, Record Players, Tape Recorder, Amateur Radio, Short-wave, Test, Educational, Home and Hobby. Save money with Heathkit models. Mail coupon or write to Daystrom Ltd., Gloucester. Tel: 29451.

DAYSTROM LTD., Dept. M.M.M. 11.
GLOUCESTER Tel. 29451

☐ Enclosed is £ ______________, plus packing and carriage.

Please send model (s) ______________

☐ Please send FREE Heathkit Catalogue.

Name ______________
(Please Print)

Address ______________

City ______________

Prices and specifications subject to change without notice.

MECCANO® Magazine

NOVEMBER 1968 VOLUME 53 NUMBER 11

Meccano Magazine, founded 1916.

Editorial Director
D. J. LAIDLAW-DICKSON

Editor
JOHN FRANKLIN

Consulting Editor for Meccano Ltd.
J. D. McHARD

Advertisement Manager
ROLAND SUTTON

MAP **HOBBY MAGAZINE**

FRONT COVER
The Disneyland "Highway in the Sky" monorail railway, in California, U.S.A., is an extremely advanced transport system. Built on the Alweg principle the transit speed is 45 m.p.h. Electrically powered, this monorail went into service in 1959 and has carried over 17,000,000 passengers since then.

NEXT MONTH
Next month's Meccano Magazine will be a real bumper issue. As well as extra editorial pages there is a FREE BOOKLET all about Meccano, an issue you must not miss! Great Engineers, Stamps, Trackside Construction, ABC of Model Railways, Transport Topics, Battle, Militaria and all your other regulars will be included as usual. There will also be a full size model aircraft plan and lots of Meccano modelling.

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

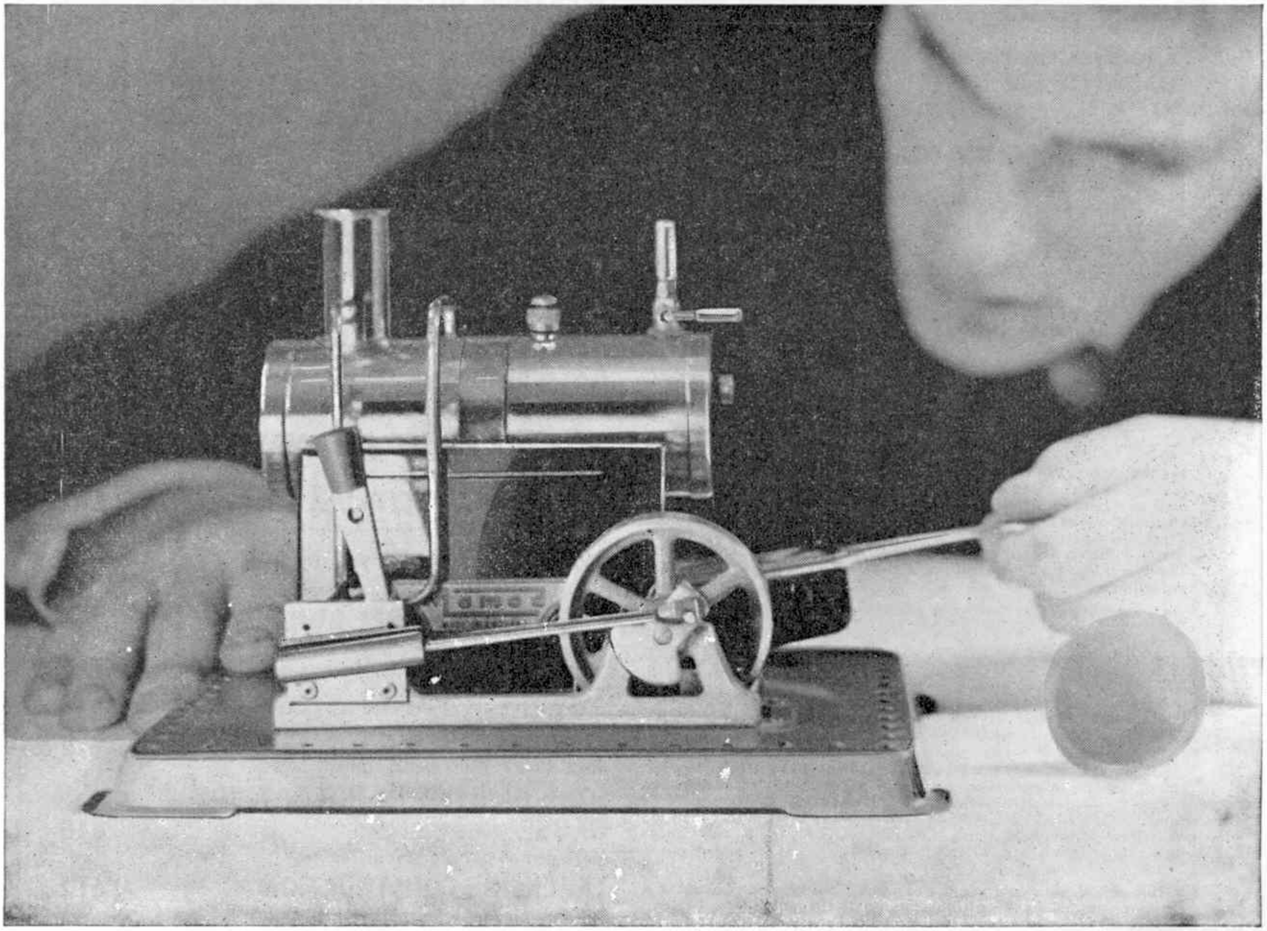
Second class postage rates paid at New York, N.Y. Registered at the G.P.O. for transmission by Canadian Post. American enquiries regarding subscriptions, news stand sales and advertising should be sent to MECCANO MAGAZINE, Eastern News Distributors Inc., 155 West 15th Street, New York, N.Y. 10011, U.S.A.,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

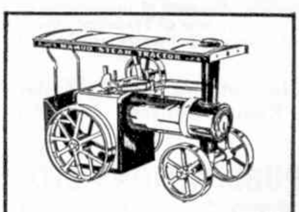
CONTENTS

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

MAMOD
STEAM ENGINES
-BIG
FAVOURITES with young model engineers



Give him a fascinating live steam engine for powering models, boats and miniature tools. Or a life-like steam roller. Or a traction engine that will run for a third of a mile in ten minutes. Mamod steam models are quality-engineered for fun with safety. Prices from 37/9 to 119/6 at leading toy and sports shops.

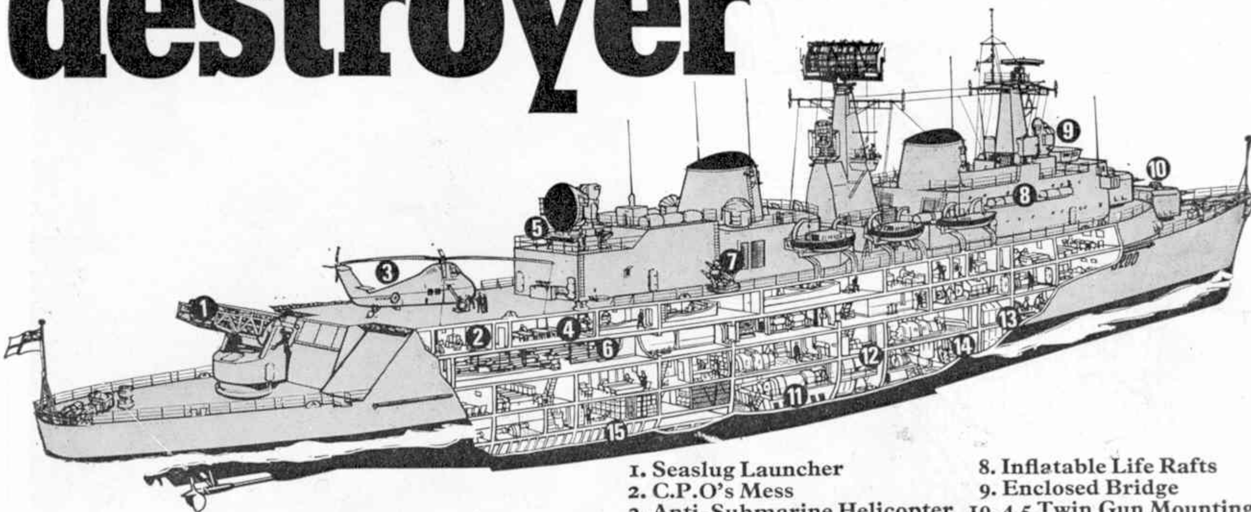


Mamod

steam models

manufactured by
Malins (Engineers) Ltd., Thorns Road
Quarry Bank, Brierley Hill, Staffs.

The missile-age destroyer



1. Seaslug Launcher
2. C.P.O.'s Mess
3. Anti-Submarine Helicopter
4. Crew's Dining Hall
5. Missile-Guidance Radar
6. Missile Stowage
7. Close Range Anti-Aircraft Missiles
8. Inflatable Life Rafts
9. Enclosed Bridge
10. 4.5 Twin Gun Mountings
11. Gas Turbine Room
12. Gearing Room
13. Boiler Room
14. Steam Turbine Room
15. Fuel Tanks

She's large. Displacement 6,000 tons. Length 520 feet. She's more than a match for a squadron of wartime cruisers. And she has just about everything.

Her Seaslug missiles can blast distant aircraft out of the sky – before the eye can see them. Her Seacat missiles destroy any aircraft that come near to the ship. She has four radar controlled semi-automatic 4.5 inch guns. The latest anti-submarine weapons–including a Wessex helicopter armed with an underwater detection device and homing torpedoes.

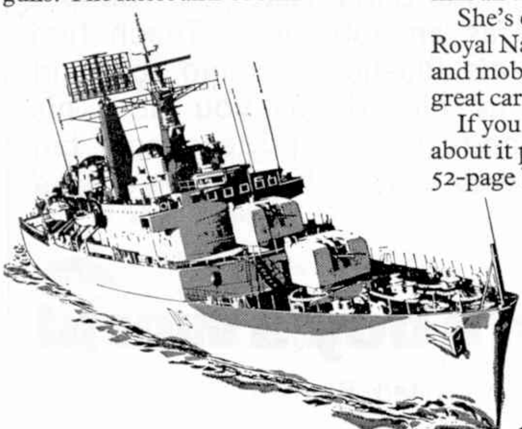
She has stabilisers. Air conditioning. An automatic helmsman that can steer the ship. Even her own TV studio.

In the centre of the ship is the operations room. Here the Captain can 'fight the ship'. Here radar screens and sonar detect everything in the air, on the sea and underneath it – giving him an up-to-date tactical picture.

She's one of the new ships of the Royal Navy. A navy that is all muscle and mobility. A navy that offers a great career to keen young men.

If you would like to know more about it post the coupon for the free 52-page booklet.

Entry as an officer. Are you aiming for at least 5 G.C.E. 'O' levels – or equivalent? Then you could apply now, even at the age of 14, for entry between 17 and 19½ as an officer in the Royal Navy. Don't fill in the coupon, but write for full details to Captain W. J. Graham, R.N., Officer Entry Section (703 YL2), Old Admiralty Building, London S.W.1.



Royal Naval Careers Service (703 YL2), Old Admiralty Building, London, SW1.
Please send me, entirely without obligation, the 52-page booklet 'The Royal Navy as a Career'.

Name

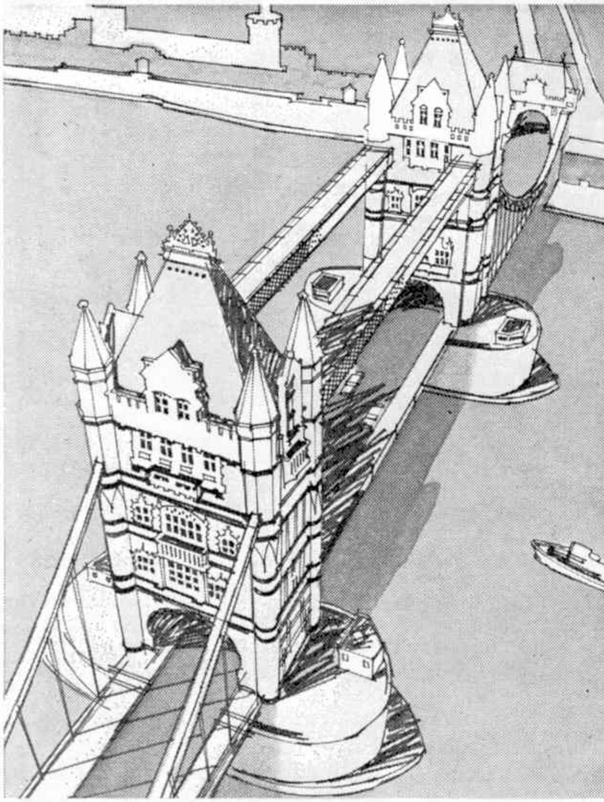
Address

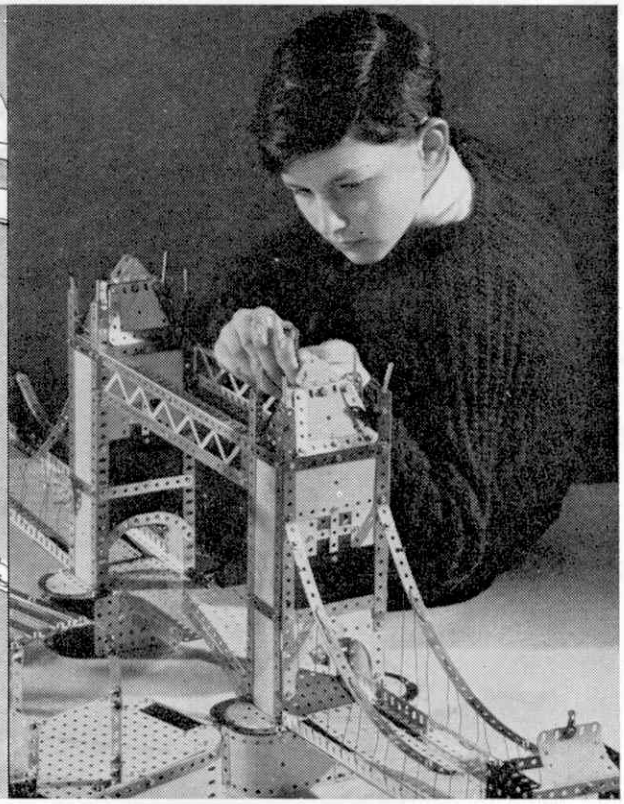
Date of birth

(Enquiries from U.K. residents only.)

Royal Navy

IT'S A MAN'S WORLD





built by a boy & his Meccano!

Meccano builds high and wide, sturdy and strong—brings you the challenge and excitement of real engineering, and gives you all the realism and action of the man's world.

Meccano has hundreds of tough, precision-made parts for young engineers to build hundreds of rugged working models, matching the best of modern building and engineering.

Become a Meccano engineer, skilfully shaping and building from Meccano's lasting metal parts. Take your younger brother as an apprentice. Teach him to use his Plastic Meccano to build things as cleverly as you do—his little hands will find Meccano's big pieces very easy to handle.

MECCANO builds big in a boy's world

You can become a Meccano engineer today! Meccano Limited, Binns Road, Liverpool.

YOUR FIRST REAL RIFLE!

The magnificent Webley JAGUAR Shooting Kit

Get the Webley Jaguar into your shoulder and get the feel of your first real rifle. Yes, the barrel is machine-cut rifled for supreme accuracy. Webley have used all their skill and experience to make the Jaguar air-rifle safe to use, and a pleasure to look at. You'll be the envy of your friends!

The kit means you can start shooting straight away. The box contains the .177 Calibre Jaguar Air Rifle; Target Holder; Target Cards; 500 .177 Pellets; 12 .177 Darts; Oil in Plastic Container.
Complete kit. Price £7.4 6.
Webley is one of the world's great names in guns. You'll see others, but none to compare with the *real* rifle quality of Webley. Make sure then, you get —Webley!

Webley make a wonderful range of Air Pistols and Air Rifles. Why not send for the fascinating leaflet — with 4d. stamp, please! Address is below.

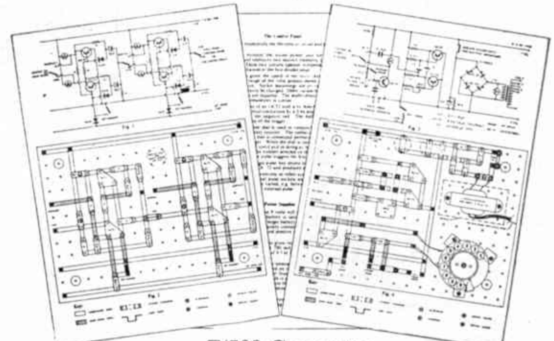
WEBLEY

For Maximum Marksmanship — Ask for a Webley 4 x 15 magnification Sight and be sure to use Webley pellets to win a Marksman's badge.

Webley & Scott Ltd. (Inc. W.W. Greener Ltd), Dept MM/2/AW5
Park Lane, Handsworth, Birmingham 21. Tel: 021-553 3952

RADIONIC

Learn as you build



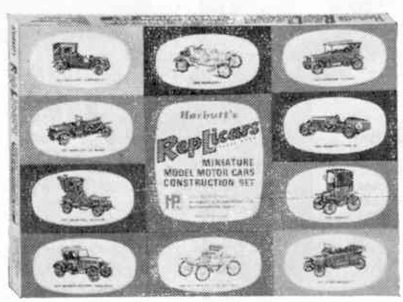
E/508-Computer

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 (include 6 Transistor and reflex superhets)
ELECTRONICS KIT: 30 plus circuits £19-7-0. Prices (Post Free)

FULL DETAILS FROM:
RADIONIC PRODUCTS LIMITED
STEPHENSON WAY, THREE BRIDGES, CRAWLEY, SUSSEX. Tel: Crawley 27028

new from Harbutt's



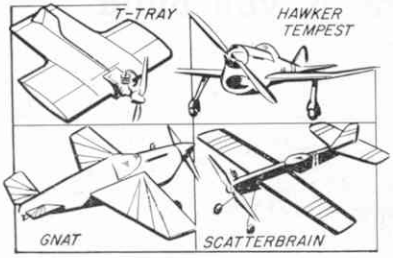
The new miniature car construction set for making up 10 vintage and veteran models. Scale 1/90th. Contents include 10 assembly kits, instruction leaflet, 'Plasticine' and assembly tools. Everything fits into place perfectly without glue. Order now.

Price 10/6

Distributed by: **HARBUTT'S PLASTICINE LTD.**
BATHAMPTON · BATH · SOMERSET

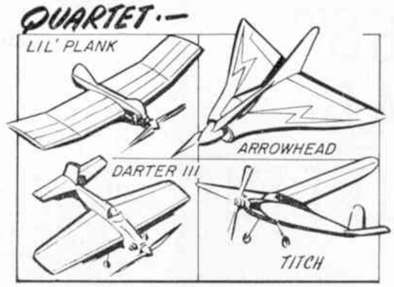
JUST A FEW OF OUR MANY PLANS FOR YOU TO BUILD FROM

FOURSOME:-



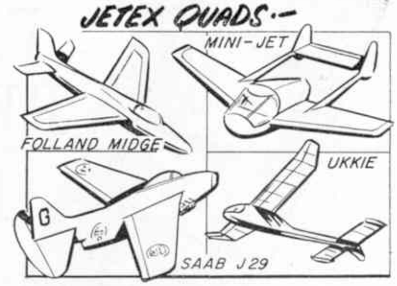
A complete course in control line for beginners. All take 0.8 c.c.-1.5 c.c. engines. Four super plans, "Scatterbrain" trainer, "T-Tray" stunter, "Gnat" team racer and "Hawker Tempest" racer. Plan U596, price **2s. 6d.**

QUARTET:-



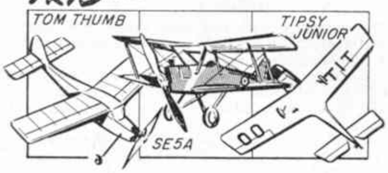
Four models for 0.5 c.c. engines. Delta controliner "Arrowhead" and stunter "Darter." Free flight models "Tich" and "Lil Plank." Very simple to build model. Plan U595, price **2s. 6d.**

JETEX QUADS:-



"Ukkie" is for the 50 unit, and the "SAAB J29" is a profile for the Atom 35. "Mini Jet" is for the 100 unit and the "Folland Midge" for the 50b or 100 unit. Plan U597, price **2s. 6d.**

TRIO:-

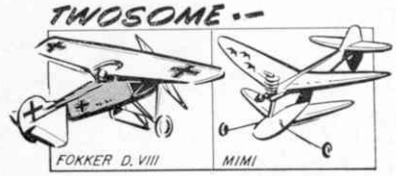


Three models for 0.010-0.020 engines. The "S.E.5a" and "Tipsy Junior" are scale free flight models and "Tom Thumb" a specially created sports cabin model. Plan U656, price **2s. 6d.**

THREESOME:-

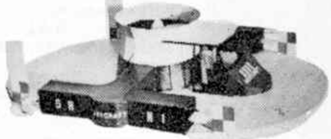
Three rubber models of simple construction including two scale models the "Piper Pacer" and "Max Holste" plus a midget racer. All about 21 in. wingspan. Plan U658, price **2s. 6d.**

TWOSOME:-



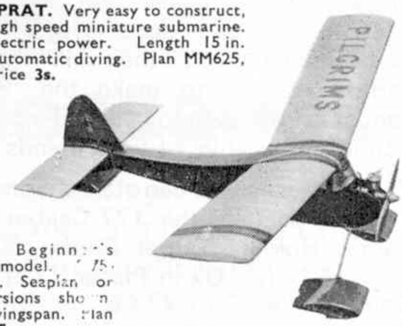
A pair of baby free flight models for engines of up to 0.5 c.c. "Mimi" is a biplane and the "Fokker DVIII" is a scale model with unique detachable wings. Plan U655, price **2s. 6d.**

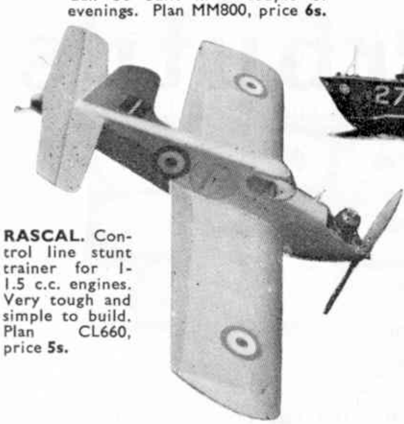
MOONGLOW. The ideal beginner's boat, power by electric or 1.5 c.c.-3.5 c.c. diesel or glow. Can be built in a couple of evenings. Plan MM800, price **6s.**



S.R.N.I. A model hovercraft that really does hover. 2.5-3.5 c.c. engines, 40 in. long. Plan MM583, price **8s. 6d.**

SPRAT. Very easy to construct, high speed miniature submarine. Electric power. Length 15 in. Automatic diving. Plan MM625, price **3s.**





RASCAL. Control line stunt trainer for 1-1.5 c.c. engines. Very tough and simple to build. Plan CL660, price **5s.**

VOSPER R.T.T.L. Authentic scale model, full of detail. Length 34 in. for 1.5 c.c.-3.5 c.c. diesels or electric drive. Plan MM530, price **10s.**

TOMBOY. Beginner's sport power model. .75-1.5 c.c. engine. Seaplane or landplane versions shown. 36 or 44 in. wingspan. Plan PET398, price **5s.**

H.M.S. COSSACK. Detailed scale model plan, 38 in. long hull. Electric power. Tribal class destroyer model. Plan MM500, price **6s.**

AIGLET. Easy to build 45 in. wingspan contest/sport glider. Simple to fly. Photo and instructions on plan. Plan G643, price **3s. 6d.**

MOONMIST. 21 in. cruiser, can be built for 15s.! Ideal beginner's model, electric drive. Plan MM610, price **3s. 6d.**

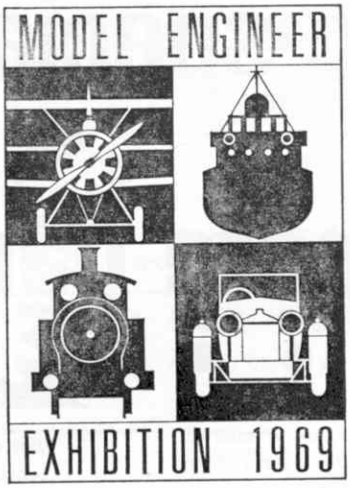
BUSTLER. An 18 in. long harbour tug model, extremely easy to build. Electric power, a very simple model. Plan MM363 price **3s. 6d.**

HOW TO ORDER

WRITE DOWN YOUR NAME AND ADDRESS WITH THE PLAN NO'S YOU REQUIRE, ENCLOSE A CHEQUE OR P.O. ORDERS, UNDER 10/- ADD 6d. POSTAGE AND SEND IT TO US AT:

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

MODEL ENGINEER EXHIBITION MODEL ENGINEER EXHIBITION MODEL ENGINEER



DO NOT MISS IT!

Model Boats, Cars Aircraft, Locomotives Traction Engines

★ MECCANO MODEL COMPETITION

★ WORKING MECCANO MODELS ON DISPLAY

31st DECEMBER 1968 TO 11th JANUARY 1969

SEYMOUR HALL LONDON W.1.

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: Auto-Models, Hugh Evelyn, Howell Dimmock, Kennions, Myfords, Traction Engine Enterprises, etc., etc.

SPECIAL ATTRACTIONS
Passenger hauling model locomotives—with rides for visitors. *NEW:* Model steam road vehicles will be demonstrated under power. Scenic Model Railway layouts—both commercial and private owners. Historic Model Cars never before in London. Demonstration Deck—many model activities, including Model Engineering and Ship Building will be demonstrated intimately in the galley demo. booths, plus the country's finest models of every kind.

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

PARTIES
Special reductions for parties, schools and pre-booking. Ask for details. Save money and avoid queueing! Route maps, parking places, full particulars on request.

WORKING LOCOMOTIVE CLASS
A new contest class with the LBSC Memorial Trophy and £10 award will be inaugurated. Points for performance—locomotives must have a track trial at the show to qualify—Ask for conditions of entry.

DUKE OF EDINBURGH TROPHY
Open to previous winners of championship cups, silver medals, challenge cups at *ANY* previous M.E. Exhibition. (Note: 3-year time lag rule has been withdrawn.)

NORTHERN & MIDLAND ENTRIES
A northern collection centre will be established if North of England entries justifies. A similar depot will be arranged in the Midlands, again if entries justify.

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. Additional Medal Awards will be made at discretion of the judges. Entry fees will be added to the Prize Pool. Prizes may take the form of Vouchers, Cash, Replica Trophies (for Challenge Trophy winners) or Championship Trophies. Please express your preference on entry form.

