DO YOU KNOW WHICH COUNTRIES THESE FLAGS AND EMBLEMS BELONG TO?*

WE DO—WE COLLECT THE SMASHING NEW BROOKE BOND PICTURE CARDS 'FLAGS & EMBLEMS OF THE WORLD!' GET THIS SUPER ALBUM FROM YOUR GROCER. IT ONLY COSTS 6P!

There's a wealth of interest and excitement in these colourful new Brooke Bond picture cards. When you collect them you soon learn the fascinating origins of 50 Flags and Emblems, as well as the countries to which they belong.

Get the Special Album. It holds the whole series of 50 cards and gives lots of extra information and drawings of Flags, Emblems and Heraldry. It costs just 6d. from your Grocer (or write to Brooke Bond Tea Ltd., Picture Card Division, Goulston Street, London, E.1, enclosing 6d. stamp). Cards and albums available in U.K. only.

*Were you right? Turn the page upside down to see the United Kingdom & Norway & Canada & India.

FLAGS & EMBLEMS OF THE WORLD

Picture Cards FREE in packets of Brooke Bond Tea and Tea Bags
"Anyone who can make a mess-up of loading an Instamatic camera is a rare genius and I'd like to meet him."

We did once.

This dreamy character loaded an Instamatic camera with a bar of chocolate. Then he ate the film.

But weirdies apart, anyone can load these cameras. It takes three short and simple seconds. (Check up on right.)

An Instamatic 25 camera costs 53/1.

And the pictures you get are just great. Colour or black-and-white.

Unless, of course, you loaded the camera with chocolate . . .

Kodak Instamatic cameras . . . picture-taking made beautifully simple

P.S. HERE'S HOW YOU DO IT WITH FILM

1. Open the camera. 2. Drop in a film cartridge 3. Close it up, wind on, and start shooting.

"Kodak" and "Instamatic" are registered trade marks of Kodak Ltd.
1 part water, 1 part mirror, a few parts Meccano
a touch of genius—and you've got a Microscope

This simple Meccano Microscope magnifies up to 40 times. The lens is a drop of water, suspended in a Meccano hole. We take off our hats to the genius from Solihull who devised this practical instrument with Meccano.

This is yet another of the marvellous models that are made by Meccano enthusiasts around the world. Original, ingenious; simply clever, or cunningly detailed; practical, entertaining, educational... lots of descriptions apply to these masterpieces, and you can build them for yourself.

If you are already a Meccano enthusiast, you'll know what we're talking about, and how to extend your Meccano with the Conversion sets. But, if you have yet to discover the thrills of building with Meccano, there are ten fabulous sets that you should know about. These are complete with instructions for making hundreds of models that really work.

We should like you to write about any models you've made which you think would be of interest to other Meccano enthusiasts round the world. Please send photographs and descriptions to Meccano Ltd., Binns Road, Liverpool 13.

THE WORLD'S GREATEST CONSTRUCTIONAL TOY
START OFF RIGHT with a KeilKraft model aircraft kit!

**FIREFLY**
Stunt model with "profile" type fuselage, specially designed for engines under 1 c.c. Kit contains die-cut parts. Wingspan 20 in. 20/-

**NOMAD**
Beginner's model with fuselage parts, tailplane and fins in pre-cut, decorated sheet balsa. 20 in. span. 6/-

**DEMON**
Class A team racer to the new S.M.A.E. specification. Kit contains die-cut parts. For engines up to 2-5 c.c. Wingspan 30 in. 36/10

**CONQUEST**
Towline glider for beginners, with a very good performance. Kit contains die-cut parts. Wingspan 30 in. 10/-

**GEMINI**
Duration model with all fuselage parts, tailplane, and fins in pre-cut, pre-decorated sheet balsa. Wingspan 22 in. 10/2

---

and when it comes to radio control

**MINI SUPER**
Keikraft's popular radio control model. A real pleasure to build and fly. Kit contents include—all parts pre-cut, metal chunk tank, preformed undercarriage, three sponge rubber wheels, pre-shaped leading edge section, full size plan and building and flying instructions. For 1-5 to 2-5 c.c. engines. Single channel or intermediate R/C. Wingspan 48 in. £4.19.8

All these Keikraft kits contain die-cut parts for speedy, accurate assembly, and full size plans plus building and flying instructions.

**RIGHT from the start!**
See this famous range at the local model shop
A. N. BECK & SONS
Continue to offer
the widest range of
CHEMISTRY
APPARATUS
and
CHEMICALS
for Students

Stockists of:
MONAX GLASSWARE
E-MIL VOLUMETRIC APPARATUS
AND THERMOMETERS
ROYAL WORCESTER AND SILLAX
PORCELAIN
COMAK CHEMICALS
BRITEX MICROSCOPES
HELIX WOODWARE AND STANDS
DISSECTING INSTRUMENTS
MICROSCOPE SUNDRIES
AND MANY OTHER PIECES OF
SCIENTIFIC EQUIPMENT

Send stamped addressed envelope for
price list to
A. N. BECK & SONS
60, Stoke Newington High Street,
London, N.16.
TELEPHONE 01 254 0335
WANT TO BE AN ENGINE DRIVER?

Then have fun driving a Mamod Steam Model. The traction engine and the road roller can actually be steered as they go. There are stationary engines, too, for powering Mamod miniature working machines and Meccano models. Precision engineered, Mamod models are safe as well as fun. Prices from 35/9 to 111/9 at leading toy and sports shops.

Mamod
STEAM MODELS
mean a world of fun for you.

MANUFACTURED BY MALINS (ENGINEERS) LTD., THORNS RD., QUARRY BANK, BRIERLEY HILL, STAFFS.
When they start to call you Mister and pay you once a month...

Life is rough. You begin your school career as The Lowest Form of Animal Life. This is not much fun, but you take it and say to yourself, 'Never mind, one day...'. Then, at long last, the day arrives and you find yourself a member of the lordly fifth or sixth. Privileged. Elite. Cock of the Walk.

Then what happens? You go out to earn your living and—crash—suddenly you are The Lowest Form of Animal Life once more. Small fry. As a sop to your wounded pride, they call you Mister and pay you a monthly salary.

So the long climb upwards begins all over again. But there is a difference this time. This time seniority will not take you to the top. The qualifications now are drive and ability.

Or they should be. In Barclays Bank—where there are over 3,000 managerial positions to keep filled—drive and ability will certainly take you high. You could be in charge of your own branch in your early thirties. You could be earning £5,000 a year or more in your mid-forties. There is tremendous scope in banking today. Think about it.

Barclays Bank

If you have never thought about banking as a career before, but would like to know more about it now, complete this coupon so that we can send you our booklet 'The Business of Banking'.

Send the coupon to The Staff Manager, Barclays Bank, 54 Lombard Street, London, E.C.3.

Please send me your booklet 'The Business of Banking'.

Name: __________________________________________________________

Address: ________________________________________________________

_______________________________________________________________

MMW/3

B
Following my announcement in last month's issue about the end of the present Meccano Magazine, I have received so many letters from readers expressing their sadness about the news, that it will be quite impossible to reply to every one individually. I would therefore, like to take this opportunity of thanking all those who wrote to me and I would also draw their attention to the announcement on page 17 of this issue. My own views about the closure were set out last month, and as this is the last MM I have devoted quite a lot of space to a 'look-back' at the early years of the magazine and the people associated with it. For older readers it will be a reunion with names from the past and for the youngsters, an introduction to the origins and originators of Meccano and its magazine.

The Editor

Contents

Spitfires to Spaceflight
Holsters and Hardware
A Tram for Two
Thunderbirds are Go!
Bovington Museum
Build a Lotus GP 24
At the Turn of a Wheel
Home of the Fighting Scouts
MM Computer
A Backward Glance
Meccano Magazine No. 1
Hovercraft
Looking Back Over the Years
Submarine
Small Meccano Models
Stamps
Meccano Grab

1939
'In Line Ahead', an appropriate cover for the outbreak of World War II, and typical of the pre-war large format MM covers.

1941
This was one of the last magazines of the pre-war format; from January 1942 wartime restrictions enforced a reduction to half the cover size which lasted almost twenty years.

1951
A Meteor jet dives over the clouds on the cover of an early post-war MM, but jet propulsion is not the only sign of the post-war age here—the price has gone up shreepence.

1961
Back to a larger format, (9 in. by 9 in.) and the 'Queen Mary' is still as popular as ever, despite competition from the air. Boats have traditionally been popular subjects for MM covers.

1963
One of the last 'traditional' covers, and the bi-plane reflects the tremendous growth of interest in historical transport subjects. The magazine returned to its full present cover size in March 1964.

THIS MONTH'S COVER: The 45,000 ton P & O liner Canberra at Circular Quay, Sydney. Canberra is over 800 feet long, and carries 546 first and 1716 tourist class passengers on her voyages around the world. By courtesy of P & O.
Below: A flight of Fairey Swordfish against a background of sky and sea. These biplanes had a top speed of 139 m.p.h.
TWENTY-FIVE years ago, when I was a very junior and very hard-up member of Sir Sydney Camm's design team at Hawkers, I began writing articles about aeroplanes. One of them found its way to the desk of Mr. W. H. McCormick, who was then Editor of Meccano Magazine. Unlike other Editors, who had sent me sufficient 'Editor regrets' notes to paper my bedroom, he not only accepted it but offered to pay me the princely sum of three guineas for it, which was far more than my weekly pay at that time!

So started a link with M.M. that has remained unbroken through the years. My first three articles, written in the middle of World War II, dealt, predictably, with the Hurricane and Spitfire fighters and the Swordfish torpedo-bomber. The title illustration to the first of them showed Sir Sydney Camm, but for whom I would probably be an architect rather than mixed up with aviation—which had always been my real ambition.

What incredible changes we have been able to report in M.M. through this past quarter of a century. The dear old Swordfish, despite its wartime achievements, was a left-over from the biplane era with a top speed of only 139 m.p.h. Today, many aeroplanes land and take off at higher speeds than that, and the North American X-15A has reached a speed of no less than 4,250 m.p.h.

In more technical terms, the X-15's unofficial speed record, achieved on November 18 last year, was Mach 6:33, or six and one-third times the speed of sound at high altitudes. The Swordfish's top speed was Mach 0.18 at sea level—not that this would have meant much to the pilots who used it to wreck the Italian fleet at Taranto in 1940 or to cripple the German battleship Bismarck.

Machmeters, which indicate the speed of an aeroplane as a proportion of the speed of sound, began to be more important than airspeed indicators only with the arrival in service of the first jet-fighters in 1944. In a dive, the airflow over the wings of these aircraft began to approach the speed of sound. When this happened, the aircraft was buffeted by shock-waves of air, which were sometimes powerful enough to make the pilot lose control. So pilots had to be careful not to exceed a safe Mach number, and the Machmeter told them when they were getting near the danger mark.

When Geoffrey de Havilland, son of the founder of the great D.H. company, flew so fast that his little tailless research aircraft was broken up by shock-waves, the newspapers began to refer to the 'sound barrier'. The speed of sound (Mach 1) was believed by many people to represent the limit beyond which no aeroplane would ever fly.

One person who did not share this belief was Captain Charles Yeager of the U.S.A.F. He was willing to stake his life to prove that aeroplanes could fly through the 'sound barrier', and on October 14, 1947, he became the first man ever to travel at supersonic speed, in the little Bell X-1 rocket-plane. It was a rough ride, and some years later he tumbled, unconscious, for ten miles in the improved X-1A after reaching the then-unprecedented speed of 1,650 m.p.h.

This is the kind of man whose courage and skill have made possible such immense advances in aviation during the last two decades. It was a tremendous thrill to meet him and to hear the inside story of those flights, first-hand. Many other famous persons have been happy to provide stories for the M.M.—men like Sir Alliot Verdon-Roe, Britain's greatest pioneer of flying, Igor Sikorsky, builder of the first four-engined aeroplane and the first really practical helicopter, and even Yuri Gagarin, the first man to travel in a spacecraft.

No less exciting has been the opportunity to share personally in some of the great new developments, rather than simply to talk about them and write about them. This is when my rather battered old "Personal Flying Log Book" comes in handy as a check on dates and other half-forgotten details.

My monthly 'Air News' feature in the September 1948 M.M. told of the international helicopter speed record of 124-3 m.p.h. set up that year by the Fairey Gyrodyne. A few weeks later I made my first helicopter flight in the Gyrodyne, in the capable hands of test pilot F. H. Dixon. Only nine years had passed since Sikorsky's historic first hops, so it was rather like flying in a stick-and-string aeroplane of 1912, nine years after the Wright brothers' first flights.

Not long after that, my wife and I celebrated our fourth wedding anniversary by hopping across the Channel on the vehicle ferry service operated by Silver City Airways between Lympne Airport in Kent and Le Touquet in France. So many people have now travelled by Silver City and its successor, British United Air Ferries, that the service is no longer newsworthy; but it made a good story in the early days—as did a later flight on which we took a sailing dinghy on a trailer, and its towing car, to Cherbourg—the first time an aeroplane, boat and car had ever flown together.

The February 1954 issue contained an even better 'scoop'. Readers of M.M. are often just the kind of youngsters who make first-class aircrew and ground crew members; so the Air Ministry was always very willing to co-operate by providing opportunities for unusual stories.

The one for which I gathered facts and photographs at the R.A.F. Station of West Malling on November 26, 1953, was certainly unusual. Quoting from it:

'I could hear the roar of Vampire and Meteor night fighters taking off on practice interceptions as I drew up at the Station Guard House and presented my impressive-looking Air Ministry Pass.

"Fifteen minutes later I was trussed up like a Christmas turkey in the dark, cramped cockpit of Vampire NF.10 night fighter "E for Easy"; resplendent in borrowed flying suit, complete with "wings" and embroidered squadron crest, yellow "Mae West" life belt, helmet and oxygen mask. I had clipped together the four straps of my parachute and more straps of the seat harness, and plugged in my radio-telephone (R/T). Despite which I discovered that, by releasing a small catch on the side of the cockpit, I could lean forward quite comfortably and have a good look at the complex radar screens and maze of other equipment which surrounded me.'

We quickly took off on what was, I discovered later, the first-ever flight made by a journalist in a jet night fighter at night. It was an unforgettable experience, but only one of many.

Continued on page 25
This guy's perfected the downward and backward sweep which cocks and draws in one swift movement...
This guy knows what he's about...

This guy's all wrong...

Holsters and Hardware

By Doug Mitchell

Do you believe those stories about the Western gunfighter? Was he really as good with a six-gun as television makes out? Or was he the sort of guy who could only get his man with a saw-off shotgun or by shooting him in the back?

It's the fashion to debunk things these days, and to listen to some self-appointed experts, most of the famous gunmen couldn't have hit a barn—unless they'd been inside it. And as for television, it's all trick camera work.

To be fair, some of it is. You see a scene shot from behind the hero as his hand drops to his gun butt like lightning. Next, the camera is filming from in front as the gun is whipped out and fired. This is a real cheat however effective it may look, because the fast draw is done in two halves. Anyone can slam his hand down on a gun, equally, anyone can draw and fire fast if he starts with a ready-cocked gun with his hand on the butt and his finger on the trigger.

On the other hand, there are some actors, like Robert Fuller, who plays Jess Harper in Laramie, who don't need trick filming to make them appear fast. Robert Fuller is just as fast as they come, and if he is fast why not others? Let's look at some facts and see if the debunkers are right, or if there may be something in those stories after all.

First of all, consider the Quick-Draw Association of America, which holds an annual contest to decide the fastest—and most accurate—gun of the year. In 1966 the winner averaged just 0.46 of a second to draw, rise, and hit his target with a single-action pistol, which meant it had to be cocked as he drew.

"Ah, yes!" I hear the scuffler say, "but that was with a modern weapon and it wasn't for real. How would he do if the target was shooting back?"

"Right," I retort, "how about the famous fight at the O.K. Corral? Those guns weren't modern and the targets were sure firing back!"

Maybe you know all about this famous gun battle when Doc Holiday and the three Earp brothers, Wyatt, Virgil and Morgan, took on five desperate outlaws? If you do you'll know that the shooting was all over in less than 30 seconds. The lawmen fired 17 shots, eleven of them finding their mark. Three of the outlaws were killed and the other two, Billy Clanton and Ike Clanton, fled without firing a shot. How's that for accuracy when the target is shooting back?

There's another well-authenticated story concerning Harry Longbaugh, better known as the Sundance Kid on account of he came from Sundance, and Butch Cassidy. Someone had started an argument about the merits of the Winchester rifle and its accuracy against a six-gun, and Butch and the Kid decided to settle it by a demonstration. They buckled on their belts and called for some empty bottles, then they took two each, tossed them into the air and shot them to pieces before they had started to fall. They repeated the trick, if you can call it a trick, several times over.

Just to bring things up to date, but sticking to old-time hardware, a couple of years ago I saw a guy knock down three jam tins at 25 yards with just three shots out of a genuine, original Colt Forty-Five.

So where does this get us? I think the truth is that there were some real top-notch gun-slingers who could do all the things told about them, but that there were a sight more who seldom used a gun and weren't too accurate when they did.

But, you may ask, if there were fast shooters, what was the secret? The quick answer is two words: technique and practice. Let's look at technique first.

This guy's all wrong. The barrel is too long to clear the holster quickly, the belt is worn too high so that he has to bend his arm over much on the draw and, finally, he's cocking with the ball of his thumb, which is slow.

Now look at the man with the stitched belt and holster. As his hand has swept downwards and back towards the gun, his thumb has closed right over the hammer spur, knocking it into the cocked position, and already the short barrel has cleared leather (opposite page). This is where practice comes in—perfecting that downward and backward sweep which cocks and draws in one swift movement.

Now for actual shooting. This tough looking gunman (top of page) knows what he's about. His gun is well forested like a pointing finger, his legs are slightly bent at the knees to give his body balance, and the line of the gun is squarely in front of him. When that shooter goes off he's going to hit what it's pointing at! And maybe there's a secret here. If you point your finger at something just in the ordinary way, you'd be surprised how straight and accurate it is—naturally. It's much the same with a hand-gun. If you get used to it being in your hand so you don't think about aiming, it'll hit where you point it.

One of the biggest mistakes a greenhorn makes when firing, is that he pulls the trigger. No, I'm not being funny. If a trigger is pulled, maybe jerked is a better word, the gun barrel is deflected slightly to the left by a right-handed man, because of the pressure of the finger and the resistance of the trigger, even if the trigger has a very light action. The trigger should be squeezed, like if you have one of those grip developers in your hand. In this way, thethumb also exerts some pressure and the barrel remains steady.

And this brings me to the vexed question of fanning. Fanning, as you probably know, is when the gun is held with the trigger pulled while the other hand is used to brush across the hammer spur, like in the picture (above), cocking and firing in one movement. It's a very fast way of getting off shots but it's not as accurate as cocking and pulling (sorry—squeezing) the trigger.

A lot of writers have said that no professional would have ever fanned his gun, and in most cases they're right. When two men faced each other alone, it was the first accurate shot which counted and there wouldn't have been any need for another. Men like Wyatt Earp took their time, as he once said, and made sure the first round scored. But you've got to remember that when Earp took his time, it was still only a split second. What it really meant was that he never got flurried and grabbed his gun hastily. But if a man wanted to spread a lot of lead around quickly, fanning was the way he did it, and if he knew how to use his gun, he mightn't knock the pig out of an ace but he'd sure scare the dealer!

Well, friends, that just about winds it up. There's just one thing, though, if you ever point a gun at anything, be sure you mean to hit it. It's no use after you've shot someone in the face trotting out that lame old chestnut 'I didn't know it was loaded'.
A TRAM FOR TWO

Not a project that a novice should tackle, but the constructional dodges Doug McHard employed in building his 2 mm. (N gauge) tramcar, might well help to solve some of your other modelling problems.

TRAMCARS have always fascinated me and so has really small scale modelling. With the coming of a practical N gauge system there was obviously therefore an opportunity to combine the two interests, but it was not until I saw Tony Parkinson's beautiful little 2 mm. tram at the last Manchester Exhibition (see March 1967 M.M.) that I decided actively to do something about it.

