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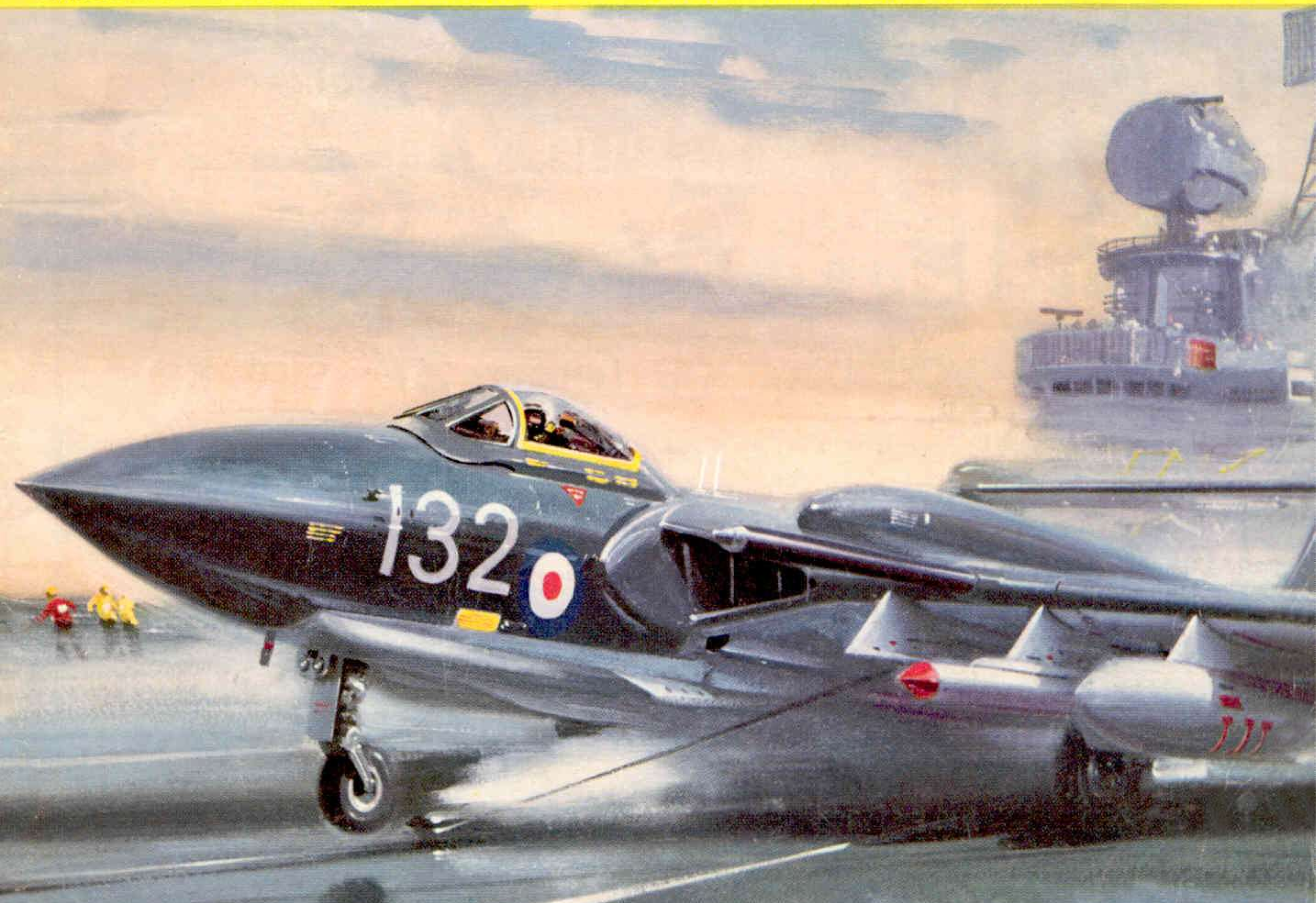

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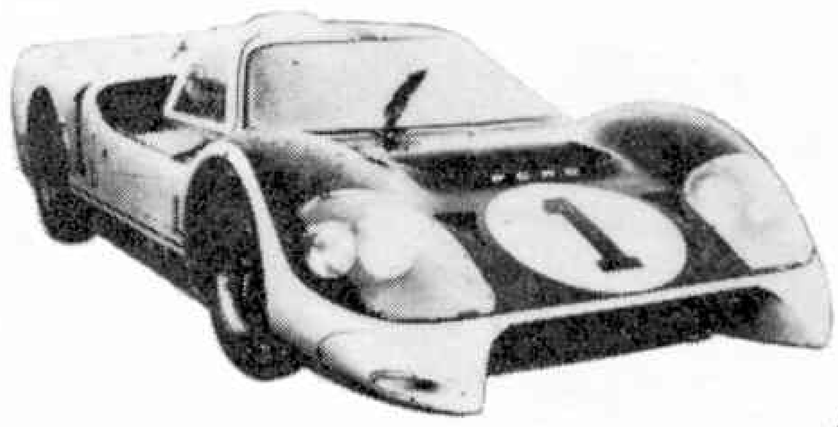

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MECCANO® Magazine

AUGUST 1968 VOLUME 53 NUMBER 8

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MAP **HOBBY MAGAZINE**

FRONT COVER

Artist Laurie Bagley captures the action as a Mk. II Sea Vixen takes off from H.M.S. Eagle.

NEXT MONTH

Watch out for the exciting scale model aircraft cover, and a report on the National Model Flying Championships. Also, in September issue are: Great Engineers, Stamps, Dinky Toy News, Meccano Models to build and another full size free model plan. We also have a more advanced than usual project for Model Railway enthusiasts, plus of course, A.B.C. of Model Railways.

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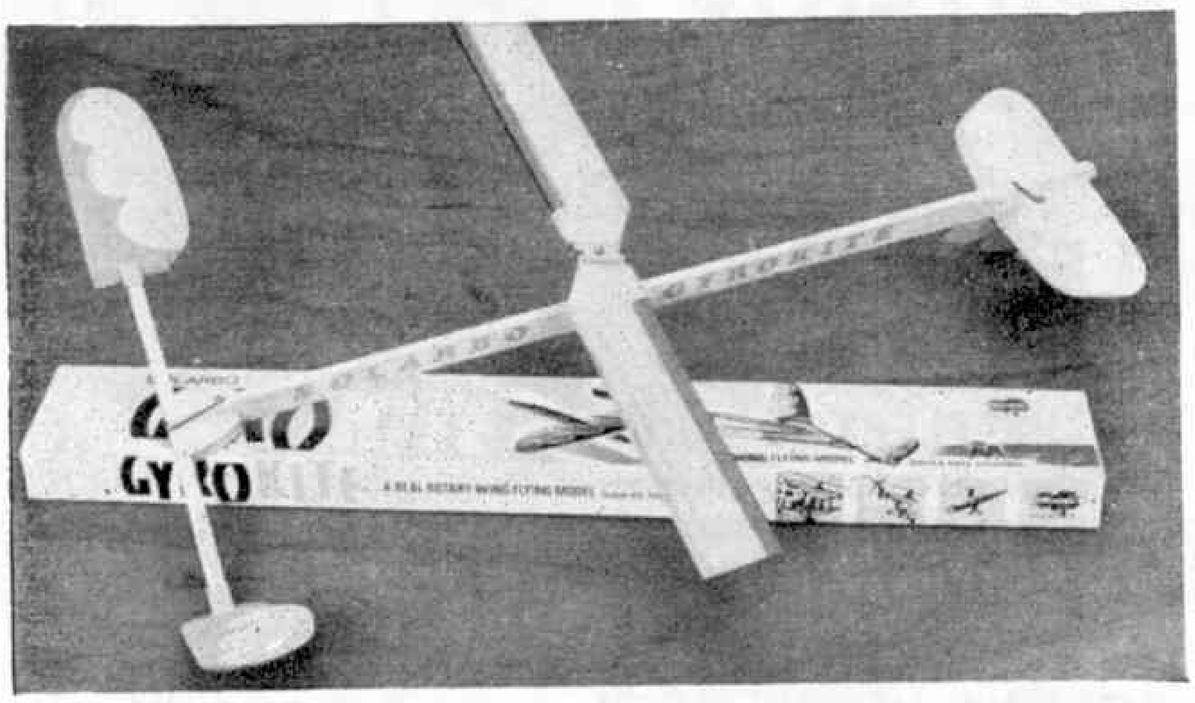
MAKING MODELS WITH Solarbo BALSA



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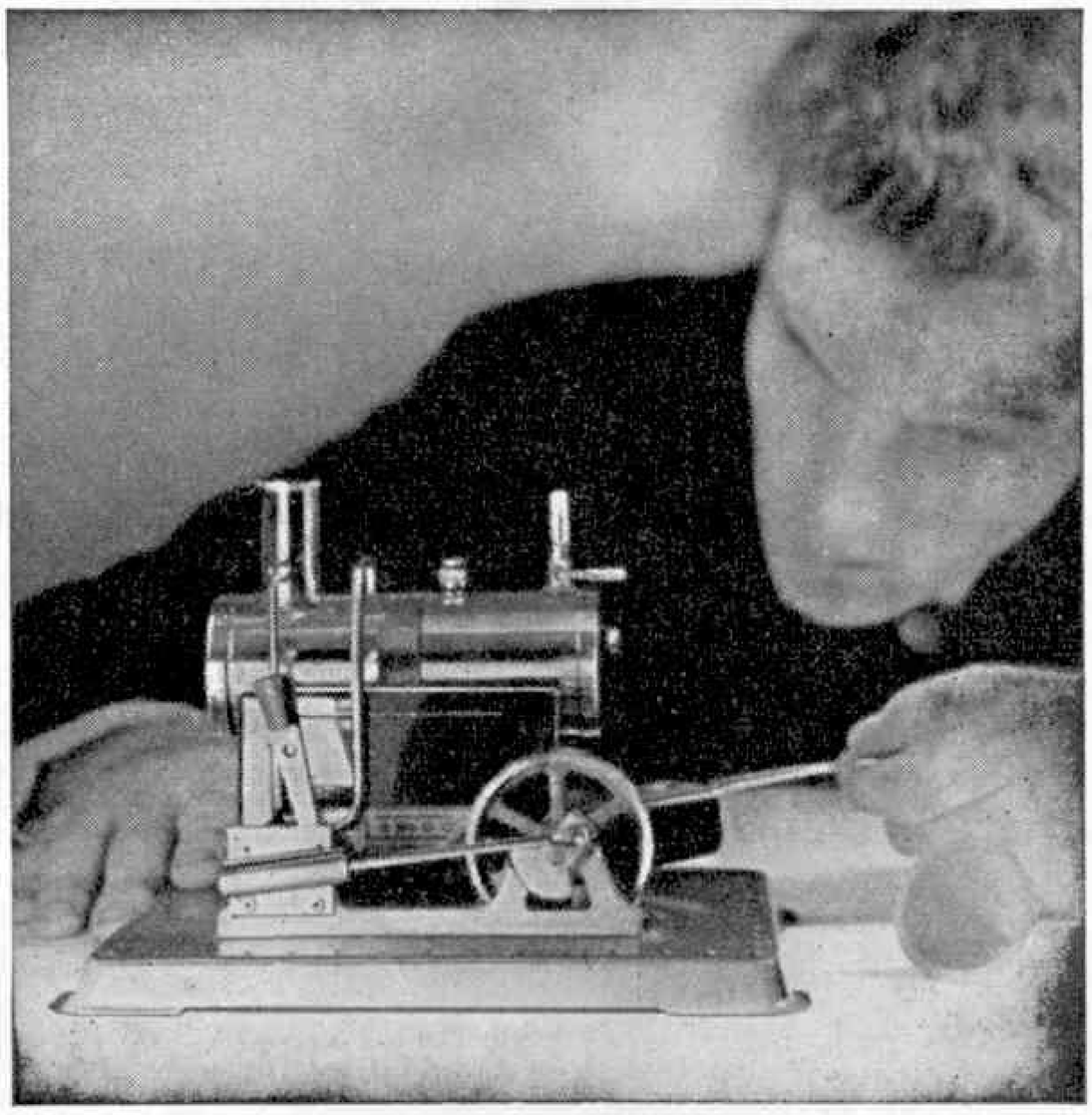

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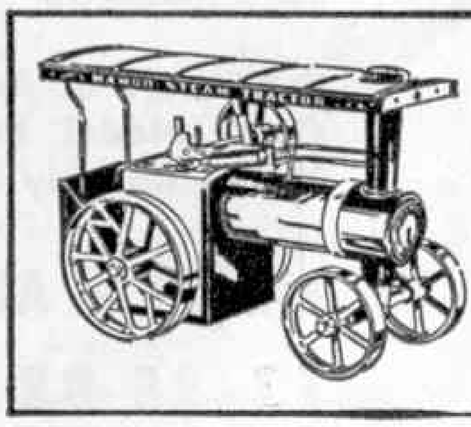
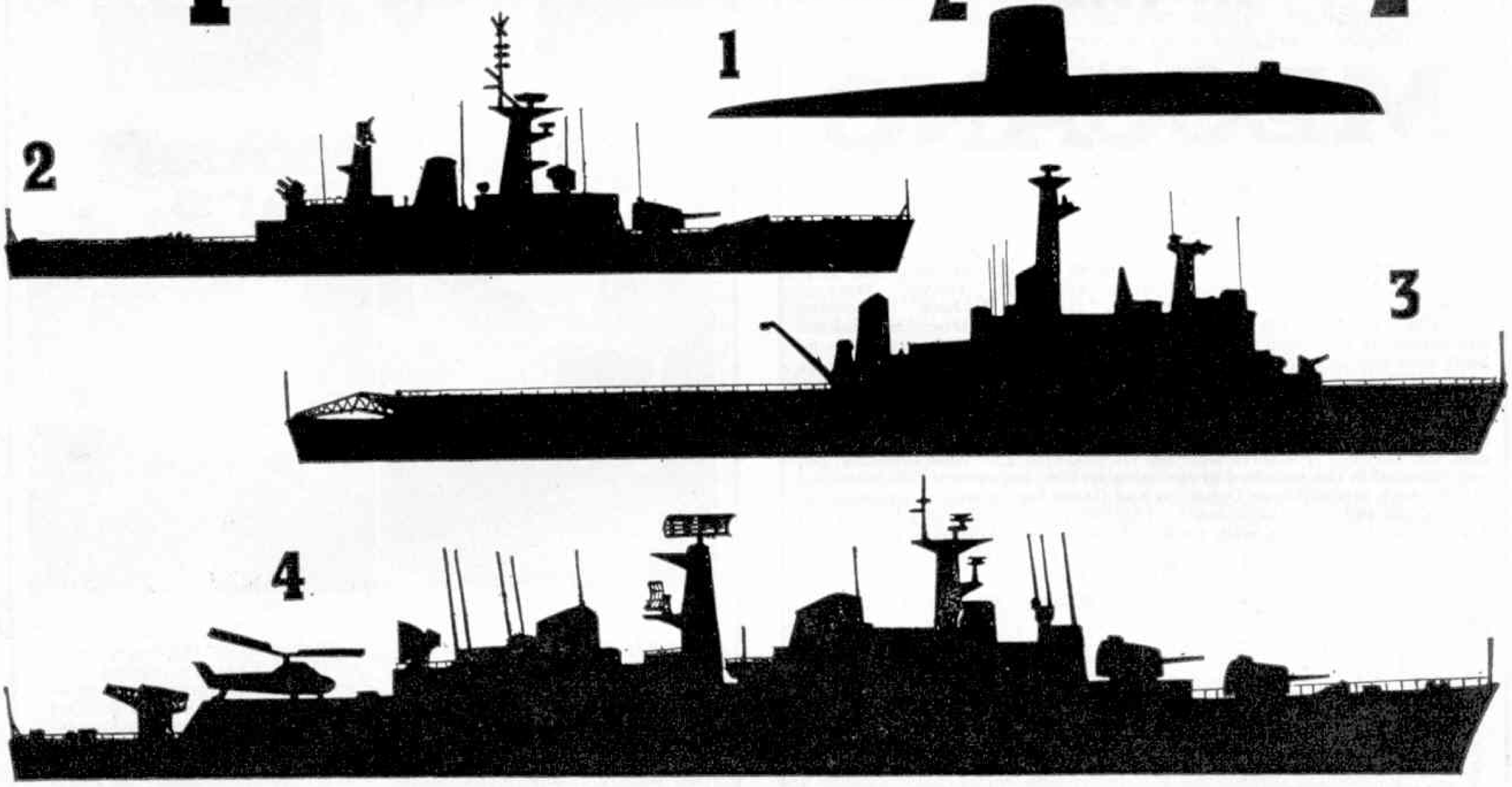


Can you name these new ships of the Royal Navy?



1 **HMS Valiant. A nuclear powered submarine designed to hunt and destroy enemy submarines. She can patrol at high speed—and circle the world without coming up for breath.**

2 **HMS Leander. One of the Navy's new general purpose frigates that can do duty as an anti-submarine and anti-aircraft escort. She carries 4.5 inch guns, Seacat guided missiles and a Wasp anti-submarine helicopter.**

3 **HMS Fearless. An assault ship that carries landing craft, vehicles, tanks and Royal Marine Commandos. The landing craft are launched by flooding compartments so that they can float out through the stern!**

4 **HMS London. A County Class guided missile destroyer. She has missiles that can punch aircraft out of the sky. Powerful guns. Anti-submarine weapons. And a Wessex anti-submarine helicopter.**

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Royal Navy

WHAT'S WHAT IN THE

MECCANO

LINE

The standard progressive Meccano system consists of ten Main Sets, numbered 1-10 inclusive each with an identifying "theme" name in addition to the number. This theme, e.g. "Highway Vehicles" is obtained from the predominant type of model featured in the Instructions Book for the particular Set and does *not* mean that *only* models of that type can be built with the Set. In fact, the number and variety of models that can be produced is limited only by the imagination of the user. Also included in the standard system is a series of seven Conversion Sets. These are not intended as constructional sets in their own right, but simply contain the necessary extra parts to convert a Meccano main outfit into the next larger one, e.g. Outfit 1 + Conversion Set 1A = Outfit 2. Also available, but not included in the standard progressive system, are several self-contained outfits, such as the Power Drive Set and Gears Set, as well as a number of Motors and additional equipment. The following is a list of all items and Sets currently available, with their U.K. recommended retail prices:

MECCANO SETS

(Complete with illustrated Books of Models)

Set No.		£	s.	d.
	Playset		15	6
1.	Junior Kit	1	3	0
2.	Super Junior	1	16	0
3.	Highway Vehicles	2	7	0
4.	Airport Services	3	10	0
5.	Site Engineering	4	16	6
6.	Ocean Terminal	5	18	6
7.	Mountain Engineer	8	2	6
8.	Breakdown Crew	13	18	6
9.	Master Engineer's Set	23	5	0
10.	Meccano Outfit in 4-Drawer Cabinet	61	10	0
	Meccano Gears Set	1	5	11
	Meccano Mechanisms Set	2	1	0
	Elektrikit	4	9	11

MECCANO CONVERSION SETS

		£	s.	d.
No. 1a	Converts No. 1 into No. 2		12	11
No. 2a	" " 2 " " 3		17	11
No. 3a	" " 3 " " 4	1	9	6
No. 4a	" " 4 " " 5	1	15	0
No. 5a	" " 5 " " 6	1	7	9
No. 6a	" " 6 " " 7	2	5	0
No. 7a	" " 7 " " 8	5	15	9

MECCANO POWER DRIVE SERIES

	£	s.	d.
Junior Power Drive Set	3	19	11
Power Drive Set	6	6	9
Power Drive Unit (6-ratio Gearbox and 6 volt D.C. Motor). Battery operated.	2	9	11
Power Drive Gear Box and Coupling	1	9	11
Power Drive Steam Engine	3	9	11
Reversible 4½ volt D.C. Motor	1	4	11

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Clockwork No. 1, reversing (including key)	1	7	11
E15R Electric, reversing*	2	19	11
EMEBO Electric Motor (Battery operated)	1	5	11
43901 B Key for No. 1 Clockwork Motor		1	3
43903 S Key for Magic Clockwork Motor			5

* Fitted with T.V. and Radio interference suppressors.

SPARE PARTS

The Meccano range of Spare Parts consists of more than 300 individual items, all of which are available for separate sale. A price list can be had on application.

LOOK!

The July issue of M.R.N. includes articles on gauges as diverse as TT3 and 1 gauge. A. Roy Warren describes his individual approach to a TT3 layout, which can be used as a OOn3 narrow-gauge line when required. A. Rudd has built a 16 mm. scale model of Talyllyn Railway No. 6 "Douglas," and describes its construction. Well-known L.N.W.R. expert Jack Nelson gives all the details of that company's distinctive signals, complete with drawings. Peter Winding describes and draws some modern diesel depots, to inspire those modellers who like to give their layouts a "modern image" appearance. Colin Binnie continues his series on injection moulding at home, and describes the moulds he uses for mass-producing wheels for several different scales. Stanier's Turbomotive was one of those "one-off" locomotives which have become part of railway history: Mike Singfield's drawing and photographs will interest all L.M.S. enthusiasts. David Jenkinson and a well-known L.M.S. Society team describe how they modified and superdetailed a Gem Midland "999" Class 4-4-0. Alex Bowie shows how kits from the Superquick range can be used to good effect, and save valuable modelling time into the bargain.

Highlights for the August issue of Model Cars are reports with plenty of photographs and technical details on the 2nd and 3rd rounds of the immensely popular Model Cars Dyna Rewind London Series. There are articles on a new "Wonk"-winder by Roger Willimott (the car he won with at Nordic!) details of how to make your own spongies and a feature on a successful model with moving body mounts.

In addition to this will be news from Trevor Tennant of design trends in Area 5 with some very competitive models from that part of the country, a brief look at some newly available Dyna Rewind products, more from Laurie's Workshop and from Robin Whitmarsh, another Workout this time, the subject being a pair of motors.

Drawings are for the Indianapolis Wedge Car, so popular in modelling circles at present, and the 1953 F.2. Ferrari.

In addition is the first in a regular column from Bob Rule our American Correspondent with details of all the big U.S. slot developments, a lighthearted report for die cast fans on a model car "Love-in," and a host of others . . . plus, of course, all the regulars.

2nd FRIDAY MONTHLY 2/6 **1st FRIDAY MONTHLY 2/6**

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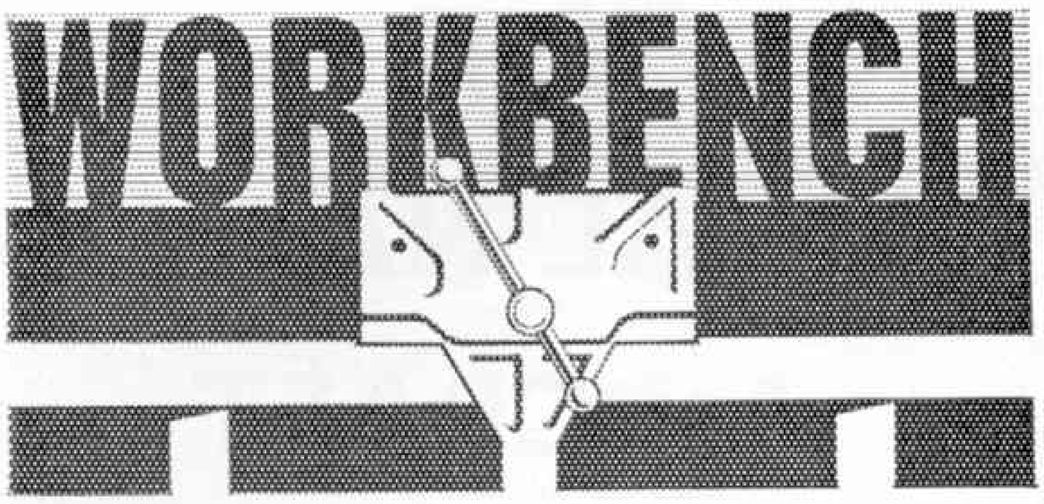


Grand Scale Rally

READERS LIVING in the southern counties can attend a really first class, all Scale Model Meeting on July 21st, at the Shuttleworth Collection Aerodrome, Old Warden, Biggleswade, Beds. Organised jointly by *Aeromodeller* magazine and *Radio Control Models*, two of our sister magazines here at M.A.P., this event is designed to bring all scale model aircraft enthusiasts together for a one day informal social meeting with incidental competitive events. Five contest classes are being catered for and readers can enter or spectate free of charge, except for the normal airfield admission charge. There are classes for non-flying scale, free-flying scale, control-line scale and two radio control events.

Anyone can enter, and the non-flying scale event will mainly be composed of plastic kit models, why not enter, you may win a prize! A special trophy is being presented by the Shuttleworth Collection to the constructor of the best replica of one of their aircraft. What are the types of aircraft in the Shuttleworth collection? You may well ask, for they are numerous. No less than 28 aircraft are preserved by the Trust ranging from a Bleriot to a Hawker Hurricane and Supermarine Spitfire and these together with many others—vintage cars and motor-cycles—can be seen in the museum while you are attending the rally. Send a stamped addressed envelope to Aeromodeller, "Scale Model Rally," 13/35 Bridge Street, Hemel Hempstead, Herts., for full details, if you wish to enter.

In addition to the Shuttleworth prizes for the above events, British United Airways will award a pair of tickets by scheduled Jet Service on any of their domestic networks to the best Non-Flying scale model, and a pair of tickets to *Gibraltar* for the best flying scale model, presented in B.U.A. livery, from the following range:—Standard V.C.10, B.A.C. III, Brittania 300, Viscount 700-800 and H.P. Herald. Models will be judged on the basis of scale, craftsmanship and performance. It is emphasised that all types of scale model will be eligible for the class awards, you do not have to enter a Shuttleworth or B.U.A. aircraft. The International Plastic Modellers' Society will have an exhibition area and readers could learn a lot from a few minutes spent studying these excellent models, first hand.

The atmosphere of the old "Flying Circus" is recaptured in miniature by the sight of many fine models in the air and it is emphasised that the meeting is restricted to scale models only—no other kind of model may be flown at Old Warden on this day. Impromptu flights can be made throughout the day by all the scale models, so if you have a scale model, be it rubber or engine powered, bring it along for some fun flying. The last Scale Model Rally at Old Warden in 1967 attracted 3,000 spectators and many hundreds of models were flown, bring the family, visit the museum and enjoy the sight of many fine models flying; don't forget the date, July 21st—flying commences at 11 a.m.

Meccano Models Aplenty

The second meeting of the Midlands Meccano Guild took place on March 30th at Stratford-on-Avon. Unfortunately, due to space limitations we cannot describe all of the models, or goings-on. Tables were set up as members arrived for model displays and demonstrations, and members gave small speeches on the principles, and interesting points in their models. So large were some of the models that one group arrived in a car/caravan combination containing one and a half tons of solid Meccano model making. Clive Hine showed three fairground models comprising a Showman's Engine, fully illuminated, Steam Organ Trailer activated by a tape recorder with genuine steam organ music, and an angled Ferris Wheel with single suspended cupolas, the spider of the wheel being illuminated by over 200 low voltage bulbs wired in series. Ernie Chandler had a more conventional Ferris Wheel driven by the latest Meccano Steam Engine, the wheel again being fully illuminated. Another steam enthusiast, Alf Hindmarsh, demonstrated his early Foden Steam Traction model in which he had incorporated the original Vertical Boiler Steam Engine, this gave realism to the model as a whole. Eric Taylor who is a skilled heavy plant engineer, usually produces models to a very high standard of design and construction, this time was no exception. Eric's large Crawler was outstanding, its caterpiller tracks were rugged in design, beautiful in action, tension compensated by simulated hydraulic cylinders, mounted on a compensating axle beam and steerable by track levers operating band brakes on either side of the rear drive differential. Clutch and transmission were highly efficient, the gear shift smooth and positive, with miniature thrust bearings in the clutch housing relieving thrust on the transmission to enable tick-over running. The heavy model was powered by one standard Meccano Powerdrive Electric Motor, and clever use of the Elektrikit parts gave fully detailed diesel engine simulation. In addition to all this, the driver's seat and bonnet were hinged to give full inspection facilities for the transmission. As a complete contrast to this model, Eric also produced an elegant model of a Chinese South Seeking Chariot. Several of the old Supermodels were on show, including two giant Draglines, the one by Jack Partridge of Oxford used the Servetti Roller Bearing, and the other by Dick Hardyman of Malvern used the original 167 geared roller race for the lower portion and a simple steel disc for the upper. Pat Briggs had a complete mini exhibition of his own, in the shape of half a dozen or more Meccano Clocks. They were all excellent time keepers (see "Tick Tock Time"—June Meccano Magazine and "Among the Model Builders" this issue), and worked well during the meeting. Bob Faulkner brought along two intricate models, one being a well designed Loom and the other a large Designing Machine with extensive gearing allowing infinite variations of movement and speed between the writing table and drawing arm. Three old favourites were produced by Dennis Perkins incorporating many of the early nickel Meccano parts. A Motor Chassis with nickel parts had been very well restored by Dennis, and all the parts were highly polished. Dennis also showed a Traction Engine with a really efficient differential and the original Tower Crane which featured in Meccano Magazines and Instruction Manuals as long ago as 1940. It worked beautifully and it must have been the cat's whiskers in those days.

Meccano Magazine readers in the Midlands are invited to join the Guild and should contact the Secretary, B. N. Love Esq., 61 Southam Road, Hall Green, Birmingham 28. In addition to model shows, the Guild also have a photographic section, arrange talks and issue a newsletter.

THE ROYAL NAVY'S AIRCRAFT AT SEA

by

John W. R. Taylor

FEW EXPERIENCES in aviation are so exciting as going to sea in one of Her Majesty's aircraft carriers. Standing high above the deck, on the ' island ' superstructure, as Sea Vixen fighters and Buccaneer strike aircraft are launched on a training exercise, one is alternately lashed by freezing wind and warmed by paraffin-scented blast from the jets. Almost-solid shock waves of sound seem to make one's whole body tremble.

There is a crescendo of noise as the pilot of each aircraft in turn opens up his engines to full power for take-off. Then, suddenly, the steam catapult hurls the aircraft along the deck, over the bows of the ship and into the air, leaving behind a wispy cloud of escaping steam that is soon dispersed. Almost before the 'plane is airborne, another is taxying forward, its wings unfolding as one of the deck crew guides and beckons its pilot towards the waiting catapult.

While all this is happening, a ' plane guard ' helicopter hovers, seemingly motionless, just off the port side of the deck, ready for immediate action if any pilot should run into trouble on take-off and have to ditch

With wheels, flaps and arrester hook down, a Sea Vixen Mk 1 approaches the angled flight deck of H.M.S. Victorious; one can imagine the speed the carrier is travelling at to create all that wash ! At left, the Flight Deck Officer drops his flag and a bomb-laden Buccaneer is steam-catapulted off the deck, with its engines screaming as full power is applied by the pilot.

As this Sea Vixen Mk I takes off, the strop (by which it was connected to the steam catapult) falls away into the sea—this is not recovered. Note the 'plane guard helicopter hovering.

in the sea. Larger Wessex helicopters are stowed in the below-deck hangars, their rotor blades and tail folded to save space. Their task is to hunt and destroy enemy submarines in wartime, but they are not involved in today's exercise. Nor are the Gannet airborne early-warning aircraft, which look like ungainly ugly ducklings as they squat to one side of the rear deck, their wings double-folded into a Z shape and a great bulged radome under their belly. The radome houses a scanner which enables them to detect any aircraft or surface ship approaching the naval forces they protect, while it is still far away, giving the carrier-borne aircraft time to take off and deal with any threatened enemy attack.

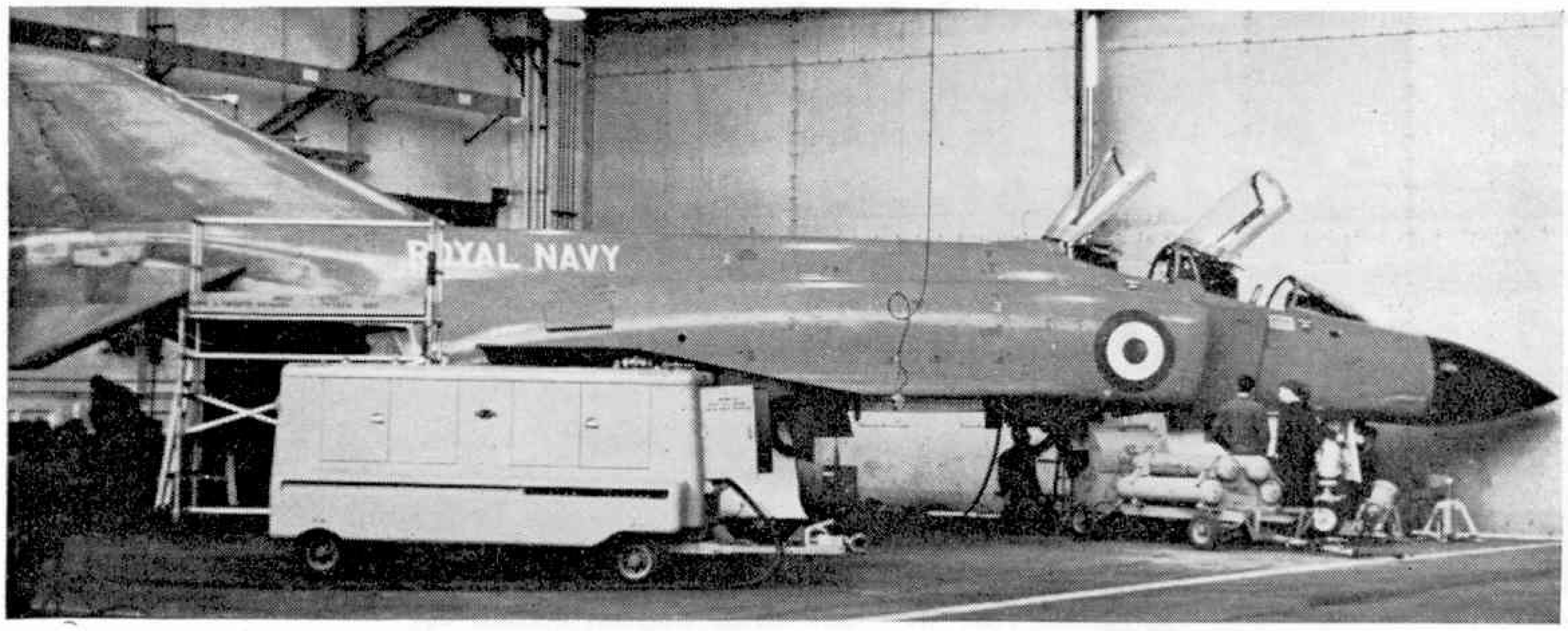
All is quiet as the last of the Sea Vixens and Buccaneers climbs away and the carrier begins a gentle turn, out of the head wind that streamed over its deck while the aircraft were being launched. But it is never quiet for long on a carrier.

A tiny cluster of dots on the skyline grows rapidly into a flight of Sea Vixens which flash overhead and then break away to take up a line-astern formation. One after the other they dive on to a target that has been placed in the sea at a safe distance from the carrier. As they do so, rockets zip from beneath their wings with a terrifying whoooshh and churn up the water around the target.

Fascinated by this display of fighter tactics, visitors to the carrier usually fail to spot anything else that is happening—like the Buccaneers that converge on the ship, skimming above the sea at just below the speed of sound—until one of the loudest and most unexpected roars they have ever heard makes them nearly jump out of their skin.

Heads swivel round and upward as each Buccaneer curves up in a half-loop, demonstrating the technique of toss-bombing which enables it to lob nuclear weapons

Another Sea Vixen, this time with rockets leaving the underwing pods during weapon-firing practice well out at sea.



Above, one of the first of the Royal Navy's huge McDonnell F-4K Phantoms, surrounded by ground servicing equipment.

on to a target and beat a hasty retreat by half-rolling off the top of the loop and returning in the direction from which it came, without much loss of speed.

Later, the exercise completed, the Sea Vixens and Buccaneers circle the ship in line astern, wheels, flaps and arrester hooks down, awaiting their turn to land. One by one they approach the stern, nose held high, and slam onto the deck as their hook snags an arrester wire, with a sickening thud that gives the spectators a new respect for the ability of undercarriage designers.

Within seconds, the arrester wire has been unhooked and the aircraft taxies forward, its wings folding upward as it nears the lift that will transport it to the below-deck servicing hangars.

There are some people who believe that aircraft carriers have had their day and are too vulnerable to air and submarine attack to be of any use in modern warfare. That is why Britain's Defence Ministry plans to retire all the Royal Navy's big carriers, H.M.S. *Eagle*, *Ark Royal* and *Victorious*, within the next two or three years.

Critics of this move admit that carriers would be vulnerable in an all-out nuclear war, but point to the tremendous contributions made by carrier-borne aircraft during the more limited wars fought in Korea, Vietnam and Suez. The presence of a carrier can even help to prevent an outbreak of war or violence, as was proved in Aden last year and in the Far East during the Indonesian/Malaysian confrontation.

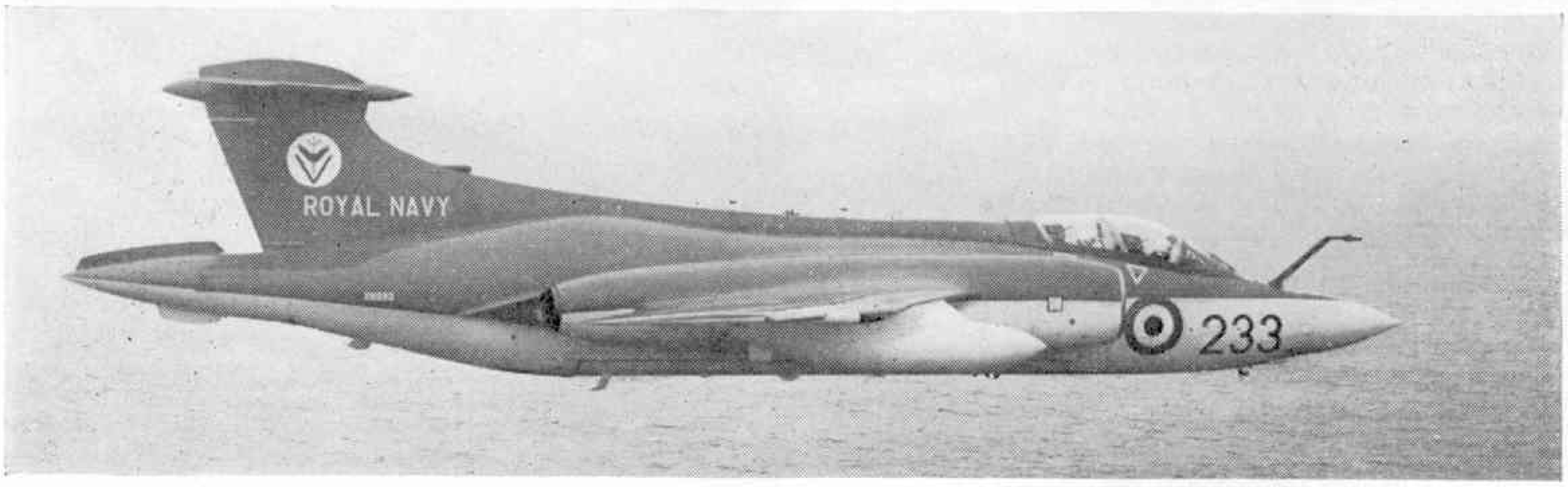
However, unless there is yet another change in our defence plans, only H.M.S. *Ark Royal* will be refitted to operate the American-built Phantom fighters which are beginning to arrive as replacements for the Sea Vixen. H.M.S. *Eagle* will continue to operate her present complement of 12 Sea Vixens, 10 Buccaneers, four Gannets and eight anti-submarine helicopters until both ships follow the *Victorious* into retirement.

This must cause some disappointement, as the Fleet Air Arm has been looking forward to its Phantoms—and with good reason. Operations in Vietnam, by both the U.S.A.F. and U.S. Navy, have proved that this big, twenty-five-ton, two seat, all-weather fighter, is second to none in the world. It can fly at more than twice the speed of sound (1,320 m.p.h.) with a full load of weapons, and can attack targets more than 1,000 miles from its base, without refuelling in flight.

The Royal Navy's F-4K version is even better than its U.S. Navy counterparts. As a start it is powered by two of Rolls Royce's magnificent Spey Mk 201 turbofan engines, each with a normal rating of 12,500 lb. thrust, which can be increased by up to 70 per cent. by use of reheat. The F-4K is, therefore, much more powerful than other Phantoms now in service.

Its armament is also tremendously heavy by any standards, as Phantoms have demonstrated their ability to carry up to 7 tons of bombs, rockets and missiles. Standard interceptor armament of the F-4K is six Sparrow, long-range, radar-homeing missiles,

A Buccaneer of No. 801 Squadron. Projecting above the nose is the aircraft's flight refuelling boom.



which are carried semi-submerged under its fuselage and inner wings. In addition, it can carry the formidable new Anglo/French Martel T.V.-guided air-to-surface missile.

Most of the Phantoms ordered by the Royal Navy will be taken over eventually by the R.A.F., and some ex-Fleet Air Arm Buccaneers are also to be operated in a land-based role, as replacements for the R.A.F.'s cancelled 'swing-wing' strike and reconnaissance aircraft.

This will not mean the end of Britain's naval air power. H.M.S. *Albion* and *Bulwark* will continue to serve as Commando carriers, each with 16 Wessex assault transport helicopters, able to put ashore tough Marine Commandos to deal with outbreaks of violence in the territories of Britain or its friends. And, of course, more and more ships of the Royal Navy are being equipped to carry helicopters for anti-submarine duties.

Even a small 'chopper' like the Wasp has great potential for this kind of work. If its parent ship detects the presence of an unidentified submarine, it can take off from a tiny platform, in almost any weather and sea conditions, carrying a pair of deadly homing torpedoes that, once dropped, can search out and destroy any underwater target. The larger Wessex helicopters, carried by bigger ships, have sonar and other devices to locate the submarines themselves, as well as homing torpedoes, rockets and missiles with which to attack the enemy.

Helicopters may seem a little tame after transonic strike aircraft like the Buccaneer and supersonic fighters such as the Phantom; but they can do jobs that are beyond the capability of less-versatile fixed-wing aeroplanes. So Britain's flying sailors will continue to have an important role to play even after the big carriers have disappeared.