Enquiries for Competition Entry Forms, Trade Stands to EXHIBITION MANAGER, M.A.P. Ltd. 13/35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTS.

EXHIBITION MODEL ENGINEER EXHIBITION MODEL ENGINEER EXHIBITION MODEL ENGINEER EXHIBITION MODEL ENGINEER

EXHIBITION MODEL ENGINEER EXHIBITION MODEL ENGINEER EXHIBITION

MODEL ENGINEER EXHIBITION MODEL ENGINEER EXHIBITION MODEL ENGINEER EXHIBITION MODEL ENGINEER EXHIBITION MODEL ENGINEER EXHIBITION

model shops who specialise in MECCANO spare parts

Dealers wishing to advertise on this page should contact **MECCANO LTD., LIVERPOOL direct**, M. A. P. do not accept bookings for this page.

Listed below are some of the dealers who sell Meccano accessories and spare parts. This is intended to aid enthusiasts—and there are many of them—who constantly require additional spare parts for their sets. All dealers can, of course, order Meccano spare parts for their customers, but those listed here are among our spare part specialists.

JOHN WEBBER
Sports Ltd.,
223 High Street
EXETER
Telephone: 74975

C. G. MARSHALL
Maxwell Road
BEACONSFIELD
Telephone: 4092

TAYLOR & McKENNA
203 Marlowes
HEMEL HEMPSTEAD, HERTS.
Tel: Hemel Hempstead 53691

"WALKERS"
15 St. Thomas Street,
SCARBOROUGH, YORKS.
Tel: SCARBOROUGH 3223
(Mail orders welcomed)

THE GUILDFORD DOLL'S HOSPITAL LTD.
13 Swan Lane, GUILDFORD
Telephone: 61331

BARRETT'S LTD.
2 St. George's Street
CANTERBURY
Telephone: 66161

JEREMY
16 Princes Arcade,
Piccadilly
LONDON S.W.1
Telephone: Regent 1846

M. H. B. DAWSON
96 Whiteladies Road,
BRISTOL 8.
Telephone: 38534

LUCAS'S (Hobbies) LTD.
7 Tarleton Street
LIVERPOOL 1
Telephone: Royal 7562

Cheltenham Motor & Cycle Co. Ltd.
31 High Street
CHELTENHAM
Telephone: 53099

F. T. B. LAWSON
New George Street
City Centre, PLYMOUTH
Telephone: 65363

JOHN W. BAGNALL LTD.
18 Salter Street
STAFFORD
Telephone: 3420

BEATTIES OF LONDON
112 & 112A High Holborn,
LONDON W.C.1.
Telephone: HOL. 6285

W. PAINE & CO. LTD.
168 High Street
CHATHAM,
Also at Grays
Telephone: 45215

H. A. BLUNT & SONS LTD.
133 The Broadway,
Mill Hill
LONDON N.W.7
Telephone: Mill Hill 2877

LESLIE BROWN
Super Toy and Model Store 95 High Street,
Stockton-on-Tees
Telephone: 67616

CANADA

ESBE SCIENCE CENTRE
3431 Bathurst Street
TORONTO, 19
Telephone: 789-3161

YOUNGSTERS (THE DOLL'S HOSPITAL)
55 Hallgate
DONCASTER
Telephone: 2831

THE MODEL SHOP
7-13 Bootle Street,
Off Deansgate,
MANCHESTER 2.
Tel: Blackfriars 21935

WILTONS GAMES/SPORTS STORE
Corner House,
Canal/Queen Street
SALISBURY
Telephone: 22984

NEW ZEALAND

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

Meccano Contest 1968-9

CASH PRIZES FOR YOUR MECCANO MODEL

When the old Meccano Magazine ceased publication last year, Meccano Limited were forced to abandon the model-building competition they were running at the time. This, however, did not mean that the Contests which, over the years, had become part of the Meccano tradition were being abandoned for all time—definitely not! Now that the new Meccano Mag. is well and truly here, in fact, we are delighted to announce the start of yet another contest in which valuable cash prizes are offered to the builders of Meccano models which the judges, taking all things into consideration, feel to be most worthy of success.

ALL COMERS WELCOME

As usual, the competition is open to every owner of a Meccano Set living anywhere in the world and no limit, maximum or minimum, is set either on the number of entries which may be submitted or the quantity of parts which may be used. Any kind of model is eligible for entry unless taken direct from a Meccano manual, and all will be judged on their individual merits. *The only stipulations are that the model or models must be built entirely of standard Meccano Parts and must be your own unaided work.*

Prizes will be awarded for what the judges consider to be the best-built models with particular attention being given to those in which the more unusual parts are put to good use, as well as, of course, to originality of subject. Remember, too, that a small well-built model stands just as much chance of success as a large, unstable example, so don't be put off entering the contest just because you don't own a big stock of Meccano. The competition closes on January 31, 1969, for competitors in the U.K. and Ireland and two weeks later, on February 14, for overseas competitors.

Entries will be divided into two sections, A and B. Section A is for competitors under 14 years of age on the closing date and Section B for competitors aged 14 or over on that date. Prizes in these sections are as follows: Section A, 1st. £5.5.0; 2nd. £3.3.0; 3rd. £2.2.0; 10 prizes of 10s.6d. Section B, 1st. £7.7.0; 2nd. £5.5.0; 3rd. £3.3.0; 10 prizes of £1.1.0.

HOW TO ENTER

Once you have built the model, obtain a good photograph of it, or, failing this, a reasonably detailed sketch. If you are not an artist yourself, it is quite permissible to have a friend prepare the sketch. It is also advisable to include a short description of the main features of the model with your entry, mentioning any points of interest that you would like brought to the attention of the judges. *Under no circumstances, however, must the actual model be sent.*

In entering the Contest, write your name and address on the back of *each* photograph or drawing, together with the letter A. or B. depending on the Section for which you qualify, and forward to **Model-building Contest, Meccano Magazine, Binns Road, Liverpool 13.**

Prize-winning entries become the property of Meccano Limited but unsuccessful attempts will be returned if accompanied by a suitable stamp-addressed envelope or, in the case of overseas entries, a self-addressed envelope and the appropriate International Reply Coupons. Note that entries can be accepted only on the understanding that Meccano Magazine will not be held responsible for any entry damaged or lost and that the judges' decisions are final. No correspondence relating to unsuccessful entries can be considered.

WORKBENCH

Win a sailing dinghy

THE AURORA Plastics Co. (U.K.) Ltd., are running a ship model building contest with a Swedish Eagle Dinghy as first prize. Some 10 ft. long, the Eagle Dinghy is built of glass fibre, weighs 100 lbs and has nylon sails. To enter the contest you must construct one of the following ship models made by Aurora. Wander Whaler; Bon Homme Richard; Sea Witch; Hartford; Buccaneer Sea Rider; Cutty Sark; Chinese Junk; Bluenose Schooner; Viking Ship; Constitution; Black Falcon; Privateer Corsair; Roman Bireme; or Sovereign of the Seas. Entry forms are available at your local model shop or Aurora dealer and all you have to do is as follows. Fill in the entry form and post it to Aurora Plastics Co. (U.K.) Ltd., Green Dragon House, 64/70 High Street, Croydon, CR9 INA, Surrey. They will tell you where to take your model ship for judging. You must have built and painted the model yourself and received no professional assistance whatsoever. The contest is open for entries from July 1st to December 31st 1968. Five heats will be run, in Scotland, Northern England, Midlands and Wales, Southern England and Northern Ireland. Prizes will be awarded to the best six in each area. The winners will then compete in the final to be held in February 1969 for the Eagle Dinghy, Star Prize.

Correction

Spanner writes: On page 505 of the September issue, I stated that Meccano "Pinions and Gears will only mesh if the combined diameters of any two parts add up to the round inch or half-inch."

Mr. P. V. Ashworth of Hull has correctly pointed out that, in fact, the combined diameters of any two parts should add up only to the round inch, as they will not mesh, in the context of standard Meccano hole-spacing if their diameters add up to the round half-inch. Thanks, Mr. Ashworth!

Manchester exhibition

The South Manchester Models Group are to hold an exhibition of all types of models from October 25th-27th. The venue is St. Johns Church Hall, Ashley Road, Altrincham, Cheshire which is about 100 yards from the Downs bus terminus. Models on display will include railway layouts in 'N', 'OO' and 'EM' gauges. Aircraft, Boats, Ships ancient and modern, Radio controlled models and a Model Engineering section which includes 3½ in. and 5 in. gauge live steam locomotives. Further details can be obtained from the Secretary: B. Billington, 18 Cholmondeley Ave, West Timperley, Altrincham, Cheshire.

Railway centenary celebrations

In connection with the centenary celebrations by the Midland Railway London Extension Association, a special Exhibition Train will be visiting the following towns on the dates shown: St. Albans (Herts.) Fri/Sat/Sun October 4th-6th; Luton (Beds.) Fri/Sat/Sun October 11th-13th; Bedford Thursday-Sunday October 17th-20th. To mark this event a specially designed souvenir envelope (with printed stiffener) will be on sale on the train. Suitably worded, it will bear the handsome Midland Wyvern Crest of the Association and an illustration of a Kirtley 800 locomotive of 1870 vintage, cost 1/6d. Anyone requiring a cover should send a P.O. or cheque for 2/6d. (7/6d. if all three required)—made payable to M.R.L.E.C.C.A.—to Mr. D. P. Gowen, 15 Victoria Crescent, Royston, Herts., who will arrange to address the post.

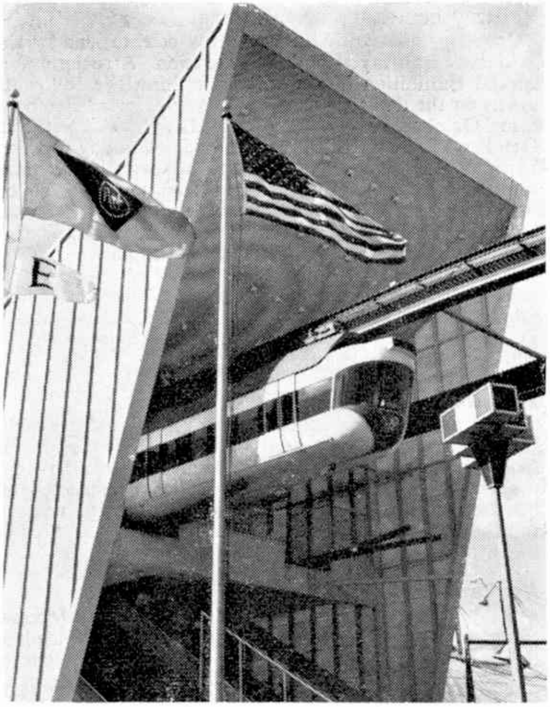
Free tool kit

It's not very often one gets a real bargain these days, but Heathkits offer is really genuine. See the inside front cover advertisement for details of this £1-14-0 tool kit, free offer. Your Editor has constructed an advanced stero outfit made by Heathkit, and can vouch for the high quality. Why not send for the free catalogue as well?

Meccano contests

Some readers may be confused with the two Meccano contests advertised in this magazine, so let's explain them a little more. There are in fact two separate model building contests. The first is the "Meccano Contest 1968-69" where contestants have to send a photograph or drawing of the model to Model Building Contest, Meccano Magazine, Binns Road, Liverpool 13. See page 579 of this issue for full details. The second contest is the "Model Engineer Exhibition 1969". This is mainly an exhibition but contests among the exhibits are also being organised. There will be a display of working Meccano Models from the Meccano factory and you are invited to enter your model in the "Meccano Model Competition". Any kind of Meccano Model is eligible. DO NOT SEND ANY MODELS YET! Write to : The Exhibition Manager, Model Engineer Exhibition, 13-35 Bridge Street, Hemel Hempstead, Herts., enclosing *details* of the model you wish to enter. The Exhibition dates are Dec. 31st to Jan. 11th. The judges will be your Editor and "Spanner" from Meccano Ltd., Liverpool. The third contest is an audience participation event. At the Daily Mail New Year Show, Empire Hall, Olympia, Dec. 28th to Jan. 11th. Meccano will be running a constructional contest on their stand.

Lawrence Bagley our cover artist presents the original painting used for August Meccano Magazines cover to Commander K. H. Dedman R.N. This Sea Vixen painting was received by Cdr. Dedman R.N. on behalf of 899 Squadron R.N.A.S.



THERE NO longer seems so much doubt of the ultimate success of monorail systems. Several are now operating successfully and many more are contemplated. However, there are still radical differences of opinion on most aspects of monorail design.

The basic problem of whether the monorail car should be suspended from above, or supported from beneath by a beam, is still very much in dispute. However, supported monorails have recently gained much wider acceptance than suspended types.

The very first monorail of which records still exist straddled a wooden beam. It was built by Henry Palmer in 1821 and the beam was supported on wooden posts. The vehicle was fitted with two wheels in tandem, hooks attached to a cross-yolk being used to carry the load. This horse-drawn device proved to be somewhat unstable but it was used successfully for materials handling at a brick yard and in a ship yard.

A monorail supported on wooden "A" frames, built in 1872 to connect Brooklyn with Coney Island, was more ambitious. Several steam locomotives were employed but operations ceased after one year because of inadequate passenger revenue.

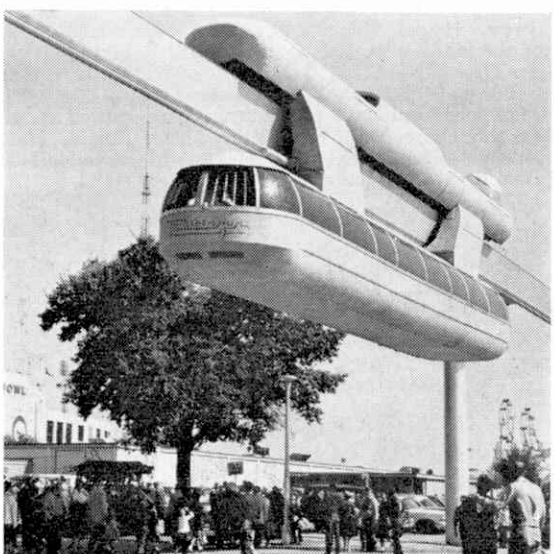
Monorail transit systems have achieved a surprisingly high safety record. The only serious accident on record was sustained in 1878 by the Peg-Leg Railroad built to connect Bradford and Gilmore, Pennsylvania.

The locomotives, and coaches, were supported on an A-frame structure and stabilised by two auxiliary rails at the cross-bar of the A. The length of the track was six miles and a speed of 30 m.p.h. was achieved.

Three locomotives were built initially and were very

MONORAILS by H. McDougall

The first part of a detailed history of Monorail Railways from the very first monorail of 1821 to the design for future transport



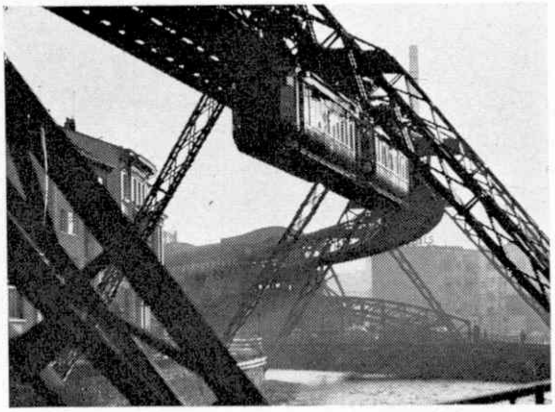
successful. A fourth and faster steam locomotive was eventually purchased but it exploded on its first run killing five people. Further operations were suspended.

In spite of the ingenuity shown, none of the monorails built in the last century can be considered as more than novelties. It was not until 1901, when the Schwebebahn (literally, "Swinging Railroad") went into service, that the monorail began to come of age. This installation, which connects the German industrial communities of Barfield and Wuppertal, has carried more than a thousand million passengers without a single accident attributable to derailment or structural failure. The track is 9.3 miles long of which 6.2 miles is suspended above the River Wuppertal.

The rail structure above the river is supported by sloped lattice-boxed girders spaced 80 to 110 feet apart, every sixth girder being in the form of a double A frame to compensate for longitudinal stresses. The frames are bridged by horizontal steel plate girders which support the rail 39 feet above the water. For the overland portion, the rails are carried at a height of 26 feet above the ground by a portal type structure.

The original cars, which are still in use, are 37.5

Above, the Safege monorail system as used at the United States World Fair. Here the cars are suspended from bogies. At left, another type of monorail, the U shaped hanger seen in Texas.



The Schwebebahn (Swinging Railroad) system built in Germany during 1901. The original cars are still in use. New lightweight cars are now being introduced to hold 70 passengers.

feet long, 6.75 feet wide, and 8.5 feet high. Each carries fifty passengers and weighs 12 tons. In 1951, twenty new 70-passenger, lightweight cars were introduced.

Each car is suspended from dual two-wheel tandem bogies powered by worm-driven 59 h.p. motors from a 600 volts DC current rail supply. Peak traffic volumes are 4,200 passengers per hour in each direction on an operating headway of two minutes.

The Schwebebahn is often quoted as proof of the high standard of mechanical reliability that a monorail system can attain. However, most proponents of modern monorails systems consider the Schwebebahn as little more than an antique—a curiosity which is no longer representative of modern monorail technology. They feel that its continued existence has tended to retard rather than encourage interest in monorails. One of the reasons for the success of the Schwebebahn is that it occupies air space, above a river, that could not be utilised in any other manner. This circumstance is unlikely to be repeated elsewhere.

Japan is an over-populated country where all new forms of transportation are studied with great interest. An experimental suspended monorail was built in 1957 in the Tokyo Zoological Gardens as the prototype of a proposed mass-transit system. It was designed for a maximum speed of 20 m.p.h., although on the 1,200 feet of rail installed the permitted speed is only 8.5 m.p.h.

The track is a shallow trough on the upper surface of a box girder. The girders and the 23 inverted-J supports were built up from sheet and angle steel.

Each car is 30.5 feet long, seats 31 passengers, and weighs 6 tons. The cars are suspended by U-shaped hangers from two rubber-tired bogies, each powered by a 130 kw motor. Power pickup is by pantograph from a 600 V DC source beneath the beam. The cars are kept in alignment by four small spring-loaded tires mounted on each bogie rolling in a horizontal plane against the outside of the rail.

The cars were fabricated very economically by using components from conventional transit system cars. However, although it is still in operation it was not considered a successful installation. Serious problems were encountered including cracks in the hangers and undue wear on the drive gears.

Another suspended system, developed about the same time as that in Tokyo, was built by Monorail Inc., and installed at the Cotton Bowl, Dallas, Texas. The track is a 30-inch diameter tube with a flat 18-inch wide top. A vertical flange 6 inches high and ½-inch wide is welded down the centre of the top to guide the wheels which contact both sides of the flange. The track is welded to eighteen 30-feet inverted-J steel towers, spaced 55 feet apart and sunk 16 feet into the ground.

The 26,760 lb. air-conditioned coach seats 60 passengers. It is 54 feet long and is powered by two 310 h.p. Packard engines. One engine is installed in the centre of each of the two -four-tired bogies. Eight small guide wheels centre the drive wheels by rolling in a horizontal plane along the sides of the six-inch track flange.

The operator sits in a cockpit above the rail. A speed of 58.5 m.p.h. has been claimed. No sideway and very little sense of motion is felt even at top speed. It has been estimated that if a longer track was installed, speeds of up to 100 m.p.h. would be quite possible.

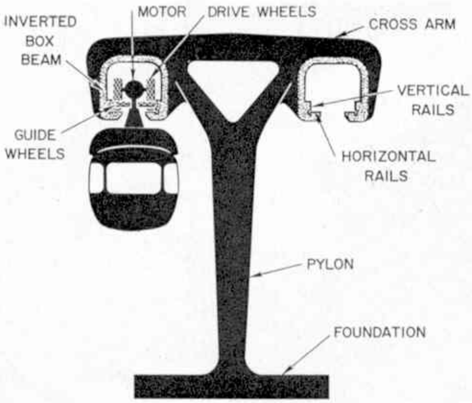
The primary problem faced by monorail designers is that of keeping the per-passenger weight to an absolute minimum. This is vitally important because the lighter the weight of the trains, the fewer the supports needed for the track.

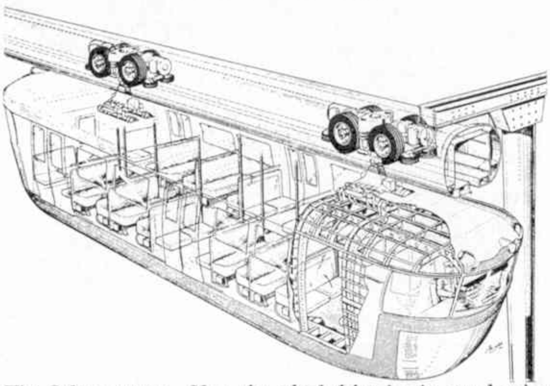
In a conventional transit car a single load-carrying underframe transmits the weight directly to the bogies. The car sides and roof are needed only to enclose the passengers and provide some resistance in the event of a collision.

In a suspended monorail the load must still be concentrated on an underframe but it must then be transmitted to the roof since it is the latter which is connected to the bogies. This means that the entire car must be made very strong. The only alternative is to use massive U-shaped hangers, as in the Texas and Tokyo installations, passing around the car to connect to the underframe. It is thus difficult to design any type of suspended car which is light in weight yet has the required strength factors.

A further complication is that in order to keep the weight imposed at any particular point as low as possible it is desirable that the cars should be long and narrow rather than short and stubby. Unfortunately, this implies that an even stronger roof frame

The Tokyo Hanedh line in Japan showing the "Switch." This type of monorail is just the opposite to the more popular suspended systems, and is rapidly gaining popularity.





The Safege system. Note the wheel drive in the car drawing and the 'T' type supports for double track layouts. The car is suspended 14 feet from the ground, overall height is 30 feet.

is desirable to prevent the car from sagging between the points of suspension. If very high speed monorails are eventually developed the long, slim profile will have the obvious advantage of being more streamlined. But the modest speeds at which present-day monorails operate make streamlining relatively unimportant.

Bogie design presents no particular problems. In most instances use can be made of conventional components long proven in automotive or railroad applications.

The trend in modern monorail systems is toward the use of pneumatic tires rather than steel flanged wheels. Pneumatic-tired stabilising wheels running along the side of the rail tend to increase rolling friction but pose no particular mechanical problems.

Although several types of propulsion have been used successfully in the past, most modern monorails are electrically-powered.

Suspended monorails are much favoured by amusement parks such as the US installations at the Miami Seaquarium and Busch Gardens, Tampa. High Speed operation is not required but it is important to give passengers a good downward view.

The monorail installed at the 1964-65 New York Worlds Fair met these requirements but it was actually a slow-speed version of the most sophisticated suspended monorail yet built—the SAFEGE system erected for experimental purposes at Chateuneuf-sur-Loire near Orleans, France, by a consortium of transportation companies.

Instead of being "hooked" around the rail, the cars used in the SAFEGE system are suspended from bogies which operate inside an inverted box beam fitted with internal rails. The drive wheels run along horizontal rails and the guide wheels bear outward on vertical rails. This system prevents excessive sway and provides a steady ride.

The design of the SAFEGE monorail system was preceded by very extensive investigations of all types, including the supported monorail. The French engineers concluded that the latter presented several problems that could be eliminated in the design of a suspended monorail. These included a tendency toward instability due to the relatively high centre of gravity, and difficulties when short radius curves must be negotiated. Neither of these problems are encountered with suspended systems.

A box girder track, built from plates electrically welded to each other, was found to be the most economical yet efficient structure for maintaining the transverse stability of the cars and trains running at high speeds. Because of the high strength of the box girder, the track requires supports only about every 100 feet. Since the cost of the track installations usually represents more than 50% of the total cost of a monorail system, economy in building the track structure is usually considered to be of major importance.

Other advantages of the box type construction of the rail are that it is completely weather-proof and it reduces even further the already low noise level of the rubber-tired wheels.

Switching presents no particular problems. The method used for the SAFEGE installations is similar in esentials to that of a conventional railway switch. A central articulated element rotates around an axis at the point of the frog of the switch to establish running and guiding tracks respectively on the straight and turned-out tracks.

The car is constructed of aluminium on the integral shell principle. It weighs 16 metric tons, including the two suspension bogies and is 57 feet long. It can carry 32 seated passengers and 91 standing.

A pneumatic suspension system is employed.

Each of the two overhead bogies has four primary wheels and four small guide wheels. Each bogie has two 600-750 volt traction motors rated for 93/115 h.p. in continuous operation.

A steel safety flange on the wheels eliminates the possibility of accidents caused by tyre blowouts. Rheostat motor braking and air-operated drum or disc brakes operating independently of each other stop the car safely under all circumstances.

This sleek space age monorail is an Italian development and operates on a beam type rail. Note the current pick up rails.

Another view of the Safege monorail system used at the U.S.A. World Fair. This is the most advanced principle in use today.

The light weight of the car, the high traction power and the inherent adhesion of rubber tires, permit fast acceleration and quick stops. Normal operating speeds are 50 to 70 m.p.h.

All experiments made to date with suspended monorails point up the fact that due to the design problems, inherent in the configuration of the cars, they will always tend to be heavy.

Ideally, a monorail would be supported from below but since the centre of gravity of the car would then be above the rail, some means of balancing is obviously required.

During the 1880's, a period sometimes referred to in popular magazines of the time as one of "monorail madness", a device known as the Boynton Bicycle locomotive achieved modest success on Long Island, USA. A steam locomotive which operated over a track two miles long rolled along on a single 8-foot diameter wheel and two smaller tracking wheels. It was stabilised by two dollies extending from the top of the car. They were fitted with wheels that ran in a horizontal plane along each side of an overhead rail.

In 1908 another US experimenter, E. W. C. Kierny, tested a similar system in which the vehicle was stabilised by an overhead guide rail. When it was travelling fast, pressure on the upper rail was reduced almost to zero, but difficulty was experienced at curves. Any variation from the exact design speed caused excessive sideways stresses to be imposed on the guide rail.

In 1909, Louis Brennan in London, sought a more sophisticated solution. He designed a monorail stabilised by a gyroscope. A 40-foot car weighing about ten tons and capable of carrying 40 passengers, ran on a single rail, kept upright by two 1500 pound gyroscopic wheels rotating in opposite directions at 3000 r.p.m. Speeds of up to 125 m.p.h. were theoretically possible, although the question of whether the vehicle could be kept stable as it rounded curves at various speeds was never solved. The project was abandoned primarily because of fear of the gyroscope stopping.

What was required was some system whereby a monorail running along a beam could be made inherently stable, without the need for complex track structures of failure-prone stabilising devices. The solution accepted by present-day designers is to elevate the beam and design a car which straddles it. The power units and all other heavy equipment can then be incorporated into those parts of structure which hang down like panniers on each side of the beam.

