VOL. XXXIV. No. 1 JANUARY 1949

MECCANO MAGAZINE

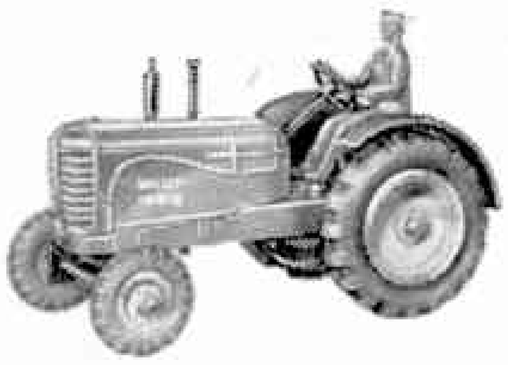
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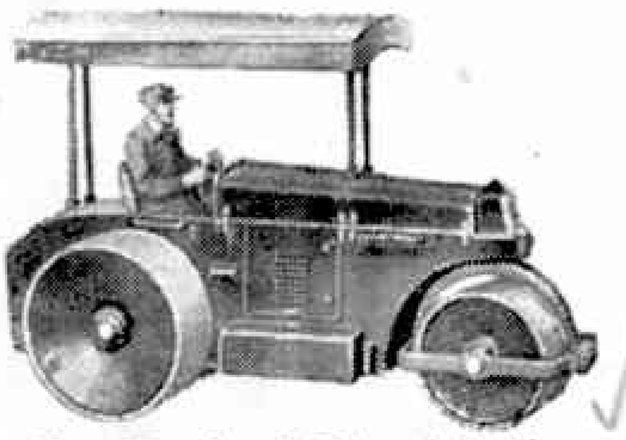
DINKY TOYS



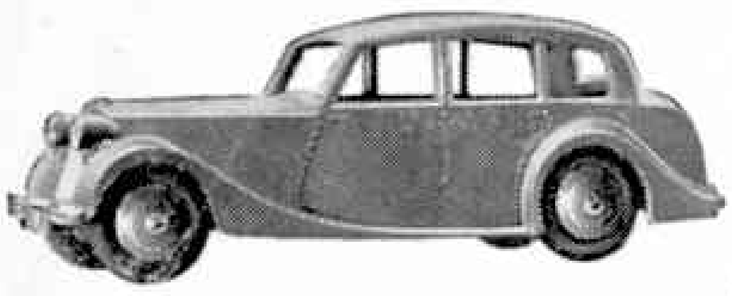
The Standard "Vanguard" Saloon
No. 40e
Price **1/9** each (including tax)



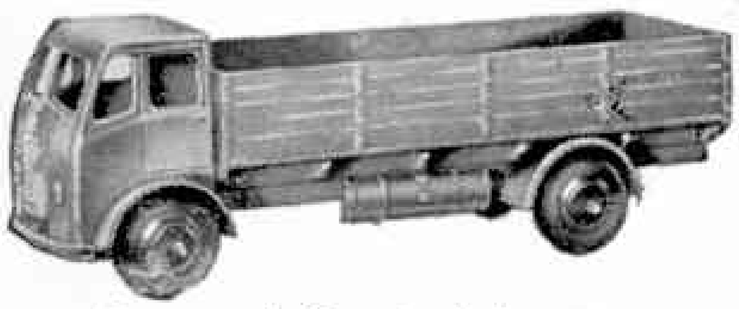
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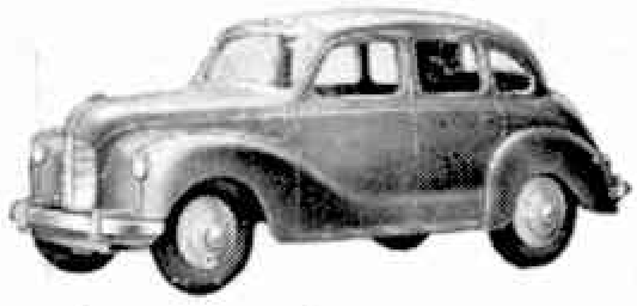


Triumph '1800' Saloon
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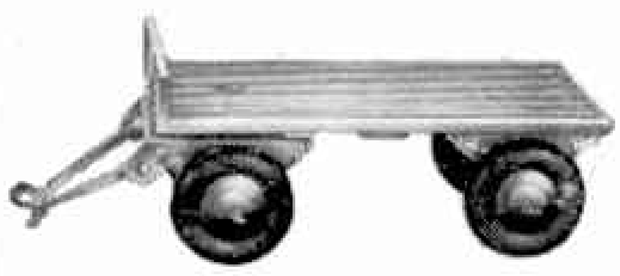
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No. 25g
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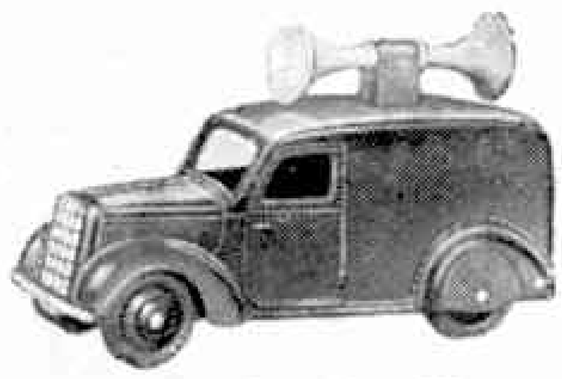
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Bedford Refuse Wagon
No. 25v

Sliding covers, tipping mechanism, opening rear door

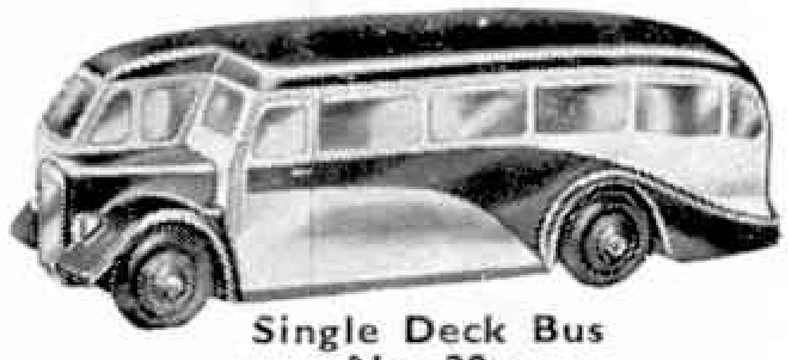
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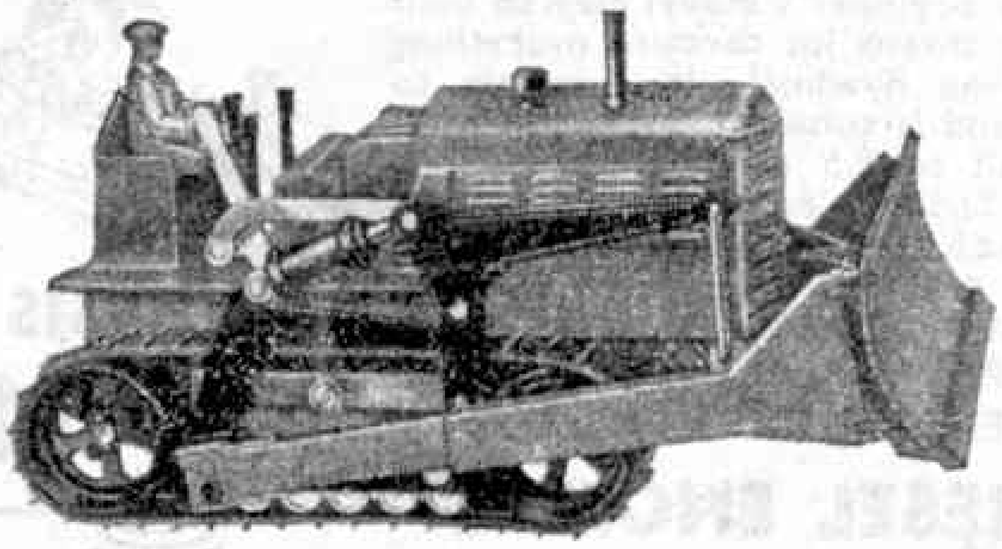
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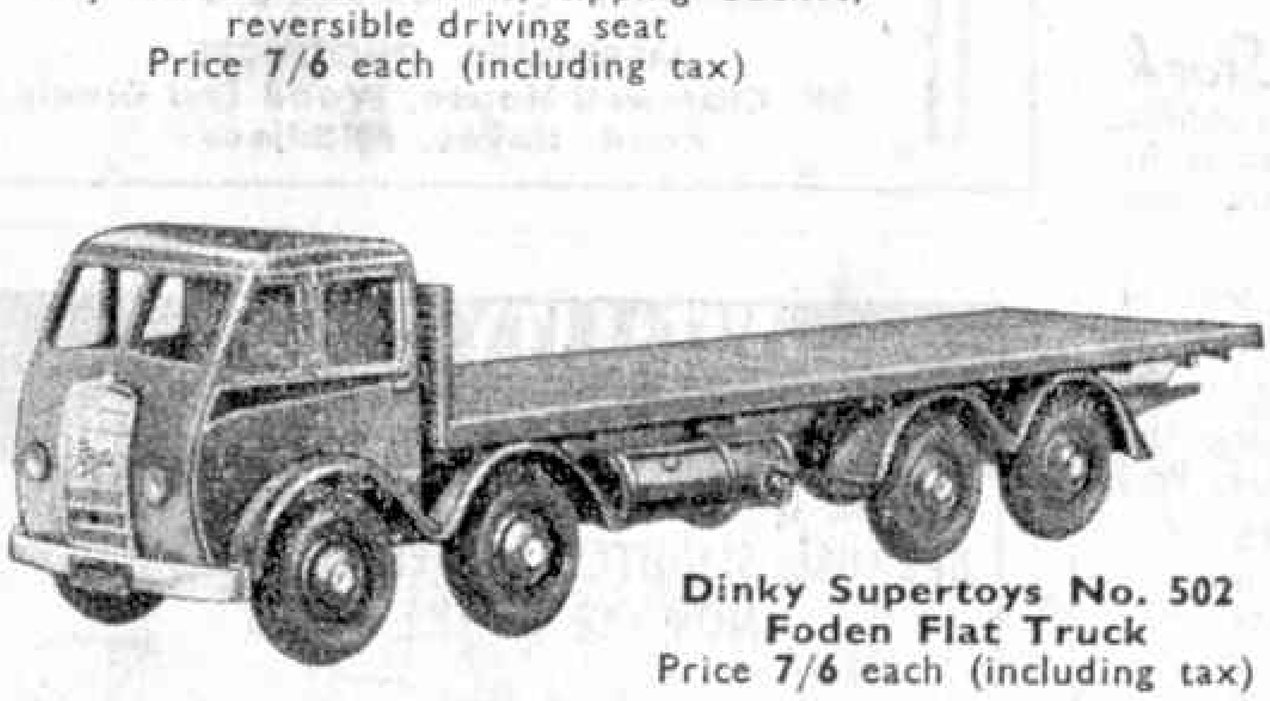
Dinky Supertoys No. 551
Trailer
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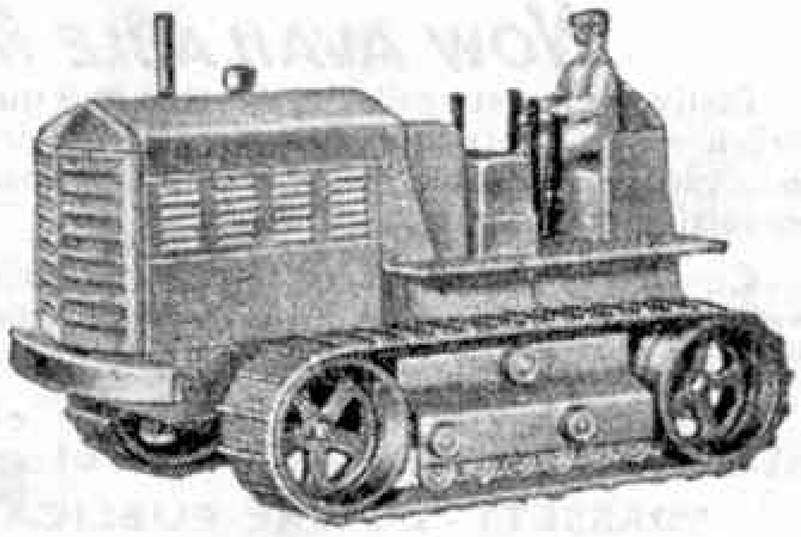
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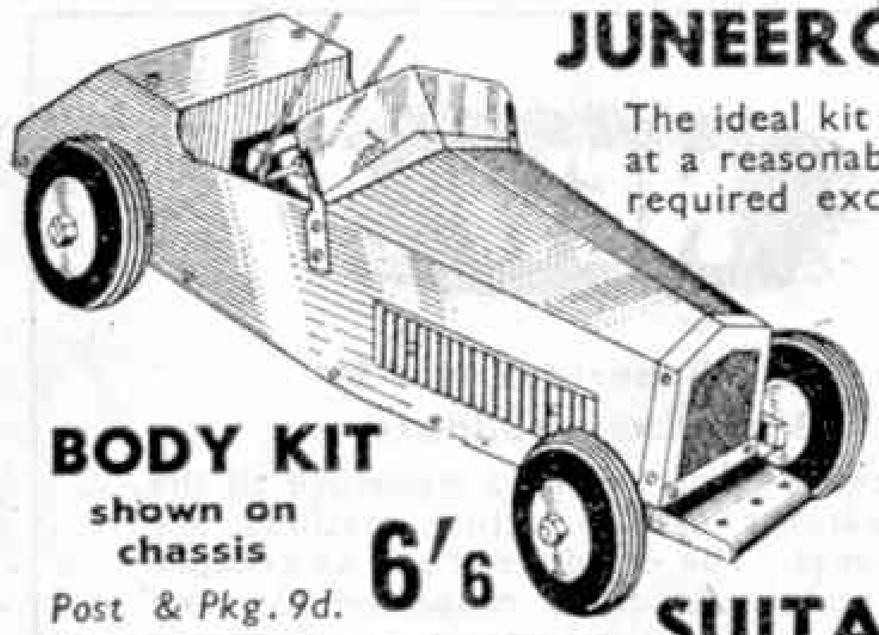
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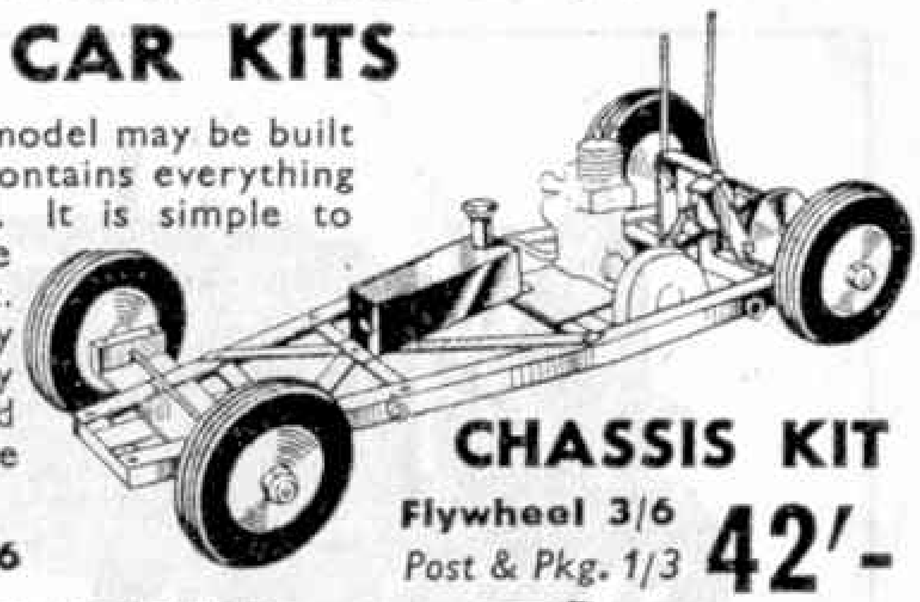
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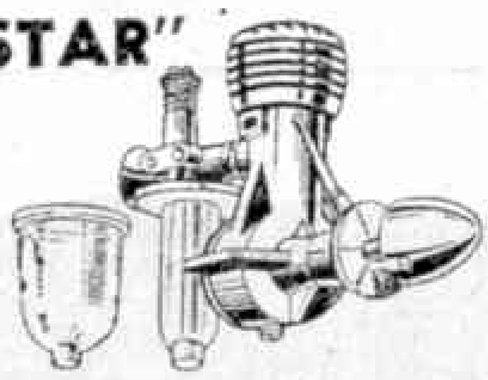
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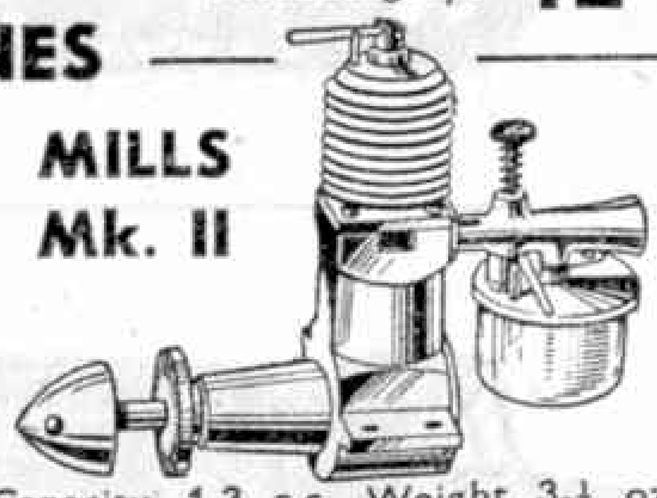
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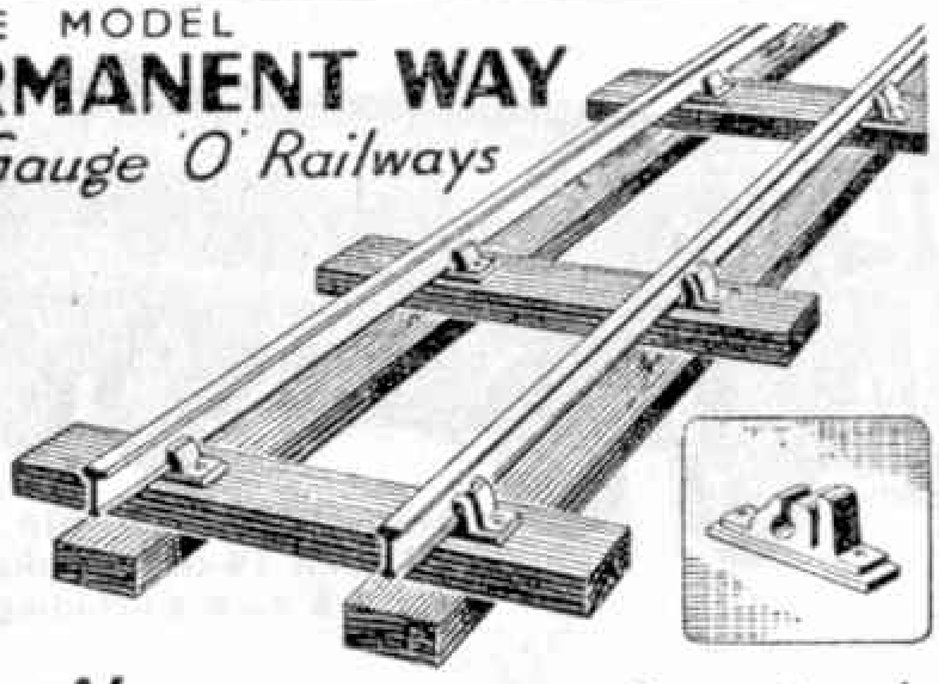


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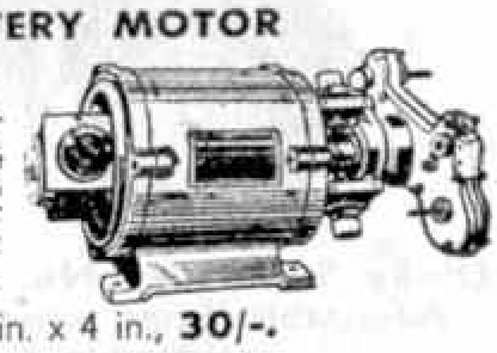
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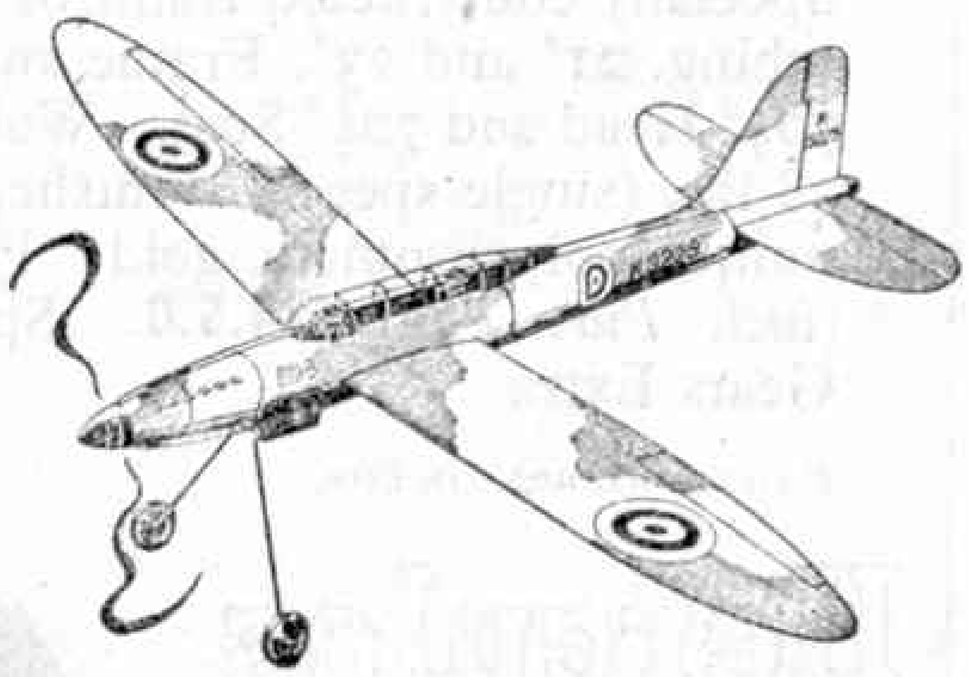
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SPAN—12" **12/10**



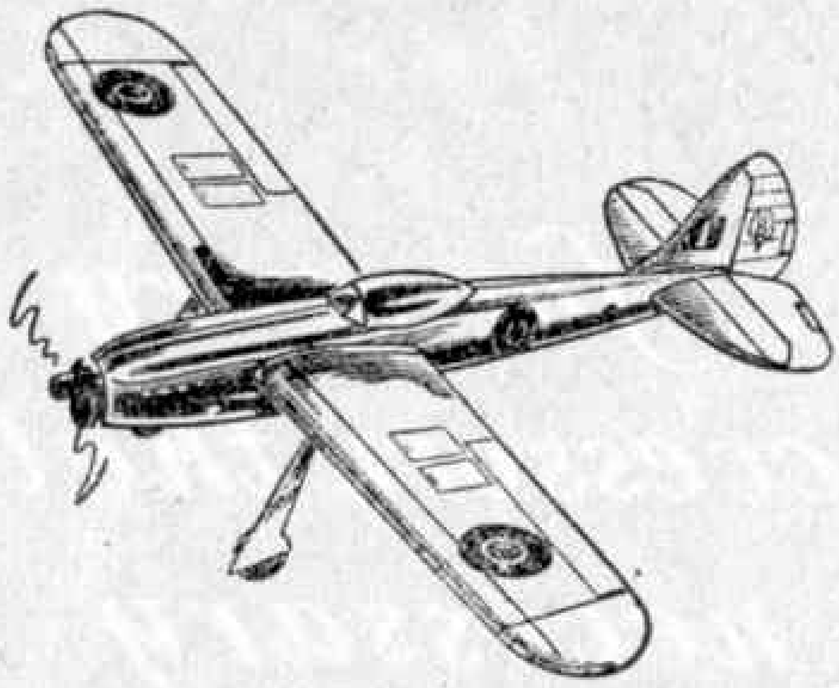
"SPITFIRE"

A fine, near-scale model of the famous 'Battle of Britain' "Spitfire" fighter. It is neatly finished in correct camouflage colours and has a flying performance like the real thing.

SPAN—17" **8/3**



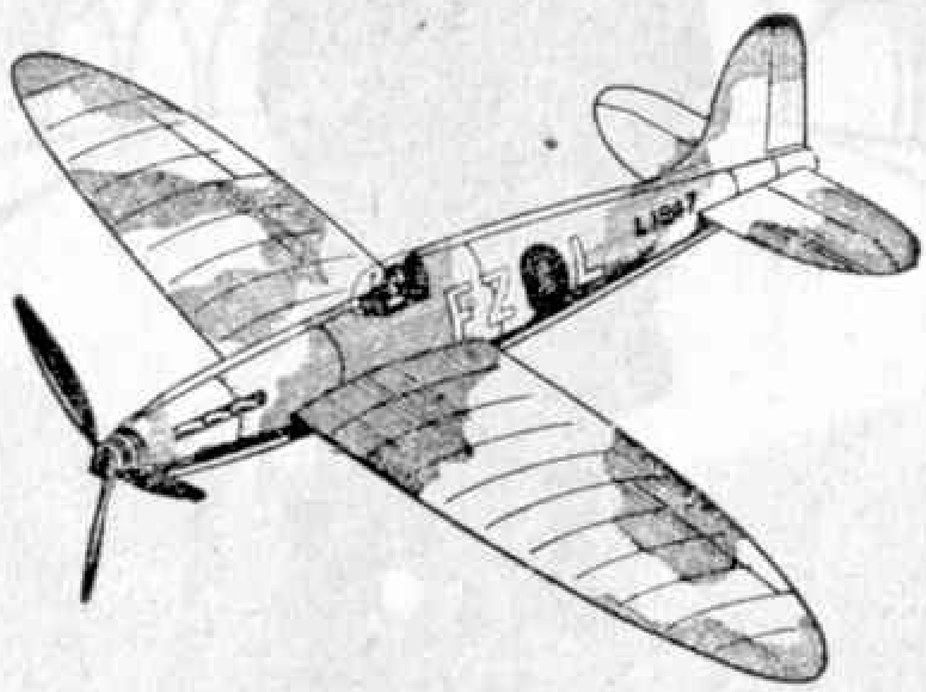
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SPAN—20" **10/6**



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Featuring the same method of construction as the larger "Dive Bomber" and "Spitfire" models, the "Raider" will take-off and fly for 200 ft.

SPAN—12" **3/11**

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Hercules Kestrel Kestrel Kestrel

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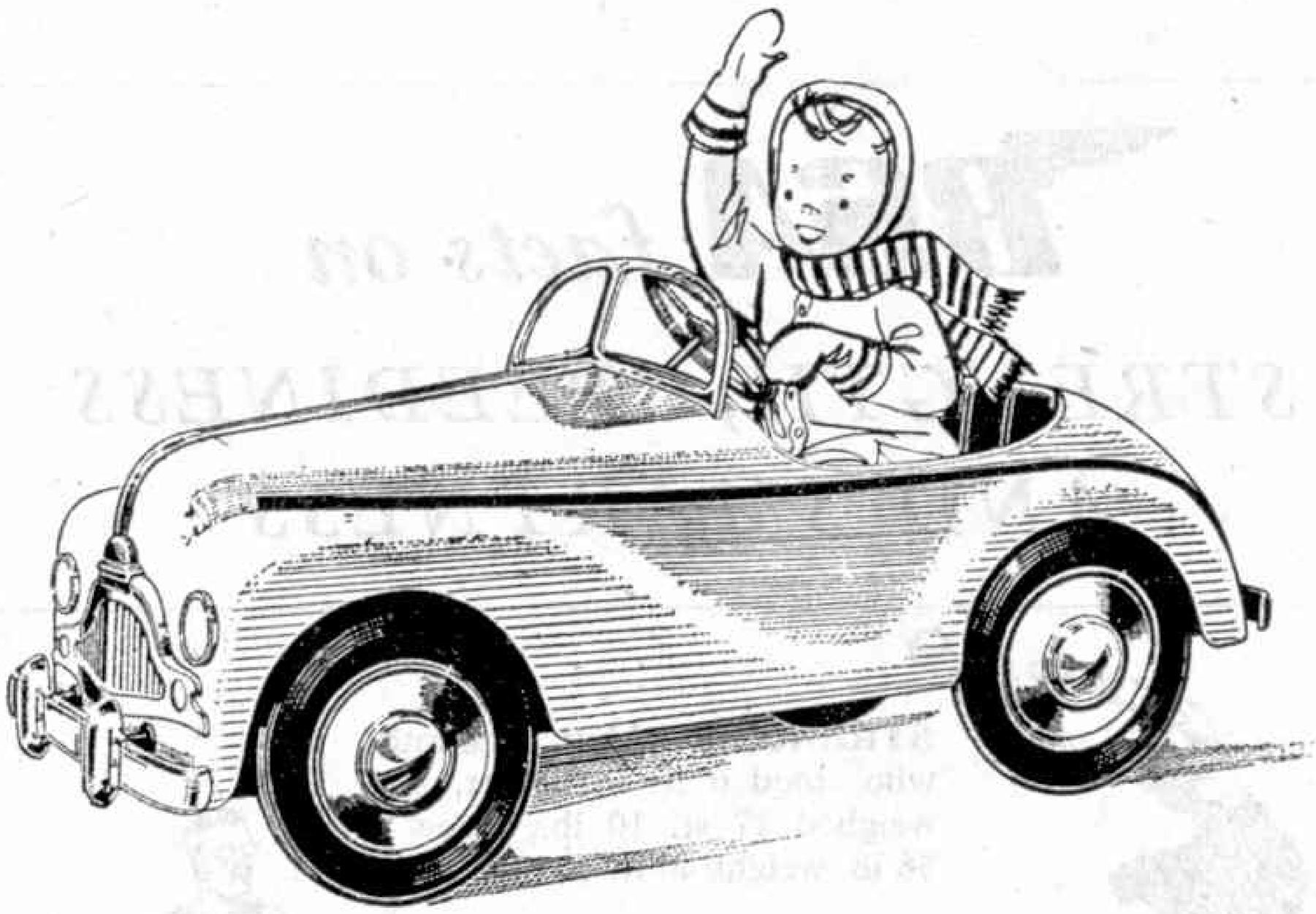
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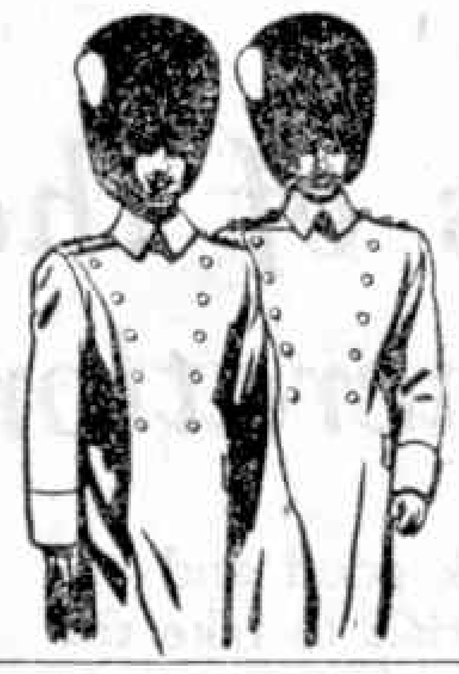
STRENGTH, SPEEDINESS AND SMARTNESS



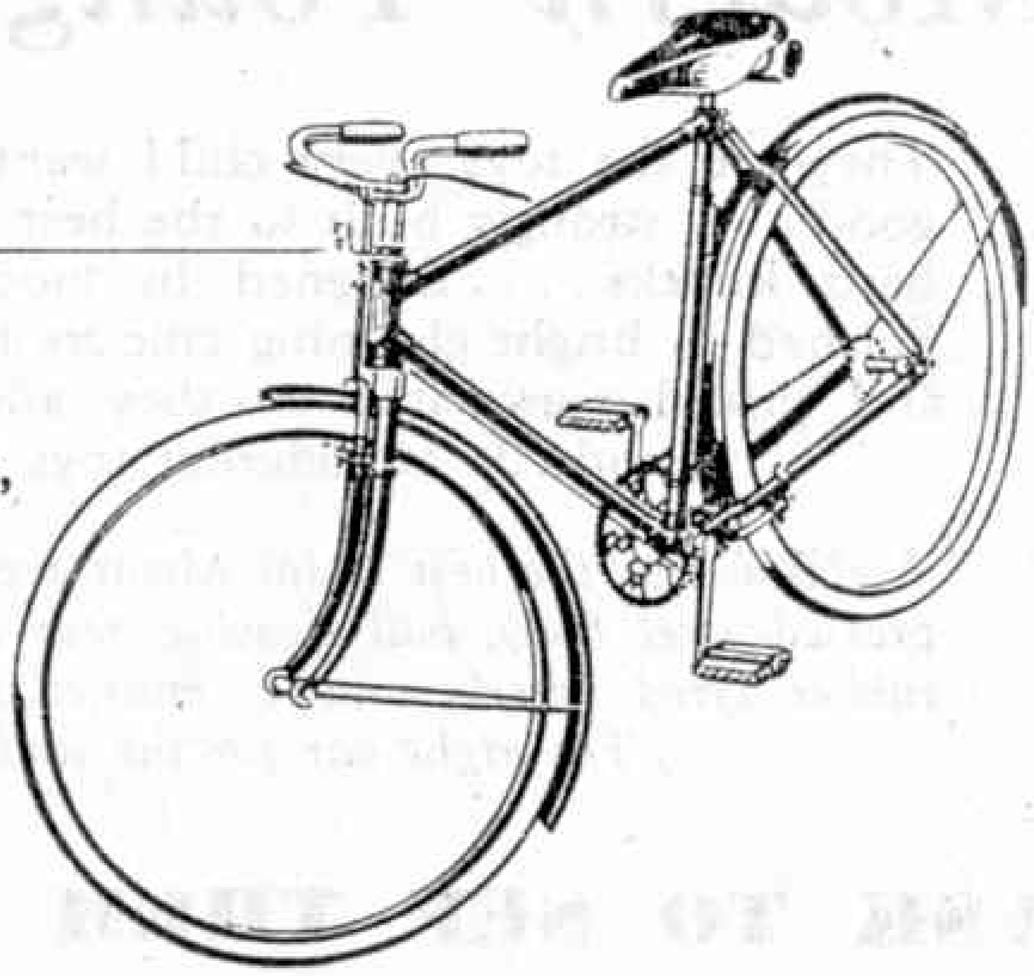
STRENGTH Matt McGrath, who stood 6 ft. in height, and weighed 17 st. 10 lb., threw a 56 lb. weight 40 ft. 6⅜ in.!



SPEED In 1937, S. C. Wooderson (Great Britain) ran the mile in 4 minutes, 6.6 seconds!



SMARTNESS The Coldstream Guards were formed in 1659. They are renowned for their smartness.



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A HAPPY NEW YEAR TO EVERY READER—The Editor

MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

Vol. XXXIV
No. 1
January 1949

With the Editor

The Conquest of Fog

Few of us escaped entirely the fog, the worst for many years, that blanketed Great Britain last November. In some places the A.A. reported "visibility nil," and that means a real blackout. Fogs of this kind are bad for all traffic, but they are specially dangerous for ferries such as those across the Mersey between Liverpool and Wallasey and Birkenhead, and that between Tilbury and Gravesend in the Thames Estuary. In the past Mersey ferries have been slowed down by fog to a serious extent, and on occasion the Tilbury and Gravesend ferry has stopped altogether.

Now radar comes to the rescue of these busy services on crowded waterways. The pioneer application of this wonderful invention was made in August 1947 by the Wallasey Ferries, which every year carry more than 20,000,000 passengers across the Mersey. When fog comes down now on Merseyside the scanner of the Wallasey radar equipment begins to turn, and the pictures of the river it produces on the screen of the receiver show the positions of the ferry boats and of other vessels. This information is given to the captains of the ferry boats by radio telephone, and in this way they are guided safely across the river, missing scarcely one of their scheduled trips, even in such a prolonged fog as that of November. The service now covers the adjoining Birkenhead Ferries, which carry about 7,000,000 passengers a year.

I was reminded of this by the news that the British Railways Tilbury-Gravesend ferry has been equipped with radar. This important service conveys each year some 3,000,000 passengers, many of whom are employed at Tilbury and have their homes at Gravesend; and with this new aid it is hoped to provide a regular service in even the worst weather.

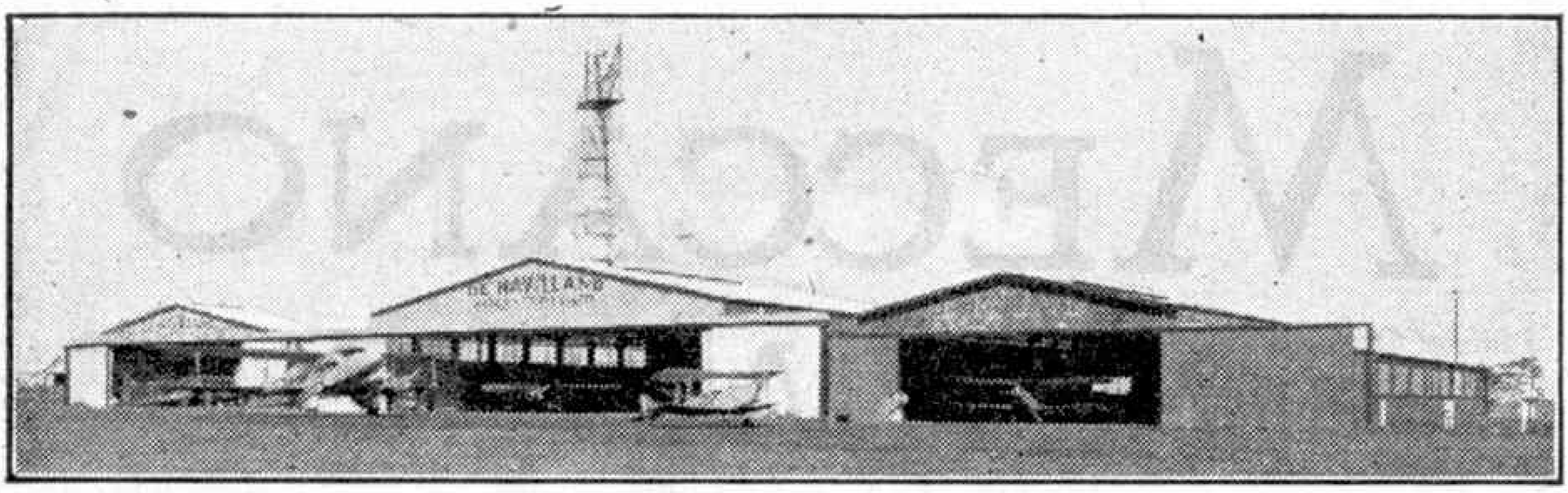
Competition Entries

I am sorry to say that scarcely a month passes without some really good entry of prize-winning standard in one or other of our competitions having to be disqualified because of failure to follow the rules. It seems almost incredible, but entries continue to arrive without the name and address of the sender. In the photographic competitions many readers spoil their chances by failing to state exactly what their prints represent, and giving only a fancy title. Others completely ignore the subject of the competition and send in pictures that have to be disqualified at once because they are of some entirely different subject.

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Mascot, Sydney, as it was just before the second World War. The three aircraft—a Qantas D.H. 86B, R.A.A.F. "Tiger Moth" and a privately owned "Puss Moth"—typify the range of the Australian de Havilland Company's activities in the thirties. The photographs on this and the next page are by courtesy of de Havilland Enterprise.

Made in Australia

By John W. R. Taylor

TWENTY-ONE years ago a small group of enthusiasts waited for an aeroplane, in a broken-down galvanized iron warehouse in Melbourne, Australia. They were not idle while they waited, for every now and again they invited the staff of a nearby tea warehouse to join in a spirited hunt for the rats which shared the shed with them.

At last their big day came, when a de Havilland "Moth" biplane from Britain arrived at the "factory" in a crate on a trailer. Unfortunately, it had to stay on the trailer all day, as the warehouse roof had sagged and the doors would not open. Once inside, however, its assembly went well until the wings were put on; then both wheels broke through the floor and disturbed a lot more rats. Despite all this, the "Moth" was eventually assembled by the erecting shop staff of one, rigged, inspected and towed away very early one morning, with its wings folded, through the streets to the aerodrome at Essendon, where it was delivered to its proud owner.

To-day, the de Havilland Company of Australia no longer occupy the little shed in Melbourne. Instead, in a fine modern factory at Bankstown, New South Wales, they are busily turning out "Vampire" jet fighters for the Royal Australian Air Force, and rugged "Drover" air liners, like that shown on our cover, designed for arduous service in the Australian bush.

But the last 21 years have seen more than just the growth of this one company in the Commonwealth; for in that time Australia has become the most air-minded country in the world. This is not altogether surprising, as the great distances between cities, and the absence of other forms of transport in the vast undeveloped areas of Central and North Australia, make air transport not merely the quickest and most economical, but almost the only practical means of travel. Perhaps that is why Australia has produced so many magnificent airmen like Harry Hawker, Keith and Ross Smith, Charles Kingsford Smith, Hudson Fysh and Bert Hinkler. Through their efforts Australia is no longer the other end of the world, but the halfway mark on an all-British airline network encircling the globe.

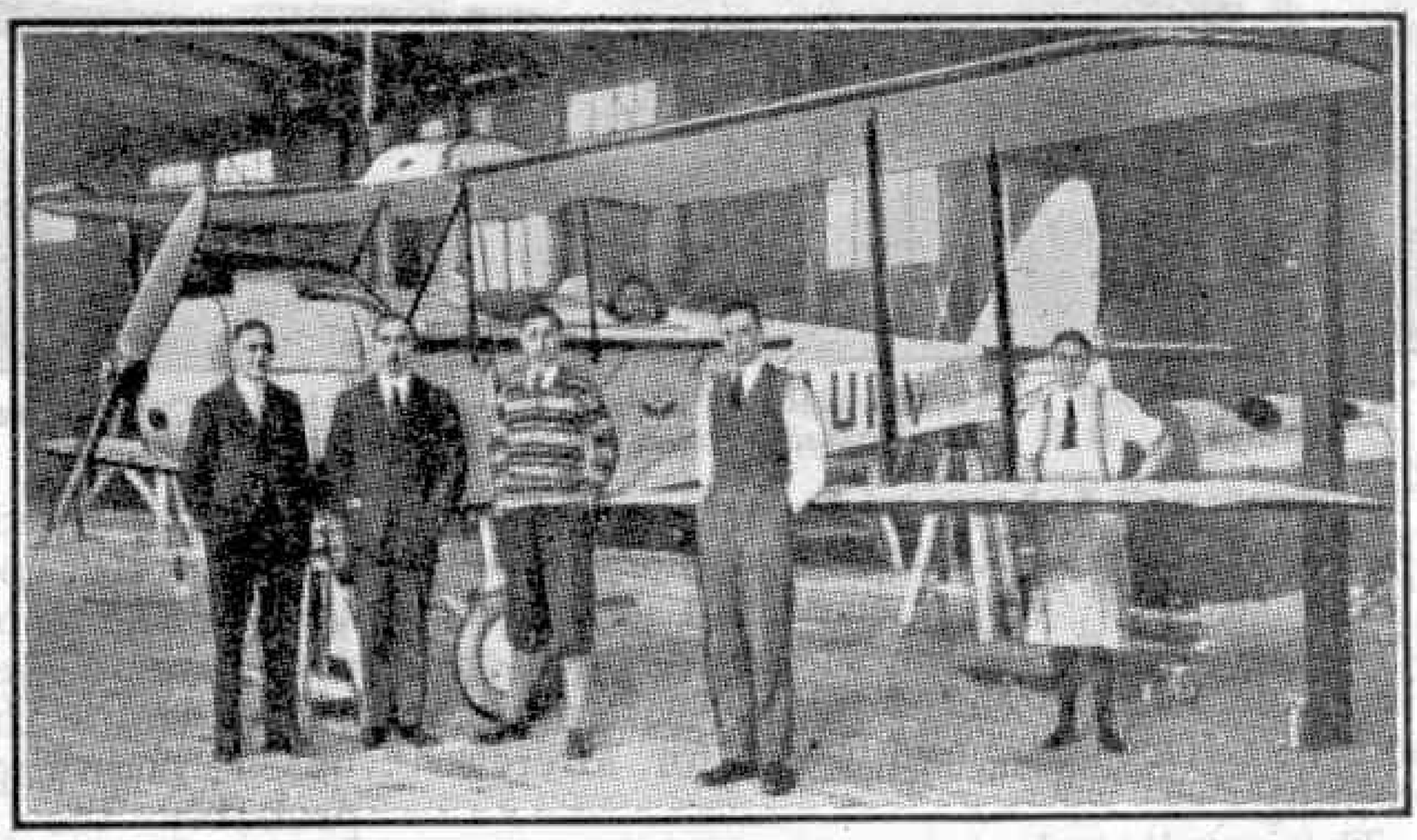
The pioneer flights of Australian airmen were not made in Australian aircraft, however, for comparatively few aeroplanes were built in that country before the second World War. Admittedly, some stick-and-string box-kite biplanes were built by mechanics of the Government Central Flying School at Point Cook, Victoria, early on in the first War to end Wars; and after that War the R.A.A.F. Experimental Station at Sydney built several aircraft under the supervision of Squadron Leader L. J. Wackett—still the Commonwealth's best-known designer. In addition private companies, including the Larkin Aircraft Supply Co., produced some interesting prototypes. Unfortunately, none of these came to much, and even when de Havillands entered the picture in 1927 they did not design their own aircraft, but merely assembled, serviced and repaired machines imported from Britain. Nevertheless, the new company did much to make Australians air-minded, by supplying large numbers of "Moths" to flying clubs and private owners, and

later by introducing the famous "Dragon" and D.H. 86B to Australian airline operators.

The Australian Government realized in the middle 30s that this was not enough; their country needed its own proper aircraft industry to enable it to face the growing threat of war, for obviously it could expect little help from the far-off, hard-pressed British industry. As a result, in 1936 the Government-supported but privately-owned Commonwealth Aircraft Corporation was formed at Port Melbourne, Victoria, with L. J. Wackett as manager.

The first contract received by the new company was for a large number of modified North American NA-16 two-seat general purpose monoplanes, named "Wirraways," which they built under license for the R.A.A.F. Simultaneously the great Empire Air Training Scheme was launched, and the Australian de Havilland Company were awarded a substantial contract to build "Tiger Moths" for the R.A.A.F.

That was only a start, for when war finally broke out the Aircraft Production Branch of the Department of Supply and Development (later the Department of Aircraft Production) set to with a will and formed a special Beaufort Division to organize the production of Bristol "Beaufort" torpedo-bombers in Australia. Unfortunately there was no more aircraft industry factory space available, but a little thing like that is no match for Australian enterprise and ingenuity.

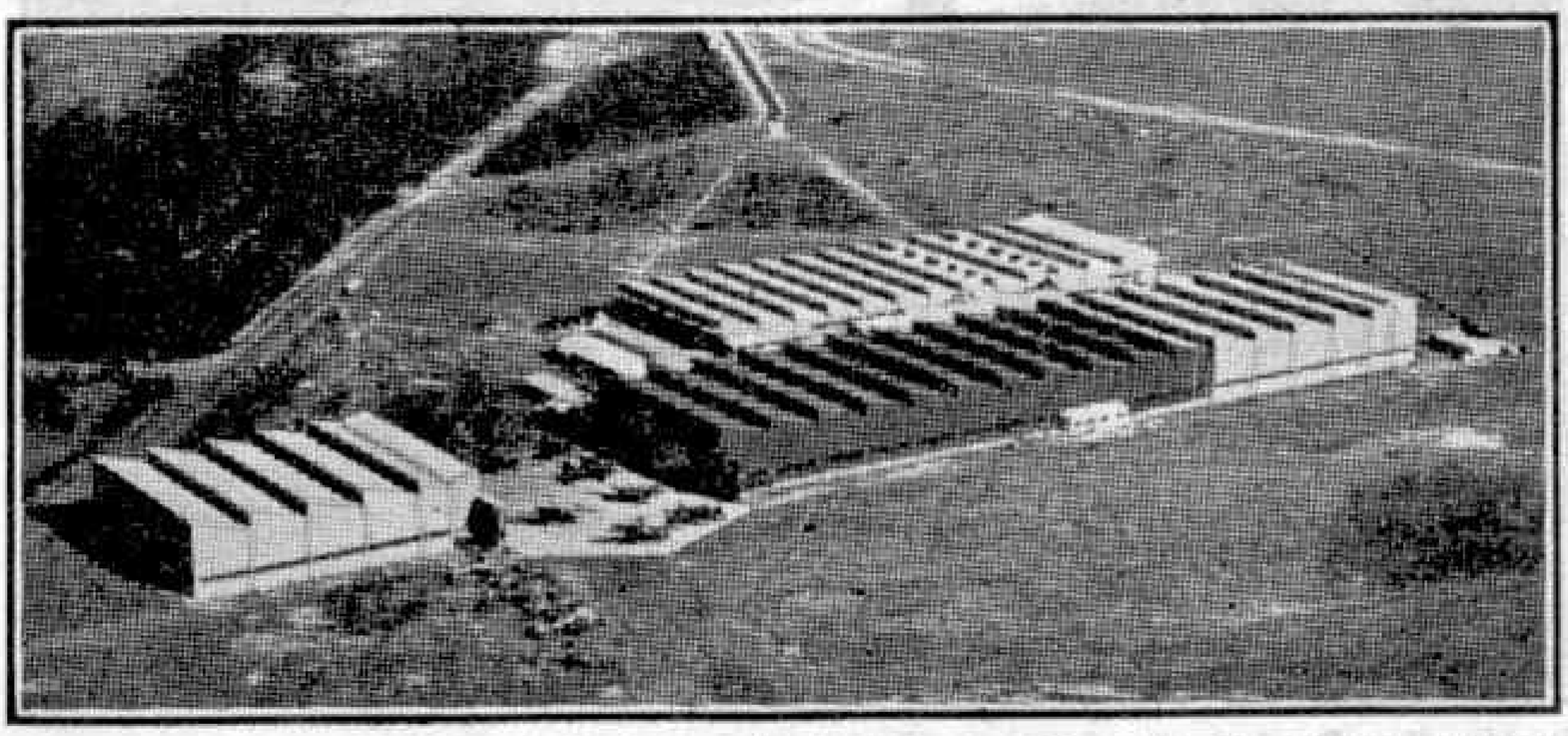


The staff of the Company in 1927, with the first D.H. "Moth" that they assembled at Melbourne.

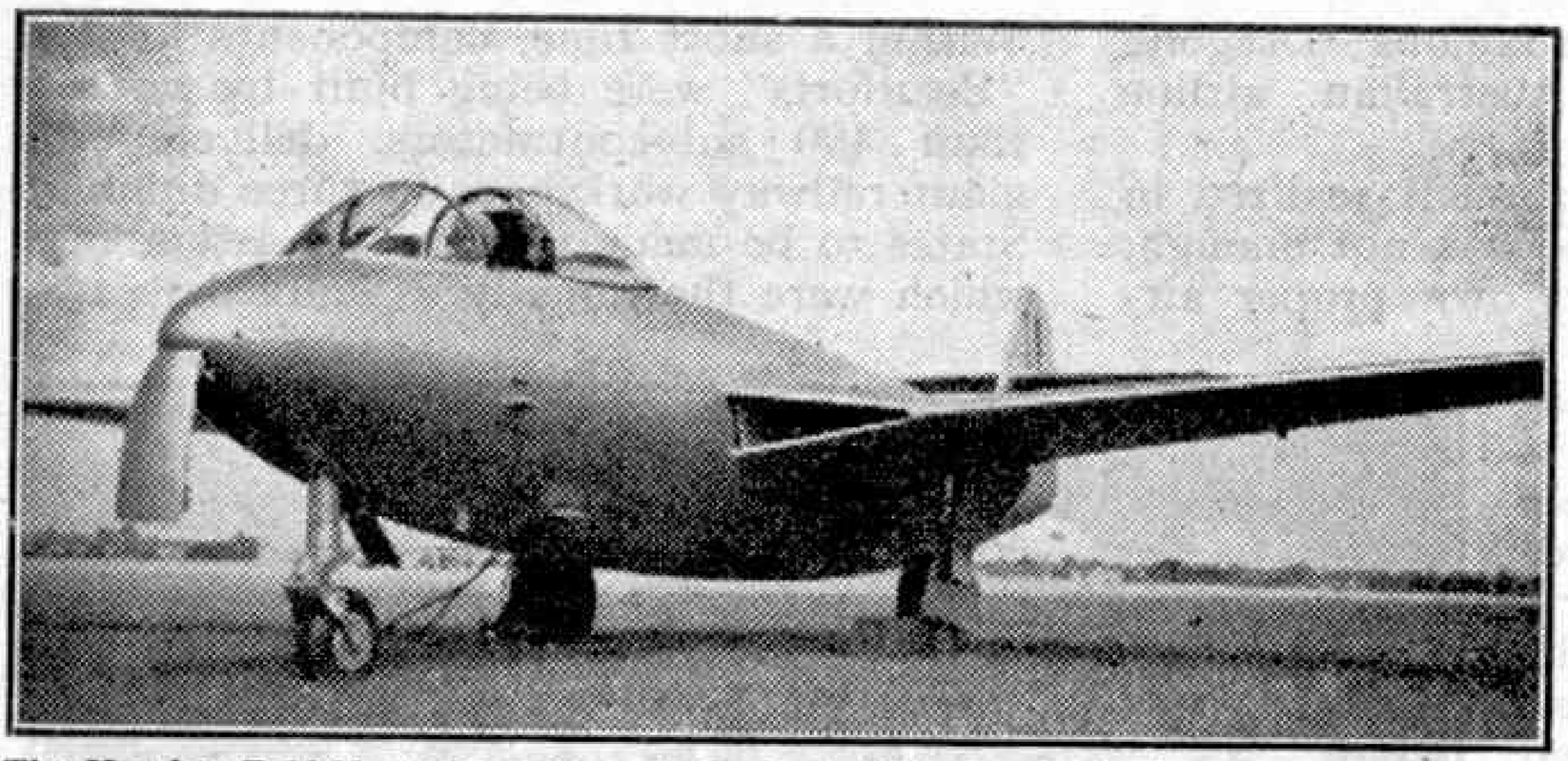
Within a short time, components for the "Beauforts" were being built by no less than 400 sub-contractors, delivered to giant railway workshops in three different States to be made up into sub-assemblies, which were then finally assembled in two factories at Fishermen's Bend, Melbourne, and Mascot, Sydney.

It was originally intended that the Bristol Aeroplane Company should supply all the drawings, jigs and tools needed, together with ten sets of "Beaufort" components to get the scheme under way. But the war situation prevented this, and Australian engineers had to undertake not only much of this basic work but also the development of special constant-speed propellers, retractable undercarriages, self-sealing fuel tanks, gun turrets, and even special grades of steel and duralumin suitable for the "Beauforts." Then the supply of British-built "Taurus" engines was cut off. Not to be outdone, they modified the aircraft to take two American "Twin Wasps," which were put into production by the Commonwealth Corporation.

The first Australian "Beaufort" flew in May 1941. The type was in full production eight months later, and more than 700 were built before they were superseded in production by "Beaufighters" in 1943. Meanwhile, Commonwealths had been going strong and had completed over 700 "Wirraways" and 250



The modern de Havilland factory at Bankstown, New South Wales, where "Drovers" and "Vampires" are being produced.



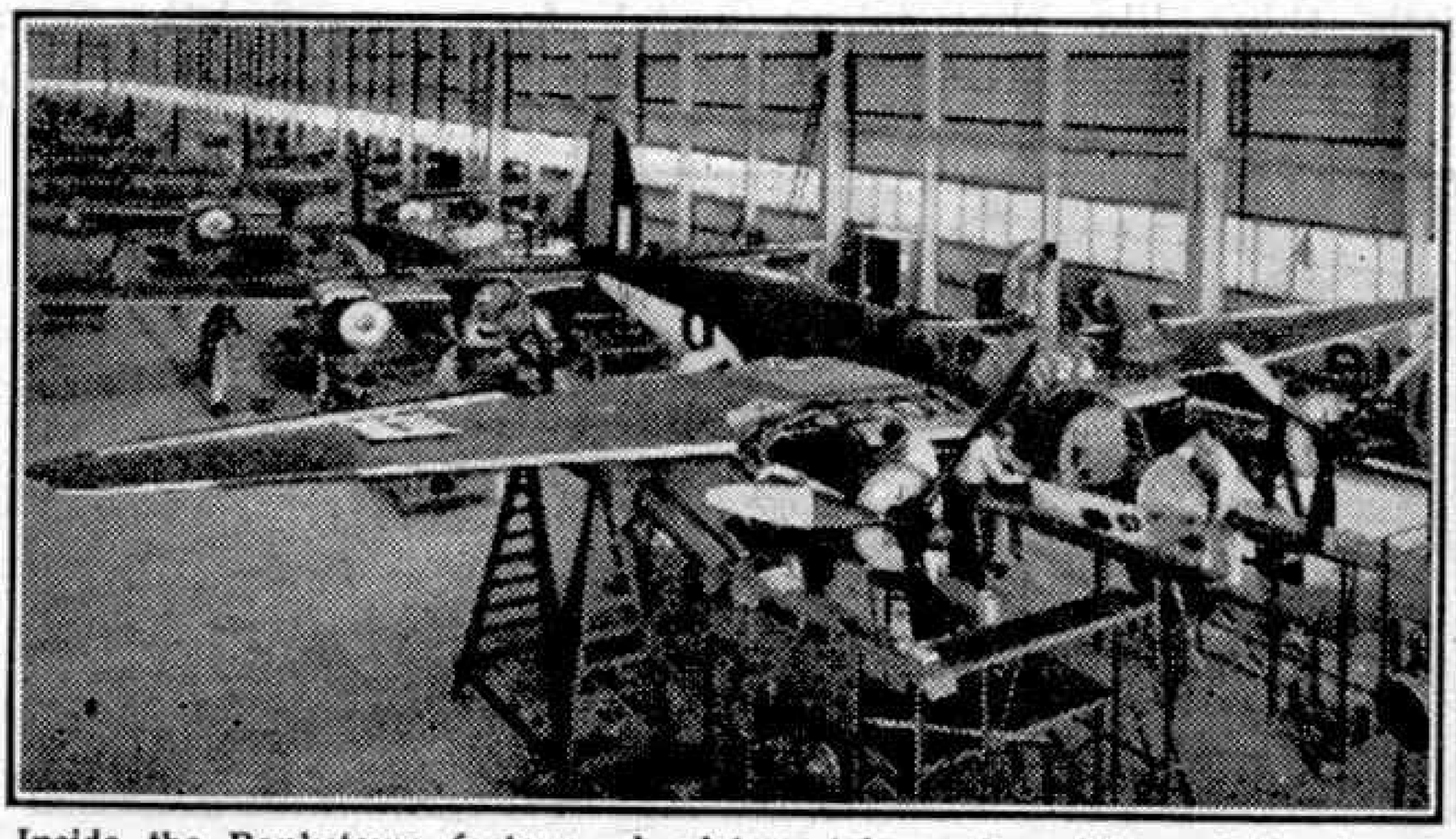
The Hawker P 1040, which will probably be built in Australia by the Commonwealth Company. It is a land-based version of the N7/46 naval jet fighter.

"Boomerang" fighters of their own design. De Havilland's contribution included 1,100 "Tiger Moths," which they had delivered to the R.A.A.F., India, Malaya, Southern Rhodesia and the Netherlands East Indies, and 87 "Dragons" equipped for aircrew training.

The small industry was spreading its wings fast, but the demand for more and better aircraft grew even faster. Japanese warplanes were proving a far tougher proposition than had been expected, and the R.A.A.F. urgently needed high-performance modern fighters able to outfly and outfight the "Zekes" and "Betties." The Australian industry did not intend to let down the Air Force. Commonwealths, continuing their close association with North American Aviation, turned over to production of the "Mustang" fighter; the Beaufort Division started to plan a "Lancaster" Mk IV assembly line at Fishermen's Bend; de Havillands put up a huge modern factory at Bankstown, N.S.W., and began building "Mosquito" intruder fighters. The first was delivered in July 1943, just 13 months after the first drawings had been received, and the R.A.A.F. had been supplied with 108 of these superb aircraft when the atomic bombs ended the Pacific War.

The war was over, but the Australian Government made up their mind never again to be caught napping, as in 1942 when R.A.A.F. pilots gallantly but hopelessly flew training aircraft into action against Japanese "Zeros" at Darwin. Consequently, side-by-side with more peaceful aircraft, modern warplanes continue to roll down the assembly lines in Australian factories. The Commonwealth Company are still building "Mustangs," and have also designed and built a bigger, more powerful fighter of somewhat similar layout, powered by a 2,035 h.p. "Griffon" engine. But piston-engined fighters will soon be things of the past for the R.A.A.F., and Commonwealth are planning to build in Australia the Hawker P 1040, land-based counterpart of the N7/46 and probably the world's finest all-purpose jet fighter. Similarly, the Beaufort Division, at present building 73 Avro "Lincoln" heavy bombers, are preparing to manufacture twin-engined jet bombers of British design at Fishermen's Bend—possibly the revolutionary English Electric aircraft mentioned recently by an American journal.

An important new development is the recent formation in Sydney of Fairey-Clyde Aviation, a subsidiary of the famous British Fairey Aviation Company, to take over the aviation interests of the powerful Clyde Engineering Company. At first the new firm will be engaged chiefly on the repair and maintenance of Fairey "Firefly" fighters and other aircraft in service with the (*Continued on page 34*)

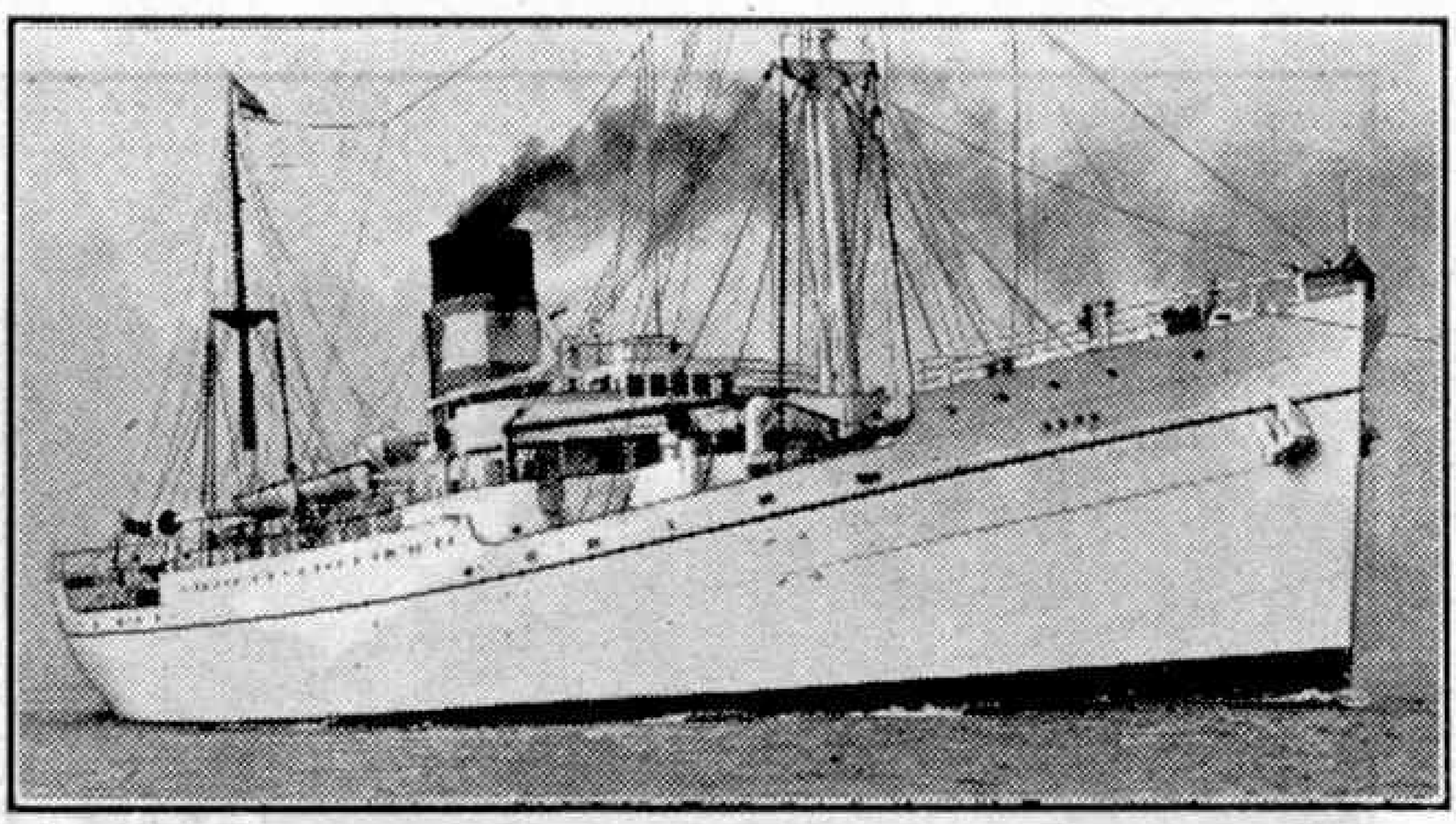


Inside the Bankstown factory. A picture taken when "Mosquito" aircraft were in production there. Photograph by courtesy of de Havilland Enterprise.

The Salvage of the "*Eros*"

By Denis Rebbeck, M.A., M.Sc., B.Litt., M.I.N.A.

THE 17 knot transatlantic fruit ship "*Eros*" was built at Belfast in 1936 by Harland and Wolff Ltd. This splendid looking vessel, with her modern exhaust turbo-electric drive operating in conjunction with a four-cylinder triple expansion steam engine, had made a name for herself by the time war broke out in September 1939. It was only natural then that the Germans would be very pleased if they could send such a useful and fast cargo ship to the bottom of the sea.



Unfortunately for the Allies a well-aimed torpedo very nearly succeeded in accomplishing this Nazi dream, and this short article describes how the ingenuity of a British salvage company cheated the enemy of their victim.

On the morning of 7th June 1940 it became known that the "*Eros*" had been torpedoed 18 miles north of Tory Island. The vessel had a very valuable cargo consisting of fighter 'planes, R.A.F. equipment and a refrigerated cargo of bacon and hams. She was taken in tow by a rescue tug and an attempt was made to tow her into Lough Swilly, but as the vessel was rapidly settling by the head every effort was made to beach her inside Tory Island. This was eventually accomplished and the vessel took the ground about four miles west of Horn Head where she lay with her forward decks submerged to the bridge—a truly sorry sight! The hull was flooded from the stem to the engine room, but the machinery space and the after compartments were intact.

Due to the persistent Atlantic swell it was the 11th June before a diver's examination could be carried out. This showed that the vessel had been hit by the torpedo forward on the starboard side, and her entire forefoot had been carried away, the damage extending up to the 31 ft. draught mark on the stem. The bottom of the chain locker was missing and the anchor cables had fully run out. As these cables were acting as a drag they were severed by gelignite. There was further damage to the ship's structure, too extensive to mention here.

In due course, after sealing certain compartments, and using compressed air, the "*Eros*" was towed off to Lough Swilly, drawing no less than 39 ft. forward (the fore decks just awash), and there, near Buncrana, the vessel again took the ground. She was further lightened, and ultimately beached off Hawks Nest on the Island of Inch, an even more sheltered position. By the 4th July (less than one month after being torpedoed) the "*Eros*" was made fit to proceed to Belfast, and on the following day she was taken in tow, arriving safely in Belfast Lough at 2 a.m. on the 6th July. It was then decided that she should continue the passage to Liverpool in the fine weather conditions prevailing—a change from the unusually bad weather experienced earlier on—and so the little convoy set off again at 7 a.m. on the following day for Birkenhead, where the "*Eros*" was docked on the afternoon tide of the 8th July.

This simple story cannot do justice to the salvage company concerned, but a full account of this clever and daring piece of work would fill many pages of the "*M.M.*"

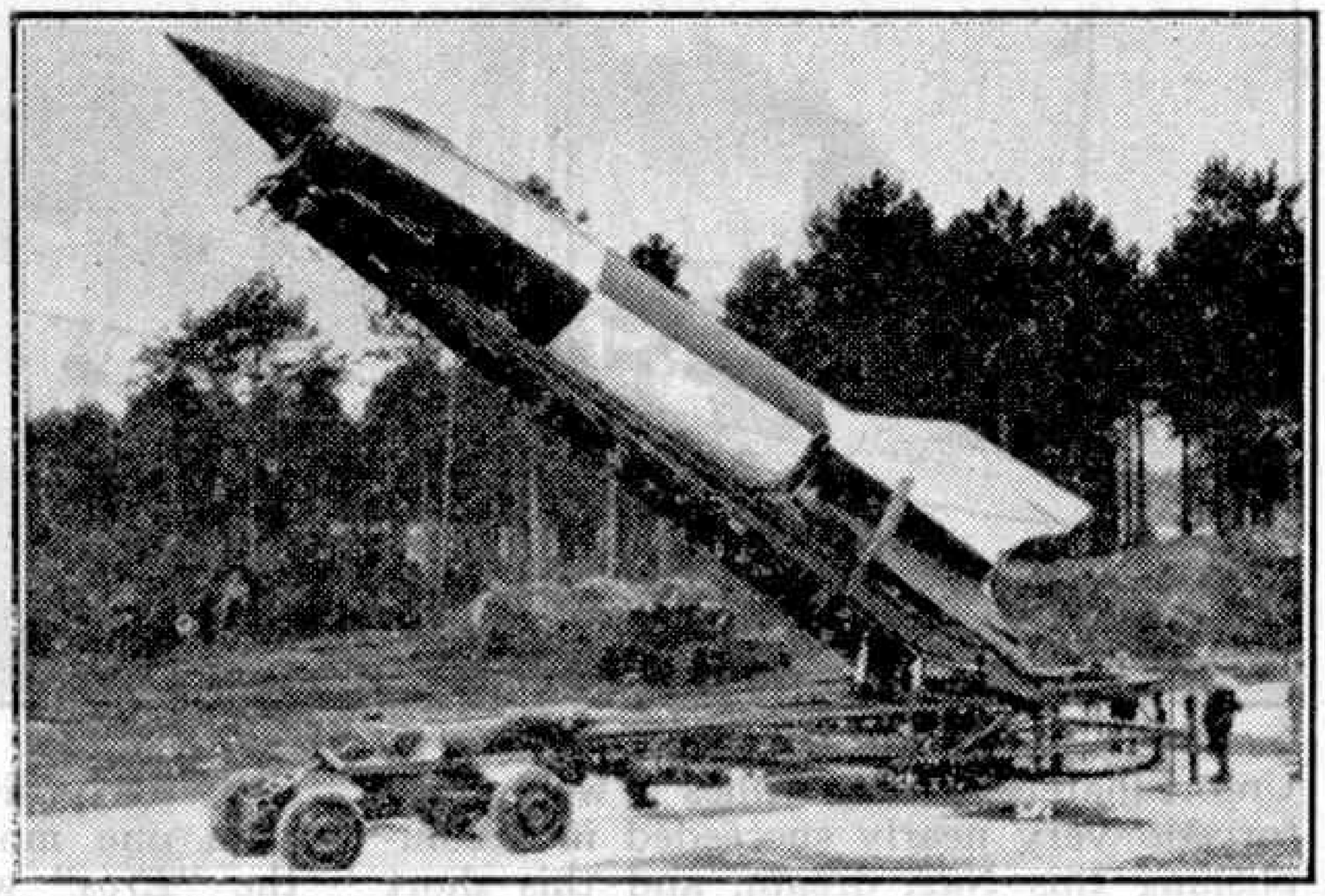
Throughout the war period there was an average of two merchant ship casualties in every five days over the west coast. The importance of Belfast, therefore, as a repair base for damaged ships was appreciated by all concerned, especially the Germans, who damaged the famous Harland and Wolff yards very badly by bombing in 1941.

The German Long Range Rocket

By J. L. Robertson

THE A-4 long range rocket, known to the Germans as "Vergeltungswaffe 2," which means Revenge Weapon 2, was an enormous projectile, measuring 46 ft. in length. It consisted of four main parts, all circular in cross section and together forming the complete hull or fuselage. The warhead contained 1,600 lb. of high explosive, which was detonated by three separate fuses.

Immediately behind the warhead lay the control compartment, in shape a truncated cone divided into four longitudinal sections by plywood partitions. This compartment contained all the equipment necessary for the firing of the rocket and for its steering and control once it had become airborne. Among the intricate mechanisms located here were delicate gyroscopes, radio equipment, tiny motor-alternators, compressed air cylinders, electrical storage batteries of unique design and performance, a mechanism to "arm" the warhead fuses once the rocket had reached a safe height, and a main electrical distribution panel. This compartment formed the "brain" of the rocket, and herein lay the key to whatever success the A4 achieved as a military weapon; just what effect the various controls had on the rocket we shall discuss later.



Elevating the rocket on its special cradle transporter. The rams lifting the cradle can be seen, as well as the launching platform to the rear of the trailer.

The largest part of the rocket fuselage was the centre section or tank bay. This was constructed in two longitudinal halves, each built up from semi-circular formers and channel-section stringers, the whole being covered with smooth, thin steel sheeting; both spot welding and riveting were used in this assembly. In this section were carried the two main tanks, one containing alcohol, and the other liquid oxygen. Oxygen can only exist in the liquid state at the incredibly low temperature of 183 deg. C. below freezing point. For this reason both the main tanks were heavily lagged with glass wool to prevent the oxygen from boiling off at normal atmospheric temperatures, and to prevent the intense cold which emanated from it from freezing up and rendering inoperative various vital mechanisms inside the rocket.

Next in order came the tail unit. This carried the four large stabilizing fins, and contained the main and auxiliary power units. To deal with the last named first, this consisted of a small combustion chamber in which highly concentrated hydrogen peroxide from a tank was mixed with calcium or sodium permanganate. This was, in effect, a small rocket motor, and the high-pressure gases produced inside it were led to the nozzles of a small turbine, which was in turn coupled directly to two centrifugal pumps. To these the alcohol and oxygen delivery pipes were connected via brass bellows, which were inserted into the system to allow for vibration, expansion and contraction.

The output from the oxygen pump was taken through a main distributing valve, and thence through light alloy tubes to "roses" or sprays inside inverted steel cups welded to the head of the combustion chamber of the main power unit. The output from the alcohol pump was forced forward (or up) to the head of the combustion chamber, acting in its passage as a liquid coolant for the main motor unit, and itself being preheated before injection into the combustion chamber. The exhaust from the turbine itself was passed

through a "heat exchanger" and then allowed to escape into the atmosphere.

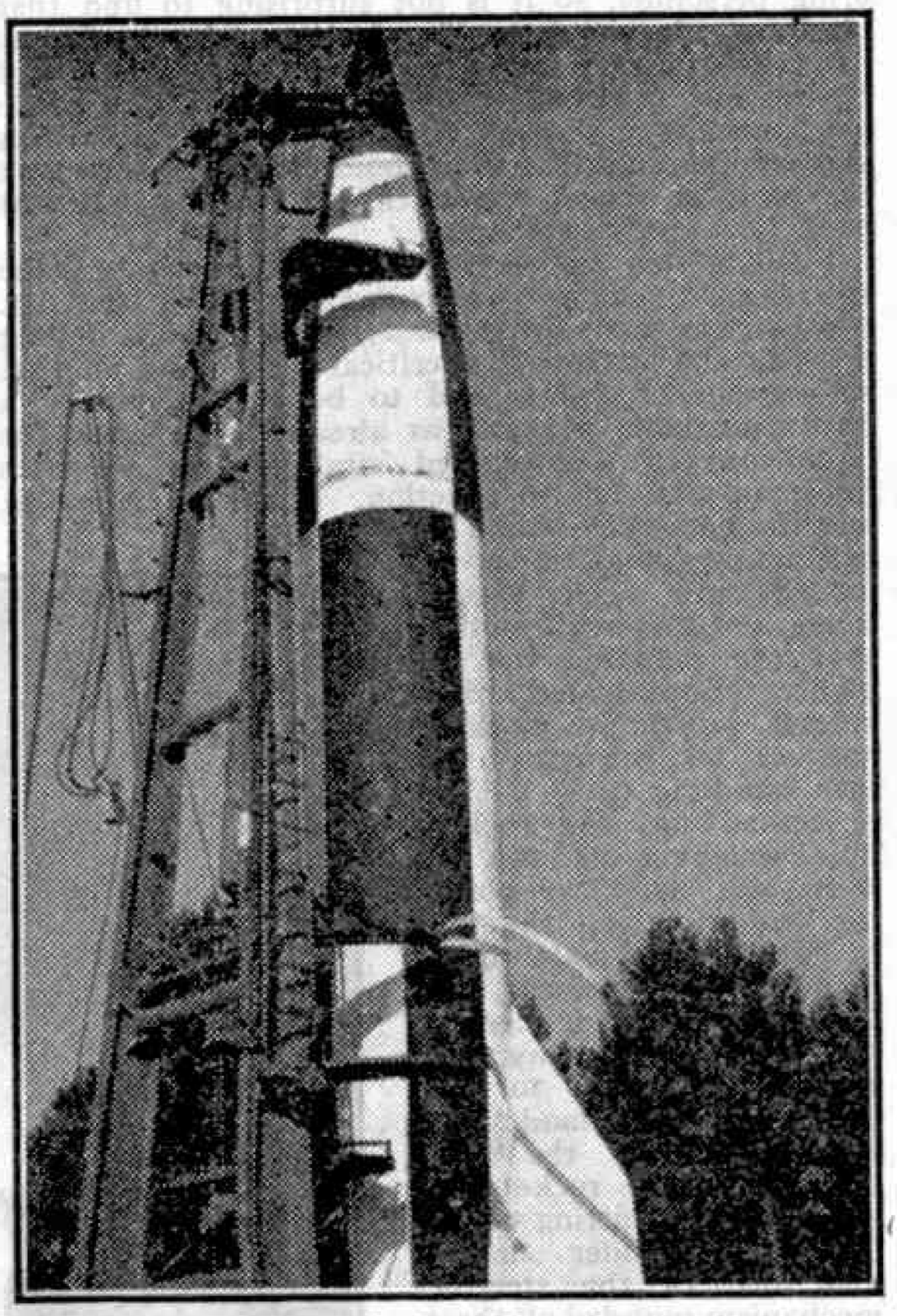
The turbo-pump arrangement was in itself an engineering feat. Although weighing only 170 lb. it could develop no less than 750 b.h.p., to give the very remarkable power weight ratio of only 0.22 lb. per b.h.p.

The four stabilizing fins were of orthodox braced girder construction, and were covered with a thin steel skin. Each fin carried a small air rudder at its trailing tip, these being driven and controlled by hydraulic servos inside the tail unit. Also driven by these servos were the main steering rudders, four vanes so placed as to operate in the jet stream itself.

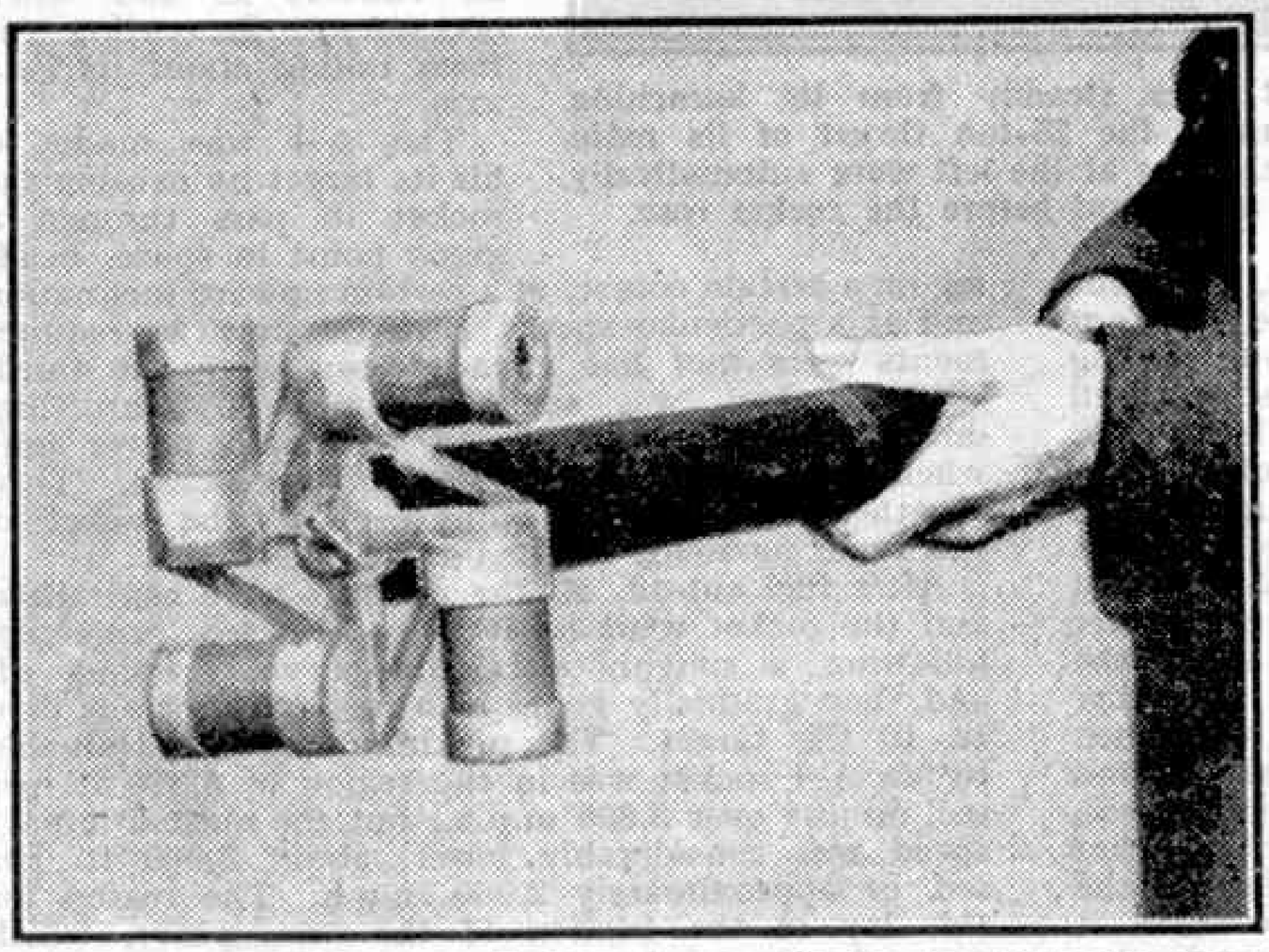
The eight tons of liquid held in the main tanks were pumped out and consumed in just about one minute.

The procedure for preparing and firing an operational rocket was roughly as follows. A small steel platform or table, fitted with four adjustable legs and surmounted by a rotatable ring, was placed in position on a suitable piece of level hard ground. The rocket was then brought up on a special cradle transporter and elevated on its cradle until it reached a vertical position, with the main exhaust directly over the centre of the launching platform. The latter was next jacked up to take the weight of the rocket, and, this done, the securing bands on the rocket were released and the cradle, stil vertical, was withdrawn a yard or so.

This left the projectile standing on its firing platform and the cradle now became a ladder giving access to all parts of the rocket. Two working platforms were hinged to the cradle at convenient points, while electric lights and anti-aircraft machine-gun mountings were also provided. Next the rocket was viewed through special instruments to ensure that it was exactly vertical, as any inaccuracy in this respect would have had a serious effect on the ultimate trajectory. After this process had been completed, all the rocket hatches were opened, and a series of test and power cables connected up. Three of the jet rudders, which were fragile and had travelled so far in a special container, were fitted to their bearings in the rear of the tail unit; the fourth was left off for the time being to allow of access to the exhaust.



The cradle in the vertical position showing the access ladders and working platforms. The rocket hatches have not yet been opened.



The igniter. This was just a large "Catherine Wheel" fired electrically from the control car, in which a signal lamp lit up when the igniter was functioning correctly.

At this point it must be mentioned that the A-4, even in its final form, was at all times a temperamental and far from reliable weapon. This caused a number of serious accidents to

firing personnel, so it is not surprising to find that the next stage in the preparation for action was invariably a meticulous check of all steering and power unit controls. Each section of the intricate mechanism was checked in turn and any failure was at once investigated; if it could not be rectified on the spot the rocket was forthwith rejected and sent back for expert overhaul.

Fuelling was the next step, and one by one the special road tankers were called forward to the site. Alcohol was loaded first, then liquid oxygen. Filling up with the latter was a critical proceeding, in that all subsequent moves had to be carried out to a fixed timetable, because, as already mentioned, the liquid oxygen soon caused vital working parts to freeze up and fail to function. Hydrogen peroxide, and the catalyst, sodium or calcium permanganate, were loaded into their special tanks, and it is worth noting that the peroxide was so highly concentrated that special protective clothing had to be worn by the men handling it.

Tanked up, the rocket, now weighing its full 12 tons, was "laid" by pointing one fin along the line of fire, two dial sights being used to ensure that the operation was carried out accurately. Any adjustment found to be necessary was made by simply slewing the ring upon which the rocket was standing. The fitting of the fourth jet rudder and a final test of the steering mechanism rounded off these prolonged and involved preparations.

The total time required to get a rocket ready to fire varied considerably, depending mainly upon whether or not the rocket responded perfectly to all its tests. If all went well, the average time was usually about three hours with a fully trained crew.

As soon as the preparations described had been finished all vehicles and unnecessary personnel were cleared from the site, and the igniter, which was nothing more or less than a glorified catherine wheel, was inserted in the exhaust. At this point, then, the rocket stood quite alone upon its little table, with not a soul in sight, and only a wisp of vapour trailing from a vent in the tail showing that, in spite of all precautions, the liquid oxygen was slowly boiling off.

Some hundred yards away, the control car, an armoured half-track vehicle, had been dug in, and inside this car the officer in charge and his engineers had taken up their action stations at complex control panels. These panels were connected to the rocket by cables controlling the propulsion unit, the pressurising and fuel valves and the igniter. A further cable, attached to the control compartment, continued to power all the internal control mechanisms, and this cable, held in position electro-magnetically, was designed to fall away an instant before the rocket lifted. The other cables were disconnected by the rocket itself withdrawing the connections when it started on its flight, just as an ordinary electric plug is pulled from a socket.

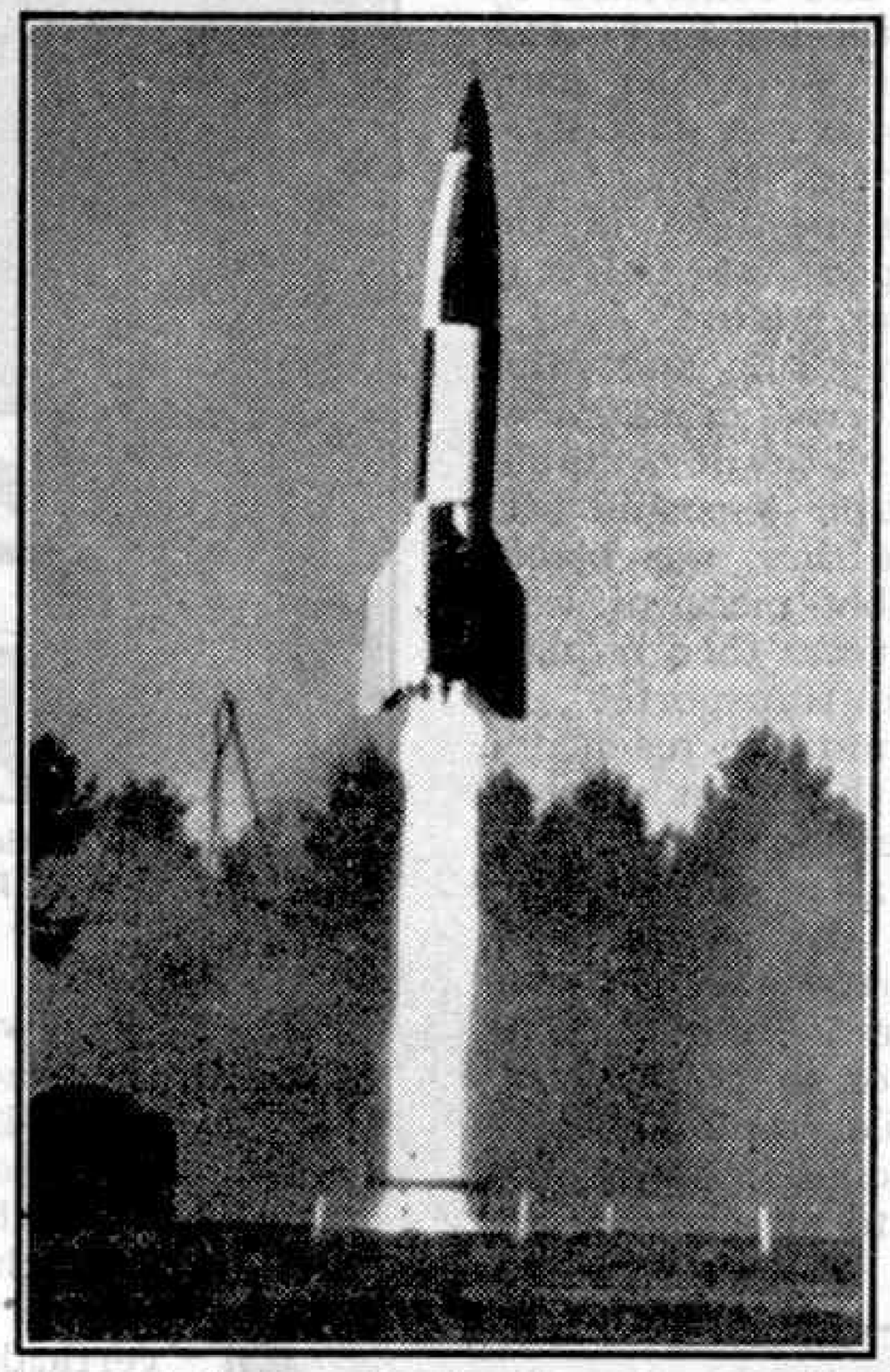
At the long awaited "X hour" the officer in charge ordered "*Feuer!*" and a puff of blue smoke suddenly erupting from underneath the rocket showed that the igniter had started. Pushing a button in the control car, one of the engineers caused air pressure to be applied to the main rocket tanks, and when sufficient pressure had been applied, the command "*Vorstufe!*" was given. This means "Preliminary Stage." The main alcohol valve was then slightly opened and a small quantity of fuel admitted to the combustion chamber; here it was at once set on fire by the igniter, and a short, stubby jet of bright flame flickered from the exhaust. This jet was anxiously scrutinized to see that it was burning properly and, if it were, "*Hauptstufe!*" or Main Stage followed immediately.

Then things really did begin to happen. Both main valves, alcohol and liquid oxygen, were fully opened, and the turbo-pump, driven it will be remembered by its own small rocket motor, roared into action. With a tremendous, deep ragged bellow the rocket rose comparatively slowly amid sheets of flame and swirling dust, and then shot rapidly upward, trailing a 70-ft. jet of brilliant flame behind it. As the projectile roared upward and dwindled from sight, a graceful vapour trail, similar to that sometimes created by a high-flying aircraft, streamed out in its wake.

