MECCANO® Magazine

JANUARY 1972

MODEL ENGINEER EXHIBITION 1972

MAP HOBBY MAGAZINE

15p

U.S.A. & CANADA
SEVENTY-FIVE CENTS

MECCANO® Magazine

JANUARY 1972 VOLUME 57 NUMBER 1

Meccano Magazine, founded 1916

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MAP **HOBBY MAGAZINE**

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FRONT COVER

Veteran Hornby trains belonging to the Hornby Railway Collectors' Association ran on a "tinplate layout" throughout our recent Model Railways Exhibition and (whisper it!) seemed to have a far greater reliability factor than many more modern layouts. They brought back nostalgic memories to many of the thousands of middle-aged and elderly visitors to the Show.

NEXT MONTH

Full-sized plans for an inexpensive but efficient little kite are a feature of February's issue. Its performance will surprise you!

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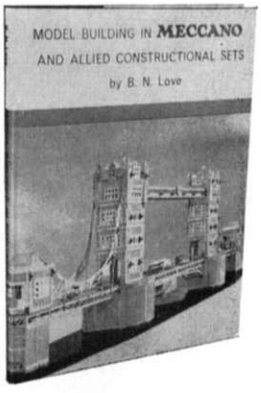

MODEL BUILDING IN MECCANO®
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JANUARY ISSUE

Hot air balloons are very much in vogue these days, so what better to raise the temperature on the flying field than a three-foot diameter, 24 cubic foot model replica? Working drawings for this 'different' type of model are provided, while the material required consists mainly of tissue paper – certainly cheap to make.

As a complete contrast, but with equally crowd-pulling results, are the plans for a 45" span twin engined control line scale model of the Beagle 206 Bassett, just the job for a winter building project. Gadget Review, after a lapse of several years, makes its re-appearance while the regular Aircraft Described series contains another super detailed drawing by Pat Lloyd—in this instance the most attractive 'Owl' Formulae I racer, as designed by George Owl and raced by Bert Pedigo in the United States.

The intricacies of trimming a free flight scale model are carefully explained by Eric Coates in his most popular series, which together with all the regular features, such as Engine Test, Free Flight Comment, Golden Wings, Club News, etc., comprises the January 1972 issue of Aero Modeller—on sale December 17th.

Aero Modeller

ON SALE DEC. 17th PRICE 15p

THE REPLICA OF RUGBY UNION AND LEAGUE FOOTBALL

A new family game played by skilful finger-tip control. Subbuteo "Table Rugby" captures the spirit and thrills of real Rugby in both codes. Complete with fifteen 00 scale figures for each side; goals, balls, live action full back able to kick goals from any angle. Scrummer device, playing cloth, set of rules. Tries, conversions; runs for goal line, passing moves, penalty goals.

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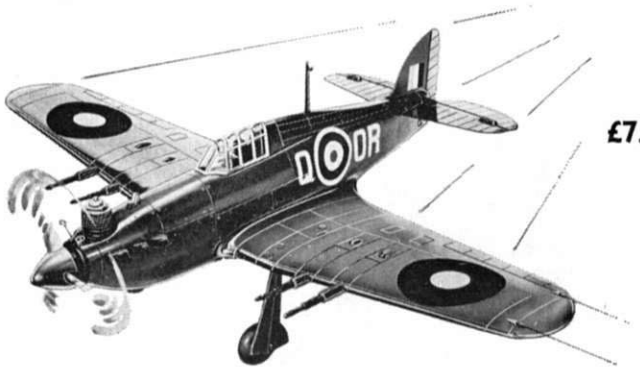

£7.40

YES—this model really flies! Powered by the renowned McCoy .049 Glow motor, fitted with spring starter. The airframe is made from a specially developed tough plastic to withstand hard usage and comes complete with control line handle, control line and glow clip connector—All you need is some fuel (KK Nitrex 15 of course) and a starter battery then prepare yourself for hours of flying fun and excitement. Flying and starting is covered in full in the very complete instruction manual.

Fly your own Control Line Model

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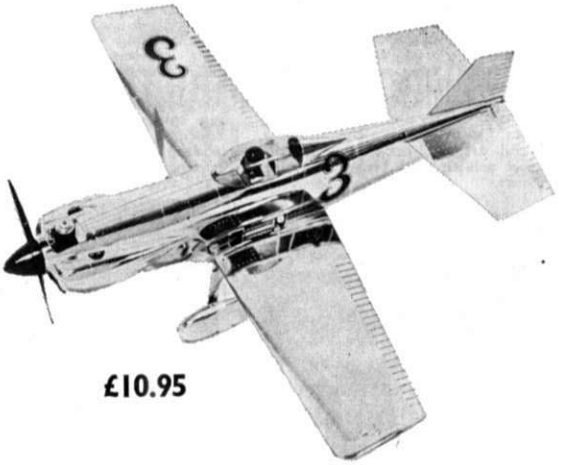
Big 22½" wingspan
21½" fuselage
Powered by McCoy .049 engine



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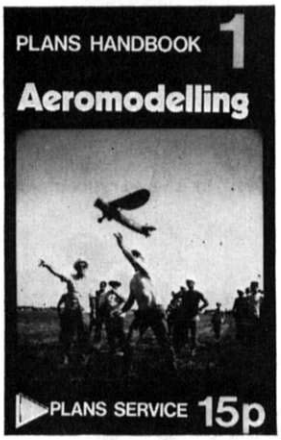
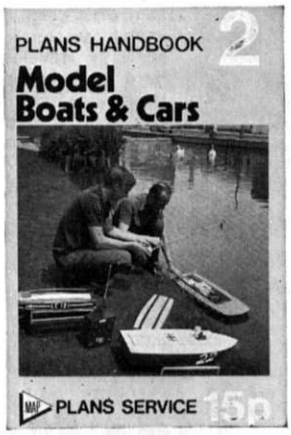
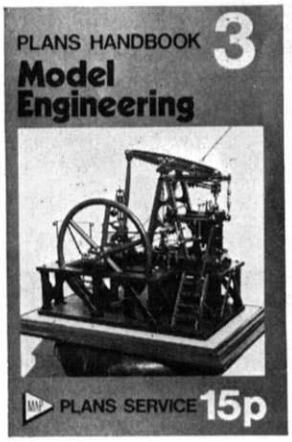


Aeromodelling
128 pages featuring hundreds of working model aircraft, illustrated almost entirely by photographic reproductions of the actual models, plus span, brief description and graded for ease of construction; also selected engine list with tabulated data; index to illustrated plans, X list of vintage unorthodox novel plans, many other classifications, useful articles, order forms. Also good selection of trade advertisements.



Model Boats & Cars
96 pages of plans of scale and semi-scale ships, tugs, lifeboats, submarines, paddle steamers, period ships, racing yachts, hovercraft, cabin cruisers, mostly illustrated, fully described, and classed for ease of building. Working model cars and usual vehicles are included and the very range of scale car drawings, racing cars, ancient and modern. Index of drawings; useful articles on building; waterline plans; trade advertisements.



Model Engineering
96 pages of working model drawings for steam locomotives, traction engines, steam engines, petrol engines, workshop equipment from LBSC, Westbury, Evans, Maskelyne, Bradley, Hughes. Plus useful model engineering information, screw-cutting tables, standard threads, letter and number drills, wire and sheet metal gauges, miscellaneous information.

Radio Control Models
96 pages of R/C plans of models and equipment. There are 128 R/C aircraft, all illustrated, including S/C Sports Models and Trainers, Galloping Ghost Models, Cumpetition Aerobatic Models, Multi-Sport and Trainers, Pylon Racers, S/C and M/C Scale Gliders and Soarers. 87 model boats suitable for radio control, plus do-it-yourself R/C systems.

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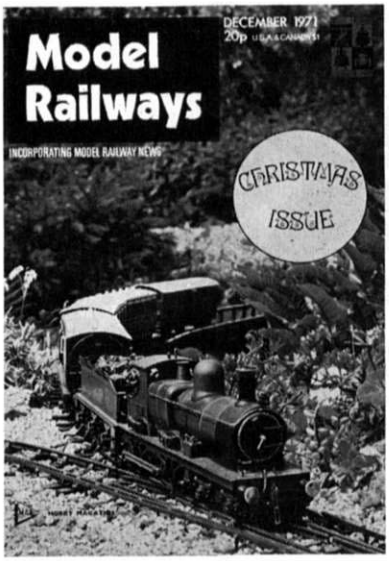
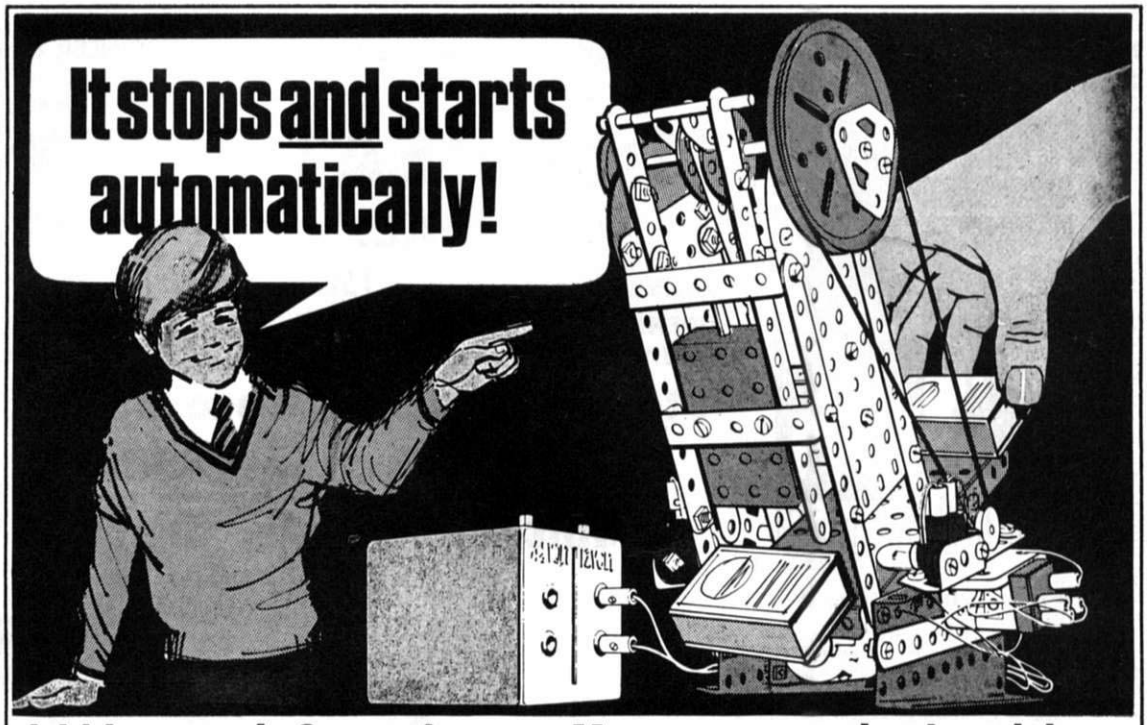


A MONTHLY MAGAZINE CONTAINING A REFRESHING APPROACH TO THE MOST ALL-EMBRACING HOBBY OF THEM ALL.

20p
PUBLISHED SECOND FRIDAY OF THE MONTH

MAP
HOBBY MAGAZINE

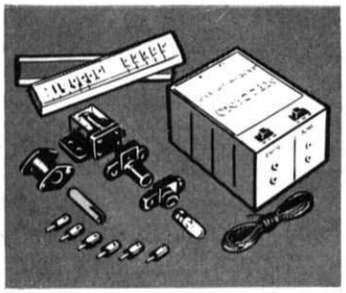
NEW MECCANO NEWS



Add Automatic Control to your Meccano motorised models with the NEW ELECTRONIC CONTROL SET

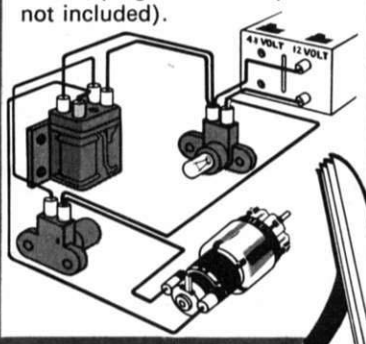
Add this exciting electronic accessory set to your existing sets and control your motorised models automatically.

With a photo-electric cell you can add a new 'computer-age' look and action to your model-making.



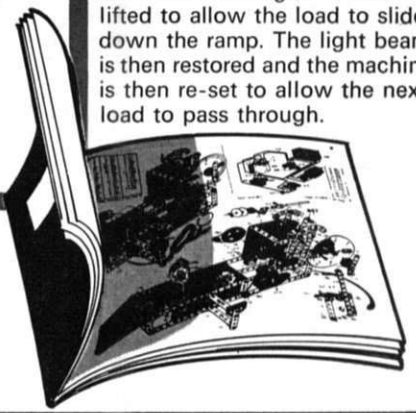
Electronic Control

This set includes a battery control box, an electronic eye that acts as an automatic switch, a relay, solenoid, bulb holder, plugs and wire. (motor not included).



See how Electronic Control works with the Automatic press

The load for pressing is slid down the ramp breaking a light beam as it arrives in position under the press tool. As the beam is broken the motor starts and the press tool descends upon the load, held in place by the metal retaining gate.
As the press tool is automatically raised the metal gate is also lifted to allow the load to slide down the ramp. The light beam is then restored and the machine is then re-set to allow the next load to pass through.



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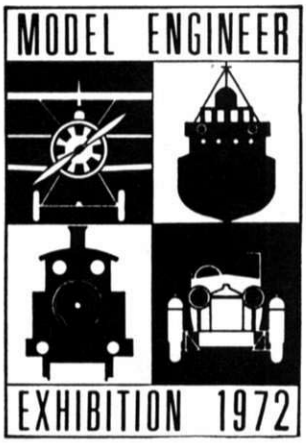


41st GREAT SHOW!

SEYMOUR HALL, LONDON, W.1.

4th January — 15th January 1972

OPENING HOURS: DAILY 10 a.m.—9 p.m. NOT SUNDAY
(JANUARY 4th, 2.30—9 p.m. JANUARY 15th, 10 a.m.—7 p.m.)

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

WHAT WILL BE ON DISPLAY

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

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

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

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

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

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

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

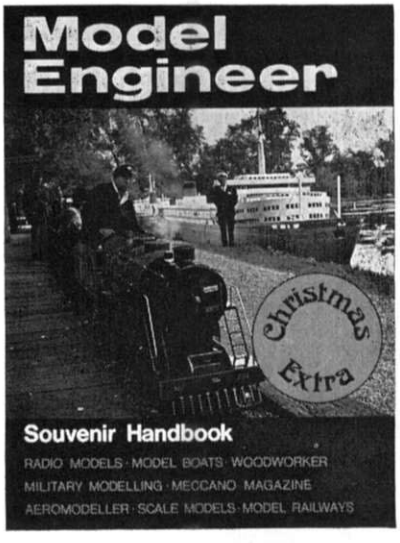
GALLERIES will provide sitting out space, spectator room and house additional club displays including our favourite BOYS' EXHIBITION. Furniture and craft entries under the auspices of *Woodworker* will be on show.

REFRESHMENTS

Snack Bar in the Balcony, Cafe, with teas, soft drinks, sandwiches, cakes Restaurant Service (licensed) available on ground floor. Parties may book in advance.

SOUVENIR GUIDE

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



ADMISSION

Price of admission at the door will be 25p adult, 15p child. A child is regarded as anyone still at school. Children under 5 who have not started school and are accompanied will not be charged.
Reduced admission charges for pre-booking is as under:
Single and small number pre-booking tickets available from these offices. Adult 22½p, Child 12½p. Parties of more than 10: Adult 20p, Child 10p, Teachers i/c parties free—one per 10 in party.
A combined family ticket can also be bought in advance.

Advance Bookings and details from:
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1972

The year of 1971 was not exactly uneventful for Meccano enthusiasts, though the formation of the new company, Meccano (1971) Ltd., ensured no interruption in the supplies of Meccano and Dinky Toys. The story is not of course finished, but there is no reason to anticipate anything other than a happy outcome.

This, the first issue of 1972, appears, in the way of publishing, before 1971 has run its last few days out, and indeed, before Christmas. It therefore gives the opportunity for the Editor and Staff to wish all readers a very Happy Christmas, and, especially in view of the preceding paragraph, a happy, peaceful, and prosperous New Year.

Competition Judges

The photograph of a group discussing Pocket Meccano was taken at the Glendower Hotel on the occasion of judging the highly successful Pocket Meccano Competition. From left to right, Mr. D. McHard, Marketing Manager, Meccano (1971) Ltd., Mr. T. V. Thomas, Editor of "British Toys", Mr. H. J. Fallman, Chairman and Managing Director, Meccano (1971) Ltd., Mr. N. Hauser, Director of "Toys International", and Mr. E. Simmons, Editor of "Games and Toys". The remaining judge was taking the picture! A full report with all the 33 winners' names appears in this issue.

Hovering

If you have £750 to spare you can buy a 1+1 seat hovercraft, the *Cyclone 274* shown in our second picture. This is a sports vehicle manufactured by the Light Hovercraft Company of East Grinstead, who normally produce industrial air cushion craft such as hover-pallets. Two 137 cc. 9 h.p. two-stroke engines provide vertical lift and thrust, producing a top speed of 25 knots for a vehicle weight of 200 lbs. The machine is simple and low on maintenance, and has a segmented skirt, individual segments of which can be replaced in the event of damage. Land, water, mud, snow, and ice are all taken in the *Cyclone's* stride.

Motor Shows

The London and Paris shows had very little in the way of new cars, although of course there are always the experimental or unusual cars which you don't often get a chance to see, particularly all together. The lack of new ones is partly tied up with the uncertainty of completion dates (Triumph has just postponed introduction of its Dolomite to January, since they cannot be sure of enough cars in December, due to troubles in contracting firms) but is also a question of a generally shrinking number of new models. The costs of developing a new car are nowadays enormous; at the same time, the buying public is changing its attitude. Most people are now tending to think of a car as a practical means of transport, rather than a status symbol, and they are less likely to be influenced into buying by glamour. Reliability, safety, and maintenance at reasonable levels of cash and convenience are beginning to be the main factors. Inevitably this leads the makers to develop and improve existing models; it is, indeed, a much saner way to look at cars, but it does mean fewer new ones to get excited about.

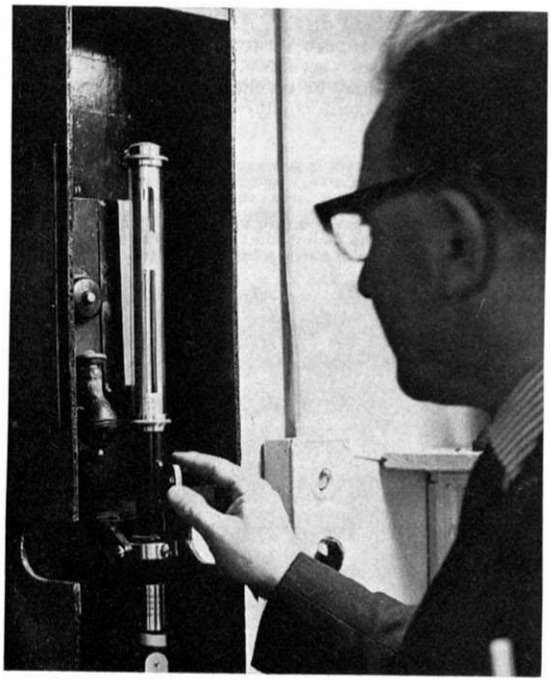
It has been left to the Italians, in their show at Turin, to produce an absolutely new vehicle, the Alfa Romeo Alfasud, and to cause a buzz with the Fiat 128 coupe going to front wheel drive. As is usual at this show, there were some superb custom-built designs by the well-known Italian stylists. It seems that mid-mounted engines may be on their way in. H'm—does this mean you sit comfortably while working on them?

Distinguished group at the judging of the Pocket Meccano Competition (left) and, below, the *Cyclone 274* light hovercraft, which will carry a load of 200 lbs.

SPACE AGE WEATHER FORECASTING

BY GEORGE H. HAINES

Above, Forecaster here! When you ring up for a forecast you speak to the forecaster with his charts in front of him. Below, The barometer and other instruments used by forecasters were known by the 17th century. The advances in forecasting are due to advances outside meteorology.



MEN have been trying to forecast the weather from the very earliest times and the principle has remained the same. The forecaster studies existing conditions and then estimates the way these will develop and what weather the new conditions will produce. The basic instruments—the barometer, the thermometer and the hygrometer (which measures humidity) were invented by the 17th century.

The advances in forecasting have all come from inventions outside the meteorological field. It was the invention of the electric telegraph that enabled information to be gathered from a wide area in a short space of time and so made it possible to produce the first weather map in 1851, to be followed by the issue of an official daily weather forecast in 1861.

Over the years an efficient Meteorological service was built up, but the forecasts were all based on information gathered on the surface of the earth. The atmosphere is like a deep sea filled with currents of which our weather is the bottom layer. Meteorologists realised that it would be valuable to have information from the upper levels.

Interest in the upper air is not entirely new—Benjamin Franklin used a kite in his experiments with lightning in 1752. This form of upper air exploration was still being used in the early part of this century—by 1917 the kite wire was being used to send information to the ground. Primitive recording units were also sent up on balloons but these were only of use if recovered in an undamaged state when they crashed back to the ground.

The breakthrough came with the invention of radio telegraphy which brought the ability to send messages back to the ground. This led to the development of the radio sonde—a 3½ lbs unit consisting of a small transmitter and instruments for measuring temperature, pressure and humidity, which can be attached to a balloon. A windmill on the side of the sonde rotates as the balloon rises and this switches each instrument into circuit in turn to vary a continuous high pitched note transmitted by the radio unit. Specially calibrated receivers measure the pitch of the note and show the reading of the instruments. Some of the balloons have taken sondes to a height of over 100,000 feet before bursting, but a height of 60,000 feet is more usual.

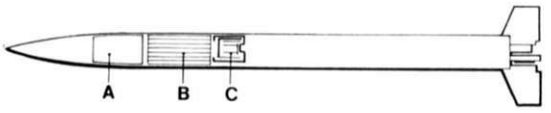
For information from even higher levels sondes are sent up in rockets and released to drift down on parachutes. The Skua rocket produced by the Bristol Aerojet Co. is generally used—this is about 8 ft long and has taken sondes to 230,000 feet.

In making forecasts of conditions near his station the forecaster modifies the information provided by his charts by what he can see from his window. His vision has now been extended by the use of radar which enables him to watch the progress of a belt of rain and decide if it will pass over the station and when it is likely to arrive.

Radar was developed during World War II as a means of detecting enemy aircraft and one of the early discoveries was that rain clouds obscured the signals received from the aircraft. This suggested that the system might be developed for meteorological purposes.

A radar set consists basically of a transmitter which beams out pulses of energy and a receiver which detects the reflections of these impulses from clouds, aircraft etc. The set measures the time taken for the impulse to travel from the set to the object and back, calculates the distance and shows this on a display panel.

The antenna (or aerial) can be set to scan the area in various ways. For meteorological purposes the types most used are P.P.I. and R.H.I. For the P.P.I. (Plan



Position Indicator) Display the antenna rotates on a vertical axis and as it does so the beam is shown as a clock hand sweeping round a dial with the radar as the centre. Extra bright patches show the position of clouds etc.

When set for R.H.I. (Range Height Indicator) the antenna nods up and down on a vertical plane and the display shows a vertical 'slice' through the atmosphere.

For most meteorological observations, sets with antenna about 12 feet across are used, but at Defford near Pershore there is a giant with an antenna 80 feet across. This equipment is so sensitive that it can observe the layers of turbulence in clear air which arise between layers of air moving at different speeds. These are very dangerous for aircraft and the radar is providing information which could be of great value in ensuring safety.

In the course of their work, observers discovered that with this set they could watch the build up of a thunderstorm on a clear day with no clouds in the sky. This began as a 'blister' in the band between two layers of air and gradually grew over the day—so that ample time for warning would be possible.

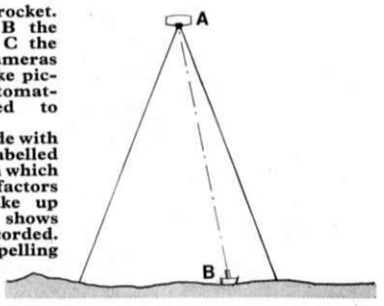
We can expect to have even greater benefits from modern technological developments. In making forecasts, the met officers gather together all available information and plot this on a chart to show the present conditions. However, although there are many stations in England, there are few in the Atlantic so that the picture of approaching weather is not very accurate.

The advent of earth satellites has given the met people the opportunity to step off the world and take a look at it. In fact they found that it was not necessary to do anything quite so dramatic—instead they equipped a satellite with cameras and a means of transmitting pictures back to earth. After the first experimental launchings, Tiros IX was launched at an angle of about 100° to the equator in an orbit which took about 110 minutes for the trip round the world. While the satellite is making its orbits the world is revolving below it and as a result of this dual motion the satellite scans the earth's surface twice in every 24 hours. The pictures show the earth's surface with the clouds above, so that it is possible to follow the movement of weather systems.

One great disadvantage of this system is that it can only report on portions of the earth which are in daylight, but important changes take place during the night and meteorologists therefore sought a way of overcoming this 'blind spot'. Experiments showed that the measuring of infra-red radiation could offer a solution, for this has a direct relation to temperature. As the temperature of cloud tops, land and sea usually varies quite considerably, the infra-red records depict these. Special High Resolution Infra-Red Radiometers were constructed and these produce pictures which are remarkably similar to those taken by ordinary cameras in daylight, enabling a 24 hour watch on the weather to be maintained. This system was used in ITOS I launched by the U.S. in January 1970.