This idea was pioneered by the Listowel & Ballybunnion Railroad built in Ireland in 1888. Extending for a distance of 9½ miles it ran on a rail supported by A-frames. Guide rails were installed along each side of the frames. The track was raised about 3½ feet above the ground and the frames were laid on ties positioned parallel to the track. Three engines, 14 passenger cars and 24 freight cars were used.

Each locomotive had twin boilers, fireboxes and cabs. Two cylinders powered the centre wheel of three coupled wheels positioned between the boilers.

This curious contrivance proved quite successful in operation and it continued in service until 1924 when road competition forced its abandonment.

With any beam type monorail, superelevation must be introduced on curves. With careful design this can be calculated so that it will prevent undue sideways motion of the vehicle in normal operation yet permit it to slow down or, if necessary, to stop on curves without disastrous results.

Beam-type monorails now exceed in number all other types. Most of those installed during the last decade stem directly or indirectly from the experiments made by the ALWEG Company, founded by Axel Lennert Wenner-Gren.

The pioneering ALWEG installation was built in 1952 at Fuehlinger Hyde, Germany. for test and exhibition purposes. It operated over a track consisting of a concrete beam which was prefabricated and assembled in sections.

The beam carried five tracks, each made from flat steel, One track on the top of the beam supported the monorail car; two tracks were used at each side to stabilise it.,

All superelevations were cast into the beam. Minimum radius on curves was 444 feet and the maximum banking angle was 45°. The beam was supported by reinforced concrete pylons about eight feet high positioned 20 feet apart.

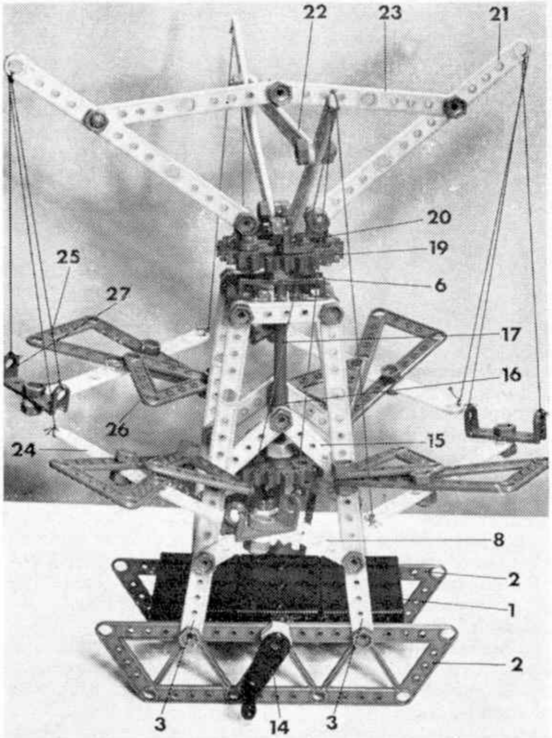
A three-car train was employed for test purposes, each car being about 30 feet long, 10 feet wide and 12 feet high. Power for the electric motors in each of the dual two-wheeled bogies fitted to each car was collected from a pair of current supply rails on each side of the beamway. The train was controlled automatically from a central off-track cab.

This installation, which was two-fifths full size, proved so successful that it was replaced in 1957 by a full-scale test oval just over a mile long. A two-car unit operates over the installation which includes a station and switch systems.

The beam used is of pre-stressed reinforced concrete, the joints between the sections being covered by finger plates. The conductor rails are recessed in the lateral surfaces of the beam and all electrical cables pass through the inside of the beam.

The dimensions and style of the reinforced concrete pylons designed by ALWEG can be adapted to suit local requirements. The distance between pylons is 65-97 feet but longer distances can be spanned by special structures. Base requirement at street level is only 10-15 feet. Double-tracked sections can be carried on 'T' shaped pylons.

Concluded in next month's MECCANO MAGAZINE



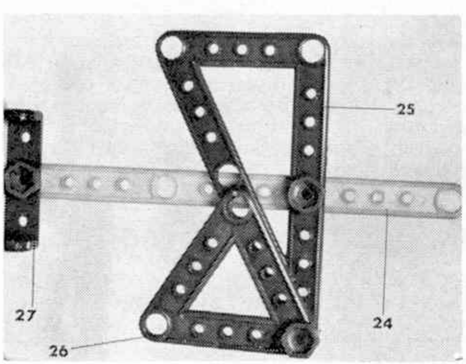
HIGH-FLYERS

by Spanner

A new Plastic Meccano model built from a Set C

This magnificent Aeroplane Roundabout, built with Plastic Meccano Set C, was specially designed for Meccano Magazine.

BOB MOY, experienced head of Meccano Limited's Model-building Department recently confirmed something which I have believed to be true for many years—namely, that models based on fairground amusements are highly popular with both young and old alike. In case you should be wondering why I regard Bob's opinion in the matter as reliable confirmation, I must explain that one of the main functions of the Model-building Department is to produce large special display models which have been chosen and ordered by Meccano dealers all over the country. The dealers naturally chose those models which they have found attract most attention and records prove beyond a shadow of a doubt that the majority of models ordered are fairground reproductions. The head of the Department concerned with building and supplying the models, therefore, certainly knows what he is talking about !



Over the years we have featured innumerable fairground models in the M.M., but these have virtually all been built with standard metal Meccano. Plastic Meccano has hardly entered into it, which isn't really surprising considering its comparatively recent introduction, so I felt it was about time something was done to rectify the situation. The outcome is the working Aeroplane Roundabout built with Plastic Meccano Set C.

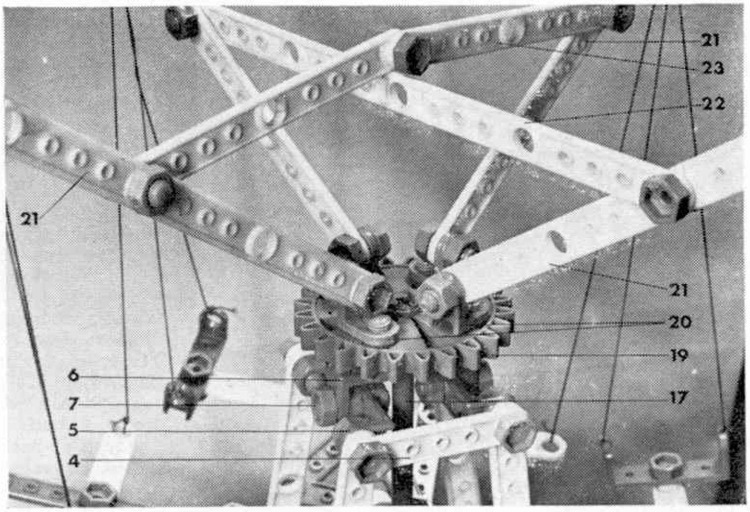
To start with, a large baseplate is built up from three Bases 1 to each side of which a Bridge Girder 2 and two 5-hole Strips 3 are attached. At the top, Strips 3 are joined by a 2-hole Strip 4, the securing Bolts also fixing two Double Angle Strips 5 between Strips 3 at each side. The centre of these Double Angle Strips are joined by a third Double Angle Strip 6, its lugs spaced from the previous Double Angle Strips by an extra Nut on the shank of each securing 1 in. Bolt 7. To avoid difficulty, it is advisable to build this Double Angle Strip arrangement separately and fit it to the model when completed.

Two 2-hole Strips 8 are next bolted to the outside of Strips 3 at each side, the free holes in their overlapping ends providing bearings for a 6 in. Axle 9. Mounted on this Axle are a 20-teeth Sprocket Wheel and an 18-teeth Gear Wheel 11, the former connected by Chain Links to a 10-teeth Sprocket Wheel 12 on another 6 in. Axle 13 held in the centre Base by a Handle 14.

Another set of 2-hole Strips 15 are bolted to Strips 3, on the inside, this time, and further up than Strips 8. The overlapping ends of these Strips, at each side,

This picture of one of the aircraft fitted to the model shows how a few well-chosen parts can be used to produce a simple, easily-identifiable representation of an aircraft outline.

A close-up view of the top of the Roundabout showing the method of fixing and bracing the radiating support arms.



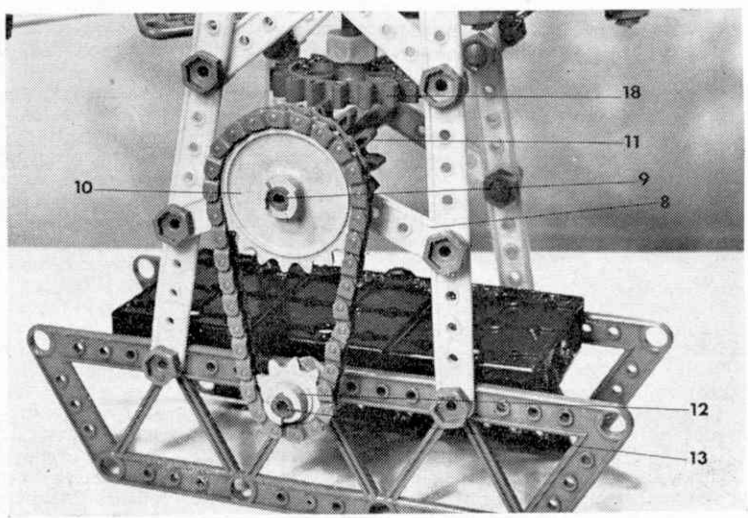
are joined by a Double Angle Strip 16, as shown. Journalled in this Double Angle Strip and Double Angle Strip 6 is a third 6 in. Axle 17 which carries an 18-teeth Gear Wheel 18 on its lower end and a 24-teeth gear 19 on its upper end. Gear 18 engages at right-angles with Gear 11 on Axle 9. Where necessary, incidentally, Axle Clips are used to hold the Rods in position.

Now fixed, by Bolts only, to the upper face of Gear Wheel 19 are four Angle Brackets 20, to each of which a 4-hole Strip 21 is bolted. Opposite Strips 21 are joined, for strengthening purposes, by a 5-hole Strip 22 in one case and by a 5-hole compound strip 23, obtained from two 3-hole Strips, in the other.

This leaves only the four aeroplanes to be built, all of which are identical. A 4-hole Strip 24 acts as the fuselage with the wings being supplied by one 3-hole Triangular Girder 25 and one 2-hole Triangular Girder 26, the latter bolted to the apex hole of the former which, in turn, is bolted to Strip 24. The tail assembly is represented by a Double Angle Strip 27. Each aircraft is attached by lengths of cord to two adjacent Strips 21, one length being tied between one Strip and the "nose" of the aircraft, while the remaining two lengths are tied between the other Strip and the 'plane's "fins."

PARTS REQUIRED

10—2-hole Strips	2—Axle Clips
2—3-hole Strips	4—2-hole Triangular Girders
8—4-hole Strips	3—6in. Axles
5—5-hole Strips	1—Handle
3—Bases	1—24-teeth Gear Wheel
43—Bolts	2—18-teeth Gear Wheel
2—1in. Bolts	1—20-teeth Sprocket Wheel
43—Nuts	1—10-teeth Sprocket Wheel
4—Angle Brackets	34—Chain Links
8—Double Angle Strips	2—Bridge Girders
	4—3-hole Triangular Girders



In this close-up view of the lower section of the model, the method used to transfer the drive to the vertical Axle is clearly shown. Note the simple construction.

FLASH! BANG! WALLOP!—WHAT A DINKY

Chris Jelley in a musical mood, looks at the latest Dinky Toy releases

WITHOUT WISHING to appear a musical genius, or anything like that, I must say that the above title, "borrowed" in modified form from the successful musical show "Half A Sixpence", came unbidden into my mind when I was shown the first of the new Dinkys which should be on sale when you read this. What, you may be wondering, is so significant about the title? Well, I must admit that "Bang!" and "Wallop!" don't really come into it, but the word "Flash!" tells the whole story. The model in question—No. 157 B.M.W. 2000 Tilux—does flash, and flashes most realistically at that!

To avoid any misunderstanding I must qualify this statement by explaining that the model as a whole does not shine like some sort of science fiction dream-car. If it did, of course, it wouldn't be a scale reproduction of a real-life car and Germany's B.M.W. is definitely a real car. No, the flashing features, in fact, are the direction indicators, a complete front-and-rear set of which are included. To the best of my knowledge, Dinky Toys were the first, certainly in this country, to fit working trafficators to a die-cast model with their Vega Major Luxury Coach, although only one trafficator was included at each side. Now they have done it again by being first to introduce a completely realistic direction indicating system with amber-coloured front and rear lights at each side. These work in conjunction with the model's Prestomatic steering so that, when the car is pressed down on one side or the other to bring the steering into action, the relevant indicators flash on and off as the model is pushed along. The effect is fascinating—particularly at night!

A word of advice at this stage: when you see the model don't, like I did, wonder how on earth they managed to obtain such small lamp bulbs! You'll be barking up the wrong tree because lamps are not contained in the visible "ends" of the trafficators. The lamps, themselves (only two of which are included) are actually situated deep inside the model and their light is transmitted to the trafficators down special "light guides". These are made of a translucent plastic which enables light shone on it at one end to be seen at the other end. In a sense, it is rather like the light version of a speaking tube except that this, of course, enables sound introduced at one end to be heard at the other.

Other features included in the model besides the trafficators and steering are 4-wheel suspension, windows and seats, steering wheel and continental-style number plates. The seat moulding, however, is meant only to give an indication of detail as it has not been possible to include the usual realistic interior owing to the room taken up by the trafficator equipment. In order to make the model sufficiently large to accommodate this equipment, incidentally, it has been necessary to increase its scale from Dinky's normal 1 : 42 to 1 : 37—a perfectly acceptable state of affairs considering what it has been possible to achieve by increasing the size. The trafficators, by the way, draw their power from a 1½ volt Exide T3, Ever Ready U16 or equivalent battery which slots into a cavity in the base of the model. Because of the danger of battery deterioration while the model remains in stock, the battery is not supplied with the model, but it is readily obtainable from any electrical supplier.

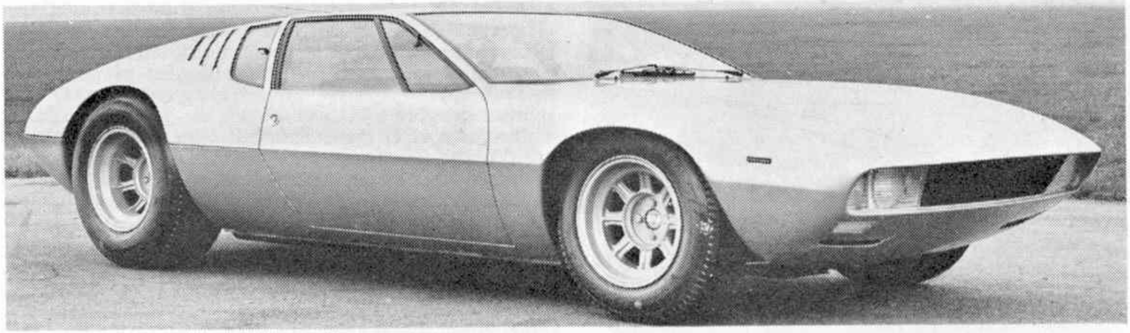
Time, now, for a quick look at the real B.M.W. 2000 Tilux as manufactured by the German company, Bayerische Motoren Werke A.G. (B.M.W. for short), based in Munich. The 2000 Tilux, I understand, was designed both for the driver who expects a high standard of performance and for those who, according to the manufacturers "place the emphasis on peak sporting performance". It certainly lives up to its expectations being a tremendously comfortable and beautifully upholstered car with bucket-type seats and wood-panelled facia. It is powered by a 4-cylinder, in-line engine of 1,900 c.c. capacity that develops 135 h.p. (S.A.E.) at 5,800 r.p.m. to give the car a top speed of 112 m.p.h. and getting it from 0 to 60 m.p.h. in only 10 seconds. Transmission is via a 4-speed all-synchromesh gearbox.

Performance surpassed

The performance of the B.M.W. is excellent for the size and weight of the car, but it is far surpassed by the performance of the car on which the other new Dinky Toy is based. This, the De Tomaso Mangusta is only just starting to warm up at 112 m.p.h. It's top speed is a staggering 175 m.p.h.! Mind you, this is not too surprising as it falls into the racing sports car class, drawing its power from a mighty 4,778 c.c. engine that develops some 375 b.h.p. It has the low-slung, aerodynamic lines of the classic road-racer; lines which are faithfully reproduced in the Dinky Toy model marketed under Sales No. 187.

One of the features of the real Mangusta is its enormous rear-mounted engine, enclosed by a pair of upward-opening gullwing-type engine covers. A minutely-detailed, gold-coloured representation of the engine is built into the Dinky and, like the original, it is enclosed by opening "gullwing" engine covers. Tucked behind the engine is the spare wheel, while other features include opening luggage compartment at the front, seats, steering wheel, number plates and the racing number "7" on the luggage compartment lid. Of particular interest are the extremely realistic wheels, those at the rear being fitted with extra-wide tyres to further increase realism. As with all modern Dinkys, including the B.M.W., the Mangusta incorporates rear-view mirror and windscreen wiper representations in the windscreen moulding.

If you have looked in almost any toy shop window recently, you will have seen the Dinky Mangusta. You could hardly fail to do so because it stands right out, thanks to its striking colour-scheme of bright fluorescent red body with white base, engine-covers and luggage compartment lid. The interior of the driving compartment is a contrasting black, set off beautifully by the steering wheel which is finished in silver. In short, Dinky have yet again turned out a really appealing model which will grace any collection.



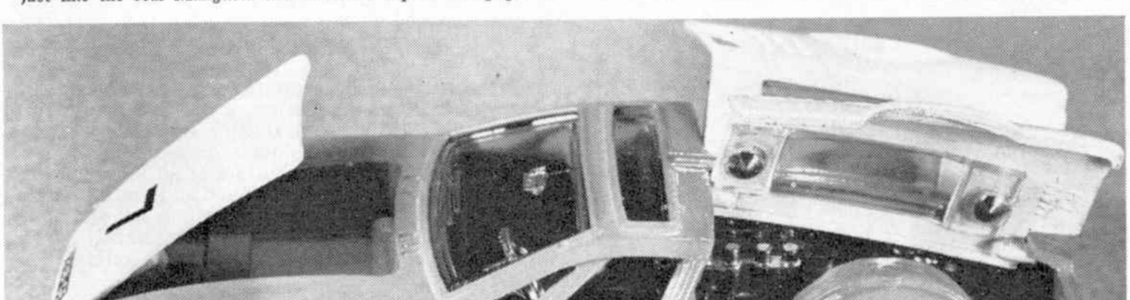
Above, the super sleek 175 m.p.h. De Tomaso Mangusta—note those low slung racing car lines of the classic road racing car and those huge "mag" wheels. The windscreen wipers "park" on top of each other in the centre of the screen.

The power for the B.M.W. 2000's trafficators is provided by this small $1\frac{1}{2}$ volt battery which fits into a special cavity in the base of the model, easy to remove and replace when exhausted.

Dinky Toy No. 157 B.M.W. 2000 Tilux makes another landmark in British die-cast modelling history by being the first toy to be fitted with a full front-and-rear set of flashing direction indicators.

The indicators of the B.M.W. work in conjunction with the steering. Pressing down on one side of the model causes the front wheels to turn and the indicators to flash as the model is pushed along.

Destined to be a winner, the Dinky De Tomaso Mangusta No. 187. Note the opening luggage compartment, opening doors, "gullwing" engine covers and those super detailed wheels just like the real Mangusta shown at the top of this page.

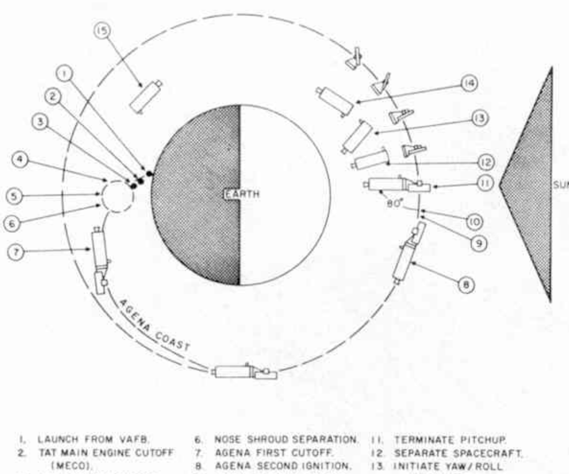


WEATHER SATELLITES AND THEIR USES

by Charles A. Rigby

Above: California photographed from 700 miles up. This automatic transmission photograph shows the Pacific Ocean, Gulf of California and Mexico area.

Below: The Thor Agena B flight events for Nimbus C mission. Photos courtesy of General Electric Company, New York.



1. LAUNCH FROM VAFB.
2. TAT MAIN ENGINE CUTOFF (MECO).
3. TAT VERNIER CUTOFF (VECO)
4. TAT/AGENA SEPARATION AGENA FIRST BURN
6. NOSE SHROUD SEPARATION.
7. AGENA FIRST CUTOFF.
8. AGENA SECOND IGNITION.
9. AGENA SECOND CUTOFF.
10. INITIATE 60°/MINUTE PITCHUP.
11. TERMINATE PITCHUP.
12. SEPARATE SPACECRAFT.
13. INITIATE YAW/ROLL MANEUVER.
14. TERMINATE YAW/ROLL MANEUVER, FIRST RETRO.
15. SECOND RETRO.

WITH THE successful launching of the first satellite, the Russian Sputnik, other successes and developments followed. More important still, different kinds of satellites were constructed for various purposes including space capsules for carrying astronauts. In another category are those known as 'probes', including balloons, like those directed to the moon. Others like 'Early Bird' are communication stations, while some are used as weather satellites for studying the world's weather.

The first weather satellites tested in America were the Tiros type with few parts. Nimbus I was launched on August 28th 1964 into an elliptical orbit around the earth and during the next month it sent down a steady stream of meteorological observations from its three sensor sub-system, and stopped operating 26 days after it was launched when the solar array drive failed and the spacecraft power supply was depleted. More than 27,000 remarkably clear photographs were received.

Much bigger still, Nimbus II weighing 912 lbs. was launched on May 15th 1966 from a Thrust Augmented Thor (TAT) Agena B. Rocket. This circled the earth every 108 minutes in a near-polar orbit at an altitude of 700 miles, setting a new long-life record for complex, earth orbiting satellites on July 28th when it completed 1,000 orbits.

In the first two months after going into orbit it travelled more than 20 million miles, received more than 23,000 commands from ground control and took more than 150,000 pictures. This was largely due to the special stabilization and control system which kept the Nimbus II camera system constantly pointed towards earth.

Nimbus II was a three-axis, earth stabilized satellite providing full earth coverage on a daily basis by means of a near-polar orbit having an inclination of approximately 80° to the equator. The earth's rotational movement provided the mechanism for longitudinal coverage, while latitudinal coverage was obtained by the satellite's orbital motion. Its mission was to bring all parts of the earth under regular daily observation for the rapid processing, evaluation, analysis and interpretation of the physical data for use in real time meteorological operation and for studies of the earth's atmosphere. With this mission successfully accomplished, a significant step forward was made in the development of a global meteorological satellite system. It was launched at 00.58 am. on May 15th near midnight or noon providing the best conditions for earth viewing.

One of the most significant engineering achievements of the satellite was the flawless operation of the control system which had kept the satellite stable and pointing directly at the earth to within 1 degree. Its ability to remain focussed on earth's surface at all times was due to the unique three-axis stabilization and control system. Based on the principle that the earth is hot and space cold, two infra-red horizon scanners constantly viewed the horizon and sensed the spacecraft's reference to the earth's surface.

Had the satellite deviated from its proper hot-cold, earth position, an onboard computer automatically directed small flywheels and gas jets to re-adjust the vehicle to its proper balance. Less than 2 per cent of the Freon gas supply for the gas jets was used during the first two month's of operation. The satellite's three electrically-driven flywheels, one each for pitch, yaw, and roll, were used extensively to keep the camera system on target.

Adding to the satellite's payload were cameras for making regional and large scale weather patterns and radiation measuring equipment to investigate the atmospheric envelope around the globe. The camera array consisted of an Advanced Vidicon Camera System (AVCS), Automatic Picture Transmission equipment (APT), and High Resolution Infra-red Radiometer (HRIR). The AVCS included three TV cameras which took large-scale pictures, plus a tape recorder for storing the photographs until transmitted to control stations at Fairbanks, Alaska, and Rosman, North Carolina.

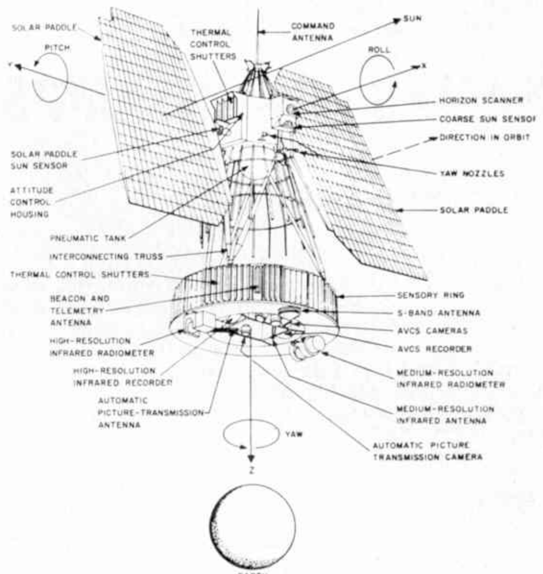
The AVCS could take a new picture every 91 seconds. The APT system transmitted a daylight photograph to ground stations every 208 seconds, so that a ground station could usually pick up about three photographs each time the satellite passed over its area. The HRIR system sent night-time cloud cover pictures to the ground stations, and also measured cloud-top temperatures. Meteorological teams in many parts of the world were thus able to make use of the nearly 3,000 daily photographs from Nimbus II to assist in daily weather forecasting, and also to help develop the future technology needed to predict the weather weeks in advance. Hence, in addition to the long term importance of the weather satellite it is of immediate benefit because it places all parts of the world under regular daily observation for the quick processing of dates for weather forecasts.

A new piece of equipment on board was a Medium Resolution Infra-red Radiometer (MRIR) which measures the earth's heat balance, detecting how much of the sun's rays the earth retains in its atmosphere. This is important because meteorologists think such information may help to explain the birth and death of storms. It is known that warm spots linger over certain areas of the earth, but their part in the formation of weather patterns is still a mystery.

Nimbus II provided extensive infra-red photo coverage of hurricane breeding areas in the Atlantic Ocean. The two daytime cameras and two infra-red (night-time) detectors marked the greatest hurricane coverage to date from a single weather platform. It also picked up and tracked Typhoon Irma in the Pacific Ocean during its second orbit, and a week later tracked Hurricane Alma from its birth to death in the Atlantic.