For the first four seconds the rocket rose vertically, and then two of the jet rudders were automatically moved over to cause the nose of the weapon to incline in the direction of the target. This movement continued until the longitudinal axis of the rocket was about 47 deg. from the horizontal; thenceforward, until the fuel was cut off, these rudders held it steady at this inclination. Meanwhile, the other two jet rudders were keeping the A-4 on its correct lateral course and, assisted by the air rudders as and when necessary, preventing it from rolling about its long axis.

The A-4 was made to hit its target by causing the rocket to pass through a given point in space, heading on a certain course, at a certain upward inclination and at a particular speed. How the first two requirements were met has already been seen; the third, speed control, was achieved simply by throttling down and then shutting off the main power unit when the desired speed had been reached. This, together with the "angle of ascent" of the rocket at the same moment, decided the range.

After fuel cut-off, all the controls were centralized and the rocket went on its way as a free projectile, following a roughly parabolic curve, levelling off and then gradually going into its last ferocious dive on to the target. The maximum speed attainable by an A-4 rocket was in the region of 5,370 ft. per sec. or just over 3,600 m.p.h., but the normal impact speed was considerably lower, about 3,000 ft. per sec. or approximately 2,000 m.p.h. The reason for this lay in the friction of the atmosphere, which not only slowed down the rocket to such a marked degree, but also caused the whole structure to undergo very considerable heating; it is even possible that the A-4 glowed dull red in the last stages of flight.

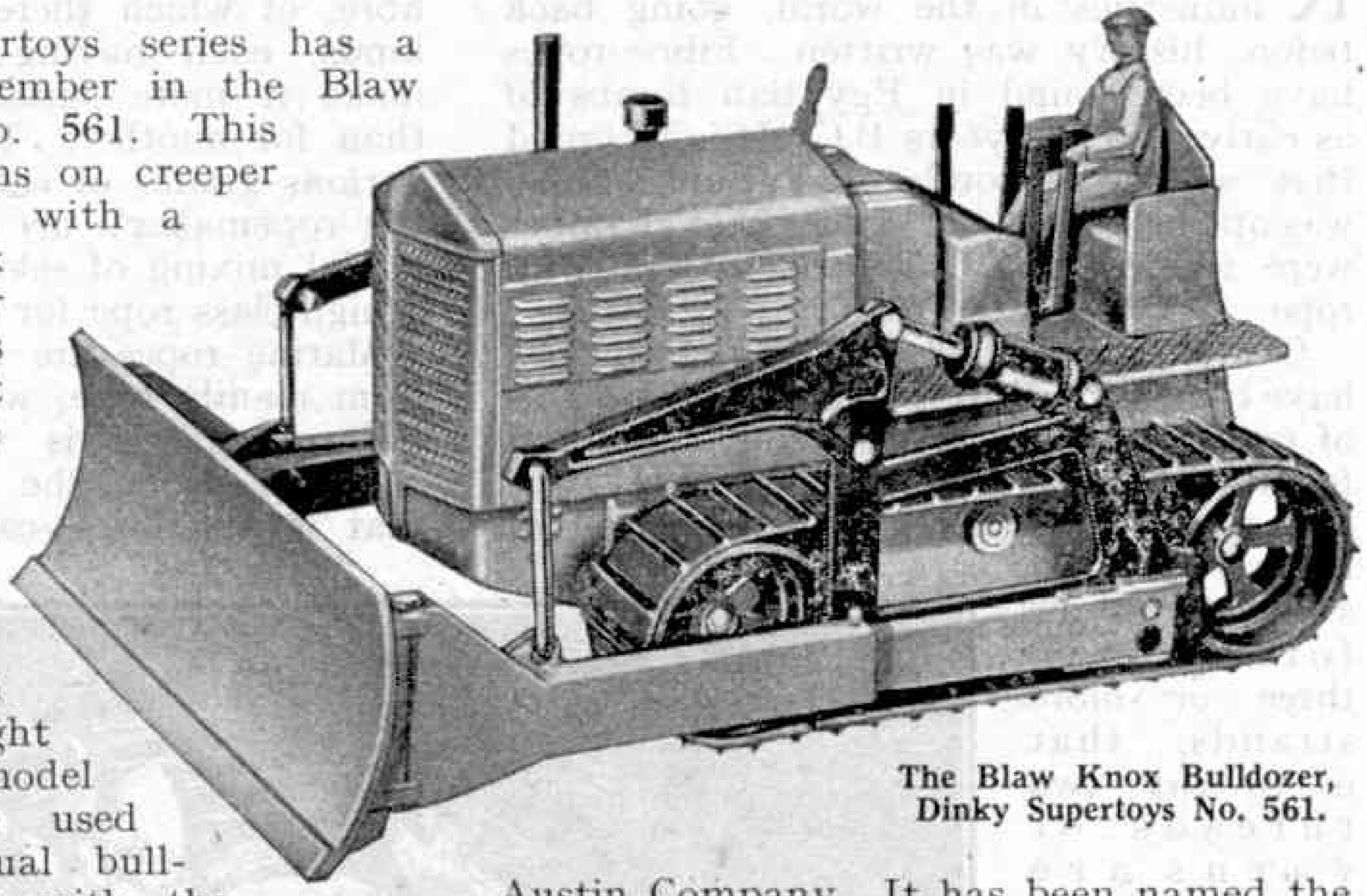


The rocket rises steadily from its launching platform, under the 25-ton thrust of its main motor. The cables at the left were automatically released an instant before the rocket rose.

Dinky Toys and Supertoys

Blaw Knox Bulldozer and Austin "Devon"

THE Dinky Supertoys series has a striking new member in the Blaw Knox Bulldozer, No. 561. This impressive model runs on creeper track and is fitted with a heavy framework carrying a bulldozer blade. The frame is correctly hinged at the rear, and the blade is lifted or lowered as desired by means of a lever. It is automatically locked in the raised position when the lever is pulled right back, so that the model can not only be used realistically for actual bull-dozing in miniature with the blade lowered, but also can be run to the site where it is to work with its blade held well above the ground.



The Blaw Knox Bulldozer, Dinky Supertoys No. 561.

The Blaw Knox Bulldozer with the blade raised.

On the real Blaw Knox bulldozer the blade is moved by a hydraulic mechanism, and the hydraulic cylinders on the actual machine, one on each side, are represented in miniature.

This handsome model is enamelled in red, except for the cylinders and actuating arms of the blade, which are black.

The illustration at the foot of this page shows the latest addition to the Dinky Toys series, a splendid reproduction of the Austin "Devon" saloon. This fine 10 h.p. car breaks new ground for the Austin Company. It has been named the A40 because, although the capacity of its engine is only 1,200 c.c., this actually develops 40 b.h.p. The handsome body extends out to the limits of the wheel tracks, with no running boards. The bonnet is of the alligator type, and the front appearance is in a style that is modern in tone, but does not depart unduly from Austin tradition.

The miniature faithfully follows the handsome lines of the bonnet and body-work, and reproduces well the curved mudguards and the stout bumpers front and back, with their over-riders.

* * * *

CORRECTION

In last month's Dinky Toys article the maximum speed of the Standard "Vanguard" on top gear was given as 50 m.p.h. This should have been 80 m.p.h.

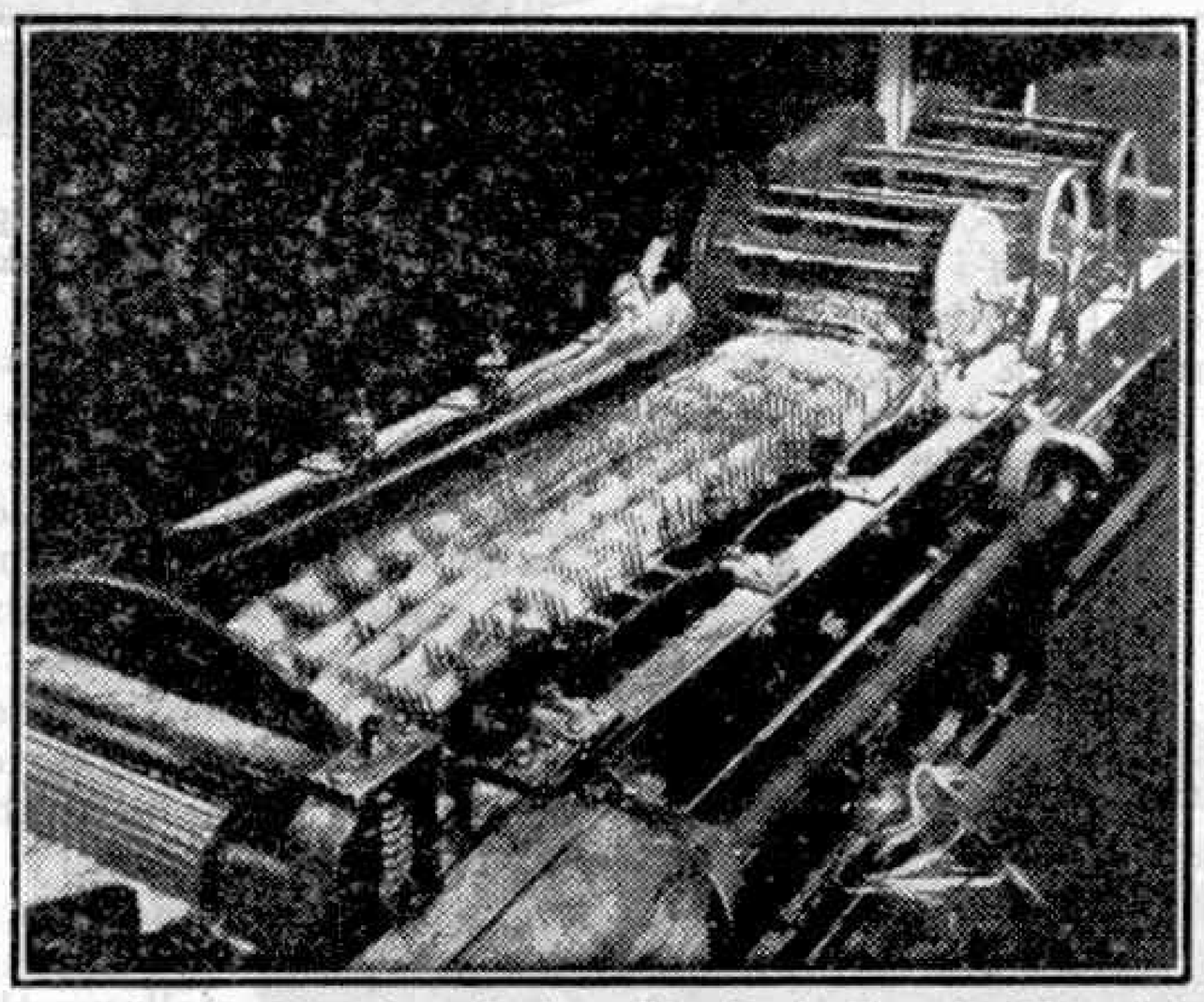


The Austin "Devon," Dinky Toys No. 40d.

Making Ropes From Fibre

ROPEMAKING is one of the oldest industries in the world, going back before history was written. Fibre ropes have been found in Egyptian tombs of as early as 3,000 years B.C. It is recorded that when the tomb of Tut-ankh-amen was opened, the doors of the inner chamber were found to be fastened with a 4-in. rope.

Over a long period various descriptions have been applied to different constructions of rope. Cordage is a general name used for all forms of rope, packing cord, lines and twines. A rope is a composition of more than six threads formed into three or more strands, that is to say two threads or yarns are twisted together to form a strand, and three or more of the strands are laid together to form a rope. Twine is one or more yarns, twisted together, made from soft hemp, jute, manila or sisal. Of these, sisal is generally used for packing purposes and binder and baler twine, and manila for making nets for the fishing industry. If required the twine can be polished with sizing materials.



Preparing the fibre for spinning. The illustrations to this article are reproduced by courtesy of British Ropes Ltd.

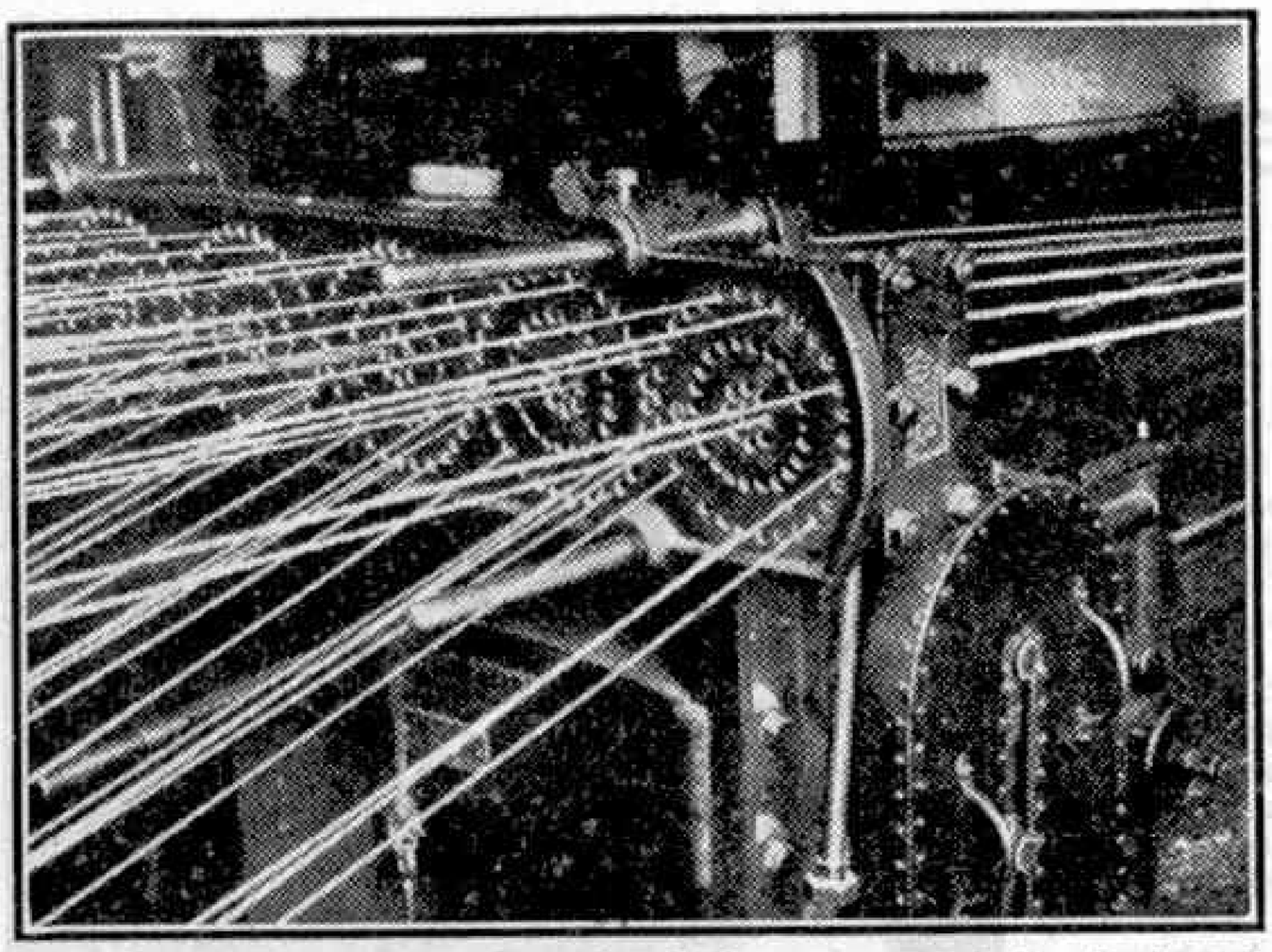
What is called the "lay" of a rope is a matter of interest. A rope is described as "hawser" laid when three strands, each consisting of a number of yarns, are twisted together. This is the general construction, as it is strongest. When four strands, each consisting of a number of yarns, are twisted together to form a rope, this is said to be "shroud" laid, a form that is mainly used for running gear, and over pulleys, as the surface wear is more evenly distributed. Three complete ropes laid together form a "cable"-laid rope. This can be of either right-hand or left-hand finish as desired, and is used where elasticity is required, as for towing springs.

The raw material of the ropemaker is fibre, of which there are many different kinds, each having characteristics that make it more suitable for one purpose than for another. Then again there are various grades of each fibre, and part of the ropemaker's art is the selection and skilful mixing of selected grades to make a high-class rope for a particular purpose.

Marine ropes are manufactured chiefly from manila fibre, which comes from the Philippines. It is very strong, and is obtained from the conjoint leaf stalk that forms the so-called stem of a tree, the non-edible plantain. The fibre is obtained by cutting down the trees near the root and stripping off the leaves just below their expansion. The different layers produce varying types of fibre, those towards the centre of the stem being white in colour and fine in texture, while the outside coverings are dull brown and coarse.

The other fibre most used is sisal, which is obtained from the fleshy leaves of one of the many varieties of agave. The bulk of the sisal used in this country comes from British East Africa. It is a clean white fibre and is used principally in the manufacture of binder twine and packing cords and twines. Other fibres in use are hemps from New Zealand, St. Helena and Mauritius. New Zealand hemp is softer than manila fibre and has a brownish tinge; St. Helena hemp is similar to that from New Zealand in texture, but is rather brighter in colour; while Mauritius hemp is white and similar to sisal, though it has very little sheen.

It should be noted that supplies of manila fibre were cut off in 1941 as a result of the Japanese occupation of the Philippines. It will be several years



The metal register plate through which yarns pass to the foreboard of the rope-making machine.

before it is again in full production, and as it is a dollar purchase only limited quantities can be available for Great Britain. An encouraging fact however is that experiments with special preservative treatments during the war have resulted in the production of sisal cordage that because of waterproofing and rot-proofing makes an effective substitute.

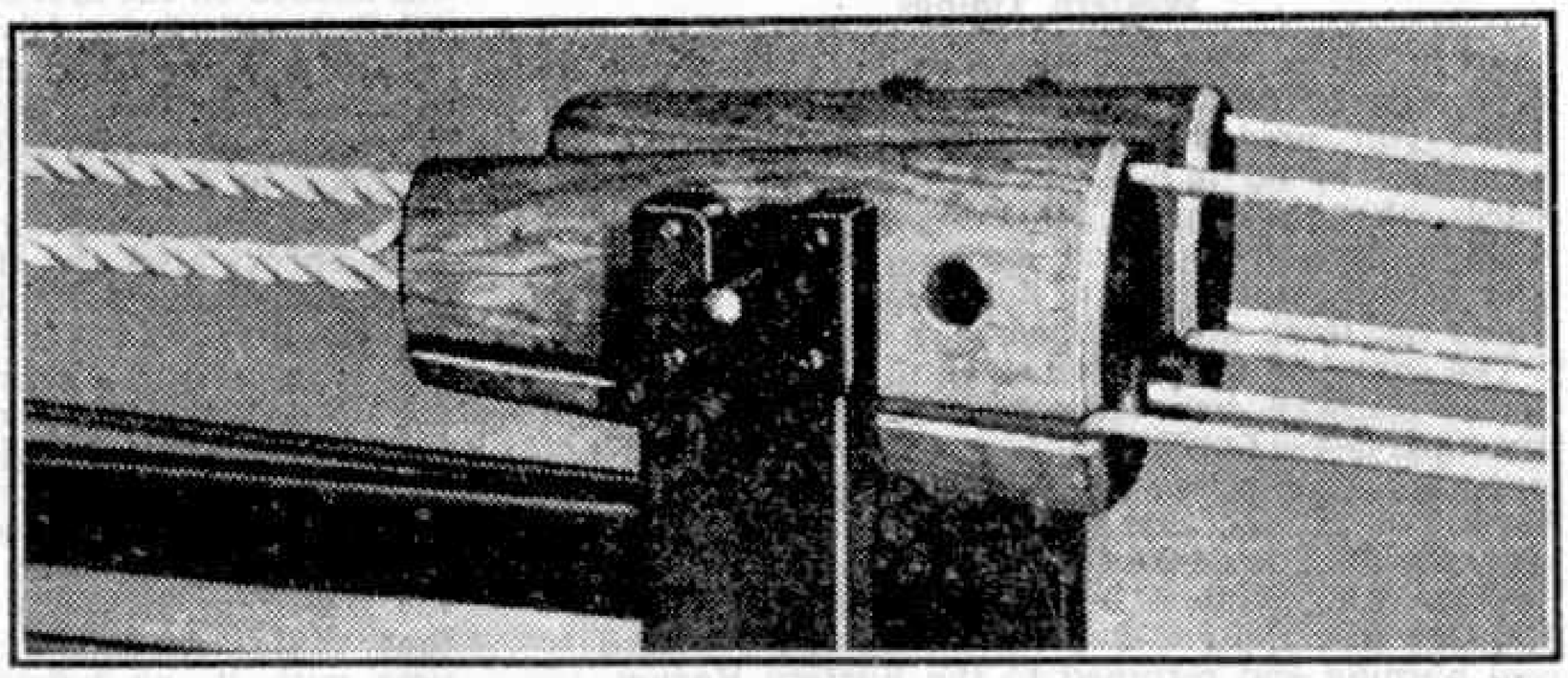
All these fibres are received in press-packed bales, the fibre itself being made up into bundles, or "heads" as the rope-makers call them, which have to be separated before the mechanical process can be begun. The initial process of preparing the fibre for spinning is performed in machines that have two sets of chains fitted with hackle pins or steel spikes. The first chain carries the fibre to the second, which travels at a greater speed, thereby combing and cleaning it. The fibre is fed to the machine in separate heads, and leaves it in a continuous ribbon or sliver as it is called. This process is repeated several times, and the fibre then reaches the second process, which is called drawing. Here the combing process is continued and the fibre emerges from the machine in finer slivers, which are controlled by variation in the speed of the feed and delivery, according to the size of yarn required.

The final process is carried out over automatic or gill spinners. Gill spinners are the latest development in high-speed production. The spinning process involves the conversion of the sliver, which consists of fibres laying parallel to one another, into a yarn composed of fibre with a predetermined twist according to size of yarn.

There are two methods of ropemaking in use to-day, one on the rope-walk, and the other by what are known as house machines. In the first of these, when the yarn is spun the bobbins on which it is wound are transported to the rope-walk or the ropemaking shops. The rope-walk is usually a long building furnished with rail tracks. The yarn is put on to bobbin racks or banks, and when drawn off is passed through a metal register plate, pierced with holes, which are formed in circles corresponding to the outer and inner yarns of the strand of the rope. After the yarns have passed through the register plate they are drawn through a tube in a fixed or standing part of the rope-making machine, which is known as the foreboard.

The combination of yarns, or strand as it is then known, drawn through the tube is attached to the traveller, which is a machine with a series of large revolving hooks. This machine travels down the rope-walk on the rail track, hauling out the strand or strands, and at the same time imparting the twist required. When the predetermined length of strand has been drawn off it is cut from the tube and attached to hooks on the foreboard, similar to those on the traveller.

When sufficient twist or turn has been imparted to the (*Continued on page 34*)



Laying a rope. The strands pass through grooves in a tapered piece of wood before being twisted together.

Railway Notes

By R. A. H. Weight

National News

It has been decided to adopt standard codes for describing or identifying passenger rolling stock in operating instructions and messages, by means of distinguishing letters, which will also be painted on the ends or sides of vehicles, as is already done in some Regions. "T" indicates third class; "F," first; "C," composite, meaning more than one class of accommodation; following letters will be observed such as: "L," lavatory; "K." corridor; "O," open (not compartment) coach. "R" preceding description of type of vehicle will mean that it is a restaurant or buffet car; "S" will similarly indicate a sleeping car. The tare weight also appears on the ends of most coaches and vans, the latter also having their own descriptive lettering.

Since the post-war resumption of excursion bookings, about three million passengers have been carried in special trains as well as many thousands more by ordinary services. Such facilities are to be continued during 1949, with other developments if circumstances permit. Circular tour tickets at reduced fares are being resumed for the benefit of ramblers and cyclists.

Oil fuelling of locomotives is being discontinued and the apparatus removed.

Railwaymen's badges worn on caps or clothing will gradually be modified to include British Railways' lettering and totem, and the Regional colour as seen on timetable covers and elsewhere.

British railwaymen are to have their own national boxing championships as part of a general scheme for furthering social and recreational activities, as well as fostering a spirit of competition among the Regions.

Some excellent "schools on wheels" fitted with instructional models, cinema projectors, loudspeakers, blackboards, fitters' benches, living and seating accommodation, etc., are already in existence, and make travelling tours of sheds and depots. Two new units, adapted from bogie coaches or vans, have just been completed at Derby and are commencing extensive travels.

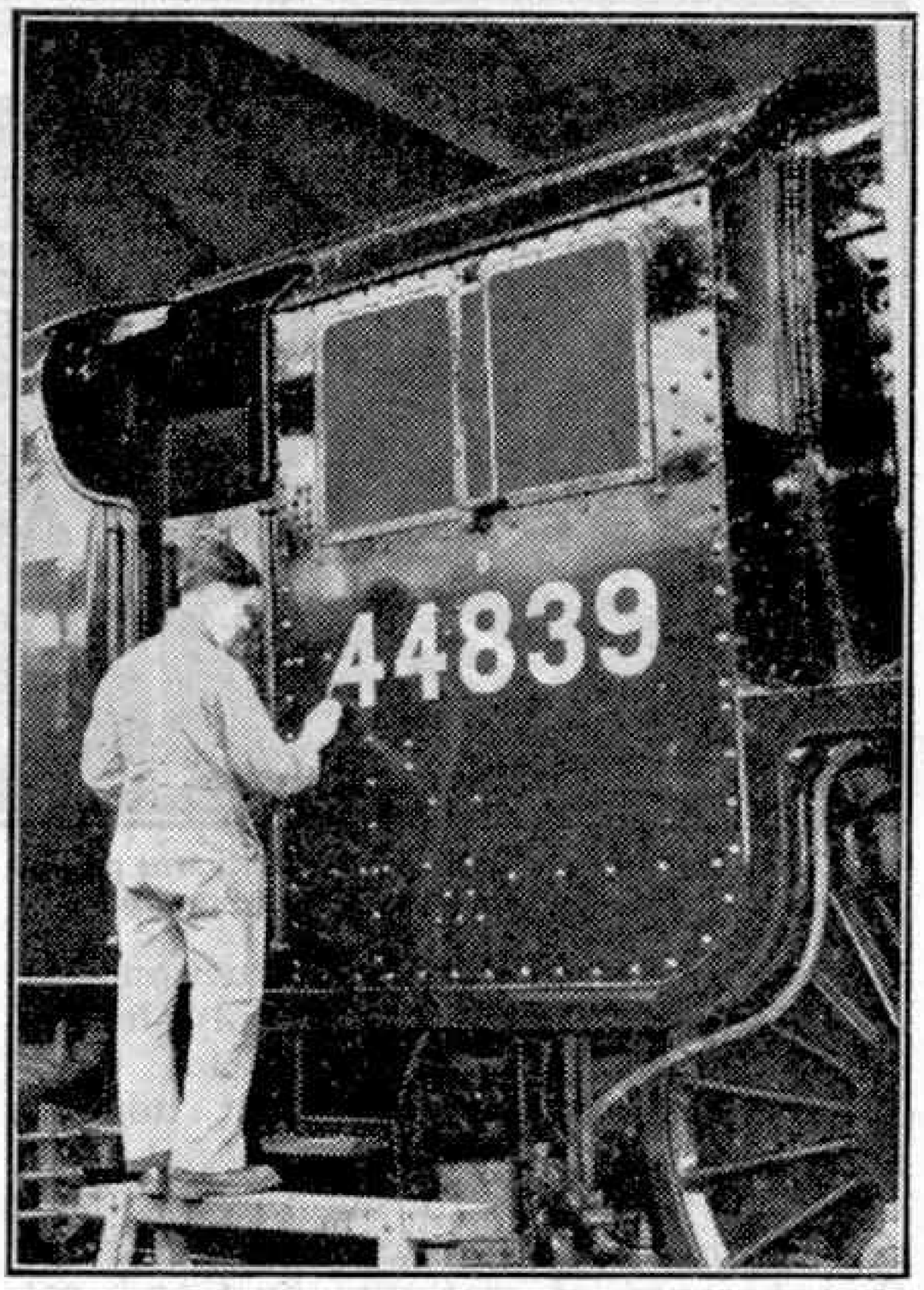
The North British Locomotive Co. Ltd., Glasgow, are turning out "L1" 2–6–4Ts to L.N.E.R. design, numbered from 67731 upward. Some are already at work on the King's Cross-Cambridge lines from Hitchin shed. We learn that Nos. 67735–6, painted lined black and fitted with electric light, went when new to Polmadie or Hamilton sheds, whence they have been working former L.M.S. duties to and from Glasgow Central. The North British Locomotive Co., like other British firms, have a number of important orders on hand for engines destined to work in various parts of the world.

Western Tidings

As in other Regions, there is not yet a settled locomotive or rolling stock painting policy, so Swindon styles still predominate. Higher speeds up to a maximum of 85 m.p.h. are now allowed in certain places, though a more general permitted maximum is 75; reduction to much lower speeds is necessary past certain stations and junctions, over curves, or where the track and roadbed may be under repair.

The complete locomotive stock of the narrow gauge Corris Railway has been condemned, consisting of two tiny 0–4–2Ts, Nos. 3–4, which we described not long ago. Withdrawals continue of some of the 51xx 2–6–2T, because new 41xx ones have come into service, numbered 4160–7, largely for use in South Wales. Latest 0–6–0Ts include Nos. 7435–9. Ministry of Supply 2–8–0 No. 63152 has reverted to coal burning and returned to the Eastern Region.

Locomotive performance varies a good deal in these difficult days, but we are glad this month to be able



Putting the finishing touches to the number of a London Midland locomotive. British Railways Official Photograph.

to give brief details of several excellent runs of which logs are to hand. The 2¼ hour business man's expresses between Paddington and Birmingham, calling at High Wycombe, are not easy to work, in view of the extra speed restrictions at several points. They are not "King" turns. A fine 10-coach set is provided weighing 335 tons empty. Northbound from Paddington at 9.0 a.m. the latest "Castle," No. 7017, "*G. J. Churchward*," was stopped by signal before Westbourne Park, just out of the terminus, then checked before High Wycombe, where the arrival was 2 min. late. After getting away well uphill, and touching 80 m.p.h. after Princes Risborough, came the long-lasting dead slowing past redrainage works at Haddenham. The performance throughout was of a high order; notwithstanding three more slowings, Snow Hill, Birmingham, was reached to time—equivalent to a non-stop run from London, unchecked apart from normal slacks, in 118½ min. for 110½ miles.

The return train leaving Birmingham at 4.50 p.m. was headed on the first occasion by one of the modified "Halls" with 6 ft. driving wheels, No. 6974, which provided some hurricane travelling. A fast start and a maximum of 85 down Hatton bank took the train through Leamington, 23¼ miles, in 24¼ min., Banbury, 43 miles, in 46½ min., two minutes early. After that there was an easing, but although there were four other checks after the Haddenham crawl, Paddington was reached approximately to time. For the second run "County" No. 1021 "*County of Montgomery*," of the high-pressure intermediate express type, was the steed, and did not run so fast, but maintained a good average, with quicker travel through Bicester and beyond to give time in hand for the Haddenham delay, so reaching Wycombe punctually.

The mid-day up train on Saturday with 15 coaches, 494 tons tare or about 530 gross, is very heavy for that route, though a "*Castle*" unaided has kept time with it, on balance. Pilot assistance is given to these engines sometimes when loads are heavy between Leamington and Banbury or Birmingham.



The latest Southern Electric locomotive No. 20003. It can work continuously for several days and nights and haul passenger trains at speeds up to 75 m.p.h., or 1,000 ton freight trains. British Railways Official Photograph.

One of the more usual engines, No. 6005, "*King George II*," of Wolverhampton, when timed from Leamington improved on schedule most of the way when circumstances allowed, stopping at Banbury and Bicester. The maximum speed approaching Greenford was 70¼, and this heavy train was in Paddington well ahead of time on a schedule allowing some recovery margin when operated by a "King" in good condition.

No. 7014 "*Caerhays Castle*," of the latest batch, on the noon luncheon car express from Bristol to London, with "13 on," 430 tons full, had to draw up to get the whole train to the platform at Bath, then suffered two long signal stops before Chippenham, which station was left 12½ min. late. Including a slowing through Reading, the 71½ miles between Swindon and Ealing were covered in 69½ min. on an almost perfectly graded road, giving an arrival at Paddington less than 10 min. late. Since this run was recorded the train has been notably accelerated, being allowed only 80 min. from passing Swindon to arrival at Paddington. "*Caerhays Castle*" achieved this with ease.

Two further "Bulldog" 4–4–0s with 5 ft. 8 in. driving wheels have been condemned. These are No. 3335, unnamed, of the earlier series, and No. 3445 "*Flamingo*" of the last lot built.

London Midland Region

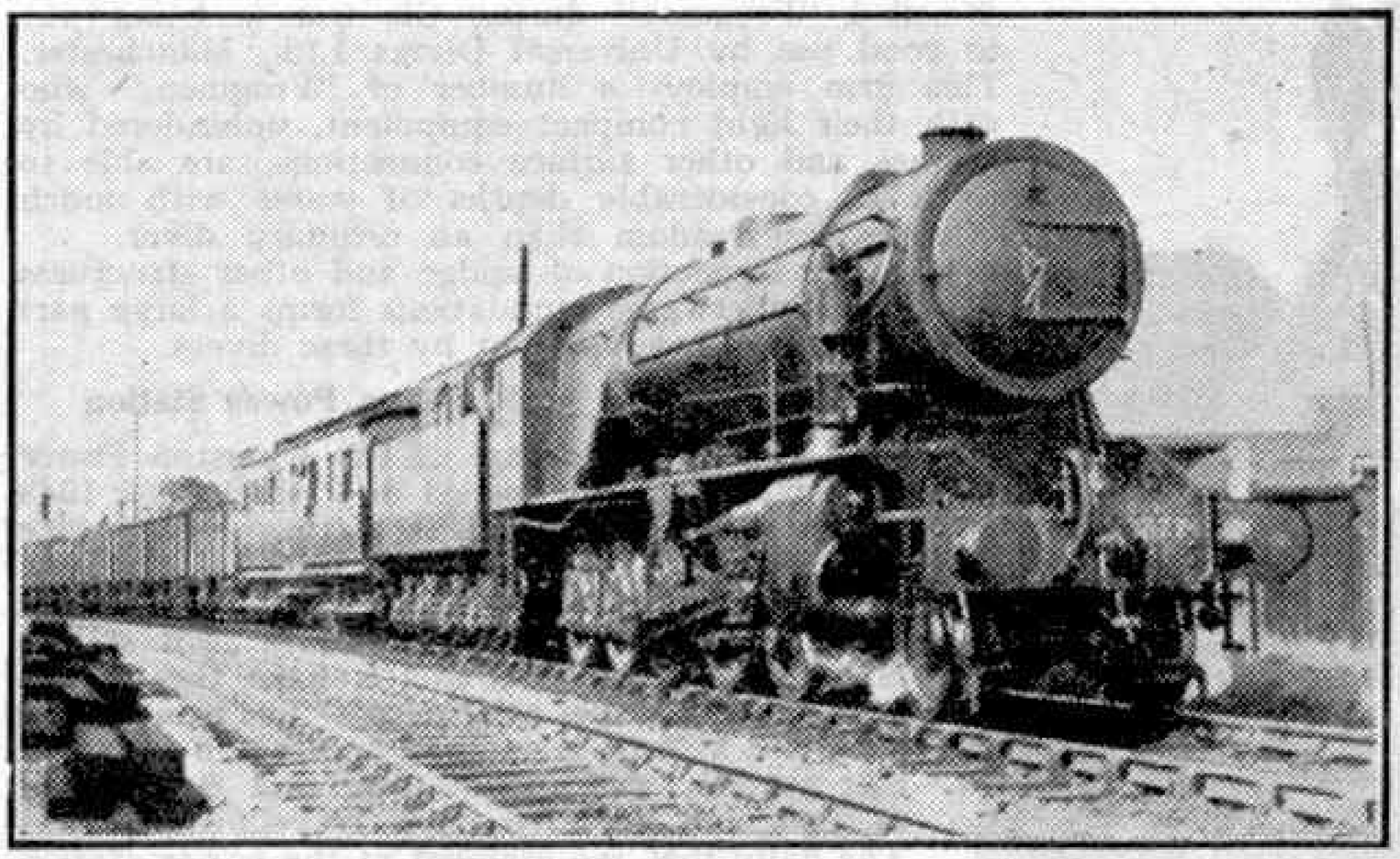
As we foreshadowed some months ago, historic locomotive names, which in some cases date back almost to the earliest years of railways and have been carried by a succession of gradually larger engines, have been chosen for eight of the "Patriot" 4–6–0s which are to be converted to "6P" with the tapered boiler. No. 45545, "*Planet*," the first, was ready in November last. The other selected names are "*Vulcan*," "*Goliath*," "*Courier*," "*Velocipede*," "*Champion*," "*Dragon*" and "*Harlequin*." Class "5" 4–6–0s Nos. 44755–6, with Caprotti gear, also have double chimneys.

Nos. 44709–12, built at Horwich, are allocated to Crewe, 5A. "4P" 2–6–4Ts Nos. 42170–4, completed at Derby, have all gone to Scotland: the first three to Polmadie, 27A, and the last two to 28C, Carstairs. More light 2–6–2Ts, "2P," from Crewe are allotted chiefly to Midlands or North Wales depots as follows: Nos. 41223–4, 7B, Llandudno Junction; No. 41225, 3B, Bushbury; No. 41226, 3C, Walsall; Nos. 41227–8, 2E, Warwick; and No. 41229, 5A, Crewe. They are seen on many parts of the system.

"Royal Scots" have been reported working through between Glasgow and Manchester, via Preston. The only "7P" 4–6–2 to retain streamlined casing at the time of writing is No. 6243, "*City of Lancaster*." There are some dark blue, also green, experimentally painted express engines still running.

The L.M.R. transported 546,414 wagons of coal during four weeks ending October 31st last. "Save the lbs. and so help to save the £s" runs a coal-saving appeal to operating staff.

Various station platforms, bridges and retaining walls are to be renewed or repaired.



A Ministry of Supply 2-10-0 No. 73774 on test with a dynamometer car on a Bristol - Eastleigh coal train. Photograph by A. F. Cook.

New Southern Names

The names of the first two "Merchant Navy" 4–6–2s of the series of 10 under construction are announced as: No. 35021, "*New Zealand Line*": No. 35022, "*Holland America Line*." "West Countries" Nos. 34042–3 are named respectively: "*Dorchester*," "*Combe Martin*"; "Battle of Britain" series: No. 34060, "*25 Squadron*"; No. 34082, "*615 Squadron*."

Engineering Notes

Two Fine Excavating Mechanisms

Many kinds of public utility services such as electricity, gas and water require the construction of miles of small trenches to accommodate the various pipes and cables. Until comparatively recent years such trenches had to be cut by manual labour, but nowadays various ingenious machines are available to do the work much more quickly and cheaply. One of these machines is the trench excavator shown in the lower illustration. It is a product of John Allen and Sons (Oxford) Ltd., and can dig a trench only 13 in. wide to a depth of 6 ft., a task that a man using a shovel would find impossible as he would require a wider space to work satisfactorily at such a depth. In normal working, in ordinary soil, the machine will cut about 30 yards of trench 13 in. wide and 3 ft. deep in one day. The chain of digging buckets is driven by a diesel engine, and an oil-operated hydraulic system is provided for raising or lowering the boom. The machine is mounted on creeper tracks and can travel along roads at speeds of either 2½ or 4 miles per hour.

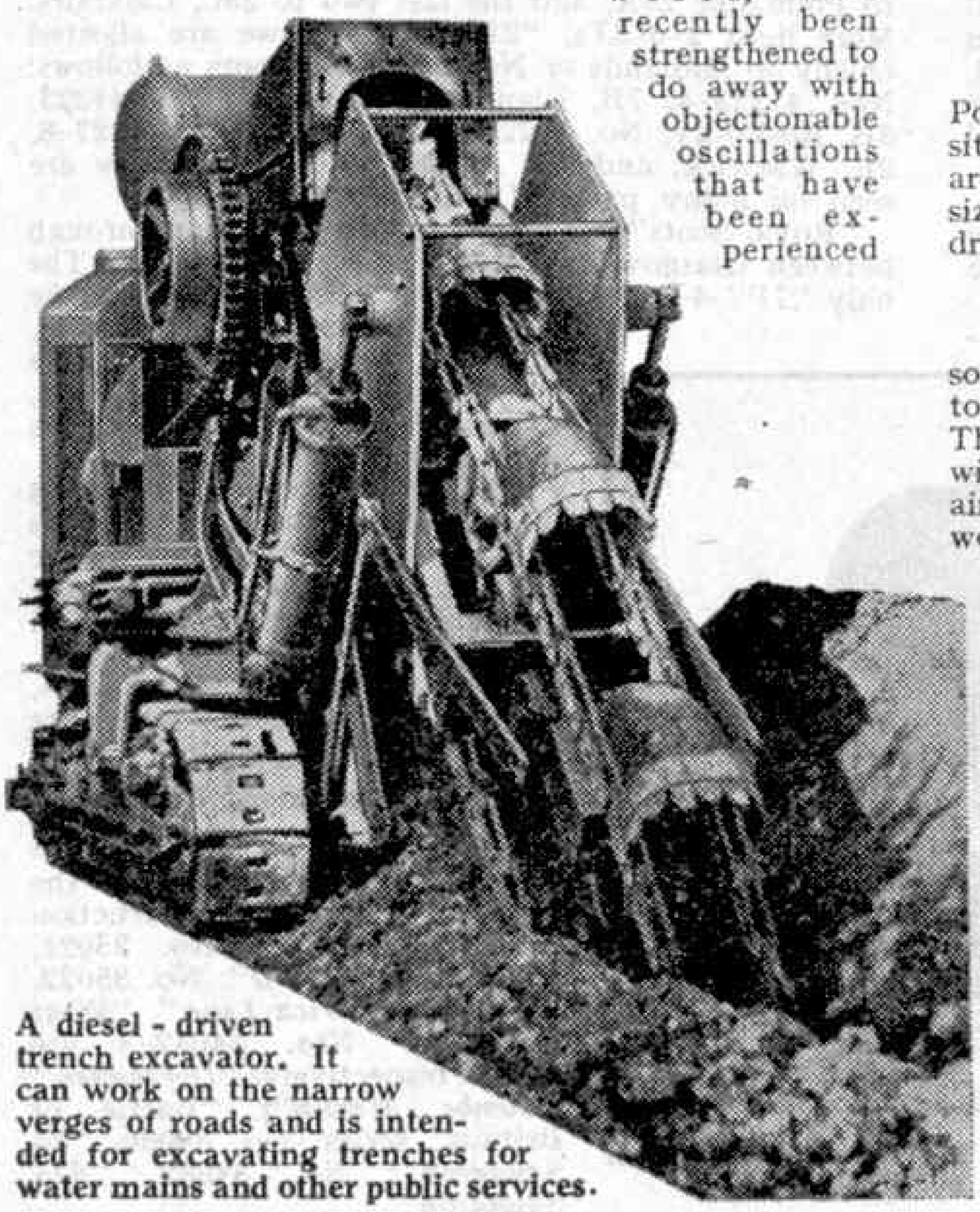
A different type of excavator is the Mobile Shovel shown in the upper illustration. This machine, which is also a product of John Allen and Sons Ltd., can be used either as a shovel or a crane. It is driven by a diesel engine, and when used as an excavator is fitted with a shovel of ½ cu. yd. capacity, working on a boom 15 ft. 3 in. in length. This boom is replaced by a trellis girder jib 25 ft.–30 ft. long when the machine is used as a crane.

Strengthening a Great Bridge

The Whitestone suspension bridge, New York, which is the fourth largest suspension bridge in the world, has recently been strengthened to do away with objectionable oscillations that have been experienced ever since it was built in 1939. By reinforcing certain of the main girders in the bridge it is hoped that the oscillations will be reduced or eliminated; and while this work has been in progress opportunity has been taken to widen the deck so as to provide a three-lane roadway, 31 ft. in width, for each direction of traffic. The bridge has a length of 2,300 ft. between the towers and end spans of 735 ft. each.



The mobile excavator-crane mentioned on this page. This machine and the one shown below are products of John Allen and Sons (Oxford) Ltd.



A diesel - driven trench excavator. It can work on the narrow verges of roads and is intended for excavating trenches for water mains and other public services.

A New Harbour in Mozambique

A great new harbour, which may prove to be the finest south of the Equator, is now under construction in Nacala in the Portuguese colony at Mozambique. The harbour is situated in the bay of Fernao Veloso, and its inner area could provide anchorage for several ships of the size of the "*Queen Elizabeth*" without any preliminary dredging.

"Frogmen" at Work Again

Experience of underwater working gained by the so-called "Frogmen" during the war is being put to good use by Universal Divers Ltd., Manchester. This firm employs a number of "Frogmen," who with their light compact equipment, unhindered by airlines and other surface connections, are able to work in considerable depths of water with much greater freedom than an ordinary diver.

The inspection of bridge and other structures with underwater foundations forms a large part of the work carried out by these divers.

Coal Handling at Kingston Power Station

An interesting feature of the Kingston Power Station, which was opened on 27th October 1948 by the King and Queen, is a transporter bridge that spans the full 200 ft. width of the coal storage area. This serves the double purpose of distributing the coal over the area as it arrives in barges, and of removing it from the storage area to the furnaces as required. The transporter, complete with its reclaiming cranes and conveyor belt system, weighs 350 tons, and is mounted at each end on a 16-wheel travelling carriage. The daily fuel requirement of the power station under full-load conditions is between 1,000 and 1,200 tons.

Story of the Widnes Foundry

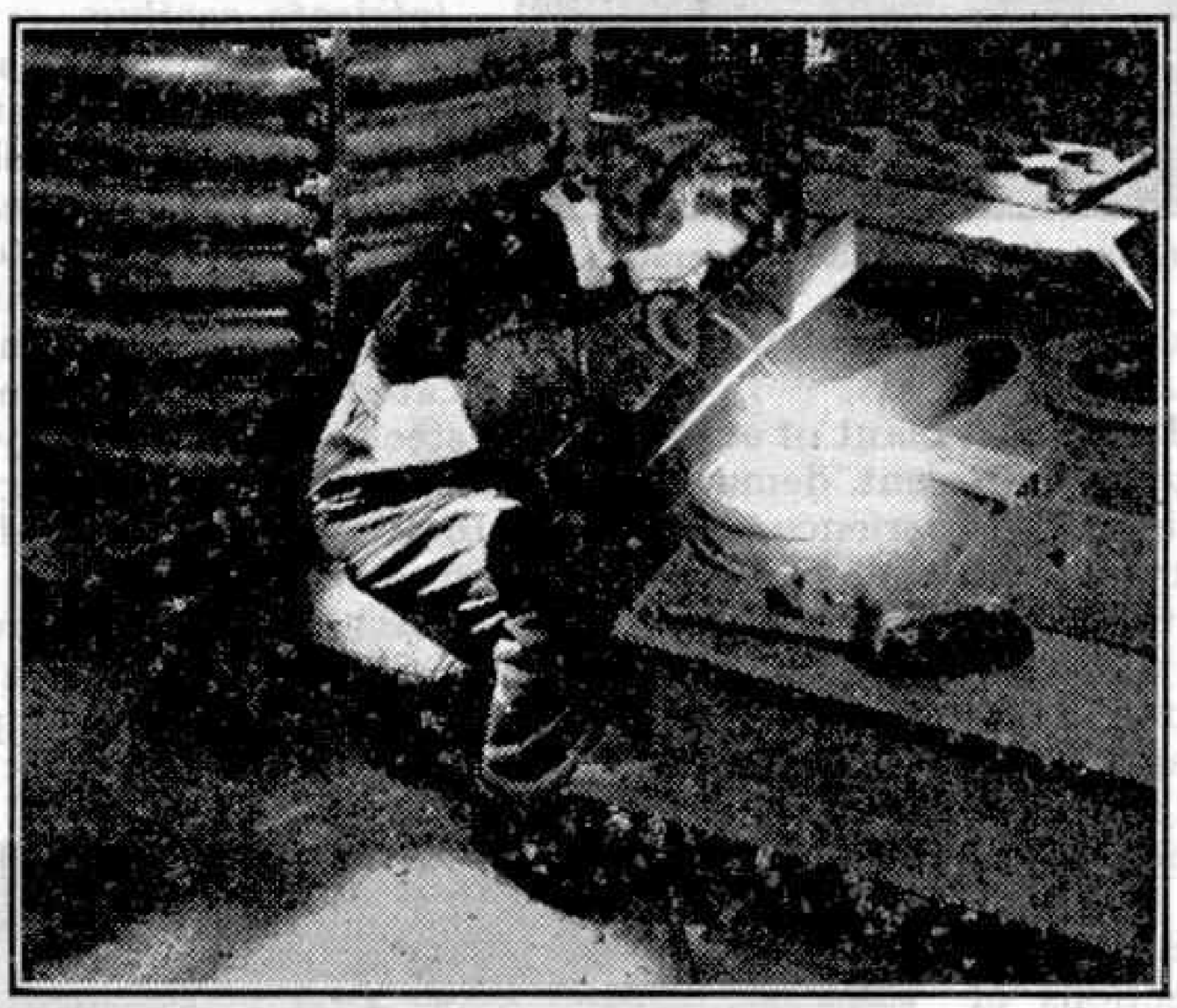
A Century of Engineering Development

TOWARDS the close of the 18th century, the industrial life of this country sprang into an extraordinary fullness of working achievement; many abstract sciences burst from their academic seclusion to reshape the entire practice of craftsmanship, manufacture and commerce. The impact of the new era was particularly noticeable in the Widnes-St. Helens area, which even at that time was renowned for its special industries and its community of skilful artisans and inventive mechanics.

The early history of the Widnes Foundry is largely the biographical record of one man, Thomas Robinson, born in St. Helens on 8th May 1814. He came of lowly folk, and as an orphan was adopted by his uncle John Cook, a tradesman of the town. After a very short period at a local school young Robinson went to Northwich to work in a chemist's shop. The dull routine job failed to appeal to him; he wanted to work to real purpose and to exercise his creative instinct in the making of useful things. A neighbouring smithy attracted him irresistibly, and apparently he was more often to be found helping at the anvil than weighing out the chemist's salts.

Very naturally his job soon came to an end, and he was sent to be a blacksmith's apprentice at the Wheelock Forge near Crewe. This was fortunate for him, for he now found himself in a job that really appealed to him. In due course he moved from the Wheelock Forge to other jobs, and finally, as a regular journeyman blacksmith, now 26 years old, he took up work in Liverpool. This employment called for a daily journey of 10 miles each way to and from his home in St. Helens and this he walked six days a week. Blacksmiths were busy and well paid men in those days, but, even with the £6 a week he is said to have earned, 20 miles each day shows the calibre of the man.

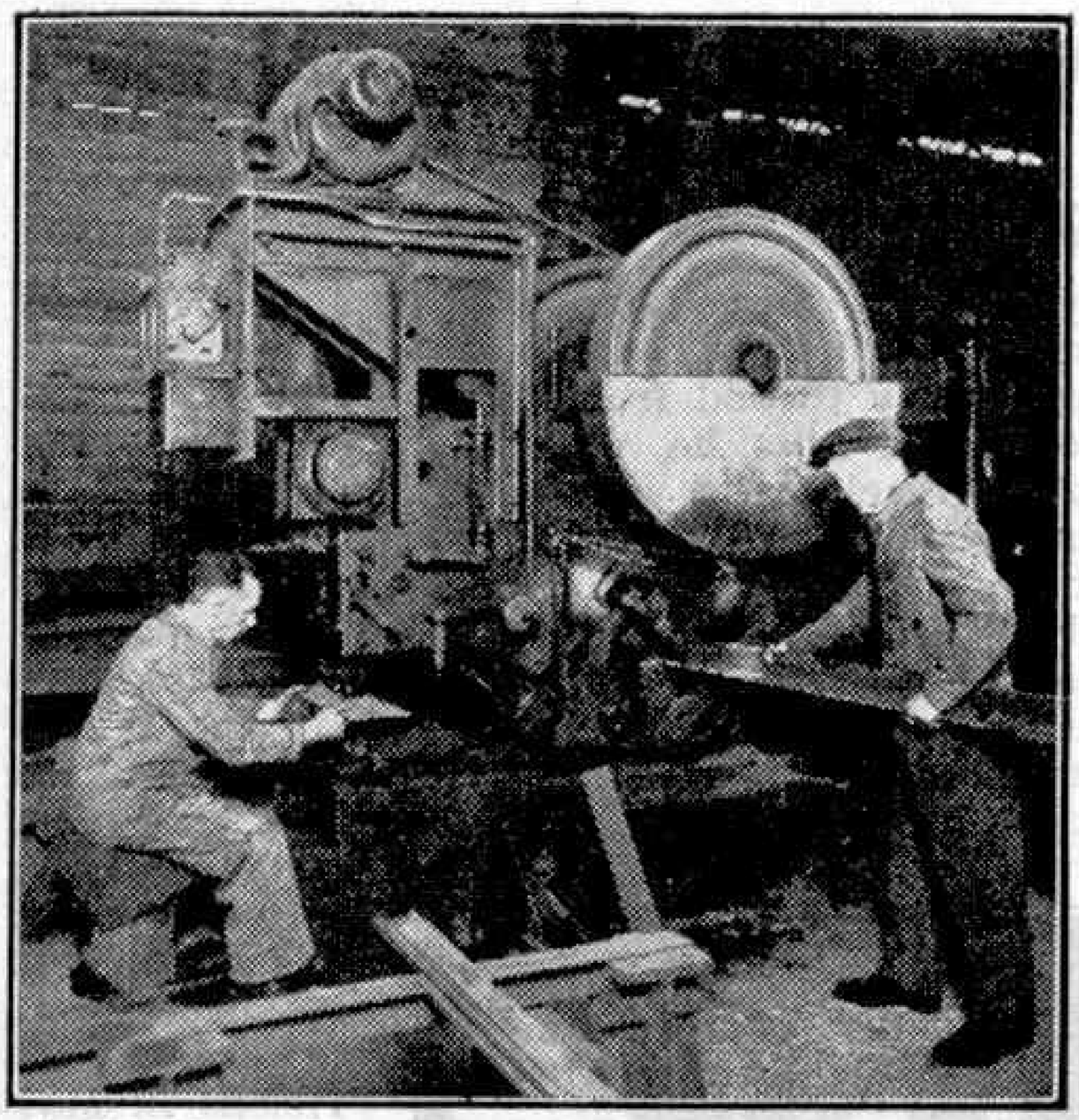
It was natural for a man of Robinson's mettle to seek independence, and it was not long before he set up in business with his uncle John Cook. Robinson and Cook, Engineers and Ironfounders, began business in a small workshop in St. Helens in May 1841. The modest little firm prospered amazingly. Robinson himself was the operative engineer, Cook was the "sleeping partner" who provided much of the financial requirements of the business. While blacksmith's work formed the bulk of his activities, Robinson showed himself a gifted inventor of machines and plant. He originated glass grinding machines, devised new methods of moulding and casting in iron and earthenware, and designed chemical process plants. Many of these inventions of his came into general use, and some, with only slight modifications, are in common practice to this day.



Electric arc welding in the Constructional Department of the Widnes Foundry. The operator shown was a war-time trainee who became one of the most skilled electric welders the Company have ever employed. For the illustrations to this article we are indebted to the Widnes Foundry and Engineering Co. Ltd.

During the 1914–18 war the firm produced a great deal of plant for the manufacture of high explosives and special equipment for the making of finer chemicals and drugs.

In 1936 the company was bought by Thos. W. Ward Ltd. of Sheffield, and constituted as a separate undertaking



A "Pels" cropping and punching machine in operation.

under the style of Widnes Foundry and Engineering Co. Ltd.

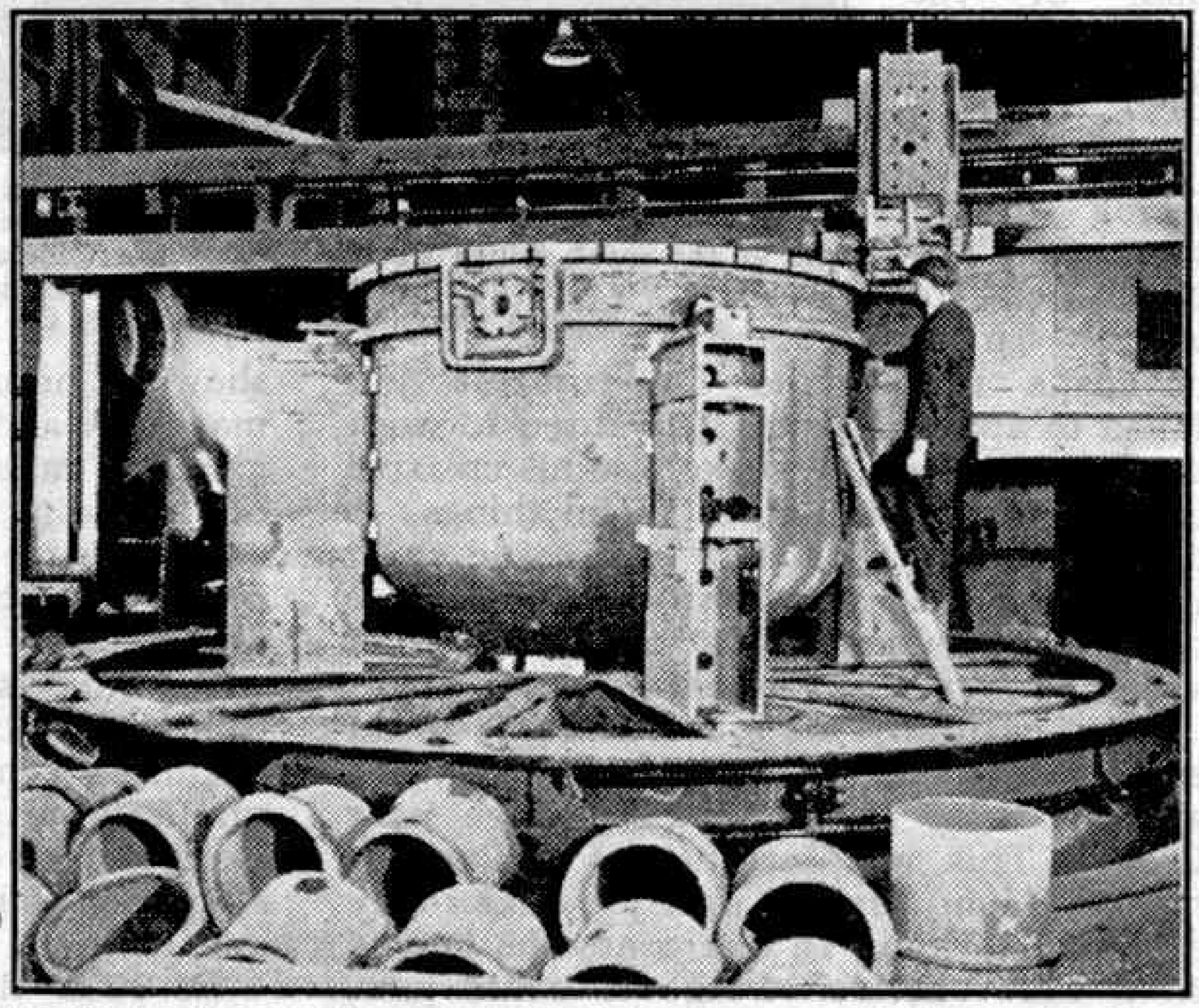
In World War II chemical plant of every description was again in urgent demand, and Widnes Foundry experience and productive capacity was extended to the full. The Constructional Department turned out a great variety of equipment, including parts for Bailey Bridges, pre-fabricated ship units, portable cranes for Admiralty and Royal Engineers, and gun settings for the Navy.

Now let us take a glance at some of the sections of the Widnes Foundry. The accuracy of every casting depends primarily on the skilled technical knowledge of the pattern-maker. In the pattern shop, which is equipped with every conceivable item of wood-working equipment, are built up skilfully adapted prototypes from which the moulder prepares his forms. Picture 1, on the next page shows one of the firm's oldest pattern-makers, who began work at the Foundry over 35 years ago. After the pattern-maker, the moulder's skilled technique is the next requirement in the production of good castings. Picture 2 shows the preparation of the mould for a crane barrel casting.

The shops produce castings of various types up to 25 tons. Special care is taken of the melts and Picture 3 shows the exciting job of metal pouring.

After casting, the skill of the dresser comes into play. Pneumatic tools are of course largely utilized for this work, but much is still done by the original method of hammer and chisel. Inspection is specially emphasized. Only the best castings, free from hard spots and porosity, are allowed to go forward to the machine shop. Picture 4 shows a dresser at work with a pneumatic chisel on the interior of an intricate casting.

The Constructional Department at Widnes was completely re-organized in 1939. The same skilled hands that built Bailey Bridges, pre-fabricated ship components and Mulberry Harbour equipment during the war years, now produce an infinite variety of fabricated construction in mild and stainless steels. Picture 5 shows plate-bending rolls capable of forming cylindrical shapes up to 16 ft. 8 in. wide, of 1 in. mild steel. Alternative rolls increase the capacity of the machine to the accommodation of plates 27 ft. wide of $\frac{3}{8}$ in. thickness. The work shown under manipulation is 8 ft. 8 in. in diameter.



The body of a cast iron still being machined on a vertical boring machine. The table diameter of this machine is 21 ft.

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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, and certain others that will be indicated, these should be ordered through a bookseller.

"BUTTERFLY HAUNTS"

By L. Hugh Newman, F.R.E.S., F.R.H.S. (Chapman & Hall. 21/-)

Mr. Newman, who has contributed many fine articles on butterflies and other insects to the "*M.M.*," has had the happy idea of presenting the butterflies of Great Britain in their natural surroundings. To each of 64 of these, all genuine living British species, he has devoted two opposite pages in this book. First in each of these sections comes a good reproduction of a suitable photograph of the butterfly itself, usually on its typical food plant, and on the opposite page there is an excellent reproduction of the kind of scene in which it can be found. In some cases indeed there are two of these photographs, but the page is a large one, measuring 9¾ in. by 7 in., and the illustrations are impressive in size as well as delightful in subject. There is also a brief account of the insect itself.

To the expert this handsome volume will bring back the joys of summer days during winter, and it will quicken the interest of the novice. As Brian Vesey-Fitzgerald points out in his appreciative foreword, however, there is more here than beauty. The author is an expert on butterflies, and although he has not tried to put all his knowledge into this book, he has contrived in the space available to give his readers a wealth of accurate information about the butterflies dealt with.

"THE BOYS' BOOK OF ENGINES, MOTORS AND TURBINES"

By Alfred Morgan (Stanmore Press. 10/6)

Mr. Morgan is well known as the author of successful books on electricity and other topics, specially written for boys, and here is another volume from him on a subject of outstanding interest. His book provides both instruction and recreation for its readers.

The author first explains simply how steam and oil engines of all kinds work, how electricity is produced and applied, and how water wheels and water turbines act. Then he turns to the building of working models. The reader is shown how to make small water wheels, a steam engine, a steam turbine and an engine that will run on "dry ice." He learns also how to make a toy electric motor that will operate on current from a battery, and a synchronous motor.

All the models described in the book have actually been built by boys, and no snags are likely to arise when the instructions given are faithfully followed. The plans are practical and the material required is inexpensive. The book indeed is one that will delight the fortunate boy who obtains a copy.

"YELLOWFACE"

By H. Mortimer Batten (Evans. 6/- net)

This story by Mr. Mortimer Batten has for its scene the Canadian woodlands. Donnie Hughes is a trader, travelling from camp to camp in the woodlands by canoe, and on his trips he is accompanied by Banska, a bear cub that he has adopted. His trading is successful, but he runs foul of Johnson, known as Yellowface because of his curious appearance. Yellowface is a dangerous enemy who nearly kills Donnie, being thwarted only by Banska, who attacks the villain. The sequel is very exciting. Yellowface is captured after a long chase, but escapes from the police, only to come to a final reckoning with Banska, who rids the world of a dangerous criminal.

This adventure story is packed with thrills from start to finish, and is one of the best of its kind that the author has written.

"IN NATURE'S WORKSHOP"

By Norman Wymer (Harrap. 8/6 net)

The sub-title of this book is "*With the Creepy-Crawlies,*" a description that gives a clue to the marvellous creatures dealt with. These range from the worm, distinguished as the ploughman, to the ant, which is a natural architect, the silk worm, a maker of fine thread, and the oyster, which produces pearls. Altogether 13 of Nature's workers are dealt with in turn, but not in a dry account of their lives and works; instead we have their stories as told to two brothers by their father in pleasant short talks, during which the actual work of the creatures concerned is examined. For instance, the story of the wasp as a paper maker begins with the digging out of a wasps' nest, which allows the boys to see exactly how this is constructed and how it sheds light on wasp life. The story winds up with a surprising estimate of the value of the creepy-crawlies to ourselves.

Most boys will be vastly interested in the book, which will introduce them to a world that is strange to most people, but nevertheless is very attractive and full of surprises. The illustrations include four full page plates in colour and a large number of line drawings in the text.

"THE McINTOSH LOCOMOTIVES OF THE CALEDONIAN RAILWAY"

By A. B. McLeod (Ian Allan Ltd. 3/6)

This is a revised and enlarged version of the "*McIntosh Locomotives*" book reviewed in the "*M.M.*" in March 1945. It follows the same general plan, dealing in a concise yet very readable manner with each class in turn of the well-known series of engines put into service on the former Caledonian Railway by J. F. McIntosh, who ruled at St. Rollox from 1895 to 1914. These were remarkable for consistency in design and appearance, strongly built and hard-working, yet elegant and attractively finished. Excellent illustrations of the engines in characteristic attitudes on such trains as the "*Grampian Corridor,*" the "*Granite City*" and the "*West Coast Postal*" are given, with principal dimensions and interesting facts of each class, and there are useful details of the post-grouping history of the locomotives.

Copies can be obtained from booksellers, or direct from Ian Allan Ltd., Mail Order Department, 33, Knollys Road, Streatham, London S.W.16, price 3/8½ including postage.

"BUILDING PASSENGER ROLLING STOCK" "WAGON AND VAN CONSTRUCTION"

By Ernest F. Carter (Percival Marshall & Co. Ltd. 3/- each)

Here are two more of Mr. Carter's constructional handbooks on railway subjects. They are intended for the enthusiasts who revel in building their own rolling stock. Each begins with general remarks on the types of real rolling stock concerned, and then deals fully with their reproduction in miniature, giving details of materials, methods and tools, with hints on overcoming the inevitable snags that arise to plague the beginner. This is followed by useful information on the painting and finishing processes. Both books are thoroughly practical, and useful to the more experienced model railway owner as well as the beginner.

Illustrations consist of drawings showing constructional details, with scale drawings of a selected prototype in each. The author shows great ingenuity in making fittings from commonplace articles.

"CIGARETTE CARD CAVALCADE"

By A. J. Cruse
(Vawser and Wiles Ltd. 10/6 net)

No cigarette cards have been issued since 1940 and owing to shortage of paper it may be some time before more come along. If anything, this lapse has increased their interest for collectors, who will welcome this interesting survey. The hobby is not confined to schoolboys. Many of those who no doubt began to collect cards when they were very young have retained their interest in later life. This is not surprising, for in a way the cards have produced a passing pageant of the times in which they were issued, and hunting down rare sets and examples provides the collector with all the pleasures of the chase.

Mr. Cruse remarks that there are over 3,000 series of British cards, while more than 500 British sets have been issued overseas and over 750 by foreign manufacturers. The earliest cards of course were used only as stiffeners, and 70 years ago some of these carried pictures, usually of actresses and glamorous beauties. One day in 1878 Edward Bok picked up one of these cards thrown down in the street and noticed that the back of the card was blank. This seemed to him a waste of space, and he suggested to the company issuing them that the cards would become more interesting and attractive if a biography of the subject was printed on them. When the first cigarette card appeared is not known, but this suggestion by Edward Bok was certainly the beginning of the long series of cards that have taught us something about great men, beautiful scenes and famous buildings, history, flying, science, medals, flags and indeed almost every topic under the Sun. In the book we can read the stories of many of the most outstanding of these, while typical examples can be studied in the 102 illustrations of famous cigarette cards on the 28 whole page plates included in the book.

Other attractions of Mr. Cruse's volume are notes on errors and forgeries, in which many collectors specialize; hints on the mounting and display of cards; and suggestions for further series when the issue of these attractive bits of card is resumed. The story of tobacco too is told briefly, with many tales of the changes that have occurred since the Elizabethans introduced the custom of smoking; and generally the book is packed with interesting details that cover as wide a range as do the cards themselves.

"MINIATURE LOCOMOTIVE CONSTRUCTION"

By John H. Ahern
(Percival Marshall & Co. Ltd. Price 8/6)

In this book the rather specialized subject of miniature locomotive building receives the same practical and painstaking attention from the author as was evident in his previous "*Model Building Construction*," reviewed in the "*M.M.*" in August 1947. It is primarily devoted to the electrically-operated types in Gauge 00, though many of the principles advocated can be applied equally well to other scales and to clockwork engines. Steam locomotives are not considered; they form quite a separate branch of the subject of model engine building.

The methods described represent the results of the author's experience in the construction of small-scale locomotives, and illustrate the fascination of building-up a model locomotive from raw materials, with perhaps a few purchased fittings. Those who have not experienced this will be encouraged by the author's confession that his book records not only what is supposed to happen, but what actually does happen sometimes. The illustrations consist largely of excellent and instructive line sketches showing different parts, method of assembly and so on.

The author deals so well with what we may call the mechanical part of the job that it is a little disappointing that the painting and finishing processes are not described.

"THE BOYS' BOOK OF SOCCER"

(Evans. 10/6)

We have received the 1949 edition of this annual, which should certainly be in the hands of all boys who are interested in Association football. All the articles, stories and illustrations in this fourth edition are entirely new, and it provides a wealth of reading for the enthusiast. There are articles on the laws of the game, how to play it well, and how to make oneself fit, a necessary preliminary to playing the game properly. Stories are told of famous football teams and of outstanding matches, including the 1948 Cup Final and international games, and there is a special section devoted to records and dates of importance in the history of the game. Stories and puzzles, cartoons and crosswords in which football plays a part, make up a very fine book.

The illustrations are noteworthy. They include line drawings in the general articles and stories, and in addition there are many excellent reproductions of photographs of games, players and football scenes.

"STILL MORE OF MY BEST RAILWAY PHOTOGRAPHS"

No. 13 (L.M. Region)

By Rev. Canon E. Treacy
(Ian Allan Ltd. 1/9)

Canon Treacy has already contributed to this well-known series, and his third selection of railway photographs is very welcome. In choosing this set he has introduced more variety, aiming at presenting pictures instead of being content with just portraits of engines or trains. He explains the new principles on which his selection is based in an interesting introduction, and the result of his thoughts, as seen in the collection forming these pages, certainly arouses the keenest interest in the railway fan as well as in the photographic enthusiast. Many of the shots are striking, while the different aspects are well varied.

Copies can be obtained from booksellers at 1/9 each, or from Ian Allan Ltd., Mail Order Department, 33, Knollys Road, Streatham, London S.W.16, price 1/11½ including postage.

"THE A.B.C. OF BRITISH LOCOMOTIVES"

Parts I, II, III, IV
(Ian Allan Ltd. 2/- each)

The renumbering of British locomotives in accordance with the national scheme has made necessary the revision of the familiar "ABC" books, and Parts I to IV now deal respectively with the steam locomotives of the Western, Southern, London Midland and Eastern Regions of British Railways. All engines in service up to 31st August 1948 appear class by class in order of their new numbers, together with their names where these are carried.

As usual with these excellent booklets, illustrations are plentiful and varied, the principal dimensions of the various classes are given, and there are lists of depots and other useful details. Copies are available from bookstalls and booksellers, 2/- each, or direct from Ian Allan Ltd., Mail Order Department, 33, Knollys Road, Streatham, London S.W.16, price 2/2½ including postage.

"BUNKLE AND BELINDA"

By M. Pardoe (Routledge. 7/6)

Bunkle and his family are now firmly established favourites. They have appeared in five previous books by Mr. Pardoe and have earned the further distinction of appearances in the Children's Hour of the B.B.C. Readers of the "*M.M.*" therefore will not need any special recommendation of this, the latest adventure of Bunkle and his brother and sister with their friends in Cornwall. It is exciting enough, for besides enjoying themselves thoroughly on holiday they go down a tin mine that seems to hold a mystery, discover a cave that is found to contain a long-lost treasure, and discover a concealed uranium mine.

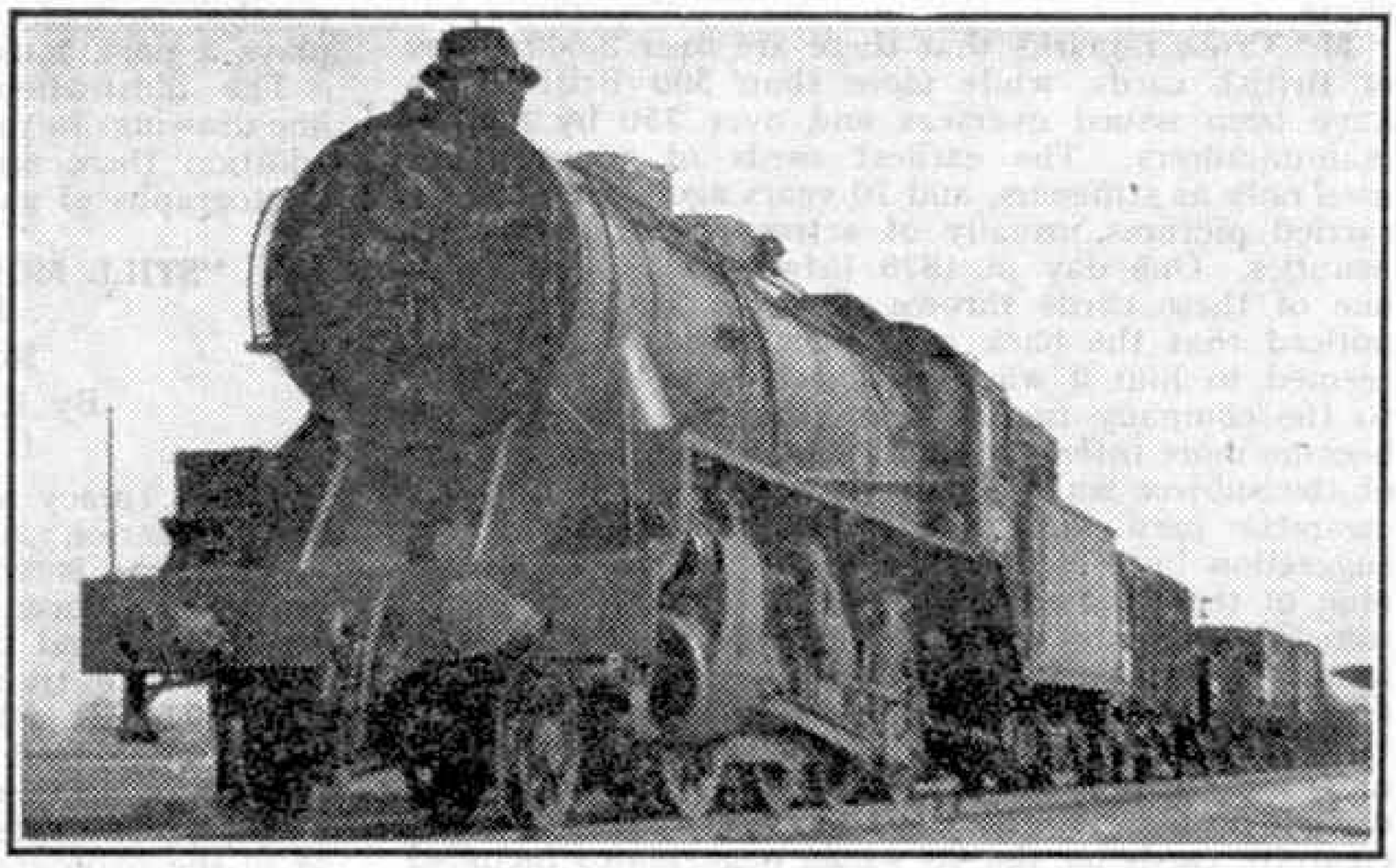
A Railway Enthusiast Goes to Belgium

By J. D. Mills

HERE are related the experiences of a railway enthusiast's holiday visit to Belgium, when the writer was lucky enough to have the opportunity of visiting Ostend and Bruges running sheds.

The crossing was made by the Dover-Ostend service and the arrival at Ostend was in the evening. Damage to Ostend Harbour Station during the war has necessitated an extensive reconstruction programme. Our Bruges-Brussels express did not depart for some two hours, and during this time a careful study of the station and rolling stock was made. Our train was made up of first and second class coaches painted olive green, in addition to "Blue" International Sleeping Cars. All the stock was of the latest steel-panelled design and luxuriously fitted out.

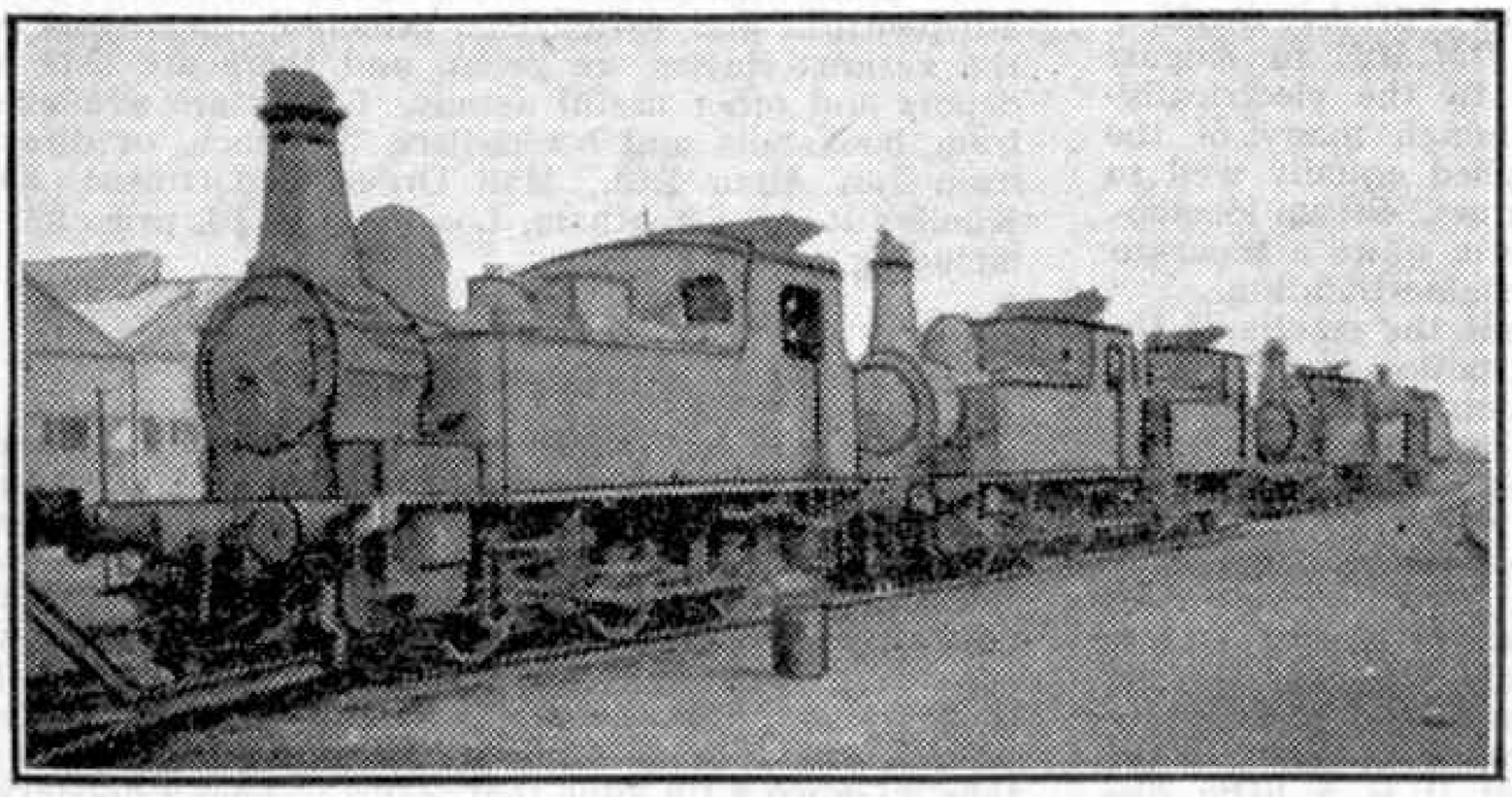
One of the locomotives seen was a giant 4–6–2 or "Super-Pacific" painted green and in spotless condition with shining brasswork. Close examination showed many interesting features, including electric head and tail lamps as well as cab lighting, two fire-hole doors to aid the fireman, and a high-capacity bogie tender. Another engine seen was an aged 4–4–2T on a Bruges-Ostend local train. This was fitted with an unusual coal hopper in the bunker and it carried also a supply of briquettes on the cab roof. After chatting with the driver I heard the familiar clank of connecting rods, and on looking round saw another of the "Super-Pacifics" gracefully backing on to our Bruges-Brussels train. In a few minutes, with a long blast on the siren whistle, we moved off on our journey.



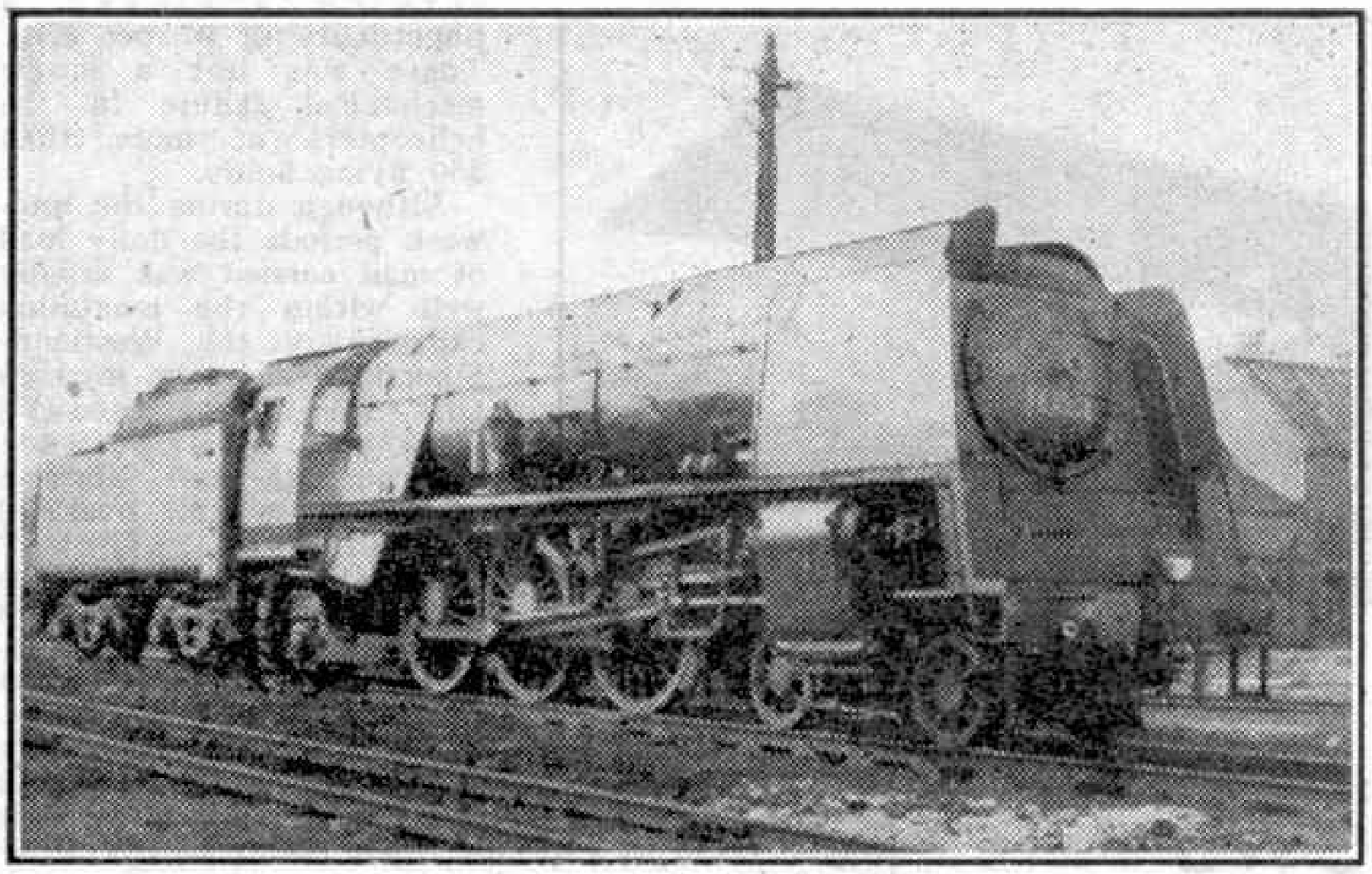
Belgian State 2-8-0 No. 38016 near Bruges on the freight train referred to in this article.

The first locomotive depot to be visited was Bruges, one of the system's largest and most modern sheds. Here two of my friends and I presented ourselves at the main office where we were cordially received, and then handed over to two officials who spoke fluent English. The shed is of the usual ferro-concrete design and is maintained in excellent condition—a happy feature throughout the Belgian State Railways. Combined with the steam shed is a railcar shed and works, as well as a commodious yard.

We were first shown into the railcar shed where both steam and diesel-driven cars are kept. Then we toured the yards and were surprised to find a large number of withdrawn 0–6–0 tender



A row of old engines at Ostend. Note the remarkable shape and size of their chimneys.



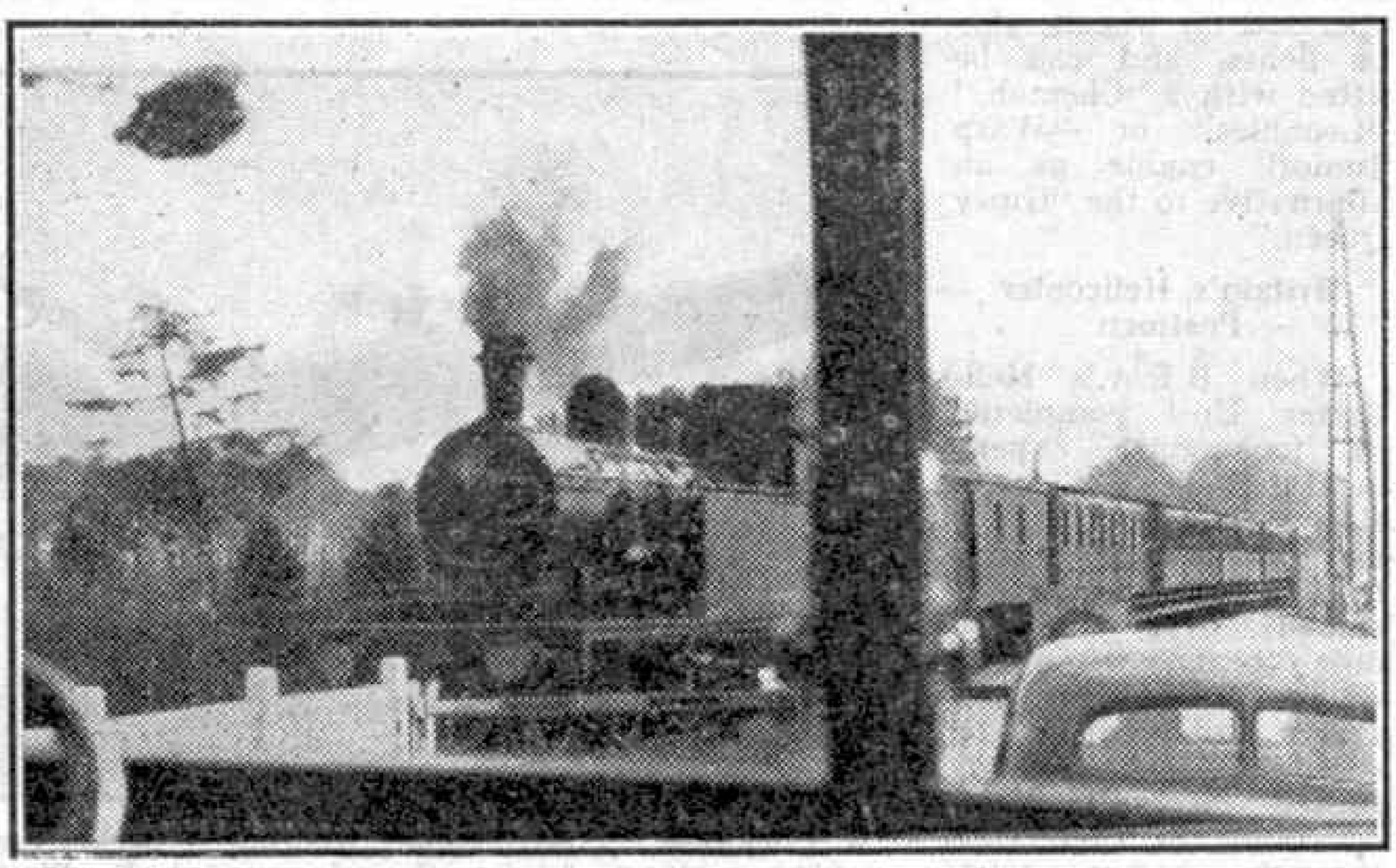
Belgian State Railways "Pacific" locomotive No. 1021 at Ostend.

engines. They were mainly of Sharp Stewart build, and they provided excellent opportunities for my camera. At the far end of the yard was 0–6–0 No. 44260 that had been involved in a fatal accident at Bruges. The engine, which had only been "off the shed" a few minutes, came into a head-on collision with a passenger train that was running against the signals, both fireman and driver of the 0–6–0 being killed instantly.

We were then taken to the water softening and cleansing tower recently installed; in this the water supply is softened and cleaned by an all-mechanical process. From this high vantage point it is possible to secure a fine photograph of the shed yard and surrounding countryside. After this we inspected the locomotive shed and works and said good-bye to our guides, who presented me with the number plate of an ex-German locomotive that had been destroyed by the R.A.F. On that happy ending we left our friends.

In the afternoon of the same day I went in search of a suitable place for taking photographs of trains at speed. I found my site some half a mile from the station on a high embankment, where one has an unobstructed view of trains entering and leaving Bruges. After "shooting" a number of passenger trains I waited hopefully for a goods train to put in an appearance, but these seemed to be very rare. After waiting an hour and a half in vain I packed up my camera and tripod and began to descend the embankment. Immediately I heard the familiar siren whistle and rattle of goods wagons travelling at speed through the station; dropping my rucksack I clambered up the embankment again and just managed to set the shutter and direct vision viewfinder before it thundered by.

At Ostend locomotive depot I was received with the same cordiality. Ostend depot is not as large as Bruges, but possesses a carriage and wagon works alongside the engine shed. Here the ravages of the late war could still be seen; once-beautiful sleeping cars were now burnt-out shells and there were hundreds of wagons twisted and bent by bomb-blast and fire. The shed contained the usual 4–6–2 and 4–6–0 express engines as well as some German-built 2–8–0s with enormous outside cylinders and Walschaerts valve gear. Outside the shed was a row of the oldest engines in Belgium waiting to be scrapped. They were 0–6–0 tanks with small wheels and enormous milk-churn-shaped chimneys.



A typical Belgian level crossing scene, photographed through the window of a bus. A stopping train hauled by a 4-4-2T is approaching the crossing.



