VOL. XXV. No. 1

JANUARY 1940

MECCANO MAGAZINE

CHALLENGE!

6D.

MECCANO

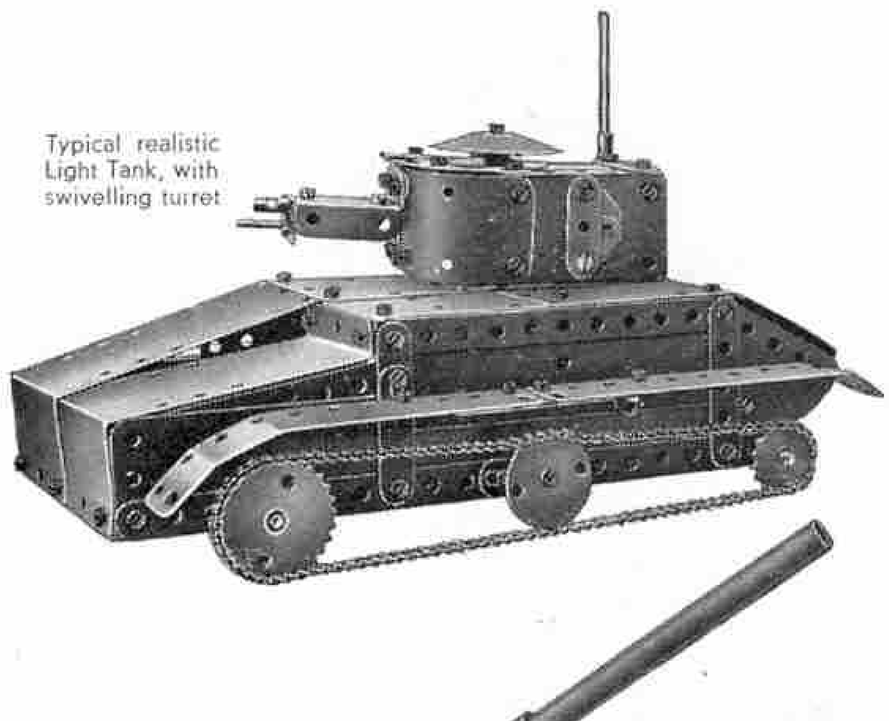
MECHANISED ARMY OUTFIT

Every boy is interested in the mechanised units of the British Army, and will welcome this fine new Mechanised Army Outfit, which makes possible the building of models of a variety of Army prototypes.

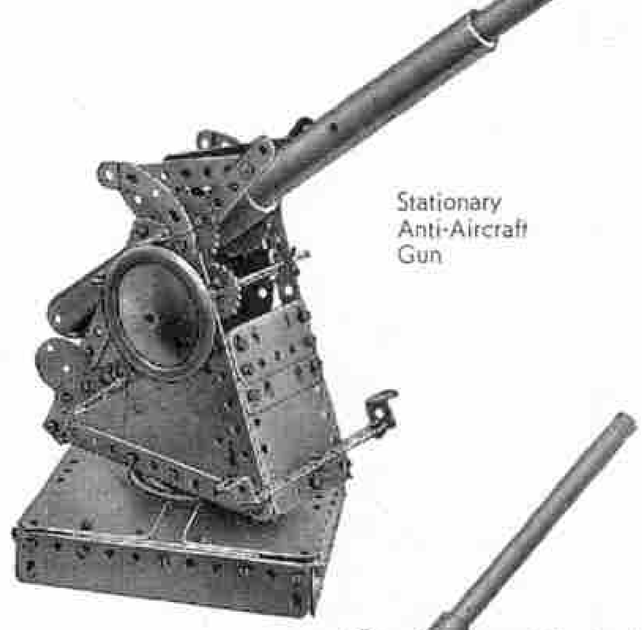
The Outfit consists of a big assortment of specially designed Meccano Parts, including gun barrels, with which realistic models of Tanks, Anti-Aircraft Guns, Field Guns, Transport Lorries, etc., can be built. The parts are finished in the correct shade of Service green.

The models shown here are taken from the illustrated Manual of Instructions included in the Outfit.

Revised Price **12'6**



Typical realistic Light Tank, with swivelling turret



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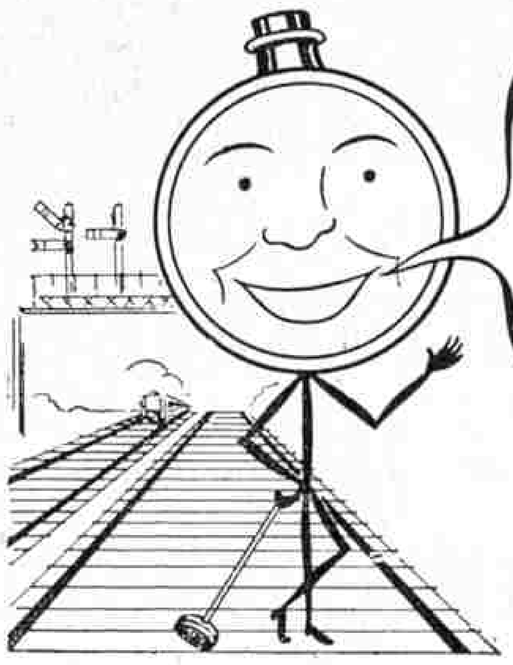

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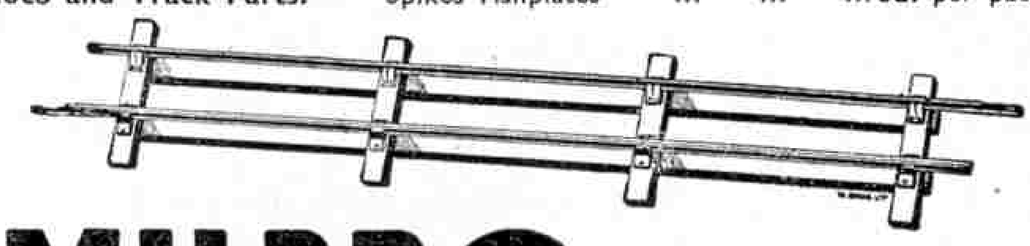

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185	186	8	·45	**1/–**	**11d.**	227	228	10	·45	**1/–**	**11d.**
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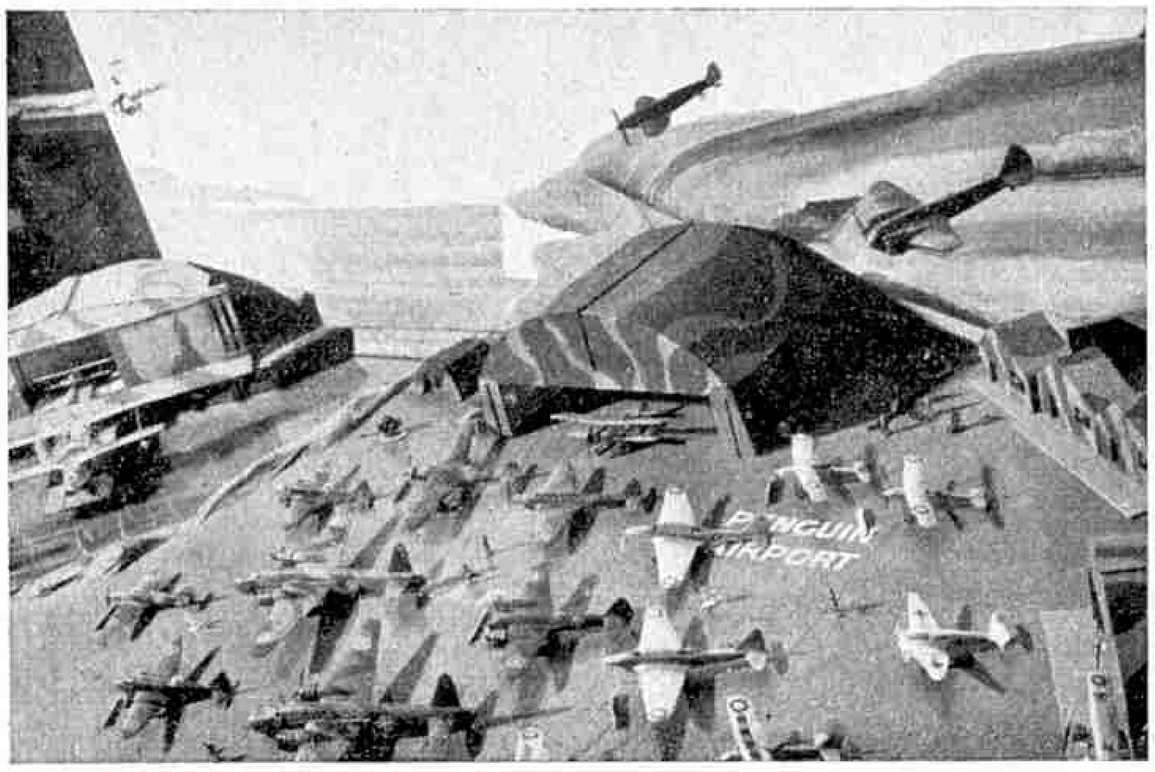

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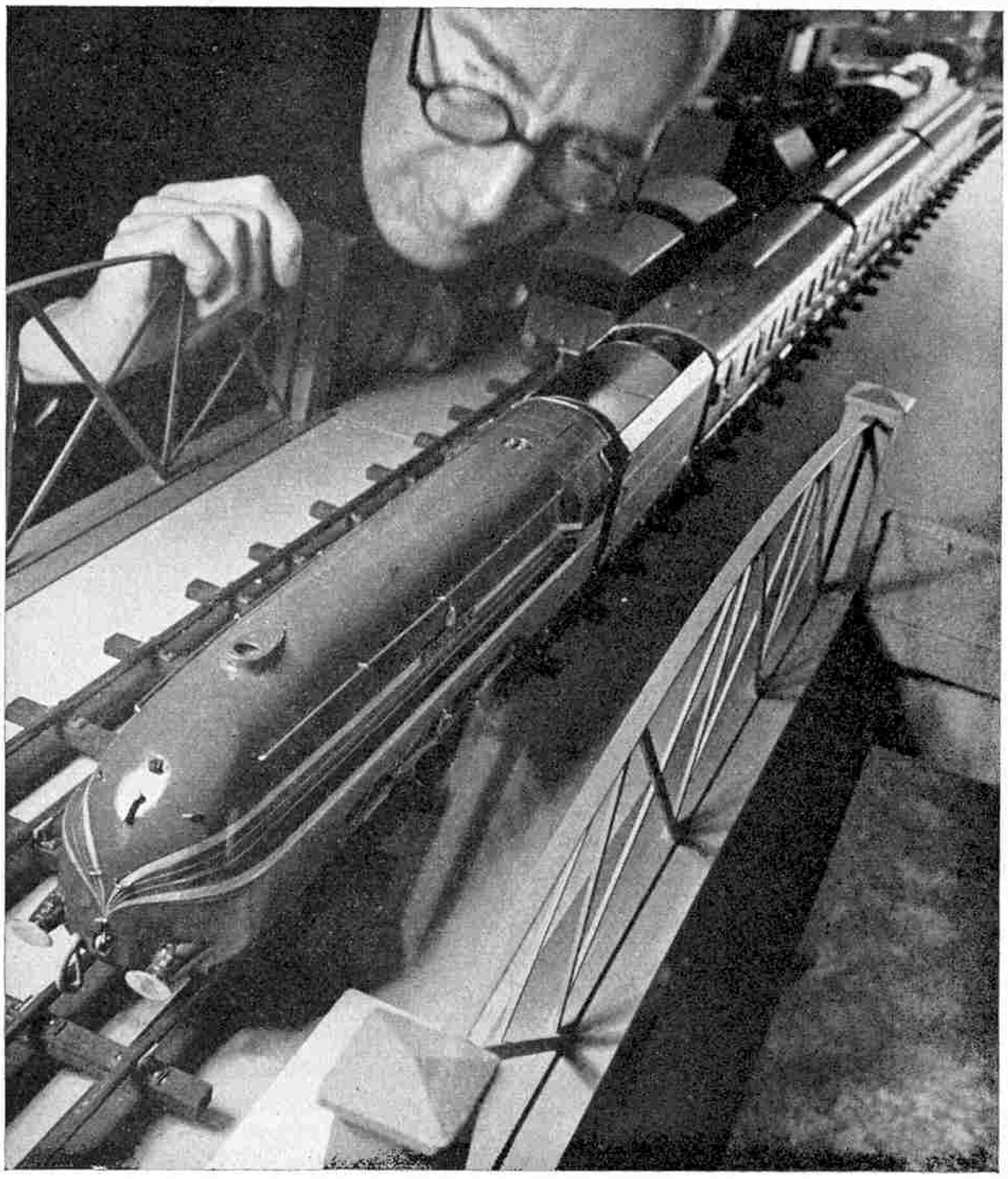

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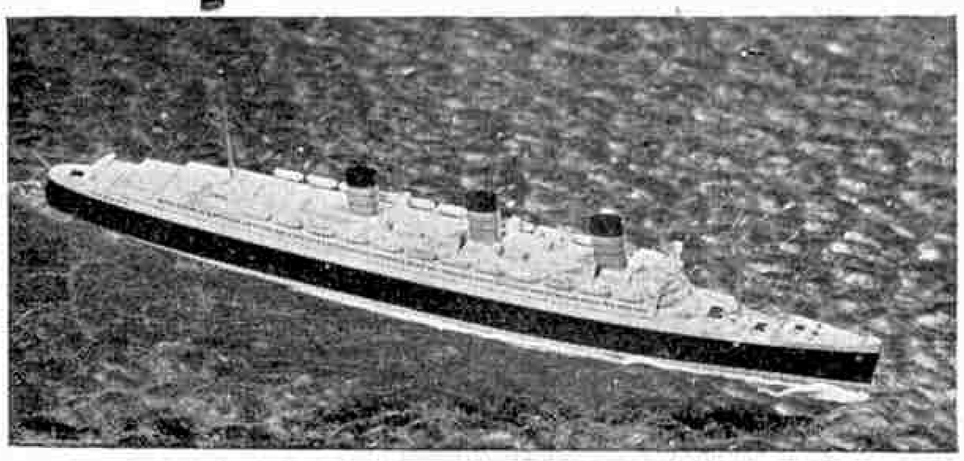

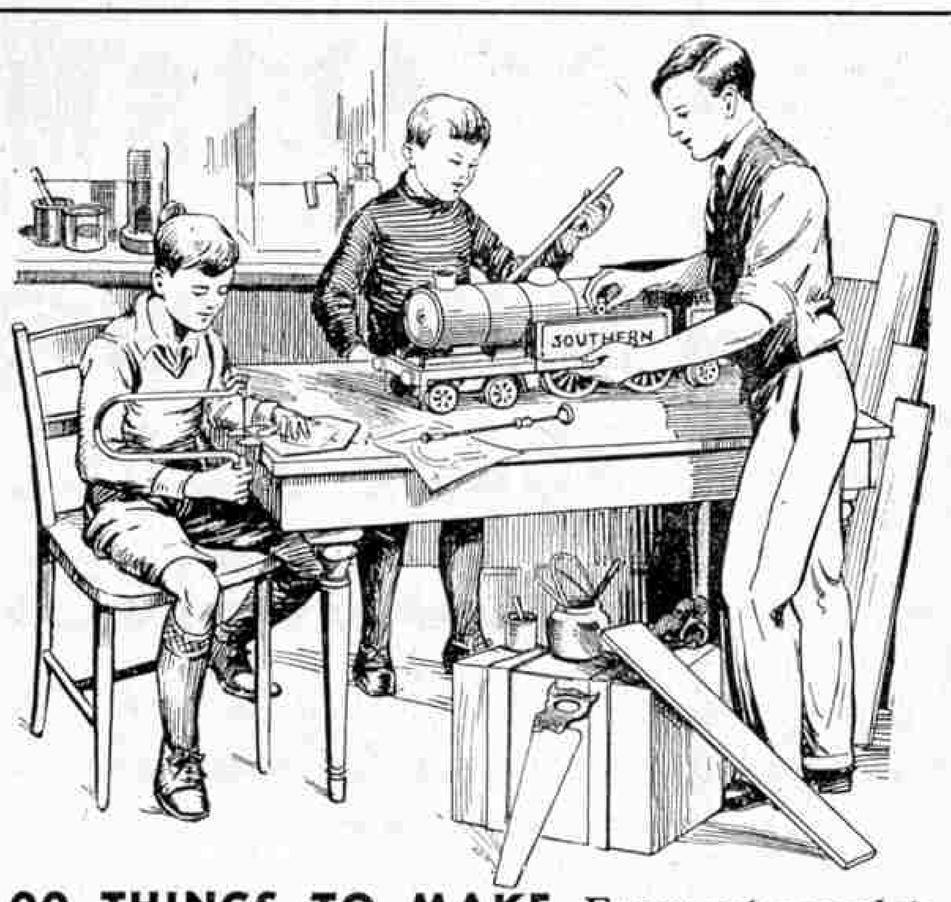

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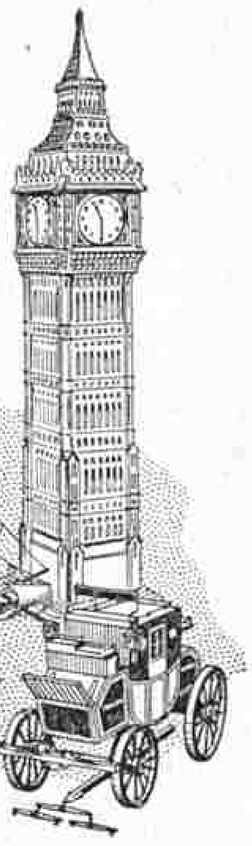

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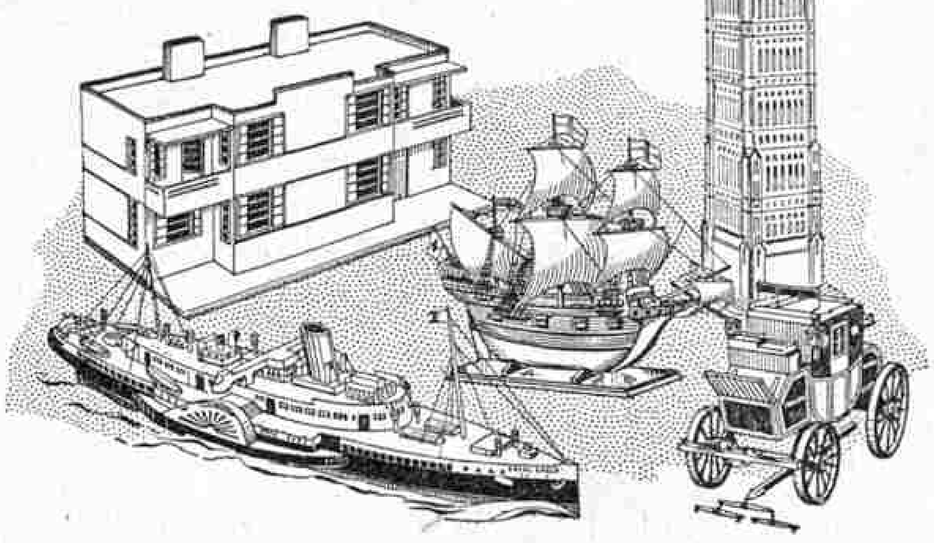

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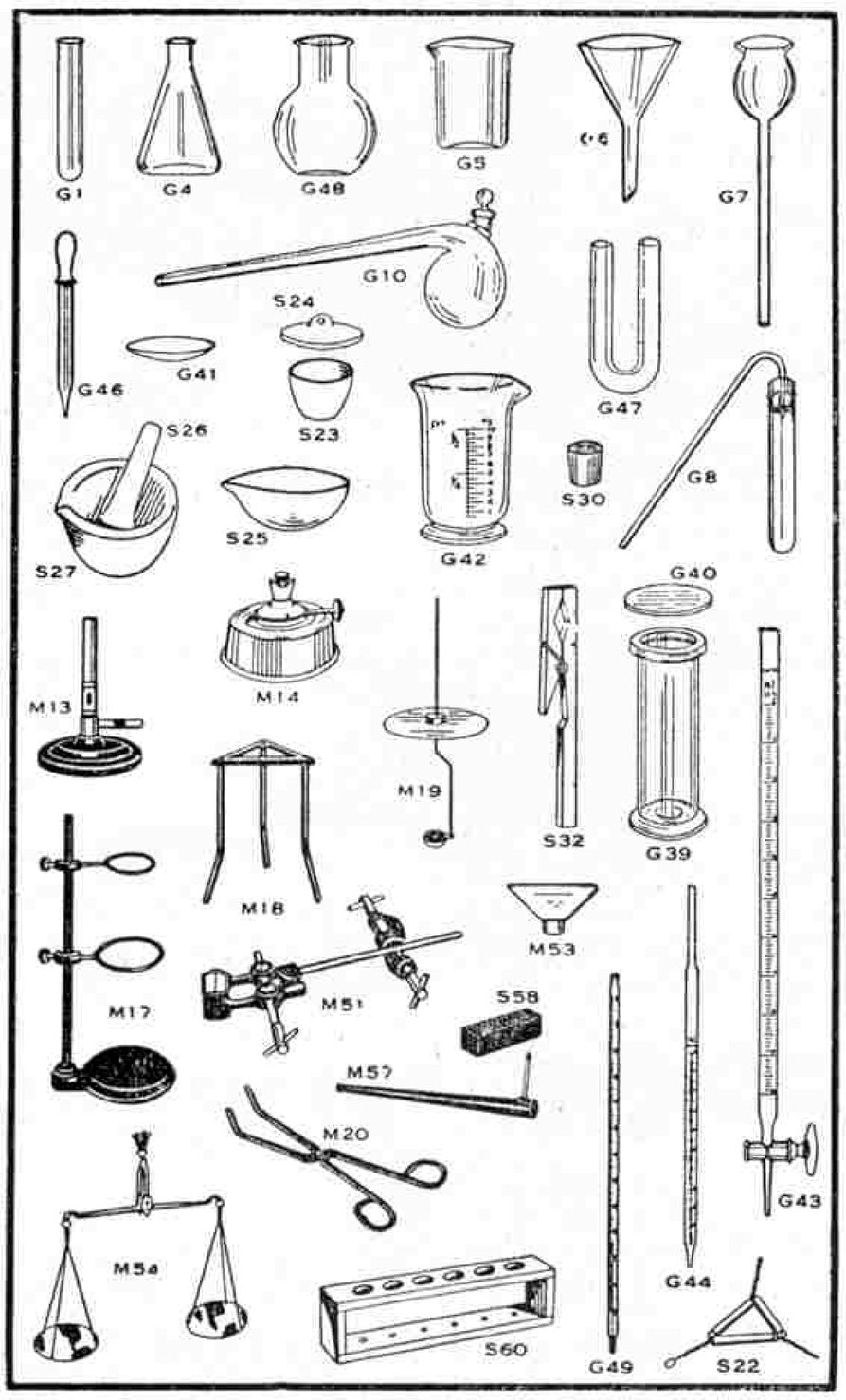

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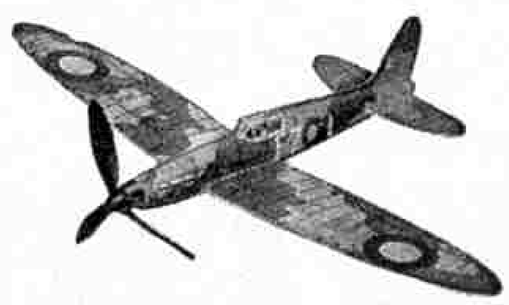

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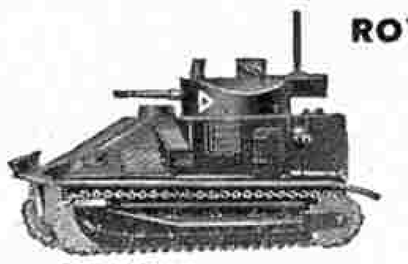


151A

151D

150D

151C

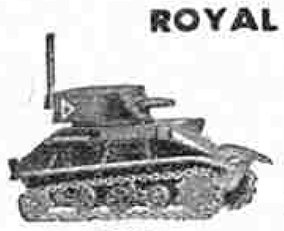
151B

Dinky Toys No. 151

No. 151a	Medium Tank	each	1'9
No. 151b	Transport Wagon ...	"	1'2
No. 151c	Cooker Trailer	"	7d.
No. 151d	Water Tank Trailer ...	"	5d.
No. 150d	Driver	"	2d.

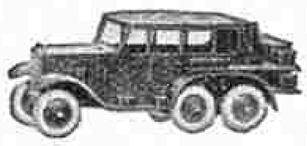
Price of complete set **4'-**

ROYAL TANK CORPS LIGHT TANK SET



152 a

150 d



152 b

152 c

Dinky Toys No. 152

No. 152a	Light Tank ...	each 1'2	No. 152c	Austin Seven Car	each 5d.
No. 152b	Reconnaissance Car	" 1'2	No. 150d	Driver ...	" 2d.

Price of complete set **2'11**

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150a

150b

150c

150e

Dinky Toys No. 150

No. 150a	Officer	each	2½d.
No. 150b	Private, sitting (two in set)	"	2d.
No. 150c	Private, standing (two in set) ...	"	2d.
No. 150e	N.C.O.	"	2d.

Price of complete set **1'-**

MOBILE ANTI-AIRCRAFT UNIT

Dinky Toys No. 161

Comprises scale models of a Quick-firing Anti-aircraft Gun mounted on a mobile platform and a Searchlight mounted on a lorry. Both Gun and Searchlight have elevating and traversing movements. Price **3'6** per set

ROYAL ARTILLERY PERSONNEL

160A 160B 160C 160D

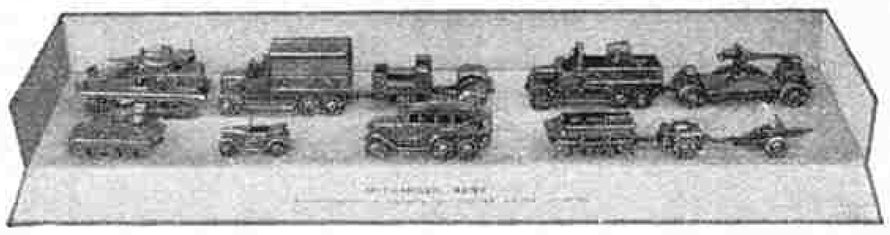
Dinky Toys No. 160

For use with Dinky Toys No. 161, Mobile Anti-Aircraft Unit and No. 162, 18-pounder Quick-Firing Field Gun Unit.

No. 160a	N.C.O.	each	2½d.
No. 160b	Gunner, sitting (two in set)	"	2d.
No. 160c	Gunlayer	"	2d.
No. 160d	Gunner, standing (two in set)	"	2d.

Price of complete set **1'-**

MECHANISED ARMY



Dinky Toys No. 156

This fine set contains the principal units of a modern mechanised army. It includes the following items:

Royal Tank Corps Medium Tank Set (Dinky Toys No. 151) without driver.
Royal Tank Corps Light Tank Set (Dinky Toys No. 152) without driver.
Mobile Anti-Aircraft Unit (Dinky Toys No. 161).
18-Pounder Quick-Firing Field Gun Unit (Dinky Toys No. 162).

Price **12'6**

A FASCINATING COLLECTING HOBBY

DINKY TOYS

OVER 300 VARIETIES

GARDNER'S M.G. RECORD CAR

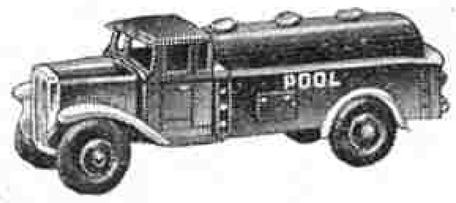
Dinky Toys No. 23p

Announced in our September issue, but production unavoidably suspended until this month.

A scale model of the car in which Major A. T. G. Gardner, in May 1939, set up new world speed records for the kilometre and flying mile for cars up to 1,100 c.c., and for the flying kilometre, mile and five kilometres for cars up to 1,500 c.c. Price **1/-** each

NEW THIS MONTH

"POOL" PETROL TANK WAGON



Dinky Toys No. 25d

This is a realistic model of one of the wartime tank wagons in which "pool" petrol is distributed. It is enamelled grey with white wings, and bears the name "Pool" on the tank sides. Price **11d.** each

SEARCHLIGHT LORRY

Dinky Toys No. 22s

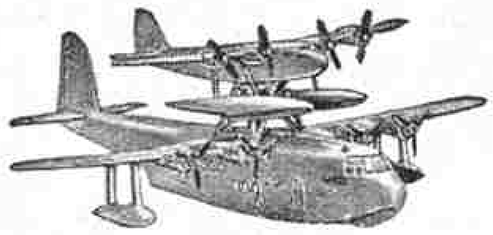
A fine model of a four-wheeled motor lorry carrying a searchlight that can be elevated and traversed. It is enamelled in Service green. Price **1/-** each

AIRSPEED "ENVOY" MONOPLANE

Dinky Toys No. 62m

Scale model of the Airspeed "Envoy" twin-engined commercial monoplane. Assorted colours. Price **7d.** each

MAYO COMPOSITE AIRCRAFT



Dinky Toys No. 63

Scale model of the Mayo Composite Aircraft. Price **2/4** each

The components of the above can be purchased separately.

No. 63a Flying Boat "*Maia*" ... each **1/6**
No. 63b Seaplane "*Mercury*" ... „ **11d.**

HAWKER "HURRICANE" SINGLE-SEATER FIGHTER (Camouflaged)

Dinky Toys No. 62h

Scale model of the Hawker "Hurricane" single-seater Fighter extensively used by the R.A.F. Price **7d.** each

IMPERIAL AIRWAYS "FROBISHER" CLASS LINER

Dinky Toys No. 62w

Scale model of the Imperial Airways "Frobisher" class liner. Three models available named: "*Frobisher*," "*Falcon*" and "*Fortuna*." Price **1/-** each

"DOUGLAS D.C.3" AIR LINER

Dinky Toys No. 60t

Scale model of the "Douglas D.C.3" air liner, which is in regular service on American and European routes. Price **11d.** each

BOEING "FLYING FORTRESS"

Dinky Toys No. 62g

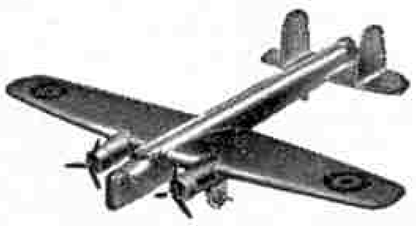
Scale model of B-17 "Flying Fortress," one of the fastest bombers in the world, and extensively used by the United States Army Air Corps. Price **1/2** each

ARMSTRONG WHITWORTH "ENSIGN" AIR LINER

Dinky Toys No. 62p

Scale model of the largest British air liner. Six models available, named "*Ensign*," "*Elsinore*," "*Explorer*," "*Echo*," "*Ettrick*" and "*Elysian*." Price **1/3** each

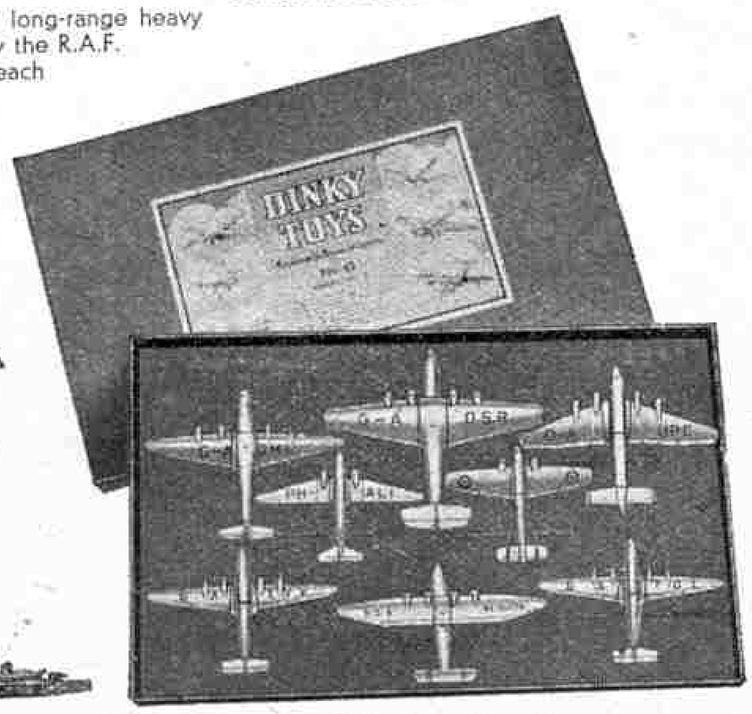
ARMSTRONG WHITWORTH "WHITLEY" BOMBER



Dinky Toys No. 60v

Scale model of "Whitley" long-range heavy bomber adopted by the R.A.F. Price **11d.** each

PRESENTATION AEROPLANE SET



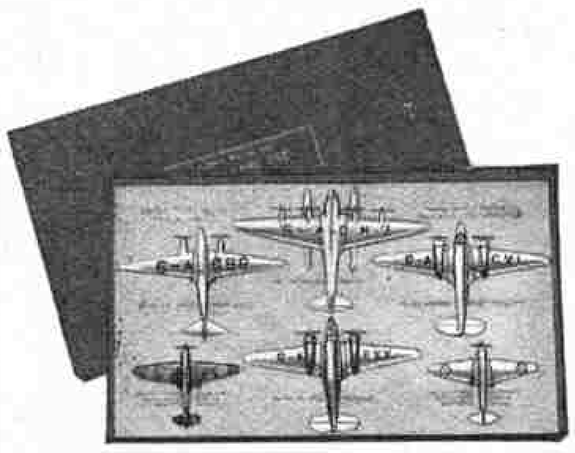
Dinky Toys No. 65

This Aeroplane Set, in presentation box, consists of the following Dinky Toys:

No. 60r Empire Flying Boat
No. 60t Douglas DC-3 Air Liner
No. 60v Armstrong Whitworth "Whitley" Bomber
No. 60w "Clipper III" Flying Boat
No. 62n Junkers Ju 90 Air Liner
No. 62p Armstrong Whitworth "Ensign" Air Liner
No. 62r De Havilland "Albatross" Air Liner
No. 62w Imperial Airways "Frobisher" Class Air Liner

Price **8/6**

PRESENTATION AEROPLANE SET



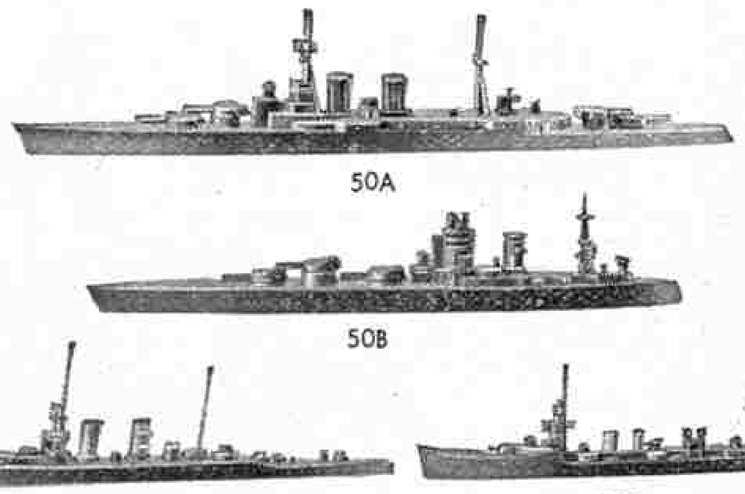
Dinky Toys No. 64

This Aeroplane Set, in presentation box, consists of one each of the following Dinky Toys:

No. 60g D.H. "Comet" Aeroplane
No. 62h Hawker "Hurricane" Single-Seater Fighter (Camouflaged)
No. 62k The King's Aeroplane—Airspeed "Envoy"
No. 62m Airspeed "Envoy" Monoplane
No. 62s Hawker "Hurricane" Single-Seater Fighter (Aluminium Finish)
No. 63b Seaplane "Mercury"

Price **4/-**

SHIPS OF THE BRITISH NAVY



50A

50B

50C

50E

No. 50a	Battle Cruiser "Hood"	each **7d.**
No. 50b	Battleships, "Nelson" Class (Two in set) ...	„ **6d.**
No. 50c	Cruiser "Effingham"	„ **5d.**
No. 50d	Cruiser "York"	„ **5d.**
No. 50e	Cruiser "Delhi"	„ **4d.**
No. 50f	Destroyers, "Broke" Class (Three in set) ...	„ **1½d.**
No. 50g	Submarine, "K" Class	„ **1½d.**
No. 50h	Destroyers, "Amazon" Class (Three in set)...	„ **1½d.**
No. 50k	Submarine, "X" Class	„ **1½d.**

Price of complete set **3/6**

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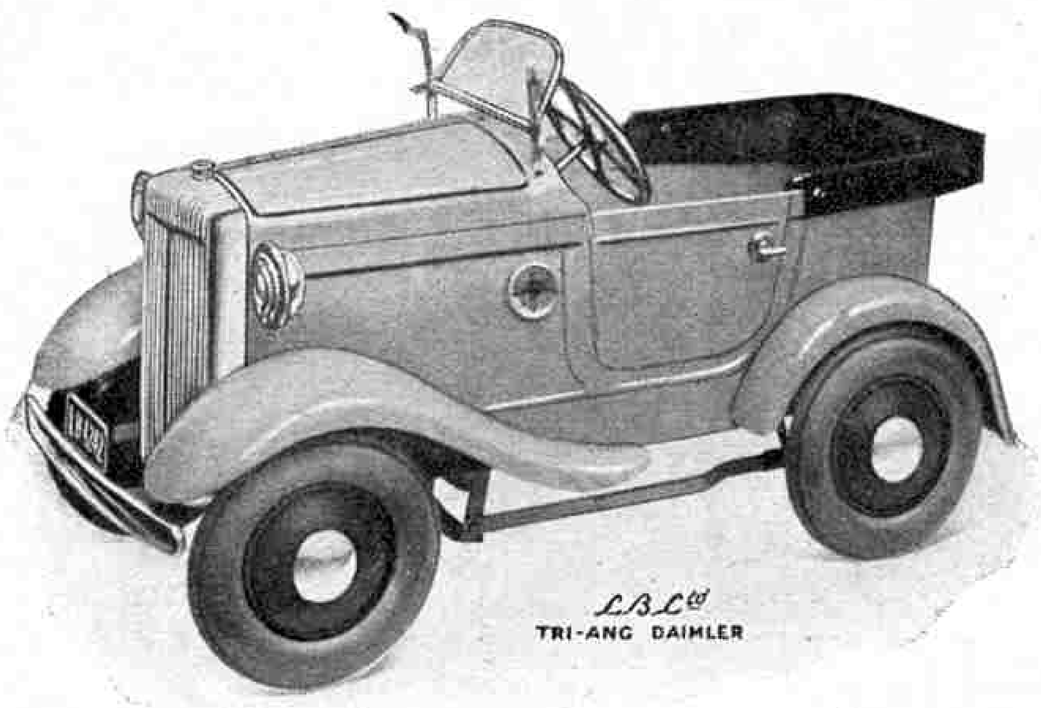
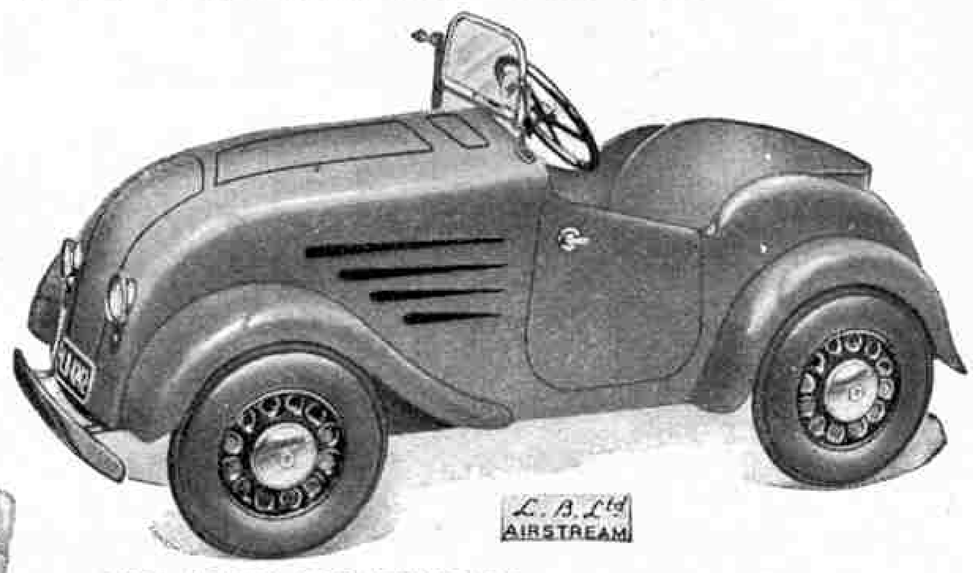
TRI-ANG

ALL BRITISH TOYS



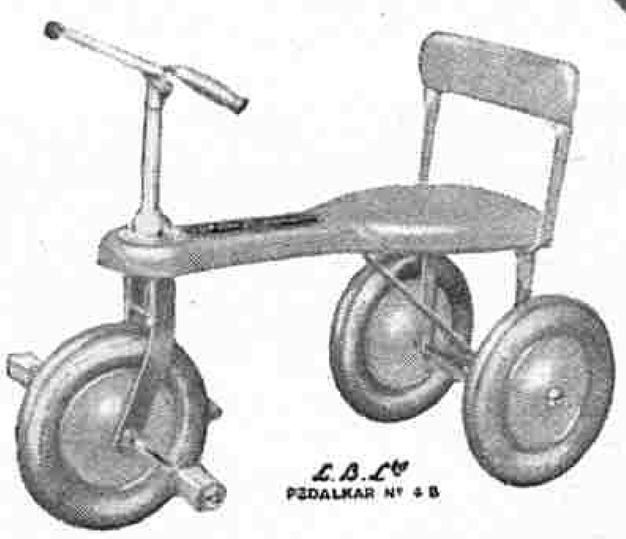
TRI-ANG DAIMLER

Modern design. Steel body with opening side door. Upholstered seat and back. BALL-BEARING BACK AXLE. Facsimile Daimler radiator, dummy hood and lamps. Latest type mudguards. 9 in. balloon disc wheels. ⅝ in. rubber tyres. All bright parts CHROMIUM PLATED. Length 37 ins.



TRI-ANG AIRSTREAM

New Model. Steel body with opening side door, upholstered seat. Adjustable wind screen and direction indicators. 9 in. new type easy-clean wheels with malleable hubs, ⅝ in. tyres. Hand brake. Length 44 ins. Suitable for ages 4 to 7.

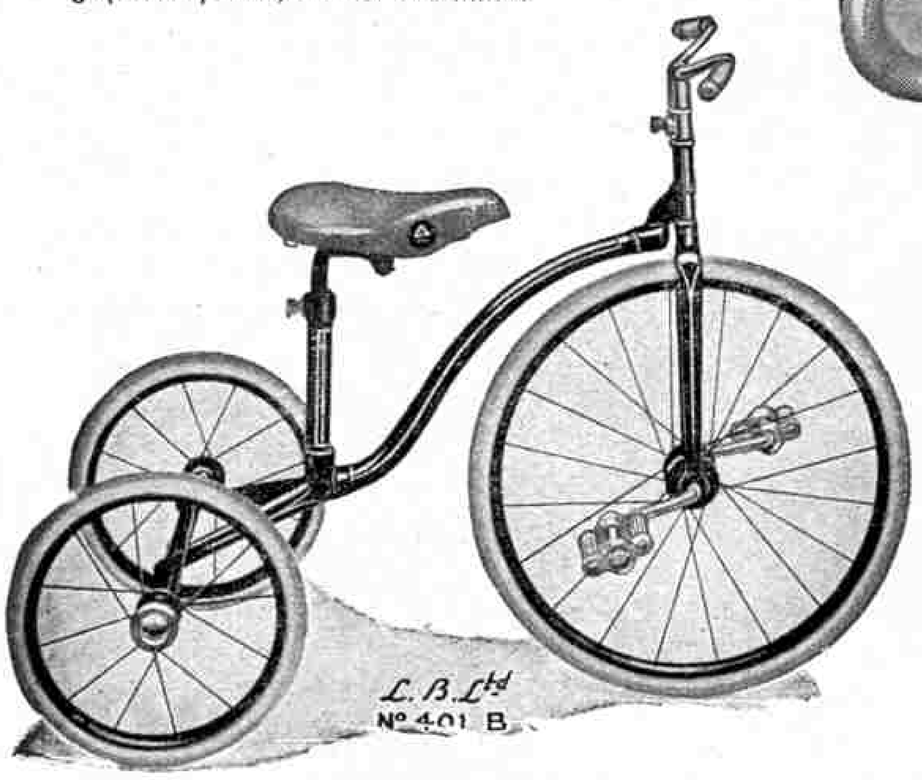


4 B PEDAL KAR

Pressed steel seat and folding back rest, balloon disc wheels, rubber tyres, nickel plated handlebars, rubber grips and pedals, blue or red finish.

TRI-ANG DAIMLER SPORTS No. 8

Magnificent coach-built sports car. Upholstered seat. Tubular front axle. BALL-BEARING REAR AXLE, both fully sprung. Adjustable pedals. Band brake. Facsimile Daimler radiator. Adjustable windscreen. Klakker horn, etc. Dunlop 2¼ in. Pneumatic tyres on tangent spoke wheels. All bright parts CHROMIUM-PLATED. Length 54 ins.



TRI-ANG JUNIOR TRIKE No. 401B

Strong cycle tube frames, enamelled black, gold lines. Adjustable saddle. Thick white cushion tyres. Nickel-plated fittings.

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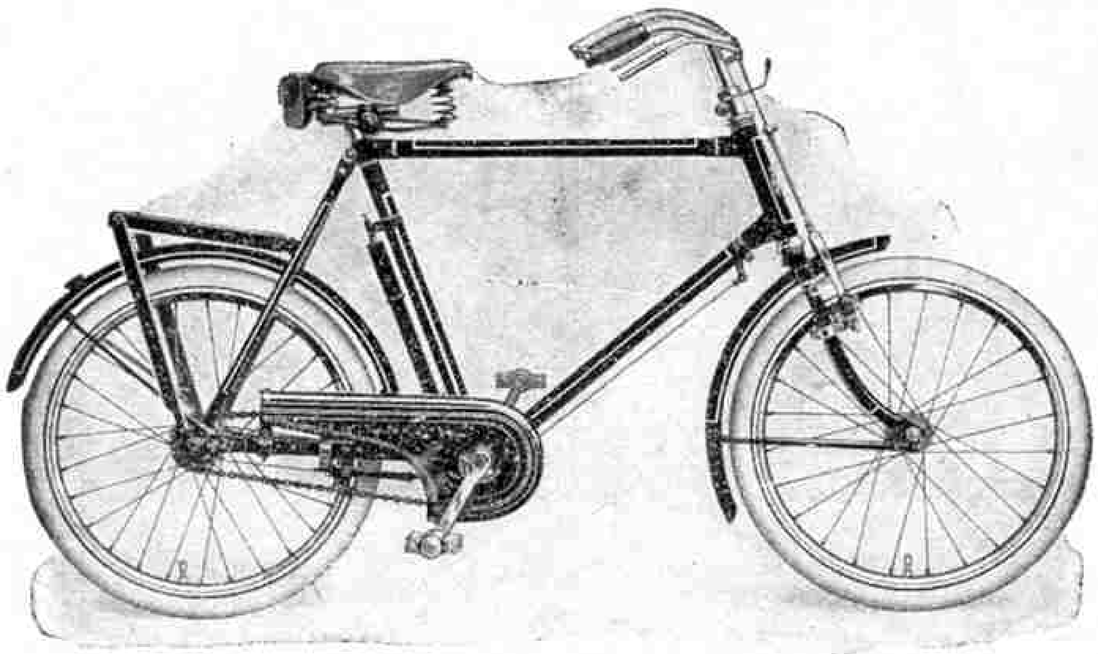
TRI-ANG TOYS

Obtainable from all good toy shops and stores.



"UNITY" BOY'S CYCLE No. 18 PB

18 in. frame. Finest quality British tube. Wheels 18 in. x 1⅜ in. CHROMIUM-PLATED rims. Dunlop pneumatic tyres. Roller lever pattern brakes. Three-coil saddle. ½ in x ⅛ in. roller chain. Ball-bearings throughout. Complete with equipment and finished in black, blue or maroon. All usual bright parts CHROMIUM-PLATED. Ages 7 to 11.

TRI-ANG TRICYCLE No. 5B (Regd. Trade Mark)

Cycle chain drive with free-wheel. Frame and forks best quality weldless cycle tubing. 16 in. front and rear wheels. 1⅜ in. jointless sponge-rubber tyres. Roller lever brake. Ball-bearings throughout. Coil spring saddle. CHROMIUM FITTINGS. Black, blue or maroon.

Made by LINES BROS. LTD., Tri-ang Works, LONDON S.W.19

A HAPPY NEW YEAR TO EVERY READER!

MECCANO MAGAZINE

Editorial Office:
Binns Road, Liverpool 13
England

Vol. XXV. No. 1
January 1940

With the Editor

Our Radio Fund for the Royal Air Force

Last month I made a preliminary announcement of the starting of *"The M.M. Radio Fund for the R.A.F."* Large numbers of readers have written to say how delighted they are at this opportunity of doing something for the Royal Air Force of which we are all so proud, and to ask for details. Here they are.

The object of the Fund is to provide portable radio sets for the isolated units of the R.A.F., who are in urgent need of this means of keeping in touch with current events and hearing the programmes of the B.B.C. These units, which include the Observer Corps and outlying detachments of all kinds, are on watch unceasingly, day and night, for enemy activities. The conditions in which they work cut them off almost entirely from any form of amusement, and their off-duty hours are apt to become very monotonous. For these units a radio set will come as the most welcome of all gifts.

The Fund will be operated in direct association with the R.A.F. Comforts Committee, and all money received will be forwarded to this Committee *without any deduction of any kind for working expenses*. The Committee will buy suitable radio sets, and distribute them where they are most needed. The Fund will be audited by Messrs. Simon Jude and West, Chartered Accountants of Liverpool, who will prepare detailed statements at intervals. These statements will appear on a special page of the *"M.M."* on which, month by month, *every contribution will be acknowledged individually*.

General Sir W. Edmund Ironside, G.C.B., C.M.G., D.S.O., Chief of the Imperial General Staff.

To start the Fund well the Directors of Meccano Limited have promised an immediate contribution of twenty-five pounds.

And now, readers, I appeal to every one of you to look on this Fund as your own special way of making things more cheerful for the men of the R.A.F. who are guarding us so splendidly at Home, on the Continent and Overseas. Send your contributions as soon as possible, so that the R.A.F. Comforts Committee can get to work. Tell your parents, uncles and all other relations about the Fund, and gather in their subscriptions. Tell your friends; rope them all in; don't let a single one escape! And don't be discouraged if your contributions are small; every penny will help. When you have tackled the job, keep it going. Send something along each month, so that the supply of sets can be continued.

Readers, this is our very own Fund. Help me to make it a resounding success!

All envelopes containing contributions should be addressed as follows: The Editor, R.A.F. Fund, "Meccano Magazine," Binns Road, Liverpool 13.

Leaders in the War
IV. Sir Edmund Ironside

General Sir Edmund Ironside was born in 1880, and has had a distinguished and adventurous military career. After passing through Woolwich he joined the Royal Artillery in 1899, and served in the South African war, and the Great War. In 1938 he was appointed Inspector-General of Overseas Forces, and immediately on the outbreak of war he was made Chief of the Imperial General Staff.

Around our Zoos in War Time

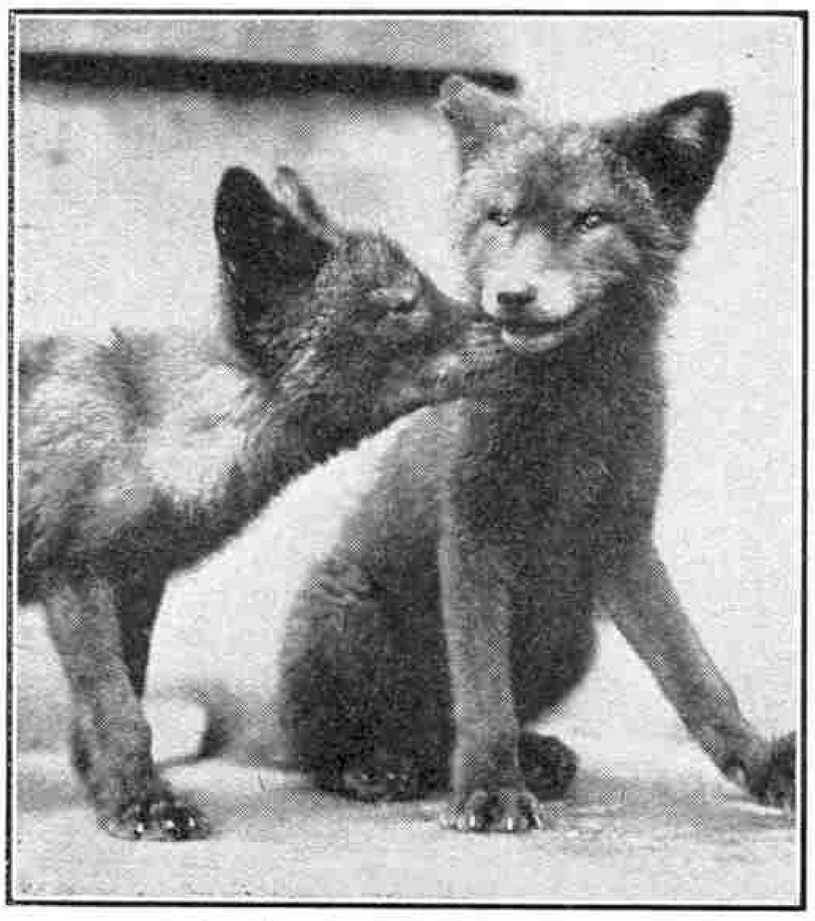
By Sydney Moorhouse, F.R.G.S.

ALTHOUGH the casual visitor to any of our great British Zoos—Regent's Park, Whipsnade, Edinburgh, Belle Vue (Manchester), Dudley or Chester—will find the motto of "Business as usual" predominating, the outbreak of war has presented serious problems that have had to be dealt with by the various authorities.

During the Great War of 1914–1918 the greatest difficulty was in obtaining a sufficiency of foodstuffs to maintain the animals. That problem has not yet been met with in the present war, but rigid economies have already been put into operation, and there is no doubt that if the struggle is of long duration the food question at many of our zoos will again become acute. To-day, however, the ever-present threat of attack from the air has caused a new and more difficult problem for those responsible for organising the life of our zoos. Not only has the safety of visitors been given careful consideration, but special arrangements have had to be made for the preservation of some of the rarer and more valuable birds and beasts. In fact, although the visitor will notice very little change from pre-war days, actually quite a lot of work has been going on behind the scenes.

At Regent's Park, where the Zoological Society of London's main collection is housed, 11 air raid shelters have been prepared, and it is estimated that 2,000 people could be provided with adequate cover. Out of a staff of approximately 250, over 80 members have volunteered and been trained for various A.R.P. duties and have been posted to their various positions. A Control Centre, which is in communication with the A.R.P. Office of the local borough, has been installed.

Immediately following the outbreak of war, valuable books and documents, and some of the rarer animals, such as Baba the baby elephant, and the giant panda (Public Favourite No. 1) were evacuated to Whipsnade. It is not generally known that the Zoological Society's library is insured for £60,000 and contains works that it would be impossible to replace in the event of loss.



Baby silver foxes at the London Zoo.

Readers may think that some of the larger and more ferocious animals might escape and constitute a real danger in the event of an air raid, but it is felt by those in charge that any explosion of a bomb that is sufficient to wreck or destroy

"Mary," the lioness at Cobtree Manor Zoo, near Maidstone, with her twins.

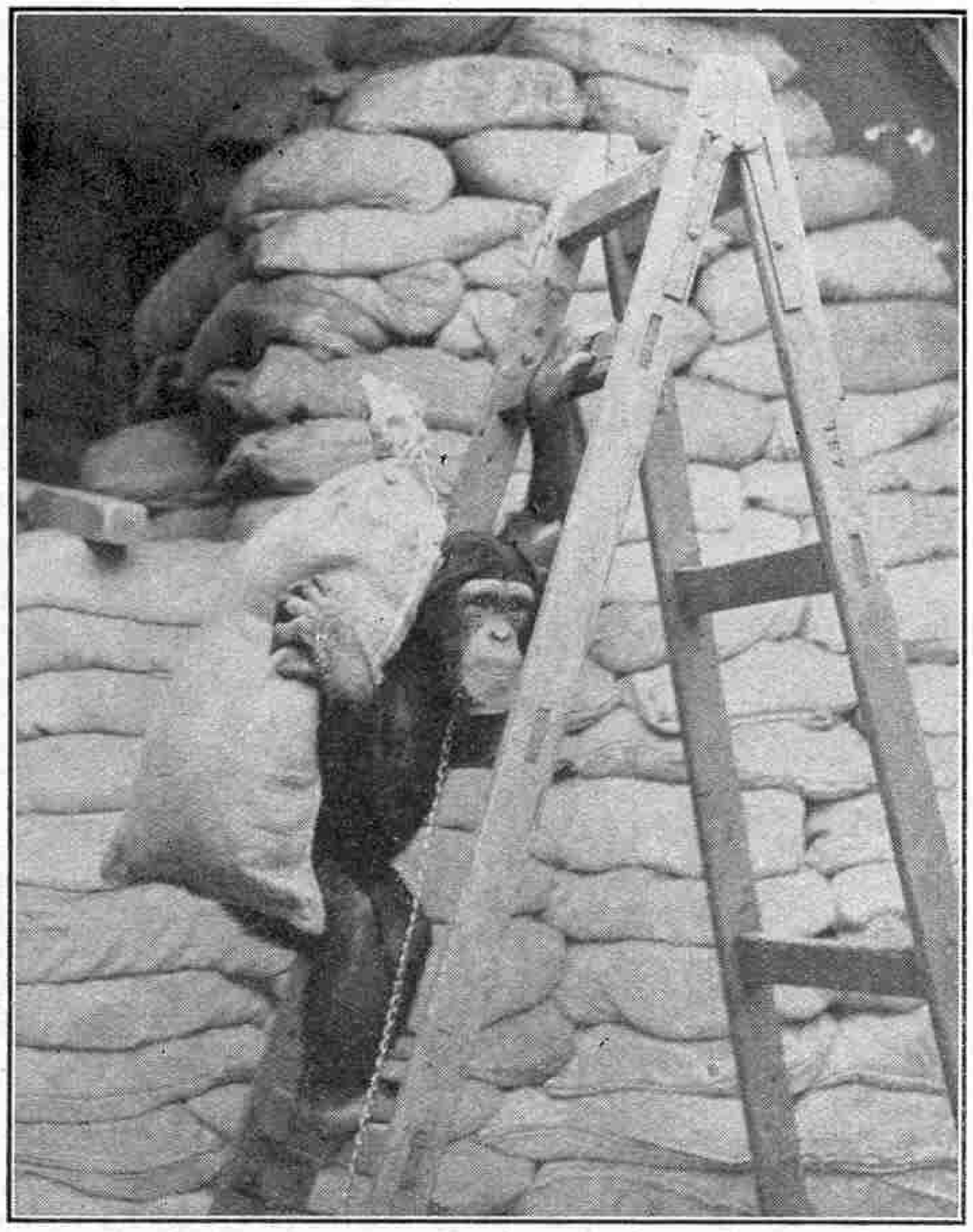
a cage would be certain to kill or severely injure the occupants. Nevertheless, many of the keepers have been provided with guns, so that in the event of an animal getting free it could quickly be destroyed.

Reptiles constitute a greater danger, for the cracking or splintering of the glass behind which they are housed would provide them with a ready means of escape. As a precaution, therefore, all venomous snakes have been destroyed, and the larger ones, such as boa constrictors and pythons, securely boxed up. The venomous Black Widow spiders in the Insect House also have been destroyed.

Similar precautions have been taken at both the Edinburgh and Belle Vue zoos, although in the latter the one or two poisonous snakes housed there have not been interfered with.

Other countries involved in the war have also made provision for their zoological collections. A report from Paris at the outbreak of hostilities stated: "Like other communities in France, the Paris Zoo is being broken up and evacuated to the country. The censorship declines to reveal the destination, but the different groups in the animal kingdom are being caged, crated and shipped separately, and, in all probability, to different destinations."

Many of the rarities from the German collections have



"George" the chimpanzee helps in sandbagging a Zoo shelter.

been boarded in Dutch zoos for the duration of the war, but it is reported from Swiss sources that all elephants, camels and zebras from the 30 largest zoos in Germany have been conscripted for National Service. This may be taken as an indication that, in view of the limitations of the German petroleum supply, motor fuel will be reserved for military purposes while the great beasts draw tractors across German farm lands.

Feeding at any zoo has to be done on a mammoth scale, and large supplies of foreign vegetables and fruits are purchased each year. This, of course, means that as the cost of these foods goes up, so does the cost of maintaining the zoo; and when there is at the same time a great decrease in the number of visitors—as is inevitably the case in war-time—it becomes increasingly hard for the zoo authorities to balance their budget. Some idea of the amount of fruit consumed at our zoos may be gained from the fact that at Regent's Park alone over three tons of grapes, some 227,000 bananas, 22,000 oranges, three tons of dates and three tons of sultanas are devoured by the hungry inmates in the course of a year!

About 700 horses and goats are used to feed the larger mammals, and sea lions and others account for some 50 tons of fish annually. Fish, of course, is scarce in war time, but actually horse flesh is more plentiful. I was told by one keeper that this is accounted for by the fact that whereas in normal times many of our British horses are taken to the Continent to be killed, horse slaughter is carried out at home during war time, and consequently horse flesh is not only more easily obtained but also is much cheaper.

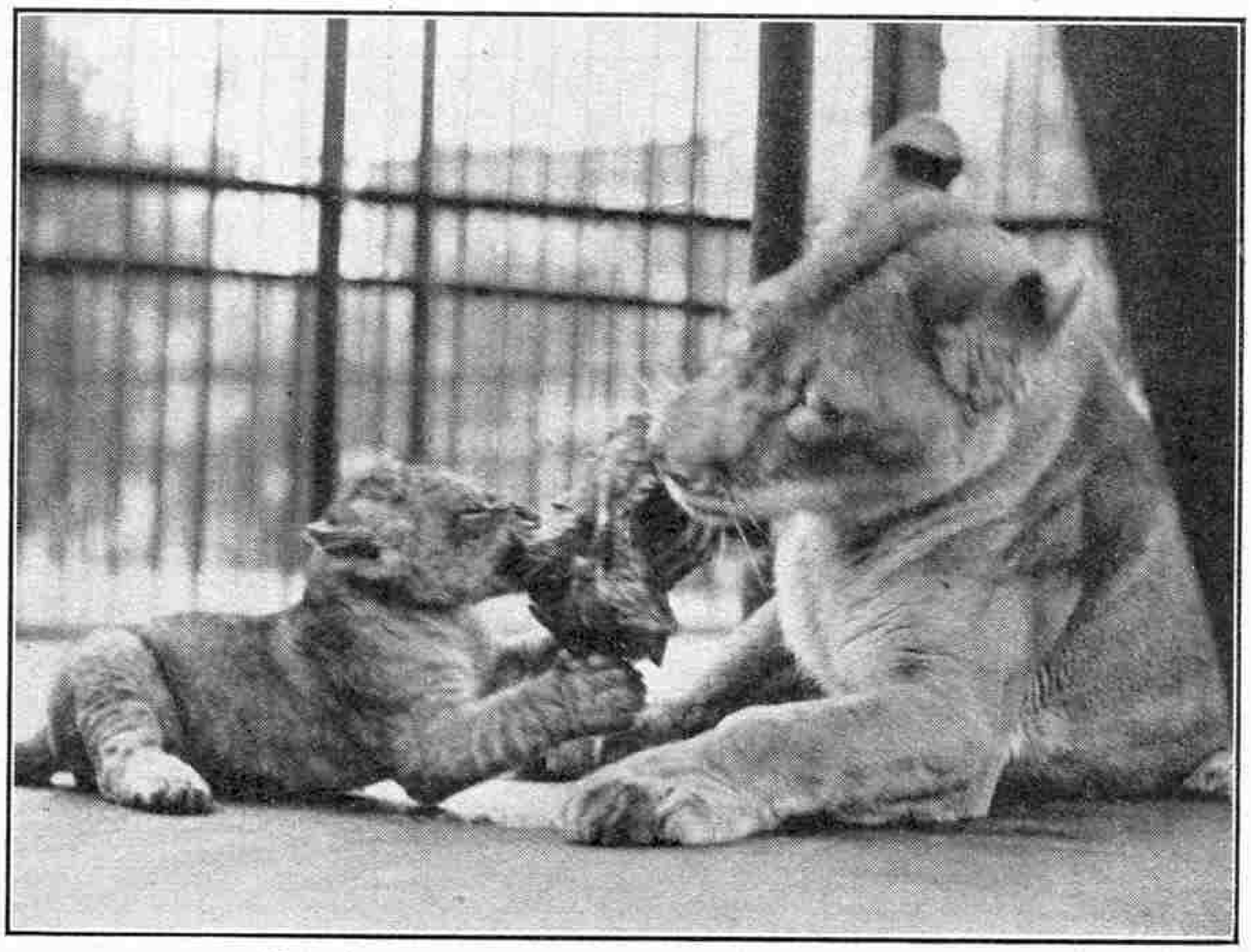
The Regent's Park authorities also use about 800 lb. of meal-worms in a year, and during the last war the price of these soared from about 4/– a lb. to over 20/–. Such a contingency is now provided for by the London Zoo, however, for it has its own meal-worm farm, which is able to produce an almost unlimited supply.

Although at present there is very little change in the type of inmates of our English zoos, it is obvious that expeditions for acquiring new specimens will be impossible for some time to come, and this means that animals or birds that die will be hard to replace.

Practically every British zoo has its own special attraction, and it is evident that rarities must be afforded extra protection during an air raid. Chester, for instance, shares with Berlin the distinction of being the only European zoos to possess an example of the Checko variety of black chimpanzee. This ape is the strongest animal in the zoo, and in spite of the fact that his special compartment has bars more than 2 in. in thickness, he has been known to bend these and cause rather frantic heart beatings of visitors who happened to be near at the time! At Regent's Park is the only snub-nosed monkey exhibited at any Zoo in the world; and this, like the giant panda, came to Britain from Western China.

Although it is too early yet to say just what war's effect will be on our British zoos, it was pleasant to find, on my recent tour, that a great spirit of optimism reigned among those in charge. Every precaution is being taken to ensure the safety of visitors, and it is firmly believed that as time goes on people will realise that to watch the antics of the various animals and birds is an excellent war-time relaxation.

The killing and destruction of animals and other inmates will only be resorted to when everything else has failed, and we all hope that such a state of affairs will never be brought about. Zoos have long been a feature of our national life, and it would be disastrous if anything was allowed to seriously interfere with their existence.

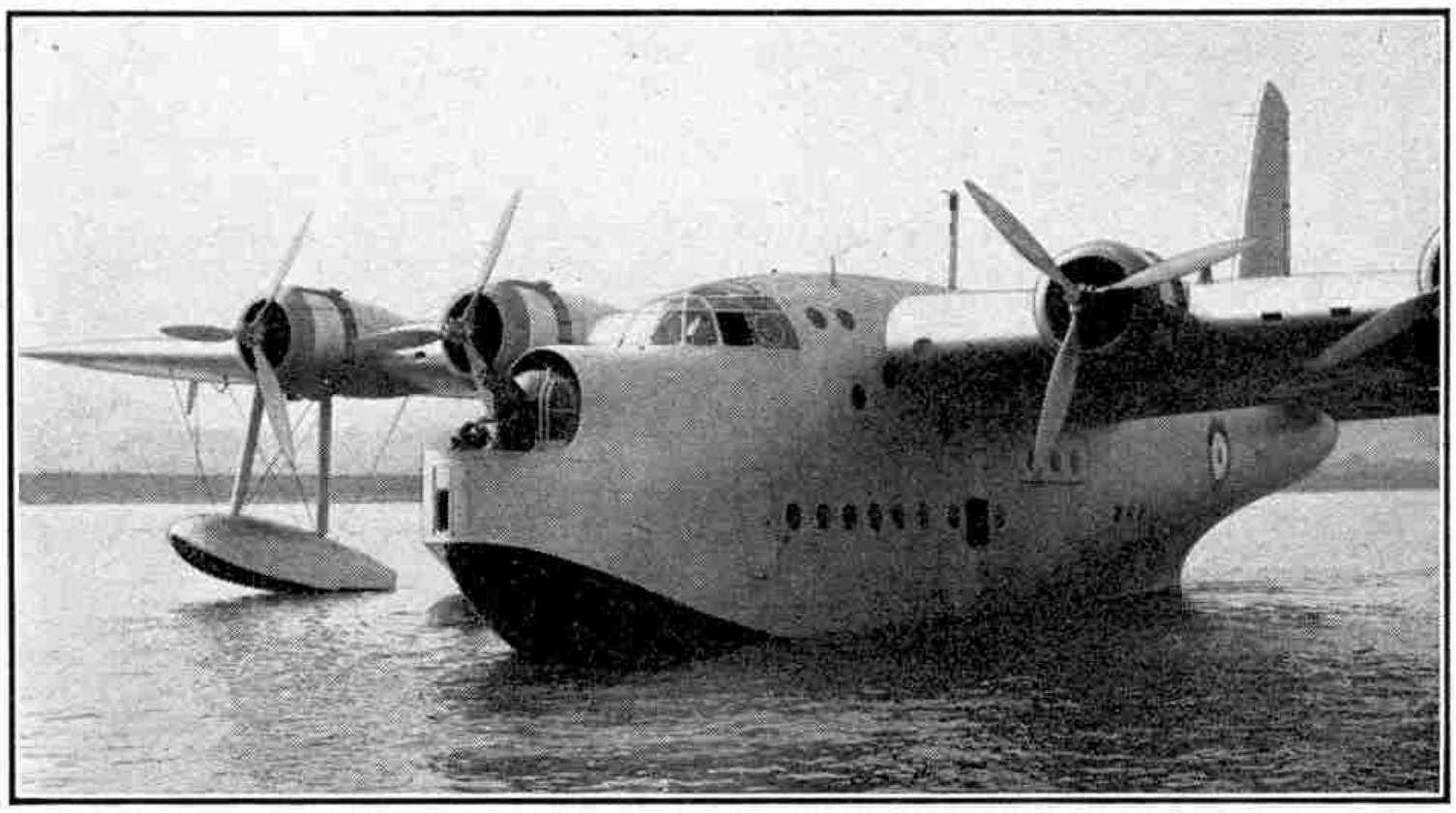


"Juno," Zoo lioness, and her cub "Max" share a joint of meat.