The Navy is certainly not despondent about the future. It recalls that 50 years ago the Royal Naval Air Service disappeared completely when it became part of the newly-formed Royal Air Force. The strength of the naval air units was reduced in 1919 to just one reconnaissance and spotting squadron, half a torpedo squadron and single flights of fighters, flying-boats and seaplanes. Yet, by the time World War II started the Fleet Air Arm was back under Admiralty control and capable of expansion into the immense fleet of carriers and aircraft that played such a big part in winning the war at sea.

Britain's main deterrent force, to help prevent a third world war, has passed from the R.A.F. to the Royal Navy, in the shape of four Polaris missile submarines. The Commando carriers represent one of the best possible investments to prevent or fight small scale wars and police actions; and there is no reason why these ships should be limited to operating only helicopters in the future.

Hawker Siddeley Aviation have already demonstrated that their Harrier vertical take-off strike and reconnaissance fighter can operate safely from ships, and it would be logical to expect such aircraft to find a place on board Commando carriers one day, to give our assault forces the kind of powerful close support that only this world-beating British aircraft can provide.

At right, top to bottom. Strike aircraft: The Buccaneer is catapulted with its nose-wheel raised off the deck to increase the wing lift. Next, Commando assault transport: Troops embark on a Wessex H.U. Mk 5 to be flown ashore from a Commando carrier. Next, anti-submarine helicopter: The Wasp takes off from a small platform on Frigates and Destroyers. Lastly, all-weather fighters: Sea Vixens of No. 892 Squadron take off on a training exercise, these go on all the time at sea.

At left, the Sea Prince aircraft in which your Editor flew at H.M.S. Condor. This is used for Air Experience, to teach the basic principles of flight and lift to Air Cadets and trainees on the station.

Mechanical Engineer Training in the Fleet Air Arm

The Editor describes the training given to Fleet Air Arm Engineers at H.M.S. Condor, Arbroath, Scotland

HAVE YOU a mechanical aptitude? Do you fancy life at sea *and* working with aircraft? If the answer to both these questions is "yes", read on.

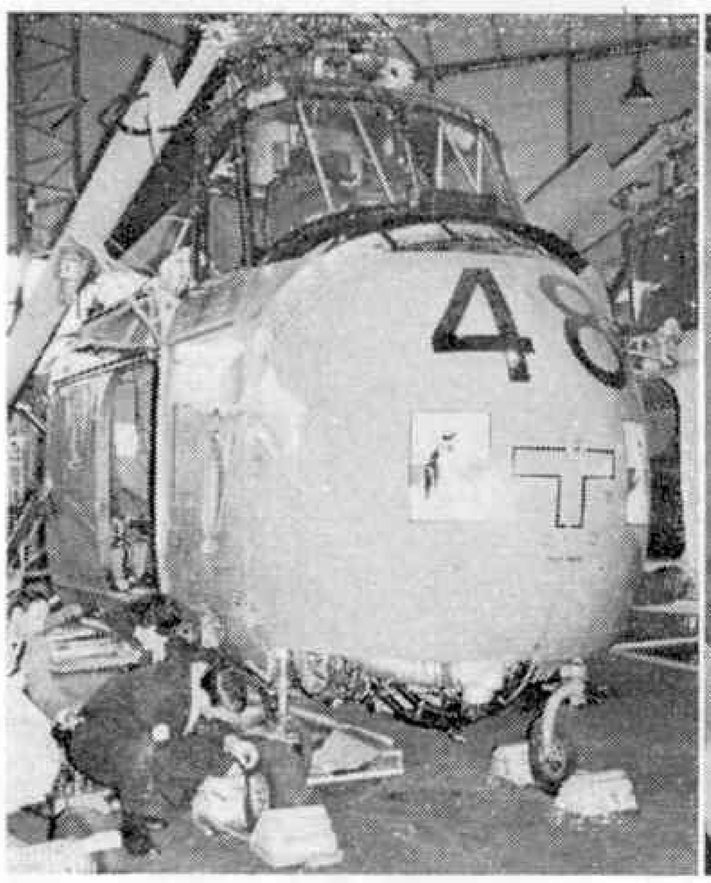
The Editor recently visited the Royal Naval Air Station, Arbroath, Scotland (H.M.S. Condor) and saw, first hand, the training programmes and facilities offered to youngsters who join the Fleet Air Arm of the Navy as Naval Air Mechanics and Aircraft Artificer Apprentices. Both these careers are very demanding, requiring a high standard of practical skill for the mechanic, and high standards of both practical and academic skill for the Artificer, but it is also very rewarding in that travel is assured and postings are varied. H.M.S. Condor is the station at which Naval Air Mechanics and Aircraft Artificer Apprentices are trained. The basic training being divided into several categories, academic, practical and character building.

We watched Naval Air Mechanics and Artificer Apprentices working in both the classroom and workshop, and saw just how high the standard of workmanship is, as the case of sample workshop projects below, shows. When attached to a Squadron, the mechanic has to do the right thing first time and with the minimum of supervision—this is just what they do at H.M.S. Condor. Lots of time-expired aircraft are retained so that they can be dismantled and skilfully mended over and over again for practice. These include Buccaneers, Gannets, Sea Hawks Whirlwinds, Sea Venom and Scimitars. Dorsal fins, fibreglass nose covers and engine components were all being repaired during our tour, by both male and female mechanics, as the Wren mechanics play an important role in this sphere.

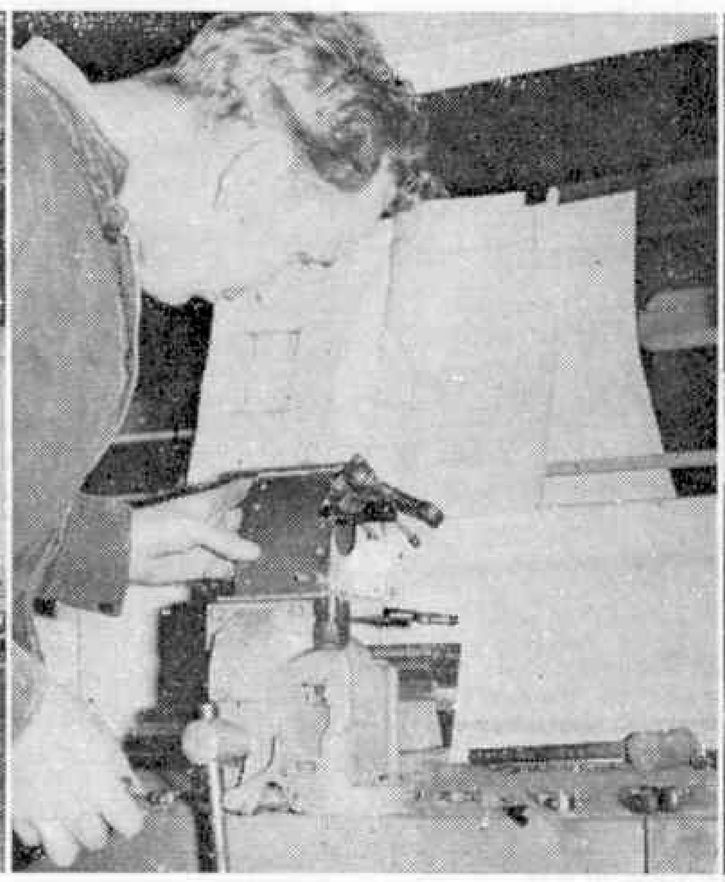
There are at present two ways of joining as a Naval Air Mechanic, these gradings allowing for different ages: Junior (O) (16-17½ years) and Adults (17½ plus). Both age groups join at H.M.S. St. Vincent, Hampshire or H.M.S. Raleigh, Cornwall and are given basically similar courses in seamanship, parades, education and fire fighting for a period of six weeks.

They leave H.M.S. St. Vincent or Raleigh as Trainee

Below, a final year Artificer Apprentice on field work training checks a wheel on a Westerland Whirlwind helicopter; this one has come from a Polar expedition—note the "Penguin" emblem on nose.



Below, P.O. Rollinson fabricates a leading edge section from sheet metal whilst doing Craft Training on a Mechanician course. This was very well made, and it's not such a simple exercise as it looks.



Below, this display case contains the syllabus of sheet metal-work jobs carried out at H.M.S. Condor. Again, they may look easy, but some are quite involved, one starts with the easiest, of course.

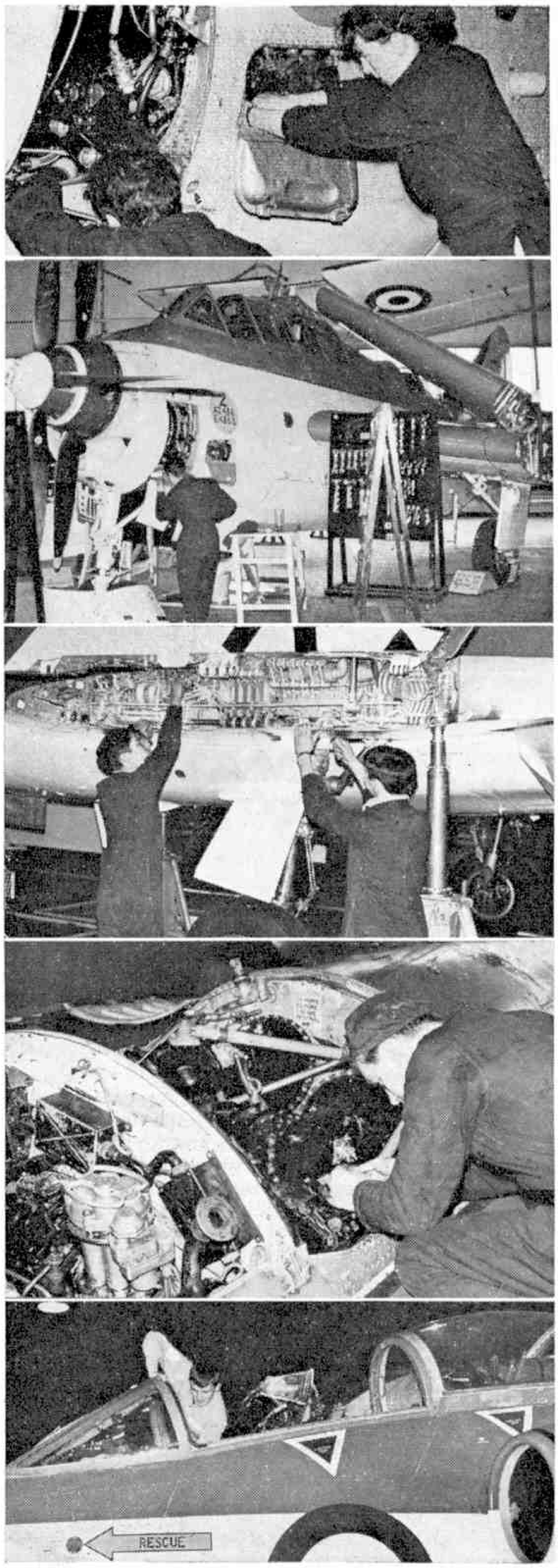
Above, trainees undergoing adventure training move a bridge into position. The Scottish countryside surrouding the station, is very suitable for this kind of adventure training.

Naval Air Mechanics and transfer to H.M.S. Condor for 16 weeks of technical and service training. The first few weeks are spent on general engineering training and as an introduction to the Fleet Air Arm. The second part includes airframe and engine familiarisation and training, the principles of jet propulsion and flight. Two weeks of practical work are then undertaken, with a week's revision and a final testing before posting to a Front Line Air Station or Aircraft Carrier for about three years service experience. On completion of this service, and successful completion of a 12 week training course, they are eligible for selection as Aircraft Mechanicians, or to continue their career as a Leading Mechanic and in due course as a Petty Officer and Chief Petty Officer.

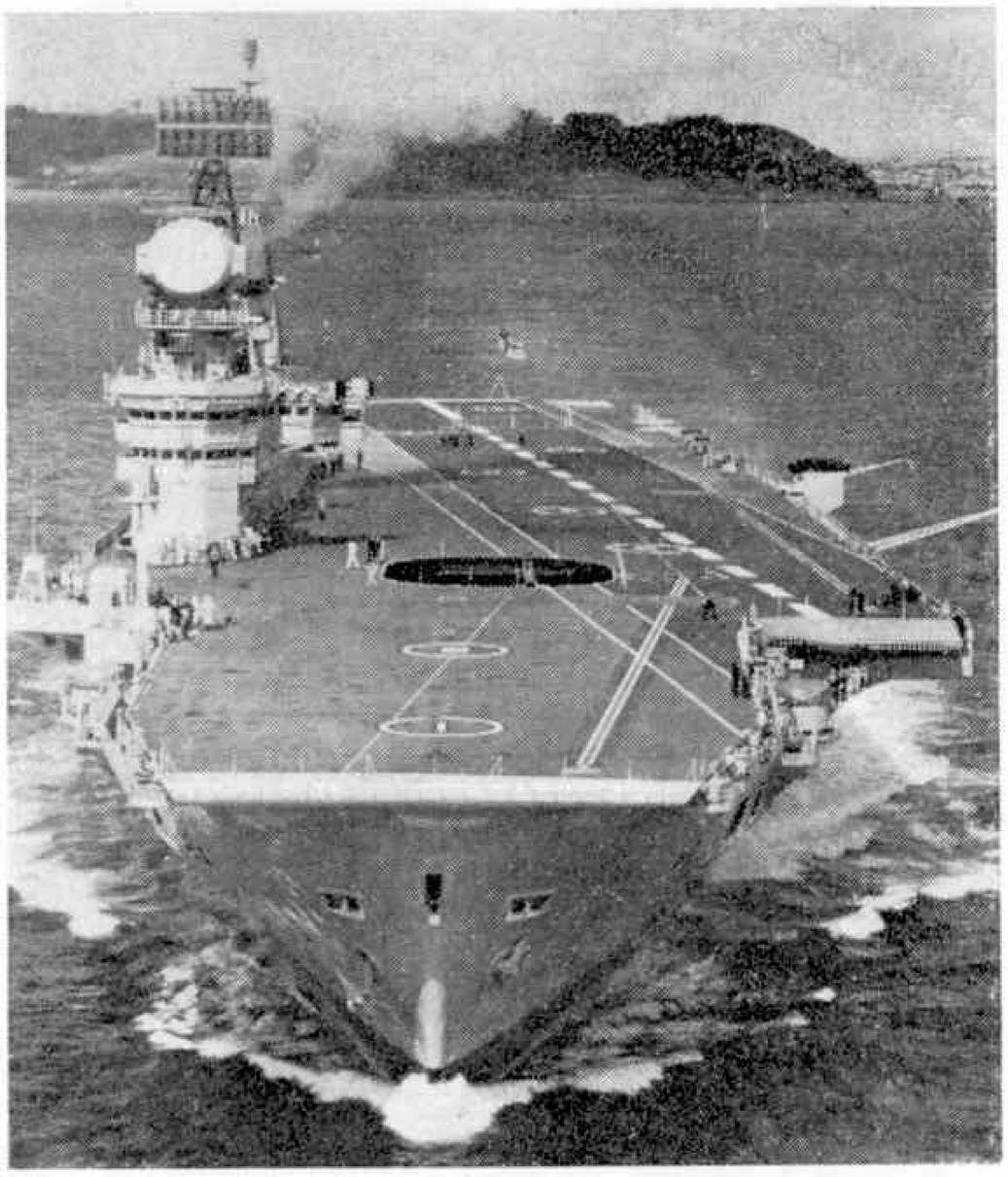
Once selected as a Mechanician, two years are spent at H.M.S. Condor; on qualifying, entrants become a Petty Officer—Aircraft Mechanician Third Class. After one year at this rank, they become Aircraft Mechanician Second Class and by passing written examinations within twelve months they can become Aircraft Mechanicians First Class for a Chief Petty Officer rating. Eventually of course, one can rise to become Special Duties Air Engineering Officer. One has to sign on for a minimum of nine years, men's time, as a Naval Air Mechanic—men's time commencing from the age of 18. With further periods of enlistment one can become eligible for a pension at the age of 40.

The Aircraft Artificer Apprentice is the more qualified entry and here one has to pass a written entrance examination and mechanical aptitude test. G.C.E. 'O' Level passes in Mathematics, English and Science exempts one from the entrance examination. The 15½-17½ year old Aircraft Artificer Apprentices all spend one year at H.M.S. Fisgard in Cornwall on general service training and craft courses. Here they are categorised for future reference as to which branch of the service they are most suited. After the year spent at H.M.S. Fisgard, Artificer Apprentices transfer to H.M.S. Condor for the second and third years. Here, schooling, craft, general service, sport, and venture training are undertaken and approximately 50% of the entry pass their Ordinary National Certificate in

Continued on page 455



At right, top to bottom. K. Taylor and Wren C. King working on a Gannet's Mamba engine. Wrens perform men's jobs on aircraft servicing. Next, a more complete view of the rather ungainly Gannet illustrates its huge size. Next, A. S. Bell (left) and M. J. Randle working on a Scimitar wing root. Next, jet engines are very complex and here a trainee, R. G. Stevenson, replaces a burner on a Sea Hawk's Nene engine. Bottom right: S. E. Rainsbury, checking some cockpit instruments in a Mk 1 Buccaneer, retired from service.



H.M.S. Eagle showing flight deck and hatch where the aircraft are brought up from the hangar. *Ministry of Defence Crown Copyright photo.*

THE ULTIMATE IN SURFACE WARSHIPS

By John Mannering

In a comparatively short period the aircraft carrier has been brought to a powerful perfection. But she is likely to be the last descendant of the great warships which have decided so much of the world's history, past and present on the oceans.

BASICALLY ALL ships of war are floating platforms from which to operate offensive weapons. This has been so since the Greeks and Romans devised huge catapults on their galleys, which could hurl stones upon the ships and crews of the enemy.

For centuries the sailing ship grew in size and efficiency until, at the battle of Trafalgar the three most powerful navies of the world fought what proved to be the last great battle under sail.

Some two thousand years had intervened between the galleys of the Roman Empire and the magnificent three deckers of the early nineteenth century. But in spite of the refinements to gear and sails, and the great difference in size, both of ships and weapons, the basic principle was the same. The "Victory" was simply a mobile floating platform designed to carry as many guns as possible, and the men necessary to fire them.

With the coming of steam; iron, and finally steel vessels, carried on the tradition until the powerful battle-ships of the 1914-18 war represented the last word in warship design. But in July 1909 a strange humming noise broke the stillness of a summer morning off the Kent coast; and a Frenchman in a fragile aeroplane of wood and varnished fabric landed on the cliffs near Dover, having made the first flight across the Channel. It was the beginning of the end of the capital ship.

Five years later Europe had fallen into the abyss of war, and already military leaders had seen the possibilities offered by the still crude and unreliable 'flying machines'. Reconnaissance, artillery spotting and bombing were their obvious uses. Naval authorities also saw the advantages. But the aeroplane suffered from the defect that it required a long level stretch of ground from which to take off or return to. Man's ingenuity overcame this to some extent by substituting floats for wheels, thus enabling planes to operate from lakes, wide rivers, and the sea when calm.

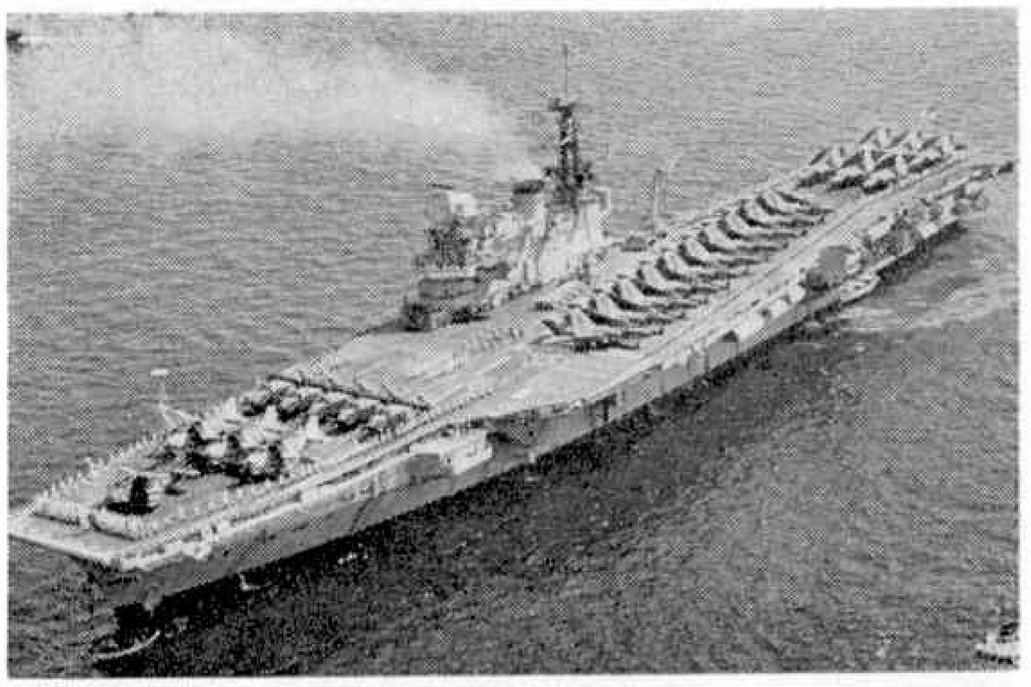
The Navy quickly made use of these seaplanes, and quite early on in the first world war they were carried on some battleships and cruisers; being chiefly used on reconnaissance. For a plane, like the fast frigates of Nelson's time, became the eyes of the fleet and could quickly report what was happening fifty miles over the horizon. The procedure was for the plane to be launched on the water from the parent ship by means of a crane, and to be retrieved from the water by the same means when the mission was accomplished. It was a laborious and risky business in anything but very calm weather.

It was not until 1918 that an aircraft succeeded in landing safely on a ship's deck. At the end of the war a number of fast cross Channel steamers had been converted into aircraft carriers, in the full sense of the word; able to launch and receive back their own aircraft; but it was not until 1923 that the Navy had its own carrier specially designed as such. She was the Hermes, and was the natural descendant of all warships, a floating platform for the latest offensive weapon.

Between the wars the development of aircraft and their mother ships had grown far beyond anything imagined at the close of the 1914-18 war. But no Navies had had any fighting experience with the powerful new ships. The British Navy entered the second world war with six carriers; Pegasus, Furious, Argus, Ark Royal and Hermes; of which only Hermes and Ark Royal were laid down as carriers. Ark Royal, built in 1938 was to become one of the most famous of her class, and her career included covering the successful evacuation of 24,000 allied troops from Narvik; the dramatic attack on the French fleet at Oran; convoy work in the Mediterranean, the bombardment of Genoa and Leghorn, and her magnificent participation in the sinking of the Bismark in the Atlantic, when Swordfish torpedo-bombers from Ark Royal achieved a crippling hit on the stern of the German battleship, so reducing her speed and manoeuvrability that the battleships George V and Rodney were able to close with the enemy vessel and destroy her. But it was the aircraft carrier which made it possible. Ark Royal was herself sunk by U boat attack near Gibraltar on November 13th, 1941; having accomplished all that the supporters of aircraft carriers could desire.

It was the Illustrious which had demonstrated the immense value of carrier borne aircraft in the attack on Taranto in November 1940 when two striking forces comprising 21 aircraft sunk three Italian battleships at their moorings in that port.

At the end of the war Naval experts of all countries were certain about two things: that it was almost impossible to keep a battleship safely at sea for any length of time in any position where she could be usefully employed; and that it was the striking power of the aircraft carrier which had brought this about.



H.M.S. Hermes at Hong Kong, with her crew " manning ship ". *Ministry of Defence Crown Copyright photo.*

After the war the British Navy in cutting down to peace time requirements, maintained a carrier force as its principal striking arm. Other navies did likewise, and both the Korean war and the war in Vietnam have shown the enormous power of destruction wielded by a modern carrier equipped with the latest bombers and fighters.

British Naval policy has recently become dominated by the doctrinaire theories of politicians, and this, together with the shedding of many of our overseas commitments and the vast expense of modern warships, has cut down our fleet to a bare minimum for safety. Some would say it has been cut too much.

At the moment we have four carriers, listed in Janes Fighting Ships as Eagle, Ark Royal, Victorious and Hermes.

Eagle was completed in 1951 by Harland & Wolff at Belfast. She is 43,000 tons displacement, with a length of 803 feet. She can carry 34 aircraft and 10 helicopters. Her Parsons geared turbines of 15,000 shp, driving four screws give her a speed of 31.5 knots. Armament consists of 8 115mm guns, and she carries a total complement of 2750, including air crews.

Centaur is a smaller but slightly more modern vessel of 22,000 tons displacement, built by the same firm and completed in 1953. 741 feet long, she carries 18 aircraft and 8 helicopters. Her twin screws, powered by Parsons geared turbines of 78,000 shp, give a speed of 28 knots. Her total complement is 1330 officers and crew.

Ark Royal, a fitting successor to her wartime namesake, is another big ship of 43,060 tons, with an overall length of 810 feet. She was completed in 1955 by Cammell Laird at Birkenhead. Carrying 40 aircraft and 8 helicopters she is our most powerful carrier. Like Eagle she has four screws driven by Parsons geared turbines, giving her a speed of 31.5 knots, and is armed with 18 40mm guns. Her total complement is 2,345. At the moment Ark Royal is undergoing a long and expensive refit, and her ultimate fate is rather uncertain.

Victorious is an older ship built by Vickers Armstrong at Newcastle-on-Tyne in 1941, and rebuilt at H.M. Dockyard, Portsmouth in 1950/60. Her displacement tonnage is 33,350 on a length of 770 feet. She carries 23 aircraft and 8 helicopters, and has a total complement of 2,400. Her triple screws are powered by Parson turbines with a total of 111,000 shp.

Hermes, completed by Vickers Armstrong in 1959 is 23,000 tons displacement, with a length of 744 feet. Carrying 22 aircraft and 8 helicopters she has a speed of 28 knots from two screws driven by Parsons turbines of 78,000 shp. Total complement is 2,100.

In addition to the above five carriers there are two Commando Ships, Albion and Bulwark, of 23,000 tons displacement, equipped with helicopters and amphibious craft to land Royal Marine Commandos at any particular ' trouble spot '. In addition to their normal crews of 1,000 men, they each have accommodation for a Commando of 750 officers and men.

These then are the surface ships which carry our naval striking power; and although not great in numbers they have the most up-to-date and efficient equipment. Each vessel has a greater hitting power than a squadron of battleships of the 1914-18 war.

Steam catapults are now used for launching aircraft, giving a smoother take-off with greater acceleration than the previous cordite or hydraulic catapult. The ' angled deck ' conceived by Mr. L. Boddington and Captain D. R. F. Campbell, enabled the problems caused by landing at ever increasing speeds, to be overcome; for most of the carrier borne aircraft such as the Buccaneer and Sea Vixen are powered by turbo-jet engines.

The Mirror Landing Aid by which human error is eliminated in the control of landings, and the Action Data Automation System which gives a ship command and control facilities in advance of any other system is fitted to Eagle.

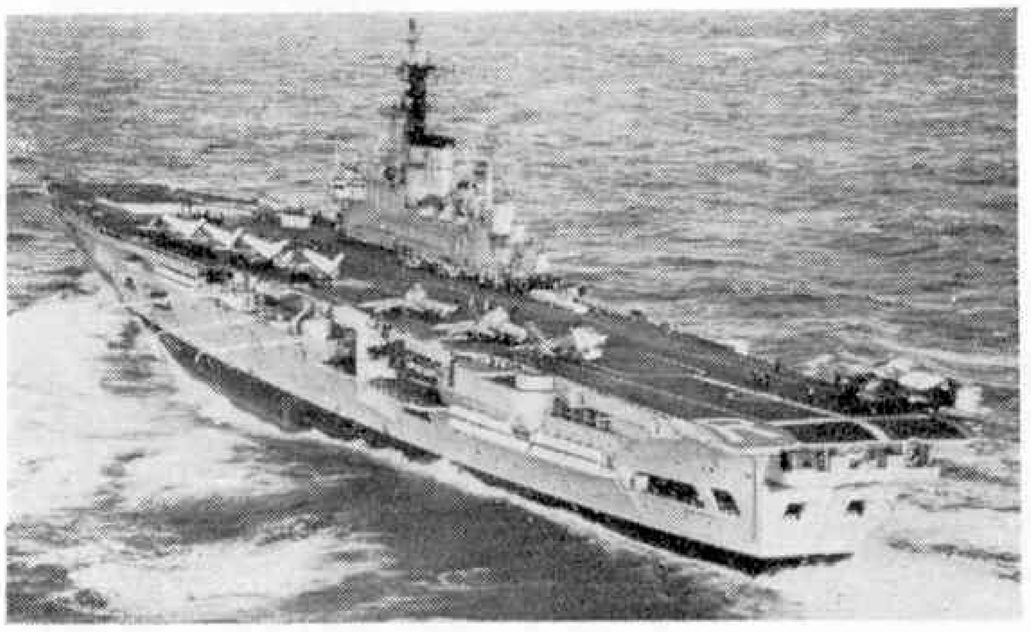
It seems as though the aircraft carrier of the late 'sixties has almost reached perfection; for some Naval experts think that within ten years the work now done by carriers will be performed by land based aircraft. Accurate long range bombing by self guided missiles, and even from space satellites, is probably not far off, and so the shadow of redundancy, in a quickly developing technical age, hovers over the aircraft carriers. It may well be that within a decade they will no longer play the dominant role in the work of Admiralty.

Although an aircraft carrier, steaming at speed, with planes being launched from her deck can inspire a might respect, not even their most ardent supporters can say they are good looking ships. They are designed for a very specialized and limited use, and have never quite displayed the grace and impression of latent power of the great battleships of thirty years ago.

Man's mastery of the air brought them into being; his ultimate achievement of world wide flight and conquest of space, will render them archaic.

Like a comet they have flashed across the scene of human endeavour for half a century, to be lost in the limbo of history.

But while they are at their peak it is well to study them and understand what they and their valiant crews have achieved.



H.M.S. Ark Royal steaming into rough sea. Her four screws driven by Parsons geared turbines of 152,000 s.h.p. drive her at at just over 31 knots. *Ministry of Defence Crown Copyright photo.*

GET OUT and ABOUT

Miss P. Gillhespey describes the fun and enjoyment that can be obtained from a holiday spent touring Youth Hostels.

IF YOU are adventurous, like travelling cheaply and living simply, why not try Youth Hostelling. You travel cheaply, as it is a policy of the Youth Hostels Association (Y.H.A.), that you travel under your own steam i.e. by cycling or walking. As Youth Hostels are not luxurious and extravagant, the overnight accommodation charge is very low. Before you can start hostelling, however, you must join the Y.H.A. Juveniles (under 16) pay 5/- a year, Juniors (16-21) pay 12/6d. and Seniors (21 and over), pay 20/- a year. These fees include a membership card and the Y.H.A. Handbook. This Handbook contains all the information you need to plan a Youth Hostel tour; there are maps showing the approximate position of the hostels, details of the opening dates, and a list of facilities.

If you are not an experienced walker, do not attempt long distance walks. Most find that 14 miles is long enough for a first walk between hostels and it is advisable to wear fell boots with good thick socks, as they are both practical and comfortable for long distance walking.

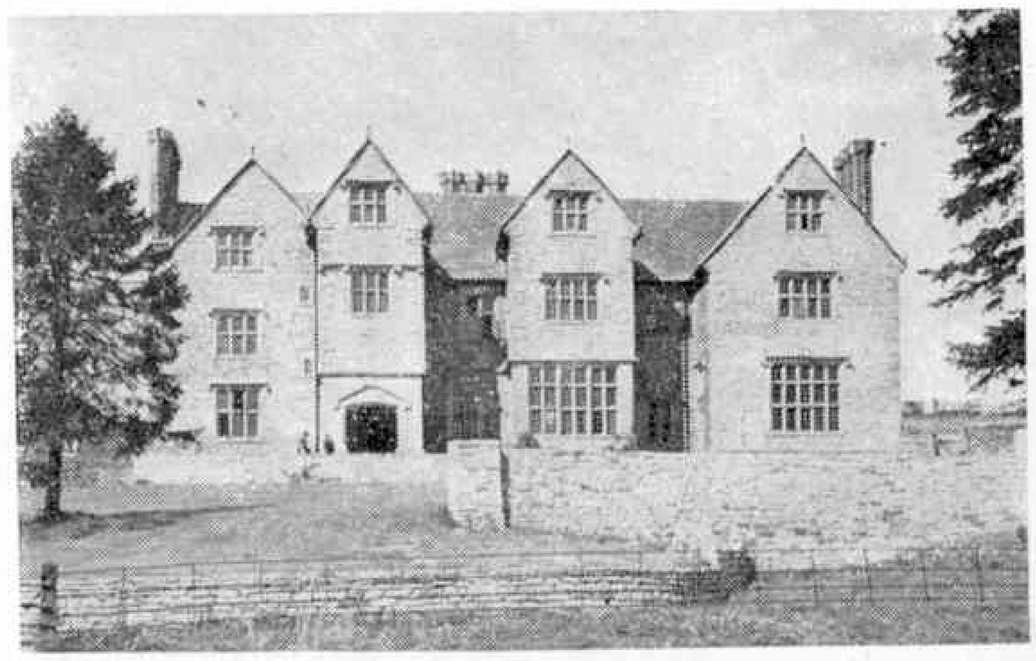
When you arrive at your hostel, which may be anything from a cottage to a castle, you are made welcome by the warden and you sign a book stating how you travelled, and if you intend to cook your own food or have hostel meals. Overnight fees are 5/- for Seniors, 4/- for Juniors and 3/- for Juveniles. These prices refer to country hostels, the three London hostels are more expensive as they have more facilities.

After booking in, you must make up your bunk, hostels rarely have beds, but the bunks are quite comfortable. You are given a pillow and blankets, but you must have your own sheet sleeping bag. By this time you will probably be extremely hungry after a day's walking or cycling. You can have meals prepared by the hostel, which are usually very good, or you can cook your own meals—it is best to think ahead about how you will feel after the journey to the hostel, you may be too tired to cook an evening meal! Hostels do not open until 5 p.m. and you must leave by 10 a.m. the next morning. Some hostels like Windsor which are very large, have a huge kitchen and good cooking facilities, but in smaller hostels the facilities may be rather cramped if the hostel is full. Most find it is cheaper to cook their own meals, and a friend and myself have bought our meals for one day, while Youth Hostelling, out of 5/-! Most hostels have a small store that sells provisions but some of the more remote hostels may be out of stock, so it is best to make sure that you carry some spare rations with you. Hostel meals are very good, but you must be prepared to wash up afterwards, if you are chosen! Breakfast is 3/- and usually consists of cereal, perhaps bacon and eggs then tea, toast and marmalade. The lunch packet is 2/- and is quite adequate. The suppers are very good at 4/- with soup, main course, a sweet and sometimes tea.

In the common room of the hostel you will probably find books on the surrounding area, which help you to appreciate the countryside and places of interest. It is also in the common room of hostels that most people usually plan their next day's trip.

Before you leave in the morning, you are expected to help out with the housework at the hostel, for example dusting and sweeping. After this, you collect your membership card from the warden who keeps it overnight. If you cycle, you can always lock up your bicycle in a shed at the hostel, and they sell puncture

Three very interesting Hostels. Above left, cyclists outside Holmbury St. Mary Youth Hostel, a modern hostel designed for the purpose and opened in 1935. To the right of this we have Houghton Mill, Huntingdonshire. A 17th Century water-mill on a reach of the River Ouse, this 40 bed hostel belongs to the National Trust. At left, Boscastle Youth Hostel, Cornwall, is also a National Trust property, at the side of the harbour.



At right, Wilderhope Youth Hostel. Built in 1588, it is preserved by the National Trust and is a beautiful building.

kits and other spares. You may be able to travel by canoe to some hostels or pony trek. The Yough Hostels Association will inform you of where this is possible.

When you have decided how you wish to travel, you must choose a route. There is a large choice of hostels, some 266 in England and Wales. If it is your first trip it is best to go to a string of hostels fairly close together. For example, on the North Downs in Surrey there is a group of hostels all fairly close together—I have visited this group and found the area very beautiful and interesting.

Tanners Hatch was a quaint hostel. You climb up onto the Downs from Dorking to Ranmore Common. The hostel is a small white cottage and you have to follow woodland tracks until you find it at the back of the woods. There is no hot water or electric light—hurricane lamps provide the necessary light—and there is a large log fire in the hearth.

Only six miles away is the Holmbury St. Mary Hostel, very modern and specially built for the Youth Hostels Association. The dormitories are large, warm and very comfortable. Opposite the hostel is a large wood, the whole area being woodland and sandy heath. The hostel store is marvellous, selling a wide range of foodstuffs.

From Holmbury St. Mary it is a short six miles walk to Ewhurst Green Youth Hostel. This hostel is near the village which is very convenient as the store is small and no meals are provided; it is in the form of a large bungalow and has a huge airy common room which acts as an extra dining room. The furniture is all wooden, with large oak tables, and the large fireplace has seats *in it*. The kitchen is not particularly big, but it is well equipped. There are cold showers here and good washing facilities—some hostels have baths or hot showers, but you usually have to pay 6d. for either of these. There are a few hostels at which you may find only a bowl and a jug which you have to fill at a pump outside! Of course, you can overcome this problem simply—don't wash!

My friend and I learned a lesson at this hostel; as it only took us a few hours to get to it from Holmbury St. Mary, we had nearly all day with nothing to do. As the hostel did not open for six hours we lazed on the common near the hostel, but if it had been a wet day, we would have had to sit and get pneumonia! So plan your day well!

The next hostel we visited was Hindhead in the Devils Punch Bowl; this hostel is as wild as its position suggests. It is thirteen miles from Ewhurst Green, a gruelling but lovely walk, and by the time we reached Cranleigh—a mere six miles— we were buying antiseptic plasters for our poor blistered feet. However, this was our first long trip, we had taken a lot of unnecessary clothing making our rucksacks far too heavy, and we were walking in ordinary shoes. We must have gone astray with our map reading as it seemed that we had walked twenty miles, but we found the warden by accident and he directed us to the hostel, which turned out to be a tiny cottage by a stream. We were quite astounded, but the weather was dreadful and we were thankful for the shelter it offered. There was no electric light, no running water, to us quite a spartan hostel! Some kind soul lit a log fire, but the smoke proceeded to fill the room instead of going up the chimney! We suddenly realised how hungry we were and cooked some soup by paraffin lamp, over a gas ring in the kitchen. Unfortunately, the paraffin lamp dripped a considerable amount into our soup and it took quite a while to discover what the unusual flavour was! As we could not stand being asphyxiated by the fire, we decided to go to bed, and when we inquired as to where we would sleep, the warden said, "In the shed!" We were too tired to argue so we went to the garden shed and looked in. Fortunately, there were two sets of bunks! It seemed very unusual going to bed by hurricane lamp in a garden shed. Another strange thing, was that some of the blankets were coffin-shaped! We had no idea why.

In the morning, a few courageous people went to wash in the stream, we remained dirty, only fools wash in streams on wet, icy mornings as far as we were concerned.

The next hostel to visit was Milford. It was only five miles to Milford, northward along the A3, but here we learned another lesson—never walk along straight main roads, it makes the distance seem twice as far; it is noisy, with fumes and absolutely unpleasant. If we had known how unpleasant it was, we would have gone by lanes and footpaths. Anyway, this hostel is really great, it is a large house in the town, warm and comfortable, and mountaineering courses are held as there is very suitable country for it in the area. We decided to tackle some hill walking on our next trip. When doing this, you must wear good boots and warm clothing; beware of mountain mists as they can envelop you in several minutes. If this does occur, you can determine your route only by compass, in fact it is almost like being blind! We found this the most

Continued on page 436

At right, Nantllanerch Youth Hostel, a typical old Welsh farmhouse built in the early 18th Century. This is in Brecon Beacons National Park, South Wales, a very beautiful area.

Above, News Reader Michael Aspel, a well known face to millions of television viewers, reads the news on B.B.C. 1 television; note the things you never see!

THIS IS THE NEWS

by J. Stanley

THE B.B.C. broadcasts news programmes in thirty-nine different languages for overseas reception and in English for National and a dozen regional programmes in Britain every day. The television news reaches an audience 30 million strong, whilst the radio accounts for a further 20 million. Such a vast daily task requires enormous organisation and precision, and every day's work is really rather like an oversized initiative test.

The news stories themselves come from a multiplicity of sources, the giant International News Agencies like Reuter, and the Press Association pour an average of 400,000 words a day onto the News Editors' desks, and a complicated network of staff and freelance reporters and cameramen in this country maintain a close watch on home stories. In the case of such a home story, it is either a National story broken by a National Newspaper or Agency, or else it has been unearthed by one of the regional studios which has received information from a local correspondent.

Take, for instance, that express train crash last year at Didcot in Berkshire. This was on the edge of the area which I cover for B.B.C. television. The crash occurred, and immediately the local film cameras were dispatched, closely followed by a sound team from the National News Head Office and studios at Alexandra Palace. The local men were using small, silent cameras, ideal for use in an emergency whilst the National crew were bringing down a sound unit to interview people on the spot. This meant that the silent film would be used in the next broadcast which kept the news really up to date, and it would be followed up by the interviews just as soon as they arrived, were processed and edited.