The Prestwick "Pioneer" four-seater aircraft described on this page.

Air News

By John W. R. Taylor

The Prestwick "Pioneer"

A feature of the Prestwick "Pioneer" that never fails to impress onlookers is its incredibly short landing run. It can land literally within its own length, needing a run of only some 30 ft. in a moderate wind. Apart from helicopters, no other aircraft in the world can match this performance and, of course, it is more economical than helicopters for most purposes.

The "Pioneer," illustrated above, was developed to a military specification for air observation post and liaison duties, and undoubtedly owes much to the German Fieseler "Storch," two of which landed on a glacier high in the Swiss Alps in 1946 to rescue passengers from a crashed air liner. It shares many of the "Storch's" design features, including full-length leading edge slots and extensive wing flaps, combining them with slightly higher power and rugged all-metal construction.

It is designed for operation from very small areas, and could prove invaluable for air taxi, ambulance or similar duties in places like the Scottish islands and highlands. It is not designed for high speeds, but its 250 h.p. "Gipsy Queen" engine enables it to carry four people for 500 miles at 114 m.p.h., which is quite good when considered in conjunction with its slow-flying characteristics. What is more it can be operated on wheels, skis or floats, and can be fitted with a "Cheetah," "Leonides" or "Wasp Junior" engine as an alternative to the "Gipsy Queen."

Britain's Helicopter Postmen

When B.E.A.'s Helicopter Unit completed its four-month experimental mail service in East Anglia last year, it had made 100 daily flights (Sundays excluded) over the 270 mile "beat," without a single break, and its strict adherence to schedule had been interrupted on only three occasions, in each case through heavy mist. Thus, Europe's first scheduled helicopter mail service achieved a punctuality of 97 per cent. There was not a single mechanical failure in the helicopters in more than 350 flying hours.

Although during the mid-week periods the daily load of mail carried was usually well within the maximum capacity of the Westland-Sikorsky helicopters used on this service, Saturday's week-end mail between Peterborough and Norwich often imposed an overload beyond the "official" maximum of 400 lb. The biggest load of mail lifted was, in fact, 680 lb., representing about 10,200 letters and post cards.

During the total period of operation, something in the region of 500,000 letters, post cards and small packages were delivered and collected, giving East Anglian residents a speeding up of their correspondence by 12 hrs. or more during the week, and up to 48 hrs. at week-ends.

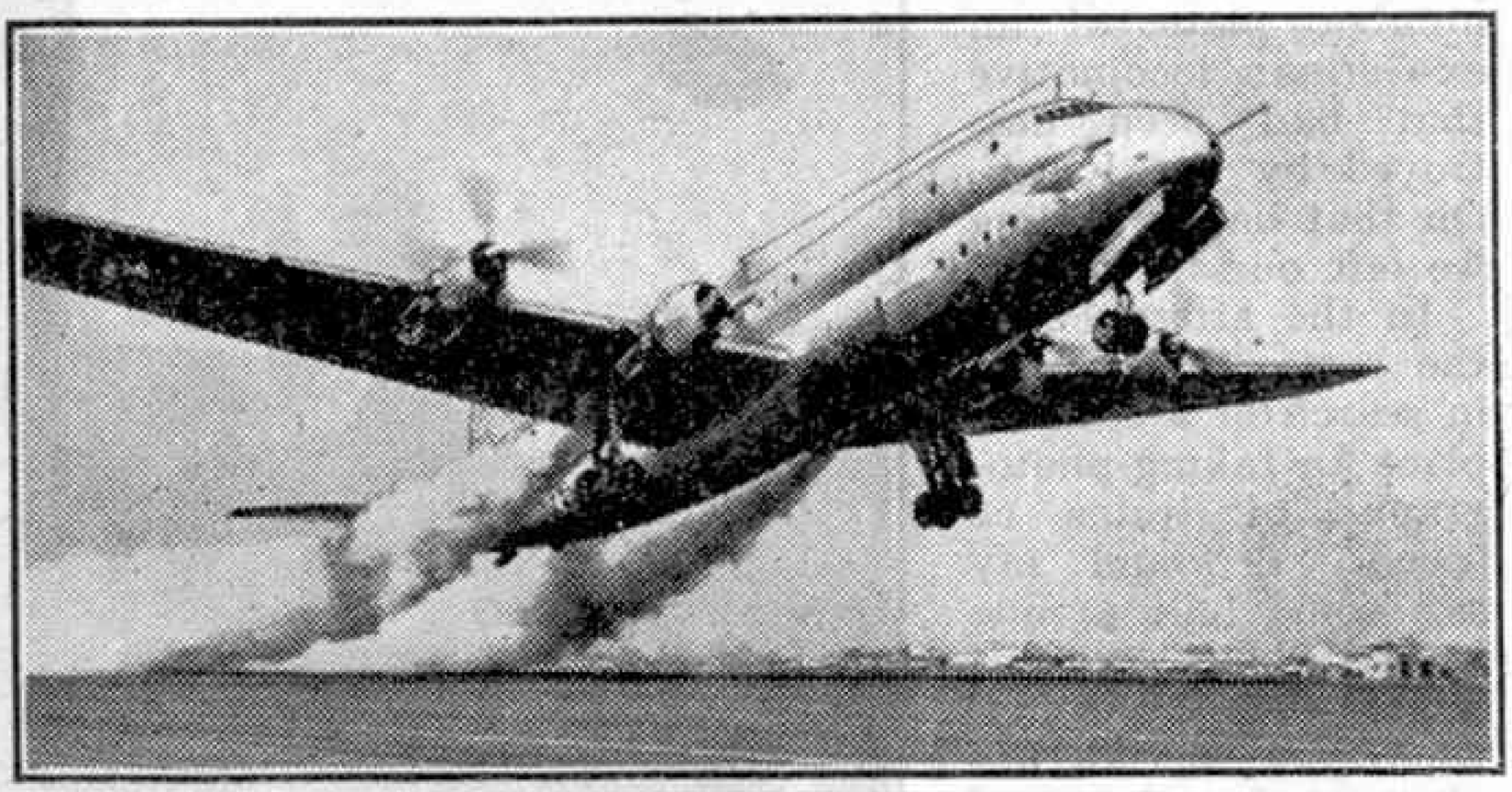
D.H. "Vampires" Fly 960 Miles Non-Stop

On the last stage of a recent 6,000-mile delivery flight from England to India three de Havilland "Vampires" for the Government of India covered the 960 miles from Sharjah to Khambalia non-stop. This is a remarkable distance for fully operational single-engined jet fighters with normal tankage and equipment as supplied to the Royal Air Force.

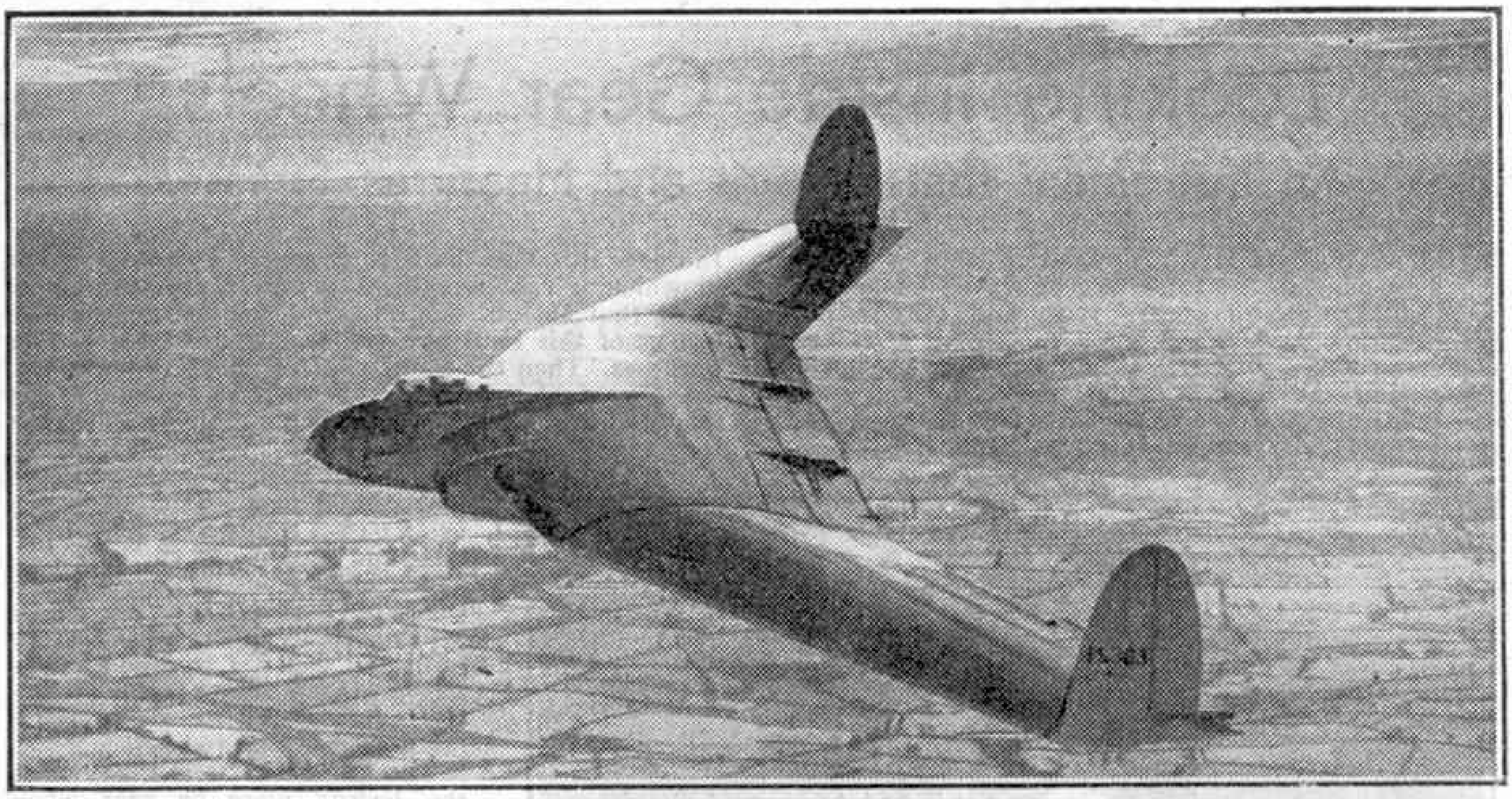
Air-Britain

A new organization known as Air-Britain has been formed to foster interest in aviation among people of both sexes and all ages. It is the post-war successor to the nation's 800 wartime Spotters' Clubs, which closed down in April 1946.

Air-Britain's Secretary is John S. Webb, who organized the Reading Sky Observers' Club and also edits the organization's monthly magazine "*The Skywriter*," which is circulated privately to members. Air-Britain has both a London Headquarters, at 15, Tavistock Street, W.C.2, and a large number of local branches. Members are offered facilities for visits to civil airfields and air displays, membership of the Aircraft Recognition Society at a reduced fee, and access to an Information Pool operated by specialists who can supply data on such things as aircraft registrations and history, as well as photographs.



A Lockheed "Constitution" making a rocket-assisted take-off to test the effect of this method of take-off on large aircraft. Photograph by courtesy of Lockheed Aircraft News Bureau.



A new picture of the Armstrong Whitworth A.W.52 "Flying Wing" research aircraft. Photo. "Flight" Copyright.

New Marine Airport

B.O.A.C. flying boats operating services to South Africa, Pakistan, India, Australia and the Far East now call at Alexandria, in Egypt, instead of at Cairo. This change has been made at the request of the Egyptian Government, who have built a new marine airport on Lake Mariut, which has the great advantage of being near the centre of Alexandria.

Alexandria is not a new port of call for British flying boats, as the old Imperial Airways' "Empire" flying boats used the harbour there before the war.

The change concerns B.O.A.C. flying boats only, and the Corporation's landplane services to and through the Middle East continue to use Almaza airfield at Cairo.

A Supermarine Amphibian

The new Vickers-Supermarine "Seagull" amphibian, illustrated on this page, must surely rank as one of the most interesting aircraft ever built. Designed as a "maid-of-all-work" for the Royal Navy, it is intended as a replacement for the veteran "Sea Otter," the type that has given such good service on air-sea rescue and liaison duties.

Despite the fact that it carries a crew of three, has folding wings and can operate from land, sea or carrier-deck, the "Seagull" has a top speed of 260 m.p.h., which is exceptionally high for this type of aircraft. The explanation of this performance is the clever combination of a Rolls-Royce "Griffon" engine, comparatively clean design and the use of a special variable-incidence wing. First tried out on the experimental "Dumbo" torpedo-bomber, this wing can be set to give maximum lift for take-off, and then turned bodily in relation to the fuselage during flight to avoid the usual nose-down attitude that causes excessive drag and so reduces performance.

The "Seagull" has a span of 52 ft. 6 in. and weighs 14,500 lb. fully loaded. Its "Griffon" engine, which drives a six-bladed contra-prop, normally develops 2,055 h.p., but this can be increased to 2,500 h.p. by water-methanol injection.

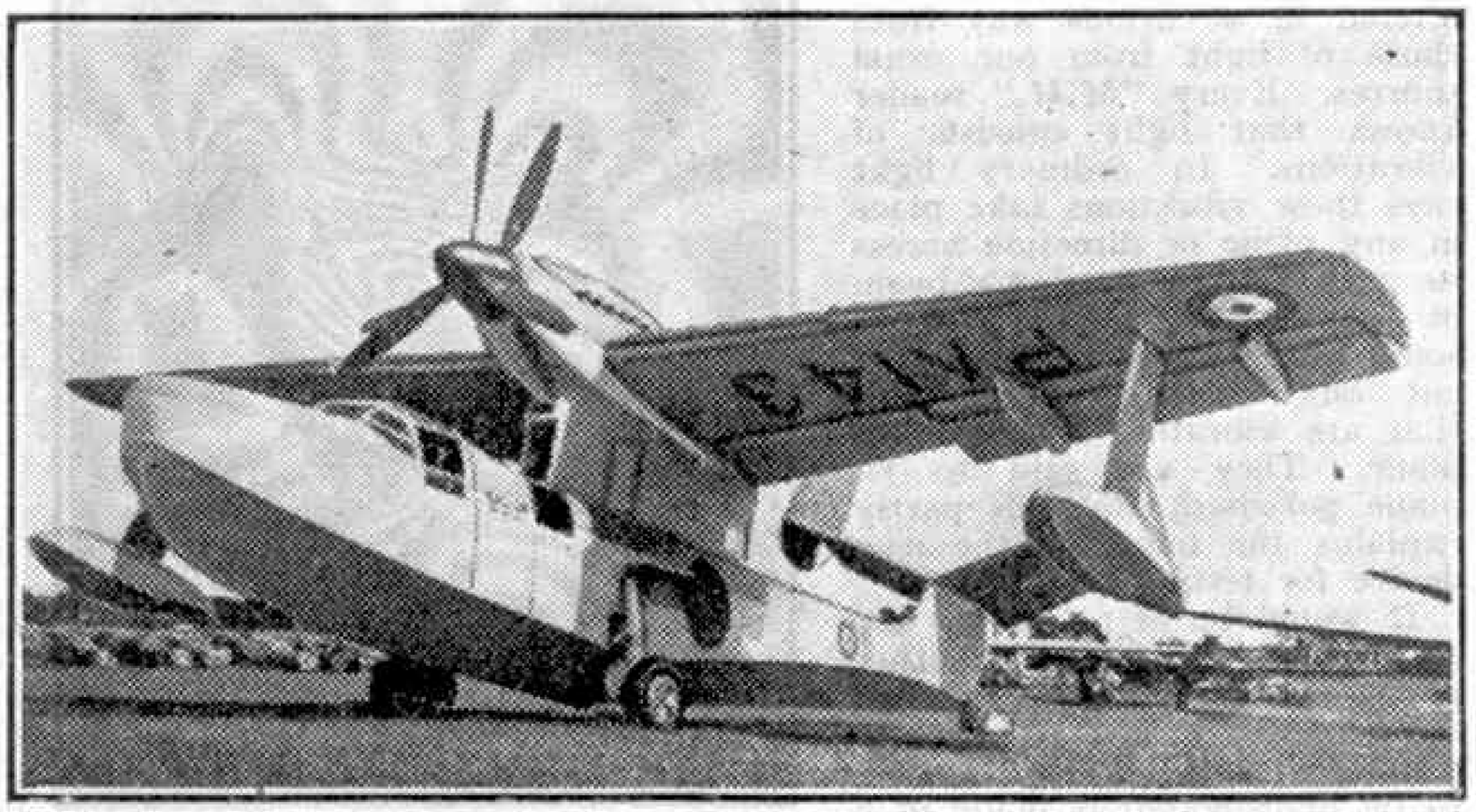
Cotton Plants Sprayed by Helicopter

Further proof of the helicopter's ability to perform jobs beyond the scope of any other form of transport was recently given in the Sudan. A total of 90 acres of young cotton plants at Turabi were sprayed with insecticide from a Westland-Sikorsky S-51 helicopter, to counter the ravages of the jassid insect, which sucks the leaves of cotton plants, causing a reduction in yield. Normally such spraying is done by tractor, but this proved impossible during irrigation.

This is believed to be the first time that a helicopter has been flown in Africa.

"Hornet" Showmanship

During a recent demonstration tour of the United States, Lieut. Cdr. D. B. Law, D.S.C., leader of the Royal Navy's No. 806 Squadron, carried out two complete loops in a de Havilland "Sea Hornet" with both engines stopped. He then re-started the engines in the air and continued his demonstration.

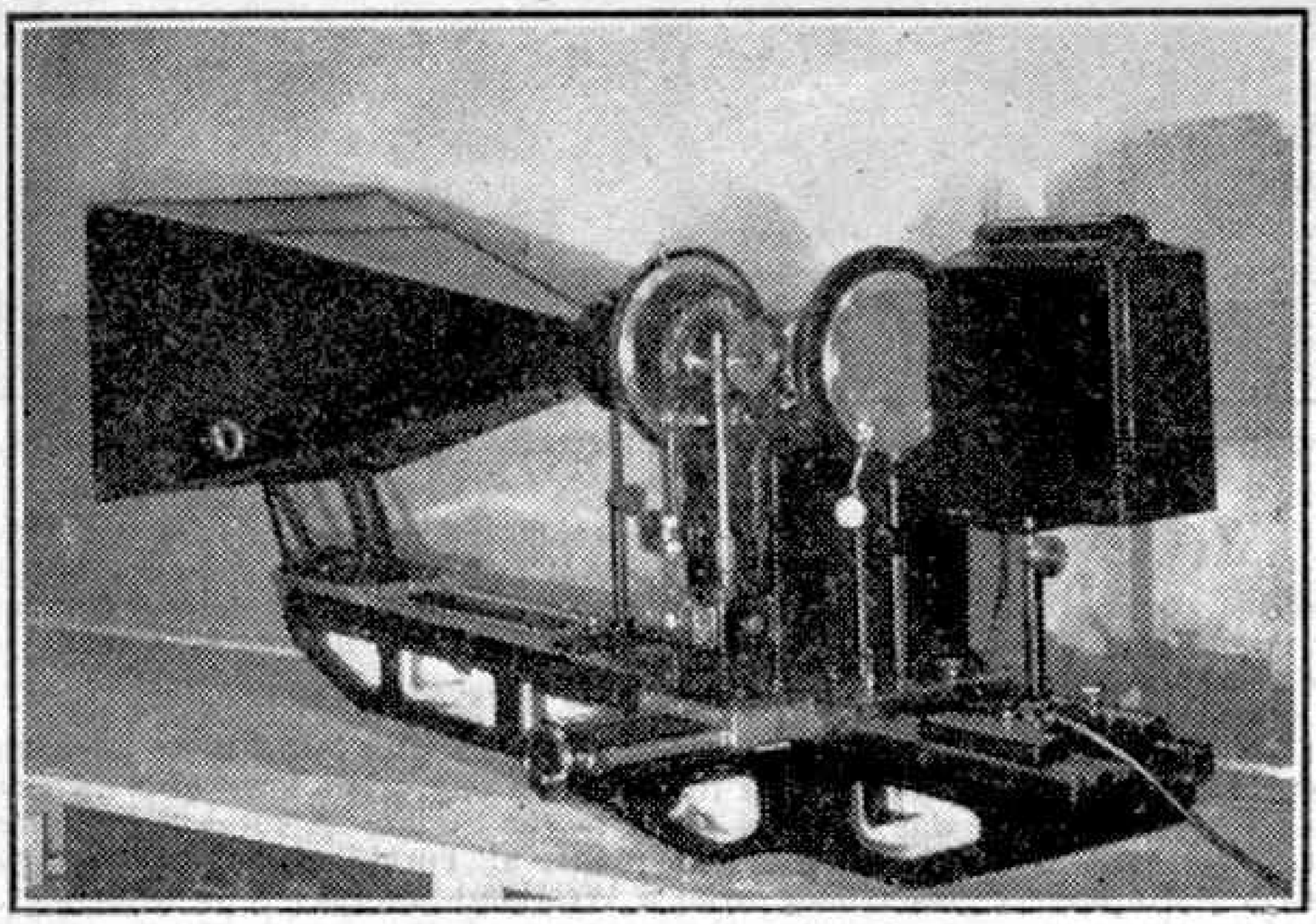


The Supermarine "Seagull" air-sea rescue amphibian, which has a variable-incidence wing. It is powered by a Rolls-Royce "Griffon" engine.

Looking Inside Gear Wheels

An Instrument that Detects and Measures Stresses

NOT so long ago it was difficult to learn what was happening to the teeth of gear wheels while these were in motion, or generally to find exactly how pieces of metal behaved when they were stretched, compressed or bent. It was impossible to see inside them, and the way in which they changed under stresses, or where they were subject to their greatest ordeals, could be learned only by calculations. These were liable to uncertainty, and some of them we now know to have been based on wrong ideas.



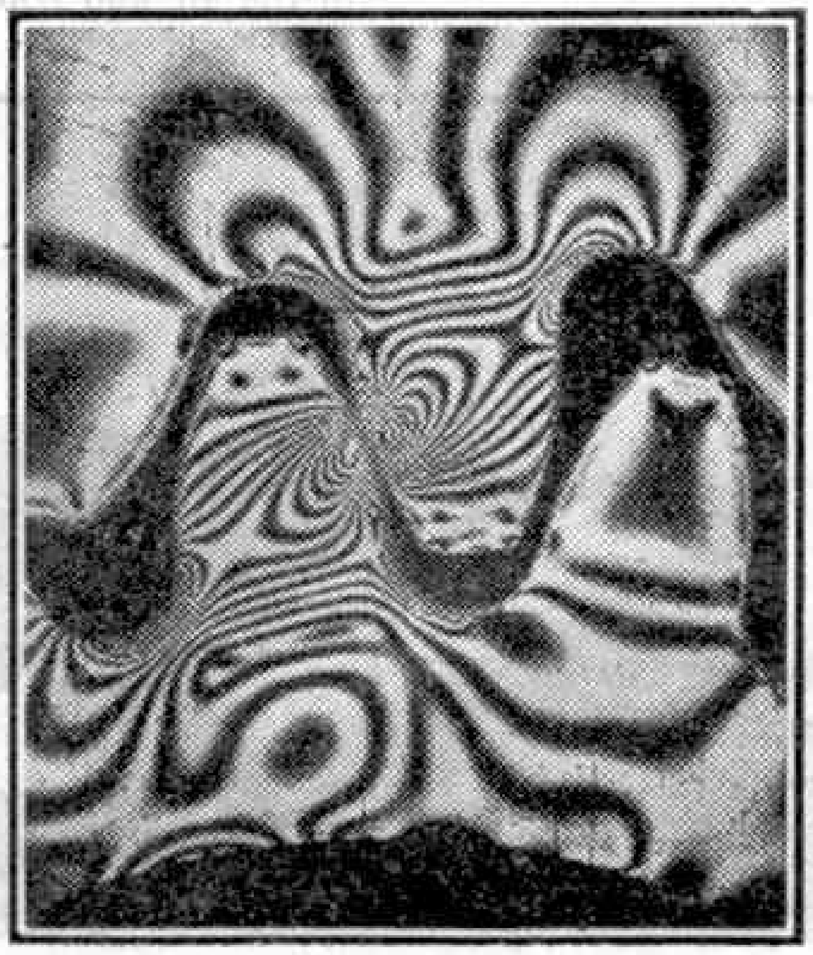
The polariscope used for detecting stresses in metal parts. Gear wheels in mesh are being tested. Our illustrations are by courtesy of David Brown and Sons (Huddersfield) Ltd.

All this has been changed by the introduction of a remarkable testing device to which the somewhat cumbersome word of polariscope is given. The upper illustration on this page shows one of these instruments that was designed and built in the Research Department of David Brown and Sons (Huddersfield) Ltd. This makes use of light rays or beams, but these have been altered in a curious way from those of light from our usual sources. Every "*M.M.*" reader knows that light consists of vibrations. In ordinary light rays these vibrations take place in any plane or direction across its path, but by passing a beam of light through certain crystals some of the vibrations can be cut out, leaving only waves that are vibrating in the same plane. They are said to be plane polarised, and this partly explains the name of the new device for testing for stresses.

It would be of no use to try to pass rays of light, whether polarised or not, through steel rods, plates or gear wheels, so for these tests the part that is to be investigated is made of a transparent plastic, that is one that allows light rays to pass through it. This part is fixed in a special frame in which it can be subject to forces proportional to those that act on its steel prototype, several suitable frames of this kind having been designed for various purposes. Then the frame is placed in the polariscope. On the right of this is a mercury vapour lamp mounted in a lamp house, the light from which passes through a circular sheet of a special glass called Polaroid, which gives the required polarising effect. The polarised beam passes through the part under test and then into an analyser, which again consists of a circular sheet of Polaroid, and an image of the part under test is then projected on a ground glass screen. Often photographic records are required, and then a camera is used in place of the screen.

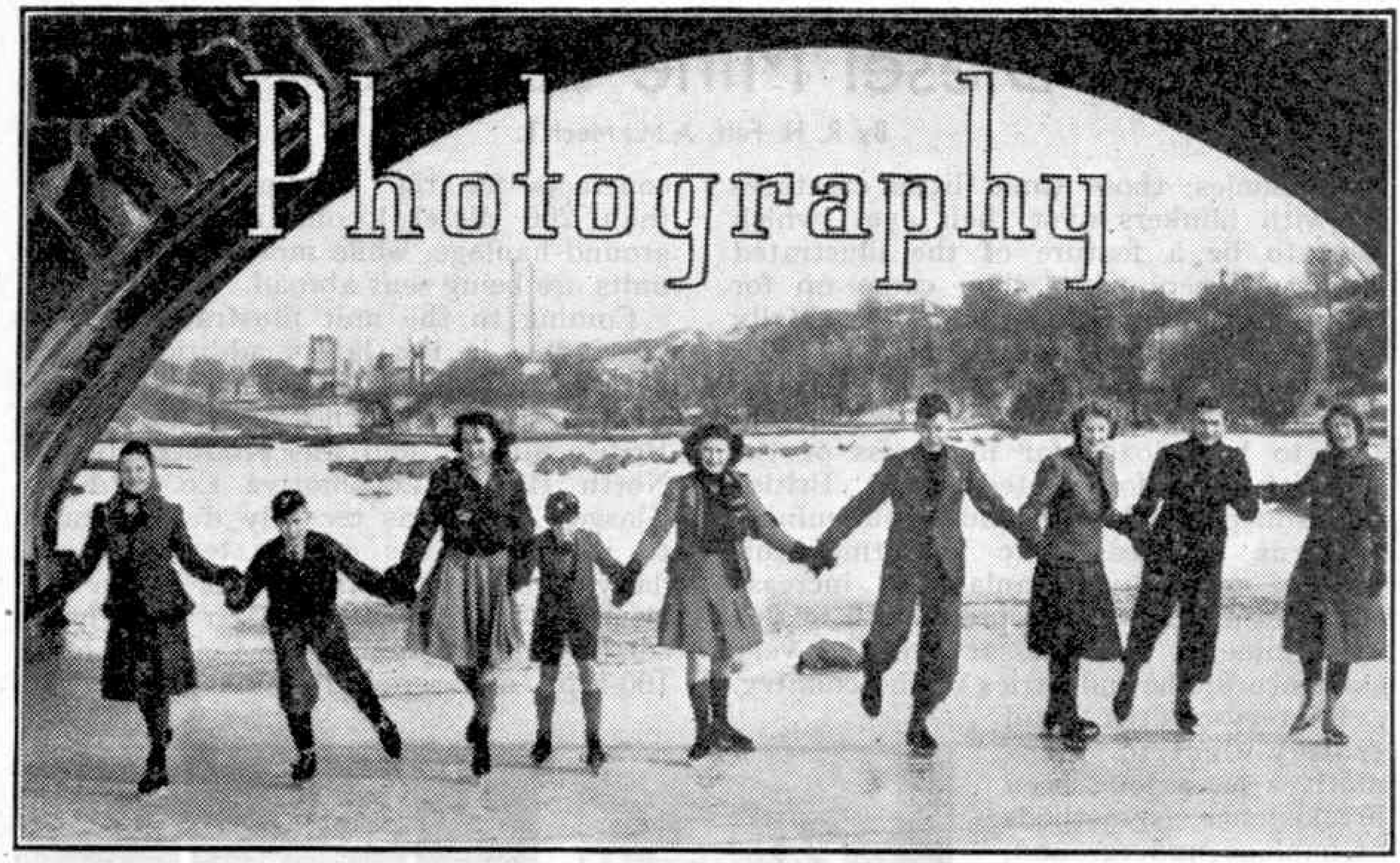
The plastic material of which the testing piece or gear wheel is made is capable of what is known as double refraction, that is it splits the polarised light passing through it into two rays. These vibrate in the directions of the two principal stresses to which it is subject, and travel at different speeds. The two rays are recombined in the analyser, but as they go through the strained plastic at different speeds they are now out of step, so that on the screen or photographic plate they interfere with each other. The image of the model reveals this by a series of brightly coloured lines if ordinary light is used, and as black lines only if the original light has only one colour. How far the two rays are out of step at any point depends on the magnitudes of the two principal stresses at the point, and these can readily be calculated.

There are two kinds of line patterns. One is formed when the plane in which the light passing through the model vibrates coincides with the direction of the principal stresses. This is cut out by the analyser and the result is a pattern of black lines, known as isoclinics, on the screen. These show the directions of the principal stresses. They can be cut out when not wanted, by the use of a special piece of mica known as a quarter-wave plate, and then only the second pattern of lines, called isochromatics, is seen. These are like contour lines on a map; crossing them indicates movement from a region of low stresses to one of high stresses, so that the increase in stress is greatest where they are close together.



Polariscope image of gear wheels in contact under load.

The lower illustration on this page shows a polariscope picture of two gear wheels in action, one driving the other. The isochromatic lines are crowded together where the two teeth shown in the centre are in contact with each other, showing that the (*Continued on page 34*)



The Skaters. Photograph by R. Wrigley, Clitheroe.

Frost and Snow Pictures

THE most striking frost pictures are seen when there has been both frost and fog; then damp air, freezing on every twig and leaf, transforms what may be an otherwise drab picture into a fairyland scene. The morning sunshine that gives such a delightful sparkle to everything also sets a time limit to the photographer's opportunity, as the delicate beauty of rime-covered trees soon melts away.

Open landscapes seen in sunshine after a heavy fall of snow seem to be ideal subjects for photography, but unless there is some dark object in the near foreground the picture is almost always uninteresting. The effect is similar to that of an expanse of open sea photographed from the shore; without a foreground such as rocks or a boat the picture seems flat. A foreground object for a snow scene may be almost anything in the way of a building or a tree or trees; the only requirement is that it should be relatively dark and well defined.

A small stream in its winter dress usually provides good pictures, especially at a point where it makes a bend. This bend idea can be remarkably important in pictures. For instance, one may be walking along a country lane under snow and see nothing to photograph; then the lane makes a sharp bend to right or left, and immediately a picture is provided.

Pictures of groups of skaters are easy to take and generally turn out well. Curling also is a good subject, but it is often necessary to wait patiently for a while until the curlers group themselves suitably. Sledging too is worth attention, and in my opinion is greatly neglected. Another happy subject is that of children excitedly snowballing. Outdoor pictures of this kind definitely require bright sunshine to look well, and it is not much use wasting films on a really dull day.

Finally, look round for any big snowman in your neighbourhood; if he is well made he will provide a happy picture. A friend of mine has an album of pictures of snowmen taken during past winters, and it is one of the most amusing albums I have seen.

If you develop your films yourself, remember that the development of snow and frost films should be rather shorter than normal in order to produce negatives that are full of detail, but without harsh contrasts.

The Diesel Mine Locomotive

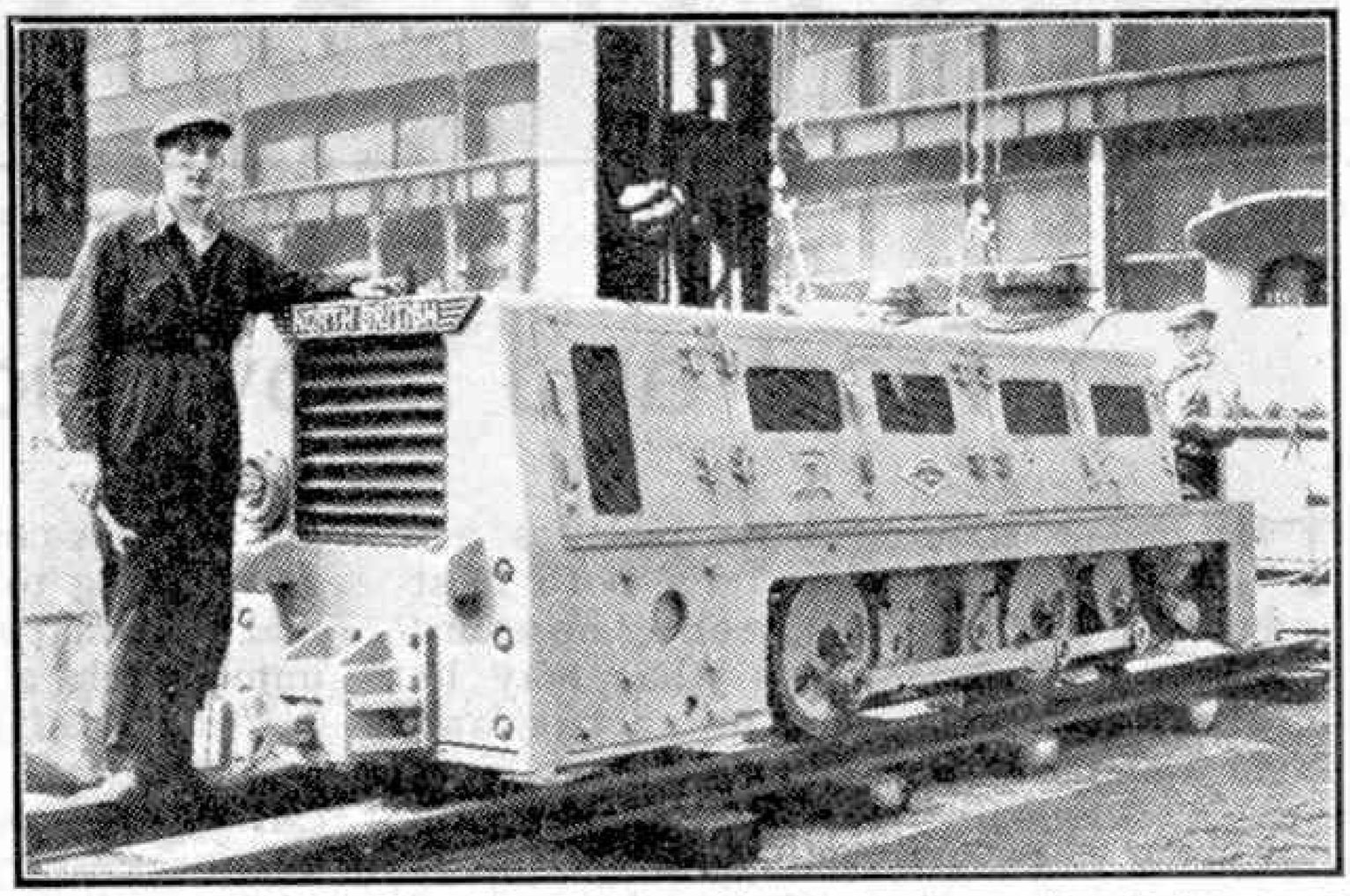
By R. H. Fett, A.M.I.Mech.E.

PIT ponies, those timid little creatures with blinkers over their eyes, which used to be a feature of the illustrated Sunday papers when they came up for their annual grazing period, are gradually but surely disappearing. Their place is being taken by the modern diesel mine locomotive, infinitely more powerful and able to haul loads far in excess of the capacity of our four-footed friends. British mines in particular, and numerous mining concerns overseas, are adopting this modern method of haulage to increase output and step up the production of this vital mineral, so necessary to the very existence of the industries of the country.

Battery-electric and trolley-electric locomotives have long been in existence as methods of haulage underground, but there are limitations on the use of the latter where "gassy" mines are concerned because of the possibility of explosion, while the battery locomotive is expensive in upkeep and can work for relatively short periods only before requiring recharging. The trolley locomotive also is dependent upon an outside source of power, the failure of which would paralyse the whole haulage system of a pit.

The diesel locomotive however is an independent unit, able to go anywhere where tracks are laid, work continuously for 24 hours if necessary, except for short refuelling periods, and if it should break down haulage in the pit is not suspended, as the offending locomotive may be towed into the underground depot and repaired. It is less expensive to instal the diesel locomotive in the pit, as it requires no external source of power, no overhead wires or special charging depots and costly operating gear. It is therefore no surprise to find the diesel which, especially abroad, has shown itself supreme in the traction field, taking its place as the principal method of haulage in the pits. Not so long ago the National Coal Board announced the placing of contracts for the building of no fewer than 200 diesel locomotives for underground haulage, while more of these small units are being sent abroad.

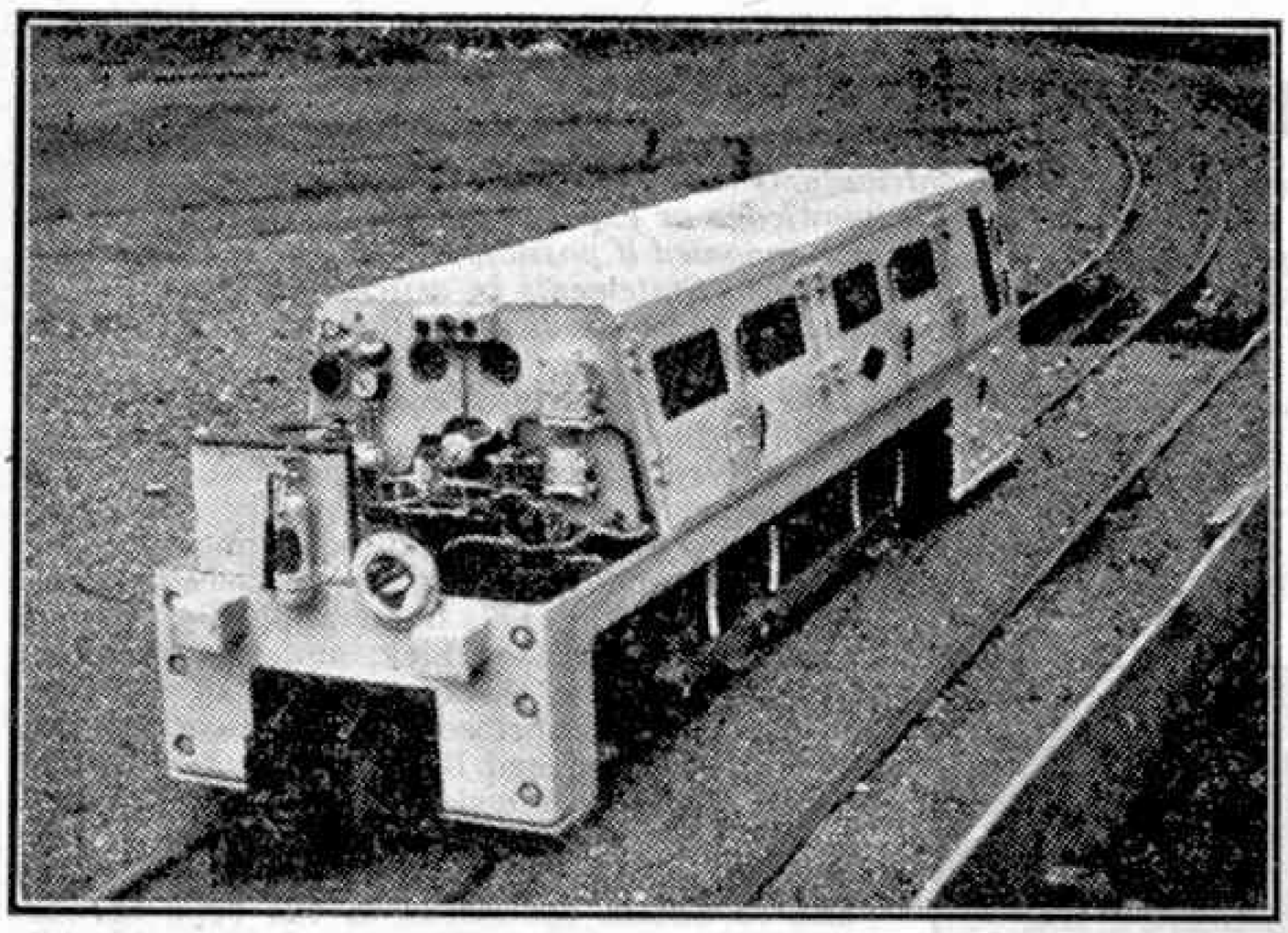
Coming to the unit illustrated on this page, this is the latest addition to the fleet of locomotives now working in the British pits. It is known as the "North British Miner," and was produced by the North British Locomotive Co. Ltd., of Glasgow, and was recently demonstrated to representatives of the technical and daily press along with officials of the Coal Board. It is unique in so far as it has a smaller cross-sectional area than any other 100-h.p. underground mine locomotive.



The "North British Miner," a 100 h.p. diesel mine locomotive designed and built by the North British Locomotive Co. Ltd., Glasgow, to whom we are indebted for the illustrations to this article.

Its height and width do not exceed the corresponding dimensions of the standard high capacity mine tub; this is a most important feature where the mining engineer is concerned, as it means smaller tunnels or roadways.

Power is derived from a six-cylinder Davey Paxman diesel engine, which develops 100 h.p. at 1,250 r.p.m. In addition to the radiator fan, lighting dynamo and other auxiliaries, the engine drives a two-stage air compressor, which charges the high pressure air bottle to 450 lb. per sq. in. This air is used for engine starting, the air being led to the engine cylinders through a distributor block. A reducing valve in the pipe line brings down this pressure to 60 lb. per



A three-quarter rear view, showing the controls and driver's seat.

sq. in. for operating the compressed air braking system, gear-box control, sanding and horn.

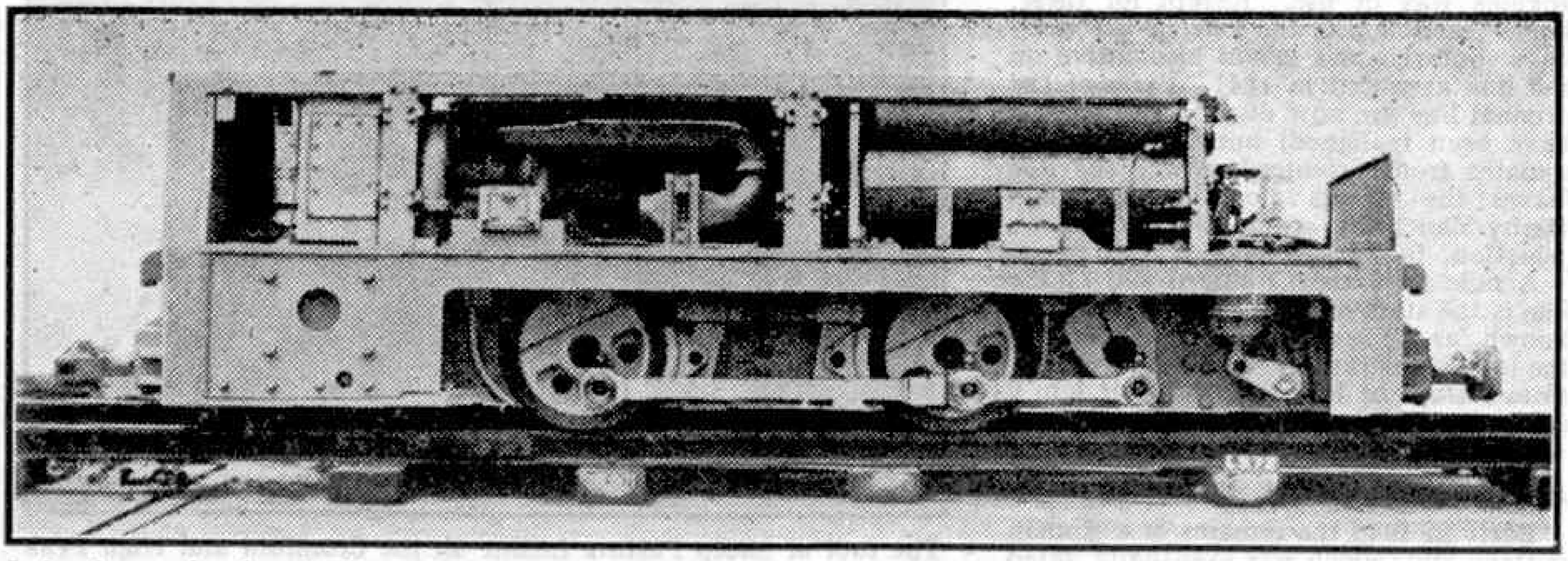
The drive from the engine is taken through a flexible bonded rubber coupling to a three-speed oil operated S.L.M. gear-box, which incorporates a final bevel and reduction gear on a jackshaft, the fly cranks of which are connected to the four road wheels through coupling rods. Reversing is by means of an air-operated dog clutch, which engages one or other of the crown bevels.

The gear-box gives three speeds of 3, 6.5 and 15 m.p.h. in each direction, at which the respective tractive efforts are 8,400 lb., 4,380 lb. and 1,900 lb. The locomotive weighs 15 tons in working order, and on a basis of 25 per cent. adhesion against a running resistance of 20 lb. per ton it can haul a load of 420 tons, including the weight of the unit, or 28 times its own weight at 3 m.p.h. on the level.

Most important of all things on underground power equipment is flame proofing, and for a diesel locomotive exhaust conditioning also is essential. No power equipment of any description which is liable to give off flame or is subject to internal explosion is allowed to work in a "gassy" pit without being fully flame proofed. The diesel engine is subjected to flame proofing at both the induction or air intake end and at the exhaust. The flame traps consist of stainless steel blades about two inches deep placed back to back in a pack, with spacers between which allow a maximum gap of only 16 thousandths of an inch; no flame can penetrate these gaps.

In addition to flame proofing, the diesel engine exhaust requires to be conditioned before release to the atmosphere; in other words it is washed in a conditioner box, passing through water several times and then through some filtering medium where it gives up its moisture and any solids it may carry. Carbon monoxide, so deadly a component of the petrol engine exhaust, is almost non-existent in the diesel exhaust, and is not permitted to exceed .06 per cent. In this case the exhaust is diffused to the extent of 16/1 air to gas ratio before release, being mixed with the air from the radiator fan.

The driver sits at the rear end of the locomotive. Driving is very simple, the three principal controls being engine throttle, gear change and power brake. The locomotive is fitted with central automatic buffer-couplers and is suitable for gauges between 2 ft. 6 in. and 3 ft. 0 in.



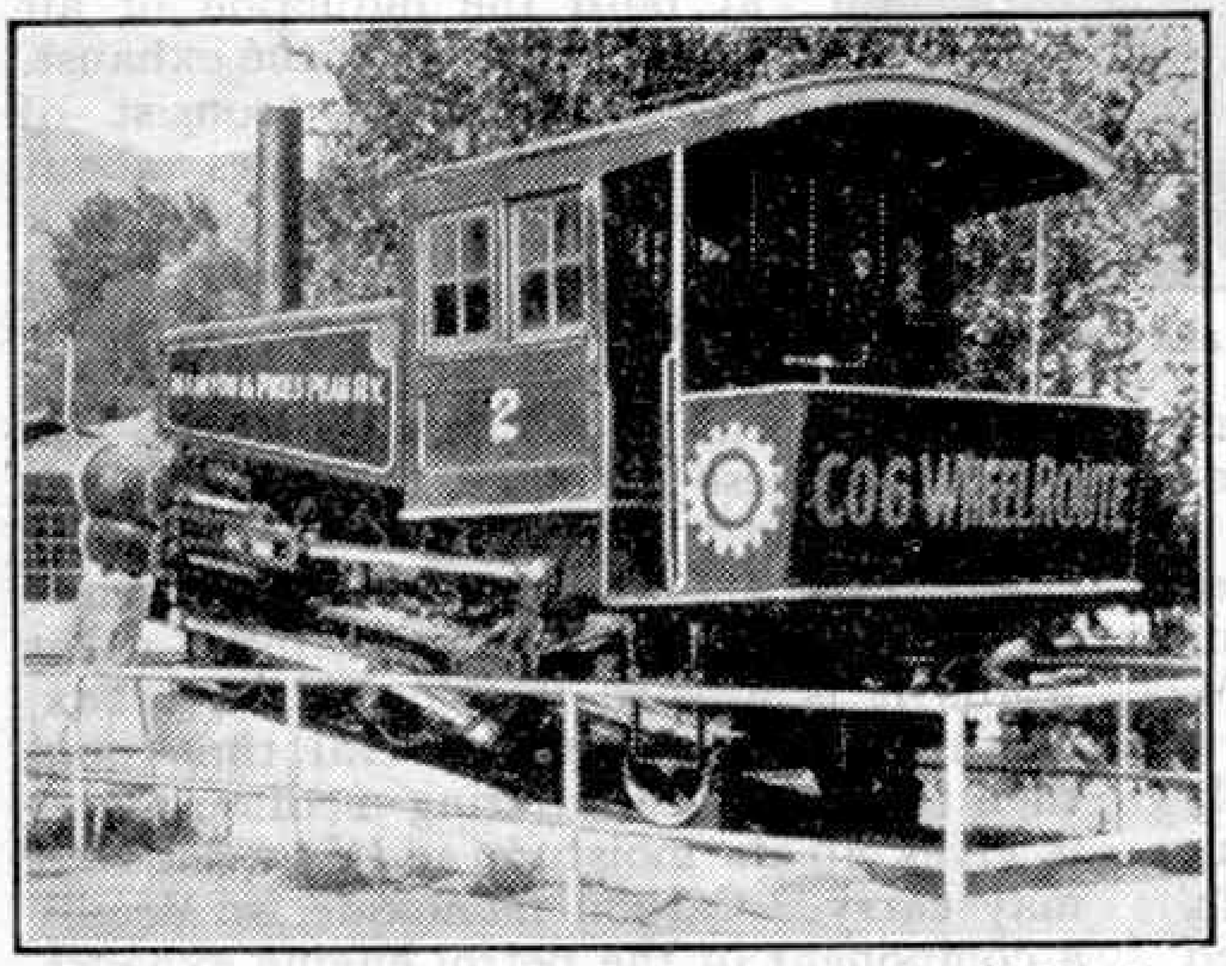
Induction and exhaust side, with the doors removed. The inlet flame trap is on the right of the air inlet filter.

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.

THE "COG WHEEL ROUTE"

Pike's Peak in Colorado, U.S.A., 14,134 ft. high, was discovered in November 1806 by Lieutenant Zebulon M. Pike of the U.S. Army. It has the distinction of possessing the longest rack or "cog" railway in the world, formerly a steam line, but now diesel-electric in working. This is nine miles long and the accompanying illustration shows a steam locomotive of this railway now on permanent exhibition at Manitou. The "Cog Wheel Route" emblem on the bunker will be noticed.



A Pike's Peak rack-rail engine preserved at Manitou, Colorado. Photograph by R. A. Davison, Stafford.

R. A. Davison (Stafford).

THE HIGH PEAK RAILWAY

The Cromford and High Peak Railway, now a section of the London Midland Region, was constructed in 1825–32. It was, and still is, a remarkable section of railway, for of the original 33 miles, only 12 were level. There were eight inclines, on which cable haulage by stationary engines was in use. Except for these, horse traction was the rule in the early days, but the first steam locomotive on the line appeared in 1841. Parts of the original line are now disused and several have been realigned; but the old route remains from Cromford, where the line leaves the sidings alongside the main Derby-Manchester route at High Peak Junction, to Parsley Hay.

A mile from the Cromford end of the line is the start of a cable-worked incline, known as "Sheep Pasture," shown in the lower illustration. The abrupt change from a slope of 1 in 200 to one of 1 in 9 is clearly visible.

J. E. Allen (Stanmore).

A SECOND CENTURY POTTERY KILN

Early in 1946 the remains of a Roman pottery kiln, which was eventually dated as having been in use during the latter half of the second century A.D., were found in a small Suffolk village.

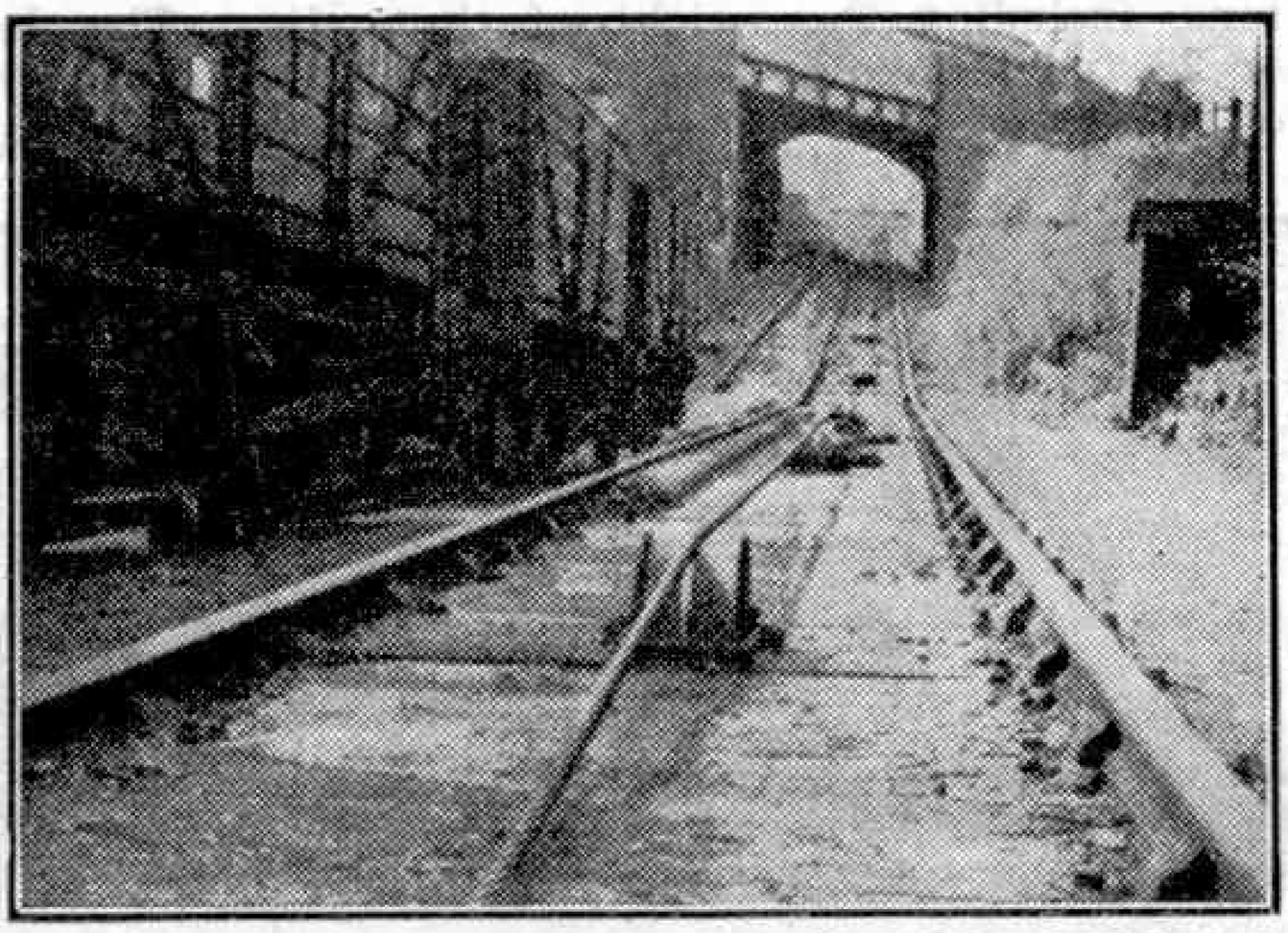
When I arrived at the site, I found that the dome-shaped outer wall, which had originally risen to a height of 7 ft. or 8 ft., had collapsed, filling the lower half with debris and smashing any vessels that had been left inside. This outer wall of clay, some three to four inches thick, and the remaining pieces, still bore the impressions of the osier twigs that had formed the framework around which the dome had been constructed.

By noon, the interior had been cleared and many fragments of pottery recovered. We were later able to piece most of it together and so obtain specimens of the type of ware that was produced. We found that this kiln was used mainly for the firing of vases and flat dishes.

The actual layout of the kiln was unusual, being oval instead of the nearly round shape that is normal. Level with the top of the firing arch it was approximately 4 ft. 6 in. by 3 ft., and in the centre of the wall, 5 ft. 6 in. by 4 ft. The central stand was separated from the outer wall by a channel 6 in. wide. It supported the base, pierced at intervals to allow the flames and hot gases to enter the interior. The stand and base were burnt to a brilliant red, indicating that the kiln had been working at very high temperatures. The vessels when ready were stacked on the base, the dome was then sealed and firing commenced. Firing was carried out by lighting a fire in a deep channel outside the arch, the flames and hot gases being blown into the kiln by the prevailing winds.

The pottery from this kiln is a light grey in colour, rough glazed on the outer surface with a darker shade, sometimes almost black, depending on the temperature to which it was fired. Although there were many other potteries in the district, none produced ware of the same texture as this one, and all differ in the proportion of mica in their products.

A. Rudd (Ixworth).



The foot of Sheep Pasture incline on the Cromford and High Peak line. Photograph by J. E. Allen, Stanmore.

Club and Branch News

WITH THE SECRETARY

A HAPPY NEW YEAR

With this first issue of 1949 I have pleasure in wishing a happy and successful New Year to all members of the Guild and the H.R.C. In the past year more than 10,000 new members have been enrolled in the Guild, and nearly 13,000 in the H.R.C. I hope that even these figures will be surpassed during 1949.

I am also looking forward to real progress among Clubs and Branches. Every existing organization should be adding considerably to its strength with the coming of so many new members, and its proceedings should become livelier and more enjoyable as its strength increases. More new Clubs and Branches too should be coming into existence. Every member of the Guild or the H.R.C. who does not already belong to a Club or Branch should look round for one that he can join, and I shall be glad to give information that will be helpful in this respect. Where there is no Club or Branch in the neighbourhood the enthusiasts there should set to work to form one. The first step of course is to find others willing to join in the effort, and this usually is not difficult, as every member must have friends who also are enthusiasts.

The great thing is to get together, even if the number to start with is small, for there is no doubt whatever that the fun of model-building or of Hornby and Hornby-Dublo Train operation is increased to a surprising extent when it is shared with others. Once a Club or Branch is started it will soon grow, and provide many happy times for its members.

RAILWAY FILMS

I have received a very interesting list of 16 mm. colour sound films and film strips on railway work, railway travel and general interest subjects from the London Midland Region of British Railways. These can be obtained on loan by Meccano Clubs and Branches of the H.R.C. The colour sound films deal with holiday resorts, railways and important British industries, and the film strips are modern "lantern slides" providing up to 100 still pictures, typical titles being "Passenger Trains," "Permanent Way," and "Travelling Post Offices." They are only loaned where assurance is given that a suitable projector and a competent operator are available, and when admission is free. They will provide splendid programme items for Clubs and Branches who are able to make use of them, and any Leader or Chairman who is interested should write to me, so that I can give him further particulars and tell him where to apply.

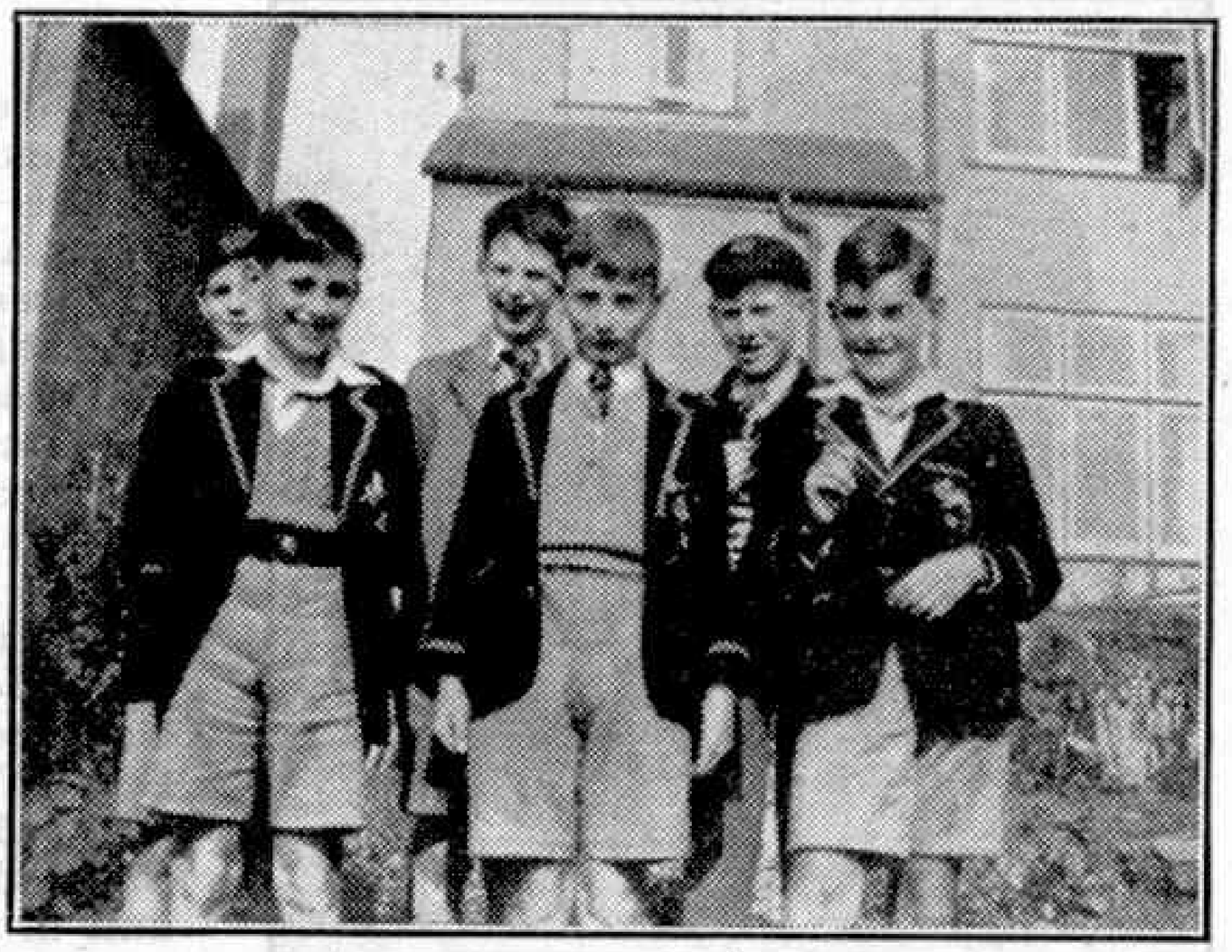
CLUB NOTES

WHITGIFT SCHOOL M.C.—A competition with an omnibus as the subject has been held. The Hornby Train Section continues active and a Hornby-Dublo Section has been formed. Members visited the Shirley M.C. by invitation for Lantern Lectures, and Visits have been paid to the Kenview Model Railway, Finsbury Park Station and King's Cross. Club roll: 30. *Secretary:* P. J. Cousins, 20, Langley Oaks Avenue, Sanderstead, Surrey.

THORNTON GRAMMAR SCHOOL (THORNTON) M.C.—Engineering and Woodwork Sections have been formed. Members of the Engineering Section are building a model of the Hawkesbury Bridge, New South Wales. The Club Library has been re-opened. Club roll: 17. *Secretary:* M. H. Reynard, 43, Bronte Old Road, Thornton, Bradford.

PETERBOROUGH M.C.—Fine models have been built of a combine harvester and the Eiffel Tower. A Visit has been paid to a local engineering works. Games and Debates are enjoyed regularly. A Darts Tournament has been held and a successful Christmas Party was organized. Club roll: 16. *Secretary:* R. Booker, 110, Alexandra Road, Peterborough.

WORCESTER COLLEGE FOR THE BLIND M.C.—Steady progress is being made. Members are building a set of railway rolling stock, one group building trucks, another coaches and a third locomotives, and a fourth laying down track. The local telephone exchange has been visited, and a visit to the Austin Motor Works has been arranged. *Leader:* Mr. R. D. Follett, Worcester College for the Blind, Worcester.



Members of the Stroud Branch, No. 502, Chairman, Mr. C. T. Hargest, Secretary, D. Hargest. This Branch was affiliated in July 1947. Track meetings are held regularly and good displays have been organized, including an outdoor Exhibition of Hornby Trains and Dinky Toys in July last that was specially reported in the local newspaper. Cricket and other indoor and outdoor games also are enjoyed.

BRANCH NEWS

DAWSON PRIMARY BOYS' SCHOOL (DAGENHAM)—Regular track meetings continue. At one of these locomotives were tested and certificates of their performance were given. Mr. J. Brooks, Chairman, gave demonstrations with his own locomotives. Lantern Lectures on the history of British railways have been given. A Newsletter by Mr. E. Lynch, Locomotive Inspector at Plaistow, gave interesting details of locomotive work. *Chairman:* Mr. J. Brooks, Dawson Primary Boys' School, Ellerton Road, Dagenham, Essex.

Among the Model-Builders

By "Spanner"



First Prize winner A. R. Tinckson, Sydney. He won the highest award in the "February" Model-Building Contest (Overseas Section).

Reversing Mechanism for E06 and E020 Motors

Owners of either the Meccano E06 or E020 type Electric Motors will know that they are supplied with a special pulley fitted to the armature shaft. In most cases this pulley can be connected by Cord or a Driving Band to a suitable pulley on the model. In some types of models, however, it is preferable to drive through a gear train, and Fig. 1 shows how this can be

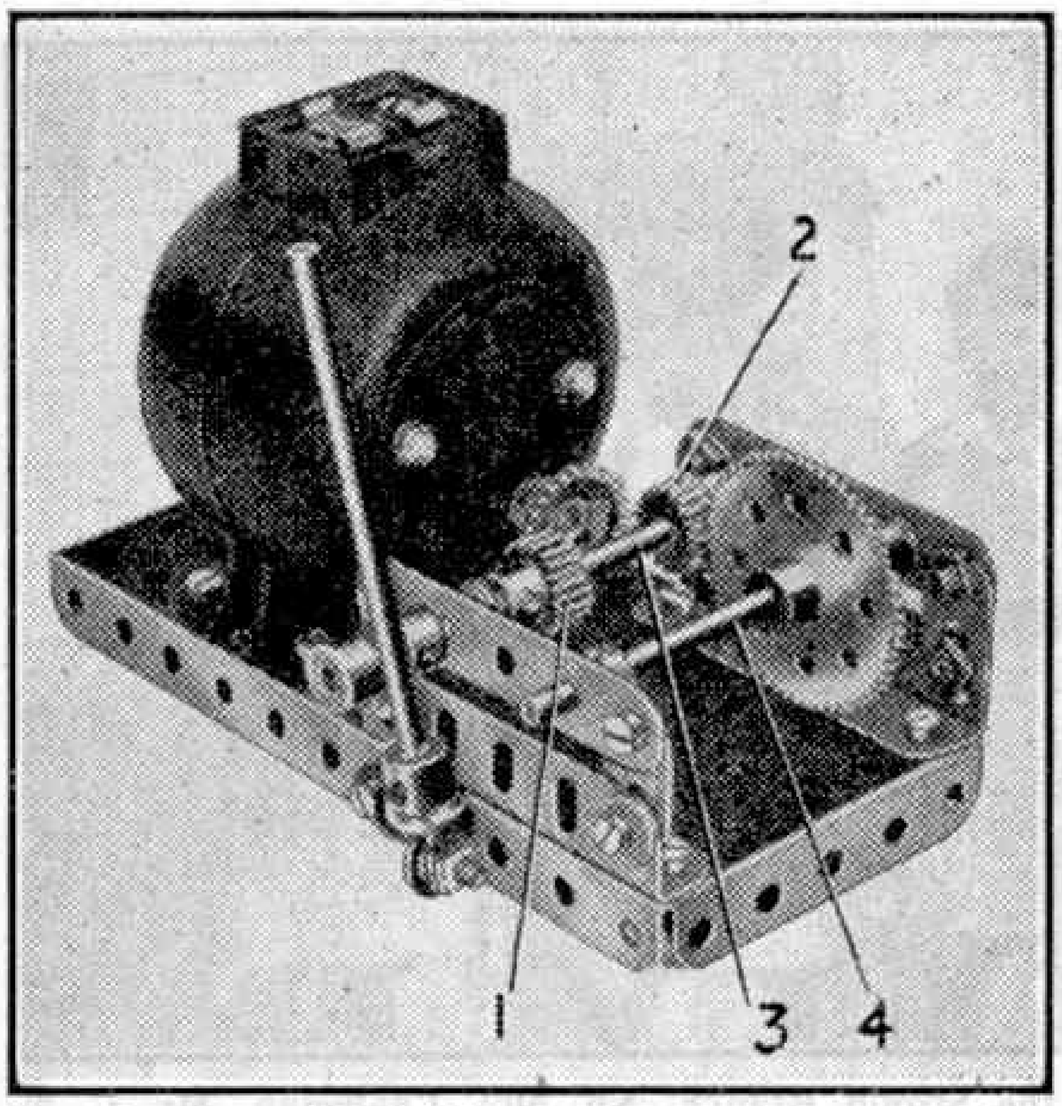


Fig. 1. A useful driving and reversing mechanism fitted to an E06 or E020 type Meccano Electric Motor.

combined with a neat reversing mechanism.

The Motor is bolted to the base of the model, and the armature pulley is removed and replaced by a $\frac{3}{4}$" Contrate. From the Contrate the drive can be transmitted to either of two $\frac{1}{2}$" Pinions 1 and 2. These are fixed on a Rod 3, mounted in two $2\frac{1}{2}$" Strips. The $2\frac{1}{2}$" Strips are supported at each end by Fishplates bolted to $2\frac{1}{2}$" Angle Girders attached to the base. From Rod 3 the drive is taken to the output shaft 4 by a 57-teeth Gear meshing with the Pinion 2.

Movement of Rod 3 is controlled by a Rod fixed in an End Bearing that is attached by a lock-nutted bolt to an Angle Bracket bolted to the base. The Rod engages between Collars fixed to the end of Rod 3 outside the framework.

Friction Drive

Here is a suggestion for a novel friction drive device that I received from an old Meccano enthusiast, F/Lt. N. C. Ta'Bois, who is now serving with B.A.O.R. in Germany. Regular readers of the "*M.M.*" will remember the many models and mechanisms devised by Ta'Bois that have appeared in past issues of the "*M.M.*" His friction device, shown in Fig. 2, was designed for use in the drive to the film take-up spool of a cinematograph.

Two $1" \times \frac{1}{2}"$ Angle Brackets are bolted together by means of a set screw and nut to form a large reversed angle bracket. One end of this is bolted to a 57-teeth Gear Wheel that is loosely mounted to a Rod, while its other end is journalled on the Rod. Two Collars retain this built-up unit in place. Seven Spring Clips are now pressed on to the Rod. The drive is transmitted from the Gear Wheel through the Angle Brackets and Clips to the Rod. By varying the number of Clips the power transmitted can be controlled.

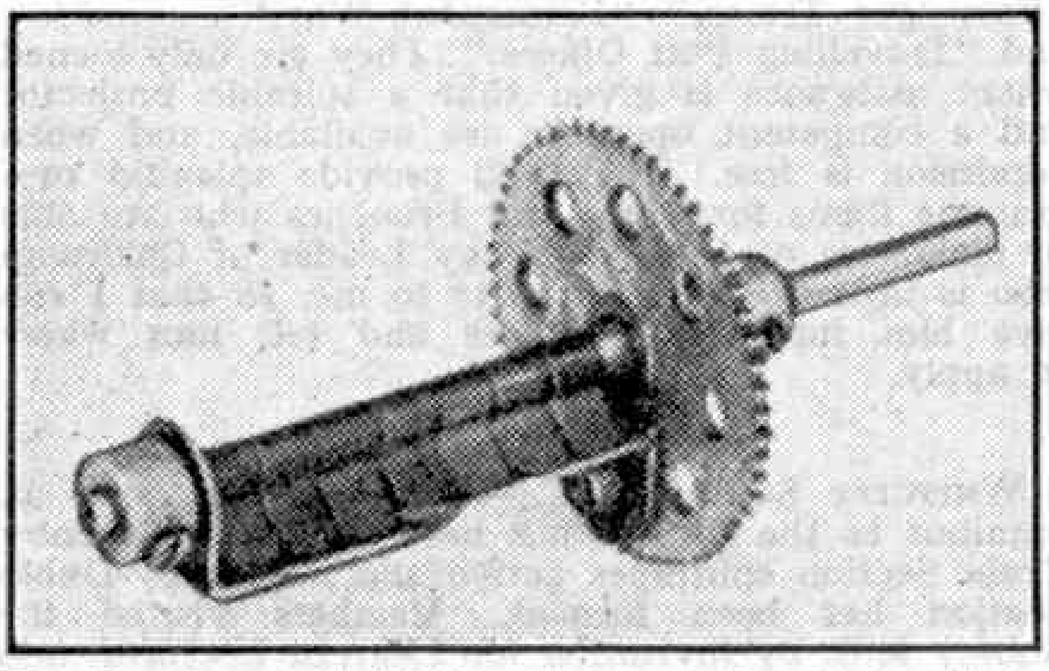


Fig. 2. A novel friction drive device designed by F/Lt. N. C. Ta'Bois, B.A.O.R., Germany, for use in the take-up spool drive of a cinematograph.

How to Use Meccano Parts

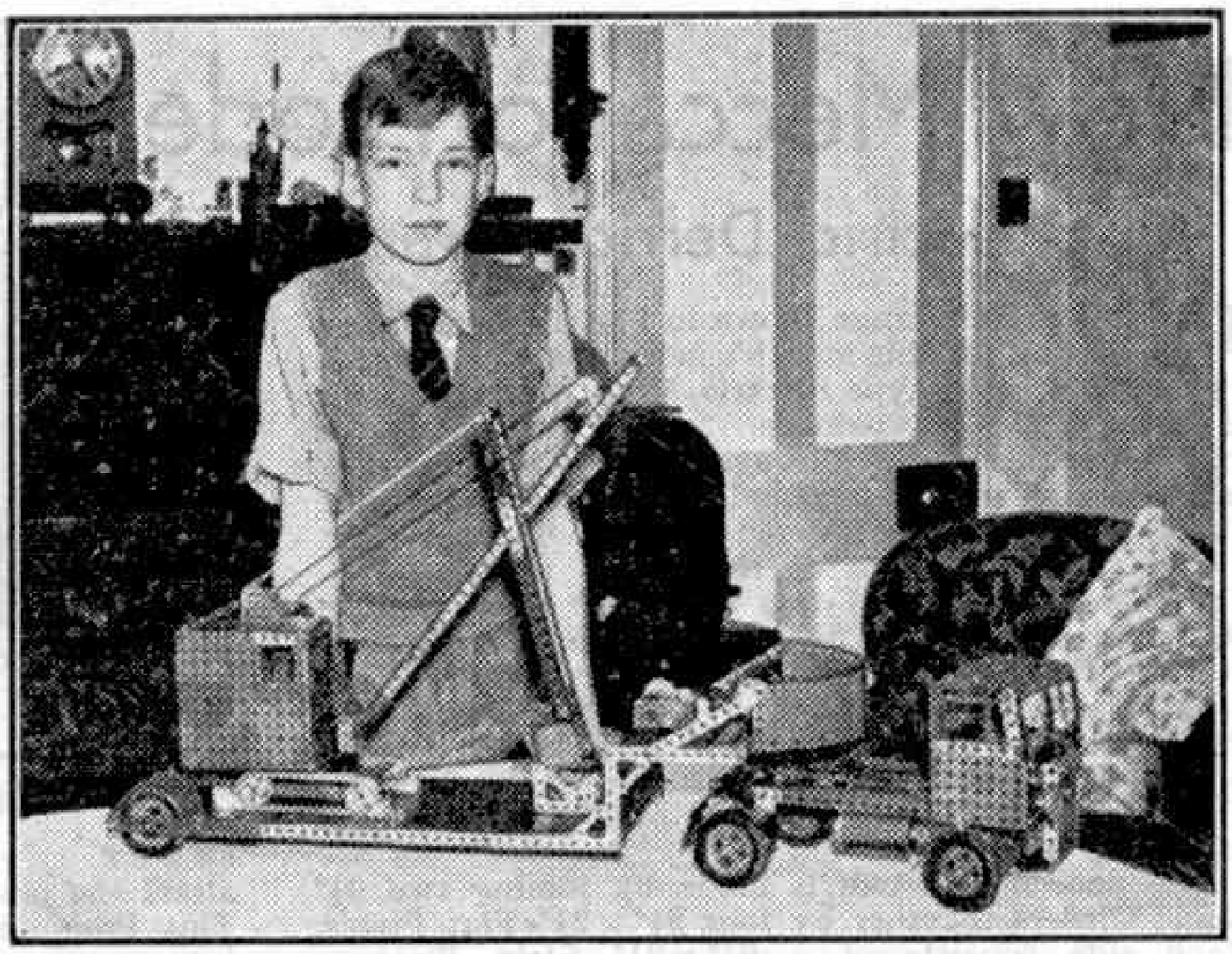
Fork Pieces (Part No. 116 Large; Part No. 116a Small)

Fork Pieces are designed for making pivotal connections between Rods and Strips, or between two Rods meeting at right-angles. In Fig. 4 a small Fork Piece is used as a bearing for a ½" loose Pulley, which runs on a ½" Bolt passed through its arms. A large Fork Piece makes a neat journal bearing for a short Rod, and it is useful also for forming a connection or bridging piece between other parts such as Strips.

Threaded Boss (Part No. 64)

The Threaded Boss is of the same diameter as the Collar, but measures ⅜" in length and is perforated longitudinally and transversely with threaded holes. Hence the part is particularly valuable in Meccano screw gearing. In Fig. 3 for example, a Threaded Boss is shown mounted on a short Screwed Rod, but it is prevented from rotating with the Rod. Consequently, when the handwheel shown is rotated the Boss travels longitudinally, and in the mechanism illustrated this movement is utilized to control a simple brake device.

The Threaded Boss is useful also for connecting Strips and Girders to Screwed Rods.



A model-builder at home. Here is 12-year old David Hughes of Dursley, Gloucestershire, with an interesting model excavator and carrier he has built. David is a pupil at the Dursley Grammar School and is a keen Meccano boy.

"NEW-YEAR" MODEL-BUILDING COMPETITION

In the first Meccano competition to be announced in 1949, we are offering fine cash prizes for models of any kind built by readers of the "*M.M.*" There are no age limits, and the only conditions are that models must be built from Meccano parts and must be the unaided work of competitors themselves. There is no restriction whatever on the kind or size of models that may be submitted.

The contest is divided into two Sections, A, for competitors of all ages living in the British Isles; B, for competitors of all ages living Overseas. The prizes to be awarded in each Section are as follows: First, Cheque for £3/3/–; Second, Cheque for £2/2/–; Third, Cheque for £1/1/–. There will be also five prizes each consisting of a P.O. for 10/6 and five prizes each of 5/–. Certificates of Merit also will be awarded.

Section A will remain open for entries until 28th February, but Overseas readers entering for Section B, can send in their entries up to 31st May next.

Actual models must not be sent. All that is required is a photograph or a neat sketch of the model together with a few details of its chief features. Entries should be addressed "*New Year Model-Building Contest, Meccano Ltd., Binns Road, Liverpool 13.*" Competitors should note that illustrations of prize-winning models become the property of Meccano Ltd., and will not be returned.

"COLLIS TRUCK" MODEL-BUILDING CONTEST

This is the last opportunity we shall have of reminding intending competitors living in the British Isles, of the fine prizes to be won in the "*Collis Truck*" Model-Building Competition, full details of which were first announced in the November 1948 issue of the "M.M." The Home Section of this Contest closes on the 31st January, so that there is not much time to lose in sending in entries. The Overseas Section closes on 30th April.

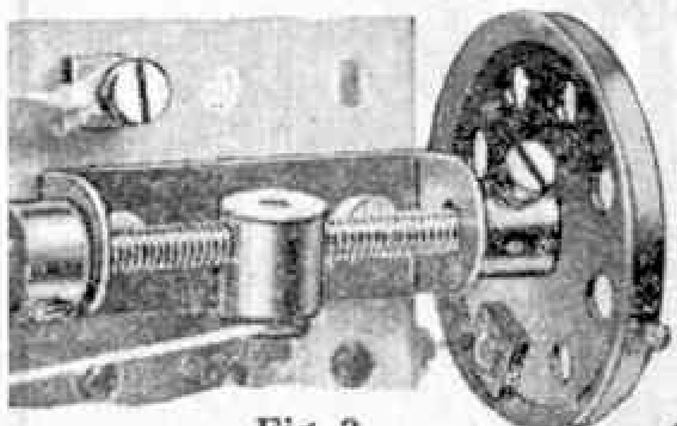


Fig. 3.

Examples of uses for the Meccano Threaded Boss and the small Fork Piece.

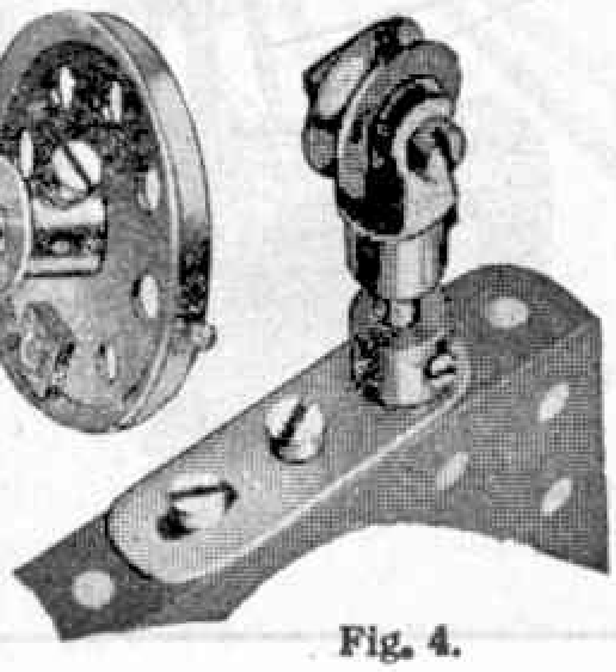


Fig. 4.

1948 MODEL-BUILDING COMPETITION RESULTS

April General Contest (Overseas). The principal prizes were awarded as follows: 1st Prize, Cheque for £2/2/–: A. W. Dickie, Dunedin, New Zealand; 2nd, Cheque for £1/1/–: G. Burns, Warragul, Victoria, Australia; 3rd, Cheque for 10/6: R. J. Hadwick, Auckland, New Zealand.

"Meccano Picture" Contest (Home). 1st Prize, £2/2/–: J. A. Draper, Worcester Park; 2nd, £1/1/–: R. J. Sowersby, Davyhulme; 3rd, 10/6: J. Williams, Tolworth.

Overseas. 1st Prize, £2/2/–: R. O. Bickley, Melbourne, Australia; 2nd, £1/1/–: J. A. Erdos, Wellington, New Zealand; 3rd, 10/6: G. Burns, Warragul, Australia.

New Meccano Model

Electric Derrick Crane

THE fine derrick crane shown in Fig. 1, which forms the subject for this month's new model, is operated by an E06 or E020 type Electric Motor, and is capable of lifting quite heavy loads. All its movements are driven by the Motor through a compact gear-box, and a neat reversing mechanism is fitted so that the jib and load can be lowered steadily under power.

The triangular base of the model is built first. The main members of this are 18½" Angle Girders bolted at one end to 5½" × 2½" Flanged Plates, and at the other end to 3½" × 2½" Flanged Plates. The 5½" × 2½" Plates are joined by two 5½" Strips, and the 3½" × 2½" Plates by a third 18½" Angle Girder. A 3" Pulley 1 is bolted at the centre of the 5½" × 2½" Flanged Plates to form part of a built-up ball bearing as shown in Fig. 2.

The floor of the cab is made by joining two 9½" Angle Girders together by four 5½" × 2½" Flat Plates. Each side consists of a 9½" × 2½" Strip Plate, a 5½" × 2½" Flexible Plate and two 9½" Strips. These are bolted at the rear to a vertical 5½" Angle Girder, and at the front to 7½" Angle Girders 2. The vertical Girders are joined across by 5½" Strips and by a 5½" Angle Girder at the rear. The Angle Girders 2 are extended upward by 4½" Angle Girders, and the latter are connected at their upper ends by a 3½" Angle Girder 3. The supporting tower of the cab is completed by attaching two 7½" Strips 4 to 3" Angle Girders bolted to the Angle Girder 3. A pivot is provided by a 2" Rod passed through a Double Bent Strip and a 3½" Angle Girder. The Rod is fitted at its upper end with a Bush Wheel 5, and is held in position by Collars.

The centre section of the jib consists of four 12½" Angle Girders joined together by 1½" Strips to form a box girder. This is filled in by 5½" × 1½" and 2½" × 1½" Flexible Plates held in place by nuts on Screwed Rods passed through the Girders and Plates. The jib is completed by a tapered section at each end consisting of four 9½" Strips. The Strips on each side are joined together nine holes from their ends by 1½" × ½" Double Angle Strips. The jib is pivoted on a 3½" Rod held by Collars in a 2½" × 1" Double Angle Strip bolted to the front of the cab.

The gear-box is shown removed from the cab in Fig. 3, and is built up as a separate unit and bolted to the cab floor when assembled. The sides of the unit are 5½" × 2½" Flat Plates, and the bottom is two 3½" × 2½" Flanged Plates. The sides are also joined by two 3½" × ½" Double Angle Strips at each end. The input shaft 6 is a 6½" Rod mounted in a 2½" × 1" Double Angle Strip bolted to the side of the housing. The Rod 6 is held in place by Collars, and carries a ½" Pinion 7. This Pinion meshes with a ½" diameter ¾" face Pinion fixed on a 4½" Rod 8, which is also mounted in a 2½" × 1" Double Angle Strip. The Rod 8 is free to slide within limits, and is controlled by a lever 9, fixed on a transverse 4½" Rod. This Rod is journalled in 1" Corner Brackets and carries a Crank at one end. A ⅜" Bolt fixed to the Crank engages between Collars on the Rod 8 so that movement of the lever alters the position of the ½" diameter ¾" face Pinion. This Pinion is positioned so that it can be brought into engagement with either side of a 1½" Contrate, to reverse the direction of drive.

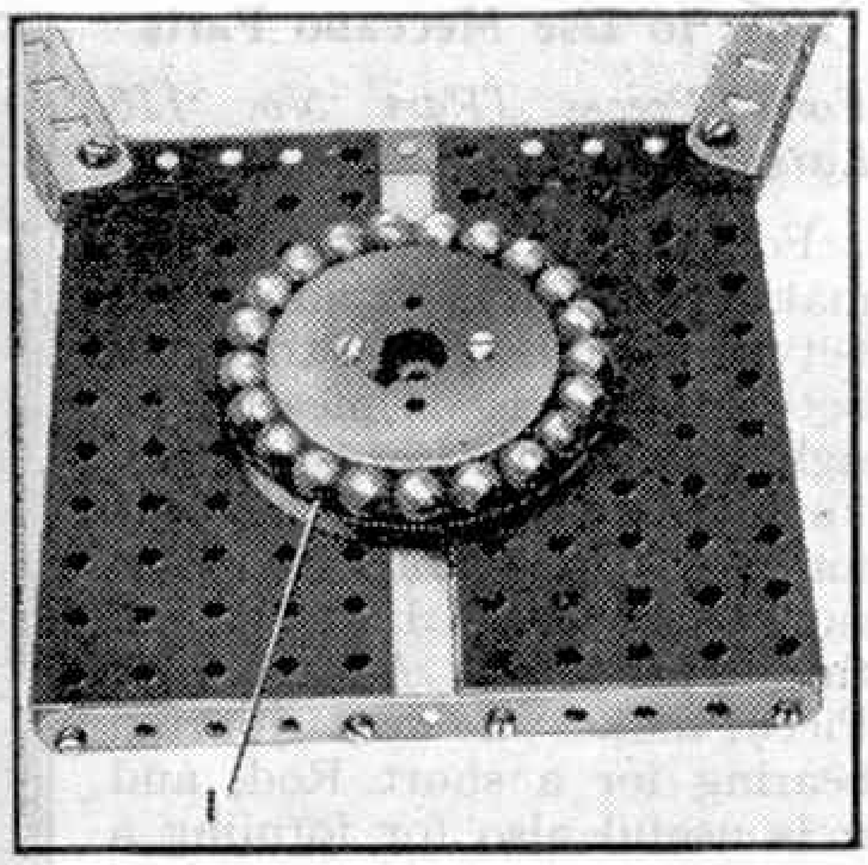
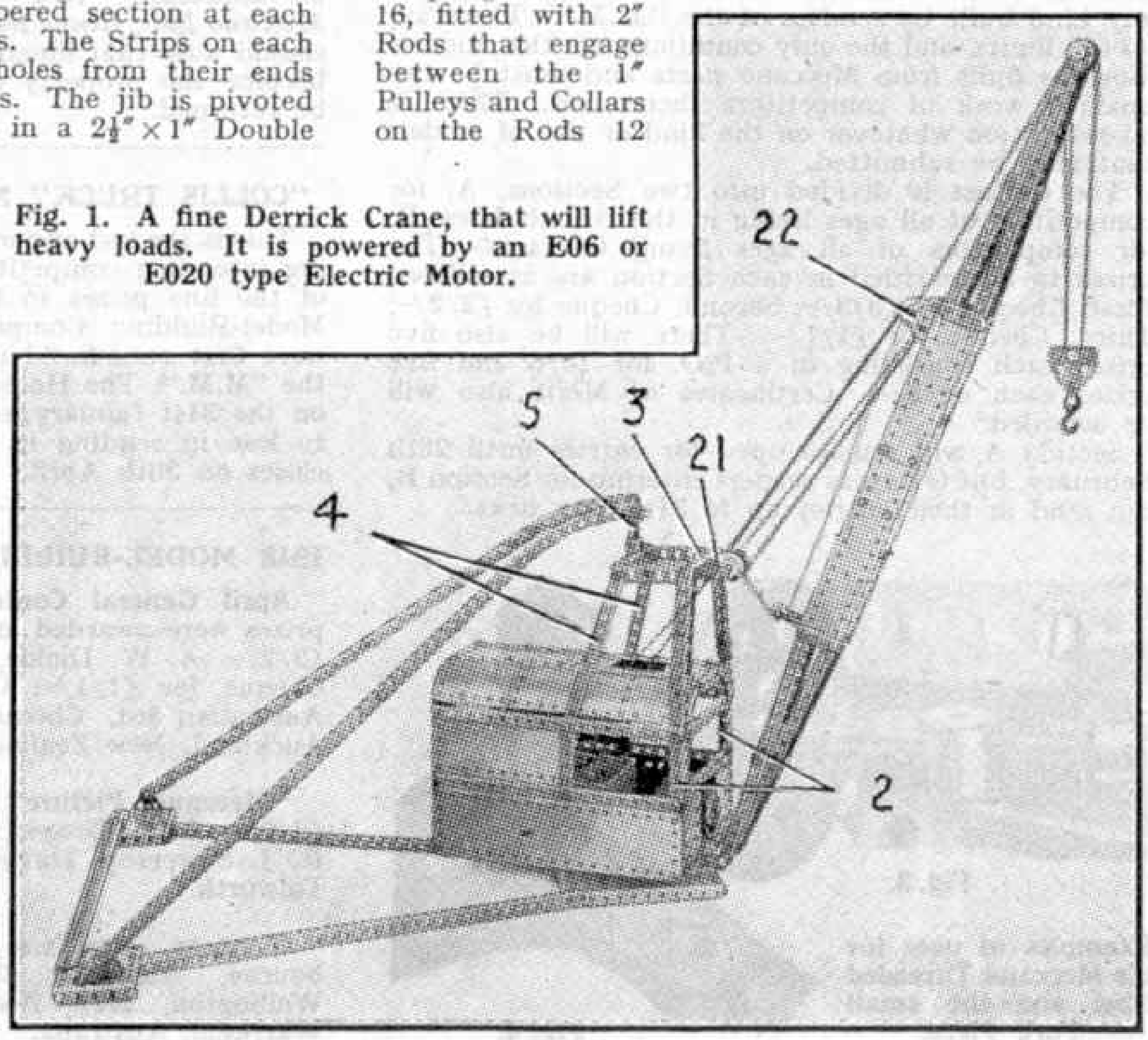


Fig. 2. The ball bearing unit on which the control cab is mounted.