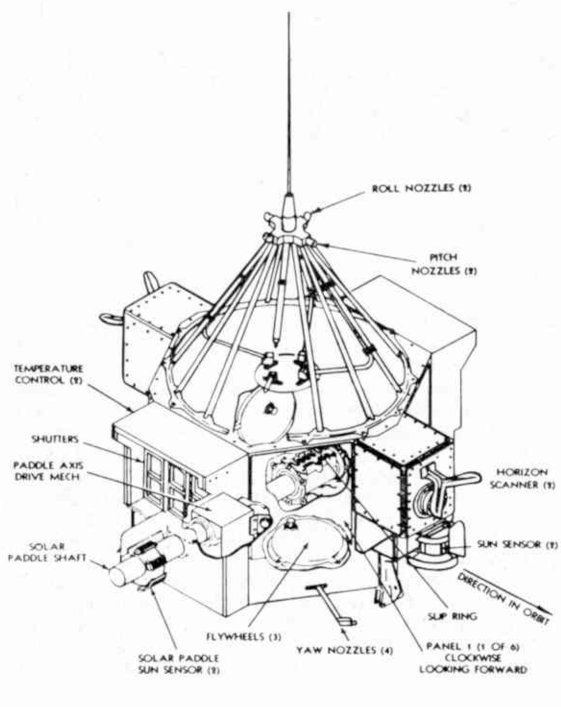
In addition to broadening the world's knowledge of the weather, data obtained this way is used in geology, topographic mapping, forestry, ice pack reconnaissance, hydrology, and oceanography. For example, information sent back from Nimbus I moved a mountain. Its photographs of Antarctica caused mapmakers to reposition a 10,000-foot mountain 45 miles further west.

Nimbus II carried basically the same payload as its predecessor, Nimbus I, plus a Medium Resolution Infra-red Radiometer (MRIR) for the purpose already mentioned. In addition to this, it carried the same camera systems as Nimbus I. These include: A—Advanced Vidicon Camera System (AVCS) which consists of three synchronized TV cameras and a magnetic tape recorder. The cameras take a three-segment picture that covers an area 107° by 37°, approximately 6,420 nautical miles by 2,200 nautical miles at the equator. B—Automatic Picture Transmission (APT) which utilizes a vidicon tube camera with long-duration storage capability and a slow read-out rate. A timer programmes the camera, vidicon and transmitter for continuous operation, signals being transmitted to relatively simple ground stations which automatically receive cloud cover photographs transmitted by the satellite during three successive orbits. C—A High Resolution Infra-red Radiometer (HRIR) designed to detect thermal radiation from the earth and atmosphere. Because of the temperature difference between clouds and the earth, the HRIR is used to obtain night-time cloud cover pictures and also to measure cloud-top temperatures.



The Nimbus II flight spacecraft. Photo courtesy of General Electric Company, New York.

The stabilisation and control system of a Nimbus II spacecraft. Photo courtesy of General Electric Company, New York.



THE OLYMPIC GAMES ON STAMPS

by James A. Mackay

THE OLYMPIC Games of the ancient world were founded in 776 B.C. and consisted of a trial of athletics and sports between the various Greek states. The Games were held every four years (known as an Olympiad) and they survived as late as A.D. 393. For fifteen centuries the Olympic Games and their ideals languished in oblivion but in January 1894 a Frenchman, Baron Pierre de Coubertin, sent a circular to all governing bodies of sport advocating the educational value of sport and its use in promoting the ideals of peace and friendship among the peoples of the world.

His proposals were enthusiastically accepted and plans were put in hand for the first modern Olympic Games which were held, appropriately enough, in Greece in 1896. The Greek government gave tremendous support to the Games and even went so far as to issue an expensive set of twelve stamps to mark the occasion. This is all the more remarkable when it is remembered that the first commemorative stamps had appeared only within the previous decade and up to that time very few countries had followed the precedent. The stamps had a face value of about £1—a lot of money for those days—and many collectors boycotted the stamps as being an attempt to exploit them, but as they are now catalogued at over £184 they turned out to be a nice investment !

The stamps depicted sporting events alluding to the classical games, as well as views of the Acropolis and the Parthenon. In 1900 five of the series were re-issued with new values surcharged on them. Greece held another "Olympic Games" in 1906 and issued a set of fourteen stamps, but these "games" were not officially recognised. In the meantime the second and third Olympiads were staged in Paris and St. Louis in 1900 and 1904 respectively, but on neither occasion were stamps issued. The next two Games were held in London (1908) and Stockholm (1912); commemorative labels, postcards and other souvenirs have been recorded from these early Games, but no stamps,

The VIth Olympiad was scheduled for Berlin in 1916 but was cancelled because of the First World War. The VIIth Olympiad was duly held in Antwerp in 1920 and this was honoured with a set of three stamps issued by Belgium. Like the Greek issues, these stamps featured classical athletes—discus-thrower, runner and charioteer. All three stamps were released the following year surcharged for use as 20c. stamps.

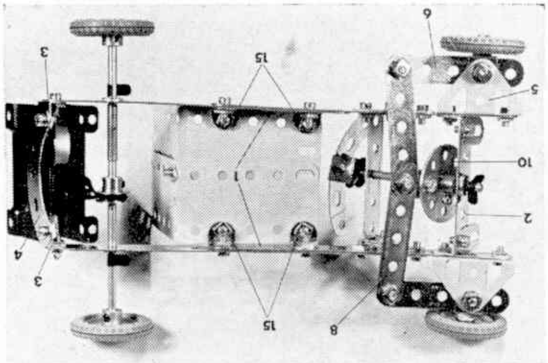
In 1924 the Games returned to Paris and France issued four stamps for the event. These featured the Olympic stadium and the Arc de Triomphe, Notre Dame cathedral with the Pont Neuf, a man tearing a tree apart, and an athlete giving the Roman salute. By now the practice of issuing stamps by the host country was well established, so when the Games moved to Amsterdam in 1928 the Netherlands produced a set of eight sports stamps. For the first time modern events were depicted—sculling, boxing, fencing and yachting being among those featured. The 3c. stamp showed a footballer and this reminds me that the only non-host country to release Olympic stamps in the pre-war period was Uruguay which issued sets of three in 1924 and 1928 to celebrate the victory of her team in the football events.

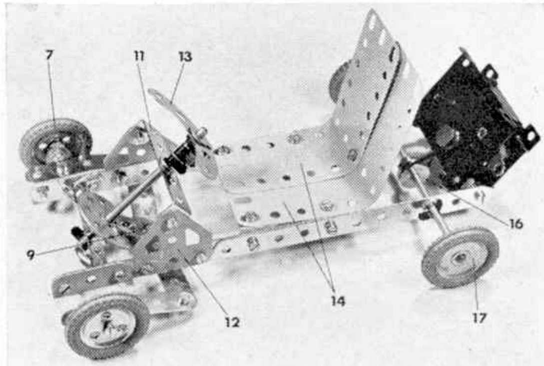
In 1932 the first Olympic Games held outside Europe were staged at Los Angeles and the United States issued two stamps featuring a sprinter and a discus-thrower respectively. The United States was the first country to issue special stamps for the Winter Olympics, a skier at Lake Placid being the subject of the 2c. stamp. Berlin was the venue of the XIth Olympiad in 1936 and Hitler used the occasion to proclaim to the world the supremacy of the "Master race", with the Germans winning 31 gold medals. Three stamps were issued for the winter sports held at Garmisch-Partenkirchen and eight stamps (plus miniature sheets and special stationery) for the summer games.

The XIIth Olympiad should have taken place in Tokio, and then this was altered to Helsinki, but the Second World War intervened. Finland, however, publicised the games which were never held by using slogan postmarks in the autumn of 1939. The next Games were staged at Wembley in 1948, with the winter sports at St. Moritz, and both Britain and Switzerland issued four stamps apiece for the Games.

The Games finally came to Helsinki in 1952 and, in anticipation, Finland released four stamps the previous year. Norway issued three stamps at the same time to publicise the Winter Games which were held in Oslo. The practice of issuing stamps in advance of the event in order to gain useful publicity was adopted by Australia which had been nominated as host country for the 1956 Games. Stamps were issued in 1954 and 1955 in honour of the forthcoming event, while the Melbourne Games themselves were marked by four colourful stamps released in 1956. The winter sports were held in Cortina and the equestrian events in Stockholm; Italy issued four stamps showing the skating rink, ski-jump and stadium,

Continued on facing page





The Go-Kart above is built with Outfit No. 1 plus a Magic Motor and the ½ in. Pulley packed with the Motor. Left: the underside view showing chassis and steering mechanism.

Let's Go Karting

says Spanner

A delightful little model built with an Outfit No. 1 and powered by a Meccano Magic Motor

A SPORT we do not seem to hear very much about these days, but which is still highly popular with its followers is Go-Kart racing. Only recently I visited a Kart Meeting at a local track and thrilled to the high-pitched roars from the engines of these great little machines as they screamed around a tight circuit at speeds of anything up to 100 m.p.h. It's a sight to warm the heart of any motor sportsman, and it reminded me that it is quite some time since we featured a Kart in the M.M. The situation is therefore rectified with the model featured here.

One of the best things about Go-Karts is that their simple design enables a pretty good Meccano reproduction to be produced out of a small Outfit. This model, in fact, is built with the No. 1 Set plus a Magic Clockwork Motor and the ½ in. Pulley that goes with it. The two main chassis members 1, each consisting of two 5½ in. Strips overlapped five holes, are joined through their third holes by a 2½ × ½ in. Double Angle Strip 2. The Magic Motor is attached to the rear end of the chassis by two Angle Brackets 3, joined together by a 2½ in. Stepped Curved Strip 4.

Now bolted to the front of each chassis member is a Trunnion 5, to the apex of which an Angle Bracket is lock-nutted, at the same time fixing a 2½ in. Strip 6 to the Bracket. A ⅜ in. Bolt, carrying a 1 in. loose Pulley with Motor Tyre 7, is held by Nuts in the vertical lug of the Bracket, while lock-nutted between Strips 6 is a 4½ in. compound strip 8 obtained from two 2½ in. Strips. The Bolt joining the Strips also holds a bent Fishplate 9 in position, the Fishplate engaging with the shank of a Bolt held by a Nut in the face of a Bush Wheel 10. This Bush Wheel is mounted as shown on a 3½ in. Rod held by Spring Clips in Double Angle Strip 2 and in a similar Double Angle Strip 11 bolted to two Flat Trunnions 12 fixed to the chassis members. A steering handle is represented by a 2½ in. Stepped Curved Strip 13 mounted inside one lug of a Double Bracket held by Spring Clips on the Rod.

A seat is next provided by two shaped 5½ × 1½ in. Flexible Plates 14 fixed to the chassis by four Angle Brackets 15. Held by Spring Clips in the chassis members are a 3½ in. Rod and a 2 in. Rod joined by a Rod Connector to serve as the rear axle. A ½ in. Pulley with boss 16 is mounted on the 3½ in. Rod to be connected to the Pulley on the output shaft of the Motor by a 2½ in. Driving Band. A 1 in. Pulley with Motor Tyre 17 is fixed on the axle to act as the rear road wheels, then the model is finished by bolting two Fishplates to Double Angle Strip 2 to represent control pedals.

PARTS REQUIRED

4—2	2—22a	2—90a
4—5	1—23a	4—111c
3—10	1—24	2—126
1—11	6—35	2—126a
8—12	42—37a	4—142c
2—16	30—37b	1—186
1—17	8—38	2—189
2—22	1—48a	1—213

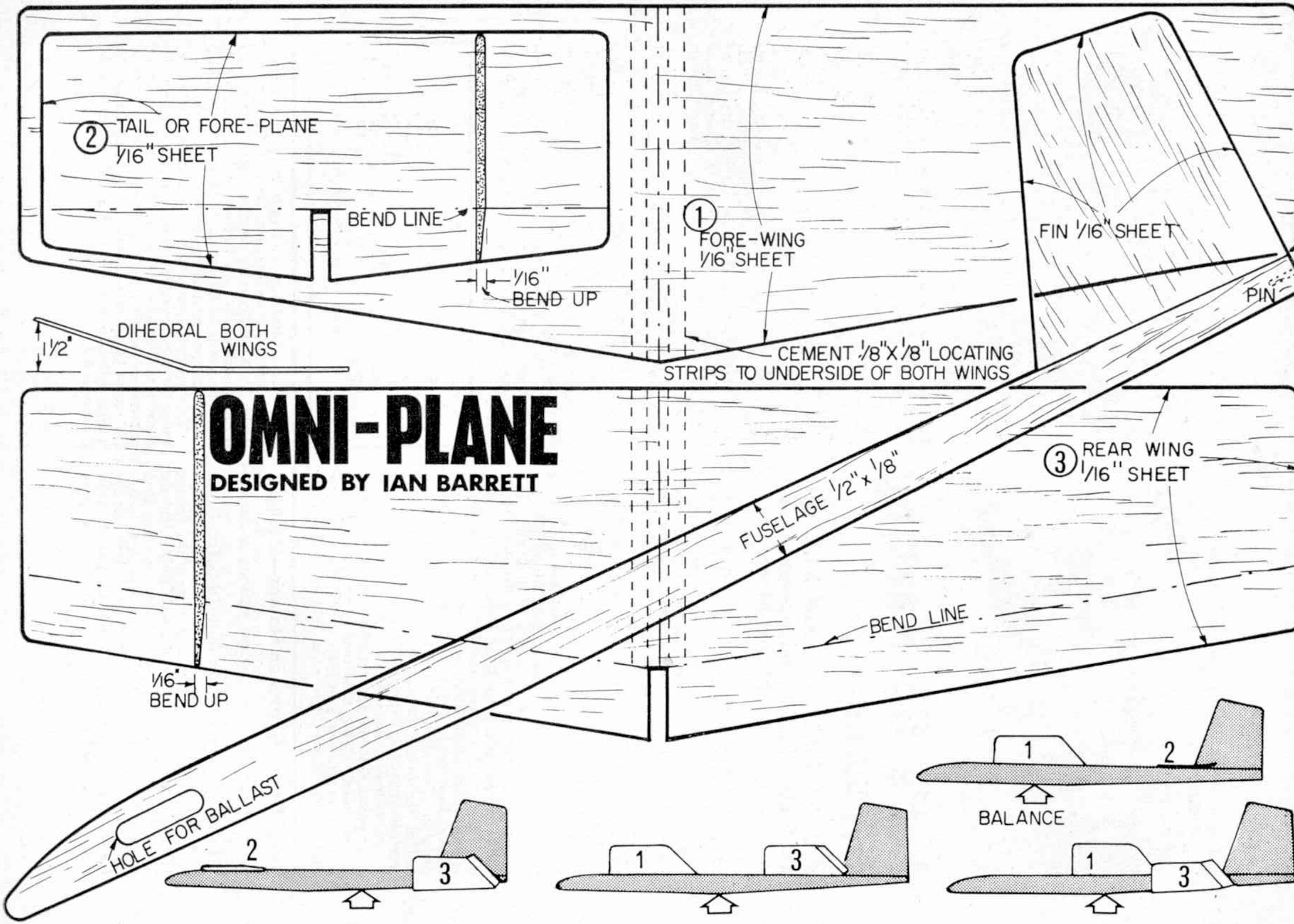
1—Magic Clockwork Motor.

The Olympic Games on Stamps—*Continued*

while Sweden had three stamps showing a classical horseman.

Italy's nine stamps for the Rome Olympics of 1960 featured classical statues of athletes, while America released a single stamp showing a snowflake for the Winter Games at Sun Valley, California. For the Tokio Games in 1964 Japan released no fewer than six advance publicity stamp sets, plus five stamps during the actual games. Austria's set of seven stamps for the Winter Olympics at Innsbruck was the most ambitious released up to that time for this event, but it was over-shadowed by the stamps issued by numerous other countries, from Russia to Burundi (in equatorial Africa !). So many other countries have now climbed on the bandwagon, even when they have little or no connection with the Olympics, that it is difficult to keep up with all the new stamps.

This year's Olympic Games has already witnessed issues for the Grenoble winter sports from such unlikely places as the sheikhdoms of the Persian Gulf and several countries in Central Africa, while many of the sixty-odd countries competing at Mexico City this month will also have released special stamps before the year is out.



OMNI-PLANE
DESIGNED BY IAN BARRETT
② TAIL OR FORE-PLANE
1/16" SHEET
BEND LINE
1/16"
BEND UP
① FORE-WING
1/16" SHEET
FIN 1/16" SHEET
PIN
DIHEDRAL BOTH
WINGS
1 1/2"
CEMENT 1/8"X1/8" LOCATING
STRIPS TO UNDERSIDE OF BOTH WINGS
③ REAR WING
1/16" SHEET
FUSELAGE 1/2" x 1/8"
BEND LINE
1/16"
BEND UP
HOLE FOR BALLAST
BALANCE
1
2
3

MODEL AEROPLANES can be made to fly successfully in a variety of configurations, and this little glider design demonstrates this point.

The model is basically of conventional design, but with its detachable wings and tailplane and an extra pair of wings, several combinations can be constructed.

Using $\frac{1}{16}$ in. sheet for flying surfaces, and $\frac{1}{8}$ in. sheet for the fuselage, construction is quick and simple. Notice, however, that the trailing edges of the tailplane and one of the pairs of wings are raised $\frac{1}{16}$ in.

When all the parts have been cut out and sanded smooth, the model of your choice can be assembled, noting particularly which way up you mount the tailplane, if used, and the position of the wings.

By referring to the sketches and photographs, try and make the following combinations.

Conventional Layout

Mount the tailplane (item 2) either above or below the rear fuselage, with its trailing edge bent up. Fit the wing (item 1) on top of the fuselage approximately mid-way between the nose and tailplane. Squeeze modelling clay through the hole in the nose until the model balances level when supported about half-way back under the wing. Launch the model and note its behaviour. If the nose lifts and the flying speed falls, and then the nose drops suddenly, add more nose weight. If the model dives, remove some weight and so on until you can get a long straight glide. This method of adjusting the flight path is standard for all the other models; only the position of the balance point (centre of gravity) will vary.

Canard (Tail-first)

Fit item 2 (now the fore-plane) onto the top of the fuselage nose, with the trailing edge bent down. The rear wing (item 3) goes underneath the rear of the fuselage, with its trailing edge bent up. The balance point is about $\frac{1}{3}$rd of the distance between the flying surfaces forward of the rear wing.

Tandem Wing

Mount the two wings (items 1 and 3) on top of the fuselage, item 3 to the rear and with the trailing edge bent up. The balance point is just behind the trailing edge of the forward wing.

Staggered Wing

Mount the wing with the bent trailing edge (item 3) under the rear fuselage, and the other wing (item 2) above the fuselage with its trailing edge above the leading edge of the lower wing. The balance point is about half-way back from the leading edge of the top wing.

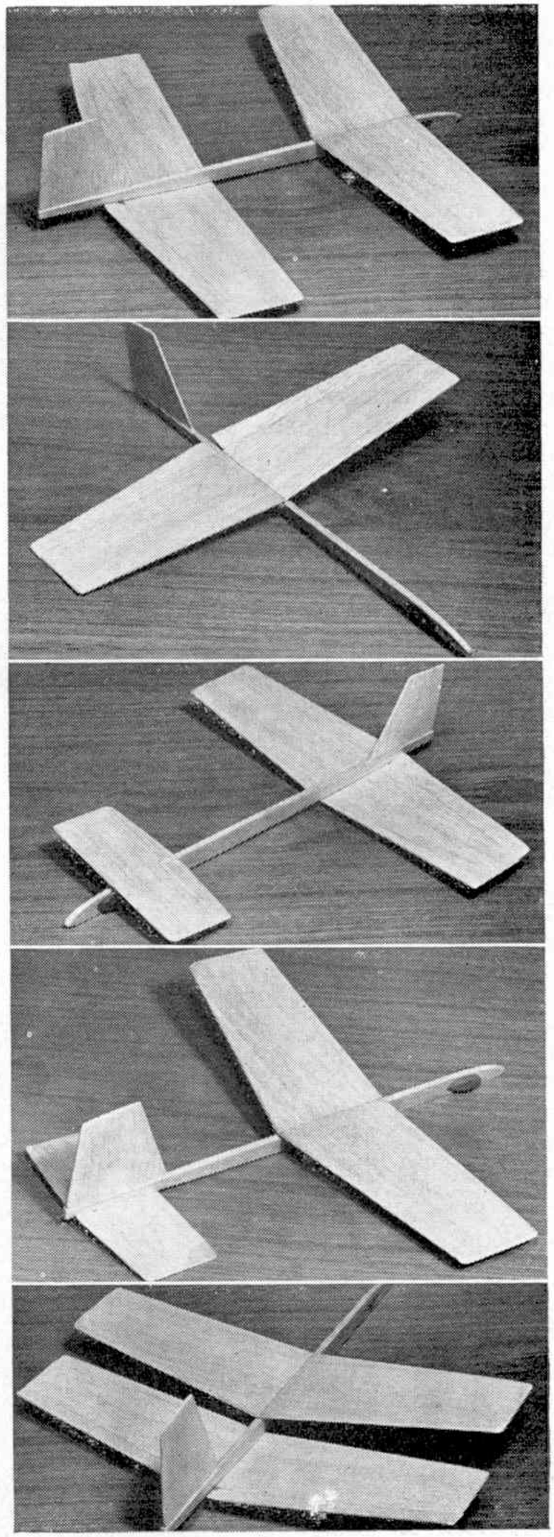
Flying Wing

Put the wing (item 3) on top of the fuselage just forward of the fin. The balance point should be on the leading edge of the wing.

In all the models described above, the balance point positions are only approximate, and will require adjusting to suit each individual model.

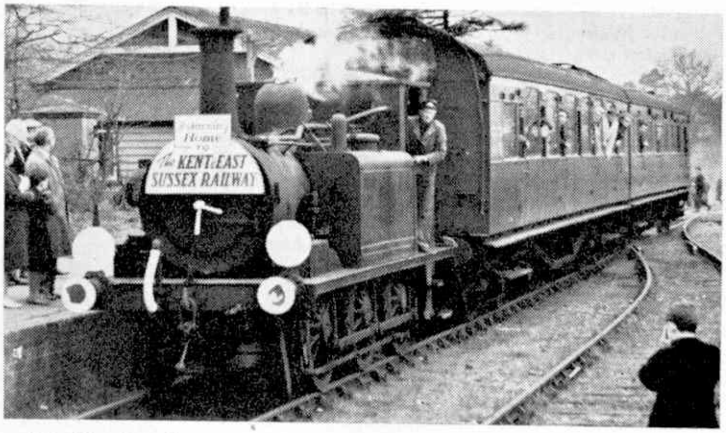
When each model has been trimmed for straight flight, turns can be accomplished by launching in a slight bank.

Now see if you can make up any more combinations.



The five configurations of Omni-Plane. Top to bottom they are Tandam Wing; Flying Wing; Canard (tail first); Conventional Layout and Staggered Wing.

TRANSPORT TOPICS by Mike Rickett



A monthly page of news and items of general interest, concerning mainly railways, but in which we also hope to include from time-to-time, paragraphs on other forms of transport—ships, canals, buses, etc. Mike Rickett is also interested in including anything unusual, interesting or noteworthy under the above headings and if readers see anything that they think would be suitable for publication, they are invited to contact him, c/o Meccano Magazine.

STEAM LOMOMOTIVES have fascinated many of us, both young and old, during their long history. It really all began about 143 years ago, when "Rocket" puffed its way into history as it made the famous journey from Liverpool to Manchester with its train of stage-coach-like carriages. Things have changed a great deal since then and speeds approaching 100 m.p.h. are now quite commonplace. For the steam engine however, the climax came in 1938, when the world record for a steam locomotive was made when L.N.E.R. Pacific "Mallard" touched 126 m.p.h.

Even when British Railways announced its modernisation programme in 1958, steam locomotives still played a vital part on the railways of Britain. They could always be seen, even quite recently, if you were prepared to look for them, in one of the few locomotive depots that still had an allocation. Finally however, the curtain has come down on the trusty steam engine, for on August 11, the last of a long, long, line of steam hauled trains weaved its way out of Liverpool Lime Street Station on a 314 mile journey to Carlisle and back.

For this indeed was the very last steam operated train to travel on British Railways standard gauge track, hauled by a British Railways steam locomotive. Carrying 470 passengers, each paying 15 guineas for a seat, the train travelled via Manchester, Blackburn and Hellifield, and special stops were made at Rainhill, where the historic locomotive trails were held by the Liverpool and Manchester Railway in 1829, and also at Parkside, where the Rt. Hon. William Huskinson M.P. was killed by "Rocket" following the opening ceremony of the Liverpool and Manchester Railway on September 15, 1830. Another lineside stop was made at Ais Gill, 1,169 feet above sea level, the highest point on any main line in England.

For the first leg of the journey, Class 5 4-6-0 No. 45110 pulled the train from Liverpool Lime Street to Manchester Victoria, and from there over some of the heaviest gradients on the route, Class 7 4-6-2 "Oliver Cromwell" completed the remainder of the journey to Carlisle (Citadel) Station, her last trip before retirement to a railway museum in Norwich. For the return journey, Class 5 locomotives No. 44871 and 44781 were put on the end, and No. 45110 was used once again for the return journey from Manchester. All four Class 5's have since made their final journeys to the scrap yard.

A number of whole plate photographs, taken at Rainhill and showing the cylinders of "Novelty"—one of the historic locomotives to take part in the locomotive trials of 1829—the famous skew bridge built by George Stephenson and a tablet commemorating "Rocket" as well as views showing the Huskinson Memorial, are available from the Public Relations Officer, Rail House, Liverpool. These are for sale for a limited period only and are available either individually at 3/- each, or 16/- the set of six.

Above, "Terrier" No. 3 draws into Junction Road Platform with stock train from Robertsbridge. Below, thousands turned out to see the last official steam train at Rainhill.

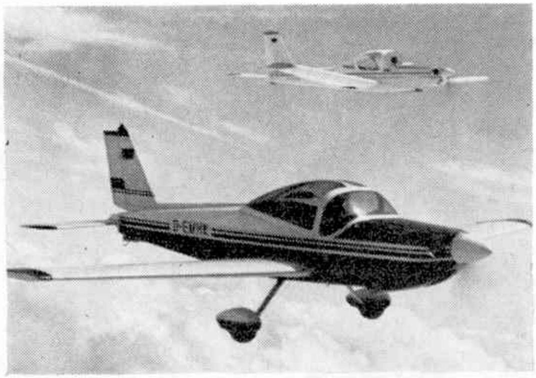
Although B.R. have completely finished with steam, there remains, happily, up and down the country, an astonishing number of privately owned and preserved railways, both standard and narrow gauge, which rely partially or completely on their own steam locomotives for power. It is therefore, still possible to see steam locomotives in action, and one such engine is the "Terrier" 0-6-0T owned by the Kent and East Sussex Line, shown in one of our photographs, arriving at Tenterden Town Station with the first train to actually travel on the line from Robertsbridge since 1961. In addition to the ex-L.B.S.C.R. "Terrier", the preservation society also owns an ex-Ford Motor Company B.T.H. Bo-Bo diesel electric locomotive and a Hunslet 0-6-0T "Hastings".