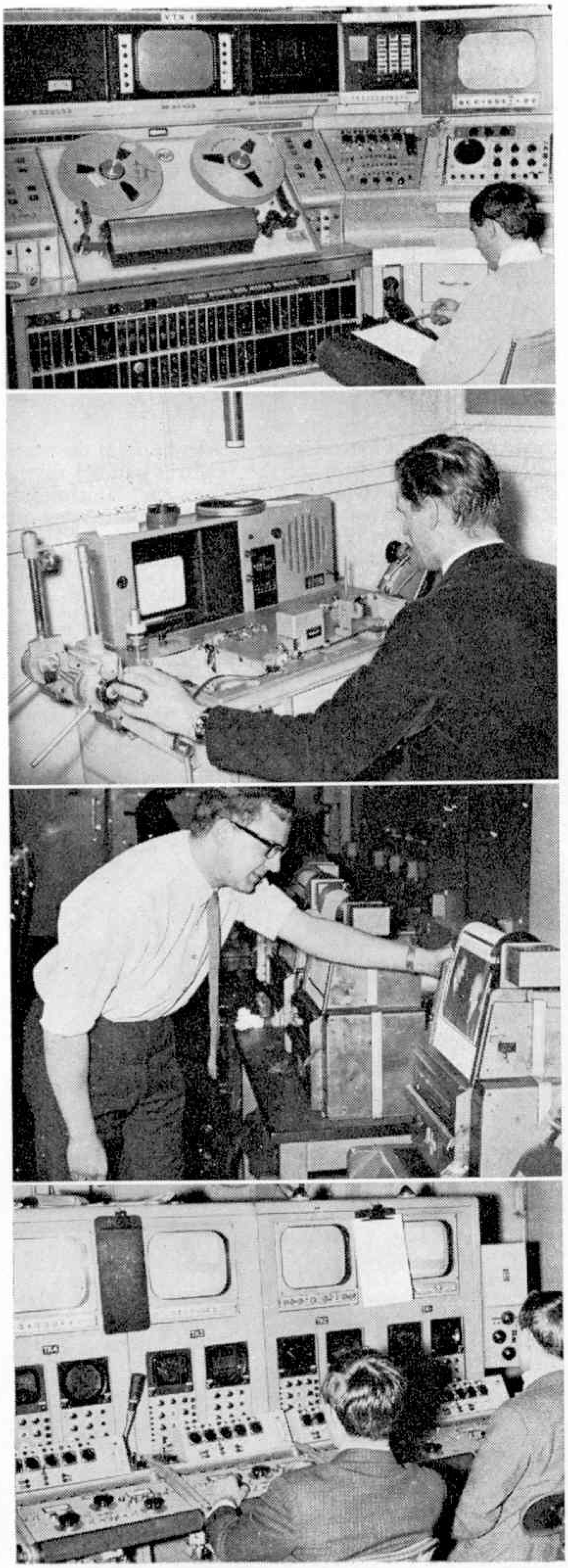
At 10.00 the next morning, my telephone rang and the Planning Assistant gave me instructions to get back down to the crash scene, as a local correspondent had reported they were completing the emergency repairs to the track and they wanted film of the first train passing the disaster scene for the National T.V. news bulletin at 1.45. I packed a silent camera into my car and drove 16 miles to the scene. It was 10.30 and back at the studios, the morning editorial conference was going into session. At this, all the Heads of the Departments concerned with the day's news programmes, met for a quick post-mortem on the previous evening's bulletins, and a first run-through on the possible stories for the day. It was decided that in order to get my film back in time for the lunch-time news, it would be necessary to use a special B.B.C. Despatch Rider to ride part of the way towards me, collect my film and rush back through the traffic to the studios for processing. I reached the railway lines and started to film the gangs of workmen clamping down the fresh rails. Shots had also to be taken of the wrecked coaches again and close-ups of the men working. Quick close-ups or cut aways, are very important to news filming for the Film Editor has to fit this film together very quickly and to whatever length is specified by the Conference. These quick shorts are the snippets which add interest and length when necessary. Just a single shot of the first train passing would be very boring without the other shots of the workmen and the crashed coaches.

Once I finished, I instantly rang the studios to find out whether to drive the film into the studios, send it by express train, or, as in this case, meet with a Despatch Rider. The chosen rendezvous was to be at Beaconsfield some 36 miles cross country for me and about 25 miles from the studios. The Rider then took the film into the laboratories and it was processed, while my notes on the film were read by the Editors giving them some idea of what to expect. The processed film was then rushed into the viewing theatre where it was run through once for the Duty Editor, the Film Editor and the scriptwriter, who having seen it, went quickly to the studio and wrote the final version of the story. The Editors knew what time/length was required and the film was cut into shape. In the actual studios the Production Assistant had been rehearsing with the News Reader and crew. All the time an eye is kept on the teleprinters for late news which might rearrange everything even at this late hour. My crash film was too late for a rehearsal and was laced straight into the telecine machine for transmission. It was 1.45 and the Production Assistant cued in the News Reader and out went the news to the nation.

Minutes later, at 2.40 the Editor of the day held his daily meeting in the newsroom with the entire staff including the News Reader, a representative from B.B.C. 2 news, the Duty Engineer, Organiser Film Output who deals with incoming films, and the evening's Production Assistant who will be responsible for the evening news bulletins.

The stories which have been broken during the day are evaluated against those used at lunch and a decision made on what is to be used. There will be further rushes to get other stories back in time, some lunch-time stories will be dropped, others re-edited. That's what goes on behind the scenes of one of television's most important and popular programmes.

At right, top to bottom. The machinery used for showing taped programmes and pieces from regional newsrooms. Next, a film editor at work on the cutting of a story for the National News. Next, an electronic picture reproduction arrives on the Mufax machine from Associated Press. Next, the equipment used for showing film on television; these are the operators of the monitors and control panels. This picture was taken at a rehearsal for Town and Around. All pictures from B.B.C. T.V. News.



A.B.C. of Model Railways

SIGNALS

Part 2

LAST MONTH, we looked at the evolution of the standard railway semaphore signal. In this article, we shall delve a little deeper into the subject of signalling from the model railway enthusiats point of view.

As mentioned last month, the rising speeds of trains in the 1840's led to the introduction of Distant signals, which warned the drivers of trains that the next Home signal they encountered was likely to be at danger. Of course, when a driver passes a Distant in the On position, the next Home signal *will* be at danger, unless something has happened in the meantime to alter things—perhaps a slow-moving goods train ahead has been shunted into a yard or relief loop, for example. The yellow and black Distant arm is well known: at night, a yellow light shines for the On position and a green light for Off.

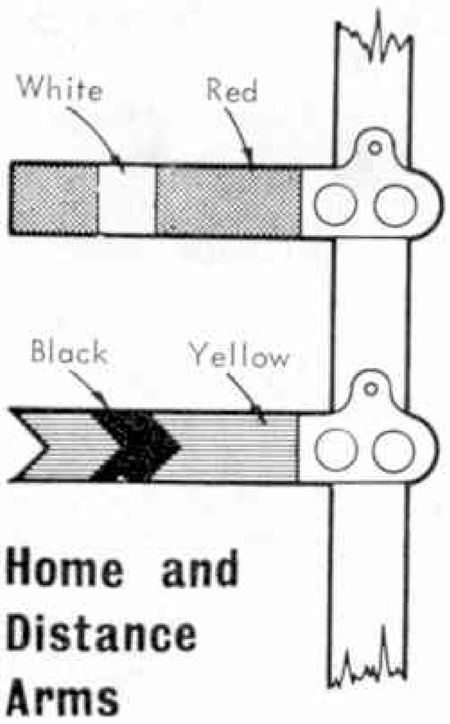
Mechanical interlocking of the signal levers in the signal box itself ensures that the Distant cannot be pulled Off until the Home signal has been set to the Off position—a valuable safety precaution against human error which has been law since an Act of Parliament of the late 1880's. Interlocking is rarely used on model railways, but never let it be seen that one of your Distants is Off while its corresponding Home is On!

Sometimes, a Home signal shares a post with the Distant arm for the *next* Home. In such cases, the Home arm is always the uppermost. This particular combination looks very attractive on a model railway, but there is one very important point to bear in mind: whilst it is quite in order for the Distant arm to be in the On position while the Home arm is Off, the Distant obviously cannot be Off while the Home arm is On. In practice, the two arms would be operated from different signal boxes: the Home arm from the local box, and the distant from the next box up the line.

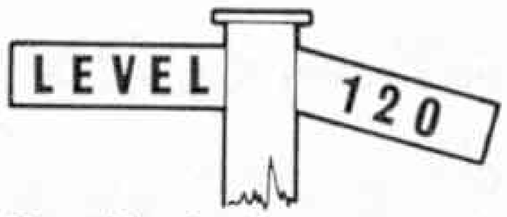
The Home signals themselves protect the entry to "Blocks" or "Sections." They are also used at turnouts and junctions, where they take the form of Junction signals, which are virtually signposts, telling the driver which track he is about to take. If one of the diverging lines is more important than the other, then its signal is usually carried on a higher post.

A Starter signal looks exactly like an ordinary Home signal, and the driver must stop dead if it is at danger. Starters are found at the end of station platforms, and are used to hold trains in the station while shunting and similar operations can be carried out in the section ahead. The starter is thus in advance of the next section, and the signal box up the line does not have to accept trains which are merely shunting within the station limits.

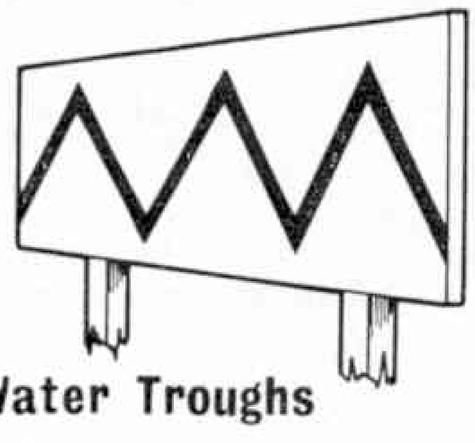
All signals stand on the left-hand side of the running track, except on lines of the old Great Western Railway, where they are positioned on the right (all G.W. locomotives were right-hand drive). Signalling is such a complicated subject, that no model railway could really hope to be fully signalled. It is a good idea to provide junction signals and Starters, but most Distants can be dispensed with.



Home and Distance Arms



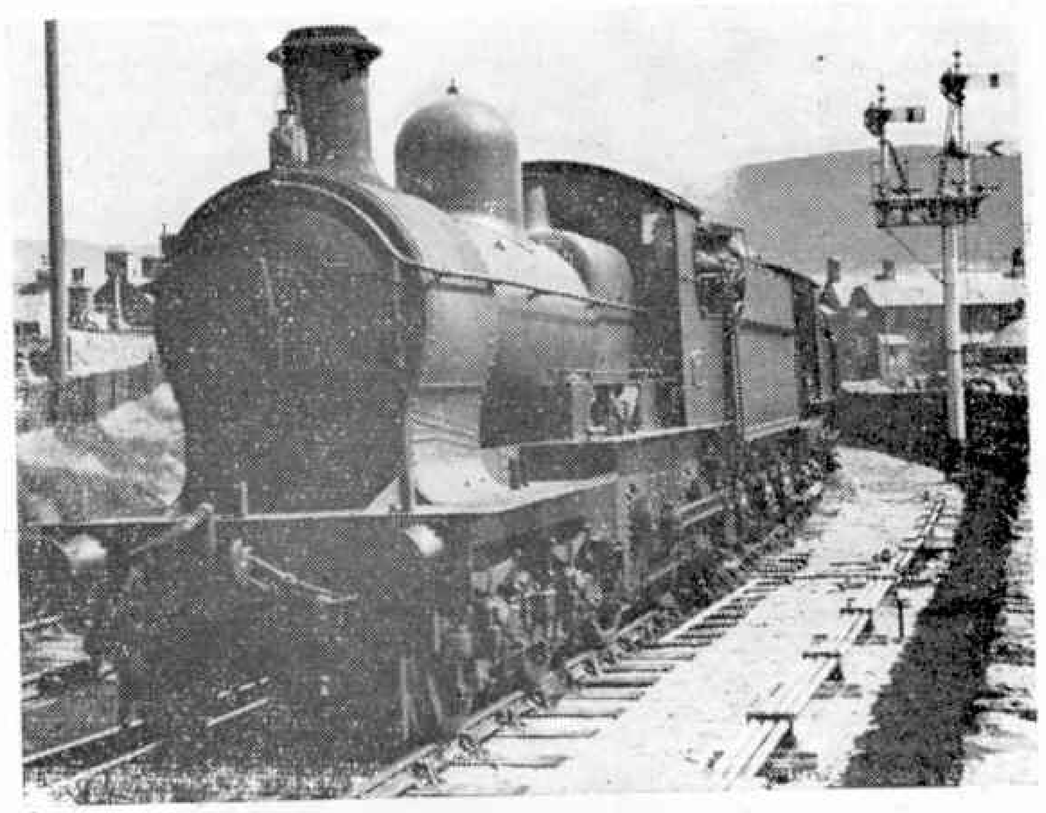
Gradient Post



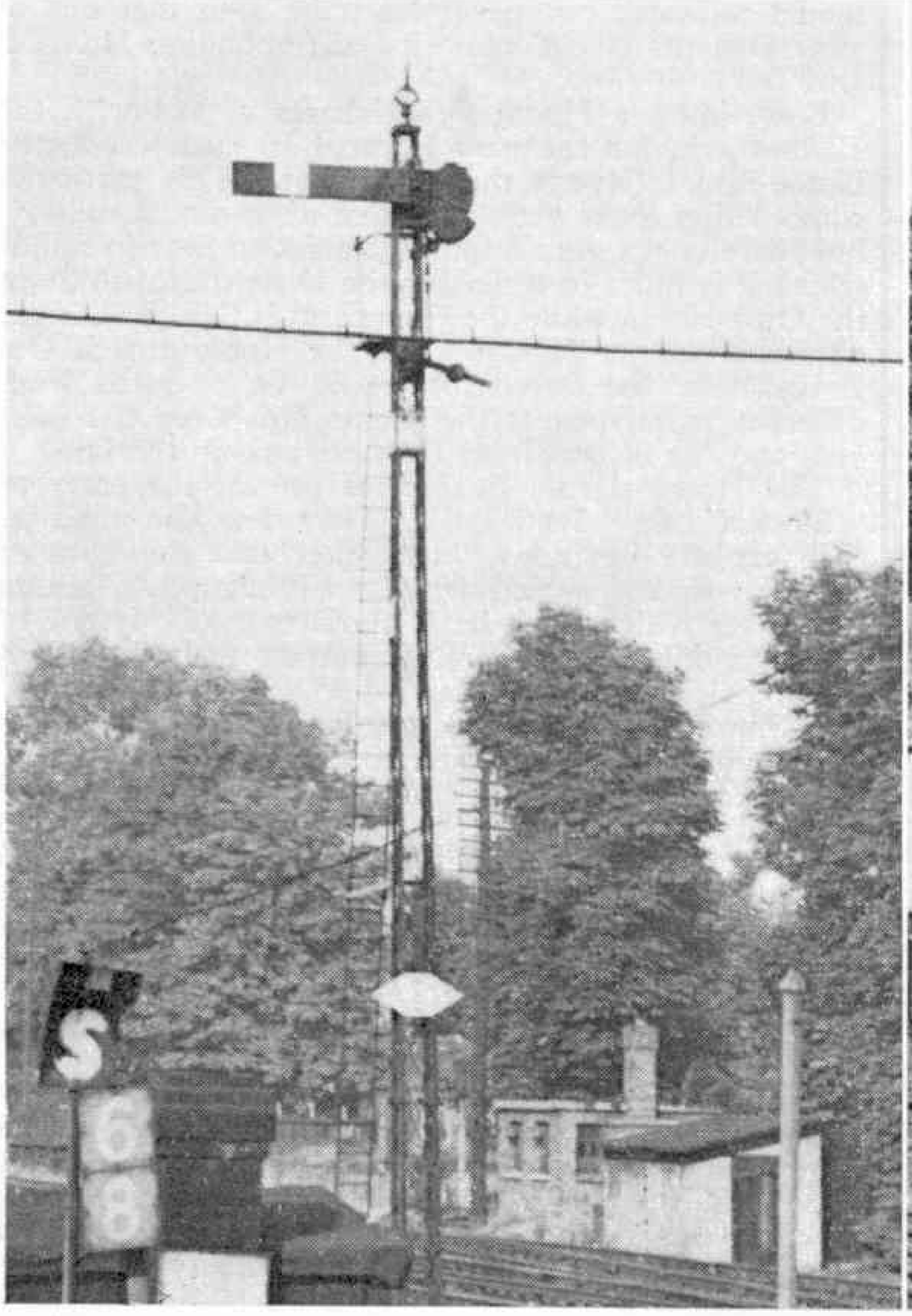
Water Troughs

Conventional signals are not the only "signposts" which railway drivers have to obey: there are also such things as mileposts, gradient boards and water trough boards erected beside the tracks. Most readers of Meccano Magazine will be familiar with mileposts, which are situated every quarter of a mile. Usually, the quarters are marked by a simple stroke on the post, and the sequence goes like this: 27, 1, 11, 111 (for three-quarters) 28, 1, 11, etc., etc., etc. Mileposts are hardly ever seen on model railways, but they would be extremely easy to make from scrap balsa, painted white.

Gradient boards are also a common sight beside the line; they give the driver an idea of the steepness of the gradient he is ascending or descending. If the track is on the level, the arm of the board is parallel to the ground, with the word "Level" on it. If the arm drops at an angle (see sketch) with the number 120 on it, this means that the tracks descend at a gradient of 1 in 120. In other words, the track drops one foot in every 120 feet of length.



Above: Great Western "Dukedog" class rebuilt 4-4-0 trundles under a typical lower-quadrant bracket signal of G.W. pattern. Location is Barmouth, Mid-Wales, and the train is, in fact, double-headed (second engine behind the tender of the first). Below: two old London and South Western Railway Home signals on the Waterloo-Woking main line, very easy to model.



HAVE YOU SEEN ??

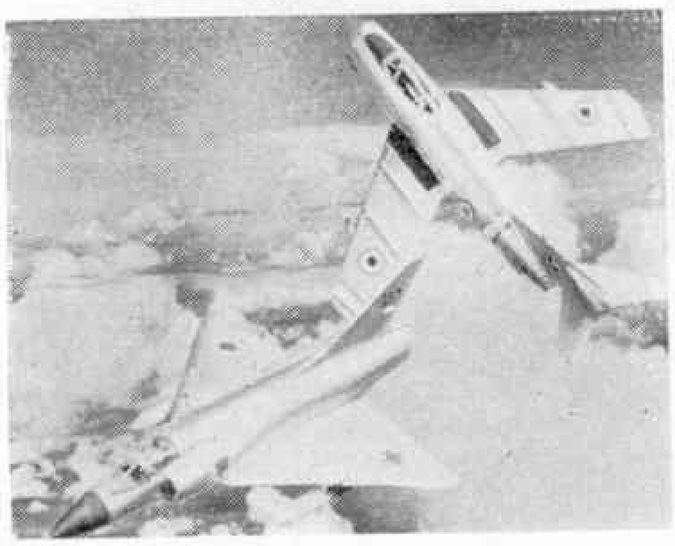
Three New Kits from Airfix

THE LATEST releases from Airfix include the "Tirpitz", "Beagle Basset", and Dogfight Double, "Mirage IIIc and Mig 15". The pocket battleship "Tirpitz" represented a considerable threat to Allied shipping from the moment she was commissioned in 1941, and for three years the Allies mounted an unparalleled series of attacks on the heavily armed ship. Her enormous fire power can be estimated from the detailed mass of armament which is the striking part of this 158 part kit. But her guns were not enough to ward off the sheer weight of Allied submarine, surface and aerial attacks—she was finally sunk in the winter of 1944, by two squadrons of Lancaster bombers. Constructing this Airfix kit is very simple, despite the intricately detailed parts, as fully illustrated step-by-step instructions are included. The finished model is 16½ in. long and the kit costs 7/6d.

Compared with the Tirpitz, the Beagle Basset in 1/72nd scale is a far more simple model to construct. The real Beagle Basset is a winner for Britain's Export drive and the model is now boosting the Export order book of Airfix Products. The Basset 206 is a twin engined, seven seater, equipped with deicing, airconditioning and full hydraulic systems as well as full radio and navigational equipment, making it equal in many respects to a modern airliner. In the U.K. the R.A.F. Air Support Command use Bassets for the rapid deployment of whole V Bomber crews, and overseas the aircraft fulfils a wide variety of roles. The 7½ in. wingspan model is constructed from 47 parts and costs 3/6d. Fully illustrated instructions are provided together with R.A.F. marking transfers and painting instructions.

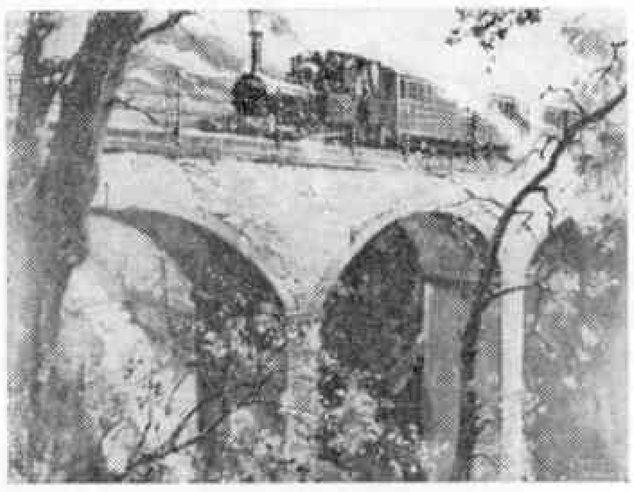
The latest Dogfight Double from Airfix consists of an Israeli Mirage IIIc and an Egyptian Mig 15, both in 1/72nd scale, and shown in a Middle East setting. The Soviet Mig 15 first flew in 1947 and it played a major part in the Korean war, proving a worthy opponent to the American Sabre. During its long career the Mig 15 has flown in the colours of all the Soviet bloc air forces as well as those of the United Arab Republic and Syria. Over 30 parts are used to construct this model. As a contrast the Mirage IIIc is a really modern aircraft constructed from 40 parts. Outstandingly successful in the Middle East Conflict, the Mirage was developed from a French prototype built by Dassault. The 72 1,400 m.p.h. Mirages flown by the Israelies, were equipped with Matra missiles and full radar and navigational equipment. Full instructions and Middle East transfers are included in this 5/- kit.

Below, the latest Airfix Dog Fight Double with the Mirage 111c on the left and the Mig 15 on the right. At right, the Airfix pocket battleship Tirpitz. This fine 158 part kit builds up into a model 16½ inches long and costs 7/6d.



Talyllyn Railway Painting

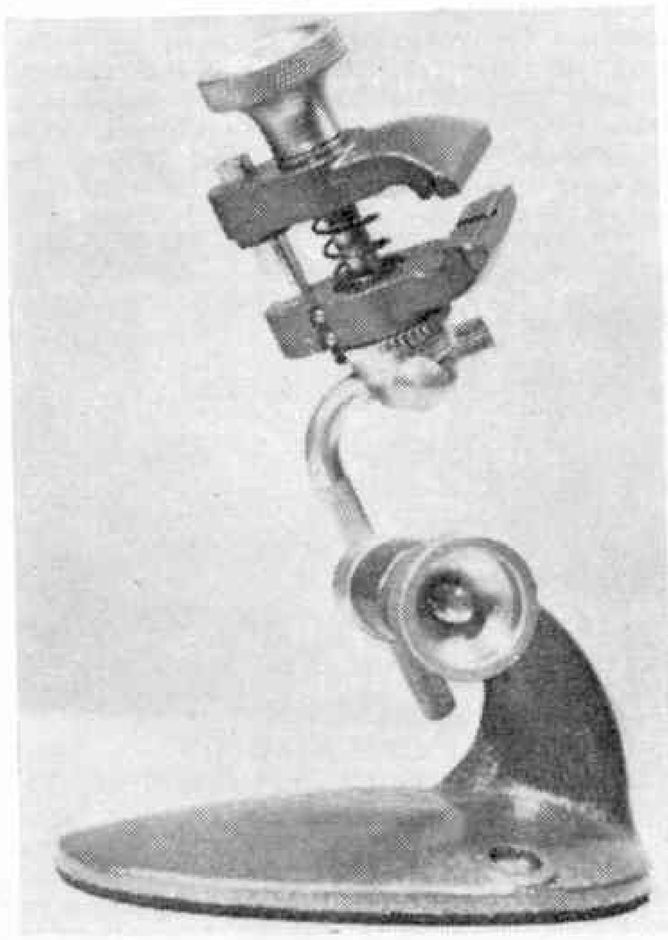
The Talyllyn Railway Company of Towyn, Merioneth, Wales, have just released a reproduction of a painting by Terence Cuneo of the Talyllyn Railway locomotive No. 2 "Dolgoch", crossing Dolgoch Viaduct. The locomotive was built in 1865 by Messrs. Fletcher Jennings for the opening of the line, and is depicted hauling the original four wheeled coaches used on the railway. The picture size is 20 in. x 25 in. in full colour, and it is available, price 30/- postage included, from The Railway Shop, Talyllyn Railway, Wharf Station, Towyn, Merioneth, Wales.

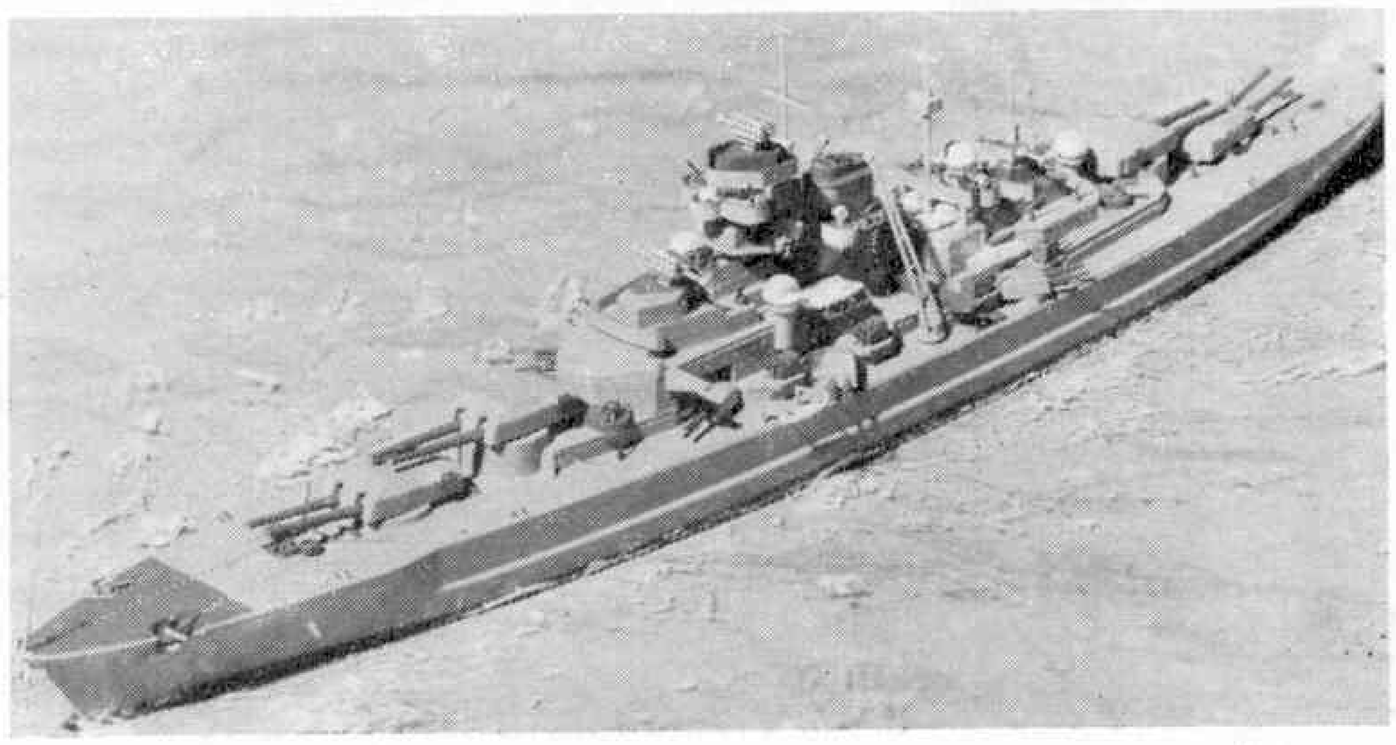


Universal Vice

To get vice jaws to grip lightly but firmly on a small round component is often a problem. This difficulty has been overcome by the Coventry Movement Co. Ltd., with their new miniature vice and stand—The Multi-Mini Vice and Stand price 67/6d. The vice comes complete with a rubber fitted stand, and has three movable points so that any angle or attitude can be assumed by the jaws; in fact the infinitely variable adjustment of vice position, gives 360 degrees of rotation in any plane. This is easy to accomplish by adjusting some knurled screws. The vice jaws rotate on a ratchet, which can serve as a divider plate to set it at different angles (40 teeth giving 9 degree steps)—very handy. We found this most useful for holding small components together whilst they were soldered. The jaw capacity is 11/16 in. and hard neoprene-rubber self-adhesive jaw liners are supplied loose for fitting when the vice is used for delicate parts. The base and vice jaws are hammer-grey painted, all the other bright steel parts, including the finger nuts, are metal plated. This unique, multi-positional table vice was introduced about eight months ago, and has recently been selected for exhibition at the Design Centre, London—an ideal model makers aid.

At left, the Talyllyn Railway Shop have recently released this fine painting reproduction of Locomotive No. 2 crossing Dolgoch Viaduct. Below, the rather unusual looking, but highly versatile Multi-Mini vice and stand made by the Coventry Movement Co. This is invaluable for holding small components.





Corgi New Releases

The latest two Corgi models received for review are the Rover 2,000 TC and Panda—an Imp Police car. The Rover 2,000 TC is the second Corgi model featuring Golden Jacks and removable wheels, and has all the style and finish of the special Rover 2,000 TC (twin-carburettors). Twin headlamps, plated grill and bumper, Rover emblem and TC insignia on the bonnet, full luxury interior trim, and of course suspension. The model also includes a Triplex glass roof, through which the interior of the model can be clearly seen. Another feature which is quite unique, is the boot mounted spare wheel, available on the real car when extra space is needed in the boot for the luggage. On the model, the spare wheel fits neatly into the cover and can be interchanged with any of the wheels on the car. Three-and-three-quarter inches long, the Rover 2,000 TC costs 7/-.

Nick-named the " Panda " because of its square dimensions and black and white colouring, the Police models of the Rootes Imp are gaining popularity around the country. Originally they were designed for patrol in Scotland around the lochs and carried special equipment for the holiday maker on the lochs.

Now, the use of this nippy little vehicle has spread to police forces in Devonshire and Coventry. Reproduced in the Corgi model are the police signs on the body of the car, the roof mounted blue-beacon and, sitting at the wheel, police driver in uniform. The rear window of the model lifts and the rear seat can be lowered for carrying equipment by pressing on the rear suspension—a feature much appreciated by model collectors who like to ' load ' their vehicles with their own paraphernalia. The Imp is 3¼ in. long and costs 6/3d.

Garage and Petrol Station

Lone Star Products, who produce the Impy Super Cars range, have just announced a new petrol station and also a lock-up garage. Designed to house any of the Impy models, the lock-up Garage only costs 1/6d. It has an up-and-over door and is moulded from plastic in contrasting colours. The Mobil petrol pump set costs 4/9d. and is complete with three petrol pumps with plastic hose pipes for added play value. Between the pumps is an oil dispenser for greater realism. A plastic roof canopy and a separate Mobil diecast Standard complete the set. In our picture the station is busy serving some more recent Impy releases, the Ford Taunus and Pergeot, with a Mobile tanker in the background. These are all available at 3/6d. each.

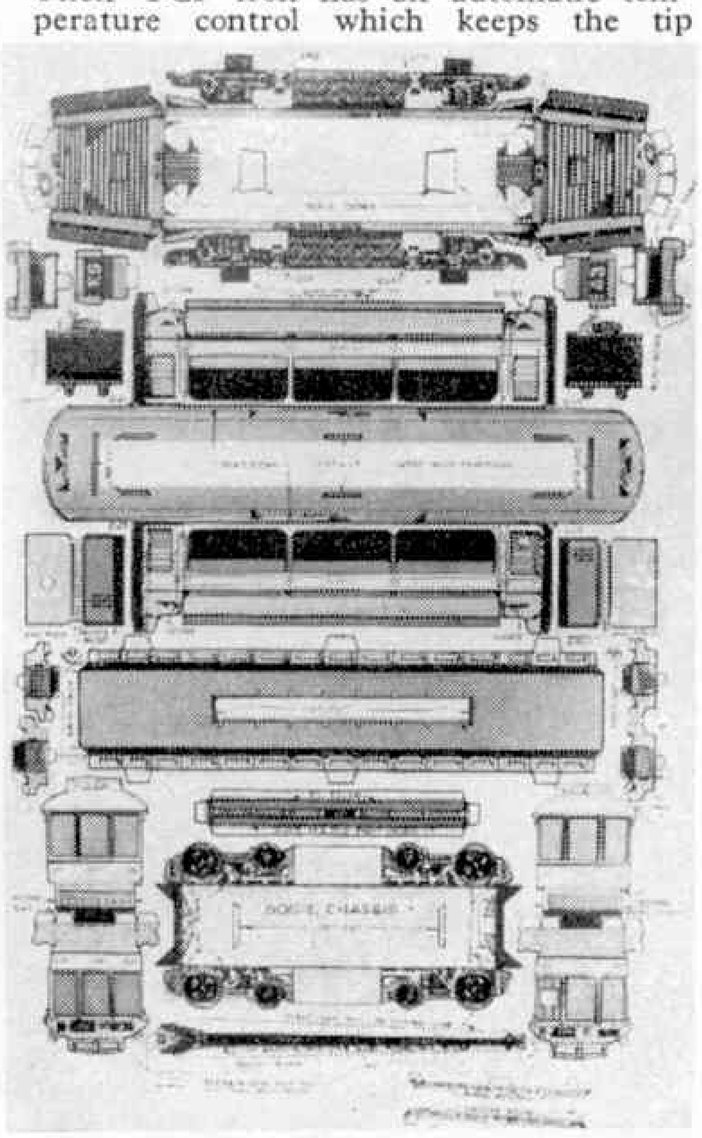
Trolley Bus Model

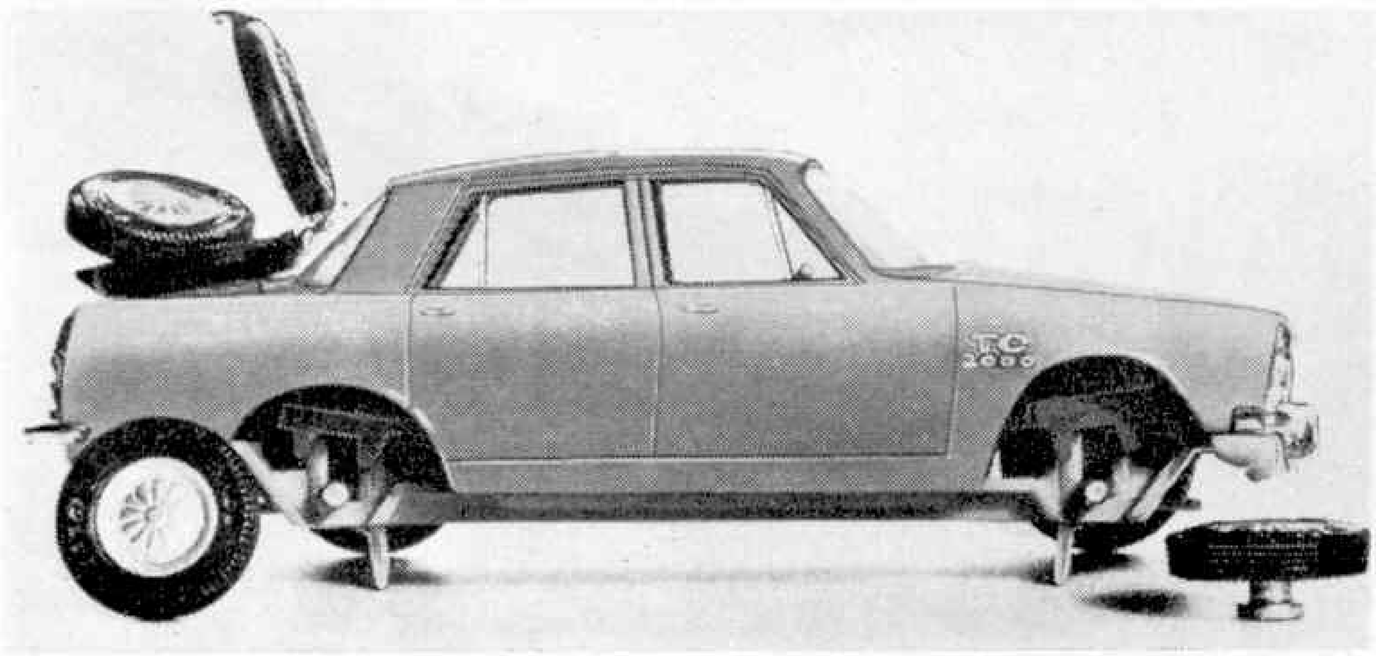
The Manchester Transport Museum Society, who published the book " Manchester Trolleybuses ", have drawn our attention to a cardboard cut-out tram model. The model sheet costs 2/6d. and is a representation of a Manchester Single Deck tramcar. Printed on fairly stout cardboard, all the parts are easy to cut out; separate assembly instructions are included, together with some copper wire for rails. This is a model of an actual tram owned by the Society rebuilt at a cost of nearly £3,000.

Above top: The Lone Star Mobil petrol station. Above centre: The Airfix Beagle Basset in 1/72nd scale, a very nice little kit. At left: A line up of Corgi Panda Imp Police cars outside a model police station. At right: The flat colour printed cardboard cut-out tram model from Manchester. Below: The Corgi Rover 2000 TC with " Golden Jacks ", showing two wheels removed, and boot wheel.

Weller Safety Holders for Soldering Irons

Soldering irons are frequently left in dangerous positions in the model room, workshop or factory and it is very easy to damage modelling components by touching the soldering iron against them or to melt a component by resting the iron on it. Weller, whose soldering irons are well known to modellers for their handy size and price, have now introduced a range of simple, safe bench holders for all their soldering irons. Briefly, the base is a block of teak incorporating a recess which holds a cleaning sponge. The holder is completed by the standard Weller spring and funnel holding device. The iron tip is placed inside the spring which acts as a positive holder and shield to stop unwary hands from burning themselves. These holders range in price from 16/- for the TCP-1 iron to 22/- for the SP8OD iron. For those who have not yet come across Weller soldering irons, we can recommend them for efficiency and light weight. Their TCP iron has an automatic temperature control which keeps the tip

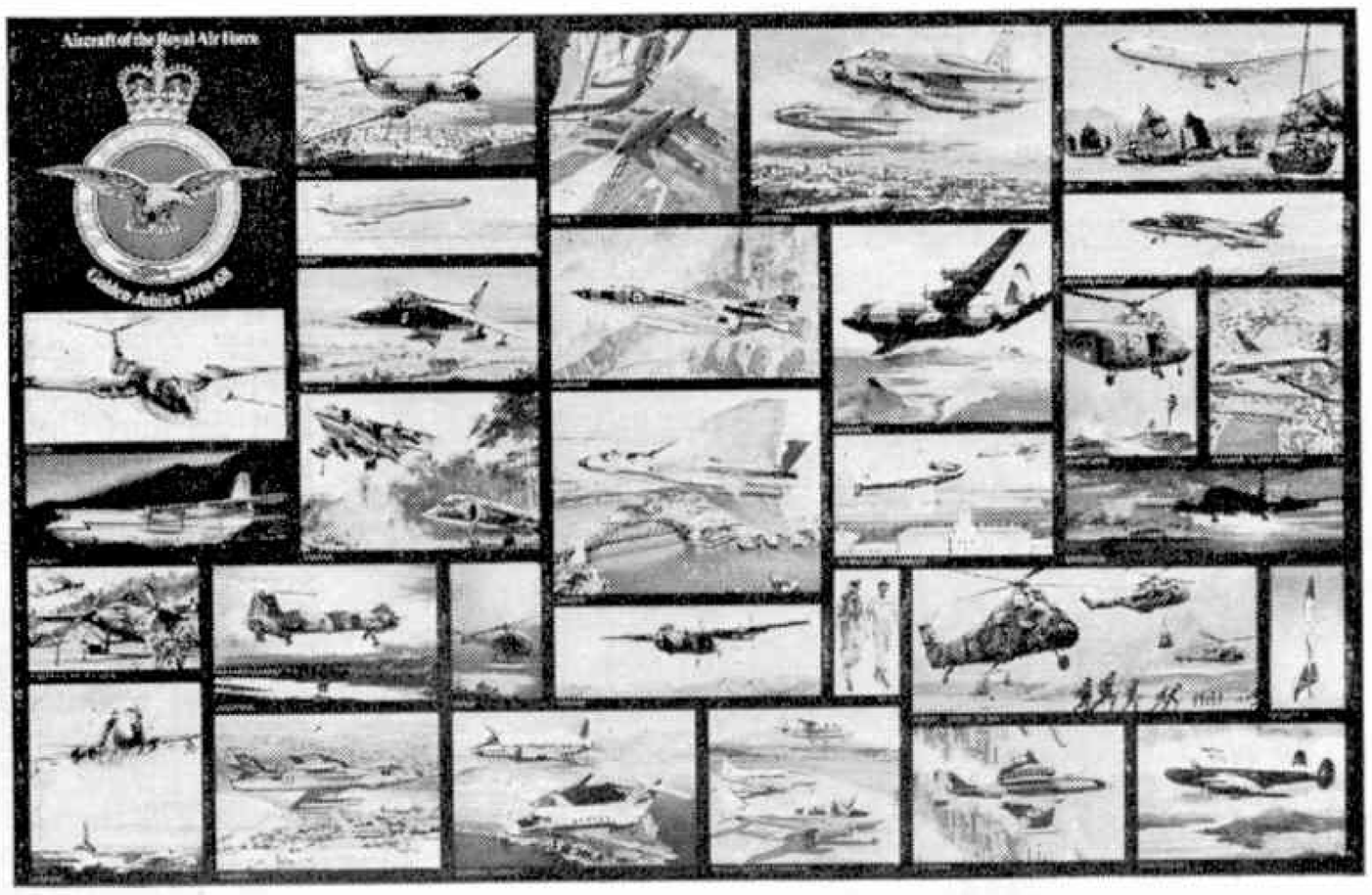




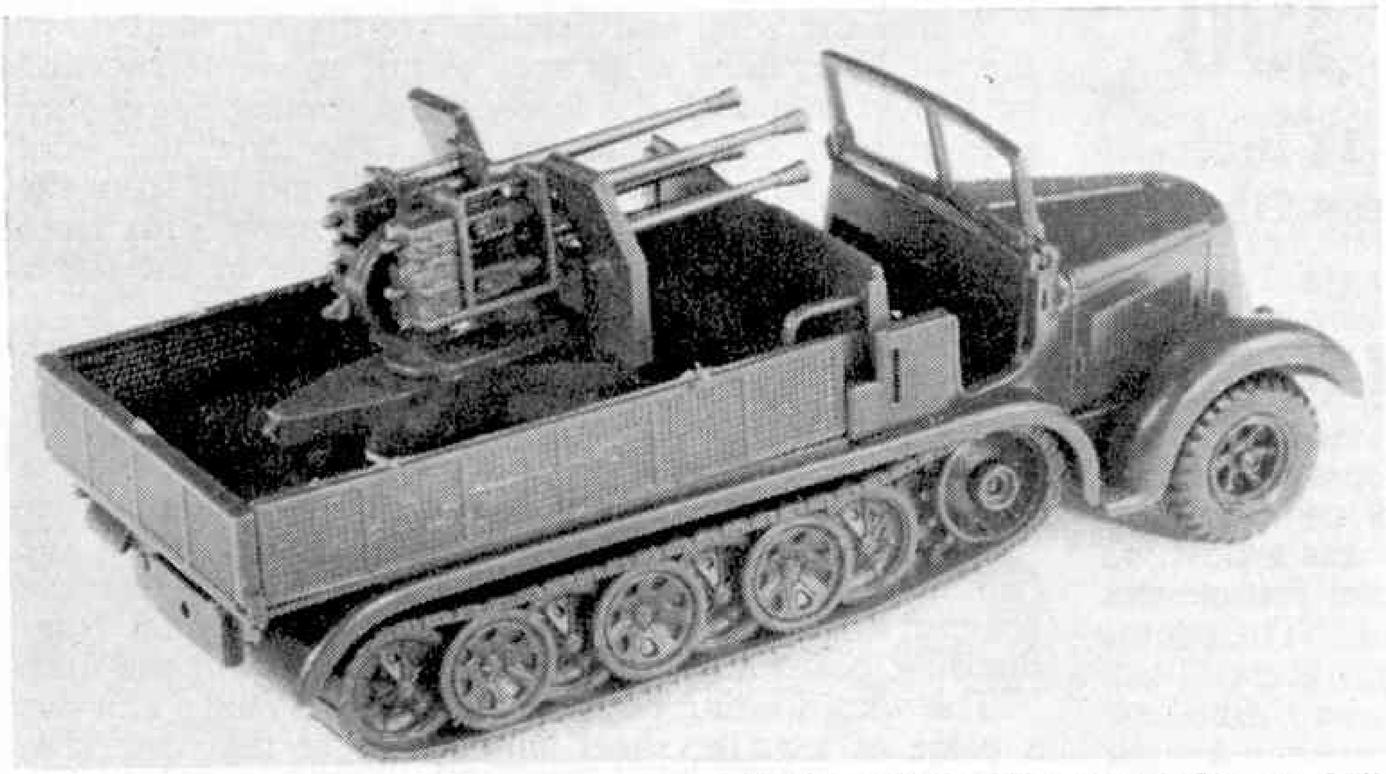
within a standard heat range (ideal for electrical work) and one can change the heat range by using a different tip. The Marksman range of irons are very attractive to hobbyists as they are very economically priced, have easily replaced, nickel-plated, copper tips, and the handle remains cool and comfortable at all times.