Next year a new series of satellites incorporating both normal and H.R.I.R. cameras will be launched in orbit over the equator. These will be set to remain stationary relative to the Earth's surface and each one will maintain a constant watch over a quarter of the earth's surface between 50° N and 50° S. This is a particularly

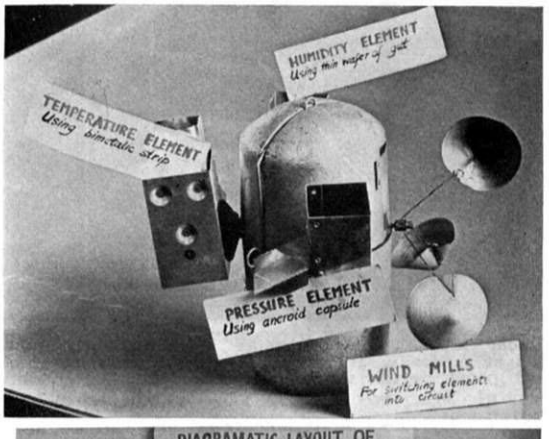
Left, the Skua rocket. A is the sonde, B the sonde parachute, C the motor. Right, Cameras on satellite (A) take pictures which are automatically transmitted to station (B).
Below, a radio sonde with the various parts labelled Bottom, a diagram which shows the many factors which go to make up "weather" and shows how they are recorded. Also shows a spelling mistake!

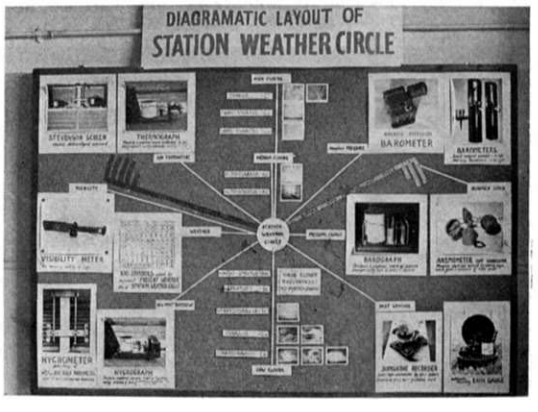


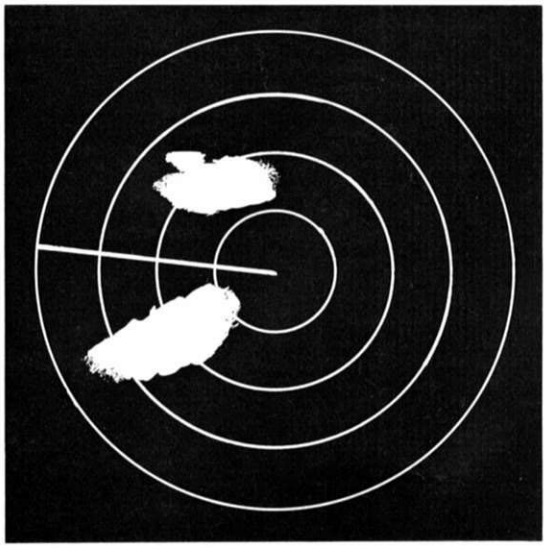
important region as it is believed that many weather systems originate in this area including the cyclones which cause so much damage.

Although pictures showing the movements of clouds are very useful it is planned to use satellites to collect direct information on temperature and pressure. At present reports are very scarce from the oceanic and less developed parts of the world's surface. It has therefore been proposed that automatic reporting stations should be set up—some on land and others on buoys at sea—to record temperature, pressure, wind speed and direction, and store the information so that it can be collected by a satellite for retransmission to stations on earth. In this way a very complete picture could be built up.

Experiments have shown that it is also possible to equip satellites to collect their own information about conditions in the earth's atmosphere. Nimbus III and IV were equipped with infra-red spectrometers which

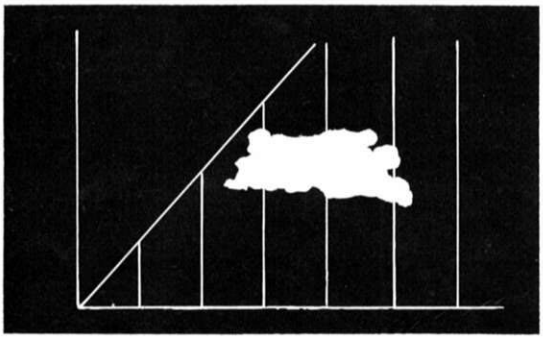






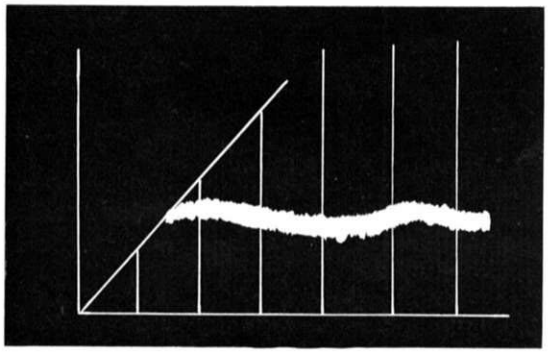
Above, radar P.P.I. display. As the antenna sweeps round, the beam follows it on the display panel. Patches show clouds, circles indicate distance.

Right, the giant radar antenna at Defford used by the Meteorological Research staff. (Note the Landrover in front of it.) This is also used for astronomical work.



Radar R.H.I. display. Distance is shown horizontally, height vertically. Direction obviously depends on which way the antenna is headed.

This display shows air turbulence as "seen" by the giant radar equipment at Defford.

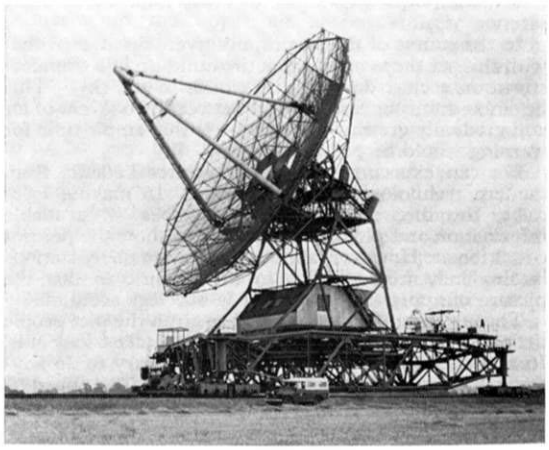


collected data of the temperature at various heights which compared very well with that obtained by radio sondes. If this system can be made completely reliable it will be possible to compile a very complete weather chart.

All these systems are presenting the weather men with more and more information and the modern answer to a great mass of information is a computer—but can you calculate the weather? In fact this problem has been before the experts for many years.

With the growth of knowledge of the movements of the upper air masses it was realised that these move according to the laws of fluids and this suggested that future conditions could be calculated.

In order to do this you have to set up a three-dimensional grid over the area—imagine the area covered with cubes arranged in layers upwards. Then with the necessary formulae you can calculate the movements that will take place over the grids. This was attempted by L. F. Richardson and the results published in 1922. He



took the data for 20th May 1910 and calculated the changes which should have taken place between 0400 and 1000 hours. It was a mammoth venture and it ended in total failure as the calculations showed a change of 145 millibars whereas in fact the barometer showed no change! (Richardson also worked out that to keep ahead of the weather 64,000 trained human calculators would be needed!)

We now know that Richardson used too large a grid and that in fact many more calculations would be necessary. However, we now have computers able to work at lightning speed.

For some years the Meteorological Office has been using computers to produce forecasts at three levels in the atmosphere and these have become so accurate that they have been used for forecasting upper air conditions for pilots. However, the problem is much more difficult when it comes to conditions near the earth's surface because land and sea masses and mountains complicate the problem of air-flow. To cope with these points a new computer capable of calculating data on a 10 level model of the atmosphere is being installed and this is expected to come into action towards the end of this year. With this it is hoped to be able to forecast even the amount of rainfall.

Next time the forecast proves to be incorrect you will know that at least the Met Office has been using every modern device.

Pocket Meccano Competition

"Staggering Success" says 'Spanner'

The lucky winners receive their prizes from Mr. J. D. McHard, Marketing Manager of Meccano (1971) Ltd. From left to right, Mark Knowles, Mr. McHard, Jonathan Thompson and Dixon Upcott. Below, the 11 finalists in the 8-years and under section.

IN my years with Meccano I have seen many things that have surprised me, but never have I been so amazed as by the response to the Pocket Meccano Competition which closed at the end of September—and by response I not only mean the number of entrants, but also the unbelievable variety of models submitted. It was, in short, a staggering success!

Before going into detail, it should be borne in mind just how "miniature" Pocket Meccano really is. Excluding the Instructions Leaflet, the Set contains a grand total of only 68 parts and, of these, Nuts and Bolts account for 47 of them, with a length of Cord serving as another. This leaves 20 "buildable" parts and yet competition entrants used these parts to produce more than 750 *different* models. Yes, *different* models! No two models were identical, although there were, of course, many similar *types* of models in the sense that there were several helicopters, several cranes, several cars, etc., but no two models of a particular type were identical in design.

Obviously, then, we were first of all amazed that so many models could be built with such a small Set, but we were also greatly surprised by the excellent quality of very many of the models submitted and the ingenuity that had been used to build them. Considering the size of the Set, there were no end of models that really looked very much like the objects they represented and there were numerous others which "worked", i.e., models that performed the actions of the originals. There were plenty more that both looked right *and* worked right.

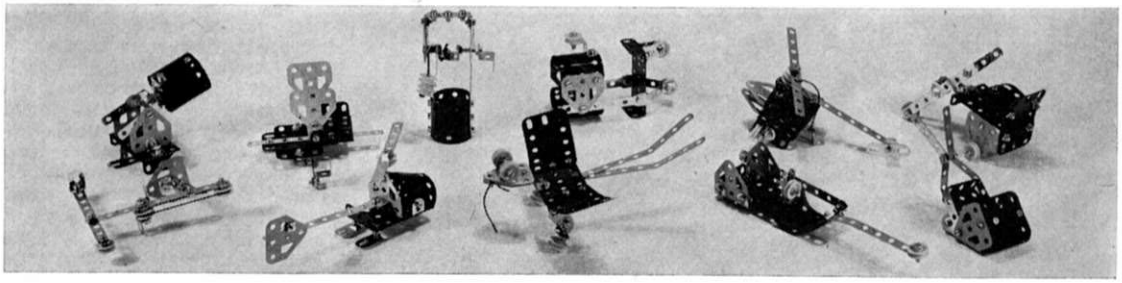
Understandably, a lot of the models entered in the competition were based on the popular Meccano subjects such as cranes, road vehicles, aircraft, etc., but it was surprising how many totally unusual and unexpected creations turned up. There were, for example, a number of birds and other animals—including people—as well as various "fictional" creations drawn from the fertile imaginations of the children who took part. A weird "Meccano Insect", for instance, comes to mind as an example of the last type.

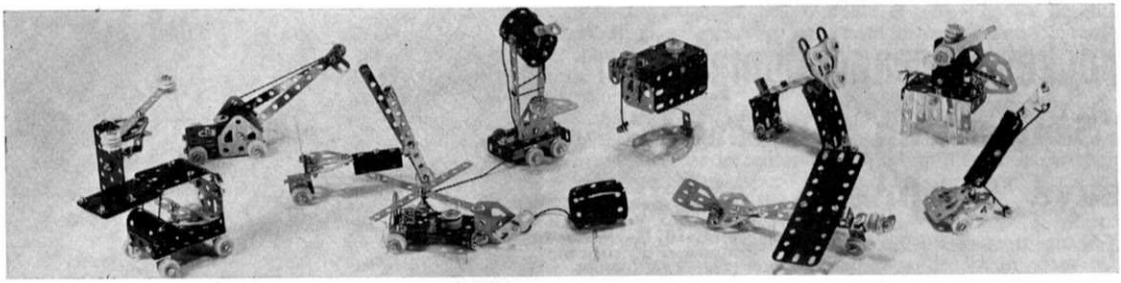
In many cases, the ordinary standard parts contained in the Pocket Meccano Set were put to some unusual and extremely clever uses to achieve successful results. In several models, for example, a Plastic Plate, normally used for cladding purposes, was used as a spring. In others, the Cord was carefully interwoven between parts to secure them together, thus leaving Nuts and Bolts free for other uses. In one model, the Spanner itself was even used as an integral part of the construction! Ingenuity, in fact, was frequently in evidence, so much so that I am prompted to say that, if this competition did nothing else, it proved that the modern youngster is not the television-engrossed "moron" that many people claim, these days!

Judging

In entering the competition, a number of contestants seemed a little worried that the drawing of their model on their entry form was not very good and might therefore prejudice their chances of success. I can put their minds at rest as Meccano in Liverpool used an excellent system to ensure that every entry worthy of consideration received an equal chance of success. When each entry was received, the model-building experts at Meccano were able to tell from even the worst drawing whether or not the illustrated model would stand even the ghost of a chance in the final judging. If it did stand a chance, then the model was re-built at Meccano, exactly as depicted in the drawing, and it was the model which the judges considered—not the drawing. Thus nobody had an unfair advantage.

When the competition closed, all the models for judging were separated into the three competition Sections: 8 years and under, 9–12 years and 13–15 years, then the difficult task of judging began, this being split into two parts. In each Section, a first prize of a bicycle was being offered, with ten runners-up each receiving a No. 5 Meccano Set. This meant that 33 finalists (11 in each Section) had to be chosen and





The final selection of 11 in Section 2 of the competition.

this choice was accordingly made by a primary panel of judges in Liverpool. This primary panel was concerned only with selecting the 33 finalists, however, and was in no way concerned with choosing the overall winners in three Sections

The final winning selections were made at the Glendower Hotel in London by a distinguished panel of judges made up of Mr. N. Hauser, Director of "Toys International" magazine, Mr. E. Simmons, Editor of "Games and Toys", Mr. V. E. Smeed, Editor of "Meccano Magazine" and Mr. T. V. Thomas, Editor of "British Toys". Keeping originality and ingenuity strongly in mind, the judges had an extremely difficult job choosing the winners, but they finally awarded the prizes to the following:

Section 1 (8 years and under), Jonathan Thompson of Lymington, Hants. for his "Prehistoric Bird".

Section 2 (9–12 years), Mark Knowles of Salisbury, Wilts. for his "Small Dog".

Section 3 (13–15 years), Dixon R. S. Upcott of South Harrow, Middlesex for his "Dock Crane".

The ten runners-up in each Section were as follows:

Section 1

Lawrence Broom of Ipswich, Suffolk; John Aidan Byrne of Stockport, Cheshire; Andrew Hill of Boston, Lincs; Matthew Loivis of Godalming, Surrey; Ian Palmer of Horsham; Sussex; Mark Powell of Thurmaston, Leicester; Kenneth Murray of St. Annes-on-Sea, Lancs; Cheryl Rhodes of Pudsey, Yorks; David Stern of Sutton, Surrey; Richard Taylor of Liversedge, Yorks.

Section 2

Michael Belcher of Reading, Berks; Colin Carruthers of Muirhouse Grove, Edinburgh; Philip Chapman of Askam-in-Furness, Lancs; David Ferrisey of Liverpool, Lancs; Timothy Haylett of Poole, Dorset, Gary Reuben Kitchen of Newcastle-on-Tyne, Northumberland; Andrew Norton, Chesterfield, Derbyshire; Gary Middleweek of Sudbury, Suffolk; Anthony Pople of Cheddar, Somerset; David Russel of Mansfield, Notts.

Section 3

Jonathan Green of Scunthorpe, Lincs; Martin Price of Sheffield, Yorkshire; C. J. Barling of Bromley, Kent; Raymond Anderson of Morpeth, Northumberland; Stephen Manthorp of Keighley, Yorkshire; Frances Matthews of Hurstpierpoint, Sussex; Nigel Parsons of Hawkhurst, Kent; Andrew Bell of Stoke-on-Trent, Staffs; James Nelson of Nevilles Cross, Co. Durham; J. C. Steventon, of Upminster, Essex.

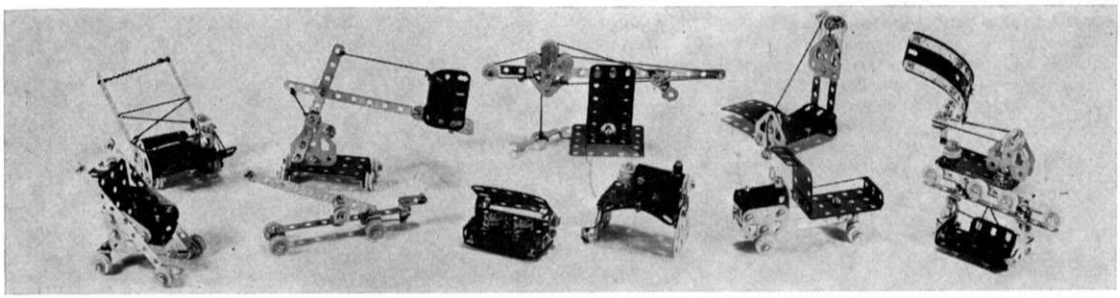
Having myself seen all the models which were built up for the competition judging, I can readily understand just how difficult a task the judges had in choosing both the finalists and the Section winners. In fact, I can honestly say that this is one occasion when I was glad I was not among the judges! I would, however, like to offer my hearty congratulations to all the successful entrants and I am sure they will agree that Pocket Meccano has a great future.

Models to Build

In the coming months we propose to feature quite a few of the models entered in the Competition in the M.M. and it is only right that we should begin here with the three winners. Looking first at Section 1, therefore, we have the Prehistoric Bird designed by 8-year old Jonathan Thompson of Lymington, Hants. The main body is supplied by a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flanged Plate 1, to which two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Plastic Plates 2 are bolted to serve as the wings. The Plates are curved upwards slightly to increase realism and full advantage is taken of their slotted holes to allow a "sweep back" effect. The tail is supplied quite simply by two $4\frac{1}{2}$ in. Narrow Strips 3, bent to shape, and fixed by one bolt through the centre rear hole of the Flanged Plate.

In the case of the head, two Flat Trunnions 4 are bolted to a $\frac{1}{2}$ in. Reversed Angle Bracket fixed through the centre front hole of the Flanged Plate. Note, however, that a Bolt, without a Nut, is carried free in the apex hole of the lower Trunnion, being held in place by the pressure of the upper Trunnion on

Below, the 11 finalists in the oldest age group, 13-15 years.



the bolthead. A short length of Cord is threaded through the slot in the bolthead, this Cord representing a worm! The Bird's eyes are ½ in. Pulleys 5 on ½ in. Bolts, held in the lugs of two Angle Brackets bolted to the Flat Trunnions.

Two further ½ in. Pulleys serve as the feet, each of these being fixed on a ½ in. Bolt held by Nuts in one lug of an Angle Bracket 6. The other lug of this Angle Bracket is bolted, at the angle shown, to a Fishplate which is in turn secured to one or other flange of the Flanges Plate. When the angle of the legs is correctly adjusted, the bird will balance rather nicely on its feet.

PARTS REQUIRED

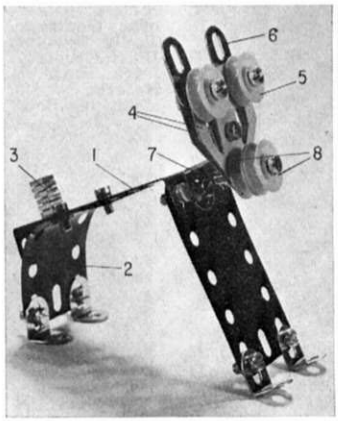
2—10	13—37b	1—125
4—12	1—40	2—126a
4—23	1—51	2—194
22—37a	4—111a	2—235d

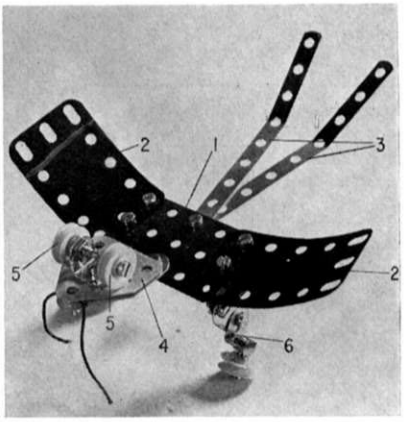
Meccano Dog

"Meccano Woof" is the delightful name which 10 year-old Mark Knowles of Salisbury gave to the Dog which won him first prize in Section 2. I must say that this is a particularly novel model because, as Mark said on his Entry Form, "If you prod the middle of its back, it jumps along." It does, too!

Its back consists quite simply of a 2½ × ½ in. Flanged Plate 1, with the front and rear legs being provided by two 2½ × 1½ in. Plastic Plates. Note that the front Plate is bolted to one flange of Plate 1, with the full length of the Plate serving as the legs, while the rear Plate 2 is bolted to the underside of the Plate 1 and is curved round so that only half the Plate serves as the rear legs. It will be noticed that the Bolts securing the Plastic Plate to the Flanged Plate pass through the second row of holes from the rear end of the Flanged Plate, but through the end holes of the Plastic Plate. Before fitting the Plastic Plate, however, it is advisable to first fit the tail 3, this being supplied by a ½ in. Bolt fixed, shank upwards, in the centre end hole in Flanged Plate 1 and fitted with six Nuts.

Woof's head is built up from two Flat Trunnions 4, bases upwards and placed one in front of the other. Two ½ in. Bolts are passed through the base corner holes of the Trunnions, each of these Bolts fixing a ½ in. Pulley 5 to the front Trunnion and a Fishplate 6 to the rear Trunnion, a Nut being used to space the front Trunnion from the Fishplate. The Pulleys, of course, serve as eyes and the Fishplates as ears.





Left, "Meccano Woof", the jumping dog which gained 1st Prize in Section 2 for Mark Knowles, aged 10, of Salisbury, Wilts., and right, the "Prehistoric Bird" which won 1st Prize in Section 1 for 8-year-old Jonathan Thompson of Lymington, Hants.

At their apexes, the Flat Trunnions are connected together by a ¾ in. Bolt which also fixes in place a ½ in. Reversed Angle Bracket 7 and two ½ in. Pulleys 8, the latter one on top of the other to represent the snout. The spare lug of the Reversed Angle Bracket is bolted to the body of the dog to secure the head in place, then the "paws" are finally supplied by four Angle Brackets bolted to the lower corners of the Plastic Plates.

As Mark said, if Flanged Plate 1 is prodded, the model will jump along, this movement resulting from the flexibility of the Plastic Plates forming the legs. It's great fun!

PARTS REQUIRED

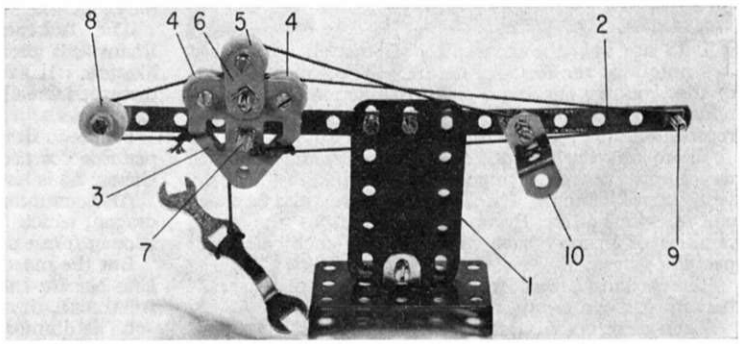
2—10	21—37a	1—111	2—126a
4—12	10—37b	3—111a	2—194
4—23	1—51	1—125	

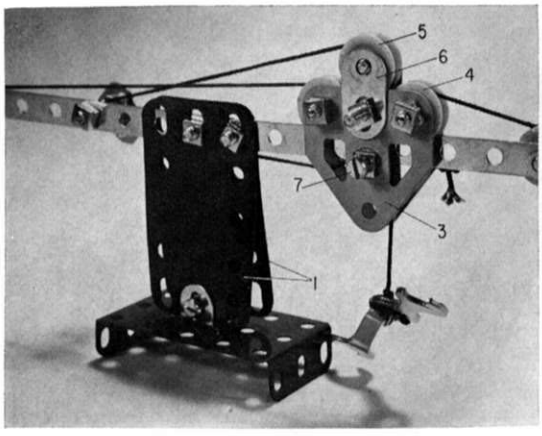
Dock Crane

Last, but not least, we have the Dockside Crane which gained first prize in Section 3 for 14 year-old Dixon Upcott of South Harrow, Middlesex. This is particularly interesting for its working features, achieved by a very clever use of Cord. The body of the Crane is supplied by two 2½ × 1½ in. Plastic Plates 1 which are attached by Angle Brackets to a 2½ × 1½ in. Flanged Plate, forming the base. An 8 in. compound narrow strip 2, built up from two 5½ in. Narrow Strips, serves as the jib, this being bolted between the upper ends of Plates 1 to project seven holes one way and six holes the other.

Running on the longer arm of the jib is the gantry trolley which is built up from two Flat Trunnions 3 connected through their base corner holes by two ½ in. Bolts, on each of which a ½ in. Pulley 4 is mounted, the Pulley being sandwiched between the Trunnions. Another ½ in. Pulley 5 is mounted above the first Pulleys on another ½ in. Bolt held in two Fishplates 6, bolted to the Trunnions. A rather clever stabilising system to ensure that the

A general view of the Dock Crane with which 14-year-old Dixon Upcott, of South Harrow, Middlesex gained 1st Prize in Section 3.