The 1½" Contrate is fixed on a 4" Rod 10, which is mounted in the side-plates. The bearings in which this Rod rotates are strengthened by 2½" Strips. The Rod is fitted between the Plates with a ½" Pinion 11 and a Worm Gear. Movement of the load and luffing of the jib are controlled by the 4½" Rods 12 and 13. Each of these carries a 57-teeth Gear and two 1" Pulleys. A Cord Anchoring Spring is placed between the 1" Pulleys on each Rod. The Rods are allowed approximately ½" sliding movement in their bearings, so that either of the 57-teeth Gears can be brought into mesh with the Pinion 11.

The Rods 12 and 13 are controlled by a lever 14. This is fixed in a Coupling locked on a 6½" Rod mounted in the lower pair of 3½" × ½" Double Angle Strips joining the sides of the mechanism. The 6½" Rod carries two Couplings 15 and 16, fitted with 2" Rods that engage between the 1" Pulleys and Collars on the Rods 12

Fig. 1. A fine Derrick Crane, that will lift heavy loads. It is powered by an E06 or E020 type Electric Motor.



and 13. The Collar on Rod 12 is fitted with a $\frac{3}{8}$" Bolt, so that when the drive to this Rod is disengaged the Bolt contacts a second Bolt 17 and prevents the Rod from turning. The Rod 13 is fitted with a similar automatic brake, but in this case the $\frac{3}{8}$" Bolt is screwed into the boss of the 57-teeth Gear.

The slewing motion of the cab is operated by a $6\frac{1}{2}$" Rod 18, mounted in Flat Trunnions bolted to the lower $3\frac{1}{2}$" × $\frac{1}{2}$" Double Angle Strips. This Rod carries a 57-teeth Gear 19 and a $\frac{1}{2}$" Pinion 20. The 57-teeth Gear is positioned so that by sliding the Rod 18 it can be meshed with a Worm on Rod 10. Movement of Rod 18 is controlled by a lever 21, which is fixed in a Coupling. The Coupling is locked on a 4" Rod that carries also a Crank, and a Threaded Pin attached to the Crank engages between Collars on the Rod 18. The 4" Rod is prevented from moving freely by a 1" Pulley fitted with a Rubber Ring arranged so that it presses against the mechanism side plate.

The complete gear-box unit is bolted to the floor of the cab, and an E06 type Electric Motor is also bolted in position. A $\frac{3}{4}$" Sprocket on the Motor armature shaft is connected by Sprocket Chain to a $1\frac{1}{2}$" Sprocket on Rod 6.

The cab is pivoted on a built-up bearing formed by a Wheel Flange bolted to the Pulley 1, and by 21 Metal Balls arranged in the groove between the rim of the Pulley and the Wheel Flange. A $1\frac{1}{2}$" Rod is fixed in the Pulley 1, and passed through a second 3" Pulley bolted to the base of the cab. A $1\frac{1}{2}$"

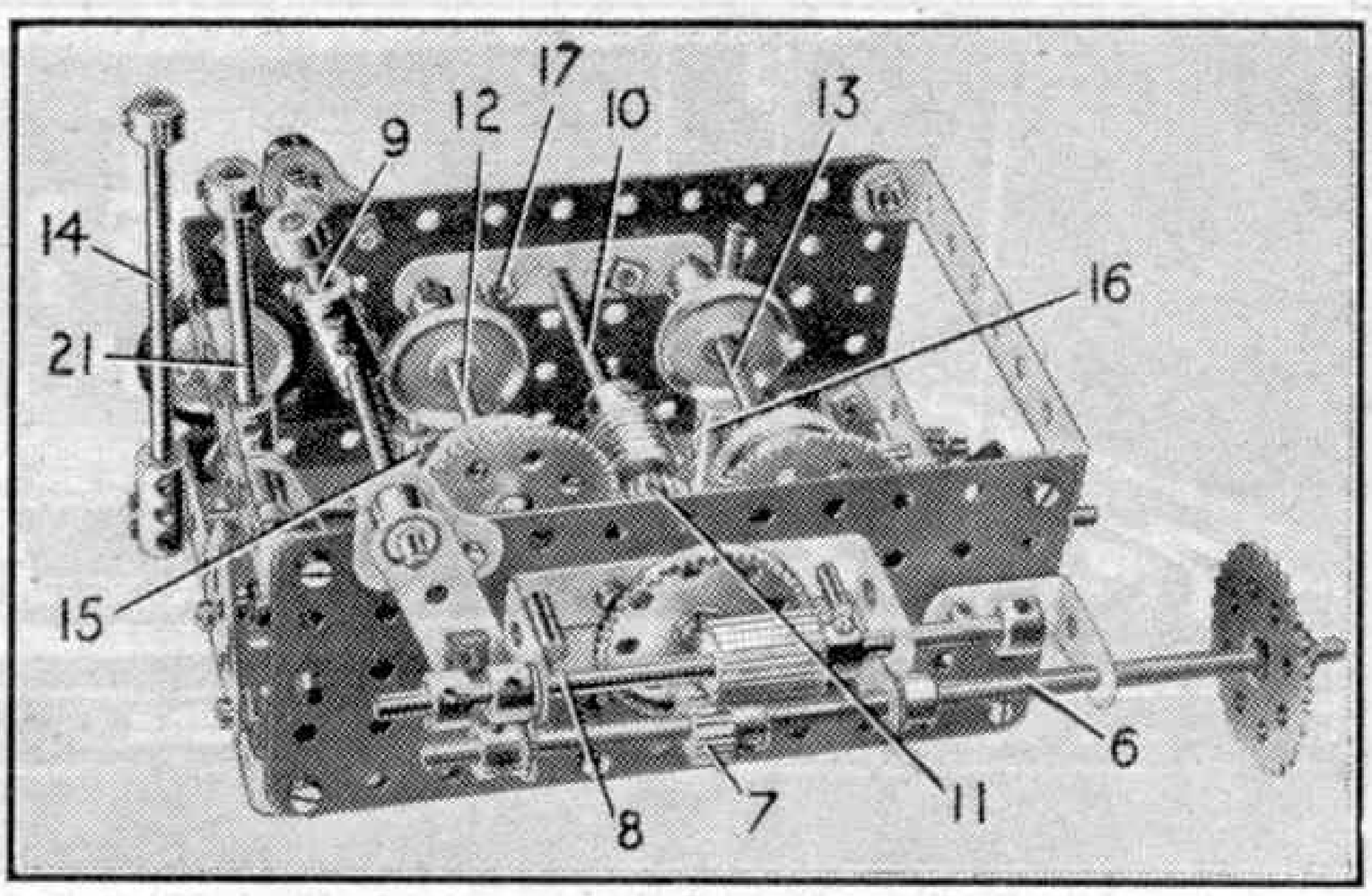


Fig. 3. The gear-box removed from the control cab.

Contrate is fixed on the upper end of the $1\frac{1}{2}$" Rod so that it meshes with the $\frac{1}{2}$" Pinion 20.

The cab is braced by stays extending from the $3\frac{1}{2}$" × $2\frac{1}{2}$" Flanged Plates of the base and attached by Angle Brackets to the Bush Wheel 5. Each of these stays is built up from $12\frac{1}{2}$" Strips and $5\frac{1}{2}$" Curved Strips.

The arrangement of the jib luffing Cords is as follows. A length of Cord is tied to the Rod 13, and passed over 1" Pulleys on Rods 21 and 22. It then passes around two further sets of 1" Pulleys on Rods 21 and 22, and is tied finally to Rod 21. Rod 21 is mounted in a $2\frac{1}{2}$" × 1" Double Angle Strip, and Rod 22 in Trunnions fixed to the jib.

The hoisting Cord is tied to Rod 12, and passed over a $\frac{1}{2}$" loose Pulley on Rod 21. It is then taken round a $\frac{1}{2}$" Pulley mounted between the jaws of a Fork Piece fixed to the jib, and over a 1" loose Pulley at the jib head. It is passed round a 1" loose Pulley in the pulley block, and again round similar Pulleys in the jib head and pulley block. It is then tied to the jib head.

The pulley block consists of two Flat Trunnions joined by Double Brackets, and a Large Hook is attached by a $\frac{3}{4}$" Bolt. The roof of the cab is built up from Flexible Plates and is connected to the sides by Obtuse Angle Brackets.

If required the completed model may be fixed by screws to some form of baseboard. The model is well-balanced however, and will remain stable even with the jib lowered to its maximum radius under normal loads. If exceptionally heavy loads are raised the $3\frac{1}{2}$" × $2\frac{1}{2}$" Flanged Plates of the base can be weighted to increase the stability.

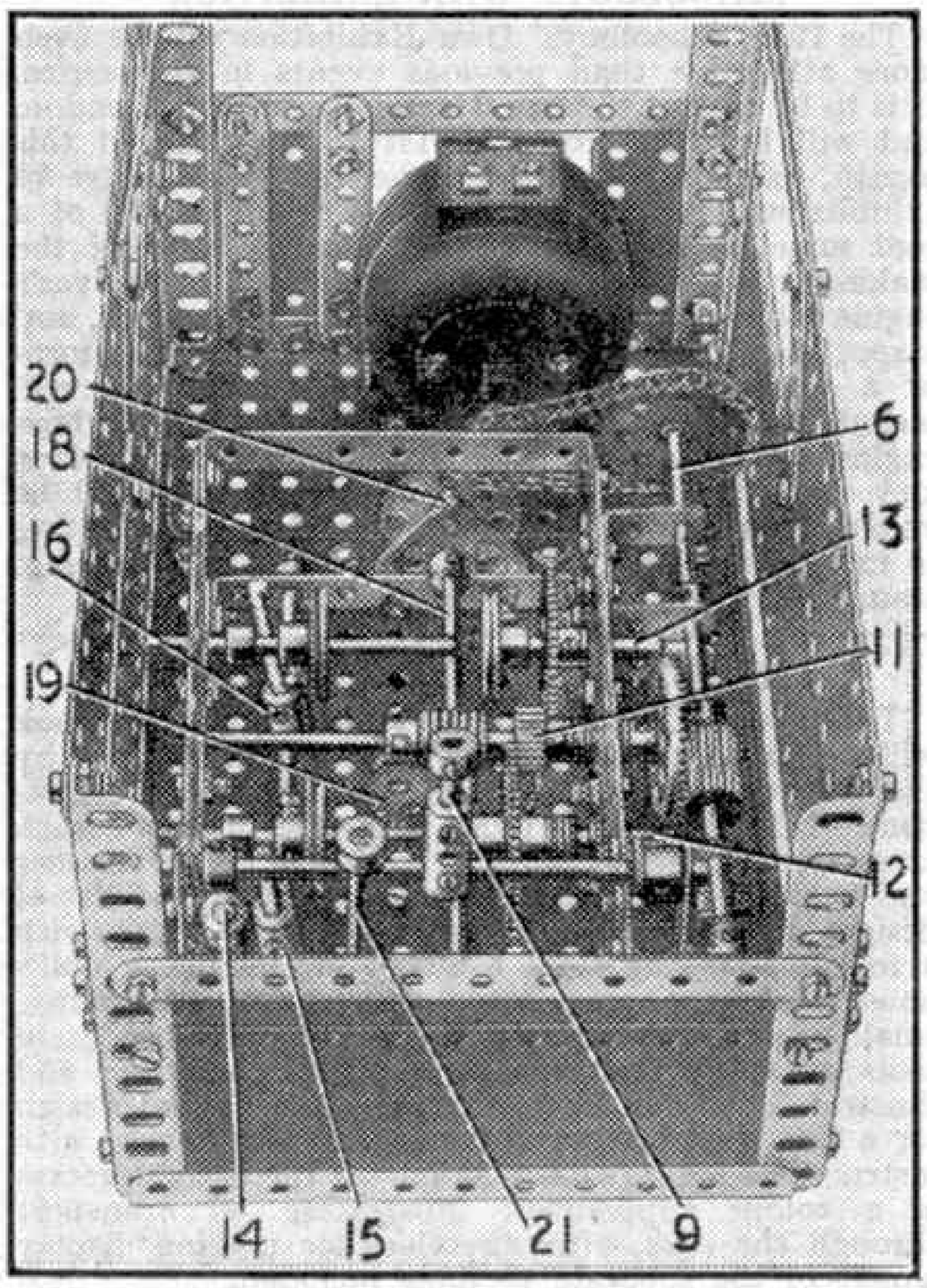
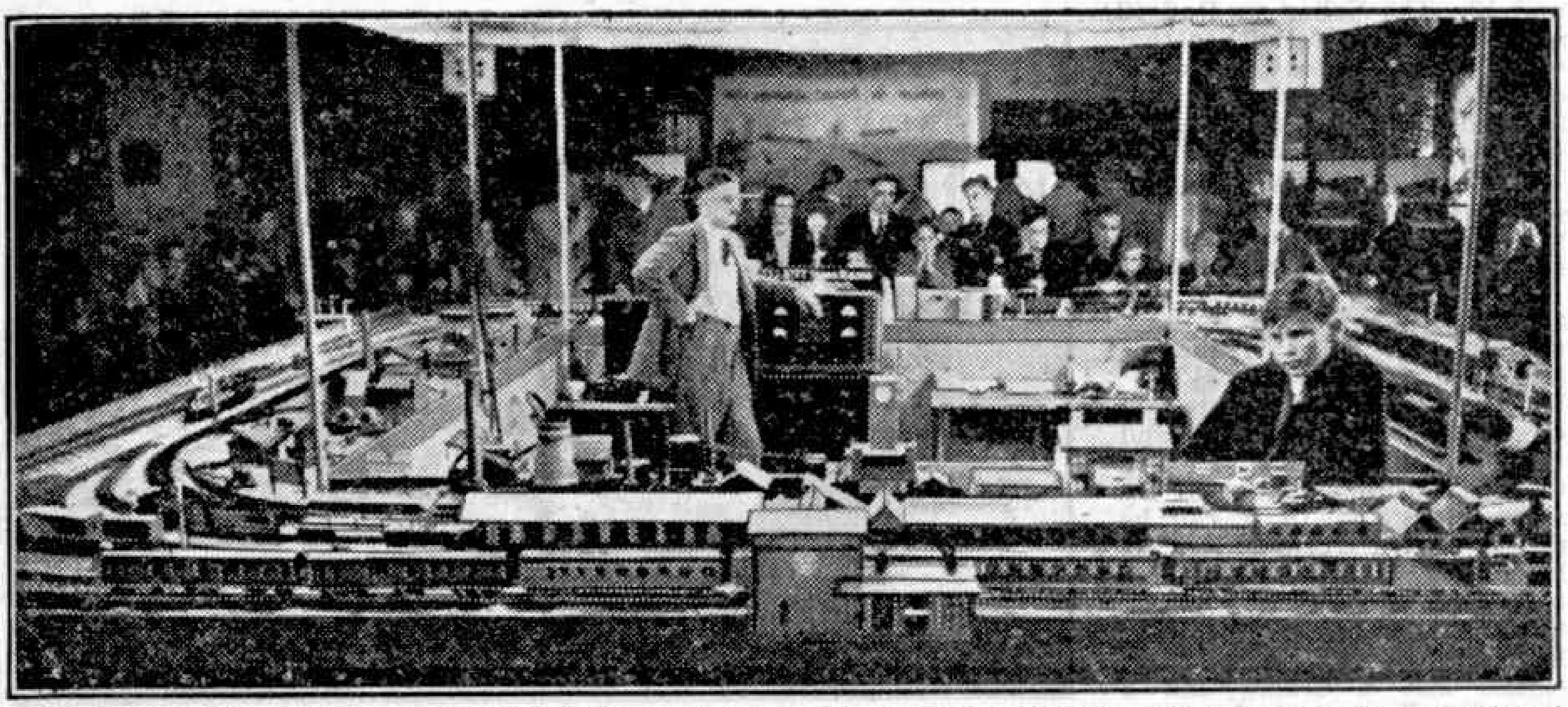


Fig. 4. The cab with the roof removed to show the mechanism.

Parts required to build the Electric Derrick Crane: 6 of No. 1; 12 of No. 1a; 2 of No. 1b; 6 of No. 2; 2 of No. 3; 2 of No. 4; 8 of No. 5; 8 of No. 6a; 3 of No. 7a; 4 of No. 8; 2 of No. 8a; 2 of No. 8b; 4 of No. 9; 2 of No. 9a; 2 of No. 9b; 2 of No. 9c; 2 of No. 11; 1 of No. 12; 3 of No. 12a; 3 of No. 14; 4 of No. 15a; 2 of No. 15b; 3 of No. 16; 1 of No. 16a; 3 of No. 17; 4 of No. 18a; 1 of No. 18b; 20 of No. 19b; 11 of No. 22; 4 of No. 23; 2 of No. 22a; 1 of No. 24; 3 of No. 26; 1 of No. 26b; 3 of No. 27a; 2 of No. 28; 1 of No. 32; 170 of No. 37; 22 of No. 37a; 85 of No. 38; 1 of No. 45; 3 of No. 46; 5 of No. 48; 4 of No. 48b; 2 of No. 52; 4 of No. 53; 1 of No. 57b; 32 of No. 59; 2 of No. 62; 5 of No. 63; 6 of No. 70; 8 of No. 81; 2 of No. 89; 4 of No. 90a; 1 of No. 94; 1 of No. 95a; 1 of No. 96a; 3 of No. 111; 15 of No. 111c; 2 of No. 115; 21 of No. 117; 1 of No. 116a; 1 of No. 120b; 4 of No. 126; 2 of No. 133a; 1 of No. 137; 1 of No. 155; 1 of No. 147b; 2 of No. 176; 2 of No. 188; 12 of No. 189; 4 of No. 192; 2 of No. 196; 1 E06 or E020 Electric Motor.



A good view of the Exhibition Model Railway operated by Mr. J. Elliott, Spalding. The system was first referred to in the "M.M." last October, and occupies a space 22 ft. by 20 ft. There are nine locomotives, some of which are electrically operated and some steam driven, 35 main line coaches and over 50 goods vehicles.

Made in Australia—(*Continued from page 4*)

new Australian Naval Air Arm, but we can expect to hear much more of them in the future.

Meanwhile the 225th, and last, "Mosquito" has left Bankstown, and deadly little "Vampire" jet fighters are beginning to appear there, together with "Drover" seven-seat air liners. The "Vampires," P 1040s and the new jet bombers will all be fitted with Rolls-Royce "Nene" turbo-jets built by the Engine Division of the Commonwealth Company. It marks the beginning of a new era for Australian aviation, for in these aircraft the R.A.A.F. will have some of the world's most efficient fighters and bombers, while the Australian-designed "Drover" is undoubtedly as good as anything else in its class anywhere in the world.

Australia, strategically-placed, may well become in time a leading aviation research and production centre of the British Commonwealth. If it does, the record of its aircraft industry proves that there will be no lack of initiative and skill to retain Britain's traditional leadership in the air.

Looking Inside Gear Wheels—(*Cont. from page 24*)

stresses there are severe. But they also show that there is another area in each tooth that is heavily stressed. This is on the free face of the tooth and right at the roots.

This remarkable device enables the engineer to look into his productions and see where they are subject to the greatest forces tending to distort or break them. With this information he can design them better, both to stand up to their tasks and to make their work easier and more precise.

Making Ropes from Fibre—(*Cont. from page 11*)

strand, the three strands on the traveller are taken off their respective hooks and fixed to a centre hook ready for laying together.

Between the foreboard and the traveller is a machine known as a top-cart, on which is fixed a tapered piece of wood with three or four grooves in it, according to the number of strands to be laid together. The three strands are put in their respective grooves and the machinery is started to impart further turn to the strands and opposite turn to the rope.

This operation causes the top-cart to travel in the direction of the foreboard, and results in the three strands twisting together to form a rope; and according to the speed at which the top-cart is made to travel, the lay of the strands in the rope becomes longer or shorter as required.

When laid up, the finished rope is ready for coiling, which is the method used for packing rope in a compact form for delivery.

The other method of making rope is by means of house machines in the rope-making shop. The yarn is put on bobbin banks or racks, drawn off, and formed into a strand on a machine a few feet away, known as a former, the strand being wound on to a bobbin. When sufficient strand has been formed, the bobbins are put into a closing machine, which is then set in motion to close the strands into the finished rope.

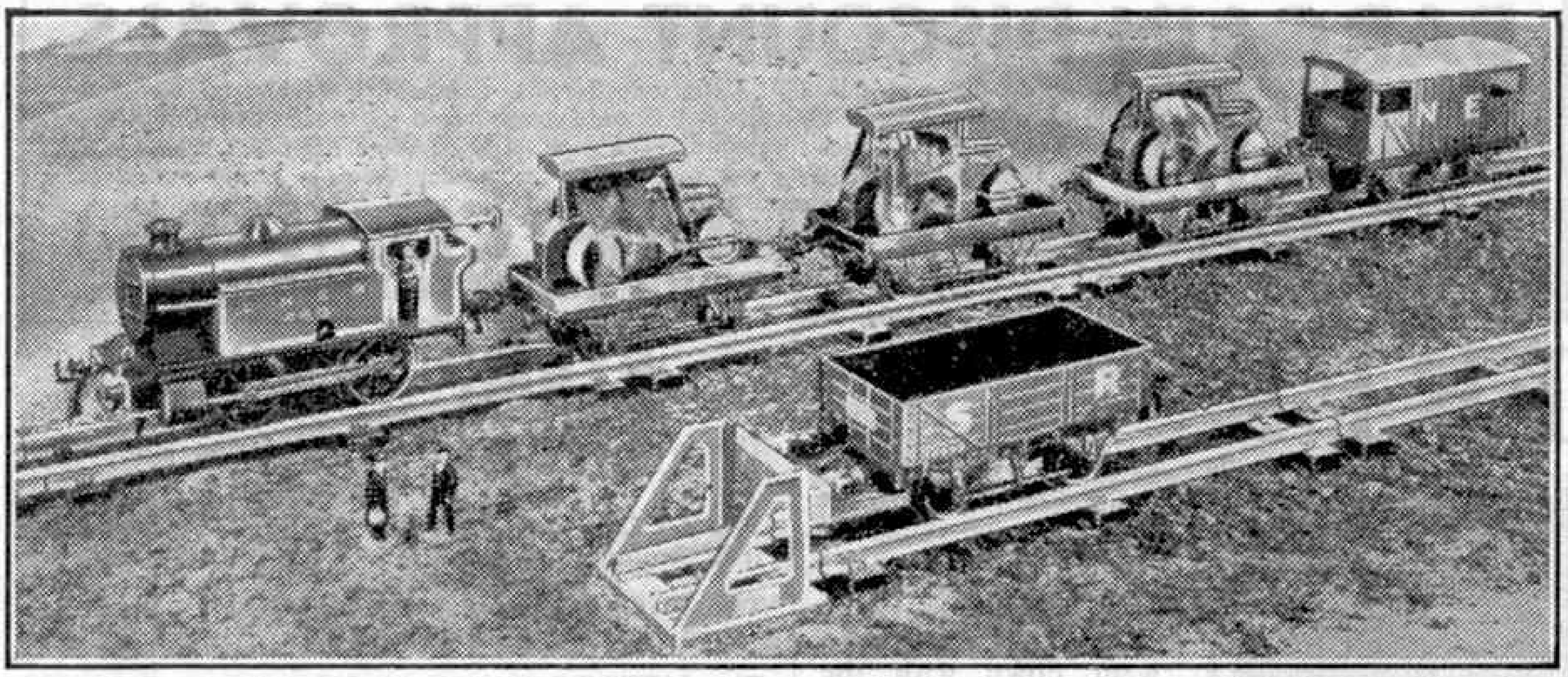
SCHOOLBOYS' OWN EXHIBITION

The 1949 Schoolboys' Own Exhibition will be even more attractive than previous events in this series. It is to be held at the new Horticultural Hall, London, and will be open from the 1st to the 15th of this month, excluding Sundays. The very wide range of exhibits will include a complete working model of a coal mine in Perspex, working models showing the making of steel, models of aircraft, a destroyer's engine room platform on which visitors can work, and a special British Railway exhibit that takes the form of a working model railway. Other exhibits will include aircraft models, a sectional gas turbine engine, postage stamps, books, games of all kinds and cigarette cards, and at one stand boys will be able to meet famous speedway riders. Prizes amounting to more than £150 will be awarded in model-making, stamp collecting and other competitions.

THE HOBBIES HANDBOOK OF 1949

The 1949 edition of this well-known Handbook will be found of the greatest value and interest by the fretworker, model-maker, toy maker and craftsman. It gives full details, with drawings, of such attractive models as a motor coach, a cargo steamer and a trailer lorry, and there is an illustrated list of designs for 350 other things that can be made with a fretsaw, ranging from a model fire engine, a doll's house and an express locomotive, to photo frames, small toys and farm figures. The excellent series of tools made by Hobbies Ltd. also are described and illustrated, and in addition there is a special design for a fine model of an old English stage coach, with instructions for its construction. A further attraction is a colour supplement illustrating air transport through the ages, with directions for making display panels of the separate pictures included.

The Handbook can be obtained from newsagents and Hobbies Branches for 1/–, or from Hobbies Ltd., Dereham, Norfolk, price 1/2 post free.



A consignment of Aveling-Barford Diesel Rollers makes an effective load on Hornby Flat Trucks. The rollers are partly sheeted over, as suggested in the article.

Dinky Toys on Hornby Layouts

MOST Hornby Train owners make use of Dinky Toys and Supertoys in connection with their Hornby Train layouts. The presence of these attractive miniatures round about the line helps to give a realistic appearance and to dispel the impression that the system is "all railway" and nothing else.

The actual size of the Dinky Toys chosen is important, but some latitude can be allowed in miniature, according to the position in which any individual item is to be used and its particular type.

Many of the vehicles in the Dinky Toys range are best used for representing road traffic in the neighbourhood of the line. Then any that are on the small side are kept fairly well away from the trains, so that they do not look unsuitable. Most of them look very effective as loads when carried on suitable Hornby Wagons or waiting at the goods yard or siding to be loaded.

The accompanying picture shows a train of Flat Trucks on which a consignment of "Aveling Barford" Diesel Rollers is loaded. When these are used in this way it is advisable to cover over the inner part at least of the Rollers with some kind of miniature sheet; this will disguise the fact that the driver is a fixture on his vehicle! The same scheme can be applied to the recently-introduced Massey-Harris Tractor. This in its striking colouring lends a bright touch to the train by which it is conveyed. Both the Roller and the Tractor are, of course, excellent also for lineside use.

All gauge 0 railway owners must have welcomed the appearance of the various Foden, Guy and Bedford motor vehicles in the Dinky Supertoys range, as they are practically perfect for gauge 0 purposes. The big Fodens are best left for long-distance road work, but the others can quite reasonably be used as railway-owned road motors. The Guy Flat Truck and the Bedford Articulated Lorry are particularly suitable for this purpose. Some Hornby Train owners make a special feature of their "Road Motor Department," and this is quite a good scheme. Where several vehicles are employed they can be housed together in a suitable building, and on systems operated by several boys together the younger ones will readily look after the running of the "Company's" motor vehicles.

A recent Dinky Toy of which very good use can be made on station platforms or in goods depots is the B.E.V. Electric Truck. Strictly speaking it is slightly too large for gauge 0, but it is so effective that this is readily overlooked. For dealing with the miscellaneous luggage at a passenger station, or the even more varied items handled by the "Goods Department," the Electric Truck is most effective.

Among other typical favourites with Hornby Train owners are the Royal Mail Van and the Mechanical Horse and Open Wagon. The real vehicles of these types are seen every day at stations, in city streets, and on country roads.

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G. L. WRIGHT (originally H. C. Watkins, Barnet), Dept. J, Palace St., CANTERBURY, Kent

For other Stamp Advertisements see also pages 38 and xi.

Stamp Collecting

"The Still-vex't Bermoothes"

By F. Riley, B.Sc.

CONTINUING our Empire stamp tour, we now sail north-eastward 800 miles or so from the Bahamas to visit the outlying Bermudas, or the "still-vex't Bermoothes," as Shakespeare calls them in "*The Tempest.*" They are out in the Atlantic Ocean, 580 miles away from the North American continent, and they seem to have been used as a calling place by Elizabethan adventurers on their way to the Spanish main. There are about 100 islands in the group, but between them they only cover some 20 square miles, an area only a little greater than that of the city of Newcastle, and only 16 or so of them have people living on them. These enjoy a beautiful climate, but severe hurricanes sweep over the Bermudas at times. This does not prevent enjoyment of the glorious sunshine on the wonderful beaches of the colony, or of yachting in the waters surrounding the islands. Another interesting point is that the Bermudas are coral islands built up by the tireless coral polyp on the summits of heights rising from the bed of the Atlantic Ocean.



The islands were discovered by a Spanish explorer, Juan Bermudez, but to English seamen they became known as Somers Islands after Sir George Somers, the leader of the first settlement, whose vessel was wrecked there in 1609. The largest is called Bermuda and occupies about three quarters of the total area of the group. It is connected by causeways and bridges with neighbouring islands, and on it is Hamilton, the chief town and the seat of government.

Naturally the achievements of Sir George Somers have been celebrated in the stamps of the Bermudas, some of the earlier stamps of the present century carrying a representation of a ship, presumably that in which he sailed and was wrecked. The first of these appeared in 1910. Portrait stamps of Queen Victoria had been used from 1865 to 1901, when a new stamp showing a dry dock with sailing ships was issued. Some of the earliest portrait stamps are rather rare, and perhaps would be beyond the pockets of younger collectors. This certainly is the case in regard to the earliest stamps of all, issued in 1848, which were prepared by W. B. Perot, then postmaster of Hamilton. These were circular, with the words Hamilton-Bermuda printed round the circumference and the date 1848 in the centre. The value "One penny" was written in ink on the stamp, which had on it also the signature of the postmaster. Specimens of this postmaster stamp are rare, and the catalogue value runs into hundreds of pounds each.



An interesting stamp appeared in 1920, to celebrate 300 years of representative institutions in the Bermudas. The chief features of the design were a portrait of King George V and the familiar Bermudas ship of 300 years ago, in oval frames. A second issue celebrating the same anniversary was called for in the following year, and this provided a new design, in which the ship was relegated to one of the corners and was much smaller.



Not until after the Silver Jubilee was any effort made to produce a real pictorial set for the Bermudas. There was certainly plenty of good material in the islands for designs, and an excellent selection was made, as the illustrations on this page suggest. Yet there seems to be a lack of life about the results, probably because the designs were not the work of artists. They are well printed and the colours are good, but they do not give a real idea of the brightness and activity of life in the Bermudas. Yet they should be included without hesitation in any collection of Empire stamps, and they will certainly make a good appearance in the album if they are well arranged and written up.



Actually there are two pictorial series to be considered, issued in 1936 and 1938 respectively. Certain designs of 1936 are repeated in 1938, with portraits of King George VI replacing those of King George V. The stamps illustrated on this page are from the second series. The 1d. black and scarlet, and the 1½d. blue and chocolate, show the Hamilton Docks, with a schooner and a liner prominent. The 2d., light blue and sepia, shows a yacht, the "*Lucie.*" The 2½d., light and deep blue, and the 1/–, green, show Grape Bay; this is an empty beach scene, framed by rather lifeless trees. The 3d., black and rose red, shows St. David's Lighthouse. The higher values from 2/– to 12/6 are formal in character, using a design that had already been introduced on the stamps of Nyasaland.

The 7½d., in black, blue and yellow-green, was not added to the set until 1941, and is by far the finest of these stamps. It is horizontal in form, and shows the Longtail flying over the Bermuda scene; the arms of the colony are shown in one corner.

After the issue of these stamps in 1938 there were colour changes with the 2d., the 2½d. and the 3d. Similar changes occurred at various dates with the higher values of this series. For instance, the 2/– value appeared in purple and blue in 1942; the surface of the blue paper used was mottled with white specks, and because of this the stamps have become known as the "Spotted Dicks." This variety is valued more highly than the stamp of the original colour, but in the lower values referred to the obsolete colours are of greater catalogue value than those now current.





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141	58	3d.	241	168	2/–	*317	*239a	4d.
143	65	4d.	242	169	3/6	324	241	9d.
144	66	2d.	243	170	2/3	*334	*243	1/–
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201	—	4d.	256	183	2/–	*352	*251	5d.
202	129	2/–	258	185	1/–	352	251	5d.
214	141	2/–	259	186	3/–	*A1	*A1	6d.
219	146	2/6	260	187	3/–	*A3	*A3	3d.
225	152	6d.	261	188	11/6	E2	E2	1/–
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For other Stamp Advertisements see also pages 36 and xi.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

IT doesn't seem a year since the writer of these notes was last sending good wishes for the New Year to Meccano readers, even though so many things have happened in the stamp world. However, here we are again with those good wishes, and may the coming twelve months be full of philatelic pleasures for all of us.

The world's post offices do their best to keep us busy, presumably subscribing to the old belief that a busy man is a happy man; or is it that they have no objections to a share of our pocket money? Whatever the reason they do provide us with plenty of pretty stamps, and of all the hundreds which are issued annually, none perhaps are more popular than the "Health" stamps of New Zealand. The wonder is that other countries have not imitated this popular Dominion by issuing similar stamps. It is said that India is going to do so. So successful have been these "Health" stamps that although several millions have been printed this year, the New Zealand Post Office announces that three quarters of the whole printing were sold during the first week they were on sale. Good luck, New Zealand Post Office! You print attractive stamps, you print enough to go round, and you treat collectors and dealers alike, in an entirely satisfactory manner.

Our "Wedding" stamps continue to hold the centre of the stamp collecting field, and the cracks in American magazines are still as hearty as ever. In most cases the writers of them omit to mention that we are not yet so bereft of events to commemorate that we must fall back on a barnyard fowl, as the U.S.A. did in the "Chicken" issue of 9th September. Nevertheless U. S. A. Commemoratives stamps continue to enjoy great popularity among junior collectors, owing to their cheapness; and many are quite attractive, though if they are compared with some of the superb issues of certain Continental countries such as Austria and France their artistic shortcomings are manifest.



An Australian reader very kindly sent a first day cover of the Mueller commemorative stamp, and remarked in his letter that he liked to read about stamps of his own country. Don't we all? However, while nobody can accuse the Australian postal authorities of issuing stamps that are particularly attractive—their muddy colours are their chief drawback, though the terrible centering of many is also a big handicap—there is no doubt that they are exceedingly popular. There is one stamp in the recently issued K.G. VI catalogue of Gibbons that in the writer's opinion is the greatest bargain price in the whole of that book. Perhaps collectors of K.G. VI stamps may like to guess which stamp is referred to.

It is known officially that





Barbados and Turks and Caicos Islands are to have stamps bearing dollar currency, and collectors have assumed apparently that all West Indian Islands will make the same change. But it seems strange that colonies like St. Kitts and Leeward Islands should be bringing out new stamps in sterling, if they were also to adopt the almighty dollar. Now the writer of these notes has heard that all the stamps of the Leeward Group, that is Leeward Islands, St. Kitts, Montserrat, Antigua and Virgin Islands, will not be changed from sterling. The news was not official, but it came from a good quarter.

During the currency of the "Olympic Games" set, the philatelic papers were full of the news that a sheet of the 1/– value overprinted 1 rupee for Muscat had been found with the overprint double. The sheet had 120 stamps, and many collectors were wondering just what these stamps were worth. Apparently most of them were bought up by a well-known London stamp firm, and it is interesting to see that they value these "errors" at £40 each. That is a nice little profit for somebody.



Our third illustration shows a handsome stamp from Bahawalpur. It commemorates the first anniversary of the union between Pakistan and the issuing country. Now as a rule Indian native states issue the least appreciated stamps of the whole of the British Commonwealth, in spite of the great philatelic interest of many of them; but so attractive are all the stamps of Bahawalpur that many collectors are taking them up. It might be a wise move to go in for some of the cheaper ones, but they are to be recommended generally from an investment standpoint; moreover it is not always possible to obtain new issues from the post office at face value, which is not a good sign.

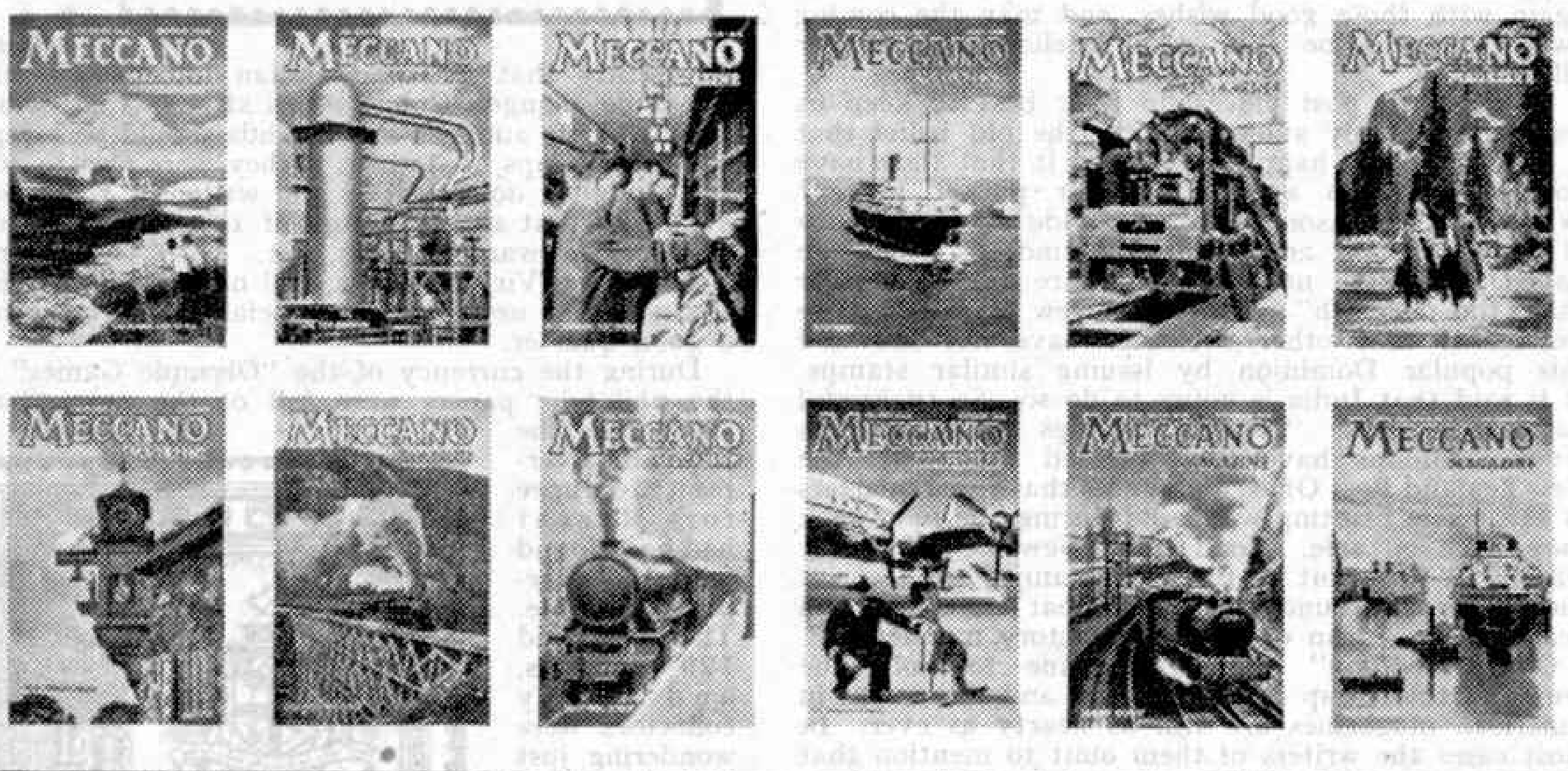
Our last illustration this month shows the new 8d. stamp from Fiji. This has the same design as the still current 1/5 value, but it is in only one colour, carmine, whereas the 1/5 was in two colours, black and carmine. It will be seen from our reproduction that the arms of the Colony form the principal feature of the design.

During the currency of the two Channel Islands stamps, which were withdrawn from sale on 30th September, dealers found that this was about their "best seller." Everybody, collectors and laymen alike, bought copies, and yet the demand is still almost as brisk as ever, though two or three times face value is being charged. Blocks of four at present prices may be worth putting away, though, of course, nobody will make a fortune out of the purchase.

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Which Were the Most Popular Covers of 1948?



Here are reproductions of the 12 covers of 1948. These are very small and they are in black and white, so that they do not give any idea of the colour and brilliance of the originals. They are reproduced only as reminders to our readers, who are now asked to express their opinions on them in our customary January Cover Voting Contest.

All that each entrant in this competition has to do is to state on a postcard: A, which cover he likes best, and B, what he thinks will be the order of popularity of the covers as decided by the votes of all the competitors. In the lists sent in the covers must be referred to by the names of the months in which they appeared, and it is not necessary that a competitor's own favourite should be at top of his list under the second heading.

Entrants should write their names and addresses on the postcards, and these should be sent to "*1948 Cover Voting Contest, Meccano Magazine, Binns Road, Liverpool 13.*" There will be separate sections for Home and Overseas readers, with prizes in each of 21/–, 15/– and 10/6 respectively. Closing dates: Home Section, 28th February; Overseas Section, 30th June.

Draw a Motor Car of 1949

The Motor Show in November of last year revealed to us the secrets of the motor cars of 1949. In general these seem to be taking on a different appearance from those of pre-war days. We may not see many of them on the roads in Great Britain during 1949, as the majority are for export, but every reader will have seen pictures of them and a few will have been lucky enough to see the cars themselves. With this in mind we have arranged for our second competition a drawing contest in which the subject is the motor car of 1949.

Any make of car can be taken as the subject for an entry in this contest, provided it is of the latest type, and the car chosen can be shown from any angle or in any surroundings. With these conditions satisfied, judging will be based entirely on the merits of the entry as a drawing, but if competitors wish they can use colour in preparing their entries. The name, age and address of the competitor, with the make of car chosen by him for his entry, must appear on the back of each drawing submitted.

As usual in these competitions, there will be separate competitions for Home and Overseas readers, and in each of these there will be two sections, A for competitors over 16 years of age, and B for those under 16. Prizes of 21/–, 15/– and 10/6 will be awarded, with Consolation Prizes for other deserving entries, in each section.

Envelopes containing entries should be addressed "*January Drawing Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: 28th February in the Home Section and 30th June Overseas.

January Photographic Contest

This month we begin the 1949 series of photographic competitions. For the first of these readers are invited to send in photographs of any subject. There are only two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of the print must be stated exactly what the photograph represents. A fancy title may be added if desired.

The competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate sections for overseas readers, and in each section prizes of 21/–, 15/– and 10/6 will be awarded.

Entries should be addressed "*January Photographic Competition, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 31st January; Overseas Section, 31st May.

Competition Results and Solutions

HOME

AUGUST 1948 "NAME SQUARES" CONTEST

1st Prize: D. Allen, Leicester. 2nd Prize: I. M. Allison, Honiton Clyst. 3rd Prize: F. I. S. Carter, Halesworth. Consolation Prizes: Miss J. Hayter, Harpenden; J. K. Tunstall, Bolton; M. K. Davis, London S.W.19.

AUGUST 1948 "OLYMPIC QUIZ"

1st Prize: D. Woods, West Mersea. 2nd Prize: T. E. Jones, Rock Ferry. 3rd Prize: P. Webber, Gillingham. Consolation Prizes: C. E. Abbott, Radley College; H. B. C. Johnston, Sutton; P. A. Marshall, Lincoln.

AUGUST 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: R. R. Bushell, Hoddesdon; Section B: P. Clifford, Wembley. 2nd Prize, Section A: H. J. Edwards, Tunbridge Wells; Section B: R. S. Hall, Aberdovey. 3rd Prize, Section A: J. W. Hind, Nottingham; Section B: D. Elliott, Portaferry. Consolation Prizes: H. W. Hardcastle, Harrogate; R. Amin, Bexleyheath; J. E. Allen, Stanmore; R. M. Shields, London, S.W.3; W. Thomson, Durham.

SEPTEMBER 1948 SHIPS CONTEST

1st Prize: T. Brown, Carlisle. 2nd Prize: K. A. Wells, Sanderstead. 3rd Prize: D. Collman, Newport. Consolation Prizes: J. K. Tunstall, Bolton; J. G. Brown, Greenock; R. Pryde, Cardiff; R. Pearson, South Harrow.

SEPTEMBER 1948 ERRORS CONTEST

1st Prize: J. McMillan, Hurlford. 2nd Prize: C. E. Wrayford, Bovey Tracey. 3rd Prize: E. Bellars, Newton-le-Willows. Consolation Prizes: D. H. Lythorpe, Cheadle; T. Maurice, Oadby; A. H. Clark, Swindon; J. Brumwell, Newcastle-on-Tyne 2; M. B. Dean, Hitchin; J. R. Hearn, Gillingham.

SEPTEMBER 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: S. L. Connors, New Malden; Section B: E. B. Sadler, Newcastle-on-Tyne 2. 2nd Prize, Section A: T. F. Rice, Rushden; Section B: P. Clifford, Wembley. 3rd Prize: Section A: T. Mahoney, Dundee; Section B: B. Jones, Aberdeen. Consolation Prizes: A. J. Nicholson; Portsmouth; H. Jackson, Preston.

OCTOBER 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: E. Oldham, Hyde; Section B: N. Cox, Sully. 2nd Prize, Section A: R. Atkins, Eccles; Section B: B. Foskett, London S.W.15. 3rd Prize, Section A: R. J. Maxwell, Bolton; Section B: S. Heaton, Bradford. Consolation Prizes: J. Giddings, Bristol; A. Brown, Isleworth; H. Brearley, Crewe; J. H. Taylor, Aberdeen; Mrs. M. U. Jones, Birmingham 13; J. Bratby, Hale; G. P. Clark, Moreton-in-Marsh; H. R. Wright, Stow-on-the-Wold; D. A. Brockies, London S.E.9; S. L. Connors, New Malden; H. Meyer, Chandler's Ford; D. Watson, Glasgow; M. Illingworth, Burley-in-Wharfedale.

OVERSEAS

FEBRUARY 1948 LOCOMOTIVE SHADOWS CONTEST

1st Prize: H. Humphreys, Durban, S.A. 2nd Prize: D. J. White, Christchurch N.1, N.Z. 3rd Prize: N. G. Geddas, Paris, France. Consolation Prizes: E. H. Parker, South Otago, N.Z.; L. J. Rimmer, Adelaide.

MARCH 1948 NOVEL DRAWING CONTEST

1st Prize: B. Evetts, Cape Town, S.A. 2nd Prize: D. Johnston, Dublin, Eire. 3rd Prize: B. Laxon, Auckland S.E.3, N.Z. Consolation Prizes: S. Taylor, Madras, India; J. Hughes, Amsterdam, Holland.

MARCH 1948 HIDDEN NAMES CONTEST

1st Prize: L. G. Poole, Melbourne, Australia. 2nd Prize: D. J. White, Christchurch N.1, N.Z. 3rd Prize: I. T. G. Johnstone, Wellington C.1, N.Z. Consolation Prizes: B. Price, Singapore; I. Miller, Dublin, Eire.

MARCH 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: Miss N. P. Milne, Hawke's Bay, N.Z. Section B: B. H. Ollier, Madras, India. 2nd Prize, Section A: L. J. Butterworth, Lyons, France; Section B: F. A. Bagona, Cape Town, S.A. 3rd Prize, Section A: T. Thompson, Hong Kong; Section B: K. Shepherd, Elisabethville, Belgian Congo. Consolation Prizes: H. Falconar, Quebec, Canada; G. Burns, Warragul, Australia.

APRIL 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: P. Duffy, Portumna, Eire; Section B: R. Williamson, Brisbane, Australia. 2nd Prize, Section A: K. J. Milne, Hastings, N.Z.; Section B: B. Andrews, Bombay, India. 3rd Prize, Section A: S. Parker, Vancouver, Canada; Section B: A. Dalal, New York, U.S.A. Consolation Prizes: R. Clatworthy, Salisbury, S. Rhodesia; R. Campbell, East London, S.A.; P. Blakemore, East London, S.A.

SOLUTIONS

APRIL 1948 THRILLS VOTING CONTEST

1st. No. 5; 2nd. No. 1; 3rd. No. 6; 4th. No. 3; 5th. No. 4; 6th. No. 2; 7th. No. 7; 8th. No. 8.

APRIL 1948 LOCOMOTIVE CONTEST

1. Lamp iron. 2. Air compressor. 3. Sand pipe. 4. Sand box. 5. Whistle. 6. Handrail. 7. Injector steam pipe. 8. Cab handrail. 9. Guard iron. 10. Footstep. 11. Main steam pipe. 12. Mechanical lubricator. 13. Coupling rod. 14. Air reservoir. 15. Eccentric rod. 16. Ash pan. 17. Axle box.



King's Cross-Newcastle express near Retford, hauled by former L.N.E.R. "Pacific" No. 15 "Quicksilver." Photograph by E. Oldham, of Hyde, who was awarded 1st Prize in Section A, October 1948 Photographic Contest.

Fireside Fun

"You've got more money than brains."
"But I have hardly any money at all."
"Well, that fits what I said."

* * *



"You see, my dear. I haven't forgotten it this time."
"But you didn't take one out with you to-day."

* * * * *

"Can you make a cigarette lighter?"
"Yes, that's easy."
"How do you do it, then?"
"Take the tobacco out."

* * * *

Bill: "I see Jones has sold his car."
Bob: "Yes. The outgo for the upkeep was too much for his income."

* * * *

THIS MONTH'S HOWLER

Infinity is where all parallel lines meet, but no one can join them.

* * * *



"No, thank you. Sit down, I can stand."
"Lemme get off! We've passed my stop."

BRAIN TEASERS

In the square of letters shown below the names of eight makes of motor car, all very well-known, are hidden. The letters of these names have been placed in position on a definite plan. What are the motor cars represented, and what is the plan?

B U D D E N S O
D A R A I N B S
A E S I I M G G
A E M O T S T M
N D I H R L N A
L R R L N R U A
R T S Y D E L O
M E A L T H N Y

* * * *

SPEED WORK

A train 220 yds. long enters a tunnel measuring a furlong in length. If the speed of the train is 60 m.p.h., where will the guard's van at the rear have reached by the time the engine is just emerging from the tunnel?

B.I.N.

* * * *



"Dear me. I've only enough for the bill."
"Let me add it up again, sir."

* * * *

THE ANSWER IS GIVEN HERE

Here is an interesting and at the same time quite easy multiplication sum, in which the answer is given. What is wanted is to find the figures represented by the letters. Can you do this?

```
  DEMOCRAT
         O
  -------
 DDDDDDDD
```

* * * *

SPREADING OUT

What English word of one syllable becomes a word of three syllables when a single letter is added to it?

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The six words of six letters each in our first puzzle last month were: 1, FestaL; 2, IguanA; 3, NepheW; 4, NatanT; 5, EnhalO; 6, YeomaN. The first and last letters of these words make up the names FINNEY and LAWTON.

Our second puzzle was a catch. NI is half of NINE; L represents 50. Putting them together we get NIL. In Latin 40 is represented by XL; divide this into equal parts by drawing a line horizontally and the upper half is VI.

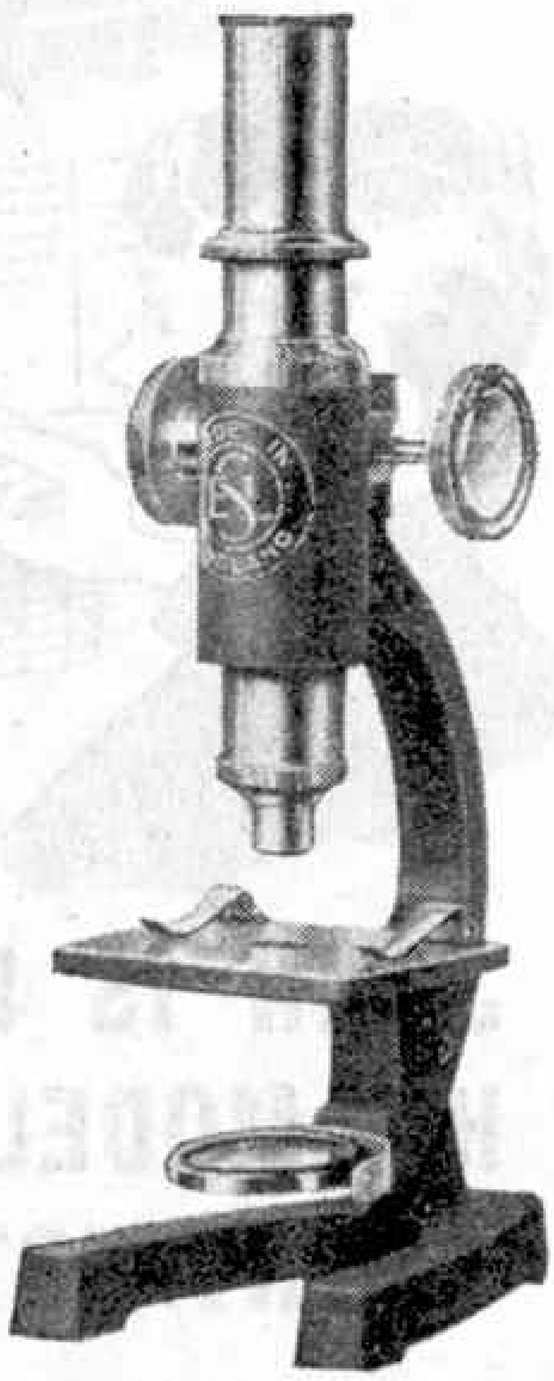
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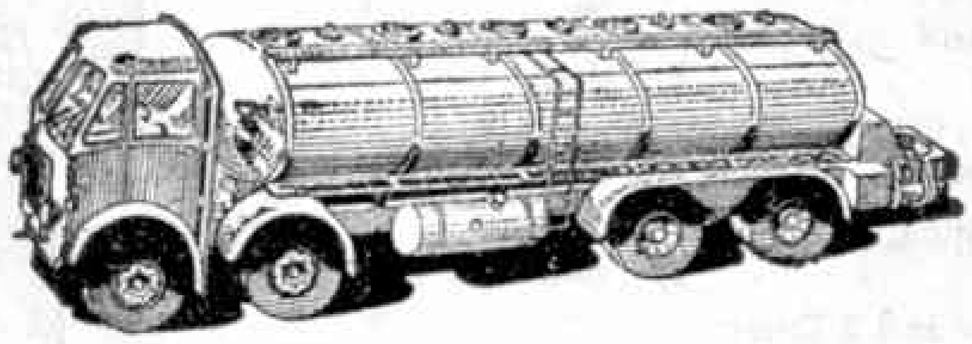
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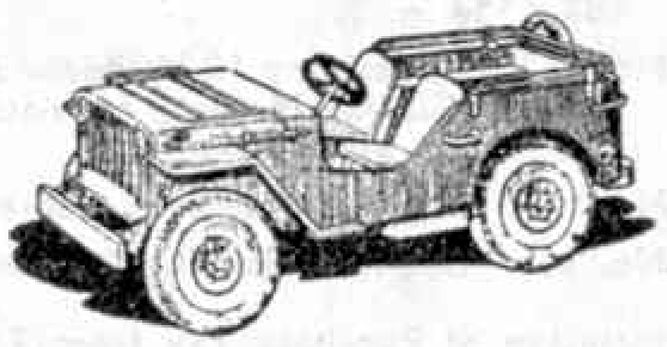
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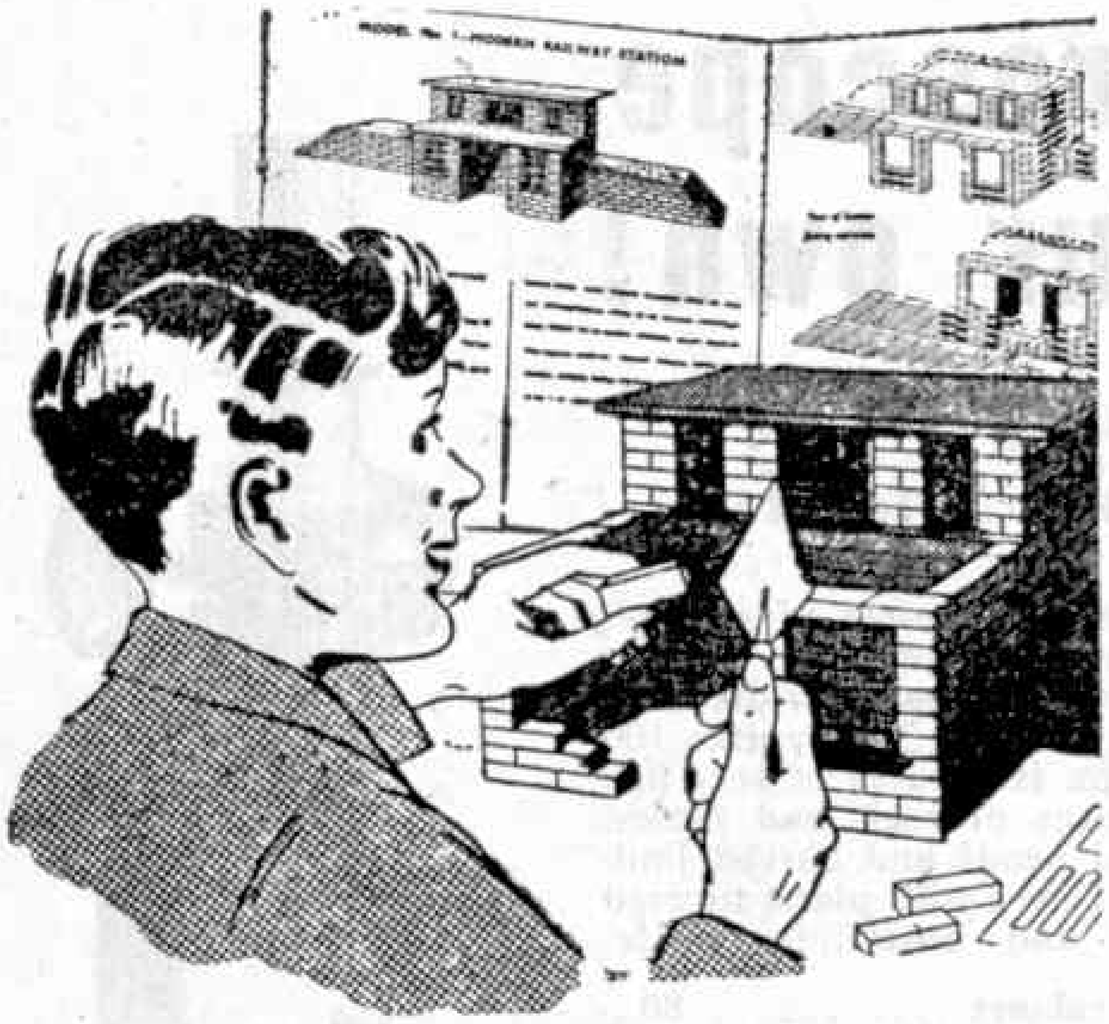




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1/8" × 3/8"	**3½d.** per yd.	1/4" × 1/2"	**5d.** per yd.
1/8" × 1/2"	**4d.** per yd.	1/4" × 1"	**7d.** per yd.
1/8" × 1"	**5d.** per yd.	1/4" × 1½"	**9d.** per yd.
1/8" × 1½"	**7d.** per yd.	1/4" × 2"	**1/2** per yd.
1/8" × 2"	**9½d.** per yd.	1/4" × 3"	**1/7** per yd.
1/8" × 3"	**1/2** per yd.	1/4" × 6"	**2/8** per yd.
1/8" × 6"	**2/-** per yd.	1/2" × 1/2"	**7d.** per yd.

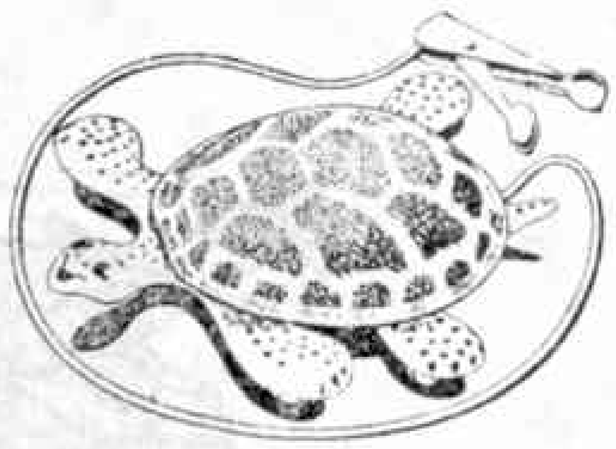
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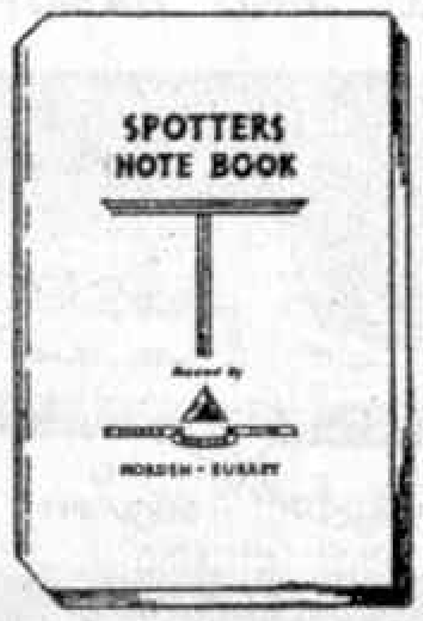
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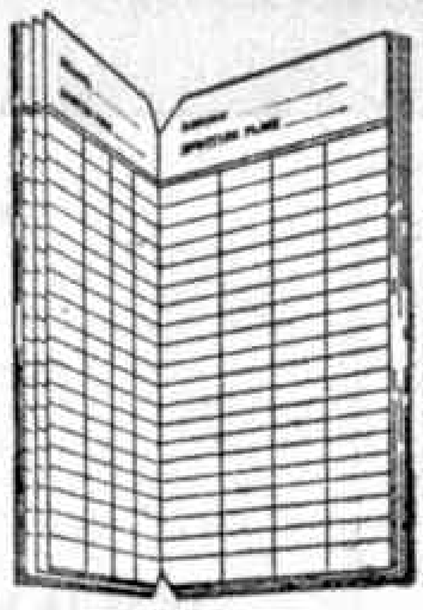


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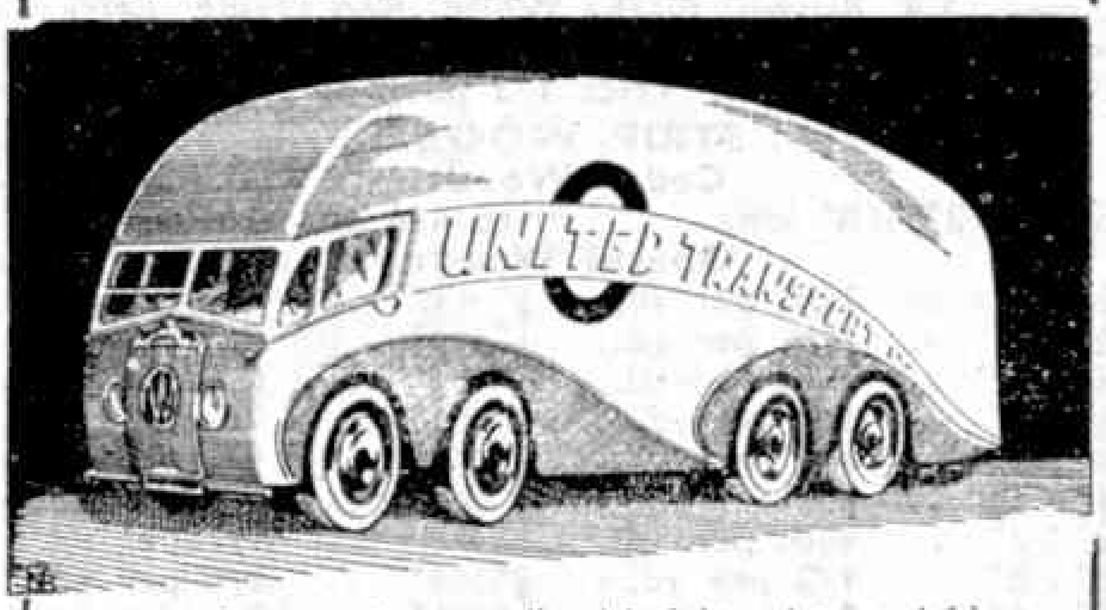
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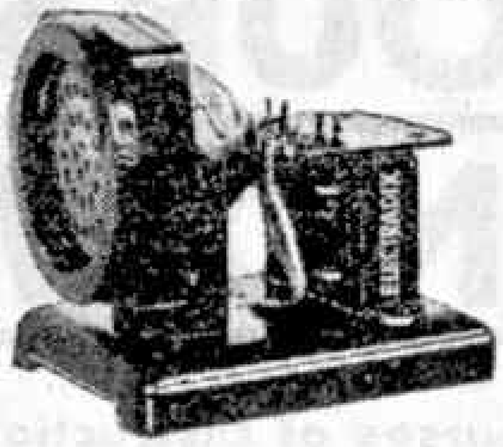
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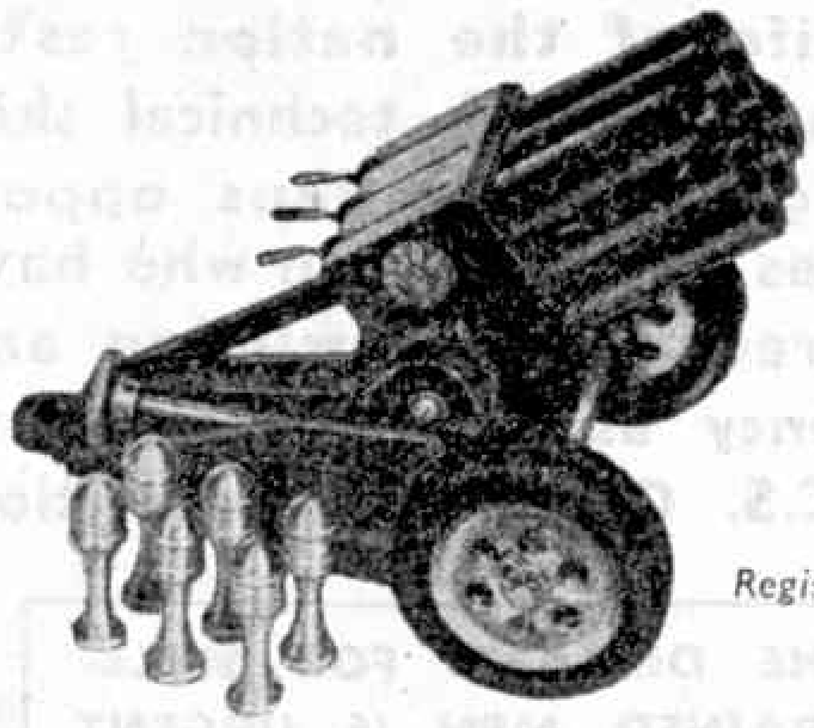
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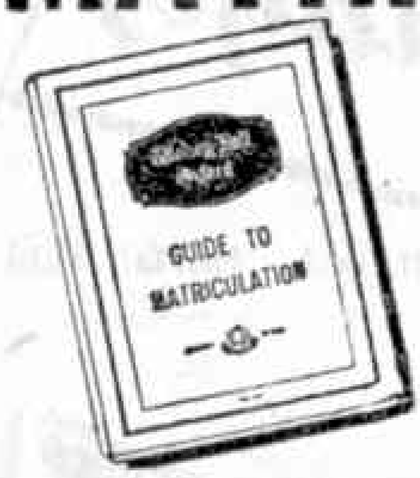


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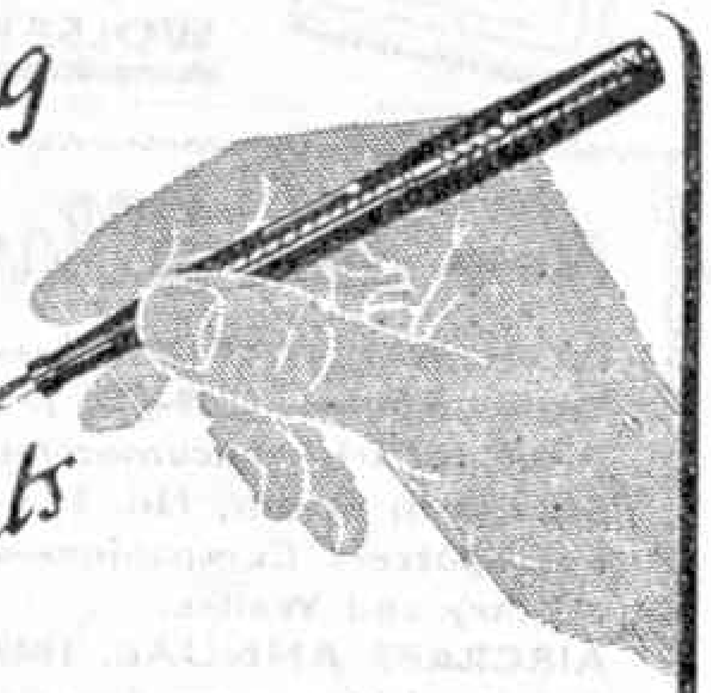
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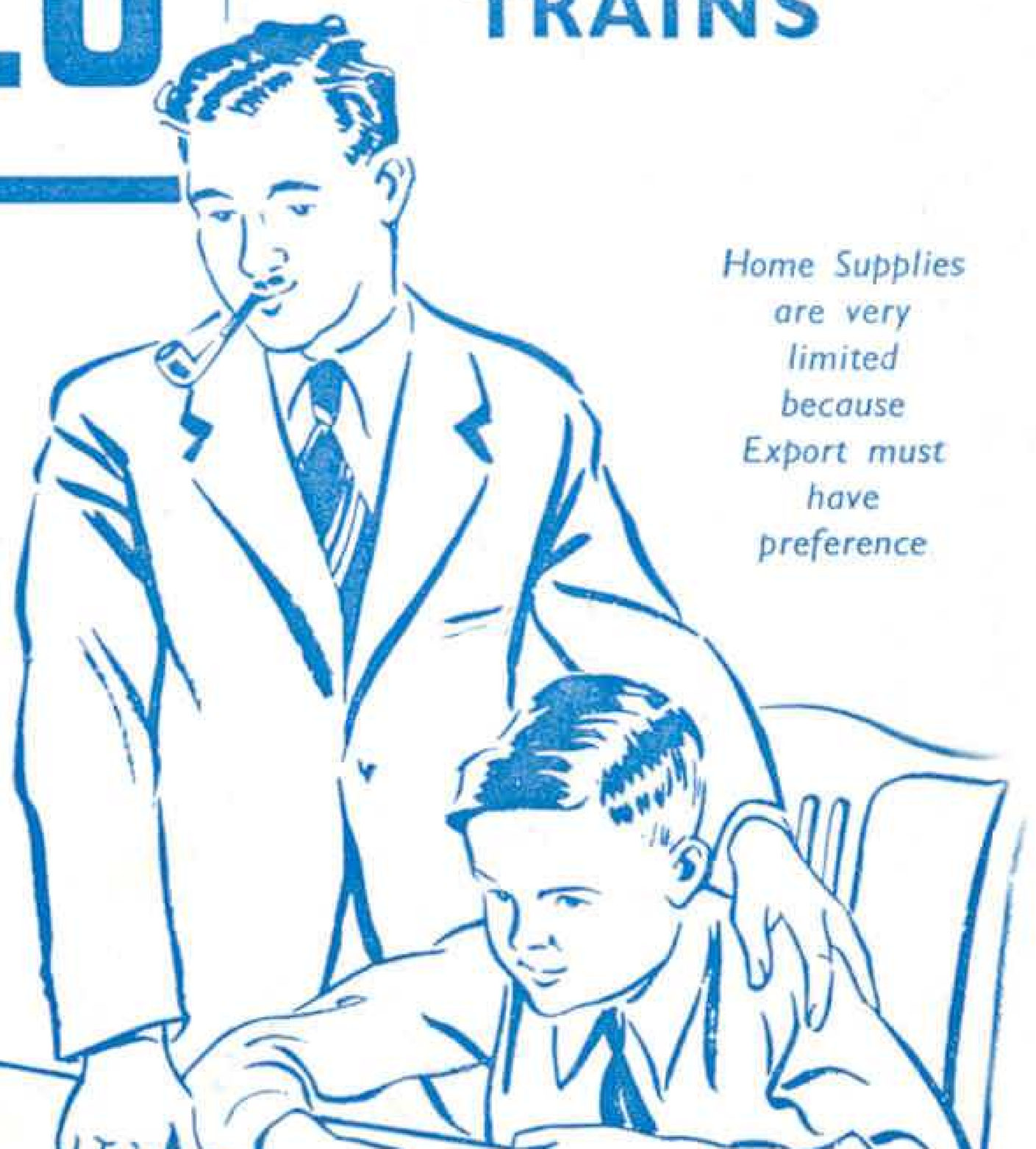
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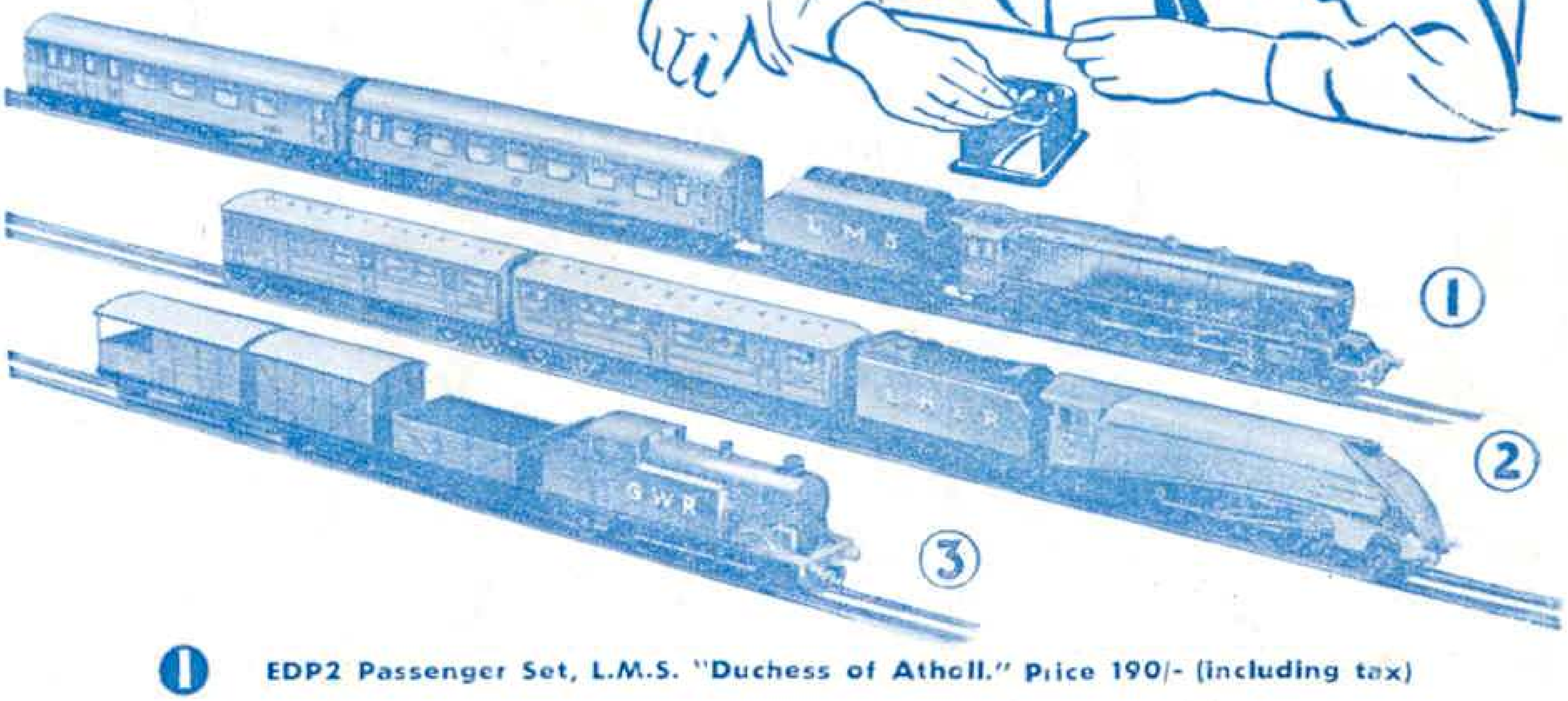


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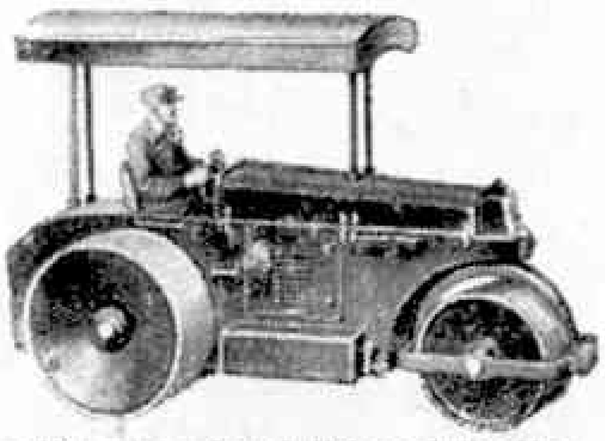
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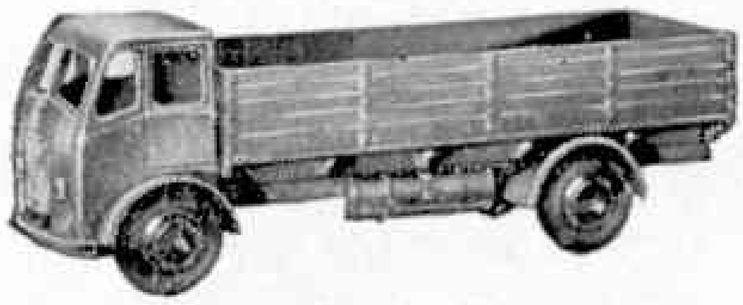
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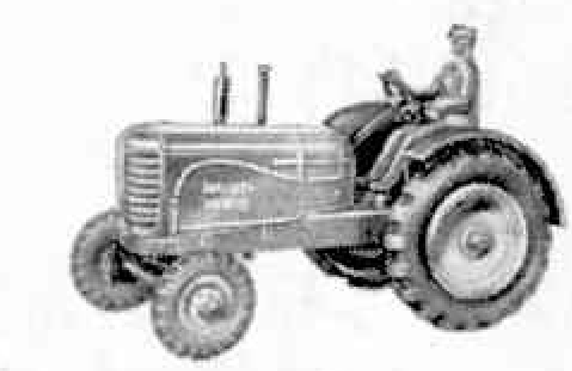


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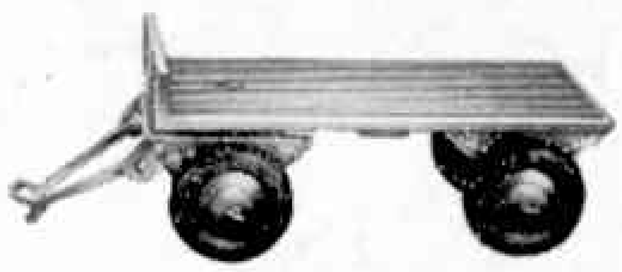
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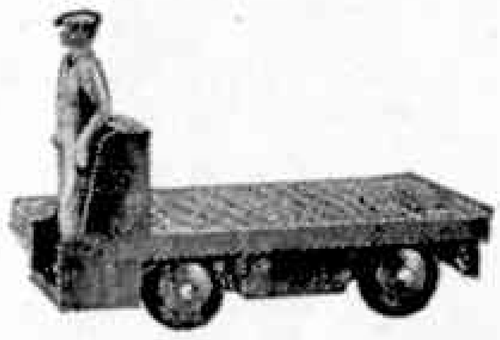
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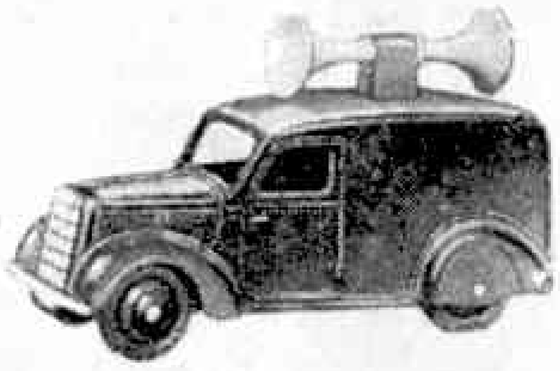
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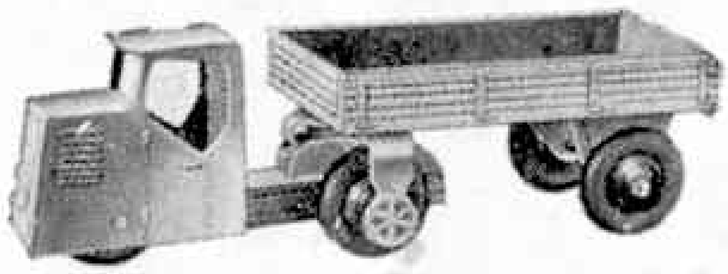
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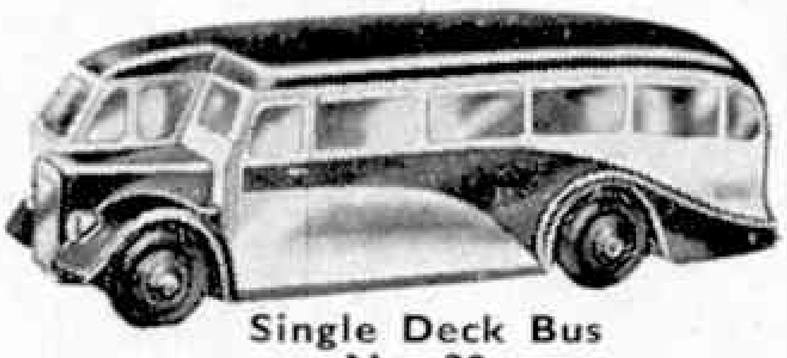
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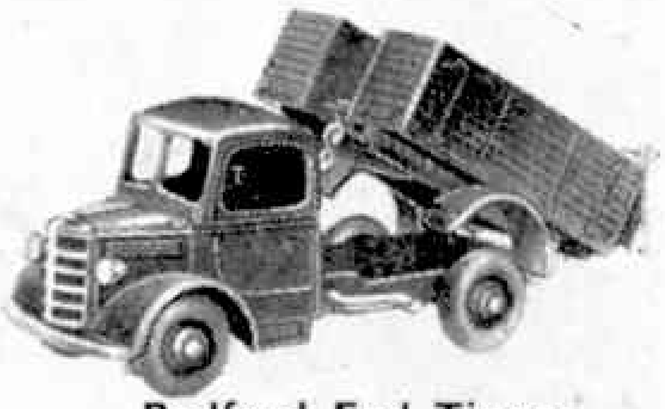
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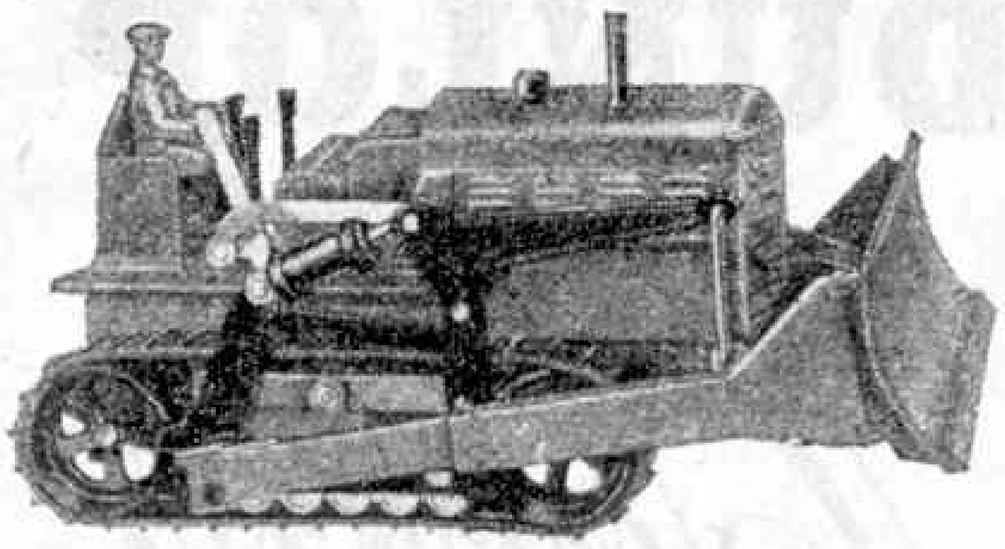
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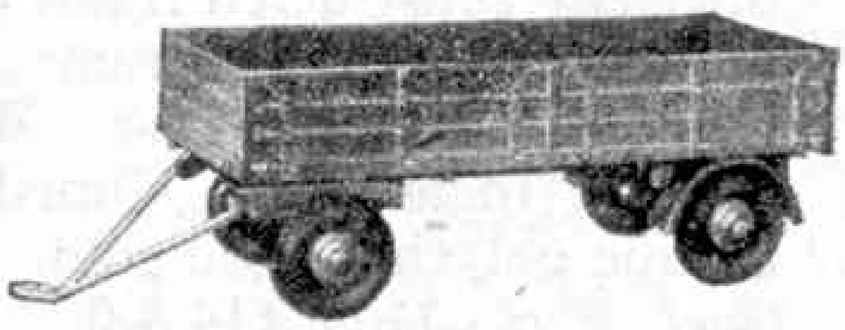
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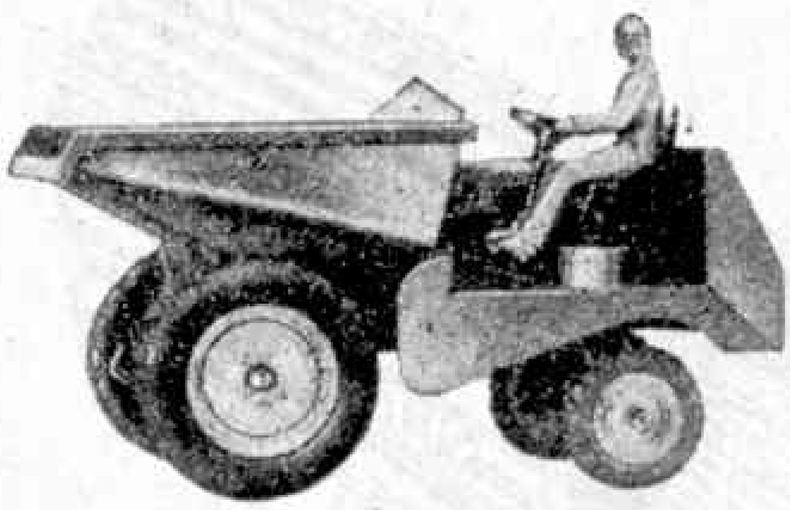
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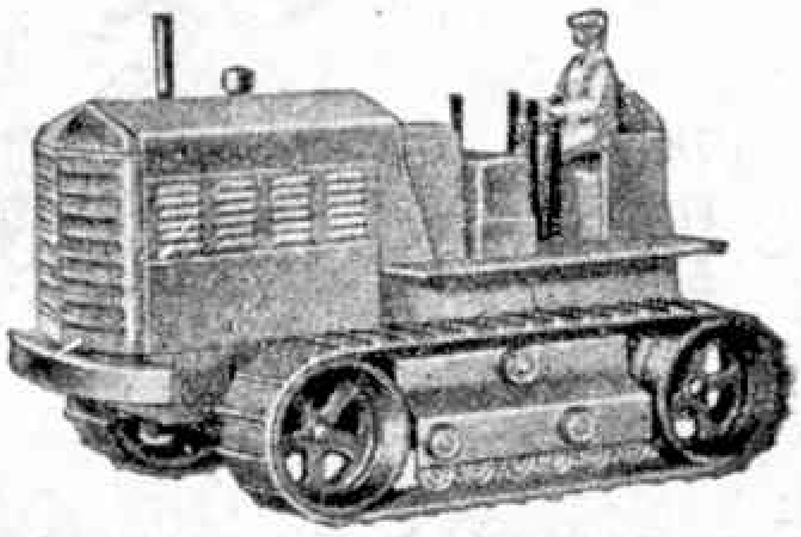
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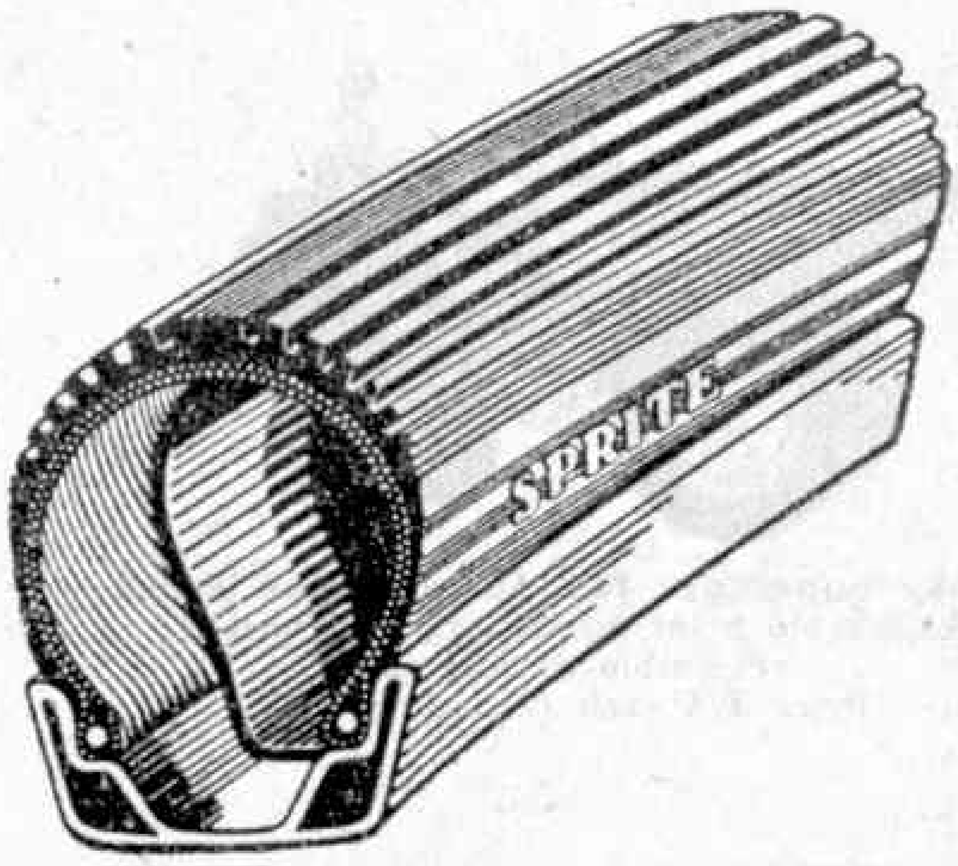
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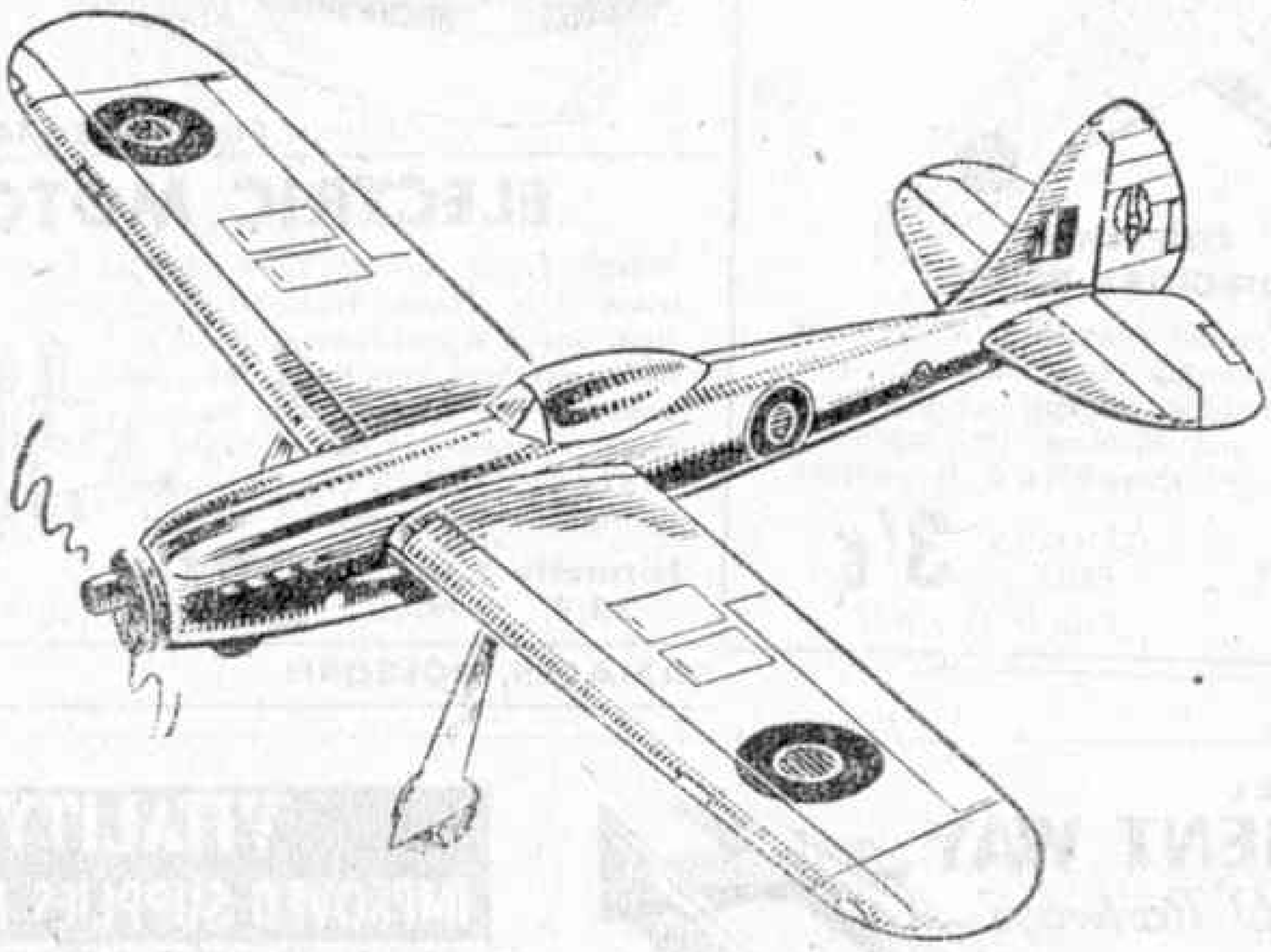