The 'Manchester Tram' used an opaque Plastikard body and an Egger mechanism (not Arnold as incorrectly reported in March), it also used a pantograph overhead collector, and I wanted, if possible, to use a trolley pole. I decided that my tram must be transparent—one of the nice things about tramcars is the way you can peer right through them—so the body would be fashioned from 1/4 in. thick Perspex sheet. I didn't have an Egger mechanism around, but I did have a spare Minitrix 0-6-0 chassis and upon investigation it seemed that it would fit the body, provided the motor could be re-aligned vertically and turned sideways to present a narrower profile. Because of the thickness of the body material the motor brush gear would also have to be rebuilt to bring the tension springs to the front and this, in turn, meant unsoldering the armature wires and rotating the commutator through 45 deg.—a tricky job!

By comparison, the work involved in shortening the chassis was child's play and the alterations can clearly be seen by reference to Photo 1, where the modified 0-4-0 unit is shown alongside the standard Minitrix chassis. The full size side view (Fig. 2) will also be useful and here I must draw your attention to the slight dissimilarities between drawing and photo. The photographs were taken before the exact body mounting method had been finalised and this is shown correctly in the drawing. A slot is filed in the motor end of the chassis to locate over one of the inner platform ends and the other end is then fixed beneath the opposite platform with a 10 BA bolt. Photos also show the mechanism wired for two-rail operation (testing) but the finished tram uses a proper trolley pole pick-up and a fine enamelled copper wire must therefore be taken to the brass tube trolley-pivot in the roof. The lead weight shown in the drawing is wedged and cemented between the tram sides, occupying as much of the 'tween-deck space as possible without 'blocking out the light'. The more weight you can cram in the better.

Now, if all that seems like an awful lot of trouble, I would like to tell you about the forthcoming Lima motor bogie which looks like being the answer to the 2 mm. tram constructor's prayer. It is narrow enough to fit within the body without alteration and is, of course, a four-wheel unit. Only trouble is that it will obscure a lot of windows, but for the non-mechanically minded it will provide an easy solution. First examples should soon be seen on the Lima British outline locomotive prototypes.

I decided to have a go at a proper trolley pole pick-up rather than a pantograph. Somehow, a British double-decker doesn't look quite right with a pantograph, although I know, of course, that some were used here and there.

A reliable overhead pick-up of this kind is always a problem in small scales but previous experience has shown a carbon block to be the best solution. In 2 mm. scale it would be necessary to make the whole head of carbon and by experiment, I eventually evolved the method shown. Using a Triang-Hornby replacement motor brush, the carbon end was carefully drilled, using a short length of 32 gauge spring steel wire (with the end stoned to a diamond point) for a 'drill'. This wire is sold in model aircraft shops for control line model flying and comes in 100 ft. coils! You could of course use a proper twist drill, but they are very expensive in these tiny sizes and I found the wire quite successful. Having drilled the block, it was then rough-shaped while still on its brass arm, using No. 400 wet and dry abrasive paper, and various Swiss files. The block is easily separated from the brass before final shaping which can be done after fixing it to the trolley pole. This too is made from 32 gauge steel wire and it is secured in place with a tiny drop of epoxy adhesive such as Araldite or Britfix 88, allowing this to dry out for several hours by gentle heat. The wire is a push-fit and it is only necessary to apply adhesive where in enters and emerges from the carbon head. Don't try to put the adhesive in the hole or you may destroy the electrical continuity. The lower end of the trolley pole is soldered to a piece of 18 s.w.g. copper wire shaped as shown in Fig. 3 to represent the trolley counterweight. This in turn is a free fit in the short 18 gauge brass tube which is epoxy glued in the roof. Photo 8 shows the trolley head being drilled and Photo 9 shows the finished head. Notice also the overhead wire which is 33 gauge copper, looped over the supporting cables or arms and soldered.

The body of the tram is, as already mentioned, made from 1/4 in. Perspex or Plexiglass. This is a rigid acrylic sheet and is fairly brittle. It may be bought by the square foot (about 7s. 6d.) and should be cut with a piercing saw. Leave the backing paper attached until the sawing is complete to avoid scratching the surface.

The body consists of five main units—two sides, two ends and a roof. The ends are shaped by heating the Perspex before a fire and, when soft, bending it over a simple wooden half-round former. It will retain its shape when cool. Best results are achieved by bending a larger piece than
required, and cutting down to size afterwards. The entrance doorway should also be cut out after bending, and the vertical edge of the entrance should be scraped and filed on its inner face until a knife-edge is achieved. Restore the polish with No. 400 wet or dry paper followed by Brasso metal polish. Photo 2 shows the body parts ready for assembly and you will notice the lower edges of the two side panels have been scraped to about \( \frac{3}{32} \) in. thick in order to allow the thin plastic (acetate sheet) truck frames to be cemented to the inside faces.

Assemble the body with Sellotape strips and try it for fit over the chassis (Photo 3). If all is well, the parts can now be joined using special Perspex cement, or Johnson's cine film cement. Balsa cement and plastic cement are not suitable for this purpose. Hold the bits together with Sellotape until set—leave them for several hours to harden thoroughly before proceeding.

The staircases are also made from \( \frac{3}{32} \) in. Perspex, sawn into thin strips, heated and twisted to shape.

The step positions are scribed on, and the steps then filed to shape with a square Swiss file. Photo 4 shows the stages of production.

More Perspex is used to fashion the inside compartment ends which are painted before fitting. End platforms are then cut and cemented beneath the body and the stairs—painted and edged with a stiff paper side panel—are fixed in place. Tweezers will be useful here (Photo 5). Perspex is also used to form the destination boxes and then the body beading and rubbing strips are cut from thin acetate sheet and fixed to the body using film cement applied with a No. 00 brush (Photo 6).

The painting can now be carried out and the windows are outlined using a draughtsman's ruling pen and ruler (Photo 7). My tram is dark blue with cream trim and dark grey roof.

Additional detail is added as follows: beneath the end platforms a further piece of \( \frac{3}{32} \) in. shaped

Continued on Page 25.
ALL the publicity surrounding the highly popular television puppet series 'Thunderbirds' tells us that 'Thunderbirds are go' and, as far as I'm concerned Thunderbirds definitely are go! What might be a 'silly children's programme' to some people is, to me, one of the best-produced and most skilful shows on television. Not only are the puppets themselves excellent models and animated by experts, but the equipment and the 'sets' in which they appear are amazingly detailed and real. All this, coupled with the skill of the photographers filming the various programmes, raises the series well above the ordinary run-of-the-mill T.V. show, from a technical point of view alone. Add to this the gripping suspense of the average Thunderbirds story, bearing in mind that it is aimed at youngsters, and you have a top-notch programme.

All well and good, but what, you may be wondering, has this to do with us here? The answer is simple. No matter what individuals think of Thunderbirds, Meccano Limited, as a company, have no doubt that Thunderbirds are go. Already they have produced a Dinky Toy model of Fab 1—the futuristic vehicle owned by Lady Penelope and driven by Parker—of the T.V. series. Now they have come up with another two International Rescue specials—Thunderbirds 2 and 4.

Followers of the series will know that International Rescue, around which the show is written, is an organisation dedicated, as the name suggests, to almost impossible rescues, not only on land, but also under water, as well as in outer space. To help them carry out their tasks, the heroes are equipped with a variety of specialised machinery, mostly rocket-powered, which enables them to do just about any-

By Chris Jelley

The two large pictures show the 'real' Thunderbird 4 diving on an underwater mission, and Thunderbird 2 (the subject of the Dinky model) hovering before extending its landing legs. Both photos are copyright AP Films Ltd 1966.
thing. The only problem is how to transport the required machinery to the scene of a rescue when needed, and the originators of the program have hit on the perfect answer—Thunderbird 2!

In effect, Thunderbird 2 is little more than a giant motorized chassis like a space ship with an enormous hole punched in the middle. This 'hole' is designed to accommodate a huge, removable pod or container in which all the necessary equipment is carried. When you think about it, the idea is ingenious. International Rescue can have any number of containers, each ready-loaded with all the equipment necessary for a particular job. It is then only a matter of moments for Thunderbird 2 to pick up everything required in an emergency, thus saving hours of valuable time.

Dinky Toys Thunderbird 1, marketed under Sales No. 101, is made under license for Century 21 Toys Ltd., who hold the rights on "Thunderbirds", and it certainly captures all the 'action' of the original. Manufactured almost entirely from die-cast metal for strength, it is of course, an exact reproduction externally on the prototype, from the 'flattened-cigar' shaped body to the raised platform tailplane, and incorporating the stubby, swept-forward wings. Protruding aft beneath the tailplane are the rocket exhausts, in red plastic with silver inserts, which strike the eye and give an appearance of power to the whole model.

Casting detail is very good, showing body panels, rivets, windscreen, flaps, etc., but of far more interest is the 'pod'. Yes! Like the original, the Dinky is fitted with a removable container complete with a drop-down door and carrying, believe it or not, a tiny plastic replica of Thunderbird 4! In the T.V. show, you may remember, Thunderbird 4 is used for underwater work and, as such, is comparatively small and compact. The Dinky Toy version, of course, must be small to fit into the container, but before anybody starts complaining, I should explain that it really comes as a bonus, Thunderbird 2 being the star of the piece, so don't go talking about 'fiddles' or anything like that. The pod, itself, incorporates two free-running rollers, allowing it to be moved into position and also serving as an undercarriage for the complete model when the pod is in place in the aircraft.

Now we come to what I feel is the most intriguing feature of the whole toy—the 'legs'. Before describing them, however, we should take another quick look at the T.V. programme to recap the usual operational methods of Thunderbird 2 when arriving at the scene of a rescue. After finding a suitable landing site, you will remember, the ship hovers over it for a few moments, then slowly lands vertically. As soon as it settles, the pod is released, and four telescopic legs raise the main ship until the container door is clear and can open. Thunderbird 2 then takes off, leaving the container behind, except on some occasions when it remains in the raised position.

The important items here are the legs and I am pleased to say that the Dinky Toy, also, is equipped with four retractable legs. Considering the small size of the model, of course, these could not be made telescopic, but they fold into the body, and are spring-loaded, so that a touch on two little buttons, one at each side, sends them shooting down into position. Consequently, it is possible to reproduce almost the exact operations followed by the original and even if the absolutely identical sequences cannot be followed, you can still have loads of fun.

Overall, the model is 53 in. long by 14 in. wide by 24 in. high on its legs and a height of 14 in. with the legs retracted. The pod alone is 23 in. long by 14 in. wide by 14 in. high, while Thunderbird 4 inside is 14 in. long. Thunderbird 2 is finished, generally, in the correct green gloss with yellow legs and, as already mentioned, red rocket exhausts, whereas little Thunderbird 4 is yellow, also with red rocket exhausts. Various identification names and numbers in white lettering appear on the body, wings, and fins of Thunderbird 2 to add the final touch to an excellent Dinky Toy.

This, then, completes the model, but, as this is probably the last issue of Meccano Magazine to be published, I should like to say goodbye to all my readers and should like to thank all of you who have written to me over the past few years. Don't forget, however, that Meccano Limited is still very much in existence, and that new Dinky Toys will continue to appear every month. Watch television and the Press for details.
This is the second part of H.L.D.’s feature on the Royal Armoured Corps Tank Museum. Part one appeared last month.

French representation is in the form of four tanks, including the 1917 Renault FT and the 1939 Char B I-Bis, which was armed with a hull mounted 75 mm. and turret mounted 47 mm. gun. This was the heaviest armoured vehicle in use with any of the combatants in 1940. A mixed collection follows with a Second World War tank from Sweden and Japan. Two Italian tanks are there. one is the successful M 13/40 medium, which saw much service in the desert. The Russian collection includes the T 34: this is a late model armed with an 85 mm. gun in a redesigned turret. Beside it is a recent trophy of the Armoured Corps, an SU-100. This Russian-built 100 mm. assault gun was captured from the Egyptians during the Suez campaign in 1956, and is still painted in Egyptian colours. The KV I heavy, and a light S.P. 76 mm. anti-tank gun make up the other Russian exhibits.

The ‘Sherman’ was the main battle tank of all the Western Allies and there are two standard tanks exhibited. One is the British Mark VC conversion armed with the potent 17-pounder gun. The American heavy ‘Pershing’, with its 90 mm. gun, was specially designed to overcome the superiority of the German ‘Panthers’ and ‘Tigers’. As it appeared in 1945 it saw little service. The ‘Centurion Mark I’ was too late to see any wartime action, but it served as the basis for the ‘Centurion’ series of tanks still in service. The ‘Conqueror’ was not a success, due to its heavy weight and unwieldy size, but it did see service from 1952 in the British army.

Armoured cars can be a study on their own, and anyone interested will not be disappointed by the display. Commencing with the large solid tyred ‘Peerless’ of 1917, there are twenty exhibits covering all periods up to the modern ‘Hornet’ guided weapons carrier, armed with two ‘Malkara’ anti-tank missiles. The famous Daimler armoured car of 1940—as modelled by Dinky—is an important exhibit. The 75 mm. S.P. gun on the German eight wheeled chassis attracts much attention. The last numbered exhibit is our old friend the German three-quarter-track Sd Kfz. 251.

This is not all the Museum has to offer, as there are numerous showcases filled with interesting equipment, uniforms and photographs. There are separate sections for armaments, wireless and instrumentation. One corner is filled with a display of tank engines.

Outside the building there are a further 19 tanks. Many of them are British and American experiments. Five are special purpose engineers’ ‘Churchill’ including a Fial mine clearer and a Bridgelayer. Two are German ‘Jagdpanzer’ (‘Hunter’ tanks). The small one is a 75 mm. gun in the chassis of a Czechoslovakian light tank, this was called the ‘Hetzer’ (‘Baiter’). The other is the large ‘Jagdpanther’ with a long barrelled 88 mm. gun in the chassis of a ‘Panther’ tank. Three First World War tanks stand in front of the main entrance, and are the first and last to be seen by the visitor. But before leaving the area, one should cross the road to see the German long barrelled anti-tank gun ‘88 mm. PAK 41/43’ in the grounds of the Junior Leaders’ Quarters. At the playing fields on the road to Wool Village, there is a ‘Churchill’ and a ‘Sherman’. The ‘Sherman’ is of particular note as it is a Mark IBY armed with a 105 mm. Howitzer and fitted with the later type of tracks and suspension.

Grateful thanks are tendered to the Curator for his help, on successive visits to the Museum, which has made this article possible. WARPICS, of 11 Lloyd Road, Birmingham 20, must also be acknowledged for their assistance in providing all of the photographs used to illustrate the feature.

The top picture gives a good side view of the Sherman MK. IBY which is on display at the playing fields near the Museum. This interesting tank has horizontal volute suspension, very wide track, and is armed with a 105 mm. Howitzer. Below it is the Sherman MK. VC, which was converted by the British in 1944 to mount the 17 pounder gun. This picture gives a very good idea of the massive armoured plate carried by such vehicles.

Next photograph shows a Centurion Mk. IX practising on the R.A.C. training grounds to the North of the Museum. It is just about to cross the public roadway.

The last picture shows a Rolls-Royce armoured car, used for instruction purposes by the R.A.C.
Dear Reader,
When it was first announced that the July Meccano Magazine would be the last, many readers wrote expressing their regret that action of this kind had been necessary. Meccano Limited wish to acknowledge these views, but feel they should point out, in view of the opinions held by a few readers, that both the Meccano Construction System and the Dinky Toy range of models will continue to be manufactured, irrespective of the future of Meccano Magazine.

Although this is indeed the last Meccano Magazine to be published by the present publishers, we feel sure that existing readers will be pleased to hear that investigations are being made into the possibility of continuing the Meccano Magazine. It is hoped to recommence publication of the Meccano Magazine later this year, possibly in a different form, and if you would be interested in receiving the new Meccano Magazine, please complete and post the enclosed card, which is addressed and prepaid. We will then undertake to notify you if and when publication recommences.

Yours sincerely,
MECCANO LIMITED
H. J. Fallmann
Managing Director
Building a G.P. Lotus 24
by Godfrey Arnold

Although there are many excellent model racing car kits available, they rarely give the same satisfaction as building one's own car, especially if it is fast, handles well and looks good. The model described in this article can be made using only a balsa knife, although other tools are useful, and will provide performance which belies the low cost of just over a pound.

In this case, performance is provided by a Race Tuned Scalextric motor and roadholding by using an Airfix body and front suspension. The parts needed being: one Airfix Lotus G.P. body with the appropriate front axle assembly, Airfix pick-up braids, a Scalextric Race Tuned motor (not the Makuchi type) and a Scalextric Lotus rear axle assembly.

Start by removing the Airfix motor retaining ribs from the lower body pan and remove the rearmost seat locating rib, leaving the front one to provide location for the motor. Cut or file out the original V-shaped axle retaining indentations until the Scalextric rear axle bushes fit snugly and squarely in position, making sure that the centre of the axle is in line with the body joint. Mix some epoxy resin, such as Britfix 88, and fix the axle in position, making sure that the groove in the contrate gear is central and that no resin is on the axle itself, then leave this to set for at least 24 hours.

Once this epoxy resin is hard ensure that the motor rests exactly in line with the body joint, cut a hole in the bottom to clear the armature and then cut small pieces of balsa wood to fit around the motor at the front and rear to locate it. Make sure at this stage that the brush spring does not foul the body, and then fit the motor in position, making sure that the gears mesh correctly, that no part of the body fouls any moving parts and that the leads are in place. Six small holes can now be made in the body floor with hot pins or a drill, and the motor 'tied' in position with 15 amp fuse wire.

The Airfix braids can now be fitted as they are on the standard car, except that they are cut off shorter internally, and the ends of the motor leads are pushed into them and retained by the clips that keep the braids in position. Now make sure that the motor turns freely in the direction required (this can be checked by holding the partially finished car on your track and applying power) and change over the leads if necessary.

All that now remains to be done is to cut away the rear of the top of the body, ensuring that the contrate gear does not foul the bodywork, then the front suspension and body can be fitted so that the car is ready for track testing.

A driver should, of course, be fitted and this is easily done by cutting off the Airfix driver at the shoulders and sticking it to the rear cockpit bulkhead. The car illustrated was painted with Humbrol Midnight Blue, given numbers and a Lotus badge from a sheet of MRRC transfers, and the front suspension and the wheels painted silver for added realism. The rear tyres were rubbed down to give better grip and a more authentic size by mounting them on an old Scalextric wheel and spinning them with an electric drill and holding coarse emery cloth against them.

On the track this car is fast and is very easy to drive, its predictable roadholding making it capable of seeing off much more expensive opposition and, provided care is taken in assembly, it will be very reliable.

1. All the parts of the Lotus before assembly
2. The Scalextric Lotus rear axle assembly
3. Make sure that the brush spring does not foul the body
4. View of the completely assembled chassis
5. The underpan, from below
AT THE TURN OF A WHEEL WITH KEN WOOTTON

As you probably all know by now, with this July issue, the Meccano Magazine, known affectionately by us all as the 'M.M.', ceases to exist.

Before I go on to this last article proper, I'd like to place on record my own feelings about M.M.'s demise. It's over two months since I first heard of the tragedy—you may say old Ken's overdoing the tearful dramatics a bit—but personally, I do feel it's a great shame.

Though my own contribution began only recently, I've 'known' the magazine for years, and my father also read it avidly when he was a boy, so I suppose I was brought up on and nourished by Meccano and Hornby trains, etc.

Yes, it's all a pity, for I firmly believe that a magazine of this nature is still wanted in the '60s by the boys of Britain—young and old. It's a pity to see it vanish, overnight, so to speak, after 51 years.

Well, there it is, I've said my piece, and I won't bore you all further with my nostalgic thinking, but go on straight away with this month's models.

I'm ending the series with six pre-war and post-war Dinky Toys, from Meccano's catalogue—the number 36 series. Post-war because these particular models were re-issued after World War II.

Before the war, the series were issued with drivers and passengers and also supplied with slightly different bodies, as the 24 series, which all had Bentley radiators (I was going to show you these later).

Then there were the 24s with Bentley rads but no badge, the two different chassis type 24's—oh, it's all very complicated, and I'll leave it for the present.

As I said at the outset, this series of articles was designed to encourage the new collector and, we hope, keep him collecting. This, I hope, we've achieved.