A close-up view of the Gantry Trolley fitted to Dixon Upcott's Dock Crane. Note the stabilising Bolt 7.

trolley remains upright is supplied by two Bolts 7 each screwed into two Nuts, placed one each side of each Trunnion. The shanks of the Bolts, while not gripping the jib, are screwed sufficiently close to prevent the trolley tipping over.

A fourth Pulley 8 is mounted at one end of the jib, while a ½ in. Bolt 9 is fixed at the other end, then a winding handle for control of the load is provided by another ½ in. Bolt, lock-nutted to the jib in the position shown. A ½ in. Reversed Angle Bracket 10 is fixed to the end of the Bolt.

Finally, we come to the Cord arrangement. The load is hoisted on a length of Cord running from the winding handle, over upper Pulley 5 and down through the centre of the gantry trolley. Trolley movement is controlled by another length of Cord which is tied to one side of the gantry trolley, passed around Pulley 8, over Pulleys 4, but under Pulley 5, along and around Bolt 9, to be finally brought back and tied to the remaining side of the gantry trolley. The limitations of the Set prevented a control handle being incorporated, and so the trolley is moved by holding the upper length of Cord, running between Bolt 9 and the Trolley, and by moving the Cord by hand. With load hoisting and gantry movement, therefore, this little model is packed with "play-value".

PARTS REQUIRED

2—10	10—37b	2—126a
2—12	1—111	2—194
4—23	4—111a	2—235d
22—37a	1—125	

The Amazing Lizards of Australia

By Frank Madigan

The Goanna (left) grows to at least six feet. Opposite, the Cape-necked Lizard of the Northern Territory and another goanna, valuable for destroying snakes, mice, and rats.

IT IS not only the marsupials of Australia which are unique in the realm of nature. The Lizard Family of that country, also, can claim distinction, for it contains among its species some of the most amazing reptiles found anywhere in the world.

There are over 300 species in the five distinct families ranging in size from a tiny inch long Skink, to the seven foot Giant Goanna. The Dragon-Lizards, the Geckoes and the snake-like Pygopodes, as well as the other families of lizards, have many strange members with peculiar ways.

The Barking Lizard, for instance, is aptly named, as it barks just like a puppy when disturbed.

Then there is the Australian Frilled Lizard, so named because of the collar around its neck, which is used for storing food, mainly insects, until required.

Another of its peculiarities is that it is able to run on its hind legs at a terrific speed, carrying its body almost erect.

The running feat of the Crested Dragon 'Bicycle' Lizard is even stranger, as it races along moving its hind legs just like a cyclist.

The Mountain Devil Lizard is a frightening looking creature completely covered with spikes, and having two horns, which protect its head. Like its relative, the Chameleon, it eludes its enemies by its ability to change colour to harmonise with its surroundings.

The most colourful lizard is undoubtedly the Painted Dragon Lizard with its coat of many colours. These colours vary from red, yellow and brown to blue.

Dragon Lizards are rather terrifying creatures to look at. One large variety of Bearded Lizards found in the Eastern states have whiskers framing their faces, and for this reason they are sometimes known as Jew Lizards, as they look like shrewd, be-whiskered old Jews.

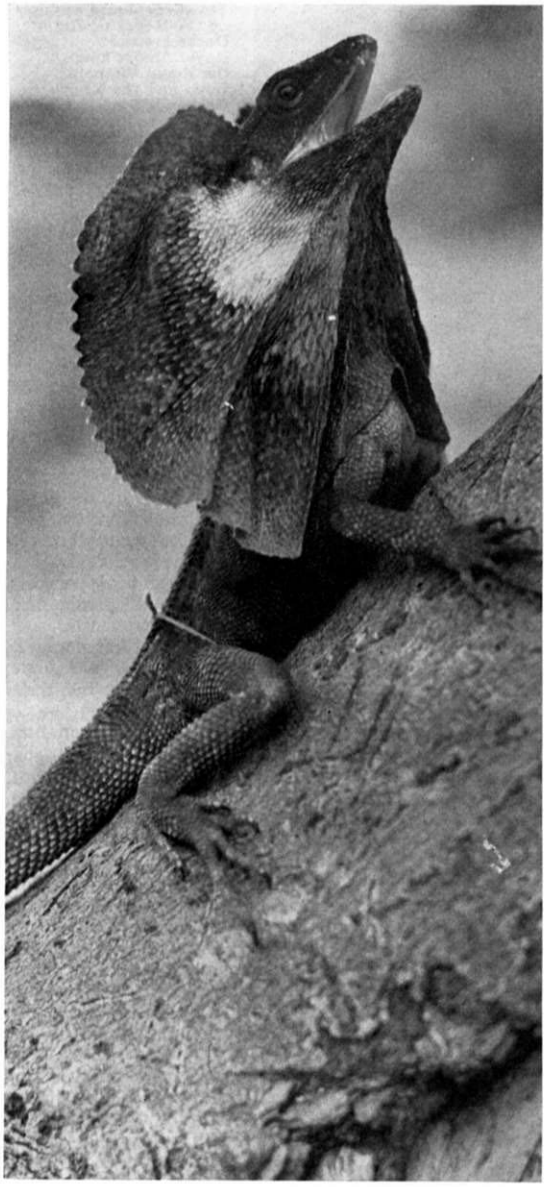
The Water-Dragon Lizard found in Gippsland, Victoria, is about 30 inches long and has a long, whip-like tail. It lives in rocky places near water, and when disturbed usually makes for the water, dives in, and then disappears.

People in different parts of Gippsland have their own pet title for this creature, as he appears to them. At Orbost he is known as the "Snowy River Crocodile".

Also common in Victoria is to be found the little tree-dragon, which is about a foot long. Its natural habitat is open forest places.

But the most amazing Dragon Lizard is described in Life Nature Library book, "The Land and Wildlife of Australia", thus:

"The dimunitive white salt dragon pursues tiny black



dragon ants on the 4,000 square miles of dry Lake Eyre's salt pan. For protection against the glare, its sunken eyes are visored by long, serrated eyelids. Its nostrils are little more than tiny slits as a filter against the blowing salt. For camouflage against aerial reconnaissance, its back is as blanched as the bones of a Diprotodon".

The famous Stump-tailed or Shingle-back Lizard is one of the 100 types of Australian Skink. There are about 600 species of skink throughout the world, but Australia has some of the biggest and oddest of the lot.

The Land Mullet Skink, for example, is the largest in the world, growing to over two feet.

The Stump-tailed is famous, because his tail looks so much like its head and it is hard to tell which end you are looking at. Also, its large scales overlap like the tiles of a roof—hence the name of Shingle-back.

William Dampier, English naturalist, pirate and explorer, in 1688 described the Stump-tailed lizard of the north-west coast:

"Guano's of the same size, same shape with other Guanos described but differing from them. For these had a larger and uglier head and had no tail. And at the rump, instead of the tail there, they had a stump of a tail, which appeared like another head, but not really such, being without mouth or eyes."

Most reptiles lay eggs, but Australia's giant skinks, for the most part, bear their young instead. And their babies are very strong at birth and able to care for themselves right away.

Geckoes are attractive little lizards with nocturnal habits, as indicated by their large eyes with vertical, oval-shaped pupils. One of the most common of the Geckoes is the Thick-tailed Gecko, which measures barely two inches in length, and is coloured chestnut-brown on the upper surface.

These lizards, like other species, have the habit of tail-casting. According to Charles Barrett, "Shedding its tail when captured, or seized by a bird or some other enemy, a lizard may escape, leaving its lost appendage wriggling and squirming, with the enemy. A new tail is grown in its place, but it lacks jointed vertebrae, consisting only of a simple gristly rod."

There are some lizards which do not possess legs, and these are often mistaken for snakes and killed. Their long bodies lack fore-limbs, and their hind-legs are but small pieces of skin.

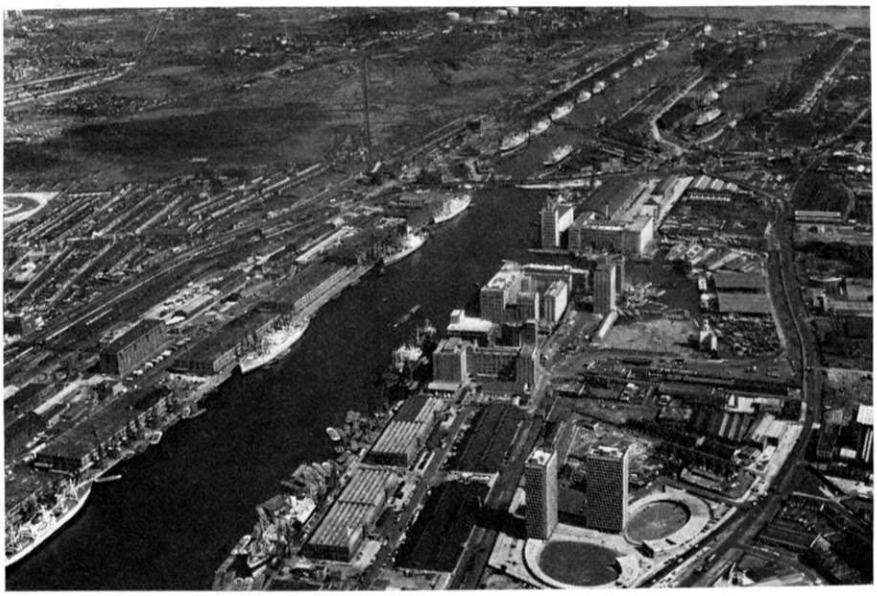
Throughout the world there are 24 great predatory monitors, and Australasia has 15 of them. The largest in the world is the Komodo dragon from Komodo Island in the East Indies which is 10 feet long, and the Australian perentie is next measuring more than 8 feet.

The common name of the monitors in Australia is goanna, and they possess long claws, forked tongues similar to those of snakes, and they are carnivorous.

The Common Goanna or Lace Lizard has its habitat down the eastern areas of Australia, and spends much of its time running up trees in a cork-screw manner, although they are often seen on the ground as well.

The lizards of Australia are not venomous, although the Bearded Lizard of Mexico and the Gila Monster also of Mexico and United States are known to be venomous.

The most amazing lizard to be found in Australia is the Elastic Lizard of Central Australia. Its skin is elastic, and when it is grasped, this skin stretches until it finally slips from the fingers, then flies sharply back into place.



The three docks making up the Royal Group of Docks are the Royal Albert Dock, the Royal Victoria Dock and the King George V Dock. The three together form the largest sheet of impounded dock water in the world, a total of 230 acres, with a depth ranging from 34 to 38 feet. There are 11 miles of quay and 52 deep-water berths. The Royal Docks on their own form the fifth largest port in the United Kingdom in terms of shipping tonnage. (*All photos courtesy Port of London Authority.*)

THE PORT OF LONDON

By TREVOR HOLLOWAY

WITHOUT the Thames there is no reason to suppose that London would ever have existed—certainly not as a capital city with one of the largest and busiest ports in the world. That London does exist is mainly due to a bed of gravel that crossed the river near the site of London Bridge.

That bed of gravel may be said to have been the most vital area in the whole of Britain. The Thames in prehistoric days was much broader than now and flanked by impassable marshes which prevented access to the river itself, except at one or two places. The bed of gravel provided the first ford on the journey upstream, and doubtless its presence was a determining factor in fixing the first settlement.

In pre-Roman times the inhabitants of the south-eastern section of Britain traded with the Continent of Europe, mainly via the old south coast ports of Lympne and Richborough. The shortest route from the rich agricultural areas of East Anglia to the coast was by way of the ford. It thus became the focus of many trackways where traders met, and gradually a settlement became established.

The Romans were quick to appreciate the value of London as a port. Being situated many miles inland, its approaches could be easily protected. Furthermore, the estuary of the Thames is directly opposite the mouths of the three great Continental rivers—the Elbe, Scheldt and Rhine.

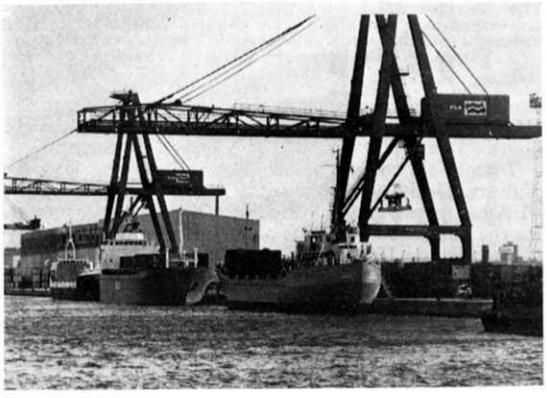
As early as A.D. 30, London had a substantial export trade with the Continent—skins, slaves, hunting dogs, corn, cattle and precious metals—which were exchanged for ivory, amber, jewellery, glassware, pottery and household articles. A document prepared towards the end of the Roman occupation mentions that London was "a great and wealthy city". In A.D. 359, some 800 cargoes of grain were exported to storehouses on the Rhine.

The importance of London as a port grew as the centuries passed. Unrest in the Low Countries during the 16th century resulted in London becoming the commercial and financial centre of the world, at the expense of Antwerp. The formation of the East India, the Hudson Bay and similar companies, greatly fostered the port's trade. A Bill for the construction of a 10-acre wet dock was given Royal Assent in 1696. The Howland Dock, as it was called, was the nucleus of the recently closed Surrey Commercial Docks.

Between the years 1700 and 1770, the trade of the port doubled, then doubled again between 1770 and 1795. So great was the congestion of shipping that had not Parliament authorised a new dock on the Isle of Dogs, merchants would have carried out their threat to divert shipping to other ports.

Some idea of the appalling congestion at the end of the

The Tilbury Grain Terminal provides one of the world's most advanced grain-handling facilities, able to discharge bulk carriers up to 65,000 tons d.w. with a maximum degree of automation at a rate of 2,000 tons an hour. During its first year in operation nearly 1½ million tons of grain were handled.



The new Tilbury dock extension, which has added nearly two miles of deepwater quay and makes Tilbury the leading British port for utilised cargo handling.

The Port of London building in Trinity Square, administrative headquarters of the Port of London Authority.

18th century may be gathered from the fact that in the Upper Pool 1,775 vessels were accommodated in a space designed for only one-third of that number. Quays and wharves were pitifully inadequate and goods often lay in lighters for weeks on end.

River thieves reaped rich harvests. Highly organised, they rejoiced in such designations as Light and Heavy Horsemen, Scuffle-Hunters, Mudlarks and so on. It was estimated at least one-third of the cargoes on the Thames fell into the hands of the river thieves. Whole strings of barges would be cut adrift and towed to some secluded creek for unloading. Sometimes, heavily armed gangs would board a vessel, take over command and head for the Continent or some other convenient destination.

Merchants demanded greater security for their cargoes and the Marine Police was the result. It was a permanent force of eighty hand-picked men armed with cutlasses and blunderbusses and equipped with twenty rowing boats.

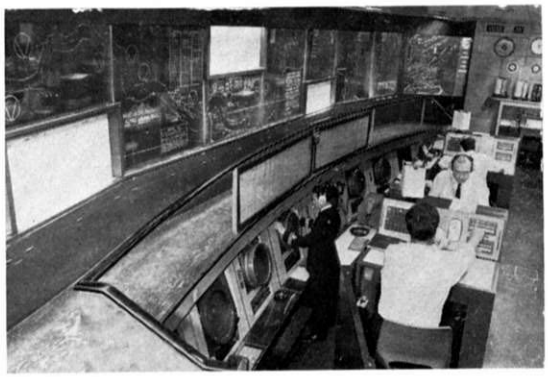
Within twelve months the Mudlarks and their associates had learnt to dread the efficient new force with their pigtails and cheese-cutter hats, whose daring and toughness was greater than their own. Over 2,000 river pirates were captured during the first year.

The 19th century was a period of continuous dock building, amalgamation and adjustment and so it continued until the Port of London Authority was established in 1909, charged with the task of improving accommodation, services and equipment. Initially, over £20 million was spent on this immediate work. King George V Dock was built and opened in 1921 and improvements carried out in the other docks. A systematic dredging programme to improve the navigable channel was also carried out.

Today the PLA controls and superintends the river and its traffic from the beginning of the tidal waters at Teddington to the outer limits of the Estuary, a distance of 92 miles, representing one of the world's busiest waterways and largest commercial ports.

Within the Port are three large enclosed dock systems —India and Millwall, Royals, and Tilbury, with a total area of more than 2,500 acres. The East India, London,

The India & Millwall Docks are situated on the Isle of Dogs, bounded on three sides by the great sweep of of Limehouse, Greenwich and Blackwall Reaches. Some 40 shipping companies based on the India & Millwall Docks operate regular services between London and America, E. and S. Africa, the West Indies, Scandinavia, the Mediterranean ports, the Persian Gulf, the Middle East, the Far East, the Canary Islands, Spain, Portugal, Italy, Yugoslavia, Bulgaria and the Continent. The main imports are green fruit, vegetables, softwood, hardwood, wine, paper pulp and boards, hides and skins, canned goods, rubber, hemp and manufactured goods from the Far East.



The Thames Navigation Service (T.N.S.) building at Gravesend uses radar and other modern equipment to give up-to-the-minute information about the tideway to ships fitted with the necessary V.H.F./R.T. receivers.

St. Katherine and Surrey Commercial Docks were closed in turn between 1967 and 1970.

The Royal Docks have a water area of 230 acres—perhaps the largest sheet of impounded dock water in the world. With a depth of water of up to 38 ft. they can receive some of the largest general cargo ships of the world. Approximately three million tons of cargo are handled by this group of docks every year.

Of special interest at the Royal Victoria Dock is No. 4 berth where a shed 700 ft. long, 200 ft. wide and 65 ft. high gives an unimpeded working space of 140,000 square feet.

The India and Millwall docks is the most upriver group operated by the PLA. These docks are used by ships trading between U.K. and Scandinavia, Eastern Europe, Spain and Portugal, the Canadian Lakes, the Mediterranean, East and South Africa, the Caribbean, the Persian Gulf and the Far East. An extremely wide range of cargoes is handled, including fruit.

No. 19 Shed is one of the most advanced transit-warehouse sheds in the country. It has been designed as a transit shed at ground and first-floor levels, with warehouse accommodation on the second floor. An elevated roadway gives lorry access to the first floor, and undersurface heating ensures an ice-free surface in winter. Import vessels can follow one another on to the berth in quick succession by discharging to alternate floors.

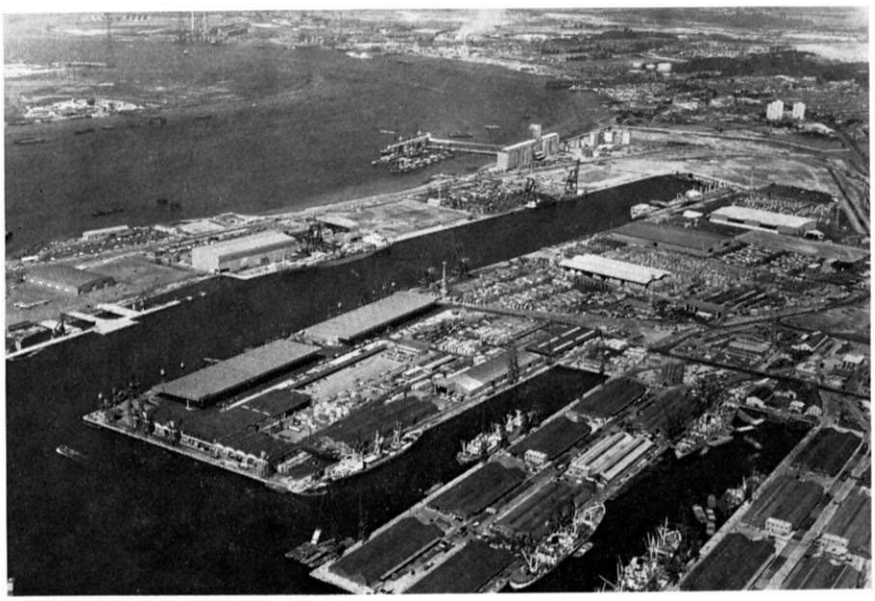
Twenty-six miles below London Bridge are the Tilbury Docks where, during the last few years, the PLA has invested over £30 million in providing facilities for the most modern forms of cargo handling. Developments include 13 new berths, new sheds, road and rail links, and modern equipment for the fast handling of container and unit-load cargoes.

Another feature of the Tilbury development has been the building of a £6 million grain terminal on the riverside. It is one of the fastest discharging installations of its kind in the world—rates up to 2,000 tons per hour are achieved on unloading large bulk grain carriers. The shore-based silo building has a capacity of 100,000 tons.

To ensure safe movements of ships, which number about 1,000 per week, the PLA maintains the Thames Navigation Service which uses radar, radio and remote reading tide gauges. From its stations at Gravesend and Gallions Reach (near the Royal Docks) half-hourly VHF broadcasts go out to all shipping, giving up-to-the-minute information on conditions in the tideway, weather, visibility and other matters affecting navigation. Radar watch is kept over 50 miles of the commercial tideway, ensuring the safety and smooth flow of shipping, especially in low visibility, so that no longer does fog bring the port to a standstill.

The average total annual tonnage of cargo handled in the Port of London as a whole is 60 million, of which approximately half is oil and oil products. 48 million tons of the total are imports, the remainder being exports and trans-shipped cargo.

There are over 41,000 shipping movements in the port each year. The net registered tonnage of shipping using the port is nearly 85 million, of which nearly 13,000 ships of 28½ million NRT entered and left the PLA's enclosed docks.



The actual berth development which cost £20 million of the £30 million scheme for re-development at Tilbury provided thirteen berths—six for container traffic, three for utilised forest products, two for roll-on roll-off traffic and two for mechanically handled general cargo. Other developments included a grain terminal, a rail container terminal and new impounding station.

Milestones and Mailcoaches

STAMPS

By J. A. Mackay

TWO hundred years ago a letter posted in Bath on a Monday would not be delivered in London until the Wednesday afternoon—a deplorable situation to which, despite enormous technical advances in recent years, we have now returned. Why letters from the West Country to the metropolis should take so long nowadays is perhaps too complicated to explain. In the 1770s the answer was simple—the post-boys (who could be anything from nine to ninety) adopted a "go as you please" attitude. The system of relays of post-horses and riders dated back to early Tudor times and though considerable improvements had been made to the roads since that time, the postboy system was as slow and unreliable as ever. At the foot of the letter waybill which each rider carried was printed this sinister warning:

"This Mail must be conveyed at the Rate of Six Miles in the Hour at least. And if any Post-Boy or Rider conveying this Mail is found loitering on the Road he will be committed to the House of Correction and confined to hard Labour for one Month."

In 1782 John Palmer, a theatrical manager of Bath, proposed that the mail should be carried by coaches and two years later, on August 2nd 1784, his scheme was put into practice. The project was an immediate success and was rapidly extended to other parts of the country. The mail-coaches, in their attractive scarlet and blue colours, drawn by four horses, were a popular sight in Britain for almost a century until the spread of the railway system rendered them obsolete. Nevertheless, such is the nostalgia for the old coaching days that many of these handsome vehicles have been preserved and are brought out occasionally for trial runs. No British stamp has yet depicted a mail-coach, though a 3d stamp of 1960 shows one of the mounted post-boys whom they superseded.

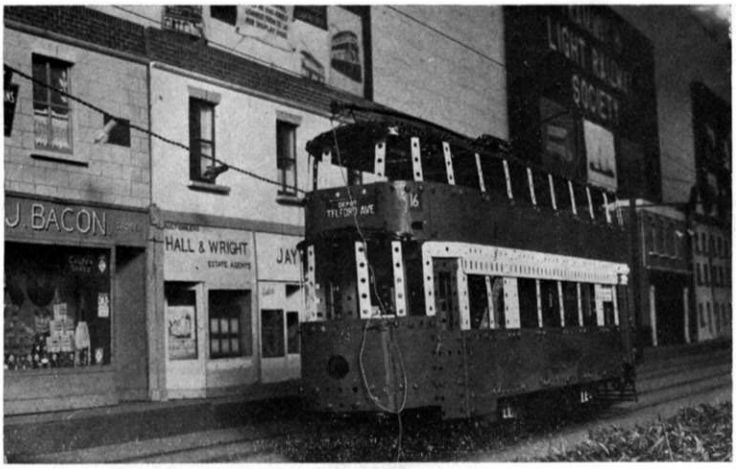
Mailcoaches have been featured on the stamps of many other countries. Two stamps with this theme appeared recently in the same week from two different countries. On September 28 Sweden added a 1.20 kronor stamp to the definitive range and chose as its subject a painting by Professor Eigil Schwab, now in the Post Office Museum in Stockholm. The painting shows a nineteenth century mailcoach drawn by three horses in line abreast.

The combined transport of passengers and mail required good roads. On the Continent such roads were really to be found only within the borders of the former Roman Empire, even by the close of the Middle Ages. Mail-coaches were used in Europe long before they were adopted in Britain, the first mail-coach route

being between Prague and Leipzig in 1585. The first Swedish mail-coaches were introduced in 1680, but not in Sweden itself. At that time the district of Pommerania (now part of the German Democratic Republic) was a Swedish dependency and it was there that mail-coaches were introduced at first. The earliest mail-coach route in Sweden itself was established about 1720, between Stockholm and Gavle.