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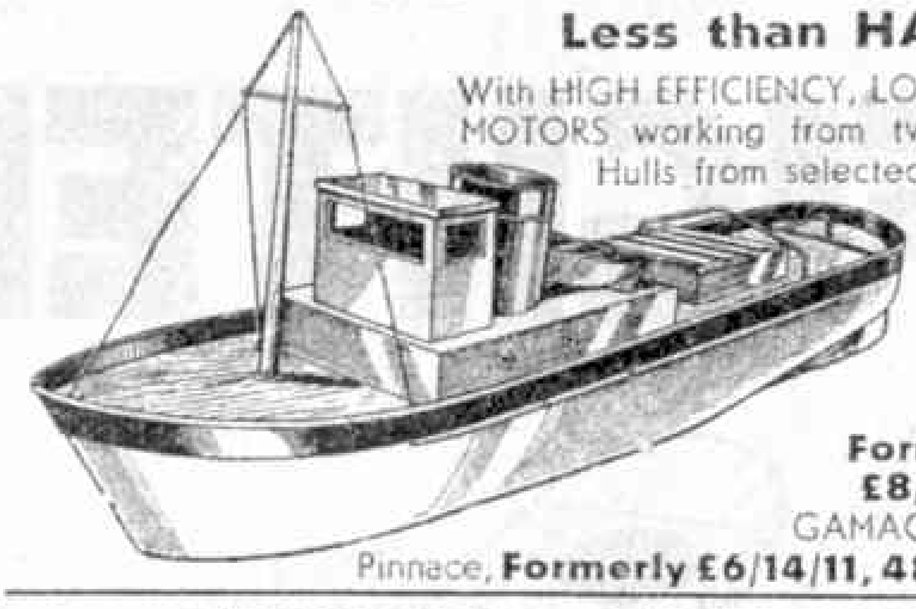


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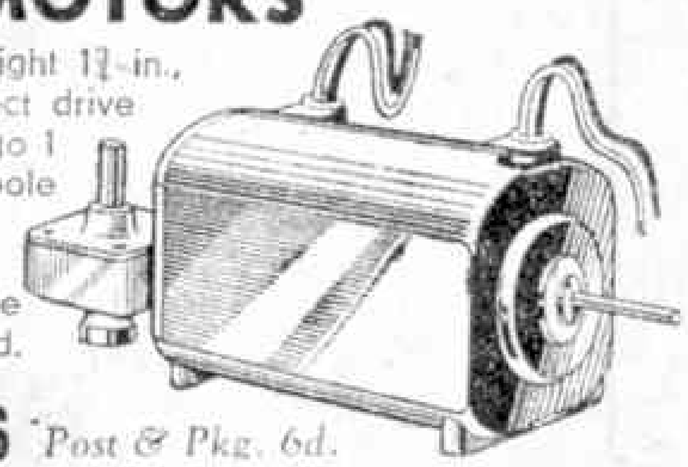
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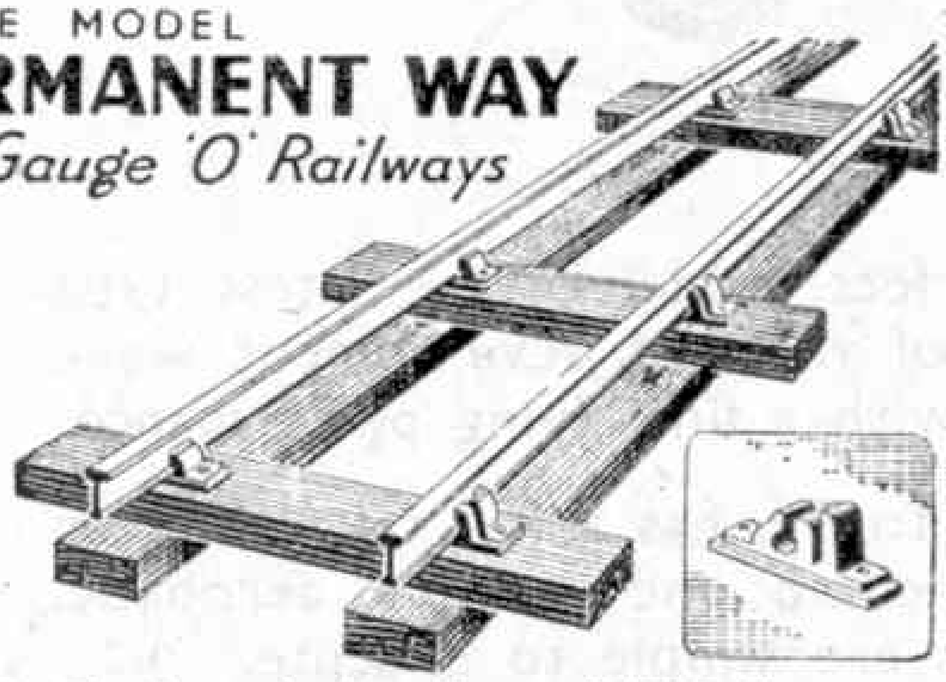
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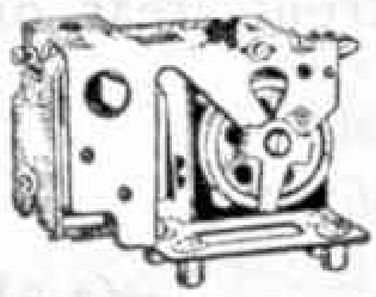
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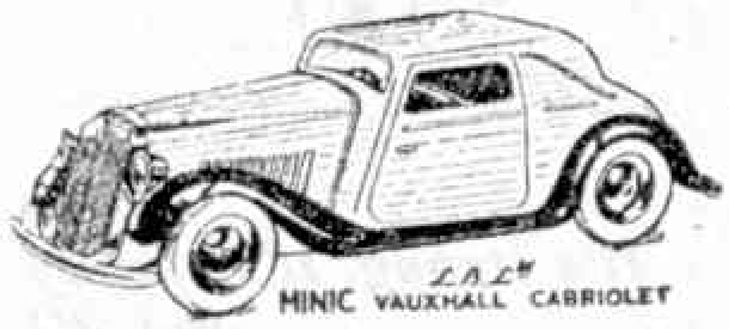
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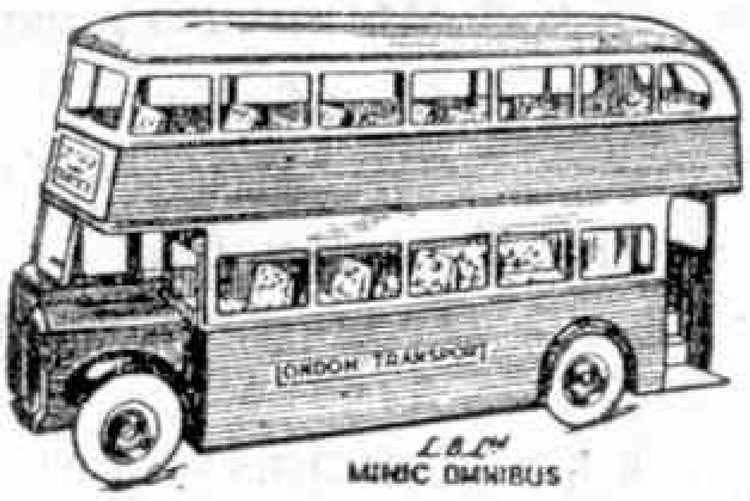
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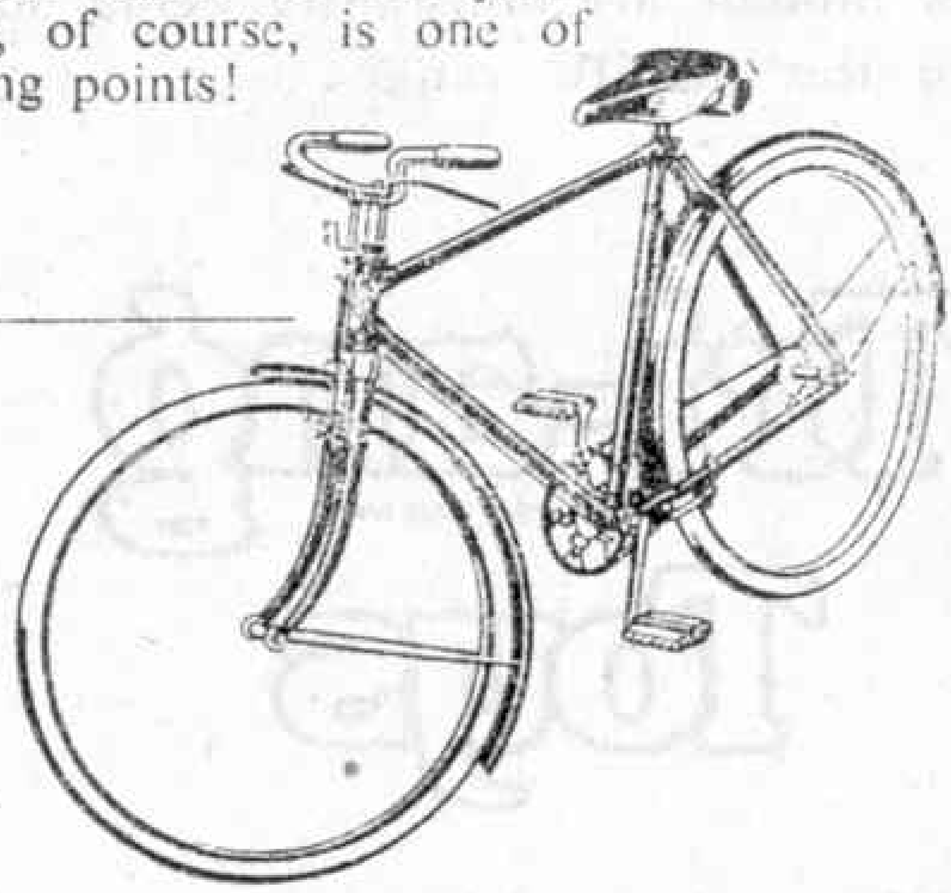
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Next Month: "GLASS THAT DEFIES HEAT." By M. Lorant

MECCANO MAGAZINE

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Vol. XXXIV
No. 2
February 1949

With the Editor

Sir Malcolm Campbell

The year 1948 as it passed took with it a great figure in English land and water speed record breaking—Sir Malcolm Campbell.

He was born in 1885, and even in his school days was keenly interested in racing. He became an underwriter at Lloyds, but his mind was concentrated on motor cars and aeroplanes, and in 1910 he began his brilliant career as a driver of high-speed cars. In the first World War he served in the Army and in the Royal Flying Corps, and after the war continued racing at Brooklands. With his successive "*Bluebirds*" he broke record after record at Pendine, at Daytona Beach and finally at Bonneville Flats, Utah, where in September 1935 he was the first to achieve a speed of more than 300 m.p.h. The record of 301.13 m.p.h. he made at that time has since been broken by Eyston and Cobb, and the latter's record of 394.2 m.p.h., set up in 1947, still stands.



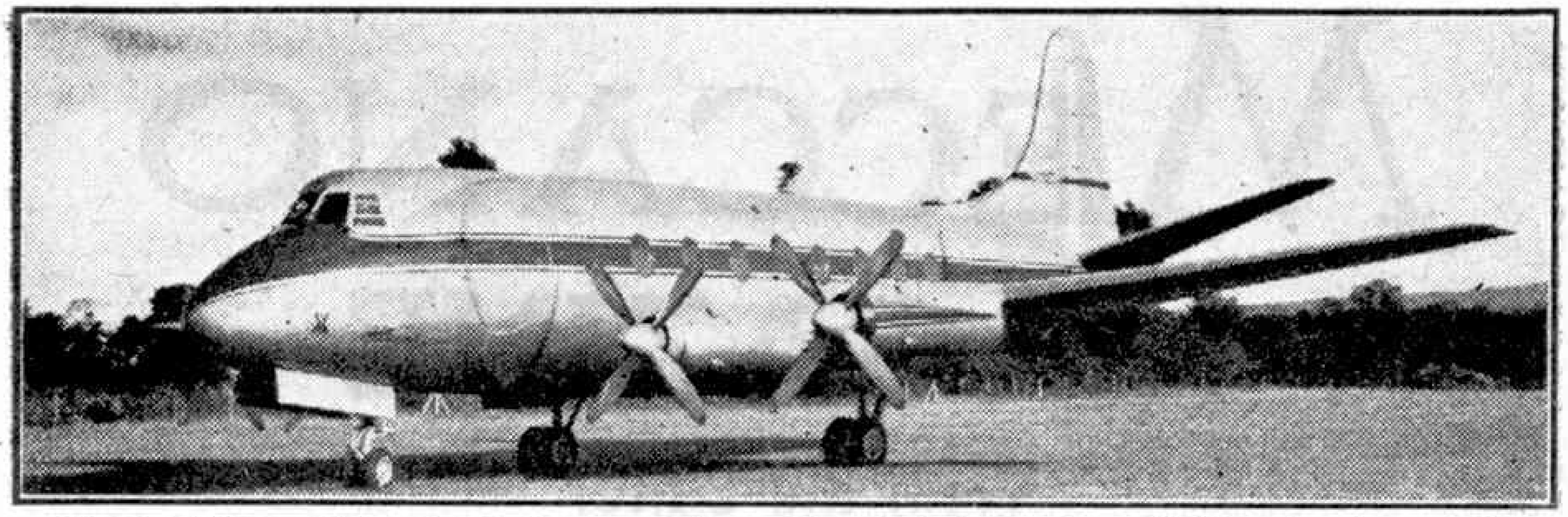
Sir Malcolm Campbell in his "Bluebird."

After Daytona Sir Malcolm turned his attention to the water speed record. In 1937 on Lake Maggiore he reached a speed of 129.5 m.p.h., and in the following year on Lake Hallwill he attained 130.86 m.p.h. His crowning effort was made on Coniston Water in 1939, with a new "*Bluebird*" designed by Vosper Ltd. and powered by a Rolls-Royce engine. He then attained a speed of 141.7 m.p.h. which still stands as the water record. After the war he began to think of records with jet engines, but his failing health prevented him from completing his experiments.

Sir Malcolm will long be remembered for his courage and determination in gaining new records for England. He was one of the most picturesque figures of his day.

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Vickers "Viscount," the first turbo-prop air liner. Photograph by courtesy of Vickers-Armstrongs Ltd.

Safety for Air Passengers

By C. G. Grey

ONE problem of Air Transport which is making everybody concerned think hard is how to make flying safer for air passengers. It is not just how to prevent crashes in which passengers may be killed, but how to prevent the killing or maiming or hurting of passengers, or even their discomfort, in a quite slight accident or when there has been no accident at all. After quite a serious crash one reads that only two or three (generally the pilot and crew up in the nose) were killed, and after a comparatively minor crash one reads that out of a crew of three or four, and ten or a dozen passengers, only two or three survived—just as on roads and railways.

Mind you, deaths in aircraft, or injuries, are few for the miles travelled, and considering the speed. But we want to get them down to vanishing point, so all possible causes have to be discovered, and discussed. A still greater puzzle is when, as in that crash at Prestwick in October last, four or five are pulled out alive, or are thrown clear of the wreck, in which 35 or so have been killed, the survivors died days or weeks afterwards of burns or internal injuries. They were obviously so near not being fatally injured that with a little better luck they and others might have survived. And in an opposite case there was that Lockheed crash nearly at the end of the war, when the pilot had to turn back and do a belly landing because of a failing engine, the only person killed out of 10 or 12, was Group Capt. Sir Nigel Norman (the founder of Heston Aerodrome, and the great pioneer of airborne troop-carrying), who, after seeing that all the rest were in good positions to stand a crash landing, took a wrong position himself, and had his neck broken.

There is such a narrow margin between being killed and staying alive—as when a person steps on a vacant banana skin and bangs his head on the pavement. It may be a hilariously funny sight or a horrid tragedy. And that is the kind of thing all these clever people are trying to stop.

Naturally, the aircraft designers and builders are doing their best, because, apart from enthusiasm for air transport, their living depends upon inducing people to travel by air; and a high death rate, or a lot of injuries, is a bad advertisement. But too many of those who have spent most of their lives in aviation have, in two wars and much experimental flying, acquired a certain callousness about accidents and have come to regard them rather as "Acts of God or the King's enemies," as the Insurance phrase has it. They forget the balancing proverb: "The Lord helps those who help themselves," and don't do enough to help to stop accidents.

Air Forces and air transport concerns of all (or most) nations try to discover causes of accidents. Dead or injured pilots or aircrews weaken a fighting service, and casualties among airline pilots decrease profits. So that is why we, and other countries, have Aeronautical Inspection Departments to assure that material and design and construction are reliable, and why most nations have air accidents investigation boards or departments or committees. Our A.I.D. was started about

1912, by my friend Major Fulton, R.A., and to-day the A.I.D. stamp on any piece of material is equivalent to the Hall Mark on silver. And our Accidents Investigation Department, under Air Commodore Vernon Brown, has the convincing quality of a Coroner's verdict or of a Judge in a Law Court.

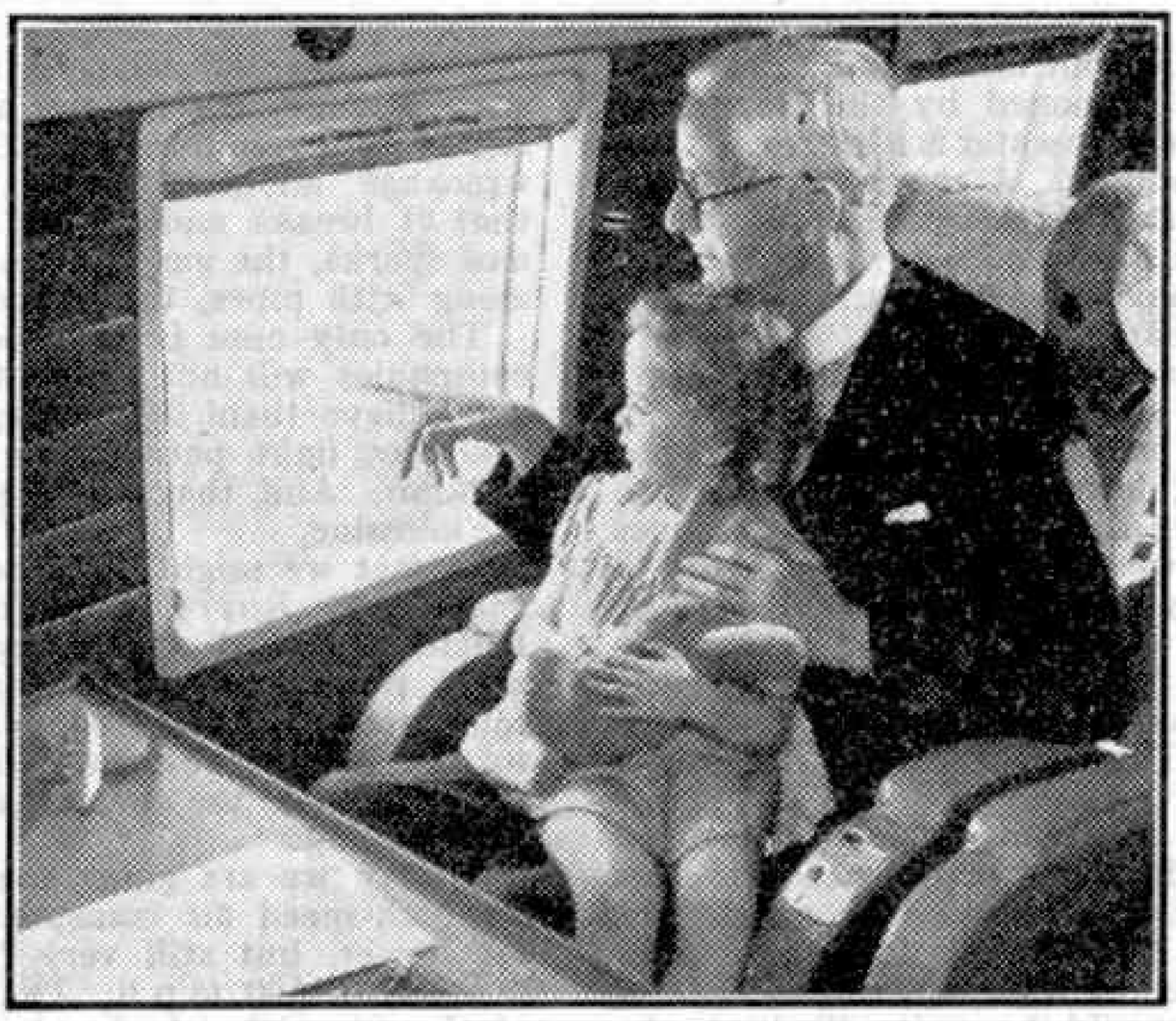
Besides that we have the Air Registration Board, made up of members of the Aircraft Trade and sundry civilian experts, to which the Minister of Civil Aviation delegates the examination of all civil aircraft and the issue of "airworthiness certificates" without which no aircraft may legally be flown. Mr. R. E. Hardingham, O.B.E., the secretary of this responsible body, produced during 1948 a paper before the Royal Aeronautical Society entitled: "Aircraft Accidents—Can Chances of Survival be Increased." As a title that struck me as a bit grim, but the author faces facts. "Accidents *will* happen in the best-regulated families," as the old saying has it.

As he said when we were talking over these things: "An aeroplane ought not only to be airworthy, it ought to be *crashworthy*." The designer who said "I design my aeroplanes to fly, not to crash," was a fool. If the engine, or engines, stop, an aeroplane is exactly in the position of a car on a steep hill if the brakes, and the transmission, fail. There is nothing the driver can do till he reaches the bottom. And what happens then depends largely on his skill and judgment in making a forced landing, but still more on what the machine hits. And that is where crashworthiness comes in.

Many of you, I imagine, have seen young men, formerly pilots in the R.A.F., whose faces have been damaged by hitting the gun-butt or sight, or an instrument on the dashboard—"the clock on the mantelpiece" as one bright lad put it—when doing a crash landing, or merely standing a trainer on its nose when learning; which you can still do, if careless. We want to stop all that.

Quite early in the game someone introduced safety belts, wide pieces of canvas in front of the pilot's stomach, attached by elastic to the frame, or fuselage, behind the seat. That was all right so far. But in a real crash, after a spin for example, the belt might pull out of its anchorage, or break. Or sometimes the belt held and ruptured the inside of the pilot. In passenger machines, where the belts are sometimes fastened to the seats, the weight of the passenger may pull the seat up by the roots, and let him fall forward to smash his face or break his neck. That is being stopped.

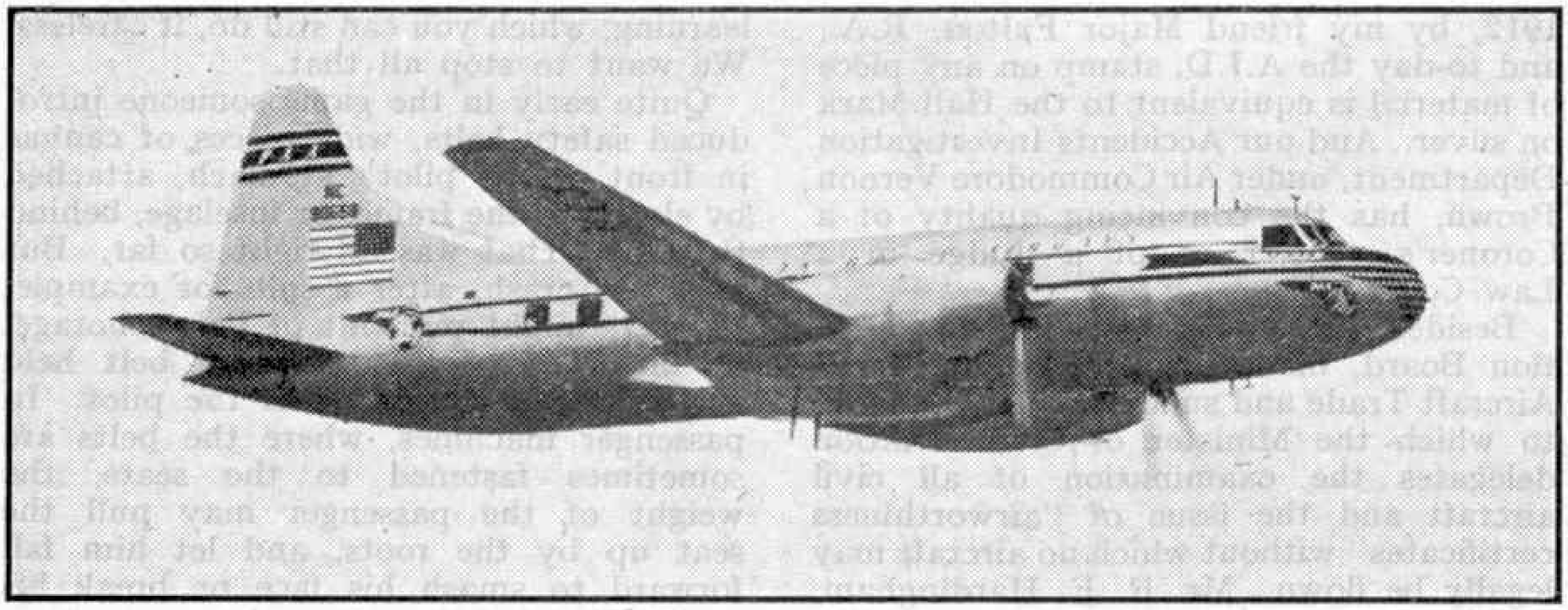
The remedy, up to a very extreme point, is to "sit with your back to the engine." The human frame can take a terrific strain backward, when the "insides" are thrown back into the cavity formed by the ribs. And the skull, resting against upholstery, is not likely to fracture, as when catapulted forward. Personally I always travel backward in a train, because if the brakes go on suddenly I would rather be pushed back into my seat by inertia than forward out of it. As Mr. Hardingham says, to be thrown forward against a knob or projection can be as lethal as a pole-axe—so all cabin fittings should be flush.



Viewing the landscape from the cabin of a B.E.A. Vickers "Viking" air liner. Photograph by courtesy of British European Airways.

A.R.B. analysis shows that not more than 10 per cent. of all accidents are, as Mr. Hardingham says, "associated with catastrophic impact," such as when an aircraft flies into a vertical cliff, or dives into the ground after a structural breakage or collision. So something ought to be possible to save passengers in 90 per cent. of accidents. The other 10 per cent. are less frequent than trains running off rails or ships hitting rocks.

Coming down in water, or "ditching" as the aircrews call it, has caused deaths, mostly by drowning, because landplanes do not float for long; and often, when



The Convair-240, a new-type Pan American World Airways "Clipper" in service on P.A.A. Latin American routes. It is the first twin-engined aircraft with a pressurized cabin for high altitude flying, and carries 40 passengers and a crew of four. Photograph by courtesy of Pan American World Airways System.

passengers have been pulled out before being drowned, they have already been damaged by the impact of the machine with the water, for water is a bit worse than concrete in a "belly" landing. A machine will slide on concrete. It digs in and stops suddenly in water. But again, few air liners have come down in the sea. Such experience as we have was got during the war, when damaged aircraft had to ditch.

Obviously fire is the worst danger. Nobody knows how many passengers and aircrews, especially in the Fighting Services, before, during and between and since the two wars, have been burned to death because they were trapped in wreckage, one hopes when unconscious, or when too badly injured to get out. Many certainly have been burned because there were no adequate emergency exits, or because (as in so many theatre and cinema fires) the exits were jammed by hysterical passengers. But fires when flying are rare. They have mostly happened in bad landings.

Mr. Hardingham, by no means a pessimist, says: "In one of my early flights I experienced no less than four forced landings between London and Newcastle with never a thought of danger; in *some* modern transport aeroplanes the chances are that in four forced landings I would be quite likely to be burned to death twice." Which only shows how far we are still from my ideal aeroplane which "will land slowly and won't burn up after a crack up." But we are progressing. Early aircraft were so slow that pilots could land them without crashing.

Emergency exits are as important in flying boats as in landplanes. Quite recently several people were drowned in the Persian Gulf because the bottom of a flying boat caved in when the boat landed badly and there was no quick and simple way out. I know of several other cases. And in these big landplanes there is no good in providing "openings through which an occupant can only go head first to a 10 or 12 foot drop to the ground, without even a hand-hold." Again I quote Mr. Hardingham with hearty approval.

A lot has been done to lessen the danger of fire. Unburstable "bag" tanks for the petrol, flexible petrol-pipes which will not be fractured by vibration, or even in a moderate crash, automatic fire extinguishers which cover everything with some horrible but non-inflammable "gooey" substance, and many other things. But the only, and ultimately the inevitable, way out is to quit using petrol, or "gasoline."

Our jet and turbo-prop engines use kerosine (a rather finer paraffin oil) which, although it burns furiously when set alight by contact with a flame does not give off volatile vapours which catch fire from a spark feet, or yards, away.

The danger of petrol is that a slight leak from a cracked pipe will fill the air for yards around with highly inflammable gas. Then if, say in pulling wreckage about, someone pulls an electric wire so that it breaks and makes a spark, or short-circuits and sparks, the gas catches fire, and up goes the lot, along with pipes, tanks and everything inflammable.

The only cure is the abolition of petrol. The oil companies will not mind, for the use of heavier oil will relieve them of the expense of whatever process produces light petrol from the heavier kerosine or paraffin. And they will be able to charge more for the kerosine.

In fact we might have been using kerosine twenty years ago. Roy Fedden (now Sir Roy) late of the Bristol Co., had a diesel-type engine which gave as much power for weight as did a petrol engine of the same size a year or so before. He wanted £40,000 to develop the heavy-oil engine to the same weight-for-power as the petrol engine, but it was not forthcoming.

To-day we are going over to turbo-jet propulsion for high-speed air transport, and to turbo-propellers for slower, but still very fast passenger transport—say 450 to 500 m.p.h. That will do away with most of the fire risk. And, what with slots and flaps on the wings, and reversible airscrews, and improved tyres and brakes, we are getting close to the aircraft which will land slowly and not burn up in a crack-up, which I have preached for so many years. The Vickers "Viscount," with four Rolls-Royce "Dart" turbo-prop engines, is very near it. An illustration of this machine appears on page 46.

A very different problem in passengers' comfort, and to a certain extent safety, is supercharging. I suppose that everybody knows to-day that the higher you go the thinner the air becomes and the greater grows the difficulty of breathing. Up to about 8,000 ft. one hardly notices any difference, unless one has to run or work hard. At 12,000 one becomes sluggish. At 16,000, for most people, breathing becomes difficult, and even experienced pilots start breathing oxygen through a mask.

At 40,000 even oxygen ceases to be useful, because there is not enough atmospheric pressure to push it down into the lungs. (Incidentally most people do not realize that there is no such thing as "suction." What we call suction, whether by mouth or by pump or as in the suction stroke of an engine, does not suck anything in. It merely removes something—whether air, gas or liquid, and so leaves room for atmospheric pressure to push something else into the vacant space).

So we supercharge engines, to push more air and petrol mixture into them. And in these days we have the practise of supercharging the cabins of

aeroplanes to keep the air pressure up to what passengers would breathe on the ground up to about 8,000 ft. or so. This is not only for the comfort but for the safety of passengers. Years ago, before supercharging or oxygen came in, some friends of mine, flying from Chile to Argentina, were in the cabin of a 3-engined Junkers with a little fat man, who began to gasp at about 8,000 ft., and at 14,000 over the high pass had to be put lying flat on the floor to give him a chance of breathing. He survived, but they were afraid that only a corpse would arrive at Mendoza in the Argentine.

In a modern aircraft one never notices any change in pressure. Early this year I went up in a Douglas D.C.6. We flew up into clouds and came out over the Thames, and recognized Gravesend by the cement works. Chatham looked small, and then we crossed the river and saw a thing like a match sticking out from the shore below. Suddenly we realized that that was the famous Southend Pier, which is about a mile and a half long. Which meant that it must have been four or five miles below us, or say 20,000 ft. But the air pressure was so well maintained that we never felt any shortage, and the stewards were running about serving drinks as if on land.

At great heights where the air is so thin that there is not enough to breathe, the supercharger fans must work like billy-oh to catch enough air to compress up to breathable thickness. Think it over.

This pressure is so great compared with the lack of pressure outside that if a bad leak happened at 25,000 ft. or so the passengers would probably die before the machine could get down to breathable air. Once when crossing the Atlantic the navigator of a liner went up into what is called the "astrodome" —a dome of transparent plastic through which to read the stars, when something better than radio direction is wanted. Whether he hit the frozen plastic nobody knows, but the thing burst, as has happened in high-flying jet fighters, and the unlucky man was blown out by the pressure in the cabin and disappeared, without a parachute, into the darkness. The pilot got down to a low level before the supercharger pumps were beaten by the leakage.

Which brings up the question of parachutes—why are they not carried by air liners? Simply because, even if the Law or the airline ordered that every passenger must wear a parachute, very few would step overboard into space when told to do so. Several clever people have suggested making a cabin (something like a bomb bay) which could be dropped bodily under a huge parachute, full of passengers.

Actually there have been hardly any accidents in airline work in which single or collective parachutes would have saved anybody. The great majority of accidents happen when taking off or landing, when parachutes would be no use, because there would not be room below for them to open. And a parachute adds about 30 lb. to the weight of the wearer—say 900 lb. in a 30-seat liner, which is a big loss of payload.

Life-belts, to be worn if ditched, are another matter. There is generally a chance of getting out and floating, before the machine sinks. In any case, only flying boats should be allowed over long stretches of water.

Practically the only times when parachutes would be any use at all would be when fire broke out. And the best guard against that is abolishing petrol, or fitting reliable extinguishers. If controls break or jam, a skilful pilot can almost always get down by some improvised way of overcoming the effect of the breakage. But in a major breakage, such as having a wing broken off in a collision, the machine would whirl round and drop so fast that neither passengers nor crew would be able to get out. They would be stuck in their places by centrifugal force. So, except in case of fire, the safest thing to do is to stick to the ship.

Lastly there is the question of radio, or radar, radio being signalling or telephoning, and radar being searching the sky and getting echoes, or "bouncing beams," from radio rays. Radar did much to help us to find and fix enemy aircraft in the war, particularly the Battle of Britain. It has done a lot in Air Transport and, in conjunction with radio, to find and bring in aircraft in fog or low cloud. But, as so often with new inventions, the protagonists (which is the opposite to antagonists) of radar have done a lot of harm by building up false hopes in the course of their "empire-building"— as the Air Force calls the pushing or advertising or building up of any one idea.

The "empire" of radar will come some day, but to-day it is not so reliable as visual or audible signalling. Like my old friend, the great pioneer of flying, Col. S. F. Cody, I mistrust any sort of "electrickery" as he called it. Why! we can't even trust the batteries or starters or dynamos or even the sparking plugs in our cars. But they all help.

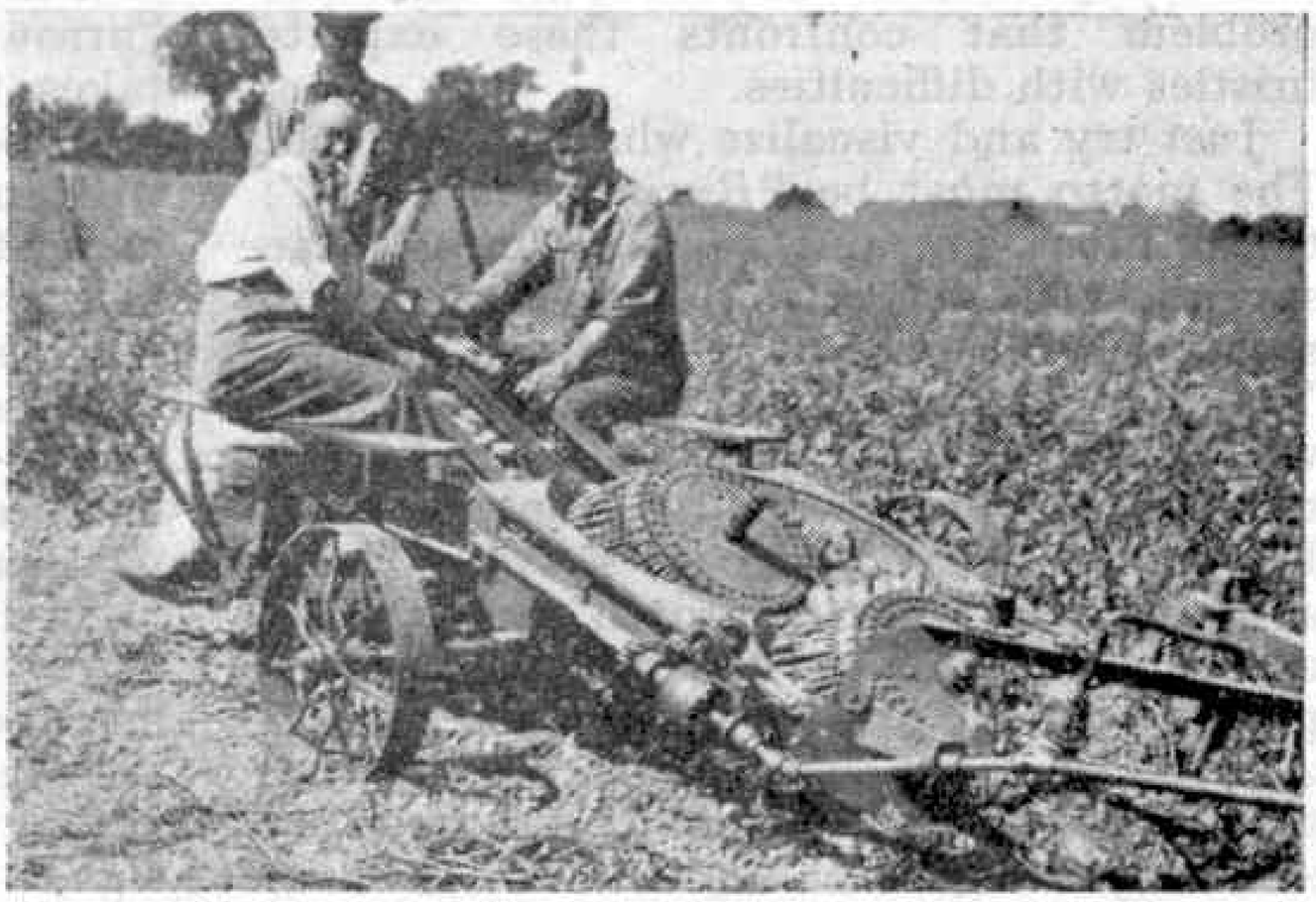
Flying to-day is about where railway travel was in 1840; it is dangerous, but worth while.

A New Way of Harvesting Potatoes

The potato harvester at work illustrated here is of an entirely new type. It digs up the crop by means of a share; and the potatoes, mixed with soil and stones, are then picked up by a rotating disc that has a series of fingers on its circumference. Most of the soil and stone is lost between the fingers, which continually change position relative to each other, and the potatoes are dropped on to a second rotating element, which carries them further up the machine and sieves out more soil and stones.

From the second disc the potatoes fall on to a conveyor belt that carries them along the machine. This belt is divided into three portions along its length. The mixture of potatoes and earth falls into the middle portion, and pickers seated on benches at the side lift the potatoes and drop them into the outside divisions, leaving the rest of the soil to drop off the conveyor at the end. These potatoes pass into hoppers that load them directly into bags, and a picker at the rear changes bags as necessary.

With an average crop of 10 tons an acre the harvester will lift potatoes at the rate of 1 cwt. a minute. It is the product of the Globe Harvester Co. Ltd., to whom we are indebted for our illustration.



Prefabricated Station Platforms

Concrete Unit Construction

By "S.M."

ONE of the stations under my supervision is a small *"Exchange"* and it was decided recently to put in hand the renewal of its platforms.

The original construction of these took the form of timber uprights and to these horizontal timbers were bolted. Sleeper timbers were also placed at the rear of the platform, forming anchors as it were. These were secured to the front timbers at intervals by very long bolts. The space between was filled up with large rocks and so on at the lowest level, graded until at the highest level the packing is ordinary earth with a top coat of granite chippings forming the platform surface.

Despite the fact that all timbers were thoroughly creosoted, wood does rot in time, and these platforms have stood very many years. So the Engineer has given his verdict; they must go. Just as decisively, too, they must be replaced; so the job is handed over to the specialists to sort out, and the problem that confronts these experts bristles with difficulties.



The look-out man with his warning equipment, and distinctive armlet. He carries red and green flags, detonators and a horn or whistle.

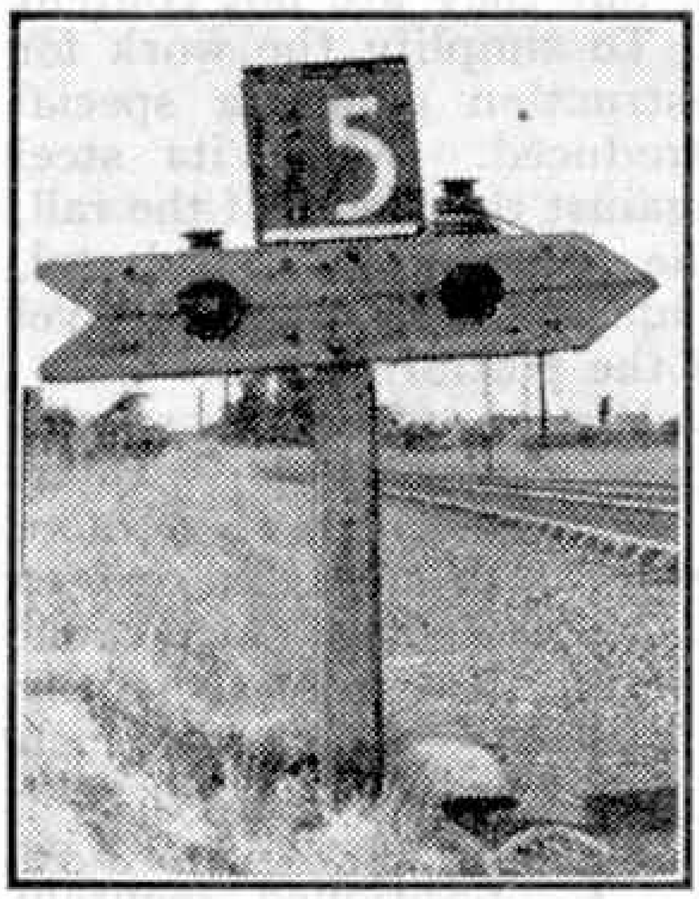
Just try and visualize what is involved. The motto must be *"Business as usual"*; trains must continue to run through the station, and the normal activities of the station itself must not be hindered unduly. Yet for weeks the platforms and permanent way will be littered with materials for the new work and the debris from the old. Dangerous situations could develop if the arrangements laid down were not absolutely water-tight, and the appropriate rules and regulations rigidly adhered to. The Rule Book provides all the answers to this, and hundreds of similar posers.

Where, on account of engineering and similar work, it is necessary at short notice or for a short period of time to restrict the speed of trains, hand signalmen are detailed to give the necessary warning to drivers. In a typical instance each man would be provided with detonators, green and red flags, and if necessary a hand-lamp. One man would be stationed at the site, and another at a point half a mile in rear of it. The latter would place a detonator on the rail, and on the approach of a train would show to the driver a green flag by day or a green light at night. He would wave this slowly from side to side. The driver knows from this that he must at once reduce speed to 15 m.p.h. or such other reduced speed as may be required.

Now we cannot monopolize men for weeks on end as hand signalmen, for these men are usually platelayers or lengthmen, and have their own regular jobs to do. But is there a safe alternative? Yes. The "arrow" sign illustrated on the next page takes the place of the man at the half-mile point. You will see that the figure "1" in this illustration has been made ineffective, leaving the "5." The arrangements will by now have appeared in printed Notices, copies of which are given to all trainmen and other staff concerned, and this 5 m.p.h. is the speed limit which it has been decided shall be imposed for this particular work.

A driver approaching, on seeing this arrow sign, is at once reminded of the arrangements he has read in the Notice, and reduces his speed. As he nears the actual site he sees the "C (commencement) sign," which is a black letter on a white

background. The point of termination of the work is marked, again appropriately, with a "T," this being white on black background. After passing this the driver may resume normal speed.



The "arrow" sign signifies a slack ahead and the speed limit laid down.

If trains continue to run after dusk the indicators are illuminated, and this is done also during fog or falling snow. In the latter event, however, a hand signalman must be provided at the outermost indicator (the "arrow" sign). This hand signalman will place a detonator on the line to be exploded by the passing train, and exhibit a green hand signal waved slowly from side to side.

In addition to the illumination of the stencil figure showing the speed to be observed, the "arrow" sign is provided with a green light and a white light in the left-hand and right-hand circular apertures respectively. These warning indicators will remain in position until such time as the work no longer warrants a reduction in speed being observed.

For the final safety measure we must have a man termed a look-out man. His job is to protect the workmen, and he wears an armlet inscribed "*Look-out.*" He carries a horn (sometimes a whistle is used) on which he sounds a lusty blast as each train appears in the distance. The Foreman in charge at once orders his men to safety, after glancing quickly around to ensure that nothing is lying foul of the line. The look-out man's remaining equipment follows the usual pattern, namely, everything necessary to enable him to bring a train to a complete stand should this course become necessary. Remember that the train is only moving at 5 m.p.h. anyway.

With these precautions in force we can get on with the job. At my station the "Down" platform was chosen first, as this was in far worse shape than the "Up." In addition, it is at the down end that there is a sleeper crossing for staff and passenger exits, there being no overbridge at this station.



The "T" sign shows where the slack ends.



The "C" sign shows where the slack begins.

In passing it may interest readers to know of a simple but effective method of warning staff of the approach of an up train. Down trains are visible at this station for a considerable distance, but it is not so with up trains, as another route crossing my line on a bridge is situated only a few yards away. This bridge can be seen in the illustration of the "T" sign. Furthermore, the line curves so that there would be very little warning. Just out of sight beyond this bridge is the up starting signal worked from the Box in rear of "*Exchange*" station, and when the signalman there places this signal to the "Off" position, it automatically closes an electrical circuit in which there is a large-gonged bell. That bell continues to ring loudly until the train has passed through the station and the signal has been restored to the normal position, which breaks the circuit.

But to return to our platform. The sloping ends of platforms are called ramps, and our gang are going to work to a plan whereby whatever piece of platform they start on will be converted to the new construction by the end of that day. First, the

old timber is removed and a certain amount of excavating done, but no more than necessary.

All the units that form the new set-up are pre-cast reinforced concrete. The uprights, which are the backbone of the structure, are called pedestals, and each one is standard and has a number by which it is known. For example the largest ones —those that support the platform, at its full height—are called "P.1"; the next size "P.2," and so on.

At first sight these pedestals might appear uninteresting, but wait—just take a glance at the illustration on this page. This shows how each part fits together. How are we to ensure that our platform shall, on completion, be the correct distance from the rails, laterally and vertically? In the illustration you will see on each pedestal a V-shaped channel, technically known as a "chase," and this performs a very special function. You will notice also a large hole roughly central in the upright portion. This is to carry electrical conduits or gas pipes. The smaller holes further up are for signal wires, and those in the lower two flags forming the front retaining wall are simply for drainage.



How the pre-cast concrete platform units fit.

Now for our "chase." "*Exchange*" station is on a very slight curve, but to simplify matters we will assume that its platforms are absolutely straight. The pedestals are designed so that, when the flags are placed in position, the top flag edge is exactly 3 ft. high measured vertically from the level of the near rail. The chase corresponds to the height of the top of the near rail, so that the work can be checked as it progresses by putting a straight-edge from rail-top to chase, when it should show level. An imaginary vertical line drawn down from the platform edge would intersect with the straight-edge at a point 2 ft. 4¾ in. from the inside edge of the rail. On curves this latter distance is increased slightly.

The designers of these concrete units have achieved a commendable piece of standardisation, but they are not content with just that. To simplify the work for the actual construction gangs, a special gauge was introduced. When its steel stop is placed against the inside of the rail, in line with the chase on the pedestal, the top of the upright arm must be level with the top of the platform.

With the assistance of these special features we can move faster without sacrificing accuracy. It surprised me to see how much could be accomplished by a small gang of men in one day. The pedestals are positioned securely and checked carefully; the rear flags are placed, and finally the top flags. Then the hard core as it is called—rocks, stones and earth—is replaced and tamped down solidly. This completes that particular piece of platform, except for cleaning up. When the whole of the platform is finished, a second line of flags is placed against the edge flags, and then a layer of chippings will cover the remaining surface.

This article is confined to platform construction, but similar methods are used in many other fields of railway maintenance.

A few miles away, there is a Motive Power Depot, and the Shed there has been entirely rebuilt, using pre-cast interlocking units. This job also had to be completed without interference with the working. Even small buildings are being designed on the same lines.

I have just returned from "*Exchange*," and the new work on the "down" side gleams in the sunlight, increasing my eagerness to see the transformation completed.

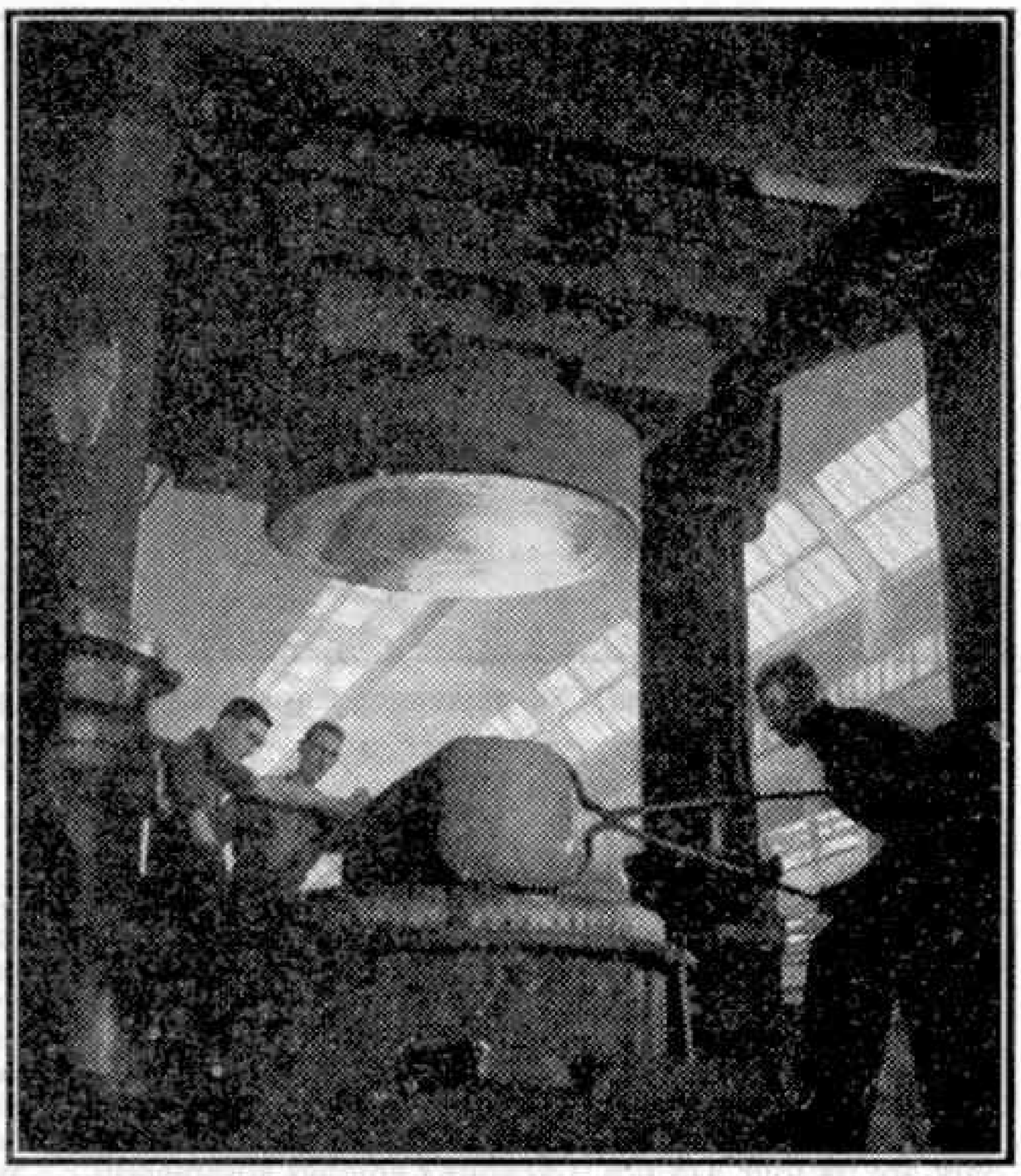
How shabby our up platform appears by comparison! But its turn will come within a few weeks; and probably as you read this it too has been brought right up to date.

Light Alloy Forging Methods

NOBODY knows who first discovered that when metal has been heated to the right temperature it can be hammered into an almost unlimited variety of shapes, but it is certain that the art of the blacksmith is one of the oldest in existence. It still has an important part to play in numerous branches of engineering; but for many purposes, and especially when the mass production of a large number of similar parts is required, hand methods have given way to die forgings using drop stamps and large forging presses.

The Schloemann press which we show on this page and in our cover picture is an interesting example of one of the many types of forging machines now in use. It is capable of exerting a total pressure of 3,000 tons, considerably more than even the "large and sinewy hands" of the original village blacksmith could have achieved! The press is employed in the works of High Duty Alloys in the manufacture of forgings from "Hiduminium" aluminium alloys. According to the makers, these alloys combine the lightness of aluminium with the strength of steel, and are widely used in the construction of aircraft and aero engines and also in the textile, building, cycle and many other industries.

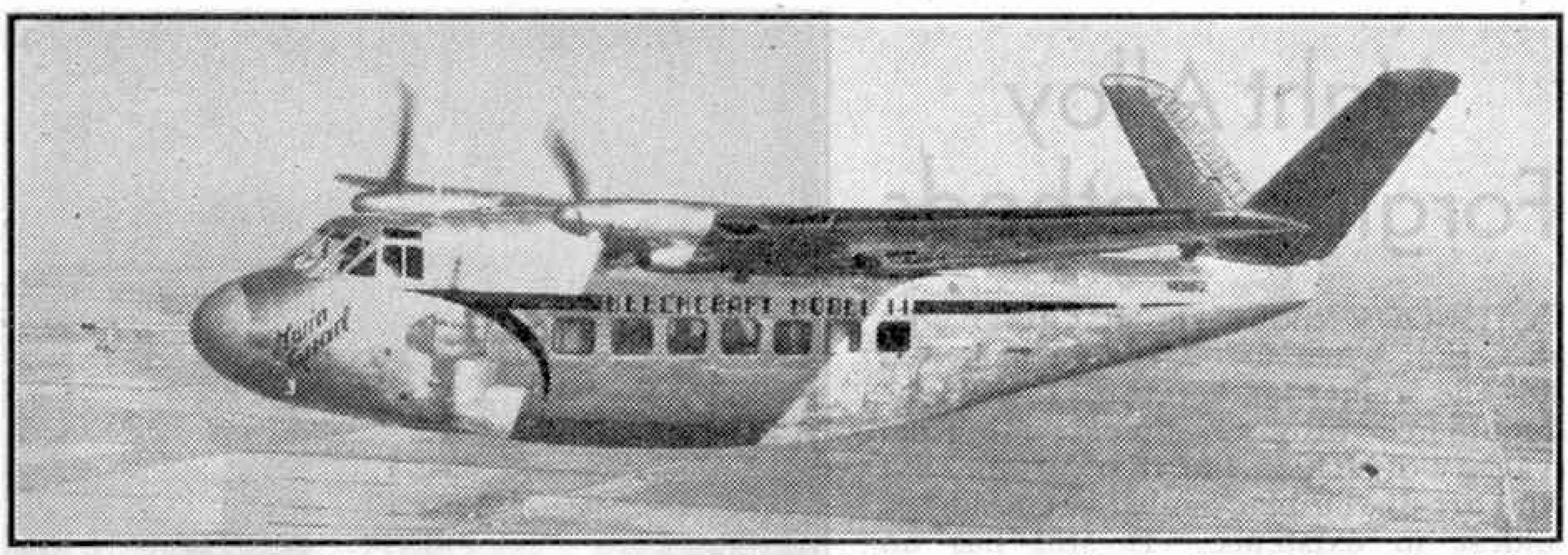
Before dealing with the way in which the Schloemann press is used, let us first see how die forgings are made. Broadly speaking, the die forging process consists of taking a metal dummy or blank roughly the same overall form and size as the finished part that is required, heating it so that it will be fairly plastic and therefore will mould easily, and stamping it to shape on a drop stamp between two dies which contain a machined impression almost exactly corresponding to the part that is to be made. When the dies come together, the top one being dropped from a height of several feet with a weight of between 10 cwt. and 18 tons attached to it, they thus in effect squeeze the dummy to the shape needed, any surplus metal being forced out through the parting line between them. When this has been done the part is removed, and then as a rule has only to be machined slightly. Sometimes, however, several forging stages are necessary, each one stamping the dummy progressively closer and closer to the finished shape.



Pre-forging an ingot of "Hiduminium" alloy on a 3,000 ton Schloemann Press. This photograph and that on which our cover is based are by courtesy of High Duty Alloys Ltd.

The Schloemann press is used at an earlier stage than all this, in the preparation of the actual dummies. In one process these are made from an ingot of metal which is cast in the foundry. When it is needed for use the ingot is heated, placed on the press and squashed down in precisely the same way that a slab of putty would be squashed if it were pressed down beneath a board. As soon as the ingot is flat enough the pressure is released, the ingot is stood up on its new end, and pressed down once more. This process, which is repeated several times, has the the effect of breaking down the crystal structure of the cast ingot and makes it considerably stronger.

Much skill is exercised by the men who work the press, and by the time the operation is finished the ingot has been turned into a dummy which, as we have seen, has very roughly the contours of the finished stamping and will fit the impression machined in the stamping dies, leaving enough excess material to fill the bosses, flanges, webs, etc. In this way a very wide variety of parts can be made, including such things as crankcases for radial aero engines, supercharger rotors, and so on.



Beechcraft "Twin-Quad" 20-passenger transport. Photograph by courtesy of Beech Aircraft Corporation, U.S.A.

Air News

By John W. R. Taylor

An Unorthodox Transport Aircraft

The Beechcraft "Twin-Quad," illustrated above, is one of the most unorthodox aircraft ever built. Not only are its four 375 h.p. Lycoming engines completely enclosed within its wings, but they are coupled in pairs to drive only two propellers. In addition, it has a "Vee" tail and incorporates two emergency landing keels in the bottom of its fuselage—completely new features in an aircraft of this size. The effectiveness of the keels was proved recently when the "Twin-Quad" was belly-landed on them without any damage to its structure.

As a short-haul air carrier the "Twin-Quad" was designed to carry 20 passengers and their baggage, plus about 1,000 lb. of air mail. If required, the six forward passenger seats can be removed to provide increased freight stowage. It meets all C.A.A. requirements for operation from small fields, including single-engined take-off, and carries enough fuel for a range of 1,400 miles with a 45-min. reserve of fuel. Nor has passenger comfort been neglected; the view from the cabin is excellent, while the combination of slow-turning propellers and of engine exhausts above the wings results in a very quiet aeroplane.

"Sunderlands" to the Rescue

The Royal Air Force's "Sunderland" flying boats are so seldom in the news that one is likely to forget that they are still the mainstay of our anti-submarine squadrons. But a "Sunderland" recently hit the headlines with a fine air-sea rescue mission off Ceylon.

A boat containing five men from the village of Kalutara was overdue after a day of gales and heavy seas. The local police asked the help of the R.A.F. flying boat base at Koggala, and a "Sunderland" of No. 205 Squadron set out to look for the missing boat and crew. After a search lasting nearly an hour the fishermen were found eight miles from shore, sitting on the bottom of their capsized boat. The "Sunderland" dropped a rubber dinghy, in which the fishermen were able to sail back to the village, while the aircraft returned to base, having previously radioed to the police at Kalutara the good news of the successful conclusion of its rescue mission.

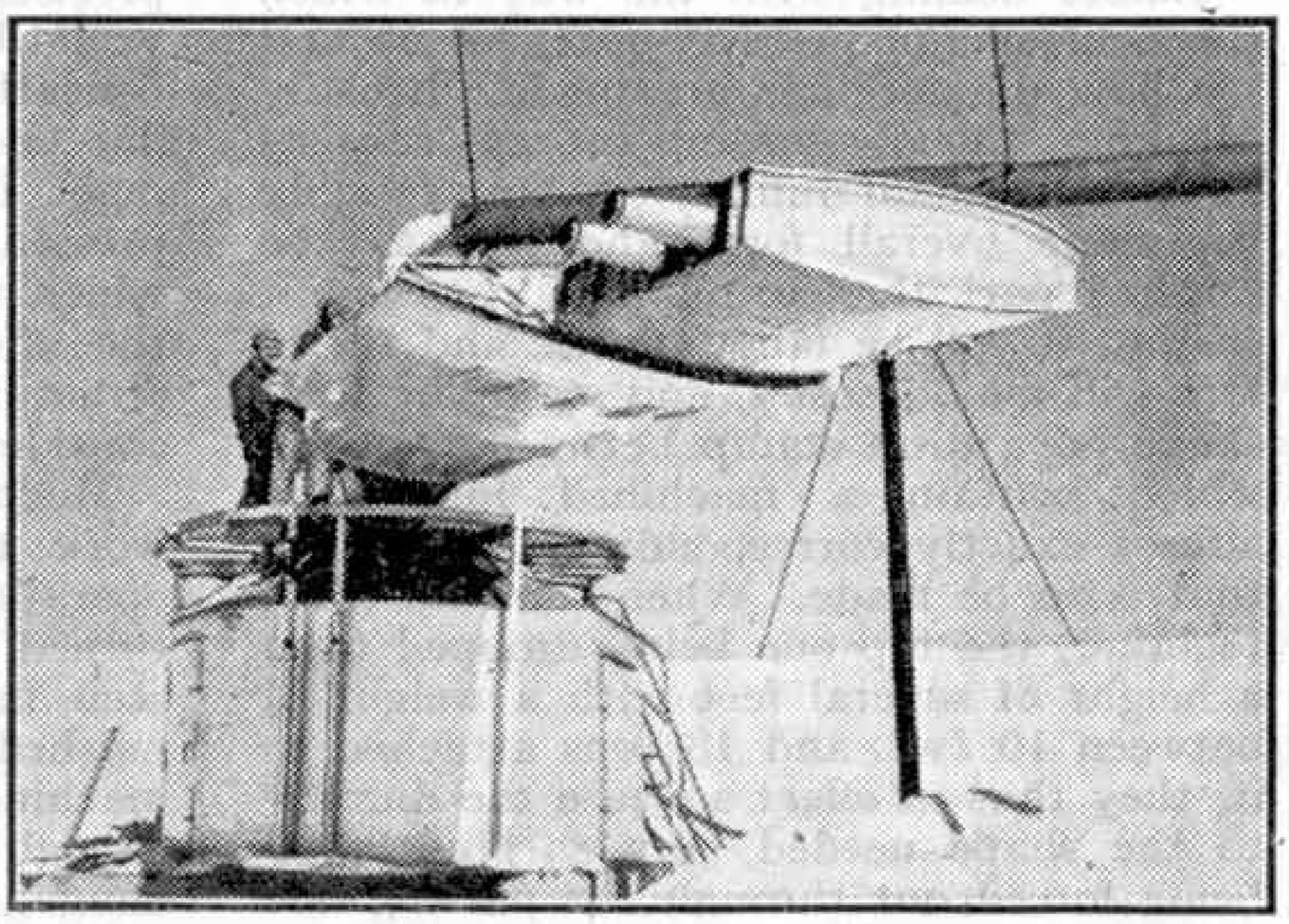
Bristol Propjet Air Liners for B.O.A.C.

B.O.A.C. have ordered through the Ministry of Supply 25 Bristol 175 propjet air liners, now in the early prototype stage. The design of Type 175 is based on B.O.A.C.'s "Medium-Range Empire" specification evolved in 1947, although, in its latest form, the aircraft represents a considerable advance on the original M.R.E. specification. Three versions of the new air liner are to be built. A night version will have 38 sleeping berths; a day version will seat 60 passengers, and another will seat 70 with less room per person, but at reduced fares.

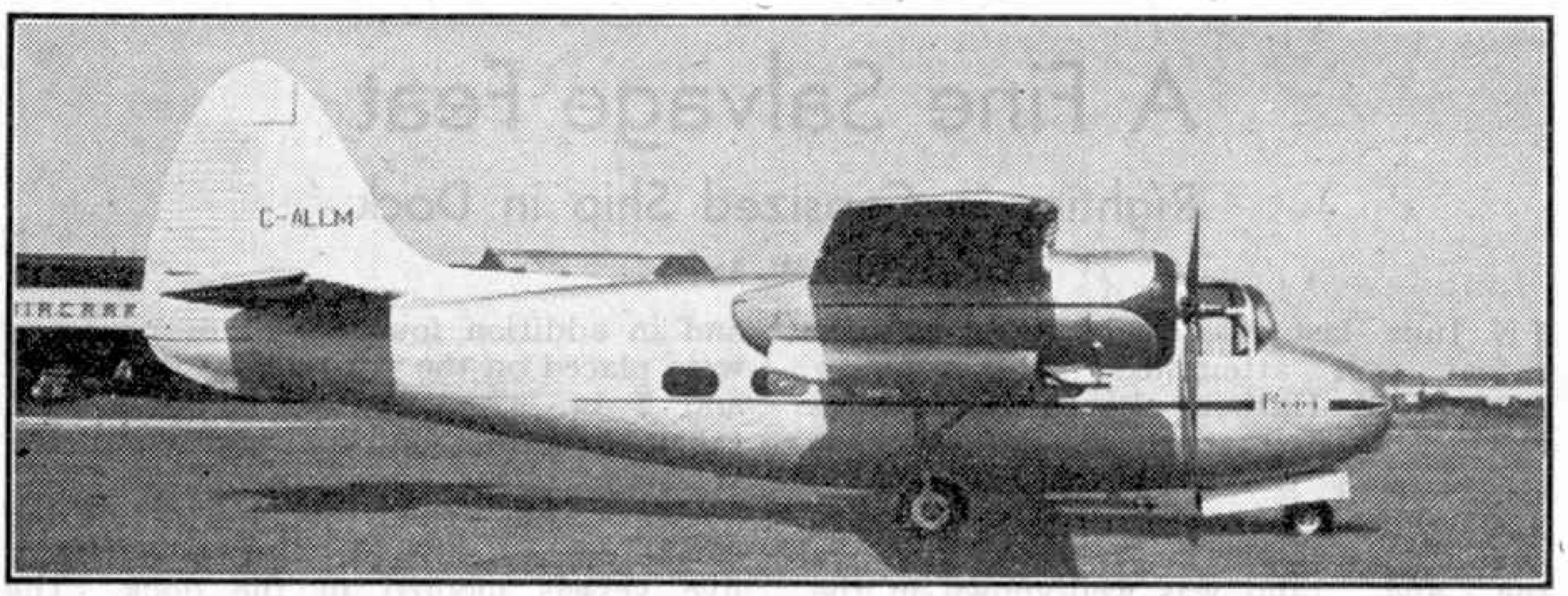
The Type 175 will have four Bristol "Proteus" propjets, giving a cruising speed of 325 m.p.h. over a maximum still-air range of 2,500 miles. If these engines are not available in sufficient numbers, the first aircraft will have "Centaurus" piston engines as a temporary measure. The type should be in service with B.O.A.C. in 1953–54.

Flying-Wing Record

The U.S.A.F. have announced that the Northrop YB-49 flying-wing bomber, which is powered by eight General Electric jet engines, has broken all endurance records for jet aircraft in tests from Muroc air base, California. Flying a shuttle course of 3,458 miles, it remained in the air for 9 hr. 30 min. at between 35,000 and 40,000 ft. The aircraft's vapour trails sometimes stretched for 100 miles.



A new type of jet power plant for helicopters being prepared for a test at the General Electric Flight Test Centre, New York, as part of research in the development of helicopters for the U.S. Air Force. Photograph by courtesy of U.S. Air Force, Wash., D.C.



The Percival "Prince" 8-10 passenger transport described below. Photograph by courtesy of Percival Aircraft Ltd.

Quicker Service to Pakistan

A saving of over 12 hrs. on the B.O.A.C. flying boat service between Southampton and Karachi has resulted from the introduction on that route of Short "Plymouth" flying boats in place of "Hythe" class boats, and the omission of the night stops at Marseilles and Bahrein made by the "Hythes." Now the only night stops on the route are at Augusta and Alexandria. The "Plymouths" are equipped to carry 22 passengers, and complete the journey from Southampton to Karachi in just over 3½ days.

The Percival "Prince"

The compact little 8–10 seater aircraft shown at the top of this page is the Percival "Prince," developed from the Percival "Merganser," of which only one was produced, and is designed for a wide variety of transport duties. It combines a high-wing layout with a roomy cabin; a 6 ft. man can walk its length without stooping. The cabin is sound-proofed, and thanks to the high-wing design should be cool and free from glare in tropical countries. The floor level is low enough for a short, hinged step to suffice for passengers to enter and leave the machine.

A total of 55 cu. ft. of luggage space is normally provided aft of the cabin, the seats, walls and floor of which can be removed easily if the whole cabin is required for freight-carrying. Large double doors permit easy loading.

The "Prince" is fitted with two 520 h.p. Alvis "Leonides" engines, and can carry a full load for 800 miles at 177 m.p.h.

Atlantic Air Travel

Every third passenger over the Atlantic travels by air, according to statistics compiled between 4th January and 11th September, 1948. During that time, 161,615 passengers came by boat from North America to Europe, and 74,205 came by air—46 per cent. of the number of boat passengers. In the opposite direction, 178,694 people went by boat to America, and 94,483 by aircraft—52 per cent. of the number of boat passengers. From 15th August to the 11th September, some 740 passengers a day flew over the North Atlantic.

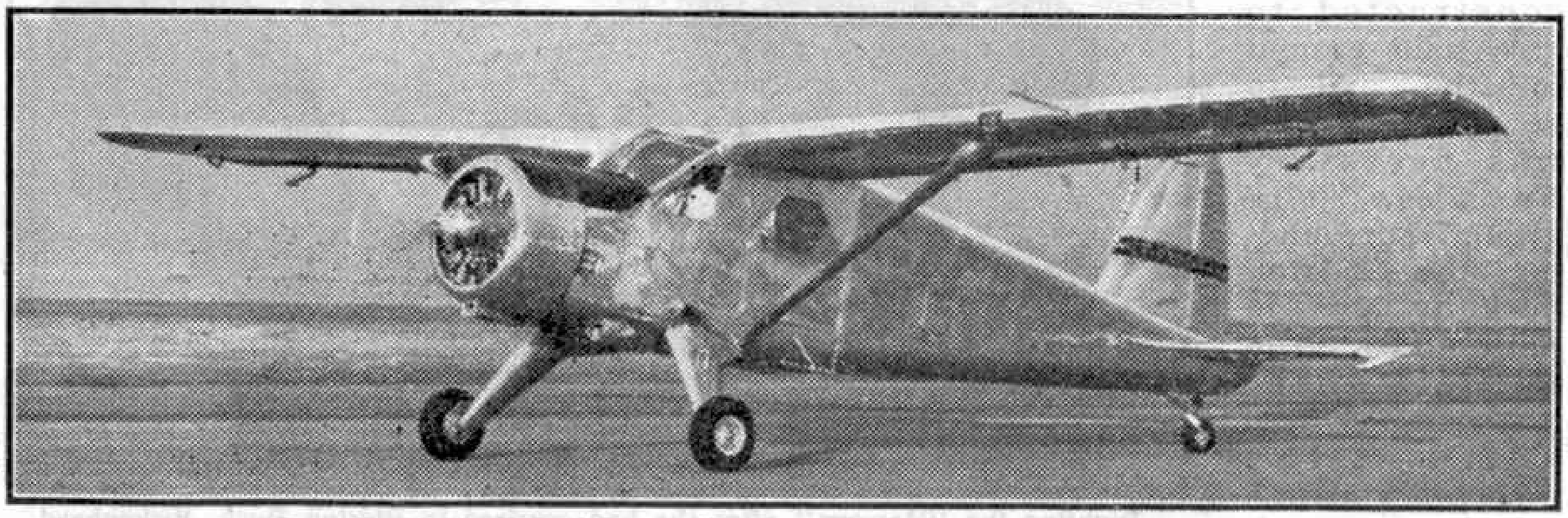
A Canadian Light Transport

The Canadian de Havilland "Beaver," shown in the lower photograph on this page, was designed as a replacement for the veteran "Fox Moth" used by Canada's famed bush-flyers. These men are not interested in streamlining or "frills" such as a retractable undercarriage. They require a rugged, dependable aircraft that can be flown fully-loaded out of unprepared landing fields or off small lakes, in all weathers and with a minimum of maintenance, and that just about sums up the "Beaver."

It was designed as a 4-seater, but with a cabin large enough to accommodate a lot of bulky freight. As a result, when the prototype proved itself very much more efficient than its designers could have hoped, there was plenty of room for another three seats, and the "Beaver" is now authorized for operation as a 7-seater, with an all-up weight of 4,820 lb. It is an orthodox all-metal monoplane, powered by a 450 h.p. "Wasp Junior" engine, and can operate on wheels, skis, or floats.

"Beavers" are now being turned out at the rate of two a week. With typical ingenuity the Company's technicians have designed a three-wheeled trolley that fits loosely under the floats of "Beaver" seaplanes. so that these aircraft can be flown from the factory runways. This saves about £120 delivery charges on each machine, as well as a lot of time.

Present production is largely for Canadian charter firms and Government fire services, but the "Beaver" should also attract operators outside the Dominion.



The prototype Canadian-built D.H. "Beaver." Photograph by courtesy of de Havilland Enterprise.

A Fine Salvage Feat

Righting a Capsized Ship in Dock

By W. Barr

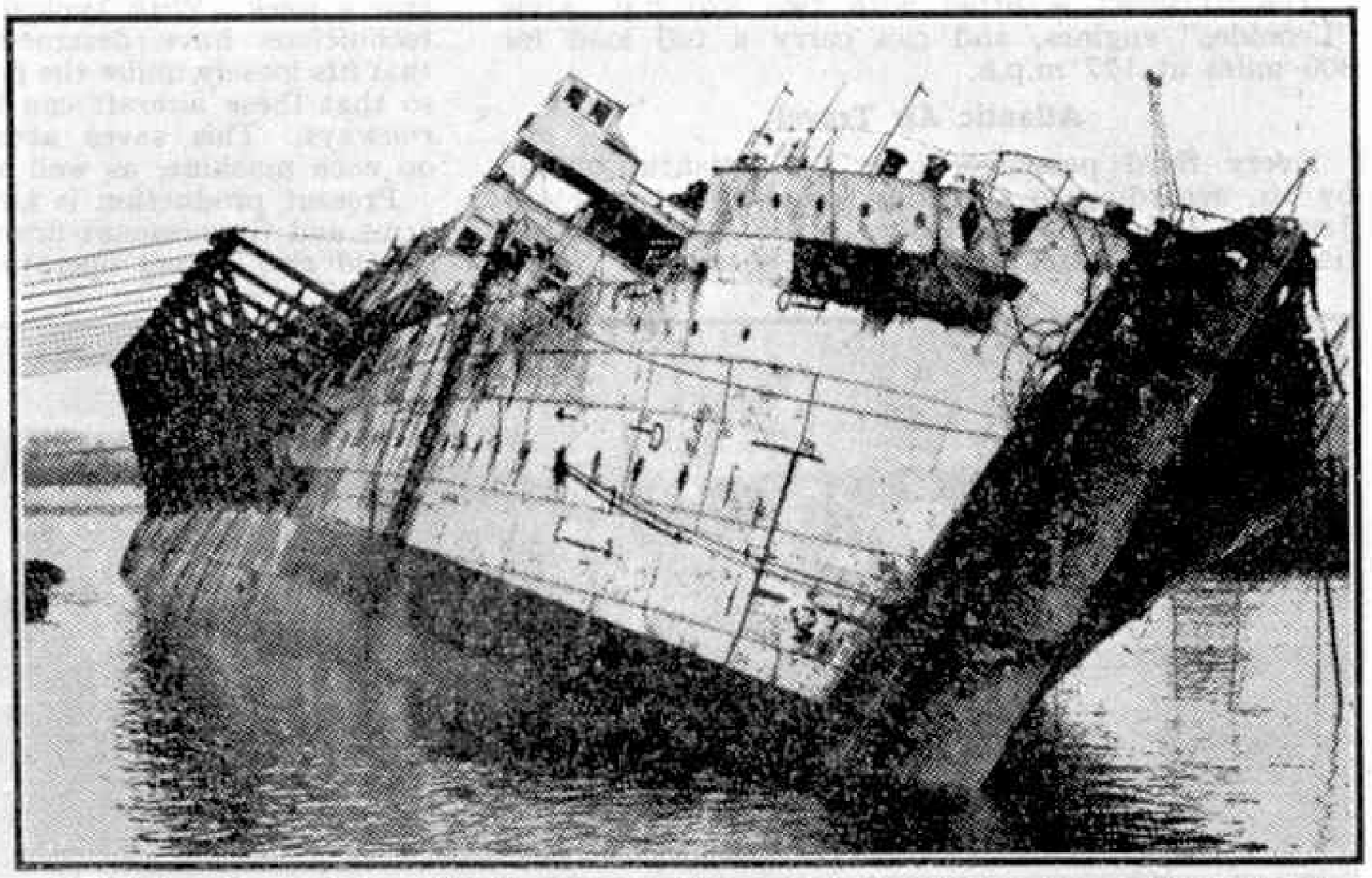
IN June last year the greatest salvage feat ever attempted by the Mersey Docks and Harbour Board successfully reached its first stage. The vessel concerned was the 7,938-ton *"Matrona,"* which during the war had been employed as a hospital ship. This vessel was formerly the *"Aba,"* and was well-known in the West African trade.

While in the Bidston Dock, Birkenhead, the *"Matrona"* had turned over on her side on October of the previous year. She lay on her port side, half submerged in 32 ft. of water and taking up valuable space in the dock that would otherwise have been available for cargo working. The first step in the salvage work that became necessary was to bring the vessel upright, and preparations for this went steadily forward from the time when she capsized. The funnel, mast, and life-boats and other gear were removed by divers in order to reduce the top weight, and openings in the hull were sealed. The men engaged in this work had to tunnel through the clay on the bottom to reach some of the port holes.

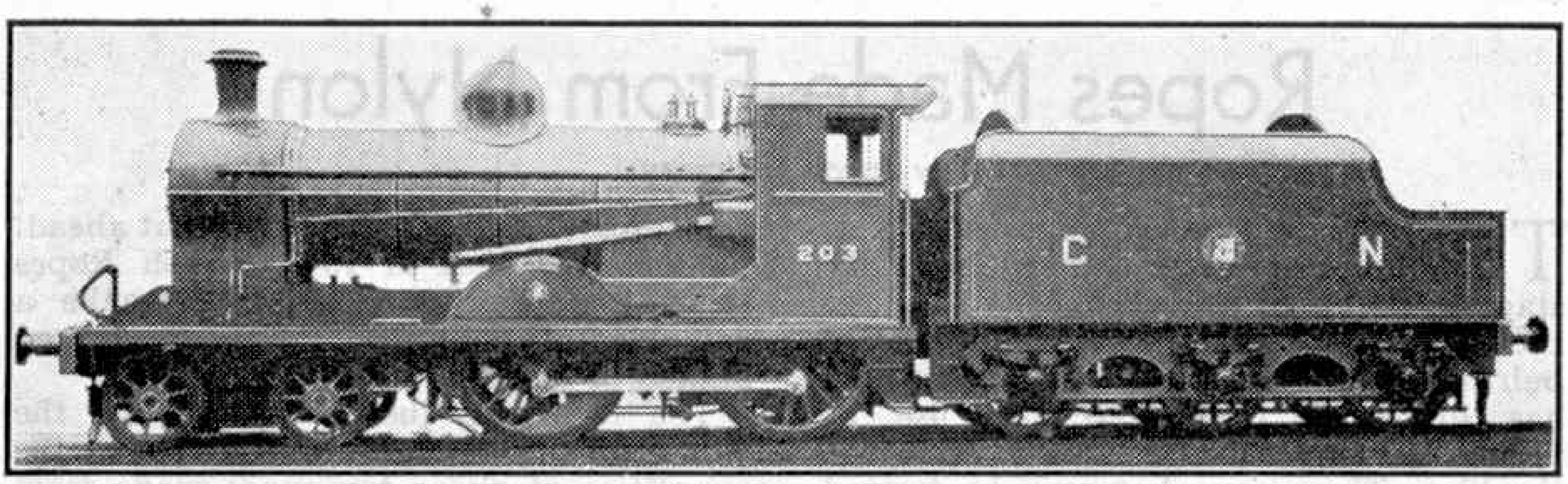
In preparation for bringing the vessel upright 14 giant tripods were welded on her starboard side, which was specially strengthened for the purpose. From these tripods 9 in. steel hawsers were taken to winches on the dock side, where a large concrete anchorage of about 3,500 tons was constructed to give solid ground for the pull to be exerted. This was necessary because the ground surrounding the Bidston dock is soft in nature. To aid in the lift water was pumped from some of the compartments of the vessel, and in addition four camels or pontoons were placed on the port side of the vessel, and 7 in. wire ropes from these were taken under the hull and secured to the starboard side.

When the vessel was to be righted steam was supplied to the winches from five vessels moored in the dock. The winches exerted a pull of about 1,400 tons and as the ship gradually lifted she found her own centre of gravity and began to right herself. The flat side of the vessel lying on the mud gave rise to some suction, and this was overcome by pumping compressed air through open ports and also by the use of high power water jets to wash away the mud. A slight hitch occurred when two of the pontoons fouled the vessel, but these were soon cut away by acetylene burners and a quick short heave then raised the *"Matrona"* to the upright position.

After this had been done the vessel remained aground, because of water in her compartments, and this had to be pumped out in order to float her. While pumping the water out of the hull it was necessary at one stage to lower the level of the water in the dock by about 10 ft. in order to keep the vessel under complete control during these operations.



Righting the "Matrona" after she had capsized in Bidston Dock, Birkenhead.



G.N.R.(I.) new 4-4-0 No. 203 "Armagh" for branch line service. G.N.R.(I.) Official Photograph.

New Engines for the G.N.R.(I.)

THERE have recently been placed in service on the G.N.R.(I.) two new series of tender engines, each of which represents an interesting development of a class previously existing. Both lots of these new engines have been constructed by Beyer, Peacock and Co. Ltd., to the requirements of Mr. H. McIntosh, Mechanical Engineer of the G.N.R., to whom we are indebted for the details and photograph.

The engine illustrated is one of five inside-cylinder 4–4–0s, regarded as belonging to the already existing Class "U." The first engines of Class "U" were introduced in 1915 for long-distance branch and cross-country work such as on the section from Dundalk to Enniskillen, Bundoran and Omagh. Here the trains in general are light, but frequent stops are the rule, and there are many curving and sharply-graded lengths. For this reason driving wheels of the moderate diameter of 5 ft. 7 in. were adopted; and as weight restrictions were severe, special attention had to be devoted towards the production of fairly light yet powerful engines. So the boilers were rather small, but provision was made for mounting heavier ones later, should this be possible.

In the new engines detail improvements have been made to improve performance and handling, but wherever possible parts have been made interchangeable with the original series. A little more scope in design has been afforded by the raising of the permissible axle load since the original Class "U" engines were turned out. The cylinders have been re-designed to improve the steam performance of the engines, and in the layout of the frames it has been possible to introduce a fair amount of strengthening by the introduction of steel castings. Similar improvements have been made in the bogie truck.

Hinged bottom doors to the ashpans and drop grates that can be operated from ground level are features that will help to reduce the time taken in disposal.

The tenders are of quite a new design and, together with the cabs now provided, follow more modern lines than the originals. Apart from these, the traditional outline of earlier classes is preserved. Six tons of coal are carried in each, and 2,500 gallons of water, and the tenders are equipped with roller bearing axle-boxes arranged for grease lubrication.

The new 4–4–0s, which are painted in the striking blue livery of G.N.R.(I.) passenger engines, are Nos. 201–205, named respectively *"Meath," "Louth," "Armagh," "Antrim,"* and *"Down."* This naming of a subsidiary class of engines is an interesting reversion to earlier G.N.R. practice when even the goods engines were named.

The second series of locomotives recently delivered are 0–6–0s of Class "UG," having the same boilers and tenders as those of the "U" class engines. These 0–6–0s are the latest development of the G.N.R.(I.) goods type following on the design of the original "UG" series, also of Beyer, Peacock build, of 1936. They have been considerably improved in detail in the same way as those of Class "U," and as far as possible details have been made common to both classes. The boilers, for instance, are interchangeable, also pistons, piston valves, slide bars and many other important items. The cab has been made larger.

The goods engines are Nos. 145–149, and they are painted black with red lines.