Coastal Patrol in a Flying Boat

By Captain H. S. Broad, A.F.C.

An intimate picture of a typical spell on patrol by the crew of one of our big flying boats. Captain Broad, British Schneider pilot, King's Cup winner and famous Test Pilot, is in touch with the latest developments in this and other branches of aviation.



"Sunderland" flying boat used for reconnaissance and patrol duties. The illustrations on this page are reproduced by courtesy of Short Bros. (Rochester and Bedford) Ltd.

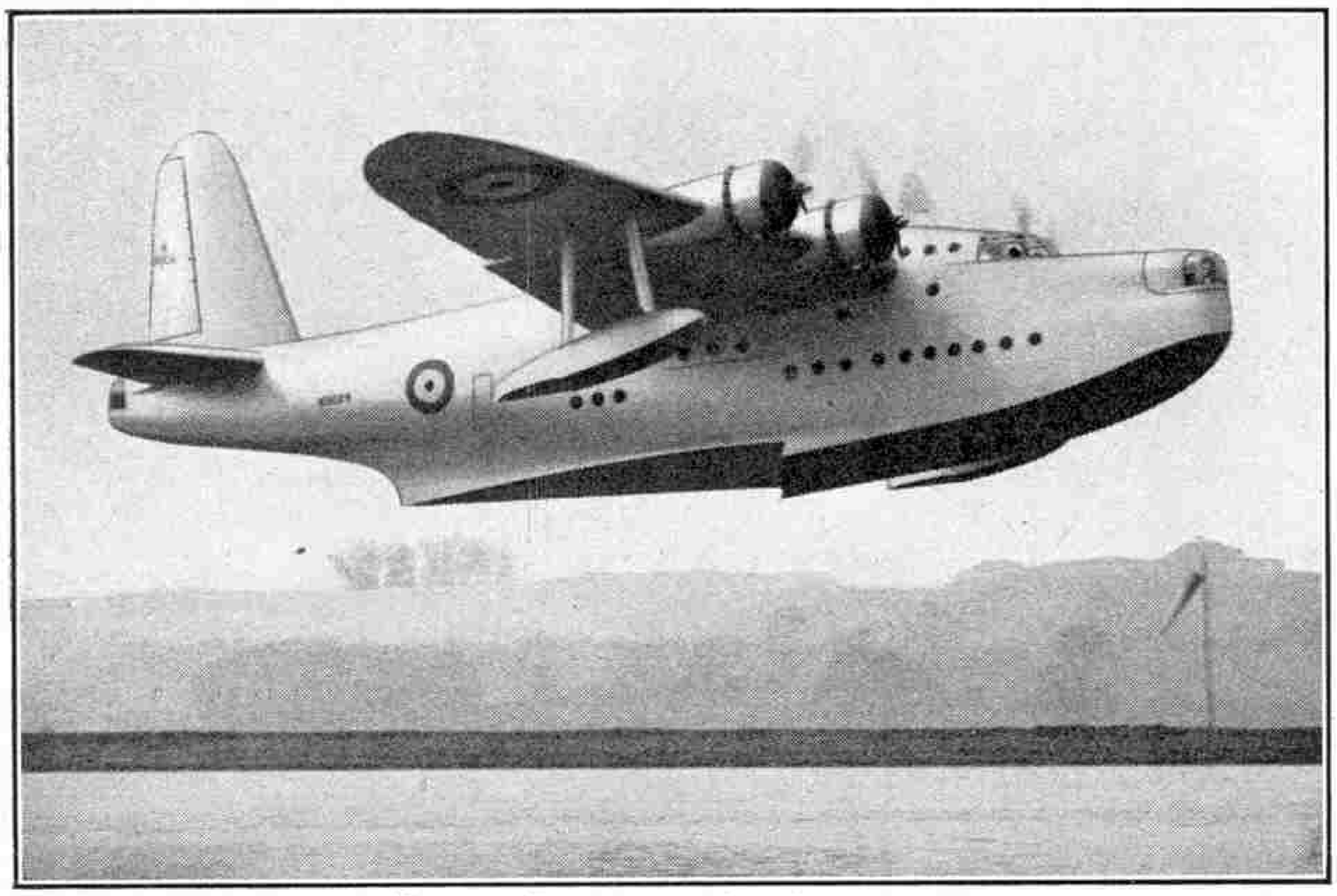
IT is early evening at a famous West Country port. The Flight-Lieutenant strolls into the general office of the flying-boat station and halts before the large notice board.

"Flight-Lieut. Blank," he reads, "Will leave at 6.00 hrs. for a six-hour patrol over area (here follow latitudes and longitudes). He will report at the Adjutant's office for any special orders before leaving." And at the top of the board this standard warning: "See that you carry nothing in your pockets which can be of any use to an enemy."

At five minutes to six next morning he sits at the controls of a huge flying boat, peering out into the gloom while he anxiously assesses the chance of fine weather. By his right hand is his second pilot, a young Pilot Officer. In the nose turret squats one of the gunners; in the tail, nearly 40 yards behind, is the other. Elsewhere in the spacious interior are a navigator, a wireless operator and a bomber.

For this particular job, which may involve anti-submarine work, four heavy bombs are carried, of a type which will not explode immediately on hitting the water, but only when they have reached some distance beneath the surface.

The four powerful engines started, the Flight-Lieut. gently eases forward the throttle levers, and the boat slowly taxis to and fro over the pitch-black expanse of water. Thus the engines are warmed up for three or four minutes and then, facing round into the wind, the pilot makes for the space between two distant lights winking at him from the mouth of the harbour. They mark the direction he must take for his get-off, and a moment later a green beam tells him that the runway is clear.



A "Sunderland" photographed just after taking off.

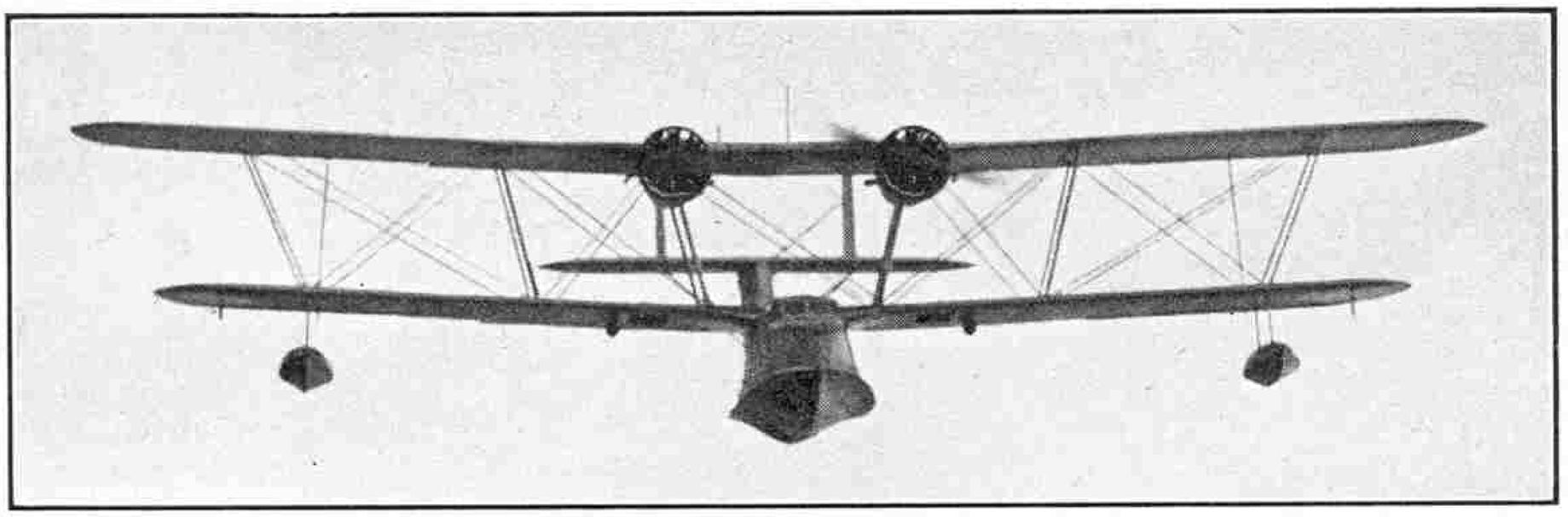
Forward go the throttle levers again, this time to the full extent of their travel. The drone of the engines changes to an ear-splitting roar. The boat gathers speed with the acceleration of a high-powered car, and in a few seconds only, carefully watching his air-speed indicator for the correct speed, the pilot pushes the "stick" forward. Forward moves the boat on to the "step" of its immense hull. Another few seconds, and flying speed is attained.

Now the stick is eased backward in a slow, even movement, and imperceptibly the 20-ton machine takes to the air.

"At this moment," remarks the Flight-Lieut. to his friend, "We may be the biggest thing in the air anywhere in the world."

"Oh, and that reminds me," he adds. "Special Orders say a convoy of freighters will cross our area at nine hours, about 30 miles south of the base. We'll have to be around to keep an eye on them."

Leaving far behind those winking lights and the invisible launches which carry them, the pilot turns westward down the coast, facing a stiff breeze. When his altimeter tells



Head-on view of a Vickers Supermarine "Stranraer" flying boat, another general reconnaissance type for coastal defence. The photographs on this page are reproduced by courtesy of Vickers (Aviation) Ltd.

him that the boat is 3,000 ft. above the sea, a slight forward movement of the stick checks her upward motion, and the four throttle levers, mounted side by side at his right hand, are brought back to reduce engine speed. The boat can fly about 1,700 miles non-stop with full load, but only if the petrol is used economically. She will cover more than 1,000 miles on this patrol!

At intervals little islands of light appear, identified as the beams from well-known lighthouses. Not all of these have been extinguished since war was declared. They are too vital to shipping to be put out of action unnecessarily.

By the time the end of the coastline is reached land is dimly visible. Unseen by most of the crew, because directly behind them, the Sun is rising. Its effect is, of course, to light up the flying boat while Earth is still in darkness. So details below will not be made out for another 20 minutes at least.

However, there is as yet nothing to see but a roughish sea, and a sky which, so far, is mercifully clear.

"Like a nap?" grins the Flight-Lieut. as his friend yawns cavernously.

"Wish I could," admits the P.O., thinking of the luxurious folding bed stowed amidships, and of his own lost night's sleep.

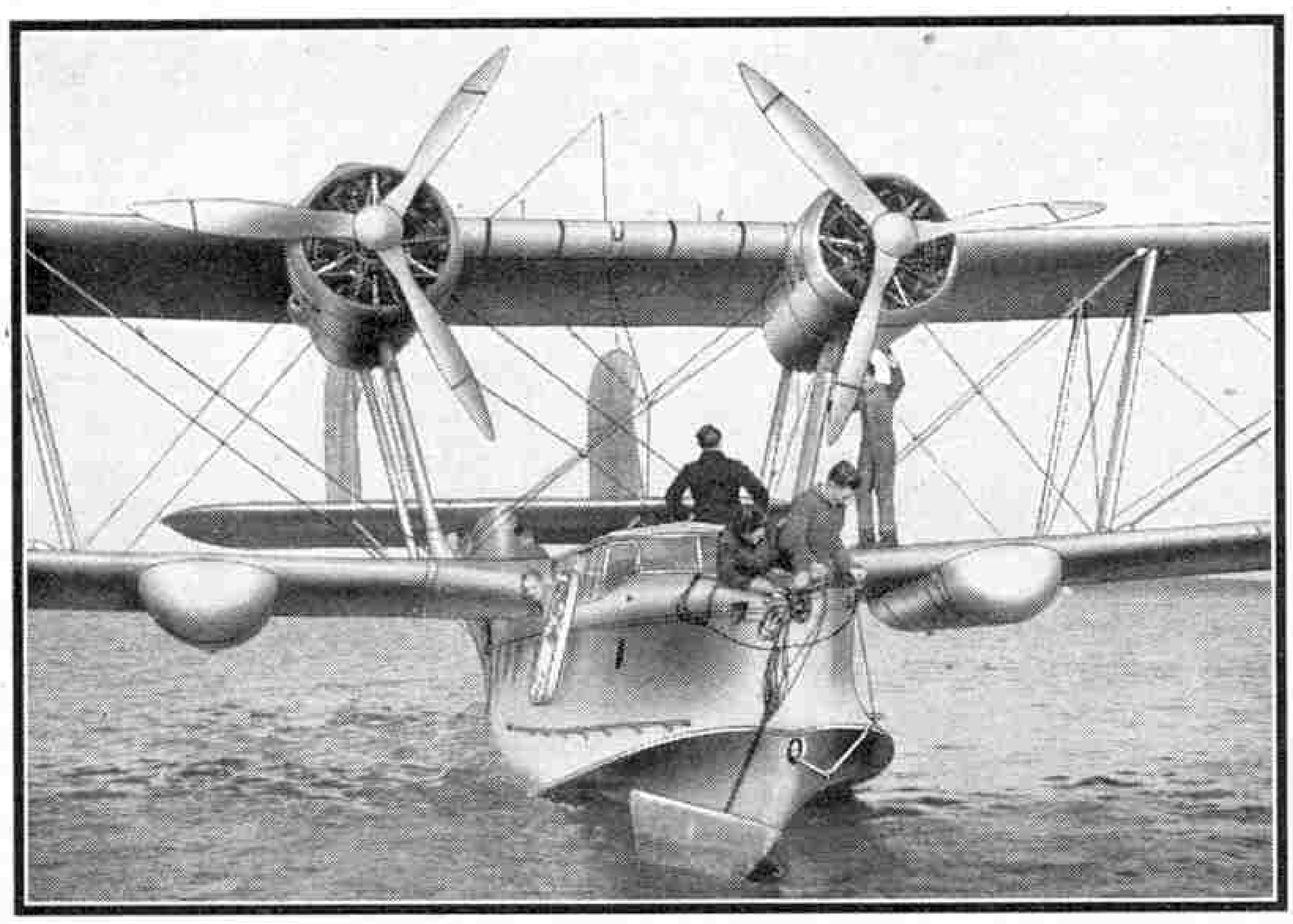
Trivial incidents are welcome on a long patrol, and the next incident is the appearance of the navigator bearing a slip of paper. It indicates that they must turn due south and fly thus for about 30 minutes, having reached the western margin of their patrol area.

Once on the right course—and the exact compass reading has been worked out by the navigator, so that the pilot has no worrying calculations to make—the Flight-Lieut. looks rapidly but keenly at the array of dials in front of him. There are something like 40 of these, and every one must show the correct reading. But long custom has enabled him to take in their reassuring messages in well under half a minute, so with a casual "Here you are, old man," he hands over to his junior for a spell at the controls.

It is now breakfast time, so he calls the spare gunner and sends him down to the galley to bring a selection of sandwiches from the ice chest, with cups of steaming coffee. Carrying these would be a ticklish job in a surface vessel just now. Up here, in this big aircraft, it is fairly easy, and the crew can eat and drink in comfort.

At appropriate intervals they turn, first due east and then northward, and then diagonally across the area already skirted, making for a large dark cloud on the western horizon. This, from the time and direction, should be the smoke of the expected convoy.

Smoke it certainly is, and in a minute or two the ships are visible. There is another flying boat circling above them, while on the outskirts, ere long, can be made out the long, sleek destroyers, obviously having a rough time in the heavy seas, but spelling safety to the many thousands of tons of merchandise they guard.



A "Stranraer" at close quarters.

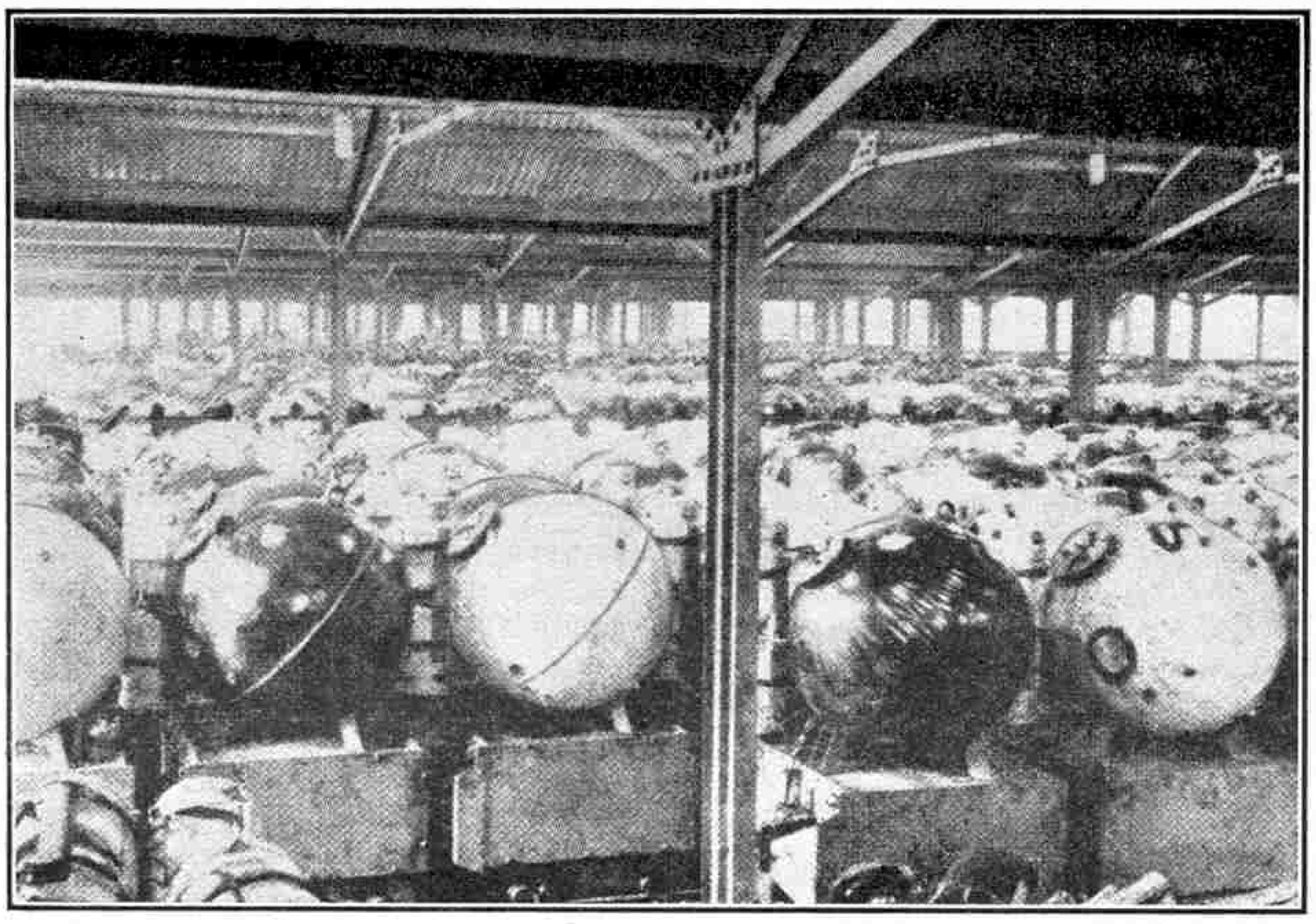
The convoy is practically out of sight astern, and the Flight-Lieut. has taken over, when the wireless man reaches over his shoulder and hands him a brief message. Brief, but to the point! "S.O.S. Longitude —. Latitude —. Attacked by submarine."

The pilot nods and hands the note to the Pilot Officer. Scarcely a minute later a second one is thrust into his hand, this time by the navigator. The scene of action is roughly 40 miles away, and a compass reading of 252 degrees will give them their exact direction after allowing for drift.

A slight pressure on the rudder bar, and the boat changes direction somewhat. The throttle levers are pushed wide open. The roar of the engines becomes more urgent, and the airspeed indicator shows that they are going through the air at well over $3\frac{1}{2}$ miles a minute—better than 200 m.p.h.–even against a headwind. But only a flying boat could be of any help in this emergency. A steamer would take three hours or so to cover the distance.

A few minutes only, and a smudge of smoke is seen on the horizon, dead ahead. Then the outline of a ship already settling by the stern. The next detail is the submarine standing off beyond her victim; then a couple of boats, and finally several dots which indicate men struggling in the water.

For the first time the Flight-Lieut. looks worried. On a calm day he could alight and pick up these men. This morning he (Continued on page 54)



Some of the 70,117 mines jointly laid by Britain and America in the Great War.

Laying 70,000 Submarine Mines

By Harold J. Shepstone, F.R.G.S.

How the Allies defeated the U-boat menace in the Great War by laying a huge minefield in the North Sea between Norway and Scotland.

THE greatest of all submarine mine barrages was that laid during the Great War by the British and American navies in the North Sea. It was a colossal undertaking, as is evident when it is stated that this great minefield consisted of over 70,000 mines containing 10 tons of T.N.T., and extending over an area of approximately 6,000 square miles. It is the opinion of not a few naval experts that the North Sea mine barrage was primarily responsible for the collapse of Germany.

When America entered the war the British Admiralty had not only laid minefields around our shores, but also had planted mines in the Heligoland Bight, as well as off the German coast and in the Skagger-ack passage between Denmark and Norway. Despite these minefields and the work of destroyers, U-boats were continually breaking through. The Germans even had special vessels called barrage-breakers whose work it was to destroy the mines. They were often aided in this task by bad weather and fog. The great problem that faced the Allies at the time of America's entry into the struggle was how to combat the U-boat menace. Ships were being sunk at the rate of from 300 to as high as 400 a month. Admiral Jellicoe was roused to warn the Prime Minister that if this loss continued at this rate we might be forced to make peace. In the Great War we lost 5,408 ships, representing an aggregate tonnage of 6,692,642 tons.

It was at this period that an American electrician, Mr. R. C. Browne, invented a submarine gun. Although it was adjudged impracticable for that purpose, it was found that one of the elements of the invention had great possibilities if adapted to a mine against submarines. It was accordingly agreed that the two navies should adopt this new form of submarine weapon and plant a great minefield across the North Sea, from Scotland to Norway, a distance of 230 miles. The Straits of Dover, being only some 20 miles in width, had been effectively closed, but U-boats were continually reaching the Atlantic by way of the North Sea, in spite of all the precautions that had been taken. It was a bold scheme. Nothing like it had ever been attempted before, and many declared at the time that it was impossible of accomplishment.

America undertook to supply the mines, a colossal order in itself. Over 500 contractors and subcontractors were engaged in the manufacture of the many parts, small and large, that go into the make-up of a complete mine. Besides being a rush order, the task was complicated by the necessity for keeping parts of the mine secret. Some pieces had to be made here and others there, and sent to the naval depot at Norfolk, Virginia, for final assembly.

A submarine mine is in many ways an ingenious mechanical device. It consists of a mine case, shaped like a ball or egg, about one yard in diameter, and an anchor in the form of an iron box about 2 ft. square, connected by a wire rope mooring cable the size of one's little finger. The mine case contains the charge of high explosive—300 lb. of T.N.T. in this case—and the firing mechanism. When assembled, the mine case is mounted on the anchor, the combination standing about 5 ft. high and weighing 1,400 lb. The anchor has four small wheels, like car wheels, to run on steel tracks, and thus the mines may be easily moved along the decks to the launching point.

When the mine goes overboard, the mine case floats on the surface, while the box-like anchor slowly sinks. Inside the anchor the mooring wire is wound on a reel, which unwinds as the anchor goes down. This reel is unlatched by the downward pull of a plummet at the end of a cord, which is made the same length that it is desired to have the mine stay below the surface. Thus, if the mine is to be say 15 ft. beneath the surface, the plummet cord is 15 ft. long.

The plummet, being nearly solid and quite heavy, about 90 lb., tends to sink faster than the more bulky anchor, thus keeping the cord taut; but as soon as the plummet strikes bottom its cord is at once slackened, releasing the latch, locking the reel, and preventing any more mooring wire from paying out. The anchor continues to sink, pulling the mine case under water until the anchor strikes bottom.

The mine case is thus finally moored always at the desired depth beneath the surface, no matter how irregular the ocean bed may be. The mine cases are buoyant enough to pull straight up from their anchors ordinarily, but in a current they are swayed away from the vertical, which drags them down somewhat deeper than intended. For this reason currents have to be allowed for when placing mines.

At Norfolk a special plant was built for charging the mine spheres with explosive—great steam kettles

Map showing the location of the minefield.

for melting the T.N.T., which was poured into the spheres. This work was a constant danger from fire risk and the poisonous fumes of the molten explosive. The sailors in attendance had to wash their heads and necks thoroughly afterwards. Several were overcome seriously in the course of the work and one man died.

Now came the problem of transporting the mines to Scotland, which was carried out by a fleet of 24 steamers. One of the vessels, the *"Lake Moor"* with 41 of her crew, was lost, sunk by a U-boat. The mines were received at two specially-prepared depots in Scotland, Fort William at the western end of the Caledonian Canal, and Kyle, on Loch Alsh, opposite the Isle of Skye. These depots were capable of handling 1,000 mines a day.

The laying of the mines, an arduous and risky undertaking, was carried out by 10 merchant ships specially fitted out for the task. Elevators had to be erected for lifting the mines from the hold to the deck, where they ran on rails to the point from which they were launched. The ships were manned by volunteer crews. The fleet was not inappropriately dubbed the "Suicide Squadron." There was the risk of bumping against mines already laid, danger from mines exploding prematurely, and not least from attack by the German Fleet as well as U-boats. The Germans were aware of what was being done, as neutrals had been advised and shipping had to be guided through the field.

The barrage was composed of some 20 groups, each consisting of from two to six parallel rows of mines, and the mines in each row were laid at one of three levels, upper, middle, or lower, the three forming a complete barrier in a vertical plane to a depth of 260 ft. The average group contained five rows, and of these three were laid at the upper level to give the surface barrage the greatest density. The reason was psychological. Submarines, knowing the barrage was there, would prefer to risk crossing on the surface, even if they knew their chances were less. The depth of water in the North Sea where the barrage was laid varied from 400 ft. to 900 ft.

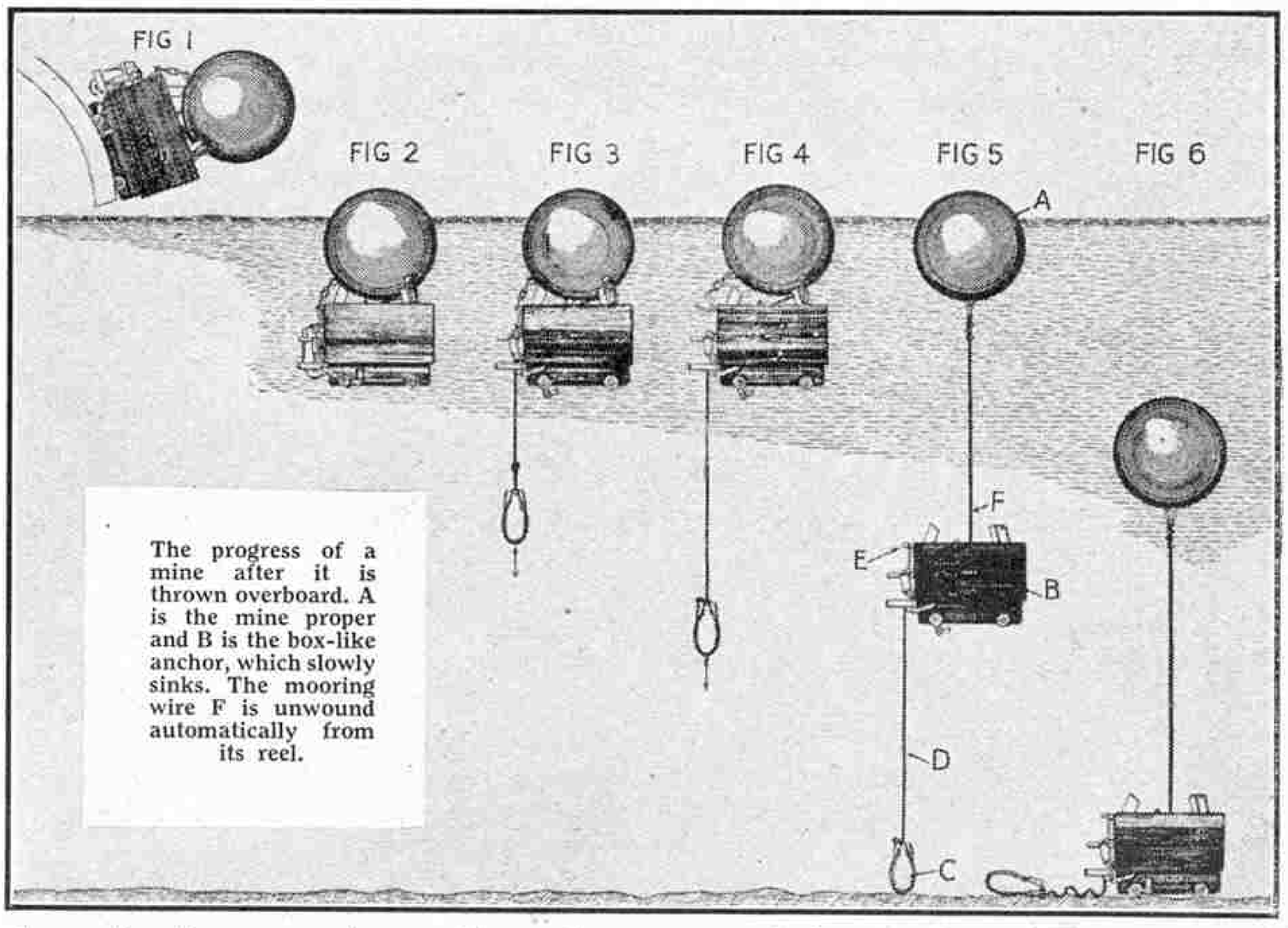
The mines were laid under the command of Rear-Admiral Straus of the American Navy. The plan was to lay 5,000 mines at a time. As the men loaded their ships with the death-dealing spheres and prepared to leave for the scene of operations, the favourite slogan among them was: "Stick to your job and go up with it!" They were well aware of the risks they ran.

Every movement was kept secret. The first departure of the "suicide squadron" was made one midnight in drizzling rain and misty weather without signals or lights. It was desired that the ships should keep at least 500 yds. apart. Steaming ahead of the little fleet, but without lights, mere moving dark objects in the blackness, were four destroyers, and another group on each side, 12 in all.

Straight over to Norway steamed the fleet, making Udsire Light some 24 hours later. It was a busy night and early morning, keeping the ships in station, going over the mines for final touches, watching on every hand for enemy submarines, and getting ready for the launching of their deadly cargo. When the ships reached their rendezvous they stretched a mile and a half in a beautifully straight line abreast. Several destroyers with their sweeps out steamed over the course to make sure no enemy mines had been laid there.

Then came the signal, the dropping of a flag from the leading ship, for the mine-laying to begin. Over went the first mine. The ship steamed forward. Officers stood watch in hand ready to give the signal for the next mine to be dumped overboard. By this careful timing and accurate steaming the mines were laid in the desired position. Four hours later the work of laying was finished, the spot being marked by special buoys. During these operations some four or five mines exploded prematurely, sending huge

(Continued on page 5.)



The progress of a mine after it is thrown overboard. A is the mine proper and B is the box-like anchor, which slowly sinks. The mooring wire F is unwound automatically from its reel.

RAILWAY NEWS

Unusual Locomotive Workings

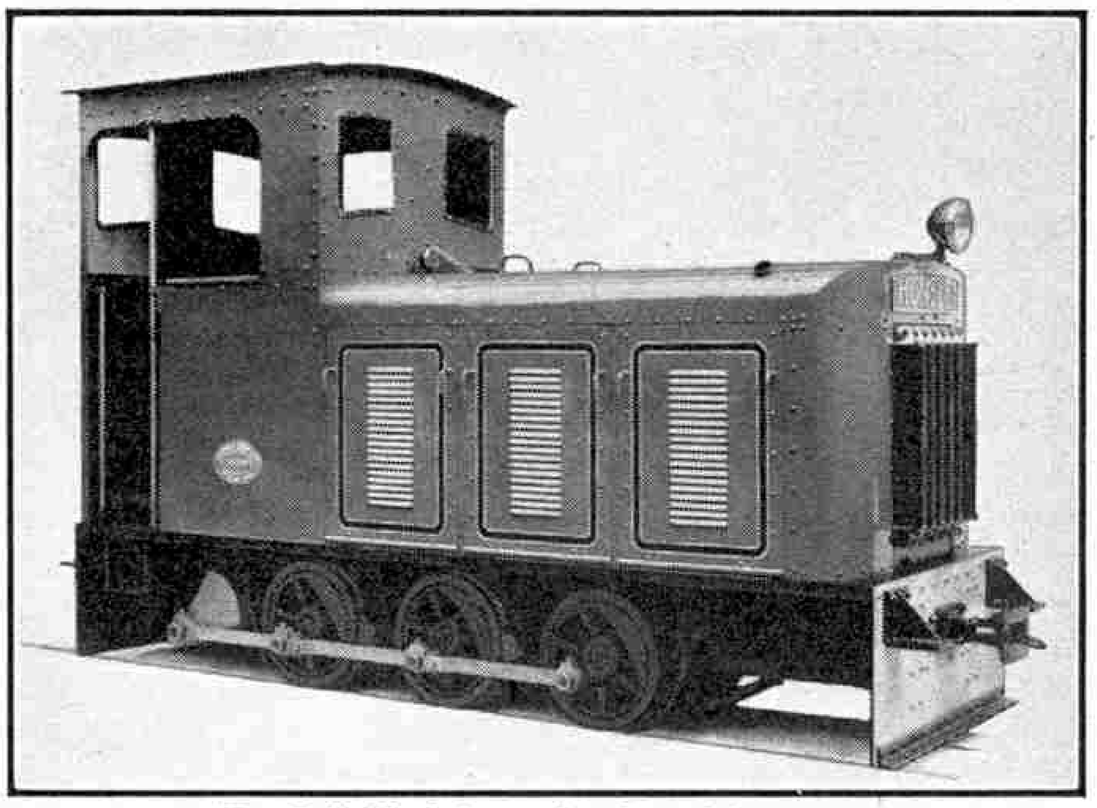
Wartime traffic is responsible for much very interesting interchange of locomotives on special and freight trains between one section and another. In the North Eastern area of the L.N.E.R. the vast increase in freight traffic has necessitated special new rosters, by which Scottish Area engines work as far south as Newcastle. In peace time it is a regular turn for the crack Edinburgh express locomotives to work through to London, but this new working is bringing much humbler types southward. From Niddrie Yard, a little east of Edinburgh, braked goods trains are brought to Newcastle by 4–4–0 express engines belonging mainly to St. Margaret's shed, Edinburgh. These include Reid designs, such as the "Scotts," and even the West Highland "Glens," with the Scottish examples of the former Great Central "Director" class. They return to Edinburgh on passenger trains.

Express engines on freight trains have always been an occasional sight in the North Eastern Area, but now they are much more common. One can regularly observe non-streamlined "Pacifics," the N.E. Atlantics, and sometimes even the 3-cylinder 4–4–0s of the "Shire" class "carrying on" in the great task of building up the nation's maximum war effort.

Double heading is not uncommon, though almost entirely the result of unbalanced workings. With so much special and urgent traffic to be conveyed it is not always easy to find a convenient return working for the engine of a troop, or other emergency train. Nevertheless these cases of double-heading provide some rare spectacles for the railway enthusiast. Here are a few noted recently, all on braked express goods trains: a "Shire" 4–4–0 piloting a "Green Arrow" 2–6–2; a "Green Arrow" piloting a N.E. 3-cylinder "Atlantic"; and above all, the "Super-Pacific" "*Cameronian*" piloting a "Shire" 4–4–0!

Another extraordinary sight was provided by a double-headed special passenger train, headed by a K3 3-cylinder "Mogul" and a 0–6–0 of class J39; in this case the two engines were coupled head-to-head with their two exhausts rising from a common front, as it were. The leading engine was running tender first.

A RAILWAY ENGINEER.



Narrow gauge "Hunslet" Diesel locomotive for mining work in South Africa. Photograph by courtesy of The Hunslet Engine Co. Ltd.

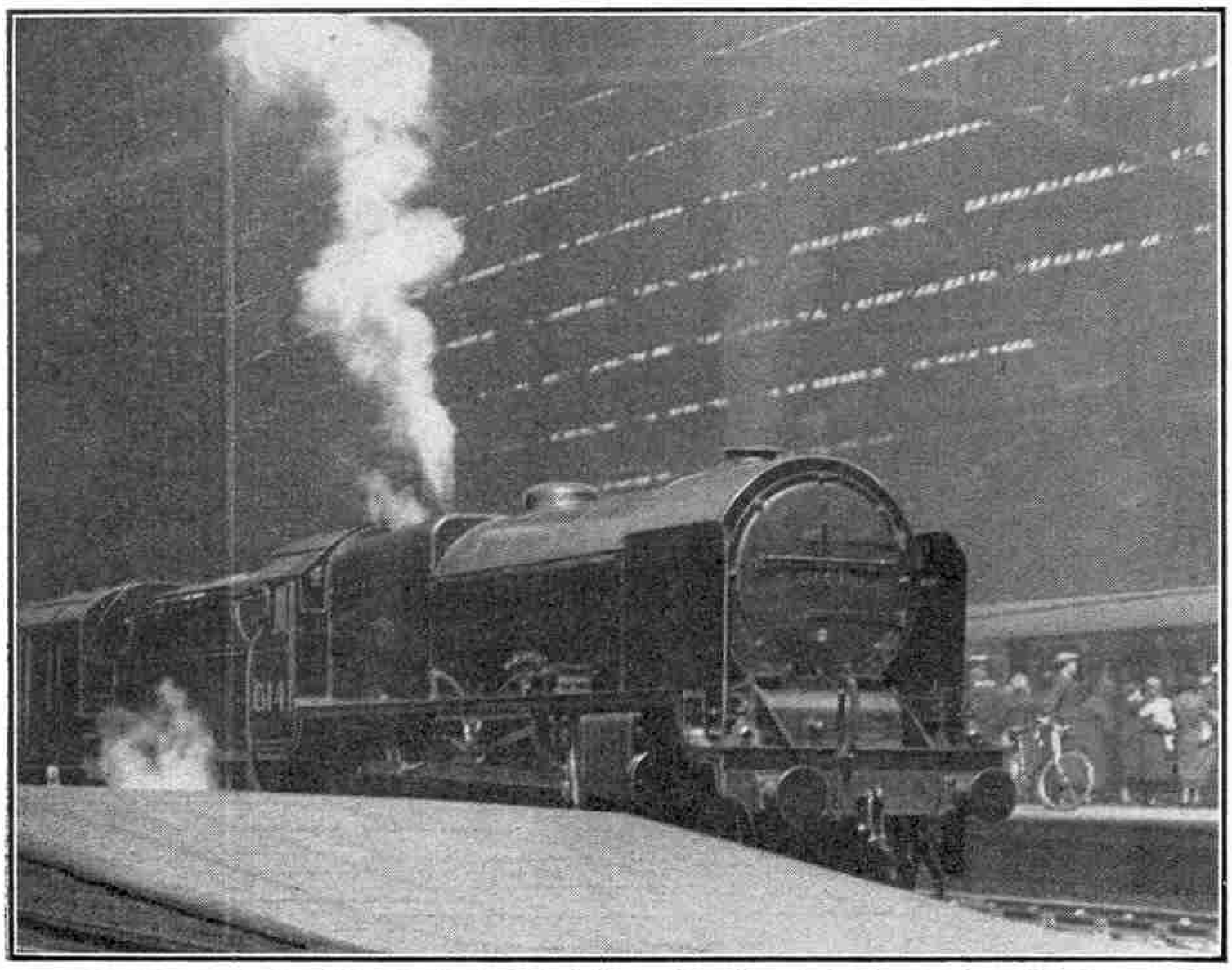
Narrow Gauge Diesel Locomotive for South Africa

The Hunslet Engine Co. Ltd. has recently shipped to a South African mining company a Diesel locomotive for work on a line of 2 ft. 6 in. gauge that involves a long gradient against the load. The power unit of the engine capable of developing 78 B.H.P. at 1,300 r.p.m.

Great care has been taken to protect all wearing parts from the dust present at the site, and very thorough filtering of fuel oil, lubricating oil and the air supply has been arranged. In the latter case the air filters have been so placed that the driver can clean these and replace them in a few moments without taking off the engine room side covers.

The cooling water temperature is controlled by thermostats, the water being circulated by pump through a large sectional radiator having quickly detachable and interchangeable elements.

The locomotive weighs 8 tons 1 cwt. and has a tractive effort of 4,190 lb. Its maximum speeds in the three gears provided are 5.9, 11.5 and 18.7 m.p.h. respectively.



"Royal Scot" locomotive No. 6141 "The North Staffordshire Regiment" ready for departure from Lime Street Station, Liverpool. Photograph by R. Watson, Burnley.

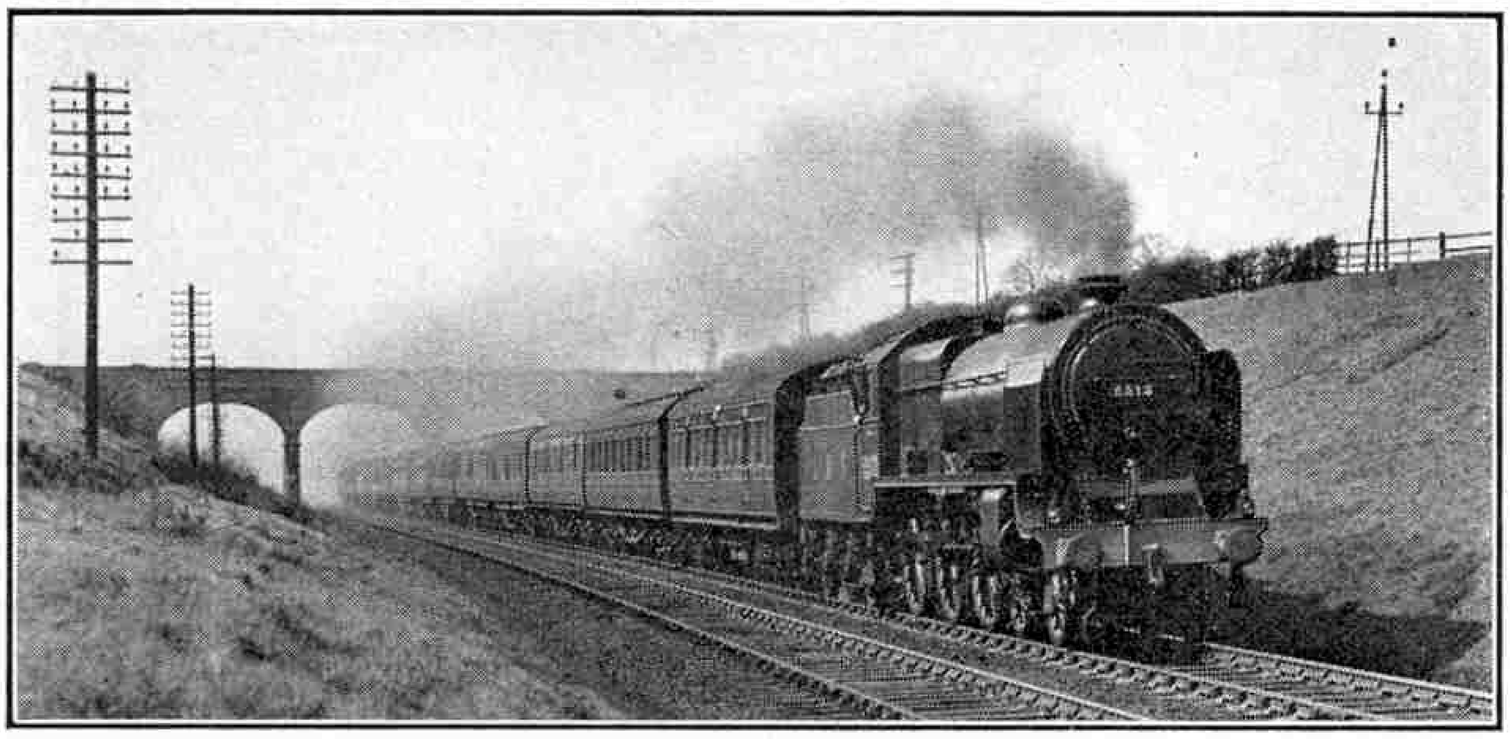
Drive for Better Locomotives in United States

The Association of American Railroads is this year to pursue a programme of research activities designed to result in further improvements in locomotive, car and track construction and in methods of operation. Among the problems to be considered will be the development of a steam locomotive designed to haul a train of approximately 16 standard passenger cars at a sustained speed of 100 m.p.h., and some road tests have already been carried out.

One result already achieved is the design of a new "tight lock coupler" for use in passenger service. The coupler is designed to hold the cars of a train more tightly together, with a consequent reduction in play that will increase safety and comfort of passengers.

* * * *

A thorough "comb-out" of the L.M.S. system has yielded 100,000 tons of additional scrap metal. Some 600 tons of this consisted of small "odds and ends" of metal found in sidings.



Up express at Hartford in charge of "Patriot" 4-6-0, No. 5513. Photograph by J. G. Muir, West Kirby.

Locomotive News

On the G.W.R. three "Kings" are now shedded at Bristol for working east and west over the original main line. They are No. 6011 *"King James I,"* No. 6017 *"King Edward IV,"* and No. 6026 *"King John."* "King" class engines are now stationed at Exeter for working the Night Postal train from London to Penzance. The other normal allocations of locomotives of this class are to the depots at Old Oak Common (London), Wolverhampton, Newton Abbot and Laira (Plymouth).

Owing to the reduced extent of Continental regular passenger traffic, some of the "Lord Nelson" 4–6–0 engines are employed on London–Ramsgate workings via Chatham, while a number of the "King Arthur" type stationed at Stewarts Lane, Battersea, London, as well as some temporarily located at Hither Green, chiefly a suburban and freight shed in the Kent suburbs, are now taking shares in the handling of heavy goods trains with the S15 4–6–0 type. The order for 20 standard "Q" class 0–6–0 goods engines has been completed at Eastleigh. Nos. 530-49 are working on the Western Division and are useful also for passenger trains.

The L.N.E.R. continue the production of the remarkable general service 2–6–2 "Green Arrow" class, and further 2–6–2T engines similar to the 3-cylinder VI type, but with higher boiler pressure and classed V3, constructed at Doncaster, are working in the N.E. area. R. A. H. Weight.

War Traffic Developments

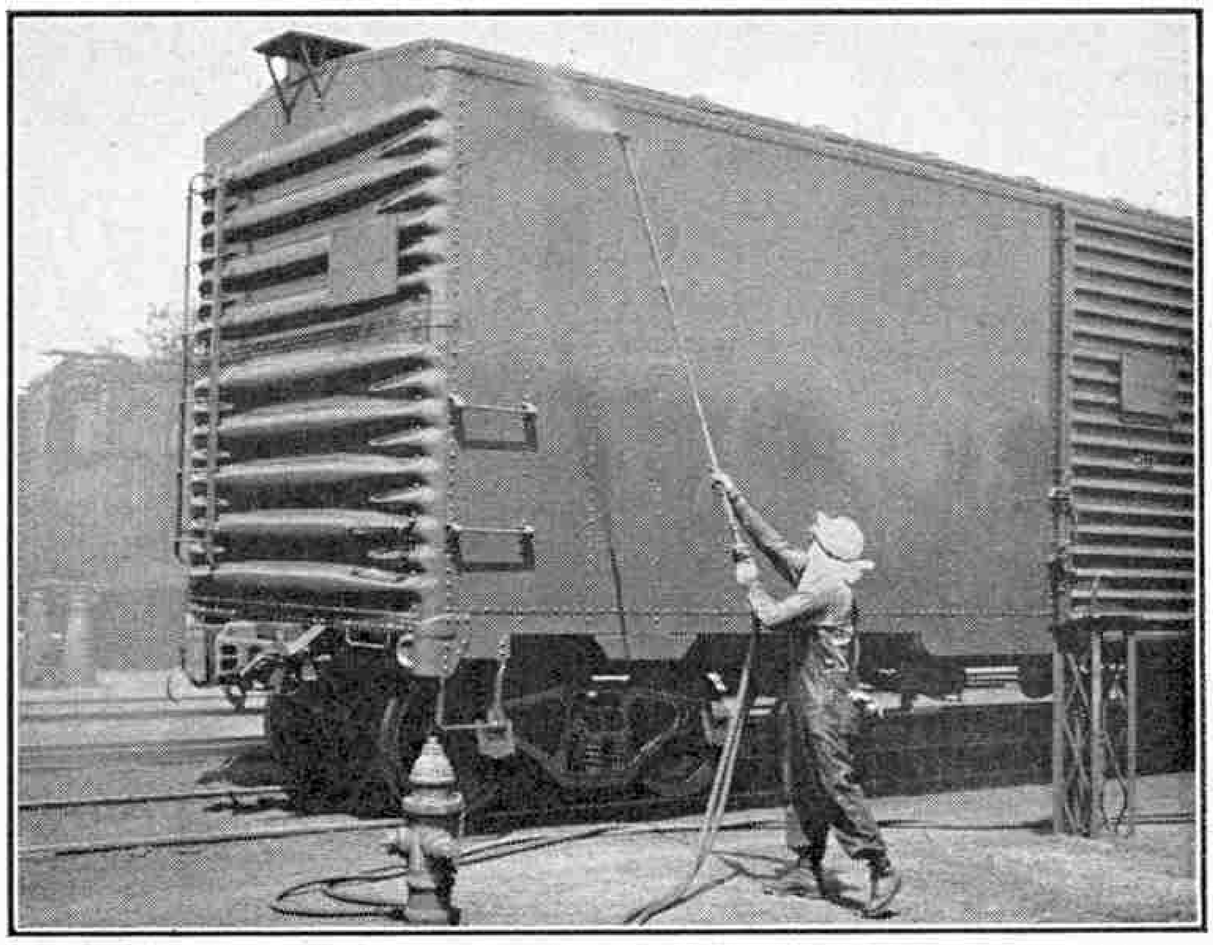
In last month's *"Railway News"* reference was made to the greatly increased goods traffic now carried on British railways. This is not due in any very great measure to purely wartime traffic, such as munitions, but to circumstances incidental to the outbreak of war.

The rationing of petrol has greatly curtailed the activities of road transport concerns, and for short distance hauls much business has had to be sent by rail. Then a surprising amount of freight used to be taken by coastal shipping. This latter traffic has now almost entirely disappeared, partly on account of the danger from attack by U-boats and partly through the requisitioning of many of the vessels concerned by the Admiralty for auxiliary service with the Fleet.

The goods traffic once carried by these ships also has passed mainly to the railways. The usual flow of traffic in connection with our export trade has in many cases been changed, since so many of the ships start at the same time, and from the same place, to fit in with the convoy system.

Other difficult conditions have been introduced by the blackout. The fastest freight services used to run by night, but in the darkened yards marshalling work is necessarily slower. The extra traffic has to be carried in the daytime, and this explains why it has been found necessary, even in the improved timetables, to keep passenger services at a bare minimum and running at comparatively slow speed. Now it is a case of fitting in passenger trains where possible, on lines full to repletion with goods trains of all kinds. Many passenger locomotives are working almost continuously on freight trains.

The war has made necessary some extensive locomotive building programmes. It is now expected that at least 300 British locomotives will be sent overseas. These will be mainly of the former Great Central 2–8–0 type, many of them veterans of the war of 1914–8. The L.N.E.R. will be the principal loser as far as home traffic is concerned, and it is expected that these engines will be replaced by a new series of Class 02 3-cylinder 2-8-0s of the Great Northern design, and a further batch of the ever-useful "Green Arrow" 2–6–2s. The G.W. also have a number of 2–8–0s of the G.C. type, all veterans of the last war, and to replace these it is understood that the L.N.E.R. will lend a number of 0–6–0 tender engines.



Spraying one of the many new box cars being placed in service for high-speed merchandise freight traffic on the Union Pacific Railroad of the U.S.A. Photograph by courtesy of the Union Pacific Railroad.

Elaborate plans were made for the loan of steam locomotives for suburban duty in the London area. In anticipation of intensive air bombardment, engines were kept in reserve ready for quick transference to the S.R. in the event of a power station being "knocked-out," and thereby causing part of the electric services to be brought to a stand. The L.N.E.R. provided the main stand-by locomotive stock, chiefly in the shape of 0–6–2 tank engines of both G.N. and G.E. design. Both types are extremely powerful for their weight and easy to handle by a strange crew, and should the need arise they would acquit themselves well. O. S. Nock.

L.M.S. and L.N.E.R. "Speed-Up"

Faster expresses were introduced last month by the L.M.S. and L.N.E.R., with many additional long-distance trains. The trains now run are lighter and there has been a definite improvement in speed. The new timings are based generally on a point to point speed of 50 m.p.h. so far as this is compatible with the maximum speed of 60 m.p.h. that must still be observed.

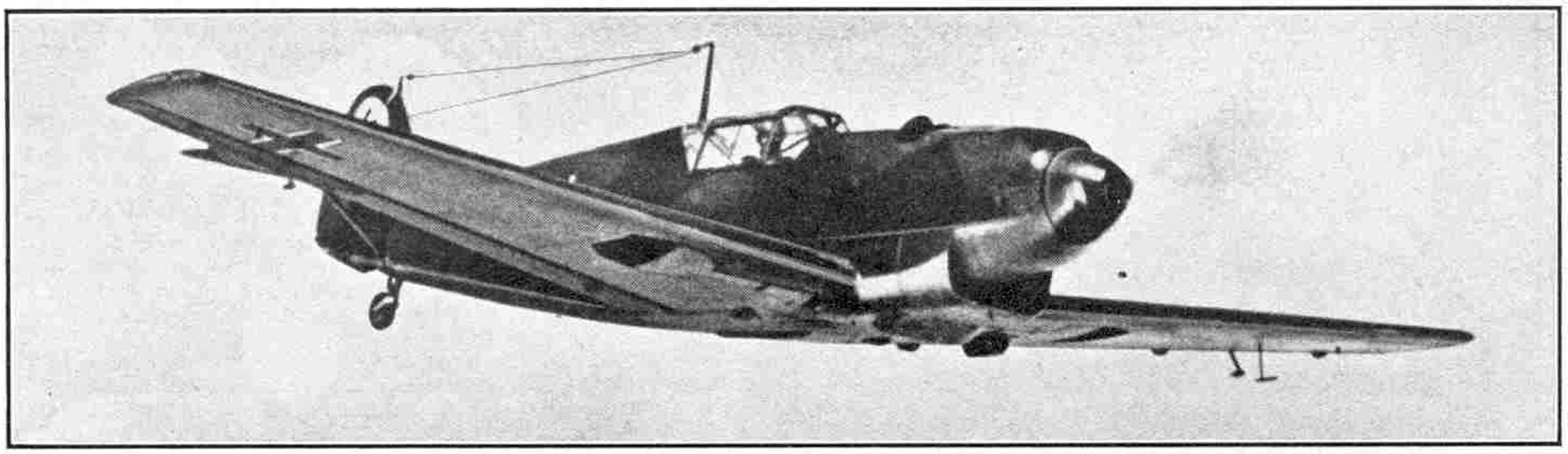
A feature of the new services is the introduction of mid-day expresses to Scotland from Euston and King's Cross at 1.0 p.m., with similar trains from Glasgow (Central) at 1.0 p.m., and Edinburgh (Waverley) at 1.20 p.m. These trains complete their journeys in 8¾ hr. thus reducing the throughout time by a full hour.

"The Flying Scotsman" no longer calls at Doncaster, Darlington and Dunbar in the north-bound direction, and arrives at Edinburgh at 6.25 p.m. instead of 7.38 p.m. The south-bound *"Flying Scotsman,"* with a connecting service leaving Aberdeen at 6.0 a.m., also is accelerated, reaching King's Cross at 6.34 p.m., 71 min. earlier.

In addition to new morning trains, later evening trains with both First and Third Class Sleeping Cars have been introduced between Euston and Liverpool. On the Leeds and Bradford services there are new trains from King's Cross and St. Pancras. Additional trains also run between London and Lancashire, London and Birmingham and Wolverhampton, London and Newcastle, London and Hull, and cross-country journeys are improved by extra trains between Liverpool and Birmingham, Sheffield and Birmingham, and Manchester and Birmingham.

* * * *

The L.M.S. announce that over a million fog signals are being used during this winter. There is no danger of a fog signal being mistaken for a bomb, as a detonator gives a short crack except when placed in a confined space. To prevent the fogman's fire from showing a glare skyward the braziers have been fitted with special covers.



The Messerschmitt Me 109 single-seater Fighter.

German Fighters and Bombers

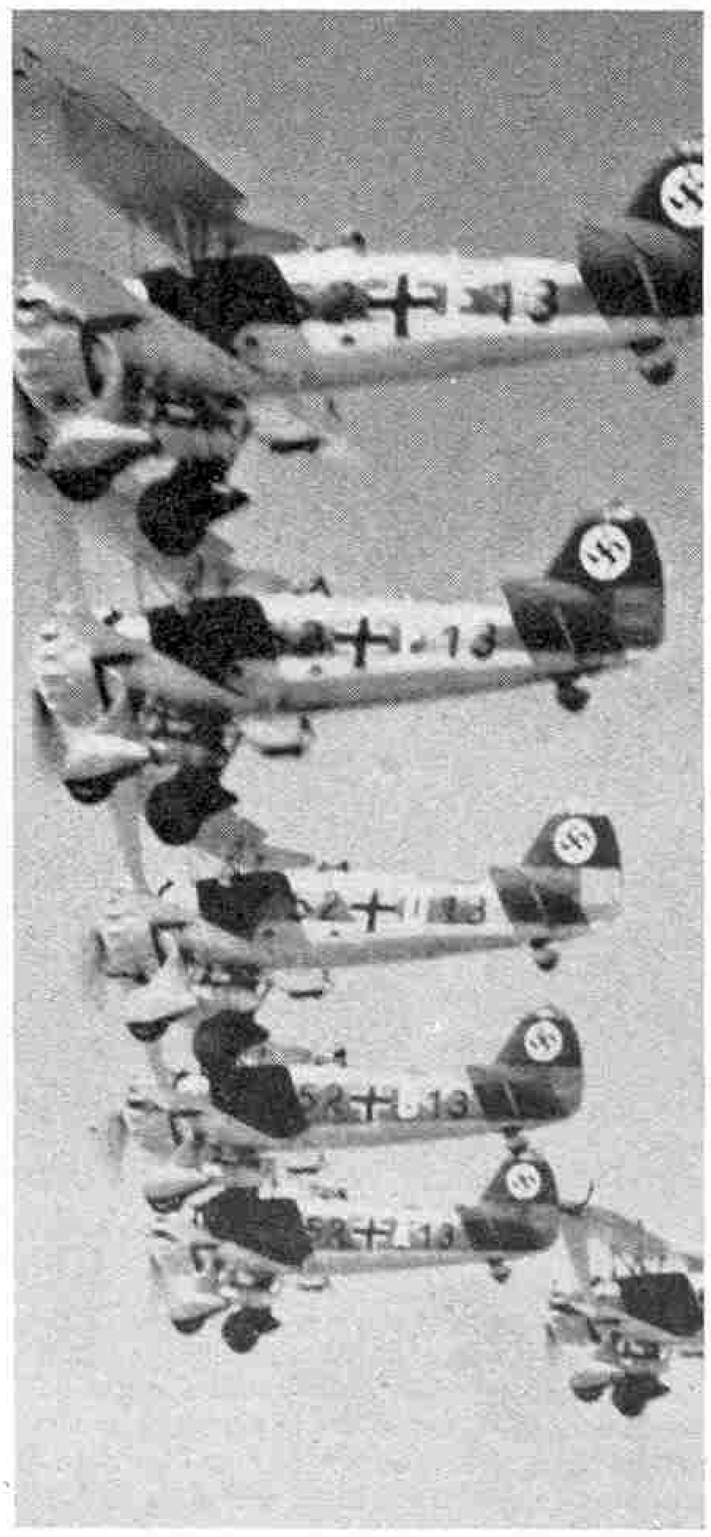
Machines in the News To-day

ALMOST every day now we hear of combats in which our airmen meet German machines of various types, either off our shores, over the enemy's sea bases on the north coast of Germany, or during the flights of the Royal Air Force over great stretches of Germany itself. These are followed with the keenest interest by "*M.M.*" readers, many of whom have asked us for some details of the machines that our airmen have fought with such brilliant success. In this article therefore we describe and illustrate several of the German fighting and bombing aeroplanes.

Probably the best known of the German fighting aircraft is the Messerschmitt Me 109, sometimes called the Bf 109. This single-seater monoplane was introduced in 1937, and it is noted for its speed and for ease of manœuvre. A special version of the machine, called the Me 109R, set up a new world absolute speed record of 469.225 m.p.h. on the 26th April 1939. This record beat one of 463.945 m.p.h. achieved only three weeks previously by a special Heinkel fighter. Another notable high-speed flight in a specially modified Messerschmitt fighter was that made by J. H. Wurster on the 11th November 1937. In a machine called the Me 113R he flew at a speed of 379.59 m.p.h.

Early examples of the standard Messerschmitt Me 109 single-engined fighter were fitted with a 600 h.p. Junkers "Jumo" 210B engine and could attain a speed of 311 m.p.h. They had a large cooling radiator below the engine cowling. The latest version of this fighter has a 1,050 h.p. Daimler-Benz engine and is capable of a top speed of 354 m.p.h. at 12,000 ft. It has three small radiators instead of a single large one.

The Messerschmitt Me 109 is a low wing all-metal monoplane armed with two machine guns in the wings that fire outside the radius of the airscrew. There are two synchronised machine guns installed in special troughs on the top of the engine cowling, and a 23 mm. cannon that fires through the hollow hub of the airscrew. Unusual features of the wings are their blunt, almost square ends, and their attachment to the fuselage by special pins at only three points. The machine has a retractable undercarriage.



Henschel Hs 123 single-seater Dive-Bombers. This photograph and the lower one on the next page are reproduced by courtesy of "Flight."

A new and larger Messerschmitt is the Me 110, a long-range fighter for bomber escort duties. This low wing two-seater is fitted with two 1,100 h.p. Daimler-Benz engines, and is credited with a top speed of 285 m.p.h. Its heavy armament is believed to include two 20 mm. cannon.

A different type of German single-seater fighter in extensive use is the Heinkel He 112. On 30th March 1939 the He 112U, a specially modified Heinkel fighter fitted with a 1,660 h.p. Daimler-Benz engine, set up the world speed record of 463.945 m.p.h. already mentioned. The latest standard Heinkel He 112 has a 1,150 h.p. engine of the same type as the He 112U, and attains a top speed of 358 m.p.h. at 12,300 ft. Some of these fighters have extra fuel tankage so that they can act as escorts to long-distance bombers.

The Heinkel He 112 fighter is a metal-built low wing monoplane with wings of oval shape that curve down from the fuselage before sweeping slightly upward to sharply-tapered tips. Normally it is armed with two 7.7 mm. machine guns fixed in streamlined troughs along the sides of the fuselage, another gun inside each wing, and a 20 mm. cannon fixed to fire through the hub of the airscrew. There are racks for

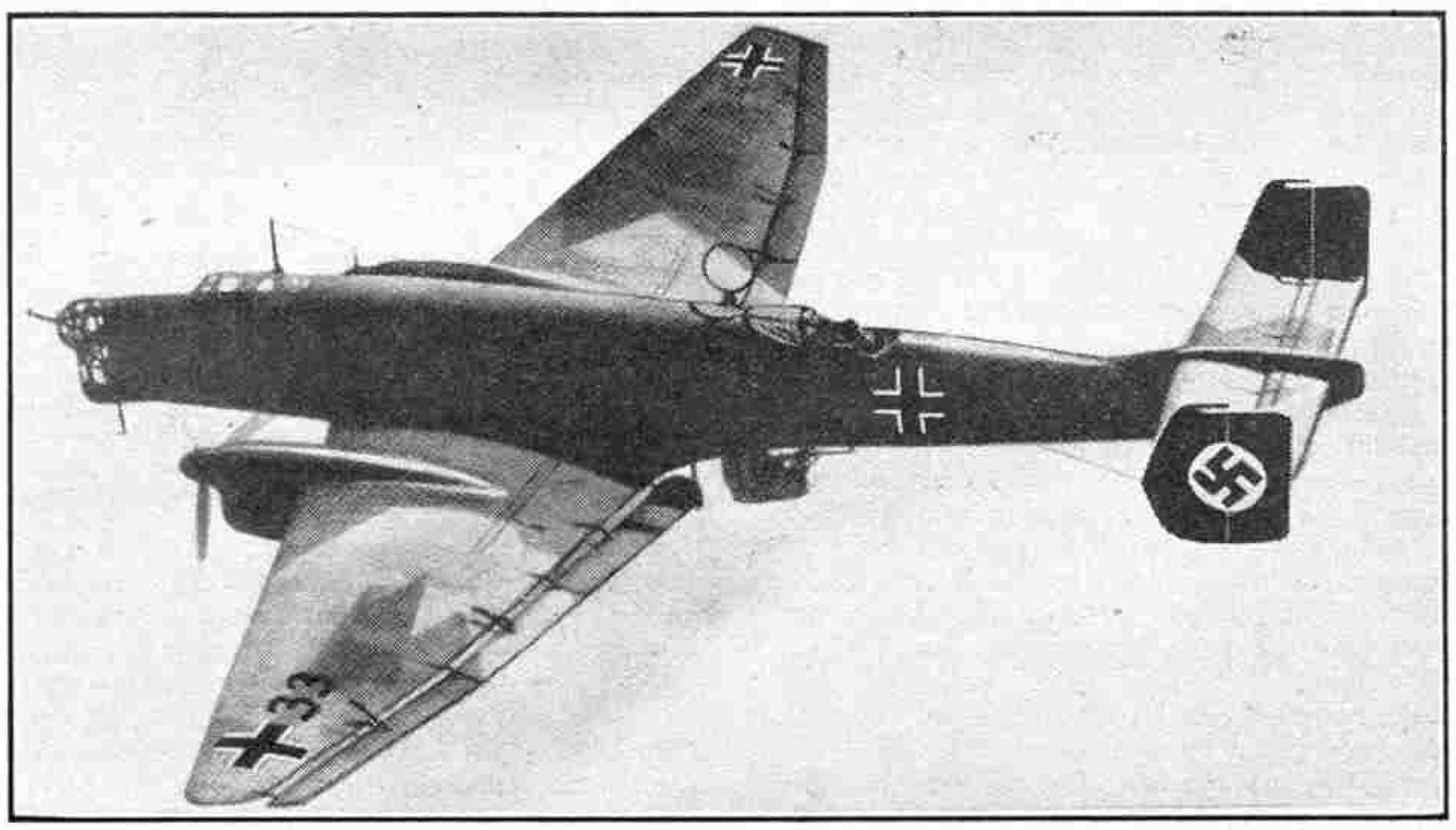
three small bombs under each wing.

In Germany, as in England, attention has been given during the last year or two to the development of dive-bombers. When these aircraft are attacking they are dived steeply toward their objective. The terrific descent is checked when the machine is only a few thousand feet above the target, and the bomb is released as the aeroplane turns upward again for rapid climb and escape. Dive-bombing aircraft have to be immensely strong in order to withstand the very great strains imposed upon them when pulling abruptly out of the dive.

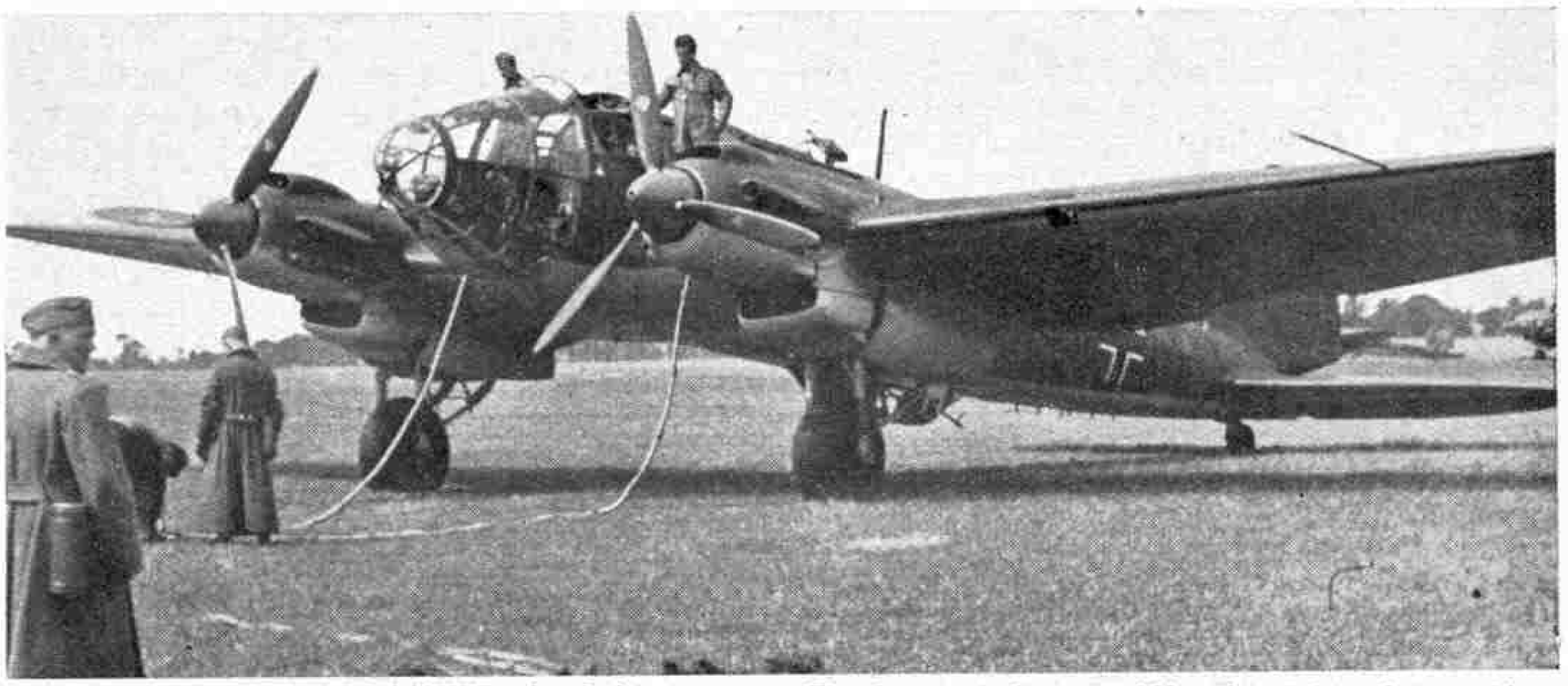
Two types of German dive-bombers are the Junkers Ju 87 and the Henschel Hs 123. The Junkers type is a low wing monoplane, with a bomb load of about 1,100 lb. A dive-bomber has to be able to defend itself against enemy fighter aircraft, and for this purpose the Junkers Ju 87 has two fixed machine guns in the wings, one on each side of the fuselage—these fire clear of the airscrew—and a third on a rotating mounting in the rear cockpit. Many Ju 87 dive-bombers are fitted with the 1,100 h.p. Junkers "Jumo" 211 type engine, and they have a top speed of about 240 m.p.h.