R.A.F. Aircraft Illustrated

A Golden Jubilee anniversary is as much a time to review the present and future, as it is to reminisce on the previous 50 years. The Golden Jubilee of the Royal Air Force this year is, therefore, the reason for the publication of an extremely attractive and informative full colour broadsheet poster, 38 in. x 25 in., illustrating 35 aircraft currently in use or scheduled for future service, which is accompanied by a separate identification and information sheet giving the statistics of each model. Devised and illustrated by John Young MSIA, the poster and information sheet is designed and published by Design Group Ltd., Gillow House, 5 Winsley Street, London W.1., at the suggested retail price of £1 os. od. It has been produced with the co-operation and approval of the Ministry of Defence. Rather expensive for most pockets, this poster could be worthwhile investment for the aircraft spotter, as it makes an ideal "den" picture.



At left, the enormous 38 x 25 inch R.A.F. Golden Jubilee broadsheet with no less than 29 original paintings reproduced on it, of present and future R.A.F. aircraft.

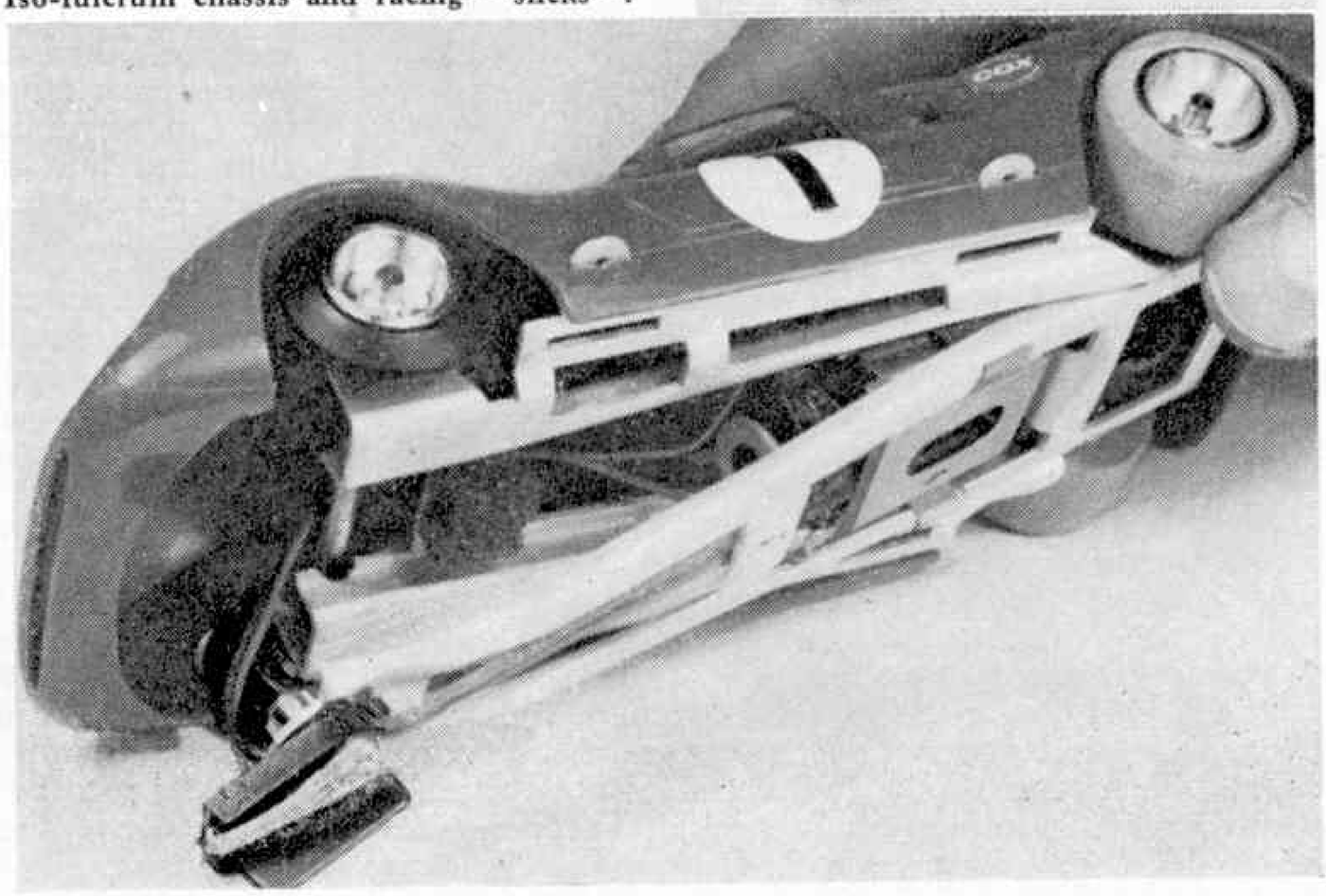


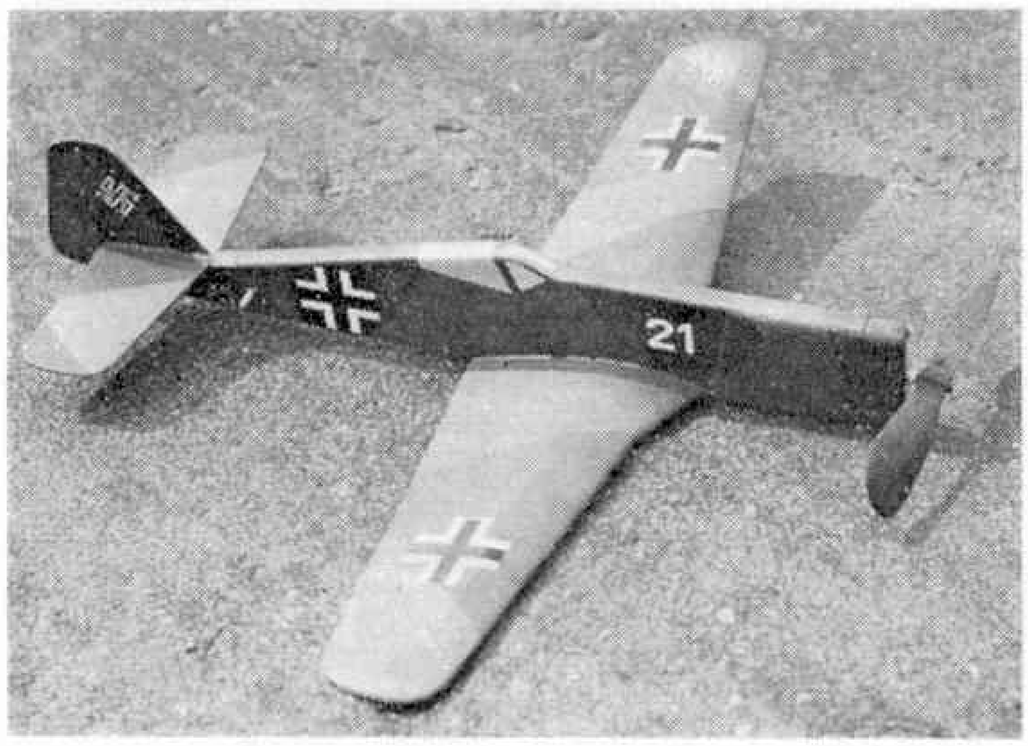
Above, another view of the German half-track SdKfz 7, described in this month's Militaria. Note the intricate gun detail.

Cox 1/24th Ferrari

By no means new in the model shops, the Cox 1/24th Scale Ferrari still has an amazing performance and is worthy of further attention by slot car racing fans. This is a ready-to-run, fully assembled model to the highest competition standards, and one only has to open the box, place it on the track and race. Our sample, submitted by "Atkinsons" of Swansea, was extremely fast on the track with exceptional road-holding, braking and acceleration. This is no doubt due to the very clever Iso-fulcrum chassis design, where the motor is mounted on the fall-away guide, pivoted just forward of the rear wheels. This design has also been used in other Cox cars with very good results. Pressed from aluminium alloy, the chassis is very light and strong, also exceptionally low. The guide shoe is a very good design with quick-change, plug-in, nickel-plated, copper pick-up braids. The whole shoe is tensioned by an elastic band for self-centering so that marshalling can be speeded up The performance is no doubt influenced by the wheels fitted; all wheels are turned from alloy with grey sponge slicks on the back wheels and knife-edged hard rubber tyres on the front. A fast Cox steel pinion and nylon gearwheel is used for the power transmission. The body is a bright red, plastic injection moulding, and simply clips on to the chassis lugs with a little pulling about. It is easy to remove for maintenance, etc. If you have ever been tempted to have a go at a pay-circuit or a fast Club track, we would recommend this car. It may seem very expensive at £5-19-6d., but the performance and the fact that it is ready to run does compensate for this.

At right and below, the Cox 1/24th scale Ferrari, ready to race slot car, note the Iso-fulcrum chassis and racing "slicks".





Your full size free plan!

FOCKE WULF 190

Construct this easy to build, 17 inch wingspan rubber powered free flight scale model from W.W.2

Designed by G. A. Hatton

THIS WELL-KNOWN German fighter was designed by Kurt Tank; the prototype was completed in 1938 and first flew in 1939. The engine was a B.M.W. 139, developing 1,300 h.p., and an unusual feature was the ducted spinner to assist engine cooling. The prototype F.W.190 had a civil registration. Kurt Tank named it "Wurger" (known in Britain as "Shrike" or "Butcher Bird") and development continued right up to the end of W.W. II ending with the T.A. 152.

Commence construction by cutting out all the sheet parts except the wing leading edge sheeting. Trace the parts on to thin paper, cut out, then lightly glue the paper templates on to the sheet. It is best to use a rubber cement such as "Cow Gum" or "Copydex" for this, so that you can peel the paper templates off easily after the parts have been cut out. Pin down the $\frac{1}{8}$ in. × $\frac{3}{8}$ in. basic fuselage strips (if you want to put in a larger motor, use $\frac{1}{8}$ in. × $\frac{1}{2}$ in. and widen the nose block, CS1 and CS2), leave the bottom strip in one piece as you cut out the motor access hole later. Pin and cement CS2 in place the $\frac{3}{8}$ in. sheet noseblock top and the $\frac{3}{8}$ in. × $\frac{1}{4}$ in. rail upright.

Whilst the fueslage frame is drying, pin the leading and trailing edges of one wing panel down. Cement and pin the $\frac{3}{8}$ in. sheet tip and $\frac{3}{16}$ in. end rib in place, follow with all the other ribs leaving R1 until last. Use template RA to set the angle of R1, for correct dihedral and then add the $\frac{1}{8}$ in. sq. spar. Leave this to set and continue with the fuselage construction. Before lifting the framework off the plan, pin a small piece of $\frac{1}{8}$ in. sq. strip across the nose, connecting the top and lower longerons. The next step is to cement a $\frac{1}{16}$ in. sheet fuselage side skin on, pin it in place, leave it to dry.

Whilst the wing and fuselage are drying, sand down the tailplane; there is no need to put an aerofoil section on it, just round off the leading and trailing edges then sand the fin and rudder smooth. By now the wing panel should be dry. Remove the pins and lift from the board. Place this to one side and remove pins from fuselage. Cut out the motor access hole in the lower longeron and cement the second side in place.

The next step is to lay down the second wing panel, using the same constructional procedure as for the first panel, but make sure you have constructed two *opposite* wing panels and not two the same! Now sand the first wing panel's leading and trailing edges to section, remove the pins from the fuselage and add the two nose doublers, pinning them in place while the cement dries. Remove the second wing panel from building board and sand to section as you did the first.

The wing leading edge sheeting comes next. Cut out a piece of 1/32 in. sheet slightly larger than the area to be covered, making sure it has a straight edge to join up with the wing spar. Cement it to the wing and pin and clip it at the leading edge. Repeat for the other wing. While the sheeting is drying remove the pins from fuselage. Cut out the $\frac{3}{8}$ in. sheet noseblock (do not forget to use $\frac{1}{2}$ in. sheet if you have the wider fuselage), then drill a hole and insert the tube for the propeller shaft; use 3-4 degrees down thrust. Next, add the $\frac{1}{8}$ in. sheet doublers to the noseblock. Remove the clips and pins from the wing panels, then trim and sand the leading edge sheeting to finished shape.

MATERIALS REQUIRED

Medium Balsa	Medium Balsa
1 Sheet 1/32" x 3" x 18"	1 Strip 1/8" x 1/8" x 18"
1 Sheet 1/16" x 3" x 36"	1 Strip 1/8" x 1/4" x 18"
1 Sheet 3/32" x 3" x 12"	1 Strip 1/8" x 3/8" x 36"
1 Sheet 1/8" x 3" x 6"	1 Strip 1/8" x 1/2" x 18"
1 Sheet 3/8" x 3" x 12"	
1 length 18 s.w.g. piano wire.	7" dia. K-K plastic prop.

Get Out and About—*Continued from page 429*

enjoyable aspect of youth hostelling. Brecon Beacons National Park contains several lovely hostels and several mountain masses such as the Black Mountains and the Brecon Beacons. The former provide a magnificent ridge walk from Storey Arms Youth Hostel to Nantllanerch Youth Hostel. The hostel at Nantllanerch is a modified farmhouse near the head of a forested valley at the foot of the Beacons. It is extremely beautiful and convenient in its position.

The Youth Hostel Association arranges holidays to cater for doing all manner of things under expert supervision; for approximately £11 os. od. you can learn to skin dive at Salcombe for a week. These holidays enable members of the Youth Hostel Association to have, for a reasonable fee, a week of an exciting pastime using good equipment and with expert instruction. A whole range of interesting activities are covered: sailing, gliding, canoeing, pony trekking, rock climbing, bird watching and many others. Most of these cost about £12 os. od. for a week which covers food, accommodation, equipment hire and practically everything except pocket money and the fares.

The Youth Hostel Association also run holidays abroad, but these, of course, are more expensive as the cost includes travelling. Some of the arranged holidays are in such countries as Germany and Switzerland. Information on adventure holidays and European holidays can be obtained from The Youth Hostels Association, Trevelyan House, St. Stephens Hill, St. Albans.

Cement the dihedral brace into CS1, then cement CS1 to one wing panel and leave to dry. Then sand the fuselage smooth and round off all the corners. Now cement the tailplane to the fuselage, making sure it is square, pin it in place.

Next, cement the other wing panel to CS1 and pin it in place, add the fin to the fuselage and again make sure it is square and lines up with the fuselage centre line. Cover the wing with lightweight tissue using 3 or 4 panels of tissue. Use any commercial tissue paste as adhesive, a good substitute is "Gripfix," and do not forget to smooth out all the wrinkles.

Now go back to the fuselage and remove the pins from the fin and add the soft wire hinges (wire from the florists; they use it for flower arranging). Push a pin into the back of the fin, making sure it does not break out of the side (try it first on a scrap piece of balsa). When they are in line, mark the position of the holes in the rudder and push a pin in there also. Cut the soft wires to length and cement them in place in the matching pin holes to join the fin and rudder.

Next, dope the wing, one panel at a time and when they are almost dry pin them down to the building board to prevent warping. Next, give the fuselage and tail surfaces a coat of clear dope. Unpin the wing and repeat for the other panel. When the fuselage is dry sand it down and apply another coat of dope. Repeat for the wing but use 50/50 thinned dope for the second coat. Lightly sand the fuselage and wings then glue the wing to the fuselage. Check for squareness, and add the scrap piece beneath the wing to the level of the fuselage.

When the wing is dry, colour paint the model using the paints of your choice. We used Humbrol matt colours and painted the undersides in Hellblau (light blue), the top surfaces and sides of fuselage in Swarzgrun (mid green) and Dunklegrun (dark green). Paint the colour divisions as shown in the photographs and add the transfers in the positions indicated. The rudder and underside of the nose, forward of the wing, should be painted red. Next, add the propeller shaft and the propeller. Use a 7 in. diameter propeller cut down to 5 in. diameter; do not use wooden propellers as they break easily.

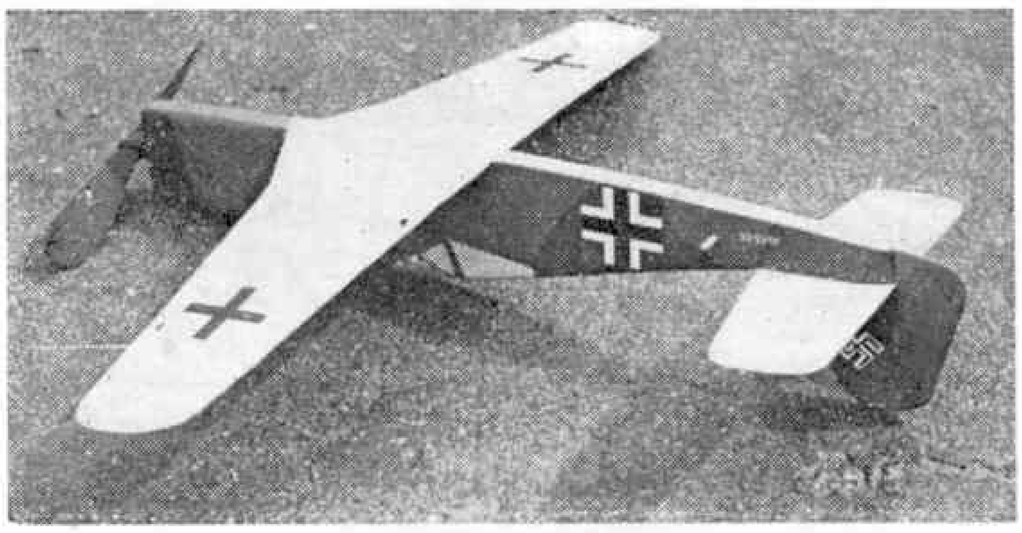
The motor should be made from one strip of $\frac{1}{8}$ in. flat rubber, 36 in. long, knotted at one end and looped into four; if you have constructed the wider fuselage you can use six loops of $\frac{1}{8}$ in. flat or four loops of $\frac{1}{4}$ in. flat. Allow 18 in.-19 in. rubber length for each loop.

With the motor in place add weight to the nose until the *model balances on the main spar position at the wing tips.*

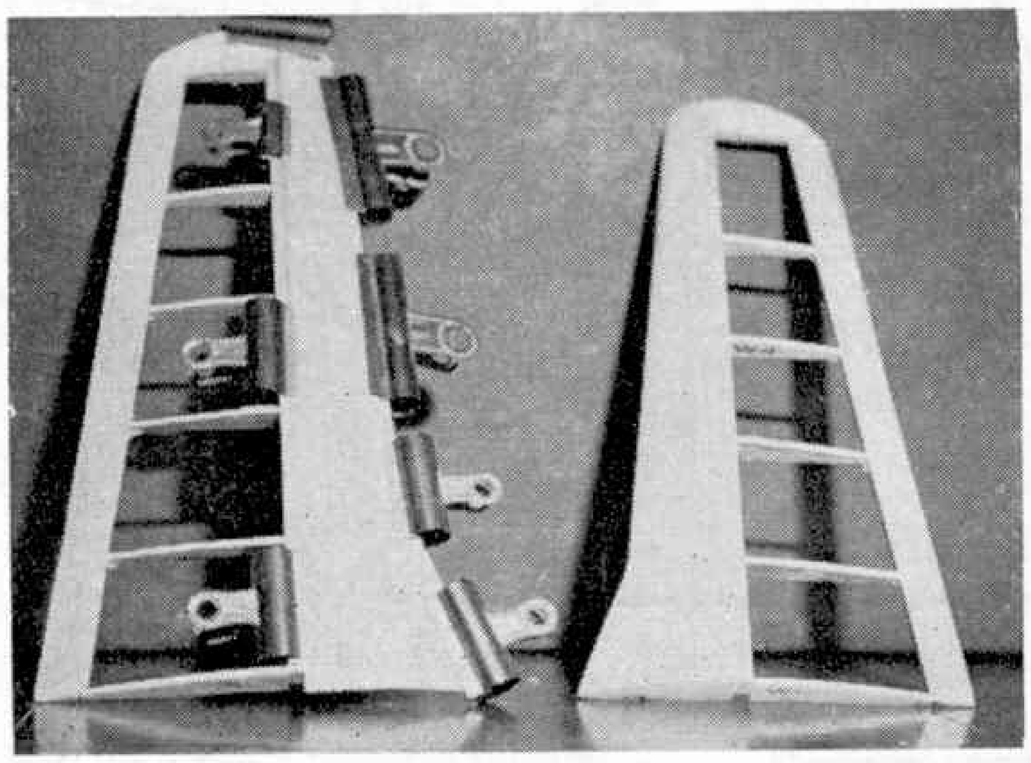
Now we come to the flying; test glide, preferably over long grass and add Plasticine to the nose or tail unit until a flat glide is obtained, from a hand launch. For the first powered flight only wind 75-100 turns on the motor. Fly with this amount of turns until a gentle turn to the right is obtained, then increase the power slowly up to a maximum of 300 turns, correcting any tendency for the model to swing to the left with slight amounts of *right* rudder trim.

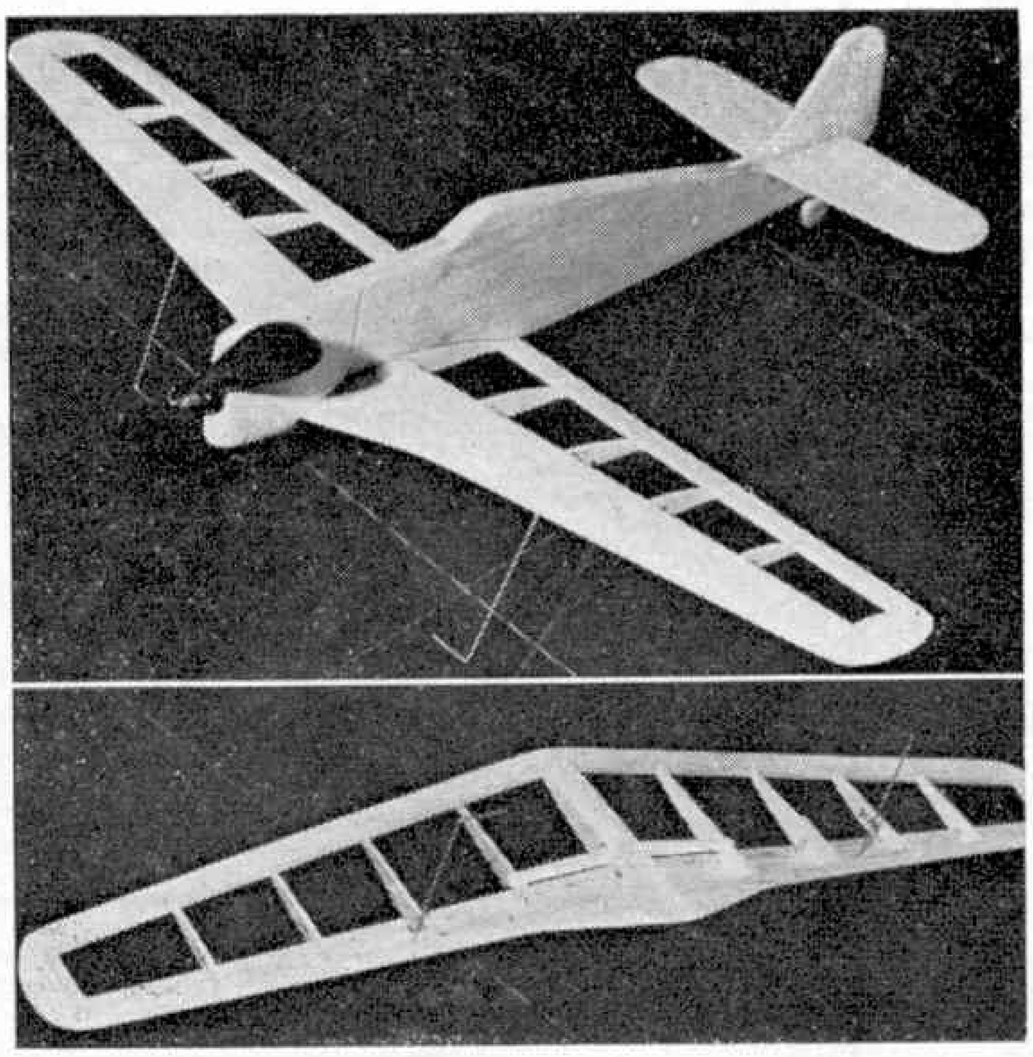
The best method of launching the prototype appeared to be a fairly hard throw into wind, pointing the nose slightly upwards (about 10 to 15 degrees).

After many successful rubber powered flights, it was decided to modify the prototype to make it an effective catapult glider. A short length of $\frac{1}{8}$ in. diameter dowel rod was pushed into CS2 just in front of the wing leading edge, to form a notch for the catapult rubber, and about six yards of $\frac{1}{4}$ in. flat rubber looped over a stout post pushed well into the ground took care of the catapult. The prototype made several flights of up to 400 yards distance with an altitude of about 75 ft. If you wish to modify the model for catapult flying it is advisable to make a new noseblock up (adding extra weight to compensate for the loss of the propeller and to maintain the centre of gravity in the correct position).



Above, on this and opposite page. Two views of the finished model, note the camouflage pattern and simple flat sided sheet balsa fuselage. Below, this picture shows the use of paper clamps to hold the 1/32nd of an inch leading edge sheeting in place while the cement sets. Note how two opposite wing panels are constructed ! At right, the finished uncovered wing and complete model. Note the undercarriage; we decided not to incorporate this in the final version as it added too much extra weight and made the model tip over on landing. Note the shorter nose also used on the prototype, this being modified in the final version shown above.

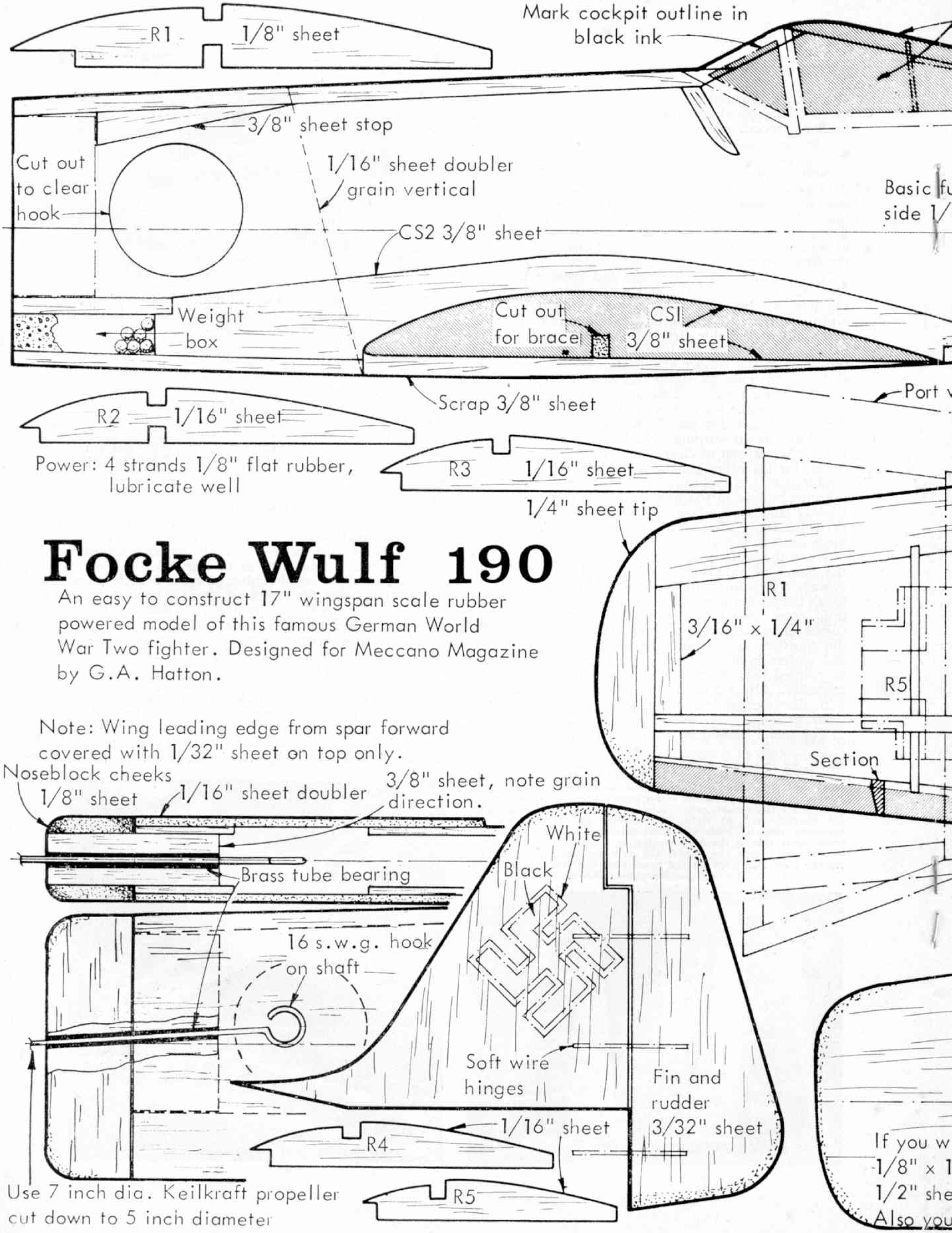




Focke Wulf 190

An easy to construct 17" wingspan scale rubber powered model of this famous German World War Two fighter. Designed for Meccano Magazine by G.A. Hatton.

Note: Wing leading edge from spar forward covered with 1/32" sheet on top only.



Paint silver

Use RA to set angle of R1 for correct dihedral

Wing

R2

R1

RA — 1/16" sheet

Tailplane

fuselage
/8" x 3/8"

Black

White

1/8" dia. dowel

1/4" x 3/8"

Celluloid disc for reinforcement

Cut this part away for motor access after sides have been glued on.

t wing

Trailing edge 1/8" x 1/2"

Starboard wing

Tip from 1/4" sheet

R2

R3

R4

R5

R1

R4

R3

1/8" sq.

R2

Leading edge covered with 1/32" sheet

3/16" x 1/4

Chamfer leading edge for 1/32" sheeting

Leading edge 1/8" x 1/4"

1/8" sheet

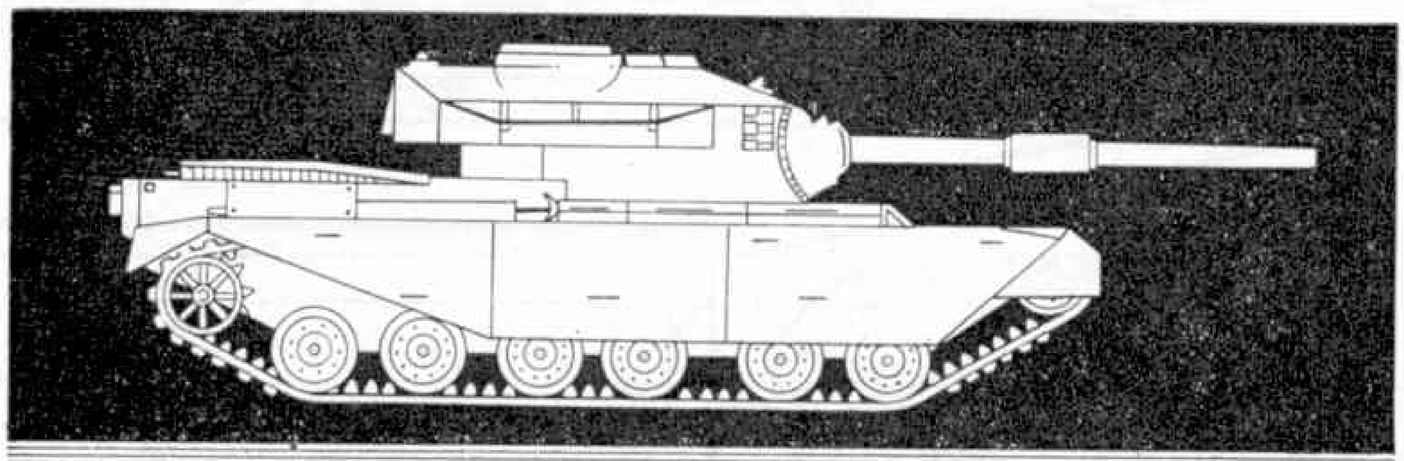
C.S.1
3/8" sheet

Tailplane 3/32" sheet

Dihedral brace—
1/8" sheet

wish you can make fuselage strips
x 1/2", but make CS1, CS2 from
sheet and widen dihedral brace.
ou can increase rubber to 6 strands.

Mark elevator hinges in black ink



MILITARIA

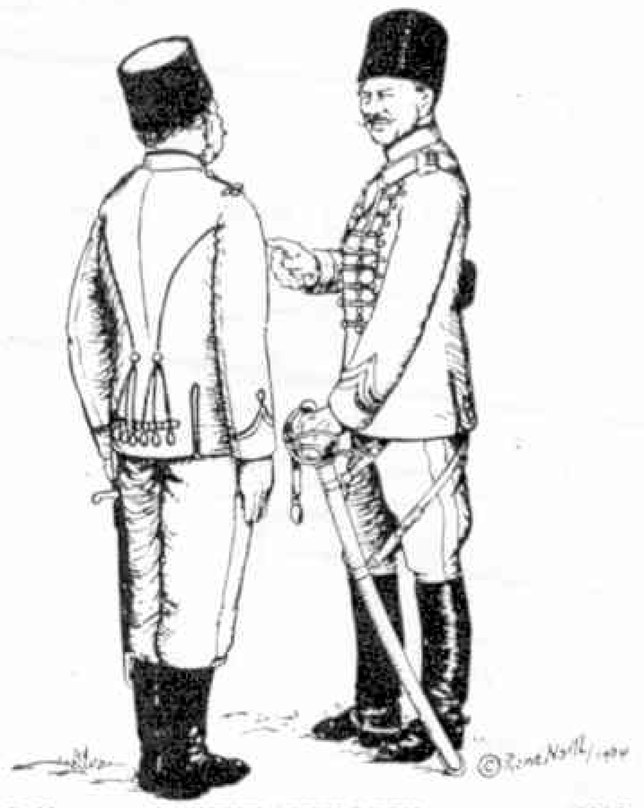
A REVIEW BY CHARLES GRANT

QUITE CERTAIN it is that, in this day and age, the collector of model soldiers and his close associate, the battlegamer, have never had it so good. To one who remembers the days when anyone rash enough to express an interest in miniature leaden soldiery was looked upon as being more than a little eccentric or of retarded mental development it is tremendously gratifying that such is no longer the case. Indeed the model soldier has achieved a popularity and even a respectability still mildly surprising to the "old hands" of the hobby. All sorts of commercial enterprises catering for the military enthusiast have deluged us with their products—metal and plastic figures, every sort of model kit, documentation and so on. It is proposed then, that, from time to time, we should have a kind of forum on what is new, to re-appraise already established items and if possible to give news of what might be released in the immediate future. Some of these manufacturer's products might be well known to many readers, but it is hoped that the comments and notes on as wide a selection as possible might be both interesting and useful.

So let's get under way with what the model soldier requires before he can really get down to business. This is of course a battlefield, and we can do no better than mention the terrain pieces produced by Merberlen Ltd under the name of **"BELLONA BATTLEFIELDS"**. These—the pieces—come in a variety of sizes and are designed for every possible military contingency—the largest being entitled "Bellona Dioramas". They measure 16½ in. by 10 in., are constructed of hard P.V.C. and are of the greatest use for the battlegamer. The two most recent productions are illustrated. The "Fighter Dispersal Bay" can be used as a static display background for one's favourite model aircraft and I can see its being used in a battlegame involving a commando operation or a parachute 'drop'. The "Redan" can be employed in all sorts of desperate fighting—it is appropriate to any period, really, over the last couple of hundred years or more. From a purely functional point of view the advantage of such scenic pieces is obvious—they can be juggled about as the battlegamer desires to produce all sorts of different layouts, and they are extremely tough and durable into the bargain. The price of the largest size—including the two referred to—is by no means too high for what they are and is 11/1 each, plus postage and packing. Smaller pieces cost less of course.

From terrain to troops is but a step and this particular one takes us to the latest 30 mm. figures produced by the justly famous firm of **NORMAN NEWTON LTD.**, whose showroom at 44 Dover Street, London, W.1 is a veritable 'Mecca' for all amateurs of militaria. Doubtless inspired by the repeated success of the film "Zulu" these figures—of which a selection is illustrated—represent both Zulu warriors and British troops opposing them. The 30 mm. size was for long associated with the 'continental flat' type of figure and it is only in recent years that the possibilities of the "round" in this size have been really exploited. For vigour of action position and detail of moulding the ones we speak of are certainly among the best yet put out by the firm making them. They are really a joy to paint, nor is the job a difficult one, so well detailed are the figures. The price—3/1 unpainted—is most reasonable, not too great for even possibly limited pocket money to acquire as a group of such fine examples of the modelmaker's craft.

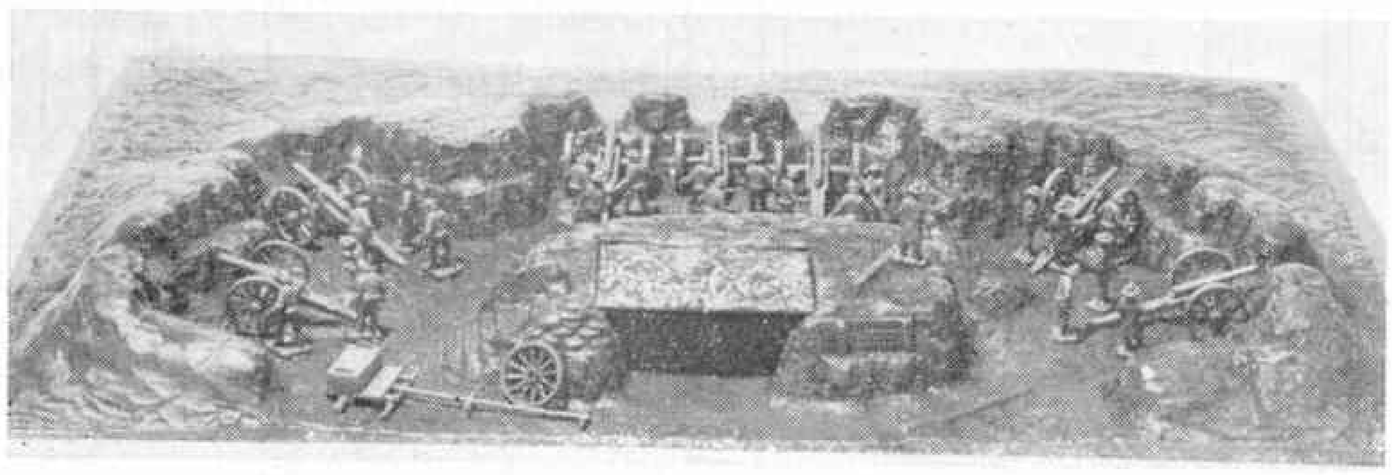
It is essential to ensure accuracy when painting miniature figures and Mr. Rene North, publisher of **"NORTH'S PAINT YOUR OWN POSTCARDS"** furnishes much of the necessary documentation. His cards—a specimen is reproduced—come in sets of six, are suitable for watercolouring and are complete with full uniform details. They are most useful for the colletcor interested in the lesser known European uniforms, and have also



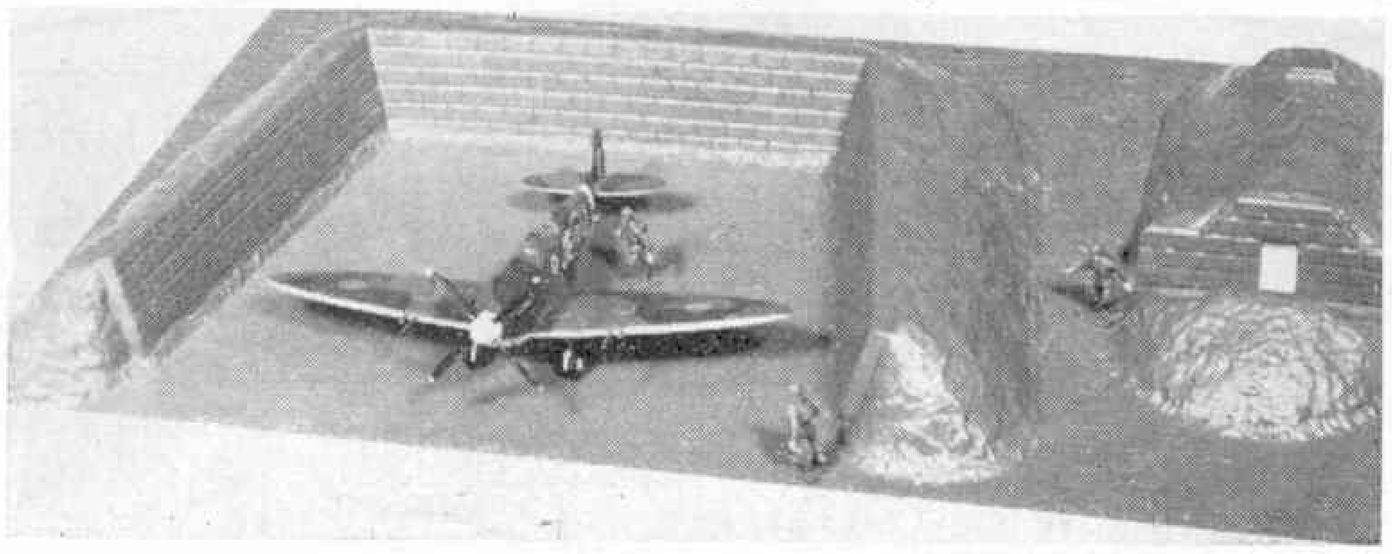
Set B.43 TURKISH ARTILLERY c.1912
No.4. - Gunner (Field) and Officer (Straits)
FEZ: Probably red top.
TUNICS: Blue. Red collar and cuffs. Gold chevrons, crossbelt, shoulder-straps. Brass buttons.
BREECHES: Gunner, grey. Officer, blue with red stripe.
SWORDS: Gunner, brass fittings. Officer, all-steel, gold knot and slings.
GLOVES: White (after Sussmann and photographs)

quite a slant in favour of artillerymen of all nations, these being Mr North's own particular interest. There are some fifty different sets available (from Rene North, 15 Inverness Terrace, London W.2) and they cost about 6/- per set.