Ropes Made From Nylon

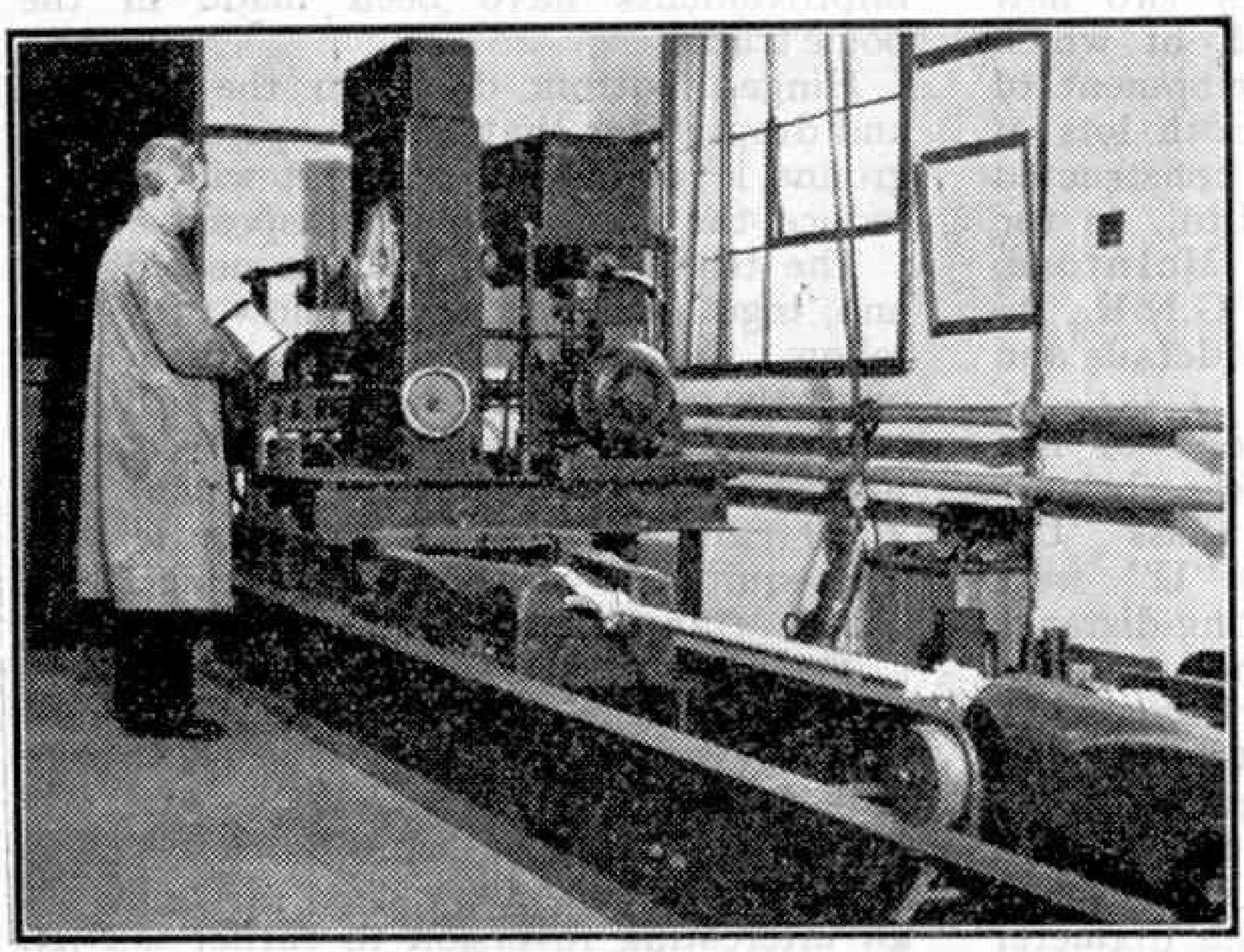
By Trevor Holloway

THE ancient craft of rope-making is entering upon a new and revolutionary stage in its history. Over 3,000 years ago the Egyptians were making ropes of bulrushes and camel hair. Since then man has gradually introduced the use of vegetable fibres such as manila, sisal and the like. These are what may be termed natural fibres. To-day ropes are being made from synthetic man-made fibres in the form of nylon.

The war necessitated urgent research in many fields of applied science, and the rope of nylon fibre was one of the results. In 1939 this synthetic material was just being produced in large quantities, and the British Ministry of Aircraft Production were quick to appreciate the possibilities of the new fibre. Accordingly they approached the Leith Works of British Ropes Limited, the largest manufacturers in the country, with the suggestion that they would like the firm to investigate the question of nylon in relation to rope-making. It was soon apparent that here was an entirely new raw material in almost every way far superior to anything then in use. In short, the investigations strongly indicated that nylon was the rope fibre of the future.

Despite the fact that costs were high, and that only limited supplies of nylon could be made available for this particular use, research and development went ahead. Thus it was that in 1943 British Ropes Limited were in a position to make a valuable contribution to a specialized branch of our fighting forces.

The firm had just completed for the Ministry of Aircraft Production large quantities of glider tow-ropes made from Italian hemp and manila. Admirable as these special-type glider ropes had proved to be, a new technique was being developed by the Aircraft Research and Development Department that seemed to require something even better. This involved the snatching of a loaded glider from the ground without the tug aircraft having to land. The operation demanded the use of an improved towing system, capable of withstanding the shock of high peak loads, but light in weight, so as not to stress unduly either the airframe or the glider.

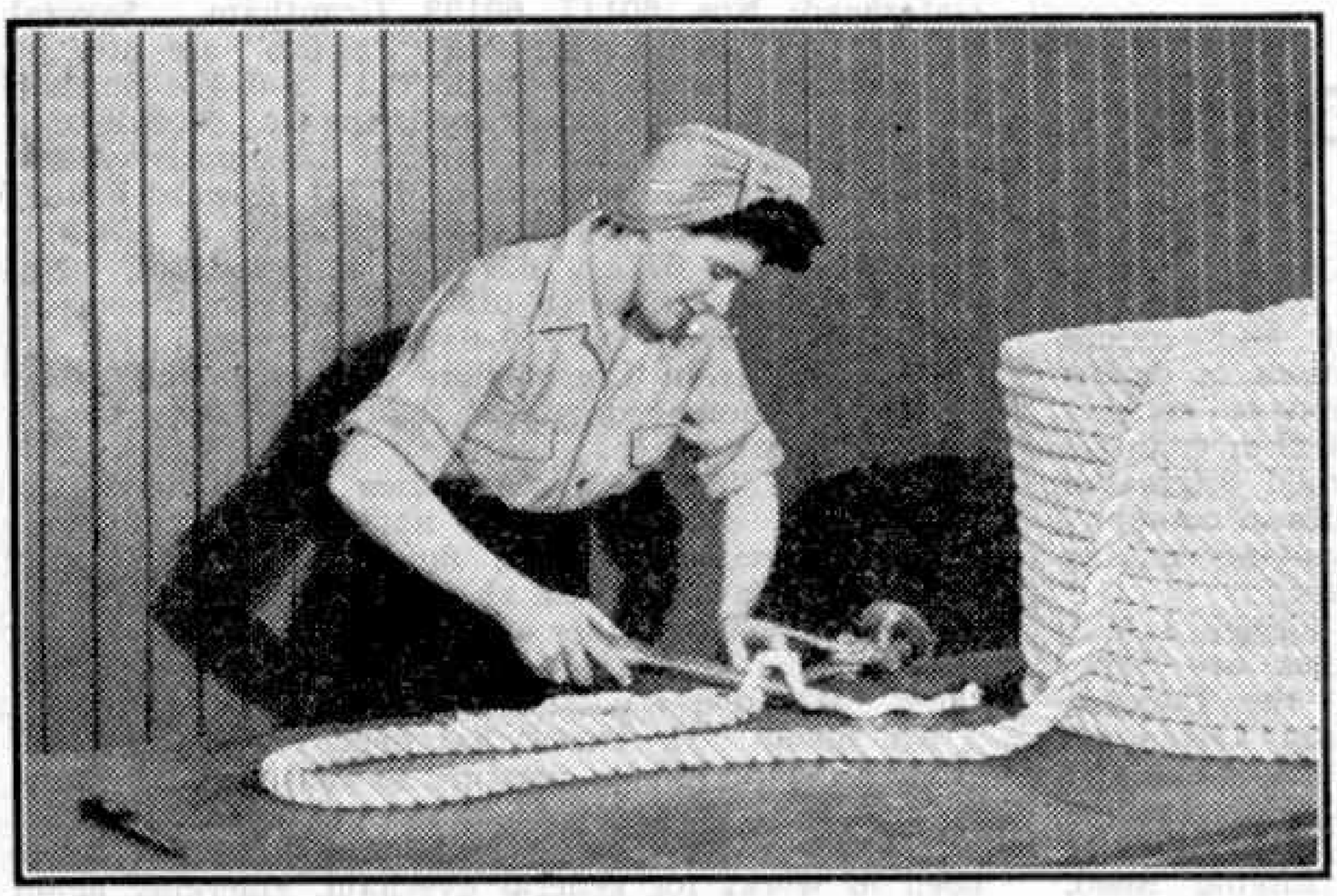


Testing nylon rope on a 30-ton tensile testing machine. Our illustrations are reproduced by courtesy of British Ropes Limited, Leith.

This problem was passed to British Ropes on Friday afternoon, and by the following Monday the first complete nylon tow cable was ready for use. The Manager of the Leith factory flew in the first glider flight to observe the behaviour of the cable under operational conditions. So successful was this first flight, and so well did the new type of rope behave, that contracts were immediately placed for bulk quantities. In the first instance the ropes were to be for pick-up work only, but later, when heavier type gliders were developed, for orthodox towing.

Towards the end of the war the United States Army Air Force also were being supplied. The feature that particularly won their admiration was the incorporation of a telephone cable in each strand, which allowed of intercommunication between the glider and the towing plane. Until that time, intercommunication cables were loosely affixed to the outside of the tow ropes, a practice that had many disadvantages, such as the trailing of loose loops.

The Admiralty made much use of the



Splicing nylon ropes.

nylon ropes, as did also the Combined Operations Command, who issued them to Commando troops for use in mountain warfare and rock climbing.

Many advantages are claimed for this relatively new cordage. It has tremendous strength and great elasticity, and also is resistant to water, chemical action, rot and marine decay. In addition, it may be considered non-inflammable, and it is smooth, flexible and easy to handle. As may be expected, it has a beautiful silvery appearance, which completely belies its strength. It will not deteriorate in storage, even when wet, and it can be cleaned with soap and water.

The tensile strength of a nylon rope is almost double that of a rope of the same size made from high-grade manila fibre or Italian hemp. As regards weight and weight-strength ratio, for equivalent sizes of rope nylon can be regarded as being about of the same weight as manila, but as it is considerably stronger, it will support a greater load per unit weight. The following illustration may make this clear. A high-grade manila rope 3 in. in circumference, weighing 1.71 lb. per fathom, will give a breaking load of 5 tons; whereas a nylon rope slightly over 2 in. in circumference and weighing 0.84 lb. per fathom will provide the same breaking load.

Perhaps the most interesting features of the new rope are its extensibility and elasticity. In some cases the degree of extensibility under load is as much as 40 per cent. above the original length before fracture. Its elastic properties are such that a nylon rope will recover to within 10 per cent. of its original length after the application of a load that is half of the ultimate tensile strength.

Ropes made from manila, hemp and other vegetable fibres are almost completely lacking in this characteristic. They can be stretched under load, but such stretch is mainly the result of the deformation of the component yarns and strands, and the slippage or fracture of filaments contained in the rope body. Consequently the stretching of a vegetable fibre rope to any degree reduces the length of life of that rope and also impairs its reliability.

The technique of incorporating a telephone cable in a nylon rope will doubtless prove of great service in sea rescue work and marine salvage.

British Ropes Ltd. have recently installed an extremely interesting apparatus called a weatherometer for testing nylon and other ropes. This device is capable of producing "artificial weather" of almost any type desired, for with it temperature, humidity and light-intensity can be varied over a wide range. Tests made by this means may determine in a period of days or weeks the rate of deterioration which would occur in normal conditions during months of exposure to sun, rain and cold.



Nylon glider tow ropes. The larger rope on the left is for marine towing.

Railway Notes

By R. A. H. Weight

National News

In order to simplify supervision and reduce administrative costs, certain lines, stations or depots are being transferred from one Region to another in order to bring them into a more logical or compact area. In most cases the lines concerned originated as competitive penetrations by one railway company into the territory of another, often involving running power and joint operating arrangements.

For example: all sections of the former L.M.S. Railway in South and Central Wales are being transferred to the Western Region; the London, Tilbury and Southend section, including Tottenham to Barking, from L.M. to E. Region which operates all other railways in Essex; Carlisle-Silloth branch, at one time worked by the Scottish North British Company in England, also Canal Engine Shed, Carlisle, go into the L.M.R. orbit, as will some of the outlying ex-L.N.E.R. stations in West Lancashire and Cheshire; the Great Western Newbury-Winchester line is transferred to the Southern Region. This will not necessarily involve any immediate change in the locomotives or rolling stock employed.

The important through stations at Bristol (Temple Meads) and Worcester (Shrub Hill) will be controlled by the Western Region, abolishing the long-standing joint supervision by the "Midland" though L.M.R. trains will continue to run in, particularly at Bristol.

The Connel Ferry Bridge

By courtesy of Mr. H. M. Madgwick we are able to illustrate the fine and unusual cantilever bridge in the Western Highlands which carries the single branch line from Connel Ferry to Ballachulish across Loch Etive. The only road for many miles across the loch runs alongside the railway over the bridge under very narrow limits, a toll being levied on vehicular traffic by the railway authorities. Owing to the lack of clearance space, road vehicles cannot cross while a train is on the bridge.

The bridge is set amid superb scenery at a height of 50 ft. above high water, with a clear space of 500 ft. between the piers. It was a fine piece of engineering when opened in 1903, containing some 2,500 tons of steelwork, being owned in its early days by the Caledonian Railway.

Eastern and North Eastern Regions

A contract has been placed with a famous Clydebank firm for the construction of another twin-screw, oil-fired, geared turbine ship for the Harwich–Hook of Holland service, similar to the "*Arnhem*" completed in 1947, to replace "*Prague*" which became a total loss as the result of fire last year. The new vessel will be a small "Liner" in every respect, carrying 500 passengers in cabins.

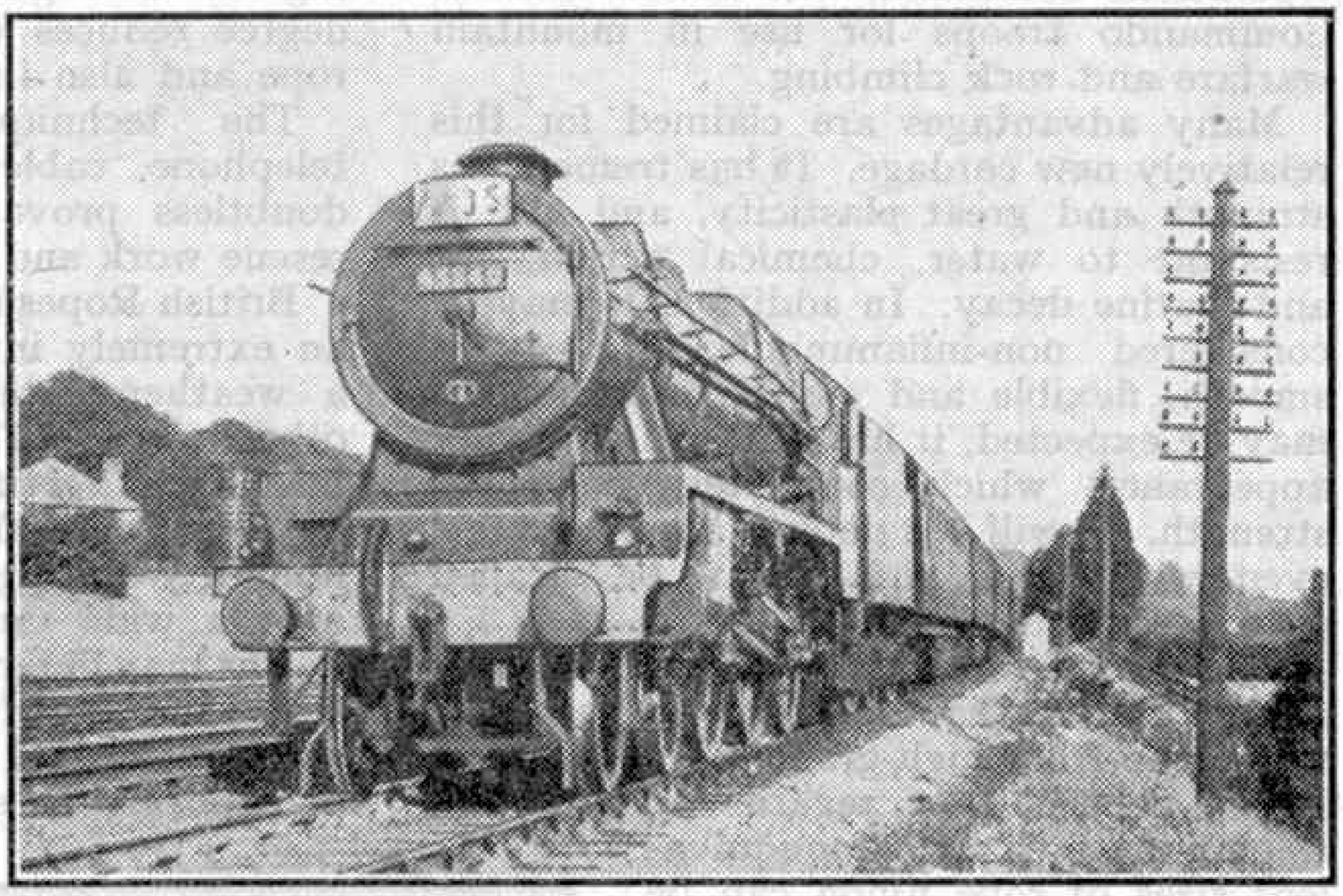
New "A1" 4–6–2s continue to come into service from Doncaster and Darlington Works rapidly. Recent allocations at the time of writing include Nos. 60120, 60130–1, King's Cross; Nos. 60118–9, 60134, 60136, Copley Hill, Leeds; Nos. 60132, 60135, 60137, Gateshead; Nos. 60117, 60133, Grantham. Several of the "A2" smaller-wheeled "Pacifics" are now at Peterborough main line shed. "L1" 2–6–4Ts finished in lined black are also appearing in considerable numbers from the North British Locomotive Company's plant numbered from 67731 upward. Nos. 67731–2, 67737–8, 67743–4 are stationed at Hitchin; Nos. 67733–6, 67741, 67745–6 at Stratford; No. 67747 at Neasden, with others coming into service. Some "N2" and "N7" 0–6–2T are being tried on local workings in Lincolnshire and may well prove faster and more economical than the elderly tender engines they replace.

Of the 10 "C1" G.N. "Atlantics" remaining on the active list, one has been nationally renumbered 62885. Survivors of this famous class were still working from Grantham shed quite recently. Withdrawals of various older engines continue; two former Metropolitan classes are extinct; "L2" 2–6–4 goods tank: "M2" 0–6–4 passenger tank.

No. 60068 "*Sir Visto*" has been rebuilt to "A3" standard with 220 lb. pressure so that there are now no 180 lb. Gresley 4–6–2s of the original "A1" type, afterwards styled "A10." No. 60074, "*Harvester*" has been in works for general overhaul, emerging again painted experimental blue with red, cream and grey lining.

Among good runs lately reported were the 4.10 a.m. from King's Cross which covered the 44½ miles Hitchin to Peterborough start to stop in about 42 min. with "10 on," hauled by "A3" No. 60050, "*Persimmon*," so arriving well ahead of time; "A2/1" No. 60508, "*Duke of Rothesay*," now painted green, arriving King's Cross 9½ min. early with the 1.49 p.m. Sunderland, Saltburn and York express; similar or rather greater time recovery by the southbound "*Yorkshire Pullman*" headed by "A1" No. 60134 from Leeds; the relief portion of the up "*Flying Scotsman*," starting at Newcastle, a 470-ton train worked by "A3" No. 110, "*Robert the Devil*," gained 12 min. south of Grantham, reaching London 9 min. early; "A4" No. 22, "*Mallard*" with a similarly-loaded up Leeds express made up 11 min. from Stoke summit although closely following a heavy train hauled by a "V2" 2–6–2. There are some commendably fast timings in the N.E. Region between Darlington and York where sustained speeds often are higher than now usual on many parts of the former G.N. main line.

The King's Cross–Cambridge buffet car expresses, intermediately serving Welwyn and Letchworth Garden Cities, also Hitchin, which were such a popular



London Midland "6P" 4-6-0 No. 45540 "Sir Robert Turnbull" passing Berkhamsted with a Wolverhampton train. Photograph by H. C. Casserley.

pre-war feature, were restored in December last, worked chiefly by "B1" 4–6–0s. Heavy fish traffic from East Anglian ports brought many 2–6–0s to the Yarmouth and Lowestoft area.

London Midland, and Scottish Regions

An appreciation reaches us of the extremely clean and well-kept appearance of the Class "5" and "5XP" 4–6–0s stationed at Bristol, 22A shed. Some of the latter are still painted red and work through to Derby, Sheffield and elsewhere.

Class "5" No. 44811 of Saltley shed, Birmingham, hauling an 8-coach Manchester-Bournemouth train was logged from Gloucester to Bath and gave a good run, recovering 4¼ min. After leaving the main line at Mangotsfield N. Junction, the rather remarkable speed of 80 m.p.h. was attained on the secondary Midland line to Bath near the foot of a sharp descent past Kelston.

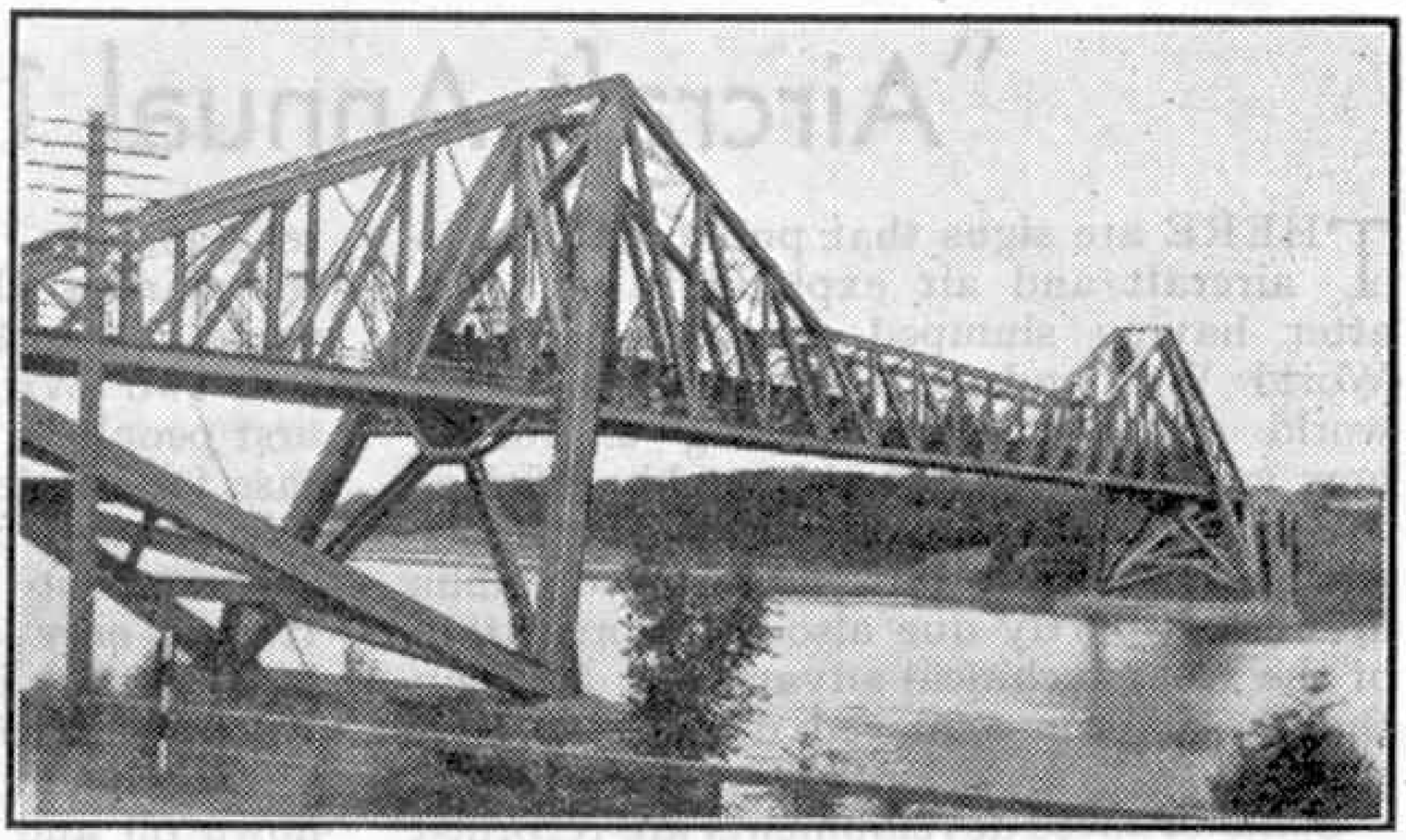
No. 45523 is now "6P" converted "Patriot" 4–6–0. All the unsuperheated "Dunalastair" 4–4–0 engines of Caledonian origin have been withdrawn, though some remain as superheated members of class "3."

New engines have been placed in service and allocated as follows: 2–6–4 class "4" mixed traffic tank Nos. 42175–6, 27B, Greenock; 42177, 17A, Derby; 42178, 24C, Lostock Hall, Lancs., 42179, 23D, Wigan. "2F" 2–6–0: Nos. 46420–4, 8D, Widnes; 46425–7, 3A, Bescot. Class "5" 4–6–0: Nos. 44713–7, 5A, Crewe North.

Certain intermediate types of locomotives are now designated "Mixed Traffic," such as the 2–6–2 and 2–6–4T; the new lighter 2–6–0s now coming into service, as well as the "5F" 2–6–0s of the "42XXX" series; and the Webb 0–6–2T engines now "2PT."

Western and Southern Tidings

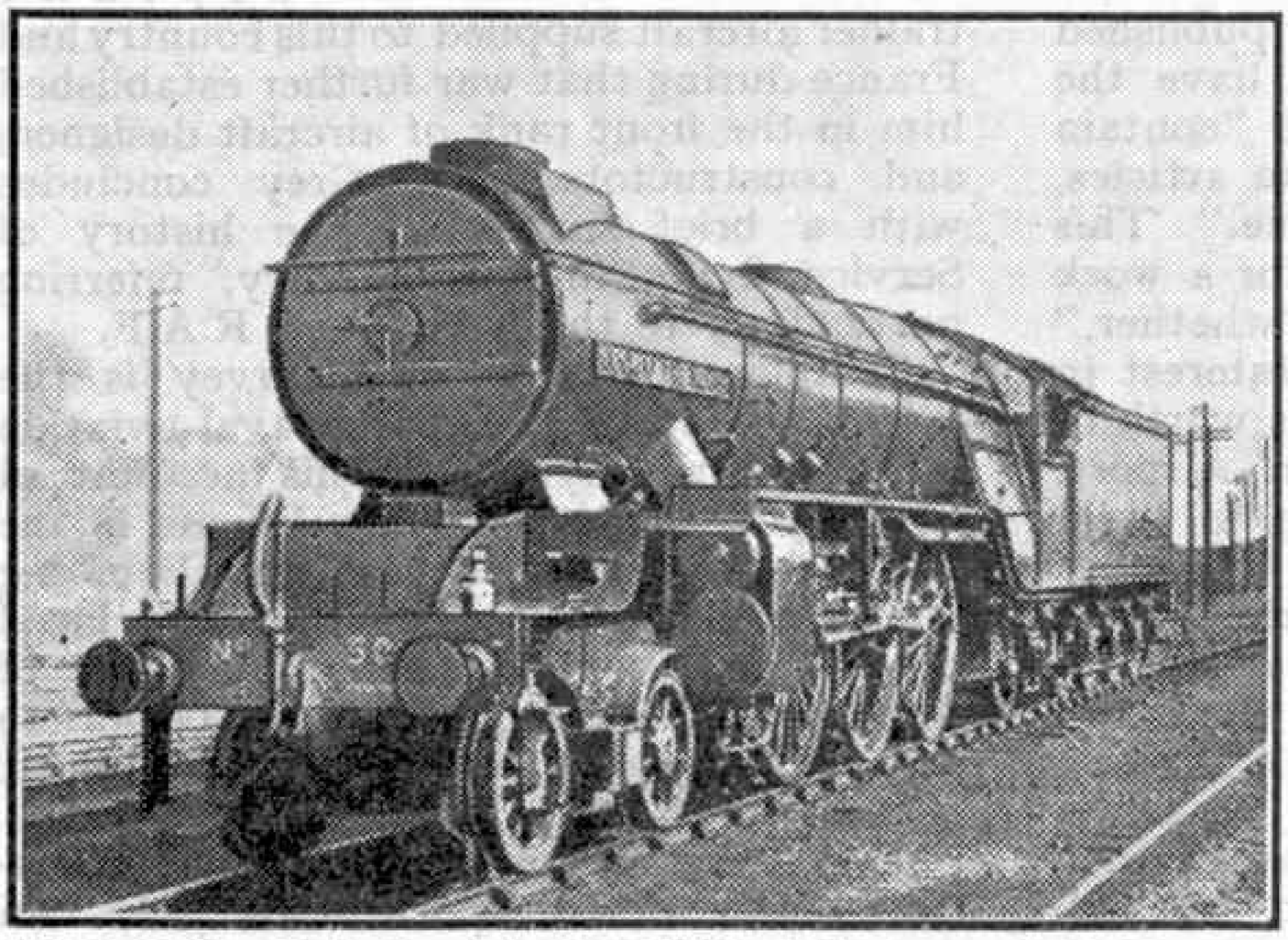
New engines built at Swindon include: 4–6–0 Nos. 6991, "*Acton Burnell Hall*"; 6992, "*Arborfield Hall*"; 6993 "*Arthog Hall*"; 6994 "*Baggrave Hall*"; 6995 "*Benthall Hall*"; 2–6–2T, Nos. 4168–9, and 0–6–0T, Nos. 6760–4. Many engines are now being turned out in lined black and some of freight or shunting types are in plain black. Most of them are without lettering, which also applies to some Southern Region engines. Several more "Castle" and "Hall" class 4–6–0s have been converted back from oil to coal burning. As usual during periods of heavy traffic, all classes of 4–6–0, together with some 2–6–0 and 4–4–0 engines, played their part in handling the large number of additional Christmas trains.



Connel Ferry bridge, the second largest cantilever bridge in the British Isles. It crosses Loch Etive and is situated on the ex-L.M.S. Ballachulish line. Photograph by H. M. Madgwick.

Turning now to the Southern Region, we learn that new "Merchant Navy" locomotives are being completed in quick succession at Eastleigh, Nos. 35027–8 being nearly ready at the time of writing. Nos. 35023–4 are stationed at Exmouth Junction, Exeter; new "Battle of Britain" light 4–6–2s, 34083–4 are at Stewarts Lane, London, 34086 (light green) at Ramsgate. There has been some further adjustment among "West Country" engines allocated to Brighton and Salisbury sheds respectively. "F1" class Stirling 4–4–0s are seen on Reading–Redhill trains, probably their last area of service as regular passenger engines. This important cross-country line still presents an interesting variety of motive power. A good many more engines have been withdrawn from the stocks of the former three constituent companies which formed the S.R.

The Kent and East Sussex line is now part of the Ashford running district, while the old East Kent Railway (now freight only) comes under control of Dover shed.



"Cock O' The North," originally a 2-8-2 of the former L.N.E.R., now converted to a 4-6-2 of Class "A2/2." Photographed at Aberdeen by P. L. Melvill.

Gas-Turbine Progress

The Brown-Boveri gas-turbine electric locomotive, ordered by the former G.W.R. in 1946, is now reaching an advanced stage of manufacture, and it is anticipated that it will be delivered to British Railways in July this year.

Construction of both the power unit and chassis is in progress. Bench tests of the power unit should take place towards the end of next month and load trials of the complete locomotive on the Swiss Federal Railways in June.

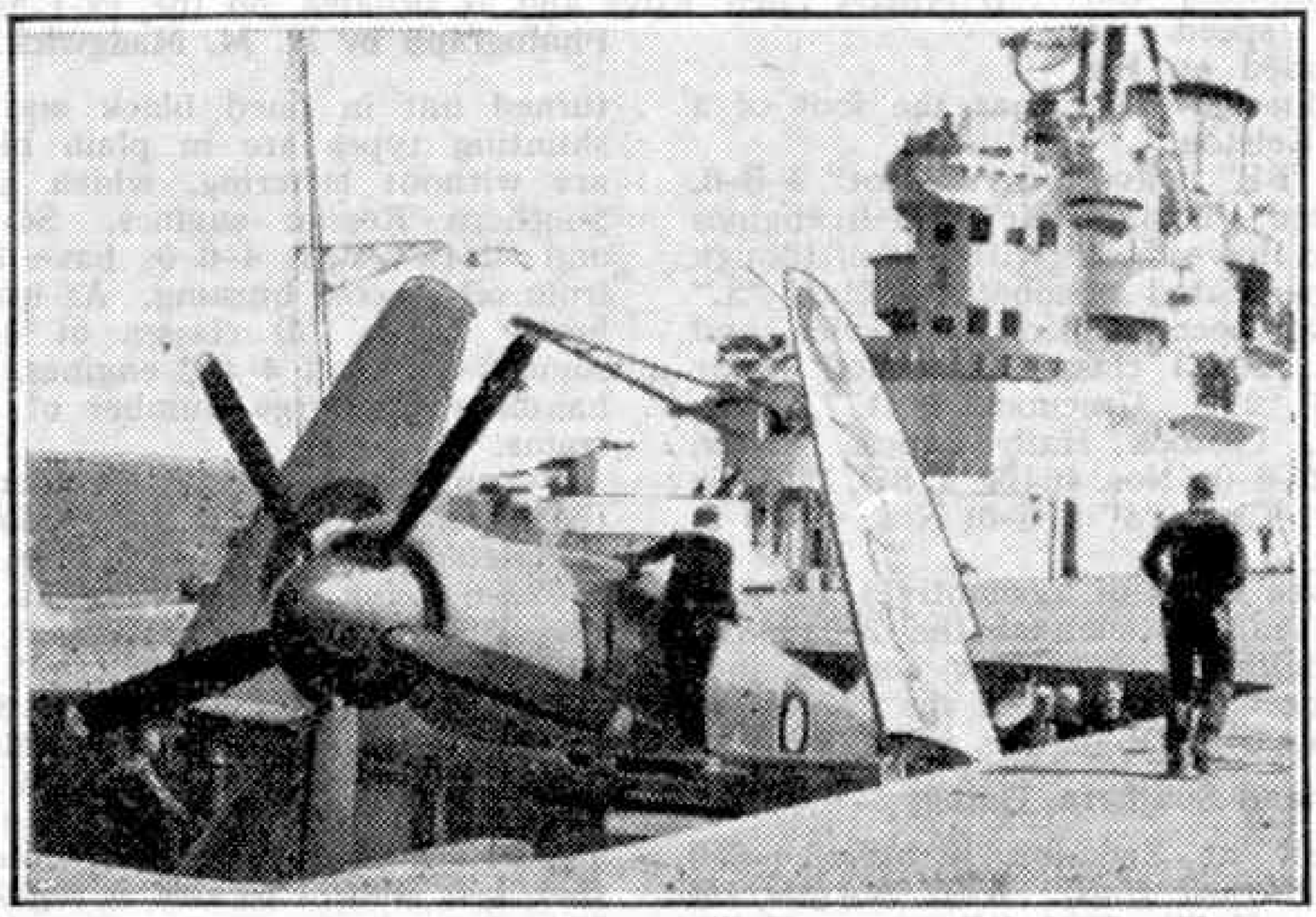
The power-unit for the gas-turbine locomotive undertaken by the Metropolitan - Vickers Electric Company, at Manchester, in conjunction with British Railways (Western Region), is also well advanced, and progress has been made with the design of the mechanical parts.

"Aircraft Annual 1949"

THERE are signs that public interest in aircraft and air exploits is reviving, after having slumped when the second World War ended. Continued unsettled world conditions are making us realize how very important a thoroughly efficient Air Force is as the first line of defence against aggression, but the renewed public interest is partly due also to appreciation of the great technical advances in aviation that have been achieved during the past year or so.

Some of these developments are recorded in "*Aircraft Annual 1949*"* just published under the editorship of John W. R. Taylor. Mr. Taylor does not need any introduction to "*M.M.*" readers, as his aviation articles and "*Air News*" have been a popular feature of the Magazine for several years past. The title indicates that the book is to be published yearly, and it is gratifying to have the Editor's assurance that it will "contain only the best and most accurate articles, and the finest pictures available." This is a very high standard to set for a work designed to cater for everybody, "whether," to quote the Foreword, "your interest in aircraft is confined to a shilling's worth of the public enclosure at London Airport, whether you fly, fly in or help to build aeroplanes." The first number measures up well to this standard, for the names and experience of the contributors testify to the accuracy of the text, and the many half-tone pictures are excellent.

The opening article is by C. G. Grey, who has been "in aviation" since its early days, and is also well known to "*M.M.*" readers. In his candid racy style he summarizes the history of aviation, and while acknowledging the achievements of the two Wright brothers in being the first people to fly, he puts forward a strong case for greater recognition of the splendid pioneer work of that other American, Glenn Curtiss, who commenced flying in 1908. It was only one year later that Curtiss beat Bleriot in the Gordon Bennett Cup Race at Rheims, and in 1910 a Curtiss biplane made history by being successfully flown off and on to a platform erected on the deck of a warship. Curtiss turned his attention to designing and building flying boats, and in the 1914–18 war dozens of twin-engined Curtiss boats were in service with the Royal Navy on anti-submarine patrol. The large number of Curtiss biplane trainer aircraft supplied to this country and France during that war further established him in the front rank of aircraft designers and constructors. Mr. Grey concludes with a brief survey of the history of Service flying in this country, referring particularly to the R.F.C. and R.A.F.

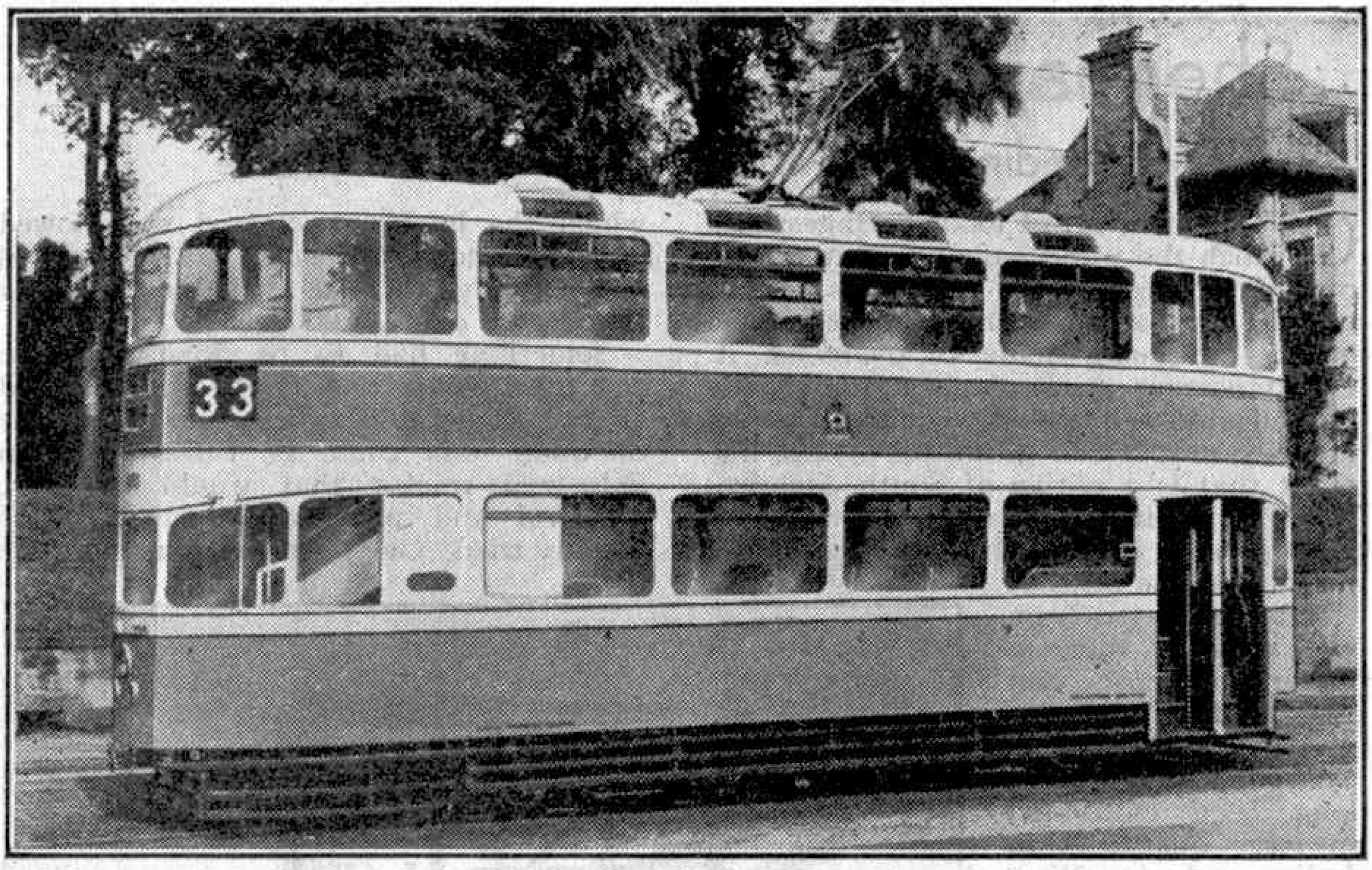


A Hawker "Sea Fury," with wings folded, being brought up from the below-deck hangars of H.M.S. "Illustrious." (One of the illustrations in "Aircraft Annual 1949" reviewed on this page).

Complementary to this survey is the fascinating story of British naval aviation told by Mr. Taylor. In his account of the Royal Navy's air achievements in the 1914–18 war he recalls those early bombing and torpedoing successes that convinced the Admiralty of the offensive value of ship-based aircraft, and thus began to prepare the way for the great aircraft carriers of to-day.

This is the age of transocean and trans-continental air transport. Last year Pan American World Airways celebrated their 21st birthday, and a special chapter in this book tells the (*Continued on page 84*)

*"*Aircraft Annual 1949*" *edited by John W. R. Taylor. Published by Ian Allan Ltd., 33, Knollys Road, Streatham, London S.W.16, price 8/- post free.*



Glasgow's New Tramcars

Speedy Transport in Comfort and Safety

GLASGOW has long been famous for its fleet of comfortable and efficient tramcars, and no effort is being spared to keep the city well to the forefront in this respect. Before the war the Transport Department designed and built in its own workshops 100 new tramcars for the Empire Exhibition held in Glasgow in 1938. These were known as the "Coronation" type. A further 50 were completed in 1940, and then further modernizing of the fleet was brought to a standstill by the war.

As soon as possible after the war a very fine experimental tramcar was built in Glasgow. This was illustrated and described in the *"M.M."* for February of last year. Now a start has been made with the construction in the Transport Department's works of 100 new tramcars that retain the best features of the "Coronation" car. The experience gained in the building of the experimental car already referred to also has been helpful in designing this latest luxurious type, which provides speedy transport in comfort and safety.

The new vehicle is a handsome one, as can be seen from our illustration, reproduced by courtesy of Mr. E. R. L. Fitzpayne, General Manager, Glasgow Corporation Transport. The lower saloon seats 30 passengers and the upper saloon 40. The seats are made of steel tubular frames fitted with Dunlopillo cushions. Those in the upper saloon are trimmed with leather, the colour scheme being red with green bandings. The lower saloon seats have moquette coverings with leather bandings, and the ceiling of this saloon is in colours to blend with those of the seat moquette. The floors are covered with cork tiles. Rubber cushions fitted to the edges of the doors prevent draughts and safeguard against accidents, and another interesting feature that our illustration shows is the provision in the upper saloon of roof lights made of Perspex.

The platform doors are folding, and provision has been made for fitting gear for operating them by means of compressed air. The first tramcar built is not equipped in this manner, but experiments are to be made with the system, and if these are successful it will be applied to all new vehicles. There are three steps from the street to the floor of the lower saloon, which is at the same level throughout the vehicle, and the fitting and spacing of hand rails has been carefully considered in the interests of safety. Route numbers can easily be read from the pavement.

Sherman Tank to Shervick Tractor

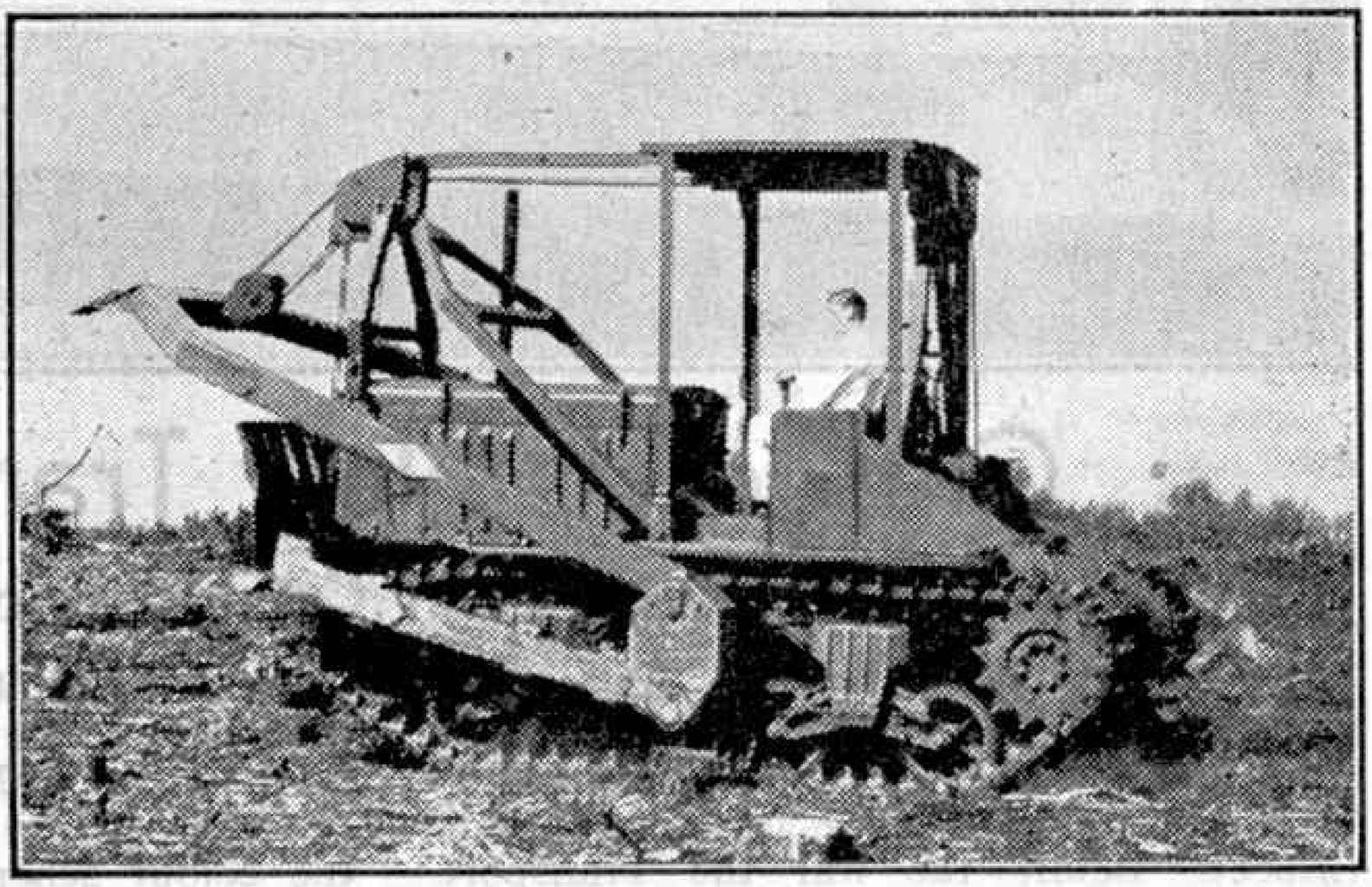
Speeding the African Ground Nut Scheme

ONE of the greatest food shortages from which the world suffers to-day is lack of sufficient edible oils and fats. This is causing special concern, and determined efforts are being made to overcome it. One important source of oils and fats is the ground nut, well-known to children as the monkey nut, which grows on a bean-like plant that is a native of South America. The peanut itself is found a few inches underground, not on the branches of the plant; and the oil that can be extracted from it is of great value in making margarine and cooking fats, and also soap.

Ground nuts have long been cultivated in large quantities in India and in West Africa, as well as in various parts of America, but to-day India needs all her own production, and lack of locomotives and other difficulties have slowed down the export of African ground nuts. A plan to extend the area of cultivation therefore was suggested in 1945 by the United Africa Company, and has been put into operation by the British Government. The scene of these activities is Tanganyika, in East Africa, a former German colony that came under British mandate at the end of the first world war. There an immense area of ground has been marked out for clearance, a railway has been built and other lines are projected, and the ports of the country are being extended to cope with the heavy traffic that the scheme will involve when in full operation.

The first area to be cleared was around Kongwa, about 240 miles inland from Dar-es-Salaam, the chief port of Tanganyika, and for this purpose tractors left over after the war were shipped to Tanganyika. But the Kongwa thorn bush, which grows to a height of 10 ft. or so, has tough stems and roots that defied the efforts of the machines first used. Breakdowns were numerous, and the rate at which the land was cleared was slowed down so much that instead of the expected 150,000 acres of land available in a year there were only 15,000 acres.

Something had to be done to make clearing quicker and more effective, and at this stage it was suggested that the Sherman tank could be turned into an industrial tractor that would be more powerful and more robust than those already tried. One of these tanks therefore was sent to the works of Vickers-Armstrongs Ltd. at Chertsey. There it was examined, and a scheme was worked out for its conversion from the warlike use for which it was planned to the happier task of helping to provide more food.



The Shervick tractor at a demonstration of its power on rough ground near Camberley. The illustrations to this article are reproduced by courtesy of Vickers-Armstrongs Ltd.

Three months later the first model was completed and began its trials. Shortly afterwards two converted Shermans demonstrated their powers so convincingly near Camberley that a regular scheme for the conversion of more Sherman tanks to peaceful purposes was put into operation. One of them, fitted with a curved plate similar to that of a bulldozer, swept away the stumps of huge trees, and the immense curved knives of a Blaw Knox root-cutter towed behind the second tore irresistibly through the underground roots of tree stumps. This tool combines the action of a disc plough with that of a ripper. The roots themselves afterwards were dragged

out of the ground by a 16 ft. rake with teeth more than a yard long. Even living trees did not halt its progress, for it was armed with a tree dozer, a heavy metal blade carried at the ends of long arms that pushed large trees over at a steep angle as the tractor surged forward. After this each stump could be torn out of the ground by the curved plate, which penetrated under the trunk and heaved the entire tree out of the ground.



The stumper of a Shervick at work on a tree that has been partly uprooted by the tree dozer.

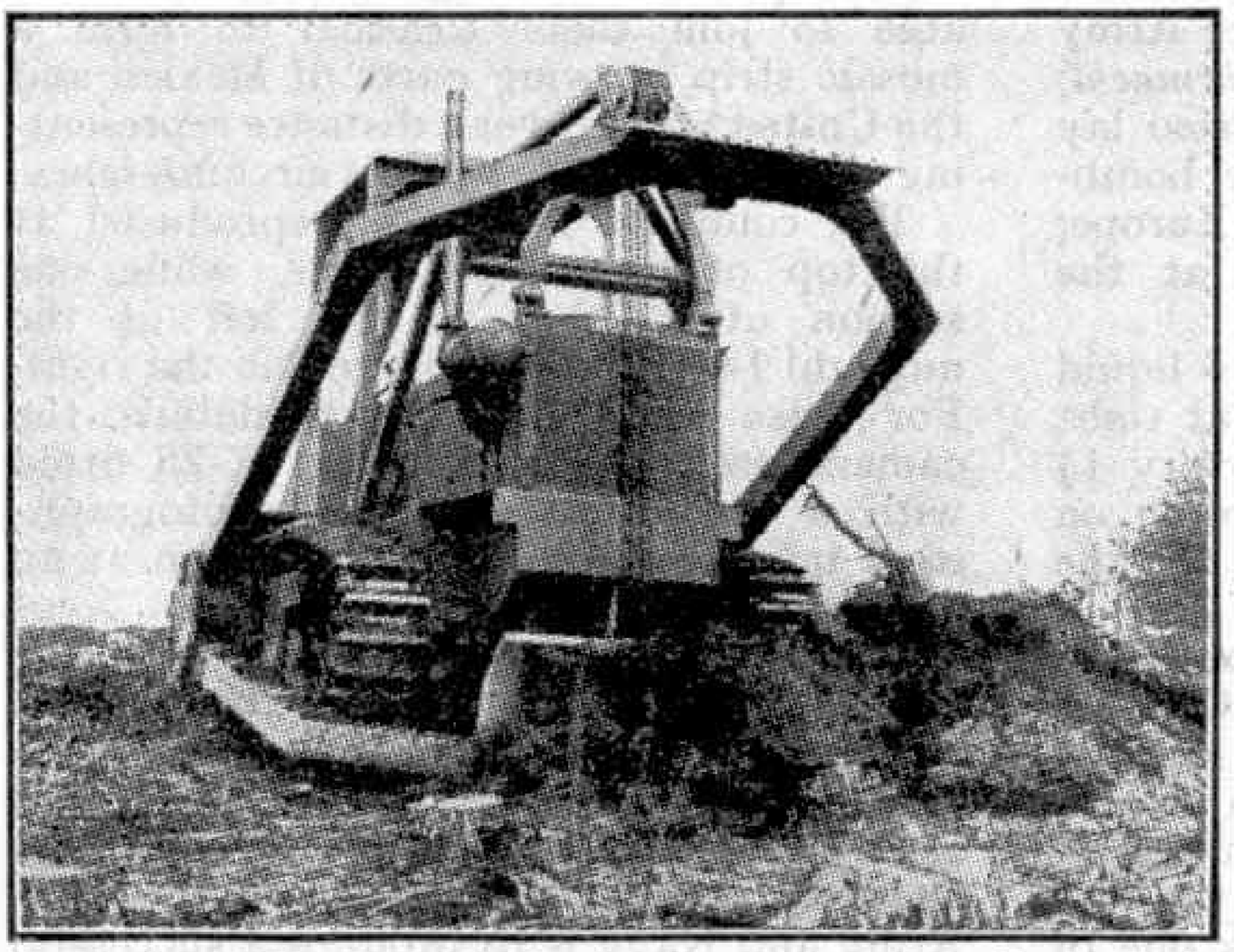
This new weapon in the world's food campaign is called the Shervick tractor, a name that is an apt combination of that of the tank from which it is made and the name of the firm carrying out the conversion. In this the tank is completely dismantled, and all parts are inspected, cleaned and overhauled. A completely new frame is then made. This has the shape of a punt, with cross members of box section at the front and in the centre. The centre cross member is extended on each side, ending in heavy square flanges to which the arms of the tree dozer and stumper are welded.

The Shervick uses the crawler tracks of the tank, with some modifications, but only one of the two six-cylinder diesel engines fitted to the Sherman is included in the Shervick design. This means that a pool of spare engines is being built up, so that engine breakdowns will not cause loss of valuable time. A new engine can be fitted into a tractor without delay when the old one requires overhaul. The speed of the engine, which is of the two-stroke type, is governed at about 1,500 r.p.m., at which it develops 165–177 b.h.p.

A standard General Motors clutch is used, with a few necessary modifications. The complete gear box unit of the Sherman is retained, but only four forward gears and the reverse are generally used. The forward gears give operating speeds up to 7½ m.p.h. at the engine speed of 1,500 r.p.m.

The Shervick presents an impressive appearance, with its giant radiator and bonnet, the stumper and tree dozer mechanisms, and the exhaust pipe raised high to carry fumes clear of the driver. The whole tractor is 15 ft. long and 9 ft. wide, and it weighs 18¾ tons with a tree dozer fitted, 15¼ tons without. The driver's seat is of double width, and track guards and radiator guards are fitted.

The conversion of the Sherman tank into an agricultural tractor is a strikingly liberal example in modern form of turning swords into ploughshares. Reports on the performance of the first Shervicks to be used in Tanganyika show that they have proved equal to the task for which they were designed.



Front view of the Shervick, showing the stumper in action, with the tree dozer above it.



Photography from 300,000 Feet

Earth's Surface Recorded by Rocket Camera

By John W. R. Taylor

"FIVE . . . . four . . . . three . . . . two . . . . NOW."

At the touch of an electric button the giant V2 rocket burst into life, white-hot gases blasting from its tail with an ear-shattering roar. At first it rose so slowly that it seemed it must topple over. Then suddenly it shot up, accelerating so quickly that it was lost to sight in a moment, leaving only a white vapour trail against the deep blue sky.

That scene was repeated time after time in Western Europe before VE-Day, but this time there were differences. The officer who pushed the button wore the khaki uniform of the United States Army instead of the field-grey of the *Wehrmacht*; the white desert sand of New Mexico lay beneath the rocket instead of the bomb-scarred coast of Hitler's Fortress Europe; and this rocket was not aimed at the heart of the British Empire.

From its slim body, between two liquid fuel tanks, a camera pointed out at right angles to the line of flight, and every 1½ seconds the shutter clicked, recording on film everything within range of the special lens.

After a little more than a minute the rocket's power was exhausted and, 60 miles above the Earth, it gradually lost its momentum, until finally it spun slowly over and began to hurtle down again. During those few seconds at the peak of its climb the rocket's camera took one of the most amazing series of photographs ever recorded.

On the ground, scientists followed the path of the rocket on radar screens, and after it had dropped 36 miles they detonated by radio an explosive charge which blew the camera clear. When it was recovered three days later the camera was little worse for its ordeal; its shutter still worked and the film was undamaged.

When developed, the film was found to contain more than 240 photographs taken at various heights, the most important being the series of 16 negatives exposed when the lens swept along 2,700 miles of the horizon as the rocket changed direction at the peak of its flight. Experts were able to join them together to form a mosaic strip showing parts of Mexico and the United States over a distance representing one-ninth of the world's circumference.

The complete mosaic is reproduced at the top of these two pages, while one section of it—that to the left of the numeral 1—is shown enlarged on the right. For those who like technical details, the camera used was a modified K-25 fitted with a red filter; and the photographs were taken on Aero Super XX film at an exposure of 1/500th second.

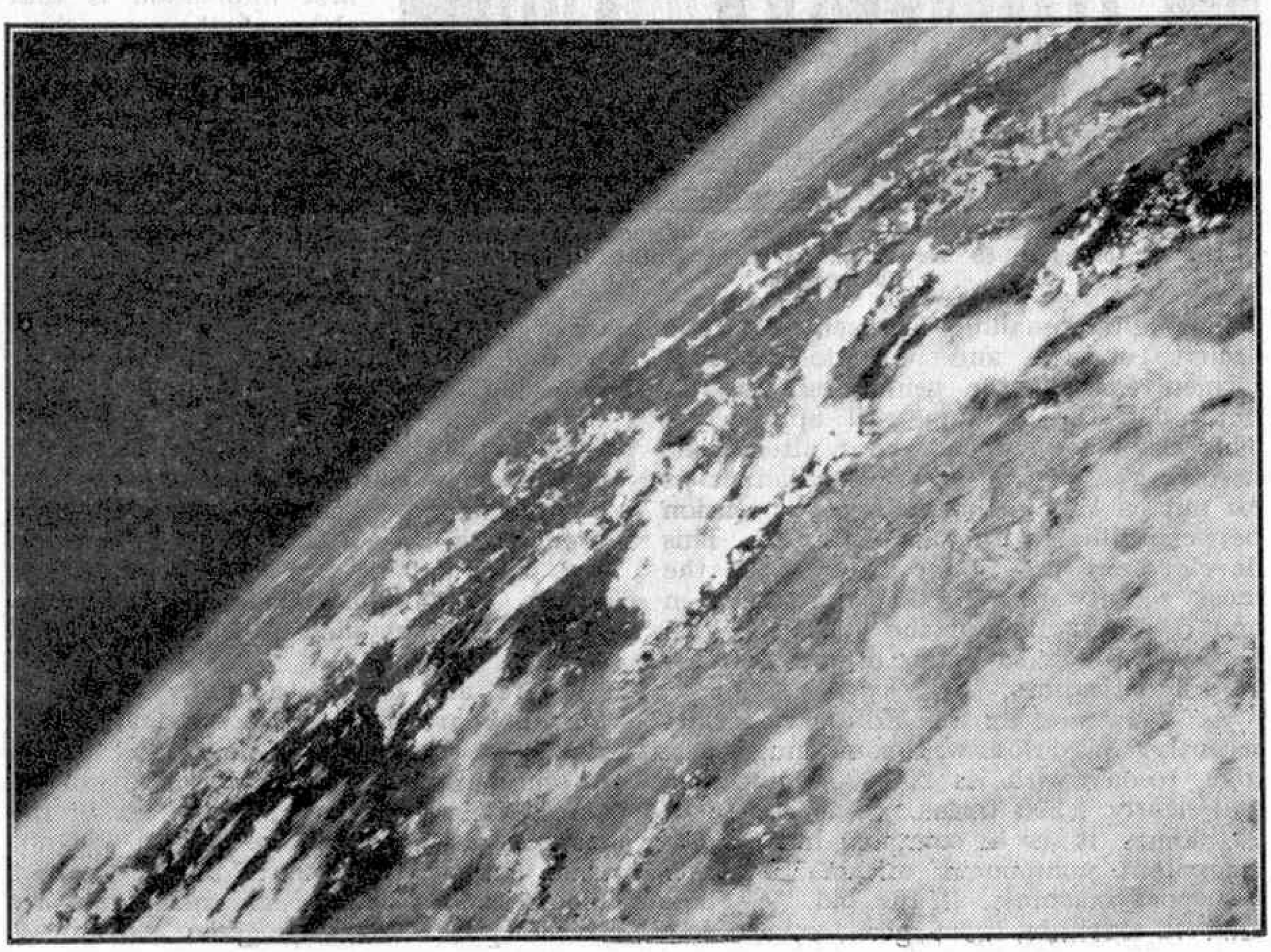
It would be wrong to suggest that the sole purpose of the present series of American rocket experiments is to obtain small-scale photographs of Mexico and the Southern United States. On the contrary, the chief concern of the U.S. Army and Navy is to produce a successful guided missile capable of delivering a knock-out atomic blow quickly and



precisely to any aggressor nation. But when additional scientific information, like these photographs, can be obtained without interfering with the basic test programme, this is encouraged. On this occasion the V2 carried also instruments to collect cosmic ray and meteorological data, installed by scientists of the Applied Physics Laboratory of Johns Hopkins University, Maryland, under a U.S. Navy contract.

The additional information often has great possibilities from the military point of view. For example, the success of this trial photographic flight proved that, if an efficient method of controlling rocket flight could be evolved, missiles could be used to obtain reconnaissance photographs of enemy territory, without risk to human aircrew.

It will be many years before such "push-button" missiles become a military possibility, for the Americans have not yet released details of a rocket of their own design even as good as the German V2 described in last month's *"M.M."*



A Visit to "Waterloo Box"

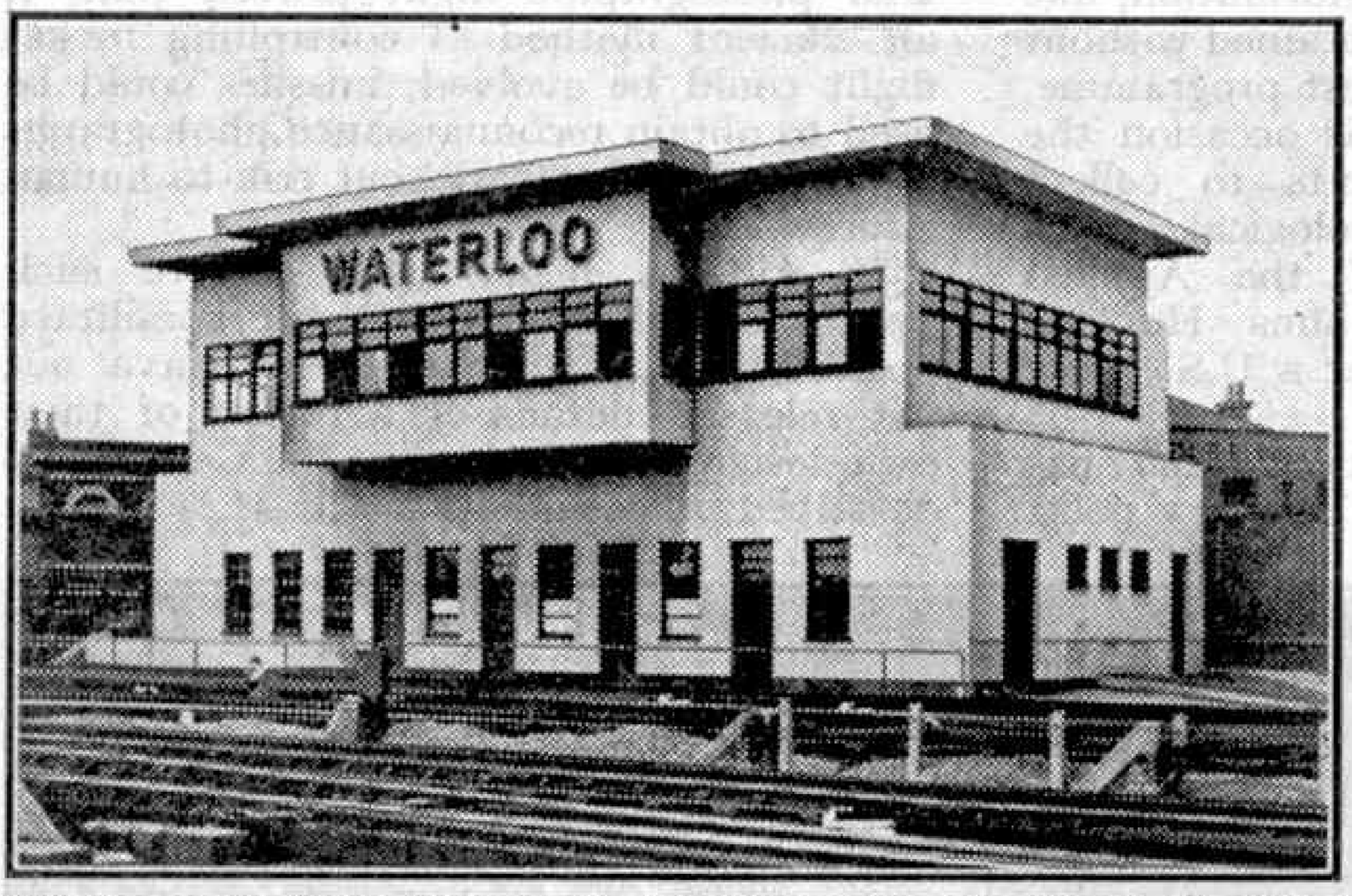
By "North Western"

A little while ago, through the courtesy of British Railways, Southern Region, I was privileged to visit the all-electric signal cabin controlling train movements in and out of the 21 platforms at Waterloo. This has been a familiar landmark to Southern railfarers since 1936, when it replaced six older boxes from Vauxhall to the terminus, including the famous Waterloo "A" Box that straddled the track beyond the platform ends.

The concentration of control thus obtained came with the introduction of colour-light signalling between Hampton Court Junction and Waterloo and it formed part of the general scheme for improving the terminal rail approaches. This scheme included layout alterations, involving a concrete fly-over viaduct as far out as Wimbledon to avoid confusion between different streams of traffic. This development may be considered as the most recent step in the reorganization and reconstruction of the station, which passed through so many different stages at different times.

At one time, as the Editor remarked recently, Waterloo was something of a joke; to-day with its 200,000 passengers and nearly 1,200 trains in the course of 24 hours, it is a complex but highly competent component of the Southern transport machine. If the old "A" box and its satellites have gone, so also has the once imposing array of semaphore signals. They stood thickly on the platform ends and some were mounted high on a gantry astride the tracks right by "A" Box itself; but to-day they have all gone. As a result the station approach at the outer end has a remarkably free and "open" appearance. The colour-light signals, being lower than the former semaphores, are relatively unobtrusive, but they are perfectly competent.

Unlike the traditional signal cabin with its wooden stairway outside, Waterloo Box is entered on the ground floor, and the stairway leading up to the operating floor is inside. So you approach the scene of activities much as you gain the landing at home, and arrive on the upper floor in the far corner shown in the interior view on the next page. Your first impression is that although there are three men working the Box, with two booking boys and a supervising Inspector, there is practically no noise. Train describers and telephones buzz but there is none of the familiar clatter as when levers are pulled off or put back to normal in a mechanically-worked box, and there is no heaving or straining for the signalmen. And everywhere is neat, clean and orderly.



The all-electric signal box at Waterloo, Southern Region. This and the upper illustration on page 69 are reproduced from British Railways Official Photographs.

Points as well as signals are electrically controlled, requiring 136 points machines housed in neat cast-iron cases alongside the switch rails. A 130-volt battery in the basement of the Box provides the power, so that points can be moved even if a mishap should cut off the normal signalling supply.

There are levers to pull, of course, but they are quite small ones, and they can be worked with the finger and thumb of one hand. But they cannot be worked at all unless conflicting levers are in the correct position; and the signals will not then change from the "danger" aspect unless the track is clear and points are correctly set for any given movement.



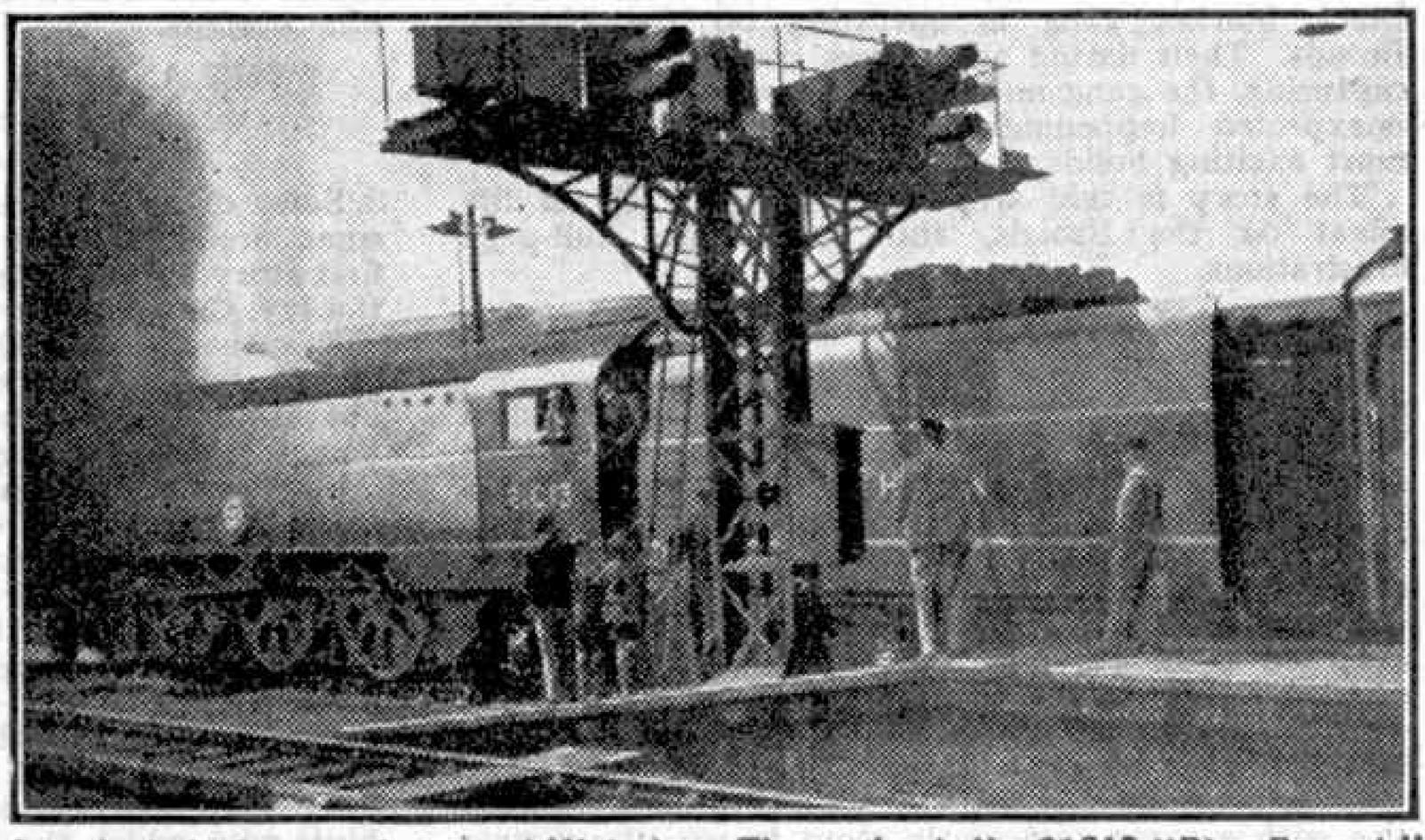
An interior view showing two of the all-electric lever frames. Note the illuminated diagrams on which train movements are automatically indicated.

This is because the whole area controlled by the Box is divided up into 153 track-circuited sections and electric locking ensures that conflicting or incorrect signals cannot be given. I know; I was allowed to try it, when under the Inspector's expert guidance, I set the road for an incoming electric train, an operation requiring four or five lever movements in order, and I assured myself that until this sequence had been completed it was impossible to admit the train.

There are 81 controlled signals and route indications, 20 automatic signals and 65 shunt signals in the Waterloo installation. For the number of levers in use—309 replacing the 499 in the six boxes previously controlling the area—Waterloo Box is remarkably compact. Yet it houses three lever frames, one long one running along the back wall and a shorter one across each end. Although I call them lever "frames," they are not like the ordinary mechanical frames with which most readers will be familiar. Actually each frame somewhat resembles a long desk or cabinet with the dwarf levers projecting upward in front of a back panel in which each individual signal aspect is repeated, as well as the positions, normal or reverse, of all points. By each lever are marked the numbers of the other levers that must be moved in sequence in order to release it.

Each of the end lever frames has its illuminated control panel, and owing to the length of the long frame two are provided above this. These panels display a diagram of the tracks controlled from the box; these approach Waterloo from what is known as "*Loco. Junction*" (Nine Elms) through Vauxhall and so to Waterloo itself where eight roads fan out to serve the 21 platforms. A series of lights on each panel connect with the track circuits to show whether a section is occupied or not. Thus the progress of a train through the sections can be traced by the indicator lights along its track on the panel, each winking in turn as the train proceeds. In addition to this notable aid to efficient working there are 16 train describers. These record and can store messages offering trains or engines from the next box down the line.

An interesting detail that appealed to me was the series of indicator lights, one to each platform on the control panel, that lit up intermittently during my stay. These lights are operated by the Platform Foreman, and form a message from him to the (*Continued on page 84*)



A typical platform-end study at Waterloo. The engine is No. 21C13 "Blue Funnel," ready to leave with the "Bournemouth Belle." Photograph by F. G. Reynolds.

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, and certain others that will be indicated, these should be ordered through a bookseller.

"TRAINS ANNUAL 1949"

Edited by CECIL J. ALLEN, M.Inst.T., A.I. Loco.E.
(Ian Allan Ltd. 7/6)

"Trains Annual 1949" presents a pleasing and well-illustrated variety of articles on railway subjects. In it the Editor, Cecil J. Allen, who needs no introduction to our readers, writes admirably about the first year of nationalized British Railways, describes the world's biggest railway bridges and tells us something about the remarkable streamlined trains that are such a feature of current American railroad practice.

An impressive team of writers contributes the remainder of the contents of the book. Among them are David L. Smith, well known for his intimate acquaintance with the former G.S.W.R., with his lively *"Tales of the Sou'West,"* and R. E. Charlewood, an authority on train services for many years, who traces the development of *"The Flying Scotsman"* from its earliest days.

Railway working in the Ruhr, the mysteries of slip-coaches, once so popular, footplate experiences in France, signalling developments, electric locomotives, multi-cylinder steam locomotive practice and an American troop train journey are among other fascinating topics dealt with. We end with the little-known Cromford and High Peak Line, with its fearsome gradients, which is described at first hand—of course with excellent photographs—by H. C. Casserley.

The illustrations include a special survey in pictures of British locomotives in 1948 and of the exchange trials carried out during the year. Many of the subjects are striking, and all are well reproduced on art paper.

In its attractive coloured jacket the Annual will be welcomed, particularly by junior railway enthusiasts. Copies cost 7/6 from leading booksellers and Ian Allan agents, or 8/- post free direct from the publishers at 33, Knollys Road, Streatham, London S.W.16.

"HOLIDAY RIVER"

By GLADYS MITCHELL (Evans. 6/-)

Pam, Gillian and Hilary on holiday in their motor-cruiser *"Buccaneer,"* and David and Roger in the yacht *"Saucy Sandboy,"* become suspicious that a Black Market gang is operating on the Norfolk Broads. Their daring adventures trailing, and finally capturing, the gang make thrilling reading, and these unexpected happenings give the five friends the most exciting holiday of their lives.

The story is told with interesting details of life afloat on the Broads, and has several full-page illustrations.

"THE L.M.R. LOCOMOTIVE REFERENCE BOOK"

By R. P. SYKES. 3/- post free

This book, now in its third edition, is published by Christian and Sykes on behalf of the British Locomotive Society. It gives the British Railways numbers, and names where carried, of all London Midland locomotives, including ex-L.M.S. engines of Scottish Region. The lists are in numerical order, class by class, and the depot to which each engine is attached is noted. Space is provided alongside the number columns for shed changes, livery and lettering details and other special notes. London Midland Motive Power depots and works also are listed.

As in previous editions, the book is of handy pocket size with a cover sufficiently stout to withstand wear and tear. Copies are obtainable from Mr. R. P. Sykes, 42, Coombe Road, Handsworth, Birmingham 20.

"A.B.C. OF AIRPORTS AND AIRLINERS"

By O. G. THETFORD
(Ian Allan Ltd. 3/6 net)

Aircraft enthusiasts living near airports, or able to visit them to watch the arrival and departure of air liners of various nationalities from the public enclosure, will find this handbook of great value. It contains detailed lists of the aircraft fleets of British and foreign air transport companies, giving in each case the registration letters and names of the machines. There is also an alphabetical guide to air liner registration, while the airlines operating services to and from the British Isles are named.

Scale plans of the principal airports in the British Isles, with timetables of the services using them and details of the types of machines employed, also are included, and in the case of London and Prestwick airports the service details are grouped according to the day of the week, thus enabling the reader to see at a glance what airline arrivals and departures he can witness there on any particular day. Finally there are scale three-view silhouettes and specification details of the types of air liners in regular service, with a brief historical note on each type.

Nearly 60 excellent half-tone illustrations of some of the aircraft listed in the text add greatly to the interest of the book, and indicate the wide range of types of commercial transports in service to-day.

Copies of this book are obtainable from booksellers and most hobby shops, or direct from the publishers, Ian Allan Ltd., Mail Order Department, 33, Knollys Road, London S.W.16, price 3/9 including postage.

"A MISCELLANY OF BRITISH FLAGS"

By CAPT. G. G. THORNE, R.D., R.N.R.
(Brown, Son & Ferguson. 2/6 net)

Flags are of perennial interest to all boys, and especially to those who live by the sea, where flags take on an added meaning. Capt. Thorne has condensed into small space a surprising amount of information on British flags, telling us of their origin and going on to speak of their uses. Every page has its own special interest, and there is ample evidence of the author's familiarity with his subject and of his practical experience of flags and their uses.

There are two coloured plates, showing the development of the Union Flag and of the red, white and blue ensigns.

"THE ANIMALS OF BUTTERMILK HALL"

By KATE FLOYD MORTON
(Harrap. 5/- net)

Some of Kate Floyd Morton's animals are wild and some are tame, but from the mother bird of her first story to the little creatures of the world beneath the ivy, that provide the last, they are full of interest. The author lives in Derbyshire, where her family are known to have settled since Tudor times, and she has studied sympathetically the animals about her home, penetrating into their very minds.

Readers will learn to understand these animals from the author's stories of them. They will meet a stoat and a lame rook, a bob-tailed fox and a blue sheep dog rescued from a cruel owner, a pet lamb and a London pony that found a home at Buttermilk Hall; and they will revel also in the stories of such pests as a king rat and the mice that live in the thick walls of the old Hall. When they have read these tales they will be equally delighted with the discussion on the minds and senses of animals and birds with which the book is brought to an end.

Fine drawings by Mary Shillabeer add to the fascination of the book.

Photography

Table-Top Scenes

TABLE-TOP photography consists of arranging miniature models on a table or baseboard in such a way that they represent a scene, and photographing the assembly at close range to obtain the illusion of a full-size scene. It is an ideal pastime for winter evenings. Most of the simple materials required are ready to hand in the home, and only a little skill and ingenuity are needed to build up very realistic and charming scenes.

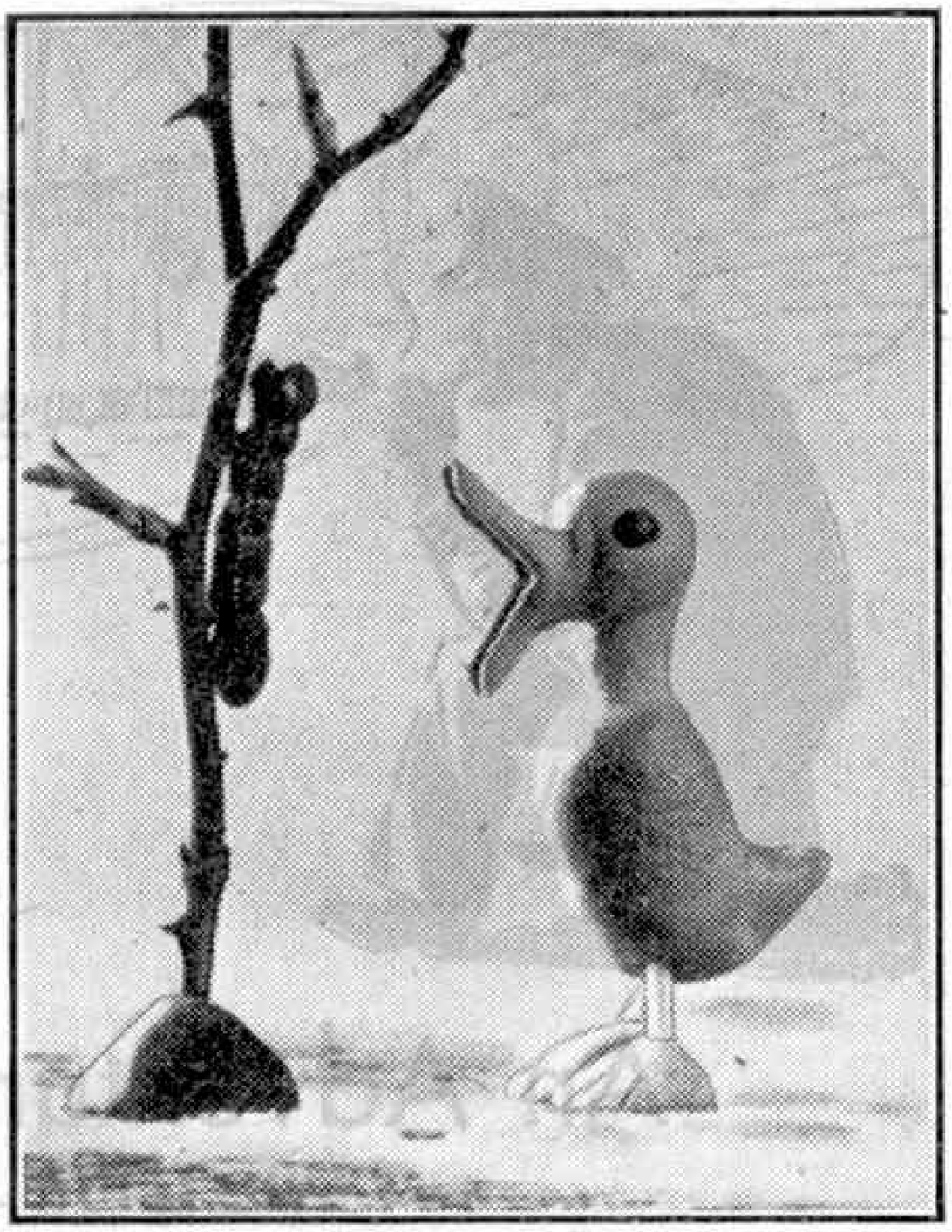


"A New Tale of Old Japan." This fine table-top photograph is by A. G. Dell, London S.E.27.

A small table can be used as the stage, but a baseboard about 18 in. by 12 in. is better. You may prefer to design your own scenery, but if not you can manage quite well by cutting out a suitable scene from some illustrated paper and pasting it on to a sheet of cardboard. Even a background consisting of a plain grey or buff card, in front of which the various items can be grouped to form a scene, is very effective.

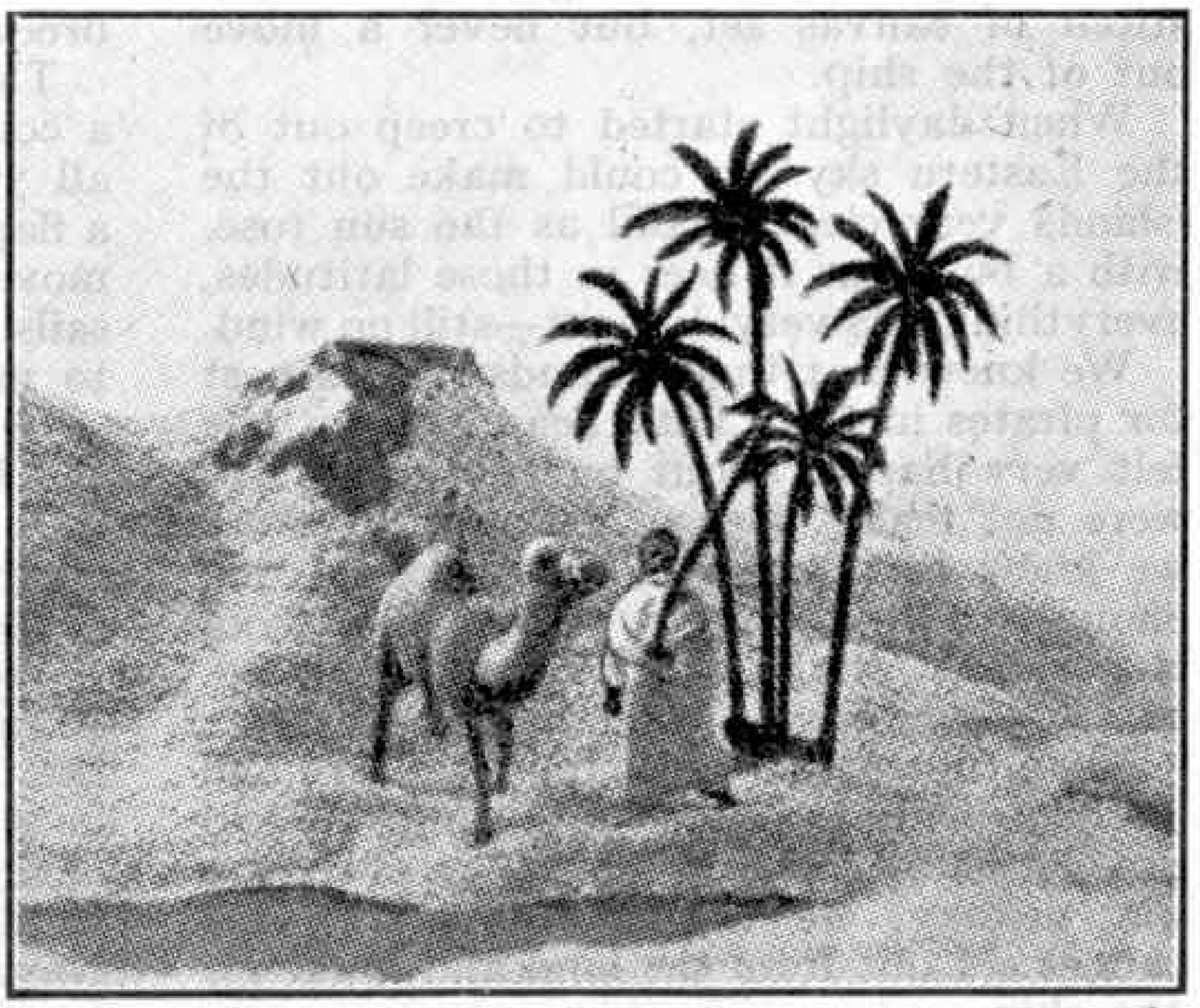
Meccano Dinky Toys motor vehicles are ideal for table-top photography, and small dolls, tiny ornaments or die-cast figures are excellent for "peopling" the scene. Small pieces of rock and stone can be used to represent crags and boulders, sawdust dyed green does for short grass and sand for paths, and twigs cut from bushes in the garden make excellent trees. Cotton wool does well for snow, and a coating of salt can transform any scene into a realistic miniature picture of winter. These are just a few ideas; others quite as simple will occur to you. It is almost as much fun experimenting to obtain the desired effect as it is taking and developing the photograph of the scene.

The camera must be used close to the subject, and sharp focussing is very important. A camera fitted with a focussing screen is the most suitable type for this work, but a box-form or other non-focussing camera can be used with good result if a portrait attachment is fitted to the ordinary lens. This will allow the camera to be placed at a distance of 3 ft. from the picture. This distance should be measured accurately from the camera lens to the main feature of the picture.

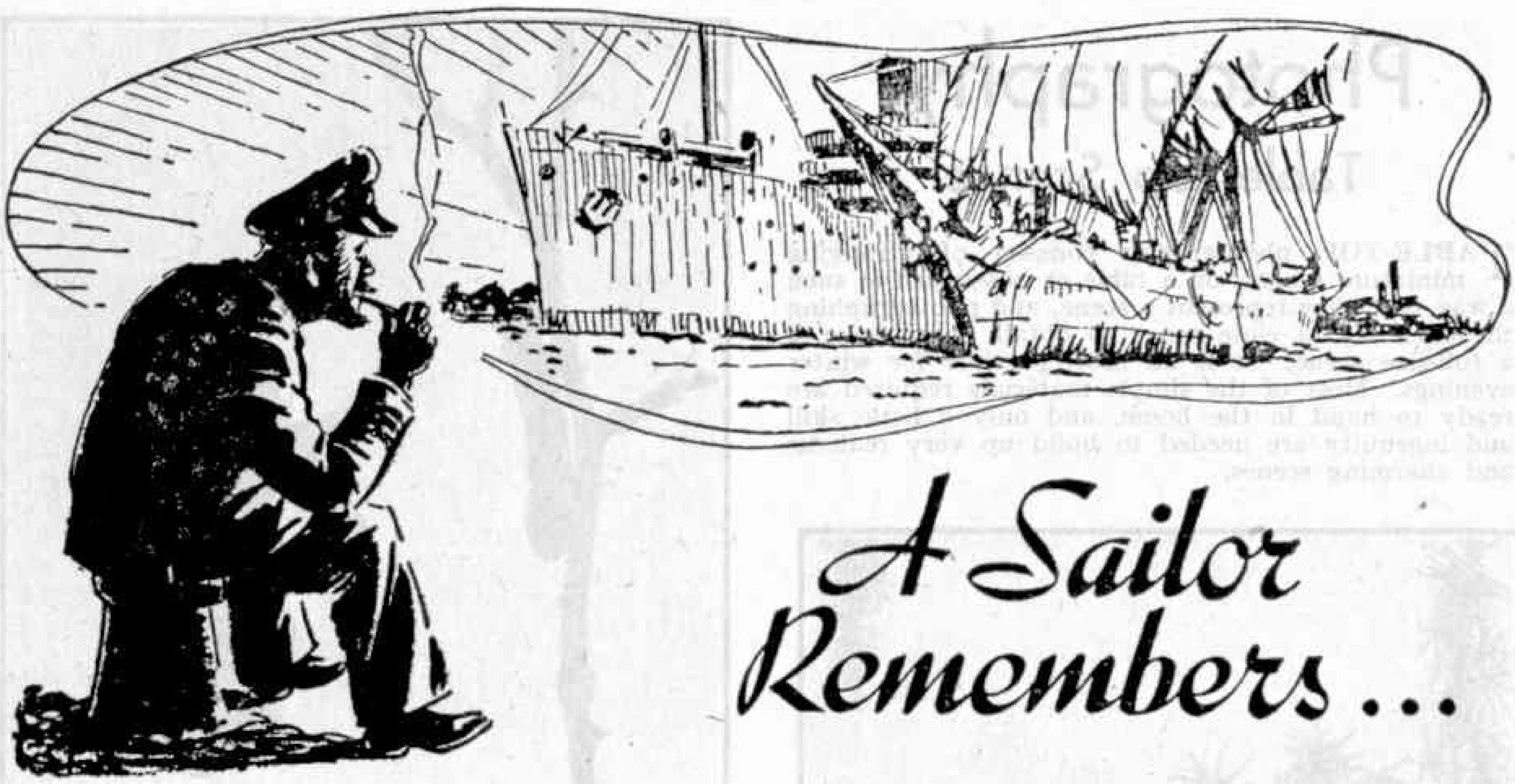


"The Early Bird." A humorous table-top subject by A. W. Bull, Beeston.