The Henschel Hs 123 dive-bomber, shown in the lower illustration on page 10, is one of the very few types of biplane in the German Air Force. It is a single-seater open cockpit machine, and carries a large bomb or several small ones between the legs of the fixed undercarriage. The defensive armament is variously given as two fixed machine guns mounted in the upper part of the engine cowling and synchronised to fire through the radius of the airscrew, and as four machine guns that fire outside the airscrew disc. The top plane is of much greater span than the bottom one, and is held above the fuselage by N-shaped supports. The standard Henschel Hs 123 is fitted with a B.M.W. type engine, and is believed to have a top speed of about 220 m.p.h. The fuel tanks are inside the fuselage.

One of the many types of German twin-engined bombers is the Heinkel He 111K shown in the lower illustration on this page. This bomber was developed from the He 112 transport monoplane built for the Deutsche Lufthansa. It is a low wing machine with elliptical wings, and is capable of a top speed of about 274 m.p.h. at 12,300 ft. A specially modified version called the Heinkel He 111U and carrying a load of 2,205 lb. made a notable flight on 22nd November 1937, when it covered 621 miles at an average speed of 313 m.p.h. Like other specially prepared German record-breaking aircraft already mentioned, the He 111U had Daimler-Benz engines boosted to give 1,660 h.p. each.



The Junkers Ju 86K twin-engined bomber. The retractable gun turret under the fuselage is seen lowered for action. This illustration and the upper one on the opposite page are reproduced by courtesy of "The Aeroplane."



Refuelling a short-nosed Heinkel 111K Bomber during manœuvres. The photograph gives a good idea of the height of the machine.

Early Heinkel He 111K bombers had a long, almost pointed nose, but the current version has a much shorter one. The machine carries about 4,400 lb. of bombs stowed vertically in special compartments in the wing centre-section, and released through trap-doors in the floor of the fuselage. When attacked by enemy pursuit fighters the He 111K can bring three guns into action to defend itself. One of these is in the nose of the fuselage, another on the top, about in line with the trailing edge of the wings, and a third is in a faired compartment in the bottom of the fuselage. The normal range of this Heinkel bomber is 2,140 miles.

The Dornier Do 17 twin-engined bomber must be mentioned. The unusually slim fuselage and long pointed nose of the early Do 17 led to its being nick-named the "Flying Pencil." Later bombers of this type have blunter noses, but even so they have a graceful appearance that is in contrast to their sinister purpose.

The Do 17 is a high wing monoplane with enclosed cockpit, and normally carries a crew of three, consisting of the pilot, bomb-aimer, and a gunner whose station is a short way behind the pilot and in line with the leading edge of the wings. The navigating equipment includes two-way radio, an automatic pilot, and direction-finding apparatus. The bombs are carried horizontally in the centre of the fuselage, and for defence the Do 17 is armed with four machine guns.

Winter Fishing in Frozen Canadian Lakes

By James Montagnes

WINTER fishing through holes in the ice has become a vast business in northern Canada. Many cities of the Canadian west and those near the border in the United States receive in time for noon or evening meals fresh fish caught that day in lakes on which the ice varies in thickness from one foot to four feet. Aeroplanes speed this fish direct to the cities, carrying upwards of half a ton at a time.

When these winter fishermen begin their work fish in great variety are flown from these cold northern waters. Among these are whitefish, lake trout, sturgeon and pickerel, or American pike. Some of the lakes are barren, but the fishermen are careful to test their fishing grounds before they settle down for the winter; and so prolific are the fish in most of these northern unfished waters that the men who take part in this strange pursuit can pick on nearly any lake they see and expect a good catch during the few months of winter.

Fishing camps on the shores of the wooded lakes, some of them near the northern edge of the forest belt, are quickly prepared each autumn. Fishermen move in, by boat or aeroplane, sometimes with their families. They build log cabins or, if there are only men in the party, they may make do with a tent in a sheltered bit of forest. It takes several weeks to make the camp comfortable for the four to six months it will be occupied. While navigation remains open the nearest fishing camps to the railway bring in horses and sleighs by boat to pull the loads of fish to shore each day, when later the lake is frozen over. The more distant fishing camps rely on teams of husky dogs for

An Indian squaw getting the family's dinner from a hole in the ice of Great Slave Lake.

this purpose, and the dogs and equipment often are brought to the camps by aeroplane.

By December the ice is hard enough to

Commercial fishermen hauling their net out of a hole in the ice on a lake in northern Ontario. The net will have a haul of live fish, which will freeze as soon as they come out of the water.

form a crust over most of the small and large lakes of the far north. In January it is thick enough to support the heaviest tractors, and the fishermen go out and chop through the ice to the water beneath. Then they try out these first holes. If the fish bite as readily as they expect, the men sink a guide line through the hole, and pay it out to whatever length they desire. A metal scraper attached to the guide line on a wooden float scratches against the under surface of the ice. The position this has reached is found by careful listening, and at this point the men chop through the ice. If they have calculated properly they find the guide line in the open water in the hole, and after hauling it up they can stretch a net between the two holes.

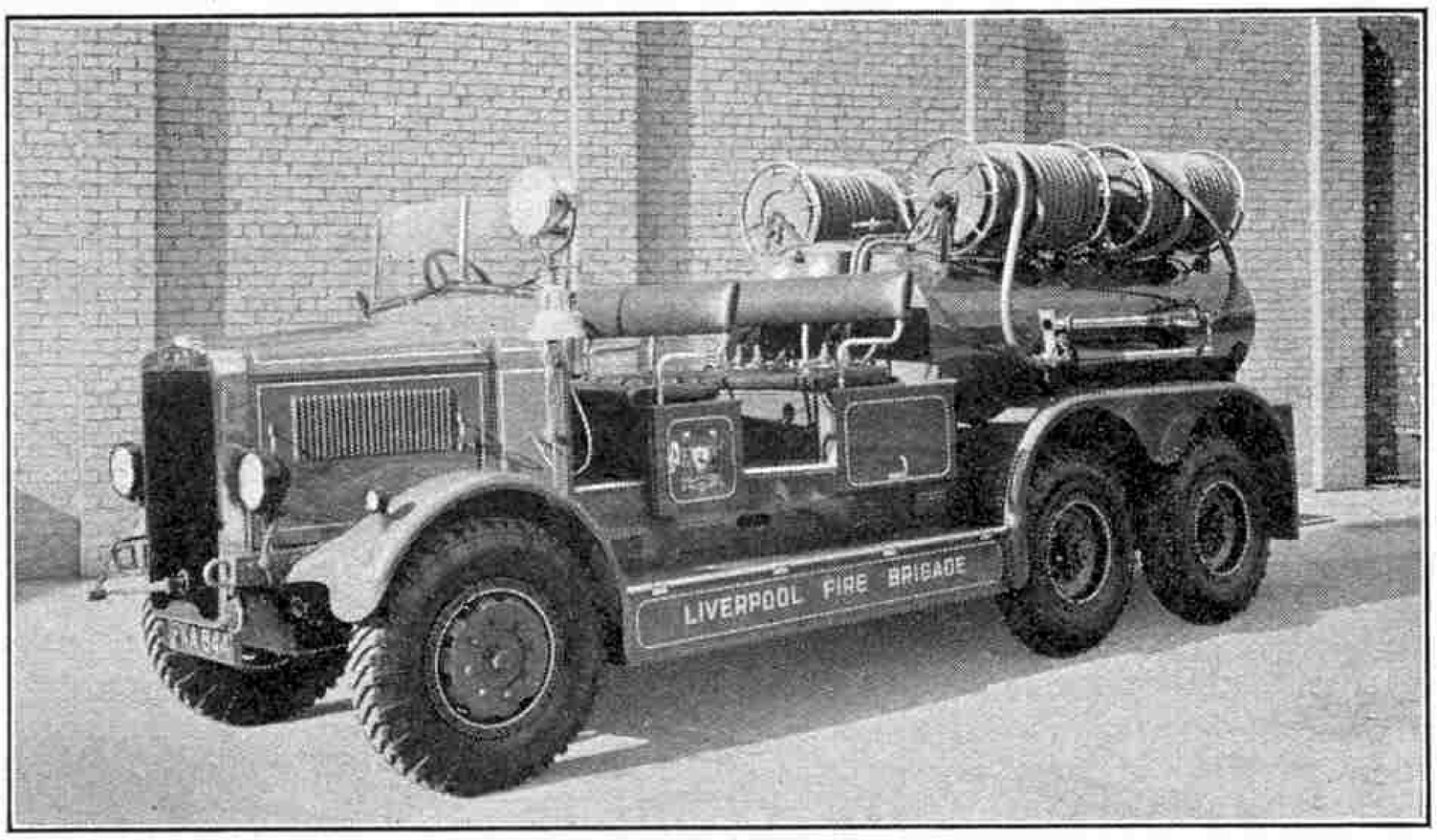
From the central hole they start other nets, or put several nets between the two holes. Fastening the nets in the ice at the open holes, they set more nets all over the lake and next day start hauling in their catch. Then it is a matter of stringing out the nets again one at a time as fast as each net is emptied. The fresh-caught fish are cleaned immediately. They freeze in the cold air, and are packed in boxes that are taken on sleds to the shore, where tractors call for the boxes, or aeroplanes land nearby to pick them up.

This winter ice fishing is dangerous for the fisherman, because he must be constantly on the lookout for fissures and cracks in the ice, which may open to sweep him into the cold waters, with little chance of rescue near at hand, for he works far out on the lakes. It is dangerous too for the dog teams and horse sleighs and their drivers, for the ice may have air pockets in it, and may give way under excessive weight, tumbling men and animals into the water. Tractor train drivers have to pick the most careful paths across the ice-covered lakes, for a plunge into a break in the ice means loss of tractor and load, and possibly life, since it would be hard to come up under the thick roof of ice on the lake. Aeroplane operators too know the dangers of a forced landing or a broken ski in that remote country, where weeks may have to be spent before rescue can reach the fish freighter stalled by accident or broken equipment.

It is a cold job these ice fishermen have. They and their families are isolated for at least half the year. The only people they see are the aeroplane or tractor drivers who come for their fish, in sunny weather or blizzards, whether the temperature is above zero or 40 deg. below. Their nearest neighbours are trappers and Indians, or sometimes a dozen miles away there is one of the growing number of radio stations installed by air transport operators, mining companies or the government. Nearly all fishermen keep in touch with the outside world by means of battery-operated radio receivers, for there are no electric lights at the fishing camps. Neither are there doctors or hospitals, and only the barest of first aid equipment is carried at the larger camps. Reliance is placed on aeroplanes to bring doctors, or to take patients out to hospitals in case of sickness or accident.

The fishermen often bring their families with them for the winter's fishing. Women and children take part in the cold and strenuous work of hauling in the fish from the frozen lakes. Not long ago a pilot at one of these fishing camps heard of sickness in one family. There was no doctor at the camp, only first aid supplies. The mother told him that her youngster ought to really go out to the nearest city to a hospital, but she had no money with which to pay for sending him there. She only allowed the pilot to take her and the youngster the 115 miles to the nearest city if he would take the fare later out of the winter's fishing proceeds.

Winter commercial fishing is not confined solely to the prairie provinces, where more of it is done each year, but is a growing business even much farther north in the North West Territories. Thousands of fish are caught there annually for home consumption, that is for the missions, the trading posts, police posts and the Eskimos themselves. For dogs fish is a staple food when dried, and with the settling of the country and the coming of better transport there is some development of a commercial nature in the great lakes that are not far distant from the Mackenzie River, the greatest traffic artery of the North West Territories. Here in these unfished lakes lies a huge fortune in fish, available when transportation difficulties can be overcome.



A Leyland "foam-fighter" fire-engine specially designed for fighting fires breaking out in aircraft after a crash. Photographs on this page are reproduced by courtesy of Leyland Motors Ltd., Leyland.

Fighting Aeroplane Fires

Foam Engine for Special "Crash" Work

A SPECIAL "foam-fighter" fire-engine has been placed in service at a large airport to deal with fire breaking out in aircraft as a result of a crash. The new engine has been designed by Leyland Motors Ltd. in conjunction with the chief officer of the fire brigade of the area in which the airport is situated, and is shown in the illustrations on this page. The station is staffed with professional firemen, and in addition to the new "crash engine" is equipped with two Leyland fire-engines and a tender.

Although an outbreak of fire does not always follow a crash, there is always the possibility of this further disaster, so the fire-fighting machine and crew must turn out as soon as an aeroplane disaster threatens. In order that the station staff can be warned as soon as an aeroplane seems to be in difficulties over the landing ground, and a crash appears imminent, an alarm and a telephone in the watch-room are connected with the aerodrome control station. The most distant points of the airport are about one mile from the fire station. This means that the fire-engine would take about two minutes to arrive at such a spot and this is about the longest period that can be allowed if there is to be any chance of saving life, assuming fire breaks out immediately the crash occurs.

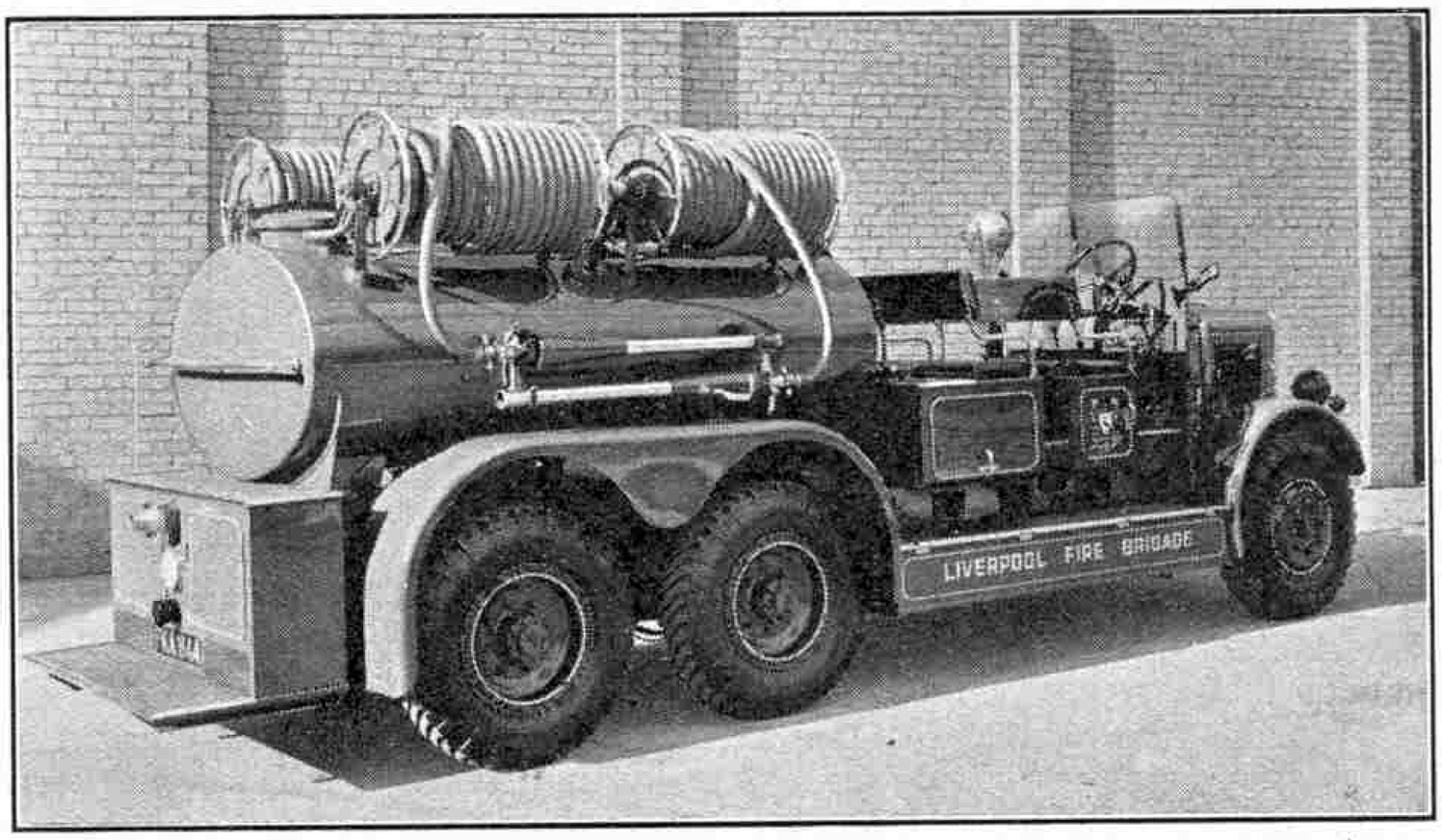
As the surface over which the fire-engine has to travel may become soft in rainy weather a double-drive six-wheeled Leyland Cub chassis is employed. This is equipped with a fully articulated bogie, main and auxiliary gear-boxes giving altogether eight speeds, and Trak-grip tyres all round.

Water-and-air foam is the medium chosen for fighting the petrol-type fires that will be encountered, and as there is no time to waste in conveying water to the engine at the site of a crash, the only alternative is to carry it on the engine itself. The water is stored, together with the foam-making compound, in a 650-gallon tank, the interior of which is lined with bitumen. From this it is pumped by a two-stage 500-700 g.p.m. pump placed amidships. The tank is fitted with four individually-controlled delivery connections direct-coupled to four hose reels, each of which carries 100 ft. of $1\frac{1}{4}$ in. bore non-kinkable hose. Four Pyrene foam "guns," each separately controlled, are mounted two at each side of the tank. Each gun will produce about 600-650 gallons of foam a minute, so making the total delivery capacity of the outfit about 2,500 foam gallons per minute.

The foam guns are kept coupled up to the reels, and as foam-making at the scene of a fire is absolutely instantaneous, the engine is ready for action immediately the guns are lifted from their hangers.

In order to prevent as far as possible delays and breakdowns due to engine trouble, the petrol engine by which the machine is propelled is equipped with both magneto and coil ignition systems and two sets of sparking plugs. To facilitate operations at night an 11 in. searchlight is mounted in front of the windscreen.

In addition to the crash work for which it is specially designed the fire-engine can, of course, also be used without modifications as a first-aid engine for ordinary fires, in which case water is pumped from its tank. It can also be used as an ordinary fire pump working from the mains, and for this purpose provision is made for the attachment of a 4 in. suction inlet to be connected with the nearest hydrant.



Another view of the Leyland "foam" fire-fighter showing at the rear the hydrant connection to the pump for use when the machine is in action as an ordinary fire pump.

Finland, The Home of Ski-ing

By M. A. Savonius

This article, written by a native of Finland before the Russian attack, gives a splendid picture of winter in that heroic little country.

FINLAND might almost be called the "grandfather" of the winter sports world, as Finnish history records that for more than 4,000 years the Finns have used skis for travelling about the country in winter. The Lapps of Northern Finland probably evolved the first primitive skis from sheer necessity, as they have always been compelled to travel long distances with their herds of reindeer, looking for the patches of grey moss and lichen that form the animals' only nourishment for nearly half the year.

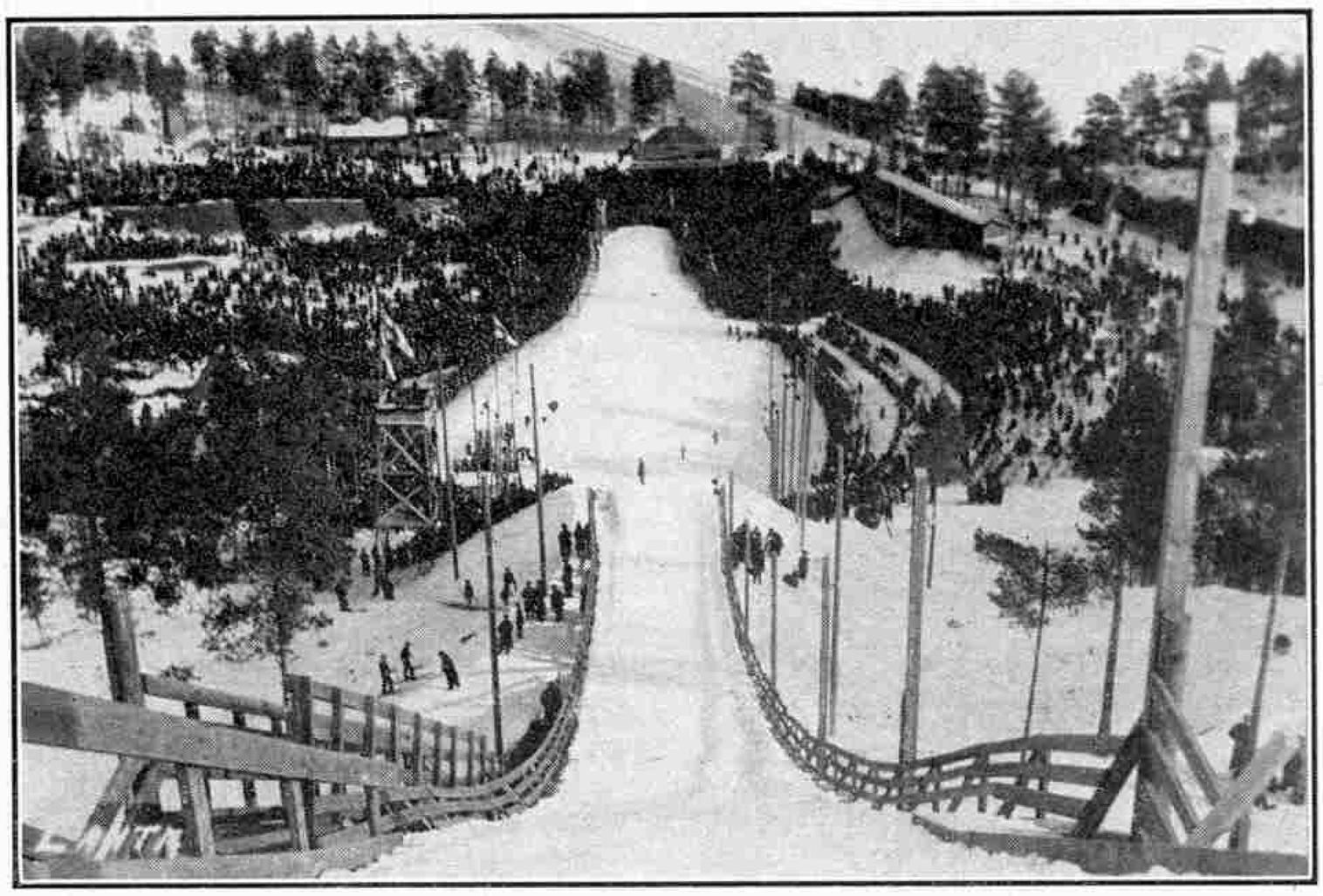
The earliest types of skis were quite different from the ones used to-day. They consisted of one long narrow ski and one short one, and the skier propelled himself along rather like a boy on a scooter. Later Finnish skis altered in design, and both were made the same length. About 25 years ago they were still very long and narrow, and no bindings of any kind were used, merely a strap over the curled toe of the ski-ing boot.

This type of ski is ideal for travelling fast over flat ground or across the frozen lakes. In autumn and spring, when the ice is not strong enough to bear a man walking over it, he can still travel across on long skis, which distribute his weight over a larger surface. Any down-hill running that required turning at speed was of course impossible with these long skis. Shorter skis, secured with bindings to the feet, became popular in Switzerland when ski-ing developed into a sport, from having been only a necessary mode of travelling in Scandinavia.

To-day ski-ing in Finland is a sport as well as a necessity, and the skis and bindings in use are the same as in all other countries where ski-ing is practised. Most people possess a pair of skis, and because of this general demand skis and boots are not luxury articles, but are sold in large quantities at low prices. The children begin to ski almost as soon as they can walk, and quickly become very confident and skilled.

The topography of a country of course plays an important part in a sport like ski-ing. In Switzerland down-hill running is naturally the chief sport; Norway excels in jumping, and in Sweden and Finland long distance ski-ing is most popular. The greater part of Finland is covered with thick forests, broken by lakes, occasional fields, and rather low granite hills. This gives a varied terrain for ski-ing—picking your way between the trees, speeding over the flat, climbing inclines, and rushing down short slopes on to the ice or into the forest again.

Ski-ing over this type of country for several hours is very tiring unless you are well trained and your skis are in perfect condition. In Switzerland you use strips of skin fastened on to the underside of the skis to prevent them slipping backward when you are climbing a hill. This method would not be practicable in Finland, because you would have to be constantly removing and re-fixing the skins as you go up and down. Instead you smear your skis at the beginning of the trip with a mixture of wax and tar. This must be done in a special way, so as to make the skis slip forward but not backward. Special mixtures are used for different temperatures, and every keen skier has a secret recipe of his own, which he is quite convinced is better than that of everybody else!



The great stadium at Lahti, looking from the top of the ski-jump.

It is only recently that the fells in Lapland have become popular as a ski-ing centre. Now hotels have been built right up here in the Arctic, and every year more and more people go to Lapland for a few weeks' ski-ing, particularly in the early spring when the snow is vanishing in southern Finland. You get a different type of sport up here, rather more like the down-hill running in Switzerland; and Finnish skiers who so far have not paid much attention to "slalom," or the various "turns" used in Alpine ski-ing, now find that turns are just as important as the ability to keep standing when you hurtle down a hill at speed.

Throughout the winter, from January to the end of March, ski-ing competitions are organised all over the country for people of all ages. School competitions are very important, and the best skiers from each school take part in the big inter-school races. The boys train very seriously for these events, and for the honour of winning the various cups that are presented each year.

Most schools arrange for a special sports holiday in February, lasting a week; and parties led by teachers set off on exciting expeditions into other parts of the country that the boys otherwise would hardly have a chance of visiting. Some of the elder boys often hire a horse-sledge to carry tents and equipment and go off on their own for a really primitive holiday in the forests, camping out at night and cooking their own food, and generally treating the trip as

Hill specially built for world championship jumps.

an endurance test.

It takes some time for a beginner to get used to the feeling of wearing skis, and it is not much good trying to practise turns until your leg muscles have become strong enough for you to be able to get the skis in any position without much effort. After a while you come to regard your skis more as part of yourself than just as cumbersome lengths of wood fixed to your boots, and by then you will have control over the skis instead of their running away with you.

The great secret of straightforward down-hill running—apart from a sense of balance, which is difficult to acquire unless you are born with it—is never to allow yourself to become rigid. Your whole body must be flexible, particularly at the knees, so that you can ski over bumps in the ground without being thrown over by the jolt. Therefore a skier coming down hill never stands absolutely straight, but bends his knees and leans slightly forward. If you tend to fall over backward it shows that your position is wrong, and that you are "letting" yourself fall. Falling forward is a much less serious fault, and just means that you will need more practice. One well-known Finnish skier once said: "When going down a hill you must never allow yourself to fall unless the ground comes up and hits you in the face."

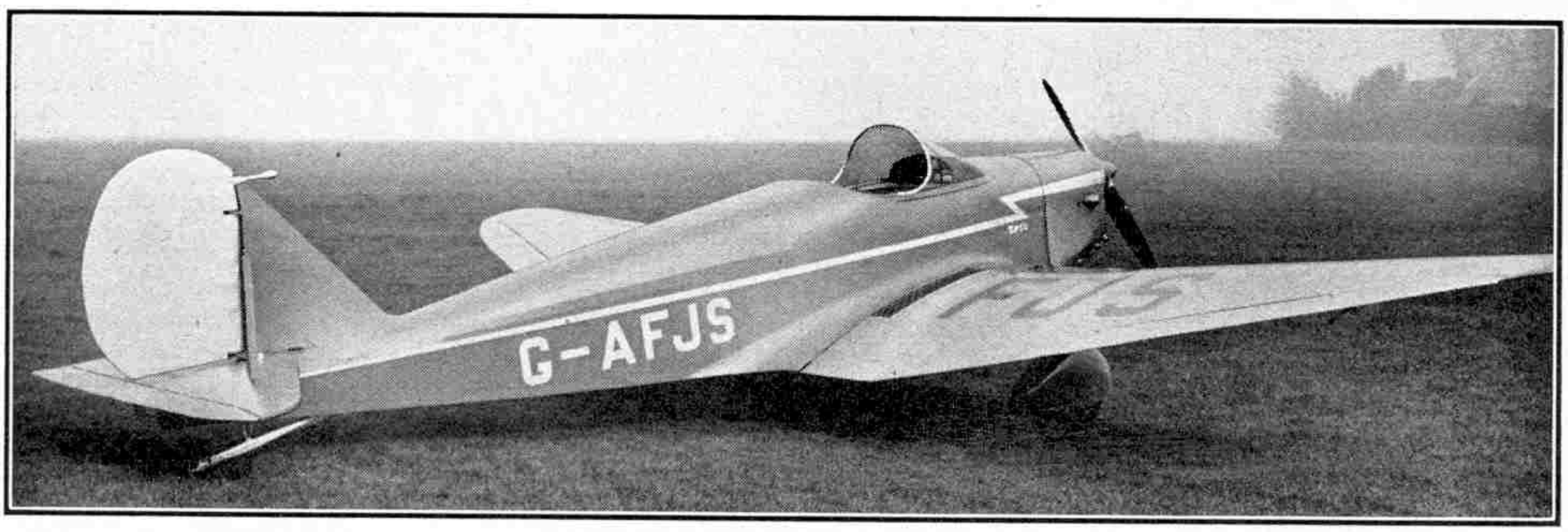
The faster you travel on skis the harder it is to keep your muscles relaxed, and the more you tend to become all rigid and excited and end up buried in a snow drift. But there are various ways in which you can lessen your speed and make the descent less dangerous. The simplest way to come down a hill slowly, without committing the crime of braking with your sticks, is to use your skis as a snow-plough. The way to do this is to point your toes inward, keeping your feet level with each other but at a good distance apart. The skis should be tilted on the inside edge. This method gives you a rather knock-kneed appearance, but it will enable you to "plough" slowly down the hill, and if the slope is not too steep it is quite a good way of stopping.

Another way of slowing is to do a series of slalom turns. If you are running downhill and want to turn to the right, you bring your left foot forward and place the ski in a modified "snow-plough" position. The right ski of course must not be allowed to cross over the left one. This will make you swing round in a curve to the right, and if you wish to turn left you use the right foot in the same way. After some practice at slalom turns you will find that merely swinging your hips strongly from side to side will make the skis turn in the opposite direction. Of course you are moving your skis at the same time, but that movement becomes so automatic that you hardly notice you are doing it.

If you want to stop on a hill, you have to do a turn that will bring your skis round so as to face across the hill instead of down it. The simplest method here again, besides the snow-plough that I have already described, is to bring one ski forward, crossing it in front of the other, which must be kept well back, or both skis will cross and you will fall on your nose. A more difficult turn is jumping right up into the air and turning round your stick while both skis are off the ground. The photograph shows how an expert does this turn in style.

I was privileged to be the only British journalist at the World Ski-ing Championships held at Lahti in Finland in February 1938. The sun shone in the pale blue northern sky in almost spring-like welcome for the opening ceremony of this great annual festival of the "snow kings" of a dozen countries. The imposing new hill built by the authorities for the ski-jumping towered above everything, and with four Finnish flags fluttering bravely in the breeze. For nearly a week we were entertained by the most magnificent display of ski-ing I have ever witnessed, leaving memories that will never be forgotten.

A Finnish skier demonstrating a jump from almost level ground.



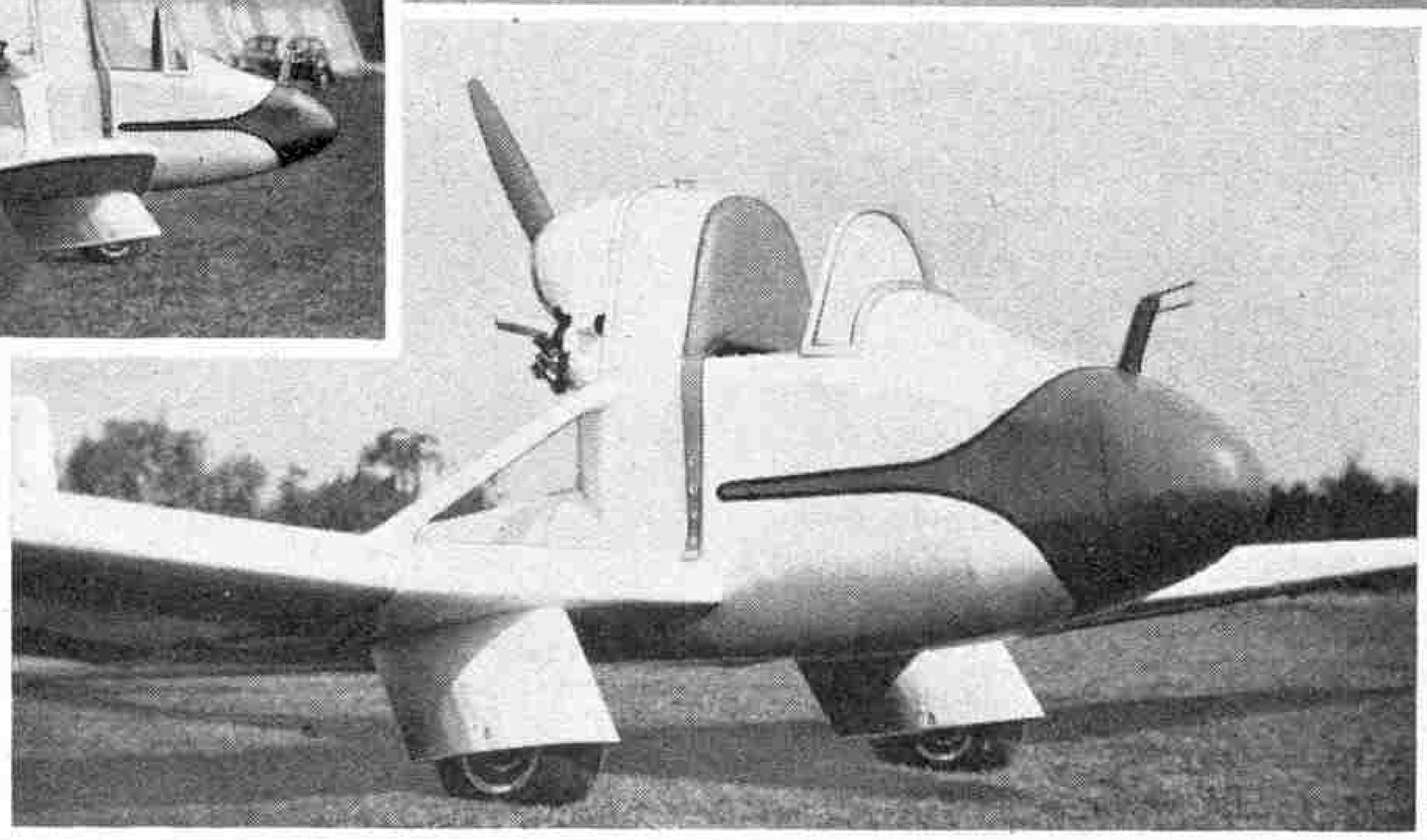
The "Tipsy" light monoplane. Photograph by courtesy of Tipsy Aircraft Co. Ltd.

Air News

An Unusual Light Aeroplane

The lower illustrations on this page show two views of the Luton "Buzzard," an unusual ultra-light single-seater monoplane. It is a "pusher" machine, as the airscrew is behind the wings instead of in front of them. When fitted with a 34 h.p. British Anzani engine the "Buzzard" can attain a top speed of 95 m.p.h. It is made of wood, with a fuselage of normal depth only as far as mid-wing, where it diminishes to a low, slender form in order to give clearance for the airscrew. The fuselage carries a neat tail unit, which has a fixed tailplane of 7 ft. 6 in. span.

The main dimensions of the "Buzzard" are: span 35 ft., length 20 ft., and height 5 ft. 6 in.



Two views of an unusual British lightweight, the Luton "Buzzard" single-seater "pusher" type monoplane. Photographs by courtesy of Luton Aircraft Ltd.

A New "G" Class Flying Boat

"Golden Fleece," the third of the "G" class flying boats built for Imperial Airways, now British Overseas Airways Corporation, has now been launched and will be taken over by the company after passing its acceptance tests.

The first of these giant 32-ton flying boats is the *"Golden Hind,"* which has been undergoing minor alterations, and the second is named *"Golden Horn."* They have been designed for service on the Atlantic air route, and it is expected that they will be employed on the transatlantic service next summer.

Boeing "Stratoliner" Tests in Final Stage

The extensive testing of the American "Stratoliner" 4-engined monoplane by the makers, the Boeing Aircraft Company, of Seattle, California, is almost completed. Afterward the air liner will be passed to the Civil Aeronautics Authority for government tests that may take several weeks to carry through.

Nine of these great air liners are being built, and all are being fitted with special altitude-conditioning equipment for comfortable flight at "above the weather" heights. One of the "Stratoliners" is being used by Howard Hughes, the well-known American airman, for experimental flights in the Los Angeles area, and during recent months two others have been in the hands of E. T. Allen, the Boeing company's Director of Flight and Research. The passenger furnishings will not be installed in the aircraft until all test work is completed. Each "Stratoliner" will seat 33 passengers.

Radio Beacons in Italy

Radio beacons operating in groups of three are proving valuable aids to aerial navigation in Italy, and the system is to be extended. The three beacons of a group transmit successively 2-min. signals of the same frequency at intervals of 4 min., and bearings taken on the three enable navigators to determine the positions of their machine.

The beacons of one of these groups are at Tripoli, Brindisi, and Bengazi respectively, and they operate on a wavelength of 1,167 m. Tripoli and Bengazi are in northern Africa, and Brindisi is in southern Italy. Another set of three are at Venice, Milan, and Rome respectively, and in this case a wavelength of 838 m. is used. A slightly shorter wavelength will be employed by a new group of beacons shortly to be put into operation at Naples, Cagliari, and Syracuse.

* * * *

Sweden has ordered 80 aircraft from the Republic Aircraft Corporation, in the United States.

* * * *

A new flying school was opened recently at Kassa, in Hungary.

Dutch Military Aircraft Markings

Official details of new identification markings for Dutch military aircraft have been issued. In future these machines will have an equilateral triangle of orange, surrounded by a black border about 4 in. deep, on each side of the fuselage. Monoplanes will have this coloured marking also on both sides of the wings, and biplanes will bear it upon the upper surface of the top wings and on the underside of the bottom wings. In addition, the rudders of all military aircraft will be marked with a vertical orange strip edged with black.

Linking Up with the Transatlantic Air Service

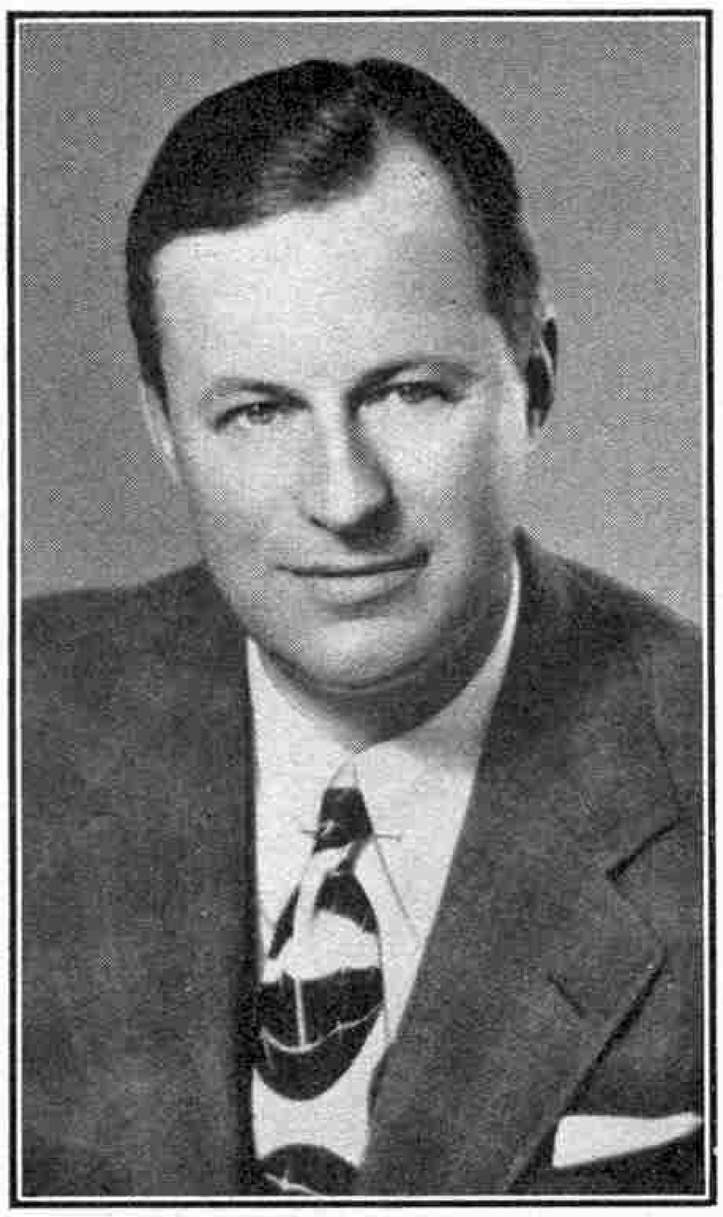
The introduction of a British air service to Lisbon, the present eastern terminus of Pan American Airways' transatlantic air service, is under consideration. Such a service would make possible a great saving in the transport of air mail from Great Britain to the United States during the months that the British transatlantic service is not operating.

In France a similar connecting link is to be established, and Air France are preparing to operate a service to Lisbon.

Speeding Up Air Mail to China

Transport of air mail to China will be speeded up under a new arrangement by which the Chinese Aviation Corporation will convey air mail by their new Chungking-Rangoon air service, which will link up 13 Provinces in China. Hitherto the air mail has travelled over the Imperial Airways route by way of Hong Kong and French Indo-China.

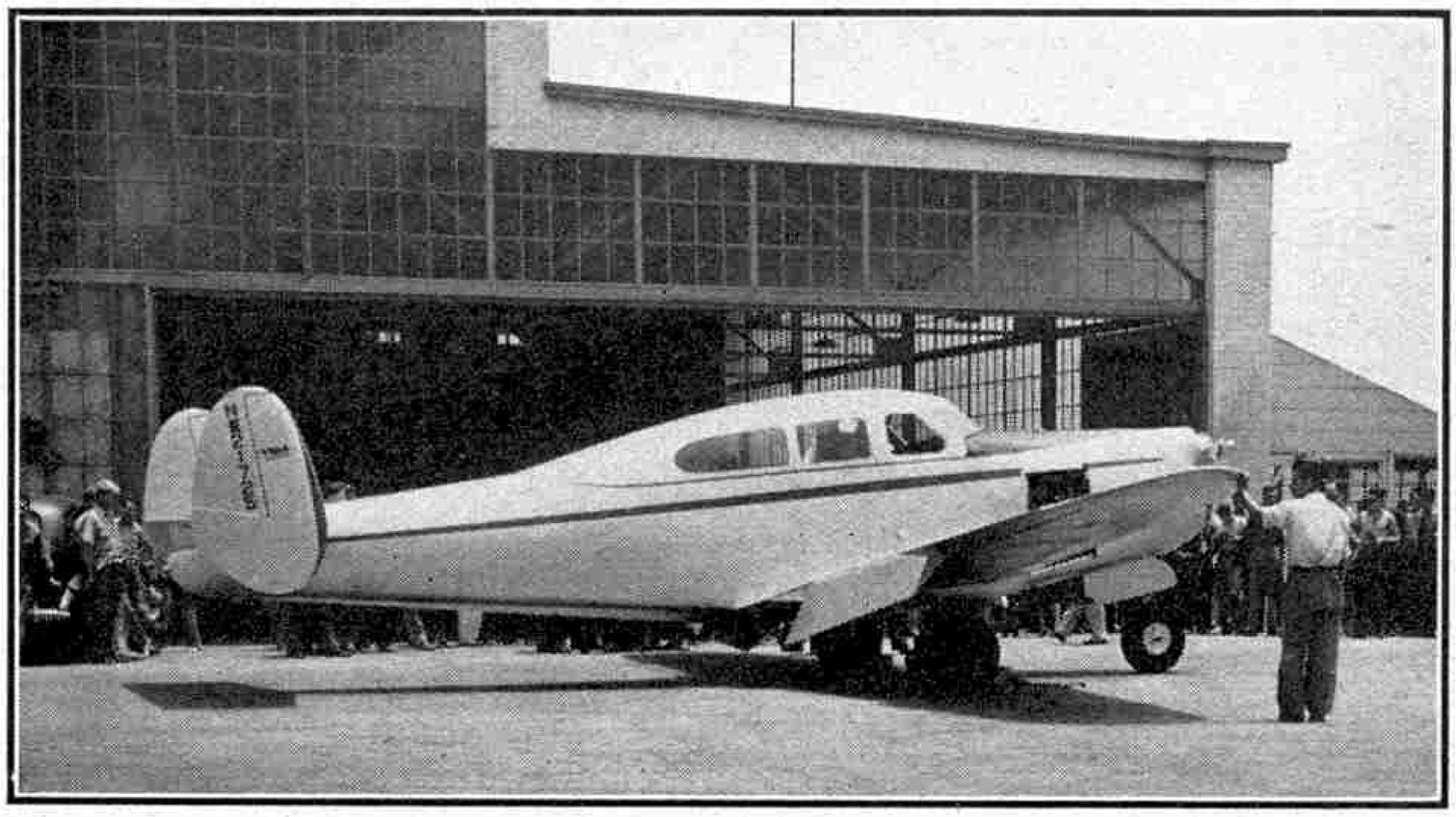
Another Chinese air development will be the opening in the near future of a direct air service between China and Russia, via Sinkiang. The Sino-German Eurasia Company will operate the Chungking-Hami portion of the service.



Robert E. Gross, President of the Lockheed Aircraft Corporation, Burbank, California, U.S.A.

Trans-Canada Air Lines Progress

Trans-Canada Air Lines have speeded up their transcontinental Montreal–Vancouver air service, and the journey now takes 25 min. less than formerly. The air liner takes off from Montreal at 9 o'clock at night and arrives at Vancouver at 11.10 next morning, Pacific time.



The new Vega "Starliner" transport aeroplane, in which the Menasco "Unitwin" engine is fitted. The photographs on this page are reproduced by courtesy of the Lockheed Aircraft Corporation, U.S.A.

A morning air service between Montreal, Ottawa, and Toronto has been introduced, and it is operated in both directions. The aeroplane departs from Toronto at 8.0 a.m., calls at Ottawa ¾ hr. later, and arrives at Montreal at 10.45 a.m. In the reverse direction an air liner takes off from Montreal at 8.30 a.m., and after calling at Ottawa reaches Toronto at 11.15 a.m.

Passengers in Trans-Canada aircraft are able to send or receive radio messages free of charge during flight. Some idea of the rapidly growing traffic on the company's routes is shown by the fact that in July last the passengers carried totalled 2,702, while in January 1939 the total was only 131.

Qantas Empire Airways' Workshops

The new well-equipped workshop of Qantas Empire Airways at Kingsford Smith Aerodrome, Mascot, Australia, is now occupied, and eventually it will have a staff of 65 engineers. In this workshop the "Bristol" Pegasus engines of the Empire flying boats will be completely overhauled as required. It is calculated that the facilities available will enable three or four overhauls to be completed in a week.

Canadian Colonial Airways

Canadian Colonial Airways recently completed 14 years of air line operation. Last year traffic on the company's Montreal–New York service increased very greatly, and 10,415 passengers were carried during the nine months January to September last year, as compared with 2,916 during the corresponding period in 1938. In September 1939 alone 2,151 people travelled over this air route in C.C.A. aircraft. The World's Fair at New York no doubt accounted for some of this remarkable increase in passenger traffic.

* * * *

Six Boeing B-17 "Flying Fortress" Bombers of the United States Army Air Corps may shortly make a goodwill flight to Rio de Janeiro.

Five American Airlines to have Combined Headquarters

A five-storey building now being erected opposite the Grand Central Railway terminal, New York, will be known as Union Air Terminal. It will be the joint headquarters of Pan American Airways, American Airlines, United Air Lines, Eastern Air Lines, and Transcontinental and Western Air, Inc. Lifts will swiftly convey passengers from ground level to the main waiting room, where there will be the booking offices, etc. At the coach station in the building they will board coaches that will take them to the airport of the air line by which they are to travel. It is expected that this joint headquarters will be ready for occupation by spring this year.

Denmark–England Air Service

A new air service between Denmark and England began on the 13th November 1939, when a Focke-Wulf "Condor" monoplane arrived at the British Civil Base, somewhere in the south of England. It is being operated by Danish Air Lines, and the Danish terminus of the service is Copenhagen; a call is made at Amsterdam.

The Douglas DC-4 in Japan

The big American Douglas DC-4 42-seater air liner bought last year by Japan Air Transport Ltd. had to be so extensively dismantled for shipment that on arrival in Japan re-assembly took three weeks. The aeroplane has since been test flown successfully at Haneda. This DC-4 is the first of its type, and others are now being built.

More Empire Air Services

The recent doubling of the weekly landplane service between this country and India, has also benefited Malta, which now has a twice-weekly air mail from the Mother Country. The increased service to India and the twice-weekly flying boat service to Australia bring the Empire air traffic over India nearly to peace-time proportions.

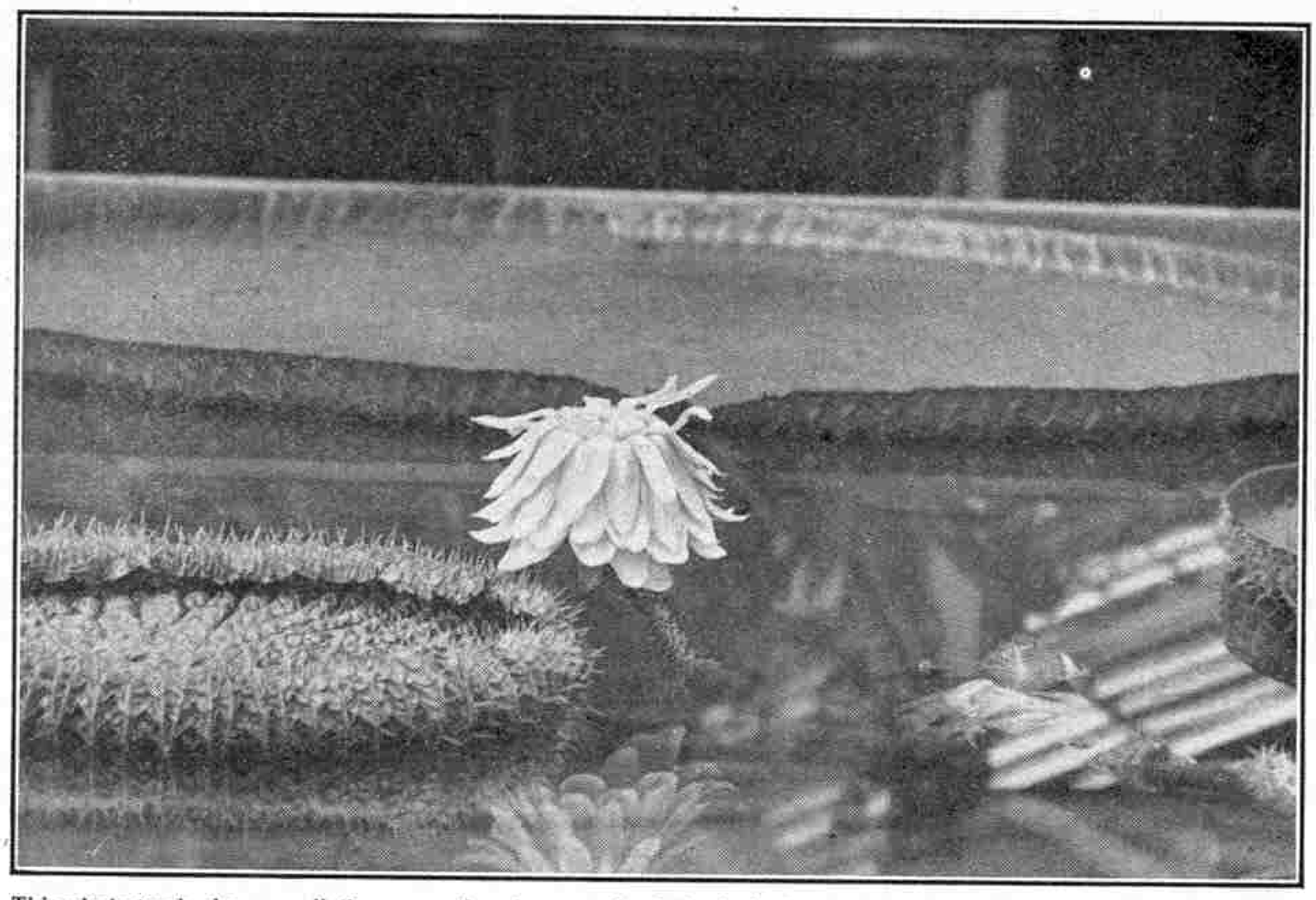
Stearman Training Aircraft for Brazil

A new fleet of Stearman primary training aircraft of a total value of about £60,000 has been ordered by the Brazilian Army Air Corps. The aircraft will be delivered this spring.

Nature as an Inventor

Engineering in the World of Plants

By Harold Bastin



This photograph shows well the supporting framework of the leaf of the giant African water-lily, which inspired the design of the Crystal Palace. In the background is a fully-expanded leaf.

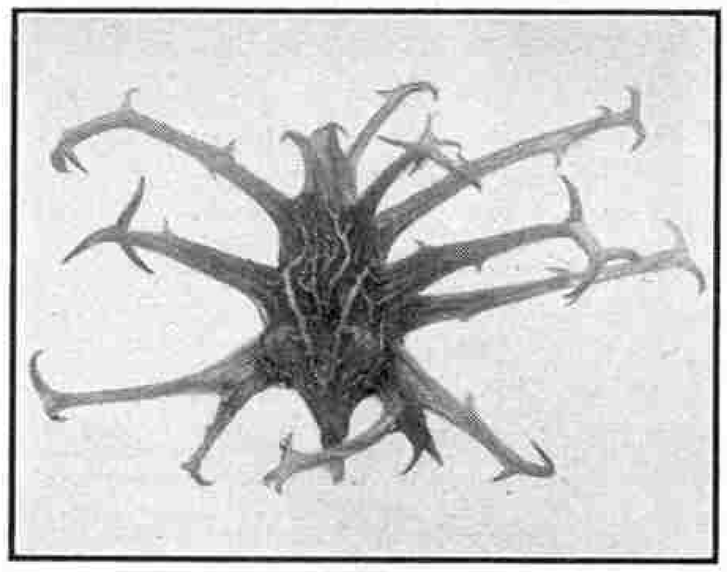
STRICTLY speaking, Nature was first in the field where inventions are concerned. Long before mankind came on the scene she had planned and perfected all manner of structural and mechanical devices, some of which have been deliberately copied by human architects and engineers. For example, when Smeaton prepared the plan for his famous lighthouse, he took as his model "the natural figure of the waist or bole of a large oak," to quote his own words. Sir Joseph Paxton, admitted that he translated the intricate framework of the leaf of the giant African waterlily into his design for the Crystal Palace. Similarly we know that Sir M. I. Brunel carefully studied the operations of the teredo or ship-worm, and subsequently adopted its method when driving his Thames tunnel. This creature is very destructive to submerged woodwork, but Brunel observed that it had the habit of strengthening its burrows with an inner casing of hard shelly material. This was precisely the artifice that he needed in his own excavations to guard against subsidence.

At the commencement of the Great War practically all Germany's military monoplanes were of the kind known as "Tauben" or "doves." It is said that the designer of this type of machine, an Austrian millionaire named Ettrich, derived his inspiration from the remarkable winged seed of a plant known to science as *Zanonia*, a climbing herb found in Java. Some of these seeds measure as much as seven inches across the "plane," and that they bear a striking resemblance in structure and outline to the German "steel dove" is certain. After ripening they are shaken from the plant, and they float away on the breeze over the countryside, sometimes for miles, before they fall to earth and germinate. This is the plant's device for distributing itself, as a species, over wide areas.

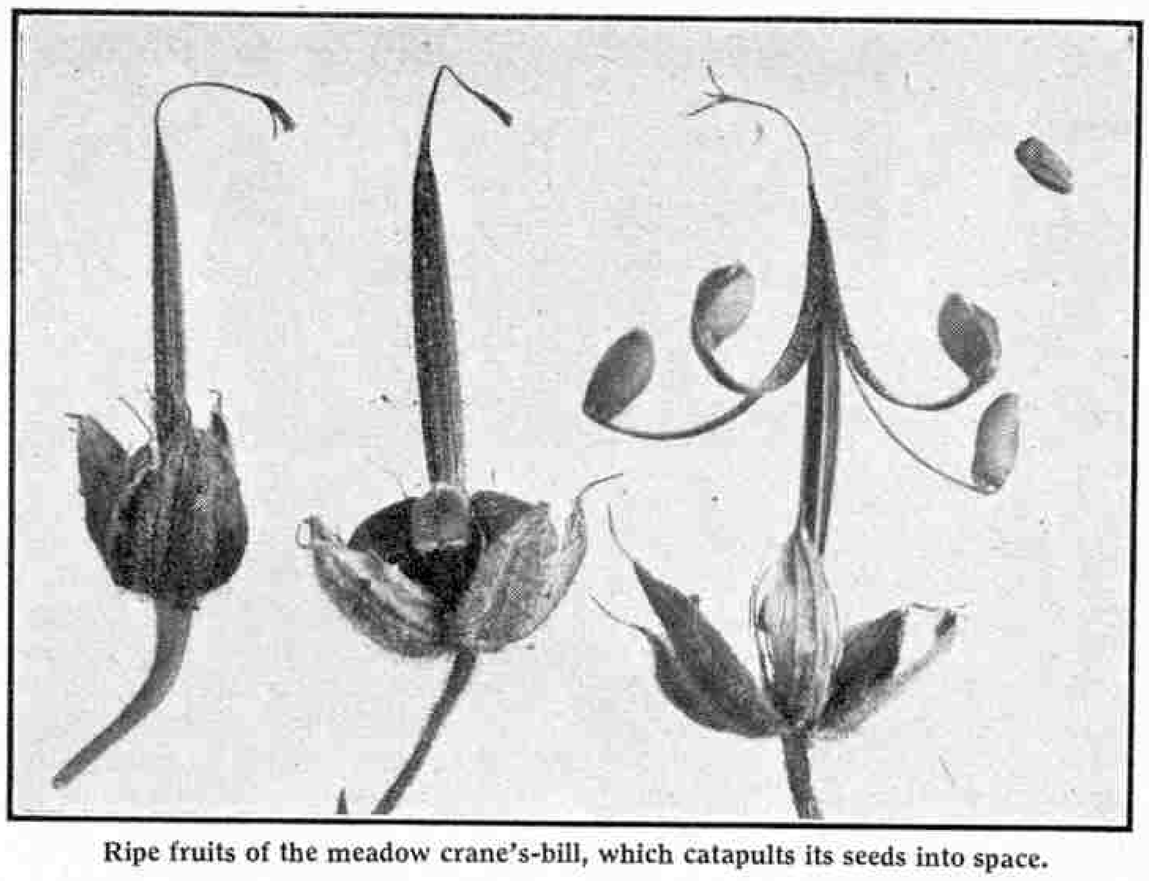
Towards the close of his life, the late Rev. J. G. Wood, who probably did more by his lectures and writing than any other man to popularize the study of natural history in this country, came to the instructive conclusion that "as existing human inventions have been anticipated by Nature, so it will surely be found that in Nature lie the prototypes of inventions not yet revealed to Man." He thus points out the royal road to would-be inventors of our own generation! The only mechanical device of outstanding importance to which man may fairly lay exclusive claim appears to be the wheel. This the biologist Sir J. Arthur Thomson regarded as "very difficult to account for," because in the whole realm of Nature, apart from the intrusions of mankind, nothing quite resembling it in construction and application can be shown to exist.

Let us turn to a few examples of what may be called the "ingenuity" of plants, which are devoid of brains and nervous systems and cannot be supposed to "think things out" after the manner of man and the higher animals. They surmount many special difficulties that are encountered in the course of their life and growth. Consider first some facts about climbing plants. In many instances their efficiency is little short of amazing. Their problem is to escape from the crowd of herbs and grasses that clothe every square foot of fertile soil, so that they may hang their leaves in the upper air, where plenty of sunlight is available. Darwin speaks of a climbing bignonia that ascended an upright, smooth stick by twisting spirally round it and "seizing it alternately by two tendrils, like a sailor pulling himself up a rope hand over hand."

Many of the arm-like tendrils and shoots developed by these plants have an extraordinary revolving motion when they search for support. Some, such as those of the hop, turn clockwise, or with the Sun's course; others, such as the garden pea, turn in the reverse direction. A few plants, more versatile than the rest, are able to turn in either direction, and in fact adapt their procedure to circumstances in a manner almost uncanny to contemplate.



The formidable hooks of the seed vessel of the African grapple plant.



Ripe fruits of the meadow crane's-bill, which catapults its seeds into space.

A climbing plant the habits of which may easily be watched is the well-known Virginia creeper. Its tendrils have a number of tiny branches, like thin fingers, with claw-like tips, and these search everywhere for support as if they were hands actuated by a brain. Their behaviour varies according to circumstances. Some find their way into crevices, while others perforce twine round bare twigs. In either case, when once the "fingers" have taken hold they swell out and stiffen, wedging themselves into the crack or gripping the twig more firmly, as circumstances dictate, until their weight-supporting power is increased to the utmost possible limit.

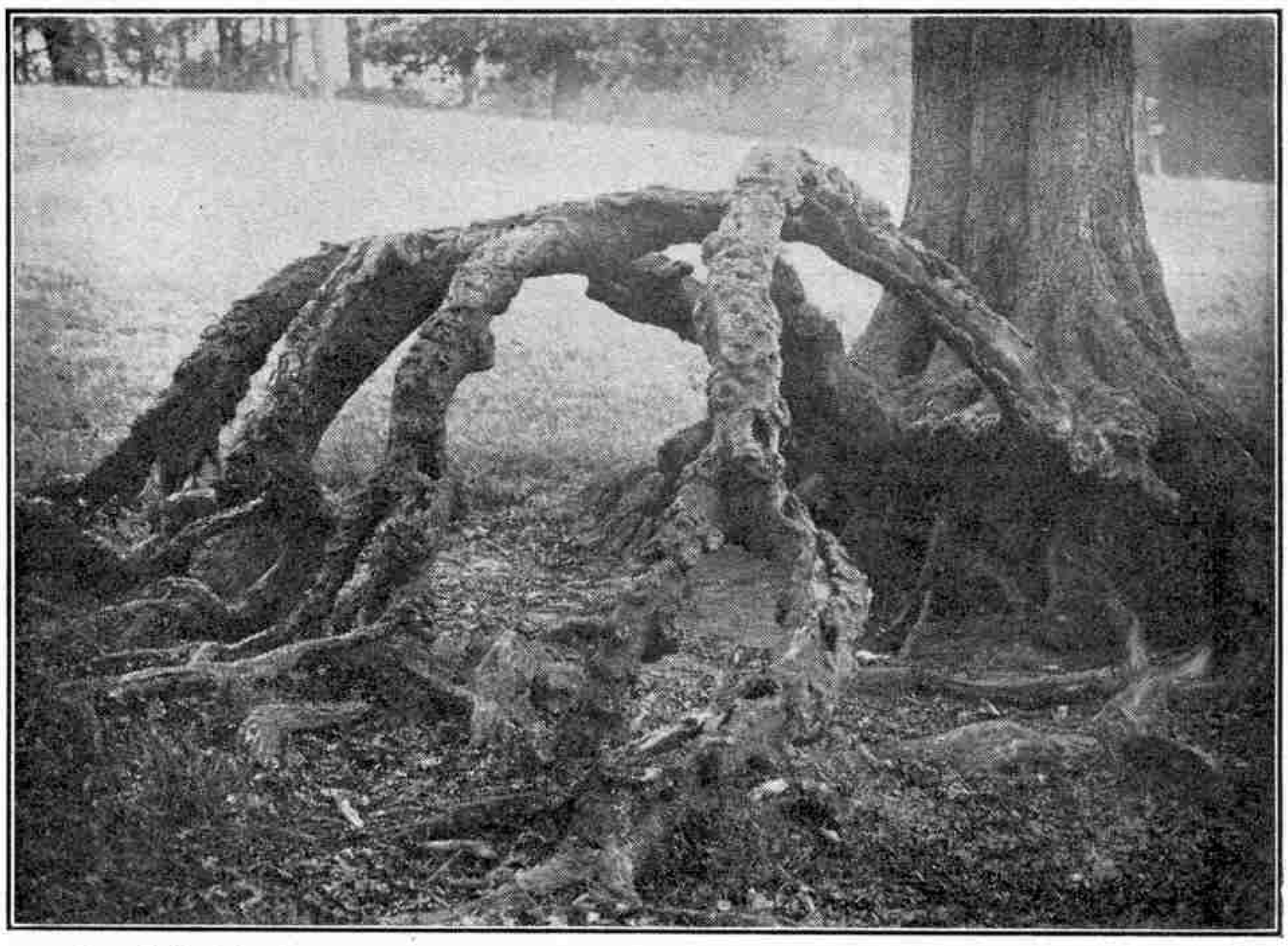
On one occasion the writer tested this by experiment. He selected a tendril that had fixed its "fingers" in a crack between two boards of a garden shed. This particular tendril was dry and withered, and probably had been dead for at least two years. Yet so strong was the hold that it had taken that it proved capable of sustaining a weight of 2 lb. attached to it by a cord.

Those readers who live in well-wooded districts cannot have failed to notice how adroitly forest trees respond to accidents, such as landslides, or the washing away of soil from their roots by winter rains, that endanger their stability. The abnormal strains and stresses thus imposed are counteracted, often with surprising success, by an extensive underpinning of the trunk; or flying buttresses may be thrown out to save the tree from toppling over on the side where its support has been most seriously weakened. When trees suffer injury by fire or lightning, or when a branch is wrenched off in a gale, the raw wounds are covered over and the lost tissues replaced in much the same manner as a cut or a fracture is made good by an animal. But trees have an aptitude for self-restoration markedly superior to that of the higher animals, and this goes far to account for the varied forms assumed by trees of the same species.

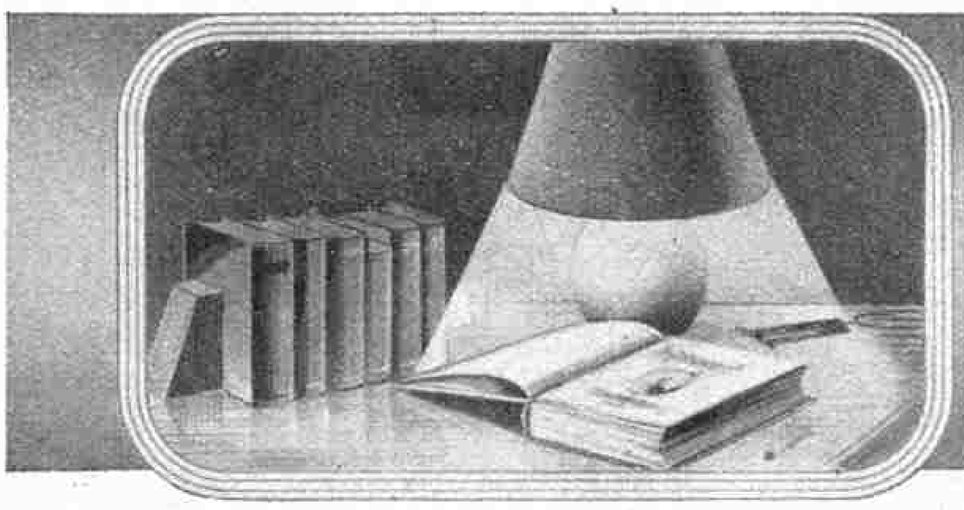
In conclusion, we may deal briefly with the inventiveness of plants in solving their problems of seed-dispersal. Very many seeds when ripe simply drop to the ground from the branches of the parent, and germinate where they fall. This is true of many annual herbs, which are dead and gone long before their seedlings begin to grow. Both the parent plants and the expected seedlings would be helped in life's battle by spreading the seeds more widely. The former would preserve room in which to develop and flourish, unhampered by the growth of young plants about their roots; and the latter would enjoy the advantage of unexhausted soil.

We have already seen how the *Zanonia* transforms its seeds in to efficient monoplanes. Some plants, of which the dandelion and the goat's beard are typical, equip their seeds with parachute-like attachments; others, for example the cocanut palm, pack them up in buoyant, watertight containers, so that they are able to make long sea voyages without hurt. Especially interesting are the numerous hooked and burred seeds, which become attached to the woolly or hairy coats of animals, and so are carried about and distributed over wide areas. A wonderful example is the seed-vessel of the African "grapple plant," which is covered with long hooked arms standing out at all angles. When it has become firmly fixed to an animal it cannot possibly be shaken off, but is carried about from place to place, wherever its bearer may wander. As the pod dries and splits the seeds are shaken out, a few here and a few there.

Some plants actually employ mechanical devices for catapulting their seeds into space. An example is the meadow crane's-bill. Its composite seed-vessel consists of five parts ranged round a central column. Each part is made up of an elastic rod attached at one end to the top of the column, and bearing at the other a cup containing the seed. At the time of ripening the rods spring outward and so hurl the seeds from their cups.