Still on the subject of documentation, the May 1968 issue of **"SLINGSHOT"** is to hand. This is the bi-monthly journal of the "Society of Ancients" (Editor—Mr T. A. Bath, 11 King Edward's Avenue, Southampton). This somewhat impressively sounding body is not—as the uninitiated may conceive—a group of hoary and bearded professors, but rather a lively bunch of people who devote themselves to the fighting of battles and campaigns of ancient and mediaeval times—say up to the 14th Century or so (Guns, or anything that goes 'bang' are anathema to them).



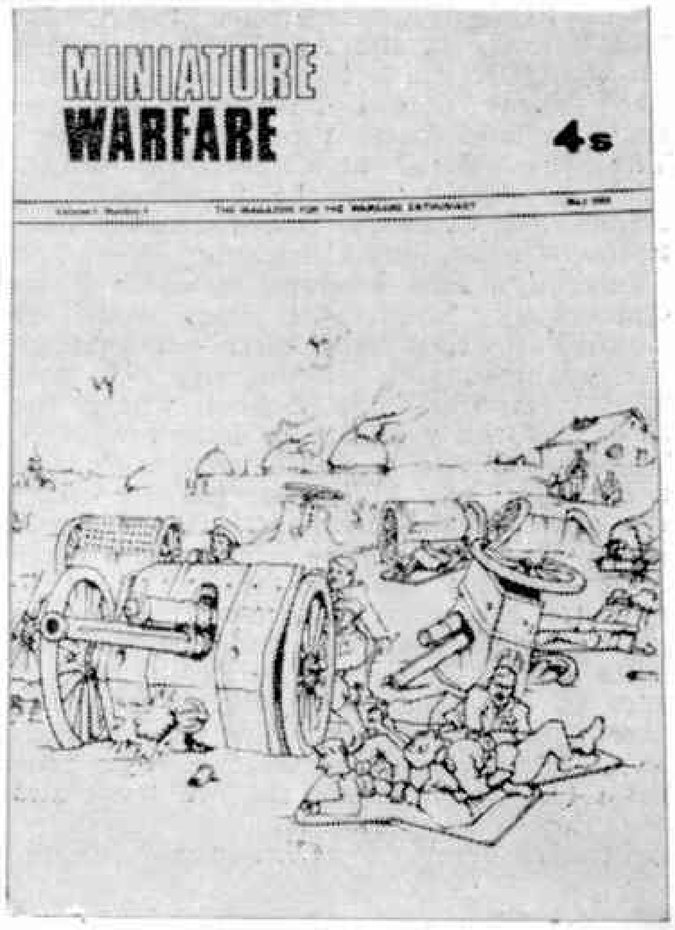
Above right, a reproduction of Rene North's Turkish Artillery "Paint Your Own Postcard". Above, the Bellona "Redan". This tough P.V.C. moulding can have a multitude of Battle Gaming uses. Below, the Bellona "Fighter Dispersal Bay"; this can be used in W.W.2 or modern battle games. These Bellona dioramas look very plastic-like when purchased, but a little careful painting with a matt enamel makes them blend into the scenery.



" Slingshot " is a pleasant mixture of good scholarship and good fun, this edition containing articles on the development of the heavy infantry spear in ancient times, on the Army of Sassanid Persia in 550 A.D. plus the second part of a very well illustrated article on French coats of arms of the 14th Century. On the other side of the coin are interesting and amusing accounts of table-top battles fought by these ' ancient ' enthusiasts (but how much better it would be if each report were accompanied by a map !).

The ' Ancients ' would look with much disfavour on our next item—the recent offering from **AIRFIX LTD.**—the Royal Horse Artillery eighteen-pounder gun and team of World War I. A little beauty, this, although it does require a little patience in its assembly, but very well worth the trouble. The scale of course is HO and the price 2/7d. Also from Airfix is the Russian World War II medium tank, the formidable T.34, opponent of the German Panther. This is well up to the standard of previous Airfix armoured fighting vehicles—as can be seen from the illustration. The T.34/85 is shown but also included in the outfit is the alternative 76 mm gun turret—and excellent idea to provide both, I think.

I can recommend a large paperback I have seen—" **STURMARTILLERIE** ", a copiously illustrated study of German assault guns by W. J. Spielberger and U. Feist. Presumably a translation from the German, it contains a mass of splendid photographs of all sorts of types of the " Sturmgeschutz " as well as coloured illustrations of them in action. Most useful for the modern battlegamer, but a little expensive at 23/-. (Published in the U.S.A.—United Kingdom agent—W. E. Hornant Ltd., 228 Archway Road, Highgate, London N.6).



Above, top. Zulu figures are the latest from Norman Newton Limited, in the 30 mm size; very well detailed they are a joy to paint. Above, the two leading Wargamers' magazines. At left, the latest from Minitanks—the SdKfz 7—this comes in two versions a weapon carrier or prime mover, these plastic models need painting and ' dirtying-up ' to make them more realistic. Below, the new Airfix T34, note the two different gun turrets, both are included in this kit that is to HO scale.

One of the best models yet produced by **MINITANKS** (or Roco, if you prefer) and one of the most useful to battlegamers is this firm's version of the German 8-ton half-track of World War II—the SdKfz 7. It comes either as a weapon carrier or as a prime mover for various types of artillery and it is most excellently detailed in both cases. The half-track was certainly one of the most ubiquitous vehicles of W.W. II and this particular one I doubt not will see much service on many a miniature battlefield. Roco vehicles are somewhat smaller than their Airfix counterparts but the latter's troops are not greatly out of scale with them. Due to purchase tax, devaluation and what have you Minitanks vehicles are a little more expensive than when they first appeared on the market but, even so, at 3/9 this is still very good value.

Of the journals devoted to battlegaming in general, the two ' big guns ' (no pun intended) are " **WARGAMER'S NEWSLETTER** " (published and edited by Mr. D. Featherstone, 69 Hill Lane, Southampton) and " **MINIATURE WARFARE** " (organ of the London Wargame Section, 61 Benares Road, London S.E.18). The first named is much the senior, having been in existence for some six years or more, while the latter is the ' new boy ', only four issues having as yet appeared. " Wargamer's Newsletter " is rather more readable. Full of news and views, it is very much a personalised magazine. In the three most recent numbers—March, April and May of this year—articles have included accounts of Peninsular War engagements refought as battlegames, a refight of Dettingen (1744) and much of what might be called the ' correspondence ' side of the hobby, this being a feature of the " Newsletter "—eager debates by correspondents, often hundreds or even thousands of miles apart, on some feature of military history or tactics. On the other hand, " Miniature Warfare " is a more serious publication—indeed it might be said that so far it takes itself possibly a little too seriously, and may occasionally verge on the pedantic, conveying little of the fun and excitement which is to be encountered on and around a battlegame table. It is, however, most professionally produced and the issues to date contain a wealth of factual information—much of it extremely well illustrated—ranging from a learned article on artillery of the American Civil War, through " Characteristics of Modern Infantry Weapons " to " Notes on Crossbows and Longbows ". The annual subscriptions to both journals—they appear monthly, of course—are much the same —£1-18-0 for " Miniature Warfare " with " Wargamer's Newsletter " two shillings less. I truly find it difficult to decide which is the better—maybe they are complementary to each other. If preference—or lack of funds—dictate a sub. to only one—just flip a coin and hope for the best !

Readers' Letters

Publication of a Reader's letter entitles the writer to a Swan-Morton "Unitool," a small "thank you" from the Ed.

Invicta

DEAR SIR,—With reference to A. W. Neal's letter in the April issue referring to the 'Invicta' locomotive, I would like to say that I have now explored the line and been through the tunnel. The line started at Canterbury South, near the site where the 'Invicta' now stands. Canterbury South station does not now exist, but Canterbury West and Canterbury East stations remain. From Canterbury South the lines went to Canterbury East and then out through the northern side of the city. It goes to the Archbishop's School where the mouth of the ¾ of a mile long tunnel is. The tunnel has a single track only and it ends at Tyler Hill, after passing under the new Kent University. It then goes on to The Halt, where it stops and there is a loop so the two trains going in opposite directions can pass. There is also a level crossing, and the original gates can still be seen. From here it goes to the edge of Whitstable where it goes over a road, over the present railway, along an embankment, over the main road, then along the sea front and into the harbour station.

Ashtead, Surrey. *Christopher Bolton.*

F3 not F2

DEAR SIR,—Having just received this month's edition (June) and having read that you received only one letter pointing out a mistake in your last edition, I feel compelled to point out that in "Workbench" you say that Chequered Flag are a F3 Racing Team, but under the photo, you say they are Formula 2.

However, I think it is a marvellous magazine, and I especially like your article on Model Railways and Aeroplanes. I myself, am not a Meccano fan but I think those models look very good.

Kingham, Oxford. *P. J. Ormiston.*

You are quite right, we did slip up. Chequered Flag are a Formula 3 Racing Team.—Ed.

Very disturbed

DEAR SIR,—I found your article on Lightning very interesting, but was very disturbed to see the very misleading statement "of a current of enormous voltage", when we, as boys, have struggled to understand that voltage is a pressure *across* two points and that current (measured in amps) flows *along* the path.

Holloway, London N.7. *David Tuntly.*

History of parts

DEAR SIR,—Meccano has been produced for almost 70 years and many of the early parts are collectors' items, rarely seen by the present generation of model builders. So that information on these early items may not be lost to future enthusiasts, Mr. Hardmarsh and myself are preparing a detailed History of Parts and Variations. We should welcome correspondence with older readers who, like Mr. Pudney, could clear up some of the more obscure points.

Thanking you for producing a really wonderful magazine.

R. R. Hauton.

31 Rufford Green, Lincoln.

Delighted

DEAR SIR,—Firstly may I say how pleased I am to see Meccano Magazine back in circulation. I have been a reader since my boyhood and am always pleased to read through my old favourite. Much of the character of the old Meccano Magazine has been retained, I am happy to see, and whilst I am not a Meccano enthusiast myself, I don't begrudge the pages devoted to this very popular pastime. I agree that Model Railway articles are well catered for in Railway magazines—but I was delighted to read the articles on good old Hornby 'O' Gauge trains in a recent issue of Meccano Magazine. I am very interested in these wonderful toys and I am sure many like myself would be delighted to see some reprints of old Hornby Catalogues, etc., in future issues, or at least some pictures of old layouts. I would also like to see the re-introduction of the Dinky Toys competition or a similar one. These are always great fun and we always stand a chance of adding something to the collection! Perhaps other items both new and old could be offered as prizes, there seems to be plenty of enthusiasts in all fields of model making and collecting these days. Glad to see the old Meccano Magazine in its glory again and all good wishes for its future success.

Farsta, Sweden. *B. Foster.*

Derailments

DEAR SIR,—In your article "OO Gauge Trackside Construction" — Meccano Magazine June 1968—you appear to suggest completely engulfing a tunnel with no access points. From past experience I would suggest that this is a mistake as derailments can, and do, occur, especially with the steep curves used by Tri-ang. It is not difficult to provide an access point and, believe me, it is well worth the trouble. The scenery can be built up as you suggest but cardboard, or preferably thin sheet balsa, upright positioned on each side of the track (to hold back the newspaper) to the height of the scenery top. Except for this "trough" the scenery can then be built up as described in your article. A ½ in. wide flat surface along the edge of the trough should be left so that the cover can be laid on flush.

The cover can then be made on a stiff card or balsa framework to fit on top of the trough (to compensate for the framework thickness, the scenery on each side of the cover should be raised by the thickness of the trough), with a tree or two to aid lifting off. The cover need not be level but it is easier to construct this way.

London N.W.2. *C. W. Read.*

Familiar red boxes

DEAR SIR,—I was amazed to read P. E. Randall's article about "O" gauge Hornby trains in the April issue. I had no idea these models had any value.

The article stirred memories of an extensive Hornby layout in my childhood. This had been put away for good in the 1930's and I certainly had not set eyes on it since leaving the parental home to join the Army during the war.

Was any of it left? This intriguing question could only be answered by a search of the old home. So back I went at the earliest opportunity and ransacked cupboards, wardrobes and attic. The search had all the drama and excitement of a treasure hunt.

The climax came when under a pile of suitcases and linen on top of a wardrobe in a disused room, carefully wrapped in newspaper by my mother, were discovered some familiar red boxes. They proved to contain the following: two No. 2 Special Pullman coaches, an M3 tank loco (the price 9s. 6d. being pencilled on the box) and a No. 2 Special Tank loco, complete with key, packet of lamps, and the original guarantee with date of purchase—6th June 1933! All were in first-class condition, which says a lot for the robustness and finish of the Hornby products of those days. Nothing remained of the other items or the tracks, but I had found enough.

On the way back I was conscious that the car boot contained a load more precious (to me) than a bar of gold. My three sons already have a Tri-ang Hornby "OO" gauge layout, so these treasures will be carefully preserved. Judging by your article they must be worth quite a bit, but I wouldn't part with them at any price.

I am most grateful to you and your magazine for being instrumental in salvaging these treasures of the past. One wonders how much is lying round in peril of loss through the ignorance of owners.

Whetstone, N.20. *Henry Cunningham.*

Keep it simple

DEAR SIR,—I have just received my first three Meccano Magazines in a bunch. In some respects I think it is better than the old one, especially in the way there are plenty of Meccano models in it for specific sets and also in keeping to small and simple sets for people who have not enough parts to do larger or more complicated models. I hope it stays that way.

Campbell, Australia. *T. A. Learmonth.*

First time

DEAR SIR,—I would like to congratulate and thank Mr. P. W. Bradley on his excellent Scammel "Contractor" Heavy Tractor.

I have been studying the photographs of it and for the first time I have been able to complete a model lorry with both correct Ackermann steering and suspension. This is entirely due to him as I have no other Meccano Magazines from which to obtain such information.

I think that your Meccano Magazine is also excellent because it deals with the Meccano section in both size and detail. The old issue dealt more widely with the ships, railways and aeroplane sections and little to the Meccano. These sections did not concern me because I am "pure" Meccano and nothing else. Keep up the good work, please, and thanks again.

St. Austell, Cornwall. *S. Grainger-Allen.*

Battle Gaming Club

DEAR SIR,—It would appear from the current issue of Meccano Magazine that you have no "Letters to the Editor" type column. Maybe there was such a column at one time and I have missed it. I must confess that the May Meccano Magazine is the first one that I have ever purchased, but it is a very good magazine indeed, so that's all that matters.

I am writing to you mainly in an attempt to find "Battle Gamers" in the Halifax area, with the idea of forming a Club to cover Battle Gaming and all aspects of military modelling (Navy, Army and Air Force). If you can find a small corner somewhere in a future

edition of Meccano Magazine to print this letter, it will be appreciated, and anyone interested will then be able to contact me at the address below.
64 St. Augustines Terrace, *A. R. Barron.*
Halifax, Yorkshire.

Plating costs

DEAR SIR,—The "Readers' Letters" feature of the new style Meccano Magazine certainly leaves no doubts that the present magazine is meeting with a favourable reception in all quarters, but these people who "would not shed a tear" (such as John Edwards of Yorks., June issue) if the actual Meccano model building section was to die a quick death, deserve, in my opinion, a slow death. In the past, there has been all too little space reserved for what is after all, the essential reason for the magazine's existence, and as there are (as Mr. Edwards points out) other magazines devoted *entirely* to both of Mr. Edwards hobbies, he should "live and let live", though I was pleased to see he possesses a modicum of common sense in realising that without Meccano, there would be no magazine.

And does your reader L. G. Pudney, who would welcome a return to nickel-plated or *chrome* Meccano, realise just how much this would add to the cost of production, or the complications such plating would produce on Flexible Plates, when they are being curved (for example) into a half-circle in the construction of an engine boiler—or a similar component?

However, I would add my comments to others, and endorse that the present style Meccano Magazine is a vast improvement on its predecessor, but this possessed a feature that appeared in the last few issues, that I considered to be outstanding, and that was the publication of full page photos of prize winning models constructed by Meccano enthusiasts.

These illustrations often brought to light constructional details of considerable interest, which would have been lost in the smaller type blocks usually used.

Could we have this feature restored from time to time? Or perhaps a really outstanding model from a Meccano enthusiast could sometimes constitute the cover illustration? To conclude, I would inform you I was very happy to renew my subscription to the Meccano Magazine recently, for the maximum period of one year.
London S.E.15. *H. J. Halliday.*

Meccano models are going to be featured on the cover from time to time and we would like readers to send pictures of their models to "Spanner", Meccano Ltd., Binns Road, Liverpool 13. Readers can take out subscriptions for both 6 month and 12 month periods. —Ed.

Hornby 'O' gauge layout

DEAR SIR,—I was most interested in the article in the May Meccano Magazine dealing with the old Hornby "O" gauge models. I hope that it will be possible for you to produce further articles on this subject—perhaps dealing with the semi-scale models produced just before the war, which can even today make up a most interesting display.

I am a children's librarian by profession, and have a semi-permanent display of pre-war "O" gauge stock on show in the library here at Penge, including two D49 "Hunt" class 4-4-0 locomotives, a "Schools" 4-4-0, the L.N.E.R. 4-4-2T No. 1784 and the little 0-4-0 S.R. No. 29. Together with period rolling stock to match—mainly Hornby tinplate bogie coaches, and a set of electrically lit signals, the items have aroused a great deal of interest not only among the children using the library, but among many of their parents also. All the locomotives are electric, and contrary to P. E. Randall's suggestion that these would interfere seriously with television, I have had an engine and two coaches wired up so that visitors can run them up and down a 20 ft. length of track, and there have been no complaints of interference from the 20 volt motors during the six months in which they have been running. The only snag which has arisen is that the reversing relay in some of the engines tends to be a little erratic after 30 years use, and I have suffered one or two spectacular buffer collisions as a result of trains not reversing at the end of the straight run. This is a source of great amusement to some of my younger borrowers, but is hardly the best way of treating such venerable rolling stock, and I have to keep the motors in a good state of repair in order to avoid this problem arising.

I would, of course, be delighted to see any fellow enthusiasts in the library, which is situated in Anerley Road, Penge and would also be interested to know whether anyone else still has an operating layout of pre-war stock available for free use to the public.
London S.E.20. *Robin W. Doust, A.L.A.*

Misunderstanding

DEAR SIR,—I hasten to clear up a misunderstanding in your appreciation of Peter Young's book—"Challenge". The appendix on "How to build up an army" is actually the work, not of myself, but of my son—Charles Stewart Grant, now Sr. Cadet Cpl., R.M.A. Sandhurst. My own name does appear in the book, however, in the select biography which refers to my "Mid-Eighteenth Century War Game Rules", along with a number of famous names I blush to find myself with.
Dover, Kent. *Charles Grant.*

Tank tracks

DEAR SIR,—I am a keen modeller and I read your magazine with great interest. I have a tip for military modellers who make layouts on base boards. I find that tank tracks add atmosphere and realism to these board battles and make them by getting the tracks from a tank and a tube of 'Croid' universal glue. When you have selected where to put your track marks spread the glue over it, the width of the track, about one millimetre deep. Now leave the glue for a quarter to half an hour to get 'tacky'. When your glue is tacky place the tank track on the glue and pull it off when the glue has set hard. You might have to devedop your own techniques but this method is very reliable. Tracks can be made by putting a match stick through a wheel and running it along the tacky glue for wheeled vehicles. Congratulations on the new magazine.
Ottery St. Mary, Devon. *J. J. Griffiths.*

Power for Meccano

DEAR SIR,—Some years ago, I, too, had I. Reid's idea (Readers' Letters June issue), of powering Meccano motor vehicles by some form of internal combustion engine. I rejected this plan on the grounds of excessive noise and messiness, both liable to cause extreme discord in the home!

A glow-plug engine of this size is notoriously temperamental and cannot possibly achieve the ease and convenience of starting and control (by rheostat or thyristor) that are characteristic of the electric motor.

My own requirements for heavy motor lorries have been extremely successfully met by the purchase of a series-wound universal 1/15 h.p. motor. One word of warning, these motors will run at very high r.p.m. off-load (i.e. 12,000 r.p.m.) so invest in a few dozen double arm cranks—they make excellent bearings and you will certainly need them!

The twelve pages devoted to Meccano this month were much appreciated.
Totley Rise, Sheffield. *C. F. Van Ingen.*

Plans and Index

DEAR SIR,—I have just bought the first three copies of the new Meccano Magazine. I had just started purchasing the old Meccano Magazine when it "packed up", I had enjoyed reading all the articles in it (especially ones concerned with aircraft, whether model or real) and I was extremely pleased when it started up again. I cycled two miles to obtain the first three issues of the new series.

My brother and I think that they are well worthwhile, and cover our interests admirably (namely chemistry, electronics and modelling).

I disagree with certain readers' letters in the February edition over the subject of more railways, less modelling. Have enough of each to satisfy enthusiasts of them. As I am only a beginner to the art of modelling, I find the Meccano Magazine very helpful. It has some excellent model plans which will be very rewarding to build.

The only complaint I have about the new magazine is that the plans are printed on different pages, necessitating the removal of half the magazine to obtain them. Wouldn't it be possible to print them on a centre page or a separate sheet of paper?

I was interested to see a control line model plan, as these did not use to be featured. I hope that there will be more articles on C/L models and slot cars. Will you be publishing an index magazine annually? Would there be any full size plans for models such as the Swinger (February issue) and Baby Delta (March issue) by the time overseas readers obtain their Meccano Magazines and write to you?
Christchurch, New Zealand. *J. Kennedy.*

We will be publishing an Index for the new Meccano Magazine and hope to announce the availability of this in January 1969 issue. Plans for all the half size balsa wood models drawn in the magazine, are available from our Editorial Offices, price 2/6d. each.—Ed.

Trevithick's statue

DEAR SIR,—I would like to thank you for the new Meccano Magazine. It is not as big as the old magazine perhaps, but I prefer it because the articles are so much better. My real reason for writing to you, however, is not to congratulate you, though you do deserve it, but to make a suggestion. This was inspired by your article in the June issue about Richard Trevithick which I enjoyed. When I went to Cornwall, I visited the Holman Museum in Camborne, right opposite Trevithick's statue; it is a most interesting place, having plenty of historical value (how gunpowder took mining underground); there are steam engines (now worked by compressed air, incidentally), and a massive beam engine (4-5 storeys high) which really worked in a Cornish mine. I hope all this is of interest to you, indeed I hope you have not heard it all before, but if this helps you to make your magazine an even better publication (if possible), I will have achieved my aim.
Stoke on Trent, Staffs. *D. Faram.*

BATTLE

by Charles Grant

Part IV—

The Infantryman's Weapons

SOMEONE ONCE described the infantry arm of the ground forces as the " Queen of Battles " and even in this day of guided missiles, super tanks and what have you, the description is still pretty apt. In any case, as we are starting from basics it is only fair that our next consideration should be for the infantry soldier and his weapons. As we shall do for tank guns and conventional artillery we shall first, before we attempt to calculate their striking power, assemble some rules for their range, beginning with the smallest and working up to the most powerful.

Within these terms of reference the first is obviously the revolver or automatic pistol. This is, generally speaking, an officer's weapon but can also be used by tank crews and similar personnel. It wasn't a great deal of use, sad to say, a fact which might be considered surprising, conditioned as we have been through the years, first by the cinema and then by the television. If we are to accept what is pumped out by these media, our idea of what a man can achieve with a pistol or revolver is going to be grotesquely in error. It would appear to be commonplace, for instance, for a cowboy to pick off men on galloping horses at ranges of what appear to be several hundred yards. This, needless to say, is just plain bunkum. A first rate pistol shot, operating under competition conditions in an enclosed range, will take ages to get a single shot off at a target not much more than a score of yards away, and this with a favourite pistol, equipped possibly with partial wrist support. There is not much chance for a man to do this in action, when snapshooting is the invariable rule. At any range above about twenty yards we can therefore say that, by reason of the inaccuracy of the weapon and the fallibility of the operator, both pistol and revolver are completely ineffective. However, let us not be ungenerous and, recalling that our scale is 100 yards = 3 in. (this was the basic infantry move, you will remember), give the hand-held weapon a range of 1 in., or approximately 33 yards (in the real thing). When it comes down to brass tacks the pistol is practically a mêlée or close-combat weapon.

Working up the scale we come next to the sub-machine gun. Not tremendously used since the advent of the self-loading rifle, it was in general service in the period we are interested in—World War II—particularly by the Russians. It seems that a very high proportion of their troops was so equipped, whole units being issued with sub-machine guns instead of with rifles, giving tremendous firepower at short range. If we wish to equip an army on Russian lines, then a large number of tommy-gunners will have to be included, and they would certainly come in most useful in street or house-to-house fighting (the Stalingrad type of operation, for example). It—the tommy-gun—did have a number of advantages; it was easy to handle and its size enabled it to be carried by crewmen in the confined space of a tank.

Now for its range, which was not enormous, as the normal ammunition had a low propellant content, and which was considerably less than that of the rifle. The S.M.G.'s employed by the various contending powers had accurate ranges of up to 200 yards or so, but this seems to be an over-estimate, I feel, and if we allocate a maximum range of about 140 yards to our S.M.G. we shan't be very far out. This, converted to our table scale, is 4 in., or as near as makes no difference. (Here may I interject that when we get round to assessing the effect of the sub-machine gun, or any other weapon for that matter, the range at which it is firing will have an obvious effect on its accuracy and consequently upon its effectiveness. The rules will provide for this in due course.)

With the tommy-gun taken care of, we go on to the classic weapon of the infantryman, to wit, the rifle. We shall not try to differentiate between the various national types—this would complicate the business intolerably—but we'll try to take an average sort of weapon and give it average sort of capabilities. O.K. ?

Right, then. Frequently, one thinks of the rifle as having a most prodigious range (these TV. characters again!) and we read of infantry opening fire at a thousand yards range and so on. However, it is a fact that a World War II infantryman's chances of hitting a man-sized target at that range with a rifle are quite literally not tremendously greater that those of an eighteenth century soldier's doing the same with a " Brown Bess." (A point of interest—I am told that the thousand yards target at Bisley is ten feet across by six feet high and that the " bull " is sixty inches across! And this is for the best shots in the country, so how could a normal average infantryman hope to emulate this ?) A former instructor at the Army School of Infantry assured me that—leaving out the specialist " marksman," the chap who in earlier days would have been termed a " sniper " —he, the instructor, would have been quite pleased to see the ordinary infantryman hit a man-sized target at 200 yards! A bit of a comedown from what might have been our pre-conceived ideas on the subject. In point of fact, the present-day rifle is sighted up to 300 yards for general action, and this I feel is a much more realistic range for our riflemen—so we accordingly lay down the rule that maximum rifle range is 300 yards or, on the table, 9 in.

Now we come to a very powerful weapon indeed, the machine gun. This comes in a variety of shapes and sizes, including the British Vickers .303, the Russian D.Sh.K. 12.7 mm. (frequently mounted on a splendid little two-wheeled trailer with a shield attached which could be trundled around by the crew) and the American .5 Browning. All had well defined qualities of reliability and punch, but their functions were similar—to lay down patterns of fire and to inhibit the movements of enemy infantry, and their effective range (as opposed to maximum range) was similar, depending as it did upon the eyes of the crew, aided or unaided. Before going on it might be as well if we described what we are considering—the heavy machine gun—particularly as the calibres of those mentioned vary considerably—between .3 in. and .5 in. in fact. It—the heavy machine gun—can be defined as a " tripod mounted defensive machine gun," and by this token the actual calibre does not matter. Now, the Vickers is described as having an accurate range up to 600 yards, and I think that this will suffice for our purpose. The tactics and technique of machine gun fire can be pretty complicated, but what we shall initially do is to employ it in its

simplest role—for direct fire—and for that purpose we shall take the 600 yards mentioned above as maximum range, reduced, by a quick bit of calculation, to 18 in. on the battlegame table.

The machine gun was fine against enemy personnel, but something heavier was required by infantry when they had to mix it with armoured fighting vehicles. Round about 1943 the Americans produced the earliest anti-tank rocket launcher, popularly known as the Bazooka. This was followed by the British P.I.A.T. (Projectile Infantry Anti-Tank) and the German Panzerfaust. All had an extremely powerful punch, but their short range made them virtually ambush weapons, more so in the case of the P.I.A.T., which seems to have been effective up to about 100 yards or so. Maximum range of the Bazooka is stated to have been 400 yards, but this may be rather an overestimate. The German rocket-launchers were extremely powerful and in favourable circumstances their missiles were able to penetrate over 4 in. of armour at 165 yards. The favourable circumstances were, of course, its angle of striking its target and where it actually struck. I think it is reasonable to give a maximum range of 200 yards to both Panzerfaust and Bazooka, with 100 yards to the P.I.A.T. As we shall see, they are pretty well one-shot weapons, as, if the first one went astray, it would be followed by a most lethal spray of bullets from the tank at which it had fired. Ranges then—Bazooka and Panzerfaust—6 in.; P.I.A.T.—3 in. (It won't matter too much about the latter—we shan't be using it a great deal.)

Last of the infantry "heavy" weapons is the mortar, used by every World War II army in great numbers and in every theatre of operations. Its use is pretty obvious. It could fling its projectile high into the air to drop in "dead ground" behind a hill or a wood, and it could plaster whole areas with the most deadly effect. It could be used for direct fire—i.e. with the target in visibility range—or the heavier varieties could have their fire directed by "spotters" at much more distant objectives. Some of these big chaps were quite enormous, the Russians having mortars of an incredible 305 mm. calibre, but these really come into the "artillery" category and we shall consider here the smaller type, such as might be used by the heavy weapons platoon of an infantry battalion. Let us take three examples—the U.S. 60 mm., the German 81 mm., and the British 3 in. In general terms the maximum "mean" range of the three averages out to something like 1,600 yards or just over—and this, reduced to our Battlegame scale, is round about 50 in. Whether our mortars can be fired at this range would depend on visibility, unless spotters were available, but of this more later. For the moment, then, we shall say that maximum range for our infantry type mortar is 50 in. (Later we shall have a word to say concerning the heavier ones, such as the Russian 120 mm.)

We go right back to the other end of the scale for our final weapon—the hand grenade—leaving it to the end because it is projected by the individual rather than by an explosion. Obviously of very short range, it is used in close combat, say, to flush enemy infantry out of a building, a grenade lobbed through a window doing this rapidly and effectively. Its range? This would depend on the man of course, but we have to have a "mean" so let us say 2 in. This is over sixty yards in effect, but 1 in. would be too short, I feel.

That's the lot, then, for infantry, so let us conclude with a summary of the above.

WEAPON	MAX. RANGE
Pistol/revolver	1"
Sub-machine gun	4"
Rifle	9"
Machine gun	18"
Bazooka/Panzerfaust	6"
P.I.A.T.	3"
Infantry mortar	50"
Hand Grenade	2"

Battle scene—heavy mortars in action, with transport and infantry coming up in the rear. (Figures by Airfix; vehicles by Rocco; house home made).

FROGS ON STAMPS

By J. A. Mackay

THERE ARE more than 300 kinds of tailless amphibians known as frogs and yet surprisingly few of them have ever appeared on stamps. The West India island of Dominica set the ball rolling as recently as 1963 when a new 10c. stamp featured a Crapaud, a giant frog known to the islanders as "mountain chicken" and much esteemed as a delicacy. This creature is nocturnal, so the Dominicans hunt him at night with lighted torches. It sound revolting, but apparently the Crapaud when boiled up makes tasty soup.

West Germany produced a set of four stamps in 1966 to raise funds for humanitarian relief work and chose as their theme the Grimm's fairy tale about the Frog Prince. The story concerns a princess who is given a golden ball inscribed "Through me you shall find your own true love", but one day, while playing with it, she accidentally drops it into a pond. Just as she despairs of recovering the ball, up pops a frog who makes her promise to do anything he asks if he should find the ball for her. The 10 + 5 pf. stamp shows the frog and the princess as he gives her back the ball. Unfortunately the princess has to promise to dine each evening with the frog and afterwards let him sleep on her pillow. The 20 + 10 pf. stamp shows the unlikely couple dining together. This happens for three nights, but on the following morning the princess wakes up to find a handsome young prince (shown on the 30 + 15 pf. stamp) who had been changed into a frog by a wicked magician. The top value in the set, 50 + 25 pf. shows the prince and princess in their coach, about to "live happily ever after."

The theme of frogs on stamps has now had a great boost from Papua and New Guinea which issued four stamps featuring different frogs on April 24th. This is this year's set in the annual Flora and Fauna Conservation series.

The 5c. stamp features a young tree frog (*Hyla thesaurensis*). This species of frog was first reported from Treasury Island in the Solomons in 1878 by the German naturalist, W. Peters. This frog breeds in static or slowly moving water. Over 1,000 eggs are laid in large shapeless clumps and the tadpoles hatching from them take up to three months to complete their development into frogs.

This species has the unusual feature of possessing bright bluish-green bones. The pigmentation is so pronounced that, from the under surface of the limbs where there are no skin pigments, the bones can be seen through the skin. The geographic range is now known to include lowland areas through New Guinea, ascending as far as the Moluccas.

The 10c. stamp shows another species of tree frog, the *Hyla iris*, a slender and extremely agile specimen. It rarely exceeds 1½ inches in length and is undoubtedly one of the most beautiful of the New Guinea frogs, being named after Iris, the goddess of the rainbow. Its breeding habits are most unusual for it lays clumps of bright green eggs in masses of clear jelly in the branches of shrubs overhanging streams and rivers. After hatching from the egg and membranes the tadpoles remain for several days within the nest of jelly surrounding them and only drop into the stream when capable of swimming strongly.

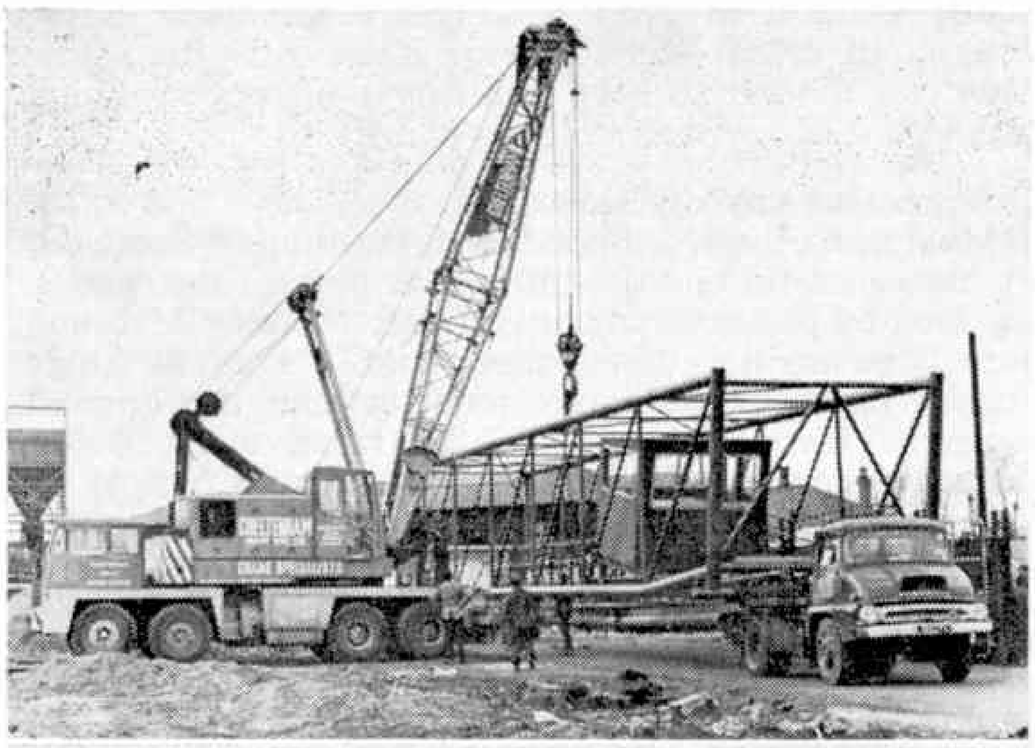
Ceratobatrachus guentheri, shown on the 15c., is a ground dwelling species and is characterised by the presence of small triangular tufts of skin on the tip of the snout, jaw, upper eyelids and posterior edges of the limbs. Among dead leaves with serrated edges it would obviously be well camouflaged.

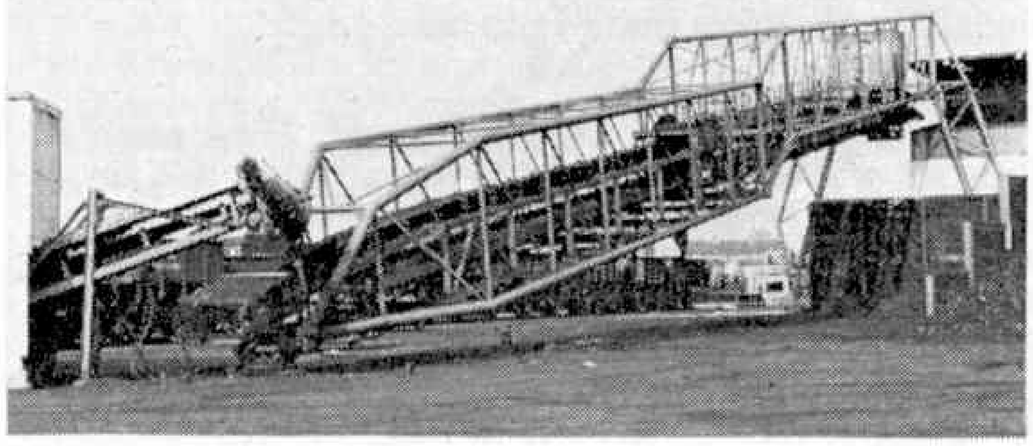
In common with most other ground-dwelling frogs of the Solomon Islands and New Guinea, this species probably lays its eggs on land well away from water. In such instances there is no free swimming tadpole stage, for this period is spent within the egg membranes and eventually miniature frogs emerge.

The top value, 20c. features *Nyctinystes narinosa*. At present about twenty species of this tree frog genus are recognised but undoubtedly there are many more awaiting discovery.

Although nothing is known of its habits and development eggs dissected from gravid females are large and unpigmented. Other species of this genus with similar eggs lay them beneath flat stones on the floor of mountain torrents. The gelatinous material surrounding each egg is extremely firm, probably to protect the egg from the direct force of the current. The emerging tadpoles have flattened streamlined bodies and large sucker mouths by which they attach themselves to smoother rocks.

The species inhabits mountain rain forests at altitudes up to 10,000 feet above sea level. Tree stumps in rain forests are often completely covered with a cloak of mosses and lichens and some of the latter may be brightly coloured. Against such a background *Nyctinystes narinosa* is difficult to detect.