So, when you've digested the details below and know what to look for, go out and try to find some of these old Dinkys; like the Yankee saloons and British sports cars I described earlier, they now have a vintage charm of their own and, furthermore, are excellent castings.

All mine are mint and in their original factory finish, and only obtained, I might add, after many years of searching. I also began with repaints, some without headlamps or bumpers and a few with no wheels! Still, I had a lot of fun, and you can, too, making my own bumpers out of bits of plastic or sheet brass, etc. Repainting 'em can be fun, too, and you'll find your technique improves as you go along. It's truly surprising what a coat or two of paint will do to an otherwise old wreck!

Now to the models, they're all made to the three part construction plan, but not in the same manner as the 39 series American cars, etc., which had separate baseplates but not separate radiators.

All have the same chassis/base plate with different bodies, and rads which are clipped into the body fronts. Axles, unlike the present day ones, are the pinched end sort and these are threaded through the body/chassis sections when wheels are added, thus locking the parts together.

Mine are as follows: 36A Armstrong Siddeley saloon in maroon and black; 36B Bentley two-seater sports coupe in bright green and black; 36C Humber Vogue saloon, mid-brown and black (notice the engine cooling flaps on the bonnet sides); 36D Rover streamlined saloon in the same colours as the Bentley; 36E British Salmons two-seater sports in red and black with matt grey seats by me; 36F Salmons four-seater in light grey and black, again with upholstery by me—this time red.

Radiators are, according to the ads in the old Meccano Mags and catalogues, 'silver plated'. I'm not really sure what this means exactly (could it be nickel silver?) but when new, the cars looked very fine indeed. The radiators yellowed with age and could be scratched fairly easily. Except for this, they outshone our silver paint and even the plastic vacuum metalising—mis-takenly called 'chrome'—which is maybe a later version of this Dinky plating, used incidentally on the much earlier Tootsietoys. Does Chris Jelley or anyone else at Meccano know exactly what this early plating is, or was?

Well, that's it. I hope you've all enjoyed 'Turning The Wheel' with me. I've certainly enjoyed writing it and hearing from you all.

I'm indebted to my very good friend Jack Wheeldon of Peco, who has stayed up nights turning out the excellent prints you've been looking at.

Until another time, good luck with your collection, and keep at it!
In a century or so, men will see the years we now live in as the beginning of perhaps the greatest change ever to affect mankind — the dawn of the Robot Age.

By Robots, we do not mean mechanical men, but computerised machines programmed to perform all kinds of operations with the minimum of external stimulus.

Quietly, almost unnoticed, such robots have become part of our daily lives — fully automatic washing machines, tea-making machines, automatic central heating systems, programmed teaching machines. There are even robots which can duplicate the movements of arms, wrists and fingers, doing production-line jobs with precision, power and delicacy.

Computers are robot 'brains', with fantastic capacity for storing facts, checking new information against those facts, and making calculations at lightning speed.

A robot is the brainchild of mechanical and electronic engineers, who are working in an excitingly creative way to produce machines which can outperform human beings on special tasks. Robots can do routine and repetitive work, without fatigue. They need neither sleep nor entertainment, and their attention never wanders. They can stand pressures and tensions, impacts and gases, which a man could not. They can also perform many functions faster and more precisely than men, and combine great strength with great delicacy.

Robots on the Moon

One of the many exciting ways in which Robots can help mankind is in the exploration of space. Robots are not bothered by long weightless journeys, nor do they need oxygen to breathe. They can be launched into space on the nose of a rocket, dropped onto a distant planet and ordered to carry out exploratory work and report back to Earth.
America's Surveyor 3 is such a Robot. The main illustration shows its construction. When it landed on the moon on April 19, 1967, it was ordered to start scratching, digging, knocking the surface, crushing soil, and scooping out a trench with its extendible arm. It photographed the results of each operation and televised the pictures back to Earth. By the beginning of May, more than 5,000 pictures had been received. The photograph above shows the trench which Surveyor 3 dug in the moon, not very exciting to look at, until you remember that a Robot did it, a quarter of a million miles away from any man.

Mastering Radio, Electronic and Mechanical Engineering

If ever there was a certainty in life, it's this. In tomorrow's world, electronic and mechanical engineering will play an ever-increasing role. One of the best ways to enjoy studying these subjects is with Philips Young Engineer Kits, which set out to teach the basics of the technologies they deal with. Theory is put into practice through the construction of working models - of tractors, cars that stop when you whistle, radios, inter-coms, electronic organs and so on. The electronic components used are real-life ones, exactly like those you find in robots. Transistors, diodes, resistors, electronic eyes - these are just a few of the components you learn to use. Take a Diode for instance.

A Diode rectifies current

There are two kinds of electric current.

**DC**  Direct Current (DC), where electrons flow from atom to atom in one direction, the sort of current you get from a torch battery.

**AC**  Alternating Current (AC), where electrons pulse backwards and forwards from atom to atom, each to-and-fro movement known as a 'cycle'. This is the sort of current used in the home for electric light or to 'drive' mains radios and TV sets. The normal mains current alternates at 50 cycles per second (50 c/s).

Sometimes, in a radio for instance, Alternating Current must be changed into Direct Current. This is where the Diode comes in. It lets current pass in one direction but not in the other. So if you try to pass Alternating Current through a Diode, the 'forward' pulses would be allowed through, but not the 'reverse' pulses. The current coming out of the Diode would be Direct Current, in a series of pulses. This is what electronic engineers call 'rectification'.

POST TODAY TO:
Philips Electrical Ltd • Century House • Shaftesbury Ave • London WC2
Please send me details of Philips Young Engineer Kits.

NAME
ADDRESS

WATCH OUT FOR
FURTHER ARTICLES IN THIS SERIES ABOUT ELECTRO-MECHANICS
In this, the fifth and final instalment of the series, Ken McDonough describes how you can add the final touches of realism to your model aerodrome. Trees, and vegetation generally, are often a problem to the scenic modeller, and if you've ever been faced with the problem of 'growing' a miniature cabbage patch, then read on and learn how!

There are, of course, a large number of trackside models to 00 scale (the approximate equivalent of 1/72nd scale) on the market. Many of the figures can be modified and repainted to represent R.F.C. personnel. Such items as bicycles, oil drums and straw bales will find a ready use in your layout. Model trees, however, are very difficult to reproduce commercially and, almost without exception, they are unrealistic. It is much better to make your own, using natural twigs and pieces of sponge. However, before describing a method of making trees, we are going to show you how to construct a couple of accessories which are not available in any commercial range.

Bell tents were much more widely employed in the first war than in the second. They formed an essential part of the equipment of every military unit. The tent itself is cut out of cartridge paper, using the full-size pattern shown in figure 1a. Bend along all dotted lines and glue tab A to edge A. Now, referring to figure 1b, which is a view of the underside of the tent, glue short lengths of thread to represent the guy ropes at each fold of the paper as shown. The braiding is a small strip of fabric which hangs vertically down from the base of the tent and is glued round the tent over the upper ends of the guy ropes. The tent pole, a short piece of \frac{1}{2} in. doweling, is now glued to the apex of the tent from the inside. The lower end of the pole is pointed so that the tent can be inserted in a hole in the baseboard.

Figure 1c shows the completed tent. Note how the entrance flaps are folded back and glued. The small ventilators are made from balsa scrap. The
free ends of the guy ropes should be glued to the baseboard after the tent pole has been inserted in its appropriate hole. Four bell tents were constructed for our layout, but you can make as many as you like, depending on the size of your aerodrome. Paint your tents a khaki colour and try to introduce some evidence of wear and tear by stippling on some patches of a darker tone here and there.

Figure 2a illustrates a typical telephone pole. Note that, contrary to British practice, there are no crossbars. This type of pole is still seen in rural districts of France and, of course, telephonic communication was not so widespread fifty years ago as it is today. The pole is drawn full-size and made from a length of bamboo or hardwood strip. The insulator brackets are bent from 20 s.w.g. wire or pins, bound and glued to the pole, and the insulators themselves are blobs of cement painted white. Colour the pole dark brown. Telephone wires can be simulated by using 5 amp. fuse wire. The ends of the telephone poles (three were used in our layout) are painted and inserted in holes in the baseboard. Reference to the photographs will indicate their positions.

Two-inch lengths of ⅛ in. by ⅛ in. balsa could represent planks of wood placed over muddy ground. In our layout, imitation grass on a paper backing was employed extensively, except on the baseboards of the houses and roads. The grass paper is available in large sheets, and sold at shops dealing with model railway equipment. On the area in front of the hangar, the paper was cut up into irregular shapes and each piece attached separately with P.V.A. adhesive so that patches of bare earth were represented.

Figure 3 depicts our method of making trees. 3a shows a typical sprig. It is a good plan to gather a number of these and select the ones which are most realistic. Plastic or natural sponge is used for the foliage and each piece should be cut into an irregular shape with nail scissors, as illustrated in figure 3b. The pieces of foliage are of various sizes and attached to the sprig with Evo-Stik. Wrap the sponge round the sprig and tie with cotton. The sponge can be either painted after assembly or dipped in a solution of dull green water colour. If the sponge is pre-coloured, allow some time to dry before gluing into place.

Cultivated fields can be represented in a number of ways. One method, widely employed in architectural models, is to use the bristles of small brushes to give the effect of a wheat or barley field. Bristles can represent tall grass or coarse vegetation, and green tissue paper also has its effective uses.

Many R.F.C. squadrons used to cultivate their own kitchen gardens. The famous pilots, Albert Ball and Charles Nungesser, were both keen gardeners, and found recreation by this means after the strain of war flying. Cabbage or kale is easily made from green tissue paper. First slice the tissue into strips about ⅛ in. wide. Several strips are then screwed up together and dipped in glue size. Plant the vegetation in regular rows as in figure 4. The fencing is made from matchsticks and thread. Each matchstick is split half-way down with a razor blade to allow the thread to be attached in a continuous length.

There are many other ways by which you can add interest to your model aerodrome. Wherever possible, refer to photographs taken on R.F.C. aerodromes and pick out all the items of equipment that can be reproduced in model form.

As suggested in our previous articles, colouring should be kept dull and not too dark in tone. The best types of colours to use are poster or emulation paints. The following colours have proved to be the most useful: Vermillion, Yellow Ochre, Cobalt Blue, Oxide of Chrome, Burnt Umber, Burnt Sienna and, of course, White. Ordinary household white emulation paint is most economical and mixes readily with poster colours. Clear varnish can be applied where necessary to achieve a gloss effect.

Oil colour hogs hair brushes are to be recommended for covering large areas and water colour brushes (Nos. 3 and 6) for the smaller details. A small piece of sponge and a strip of stout card are also useful tools for applying colour.
The Meccano Mag Computer by Ron Waring

BY now you should have become quite familiar with the working of your computer and working out problems in binary numbers. You can go on extending the range of your computer simply by adding additional stages. Ten stages, for example, will give you a total count of just over 1,000 (actually 1,023); eleven stages will give a total count of 2,047; twelve stages a total count of 4,095; thirteen stages a total count of 8,191; fourteen stages a total count of 16,381; and so on.

This is the most logical way of extending the capability of your computer—simply build more stages as described in the first article and add them on. To help you with number 'translation' or programming the computer we give a further table of binary number equivalents for the computer extended to seven stages.

To speed feeding in digits to your computer you can use an ordinary telephone dial as an input device. This is simply connected to the input tag on stage 1 and the +6 volts line, when manipulation of the dial feeds in the appropriate number of pulses according to the number dialled. In other words, with a dial input there is no need to translate the original number into a binary number first—the dial does this automatically (or rather feeds in pulses, one for each digit involved, which is the same thing as far as the computer is concerned). The answer to an addition (or subtraction) sum performed by dialling in the numbers involved will still, of course, be displayed as a binary number on the computer itself.

Telephone dials are readily obtainable from most radio suppliers and should not cost more than a few shillings. A dial input can be connected directly to stage 1 and does not need the pulse shaper (described below).

There is one point to watch, however. Most dial movements transmit one more pulse than the number actually dialled. This is because movement of the dial between '1' and the finger stop transmits an extra pulse before the '1' position reaches the finger stop. You can check this by examining the movement of the dial from the back. To modify to give a true number of pulses the simplest solution is to alter the position of the finger stop, or fit a new stop, which arrests movement of the dial at a point before the 'make' position for the intermediate digit. This will also speed up the working of the dial as far as feeding true numbers into the computer is concerned.

You can also adapt your computer to accept other than manual input signals. Actually, the effective counting speed of the circuit is considerably better than one pulse per second—or faster than you are ever likely to achieve with manual signalling, however proficient you become at setting up numbers. Thus the computer can also accept pulsed signals of other types, provided the frequency is not too high—say not more than about two pulses per second.

If these pulses are approximately square in shape, or clearly defined, and do not exceed an amplitude of more than 6 volts, positive pulses can be fed directly into stage 1 of the computer via the normally unused 'IN' and 'O' tags. The computer may not have a suitable pulse shape, however. This difficulty can readily be overcome by inserting a pulse shaper immediately in front of the input to stage 1. The circuit is very simple and is shown in Fig. 1.

Basically, this pulse shaper circuit used a single transistor positively biased to cut off via a resistor connected to the +6 volts supply. Negative pulses applied across input 1 and 0 are then applied to the base of the transistor via another resistor, causing the transistor to conduct the pulse. On cessation of the pulse the transistor becomes non-conducting again, producing a square positive pulse as an output to the first stage.

It is well worth adding the pulse shaper to your computer as it is easy enough to construct and uses only a minimum of components. It is then there for use, should you need it.

Start by cutting out a Paxolin panel to the exact size shown in Fig. 2 and drilling holes for mounting tags in the positions shown. These tags are mounted on the underside to complete the panel (Fig. 3). The resistors and transistors are then soldered into the circuit as shown in Fig. 4.

Components required for this circuit are:

Paxolin panel: 2½ in by 1 in.
Resistors: R1 15 kilohms.
R2 220 kilohms.

Incidentally, there is another method of working subtraction by adding the complements of the binary numbers concerned. The complement of a number is given by changing the '1's to '0's and the '0's to '1's. Thus if the binary number is 10011 the complement is 01100.

Adding the complement of the number is the same as subtracting that number.

Thus to subtract by complements on the computer, follow these stages:

(i) Set all SW2 switches to add.
(ii) Operate the reset switch to extinguish all lights.
(iii) Use a wire to connect the output tag from the last stage to the input terminal on the first stage. (This is to provide 'end carry-over', which is an essential feature for correct working of the computer.)
(iv) Operate the set switches on the various stages to set up a number (binary equivalent, of course).
(v) Now operate the set switches to add the complement of the number to be subtracted.
(vi) Repeat as necessary to add the complement at any number subtracted.
(vii) Finally, read the answer as a binary number and translate into its ordinary number equivalent.

You will find that subtraction by complements in this manner is generally faster and easier than straightforward subtraction.

R3 2.5 kilohms All 7 watt tolerance 10%
R4 330 kilohms Transistor: Mullard OC71 (or equivalent).
Seven terminal tags and rivets or eyelets to mount on panel.

Connection of this panel to the first stage of the computer is shown in Fig. 5. This calls for an extension of the base and side pieces of the cabinet by ½ in. The 'OUT' tag is bolted to 'IN' on stage 1; and the '0' tags similarly connected. Connecting in the pulse shaper is then completed by the wiring of the +6 V and −6 V tags to the respective wires on the side of the cabinet.

Negative pulse input is applied via Input 1 and 0. Positive pulse inputs can be applied directly via Input 2 and 0.

This new Antex soldering kit is ideal for the type of work involved in assembling the computer. Self-contained case and interchangeable soldering tips are only two of its many features.

Fig. 1
Ten months later I had my first opportunity to sample an autorotative (engine-off) landing in a helicopter—an S-51 in the capable hands of Westland test pilot Derek Colvin. It was less alarming than I expected and enabled me to provide a perfect answer to M.M. readers who had written to ask what happens to a helicopter if the engine stops in flight.

In October 1954, I accompanied Fairey test pilot David Masters on a demonstration of the Gannet anti-submarine aircraft at Ringway Airport. It was tremendous fun, even though I couldn’t persuade the radar ‘dustbin’ to lower itself, which was my only job. I felt pretty dismal when I discovered that I’d been wrongly briefed, and that it would have worked if I had pushed the switch up instead of down; but morale rose when the evening newspapers described part of our display as a ‘Dive of death over Ringway’. For me it had been a very enlivening rather than killing experience, but it must have looked hair-raising from ground level. David was quite a pilot!

Meeting and flying with a lot of wonderful pilots has, perhaps, been the most rewarding part of a job that has not given me a big total of flying hours in my log book, but has enabled me to fill its pages with scores of interesting and unusual aeroplanes, landing and taking off at quite a lot of interesting places.

To one pilot, whom I will call John, I owe my life; for his skill achieved a seeming miracle when the transport aeroplane in which we were flying got into a spin from only 1,300 feet—though I feel that it was, perhaps, the hand of God rather than even John’s which pulled us out of that one.

It is strange to think that next time I go aerobatting in a light aircraft over the Lagoon in Venice, skimming the Solent in a Hovercraft, jetting in armchair luxury to the Holy Land, watching the crowds go past during a flight at the Farnborough Air Display, or simply travelling from A to B on an ordinary airline service, there will be no opportunity to tell you about it in M.M. Perhaps, on second thoughts, I’m getting out just in time. Gannets, Vampires and Gyrspexes were fleetingly a part of our life; Fig. 5 shows ‘Yes’ so enthusiastically if someone invited me to join the first batch of journalists to go into orbit?

A Tram for Two—from page 13

Perspex locates the chassis ends and supports the step and life guard—both made from thin acetate and latter scribed to represent wooden slats as in (Fig. 4).

The grab pole is made from 32 gauge steel wire Araldited in place. The headlamp is cut from a piece of brass tube embedded in the Perspex end and then filled ‘to the brim’ with Araldite which will dry out to represent glass.

A bow projection (in Fig. Perspex) is fitted to each end beneath the driver’s windows and the little wire grab handle on the compartment end is fixed in place by pressing with the tip of a hot soldering iron. The hot wire will sink into the Perspex and expand. Fig. 5 shows these parts and also the method of attaching the truck sides to the inner faces of the body. The axle boxes are built up with pieces of thin acetate sheet.

If the overhead is considered as the ‘common return’ and the existing chassis 2 rail insulation is retained, then it is possible to run two trams quite independently on one track (two wheels being ‘dead’). However, point and track laying is simplified and electrical reliability greatly improved if all four wheels are used for positive pick-up but, of course, only one tram may then be run on each track.

The proportions of our little tram are the same as those of the LCC Class ‘M’ car of 1910, but although the overall dimensions are exactly correct there are so many styling alterations and simplifications that the model is really representative of no full size prototype. The Class M, for instance, had open driving compartments and twin trolley poles. Perhaps we should call ours a Class M.M.M.

Having proved that a realistic 2 mm. tram is a practical possibility the next job is to lay the track system, and that’s going to be as much a challenge as the tram. The heading photo gives some idea of the effect that can be produced with patience, but realism is never achieved by rushing a job, and the task ahead will therefore be an extended one.

---

**Fig. 2**

- Diagram showing a circuit with labels and connections. The diagram includes symbols for components such as diodes and transistors, with labels such as IN1, IN2, OUT, 6V, and -6V. The circuit appears to be a simple electronic circuit with insulated wires and tags.
When Ellison Hawks first knew the M.M., it was merely a four-page bi-monthly and he little thought then, as Editor, he was destined to steer it through the exciting years of the 'twenties and early 'thirties. Norman Tudor, for many years, filled the role of 'Spanner'. In this article, they both cast a backward glance over the years.

THE Press announcement that the 'Meccano Magazine' was to cease publication with this July issue was sad news, not only to present-day readers but also to many fathers who were the Meccano boys of some 30 years ago. So the 'M.M.' follows into oblivion those other stalwarts—'Young England', 'The Captain', and more recently, the 'Boy's Own Paper'.

When I joined Meccano Ltd. in 1921, the 'M.M.' consisted of four pages, and was priced 1d. Issued bi-monthly until September 1922, after which date it was published on the 15th of every month, the price remained until December 1923. I had always been interested in boys' magazines and it seemed to me that this was an opportunity to develop something on the lines that I had been thinking about for many years. I determined that as soon as possible I would develop it, but as my appointment was as Advertising Manager for Meccano Ltd., and because of planning the advertising campaign for the following Christmas, my idea had to be postponed.