Good lighting also is most important. Table-top subjects to be photographed in daylight should be placed close to a window in such a position that the light comes from the side and slightly in front. For table-top photography by artificial light it is best to place the scene almost directly under a top light of, say, 60 watts, and have a second and less strong light to one side and slightly in front to avoid flat lighting.



"A Desert Oasis." Sawdust, pieces of rock and toy figures are used in this interesting table-top scene.



A Sailor Remembers ...

An Adventure with Pirates

By Capt. H. H. Neligan

ONCE upon a time, in the long ago, I was in one of those beautiful clipper ships bound to China. We were well on our way, and in the North Pacific Ocean, being helped on our journey by the fresh North East trade winds, and steering West for the port of Hong Kong.

One evening we sighted some islands away on our port side, so far off that we could only just make out the land. As the sun went down, so did the wind, and we lay in a dead calm all night, with every stitch of canvas set, but never a move out of the ship.

When daylight started to creep out of the Eastern sky we could make out the islands very clearly, and as the sun rose, with a burst, as it does in those latitudes, everything was very distinct—still no wind.

We knew that those islands were a nest for pirates in the China Seas, and no one felt very happy about our position. We were not really uneasy, however, because we knew that any wind that was strong enough to bring out a pirate junk from the islands would also be strong enough to take us away.

Then the unexpected happened. We had all been thinking of a junk, and we had not bargained for canoes. Presently, to our dismay, we saw about twenty big canoes set out from the land and make for the ship.

As we were still becalmed, all we could do was to prepare to defend ourselves by every possible means, for we knew what would happen to us if the natives succeeded in getting on board. Every gun and every weapon of any kind was got ready. As a final precaution every pot and pan that could be placed on the galley stove was filled with water and set on the range to boil, for even a savage cannot argue with scalding water. All this time the canoes were coming along at their utmost speed.

How we whistled and waited for a breeze!

The foremost of the canoes were only a couple of ship's lengths off, the savages all yelling and shouting, when there was a flap of our light sails. There was a faint move in the air at last! Then the heavier sails caught the wind, and the ship started to move.

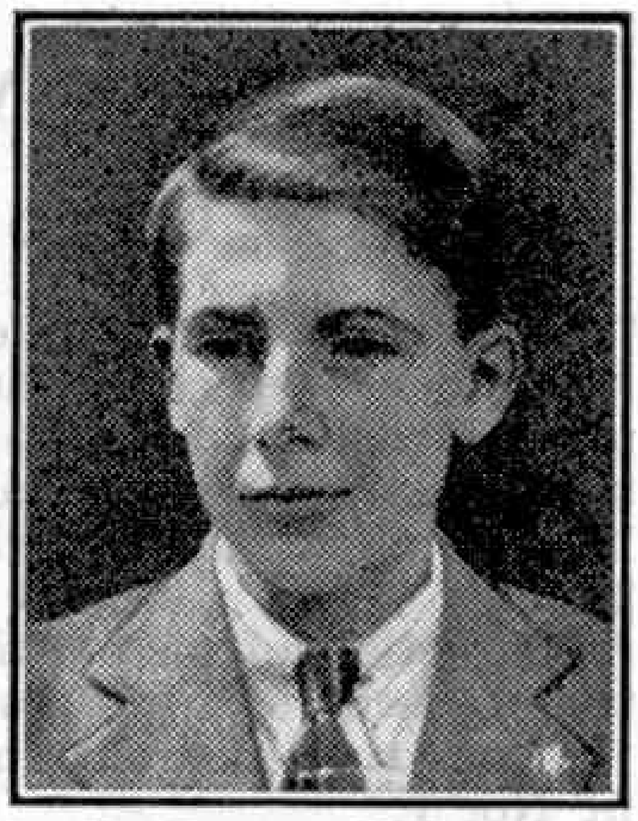
In the space of a few minutes we had the brave Trade Winds back again, and were bowling along in good style, leaving all that crowd of natives yelling with rage on being deprived of their prey.

We sailed on and arrived safely in Hong Kong, where the incident was reported to the Admiralty there. They sent a gun boat out, and before we left Hong Kong again I had the satisfaction of seeing one of the head pirates brought on shore under Naval Escort, taken up the Hill outside the town, and shot.

So ends an adventure with pirates.

Among the Model-Builders

By "Spanner"



P. R. Brown, Oldbury, nr. Birmingham, who won a Third Prize in a Meccano Model-Building Competition.

A Novel Rack and Pinion Drive

Machine tools make excellent subjects for Meccano models, but it is sometimes difficult to decide a suitable means of arranging the feed mechanism that forms a feature of many such machines. The most satisfactory method of constructing this is to use a Pinion meshed with a Rack Strip, but J. T. Morton, Ashby-de-la-Zouch, has devised a novel substitute making use of Sprocket Chain and Wheels.

The device is illustrated in Fig. 1, and consists of a length of Sprocket Chain fixed to a suitable bed. One end of the Chain is attached by opening out the end link and passing its lugs through a hole in the bed. The other end of the Chain is firmly tied by a short length of Cord or wire, but it is important to make sure that the Chain is tightly stretched and that side-play is reduced to a minimum. A Sprocket Wheel is then arranged so that its teeth engage the Chain, giving the same effect as the more usual Rack and Pinion.

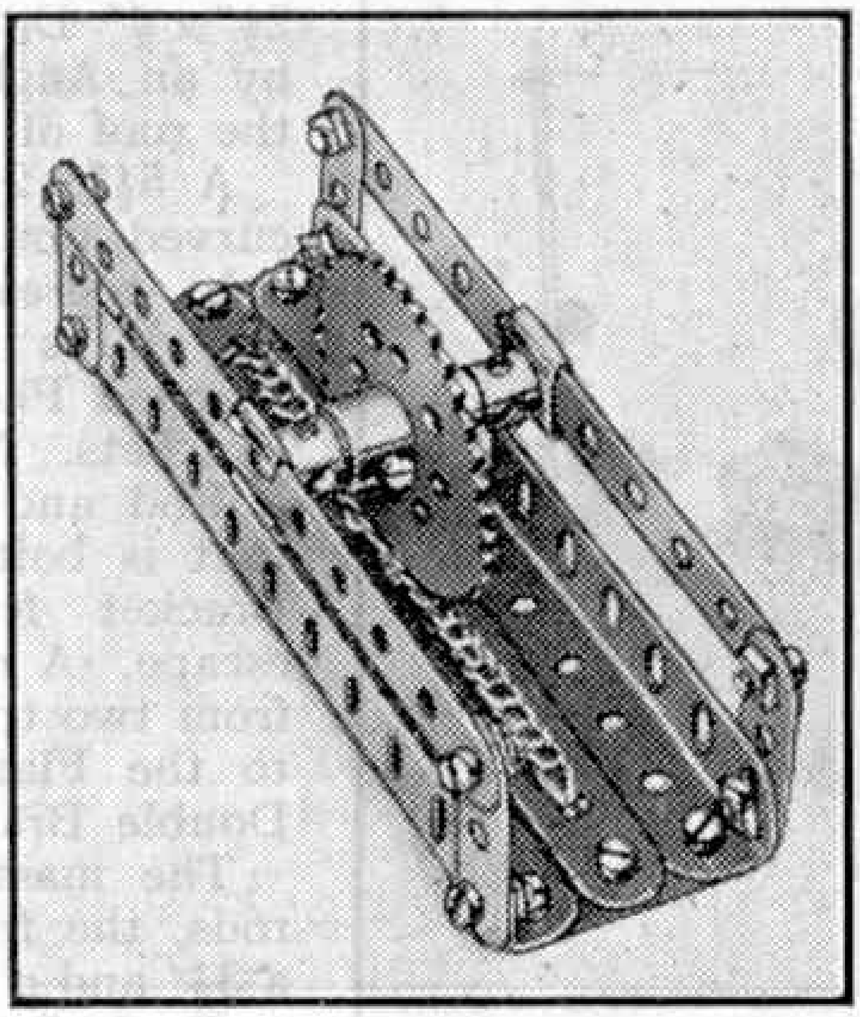


Fig. 1. A novel rack and pinion device using a Sprocket and Chain.

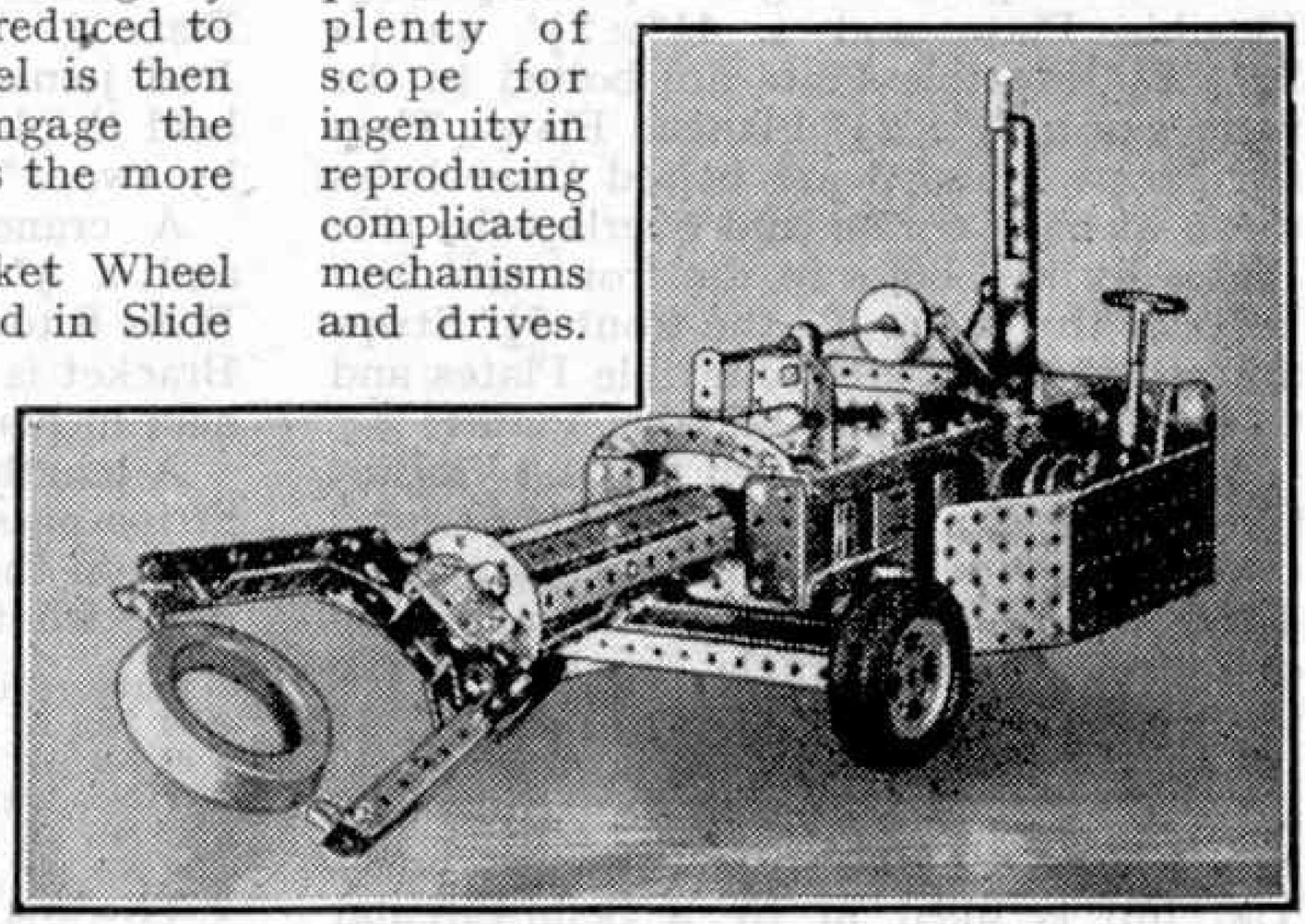
In the illustration the Sprocket Wheel is mounted on a short Rod held in Slide Pieces that are free to slide on 5½" Strips. In practice, however, the Wheel is mounted underneath the tool rest of the machine, so that by turning the Wheel the tool rest is carried along its bed.

An Interesting Model from Sweden

I received from J. M. Schenström, Surahammas, a Swedish engineer, who is also an old Meccano model-builder, photographs of a fine model steel furnace charger that he built recently. One of the photographs is reproduced on this page, and I think that model-builders on the look-out for unusual subjects will find it of interest. The charger is based on an actual plant manufactured by Wellman-Smith Owen Engineering Corporation Ltd., and is built to a scale of approximately 1 : 10. Mr. Schenström is the manager of the forging shop at a steelworks in Sweden, and he built his model for experimental purposes at the works. As a result of these experiments an order for an actual machine was eventually placed.

The model can make all the movements of an actual charger, and is very neatly constructed.

Models of this kind make a welcome change from the more usual subjects such as vehicles, locomotives and cranes, and they provide plenty of scope for ingenuity in reproducing complicated mechanisms and drives.



A model of a furnace charging machine used in iron and steel making. It was built by Johan M. Schenström, Surahammas, Sweden.

New Meccano Models

Cargo Boat—Galleon-type Sailing Ship

THIS month we give details of two new models specially designed for the many model-builders who like constructing ships. One of these is a fine cargo boat built from Outfit No. 3, which is illustrated in Figs. 1 and 2, and the other is a reproduction of an old-time galleon type vessel, seen in Fig. 3, which is designed for construction from the parts in Outfit No. 1.

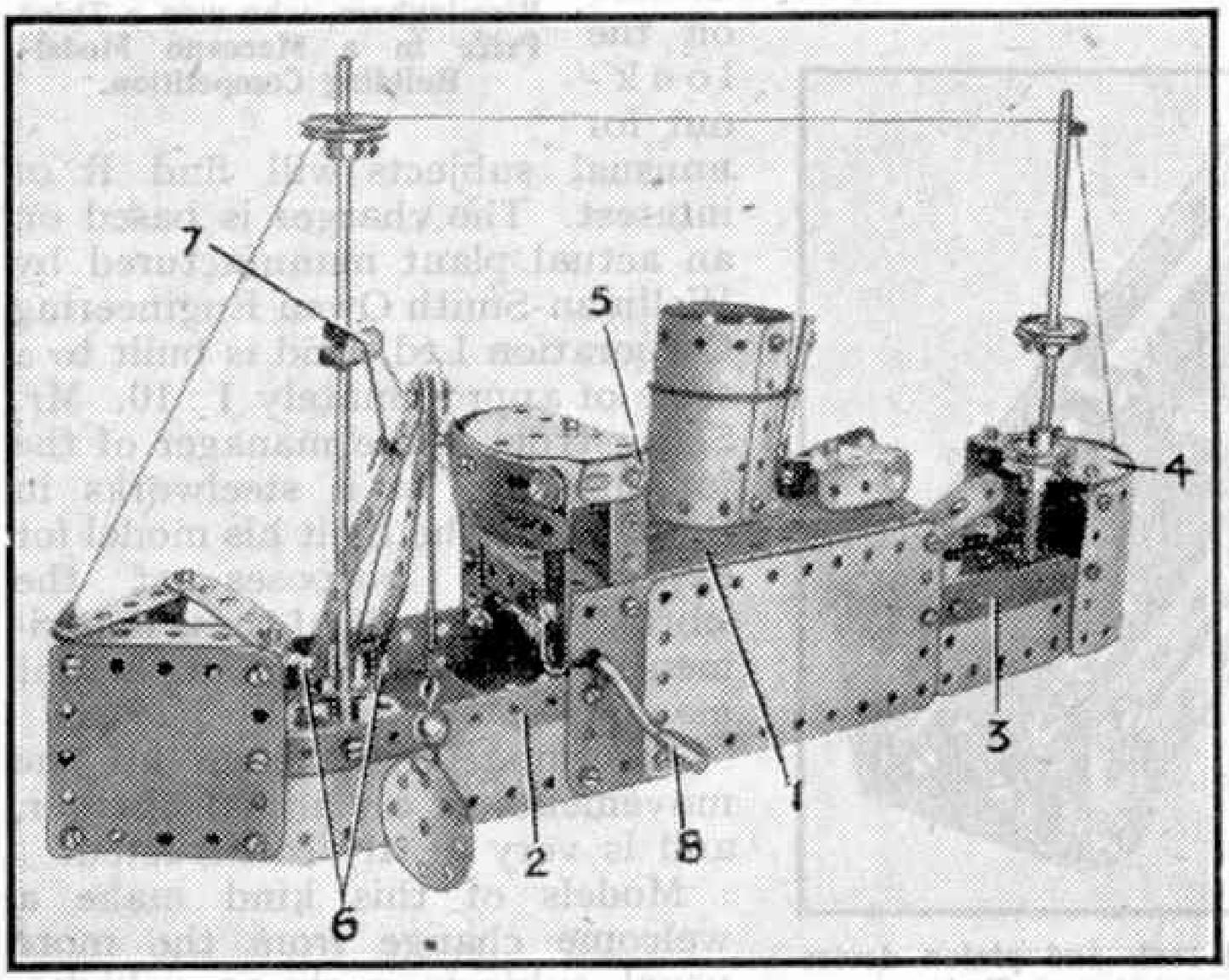


Fig. 1. A simple model cargo vessel, built from Outfit No. 3.

In building the cargo ship a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate and a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ and a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate are bolted to the flanges of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. Then $5\frac{1}{2}''$ Strips 2 and 3 are bolted three holes down at each corner and overlap the side Plates by two holes in the front and four holes at the back. To the front $5\frac{1}{2}''$ Strips are attached $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates and to the back $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates.

The fo'castle consists of two $1\frac{11}{16}''$ radius Curved Plates overlapping the $5\frac{1}{2}''$ Strips 2 two holes and bolted together as shown. Three $2\frac{1}{2}''$ Strips are attached to the top of the fo'castle by Angle Brackets in the form of a triangle.

The stern superstructure is represented by a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate curved and overlapping the $5\frac{1}{2}''$ Strips 3 by two holes. The top is filled in by a Semi-Circular Plate 4 attached to the $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Plate by two Angle Brackets.

A $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate 9 supported by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip covers the fore deck, while two U-Section Curved Plates and a $2\frac{1}{2}''$ Strip 10 cover the aft deck.

The bridge is made by bolting four $2\frac{1}{2}''$ Strips to the Flanged Plate and attaching to them a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 5 and a Formed Slotted Strip. A second Formed Slotted Strip is attached to the first by a Fishplate. A Semi-Circular Plate bolted to the $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip by an Angle Bracket forms the roof of the Bridge.

A $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate curved and overlapped one hole represents the funnel and it is attached to the Flanged Plate by two Angle Brackets. A 2″ Rod fixed in a Rod and Strip Connector that is bolted to the Angle Bracket forms the steam escape. A cabin constructed from two trunnions is bolted to the Flanged Plate by a Double Bracket.

The masts are compound rods, the front consisting of a $3\frac{1}{2}''$ and a 4″ Rod joined by a Rod Connector. It is mounted in a Bush Wheel that is bolted to the $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip supporting the Flexible Plate 9. The aft mast is a $3\frac{1}{2}''$ and 4″ Rod joined together by a 1″ Pulley and held in place in the Semi-Circular Plate 4 by two 1″ Pulleys.

A crane consisting of two $5\frac{1}{2}''$ Strips and a $\frac{1}{2}''$ Pulley is lock-nutted by the Bolts 6 to a Double Bracket. The Double Bracket is pivoted on the foremast and is held in place by a Cord Anchoring Spring.

A length of Cord tied to one of the $5\frac{1}{2}''$ Strips passes through an Angle Bracket 7 held on the mast by two Spring Clips and it is tied to the Crank Handle 8.

Parts required to build the model Cargo Ship: 6 of No. 2; 8 of No. 5; 3 of No. 10; 2 of No. 11; 8 of No. 12; 1 of No. 15b; 3 of No. 16; 1 of No. 17; 1 of No. 19g; 4 of No. 22; 1 of No. 23; 1 of No. 24; 5 of No. 35; 50 of No. 37; 6 of No. 37a; 4 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 1 of No. 57c. 2 of No. 90a; 5 of No. 111c; 2 of No. 126; 1 of No. 176; 1 of No. 186; 2 of No. 188; 2 of No. 189; 2 of No. 190; 2 of No. 191; 2 of No. 192; 2 of No. 199; 2 of No. 200; 1 of No. 212; 1 of No. 213; 2 of No. 214; 2 of No. 215.

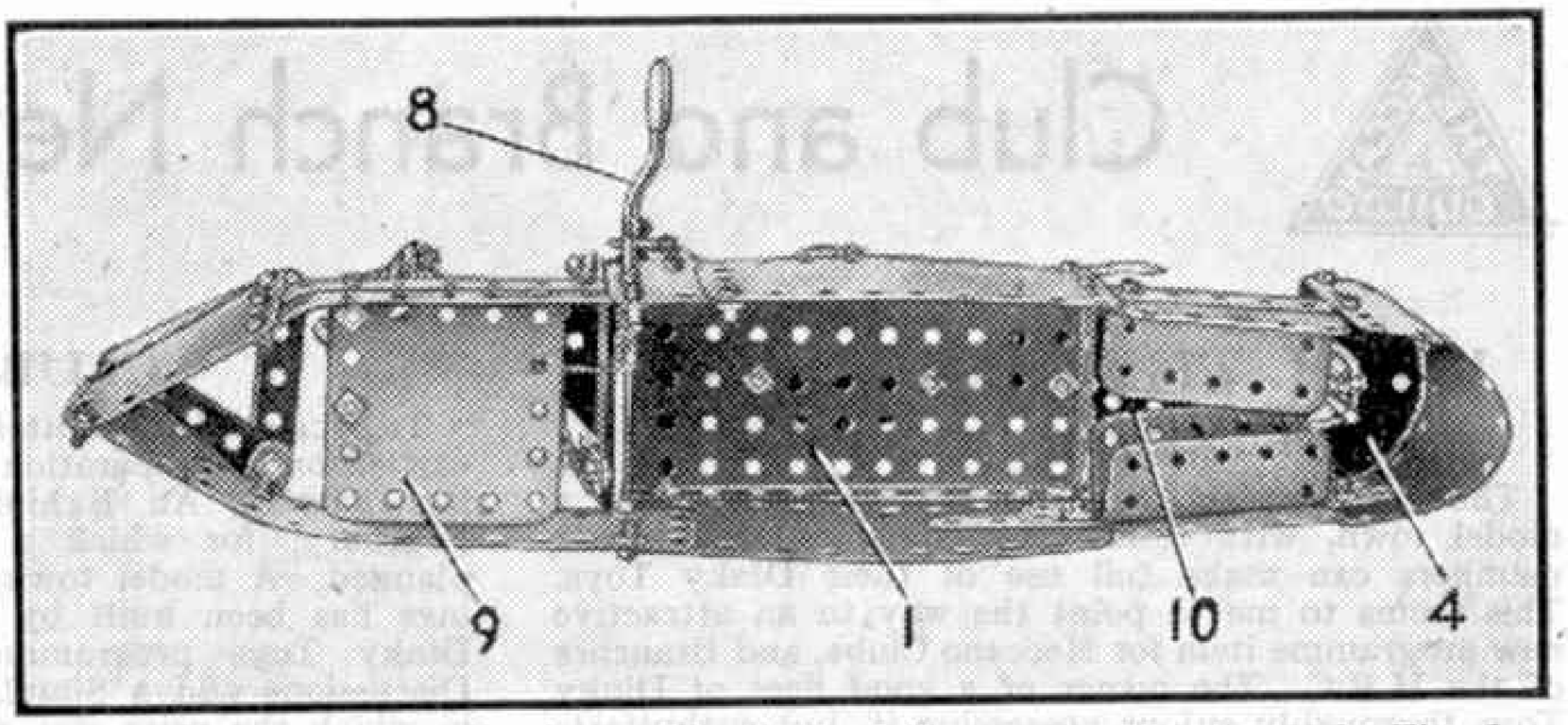


Fig. 2. An underneath view of the hull of the cargo ship shown in Fig. 1.

Galleon-type Sailing Ship

Owners of Outfit No. 1 will have all the parts required to build the interesting little galleon-type sailing ship shown in Fig. 3. The main part of the structure of this is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate 1 fixed flanges upward. This forms the main deck, and to its sides are bolted two $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates 2 to form the sides of the hull. At the bows two $2\frac{1}{2}''$ small radius Curved Strips are fixed as shown, and bolted to the forward end of the Flanged Plate 1 is a Trunnion 3 and a $5\frac{1}{2}''$ Strip 4 that represents a mast. The other mast is also a $5\frac{1}{2}''$ Strip, and it is bolted to a Trunnion 5 fixed to the Flanged Plate in the position indicated. The forward and the rear mast each carry two Fishplates 6 representing cross spars and the rear mast carries in addition a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 7.

A $2\frac{1}{2}''$ Strip 8 is bolted to the Flanged Plate at each side, and to each of these a $5\frac{1}{2}''$ Strip 9 and a $2\frac{1}{2}''$ Strip 10 is fixed. The bolts that hold the $2\frac{1}{2}''$ Strip serve to hold also a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 11. The stern end of the ship is formed by two Flat Trunnions. Through these passes a $3\frac{1}{2}''$ Rod 12, which is held by Spring Clips pressed against the Flat Trunnions.

Parts required to build the Sailing Ship: 4 of No. 2; 4 of No. 5; 4 of No. 10; 1 of No. 16; 3 of No. 35; 22 of No. 37; 2 of No. 37a; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 2 of No. 111c; 2 of No. 126; 2 of No. 126a; 2 of No. 189.

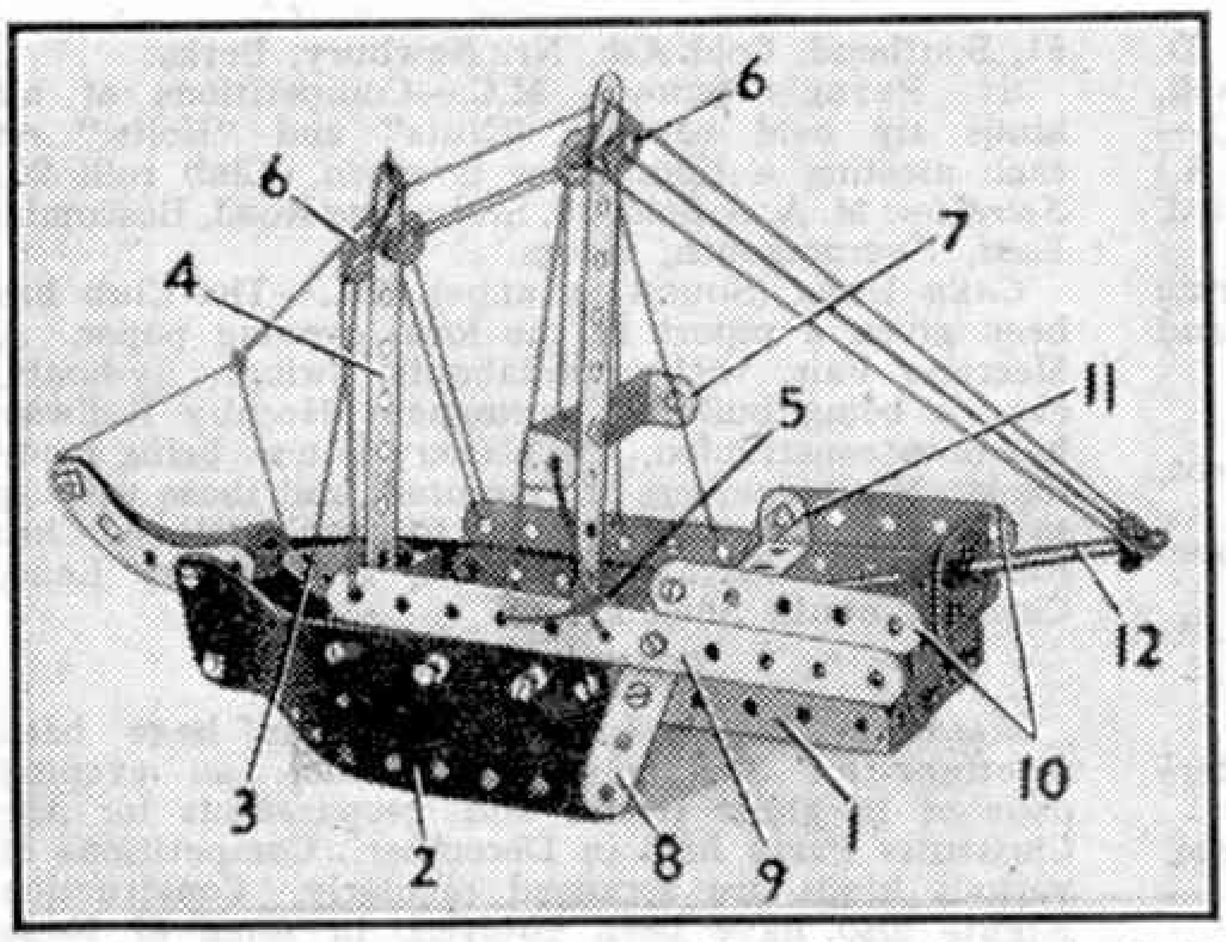


Fig. 3. A realistic galleon-type sailing ship. It can be built from parts in Outfit No. 1.

Fine Cash Prizes for Meccano Models

Fine cash prizes for models of any kind built by readers of the *"M.M."* are offered in the grand *"New Year"* Model-Building Competition, details of which are given here. There are no age limits and the only conditions are that models must be built from Meccano Parts and must be the unaided work of competitors themselves. There are no restrictions whatever on the kind or size of models that may be submitted.

The competition is divided into two Sections: A, for competitors of all ages living in the British Isles; B, for competitors of all ages living Overseas. The prizes to be awarded in each Section are as follows: First, Cheque for £3/3/–. Second, Cheque for £2/2/–. Third, Cheque for £1/1/–. There will be also five prizes each consisting of a P.O. for 10/6, and five prizes each of 5/–. Certificates of Merit will be awarded to competitors whose models in the opinion of the judges just fail to reach prize-winning standard.

Section A will remain open for entries until 28th February, but Overseas readers entering for Section B can send in their entries up to 31st May next.

Competitors should note that actual models must not be sent. A photograph or a neat sketch of the model, together with a few details of its chief features, are all that is required. Entries should be addressed *"New Year Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13."*

Illustrations of prize-winning models become the property of Meccano Ltd., and will not be returned. Prizewinners will be notified by letter.

Club and Branch News

WITH THE SECRETARY

DINKY TOYS LAYOUTS

The Secretary of the Thatcham M.C. has built a model town, with countryside surrounding, so that members can make full use of their Dinky Toys. This seems to me to point the way to an attractive new programme item for Meccano Clubs, and Branches of the H.R.C. The owner of a good fleet of Dinky Toys thoroughly enjoys possessing it, but enthusiasts get most fun from this hobby by making use of their possessions. At first they may be content with makeshift arrangements on the table, in which imagination plays a great part, but soon they begin to mark out roads on boards of some kind, and follow this by constructing buildings if a town scene is required, or fields and hedges if a countryside scene is favoured. As the road system is extended, roundabouts, halts and other features are introduced, and the running of Dinky Toys motor cars, buses and other vehicles is made more and more attractive.

MERIT MEDALLIONS FOR 1949

I am sorry to find that Leaders of Meccano Clubs are not yet making full use of the Merit Medallion. Good work on behalf of his Club by any member should be recognized, whether it consists of bringing in new members, helping to organize proceedings, suggesting new schemes of interest, or faithfully carrying out the aims and objects of the Guild in some way over a long period, and the Merit Medallion has been introduced for this express purpose. The judge of the work for which it is awarded is the Leader, who is in regular contact with his members and can best decide the value of their Club work.

I have pleasure in congratulating the following Club members on earning this award, the highest open to Guild members, since my last list appeared. BOSTON M.C.—K. J. Cross, P. E. Luff, R. C. Sharp, M. T. Ward; HUNTINGDON M.C.—T. Abbot, P. Burton, J. Cowling, T. Edwards, D. Fuller, F. Hodge, G. Hunter, P. Marshall, R. Newell, F. Young; MALVERN (JOHANNESBURG, S.A.) M.C.—D. Stocker, T. Tregear; MAYLANDS (PERTH, W.A.) M.C.—V. Chester, D. Coultas, G. Friend, K. Leppard, W. Sansam, A. Youens.

I urge Leaders to keep this award in mind during 1949, which should be a year of real progress and expansion in the Club world.

BRANCHES RECENTLY INCORPORATED

B.512—DIDCOT—R. Haskens, 20, South Road, Didcot, Berks.

B.513—HIGH BLANTYRE—A. McLachlan, 15, School Lane, High Blantyre, Glasgow.

B.514—MAGDALEN COLLEGE SCHOOL (OXFORD)—R. A. Bowen, 13, Richmond Road, Oxford.

PROPOSED CLUBS

LONDON—P. Sonneborn, 78, The Ridgway, Golders Green, N.W.1.

LONDON—M. Lustig, 33, Vincent Court, Bell Lane, Hendon, N.W.4.

LONDON—M. Rose, 13, Cresswell Place, S.W.10.

NOTTINGHAM — T. Thorburn, 12, Mabel Street, Meadows, Nottingham.

CLUB NOTES

THATCHAM M.C.—Intense model-building has been carried on in preparation for a Parents' Evening held last month. An Exhibition is to be held during February, for which a Hornby Layout has been planned. A model town with countryside surroundings has been built by the Secretary, and on this Dinky Toys programmes are carried out. Film Discussions and a Simplicity Model-building Contest in which the prize was a Dinky Toy also have been held. Club roll: 22. *Secretary:* B. M. J. Ambrose, 51, Southend, Cold Ash, Nr. Newbury, Berks.



A few members of the Magdalen College School (Oxford) Branch, No. 514, with Mr. Northover, its first Chairman. The President is Mr. R. S. Stanier, the Chairman Mr. G. Howden, and the Secretary R. A. Bowen. This Branch was incorporated in December of last year. Its meetings are held weekly in the School Physics Laboratory, where there is ample room for an extensive layout giving good track operation.

ST. PETER'S SCHOOL M.C.—Competitions of all kinds are held between "Nuts" and "Bolts." At each meeting a Film Show is given. Club roll: 26. *Secretary:* M. A. Arnold, 30, Seabourne Road, Boscombe East, Bournemouth, Hants.

CAER URFA (SOUTH SHIELDS) M.C.—The Club has been given a report in the local evening paper. A Meccano Fair, with roundabouts, swings, fly-boats, etc., is being built. A permanent Hornby Railway has been constructed, and scenery is now being made for it. More members are required, and those wishing to join should send a postcard to the Secretary. Club roll: 15. *Secretary:* G. Burrows, 113, Quarry Lane, Cleadon, South Shields.

SOUTH AFRICA

MALVERN M.C. — Interesting events have been meetings for Swimming and Games, an evening devoted to ghost stories and preparations for the Christmas Party held in December. Competitions of various kinds are arranged regularly. Construction Nights also have been enjoyed; in some of these members are arranged in teams. *Secretary:* K. E. Tanner, P.O. Box 8, Cleveland, Johannesburg.

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.

THE STORETON TRAMWAY

In 1837/8 a light railway was constructed from the Storeton quarries, in the Wirral Peninsula, through Bebington and what is now Port Sunlight to the Stone Quay at the mouth of the Bromborough Pool, on the River Mersey. The most interesting feature of this old Storeton Tramway, as it was originally known, is the old-time rails. These were bought secondhand. It is thought they came from the Liverpool and Manchester Railway, the first really complete railway in the world, constructed by George Stephenson, and over them the "*Rocket*" may have run on its epoch-making journeys in the thirties of last century.



A length of rail, of the early fish-bellied form, of the old Storeton Tramway. Photograph by Cyril R. Rowson, Liverpool.

The accompanying photograph shows a length of the Storeton rails, no longer in use, and they certainly agree in dimensions and style with the original Stephenson track of the Liverpool and Manchester line. They were of the fish-bellied type, and were not fastened to wooden sleepers, but spiked down to square blocks of stone. Some of these blocks can be seen in a wall close to the Storeton quarries. Practically all the old rails have now disappeared, but fortunately a short stretch has been preserved, at the point where the track crossed the Spital Road, close to Lower Bebington Church.

Many of Liverpool's public buildings were constructed of the Keuper Sandstone brought down by the Storeton Tramway from the quarries, which date back to Roman times.

CYRIL R. ROWSON (Liverpool)

AUSTRALIAN PARKS NAMED AFTER FAMOUS AIRMEN

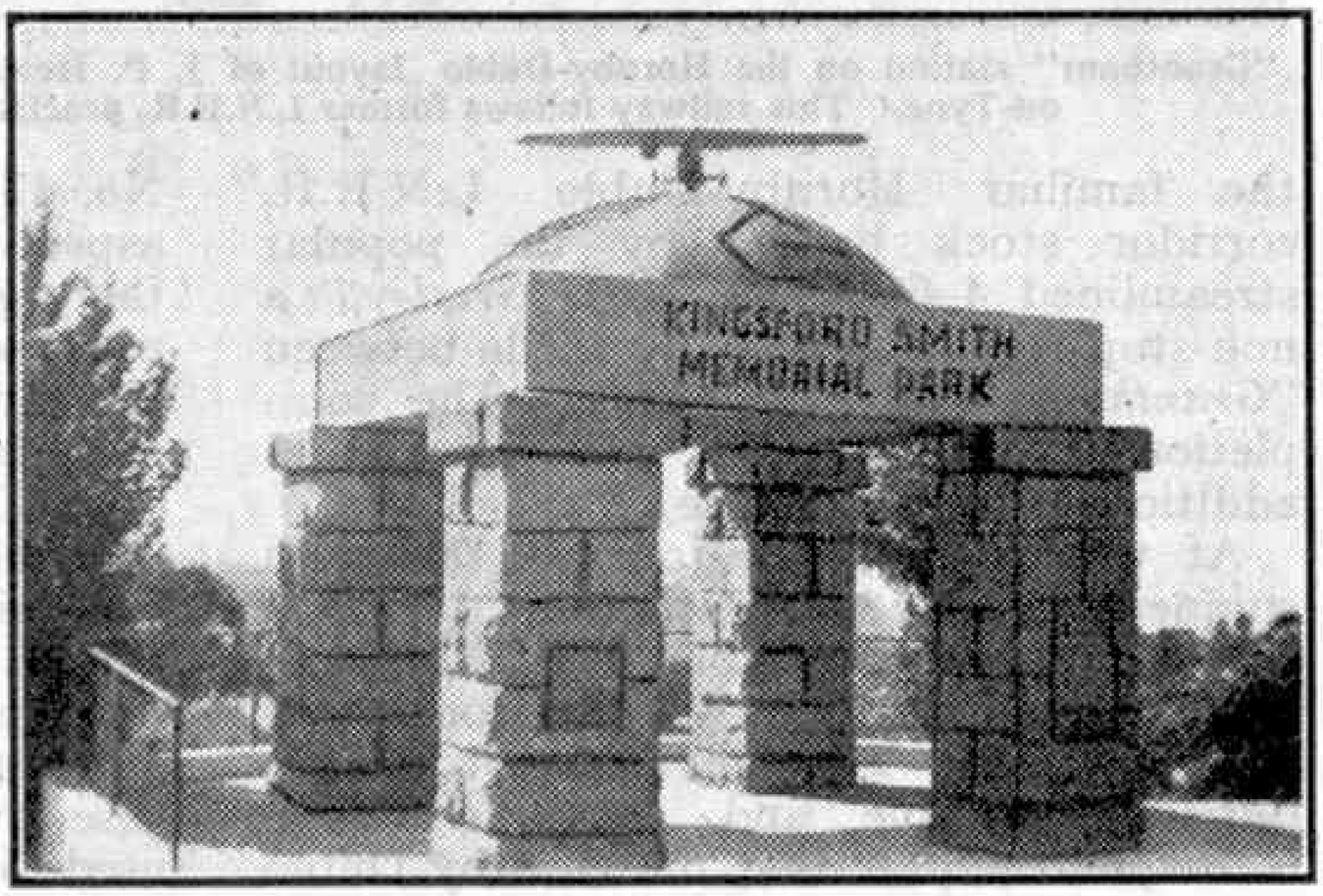
Two renowned Australian airmen, Sir Charles Kingsford Smith and Squadron Leader Bert Hinkler, are remembered at Katoomba, one of the Blue Mountain tourist resorts of New South Wales, Australia. The local Council have fittingly named two of their pretty park reserves after them.

"Kingsford Smith Park" was originally known by the name of "Hudson's Gully," and the site was formerly a dump for waste material, covered with blackberry bushes. Now it has been transformed into a reserve of absorbing beauty. It covers three acres and is in the form of a huge amphitheatre, or "bowl," with sloping sides. Two artificial lakes fit into its layout, in addition to a children's playing area, and there is also a band rotunda. The park was opened in January 1940.

On the upper level, above the entrance gates, is a small-scale model of the world-famous monoplane "Southern Cross," in which "Smithy," as he was familiarly called, made his world-wide flights. The aircraft hovers over a globular map of Australia, symbolizing the airman's numerous Australian aerial ventures. He made the first crossing of the Pacific by air, and also made record flights between England and Australia. It is believed that he lost his life in the Bay of Bengal while attempting another record flight.

The second reserve, named after Bert Hinkler, was dedicated on 27th November 1934. Flowers, shrubs and trees adorn the area, which includes also a children's playing ground. An artificial lake and attractive shelters are provided, and a commemorative plaque near one of the entrances records that the park was officially opened by Hinkler's mother. Hinkler achieved fame in 1928 by flying from England to Australia in a light aeroplane in 15½ days. He met his death in the Italian Alps during a further attempt on this record.

K. ALLEN (Oatley, N.S.W.)



A Kingsford Smith memorial at Katoomba, New South Wales. Photograph by K. Allen, Oatley, N.S.W.

To "*Newcastle*" by Hornby-Dublo

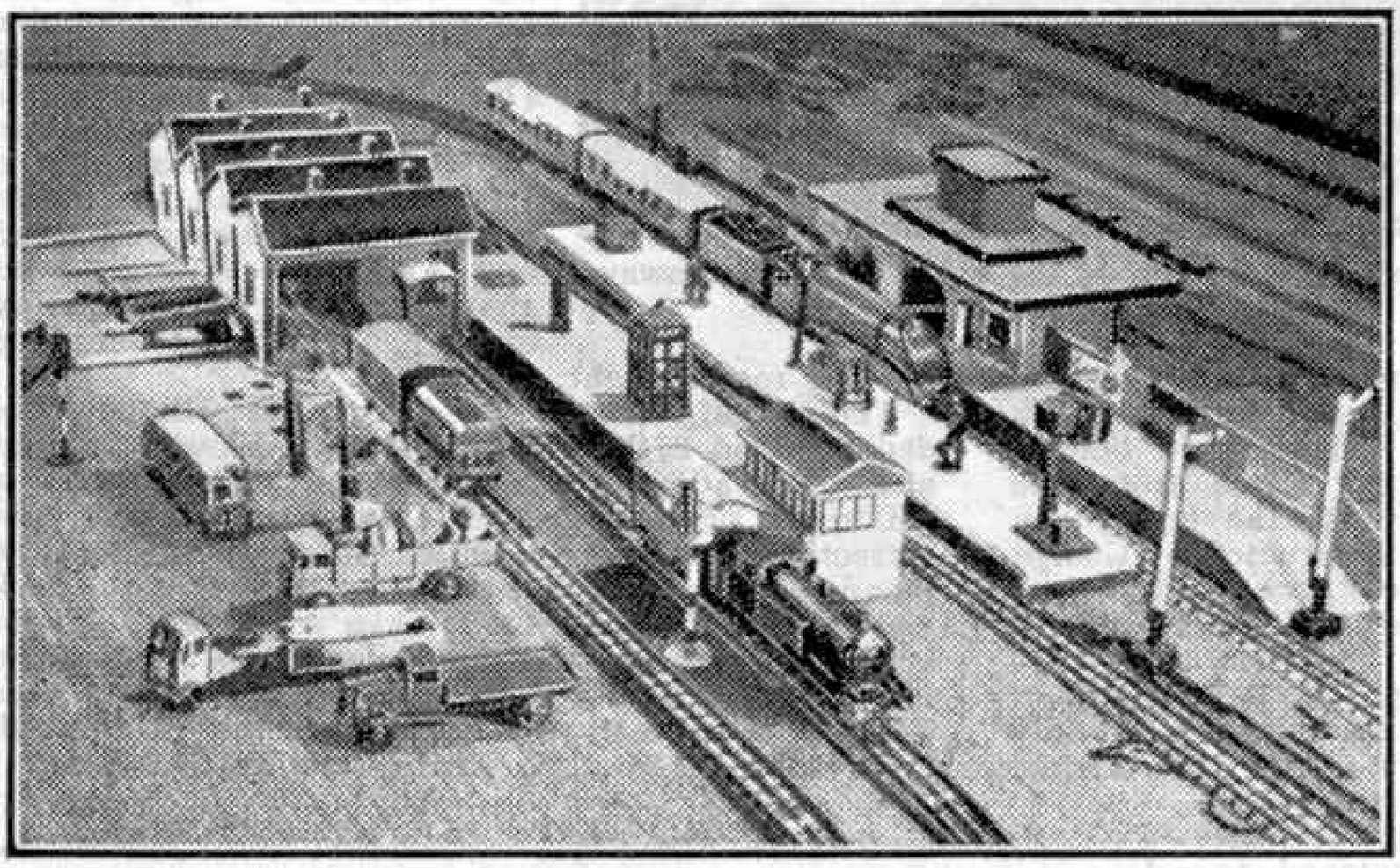
AS might be expected from its situation, the Hornby-Dublo layout of J. P. Heald, Newcastle-on-Tyne, represents part of the main line of the former L.N.E.R. The accompanying photograph shows "*Grantham*" station on this miniature East Coast Route. The layout, for the time being, is situated on the floor, but a scheme is afoot to provide a raised substructure or a suitable table when possible. The railway itself is simple and the equipment generally is not elaborate. Most of the buildings have been made at home and the general effect of the line is quite good, as the photograph shows.

"*Grantham*," "*Darlington*" and "*Newcastle*" are the chief traffic centres, the miniature "*Darlington*" being under construction at the time of writing. A typical express run involves the use of the familiar Hornby-Dublo L.N.E.R. corridor stock hauled by the popular streamlined 4–6–2 "*Sir Nigel Gresley*," a non-stop run being usually made between "*Grantham*" and "*Newcastle*." The completion of "*Darlington*" will provide an additional stopping place.

At the end of each journey the train engine invariably shunts its train. Although there is a Hornby-Dublo 0–6–2 Tank in service it is kept busy with local and goods traffic. This division of engine duties is simple and convenient and is frequently practised on Hornby-Dublo railways.

There are various realistic touches in evidence here and there on the layout and its equipment. A tunnel is situated between "*Darlington*" and "*Newcastle*" and near one end of it the general scene is improved by the use of suitably coloured fabric laid over various shapes to represent cuttings, banks and so on. In this setting a surfacemen's hut, a typical structure with brick chimney at one end, and some of the Hornby Trees available in pre-war days, look most real.

The imitation coal provided on the tender of the 4–6–2 has had a small quantity of real coal added on top of it, giving the well-heaped-up effect seen nowadays on actual tenders. Neat and realistic destination boards have been added to the coaches and they can just be distinguished under the edges of the coach roofs in the illustration.



"Grantham" station on the Hornby-Dublo layout of J. P. Heald, Newcastle-on-Tyne. This railway follows former L.N.E.R. practice.

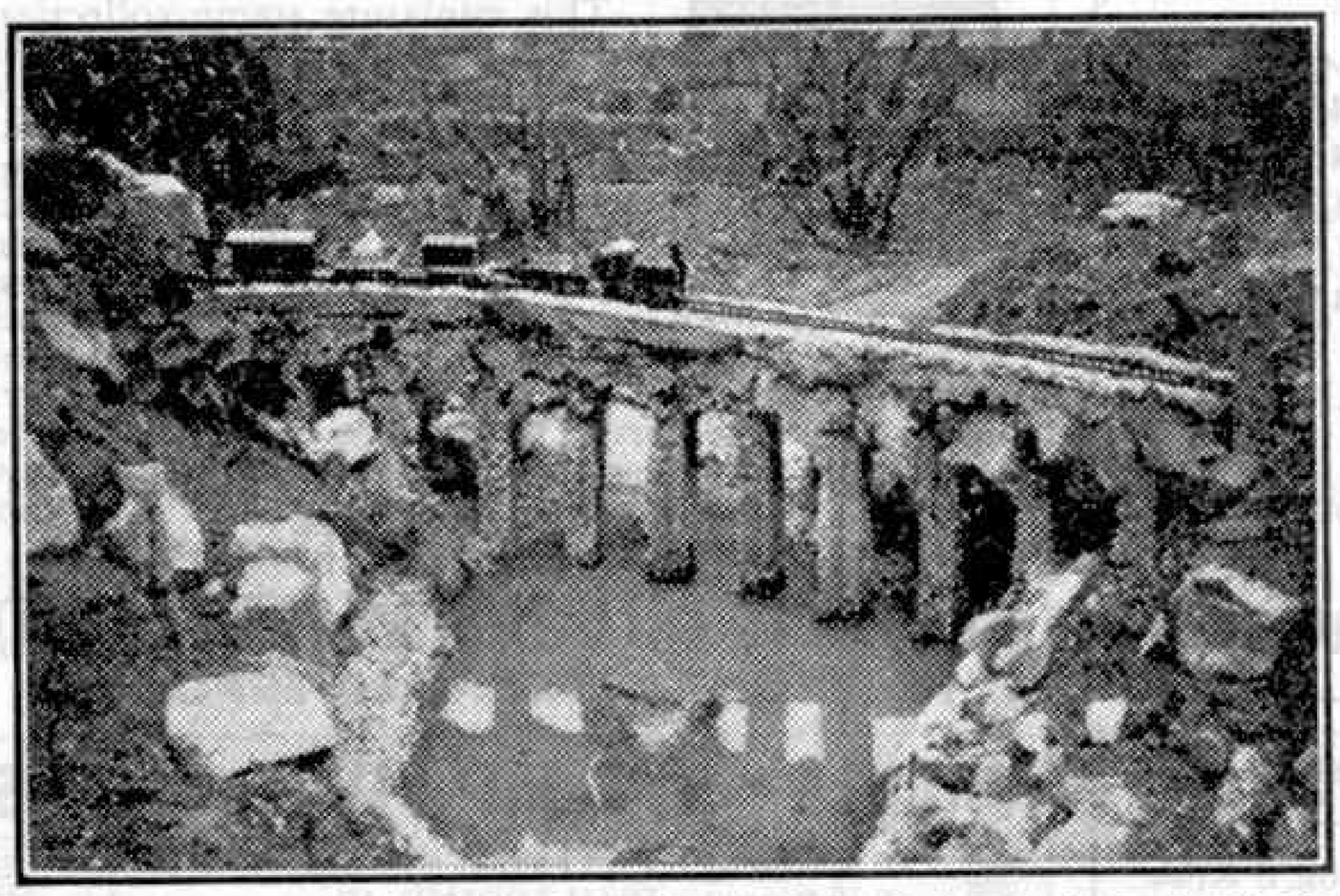
Particularly good use is made of Dinky Toys, as has been suggested on many occasions in these pages. Various motor vehicles are used on and around the railway. Miniature crates and bales and such regular freight items as a load of timber appear on some of the motors shown in the "*Grantham*" goods yard.

An interesting adaptation of a road component to railway purposes is the use of a Robot Traffic Signal (Dinky Toys No. 47y). This makes quite a good three-aspect colour light signal and is just about the right size for Hornby-Dublo railway purposes. Such signals do not "work" in the same sense as the standard semaphore type but they look particularly effective on a Dublo layout.

If the signals are to be used permanently for railway purposes alone, the orange beacon on top of the lamp case is easily removed. Similarly, the half-round hoods above the "lenses" on one side of the lamp case are not required if the signal is to be used for one-way traffic, as is usual in railway practice. The hoods not required can be filed off.

Two Readers' Hornby Railways

THE Hornby railways illustrated on this page provide some interesting comparisons. One shows an indoor system representative of so many Hornby layouts, that are put down for running and have to be taken up again afterwards.



An outdoor concrete viaduct on the Hornby layout of Capt. M. B. Walker, Braunstone.

The other shows an outdoor Hornby system developed specially to represent a railway in the Scottish Highlands.

Special attention has been given on both these layouts to lineside features. Those of the indoor system can readily be varied according to layout requirements, in contrast to the more or less permanent "Highland" characteristics of the outdoor railway.

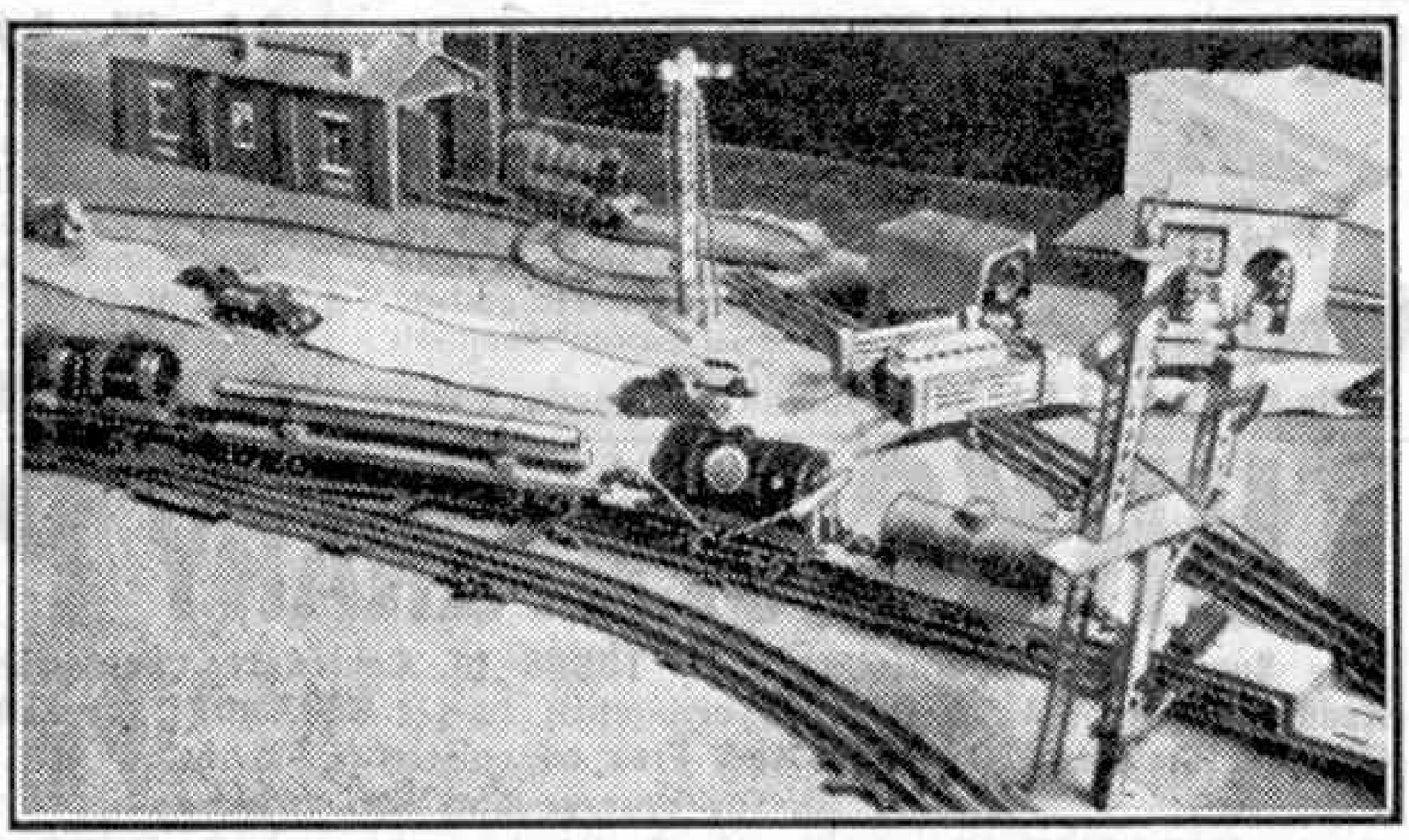
The indoor layout has a continuous main line with various sidings, and a short branch and turntable giving access to an engine shed. This line is owned and operated by our reader R. J. Maltby, Epsom Downs, who is fortunate in possessing a good selection of the Hornby stock available before the war. A large E220 Special 4–4–2 Tank is the principal engine, especially for passenger working.

Roads in the neighbourhood of the line are represented by lengths of paper cut to a suitable width and shape, coloured and laid out on the floor. The same scheme also allows a "Canal" complete with a dummy power boat and two barges to be represented.

The other layout is situated in the front garden of its owner, Capt. M. B. Walker, Braunstone. This railway is known as the *"Caledonian and Hebrides Union Railway"* and is a single-line system. Quite appropriately the special character of the line is matched by its unusual railway buildings and other lineside features.

This is how the owner describes the railway: "After leaving Applecross on the coast, where travellers from the Hebrides entrain, the line travels by Glen Torridon, winding through Strath Glass before tunnelling towards Loch Garry viaduct. This eleven-arch miniature is based on the real Glenfinnan viaduct on the West Highland line from Fort William to Mallaig. Another tunnel takes the line to Black-mile Pass, a mountain station with a branch over which merchandise is trans-shipped from the nearby 'Caledonian Canal.' The track returns down Glen Shiel and Strathcarron to Applecross. Here there are three platforms, a siding and a turntable.

"The view of the viaduct shows a typical mixed train including some pre-war Hornby stock headed by an 0–4–2T. This engine is a Hornby No. 1 Tank modified by a more ornate chimney."



An indoor view of a Hornby layout. This is an electric system owned by R. J. Maltby, Epsom Downs.

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For other Stamp Advertisements see also pages 82 and xi.

Stamp Collecting

The Story of Newfoundland

By F. Riley, B.Sc.

NEWFOUNDLAND is specially interesting in the stamp world just now, for the island is about to become one of the provinces of Canada, and this can be taken to mean that its individual stamp history of 91 years will come to an end. The island has many claims to distinction. It was actually Britain's first colony, founded in 1583 by Sir Humphrey Gilbert, and it has been associated with such outstanding events as the completion of the first Atlantic cable, the pioneer experiments of Marconi, the founder of modern wireless telegraphy, and the earliest transatlantic flights.



The stamps of Newfoundland cover a very wide range, and tell us much about the island and its story. The practice of doing this through stamps began 83 years ago with the appearance of designs showing a codfish and a seal on an icefloe, and both cod and seal have been prominent on Newfoundland stamps at intervals ever since. The island is famous for fishing, for to the south are the inexhaustible Grand Banks, perhaps the greatest fishing ground in the world. The single codfish of the 1866 stamp appeared again in a different frame in 1880 and in a later issue, and in 1932 a whole pile of codfish came along on the 1c. stamp of that year's pictorial issue, a stamp that must be well known to every *"M.M."* reader. There was a different single fish in 1937, again on the 1c. value, and the pile returned in 1941–44. In various issues the Grand Banks fishing fleet also received recognition, while seals and sealing fleets continued the story on stamps of Newfoundland's other famous maritime enterprise.



Fish and seals are not the only creatures for which Newfoundland is famous. Another is the caribou, the Arctic deer, which made its first appearance in 1897. It was next prominent in the 1919 series, commemorative of the Newfoundland contingent in the first World War. Another caribou design appeared on the 5c. value of the 1932 issue, and this was repeated in 1941–44, while in the meantime the caribou had been the subject of the 7c. stamp of the additional Coronation issue of 1937. The salmon abundant in the rivers of Newfoundland received recognition on stamps of 1932, to reappear in later issues. The island's forests also have yielded stamp designs featuring logging and paper mills.

Many famous men have been associated with Newfoundland since John Cabot first sighted it in 1497. This event was commemorated in 1897 by a special issue that also marked the Diamond Jubilee of Queen Victoria. A portrait of Cabot appeared on the 2c. value; Cape Bonavista, his landfall, was seen on the 3c. value, and his ship *"Matthew"* was shown leaving the Avon on a third stamp of the issue, which also included a portrait of Henry VII, who commissioned Cabot's voyage of discovery. The 450th anniversary of his achievement was celebrated in 1947 by the issue of a 5c. stamp showing the discoverer on board his ship off Cape Bonavista.



The next great name to be associated with Newfoundland was that of Sir Humphrey Gilbert, the famous Elizabethan sailor who took possession on behalf of Queen Elizabeth in 1583. Gilbert's portrait appeared on the lowest value of the issue commemorating the 350th anniversary of this event, and the remaining issues showed various scenes in connection with it, a portrait of Queen Elizabeth herself gracing the 24c. value.

Another British monarch to have his portrait on a Newfoundland stamp was James I. This appeared in 1910, in a set celebrating the colonization of the island by an expedition under John Guy, whose portrait appeared on one of the stamps of the issue, his ship and the arms of his company showing on others. One stamp of this issue carried the portrait of Sir Francis Bacon, the famous philosopher.

The 5c. blue stamp of December 1941 is yet another that carries the portrait of a famous man associated with Newfoundland. This is Sir Wilfred Grenfell, the great missionary of Labrador, which is on the mainland of North America but is part of the territory of Newfoundland.



And now we must turn to another aspect of Newfoundland stamps that is of outstanding interest of a more modern type. A guide to this is to be found on a stamp of 1931 that shows the routes followed on famous pioneer transatlantic flights from Newfoundland to Europe. The island was the natural starting place for these, which were made from west to east in order to take advantage of prevailing winds. With these flights the names of H. G. Hawker and M. Grieve, and of Sir John Alcock and Sir A. Whitten-Brown were associated. Hawker and Grieve were not successful, their aircraft failing in mid-ocean, but the two airmen were rescued by a passing steamer. Alcock and Brown were successful two months later, in June 1919. In both instances stamps of Newfoundland with special overprints were used for mail carried on the flights. This practice was followed with later transatlantic flights, and one of the stamps of the "Publicity" issue of 1928 showed the aircraft of Alcock and Brown, a converted Vickers "Vimy" bomber, which also appeared, along with an early sailing packet, on a 1931 air stamp.



FOUR RUSSIA Free



We will send you **ABSOLUTELY FREE** to add to and improve your collection a set of four valuable **RUSSIAN** stamps which have a catalogue value of **3/4.** These very interesting stamps were issued in 1929, and depict various Russian workers. They show a Parachutist (with aeroplane in background), a Soldier (Infantryman with helmet, rifle and pack), a Riveter (with his riveting machine) and a Factory Girl. Three of these stamps are illustrated here. **All these 4 stamps**—worth **3/4**—will be **sent to you Absolutely Free,** together with our Windsor approvals. No obligation to purchase from approvals. You must however, send 3d. stamps for our postage to you of our approvals and this stupendous free gift. Send now.

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S. G. Large Cata. Nos. Mint Marked * Postage Extra. Cash with Order.

1d. ea. 1, 2, 12, 13, 36, 47, 53, 71, 72, 74, 75, 76, 79, 89, 92, 93, 96, 98, 105, 107, 109, *111, 111, 112, 113, 114, 115, 116, 126, 128, *129, 129, *130, 131, 132, *133, 133, 135, 136, D2, D3, *D5, D5. **2d. ea.** *1, *36, *47, *52, 52, *71, *72, 73, 78, 80, 82, 94, *112, 117, 118, *D1, D1, *D6, D6, D7. **3d. ea.** *53, 55, 74A, 77, *113, *114, 119, 122, *126, 137, 138, *D2, *D7. **4d. ea.** *2, *49, 49, *73, *74, *89, *92, *93, *94, *96, *98, *105, *107 *109, *115, *116, 120, *128, *130, *132, *135, *136, *138, 139, 141, *D3. **6d. ea.** *54, 54, *55, *71A, 71A, *72B, 72B, *75, *76, *90, 90, *95, 95, *97, 97, *106, 106, *108, 108, *110, 110, *117, *118, 134, *139, *141. **9d. ea.** *12, *13, 38, 60, *74A, *77, *119, 121, *137, *142, 142, *D4, D4, *D8, D8. **1/– ea.** 5, *22, 33, 39, *58, 58, *78, *79, 81, 91, *120. **1/3 ea.** 22, *38, 39, *56, 57, *60, 63, *80, *121, *122, *134. **1/6 ea.** *4, *6, 6, 15, 56, *57, *59, *91. **2/– ea.** 4, *23, 23, *33, *40, *61, *62, *63, *81, *82, *127, 127. **2/6 ea.** *7, 7, 40, 61, 123. **3/– ea.** *5, *9, *41, *42, *102, *123. **3/6 ea.** 9, 41, 102. **4/– ea.** *8, 37, 42, 62. **4/6 ea.** 8, *15, 25, 124.

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For other Stamp Advertisements see also pages 80 and xi.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

PERHAPS the most interesting colonial novelty issued since these notes were last written has been the Malta set, which appeared overprinted "*Self Government*" on 25th November. Only older collectors will remember the furore created when Maltese stamps were similarly treated some years ago. Many of these latter stamps are valuable to-day, so it is only natural that there has been a big rush to obtain specimens of the new stamps. The overprint is in black on some values and red in others, and whereas collectors can hardly expect these stamps to become as scarce as the previous ones have done they will certainly be worth collecting from an investment point of view.



Egypt generally manages to keep in the stamp news and has done it again by issuing on 10th November a 10 mills stamp in honour of Ibrahim Pasha, who was an ancestor, the great-great grandfather to be exact, of the present King of Egypt, King Farouk. It is just possible that there are one or two readers of the "*M.M.*" who are as ignorant as to the identity of the Pasha as was the writer of these notes before looking the matter up. Anyhow, he is credited as being the builder of modern Egypt, which is one way of describing a warrior. The stamp is quite handsome and typical in design of modern Egyptian stamps.



One result of the cancellation of the King's visit to Australia and New Zealand was the cancellation also of the two sets of stamps that were to have been issued in honour of the event. Maybe there are enough new stamps anyhow, so a couple of sets won't be missed. It is not generally known what the designs were to have been for the Australian set, but pictures of those for New Zealand were published, and two of the four stamps at least looked pretty moderate, though they could hardly have been as poor as those recently issued for Bahamas.

A sheet of the 2½d. "Silver Wedding" stamps overprinted for use in Tangier has been found with the overprint misplaced. This has resulted in the six stamps of the top row being without an overprint at all, and the rest of the stamps in the sheet have the overprint at the top instead of the bottom. Two collectors want to know what is the philatelic value of these latter stamps, and there may be others who are wondering. To be quite candid, precious little. The two top rows of the sheet, which will have one stamp in each pair without an overprint at all, are interesting enough, but the rest are small fry indeed, for it is not likely that Gibbons will ever catalogue them, and after the novelty has worn off interest will mostly die away.



These particular stamps have been mentioned to illustrate a point of considerable interest at the moment, with so many varieties flying about. Hitherto few errors have cropped up on British stamps, but recently several have appeared, such as the two sheets of "Olympic Games" stamps with the double overprints; and while in pukka errors of this special type—we say pukka, for many so called double overprints are actually nothing of the kind—we have a philatelic variety that is of major importance and thus is valuable, such a thing as a misplaced overprint is something entirely different, and whatever price these items bring in the first place they ultimately find their true level. Those who have rushed in and paid a fancy figure will rue their bargains later on.



Australia issued a winner when the "Scout Jamboree" stamp appeared on 15th November. It is a pity that the stamp wasn't a bit larger, for the design is attractive enough, though the colour is dingy red, and the fact that it was printed on watermarked paper is interesting, in view of the recently issued Princess Elizabeth stamp, which is now on unwatermarked paper.

The stamp appeared in plenty of time for use in the special post office opened on 29th December at the Wongo Park Camp. Many Boy Scouts are keen stamp collectors, and they must feel honoured at the philatelic attention their craft receives. There is news that the Philippine Republic plans to issue two stamps shortly to commemorate the 25th anniversary of their own Scout Association.

Figures have been issued by our postal authorities of the numbers of "Wedding" stamps which were sold. Apparently the figure for the £1 value was 419,628 copies. One or two contemporaries have stated that this is not a substantial quantity, and that in consequence the stamps will turn out scarce. We don't believe it, for there was hardly a collector who didn't buy from a single copy to a few sheets, and most of these will find their way back on to the stamp market one fine day. There are relatively few used about, which helps to prove how many are held for speculation. At the same time, the fact that the public did not use many for ordinary commercial postage does not mean that a £1 stamp is not needed. It takes the public a long time to adopt a new value, no matter how useful. An instance of that is the 11d. stamp. Used copies are scarce, yet parcels are still being sent with two stamps to make up 11d. postage.

We seem to have talked about nothing but our own British or colonial stamps this month, but it is just these stamps which engage the attention mostly of collectors who are likely to read these notes. One dealer tells us that all his young customers to-day demand colonial stamps, but we cannot overlook the attractive Dutch Child Welfare set which came out in November.

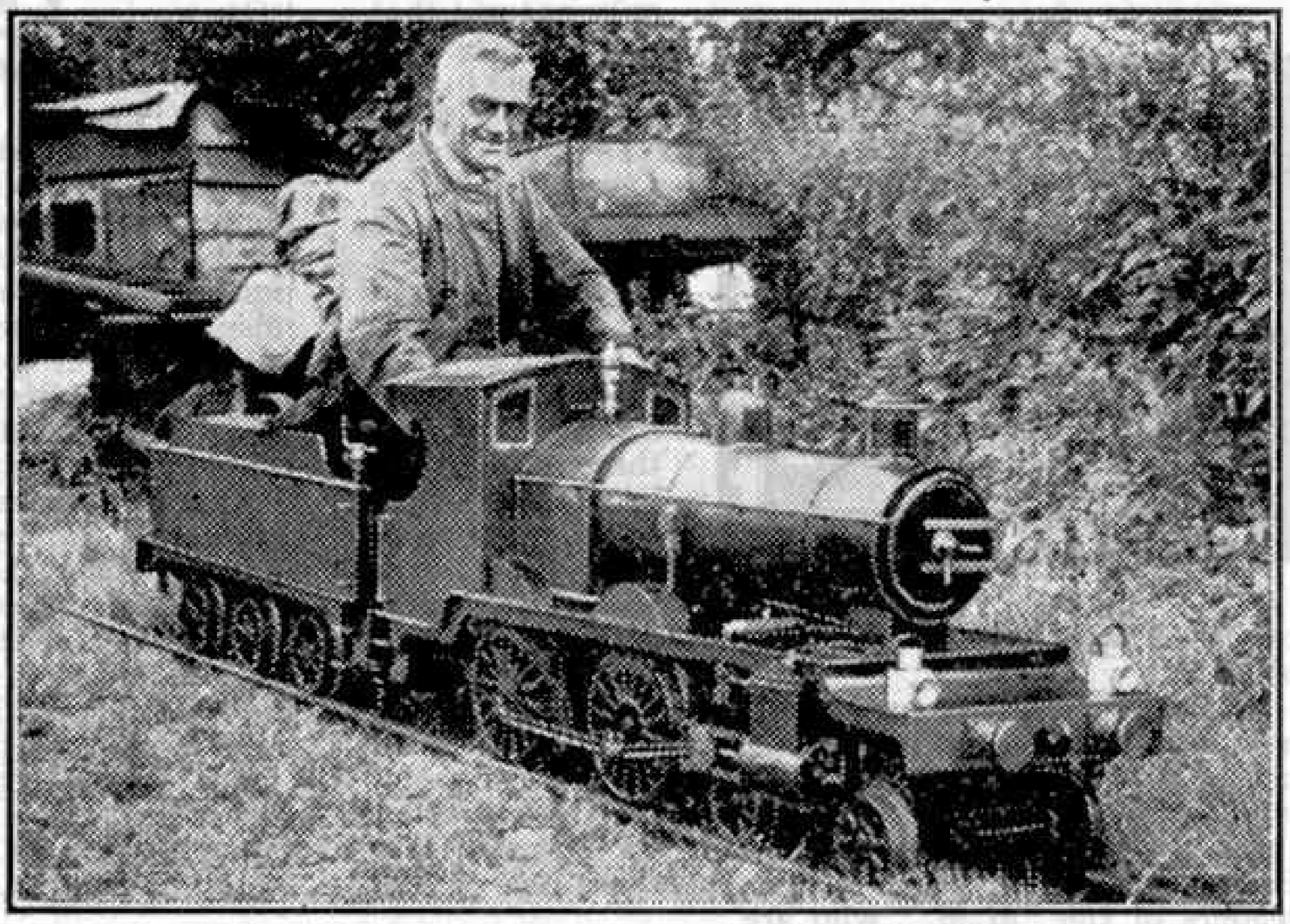
"Aircraft Annual 1949"—(*Continued from page 62*)

romantic story of their development from a struggling little airline operating over a 90-mile route to the largest international airline in the world, with 92,000 miles of air routes linking the United States with every continent.

The ever-increasing growth of air transport and the economic necessity of carrying the maximum payload on every journey has caused serious attention to be given to the possibilities of refuelling aircraft in flight. In this process the machine takes off with only partly-filled fuel tanks but with a greater load of passengers or freight than it could lift if the tanks were full; and when fully airborne and at a predetermined height it is refuelled by flexible pipeline from a tanker aircraft flying overhead. Sir Alan Cobham, another great pioneer of flying and to-day Managing Director of Flight Refuelling Ltd., relates the history of this interesting development, from the first known effort at refuelling in the air, made in November 1923 at a carnival at Kelly Field, U.S.A., to the highly successful flight refuelling carried out on the North Atlantic service between London and Montreal in the winter of 1947.

A detailed description of the Boeing "Stratocruiser," the civil version of the C-97 "Stratofreighter" war cargo and troop transport, gives a vivid insight into the structural details and luxurious passenger equipment of a modern 4-engined air liner. Another chapter deals with the measures taken to make flying as safe as humanly possible. We are told about the numerous safety regulations, the fog dispersal systems employed to enable aircraft to take off from, and land at, airports obscured by fog, and of the great part played by radio, and more recently radar, in helping to overcome the hazards of flying. C. W. Cain, who edited *"The Aeroplane Spotter"* from 1944 until it ceased publication in July last year, has some interesting things to say on the fascination and value of being able to identify aircraft on sight. Even the philatelist who is airminded is not forgotten, for there is an interesting chapter on air mail and air commemorative stamps.

The many half-tone photographs illustrating the text add greatly to the interest of the Annual, and its value is further increased by a large folded sheet at the end giving specification details of current types of British and foreign civil and military aircraft.



Mr. Richard Small, of Cookham Dean, Berks., with his steam 4-4-0. It weighs 8 cwt. and can travel at 18 m.p.h. Photograph by "Loral."

A Visit to "Waterloo Box"—(*Cont. from page 69*)

signalmen that the train standing at a particular platform is ready to go. Then a few seconds later the route has been set up, and within a minute or two the end vehicle has passed the Box and the procession of lights along the track diagram records the train's passage outward.

On an afternoon busy with early summer traffic I was able to see how smoothly everything worked. Suburban electrics came and went without concern. There were Portsmouth and West of England arrivals, empty stock for disposal, further empties to form outgoing departures a little later on. Light engine movements were a necessary accompaniment and the usual manœuvres when vans arriving by passenger train had to be shunted from one road to another. To add to the pressure there were incoming "Union Castle" Boat Specials, and I saw one of those very important-looking *"Queen Mary"* Boat Specials leave for Southampton. Fittingly enough, a "Merchant Navy" 4-6-2 sailed out with this train, while the Bournemouth and West of England traffic was divided between hard-slogging "King Arthurs" and stately "Nelsons." A motley collection handled the empties, including a Drummond "Hopper" 4-4-0, the inevitable "M7" 0-4-4Ts, a Maunsell "Mogul," and just one little "foreigner"—a Wainwright 0-4-4T from the neighbouring Eastern Section.

All this movement, however, was taken as a matter of course by the Box staff. Practice makes perfect we know, but the nature of the Waterloo apparatus and its reliability gives the operators a quiet confidence that makes the job look easy.

The lower floor of this remarkable Box is as impressive in its way as the "upper deck." Here are located the very vitals that ensure that the points and signals carry out the signalman's wishes and that, contrariwise, the indicator lights on the control panels wink their message unfailingly to the operators. In neat rows, on shelves as it were, are glass-cased relays, fuses and so on, doing their intricate job, silently and unattended, while sinister-looking black cables appear to writhe snakily in the background. There are in fact 728 relays, over 1,500 fuses and several thousand lever and relay contacts. In addition the Box contains 110 miles of wire in interlocking, selection, points control, track locking and diagram circuits, as well as 30 miles of wire for telephones.

The maintenance specialists who attend to this remarkable installation, who should know, hold that "nothing much ever goes wrong with it."

THE JOHNSON 'WELLCOME' PHOTOGRAPHIC YEAR BOOK

The Burroughs 'Wellcome' Photographic Year Book has been taken over by our advertisers, Johnsons of Hendon Ltd., the well-known makers of photographic material, and the 1949 issue appears under the above title.

All the familiar features that have made the year book so valuable to photographers in the past have been retained. In addition to the diary and the pages for recording exposure details, there are monthly light tables and the Wellcome 'Exposure Calculator,' the value of which has been amply proved by the experience of thousands of amateur photographers since they were introduced many years ago. Information is given on 'Tabloid' photographic products, and there is a new section describing some of the popular Johnson photographic chemicals and equipment. A new feature is a depth of field calculator that should be highly appreciated by photographers.

The price of the book is 5/–, including purchase tax.

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Find These Station Names

Many railway stations have curious names, and these are always of the greatest interest to enthusiasts. This month we have a competition in which British stations with unusual names form the central feature. Entrants are asked to find the names from the clues in the panel in the centre of this page. They are 12 in number, and each should lead to the name of a British railway station that is not merely a place name, but can have some other meaning. In each case the region of British Railways in which the station is to be found also must be stated.

1. **Where monks live among the trees.**
2. **Shuttlecock play.**
3. **Fought during war.**
4. **Entrance to the woods.**
5. **Found on a crane.**
6. **Famous trains.**
7. **Stone edifice.**
8. **Girl's name.**
9. **Royalty often passes through.**
10. **Trees at the top of the mountain?**
11. **Rivers and many streets have them.**
12. **Both seen on some streets (two words).**

Entries in this contest can be written on a postcard, or on a single sheet of paper, and they should be addressed to *"February Stations Contest, Meccano Magazine, Binns Road, Liverpool 13."* If there is a tie for any one of the prizes to be awarded the judges will take into consideration the neatness and novelty of the entries concerned.

There will be the usual two sections in this competition, for Home and Overseas readers respectively, and in each prizes will be awarded of 21/–, 15/– and 10/6 for the best entries in order of merit. In addition consolation prizes will be given for good efforts that fall just short of the prize winning standard. Closing dates: Home Section, 31st March; Overseas Section, 30th July.

Choosing an Engineering Career

Readers of the "*M.M.*" are deeply interested in engineering, and many of them must have dreams of becoming engineers themselves. Such ambitions are good, for the world certainly needs its engineers, whose victories in many fields have been of the greatest benefit to all of us. This will be realized at once from the following list of some of the branches of the engineering profession: 1. Civil; 2. Mechanical; 3. Electrical; 4. Mining; 5. Aeronautical; 6. Marine; 7. Oil; 8. Chemical; 9. Railway; 10. Shipbuilding.

This list covers only part of the ground in which engineering plays a part, but it is long enough to form the basis of a competition that we feel sure will be attractive to our readers. What we wish them to do is to decide for themselves which branch of the profession they would enter if they had the opportunity of becoming engineers when they grow up, and to give the reasons that would guide them in making their choice.

It is not necessary to give long explanations. Indeed entries must be kept within 100 words, a length that should be sufficient to enable the reasons to be given briefly but clearly, whether these are based on personal inclinations or aptitude, or on the special attractions and value of the branch that is chosen.

Entries in this contest will be judged on their merits as explanations; the actual choice of a competitor will not be taken into account. Readers in the Home Section have until 31st March to make their selections and summarize their reasons to keep their account within the limit of 100 words, and the closing date in the Overseas Section is 30th July. In each of these sections there will be prizes of 21/–, 15/–, and 10/6, for the three entries judged the best, and other good attempts will earn consolation awards for their writers.

Entries in this contest must be addressed "*Engineering Choice Contest, Meccano Magazine, Binns Road, Liverpool 13.*" They should be written on one side of each sheet of paper used, and competitors must not forget to write their full names and addresses on them.

February Photographic Contest

For the second of our 1949 Photographic Competitions we return to a special subject. We have just passed the depth of winter and there have been excellent opportunities for taking snow pictures, while others are possible during February, which has often provided us with intense frosts and severe snowstorms in the past. Readers therefore are asked to send in prints of snow scene photographs they have taken. There are only two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of the print must be stated exactly what the photograph represents. A fancy title may be added if desired.

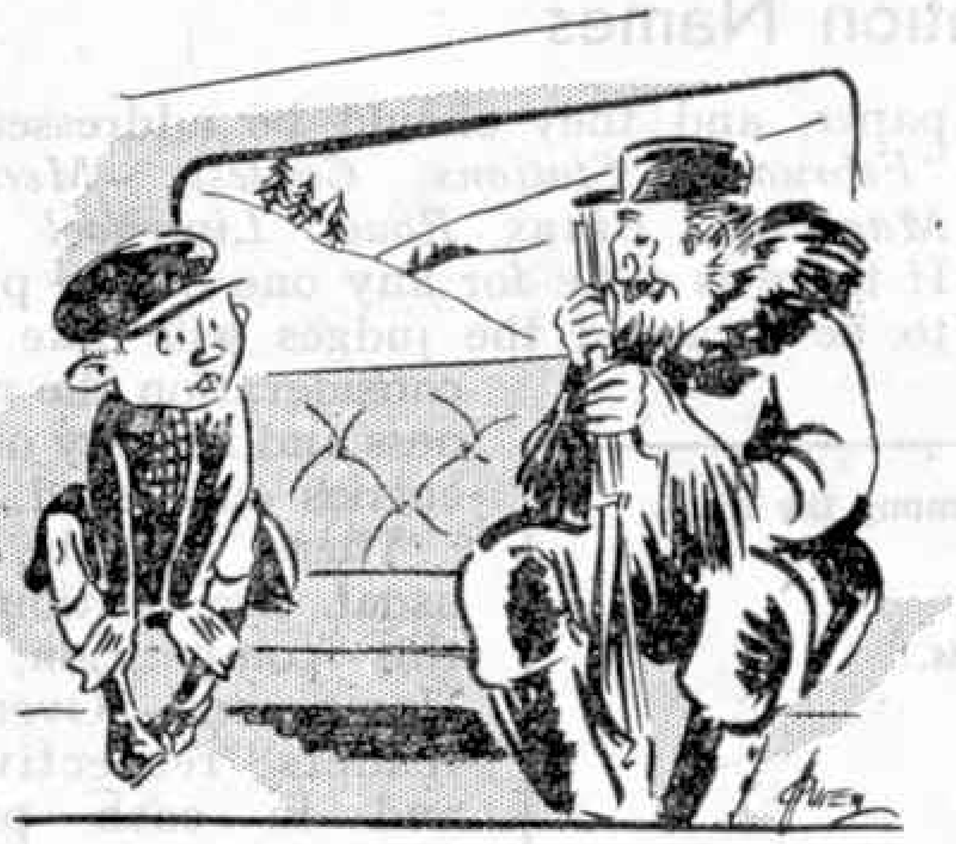
The competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate sections for overseas readers, and in each section prizes of 21/–, 15/– and 10/6 will be awarded.

Entries should be addressed "*February Photographic Competition, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 28th February; Overseas Section, 30th June.

Fireside Fun

"Which of you broke my window?"
"It' was 'im, mum. He ducked when I threw a stone at 'im."

* * * *



"You hunt bear, Sir?"
"No. Always wear this hunting outfit."

* * * *

"Look here. The feathers are falling off this stuffed owl you sold me."
"Well, sir, this is the moulting season, you know. That shows you how life-like our stuffed owls are."

* * * *

"There's no house in that picture. Why is it called 'Home'?"
"No place like it, I supppose."

* * * *

"I'm not going to work for Mr. Smith after what he said to me."
"What did he say?"
"You're fired."

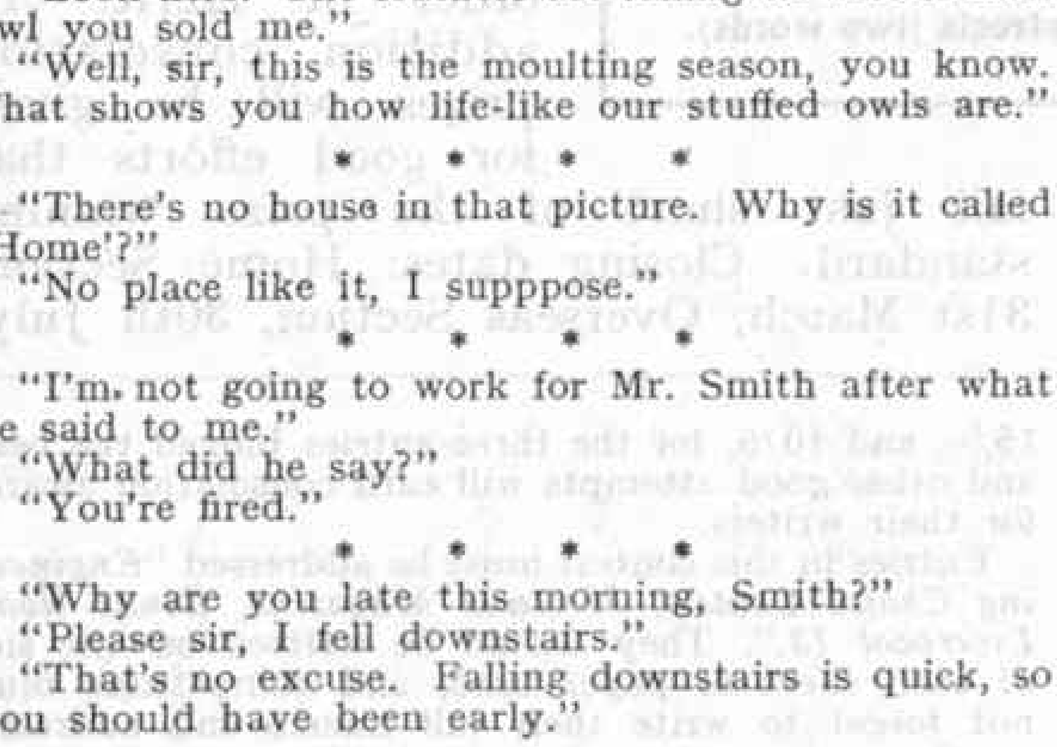
* * * *

"Why are you late this morning, Smith?"
"Please sir, I fell downstairs."
"That's no excuse. Falling downstairs is quick, so you should have been early."

* * * *

"What's that you are putting on the bacon?"
"Lux."
"Whatever for?"
"Well, the advertisements say it stops shrinking."

* * * *



"Father says I'm slow but sure."
"That's true. You're slow to learn and sure to forget."

BRAIN TEASERS

DON'T LOOK AT THE SCORING BOOK

In a cricket match Arthur made 42 runs. Charlie made half as many as Bill, and Dick's score was a third of Bill's. Arthur's score exceeded Bill's by the same number as Charlie's exceeded Dick's. How many runs did each make? S.W.C.

* * * *

MOVIES MOVED ABOUT

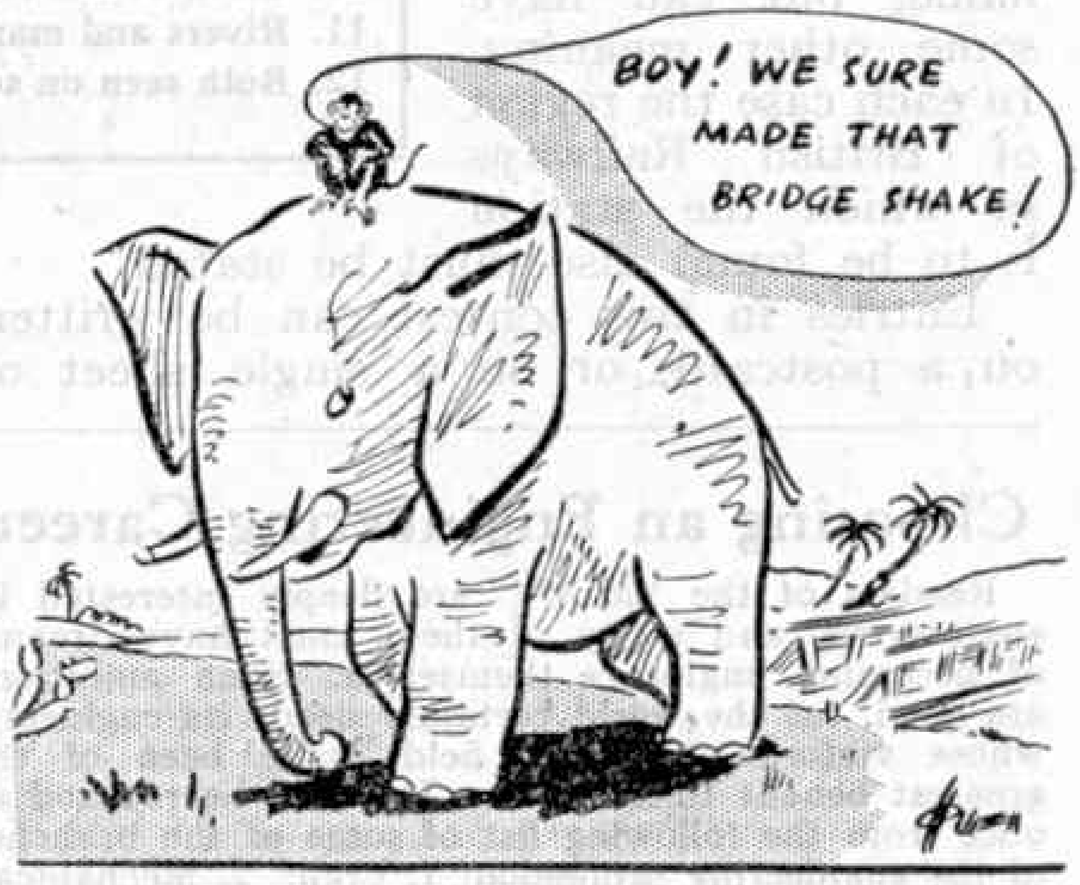
Recently I had a good week at the picture houses. On Monday I saw LEROVI SWITT; on Wednesday I saw HET YAW OT ETH TRASS; on Friday the picture was FELI TWIH HATFER, while next day I saw both NELALF DOIL and LUBLREGHFITS. What did I see? B.N.G.V.

* * * *

WHO'S WHO IN DIZZY VILLAGE

I was recently amused to find that the doctor, the baker, the butcher and the porter at the railway station in our village are named Porter, Baker, Butcher and Doctor, but none of these men have names corresponding to their daily work. For instance Mr. Doctor is not the doctor; he isn't the baker either; and Mr. Porter is not the butcher. The porter and Mr. Butcher are great friends, but Mr. Porter hates the doctor, while Mr. Baker and the butcher meet in a friendly way whenever they can. Who is who in this remarkable mix-up? B.I.N.