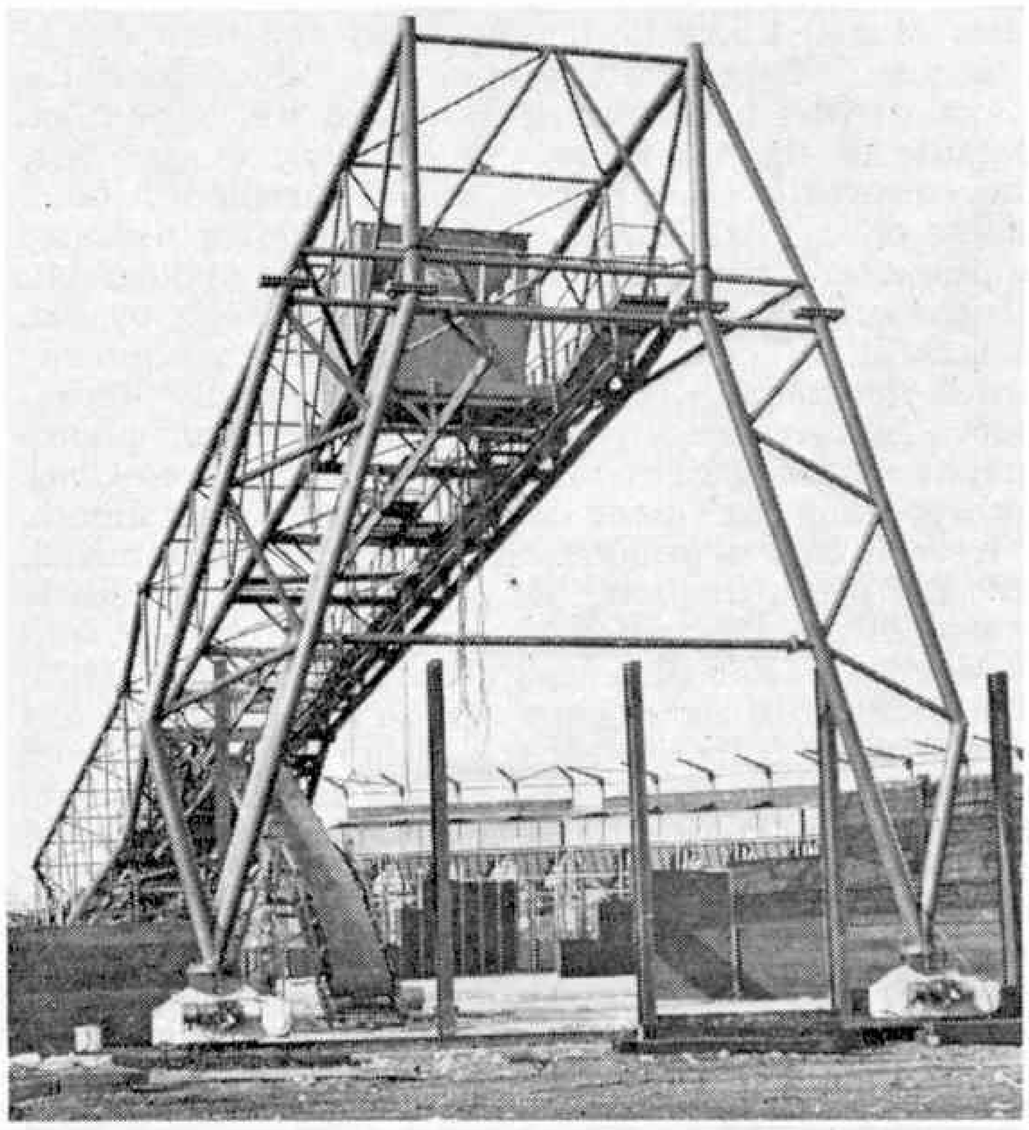




Above top. The top half of the new conveyor boom arriving at Cheltenham Coal Concentration Depot. Above, the completed conveyor system, on the right at the first bagging hoppers. At right, top. The conveyor boom nearing completion. Bottom of page, the top half of the conveyor boom being swung into position by mobile crane, behind are the coal bagging hoppers.

CHELTENHAM COAL CONCENTRATION DEPOT by E. G. Hodgkins

From Wagon to Sack by Automation



FOLLOWING THE recent closure of several of Cheltenham's Stations and Goods Yards, the task of coal delivery to the town's merchants has become increasingly difficult. The few remaining sidings and yards were becoming congested with piles of fuel and queues of lorries. To overcome this, the National Coal Board have built a Coal Concentration Depot in Tewkesbury Road, Cheltenham, alongside the main Birmingham-Bristol Railway line. This Depot is centred around a huge steel Conveyor Boom 14 ft. wide, 10 ft. deep and 154 ft. long, which pivots around one end. The delivery end rolls around a semicircular track on wheels powered by two electric motors.

The pivot end of the conveyor is fed with coal by a feeder conveyor which lifts the fuel from a hopper below the special bottom—opening railway delivery wagons. The coal is then carried up the length of the conveyor boom and dropped either into one of 14 bagging hoppers or into a semicircle of open storage bays.

Each of the bagging hoppers will hold 25 tons of coal and an automatic push-button delivery chute under each hopper will weigh out a precise quantity of coal into the sacks. These are then at a convenient height to load directly onto the merchants' lorries.

The Boom itself was fabricated by Hugh Stevenson Engineering Limited of New Milton, Hants, and transported to the site in two halves by road. The conveyor is operated from a covered cabin at the top of the boom and is powered by two 7½ H.P. electric motors in tandem.

Finally, a weigh-bridge and office block were built on the site to control the running of the depot, and the result should mean a much easier life for the coal-man.

AMONG THE MODEL BUILDERS

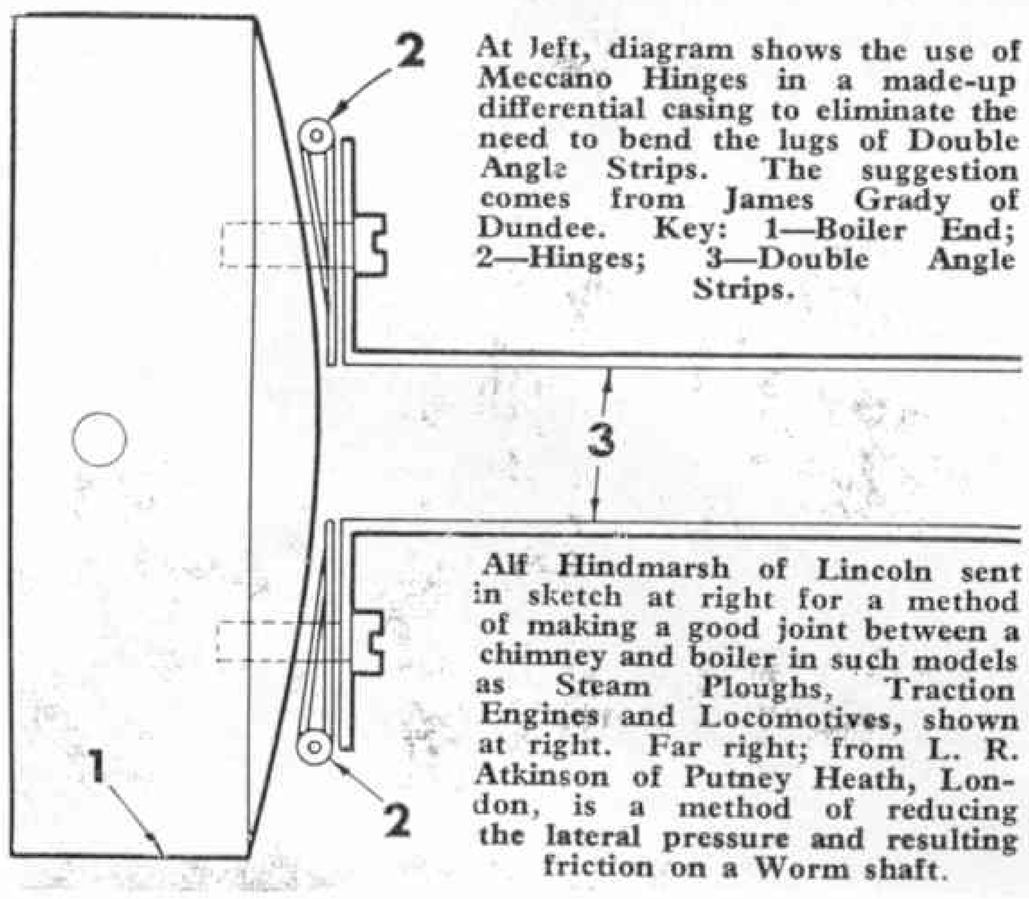
with Spanner

Mantel clock modifications

LAST MONTH M.M. reader Pat. Briggs of Nottingham gave detailed building instructions for a first-class Mantel Clock he had designed and built out of Meccano. Other readers who have since built the Clock or who have studied its design will know that, because of the simplicity and efficiency of the basic movement, the clock motion can be installed in other clocks of, as Mr. Briggs puts it, "more sophisticated appearance." Bert Love has sent me some photographs of just such another clock, this one also built by Pat. Briggs, and I thought it would be ideal to begin my article this month with a look at the new clock. Reproduced here, therefore, are a couple of Bert's photographs showing a traditional-style Carriage Clock incorporating Pat's basic design as featured last month. I leave it to Pat to comment on his first-rate model.

"The ornamentation," he says (and which is clearly shown in the illustration), "is achieved entirely with standard Meccano parts, apart from the dial and hands. A refinement to the original motion is included in this particular clock by making the anchor shaft itself from a 2 in. Elektrikit Pivot Rod, giving further reduction in overall friction and an increase in running time of up to 38 hours. Under these circumstances it is necessary to modify the crutch mechanism by attaching it to the anchor shaft internally and allowing the crutch pins to protrude through the rear of the clock case to engage the pendulum Collar, as shown in one of the accompanying pictures. In this event, the crutch must be of open triangular construction—to prevent fouling of the escapement rod immediately below it—and is made from two 2½ in. Narrow Strips bolted to a Double Arm Crank and spaced by Collars so as to clear the recessed Pivot Bolt."

This, then, is all that needs to be said about the modifications. The basic mechanism was fully described last month and the accompanying pictures are sufficiently detailed to give a good idea of the outer casing design. In effect, therefore, you clock enthusiasts now have two models to keep you busy—always assuming that you did buy last month's M.M.!



At left, diagram shows the use of Meccano Hinges in a made-up differential casing to eliminate the need to bend the lugs of Double Angle Strips. The suggestion comes from James Grady of Dundee. Key: 1—Boiler End; 2—Hinges; 3—Double Angle Strips.

Alf Hindmarsh of Lincoln sent in sketch at right for a method of making a good joint between a chimney and boiler in such models as Steam Ploughs, Traction Engines and Locomotives, shown at right. Far right; from L. R. Atkinson of Putney Heath, London, is a method of reducing the lateral pressure and resulting friction on a Worm shaft.

Differential casing hint

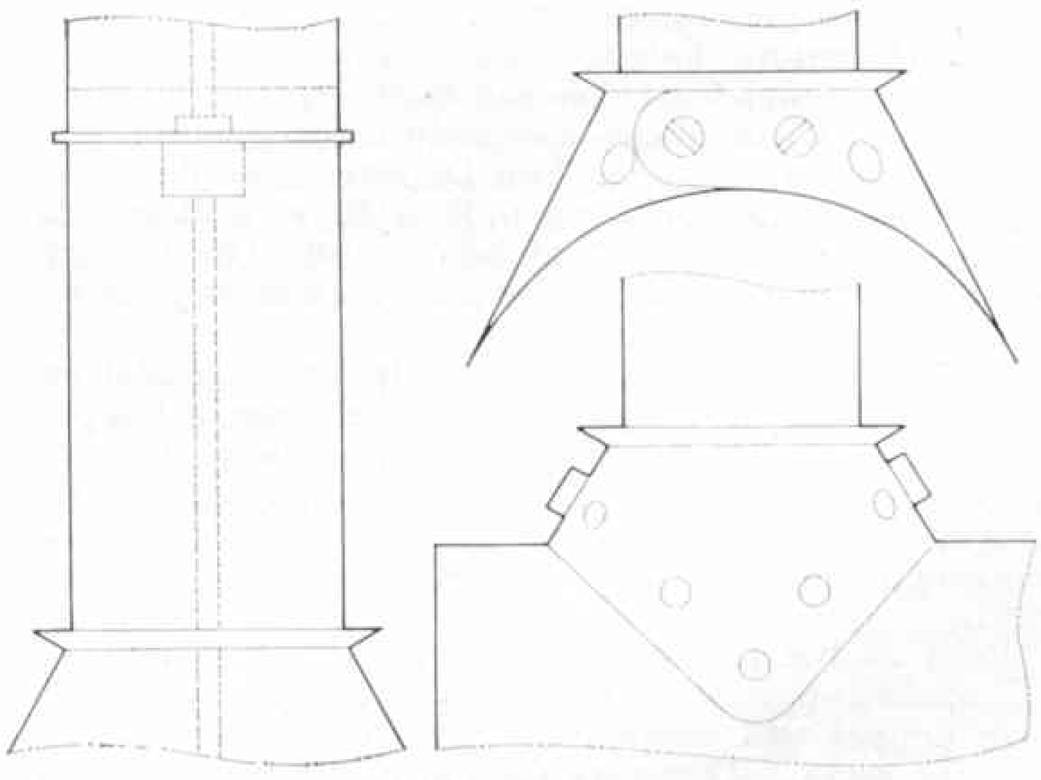
Moving northwards from Nottingham up to Scotland, we have a useful hint on differential casing construction supplied by James Grady of Dundee. "Many Meccano users," he writes, "find that, once a Double Angle Strip is bent, it is difficult to reset it at the original angle. This particularly applies when using Boiler Ends (in conjunction with Double Angle Strips) to form differential casings and the insertion of a Meccano Hinge eliminates having to bend the lug of the Strip."

The accompanying diagram shows how the Hinges are used in this particular construction and, having tried it myself, I can vouch for its success. James goes on to say, however, that, "By using this method, a Strip can also be laid successfully straight across a Boiler End." He's quite right, too!

Boiler/chimney joint

Our next offering comes from Alf. Hindmarsh of Lincoln who recently dropped us a line. "I am in the midst of building a 'Steam Plough' in Meccano," he wrote, "and have come up against the difficulty of a good joint between the chimney and boiler. This is how I've overcome it . . . (see accompanying diagram). I've utilised two parts 201 Flexible Fusset Plate, curved them, and bolted them to each other. The resulting aperture just takes a 1½ in. Pulley Wheel. One has only to use a suitable Threaded Rod, Cylinders and 1⅛ in. Flanged Wheels to get the desired effect, and the chimney can be made as tall as you like by simply adding Cylinders and Flanged Wheels."

Alf's idea has much to recommend it, particularly as it can be used not only with a Steam Plough, but with almost any model incorporating a chimney and boiler. It would be ideal for Traction Engines and Locomotives, provided they were made to a suitable scale.



Bending and straightening

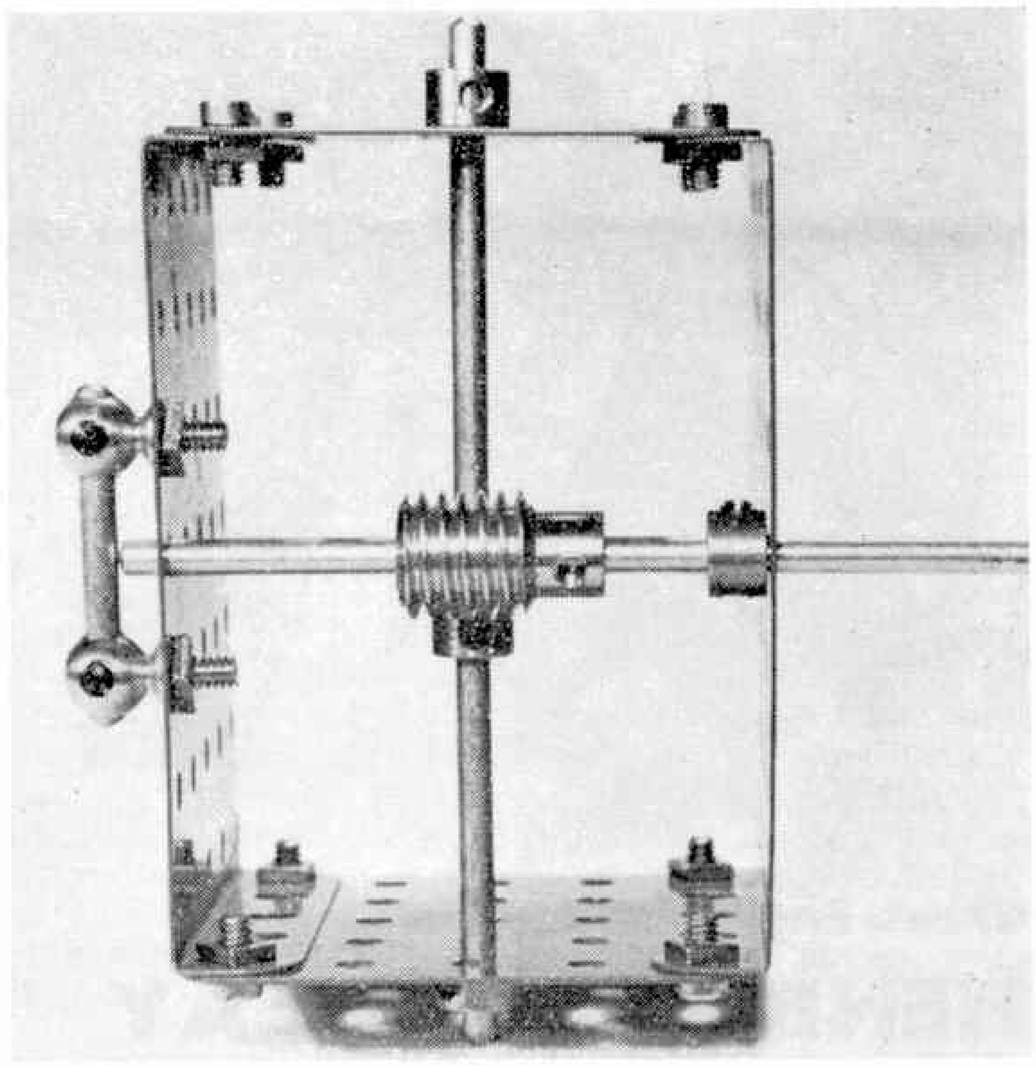
So as not to confuse you into thinking that the above sub-heading refers to a keep-fit-class, let me explain immediately that Mr. Grady's suggestion reminds me of the numerous letters we regularly receive on the subject of bending and straightening parts such as Strips and Flexible Plates. This is a problem which affects many enthusiasts, some of whom find that they occasionally bend parts beyond repair, so I feel justified in giving a few general pointers here.

When shaping a part for a model most damage is usually caused by the builder giving too sharp a bend to the part, thus fracturing the metal. The bend, in other words, looks like a geometrical angle, whereas it should really be more like a tight curve with no definite "point" in evidence. "Easier said than done," I can hear you muttering, but I must answer that it really isn't very difficult to produce a curve if you go about it the right way. In the Model-Building Department of Meccano Limited, for example, they have been shaping parts for something like half a century without any difficulty. Mind you, they have some special equipment to help them, but equipment which could easily be obtained by anyone.

It consists of nothing more than a set of six short wooden cylinders of different diameters ranging from about 3 in. down to about $\frac{1}{2}$ in. (exact size is not critical). When, say, a Flexible Plate is to be bent, it is first formed round the largest cylinder, then the second larger, then the third and so on down through the cylinders until the correct shape is obtained. There's really nothing to it, and straightening the Plate again is just as easy. It's simply placed between two blocks of wood or metal on a firm surface—preferably the floor or a good, solid work bench—then the upper block is hit with a hammer. Admittedly, the result is not a new Plate, but at least the Plate will be perfectly useable, in most cases. And the cylinders? Any bits of scrap wood would do—pieces sawn off old table legs, broom handles, dowelling, etc. They're certainly not difficult to come by if you look out for wood scrap.

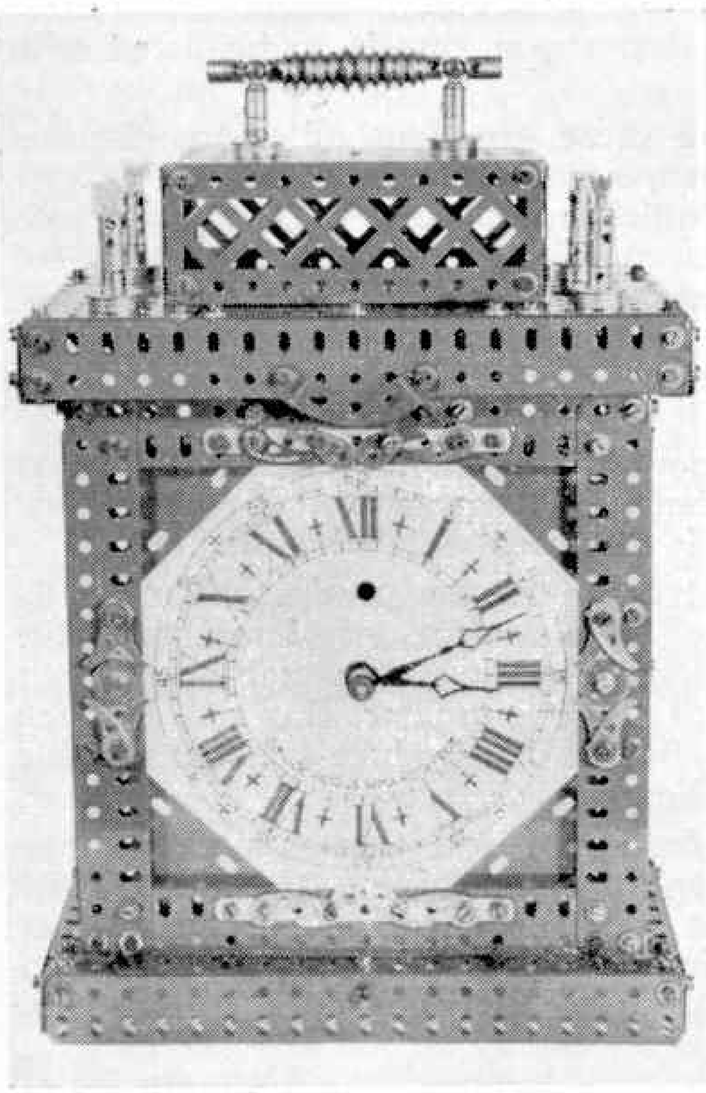
Reduced friction mounting

Finally this month we have another hint from L. R. Atkinson of Putney Heath, London who has had material featured in the last two issues. This particular idea is for an easy method of reducing the lateral pressure and resulting friction on a Worm Shaft. As you know, when a Worm on one Rod is used to drive a Pinion or

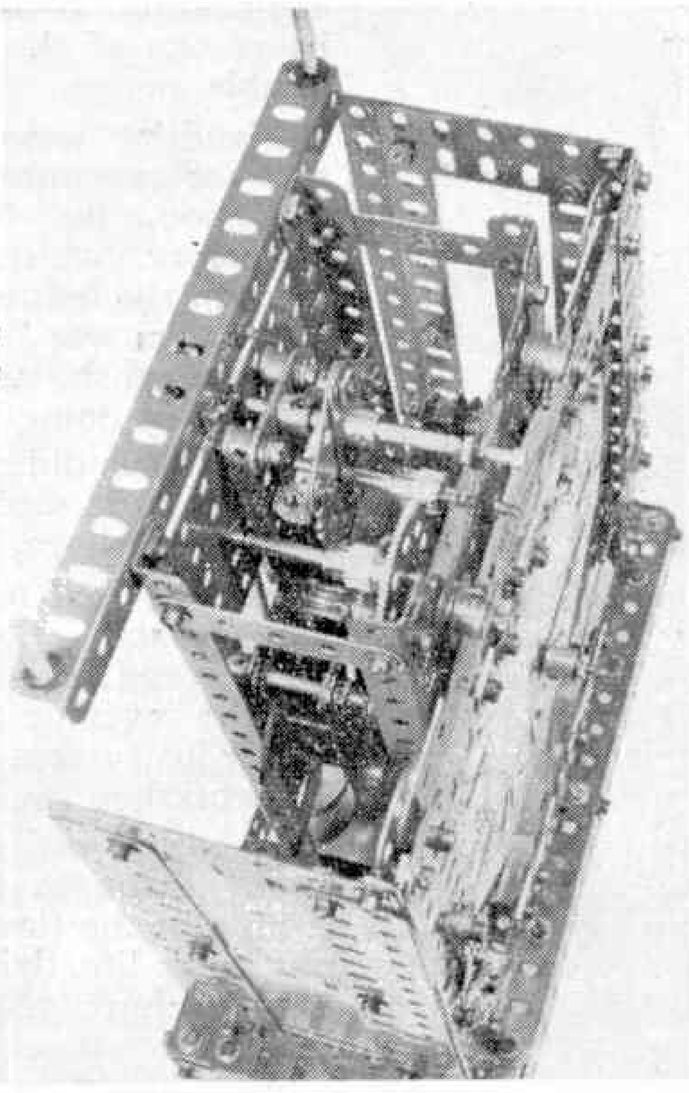


Gear on another Rod, the screwing motion of the Worm acting against the Pinion tends to force the Rod carrying the Worm away from the Pinion. If the Rod is held in place by Collars, for example, one of the Collars will be pressed against the Rod mounting, resulting in increased friction. This friction can be kept to an absolute minimum by doing away with the usual Collar and replacing it with a Rod held in Hand-rail Supports as shown in the accompanying photo-graph. The area of contact and therefore friction is thus greatly reduced and the reduction is even greater if the end of the Worm Rod is filed to a point.

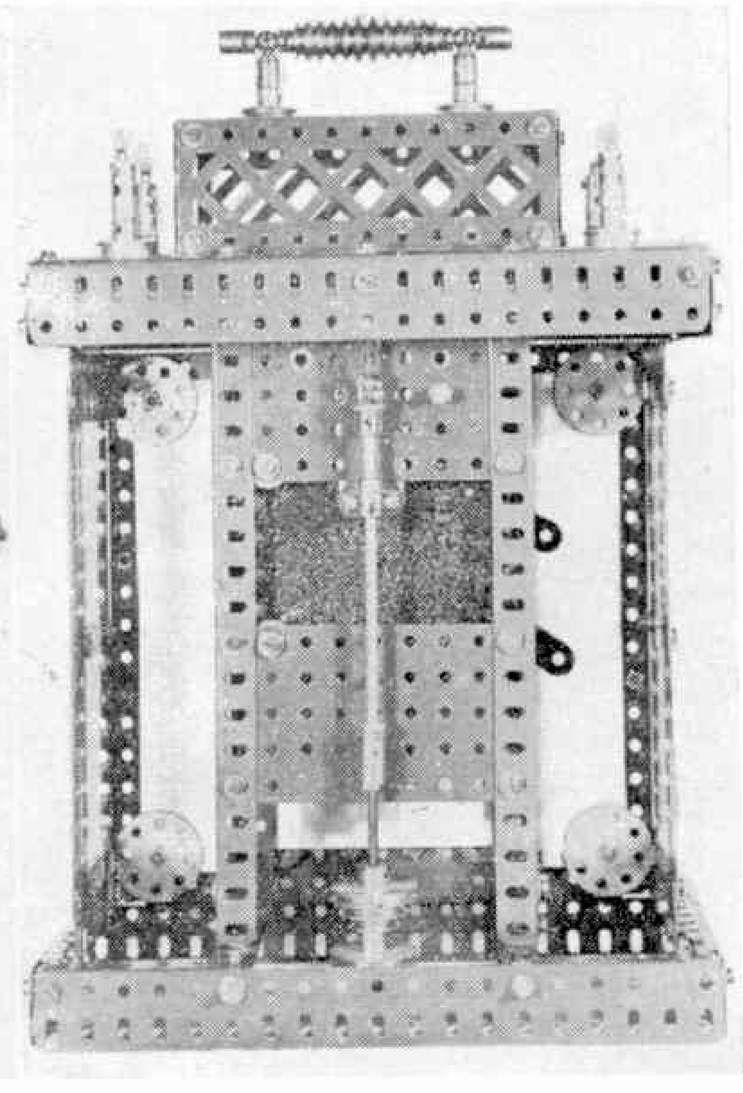
A 36-hour ornate Carriage Clock built by Pat. Briggs of Nottingham, using the same basic movements incorporated in last month's Clock also built by Pat.



In this view of the Carriage Clock, the top has been removed to show the modified escapement shaft and crutch mechanism.



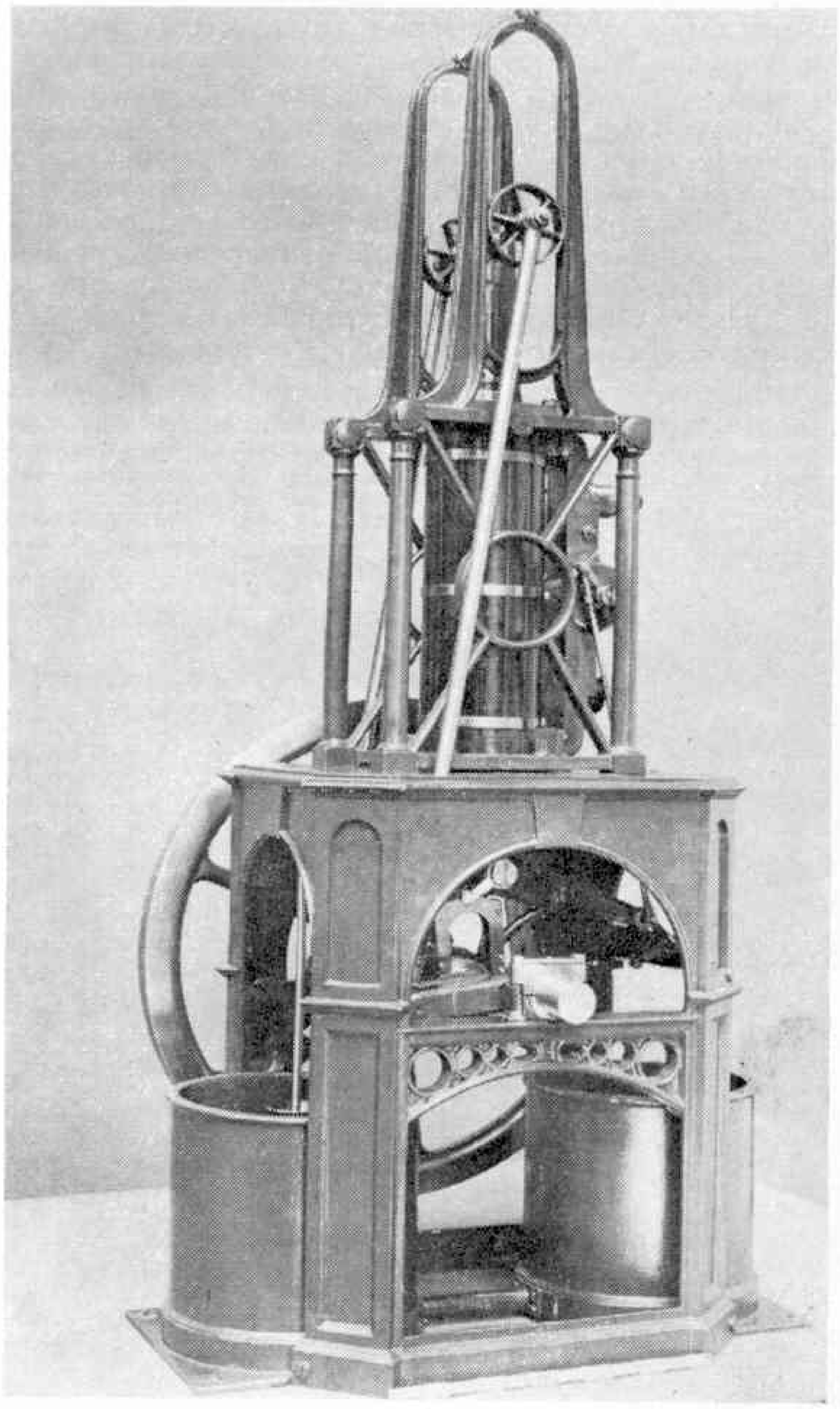
A rear view of Pat. Briggs' Clock in which the lower end of the modified crutch mechanism, incorporating the crutch pins, can be seen.



Great Engineers No. 7

HENRY MAUDSLAY

Below, a scale model of Maudslay's table engine.



THE NAME of Henry Maudslay is little known outside the field of mechanical engineering, yet the impact his work made in this field cannot be overrated.

He was born at Woolwich, his father being a storekeeper in the Woolwich Dockyard. The young Maudslay's formal education cannot have gone beyond elementary stages, since it is recorded that he was a cartridge filler at the age of twelve years. Further, he never served a regular apprenticeship to the trade he eventually followed.

At the age of eighteen he managed to obtain employment with Joseph Bramah, a well known engine maker of Piccadilly. The term of ' engine maker ' at that time meant a maker of mechanisms. Today Bramah would have been called a locksmith, and Maudslay stayed with him for about eight years making special tools used in the manufacture of locks. About this time he seems to have improved the lathe by the development of a slide rest to his own design. It was not the first, since such a rest was in use in France, although Mauldslay would probably not have seen it.

In 1797 Bramah refused a request by Maudslay for an increase in his wages of 30/- per week. Thereupon Maudslay left and set up business on his own account in a small workshop in Wells Street, London.

At this time Marc Isambard Brunel, father of a more famous son, wished to mass produce lifting blocks for Admiralty ships and discussed the problems involved with Maudslay. The outcome was a series of special-purpose machines for the job, and resulted in the largest contract he had undertaken up to that date. The work brought him into contact with Joshua Field, a Portsmouth Dockyard draughtsman, who eventually became his partner.

By 1810 Maudslay was again seeking larger premises, his business having grown so much. He re-established his works at Lambeth, trading under the name of Maudslay, Sons and Field. The works became one of the main axis around which mechanical engineering developed, and many of the foremost engineers of the time were associated with it, and it was here that he produced his table engine. He entered the marine engineering field, the ' London Engineer ' (1818) being one of the first steam vessels to be fitted with a table engine.

Maudslay was a great exponent of standardization and accurate measurement. He had his own private workshop, the equivalent of the modern research laboratory, which contained numerous examples of relics of the first embodiments of his inventive genious. His maxim was " get a clear notion of what you desire to accomplish, and then in all probability you will succeed in doing it."

But things did not always go smoothly, for it appears that when he designed and constructed a roof for one of his workshops, it collapsed with a loss of life.

He was well advanced in the production of really flat surfaces, the development of interchangeable threads and tool-room techniques generally. He was not the inventor of the micrometer, this was a much earlier instrument, but he did produce a model suitable for workshop application.

Maudslay had four sons and three daughters, the family living in an house adjoining the offices, the custom of the time. He remained in Lambeth for the rest of his life, dying in 1831 and he now rests in Saint Mary's churchyard in a cast-iron tomb of his own design.

WHY IT CAN'T BE DONE

Chris Jelley explains why collectors are disappointed when they ask Meccano Ltd. to make them a special Dinky Toy model.

"WE REGRET that we cannot undertake to make special Dinky Toys for individual collectors." —A short, official statement that has caused a certain amount of surprise to quite a lot of readers over the years. It's the sort of answer received by collectors who write to Meccano asking them to make such-and-such a model specially for them, but while it is disappointing, it is unfortunately the only sensible answer that can be given. As I have no new models to describe this month, I would like to use up some of my coveted space by explaining why this should be.

As you may know, die-cast model collecting is perhaps more popular now than it has ever been in its history. The demand for die-casts, in fact, is so tremendous that Meccano report they are hard-pressed to turn out models fast enough. You will appreciate, therefore, that for Meccano to meet the demand, their Liverpool factory must be organised for high-speed, mass-production and you can take it from me that it most certainly is. Thousands of models pour off the assembly lines at Binns Road every day and all the miniature components used in them are cast, moulded, treated and sprayed on automated machinery. When you think that there are more than 50 individual parts used in some Dinkys, you can imagine how many machines are involved and they must all be specially prepared and tooled-up for the job on hand. So, also, must be the various machines used in assembling the parts into complete models.

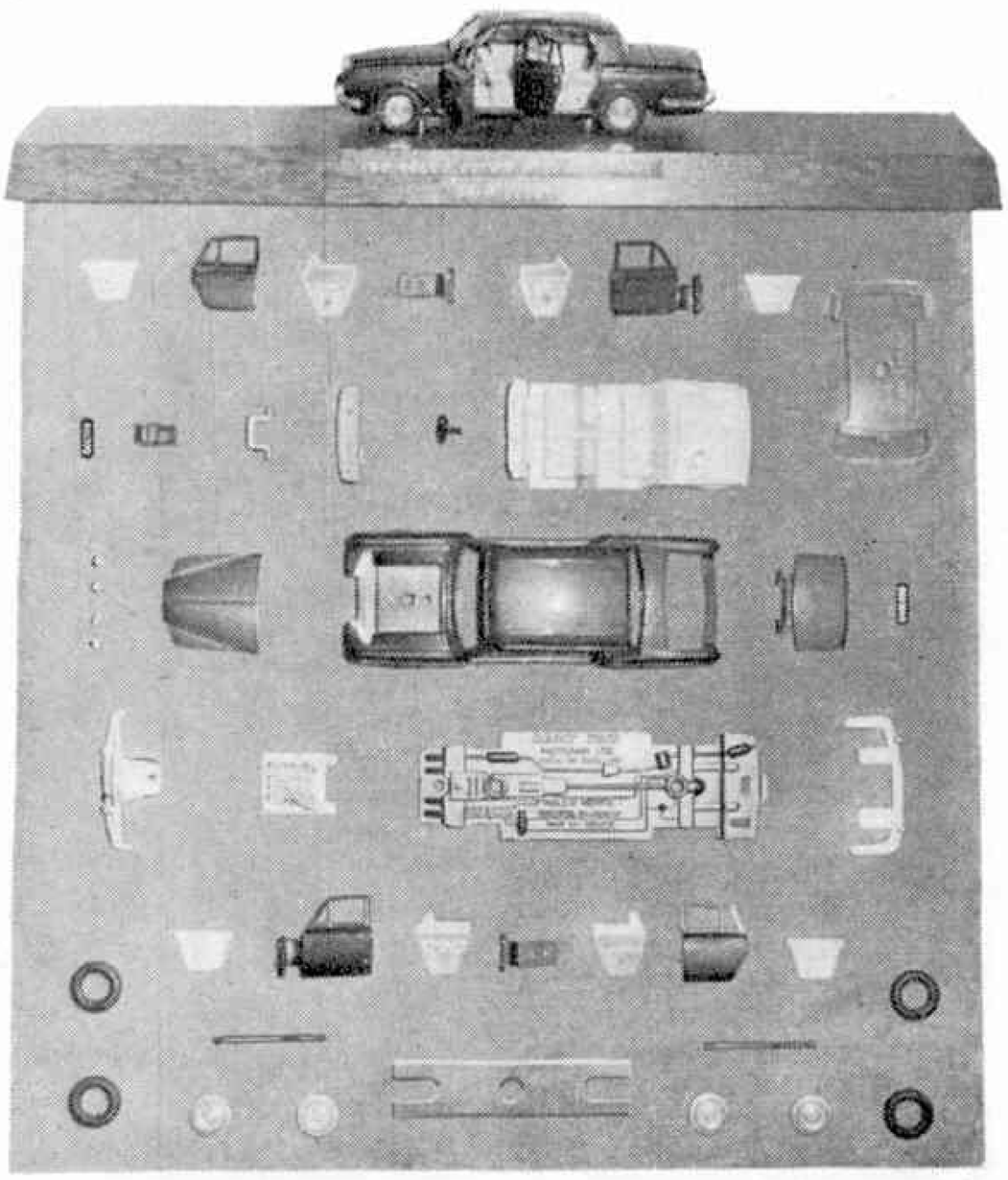
The preparations in question are, to say the least, expensive. First of all there is the design stage where full working drawings ("blueprints") must be produced not only for the model as a whole, but also for every individual component as well as for every machine tool and jig used in production. More than 100 drawings could be required, then the tools and dies themselves, must be made. There might be in excess of 50 of these and they are all extremely costly items, bearing in mind that they are turned out by highly-skilled craftsmen, as also are the plans.

When all the tools are ready, production of existing models must stop while all the machines are stripped down and the new tools fitted to them, which takes time and costs a great deal of money in lost production.

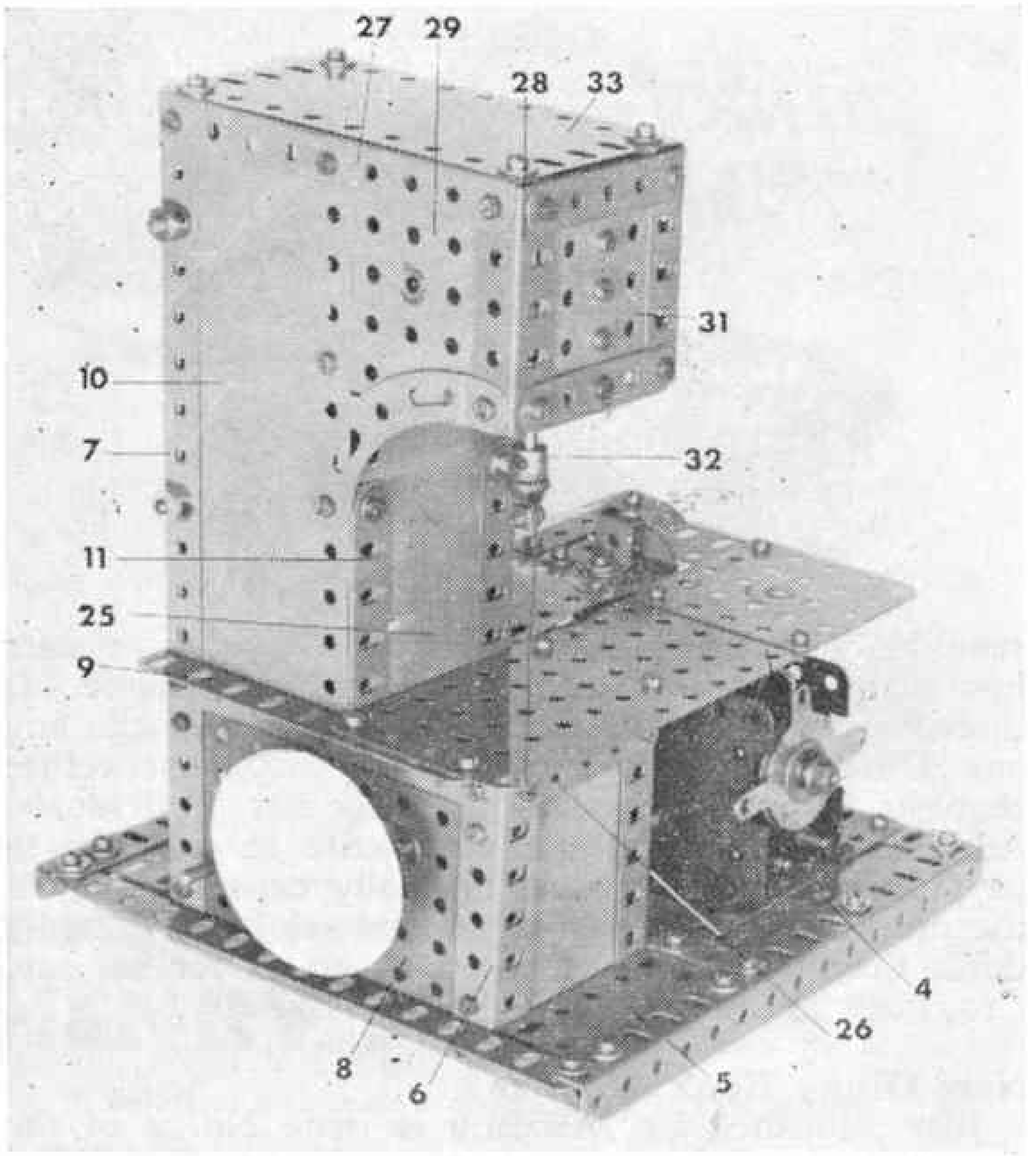
Costs, in fact, build up at a phenomenal rate. Taking labour plus origination charges into account, but excluding lost production, they might well add up to anywhere between ten and fifteen thousand pounds, and it is only after all this has been tied up that the model can actually be made. In other words, as all Dinky Toys are more or less similarly produced, the same amount of origination work is involved no matter how many models—1 or 100,000—are to be made. It therefore costs several thousand pounds to make any one Dinky and this is why Meccano must refuse requests to make models specially for individuals. Admittedly some of those who write in do offer to pay more than they would normally expect to pay if the proposed model was on general sale, but I hardly think they would be prepared to go as far as, say, £10,000! Do you?

