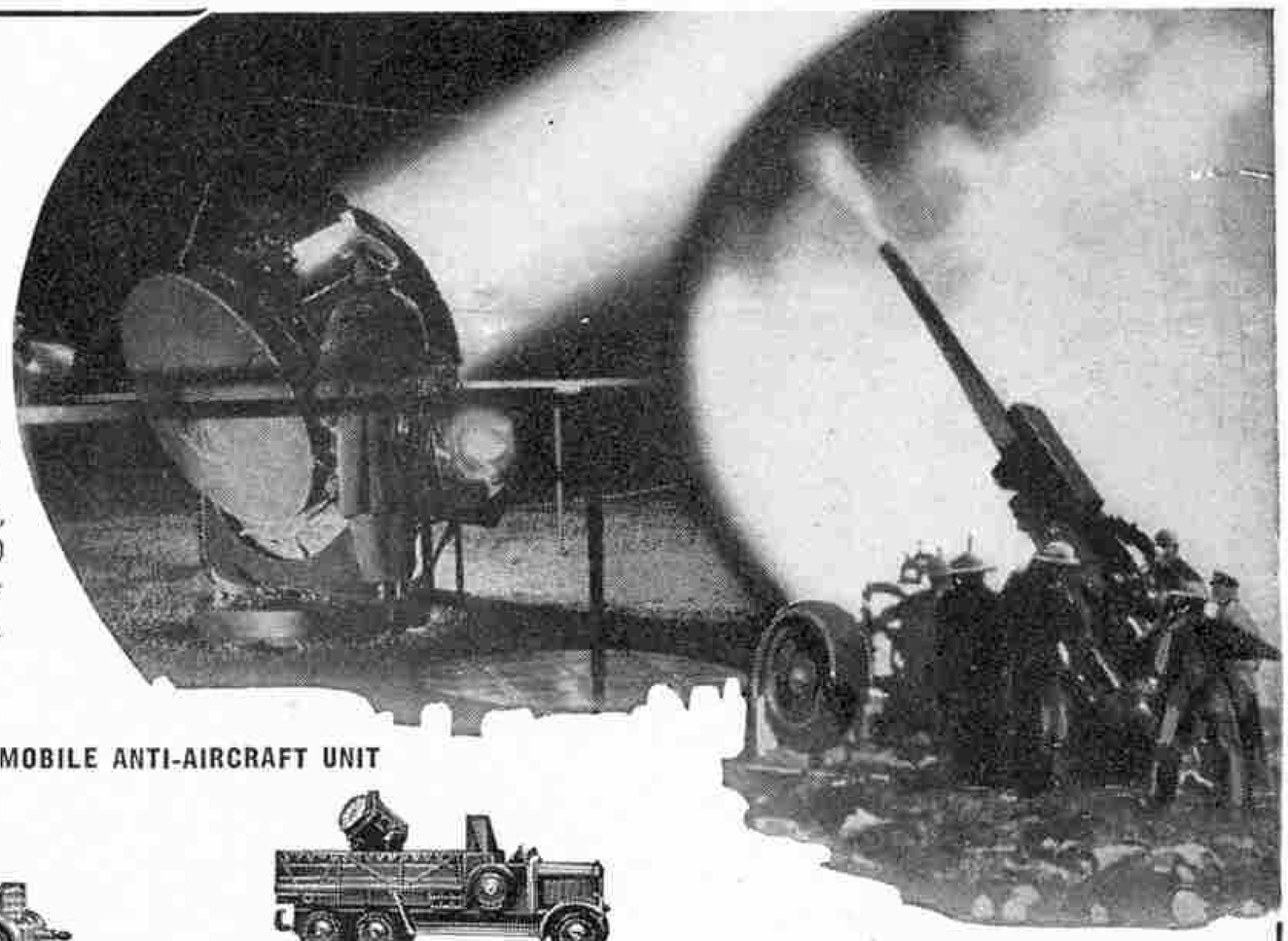
VOL. XXV. Nº 11 NOVEMBER 1940

MECCANO MAGAZINE

RUSTLESS STEEL

6D.

DINKY TOYS



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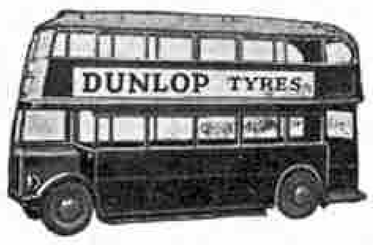

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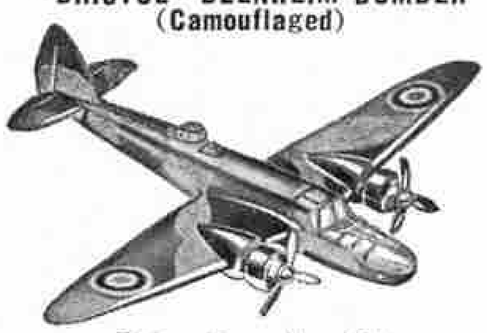

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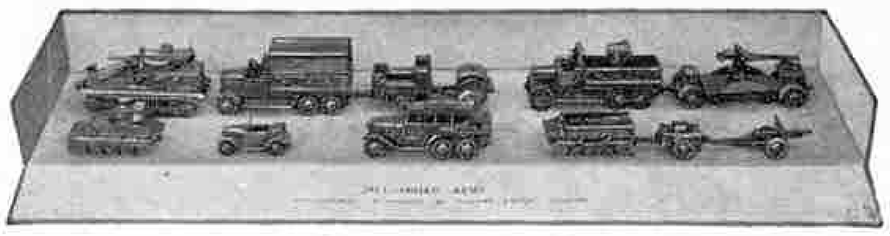

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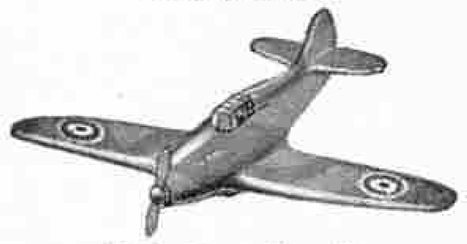

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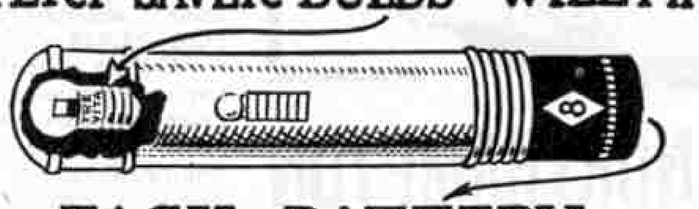

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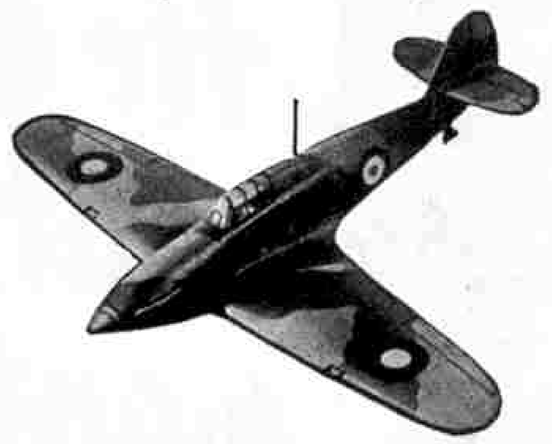

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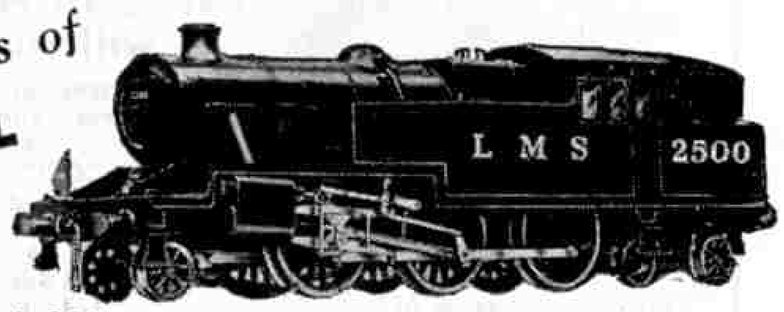

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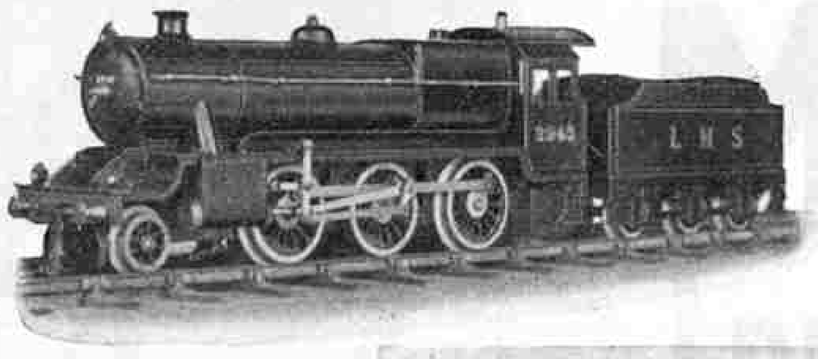

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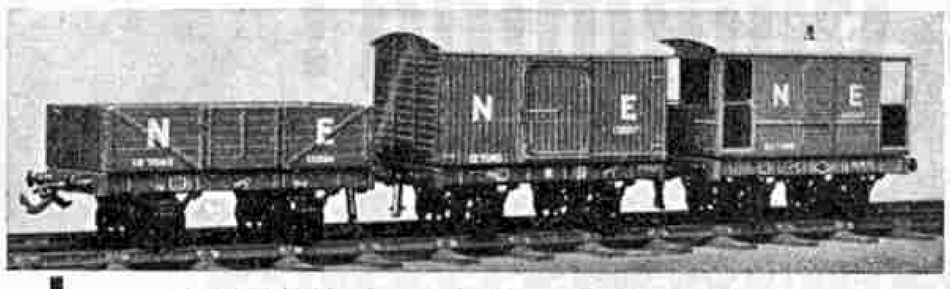

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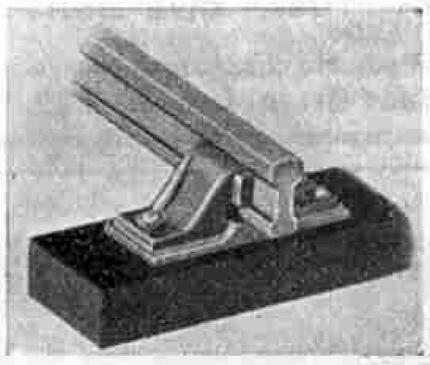

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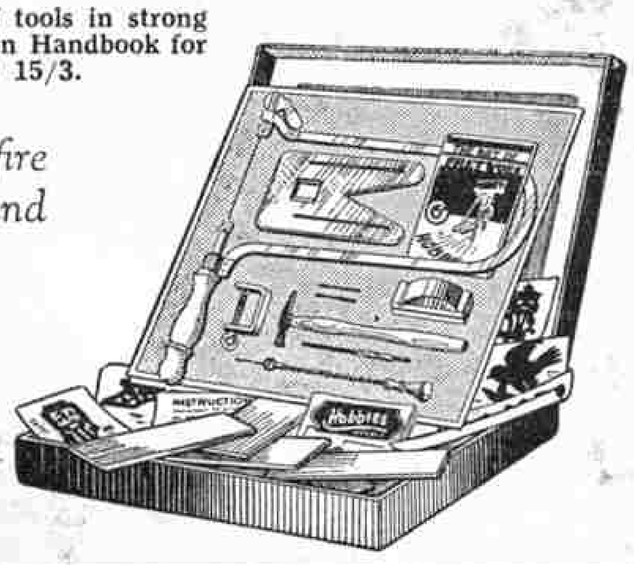

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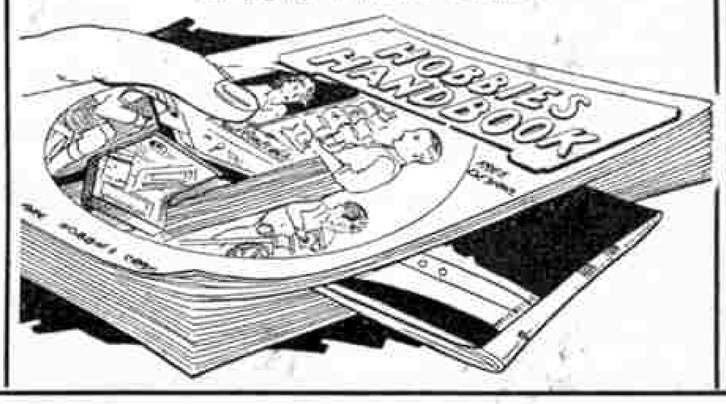

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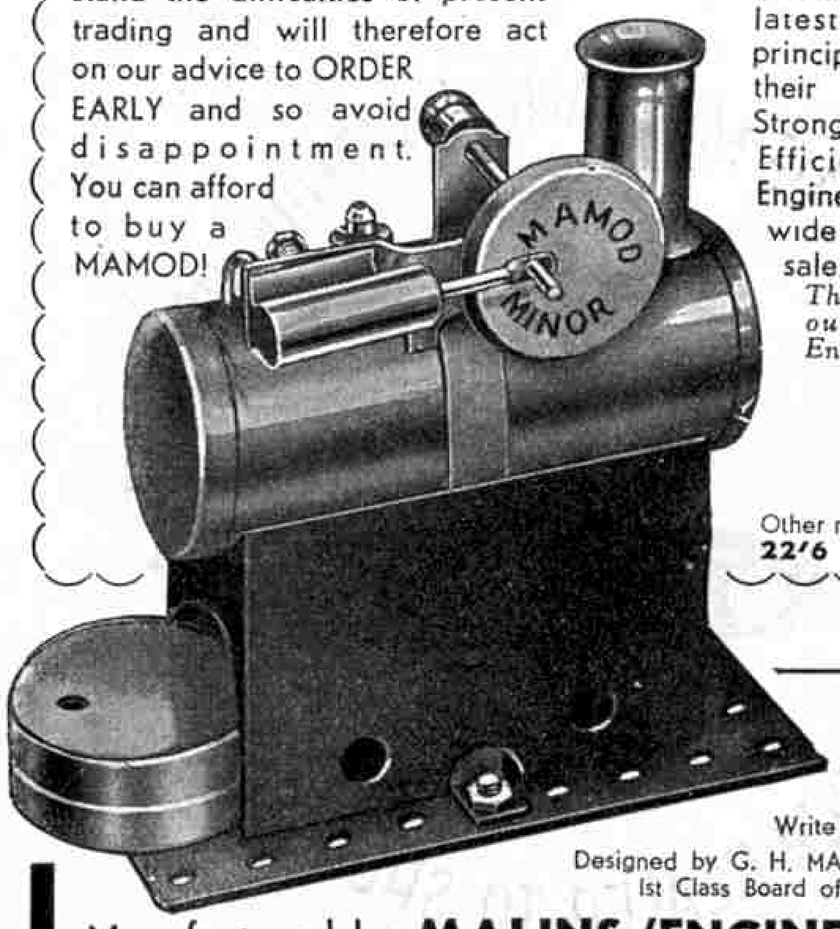

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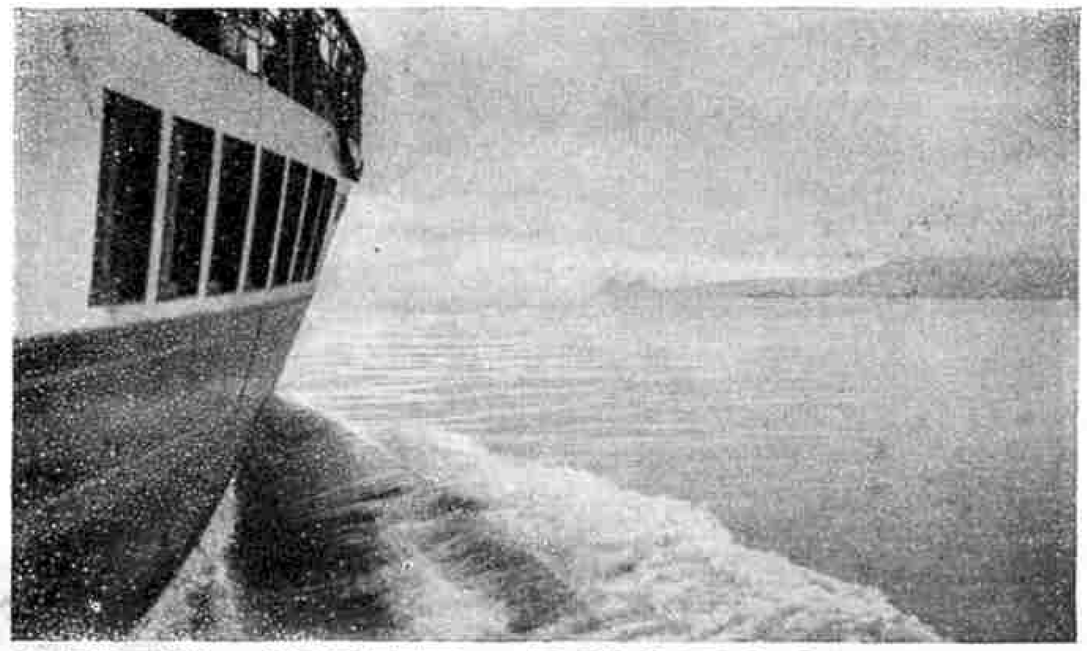

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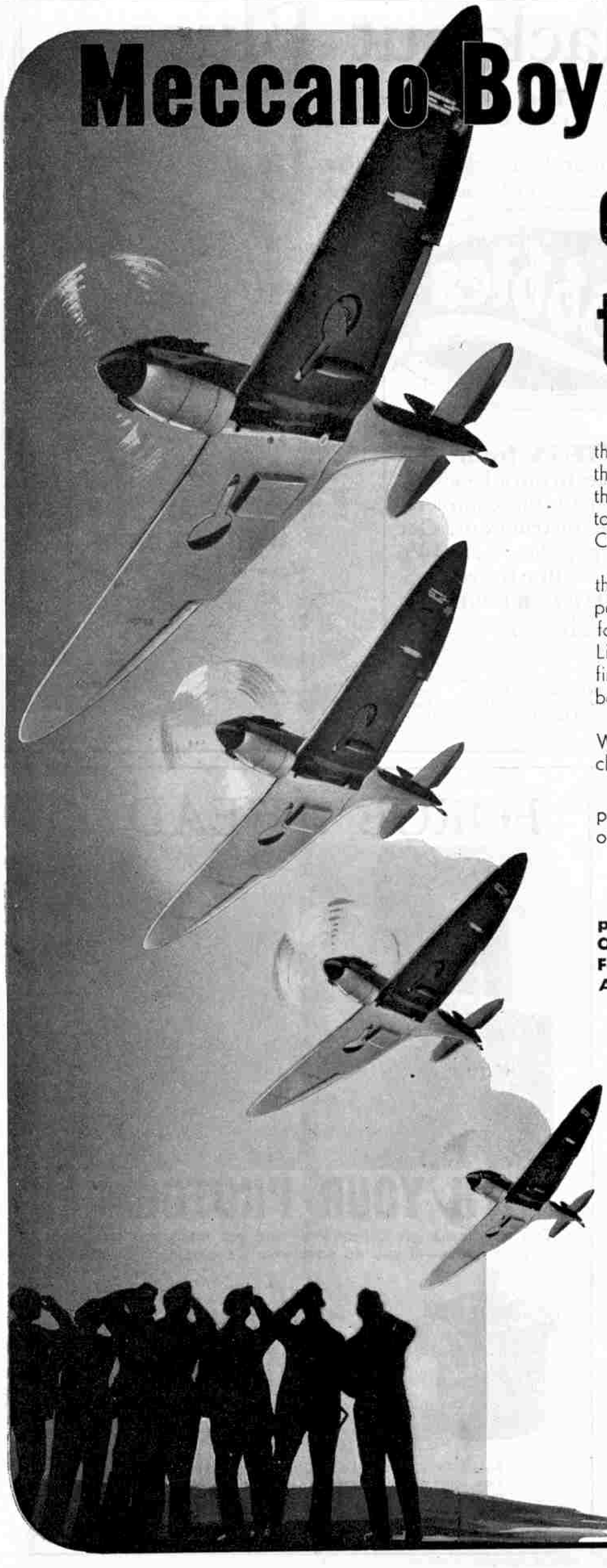

Meccano Boys to give their own "Spitfire" to the R.A.F!

Meccano boys from all parts of the Empire have written during the past few months to express the wish that it might be possible for them to combine in some way to buy a "Spitfire," to be known as the "Meccano Spitfire," for the R.A.F. In this way they would be able to express their appreciation of the glorious work of the Fighter Command.

To help to carry out this scheme our Directors have arranged for the production of a special miniature "Spitfire" in the form of a pendant. This pendant is available beautifully enamelled in the following colours: Light Grey, Red, Yellow, Magenta, Dark Blue, Light Blue, Emerald Green, Medium Green, and also in specially finished Camouflage. It is fitted with a split ring so that it can be worn on the lapel of a coat or costume.

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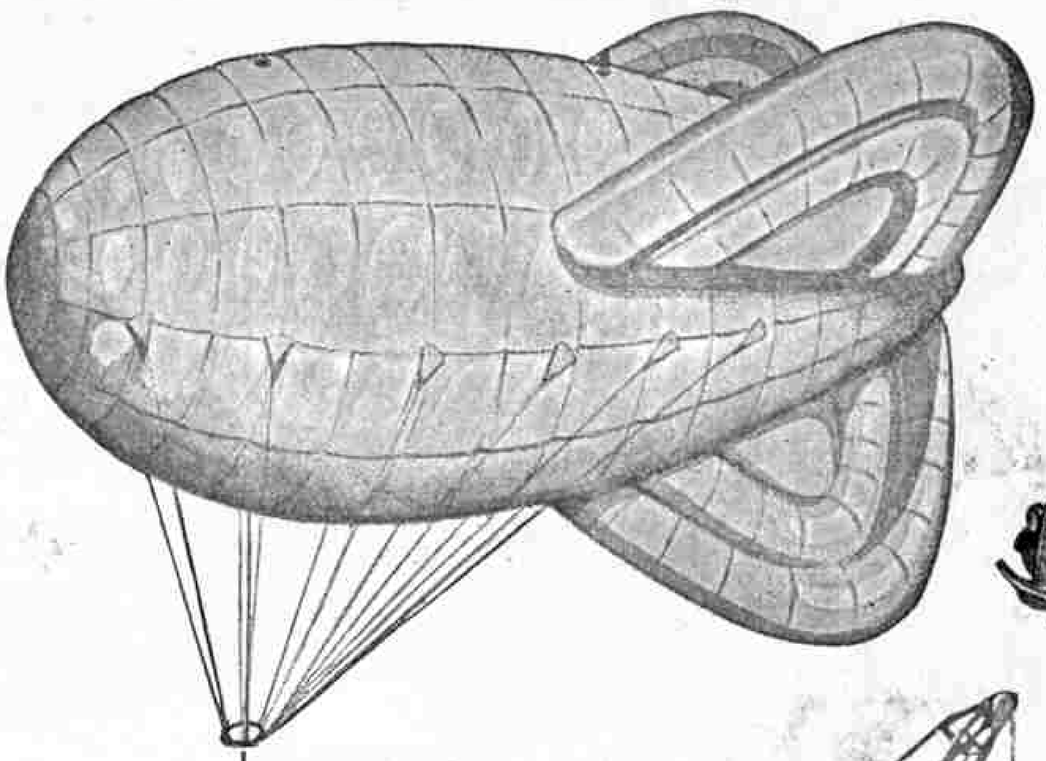

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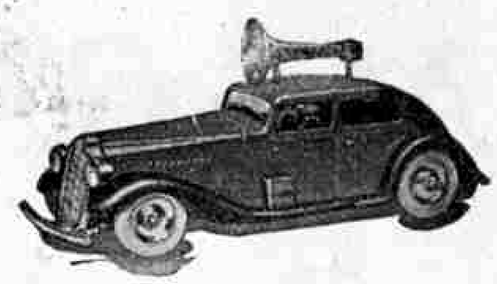
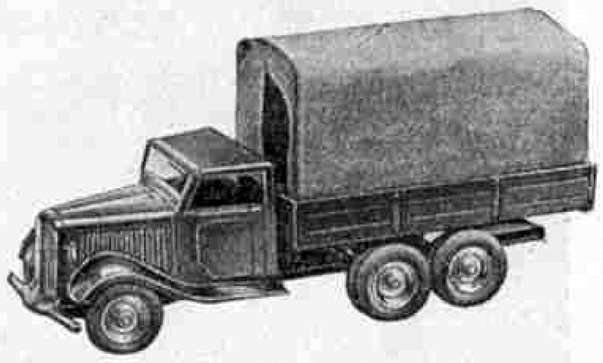
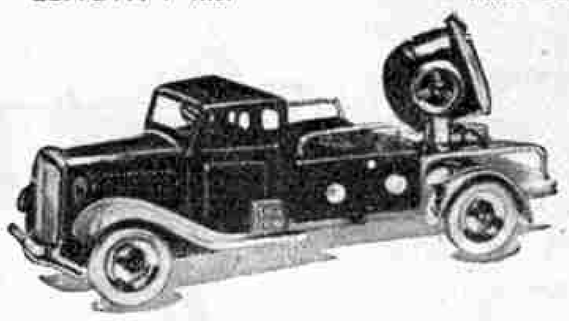


MINIC Traffic Control Car.
LENGTH 7 ins.



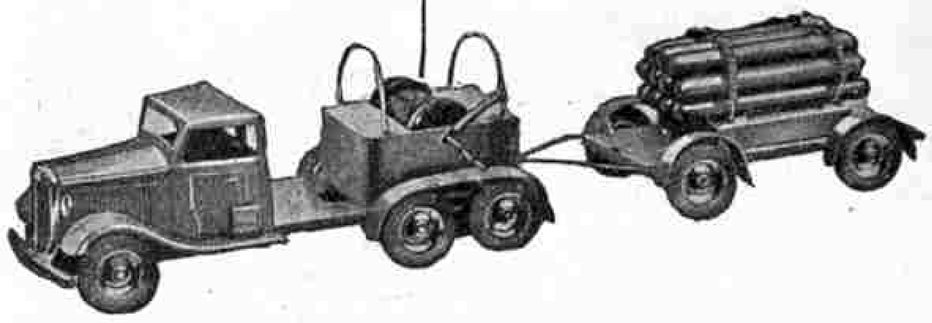
MINIC Canvas Tilt Lorry.
Also obtainable in camouflage colours.
LENGTH 5¼ ins.

MINIC Breakdown Lorry.
Also obtainable in camouflage colours.
LENGTH 5¼ ins.



MINIC Searchlight Lorry.
with Electric Searchlight and Battery.
LENGTH 5¼ ins.

MINIC Tank. Length 3¼ ins. Also obtainable in Camouflage Colours.



MINIC BALLOON BARRAGE

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LENGTH of Barrage Balloon 13½ ins. LENGTH of Cable 18 ft.

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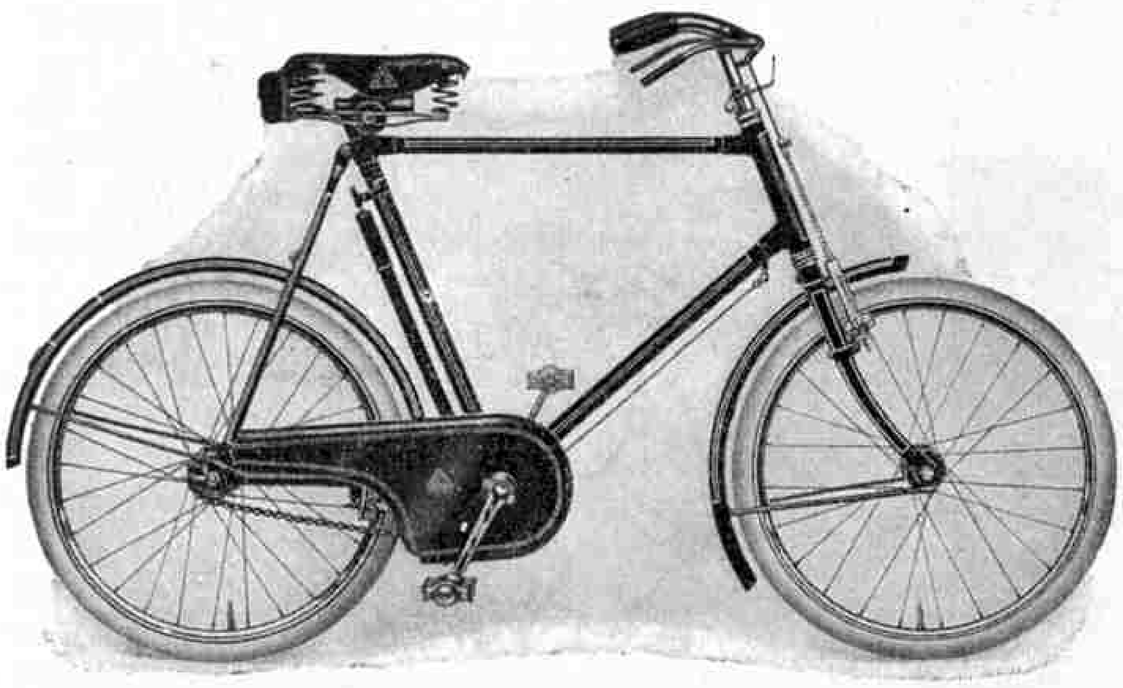

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TRI-ANG SPORTS DAIMLER

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.

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Next Month: "A FAST L.M.S. FREIGHT TRIP." Publishing Date: 2nd December

MECCANO MAGAZINE

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With the Editor

Lord Beaverbrook
Minister of Aircraft Production

William Maxwell Aitken, Baron Beaverbrook, was born in 1879 at Newcastle, New Brunswick, Canada, where his father was Presbyterian minister. He started business at Halifax, Nova Scotia, and later moved to Montreal where he became a member of the Stock Exchange. His most notable business operation there was an amalgamation of the cement mills of Canada. Soon afterwards he retired from business and came to England. In 1910 he was elected Unionist M.P. for Ashton-under-Lyne, and became private secretary to Bonar Law. He was knighted in 1911, created a baronet in 1916, and raised to the peerage in the following year as Baron Beaverbrook of Beaverbrook, New Brunswick, and Cherkley, Surrey. During the Great War of 1914-18 he was Canadian "Eye Witness" at the Front, and later took charge of Canadian war records. In 1918 he joined the Cabinet as Chancellor of the Duchy of Lancaster and Minister of Information. After the Armistice he abandoned politics and took over the entire control of the *"Daily Express."* In 1921 he founded the *"Sunday Express."*

Speeding-up Output

In May 1940 Lord Beaverbrook was appointed Minister of Aircraft Production. It was expected that his tremendous energy and driving power would have a vital effect in speeding-up the output of aircraft, and this expectation has been amply fulfilled. His appeals to the workers in the aircraft factories have received a remarkable response. In a message issued on 13th September to these workers thanking them for the way in which they had maintained their output in spite of air raid warnings, he said: "The devotion to the nation that has been displayed will make a new and splendid chapter in the history of British courage." Lord Beaverbrook has not only greatly speeded-up the weekly output of British aeroplanes, but also has increased orders for American machines.

Lord Beaverbrook
Minister of Aircraft Production.

On 31st July 1940 Lord Beaverbrook became a Member of the War Cabinet.

"Meccano Spitfire" Fund

I am delighted to be able to state that the announcement of the fund for the purchase of a "Meccano Spitfire" to be presented to the Royal Air Force has been received with the greatest enthusiasm. Meccano boys everywhere have rallied to the appeal, and up to the time of writing more than 20,000 pendants have been sold, equivalent to a sum of over £2,500. Of this total, 1,500 have been purchased by the Meccano factory employees and over 300 by the Head Office staff. Last week a first cheque for £2,000 was sent to Lord Beaverbrook.

I want every reader to do his utmost to secure sales of the pendant so that we can quickly raise the whole sum required to purchase a "Spitfire."

* * *

The special Christmas number of the *"M.M.,"* published on 2nd December, will be enlarged. Its contents will include a fascinating article on secret ciphers, the story of gold-beating, an account of a trip in the guard's brake van on a fast freight train, the romance of Chilean nitrates, simple conjuring tricks, and all the regular features.

Make sure your copy is definitely ordered, as the issue is certain to be sold out very quickly.

Guide to the Blitzkrieg

By Flight-Lieut. Tom Rose, D.F.C.

"Ace" fighter pilot, long-distance record holder and now Chief Test Pilot to a famous firm of aircraft constructors, "Tommy" Rose, already well known to our readers, gives a breezy commentary on German raids, raiders and allied topics.

"HOW high is that 'Jerry'?" "Is that a bomb or a gun?" "How fast would he be going?" Those are just three of the questions asked by the layman and his wife, and particularly by their family, as they all squat in the "Anderson" and listen to the latest examples of Kultur. I had almost decided to publish "Rose's Guide to the Blitzkrieg" when the Editor of the "*Meccano Magazine*" forestalled me!

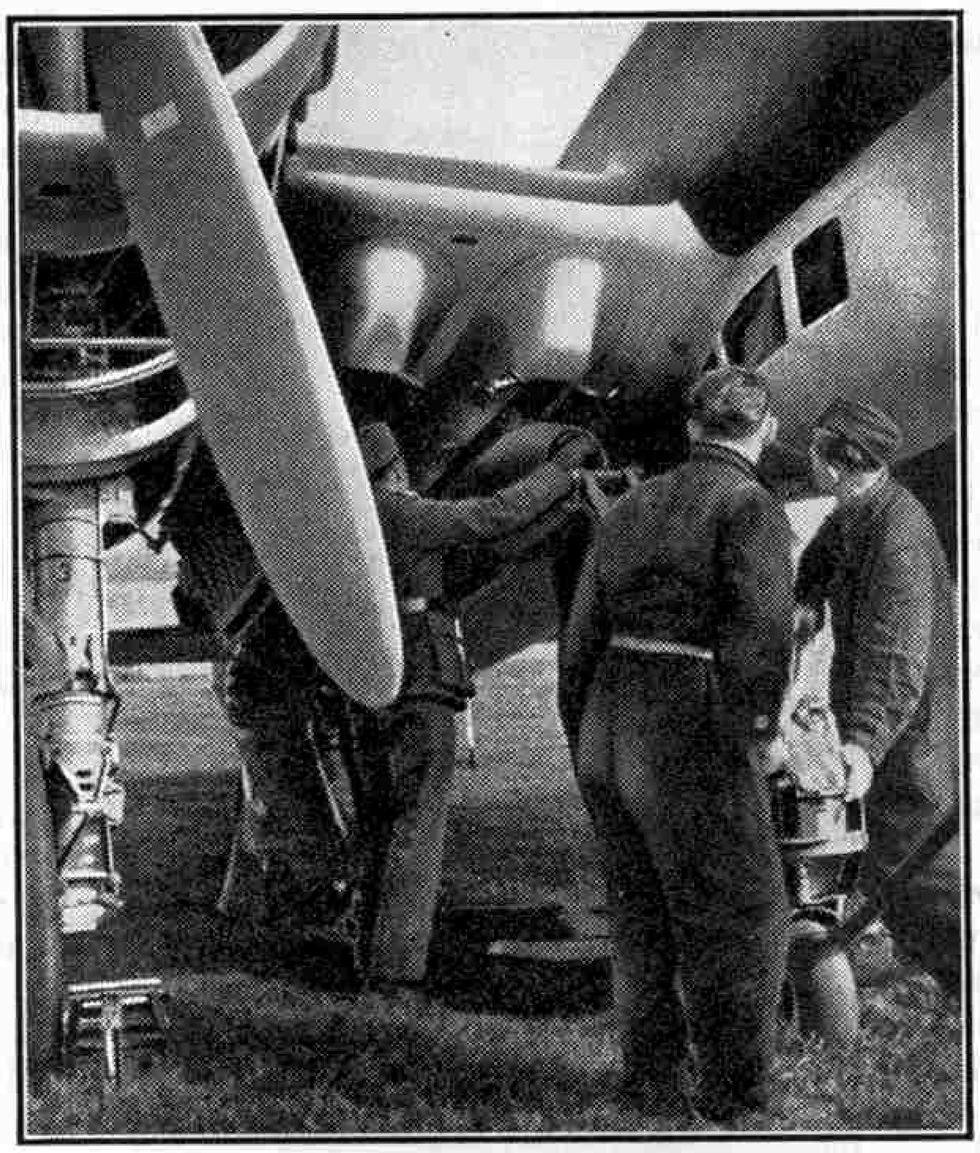
Well, the theory behind the German bombers is rather different from that of our own designers. The Nazis believe in raiders so fast that they can drop their loads and escape from our fighters by main speed. It hasn't quite worked out according to programme, but Messrs. Mitchell and Camm are to blame for that—they designed the "Spitfire" and "Hurricane" at a time when the "Heinkel," German's standard bomber, was faster than our fastest military aircraft in any category.

This "Heinkel" is still their biggest regular raider, with a wingspan of 74 ft. 3 in., or just over twice that of the deadly little "Spitfire." The "Dorniers" have a span of 59 ft.; the latest Junkers—the "86"—of 56 ft.; while the "Jaguar," which is the bomber version of the Messerschmitt 110, measures 55 ft. from wingtip to wingtip.

The enemy raiders are smaller than our corresponding types, but are faster and more heavily loaded. Thus the "Heinkel," which roughly corresponds with our "Wellington," has a top speed of 274 m.p.h., or fractionally more than the "Wellington," and weighs about 12½ tons fully loaded. It is said to have a range of over 2,000 miles at cruising speeds, and so can easily carry out a "nuisance raid" of nine or ten hours.

The "Dornier's" makers claim for it a top speed of 312 m.p.h., which may be somewhat optimistic; while the pilot of a "Junkers 88," using whip and spurs without stint, can muster 317 m.p.h., in favourable conditions. The "Messerschmitt" is faster still.

All these are twin-engined aircraft. The single-engined "Me. 109," carrying a small load, can make "tip and run" raids at very high speed, and has done so. The special "Junkers 87" dive-bomber, which played such havoc in Poland, is also a single-engined machine, much slower, with just about range enough to take it to London and back. The balloon barrage will prevent its being used much.



Loading bombs on the centre-section racks of a "Junkers Ju 88" high-speed bomber.

But the speeds I have mentioned are top speeds, only attained when the R.A.F. fighters are out for blood. Normally the "Heinkel" will come over at about 230, the "Dornier" at about 260, and the "Junkers 88" at about the same speed. At night they almost certainly fly at lower speeds, unless there is some reason for haste.

Where balloon barrages are found, the enemy will fly to clear the gasbags by 1,000 ft. or more. If we call it 12,000 or 14,000 ft., we shan't give away any secrets. When the "Ack-Ack" gets thick they can go very much higher. The "Messerschmitt 110," for instance, is said to have a "ceiling" with military load of 35,000 ft. As a bomber it can reach an honest 30,000, when it is certainly safe from the ground defences. The "Dornier" and "Junkers" can reach about 29,000 ft., but the "Heinkel" has a struggle to better 24,000, even in its latest form.

* * * *

Bomb loads, as a matter of fact, vary enormously. For raids on workers' dwellings and similar small buildings the raiders carry containers of one hundred and twenty 2.2 lb. incendiary bombs. That is by no means a complete load. For instance, the Nazis might come across something of great military importance, such as a hospital or a children's home. This would call for high-explosive bombs of about one, five or ten hundredweight (50, 250 or 500 kilogrammes). It has been found that the "Heinkel," for example, is often equipped with either four or eight 250 kg. bombs.

The same machine, on a short-distance raid and therefore having a lightish petrol load, might also have a few 10 kg. fragmentation bombs, whose cases of high-quality steel splinter and spread over a wide area—recommended by the Luftwaffe for surprise raids on playgrounds or women shopping. Nominally, of course, they are designed for attacking troop concentrations.

An interesting point not widely known is that the Germans have collated figures showing the size of craters made in "average" ground (yes, your guess is as good as mine as to what that means) by various types of bomb. The 50 kg. type is supposed to make a hole of about 2 ft. 6 in. if of the impact type; while the same size of delayed-action bomb would dig a hole of 7 ft. or 8 ft. depth with a diameter of nearly 20 ft.

The small incendiaries, by the way, are some 14 in. long, the various types increasing in size until we come to the big fellows—the half-tonners—which are about 6 ft. 7 in. tall and 18 in. in diameter.

Details of bomb sights, which make allowance for speed, altitude and wind direction, are closely-guarded secrets, and I am afraid the

Censor would not even let me tell you how much we know about the German sights—they're probably not quite certain themselves. One thing, however, I refuse to believe—this story that they have perfected a photo-electric bomb sight that automatically releases the missile at the right moment. If that were true, why do they ever miss?

In most machines the bombs are stowed internally, the larger ones being carried upside down. Hence if you can see them near the moment of release—I have watched one or two myself—you will see them turn over in the air before assuming their proper position. As the streamline shape takes effect they lose most of their forward speed, and come down in an arc which becomes more and more nearly vertical.

* * * *

For the most part, of course, you hear the bombs without being able to see them. The incendiaries make little noise, but on the larger types the whistle of air through the tail fins results in a high-pitched whine audible for a long distance.

Don't confuse these with "screaming" bombs. The latter, as far as I know, have not yet been heard over England. The fins are applied to render the flight more accurate; the "screamers," have in addition, small organ tubes, about $1\frac{1}{2}$ in. across, fixed inside the fins. Once you have heard this "scream" you will never forget it, but it's nothing to worry about. The noise, far from hurting you, gives you ample warning to take cover.

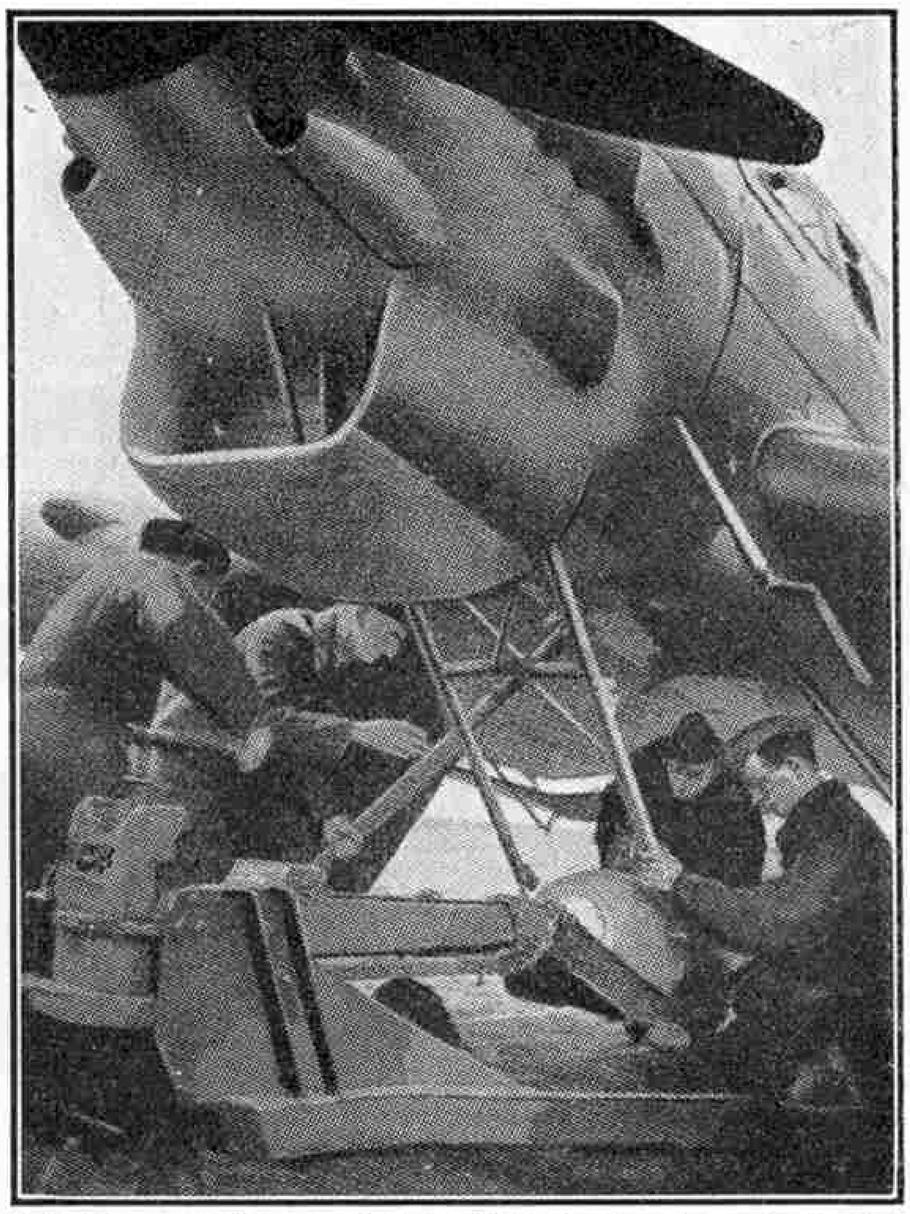
It is more difficult to set down, in black and white, any formula for distinguishing between bomb burst and gunfire. The best I can say is that the gun-charges explode with a sharp, well-defined "crack." The bomb makes a gigantic "woof," and the first time any reader hears a big bomb burst within 50 yards of him he will be quite sure he is dead! No one can help this feeling, and if you find yourself shaking like an aspen leaf, it's nothing to be ashamed of.

Finally, there are the sky lights, which to my mind are almost self-explanatory. It is often difficult, from the ground, to see much difference between the flashes from guns and from bursting H.E. bombs. The best way I know of identifying a flash is to wait and see what follows it.

You may see a bright flash and hear nothing, but several seconds later notice a little star of light twinkle in the sky, like a tiny firework. Then you know the flash came from a gun. Conversely it is likely, though not certain, that "no firework" means "no gun, and therefore one bomb."

The explanation of these noiseless flashes is, of course, a matter of simple science. Light waves travel many times faster and farther than sound. The guns or bombs whose flashes you see may be inaudible to the keenest ear, either through distance or because of an adverse wind.

You may never see the "flaming onion," a relic of the last war, a sort of ball of phosphorus on a string. The Bofors gun burst is often mistaken for this, though goodness knows why, for the Bofors is a lethal weapon, and the "onion" bothers no one nowadays.



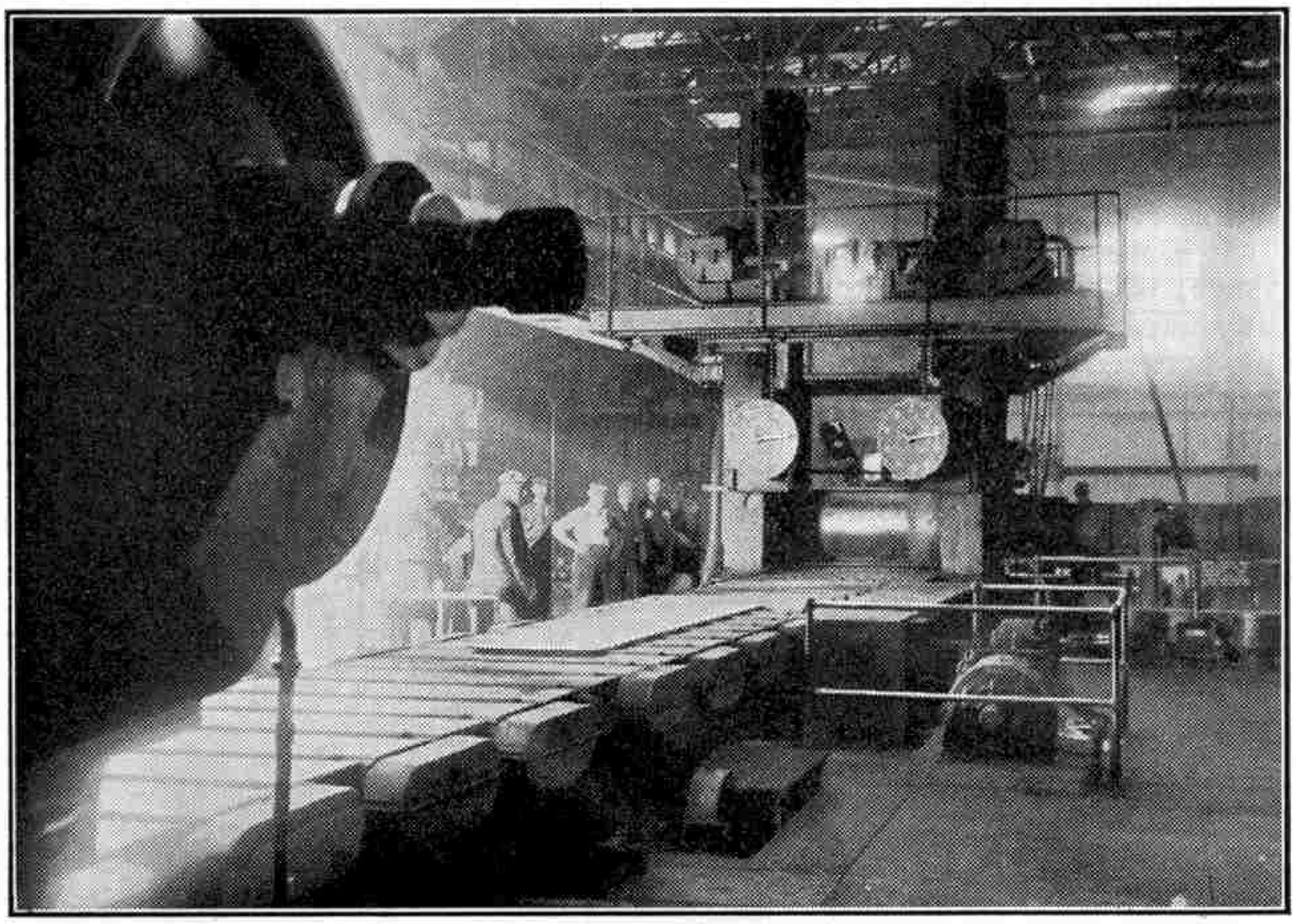
A 500 k.g. whistling bomb being fitted to the ejector cradle of a "Junkers Ju 87" dive-bomber. This illustration and the one on the previous page are by courtesy of "Flight."

It is difficult to say much about our defence methods without giving away useful information, but I suppose there is no harm in mentioning that when searchlights are co-operating with our aircraft they try to arrange a "trailing beam." That is to say, they like to get the raider in a beam from the rear, so that our aircraft can attack from behind without the English pilots being blinded by their own searchlights. On the other hand, an A.A. barrage is put up slightly in front of its objective, so as to force the enemy, if possible, to turn back.

Though actual figures may not be given, it is reassuring to know that the sound-locator crew is required to be "on sound" to an invisible enemy aircraft within a very few seconds indeed; and that within another few seconds the exact direction and elevation must be passed on to the searchlight people, who themselves are required to have their beam in the right direction in an incredibly short time.

The entire country is divided into sections for searchlight operation. Each section, theoretically, picks up an enemy, holds him in the intersection of several lights, and then passes him over to an adjacent section—and so on, if necessary, for a hundred miles. That theory doesn't quite come true in practice is largely because the Germans (Cont. on page 510)

Men undergoing training with a Bofors light anti-aircraft gun "somewhere in Northern Ireland." The majority of this crew served in the last war.



Large roughing mill for the production of "Staybrite" steel. The illustrations to this article are by courtesy of Firth-Vickers Stainless Steels Ltd., Sheffield.

Stainless Steel

The Development of a Wonderful Alloy

OUR cover illustration shows an electrical melting plant for the manufacture of stainless steel, and is based on an illustration kindly supplied by Firth-Vickers Stainless Steels Ltd., Sheffield. The development of stainless steel is perhaps the greatest metallurgical achievement of the present century.

It has been estimated that several million pounds are lost every year simply as the result of the ravages of rust and corrosion. We are all familiar with the sight of rusted knives, rusty railway lines, and rust on ships' plating; and there are many cases in the chemical industries and elsewhere that we do not usually see, where tanks, pipes and valves are pitted and actually eaten away by the corrosive attack of acids. By the suitable addition of alloys to steel its inherent properties are fundamentally altered, and according to the alloy additions it contains it is made proof against rust, sea-water and even acids, including strong nitric acid and boiling acetic acid.

Chromium and nickel are the principal alloying elements used. Chromium occurs naturally as the oxide found in the earth in combination with iron oxide, in a mineral called chromite. It is mined in New Caledonia, Rhodesia, Turkey, Russia, California, India and one or two other places; and an iron-chromium alloy known as ferro-chromium is obtained by reducing the ore with silicon and carbon in electric furnaces. Nickel occurs mainly as the sulphide, in Ontario, Canada, and is reduced to the pure metal either by smelting or by a complicated chemical procedure known as the Carbonyl process.