Remarkable flying buttresses thrown out by a tree threatened with loss of stability owing to winter rains.



BOOKS to READ

Here we review books of interest and of use to readers of the "M.M." We can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 1/- for postage to the price. Postage on different books varies, but any balance remaining will be refunded.

"Columbus Sails"

By C. Walter Hodges. (Bell. 7/6 net)

The first voyage of Christopher Columbus to the New World was one of the greatest and most daring of all adventures. It is not easy for us to realise how desperate the voyage seemed to all but Columbus himself. We are now accustomed to the idea that the Earth is round, and that we can reach China and the Far East by sailing west. Columbus, however, had to spend many years in wearying travel before he could find anyone with sufficient faith in his scheme to provide him with ships for the voyage out into the mysterious Atlantic.

The full story of the voyage is here told splendidly, and we are able to understand what a great achievement it was because we see it through the eyes of the men who took part in the adventure, and also of those who watched them sail and shared their feelings of dread and excitement. First a monk describes the difficulties strewn in the way at the Court of Spain and explains how these were overcome by Columbus. Then the story is taken up by a sailor, the vagabond son of a lawyer who sailed on the "*Santa Maria*" to escape the police. How the terrors of the crew brought them almost to mutiny during the outward voyage, and the discovery of land when even Columbus himself was on the point of turning back, are vividly described. We read also of the hospitality and kindness of the Indians on the islands that Columbus discovered, see how the greed of the white man stirred up enmity and hatred, and learn the fate of the Spaniards left behind and besieged by Indians. Finally we have the return of Columbus in the words of one of the Indians whom he brought to Spain.

The book is full of colour and action, vivid and exciting. It is splendidly illustrated by the author's own drawings of people who took part in the adventure, and of scenes during the voyage and in the West Indies.

"How I Toured the World on Nothing"

By Walter Buchler. (Useful Publications. 1/- net)

Mr. Buchler appears to have included almost every country in the world in his tour, among them the remotest parts of China and other far eastern countries. He paid his way by writing articles for the press, and in a sense his book is a guide to others who wish to follow his example. He makes many valuable suggestions on what he calls the career of journalism on tour. His own method is to submit questionnaires to people who know the subjects on which he wishes to write, and he gives several examples of his own questionnaires and of the articles based on them.

"The Grey Men"

By C. Hamilton Ellis
(Oxford University Press. 3/6 net)

The Grey Men are a mysterious band who derail trains, blow up bridges and commit other wanton acts of destruction on a great British railway. Behind them is a sinister organisation that is at enmity with Great Britain. Their headquarters are in a village in the West Highlands of Scotland, and it is there that David Houston, the hero of the story, and a friend seek for the solution of the problem of how to put an end to the outrages. David is himself a railway worker, the son of the Chief Mechanical Engineer of the railway concerned, and by accident he is present at more than one of the railway outrages. Eventually the Grey Men are run to earth, and in the process David and his companions have some startling adventures, ending in a fierce fight when the gang try to blow up a great viaduct as a train approached it. The viaduct actually is destroyed, but the train is pulled up in the nick of time.

The story in itself is exciting, with the right touch of mystery to lure the reader on, and for "*M.M.*" readers its attractions are increased by its railway atmosphere. Mr. Ellis is a well-known writer on railway matters who has contributed to the "*M.M.*" The background he provides for the developments of his yarn is both vivid and accurate, and altogether he gives his readers splendid entertainment.

There is a coloured frontispiece, with six full page illustrations and a useful map to help the reader to follow the story.

"Great Flights"

By E. Colston Shepherd. (A. and C. Black. 7/6 net)

Mr. Shepherd has written the plain stories of 14 famous flights between 1919 and 1939. The heroes and heroines of these great exploits were true pioneer adventurers, who set out in the same spirit that inspired the great explorers and navigators of previous centuries. Why they went does not very much matter; many were simply satisfying their own desire to accomplish some remarkable feat, and in doing so they helped to speed up man's conquest of the air.

Among those figuring prominently in these stories are Ross-Smith, who made the first flight from England to Australia; Alcock and Whitten Brown, the first to cross the Atlantic nonstop; and Lindbergh, the hero of the great solo flight from New York to Paris. Arctic explorations, flights over Mount Everest, and breathless journeys by air round the world are among the other exploits dealt with. All are described in vivid style, but without exaggeration, and we are able to picture the pilots who made the flights and to understand both why they set out on their difficult tasks and how they gained success. The writer was personally acquainted with most of those of whom he writes, and with his accurate and extensive knowledge of flying in general he has produced a volume that can be relied upon and at the same time is thrilling enough for any reader. It can be thoroughly recommended.

The book is splendidly illustrated by a frontispiece and 15 full page plates in half-tone.

Aboard one of Columbus' ships. From "Columbus Sails," reviewed on this page.

"British Railways To-day"

By K. G. Fenelon. (Nelson. 2/6 net)

This book will appeal to those whose interest in British railways goes further than a mere knowledge of locomotives and trains, permanent way and the usual features found along the line. It is concerned particularly with problems involved in present-day railway working, with special reference to the conditions that brought about the "Square Deal" campaign.

In order to understand fully the present railway position it is necessary to know something of the development of railways in this country. The book therefore commences with an account of the growth of railways from their beginnings, over 100 years ago, through the period when they enjoyed a practical monopoly of land transport and the reorganisation that followed the great War, and to the conditions of the present day.

Although our railways represent privately raised capital, they have always been under a considerable degree of supervision by the State. The second chapter considers the extent of this control, and treats particularly the subject of railway charges and their regulation. In addition it introduces the reader to the mysteries of the classification of freight and tells him something of the railway rate book.

The measures taken by railways to attract and deal with passenger traffic are then considered. The requirements of the trader and of the farmer and how they are met account for two further chapters. Special attention is given to the means adopted to secure efficient service in these directions. Then come details of special services, the relation between railways and the roads, and railway finance. The book ends with a survey of facts about British railways.

There is a good index and a list of works suggested for further reading by those who wish to increase their knowledge of serious rail-roading. The illustrations consist of nine plates in half-tone and several line drawings.

"Auto-Electric Model Railways"

By A. Duncan Stubbs. (Nelson. 3/6 net)

Mr. Stubb's book is suitable for those who have already run small miniature railways, perhaps from a very early age, and now have decided to embark on a more realistic model. With it as a guide the enthusiast can make an excellent start, and the schemes that are described will enable him to develop his layout on practical lines, with complete equipment for signalling and control, both local and remote.

After discussing the choice of railway gauge and material, Mr. Stubbs turns to sources of power, considering both accumulators and rectified alternating current. Track layouts follow, with useful advice on the solution of difficulties such as those presented by doors and awkward corners, and the operation of opening bridges by small motors. Then come long sections dealing fully with control systems. The advantages of each type, sectional, remote and automatic, are carefully explained, and there is a wealth of practical constructional detail in the descriptions that the author gives of the devices needed and of their application in practice.

The final chapter is interesting, although its connection with model railways is not apparent. In it the author describes suitable apparatus for transmitting and receiving radio signals, with constructional details of the necessary control devices, and suggests schemes for using radio control for cameras and other purposes.

The book is illustrated by 91 diagrams by the author. There is no index.

The author of "My Animal Friends," reviewed on this page, with her pet lioness.

"Hidden Valley"

By Laura Benet. (Harrap. 5/- net)

Can a white boy look after himself in the wilds of an undeveloped country? This is the problem that Seth Beattie sets out to solve in practice when he deliberately loses himself in the California of the gold rush days, and allows his horse to carry him to the Hidden Valley, now well known as the Yosemite. There he is startled by the sudden appearance of Ahwahnee, an Indian boy sent by his chieftain father to live for a time by his own skill and prowess before gaining full admission to the tribe. Together the two enjoy life in the Valley, encountering dangers of all kinds while exploring and foraging, particularly when in search of a rock about which Indian tradition centres. The tale is dramatic, and when in the end Seth's father rides into the Indian encampment in search of his son he finds waiting for him a capable and self-reliant boy full of the adventurous spirit of the true pioneer. A very fine and dramatic tale, with spirited line drawings for illustrations.

"My Animal Friends"

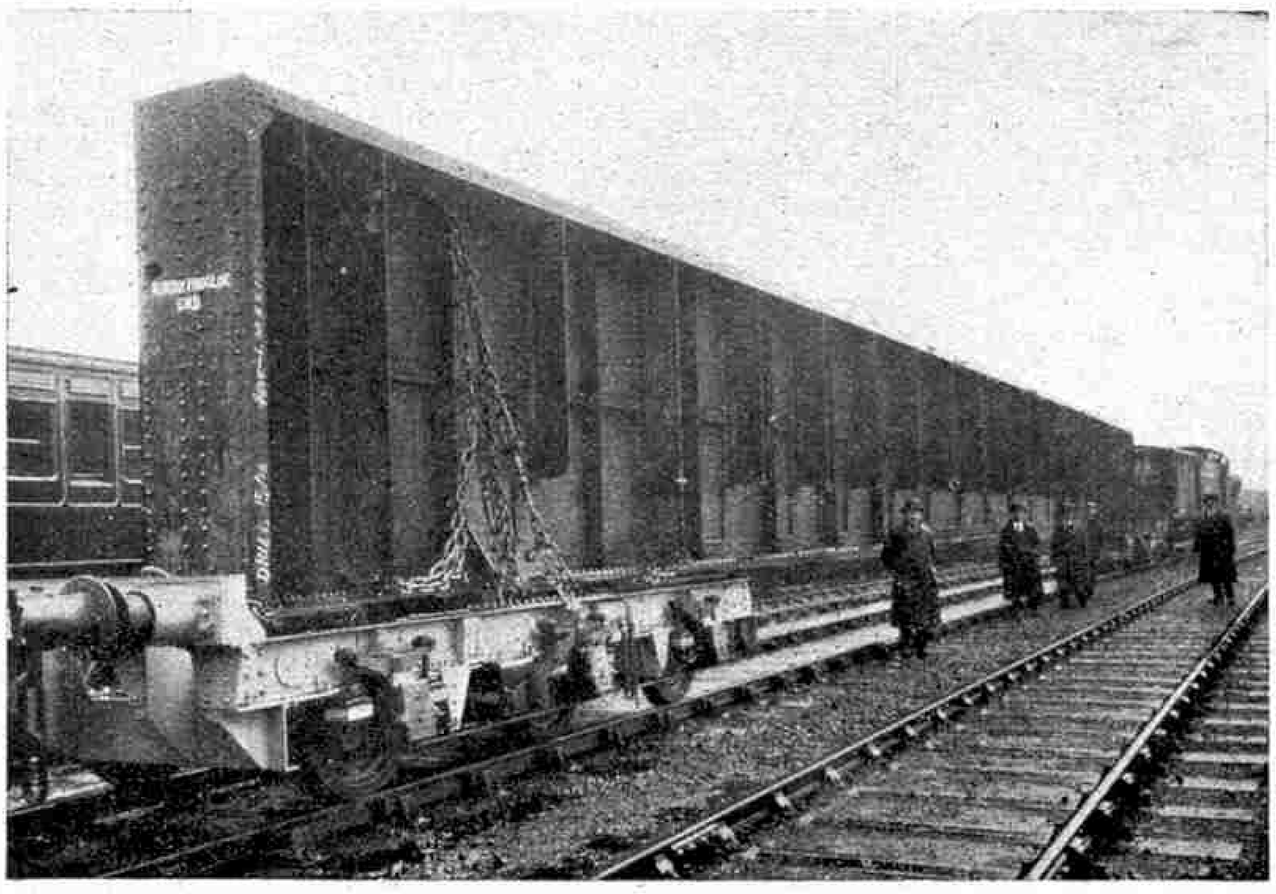
By Vera Chaplina. (Routledge. 6/- net)

This is a delightful and fascinating book. The author has a great capacity for understanding animals and their moods, and for cultivating their friendship; and her stories of the various creatures with which she has had to deal will be thoroughly enjoyed by all animal lovers, particularly by boys and girls.

There are two parts to the book. In the first we read of a variety of animals in the Zoological Gardens in Moscow, where the author was employed. Some of her special charges were queer pets, for they included a walrus and a hyena, an elk, a bear, a wolf and a fox. Different as these were in size and in ways, they were all alike in ingenuity and quaintness, and there are good stories of all of them.

The second part of the book is even more astonishing, for it tells the story of a lion cub that lived in the author's flat as a regular member of the family. "*Foundling*," as this cub was called, was adopted when she was only a few days old. From that moment until the time when she became a fully-grown lioness, and had to be returned to the Zoo, she was the pet of all friends of the family and a source of terror to unwanted strangers. Her two companions were a sheep dog and a lynx that also was a foundling from the Zoo; and besides playing with them she went to parties, enjoyed games with children, and even sat at the table for meals. There were many amusing and exciting scenes in which she played a part, and a film actually was made of her in the author's flat and the surrounding streets, large crowds assembling to watch the scene.

There are 16 splendid illustrations, reproduced from photographs of "*Foundling*" and of the other pets of which the author has stories to tell.



A 70-ton girder carried on twin trucks. From "British Railways To-day," reviewed on this page.

ENGINEERING NEWS

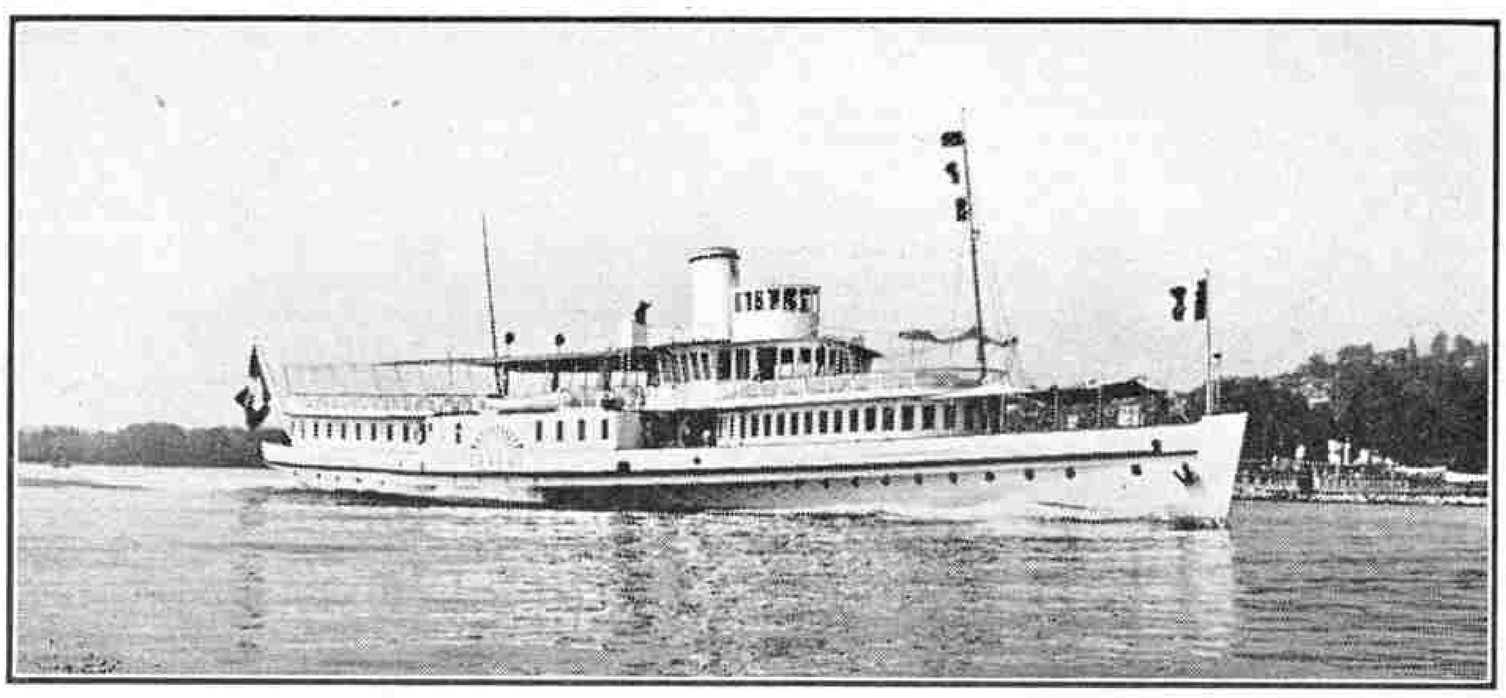
Steamship Converted to Diesel Electric Drive

During recent years many old steam-driven ships have been converted to Diesel-electric drive. Among them was the paddle steamer "*Genève*," which was built in 1895 by Sulzer Brothers, Winterthur, Switzerland, and is shown in the illustration below. The vessel was converted in 1934 and her subsequent service has been entirely satisfactory. When unloaded the ship can maintain a speed of 14.8 knots with the Diesel engines developing their normal output of 1,070 b.h.p. For maintaining the normal service speed of 13.5 knots the engines need only develop 795 b.h.p. With the engines running full out the vessel attains a speed of 15.6 knots, and even then is free from vibration.

A great saving in fuel costs has been effected by the conversion. A further advantage is that the new engines take up much less space than the former steam plant, in spite of the fact that the power has been increased by one third. The space gained has been used to improve the arrangement of the accommodation.

The Diesel generator sets and the switchboard are located in a watertight compartment, and in a second compartment are the reduction gear, propulsion motors, fuel tanks and an auxiliary set, comprising a Diesel engine with generator and emergency compressor. The two main Diesel engines each develop 535 b.h.p. at 400 r.p.m., and are of Sulzer design with six cylinders. Each engine is direct coupled to a generator developing normally 550 amp. at 650 volts. Two auxiliary and exciter generators are keyed on the ends of the shafts of the main generators. One supplies current for exciting the two main generators and the two propulsion motors, and the other current for driving the auxiliary pumps and lighting the vessel. Each propulsion motor is rated at 460 b.h.p. at 500 r.p.m.

The main and auxiliary generators, and also the propulsion motors, were supplied by Brown, Boveri and Co. Ltd., Baden. An auxiliary group, consisting of a Sulzer two-cylinder two-cycle Diesel engine and a Brown, Boveri direct-current dynamo, supplies the electric energy required for lighting the vessel and for other auxiliary services when the main engines are not running.

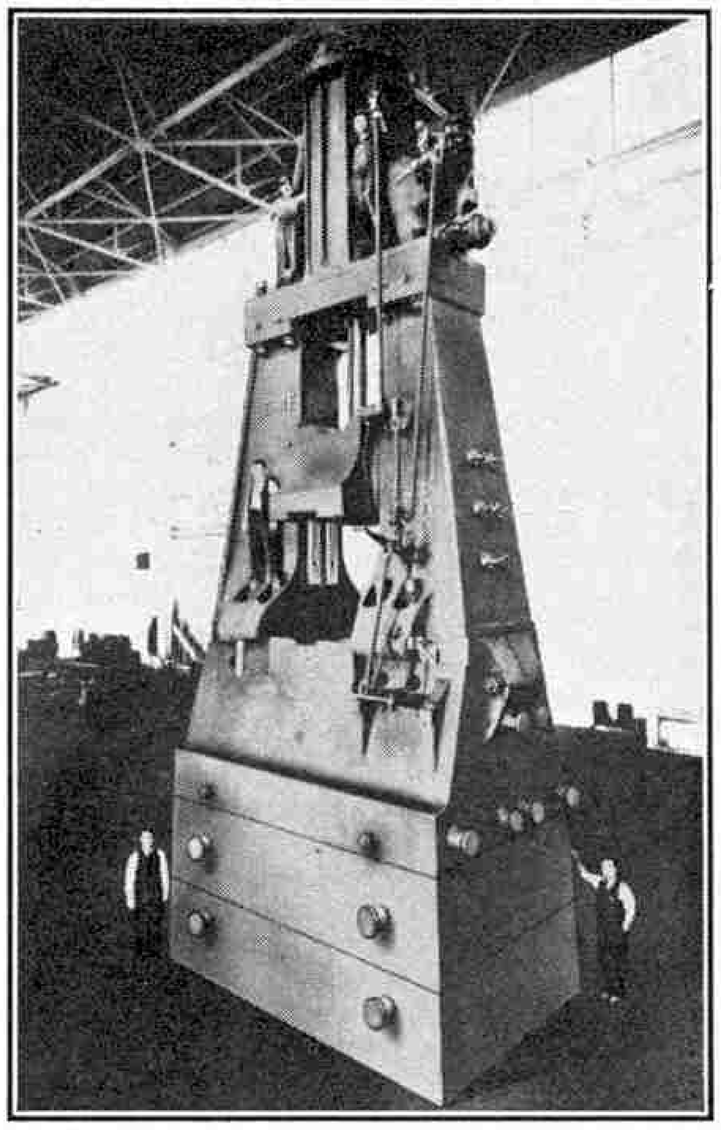


The paddle vessel "Genève" on Lake Geneva. As explained on this page, this vessel was converted from a steamer to a motorship. Photograph by courtesy of Sulzer Bros. (London) Ltd.

Motor Lorry Equipped with Wireless

A six-wheeled Leyland Cub motor lorry engaged in conveying mail from Marree to Birdsville in Australia has been fitted with a wireless transmitter with a range of over 600 miles. In its journey the lorry has to pass over arid deserts, swamps and sandhills 100 ft. in height, and often meets severe floods in certain parts of the route. Owing to the serious effects of floodwaters the route the lorry takes is frequently altered, and the wireless transmitter has been fitted to enable the driver to maintain communication with his base depot. If the vehicle becomes bogged or stranded among the sandhills the driver can make known his plight, and give directions for guiding a relief squad.

Camels carried the mail to Birdsville before the lorry was introduced to the service, and the journey sometimes took a month or more. The lorry has reduced the time taken to three days, but owing to stranding it was occasionally "lost" before the wireless equipment was installed.



The largest drop hammer in the world. Photograph by courtesy of High Duty Alloys Ltd., Slough.

World's Largest Drop Hammer

The largest drop hammer in the world is now in operation in this country, and is being used for the manufacture of large forgings of light alloys. It is shown in the upper illustration on this page.

The total weight of the hammer is 470 tons, of which the anvil accounts for 360 tons. When in operation the total weight of the moving parts, including tup, die, piston and rod, is 29 tons. The height from ground level to the top of the cylinder is 27 ft., but the full height of the machine is about 40 ft., for the anvil blocks go down nearly 13 ft. into the concrete foundations.

A firm foundation is necessary for such a huge machine as this, and an excavation 30 ft. 9 in. deep and 39 ft. across was filled with concrete up to about 23 ft. from the bottom. Two layers of stout oak timbers were then laid down and the anvil rests on these shock-absorbing supports. The remaining space was then filled with more concrete. Altogether 1,800 tons of concrete were used in the foundations, and it was pumped in continuously for several days.

The hammer is of the pneumatic type and the Broom and Wade compressors fitted have a total capacity of 7,000 cu. ft. of air a minute.

The hammer was constructed in the United States of America, and shipped to this country in sections. Transport from the dock to the factory was carried out by the L.M.S. Railway in special trucks.

The Institute of Marine Engineers

An examination for admission to Associate Membership of the Institute of Marine Engineers is to be held on 20th to 27th May 1940. The annual examination for admission of Probationer Students and Students will be held on 20th to 28th May 1940.

The Institute's examinations are held in London and other centres according to candidates' places of residence. Full particulars may be obtained on application to the Secretary, The Institute of Marine Engineers, 73, Amersham Road, High Wycombe, Bucks.

Power Truck that Makes Stacking Easy

The lower illustration on this page shows a novel electric-battery operated tiering truck manufactured by Ransomes, Sims and Jefferies Ltd., Ipswich. It is a development of the ordinary electric truck with elevating platform, and is intended for use in factories and warehouses where goods have to be loaded or unloaded at different heights from the ground, for example to or from railway wagons or lorries. The goods are stacked on a steel platform, which can be raised and lowered through a distance of several feet by means of pulley mechanism operated by an electric motor.

The truck will handle loads up to two tons and sufficient power is provided to lift this weight to a height of 5 ft. from the floor in less than a minute. The travelling speed is about 4½ m.p.h. on the flat, but the truck can be used at a lower speed, with full load, on gradients up to 1 in 6. The platform on which the goods are loaded is 4 ft. 6 in. long by 3 ft. wide.

The truck travels on four wheels, which are fitted with solid rubber tyres and are controlled through four-wheel Ackermann-type steering from a tiller placed to the right of the driver's platform. The driving axle is carried in horn blocks fitted with helical springs.

Power for travelling is provided by a 2.5 b.h.p. totally-enclosed motor rigidly mounted on the axle housing, the power being transmitted through double-reduction spur and helical gearing. A differential is incorporated, and the shafts drive the wheels through universal ball joints. Ball bearings are used throughout and the whole of the gear runs in oil.

The truck cannot be started unless the controller handle is first placed in the "neutral" position, and control is exercised by means of a pedal that has to be kept depressed while the truck is working, so that power is automatically cut off when the driver leaves his platform. This pedal operates also the brake, which is of the external contracting type and is attached to the motor shaft. The brake when the truck is at rest is in the "on" position, and an interlocking device makes it impossible to operate the controller without the brake being first released.

The load platform is operated by a separate motor, and current for both driving and hoisting motors is supplied normally from a battery of 20 Exide cells of 40 volts and 161 amp. hr. capacity.

A 2-ton electric tiering truck for loading or unloading goods at different levels. Photograph by courtesy of Ransomes, Sims and Jefferies Ltd., Ipswich.

An Unusual Steel Pontoon Bridge

An unusual steel pontoon highway bridge has been completed across the Golden Horn at Istanbul, Turkey. The construction of a pontoon bridge instead of a cantilever or girder bridge was made necessary owing to difficulties caused by the nature of the sea bed at this point. At the place where the bridge is placed the depth of water varies between 65 ft. and 130 ft., and this, combined with a sea bottom of soft clay at least 100 ft. deep, prevented the economic construction of foundations required for the usual fixed types of bridges.

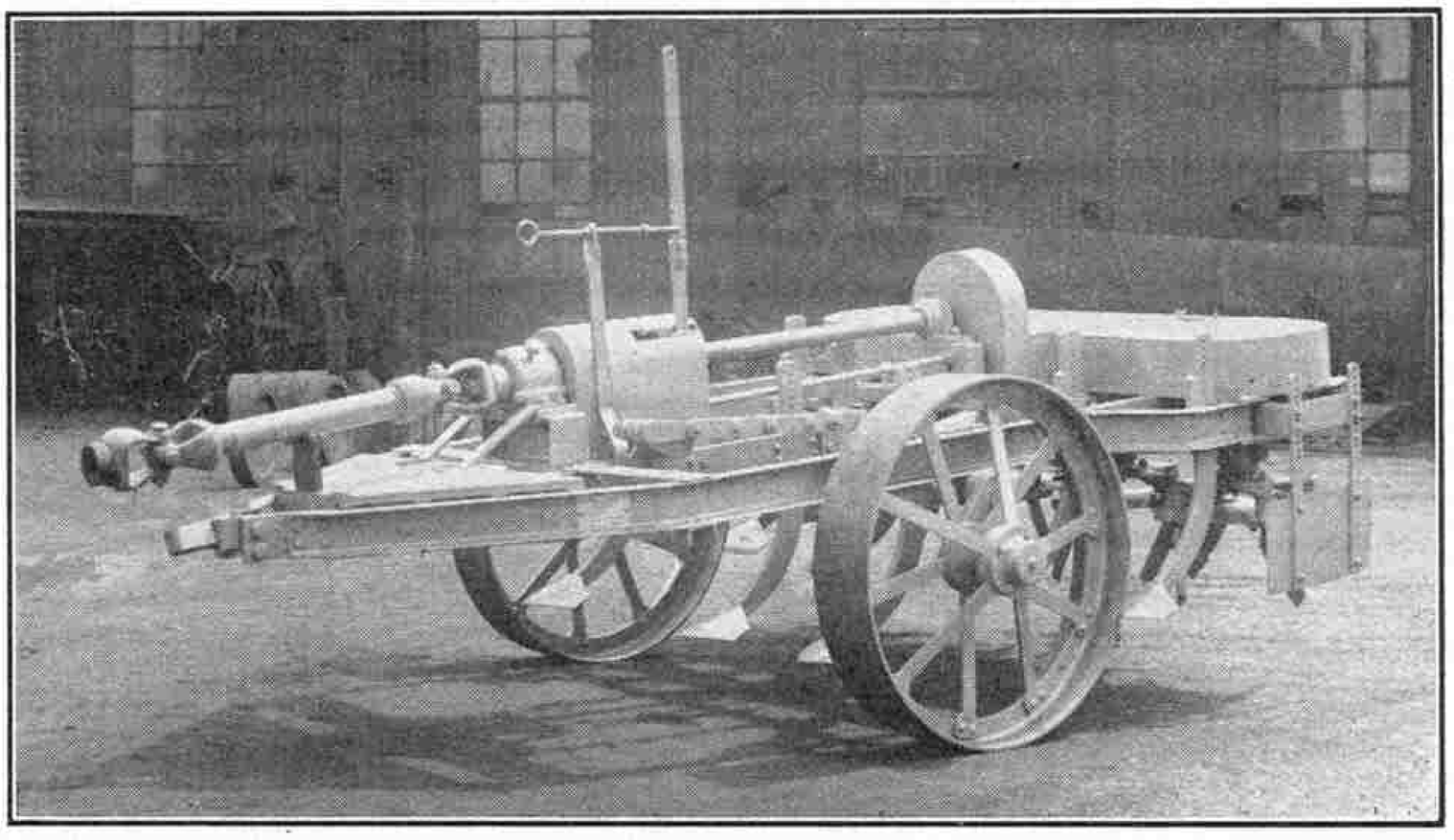
The bridge is about 1,500 ft. long and 82 ft. wide and consists of two end sections of 10 pontoons each and a centre section of four pontoons. The pontoons forming the centre section are movable and can be towed out of position by tugs to allow the passage of large vessels. The pontoons are spaced about 30 ft. apart. Each is 82 ft. long, 30 ft. wide, and 11 ft. deep, and is divided into nine watertight compartments.

Italy's New Dreadnought

A giant new Italian warship was launched recently, and is expected to be ready for service in 1942. It has been named "*Impero.*" The new vessel will carry nine 15-in. guns, twelve 6-in. guns and twelve 3.5-in. anti-aircraft guns, in addition to machine-guns. Another ship of the same type is now on the stocks.

Rotary Machine for Soil Cultivation

The upper illustration on this page shows a new type of rotary cultivator constructed by Radial Tillers Ltd., Leeds. It takes the form of a combined machine carrying a set of eight rigid steel tines, and a set of 16 revolving tilling tines. As the machine travels along the rigid tines penetrate into the soil in front of the revolving tines, and the breaking action of the former makes tilling of the hardest land more easy and also aerates the subsoil.



An agricultural cultivator of the type described on this page. It has 16 rotating tines, which plough up the soil as the machine is drawn along. Photograph by courtesy of Radial Tillers Ltd., Leeds.

The main frame of the machine is built up of steel channel girders, strongly stayed and furnished with a heavy drawbar attachment for the tractor. In this frame are incorporated eight forged steel tine sockets, which accommodate the leading fixed tines. These tines are made in special steel and are curved at their lower ends, where they are fitted with renewable steel plate points, bolted in position. The main wheels are of the built-up type, having a diameter of 3 ft. 8 in. and a width of 5 in.

The drive to the rotating tines is so arranged that of each pair of tillers one rotates clockwise and the other anti-clockwise. At the lower end of each of the tiller shafts is a star-shaped steel casting, bored with equidistant vertical holes to receive the upper ends of the tilling tine shanks. A series of holes drilled at a radius from the centre of the tine allows for the adjustment in the radial direction, and so permits the user to vary the "forward cut" of the tines to suit the class of soil, and the finish of the land that is required. Further adjustment is obtainable by the use of one or other of the tractor speeds provided.

The machine has a working width of 7 ft. and a working depth ranging from 3 in. to 10 in. and will cultivate about one and a half acres of ground an hour.

Apparatus to Detect Leaks in Ships

Some of the large Italian ships are now being fitted with apparatus that shows automatically the height to which water may be rising in any part of the vessel, and also indicates the point at which the leak is present. The device is intended to add to the safety of the vessels at sea, for, even if the watertight bulkheads are closed following a leak in any part of the vessel, the apparatus continues to record the level of the water.

HOW THINGS ARE MADE:

Plywood

By F. W. Farley

ALTHOUGH the idea of constructing wood in layers for extra strength is by no means new, having been used even in ancient Chinese furniture, the increase in the amount of plywood employed for all constructional purposes in recent years is so remarkable that it is interesting to know something about the product and why it is so popular.

The advantages of plywood can soon be summed up. In the first place, boards are made available of great length and width when required, but possessing far greater strength than an equivalent area of ordinary wood of the same thickness. In addition to this, plywood is light in proportion to its strength; the shrinkage that takes place is so slight as to be negligible; and the board is practically split-proof, does not warp easily, works well with the woodworking tools, takes stain very well, and is economical to use. Consider also that plywood, laminated board and blockboard can be obtained in a large number of different woods, including panels veneered with the rarer cabinet woods, and in numerous different grades of uniform quality within the grade, and you have some idea why this manufactured wood board has assumed such prominence as a constructional material.

Plywood can be obtained faced with almost any wood, and even with metal; but there are several timbers that are eminently suitable for the actual manufacture, because of the fact that suitable logs are available that will peel well on the machines. The most suitable trees for plywood making are those with straight trunks of good diameter, and the fewest possible number of branches to cause blemishes in the wood. For this reason the various pines and firs are much used, especially the Douglas fir, giving the well-known Oregon pine plywood. A great quantity of birch plywood is made from European birch, drawn from such countries as Russia, Latvia and Finland; while gaboon mahogany logs from West Africa, ranging in diameter from 2 ft. to over 6 ft., yield veneers from which are made plywood sheets as large as 10 ft. by 5 ft. Alder and ash are two other timbers used.

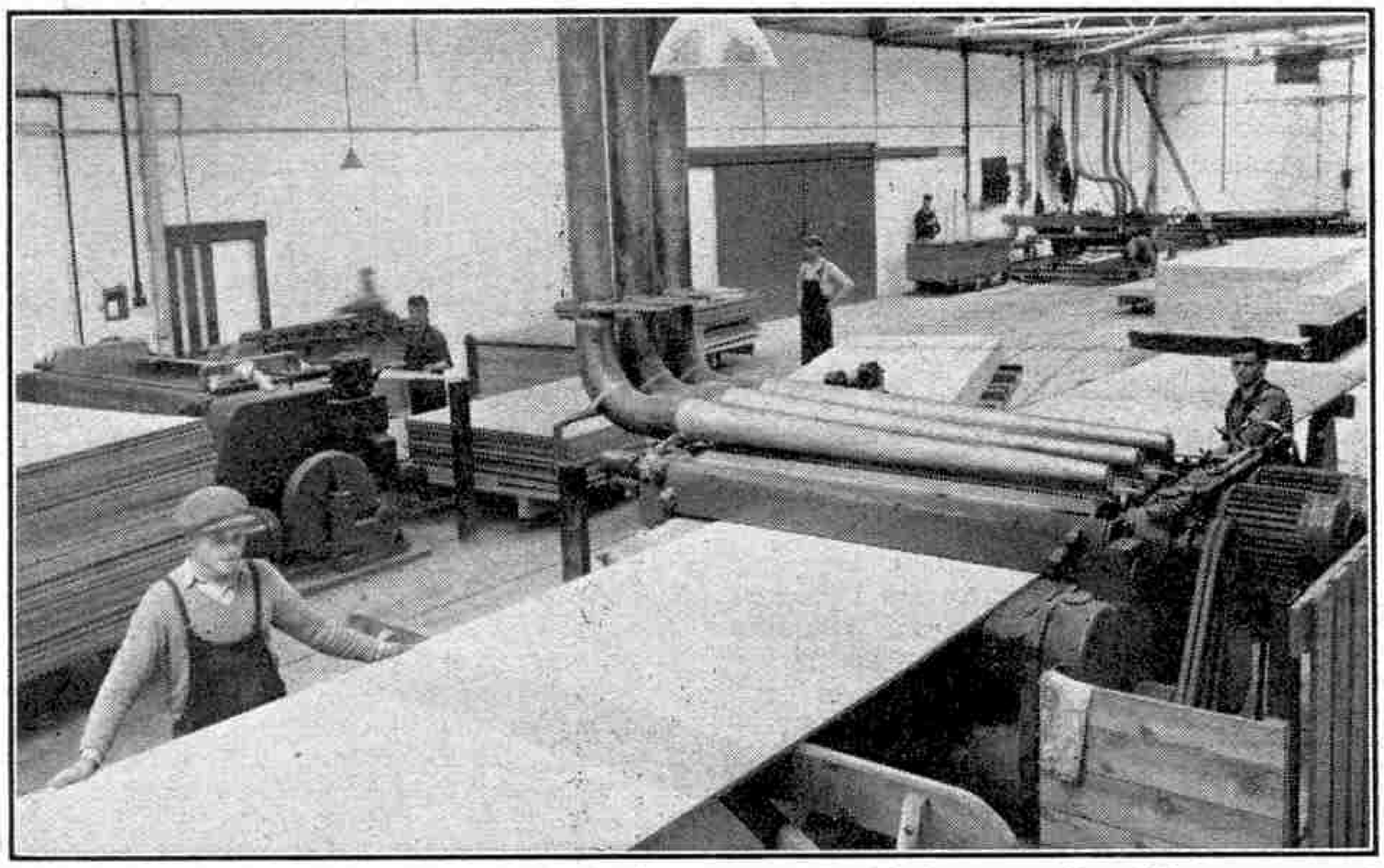
Whether plywood, laminated board or blockboards are made depends upon the use to which the material is to be put. Plywood is made from $\frac{1}{32}$ in. to 1 in. in thickness, while blockboards for doors, panelling, etc., are made from $\frac{1}{2}$ in. to 2 in. thick, and built up from 1 in. strips. Laminated boards are the same thicknesses, but the strips of which they are composed are only $\frac{5}{16}$ in. thick. Logs of at least 2 ft. diameter are preferred, and these are selected for freedom from defects such as knots or wide sapwood, and brought to the mill log pond by water or rail in lengths of about 30 ft. In the Tyneside works, logs arrive by water, and are unloaded from the ships on to the quayside where they are weighed and stacked. Then, as they are required, they are crosscut into convenient lengths for the machines by means of portable chain crosscut saws, and are picked up by a powerful overhead travelling gantry, which lowers them into the steaming pits, large concrete tanks about 12 ft. deep and containing water kept hot by hot-water pipes at the bottom. Here the logs are left soaking for about two days, during which time they become very much softened, and are then in a suitable condition to be "unrolled." These short logs are called "peelers."

Handling such heavy logs by manual methods would of course be out of the question, and they are brought from the steaming pits and lifted into place between the centres of the plywood lathes by heavy power cranes. In the lathe a long continuous veneer is cut from the revolving log by means of a knife, which is controlled to give the desired thickness; and the resulting thin sheet of wood is fed on to conveyor rollers, which take it to a long table provided with a knife that can be slid down on to the sheet with a guillotine action. This is called the "clipper," and the man operating this machine is able to cut off lengths of veneer as needed for the various size sheets, having regard to the elimination of unsound portions.

For laminated board the veneer is cut to a thickness of about $\frac{5}{16}$ in., but if blockboards are to be made, the selected logs are taken not to lathes but to large band saws, which cut off boards of 1 in. thickness that later will form the cores of the blockboard. These cores are made by gluing together about 24 of the 1 in. boards, and then sawing through the opposite way in a suitable thickness so as to produce a core section composed of strips. The idea of this is that each strip will tend to counteract the shrinkage of the next one, and the resulting amount of shrinkage will be negligible. A similar method of gluing and cutting is adopted for laminated boards.

To return to our veneer, after leaving the clippers the cut sheets are sorted into grades and are then conveyed to the automatic roller driers, where they can be reduced to a definite moisture content. These machines are rather like long boxes, and they contain a number of banks of rollers that draw the veneer slowly through a warm atmosphere provided by hot-water pipes. The drying process of a batch of veneer occupies about a quarter of an hour, after which time the batch appears at the other end of the machine. The rollers have to be run at a slower rate for the thicker veneers, because these contain more moisture. The sheets are collected by other conveyors, after which sorting takes place again to ascertain to which grade each piece belongs. Sound material with an inferior appearance can be used for the inner layers, while the best and second-best wood can be used as face veneer of first and second quality.

Pieces of veneer often need to be jointed in their width, to give a large enough sheet, especially when bad portions have been ruthlessly trimmed out by the clippers, resulting in a number of relatively narrow strips. The machine used for this edge jointing is interesting. The edges that are to be jointed are painted with glue, and the pieces of veneer passed along a table with their edges running against a brass wheel that protrudes a little above the level of the table. This wheel, which is dipping into a trough of formaldehyde, leaves some of this liquid on the edges, and this assists the gluing process. The veneer then passes between two travelling steel bands provided with sloping grooves, so that the effect is to pull the edges tightly together.

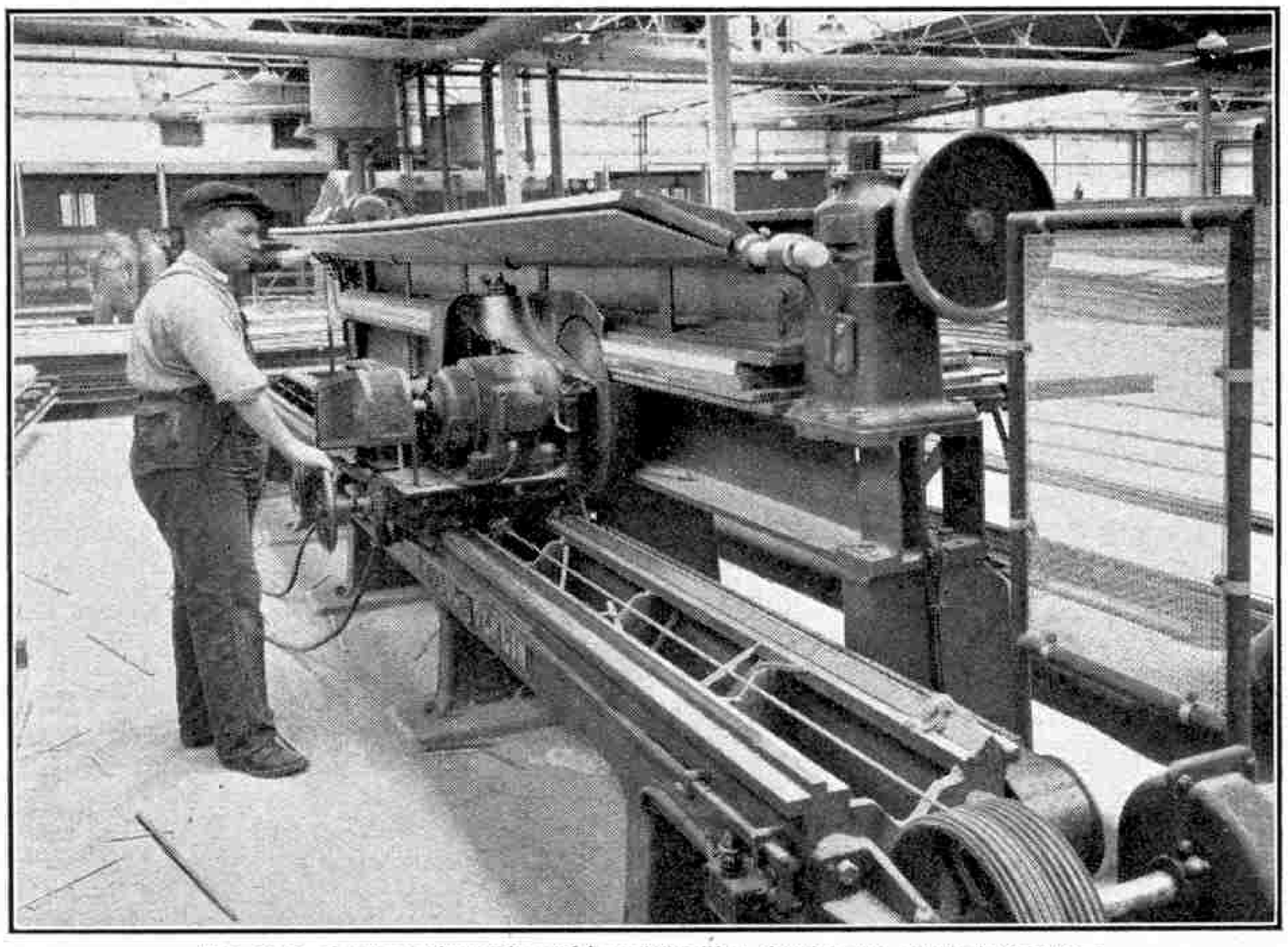


Automatic sanding machine for giving superfine finish to Plywood. The illustrations to this article are reproduced by courtesy of Tyneside Plywood Works Ltd.

Edge gluing is necessary for laminated and blockboards also. These thicker layers are first trimmed straight on their edges by a travelling circular saw, and are then glued, passed over sponge rubber soaked with formaldehyde, and finally into another type of machine, where they are tightly held together. The cores of laminations or strips are planed, and are then ready for facing with sheets of veneer to produce the finished boards, or possibly a standard flush door. These are produced in ever-increasing numbers because of their popularity in modern buildings.

The choice of a suitable glue is no light matter, for it must spread easily, have good powers of penetrating the cells of the wood without coming right through and staining the outside of the panel, and be strong enough to withstand use and possibly exposure to the weather. Whether hot or cold glue is used depends upon the object in view, for if the plywood has to be waterproof it is glued in a hot press with resin glue, while for ordinary purposes cold protein glue is used. The glue is spread on the sheets by passing them through two rollers that are kept supplied with glue of the correct consistency and temperature.

The glued plies are built up into the necessary thicknesses layer by layer, with the grain in opposite directions, until bundles of glued panels are obtained. These bundles are then placed in large hydraulic presses and subjected to pressures of between 100 lb. and 200 lb. per sq. in., the direct pressure being taken by thick boards at top and bottom of the pile. Aluminium plates are put between the panels and the heated plates of the press to prevent damage to the surfaces. It will be noticed that the gluing of the core sections for blockboards and laminated boards takes place in a separate press, in which the boards are pressed together, cramps are applied, and the resulting "balk" of timber is taken away to dry for a few days while still in the retaining cramps. It is only when the core sections have been trimmed and the edges jointed as already described that they are faced with sheets of veneer, which are laid in the same presses as are used for the plywood. When the panels are cool, they are passed through a scraping machine, and if a superfine finish is required are then



The edges of core sections trimmed by a travelling circular saw, ready for jointing.

dealt with by an automatic drum sander. The sander, dealing with such a large sheet, and provided with an exhaust system to draw off the dust, is quite an impressive machine, and those of us who have done any hand sanding of wood surfaces will no doubt make mental comparisons!

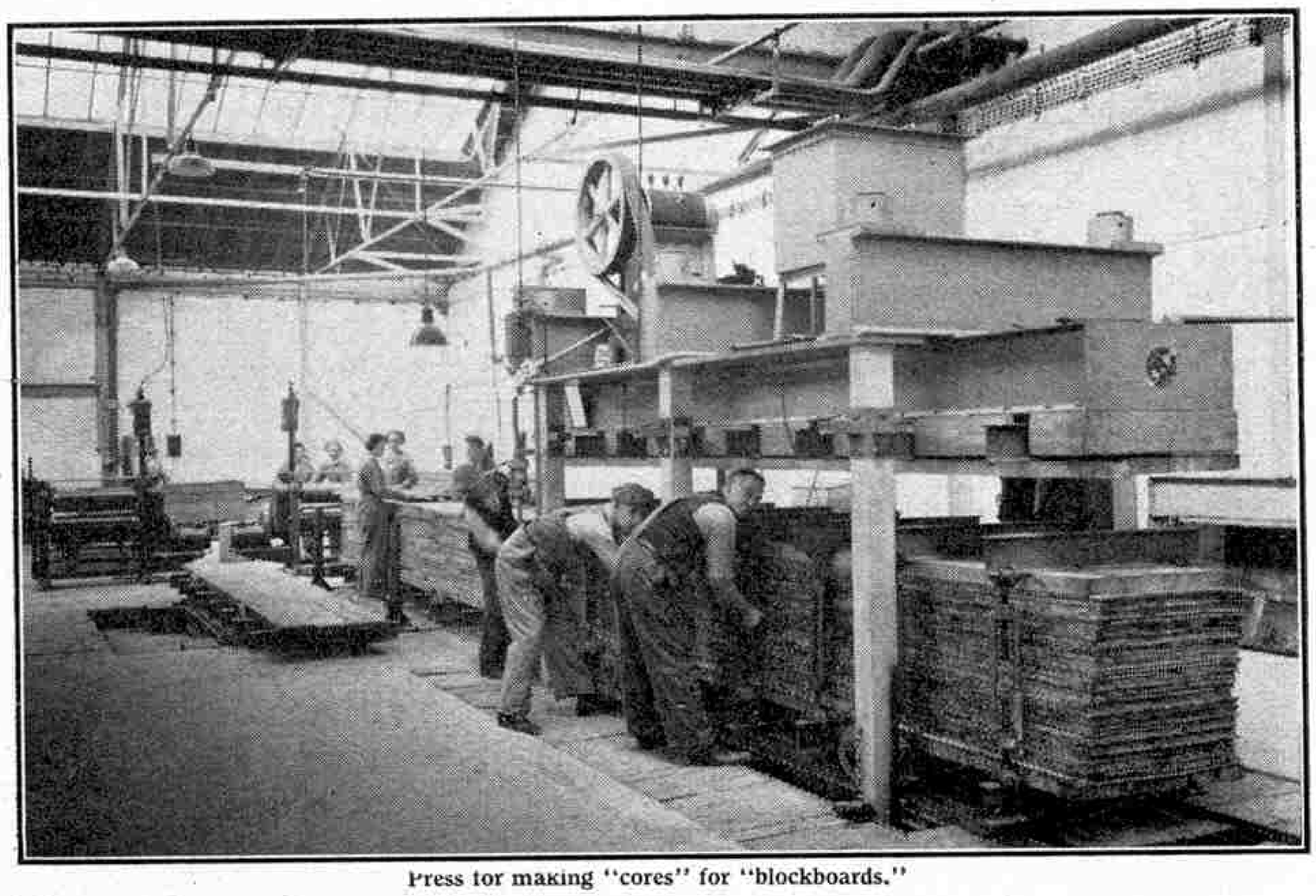
This sanding to the finished surface and thickness is the final stage in the manufacture, except for further inspection and grading. Any imperfections found after sanding are skilfully corrected in the patching room, and with the final storage or dispatch of the boards is reached the last step in the complex and highly organised chain of processes that contribute to the manufacture of modern plywood.

Now let us examine some of the uses to which plywood is put, for it is clear that unless the demand for the product were very large, speedy and up-to-date processes such as those described here would never have been evolved. Because of its convenient width and great strength, plywood specially made for the purpose early found favour in the aircraft industry; while in railway carriages and ships vast quantities are employed for uses ranging from sub-floors to linings and panelling. A good sub-floor is also necessary in a house when laying wood-block or parquet flooring, and large sheets of thick ply are ideal for the purpose. The nails or adhesive composition by means of which wood blocks or rubber flooring are fixed can obtain a good grip on the surface of the plywood.

All sorts of uses spring to the mind when considering the modern house. Smooth concrete work is often done in plywood "forms," for practical men know that the form must be strong, and to avoid trouble after the cement has set it must leave the surface of the finished work reasonably smooth. Further, the forms are light in weight, and large concrete castings can be undertaken with ease, the plywood still having considerable re-use value after taking apart. Even bench moulds for metal castings, which must be reliable, are often made from thick plywood. Then we have the blockboard and laminated board flush doors and table tops, plywood tops for table tennis, and handsome curved plywood panels flanking the hand-rail space of the modern stairway. The attic can rapidly be converted into a habitable room.

In America the fashion is even growing for plywood houses, made in sections in the factory from strong plywood sheets securely fastened to frameworks, and arranged for bolting together on the site with a few hand tools. These panels are, of course, of the waterproof variety. The inside finish of such houses need show no signs of the wood construction. Key laths are often fastened to the walls and a standard plaster finish given, which, because of the non-cracking and non-shrinking character of the groundwork, can be trusted not to crack.

One of the most interesting developments of late years is the production of one-piece pressed plywood furniture of ultra-modern design, and this has been extended to cover a range of articles of common use.



Press for making "cores" for "blockboards."

From Our Readers

These pages are reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

Historic Salisbury

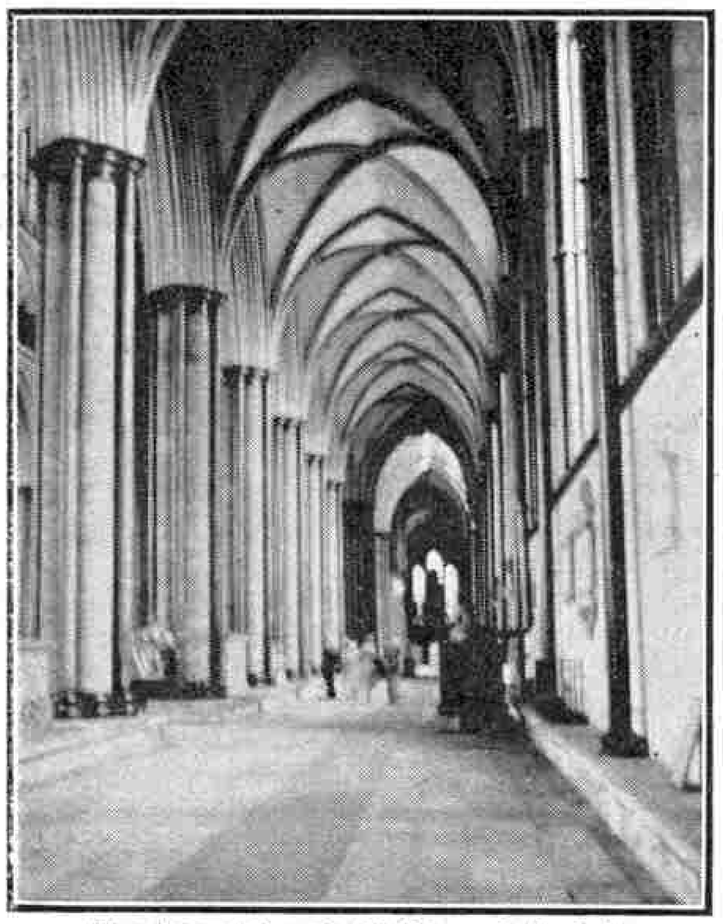
Salisbury, or Searobyrig as the Saxons called it, is one of Britain's oldest cities, and its actual age is unknown. The old city was about a mile to the north of the present one. Its great earthworks were probably thrown up more than 2,000 years ago. When the Romans came great stone buildings sprang up, villas, places of worship and barracks for the occupying Legions. The Romans left, and the hands of Saxons and Normans made their successive additions and alterations to the city.

In the year 1218 the Bishop of Salisbury obtained authority to move from the old site to a position on the banks of the River Avon, and there the new city was planned with a great cathedral, the foundations of which were laid in 1220.

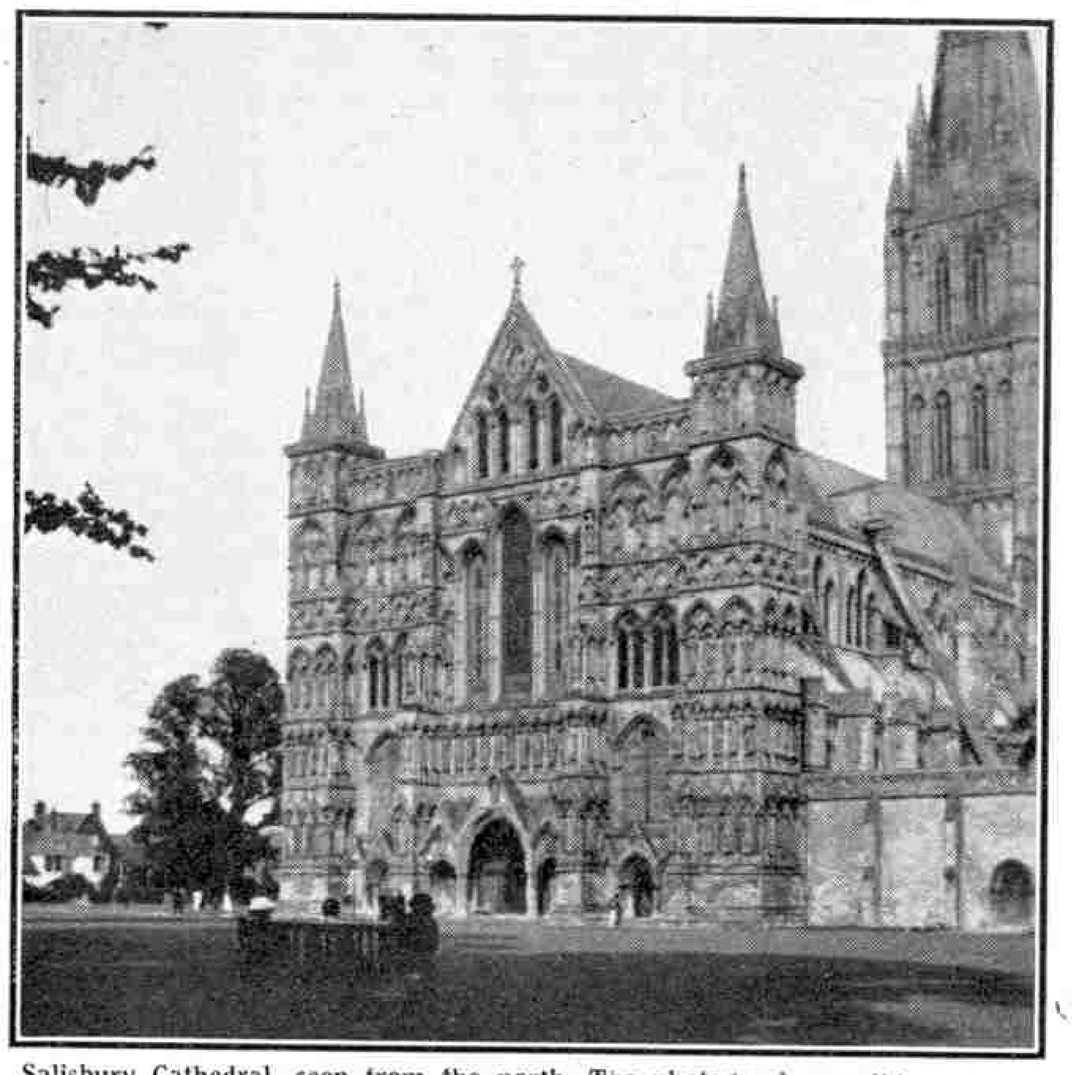
Salisbury Cathedral is considered by many to be the most beautiful in the country. According to old documents its cost amounted to about £27,000, which represents a sum that would be many times larger in present day currency. The building took 38 years to complete, and was consecrated in 1258 by Boniface of Canterbury. King Henry III was present at the ceremony. Almost a century later the famous spire was added. This towers to a height of 402 ft. It is the tallest spire in England, and is a beautiful landmark that can be seen for many miles over Wiltshire.

There are many ancient buildings in Salisbury. One of the most interesting is the George Inn, which was erected in 1320 as a hostelry for pilgrims. In June 1668 Pepys the diarist spent a night under its roof, and in his diary he writes of lying in a silk bed and enjoying "very good diet," but he was "much displeased at certain charges and resolved to trouble the mistress about it!"

J. WAKELEY (Bournemouth).



The decorated roof of Salisbury Cathedral.



Salisbury Cathedral, seen from the north. The photographs on this page are by J. Wakeley, Bournemouth.

A Tanker in the Baltic Sea

Before the war I managed to arrange a trip up the Baltic, not in luxury in a cruising liner, but roughing it in a very ordinary Norwegian oil tanker.

My trip started from Copenhagen, from which historic city I travelled overland to Korsör by train. After finding the pilot boat there I went out to join the tanker, which had come from Mexico.

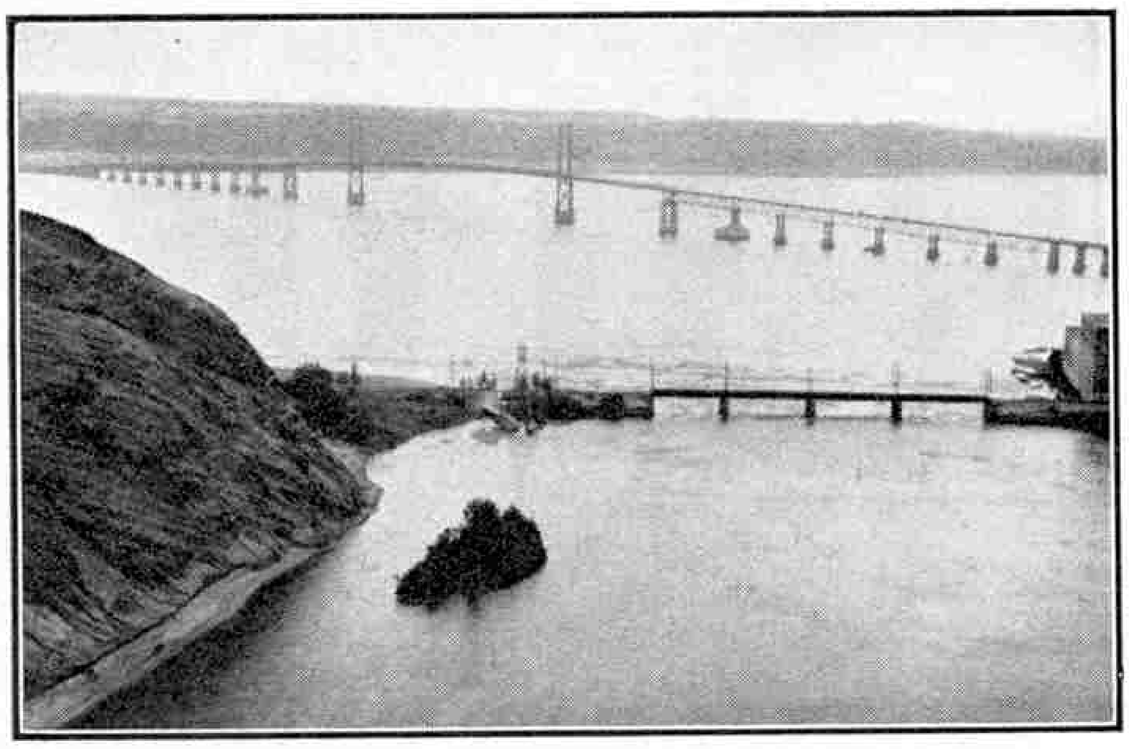
The weather was perfect, with a smooth sea and a blue sky, and a summer haze hiding the horizon. After a brief inspection of the ship I ascended to the bridge, from which vantage point many interesting things were pointed out by the captain. So we steamed on at a good 10 knots down the Great Belt, keeping the Island of Laaland on our port bow. We passed the island of Bornholm, the highest part of Denmark, and on we went up the coast of Sweden, past Öland and Gotland, through the beautiful summer night and another glorious summer day, eventually tying up in Stockholm.

If Venice is the Queen of the Adriatic, then Stockholm must surely be the Queen of the Baltic. I shall never forget the trip up to the city from the Baltic, with those innumerable wooded islands, each mile unfurling new scenes of beauty and splendour.

Two days were spent sight-seeing in Stockholm and its environs while our ship pumped out its cargo of oil. Then very regretfully we bade farewell to that beautiful city, and turned our bows once more to the Baltic Sea. Crossing the 60 deg. latitude line we steamed on northward past the Äland Islands, and so to Gävle, another Swedish port, where more oil was discharged and a day was spent on pleasant trips ashore. After we left Gävle, where the night at that time of year is very short indeed, the weather broke at last and in rain and fog we steamed slowly in an easterly direction bound for the Gulf of Finland, with Helsinki, the Finnish capital, as our destination. This pleasant spot we reached the following day.

In Helsinki we found the language rather a difficulty. In Sweden we had managed quite well with our broken Danish, the languages being very similar, but Finnish was quite another matter! We managed somehow, however, and spent two extremely happy days in the land of a thousand lakes. At last our ship had pumped out the remainder of her cargo, and we were ready to depart for Copenhagen.

D. REBBECK (Belfast).



Where the Montmorency River enters the St. Lawrence. In the background is the Isle of Orleans. Photograph by T. Stopford, Manchester.

The Montmorency Falls

I was one of a party of 28 Public School boys who visited Canada last summer, leaving Southampton by R.M.S. *"Antonia"* and returning in the *"Queen Mary."*

I enjoyed many interesting excursions during my tour. After a six day crossing of the Atlantic, and a run of two days up the St. Lawrence we landed at Quebec. There a tour of the city and its surroundings was made in a motor coach. During the trip we stopped by a sign post that surely must be unique, for it gives the directions and distances to the North and South Poles!

On one excursion we visited the Montmorency Falls. These are at the mouth of the Montmorency River, which flows into the St. Lawrence east of Quebec. Although these are 100 ft. higher than the more famous Niagara Falls, which we also visited, a much smaller volume of water flows over them. They provide electricity for the greater part of the city of Quebec.

The following interesting story is told about these falls. One day two farmers, with their families, were crossing the bridge that spanned the falls when it gave way. The unfortunate people were drowned and their bodies were never recovered. This led the authorities to believe that a subterranean passage existed. To verify this a marked log was allowed to flow over the falls. Although a careful watch was kept, the log was not seen to pass under the bridge at the mouth of the river, which is shown in the accompanying illustration, but two days later it was identified floating down the St. Lawrence on the far side of the Isle of Orleans, which can be seen in the background of the illustration. Support for the theory of a subterranean passage seems to be given by the fact that the volume of water flowing under the bridge is much less than that which flows over the falls.

T. STOPFORD (Manchester).

Beam Engine 142 years old

Recently I paid a visit to a G.W.R. Pumping Station. The engine in use there was built in 1797 for a Cornish tin mine, and is now employed to pump water from a reservoir into an adjoining Canal. It has cylinders of diameter 3 ft. 6 in., and the stroke is 7 ft. 9 in. The working pressure is only 20 lb. per sq. inch. One end of the 8-ton beam carries the piston rod, and the other carries the pump rod, which is 40 ft. long. The engine pumps 240 gallons each stroke, and makes 12 strokes a minute. Steam for the old engine is supplied by modern boilers that have been built to replace the Cornish boilers once in use with it.

The valve gear is a complicated arrangement of rods, quadrants and weights, and it works perfectly after 140 years or so. To start the engine the valve gear is worked by hand, and adjustment to the valves is made by means of threaded rods. I hope that this fine example of pioneer British engineering will stay at work many years longer.

A. R. GILL (Oxford).

The de Lesseps Statue at Port Said

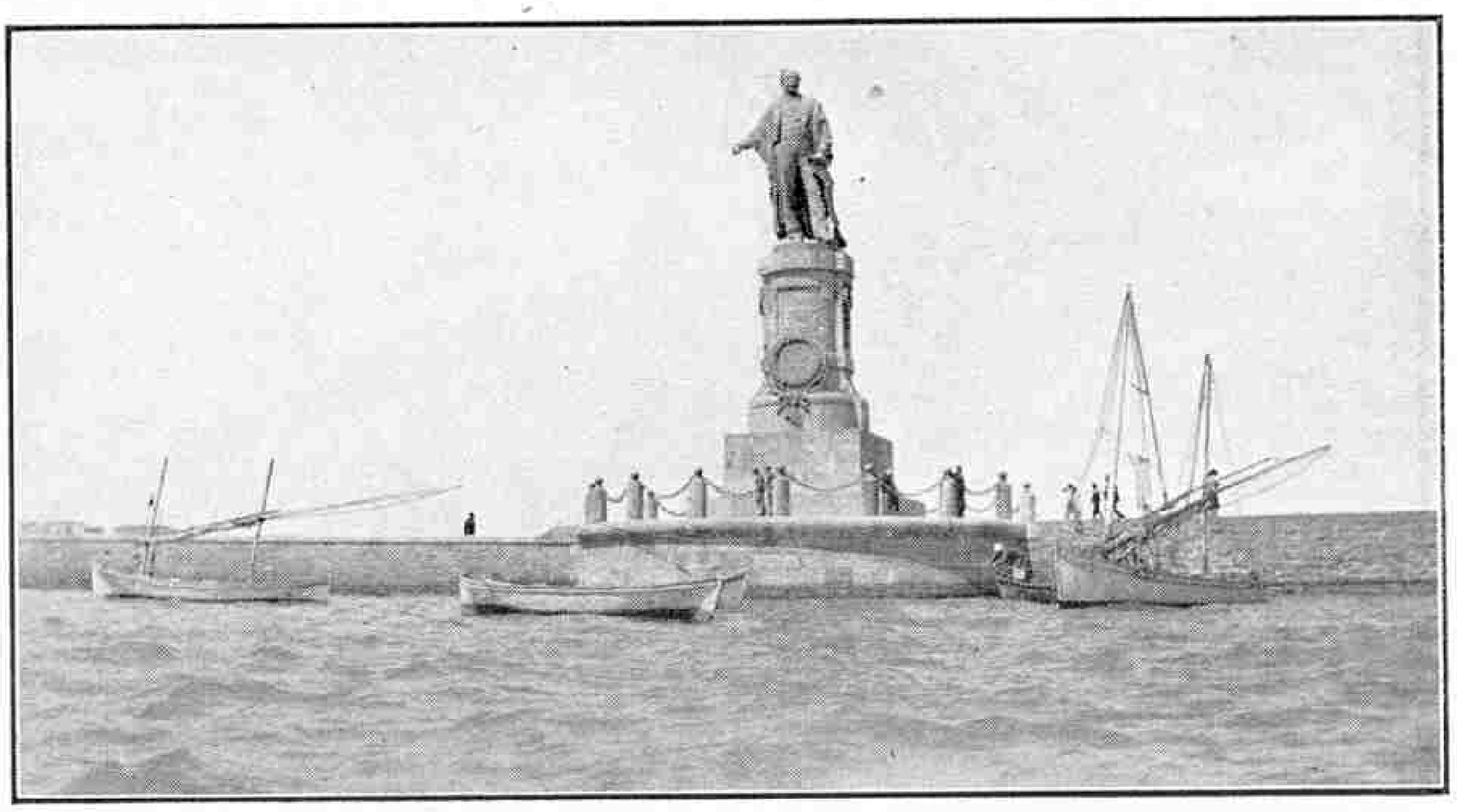
Port Said, at the Mediterranean end of the Suez Canal, is one of the busiest ports in the world, and when I passed through last summer I took the opportunity of having a good look round.