If you are one of those people with an incurable passion for old railway relics and "junk", and you also happen to live in or near Glasgow, then "Collectors Corner", at St. Enoch Station, is the place you have been looking for. Situated at the former offices of the Glasgow and South Western Railway, adjacent to platform 1, this has on sale items like oil lamps, guards watches, oil paintings of railway scenes, leather bound volumes of company papers dating from 1854, station signs and direction notices, postcards, train headlamps, tail lamps, shed plates and engine whistles. All at bargain prices!

B.R. do not confine special train services to last steam trains by any means, for they have recently announced services linking up two steelworks in the Scottish and North West Group of the British Steel Corporation. The two steel works are Shotton, near Chester, and Etruria, Stoke-on-Trent, both in the Summers Division. Coal produced at Wolsanton Colliery, adjacent to the Etruria Steelworks is converted into coke at Shotton, and the special trains carry coal from Etruria to Shotton, and coke in the reverse direction. When the coal has been discharged the wagons are reloaded with coke and taken back to Etruria. The same two type II diesel locomotives are in continuous use, exchanging trains of coke and coal at the end of each journey between the two steelworks, and changing crews at the end of each round trip. In twelve months an estimated total of 307,500 tons of coal and 181,000 tons of coke will have been carried.

AIR NEWS

by John W. R. Taylor



WHEN THE Guild of Air Pilots and Navigators began making plans for an air display at Denham aerodrome, they decided that it would add to the interest of the show if the "intrepid wing walker" was somebody who had never before tried the stunt.

They asked for a volunteer from among BEA stewardesses and were surprised when no fewer than seven young ladies jumped at the opportunity of something more exciting than serving coffee to passengers at 30,000 feet in a Trident or Comet jet-liner.

All seven were given a couple of low-flying circuits, strapped to a support on the top wing of a Tiger Moth piloted by Dennis Hartas, a BEA Senior First Officer and member of the famous Tiger Club. Their verdict —a tremendous thrill but a trifle chilly.

Above, top: Bolkow's new MHK-101 lightplane with retractable nose leg. Next, anyone for a walk? Seven young ladies found it a trifle chilly.
Below: The Airtruck built in Australia. It has two entirely separate tail units, each carried on a spindly boom.

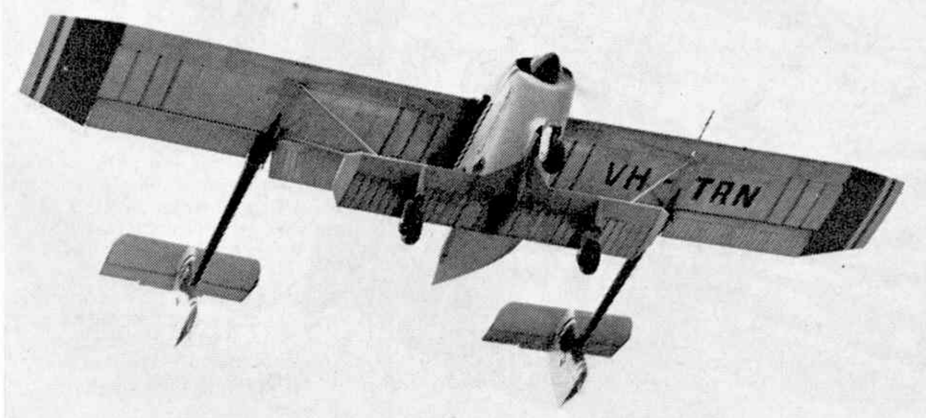
Scaring the birds

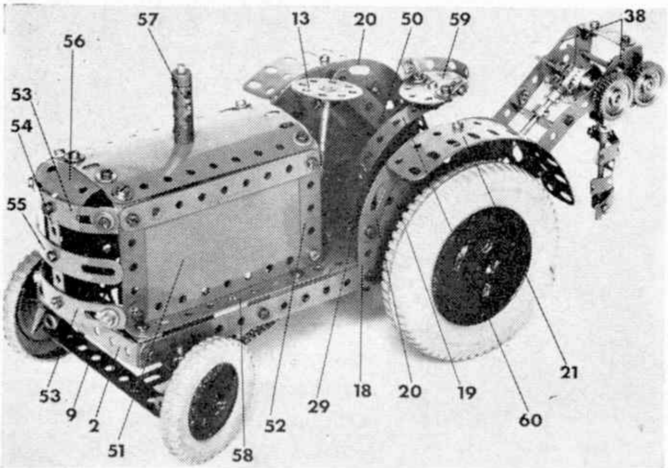
The title of this item has nothing to do with making stewardesses walk the wing in flight. It seems that so many birds of the feathered variety like to do their low flying at or near RAF aerodromes that it costs £1 million a year to repair the damage caused when aircraft collide with them.

All sorts of ideas have been put forward for scaring away the birds, from devices which cause a loud bang at frequent intervals to sending up falcons to chase them. Most successful is "Sappho", a broadcasting system which uses tape-recordings of the distress calls of frightened birds, and it is being installed at 50 RAF stations in Britain and five in Germany.

"Sappho" is normally carried on a fire tender, which is driven to a point 100-200 yards upwind from flocks of birds on the aerodrome when aircraft are waiting to take off or land. After identifying the birds,

Continued on page 608





At left: Tractors a-plenty have been built in Meccano, but it is unusual to find one, like this model, fitted with an attachment for boring post-holes.

Below: In this underside view of the rear section of the model, the method of securing the boring attachment to the main section is clearly shown.

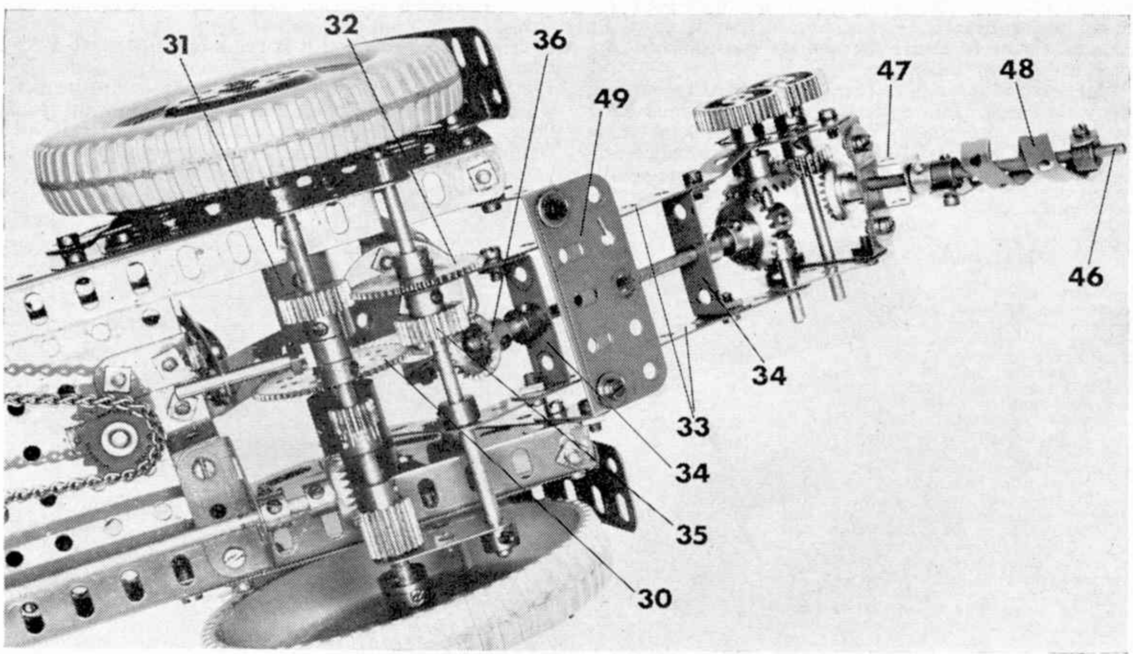
At right, top: A close up view of the transfer drive mechanism, as seen from beneath the model. If it is to work well gears must be positioned accurately.

At right, bottom: The boring attachment as it appears when removed from the model. The boring tool itself, can be driven at any angle.

HOLE BORING TRACTOR

by SPANNER

The real thing may be used for boring holes, but this appealing and working model won't bore you as you construct it.



AGRICULTURAL IMPLEMENTS hold considerable appeal for Meccano model-builders no matter whether they live in town or country. Our designer has, therefore, produced the appealing model pictured in the accompanying illustrations. At first glance you will recognise it as a tractor, but on closer inspection you will see that it is rather more than "just an ordinary tractor". What makes it so special ?—The fact that it incorporates an ingenious working attachment intended for boring post-holes !

A single Power Drive Unit provides the operating power for both the Tractor and its attachment, although both cannot be driven simultaneously. Movement of a gear lever in the driver's position determines which is to be used and it is interesting to note that the boring attachment will continue to operate even while its working position and angle are being changed.

Chassis and steering

Dealing first with the chassis, the vertical flanges of two 9½ in. Angle Girders 1 are joined by two 3½ × ½ in. Double Angle Strips 2 and 3, and a 3½ × 2½ in. Flanged Plate 4. Bolted between the horizontal flanges of the Girders, on the other hand, are two 3½ in. Strips 5 and 6, Strip 5 being extended one hole at each end by a Crank 7. Free in the boss of this Crank is a 1½ in. Rod held in place by a Collar above the Crank and a Coupling 8 beneath it. Note that the Rod passes through one end transverse bore of the Coupling to leave room for a 4½ in. Strip 9 to be pivotally attached to it, the attachment being made by a ⅜ in. Bolt held in the other end transverse bore of the Coupling. Strip 9, of course, is used to connect the Couplings at each side of the model. The front 2½ in. Road Wheels are mounted loose on 1⅛ in. Bolts, screwed into the central transverse tapped bores of the Couplings.

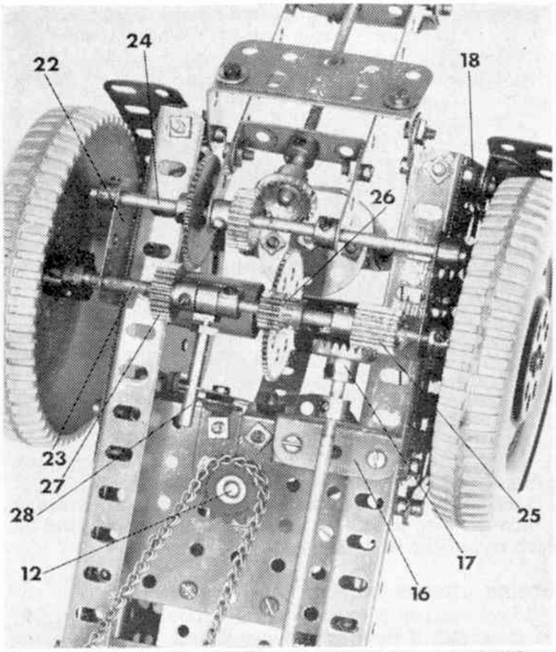
Journalled in Strip 6 and in a Double Bent Strip bolted to the top of the Strip is a 2 in. Rod on which a 1½ in. Sprocket Wheel 10 and an 8-hole Bush Wheel are fixed. Bolted to the Bush Wheel is a 2 in. Slotted Strip 11, a Bolt held by a Nut in Strip 9 engaging in its slotted hole. Sprocket Wheel 10 is connected by Chain to a ¾ in. Sprocket Wheel on a 4 in. Rod 12 held by Collars in Flanged Plate 4 and in a Reversed Angle Bracket bolted to the top of the Flanged Plate. An 8-hole Bush Wheel 13 is mounted on the upper end of the Rod to act as a steering wheel.

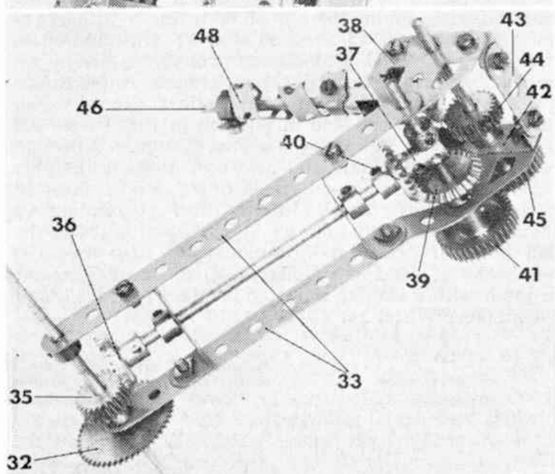
Motor and drive

At this stage, it is advisable to fit the power-plant and drive mechanism to the model. A Power Drive Unit 14 is bolted to Strip 3 and Flanged Plate 4, the output shaft of the unit pointing forwards. A ½ in. Pulley on this output shaft is connected by a 6 in. Driving Band to a 1 in. Pulley 15 on a 5½ in. Rod journalled in the apex holes of two Trunnions 16, one bolted to Strip 6 and one Angle Girder 1, and the other bolted to a Double Bracket, attached to Flanged Plate 4, as well as to the same Angle Girder 1. Fixed on the end of the Rod, which is held in place by a Collar, is a ¾ in. Contrate 17.

Before going any further, the rear mudguards should each be built up from two 2½ × 1½ in. Triangular Flexible Plates 18 and a 3½ × 2½ in. Flexible Plate 19, all rounded off by two 3 in. Stepped Curved Strips 20. These Curved Strips are only bolted direct to the

Continued on next page.





PARTS REQUIRED

2—2	2—16a	2—48b	2—126a
4—2a	1—17	1—53	2—163
3—3	3—18a	18—59	1—179
3—5	1—22	2—62	1—186
2—6a	1—23	3—63	2—187
2—8a	3—24	1—63d	2—187b
2—9a	3—25	2—74	1—188
2—9d	1—26a	4—89a	2—190a
1—11	1—26c	1—94	2—191
8—12	1—27	1—95a	2—215
1—12a	1—27d	1—96a	4—221
11—12c	3—29	2—103	1—235
1—14	2—30	1—103f	1—235a
1—14a	114—37a	2—111	1—335f
1—15	106—37b	1—111a	1 Power
2—15a	24—38	1—115a	Drive
1—15b	2—45	1—125	Unit.
1—16	1—46	2—126	
	4—48		

Triangular Plates, being secured to the Flexible Plate by the "trapping" action of two Washers on Bolts held by Nuts in the Flexible Plate. A shaped 5½ in. Flat Girder 21 is attached by Angle Brackets to the Stepped Curved Strips, as shown.

The mudguards are bolted to Angle Girders 1 along with two 1½ × 1½ in. Flat Plates 22, in which a 5 in. Rod 23 and a 4½ in. Rod 24 are journalled. Rod 23 carries a ½ × ½ in. Pinion 25, in constant mesh with Contrate 17, a 7/16 in. Pinion 26 and a loose Collar trapped between a fixed Collar and a ¾ in. Pinion 27. A Long Threaded Pin 28 is screwed into one threaded bore of the loose Collar, care being taken to see that it does not foul the Rod which must be free to slide a short distance in its bearings. Collars on the ends of the Rod prevent it from sliding too far. The shank of the Long Threaded Pin engages in the lower end hole of a 3 in. Narrow Strip 29, lock-nutted to a 1 × 1 in. Angle Bracket bolted to the rear underside of Flanged Plate 4.

Acting as the rear axle is a 5½ in. Rod held in Angle Girders 1 by Collars. A 60-teeth Gear 30, centrally-mounted on the Rod, lies between two Sleeve Pieces 31 bolted one each to Girders 1 and through which the Rod passes. A 4¼ in. Road Wheel is fixed on each end of the Rod.

Boring attachment

Movement of Narrow Strip 29 should bring Pinion 26 in or out of mesh with Gear Wheel 30, at the same time bringing Pinion 27 out of or in mesh with a 50-teeth Gear Wheel 32 fixed on Rod 24. In addition to the Gear, this Rod also carries two 5½ in. Strips 33, joined together by two 1½ × ½ in. Double Angle Strips 34, a ¾ in. Pinion 35 and three Collars, two of which are used to hold the Rod in position in Flat Plates 22.

In mesh with Pinion 35 is a ¾ in. Contrate Wheel 36 on the end of a 4½ in. Rod held by Collars on Double Angle Strips 34. The other end of this Rod is inserted half-way into the longitudinal bore of a Coupling 37 mounted transversely on a 2½ in. Rod, journalled in the end holes of two Flat Trunnions 38. Also mounted on the 2½ in. Rod is a Collar, a ⅞ in. Bevel Gear 38, in mesh with a similar Bevel 40 on the 4½ in. Rod, and a 1 in. Gear Wheel 41.

Bolted one each to Flat Trunnions 38 are two 1½ × ½ in. Double Angle Strips 42, the lugs of which are joined by 1½ in. Strips 43. Journalled in the Double Angle Strips and Flat Trunnions is a second 2½ in. Rod carrying a ¾ in. Pinion 44 and a 1 in. Gear Wheel 45, the latter in mesh with Gear 41. In mesh with Pinion 44, however, is a ¾ in. Contrate Wheel on a 3½ in. Rod 46, held by a Collar in one Strip 43 and in a Double Bent Strip 47 bolted to the Strip. This Rod 46 acts as the boring tool, made more realistic by a 5½ in. Narrow strip 48 twisted to shape and attached to two Collars fixed on the Rod.

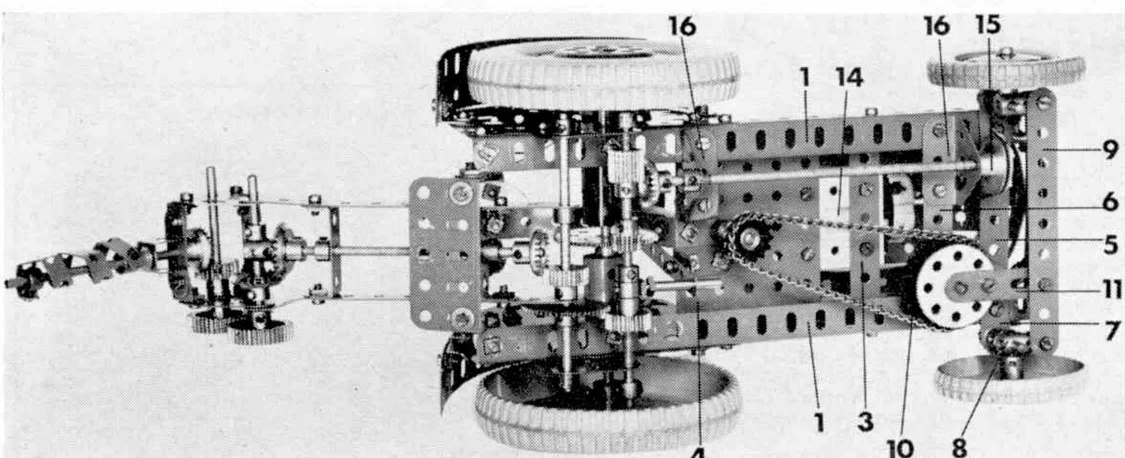
The position of the attachment is controlled by means of a handle built up from a 2½ × 1 in. Double Angle Strip to which a 2½ in. Flat Girder 49 is bolted and one lug of which is extended by a 4½ in. Strip 50.

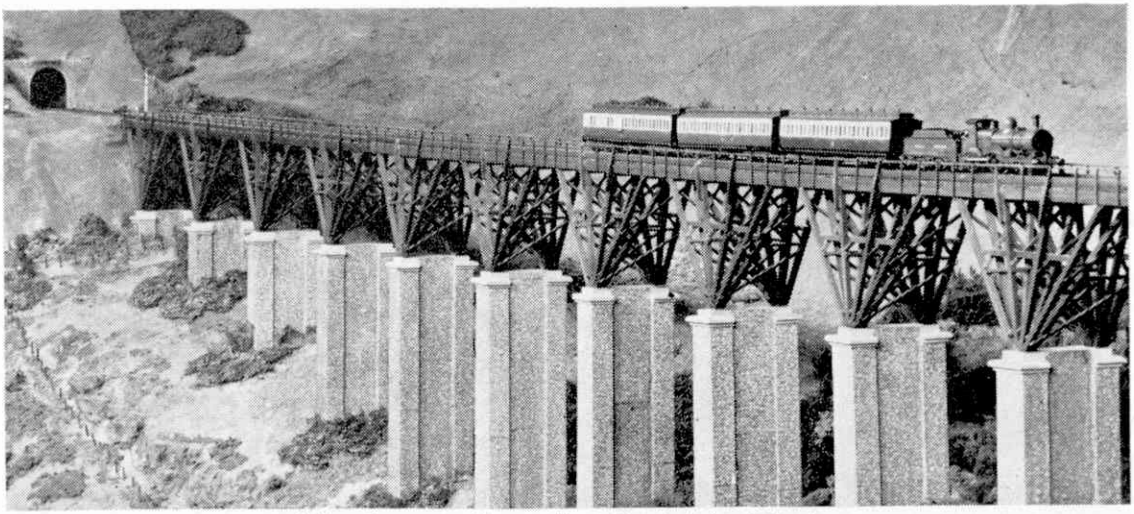
Engine cowling and seat

Turning to the engine cowiing, this is best built separately and fitted to the model when completed. Each side consists of a 4½ × 2½ in. Flexible Plate 51, edged along the top by a 4½ in. Strip, along the forward side by a 2½ in. Strip and along the rear side by a 2½ in. Angle Girder 52. Angle Girders 52 are joined at the top by a 2½ in. Strip while, at the front, the sides are joined by two Formed Slotted Strips 53, attached by Obtuse Angle Brackets. A 2½ in. Narrow Strip 54, to which a third Formed Slotted Strip 55 is fixed, is bolted between Strips 53. The top consists of a second 4½ × 2½ in. Flexible Plate also attached by Obtuse Angle Brackets and extended by a 2½ × 1½ in. Flexible Plate 56 bolted to upper Strip 54. An exhaust pipe 57 is represented by a Collar and a Coupling, both mounted on a 1½ in. Rod in a Rod Socket fixed in the centre of the top Plate. The completed cowling is then bolted to two 4½ in. Angle Girders 58, secured to Flanged Plate 4, Double Angle Strip 3 and Angle Brackets bolted to the front ends of Girders 1.

Last, but by no means least, a seat is constructed from an 8-hole Bush Wheel 59, to which a shaped 3 in. Narrow Strip is attached by Obtuse Angle Brackets. The Bush Wheel is fixed by a ½ in. Bolt to a bent 3½ in. Strip 60 which is in turn fixed by a final Obtuse Angle Bracket to Flanged Plate 4.

A complete underside view of the model showing the layout of the chassis and the position of the attachment transfer-drive mechanism in relation to it.





Believe it or not, this magnificent Brunel timber bridge is a OO scale model! It can be seen at the Pendon Railway Museum at Long Wittenham, Berkshire. The surrounding countryside is typical of the Dartmoor area. Notice how the timber part of the bridge is supported by huge masonry piers; many of these piers are still standing beside newer viaducts on Western Region lines in Devon and Cornwall.

ABC OF MODEL RAILWAYS

BRIDGES

ONE OF the basic facts about a railway which gives it an advantage over other forms of transport is that the railway usually goes from A to B by a route which is not only direct, but relatively free from steep gradients. Such level routes are necessary for trains, which cannot cope with the sort of hills a car or bus can climb. When a road reaches a mountain, it must either make a lengthy detour around the foothills, or go right over the top, zig-zagging up the mountainside in order to lessen the gradient. A conventional railway may also make the detour round the mountain, but it certainly will not go over the top, unless it is one of those magnificent "rack" lines to be found in Switzerland (or, in this country, at Snowdon). If it is a main line, which was designed in the first place for fast running, then in all probability it will strike straight through the mountain by way of a tunnel. When the line reaches a deep valley, it may make another detour in order to cross the "head" of the valley, but it is more than likely it will span the valley with a bridge.

Isambard Kingdom Brunel, who engineered the Great Western Railway and several other lesser lines in the West of England, was a great believer in a fast and level "road" for his trains to run on. As most of you will know, his lines were built to the broad seven foot gauge, which gave his trains a terrific stability at high speeds. Now, Brunel was the engineer of the Cornwall Railway, which was opened in 1859, running westwards into the Duchy from Plymouth. This railway was eventually taken over by the Great Western, and today it forms part of the Western Region's main line to the Cornish resorts. Those of you who know Cornwall will realise that it is a country of hills and valleys, and will be able to appreciate the sort of task that Brunel took on when he was appointed as engineer of the Cornwall Railway. The "road" obviously had to be kept as level as possible, as the line was visualised as a western extension of the mighty Great Western, over which passengers would be able to travel direct from Paddington without changing trains; therefore, the Cornwall Railway was to be no "light railway" but a full blooded main line through difficult country. The first major obstacle to the new railway on its route westward was at Plymouth itself, in the shape of the River Tamar at Saltash. This was bridged by a magnificent iron bridge of unusual design—the Royal Albert Bridge. This still stands to this day, and the ultra-modern Western Region diesel-hydraulic locomotives pass daily under the vast iron tubes which support the bridge decking itself, and under the tall arch of the tower, on which this inscription proudly remains: "I. K. Brunel. Engineer 1859." In next month's issue, we shall be looking at some famous railway bridges in greater detail.

Back to Brunel: once over the Tamar, the Cornwall Railway traversed much very hilly country, and here the great engineer put his famous timber viaducts to good use. The photograph shows a magnificent OO scale model of one of these, which can be seen at the Pendon Museum, at Long Wittenham, Abingdon, Berkshire. Actually, the prototype for this particular model was in the Dartmoor area of Devon, but the Cornish ones were built to the same general design. The supporting piers were built of stone, but the rest of the structure was entirely of timber. Some of these viaducts lasted into the 'thirties, and to this day many original masonry piers still stand beside new viaducts as a reminder of the pioneering days of railways in the West Country.

ST. PANCRAS ... Citadel of Steam

by Bernard Dumpleton

ONE HUNDRED years of steam, smoke and controversy. London's St. Pancras Station was opened on the first of October, 1868. The famous neo-Gothic creation of Sir George Gilbert Scott is loved or hated with equal passion and vehemence by its admirers and critics. You may love it or loathe it, but you cannot ignore it.