Both chromium and nickel are found in sufficient quantities in the Earth's crust; but the cost of mining the ores, reducing the metals, and then making and working the alloy steel, is such that it is not economical to replace all ordinary steel by the stainless variety. Rustless ships, for example, remain a dream of the future. Nevertheless, rustless and acid-resisting steels are used to-day in applications as far apart as cutlery and surgical instruments, motor boat propellers and yacht fittings, domestic hollow ware, and huge pieces of chemical plant weighing several tons.

The earliest form of non-corrodible steel was marketed under the name "Firth Stainless" steel, and was discovered in the Brown-Firth Research Laboratories, Sheffield. This steel contained approximately 13 per cent. chromium with approximately 0.3 per cent. carbon. The "Staybrite" family of steels is a later discovery of these laboratories, and is now used to a considerable extent in almost every industry. "Staybrite" steel is not just a surface plating, but a material that is solidly stainless throughout; and its brilliantly polished surface remains bright under conditions that tarnish other metals. It is a steel alloyed with 12 to 18 per cent. by weight of chromium and 8 to 12 per cent. of nickel, and has low carbon content.

The plain chromium stainless steel is now used in nearly every household in the form of stainless knives. It is employed also for surgical and dental instruments, and for ordinary pocket knives. In engineering it is used for steam valve seats, because it avoids the pitting caused in ordinary steel by high-pressure steam; and it is used for golf ball moulding dies and other dies for rubber and plastics because it retains its high polish.

Even if you have never asked the question yourself, everyone has heard it—"Can stainless steel knives be sharpened?" Far from being incapable of taking a keen edge, stainless steel does in fact take a razor-sharp edge. The belief that stainless steel cannot be sharpened arose from two main factors. The first was that when this steel was discovered its heat treatment and manipulation were not fully understood by many of the cutlers working on it, and naturally the finished product fell short of what is being achieved to-day. That however, was more than a quarter of a century ago. The stainless steel knife that is produced to-day is perfectly hardened and will take the keenest cutting edge. The other factor was that few people realised that when they clean an ordinary knife on a knife-board or in a knife machine they actually sharpen it at the same time. On the other hand, the stainless steel knife never saw the knife-board, and no one ever thought of sharpening it any other way. Owners of stainless steel knives are advised to have them sharpened at regular intervals, either with a steel or in a patent sharpener.

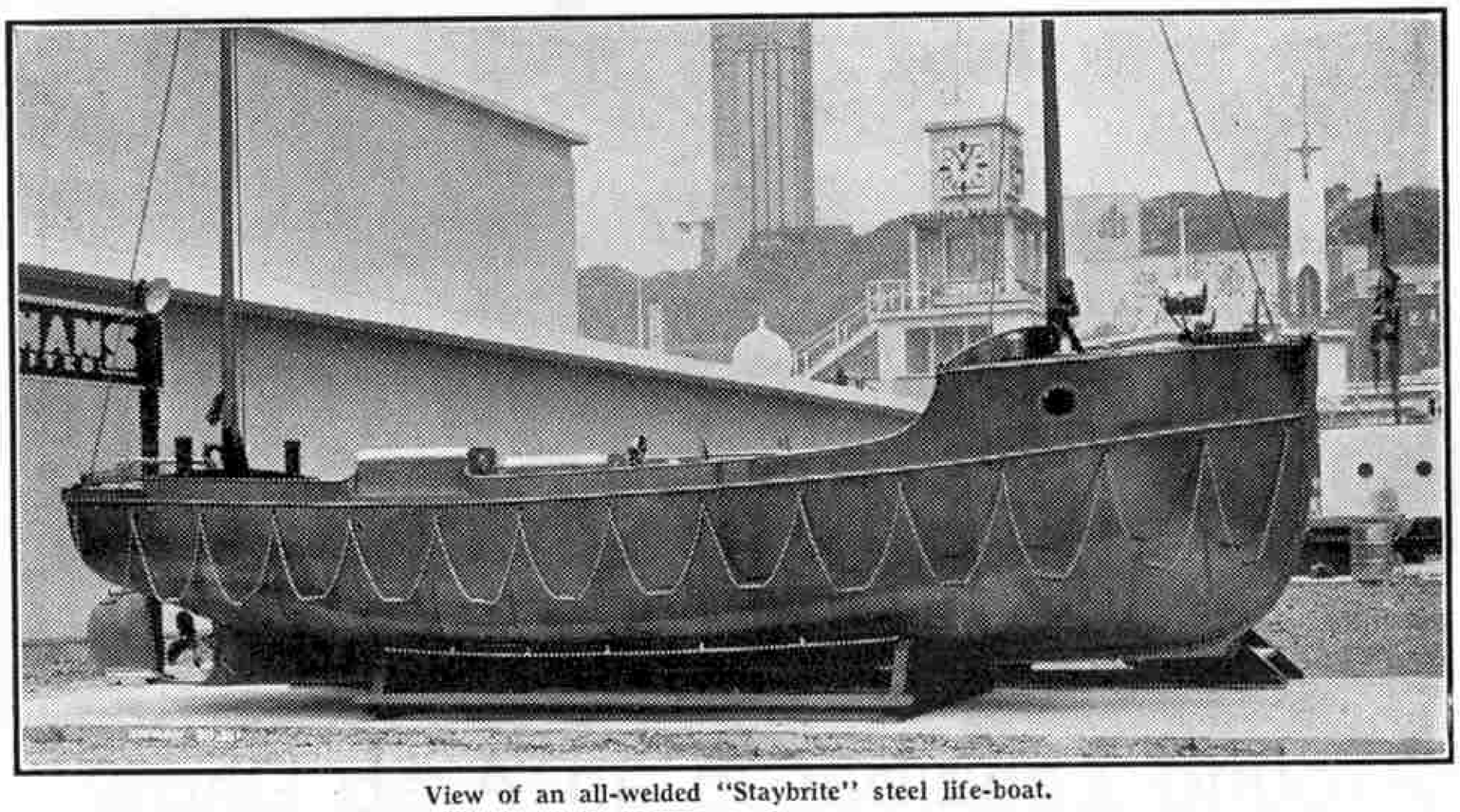
The wide range of objects made in stainless steel must be seen to be believed. Besides cutlery, the tableware section alone includes dishes of every imaginable description, both practical and artistic in design. As the metal is impervious to food and fruit acids, it will never stain, and

is therefore particularly desirable for such articles as fish knives and forks. Stainless steel articles that stand on the sideboard do not become blackened with the sulphur present in the air, particularly in towns. All the treatment that such articles need after use is the wash, rinse and polish that are given to glass.

Apart from domestic uses, stainless steel is used in great quantities in containers of various kinds employed in the chemical industries in the manufacture and handling of nitric acid and nitrates. Even strong nitric acid can be handled by "Staybrite" steel, and storage tanks, transport tanks, pipes and other details are now made in this material. In the past dye vats used to be made of wood. This was satisfactory up to a point, but it had the great disadvantage that when the vat was emptied of one coloured dye and another was poured in, traces of the first dye remained soaked in the wood and so contaminated the second. This difficulty is now entirely overcome by the extensive use of stainless steel.

Every day thousands of gallons of milk are carried to London by train or road tankers made of stainless steel, thus ensuring absolute cleanliness.

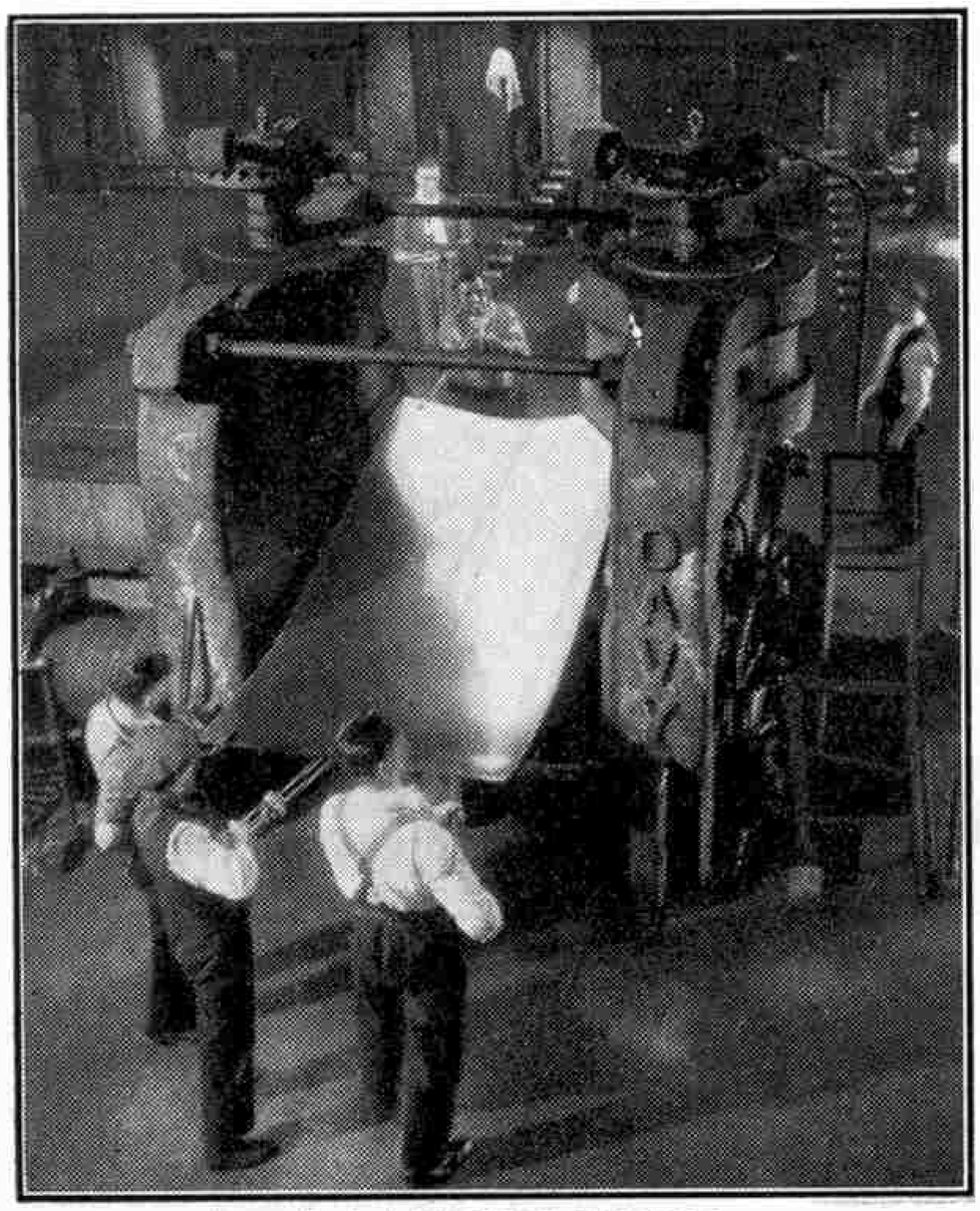
An outstanding example of the extended use of stainless steel was the construction of a life-boat from this material. The boat, which is illustrated on this page, is built of "Staybrite" steel, the 18 per cent. chromium, 8 per cent. nickel stainless steel, containing certain other special alloys and more resistant to marine conditions than any other metal.



View of an all-welded "Staybrite" steel life-boat.

This steel is used not only for the hull itself, the propeller and the rudder, but also for the vast number of small fittings in the boat.

Corrosion and heat resisting steels are produced by melting iron, nickel, chromium and other alloys in electric furnaces. When the steel melters are satisfied that the quality of steel, its temperature, composition and purity, reach the standard that is required, the molten metal is tapped from the furnace into a ladle by tilting the whole furnace forward. The ladle is then taken to the casting pit where the molten steel is teemed into specially shaped moulds, designed in such a manner as to ensure the production of sound ingots. These ingots are then reduced in section by hammering or rolling. In the mill the ingots are rolled backward and forward and reduced to the various forms required, either slabs for the production of sheet, or billets for the production of bars, angles and other required sections. Certain types of steel, however, are hammered instead of being rolled.



The rolling of "Staybrite" steel sheets.

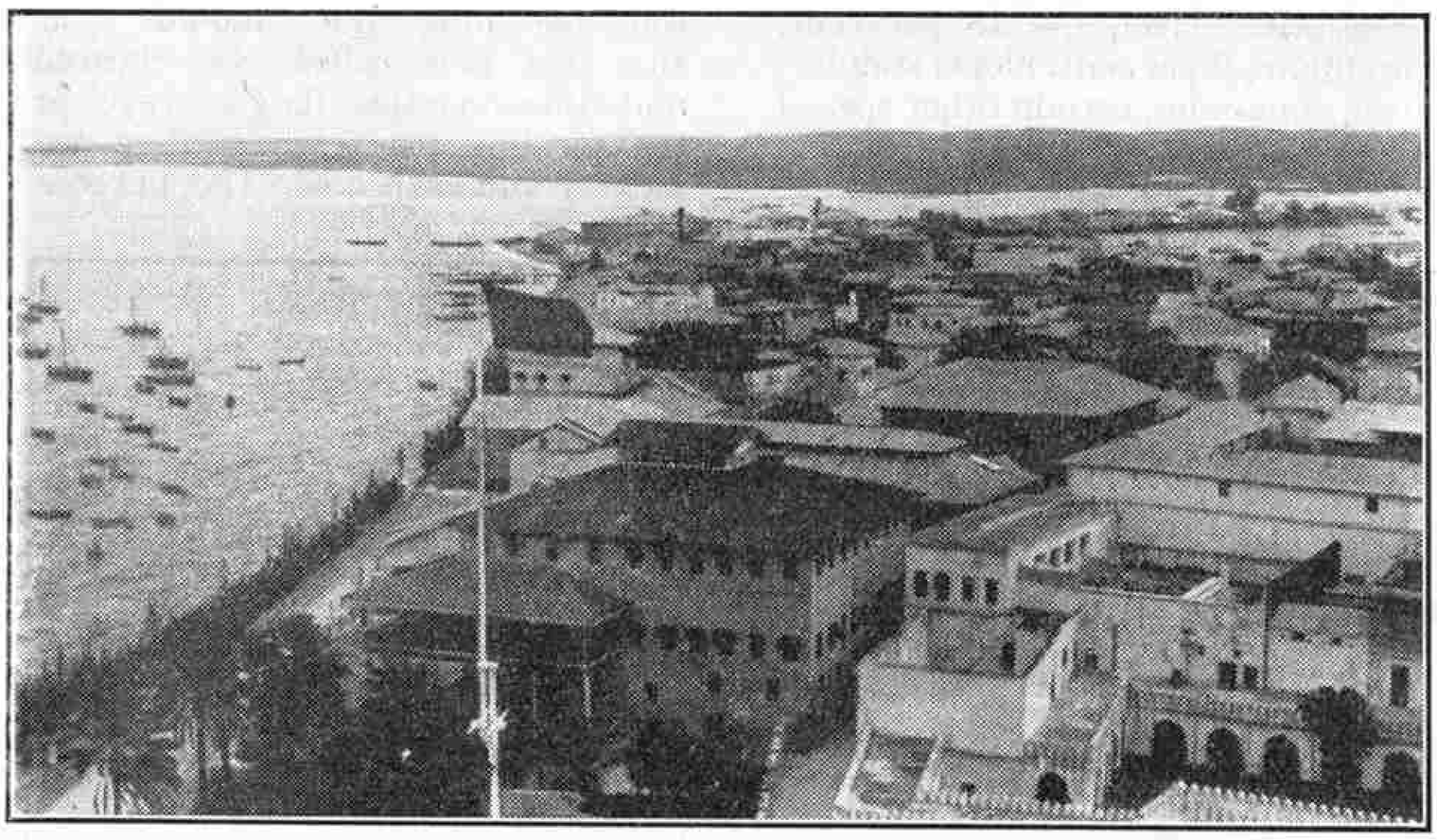
The next stage in the production of sheets is to re-heat the slabs and roll them in a large roughing mill of the reversing type. From the roughing mill, the "moulds," as they are now called, are sheared and taken on a travelling conveyor to the pickling plant where they are pickled and inspected. The purpose of this inspection is to ensure that they have a perfect surface before they are passed on to the final sheet rolling operation.

The rolling and heat treatment processes leave the sheets with a very thin layer of surface scale, which is removed by pickling them in acid. From the tank the sheets are passed to a washer and then, by means of an overhead rail, are carried down a drying corridor to the sheet warehouse for final inspection, etc.

In addition to the descaled finish, sheets may be supplied also bright polished or satin polished.

It is interesting to note that "Staybrite" steel was used for the tanks, pipes, etc. of the first large-scale plant in this country for the production of nitric acid by the ammonia oxidation process, laid down by Imperial Chemical Industries in 1926; for the fittings and decorative trim of the "Silver Jubilee" express from London to Newcastle in 1935; in the turbines and rudder gear of the "*Queen Mary*," and in the interior of the Mersey Tunnel. During the reconstruction of the dome of St. Paul's Cathedral in 1928 many tons of "Staybrite" steel were used in the form of bars in the bases of the eight piers supporting the dome, and in the form of tie-rods for tying the inner wall of the dome to the outer wall.

For the information on which this article is based we are indebted to Firth-Vickers Stainless Steels Ltd., Sheffield.



Bird's eye view of Zanzibar city.

Around Zanzibar in an Arab Dhow

By Arthur Lamsley

FEW experiences can be more romantic than cruising in a lazy-moving dhow off the shores of Zanzibar. Discomfort there was in plenty, but it was well worth enduring.

I joined the dhow at Mkokotoni, a Government administrative station on the north-west coast of the island nearly twenty miles from Zanzibar City. We towed a pram for my use, which enabled me to row ashore; apart from the chance of stretching my legs on the beach, it also allowed me to have a little respite from the crew and the foul smell of the ship. Furthermore, while rowing about in the pram with an Indian friend, I was able to enjoy the colours in the shallow waters that just covered the submerged coral rocks.

The beauty of these waters fringing the coast of Zanzibar almost baffles description. The deeper water is of every imaginable blue, but close inshore, where the wavelets lap the partly-submerged coral reefs, the water is a vivid scintillating green. Towards evening when the sun has set below the horizon this translucent water mirrors the sky, and during the monsoon season I have seen the water resemble a perfect reflection of the sky with clouds passing across the glassy surface as if one were looking up into the heavens.

From Mkokotoni we cruised the Island of Tambatu before going down the coast. The island is about five miles long and one wide and is of coral. The inhabitants, who claim to be of Persian descent, were at first rather suspicious, but they became more friendly and more hospitably inclined when I met the Sheikh and conversed with him in elementary Swahili. The bearded old man was most obliging, and offered to show me the ruins of an ancient town for which the island is famous. I noticed that he was decorated on the breast with a medal as big as a dinner plate, but had not the courage to ask its origin.

The ruins on Tambatu are extremely interesting, and evidence that the place was important as a port many centuries ago. Some explorers place its foundation in the 7th century, when there was a considerable trade between Persia and East Africa. I was told that the inhabitants of this island are among the finest sailors in the Azalian Sea, a fact speaking of their sea-faring ancestors.

Tambatu on to Mangapwani, meaning "Arab Coast." In the beginning of last century this particular bit of coast was the centre of the African slave trade. Hundreds of natives of Zanzibar were captured and imprisoned in caves along the seashore that had been made by the action of the sea on the coral rock, and when the south-west trades came were shipped in large dhows across to Muscat and the Persian Gulf.

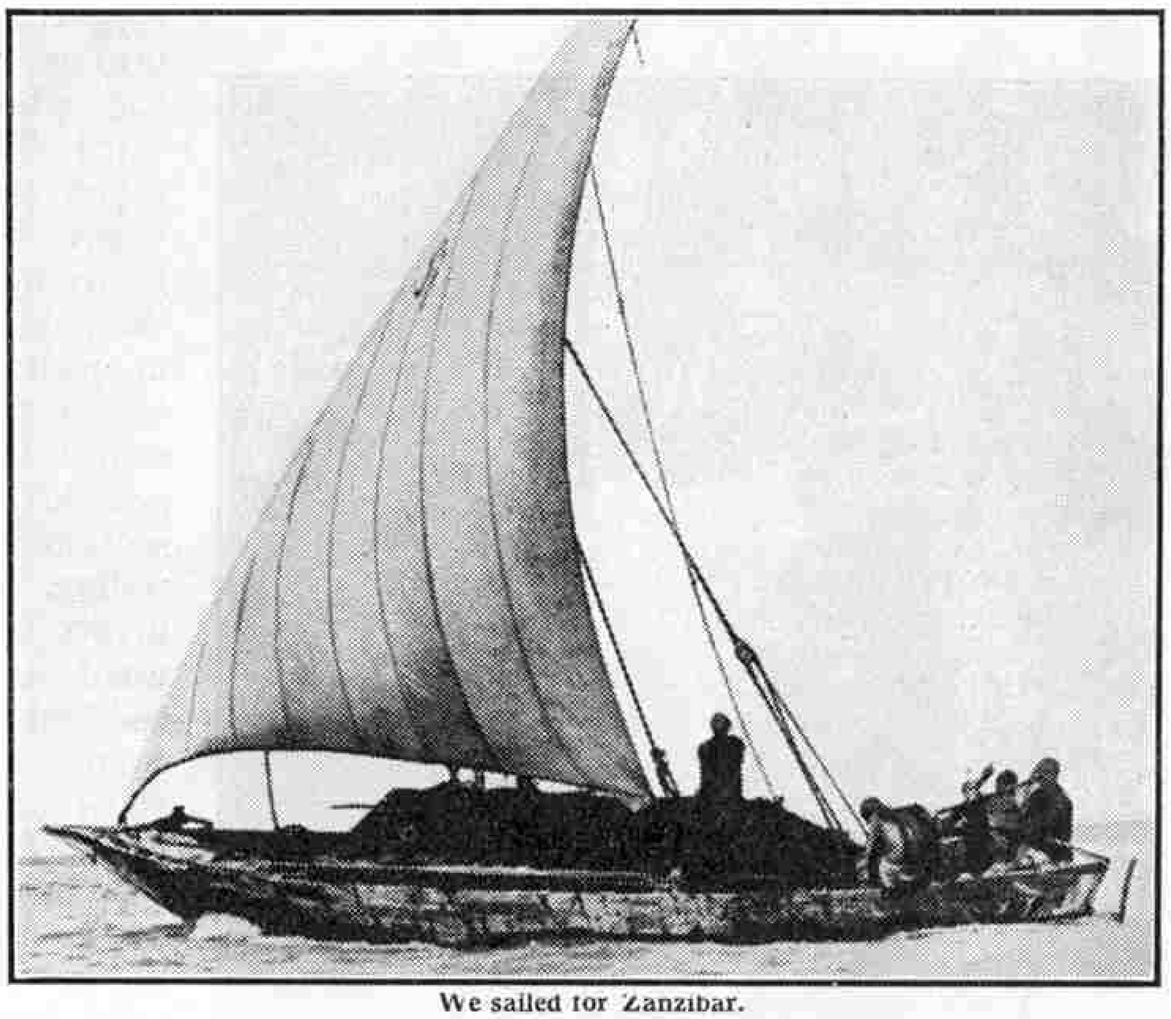
Leaving Mangapwani we stood far out to sea to obtain a view of the island coast through the blue haze of early morning. Appearing on the top of the water was the island, resembling a light blue floating cloud. By slow degrees the shaggy heads of the tall palms rose above the horizon, and suddenly a strip of white beach showed above a sea of turquoise-blue; there were no pretentious mountains or high range of hills to command attention. Behind this shimmering stretch of white sands rolled the coconut plantations, and away towards the inclining downs could be distinguished the olive-green of the clove trees.

Sailing slowly along by this dead-level white beach, we seemed to be floating on a magic wind towards a world made of dreams. On, past tiny uninhabited coral islets, decked like emeralds, towards the City of Zanzibar itself, the strangest, most picturesque Arab dhows, with lateen sails unfurled, skimming the green-blue waters like great white birds.

Slower and slower. We passed dozens of catamarans, the native fishing boats, and at length reached Zanzibar City. The town itself is built on a low coral promontory jutting out into the bluest of waters, and gives the impression of a great white city built on a floating island.

The people of the Island of Zanzibar are hospitable and lovable. There is an atmosphere about the place that says, "To-morrow will do," and all things seem to move in unison towards that end. But starving would be a thing impossible in Zanzibar; Nature is too abundant, and gives enough for all her children—and more.

Outside Zanzibar Harbour a gentle breeze filled our big lateen sail till the rigging strained and creaked with the strong pull of the bellying canvas. We continued our cruise to a large fishing village named Chwaka, on the eastern coast of Zanzibar, and stayed in the bay for a day or so before circling the northern shores of the island back to Zanzibar Harbour. The wind increased slightly and headed a bit, so that our old dhow began to pitch and become thoroughly uncomfortable. However, we were in the safe hands of Allah, so the grinning skipper told me, and all would be well. We reached a good deal out of our course, and came to Chwaka Bay, after nine hours' good hard sailing on a jumpy sea under a blistering sun.



We sailed for Zanzibar.

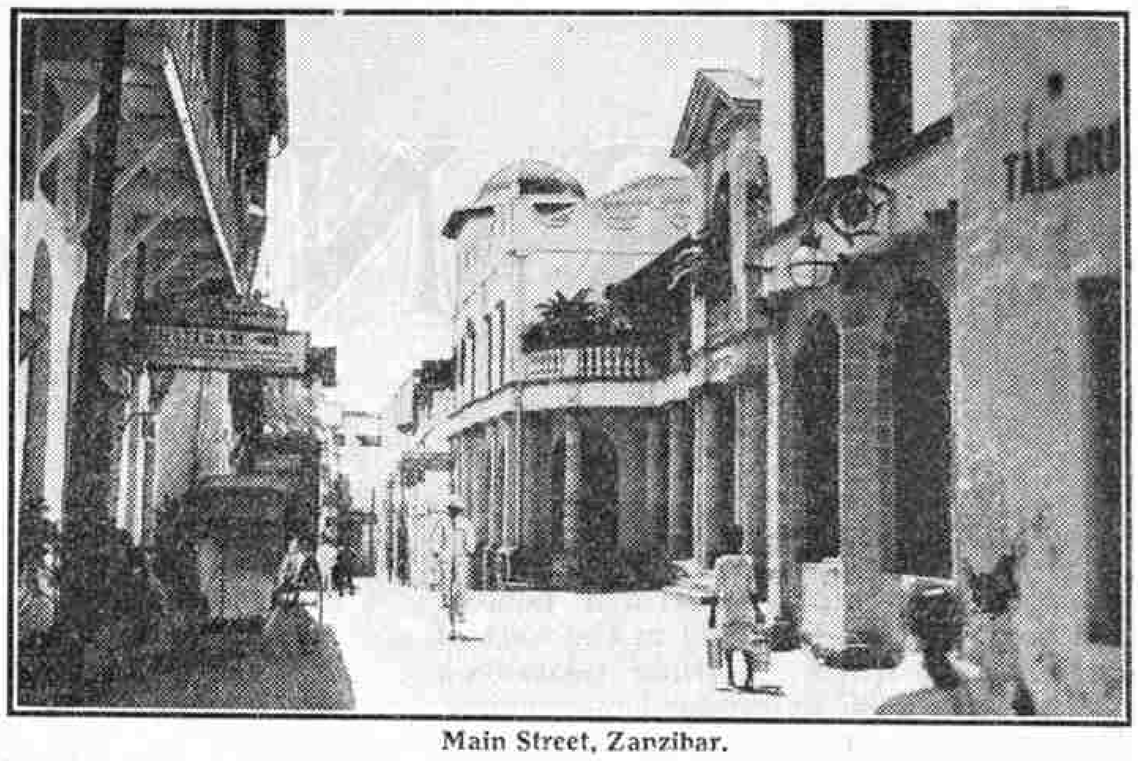
At Chwaka there were some delightful bungalows on the sandy beach, used by the European population of the island for week-ending. As the water was rough, I decided to have a day ashore exploring the surrounding countryside. The District Commissioner's assistant loaned me a small bungalow and two house-boys; a plentiful

supply of food could be bought from the Swahili village half a mile away.

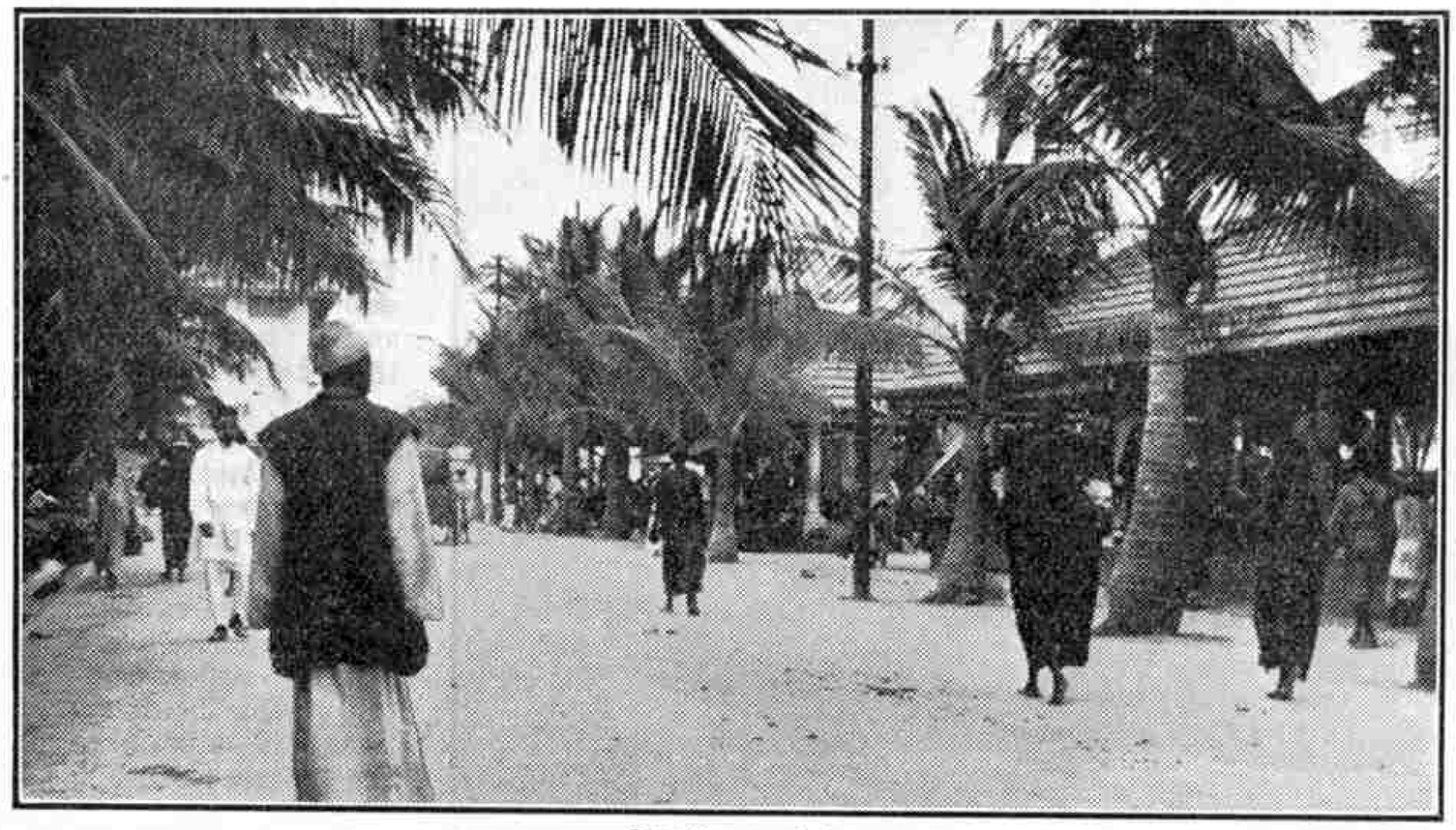
In the evening an Indian friend and I followed the beating of a drum, and walking through the low bush came upon a native dance. Swahili men and women were dancing around in a large circle to the rhythmic banging of a big drum. The Chief bade us sit with him on a bench of honour and gave us coconut milk to drink.

Next day a Parsee merchant offered to drive us in his car to the Dunga Clove Shambas (plantation) in the middle of the island. I gladly accepted, and spent some hours watching Swahili men and women at work on these spice farms. Ninety per cent. of the world's clove supply comes from Zanzibar and the adjacent little island of Pemba. The first home of the clove was in the East Indies, in the Molucca Islands, and it was said to have been brought to Zanzibar by the Oman Arabs in the early 19th century. Since that time it has gradually become a flourishing industry.

Soil as well as climate makes for success in a clove plantation; the former has to be of rich red loam and well drained. In Zanzibar and Pemba the soil is the most suitable for consistent crops, and as both islands are of coral-line rock the drainage is



Main Street, Zanzibar.



Zanzibar market.

mostly perfect. In the larger island the plantations come to within four miles of the City of Zanzibar, whose streets during the long harvest always smell of the clove.

The clove trees are planted in long lines about twenty feet apart, running east and west, so as to ensure the crop having the maximum sunshine. Two crops a year are gathered from each tree. The trees are raised from seedlings, and great care has to be taken with them for the first two years, especially to guarantee their being watered regularly. The fifth year brings a first harvest, but from the seventh year on the trees bear well. Their average life is approximately eighty years, with constant care.

The cloves are found in bunches of from ten to fifteen, hidden beneath the leaves, and are ready for picking after about four months' growth. The clove as we know it is really the unexpanded flower-bud which, if allowed to flower, would be of no use afterwards for the article of commerce that is so valuable. Usually the harvest begins in July, and may continue, in a favourable season, to the end of the following January or even into February. The cloves are gathered when they are a pinkish colour. It is a unique sight to see a tree in full bud, the delicate pink against the varying greens of the clustering leaves.

After picking, the cloves are taken to drying grounds cut in the bush where for several days they are dried in the sun. At night, just before sundown, they are gathered into drying mats and covered from the heavy dew that falls. When completely dried, ready for commercial use, the clove loses its pink colour and becomes the dull brown spice we use in cooking.

The next afternoon the sea calmed sufficiently to permit us to continue our cruise. The dhow out in the Chwaka Bay looked a lonely ship as we approached her in our pram. I was not sorry to be afloat again except for the lack of comfort aboard, for the heat ashore in the shambas had been terrific.

We weighed anchor and slid out of the blue bay surrounded by whispering palms. We kept well out to sea, as we had been warned of submerged coral reefs running far out from the shore. In the light breeze we did not sail more than about five miles an hour, and before we reached the northern end of the island, and caught sight of the Ras Nungwe Lighthouse about a mile on our port bow, we had probably sailed about thirty miles.

It was a peaceful night; the wind died down and we decided to drop our hook in open water (Arab fashion) for the night. Arab seamen drop anchor anywhere and commit themselves to Allah.

Dawn came into the sky and found me awake; the air was scented with clove, and mixed with the aroma of my morning coffee. Such an atmosphere at dawn of day brings its own romance. Fish for breakfast, and caught while we waited. In this part of the world Mother Nature is ever accommodating. The big basket of fruit on board, oranges, pineapple, paupau, limes, bananas, all grown on the island, had cost only three rupees (four shillings), and here was enough for several days, especially oranges, which I could buy at 120 for eightpence.

During the day, in spite of tempering breezes, the sun's heat was intense. I could not believe it was really Christmas Eve, and that at home the skies were leaden-grey and folk shivering beneath overcoats.

The dhow skipper told me it would be about 40 miles back to Zanzibar Harbour if we cruised out into the open sea of Zanzibar Channel as I suggested. The final lap would take us all day with a beam wind, keeping well west of Tambatu Island. It would be sundown before we arrived in harbour, which would suit me admirably, as I could go ashore and have a meal with friends. I shall not easily forget sailing over a lazy sun-flecked sea. Except for an occasional order by the skipper to a member of his crew, no sound disturbed the serenity of the morning. Even the crew forgot to chatter and, having very little work to do, curled up like great black cats to bask in the sun.

At high noon we lowered our sail and prepared what at its best was a picnic lunch. The skipper and crew kept up to leeward, well forward, for they had a meal of dried shark and rice. The latter is harmless and odourless enough, but dried shark needs to be smelt to appreciate its effect on sensitive nostrils! My meal consisted of orange juice, biscuits, and fruit. Highly satisfying in the tropics.

Towards tea-time we had made such good progress down the coast that we were abreast of Bububu, one of the main clove plantations in the island, and in an hour dropped our hook about half a mile out from Zanzibar waterfront. I sent my boy ashore in the pram to warn a friend that I was coming in to dinner.

In spite of the hospitality of my friends, and their constant urging that I should spend the night ashore, I insisted upon returning to the dhow, and found my boy waiting for me just before eleven at the Customs Beach. Before making for the dhow I asked him to row about in the harbour so that I might savour the beauty of starlight in the tropics. The native policeman on shore shouted the midnight hour, and the vibrating tones of his rich bass voice rang across the sea. Back in the dhow I wrapped myself in rugs, for in spite of the heat of the night, it is wise for a European to keep his body covered, and dropped into a profound sleep.

My boy went ashore early for some extra stores, and that morning gave me an English breakfast of ham and eggs, washed down with fragrant Kenya coffee. I noticed that Ali was wearing his festal Kanza. He had learned it was my birthday!

AIR NEWS

Pursuit and Victory

Immediately after a German bomber had bombed a landing field in the west of England, two R.A.F. "Spitfire" pilots took off from the field, determined on revenge. They pursued the enemy for nearly 100 miles, losing him from time to time in cloud and then picking him up again. Eventually, when near Southampton, they got on the bomber's tail. One of the fighters made a beam attack at 200 yd. range and fired short bursts until smoke poured from the enemy.

"As I pulled away I saw that the enemy aircraft was losing height rapidly," this pilot said afterwards. "Then Number Two took up the attack from astern and expended all his ammunition. The enemy bomber flew low over the sea in a south-easterly direction for a few minutes, then it turned and flew parallel with the coast. Immediately afterwards I saw it dive into the sea and disappear."

On another occasion a German "Junkers 88" pilot became so desperate after an R.A.F. "Blenheim" fighter had chased him for over 50 miles that he attempted to ram his pursuer head-on. Suddenly turning at the end of the chase, he drove his "Junkers" straight at the "Blenheim." He nearly succeeded, as the bomber passed only 10 yd. underneath the fighter. The "Blenheim" pilot had previously opened fire and damaged the bomber, and when last seen this was flying slowly, with oil pouring out.

One clear night recently a "Blenheim" fighter pilot saw bombs drop near a town in the north-west. A few minutes later, among the stars, he saw one which seemed to be moving. It was a light showing from a "Heinkel". Whether the German pilot knew he was being followed will never be known, but he led his pursuer first into the heart of the Midlands and then back up towards the Yorkshire coast, before he headed for home.

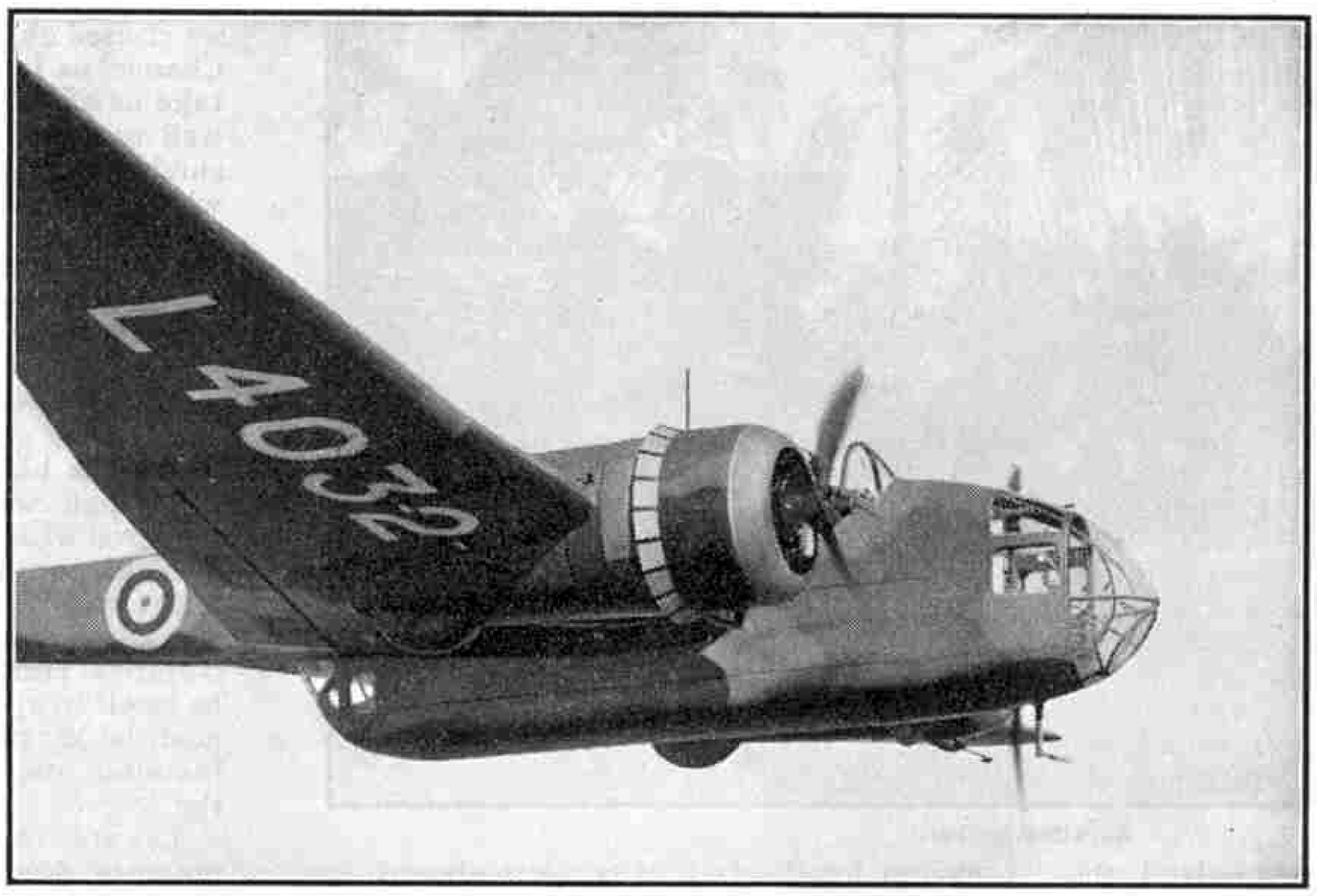
Forty miles out to sea the "Blenheim" pilot, who had been going "full bat" and keeping the "Heinkel" in sight for at least an hour, told his station that he thought he would have to give up the chase. He was told that as he had gone so far he might as well let off his ammunition with a long shot. He fired his front guns at a range of about a quarter of a mile, and to his great surprise found himself at once gaining rapidly on the "Heinkel." He continued to fire, finished his ammunition, and was then able to come up alongside to let his gunner pour in a broadside that sent the "Heinkel" crashing into the sea.

The "Flying Suitcase"

Handley Page "Hampden" bombers of the Royal Air Force have given a good account of themselves in raids and reconnaissance flights over Germany. A photograph of an aircraft of this type appears on this page.

The "Hampden" is one of the fastest medium bombers in the world, and is very easy to identify when in the air. The narrow fuselage is of deep section in the forepart and tapers rapidly to a slim tail boom, and the unusual silhouette, seen from the side, has earned the machine the nickname of "flying suitcase." It is an all-metal, middle wing monoplane, capable of carrying a very big load for a long distance at high speed. When fitted with two "Bristol" Pegasus engines, each developing about 1,000 h.p., it has a top speed of 265 m.p.h. The maximum range is nearly 2,000 miles. Normally a crew of three or four is carried.

In common with other British aircraft, the defensive armament of the "Hampden" has been considerably strengthened since the outbreak of war, and this bomber can put up a formidable defence against attacking enemy aircraft. Its name commemorates John Hampden, an English statesman of the 17th century who was a cousin of Oliver Cromwell and became famous as a defender of civil liberties.



A Handley Page "Hampden" Bomber. The gun turret under the fuselage and a similarly armed upper turret enable the gunners to deal effectively with any rearward attack by enemy fighters in pursuit. There is also a gun station in the nose. This photograph and the upper one on the next page are by courtesy of "The Aeroplane."

Boeing "Stratoliners" in Service

The new Boeing "Stratoliners" put into service this summer by Transcontinental & Western Air, Inc., reduced the journey time on the company's air route across the United States by at least 1 hr., and have enabled the company to maintain their claim of operating the fastest coast-to-coast service in that country. On the third day in service the westbound "Stratoliner" arrived at Burbank, California, 14 hr. 15 min. after taking-off from New York, and the eastbound machine arrived at New York only 11 hr. 48 min. after leaving Burbank.

The "Stratoliners" are being flown at about 18,000 ft., and their efficient altitude-conditioning system maintains air conditions in the passenger cabins equivalent to flying at only 11,300 ft.

Dutch Airmen with the R.A.F.

Units of the Royal Dutch Naval Air Service now co-operating with the R.A.F. Coastal Command have attacked several U-boats in the Atlantic. They have also a fine record of air combats in which Dutch tenacity has routed the enemy. Using their own aircraft, which they flew over to this country when Holland fell, they lost no time in beginning operations with the R.A.F. Many of their officers and men are married, with families in Holland of whom they have heard nothing. These men live for the day when they will assist in driving the invader from their country.

In the meantime they are popular members of the messes they share with the R.A.F. For all purposes of Service life they live in exactly the same conditions as their R.A.F. colleagues. At one flying boat station in the west country, all the Dutch officers speak English.

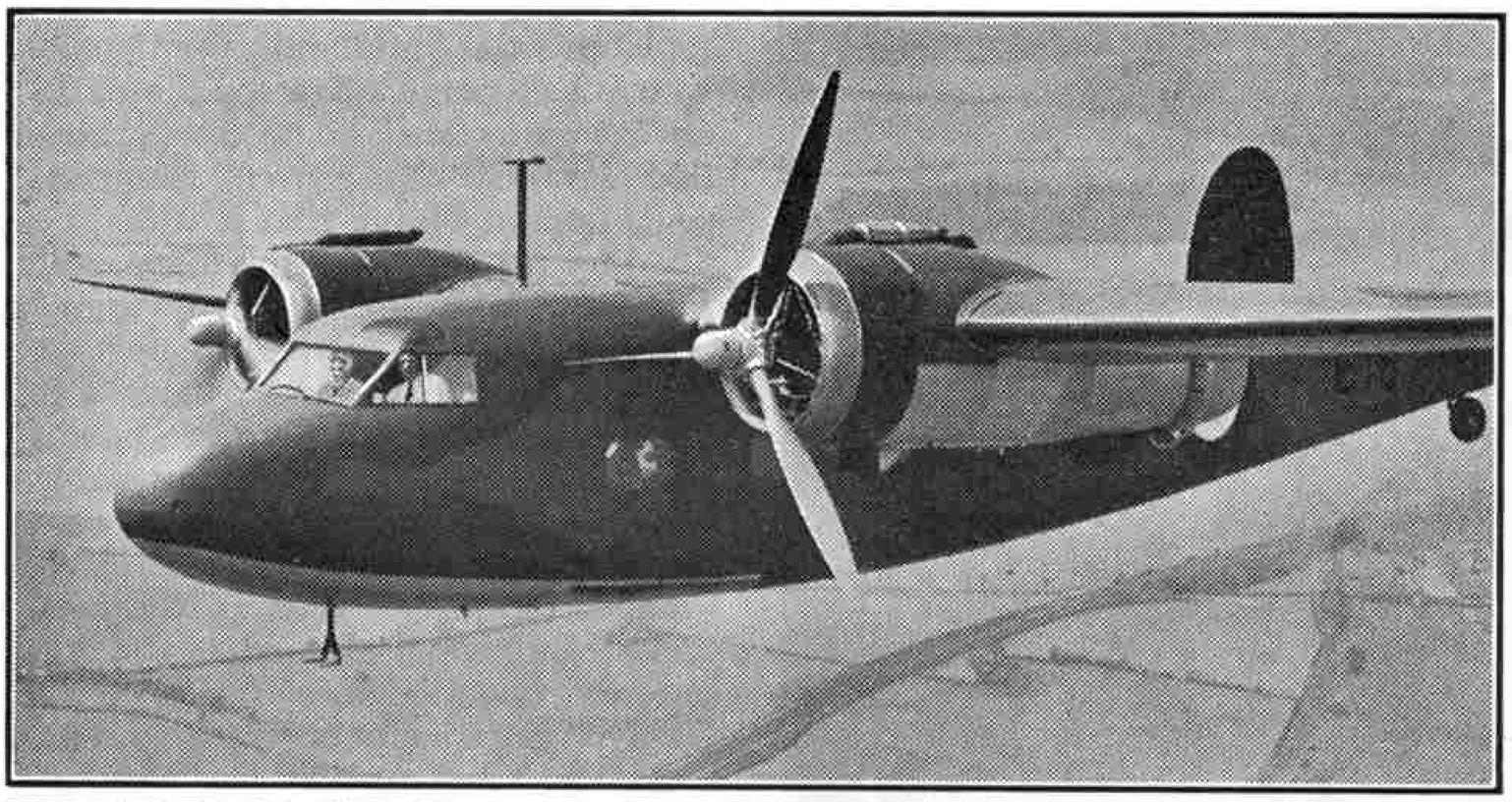
Britain Buys Flying Boat "Guba"

In the August *"Air News"* it was mentioned that the Consolidated 4-engined flying boat *"Guba,"* owned by Richard Archibald, the American explorer, was for sale. It has since become known that this boat has been bought by the British Ministry of Aircraft Production, and may be used for flying urgent freight from the United States to Great Britain.

"All Sergeants" Raid

One of the recent very successful R.A.F. raids on the German-occupied aerodrome at St. Omer, in France, was carried out entirely by sergeants. Each of the bombers engaged had a sergeant pilot at the controls, accompanied by a sergeant observer and a sergeant air gunner.

Several of these pilots were old hands, but one, making his first raid on the enemy, was also the first to reach the target. As soon as he dropped his bombs a cluster of searchlights caught and held his aircraft, and enemy fighters converged to attack. Dodging swiftly the pilot dived away into the darkness, and the fighters lost him.



A D.H. "Flamingo" in flight with one engine idling. Aircraft of this type are being used by the Royal Air Force on communications duties.

British Airways Carries On

At the beginning of the second year of the war the route miles flown by British civil aircraft were 94 per cent. of the peacetime total. Each swiftly-changing phase of the conflict has necessitated drastic re-organisation of the services of the British Overseas Airways Corporation, now officially referred to as British Airways. In spite of the heavy calls made on civil pilots, crews, and aircraft by the military authorities, and the closing of the Mediterranean over which the air highway of Empire used to run, new routes have been charted and new services introduced by the company. This re-organisation is continuing, and further Imperial links are planned.

The most important event of the past summer in this respect was the resumption of direct flights between England and North America, referred to in last month's "*Air News*." Four of the flights were made by the company's flying boat "*Clare*," and during her fourth return trip, which ended on 23rd Sept. last, she accomplished the ocean crossing from Botwood to Foynes in 11 hr., the fastest this year. On this flight "*Clare*" had six passengers on board. The fifth and last trip of the series was made by the company's flying boat "*Clyde*."

The main Empire service now operating is a twice-weekly one linking Durban, South Africa, and Sidney, Australia, and is known as the "horseshoe" route. The Trans-Tasman air service between Sidney and Auckland, New Zealand, is being operated three times a week, and a link between Bangkok, Thailand, and Hong Kong, China, is maintained by landplane twice a week. On the "horseshoe" route, with its feeder services, an average distance of 37,000 miles is being flown every week by British aircraft. Contact with Europe is also maintained regularly by flying boat and landplane services to Lisbon, and both mail and passengers, chiefly priority, are carried.

Plans are being prepared for strengthening the air links not only inside the Empire, but also with neutral countries. An important part in this development will be played by a fleet of eight D.H. "Flamingo" air liners on order for British Airways. The first of these machines, named "*King Arthur*," was delivered to the company in September last.

Bombing Enemy Invasion Bases

One R.A.F. bomber that took part in a recent attack on the invasion bases was badly hit as it flew through the terrific A.A. barrage, and caught fire. The greater part of the damage was in the centre of the machine, close to the rear gunner's position. For a brief period the captain thought that his aircraft was doomed, and that it would have to be abandoned. He related afterward: "The fire broke out amidships immediately after or during the attack. I warned my crew to prepare to jump. This, however, would not have been easy for them, because not only were the flames beginning to spread, but thousands of rounds of ammunition were exploding. I urged the crew to make every effort to extinguish the fire, and 10 min. later my wireless operator reported 'fire out'."