New Dinky Book of Cars

Just published by Meccano is issue No. 4 of the Dinky Book of Cars. With 104 colour-packed pages plus an itemised price list, it details the entire current Dinky Toy range as well as featuring some of the models scheduled to be released in future months. Except in a few isolated cases, each model has a full page to itself, allowing not only large illustration to be included, but also additional diagrams depicting the action features of the model. Technical specifications (where applicable) of the real-life vehicle are also included to make the booklet a collectors piece in itself. Priced at 6d., it is obtainable from all Dinky Toy dealers.

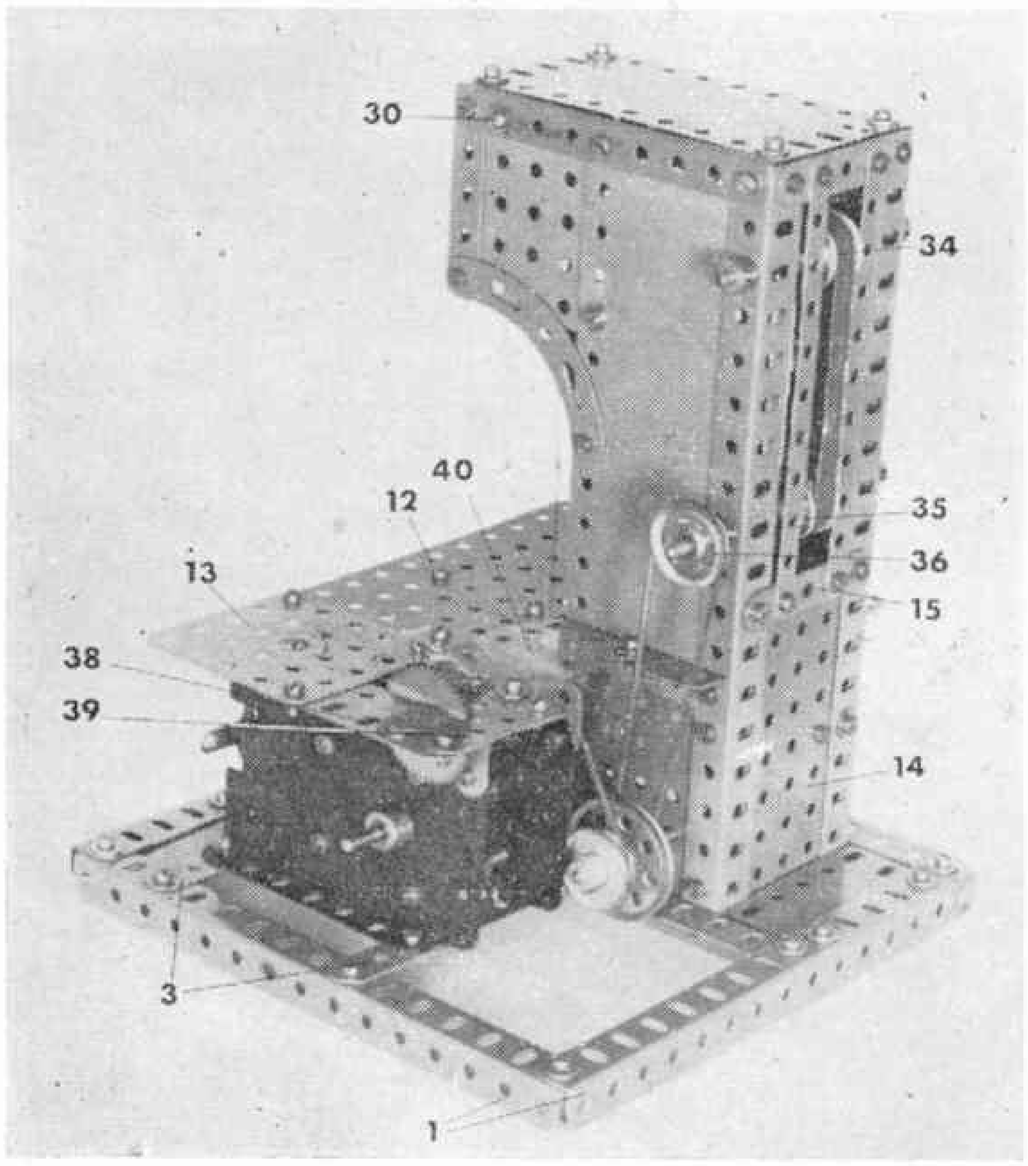


Just to prove how much work goes into a typical modern Dinky Toy, this picture shows the 44 separate parts which together make up model No. 158 Rolls-Royce Silver Shadow!



A WORKSHOP IN ONE

Spanner describes an amazing Meccano Woodworking Machine that actually "works" with real wood



IN MY years with the M.M., I must have seen literally thousands of Meccano models, a high proportion of which have been really excellent affairs. It is only natural that some of these have appealed to my own personal tastes more than others, but I do not think I am any different from most readers in finding working models usually more appealing than static constructions. By working models, of course, I mean models which incorporate the movements or basic principles of a prototype, rather than reproduce the actual work done by a prototype. The former (such as the Punching Machine on page 456 which performs the movements without punching the holes) are quite common, whereas examples of the latter are more difficult to find. In view of this, I was delighted with the Woodworking Machine featured below, not only because it is a full working model—which would have been enough in itself—but also because it is really four models in one!

Yes, four models in one, all of which can be used to some degree in the cutting and shaping of wood! It incorporates a vertically-mounted fret saw, a circular sanding disc, an endless sanding belt and a little circular saw. The first three features work extremely well using a real fret saw blade and proper sand paper, as the case may be, and it is only the circular saw which is perhaps not quite so successful. This is represented by a 50-teeth Gear, a circular saw blade no longer being included in the Meccano system, and so its cutting properties are not particularly good. It does, however, cut to a certain extent—especially balsa wood, which is really the material best suited to the machine as a whole, bearing in mind that it is after all a model. Power for all operations is supplied by an E15R Electric Motor.

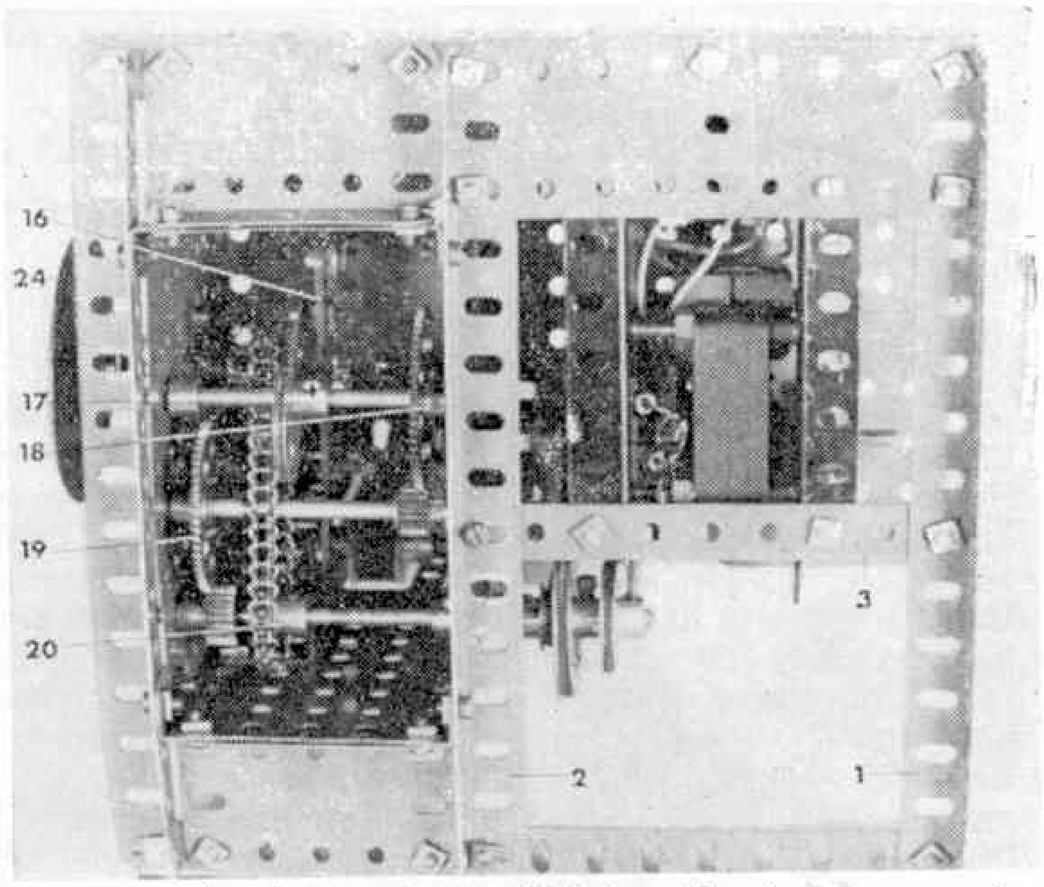
Despite the varied movements of the model it is not by any means a complicated construction. A square base is built up from four $7\frac{1}{2}$ in. Angle Girders 1, two of which are joined through their seventh holes by a further $7\frac{1}{2}$ in. Girder 2. Bolted between this Girder and one Girder 1 are two $4\frac{1}{2}$ in. Strips 3, the securing Bolts holding one of these also helping to fix a $4\frac{1}{2} \times 1\frac{1}{2}$ in. compound flexible plate 4, obtained from two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plates, in position. Another $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 5 is bolted to front Girder 1 as shown.

Two similar constructions, each consisting of a $3\frac{1}{2}$ in. Angle Girder 6, and a $9\frac{1}{2}$ in. Angle Girder 7, joined by a $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 8, are now fixed one to the vertical flange of Girder 2 and the other to one Girder 1. In each case, the top of Girder 6 is connected to Girder 7 by a $4\frac{1}{2}$ in. Angle Girder 9, at the same time fixing a $9\frac{1}{2} \times 2\frac{1}{2}$ in. Strip Plate 10 and a $3\frac{1}{2}$ in. Angle Girder 11 in the positions shown, Girder 11 projecting a distance of one hole below Girder 9. A $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 12, extended by a $2\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 13, is bolted to the horizontal flanges of Girders 9 in such a way that it extends the full width of the base. A $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 14, overlayed at each end by a $2\frac{1}{2}$ in. Strip 15 is bolted between the lower ends of Girders 7.

Before going any further with the casing, the major part of the operating mechanism should now be fitted. First, however, two Fishplates placed one on top of the other are lock-nutted to one end of two $3\frac{1}{2}$ in. Strips 16, also placed one on top of the other. Lock-nutted through the second holes of these Strips is a Single Throw Eccentric 17, then a fine fretwork blade about $3\frac{1}{4}$ in long is clamped by a Bolt between the Fishplates.

Powered by an E15R Electric Motor, this 4-in-1 Meccano Woodworking Machine can be used to cut and shape balsa wood. Note the "endless" sanding belt.

An underside view of the model showing the drive to fret saw and sanding disc mechanism.



This blade is inserted in one of the holes in Flat Plate 12, the other ends of Strips 16 being lock-nutted to a 1 × 1 in. Angle Bracket bolted to the inside of Plate 14, and the Eccentric is fixed on a 3½ in. Rod held by a Collar and a 60-teeth Gear Wheel 18 in Flat Plates 8. In mesh with Gear 18 is a $\frac{7}{16}$ in. Pinion mounted, along with a 57-teeth Gear Wheel 19, on a second 3½ in. Rod journalled in Plates 8. Gear 19, in turn, meshes with a ½ in. Pinion on a 5 in. Rod mounted in Plates 8 and also carrying a 1 in. Sprocket Wheel 20, a Collar, a ½ in. Pulley 21, a 1½ in. Pulley 22 and a 1 in. Pulley 23, the last three all with bosses and all positioned outside Plates 8. The first three items lie between the Plates with the Collar and the Pinion holding the Rod in place.

Bolted to the outside of one Plate 8 is a Double Bent Strip which, along with the Plate itself, provides the bearings for a 2 in. Rod, on the outside end of which a Face Plate 24 is fixed. Mounted on the inside of the Rod is a Collar, holding the Rod in place, and a ¾ in. Sprocket Wheel, connected by Chain to Sprocket Wheel 20.

The rest of the casing can now be finished. A 4½ × 2½ in. Flexible Plate 25, curved outwards at the top, is bolted to Girders 11, while a 3½ × 2½ in. Flexible Plate is bolted between Girders 6 at the front, the securing Bolts also fixing a 2½ in. Strip 26 to the tops of the Girders. Bolted to the top of each Girder 7, at right angles, is a 4½ in. Angle Girder 27, to the end of which a 2½ in. Angle Girder 28 is fixed, also at right angles, with the securing Bolt helping to fix a 2½ × 2½ in. Flat Plate 29 in position, as shown. A Long Threaded Pin 30 with a Collar mounted on its end is fixed to the inside of one Girder 27, then Girders 28 at each side are joined by a further 2½ × 2½ in. Flat Plate 31 edged at the top and bottom by a 2½ in. Strip. Bolted to the inside of this Plate are two 1 × 1 in. Angle Brackets, the end holes in the free lugs of which provide guides for a 2½ in. Rod on which a Collar and an End Bearing 32 are fixed, the Collar being positioned beneath the lug of the upper Angle Bracket. The fret-saw blade is clamped in the End Bearing, then a 2½ in. Driving Band is slipped over Threaded Pin 30 and over a Bolt fixed in the Collar, the latter therefore acting as a stop to prevent the Rod being pulled too far upwards by the elastic action of the Driving Band. A 4½ × 2½ in. Flexible Plate 33 is bolted to the tops of Girders 27.

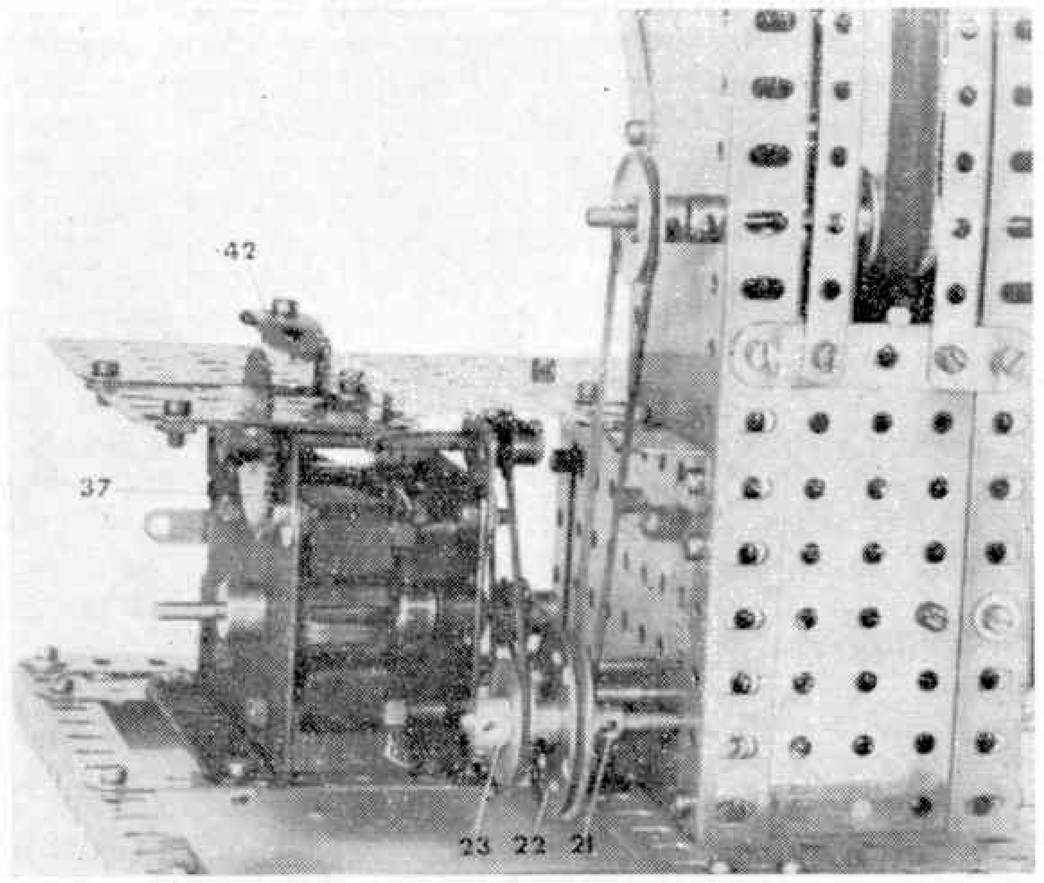
Now journalled in the third holes down of Angle Girders 7 is a 3½ in. Rod held in place by Collars. Mounted in the centre of the Rod are two ¾ in. Flanged Wheels 34 fixed face to face to form a drum. Another two similar Flanged Wheels 35 are mounted on a 4 in. Rod journalled in the ninth holes down of the Girders and held by Collars. A 1 in. Pulley 36 is fixed on the inside end of this Rod, being joined to Pulley 21 by a 6 in. Driving Band. Two 5½ in. Narrow Strips, one each side of the drums, are fixed between Strips 15.

An E15R Motor is next bolted to Strips 3, a ½ in. Pulley on its output shaft being connected by a Driving Band to Pulley 22. Two 1 in. Corner Brackets are then fixed one to each upper rear corner of the Motor sideplates, and in these is journalled a 2½ in. Rod held in place by a ½ in. Pulley with boss and a 50-teeth Gear Wheel 37. This Gear represents the circular saw and is driven by a Driving Band between the ½ in. Pulley and Pulley 23. A work table around the saw is supplied by two 2½ in. Flat Girders 38 joined by a 2 in. Strip 39 and bolted to Flat Plate 13. Inside Flat Girder 38 is connected to Angle Girder 9 by a shaped 2½ × 1½ in. Flexible Plate 40 at the same time fixing a ½ × ½ in. Reversed Angle Bracket in position. Bolted to the free lug of this, but spaced from it by two Washers on the shank of the securing Bolt is a curved 1½ in. Strip 41 serving as a guard for the saw blade.

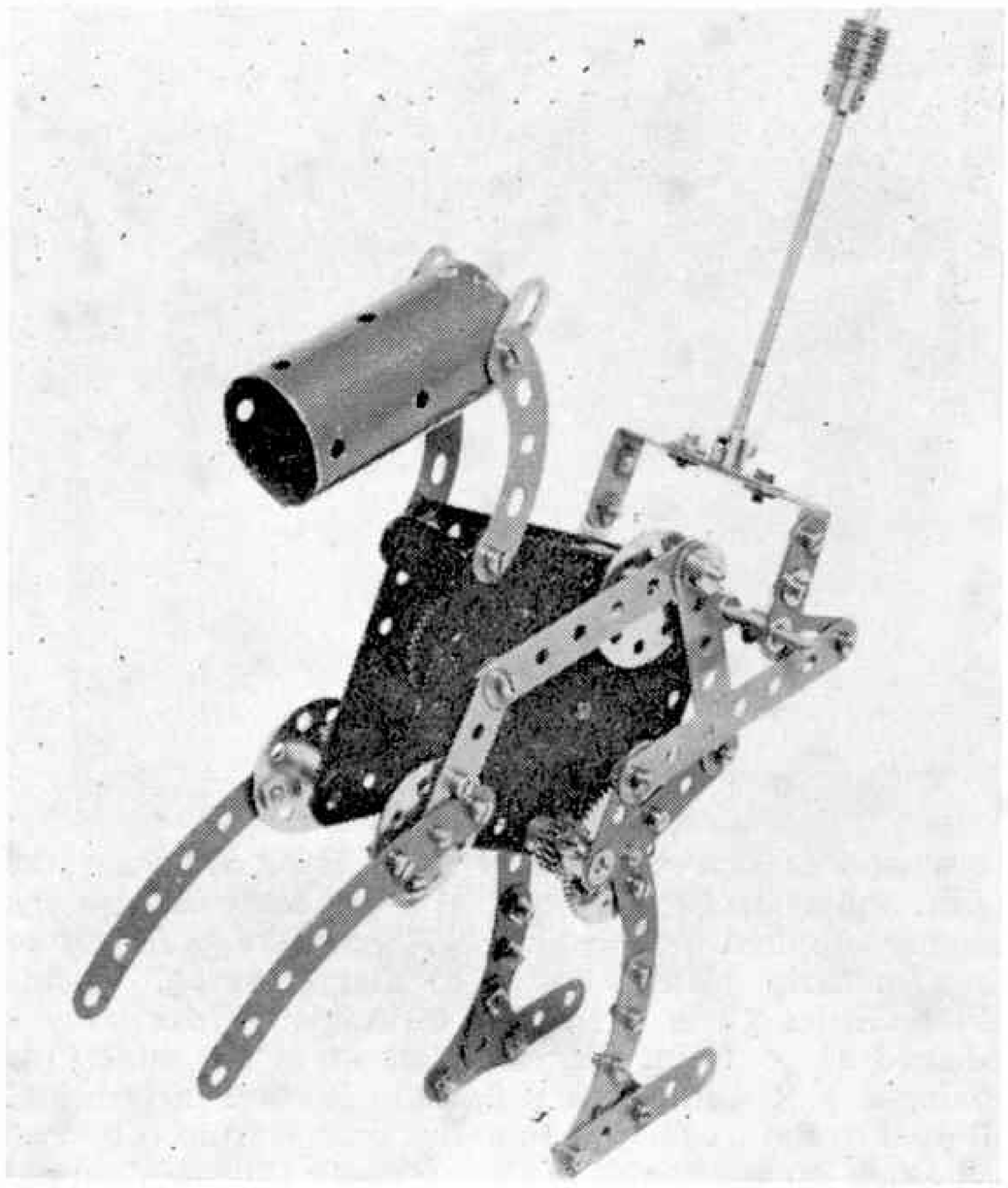
So far, then, we have the model built and the saw attachments completed. All that remains to be finished are the sanding attachments and these present no great problem. In one case, a circular disc 2 in. in diameter is cut out of a piece of sandpaper and stuck onto Face Plate 24 with a suitable adhesive such as Bostik 1 or Evostik. In the other case, a strip of emery paper ⅜ in. wide and 8⅜ in. long is passed round Flanged Wheels 34 and 35, and the ends joined to form an "endless" belt. Ideally, the ends should not overlap, but should be "butt-jointed" using a strip of adhsive tape stuck to the back of the emery paper across the join.

In operation, the model is tremendously impressive, but I must stress that it *is* a model so don't expect *too* much from it.

See page 455 for Parts List.



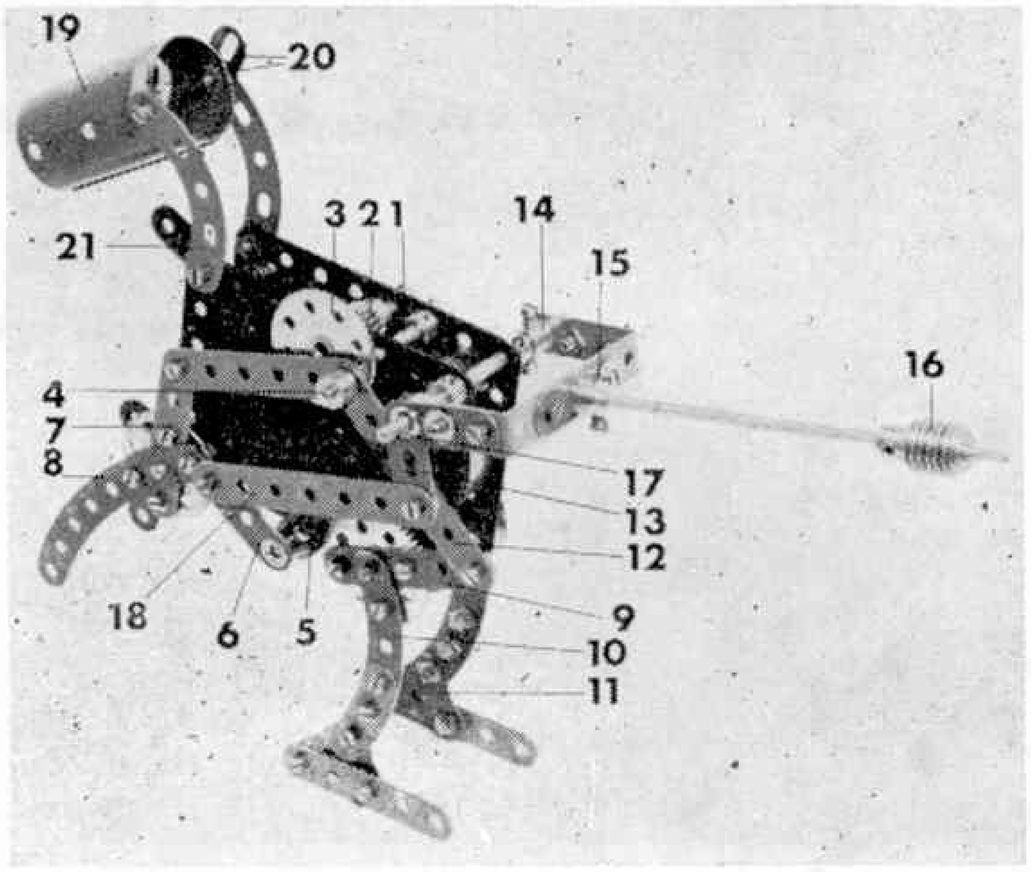
A close-up view of the Motor mounting and initial drives to the various operating features.



COME STEEPLECHASING

. . . with this fun-packed Meccano Model described as a "Steeplechaser" by its builder, D. J. Turnham of Old Marston, Oxford

Above, laughs galore can be had with this Meccano "Steeplechaser" designed and built by D. J. Turnham of Old Marston, Oxford ! Below, another view of the "Steeplechaser" showing almost its entire construction. This is an outstanding model considering its performance in relation to its simplicity.



GENERALLY SPEAKING Meccano is regarded as a fully-fledged miniature engineering system. This is as it should be, but it does not mean that Meccano must *only* be used for the reproduction of genuine engineering structures. On the contrary, the system can be, and often is, used to make more light-hearted models such as the steeplechaser featured in this article. (You will see from the accompanying photographs that the model does look something like a horse and, as it performs two movements—a "prance" followed by a "step"—the title "Steeplechaser" seemed particularly appropriate to me!—Spanner.)

So as to keep the quantity of parts used in the model as low as possible, the horse was built round a No. 1 Clockwork Motor, the Motor thus not only providing the power for the movements, but also serving as the major part of the horse's body. Before actual construction is begun, however, the drive pinion is removed from the Motor which is then wound. A 1½ in. Rod 1 is mounted in the Motor sideplates, six holes from the brake lever, where it is held in place by Collars positioned one each side of one of the plates. The inner Collar acts as a retainer to limit the expansion of the Motor mainspring thus preventing it from fouling a ½ in. Pinion 2 mounted on a 1½ in. Rod, held in the sideplates by a Collar and an 8-hole Bush Wheel 3. A Threaded Pin 4 is fixed to this Bush Wheel as shown, while the Pinion engages with the main drive gear wheel of the Motor. Held by a Collar in the opposite edges of the sideplates, in line with the above 1½ in. Rod, is a 2 in. Rod on which a ½ in. Pinion 5 and a Crank 6 are securely fixed.

Turning to the left foreleg, a 2½ in. Strip 7 is bolted across an 8-hole Bush Wheel, a spacing Washer being mounted on each securing Bolt. Fixed by ⅜ in. Bolts to this assembly, as illustrated, is a 4 in. Stepped Curved Strip 8, a Nut on each Bolt being used as a spacer, in this case. The right foreleg is similarly built, except that Strip 7 is omitted, then both legs are mounted tight on a 2 in. Rod journalled in the corner holes in the Motor sideplates. The Rod, of course, is passed through the bosses of the Bush Wheels. One end of a 3 in. Strip is lock-nutted to Strip 7, the other end being slipped onto Threaded Pin 4.

In the case of the left hindleg, a 2½ in. Strip 9 is bolted across a 57-teeth Gear as also is a 2½ in. Curved Strip 10, the latter, at right-angles to the former, running only to the centre of the Gear and being spaced from it by a Washer. Curved Strip 10 is extended three holes by a similar Curved Strip to which a 2½ in. Strip 11 is bolted, the joint being strengthened by a 1 in. Corner Bracket. In the right hindleg, Strip 8 is omitted and an 8-hole Bush Wheel is substituted for the 57-teeth Gear, but otherwise construction is similar. Both legs are mounted on a 2 in. Rod, journalled in the Motor sideplates, with the 57-teeth Gear engaging Pinion 5. A 3 in. Strip 12 is lock-nutted, at one end, to Strip 9, the other end being slipped onto Threaded Pin 4 where it is held in place by a Collar.

The tail unit acts as a counterbalance and is built up from a Bell Crank 13 connected to an ordinary Crank 14 by a 2½ × 1 in. Double Angle Strip. Bolted

PARTS REQUIRED

1—3	2—18a	5—38	4—90
2—4	1—19a	1—46	2—90a
4—5	4—24	7—59	2—111c
2—10	2—26	2—62	1—115
1—16	1—27a	1—62b	1—128
3—17	1—32	2—89b	2—133a
	No. 1 Clockwork Motor		1—216

to this Double Angle Strip is a Double Arm Crank 15, in the boss of which a 5 in. Rod is fixed. A Worm 16 is mounted on this Rod. Cranks 13 and 14 are now secured on a 3½ in. Rod 17 held by Collars in the upper rear corner holes of the Motor sideplates. To obtain balance, it is important that an equal length of surplus Rod should project through the bosses of the Cranks at each side. A 3½ in. Strip 18 is lock-nutted between Bell Crank 13 and Crank 6, as shown, the end of Rod 17 serving as a stop for the Strip.

Finally, the head is very easily built from a Cylinder 19 to which two Fishplates 20 and two 2½ in. Stepped Curved Strips 21 are bolted, the former to represent the ears and the latter, the neck, being fixed tight to the upper front corners of the Motor sideplates.

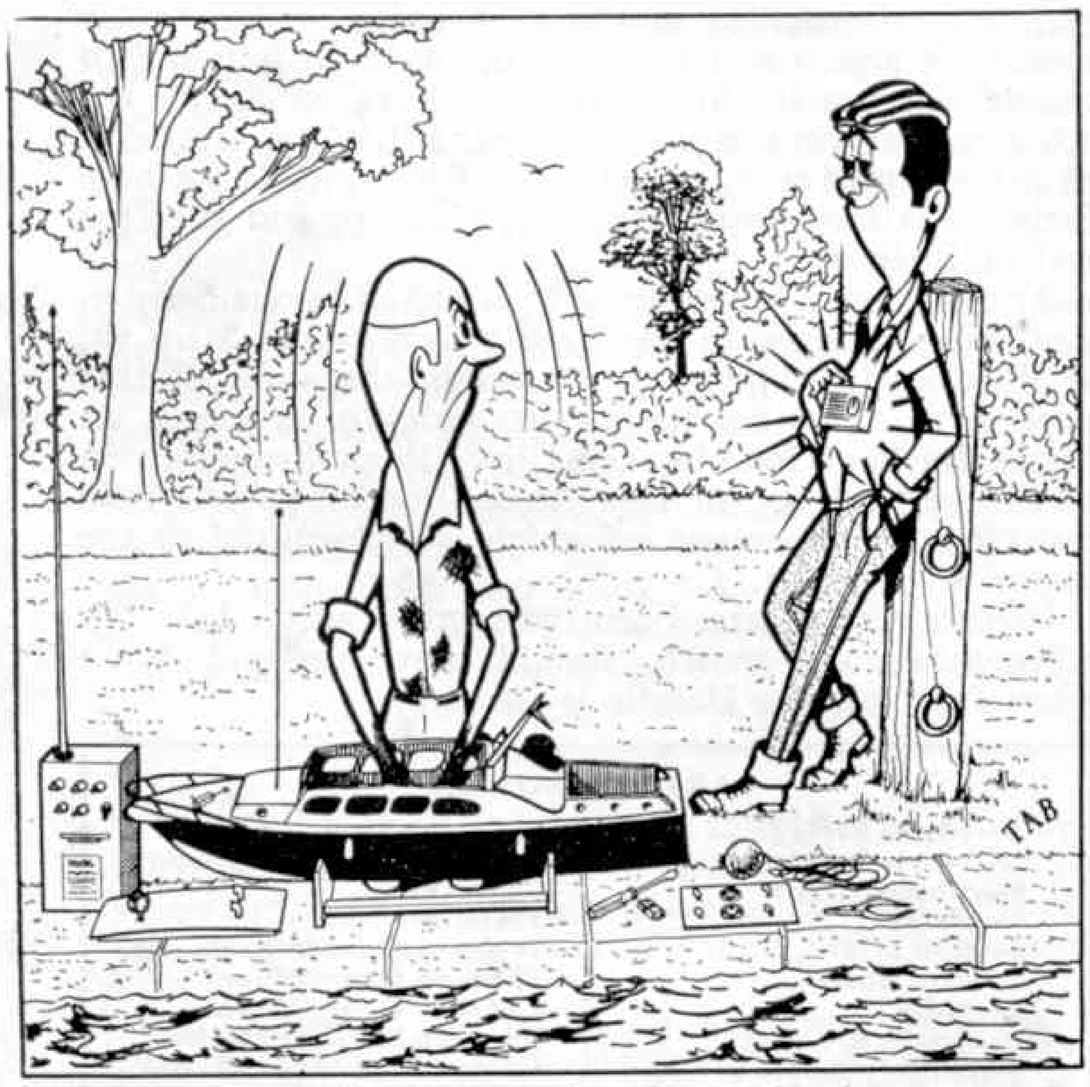
With the model completed it is "trimmed" by first ensuring that the forelegs are in alignment and that it stands firmly on its balancing feet in the "prance" position. Crank 6, the angle of the neck and the position of Worm 16 on its Rod are then adjusted until the model performs a "prance" successfully without falling over backwards. It is advisable to fit two Grub Screws in the boss of the Gear and each Bush Wheel used in the legs.

The movements of the horse are mainly dependent on the action of the tail counterbalance on Pinion 5. When the tail is horizontal, the Pinion climbs around the 57-teeth Gear simulating a prance, but when it is vertical, a step is made.

PARTS REQUIRED—A WORKSHOP IN ONE

2—2a	3—16	103—37b	1—111c
2—3	2—16a	36—38	1—115a
7—5	1—17	1—45	1—125
1—6	4—20b	3—53a	1—130a
2—8a	1—21	9—59	2—133a
5—8b	1—22	1—70	1—166
4—9a	3—23a	4—72	2—186
4—9b	1—26	2—89a	2—186a
2—9d	1—26c	1—94	5—188
2—10	1—27	1—96	1—190a
2—12a	1—27a	1—96a	1—191
1—15	1—27d	2—103f	2—195
1—15b	107—37a	1—109	2—235f

1 E15R Motor



"Good afternoon gentlemen, here is the shipping forecast for today Saturday the . . ."

Mechanical Engineer

Training in the Fleet Air Arm

Continued from page 425

Mechanical Engineering. The fourth year is spent on Front Line service at Naval Air Stations for field experience and the fifth back again at H.M.S. Condor. The fifth year being devoted almost entirely to technical training, and at the end of this course, Aircraft Artificers —as they then are—have a thorough training behind them in both the practical and theoretical skills needed, which is recognised by the T.U.C. as being equivalent to civilian apprenticeships. During the fourth and fifth years, entrants can sit for their Higher National Certificate, studying in their own time, but most Artificers prefer to leave this until they have reached the rank of Petty Officer.

The training given to Artificer Apprentices is to say the least, very expensive and because of this the Navy have to ensure that they do get a minimum of return on their investment. The minimum signing-on period is 12 years, man's time, running from the age of 18. At the age of 30, which is the first available time for leaving the service, a further 10 years can be signed on for to give release at the age of 40—after 22 years service—which is then pensionable.

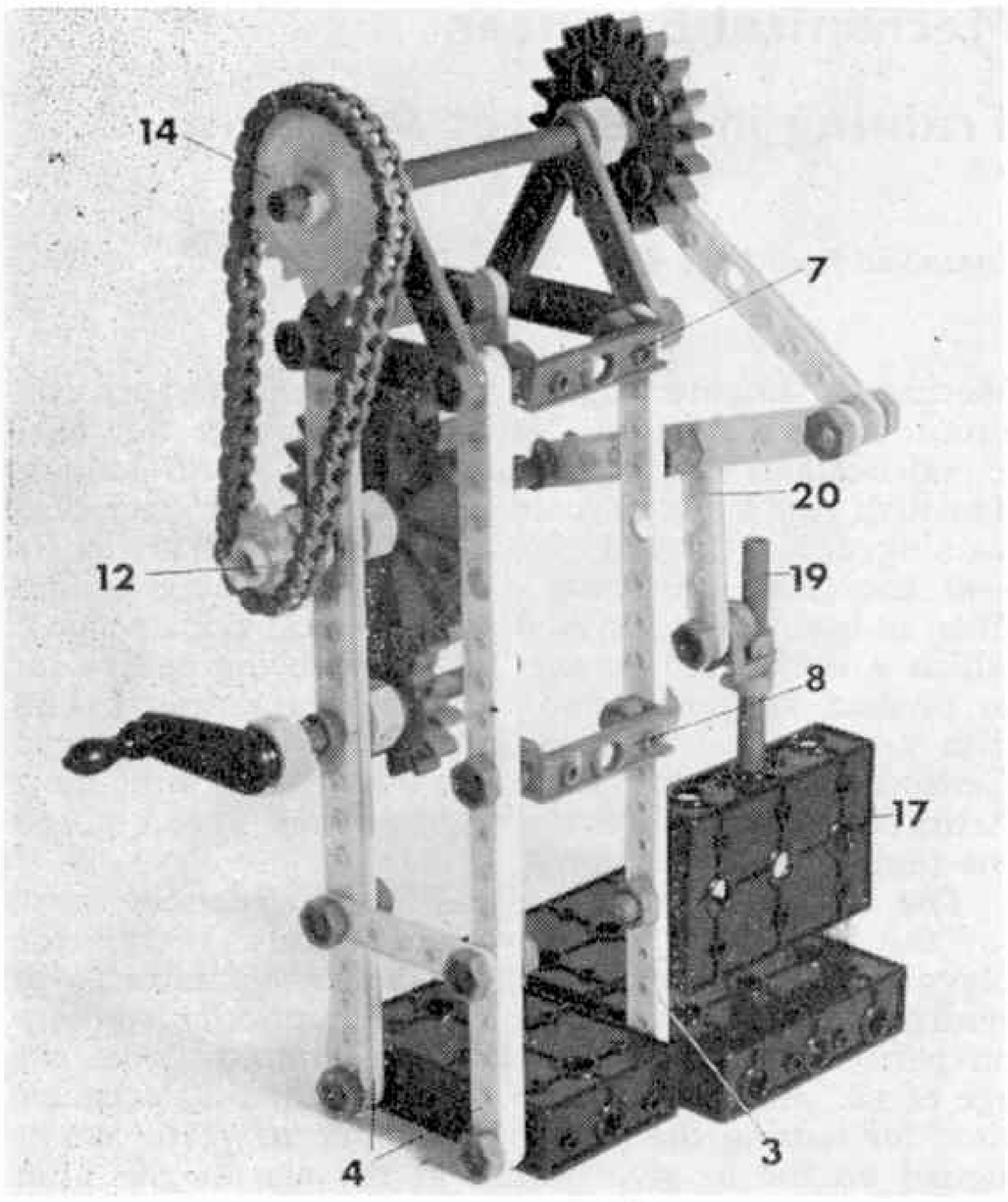
When one considers the rate of pay, at first it would seem a little low, but on subsequent inspection bearing in mind that one is paid 7 days a week and accommodation and food, etc., are provided, they are comparable to civilian pay. First year Artificer Apprentices earn 9/- a day, fourth year Artificer Apprentices earn 22/3d. a day, Leading Hands earn 37/9d. a day, whilst Petty Officers earn 48/9d. a day.

Whilst at H.M.S. Condor the Editor was very impressed by the accent placed on leadership training. In addition to the parade ground work and leadership lectures, extensive facilities are conveniently available in the local area for venture training which includes camping, canoeing, hill walking and sailing. During an air trip in the Sea Prince aircraft, piloted by Lt. Cdr. S. C. Farquhar, which is held on the station for practical aerodynamic instruction and for giving trainees air experience, we spotted several groups on venture training in the snow covered Scottish hills. This flight really was something to be remembered, as your Ed. sat in the Navigator's seat at the side of the pilot, flying low over the snow covered Scottish hills, in brilliant sunlight, with the red Naval tents standing out vividly against the white background.

A real surprise was in store on landing, as Lt. Cdr. Farquhar decided to test the station's alertness. He landed short on the main runway, and called the tower up to say the aircraft had crashed, to test reactions of the fire, ambulance and rescue crews. Within seconds your Ed. was being dragged from his seat by an asbestos-clad, hatchet wielding, rescue crew member. Quite an experience, and reassuring to know that these chaps are on the ball, all the time.