The Swedish Post Office took over the mail-coach system in 1850 and ran a service from Ystad to Helsingborg via Malmo, but by that time the railway network was being rapidly extended. Mail coaches were used until 1870, after which date they were gradually phased out and mail conveyed by rail. The last Swedish mail-coach ran from Gothenburg to Varberg in 1888. The pictorial handstamp used on First Day covers bearing this stamp reproduces an old Swedish milestone. On it is engraved the royal crown and the monogram of King Gustav III, with the inscription 1 MIL. Old milestones of this type are still a familiar sight along the roads of Sweden.

On October 5 the German Democratic Republic issued two stamps to mark Philatelists' Day. The 10 + 5 pfennig stamp shows a Tupolev 134 airliner of Interflug (the state airline) loading from a mailvan. By contrast the 25pf stamp depicts an eighteenth century mailcoach and a milestone of the same vintage. The mailcoach is the type known as a Geometric Wagon, invented by Adam Friedrich Zurner (1679–1742). Zurner, a Lutheran pastor, later became Provincial Geographer (government surveyor) and was largely responsible for the accurate measurement of the roadways in the kingdom of Saxony. The intricate milestone shows the distances in old German miles from the town of Mittweida to other towns and cities of the kingdom. This interesting old milestone is now preserved as a historic monument. It is interesting to note that the old Saxon post or police mile measured 9.062 kilometres (or more than five English statute miles). If a mile is regarded as being one thousand paces, one can only assume that the Saxons of days gone by were very long in the stride!



TRAMS IN MECCANO

'Spanner' introduces an interesting article which appeared in "Southern Transport Gazette"

"WHEN this article was written," says 'Spanner', "it was not aimed at the dedicated Meccano fraternity, but at readers of the "Southern Transport Gazette" who are made up primarily of model railway and tram enthusiasts. For this reason, several suggestions and methods of construction are described upon which the serious Meccano man might well frown and which will give terrible nightmares to a number of Meccano purists I know! In some cases non-Meccano parts are used and there are even plans for a complete non-Meccano assembly. I make no personal comment on any of these points as the article was not written with M.M. readers in mind and, in any case, the Meccano enthusiast will be able to modify accordingly, but I reprint the article with few omissions because it is readable and very interesting. I hope you will agree".

¾ INCH SCALE TRAM BUILDING IN MECCANO

by NORMAN MATTHEWS
Photos. by Roy Makewell
Reprinted from the
"Southern Transport Gazette'

It all started with Richard III. That is to say, someone gave my third son, Richard, a large box of Meccano.

After a period of making various models, I persuaded him that we could make a ¾ in. scale model of a London Transport Routemaster bus, complete with tyred wheels and Ackermann steering.

Having acquired a scale drawing of the vehicle we set to work to make this as nearly as possible to correct proportions within the limitations of the ½ in. spaced holes of the Meccano, e.g. the width of an eight foot bus in this scale should be 6 in., but, as the main plates were 5½ in., this size was adopted although it was "pulled out" as far as the slotted angle girders would allow to make it as near to 6 in. as possible.

The result is shown opposite and although it leaves a lot to be desired (have you ever tried to get a 'domed' effect for a roof with Flat Plates?) we think that it looks reasonable for a Meccano model.

The steering gear is on the Ackermann principle and has a 5:1 gear ratio, see photo. For ease of operation the steering column can be extended through the roof by coupling up a 11½ in. Axle Rod to the main steering wheel!

After a while the novelty of this 'push and steer' operation wore off for son No. 3 and as we had plenty of Meccano left over, our thoughts turned towards (or rather Dad's tramway enthusiasm suggested) making an L.C.C. tram which could be fitted with means of propulsion.

A ¾ in. scale plan of an H.R.2 was obtained and work commenced. Although we had stacks of Meccano parts, much of it was, of course, too long or too short for what we required, so even more had to be purchased. We obtained them from Jeremy's of Princes Arcade, Piccadilly, London, who keep a complete range of parts in stock.

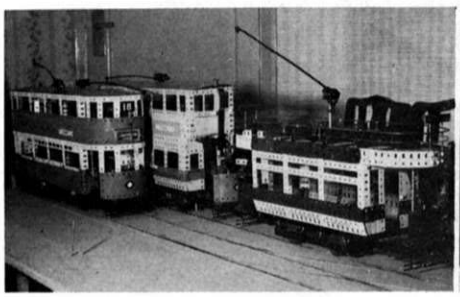
Here again, the body was constructed as nearly as possible to scale within the limits of Meccano and although the 5½ in. Plates in this case made the model a fraction too wide, the finished effect appears reasonably well proportioned as may be seen.

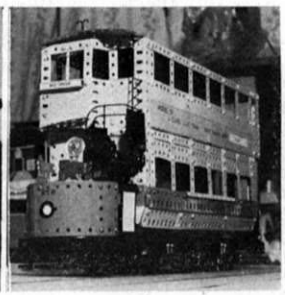
Construction Details

To build an acceptable model in this medium, certain compromises have to be made:

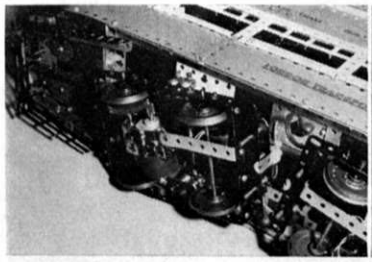
(a) Small details must be omitted or made up from other material.
(b) The largest possible Strips, Girders and Plates should be used to ensure the minimum amount of joins, overlapping, etc., which gives a patchwork quilt effect.
(c) Certain modifications must be made to avoid a clumsy appearance.

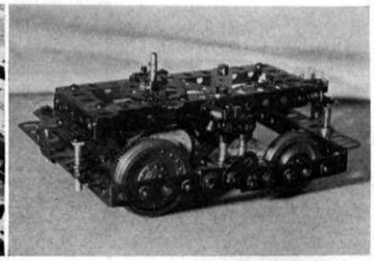
With regard to (a), while much of the detail has been omitted, essential items such as lifeguards, handrails, trolley arms and wheels, destination





Far left, a scene at the terminus of the author's tram layout. Left, an L.U.T., "U"-type Tram also produced by the author. Heading picture shows a Feltham Tram which was completed after the author had finished the article.





Right, an underside view of the H.R.2 showing one of the bogies. There are some things here which will cause the dedicated Meccano man to raise his eyebrows. Far right, the final and most successful U-type bogie, painted up for original colour-scheme realism.

boxes etc. have been made up from other materials.

An example of (b) is that for a tram side panel, one $12\frac{1}{2} \times 2\frac{1}{2}$ in. Strip Plate looks infinitely better than three $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plates joined together.

With reference to (c), when making the H.R.2 it was found that the correct projecting windscreen would have entailed so many odd Strips and Nuts and Bolts that the finished result would have been ugly, clumsy and very heavy—so a flush front was decided upon.

However, now to get down to building hints. Having acquired the scale drawing and measured up the lengths required, we constructed the basic framework of the body with Angle Girders, making certain to get it absolutely square. Incidentally, if Angle Girders are not supplied in the lengths required we would recommend using a larger size and cutting them down to size with a hacksaw rather than joining shorter ones as this leads to uneven sides and other complications. Further, we found it better when cutting several Angle Girders to cut the whole lot at once, bolted together, as this method is much quicker and more 'certain'. Warning—do not forget to round off the sharp corners and file the rough edges or you will wonder where the blood is coming from when you start to use them!

The main body can then be built up as required using maximum size plates as mentioned above. Flush sided bodies can have $2\frac{1}{2}$ in. wide plates for side panels and be built $5\frac{1}{2}$ in. wide, see Fig. 4. Older types can have side panels made from two Flat Girders built up from a $4\frac{1}{2}$ in. width base spreading out to a $5\frac{1}{2}$ in. wide body. Of course, at times it is necessary to join plates together and it is preferable to make these where a pillar occurs if possible. Incidentally, although Plastic Plates can be used which have a weight (and cash) saving advantage, we found that Strip Plates and Flexible Plates are preferable.

For the strips between windows, the Meccano Narrow Strips might be more true to scale, but these are generally more expensive and might lead to complications. We did, however, use $\frac{1}{8}$ in. Birdcage punched bar for effect in the lower saloon, top windows of the H.R.2.

Other items can be made up as follows:

Fenders—Circular Girder $5\frac{1}{2}$ in. (Part No. 143) cut in half.

Controller—Pair of $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flanged Plates (Part No. 51) with detail added.

Brake Wheel—Curtain Ring, 1 in., with six spokes soldered to $\frac{5}{32}$ in. Brass Tube.

Brake Handle—$\frac{1}{16}$ in. Brass Rod.

Trolley Arm—$\frac{1}{16}$ in. Steel Rod inside plastic covered sprung curtain wire (Woolworths) painted black.

Headlamp Frame—Fibre Washers $\frac{1}{2}$ in. internal; $\frac{3}{4}$ in. external; with three card fixing lips added.

Handrails—$\frac{1}{16}$ in. Brass Rod with ends wrapped round protruding 4BA screws and "Evostuck".

Destination Boxes—Two plastic Wilkinson Razor Blade holders, sawn in two offset halves and glued together giving the correct size and completed with 'blind' and glass. A piece of strip wood was glued to the top to give the correct proportions and added strength. Several coats of French Polish simulate polished wood and the boxes were recessed into an oblong hole cut into body. Destination 'card' can then be slid in and out as required.

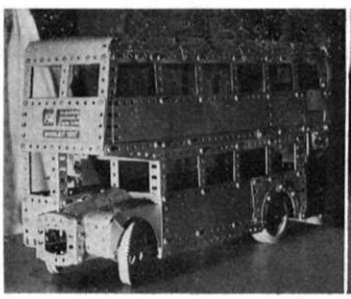
Route Board Holders—Hamblings 'OO' gauge fishplates slightly opened out.

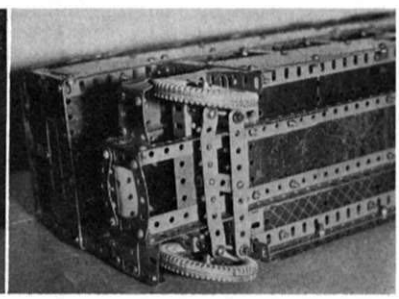
Route Boards—Slaters Plastikard rubbed down. UNO Stencil lettering.

When the first body was completed, our thoughts turned to the bogies. Meccano Flanged Wheels were found to be the incorrect size and were unsuitable as they rode unevenly—probably because they are stamped out instead of being turned up. After a good deal of hunting around we discovered suitable castings ($2\frac{1}{2}$ in. gauge Coach Wheels from Stuart Turner's) and asked a friend to turn these up to T.L.R.S. standards.

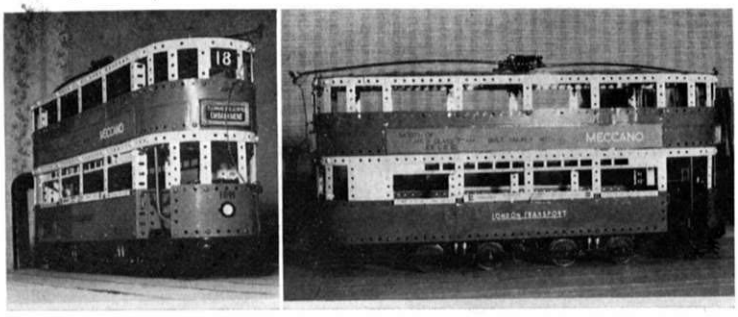
A pair of simple, unsprung, bogies was made with disastrous results—derailments unlimited. The wheels, on $\frac{5}{32}$ in. steel axles, run in brass bearings (Double Arm Cranks —Part 62B with Grub Screws removed to act as oil holes) which are bolted to the bogie frames. Many different bogie arrangements were tried out before we hit on the correct answer. Slotted Strips and Angle Girders were used at first to allow the axles flexibility, but this proved unsatisfactory and looked extremely clumsy. The only alternative was to spring the bogie frames themselves and give complete independent suspension, while still keeping the 'bearings' true with the axles.

The final result consists of 'U'-shaped ends rigid to the axleboxes with a 'floating arm' in the centre pivoted at each end where it joins the 'U' axle section. Inner frames were then made up to hold the bogie swivelling gear and the motor and these are connected by eight compression springs (Part 120B) to the outer frames—two at each end and two on each side as shown above.





Right, an early attempt at a Routemaster bus. Far right, an underside view of the Routemaster Bus showing the steering arrangement.



Left, a side view of the completed H.R.2 showing its realistic proportions.

These have proved very successful and have worked satisfactorily both at home and on the T.L.R.S. layout at Clapham Museum.

The Track

On completion of the first car, all we had to test it on was a ten foot length of Meccano (Angle Girder) track. This was not very satisfactory, was extremely expensive and moreover we wanted these 18½ in. Angle Girders for the next tram (L.U.T.—'U' type).

Brass flatbottomed rail was far too expensive so we bought some ⅛ in. × 1/32 in. strip brass from Smiths, the wholesalers, St. Johns Square, London, a quantity of ⅛ in. punched birdcage (tinned steel) strip from Romany's, of Camden Town and a fair quantity of 2 × ½ in. and ¾ × ½ in. hard wood from our local wood shop.

Having built seven scale miles of 'OO' track in our early days, most of which was on the 'soldered rail to metal sleepers' principle, it was decided to use this system for the track, although using the birdcage strip as 'chairs' instead of sleepers.

The general idea is to make up a framework for the track with 2 × ½ in. battens under the running rails screwed to 2 × ½ in. cross supports about every two feet and ¾ × ½ in. between each main cross support. Draw the track lines on the longitudinal battens and nail short lengths of punched birdcage strip about every two inches to form the 'chair' base plates. The ⅛ in. square brass can then be soldered to the baseplates to form one rail. The second rail can then be soldered down with the aid of a jig. WARNING—It should be noted that sometimes there is a slight twist in the brass section. This must be 'detwisted' before using. We overlooked this point in one section and hoped that the finished soldered joints would be enough to hold it—we were wrong!

The 'check' rail can then be added using the ⅜ × 1/32 in. brass strip which is soldered in the same way using a strip of ⅛ in. wood to give the correct clearance from the running rail.

We have built a 'jig' for making up curved track baseboard and a useful 'radial arm' for drawing large radius curves can be made by joining a few long strips of Meccano together and having a pencil at one end and a pivot at the other.

Points and Crossings are quite easy to make if drawn out on the baseboard and the gauge rigidly adhered to.

Finally, the 'road' can be filled in using ⅛ in. hardboard. This hardboard rests nicely on the birdcage strip, but where the 'road' meets the rails, the underside of the hardboard should be chamfered to allow for the soldered joints. If a 'road' is provided parallel to the track it should be pinned down to the longitudinal batten at the gutter and in this way a slight camber will be formed which adds to the realism.

Filling in road with hardboard on straight track is easy but for curves and points we found the best method was to get some stout paper or thin cardboard and press it firmly over the track. This makes an imprint on the card which can be cut out and used as a template to mark the hardboard. It is advisable to keep the curved track road 'fill-in' sections short as the thin card tends to spread.

For points, it is as well to have a short removable section of road between the tracks screwed down so that the mechanism or spring is easily accessible.

In conclusion, we must say that the construction of the trams and the track has been most enjoyable. There must be many like ourselves who have a restricted amount of time, cash and modelling ability but who would like to have a working tramway.

To these we would say—have a go with Meccano!

TALE OF TWO CITIES (*continued from opposite page*) are thought to have been buried here, re-interred in the late eighteenth century from hundreds of graveyards in the centre of Paris in order to clear valuable land for building and reduce the risk of polluting the underground water supply.

It was the Romans who laid the foundations for the underground city by quarrying stone for their houses in the village of Lutetia. Paris and the quarries grew hand in hand. The oldest parts of the cathedral of Notre Dame, the Church of St Etienne and the Louvre were all built from stone mined beneath the expanding city. The myriad tunnels created have been a sanctuary for all kinds of villains and heroes, from the desperate refugees of the French Revolution to the Resistance fighters of the Second World War, who could literally be called the "French Underground"!

Today, one thousand million people travel beneath Paris every year—on the Metro, the underground railway. Fulgence Bienvenue was attacked from every side when he first proposed the building of a subway. Some said it could not be built, that it would undermine the foundations of the city, that if it were built no one could use it because of the risk to health caused by the damp, foul air. But the Metro was completed and is now one of the world's busiest underground railways.

Today's inhabitants of the City of Darkness are the eight hundred men who patrol and maintain the sewers. It is a perilous occupation. Their mole-like existence is a hazard to eyesight and lungs, and there is the ever-present danger of rain which can flood the tunnels to the roof in minutes, so every fifty yards there is an escape ladder to the surface.

Modern engineering skill and knowledge mean that underground Paris can now be on the move again. There are plans to build a network of roads to relieve traffic congestion above ground. Already, nearly thirty subterranean car parks have been built. It could mean that the underground city, simply begun by the Romans, points the way to the future development of densely populated towns—one city on the surface with its identical twin lying beneath.

A TALE OF TWO CITIES

BY

JOHN RUFFELS

Photos: Courtesy of the French Government Tourist Office

PARIS has been nicknamed the "City of Light", but there is a second Paris which might well be called the "City of Darkness". For underneath the five thousand brightly lit avenues of Gay Paree lie another thousand miles of gloomy roads, tunnels and wide sewers, an entire subterranean city, an engineering wonder of the past and present.

In 1813 the authorities were forced to ban any further quarrying or tunnelling to prevent Paris from disappearing altogether into a gigantic hole. Today, two thousand acres of the city stand over a hollow. In the past whole streets have been swallowed up in the void; only ten years ago a block of houses collapsed into a gaping hole when the columns of gypsum they stood over disintegrated. There is an official map of the honeycomb city called the Underground Atlas of the Quarry Inspection Service which must be scrutinised by every architect and builder who plans to raise a new construction in Paris.

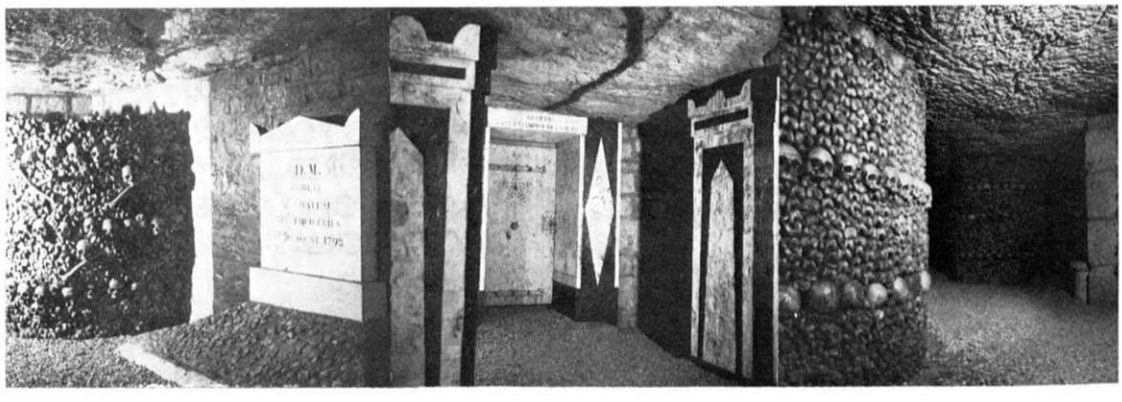
This unique underworld can offer sights as fascinating as anything seen in its reflection on the surface. The streets of sewers were made world famous by Victor Hugo in his novel "Les Miserables", in which the hero Jean Valjean, an escaped convict, races through the dark tunnels in fear of his life. The twelve hundred miles of sewers all have their names displayed on street signs, just like their surface counterparts. Attached to their walls are sixty miles of steam tubes conveying heat to large buildings, two hundred and forty miles of pipes carrying special delivery mail, five hundred miles of compressed air pipes and two million miles of telephone and telegraph wires.

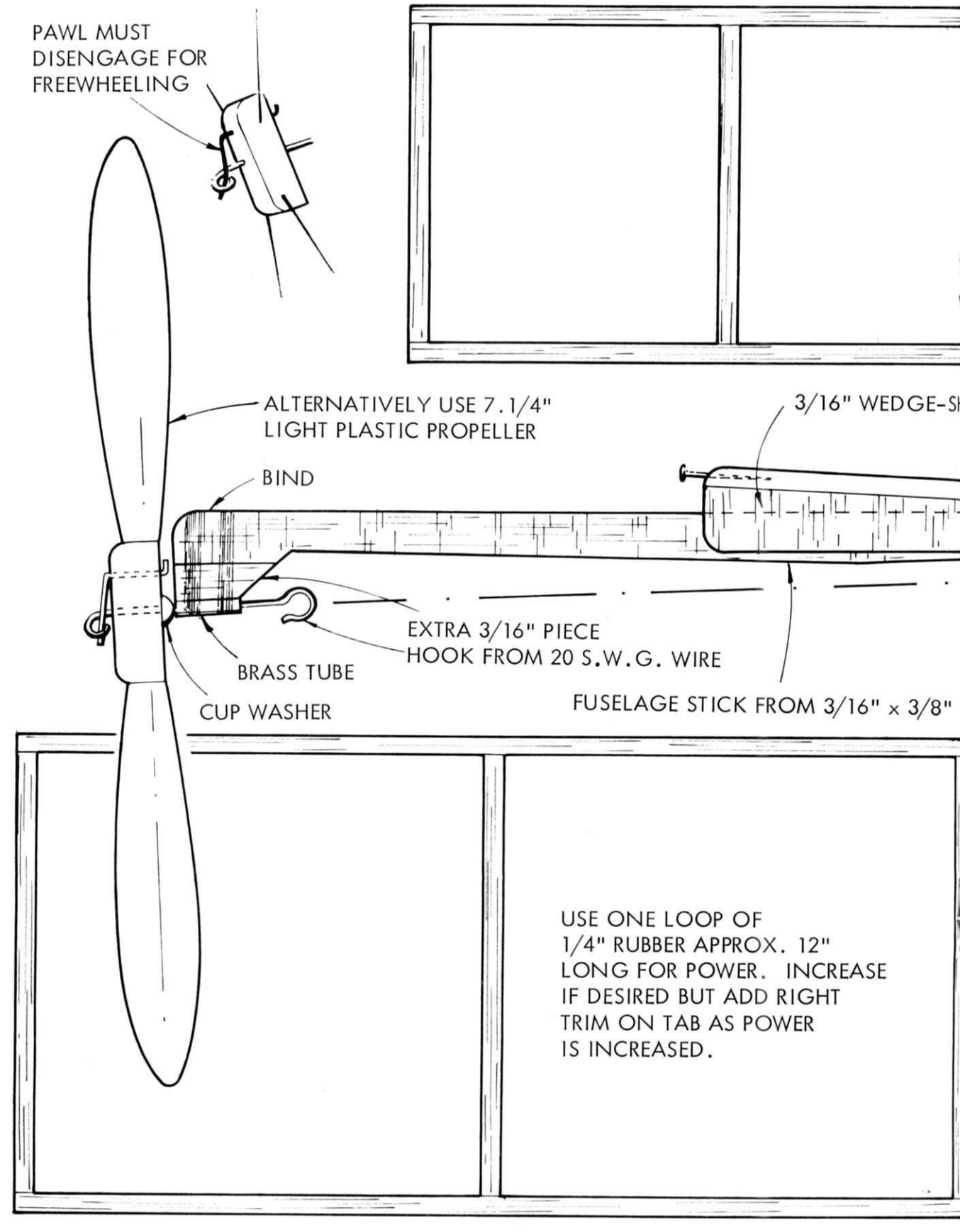
There used to be thirty thousand springs and wells underneath the city and over one hundred still exist. There is mineral wealth too; lignite under the Place de la Montsouris, sulphur under the Place de la République, manganese under the Place de la Concorde, and oil in several parts of the city. There are rich archeological finds too, Roman villas, ancient churches carved from the limestone, spas and market squares, large arenas where Christians once fought lions, the skeletons of prehistoric animals such as the hairy mammoth, and the world's largest cemetery, the famous Catacombs.