The damage was so severe that it was extraordinary that the aircraft reached its base. Huge holes were torn in the wings, three petrol tanks were destroyed, and the interior of the fuselage and the air gunner's cockpit almost destroyed.

The Flight Steward Answers Them all

In the Empire flying boats the Flight Steward is the main contact between passengers and crew. He is responsible for the comfort of the passengers, the preparation of their meals and drinks, and has to cope with their questions which are shot at him from all angles. A favourite query of first trippers is "Where are the parachutes?" and most of them also enquire about the height at which the boat is travelling. Regular fliers are keen to know who is the Skipper of the boat.

On one occasion a passenger in the smoking room of a Qantas Empire Airways flying boat discreetly beckoned to the Flight Steward and said in a very confidential whisper, "I say, Steward, don't cause any panic, but tell the Captain a piece of the wing is going to fall off any minute." He was watching the port aileron at work!

* * * *

A weekly air mail and passenger service between Karachi and Calcutta has been introduced by Indian National Airways. It is being operated with Beechcraft E.17.B transports, an American type.

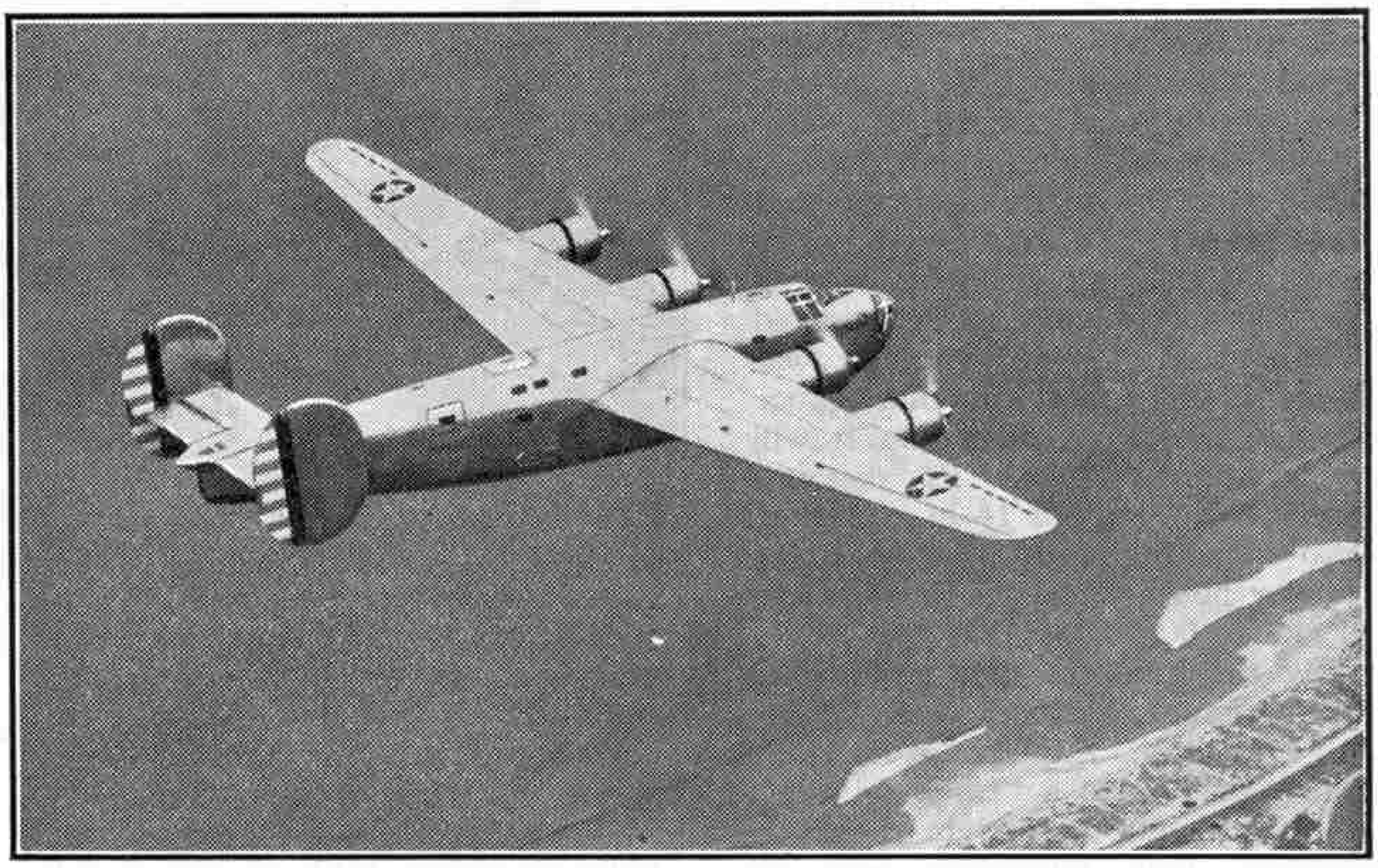
The Pilot's New Car

A fighter pilot, stationed in Scotland, was recently on leave in London, where he bought a car. He arranged for it to be carried on the train by which he was travelling back to Scotland. On arrival at his destination he grandly summoned porters to open the van so that he could drive away.

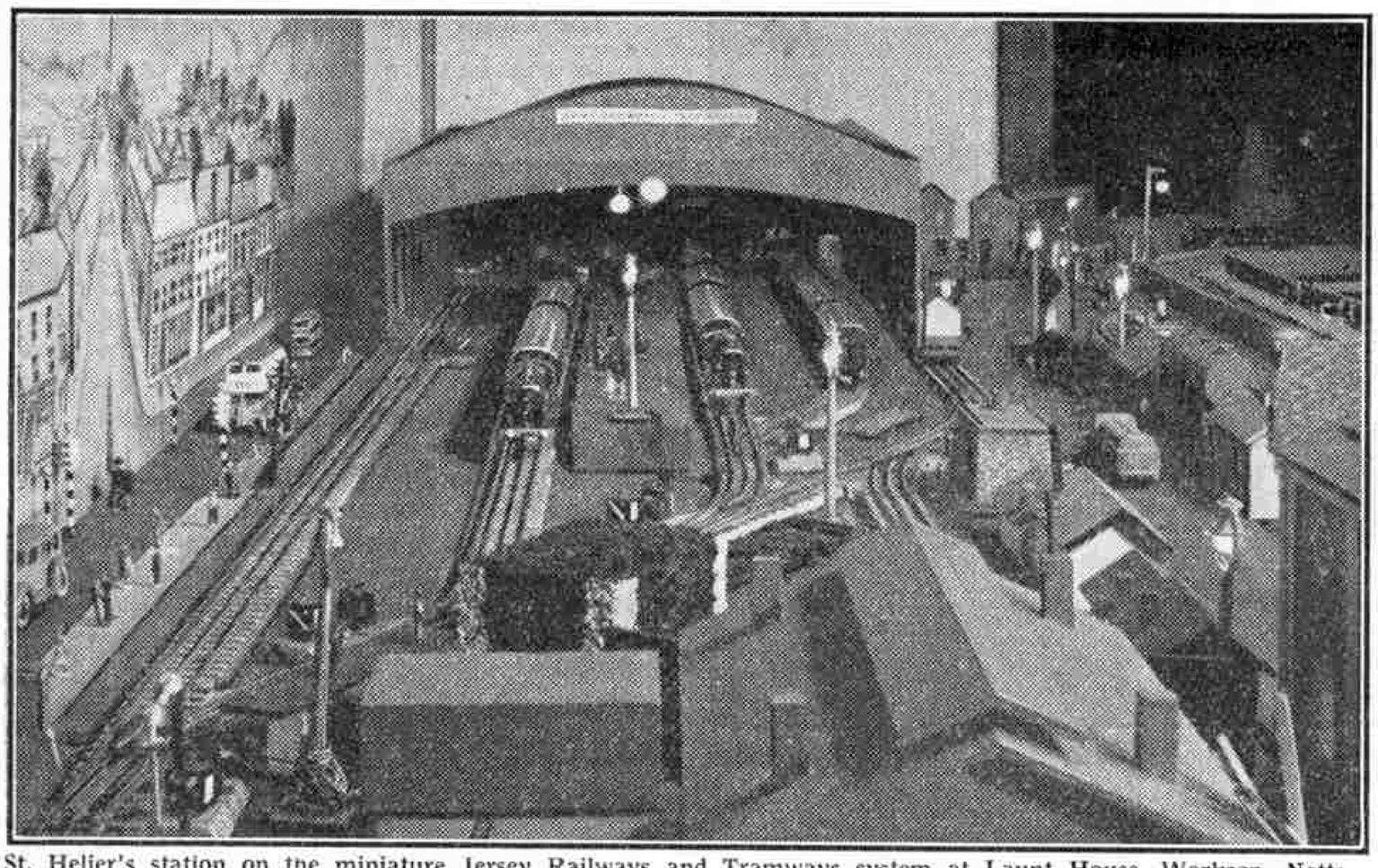
They opened the van, and a horse walked out . . .

Pick-up Air Services in the United States

All American Aviation, Inc., who operated two experimental pick-up air mail routes until early last summer, have been granted authority to operate five such services in the United States, and to carry freight in addition to mails. All the services will operate from Pittsburgh, one to Philadelphia, one to Jamestown, New York, another to Williamsport, and two to Huntingdon, West Virginia, and pick-ups will be made at many intermediate points.



Consolidated Model 32 4-engined heavy bomber, a type in production for the United States Army Air Corps. It has a top speed of over 300 m.p.h. and a range of about 3,000 miles. Photograph by courtesy of the Consolidated Aircraft Corporation, U.S.A.



St. Helier's station on the miniature Jersey Railways and Tramways system at Launt House, Worksop, Notts., described in this article.

Thirty-One Years of Model Railways

From Gauge 1 to Gauge 00

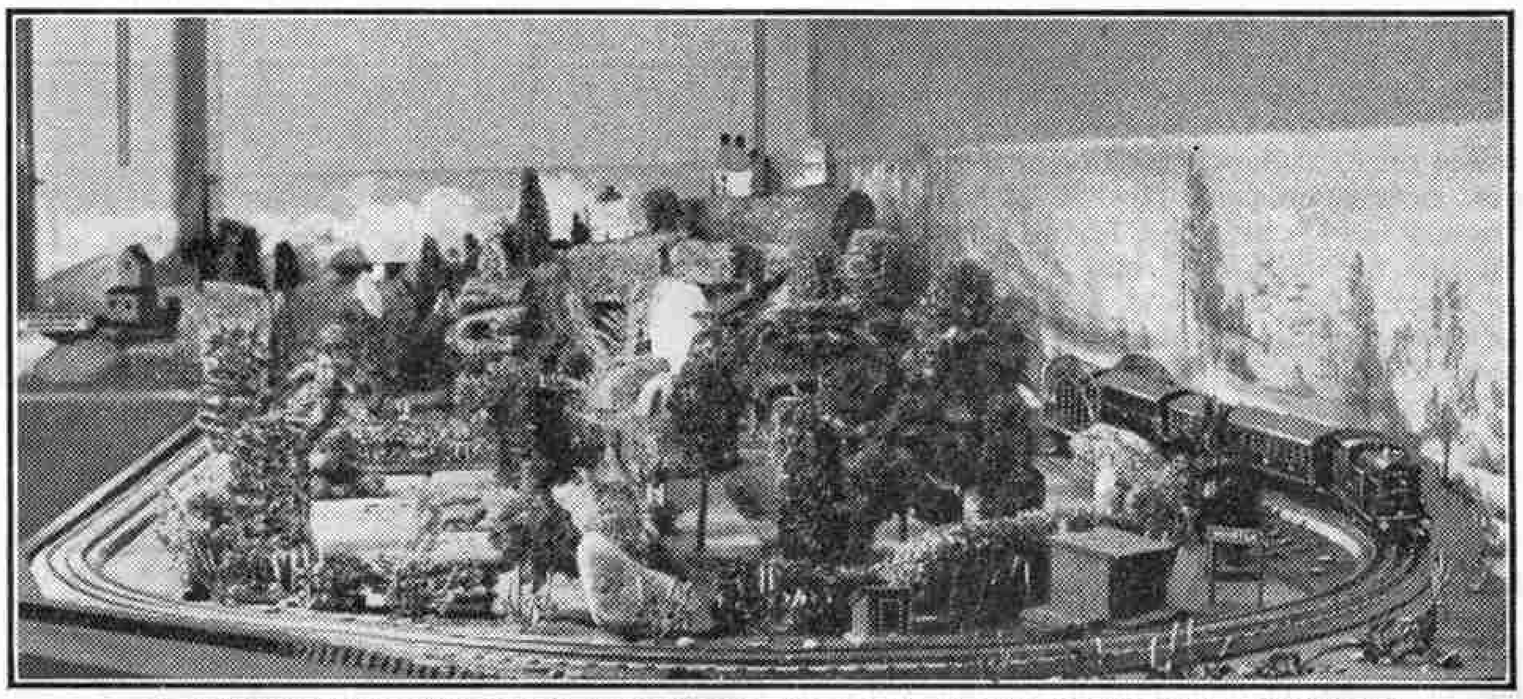
By V. Boyd-Carpenter

MY first model railway commenced operation in 1909 as a clockwork system in Gauge 1. Since then I have always had a model layout and the present system, in Gauge 00, has resulted from seven complete changes of site owing to household removals, various gauge alterations and successive changes in motive power from clockwork to steam and from steam to electricity.

The successive alterations of gauge are typical of many systems that have been in use over a number of years. At the time when the original line started Gauge 1 was considered comparatively small and it was probably the most popular gauge then in use. Now, of course, it will seem immense, with its distance between the rails of $1\frac{3}{4}$ in., to those who have taken up the miniature railway hobby since the introduction of Gauge 00.

By the time the first removal of the original system took place, in 1911, the tinplate oval track had expanded to a "track mileage" of 100 ft. and there were then two engines, four passenger and 26 freight vehicles. From 1916 to 1920 the system was located in the Channel Isles; the next removal, from Jersey to Suffolk, thus constituting the third upheaval to which the line had been subject. Back in England again the system was developed out of doors, using now a wood-sleepered track, until a track mileage of 462 ft. was in use.

Steam power now made its appeal and after an adventure involving absence from school the "General Manager" of the line became the possessor of a steam Midland Compound No. 1000, a favourite model among enthusiasts for many years. Later a steam tank of the 0–4–0 type made its appearance and shortly afterwards, at the end of 1922, the line was removed to Worcestershire. Outdoor location was again chosen and the track extended to a total length of over 500 ft.



A picturesque curve between St. Aubyn's and Don Bridge. A train to Corbiere is approaching.

In 1924, an S.R. "King Arthur" replaced the Midland Compound which had come off second best in an encounter with some cows which had invaded the garden. Stephenson's famous saying that it would be "bad for the coo" was thus disproved! Five years later, during which various additions were made, a further removal took place and a large loft formed the new site for the system. Unfortunately the space available meant a reduction of track mileage by practically one half. It was decided on this account to give up Gauge 1 and steam propulsion and so the line entered upon a new phase as a Gauge 0 electrically-operated system.

At the same time it was decided that a definite section of real line should be represented. Accordingly the G.W.R. branch line from Taunton to Chard was selected. Among the new locomotives obtained was a Hornby clockwork *"County of Bedford,"* one such engine being always insisted on by the "Management." This system worked quite well but the advantages of 00 Gauge became more and more apparent and with a further change in residence in 1935 it was decided to adopt the smaller scale.

So the present system, which represents the Jersey Railways and Tramways line from St. Helier's to Corbiere, commenced indoors in a space of 12 ft. by 10 ft. The layout is put down on a raised baseboard and a total layout of 213 ft. of track is in use, 126 ft. of this being main line "mileage." To obtain the necessary length, the layout being of the end-to-end or non-continuous variety, it has been necessary for a certain amount of "doubling back" to be carried out. This however does not interfere with the general effect of the system which, I think, represents fairly closely the real thing in its arrangement and scenery.

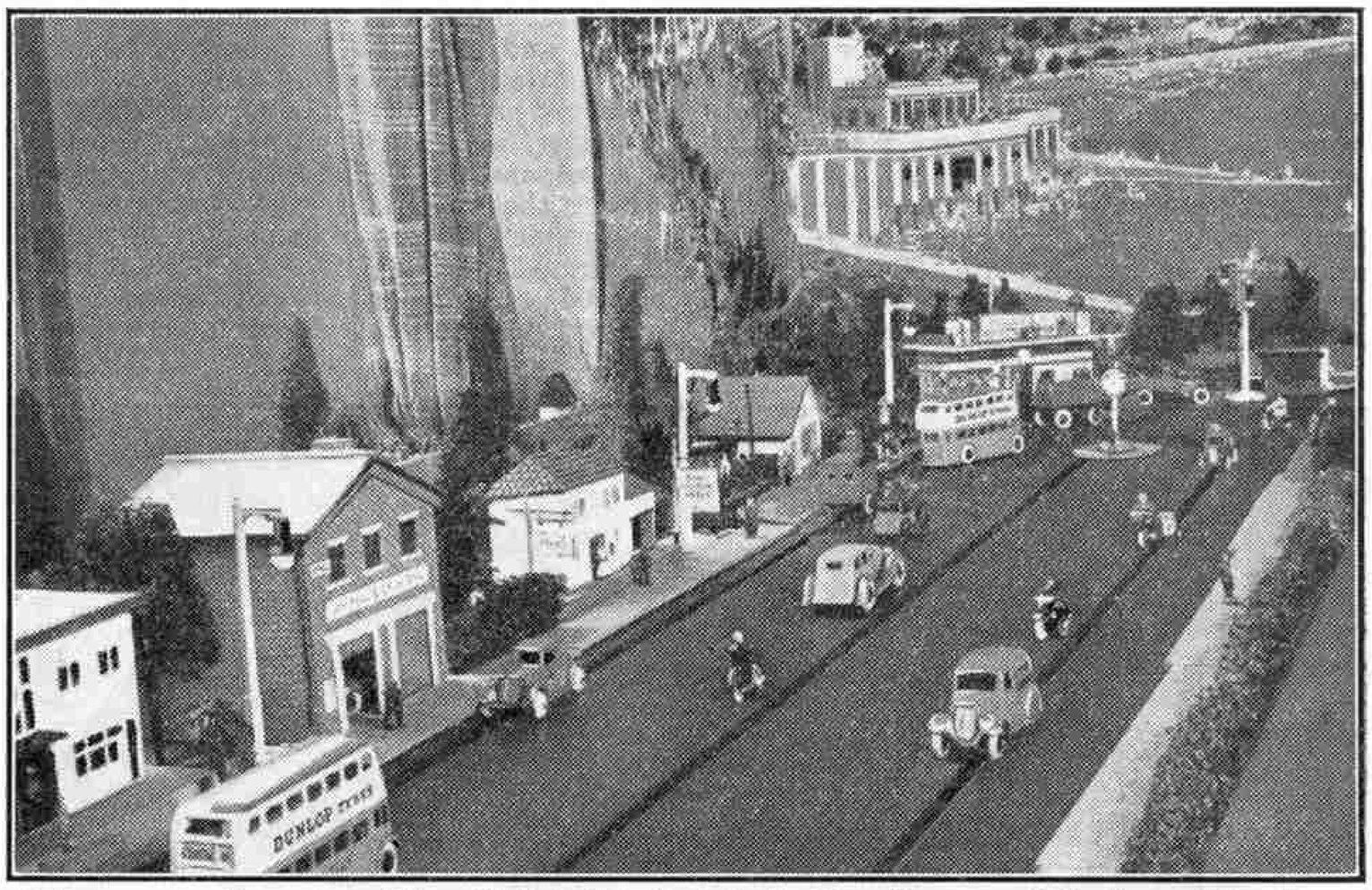
St. Helier's station is situated in the town square and is served by three tracks; there is also a carriage siding alongside the station itself. The various station tracks converge into a single main line. This track proceeds for some distance and then doubles back on itself, passing behind the locomotive sheds and carriage depôt that are situated a little way out of the station. It then runs parallel to its original course and is joined by a freight siding; after this, as the main line swings through a right angle a level crossing is negotiated and West Park is entered. The station serving this is situated on the Esplanade.

This station faces a scenic background representing the sea and is backed by the Municipal Gardens and the main road running from St. Helier's to Corbiere, on which there is a great variety of Dinky Toys "traffic." Further gardens and beach scenery are next encountered and then with another right-angle bend the line reaches Millbrook station. This forms a crossing place, the single line here developing into separate up and down tracks through the platforms.

A short straight run, still paralleled by the road, brings us into St. Aubyn's, a busy town and the old capital of the Island. Here the main part of the station, which is the largest on the system, is served by two terminal platforms covered by an overall roof. The through line for Corbiere branches off the main track just short of St. Aubyn's and through trains are accommodated at a separate platform connected to the main station. Carriage sheds and sidings and a freight road are provided.

After turning gently through another right angle the line passes through a tunnel and then encounters a miniature stream which it crosses twice by means of realistic viaducts. Deep stone cuttings are now prominent and eventually Don Bridge is reached. This is another crossing place but although there are two tracks here a single platform only is provided.

Hilly country now appears and a track branches off to serve the La Moye Granite Quarries. Then with the line making a final turn through rather more than a right angle the other end of the system is reached at Corbiere.



A busy scene on the main road from St. Helier's to St. Aubyn's. The railway, parallel to the road, lies between the buildings and the scenic background.

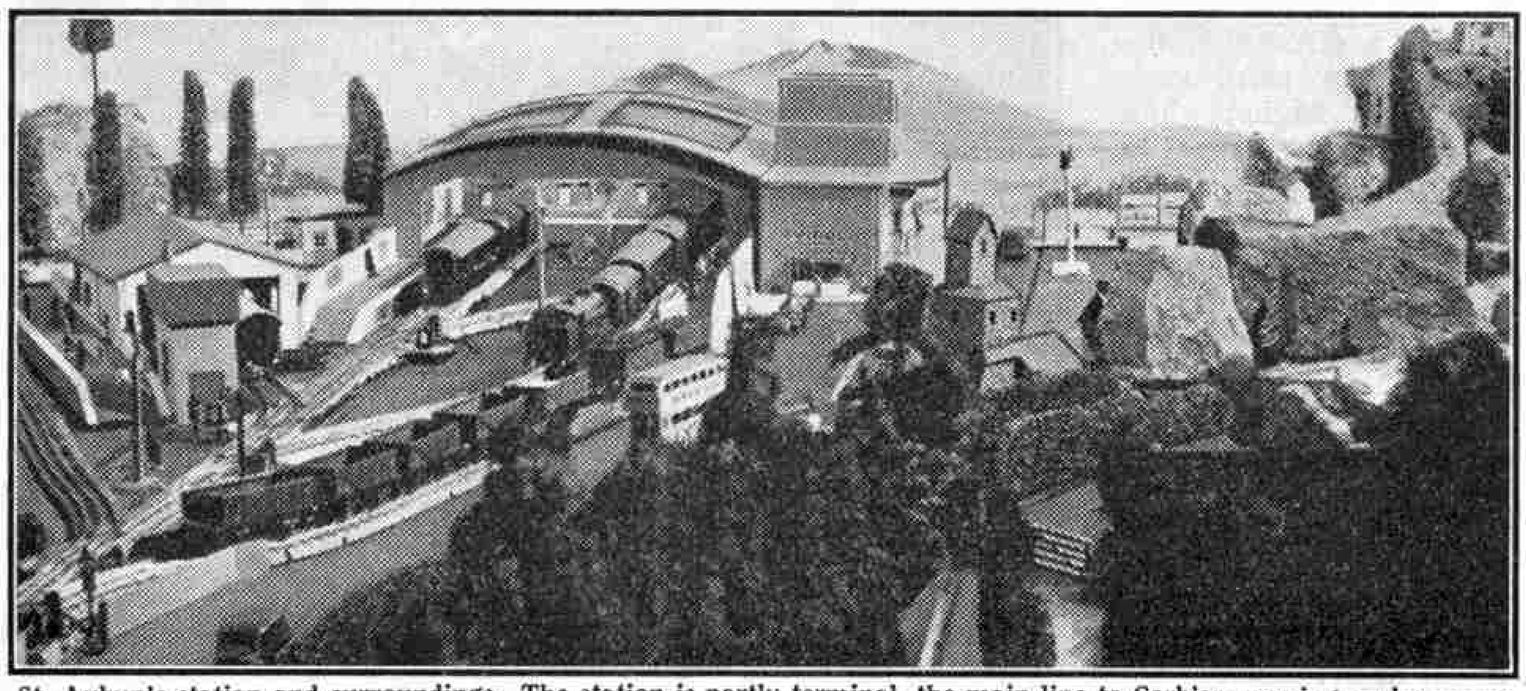
A feature of the operation of this system is that timetable working based on the actual services is strictly adhered to. Not only so but fresh timetables are prepared twice yearly and are correctly printed sheets that are the work of the firm responsible for the timetables of real practice. On the miniature system the whole of the service is run daily and a train is never omitted from the service as laid down on the time sheet except in a grave emergency. This I think strikes an unusual note in train working in miniature.

For working the trains five rebuilt Hornby-Dublo 0–6–2 Tanks are in use and they perform exceedingly well under the intensive conditions of running that are the rule in the system. Very few failures have to be reported during the year in which the layout has been in operation. The running of the engines is subject to the same strict system as is the timetable operation. Duties are arranged in a cycle covering three weeks, at the end of which period the roster recommences as before.

Electrically-operated points are employed and the crossing gates are similarly worked, also the one signal of which the prototype boasted, near St. Aubyn's. In addition there are electrically-operated whistles which give a realistic effect to train working. In real practice there were no signal cabins on the Jersey Railways but the miniature system has had to be provided with these owing to the system of remote control in use.

The lighting of the line calls for 140 lamps, for many of which current is obtained from Meccano Transformers. As the upper illustration on this page shows good use is made of Dinky Toys components for the lineside effects. The buses in particular look very realistic, and give a decided touch of life to the scene.

The system is open for inspection at any time by appointment and has a collecting box which raised some £4 last year for the North Eastern Railway Cottage Homes.



St. Aubyn's station and surroundings. The station is partly terminal, the main line to Corbiere passing on by means of the diverging track seen on the left hand side of the photograph.

From Our Readers

This page is 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.

Bird Ringing

The system of placing small aluminium rings on the legs of birds was devised to enable the mysteries of bird migration to be penetrated. The aluminium rings used most extensively in Britain bear the inscription: "INFORM BRITISH MUSEUM, NAT. HIST. LONDON," with a code number. The rings are either placed on young birds in the nest, or on adults caught in large traps. They are made in eight sizes, and each bird must have the correct size of ring placed on it.

The number of the ring, the species of bird, the date and place where it was ringed are all noted down. Then in the autumn or spring, when the bird migrates, it may be caught in someone else's trap, or more likely, it may be found dead. Most of the birds are never heard of again, but quite a high percentage of them are traced and provide very interesting results.

It is only by ringing a large number of birds that conclusive evidence can be obtained, and bird watchers all over the country ring about 55,000 birds a year. Many of these are ringed at bird sanctuaries.

Details of some remarkable journeys have been obtained by this means. For instance, a puffin ringed on St. Kilda was recovered in Newfoundland. Birds from Britain have also been traced to the United States of America, and starlings from England have reappeared in Russia, Northern Poland, Finland, and as far away as the Arctic Circle.

One interesting result that has been proved by ringing is that swallows and a few other birds come back to their previous nesting haunts. Ringing also tells us to what age birds grow. A blue tit caught at the same place over and over again was proved to reach the age of eight years, and a starling has been found to live to be nine years old.

G. H. COATES (New Earswick, York).

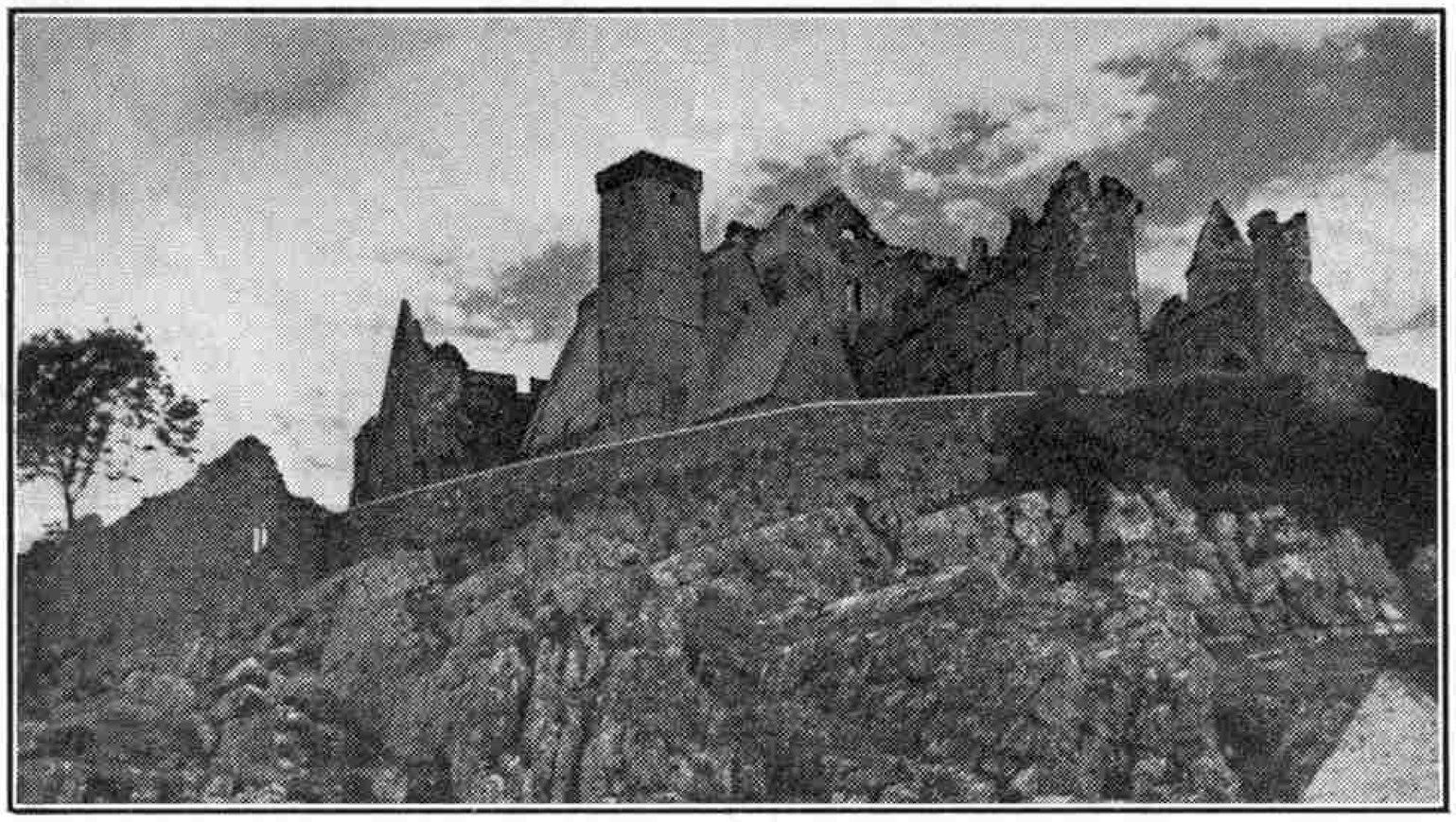
The Rock of Cashel

On my holiday in Ireland last year I was fortunate in being able to see the Rock of Cashel, Tipperary. This is a hill of solid limestone rising abruptly to a height of 300 ft. and crowned by a group of buildings which, even in their ruined state, display the most interesting examples of mediæval castle and cathedral buildings to be seen in Ireland. The group comprises the remains of the residence of the Kings of Munster, an ancient cathedral, Cormac's Chapel, and the Round Tower, and nearby stands the ancient Cross of Cashel.

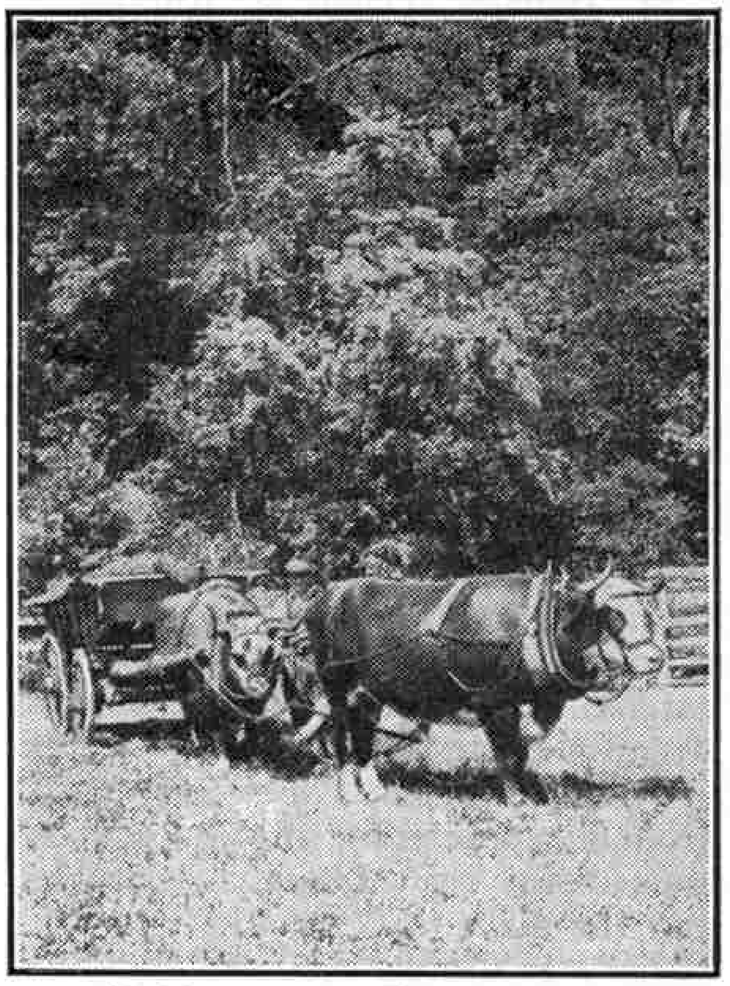
Cormac's Chapel, built in 1127, is richly decorated. The main doorway is beautifully carved, and the stone roof, which is of unusually steep pitch, as will be seen in the accompanying photograph, is still preserved. The walls are ornamented with carved heads of the ancient kings of Munster.

The Round Tower is 90 ft. high, and it is possible to climb to the top by a circular staircase. Every third stair is a foot higher than its fellows in order to trip any attackers climbing the staircase, which winds in a clockwise direction so as to impede the use of the sword arm of an attacker, while allowing unrestricted movement to a defender. At the top of the tower the battlements are provided with flues through which molten metal could be poured on the heads of attackers.

L. C. M. MUDIS (Hove).



The Rock of Cashel, Tipperary, on which is the most interesting group of ruins in Ireland. Photograph by L. C. M. Mudis, Hove.



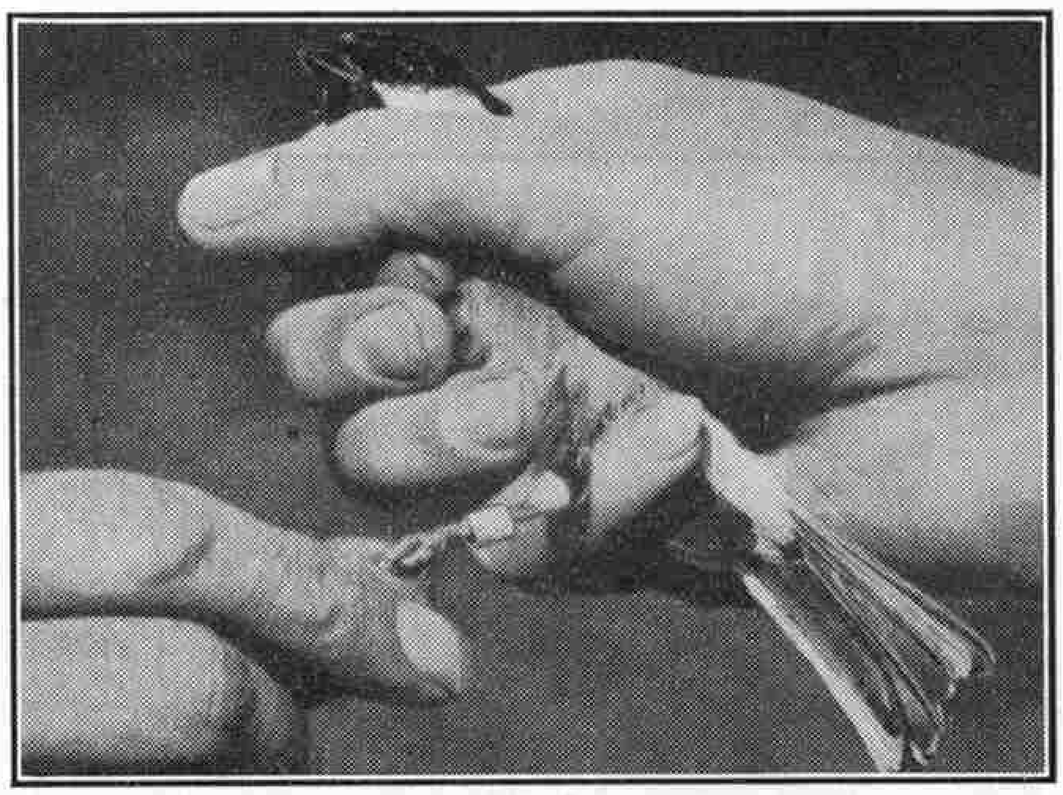
Working oxen on a Gloucestershire estate.

Working Oxen

At the beginning of the last war there were several teams of oxen still working in England, especially in Sussex, but they nearly all went to the butcher, some individual animals fetching as much as £100 each. Perhaps six teams were reformed after the Armistice, and there were certainly oxen at Saddlescombe and Exceat, to mention two places, but very few were kept up for long. Indeed, it seems almost certain that the outbreak of the present war found England with only a single team of oxen, on an estate in Gloucestershire, and the accompanying illustration shows two of the oxen working there this summer. It will be seen that the animals have collars and hames like those used for horses, and are worked in tandem.

As working oxen have so nearly disappeared from Britain, it is worth recalling that they were the source of many of our measures of land. Furlong is simply "furrow-long," the distance oxen would draw a plough without pause, and a rod, or 16½ ft., is the normal length of the ox goad used by a driver of the eight oxen that formed a full team.

RUSTICUS (Reading).



A great tit just after a ring has been placed on its leg. Photograph by G. H. Coates, New Earswick, York.

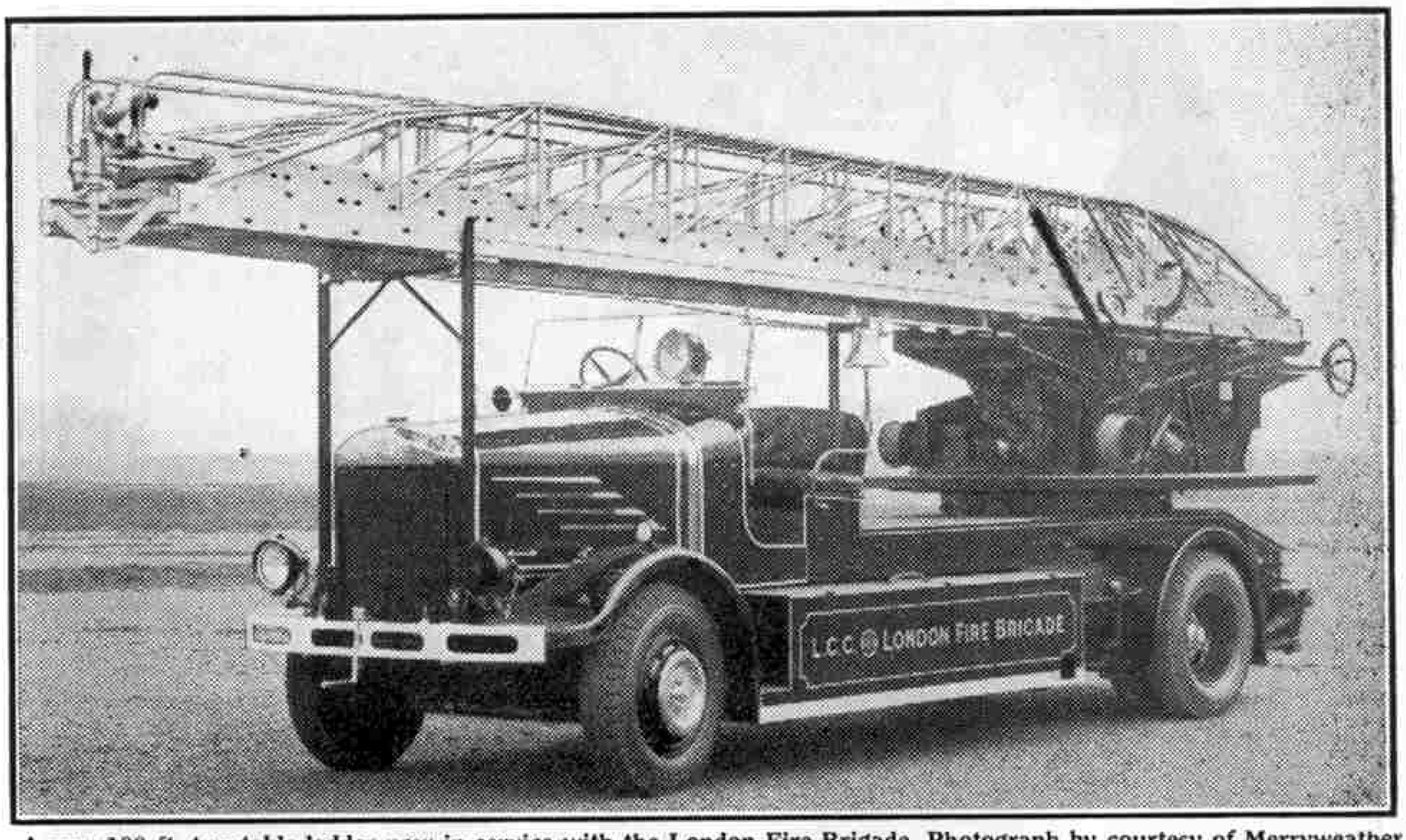
Engineering News

New Turntable Ladder for London Fire Brigade

The illustration at the right shows a new motor turntable ladder built by Merryweather and Sons Ltd., Greenwich, which is now in service with the London Fire Brigade.

The ladder is mounted on a Dennis chassis fitted with a six-cylinder engine capable of developing 115 b.h.p. It is in four sections and reaches a height of 100 ft. from ground level when fully extended. It is built entirely of welded steel to the firm's patents, and is operated from a power take-off combined with the chassis gearbox. The rungs are covered with non-slip, heat-insulating material, and automatic safety pawls fitted to each ladder section ensure that when in use they rest on one another and are supported independently of the extending ropes.

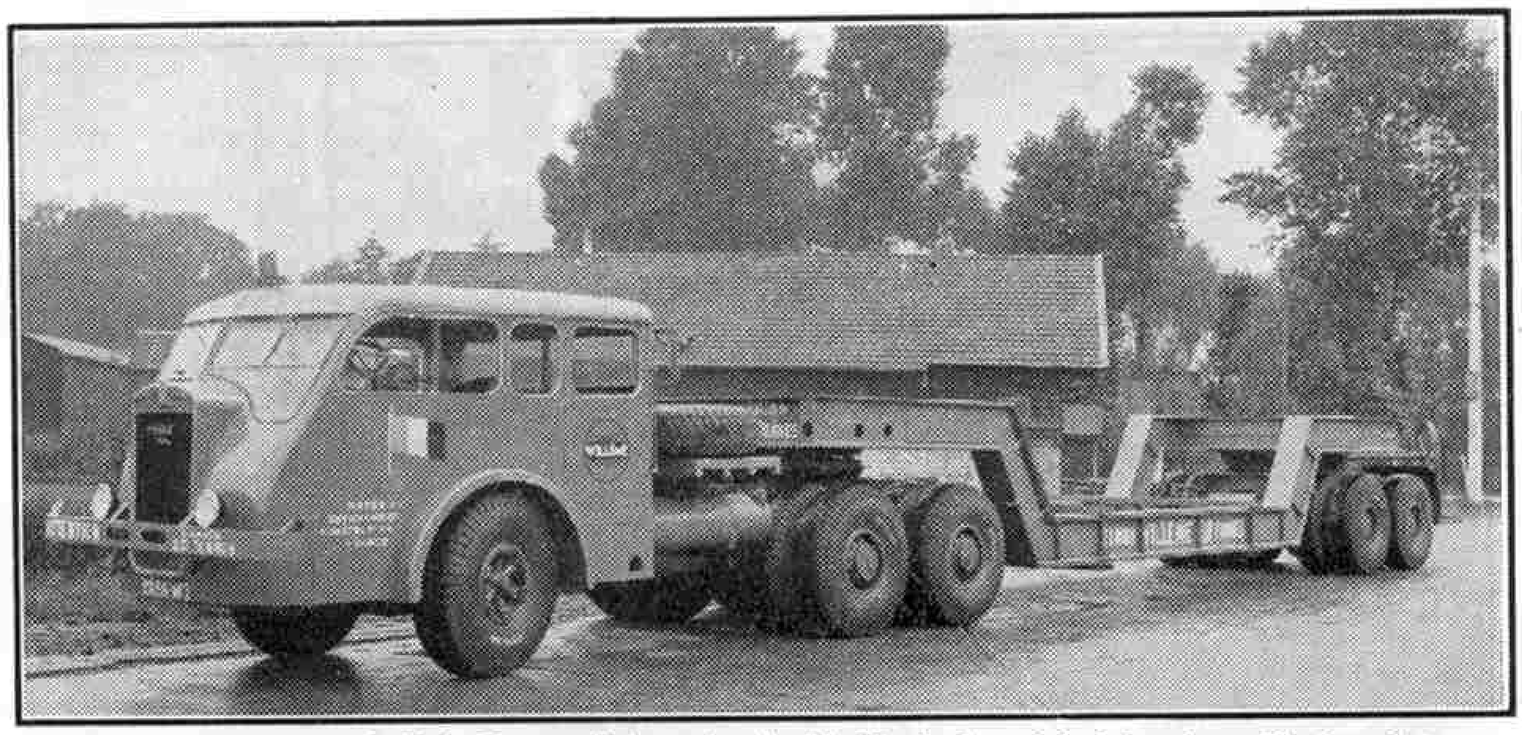
The ladder is attached to a hinged steel tilting frame mounted on a turntable, which rotates on the chassis. Three hand levers operating friction clutches control the tilting, extension and rotation of the ladder and a connection is also provided to the engine throttle to enable the man in charge to control the speed of movement of the ladder.



A new 100 ft. turntable ladder now in service with the London Fire Brigade. Photograph by courtesy of Merryweather and Sons Ltd., London S.E.10.

Building Ships in Dry Dock

In some American dockyards special arrangements have been made for building ships in dry dock, one large ship built in this manner being the 10,000-ton cruiser "*Louisville*" of the United States Navy. At Puget Sound Navy Yard, where this vessel was constructed, there is a shallow concrete dock, 927 ft. long and 130 ft. wide, which is of sufficient size for the simultaneous construction of two cruisers of the size of the "*Louisville.*"



A giant 110-ton lorry built in France. It is equipped with 18 wheels and is driven by a Diesel engine.

The main advantage of this method of ship construction is that when the hull is completed it is only necessary to fill the dock with water to float the vessel and it can then be towed to the fitting out basin. This is a comparatively cheap and safe operation compared with the erection of a ship on inclined slipways and launching it in the usual manner.

A Novel Life-Saving Invention

A novel life-saving suit, designed to be worn continuously by seamen, has been invented by a Swedish engineer. It is made of water-proofed fabric, closed in front by a special rubber "Zip" fastener, and is given buoyancy by a waistcoat filled with kapok, which is sewn into the suit. The suit combines boots and mittens, and besides keeping a ship-wrecked person warm while he is in the water it also protects him from severe cold if and when he is rescued.

New American Ships

One of the latest ships launched in the United States is the "*President Jackson,*" a fine passenger and cargo liner of 9,300 tons gross. It is the first of seven "President" ships being constructed for the round-the-world service of the American President Line, and is 492 ft. long with a breadth of 69 ft. 6 in. The designed speed of the ship is 16½ knots.

Another fine ship now being built in the United States is a 19,405 ton tanker. This is to be of all-welded construction and will be equipped with turbo-electric propelling machinery constructed by the General Electric Co., Schenectady. This ship has been ordered by the Atlantic Refining Co., Philadelphia.

Segraves' "Sunbeam" Record Car on Show

One of the most famous of record-breaking motor cars is the 1,000 h.p. Sunbeam with which the late Sir Henry Segrave set up a world's record of 203.7 miles an hour at Daytona Beach in 1927. This was the first road vehicle to attain a speed of over 200 m.p.h. It has been carefully preserved by Sunbeam Commercial Vehicles Ltd. at the works where it was originally built, and recently has been lent to Loughborough College, at the request of Dr. Herbert Schofield, Principal. The car has been placed on view with other "museum pieces" for the benefit of the students of the college.

Giant Excavator Driven by 25 Engines

From Russia comes news of a giant dragline excavator that is now under construction at Kramatorsk. The various motions of the machine are operated by 25 separate engines and five electric generators, and it is capable of handling up to 19,070 cu. ft. of earth per hour. The dragline bucket can operate at a maximum radius of 164 ft. from the base of the boom.

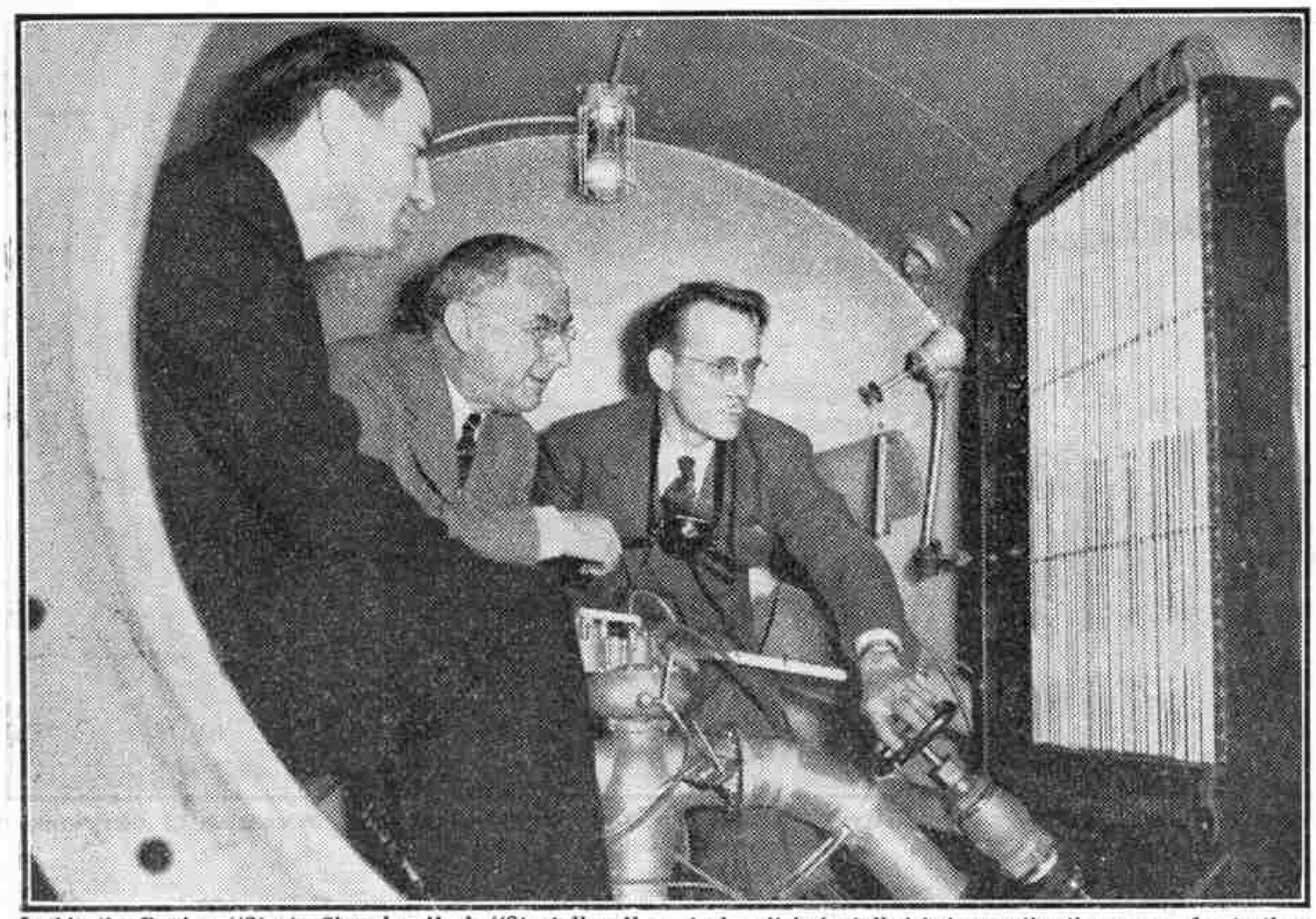
New Motor Life-boat the Gift of Girl Guides

The Royal National Life-boat Institution has received a cheque for £5,000 from the Girl Guides Association. This is part of the £50,000 contributed by the 700,000 guides of the Empire, who set themselves to give £20,000 in Empire week to provide two air ambulances and a motor life-boat.