Gradually, as more time became available, I was able to introduce new features and, whilst we were asked to deal with new Meccano models, it seemed desirable to associate these with their prototypes in actual life. To comply with this request the publication of a special instruction leaflet, the Meccano motor chassis, provided an opportunity (September 1921). The next special model to be described was the Loom (November 1921) and the story of spinning and weaving was introduced. The idea ultimately became the basis of many of our informative articles—for instance, the Grandfather Clock (November 1923) with the story of Big Ben and the Greenwich Time Signals.

This projected programme was interrupted when Mr. Frank Hornby (our Governing Director) paid one of his visits to the United States where he had his first experience of receiving sound and speech broadcast by radio. Later, our design department produced a 'cat's whisker' receiving set on which broadcast was received from stations that were transmitting at that time. As a result the Meccano Crystal Receiver was introduced for which it was claimed that 'any boy could assemble it in one evening'. In London we listened to concerts from Marconi House and later from 2LO; and the set proved to be as efficient as more costly instruments. The enthusiasm for this radio development soon percolated to the pages of the 'M.M.' and it was suggested that in future considerable space should be devoted to a radio section.

Although the radio receiver demonstrated the possibilities of applying Meccano to latest science, the idea did not remain so simple; for the crystal detector was further developed by the use of amplifying valves, including the Fleming amplifier and the de Forrest third electrode that led to the extraordinary developments of later years. The interesting fact remains that the Meccano crystal set, as announced in the 'M.M.' (September 1922), did give readers a foretaste of the wonders of today's TV.

Incidentally, the development of this interest produced one of the first letters that, as Editor, I received over the years from many famous men. Sir Oliver Lodge, F.R.S., one of the early scientists working with Hertzian waves, expressed his interest in the Meccano receiver and congratulated us on being able to enjoy the practical experience of recent scientific discoveries. He wrote 'Perhaps some of your readers will be able to engage in work that will lead to even further improvements, the ultimate end of which no-one can foresee.'

There are very many nostalgic items that come to mind, but I have only a limited amount of space in this farewell article so that I must curtail my reminiscences and deal only with one or two of outstanding interest. At the pantomime 'Sleeping Beauty', staged at the Empire Theatre, Liverpool, in 1925, the stage was filled with gigantic Meccano models and real Meccano boys wearing the regular jersey. Marie Blanche was the charming principal boy and George Robey and 'Wee George Wood' helped to make the show an enormous success.

Meantime, with the enlargement of the 'M.M.' and the increasing number of subjects with which we decided to deal, it became imperative that our staff should be increased and we were fortunate over the following years to engage many enthusiastic workers to whom, as Editor, I would pay tribute to the loyalty and support they gave me. (Incidentally, I have only recently heard that I was known to them as 'Uncle Ellison'!) It was pleasing to know that the experience they gained whilst working for the 'M.M.' stood them in good stead in their subsequent careers. During the later years they wrote telling me how useful their training had been and how it enabled them to obtain advancement on their way through life.

Sad to say some of them are no longer with us. Gisbert Garrett joined the 'M.M.' and for some years he dealt with aeroplane matters. In 1940 he joined Hawker Aircraft Ltd., to become Technical Publications Manager and the Editor of the Hawker Siddeley Review. At the time of his death (January 15, 1959, aged 49 after a long and painful heart complaint) he was Chairman of the London Association of Industrial Editors and a member of the National Executive. Sir Roy Dobson recorded his tribute to Garrett as 'a loyal and stalwart servant who endeared himself to all of us. We shall miss him sadly'. I take this opportunity of endorsing Sir Roy's tribute.

Another member of the staff was Trevor J. Edwards who dealt with photographic matters and whose portrait appeared (January 1926) in one of his articles on trick photography showing him inside an 8 oz. medicine bottle. One day I
Ellison Hawks

asked Trevor if he knew anything about stamp collecting. He confessed he knew nothing about it. "Well" I said, 'you had better learn something quickly because I would like you to take over the philatelic pages. Buy a packet of stamps, some hinges, and a S.G. Catalogue, and get cracking and produce a thousand words for next month’s "M.M."'. For many years Trevor Edwards continued his articles, and when the War caused many employees of Meccano Ltd. to be relegated as redundant, he found his experience to be of such use that he had no difficulty in obtaining an important post with H. R. Harmer Ltd., the philatelic auctioneers of Bond Street, London. There he worked with considerable success until his death in September 1936.

I was surprised to read in the Editorial in last May’s issue the idea of young Meccano enthusiasts getting together to form clubs to co-operate in building large models that would have been too big a project for them to tackle individually. I have been out of touch with Meccano matters for many years and I cannot help wondering what happened to the one-time Meccano Guild that was formed in the early days with exactly this proposition in mind. When I left Meccano Ltd. in 1935 the Guild had over 250,000 members and over 750 affiliated clubs each with an adult leader. In February 1926 we announced that the largest Meccano Club in the world was that at Auckland, New Zealand. Founded by Frank Wiseman in 1924, its phenomenal growth afforded a striking example of what can be done by unlimited enthusiasm applied at the right time. The Club was affiliated in March 1925, by which time its membership had reached the remarkable figure of 660, and this in the following year had increased to over 800.

The object of the Guild was precisely what the present Editor had in mind when he made his suggestion: (1) to make every boy’s life brighter and happier, (2) to foster clean-mindedness, truthfulness, ambition and initiative, and (3) to encourage boys in the pursuit of their studies and hobbies, especially in the development of their knowledge of mechanical and engineering principles.

Apart from the members meeting on club nights, visits were made to various interesting firms, including the ‘Daily Mail’ printing works, the Royal Mint, the General Omnibus Company, and other local works that were of interest in the areas. The Secretaries of the clubs sent weekly reports of their meetings to me and on occasions I paid visits to some of the clubs to give lectures on some engineering wonders that tied up with the Meccano models featured in the ‘M.M.’. (I still have my collection of lantern slides but as these were the old 3½ in. by 3½ in. manuals were published in no less than 16 languages. (Incidentally, the ‘M.M.’ was, at one time, published both in French and Spanish.) So that it was no great task to turn to our experts to translate the replies to my correspondence into their own language.

Although I have only touched on the fringe of my early years as Editor, I have already exceeded the space kindly placed at my disposal. I hope that these notes may have been of interest, especially to those who became the fathers of the Meccano boys of today.

And so I make my farewell gesture to past and present readers, ‘wherever they may be’—feeling that our efforts in those early days were well worth while.

The Transporter Bridge illustrated here is one of the famous pre-war ‘Super’ models, and is still built by advanced Meccano enthusiasts today. A really superb example of engineering in miniature, it was similar in design to actual examples at Runcorn and Middlesbrough.

The Transporter Bridge

and Norman Tudor

BEGINNING in 1927 my association with the M.M. covered the major period of its 51 years of existence. In looking back over the years I do so primarily as one whose main concern was with the preparation of those sections of the Magazine devoted to Meccano enthusiasts, the development of the Meccano system in general, and other matters associated with the great hobby of model-building.

The Magazine had been in existence for about 11 years when I, as a young engineer and writer, joined the Editorial staff. During this time it had grown from a simple newsheet with line illustrations, in which form it first appeared during the later years of the Great War, to a high quality, many-paged publication splendidly illustrated in half-tone and with a cover printed in full colour. Much of the progress from simple beginnings had
been made under the Editorship of Ellison Hawks who was in control when I joined the staff.

Originally the Magazine had been planned primarily as a medium to weld together in happy association the many thousands of Meccano model-builders in all parts of the world and to provide them with ideas and assistance in obtaining the utmost pleasure from their hobby. It was also the official organ of the Meccano Guild. Later, after the introduction of Hornby Clockwork and Electric trains the Hornby Railway Club was formed, and special sections of the Magazine were devoted to articles of interest to model-railway enthusiasts. Many years later with the advent of the now famous Meccano Dinky Toys miniatures and the formation of the Dinky Toys Club still further special pages were added to the Magazine to cater for the interests of members. Thus the Magazine eventually served as the official organ of all these world-wide organisations.

During the inter-war years the model-building sections of the M.M. reached their peak and many very fine Meccano models were illustrated and described. There was, for example, a range of about 20 super models designed and built in the Magazine model-building department. These were planned for construction from the largest Meccano Outfit of the period—the super models, as older readers will remember, included the Meccano Loom, Giant Hammerhead Crane, Motor Chassis complete with three-speed gearbox, clutch, differential and Ackermann steering gear, and the Meccanograph design machine. Their appearance in the M.M. excited the interest of model-builders everywhere, and even now there is a steady demand for details of their construction.

Also during this period the very popular feature 'Spanner's Suggestions Section' was at its peak, a feature which figured in the M.M. regularly for nearly 20 years. Hundreds of ingenious Meccano mechanisms were described and illustrated. Many of these were designed by the M.M. staff, but others were contributed by enthusiasts from all parts of the world. I took very special interest in preparing the material for these 'Suggestion Section' pages for it involved, in correspondence with model-builders in most countries and resulted in many friendly contacts that I am pleased to say I still have the privilege to enjoy.

I come now to the dark days that came with the outbreak of the Second World War in 1939. For some years previously the Editorial chair had been occupied by W. H. McCormick who had succeeded Ellison Hawks, and when war came it brought many difficulties for him and his Assistant Editor, Frank Riley, B.Sc. One by one members of the staff left to join the Armed Forces and the severe Government restriction on paper supplies seemed likely to make it impossible for the Magazine to continue. Fortunately, the latter difficulty was eventually overcome, but although publication was allowed to continue, both the size and number of pages had to be very greatly reduced. The wartime M.M. therefore was a pale shadow of its former self. McCormick and his small remaining staff did a splendid job in maintaining regular publication under the difficulties they faced.

When the war ended in 1945 came the equally difficult task of building up the Magazine by reviving many old popular features and introducing new ones, and recovering the lost circulation that paper controls and wartime conditions generally had made inevitable. However, with the return of staff from the Forces and the eventual easing of restrictions, the M.M. slowly recovered; but it never again appeared in the same format as had been customary prior to 1939.

A few years after the war, Mr. McCormick retired and Frank Riley succeeded as Editor. Under his control the Magazine progressed steadily for several years and its coverage was extended to include articles by experts on up-to-date topics such as electronics and space research.

On Mr. Riley’s eventual retirement after nearly a decade as Editor, his position was taken over by Geoffrey Byrom, who continued in control until 1964 when the Magazine passed to its present publishers who I am sure readers will agree have upheld the high standard previously achieved and have produced many magnificent issues.

Now it is all over and I am writing my last contribution to the Magazine that has taken such a large place in my life and for which I have always had great regard and affection. I am both proud and privileged to have been associated with it and with the various Editors and other members of the staff who have controlled its destiny. Among these I would like to mention specially Ernest Miller, a most able Assistant Editor for many years and Leslie Norman, who for 30 years contributed a continuous stream of articles on both real and model railway topics. A word of congratulation also to my very good friend Harold H. Taylor of Huddersfield, a textile machinery expert, who designed and built for me many of the finest working Meccano models illustrated and described in the M.M. during the last 20 years.

It is sad indeed that economic conditions and the very high costs entailed in publishing now-a-days make it no longer possible to continue this fine Magazine, which throughout its 51 years of existence has striven always to provide wholesome entertainment and instructive reading for young people everywhere. The world will be poorer for its passing.

The Very First MM

On the following four pages we have reproduced in its entirety, the very first issue of Meccano Magazine, dated September-October 1916. This was the seed from which the M.M. grew and the models which were illustrated in that first issue, so long ago, can still be built today. Such is the appeal of the Meccano Hobby! You can, of course, pull out this reproduction of the first M.M. and have your own 'Number One', only slightly smaller than its original 13 3/4 x 10" format.
A Message to Meccano Boys
from the Inventor of Meccano

Since I first took out patents for Meccano in 1901, the hobby has made remarkable strides. I look back upon those days with keen pleasure, because even then have recognised the merits and usefulness of Meccano parts and bought them eagerly. In those early struggling days, I had no factory to make the parts, or in which to work out new ideas. The difficulties were numerous and often almost insurmountable. Now Meccano is manufactured in the largest toy factory in the British Empire, equipped with the latest machinery, operated by many hundreds of skilled workpeople.

During these eventful fifteen years, a million boys of all nationalities and ages have bought and played with Meccano. Once they have started the hobby they have continued with it, buying the new parts and the new manuals as they came along. More boys play with Meccano than play football or cricket or any other hobby. I have corresponded with so many boys about Meccano, and I have got to know them so well, that I have come to look upon every Meccano boy as a personal friend, and I do not think that since the world began any man has been better known to the boys than I am. It is a great happiness to me to be able to send to them all a message of good will through the Meccano Magazine.

In future issues I want to tell you of some of the early struggles and experiences which I had in gaining opportunities for you to buy Meccano and in getting it manufactured, how some of the best parts and models were suggested to me, and plans which have been laid for the future development of the hobby. I want you to know all better, and I want you to know Meccano and my self better. My termination is the same now as it was then for fifteen years, to keep Meccano the happiest, most pleasurable, and most instructive toy which ever was.

Our First Number

Meccano boys have been asking us for some years now to start a Meccano magazine, and here it is at last. This is a modest little first number, but it will achieve its purpose if it makes all you Meccano boys feel that you know as a little better. We have a lot of interesting developments in store, all of which will be announced in the Meccano Magazine, and we want you boys to look out for them, as they will all mean more fun and pleasure for you. Some of you are apt to get into a rut and to think that you are having all the fun it is possible to get out of Meccano, whereas, as a matter of fact, we are going ahead all the time and discovering new models, new ideas, and new fun for you.

Write to the Editor as often as you like; he is just a grown-up boy with a lot of experience, and he knows how boys feel about things, and how to help them out of their difficulties. If your letters to him are interesting enough, you will probably find them printed in the Meccano Magazine.

The New Meccano Manual of Instructions

If you want to really taste the joys of Meccano, you must obtain this new edition of the Meccano Manual of Instructions. For the first time it contains the great possibilities of the hobby. It contains hundreds of prize-winning models with instructions for building them. There are models in this book which have taken years to bring to perfection. Models to play with, like the Motorbatter the Automatic Billiard Player, Joy Wheels, and Box Bell Alley; models to work with, like the Meccano Loom, which automatically weaves braids and belts in all colours just as good as any we could buy in the shops. The Meccano graph for making thousands of capital designs with years of interest in it for children or grownups, engineering models like the Ship, Slings Bridge, Stone Sawing Machine, Weighting Machines of various patterns, new Crane and Bridges, scientific models of Caree, Amusement Cars, and others of our interest. By the time you have made all these models, you will have learned many useful engineering things, you will be a much braver fellow than when you started, and you will be really for the new model of about 10. You can obtain either from your regular dealer, or from us if you have any difficulty.
All these models won prizes in the last grand Meccano Competition.

World-famous Meccano Beasts Germans Hollow

This is the verdict of Mr. A. W. Gamage, of the firm of A. W. Gamage, Ltd., London, expressed in an article which he has just written for "Perrona's Weekly." Mr. Gamage writes: "Luckily Germany did not capture every section of the toy trade. In some directions we are still pre-eminent. Britain's soldiers were second to none, they were perfect in every detail. The world-famous Meccano toys beat the German hollow. Our rubber balls were excellent, and our big wooden toys rivaled creation."

Mr. Gamage's verdict on Meccano is endorsed by every toy dealer and every boy in Great Britain. In some directions the Germans certainly did not have it all their own way, and when the terrible German-made war is over it will be our endeavour to see that much of the toy business which was formerly held by Germany and Austria will be wrested from these countries, and that the British public will know that when they are buying toys they are supporting British workmen in British factories.

The Meccano Electric Motor

This is a perfectly designed motor which makes it possible for a boy to run his models continuously. Properly geared, it has enormous lifting power. It has the Meccano equivalent of a horse power, and can be fitted into the Meccano models without difficulty. It is simple to use, and there is no danger whatever attached to it. It may be run with dry batteries, an accumulator, or direct from the home supply with a transformer. Where possible, we recommend that an accumulator be used giving four volts. This lasts for a long time, is very reliable, and can be easily recharged at small cost.

The motor is supplied in two patterns, with or without reversing gear, costing 7s. 6d. and 12s. 6d. respectively, with reversing, stopping, and starting gear costing 7s. 6d. Instructions go with each model. Ask your dealer to show it to you.

Meccano Outfits as Prizes

The following well-known publications are offering Meccano Outfits as prizes in the competitions which they are running this winter:

- "The Scout."
- "Home Notes."
- "Perrona's Weekly."
- "Everywoman's Weekly."

Some of our clever Meccano boys should have no difficulty in securing these outfits.

The Meccano Inventor's Accessory Outfit

No Meccano toy should be without this accessory outfit. No matter what regular outfit you have, the nuts are useful. It contains a set of large wheels which can be used on motor cars, trucks, &c., two sizes of spoke-wheels with a length of chain for giving a positive drive and dispensing with the usual cord, which is apt to get slack and slip round the pulley. It also contains a supply of the new braced girders for building large, imposing models. There is also included in it a supply of wheels, which are indispensable in building a Meccano Farm. It also contains other parts previously included in the higher-priced outfits only. It is a great help to the young Meccano inventor who desires to extend the scope of his outfit.

The cost of the Inventor's Accessory Outfit is 7s. 6d.

"Dad"

When father has money we call him "Father.
When he teaches Sunday School, we call him "Papa.
If he is with mother and wheel the baby carriage, we call him "Papa."
But if he buys us Meccano and gives me a hand with the models till his fingers ache with screwing up the bolts instead of using a screwdriver, we call him "Dad."
A New

£200 PRIZE CONTEST

1st Prize £50 in Cash. 140 other prizes

Another grand Meccano Contest has started, and we want every boy to have a try for one of the big money prizes. These contests help the Meccano fun along and make model-building worth while. If you invent something new you prove yourself to be an original thinker, and if there is merit in it you get well paid for your work. The first thing to do is to study all the models which you make from the Manual of Instructions, and think out improvements on them. This gets your brain at work on new ideas, and it is just those ideas which we want. If you are contented to simply copy the Meccano models as you see them, you will never be successful in inventing anything new. Get to work now. See what the other fellows have done in the last two big competitions, and then go to work on something better. Do not forget the entry form; your dealer will give you one or we will post one to you on request.

The Meccano Braced Girder

This is a new flexible girder enabling large constructional models to be built, such as bridges, elevators, towers, etc., and forming a most effective decoration for many of the smaller models. It is a perfectly designed part on the lines of actual girder bars used in building construction. It is made in two sizes: 21" costing 1s. 6d. per 4 feet, and 14" costing 1s. 6d. per 6 feet.

The Meccano Crank and Coupling

These are specially patented parts without which it is impossible to build many of the best Meccano models. They are perfect in design, and are adapted to hundreds of different uses. It is such parts as these which give Meccano its supreme position amongst constructional toys. Now use for them are being devised every day, and every Meccano boy should study them carefully. The cost of either crank or coupling is 6d.

More Prizes for Meccano Boys

We often receive very interesting letters from enthusiastic boys telling us of the pleasure they derive from their Meccano models, and some of these letters show unusual literary merit. We now offer a prize of a No. 7 Meccano outfit for the best essay on "Meccano as a Toy," and another prize for the best essay on "Meccano as a help to the study of Engineering." The essays should not consist of more than 500 words, and must be received by us not later than January 1st, 1917. Any user of Meccano may try for these prizes.
The Meccano graph

The Premier Toy

Every boy who takes up Meccano finds it
the brightest and finest hobby which ever
brightened up his play hours. It holds
you.
Once you take it up, you never drop it
again. It takes for ever to do all the fine
things possible with Meccano. Scores of boys
who have had their outfits for many years
write to us and say that Meccano is the only winter
activity of their holiday.

We are building a model steam engine.