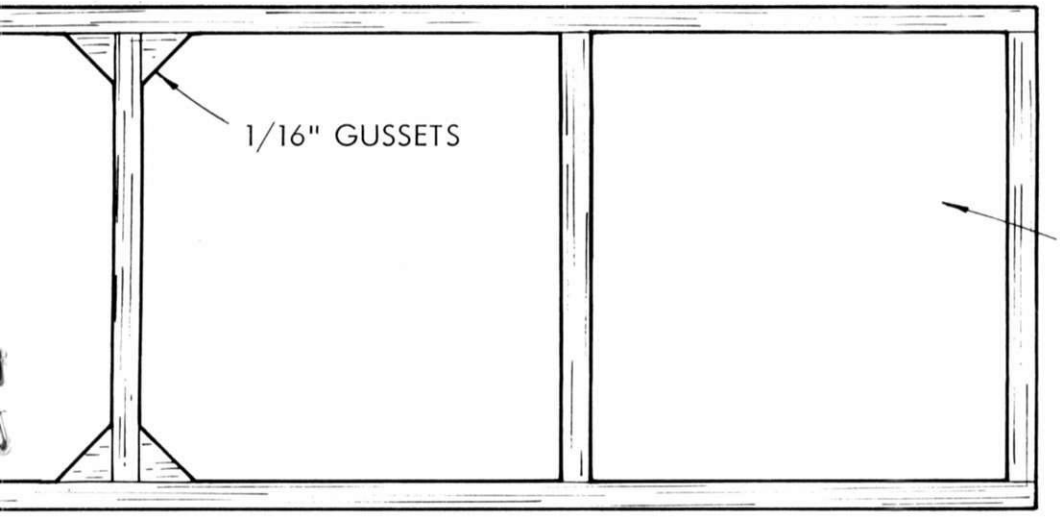
To see the Catacombs, tourists are led by lantern light down a long flight of steps to a stone doorway which bears the inscription, "Halt! You are Now Entering the Kingdom of the Dead". Close to six million people

(*continued on opposite page*)

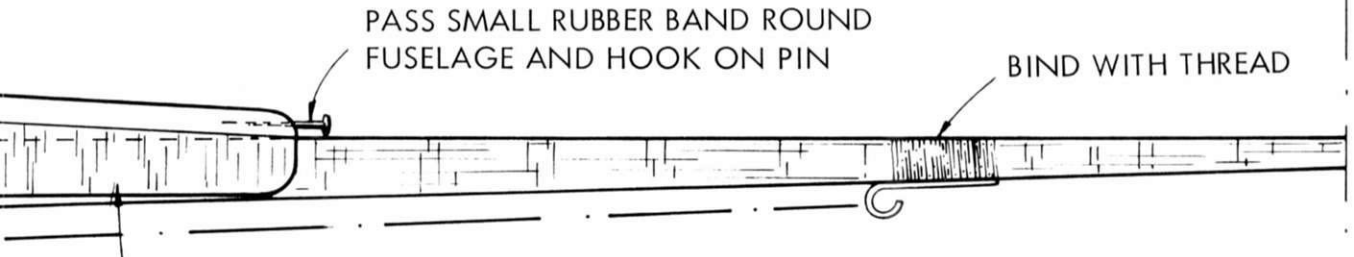
Above, tourists visit the famous sewers under Paris. Right, Pigalle, one of the stations of the Metro. Below, from left to right: 1. In the Catacombs a monument to those who died at the Tuileries Palace during the French Revolution. 2. The entrance to the Catacombs. 3. Walls of bones and skulls line the tunnels of the Catacombs.







HAPED CORE

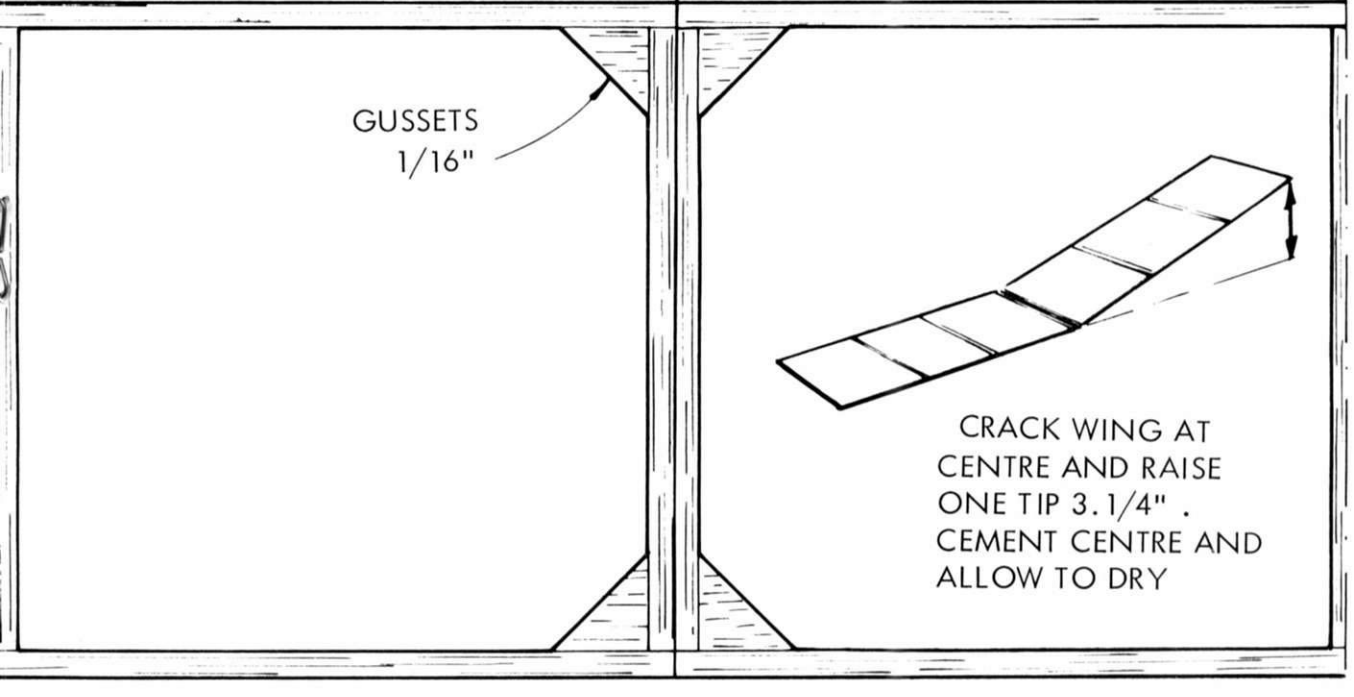


1/16" BALSA, GRAIN VERTICAL, EACH SIDE, ALLOWS WING TO SLIDE FORE AND AFT.

HARD BALSA

REAR HOOK UPRIGHT FORCED INTO FUSELAGE STICK

CRACK

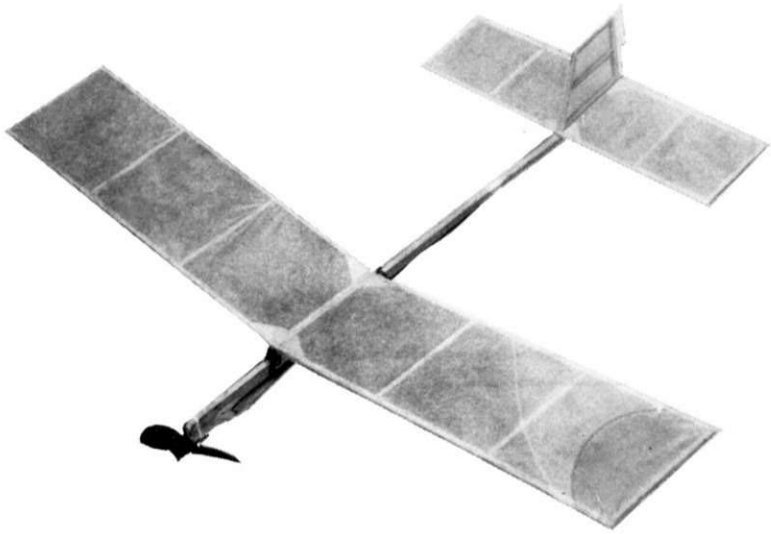


CRACK WING AT CENTRE AND RAISE ONE TIP 3.1/4". CEMENT CENTRE AND ALLOW TO DRY

A simple 21in. span rubber-powered flying model

Stickler

built from the full-size plans in this issue.



By Meccano Magazine Staff

TO fly well, a model aeroplane does not have to be especially elaborate, and one of the simplest forms of rubber-powered aircraft is the "stick" model. This one can be trimmed to make regular 20–30 second flights (a lot longer than it sounds!) and on a warm day with thermal currents active, could quite easily fly out of sight.

The main requirements are 3 lengths of $\frac{1}{8}$ in. sq. medium balsa, a length of $\frac{3}{16}$ × $\frac{3}{8}$ in. balsa, fairly hard, a few scraps of $\frac{1}{16}$ in. sheet, tissue, cement, a little wire, and a stub of tube. The wing, tail, and fin are built flat on the plan (rub soap or a candle on the joint areas of the plan to prevent the cement sticking to the paper) using pins placed each side of (not through) the strips. Don't cement the wing centre "ribs" together until after cracking the leading and trailing edges and propping one tip up as shown. Add the gussets, then lightly sand all leading and trailing edges slightly round.

Cut the fuselage stick from the $\frac{3}{16}$ × $\frac{3}{8}$ strip and use some of the left-over to cut a wedge (as shown in the side view) to cement under the wing centre. Take care to make a good and accurate job of this wedge. Cut and cement $\frac{1}{16}$ in. balsa each side of the wedge so that the wing will sit firmly on the stick, able to slide backwards and forwards but not rock sideways.

Cover the top of the wing and tail and one side of the fin with lightweight tissue, ask for a "hard" or "smooth" tissue, not lightweight Modelspan which, while best for many models, shrinks too much for this one. The best tissue paste for this particular job is Gripfix, which helps to get the tissue smooth and flat with no wrinkles. Lightly steam the tissue near the spout of a boiling kettle, which will shrink it slightly, and allow it to dry, checking that the surfaces are not warping. Apply a thin coat of thin banana oil (a cellulose preparation) which airproofs the tissue without shrinking it; again, avoid warps, by pinning down over a sheet of waxed paper while it dries, if necessary.

The nose of the stick needs deepening by cementing on a further piece, to the bottom of which is glued the stub of brass or aluminium tube. Bind it with cotton and rub cement into the cotton. Bend the prop-shaft from a piece of 20 s.w.g. piano-wire, with pointed pliers, and bend the rear hook, which is bound and cemented in place. Round off the corners of the stick slightly, and, if you wish, finish it with a coat of banana oil.

If a plastic propeller is used, the diameter should be 7–7¼ in., the Keilkraft one being used on our model with success. This has a free-wheel "cam" on the front, and all that is necessary is to bend the shaft at right-angles. Don't forget a cup-washer to form a bearing (curved side to the tube) between prop and tube; if you can only get flat washers, use two with a small round glass bead between them.

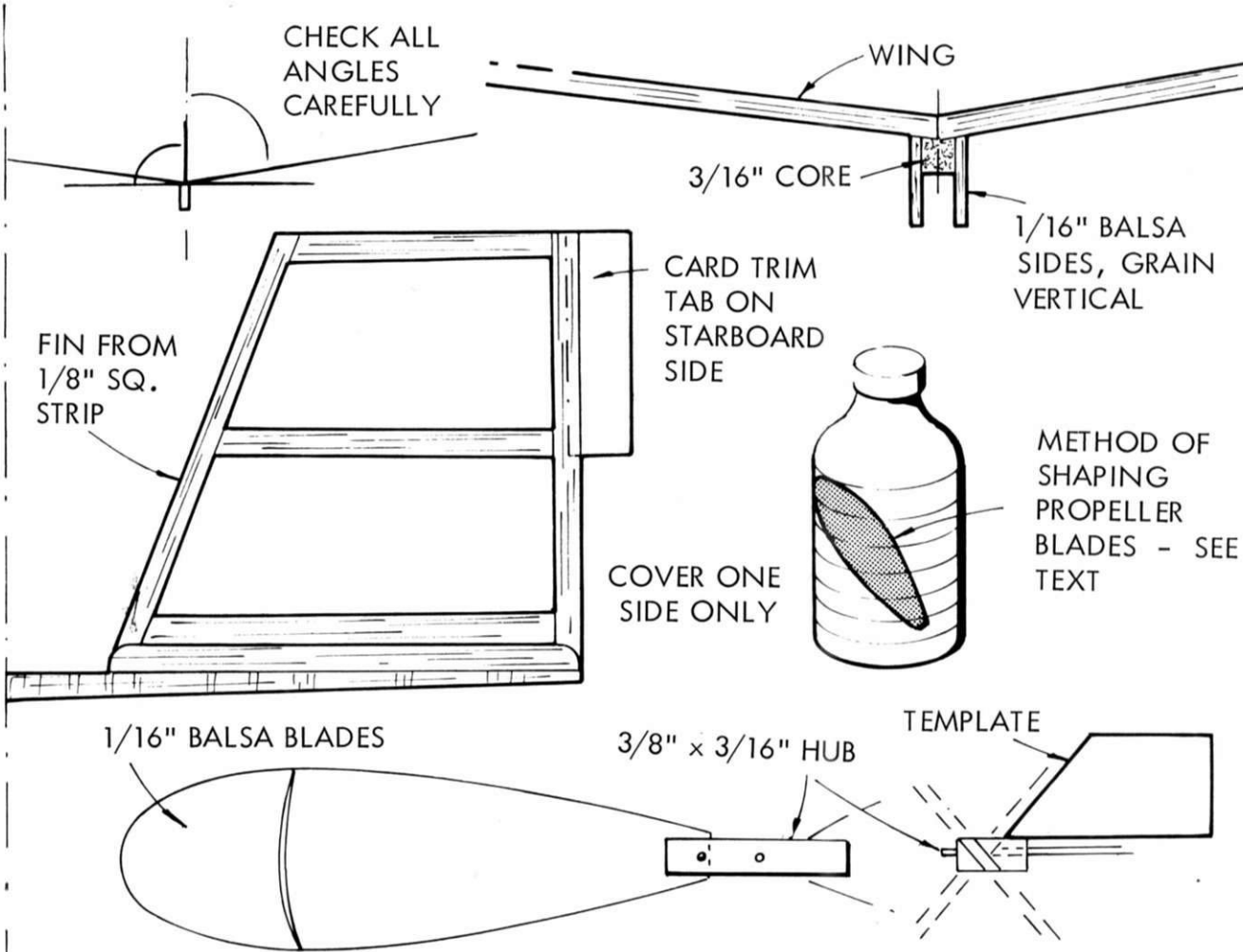
A 7 in. balsa propeller can be used, or one can be made up as shown on the drawing. Cut a card template to get the grooves in the boss accurate. Cut the blades from $\frac{1}{16}$ in. balsa and sand them to tapered edges; they can be cemented straight into the boss or shaped further by wetting them and binding them on to a bottle or tin about 2½ in. diameter, as sketched, while they dry. Coat with banana oil after cementing in, then make the little wire free-wheel pawl, which is fitted through the hub. Balance the prop by sanding the heavy side. The same free-wheel device can be fitted to a ready-made balsa propeller, which will probably also need balancing.

A $\frac{1}{4}$ in. rubber loop should be made up to the length stated; this is longer than the distance between the hooks but this is correct. You get more turns on, and when the rubber runs out there is no tension on the propeller, which can then free-wheel easily and prolong the flight considerably. If you are going for the longest possible flights, use a wire ring at the rear end of the rubber so that it can be slipped off the rear hook and "stretch-wound" with a hook in a hand-drill. Lubricate the rubber with castor oil, failing purpose-made rubber lubricant.

Cement the tailplane squarely to the stick, and the fin squarely on top of it. Push pins in the wing centre leading and trailing edges, and use a very small rubber band hooked over each pin, passed round the stick (twice if necessary) and hooked back on the pin, to hold the wing firmly in place but not firmly enough to prevent it knocking off in a crash. Sight from ahead and above that the wing, tail, and fin are all square; misalignment can ruin the flight. Stick a small card trim tab on the fin and bend this to turn the model very slightly to the right.

Fit the rubber motor on and slide the wing along until the model appears to balance on your fingertips under the middle of the wing. Wait for calm weather, then glide test over long grass by launching the model smoothly, nose down, fairly fast, but don't throw it. If it appears to dive, slide the wing forward, if it swoops up and stalls (drops suddenly) move the wing back. Make a pencil mark on the stick and check that the wing is in the same place before each flight, once a satisfactory setting is found.

Put on about 50 turns for the first flight, gradually building up as the rubber "runs in". Add more right turn by bending the tab if the model circles sharply left, and adjust the wing position very slightly to get the flattest glide from a height.



FINISHED WEIGHT OF MODEL WITH PLASTIC PROPELLER WAS JUST A LITTLE UNDER 3/4 OZ.

WING COVERED TOP ONLY WITH LIGHTWEIGHT "HARD" TISSUE. LIGHTLY STEAM SHRINK AND APPLY ONE THIN COAT OF BANANA OIL.

PHOTOGRAPHY IS EASY No. 3

FILTERS CAN SAVE THE SKY

Peter Wilkes explains the use of filters to make the picture complete

POSSIBLY there is more confusion in photographic circles on the use of filters than on any other subject. Yet filters, correctly used, do more to improve photography for the average camera user than any other photographic accessory.

A narrow beam of white light, if projected through a glass prism will be split up into a band of colours known as THE SPECTRUM—violet; indigo; blue; green; yellow; orange and red.

Today's black and white films, excellent as they are in colour rendering, do have a common fault. They are over sensitive to blue and violet. The result of this can be seen in many landscape photographs, where the glorious blue sky of summer with billowy white clouds floating across it, comes out, on the final print, to the disappointment of the photographer, as near blank areas of white paper.

It is this falsification of colour rendering that filters, known as "correction filters", are designed to correct. The action of a filter is to let through that part of the spectrum which is its own colour, but to obstruct light of a complementary colour. In other words a filter will lighten its own colour but darken those of complementary colours.

For example, a deep yellow filter will lighten green and red, the constituents of yellow, and darken blue—the complementary. A red filter will lighten red and orange and darken blue and green.

The use of filters becomes easier if the common complementary colours are remembered:—
Red—Green; Blue—Orange; Yellow—Violet.

Filters are sub-divided, for photographic use, into CORRECTION and CONTRAST filter. A "correction" filter, as the name implies, is used to correct tones that would be missing in the final print if one were not used, while "contrast" filters over-correct to give dramatic results in the final print.

In the case of the missing sky, although from the foregoing it may seem that the natural choice would be a red filter, the effect will be over-correction so that, in practice, the red CONTRAST filter gives place to a yellow CORRECTION filter.

If you use a yellow filter on all outdoor photographs that feature a blue sky you will find that they look far more natural and pleasing than they ever did before.

Another use for a correction filter is to create a "false" colour rendering for objects that, on the print, would reproduce in nearly identical shades of grey. An example of this is the case of the yellow sandstone building which, in reality, stands out in vivid contrast against a bright blue sky. If the scene were photographed without the use of a filter, the dramatic effect that first caught the eye would be completely lost, for the contrast would be lost by the film's reproduction of tone.

To correct this, applying the rules we already know, a yellow filter would be used. This would lighten its own colour, the yellow of the sandstone building, and darken the complementary, the blue of the sky and hence, in the final print, give just those qualities of contrast that first attracted in the original scene.

From the foregoing it is not difficult to see that striking pictorial effects can be achieved by the use of CONTRAST filters.

In this range are the deep yellow, orange, red, and blue filters. Of these, in normal amateur use, the most popular are the orange or red and deep yellow.

With an orange or red filter over the camera lens, skies of most dramatic quality can be recorded on normal film and, if a deep red is used, the final results can have a ghostly "moonlight" effect.

The orange or red filter has a practical use in the photography of distant scenes on a hazy day. An orange filter will drastically cut through the haze while, if a red one is used, the final print will astonish you by containing details that, because of the haze, were invisible to the human eye.

It will, of course, be obvious that we cannot put a filter over the lens of a camera without cutting down the amount of light entering the camera and hence affecting the exposure.

However, exposure calculation with a filter presents no problems in practice. All filters are marked with what is known as a "filter factor". This is the amount by which the exposure has to be increased when the filter is used. In the case of a medium yellow filter used

for darkening the blue sky, its container will be marked either 1½x or 2x. This shows that the exposure must be increased by 1½ or 2 times the normal rate. In practical photography it can be done by using a slower shutter speed i.e. from 1/250 a second to 1/125 a second or by altering the aperture from f.16 to f.11.

Contrast filters require a greater degree of correction and an orange will usually be 4x while a red contrast filter may require 6 times the exposure.

There are filters available which have no influence on the colour rendering but which play their part in photographic improvement. One such example is the natural density filter which, with a filter factor of 2x or 4x, can come to your assistance if you get caught under lighting conditions too great for your film-lens combination.

If your photography is varied and you have been using a high speed film for photography under bad lighting conditions, it could easily happen that you find yourself on the beach on a brilliant summer's day when the combination of direct sunlight and light reflected from the sand will be such that the exposure combination, with a fast film, is outside the range of your camera. Here a 2x or 4x N.D. filter will bring the exposure down to reasonable levels.

Another filter which has no correction value but is nevertheless a most valuable addition to the photographer's accessories is the POLARISING FILTER. This does not distort colours but subdues or eliminates unwanted reflections from shiny surfaces. It is often difficult, under practical conditions, to photograph a shop window, a display under glass, or fish in a pond, because of surface reflections. A polarising filter will cut out such reflections completely but, because it cuts out reflected light from one direction only, it is necessary to rotate it until the angle is right before using it. This can be done easily by holding it to the eye and looking through it as you rotate until the desired effect is obtained. The filter is then transferred in that same position to the camera lens.

Another use that filters can be put to is to remove unwanted marks on old books, prints or other papers that are being copied photographically.

If you had in your possession a document that you wanted to copy with your camera but that has been stained by red ink being spilled on it, a knowledge of filters would enable you to select one that would eliminate unwanted stain. In the case quoted, to remove a red stain, a red filter would be selected. This would help to remove yellow discoloration that is found on many aged documents or photographs.

Filters are obtainable in three forms, made from gelatine films, gelatine film cemented between optic ground glass, and glass that has been dyed in the mass.

In practice gelatine film filters are too fragile and, after some use, their surface becomes finger marked. While gelatine cemented between optically ground glass is the perfection in filters, the most popular, because of their cheapness, are those cut from dyed-in-the-mass glass. These are of good enough quality for all practical purposes and yet relatively cheap to buy.

For normal tone correction work, a medium yellow 2x filter will be sufficient for most camera users with, for special effects if required, an orange or red. Do avoid becoming a filter collector and remember that piece of age old photographic advice: "Add nothing to your basic outfit unless you know you have a need for it".

Always treat your filters with the respect you show your lens. Avoid finger marks on them and always keep them in a case or the box provided when not in use.

Remember that even the best lens will suffer if you use a filter that has been subjected to such abuse that its surface is scratched and marked, and respect them accordingly.

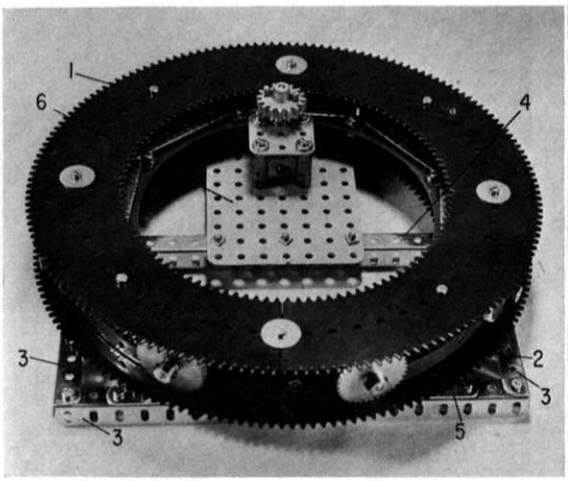
Table No. 1
Filters and their effects

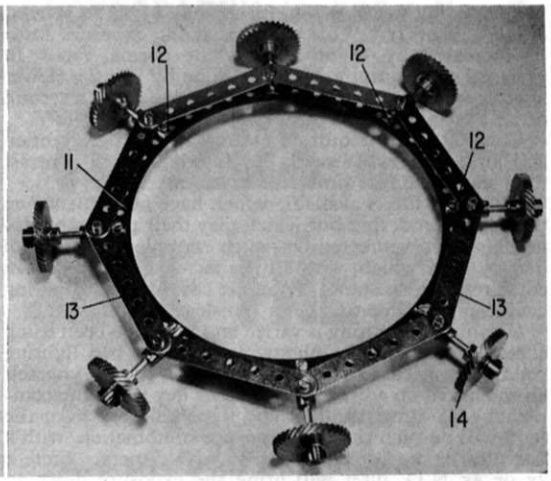
Colour	Factor	Lightens	Darkens
Light Yellow	1½x	Yellow; Green slightly	Blue slightly
Medium Yellow	2x	Yellow; Green	Blue; Violet
Deep Yellow	3x	Yellow; Green	Blue; Violet
Light Green	2x	Green	Orange; Red; Blue slightly
Medium Green	3x	Green	Orange; Red; Blue slightly
Orange	4x to 6x	Red; Orange; Yellow	Blue; Violet; Green
Red	6x to 10x	Red; Orange; Yellow	Blue; Violet; Green

Table No. 2
Filter factors—their use in practice

Factor	Speed adjustment	Aperture adjustment
1½x		open up by HALF a stop
2x	Double shutter speed *OR*	open up ONE stop
3x	Double shutter speed *AND*	open up HALF a stop
3x		open up ONE & A HALF stops
4x	Increase to four times	open up TWO stops
5x	Increase to four times *AND*	open up HALF a stop
5x		open up TWO & A HALF stops
6x	Increase to six times *OR*	open up THREE stops
7x	Double shutter speed *AND*	open up ONE & A HALF stops
7x	Increase to four times *AND*	open up HALF A STOP

Opposite page, semi night effect by using orange filter to deepen the sky. Right, Effect of using deep yellow filter—without such a filter sky behind windmill would have reproduced as white paper. The use of a filter has made a picture complete.



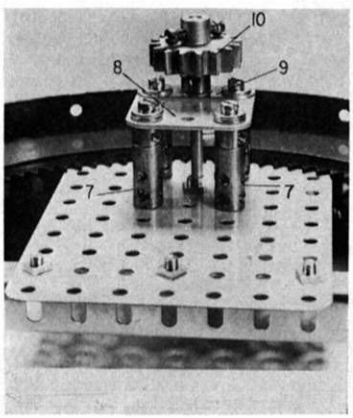


Among the Model-Builders with 'Spanner'

Heavy Duty Turn-table

It is, of course, well-known among enthusiasts that Meccano (1971) Ltd. in Liverpool have a special Model-building Department, whose job it is to design and build display models for Meccano dealers and for various shows and exhibitions which are held from time to time around the Country. Some of these models are necessarily very large and heavy constructions and one such model was a 6 ft. diameter Roundabout which was in fact included in the Company's Lord Mayor's Parade float illustrated on last month's cover.