The gift provided a self-righting life-boat of a new design, which was completed at the end of last May. The new boat went straight from the building yard to Dunkirk, where she was one of 19 life-boats of the Institution that helped to take off from the beaches thousands of men of the British Army. She then returned to the building yard for overhaul and repair. At the wish of the Girl Guides Association she will be named "*Guide of Dunkirk.*"

A New Record in Bridge Construction

Part of the Canadian National Railway track in the island of Montreal is now carried by the world's largest pre-cast concrete bridge. This has a span of 77 ft., and consists of four huge reinforced concrete slabs each weighing about 120 tons.



Inside the Boeing "Strato-Chamber." A "Stratoliner" control unit is installed between the three men for testing. The photographs on this page are by courtesy of the Boeing Aircraft Company, U.S.A.

The Boeing "Strato-Chamber"

High Altitude Trials at Ground Level

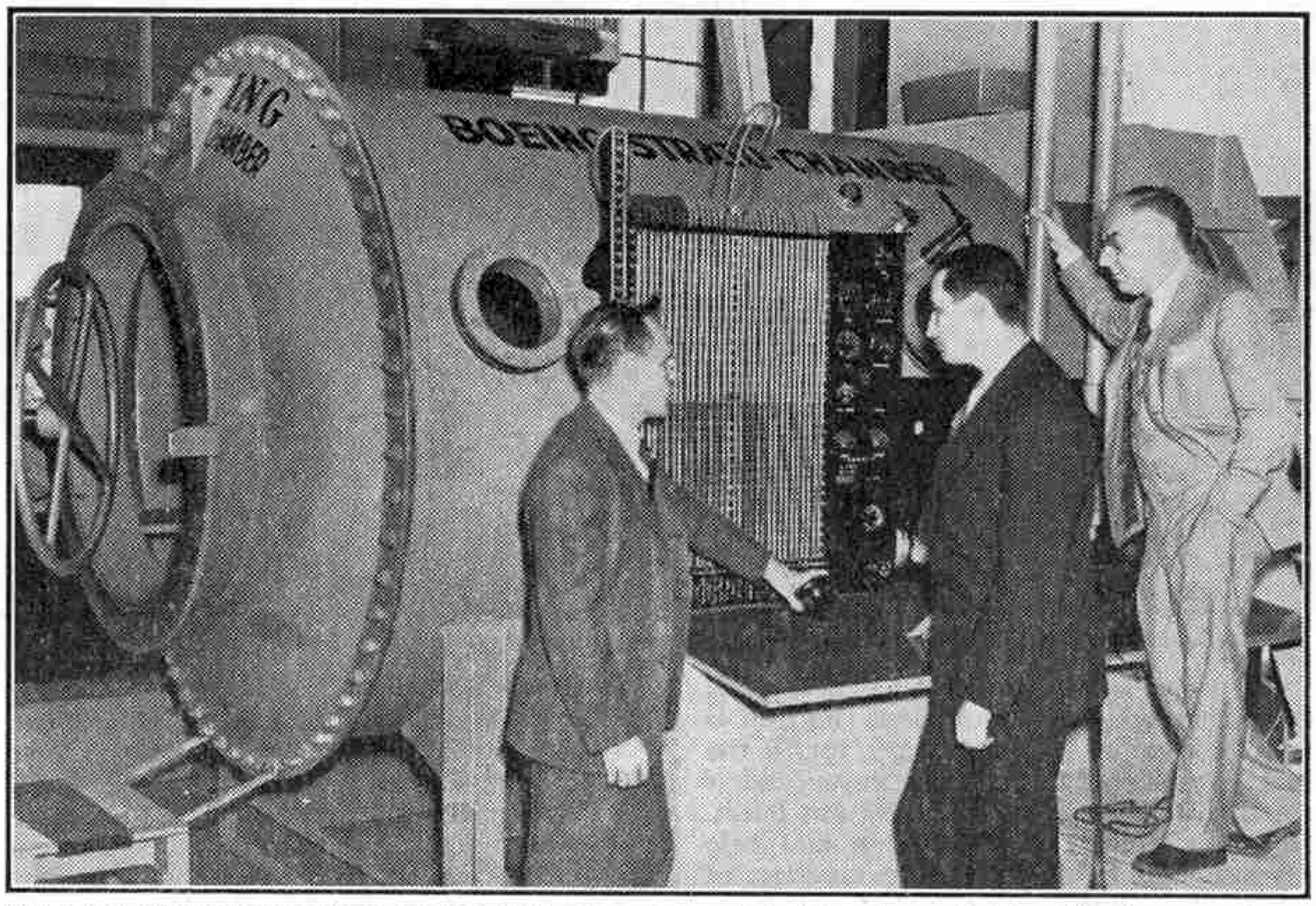
THIS year the Boeing Aircraft Company, of Seattle, U.S.A., completed a fleet of "Stratoliner" 4-engined transports for Transcontinental and Western Air, Inc., one of the leading United States air line operators. These aircraft are the first large air liners to be equipped with an automatic pressure regulating or altitude conditioning system for comfortable flight at "above the weather" heights. This equipment was tested by the Boeing research engineers in a special laboratory devised by them and called a "Strato-Chamber," so as to check the working of the apparatus under true high-altitude flight conditions before installing it in the "Stratoliners" for the actual flight tests. This enabled the engineers to make any necessary adjustments on the ground, and so avoid undue expenditure of flight-test time, which is very costly.

The Strato-Chamber recreates on the ground the conditions of supercharged flight at great heights, and seated inside it the engineers are able to "fly" in a few minutes to any desired height up to 40,000 ft., either with comfortable supercharged air conditions or with oxygen masks and no supercharging. Without leaving the ground they are able to test innumerable devices, controls, pressure seals, windows, structural members, etc., for the aeroplane of to-morrow as though these were being tested in actual high-altitude flight.

This novel chamber is a 3-ton steel tank 12 ft. long and 5 ft. 6 in. diameter, with pressure-tight doors at each end. Its extensive equipment includes air locks, superchargers, vacuum pumps, control valves, and a dry-ice refrigerating plant, and on its walls are many recording instruments and test devices. The chamber is divided into two inter-connected compartments, in one of which the atmosphere is the warmed, normal one of a modern supercharged aeroplane cabin, and in the other is the rarified, cold air of the stratosphere. The upper photograph on this page shows the portion of the chamber that represents the interior of a modern high-flying aeroplane, with a "Stratoliner" control unit installed for testing between the three men. This compartment is equipped with controls and instruments that duplicate a set on the outside, and contact is maintained by means of observation windows and a telephone system.

A motor-driven vacuum pump is used to reduce the air pressures within the high-altitude section of the Strato-Chamber to simulate air conditions at great height, and the refrigerating plant reduces the temperature of this air to the 30 or more deg. F. below zero prevailing at those heights. The air is then piped into the compartment that represents the cabin of an air liner flying very high, and is warmed and supercharged to a comfortable condition.

By adding stronger pumps the Boeing Strato-Chamber could be used for high-altitude development work above the present level of 40,000 ft., up to 60,000 ft., or more than 11 miles above sea level.



The Strato-Chamber viewed from outside. External controls and instruments are duplicated in the compartment shown in the upper photograph.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, 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.

"World Natural History"

By E. G. Boulenger
(Scientific Book Club. Members only, 2/6)

For all who are interested in animal life here is a book that is easy to read, is accurate, and is illustrated by 150 magnificent photographs and 26 drawings. It represents astonishing value at the low price of 2/6 at which it is available to members of the Scientific Book Club; and its interest is so great and its appeal so difficult to resist that any boy to whom a copy is given is sure to be absorbed in its contents, and to be well on the way to becoming a naturalist. Mr. H. G. Wells sums this up in the excellent introduction that he contributes, in which he commends the book as a necessary supplement to visits to the Zoo and describes it as one to own, to give as a present and to give as a prize.

With such a wealth of material as that Mr. Boulenger has collected it is impossible to give prospective readers a full idea of the contents of the book. It is perhaps sufficient to say that in it we read of every type of animal life, from man himself and the anthropoid apes, the chimpanzee, the gorilla, and the orang-utan, down to worms, jellyfish and the very simplest single-celled animals that swarm in the air, in soil and in water. In following the great line of creatures between these extremes we meet with the most amazing diversities. Familiar friends such as lions, elephants, whales, seals and dolphins, zebras, kangaroos and birds and reptiles in variety are there. With them we meet less known monkeys, such as the loris and the lemurs; the okapi, the Central African relative of the giraffe that was entirely unknown to Europeans until well into the present century, and hosts of tropical birds, dragons, lizards and monsters of all kinds. We read the marvellous stories of the insects, and of fishes and other salt and fresh water creatures, many of them of surprising interest. It is only necessary to mention the flying fishes, the sea horses with their bony armour, the cuttle-fishes, and the angler fishes of the deeps that have a luminous bulb as a lure to indicate the wonders of the fish world.

Throughout we are interested in the relationships that can be traced in the world of animals.

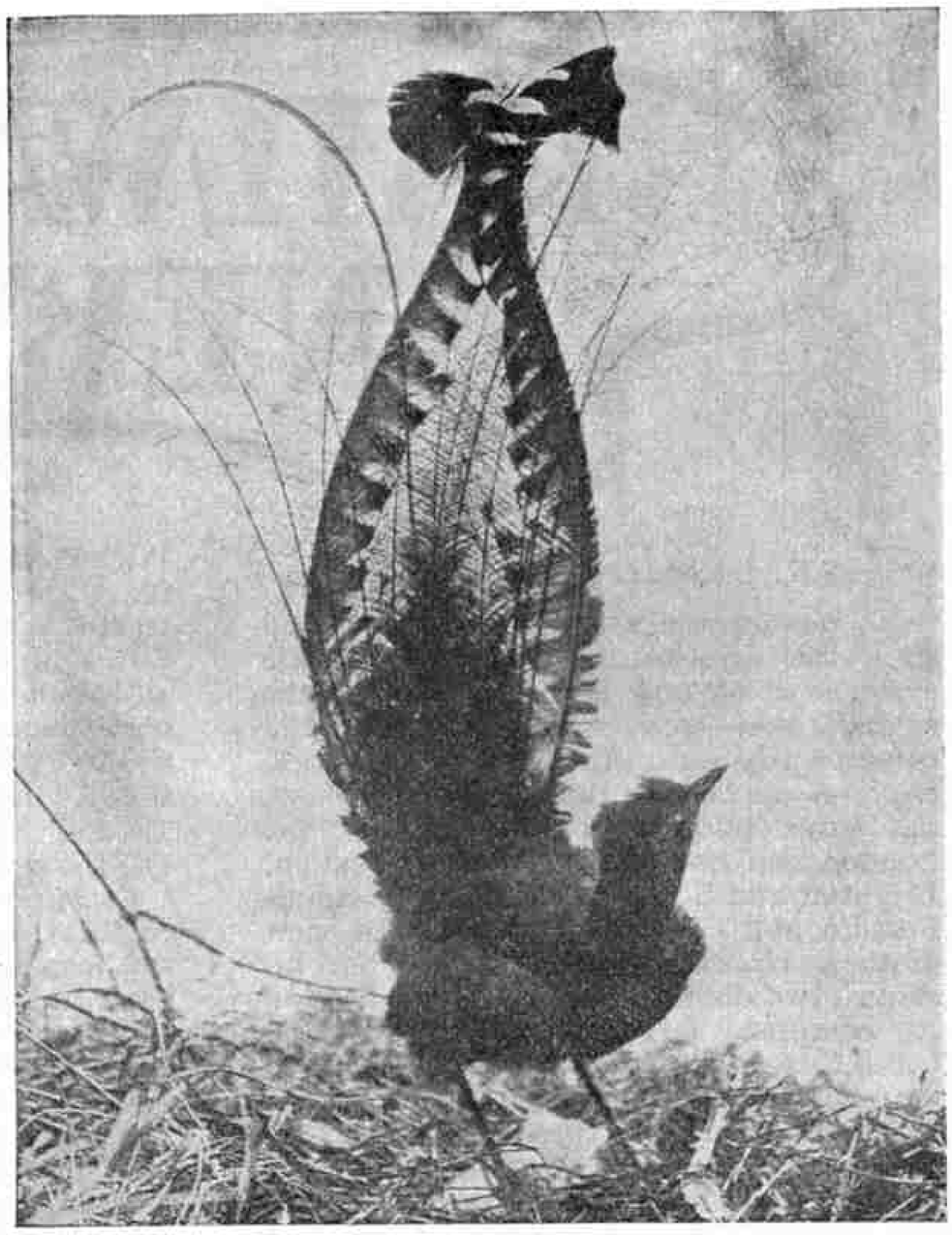
Mr. Boulenger gives us brief but vivid accounts of each of these creatures and of their habits, and with the splendid illustrations to help him the reader will acquire a store of exact and up-to-date knowledge. He will gain also a profound respect for the animal kingdom.

"What Engineers Do"

By Walter D. Binger
(Scientific Book Club
Members Only, 2/6)

Mr. Binger's book has already been reviewed in the "*M.M.*" It is now made available in a revised and enlarged edition to members of the Scientific Book Club. The engineers whose work is explained are those who build bridges, dams and railways, make highways, erect great buildings, bore tunnels and provide us with water. We see just how they survey their tasks and make their plans, and then carry these out with almost incredible accuracy.

The author's simple but comprehensive story gives his readers clear ideas of the great debt we owe to these men, and his clever diagrams reveal at a glance many of the secrets of their structures.



The lyre bird of Australia. This illustration and the one below are from "World Natural History," reviewed on this page.

"Engineering Workshop Manual"

By E. Pull. (Technical Press Ltd. 4/- net)

This well-known manual has now reached its 7th edition, for which it has been considerably revised and enlarged. It is written mainly for the apprentice and the beginner in workshop practice, and covers the entire field from workshop arithmetic and the heat treatment of metals to lathe work, screw-cutting, planing, milling and gear cutting. New chapters on drilling and boring, capstan and turret lathes and how to read a blueprint add to the value of the book, which is thoroughly practical and can be well recommended. Many illustrations help to make clear the author's descriptions and explanations.

"The Dragon of the Moor"

By G. F. Cowen. (Lutterworth Press. 2/6 net)

Weird sounds and strange lights on a lonely moor, where there is a tradition of a mysterious dragon, arouse the interest of the boys of a neighbouring school. They are not satisfied with the explanations given them and decide to look into things themselves. They turn a geological expedition across the moor into a dragon hunt, and then one of the boys discovers the secret of the moaning valley, only to find himself in serious danger. Desperate struggles with convicts and counterfeiters follow, but after much excitement all is well, and the "dragon" no longer troubles the moor. The story is full of adventure and surprises that maintain the interest to the end. There is a coloured frontispiece.

The great anteater of Brazil. Its hairy tail serves as a shelter from the Sun or tropical rain.

"Who Goes to the Wood"

By Fay Inchfawn
(Lutterworth Press. 6/-)

Our younger readers will make lasting friends of Mouse, Duck and the other furred and feathered creatures of the meadow who are portrayed in this delightful story book. They will enjoy reading about Mrs. Frog, Uncle and Auntie Shrew, Baron Badger and especially the lively and mysterious Whatever-It-Was whom Mouse and Duck adopt. There are many splendid illustrations, four of which are in colour.

RAILWAY NEWS

S.R. Locomotive Classification

No new classification has been evolved since the amalgamation of the separate systems which now form the S.R. All the engines that were taken over in 1923 consequently are still known by the descriptions applied by their previous owners, the three principal of which were the London and South Western, the London, Brighton and South Coast, and the South Eastern and Chatham Railways. In view of these circumstances there are, for instance, two distinct J classes. Both happen to comprise large tank engines, the L.B.S.C. 4–6–2s and the S.E.C. 0–6–4s, so that it is a little confusing.

In most instances there is a feature in the combination of class letters and numbers that renders each group distinctive, however. Before the re-numbering of the locomotives under S.R. auspices each carried above its number a letter indicating its original ownership, or the works on whose books it was borne. These letters were E for Eastleigh, now Western Section, B for Brighton, now Central Section, and A for Ashford, now Eastern Section. E engines are numbered below 1,000, except for a few "duplicates," which have 3,000 added to their numbers. The numbers of A engines are between 1,000 and 2,000, and those of B engines from 2001 to 2700.

In the following notes the three divisional letters are used to indicate the "owning section," though the engines are not necessarily confined thereto when at work. Of tender locomotives, 4–6–0 types are all E. "Lord Nelson" engines are always described as such, as their works classification lettering E124 is rather too cumbersome for everyday use. The "King Arthurs" are classed N15, Urie and Maunsell mixed traffic engines with 6 ft. wheels are H15, and those with 5 ft. 7 in. driving wheels are S15, while Drummond "paddleboxes" are T14. A separate paragraph on this page gives other details.

The seven "Remembrance" class engines Nos. 2327-33, rebuilt from 4–6–4T, are N15x, B. The 4–4–2s Nos. 2037-41 are H1, B, and Nos. 2421-6 are H2, B. Of 2–6–0s carrying the letter A Nos. 1790-1802 and 1610-39, with 6 ft. wheels, form Class U, and Nos. 1890-1910, which are similar but have three cylinders, are Class U1. Class N, with 5 ft. 6 in. wheels, includes Nos. 1810-21, 1823-75 and 1400-14. Class N1, with three cylinders, comprising Nos. 1822, 1876-80, work chiefly on the Hastings route. In the Central Section, with letter B, is Class K, Nos. 2337-53, former L.B.S.C.

Next we take 4–4–0 designs, dealing first with Western Section engines, lettered E. The 4–4–0 "Schools" form class V, built by the S.R., with numbers 900-39. The L.S.W. Drummond family of 4–4–0s, with 6 ft. 7 in. driving wheels, are Nos. 463-72, class D15, and Nos. 415-34, L12. With 6 ft. 1 in. wheels, Nos. 395-404 form Class S11. Classes K10 and L11 are mixed traffic 5 ft. 7 in. engines. Of the older 6 ft. 7 in. express engines, the T9 class are all rebuilds and well known for all round performance. They are numbered 113-22, 280-9, 702-733, etc. The few survivors of the Adams outside cylinder classes are T3 and X6, with 6 ft. 7 in. wheels, and T6, the once famous 7 ft. design.

Certain of the B4 and rebuilt B4x classes engines Nos. 20xx are all that remain of the former "Brighton" 4–4–0 types with letter B, and are easily distinguishable in appearance by their raised footplates and bogie wheel "mudguards."

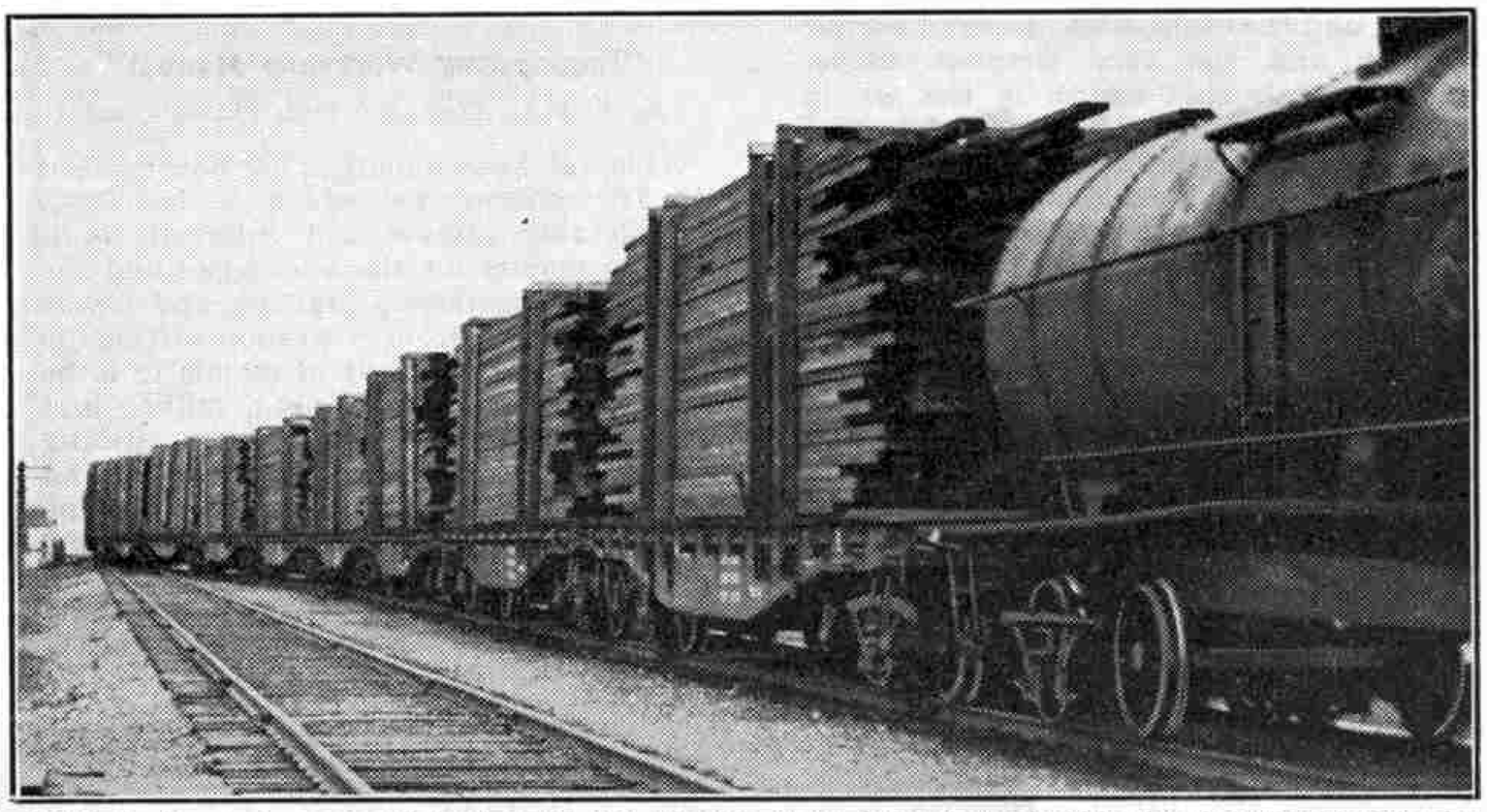
In the Eastern Section, marked by letter A, Class L1, Nos. 1753-9 and 1782-9, were built in 1926 for the S.R. Class L, Nos. 1760-81, were built in 1914. Classes E, with Belpaire firebox, and D were the extended smokebox, are known as the "700" class. The Adams 0–6–0s, built in 1881-6 and now numbered in the duplicate list with 3,000 added, are called "0395" class, as they were for a time so numbered. The 0–4–2 E mixed traffic engines called "Jubilees" form Class A12.

The classification of S.R. tank engines will be dealt with next month.

S.R. 4-6-0 Notes

Express engines of the 4–6–0 type were introduced over 30 years ago on the former L.S.W.R. by Mr. Dugald Drummond. In a rebuilt form, some of his final 4-cylinder designs exist to-day in Nos. 443-7, 458-62 of Class T14. They are still known as "Paddleboxes" on account of their original long boxlike splasher. Mr. R. W. Urie, the next Eastleigh chief, turned out Nos. 736-55 for express work with two 22 in. cylinders, which are incorporated in the present N15 class and are mostly modified to the "King Arthur" standards of boiler, motion and cylinders.

Mr. R. E. L. Maunsell, who had been Chief Mechanical Engineer to the South Eastern and Chatham Railway since 1914, was appointed to the control of the S.R. locomotive stock in 1923. His pioneer "King Arthurs" are numbered 448-57, and were built at Eastleigh in 1925. Nos. 763-92, constructed soon after by the North British Locomotive Co. Ltd., are almost identical, but are built within the clearance gauge of the main Eastern and Central section routes. Nos. 793-806 also



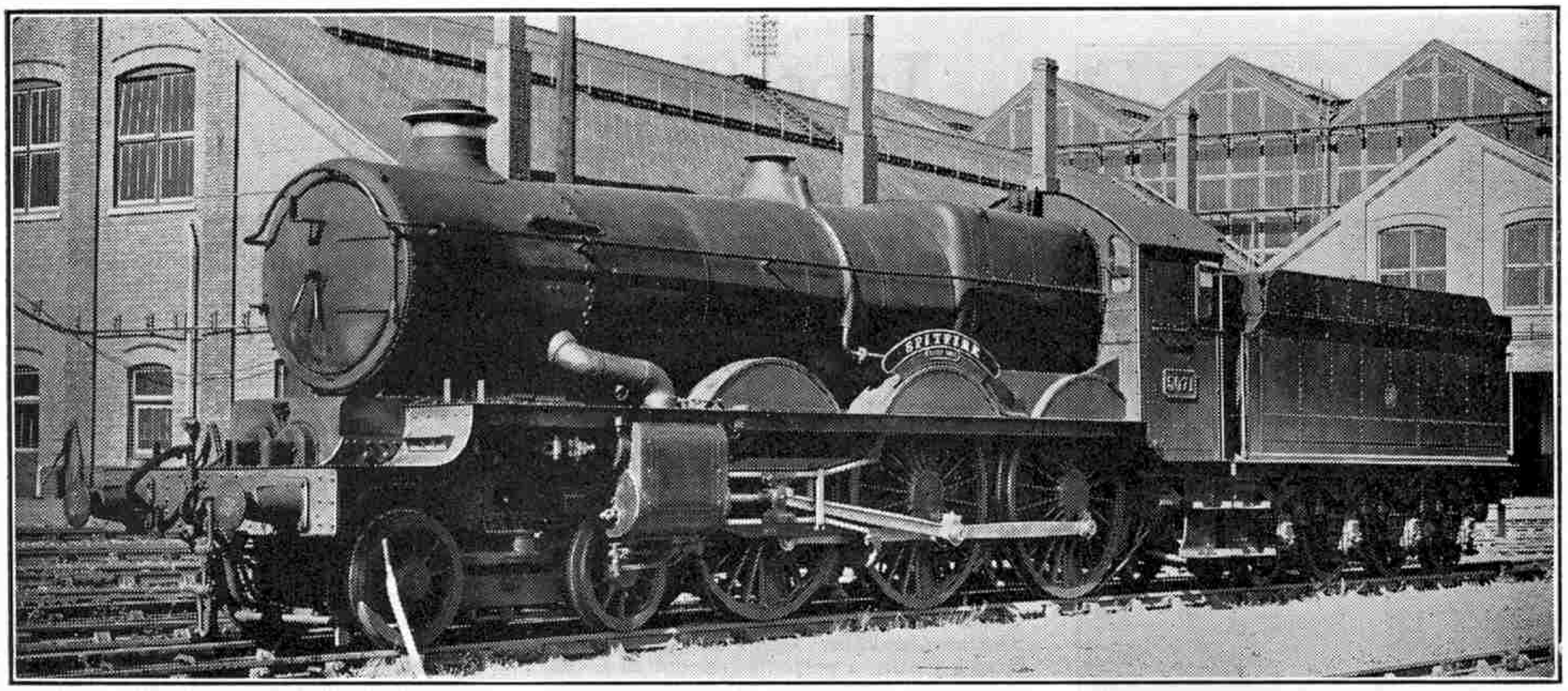
C.N.R. lumber train passing through North Bay, Ontario. Every day train loads of lumber from British Columbia are moving across Canada, and Canadian lumber and pulp mills are working to capacity. Photograph by S. M. Thomas, Bournemouth.

Wainwright S.E.C.R. express engines of 30 years ago. A number of engines of each of these classes, rebuilt with high-pitched boiler, piston valves and superheater, are now known as E1 or D1, but are almost identical. The veteran classes F1, the older, and B1, the latter with inside springs to the tender, are rebuilt survivals of Stirling's South Eastern design. These, together with the 0–6–0 classes, comprising O1, rebuilt Stirling engines with small boiler and outside springs on tender, and C, Wainwright standard, have their numbers intermingled and not in continuous batches.

Other 0–6–0 classes are C2, numbered 24-25xx, a number rebuilt and styled C2x, and C3 Nos. 2300-9, all B engines. Among E locomotives the new S.R. Class Q are numbered 530-49. Rebuilt L.S.W.R. Drummonds, with stovepipe chimney and conform to this clearance gauge, but as built at Eastleigh for the Brighton line they have six-wheeled tenders as distinct from the eight-wheelers hitherto favoured.

Of the mixed traffic classes Nos. 482-91, the first of Class H15, were Urie engines with short stovepipe chimneys. The Maunsell engines Nos. 473-8 and 521-4 also are of this class, as are the hybrid, much-rebuilt West Country locomotives Nos. 330-5. The S15 express goods group began in 1920 with L.S.W.R. engines Nos. 496-515, and continued with the modern 823-847 series.

Apart from wheel diameters, all the Maunsell 4–6–0 types conform to the same principal dimensions. They have two 20½-in. cylinders and a boiler pressure of 200 lb. per sq. in., with the exception of the "Lord Nelsons," which have four cylinders and 220 lb. per sq. in. pressure.



G.W.R. No. 5071 "Spitfire," the first of the "Castle" class locomotives to which the names of British aircraft have been given. This engine was formerly named "Clifford Castle." Photograph by courtesy of the G.W.R.

Aeroplane Names for G.W.R. "Castles"

Certain of the latest "Castle" class G.W.R. 4-cyl. 4–6–0 express locomotives are being re-named after famous aeroplane types used by the R.A.F. The names and numbers of the first 12 of these are as follows: No. 5071, *"Spitfire"*; No. 5072, *"Hurricane"*; No. 5073, *"Blenheim"*; No. 5074, *"Hampden"*; No. 5075, *"Wellington"*; No. 5076, *"Gladiator"*; No. 5077, *"Fairey Battle"*; No. 5078, *"Beaufort"*; No. 5079, *"Lysander"*; No. 5080, *"Defiant"*; No. 5081, *"Lockheed Hudson"*; and No. 5082 *"Swordfish."*

The former names of these engines were respectively *"Clifford Castle," "Compton Castle," "Cranbrook Castle," "Denbigh Castle," "Devizes Castle," "Drysllwyn Castle," "Eastnor Castle," "Lamphey Castle," "Lydford Castle," "Ogmore Castle," "Penrice Castle,"* and *"Powis Castle."*

No. 5071 *"Spitfire,"* the first of the re-named locomotives, is seen in the illustration at the head of this page.

The Irish Mail

An interesting feature of L.M.S. train services is that the only famous express to retain the distinction of being identified by name in the time-tables is *"The Irish Mail,"* which is of course also by far the oldest of the large pre-war fleet of L.M.S. named expresses.

Since the war started, *"The Irish Mail"* has undergone several vicissitudes; the day train in each direction was suspended as between Chester and Holyhead about a month after the outbreak, but commencing in September this year, matters were reversed by taking off the night trains and restoring the day service. The latter, usually of considerable weight and Pacific-hauled throughout, now leaves Euston at 8.20 a.m., 25 minutes earlier than before the war, and arrives at Holyhead at 2.23 p.m. instead of 2.5 p.m., so that the total deceleration over the 263¾ miles amounts to 43 minutes.

In the reverse direction, with a departure from Holyhead at 1.45 p.m. and an arrival at Euston at 7.35 p.m. (these times are slightly different on Sundays) the journey takes 40 minutes longer. Before the war, the Up train was booked over the 82½ miles from Rugby to Euston in 82 minutes start-to-stop, which with a "Royal Scot" 4–6–0 and upwards of 450 tons was one of the hardest locomotive propositions on the system. Between Chester and Holyhead, 84½ miles, the pre-war allowances of 98 minutes Down and 94 minutes Up have been eased to 106 and 107 minutes respectively, giving an average speed over this section of about 47 m.p.h.

D. S. Barrie.

A Wartime Run to Devon

A run on the 1.30 p.m. from Paddington behind "King" class 4-cyl. 4–6–0 No. 6018 *"King Henry VI"* was from the locomotive performance point of view a remarkably steady if unexciting journey.

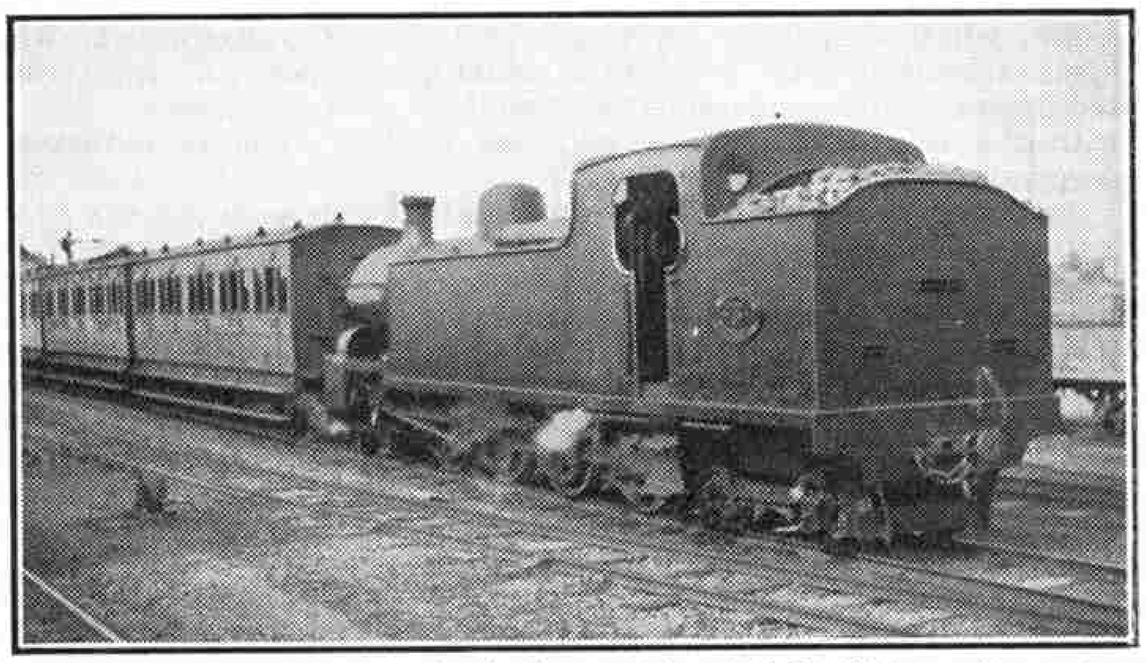
The first 36 miles to Reading occupied 45 min., including a relaying slack, and on restarting with a considerably increased passenger complement the train according to the public time-table was 4½ min. late. On the next non-stop stage to Taunton this loss was exactly recouped, the 106¾ miles taking 127¼ min. unchecked, instead of the 132 min. allowed, though at no point did speed exceed 60 m.p.h. The engine ran considerable distances downhill with steam shut off. The minima at Savernake and Brewham respectively were 45 m.p.h. and 41 m.p.h. The "cut-offs" avoiding Westbury and Frome stations with their sharp curves were traversed.

Soon after getting away from Taunton comes the stiff climb to Whiteball. Attaining 47 m.p.h. on the broken rise to Wellington, the "King" with a heavy train of 15 cars weighing 510-515 tons full fell below 30 m.p.h. on the steeper 1 in 90-80 to the tunnel. Down the easy descent to Exeter, the rate of travel was very restrained, so that 1½ min. were lost on this stage. A fast start was made on the level from Exeter along the estuary side, and the maximum speed of the trip, 63½ m.p.h., was attained before Dawlish. The arrival at Newton Abbot was punctual, as was that at Torquay with a reduced load of seven bogies behind a smaller 4–6–0, the other eight coaches forming the Plymouth portion of the original train.

It was noticed during the journey, as well as from the arrival report boards, that many of the regular expresses were running in two portions, with a pretty good average of punctuality.

The Railway Salvage Campaign

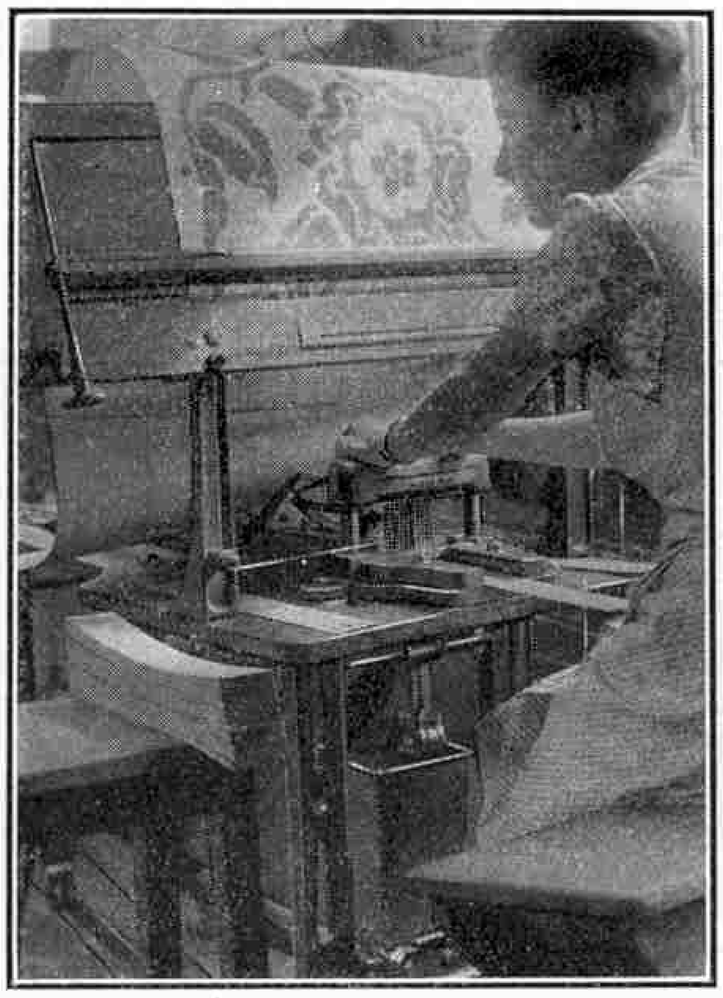
Railwaymen are co-operating actively in national salvage schemes, and the fruits of their labours are on a vast scale. The neat racks for excursion and other handbills that have in recent years been a feature of L.N.E.R. booking halls have been sacrificed to provide half a ton of aluminium for aeroplane construction.



A 4-8-4 tank locomotive of the Londonderry and Lough Swilly Railway. The engines of this class are the largest 3-ft. gauge tanks in the world. Photograph by V. Boyd-Carpenter, Manchester.

Tapestries Old and New

By G. Bernard Wood



Punching Jacquard cards for a Tudor design intended for House of Commons damask.

A FASCINATING industry that thrives at Sudbury, Suffolk, owes its origin to a large company of refugees who settled in East Anglia three centuries ago. That industry is silk weaving, and the refugees were the French Huguenots, or Protestants. Bringing their skill and trade secrets with them, these people soon set up a number of handlooms and began weaving again. The sympathy of their new-found friends was such that all thoughts of unfair competition were banished. Indeed, the craft was learned and adopted by many English folk.

Until 50 years ago the silk weavers of Sudbury worked in their own homes. Latterly, they produced on their handlooms beautiful umbrella silks and silk velvets. To-day, however, the industry has been centralised, but even in the modern factory that has been provided—mainly for the production of silk tapestries—there are many remainders of the industry's strange history. Some of the weavers, for example, first learned and practised the craft in one of those cottage "factories." And all the looms, whether operated by power or by hand, are fitted with Jacquard machines, the names of whose several parts—together with the handloom names—send one in desperation to a French dictionary.

Jacquard machines enable amazingly intricate designs to be employed. In the artists' room the design is drawn on to squared paper, each square representing a thread in the ultimate fabric. This paper is then set up as a guide on a card-cutting machine. The girl in charge operates the machine so that holes are punched in a set of long, narrow cards, and these holes represent the "structure" of the design. The cards are later bound together in the form of an endless chain and arranged in the loom. There they work in much the same manner as a player-piano record, controlling the play and interplay of the silk threads with a precision that is truly astonishing.

Some idea of the work involved in preparing these cards may be gained from the fact that one particular tapestry, only 25 in. square, necessitated the punching of 4,400 cards. For other fabrics the number of cards used is more or less in proportion, according to the richness of the design and the variety of the colours.

On walking through the factory one sees many curious sights. Huge storage frames where thousands of design-card "chains" hang like so many Oriental curtains; a girl winding the skeins of Chinese silk on to bobbins; another girl joining up warp-ends by a deft twist of the fingers that have previously been smeared on a conveniently placed pat of butter. Here is a man weaving a tapestry of the Regency period, while another loom is creating decorative fabrics for the House of Commons.

These Parliamentary damasks are in three sets of colours, cream and gold, green and gold, and red and gold; while the unmistakably Tudor design incorporates a crown, a portcullis, Tudor rose, oak leaves and acorns. The fabric was specially designed for H.M. Office of Works by the Sudbury weavers, and one of the red and gold damasks has already appeared behind the Speaker's Chair.

Various embrocades were specially woven, as furnishings for the royal suites on the liners used by their Majesties during their Canadian tour. These were "Quilted weave" fabrics, the wadding actually having been introduced during the weaving process.

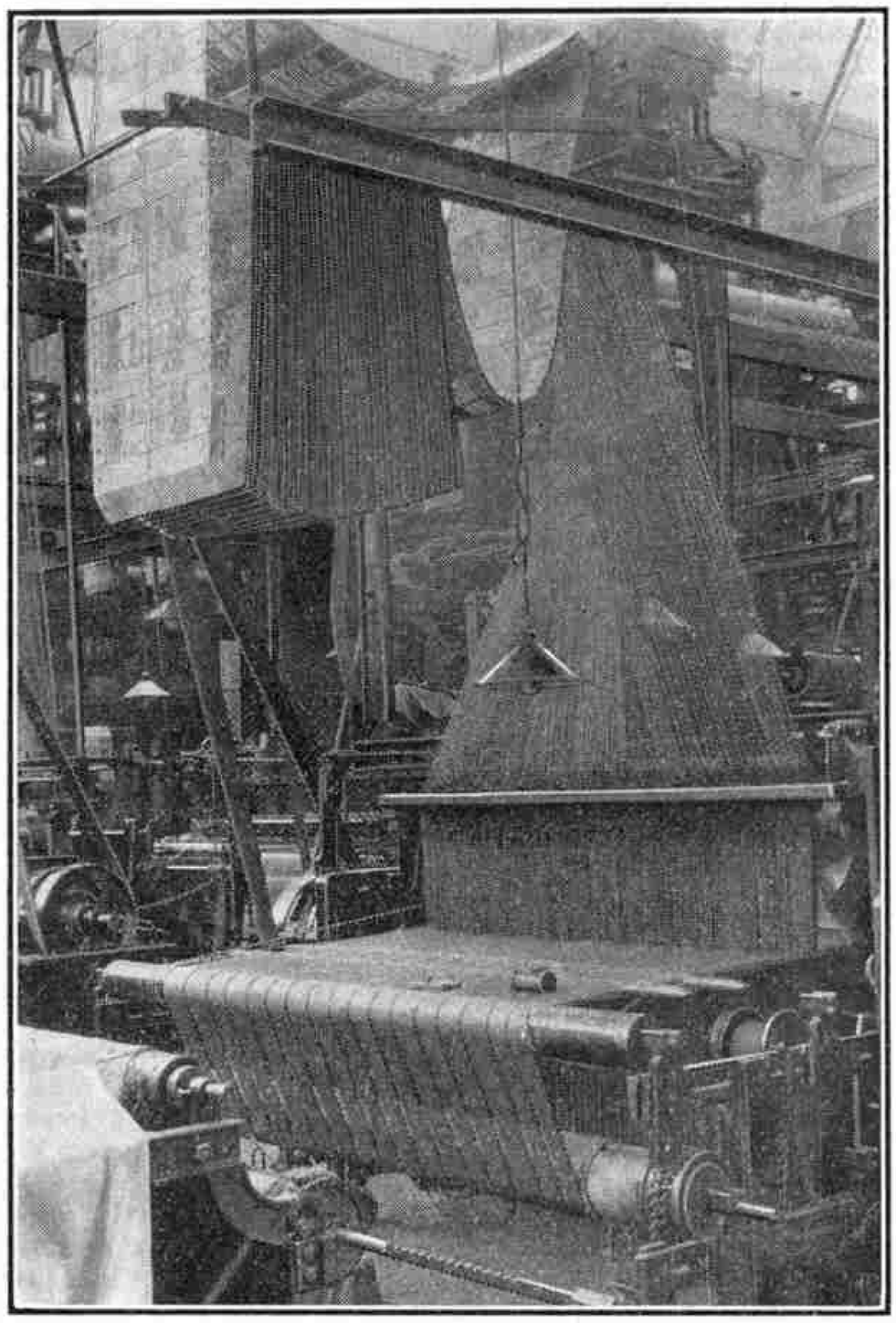
Windsor Castle, Buckingham Palace and No. 10 Downing Street have tapestries and damasks made by these craftsmen. They also furnished the Queen's Doll's House with miniature curtains, draperies and carpets, special looms being made for the purpose. One of the carpets measures 25 in. by 12 in., one-twelfth of the original size, and is an exact copy of a Persian carpet now in South Kensington Museum. The weavers' inherited skill has been requisitioned time and time again for the decoration of Government buildings, foreign legations, and cathedrals.

The reproduction of historic tapestries is another branch of work to which the weavers' craft is being applied. Even the worn and faded parts of such ancient tapestries can be faithfully reproduced, each worn thread on the original being examined through a magnifying glass and then inserted in the artist's design. So accurate is the reproduction, even to the antique appearance of the surface, that inspection of the two fabrics when placed side by side makes it almost impossible to detect which is the old and which the new.

When one considers the number of old English tapestries—such as the priceless Bayeux tapestry, which records many episodes of the Norman Conquest—that may some day need to be replaced, owing to decay, it is particularly gratifying to know that modern methods of silk weaving can ensure for posterity exact counterparts of the originals.

Many historical tapestries bore animal designs. Consequently hounds, white harts, horses, vultures and many other creatures, originally chosen for their intrinsic appeal or for their symbolism, find a prominent place in the designs of tapestries woven to-day for those who desire an air of antiquity about their homes. Sometimes a hunting scene is introduced.

In recent years many of England's historic mansions have been furnished, in part, with tapestries that help in a wonderful way to recapture the very atmosphere of bygone romance. Haddon Hall in Derbyshire, associated with Dorothy Vernon, has been decorated with tapestry curtains in red and silver. Harewood House, the Yorkshire home of the Princess Royal, is another recent example; and, somehow, the ghost of Katherine Ingram which is supposed to haunt the Blue Damask Room at Temple Newsam Mansion, near Leeds, becomes more credible now that one can see the room, which has been re-decorated only this year with a lovely damask of rich floral design that was very popular during the 17th and 18th centuries.



Back view of a power loom fitted with a Jacquard attachment, showing chain of perforated cards.

New York's Latest Bridge

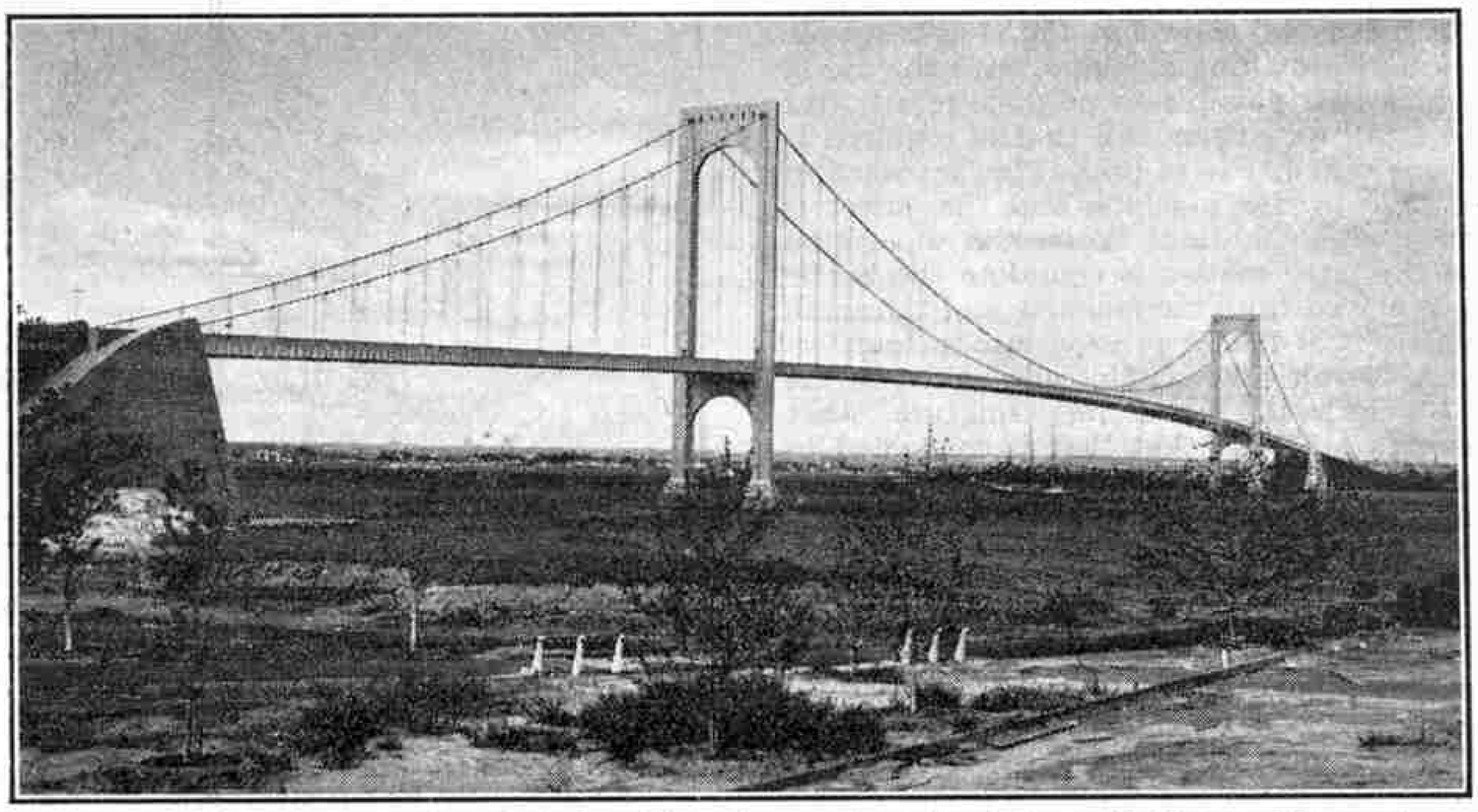
Distinctive Features of a Graceful Structure

THE latest of the great bridges that have been built in New York during the past 10 years is the Bronx-Whitestone suspension bridge, which spans the East River between Bronx and Queens, and was opened to traffic last year. It is designed to form a link in the great arterial highway system of the New York Metropolitan area, and although it breaks no records for length of span it embodies a number of distinctive features.

As can be seen from the accompanying illustration, the bridge is of very graceful appearance, a feature that is due largely to the fact that the supporting towers are constructed as solid frames, without any diagonal cross-bracing either above or below the roadway. It has a main span of 2,300 ft. and end spans of 735 ft. each, and is the fourth longest suspension bridge yet built. The approach viaduct on the Queens side is 1,620 ft. in length, and that on the Bronx side 2,360 ft.

A clear height of 135 ft. above high water at the centre of the span is provided by the bridge deck. Its total width is 74 ft. and it is divided into two roadways, each 29 ft. wide, separated by a centre curb and flanked by two sidewalks. The roadways consist of light concrete slabs 5 in. thick, encasing a grid of reinforced steel. Patrons of this bridge are able to enjoy an unusual view up and down the river, unimpeded by the structural members used in stiffening or supporting other bridge structures.