The Meccanograph

These are a few of the wonderful designs which may be made with the Meccano graph. By simply altering the adjustments slightly, thousands of excellent designs may be made, all different. There is no difficulty, anywhere, and even a young boy can make the machine for himself and use it. It is only necessary to punch the paper in the table place the pencil in the proper position, and turn the handle. The machine itself goes by itself. We ourselves are experimenting with this machine all the
time, and we shall have further useful suggestions to make regarding it in the next month's Meccano Magazine. In the meantime, we offer a price of No. 3 Meccano Outfit for the best set of 13 designs made with the machine and in to us before January 31st, 1927. Full instructions for building this model will be found in the new Meccano Manual of Instructions.

MECCANO

Game from our Mail Bag

O. T. Tawney, writes: 'My Meccano toy is immensely pleased with the Inventor's outfit, and we build to the limit of the outfits, and are loving. I don't suppose you ever get to know the value of your many little engineers, but I often wonder if my son is one of the.

N. L. J. writes (from Batavia, Illinois, U.S.A.): 'I am a Meccano enthusiast and I will say my parents say that I am the best boy in the family. I have been working on my Meccano outfits for nine years, and have built many wonderful things. I have built a steam engine, a bicycle, and a number of other things. I have used only one outfit, and I am very glad I did. I have built many wonderful things, and I am very happy that I have been able to build them with the Meccano outfits.'

W. R. U. writes: 'I am a Meccano enthusiast and I will say my parents say that I am the best boy in the family. I have been working on my Meccano outfits for nine years, and have built many wonderful things. I have built a steam engine, a bicycle, and a number of other things. I have used only one outfit, and I am very glad I did. I have built many wonderful things, and I am very happy that I have been able to build them with the Meccano outfits.'

We have this nice fragment from our letter box:

H. L. W. writes from Singapore: 'With much respect to your Meccano book which I have in my library, I am sorry to say that it is not the best book I have ever read. It is well written, but I hope the direction shall be clear and easy. I would ask you for a better book if you have one.'

K. A. A. writes: 'I have sent in the outfit, and I have been working on it for nine years. I have built many wonderful things, and I am very happy that I have been able to build them with the Meccano outfits.'

The Meccano Outfits with Electric Motors

These are the regular Meccano outfits with the Meccano Electric Motor added. Each one is a magnetic tool for every boy.

No. 1x, with non-reversing motor 12.6
2x '  '  '  '  18.6
3x '  '  '  '  30.6

Each Meccano outfit is complete with all parts and tools necessary for building models. Full instructions are included and the youngest boy can commence to build in one without study. An accessory outfit may also be purchased at any time enabling bigger and more interesting models to be built. Additional parts may also be purchased separately, at prices given in our published lists.

Remember that though boys play with Meccano for pleasure, and though they get some fine fun from it, they also give a young engineer a chance to develop his talents and abilities.

Sincerely yours,

E. H. L. Meccano Ltd.

Prices of Meccano

No. 1
10 Outfit with full instructions for building 3.9
2d.
3d.
4d.
5d.

Accessory Outfits

No. 2
Meccano No. 2 Outfit No. 2 3.3
3d.
4d.
5d.
6d.
7d.
8d.
9d.
10d.

Meccano Outfits with Electric Motors

These are the regular Meccano outfits with the Meccano Electric Motor added. Each one is a magnetic tool for every boy.

No. 1x, with non-reversing motor 12.6
2x '  '  '  '  18.6
3x '  '  '  '  30.6

Each Meccano outfit is complete with all parts and tools necessary for building models. Full instructions are included and the youngest boy can commence to build in one without study. An accessory outfit may also be purchased at any time enabling bigger and more interesting models to be built. Additional parts may also be purchased separately, at prices given in our published lists.

Remember that though boys play with Meccano for pleasure, and though they get some fine fun from it, they also give a young engineer a chance to develop his talents and abilities.

Sincerely yours,

E. H. L. Meccano Ltd.

Printed by Higgins & Dye, Ltd., Harrow, Middlesex, and London.
Build a basic Hovercraft

Cut deck to outline shape from two 10 in. by 3 in. panels cemented together, then complete the five cut outs. Cut sides, front sides, front and back to shape, then cement to deck to complete the body. Be sure all joints are "tight".

Fit 1 in. diameter electric motor, as shown, in deck cut out. Make up fan assembly and fit to motor spindle. Cut and fit the four braces and then cement the circular stack in place, made from a 10½ in. strip of thin card 1½ in wide.

Add battery clips cut from thin brass, connect to motor terminals with insulated wire . . . and your basic hovercraft is ready to go! If necessary, adjust trim by altering battery position to balance weight of motor used.

You can add more detail to your "basic" model, if you prefer—but keep the model light.

---

*ALL PARTS SHOWN FULL SIZE
USE VERY LIGHT Balsa THROUGHOUT*
Looking back over

T is in many ways fitting that this final issue of the 'M.M.' should include a farewell article looking back over the last 50 years at those events in the railway world that made news, and which have formed the subject of many articles written by some of the most famous names in railway literature. Looking through the fifty volumes of 'M.M.', names of acknowledged experts like O. S. Needham, R. L. Allen, R. S. McNab and R. A. H. Weight, appear above articles on interesting topics of the day.

When 'Meccano Magazine' first appeared in 1916 its contents were confined purely to Meccano modelling, and it was not until 1922 that they became more diversified by the addition of notes and features on a wide variety of subjects. In the May/June issue, railways made their first, but brief, appearance with a photograph and section on the G.W.R. Locomotive "Princess Mary", which had recently been used to convey H.R.H. Princess Mary and Viscount Lascelles from Paddington to Shifnal. From 1923, however, which roughly coincided with the introduction of the first Hornby Trains, railways made regular and even considerable appearances in the pages of the Magazine.

News of railway events was regularly included, making the 'M.M.' only the second magazine at that time to regularly devote space to the subject. The emphasis was not, however, entirely on news, although in 1924 we see articles describing the famous Wembley Exhibition with photographs showing the L.N.E.R. exhibits of 'Locomotion No. 1' and the almost legendary 'Flying Scotsman' No. 4472, the subject of many articles in the Magazine. There was also an interesting feature on a new L.M.S. coaling stage that lifted 10-ton wagons and which was capable of coaling two locomotives in two minutes. Apart from these, however, were a number of informative articles on the lives of famous engineers, including George Stephenson, the builder of the Liverpool-Manchester and other railways, and his son, Robert Stephenson, builder of locomotives and bridges. London's tube railway also received full attention and mentioned is the 'Passimeter', a mechanical apparatus, which combined the duties of booking clerk, barrier attendant and ticket inspector—and that was in 1924!

In many ways, 1925 was a momentous year for railways. With, among other things, the locomotive trials between the G.W.R. 'Castle' Locomotives and the L.N.E.R. 'Pacifics—an event that had enthusiasts arguing ever since. One of the locomotives that took part, 'Pendennis Castle', still exists to this day and is now privately preserved. The other event that received widespread publicity, and which was also included in the Magazine, was the centenary celebrations of the Stockton and Darlington Railway, when a procession of veteran locomotives travelled over the original Stockton and Darlington railway line. Also published in the 'M.M.' to coincide with this event, was a whole series of appropriate articles, including 'The men who gave us Railways', and an article on Richard Trevithick, an early steam locomotive pioneer.

September 1925 also saw the first article of 'Railway News of the Month', a series that has had a variety of names and authors, and which survives to this day in the form of 'Railway Notes'. Always eager to keep its readers well informed, the Magazine began an occasional series on the new locomotives that were appearing and among the first mentioned were the ill-fated 'River' Tanks of the Southern Railway. Praised when they were first introduced in 1925, there were to be the cause of many serious railway accidents, including the one at Sevenoaks in 1927 when thirteen people were killed and twenty-one seriously injured. More praiseworthy, however, were the L.N.E.R. 'Directors', built for express passenger service in Scotland, and also the very notable 'King George V' of the Great Western Railway, which visited America in 1928 and which was the subject of two articles, including one which described it as 'Britain's Mightiest Locomotive'. Only a few months previously, the Magazine had carried an article called 'Britain's Most Powerful Locomotive'—the Southern Railway's 'Lord Nelson' Class.

One of the most popular qualities of the 'M.M.' has always been the emphasis it has given to interesting and informative articles and when, in 1930, for example, the L.M.S. celebrated the centenary of the Liverpool and Manchester Railway, an article in the Magazine described in most vivid terms how George Stephenson vanquished the problems attendant in crossing the bog of Chat Moss and, indeed, in completing the line between the two towns. One could also read about the 'Great Railway Speed-up' described by 'Observer' in the 1932 Magazine, when railway speeds on all the principal routes were accelerated. Among the most notable of trains were the 'Liverpool Flyer', the G.W.R. 'Cheltenham Flyer' and the 'Mersey-side Express'.

Only three years later, in 1935, the L.N.E.R. was to achieve a speed record of 102 m.p.h. by 'Flying Scotsman' running between Leeds and London—anticipating by a few years the world steam speed record of 126-5 m.p.h. set up by 'Mallard'. That, however, was in the future, and many developments of great interest were to take place including, in 1935, the centenary of the Great Western Railway, the introduction of what was to become a ubiquitous design of 2-6-2 Tank Locomotive for the L.M.S. and a completely new type of steam locomotive, the L.M.S. turbine, 'Turbomotive'. Britain also saw its first streamlined train, the 'Silver Jubilee Express' on the L.N.E.R., pulled by those most famous locomotives, the record-breaking A4 Pacifics.

News was something the 'M.M.' certainly wasn't short of, and articles on new railway equipment, methods and new locomotives appeared in 1937. Among these were the L.M.S. 'Patriotas', a name...
revived from a former L.N.W.R. 'Clithorn' locomotive, and also the L.M.S. Coronation Scots, specially streamlined to compete with the L.N.E.R. In 1938 an article celebrating the centenary of the London and Birmingham Railway was published, destined to be one of the last before the shadow of war fell upon the world. Regular features began to appear in number once again in 1944, and one of the first described the then new 'Peppercorn' Pacifics of the L.N.E.R. These and the new 'County' Locomotives mentioned in the 1945 'M.M.' were among the last six-coupled engines to appear before nationalization. During the following year, the centenary of the L.N.W.R., Doncaster built its 2,000th locomotive. Since 1941, however, the Magazine had reduced its format and thickness because of wartime restrictions, and although editorial policy continued more or less unchanged there was less space for any individual subject. The emphasis was still on news, and much space was devoted to the new standard locomotives introduced by British Railways between 1951 and 1954. There were, however, articles of interest, especially the one covering the making of the film 'Titfield Thunderbolt' in 1953, when a film company took over the Camerton and Limpley Stoke Branch of the G.W.R. The veteran 0-4-2 locomotive 'Lion', formerly belonging to the Liverpool and Manchester Railway, was used in the film.

Engine nicknames also formed the subject of an article in 1953 and one was educated as to the meaning of 'Bongo' and 'Bill Bailey'. In 1954, one of the largest locomotives to be built by British Railways was introduced into service. This was the new standard 2-10-0 Locomotive, designed for heavy freight trains, and Mr. Frank Riley, Editor of the Magazine at the time, wrote an article about these impressive engines. The doom of the steam engine, however, was already sealed, for the first of the multiple-unit trains appeared in 1954, although another ten years were to pass before the momentum of dieselisation would finally eclipse the steam locomotive. Only six years later, in 1960, the last steam locomotive left the erecting shops at Swindon. Called 'Evening Star', this was the last of the 2-10-0 locomotives and is now scheduled for preservation.

Preservations and museums, in fact, had become of great interest to railway enthusiasts everywhere, and already the picturesque Festiniog Railway had been re-opened, a museum for trams had been set up in Crich, and Swindon had its own museum, which included in its exhibits the record-breaking 'City of Truro'. Articles on all these subjects appeared in the Magazine and, in 1963, a new regular feature called 'Trackside News' made its debut, although the 'Railway Notes' feature written for many years by Mr. R. A. H. Weight continued until the Magazine was taken into the International Publishing Corporation in 1964.

It is perhaps a strange coincidence that this should be the last in the long line of railway articles at a time when the steam locomotive itself is also on the eve of extinction.

By Mike Rickett
Each hole is then plugged with a cork, cut down to \( \frac{1}{4} \) in. length. Choose the length of cork cut to enable the corks to be withdrawn when pushed down flush with the deck, bend a loop in a short length of 24-gauge wire, pass the wire through the cork and then turn over the end on to the bottom of the cork. Paint the tops of the corks and the wire loops grey and, when dry, press them in place.

The main hatch is covered in a different way, using part 9 cut from \( \frac{3}{4} \) in. marine ply to the bottom of which a strip of\( \frac{3}{4} \) in. sheet balsa. This fits into the deck cut out, allowing part 9 to sit flush with the deck. However, to get a proper seal, a gasket of similar shape to part 9 (but with a cut out to fit over the plug part) is cemented to the bottom of part 9 with Bostik. This gasket is cut from \( \frac{3}{8} \) in. or \( \frac{1}{2} \) in. soft neoprene rubber sheet. The complete assembly is shown in Fig. 8. Note that this hatch cover fits over a two wire gaskets that secure the plugs to ensure that it is removed to the plug part is cemented to the bottom of part 9 with Bostik. This gasket is cut from \( \frac{3}{8} \) in. or \( \frac{1}{2} \) in. soft neoprene rubber sheet.

A hole is bored in the deck above each compartment for drainage purposes. Do not try to drill these holes. Use a length of \( \frac{3}{4} \) in. diameter metal tubing sharpened at one end and pierce the holes with a twisting motion—Fig. 7. The position of these holes is shown on the plan view drawing given with part 1.

The ply hatch also forms the base to which the conning tower is cemented. The conning tower design has been kept very simple. Outline shapes are shown on the full size plan and details in Fig. 9. It is carved from a balsa block 3 in. long by \( \frac{1}{2} \) in. by 2 in. You do not need to buy a block this size. You can build it up from pieces of \( \frac{1}{4} \) in. sheet left over, gluing together with Cascamite.

The top part is hollowed out, Part 10, cut from \( \frac{3}{4} \) in. ply, is cemented in place to form the gun platform which is completed by sticking brass pins into the ply and then soldering on a brass wire handrail, as shown. The gun is made from dowel and scrap ply pieces, assembled as shown. Mounting the gun on a dowel enables it to be swivelled.

After completing the conning tower and cementing it to the top of the hatch, give this whole assembly two or three coats of marine grey flat paint.

The twin bilge keels are 22\( \frac{1}{2} \) in. lengths of \( \frac{1}{2} \) in. by \( \frac{3}{8} \) in. spruce, which are cemented to the bottom of the hull on about the mid point of the rounding—see section drawing B-B on the main plan. These are not essential and can be omitted, if desired, but they will assist in helping the sub run straight and true on the surface in a crosswind or cross sea. Be sure that they are lined up accurately fore and aft, otherwise they will have a steering effect.

The \( \frac{1}{4} \) in. square hardwood strip cemented to the underside of the bows represents the cable cutter on a full size sub. On the model it serves the main purpose of protecting the bow against accidental damage. It will have to be fastened to the rudder and is best cemented in place with Cascamite rather than balsa cement. The notches can be cut with a file after fitting, or omitted entirely. They add to the scale appearance but can prove troublesome in catching and trapping weed when the model is operating.

Both the binnacle and the cable cutter are painted black after fitting.

The stanchions and handrail should be fitted to the deck as these greatly improve the appearance of the model. Single bulk plastic stanchions can be used, or large plated pins (preferably brass pins). The handrail can be a length of thin nylon or thread, or thick fuse wire. If using pins for the stanchions, the handrail can be secured to each pin with a dab of epoxy resin adhesive.

Only a minimum of deck fittings are needed to impart a realistic appearance. These can be restricted to six bollards, positioned as shown on the main plan; and a gun on the foredeck which can be made from dowel and ply scrap. The gun should be mounted on a circular base drilled out to be a tight fit on a short length of \( \frac{3}{4} \) in. hardwood dowel cemented into the deck. Stanchions, handrail and gun should all be painted grey.

The rudder assembly comprises both a vertical rudder (for directional control) and a horizontal rudder (for trim control). Two alternative methods of making this assembly are shown in Fig. 10. In one, a conventional rudder is fitted in a tiller tube passing through the hull. The horizontal rudders are then cut separately from 18 gauge brass sheet and bolted or riveted to the vertical rudder, as shown. The whole group turns as one for steering, via movement of the tiller. Trim control is obtained by bending the horizontal rudders.

In the alternative method the horizontal rudder is cut from 18 gauge brass sheet and screwed to the bottom of the hull above the vertical rudder, with additional brass wire bracing. The vertical rudder is then fitted as a separate unit.

The hydrovanes are cut from \( \frac{1}{4} \) in. ply to the dimensions shown in Fig. 12. These are then screwed to the \( \frac{1}{2} \) in. lengths of 18 gauge tubes on the wire arms. They are thus hinge mounted and can be folded up vertically. To hold in their normal horizontal position for running they are simply held out by a small rubber band engaging with the end of the wire arm, as shown.

The hydrovanes provide automatic 'dive' and 'surface' control, which works as follows. The vertical wire carries a small disc cut from plastic...
material, pierced to mount on the wire but free enough to be slid up and down. Half an inch or about 1 in. up from its pivot point and a rubber band is taken from this knick and fastened to the hull side with a paper clip. This is then pushed into the hull side to act as a forward stop, limiting the dive' position assumed by the hydrovanes. Next, the pin 'B' and the position of the pin anchoring the rubber band which controls the band tension can only be determined by experiment.

A second pin 'B' is then pushed into the hull side to limit the backward movement of the arm, and thus the 'surface' position of the hydrovanes and of the forward stop. This can be done in the same way as the other pin. The pin anchoring the rubber band which controls the band tension can only be determined by experiment.

A rubber band 'C' is then attached to the pin 'B' and thrown over the side of the hull and secured to the hull side. This is to keep the hull from floating away from the deck while the model is being worked on.

Initial trials should be carried out in a bath of water. Make sure that the hatch is securely clamped down, then put the model in the water. It will probably be laying on its side at an awkward angle. Ballast weight is needed to establish a proper trim, this forming the ballast keel which is screwed to the bottom of the hull. The actual amount of weight required can only be found by trial and error, but a fair amount of weight will normally be needed.

The best material for the ballast keel is strip lead (i.e. lead sheet cut into strips about 1 in. wide); or bars of plumbers' lead (the kind obtainable from any ironmonger's shop). Simply add enough lead strip (of solder bars) until the model floats level with the deck almost awash. The ballast keel can then be attached permanently with woodscrews of sufficient length to pass through the balsa bottom and up into the obeche hog.

Trimmings in this condition—decks nearly awash—the model should submerge satisfactorily under the action of the hydrovanes when given a forward push. If it doesn't you will need a stretch of open water to try this. Start with only a very small 'dive' trim on the hydrovanes and gradually increase it until you are about 1 in. below the water surface when the keel is set at a 45° angle. If possible, a strip of wood can be used to hold the keel in position.

When you are satisfied that it will stay down, cut off the wood and use electrical tape to hold the trim in position.

Initial trials should be carried out in a bath of water. Make sure that the hatch is securely clamped down, then put the model in the water. It will probably be laying on its side at an awkward angle. Ballast weight is needed to establish a proper trim, this forming the ballast keel which is screwed to the bottom of the hull. The actual amount of weight required can only be found by trial and error, but a fair amount of weight will normally be needed.

The best material for the ballast keel is strip lead (i.e. lead sheet cut into strips about 1 in. wide); or bars of plumbers' lead (the kind obtainable from any ironmonger's shop). Simply add enough lead strip (of solder bars) until the model floats level with the deck almost awash. The ballast keel can then be attached permanently with woodscrews of sufficient length to pass through the balsa bottom and up into the obeche hog.

Trimmings in this condition—decks nearly awash—the model should submerge satisfactorily under the action of the hydrovanes when given a forward push. If it doesn't you will need a stretch of open water to try this. Start with only a very small 'dive' trim on the hydrovanes and gradually increase it until you are about 1 in. below the water surface when the keel is set at a 45° angle. If possible, a strip of wood can be used to hold the keel in position.

When you are satisfied that it will stay down, cut off the wood and use electrical tape to hold the trim in position.
A neat Italian scooter from India

There's no end to what Meccano will do! Just look at the ingenious way a Meccano enthusiast in India made this perfect model of a Lambretta scooter, with every detail just right! This is yet another of the marvellous models that are made by Meccano enthusiasts round the world. Original, ingenious; simply clever or cunningly detailed; practical, entertaining, educational... lots of descriptions apply to these masterpieces, and you can build them for yourself.