This really excellent model was the work of Pat Lewis of the Model-building staff and, for use in it, Pat designed an exceptionally Heavy-duty Turn-table intended not only to carry the heavy weight of the model's revolving superstructure, but also to stand up to the "hammering" the model would taken when being bounced about on the back of an articulated flat truck. Pat has kindly built up and supplied me with a copy of the mechanism and, although extremely costly from a component point of view, I feature it here because I am sure it will be of considerable interest to advanced modellers.



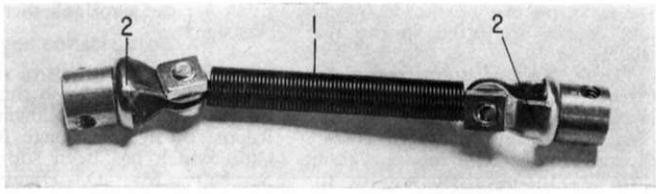
As can be seen, the unit makes use of two Large-toothed Quadrant assemblies 1 and 2, each bolted to a $9\frac{7}{8}$ in. Flanged Ring. The lower assembly is bolted to the stationary portion of the parent model—in this case represented by a square Girder arrangement, built up from four $12\frac{1}{2}$ in. Angle Girders 3, two of the resulting sides being centrally joined by a fifth $12\frac{1}{2}$ in. Angle Girder 4. When building the square, of course, two of the Girders will, of necessity, be the thickness of a Girder flange lower than the other two. To counteract this difference in level, a $7\frac{1}{2}$ in. Strip 5 is bolted to one of the lower Girders, while a $5\frac{1}{2} \times 3\frac{1}{2}$ in. Flat Plate 6 is bolted between the other Girder and Girder 4. The result is a flush seating for the Quadrant assembly.

Above left, a general view of the Heavy-duty Turn-table, produced by Mr. Pat Lewis, and designed to stand the rigours imposed on long-running giant display models. Left, a close-up view of the final drive system to the Turn-table. Above right, the central "spider" assembly included in the Heavy-duty Turn-table.

Secured to the top of Flat Plate 6 in the positions shown are four Threaded Couplings 7, the securing Bolts also helping to fix an 8-hole Wheel Disc to the underside of the Plate to later provide an extended bearing for the drive shaft. Attached to the upper ends of the Couplings by $\frac{1}{2}$ in. Bolts, but spaced from them by a Collar on each Bolt are two $1\frac{1}{2} \times 1\frac{1}{2}$ in. Flat Plates 8, one on top of the other, the relevant securing Bolts also fixing a Double Arm Crank 9 along one edge of these Plates. Note that a spacing Washer is carried under the head of each of these fixing Bolts, while two Washers are carried on each of the other fixing Bolts. The boss of the Double Arm Crank, Plate 6 and the Wheel Disc beneath the Plate all serve as bearings for the drive shaft, on the upper end of which a Large-toothed Quadrant Pinion 10 is fixed.

The central "spider" of the turn-table is supplied by a $7\frac{1}{2}$ in. Circular Strip 11, to which eight Slotted Couplings 12 are secured at regular intervals, the Circular Strip engaging in the slot in the Couplings. Eight $3\frac{1}{2}$ in. bracing Strips 13 are bolted between the Couplings, as shown, to prevent the Couplings from swivelling on the Circular Strip, then secured in the longitudinal bore of each Coupling is a 2 in. Rod, on which a $1\frac{1}{2}$ in. Helical Gear 14, boss inwards, and a Washer are *loosely* mounted to serve as a roller. A Collar on the end of the Rod holds the Roller in place.

Simple, but remarkably effective with lighter drives, is this Flexible Coupling designed by Alan Wright of Statham, Lymm, Cheshire.



With the completed unit finally assembled, the central spider is positioned with the Helical Gears outside the flanges of the Flanged Rings and running on the inside faces of the Large-toothed Quadrants. Pinion 10 engages with the inner teeth of the upper Quadrant assembly in this case, although, in another model, the drive could be taken to the external teeth of the Quadrants. It's all a matter of individual requirements.

PARTS REQUIRED

1—1b	31—37a	8—59	8—111c
8—3	39—37b	1—62b	1—145
5—8	14—38	8—63b	8—167a
8—17	8—38d	2—74	2—167b
1—24a	1—52a	8—111a	1—167c
			8—211b

Flexible Coupling

On a completely different subject, Alan Wright of Statham, Lymm, Cheshire has supplied me with details of a simple Flexible Coupling which I think is of interest. Working on the same principle as the Meccano Flexible Coupling Unit, it has the advantage of being considerably more flexible than the standard part, but the disadvantages of being suitable primarily for light, rather than heavy drives.

As a glance at the accompanying illustration will show, it consists quite simply of a Tension Spring 1, to each end of which an End Bearing 2 is fixed. Secured in the bosses of the End Bearings, of course, would be the Rods transmitting the drive to and from the coupling unit.

In operation, it is inadvisable to incorporate the Unit in a heavy drive system. The Tension Spring is a coil spring and, if too great a torque is applied to it—at least in the relevant direction—the coils will tend to unwind. With light drives, however, it would present no problem whatsoever and will certainly give a very wide angle of operation.

PARTS REQUIRED

2—37a	2—37b	1—43	2—66

South African Specials

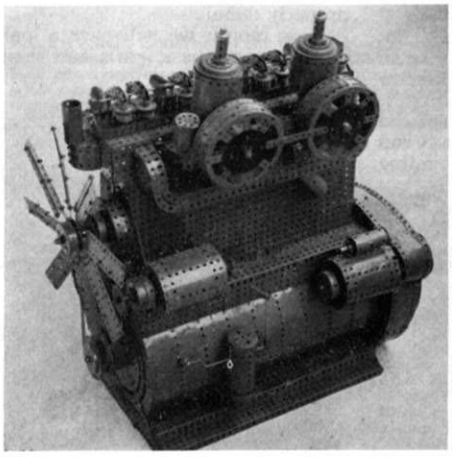
For some general interest, next, I should like to draw your attention to the two excellent advanced models illustrated in the accompanying photographs. These are a Motor Car Engine and a 1908 (or thereabouts!) Rolls-Royce, both the work of Mr. H. Smith of Port Elizabeth, South Africa, and, to give you some idea of Mr. Smith's enormous parts collection, both were built *simultaneously* over a period of six months!

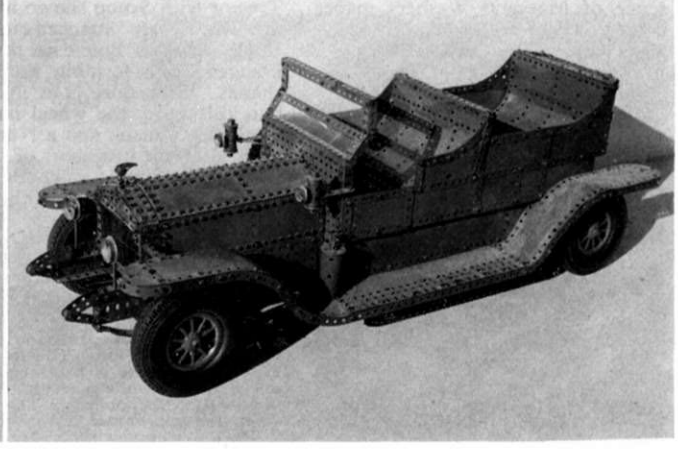
In the case of the Car Engine, says Mr. Smith, "The crank case is mounted on a framework 18½ in. long by 12½ in. wide, while the cylinder block measures 8½ in. height. The crankshaft is built up from Flanged Sector Plates, which allow for perfect balance, the pistons being made up from Flexible Plates, with 3 in. Pulleys to represent piston rings. The model, in fact, is complete in every mechanical detail.

"Being a motor mechanic by trade, valve timing and ignition timing was no problem and, as you will see from the photographs, the Engine is fitted with starter motor, distributor, oil filter manifold, twin S.U. carburettors, fuel pump and a working clutch. Torch bulbs fitted inside the cylinders light up as the "spark plugs" fire. The push rods are operated from a cam shaft, with the cams themselves constructed from Bush Wheels and Trunnions. The rockers are made up from 2½ in. Curved Strips, while the valves are 1 in. Pulleys fitted on to Axle Rods. Finally, "water jackets", water pump and coil complete the model".

Turning to the Rolls-Royce, Mr. Smith tells us that this "Is fitted with a 3-speed and reverse gearbox with 'H' gate change, the selected gear being held in position by spring-loaded steel balls. A working clutch and differential completes the transmission assembly, while engine accessories include "spark plugs", manifold, carburettor, etc. The body is supported on a fully-detailed chassis which includes leaf spring suspension on all four wheels

The skill, not only of an advanced Meccano modeller, but also of an experienced motor mechanic, is characterised by the highly-detailed Motor Car Engine below left, built by Mr. H. Smith of Port Elizabeth, South Africa. Below right, all the lines and atmosphere of the real thing have been captured in this superb Rolls-Royce, circa 1908—another fine achievement by Mr. H. Smith.





and Ackermann steering. Hand and foot brakes are fitted to the rear wheels.

"I paid a lot of attention to detail in the body construction—note the rivets on the bonnet which can be opened to reveal the "works". Overall length of the model is about 2 ft. 7½ in. Construction of the radiator-grille is simple and neat as I simply used 2½ in. Strips on a Screwed Rod, spacing each Strip with a Nut. The fenders (bumpers) and bodywork are made up from Flat Plates, Flexible Plates and Girders. Please note the "gas" lamps and cylinders!

"The only non-Meccano parts used in either of the models were the Rolls-Royce's tyres, these being kindly supplied by a local tyre manufacturer."

Mr. Smith went on to say that both his models were powdered by Meccano 20 volt Motors. These, as you know, are now obsolete, but I think we can overlook that on this occasion!

Club Report

I would like to finish this month by reprinting the following 1971 Report of the Stevenage Meccano Club which has been supplied by Secretary Mr. D. Higginson, 7 Buckthorn Avenue, Stevenage, Herts.

"The year started with a visit to the Model Engineer Exhibition in London which was enjoyed by all and a good stock of new Meccano parts was purchased by members. We had a very busy year exhibiting our models at various schools and Garden Fetes and raised a grand total of £35 for the various functions we attended, the biggest of which was held by the Pin Green School Parents Association. All members contributed to this display and we were able to show 20 models—all exhibited outdoors without any ill-effects. One of them was the Steam Engine which was re-built from the June M.M. by Peter Walton and which worked very well indeed.

"We have lost a valued member in Philip Hodges who has been granted a place at Rugby and we all wish him the very best at his new school. Several new members have joined the Club, however, including Paul Bourbousson, Phillip Phillipson, Geoff Long, Stephen Kuc, Simon Baker and a very keen adult member, Mr. John Foord, who is our lecturer. We also had the great fortune of a visit from Mr. Ron Fail to give us a lecture, with photographic slides, on mechanisms and general Meccano constructions relating to Clocks and Meccanographs. All in all, it has been a very successful year and bookings are already coming in for Fetes to be held during 1972".

Anybody interested in joining the Stevenage Meccano Club should contact Mr. Higginson at the address given above.

AIR NEWS (*continued from page* 38)

coast of the U.S.A. to show the kind of data that can be expected from the satellite. Carrying four 70 mm. cameras, it makes repeated passes over the test areas at an altitude of 65,000 ft., taking photographs every 18 days at precise local times that coincide with the time-intervals at which the ERTS satellite will pass overhead the same places. Three of the cameras produce the same "pattern" of pictures as those which will be aboard the ERTS; the fourth is loaded with colour infra-red film.

Sky Wedding on "Firework Night"

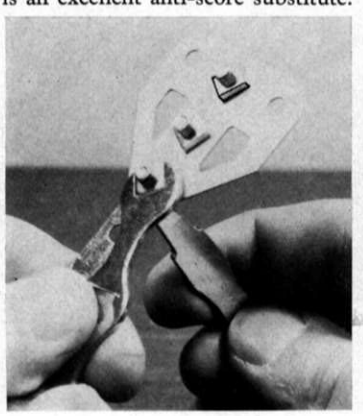
November 5th, Britain's traditional "firework night", will be remembered for a different reason by 20 Japanese couples. To celebrate the inauguration of its Boeing 747 "Jumbo jet" services from Japan to Europe, Lufthansa German Airlines invited them to be married sky-high on board its first 747 flight on that date and then to spend a 12-day honeymoon in Germany.

The wedding rites, which took place between Tokyo and Hong Kong, were conducted by a Shinto priest from the Shiba Daijingu shrine, in an age-old ceremony. The Lufthansa captain, in accordance with international law, officiated at the wedding. None of the traditional trimmings were omitted. The couples "walked down the aisle" over Kyushu to the strains of Etenraku court music, exchanged vows (seishi) in view of Okinawa, and drank the ceremonial saké over Taipei.

MECCANO PARTS

(*continued from opposite*)

extra strong grip when applied "saucer edge down", but if scoring is to be avoided they should be fitted the other way round. In the absence of Meccano Washers, paper is an excellent anti-score substitute.



The lock-nut process is one of the most useful for the Meccano constructor. In the Pocket Meccano Set there are no Axle Rods, so wheels must be attached with Bolts. In the illustration of the simple Tractor with Scoop shown in Fig. 2 the wheels are attached to ½ in. Angle Brackets Bolted to the small Flanged Plate forming the tractor chassis. Procedure is as in Fig. 5, but, this time, the wheel is placed on the Bolt shank and a Nut is run on to the Bolt just short of binding against the wheel. The Bolt then goes through the hole in the Angle Bracket and a second Nut is tightened to secure the Bolt and hence the wheel to the Bracket. A simple job but it can make a tremendous difference to the appearance and the smooth running of your model when properly done!

Next month we will have a look at some more basic parts and their uses.

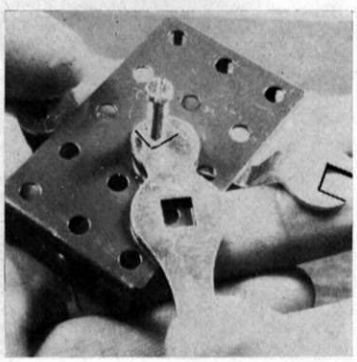


Fig. 4 (left) Correct use of the Spanner with a simple assembly. The Nut is held still and the Bolt is tightened with the Screwdriver—*not* the other way round.

Fig. 5 (right) Lock-nutting a Bolt to a Plate with two Nuts. The lower Nut beneath the Plate is held steady with one Spanner, while a second Spanner is applied to the upper Nut. To prevent scoring of the enamel, a Washer should be placed under the upper Nut.

MECCANO PARTS AND HOW TO USE THEM

A new series for the younger constructor written and illustrated by Bert Love

Fig. 1. Two Meccano Publications from the 30's on how to use Meccano Parts. Both booklets cost 6d (2½p) at the time of publication, the smaller being issued in 1930 and the larger in 1935. Although both are long since out of print, they still make very useful reference manuals.

HOW to use Meccano parts?—surely everybody with a Meccano Set knows how to use Meccano parts! But do they?

Even forty years ago Meccano parts were thirty years old but a small booklet called "How to use Meccano Parts" sold like hot cakes in 1930. A later and enlarged edition with a slight change in title published in 1935 was also a sell-out. A recent photograph of the author's copies is shown. Both books are out of print now and although some of the parts and mechanisms are now obsolete, these manuals are still very useful as reference material and are well worth looking after if the reader is fortunate enough to possess either or both. The two editions sold for 6d. in the U.K. at the time of publishing and they represented excellent value. However, it is not the intention of this series to reproduce the contents of these earlier manuals because both parts and techniques have made considerable strides since the introduction of the two booklets illustrated.

There is nothing like getting down to brass tacks when a new series is started so we will begin by looking at the hardest worked part of any Meccano Set, viz., Nuts and Bolts. Millions of these are turned out at the Binns Road Factory where high speed machines roll the threads on to the Bolt shanks faster than the eye can see. They are well made and finished with a zinc plating so that with reasonable use they will last the constructor literally for a lifetime. However, some thought and care in their use is well worth considering. Since basics should be kept simple, the Pocket Meccano Set is chosen for this introductory chapter and its contents are illustrated in Fig. 2. "Just a handful of parts", . . . you might rightfully exclaim, but judging by the popularity of the 1971 Pocket Meccano Model Building Competition and the amazing range of models submitted for prizes there is enormous scope for simple Nut and Bolt construction.

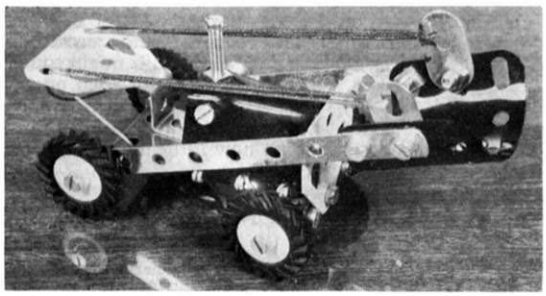
Consider Fig. 3 in which a Narrow Strip is shown attached to a Trunnion. When the boltheads are neatly aligned the construction is a pleasure to look at. Compare this with the rear view at the right of the illustration where the results of bad "Spannermanship" is all too plainly evident. The enamel on Meccano parts is really quite durable but it will not stand up to deliberate abuse. A rule of thumb for preventing such disfiguring of parts is as follows; if the Nut is against an enamelled part, hold it still and screw up the Bolt with the Screwdriver. This method is clearly illustrated in Fig. 4 and although applied to a simple assembly in this case, the principle applies right up to the largest "Supermodel".

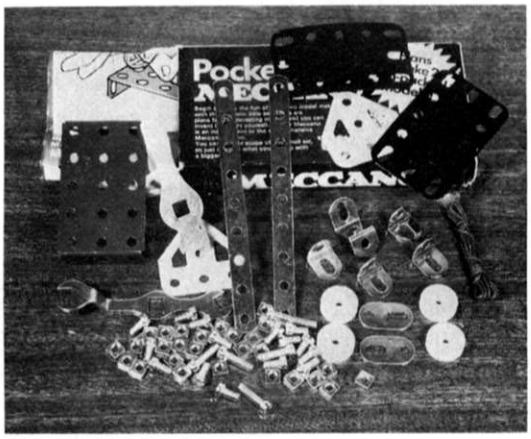
There are occasions when Nuts must be turned against an enamelled surface as shown in Fig. 5 where a Bolt is to be lock-nutted to a Plate. Two items can assist in preventing scoring in this case. The Meccano Washer may be placed between the Nut and the enamel but a word of warning here. The Washers are 'dished', that is to say they are slightly saucer-shaped to give an

(*continued opposite*)

Fig. 3. Samples of both neat and ugly nut and bolt construction. Note neat alignment of boltheads in left-hand Flat Trunnion and the bad scoring of right-hand Flat Trunnion by poor Spanner work.

Fig. 2 (right) Contents of the Pocket Meccano Set. Although comprising only a handful of parts, the scope for Nut and Bolt construction with this Set is enormous. An example of what can be done is shown below—a working Tractor Shovel with bucket hoist made from the Pocket Meccano Set. Dinky Toy tyres add the final touch of realism.





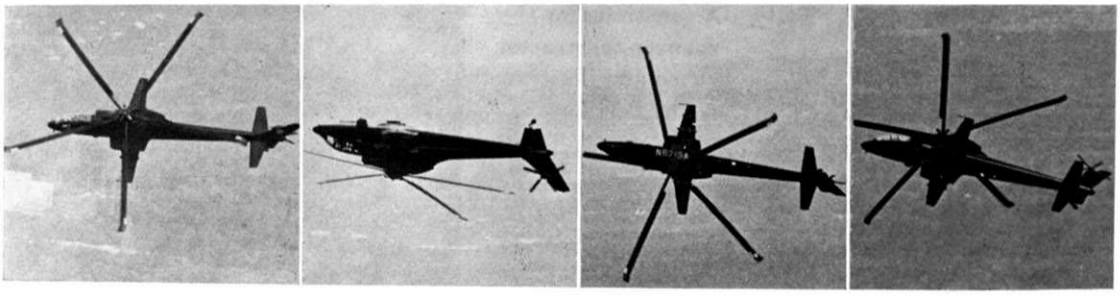


Photo sequence above shows a Sikorsky S-67 Blackhawk doing an impressive roll. (1) Aircraft enters roll. (2) Halfway into the roll, flying on its side. (3) Flying upside down. (4) Aircraft comes out of roll and returns to level flight.

AIR NEWS

By John W. R. Taylor

WHAT is an RPV? If you don't know the answer to that question, now is the time to learn, because many military experts and engineers in America believe that RPVs will take over duties performed at present by piloted aeroplanes.

The initials stand for "remotely piloted vehicle", and it could be claimed that RPVs have a far longer history than other forms of aircraft. A kite, controlled by a string held in the hand of somebody on the ground, is remotely piloted. So are radio-controlled model aeroplanes, and the target drones which fighter pilots chase in the air and anti-aircraft gunners try to shoot down whilst training.

An RPV which differs little from Teledyne Ryan's well-known Firebee target drone was used recently to attack ground targets with inert 500-lb. bombs and other weapons. More advanced versions of the Firebee have been used for years to carry cameras and other reconnaissance devices over North Vietnam, China and similar areas where it would be unwise politically, or too dangerous militarily, to send piloted "spy-planes".

As a follow-on to these successful operations, the Americans are now studying the possibility of using RPVs as interceptors, to provide a low-cost defence against attack by piloted aeroplanes.

To test this possibility, the U.S. Navy decided to match a Firebee against a Phantom fighter in a mock dog-fight over the Pacific Missile Range. In charge of the RPV was Cdr. John Pitzen, himself a fighter pilot, seated in front of a ground console on which he could observe the movements of both the Firebee and the Phantom several miles away. His hands rested on controls that could make the Firebee fly in any way he chose, pulling much tighter turns than a human pilot could withstand without blacking out.

Desperately, the pilot of the Phantom flung his 1,500 m.p.h., $4½ million aircraft around the sky in an effort to bring the robot into his sights. One after the other he loosed his armament of deadly Sparrow and Sidewinder air-to-air missiles at the tiny RPV, only to see them all miss the target hopelessly. He was in no personal danger, as this was a dummy interception by an unarmed robot; but it was frustrating to realise how helpless the Phantom was against such an "enemy".

It may be years before sufficient progress has been made to entrust the defences of any country or combat area entirely to RPVs, but the advantages are clear. Needing no life support systems for human aircrew, the robots will always be less costly and smaller than piloted fighters. They can be made to twist and turn at rates that no man could withstand, and they can be used in situations where the risk to human life would be too great for acceptance.

Ultimately we could have pilotless fighters shooting down pilotless bombers and reconnaissance aircraft in places like the Middle East and Vietnam. It might sound rather exciting, but the sheer stupidity of such operations could also help to persuade the leaders of the world that all forms of warfare, even the "push-button" remotely-controlled kind, are now futile and outmoded.

New Jobs for the Argosy

With the disbandment of No. 114 Squadron at the

Top left, the RPV (remotely piloted vehicle) in flight, from a cine film. Centre and left, the lowest priced twin engined aircraft in America, the new Piper PA-34 Seneca.

end of 1971, the Hawker Siddeley Argosy ended its decade of service with R.A.F. Transport Command and Air Support Command. This is quite a short life-span by comparison with other R.A.F. transports such as the Valetta, Hastings and Britannia, but the Argosy will long be remembered for the reliable support which it gave to British forces during operations in the Persian Gulf and Aden, and for its supply-dropping activities in Borneo during the "confrontation" with Indonesia.

In any case, the Argosy will live on in other roles. No. 115 Squadron of Strike Command uses aircraft of this type for flight checking radar and navigational systems at R.A.F. stations around the world. Some of the ex-Air Support Command Argosies will also find a new lease of life with Training Command, after they have been converted into advanced aircrew trainers.

Air Engineers will be trained on the existing flight deck, made more roomy by removal of some of the navigation and communications equipment that is no longer needed. Navigators and air electronics operators will be trained in what was formerly the cargo hold of the aircraft—an area that provides plenty of room for new navigation and radio equipment. Altogether, it should be possible to carry 12 students and instructors, besides the two pilots, although not all sorties will be suitable for training all three classes of student simultaneously.

Civil Argosies, which have sideways-opening loading doors at front and rear of their fuselage pod instead of the "crocodile" rear doors of the R.A.F. version, are also appearing in new colours. Sagittair, the Heathrow-based all-cargo operator, has taken delivery of three Argosy 101s, bought from Universal Airlines of America, and should have a fourth within a few weeks. Among other jobs, they are being used on the company's daily freight service from East Midlands Airport to Lille in Northern France, via Heathrow.

Two of these Argosies once belonged to BEA, and Sagittair believes that this state-owned airline made a big mistake in selling such useful freighters. Each can carry up to 12 short tons of cargo on journeys of between 500 and 600 miles. Loading is made easy by the fact that lorries can drive right up to the nose or tail doors, between the twin tail-booms. Nor does the freight have to be pre-loaded on pallets, as is the case with many other modern cargo-planes.

Until the Argosies arrived, Sagittair operated three small twin-engined Beechcraft 18s, which have often landed and taken off from small grass airstrips near factories and depots to take on such things as computers, valuable carpets, machinery and livestock bound for the continent. The Beechcraft continue in service, leaving the Argosies free to operate mainly into the larger European airports that are ignored by big national airlines. By flying into Lille, for example, Sagittair avoids the air and ground delays suffered by companies operating into Paris. It links up there with the road network of the Trans Inter company, which runs 2,800 vehicles throughout France, to speed delivery of its cargoes to where they are destined.