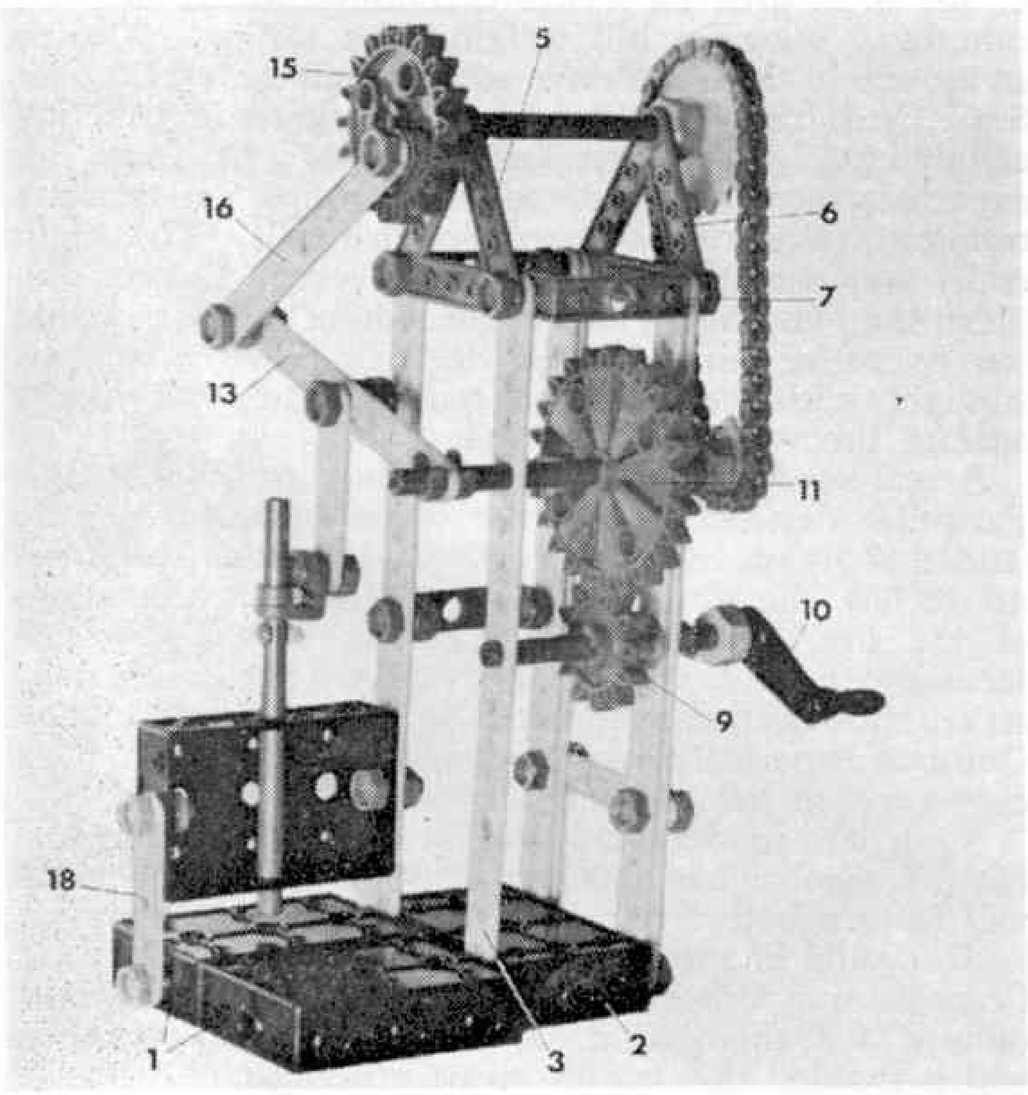
Modellers in Scotland will be pleased to note that *H.M.S. Condor* has an Open Day on July 20th, which will feature both flying and static aircraft displays.

We would like to thank Captain J. W. Mott M.V.O., Commanding Officer of *H.M.S. Condor* and his fellow officers for their kind hospitality and co-operation which enabled this feature to be produced.



PLASTIC PUNCHING MACHINE by Spanner

An interesting working model built with Plastic Meccano Set C, plus one extra 1 in. Bolt.



Built with Plastic Meccano Set C plus one additional 1 in. Bolt, this model Punching Machine illustrates the simple principles behind equipment of this type.

LOOKING AT the Instructions Leaflet packed with the Plastic Meccano Outfits it struck me that the great majority of models featured in it were based on vehicles, aircraft or engineering structures such as bridges, cranes, windmills, etc. Rather surprisingly, no engineering machines are included and, as it is perfectly possible to produce machine models with Plastic Meccano, we thought that the situation should be remedied. Our model-builder has therefore come up with the "working" Punching Machine described below. (I use "working," here, not because the model actually punches holes—it doesn't—but because it reproduces the operations of a punching machine so that you can see the simple principles behind this type of equipment.)

The model can be built from Plastic Meccano Set C with the addition of one extra 1 in. Bolt, and even this could be done without at a pinch. Like most Plastic Meccano models, construction is not difficult. Two Bases 1 are joined together then to one end of these a third Base 2 is bolted at the same time fixing two 5-hole Strips 3 between the Bases, as shown. Bolted to the outside of Base 2 are a further two pairs of 5-hole Strips 4, each pair consisting of two Strips mounted one on top of the other. Strips 3 are joined at the top by a 2-hole Triangular Girder 5, another similar Triangular Girder 6 joining Strips 4. In addition Strips 4 are joined through their second holes up by a 2-hole Strip, then both Strips 3 are connected to Strips 4 by two Double Angle Strips 7 at the top, while a further Double Angle Strip 8 is bolted between the centres of one Strip 3 and corresponding Strips 4.

Now journalled in the centre holes of remaining Strips 3 and 4 is a $4\frac{1}{2}$ in. Axle, held in place by an Axle Clip and a 12-teeth Gear Wheel 9, a Handle 10 also being fixed on the end of the Rod. Gear 9 engages with a 24-teeth Gear Wheel 11 fixed on a 6 in. Axle also secured by an Axle Clip in Strips 3 and 4. Mounted on one end of the Axle is a 10-teeth Sprocket Wheel 12, while held on the other end by Axle Clips is a 3-hole Strip 13. Journalled in the apex holes of Triangular Girders 5 and 6 is a second 6 in. Axle on one end of which a 20-teeth Sprocket Wheel 14 is fixed, the other end carrying an 18-teeth Gear Wheel 15. Sprocket 14 is connected to Sprocket 12 by Chain, while a 3-hole Strip 16 is lock-nutted between Gear 15 and the free end of Strip 13.

At this stage a fourth Base 17 is bolted to one Strip 3, also being attached to one Base 1 by a 2-hole Strip 18, as illustrated. The centre holes in the sides of this Base serve as guides for a 6 in. Axle 19 on which an Angle Bracket is held by Axle Clips. Pivotally connected to the vertical lug of this Angle Bracket is a 2-hole Strip 20 the upper end of which is lock-nutted to the centre of Strip 13.

If everything has been correctly built, Axle 19 representing the punch, should move up and down when the cranking Handle is turned.

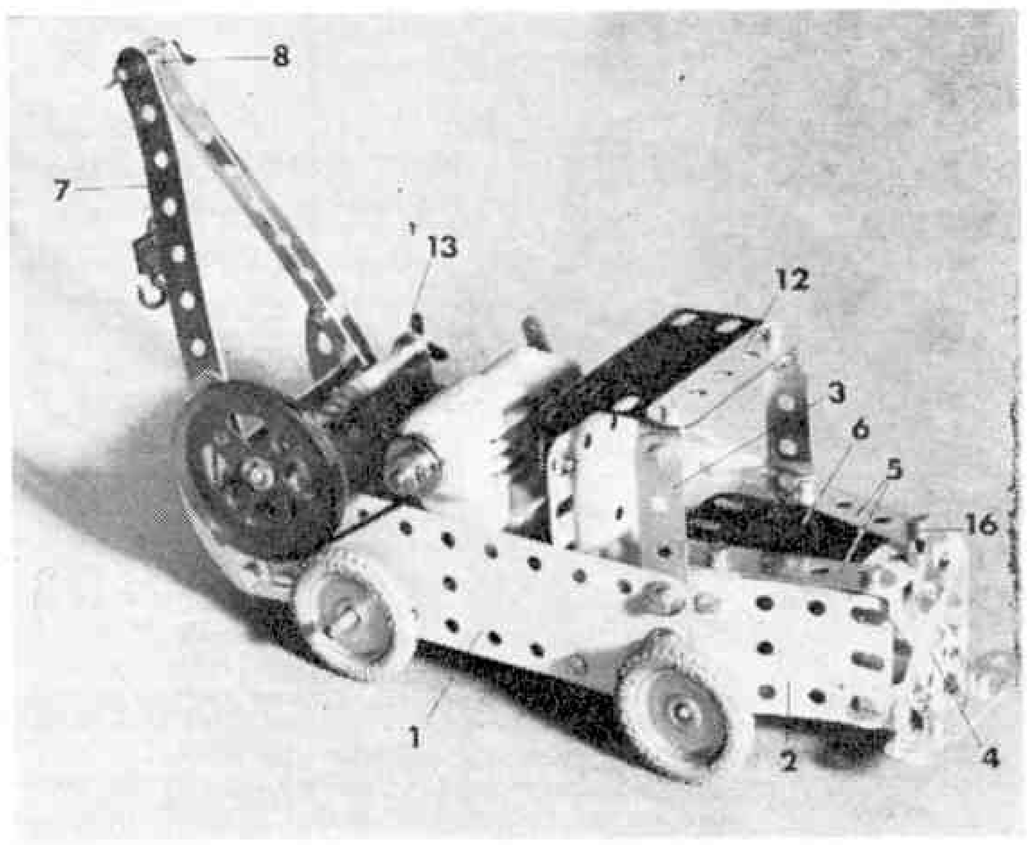
PARTS REQUIRED

3—2-hole Strips	1—$4\frac{1}{2}$ in. Axle
2—3-hole Strips	2—2-hole Triangular Girders
6—5-hole Strips	3—6 in. Axles
4—Bases	1—Handle
15—Bolts	1—24-teeth Gear Wheel
5—1 in. Bolts	1—18-teeth Gear Wheel
23—Nuts	1—12-teeth Gear Wheel
1—Angle Bracket	1—20-teeth Sprocket Wheel
3—Double Angle Strips	1—10-teeth Sprocket Wheel
6—Axle Clips	41—Chain Links

BREAKDOWN TRUCK

by Spanner

An interesting little model built with the Meccano Junior Power Drive Set, or Meccano Outfit No. 2. The winch is driven by the new Junior Power Drive Unit.



FOLLOWING THE tremendous success of the Power Drive Set over the past two years, Meccano introduced a smaller motorised outfit, the Junior Power Drive Set, shortly before last Christmas. The Junior Power Drive Unit (consisting of a 4½ volt reversible D.C. motor coupled to a fixed-ratio gear mechanism) contained in the Set has itself created considerable interest—so much so, in fact, that it is intended to market the Unit separately as is done with the larger Power Drive Unit. Featured below, therefore, is a simple Breakdown Truck which can not only be built with the Junior Power Drive Set, but which, in view of the separate availability of the J.P.D.U., can also be built with the No. 2 Standard Outfit plus one ½ in. Pulley to fix on the output shaft of the Unit to drive the winch.

Each side of the model is similarly built from a 5½ × 1½ in. Flexible Plate 1 extended four holes by a shaped 2½ × 1½ in. Flexible Plate 2, at the same time fixing a 2½ in. Strip 3 in position as shown. At the lower front corner, Plate 2 is attached by an Angle Bracket to a Trunnion 4, the securing Bolt passing through one of the open areas of the Trunnion. Because of this, a Washer is mounted on the Bolt so as to hold the Trunnion in place. A second, inverted Trunnion is then bolted to the apex of Trunnion 4 and to this are fixed two 2½ in. Strips 5, the securing Bolts also holding a 2½ × 1½ in. Plastic Plate 6 in place. Each Strip is attached to corresponding Plate 2 by an Angle Bracket while another 2½ in. Strip is bolted to the horizontal flange of Trunnion 4.

Strips 3 are now joined by a 2½ × ½ in. Double Angle Strip, while another similar Double Angle Strip is bolted between the upper rear corners of Plate 1, the securing Bolts also fixing a 5½ in. Strip 7 in place at each side. These Strips are curved inwards and shaped until a 1 in. Rod 8 can be held by Spring Clips in their end holes, then each is braced by a 2½ in. Stepped Curved Strip bolted to the lower corner of Plate 1.

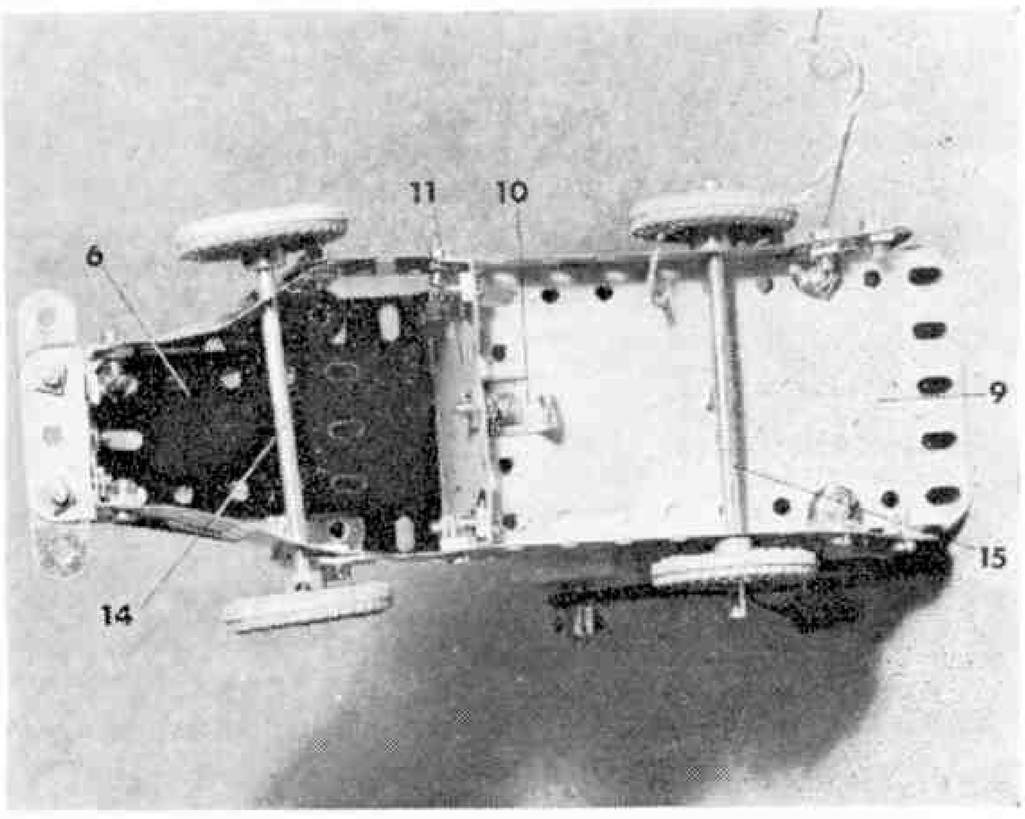
The bed of the truck consists simply of a 4½ × 2½ in. Flexible Plate 9 attached to Plates 1 by Angle Brackets. Fixed by a Double Bracket across the inside end of this Plate is a 2½ × 2½ in. Flexible Plate 10 extended by a 2½ × 2½ in. Plastic Plate 11, the latter curved over and bolted, along with a 2½ in. Strip 12, to the Double Angle Strip joining Strips 3.

A 3½ in. Rod 13, journalled in Fishplates bolted to Plates 1, acts as the winch. The Rod carries a length of Cord attached to a Cord Anchoring Spring and is held in place by a Spring Clip and a 2 in. Pulley. This Pulley is connected by a Driving Band to a ½ in. Pulley on the output shaft of the Junior Power Drive Unit which is fixed as shown to Plate 9. The wheels are supplied by 1 in. Pulleys with Motor Tyres, those at the front being mounted on a 3½ in. Rod 14 and those at the rear on a 4 in. compound rod 15 obtained from two 2 in. Rods joined by a Rod Connector. Finally, a Rod and Strip Connector 16 is bolted to the radiator-grille, to add some embellishment, and a hook is tied to the end of the winch Cord.

PARTS REQUIRED

2—2	1—20a	2—48a	2—188
6—5	4—22	1—69	2—189
2—10	1—23a	5—69a	1—190
1—11	3—35	2—90a	1—191
8—12	38—37a	2—126	1—194
2—16	38—37b	4—142c	1—194a
2—17	10—38	1—176	1—212
1—18b	1—40	1—186a	1—213

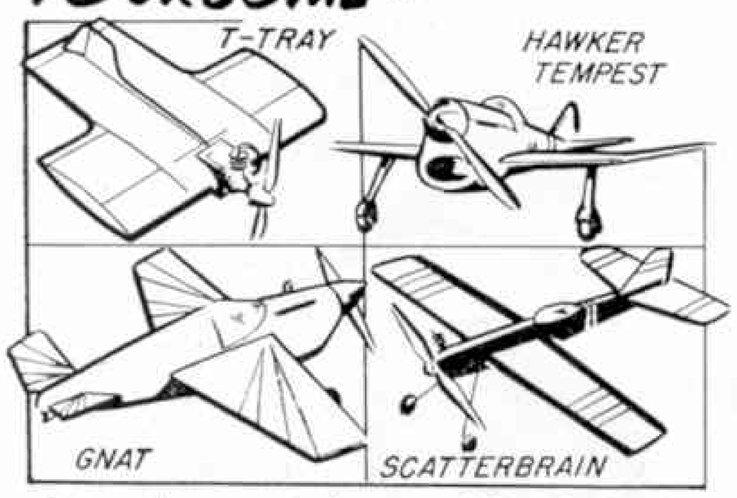
1—Small Hook



Above, built with the Meccano Junior Power Drive Set, this little Breakdown Truck incorporates a winch driven by the new Junior Power Drive Unit. At right, an underside view of the model showing its simple construction. Note the built-up rear axle.

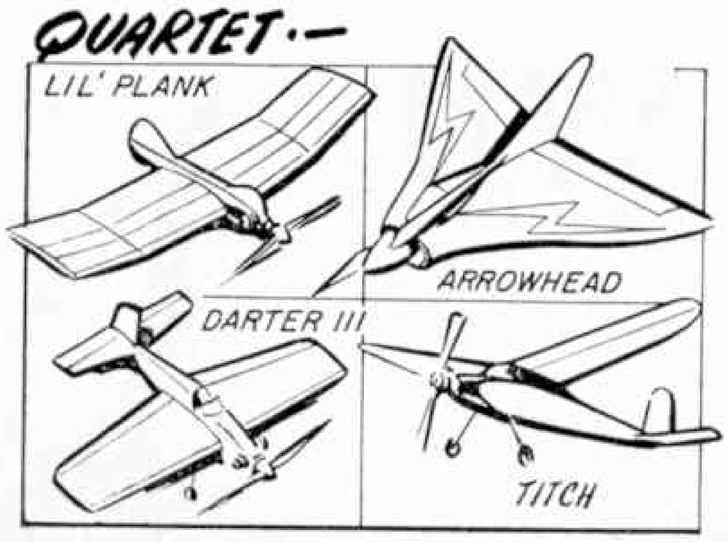
JUST A FEW OF OUR MANY PLANS FOR YOU TO BUILD FROM

FOURSOME.—



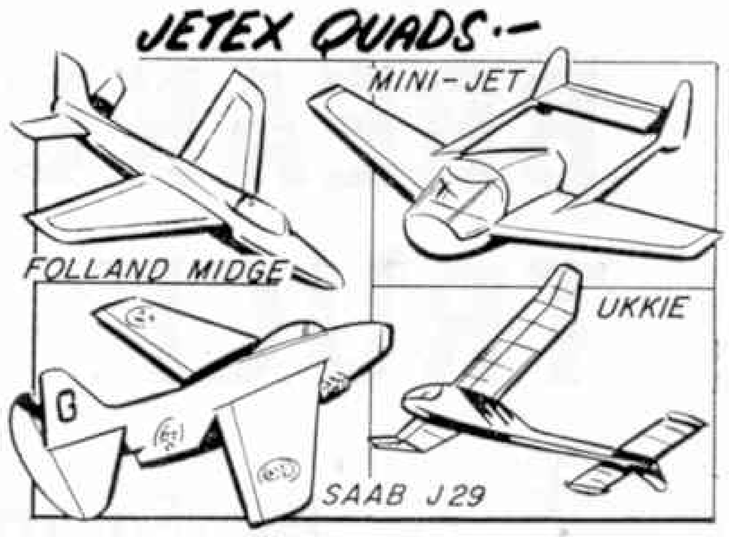
A complete course in control line for beginners. All take 0.8 c.c.-1.5 c.c. engines. Four super plans, "Scatterbrain" trainer, "T-Tray" stunter, "Gnat" team racer and "Hawker Tempest" racer. Plan U596, price **2s. 6d.**

QUARTET.—



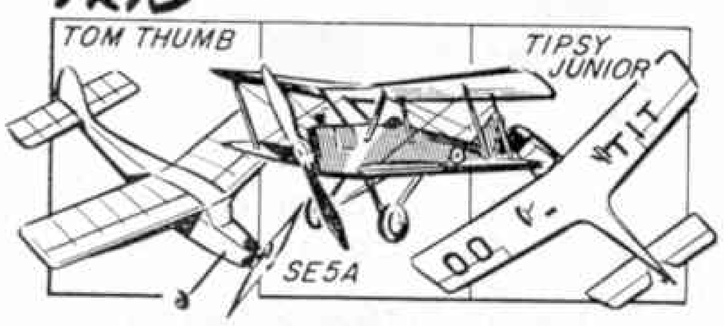
Four models for 0.5 c.c. engines. Delta controliner "Arrowhead" and stunter "Darter." Free flight models "Tich" and "Lil Plank." Very simple to build model. Plan U595, price **2s. 6d.**

JETEX QUADS.—



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

TRIO.—

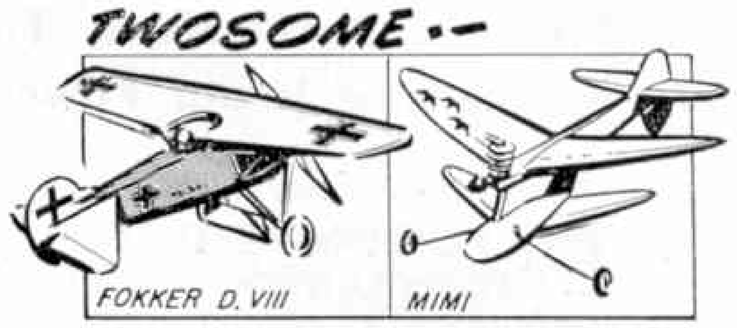


Three models for 0.010-0.020 engines. The "S.E.5a" and "Tipsy Junior" are scale free flight models and "Tom Thumb" a specially created sports cabin model. Plan U656, price **2s. 6d.**

THREESOME.—

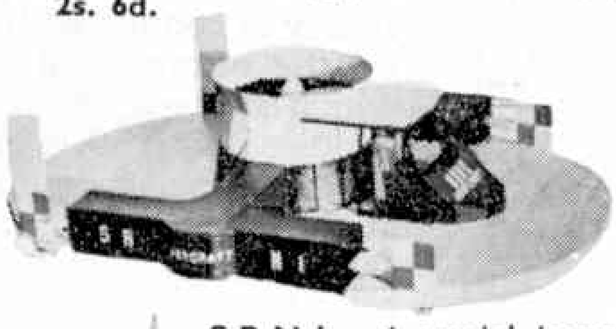
Three rubber models of simple construction including two scale models the "Piper Pacer" and "Max Holste" plus a midget racer. All about 21 in. wingspan. Plan U658, price **2s. 6d.**

TWOSOME.—

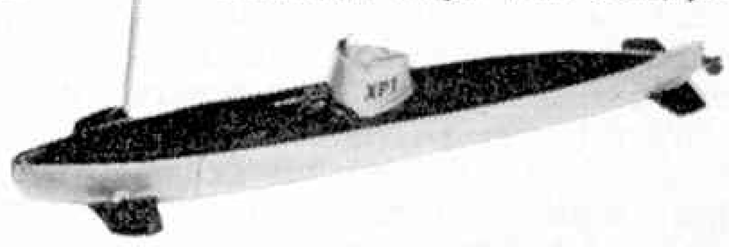


A pair of baby free flight models for engines of up to 0.5 c.c. "Mimi" is a biplane and the "Fokker DVIII" is a scale model with unique detachable wings. Plan U655, price **2s. 6d.**

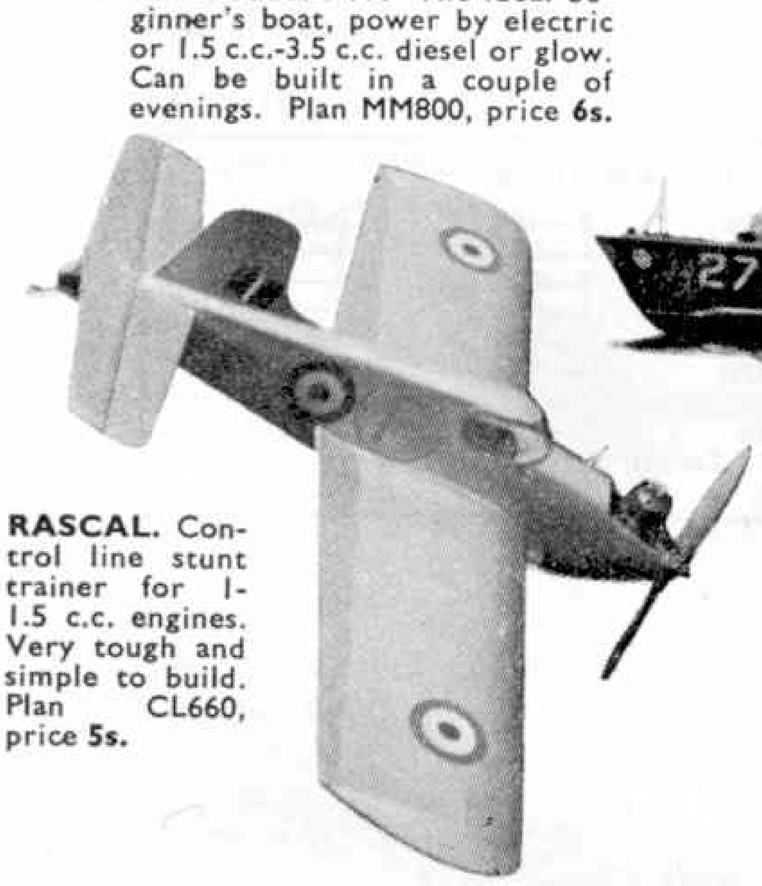
MOONGLOW. The ideal beginner's boat, power by electric or 1.5 c.c.-3.5 c.c. diesel or glow. Can be built in a couple of evenings. Plan MM800, price **6s.**



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

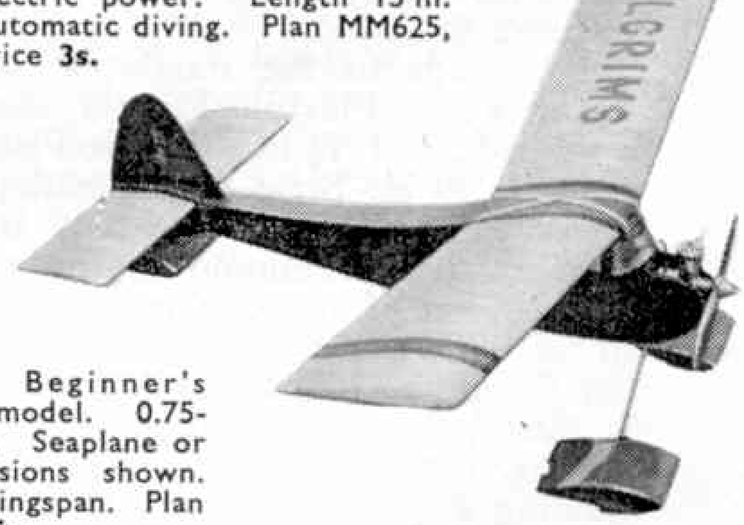


SPRAT. Very easy to construct, high speed miniature submarine. Electric power. Length 15 in. Automatic diving. Plan MM625, price **3s.**



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

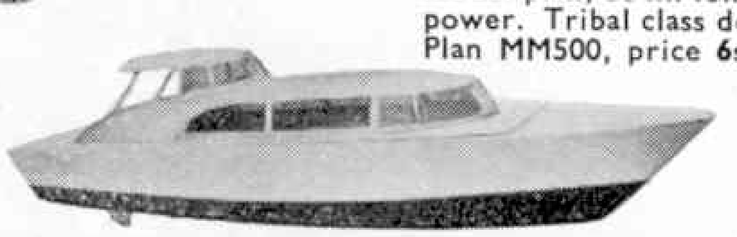
VOSPER R.T.T.L. Authentic scale model, full of detail. Length 34 in. for 1.5 c.c.-3.5 c.c. diesels or electric drive. Plan MM530, price **10s.**



TOMBOY. Beginner's sport power model. 0.75-1.5 c.c. engine. Seaplane or landplane versions shown. 36 or 44 in. wingspan. Plan PET398, price **5s.**

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

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



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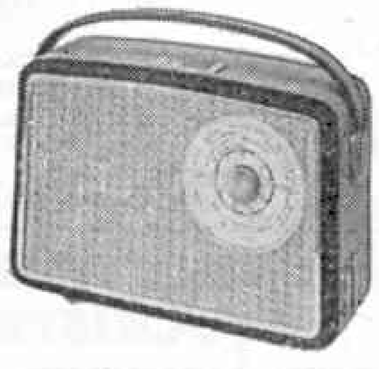

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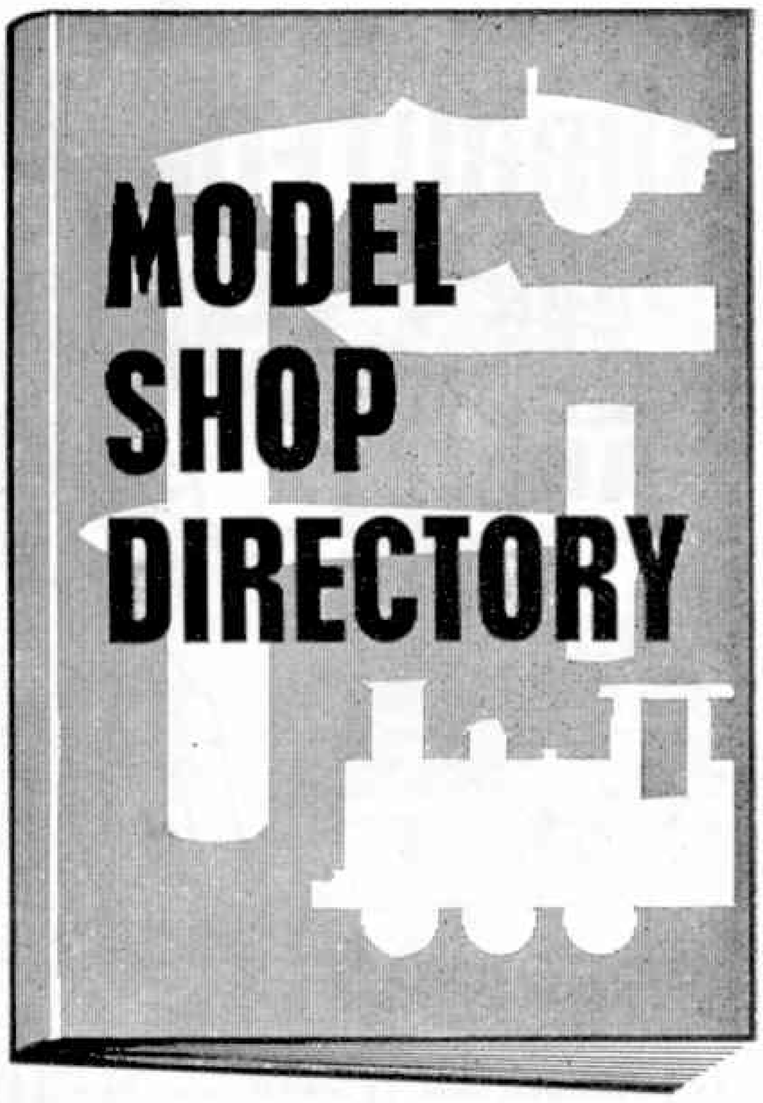

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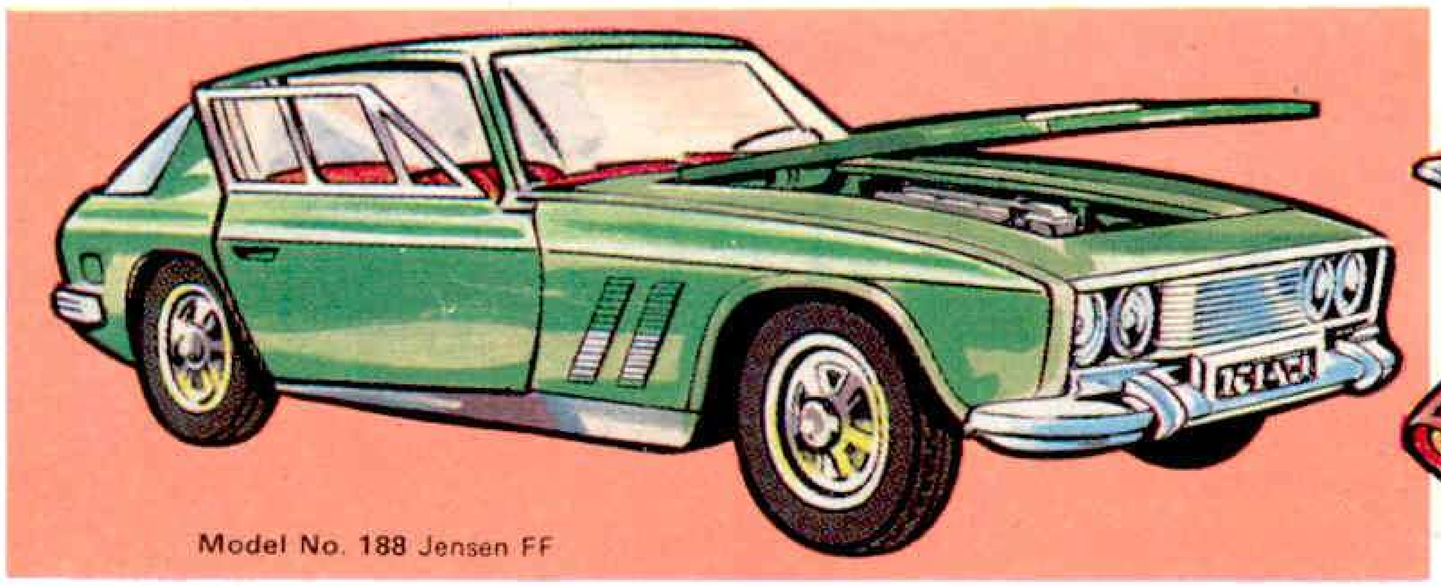

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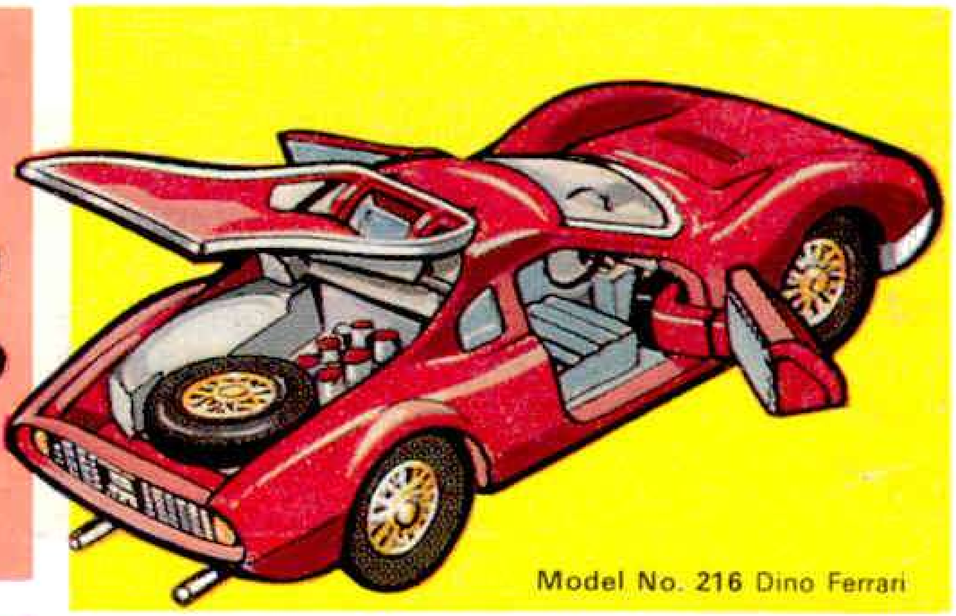

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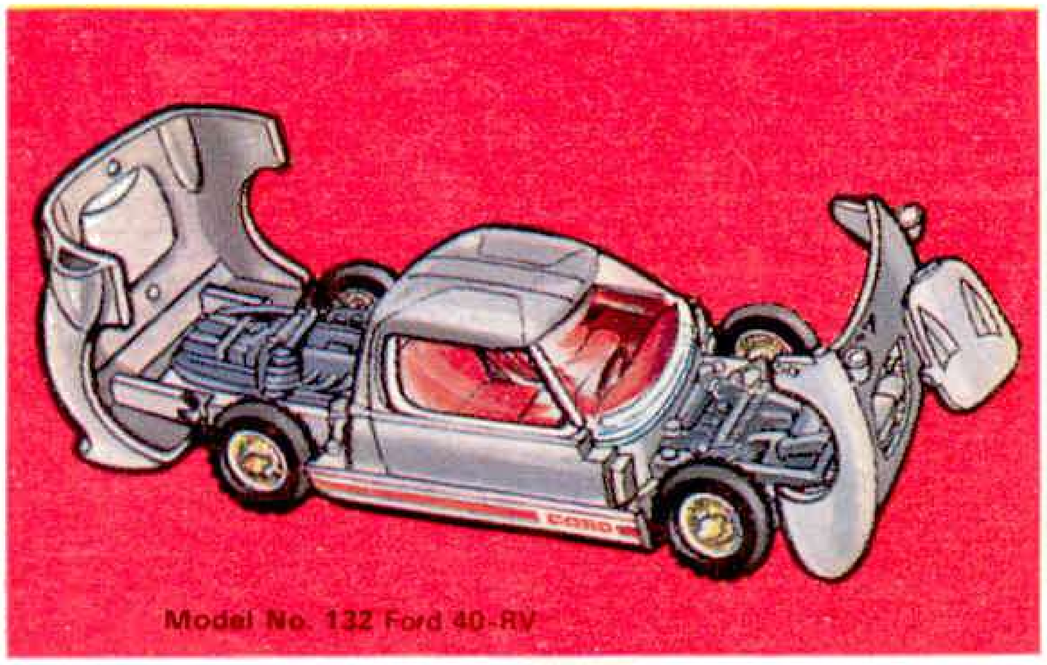

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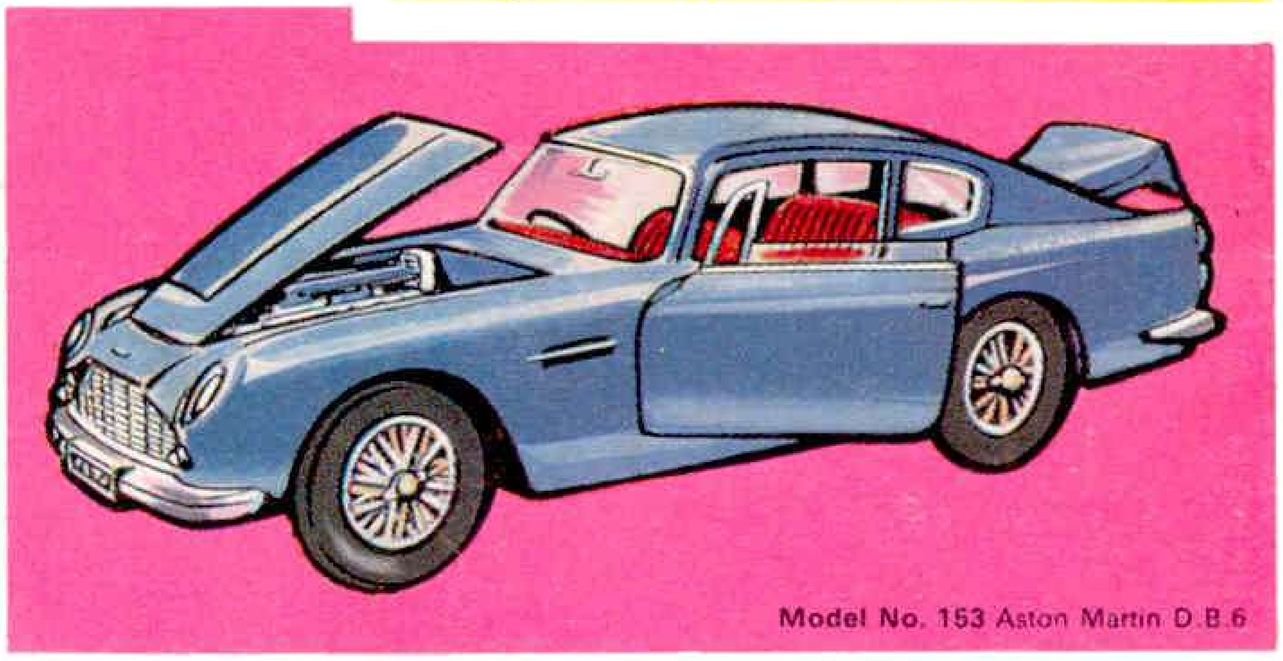

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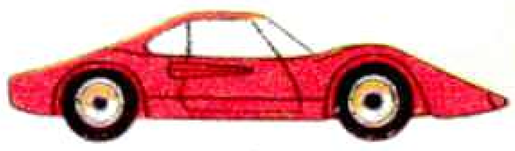
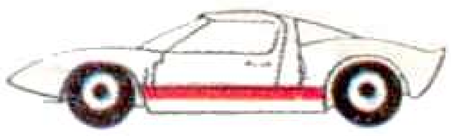


No. 216 DINO FERRARI

Take a look at the power-packed engine under the wide-opening hatch. Doors open fully to let you examine the finely-detailed interior. Every fitting to scale for **8/11**



No. 132 FORD 40-RV

A perfect scale model of this blistering top-performance track car — complete with scale details and action features to let you get at them. Wide opening engine cover and bonnet with lift-off hatch. Jewelled headlights.

The real thing in miniature for **9/11**

No. 153 ASTON MARTIN D.B.6

A true scale model — with exciting action features. Gleaming headlights, full suspension, steering and tilting seats. Boot, doors and bonnet all open so you can get to close-quarters with exact-scale details.

All this for **9/11**

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the tough, action-packed models