If you are already a Meccano enthusiast, you'll know what we're talking about, and how to extend your Meccano with the conversion sets. But if you have yet to discover the thrills of building with Meccano, there are ten fabulous sets that you should know about... from 15/3. (If dad's a Stockbroker, we have one set at £56.10.0.) These are complete with instructions for making hundreds of models that really work.

We should like you to write about any models you've made which you think would be of interest to other Meccano enthusiasts round the world. Please send photographs and descriptions to Meccano Ltd., Binns Road, Liverpool 13.

THE WORLD'S GREATEST CONSTRUCTIONAL TOY
As this Royal Navy destroyer slips away at dawn

Action and adventure lie ahead

Read about life on board – and the great career you'll have.

Where's she going? Sorry, that's secret. Perhaps to the Far East, the Mediterranean or the South Atlantic. But one thing is certain. The men on board are in for an adventurous time.

At sea anything can happen.

Ships may signal for help. Hostile coastlines have to be patrolled. Smugglers intercepted. Battle exercises carried out.

What's she like? She's a guided missile destroyer. She can explode aircraft out of the sky. Seek out and destroy submarines. Search the seas with her helicopter.

She has 60,000 shaft horsepower to send her surging through the waves. Complex electronic radar and automation equipment. Computers. Stabilisers. An automatic pilot.

There are spacious mess decks with bunks and television. Even a TV studio that can send its own programme round the ship!

What about your future in the Royal Navy?

It's a great time to join – with new ships and new weapons on the way.

You'll be taught a good trade. Encouraged to continue your education. You'll earn good pay that's now better than ever. No civilian job can offer you more opportunity for steady promotion: today, one officer in three begins his career as a rating. And your training will equip you for a good job in later life.

You'll also live a varied, active life at sea and ashore; at home and overseas. And you'll enjoy world travel, sport in plenty, fine company and an average of 6 weeks' paid holiday a year.

Post the coupon for full details today.

Royal Navy


Please send me, entirely without obligation, the free, new 32-page booklet "The Royal Navy as a Career."

NAME

ADDRESS

Date of birth ...

(Enquiries from U.K. residents only)
H & M ELECTRICAL EQUIPMENT

POWER UNITS CONTROLLERS VARIABLE TRANSFORMERS
SOLENOIDS RECTIFYING UNITS SWITCHES CUTOUTS etc. etc.

SAFE UNITS WITH DOUBLE-INSULATED TRANSFORMERS BUILT TO THE LATEST BRITISH AND WORLD SAFETY STANDARDS.

SEND 3d. POSTAGE FOR FREE PRICE LIST, OR 1/- FOR COMPLETE 28 PAGE CATALOGUE

HAMMANT AND MORGAN LTD.
HANDEM WORKS, APEM ESTATE, ST. ALBANS ROAD, WATFORD, HERTS.

ALL FREE OBER 150 STAMPS PLUS THE FAMOUS PENNY BLACK & CAPE TRIANGULAR FACSIMILES

Sensational latest British complete used set of 3 stamps—4d., 6d. and 1½d., issued to honour the Finials of 1966 "Julies" RETREAT WORLD FOOTBALL CUP Competition, held in England. The Cup that was stolen from the London Stamp Fair and later recovered by a dog! This set will be sent quite free to all who ask to see our wonderful Bonanza Stamp Bags. These contain 1000 picture stamps. Just buy any you want wr 1d., a stamp or 15 for 1s.

The Stamp Club (Dept. M.M. 27) Eastrington, Goole, Yorks.

THOR soft-faced HAMMERS
Ideal tools for the modeller and handyman. For shaping metals, driving in bolts, fitting parts, use on chisels, and for all hammering jobs where damage to work must be avoided.

THORLITE Soft-faced HAMMER SET Ref. 616
Complete set in strong carton costs 22/6 and comprises hammer head (aluminium-alloy), 12 in. Ash handle with interchangeable rubber face (2 in. dia.) of flat, dome, cone and wedge shapes.

Similar Sets:
1½" Ref. 613 Weight 14 oz. Price 15/6.
2½" Ref. 620 Weight 3 lbs. Price 32/6.

THE JUNIOR THORLITE Ref. 612 For all light hammering jobs.
Comprises an aluminium-alloy head fitted with strong Ash handle, one hard and one soft rubber face (dia. 1½ in., weight 10 oz.). The faces are extremely durable, but can be readily replaced when worn out.

Price 7/6

BELLONA PUBLICATIONS, HAWTHORN HILL, BRACKNELL, BERKS.
NEW! — FOR YOU!

SPECIAL SERVICE FOR ALL MECCANO FANS—

At Holborn and Manchester and at our new "Walk Round" store at Southgate we are displaying the full range of Meccano sets and accessories and all Meccano parts on peg board in quantity. You can get what you want on the spot or by mail order from Southgate. Send for our priced order forms — They are free.

SECONDHAND AT SOUTHGATE
Our new secondhand supermarket at Southgate offers bargains in trains, cars and Meccano parts. It is for "Personal Shoppers Only" but it is only thirty minutes on the tube from Piccadilly. You can part exchange what you don't want for new goods that you do want with a cash adjustment. We buy good locomotives and Super 4 Track for cash. Everything must be in good order, no old, damaged or dirty stuff please. Come to Southgate and see our shops.

SATURDAY AT HOLBORN
There are no parking problems at Holborn on Saturday afternoon. Both shops and the raceway are open from nine to six. You can do your part exchanges at Holborn.

FREE PARKING AT SOUTHGATE
The multi-storey car park opposite our shops costs 6d for four hours parking. Show us your parking ticket when paying your bill and we will refund your fee!

MANCHESTER SPECIALISES
Our Manchester shop specialises in trains, cars and Meccano. The shop is small but the stock is large and the staff most helpful. You can part exchange most things in trains, cars and Meccano at Manchester.

Here is the "Beattie Express" in a new, modern form. A monthly review of the pastime trade for the ordinary person — young and old. The specialist has his magazines but we aim to interest and help the ordinary man, woman, girl and boy with their hobbies.

This is to be a paper run for and by its readers, all of them. We will try and print your hints and tips and your sketches and photographs if they are of general interest. Be brief and to the point. Glossy black and white snaps only.

The review costs 1/6 post 6d or 20/- for one year. "Beattie Express" subscribers will get the "REVIEW" for the duration of their subscription. Get your friends to subscribe, we will give a 6/- voucher for each extra subscription you send in. HELP US TO HELP YOU.
Three Simple Models by ‘Spanner’
SINCE this is the last issue of the Magazine, we felt that three smaller models of the type we have been describing to readers for many years would be most appropriate, and we therefore show the construction of a Revolving Travelling Crane, built from the Junior Set, a Motor Scythe that uses the Emebo Motor, and a Lorry built from the Play-Set. Each of these three models is quite simply built, and we trust that our readers find them of interest, in this the final article in the series. May we also thank all Meccano enthusiasts for the interest and support they have given over the years.

**Revolving Travelling Crane**

Build the gantry first by bolting to each side of a 5½ in. by 2½ in. Flanged Plate 1, two 5½ in. Strips 2 and a 5½ in. by 1½ in. Flexible Plate 3. In the last hole but one in each of the 5½ in. Strips forming the ‘legs’, fasten the Double Angle Strip 4, a 3½ in. Rod is placed in the end holes of each pair of Strips and one of these has two 1 in. Pulley Wheels secured to it whilst the other has one 1 in. Pulley Wheel and a 1 in. loose Pulley Wheel, held in place by a Spring Clip. A Bush Wheel 5 has two Trunnions bolted to the diagonally opposite holes, and to the flanges of these Trunnions are bolted two 2½ in. Strips 6 and 7 and a Flat Trunnion 8. The Strips 6 are extended by Cranked Curved Strips 9 that support a 1 in. Rod carrying the 1 in. loose Pulley Wheel 10. The Bolt joining the Strips together also holds the Angle Brackets to which are bolted two Fish Plates fastened together in the shape of a ‘V’. Two 2½ in. by 1½ in. Flexible Plates 12 are joined together using two Fish Plates instead of Washers. These are then attached to the flanges of the Trunnions. The crane is attached to the gantry by securing a 1½ in. Rod in the Bush Wheel 5, through the centre hole in the Flanged Plate 1. A 1 in. Pulley Wheel is fixed to the Rod underneath the Plate, holding it in position.

The model is completed by placing a Crank Handle in the Flat Trunnion 8. A length of Cord with a Loaded Hook attached is secured to the Crank Handle.

**Parts required**

<table>
<thead>
<tr>
<th>Part</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 of No. 2</td>
<td>20 of No. 27b</td>
</tr>
<tr>
<td>2 of No. 5</td>
<td>9 of No. 38</td>
</tr>
<tr>
<td>1 of No. 6b</td>
<td>2 of No. 48</td>
</tr>
<tr>
<td>2 of No. 8a</td>
<td>1 of No. 80a</td>
</tr>
<tr>
<td>2 of No. 10</td>
<td>1 of No. 48b</td>
</tr>
<tr>
<td>1 of No. 11a</td>
<td>2 of No. 77</td>
</tr>
<tr>
<td>2 of No. 12b</td>
<td>2 of No. 90</td>
</tr>
<tr>
<td>1 of No. 15a</td>
<td>1 of No. 110</td>
</tr>
<tr>
<td>28 of No. 37a</td>
<td>2 of No. 111</td>
</tr>
</tbody>
</table>

**Lorry**

Finally, for this small model, begin by bolting two 5½ in. Strips 1 to a 5½ in. by 2½ in. Flanged Plate 2. The 5½ in. Strips are joined together at the front ends by a 2½ in. by ¾ in. Double Angle Strip which supports a Trunnion 4. Now fasten the 2½ in. Strips 5 and 6 in position, so that they are supported by a further 2½ in. Strip 7. Join the cab sides together with a 2½ in. by ¾ in. Double Angle Strip 8 and a 2½ in. Cranked Curved Strip 9 with an Angle Bracket bolted to each end.

The centre hole of the 2½ in. Strips 6, secure to the Angle Bracket to which is attached a Cranked Curved Strip 10 and a 2½ in. Strip 11. The latter are bolted to the Trunnion 4. A 1 in. Pulley Wheel 12 is bolted to an Angle Bracket that is fastened to the Curved Strip 10. The front axle is journalled in a Fish Plate 13 bolted to another Fish Plate secured to the Strips 1. Two Flat Trunnions bolted to the sides of the Flanged Plate support the axle for the rear wheels. The 1 in. Pulley Wheels complete with Tyres are secured to the axles to finish the model.

**Parts required**

<table>
<thead>
<tr>
<th>Part</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 of No. 2</td>
<td>1 of No. 27b</td>
</tr>
<tr>
<td>2 of No. 31</td>
<td>31 of No. 37a</td>
</tr>
<tr>
<td>2 of No. 10</td>
<td>30 of No. 37b</td>
</tr>
<tr>
<td>4 of No. 12</td>
<td>4 of No. 38</td>
</tr>
<tr>
<td>2 of No. 10</td>
<td>2 of No. 48a</td>
</tr>
<tr>
<td>4 of No. 22</td>
<td>1 of No. 52</td>
</tr>
</tbody>
</table>
THE MECCANOMAN'S JOURNAL

The Quarterly Magazine for Advanced Meccano Enthusiasts

Further details from:

The Chief Meccanoman,
248 Woolwich Road,
Abbey Wood, S.E.2
LONDON, ENGLAND
"U.N." Although U.N. stamps are not as popular, perhaps, in the rest of the world as they are in the U.S.A. (where they can be used for postage, if the mail is handed in at U.N. headquarters, which it very often is, particularly by collectors), they are still very much the vogue here in Great Britain. Thus the new definitive 1½ c. stamp which was issued in March is meeting with ready sales, as was to be expected. It replaced the stamp which had been on issue for sixteen years, so no one can claim that it came before its time. Four million copies have been printed by Courvoisier of Switzerland, and the designer was the Hungarian Jozef Vertel. As usual the result is an exceedingly attractive stamp, as can be seen from the illustration.

Tristan da Cunha

We are told, without anyone batting as much as an eyelid (stout people amongst stamps nowadays), that a postal need for 4d. and £1 stamps has arisen. So, of course, we are getting just these stamps and, such is the popularity of off island stamps, that they will be in the 'hot cakes' selling class just as long as they are on issue. As this new high value was taking over the royal portrait, value, the latter is also being changed and H.M.S. Challenger (I wonder if that was the warship I served in for a time during the first world war?) showed itself as that the 4d. stamp is no longer needed, so these have been surcharged 4d. Altogether, changes which will add to the popularity of Tristan stamps, for it is not overdone (I hope the £1 stamp isn't classed thus), new stamps do evoke interest. This is why the special issues of our own country have set the stamp market so literally ablaze, and sent prices rocketing. And don't overlook the forthcoming Duke of Edinburgh set.

All Phosphor

Phosphor and non-phosphor lined stamps have provided a lot of fun for British collectors, and some profit for many. Now, of course all our stamps to the 2s. 6d. value are to be phosphor lined, as is generally known. But one reader (and perhaps there are others similarly puzzled) wants to know what the 2s. 6d. value for, and by what high values are not lined. Well, first of all the high values are not generally used on letters, unless they are going by registered post, or air mail, and these are handled differently to ordinary mail. Machines are now in use in many big post offices, where much mail is handled, which are known as Automatic Letter Facing Machines. These machines prepare letters for date stamping by facing them the same way up, with stamps in the top right corner. The machines work best with phosphor lined stamps. The cost of having all stamps lined is, of course, an extra expense, but such is the labour saving by using stamps thus treated that the cost is well worthwhile, and that and explains, I hope, the queries which have been received from time to time regarding the why and wherefore of the phosphor business. Incidentally, whilst the British post office was, I think, the first to adopt the system (as to be quite fair, it often is, for there are few postal administrations as up to date, yes, and efficient, if not as free from trouble over lost deliveries), others like Canada, U.S.A., Holland, etc., have now followed its lead.

International Tourist Year

Under the aegis of the United Nations, a number of nations are issuing a set of stamps to mark this, the I.T. Year, and India released March 19, a single in participation. A nice little stamp it was, too. I cannot say that these omnibus issues, which are what collectors call stamps issued by a number of countries, with the same object in view, are particularly popular with collectors. But odd stamps of low face value, such as the one India released, sell readily enough, and this has not been illustrated until it has been almost a best seller. Indian stamps are, of course, very popular with British collectors, and, as I have previously remarked, with every reason, because whilst this postal administration sees to it that all important events are marked by an attractive stamp, no attempt is ever made to exploit collectors. May it stay that way, as an example to all those P.O.'s whose aim is apparently the opposite.

Beetles

There are an awful lot of lady collectors, many of whom will be interested in popular Papua and New Guinea stamps, but I wonder if the stamps (nothing to do with the other Beetles, or they would be popular) will be quite to their taste. Anyhow, the four stamps issued April 12, each of which illustrates, in full colour, one of the many kinds of insects which are to be found away in the South Pacific. I must say that I took care to buy a set, and the dealer told me it was a best seller. After all, the designer was a lady, a Mrs. P. M. Prescott, who has in all designed over twenty stamps for P. and N.G.

The Tip of the Month

A few weeks ago, I was shown a collection which was really the pride and joy of a father, son and daughter. They lived in the suburbs of a large city (I will not be more explicit than that, for obvious reasons), and most Saturday mornings the three of them trip off to the city and spend around five shillings on what they fancy in the way of what they consider attractive stamps, and I must say they do pick up some nice looking items. But I am afraid that their number one concern seems to be numbers, and they know to a single just how many stamps their joint collection contains. And, alas, in their desire to get as many stamps as they could, they worked on the principal that half a stamp is better than none. In other words, even damaged specimens were included. They get such pleasure out of the hobby that it would have been cruel to criticise, but it is certainly true that the collection would have looked much better if at least two hundred copies were removed. And this is my tip. Condition is getting more and more important. In fact, stockbook type of albums are being used more and more so that mint stamps may not even have hinges attached. That is, perhaps, going a bit too far, but it's the trend, so do try and keep torn (however small the tear, unless the stamp is a valuable specimen) or heavily cancelled stamps out of your collection. It will be all the better for it.

Super Model Rebuilt—continued from page 47

13. The grab is now freed from the suspender and it can be lowered in the open position (Fig. 11). On reaching the material to be removed, the hoisting rope is allowed to fall quite slack so as to give the weight of the Collar 16a a chance to pull the knot free from the catch, and so permit the closing of the jaws when hoisting is commenced.

The two ¾ in. by ¾ in. Angle Brackets 14, by bearing against the connecting arms of the grab, serve to maintain the grab head in a horizontal position in relation to the jaws under all conditions of service.

Parts required:

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 No. 1</td>
<td>2 of No. 1b</td>
</tr>
<tr>
<td>15 No. 1a</td>
<td>8 of No. 20</td>
</tr>
<tr>
<td>13 No. 1b</td>
<td>9 of No. 20</td>
</tr>
<tr>
<td>35 No. 2</td>
<td>3 of No. 21</td>
</tr>
<tr>
<td>18 No. 2a</td>
<td>4 of No. 24</td>
</tr>
<tr>
<td>17 No. 3</td>
<td>7 of No. 22</td>
</tr>
<tr>
<td>18 No. 4</td>
<td>1 of No. 25</td>
</tr>
<tr>
<td>33 No. 5</td>
<td>2 of No. 24</td>
</tr>
<tr>
<td>6 No. 6</td>
<td>5 of No. 26</td>
</tr>
<tr>
<td>10 No. 6a</td>
<td>7 of No. 26</td>
</tr>
<tr>
<td>4 No. 7</td>
<td>1 of No. 27</td>
</tr>
<tr>
<td>3 No. 7a</td>
<td>4 of No. 27</td>
</tr>
<tr>
<td>28 No. 8</td>
<td>4 of No. 27</td>
</tr>
<tr>
<td>8 No. 8a</td>
<td>6 of No. 28</td>
</tr>
<tr>
<td>9 No. 8b</td>
<td>2 of No. 28</td>
</tr>
<tr>
<td>22 No. 9</td>
<td>4 of No. 29</td>
</tr>
<tr>
<td>10 No. 9a</td>
<td>1 of No. 30</td>
</tr>
<tr>
<td>10 No. 9b</td>
<td>1 of No. 30</td>
</tr>
<tr>
<td>1 No. 9c</td>
<td>3 of No. 32</td>
</tr>
<tr>
<td>1 No. 9d</td>
<td>649 of No. 32</td>
</tr>
<tr>
<td>7 No. 9e</td>
<td>578 of No. 37</td>
</tr>
<tr>
<td>14 No. 10</td>
<td>1 of No. 40</td>
</tr>
<tr>
<td>1 No. 11a</td>
<td>7 of No. 40</td>
</tr>
<tr>
<td>20 No. 12</td>
<td>1 of No. 40</td>
</tr>
<tr>
<td>12 No. 13</td>
<td>4 of No. 41</td>
</tr>
<tr>
<td>3 No. 14a</td>
<td>6 of No. 42</td>
</tr>
<tr>
<td>8 No. 14</td>
<td>1 of No. 50</td>
</tr>
<tr>
<td>10 No. 15</td>
<td>7 of No. 52</td>
</tr>
<tr>
<td>2 No. 16</td>
<td>2 of No. 52</td>
</tr>
<tr>
<td>4 No. 17</td>
<td>4 of No. 53</td>
</tr>
<tr>
<td>16 No. 18</td>
<td>2 of No. 55</td>
</tr>
<tr>
<td>8 No. 19</td>
<td>1 of No. 60</td>
</tr>
<tr>
<td>2 power Drive</td>
<td></td>
</tr>
<tr>
<td>1 No. 20</td>
<td>1 of No. 62</td>
</tr>
<tr>
<td>Lead Weights Large = 24 in. Strips of 50 grns.</td>
<td></td>
</tr>
<tr>
<td>Lead Weights Small = 12 in. Strips of 25 grns.</td>
<td></td>
</tr>
<tr>
<td>Steel Weights 6 of 34 in. by 2 in. by 3 in.</td>
<td></td>
</tr>
</tbody>
</table>
The Construction of the Jib

The main constructional features of the jib may be seen fairly clearly by a careful study of Fig. 2. The two lower longitudinal side members each consist of one 24 in. and one 12 in. Angle Girder overlapped ten holes, whilst each of the upper longitudinal members is composed of one 24 in. and one 7½ in. Angle Girder overlapped four holes. The bottom end of the jib is extended at an angle to the main portion by 12 in. Angle Girder, the ends of which are connected together by 4½ in. by 2½ in. Flat Plates. Where the 24 in. and 12 in. Angle Girders, join at X and Y (Fig. 1), Fishplates are used to connect them together.