The decision to erect a new station was made at a time when the rivalry between the railway companies was at its peak. The site chosen for the building was known at that time as Somer town and Agar town and contained some of the worst slums in London. Nearby the imposing frontage of Kings Cross, with its clock acquired from the Great Exhibition of 1851, had attracted much favourable comment. Further along the road Euston Station displayed its splendid, if purely ornamental, Doric Arch. Clearly the new terminus of the Midland Railway would have to be something very special. Some 3,000 houses were cleared away, among them the birthplace of the comedian Dan Leno, to make room for the building. Only the Norman church of Old St. Pancras was spared. A hundred steam cranes, 6,000 men, and 1,000 horses were employed in the construction of St. Pancras and their task took them four years to complete.

The result was everything that the sponsors desired. A magnificent facade of pinnacled towers, pointed arches, clover-leafed windows, and iron balconies. It towered over its rivals in an impressive and domineering manner.

Over 60 million bricks had gone into its construction; fourteen different kinds of stone including freestone and red granite. The spired belfry contained a four-faced clock and stood, rather ostentatiously, at the eastern end, nearest to Kings Cross. The hotel was the last word in luxury for the visitor to London. Wide ornamental staircases led to the upper floors where the 400 bedrooms were carpeted in deep pile Axminster. Carved stone groins and roof bosses, mural paintings, decorated ceilings and granite columns gave an air of regal dignity. Victorian London loved it.

Behind the hotel the station was no less imposing or lacking in wonders. Mr. W. H. Barlow, the Midland Railway Engineer, designed the 100ft high roof in the form of a depressed Gothic arch.

The 240ft span, was, at that time, the largest single span roof in the world. To erect it workmen made a gigantic scaffold using 1,000 tons of timber and 80 tons of iron ties. Cranes and lifting jacks were mounted on the scaffold and each time it had to be moved a squad of men with crowbars inched it along in unison to the beat of a gong. After the completion of the roof the railway company bought the timber from the construction company and used it to form the carriageway leading up to the station. It is there to this day.

The cathedral-like atmosphere of the hotel is continued inside the station and particularly in the main booking hall. The decorative woodwork of the ticket office is reminiscent of an altar screen, the high leaded windows and fluted pillars help to create the impression that this is a temple, a citadel of the steam age.

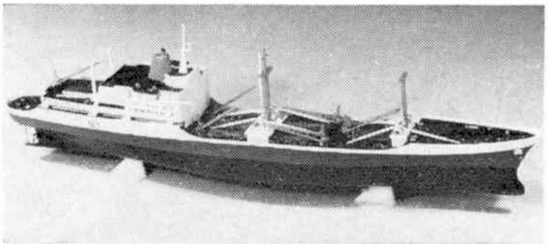
Beneath the four acres of platforms and concourse there is an enormous cellar. Much of the station's trade was with the Burton breweries and the cellar was designed with the beer barrel as a unit of measure. It was for this reason that the roof was designed as a single span. Supporting columns would have interfered with the storage space. The cellar is still used for its original purpose.

Today the hiss of steam has been replaced by the throbbing hum of electric generators. The acrid smoke has given way to the pungent smell of Diesel fumes. A regular service of Diesel expresses operates to the Midlands and Yorkshire. Suburban areas are served by Diesel multiple unit trains. The station now covers an area of nine acres and handles 180 trains and 300,000 passengers a day.

Upstairs the hotel is no more, it was closed by the London Midland and Scottish Railway in the 1930's and is now used as offices. Typewriters clatter where once log fires crackled and tea was served in delicate china cups. Mini-skirted secretaries click click along the corridors where white capped chambermaids bustled to and fro carrying hot water in shining copper jugs.

The old lady still dominates the skyline and carries her years well. Londoners still love her, and not only Londoners. To the thousands of people living north of London, in places like Radlett, St. Albans and Luton, St. Pancras is their terminus. For them the station holds many memories; of trips to the pantomime and circus, of evenings in the West End with the girl friend, missed last trains, and war time frustrations when precious moments of leave were spent waiting on cold platforms. Only once, in 1941, did the station close, when four high explosive bombs put it out of action for a week.

But whatever its fate St. Pancras Station has made its mark, an architectural wonder, a symbol of the railway system that British engineers pioneered.

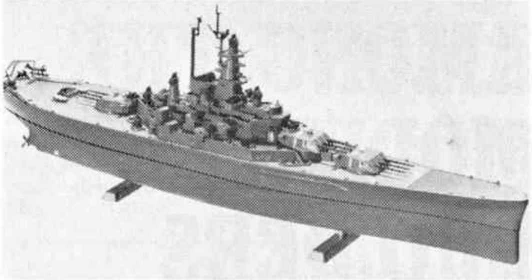


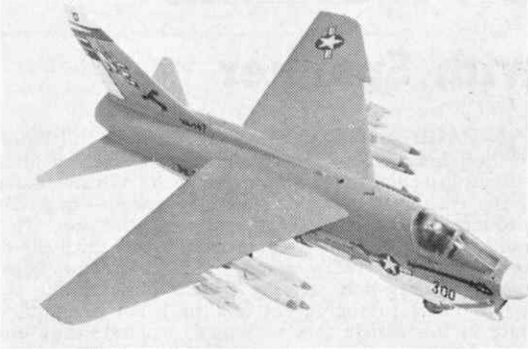
AFTER BEING deluged with **Revell's** latest releases, we have finally managed to build some up, and we present here a selection of the more interesting kits. The "**Benledi**" cargo liner has 37 pieces in it and the finished 14 in. long model makes up into a really attractive liner. A modern ship, the "**Benledi**" was built in 1965 and it makes a change from the usual run-of-the-mill military kits from plastic companies. This kit costs 13/4d. As a contrast the **U.S.S. Massachusetts** is a big

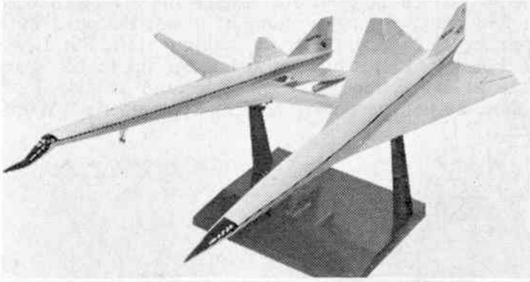
RECENT RELEASES FROM REVELL

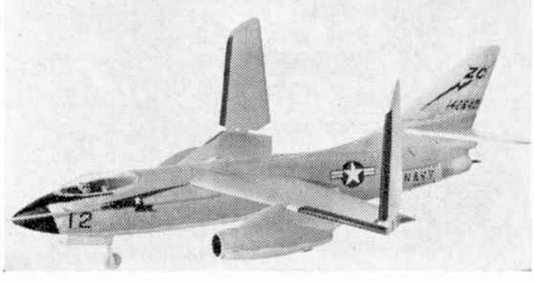
See Revells colour printed insert in this issue for many other new plastic kits

battleship of World War Two, and she participated in every major Pacific battle, never losing a man. She also participated in the last battleship dual in naval history. Again assembly is straightforward, but one needs a very fine brush and a lot of patience to paint the crowded deck details. Good value at 9/3d. For a really impressive model, in fact 2 models, the **Boeing Supersonic Prototype (S.S.T.)** is hard to beat. The 2 models are packed in one box with official Boeing markings, and the display stand holds both the models to show the two in flight configurations. To 1/200 scale this kit is again good value at 23/8d. For those who like an aircraft in the news, the U.S. Navy **A-7A Corsair II** is a fine and interesting model at 9/6d. This accurate kit fits together well, except for the underside wing joint which seems a little weak when the wings are in the folded position. Several Corsair II kits are available from other manufacturers, but Revell's seem to be the best. To 1/72nd scale, the wingspan is 6½ in. and the kit includes a complete load of bombs, fuel tanks, sidewinder missiles and 2 position landing gear. Another jet from Revell is the **Douglas Skywarrior.** This mammoth carrier aircraft has a performance and load capacity equal to many land bombers, but unfortunately the kit did not fit together very well in several places and it did not seem up to the standard of the other Revell kits. Again this model costs 9/6d. For those who like the World War 2 subjects, the 1/72nd scale **Douglas Havoc** is a very good kit, the parts are accurate and this one goes together really well. For 9/6d. we can heartily recommend this kit. The transfers are of high quality and a choice is available so that you can make the aircraft up as a British **Havoc** or convert it to the American **Boston** version. Two detailed engines are included with removable cowlings, 2 crew figures and the landing gear has two positions. The scale is 1/72nd and the wingspan 9½ in.

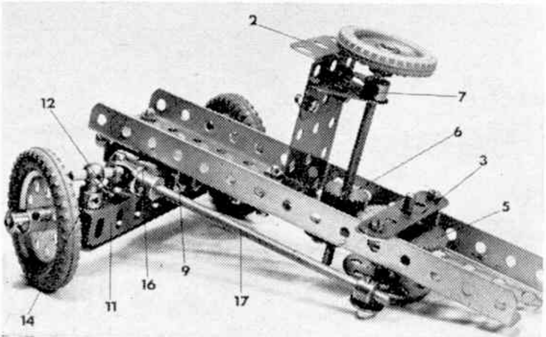








Above, top to bottom: The Benledi cargo liner, complete with stand. Next, the U.S.S. Massachusetts, one of the best known U.S. warships of W.W.2. Next, the exciting A-7A Corsair II, the wings fold up, just like the real thing! Two models on one giant stand next. The Boeing S.S.T. with "in flight" and "take off" positions. Lastly the Douglas Skywarrior carrier aircraft.

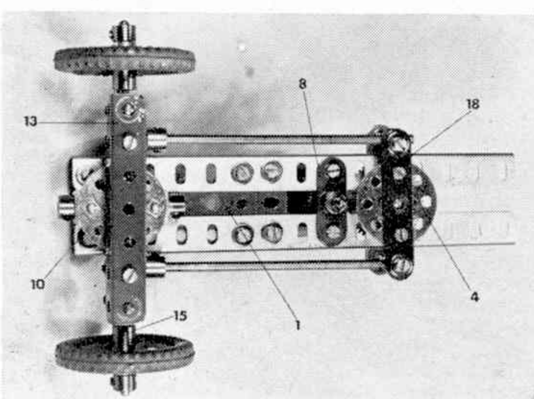


This Drag Link Steering System, designed and built by Pat Lewis of Formby, Lancashire, is intended for use in an agricultural tractor.

AMONG THE MODEL BUILDERS

with Spanner

ON PAGE 598 of this issue you will find full building instructions for an agricultural tractor fitted with an attachment for boring post-holes. Incorporated in the tractor is a working steering system—perfectly adequate for the model in question, but not what could be described as accurate from a realism point of view, as I will readily admit. Modern tractors often employ a drag-link steering system quite unlike the system fitted to the model and so I am giving first place in this article to a reasonably accurate drag-link method which is ideal for tractor models reproduced in Meccano. Strangely enough, it was designed by a member of Meccano's model-building staff, Pat Lewis of Formby, Lancashire, who built it up in his spare time at home for his son. (Meccano is also Pat's hobby, as you may have read in September's "Workbench"!)



An underside view of the Drag Link Steering mechanism showing construction of the chassis and drag link connections.

The following details apply to the mechanism as illustrated, although its design would vary depending on the model to which it was fitted. A $3 \times 1\frac{1}{2}$ in. Flat Plate 1, a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flanged Plate 2 and a $2\frac{1}{2}$ in. Strip 3 are fixed between two $7\frac{1}{2}$ in. Angle Girders, the Strip being attached by Reversed Angle Brackets to the vertical flanges of the Girders. Bolted to the horizontal flanges of the Girders, in line with Strip 3, is a $1\frac{1}{2}$ in. Strip which, along with the other Strip, provides bearings for a $1\frac{1}{2}$ in. Rod on which an 8-hole Bush Wheel 4 and a 50-teeth Gear Wheel 5 are mounted. In mesh with Gear Wheel 5 is a $\frac{3}{4}$ in. Pinion 6 on a $3\frac{1}{2}$ in. Rod held by Collars in a Trunnion 7, bolted to Flanged Plate 2, and in two $1\frac{1}{2}$ in. Strips 8 fixed between Girders 1. A 1 in. Pulley with Motor Tyre is secured on the upper end of the Rod to serve as a steering wheel.

It is interesting to note, by the way, that this mechanism, like that fitted to a full-size tractor, is fitted with a "floating" front axle which is to say that the axle is centrally pivoted to move in the vertical plane. Bolted to the underside of Flat Plate 2 is a $1\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 9 to which another similar Double Angle Strip is pivotally attached by a 2 in. Rod held in place by Collars. Bolted to this second Strip is an 8-hole Wheel Disc 10 and to this, in turn, a $3\frac{1}{2}$ in. Angle Girder 11 is bolted. Two Threaded Bosses are attached to this Girder, but are spaced from it by a Collar on the shank of each securing $\frac{3}{8}$ in. Bolt 12. Fixed by ordinary Bolts to the lower ends of the Threaded Bosses is a second $3\frac{1}{2}$ in. Angle Girder 13, the two Girders thus resulting in a "box" shape.

Journalled in the holes in each end of the Girders is a 1 in. Rod held in place by a Handrail Coupling 14 and a Collar positioned respectively above and below the upper Girder. A Rod Socket 15, carrying a 1 in. Rod, is screwed into one tapped bore of the Collar, then a $1\frac{1}{2}$ in. Pulley with Motor Tyre is mounted loose on the Rod to be secured by a Collar. The Pulley must turn freely.

A further 1 in. Rod is now fixed in the head of Handrail Coupling 14. Mounted on this Rod is the "spider" of a Swivel Bearing 16 fixed on one end of a $4\frac{1}{2}$ in. Rod 17, on the other end of which a Collar is mounted. This collar is pivotally connected to a $2\frac{1}{2}$ in. Strip 18 bolted across the centre of Bush Wheel 4. Rod 17 at each side, of course, acts as the drag link.

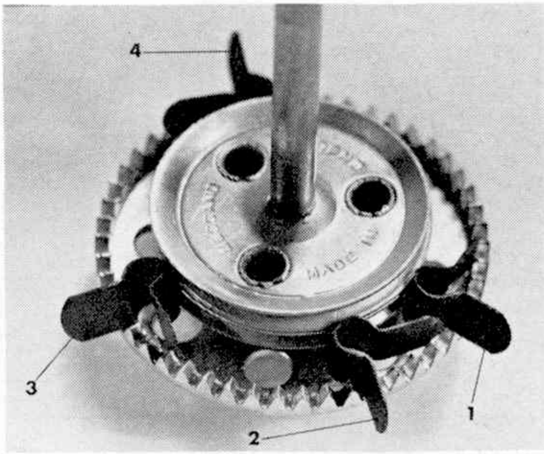
The following Parts List applies to the unit as illustrated.

PARTS REQUIRED

2—5	2—21	1—51
3—6a	1—22	12—59
2—8b	1—24	2—64
2—9b	1—24a	1—73
2—12	1—25	2—111c
2—15a	1—27	1—126
1—16	22—37a	2—136a
1—17	26—37b	1—142c
1—18a	14—38	2—142d
6—18b	2—48	2—165
		2—179

Below: A simple, compact but extremely useful Adjustable Trip Mechanism designed by R. R. Hauton of Lincoln.

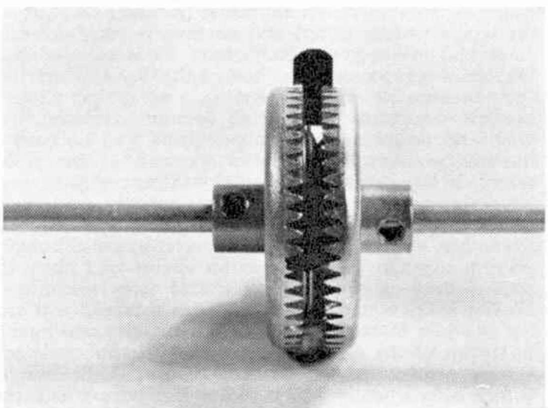
At right: In this view of Mr. Hauton's Trip Mechanism, one of the Contrate Wheels has been removed to show how basically simple the construction and layout of the mechanism is.



Below right: A 2 : 1 ratio Epicyclic Transmission Gear which has been re-built from the old pre-war Meccanno Standard Mechanisms Manual, mentioned last month.

Adjustable trip mechanism

In some models it can be necessary for a particular operation to take place, not continuously, but at specified intervals. The chimes of a clock, for example, do not ring out incessently, but only on the hour, half-hour or quarter-hour, as the case may be. In models such as this, where a particular operation is required to be brought into effect while the model as a whole is in motion, a trip mechanism is used to actuate the required operation, the trip usually being in constant motion along with the model.



M.M. reader R. R. Hauton of Lincoln, a man of many ideas, has sent me details of an extremely simple yet highly successful Trip Mechanism he has designed and which is shown in one of the accompanying illustrations. It consists of nothing more than a number of Spring Clips trapped between two $1\frac{1}{2}$ in. Contrate Wheels, two 1 in. loose pulleys, also trapped between the Contrates, holding the Spring Clips in position.

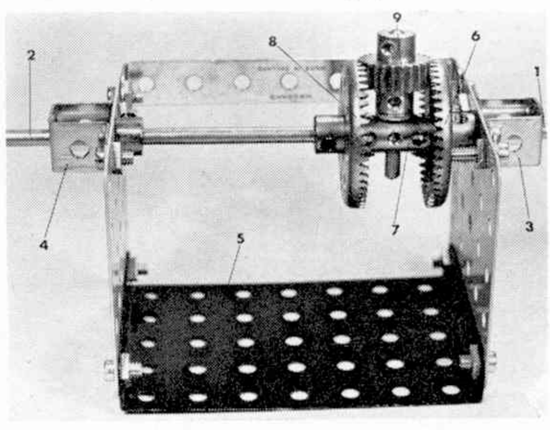
The beauty of this mechanism is that the positions of the Spring Clips can be easily altered to change the timing of the "trips". This timing can be very accurately set by counting the number of teeth between any two adjacent Spring Clips. In the example illustrated, for instance, we have used four Clips numbered 1, 2, 3 and 4. Clips 1 and 2 are separated by five teeth, Clips 2 and 3 by ten teeth and Clips 3 and 4 by 15 teeth, leaving 20 teeth between Clips 4 and 1. Taking the time between the first and second "trips" as the norm, therefore, the time between the second and third will be double, that between the third and fourth, treble, and between the fourth and the first again, quadruple. This proves the accuracy of Mr. Hauton's method.

PARTS REQUIRED		
2—22a	2—28	4—35

Transmission gear

I would like to finish this month with a further two simple mechanisms taken from the pre-war Standard Mechanisms manual mentioned in these pages last month. The first is an Epicyclic Transmission Gear designed to give a ratio of 2 : 1 between two shafts. Two Rods 1 and 2 are mounted in Double Bent Strips 3 and 4 bolted to suitable Flat Plates joined together by a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plate 5. Double Bent Strip 3 is fixed by $\frac{1}{2}$ in. Bolts. The input shaft 1 is free to turn in the boss of a $1\frac{1}{2}$ in. Contrate Wheel 6, but is secured part-way in the longitudinal bore of a Coupling 7. Free to turn in the other end of this Coupling is the output shaft 2, on which a second $1\frac{1}{2}$ in. Contrate Wheel 8 is fixed. Note, incidentally, that Contrate Wheel 6 is prevented from turning by the $\frac{1}{2}$ in. Bolts securing Double Bent Strip 3, the Bolts fitting into holes in the face of the Contrate.

Continued on next page.



AMONG THE MODEL BUILDERS

Continued from page 605

Now secured in the centre transverse bore of Coupling 7 is a 1½ in. Rod on which a free-running ¾ in. Pinion 9 is held by a Collar. This Pinion meshes with both Contrates 6 and 8 so that, when the input shaft is turned, the Pinion travels round fixed Contrate 6, revolving as it does so. This, in turn, causes Contrate 8 to revolve, but at twice the speed thus resulting in a 2 : 1 ratio.

PARTS REQUIRED

1—15a	2—28	2—45	2—59
1—16	10—37a	1—48b	1—63
1—18a	8—37b	1—53	2—72
1—25	3—38		

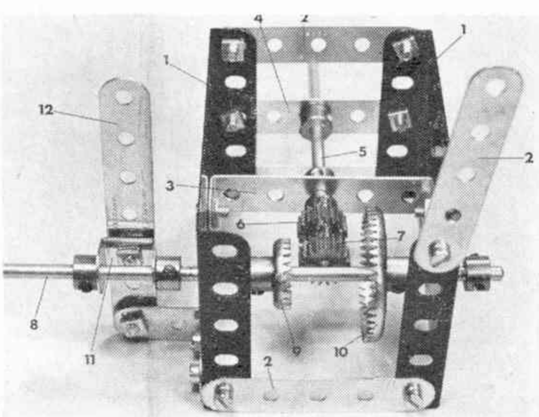
Reverse Gearbox

Finally we have our other pre-war mechanism which is a Two-speed Reverse Gearbox. A framework is built up from two 3½ × 2½ in. Flanged Plates 1 joined by four 2½ in. Strips 2, one at each corner. The centres of the Plates are joined by a 2½ × ½ in. Double Angle Strip 3 which, together with another 2½ in. Strip 4 positioned as shown, provides the bearings for a Rod 5 on which two ½ in. Pinions 6 and 7 are mounted. A second Rod 8, free to slide in its bearings, is mounted in Plates 1. A ¾ in. Contrate 9 and a 1½ in. Contrate 10 are fixed on the Rod, movement of which should bring Contrate 9 into mesh with Pinion 6 or Contrate 10 into mesh with Pinion 7. The Rod is actuated by a Double Bracket 11, held between two Collars and lock-nutted to a 3½ Strip 12. This Strip is itself lock-nutted to a 1 × 1 in. Angle Bracket bolted to one Plate 1.

PARTS REQUIRED

1—3	1—14a	1—29	1—48a
5—5	1—15b	18—37a	2—53
1—11	2—26	16—37b	5—59
1—12a	1—28		

This Two-speed Reverse Gear-box is yet another example of a mechanism, first featured in the pre-war Standard Mechanisms Manual, which is just as useful today.



BATTLE

Part VII—The Use of Dice

by Charles Grant

HAVING TAKEN care of the Defence Value in respect to tanks, etc., the obvious thing to do is to follow up with a consideration of Attack Value of armoured fighting vehicles and to draw up a comparative table of the powers of the anti-tank guns whose ranges we have already discussed.

However, it might not come amiss at this stage before doing so, if we digress a little in favour of one very important point in " Battle ". This concerns dice —how and in what circumstances we use them, and what effect they can have on the progress of the game.

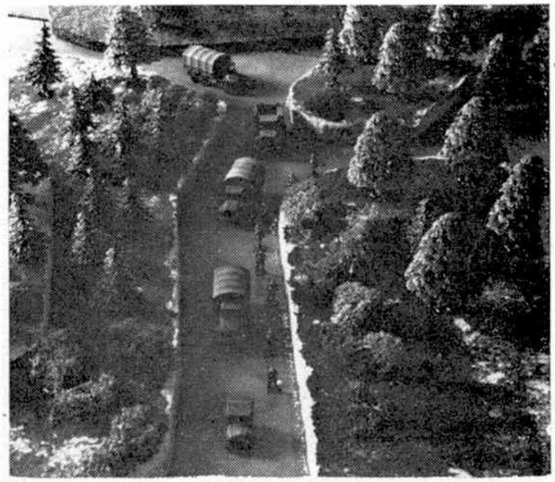
First of all, the novice beginner in the study of the military art—of whatever period you like—quickly comes to the pretty obvious conclusion that, to control the actions of a unit or even of a few individuals in any sort of engagement is a very chancy and uncertain business. Someone once wrote that the conduct of military operations is an art rather than an exact science (or words to that effect) and nothing is truer at every stage and in every section thereof. It is believed that Napoleon was pretty off-colour on the day of Waterloo, and, because he was not feeling over perky, allowed his less competent generals to commit some dreadful boobs he would never have permitted had he been a hundred-per-cent fit. This is one end of the scale, when, on one occasion, a man's physical condition may have the most far-reaching effects on the conduct of great armies and the result of important battles. At the other extreme you might have a tank gunner, peering through his sights at an enemy and about to draw a bead on him, when a trickle of perspiration— it's hot inside a tank—rolls down his forehead and into his eye just at the psychological moment, causing his lining up of the target to be just a little out and converting a direct hit into a near miss when he lets fly before he was really ready. What I'm getting at is the fact that nothing—absolutely nothing—is dead certain in a battle or a campaign and always one must allow for what might be called the 'imponderable' (an impressive word, is it not?) which we can translate as plain, down to earth luck, good or bad. If " Battle " is to be a reflection of the conditions of the 'real thing', then, the rules must give proper allowance for this factor of uncertainty.

What it comes down to is that warfare is far from being as mathematically accurate as a game of chess, where the player moves his pieces in predetermined patterns. In " Battle " the pieces can move in all sorts of surprising ways, and not infrequently even refuse to obey the dictates of the player (although the latter can 'in extremis' decide to heave the table over—and it has indeed been done, but only by the more emotional type of battlegamer). So in " Battle " we attempt to simulate the 'imponderable' that obtains in 'the real thing' by having recourse to the use of those time-honoured cubes—the dice. Or if I may be pedantic, in the singular—the die. (These are, in passing, the ordinary number type, not the 'poker' variety). It must not be thought, however, that the game is completely controlled by chance—in the shape of the dice— any more than an actual battle is completely dominated by Dame Fortune. The process takes place only within a certain framework beyond which it cannot extend.

Let me quote an example to show what I mean—I apologise for using one right out of our period and I hope that I may not be unduly castigated for doing so. Let's go right back to the days when a regiment of infantry stood in line 'in close order for firing' blazing away at another such unit about sixty yards away. If the whole lot delivers a volley, what are the two extremes of possibility ? They are as follows—(a) every man in the regiment firing will miss completely, or (b) every musket ball will strike home. Neither is at all likely, but if one considers a sizeable number of such volleys, there will emerge an average number of hits per volley. This will provide a fairly consistent pattern although, from time to time, there will be the occasional 'spread' above or below the 'norm' when one will create enormous havoc or, in contrast, will result in few or no casualties. All we can say, regarding any very great deviation from the average, is that it is governed by a multitude of factors which, in this case, amounts to nothing more nor less than luck. The training and ability of the men firing, their morale, whether they are cold or hot, their state of fatigue—all are facets of the same 'imponderable'—or just simply luck. What we must have then, in a battlegame of this period, is a firing rule which will usually give a fairly average result, but which can also cope with the occasional extreme either way. These are basically the conditions which form the framework of any rule which includes the element of uncertainty.

I heard a television interviewer once suggest that the use of dice made battlegaming on a par with Snakes and Ladders and such like games of chance. Well, he was being just stupid, or trying to take a rise out of his guest. It is in fact the imponderable which does give reality to "Battle" and, as we shall see, does cause the players to make proper allowance for the unlikely or even the seemingly impossible, which, as we read, did happen surprisingly frequently in the annals of war.