The two great parallel wire cables from which the roadway hangs are each 21½ ft. in diameter. They are spaced 74 ft. apart, and in their graceful sweeping curves carry all of the loads to the anchorages. Each cable is made up of 37 strands, each of which is in itself a separate cable or bundle of 266 parallel galvanised steel wires about 1/5th in. in diameter; and each strand is separately spun and is individually attached to chains of embedded eyebars at the anchorages. In the completed cable these strands and wires are compressed into circular shape, wrapped with wire, and clamped at intervals with cable bands. The wire of which these cables are made is about four times as strong as ordinary structural steel and weighs about 4,370 tons, with a total length of 14,800 miles. Together, under maximum conditions, they may exert a pull at each anchorage amounting to approximately 50,000,000 lb. The roadway system is suspended from the cables by 2 in. steel wire ropes.



The Bronx-Whitestone bridge, New York, the fourth longest suspension bridge in the world. Photograph by courtesy of Triborough Bridge Authority, New York.

The towers are 377 ft. high, and each required 3,500 tons of structural steel for its construction. They are intended to be flexible and are of simple design. Two vertical shafts are tied together by two deep portals, one at the top high above the floor, and one immediately below the floor. Each shaft is "T" shape in section, and is subdivided by interior steel walls or webs into 12 rectangular cells. The suspension cables are fixed in the saddle castings at their tops, with the result that the towers bend shoreward or riverward as loads and temperatures on the bridge may require, as much as 15 in. from the vertical position. Secure attachment of each tower base to its pier is made by means of 24 three in. anchor bolts, which engage a steel frame embedded in the concrete.

Each tower rests on a pier consisting of two solid concrete pedestals 34 ft. square and 24 ft. deep, connected by a reinforced concrete strut in the shape of an inverted "U." Each pedestal rests on a hollow concrete shaft 38 ft. square, sunk down to solid rock.

The cable anchorages on each shore are constructed of mass concrete and are 110 ft. wide, 180 ft. long and 110 ft. high. They are almost triangular in shape, the rear face being curved to follow the general direction of the cables and anchorage chains. The Bronx anchorage has a concrete base 15 ft. thick, which distributes the pressure to the firm sand and gravel soil. The Queens anchorage, however, rests on four caissons, which are carried down to solid rock at depths of from 156 ft. to 164 ft. below mean high water. The total quantity of concrete in foundations, piers and anchorages of the bridge approximates 200,000 cu. yds.

Sinking of the tower pier caissons and preparation of the pedestals to receive the towers required about five months' work. The actual tower erection, however, proceeded with record speed, only 18 days being required for each tower.

Only 23 months elapsed from the placing of the first construction contract for the tower piers and anchorage foundations, in June 1937, to the opening of the bridge in April 1939, and this is claimed to be a record for an important structure of this kind.

For the information on which this article is based we are indebted to Mr. O. H. Ammann, Chief Engineer, Triborough Bridge Authority, New York.

New Meccano Models

Butter-Making Machine—Snowmobile

THE model shown in Fig. 1 is a simple butter-making machine, with the aid of which it is possible to produce real butter in small quantities. All that is required is a one pint bottle of milk. This is placed in a cage in the machine and the latter is then set in motion. When the separation of the fatty matter is complete the bottle is removed from the machine and the small particles of butter pressed into a "pat."

A 20-volt Electric Motor is bolted to the $5\frac{1}{2}$" Girders 1, and its armature shaft carries a $\frac{3}{4}$" Sprocket that is connected to a $1\frac{1}{2}$" Sprocket on a $4\frac{1}{2}$" Rod. A $\frac{1}{2}$" Pinion on the other end of this Rod meshes with a $2\frac{1}{2}$" diameter Gear Wheel on Rod 2, which also carries a Crank. The bottle container consists of four $12\frac{1}{2}$" Perforated Strips, which are attached at one end to a 4" Circular Plate that carries a Bush Wheel. Two of the Strips are bolted to the ends of a $3\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip fixed to the Circular Plate, while the others are attached to it by means of a $\frac{1}{2}" \times \frac{1}{2}"$ Angle Bracket and a Meccano Hinge respectively. The other ends of the Strips are bolted to a Boiler End, in the inside of which a Bush Wheel is fixed. The Strip that is fastened to the Circular Plate by a Hinge is bolted to the Boiler End by a wing nut, which consists of a Threaded Boss with two Threaded Pins screwed into it. A 2" Motor Tyre is attached to the Plate by a length of Cord to form a pad for the bottle, and a 3" Tyre is slipped over the outside of the cage to prevent the Strips moving outwards due to centrifugal force when the machine is in action.

A Crank is secured to the end of Rod 2 and to it is bolted a $1\frac{1}{2}$" Strip. A Pivot Bolt is passed through the outer end hole in the Crank, the $1\frac{1}{2}$" Strip, the Bush Wheel, and finally a $3\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip, and a Nut is screwed firmly on it. A 2" Rod is inserted loosely in the boss of the Bush Wheel, and a Collar 3 is attached to its inner end. A Compression Spring and a second Collar are then placed on the Rod, the Collar being adjusted so that the Spring is under slight compression. On the outer end of this Rod is a Universal Coupling that carries a $3\frac{1}{2}$" Rod 4. The latter is mounted in bearings formed by $2\frac{1}{2}$" Triangular Plates.

Parts required to make butter-making machine: 4 of No. 1; 1 of No. 6a; 4 of No. 7; 10 of No. 9; 8 of No. 9d; 1 of No. 15a; 1 of No. 15b; 1 of No. 16; 1 of No. 17; 2 of No. 24; 1 of No. 26; 1 of No. 27c; 107 of No. 37af; 107 of No. 37bf; 22 of No. 38; 1 of No. 40; 1 of No. 48; 4 of No. 48a; 6 of No. 59; 1 of No. 62; 1 of No. 64; 4 of No. 76; 1 of No. 94; 1 of No. 95a; 1 of No. 96a; 4 of No. 103f; 1 of No. 114; 2 of No. 115; 1 of No. 120b; 8 of No. 133; 8 of No. 133a; 1 of No. 140; 1 of No. 142a; 1 of No. 142b; 1 of No. 146a; 1 of No. 147b; 1 of No. 162a.

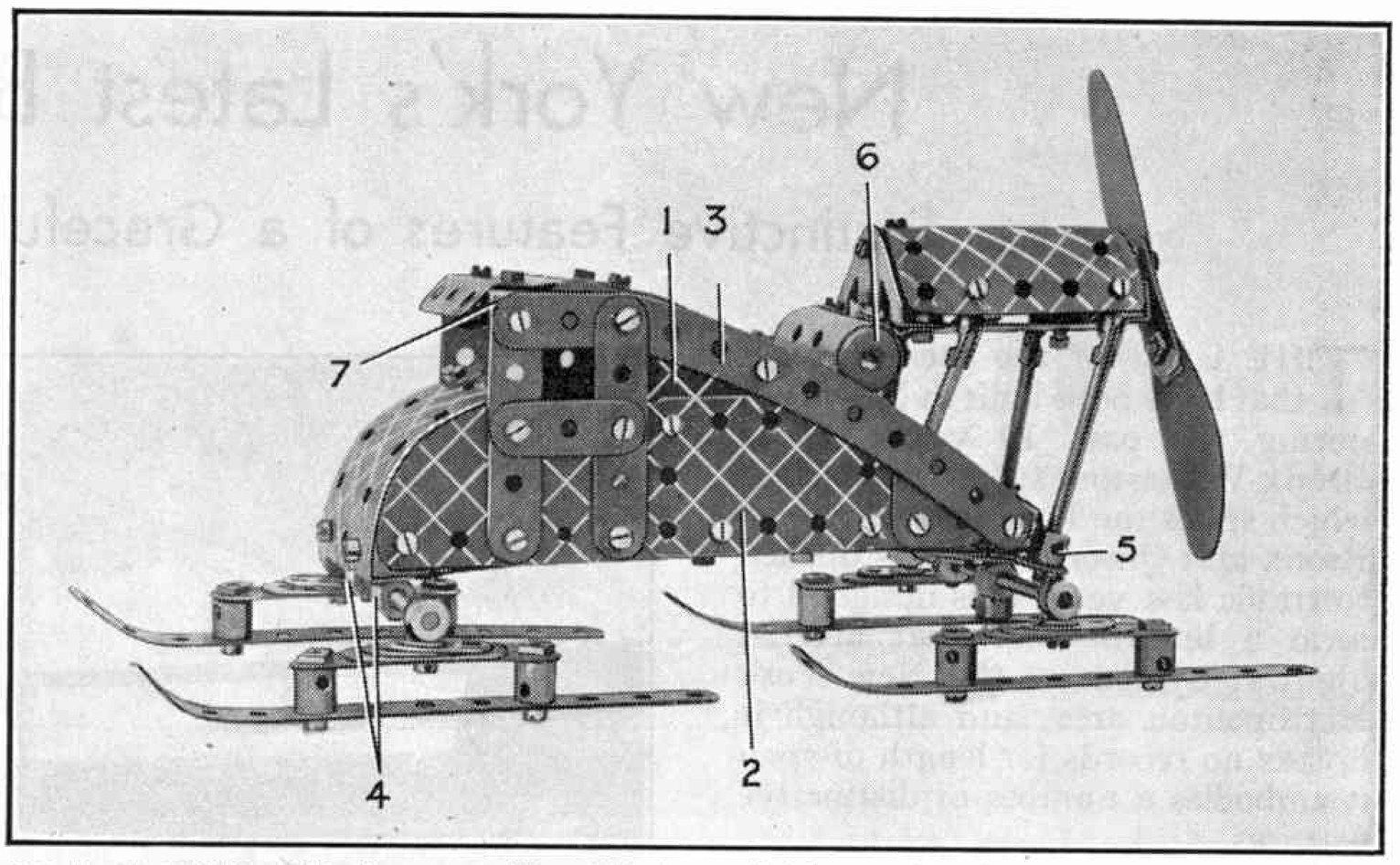


Fig. 2. A realistic model of a snowmobile, which is propelled by a pusher airscrew and is designed to travel over ice and snow.

In Fig. 2 we illustrate a simple model snowmobile, a machine designed for travelling over frozen ground and snowfields. It is mounted on skids and is propelled by a pusher airscrew mounted at the rear of the cabin.

The floor of the cabin consists of a $5\frac{1}{2}" \times 1\frac{1}{2}"$ and a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate overlapping three holes. This compound plate is flanged at each side by two $6\frac{1}{2}"$ compound strips built up of $5\frac{1}{2}"$ and 2" Strips. These are fastened to the turned up ends of a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip bolted across the Plate.

The front of the cabin is constructed by bolting a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate to the floor by means of Angle Brackets, and to the Semi-Circular Plate by means of a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip. The Semi-Circular Plate, a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate 2, and a 1" Corner Bracket fill in the remainder of the side of the cabin. The streamlined roof consists of a $5\frac{1}{2}" \times 1\frac{1}{2}"$ and a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate attached to the $5\frac{1}{2}"$ Curved Strips 3, at the sides. At the front the roof is attached to the sides of the cabin by means of a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip 7, while in the rear it is bent downwards and bolted to the floor.

The engine cowling is constructed by bolting two Trunnions to the narrow ends of a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate, and then joining a $\frac{9}{32}"$ radius Curved Plate to them by means of Angle Brackets. The petrol tank 6 is built up of a Sleeve Piece and two Chimney Adaptors, and is attached to the cowling by means of two $\frac{3}{4}"$ Bolts and Nuts.

The leaf springs of the skids consist of a $2\frac{1}{2}"$ and a $1\frac{1}{2}"$ Strip, two Flat Brackets and a Washer, all of which are bolted in the tapped bore of a Collar. A $5\frac{1}{2}"$ Strip bent up at its forward end as shown is spaced from each leaf spring by two Threaded Bosses, $\frac{1}{2}"$ bolts and nuts being used for this purpose.

Parts required to make the model snowmobile: 6 of No. 2; 8 of No. 5; 2 of No. 6; 8 of No. 6a; 8 of No. 10; 17 of No. 12; 2 of No. 12c; 2 of No. 16; 2 of No. 16a; 1 of No. 16b; 2 of No. 18a; 71 of No. 37af; 68 of No. 37bf; 8 of No. 38; 2 of No. 41; 3 of No. 48; 11 of No. 59; 2 of No. 62; 1 of No. 62b; 8 of No. 64; 2 of No. 89; 2 of No. 111; 8 of No. 111a; 2 of No. 126; 2 of No. 133a; 1 of No. 163; 2 of No. 164; 6 of No. 188; 2 of No. 189; 1 of No. 199; 4 of No. 212; 4 of No. 214.

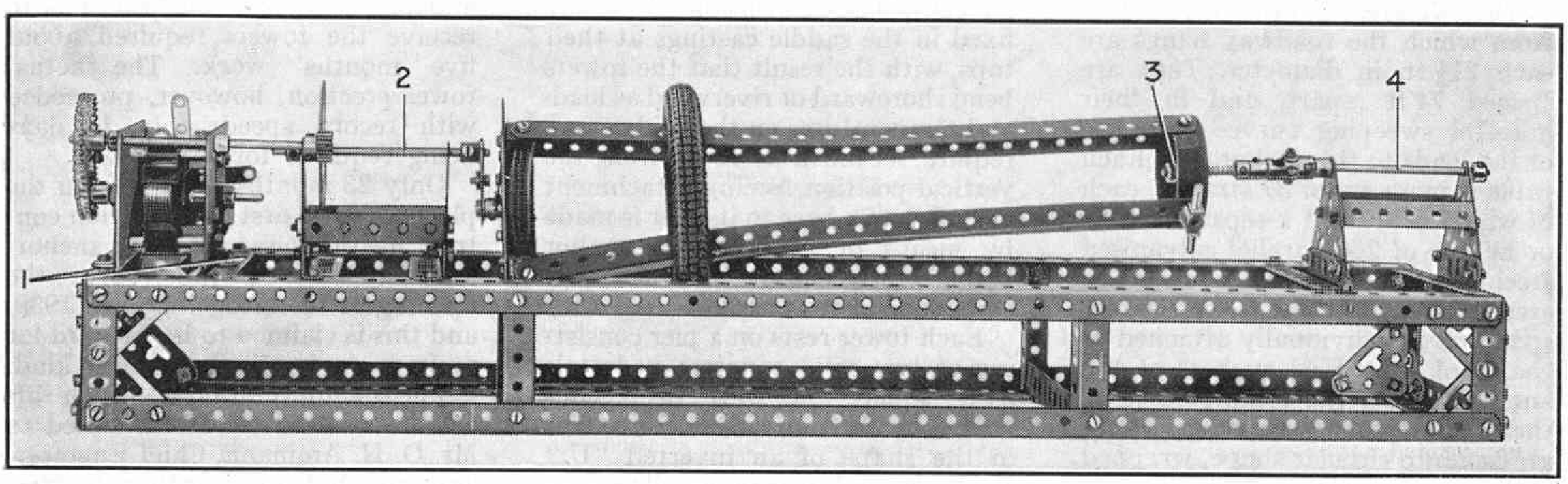
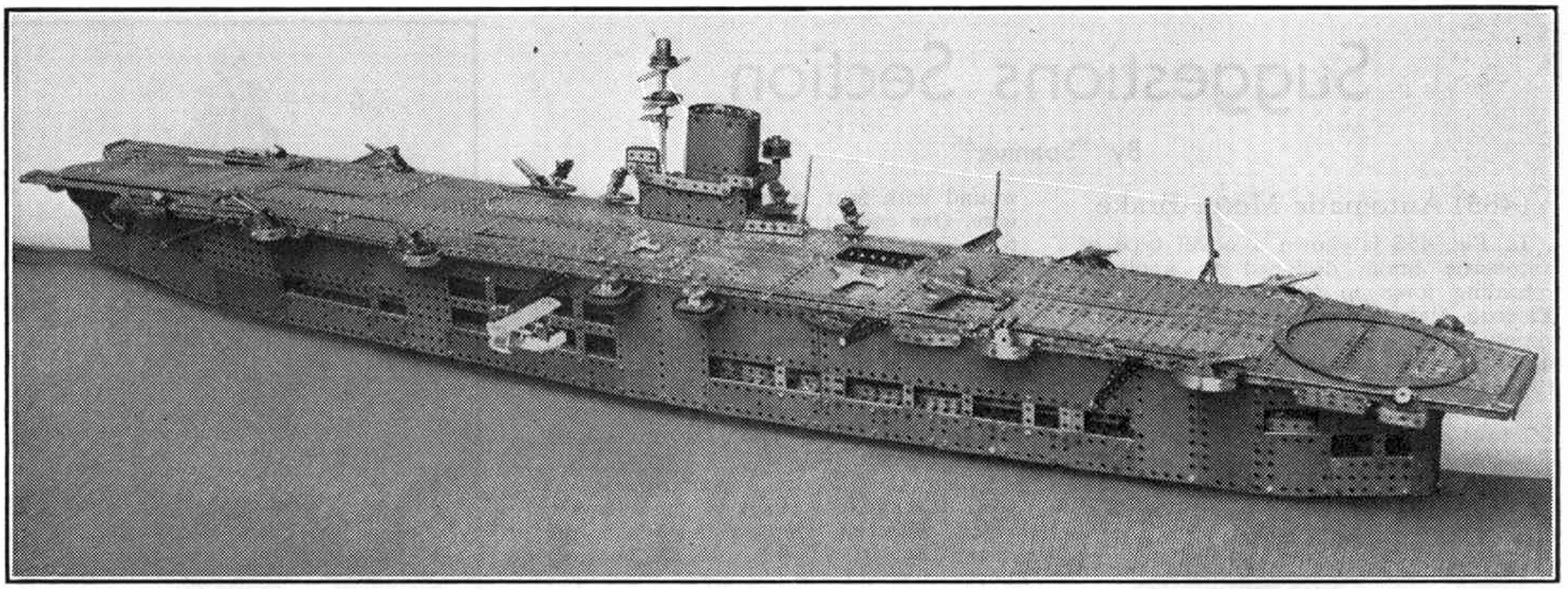


Fig. 1. A simple machine with which small quantities of real butter can be made.



H.M.S. "Ark Royal" reproduced in Meccano by J. K. Darby, A. Bleasby, and J. Marsden, Holmfirth.

Model-Building Competition

"Winter" Model-Building Contest

In this competition we offer a splendid range of prizes for the best and most original Meccano models of any kind submitted to us. All a competitor needs to do is to think of an original subject and then set to work and reproduce it as neatly as possible in Meccano. Any number of parts may be used in building the model but we should like to remind readers that a simple, well-built model stands a far greater chance of success than a badly designed and poorly constructed model, no matter how large and elaborate it may be.

There are no entry forms to fill in and no fees to pay. All models submitted must be the sender's own work both in design and construction, but if necessary help may be obtained in the preparation of photographs or drawings sent in. It should be clearly understood that actual models must not be submitted for consideration.

The competition will be divided into two Sections as follows: A, for readers living in the British Isles; B, for readers living Overseas. The ages of all competitors will be taken into consideration when judging.

The prizes to be awarded in each Section are: First, Meccano or Hornby products value £3/3/–. Second, products value £2/2/–. Third, products value £1/1/–. There will be also 10 prizes each consisting of products value 10/6 and 10 of products value 5/–.

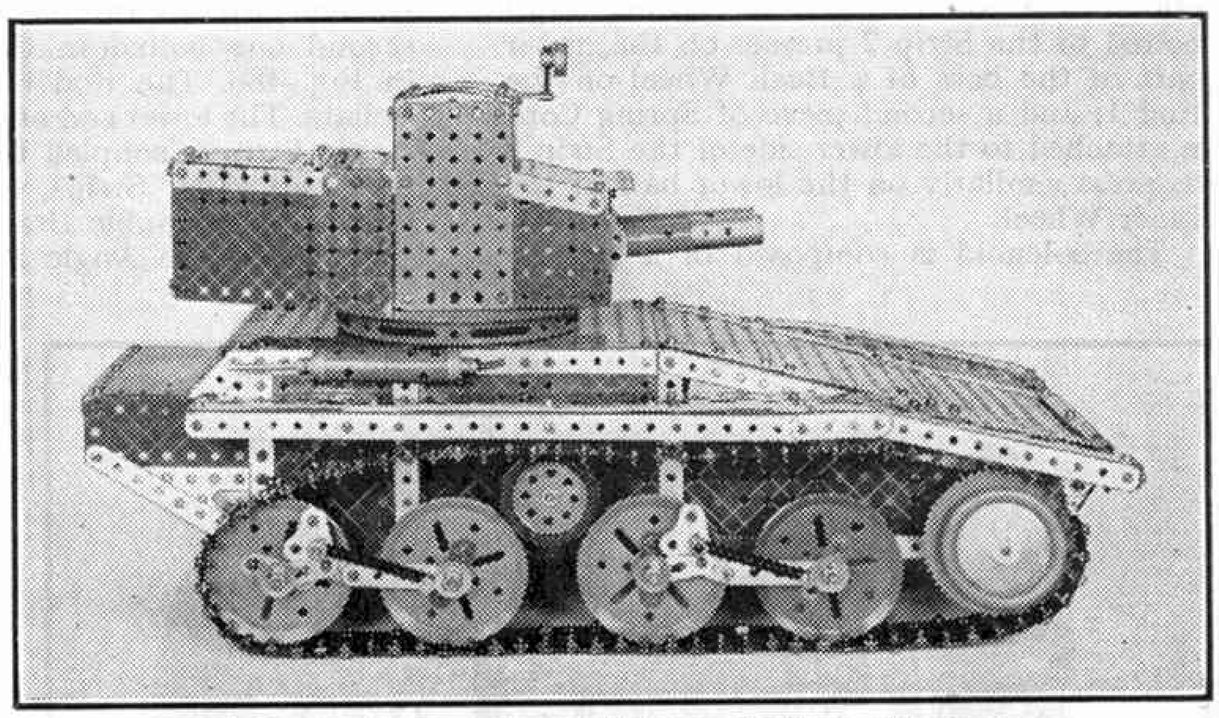
The competitor's age, name and address, together with letter A or B indicating the Section for which the entry is eligible, and the name of the competition must be written clearly on the back of each photograph or drawing submitted. The envelope should be addressed *"Winter Model-Building Contest,"* Meccano Limited, Binns Road, Liverpool 13.

The closing date for competitors living in the British Isles will be 31st December. Entries from competitors living Overseas will be accepted until 31st January, 1941. Any entries received after these dates will be disqualified.

Fine Entries in the "Allied Fighting Forces" Contest

Last month I described and illustrated a few of the models that won the principal prizes in the *"Allied Fighting Forces"* Contest, and on this page I include illustrations of two further models that were outstanding in this competition. One of these is a realistic model of H.M.S. *"Ark Royal"* and the other is a well-proportioned and neatly constructed army tank, which was built by J. Matthews, Fillongley. Some details of the model *"Ark Royal"* were given in my commentary last month and readers will perhaps remember that the model is the combined work of J. K. Darby, A. Bleasby, and J. Marsden, Holmfirth.

Another interesting model in this Contest represents an R.A.F. refuelling tender. It was built by F. W. Davies, Stewartby, and its appearance is typical of the sturdy vehicles used by the R.A.F. for this work. The model has an overall length of 13½ in. and the chassis is equipped with Ackermann steering gear and is mounted on semi-elliptic springs. A large amount of detail has been put into the cab and body, and an interesting feature is the fuel feed pipe, which is arranged to swivel so that it can be used in the most convenient position.



A fine model Army Tank built by J. Matthews, Fillongley.

There were of course among the entries many models of various kinds of warships, and most of these represented well-known British destroyers. It is hard to single out any one of them for special mention as they are all neatly constructed and in most cases reproduce the outlines of their prototypes with great accuracy. With due regard to the general excellency of these models, however, I think that Ronald Parker's effort is the best, for its construction is so well carried out that it is hard to realise that it is only a model. This realism is due to a generous use of Flexible Plates, which form the main parts of the hull and superstructure. Parker lives at St. Leonards-on-Sea, and I hope that he will send in entries for future competitions.

July "Errors" Contest Results

The "Errors" competition announced in the July issue of the *"M.M."* was well received by readers of all ages, many of whom have written to tell me of the pleasure and interest they obtained from compiling lists of the many ridiculous mistakes appearing in the construction of the horizontal steam engine that formed the subject of the contest.

The prize-winners are as follows:

1st Prize, Meccano or Hornby products value £3/3/–: E. Barker, Sheffield; 2nd, products value £2/2/–: S. Spires, Peterborough; 3rd, products value £1/1/–: A. Reeve, Melton Mowbray.

Products value 10/6: H. Neville, Twickenham; T. Stamp, Winwick; R. Thomas, London W.8; A. Harvey, Bletchley; C. Cronin, Bow.

Products value 5/–: F. Page, Hull; D. Renfrew, Peachland, B.C.Canada; F. Goddard, Hertford; G. Streether, Basingstoke; R. Moulding, Chester.

Suggestions Section

By "Spanner"

(485) Automatic Motor Brake

In Fig. 485 is shown a novel type of automatic brake designed to apply a retarding force to the armature of an Electric Motor immediately the current supply is cut off. A brake of this kind is useful in model cranes and lifts and other types of hoisting machinery.

The rotating member of the brake is a 1″ fast Pulley shod with a 1″ Rubber Tyre and secured to the armature spindle of the Motor. The fixed portion of the brake consists of a Bush Wheel on a Rod 1 that is free to slide in a Collar, which is fixed rigidly between the ends of a pair of Simple Bell Cranks. The latter are bolted to 2″ Strips 2, which are secured to the arms of a Single Bent Strip on the motor sideplate.

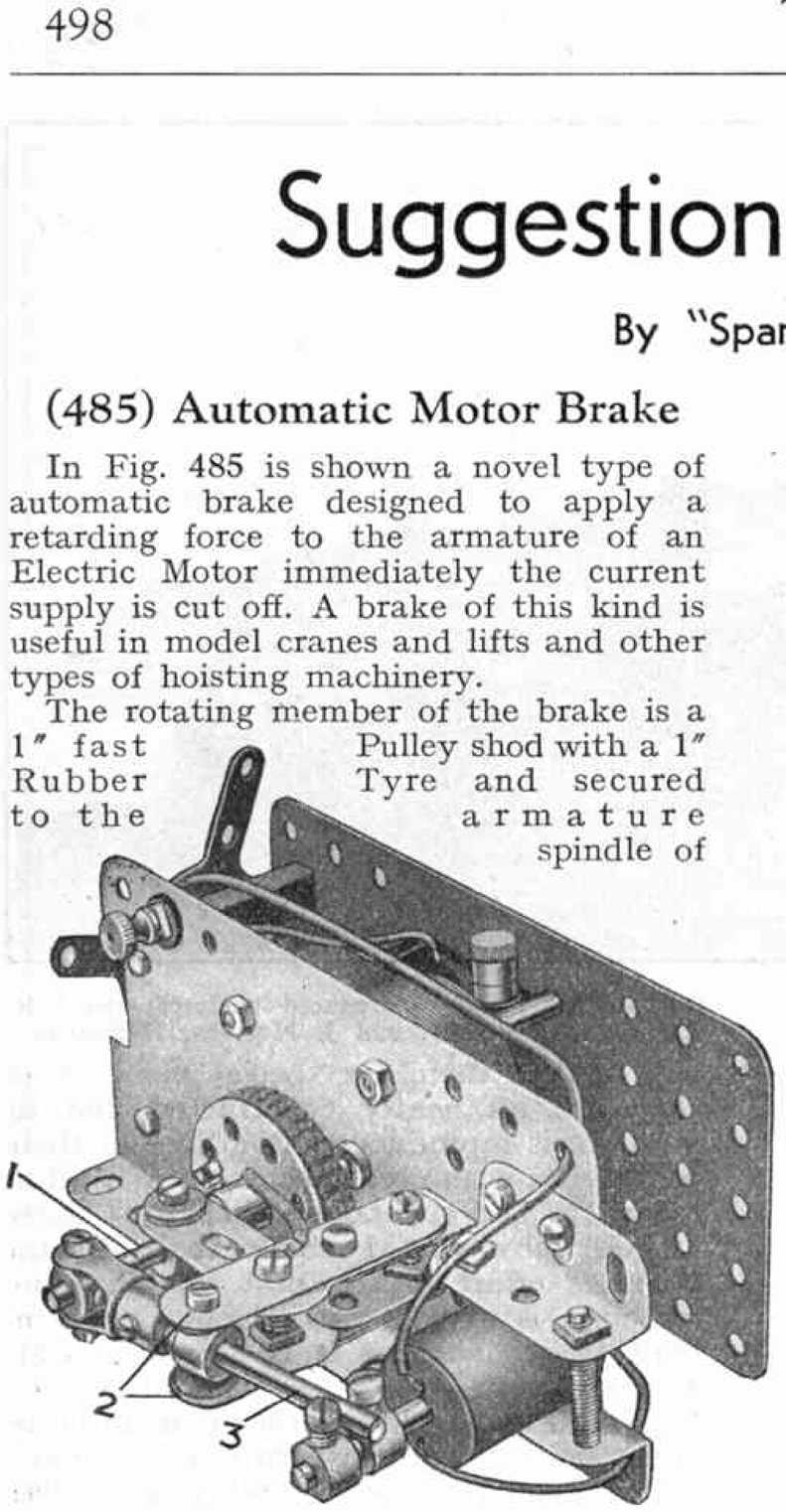


Fig. 485.

One end of a Rod 3 is attached pivotally by a Swivel Bearing to the Rod 1, while its other end rests between Collars spaced about $\frac{3}{16}$″ apart on the end of the solenoid plunger. A small piece of Spring Cord bolted to the Strip 2 presses on the upper part of the boss of a Bush Wheel on the Rod 1, and a second piece of Spring Cord is attached to the lower side of the Strip 2 to press similarly on the lower half of the Bush Wheel.

The solenoid is composed of a Bobbin wound with four layers of No. 23 S.C.C. wire. One end of the winding is attached to a Terminal that is insulated from the Motor side plate by an Insulating Bush and an Insulating Washer, and the other end is secured so that it is in metallic contact with the plate. One of the Motor terminals is treated in a similar manner, and connection is made to a $3\frac{1}{2}$-volt current supply from the terminal on the Motor side plate and the remaining Motor terminal.

When the Motor is running current flows through the turns of the solenoid, which pulls its plunger in. When the current is cut off the solenoid becomes inoperative and the plunger is freed. The Springs then pull the face of the Bush Wheel into contact with the Tyre on the 1″ fast Pulley.

(486) Independently Sprung Wheels for Motor Vehicles

(P. Swan, Rangoon)

The mechanism shown in Fig. 486 is based on a special system of front wheel suspension used in some motor vehicles. The two wheels are sprung independently, so that each can give on passing over an obstacle in the road without affecting the other. The result is smoother riding than with a suspension system of the more usual kind.

The frame of the Meccano mechanism is made up from two $3\frac{1}{2}$″ Angle Girders 1 joined together to form an inverted U-shaped girder. On each side of this girder are bolted two Flat Trunnions 5, which form the upper components of the road wheel coupler. On each side of the Girder, between the Trunnions 5, there are also Two Trunnions 2. Each Road Wheel is mounted by bolting it to a Face Plate that carries a $1\frac{1}{2}$″ × $\frac{1}{2}$″ Double Angle Strip as shown. A 2″ Axle Rod is passed through the ends of this Double Angle Strip and a second one bolted in the position shown in Fig. 486. The Rod is held in place by Collars. The lower end of the second Double Angle Strip is coupled to the Trunnions 2 by a pair of $2\frac{1}{2}$″ Strips, while its upper end is held by a Double Bracket on the top of the $1\frac{1}{2}$″ Double Angle Strip. This Double Bracket is linked by $1\frac{1}{2}$″ Strips to the Trunnions 5.

The unit is completed by putting Springs in such a position that the mechanism gives the highest degree of riding ease and better distribution of the weight of the motor vehicle. This is attained by bolting the Springs 4 between the Angle Girders and the $2\frac{1}{2}$″ Strips. This method gives the wheels a knee-action.

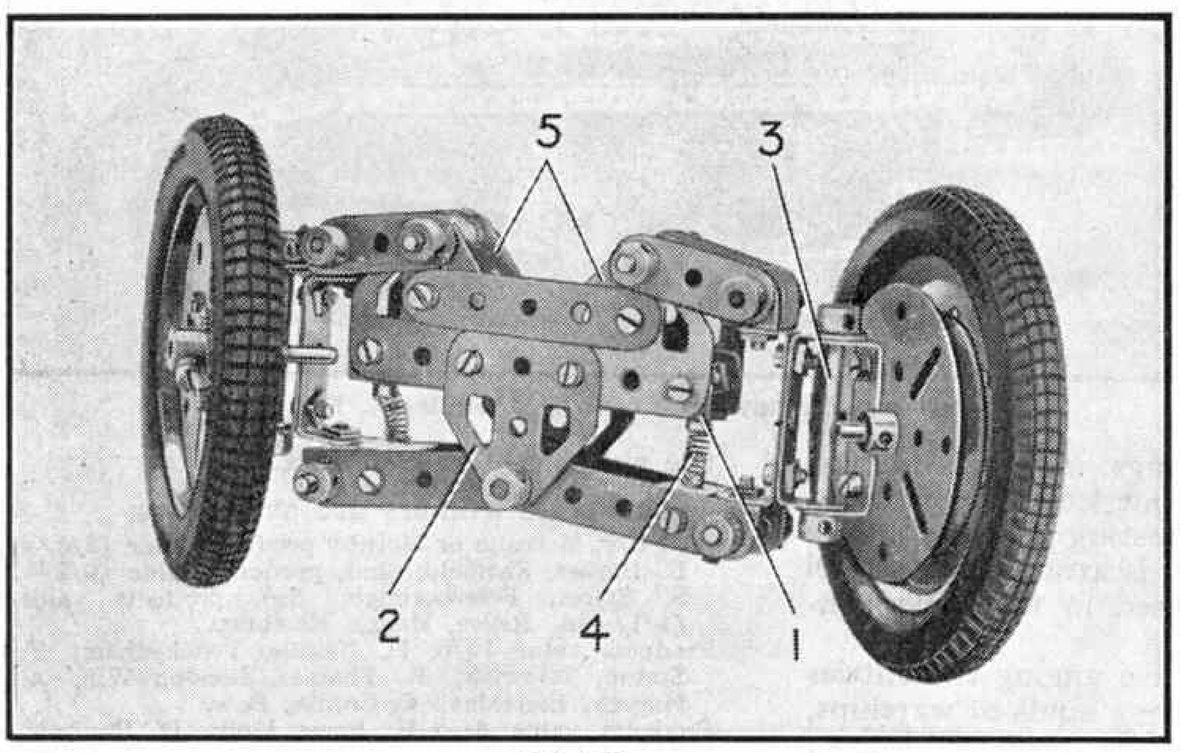


Fig. 486.

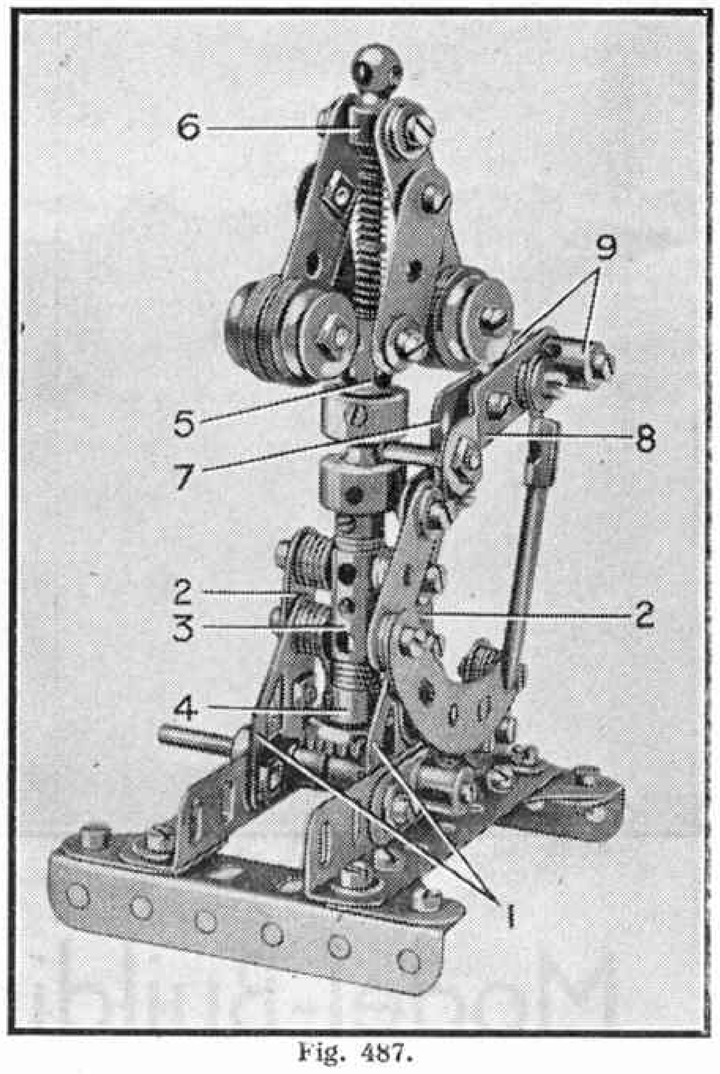


Fig. 487.

(487) Centrifugal Speed Indicator

(G. Woolfenden, Liverpool 11)

A sturdily built indicator, by means of which it is possible to determine the speed of revolving shafts and wheels, is shown in Fig. 487. It was designed by G. Woolfenden, Liverpool 11. To construct it two 3″ Angle Girders are bolted at right angles to two $3\frac{1}{2}$″ Girders to form a base. Trunnions 1 carrying $1\frac{1}{2}$″ Strips 2 are bolted in the centre of each $3\frac{1}{2}$″ Girder. Each $1\frac{1}{2}$″ Strip 2 carries two $\frac{3}{8}$″ Bolts fitted with five Washers, the Bolts being screwed into a Coupling 3 that forms a bearing for a vertical 5″ Rod on the lower end of which is a $\frac{3}{4}$″ Contrate Wheel. This Contrate engages a $\frac{1}{2}$″ Pinion on a $2\frac{1}{2}$″ Rod, which is journalled in reinforced bearings consisting of Double Arm Cranks bolted to the $3\frac{1}{2}$″ Angle Girder. The $2\frac{1}{2}$″ Rod forms the driving shaft. The upper end of the vertical Rod carries a Socket Coupling in which a Coupling 5 is gripped, a Compression Spring and a Handrail Coupling 6. To each side of the Handrail Coupling a 2″ Strip is bolted as shown, and these carry at their lower ends weights consisting of two $\frac{1}{2}$″ loose Pulleys and about six $\frac{3}{4}$″ Discs. The Coupling 5 is connected by two $1\frac{1}{2}$″ Strips to the 2″ Strips, the connections being made by means of lock-nutted bolts.

A 1″ Corner Bracket 7 has a second similar part secured to it, and lock-nutted to this is a $2\frac{1}{2}$″ Strip 8 that is curved slightly and is fitted with two Threaded Bosses 9 carried on a $\frac{3}{4}$″ Bolt. A Threaded Pin in the other end hole of this Strip engages the groove of the Socket Coupling on the 5″ Rod. To the other 1″ Corner Bracket a $1\frac{1}{2}$″ Strip is bolted, and this in turn is extended by a $2\frac{1}{2}$″ Cranked Curved Strip arranged as shown. The indicator pointer is a 2″ Rod attached by means of a Rod and Strip Connector to the $2\frac{1}{2}$″ Strip 8.

Before the device can be used for speed indication it must be fitted with a scale, which is calibrated by connecting the governor to shafts that revolve at known speeds. The positions of the pointer are then marked. The scale should be glued to the $2\frac{1}{2}$″ Cranked Curved Strip.

(488) Two-Speed Constant-Mesh Gear Box

(K. Cameron, London S.E.)

Fig. 488 shows an extremely simple and efficient gear box of the constant-mesh type. The great advantage of this type is that the shafts do not have to be moved in order to change gear. Hence the driving connections are simplified and wear and tear on gears minimised.

The driving shaft has two 1″ fast Pulleys 3 and 4 secured to it. Placed against these Pulleys, but loose on the shaft, are a 50-teeth Gear Wheel 1 and a 1″ Gear Wheel 2. Also on the shaft are two Compression Springs mounted between Washers and placed on each side of a Collar 6, which is also free on the shaft. The Collar is connected to a lever 5 and the latter is attached pivotally to an Angle Bracket on the base plate by a bolt and two nuts.

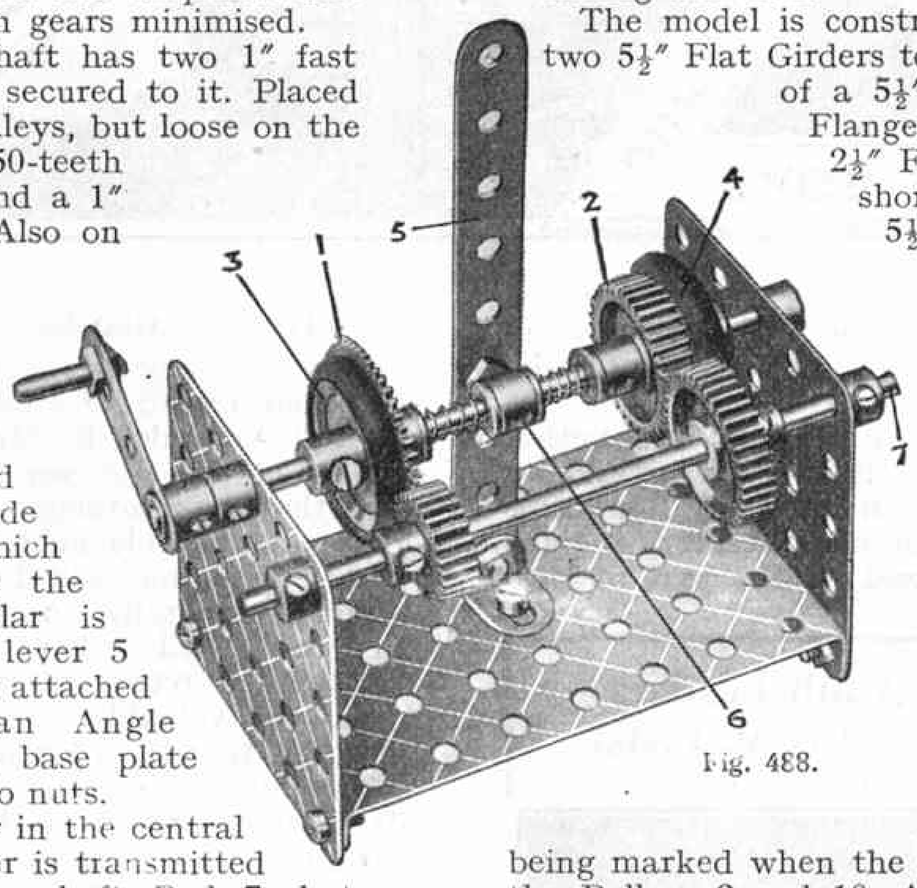


Fig. 488.

With the lever in the central position no power is transmitted to the secondary shaft Rod 7, but on moving the lever to one side or the other one of the Springs is caused to press its respective Gear firmly against a rubber-shod Pulley, and consequently the Gear commences to revolve "solid" with the driving shaft while the other Gear continues to ride idly upon it. The drive is then transmitted to the Rod 7, causing it to rotate at the same speed as the driving shaft or twice as fast, according to the direction in which the lever 5 has been moved.

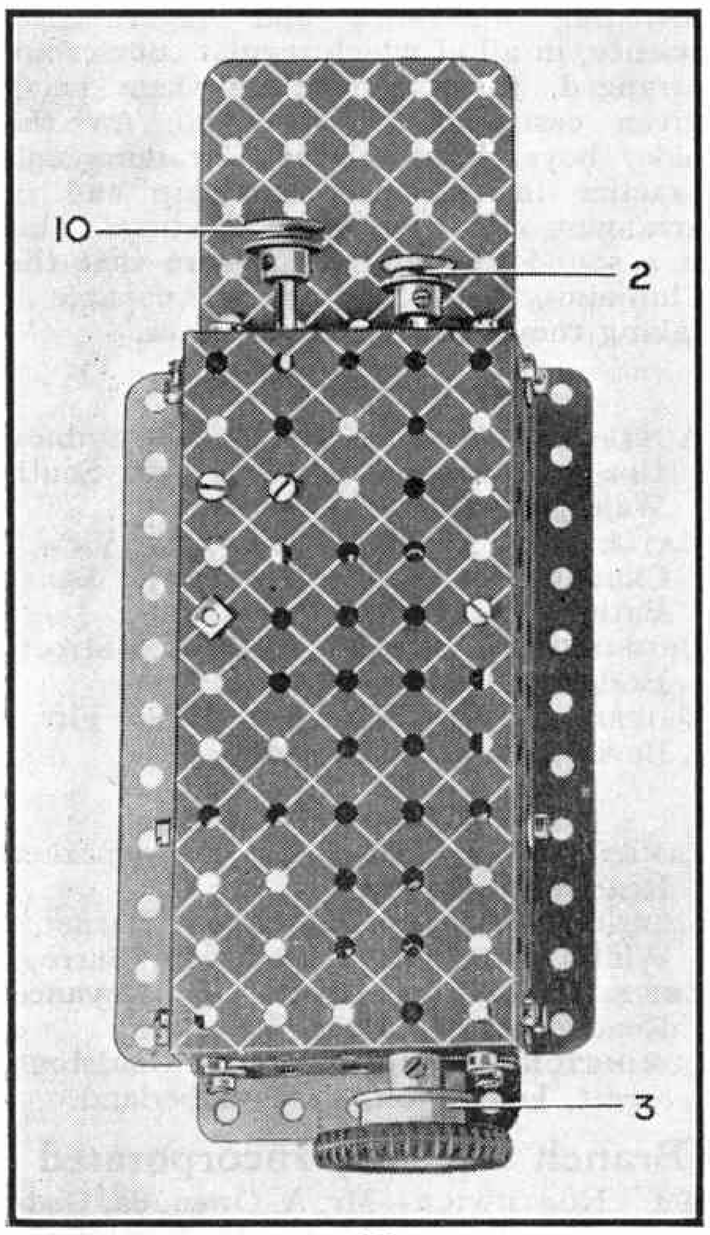


Fig. 489.

(489) A Novel Door Stop

(J. A. Wade, Johannesburg)

When this device is screwed to the bottom corner of a door a slight touch of the toe on a ½″ Pulley 2 causes a Tyre on a 1″ Pulley to press against the floor, thus preventing the door from moving. Slight pressure on a second ½″ Pulley 10 causes the Tyre to spring upward, thus releasing the door.

The model is constructed by bolting two 5½″ Flat Girders to the long flanges of a 5½″×2½″ Perforated Flanged Plate and two 2½″ Flat Girders to its short flanges. Two 5½″ Angle Girders are joined through their elongated holes to the 5½″ Flat Girders, and similarly two 2½″ Angle Girders are bolted to the two 2½″ Flat Girders. A 2½″×2½″ Perforated Plate is bolted to one of the two 2½″ Angle Girders, and this Plate prevents the door from being marked when the foot is applied to the Pulleys 2 and 10. A 6½″ Rod with a ½″ Pulley 2 joined to one end of it is supported in the narrow flanges of the Plate, and to its other end are screwed a ¾″ Flanged Wheel 3 and a 1″ Pulley on which is a Motor Tyre. This Rod carries two Handrail Couplings 4 and 5 and a Collar 6, to which is joined one end of a Spring. The other end of the Spring is bolted to the Plate. The Spring resets the model when the release mechanism is operated.

A 3½″ Rack Strip is attached to the Handrail Couplings. A centre Fork is inserted in a Coupling 7 that is free to rotate on a Pivot Bolt 8 lock-nutted to the 5½″×2½″ Flanged Plate, and this Fork engages the teeth of the Rack Strip. A length of Spring Cord attached to a bolt inserted in the Coupling ensures that the centre fork engages the teeth of the Rack Strip. A 2½″×½″ Double Angle Strip bolted to the long Flat Girders keeps the Rack Strip in position.

The release mechanism consists of a 3″ Rod 9, which passes through an Angle Bracket and the narrow flanges of the Plate. This Rod carries a ½″ Pulley 10, a Compression Spring, a Collar and a further Collar that engages the Bolt fixed in the Coupling 7.

(490) Load Indicator for Model Cranes

Most Meccano boys probably know that the load that a crane is able to handle safely varies according to the angle of the jib. The nearer the latter approaches the horizontal position the less the load that it can be allowed to deal with. A radius indicator is fitted to the majority of luffing cranes, and a glance at this indicator tells the operator the position of the jib and the maximum load that he can handle safely without increasing the angle of the jib.

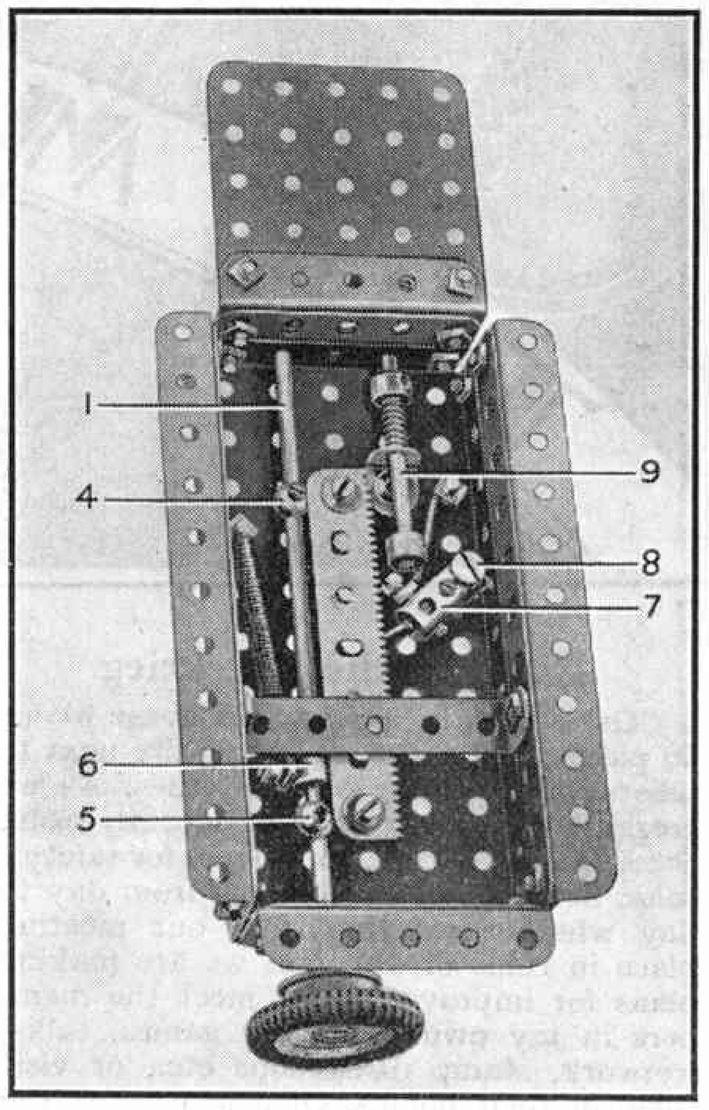


Fig. 489a.

A radius indicator can easily be constructed in Meccano and when fitted to a model crane will greatly increase its realism and interest.

A suitable device is shown in Fig. 490. The Coupling 1 is free to turn about the 1½″ Axle Rod 2, which is gripped in the boss of a Crank 3 bolted to the upturned flanges of the jib girders. It carries in its upper end a further 1½″ Rod 4, and in its lower end a 1″ Rod on which is secured a Worm 5. The weight of the latter serves to keep the Rod 4 always vertical, no matter at what angle the jib is placed. A segment dial 6, shaped from a piece of stout cardboard, is bolted at 7 to an Angle Bracket attached to the jib. The Rod 2 carries two or three Washers to space the Coupling 1 away from the card.