Above, Airbus Industrie, the management organisation for the construction of the A.300B European Airbus, has taken delivery of an Aero Spacelines Guppy – 201. It will ferry parts of the Airbus to the final assembly line at Toulouse.

Spot the Guppy

The blue, white and black livery of Sagittair is already a familiar sight at British airports. Less familiar is the huge bulk of the Guppy-201 outsize freighter built in America by Aero Spacelines of Santa Barbara, California. Each Guppy is made up of parts from several former Stratocruiser airliners or C-97 military freighters, with a huge new top cabin structure built on to the lower portion of the original fuselage, so that it can carry loads with a diameter of up to 25 ft.

Since late 1971 a Guppy-201 has been based in Europe. Its purpose is to carry components of the A.300B European Airbus between the factories where they are built, in various countries, and the final assembly line at Toulouse, France. It is being operated for Airbus Industrie by Aeromaritime, a subsidiary of the French independent airline U.T.A. One of its early flights involved the carriage of the first set of Airbus wings, built in Hawker Siddeley's Chester factory.

Chopper Gunship Loops and Rolls

Back in October 1968 a Sikorsky CH-53 helicopter made history by becoming the first "chopper" to perform loops and rolls, as part of a test programme. A second Sikorsky helicopter, the S-67 Blackhawk gunship, has now proved that anything the CH-53 can do in the way of aerobatics it can do equally well.

Already the fastest helicopter in the world, the Blackhawk performed three loops. Entry was at a height of 2,000 ft. and speed of 195 m.p.h. At the top of each loop altitude was 2,800 ft. and speed 58 m.p.h. Recovery to level flight was at 2,000 ft. and 195 m.p.h.

Right, the three Argosies based at Heathrow will now be seen in the colours of Sagittair, an all-cargo operator. The Argosy can carry up to 12 short tons to a distance of between 500-600 miles. Loading is made easy by the sideways opening doors at the front and rear.

Five rolls were flown at 1,400 ft. Each was started at 161 m.p.h. and completed at speeds ranging from 132 to 138 m.p.h. In addition to proving the Blackhawk's control and agility, the tests demonstrated again the ability of Sikorsky's fully-articulated rotor system to withstand even the most extreme flight manoeuvres.

The loops and rolls were undertaken by the company's experimental test pilots, Byron Graham and Kurt Cannon, who hold the present world helicopter speed records over 3 km. (216.844 m.p.h.) and 15/25 km. (220.885 m.p.h.) respectively. Both records were set in the Blackhawk.

Piper's New Indian Chief

Just over a year ago, a friend who visited Piper's factory at Vero Beach, Florida, reported seeing an unusual Cherokee Six with twin engines instead of the usual one. On September 23, 1971, Piper announced that it was marketing this development of its Cherokee family as the PA-34 Seneca.

Students of ancient Roman history may think of Seneca as the name of the man who was tutor to the future Emperor Nero, but the Seneca Indians were one of the Six Nations League of the Iroquois. The PA-34 Seneca thus continues the Piper tradition of naming its aircraft after Indian tribes.

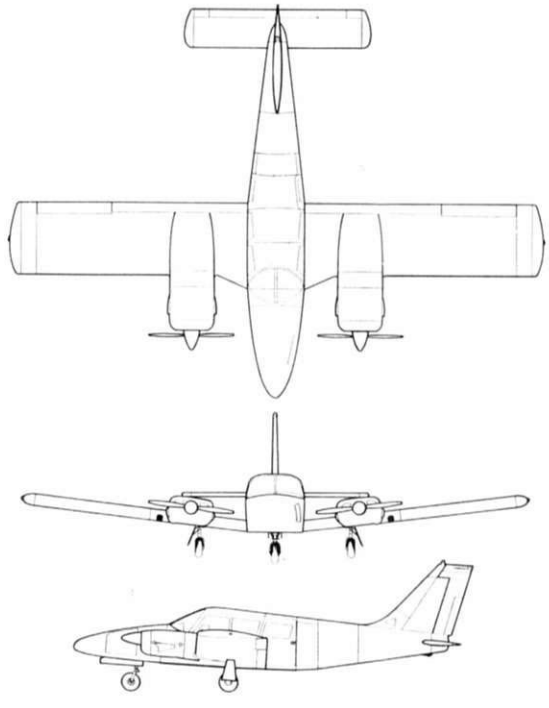
The fuselage is basically similar to that of the Cherokee Six, with six seats in pairs and room for a seventh. A specially-large door at the rear of the cabin on the port side enables stretchers to be loaded easily if the aircraft is used as an ambulance. Baggage is carried in the nose and aft of the rear seats.

The 200 h.p. Lycoming IO-360 engines drive opposite-rotating propellers, helping to give such delightful handling qualities that Piper plans to use the Seneca as a standard twin-engine conversion trainer at its Flite Centers. Top speed is a nifty 196 m.p.h. Yet, despite all the attractions, the Seneca is still the lowest-priced twin on the American market.

Spy-plane Simulates Satellite

A Lockheed U-2 high-flying reconnaissance aircraft hit the headlines in 1960, when it was shot down over Russia during a "spy-flight". Since then, the U-2's original job has been taken over mainly by orbiting satellites, and most of the surviving aircraft have been switched to less clandestine tasks such as weather reconnaissance.

Although superseded for many front-line military duties, the U-2's ability to make long-duration flights at great altitude continues to be unique. That is why the National Aeronautics and Space Administration (NASA) have chosen it for a series of survey flights in which it functions as a kind of piloted satellite.



PA-34 SENECA

NASA is devoting a great deal of money to demonstrating how satellites can survey and provide data for improving earth resources such as crops, water supplies and prospecting for oil and minerals. Next year it will put into orbit a specially designed Earth Resources Technology Satellite (ERTS) which is expected to prove the value of such spacecraft to a whole range of industries and sciences, including agriculture, oceanography, forestry and map-making. Meanwhile one of NASA's U-2s is being used to photograph test areas on the East

(*continued on page* 34)

Left, one of the NASA U-2s being used to photograph test areas on the East coast of the U.S.A. using four 70 mm cameras.

Above, plans of the new Piper PA-34 Seneca showing the similarity to its predecessor, the Cherokee.

MAN-MADE DIAMONDS

CLEAR GEM-QUALITY DIAMONDS CREATED FOR THE FIRST TIME IN A LABORATORY

BY MICHAEL LORANT

SCIENTISTS of General Electric Company's Research and Development Centre in the U.S. have recently succeeded making clear, gem-quality diamonds, some of them weighing more than a carat. The creation of these diamonds marks the exciting achievement of a long-sought goal that has tantalized and frustrated scientists for nearly two centuries.

The history of attempts at gem diamond synthesis date back to 1797, when diamond was first shown to be a form of carbon. In the decades that followed, scientists in many countries tried—and failed—to convert carbon, an abundant and inexpensive substance, into diamond, nature's hardest and most glamorous material.

General Electric's gem diamonds—as well as its man-made industrial diamond abrasive crystals—are produced by subjecting graphite, a form of carbon, to extreme pressures and temperatures in special apparatus. Over the past 15 years, the company's Specialty Materials Department has become one of the world's major producers of industrial diamond abrasives.

The process of "growing" large diamond crystals in the laboratory is long and complicated and, consequently, these carat-sized diamond gems are currently many times more costly than those dug from the ground. According to Dr Arthur M. Bueche, head of research: "We simply don't know whether it will ever become possible, in the future, for synthesized diamonds to compete economically in the gem market."

The new synthesized gem diamonds were created by Dr Herbert M. Strong and Dr Robert H. Wentorf, Jr, staff scientists of the company. They have created high quality diamonds that are white and clear as well as in a variety of colours—including various hues of blue and yellow. Some of these crystals—when uncut and unpolished—weigh more than a carat.

Company scientists' achievements in this field include the first indisputable synthesis of diamond by man, the first commercial process for mass producing industrial diamond, the first carat-sized man-made industrial crystals, the first man-made semiconducting diamonds, the first process for growing diamond crystals without the use of a metal catalyst, and the first hexagonal diamond made by static pressure methods.

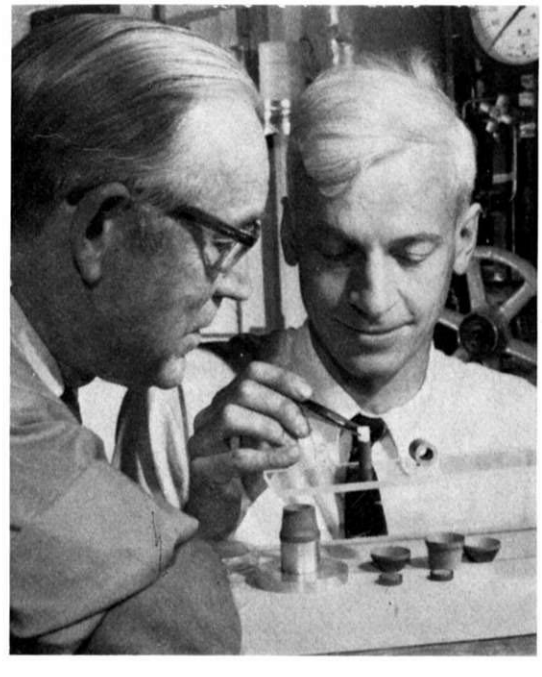
They discovered that the transformation of graphite into industrial diamond could be accomplished by the action of a molten metal catalyst and the simultaneous application of pressures of nearly one million pounds per square inch and temperatures above 2,500 degrees F.

Later, the scientists discovered that graphite could be converted directly into diamond without the use of a metal catalyst. However, the process then requires pressures as high as 2¼ million pounds per square inch and temperatures above 5,500 degrees F. (This pressure has been described as equivalent to "holding an Apollo Saturn V booster on the tips of one's fingers".)

A major objective of the company's continuing diamond-research programme is the achievement of large diamonds sufficiently free of imperfections to have the mechanical strength needed for industrial applications such as oil-well drilling and mining operations, dies for drawing wire, dressing tools for grinding wheels, and single-point cutting tools.

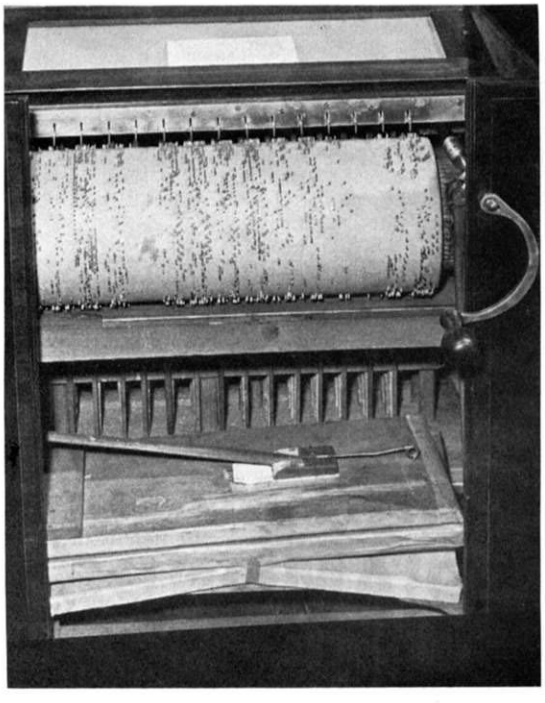
Unlike the earlier man-made diamonds, the large

(*please turn to page* 47)



Above right, this gem diamond, three quarters of a carat in weight, was created in the laboratory by scientists at the General Electric Research and Development Centre.

Right, to grow a gem diamond on the seed crystal, the cell will be placed in a special apparatus that will subject it to pressures of nearly one million pounds per square inch and temperatures above 2,500 degrees F.



Barrel organs, like the one seen here, were the forerunners of the musical box. They provided music for church services as well as for home entertainment.

The Age of Musical Boxes

Earlier generations prized their musical boxes, and today old automatic music-making machines are of increasing interest to collectors.

By Arthur Gaunt

LONG before the advent of the record player, and even before the invention of the phonograph, mechanisation had entered the world of music. Automatic musical instruments of various forms and sizes were available for home entertainment and were considered status symbols among those who could afford them.

Today many of these old instruments are classed as antiques and are sought after by collectors. They attract connoisseurs as well as less knowledgeable individuals, and there are sufficient variations to give the pursuit endless appeal.

The tune-producing mechanism of the common musical box, for example, has been fitted to watches, snuff boxes, jewel caskets, and many other finely made articles, as well as into ordinary decorated boxes and cabinets. So there is ample scope for both the ordinary enthusiast and the most discerning specialist.

Nor is interest confined to individual ownership. Musical boxes are to be seen in museums, where they may be studied and compared by students of musical history who lack the funds or inclination to own examples themselves. To the preservation of such boxes we owe much of our knowledge of melody and harmony in the part song era, for the musical box today plays exactly the same way as it did when new.

The Symphonion, an early type of musical box which creates music by means of interchangeable revolving discs.

After the Barrel Organ

The barrel organ, first used in the homes of the wealthy, may be regarded as the true ancestor of the musical box. This type of music-producing machine was adapted for religious as well as secular music in the mid-18th century. At that time many stately homes

possessed a fine mechanical organ for entertainment purposes.

When the Birmingham home of Dr. Joseph Priestley, the eminent 18th-century divine, chemist, and scientist, was burned by a mob, one of the possessions he saved was his cabinet-sized barrel organ. He even took it with him when religious persecution caused him to emigrate to Pennsylvania in 1794, and it still exists in Dickinson College there.

The term "musical box", however, is now more commonly applied to devices which produce tunes by vibrating the teeth of a metal comb, pins on a rotating barrel or disc plucking the teeth. The teeth are of different lengths to produce sounds of different pitch, and the sequence of the notes when the instrument is set in motion is determined by the position of the pins on the barrel.

Another form of musical box uses card or paper music in which the notes are represented by perforations in the sheets.

Switzerland was the cradle of the comb-playing musical box, and the mechanism of many modern ones comes from there. The craft centred largely in that country because it was perfected by craftsmen clock-makers and watchmakers, for whom Switzerland is renowned.

The Organista, a remarkable musical box with piano strings, drum, bells, and triangle. A hot-air engine drives the mechanism which transports the music.
Photographs: Birmingham Corporation.

The exact date of the beginnings of the musical box industry is uncertain, the early pioneers having worked more or less secretly to protect their trade, and they kept few written records of their business activities.

Many Refinements

But it was in 1797 that the first musical novelties using tuned steel teeth were made. From that date the craft of musical box making ran parallel with other fine skills, musical devices being fitted into scent bottle tops, walking-stick heads, seals, and even necklaces, as well as into timepieces and caskets.

They were often linked with complex automatons as well. These various devices, in which the music was of only secondary importance, gave way in the 1820's to the making of boxes just for the music, and selling on their own merits. From that time onward a wide range of models emerged, and the centre of the industry gradually moved from Switzerland to Germany, where Leipzig and Berlin became world leaders.

Most of the early musical boxes used cylinders, the disc type not coming on to the market until after 1885. Meanwhile further improvements had been introduced into the original cylinder models. Among these advancements were interchangeable cylinders, which extended the repertoire.

The musical box with a disc instead of a cylinder made its debut in Germany. The interchangeable discs were made of steel, and ranged from 4¼ in. to 38 in. in diameter. They were pierced with holes, but the metal was bent back instead of being completely punched out, thus forming projections which plucked at the combs to produce notes as the disc revolved.

Disc boxes with such fanciful names as Symphonion, Polyphon, Octavo (this had two combs, one tuned an octave higher than the other) and Celeste vied with the Swiss Sublime Harmonica and Organleide. Some could be adjusted to play fast or slow, and others were so elaborate that they could produce orchestral effects and included reed or pipe organs! Others were equipped with bells, drums, and castanets.

Some of these big and intricate music-making machines weighed a quarter of a ton and had glass fronts through which the disc could be seen revolving. They heralded the halcyon days of the musical box.

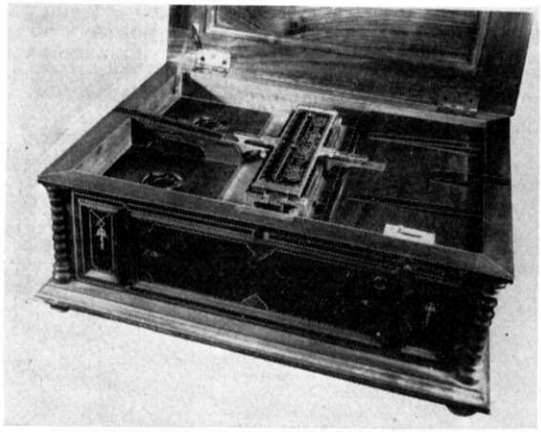
Advancements were continually being introduced, and some cylinder models were able to play without a break for more than two hours. In 1882 a model with a tune selector was brought out. By setting a pointer, any tune on the tune-sheet could be chosen and played or repeated without having to go through the whole repertoire.

Disc machines were later to have similar facilities, and these elaborate automatic music-makers were the forerunners of our present-day juke boxes. They were often installed in amusement arcades, where a few may still be found, the slowly revolving discs producing music which can be regarded as the "pop" tunes of the past.

Items for Collectors

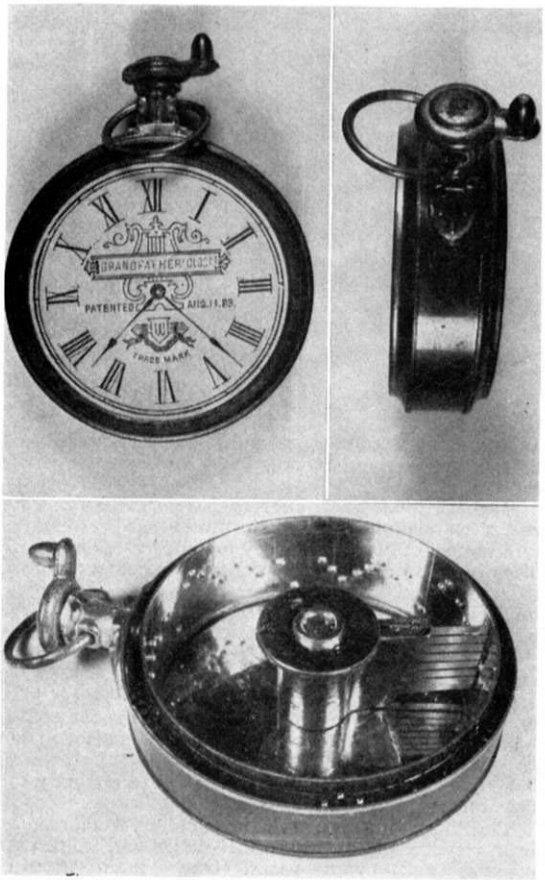
One of the fascinations of the musical box is that, unlike other antiques, it actually performs instead of being merely a mute exhibit. A lot of satisfaction can be obtained too from tracing the history of a musical box, seeking discs or cylinders for it, and restoring the instrument to its one-time pristine condition.

The choice of music available is indeed wide, ranging from classical pieces, music hall songs, and waltzes, to marches and hymn tunes. One "grand musical



A musical box of German origin, the Libellion dating from 1901. It uses folding card music, and the only other model is in America.

This musical watch was patented in the U.S.A. in 1883. Instead of telling the time, it played tunes, including "Bluebells of Scotland" and "Home, Sweet Home". It was sold to boys and girls for 50 cents, but was given free to anyone who took out a three-month subscription to a magazine called "Happy Hours".



cabinet", as it was described, was sold with six cylinders enabling it to play a total of 28 tunes, among them being such diverse pieces as *Robin Adair*, *Son of my soul*, *Carnival de Venice*, and excerpts from favourite overtures.

Another cabinet was advertised as being able to play no less than 44 pieces. Apart from having such great versatility it was an elegant piece of furniture in choice walnut and cost £120—equivalent to at least £500 today.

Collectors and students of musical boxes now have their own society and journal. The publication circulates throughout the world, enabling enthusiasts to share their common interest, pass on news of their discoveries, solve each other's problems, promote research, exchange opinions, and help to trace old cylinders, discs, and "folding book" music.

These musical bygones have attracted increasing attention during the last few years. The Musical Box Society of Great Britain was founded by 20 enthusiasts in 1962. It now has a membership of about 500 spread all over the world, and its quarterly magazine has a global circulation, going to libraries and museums in many countries, as well as to individual subscribers.

Some rare musical boxes are in private hands—such as a "Libellion" owned by a Romford connoisseur, Mr. Vince Bond. It takes nine-inch-wide zig-zag folded card music, and he is trying to locate some of these "books", so that the instrument can be made to play. The box itself is 24 in. long, 20 in. wide, and 10 in. deep, and the mechanism includes 84 spring-loaded levers, each facing a tooth on the music comb.

Research by members of the Musical Box Society has revealed that the "Libellion" was manufactured in 1900 or 1901 by a versatile German inventor, F. A. Ritcher, but it never went into full production. The only other example known to exist today is in the U.S.A., and the quest for card music to fit these two musical boxes is being carried out with the help of other collectors.

Determining the age and history of a particular musical box is often a matter of painstaking detective work and deduction. For example, tune sheets help to date and identify them, those having similar ones probably having been made by the same maker.

Counterfeiting no Menace

Interest also extends to the wooden boxes and their decorations, many of them being exquisitely made and inlaid with enamelled designs or pictures and marquetry. The cases of some of the smaller musical snuff boxes were sometimes fashioned in silver, and these often display the finest engraving and decoration.

The end of the musical box era was precipitated by the introduction of the talking machine and the player piano, which swamped the musical box market. Nevertheless, there are still a few firms in Europe and Japan making modern mass-produced musical mechanisms for such things as cigarette and cigar boxes, miniature Swiss chalets, tobacco bowls, clocks, jugs, and other fancy goods.

An interesting point is that, while small musical boxes continue to be made, the hand labour and craftsmanship needed to create the bigger ones renders forgery of them virtually impossible. In this branch of antiques, at any rate, counterfeiting is no menace today and seems unlikely to become so.

Another meritorious feature of old musical boxes is that they were very well made, and many are still playable after long use. Some show only a microscopic amount of wear, although they have provided musical entertainment regularly over a period of from fifty to one hundred years.

"Without Let or Hindrance"

The story of passports

By J. L. Swinyard

TO TRAVEL abroad one needs to have a passport, both to leave the United Kingdom and to enter the foreign country. To obtain a passport is a comparatively easy matter nowadays, and the possession of one is a commonplace affair. But it has not always been so.

No one quite knows when the first passport was issued. Although the earliest one on record in the United Kingdom was one issued in 1641 by Charles I, it is certain that passports were issued long before that.

Certainly since mankind first divided into tribes and later into nations some token of goodwill was needed to allow strangers to pass in potentially hostile territory. Perhaps the most obvious of these tokens was the olive branch, the international sign of peaceful intentions. Even after writing had been discovered it was more usual to carry a sign or symbol since few men could in fact read or write. These symbols often took the form of a ring or seal of the sovereign which the bearer could show to prove he was on official business.

Later, when knowledge of writing had spread to even minor officials, it became more usual to give these tokens in writing on some such thing as a parchment. It is on record that Julius Caesar gave a written safe conduct (or in modern terms, a passport), to one Potoman, a philosopher, which was worded—'If there be anyone on land or sea hardy enough to molest Potoman let him consider whether he be strong enough to wage war with Caesar". Strong words indeed!

During the twelfth and thirteenth centuries a royal licence was required by merchants and others both to enter and leave England. Richard III kept a very strict control over their issue and they were generally very difficult to obtain.

At this time the word passport had not come into use with its modern meaning. It then meant a permission for a ship or vessel to enter or leave a port, in other words for it to "pass the port".

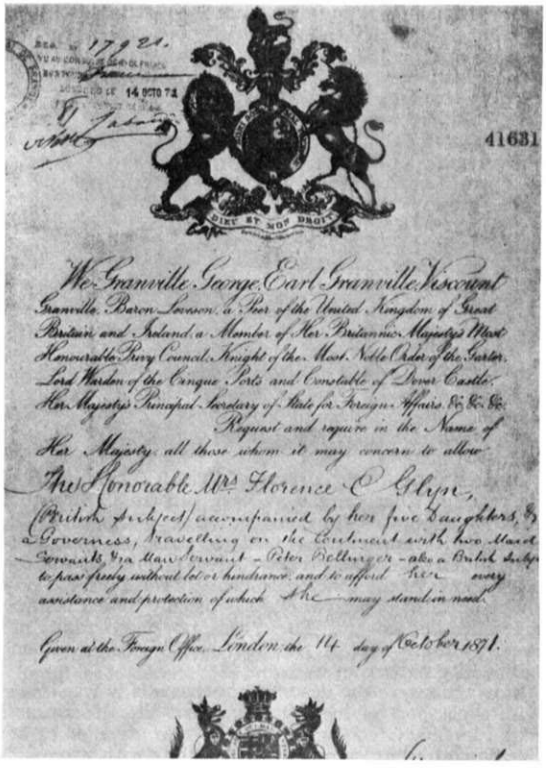
When a traveller had obtained his royal licence to leave the country and had been granted permission to enter another he would obtain a general permission to travel anywhere in that country. This permission was known as a "passe partout" or "pass everywhere".

By the early sixteenth century the two words had become confused and had come to mean the same thing, though writers of that period still differentiated between the two meanings. Shakespeare in King Henry V has King Henry saying before the Battle of Agincourt, "He that hath no stomach to this fight: let him depart: his passport shall be made and crowns for convoy put in his purse".

In this context a passport meant royal permission to travel, which was required by all from the lowest to the highest.

But Hakluyt in his 'Voyages' in 1598 used the word in its older and more literal sense when he wrote of "our ships being given their passports to leave . . .".