In Port Said one encounters people of nearly all nations, all in some degree connected with shipping. The shops, which mainly exist for the sale of souvenirs to tourists, are owned by Arabs and Greeks who speak many languages. Even the street hawkers can address a prospective customer in English, French, German, Italian or Greek, and are seldom wrong in guessing a tourist's nationality. Incredible as it may seem, quite a number of these hawkers can even carry on a conversation in broad Scottish!

Port Said was of little account before the opening of the Suez Canal in 1869, but since that time the shipping passing through it has reached the enormous total of 34,000,000 tons annually, nearly half of which is British.

Ferdinand de Lesseps, the famous Frenchman who planned the Suez Canal, was afterwards ruined by his unsuccessful effort to build a canal across the Isthmus of Panama. His statue on the breakwater at Port Said, which shows him standing with one arm outstretched towards the canal, is one of the landmarks of the town. Owing to its position, the statue cannot be photographed well from the breakwater, so I hired an Arab boatman to row me to a suitable point from which I could take a snap.

P. LAWRIE (London S.W.19).



The statue of de Lesseps at the entrance to the Suez Canal. Photograph by P. Lawrie, London.

GAUGE 'OO'

HORNBY DUBLO

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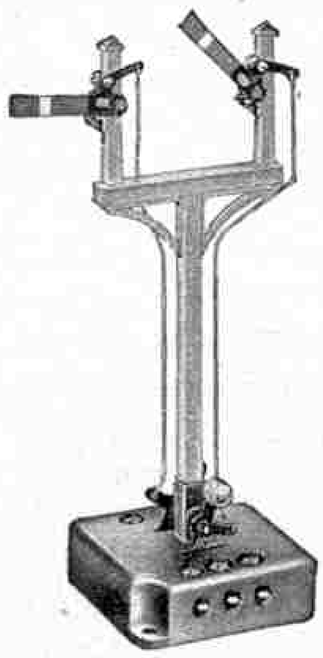
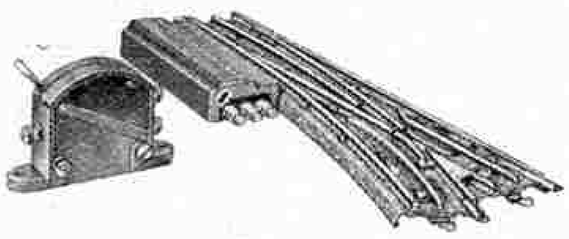


JUNCTION SIGNAL
Electrically Operated "Home" (as illustrated) or "Distant." Price **7/3**



POINTS ELECTRICALLY OPERATED
Designed to work off a Dublo Transformer or D.C. Converter. The same Transformer or Converter that supplies current to the trains can be used.
Electrically Operated Points, Right-hand } pair
Electrically Operated Points, Left-hand } **17/–**

SWITCH D1
Specially designed to control the Hornby-Dublo Electrically Operated Signals and Points.
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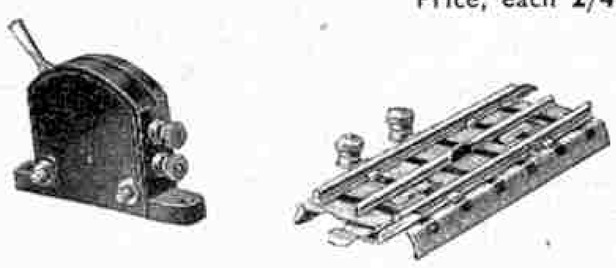
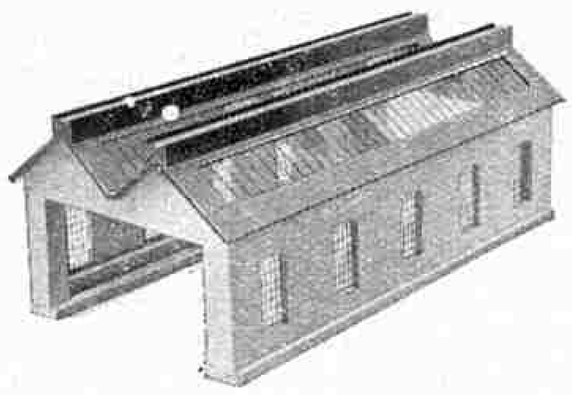


ISOLATING RAIL
The centre rail is divided into two separate sections, each connected to the terminal provided for wiring up to Switch D2.
Isolating Rails. Price, each **1/9**

SWITCH D2 (For Isolating Rail)
For connecting to the terminals of the Isolating Rail to make an isolated section of track "alive" or "dead" as required. Price, each **2/–**



ENGINE SHED
The Shed will accommodate two Hornby-Dublo express Locomotives and their Tenders.
Price **11/6**

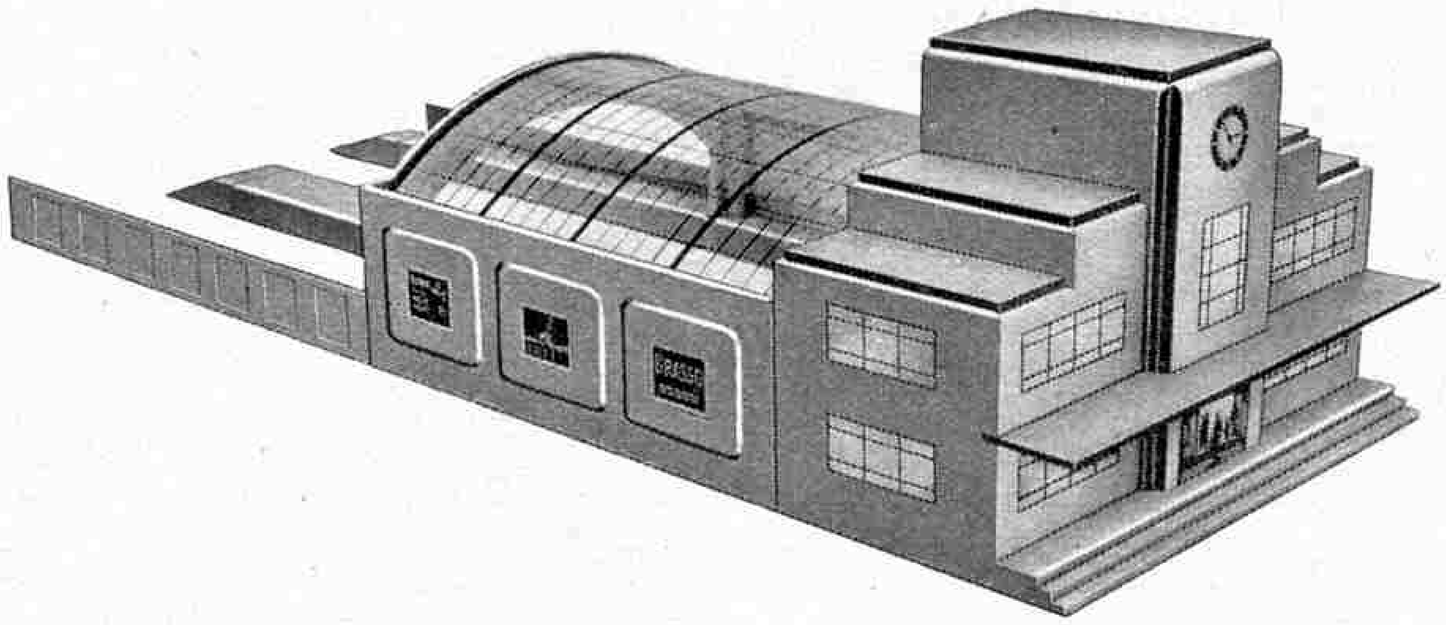
Thrilling new developments in this marvellous railway!

When the Hornby-Dublo System was introduced, we promised to develop it by the addition of Electrically Operated Points and Signals. These are now ready. **By means of a special Switch, Points and Signals can be controlled just as on real railways.** The two arms of the Double-arm and Junction Signals can be operated independently in the most realistic manner.

An even greater development is the introduction of Isolating Rails and Switches, by means of which different sections of track can be made "alive" or "dead" as required. With these Rails and Switches endless fun can be had by controlling two or more trains independently at the same time. **All kinds of fascinating shunting operations can be carried out, every movement being made as on an actual railway.**

The Hornby-Dublo track is now completed by the introduction of Large Radius Curved Rails which, used in conjunction with the standard Dublo rails, form **a perfect double track.**

Another new feature is the D.C. Converter. If your home has Direct Current **this Converter will enable you to run your Hornby-Dublo Trains from the mains just as easily, safely and successfully as with a Transformer from Alternating Current Mains.** The D.C. Converter provides sufficient current to run two trains at the same time, each on a separate track.



CITY STATION OUTFIT D2
This Outfit has been specially designed for building either of two splendid city stations.
The Terminal Station illustrated above is an imposing model in the modern style, with three platforms covered by an arched roof span in celluloid.
The Through Station seen in the railway on the right is an equally effective model, built up from the same components and ideal for through running on a large layout. Price **28/6**

Dublo brightens blackout nights

A COMPLETE MODEL RAILWAY ON A DINING TABLE

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Hornby-Dublo Electric Passenger Train Set (L.N.E.R.), mains operated ...	**77/6**
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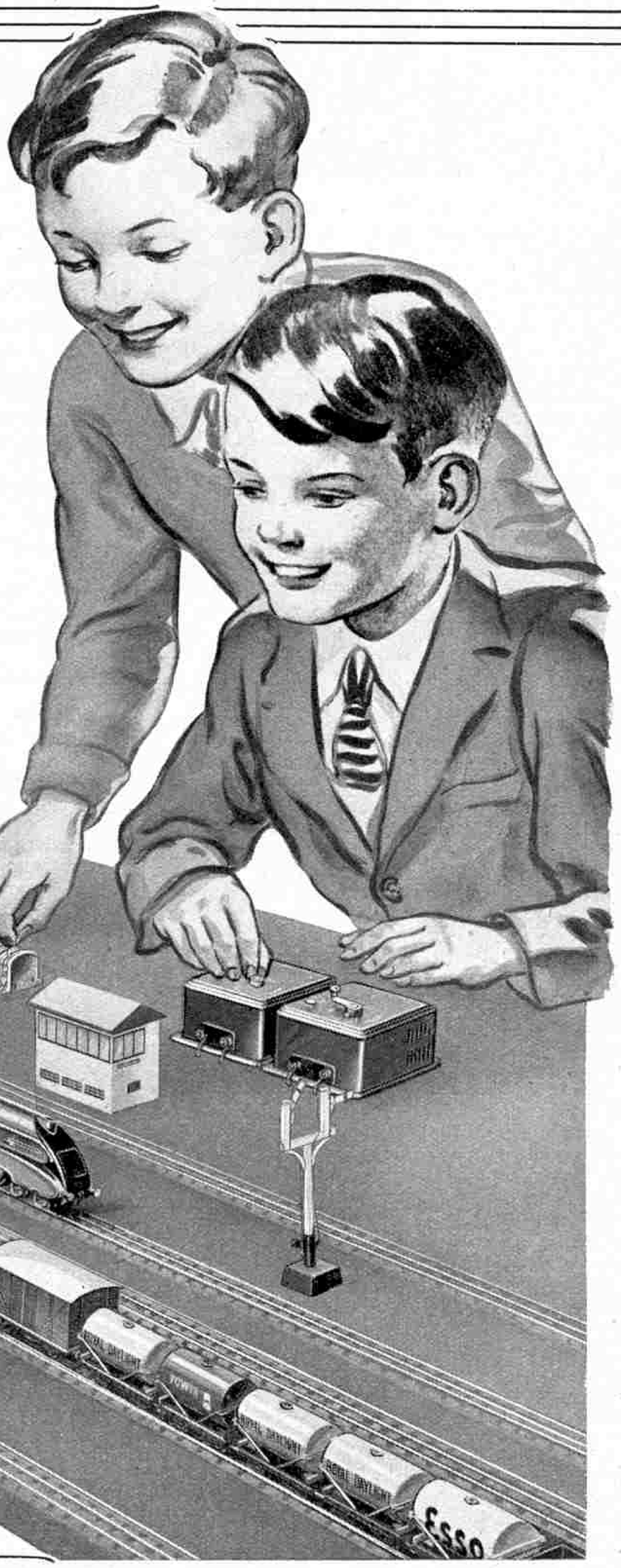
Hornby-Dublo Clockwork Tank Goods Train Set (L.M.S., L.N.E.R., G.W.R. or S.R.)	**30/–**



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Of General Interest

Explosions that Cannot be Stopped

In one of the scientific romances that Mr. H. G. Wells wrote before the Great War of 1914-1918 he described the destruction of cities from the air with radioactive bombs. The effects of these bombs did not end with the initial explosion, for this was only the beginning of a convulsion that increased in violence as it spread outward in all directions.

Mr. Wells' radioactive bombs have always been regarded as products of the imagination, but some strange experiments that were made during the present year seemed to suggest that after all such bombs are possible. In these experiments the metal uranium was bombarded by neutrons, fast-moving tiny particles that have no electric charge and can be shot clean through solid materials. Similar experiments with many elements had chipped off electrons or other bits of atoms to produce new elements, but in this case the effect was to blow the entire atom into fragments consisting of atoms of lighter elements.

Even this was not the most exciting result, for two more neutrons were formed in the break-up, and these were speedier than those starting the change. Thus further neutrons were set free to continue the bombardment and to break up more uranium atoms, with the production of yet more neutrons that in turn would act in the same way. Once started such a process of disintegration would become more and more rapid, and it certainly would be violent, for there is enough energy in an ounce of uranium to boil about 1,000 tons of water. There would be in fact a gigantic explosion that could not be stopped.

Many scientists became nervous about the prospects of such changes, and began to look for means of controlling the dangerous forces that seemed likely to be set loose. Others did not believe that this startling process really happened. They pointed out that in uranium mines there are large masses of pitchblende, in which there is a very large proportion of uranium, but that these mines have shown no signs of going up in any sort of explosion.

The solution of the puzzle came later, when it was discovered that it was an isotope, or different form of uranium, that gave rise to these strange results. This is present in ordinary uranium in so minute a proportion that there is practically no prospect of using it to make deadly radioactive bombs that would start explosions that could not be stopped, and would make a new and terrible weapon for use in modern warfare.

A Desert Problem

We readily complain of shortage of water when we have a dry summer and the level in our reservoirs becomes low. Conditions here will have to become very much more difficult before they become as bad as they are in Arizona, in the United States. There the water problem is a very serious one, as the sign shown in one of the illustrations on this page suggests. A large part of Arizona is now a desert, and in the past 20 years extensive areas formerly cultivated there have had to be abandoned. Not all the meagre supplies of water that are yet available are useful for drinking purposes, and the shortage must be intense when it is necessary to erect signs warning travellers that they will have to cover 88 miles before being able to satisfy their thirst.

The deserts of the south west of the United States are fascinating places, in spite of the difficulties that the shortage of water brings with it. One of the most interesting of these areas is the Mohave Desert, in Southern California. The chief reason for the dryness of this area is the existence of the San Gabrielle mountains to the south and west. The peaks of these mountains are more than 10,000 ft. above sea level, and air carrying moisture from the Pacific Ocean is driven upward by them and condenses to form clouds, from which snow falls on the peaks themselves. The air then moves onward, but it has been robbed of its moisture, so that the Mohave Desert is dry except for its upper edges. A drift of clouds usually stretches out 30 to 40 miles over the Desert from the highest peaks of the San Gabrielle mountains, to be finally dispersed by the desert heat. Rain does fall at times in the Mohave, and there have been occasional blizzards when snow actually has fallen there, but in general the land is parched.

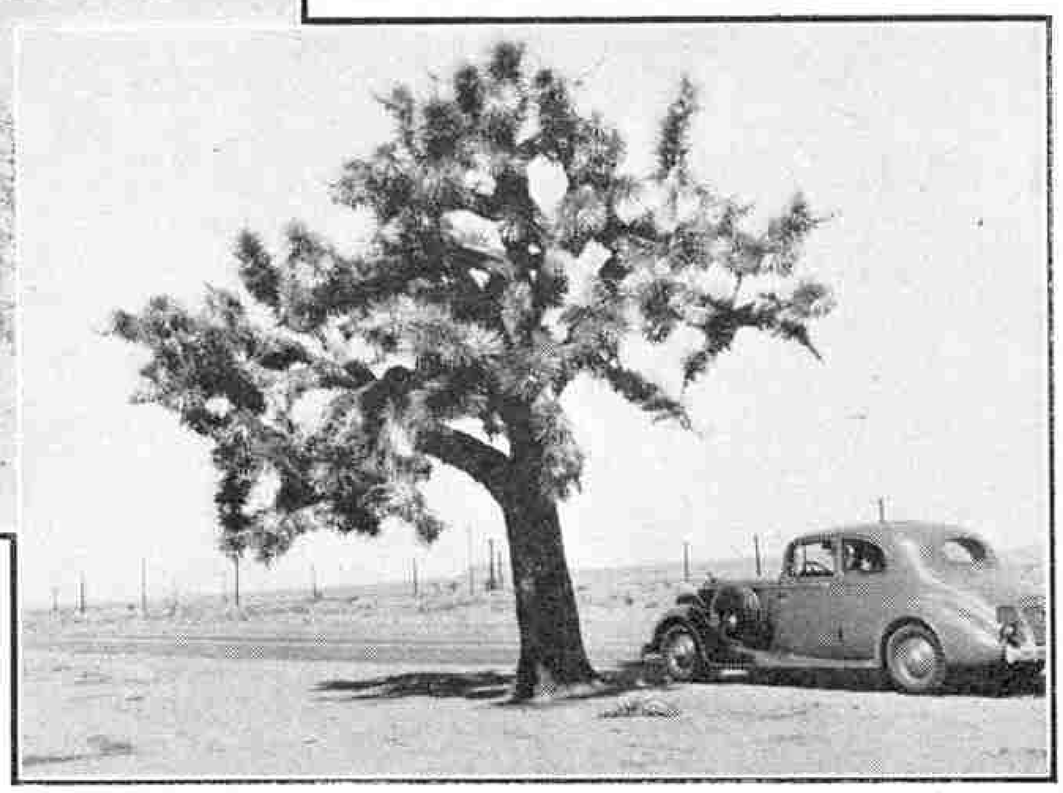
The Joshua Tree

One of the marvels of the Mohave Desert is the "Joshua Tree," which seems to point its weird arms upward as if in constant prayer. It is found on the upper edges, where a little moisture falls. Although a desert tree it spreads in a forest that in parts extends for 100 miles, descending to the margin of the depressions, and climbing the mountains until the region of pines is reached. The "Joshua Tree" is really a yucca. The lower illustration on this page gives a splendid idea of the appearance of this strange desert tree, and it would be interesting to know how it got its name.

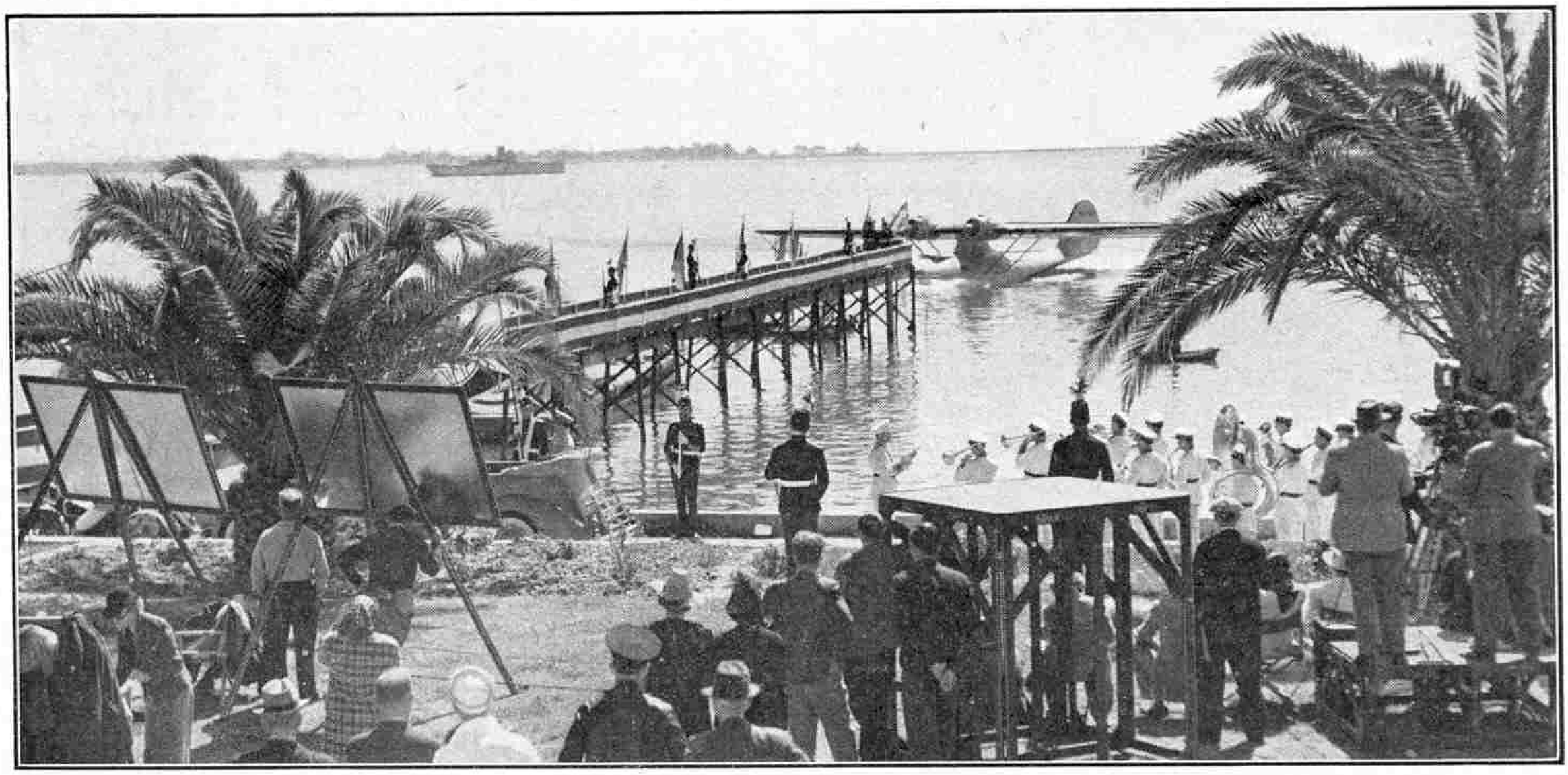
Bombing in Lamp Making

The lamp with the amber-orange light that has come into use on many sections of highway owes the colour of its glow to the presence of a tiny pinch of the metal sodium. Getting the sodium into the vacuum tube is not as easy as it may seem, for the metal must not be exposed to the air, which would oxidise it. Formerly it was distilled into the bulb, but this process is somewhat slow and cumbersome and has now been replaced by the use of the sodium bomb. This is a tiny glass bulb that has been sealed after sodium has been distilled into it.

One of these bulbs is placed in the tube that is to be made into a sodium lamp, and when this is complete it is placed inside a coil through which high voltage alternating current is passed. Eddy currents in the sodium then cause the metal first to melt and then to boil, with the result that the bomb explodes, scattering its sodium on the walls of the lamp. All that remains of the tiny glass bulb is a little glass dust that can safely be left in the lamp.



Above is a sign erected in Arizona as a warning to motorists. Photographed by A. Harvey, Appley Bridge, Lancashire. On the right is a photograph of a Joshua tree in the Mohave Desert, California, sent by H. O. Williams, 2808, Hillegass Avenue, Berkeley, California, U.S.A.



Filming a scene in "The Magnificent Fraud," a Paramount picture in which a Consolidated 28-4 flying boat has a prominent place. This model was built for American Export Airlines Inc. by the Consolidated Aircraft Corporation, San Diego, California, to whom we are indebted for our photograph.

Electric Batteries of 2,000 Years Ago

It is generally believed that current electricity has been known only since the days of Galvani and Volta, about 150 years ago. Now there appears to be some ground for believing that electric batteries were in use more than 2,000 years ago. This conclusion follows the discovery during excavations in Iraq of strange objects that can only be described as crude cells that would generate a weak electric current.

The discovery was made near the ancient city of Baghdad, and the find itself consisted of a clay vase, about 6 in. high, inside which was a cylinder of copper. The cylinder contained asphalt and was closed by a heavy block of the same material, through which passed a piece of iron rod that originally had been round, but had been corroded so severely that it ended in a point.

This assembly has a surprising resemblance to the modern dry battery, and it is difficult to see how it could have been used for any other purpose than to produce an electric current. Similar contrivances have been discovered in the neighbourhood of Baghdad, along with pieces of thinner iron and copper rods that may have been used as connecting wires; and the suggestion has been made that the batteries were used for gilding small articles of silver. The silversmiths of Baghdad to this day use a primitive method of electro-gilding, the origin of which is unknown, but probably may be traced to practices flourishing 2,000 years ago and preserved as trade secrets.

Light in War Time

The problem of providing lighting during "blackouts" that will not be visible from the air appears to have been solved by the introduction of paints that become luminous when rays of invisible light fall upon them. A special lamp that produces ultra-violet rays is used. This looks like an ordinary motor car headlamp, and its light can be switched on and off as required. It gives out a dull purple glow that is only noticeable when the direct rays can be seen. Parts of the roadway or curbs are painted with a material that either glows when the ultra-violet rays strike it, or becomes luminous and continues to give out light for some hours after the lamp has been switched off. The luminous paint can be supplied in a range of colours, but the paint that glows is only available in blue or white.

In a test of lighting by this method vans completed circuits of the track on which the demonstration was carried out, and loading was carried on without difficulty. The vehicles could easily be seen from ground level, but it is claimed that no light of any kind would be visible from above.

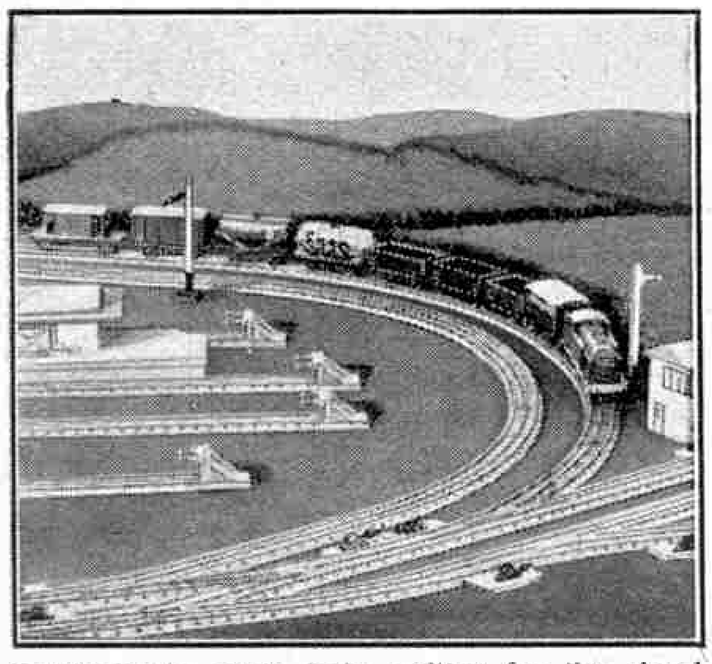
In these days of darkened streets it is interesting to find that dark-eyed people are said to see much better in the dark than those whose pupils are light in colour. The difference shows in two ways. People with light-coloured eyes seem to lack the ability to see dimly lit objects easily, and they are more readily affected by glare. A person with eyes of this type driving a motor car at night therefore is more easily dazzled by the headlights of approaching vehicles than one with dark eyes, but this is a comparative disability that is more important in normal times.

Search for Radium in the Pacific Ocean

An American expedition is setting out to search for radium in the bed of the Pacific Ocean. Samples of this will be gathered by means of a deep-sea gun, which will be lowered to the ocean floor and then fired automatically, when it will drive a hollow metal tube into the ooze and sediments that have been collecting there for millions of years. The tubes will then be hauled to the surface and tested for radio-activity.

It is thought that the sea bed may contain a larger proportion of radium than rocks at the surface. There is no intention of trying to extract this very rare metal from it, however. The purpose of the expedition is purely scientific.

Depression in the giraffe country. Photograph by V. Chamberlain Bath.



Hornby-Dublo goods train waiting for the signal to proceed on to the main line.

New Hornby-Dublo Features in Service

ALTHOUGH the new Hornby-Dublo features announced in last month's *"Meccano Magazine"* have been available for only such a short time, there is every indication that they will be the most popular additions ever made to a model railway system.

The simplest, yet in many respects the most important addition, is the Isolating Rail. This is a straight piece of track, equal in length to a Quarter Straight Rail, with its centre rail divided into two by an insulating gap. The rail is controlled by a special Switch (D2) wired up to it in such a manner that the electrical circuit can be broken by making use of the centre rail division, or can be completed again as desired by a simple movement of the Switch lever. In this way a section of the track can be made "alive" or "dead" as required. The possibilities of the Isolating Rail and Switch are almost unlimited, and every owner of a Hornby-Dublo Railway will find it easy to adapt the new feature to his own layout.

The wonderful increase in control made possible by the Isolating Rail must be experienced to be fully realised. Without this rail it would not be possible to run a passenger train and a goods train on a single track layout, because one could not be kept stationary while the other was being operated. With the rail it is now possible to send a goods train on its journey and finally run it into a siding, while a main line express makes its circuits of the layout. This can be done with quite a simple layout like that shown in Fig. 1. The essential requirements are two sidings, each having an Isolating Rail at its entrance, so that by means of a D2 Switch the siding can be made "alive" or "dead" as required.

Either the goods train or the passenger express remains in its respective siding while the other train travels round the layout. As soon as it is desired to operate the stationary train, which we will presume is the goods train, the passenger train is branched off into the vacant siding alongside which is a Main Line Station, and stopped by bringing the Controller handle back to the "off" position. Then the Isolating Switch governing the passenger train siding is switched off, making the section "dead." Next the Switch controlling the siding on which the goods train is loading alongside the Goods Depot, is switched on, so that when the Controller handle is operated again the goods train will pass out of the siding, and on to the main line. Many hours of splendid fun can be obtained in this way.

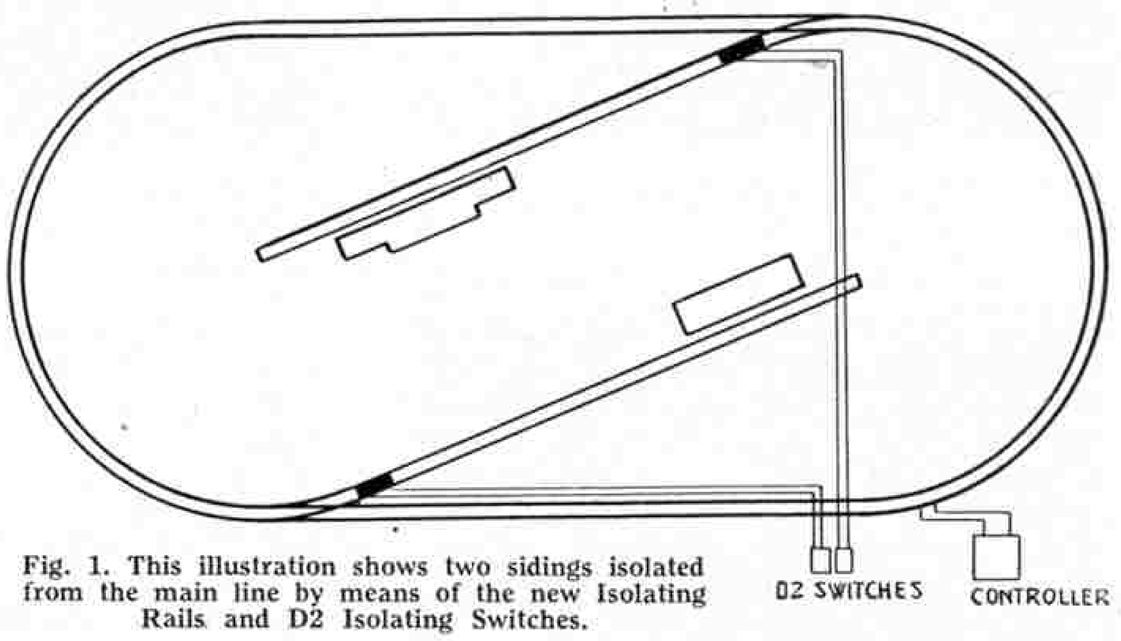
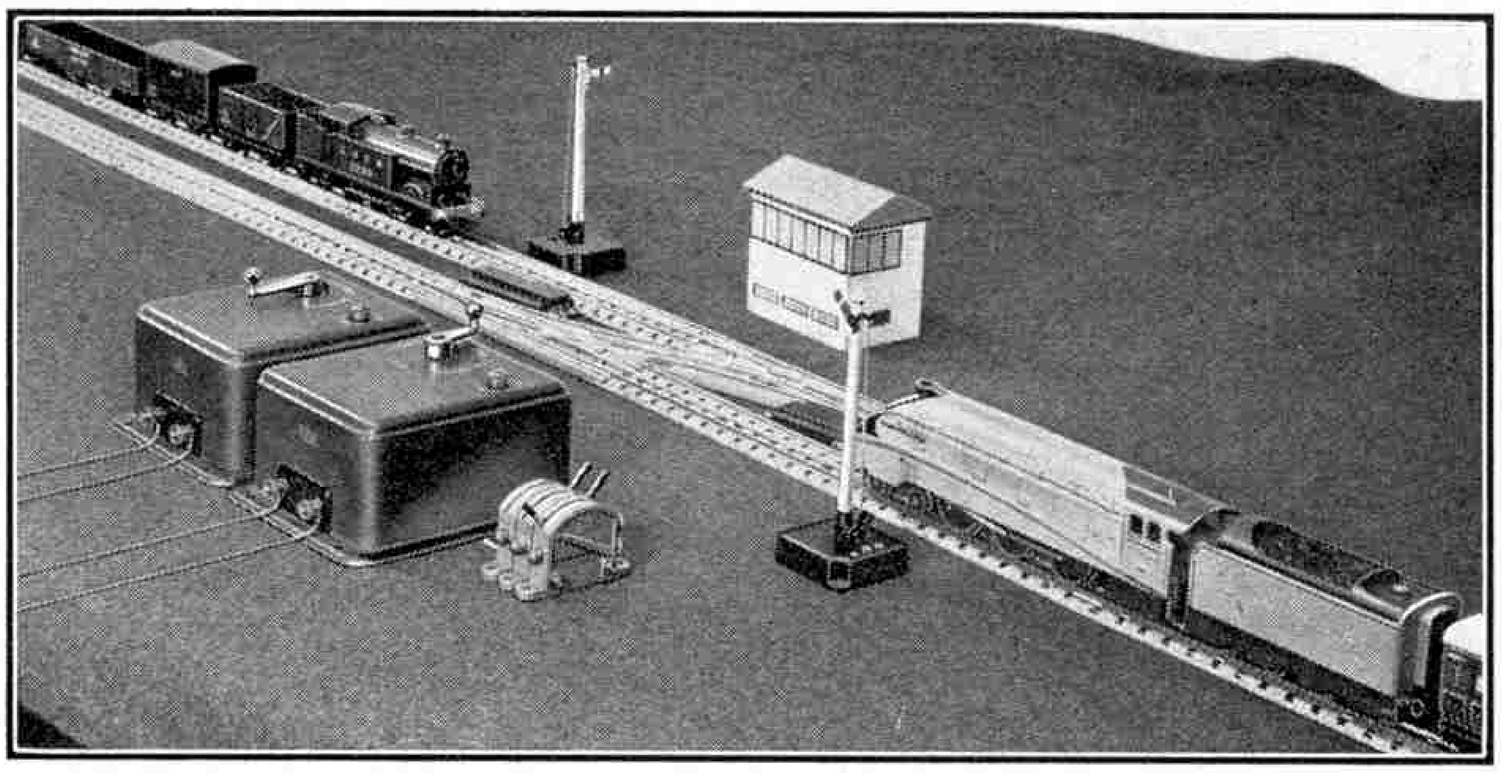


Fig. 1. This illustration shows two sidings isolated from the main line by means of the new Isolating Rails and D2 Isolating Switches.

A station loop line can be isolated in a similar manner, as shown in Fig. 2. Four Isolating Rails are required in this case, one at each end of the loop, and one at each end of the section of the main line that runs alongside the loop.

The loop line arrangement shown in Fig. 2 allows two trains to be operated in opposite directions on the same layout. Let us suppose one train is being run in a clockwise direction round the layout, taking the main line, while the second train is stationary on the loop line. As the time approaches for the second train to depart, the train that is running is brought to a standstill at the station by means of the Controller, and then the section of track on which it stands is made "dead" by switching off the D2 Isolating Switch controlling it. As soon as the departure time approaches, the loop line is made "alive" in readiness for starting the second train. Splendid fun can be had on this type of layout. An excellent idea is to combine the ideas shown in Figs. 1 and 2, and then three trains can be operated in a thrilling manner.

The Electrically Operated Points and Signals can be used in a variety of ways, of which the most obvious is the operation of Points or Signals on the far side of the layout, where they cannot be manipulated by hand



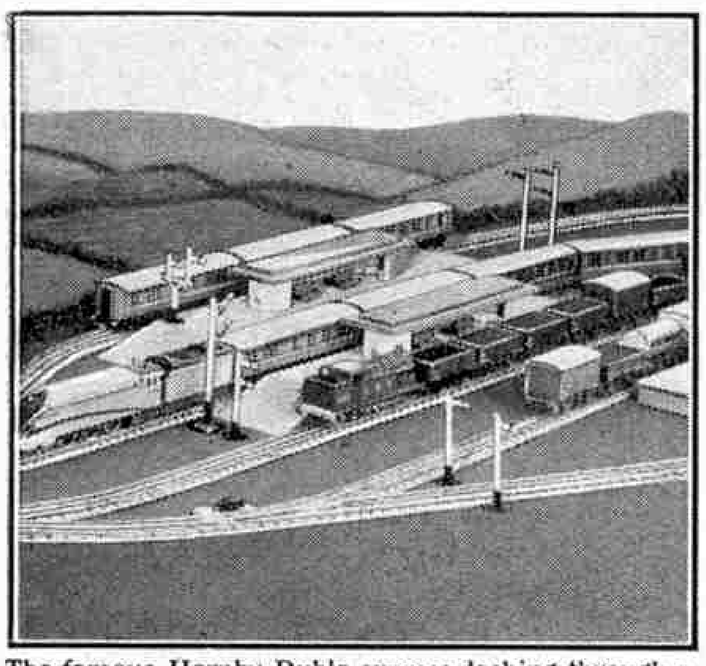
Two Controllers for operating two trains. The Switches are for working the signals and points.

without very unrailwaylike leaning over the layout, and perhaps knocking over accessories. The greatest fun of all is obtained by linking together various Points and Signals so that they operate in conjunction with one another.

It should be noted that both Points and Signals can be operated by current from the same Dublo Transformer or D.C. Converter that supplies current to the track. This will be found a great convenience.

The Electrically Operated Points and Signals work perfectly, and as their mechanism is completely enclosed they are thoroughly protected from accidental injury. It is very important to note that in using the D1 Control Switches the levers should be pulled over steadily, not "flicked" over.

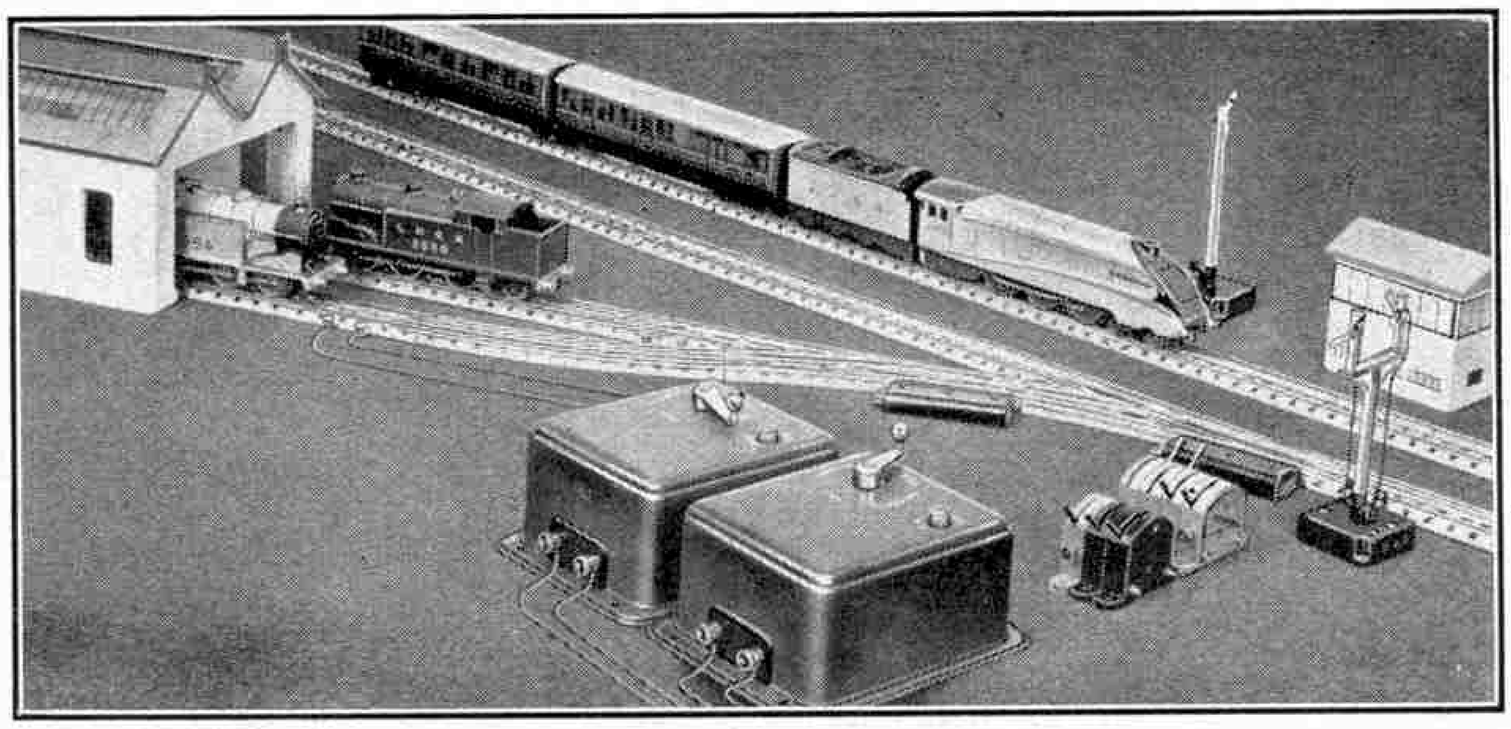
The new City Station Outfit is a very remarkable production, and all Hornby-Dublo enthusiasts should



The famous Hornby-Dublo express dashing through a suburban station headed by "Sir Nigel Gresley."

make its acquaintance as soon as possible. The main reason why stations of this type have proved unsatisfactory in the past has been that they were fixed and could not be developed or extended in any way. The two different stations that can be built with the City Station Outfit can be extended lengthways or sideways as desired, so that they can be made to fit realistically into layouts of any size. As the layout grows, so the station can grow also, with the result that the general scheme is always well proportioned.

The Terminal Station is ideal for filling up a corner of a layout, and it is easy to arrange the three approach tracks to it. One line is led off the main line to the centre of the station, a second line is led off this to the left, and a third is run between the centre and right-hand platforms. The Through Station can be used on any fairly long stretch of line, and looks well even on the



A realistic scene showing how the tracks in the Engine Shed are isolated and how the Switches are grouped together for operating the points and signals and for controlling the isolated sections.

side of a simple oval track. The platforms of both these stations should be given "life" by an assortment of Miniature Railway Staff and Passengers. If several of these are arranged in suitable positions, a marvellously realistic effect is produced. If a road can be provided alongside the station by means of the Dinky Toys Pavement, this can be made to add still further realism by the use of Dinky Toys buses and cars.

The new Large Radius track, used in conjunction with standard Hornby-Dublo curves, solves completely the problem of providing a perfectly symmetrical double track, without which no miniature railway is complete. Double track makes possible a series of most fascinating operations of exactly the same kind as those on real railways. A single Hornby-Dublo track is easily led into double track by means of the ordinary Right-hand or Left-hand Points, extended by the addition of a Half Curved Rail and a Half Straight Rail, thus forming in effect parallel points. The Half Curve is joined to the curved section of the Points to reverse its direction, and the Half Straight is connected to the straight portion of the Points.

When double track is operated, crossover points are necessary to enable trains to travel from one track to the other. In the Hornby-Dublo system the necessary crossover points are made by joining together the curved portions of two Right-hand or two Left-hand Points, according to whether a right-hand or a left-hand crossover is required. Two Half Straight Rails are then added to complete the crossover.

Hornby-Dublo enthusiasts will find the folder *"Suggestions for Hornby-Dublo Electric Rail Layouts"* very useful in connection with the design of a layout.

The first three layouts illustrated take up a space of only 6 ft. by 3 ft. and are specially suitable for a small dining table. They include isolated sidings and accessories are indicated in suitable positions. The next two layouts are a foot wider, and allow another oval to be included inside the plan. Finally a layout covering an area 8 ft. by 4 ft. shows the wonderful possibilities of the Hornby-Dublo System. This is a double track layout, and there are several sidings to add to the fun.

The layouts illustrated in this folder should be regarded as suggestions only, to be varied as required. A copy of the folder can be obtained free of charge from Meccano Ltd., Binns Road, Liverpool 13.

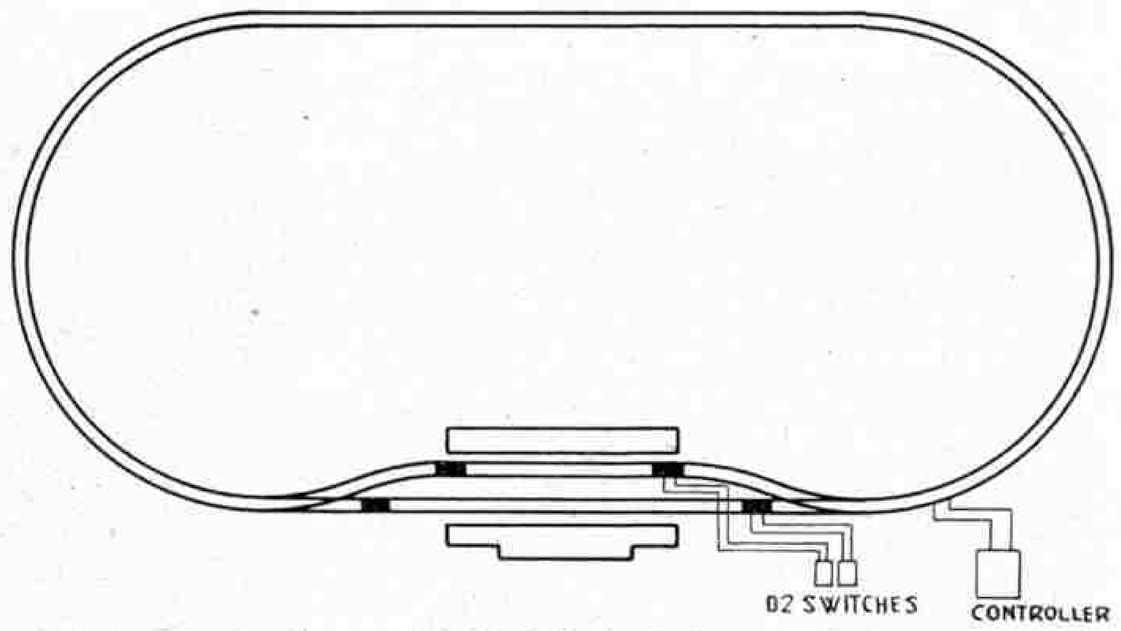
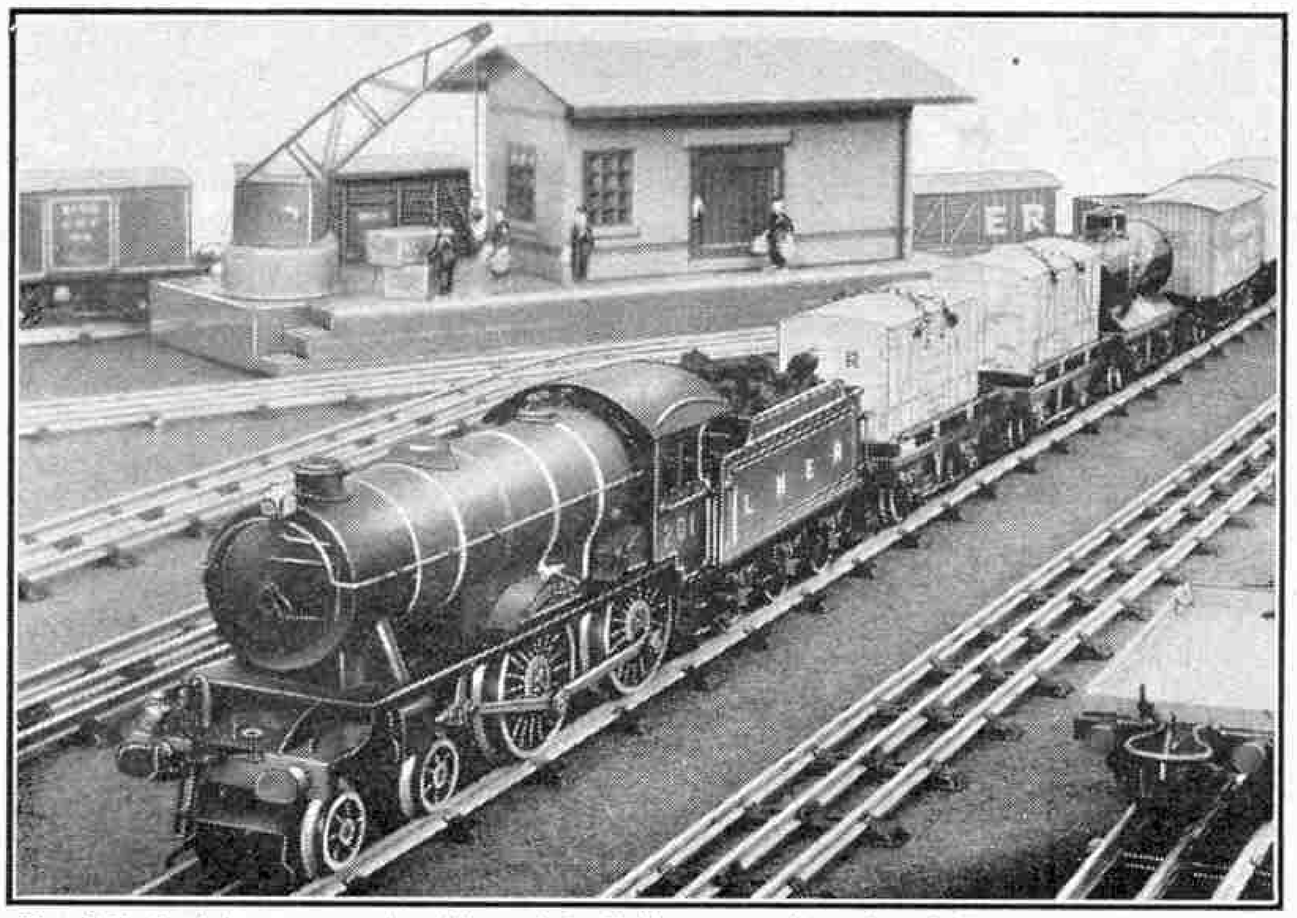


Fig. 2. A station loop line controlled by Isolating Rails and D2 Switches. It will be observed that only two of the Isolating Rails are connected to Switches.

Fun with a Hornby Railway

Developing the Layout

IN "How to begin a Hornby Railway" last month we said that readers who had obtained a Hornby Train Set would soon want to extend and develop the circular or oval track made up of the rails provided in the set. The simplest way of extending the track is by the addition of one or more straight rails on each side, so as to bring the circle into an oval, or the oval into a longer track of the same shape. A track of this kind including several straight rails provides a good long run for a train, but its use becomes monotonous after a time. The next thing is to add points to the layout, and as soon as this is done the possibilities for fun and interest become increased immensely.



Two S.R. Containers conveying "through traffic" are prominent in this illustration of an express goods train on a Hornby L.N.E.R. layout. They are mounted on flat trucks next to the engine.

The standard Hornby Right-hand and Left-hand Points are designed so that their straight portions correspond exactly in length with the ordinary straight rails, and in a similar manner their curved branches agree in length and radius with the corresponding curved rails. Now look at Fig. 1, which consists of a combination of two oval layouts. The small oval is obtained by adding Right-hand and Left-hand Points as shown, and only four more curves are required to complete the semicircle. The track that results is far more interesting than a plain oval, for the addition of the points gives a choice of routes that may be taken by the train, according to the fancy of the operator. Fig. 2 shows a further form of layout made by the addition of another set of Right-hand and Left-hand Points and four more curved rails. Fig. 3 shows how this layout can be improved by the use of an Acute-Angle Crossing.

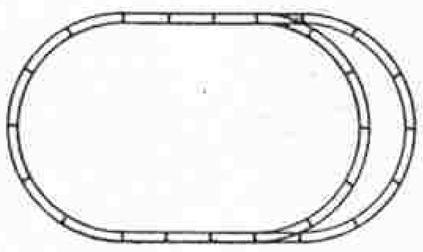
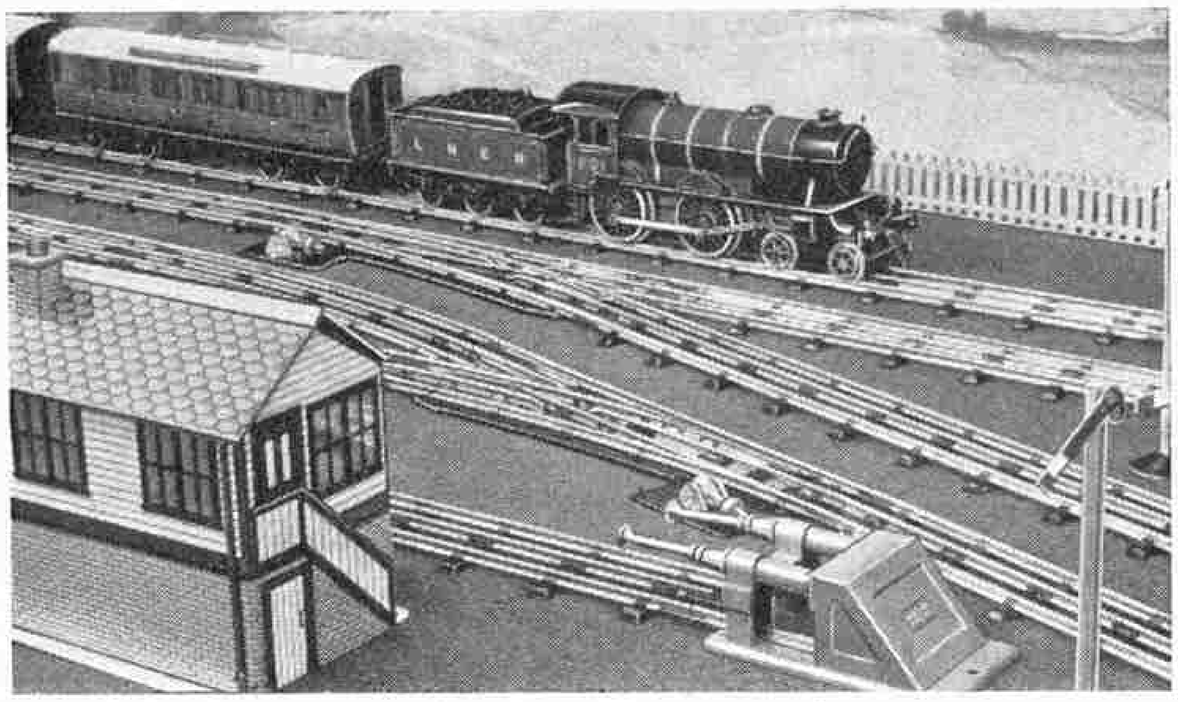


Fig. 1

Sidings form a very important part of any model railway layout, and are usually among the first items to be added. In order to make them parallel with the main line, Right-hand or Left-hand Points are required, together with one curved rail, which is necessary to reverse the direction of the track from the curved arm of the points.



An interesting arrangement for a junction laid with Hornby Solid Steel Track. A Hornby "Hunt" is hauling a train on the main line.

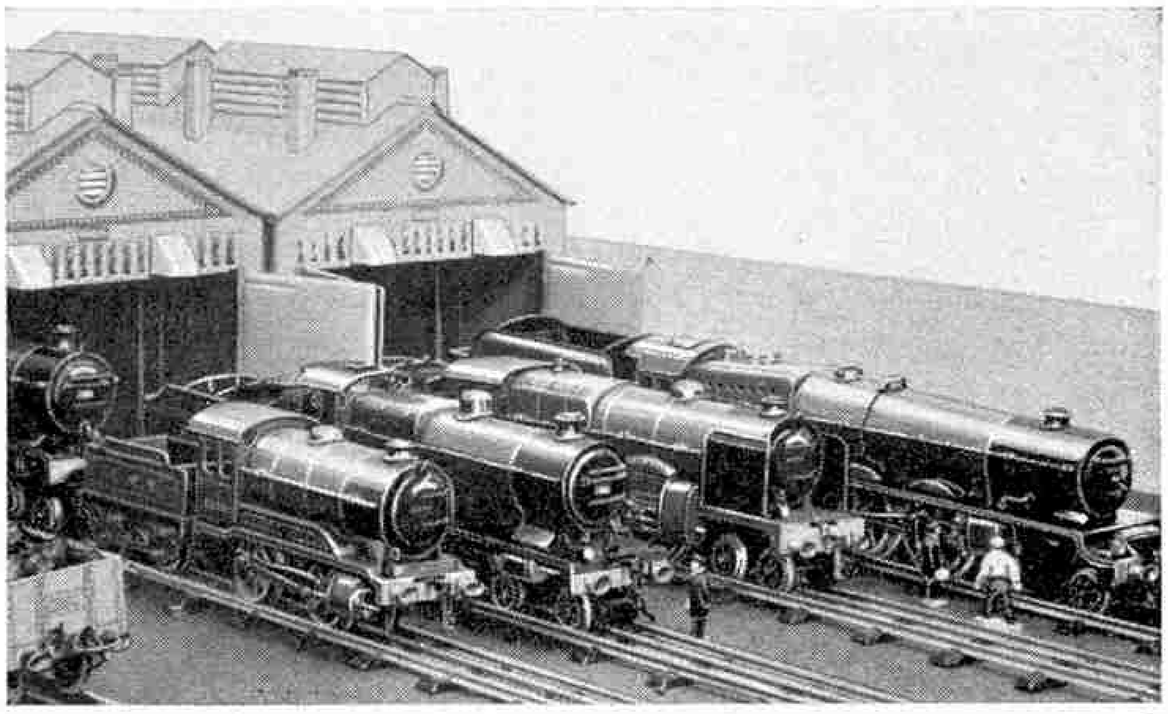
In addition to these points the Hornby System includes Double Symmetrical and Parallel Points. The Double Symmetrical Points lead one line into two diverging lines, while the Parallel Points lead one straight line into two parallel lines.

When an interesting layout has been laid down, the next step towards turning it into a real miniature railway is to add suitable accessories. A station is definitely called for; without one a layout seems to have no particular purpose. There is nowhere for the trains to start from, and nowhere for them to stop!

Several interesting station models are available for Hornby railway owners. The No. 3 Station is of up-to-date design. The station building is of light and pleasing appearance and includes the usual offices. Concrete blocks are represented at the front and back faces of the platform, and the top is finished to represent a typical station surface. The No. 4 Station consists of three detachable sections, a main centre section with the building and two end ramps. There is an actual opening through the centre of the station building to form an entrance and the booking hall, and the ticket window is finished to represent the modern glass-fronted type. A particularly attractive fitting is the miniature barrier in front of the ticket window. This looks remarkably realistic if one or two Dinky Toys Figures are arranged around it as if waiting to get their tickets. The windows and doors of the building are neat and attractive, and the bookstall has a very natural appearance. This Station can be obtained also wired for electric lighting and fitted with two lampholders.

In addition to these passenger platforms there are goods platforms,

No. 1 and No. 2. The latter has real sliding doors to the building, and a small crane that can actually be used for loading and unloading wagons. This Platform can be obtained wired for electric lighting. The Island Platform is another useful accessory.



At home! An interesting scene on a Hornby Railway before operations commence. The engines have been thoroughly cleaned before being put to work.

There are also the smaller and cheaper but very attractive M Station and Wayside Station.

Other accessories that go far towards making a layout look "alive" are the Engine Sheds, Signal Cabins, Footbridges, Turntables, Viaducts and Buffer Stops. All these accessories will be dealt with in later articles.

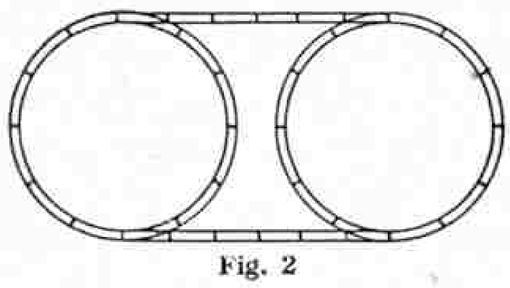


Fig. 2

This is a good opportunity to refer to lubrication. The moving parts of Hornby Locomotives and Rolling Stock cannot be expected to work correctly, and keep on doing so, if they are run dry. On the other hand, they do not work any better for being flooded with oil, which is an extreme that is liable to be reached when boys get an oil can in their hands! Any excess of oil should be avoided, for it always finds its way on to the track and gives rise to slipping. It also attracts dust and dirt. Meccano Oil is of just the right consistency for the general lubrication of Hornby Locomotives and Rolling Stock, and details of the points requiring attention are given in the instruction leaflets.

Each axle bearing of the rolling stock should have just a drop of oil, and the wheels should be spun round to see that they are free. It sometimes happens that, in course of packing, the wheel frames become pressed against the wheels and so tend to prevent their free rotation. The frames should then be bent gently outward so that the wheels have just sufficient play for easy running.

For springs, Meccano Graphite Grease is specially recommended, and is available in handy tubes. It can be squeezed from the nozzle of the tube on the parts that can easily be reached. For parts that are difficult to get at, the grease can be applied by means of a small paint brush.

A locomotive, or indeed any mechanism, is always inclined to be stiff in running when new. With careful attention to lubrication, and with regular use, the capacity of a new engine will be found to improve steadily until it becomes thoroughly "run in" and capable of undertaking the heaviest duties on fast schedules.

The mechanism of Hornby Points should never be oiled. The switch rails may be a little stiff when new, but they soon become quite easy to operate. If they are oiled, however, they become too free and liable to move and so cause derailments.

Returning now to layouts, we strongly recommend every Hornby Train owner to get a copy of the leaflet *"Hornby Gauge 0 Layouts,"* which contains diagrams and rail details for 100 layouts of all kinds. These are of great variety, ranging from the simplest types to large and elaborate schemes in which double track is used; and in addition there are some useful suggestions for goods yard, engine shed and station layouts. A further important point is that, with two exceptions, all the formations illustrated can be laid down in either electric or clockwork track.

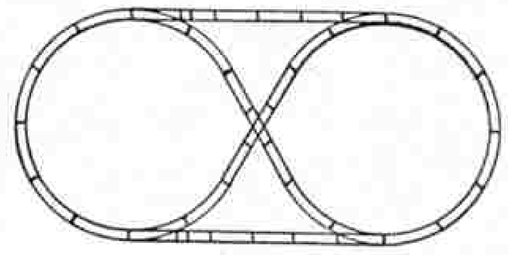
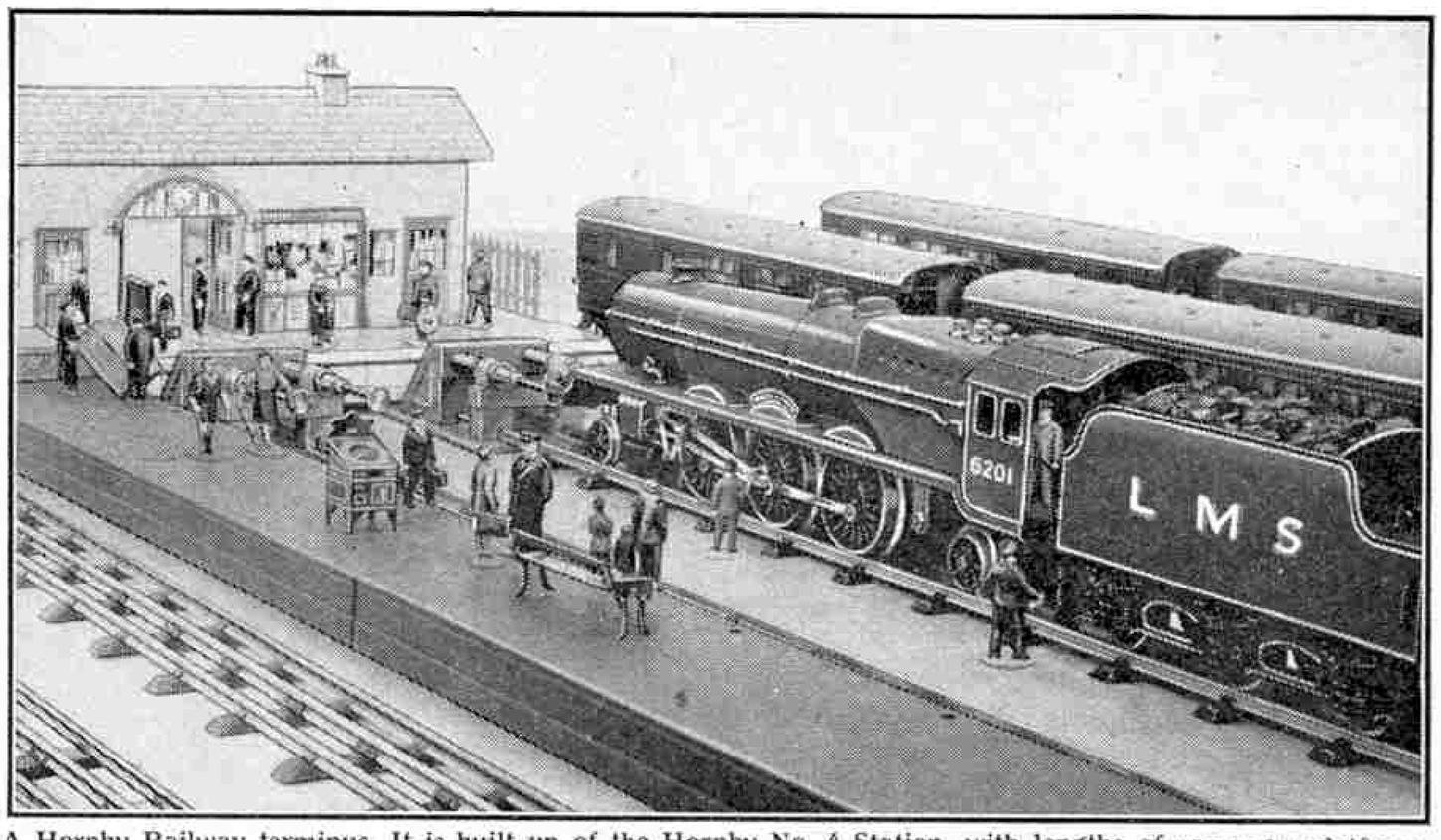


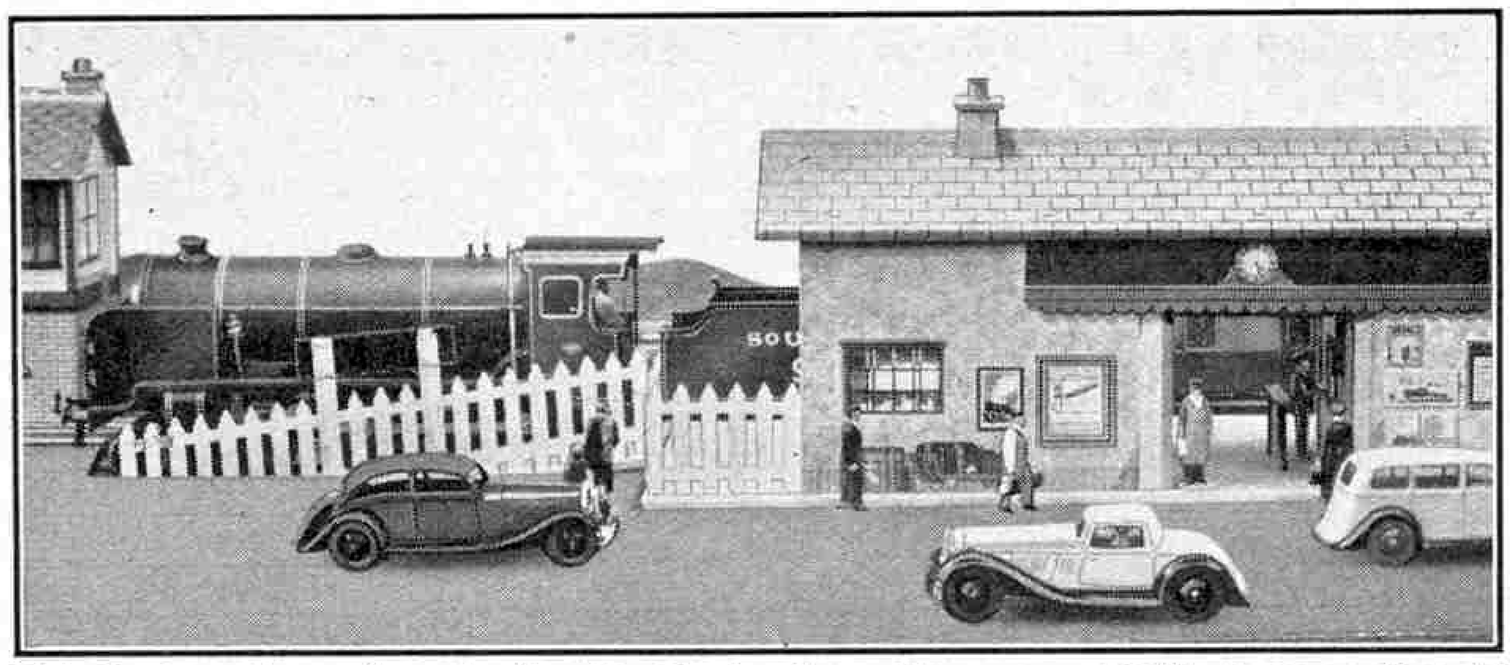
Fig. 3

The suggestions in the leaflet for station layouts are worth special examination. Very few model railways, even quite large ones, include a well planned terminal station layout, and yet this is one of the most interesting features of any line. It is great fun to plan a terminal station to fit accurately the space available, including more sidings, a turntable and, if there is room, an engine shed also.