The upper port of the jib is extended at 7¼ in. Angle Girder that are bolted to the end holes of the side members, and a 7½ in. Strip is placed over the slotted holes of each girder in order to give a neat appearance. Bracing should now be added to the sides as shown, care being taken to ensure that the various sections are exactly as indicated in the illustration.

The completed sides are now joined together. This is effected at the upper port of the jib where the plates, which is 10 in. long (one 5½ in. and one 7½ in. Angle Girder overlapped six holes), is bolted to the top of the bottom of 2½ in. in front of the Jib Pivot Pin 14½ in.

The extremities of the two upper longitudinal members of the jib are connected by a 3½ in. Angle Girder and the lower by a 3 in. Angle Girder that are bolted together by a 3 in. Angle Girder. Having in this manner determined the taper of the jib, it is a simple matter to place intermediate cross-members of the correct length and then to add the bracing. The latter is triangulated, which makes the jib very strong, and yet permits of light construction.

The jib head has two distinct sets of Pulleys, one set is at the extreme end of the jib and consists of a 1¾ in. Pulley secured to a Rod that has a 1 in. fast Pulley mounted loosely on each extremity. The other set comprises three pairs of Pulleys on a common Rod. The centre pair comprises two 1 in. loose Pulleys, on each side of which are placed Flat Trunnions to act as guards for the hoisting wire. The two remaining sets consists of a 1 in. fast and a 1 in. loose Pulley. The respective groups are spaced on the Rod every 2½ in. and 6 in., and the bosses of the fast Pulleys serve to keep the Pulleys away from the supporting frame, so that they all may run freely.

Construction of the Gear-box

The Gearbox (Figs. 5 and 6) enables the four movements of hoisting, slewing, travelling and luffing to be driven from the 6 volt Meccano Electric Motor (a Power Drive Unit is fitted in today's model) merely by the operation of two levers. The reason for fitting the unit is that it forms a self-contained unit that is readily fitted into the model.

The 5¼ in. Angle Girders 18, 18A, are butt-jointed together so that their vertical flanges point in opposite directions, the left-hand pair for engaging with the 2½ in. Flanged Plate, whilst the right-hand pair are connected together by means of a 2 in. Strip. The two right-angle to, and two holes from each end of a 9½ in. Angle Girder that will eventually be secured to the ends of the Girders 11 (see Fig. 4). Cross Girders 40, each 7½ in. long, are bolted across the Girder 18, 18A to carry the Centre Plate 19 and the right-hand plate of the gear-box, and a 5½ in. Angle Girder 20. The Centre Plate 19 is a 5½ in. by 2½ in. Flat Plate and it is secured to the Cross Girder by a 5½ in. Angle Girder.

Having now completed the constructional part of the gear-box, we now turn our attention to the gear ing. The Mainshaft 22, which is driven by the Motor, has secured to it a 1½ in. Contra-plate driven by a ½ in. Pinion on the Motor Shaft. On each side of this plate the Layshafts 22 and 23, each of which carries a ¼ in. Pinion and a 37½ teeth Gear, the latter being in constant mesh with a ¾ in. wide Pinion on the Mainshaft.

The Layshaft 22 is moved in its bearings by the Crank 36, which is secured on an 8 in. Rod that carries the 25 teeth Gear. The shaft is actuated in a similar manner by the Lever 39 through the medium of the Crank 38. Both Cranks carry bolts, the shanks of which locate between Collars spaced a short distance apart on the Rods.

By sliding the Layshaft 23 to the right the ¾ in. Pinion is brought into engagement with a 50-teeth Gear 26. This Gear is secured to a Rod carrying a ½ in. Contra-plate that is in mesh with a Pinion on a Rod 41. The latter is journaled in a Flat Trunion that is bolted to the front of the Gearbox and also in one of the ¾ in. by 3½ in. Flat Plates forming the front of the cabin. It has secured to it a ½ in. Bevel, and this meshes with a 1½ in. Bevel on a short vertical Rod on the lower extremity of which is fixed a 1 in. Sprocket Wheel 35.

A reinforced bearing is provided for the Rod carrying the Bevel and the 1 in. Sprocket Wheel 35 by bolting a 3½ in. Sprocket Gear 42, across the Gearboxes 13, secured by means of Flat Plates. The Rod also passes through the end hole of a Strip that is bolted to the upper portion of the roller race.

On moving the Layshaft 23 to the left the ¾ in. Pinion is brought into mesh with a 50-teeth Gear 27 on the other End of the Gearbox. Shown at Hoisting Barrel 31 consists of a Sleeve Piece, one end of which is passed over a ¾ in. fast Pulley secured against the face of the 50-teeth Gear 27 by a ½ in. by 3½ in. Double Angle Strips that are bolted at 45 degrees to each other. Journalled in the lugs of each Double Angle Strip and long enough to carry a Collar on its inside end and a ¾ in. Flanged Wheel on its outside end. The 'spider' is placed on the lower end of the Roller race, so that the superstructure is lowered on to it so that the upper Flanged Ring of the roller race coincides with the two distal teeth of the 'spider'. The 5 in. Rod passes freely through the 9½ in. Strips bolted to the Flanged rings and also through a 1 in. Collar to the 42-cranks 30, which is a 5½ in. Angle Girder that is bolted to a 5½ in. by 2½ in. Flat Plate in the centre of the Gearbox. Mounted on the upper end of the Rod is a 1½ in. Contra-plate that meshes with the ¼ in. Pinion on the shaft carrying the Gear 25. The upper Rod should bend down quite evenly on the ¾ in. Flanged Wheels and the complete superstructure should turn at a touch.

The jib is mounted pivotally on the tower by the tower by the 11½ in. Rod 14a through the Flat Trunnions 14 and through the bosses of Cranks that are secured to the lower Hook to the extremities of the jib. To add weights to Z in the shape of pieces of scrap lead melted into blocks of the required shape, or small pieces of scrap metal, until the jib is accurately balanced. The connecting Strips 30 may then be attached pivotally by lock-nutted collars 32, 50, 3½ in. by 12½ in. Strip 43 is bolted to the top of the Angle Girder 44 in the third hole from the end.

The hoisting cord is attached to the hoisting barrel 31, and is led over one of the pulleys 16 at the superstructure head, passing through a guide pulley on its way. The guide pulley is a 1 in. by 2½ in. Pulley running between two Bush Wheels mounted on an 8 in. Rod that is secured by Handrail Supports to the tower. From Pulley 16, the cord passes over one of the centre pair of Pulleys at the jib head, back over the remaining Pulley 16 and then to the other centre Pulley on the jib head, after which it runs over the 1½ in. Pulley at the extremity of the jib and so down to the load hook or grab, to which it is secured.

The Single Suspension Grab

Although the model may be used as an ordinary crane by fastening a leader to the top of the hoisting cord, its interest is vastly increased by the addition of a grab. The grab employed on the model is known as the single suspension type and is assembled merely by manipulation of the haul ing rope, instead of depending for its operation, as is quite usual, upon the distinct teeth of rope wound on separate barrels.

Fig. 7 is a general view of the
The side plates 2 (Fig. 8) carry the operating mechanism are 3 in. Flat Girders, which are connected together by 1 in. by \( \frac{3}{4} \) in. and \( \frac{1}{2} \) in. by \( \frac{3}{4} \) in. Angle Brackets 3, 3a. On the side plate shown detached are fixed two 1 in. Triangular Plates that carry 1 in. by \( \frac{3}{4} \) in. Angle Brackets 4 and 5, and to the Bracket 5 is secured a Double Bracket, with two Flat Brackets 6 bolted to it. Two Washers are placed between each Flat Bracket and the Double Bracket for spacing purposes.

The hooks are composed of 2 in. Strips bent to the shape shown in the illustrations and attached by means of \( \frac{3}{4} \) in. Bolts to 57-teeth Gears. The ends of the Strips are each fitted with a Pawl and a Flat Bracket. The catch 9 is composed of a Centre Fork shortened by \( \frac{3}{4} \) in., held in the end bore of a Coupling, which also carries a Handrail Support 10 and a balance weight 11 consisting of 1 in. Rod to the end of which is secured a Collar. The Gears are arranged to mesh with each other so that the Hooks 7 lie at the same angle to the perpendicular, and the Rods on which they are secured should be perfectly free to turn in the side plates 2.

The Handrail Support 10 of the catch is mounted freely on the spindle of the right-hand Gear, and a \( \frac{3}{4} \) in. Bolt 8 is secured by double nuts to the Gear in the third hole from that in which the 2 in. Strips are secured. Each hook is kept in the normal position by a piece of Spring Cord 12, one end of which is attached to the side plate and the other to a set-screw inserted in the boss of the 57-teeth Gear. Each piece of Spring Cord should be partially carried round the boss of the 57-teeth Gear before it is attached, so that its effort to come back to its normal state, and not its actual tension, is utilised to return the hooks. If it were used in the normal way, the tension would be too great for the purpose in view.

The connecting links between the grab proper and the grab head are attached by lock-nutted bolts to the 1 in. Triangular Plates, and the hoisting cord 16 is secured to the cross member 1. The cord is then threaded through the round holes in the lower guide 4 and a large knot made in it in such a position that when the jaws are open the knot rests on top of the guide. The cord is then passed through the

Diagrams illustrating the operations of the grab

Continued on page 46
Travel back in time! The Museum of British Transport contains relics of public transport over five generations: Historic locomotives—Royal coaches—trams—horse-drawn and other buses. You can also see Mallard, the fastest steam locomotive ever built—126 mph on 3 July 1938.

Visit also: The Railway Museum, York
The Great Western Railway Museum, Swindon

Museum of British Transport
Clapham High Street
London SW4

You'll do a good job better with
Swann-Morton tools
Precision-ground, superbly handy and versatile,
Swann-Morton tools are made from the finest materials

The new
Swann-Morton
UNITOOL
An all-purpose, heavy-duty pocket and
bench set with three razor-sharp blades.
'Stow-away' handle allows instant change
to the blade of your choice and prevents
blades from being lost. The flat design
ensures a safe, firm grip and prevents
accidental rolling when laid down.

Complete with three blades and plastic
wallet, 5/-; Set of 6 spare blades, 3/-

Obtainable from
Hobby, D.I.Y. and Stationery Shops

It's open:
10.00—17.30 Mondays to Saturdays
including Bank Holiday Mondays.
(closed Good Friday, Christmas Day, Boxing Day).

It costs:
1s 6d for boys and girls under 15 years;
2s 6d for adults. Reductions for school parties.

It's easy to get to:
By Underground: Northern Line to Clapham Common.
By Bus: 35, 37, 45, 88, 118, 137, 155, 181, 189.
By Green Line: 711, 712, 712A, 713.
By British Rail: Clapham (South London Line),
Clapham Junction, or Balham, then by bus.
Ask for Clapham Common bus or coach stop.

FREDERICK WARNE
14 Bedford Crt., Strand,
London, WC2

OBSERVER BOOKS

4 marvellous new additions to add
to anyone's bookshelf, all fully
illustrated yet only 6s net each.

OBSERVER'S BASIC BOOK OF AIRCRAFT—CIVIL—
an information packed pocket guide to the world's most
important civil aircraft, irrespective of age.

OBSERVER'S BASIC BOOK OF AIRCRAFT—MILITARY—
This book is entirely devoted to military aircraft.
Each book contains over 250 photographs. Both by
William Green.

OBSERVER'S BOOK OF POND LIFE—a new edition
of this remarkable little book. It describes briefly
something of the almost incredible wealth and variety of plant
and animal life in ponds and streams. John Clegg.

OBSERVER'S BOOK OF AUTOMOBILES—this new
up-to-date edition is designed to give enthusiasts the latest
information about the current models of the world. Giving
details of 103 different makers, history and the works of
cars and many more interesting facts. L. A. Manwaring.
GET ADVENTURE AND ACTION FROM A REAL GUN

The most accurate air-weapon you can buy anywhere is Britain's Webley. The one at the top of this page is the Jaguar air-rifle—light, strong—£6.19.7. FREE, with it—a full shooting kit; target-holder, target cards, pellets, darts, and Webley oil. You should always use Webley special pellets (3/9 for 500) and darts (2/3 for 12). Collect the coupons from four tins of Webley special pellets and send 3/- P.O. for a Webley Marksman's Badge. The Webley long-range telescopic sight on the Jaguar you can buy separately (£9)—an expert's sight, with 4 x magnification. Other Webley rifles are: Ranger 177, £7.19.11, Falcon 177 or 22, £11.18.7, Mk III £21.6.5.

Action out-of-doors: Webley target-launcher (£4.5.4) simple, safe. Uses 22 blank cartridges. Sends old mineral and juice cans over 60ft. into the air. Try your skill at moving targets this way.

Shoot with safety. Never point a gun, unloaded or not, at anyone. Never handle a gun before checking that it's unloaded. Always carry it so that the muzzle is fully under your control. Never leave your gun where people younger or less responsible than you can meddle with it. Never leave a loaded gun unattended. Always make certain no-one is behind your target before opening fire.

If you prefer an air-pistol, the Webleys are fast and accurate. Premier 177 or .22, weighs 37 ozs. £10.13.3, Junior model 177 weighs 24 ozs. £7.2.2.

GET A WEBLEY

BRITAIN'S BEST GUN

from your Webley shop. Or write for a list, sending 4d stamp, from: Webley & Scott Ltd. (Dept. 622) Inc. W. W. Greener Ltd., Park Lane, Handsworth, Birmingham 21.
Get the most from your modelling this month, next month and every month

BUY

AIRFIX MAGAZINE

Aircraft, tank, soldier, car and ship modelling or converting is given full practical coverage every month, with step-by-step pictures and drawings PLUS: Articles on full-size aircraft and tanks, new kit reviews, latest books, and the chance to win a free kit if your letter to the Editor is published.

All in AIRFIX Magazine
BRITAIN'S BEST-VALUE MODEL MONTHLY—ORDER IT NOW—PRICE ONLY 2s FROM YOUR NEWSAGENT OR MODEL SHOP

Postal subscriptions (30s—or $5.50—per year) from Surridge, Dawson & Co. (Productions) Ltd., 26 Aberdour Street, London, S.E.1

OR HAND THIS FORM TO YOUR NEWSAGENT OR MODEL SHOP

<table>
<thead>
<tr>
<th>To:</th>
<th>name of newsagent or model shop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Please obtain for me a regular copy of Airfix magazine—price 2s monthly—which I will collect/I would like delivered* to my address below.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Please use block capitals</td>
</tr>
</tbody>
</table>

*Delete whichever is inapplicable

INSTRUCTIONS TO NEWSAGENTS: Airfix magazine is published on the fourth Friday of the month preceding date on cover and is distributed to the wholesale trade by Surridge, Dawson & Co. (Productions) Ltd., 26 Aberdour Street, London, S.E.1 (BER 7074). Your local wholesale newsagent should be able to supply you. REMINDER TO MODEL SHOPS: Airfix magazine is distributed to the model trade by Airfix Products Ltd., Haldane Place, Garratt Lane, London, S.W.18, who will gladly supply your needs.

AIRFIX MAGAZINE is published by Knightsbridge Publications (1962) Ltd.
3/4 St. Andrew's Hill, London E.C.4

KDI
QUICKSTART

AERO ENGINES
-5 cc DART 76/2
-75 cc MERLIN 60/4
-75 cc SUPERMERLIN 65/11
1-0 cc SPITFIRE 71/10
1-5 cc SABRE 76/2
-75 cc BANTAM
GLOWPLUG ENGINE 45/8

MARINE ENGINES
-5 cc DART 96/6
-75 cc MERLIN 81/3
1-0 cc SPITFIRE 91/5
1-5 cc SABRE 96/6

Full range
spares available

CALL AT YOUR MODEL SHOP TODAY
OR IN CASE OF DIFFICULTY WRITE DIRECT TO
DAVIES CHARLTON LTD.
HILLS MEADOW, DOUGLAS, ISLE OF MAN.

ACCESSORIES
TEST STAND
CONTROL LINE
HANDLE
QUICKCLIP
CONNECTOR
QUICKSTART
GLOWPLUGS
EG 98  EG 99
EG 200
SILENCERS
NYLON PROPPELLERS
FLYWHEEL COUPLINGS

LOOK
IT COSTS YOU NOTHING

to find out more about the many interesting products advertised in the pages of Meccano Magazine. Just tick
the squares against the name of the advertiser from whom you would like to receive more product informa-
tion and post it to:—Meccano Magazine, St. Alphage

JULY COUPON

Airfix Magazine
Adana
Ashford
Archery
Ayres
Bata
Beck
Beatties
Brooke Bond
British Transport
Museum
Barclays Bank
Beaumont Aviation
Boyer Stores
H.M.S. Conway
Dunlop
Davies Charlton
Every Ready

Gamage
Harbott
Hamann & Morgan
Hobson
Henry’s Radio
Hobbies Ltd.
Johnson
Keeli
King Charles
Kodak
Impy Cars
Miniature Auto
Lottis
Lang
Malins
Merberlen
Philips

Railway Modeller
Reardon Smith
Royal Navy
Radionic
Stamp Club
Solaris
Smiths Industries
H. L. Smiths
Webley & Scott
Wris
Meccano
Scalextric
Meccano Man’s
Journal
Swann-Morton
Thor Hammer

As shown on T.V.
The Meccano Mag Computer

All components
used in Meccano Magazine articles of April, May, June and July
can be obtained from

H. L. SMITH & Co. Ltd.
287/9 EDGWARE ROAD, LONDON, W.2
Tel: 01-723 5891/7595
Model car constructing, converting, collecting & racing are given full practical coverage every month in miniature auto

Britain's premier model car magazine

2s 6d monthly

LOOK OUT FOR THE SMART miniature auto FRONT COVER AT YOUR LOCAL NEWSAGENT OR MODEL SHOP—AND BUY A COPY THIS MONTH, NEXT MONTH AND EVERY MONTH. YOU CANNOT AFFORD TO MISS THE MODEL MOTORING MAGAZINE THAT CAN SAVE YOU MONEY

Postal subscriptions (36s per year) from Pritchard Patent Product Co. Ltd., Pecoway, Seaton, Devon. OR HAND THIS FORM TO YOUR NEWSAGENT OR MODEL SHOP

To ................................................
(name of newsagent or model shop)

Please obtain for me a regular copy of Miniature Auto—price 2s. 6d. monthly—which I will collect/I would like delivered* to my address below.

NAME ...........................................................................................

ADDRESS ...........................................................................................

Please use block capitals

*Delete whichever is inapplicable

Instructions to newsagents: Miniature Auto is published on the 14th of month preceding date on cover and is distributed to the wholesale trade by Surridge Dawson & Co. (Productions) Ltd., 26 Aberdour Street, London, S.E.1. (BER 7074). Your local wholesale newsagent should be able to supply you. Reminder to model shops: Miniature Auto is distributed to the model trade by Pritchard Patent Product Co. Ltd., Pecoway, Seaton, Devon, who will gladly supply your needs.


Ever Ready pack the Action!

into battery operated toys

Get Ever Ready Power behind your toys and models—then watch them go! Ever Ready High Power Batteries get the most out of all battery operated toys—and keep them on the go much, much longer!

Pack REAL power into everything you buy and build—with Ever Ready!

The Ever Ready Co (GB) Ltd · Ever Ready House
1255 High Road · Whetstone · London N20 · 01-445 8877
CONTINUE READING—

—about the Railway Modelling hobby, in Britain's leading monthly magazine for the railway enthusiast—the Railway Modeller.

News and views every month about this absorbing hobby, along with the layout of the month and step-by-step construction articles to help the junior modeller to get to grips with his hobby.