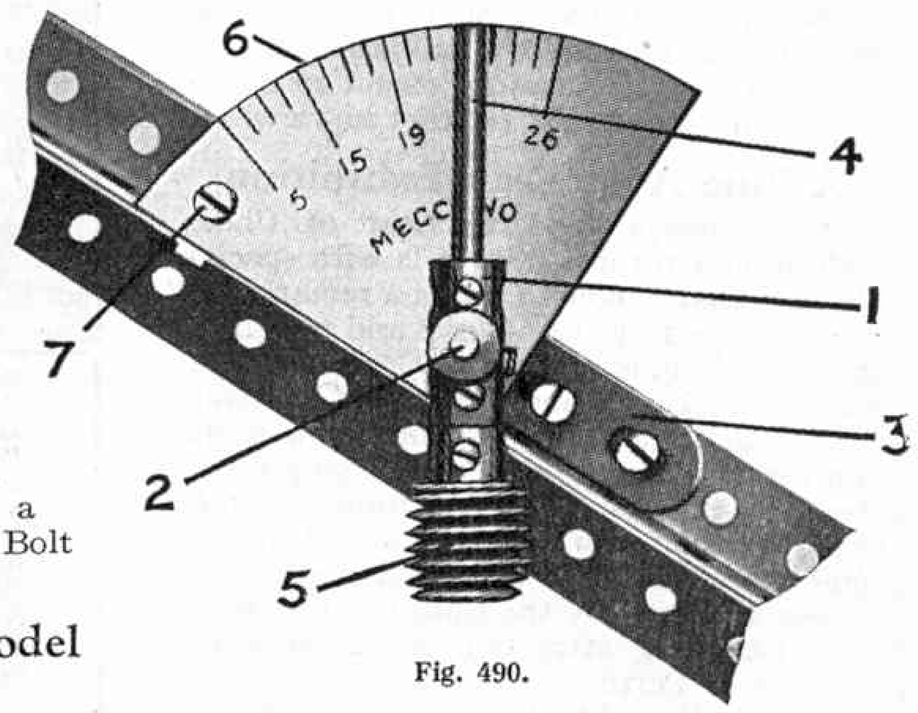
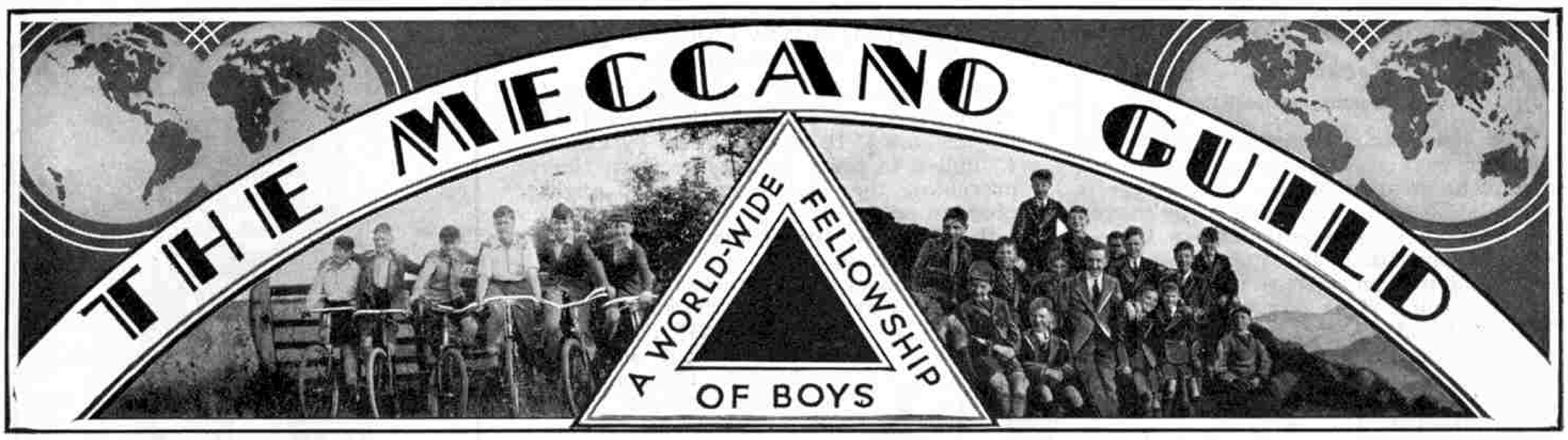


Fig. 490.

The dial moves with the crane, and the Rod 4 remaining vertical, acts as a pointer and registers the variations in the angle of the jib. It is a simple matter to set the jib in different positions, and to mark on the card the radius of the area covered by the load for each position of the pointer.

The pointer can be made to close an electrical contact when it reaches the maximum radius mark. This can operate a warning signal or a relay that stops the Motor.



Clubs in the Blitzkrieg

"Our secretary has had his house blown to pieces, and there was a big fire next to where we meet for our activities. As we treasure our large stock of Hornby Solid Steel Track we have taken it up for safety's sake, because we never know from day to day whether we shall find our meeting place in ruins or not. Yet we are making plans for improvement. I meet the members in my own house for games, talks, fretwork, stamp discussions etc., or visit them in their homes. Of course when the siren goes the boys trot to their homes, obeying their parents' wishes. *I am not going to close the Club down* while I can hold the members in any shape or form."

This is the courageous message that a Meccano Club Leader in London has sent me. Not all of us are confronted with such obstacles as he has to face, but I am sure that all will show the same spirit, and will keep the ideals of the Meccano Guild and of the Hornby Railway Company before them, whatever difficulties they may meet. Meccano boys, with their keenness and the knowledge of mechanisms and engineering in general that their hobby gives them, have already made their mark in many branches of national service, and will be doubly valuable in the days to come. While facing up to present day conditions therefore the example set by the Leader whose letter I have quoted should be followed, and plans for making Club life more attractive and more useful to members than ever should be kept in view.

A Fine Australian Exhibition

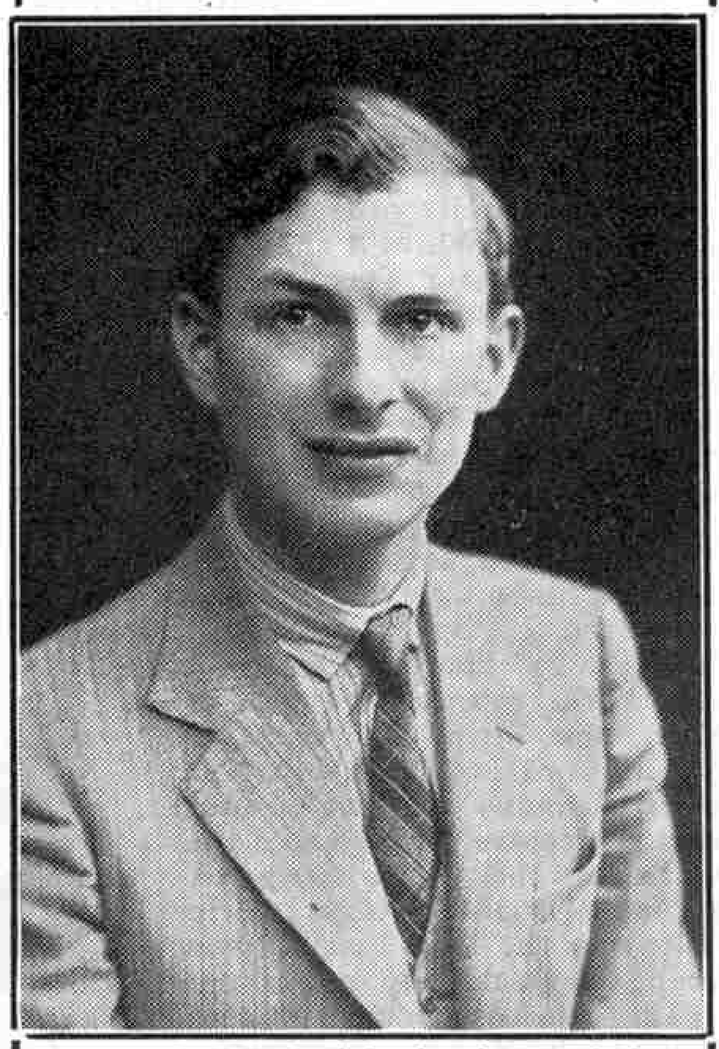
It is always good to hear of Clubs making new records, and it is with special pleasure that I have to tell of a remarkable success scored by the officials and members of the Maylands (Perth) M.C. in Western Australia. Some time ago the Club was reorganised, the Leader admitting a large number of younger boys, and relying upon them to maintain the traditions of the Club. He soon saw that he had taken the right step, and now a special display of models arranged by the Club has provided an outstanding attraction for a week in the city of Perth.

What is thought of the efforts of these boys of the Maylands M.C. is shown by the fact that the Exhibition was opened by His Excellency Hon. Sir James Mitchell, K.C.M.G., Lieutenant-Governor of Western Australia. Sir James was not satisfied with merely carrying out the opening ceremony. He stayed for more than an hour inspecting the exhibits, and declared his intention of returning to see members at work during the ordinary meetings. His kindly interest in their work was greatly appreciated by the members, and Mr. Malmgreen, Leader of the Club, writes that he believes the members passed some of their own enthusiasm on to Sir James while talking to him.

Members of the Club did not forget other good work during their Exhibition, as a collection was taken in aid of Red Cross Funds. Perhaps the finest result of the display is that interest on the part of local Meccano boys has grown to an astonishing extent. So many now wish to join the Club that a reserve of suitable applicants has been formed. The members of this join in cycle runs, picnics and similar outings, but at present cannot take part in ordinary meetings because of lack of space in the Club room. The aim of Mr. Malmgreen is to extend Club room facilities, so that more enthusiasts can be allowed to share in the fun.

Meccano Club Leaders

No. 104. Mr. C. G. V. Taylor



Mr. C. G. V. Taylor is Leader of the Ryeford Hall School M.C. and Chairman of the associated Branch No. 322 of the H.R.C. These were founded in 1937, and in each a steady programme of varied interest has been followed. The Branch layout in the School included three independent circuits, so that members were given full opportunity for taking part in track operations. In present war quarters a large loft was cleared by members, who then built up a new track on which enjoyable train working is carried out.

How to use Club Records

I have just been reading extracts from a special record of Club events that is carefully compiled by Mr. R. W. Shooter, Leader of the Hornsea M.C. Mr. Shooter finds that the information this record gives him is a valuable guide in planning the Club programme and in organising proceedings generally. A notebook of this kind could well be kept in every Club. It contains the record of each member, and is full of valuable notes on the many activities that the Club has carried on.

One interesting point that emerges from Mr. Shooter's record is that the boys who settle down best are those who join when they are 8 or 9 years of age. They stay longest with the Club, and become first useful members and then valuable officials. This confirms my own belief that the only way to ensure continuity is to recruit members while they are young. I have often urged this, and here is definite proof that the course is a wise one.

Guided by the facts that he has recorded Mr. Shooter now takes care that however long a member stays with the Hornsea Club, there is always something ahead for him. Apart from the usual social activities there are splendid hobbies to be taken up, including woodwork and experimental science, in all of which regular courses are arranged, those completing them being given certificates. Best of all, for the older boys there is special training and practice in sectional leadership and in arranging and conducting meetings. This is a sound way of making sure that the Club always has older members capable of taking things in hand themselves.

Proposed Clubs

AUSTRALIA—Mr. M. B. Keogh, 300, Sydney Road, Balgowlah, Sydney, New South Wales, Australia.

BATLEY—B. H. Winfield, "Lea View," Church Road, off Brookroyd Lane, Batley, Yorks.

BRIDGEND—J. Longden, 61, Nolton Street, Bridgend, Glam.

DRIFFIELD—Miss M. Sibcy, "The Firs," Beverley Road, Driffield.

Proposed Branches

CAMBRIDGE—J. King, 421, Newmarket Road, Cambridge.

COULSDON—A. J. Harding, "Barnet," Whitethorn Avenue, Coulsdon, Surrey.

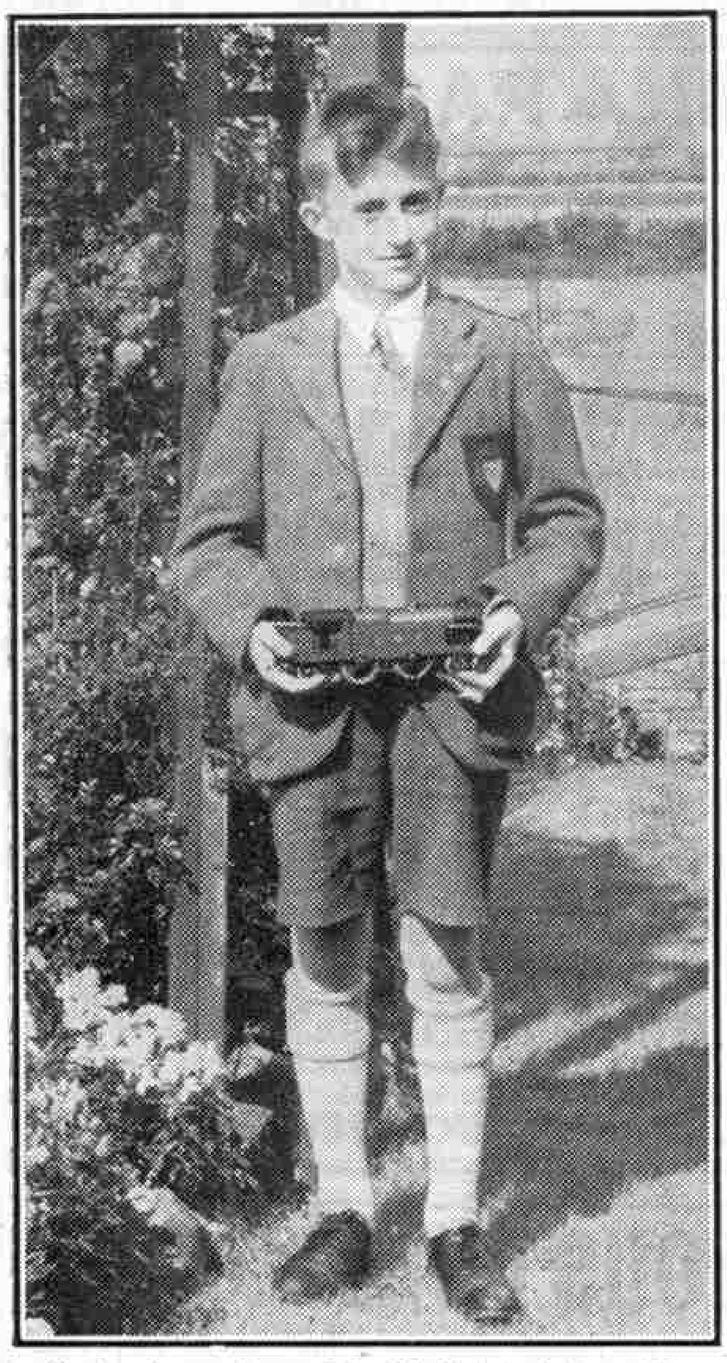
LEICESTER—A. B. Rivers, 39, Devance Road, Evington Road, Leicester.

LEMINGTON—A. E. Finlay, 9, Gladstone Street, Lemington, Northumberland.

Branch Recently Incorporated

399. NORTHWICH—Mr. A. Owen, 6a, Gadbrook Road, Rudheath, Northwich.

Club and Branch News



L. Shepherd, secretary of the St. Bede's College (Manchester) Branch No. 373. This Branch was affiliated in July 1939, with Mr. J. H. Birchall as Chairman, and members have enjoyed many good track meetings in spite of difficulties due to war conditions. Both Hornby and Hornby-Dublo trains are run, and trains operations have been filmed.

Branch News

Twyford Grove (Banbury).—The construction of the Branch layout proceeds steadily. The points installed are now remotely controlled. Operations also are being carried on, and the Branch now has 16 locomotives, 37 passenger vehicles and 91 wagons. Lectures are given regularly. Mr. W. C. Prescott, Chairman, contributed a lecture on "*The Locomotive*," and the proceeds are being given to the "*M.M.*" Radio Fund for the R.A.F. Shunting and running efficiency trials have been held, and other events have included a party. *Secretary:* J. W. C. Prescott, 6, Twyford Grove, Banbury.

Folkestone.—Train operations are carried on with great zest. Single line traffic is run to suit weather conditions, and timetables are strictly adhered to. The layout itself is being extended by the addition of sidings and interesting shunting operations are practiced. A new level crossing has been installed. *Secretary:* F. E. Saunders, 79, Dover Road, Folkestone.

Acton.—Work on the layout is now in full swing, and the stock of rails etc. is being increased in order to satisfy the demands of the engineers. Photographs have been taken showing members at work building up the first sections of the new layout. Outdoor meetings have been devoted to inspections of the railways of the district. *Secretary:* S. W. Simmons, 37, Derwentwater Road, Acton, London W.3.

Carmarthen.—Track meetings have been devoted chiefly to the running of various types of goods traffic, including milk specials and trains carrying unusual loads on trolley wagons. Trains of container wagons also have been run, and an interesting "Army Special" carried Dinky Toys Tanks etc. on flat trucks. Games and competitions also have been arranged, with small prizes for the winners. Discussions in which each member speaks for two minutes have been held. Schemes for raising contributions for the "*M.M.*" Radio Fund are being put into practice. *Secretary:* J. D. Lewis, 7, Spilman Street, Carmarthen.

Club Notes

Torquay M.C.—Competitions have figured prominently in the programme. These have included Model-building Contests, with tests of members' ability to list the parts used in models shown to them for a short time. In a Hornby-Dublo Contest members carried out certain operations in turn, and points were lost for faults. Electrical work has been carried out, and photographic Lectures and Demonstrations in the dark room have been given. In a special President's Programme a talk was given on types of bridges, and this was followed by a Model-building Contest in which bridges were to be constructed. Lantern displays, a signalling contest and games also have been enjoyed. Club roll: 11. *Secretary:* G. Fawcett, "Rosea," Marldon Rd., Shiphay, Torquay.

Wakefield M.C.—Model-building meetings have been held, chiefly for competitions. Lectures also have been given and games arranged. At one meeting a humorous play was presented. A successful whist-drive was a great help to Club funds. There is a prospect of a good Exhibition being organised. Recruiting leaflets have been printed and distributed. Club roll: 14. *Secretary:* K. Ward, 94, Alverthorpe Road, Wakefield, Yorks.

Blundellsands M.C.—Members are carrying on splendidly in spite of wartime conditions. Meetings are becoming more and more interesting, under the guidance of Mr. C. E. Curtis, who has taken over the duties of Leadership in the unavoidable absence of Mr. R. B. Cartmel. The programmes have consisted of Talks, Model-building and Games, and models constructed at home have been brought to meetings for examination and discussion. Talks have been given by members on "*Stamps*" and "*Astronomy*." A Visit has been paid to a church organ chamber, where the mechanism was fully explained. Recruiting is carried on continuously and satisfactory results are being obtained. Club roll: 36. *Secretary:* J. K. Noel, 24, Lancaster Avenue, Liverpool 23.

Exeter M.C.—Intensive model-building activity continues. Interesting and unusual models constructed include a candy puller, a catapult, and a representation of a watch and chain, while many submarines, steamships, steam engines and various guns and searchlights also have been constructed. Members show a refreshing originality in their choice of subjects, and one model built could only be described in the secretary's report as a cross between a scooter and a tower wagon! The Games Tournaments have been continued with great success. The past summer session was the best experienced for many years. Club roll: 50. *Secretary:* M. Golesworthy, 122, Old Tiverton Road, Exeter.

Totnes M.C.—Members have carried out an important piece of wartime work by working in a market garden, in which twelve of them dug up 3 tons of potatoes in one week. The owner of the garden gave members a splendid tea and made a donation to Club funds. A good programme on the usual lines is now being followed, and great interest is being taken in a Table Tennis Tournament. A welcome visitor from the Plymouth M.C. was entertained at one meeting. Club roll: 21. *Secretary:* T. J. Macnamara, "Gables," Totnes.

Acton M.C.—Very fine activity continues in spite of wartime difficulties. Special attention has been given to the construction of the club's new Hornby Train layout, which is making excellent progress. Members are thoroughly enjoying planning stations, lineside buildings and track details, all of which are properly drawn before actual constructional work begins. A Lecture describing the run of the famous L.N.E.R. train "*The Queen of Scots*" was given by a member, and a special meeting was devoted to the taking of photographs of members and of the first sections of the Club's new layout. Regular model-building meetings are being held. Club roll: 14. *Secretary:* S. W. Simmons, 37, Derwentwater Road, Acton, London W.3.

Ecclesall M.C.—Many excellent Meccano models have been built, chiefly of military, marine and aeronautical subjects. One of outstanding merit represented a Gloster "Gladiator." All models are awarded marks for neatness and efficiency, and certificates signed by the Leader, are given, on which the judge's comments are entered. A famous reservoir has been visited. The Hornby Railway section continues to do good work, and a repair depot has been fitted up to ensure that locomotives and rolling stock are kept in perfect order. The Library has been extended and a Magazine with the name of "*The Meccanitian*" is now issued. Club roll: 6. *Secretary:* T. R. Jones, 327, Millhouses Lane, Sheffield 11.

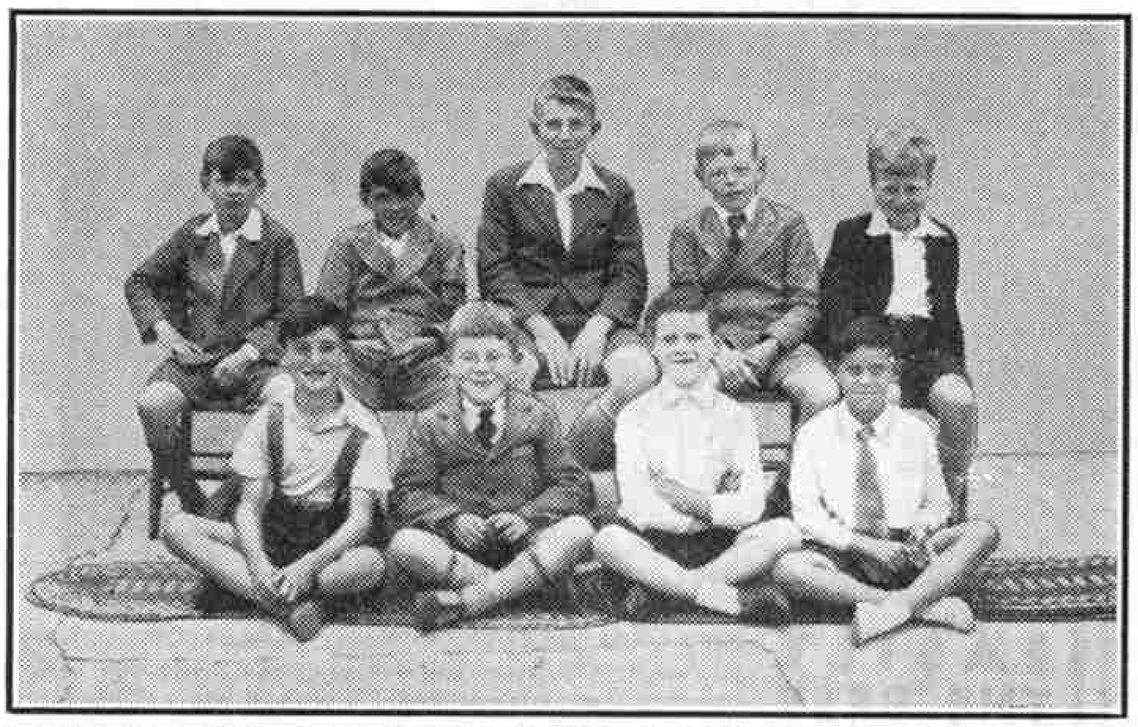
Hornsea M.C.—A special series of meetings for woodwork has been completed. The models built were excellent, and the work of members is a credit to Mr. A. Tawn, Craftsman, who acted as instructor. The Science Section also has done good work, and a third member has qualified for the Science Certificate awarded by the Club. Other meetings have been devoted to the usual activities, including fretwork and games. Club roll: 24. *Secretary:* P. Richardson, 14, Grosvenor Terrace, Hornsea.

Tynecastle School (Edinburgh) M.C.—The Club is fortunate in having the use of the school workshop, which is thoroughly blacked out, and ample air raid shelters are available. At the first meeting of the present winter session a demonstration was given of the sport of pole-flying of model aeroplanes. The aircraft included a "Spitfire" and a "Martin" dive bomber; all were of 12 in. span and were built by members. Good fun is expected from competitions based on this new sport. Battleship models also were displayed, and the programme arranged consists of model aeroplane and battleship constructional meetings, with "Flying Nights" and competitions. Club roll: 23. *Secretary:* J. Laing, 11, Wardlaw Street, Edinburgh.

Muirfield (Dundee) M.C.—Members are very keen indeed on model-building and all meetings are thoroughly enjoyable. The Library has been extended, and now includes more than 50 books. By the kindness of Mr. C. W. Meredith, Broughty Ferry, a Club visit was paid to his model layout, which is well known as the "Craigard" railway. Mr. J. Usher, Leader, unfortunately has removed to Glasgow for business reasons, but members are enthusiastic and the work will go on. Club roll: 11. *Secretary:* B. Bowie, 39, Provest Road, Dundee.

AUSTRALIA

Maylands M.C.—Further details of the Club's Exhibition week are now available. Each Faction arranged a special display, and there were many large demonstration models on view. The total number of models was 77, and most of these were driven by electric motors. The Exhibition was opened by His Excellency Hon. Sir James Mitchell, K.C.M.G., Lieutenant-Governor of Western Australia, and remained open nightly for a week. A campaign in aid of the new Club room is being carried on, with a view to building a larger and more comfortable meeting place. There is a keen desire on the part of Meccano boys in the district to join the Club, and a special reserve unit has been formed. Members of this enjoy cycle runs and other outdoor activities, and will be absorbed into the Club itself as opportunity allows. Club roll: 33. *Secretary:* W. Petersen, 1, Warne Street, Maylands, Perth.



A group of members of the Helmsley Methodist Sunday School M.C. This club was founded by Mr. R. W. Shooter, Leader of the Hornsea M.C., and was affiliated with the Guild in August of this year. The programme followed at the early meetings included Meccano model-building, special attention being given to aeroplane models, with indoor and outdoor games, talks and cycle runs.

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As a special opening advertising offer to introduce my bargain approvals to readers of the "M.M.," I am presenting free this Monster Packet of Unusual Stamps. Included in it are **JAPAN** (New Year Greetings), **INDO-CHINA** (Native Junk), **SET SENEGAL** (French W. Africa), **JAMAICA** (Pictorial), **MEXICO** (Child Welfare), **NEWFOUNDLAND** (Pictorial), **NICARAGUA** (Cathedral), **PAIR ROUMANIA** (Airs), **RUSSIA** (cat. 2/6) and many others. All good stamps, all different and all free. Simply send 3d. stamps and request approvals. Also to first 150 applicants, I will send **FREE, 3 LARGE PICTORIALS.**

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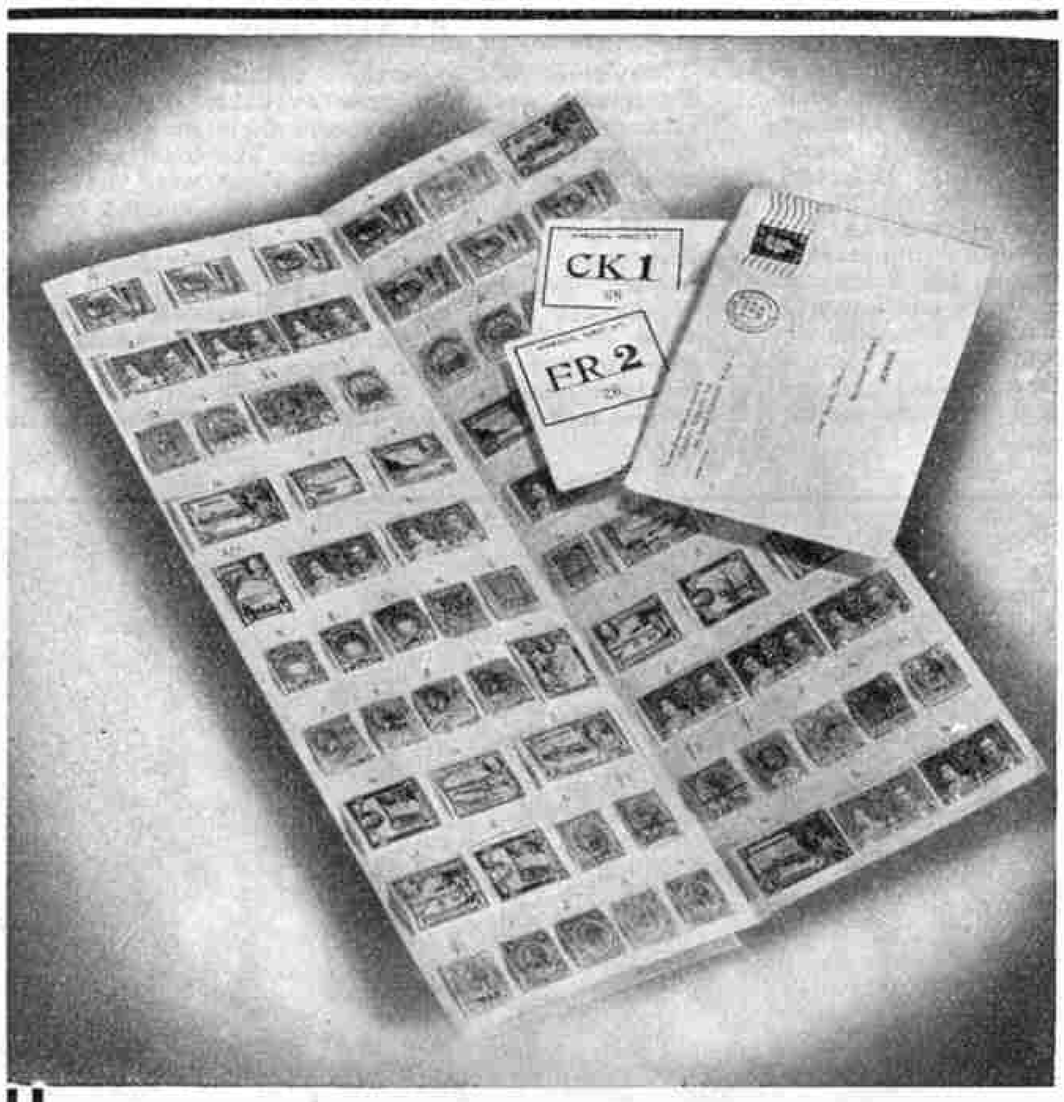

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(Postage extra please)

For other stamp advertisements see page x

STAMP COLLECTING

STAMP CURIOSITIES

IN last month's article we dealt with the early stages of stamp collecting and recommended the beginner to let his fancy roam at large around the stamp world until he finds some field in which he thinks he would like to specialise. He is sure to do this sooner or later, because in time every collector realises the hopelessness of trying to obtain every stamp that has ever been issued. He therefore turns to some country or subject that offers a special interest, and concentrates on that. Even a wide general collection almost invariably shows one or two countries in far greater completeness than the others.

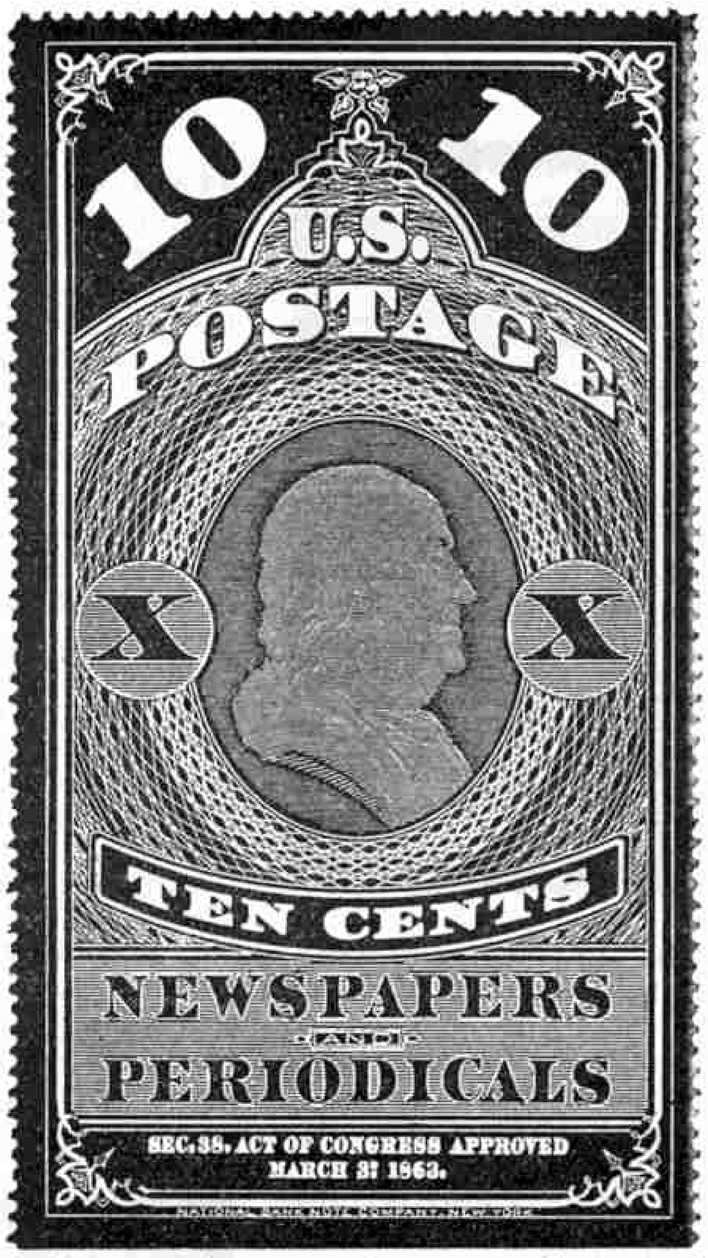
It will be seen that in practice specialisation can scarcely be avoided, and the question for the collector is the direction this shall take. It may be that he will adopt some country that is attractive to him, and seek to collect all its issues and to learn all that he can about its postal history and services. This is not easy for a young collector. His funds usually are too limited to allow him to acquire the earliest issues of all but a very few countries, such as certain of the British Colonies that have recently begun to issue their own stamps, or some of the new European States created after the

last war. Even these countries present difficulties, the British Colonies because they have yet too few stamps to make a sizable collection, and the others because most of them have indulged in too many fancy issues that have killed their philatelic interest.

For these reasons the principal outlet for the young collector is the subject collection, a form of specialisation that we have often urged in the "*M.M.*" In such collections the collector concentrates upon a particular group of designs, for example those showing animals or birds, or dealing with native customs or engineering achievements; and he seeks to obtain every stamp bearing such a design.

In recent years we have dealt exhaustively with a wide range of such topics and we shall return to them from time to time for the benefit of new readers. This month we want to suggest an entirely new outlet that will appeal particularly to the boy who really enjoys searching around for his stamps. This is to make a collection of oddities, that is stamps of interest because of some peculiarity of size, shape or use. We have been experimenting with this scheme as a wartime amusement. The idea came when we were looking through some stamps that were to be auctioned in London. One parcel consisted of a mixed lot of stamps of the United States and Great Britain. Among them were some copies of the United States 1865 newspaper postage stamps, which measure nearly $3\frac{3}{4}$ in. by 2 in., and one or two specimens of Britain's tiny ½d. issue of 1870, which is only $\frac{3}{4}$ in. across. These stamps are illustrated here in facsimile, so that readers may understand our amusement at the contrast between them.

We there and then decided to make a small collection of "oddities," and it has since progressed to include unusual items of all types, such as strange



designs, odd postmarks, unusual uses of stamps, and so on.

The British stamp illustrated is not the smallest stamp on record. That distinction is claimed by Bolivar's first stamp, issued in 1863, which measured ½ in. by $\frac{1}{5}$ in. Bolivar was one of the independent states that at one time formed the United States of Colombia, in South America, and is now a department of the republic of Colombia. The 4/4 schilling stamp issued in 1856 by Mecklenburg-Schwerin, a former Grand Duchy now incorporated in the German republic, was designed with four quarters of the same design that could be cut from the stamp to be used for local postage. The quarter stamp measured only $\frac{3}{8}$ in square, but we hardly feel justified in calling it the "smallest ever," as it cannot fairly be deemed a whole stamp.

Next we come to freak shapes, some of which are really outrageous in their unnecessarily large dimensions and unusual shapes. In the latter connection, Tannou Touva, a republic in North Mongolia, is the biggest sinner, for this country has issued stamps in outsize rectangles, triangles and diamonds merely to attract the collector who likes gay colours, irrespective of whether the stamp is really a legitimate postal issue. The 2 aksa or rouble air mail stamp of this Asiatic country, illustrated here, is carmine and buff in colour. It is dated 1921-36 and is one of a "Jubilee" issue. Spain too has ventured into the realms of the outsize, as may be judged from the accompanying reproduction of the 10 pts. value

(Continued on page 504)

Stamp Collecting—[*Continued from page 503*]

from the 1930 Columbus air issue.

As a contrast to these big stamps we show part of an envelope, itself a very small one, that bears only half a stamp. The stamp is a 2 centavos value from Salvador's 1900 issue, cut in half, or bisected, to serve as a 1c. value.

Unusual designs feature largely in our collection of oddities. Our illustration of Holland's 6c. Air Fund issue of 1935 shows it to be a tragic forecast of things to come, for it depicts the shadows of aeroplanes over Holland. We have often wondered what inspired that design. Another unusual Dutch design is a picture of a crow on the 1938 Air Stamp. A crow is hardly a speedy bird, but it is reputed to be the only bird that flies in a dead straight line!

Among the "grim" designs in our collection, there is one from Russia's anti-war issue of 1935 that is singularly appropriate to ponder upon in modern days, for its design shows bombs raining from the skies. As we write this article, anti-aircraft guns are booming and the whistle of a falling bomb comes occasionally to remind one that fantastic as this design seemed when it was issued, it was a true forecast of war's horrible possibilities.

We illustrate another Russian issue, from the Spartacist Games issue of 1935, as a sample of the modernist trend of stamp designing. It is a pity that the bright chocolate and green colouring of the original cannot be reproduced. It is an attractive example of brightness.

Other schemes will suggest themselves to readers who are interested in the idea of collecting oddities. They might include for example, specimens of Latvia's first issues, printed on the backs of Russian war maps owing to a scarcity of paper. Bank notes also were used as printing paper in this emergency. New Zealand provides examples of stamps bearing advertisements on their reverse side, printed before the application of the gum. The oddest use of the backs of stamps comes from Portugal, which in 1895 issued stamps commemorating the 700th anniversary of the birth of St. Anthony of Padua with a Latin prayer printed on the reverse side.

Stamp Gossip

and Notes on New Issues

Stamp Centenary Commemoratives

We illustrate this month the 35 centavos stamp issued by Portugal to celebrate the centenary of postage stamps in Britain. The portrait on it is that of Sir Rowland Hill, the great postal reformer who was responsible for the coming of cheap postage and postage stamps.

A very similar design was used for the same purpose in the Dominican Republic. Two stamps were issued, of 3 and 7 centavos respectively, but in this case the portrait faced right. Mexico. celebrated the occasion with two series of five stamps each, one for general postage and the other for air mail. The design showed a reproduction of the "Penny Black," the first real stamp, with suitable inscriptions.

Egyptian Commemoratives

The special stamp issues of Egypt are probably more popular with collectors than those of any other country. It is interesting therefore to know that the quantities of such issues sold in 1938 were as follows:—Royal Wedding, 197,659; King's 18th Birthday, 9,297; Cotton Congress, 383,000; Telecommunications Congress, 378,000; Leprosy Congress, 473,000. The first two issues were single stamps, and the figures for the remainder are for complete sets sold.

Readers who possess specimens of any Egyptian Commemoratives should take care to keep them. They are rising in value quickly.

* * * *

One important feature of the recent Australian issue commemorating the departure of the second A.I.F., described and illustrated in last month's "*M.M.*", escaped our notice. The 1d. stamp in this issue is the first commemorative of this value that has appeared in Australia. All previous commemorative series have commenced with a 2d. value.

The reason for the innovation is that a 1d. value is required to prepay the postage on letters passing to and from members of the A.I.F. serving overseas.

We thank David Field Ltd., 7, Vigo St., London W.1, for their courtesy in loaning the stamps from which the illustrations or our stamp pages have been made.

The Indian Post Office

A recent report on the work of the Indian Post Office gives many interesting facts concerning its services. Perhaps most remarkable to those who dwell in cities will be the fact that India still employs over 10,000 runners to convey mails on foot. These runners cover an average of 25 miles a day, over mountains and rivers, in serving the remote villages. Of India's 24,000 post offices and 52,000 letter boxes, more than 20,000 and 35,000 respectively are in rural areas.

The Indian Post Office handles over 1,200 million postal packets annually and, excluding air mail services, maintains communications over 160,000 miles of internal mail routes.

A Fine Far Eastern Stamp

A delightful design has been issued in Manchukuo to celebrate the visit of the Emperor to Japan to pay respects on the occasion of the celebration of the 2,600th anniversary of the founding of the Japanese Empire. There are two stamps in the issue, of 2f. and 4f. values respectively. The design is the same on both and shows a flight of storks over the Manchukuoan flag.

Japan also has issued commemorative stamps to mark the occasion, but specimens are not yet available. "*Gibbons Stamp Monthly*" understands that an inscription on the 10/- value of the Japanese set indicates that all peoples should live together as one happy family!

* * *

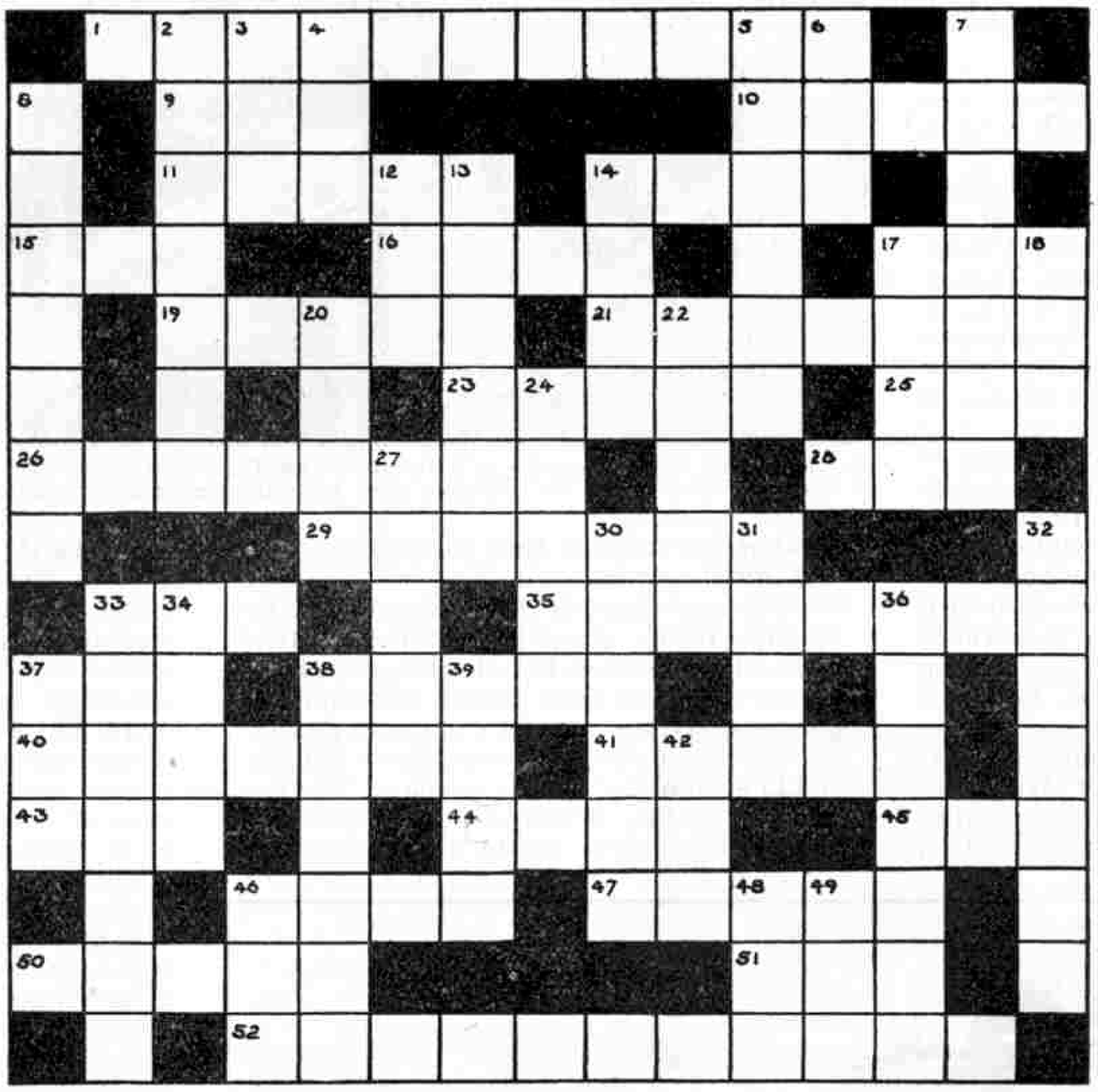
An interesting innovation is shown on a recent advertising issue from the South American republic of Colombia. The design shows a fine reproduction of a young tobacco plant and the value, 8 centavos, is shown in Roman numerals, here used for the first time in the country's stamp history.

Censor Covers

"Censor covers," envelopes bearing labels or markings showing that the letter enclosed has been read by a censor, are of great interest and could well be collected as "oddities." We have one, with an English stamp and apparently posted in Glasgow, which is marked as censored in the Gold Coast Colony. The probable explanation is that the letter was posted in a Gold Coast port on board a ship that did not possess an official ship cancelling stamp. The letter was taken ashore to be censored and finally posted in an ordinary letter box on arrival at Glasgow.

COMPETITIONS! OPEN TO ALL READERS

NOVEMBER CROSSWORD PUZZLE



CLUES ACROSS

1. Stone producing
9. Prefix
10. At no time
11. Fastened together by thread
14. Grain
15. Suitable
16. Uncivil
17. From
19. Fury
21. Animal colony
23. Missile used in S. America
25. Assist
26. Charm
28. High tone
29. Act of clipping or shaving
33. Standard
35. Bandage
37. Sailor
38. Case
40. Seed of aromatic plant
41. Ornamental vessels
43. Sign of agreement
44. Always
45. Hill
46. Carnivorous animal
47. Firmness
50. Drug
51. Manner
52. Slowness

CLUES DOWN

2. To place in office
3. Tiny sand hill
4. In what manner
5. Relations
6. Observe
7. American city
8. Blows
12. Before
13. South African city
14. Genuine
17. Young horse
18. Unusual
20. The main point
22. Couples
24. Attack
27. Watered silk
30. Odd
31. Female sheep
32. Registers
33. Complete armour
34. Parched
36. Old coins
37. To make brown
38. Colour
39. Famous Empire port
42. Metric unit
46. Allow or hinder
48. Hastened
49. Contend

This month we give another of the popular "*M.M.*" crossword puzzles, which follows the lines of those set in previous issues. The clues are all perfectly straightforward and every word used can be found in Chambers' or any other standard dictionary, with the exception of a few well-known place names. When preparing the entry it is not necessary to cut out the illustration. Instead a copy of the same size, or larger, should be used.

Prizes of Meccano products to the value of 21/–, 15/–, 10/6 and 5/– respectively will be awarded in order of merit to the senders of the four correct solutions that are neatest or most novel in presentation.

The prizes will be duplicated for the Overseas section, which is open to all readers living outside the British Isles.

Entries should be addressed "*November Crossword Puzzle,* Meccano Magazine, Binns Road, Liverpool 13." The closing dates are 30th November in the Home section and 28th February 1941 Overseas.

A "Locomotive Pie" Contest

There is real and easy fun in this month's contest, which is open to every reader of the "*M.M.*" In the next paragraph we give lists of letters and figures from which competitors are asked to make up as many engine names, with the corresponding numbers, as they can. The names and numbers must be those of locomotives of the four British railways, and the winners will be the competitors producing the longest list.

The letters and figures to be used are as follows:

A B C D D E G I L L J K M N O O
P P R S S T U X Y
0 0 1 1 1 2 4 4 5 6 6 7 8 9

As an example, the name and number of G.W.R. "King" Class locomotive No. 6010 "*King James I*" can be made up from these letters and figures, and so may be included in the entry. Each letter and figure can be used only as many times as it appears in the list. Thus G.W.R. No. 6026 "*King John*" is not eligible, for the name requires the letter N twice and this occurs only once in the list.

The contest will be divided into the usual Home and Overseas Sections, in each of which prizes of any Meccano Products to the values of 21/–, 15/– and 10/6 will be awarded for the best lists in order of merit. Entries must be addressed "*Locomotive Pie Contest,*" Meccano Magazine, Binns Road, Liverpool 13." The closing dates are 30th November for the Home Section and 28th February 1941 for the Overseas Section. Each competitor should make sure that his full name and address, together with his age, appear on the back of each sheet submitted in his entry.

H.R.C. COMPETITION RESULTS

HOME

September "Errors" Contest.—1. T. Kellett, Chester-le-Street, Co. Durham. 2. T. Hill, Bolton, Lancs. 3. B. Cooper, Coventry, Warwickshire. Consolation Prizes: H. C. Wilson, Crieff, Perthshire; Miss Doreen Dunk, Mexborough, Yorks.; S. Goldsmith, Oswestry, Shropshire; John P. Warren, East Sheen, London, S.W.14; D. H. Mouse, Lynton, Devon; D. Guinea, King's Park, Glasgow.

September Drawing Contest.—1. A. Sunderland, Cheadle Hulme, Nr. Stockport. 2. H. Daniel, Pontardulais, S. Wales. 3. E. Oldham, Hyde, Cheshire. Consolation Prizes: J. P. Tyrrell, Walton-on-Thames, Surrey; R. W. Harrod, Fulwell, Co. Durham; A. Elvey, New Eltham, London S.E.9; C. O. Hatton, Worcester Park, Surrey; J. Poulton, Glenfields, Leicester; P. R. Wickham, Countesthorpe, Leicester.

COMPETITION RESULTS

HOME

"Engineering Story Contest."—1. P. Greenough, Chesterfield; 2. W. Whitaker, Dewsbury; 3. R. Varney, Derby; 4. P. S. Ross, Blyth. Consolation Prizes: A. Chalmers, Glasgow S.3; G. H. Hucks, Birmingham 8.

"September Word Building Contest."—1. P. M. Davies, Harrow; 2. A. Clough, Colwyn Bay; 3. N. Downham, Huncoat; 4. C. E. Wrayford, Bovey Tracey. Consolation Prizes: E. Moss, Church; Thomas Hill, Bolton.

OVERSEAS

"June Crossword Puzzle."—1. L. D. Pershad, Delhi, India; 2. R. W. Roddick, Buenos Aires, Argentina; 3. E. A. Hamilton, Dunedin, N.Z.; 4. E. Vasudevan, Madras, India. Consolation Prizes: A. MacInnes, Gisborne, N.Z.; G. N. Festenstein, Bethal, S.A.; W. H. Fraser, Otahuti, N.Z.