In calculating the amount of space that will be required for a new layout it is necessary to bear in mind that allowance must be made for the overhang of the locomotives and rolling stock. This allowance must be not less than 6 in. for any circle of rails, whether of 2 ft., 1 ft. or 9 in. radius. For example, a circle of 2 ft. radius rails requires a clear width of 4 ft. 6 in. If a little more space is available so much the better; but a smaller space is impracticable.



A Hornby Railway terminus. It is built up of the Hornby No. 4 Station, with lengths of passenger platform placed at right angles.



Dinky Toys Motor Cars used in conjunction with a Hornby railway add the necessary "life" to the scene as illustrated in this picture of a Hornby No. 4 Station.

Adding Realism to a Hornby Layout

THE most attractive model railway layouts are those that are given "life" by the inclusion of miniature road transport vehicles and figures disposed at carefully selected points. Until a few years ago there were no miniatures suitable for this purpose, but the introduction of Meccano Dinky Toys has made available an extensive range of figures and vehicles with which can be reproduced almost every branch of rail-road transport. Station, goods depot and road activities of the most fascinating realism can quickly and easily be arranged at appropriate parts of the railway, thus adding considerably to the fun and pleasure of operating it.

We know that many Hornby Railway owners are already aware of the increased attractiveness that a few Dinky Toys can give to their layouts, but for the benefit of those who have not yet tried a scheme of this kind we are making a few suggestions that will give them ideas on which to work.

Railway companies are very large users of trailer vehicles hauled by mechanical horses, and these are well represented in Dinky Toys Set No. 33r. This consists of a railway mechanical horse and a trailer van for parcels traffic, and each component is available lettered L.M.S., L.N.E.R., G.W. or S.R. One or two of these units should be attached to any important freight yard of a model railway, for they not only add an essentially modern touch, but increase considerably the business-like effect of the layout.

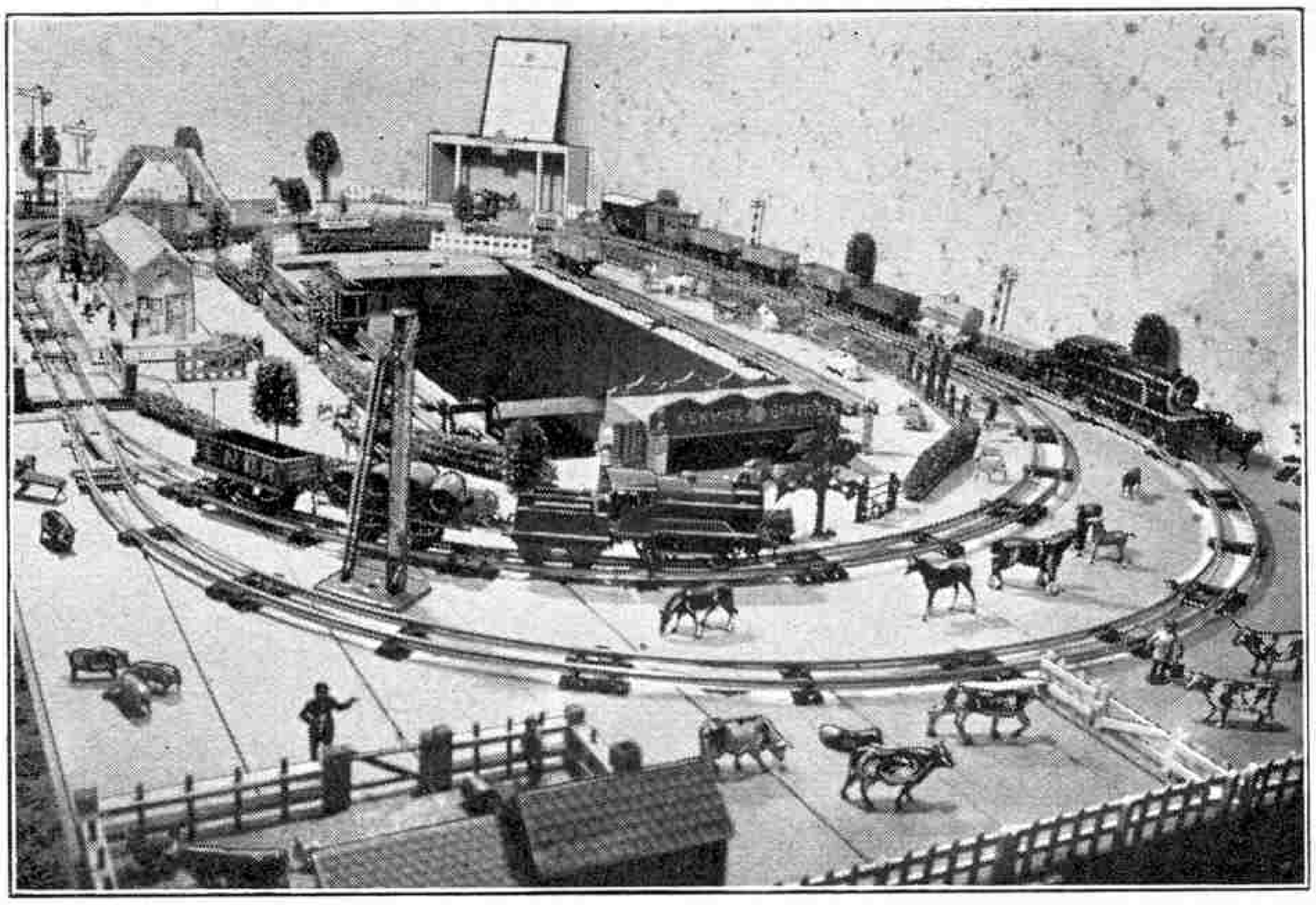
Road vehicles used by railway companies vary greatly according to the kind of traffic they have to carry. For example, in agricultural districts large numbers of vehicles known as livestock floats are used for the conveyance of cattle, sheep and pigs between outlying farms and cattle markets and railway stations. These floats are large vehicles similar in construction to the Market Gardener's Van (Dinky Toys No. 25t), and this therefore can be used for this purpose as a variation to the special work for which it is designed.

Dinky Toys Delivery Vans may be used for the collection and delivery of ordinary parcels consigned by passenger train, and they can be adapted also for railway advertising and publicity services.

Other Dinky Toys Vehicles suitable for use in goods depots are the Flat Truck (Dinky Toys No. 25c), and Wagon (No. 25a); while one or two Taxis (Dinky Toys No. 36g), together with a few private cars such as those in the Saloon Car Set No. 39, placed alongside railway stations, will give a degree of realism that must be seen to be fully appreciated.

When several road vehicles are attached to a particular goods depot, provision should be made for their accommodation. Little developments of this kind should not be overlooked, for they add considerably to the pleasure obtained from operating the line as a whole. The Garage (Dinky Toys No. 45) can be brought into use as accommodation for some of the road motor units. Fuelling of the vehicles also must be provided for, and therefore it is a good plan to place alongside the Garage one or more of the various Petrol Pumps included in Dinky Toys Set No. 49, together with the necessary Oil Bin from the same set.

In addition to their use "on the road," most of the Dinky Toys vehicles are effective as miniature loads for transport by rail. Private cars can be carried in the large bogie No. 2 Luggage Van. This has wide double doors that facilitate the loading of the vehicles from the platform.



This illustration shows how effectively miniature figures can be used on a Hornby gauge 0 layout. On the platform can be seen Dinky Toys Passengers waiting for their train.

HORNBY RAILWAY COMPANY COMPETITION PAGE

Join the Hornby Railway Company and become eligible for the competitions announced on this page.

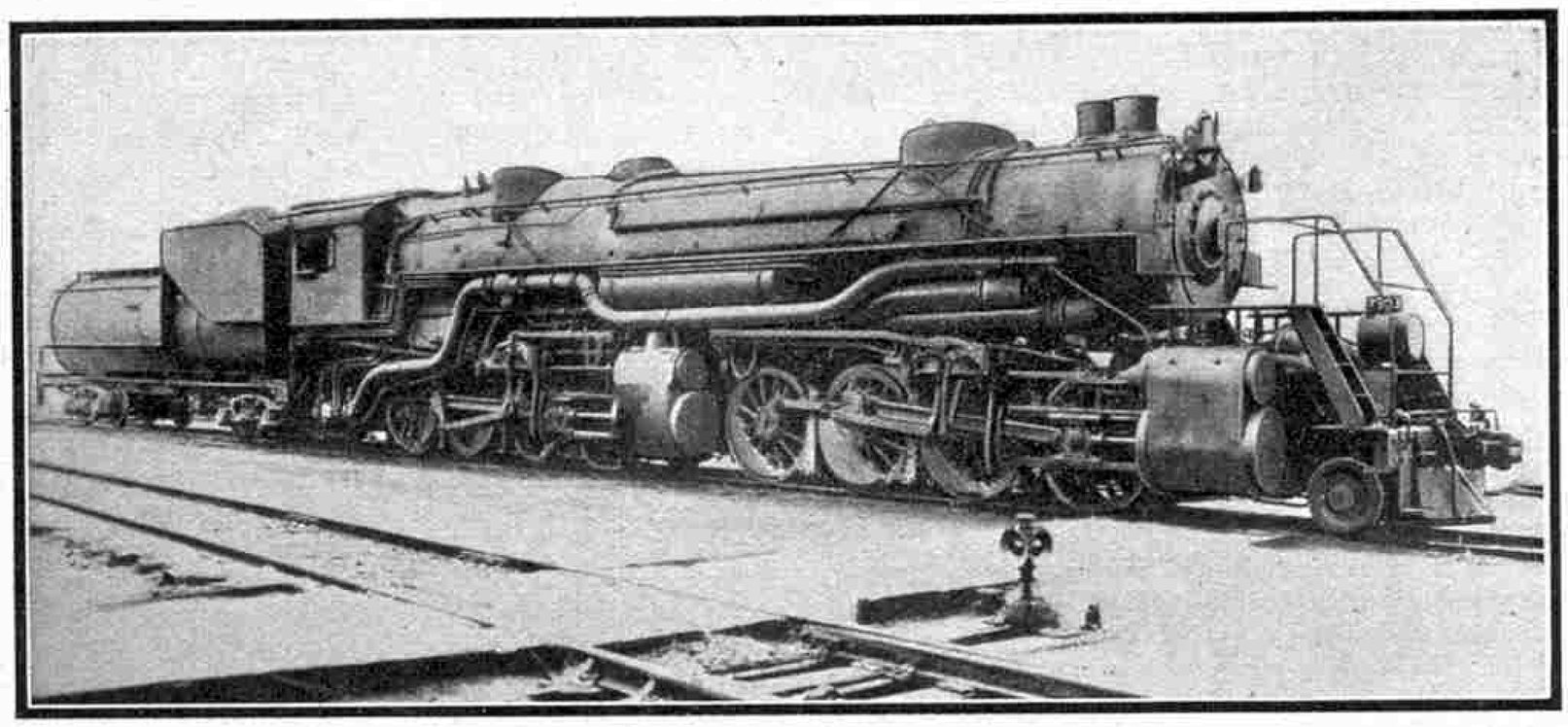
Join the Hornby Railway Company and become eligible for the competitions announced on this page.

READ THIS FIRST

Competitors entering for contests on this page should note that there are two main contests, one for the Senior Section members of the H.R.C. and the other for Junior Section members. The Senior contest is open to members who are 12 years of age and over, and the Junior contest to members under 12 years. On no account must members of the Senior Section enter the Junior Section contest, or vice versa.

Locomotive Features Contest (Senior Section)

For our first Senior Contest of 1940 we are setting an interesting problem in which the United States locomotive illustrated on this page is concerned. This is a typical American "giant." As a result of the special requirements of railway conditions in the United States it has features that are characteristically American, in which it differs considerably from the locomotives in use in Great Britain. Many of the features are apparent in the photograph. We are not drawing attention to any of them, however, as we want members to find them. Competitors are asked to make a list of these features. Only those details that are evident from the illustration must be included, and brief notes on their special purposes also should be given.



A United States locomotive giant of the Mallet compound articulated type, with two sets of coupled wheels driven from separate cylinders. This engine is the subject of the interesting competition for senior H.R.C. members that is announced on this page. It has many of the characteristic features that distinguish American locomotives from those in use in Great Britain, and entrants in the contest are asked to find these.

The contest will be divided as usual into two sections, Home and Overseas. Prizes of any Hornby products or Meccano goods, if preferred, to the value of 21/–, 15/–, 10/6 and 5/– respectively will be awarded to the four competitors in each section whose list is most complete or accurate.

Envelopes containing entries must be clearly marked in the top left-hand corner "*H.R.C. January Locomotive Contest Senior Section*" and posted to reach Headquarters at Meccano Limited, Binns Road, Liverpool 13, on or before 31st January. The latest date on which entries from readers in the Overseas section can be received is 30th April.

Do You Know These? (Junior Section)

This month we are offering to Junior members a chance of winning good prizes in a novel questions contest. There are 10 questions, and with each we give several answers. In each case only one answer is correct, and competitors are asked to tell us which it is.

Here are the 10 questions and the various answers:

1. **What colour was "The Coronation Scot" train sent on tour in the U.S.A.?**

   Red and silver; silver and gold; silver and blue; red and gold; red and blue.

2. **What flags does an engine driver carry with him on the footplate?**

   2 green; 2 red; 3 red; 1 green; 1 red and 1 green.

3. **Four consecutive beats on the bell in a signal cabin means one of the following:**

   Is line blocked? is line clear for express passenger train? train believed broken; is line clear for light engine?

4. **The headlamps on the engine of an express passenger train are arranged:**

   One on the smoke-box; one on each end of the buffer beam; one on the middle of the buffer beam; one on each bracket.

5. **Has the L.N.E.R. "Coronation" train any six-wheeled bogie coaches included in it? If so how many?**

   None; one; two; three.

6. **The longest railway tunnel in England runs under one of the following rivers:**

   Thames; Ribble; Mersey; Severn; Humber.

7. **The first electric railway in this country was:**

   The L. and Y.R. Southport–Liverpool line; London Underground Railway; the Liverpool Overhead Railway.

8. **Why do certain L.M.S. and S.R. locomotives have shields fitted alongside the smoke-box?**

   To send exhaust smoke above the cab; to keep in the heat of the steam in the cylinders; to reduce the pressure of wind on the cab windows.

9. **What is the highest point on the L.M.S. main line?**

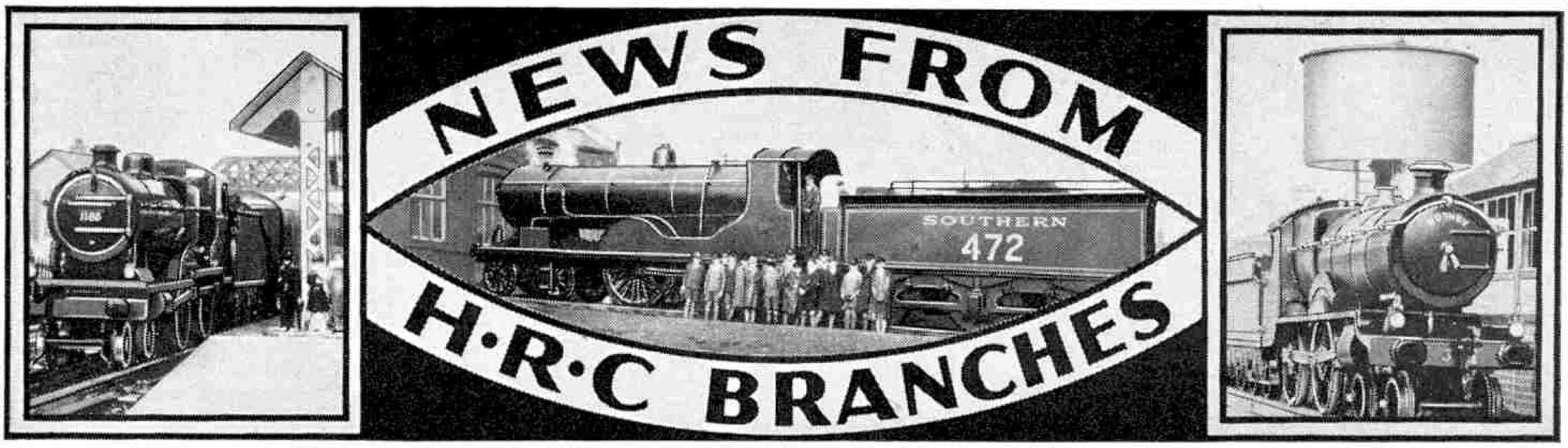
   Shap Summit; Beattock Summit; Parkhead.

10. **What is the purpose of a "distant" signal?**

    Signalling long distance expresses; warning the driver in advance of the positions of the "home" signal; letting the driver know on which track he is to enter a station.

The contest will be divided into the usual Home and Overseas sections and prizes of Hornby Trains or any goods manufactured by Meccano Limited to the respective values of 21/–, 15/–, 10/6 and 5/– will be awarded to the senders of the four most complete entries in each section. A number of consolation prizes also will be awarded to senders of entries that are deserving of a prize.

Envelopes containing entries should be marked "*H.R.C. Puzzle Junior Contest*" and should reach Headquarters at Meccano Ltd., Binns Road, Liverpool 13, not later than the 31st January. The latest date on which entries in the Overseas section can be accepted is 30th April.



EDGBASTON (BIRMINGHAM).—A special feature has been made of railway visits. On one of these Bromsgrove locomotive shed was seen, and trains were watched ascending and descending the Lickey Incline. Other visits have been paid to Derby and Manchester, trips being made by electric train and bus to Bury and Bolton. Secretary: R. L. Teare, 531, City Road, Edgbaston, Birmingham 17.

HORNSEA.—Track meetings have been held by the various sections of the Branch. The layout has been altered and extended, always with a view to improving running. At one track meeting the Senior Engineers made trial trips between "Paddington" and "Windsor." At another the Apprentices ran troop trains from "somewhere in England" to "Waterloo," while evacuation trains also were run. The organisation of services of a topical character adds interest to track meetings. It is hoped to obtain a new room for the Branch layout, and an electric signalling scheme then will be introduced. Secretary: D. E. Parker, 4, Clifton Terrace, Hornsea.

ACTON.—Track meetings have been held on Saturday afternoons. In addition to train operations the Branch rooms were decorated and various fittings installed. Scenery for the layout and station buildings at "Buggleskelly" and "Portborough" were constructed. Meccano models also were built at meetings, and a Debate has been arranged on *"Diesel v. Electric Power for Trains."* Secretary: S. W. Simmons, 7, Alfred Road, Acton, London W.3.

Mr. A. S. Fuller is treasurer of the St. Luke's (Battersea) Branch, No. 368. The Chairman is Rev. J. M. Lewis, and the secretary is Mr. Walter C. Hill. The normal programme of the Branch consists chiefly of track meetings for operations on both clockwork and electric railways, but visits and excursions of railway interest also are arranged. A Branch Magazine is published.

ST. PETERS SCHOOL (SOUTHBOURNE).—This newly incorporated Branch is making good progress. At one meeting an extensive layout was fitted up, and realistic operations carried out, after which members adjourned for tea. Other meetings are being devoted to Lectures and Talks by members, with Social Evenings and Debates for variety and added interest. Secretary: V. Wykes, 307, Belvue Road, Southbourne, Bournemouth, Hants.

BARNARD CASTLE SCHOOL.—The Branch made an excellent display at its Exhibition. The track and its surroundings were covered with "snow," and to meet war conditions the stations, points, engine sheds and other parts were barricaded with miniature sandbags. Dinky Toys Mobile Anti-Aircraft Units also were in evidence. The locomotives running on the track included the Hornby *"Flying Scotsman"* and *"Eton,"* and express goods traffic was a special feature. Secretary: A. Coates, The School, Barnard Castle.

BASSETS SCHOOL (FARNBOROUGH).—The first meetings of this recently incorporated Branch were devoted to laying down the track. At present this cannot be fitted up permanently because of lack of room. A Meccano Section is being formed, and arrangements are being made for Lectures. A Library is to be established. Secretary: B. C. P. Gulliver, Foxbury, Stone Street, Nr. Sevenoaks, Kent.

BURY ST. EDMUNDS.—Successful track meetings have been held, at which trials and experiments were carried out. These will be useful in deciding upon timetables for operations to be carried out at the Branch Exhibition. Contests and Talks by members, including one on *"Model Aircraft"* and another on *"Budgerigars,"* also have been arranged. A special games meeting was devoted to Table Tennis, Darts and Monopoly, a prize being awarded to the member who secured the highest number of points in the three games. Secretary: T. S. West, 10, Crown Street, Bury St. Edmunds, Suffolk.

UPPER WHARFEDALE.—An outstanding recent meeting was a Hornby Party in honour of the birthday of one of the members. Great interest was taken in developing the layout at this party. An innovation is the election of two members who do not at present live in the district, but are kept in touch with events by correspondence. Plans are being made for an Exhibition. Secretary: D. H. Scales, 1, The Avenue, Grassington, Yorks.

LOSTOCK GRALAM.—Most of this Branch's meetings have been devoted to running trains. Other activities have been meetings of the Photographic Section, and it has been suggested that an Aeroplane Section also be formed. Secretary: A. P. S. Milligan, Wincham Hall, Northwich.

WHITECRAIGS (GLASGOW). — Regular track meetings continue. The Branch rooms have been redecorated, and now include a very official-looking office adorned with Hornby posters. Additional stock has been obtained, and the Branch track is now greatly enlarged and improved. A special feature is being made of Talks and Debates, the former including descriptions of locomotives of various British and Overseas railways, signals and marine engines by the Branch and Junior Engineers, and accounts of railway photography and aeroplanes by other members. Secretary: A. T. Henderson, "Studley," Freeman Road, Whitecraigs.

MONKSTOWN (CO. DUBLIN).—Members are becoming more proficient in timetable working. During operations each member taking part is given a separate working timetable, so that enginemen, signalmen and others can arrange their work to fit in with the scheme and avoid delays in train running. Railway operations have been varied by a Table Tennis match and a Draughts tournament. Secretary: R. D. Pierce, 20, Monkstown Road, Monkstown, Co. Dublin.

BLACKPOOL (NORTH SHORE).—Successful track meetings have been held. The main station on the layout has been completed and the track has been ballasted. An engine shed is to be constructed. Meccano Electric Motors have been used in the construction of home-made locomotives. Secretary: J. R. Irvine, 8, Dudley Avenue, Blackpool.

Proposed Branches

The following new Branches of the Hornby Railway Company are at present in process of formation, and any boys who are interested should communicate with the promoters, whose names and addresses are given below.

BUXTON—J. R. Swain, Greenwood, College Road, Buxton.

CHORLEY—K. Rhodes, 77, Bolton Road, Chorley, Lancs.

FRASERBURGH—R. Currie, 8, Albert Street, Fraserburgh.

RUDDINGTON—N. J. Browne, 15, Wilford Road, Ruddington, Notts.

SHEFFIELD—D. Bennett, 6, Leppings Lane, Sheffield 6.

Branches Recently Incorporated

382. BOURNEMOUTH—Rev. F. Head, St. Peter's School, Southbourne.

383. CARMARTHEN—Mr. R. Lewis, 7, Spilman Street, Carmarthen.

Join THESE WORLD-WIDE FELLOWSHIPS OF HAPPY BOYS

PRESIDENT:
MR. ROLAND G. HORNBY

HORNBY RAILWAY COMPANY

A real railway company with boy directors and officials

MECCANO GUILD

THE MECCANO GUILD

BADGE OF MEMBERSHIP

To help and encourage Meccano boys

How to become a Member

Every boy who possesses a Hornby Train Set should join the Hornby Railway Company and thus become entitled to wear the badge of membership, which is beautifully enamelled in colours and has as its central feature a tiny representation of a train. All that he has to do is to fill in the application form—a copy of which is enclosed in every Train Set, or may be obtained from the Secretary, Hornby Railway Company, Binns Road, Liverpool 13—and return this, together with a remittance of 6d. (Overseas 10d.) to pay for the badge. Immediately on receipt of the completed form the applicant is enrolled as a member of this great organisation, and a handsome certificate to that effect is forwarded to him along with his badge.

The chief aim of the Company is to enable its members to get as much fun as possible from their miniature railways. This can best be done by helping them to make their layouts, and their railway operations generally, as realistic as possible, and competent railway experts on the staff at Headquarters are continuously engaged in advising members how to make the best use of the material at their disposal.

Join a Local Branch

The greatest fun is obtained from Hornby Trains by joining one of the many local Branches that have been formed in various parts of this and other countries. These Branches are composed of Hornby Train owners who meet together in order to carry out railway operations on a more extensive scale than is possible for a single individual. Every member should join a Branch, or if one does not exist in his neighbourhood, he should try to induce other enthusiasts to help him to found one.

The Meccano Guild is an organisation for boys, formed with the object of making their lives brighter and happier—and of encouraging them in the pursuit of their studies and hobbies. All owners of Meccano Outfits are eligible for membership. Each member has the personal interest of the President and is entitled to the friendly advice and assistance of the Secretary. He wears the triangular Meccano Guild badge, beautifully enamelled in blue and white, and is presented with a handsome membership certificate printed in orange and black, and undertakes to promote the great objects of the Guild.

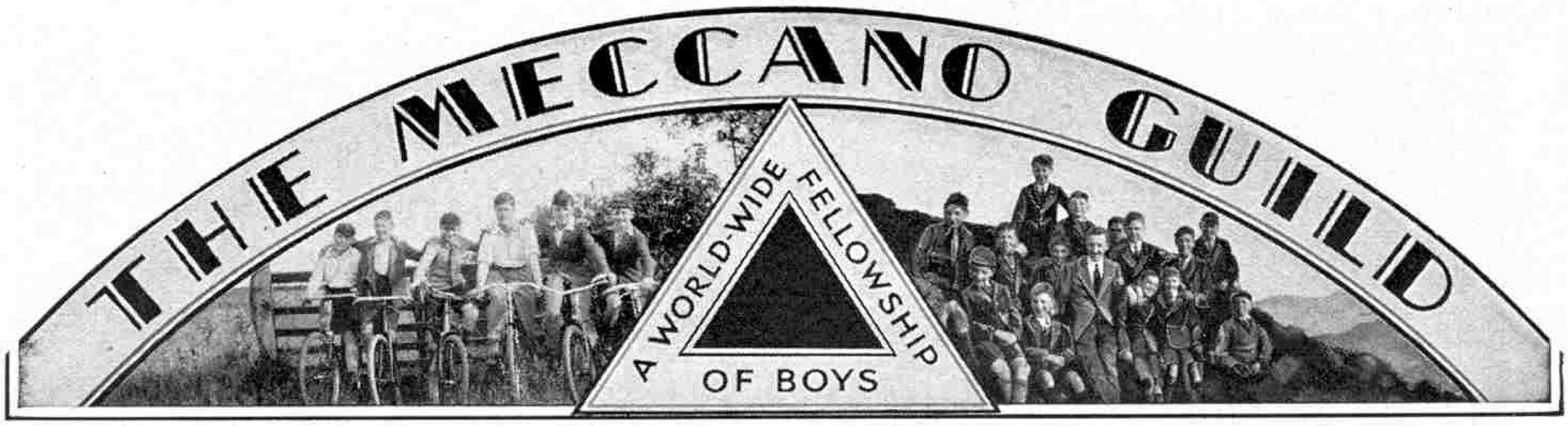
How to Join

All that is necessary to join the Guild is to fill up the form of application enclosed in all Outfits, and forward it to the Secretary, Meccano Guild, Binns Road, Liverpool 13, together with a remittance of 7d. (Overseas 1/–, Canada 25 cents) to pay for the badge. The applicant is then duly enrolled and his certificate and badge of membership are sent to him. If desired, application forms can be obtained from the Secretary.

Boys living overseas should write to one of the Meccano agents at the following addresses: CANADA: Meccano Ltd., 187-189, Church St., Toronto. AUSTRALIA: Messrs. E. G. Page & Co., 52, Clarence Street, Sydney, N.S.W. NEW ZEALAND: Models Ltd., Third Floor, Paykel's Buildings, 9, Anzac Avenue (P.O. Box 129), Auckland, C.1. SOUTH AFRICA: Mr. A. E. Harris (P.O. Box 1199), 142, Market Street, Johannesburg.

Meccano Clubs

Meccano Clubs are founded and established by enthusiastic Meccano boys under the guidance of the Guild Secretary at Headquarters. Every Guild member should join one if possible, for only in association with other Meccano boys is he able to obtain the greatest fun from his hobby. If the nearest club is too far away for him to join, he should consider the possibility of forming a new club in his own district. A special booklet entitled **"How to Run a Meccano Club"** will be sent (post free) to any reader on receipt of 2d. in stamps.



Greetings for the New Year

I have great pleasure this month in wishing a prosperous New Year to every member of the Guild and to all connected with Meccano clubs. Whether they are still at home, carrying on to the best of their ability with their usual occupations, or engaged in special war work of any kind, I hope that they will enjoy the best of everything during 1940, in spite of all difficulties that the year may bring.

In such times as these we must be prepared more than ever to give each other support and encouragement. Of the great desire of members to help in this way I have already had ample evidence in the thousands of greetings from those at home and overseas that have reached me. I want to thank specially all who have sent me New Year greetings. It is an encouraging start for a critical year to realise that there is a vast exchange of good wishes between the many thousands of boys and young men, in all parts of the world, who are associated with the Meccano hobby, and are striving to fulfil the aims of the Guild.

The Guild's Twenty-First Birthday

Last year I asked every member for support in my scheme for making 1939 a record year in honour of the Guild's 20th Birthday in October. There was another idea behind this. The Guild comes of age in 1940, and an increase in activity and enthusiasm in 1939 would have been the right preliminary to an even greater effort in 1940. Members responded well. My correspondence during the year increased almost alarmingly, recruits flowed in, and clubs became more vigorous and their programmes brighter. Then came the outbreak of war. This did not put an end to the intense activities all round, but the restrictions that followed made things more difficult, and prevented many club officials from continuing with their efforts to expand. Even here the spirit of the Guild triumphed, however, as I have shown in these pages during the last few months.

The effort must continue during 1940. Recruiting for Guild and club must go on, and in particular I urge members to keep up their correspondence with Headquarters. Whether they write to me about their model-building and other hobbies, current happenings or their own careers and hopes for better things to come, they will always receive a direct personal reply.

A Word to New Meccano Enthusiasts

This month I want to get into touch with all who have taken up the Meccano hobby during the last month or so. Many of these have already joined the Guild, and thousands more will do so in the coming weeks. Every newcomer to the hobby should join, for he cannot get the greatest amount of pleasure or profit from Meccano until he has become a member of the Guild, and has begun to take part in all the activities connected with it that are open to him.

Meccano Club Secretaries

No. 52. G. H. Howard

G. H. Howard is secretary of the St. James' (Grimsby) M.C. This club was affiliated with the Guild in November 1934, and under the able Leadership of Mr. H. V. Hayman has enjoyed a prosperous career. The club room is splendidly equipped with benches and cupboards made by members, each of whom has a separate working place, and a carpenter's bench, complete with tools, has been installed. Model-building is carried out on a large scale, along with fretwork, carpentry and model aeroplane construction.

Guild members must not be satisfied with receiving the badge and certificate. It is fine to wear the triangular mark of membership of the Guild, but the real pleasure comes from following admission up by joining a club, if one is already established in the neighbourhood, and above all by writing regularly to Headquarters.

The "M.M." Radio Fund for the R.A.F.

I want all who are connected in any way with the Guild or the H.R.C. to read with special care the very important announcement on the Editorial page of the opening of the *"M.M."* Radio Fund for the R.A.F. This gives them a splendid opportunity for showing their interest in a very fine scheme, and I am sure that they will respond whole-heartedly to the lead that the Editor of the *"M.M."* has given.

Each club or Branch will work out its own scheme to support the Fund, but I should like to suggest the organisation of a regular system of small contributions from all members. These can be collected weekly or monthly, preferably by a member specially appointed for the purpose, and forwarded periodically as directed on the Editorial page. Special evenings open to parents of members and other visitors also could be arranged for the purpose of raising funds, and there should be no difficulty in creating widespread interest and enthusiasm.

Pennies and sixpences will be just as welcome as larger contributions, so that even the smallest club should not hesitate to make its contribution. I shall not be satisfied until every club and Branch, and every member of the Guild and H.R.C., is represented in this splendid effort.

Proposed Clubs

Attempts are being made to establish Meccano clubs in the following places, and boys interested should communicate with the promoters, whose names and addresses are given below:

ACKWORTH—D. Cheetham, 86, Wakefield Road.

ALBRIGHTON—R. W. Ansell, M.3, R.A.F., Cosford, Nr. Albrighton.

BLYTH—P. S. Ross, 2, Rosebery Avenue, Blyth.

BRIGHTON—W. C. Lines, 40, Surrenden Crescent, Withdean.

CONGLETON—J. Simcock, The Lowe Farm, Bugławton.

CORK—B. Cronin, 8, Ardfoile Place, Ballintemple.

EXETER—M. Smith, St. Albans, 8, Lyndhurst Road.

EXMOUTH—P. Vickers, 50, Egremont Road.

ILFORD—S. Williams, 34, Hanover Gardens, Barkingside.

ISLEWORTH—B. Tolmie, 164, Woodlands Gardens, Isleworth.

KINGSTON-ON-THAMES—P. Avis, 16, Willoughby Road.

LISBURN—J. Flannigan, Bog Road, Maze.

MACCLESFIELD—G. Holt, c/o Mrs. Ray, 401, Park Lane.

OLD COLWYN—N. J. Davidson, "Lleweni," Llysfaen Road.

Acton M.C.—Several members have been lost owing to the evacuation scheme, but others have been recruited and meetings are being continued, although not at present in the club room. The decoration of the room was completed before it was closed, and the club property stored. Model-building meetings have been carried on, and other items have been Hornby Train Meetings, Debates and Competitions. An interesting feature was a Lecture on the production of the club's Magazine. The Library has been opened, with a catalogue that is to be kept up to date by the issue of supplements. Club roll: 14. *Secretary:* S. W. Simmons, 7, Alfred Road, Acton, London W.3.

Stretford Public Libraries M.C.—War conditions have made it necessary to transfer the club to the Lostock Branch Library, where an excellent start has been made. Miss B. Johnson has kindly undertaken the office of Leader. There is great model-building activity, models brought to meetings including a battleship, Blackpool Tower with a working lift, a mobile anti-aircraft gun, motor lorry, windmill and varieties of cranes. At one meeting a member gave a demonstration with an Aeroplane Construction Set, and other members built a replica of the model in Meccano. Games were played at most meetings, Meccano parts being awarded as prizes. The Stamp Section has been very busy, and exchanges and gifts have enabled members to complete sets of both stamps and cigarette cards. Competitions and team games involving place names on stamps have been popular. One member has made an excellent loose leaf album. Club roll: 20. *Secretary:* Miss F. Scattergood, Public Library, Technical Institute, Stretford Road, Old Trafford, Manchester.

Mallow (Co. Cork) M.C.—The club has shown increased strength and activity. Excellent progress has been made with the model A.R.P. Sets and aerodromes under construction, and the topical nature of the club work has led to the proposal to hold an Exhibition. Members are showing a great interest in correspondence with club members in England. Club roll: 10. *Secretary:* M. Roche, 8, Spa Walk, Mallow, Co. Cork, Eire.

Barnard Castle School M.C.—Membership has increased and the club room is now the scene of intense activity at meetings. The club's Exhibition was very successful. The associated H.R.C. Branch built up a fine Hornby Railway display, and there were also many excellent Meccano Models, while Dinky Toys Units made an excellent show. Club roll: 22. *Secretary:* A. Coates, The School, Barnard Castle.

Pettit's Senior Boys School (Romford) M.C.—Meetings have been resumed after being suspended on the outbreak of war, when the school was closed. Shortly before this event the club had organised a very successful Exhibition that raised its prestige considerably. Prospects are excellent, and it is expected that attendances at meetings will now improve. Club roll: 20. *Secretary:* A. Dawson, Petitt's Senior Boys School, Romford, Essex.

Exeter M.C.—Recruiting for the Guild and the club is being actively carried on, and several recruiting medallions have been earned recently. Architectural models are arousing interest. A reproduction of Exeter Central Station is being constructed by the President and secretary, and other models of this kind now being built include the block of buildings in which the club room is situated. Other models built include a roundabout and an engine shed. Club roll: 60. *Secretary:* E. Edworthy, 23, May Street, Exeter.

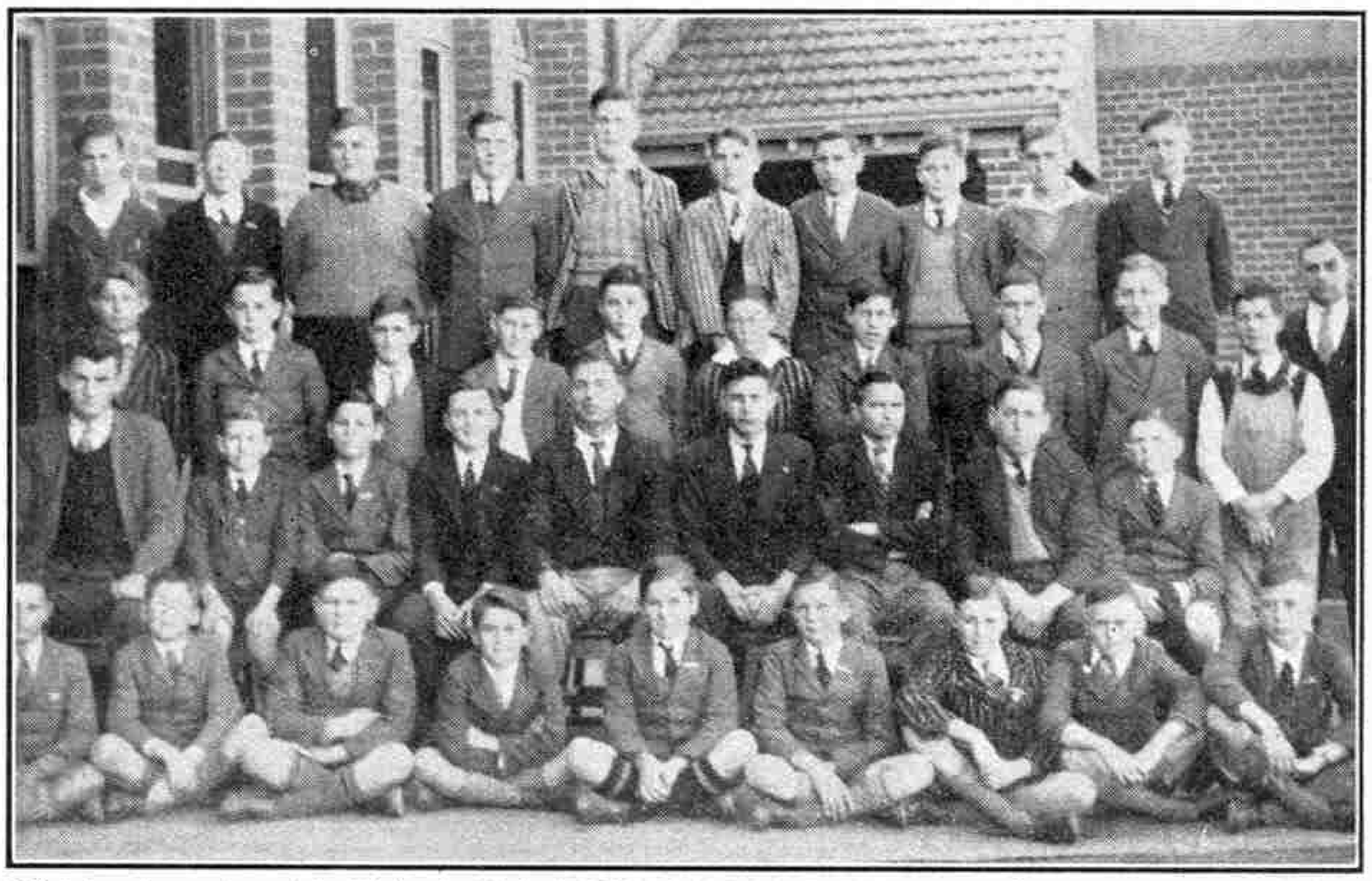
Mount Senior School M.C.—The war has not damped the enthusiasm of members, although meetings have had to be restricted until blackout preparations are complete. The usual weekly meetings will then be resumed, with a full programme. Club roll: 45. *Secretary:* D. Ayto, 18, North Gate, Newark, Notts.

Heath Grammar School (Halifax) M.C.—Suitable blackout arrangements have been made in the physics laboratory, in which meetings are held, and activity is being resumed. The programme includes a Talk by the Halifax Waterworks Engineer, which will be followed by a visit to the filtration beds. Later it is hoped to make a tour of the reservoirs supplying Halifax with water. Some of the members are engaged on special war work and all are helping to dig up the school lawn in preparation for food production. Club roll: 53. *Secretary:* M. W. Bottomley, Heath Grammar School, Halifax

Great Baddow M.C.—Meetings are being continued in the local Scout hut, as the club's rooms are now converted into an A.R.P. dressing station. Programmes are varied, including Darts and Table Tennis Tournaments, in addition to Model-building. Other special activities are being carried on in co-operation with the Scouts. Mr. D. G. Radford, Leader, is in charge also of the Scouts, and Mr. A. Cook has been appointed Deputy Leader in charge of the club, to ensure continuity when Mr. Radford is too busy to attend meetings. Club roll: 20. *Secretary:* R. C. Willis, "Ivydene," Maldon Road, Great Baddow.

Purley County School M.C.—As the club is in a neutral area its activities have been suspended for the present. Many of the members have turned to national work of various kinds, and are acting as messengers and in other capacities. Club roll: 6. *Secretary:* D. J. Hardwick, Purley County School, Old Coulsdon, Surrey.

Hornsea M.C.—All sections continue active with Lectures, Games and Film Shows. Lectures have been given by Mr. R. W. Shooter, Leader, and by members, the subjects including "*The Lake District*," "*Fishes*" and "*Metals*." Club Roll: 19. Secretary: P. Richardson, "Summerleigh," Esplanade N., Hornsea.



Officials and members of the Thebarton Technical School M.C. Mr. R. Roberts, President, is fourth from the right in the second row, with G. Croft, secretary, on his right. Mr. E. S. H. Gibson, Leader, is standing on the right. This fine South Australian club was affiliated in December 1928, and has been uniformly successful. A special feature has always been made of models of scientific interest. Lectures and demonstrations on scientific subjects also have been given, and an excellent programme of visits is followed.

Ideas for New Models

Motor Vehicles for Special Purposes

PROBABLY the most popular subjects for Meccano models are the different types of motor vehicles seen on the roads to-day. Their attraction for model-builders is due partly to their interesting mechanisms, and partly to the variety in the types of vehicles that can be reproduced. In addition to ordinary motor lorries and private cars there are many other vehicles designed for special loads, such as giant petrol tank wagons, refuse collecting vehicles and ambulances. In most cases the main features of these "special purpose" vehicles are easy to reproduce in Meccano, so that they are of special interest to model-builders on the look-out for novel ideas. Several examples of model vehicles of this kind built in Meccano are illustrated on this and the opposite page, and model-builders will find in them useful ideas that will be of help when building models of a similar type.

I have already referred to the petrol tank wagon as a particularly good subject for a model, and an example of this kind is shown in Fig. 3. A petrol tank wagon usually consists of a large circular or oval tank, mounted on the chassis behind the cab. In the model illustrated the tank is built up from $12\frac{1}{2}$" Strips, which are bolted at each end to further Strips curved to give the tank the required cross-section. Hand Rails and three filler caps, each formed by a large Flanged Wheel and a $1\frac{1}{2}$" Strip, are fitted to the tank. In some cases the petrol tank and the power unit are mounted on separate chassis, and are connected together much in the manner that a mechanical horse is connected to its trailer.

Other very interesting types of special purpose vehicles are the giant lorries used for transporting steel girders and similar loads that are of too great length to allow them to be carried on the platform of an ordinary truck. They have a very low chassis mounted on a large number of wheels, and their low centre of gravity makes them suitable also for transporting loads of large dimensions and height, such as ships' boilers, condensers and transformers. A well-built model vehicle of this kind is shown in Fig. 5. In this case the power unit and lorry body are articulated, and a winch for hauling the load aboard is mounted above the pivot. The construction of the lorry is carried out mainly with Angle Girders and Flat Plates, and the realistic details of the cab and power unit are really well thought out. The chain drive to the rear wheels of the power unit is typical of this type of lorry.

Another special purpose vehicle that makes a good prototype for a model is the tipping truck. Various methods of tipping the body can be adopted. Screw gear, cranks or lever mechanisms can be called into play, and the work of devising a system that will operate the container efficiently, and yet will not be too conspicuous, is a most intriguing job.

In the model tipping lorry shown in Fig. 4 the tipping mechanism is entirely concealed beneath the body. One side of the container is pivoted, the hinges consisting of two Double Brackets joined by a $\frac{3}{4}$" Bolt. When the side of the container is in its normal position it is held in place by two Flat Brackets. The sturdiness of the prototype is well reproduced in the model, and points worthy of

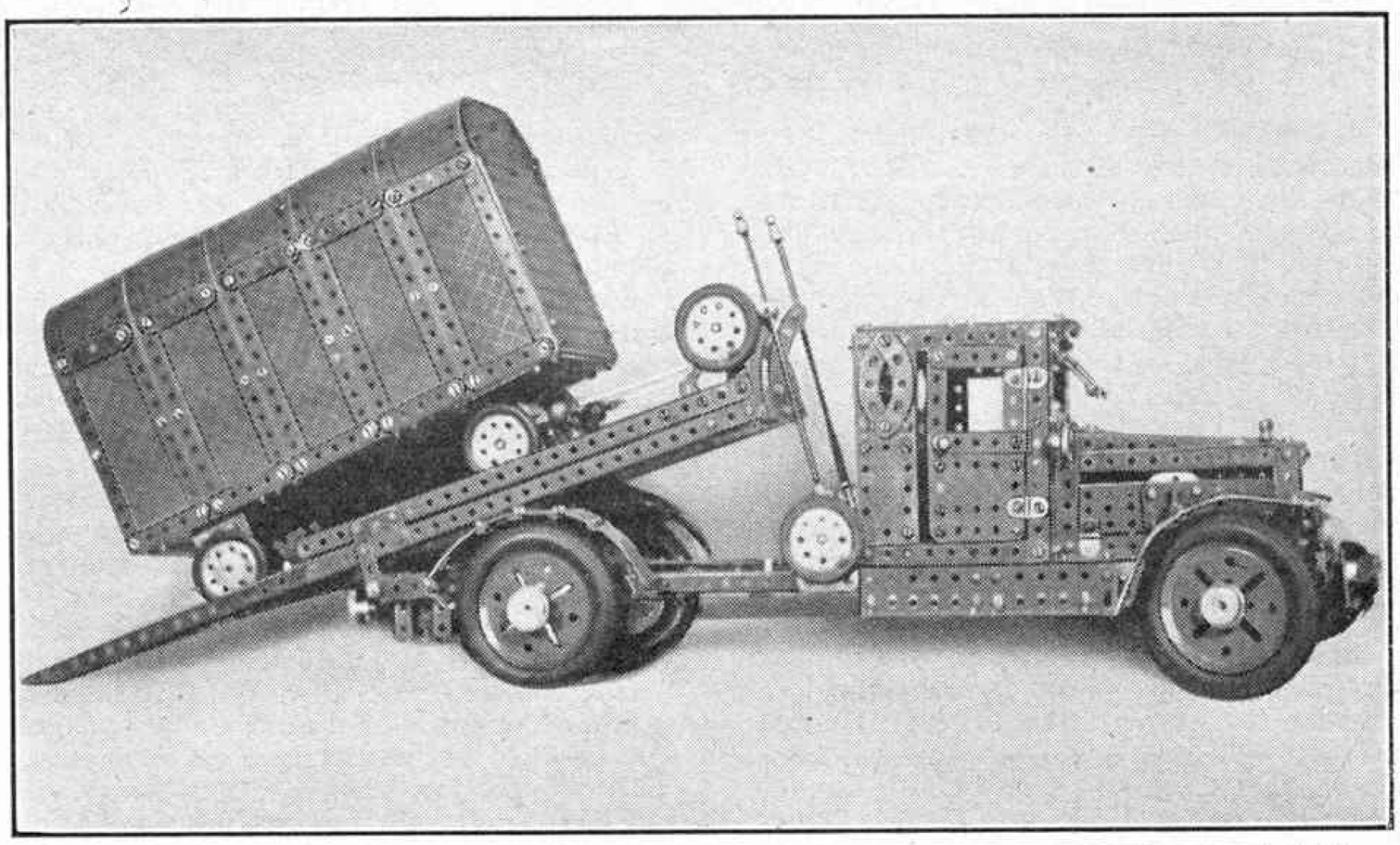


Fig. 2. A fine model of one of the many types of modern municipal dust vans. It was built by G. S. King, Tooting, S.W.17.

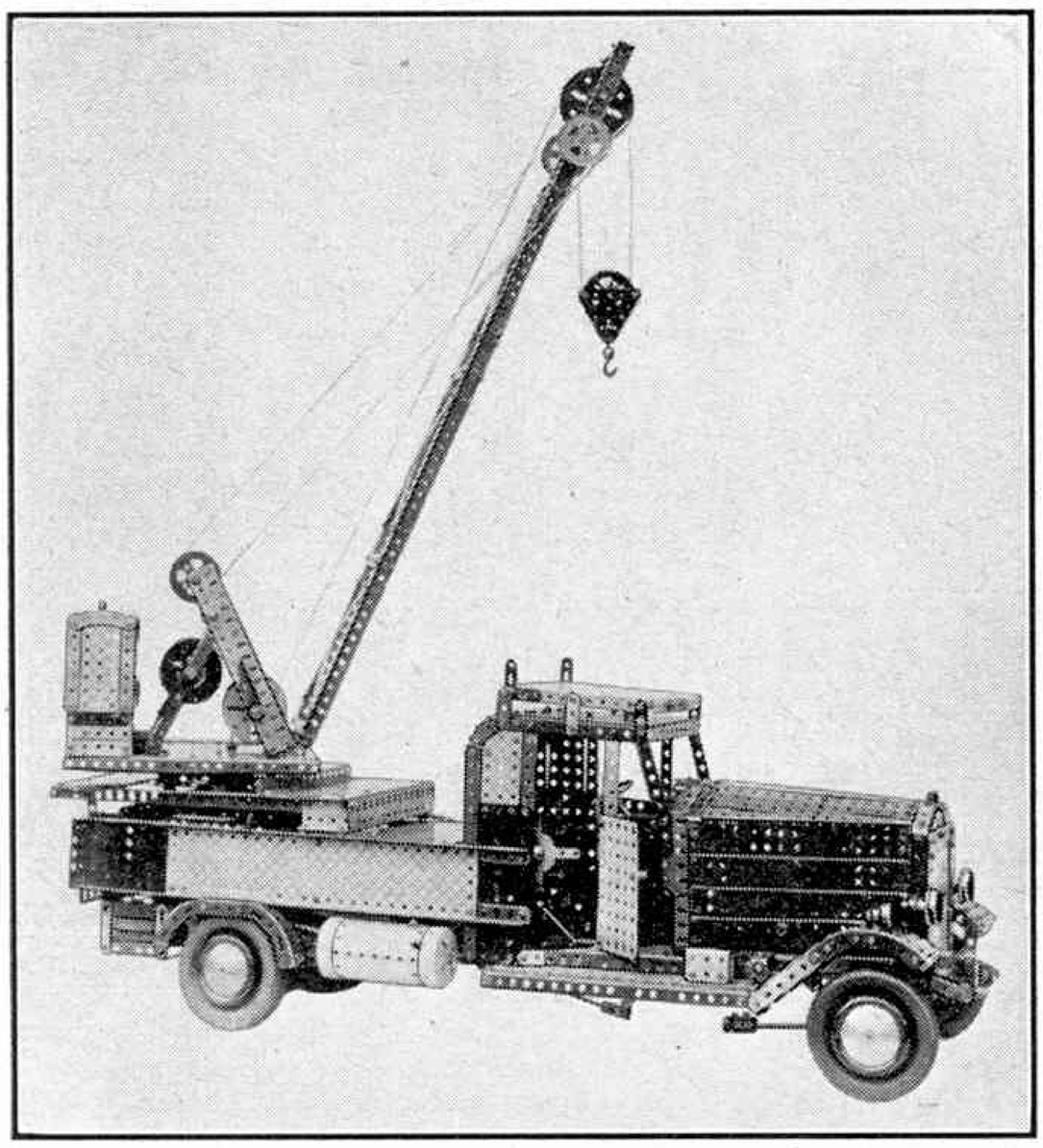


Fig. 1. The various mechanisms of a mobile crane truck provide ample scope for a Meccano model-builder. They are well reproduced in the model shown above, which was built by John Matthews, Fillongley.

special notice are the methods of constructing the radiator and headlamp brackets. The radiator consists of a piece of gauze around the edges of which Strips are fastened, and it presents a very neat appearance.

Some of the larger tipping lorries are fitted with hydraulic ram mechanisms, by means of which the container body can be tipped either endways or sideways as desired. These vehicles require a larger variety of parts for their construction than those of the simpler type, but they provide really interesting subjects for owners of large Outfits and especially for those who like experimenting with intricate mechanisms. Hydraulic working itself cannot be reproduced in Meccano, but it is possible to represent its operation by means of link mechanisms combined with screw gear.

These heavier vehicles also are often equipped with four-wheel steering. The mechanism necessary for this is not very much more complicated than that of two-wheel steering arrangements, but its incorporation in a model increases greatly its attraction. One simple method of arranging four-wheel steering is to join the tie-rods of the two pairs of wheels together by a framework of Strips, and then connect the drive from the steering column to one pair in the manner adopted in the case of ordinary two-wheel steering.

Model-builders who like reproducing curved shapes with the aid of Flexible and Strip Plates, will find the various types of pantechnicons or furniture vans good subjects for their attention. Plenty of scope is also provided in a model such as this for concealing transformers, motors and gear-boxes.

Other types of vehicles possessing specially designed load accommodation are market gardeners' vans, horse-boxes and breakdown lorries. All these are interesting variations from the ordinary type of lorry or flat truck, and therefore are more attractive as model-building subjects. A good model of a breakdown lorry is shown in Fig. 1.

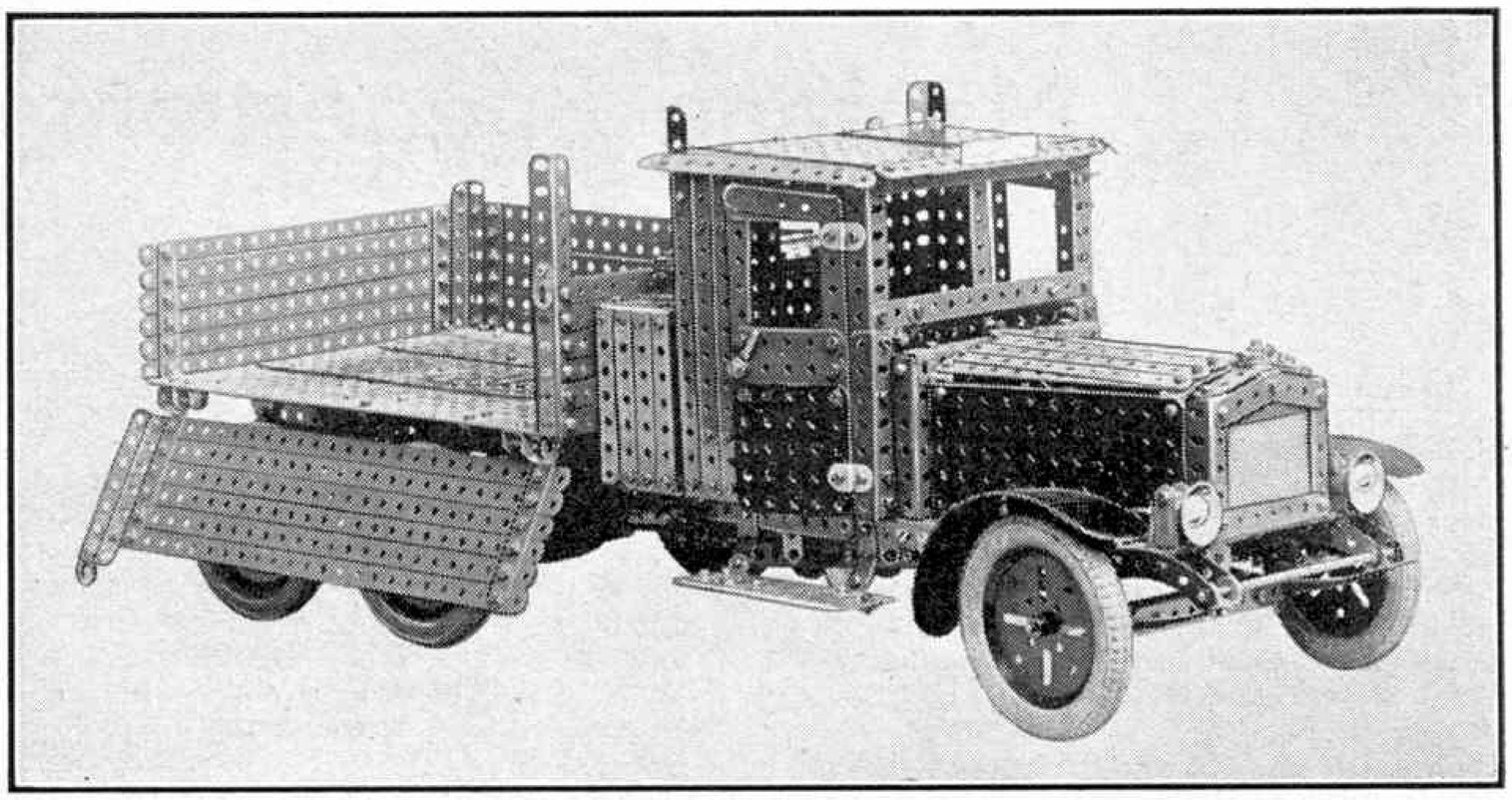


Fig. 4. Side and end tipping lorries make splendid subjects for models, as can be seen in this example by R. W. Blake, Twickenham.

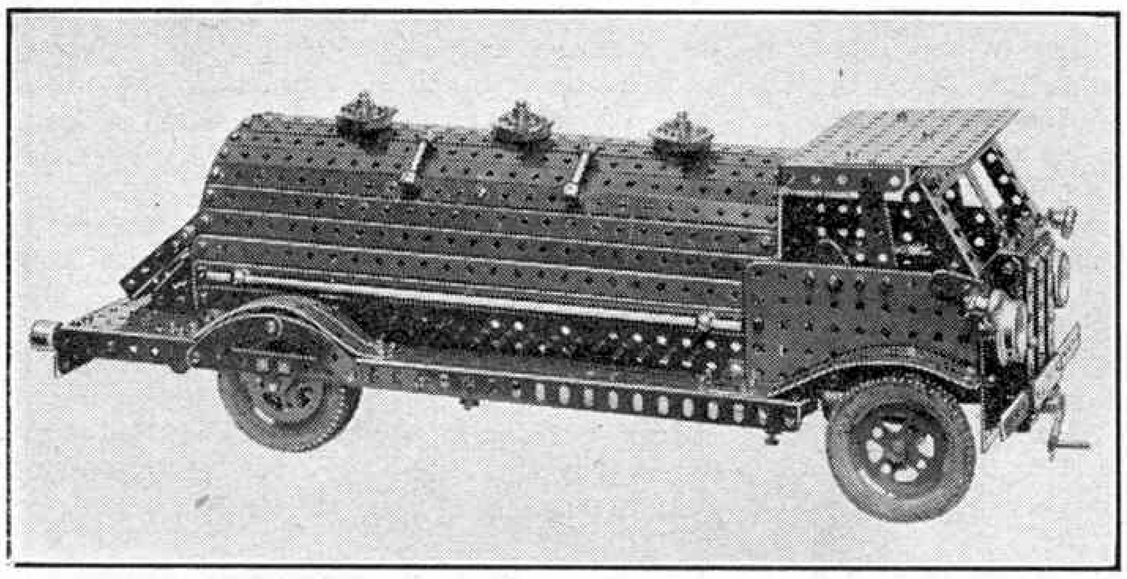


Fig. 3. A neatly built model of a petrol tank lorry. It is the work of W. D. Hawthorne, Wolverhampton.

Vehicles designed for special purposes other than transporting goods also form an attractive range of prototypes for models. Among them are municipal vehicles such as refuse collectors, and an interesting model of this type is illustrated in Fig. 2. The actual vehicle on which the model is based consists of a container unit hauled by a horse while collection proceeds. When the container is full it is run on to a special lorry on which it is hauled off to the destructor station, an empty container being left in its place. By means of this system refuse collecting can continue without undue interruption.

In the model the container is built up from Flexible Plates and Flat Plates, and in the illustration it is shown being hauled up on to the platform of the lorry by means of a hand-operated winch. The platform is provided with special running rails made of Angle Girders, and also with a pair of extension rails, which slide into slots in the body when not in use. The platform tilting mechanism incorporates two Screwed Rods, which can be seen just behind the cab. These Rods pass at their upper ends through the tapped holes of two Rod Sockets attached to the platform, and the latter is easily raised or lowered simply by turning a handwheel. The lorry itself is operated by means of an Electric Motor, and the mechanism can be inspected by lowering a flap provided in the side of the bonnet.

In some other refuse-collecting vehicles the container is mounted permanently on a lorry and is provided with sliding or hinged lids.

Other municipal vehicles that make attractive models are road sweepers, gully emptying lorries, tower wagons and ambulances. Really interesting models can be made of all these.

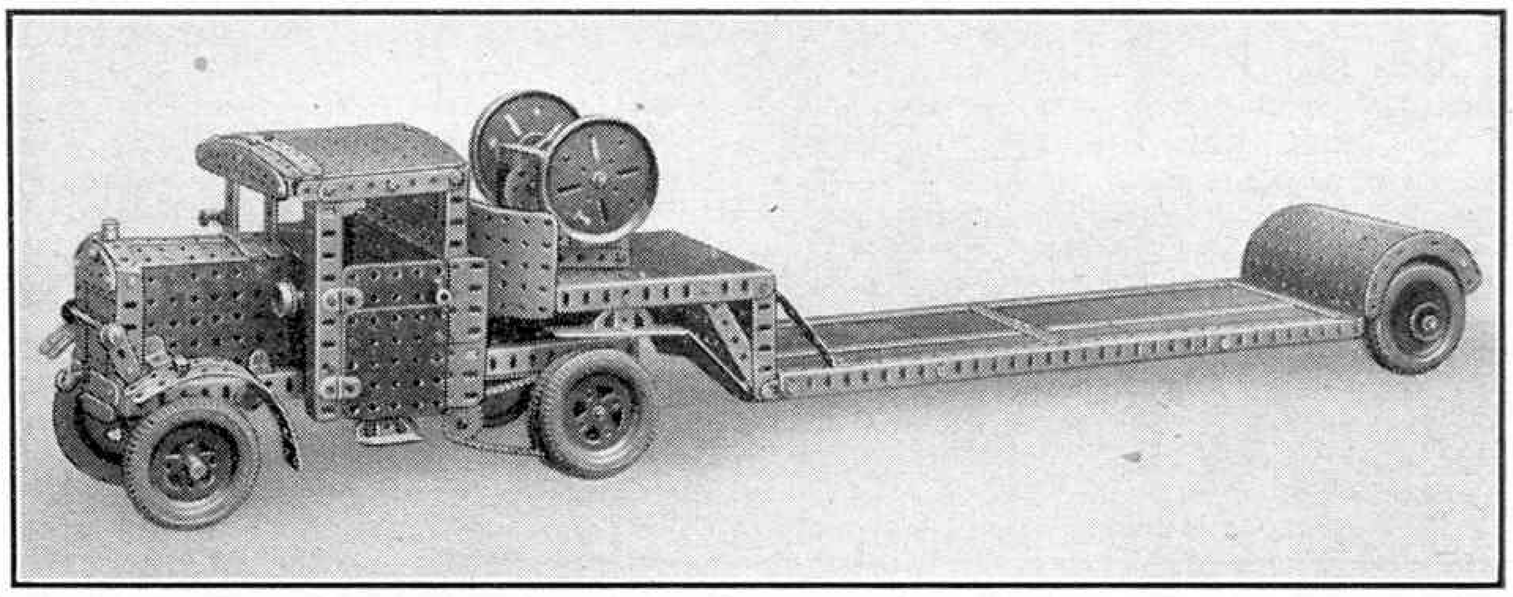


Fig. 5. A model of a giant lorry designed for carrying long girders and similar heavy loads. It was built by A. C. Durrant, London N.W.10.

Meccano Suggestions Section

By "Spanner"

(456) Block-setting Gear for Model Cranes

Many readers interested in the construction of block-setting cranes have asked me to include a description of Fidler's patent block-setting tackle. This is used to set concrete blocks at an angle in the making of certain kinds of sea walls and break-waters, and is shown in a Meccano version in Fig. 456.

Two pairs of 5½" Curved Strips 1, bearing 12 Flat Brackets 2 and spaced apart by the thickness of two Washers, form a massive notched beam. This beam hangs from a swivelling joint, the whole being suspended from a special four-sheaved pulley block. The swivel bar consists of a 2" Rod 12 bearing at its lower end a small Fork Piece on which the beam is pivoted. The swivel bar itself is supported in the Pulley Block by means of a Collar. The rotating movement of the beam on the central swivel is controlled by a Worm Wheel 15, which meshes with a ½" Pinion 16 secured to the vertical swivel bar.

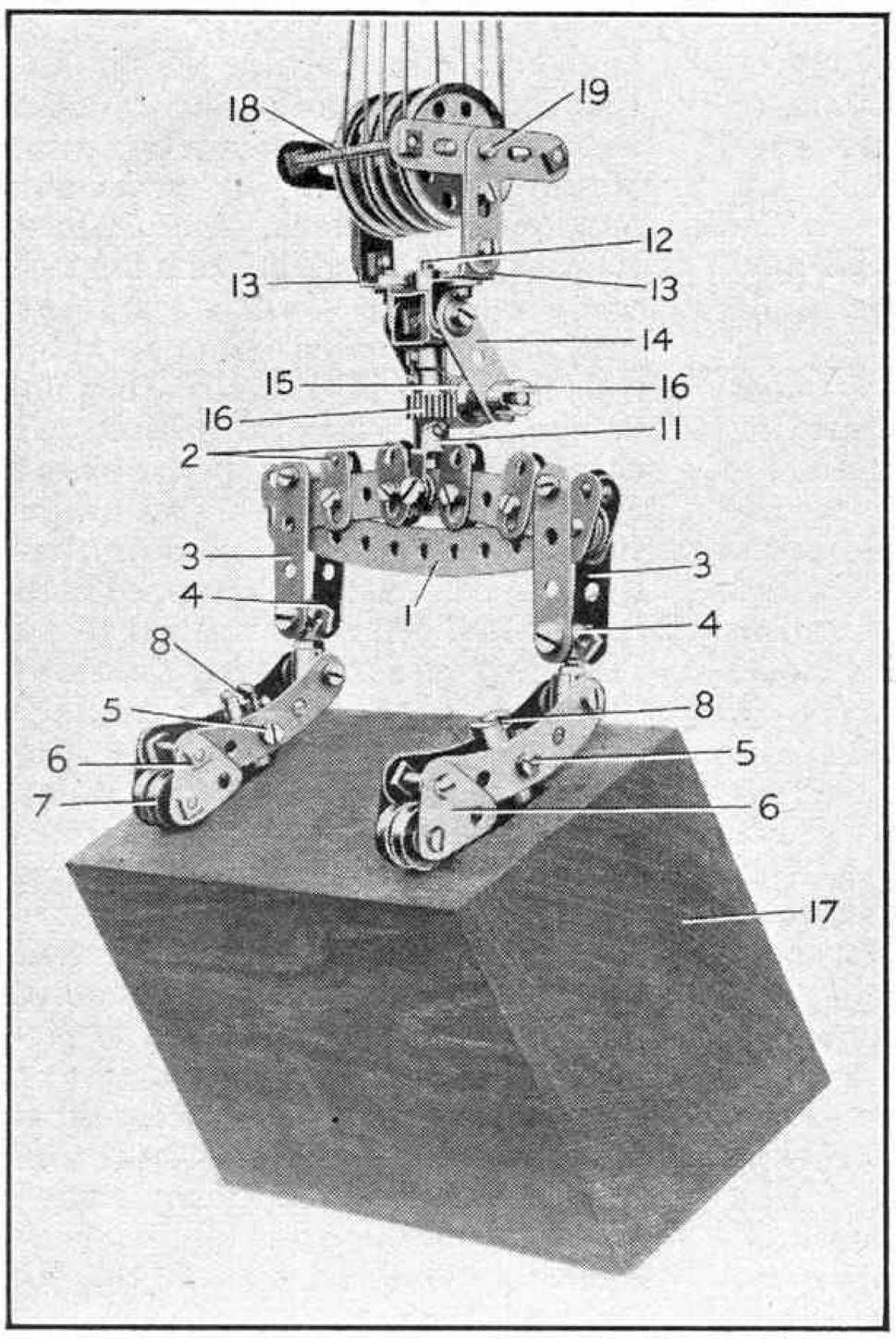


Fig. 456

Two links 3, each formed by a pair of 2" Strips and two ¾" Bolts are suspended from the outer notches of the beam. The lower ¾" Bolts of these links pass through the plain bores of Handrail Supports 4 that are screwed into the longitudinal bores of two Threaded Bosses, where they are secured in position by nuts tightly against the tops of the Bosses. Two ¾" Bolts, passed through the transverse holes of these Threaded Bosses and held in place by lock-nuts, support the crossheads 5. Each crosshead consists of two 2½" large radius Curved Strips, to which two 1" Triangular Plates 6 are rigidly secured by means of a ¾" Bolt and nuts. A roller consisting of two ½" loose Pulley Wheels 7 is mounted on a ¾" Bolt secured between each pair of Triangular Plates.