For many years there was far more emphasis on the passport being a document to leave the country than on it being a document enabling the holder to travel and enter other countries. The sovereigns of those days liked to keep a very strict eye on the whereabouts of any potential enemies or rebels.



By the end of the sixteenth century the word was beginning to change its meaning. The Taxis family of Antwerp, who had the mail contract between the Low Countries and London, were very proud in 1589 that their six couriers "all had British passports". Though here the word also had the same sense as has the word "visa"—in that they had permission from the British authorities to enter.

Although various laws had been passed during the centuries to control the egress and ingress of persons from the ports of the realm and the issue of passports, it was not until the Aliens Act of 1793 that all aliens were required to hold a passport to enter Britain. Once landed at a port they were not allowed to leave until they had obtained a passport from the Mayor or Chief Magistrate of the port. The passport was in fact a document for internal travel and not for travel abroad, and on it was was quoted the town and place to which the alien proposed to go.

Even after he had arrived at his destination the foreigner was still required to obtain a further passport to leave it. Fortunate were those merchants who were given a general passport to travel anywhere in the realm.

Today foreigners who take up residence are still required to register with the police, and are issued with registration certificates. So that it can be seen that a form of internal "passport" is still in use.

After the Napoleonic wars the rules governing the use of passports for both British subject and foreigners became less severe. For the next fifty to sixty years there was a period recognised officially as a period of *laissez faire*. During most of the nineteenth century British travellers were advised rather than compelled to have passports. Indeed in 1817 a Harriet Campbell

wrote that she was quite put out on arriving at Calais when an official demanded her passport.

As far as British subjects were concerned, passports were only compulsory for travel to Russia, but they were advised that they should have one to travel to any belligerent country. It was not until 1856 that even America demanded that all persons travelling and seeking leave to land in an American port should have a passport. American citizens were likewise required to have a passport before leaving America.

Foreigners coming to the United Kingdom were required to have passports and to make a declaration to the Chief Officer of Customs when landing. However, this rule was not strictly enforced and the declaration could be made in writing, even days after the landing. No doubt many undesirables found it expedient not to make the declaration or show their passports.

In 1858 the British passport was reduced in price from 7s 6d to 2s. Very few were issued, only 9,000 in all that year, and seemingly mainly to those inveterate travellers—the aristocracy, doing the "Grand Tour", and to business men.

Indeed in that year a party of British excursionists to the port of Cherbourg were very surprised when they were not allowed to land without passports. The excursionists apparently considered passports were mere formalities which the French had no business to ask for.

Passports of the nineteenth century were printed on a single sheet of paper, which was usually folded inside a green leather cover. There was no photograph, nor even a description of the bearer, just the name and nationality written in by hand.

So vague were the descriptions that a lady was issued with a passport giving the names as "The Honourable Mrs Florence Glyn (British subject) accompanied by her five daughters and a governess travelling with two maids and a man servant—Peter Robinson also a British subject". Apparently the nationality of the governess and maids did not matter, no one then thought that mere females were any problem.

The passport was worded then as it is now "We . . . Her Majesty's Principal Secretary of State for Foreign Affairs Request and require in the Name of Her Majesty all those whom it may concern to allow . . . to pass freely without let or hindrance and to afford him every assistance and protection of which he may stand in need."

This state of affairs continued until the outbreak of World War One, and even after that war started a passport was still not compulsory. It was not until April 1915 that aliens were required to have a passport with photograph attached or some other document satisfactorily establishing nationality and identity. Male British subjects were not allowed to leave unless they had a passport issued by the Foreign Office. It was at this time that the modern British passport started to come into use.

In 1926 the then League of Nations held an International Conference on Passports. The conference decided that a passport was extremely valuable in establishing identity and nationality, and recommended that the British type be copied as a model.

From this conference also came the forerunner of the "stateless" passport—the Nansen passport issued to refugees, who were then mainly of Russian and Armenian origin. The passport was called after the High Commissioner for Refugees, Dr Fritjof Nansen.

Though the Nansen passport no longer exists, other documents have taken its place. Most countries now have special travel documents for non-nationals which offers them some protection by the issuing state when the holders travel.

Most countries in the world accepted the recommendations of the 1926 conference and issued passports on the British pattern. They vary in size and the colour of the cover, even to the number of pages, but all given the name, the place and date of birth and a photograph of the holder. There are of course exceptions to the rule, and one tiny sheikhdom in the Persian gulf has even issued passports which were handwritten in Arabic by the Sheikh himself on pages torn from a school exercise book!

British passports have hardly changed in the past fifty years, though there are now two main types—the standard passport available for travel to all countries and valid for ten years, and the Visitors' Passport. This latter is only available for travel to certain specified countries and is valid for one year. It is a three part folded card with the bearer's name and home address and photograph, but it gives no description.

In the past few years some countries have altered the design of their passports and given them limp covers. Documents of this type can be fed into automatic processing machines, thus saving the present time-wasting process of handwriting entries on four or five pages. Amongst countries going over to the new system is Canada, though the United Kingdom has refused to do so.

With the advent of more and more computers into our lives who knows what the future passport will be like? Perhaps it will be something on the lines of a credit card, and would be fed into a computer-terminal at the point of arrival to note and check the bearer's identity?

No one can tell. But it will be a sad day when we no longer flourish a passport with those magnificent words in it '. . . requests and requires in the Name of Her Majesty all those whom it may concern to allow the bearer to pass freely without let or hindrance . . . '.

HAVE YOU SEEN? (*from opposite page*)

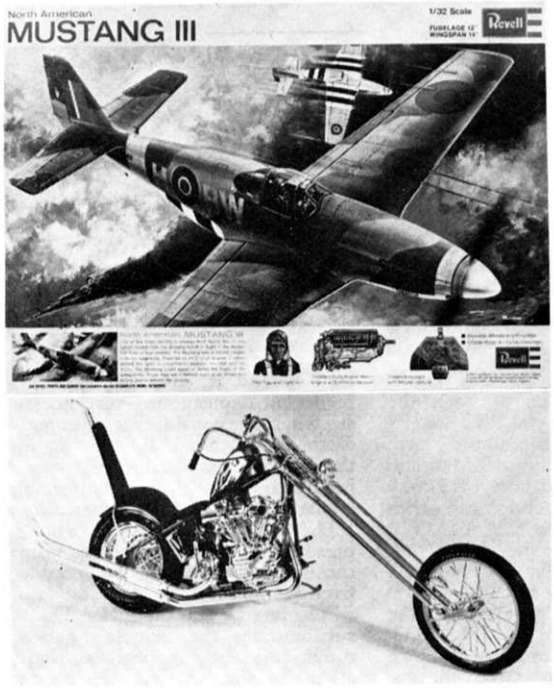
cludes a re-shaped fuselage and new markings. The Stuka has a 17 in. wing-span and the P47 15¼ in. Both these latter two kits retail at £1.11 each. The latest addition to the ⅛ in. scale bike range is the L.A. Street Chopper (price £3.82), which measures nearly 18 in. long. The parts are cleanly moulded in a metallic red plastic with roughly two-thirds chromium plated. The tyres are moulded in a soft rubber and are hollow. The last of the new releases from Revell is a kit entitled, "The Baron and his (5-winged) Funfdecker Falcker", which is a comical caricature kit that is aimed at the younger modeller. It comes under the trade mark of "Deal's Wheels", Deal being a well-known American cartoonist from whose drawings Revell are producing kits. Already they have produced four caricature cars which come under the titles "Firebird", "Go-Mad Nomad", "Baja HumBug", and "Van". These are available on the American market but not, to our knowledge, over here as yet. The Baron sells at 96p and measures 6½ inches high.

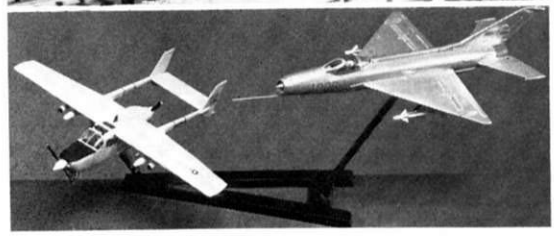
A book sure to be of interest to aircraft enthusiasts is "Spitfire", published by Patrick Stephens Limited in association with Airfix Products Ltd. (U.K. price £1.50). The book is written by Roy Cross and Gerald Scarborough and describes the history of this famous fighter and how to model it. "Spitfire", the first in a new series entitled "Classic Aircraft", is filled with useful close-up photos and descriptions of almost every part of the aircraft, inside, and out. This informative book is a must for anyone building the Airfix 1/24 scale "Spitfire" or the Revell 1/32 scale or one of the 1/72 scale Spitfires produced by Airfix, Frog and Revell.

A new book entitled, "Model Building in Meccano and Allied Constructional Sets" would make a nice Christmas or Birthday present for someone who already owns a Meccano set. The book contains hundreds of photos, with descriptions, of models made from Meccano from a simple railway crane to a working model of a steam road locomotive. The book is to be published by C. Combridge Ltd. and retails at £1.50 in the U.K.

HAVE YOU SEEN?

Right, above the 2-6-0 Mogul and below the MIG 21 and Cessna, Dogfight double.
Below, Revells new 1/32 Mustang III and 1/8 scale L.A. Chopper. Bottom right, also from Revell, the 1/32 Stuka and P47 Razorback.



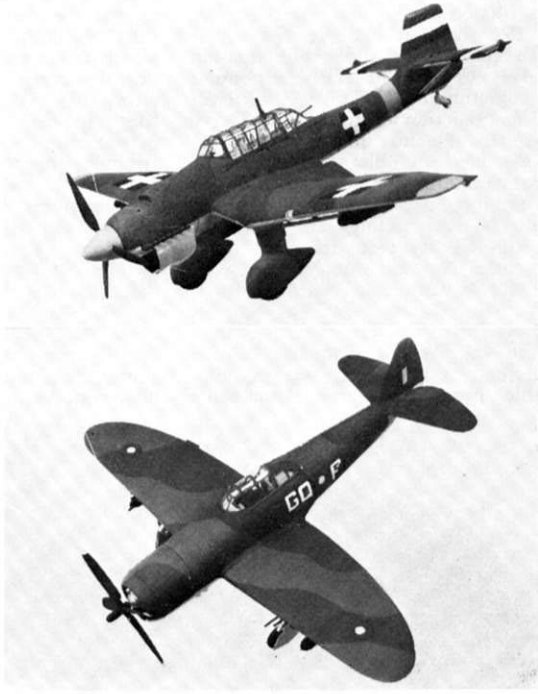


PATRICK Stephens Limited have just released three new books concerning railways. The first one, entitled "Track Topics" describes the building of the original Great Western Railway main line as well as the improvements made to it later on. Also included are chapters on Brunel, the Box Tunnel, the Royal Albert Bridge and the Severn Tunnel. "Cheltenham Flyer", the second publication, describes the Great Western Railway during the 1930's and also the world's fastest train at that time, the "Cheltenham Flyer". The last of the three we received, entitled "Locos of the Royal Road", covers, with pictures, the engines which ran on this particular railroad. It shows the development, design, construction and standard features of all the different classes of locomotives. All three books are reprints from the Great Western Railway's famous "Boys of all Ages" series by W. G. Chapman. Each book has over 230 pages with photographs and drawings, case bound with colour dust jackets. The price, £1.60, is however somewhat high for a small boy who might be interested in railways, but they would make an excellent reference source for the enthusiast.

Four new Airfix kits are the Admiral Graf Spee, Cessna and MIG 21 (in the Dog Fight Doubles series), the Douglas Invader and a re-issue of the BR 2-6-0 Mogul. The Graf Spee is in 1/600 scale. It has a very nicely detailed deck and is accurate. The only criticism is that the masts are rather clumsy and would look better if made from stretched sprue. The completed model measures 12 inches long and retails at 49p. The Dog Fight Double set (U.K. price 33p) comprising the Cessna 0-2A or 0-2B and MIG 21, could hardly be called a dog fight as the MIG has a maximum speed of 1,320 m.p.h. (Mach 2) and the Cessna only does 200 m.p.h. However, it does make a nice set of aircraft that are being used in Vietnam. The last and probably the best new aircraft release from Airfix is the Douglas Invader bomber which can be made for daylight use, with nose, fuselage and under-wing armament, or as a night fighter with wing armament and clear canopy on the nose. There are two sets of transfers, including markings for either "Miss Mildred" or "Monic", both of the U.S. Air Froce. The surface detail and part alignment on this kit is very good. The British Railways 2-6-0 Mogul is in OO/HO scale and is moulded in black polystyrene and retails at 50p. It appears to be highly accurate and is very detailed with moving valve gear parts etc., and apart from its decorative value in its own right, must turn quite a few thoughts to motorisation.

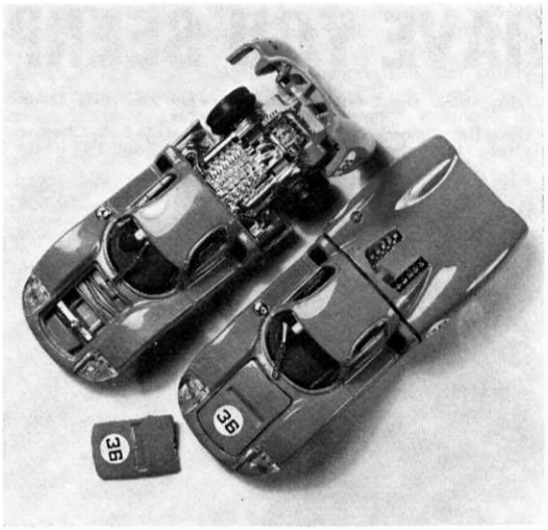
Revell have several new releases this month, including three new 1/32 scale aircraft. The first of which is the North American P51 Mustang III in RAF markings, which has had changes made to the canopy and engine from the U.S.A.F. version. It has a 14 in. wing-span and retails at 92p. The second is the Junkers JU 87B Stuka in Hungarian markings, and the third is the P47 Thunderbolt Razorback which in-

(*continued opposite*)



Fact and Fantasy

Frank Lomax looks at the latest Dinky Toy releases



This bird's-eye view of the Matra illustrates the intricate detail of the plated engine and the effective lift-off bonnet panel at the front. Note the windscreen wiper.

A "U.F.O." has been tracked on the interstellar radar scanner at S.H.A.D.O. headquarters. The Interceptor's efforts to destroy it in space have failed and, successfully evading Skydiver in the earth's atmosphere, the celestial invader manages to land in almost inaccessible woodland. Undaunted, however, S.H.A.D.O. Chief Commander Ed Straker orders into action the only vehicles designed to deal with such a situation—the S.H.A.D.O. 2 Mobiles. Several of these powerful vehicles rumble into position, encircling the alient spaceship from a distant, unknown and dying world. Ed Straker's decisive voice sounds over the radio with the inevitable order, "Destroy" and, with swift, technological precision, the S.H.A.D.O. 2 Mobiles fire their rockets and obliterate the alien craft.

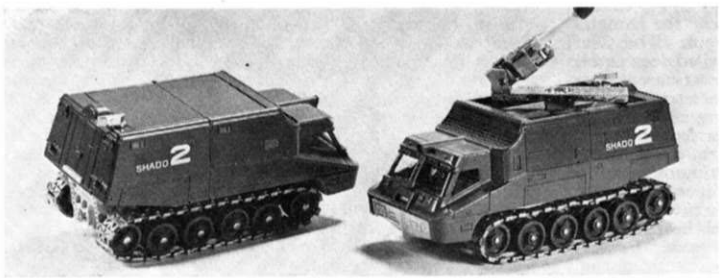
Fiction, of course, but regular T.V. watchers will recognise the foregoing as just the sort of situation likely to arise in I.T.V.'s popular programme, "U.F.O.", the latest science-fiction creation from Gerry Anderson and his Century 21 associates. Unlike their previous presentations, "U.F.O.", with its combination of spectacular visual effects, real settings and excellent acting ability from its "real" performers, appeals just as much to adults as to children. The exciting, futuristic designs of the vehicles used by the S.H.A.D.O. organisation—Supreme Headquarters Alien Defence Organisation—are admirable proof of Gerry Anderson's ingenuity and, as you may know, Dinky Toy versions of both the U.F.O. Interceptor and Ed Straker's Car from the programme have already been produced. Meccano (1971) Ltd., the makers of Dinky Toys, have now extended the series with a model of the S.H.A.D.O. 2 Mobile and I have no doubt that this will prove just as much a success as its partners.

As in the T.V. programme, the Dinky Toy version of the S.H.A.D.O. 2 has a robust, sturdy appearance caused by the impressive "heavy-duty" design of the metal mainbody which is supported by a six-wheel, flexible caterpillar track system on either side. These wide wheels and the removable, realistic track are manufactured from a durable plastic, strong enough to withstand the toughest terrain! The Mobile's unique shape gives it an unusual profile, somewhat reminiscent, in my mind, of an Army-type amphibious vehicle, and to make sure that its identity is not mistaken, a "S.H.A.D.O. 2" adhesive label decorates both sides of the craft.

The projecting cab, with its sloping face and sides and the cowl-like, concave air-intake grille, situated behind it, give the vehicle a menacing demeanour—very necessary when one considers the danger to earth from the U.F.O.'s! Inside the heavily-armoured cab, the red moulded seats look comfortable enough for the most meticulous S.H.A.D.O. 2 navigator, who is presented with a wide field of vision through the two expansive, moulded front windows.

The rear view of the S.H.A.D.O. 2 substantiates the vehicle's general rough-and-ready appearance, with all the original's details represented in outline in the casting—central doors, rear lights and track support mechanism.

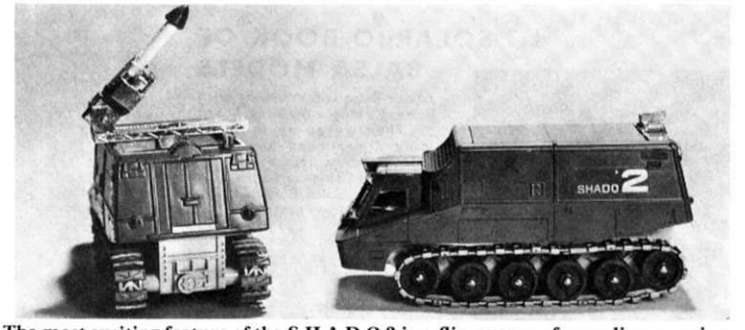
Undoubtedly, however, the most exciting feature of this model is a button-release flip-over roof with a multi-directional spring-firing rocket attached to its underside. The button is actually disguised as a radar scanner at the rear end of the roof and, upon release, the roof immediately flips over to reveal a spring-loaded rocket launcher (with rocket!) mounted on a platform which can be rotated through a full 360 degrees in either a clockwise or anti-clockwise direction. In addition to this, the rocket carriage itself can be raised to an angle of approximately 45 degrees, thus enabling the white plastic missile, rubber-tipped for safety, to be fired in virtually any direction! The rocket is fired by simply pressing a second button on the launcher which frees the rocket from its retaining catch, the launching spring then shooting it at its target.



Straight from T.V.'s "U.F.O." programme we have Dinky Toy No. 353—S.H.A.D.O.2—an "action model" packed with detail.

Marketed under Sales No. 353, the S.H.A.D.O. 2 is finished mainly in a military green enamel with the track undercarriage in a pale green, the track itself grey, and the wheels a chocolate brown. The rocket-firing mechanism and platform are plated, with the underside of the roof being painted a contrasting orange.

I understand that the "U.F.O." T.V. programme will be appearing on our screens for quite some time yet and is likely to continue growing in popularity. I am sure that the Dinky Toy enthusiast, whether he follows the T.V. series or not, will find the S.H.A.D.O. 2 Mobile irresistible!



The most exciting feature of the S.H.A.D.O.2 is a flip-over roof revealing a spring-fired rocket on an adjustable launcher—U.F.O.'s beware!

Marvellous Matra

Commander Ed Straker is, no doubt, very satisfied with the performance of his own specially-designed automobile in the "U.F.O." T.V. programme, but I am sure that he would pass more than an admiring glance at the sleek (and real!) Matra 630—the subject of the Dinky Toy to be released this month.

Built very low to the ground, for maximum stability, the Matra 630 has the typical sleek, flowing body shape of the modern racing sports car. The prominent front wheel arches slope gently down to the blunt air-intake hatches, situated either side of the driver's cab, and the long, rear section is appropriately streamlined, tapering to an almost-square tail segment.

Dinky Toys have captured all the lines of the original car in their miniature version—Sales No. 200—and they have added some of their own special features to increase realism and play-value.

Give the model a good push on a flat, smooth surface and it will streak away from you at a great speed. "Fast car, fast model" you might say, but what's more, it will carry on running and running until long past the point where any "ordinary" model would have stopped. Such performance is, of course, due to Speedwheels—just one of the exciting features of this model.

Also included is a windscreen, with a plated wiper which can actually be moved—manually—from side to side, windows, seats and steering wheel. Externally it has moulded "glass" headlamps, racing number discs on front and sides, a plated fuel filler-cap and, more impressive still, a lift-off bonnet panel at the front and an opening engine cover at the rear, the latter hingeing back to reveal a highly-detailed engine representation in a shiny plated finish.

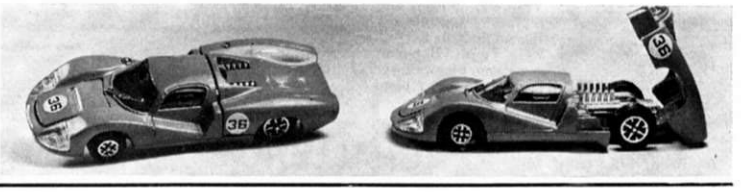
Overall finish of the model before me is in a beautiful light blue with black interior moulding, set off by a white steering wheel. The effect is striking and adds the final touch to a first class model.

Action Kit News

Dinky Toy enthusiasts are certainly being treated favourably by Meccano (1971) Ltd. this month. Apart from the S.H.A.D.O. 2 Mobile and Matra 630, the Liverpool toy factory has expanded its Dinky Action Kit range with the release of a Volvo 1800S Kit, No. 1002, and the Volkswagen 1300 Sedan Kit, No. 1003.

As Dinky Kit builders will already know, all the Kit components are supplied in unpainted form, finished to high standards, with the metal parts pre-bonderised in preparation for painting, and each Kit of course includes all the necessary wheels, axles, tyres, jewelled headlights and plastic interiors, the last moulded in effective colours.

In my opinion, the main advantage of the Action Kits, apart from the pleasure of building the components up into real, honest-to-goodness Dinky Toys, is that *you* can decide upon the colours of the completed vehicles. So, with a little imagination and, of course, some extra paint, you can create your own Dinky Toy "specials" and both the Volvo and the Volkswagen certainly offer plenty of scope for "special" finishes. Overall, then, this is a very good month for Dinky Toys.



Dinky Toy No. 200, the Matra 630, has all the sleek lines of the original plus many of its action features.

DIAMONDS (*continued from page* 39)

gem-quality crystals are grown in a continuous process, sometimes extending over a period of weeks. The process for growing these large, high-quality diamonds was developed after several years of intensive research, and required the design of apparatus that could withstand extreme pressures and temperatures for long periods of time.

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These large diamonds still are in the laboratory stage and—because the cost of growing these crystals is extremely high—not ready for commercial production. Even with highly skilled experts and an expensive apparatus, only a few such diamonds can be grown over a relatively long period of time.

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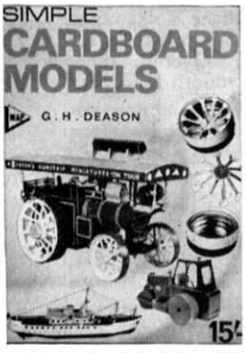

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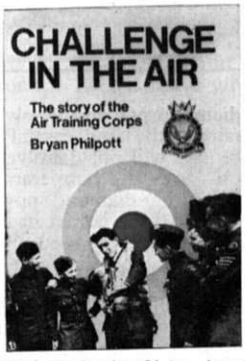

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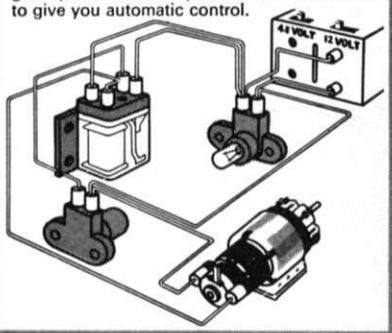

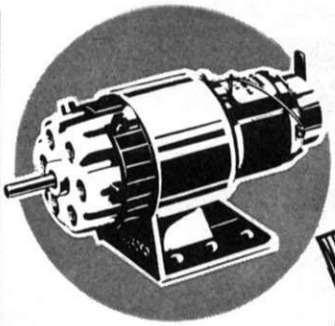

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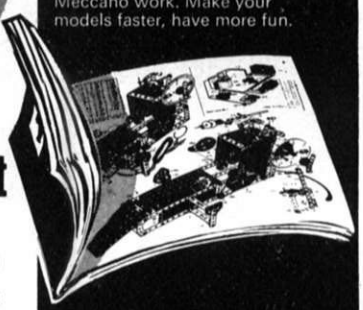

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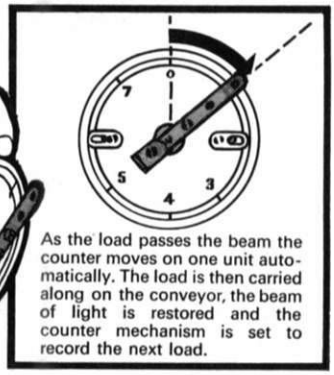

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