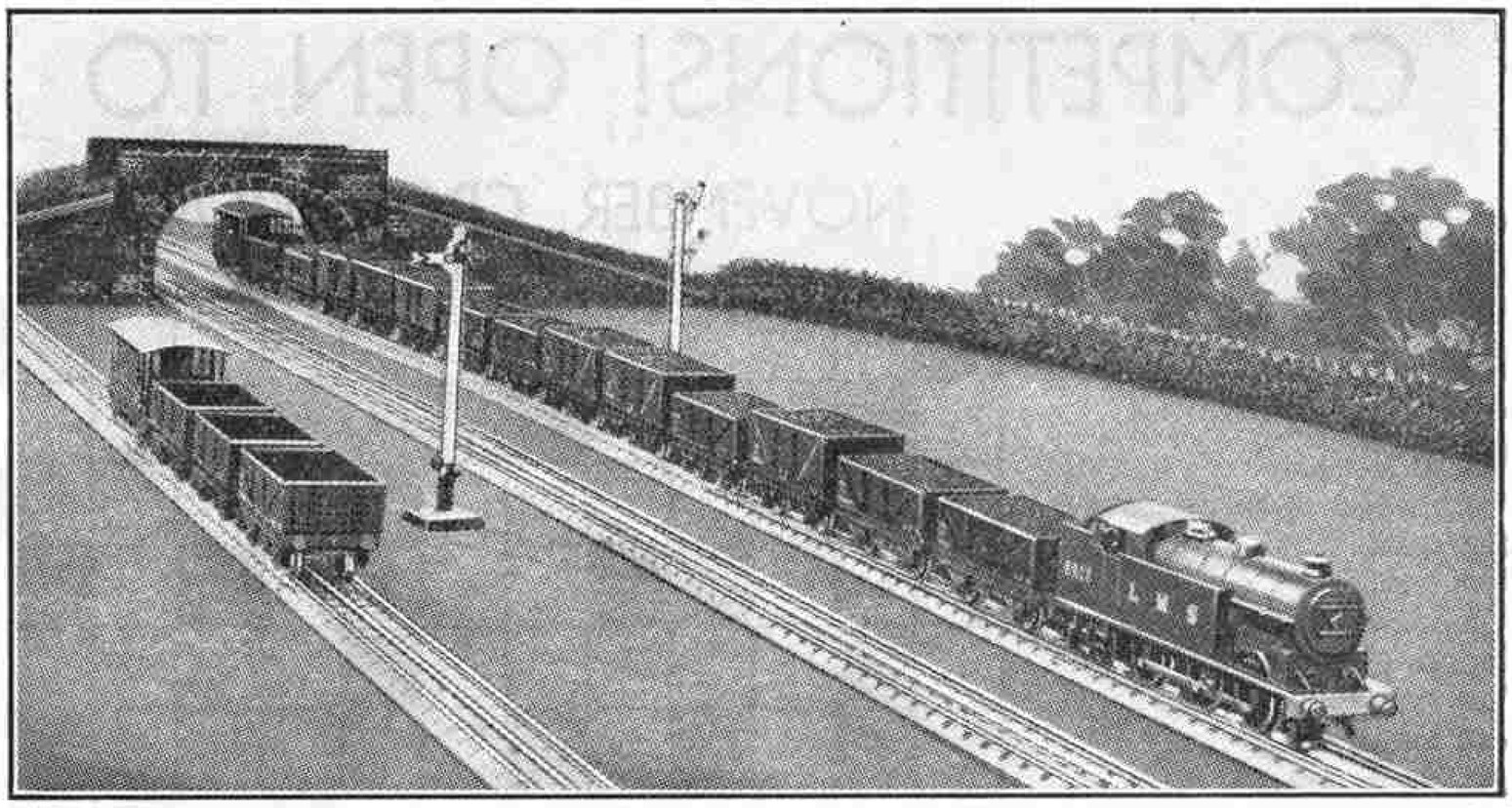
"June Photographic Contest."—1st Prizes: Section A., R. Dixon, Christchurch, N.Z.; Section B., Wing Lam Tsun, Potchefstroom, S.A. 2nd Prizes: Section A., L. W. Humm, Geraldine, N.Z. Section B., G. Davies, Capetown, S.A. Consolation Prizes: P. Thomas, Montreal, Canada; T. A. Wade, Johannesburg, S.A.; R. Jones, Sydney, Australia; M. Aston, Wellington, N.Z.; J. Swift, Durban, S.A.

Tank Engines on Hornby-Dublo Railways

THIS month we devote special attention to the standard Hornby-Dublo Tank Locomotive. Many Gauge 00 layouts commence with one of these engines so that this article should appeal particularly to those who have just started, or who are thinking of starting, a Hornby-Dublo system as well as to more advanced enthusiasts.

The Hornby-Dublo Tank Locomotive is a most useful and adaptable engine and we will say something of the various duties that it can be made to undertake, with reference to actual practice in each case. Tank engines of the 0–6–2 type are in use on all four main line systems so that there is quite a variety of different duties for which the Hornby-Dublo Tank Locomotive is suitable.

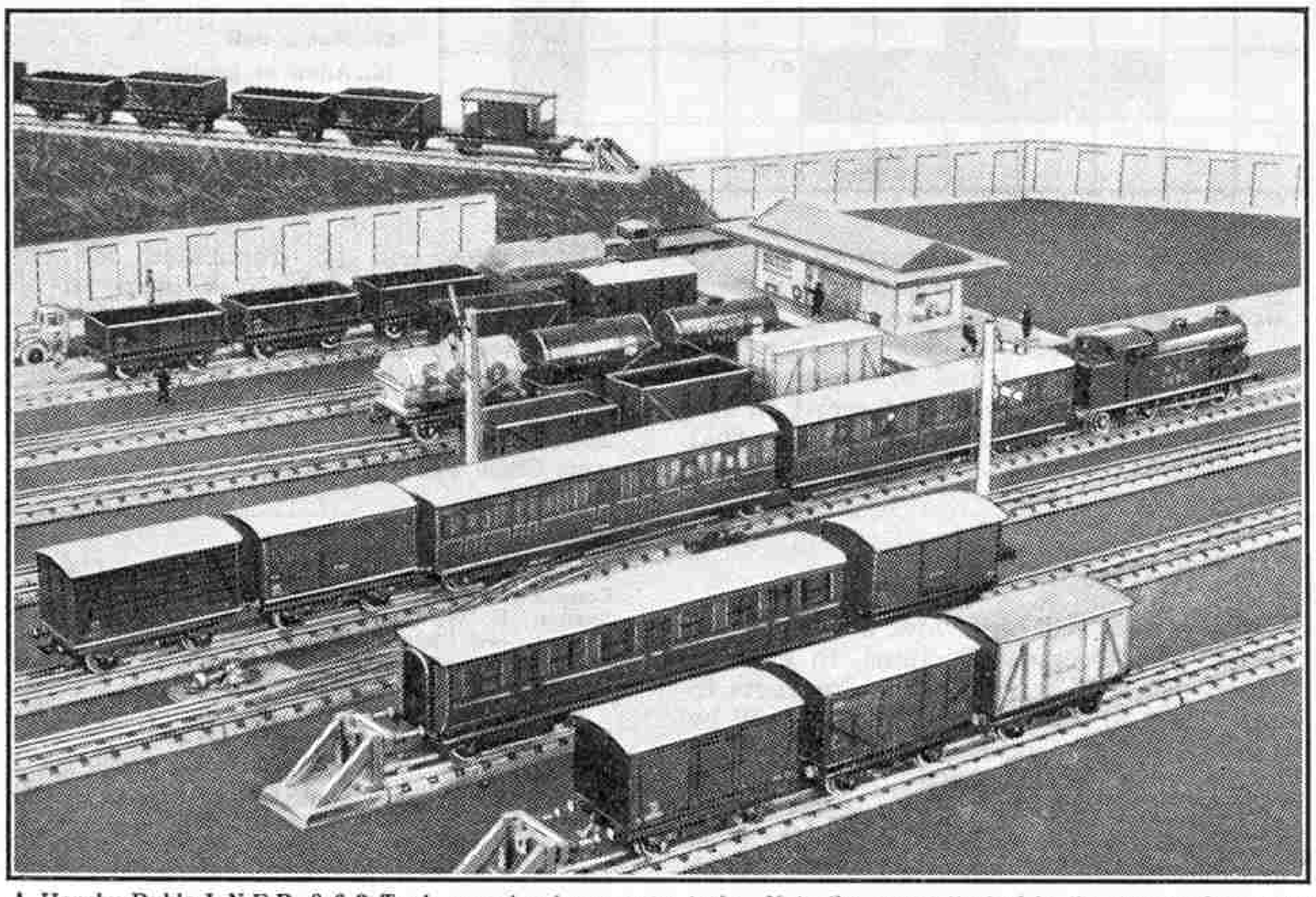
Passenger and goods work come alike to the Dublo Tank, which can truly be described as a mixed traffic engine. Passenger services of the branch line



A lengthy coal train in charge of a Hornby-Dublo Tank Locomotive. The use of ordinary and High-Sided Coal Wagons gives the train a most realistic appearance.

a suburban train of that railway.

Mention of the King's Cross services reminds one that the Doncaster 0–6–2 Ts venture below ground over the Metropolitan lines of the L.P.T.B. when travelling to and from Moorgate Street. Such underground activities suggest the possibility of an extension to any existing L.N.E.R. Dublo system by incorporating a "Metropolitan" section below the ordinary baseboard. In addition to the City passenger



A Hornby-Dublo L.N.E.R. 0-6-2 Tank on a local passenger train. Note the vans attached in the rear as frequently seen in actual practice.

variety can be worked, or there are numerous examples of suburban working that can be reproduced. Take for instance the services between King's Cross on the L.N.E.R. and the residential centres on the Northern Heights; these are worked almost exclusively by the "N1" and "N2" 0–6–2 engines to which the Hornby-Dublo Tank Locomotive has such a striking resemblance. On a Dublo system the actual operations can be reproduced very closely, for in addition to the engines we are dealing with, the Two Coach Articulated Unit is typical of L.N.E.R. practice and can be used quite reasonably to make up services there are also the freight workings in and out of Farringdon Street Depôt. Perishable trains composed of the various Hornby-Dublo Vans headed by an L.N.E.R. 0–6–2 Tank could then be worked very suitably over such an "underground" section.

Longer distance residential or business trains can also be handled by the Dublo Tank Locomotive, for it has ample speed capabilities. Thus such sprightly running as is common on the L.M.S. between Tring and Watford and London can be performed equally well in miniature practice.

For the general operations connected with local goods working, picking up wagons here and dropping them there, there could be no better example to reproduce in miniature than the running of the 0–6–2 tanks on the "Tilbury" line described in the *"M.M."* in September 1939. The Dublo Tank Locomotive makes a splendid shunting engine, and on electrically operated railways particularly the complete remote control afforded makes for most realistic effects.

Even on clockwork layouts shunting is easily possible if the engine is carefully managed. It is useless trying to shunt a few wagons with a fully-wound engine; it is necessary therefore as frequently suggested in these and the Hornby Gauge 0 articles to wind the engine just sufficiently for each movement to be carried out. A certain amount of patience is required to carry out experiments on these lines but the results obtained make the trouble taken well worth while. The reversing of clockwork engines has to be performed by hand, but if the winding up is well judged there will be little need to use the brake. Thus the work can be performed with the least amount of actual handling of the engine.

Tank engines in actual practice carry out a certain amount of main line work, especially in connection with the conveyance of through coaches or through portions of an express. An interesting instance of the running of a coach express over part of its journey by tank engines occurs on the L.N.E.R. The *"West Riding Limited"* of normal times is hauled by an "A4" streamliner between London and Leeds. Between Leeds and Bradford however 0–6–2 tank locomotives are invariably employed. This can be done exactly as in real practice on a Hornby-Dublo system. The excellent miniature streamlined "Pacific," *"Sir Nigel Gresley"* can work the train over the major portion of its journey, the remainder of the work being carried out by the standard Hornby-Dublo 0–6–2 Tank Locomotive.

Interesting suggestions for tank engine working can be gathered from the G.W.R. system, where extensive use is made in South Wales of the 0–6–2 type of tank locomotive. The Hornby-Dublo 0–6–2 Tank G.W.R. has in fact quite a "South Wales" look about it and can be used very well to work local traffic of the character found in that district. An intensive service of coal trains would be something of a novelty in miniature.

The "South Western Railway"

S.R. Practice in Gauge 00

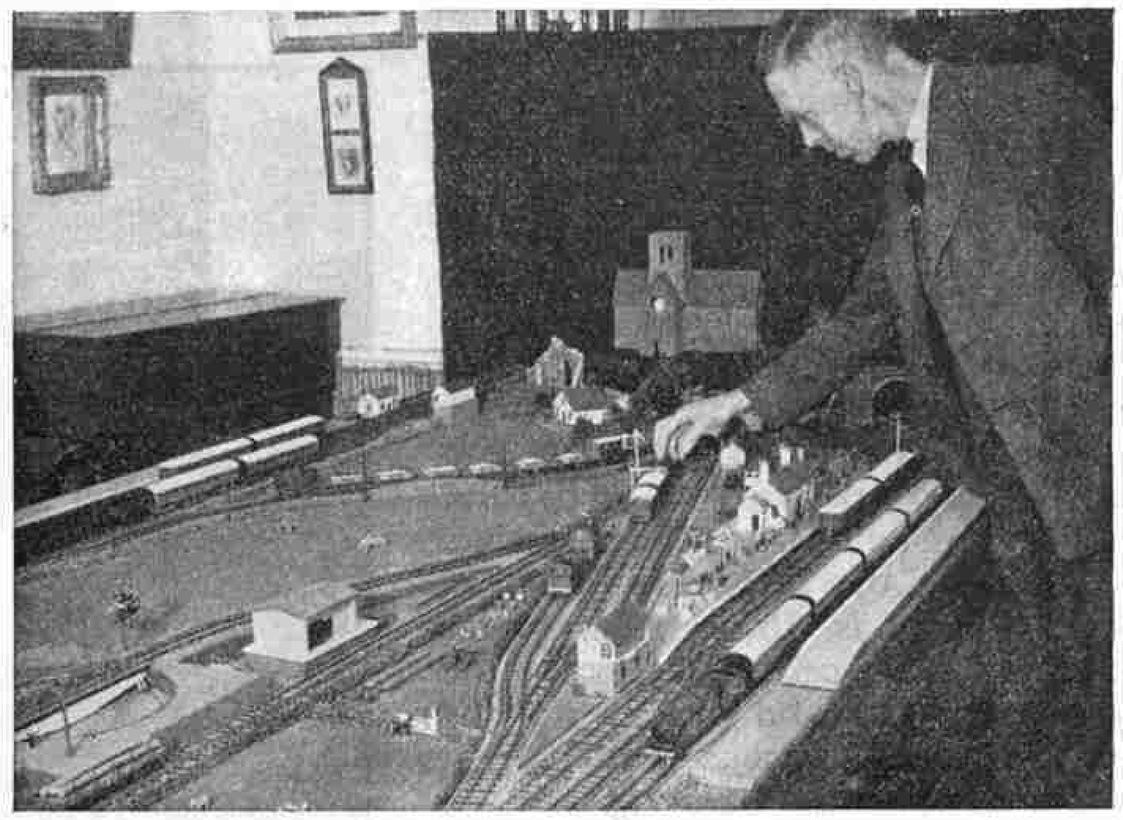
THE Gauge 00 layout described on this page has been built up by Mr. A. J. Fellows of Eastbourne. In general detail the system represents the practice of the Southern Railway, but it does not conform to any particular section of that line. The adoption of the name "South Western" for the system allows latitude in adopting mainly S.R. practice, with electric trains operating in the "London" and "Southern" areas and steam trains in the "Western" section, and in having a connection with the G.W.R. The addition of two G.W.R. locomotives to the line is being considered, a few G.W.R. passenger and goods vehicles having already been acquired.

In the first stages of the construction, the track was secured to 5-ply baseboards, and these were placed upon thick green baize laid on a few thicknesses of brown paper upon a fully-extended dining table. Then the width and length of the table were extended as the size of the layout was increased. In order to include a turntable and not mutilate the table itself with any excavation work, an incline was cut out of solid wood which led up to the turntable and four sidings situated about $2\frac{1}{2}$ in. above "normal ground level."

An occasion then came when the whole outfit had to be dismantled, and instead of re-assembling the layout in a similar manner, a large table top in three sections was constructed of deal boards $\frac{5}{8}$ in. thick on 3 in. by 2 in. battens. This gave a clearance of 3 in. between this temporary table top and the upper surface of the actual dining table. The deal top was laid on two or three thicknesses of material over the original table. To prepare the upper surface of this new "ground," it was first covered with bitumen-lined building paper, and then with sanded roofing felt. This felt was given two coats of Walpamur "stop tar" and two coats flat oil paint of moderately bright green tone.

The whole of the track was then re-laid and hedged in by standard Hornby Hedging. The wooden bases were removed and the lengths of Hedging were split lengthwise and trimmed, whilst the trees are fir cones dipped in varying shades of green paint to give the required scenic effect.

The third rail system is that using the outer third, or conductor rail, resembling as closely as possible that of the real "Southern Electric." The power supply is 6 volts D.C. from a rectifier unit and 3 volts A.C. for station and yard lighting circuits. The lighting of the coaches is carried out from the third rail, with two 3-volt lamps fitted inside each coach.

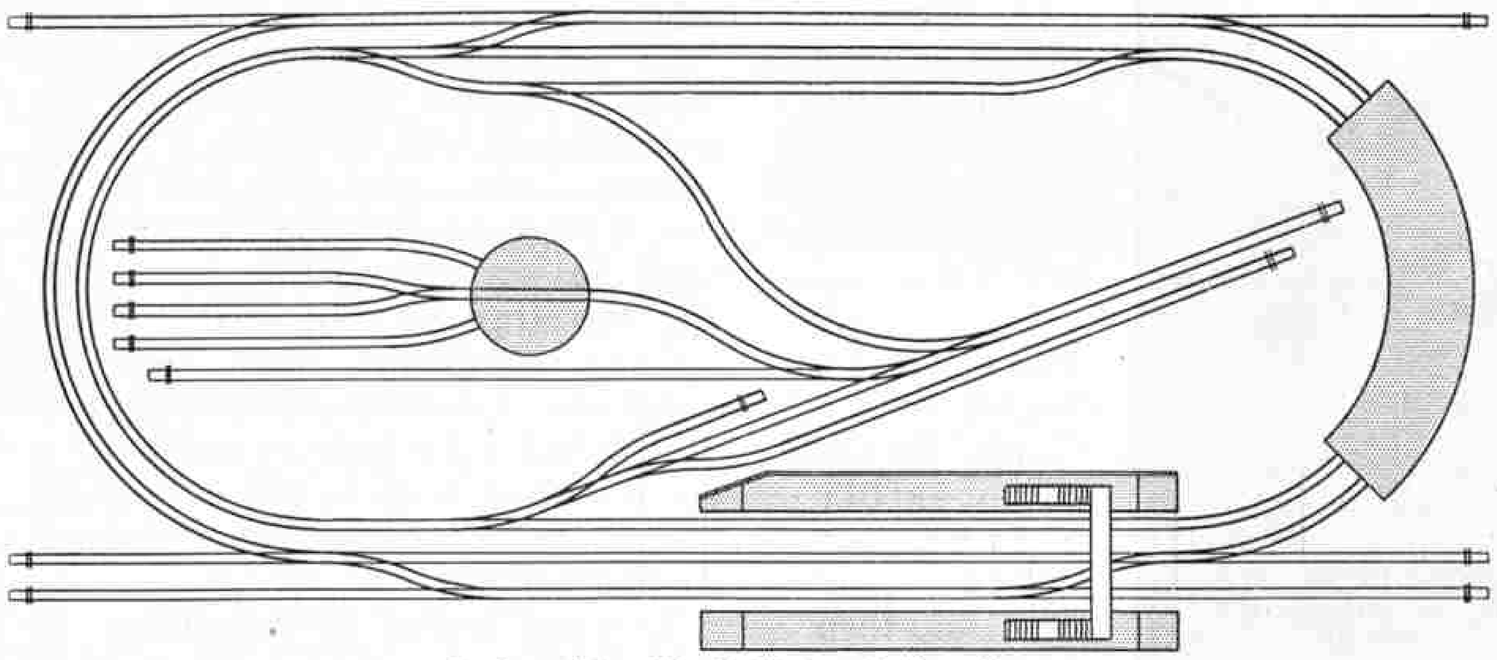


A section of the "South Western Railway" operated by Mr. A. J. Fellows, of Eastbourne. Illustration reproduced by courtesy of the "Southern Railway Magazine."

The layout is fully divided into sections, there being ten circuits altogether. The first two circuits respectively are for the up and down main lines, the third is for the principal tracks to the sidings, and so on. The turntable has a separate track circuit, and it is intended to instal a motor for its operation by remote control. A separate switchboard controls the station and other fixed lighting.

The station buildings were built of plywood from scale drawings, glued and nailed and painted, as also were the two tunnel-mouths, but lithographed paper was used for the finish of the latter. The actual bore of the tunnel was made of zinc sheet, in effect like an inverted curved trough, to avoid warping or rusting.

The rolling stock of the "South Western Railway" consists of two complete "Southern Electric" trains, a "Drummond" 4–4–0 of the S.R., two 0–4–4 tanks, an old 4–4–0 "Isle of Wight Railway" tank, one 0–6–0 "Terrier" and a 4–4–0 tank, and two powerful little 0–4–0 shunters, that really have no connection with Southern Railway design! Several S.R. as well as G.W.R., L.M.S. and L.N.E.R. coaches make up the passenger stock, and there is a varied collection of goods wagons, tank wagons and goods vans and brake vans that handle the freight traffic of the line.



A plan of the "South Western Railway."

Goods Trains on Hornby Layouts

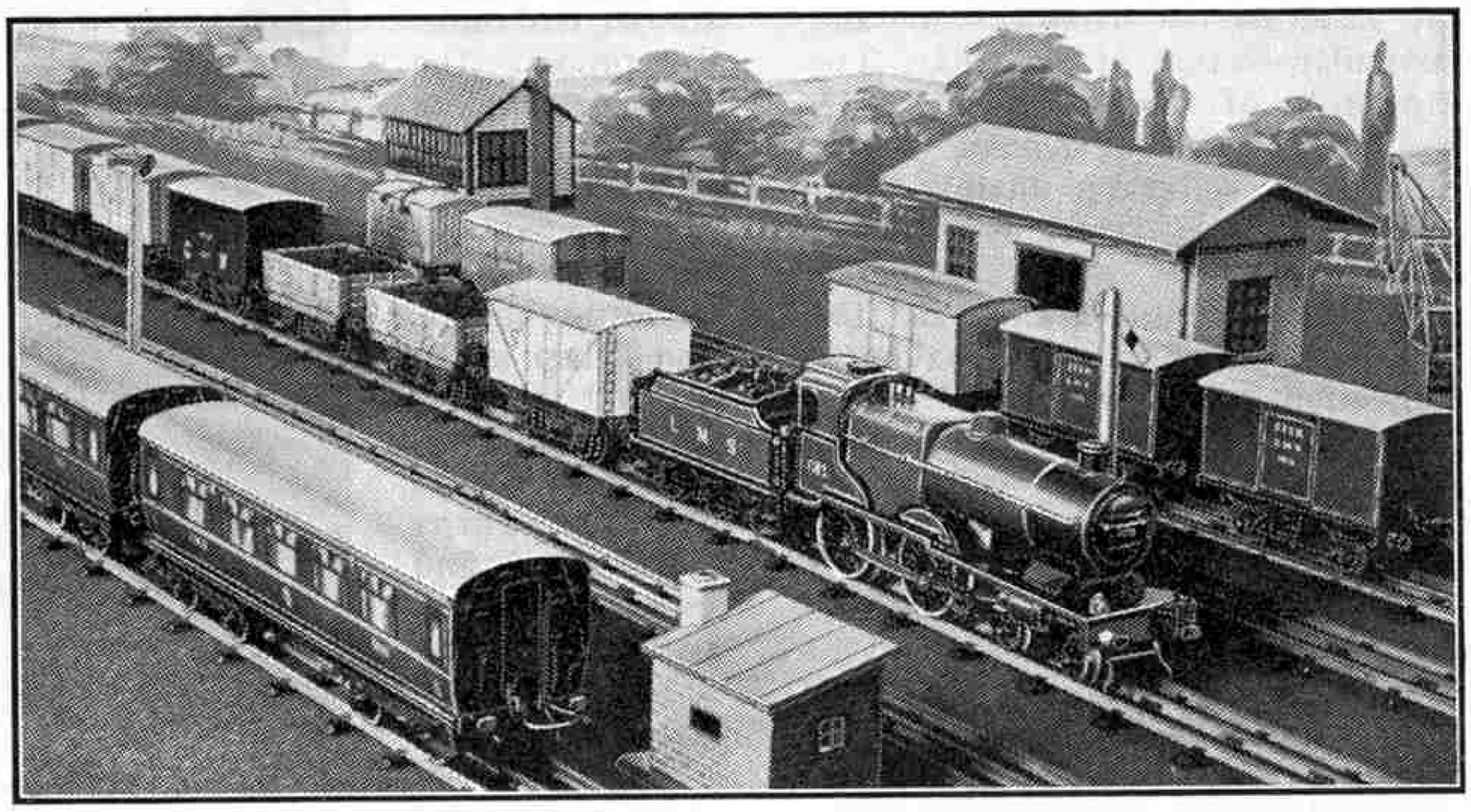
ALTHOUGH the goods train is such a familiar sight on our railways, it probably attracts less attention from those who "watch the trains go by" than its more handsome relative the passenger express. It does very important work from the railway point of view, however, and for the keen model railway owner the reproduction in miniature of goods train working is a specially fascinating branch of operations. The Hornby railway owner is most fortunate in having such a wide choice of goods vehicles available, for almost any kinds of goods train seen to-day can be made up with Hornby material. The illustrations on this and the next page give a good idea of the possibilities in this direction.

Probably the best-known type of goods train is the mixed goods, carrying a miscellaneous load from point to point, and picking up and setting down wagons at different stops on the run. Unfortunately we cannot often see exactly what freight a goods train is carrying, but a visit to a big goods depôt loading bank before the dispatch of a mixed goods train would reveal an amazing variety of items. To a certain extent this explains the great number of different kinds of wagons that are in use.

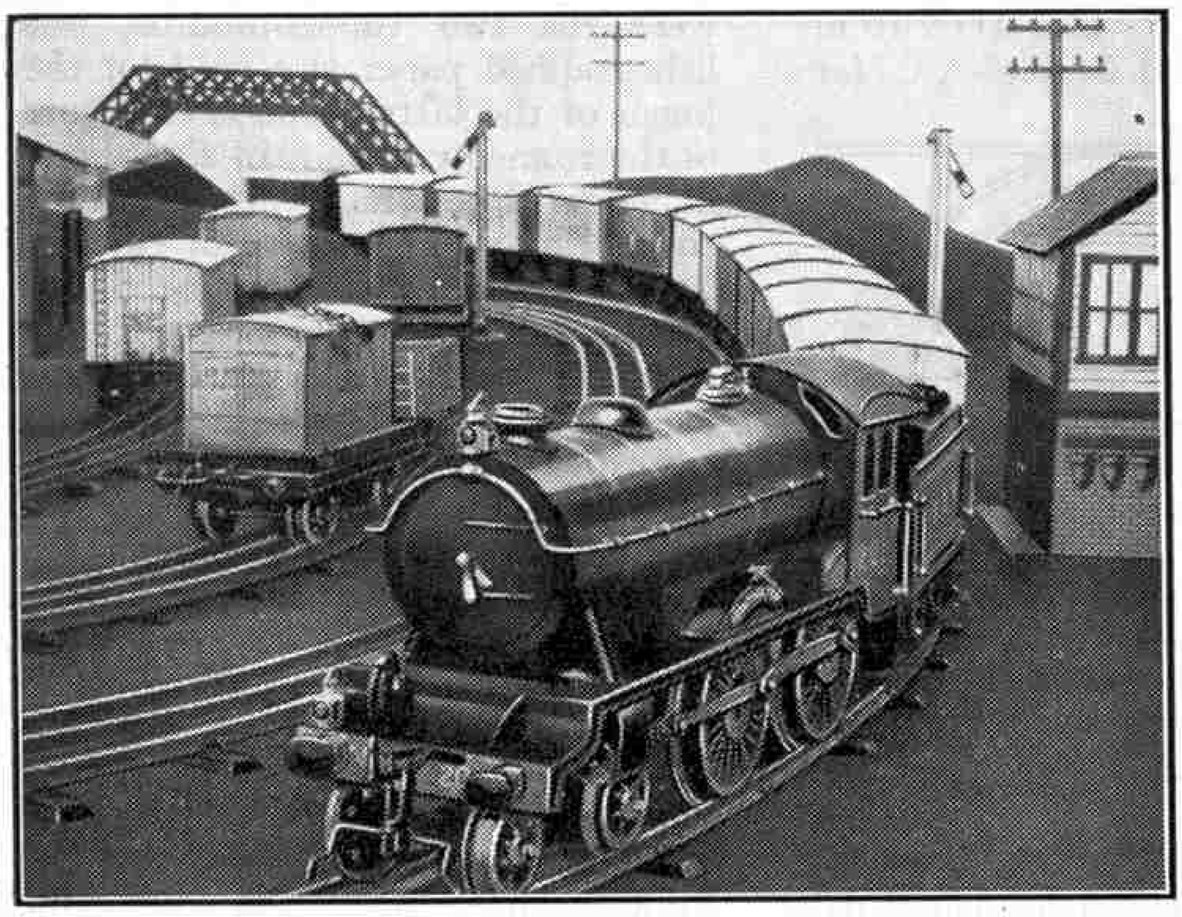
On a Hornby layout the make-up of a mixed goods train will depend a great deal on the type of traffic that is supposed to be handled on the line. Even where a miniature layout does not follow fairly closely the practice of a definite route of a real system, the model railway "Manager" invariably has fairly fixed ideas as to the traffic of the "district" that his line serves. A typical mixed goods train would include an Open Wagon or two for the rougher kinds of goods, one of them being perhaps an Open Wagon "B" with bar for supporting a miniature Tarpaulin protecting its load. Then for general goods, loose or in cases and so on, a Luggage Van will be acquired; and perhaps a No. 2 Vehicle will be needed for some particularly bulky consignments, its bogie design forming a pleasing contrast to the more usual four-wheeled types of wagons. A Flat Truck loaded with a Cable Drum or possibly a Container could come next, and then one of the numerous Vans for perishable traffic such as meat, bananas or fish. A Tank Wagon, either for oil or petrol traffic, and finally a Goods Brake Van could complete the train.

Coal and minerals form a large proportion of the tonnage conveyed by British railways, and even a coal train on a Hornby railway can be assembled with various suitable types of wagons. The ordinary open Wagon is an obvious suggestion, and it can very easily be provided with a load of Hornby Coal. There is also the special Coal Wagon that is already fitted up with a load when purchased. Appropriately enough this is lettered "Hornby Railway Company." Coal is often carried in hopper type wagons, especially when destined for power houses or manufacturing plants where the bottom discharge of the load may be necessary; therefore Hornby Hopper Wagons can be run in miniature coal trains as a regular practice. More imposing still is the No. 2 High Capacity Wagon, a type used in actual practice as a rule for the transport of coal for the railway companies' own uses, in particular for locomotive purposes. It will not take long to make up a splendid coal train in this way, using one or two of each kind of vehicle just mentioned.

Lumber traffic is important in certain districts, so that occasionally lumber or timber specials can be operated, using the No. 1 or No. 2 types of Hornby Lumber and Timber Wagons, according to the bulk of



A mixed goods train on a Hornby layout hauled by an L.M.S. "Standard Compound." Passenger engines are frequently seen on good trains nowadays.

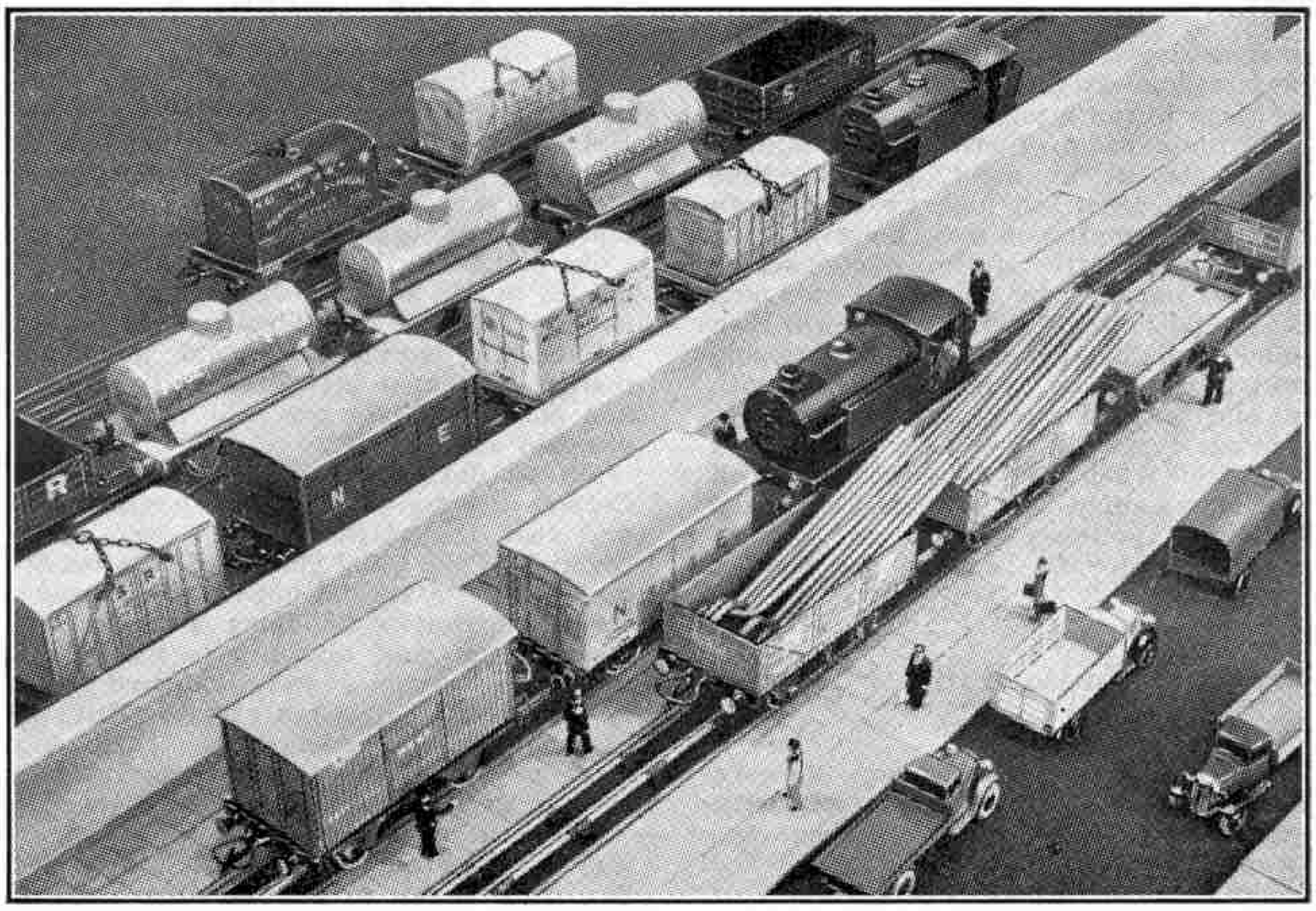


An express freight train composed of various Hornby Vans for perishable traffic. The engine is the L.N.E.R. "Hunt" class model "The Bramham Moor."

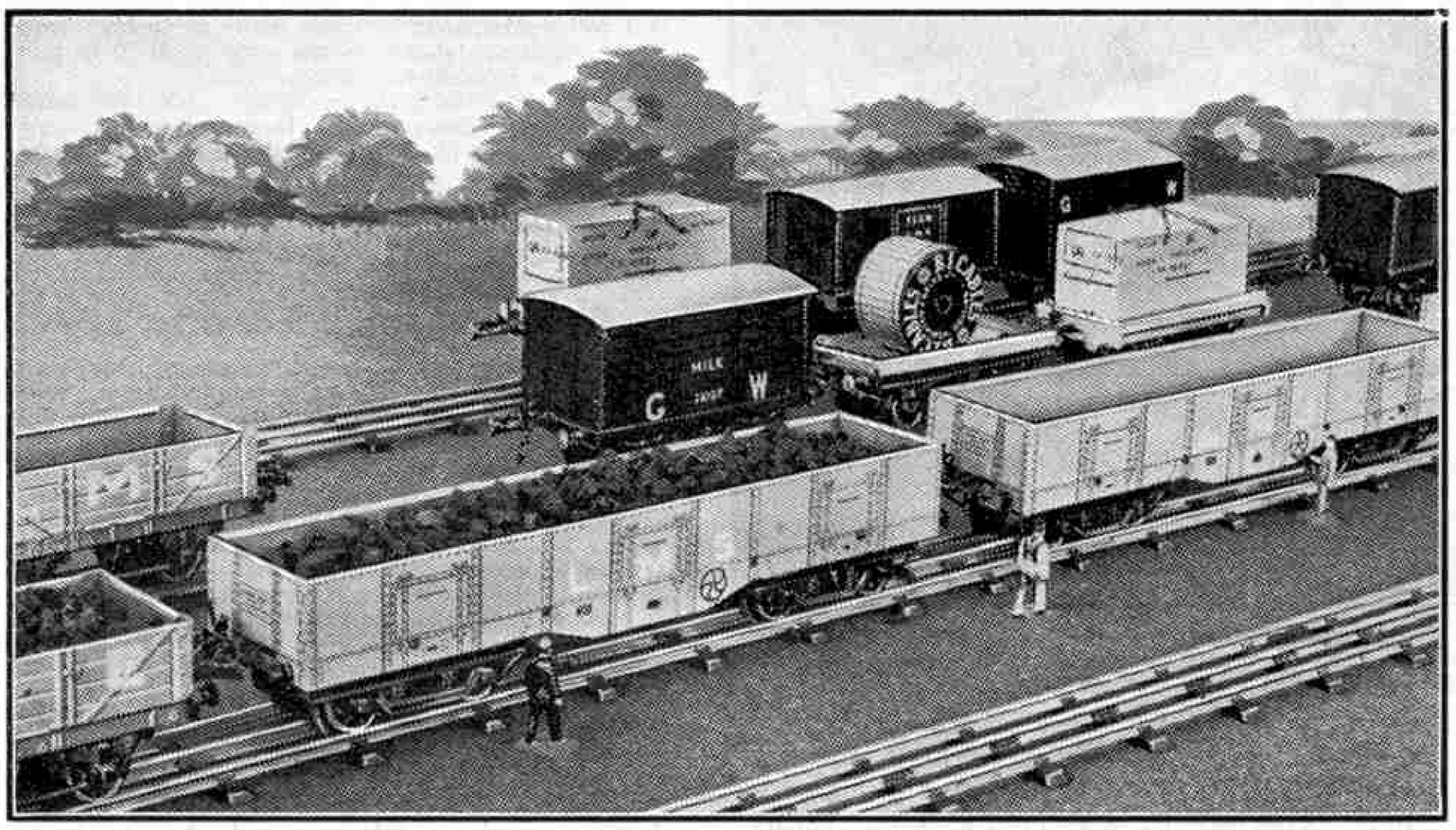
the loads to be conveyed. As a variation on the standard loads provided on these vehicles quite good miniature tree butts can be obtained by sawing up suitable lengths of sticks from hedges, bushes or small trees that can often be found in the garden or during the course of a country walk. Care should be taken to saw them up neatly, and it is important to select sticks that are not too "curly" for this purpose; otherwise they will be difficult to load properly on the Wagons.

Oil and petrol tank wagons are frequently seen in large numbers in freight trains in the neighbourhood of oil and petrol plants, and Hornby Tank Wagons of these kinds make an attractive addition to any freight train. Where several Wagons of this kind are in use they can sometimes be assembled into trains of Tank Wagons only, especially when they are supposed to be running empty.

Milk tank wagons are usually seen in trains run exclusively for the carriage of milk, although vehicles for milk traffic are often attached in ones and twos to local passenger trains for conveyance to a point where milk traffic is concentrated before despatch to cities and towns. Milk traffic is well catered for in the Hornby Series. There is the No. 0 G.W.R. Milk Van with solid tin-printed sides that represents the



A typical sea-port scene on a miniature railway. A Hornby tank locomotive shunting wagons at a goods station on a miniature Dock Road line.



A selection of Hornby goods Wagons in the sidings. The bogie High-Capacity Wagons are exceptionally useful for coal traffic. In actual practice such Wagons are used for the transport of locomotive coal.

open-boarded *"Siphons,"* as milk vans are called on the G.W.R. Then there is the No. 1 Milk Van with sliding doors, a neat van that is provided with miniature milk cans, just like the real thing. Although such vans are still largely used for local milk traffic purposes and for small consignments, modern practice favours the use of the tank wagon and this is splendidly represented by the Hornby Milk Tank Wagon.

Very bulky or exceptionally heavy or awkward loads are usually worked in a train by themselves. Often specially low-built trolley wagons are employed, their size and exact type depending on the character of the load. The Hornby Trolley Wagon, which is of the bogie type having a central "well," is representative of the general run of such vehicles. In addition to the well in which a high load can be placed it is provided with bolsters and stanchions at each end. The purpose of these is to support longitudinal beams from which a hollow load can be suspended if necessary. Miniature beams are not provided, but these can easily be cut from any smooth piece of wood.

In addition to its use on special-purpose trains the Trolley Wagon, loaded perhaps with more normal freight such as a pair of miniature Cable Drums or some item of machinery constructed of Meccano parts, will make an interesting addition to the ordinary main line goods train. Sometimes the nature of the load may require it to be covered, and then one or possibly two of the standard Wagon Tarpaulins can be pressed into use. Tanks, heavy guns and lorries of suitable size make "topical" freight for the Trolley Wagon in these days.

The express freight trains that are operated daily, or more particularly nightly, for the carriage of foodstuffs and perishable traffic generally are extremely interesting and naturally important. For these there is a very good group of special-purpose Vans in the Hornby Series for meat, fruit, fish, biscuit traffic and so on. In addition containers are widely used in actual practice nowadays for such work, and the G.W.R. and S.R. Hornby Containers are specially suitable for this purpose in miniature. The G.W.R. Container is an insulated one that can be used together with the Refrigerator Van for frozen meat. The S.R. Container is of the ventilated variety and can be used with the ordinary Meat Van for fresh meat traffic, or for any perishable freight that merely requires to be kept ventilated during its journey.

Guide to the Blitzkrieg—(*Cont. from page 479*)

are scared up to high altitudes of 20,000 ft. or more, unless there is fairly low cloud for them to run into.

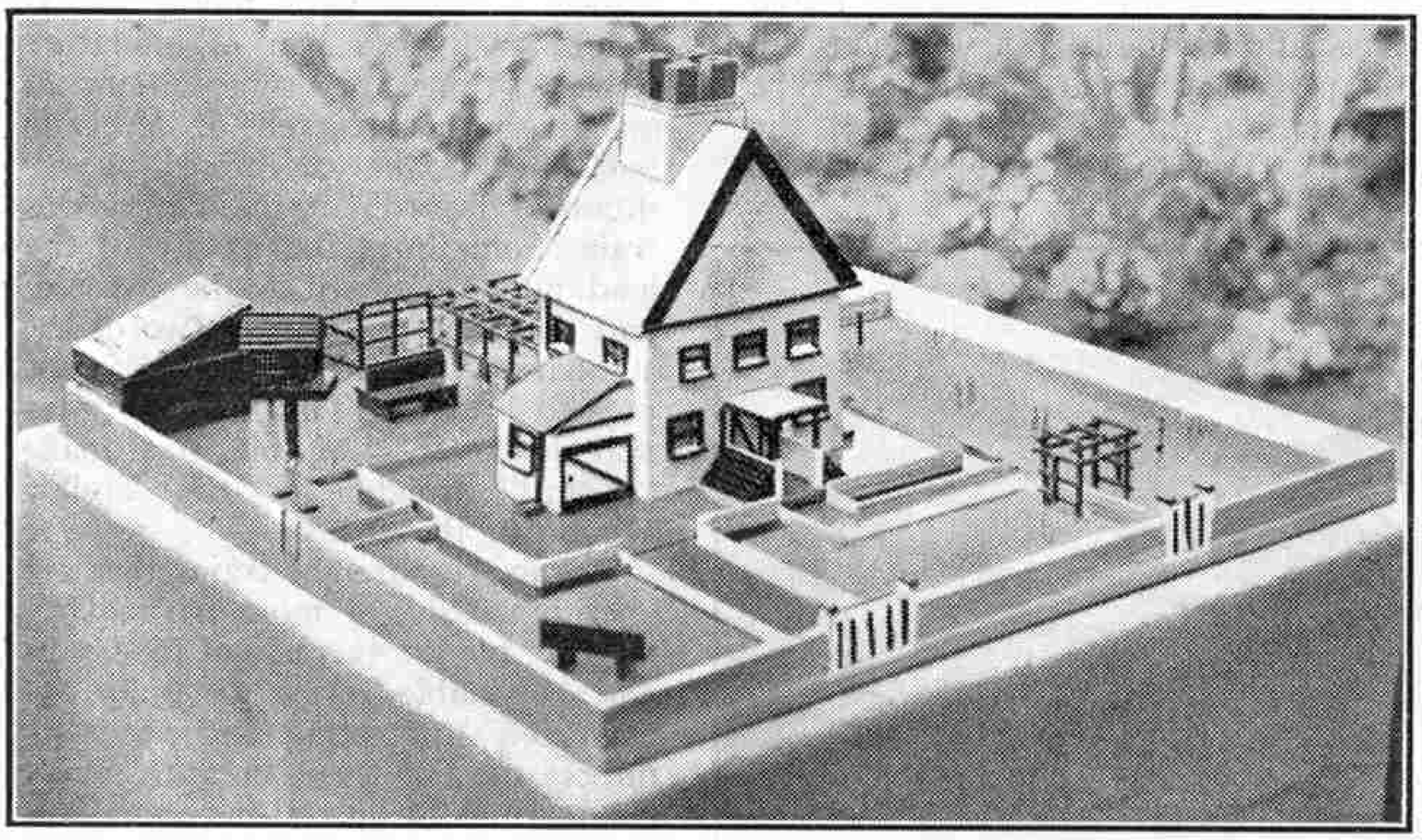
At the moment of writing there is little aerial combat at night, and day-time fighting is often too high up to be seen from the ground. You may, however, hear the staccato rattle of Browning machine guns accompanied by a slower, deeper note that is not aircraft engines. You will then know that one of our fighters is pumping lead into a raider, who is replying with his shell gun (this only applies to certain German types). If you hear that, listen carefully. When you note that the shell gun leaves off a few seconds before the Brownings, you may be fairly safe to guess that the Luftwaffe has lost yet another member.

Model House Built of Safety Matches

The illustration on this page shows a model house and garage, complete with gardens and lawns, that has been constructed entirely of safety matches. The model is full of realistic detail. Every door is complete with handles, and the windows have sills, with cellophane paper attached inside to represent glass. In the garden there are a toolshed and a pigeon cote, with seats on the lawns, and the entire model estate is surrounded by a wall.

The model is enamelled in various suitable colours. It is mounted on a base-board measuring 18 in. square, and contains 4,700 matches. There are four gateways, one of them, leading to the garage, being a double one. The gates are painted black and cream. Rustic archways in the garden add to the effect, and the final touch is given by the careful design and painting of such details as chimneys.

This splendid model is the work of Mr. C. Grove Jones, Stockport, who is a Meccano enthusiast and a competitor in "*M.M.*" model-building contests. Mr. Jones devoted the spare time of 3½ months to the design and completion of his model, which was displayed in Manchester and was instrumental in raising over £25 for Comforts Funds for the Forces.



A model house and garden built from safety matches by C. Grove Jones, Stockport, Cheshire, a reader of the "M.M." and a Meccano enthusiast. The total number of matches used in its construction was 4,700. The model was instrumental in raising more than £25 for Comforts Funds for the Forces.

A Visit to Finland

By K. A. Cossar

I had an interesting time before the war in Finland, where I made a tour of Helsinki and later visited Aulanko-Karlberg, the Finnish National Park. Helsinki is now almost totally modern, and with its beautiful granite buildings looks and really is a dignified city. It is girdled by old fortified islands, and fishing is an important industry. Fishing boats arrive from morning till noon, and the market-place is a hive of activity where fish and vegetables are sold from gaily coloured stalls.

We set out for the National Park from Central Station, and were surprised to find that the platforms there were not covered by the usual glass roof. The main roof of the station did not extend beyond the administrative buildings. The engines seemed large and ungainly to us. They were wood-burners, and compared unfavourably in appearance with British locomotives. The coaches, too, failed to reach the standard of British stock. The seats in them were hard and uncushioned.

The scenery throughout the rail journey was not inspiring. and the sight of blue flax fields began to get monotonous. At last we drew into Tammerfors, where we found a number of disreputable looking buses waiting patiently for us. These tore over what seemed miles of bumpy country lanes, and after a good shaking up we all reached Aulanko-Karlberg, where we were to have lunch at the Hotel, which is set amongst wonderful lake scenery, and has gardens filled with the glorious scents of a hundred flowers, for the Finnish summer is luxuriant if short. If any of our party had expected to see cold-looking Finns closely muffled up in furs they were disappointed. During lunch at the hotel we were attended by waitresses who were dressed for the occasion in their national costume, wide skirts resembling kilts and blouses embroidered with gay colours.

After lunch we returned in the buses to Tammerfors, and reached Central Station in time for a garden party given by the Mayor of Helsinski. After a very enjoyable day we rejoined our ship, and that night left in our wake the island-studded bay of Helsinki and its hospitable people.

Tough!

Placing a glass vessel on a block of ice and then filling it with molten iron sounds like the right way to break it. Yet this has been done safely with a glass produced at a famous American works, and it was even possible to make the glass itself red hot and to plunge it immediately into ice cold water without shattering it.

The process by which vessels of this glass were produced is equally remarkable. They were first moulded in a special type of glass and then treated in various ways, the final process consisting of washing them with dilute nitric acid. This had the effect of removing portions of the glass, and leaving what may be described as a skeleton of the more resistant material, and when this was then again heated it shrunk to a little less than two-thirds of its original size, the remaining glass being almost pure silica.

Bricks for Model Buildings

Lott's Bricks are old favourites, and are well known for their durability and the attractiveness of the structures built with them. The new series of Boxes now available contain bricks embossed as sun-trap windows, french doors, etc., all finished in two colours. With them a very large variety of buildings can be erected, among them the modern type of house. There is scope also for the design of entirely new models of various kinds, such as station buildings and other lineside structures for model railways, and the bricks make admirable material for the construction of road blocks, tank traps and block houses.

Lott's Bricks Ltd. also supply chemistry and electricity outfits, and that ingenious toy the "Stone Puzzle." Full details of all these products are contained in illustrated price lists, obtainable from Lott's Bricks Ltd., Watford, Herts. Readers should mention the "*M.M.*" when making application for them.

Waterline Ship Model Kits

Admirable kits that provide the ship model enthusiast with all he needs for building waterline miniatures of a wide range of famous vessels are supplied by our advertisers Hamley Brothers Limited. Special care has been taken in designing the sets to avoid leaving too much difficult work to the model-builder. They contain ready cut hulls and decks, and the clear numbering of the parts and the scale drawings and full instructions enclosed make assembly simple. The finished models are to the scale of 50 ft. to 1 in., and are remarkable for their accuracy.

The kits include parts for building old time sailing ships, famous liners, and a large range of famous British warships of all types. All are issued at reasonable prices, and readers who are interested should write for details to Hamley Bros. Ltd., 200-202, Regent Street, London W.1. The "*M.M.*" should be mentioned when writing.

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Ambitious readers who wish to make a success of their careers must have a sound training behind them. They can obtain this in a very practical manner from the International Correspondence Schools, which offers about 400 standard courses of commercial, technical and professional subjects, together with a very large number of special courses to meet individual needs. The experience of many years has made the courses as nearly perfect as they can be, and in a sense each student is in a class by himself, proceeding at his own pace with the help of his instructor.

All who are keen to get on should write to International Correspondence Schools Ltd., Kingsway, London W.C.2 for a free booklet describing the courses of instruction offered. When doing so they should state the subject in which they are interested, and should mention the "*M.M.*"

Locomotive, Ship and Aeroplane Photographs

Readers who are interested in photographs of locomotives and trains, ships and aeroplanes should make sure of obtaining copies of the lists of our advertisers Real Photographs Company, Cooper's Buildings, Church Street, Liverpool 1. In all three sections their lists are extensive and supplements bringing them up to date are issued regularly.

The railway section includes photographs of a wide range of British and overseas locomotives and trains. Ships are equally well represented, from sailing vessels to modern liners and vessels of the Royal Navy. The aeroplane list contains over 1,000 titles of famous civil and military aircraft, and the photographs are useful to spotters of enemy aeroplanes.