This is what makes "Battle" such a fascinating pastime, for in it we find so many examples of the old adage concerning 'the best laid schemes of mice and men, etc.' It will frequently happen in the course of a battle that, when a player has planned some brilliant tactical manoeuvre and is about to batter his opponent into abject surrender, the leading regiment of his outflanking column will take fright and run; his headquarters tank will break down, or fog will blanket his airfield so that his helicopters cannot take off. This is naturally highly satisfactory when it happens to the enemy but incredibly infuriating when one is on the receiving end of such evil fortune.



Above: Transport on the move in wooded country—it is to be hoped that some recce. had been done. Below: Attack on a block house—a tank and infantry in a combined operation.

Now that I have made—or at least I hope I have—my point about the significant part played by chance in both the 'real thing' and in our game, I can throw in some preliminary remarks about what is to be considered next—the Strike Values of guns firing armour-piercing shell and how the effectiveness of such action is judged.

First of all, if the target is visible and in range, the gun will fire and a hit may be scored (the first element of doubt). If this happens the result of the strike has to be assessed. This is done in much the same way as, in the example mentioned already, we described how we calculated the result of a volley of musketry on a regiment of infantry. In the case of the A.P. shell it might bounce or ricochet off, doing no damage at all, or it can utterly destroy the target tank (or whatever vehicle it might be). This will be determined, broadly speaking, between the two factors of armour thickness (Defence Value) and the penetrative power of the shell—the Strike Value, together with one or two other points we shall take into consideration, plus—and this is highly important—the effect of the imponderable, i.e. luck. In the next article then we shall calculate Strike Values for our guns and get on with the business of finding out how the dice are used to assist in deciding what happens when a shell collides with a tank.

AIR NEWS *continued from page 598*

the operator chooses the appropriate tape, presses a switch and the distress call is broadcast through a loud-speaker for 1½ minutes. It is most effective against gulls, rooks, jackdaws and green plovers, and has dispersed roosts of starlings. Wood pigeons, oyster catchers and golden plovers tend to ignore it, probably because they do not have distress calls of their own.

Twin-tail duster

One of the most unusual aircraft flying today is the Airtruk, built by Transavia Corporation of Australia for agricultural duties. It has two entirely separate tail units, each carried on a spindly boom. This enables trucks to drive between the tail units, right up to the rear of the fuselage pod, to load chemical spray or dust directly to the rear of the fuselage pod, into the hopper behind the pilot's cockpit.

To prove that this layout is perfectly safe, Transavia's test pilot completed the aircraft's flight trials with a spin at its maximum take-off weight of 4,090 lb. and a flat-out dive and pull-out at 237 m.p.h.

Powered by a 285 h.p. Continental IO-520-A engine, the all-metal Airtruk can carry 2,000 lb. of chemicals and has an operating speed of 110 m.p.h. The pilot sits high above the top wing, with the first-class field of view that is essential when flying at ground level in hilly country or near trees and cables. In fact, so much thought has gone into the Airtruk that Transavia is having to step up production to one aircraft every two or three weeks to keep pace with demands.

The oldest air passenger

A Boeing Vertol CH-113A Voyageur helicopter of the Canadian Armed Forces has airlifted a 180 million-year-old passenger. It did so after archaeologists reported that they had found the complete skeleton of a struthiomimid dinosaur at the bottom of a 30-ft. gulley on the Red Deer River but had no way of getting it out.

To protect their precious find, they had encased the bones in plaster and burlap, the resulting bundle weighing more than three-quarters of a ton. It presented no problem for the Voyageur, which hovered 40 feet above the gulley floor while members of the expedition attached their delicate cargo to a cable suspended from the "chopper's" under-belly hook, then ferried the load 1½ miles to a waiting truck.

Intended for display in the University of Alberta museum, the skeleton is of a creature about seven feet tall and ten feet long, resembling a large bird such as an ostrich.

Where's the wheel ?

Bolkow's new MHK-101 two-seat lightplane, shown in the picture on page 597, is one of the newest and neatest sporting aircraft in the air; but isn't there something just a little unusual about its undercarriage ? Its tiny tail-skid is clearly no more than a "bumper" to protect the rear end if the pilot lands tail-down. In any case, with the main wheels back behind the centre of gravity there ought to be a nose-wheel.

The answer is that there *is* a nose-wheel. The MHK-101 is almost unique in that only its nose-wheel retracts in flight to reduce drag. The cantilever main legs are so slender and streamlined that it is better to leave them extended than to go to the trouble of installing a complicated and weighty retraction mechanism.

THE DAY THE ROOF CAME DOWN

by Mike Rickett

IT WAS a peaceful winter's afternoon in 1905 and all was quiet in Charing Cross Station, the London terminus of the old South Eastern and Chatham Railway At No. 4 platform, the 3.50 p.m. train to Hastings stood ready to leave and the station staff were busily preparing for the boat train from Folkestone, due in at any moment. Looking down upon the scene from swinging cradles high above the platforms, were thirty workmen busily occupied in scraping and painting the great arched roof, built as long ago as 1860 for the South Eastern Railway.

Suddenly, and without any warning, an iron girder weighing almost 100 tons came crashing down from the lofty roof onto several coaches of the Hastings train, gently simmering below whilst waiting for signals. In a matter of seconds all that remained were splintered fragments scattered beneath and around the fallen girder. Underneath too, was one of the workmen, dashed to his death from the cradles in the roof. Stunned station staff were quick to recover their composure and an inspection of the wreckage revealed that the shattered coaches by some miracle, were in fact, the only vacant parts of the Hastings train.

Only minutes later, two complete bays and seventy feet of roofing thundered down onto the tracks below, taking more of the workmen that were unable to escape in time, to their deaths. The outer station wall on the river side of the station, also slowly began to bow inwards and crash bodily through the adjoining roof and wall of the Avenue Theatre (now the Playhouse), which was being altered and decorated in readiness for its opening the following January.

Crowds of curious onlookers gathered round the scene of tragedy as dazed workmen emerged from the ruined Theatre. Many were quite unaware of the cause of the upheaval and, indeed, so great was the noise, that it could be heard all over London. Many people thought that an earthquake had occurred, as pavements shook under crumbling masonry. Crowds

A general view of Charing Cross before the new barrier line was erected.

gathered, and police drew a cordon round the Avenue Theatre, where buckled walls looked menacingly down at the pavements below, and tenants of houses in Craven Street were evacuated to safer precincts. At the same time, Villiers Street and the entire danger area was sealed off and the station gates were fastened, as police acted swiftly to avoid the danger of bystanders becoming injured. The danger of further collapse had by no means passed and because of this no attempts were made to salvage the ruined walls of the station.

Over twenty ambulances and personnel were on the scene in a remarkably short time after the disaster, and nearby Charing Cross Hospital, where the noise of falling masonry acted as an alarm, was alerted to care for the injured. Eventually, over thirty were taken for treatment and of these, two later died.

Within the station, everything was chaos. Choking dust hung like a grey fog in the air, covering everything several inches deep. At the remains of No. 4 platform, the ruins of the Hastings train stood, sentinel-like, still awaiting its starting signal. A silence broken only by the still hissing locomotive hung over the strickened station.

All available lines at the station entrance were blocked by heaps of rubble and the boat train from Folkestone was only minutes away from disaster as it ran over the Hungerford Bridge on its way to Charing Cross. Railwaymen struggled to regain control, as news of further trains heading their way reached them. They acted quickly, signalmen were alerted, and in time, all trains were diverted to Cannon Street Station, where one can imagine angry passengers demanding to know the reason why !

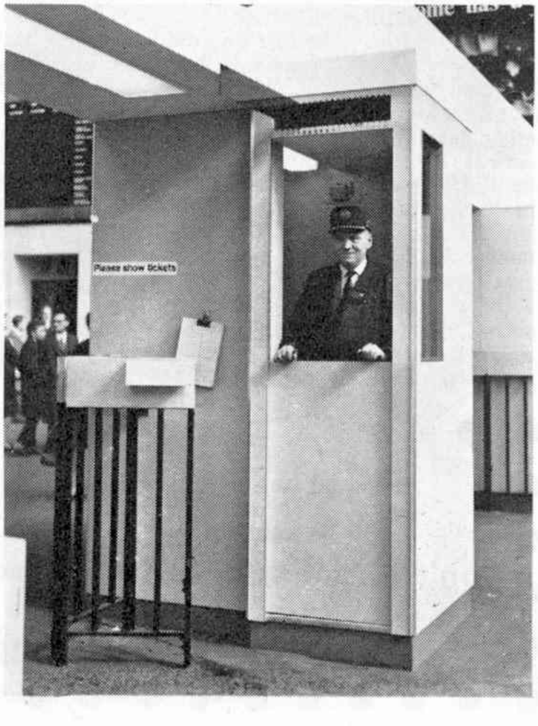
Since no further walls had collapsed and subsidence had ceased, the time had come to wait—for the dust to settle and until it was considered safe to enter the ruined building to start the mammoth and unpleasant task of digging for the dead and injured. Men laboured feverishly with shovels—and even by hand—searching for possible survivors amongst the wreckage. Others began the task of clearing the many tons of debris which littered the surrounding streets, station approaches and the remains of the Avenue Theatre. Both rescue and clearance work involved upwards of three hundred men, working day and night by the light of powerful arc lamps, for over a fortnight. Fire escapes were called in to help in the task of placing steel hawsers across the roof, and wooden towers were erected to help in the operation of shoring up the remaining roof bays with wire ropes.

As weeks went by, and clearance work was gradually completed, officials of the Board of Trade began to inquire into the disaster. Like railway termini the world over, the roof was the arched type, 700 feet in length, with a span of 165 feet, 98 feet from the ground and consisting of thirteen bays. The entire structure was built on wrought iron beds tied together by bars of large diameter and braced with ties and struts. No alterations had been made since it was originally built, to the design of Sir John Hawkshaw, and it had weathered many a gale without even flinching. Also, on December 5, 1905, the date of the disaster, not a breath of wind was stirring.

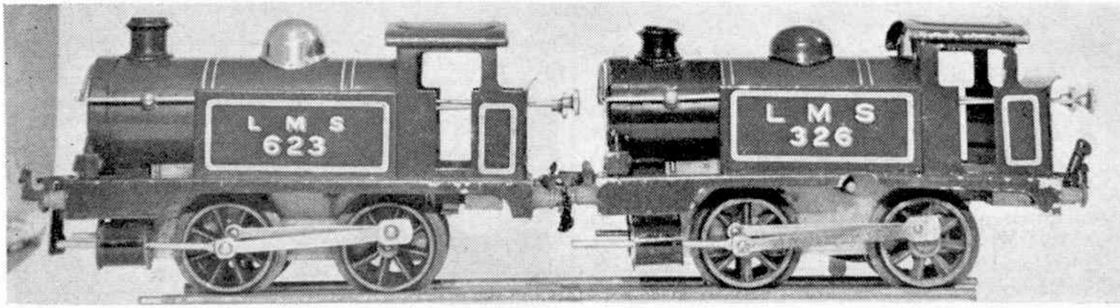
The cause of the disaster has never been understood and even today it remains something of a mystery. That a fractured tie-rod began the collapse of the roof is generally agreed, but why it should have chosen to give way at that particular moment, when winds were calm, is now unlikely ever to be solved.

Over three months later, on March 19, 1906, Charing Cross Station was re-opened, complete with a new re-built roof and a new look. Understandably, no precaution for the safety of passengers had been omitted. The Avenue Theatre was also re-built after £20,000 had been voted to them by the railway company, who also had to foot a bill for £60,000 over the re-building of the station.

For some time afterwards, many a nervous passenger glanced anxiously upwards as he boarded his train, but his fears were groundless for, after 63 years, that day in 1905 has never been repeated.



New ticket barriers in the present-day Charing Cross Station.



Some Rarities in Hornby "O" Gauge

by P. E. Randall

KNOWING MY interest, people sometimes bring me battered No. 40 tanks and ask if they are worth a fortune! They are not; in fact new ones can still be found in some shops. There is, though, an interesting point about No. 40 tanks. The last made had the new type B.R. crest and will one day be rarer than the first issue, which bore the familiar lion and wheel.

However, one does occasionally come across really rare items. Sometimes they are just very old, but they can also be more recent products which are rare because few of them were made. A few such items are described in this article, taken from my collection and those of friends.

To begin, Fig. 1 shows a very old locomotive, the Hornby "George V" in L.N.W.R. colours. This is in Peter Gomm's collection and dates from about 1920. As a boy I possessed a similar locomotive of rather later vintage, known as No. 00 and not named. These locomotives were the forerunners of the "M" series and had similar couplings although the hooks turned upwards. "George V" is lithographed in correct L.N.W.R. colours and bears the stamp "M L Ltd.". It is non-reversing and the "free" wheels are powered and not the ones attached to the piston rods, as in later models. The locomotive is very well proportioned and fitted with proper handrails although a purist would consider the tender too small and the gap between it and the locomotive too great. I would not care to guess the value of this model, but I know at least one collector who would willingly exchange a scale model for it!

The second photograph shows a coach of about the same period, and this was found by Ben Turner, another keen collector. It also is in L.N.W.R. colours and the crest can just be discerned in the picture. It has nickel wheels and the large nickel couplings which were standard in the nineteen twenties. There is a fair amount of relief work on the model, for instance the doors and celluloid windows and the raised numerals, and the proper embossed planking at the end. The model is made of much heavier gauge metal than later ones, and is bolted together with Meccano bolts and nuts, as were most items of that period.

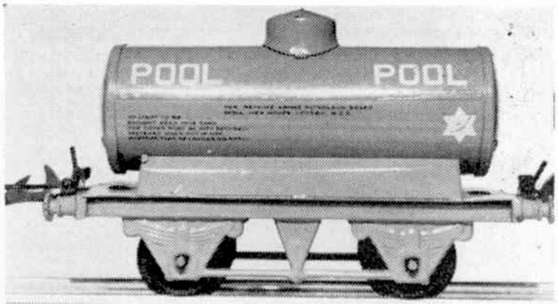
Coming forward a few years, we next see two No. 1 tanks of the pre-1931 period. These and the next two models are again from Peter Gomm's collection, which incidentally, is the envy of the South East! The locomotive on the left is the rare one. Both are finished in L.M.S. red and have similar mechanisms with the later type coupled wheels and the familiar push levers for brake and reverse. Locomotive number 623, however, has several earlier features, such as a brass dome, winding shaft on the left-hand side, and above all, a coloured smokebox! Earlier Hornby locomotives were painted like this and we think even chimneys were once coloured, although this particular locomotive has a black one. Apart from some very minor scratches, it is in mint condition and was found boxed, complete with key, guarantee and instructions !

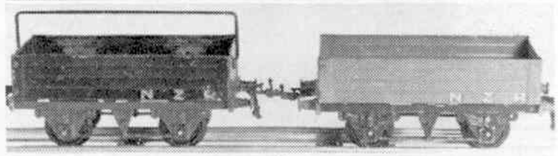
Next in line are two open wagons, one with a sheet rail, in the colours of the New Zealand Railways. They are of the 1932 type with the later pattern base but small hook couplings instead of automatic and embossed sides instead of the later lithographed type. The letters NZR are in gold with red shading. The open wagon is in grey with a black base, while the one with sheet rail is in black with a bright green base. In the nineteen thirties, someone at Meccano Ltd., had the bright idea of painting the base and roof of some rolling stock items in bright colours such as blue, green, cream, red or yellow. Present day collectors do not approve of this style, and while I have no strong objections, I did once come across a Metropolitan Locomotive with a bright scarlet base which looked most odd !

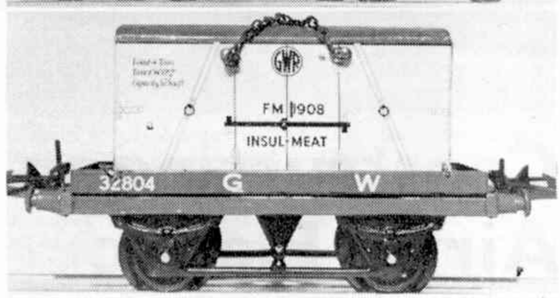
We now come to more recent items, and Fig. 5 shows a post-war bogie van dated 1948. It has some pre-war features, such as axle box slots on the bogies and the latter swing with the couplings, as on the late pre-war types. The finish is post-war, however, NE brown with a white roof and small white lettering and lamp brackets are fitted, another post-war feature on most vans. This model, and other bogie stock, had a very short post-war run and many collectors are puzzled at Hornby reintroducing their bogie stock, only to delete it so quickly.

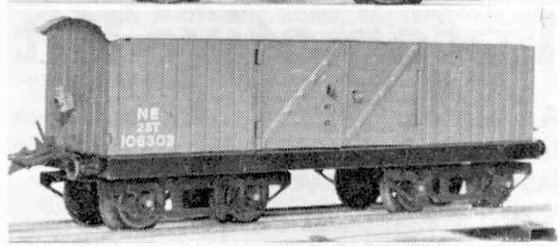
The last two models are in the author's collection, having been acquired from Ray Riisnaes, another ardent local enthusiast. The "Pool" Petrol Tank is rather a hybrid model. It was first introduced in 1940, when Pool petrol came about due to war conditions. We think the model may be an early post-war one however, because the axle guards have no slots for axle boxes, as in pre-1941 stock. However, the embossed springs are unlike either pre-war or post-war wagons, so the tank is really a bit of a mystery. It is finished in grey with a red line and is in near-mint condition.

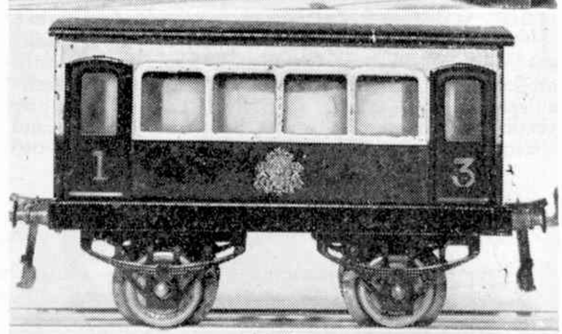
The final item is much more recent, being dated 1953, but was bought new in a local shop this year. Flat trucks with containers were produced, after the war, in all four railway's styles, but the LMS and LNER are much more common than the other two. This example is finished in dark grey, unlike the pre-war light grey, and is the standard post-war model. The Container, however, is obviously a pre-war printing as it has the old 1953 type of crest. There may well be more of these and the SR ones still in some small shops.

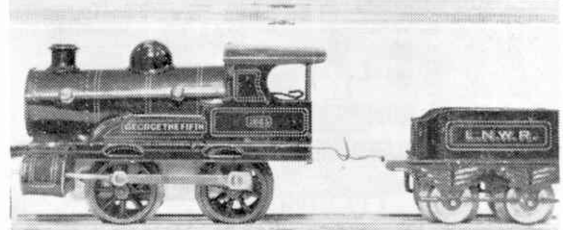




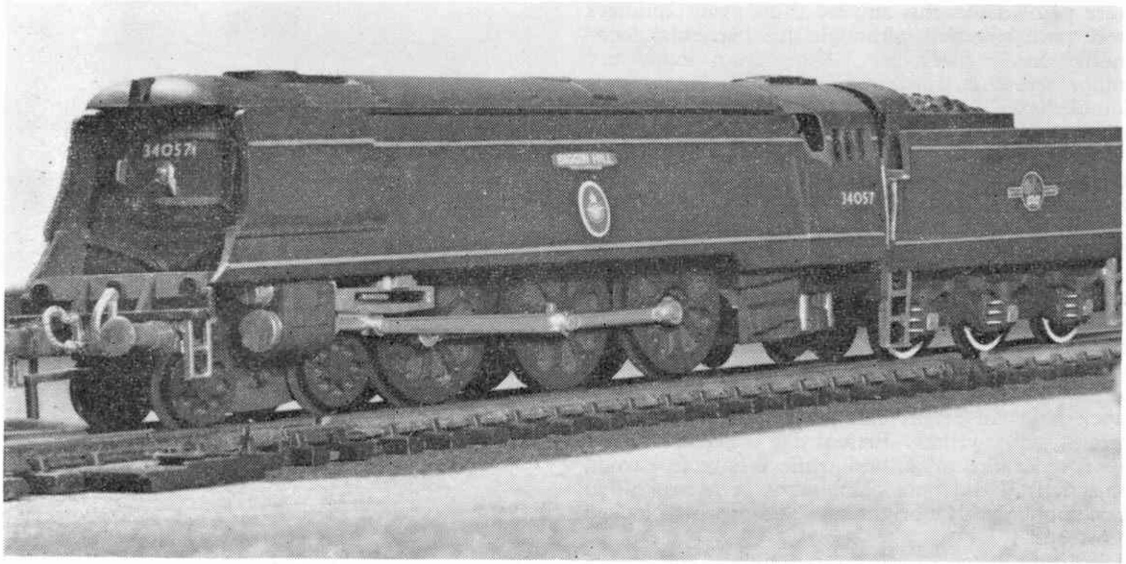








On opposite page. Fig. 3, two pre-1931 tanks, No. 623 has a coloured smokebox. At right, top to bottom: Firstly, Fig. 6, a "Pool" petrol tank wagon. Next, Fig. 4, Hornby open wagons in NZR colours. Next, Fig. 7, a post-war flat truck and container in G.W. colours. Next, Fig. 5, a post-war N.E. bogie wagon. Fig. 2 next, a Hornby L.N.W.R. coach. Lastly, Fig. 1, a 1920 Hornby "George V."



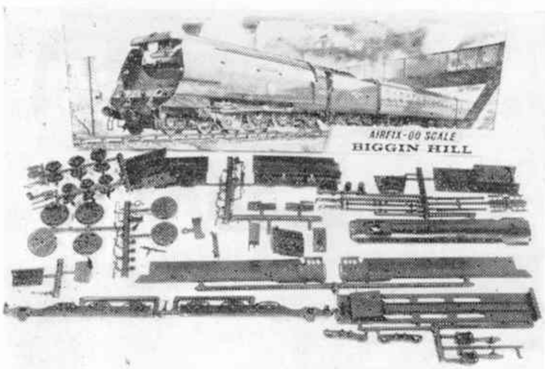
Constructing an Airfix Plastic Locomotive Kit

An inexpensive way to fill up those locomotive sheds and make your layout look more realistic

THE SOUTHERN Railway "Battle of Britain" class pacifics were, until recent years, a very well-known sight to railway enthusiasts living in the south of England. Designed by the Southern's Chief Mechanical Engineer O. V. S. Bullied, they were lighter versions of the famous "Merchant Navy" class, and sisters to the "West Country" class. Forty-two "Battle of Britain" class locomotives were built from 1947, and they incorporated many novel mechanical features which have become the hallmark of their designer. All-welded boilers, streamlined outer casing, clasp brakes, chain-driven valve gear immersed in an oil bath, electric lighting and comfortable cabs—all these features added up to an engine with a lot of character.

The new Airfix OO gauge kit for the famous "Biggin Hill" is very easy to construct, provided care is taken at all stages. We highly recommend the use of a solvent, such as Mek-Pak, for sticking the parts together. This has been described before in *Meccano Magazine*; just a trace of Mek-Pak applied to the join between the parts with a fine brush welds the parts neatly together, with none of the horrible "cob-webs" which are almost unavoidable with tube cements. Although this is not a complicated kit, it really does pay to *read the instructions*. Parts can easily be assembled in the wrong order if you "go it alone". The instruction sheets are very clear, and give step-by-step diagrams of the assembly.

All the parts are moulded in green plastic, which does not look far wrong for B.R. locomotive green. Each component has an identification number moulded on the back. All moulding is sharp and clear, although the rivet detail is rather heavy, giving the locomotive a "Clydeside" look. The characteristic Bullied-Firth-Brown cast wheels are very well done; it is *most* important to clean these of any "flash" before assembly. The tender is a beautiful little model in itself, with a good load of "coal" and air cylinders. The interior of the cab is complete with controls, moulded on to the backplate of the boiler. Altogether, there are more than 90 parts, and the completed model measures nearly $11\frac{1}{2}$ in. overall. British Railways transfers are supplied, including nameplates and Air Force badges for each side. If assembled carefully, the model "runs" very easily, and could easily be motorised with a K's tender motorisation unit. This will be the subject of a future article.



The 90 parts laid out. The "Biggin Hill" is easy to construct and the advanced modeller could motorise it with a K's unit.

JAPAN'S "SONIC GLIDER" TRAIN

by Raymond Lamont Brown

DURING TESTS on August 22, 1967, a model of Japan's new land transport revolutionary 'sonic glider' train reached a speed of 527 m.p.h. Researchers from Meijo University, Nagoya, led by the project's creator Professor Hisanojo Ozawa, are greatly encouraged by the results.

"The success of the latest test has proven theoretically," says Professor Ozawa, designer of World War II bomber *Hiryu*, "the feasibility of the 'sonic glider'. When it can be made a reality depends on whether the industrial and academic worlds can be organised in co-ordination with each other."

Motivation for the project has been building up over the past few years, as the tortuous traffic congestions in Japan became worse. Today most employees in Tokyo industry and commerce spend upwards of an hour daily in travelling to work. Again, it takes more than an hour to reach the new International Airport from the heart of Tokyo. If Japanese traffic is not to come to a complete standstill, it is necessary to develop new systems of commutor and freight transport.

A revolutionary change in rail transportation was brought about by the New Tokaido Line of Japanese National Railways, which takes 190 minutes to travel from Tokyo to Osaka, a distance of 344 miles. Thought was given to the idea of raising earth-bound transport to the speed of sound. Thus in 1959, research was undertaken at industrial Nagoya to bring together a means of terrestial transport and the power necessary to boost it to the speed of sound.

The maximum speed possible for the modern railway train is considered to be around 190 m.p.h. Speeds above this become more difficult to attain with the increase in resistance. Conventional railway trains run by using friction and adhesion between wheels and track. When the speed of the train is greatly increased, the friction decreases, but air resistance increases. No matter how much the engine power may be increased in these circumstances the wheels would turn faster but not produce any more traction, only increasing the danger of derailment.

Fundamentally the 'sonic glider' is a super-train, which works in reverse principles to the usual railway design. The 'sonic glider' itself is the rail incorporating its own propelling force. Therefore, the support for the train does not have to be a continuous rail, only a series of 'points' need be used to guide the train which *glides* on them.

An obvious advantage in this system of guidance is the fact that fewer ground facilities would be needed, thus doing away with miles and miles of continuous track. Again, with this system friction between rail and wheel could be ignored.

It was found that the guiding effect of the 'sonic glider' must not be allowed to diminish the high speeds of the vehicle by having a braking effect, so experiments were undertaken with rollers. The rollers were designed to be spaced at considerable regular intervals so that the vehicle was half-flying, half-gliding.