JULY ISSUE ON SALE JUNE 20th

—Building a footbridge, loco construction, coach modelling, and special holiday feature on Railways and relics to visit.

ORDER YOUR COPY NOW!

PECO PUBLICATIONS & PUBLICITY LTD., SEATON, DEVON
Endless interest! Build your laboratory with spare apparatus and chemicals always available. Write for FREE price list. Post free if addressed envelope enclosed with request.

LOTT'S BRICKS LTD Dept. MG5 Watford Herts

Sales
- Sales, wants, swaps, bargains, obsolete Dinkies? Advertise for them in MINIATURE AUTO'S Modellers' Market, the feature collectors read. 2d. a word private, 3d. a word trade. Details in any copy of Miniature Auto's, or from Knightride Publications, 3/4 St. Andrew's Hill, E.C.4.
- Ten beautiful Animal Stamps, free to all who request my approval. S.A.E. to: M. J. Gatesby, 115 Platt Street, Padfield, Hadfield, via Hyde, Cheshire.
- M.M.'s, 1927, 1928, except January and December, and 1931, except July to September, mostly without covers but some duplication, offers required 1923 and 1926, complete. Stokes, Schiedelhof, Albino, Holland.
- Scalextric blow-out set, plus long chicanes and two straight 'D' 45 £3. J. Timothy, School House, Oxford Road, Llandrindod, Radnorshire.
- Mamod No. 1 Steam Engine, in new condition, 25s. Roselands, Earlsbury, Whitby.
- 21 Dinky models, pre-war, post-war, £45 o.n.o. collection. Telephone 922-0485, London.
- For sale, Model Aircraft Engine (hardly used), 20s. o.n.o.; Fishing Tackle, rod, reel, line, float, hooks and lead shot (sinkers), 25s. o.n.o. T. W. Coot, 23 Broom Lane, Hatfield, Herts.
- Stamps, Cheapest pictorial approvals with discounts. Please give them a try. Stephenson, Akell, Wooler, Northumberland.
- Hundred or back-number Ian Allan A.B.C.'s for sale; state requirements and send s.a.e. for list. Forster, 63 Cemetery Road, Weston, Crew.
- Meccano parts, as new, blue and gold, £3.50 list, red and green, transformers M20, T20, T20A, T6, T6M, all canti, and Dinky parts, etc. S.A.E. and offers. 155 Nutfield Road, South Meredith, Survey, Meredith 1921.
- Lego, over 750 pieces, including town plan, highest offer. Murphy, 3 Craigmore Crescent, Penzance, Cornwall.
- Railway Stock, over 100 lots. 20 centime locomotives, coaches, wagons, transformers, station 'extras'; brand new condition. £15, 62 Leicester Road, Grimsby, Leicester, Name, Robert Lamb.
- Boy aged 16 wishes to start a Meccano club. Anyone interested please contact Rupert Alexander, 82 Parkside, Shoreham, Sussex.
- Bound M.M.'s, July 1927 to January 1966, offers over £30. 10,000 cigarette cards from 1964. Offers to: Maurice Taylor, 501 Sutton Road, Southend-on-Sea.

GREAT BRITAIN
2/6, 5/- & 10/- (cat. £3/6) FREE
This packet of stamps is given absolutely FREE to all genuine applicants. The superior used British Colonial Approval series enclosing 4d. in stamps for postage. Overseas Applications Invited.

D. L. ARCHER (M),
2 LITCHFIELD WAY, BROMBERY, HERTS.

P.B.K. CANOES
Plans, Materials, Accessories, Canoes Built to order.
G. G. HINTON (6), Milton St., Fairfield, Glos. Tel. 540

SERIOUS COLLECTORS SHOULD SEND FOR SELECTION OF FIRST-CLASS APPROVALS STATING CHIEF INTERESTS
H. E. H. B., 17, Salters Lane, Harpenden, Herts.

Ashford, 16 Lansbury Drive, Hayes, Middlesex

- Meccano Set 3, gears outfit B, Triang railway equipment N. M. McKeown, 17 Brighton Road, Basildon, Essex.
- 0-4-0T, Hornby with Goodwood Railway, good condition, much rolling stock and track; s.a.e. for details. 33 Shepherds Hill, London, N.6.
- M.M.'s, 1936-42, unmarked; Black Figure Skates (sevens); offers. 18 Dovedale Avenue, Kendon, Midlothian.
- Meccano Magazine, 1962 to 1966, three missing. Apply: 1224 Thomas Lane, Broadgreen, Liverpool 14, s.a.e. please.
- M.M.'s, December 1964-April 1967, s.a.e., Bone Campion's, Saint George's Road, Bickley, Bromley, Kent.
- Collector will have shortly for sale or exchange Meccano Magazines which are being bound at this moment, and should be available June. Bound vols. 1924, 1925, 1926, 1928, 1929. Separate months in original covers, 1925, 1926, 1927, 1929, 1929-1940. Instruction leaflet. Pre-war. Ten set leaflets. Most of these unexamined, but in excellent condition. Stephen, Stonervale, Station Road, Earl Shilton, Leicester-shire. Telephone Hinckley 3234 days; Earl Shilton 2047 after 7 p.m.

Wants
- M.M.'s, 1930 to 1946; also pre-war part 167 geared roller bearing, complete, must be mint condition. Your price please. Allen, 1a Newburgh Street, Winchester, Hants.
- Pre-war railway models, English or foreign, anything wanted. J. Westall, Waltham.
- Good prices paid for obsolete die-cast models, Dinky toys, Tootsietoys, etc., also early clockwork toys. Will buy one or complete collection. Dr. Gibson, The Green, Ansley, Leicester.
- Old Meccano Publications, M.M.'s 1916-1936, French, German, American, old catalogues, manuals, etc. Details. 67 Holly Road, Tring, Herts, Midlins.
- Obsolete Meccano Magazines, Hornby catalogues, trains, accessories, Dinkies, Minis. Foster Molkens- buuren 45/6 Farris, Sweden.
- Obsolete Dinkies, Sodidos, Tootsietoys, also tinplate, clockwork toys. Antonio Lobo, Junqueiro 104, Carcavelos, Portugal.
- Meccano Magazines, early issues and to 1950, wanted. Good prices paid for them, or will exchange sets of New Zealand stamps for them. Phillips, 28 Oakland Avenue, Papatoetoe, New Zealand.

City of Cardiff Education Committee
REARDON SMITH NAUTICAL COLLEGE, FAIRWATER, CARDIFF

PRE-SEA TRAINING
This Residential College provides courses as follows:—
(a) A one year course of Phase I towards an Ordinary National Diploma in Nautical Science—with Phases II & III after the young man goes to sea.
(b) One-year course for those not eligible for (a). Passes in Mathematics and English at least very desirable but not essential: opportunity exists to take these subjects at the College, provided a candidate's ability is such that he can reach the necessary standard.
Each course leads to NINE months' Remission of Sea Service.

Prep. and tuition £180. Grants are available from Local Education Authorities and certain other channels.
Prospects and further information may be obtained from the Principal (address as above)

Robert E. Presswood, Director of Education, City Hall, Cardiff.

Railway Magazine
the popular monthly journal for the enthusiast, describes all aspects of railway working, at home and overseas.
Profusely illustrated articles on current railway practice and development, provide valuable information for the model railway owner and operator.
A subscription for one year of only 36/- (we pay postage) provides a welcome present—for Birthday, or Christmas.

RAILWAY MAGAZINE
Subscription Department

ELLISON HAWKS Editor of the M.M. 1921-1955
wishes to complete his file of EARLY NUMBERS AND COPIES OF EARLY MANUALS, STANDARD MECHANISM, and similar publications

Would also be interested to hear from readers who corresponded with him in the early days: Real Photographs Co. Ltd, Victoria House, Southport.
Dealers who specialise in Meccano spare parts

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

<table>
<thead>
<tr>
<th>Dealers/Addresses</th>
<th>Telephone/Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. G. Marshall</td>
<td>4092</td>
</tr>
<tr>
<td>Maxwell Road, Beaconsfield</td>
<td></td>
</tr>
<tr>
<td>Barrett's Ltd.</td>
<td>66161</td>
</tr>
<tr>
<td>2 St. George's Street, Canterbury</td>
<td></td>
</tr>
<tr>
<td>Cheltenham Motor &amp; Cycle Co. Ltd.</td>
<td>53099</td>
</tr>
<tr>
<td>31 High Street, Cheltenham</td>
<td></td>
</tr>
<tr>
<td>W. Paine &amp; Co Ltd.</td>
<td>45215</td>
</tr>
<tr>
<td>168 High Street, Chatham, Also at Stroud and Grays</td>
<td></td>
</tr>
<tr>
<td>Youngsters (The Doll's Hospital)</td>
<td>2831</td>
</tr>
<tr>
<td>55 Hallgate, Doncaster</td>
<td></td>
</tr>
<tr>
<td>The Guildford</td>
<td>61331</td>
</tr>
<tr>
<td>Doll's Hospital Ltd., 13 Swan Lane, Guildford</td>
<td></td>
</tr>
<tr>
<td>Lucas's (Hobbies) Ltd.</td>
<td>7562</td>
</tr>
<tr>
<td>7 Tarleton Street, Liverpool 1</td>
<td></td>
</tr>
<tr>
<td>Wiltons Games/Sports Store, Corner House, Canal Queen Street, Salisbury</td>
<td>22984</td>
</tr>
<tr>
<td>John W. Bagnall Ltd.</td>
<td>3420</td>
</tr>
<tr>
<td>18 Salter Street, Stafford</td>
<td></td>
</tr>
<tr>
<td>Leslie Brown</td>
<td>67616</td>
</tr>
<tr>
<td>Super Toy and Model Store, 95 High Street, Stockton-on-Tees</td>
<td></td>
</tr>
<tr>
<td>Jeron</td>
<td>29366</td>
</tr>
<tr>
<td>16 Prince's Arcade, Piccadilly</td>
<td></td>
</tr>
<tr>
<td>Jeremy</td>
<td>1046</td>
</tr>
<tr>
<td>16 Prince's Arcade, Piccadilly</td>
<td></td>
</tr>
<tr>
<td>F. T. B. Lawson</td>
<td>65363</td>
</tr>
<tr>
<td>New George Street, City Centre, Plymouth</td>
<td></td>
</tr>
<tr>
<td>Lane's Toy Shop</td>
<td>41870</td>
</tr>
<tr>
<td>75 High Street, Rochester</td>
<td></td>
</tr>
<tr>
<td>Bunkers Ltd.</td>
<td></td>
</tr>
<tr>
<td>P.O. Box 58, Hastings</td>
<td></td>
</tr>
<tr>
<td>(Mail orders from all countries welcomed)</td>
<td></td>
</tr>
<tr>
<td>Overseas Dealers</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td></td>
</tr>
<tr>
<td>Walter &amp; Stevenson Pty. Ltd.</td>
<td></td>
</tr>
<tr>
<td>395 George Street, Sydney</td>
<td></td>
</tr>
<tr>
<td>Telephone: 29 3566</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>ESB Science Centre</td>
<td></td>
</tr>
<tr>
<td>3431 Bathurst Street, Toronto, 19</td>
<td></td>
</tr>
<tr>
<td>Telephone: 789-3161</td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td></td>
</tr>
<tr>
<td>Bunkers Ltd.</td>
<td></td>
</tr>
<tr>
<td>P.O. Box 58, Hastings</td>
<td></td>
</tr>
<tr>
<td>(Mail orders from all countries welcomed)</td>
<td></td>
</tr>
</tbody>
</table>
England's Only Aviation Bookshop

We BUY, SELL or EXCHANGE
Thousands of magazines and books always in stock
Send for our free 22 page catalogue
HISTORICAL MODEL ENGINEERING REFERENCE

Beaumont Aviation Literature
11 BATH STREET, LONDON, E.C.1 cle.9512
The World's Largest Collection of Aeronautical Literature

The greatest Impy yet!

No 24 FODEN Tilt-Cab Truck

Here's a really great model for you—with all the authentic details! 3¼" long, this die-cast metal model has all these features:
- Tilting Cab
- Windows, seats and steering wheel
- Die-cast chassis
- Die-cast engine
- Non-scratch tyres
- Tipping back with hinged loading flap

Remember, IMPYs are the die-cast models with ALL the Real-Car features! Additions to the series are coming along all the time!

Next on the list are:
- Ford Taunus
- Tractor
- Rolls Royce Silver Cloud III
- Merryweather Fire Engine

If you intend to turn right at a road junction, prepare in advance! When you are about 20 yards short of the turn, look behind you. If all is clear, signal your intention, and draw out to take up your position just to the left of the centre line.

2 Do not cut the corner. See that the road is clear to the right and left, wait until oncoming traffic has passed you, then take the corner in a wide arc. Gain the inside lane straight away, so as to let faster vehicles, which may be turning with you, overtake.

HOW GOOD A CYCLIST ARE YOU?

PUBLISHED IN THE INTERESTS OF SAFE CYCLING BY THE MAKERS OF THE WORLD'S SAFEST TYRES

DUNLOP
GAMAGES
FAMOUS 'SPORTSMAN' CYCLE
With 'Sturmey Archer' 3-Speed Gear
A huge contract with a well known maker enables Gamages to offer this superb quality cycle, with first class specification, at this
SENSATIONALLY LOW PRICE
£17.19.6 or 9 monthly Payments of £4.53.10 (Total £17.19.6)
CARR. PAID G.B. (Mainland)

Specification: Gent's, 19 in., 21 in., or 23 in.

HORNBY 00
2 and 3 rail
We are officially appointed Service Agents for all Hornby 00 repairs, and we also undertake conversions.

SOME LOCOS AND TRACK AVAILABLE FROM OUR SECONDHAND STOCK.
LISTS NOT AVAILABLE, PLEASE STATE SPECIFIC REQUIREMENTS.
Leading railway specialists.

KING CHARLES SPORTS CENTRE
RAILWAY HOUSE,
KING CHARLES STREET,
LEEDS, 1.
Tel. Leeds 26611
for fast movers

SCALEXTRIC

model motor racing

BIGGEST RANGE OF SETS - FROM 82/3

More sets, more thrills and many big race features that you can add to at any time... that’s Scalextric. All sets are complete with 1/32nd scale model racers, and all offer easy-to-build alternative track layouts. The '90' set at £15.80 has everything you'd like to find in a model motor racing circuit.

UP TO 8-LANE RACING WITH SCALEXTRIC

2, 4, 6, and now 8-lane racing with Scalextric. Only Scalextric offers this exciting feature. Now you can build up your circuits with special extension sections and make your racing even more thrilling. Scalextric also offer the greatest range of track sections—straights, curves, chicanes, and more special features than any other system.

'Race-Tuned' Cars

Faster, more responsive! Supercharged cars for extra speed for advanced drivers. But they must be used with the race-tuned hand controller (A/262). These cars have been specially introduced to test your skill with more speed, instant acceleration and perfect braking. Sixteen models to choose from.

ACCESSORIES AND BUILDINGS

Complete the authentic atmosphere of the track with Scalextric accessories. Buildings with super detail, trackside figures, everything you could want for realism and excitement. See the complete range in the latest Scalextric catalogue on sale in your model shop. Price 1/-.

Only Scalextric offers you so much choice

Minimodels Limited, Havant. Hants
IT'S THE NEXT BEST THING TO AN ENGINE!

Funny how a speedo makes riding a bike easier and more fun. It's great to know what speed you're doing, and you feel as though you're riding more than just an ordinary bicycle. A SMITHS cycle speedometer tells you your speed accurately up to 40 m.p.h., records the miles you travel too. SMITHS speedos don't cost a lot—you could soon save the 47/6 from your pocket money, or ... what about a hint to Dad.

Make sure you equip your bike with the next best thing to an engine—a SMITHS cycle speedometer, from any branch of Halfords and most other good cycle stores.

SMITHS INDUSTRIES LIMITED
MOTOR ACCESSORY DIVISION

bandsmanship begins with Hohner!

Music — your own music-making — means plenty of fun, whether you start it at school or get together with your pals on outings and picnics. You can soon have your own band. Get HOHNER Harmonicas, Recorders or Melodicas—they are made to last and sound fine. You can soon learn to play tunes and surprise everyone. And HOHNER Accordions are known everywhere for their big exciting music . . .

Ask at your local Music Shop for the HOHNER Catalogue.
HOBBY FOR THE WHOLE FAMILY 'Plasticine' MODELLING

Full play for creative talents — the whole family will enjoy modelling in 'Plasticine'. A fascinating pastime — soon interesting results can be achieved, and the skill grows. So easy to use — and there are eighteen attractive shades for full colour variation.

'SPlasticine'
Sole Manufacturers
HARBUTTS PLASTICINE LTD.
Bathampton : Bath : Somerset

THE H.M.S. "CONWAY"
MERCHANT NAVY CADET SCHOOL.

- Magnificently situated on the Anglesey shore of the Menai Strait, CONWAY prepares cadets for the G.C.E. examinations at O and A levels so as to qualify for leading British shipping companies or the Royal Navy.
- Cadets on entry are enrolled as Cadets R.N.R.
- Entry is between 13½ and 14½ for the three-year course, 14½ and 16 for the two-year course, if already holding five G.C.E. passes at "O" level.
- Successful completion of a CONWAY course earns up to 12 months' remission in sea service for the second mate's examination (15 months if two A level passes in G.C.E. are obtained).
- A fleet of 26 pulling, sailing and motor boats is available for technical training.
- The CONWAY course is primarily designed to fit boys for ultimate command in the Merchant Navy.

Send for illustrated prospectus to: H.M.S. CONWAY,
Nautilus House, Mariners Park, Wallasey, Cheshire.

AMBITION AND ADANA
Adds up to PROFITABLE PLEASURE!

The New ADANA "Fino Three" £9. 15. 0.

If you are looking for a really absorbing, instructive hobby and have the ambition to earn EXTRA CASH then start to get ahead NOW — by PRINTING at home with an ADANA! Your customers are all around you, waiting for the type of printing job the ADANA can produce. The potentialities are limited only by the scope of your ambition. Adana machines are world famous. They are real printing machines using standard printers' type and turning out first-class work.

Send for FREE details to:
ADANA LTD (Dept. MM37)
15/19 Church Street, Twickenham, Middlesex

ELECTRONIC COMPONENTS

Contact us for all Your Requirements
Write for Price List of Components required to build 'Electronic Computer'
Described in this issue

BRIAN J. AYRES & CO.
8 HARTFIELD ROAD, WIMBLEDON,
LONDON, S.W.19.
Tel: 01-946 6063
This little boy built a smashing ‘grab’ for fun—with the big, chunky pieces of new Plastic Meccano

Big bolts. Big nuts to fit them. Big spanners to fit them with. All big pieces, all easy pieces in new Plastic Meccano!

New Plastic Meccano is such fun for young children to play with. Because new Plastic Meccano makes it so easy for little hands to build things.

Things that work. Lots and lots of them. Like cranes and swings, and planes with wings. And cars and ships and windmills.

All in the brightly coloured . . . unbreakable . . . moulded pieces of new Plastic Meccano.

Choose from 3 boxfuls of model-making fun for younger children—

SET A 14/6  SET B 30/9  SET C 61/6

Each Set complete with simple instructions for model making

AT ALL GOOD TOY SHOPS NOW

MADE BY MECCANO LTD., BINNS RD., LIVERPOOL
Only DINKY TOYS® have so many models with so many action features.

Two great new action-packed DINKY TOYS from THUNDERBIRDS:

LADY PENelope’s Rocket-Firing Fab 1
- Flies 5 rockets (hinged radiator conceals big block-hour,) and there are 4 pursuit rockets
- Sliding cockpit canopy
- Lady Penelope and Parker
- Jewelled multiple headlights
- Super Finish
- Plated details
- Length 5½”

THUNDERBIRD 2 with THUNDERBIRD 4
- Sensational 2 in 1 special from Dinky
- Thunderbird 2 has spring-released telescopic legs
- Pod contains Thunderbird 4 for solo flights to high adventure
- Superb details. Overall length 5½”

From Hamleys, Harrods, Gamages, Selfridges, and all good toy shops. Manufactured by Meccano Ltd., Binns Rd., Liverpool.

There’s always something new from Dinky.