Photography

An Enlarger Built from Meccano Parts

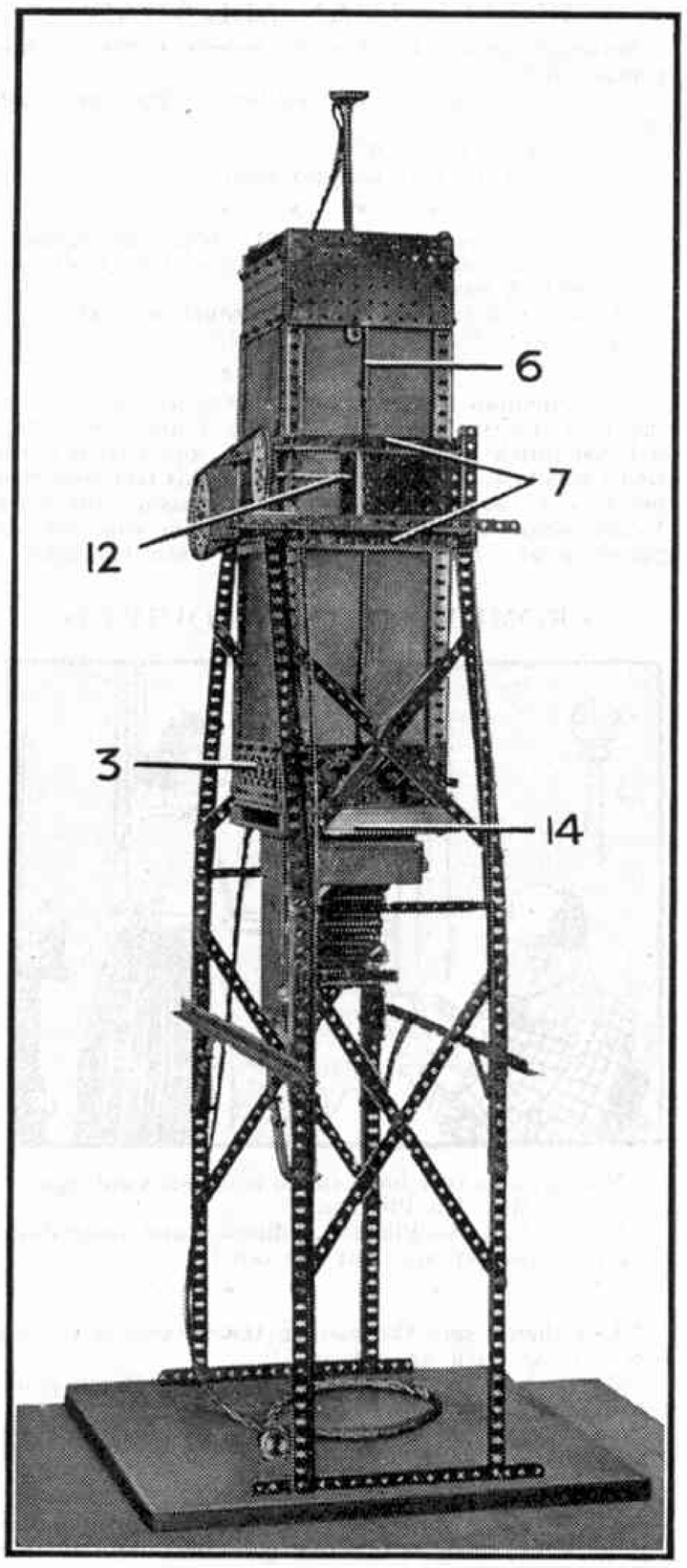


Fig. 1. A photographic enlarger built from Meccano parts.

ONE of the most fascinating branches of photography is that of making enlargements from small negatives. Unfortunately many of my younger readers are unable to experience the delights of this pastime as they cannot afford to buy a professionally made enlarger. There is no need for them to be disheartened, however, for it is easy to build quite cheaply a home-made instrument that will do really good work. Such an instrument is shown in Figs. 1 and 3 on this page. It was designed by R. J. Mowbray, Weymouth, for use in combination with a small folding camera, and it will be seen that it is built almost entirely from Meccano parts.

The principle of an enlarger is similar to that of the "magic" lantern, but instead of the picture being thrown on to a screen it is projected on to a sheet of bromide paper for a few seconds. The light is then switched off and the paper is removed from the enlarger and developed and fixed in the same way as a contact print.

The enlarger to be described consists of a wooden lamphouse built on a Meccano framework, inside which is housed a 60-watt bulb. The lower end of the lamphouse is fitted with a codnenser lens and a slot in which the negative to be enlarged is placed. Means is provided for fixing to the lower end of the lamphouse a small folding hand camera with the back removed.

In order to vary the degree of enlargement as required, the lamphouse, negative and camera are arranged to slide up and down in the supports, so as to increase or decrease the distance between the camera lens and the bromide paper, which is placed on the baseboard. The greater the distance between the lens and the paper the larger will be the resulting picture.

Any type of folding film or plate camera from which the back can be easily removed may be used with this enlarger, but the most suitable type is one having a rack and pinion focussing adjustment.

Construction of the enlarger is commenced with the lamphouse. This is built on a rectangular frame of Angle Girders, and is 18½" long, 6½" wide and 5½" deep. Four 5½" × 2½" Flat Plates 2 and 4 are bolted in the positions shown in Fig. 3. The Plates 4 and two 5½" Angle Girders are joined to 18½" Angle Girders by Strips, which are cut to a length of 6½". The frame is braced by Braced Girders 3, two 5½" Angle Girders and two built up Angle Girders 6½" in length, the flanges of the Angle Girders facing outwards.

The lamphouse 1 moves up and down between supports constructed as follows. A 9½" and a 12½" Angle Girder are joined to a 5½" × 2½" Flanged Plate 9 to form a support for the front of the lamphouse, and a similar support is constructed for the back. These supports are joined by four 5½" Angle Girders 7 and Angle Brackets. On the left-hand side, as viewed from the front of the lamphouse, the pair of 5½" Angle Girders are fixed so that there is a gap of 2½" between their flanges, and the other pair of 5½" Angle Girders are placed so that the gap is 3½" in width.

Four 3½" × 2½" Flanged Plates are attached to two 5½" × 2½" Flat Plates 8 and the latter pair of 5½" Angle Girders to form a casing for the gearing, by means of which the enlarger is travelled up and down in its supports.

The completed frame of the lamphouse is filled in with thin plywood, and the pieces should be cut accurately so as to be a tight fit between the corner Girders. The sizes of the pieces of wood required are as follows. A piece measuring 14½" × 6½" is needed for the back of the lamphouse and two pieces 14½" × 5½" for the sides. For the front a piece measuring 11" × 6½" is required and it is glued to triangular pieces at each corner of the lamphouse front so that it is spaced about ⅛" away from the Girders. Another piece of wood to form a door is attached to the 11" × 6½" piece by Meccano Hinges, and is held closed by a simple catch. If desired an opening can be cut in the door and covered with a piece of ruby glass to form a safelight 13.

The lamphouse has a lining of tin to prevent light from escaping and to shield the wood from the heat given out by the lamp. Holes should be punched in the lining and outer casing of the lamphouse to form ventilators. These holes should not be in line with one another, otherwise light will escape. The lampholder should be mounted in such a way that it can be moved either towards or away from the condenser in order to take up a position that gives even lighting of the negative. The actual arrangement will depend on the type of lampholder used, but it should not be difficult to mount this on the end of a long Rod passed through a Face Plate bolted to the top of the lamphouse. The Rod can be gripped in the desired position by means of the set screw in the Face Plate.

The negative carrier 14 consists of two 7½" × 5½" pieces of wood spaced from each other by two strips measuring 5½" × ¾" × ½". In each of the 7½" × 5½" pieces a circular opening is cut, and this should be rather larger in diameter than the diagonal of the negative to be enlarged. For example if 3½" × 2½" negatives are to be dealt with the circular opening should be at least 4½" diameter. Between the pieces of plywood slides a negative holder, which can be made quite easily from plywood to suit the negatives to be used.

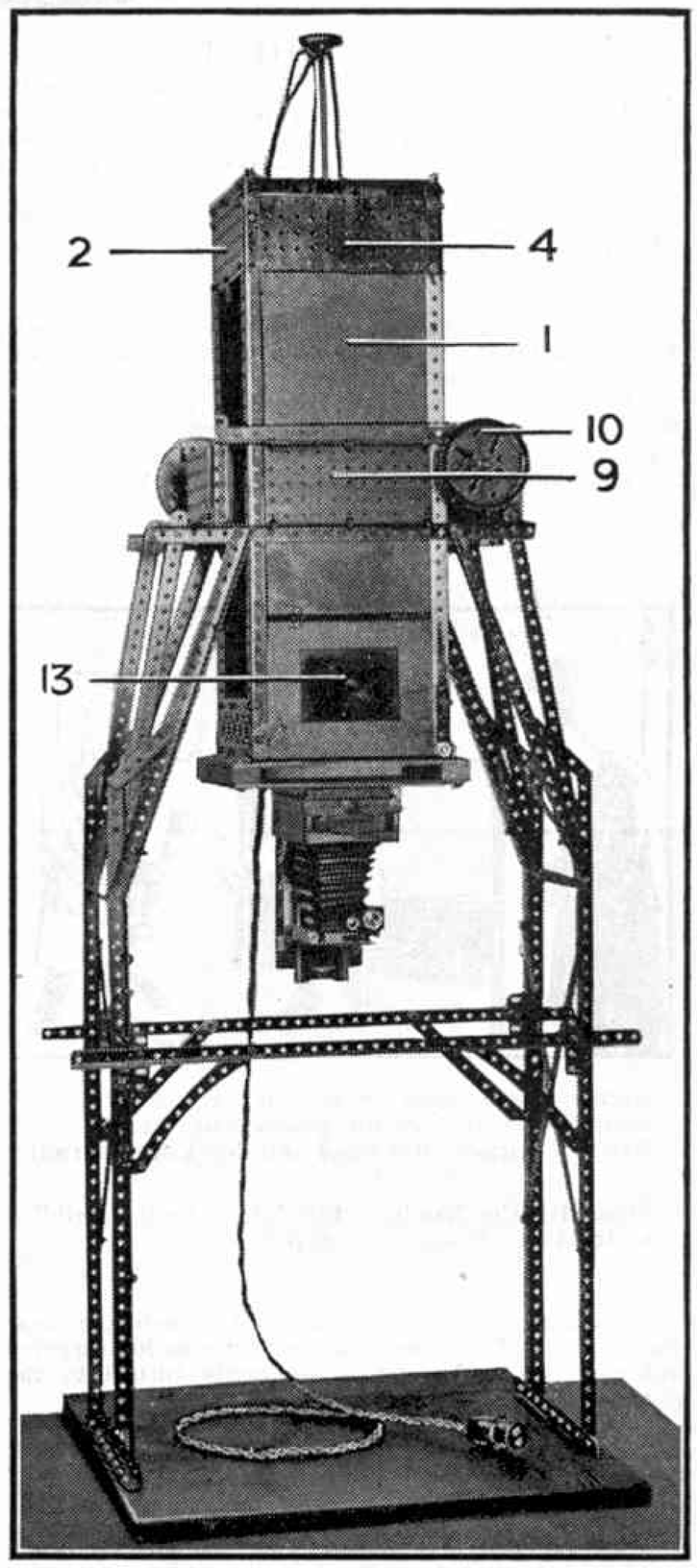


Fig. 3. The enlarger seen from the front.

The exact method of attaching the camera to the lower surface of the negative carrier will depend on the type of camera available, and it is quite easy to form suitable clips from a few Meccano Strips. If a space camera is available it may be fixed permanently in place. Suitable condenser lenses for use with this enlarger can be obtained for a few shillings from any dealer in photographic accessories. Two unmounted plano-convex glasses will be required, and their diameter will depend on the size of the negatives to be enlarged. For 3½" × 2½" negatives lenses 4½" in diameter will be suitable. The glasses should be spaced by strips of wood about ¼" apart with their convex surfaces facing, and should be placed in the lamphouse immediately over the opening in the negative carrier 14.

The lamphouse is raised and lowered by gears that engage Rack Strips fixed at each side of the lamphouse. These are operated by turning a handle consisting of a 3" Pulley 10. This is fixed on a Rod that carries a ¾" Pinion, which engages a 50-teeth Gear on a Rod that carries also two ½" Pinions. One of these Pinions meshes with a similar Pinion on the Rod 11, which in turn meshes with a 57-teeth Gear on a Rod that carries also a 1" Gear. This 1" Gear engages the teeth of a Rack Strip 5. The second ½" Pinion meshes with a 57-teeth Gear on a Rod that carries also a 3" Sprocket Wheel. The Sprocket drives a similar Sprocket on the Rod 12, which also carries a 1" Gear engaging the compound rack strip 6.

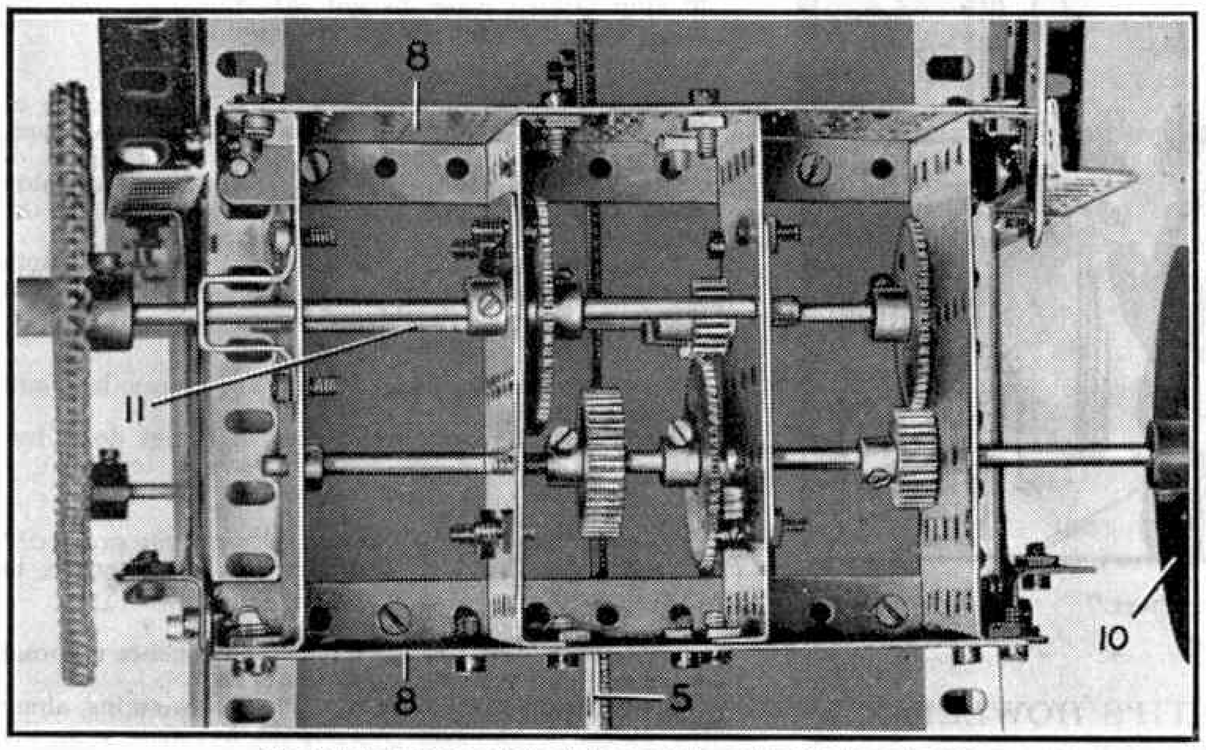


Fig. 2. The gearing for raising and lowering the lamphouse.

FIRESIDE FUN

A JUMP AHEAD

A candidate for the police force was being verbally examined. "If you were by yourself in a police car and were pursued by a desperate gang of criminals in another car doing forty miles an hour along a lonely road, what would you do?"

The candidate looked puzzled for a moment. Then he replied: "Fifty."

* * * *

Some goods which had been sent by rail three weeks before arrived at a shop in a seaside town. The manager made some sarcastic comments about transport in wartime to the van driver, who had evidently heard it all before and merely said appeasingly, "Never mind, guv, there's a good time coming."

"Is there?" snapped the manager. "Let's hope it's not coming by rail."

* * * *

INITIATION

Barber: "Here comes a man for a shave."
New Assistant: "Let me practice on him."
Barber: "Alright, but mind you don't cut yourself."

* * * *

Student: "I'm handling this 'plane pretty well."
Instructor: "Yeah, just keep it up."

* * * *

A young flying officer stationed somewhere near Egypt, while flying near the Great Pyramids carrying out exercises in navigation, suddenly turned to the pilot and said, "Take off your hat."

"Why?" said the pilot.

"Because, according to my calculations, we are now inside St. Paul's Cathedral."

* * * *

"You say this man robbed you; can you recognise anything of yours here?"

"Yes, this handkerchief."

"But that is no proof—I have one exactly like it."

"Yes, your Worship—I was robbed of two."

* * * *

"Who is that fellow with long hair?"
"He's a fellow from Yale."
"Oh, I've often heard of those Yale locks."

* * * *

"That house I have taken from you," said the dissatisfied tenant, "is horribly draughty. When I am sitting in the middle of the room my hair blows all over my head. Can't you do something about the windows?"

"Don't you think, sir," replied the agent suavely, "it would be easier and cheaper for you to get your hair cut?"

* * * *

Three men named Jones, all in the same line of business, opened shops next door to one another. The one on the right had the name "Jones" painted in large letters over the door. The one on the left immediately did the same thing.

The signpainter then approached the centre Mr. Jones, asking him if he would like his name painted also.

"No" said the wily one. "I want you to paint the word 'Entrance' over my door."

TACT

"A Guide to the Beauty of Dartmoor" and a book entitled "Locks, Bolts and Bars" were part of a gift sent recently to a prison library.

* * * *

"What are you like at full-back?" the captain of a Rugby team asked a new member of the club.

"Oh, passable," was the modest reply.

"Well, that's not much use," said the captain. "We already have a full-back that's passable. What we are looking for is one that's not."

* * * *

Cannibal Chief: "What were you before you were captured?"

Prisoner: "Merely a sub-editor."

Cannibal Chief: "Cheer up, then. After dinner you'll be Editor-in-Chief."

* * * *

Farmer: "I want a ticket to London."
Clerk: "Change at Crewe."
Farmer: "No fear, young man, I'll have my change here!"

* * * *

Mistress (to new maid): "Be careful when you dust these pictures, Mary; they are all Old Masters."

Maid: "Good gracious. Who'd ever think you'd been married all these times, mum."

* * * *

"Hello! I haven't seen you recently."
"No, been in bed a month."
"Bad luck. 'Flu, I suppose."
"Yes—and crashed."

* * * *

Davies and Jones were having an argument about whose cabbages were the larger, and to prove his case Davies volunteered to go and fetch one from the garden.

"Surely, my good fellow," said Jones when his friend returned "you wouldn't have the cheek to call that a decent cabbage?"

"Well," was the reply, "I took it out of your garden!"

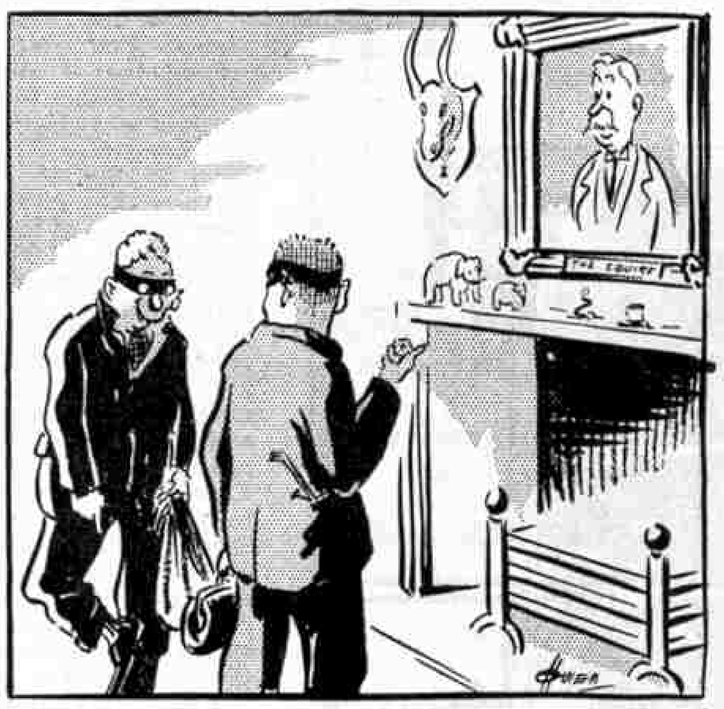
* * * *

Hospital Guide: "All the patients in this ward were struck by automobiles."

Visitor: "Looks like a bumper crop."

* * * *

FORESTALLED



"I'd like to be in 'is shoes."
"I am!"

* * * *

THIS MONTH'S HOWLER

"Bacchus was the God of Betting."

BETTER THAN ALL TOAD!

Sergeant (going round with Orderly Officer): "Any complaints?"

"Yes, sir," said an old soldier. "This 'ere toad-in-the-'ole . . . ."

"Well, what about it?"

"Why, it's all hole and no toad."

* * * *

"How are you getting on with your new house?"

"Oh, not so badly. We furnished one of the bedrooms by collecting soap coupons."

"Didn't you furnish the other seven rooms?"

"We can't. They're full of soap."

* * * *

A Frenchman was relating his experiences of studying the English Language. "When I discovered that if I was quick I was fast," he said, "and that if I was tied I was fast, if I spent too freely I was fast, and that not to eat was to fast, I was discouraged. But when I came across the sentence: 'The first one won one one guinea prize,' I gave up trying to learn English!"

* * * *

PROMPT ACTION REQUIRED

"MacTavish's cow has broken into our yard again." exclaimed Mrs. MacPherson.

"Weel," said MacPherson, "dinna stand there doin' nothin'; milk her and put her oot."

* * * *

"And then," said the man in the witness box, "my wife hit me with an oak leaf."

"Well, that couldn't do much damage," remarked the magistrate.

"Oh, yes, it did, sir; it was from the centre of our dining-room table."

* * * *

The young Irish recruit was struggling along in the blackout, when he saw the figure of a man looming nearer. Pat stopped him.

"Can you tell me," he asked, "which is the other side of the road?"

"That's it, over there," replied the stranger, pointing in the right direction.

"I thought it was," remarked Pat. "Some silly ass over there has just told me this was it."

* * * *

Interviewer: "What have you to say about anonymous letters?"

Professor: "They're stupid! I read them, but I never answer them."

* * * *

"I am sorry" said the dentist, "but you cannot have an appointment with me this afternoon. I have 18 cavities to fill," and he picked up his golfbag and went out.

* * * *

"Did you hear about Smith?"
"No."
"He had to go to court the other day. He refused to stop talking when he got into the dock, but the magistrate managed to get in a sentence."

* * * *

The storm was increasing in violence, and some of the deck fittings had already been swept overboard, when the captain decided to send up a signal of distress. But hardly had the rocket burst over the ship when a solemn-faced passenger stepped up to the bridge.

"Captain," he said, "I'd be the last man on earth to cast a damper on anyone, but it seems to me that this is no time for letting off fireworks."

* * * *

Proud Suburban Lady: "You know, my husband plays the organ."

Depressed acquaintance: "Well, if things don't improve, my husband will have to get one, too!"

* * * *

Dealer: "Shall I send the clotheshorse you ordered?"

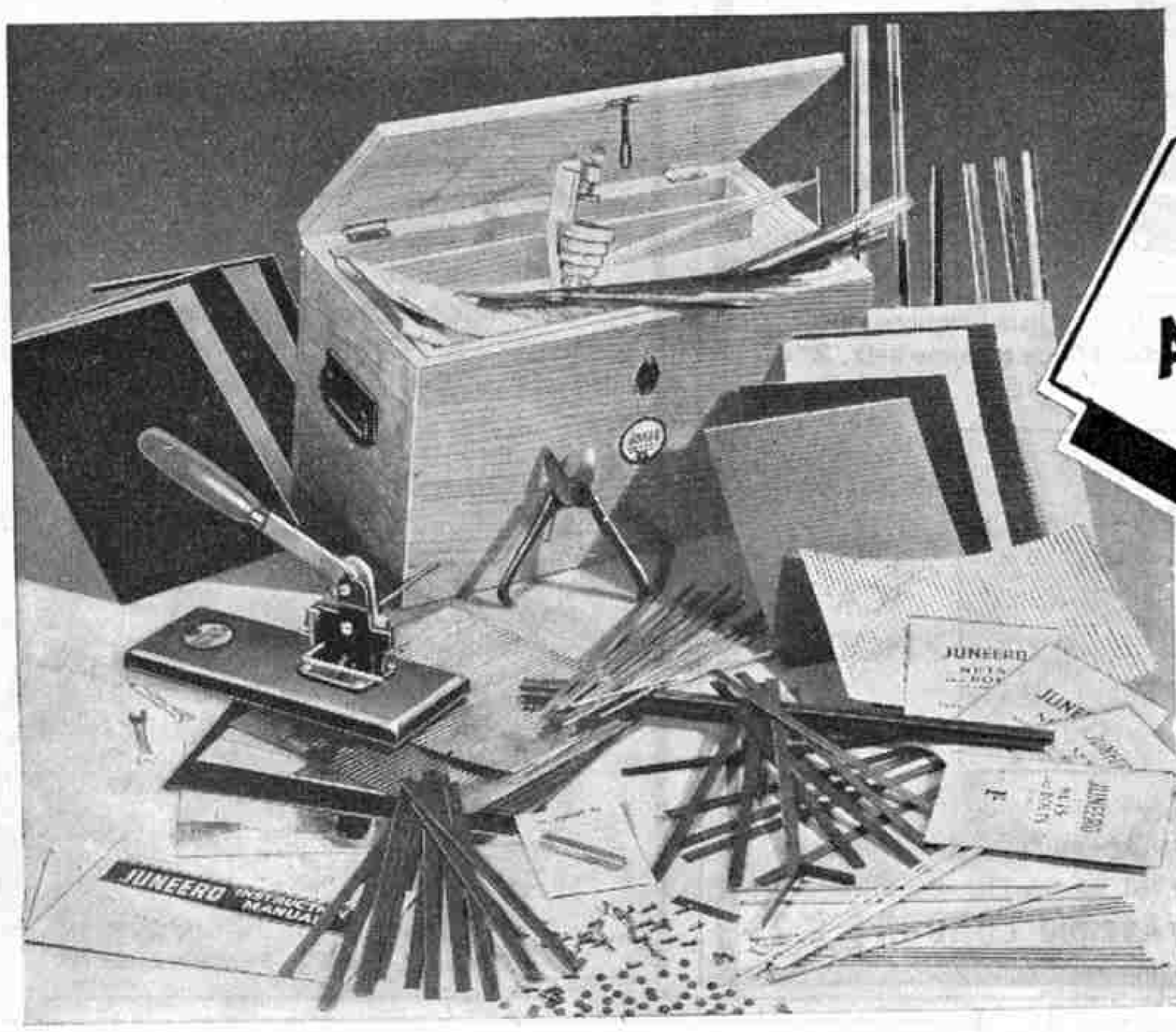
Customer: "Send it! Did you think I intended to ride it home?"

* * * *

Customer: "But I can get that for twopence a pound cheaper at your rival's, over the road."

Shopkeeper: "But look at the motors racing along the street. I am sure you would not risk your life for twopence."

and now JUNEERO PRESENTS A VERITABLE TREASURE CHEST!



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Price **60/-**

JUNEERO DESIGNERS' CONTEST

Response to the Designers' Contest announced last month has proved so encouraging that we are extending the Model Aircraft Competition for another month. If you have not yet had details and conditions of the Competition, write in now. You are invited to submit new models of different British and Nazi Bombers, Fighters, Reconnaissance Aircraft, Hangars, etc. All designs of sufficient interest will be published on a Juneero Design Sheet under the name of the designer, who will also receive a cash bonus of 10/6. Ask your Dealer for Juneero design sheets 83 and 84 (1d. each) which show you how to make a model Autogiro.

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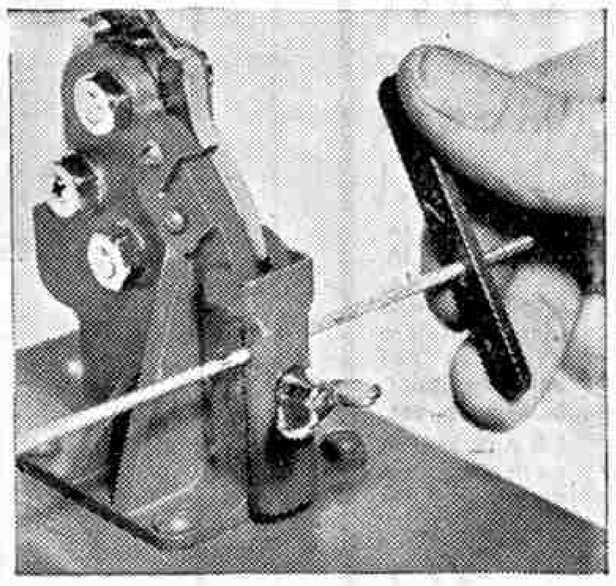

The vice of a Juneero Multi-Purpose Tool holding a rod while it is being threaded by the Juneero Screw Cutting Die. The Juneero Tool also

SHEARS metal strips and rods to accurate lengths.

PUNCHES holes for bolts in steel strip.

BENDS strip or rod to accurate right-angle or any other angle required.

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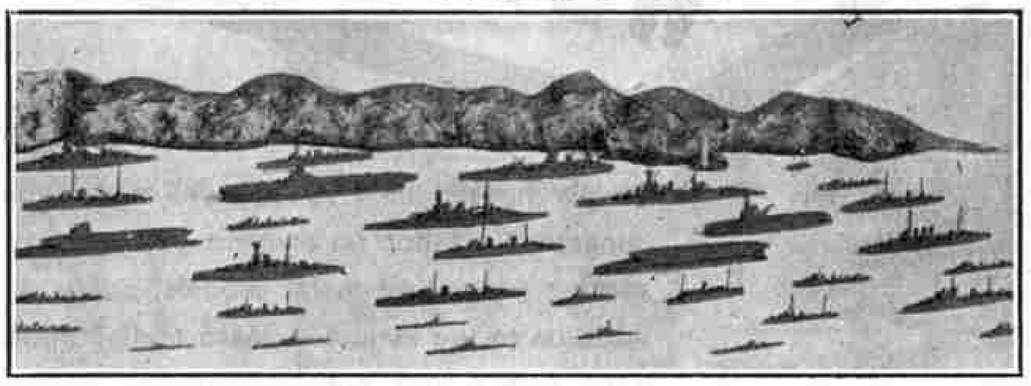

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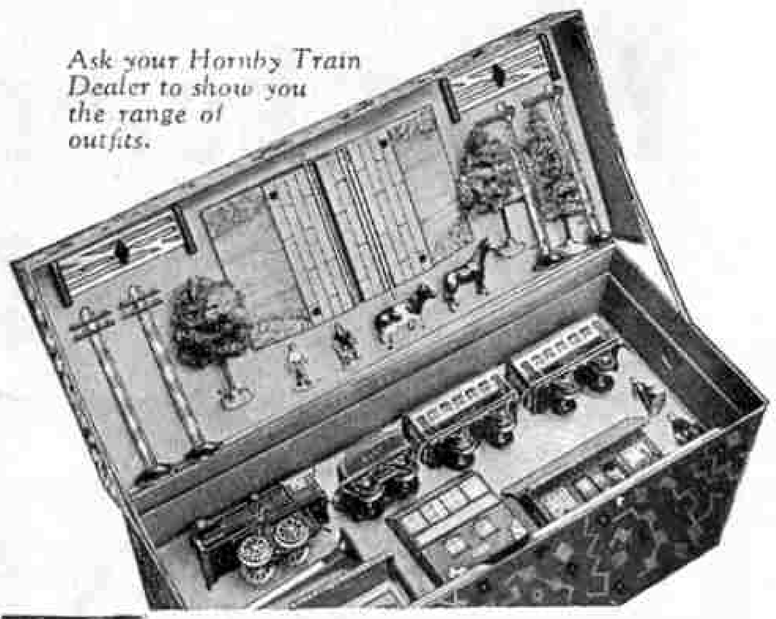

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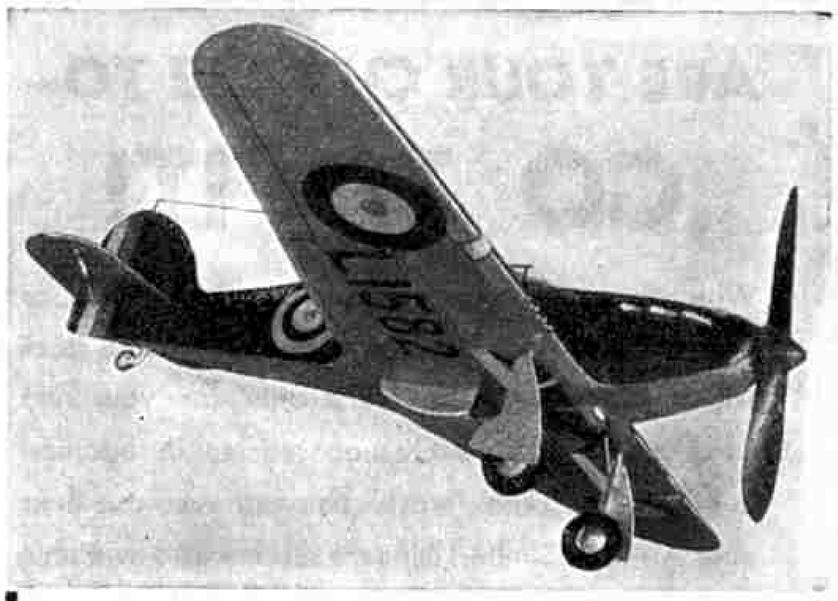

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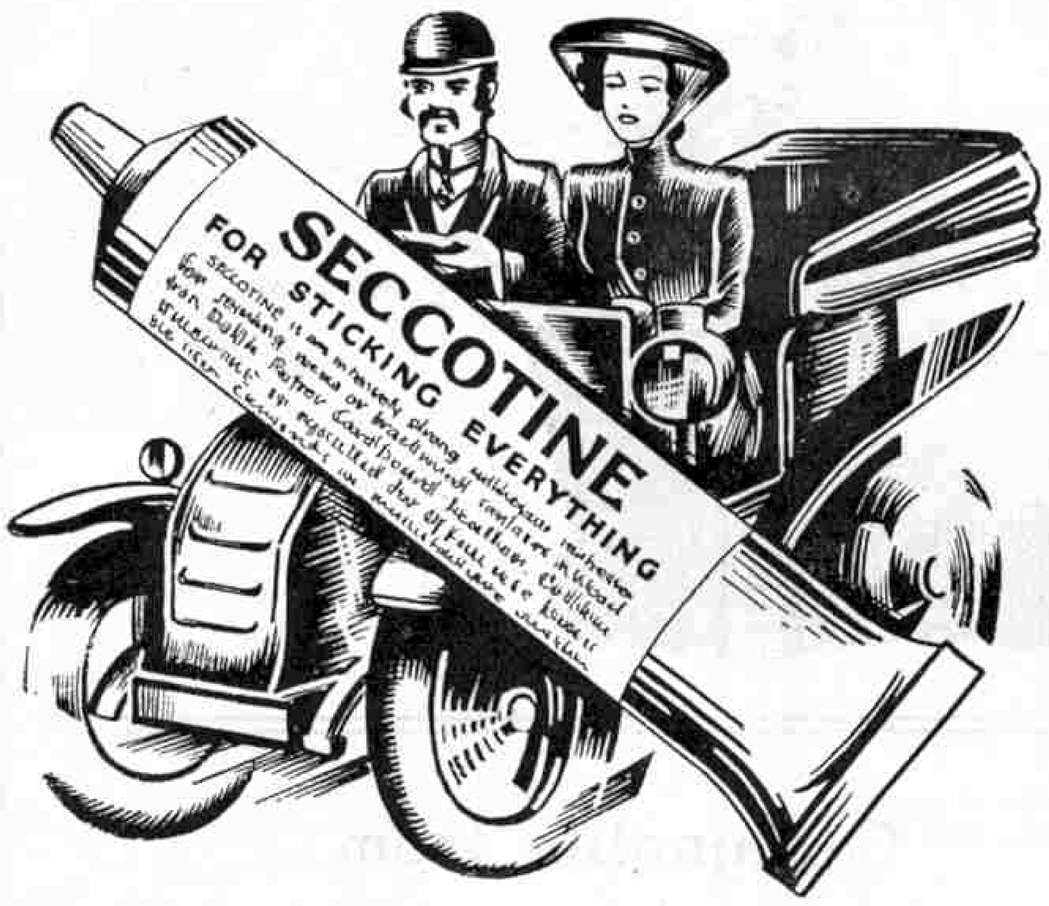

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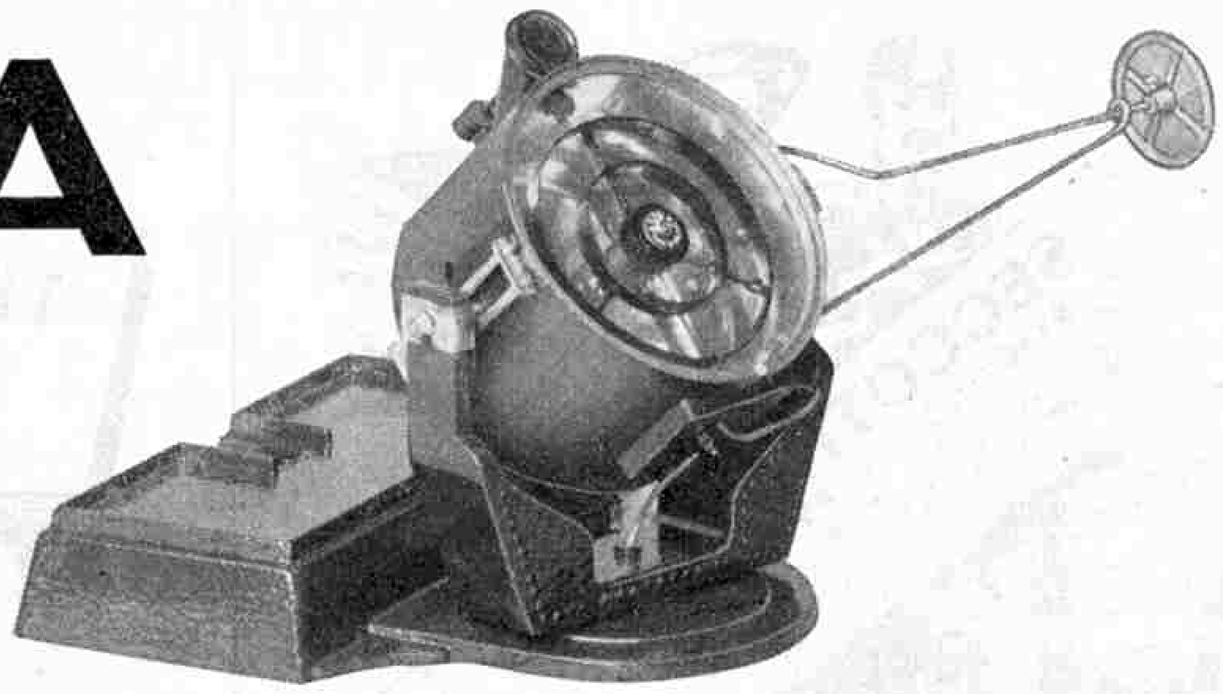

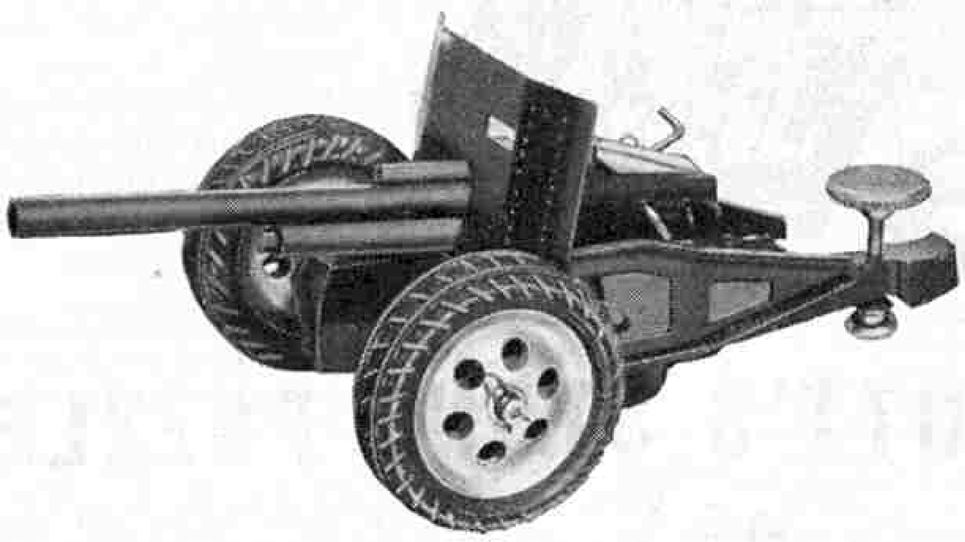

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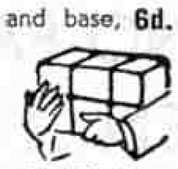

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MECCANO MAGAZINE

Registered at G.P.O., London, for transmission by Canadian Magazine Post.

EDITORIAL AND ADVERTISING OFFICE:—
LIVERPOOL 13, ENGLAND
Telegrams: "Meccano, Liverpool."

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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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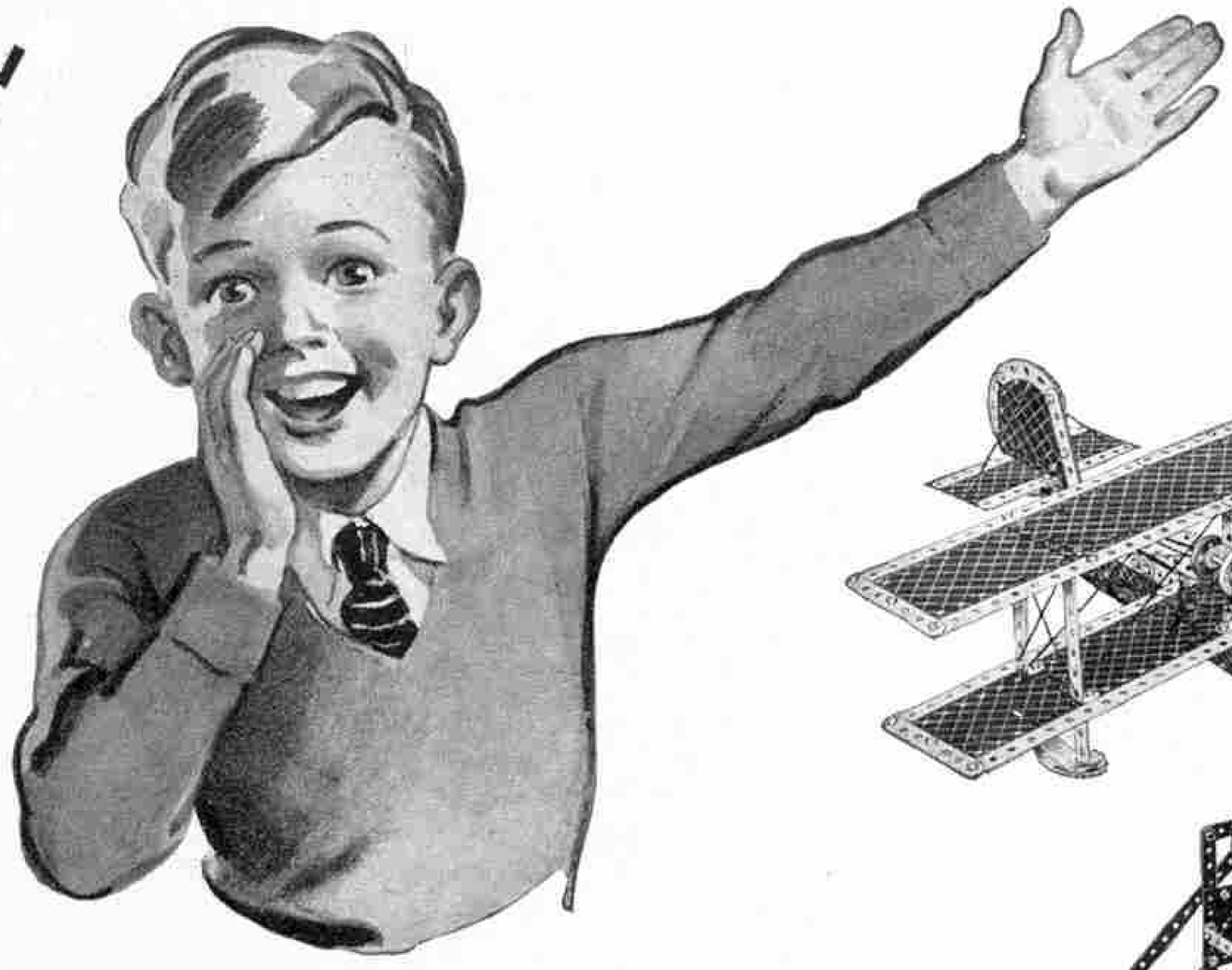

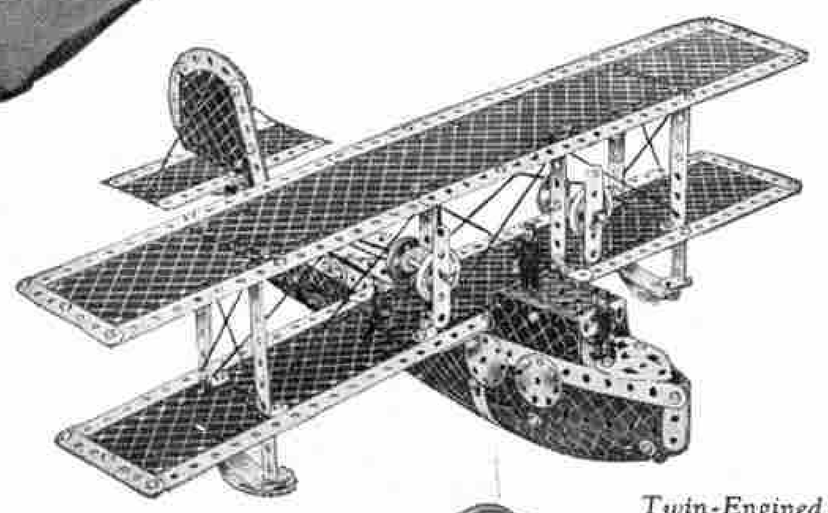

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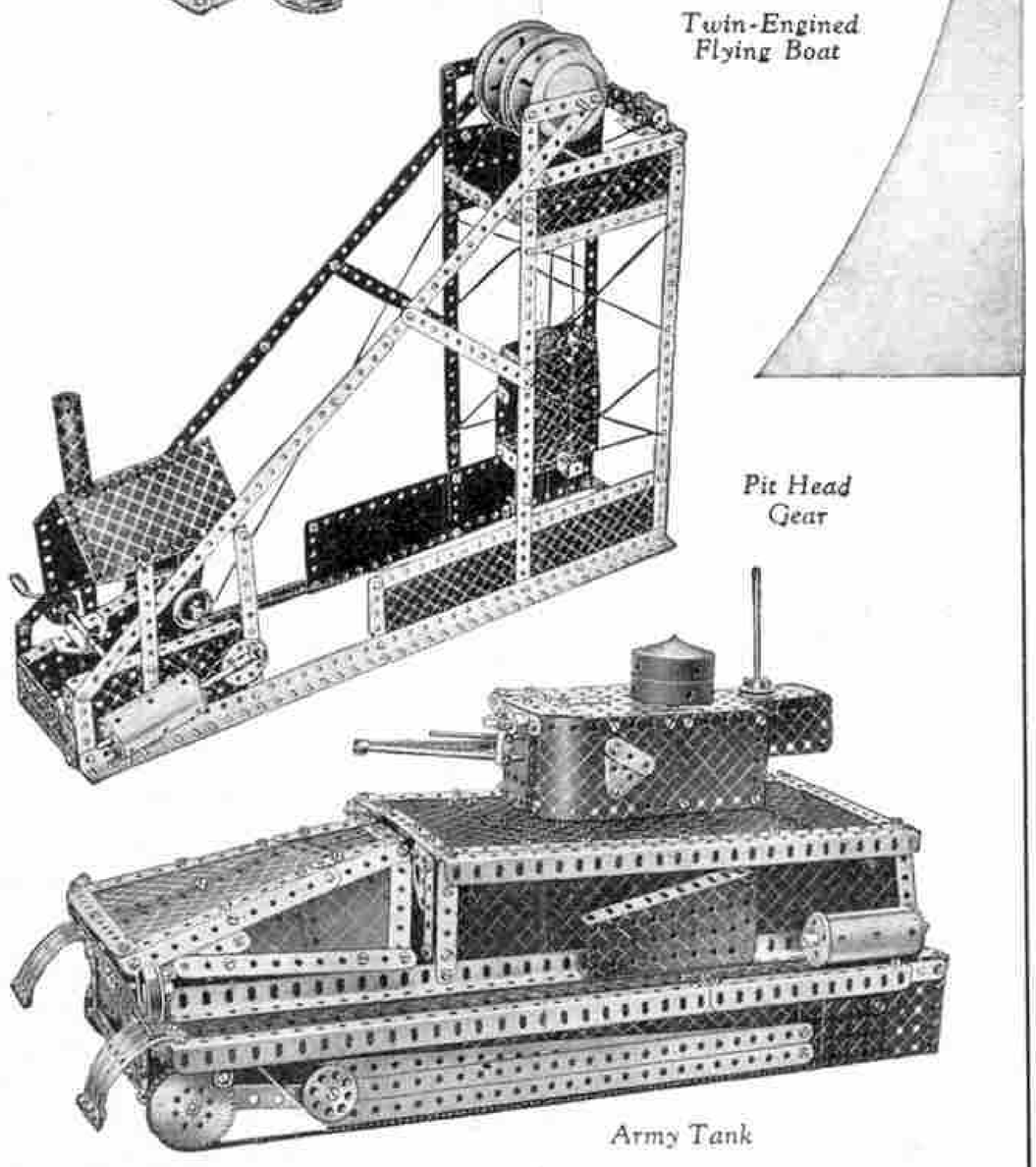

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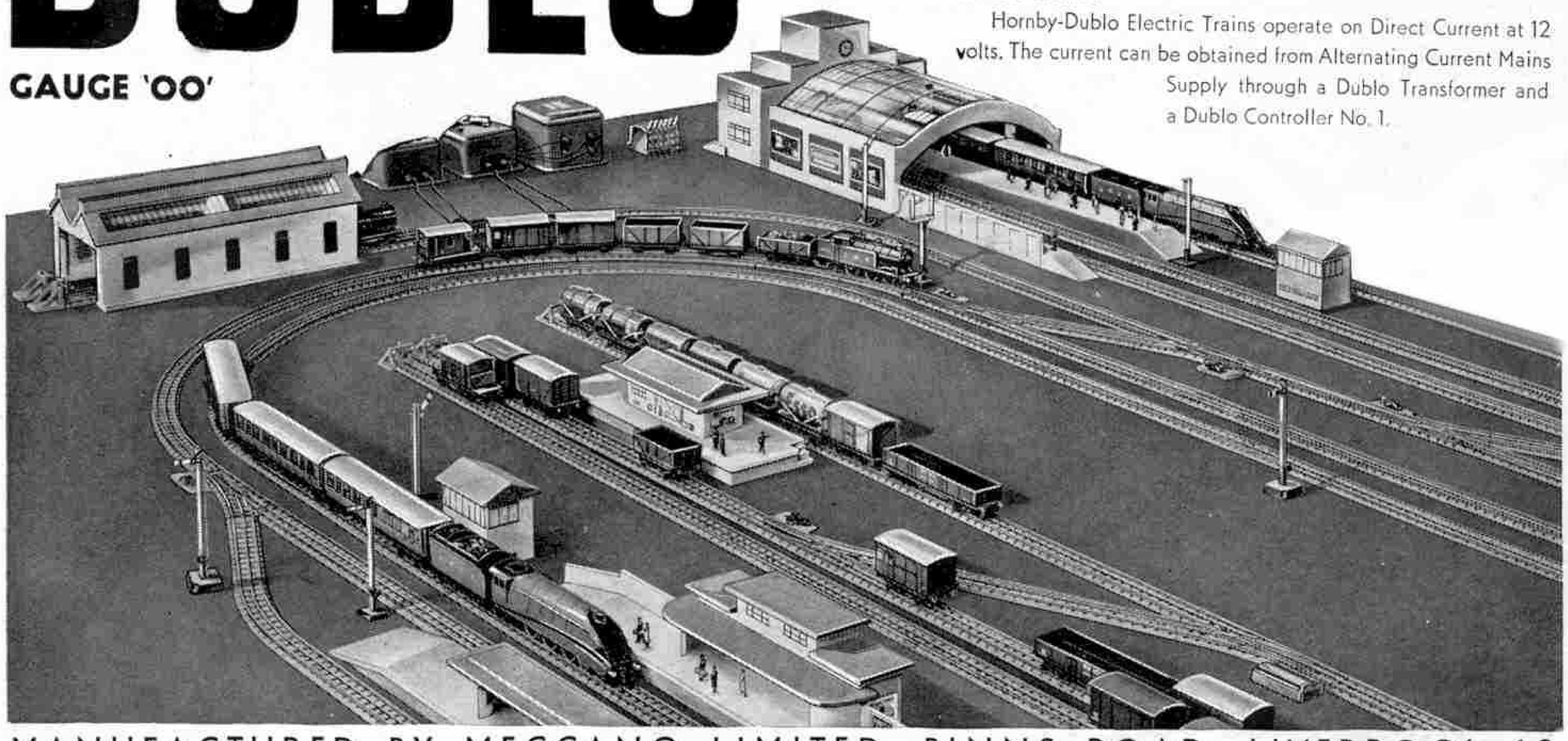

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