From the middle point of each crosshead hangs what is known as a Lewis Bar, made by securing a Coupling across the end of a 5" Rod 8, the upper end of the Rod being attached to a Collar. The Collar is pivoted on two ordinary bolts passed through the middle holes of the crosshead 5, and secured by nuts screwed firmly against the sides of the Collar to prevent the bolts from binding on the Rod 8. The upper end of each Lewis bar is fitted with a portion of a Dog Clutch, and the corresponding part of one clutch is attached to a Rod to form a key with which the Lewis bars may be turned. The key is provided with a handle consisting of two Threaded Pins screwed into a Collar.

The same arrangement is used to turn the Worm Wheel 15 that controls the swivelling movement of the beam. The Fork Piece 11, from which the beam is suspended, is secured to a 2" Rod 12 journalled in two Double Brackets bolted one within the other to Angle Brackets, which in turn are secured to the 1" by ½" Angle Brackets 13 in the pulley block. The 1½" Strips 14, which carry the Worm Wheel 15 on a 1½" Rod, are secured by means of ⅜" Bolts to the pulley block, and are spaced away from it by two Washers on the shanks of the bolts.

The concrete blocks to be set by the gear are made with two perpendicular holes to take the T-shaped pieces at the ends of the Lewis Bars. The blocks are also recessed at the lower ends of the vertical holes in order to prevent the Lewis Bars from fouling the breakwater while the blocks are being set. The bars are guided through the vertical holes in the block. When they have penetrated to the full depth of the holes, the bars are given a quarter turn, which throws their T-shaped ends out of register with the holes and prevents them from being withdrawn. Meanwhile the rollers on the crossheads take a bearing on the top of the block and roll across, altering the relative positions of the points of suspension and the Lewis Bars. The block is then lifted at the exact angle at which it is to be set in position. When the block has been placed in position the T-shaped rods are again turned until they are registered with the hole in the block, and the Lewis bars are withdrawn.

(457) Coupling Two Clockwork Motors

(J. Garrett, Coulsdon)

Although a Clockwork Motor forms an excellent power unit for driving models it suffers from a disadvantage in that it is periodically necessary to stop the model while the Motor is rewound. This drawback may be overcome by using two Motors connected together in tandem in such a manner that either of them may be coupled to the driving shaft at will. The Motors are bolted together end to end, and a 1½" Contrate Wheel is fixed to each of their driving shafts. Two ½" Pinions are then mounted on a Rod arranged to slide in its bearings so that either of the Pinions can be brought into mesh with its Contrate. The Pinions are arranged on the Rod in such a manner that only one at a time is in mesh with its Contrate. The drive to the model is then taken either by means of gearing or Sprocket Chain from the sliding shaft.

With this arrangement one Motor may be wound up while the other is working the model, so that there is always a wound Motor in reserve. When the first Motor is exhausted the other may be brought into gear merely by sliding the shaft.

(458) A Simple Friction Brake

(S. C. Smith, Sheffield 11)

An addition to the many different types of brake mechanisms that have been described in *"Suggestions Section"* is shown in Fig. 458. It was suggested by S. C. Smith, Sheffield 11, and consists of only four Meccano parts. These are a 1⅛" Flanged Wheel, a ¾" Flanged Wheel, a Socket Coupling and a 1" Rubber Ring. The 1⅛" Flanged Wheel is fixed to the driven shaft to be controlled, and the Rubber Ring is fitted inside its flange as shown. The ¾" Flanged Wheel is free on the shaft and its boss is gripped in one end of the Socket Coupling. When used in a model the Socket Coupling is slid along the shaft by means of a lever, so that the rim of the small Flanged Wheel engages the Rubber Ring. The device works quite smoothly and is free from the jarring effect of some types of brake gear.

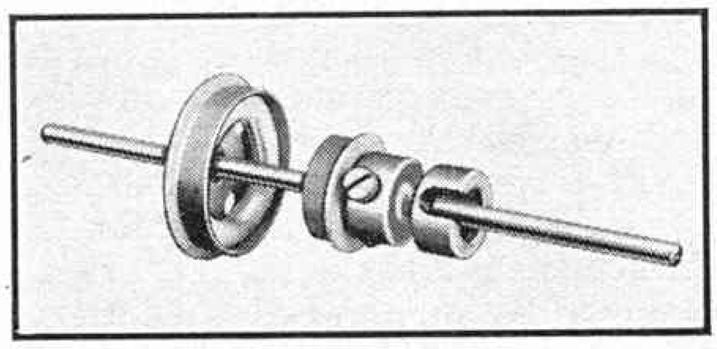


Fig. 458

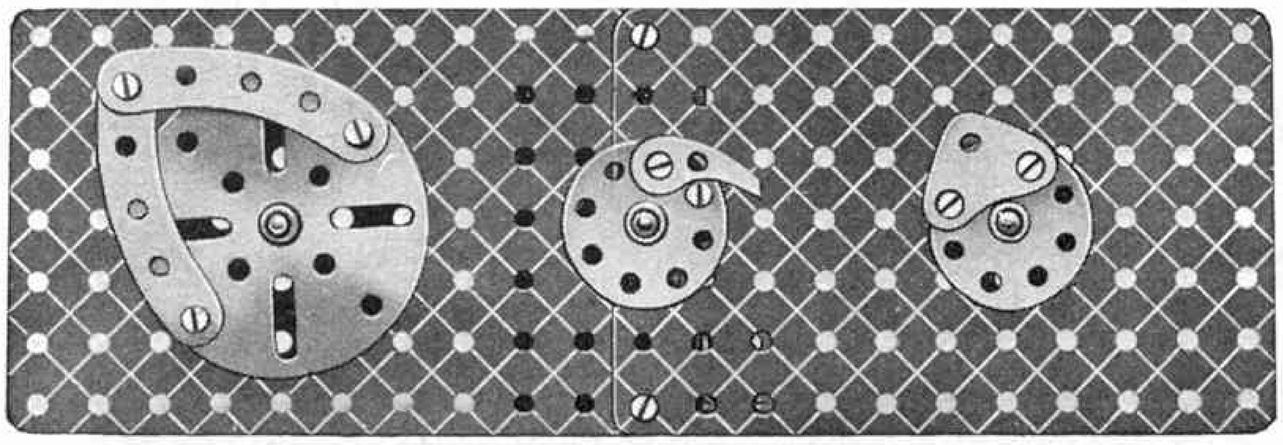


Fig. 459

(459) Useful Meccano Cams

("Spanner")

Cams are used for a large number of purposes in Meccano model building, almost any design being possible with the aid of remarkably few parts. Tappet rods for use with the cams may consist of Rods or Strips, and for more accurate work a small roller may be carried at one end of a Rod or Strip. A small Flanged Wheel or Pulley makes a suitable roller.

The cam shown on the left in Fig. 459 gives a rapid rise and fall of the tappet rod. It is made by securing two $2\frac{1}{2}''$ large radius Curved Strips on a Face Plate as shown. A smaller cam of this type can be built up from a Bush Wheel, or other similar part and a 1" Corner Bracket, as shown on the right in the illustration.

Where a comparatively slow rise but quick drop is necessary, the cam shown in the centre in Fig. 459 will be found useful. The Bush Wheel forming the cam disc is fitted with a Pawl without boss. A nut and bolt form the necessary connection, a second nut and bolt being used as a stop in order to prevent the Pawl from being pressed level with the edge of the Bush Wheel.

Another very useful and easily built cam can be assembled from two $1\frac{1}{2}''$ Pulleys or Bush Wheels connected by three Double Brackets, which are bolted edge to edge between them. If Pulleys are used a Washer should be placed on the shank of each bolt between the Pulleys and the Double Brackets to prevent the rims of the Pulleys from damage. A cam of this type is suitable for use in cases where a very rapid action is not essential.

(460) Rear Wheel Springs for Model Lorries

(R. N. Strawbridge, Te Awamutu, New Zealand)

The large number of suggestions I receive for mechanisms and refinements for model motor car chassis is striking evidence of the popularity of this kind of model-building. Methods of springing attract

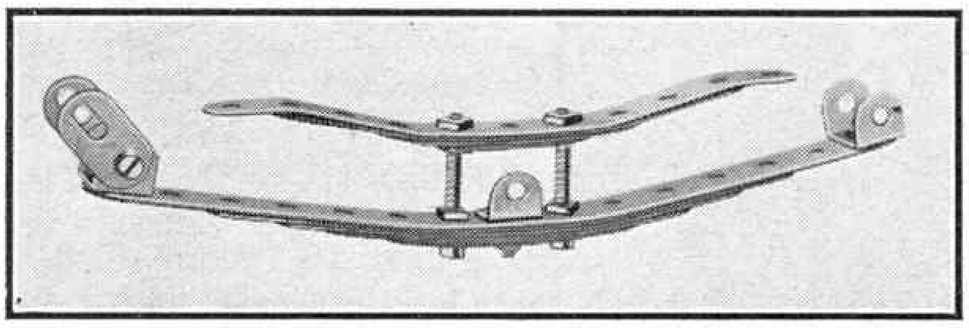


Fig. 460

many model-builders, and various types of this essential feature of a car have been described in the *"M.M."* from time to time.

Yet another suggestion comes from R. N. Strawbridge, a New Zealander. His device is shown in Fig. 460. It is suitable for springing the rear wheels of a heavy lorry and is of the semi-elliptic type. There are two springs, a main spring and an auxiliary spring, the two being arranged as shown in the illustration. The main spring consists of a $5\frac{1}{2}''$, $4\frac{1}{2}''$, $3\frac{1}{2}''$, $2\frac{1}{2}''$ and $1\frac{1}{2}''$ Strip. The auxiliary spring, which consists of a $5\frac{1}{2}''$, $4\frac{1}{2}''$, $2\frac{1}{2}''$ and $1\frac{1}{2}''$ Strip, is separated from the main one by $1\frac{1}{8}''$ Bolts and is held in place on the Bolts by means of nuts as shown. The main spring carries at each end a Double Bracket, and to one of them is bolted two Flat Brackets to form the shackle. The space between the two springs should be sufficient to allow room for the bearings and the rear axle. On the sides of the motor chassis, above each end of the auxiliary spring, $\frac{1}{2}''$ Bolts pointing outward are fitted. When a heavy load is put on the lorry the main spring bends upward and forces the auxiliary spring against the Bolts, thus causing the latter to take up part of the load.

Spring arrangements of this kind would make an interesting variation to the usual methods adopted by model-builders, and no doubt many readers will experiment with the idea in future models.

(461) Reversing Gear for Right-Angle Drive

("Spanner")

In Fig. 461 is shown an interesting drive reversing arrangement that is designed for incorporation in models where it is required to transmit a drive at right angles, with provision for reversing the direction of rotation of the driven shaft.

The essential feature of the arrangement shown in Fig. 461 is that it is not necessary to slide either the driving or the driven shafts in their bearings. Reversing is effected by means of an intermediary sliding shaft 1, which carries two $\frac{3}{4}''$ Pinions 2 and a $\frac{1}{2}'' \times \frac{1}{2}''$ Pinion 3. The $\frac{1}{2}'' \times \frac{1}{2}''$ Pinion is in constant engagement with a $\frac{1}{2}''$ Pinion on the driving shaft 4, which rotates always in the same direction. On sliding shaft 1, by moving the lever 5, either of the $\frac{3}{4}''$ Pinions can be brought into engagement with the $1\frac{1}{2}''$ Contrate Wheel 6 on the driven shaft 7. The direction in which the shaft 7 rotates is dependent on which Pinion is in mesh with the Contrate Wheel.

The mechanism is housed in a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Double Angle Strip and the control lever is supported in a left-hand Corner Angle Bracket fixed to a $1\frac{1}{2}''$ Strip. The latter is bolted to one arm of the Double Angle Strip. The control rod carries an End Bearing, the arms of which are opened out slightly so as to engage between two Collars fixed to one end of the sliding shaft.

The device was used by a reader of the *"M.M."* recently in the construction of a coil winding machine.

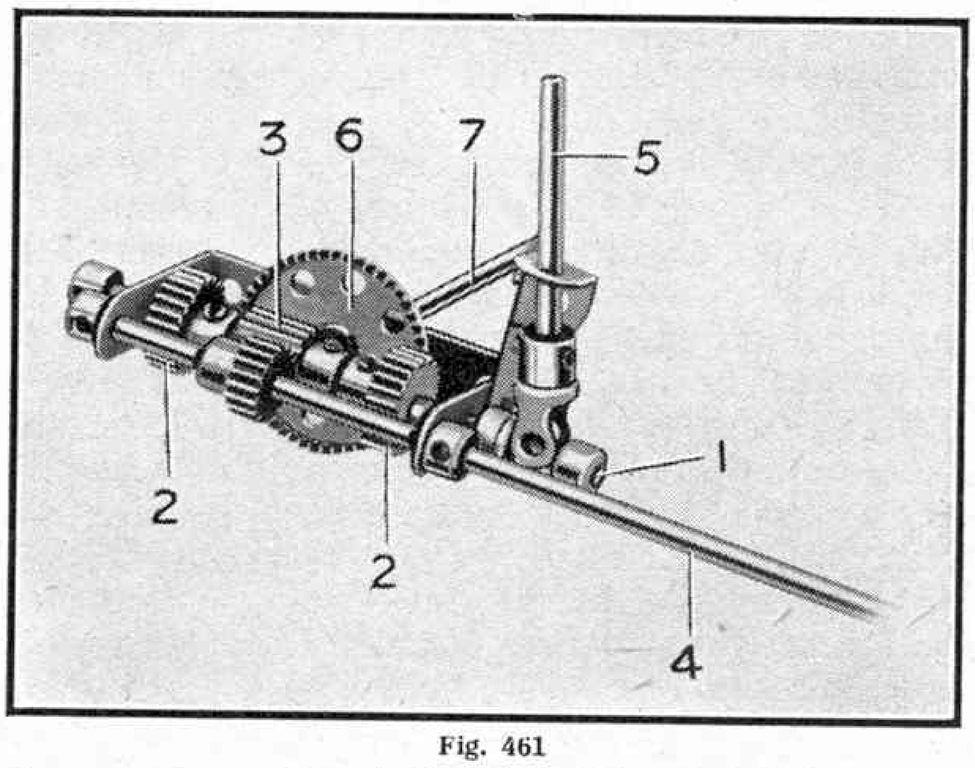


Fig. 461

(462) A Neat Electric Contact Button (H. C. Tudor, Blackburn)

A remarkably neat Meccano switch of the push button type that can be used for electric bells, buzzers and flash-lights, and also in innumerable Meccano models, may be built up in the following manner.

The device consists essentially of a Flanged Wheel and a Pivot Bolt that is pushed through the boss of the Wheel. The Wheel in turn is fixed to a Plate, Strip, or other suitable Meccano part. A small spring obtained by cutting two or three turns from the Compression Spring, Part No. 120b, is placed between the head of the Pivot Bolt and the boss of the wheel. The contact piece comprises a 6 B.A. Bolt secured with its head immediately beneath the shank of the Pivot Bolt.

One connecting wire is secured to the bolt holding the Flanged Wheel in place and the other to the insulated contact bolt.

(463) How to Use Helical Gears

Several model-builders have written to me recently regarding the proper use of the Helical Gears, Parts Nos. 211a and 211b. Owing to the design and angle of the teeth of these gears they can only be used together. They are of course intended primarily for producing a right-angle reversible drive, the ratio of which can be either 1 : 1 or 3 : 1. When fitting these gears it is very important that they should be exactly in correct position, otherwise they will tend to bind. When they are meshed correctly, however, they transmit a very efficient smooth and silent drive, and are of great use in car differentials, steering gears and similar mechanisms.

When Helical Gears are to be used in a gear-box the frame must be strongly built because of the side-thrust generated when two gears of this type are in motion. This side-thrust can be put to practical use in a neat clutch mechanism. In this a large Helical Gear, Part No. 211b, is free to move on a horizontal shaft, but is held in contact with a friction face by means of a light Compression Spring. When a small Helical Gear meshed with the large Gear rotates in one direction the larger Gear is pressed into contact with the friction face, but when the small Gear is rotated in the opposite direction the large Gear is disengaged and slightly compresses the spring, already mentioned. Thus the final driven shaft can be turned when the large Helical Gear rotates in one direction but remains stationary when the direction of the Gear is reversed.

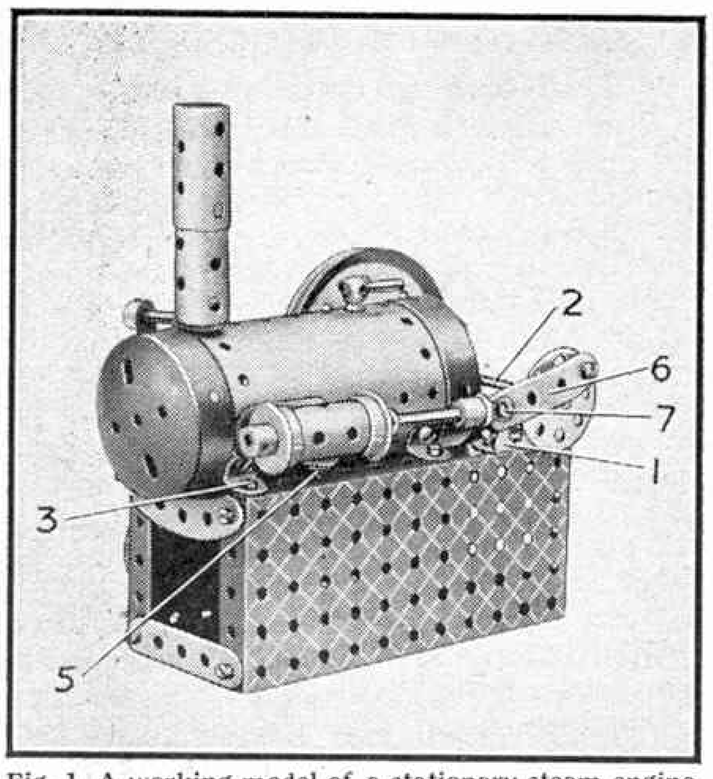


Fig. 1. A working model of a stationary steam engine and boiler plant. It is driven by a "Magic" Motor.

Build these Fine New Models

Interesting Subjects for Small and Large Outfits

IN many factories and mills power for driving the machinery is provided by means of a stationary steam engine and boiler, sometimes constructed as one unit. Power plants of this kind are excellent subjects for Meccano models, as they are sufficiently varied in design to allow the constructor ample scope for putting into effect his own ideas and skill in the use of Meccano parts.

A typical example of such a model is shown in Figs. 1 and 2. This comprises three main parts; a sturdy base, a boiler unit and an engine fitted with a flywheel and governor. The base is constructed first. It consists of two $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates spaced apart at the rear by two $2\frac{1}{2}''$ Strips, and at the front by a $1\frac{1}{2}''$ Strip and a $2\frac{1}{2}''$ Curved Strip. To the top flanges of the base at the rear two Trunnions, shown at 1 in Fig. 1, are bolted as shown, and these provide bearings for the engine driving shaft 2. The boiler unit consists of a Boiler with Ends, and is attached to the base by means of four Angle Brackets 3, which are bent slightly to allow for the curve of the boiler and to enable the unit to nestle snugly in position.

The chimney is made up from two Sleeve Pieces overlapped and pushed over a Chimney Adaptor fixed to the top of the boiler. The safety valve consists of a Handrail Support 4, in the bore of which is fixed a 1″ Rod. At the rear end of the boiler is a water gauge, consisting of a 1″ Rod held vertically in two Handrail Supports fixed to the Boiler End. The engine cylinder is a Sleeve Piece capped at each end with a $\frac{3}{4}''$ Flanged Wheel, and it is attached to a Trunnion 5, which is bolted through its flange to one side of the boiler. Through the bores of the Flanged Wheels is pushed a $3\frac{1}{2}''$ Rod, which forms the piston rod. The crosshead, by means of which connection is made between the piston rod and the 2″ Strip 6 forming the connecting rod, is an End Bearing.

It is important to note that the bolt 7 on which the 2″ Strip 6 pivots in the arms of the End Bearing is lock-nutted, care being taken to ensure that the Strip is not gripped tightly between the arms but is free to move. The other end of the 2″ Strip is freely pivoted on a $\frac{3}{8}''$ Bolt passed through a hole in a Bush Wheel, the bolt being held firmly in place by means of a nut on each side of the Wheel. The Bush Wheel is fixed on the driving shaft, which is a $4\frac{1}{2}''$ Rod carrying at its opposite end a 1″ fast Pulley and a 3″ Pulley.

To complete the engine a governor unit is constructed. The governor shaft is supported in a Double Bent Strip 8 fixed to a $1\frac{1}{2}''$ Strip, which in turn is attached at one end to the base of the model and at its other end to a Double Bracket. The Double Bracket is also attached to one of the lugs of a *Magic* Motor bolted to the side of the base. A 1″ Rod is journalled in the Double Bent Strip and is held in position by means of a Collar placed on the Rod in the position shown. A $\frac{1}{2}''$ Bolt is pushed through the boss of a Large Fork Piece 9, and on the projecting shank of the Bolt is fixed a $\frac{1}{2}''$ Pulley with boss. The Grub Screws in the Large Fork Piece and the Pulley are tightened up to grip the bolt securely.

This unit is mounted on the projecting upper end of the 1″ Rod journalled in the Double Bent Strip. A Driving Band connects the $\frac{1}{2}''$ Pulley of the governor to the 1″ Pulley on the driving shaft. A further Driving Band is passed around the small Pulley of the *Magic* Motor and the 3″ Pulley.

Before setting the model in motion it is advisable to apply a little oil to all the moving parts and bearings.

Parts required to build the model Stationary Steam Engine and Boiler: 3 of No. 5; 1 of No. 6; 1 of No. 6a; 1 of No. 11; 4 of No. 12; 1 of No. 15a; 1 of No. 16; 3 of No. 18b; 1 of No. 19b; 2 of No. 20b; 1 of No. 22; 1 of No. 23a; 1 of No. 24; 29 of No. 37b; 28 of No. 37d; 1 of No. 45; 2 of No. 52; 3 of No. 59; 1 of No. 90; 1 of No. 116; 3 of No. 126; 3 of No. 136; 1 of No. 162; 3 of No. 163; 1 of No. 164; 1 of No. 166; 2 of No. 186; 1 *Magic* Motor.

The simple but realistic model of a steam lorry shown in Fig. 3 is built from parts contained in Outfit No. 3 and is driven by a *Magic* Motor, which is fixed underneath the platform body. The first stage in the construction of the model is to bolt the $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate 1 to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. The $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 2 are then attached to the sides of Plate 1 by means of Angle Brackets, and to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate by $5\frac{1}{2}''$ Strips, Flat Brackets and Angle Brackets. The bolts hold also a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate 4, which is curved to form the front of the cab. The Plates are connected by a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Double Angle Strip to the bolts holding also vertical $2\frac{1}{2}''$ Strips that form roof supports. The roof is a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate, bolted to the Double Angle Strips 2 and attached by Angle Brackets to the vertical $2\frac{1}{2}''$ Strips.

A U-section Curved Plate bent around a pencil or some other circular object of similar size to form a tube, makes a realistic

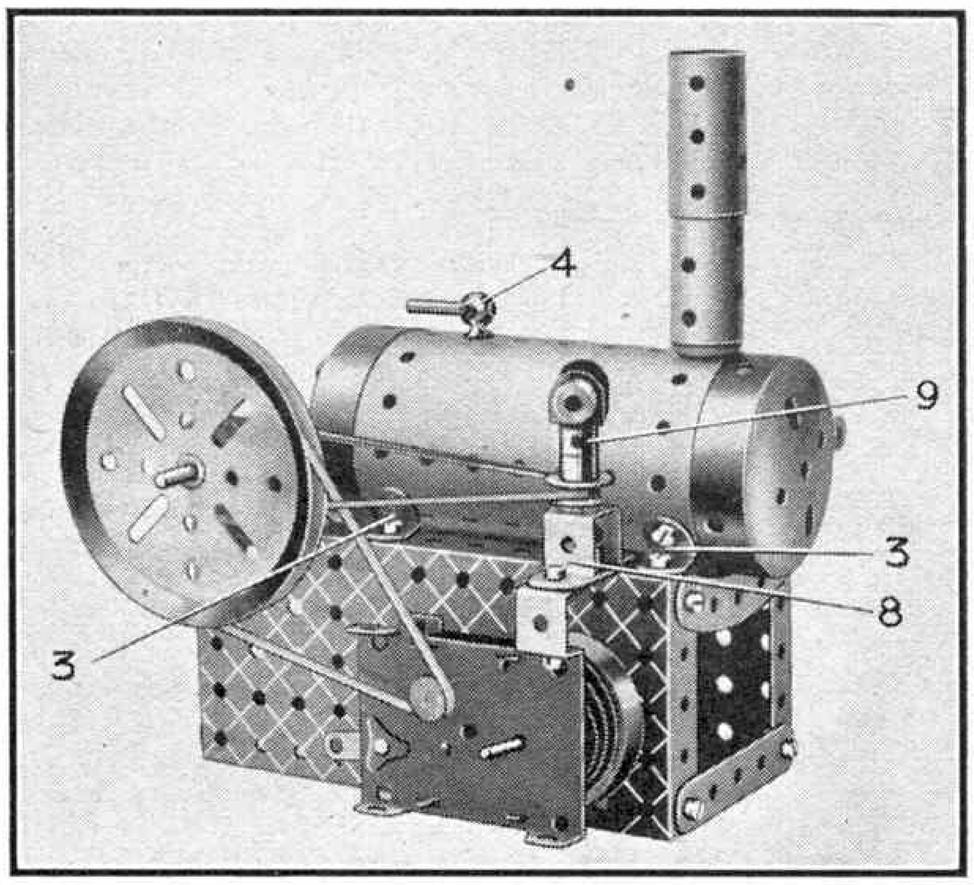


Fig. 2. Another view of the model power plant shown in Fig. 1.

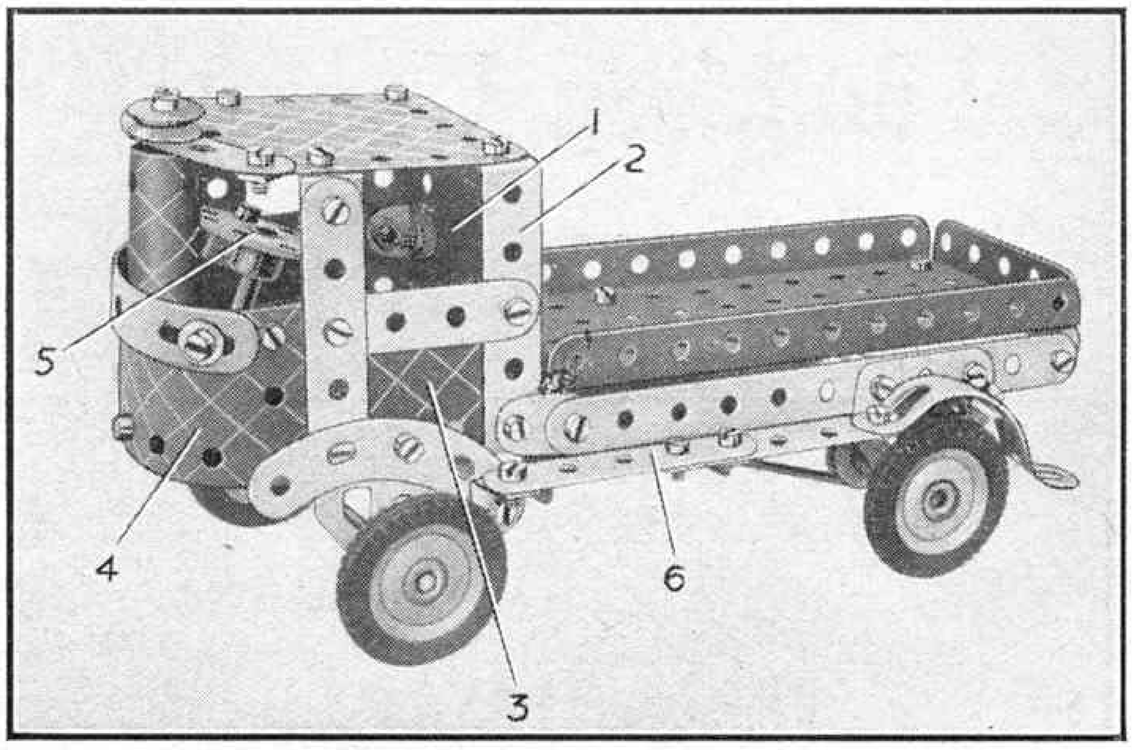


Fig. 3. This neat model steam lorry is built from the parts in Outfit No. 3 and is fitted with a "Magic" Motor that drives it at a good speed.

chimney, and it is bolted to the Flexible Plate 4. A ½″ loose Pulley fixed to a 2½″ Cranked Curved Strip forms the cowling of the chimney. The steering wheel is a Bush Wheel 5. A 1½″ Rod is fixed in its boss and it is then attached to the side of the cab by an Angle Bracket.

The bearings for the wheel axles are now fixed in position. Those for the front axle are Trunnions bolted to the Double Angle Strip connecting the sides of the cab, while the rear axle bearings are Flat Trunnions bolted to the 5½″ Strip as shown. Rear wheel mudguards are formed by 3″ Formed Slotted Strips, bent to shape and attached to the Flat Trunnions by Angle Brackets. Compound strips 6 made from 2½″ Strips form the running boards and connect the rear mudguards to those of the front wheels, which are 2½″ Cranked Curved Strips.

The wheels are now fitted in position on their axles, the rear axle carrying also a ½″ fast Pulley. This is connected by a Driving Band with the pulley of the *Magic* Motor, which is bolted underneath the Flanged Plate forming the platform body of the lorry.

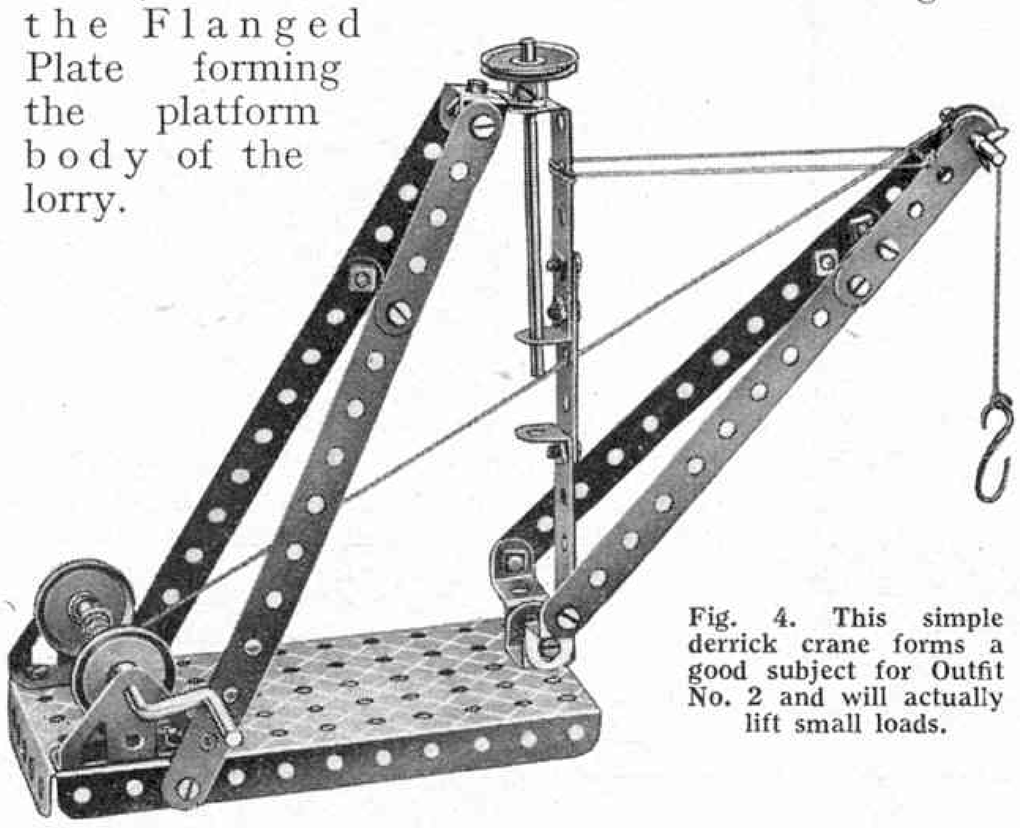


Fig. 4. This simple derrick crane forms a good subject for Outfit No. 2 and will actually lift small loads.

Parts required to build the model Steam Lorry: 2 of No. 2; 8 of No. 5; 2 of No. 10; 8 of No. 12; 2 of No. 16; 1 of No. 18a; 4 of No. 22; 1 of No. 23; 1 of No. 24; 56 of No. 37a; 50 of No. 37b; 6 of No. 38; 3 of No. 48a; 1 of No. 52; 3 of No. 90a; 6 of No. 111c; 2 of No. 126; 2 of No. 126a; 4 of No. 142c; 1 of No. 188; 1 of No. 189; 2 of No. 190; 1 of No. 199; 2 of No. 215. 1 *Magic* Motor (not included in Outfit).

The next model is a simple derrick crane shown in Fig. 4. It is designed for Outfit No. 2, and is so sturdily built that it can be used to lift small loads. The base of the model is a 5½″ × 2½″ Flanged Plate, to each side of which is attached a 5½″ Strip extended by a 2½″ Strip. At their top ends these Strips are connected by a Double Bracket, to which is bolted a Flat Bracket. Each side of the jib consists of a 5½″ Strip extended by a 2½″ Strip that overlaps the 5½″ Strip two holes. The bottom ends of these Strips are pivotally connected by means of lock-nutted bolts to two Reversed Angle Brackets fixed one to each arm of a Double Bracket bolted to the Flanged Plate. Through the end holes in the top ends of the Strips a 1″ Rod is passed and is held in place by Spring Clips.

The jib post consists of two 2½″ × ½″ Double Angle Strips connected by a 2½″ Strip as shown and at its bottom end is bolted to the base by the same bolt that holds the Double Bracket. At its top end the jib post is pivotally connected to the Flat Bracket by means of a 3½″ Axle Rod, which is pushed through the free hole in the Flat Bracket and through the turned up ends of the top Double Angle Strip. The Rod is retained in position by means of a 1″ fast Pulley. The jib is held at the correct angle by means of Cord tied to the jib and passed around the jib post.

The load is raised and lowered by turning a Crank Handle pushed through two Trunnions bolted to the rear end of the Flanged Plate. The Crank Handle is held in position by means of two 1″ fast Pulleys. A length of Meccano Cord is tied at one end to the Crank Handle, passed over the 1″ Rod at the jib head and a small Hook is tied to its other end.

Parts required to build the model Derrick Crane: 4 of No. 2; 4 of No. 5; 1 of No. 10; 2 of No. 11; 2 of No. 12b; 1 of No. 16; 1 of No. 18b; 1 of No. 19s; 3 of No. 22; 2 of No. 35; 19 of No. 37a; 17 of No. 37b; 2 of No. 48a; 1 of No. 52; 1 of No. 57c; 2 of No. 125.

The wrestlers illustrated in Fig. 5 make a very unusual and amusing model, and can be set in action merely by turning the Crank Handle 1, resulting in a complete somersault during which they are an amusing tangle of arms and legs. The model can be built from the parts in Outfit No. 2, and construction is best commenced by bolting four 5½″ Strips to the sides of a 2½″ × 5½″ Flanged Plate, as shown in the illustration, to form journals for the spindle 2. The sides of the base consist of two 5½″ × 1½″ and two 2½″ × 1½″ Flexible Plates, and they are bolted around the 2½″ × 5½″ Flanged Plates. A 3½″

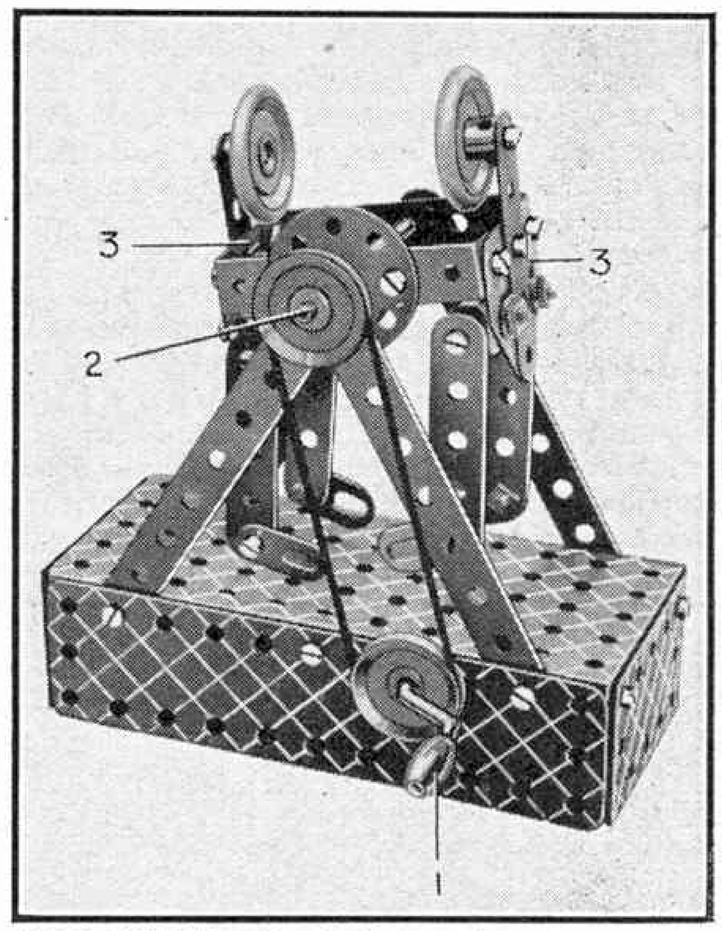


Fig. 5. "The Wrestlers." An amusing working model built from the parts in Outfit No. 2.

Crank Handle bearing a 1″ Pulley Wheel with its boss pointing inwards, is pushed through the side members of the base and secured in place by means of a Spring Clip.

The bodies of the wrestlers are formed by two Flat Trunnions 3, which are pivoted to the spindle 2 by two 2½″ Double Angle Strips representing their arms. Two 1″ Pulley Wheels complete with tyres form their heads, and are attached by means of two 2½″ Strips to the Flat Trunnions. Motion is conveyed to the figures by the Driving Band passed around the two 1″ Pulley Wheels.

Parts required to build model Wrestlers: 4 of No. 2; 6 of No. 5; 4 of No. 10; 4 of No. 12; 1 of No. 16; 1 of No. 19g; 4 of No. 22; 1 of No. 24; 1 of No. 35; 30 of No. 37a; 34 of No. 37b; 1 of No. 38; 2 of No. 48a; 1 of No. 52; 2 of No. 111c; 2 of No. 126a; 2 of No. 155a; 2 of No. 188; 2 of No. 199.

Great New Year Model-Building Contest

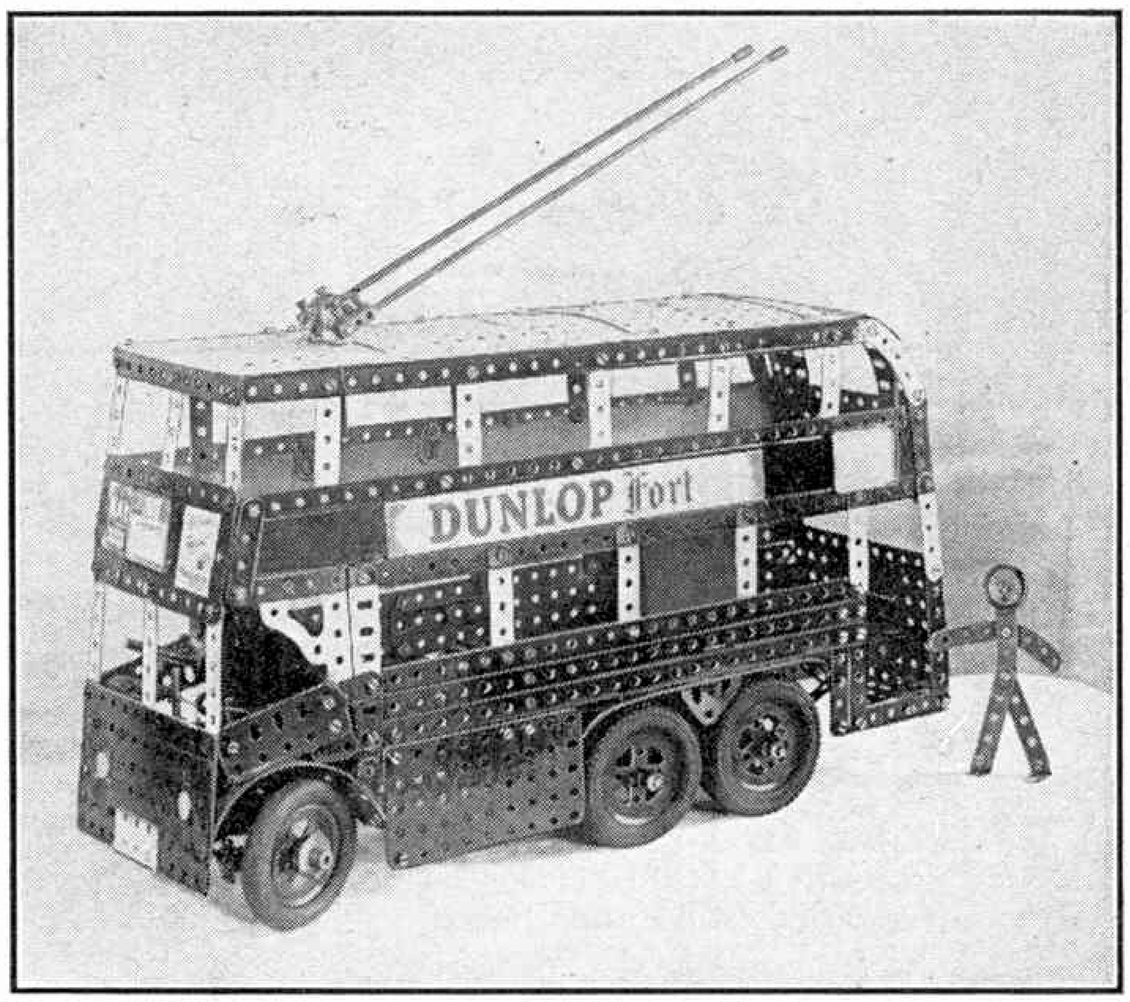
Splendid Prizes Open to All Readers

The finest way of enjoying the blackout is to build Meccano models. This is well known to thousands of "*M.M.*" readers and Meccano enthusiasts, both those who are still at home and those who have been evacuated. After all, it is only natural that Meccano boys should turn to their Outfits for pleasure and recreation in these difficult times. To encourage them to make the very best use of their Meccano parts, and so to obtain the greatest pleasure from model-building, we are offering nearly 50 splendid prizes this month in a fine New Year contest in which they can all enter. In this there are no complicated rules and conditions, and it is very easy to prepare and send in an entry.

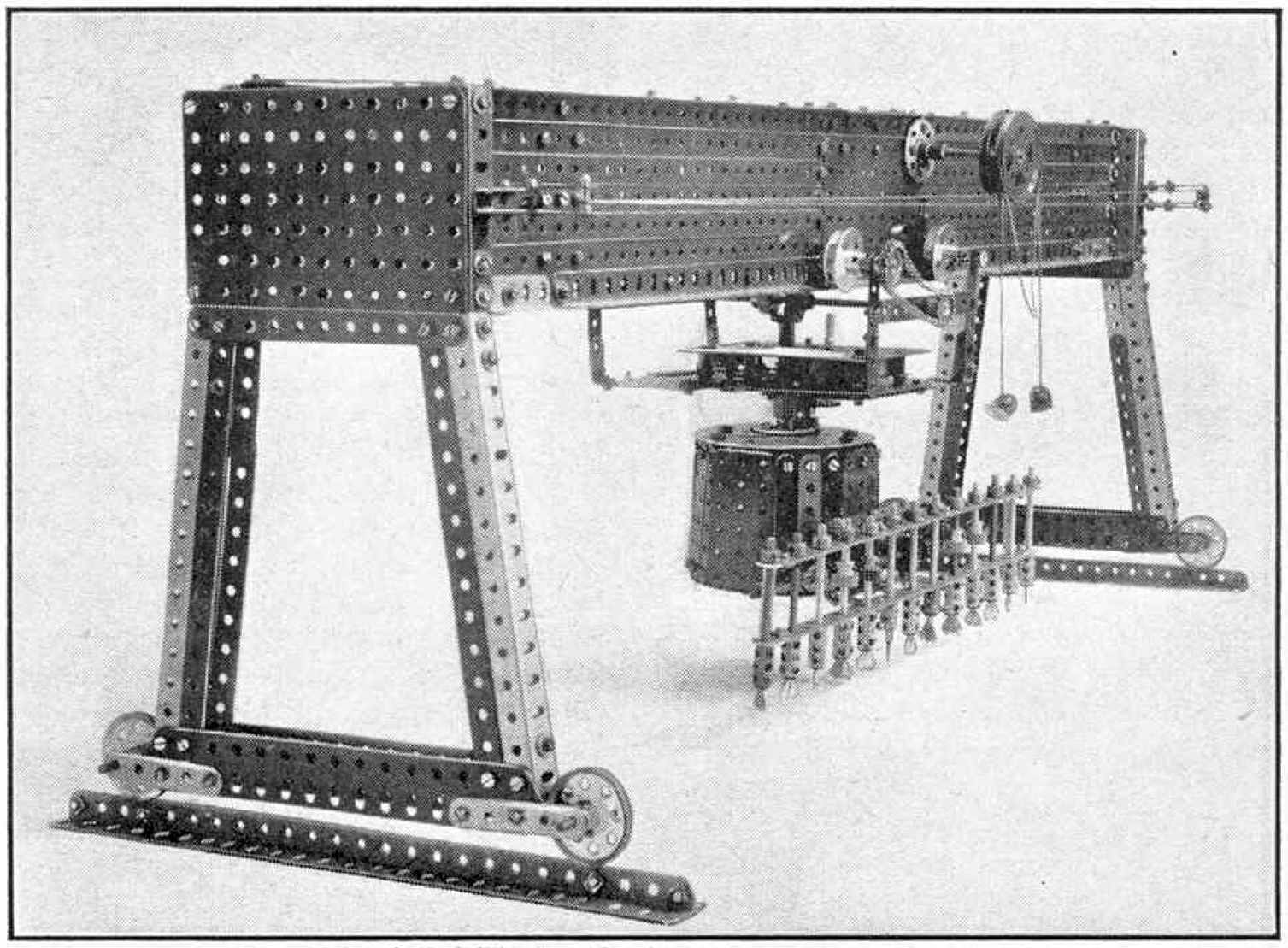
A special invitation to enter this contest is extended to new friends. This is the time of the year when there are thousands of recruits to the Meccano hobby. Many of these have already built the models shown in their Instructions Manuals, and are eager to build others in accordance with their own ideas. They will find that their model-building becomes even more exciting and interesting if they begin to plan and construct an entry for this contest.

Models of any kind whatsoever may be submitted. All Meccano structures are eligible, whether they are simple model cranes built with small Outfits, or huge locomotives, battleships or giant bridges built from the larger ones. Every competitor will have the same chance, whatever the size of his Outfit, for the judges will take this into account and will look for unusual ideas and neat construction rather than for elaboration. So pick out your best model, or build a Meccano version of that engine, machine or gadget in which you are specially interested, and send in its details in this competition.

Preparing an entry is very easy. As is the rule in "*M.M.*" model-building contests, it is not necessary to go to the trouble of packing the actual model and sending it to us. All that is required is a good drawing or, better still, a photograph. Neither of these need be the competitor's own work. He can get somebody who is more skilful than himself to help him to get this part of his entry ready. It is advisable to send also a written description of the principal features of the model, especially of parts that are not clearly shown in the illustration. Then the competitor should write his age, name and address, preferably in block letters, on the back of each photograph or drawing submitted.



This model trolley-bus won a prize in an "M.M." competition for A. Ericsson, Belvedere.



A model of a travelling multiple-spindle drilling machine for boring holes in ships' plates and similar work. It was built by Victor C. Kaile, Mayford.

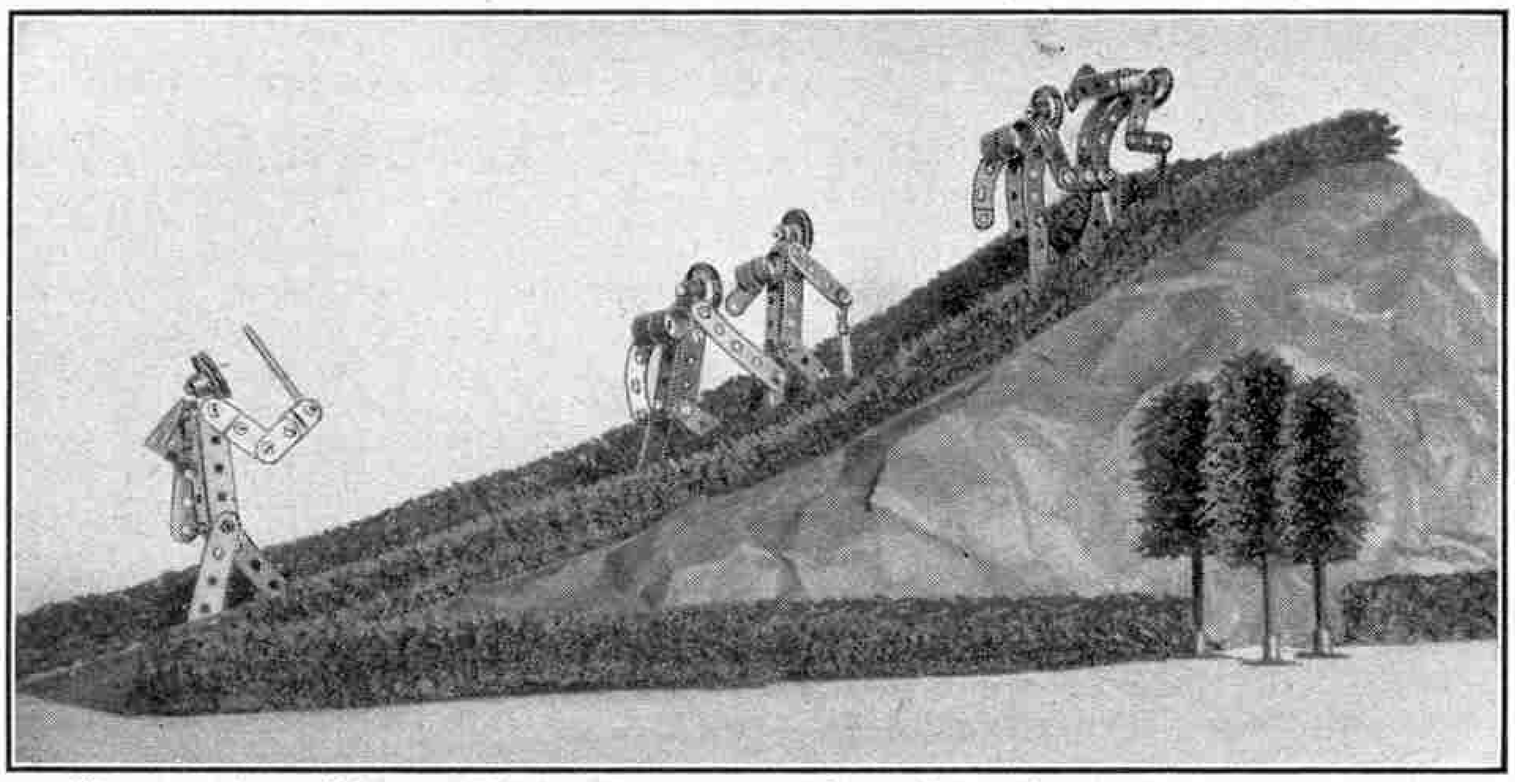
Finally the drawing or photograph, with the accompanying written description, has to be placed in an envelope addressed "*New Year General Model-Building Competition,*" Meccano Ltd., Binns Road, Liverpool 13. That is all there is to do, and every reader who takes advantage of this opportunity will have a chance of winning one of the many fine prizes we are offering for the best models submitted to us.

Entries will be divided into two sections according to the ages of competitors. Those from readers of 15 years of age or more will be placed in Section A, and those from competitors under 15 will be grouped together in Section B. In each section the age of each entrant will be taken into consideration by the judges.

The Contest will remain open for entries until 31st March, but entries should be posted as soon as they are ready so that they will reach Liverpool well before the closing date.

The following prizes will be awarded in each Section of the Contest to the builders of the most interesting models received. For the best entry there will be the First Prize, a cheque for £3/3/–. The Second and Third Prizes will consist respectively of Meccano or Hornby products to the value of £2/2/– and £1/1/–, and there will be 20 further prizes, 10 consisting of Meccano or Hornby products to the value of 10/6 and 10 of similar products to the value of 5/–. Every winner of a prize consisting of Meccano or Hornby products will be allowed to make his own choice from current lists.

Competitors who would like to have their photographs or drawings returned to them after the entries have been judged should enclose with their entries a stamped addressed envelope for that purpose. Photographs or drawings of prize-winning entries will not be returned.



"The Mountaineers." A group of Meccano figures arranged in a realistic setting by P. R. Wickham, Leicester.

Model-Building Competition Results

By "Spanner"

"Sportsman" and "Governor" Contests

The Meccano "Sportsman" Contest, which was announced in the August issue of the "*M.M.*," proved to be one of the most popular of the special summer competitions organised last year. Many interesting entries were received, and these covered all kinds of sports and outdoor pastimes. The full list of prize-winners is as follows.

Home Section.

1st Prize, Meccano or Hornby goods value £2/2/–: G. Balfour, Upminster. 2nd, products value £1/1/–: P. R. Wickham, Leicester. 3rd, products value 10/6: B. D. Rivron, Nacton, nr. Ipswich.

Products value 5/–: Miss Olive Ibberson, Reading; K. Pargeter, Stourbridge; D. Bower, Bacton, Norfolk; J. Darby, Huddersfield; I. Appleby, London N.1.

Overseas Section.

1st Prize, Meccano or Hornby goods value £2/2/–: E. P. Tapper, South Perth, W. Australia; 2nd, products value £1/1/–: B. Richards, Bombay; 3rd, products value 10/6: C. Barker, Melbourne.

Products value 5/–: J. Schembri, C. Curmi, Malta; E. Feit, Berea, Johannesburg; A. Gatt, Sliema, Malta; R. van Berkum, Fenwick, Canada; J. Robertson, Cairo, Egypt.

Prize-winners in the "Sportsman" Competition. The two upper portraits are of Miss Olive Ibberson, Reading, and G. Balfour, Upminster. The lower ones show D. Bower, Bacton, Norfolk (left) and K. Pargeter, Stourbridge.

The entry that pleased me most of all of the many really good efforts submitted in this Contest was a reproduction of a cricketing incident, sent by G. Balfour, Upminster, which was awarded First Prize in the Home Section. This entry shows a batsman neatly bowled, with the wicket-keeper, arms upraised, apparently shouting the familiar "Howzat." The figures of the batsman and the wicket-keeper are not only well-posed, but also interesting in their constructional details. For example, Collars and Couplings are used for the wicket-keeper's legs, and a Cylinder for his body, while his hands consist of Centre Forks.

I was surprised to find that very few competitors chose mountaineering as the subject for their entries. Only one or two models based on this subject were submitted, and of these the best was sent by P. R. Wickham, Leicester, and succeeded in winning Second Prize in the Home Section. As will be seen from the illustration of this entry that appears on this page, a very attractive result was obtained by making a realistic "mountain" from paper and the inclusion of a few Hornby Trees and Hedges. The mountaineers are carefully posed, and apparently are just starting out for a vigorous climb.

Miss Olive Ibberson, Reading, chose a scene from a swimming pool as the subject for her prize-winning entry. It shows swimmers on the high-diving board, the figures being very neatly constructed and arranged in attitudes characteristic of people indulging in exhibition displays of this sport.

First Prize in the Overseas Section was won by E. P. Tapper, South Perth, Western Australia, who well earned his success with the realistic representation of a tug-of-war illustrated on this page. Several entries of this type were submitted but the majority of them failed to win prizes because the attitudes of the figures were not sufficiently realistic. Tapper, however, gave careful consideration to this important feature and succeeded in giving his model a very life-like appearance.

Tennis provided many competitors with subjects for interesting models, and one of the best of these was sent by B. D. Rivron, Nacton, Suffolk. As in the case of Tapper's model, the tennis players are very carefully posed, and it was this feature that attracted the favourable attention of the competition judges.

From Fenwick, Ontario, came a model representing two baseball players, which was the work of R. van Berkum. The photograph submitted shows the batter ready to strike the ball, which the pitcher is just about to throw. The figures are well posed, but their constructional details might have been improved.

Another good entry in the Overseas Section represents boys engaged in the pastime of flying model aircraft. I think this was the only entry featuring this subject that was submitted, which is rather surprising in view of the popularity of this pastime now-a-days.

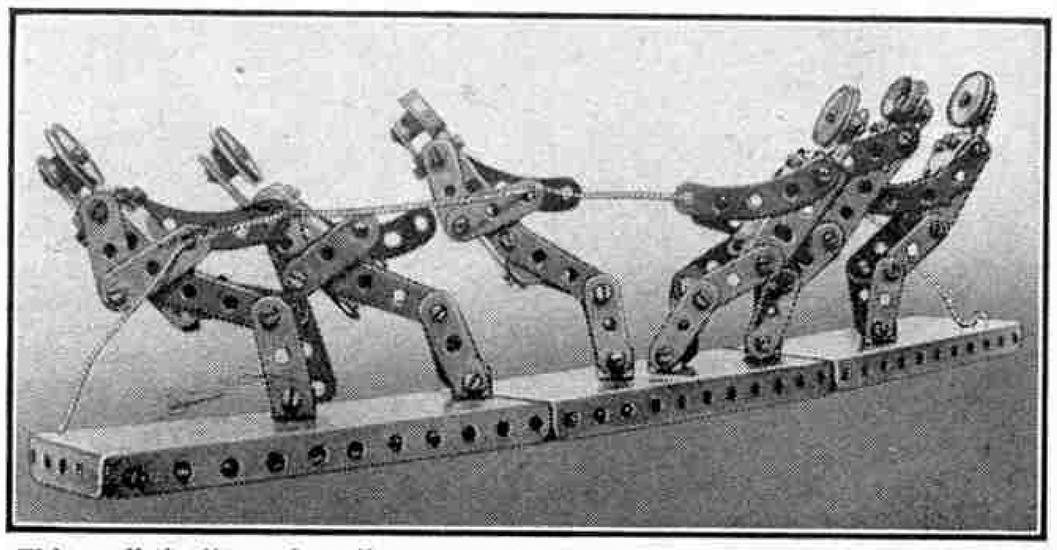
"Governor" Competition (Home Section)

In this competition prizes were offered for ingeniously constructed and neat model speed governors of the type used in gramophone motors. There is no actual difficulty in making mechanisms of this kind from Meccano parts, but the need for compactness necessitates careful choice of the Meccano parts used and a good knowledge of the purposes for which parts are best suited. The most interesting models entered for the Home Section of the contest were sent by the readers named in the following list, who have been awarded prizes as indicated.

First Prize, Meccano or Hornby products value £2/2/–: G. Parkyn, Barnet; 2nd, products value £1/1/–: W. Whitaker, Hornsea; 3rd, products value 10/6: W. Raybould, Bloxwich.

Products value 5/–: A. Bedford, Accrington; B. Gillyatt, Chesterfield; W. T. Oakley, Uppingham; I. Waters, Isleworth; A. Smith, Kirkby-in-Ashfield.

The best entries will be described in "*Suggestions Section*" in due course.



This realistic "tug-of-war" won a prize in the "Sportsman" Competition for E. P. Tapper, South Perth, W. Australia.

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100 all different, 2 Indian Silver Jubilees and 1 Mozambique Triangular Air Mail to introduce my low-priced approval books containing stamps from ¼d. Liberal discount given, and a list of 133 further bonus gifts of Coronations, Jubilees, Commemoratives. Please send 2d. for postage.

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NORRIS & CO. (Dept. M), Somercotes, Derbyshire.

For other Stamp Advertisements see pages 52 and xiv

STAMP COLLECTING

Romance in Stamp Discoveries

STAMP collecting, more than any other hobby, abounds with romantic stories of strange discoveries that have brought fortunes to keen-eyed collectors who have spotted "gems" in unlikely places. Young collectors figure so frequently in these stories that we think our readers would be interested to know something of them. There may even be among *"M.M."* readers some who possess unwittingly a treasure that may equal the one cent British Guiana, the world's greatest stamp rarity!

This famous stamp was once the property of a young collector named Vaughan of Demerara. He found it among some other old stamps in 1873, but it looked dull and uninteresting, and he thought he had made a lucky deal when he sold it to a fellow collector for 6/–! Later the purchaser sent his collection to a friend in Glasgow for disposal, and it found its way to Thomas Ridpath, a Liverpool dealer, who paid £120 for the lot and promptly sold the 1c. stamp to Count Ferrari for £150.

The only known cover carrying both Mauritius "Post Office" stamps. It fetched £5,000 at the sale of the "Hind" collection in 1934 at Harmer's, of Bond Street, to whom we are indebted for permission to reproduce the rarities illustrated on our stamp pages.

In the course of time, the stamp found its way into the collection of the late Mr. Arthur Hind, the Bradford and American millionaire wool merchant. When it was offered for sale in London £7,500 was offered for it—and refused!

We have deliberately refrained from describing the one cent British Guiana as unique, although it is believed to be such. A story is told of a mysterious visitor who called on Mr. Hind one day and showed to him another indisputably genuine copy of the stamp. The full facts of the incident will never now be known, but it is said that Mr. Hind satisfied himself that the second copy was genuine, although a much poorer specimen, and purchased it on the spot for a fantastic figure. His next step was to burn the stamp, saying as he did so, *"Now there is still only one!"*

It is highly improbable that any other specimen exists, but readers will realise that if one were to be found, the effect would be to depreciate seriously the value of the "Hind" copy, now reposing in the security of a New York safe deposit.

It is not surprising that boy collectors so often possessed great rarities. In its early days stamp collecting was essentially a boy's hobby, and several years elapsed before "grown-ups" deigned to recognise the fascination of "those little bits of paper." Crowds of young collectors used to foregather in Birchin Lane and Change Alley in London in the early sixties to exchange stamps. The earliest collectors, however, were London society girls who saw in stamps a novel form of decoration for the walls of their rooms. Advertisements for stamps for this purpose appeared in London newspapers as early as 1850, and perhaps in some obscure room in a London mansion there still exists a fortune in "Penny Blacks" buried beneath layers of later wall decorations.

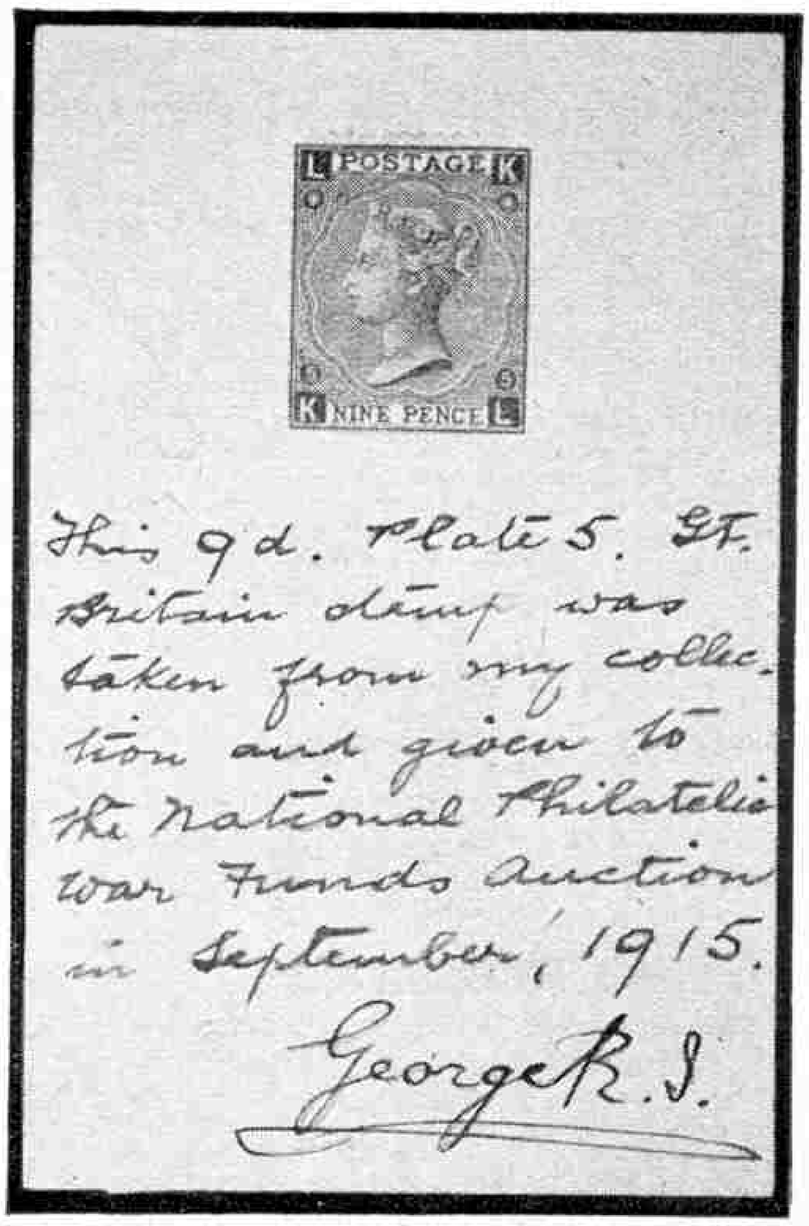
A London mansion box-room was in fact the scene of what is perhaps the most of all romantic stamp discoveries. This is known as the "Mayfair Find," and consisted of whole sheets and part sheets of early stamps in their perfect original condition that had lain untouched for nearly 60 years. Underlying the find was the story of a young collector who took up the hobby on a grand scale by sending out bank notes to Colonial post-masters, and requesting the return of stamps to the value of the remittances. He tired of the hobby soon after the stamps had reached him and dumped them in an old trunk. There they lay until they were uncovered during a search for other old papers. When auctioned by Harmer's of Bond Street they realised over £7,500.

It would be too much to attempt to catalogue here even a part of the treasures in this find. One item alone, sent from Ceylon in exchange for 10/–, consisted of two complete sheets of 120 of the ½d. lilac-black issue of 1858! Those two sheets fetched £1,180.

A lucky schoolboy was the original owner of what is usually considered to be the finest philatelic "piece" in existence. This is the cover, shown in the upper illustration on this page, bearing perfect copies of each of the Mauritius 1d. and 2d. "Post Office" issues of 1847. This is the only known example of both stamps used together on cover, and it realised £5,000 at the sale of the "Hind" collection at Harmer's. This schoolboy was searching for stamp treasures among some old papers in 1902 when he discovered the Mauritius cover and took it to his father. It was sent to Paris to a collector friend, who recognised its worth and succeeded in finding a buyer at £1,600. It passed through several hands at increasing prices before it was purchased for the "Hind" collection.

Another schoolboy had a stroke of luck with the Mauritius "Post Office" issues in 1865. He received them as a "swap" for a couple of Monte Videos from a lady collector who had unearthed a copy of each stamp among some old letters from her husband. Her album did not contain spaces for these strange stamps, and she was perfectly content with her exchange. The schoolboy had the better of the bargain, however, for he sold his collection, with these stamps, for the then big figure of 3,000 francs to a collector in Bordeaux.

The "Post Office" Mauritius issues have turned up in some curious places, but the strangest of all was a Dutch discovery of a year or two ago. The "Penny" value was found as part of the horse's neck in a picture of a man and woman in a horse-drawn trap formed entirely with postage stamps! The picture belonged to a clergyman, who gave it to his charwoman. (*Continued on page 53*)



The G.B. 1865/67 9d. straw, an exceedingly rare stamp presented by the late King George V to the National Philatelic War Fund auction in 1915. It brought £250 at the "Hind" sale.

STAMPS from STANLEY GIBBONS

Stamp Packets from Stanley Gibbons are *different*. They're better value for money than others, and the stamps they contain are stamps you don't find in other packets.
Here are four really special ones.

• "NEW ISSUES OF 1939"

These are Stanley Gibbons' Special Packets—two splendid packets of MINT NEW ISSUES of the past twelve months. Pictorial and Portrait stamps only—no overprints or surcharges.

S 5011. PACKET No. 1. 68 mint new issues including **Barbados** (General Assembly), **Canada** (2 c. Royal Visit), **Ireland** (U.S. Constitution), **North Borneo** (3 brilliant pictorials), **Samoa** (25th Anniversary), **South Africa** (½d. and 1½d. Huguenot in pairs), **Argentina** (Frigate), **Belgium** (Florence Nightingale), **Bolivia** (4 Eucharistic Congress), **Bulgaria** (1st loco), **Cameroons, Canal Zone, Cuba** (Cigar), **Danzig** ("Postal War"), **Dominican Republic, Ecuador** (Athletes' Parade), **France** (Clemenceau, Debussy, St. Gregory, Strasbourg), **Holland** (Railway), **Hungary** (Munkacs), **Iceland** (Herring), **Iran** (Royal Wedding), **Japan** (Lighthouse), **Liechtenstein** (Swallows), **Lithuania** (Basket-ball), **Luxemburg** (Arms), **Mexico, Nicaragua** (Will Rogers), **Norway** (Queen Maud), **Panama, Poland** (Winter Sports), **Roumania, Sweden** (Ling, Berzelius), **Switzerland** (Geneva Red Cross Convention), **U.S.A.** (Golden Gate, Panama Canal), **Vatican City** (Papal Coronation), etc., etc. ... ...