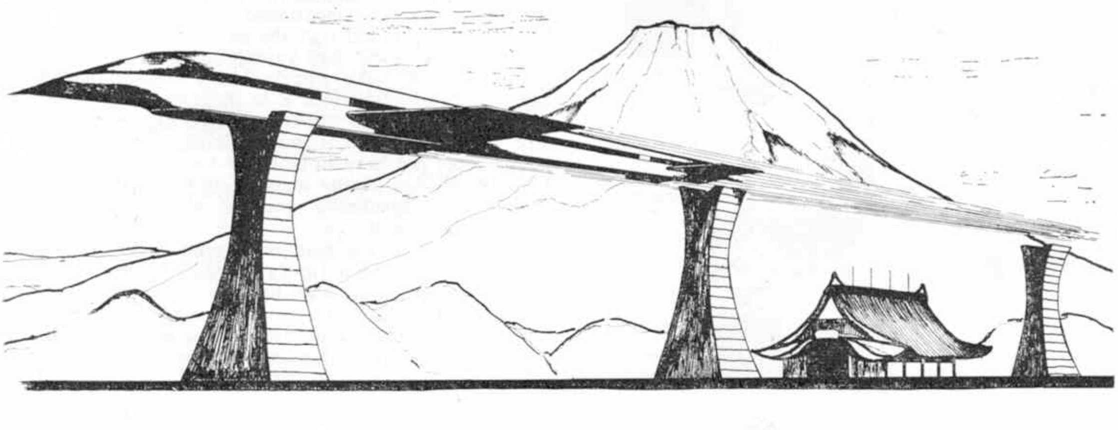
When this was decided it was then necessary to produce a form of propulsion that would free the glider from the resistances produced by a body travelling at high speeds near the ground. If the rollers on the supports were driven independently of the glider, and if their speed of rotation was such that their circumference speed was the same as that of the glider, then the friction and resistance would be nil. If. again, the speed of the rollers was faster than that of the glider, it would give extra propulsion. (The reverse would act as a brake).

Professor Ozawa and his team designed and collated feasible specifications for a glider to travel the Tokyo—Osaka run in 30 minutes: length, 720 feet; body diameter, 20 feet; seating capacity 1000 passengers; Speed 612 m.p.h. (Mach 0.8) produced by 3 or 4 turbo-jet engines, each with a thrust of 15,775 lb.

From the tests conducted on the model glider, over a period of five months, much data was collected and nothing has been detected to suggest that the project was not a practical possibility.

By compiling a Table of Comparative Performances at High Speed, the researchers found, among other things, that in the distance from Tokyo to Osaka (344 miles), Mach 0.8 at 621 m.p.h. would take 33.9 minutes, with air resistance values of 35,925 lbs. Using the 15,775 thrust turbo-jets, with rotating rollers 3 jets were needed, and with non-rotating rollers 4 jets were needed.

The model vehicle used for latest tests had the following specifications: length, 11½ feet and the dia-



meter of 4¾ inches. Made of a special light metal, propulsion was supplied by two solid, smokeless-fuel rockets, with a thrust of 770 lb. each. The vehicle glided over a 233 roller track, consisting of a straight section of distance 274 yards with a 55 yard upward slope. The glider covered the distance in 1.975 seconds with a maximum speed of 575 m.p.h. at the 220 yard point. The eighteenth test glider is designed to reach 737 m.p.h.

Gliders of this kind could be designed to carry passengers and their cars, but the major problems to face as yet are disposal of exhaust fumes, noise and so on.

The operation of the 'sonic glider', when ready for commercial use, would be carried out by an electronic computer.

Professor Ozawa plans to continue his research and designs until the 'sonic glider' becomes a practical possibility. Tests too are taking place to build a 'sonic glider' to carry mail from Nagoya to Gifu, a distance of 20 miles, in three minutes—this would act as a practical pilot scheme.

Although the 'sonic glider' is fundamentally designed to ease traffic congestion, it could bring about a revolutionary change in industrial and urban life.

Example Comparison of speeds:

Tokyo-Nagoya run: 229 miles.

By New Tokaido Line *Hikari* Express: 2 hours.

By Mach 0.8 at 621 m.p.h.: 22.3 minutes.

The same run using a new Mach 1.0 at 765 m.p.h.: 17.8 minutes.

PUZZLE MAKER

"A hundred toys" in one would be a good way to describe this new toy

JIG-SAW puzzles have always been popular with the young—and with the not-so-young as well! A dismantled jig-saw is a challenge to the ability and patience of the assembler, but I think most people will agree that, once the puzzle has been successfully completed, that particular jig-saw loses a good deal of its appeal. Admittedly, it can be dismantled and assembled again, yet the second time is never quite so enjoyable as the first. If you like jig-saw puzzles, then, what is the answer? Do you spend a small fortune buying a stack of new puzzles? Not at all. The best thing to do is to obtain a Meccano Jig-Saw Puzzle Maker.

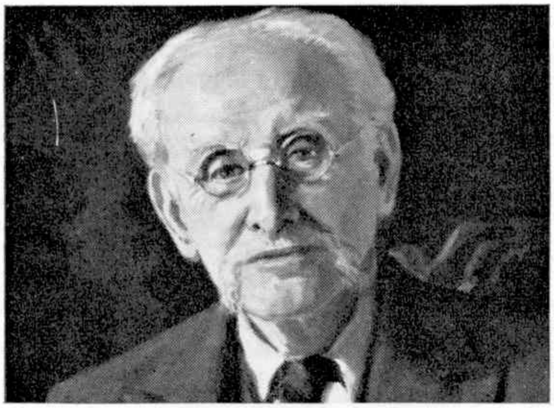
The Meccano Jig-Saw Puzzle Maker is a compact little hand-driven machine which, as its name suggests, is designed for making your own jig-saws, cutting them out of any suitable piece of stiff cardboard. Die-cast out of metal for strength it incorporates a screw clamp to allow it to be easily fixed to the edge of a table or desk and has a revolving handle controlling a specially-designed cutting blade. For safety purposes, this blade is guarded against small fingers by a plastic shield mounted in front of the blade and working in unison with it.

When using the Puzzle Maker, the idea is to place the piece of card to be cut over the small work table beneath the cutting blade and to turn the handle through one complete revolution. This causes the blade to make a single, shaped cut in the card which should then be moved further along and the action repeated. A second cut, adjoining the first, results and the process is continued until a complete strip has been cut out of the card. The whole card, in fact, is cut in to strips in this manner, after which the strips themselves, are chopped up into the familiar jig-saw shapes we all know so well.

It is worth mentioning here that, because a single cutting blade with a fixed shape is built into the machine, there is a tendency to think that only identical shapes can be produced. This, of course, is not the case. In actual fact, a great variety of different shapes can be made by changing the angle of the card between cutting operations, by varying the distance the card is moved after a cut and, when circumstances permit, by using only part of the blade to make the cuts. In the last instance, I am thinking particularly of the time when the final jig-saw shapes are being cut out of the above-mentioned "strips". Owners of a Puzzle Maker will know that the cutting blade is so designed that the familiar tongue-shaped portion lies in the centre of the blade. This, however, does *not* mean that the strip must be so positioned on the worktable that the tongue falls in the centre of the cut to be made.

Now, with what should the Puzzle Maker be used? We have already mentioned stiff cardboard, and Meccano have found that the best results are obtained from sheets of cardboard approximately 3/64 in. thick. Because of this, the Puzzle Maker is supplied with four sheets of such card, 8 in. long by 5 in. wide, on which a variety of different pictures are mounted. The size of the card is immaterial and, of course, the picture does not have to be ready-mounted on the card. In fact, the joy of the machine is that, provided you have suitable cardboard, you can glue any picture of your choice on to it.

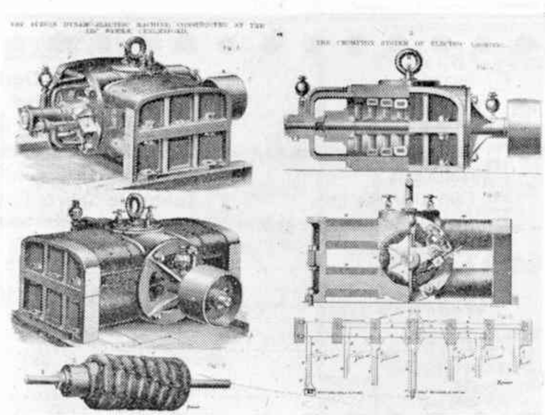
Packed in a recessed polystyrene tray to avoid damage, the Meccano Jig-Saw Puzzle Maker is one of the most interesting and useful toys on the market today. Admittedly at £1 19s. 11d. it is more expensive than the average ready-made jig-saw, but, when judged against the unlimited number of jig-saws that can be produced with it, the price is almost nothing.



Great Engineers No. 10

Rookes Evelyn Bell Crompton (1845–1939) by A. W. Neal

ROOKES EVELYN Bell Crompton was born at Sion Hill, near Thirsk, Yorkshire, in 1845, and as a young boy carried out many, but modest experiments in his father's workshop. He spent his early school days at Ripon, and then for a while he became a naval cadet. This was followed immediately by further education at Elstree and Harrow, and a short spell in the workshops of the Great Northern Railway at Doncaster, where he commenced work on a steam powered model road-engine. He later joined the Army as an Ensign, and was made an engineer to develop steam mechanical transport on the Great Trunk Road. With the aid of an R. W. Thomson engine he achieved some success, but the chief difficulty seems to have been with the boiler which needed to be wood-fed. Crompton conferred with Thompson and as a result the former constructed new engines which were capable



of providing mechanical transport of supplies and equipment for his regiment.

He left the Army in 1876, and upon his return to England was appointed Chief Engineer to the Stanton Iron Works, where two years later he installed electric arc lighting. Public electric supply had not yet commenced and individual lighting sets lit but few arc lamps, also the incandescent lamp had yet to make its appearance.

This then was the state of affairs when, in 1878, Crompton established the firm of Crompton and Company, and commenced the manufacture of electric lighting sets at Chelmsford, Essex. But he was not the man to limit himself to that particular field. He improved the arc lamp as it then existed and made it more efficient. Later he collaborated with Emil Burgin from Basle, in order to develop a new type of generator. Without going into technicalities, beyond saying it was a shunt-wound, the machine was highly successful. Soon he was manufacturing and installing lighting equipment in London, the first being used by Whiteley's. Afterwards he installed many more units, at the New Law Courts, the Mansion House in London, Holyrood Palace, Windsor Castle and Buckingham Palace. Then came a spate of dynamos embodying innovations of various kinds, the aim always being higher efficiency. They were used at such important places as Tilbury Docks, the Army and Navy Stores, Woolwich Arsenal, Victoria, King's Cross and Liverpool Street Railway Stations. Complete installations were also installed in Brussels, Copenhagen, Moscow, Batavia and so on.

Cromptons' started the Kensington Court Electric Supply Company in 1886, which later became the Kensington and Knightsbridge Electric Lighting Co. Ltd. This was the first 'public' supply undertaking in Great Britain.

A battle of the systems developed—Alternating Current or Direct Current—in which Crompton was one of the champions of the latter. As public supply power stations began to increase in number, they did not specialise in the kind of current they offered to the public. Some areas made available A.C. and others D.C., and that is how the matter stood until a few years before nationalisation of the industry, when it progressed towards a standard system of A.C. But Crompton made D.C. equipment, and Crompton alternators were installed in central stations at Wimbledon, Southampton, Great Yarmouth and so on.

Crompton was also active in the electric accumulator field and his first patent was taken out in 1881. His activities in this field gave rise to the establishment of the Crompton-Howell Storage Battery Co., and when the South African War came Crompton became Colonel of the Electric Engineers Royal Engineers Volunteer Corps. He sat on numerous committees, the most far-reaching one being Mr. Winston Churchill's (who was then First Lord of the Admiralty) 'Landship' or 'Tank' Committee. Crompton carried out many experiments in great secrecy, and actually visited the battle areas in France to be conversant with the conditions of the terrain after prolonged bombardment and severe weather conditions. He investigated existing caterpillar track design, turning circles. types of prime-movers, and no doubt many of his findings were used in the final designs for the tanks of that era.

In 1927 his firm became merged with F. & A. Parkinson Ltd., under the title of Crompton Parkinson Ltd., a change which pleased the Colonel very much, and he remained a Director of this organisation until his death in 1939, at the age of ninety-four.

TRY MECCANO MAGAZINE 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 November issue is September 4th.

FOR SALE

Meccano magazines 1931—except DEC. 1932, 1935, 1938—except JUNE & JULY 1950, 1951, 1952, 1953, 1958, 1959, 1960. All in good condition. Swop for Loom Shuttles, Sand Rollers, SMLs and pre-war Manuals. Details to J. Gamble, 17 Midland Avenue, Lenton, Nottingham. K

For sale or exchange surplus obsolete model cars, lorries, etc. Send s.a.e. for list. Box No. 14 (Teesside), Meccano Offices, Hemel Hempstead, Herts. K

Minic racing set, 24 feet of track, 2 new cars, handcontrollers, etc. Apply M. Williamson, Johns Farm, Littlebury, Saffron Walden, Essex. K

Meccano Mags., Transport magazines, Books, Tri-ang TT, some obsolete Dinky Toys. S.A.E. lists. 44 Morland Road, Kenton, Middlesex. K

Cabinet £340. Meccano many perfect, also Electrikit, 700 Meccano pages from magazines, obsolete motors, manuals. Original leaflets 1. (Spanish), 3, 8, 9, 15, 21, 23, 26, 30, 31, 33, 34. 21 others. Parts 57, 57B 104, 105, 119, 120, 127, 129, 150, 167C, 217A. Aeroplane. Williams, 121 Cambridge Road, North Harrow, Middlesex. Telephone 01-868-0131 after 6 p.m. K

Meccano Magazines 1929, 1932, 1935, 1936, 1961, 1962, 1963. Excellent condition. Box No. 15 (Berks), Meccano Offices, Hemel Hemstead, Herts. K

French Meccano Magazines, 1953-1957 for other F.M.M. or American M.M.s, plus cash adjustment. Wanted, old Meccano publications of any sort, Hornby trains, locomotives 1920-40. Details—12 Leeson House, Haggard Road, Twickenham. JK

Live Steam Model Boats. Send s.a.e. for illustrated list to—Perico Models, 104 Tenniswood Road, Enfield, Middx. JK

Scalextric set, hardly used, many accessories, mostly new track, four cars. Offers to G. Aldred, 75 Farm Road, Maidenhead, Berks. K

STAMPS

Free Stamps. Choose your own gift. Rockets, animals, ships and many more. Send 4d. for approvals.—Falmouth Stamp Supplies (M), 11 Spernen Wyn Road, Falmouth. JKL

BOOKS

Model Meccano, Railway, etc., magazines, books, bought and sold. Ed. Jones (MC1), 43 Dundonald Road, Colwyn Bay. K

Wrecks & Relics (3rd Edition). Illustrated 50 page booklet reviewing derelict and preserved aircraft in the British Isles. Price 5/6d. including postage. Orders to Merseyside Society of Aviation Enthusiasts, 11 Leybourne Grove, Gateacre Park, Liverpool, 25. K

WANTED

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

Dinky Toys, vintage toys and any car models pre-1950, urgently required by collector. Cash or exchange. Exceptional prices paid for really early models especially pre-war Dinky Vans with advertising and large scale tinplate cars. Write—103 Canford Cliffs Road, Poole, Dorset. K-P

Wanted mint Yesteryears, Britains' vehicles, Corgi Hovercraft and Record Car. Sell 1112 Missile. Box 16 (Surrey), Meccano Offices, Hemel Hempstead, Herts. K

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. G-R

Collector Seeks old trains and other toys, anything repairable considered. Write details, prices.—14 Wren Avenue, Southall, Middx. H-S

Pre-war and Early Post-war Dinkys, Tootsie-toys, Minics, etc. High prices paid.—D. Pinnock, 10 Hurstville Drive, Waterlooville, Hants. Tel: 2958 (evenings). G-L

GREAT BRITAIN
2/6, 5/- & 10/- FREE
This packet of stamps is given absolutely **FREE** to all genuine applicants for my superior used British Colonial Approvals enclosing 4d. in stamps for postage. Overseas Applications invited.
D. L. ARCHER (M),
2, LITCHFIELD WAY, BROXBOURNE, HERTS.

LABORATORY APPARATUS and CHEMICALS

Students can equip their own laboratories at lowest cost and with the highest quality apparatus and chemicals when they select from the hundreds of items in A. N. BECK & Sons' list. Just send a stamped, addressed, envelope, and your copy will be sent by return of post. You can then order by post, or, better still, pay a visit to 60 Stoke Newington High St., where the whole range is available for your inspection, along with many more items for use in schools and laboratories. Remember! If it's for Chemistry, Beck's can supply it!

A. N. BECK & SONS,
60 STOKE NEWINGTON HIGH STREET, LONDON, N.16.
Telephone: 01-254 0335.

GCE HOME STUDY COURSES
'O' and 'A' Levels
(all Boards)
LONDON UNIV. DEGREES — B.A., B.Sc., B.Sc. Econs., LL.B., B.D. and DIPLOMAS. BANKERS, BAR, SECRETARIAL, STATISTICIANS etc. Exams. *Prospectus Free from* Wyndham Milligan, M.B.E., M.A., Dept. DW.2
WOLSEY HALL · OXFORD

CHEMICALS AND APPARATUS
You can now buy Chemicals and Apparatus —Test-tubes, Beakers, Flasks, Filter Paper —everything you need to build up your own HOME LABORATORY!
You save money by ordering Direct from Suppliers. Send 6d. stamps NOW for Latest List and Order Form.
(Overseas enquiries welcomed)
P.X. TECHNICAL SUPPLIES,
53, Eldon Street, Sheffield, 1

PLANS

Plans Enlarged or Reduced and additional copies made. Send for details from—Causer & Co., 216 Goldhawk Road, London, W.12. I-N

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.

NOVEMBER COUPON

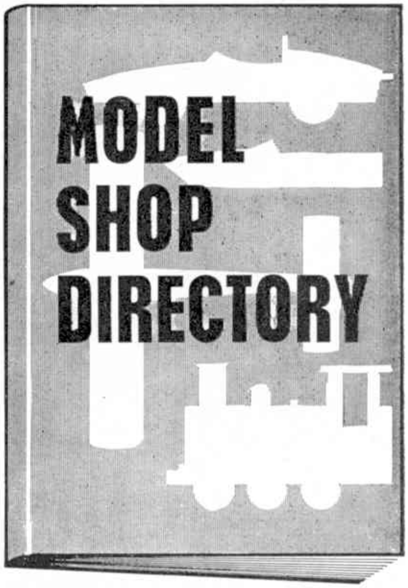
- ☐ Beatties
- ☐ Daystrom Ltd.
- ☐ Dinky Toys
- ☐ Harbutt's Plasticine Ltd.
- ☐ KeilKraft
- ☐ Lott's Bricks Ltd.
- ☐ Malins (Engineers) Ltd.
- ☐ Meccano Sets
- ☐ Meccano Spares Dealers
- ☐ Philatelics Services
- ☐ Radio Control Specialists
- ☐ Radionic Products Ltd.
- ☐ Royal Navy Recruiting
- ☐ Subbuteo Sports Games
- ☐ Solarbo

Name...

Address..

....

WISE MODEL SHOP OWNERS ADVERTISE HERE



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.

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.

HEMEL HEMPSTEAD
Tel: Hemel Hempstead 53691

TAYLOR & McKENNA
(Hemel) LTD.
203 MARLOWES, HEMEL HEMPSTEAD, HERTS.
For Model Boats, Aircraft, Railways, Racing Cars and Accessories, Metal and Plastic Meccano.

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.

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.

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: 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: 578-2299

BENNETTS SPORTS & TOYS,
3 RUISLIP ROAD, GREENFORD, MIDDX.
Radio Control stockists, Kits, Boats and Aircraft Popular range. Secondhand Engines and Radios bought and sold. Tri-ang stockists.
Closed Wednesday 1 p.m. Mail Order Specialists.

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
40 ft. SLOT CAR RACING TRACK.

MAIDSTONE
Tel: 51213

MODELCRAFT
40 UNION STREET, MAIDSTONE, KENT.
Everything for the average modeller. Cars, Aircraft, Boats, Railways.
SPARES AND REPAIRS. MAIL ORDER.

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.

READING
Tel: Reading 51558

READING MODEL SUPPLIES
1 HOSIER STREET, ST. MARY'S BUTTS, READING, BERKSHIRE.
BERKSHIRE'S MODELLING CENTRE

ST. ALBANS
Tel: 59234

BOLD & BURROWS LTD.
12-22 VERULAM ROAD, ST. ALBANS, HERTS.
Meccano Sets and Spares
Pay circuit available.

WESTON-SUPER-MARE
Tel: Weston 6600

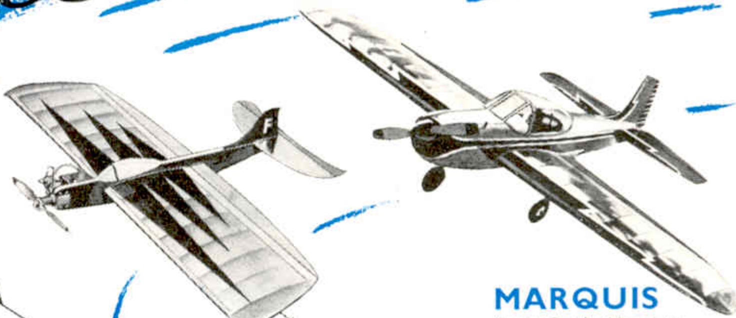
RADIO CONTROL SUPPLIES LTD., 1 THE CENTRE, WESTON-SUPER-MARE, SOMERSET.
Open until 8.30 p.m. Friday.
Largest R/C stockists in the country.
Own R/C service centre.

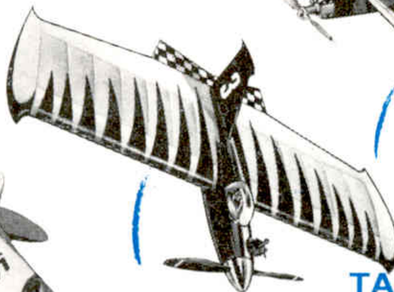
WOLVERHAMPTON
Tel: 26709

MODELS & HOBBIES
3 BELL STREET, MANDERS CENTRE, WOLVERHAMPTON.
All Meccano Sets in stock up to and including No. 10. Full Spares Box, kept up-to-date.

KEILKRAFT

Controliners





MARQUIS

A very fine looking stunt model with attractive semi-scale lines, featuring tricycle undercarriage and extra large cockpit. For 1 to 1.5 c.c. engines. Wingspan 30".

49/4

FIREFLY

Stunt model with "profile" type fuselage. Specially designed for engines under 1 c.c. Kit contains die-cut parts. Wingspan 20".

25/1

TALON

Combat design of considerable strength. Easy and quick to build. A fully aerobatic model that is great fun to fly. For 2.5 to 3.5 c.c. engines. Wingspan 32".

38/6

DEMON

Class A team racer to S.M.A.E. specification. Kit contains die-cut parts. For engines up to 2.5 c.c. Wingspan 30".

45/8

RADIAN stunt model

with coupled wing flaps and elevators

The latest thing small stunt controliners for 049 motors. Kit contents include die-cut parts, stunt tank, preformed U/C, formed canopy, all hardware, full size plan and instructions. 22" wingspan.

26/9

PHANTOM MITE

The Phantom Mite is just about the toughest model available to the newcomer to control line flying. Features all sheet construction with wings, tailplane, fin and fuselage sides ready to cut to shape. For .5 to .8 c.c. Wingspan 16".

22/6

IDEAL FOR THE NOVICE

SPECTRE

Outstanding stunt model featuring combined wing flap and elevator control. Wing ribs, formers, etc., die-cut in highest quality balsa. For 2.5 to 3.5c.c. engines. Wingspan 41".

57/11

OUT NOW!

NEW KEILKRAFT HANDBOOK

90 pages of Aeromodelling knowhow with details of kits and accessories

2/6 from your model shop

or direct from:

E. KEIL & CO. LTD. WICKFORD, ESSEX

2/6 plus 9d. postage

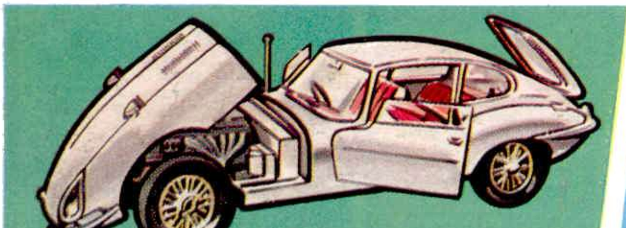
FOR TOP PERFORMANCE

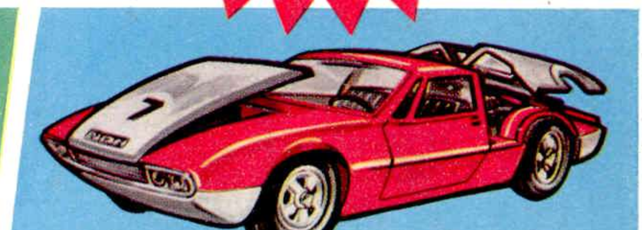
Printed in Great Britain by Electrical Press Ltd., Maidenhead, Berks., for the Proprietors, Model & Allied Publications Ltd., 13/35 Bridge Street, Hemel Hempstead, Herts. Published by the Argus Press Ltd., 12/18 Paul Street, London, E.C.2, to whom all trade enquires should be addressed.
Registered for transmission by Magazine Post to Canada including Newfoundland.

DINKY TOYS®

bring you tough, all-action models

PICK OF THE World's Best FROM DINKY


Model No. 131 Jaguar 'E' Type 2+2


Model No. 187 De Tomaso-Mangusta

Model No. 157 B.M.W. 2000 Tilux


Model No. 152 Rolls-Royce Phantom V. Limousine

No. 131 JAGUAR 'E' TYPE 2+2

Have your own high speed 'E' type and leave your friends standing. This model has opening doors, bonnet and rear window. Wire wheels, wing mirrors, aerial and engine all shining silver.

Go fast, get mobile for **12/11**

No. 187 DE TOMASO-MANGUSTA

Own a racing driver's dream car. An accurate rear-engined model with lift-up see through inspection covers. Luggage goes under the bonnet.

Get this really powerful car for **9/11**

No. 157 B.M.W. 2000 TILUX

Real flashing indicators, operated by you, powered by battery. Turn the wheel, use the suspension and watch this luxury model flash right round the corner. Set the pace for your friends.

Only **12/11**

No. 152 ROLLS-ROYCE PHANTOM V. LIMOUSINE

The shining paintwork and suspension on this model are just like the real thing. You can open all four doors, boot and bonnet, great for showing your friends its powerful engine. Own a gleaming Rolls-Royce complete with chauffeur.

For **14/11**

leaders go for

DINKY TOYS®

the tough, action-packed models