10/-

S 5012. PACKET No. 2. 68 mint new issues, **all different from those in Packet No. 1,** and including **Canada** (1 c. and 3 c. Royal Visit), **Newfoundland** (Royal Visit), **New Guinea** (Air stamp), **North Borneo** (Proboscis monkey, Parrot, Due), **Papua** (2d. air mail), **Samoa** (25th Anniversary), **South Africa** (1d. Huguenot pair), **Afghanistan, Albania** (Italian Occupation), **Belgium** (Royal Children, Rubens), **Bolivia** (Vicuna, Chinchilla, Heron, 5 c. Triangular), **Czech Protectorate, Danzig** (Knights, "Retreat from Moscow"), **Ecuador** (Horse jumping), **France** (Tennis Court Oath, Verdun, Boulogne Monument), **Germany** (Flower Show), **Greece** (2 Ionian Is.), **Holland** (St. Willibrord), **Iceland** (N.Y. Fair), **Japan, Libia, Lithuania** (20th Anniversary), **Luxemburg** (Portrait), **Mexico** (Tulsa and N.Y. Fair), **Monaco, Nicaragua** (Will Rogers), **Russia** (New Moscow, Girl aviator), **Slovakia** (Father Hlinka), **Sweden** (Linnæus), **Switzerland, U.S.A.** (Baseball, N.Y. World Fair), etc., etc. ... ...

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S 4895. 82 all different unused, 10s.

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PRICE & CO., Stamp Industries, MOLLINGTON, CHES.

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To all approval applicants we offer **FREE** either an **ENGLISH KING EDWARD 10d.** or Nigeria King Geo. V 1/-. State which preferred, or the two stamps for only 6d.

SPECIAL OFFER!

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NORTH BORNEO. High Values, 25c., 50c., $1, $2 and $5 (value 16/-) for only **1/6.**

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During this month I will include a stamp catalogued at least 3/-. Can you find it?

H. HARDY, "Hoyland," Potter Heigham, Norfolk.

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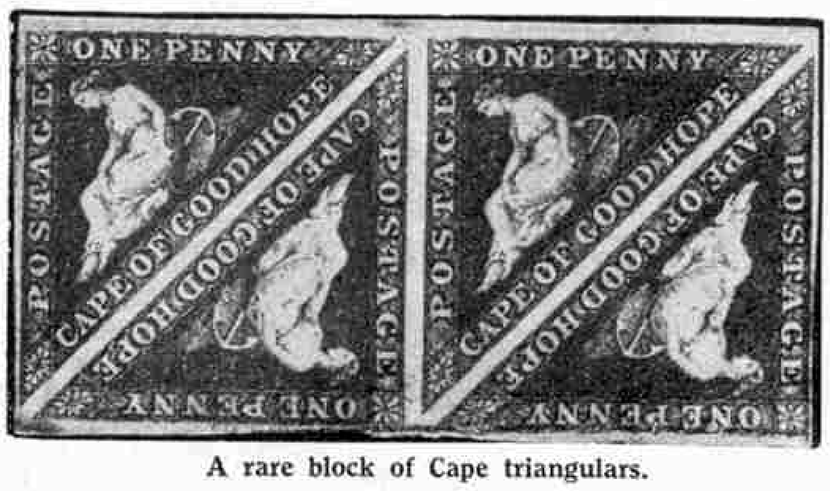
LINKHOUSE PUBLICATIONS (Dept. M), 300/304, GRAY'S INN ROAD, LONDON W.C.1.
And from all Bookstalls, Newsagents and Stamp Dealers.

For other Stamp Advertisements see pages 50 and xiv

Stamp Collecting—(*Continued from page 51*)

She sold it for twopence, and it was resold to a butcher for 3/–. The butcher had an idea of the worth of his purchase, however, and when he disposed of it for £670 he made a stipulation that he should receive 25 per cent. of any profit made on re-sale.

The most extraordinary "find" that ever came the way of a dealer was probably a sackful of Cape triangular stamps including many "Woodblocks," or Cape triangulars of 1861, which at one time were supposed to have been printed from wood blocks. This mass was purchased by Stanley Gibbons, founder of the famous firm of dealers of that name who are among the oldest of our "*M.M.*" advertisers. The Gibbons firm was founded in Plymouth. One day a couple of seamen walked into the shop there and dumped on the counter a heavy sack containing thousands upon thousands of these famous stamps. Very disgustedly they explained that they had won it in a public house raffle in a South African seaport. Their disgust changed to joy when Gibbons



A rare block of Cape triangulars.

offered them £5 for the lot!

One wonders what that sack would be worth at present-day prices. Gibbons sold the stamps for 8d. and 10d. a dozen, and probably made £500 on the deal. But unused specimens to-day range up to £200 in the catalogues, and even the comparatively common varieties are worth several pounds each. A specialised collection of Cape Triangulars was sold at Harmer's in December for no less than £2,500. Some of the individual prices in that sale were world records, which shows clearly that these popular stamps have still much further to go before they reach the zenith of their fame.

There are many amusing stories of collectors who have failed to recognise opportunity when she has knocked at their doors. One story concerns a small boy who walked into an American stamp shop and truculently demanded to be allowed to exchange a stamp that "had something wrong with it." The boy insisted that he had purchased the stamp at that shop and he was not going to be swindled out of his rights. At length the dealer permitted him to make another choice, but when the boy reached the door he turned and yelled, "Smart guy! I didn't buy it here at all!"

The dealer had the last laugh, however. There certainly was something wrong with the stamp. It was a beautiful copy of the U.S.A. 1901 Pan-American Exhibition 1c. with inverted centre, mint specimens of which are catalogued at £65. An example of the stamp is illustrated on this page.

A rare block of four Canada 1859 2½c., imperf. between.

Stamp Gossip

and Notes on New Issues

The Stamp Centenary Year

The adhesive postage stamp was born on 6th May 1840, and it is a tragedy that the War has compelled the abandonment of the great exhibition that had been planned to take place in London to commemorate the centenary. The issue of a special commemorative stamp by the G.P.O. also has been cancelled, the official reason being "that the printers will be otherwise engaged."

The abandonment of the exhibition was inevitable, but one finds it difficult not to question the official decision concerning the stamp. Stamp printing must go on, war or no war, and the issue of the stamp in spite of the war would be a very valuable piece of propaganda for Britain in the neutral countries.

There will be at least one stamp to celebrate the event, however, but it will be issued in Portugal! The design will bear a portrait of Rowland Hill, the sponsor of the "Penny Post" in Britain.

Philately will receive a good "boost" from the centenary, however, for it is certain that the newspapers of the world will devote considerable space to the topic. The "*M.M.*" of course will include a special article in the stamp pages dealing in detail with the story of the coming of the posts. Stamp collecting readers should make a point of ordering their copy of the May issue—and all other issues—well in advance. Printing difficulties arising out of the war make it impossible to produce copies beyond the actual number ordered.

Christmas Charity Issues

As we go to press—very early in December—we learn that there is a prospect that the United States may issue a special Christmas stamp for Red Cross or Anti-Tuberculosis Funds. Hitherto the U.S.A. has not issued charity stamps but a recent Postmasters' Conference sent a recommendation forward to the Postmaster-General that may lead to a change of policy.

The customary Christmas issues from the Continent appeared too late for illustration in this issue but we hope to show the most interesting of them next month.

The Belgian issue was for Anti-Tuberculosis Funds, as usual, and consisted of eight stamps, each bearing a different design showing the famous Flemish belfries at Bruges, Thuin in Hainault, Lier near Antwerp, Mons, Furnes, Namur, Alost and Tournai.

The Dutch Child Welfare issue contained five stamps, each showing an infant bearing a horn of plenty. Luxemburg produced nine stamps.

A New Stamp Catalogue

A stamp catalogue that will make a special appeal to young collectors has just

A magnificent horizontal pair of Mauritius 1848 1d. "Post Paid," which realised £525 at the sale of the "Hind" collection.

been placed on the market by our advertisers Harry Burgess and Co. The British Colonial section consists of six separate parts, priced at sixpence each, all of which can be purchased separately. The collector who is specialising in, say, British American stamps, need purchase only the American section and not the others. Another advantage is that each section is made up in a handy pocket size that can be carried around conveniently when out on a stamp hunting expedition.

All major varieties are included in the catalogue lists, but minor differences, such as perforations and unimportant shades, are excluded.

The pricings are most interesting. Since the catalogue is not strictly the price list of one firm only, the prices are actual market prices that a number of firms have undertaken to observe. Further the quotations are graded to show different prices for unused, lightly post-marked and average post-marked specimens. The differentiation is of great importance, for it is a sad fact that many unscrupulous dealers have sought to impose the full prices quoted in catalogues for good specimens for stamps that are far below standard.

Any of the dealers associated with the Reliant Catalogue, whose names and addresses are given in the advertisement of it on page 52 of this issue, will be glad to send full particulars to any reader who writes mentioning the "*M.M.*"

Philatelic Congress 1940 at Bournemouth

As we go to press we learn that the Postal History Society, who were to have organised the 1940 Philatelic Congress of Great Britain in London in connection with the Centenary Celebrations, have decided to make an attempt to stage the Congress at Bournemouth on 4th to 6th May, the last day coinciding with the Centennial anniversary of the introduction of the "Penny Black" stamp—the first postage stamp label.

An invitation to hold the Congress at Bournemouth is being extended by the Mayor and Corporation.

We are sure that our readers will be glad to learn of this attempt to rescue some part of the celebrations from a complete wartime black-out.

A Petrol "Pool" Wagon in the Dinky Toys Series

A wartime development that has provided a subject for a Dinky Toys model is the pooling of petrol. The brilliantly coloured tank lorries bearing the names "Shell-Mex," "Pratt's," "B.O.P.," etc., that used to be such familiar sights in our streets have disappeared and have been replaced, "for the duration," by grey-painted vehicles bearing the name "Pool." These vehicles distribute the pooled spirit of all the various companies. A fine model of one of these wartime tank lorries is now included in the Dinky Toys range. It is of the same design as the Petrol Tank Wagon (Dinky Toys No. 25d), which it temporarily replaces, is beautifully enamelled grey with white wings, and bears the word "pool" in white on the tank sides. Dinky Toys enthusiasts who want their collections to be up to date should not fail to obtain this latest addition.

A Torpedo Controlled by Light

An American inventor has patented a torpedo that is guided by the shadow of the vessel it is intended to blow up. The torpedo travels deep, and as it passes underneath the ship the shadow cuts off light from a photo-electric cell, with the result that the torpedo automatically shoots straight upward against the keel of the victim. The same mechanism fires the torpedo. The photo-electric cell has to be cut off from light for a certain period before the mechanism comes into play, and this prevents the torpedo from being wasted on floating debris it may pass under.

"Mystery Pictures" Competition

The series of six "*Whatever Is It*" puzzle pictures that appeared in the April to September issues of the "*M.M.*" provided a severe test of readers' powers of observation. The best efforts were submitted by the following readers, who were therefore awarded prizes as indicated.

1st Prize, Meccano or Hornby goods value £1/1/–: D. Tomkinson, Wells Green. 2nd, goods value 15/–: G. Saunders, Liverpool 4. 3rd, goods value 10/6: N. Bolton, Bradford.

The objects shown in each of the six pictures that formed the subject of the competition are as follows. No. 1, top view of an egg cup, illuminated from one side. No. 2, end view of a roll of corrugated cardboard. No. 3, a fountain pen viewed from the nib end. No. 4, a photograph taken from inside a hollow tree trunk: branches and leaves can be seen through the open upper end of the trunk. No. 5, a wine glass seen from above. No. 6, six-sided threepenny pieces standing on edge face-to-face.

Coastal Patrol in a Flying Boat—(*Continued from page 5*)

would be risking his ship to no purpose.

But he can avenge them, and he will. The nose gunner and the bomber were long ago at their stations. The wireless operator has passed on the S.O.S. to his shore station and announced his own movements. His duty is crystal clear, and without a pause he makes for the submarine, now rapidly submerging.

Half a mile away she is invisible, but a swirl of water indicates her position.

"We'll straddle her," he briefly tells the bomber. This is what he means. Of his four heavy bombs, the first is dropped on the hither side of the swirl of water, and the second slightly beyond. He then turns and flies at right angles to his original direction, and repeats the process.

It appears—absolute certainty is often difficult on these occasions—that there are patches of oil on the surface. They may well mean that the submarine has claimed her last victim, but there is nothing more the aircraft can do by way of attack.

She circles round the sinking ship, her crew picking up the welcome smoke of British destroyers in the far distance. They drop their own lifebelts out of portholes, and although most fall out of reach of the struggling men, one at least is grasped and used.

As the ship finally disappears the two officers discuss her identity, and speculate as to why she was not convoyed. Probably, they decide, being a smallish cargo vessel, she sailed from a South American port too early to be protected.

"Anyhow," says the Flight-Lieut. with a relieved glance at his wrist-watch, "We've only another two hours to do."

Laying 70,000 Submarine Mines—(Cont. *from page 7*)

columns of water high into the air. It was startling at first and proof of the mines' deadly power. Work finished, the ships reformed in four columns ready to start back to the base. Below decks the men were cleaning up, securing the gear, and getting a wash for themselves. That done, they dropped in their tracks, dog-tired, and the decks were thick with sleeping forms.

They were hoping for a quiet afternoon when a German airship claimed attention. At once all was excitement and bustle. Destroyers dashed here and there hiding the little squadron in a dense smoke-screen. During dinner that night came a warning that the periscope of a U-boat had been sighted. Everyone hastened to his station, an order was given for all ships to pursue a zigzag course. Meanwhile a destroyer had dashed to the spot and dropped a couple of depth charges.

Harbour was reached safely and the first mine-laying excursion was pronounced a success. There were in all 13 excursions by the American mine-laying squadron to the field, and 11 by the British mine-laying squadron. Twice the two squadrons were joined to lay their mines in company. On one of these joint excursions the 10 American ships planted 5,520 mines, the four British ships 1,300, making a total of 6,820 planted in four hours. This is the record for numbers. A few weeks later the American squadron planted a field 73 miles long, making a record for distance.

The whole barrier, which stretched right across the North Sea from just north of the Udsire Light off the Norwegian coast to the Orkney Islands, contained 70,117 mines, of which 56,571 were American and the remainder British. The laying of the mines commenced on 8th June 1918, and was finished on 28th October following. It proved an effective barrier. The Germans themselves admitted the loss of 24 underwater craft in the minefield, and when the field was later removed, which proved if anything a more dangerous feat than laying it, considerable submarine wreckage was found clinging to the mooring cables.

On the right is a completely equipped model, built by Mr. C. L. Fry, of one of the Leyland "Tiger" passenger coaches operated by the Great Southern Railways of Eire. Above is shown on a table alongside the actual vehicle.

Bassett-Lowke Ltd.'s New Catalogue

Our advertisers Bassett-Lowke Ltd., Northampton, have issued a splendid new catalogue of locomotives, stationary engines and everything that the model constructor requires. This catalogue is a combination of their "A" and "B" lists of previous years, and contains many items of the greatest interest to the model railway enthusiast. It deals in a very comprehensive manner with "live steamers," giving details of splendid finished models of all sizes, from Gauge 0 to the 10¼ in. gauge, and of parts from which certain models can be built. In addition there are details of castings, parts, etc., suitable for electric and clockwork engines, and of track, rolling stock, signals, station buildings and railroad accessories of all kinds from Gauge 1 upward. Stationary engines also are listed.

The catalogue contains a list of books useful for the model engineer, and a good index. Its price is 6d. when bought over the counter of the firm's premises at Northampton, or at their London and Manchester branches. Readers of the "*M.M.*" who are interested, and cannot obtain it in this way, should write to Bassett-Lowke Ltd., St. Andrews Street, Northampton, enclosing 8d., the price of the catalogue post free, and mentioning the "*M.M.*"

Brown's Boy Scout Diary for 1940

This well-known Boy Scout Diary contains the features that have made previous editions so valuable, and every Wolf Cub or Boy Scout would thoroughly appreciate a copy as a present. The diary section proper gives plenty of space for entries, and the information pages give concisely and effectively details of such matters as Scout tests and proficiency badges, camping, First Aid hints and signal codes.

Sea Scouts also will find the Diary just what they want, as it deals with tides, the Scout coast-watching scheme, types of ships and the use of the compass. There are also coloured plates of the flags of the world. The price of the diary is 1/– when ordered through a bookseller, or 1/1 post free direct from Brown, Son and Ferguson Ltd., 52-58, Darnley Street, Glasgow S.1.

Tramway and Light Railway Modelling

The Tramway and Light Railway Society gives its members assistance in technical and model-building matters, and publishes a bulletin containing articles on tramways and similar topics, with contributions dealing with model construction. Circles have been formed in the Leeds and Sheffield, Portsmouth and Birmingham districts. The yearly subscription is 5/–. Further details can be obtained from the General Secretary, Mr. S. G. Jackson, 78, Haslemere Road, Thornton Heath.

Competition Corner

Which were the Most Popular Covers in 1939?

The magnificent coloured covers of the "*M.M.*" have long been one of its most famous features. Those that appeared during 1939 probably were the finest of the entire series, and certainly were most popular with readers, thousands of whom have written in to tell us how magnificent they were. This adds unusual interest to our Annual Cover Competition for 1939, and we shall look forward eagerly to learning which of them are considered to be the best.

In the above illustrations the covers that appeared in the various issues of the "*M.M.*" during 1939 are reproduced, the six from January to June in the upper row and those for the July to December issues below them. The reproductions give no idea of the colour and brilliancy of the originals, and they are only intended to serve as a guide to readers, practically all of whom carefully store their copies and will be able to examine the actual covers. What is required in this contest is that each entrant should state on a postcard:

A. Which of the covers he likes best of all.

B. His idea of the order of popularity of the 12 covers, as it will be decided by the massed votes of the competitors.

In each case the name of the month must be given, together with the number of the issue in the volume. Competitors are reminded that they need not place their own favourite cover at the head of list B unless they think that it will prove to be the choice of the majority of the competitors. They should put it in the position they think the massed votes will give it.

The entrant's name and address must be added to the card, which should be addressed "*Cover Voting Competition*, Meccano Magazine, Binns Road, Liverpool 13." No competitor may submit more than one entry.

In the Home Section prizes of Meccano products to the value of 21/–, 15/–, 10/6 and 5/– respectively will be awarded to the four competitors whose lists most accurately forecast the final result. In the event of a tie for any of the prizes, preference will be given to the entry displaying the neatest or most novel presentation. The closing date in this section is 31st January.

A separate set of prizes will be awarded in the Overseas Section, which is reserved for readers living outside the British Isles and the Channel Islands. Overseas entries should be sent in time to reach this office not later than 29th April.

The Most Interesting Advertisement

We know from past experience that readers of the "*M.M.*" scrutinise the advertisements that appear in its pages with the keenest interest. We are therefore making these advertisements the basis of an interesting competition in which every reader can take part. In it they are asked to tell us which advertisement in this issue they consider to be the most interesting, whether because of the nature of the goods offered, the manner in which the advertisement is set out, the value of the bargain offered, or any other feature that appeals to them.

All advertisements, large and small, stamps and readers' sales, are to be considered. In addition to naming the advertisement he has selected each competitor must state in not more than 50 words his reasons for believing it to be the most interesting.

Prizes of goods to the value of 15/–, 10/6 and 5/– respectively, will be awarded to the senders of the three entries judged to be the best. The goods may be selected from the lists of any advertiser in the Magazine, as the prize-winner desires. There also will be consolation prizes of the value of 2/6 each.

Entries should be made on postcards addressed "*Advertisement Contest*, Meccano Magazine, Binns Road, Liverpool 13," and must arrive not later than 31st January. There will be an Overseas Section, with similar prizes, and the closing date in this is 29th April 1940.

COMPETITION RESULTS

HOME

November Drawing Contest.—First Prizes: Section A, S. Jones (Chester); Section B, L. E. Mainprice (Wembley). Second Prizes: Section A, W. F. R. Chard (London S.W.18); Section B, J. E. Manning (Barnstaple). Consolation Prizes: J. J. Laing (Dunstable); J. H. Lethbridge (London N.14); B. Stott (Tankerton-on-Sea, Kent); P. Sullivan (Manchester14).

November "Price Codes" Contest.—1. W. K. Cocking (Redruth). 2. C. C. O. Young (Bedford). 3. L. W. Chitty (London S.W.20). 4. M. Salter (Exeter). Consolation Prizes: S. F. Hinks (Falkirk); H. Pennifold (Horsham); R. P. Walford (Newton Abbot).

OVERSEAS

July "Point Words" Contest.—1. F. J. Harrison (Bulawayo, S. Africa). 2. M. Most (Pietermaritzburg, S. Africa). 3. J. S. de' Conti Manduca (Sliema, Malta). 4. R. G. Bunt (Greymouth, N.Z.). Consolation Prizes: D. Perrin (Greymouth, N.Z.); R. A. Wragg (Bandikui, India).

August Photo Contest.—First Prizes: Section A, G. Inson (Canberra, Australia); Section B, C. O. Ekwensi (Ibadan, W. Africa). Second Prizes: Section A, Miss V. Galea (Valletta, Malta); Section B, R. A. Holmberg (Singapore, S.S.). Consolation Prizes: M. G. Catt (Sliema, Malta); G. A. Cavin (Victoria, B.C.); L. W. Humm (Geraldine, N.Z.).

August Crossword Puzzle.—1. D. Weiss (Torrens Park, S. Australia). 2. J. S. de' Conti Manduca (Sliema, Malta). 3. R. MacInnes (Gisborne, N.Z.). 4. M. Most (Pietermaritzburg, S. Africa). Consolation Prize: L. A. S. Johnson (Cheltenham, N.S.W.).

GOOD ADVICE

Actor: "I tried a new song before the manager this afternoon, and asked his opinion whether I ought to walk off or dance off after I had sung it."

Friend: "What did he advise you to do?"

Actor: "He said: 'If I were you I should run off'."

* * * *

Liza: "Dat no'count Mose told me last night ah looked positively ethereal in de moonlight."

Mandy: "Whut did he mean?"

Liza: "Ah dunno, but I done slapped his face so as to be on the safe side."

* * * *

"Oi, Alf!"

"'Allo!"

"Have you seen my gas mask?"

"Lumme! I thought you'd got it on!"

* * * *

Judge: "I'll let you off this time, but from now on keep away from bad company."

Defendant: "Thanks, Judge; you'll never see me here again."

* * * *

The guest at the dinner party, arriving late, found a seat reserved for him near the head of the table where a goose was being carved.

"Ah!" he exclaimed, with a pleasant smile, "so I am to sit by the goose."

Then, observing the lady on his right, he made haste to amend what he thought might be considered an awkward remark.

"I mean the roasted one, of course," he said.

* * * *

"How much for this big dog?"

"Four guineas."

"And for this smaller one?"

"Five guineas."

"And this little one?"

"Six guineas."

"And for this tiny one?"

"Eight guineas."

"Heavens! What'll it cost me if I don't buy one at all?"

* * * *

"Safety First"

(F. Mills, Kearsley)

* * * *

Old James was visiting a friend in the Highlands. "Did you have much snow last winter?" he enquired.

"Not verra much," replied the Scot; "my neighbour had much more than I did."

"How could he?" queried the other. "He doesn't live more than a mile away."

"Weel, he's got a deal more land."

DIDN'T DO BADLY

"Did you ever save a life?" asked Bobby.

"Yes," said Uncle Zeke. "Once my grandfather's house caught fire. I dashed inside and went all through downstairs, then upstairs in every room. Nobody home at all, so I jumped out of the window, just in time."

* * * *

Ephraim: "Did you know dat Jonah was three days in de stomach of a whale?"

Rastus: "Dat ain't much. Mah uncle was longer dan dat in de stomach of a alligator."

Ephraim: "Yo' don' say! How long?"

Rastus: "He's dere yit!"

* * * *

A Scotsman was fumbling for his fare at a railway booking office, when a member of the impatient crowd behind him shouted: "This is terrible: I'd sooner see 20 Englishmen in front of me than one Scotsman!"

"Aye," murmured the Scot, "so would the Germans."

* * * *

During a prolonged march, a young recruit was badly out of step.

"Can't you keep in step?" demanded a colleague after the first half-mile.

Suddenly the young recruit's legs began to gyrate violently and he was soon marching perfectly.

"That's better," said his colleague, "you're in step now."

"Yes," replied the recruit, "thanks to a banana-skin."

* * * *

AWKWARD

Farmer Giles congratulated one of his men on his new Sunday suit, but suggested the use of a coat hanger to make the coat hang better.

The following Sunday he saw the man wearing the suit again.

"I can't manage that coat 'anger, sir," he said. "It was very trying across the shoulders, and when I stooped down the 'ook pushed me 'at off."

* * * *

Jones: "I dreamed last night that I was being kicked by a horse."

Brown: "It must have been a night-mare."

* * * *

"You have been watching me for three hours," said the angler, "why don't you try fishing, yourself?"

"Nay, mister," replied the spectator, "I haven't the patience."

* * * *

Mr. and Mrs. Smith had returned from a camping and fishing holiday.

"Did you fish with flies?" asked a friend.

"Rather!" replied Smith. "Camped with them, ate with them, and slept with them as well."

* * * *

Counsel (cross-examining): "How often do we find people searching for a gas leak with a naked light?"

Witness: "Once."

* * * *

Tenderfoot (distractedly). "I've told you to keep away from here, Cub. Now see what you've done—knocked down my camp book and lost the page, and I haven't any idea what I am cooking."

* * * *

"The horn on your car must be broken."

"No, it's just indifferent."

"Indifferent! What do you mean?"

"It just doesn't give a hoot!"

* * * *

Hostess: "Are you sure you won't have another slice of cake, Tommy?"

Tommy: "No, thank you. I'll be getting a proper tea when I get home."

* * * *

"But you guaranteed that this watch would last me a lifetime."

"I know—but you didn't look very healthy the day you bought it."

* * * *

First Burgler: "Hey, let's get out of this. We've broken into the home of the heavy-weight champion!"

Second Burgler: "Aw, don't let that worry you. He wouldn't fight for nothing less than £1,000."

* * * *

THIS MONTH'S HOWLER

"He died of a painful melody."

GETTING IT WRONG

"Is ink so very expensive, father?"

"No, dear. What makes you think so?"

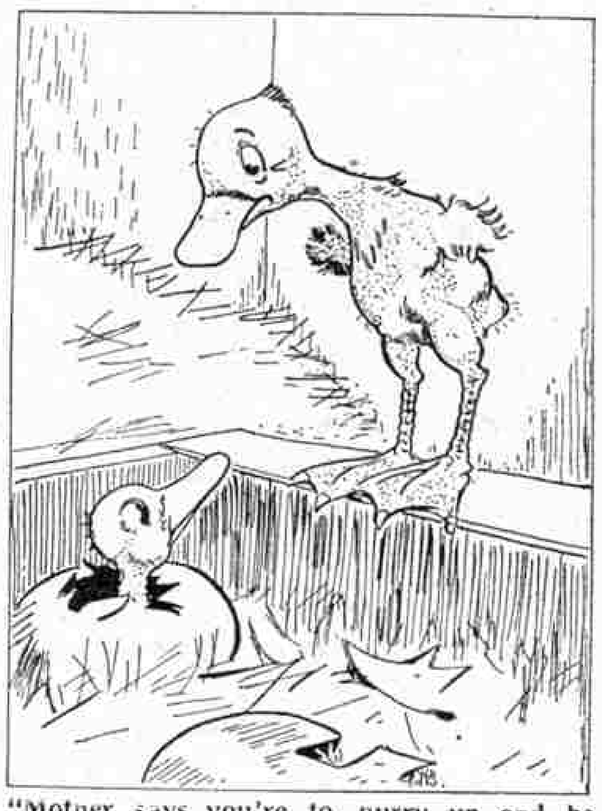
"Well, mother seems quite disturbed because I spilled some on the hall carpet."

* * * *

Housewife: "What do you work at, my poor man?"

Tramp: "Intervals, ma'am."

* * * *



"Motner says you're to nurry up and be hatched."

(F. Mills, Kearsley)

* * * *

One day, two natives were watching a leopard chasing their friend.

First Native: "Can you spot the winner?"

Second Native: "The winner is already spotted."

* * * *

Alf: "How long has that man worked for you?"

Rube: "About two days."

Alf: "I thought he had been here more than a month."

Rube: "He has."

* * * *

Motorist at police station: "Is my car back yet? Some of your men borrowed it to chase a burglar."

Sergeant: "Yes. We're summoning you for defective brakes and lights, as well as an inefficient silencer."

* * * *

"I is," began Joan.

"I am," promptly corrected the teacher.

"I am the ninth letter in the alphabet," Joan finished.

* * * *

Old Woman on Liner: "Steward, I must have a seat at the other side of the table. I can never travel with my back to the engine."

* * * *

Teacher: "Now, boys, tell me the signs of the Zodiac. You first, Thomas."

Thomas: "Taurus, the bull."

Teacher: "Right. Now you, Harold, another one."

Harold: "Cancer, the crab."

Teacher: "Right again. And now it's your turn Albert."

Albert (hesitating): "Mickey, the Mouse."

* * * *

"Frightened of walkin' on that beam?" said the housebreakers' foreman to the navvy who was crawling on hands and knees over a fifty feet chasm.

"No—frightened of walkin' orf it."

* * * *

Customer: "I don't like the look of that haddock."

Fish Dealer: "Lady, if it's looks you're after why don't you buy a gold fish?"

* * * *

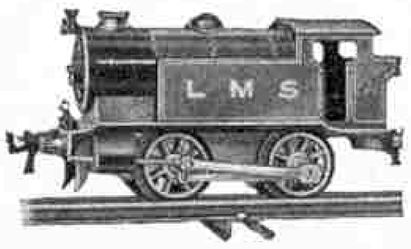
"I got sacked last week!"

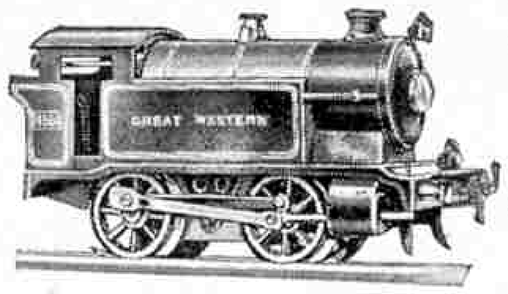
"What for?"

"For good!"

HORNBY
TANK LOCOMOTIVES

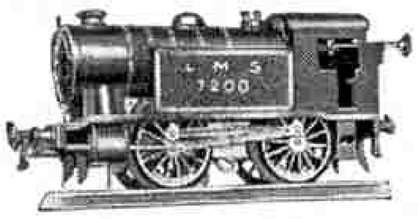
*No. 1 Clockwork Tank Locomotive
Reversing ... Price **15/-**

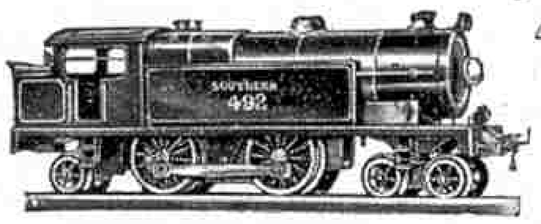




*E120 (20-volt) Electric Tank Locomotive
Reversing ... Price **22/6**

*No. 1 Special Clockwork Tank Locomotive
Reversing ... Price **19/-**





*E220 (20-volt) Special Electric Tank Locomotives
Automatic reversing. Price **34/-**

Lettered and coloured to represent L.M.S., G.W.R., L.N.E.R. or S.R. Locomotives.

MECCANO LTD. BINNS ROAD LIVERPOOL 13

Boy's Own Paper

January number

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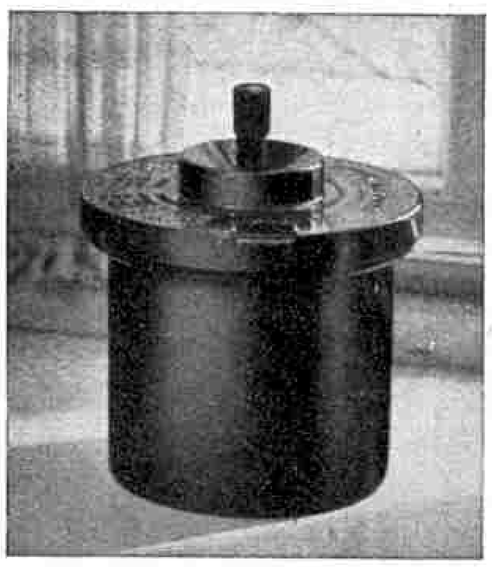

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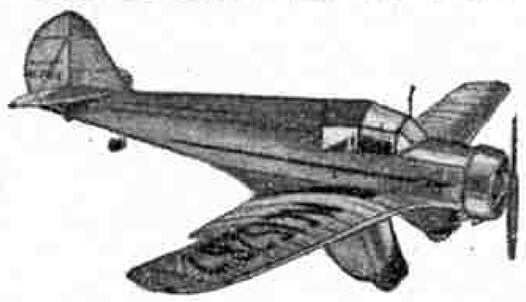

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Kits for 12 in. wing span Flying Models of the AERONCA, BOEING P12E, CURTISS PURSUIT, HELL DIVER, LOCKHEED VEGA, MONOCOUPE, PUSS MOTH, STINSON RELIANT, TAYLOR CUB, VULTEE VIA, WACO, GULF HAWK, HORNET MOTH, MILES MAGISTER.
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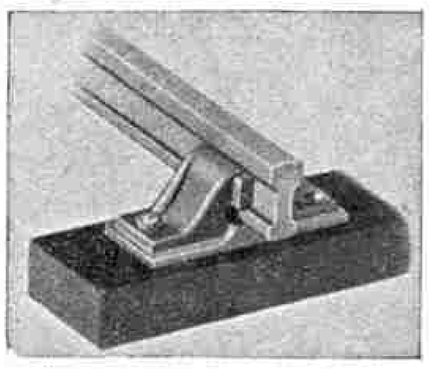

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E320 Riviera "Blue" Passenger Train Set (20-volt) automatic reversing	„	**77/-**

Ask your dealer for a copy of the latest complete price list of Hornby Trains and Accessories, or write direct to:

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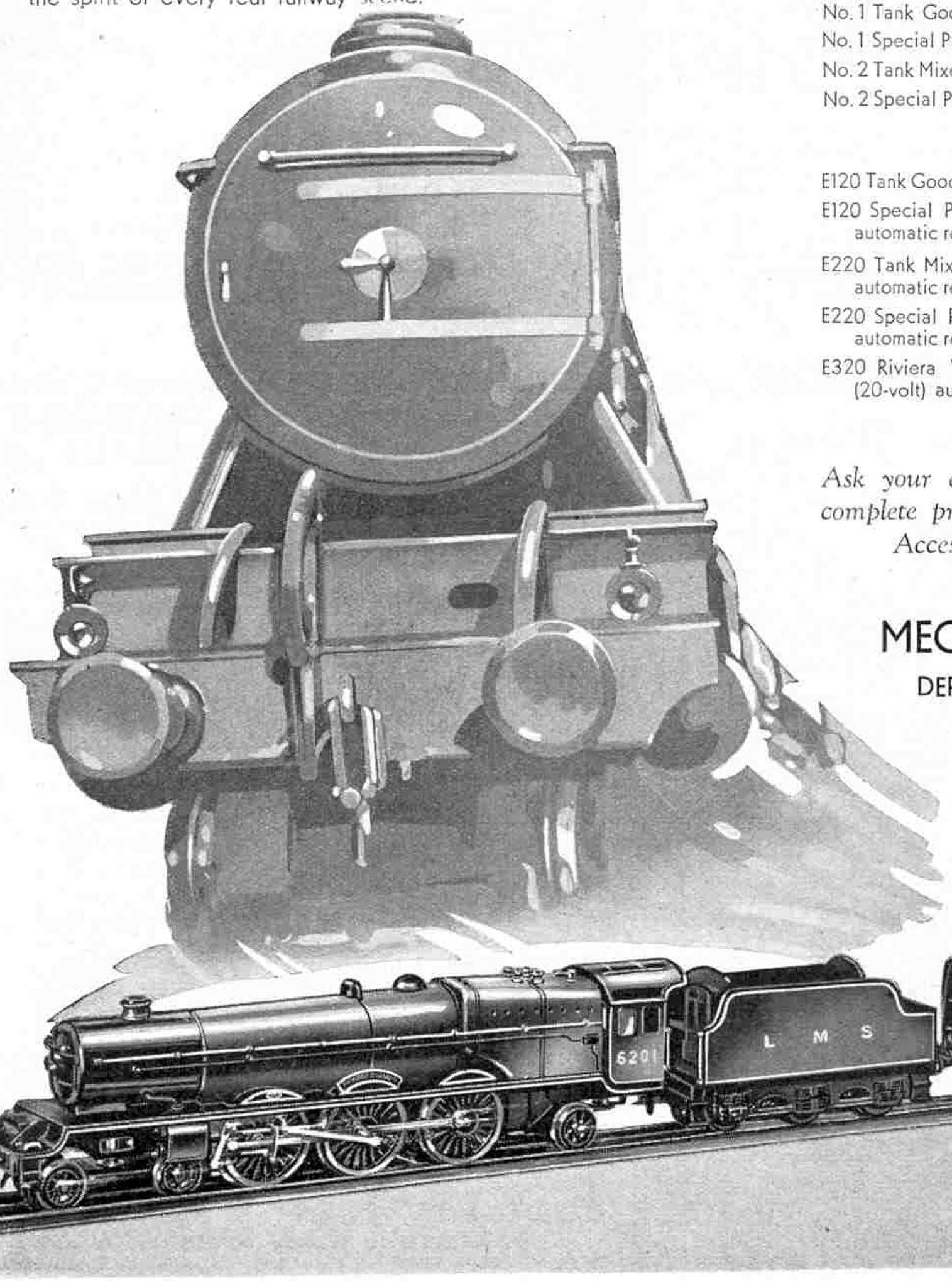

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GAUGE O

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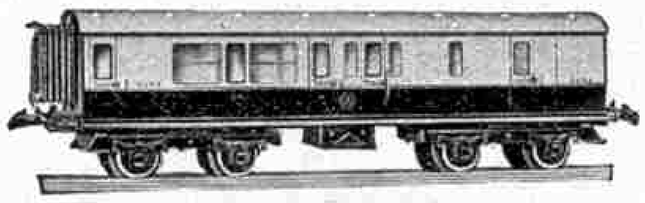
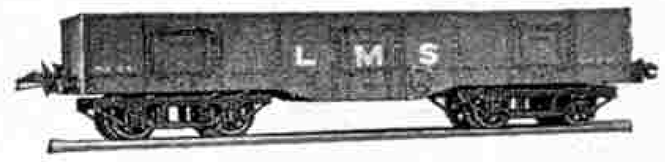
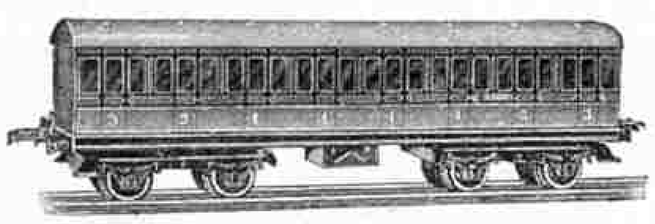


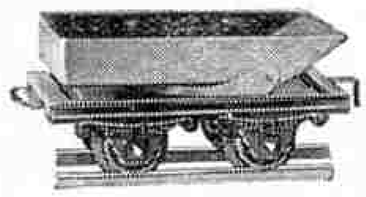
No. 2 CORRIDOR COACH
G.W. Brake-composite. Not suitable for 1 ft. radius rails.
Price **8/9**



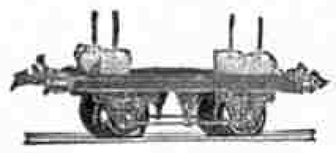
No. 2 HIGH CAPACITY WAGON
Finished in correct colours of G.W. and L.M.S. "Loco Coal" Wagons, or L.N.E.R. "Brick" Wagon. Not suitable for 1 ft. radius rails. Price **4/6**



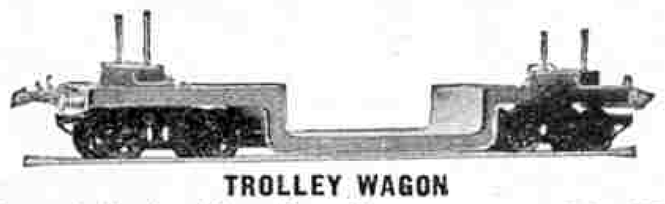
No. 2 PASSENGER COACH
First-third or Brake-third. Not suitable for 1 ft. radius rails.
Price **7/6**



No. 0 ROTARY TIPPING WAGON
Container revolves and tips.
Price **1/6**

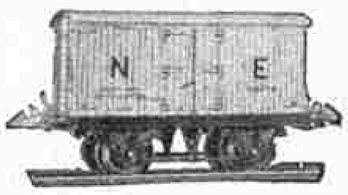


No. 1 LUMBER WAGON
Fitted with bolsters and stanchions for log transport.
Price **1/6**

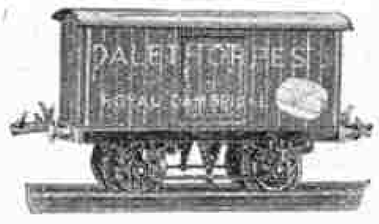


TROLLEY WAGON
Not suitable for 1 ft. radius rails. Price **4/3**

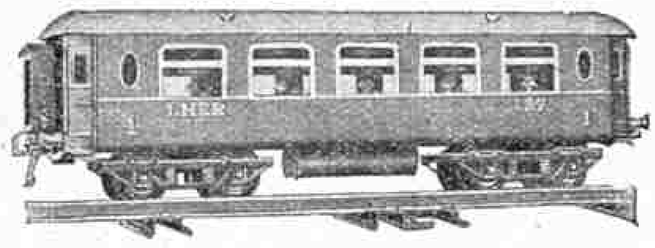
TROLLEY WAGON
Fitted with two Cable Drums Price **4/9**



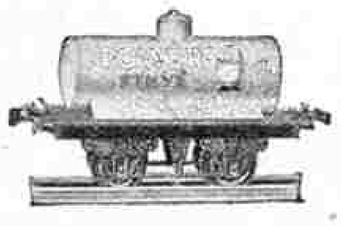
No. 0 REFRIGERATOR VAN
Lettered L.M.S., G.W., N.E. or S.R. Finished with the appropriate details. Price **1/9**



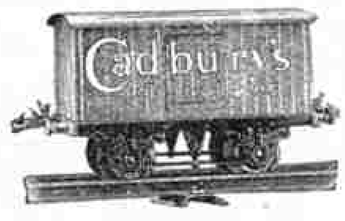
SAUSAGE VAN "PALETHORPES"
Fitted with sliding doors.
Price **2/6**



No. 2 SALOON COACH
L.M.S. or L.N.E.R. Price **11/-**
Not suitable for 1 ft. radius rails.



No. 1 PETROL TANK WAGON "POWER ETHYL"
Price **1/11**



CHOCOLATE VAN "CADBURY'S"
This van is beautifully enamelled in blue with white roof.
Price **2/6**

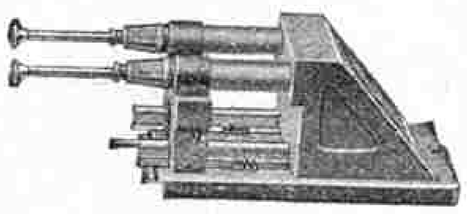
MECCANO LIMITED — BINNS ROAD — LIVERPOOL 13

★ *The increased prices quoted on this page take effect as from 1st January*

HORNBY ACCESSORIES

Here are a few items from the splendid range of accessories of the Hornby Railway system. See how realistic they are—all built in perfect proportion and all beautifully finished. Add some of them to your Hornby Railway and give it a realism that will be the envy of all your friends.

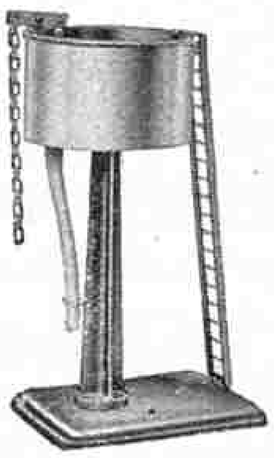
Ask your dealer to show you the complete range of Hornby Accessories.



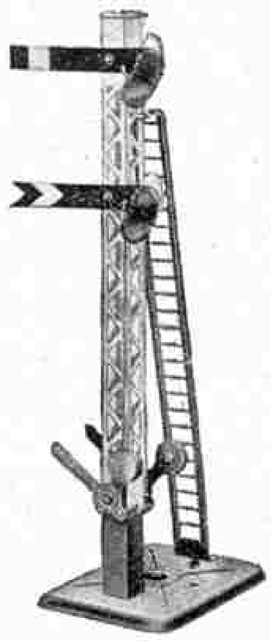
No. 2A BUFFER STOPS
Hydraulic type. Price **2/9**

No. 3A BUFFER STOPS
Similar in design to No. 2A Buffer Stops, but fitted for use with Hornby Solid Steel Track. Price **3/6**

No. 2 SIGNAL CABIN
Dimensions: Height 6½ in., width 3½ in., length 6½ in.. Price **4/-**



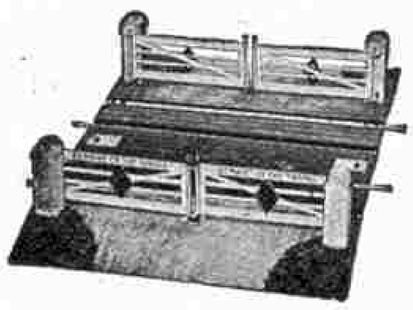
WATER TANK
Fitted with flexible tubes and valve lever. Stands 6½ in. high. Price **2/6**



No. 1 SIGNAL, DOUBLE ARM
Price **1/3**

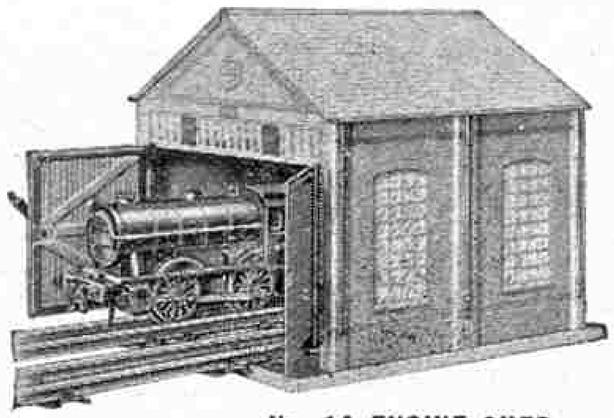
STATION OR FIELD HOARDING
Price **4d.**

No. 1 TUNNEL (STRAIGHT)
Base measurement:
Length 7 1/16 in., width 6¼ in.
Price **1/9**



No. 2 LEVEL CROSSING
Measures 13½ x 10¼ in., with two gauge O tracks in position.
Price **6/-**

No. 1 GOODS PLATFORM
Length 13 in., height 6¾ in., width 6 in. Price **5/-**

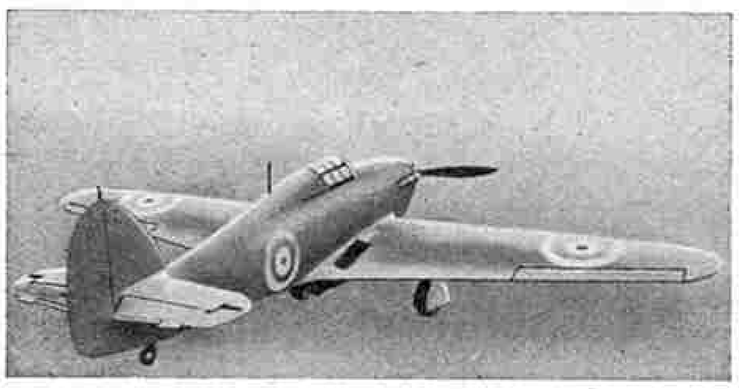


No. 1A ENGINE SHED
Price **6/6**

No. 7 RAILWAY ACCESSORIES
Watchman's Hut, Brazier, Shovel and Poker. Price **10d.**

BOYS! THEY'RE HERE

AUTHENTIC MODEL CONSTRUCTION OUTFITS



Hawker "Hurricane." Scale $\frac{1}{48}$ Actual Size.

OUR RANGE INCLUDES THE FOLLOWING WELL-KNOWN TYPES:

Hawker "Hurricane," Fairey "Battle," Blackburn "Skua," Hawker "Fury," Miles "Master," Miles "Monarch," etc., etc.

EACH MODEL HAS BEEN DESIGNED BY AN EXPERT AND IS THE LAST WORD IN COMPLETENESS.

EACH OUTFIT CONTAINS EVERYTHING NECESSARY TO COMPLETE THE MODEL, EVEN TO WATER TRANSFERS FOR INSIGNIAS.

14 Models from **1'11** to **5'-** each

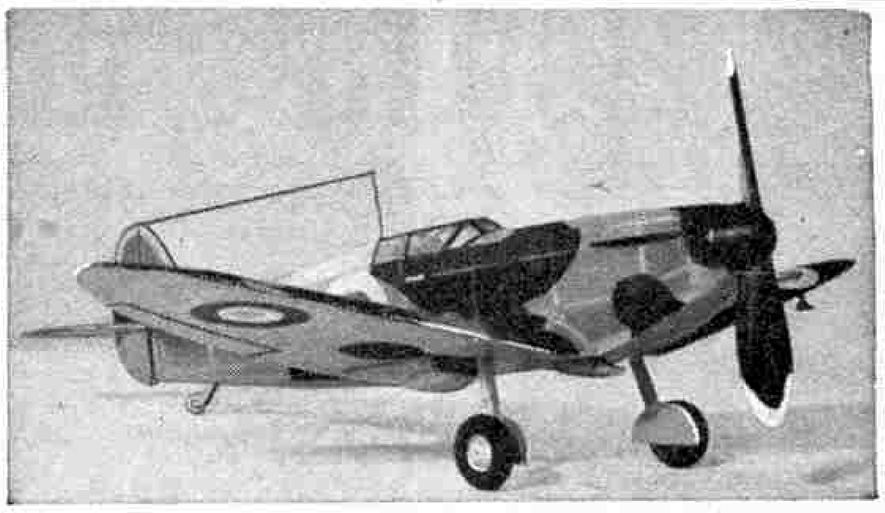
ASK FOR THEM AT YOUR LOCAL TOY SHOP OR MODEL DEALER

POST THIS COUPON FOR FREE DETAILS

Name.....

Address.....

To: THE AUTHENTIC MODEL CO., MERSEY STREET, WARRINGTON



A FINE GIFT *for* **BOYS** *from* **12 UPWARDS**

Flying Model of Britain's Crack Fighter

SUPERMARINE SPITFIRE

Sturdy, realistic, complete with undercarriage, radiators, and cooling surfaces . . . specially designed to our own exclusive principle to give hour upon hour of steady, trouble-free flying. Complete kit of parts has very detailed plan, three large printed balsa sheets, balsa prop., cements, tissue, etc. Pre-war value, fully worth 3/11, or more.

16" WING SPAN

2'9

COMPLETE KIT OF PARTS

WESTLAND LYSANDER

Wing span 19", length 11". Exact scale model and fine flyer. Detailed plan with squadron letters. Ready turned balsa cowl. Complete kit, hand carved flying prop., cement, dope, etc.

3'11

Satisfaction or Money Refunded – Sold by Dealers or

SEND P.O. *NOW* TO

M. SWEETEN LTD., BANK HEY STREET, BLACKPOOL.

CATALOGUE 26 pages full of illustrations. 3d. post free.

It's a **Tower** *GUARANTEED* **AEROPLANE KIT**

Build your own engine

Only a few hand tools required.

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Completely machined set with full instructions:
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72 pages fully illustrated.

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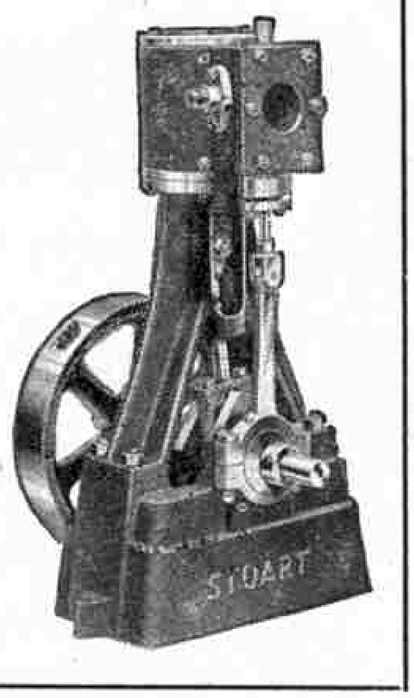

ABOVE ALL OTHERS!

AN "ELITE" PRODUCT "NIPPY"

Wingspan 30 ins. Length 24 ins. Average Duration 90-120 secs.

A COMPLETE KIT FOR BUILDING THIS FINE MODEL

Contains: Finished Prop. Free-wheeling Shaft, Balloon Wheels, Rib Outlines clearly printed on M.A.T.A. Balsa, Balsa Strip, Wire, Tissue, Brass Brush, Cement, Dope, Tissue-paste, semi-finished Nose Block, FULL SIZE PLAN Instruction Sheet, Aluminium Tube, Washers, 8 strands Rubber. UNBEATABLE VALUE. Only **6/6**, post free.

THE FAMOUS "BURD" KITS

30 in. WINGSPAN—Mr. Mulligan; Boeing P.26.A; Aeronca C70; 1936 Stinson, etc., **3/9** each, post free.

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"SKEETER"—Three in one! Land-, Sea- and Iceplane. Suits every need. Easy to build. 36 in. span. **8/6**, post free.

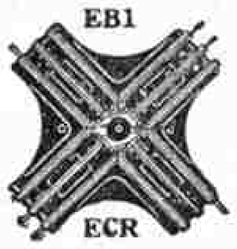
SELLEY-TEX—The Wonder Kits. Ask for full particulars.

Send **2d.** *for our large 1939 catalogue, illustrating a full range of Kits from* **1/3** *to* **21/-**. *Every type of accessory is also listed.*

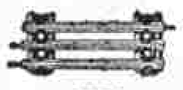
ELITE MODEL AIRPLANE SUPPLIES 14, BURY NEW ROAD, MANCHESTER 8.

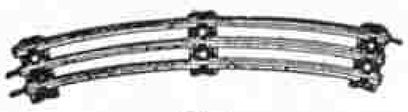
HORNBY TINPLATE TRACK

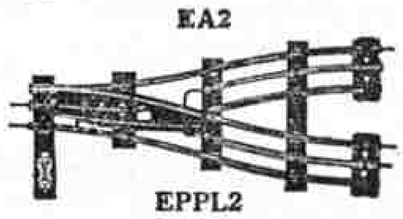
EB1

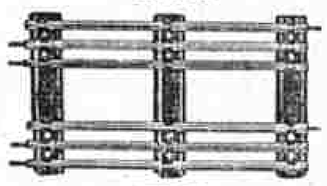

ECR

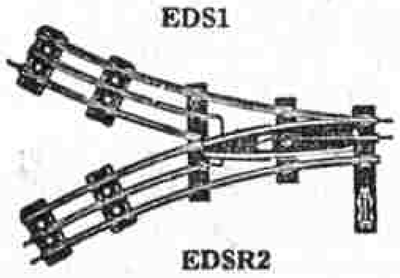
EA2½


EB½


EA2


EPPL2


EDS1


EDSR2

GAUGE 0, 1¼". HORNBY SERIES.

Hornby Rails, Points and Crossings are built for hard wear and for smooth running.

There is practically no limit to the number of rail formations that can be built with them. Their adaptability is well shown in the booklets "How to Plan your Hornby Railway" and "Hornby Layouts—60 Suggestions," both of which may be obtained from your dealer, price 3d., or from Meccano Ltd., Binns Road, Liverpool 13, price 4d.

A SELECTION OF RAILS, POINTS AND CROSSINGS FOR ELECTRIC TRAINS

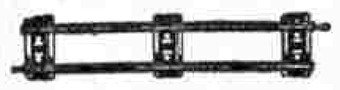
EB1 Straight rails	per doz.	6/-	EDS1 Straight rails, double track	½ doz. 9/6
EB½ „ half rails ...	„ „	5/-		
EA2½ Curved quarter rails (2 ft. radius)	„ „	4/6		
EA2 Curved rails (2 ft. radius)	„ „	6/-		
EPPR2 Parallel points, right-hand	per pair	8/-	EDSR2 Double symmetrical points, right-hand (2 ft. radius)	per pair 8/-
EPPL2 Parallel points, left-hand			EDSL2 Double symmetrical points, left-hand (2 ft. radius)	
These points can be used with either 1 ft. or 2 ft. radius track.				
EPR2 Right-hand points (2 ft. radius)	per pair	9/-	EDSR1 Double symmetrical points, right-hand (1 ft. radius)	per pair 8/-
EPL2 Left-hand points (2 ft. radius)			EDSL1 Double symmetrical points, left-hand (1 ft. radius)	
EPR1 Right-hand points (1 ft. radius)	per pair	7/6		
EPL1 Left-hand points (1 ft. radius)				

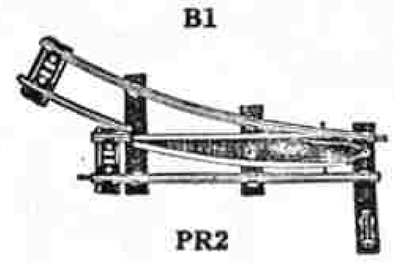
FOR CLOCKWORK TRAINS

B1 Straight rails	per doz.	4/-	CA2 Acute-angle crossings (for 2 ft. radius track) ...	each 1/9
A1 Curved rails (1 ft. radius)	„ „	4/-		
PR1 Right-hand points (1 ft. radius)	per pair	4/-	PPR2 Parallel points, right-hand	per pair 4/6
PL1 Left-hand points (1 ft. radius)			PPL2 Parallel points, left-hand	
			These points can be used for either 1 ft. or 2 ft. radius track.	
PR2 Right-hand points (2 ft. radius)	per pair	4/-	DC2 Curved rails, double track, 2 ft. radius only ...	½ doz. 7/-
PL2 Left-hand points (2 ft. radius)				

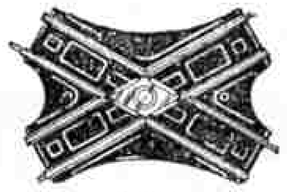
Ask your dealer for an illustrated price list.

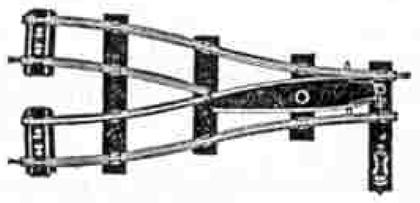
MECCANO LIMITED, Binns Road, Liverpool 13

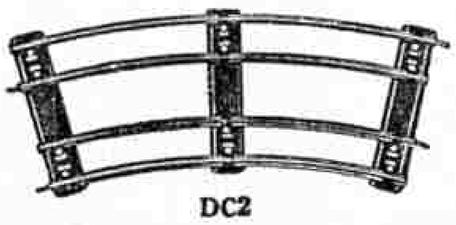

B1


PR2

A2


CA2


PPR2

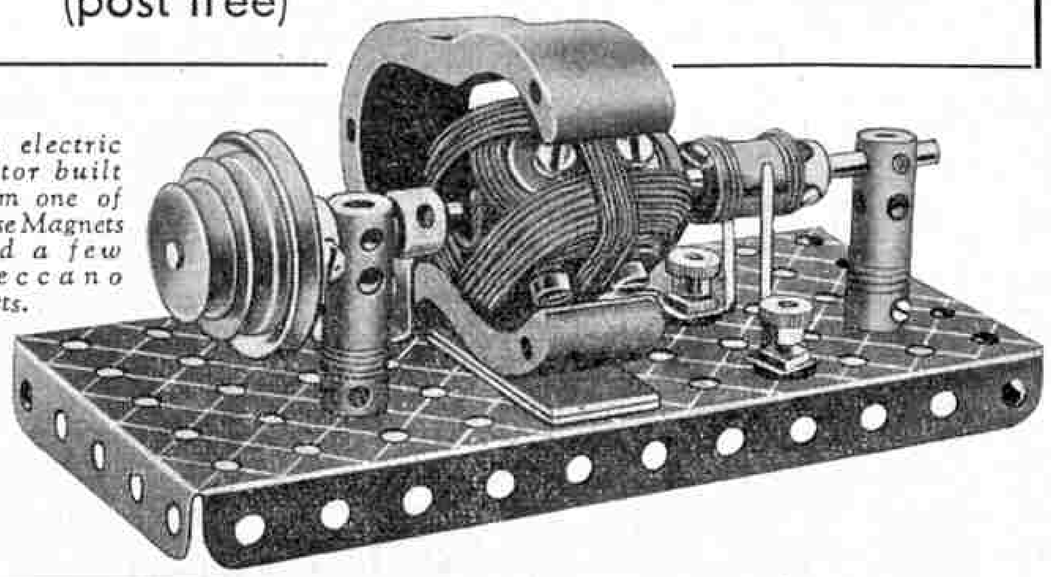

DC2

★Build your own Electric Motors and Dynamos

Cobalt Steel Magnets 2/9 each (post free)

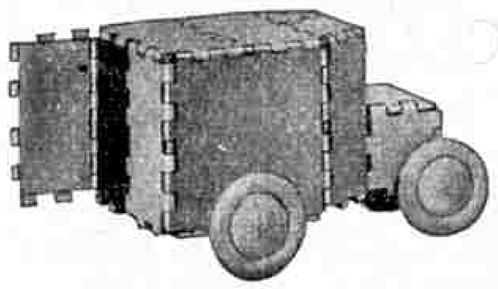
We have a limited supply of surplus permanent magnets suitable for use in building up small dynamos, electric motors and other experimental electric apparatus. These magnets are made from high-grade cobalt steel and are exceptionally powerful for their size. They can be obtained only from Meccano Ltd., Binns Road, Liverpool 13.

This offer cannot be repeated when the present stock is disposed of, and readers should order immediately.



An electric motor built from one of these Magnets and a few Meccano parts.

DINKY BUILDER



A fine model of a Motor Van built with Outfit No. 1.

Simplicity is the keynote of this new building system, by means of which the youngest children can build all kinds of models with the greatest of ease.

No. O DINKY BUILDER OUTFIT

This Outfit contains a good assortment of Dinky Builder parts (including two road wheels), with which a splendid range of models can be built. The Instruction Folder included gives examples of 40 models. *Price 2/9

No. 1 DINKY BUILDER OUTFIT

This splendid Outfit contains a varied selection of parts, including a set of four road wheels for constructing miniature wheel toys. The Instruction Manual included shows a total of 56 fine models. *Price 5/6

No. 2 DINKY BUILDER OUTFIT

The parts in this fine Outfit make possible the construction of six groups of miniature model furniture and other wonderful models. Full instructions for building the complete range of 74 models are given. *Price 8/6

No. 3 DINKY BUILDER OUTFIT

This is the largest Outfit in the series, and its model-building possibilities are almost limitless. It is the ideal gift for young boys and girls.

The parts contained in this Outfit can be used over and over again to make hundreds of different models. *Price 12/-

*The increased prices given take effect as from 1st January

MECCANO LTD. - BINNS ROAD - LIVERPOOL 13

USE ONE OF THESE FOR EASY TYRE INFLATION

EXCEPTIONAL QUALITY

15″ × 7/8″
2/6

BAILEY'S "SUPER" PUMP. Steel Lined; Celluloid Covered
The linings are solid drawn; cartridge fashion; each pump being drawn from its own metal blank, therefore there are no solderings or loose pieces to leak
CANNOT WARP NOR LEAK

APEX SUPERLITE
The World's Best Seller

15″ × 7/8″
2/3

APEX "SUPERLITE" CELLULOID PUMP
Made of best quality celluloid; strongly constructed and beautifully polished
Manufactured by:
APEX INFLATOR CO. LTD., Thapex Works, Aldridge Road, Perry Barr, Birmingham

STAMP ADVERTISEMENTS (Continued from page 52)

FREE! GEORGE VI
15 MINT COLONIALS
ALSO packet Assorted Colonials, OR, IF PREFERRED, 15 MINT FOREIGN NEW ISSUES, and packet Assorted Foreign (state which). ALSO packet MOUNTS, AND Six Greaseproof Envelopes, to all GENUINE Approval Applicants requesting a Selection of my Unbeatable Approvals enclosing 2d. in halfpenny stamps (abroad 6d.) to cover Postage, etc. DON'T DELAY. WRITE NOW!
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A collection in itself!
To all genuine applicants for my cheap approvals. Lowest prices. Liberal Commission. Packet without approvals, 8d.
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This scarce high value stamp will be given free to all genuine applicants for our famous ONE PENNY Approval BOOKLETS of BRITISH COLONIALS. These Booklets abound with JUBILEES, CORONATIONS, large BI-COLOURED PICTORIALS and the latest KING GEORGE VI stamps. The best value on the market and every stamp an investment—no worthless foreign stamps. N.B.—Enclose 1½d. for Postage.
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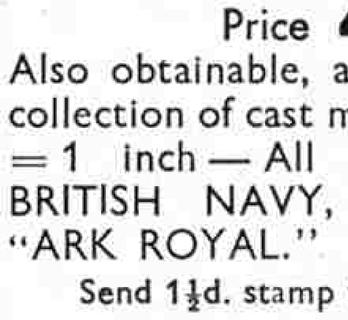

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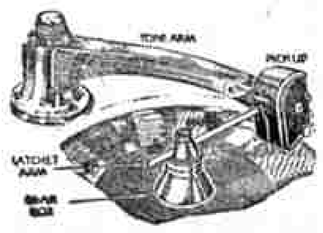

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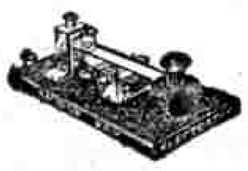

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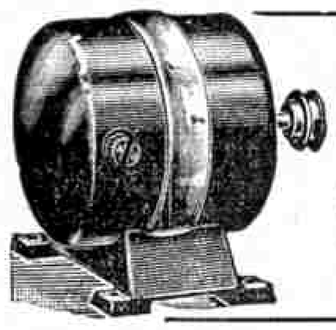

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Telegrams: "Meccano, Liverpool."

Publication Date. The "*M.M.*" is published on the 1st of each month and may be ordered from any Meccano dealer, or from any bookstall or newsagent, price 6d. per copy. It will be mailed direct from this office, 4/- for six issues and 8/- for twelve issues.

To Contributors. The Editor will consider articles and photographs of general interest and payment will be made for those published. Whilst every care will be taken of articles, etc., submitted, the Editor cannot accept responsibility for any loss or damage. A stamped addressed envelope of the requisite size should be sent where the contribution is to be returned if unacceptable.

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NEW ZEALAND: Models Limited, Third Floor, Paykel's Buildings, 9, Anzac Avenue (P.O. Box 129), Auckland. C.1.
SOUTH AFRICA: Mr. A. E. Harris (P.O. Box 1199), 142, Market Street, Johannesburg.
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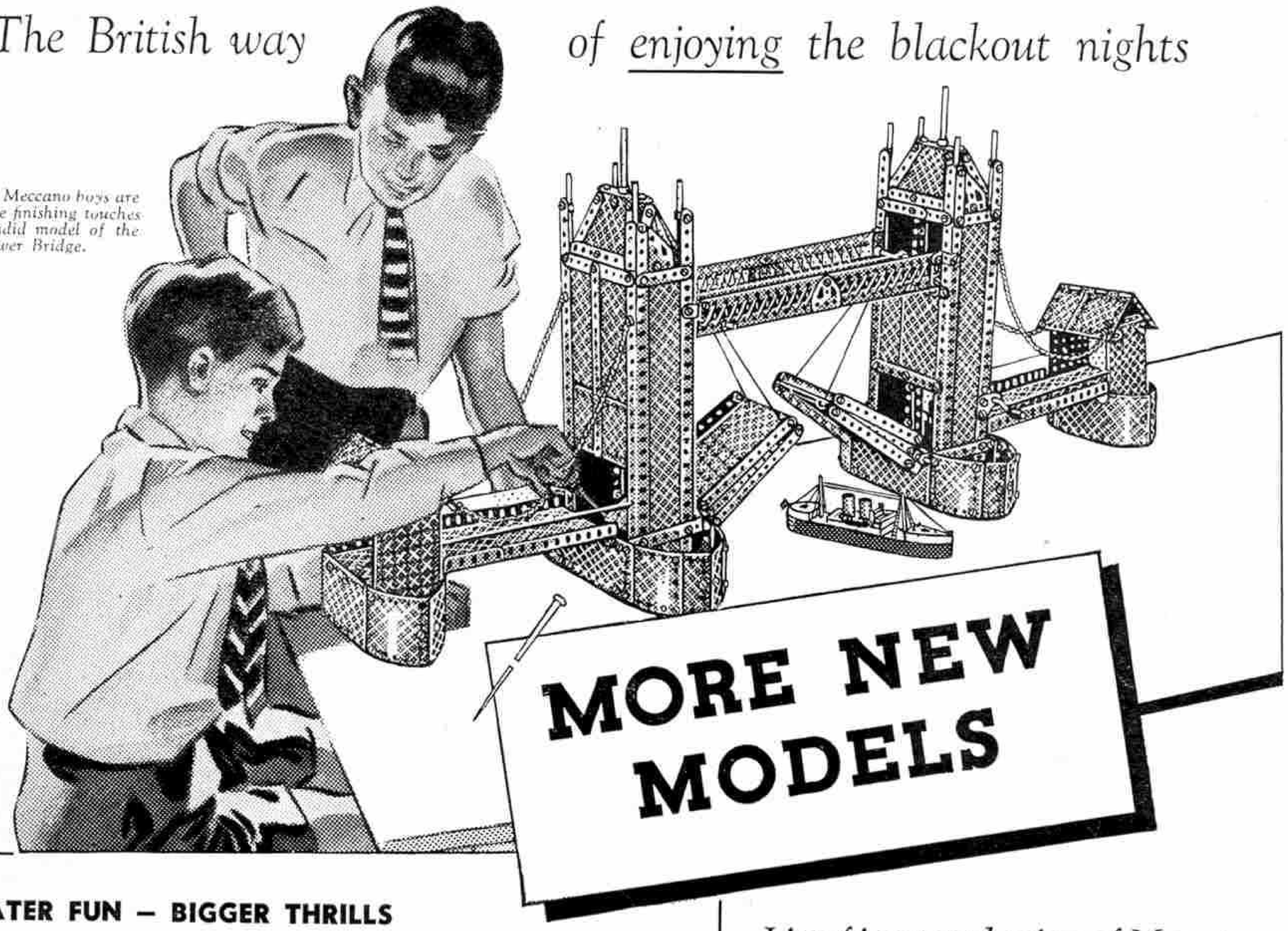

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