* * * *



SOLUTIONS TO LAST MONTH'S PUZZLES

The eight makes of motor car in our first puzzle last month were MORRIS, HILLMAN, STANDARD, AUSTIN, LAGONDA, ARMSTRONG SIDDELEY, HUMBER and BENTLEY. Start at M in the third row and follow the Knight's move at chess.

Our second puzzle was really a catch. A furlong is 220 yds., so that the guard's van would enter the tunnel as the engine left at the other end. The speed of the train has nothing to do with it.

The solution to our third puzzle is:

24691358
9

222222222

The word asked for in our last puzzle was ARE. On adding the letter A we get the word AREA.

* * * *

THIS MONTH'S HOWLER

An orchid is where apples grow.

BOND'S

Special Fine Ground Egg-Shell Finish Paints

L.M.S. Red; L.M.S. Grey; L.M.S. Brown; L.N.E.R. Green; L.N.E.R. Grey; G.W.R. Green; G.W.R. Brown; G.W.R. Cream; G.W.R. Grey; S.R. Malachite; S.R. Green; S.R. Brown; Black; White; Red Oxide; Brick; Stone; Slate Grey; Signal Red; Signal Yellow; Engineers' Blue; Clear Varnish. Price **1/3** per pot plus postage.

STRIP WOOD

Cedar Wood:

3/32" × 2" × 18" long .. Price **4/6** per doz. lengths

Obechi Wood:

1/16" × 1/8"	2½d. per yd.	1/4" × 1/4"	4d. per yd.
1/16" × 1/4"	2½d. per yd.	1/4" × 3/8"	5d. per yd.
1/16" × 3/8"	3½d. per yd.	1/4" × 1/2"	5d. per yd.
1/16" × 1/2"	4d. per yd.	1/4" × 1"	7d. per yd.
1/16" × 1"	5d. per yd.	1/4" × 1½"	9d. per yd.
1/16" × 1½"	7d. per yd.	1/4" × 2"	1/2 per yd.
1/16" × 2"	9½d. per yd.	1/4" × 3"	1/7 per yd.
1/16" × 3"	1/2 per yd.	1/4" × 6"	2/8 per yd.
1/16" × 6"	2/- per yd.	1/2" × 1/2"	7d. per yd.

Building Wood Sections:

1¼" × 1/8" scored wood to represent planking ..	1/3 yd.
2⅜" × 1/8" " " " " " ..	2/6 yd.
1/4" Moulded Gutter Spouting	1/3 yd.
3/8" " " "	1/3 yd.
1/4" Half Round Gutter Spouting	1/3 yd.
3/8" " " "	1/6 yd.
1/8" × 1/4" Channel Section	1/3 yd.
1/8" × 3/8" " "	1/6 yd.
1/8" × 1/4" H Section	1/3 yd.
1/8" × 3/8" " "	1/6 yd.

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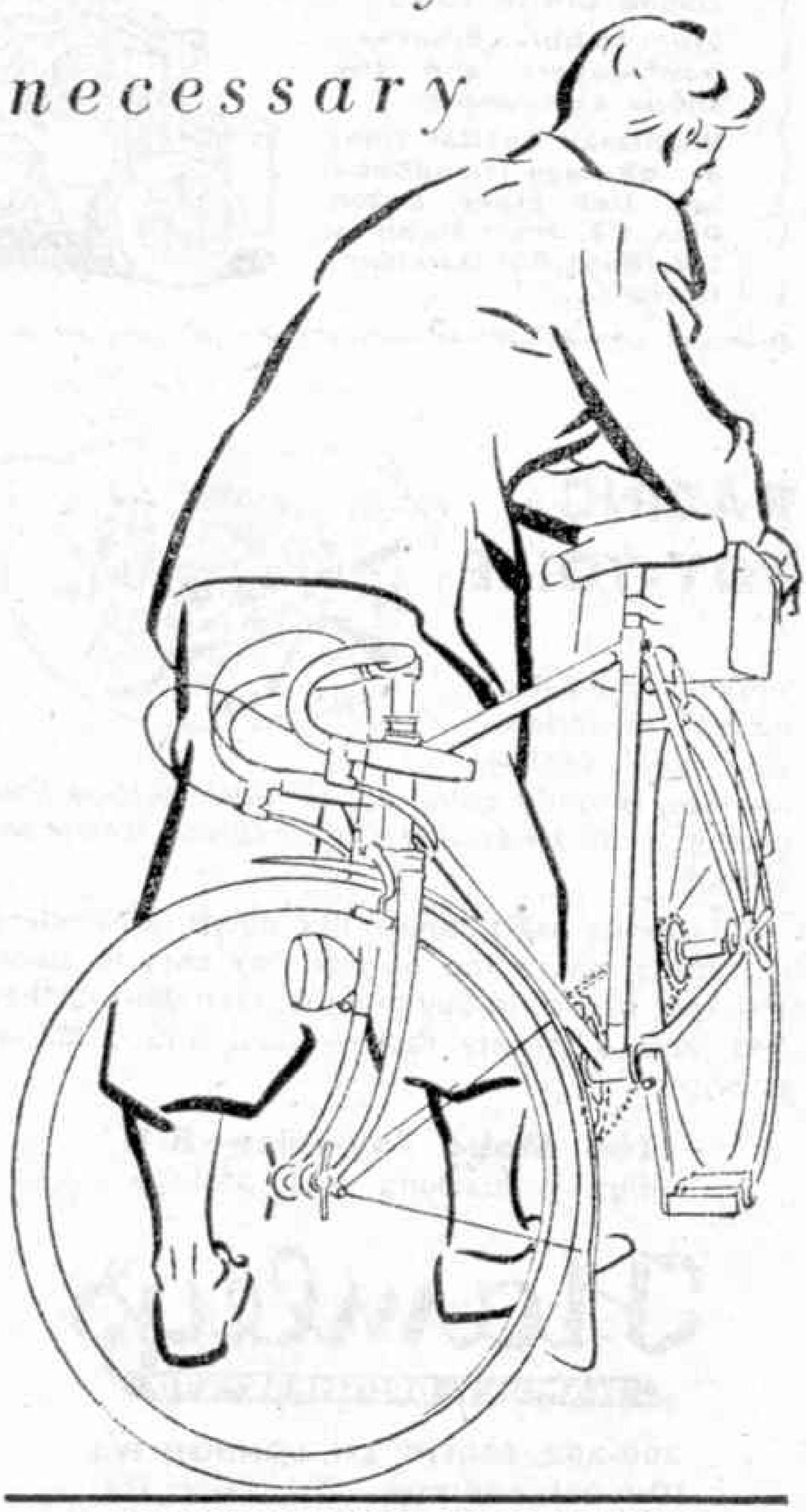
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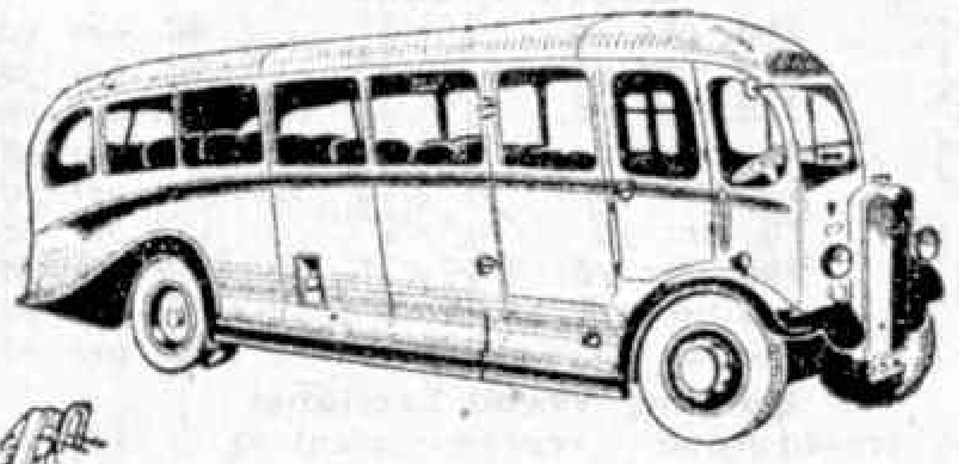
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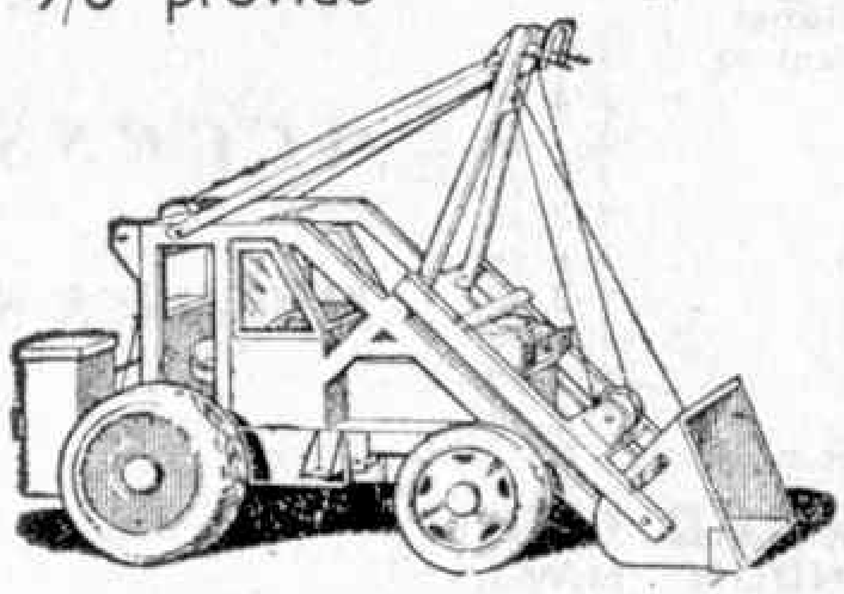
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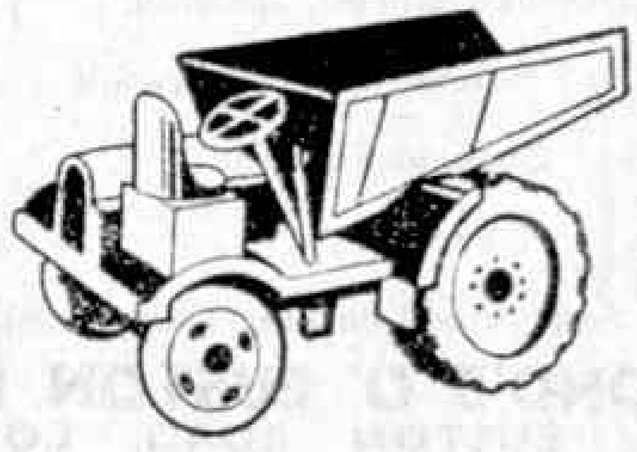
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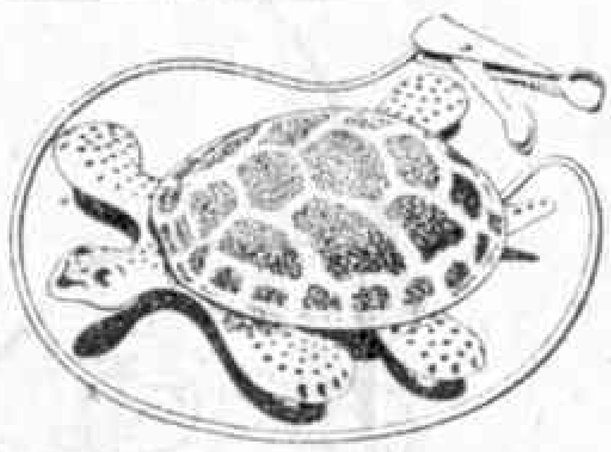


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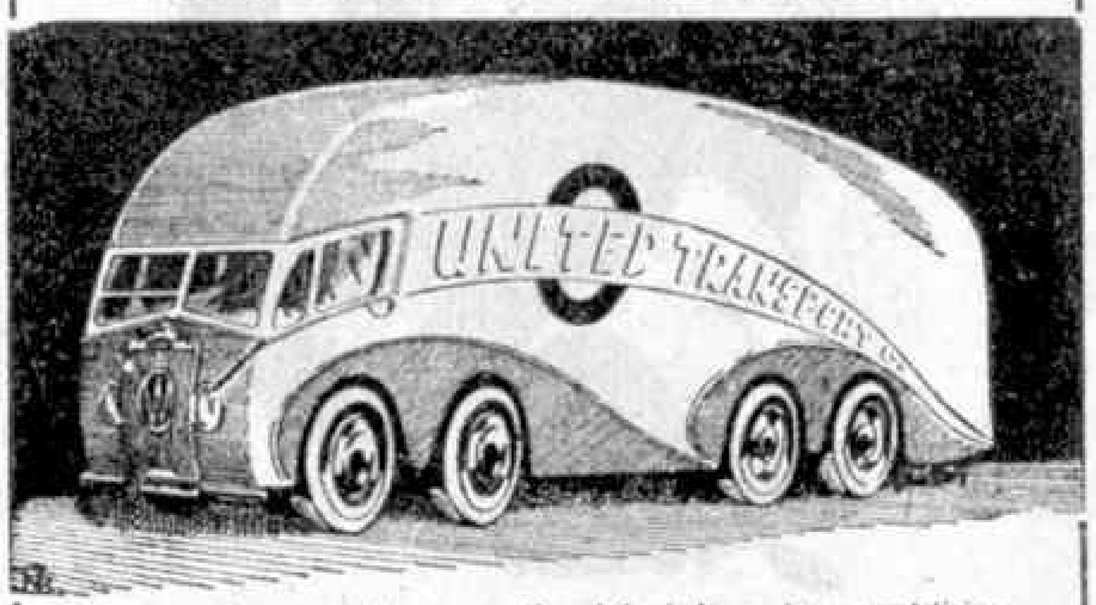
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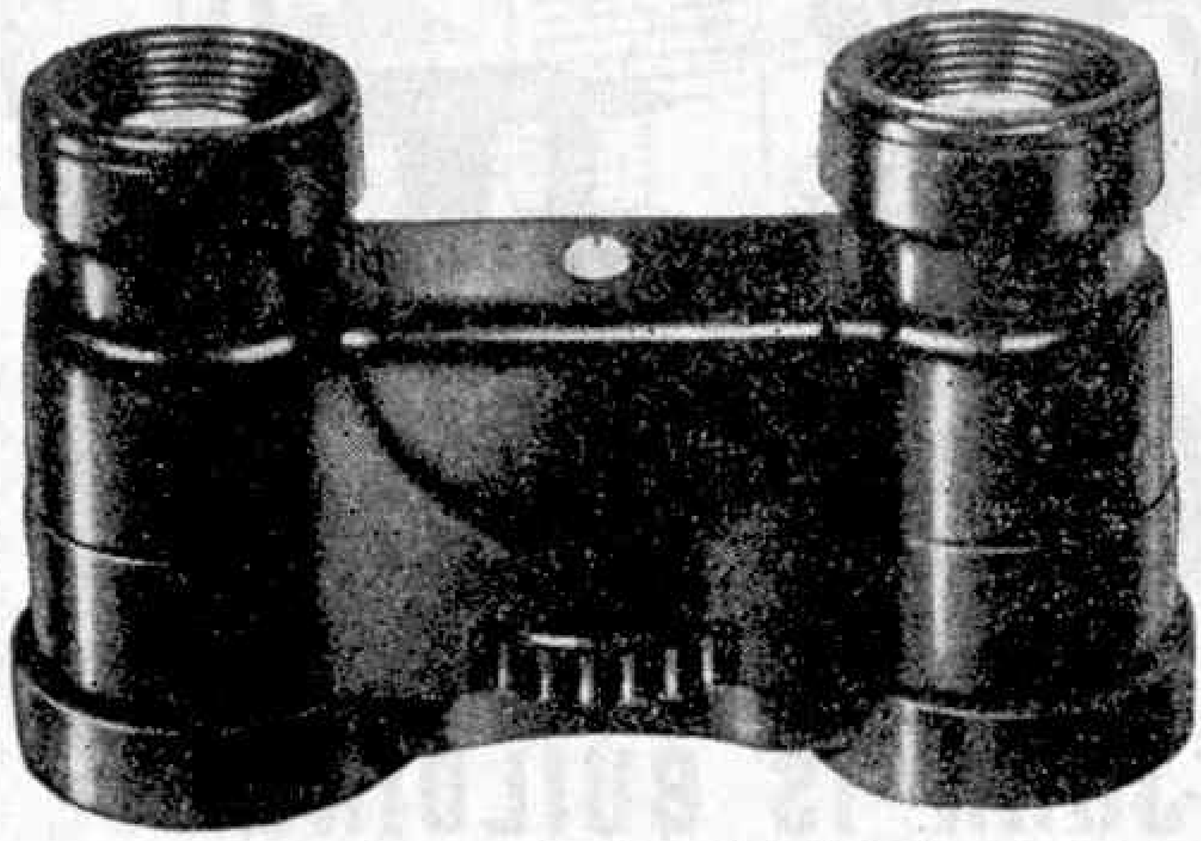
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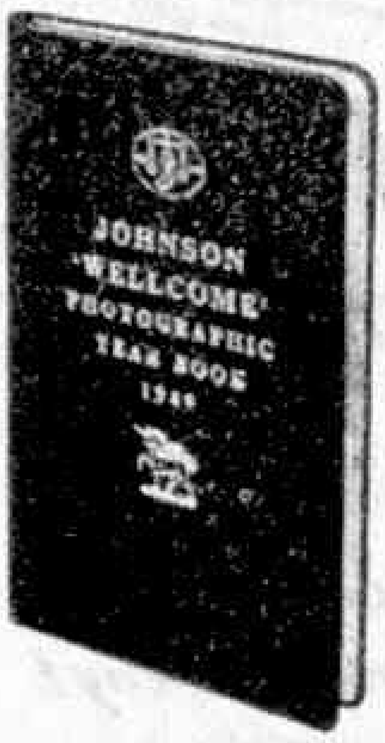
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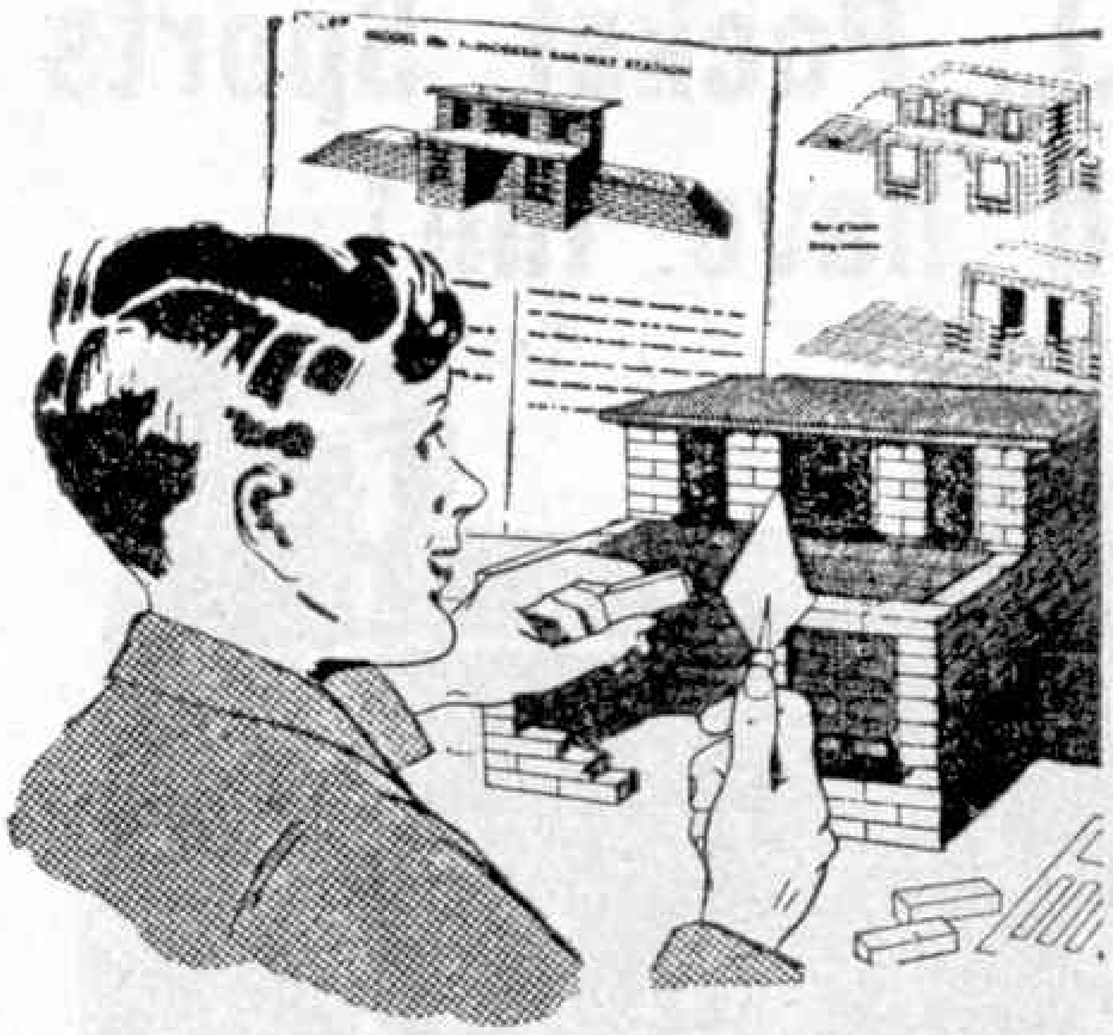
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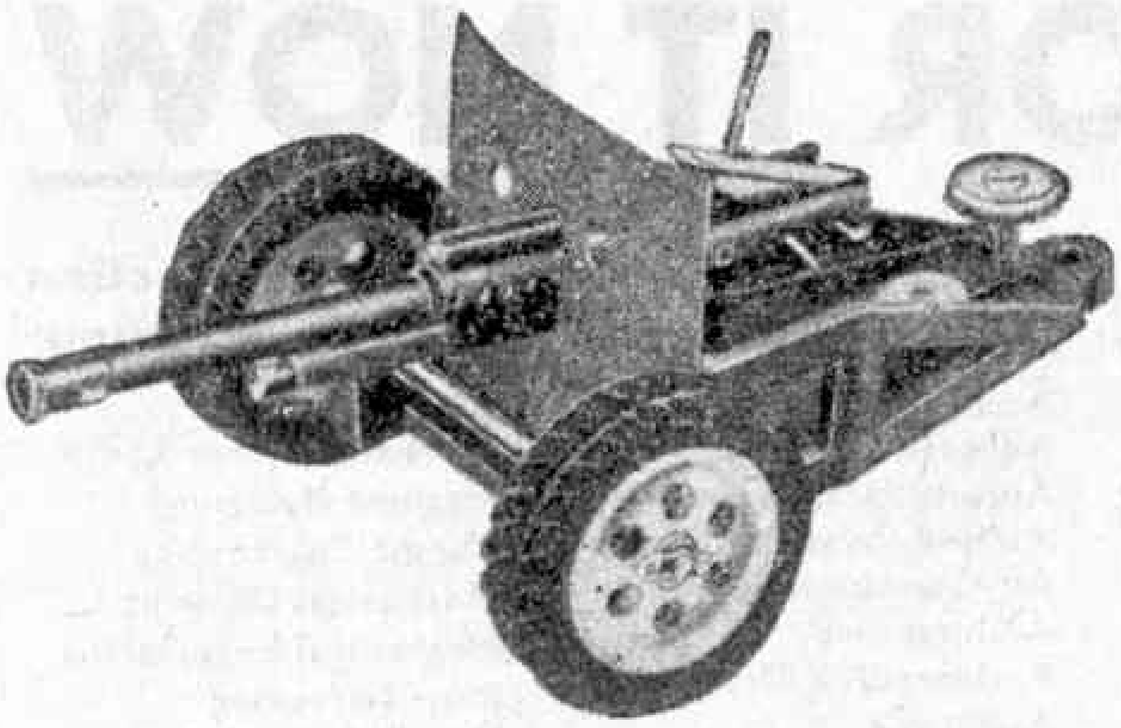
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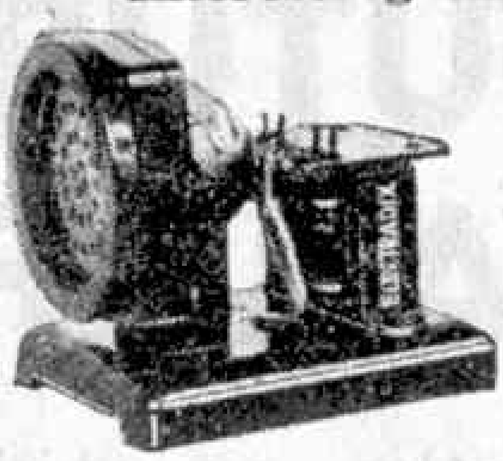
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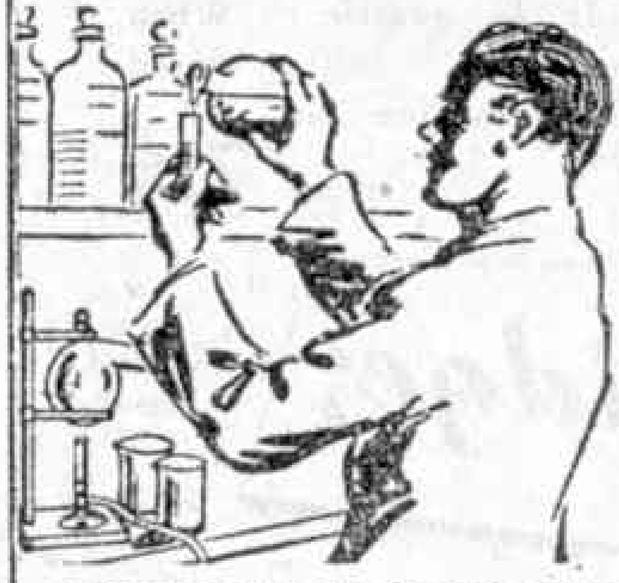
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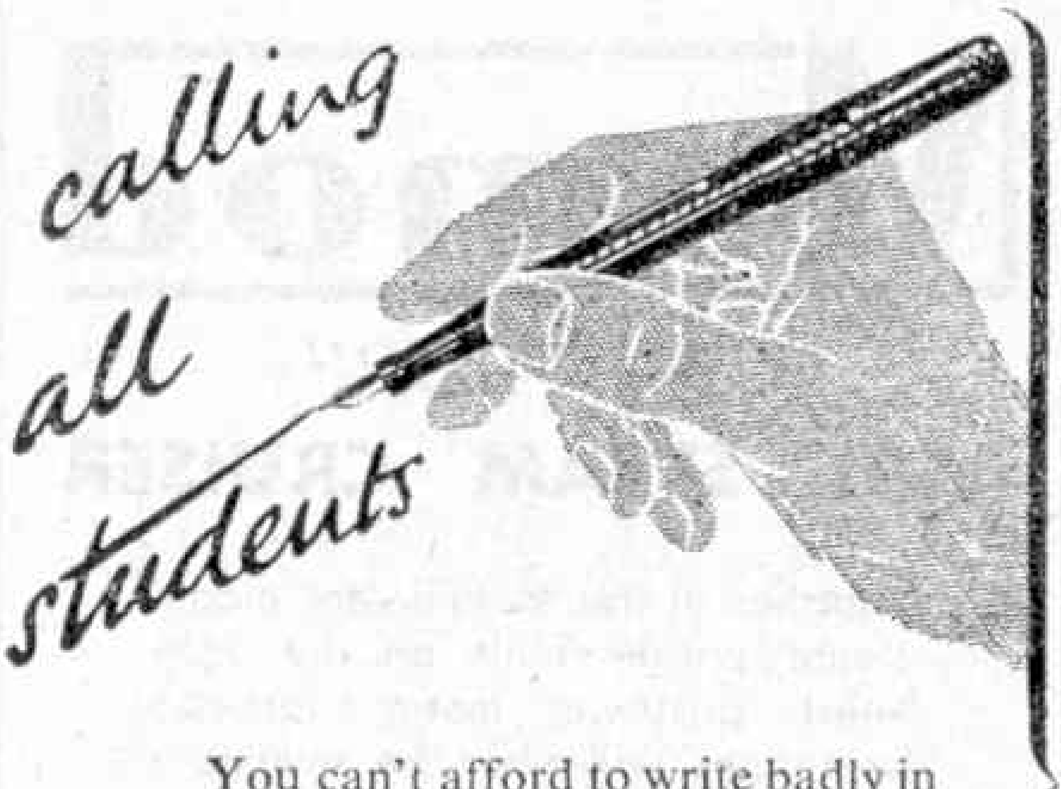
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Good prices given for Meccano Parts, Nos. 181—Bobbins—and 307—Contact Screws—also Elektron Magnet Coils. Write—O'Brien, Edwardstone Lodge, Edwardstone, Suffolk.

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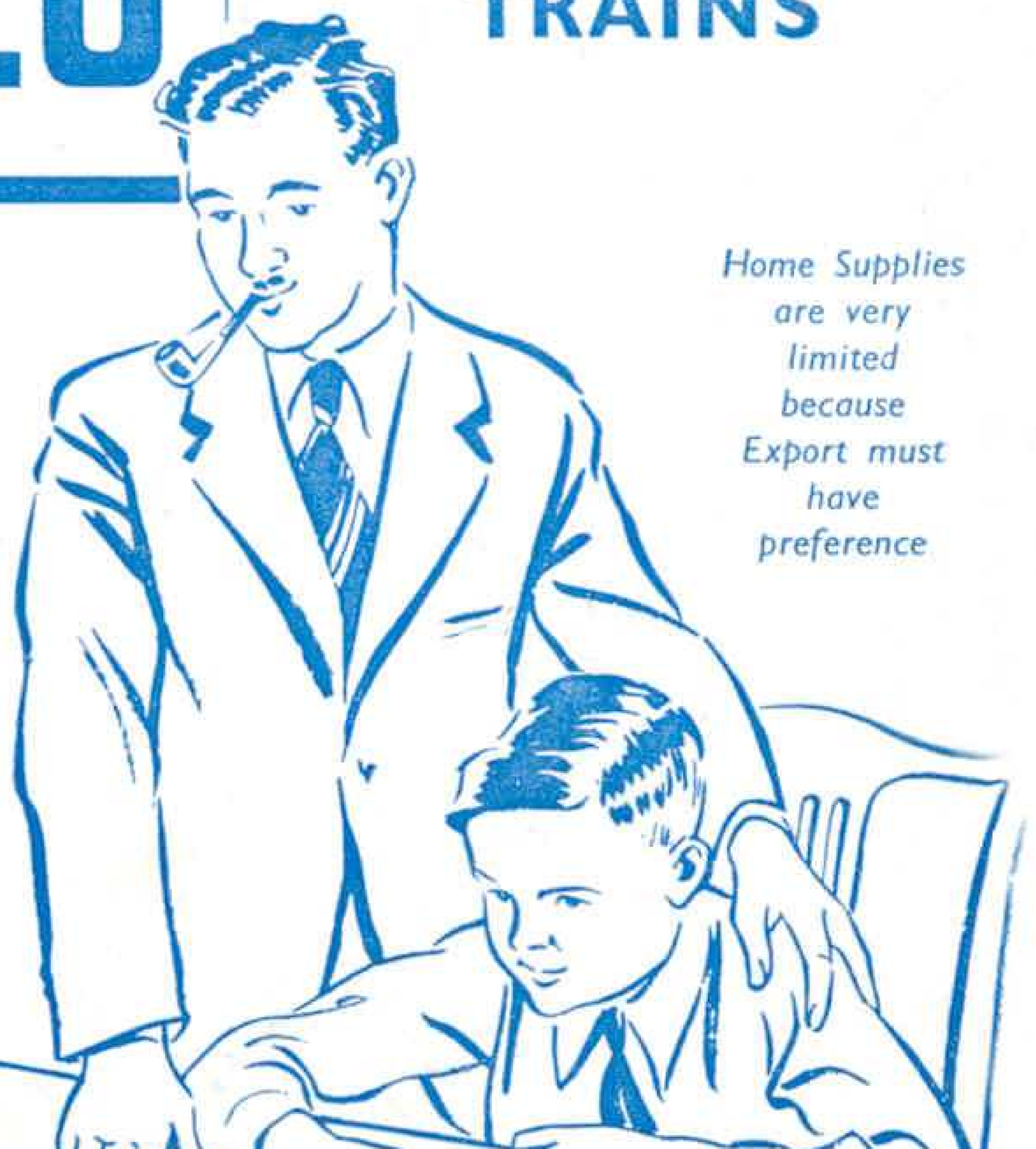
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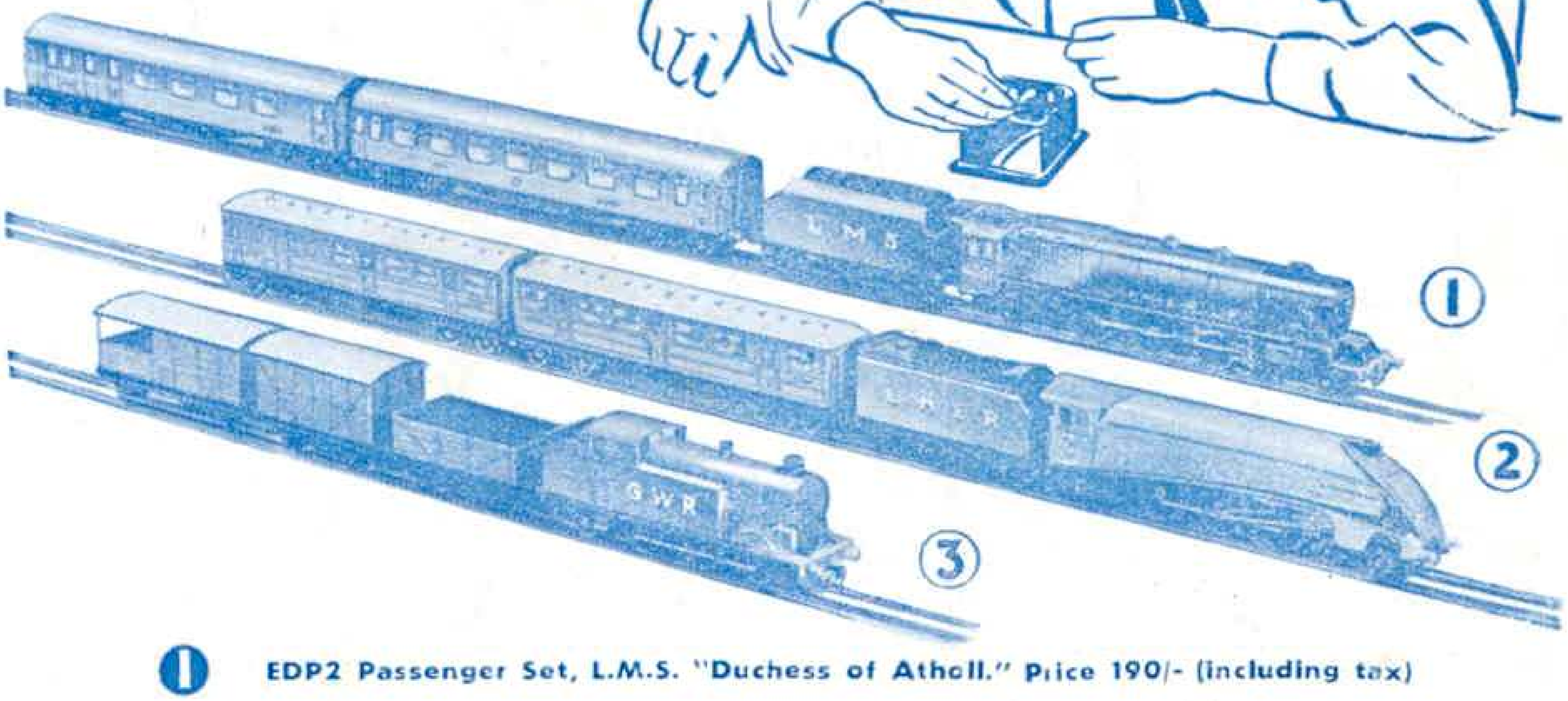


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VOL. XXXIV. No. 3. MARCH 1949

MECCANO MAGAZINE

THE ANDERTON BOAT LIFT

6D.

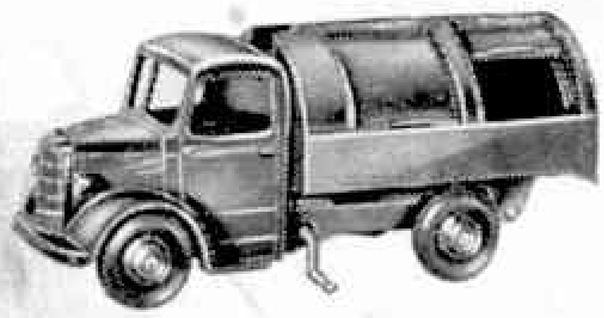
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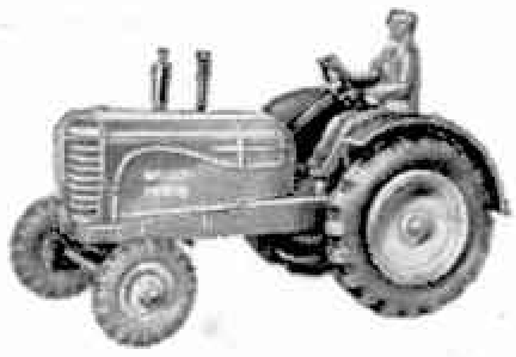
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Dinky Toys No. 40d
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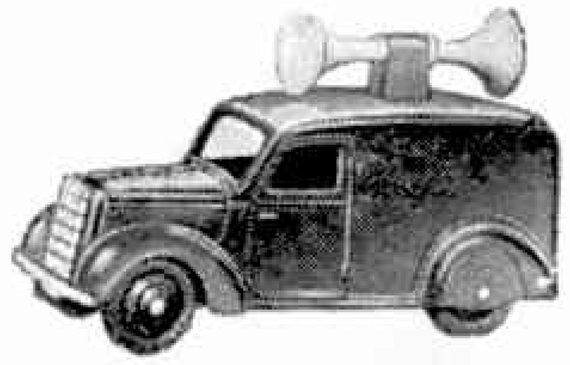
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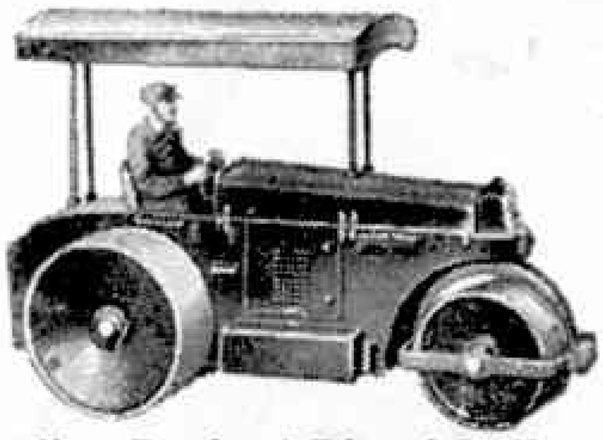
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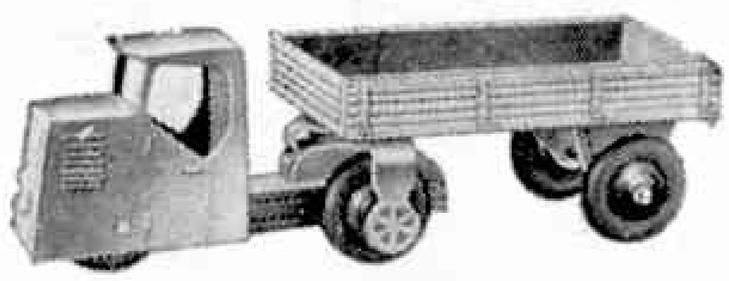
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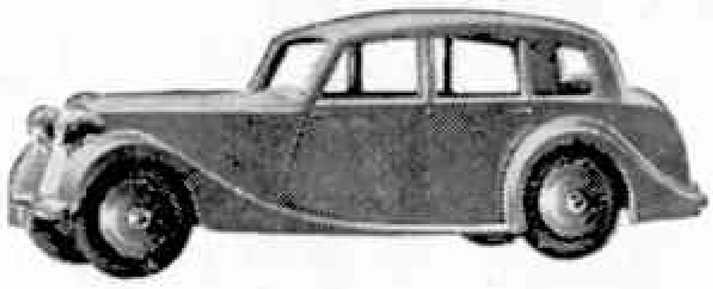
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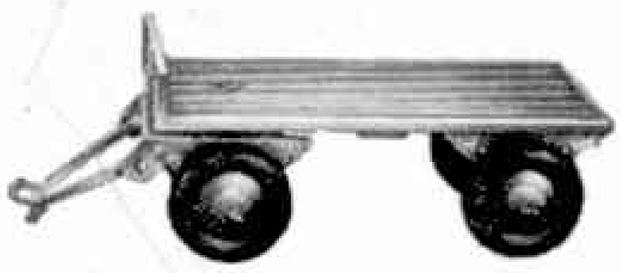
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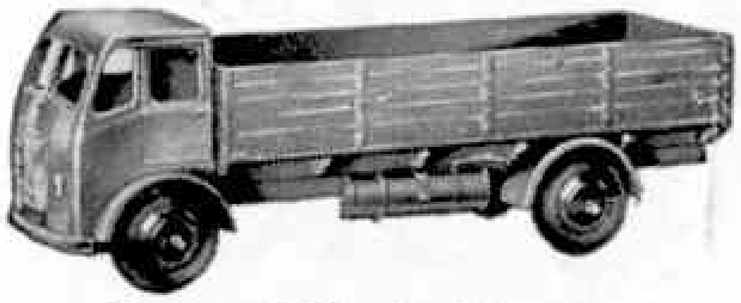
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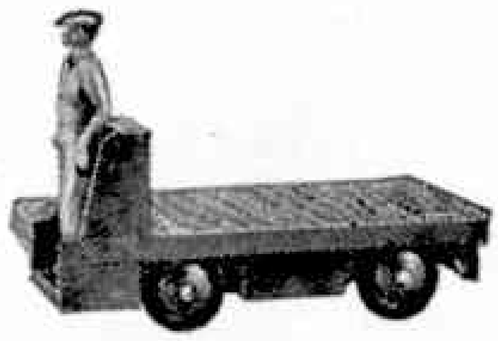
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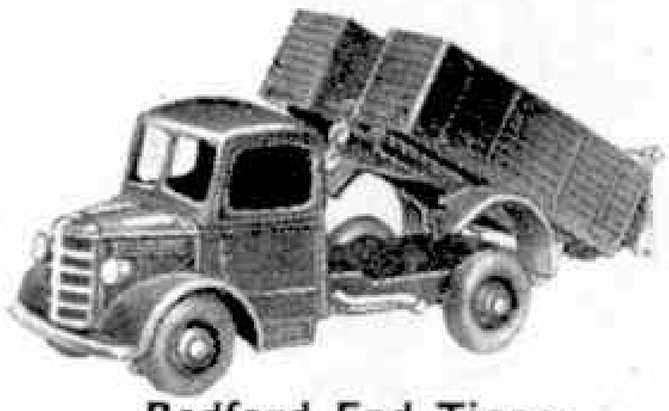
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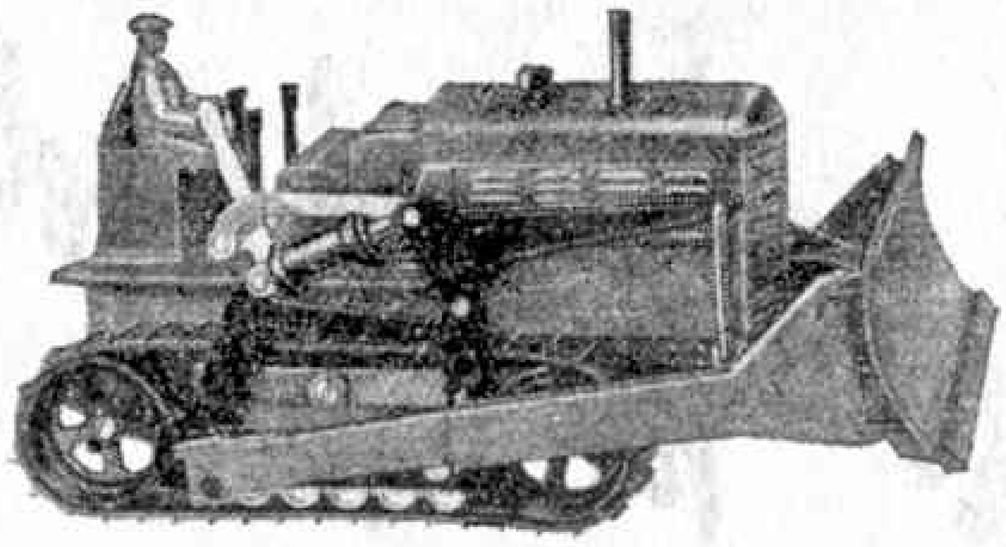
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& SUPERTOYS



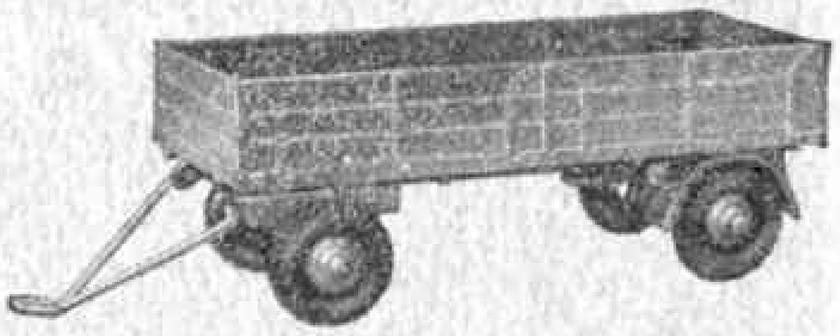
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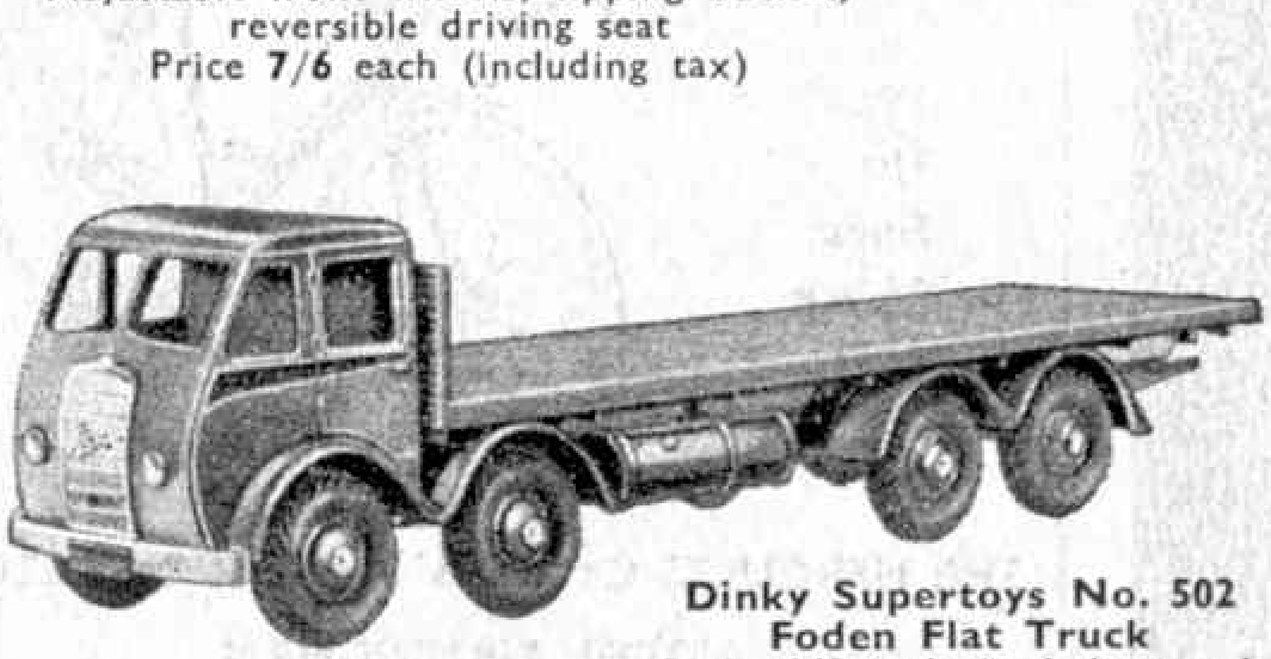
Dinky Supertoys No. 551
Trailer
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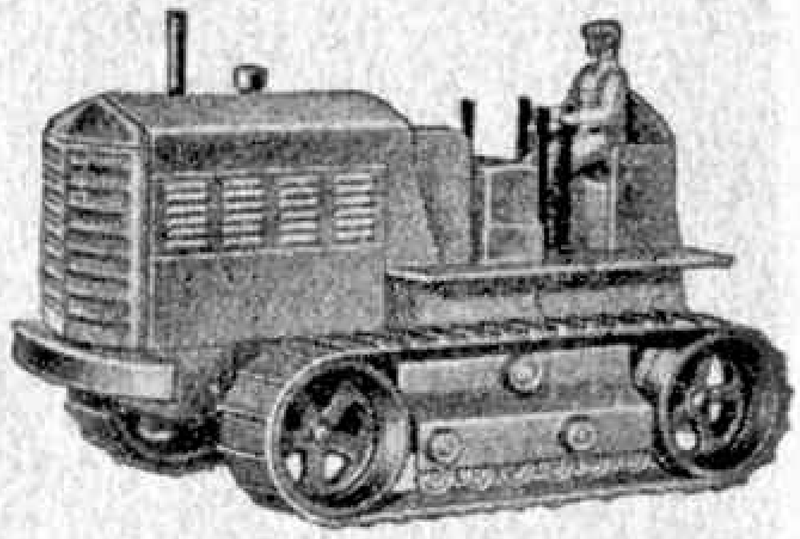
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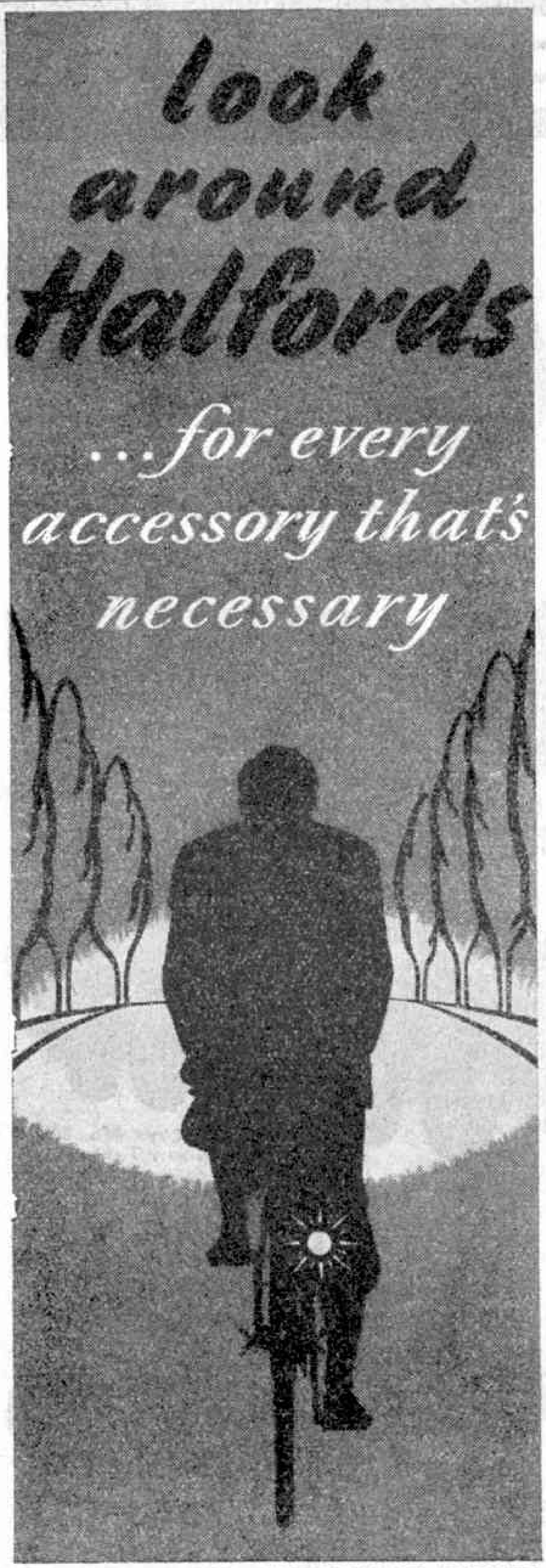


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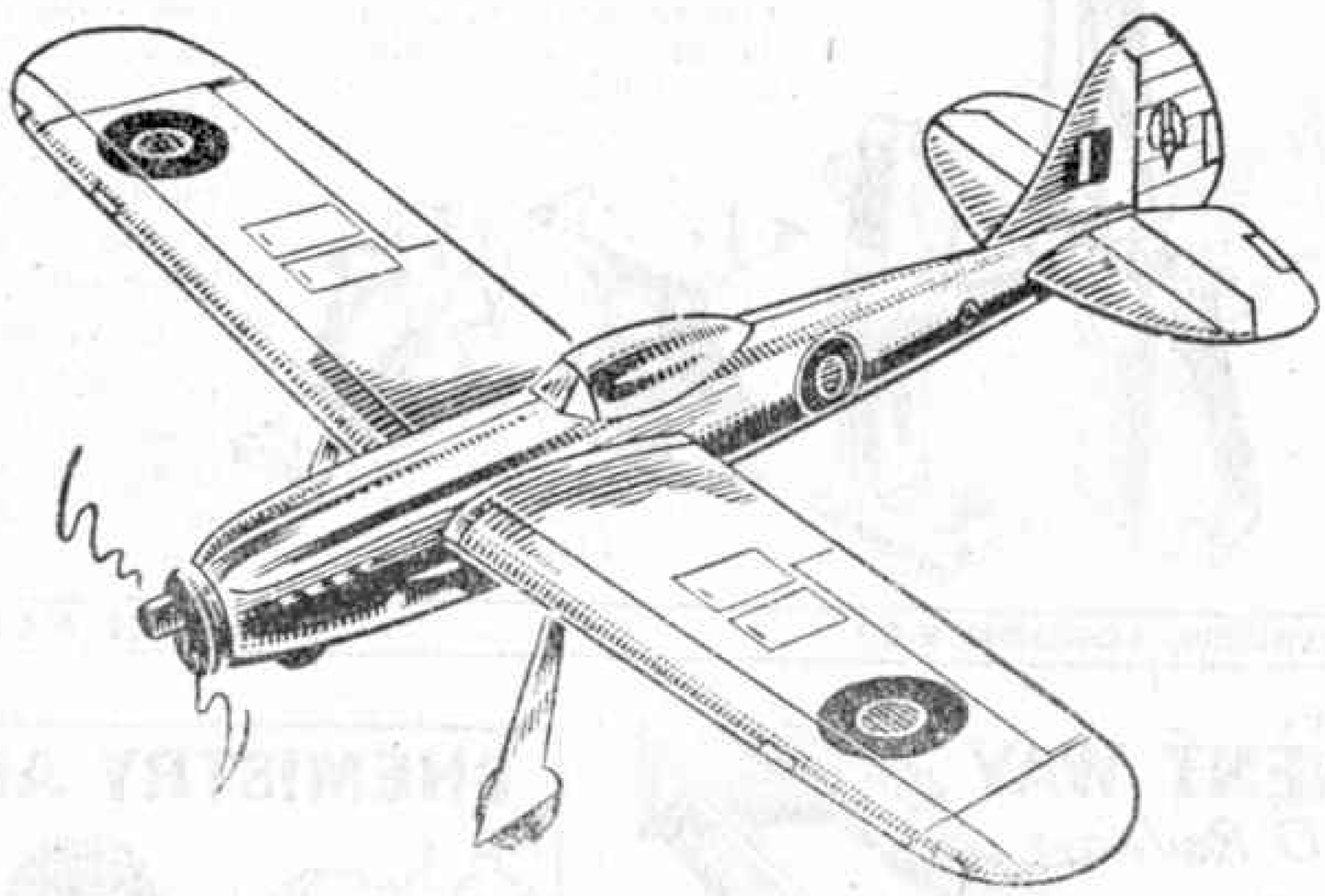
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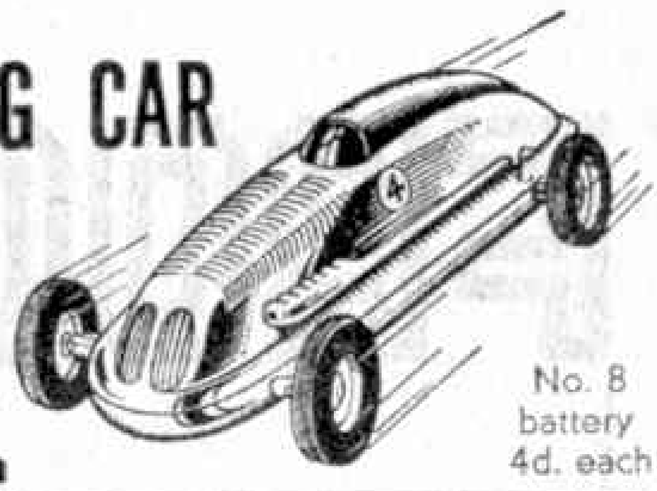
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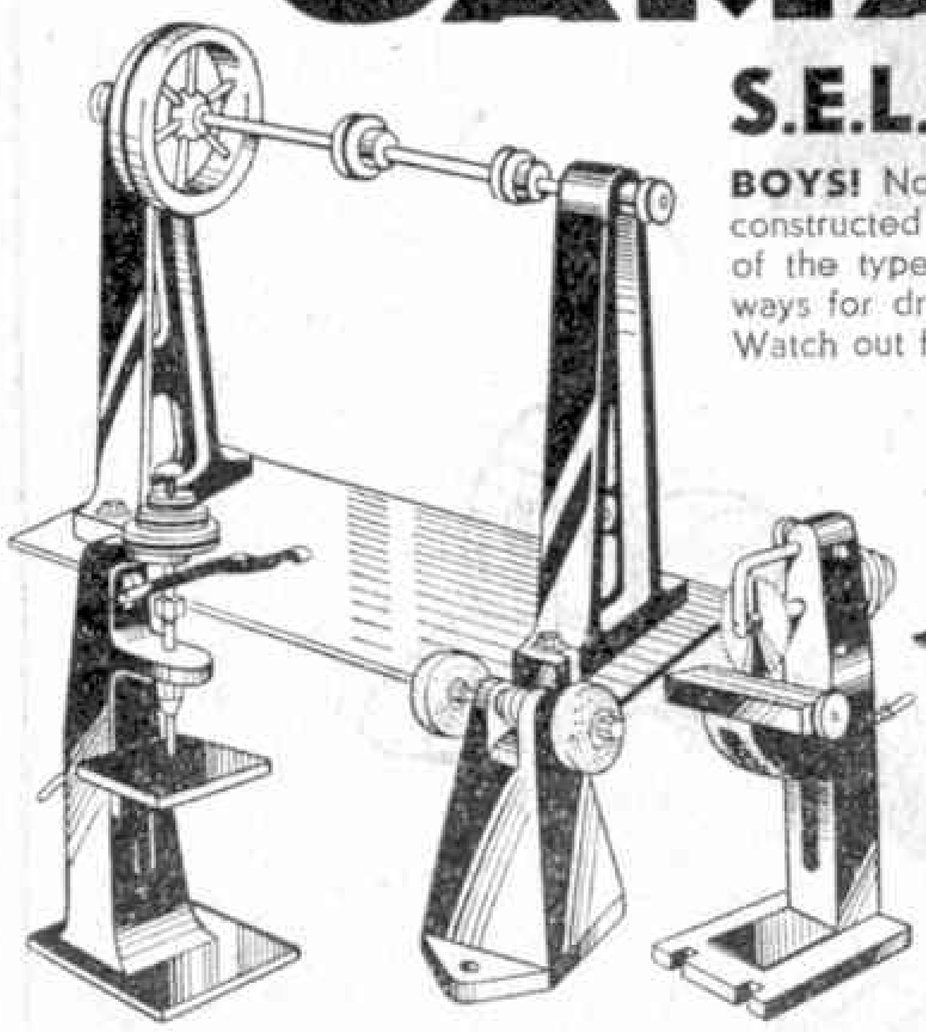


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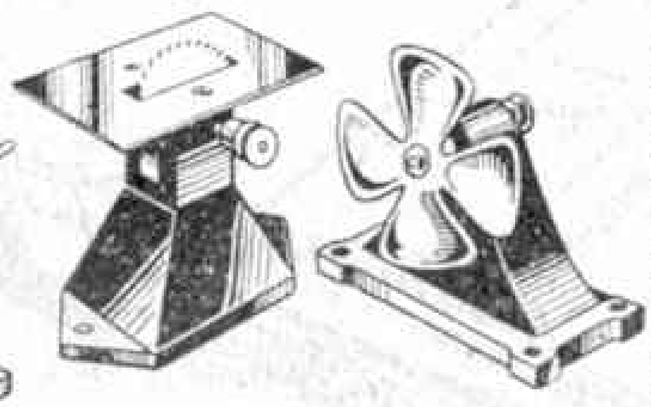
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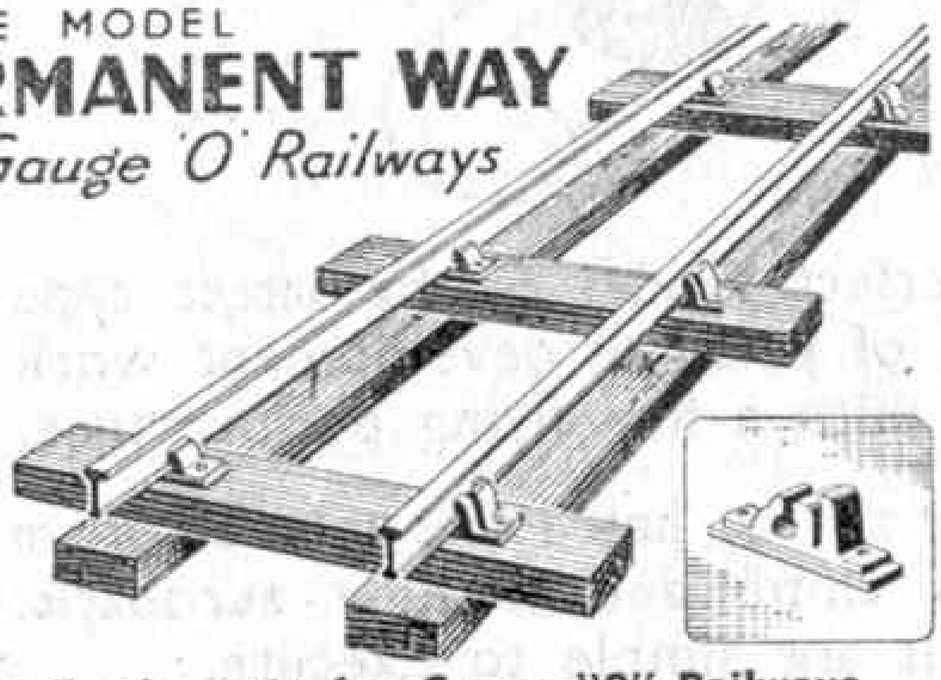
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YACHTS

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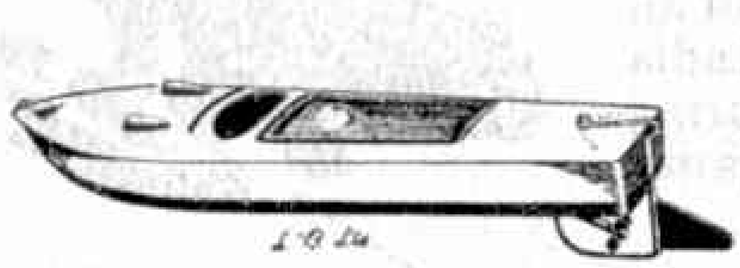
Watercraft Enthusiasts!



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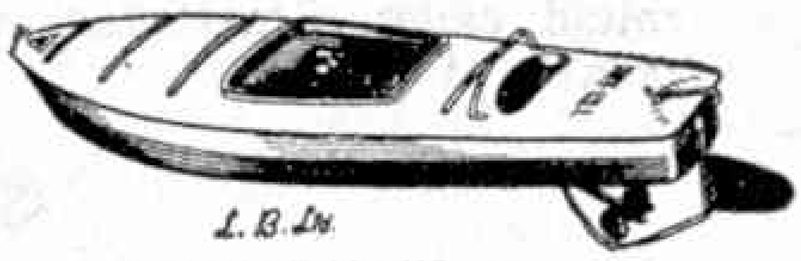
YACHT C. 16

Watch out in your local toy shops for the splendid TRI-ANG Yachts. They come in a variety of sizes, all well rigged and unsinkable. They feature streamlined water-tight metal hulls beautifully finished in a variety of high-gloss enamelled colours.



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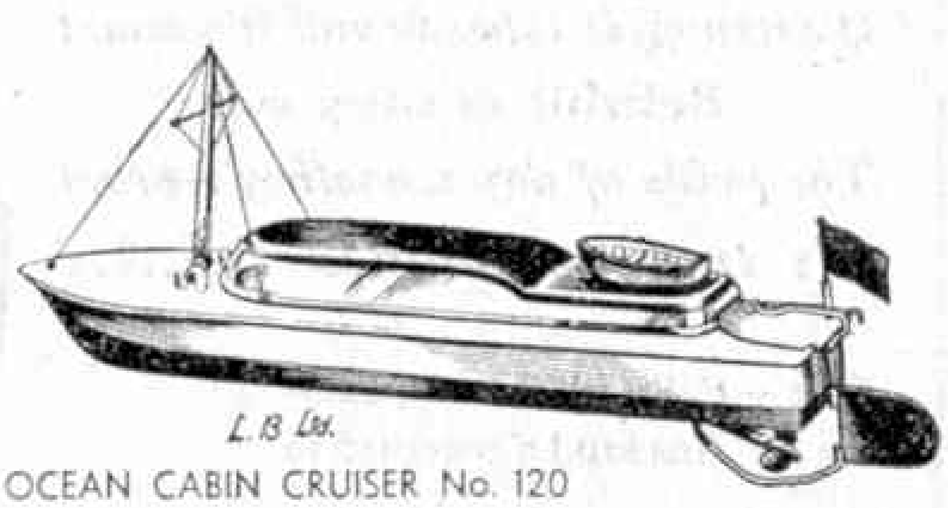
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SPEEDBOAT No. 110

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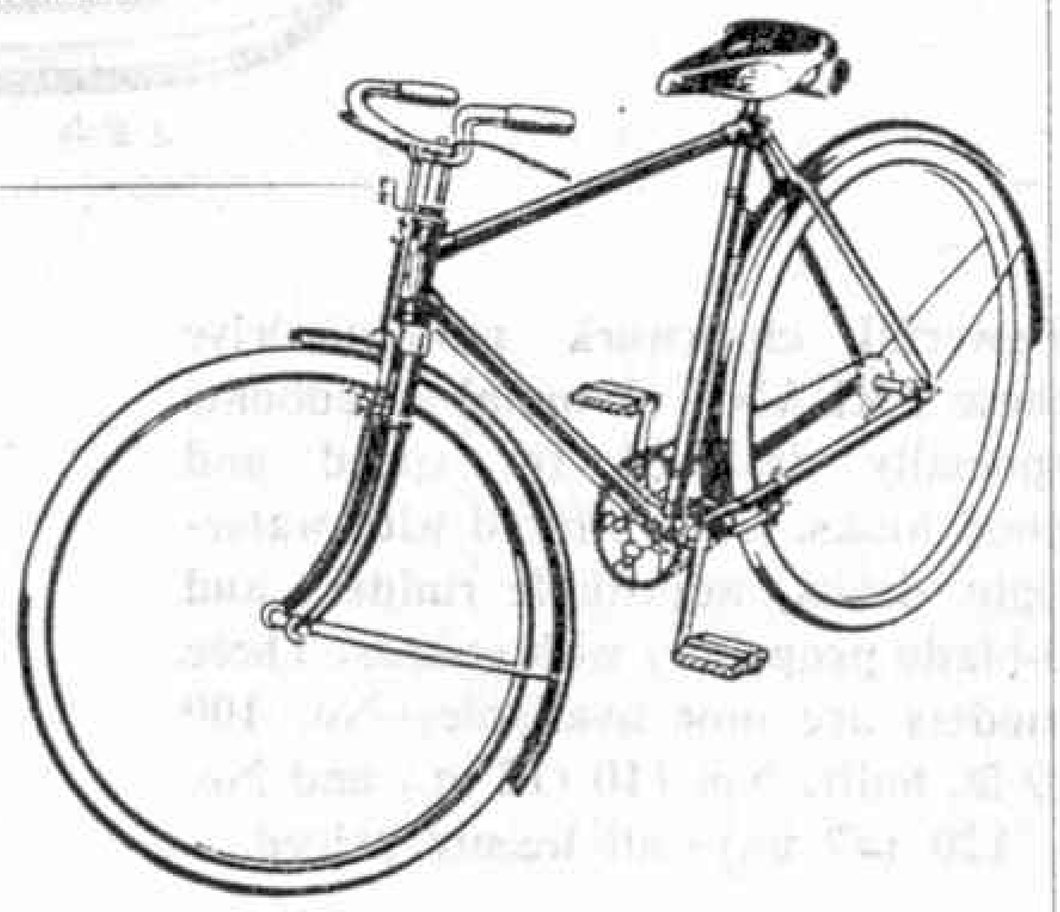
STRENGTH C. I. Thornton, famous County cricketer, made several hits of 150-160 yards.



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Next Month: "LESSONS OF THE AIR LIFT." By John W. R. Taylor

MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

Vol. XXXIV
No. 3
March 1949

With the Editor

British Railways Colours

In *"Railway Notes"* of this issue we give the announcement of the Railway Executive in regard to the colours of British Railways locomotives and passenger stock. In many respects the announcement is vague, but it does away with the fear that has been widely expressed that all future engines were to be black.

Blue is the colour chosen for the heavy-duty types, which presumably will include all classes of 4–6–2s. While dark green has long been a traditional British locomotive colour, many no doubt will regret the passing of the lighter green of the former L.N.E.R. At the same time Western Region supporters will be glad that some at least of their Swindon favourites will have a finish closely resembling that which has distinguished them for so long. There will be many black engines, some with lining and some without. Midland Red, another old favourite, will disappear from the railway scene. Green, as expected, is to be used for electric trains.

Careless Passengers

Last year more than 280 people were prosecuted by the Railway Executive for entering, leaving, or opening carriage doors of trains in motion. It has always seemed to me a most extraordinary thing that passengers should throw open carriage doors when a train is drawing to a stop at a platform, utterly indifferent to the injuries that they may cause to people on the platform. Almost as extraordinary is the habit that some folk display of jumping from a carriage before the train stops, although they are not really in the slightest hurry. Altogether one person is injured every week as the result of carriage doors being opened before the train stops. A new poster just issued by British Railways draws attention to the danger of this practice and appeals to passengers to *"Please Be Careful."*

* * * *

"Night-Flying By Day" is not the contradiction it seems, but is actually a highly important part of the training of R.A.F. pilots. On page 96 Mr. J. W. R. Taylor describes the research that led to a satisfactory scheme for training pilots for night flying without the nervous strain that previously existed. Next month Mr. Taylor will deal with another very topical subject—the great air lift by which the people of the Western Zones of Berlin are kept supplied with food and equipment.

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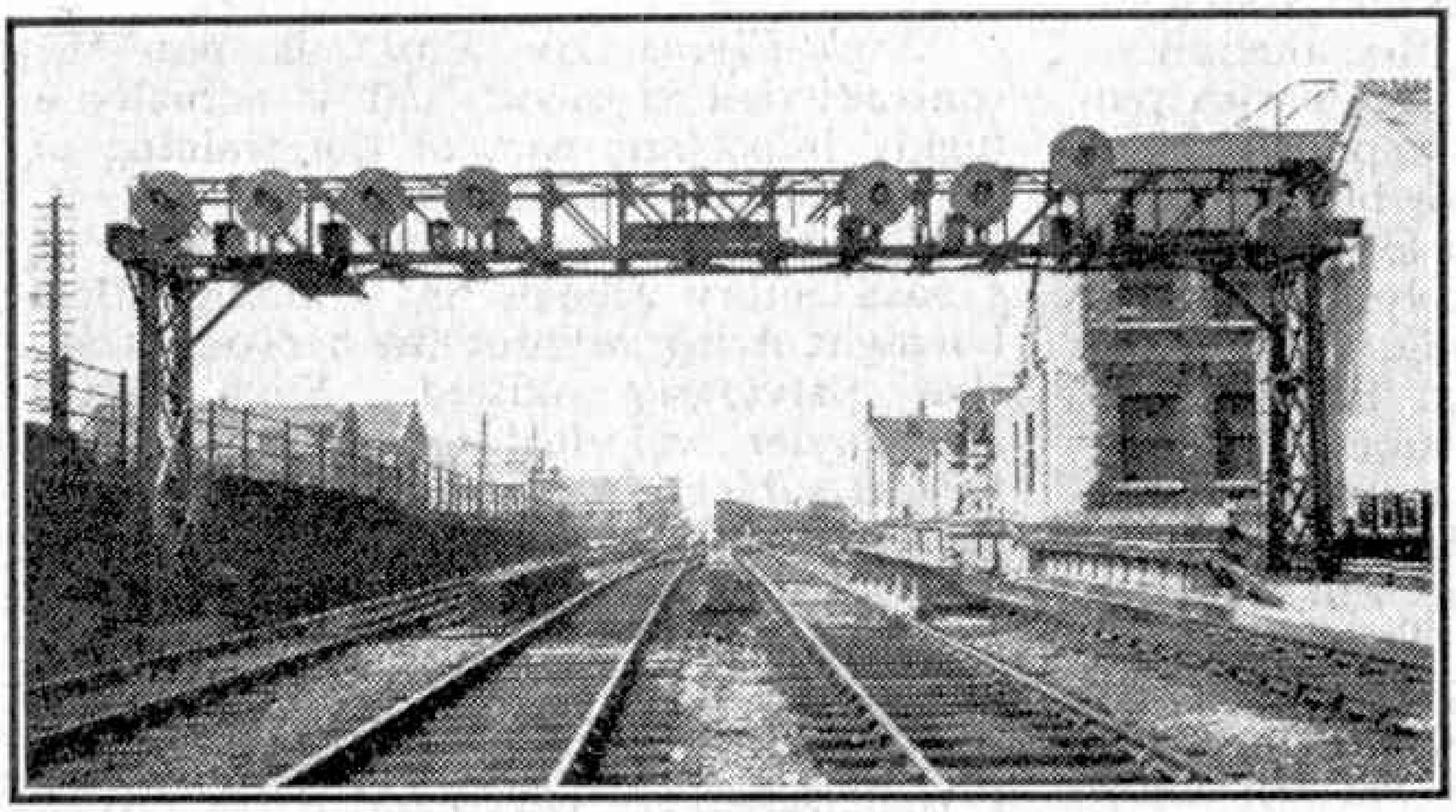
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Railway Signal Aspects

By H. C. Towers, M.I.E.E., M.I.R.S.E., M.Inst.T.
Deputy Chief Engineer (Signals), Bombay, Baroda and Central India Railway

RAILWAY signalling covers a very wide field in mechanical and electrical engineering. There are often wide differences of opinion between signal engineers as to methods of installing a particular system of signalling, and the kind of material and apparatus to be employed. As an instance, the type of signal aspect is perhaps the most controversial subject in the signalling world. People not connected with railway matters sometimes question the necessity for so many different types of signals and ask why some railways adopt methods so different from others. An attempt is made in this article to offer some explanation for these differences, though only of a general nature and with reference to British practice.



A gantry of searchlight signals at Cardiff. British Railways Official photograph.

The type of aspect to be employed is generally governed by situation and not by the system of signalling in use. For example, the familiar semaphore signal cannot be used in a tunnel or other places where clearances will not permit it. A light signal is the only solution here.

The semaphore is one of the most widely used signals in the world and, subject to certain limitations, is very efficient. When it is correctly positioned with regard to background and approach, very considerable sighting distances can be obtained under favourable atmospheric conditions. The night aspect, usually consisting of red and green lights, can also give excellent sighting distances if the oil lamps are well trimmed and maintained. The sighting of signals is of paramount importance, since it is possible for serious accidents to occur even on a lightly-travelled railway in the event of a badly-sighted signal being missed by a driver.

When signals have a background of trees or buildings, the colour-light signal is the better proposition, since it is most efficient against a dark background. Semaphores are also unsuitable in electrified areas where the overhead system of current collection is in use. The cross bracings of the overhead structures interfere with the sighting of signal arms when in the "Off" position, so that in adverse atmospheric conditions "phantom" indications are liable to appear.

The colour-light is superior to the semaphore because it has no heavy moving parts, and also it has constancy of aspect. With the semaphore the day indication is by arm position and at night by the exhibition of light. The colour-light gives the same aspect throughout the 24 hours. This signal, however, cannot be used in remote districts where an electrical supply is not available, unless special arrangements are made. Its installation would depend upon traffic density or special sighting difficulties.

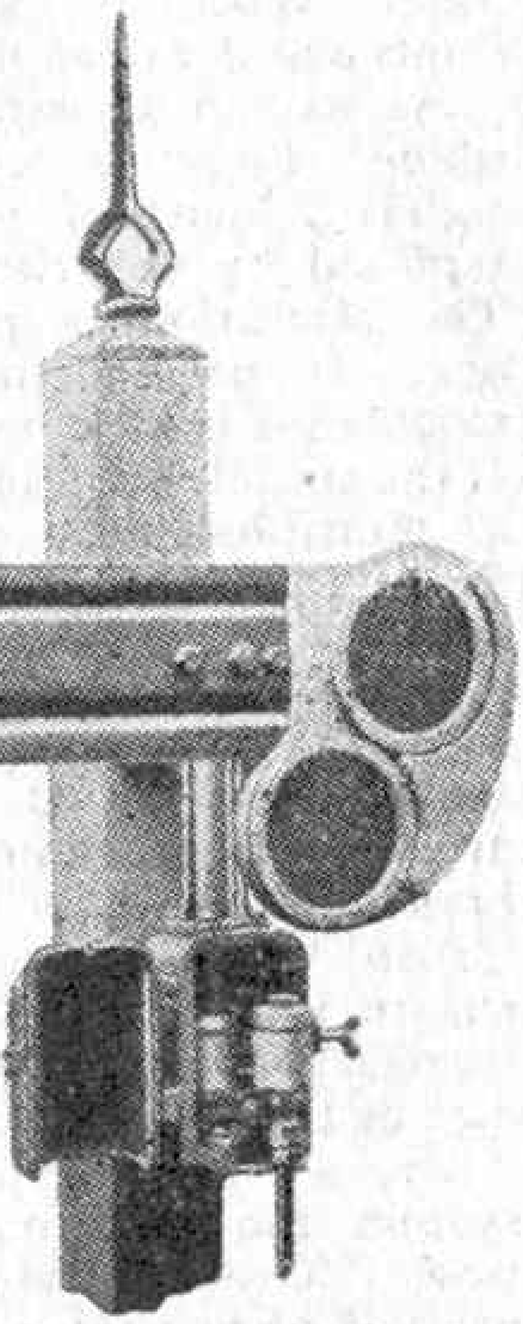
In England the normal equipment for station approach is "Distant," "Outer Home," and "Home" signals. The distant signal is located the full braking distance from the outer home signal. On sighting the distant signal at "Caution" a driver knows that he must be ready to bring his train to a stand at the next signal, if it is at danger. The distant arms are fishtailed, painted yellow with a black fishtailed stripe, and show a yellow or a green light at night. Other arms are red, with a white stripe.

On busy sections of a line, where stations and even signal cabins are frequent, signals are closer together. The distant signal of the next station, or often the next cabin, is frequently found underneath

the starting signal of the previous station. The starting signal is the one at the platform end; this permits the train to start, hence its name. On some sections matters are even more complicated than this. which makes the interpretation of aspects a burden for the engine crew.

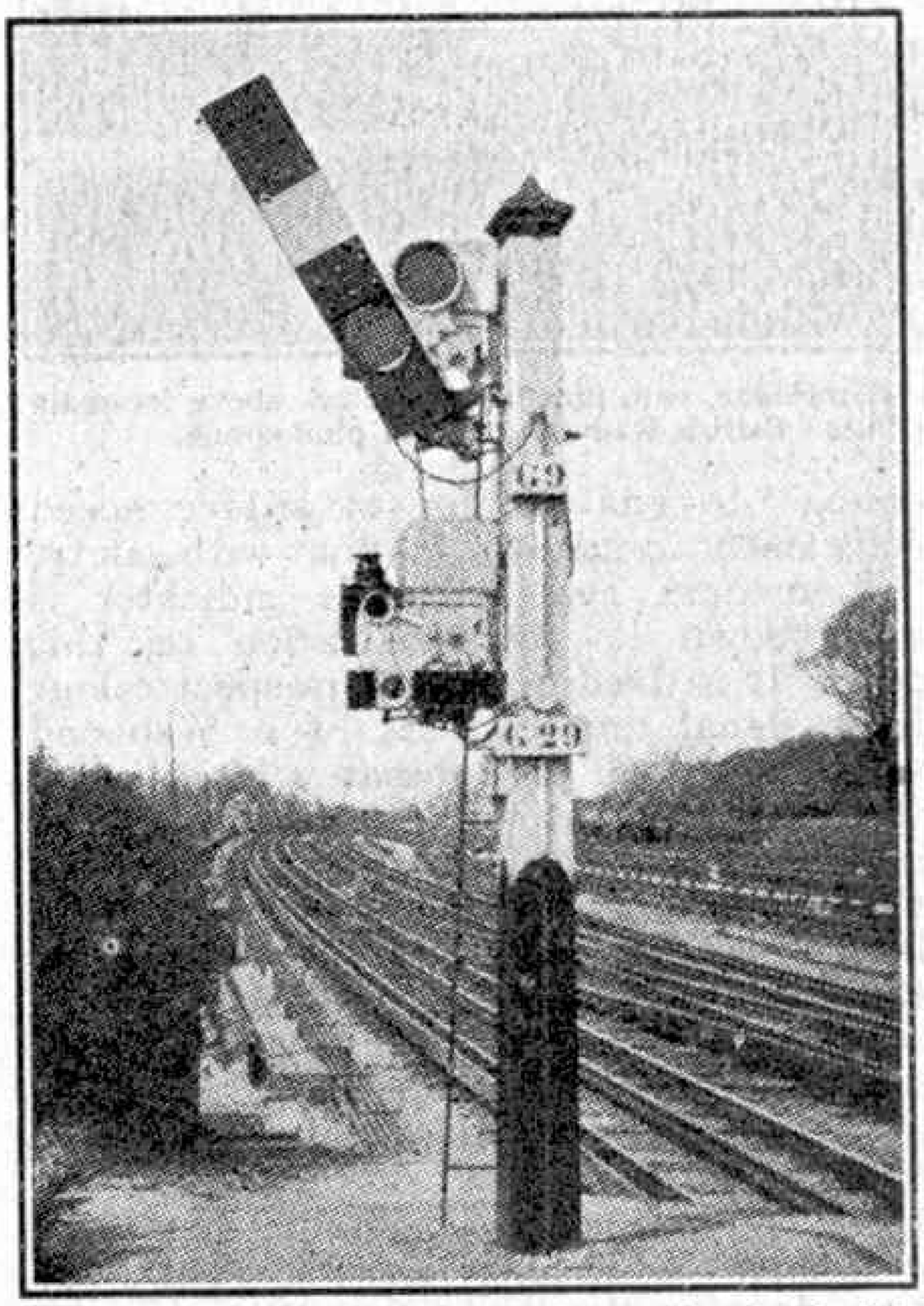
This difficulty is avoided by three-aspect signalling. In this system every signal becomes a distant signal in that it reflects the condition of the next signal ahead. The semaphore arms have three positions, horizontal, inclined upward at 45 degrees, and vertical. The driver receives two indications before approaching a "Stop" signal. The vertical position shows that the next signal ahead is either at the vertical indication, or inclined at 45 degrees, so that there is no immediate need to reduce speed. If the next signal ahead is sighted at 45 degrees the driver reduces speed and brings his train under such control as to be able to come to a stand at the "Stop" signal. The night indications are red, yellow and green.

Three-aspect signalling has been tried with the 45 degrees and vertical positions in the lower quadrant. It was unsatisfactory because the vertical position did not give a good indication and because of mechanical considerations in the operation of the signal itself. Although the signal arms may be mechanically worked, electrical operation is more general since the various positions are usually controlled and operated by track circuits.



An electro-pneumatic semaphore signal as used on some sections of the London Transport lines.

With upper quadrant working the signal arms are elevated to the 45 degrees and vertical positions by an electric motor which is usually fixed at the top of the signal mast and drives the arm through gears. On the signal being released from the vertical position to restore it to "Danger," the arms falls by gravity. On signals operated from signal boxes, the energy developed by the arm returning to "Danger" is used to drive the signal motor as a generator and so return current to the signal cabin in the form of an indication circuit to inform the signalman that the signal has correctly returned to the "Danger" position. Therefore, with upper quadrant working, the return of the signal arm to the "Danger" position is positive, and there is little likelihood of it remaining in a false "Clear" position, except possibly under very severe conditions of ice or snow.



An electrically-operated semaphore signal of the upper-quadrant type.

Where railways are required to be signalled for high speeds and where traffic is dense, the three-aspect system has limitations. The introduction of four or even five aspects permits a driver to run at the maximum speed permissible in the section, having regard to engineering considerations, and yet at the same time to receive early indication of the condition of the line ahead with full braking distance available. The application of more than three positions to the semaphore signal is difficult and cannot be applied, except in conjunction with

other types of signals, as used on Continental railways.

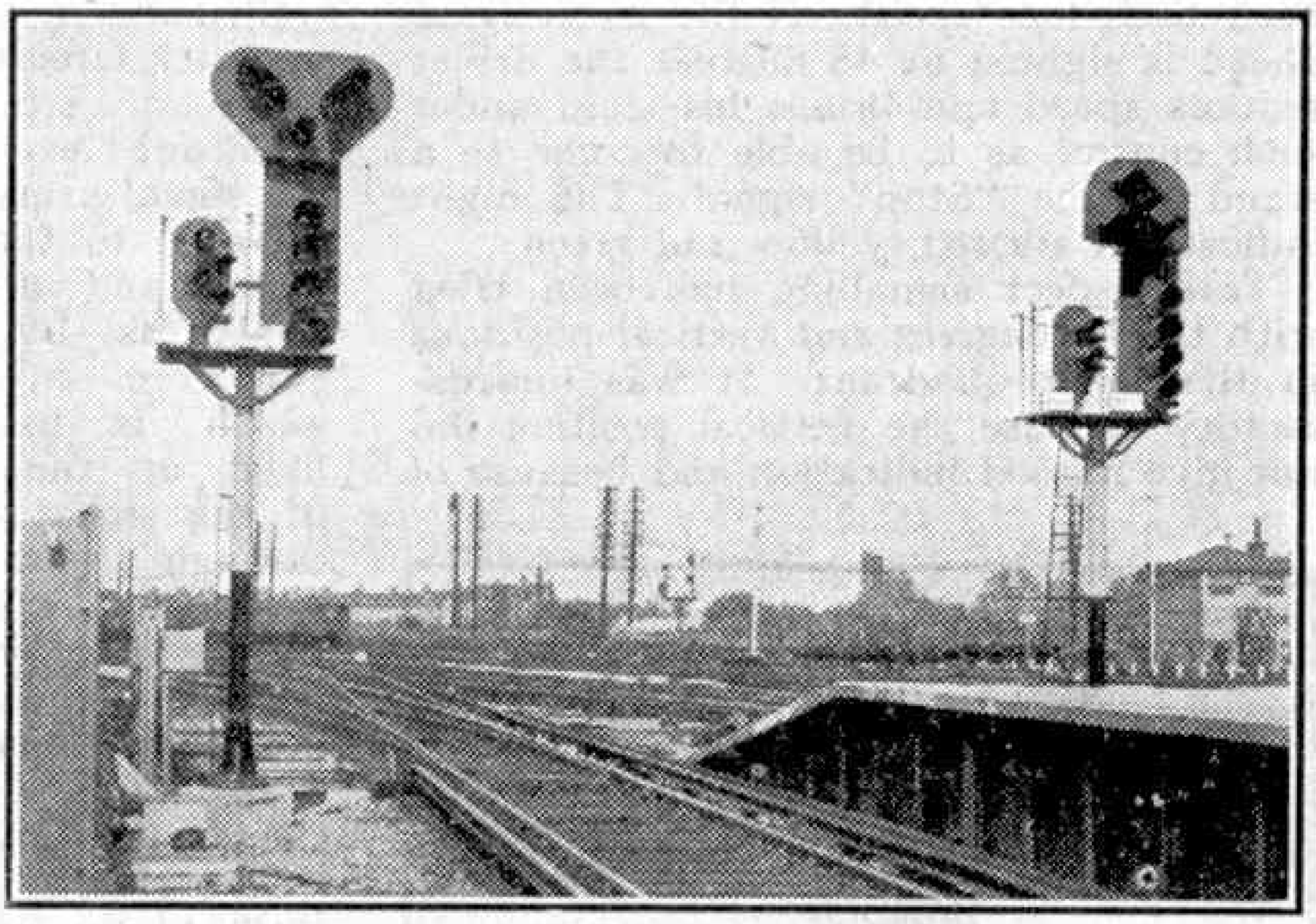
As explained earlier, where the semaphore signal is unsatisfactory from a sighting point of view it can easily be replaced by the two-position colour-light. The alteration is purely an engineering one. If colour-light signals are to be installed it is more usual to take advantage of the simplicity of such signals to introduce a multiple-aspect system that reflects the condition of the next signal ahead as soon as the line is clear as far as that signal. The greater number of aspects used the closer together can signals be spaced, and yet at the same time allow drivers of fast-running trains to commence braking sufficiently far in the rear of a "Stop" indication to ensure that the train is correctly brought to a halt at that indication.

In a four-aspect system the first indication, "Green," means proceed at normal speed. In the event of the fourth signal ahead being at "Stop," the next signal encountered would display two yellow lights warning the driver that he should reduce speed. Assuming the aspect of the fourth signal is still at "Stop," the third signal would display one yellow light, by which time the driver would now have his train completely under control and be prepared to halt at the "Stop" aspect. Sometimes the lights are arranged in the form of a circle. These signals are known as cluster lights.

In addition to giving ample warning to train drivers of the condition of the line ahead, it is also necessary, when approaching stations, to indicate if the train is to be received on the main line or diverted to other lines. It is obvious that a train cannot be allowed to travel over points set for a diverging route at the same speed as for the straight line.

In semaphore signalling these indications are conveyed by means of a number of arms mounted on "dolls" or short posts attached to a main post. The arm of the tallest post applies to the main line. The next tallest, the first to the left, or right, and so on. In large station yards, where several such bracket signals may be necessary, matters become complicated and signal indications difficult to follow.

To overcome this difficulty one signal only is often used, located at the outermost points. A route indicator underneath the signal exhibits a number when the signal is "Off," which corresponds with the road number into which the train is to be received. These indicators are very suitable for medium speeds. They cannot be used when it is necessary to inform drivers of fast-moving trains that they are to be diverted from one line to another, on account of their sighting distance being relatively small. If the driver of a fast train is to be diverted from one line to another he must be informed early enough to enable him to reduce speed sufficiently to take the turnout with safety.



Colour-light signals at Wimbledon, with junction indicators above for main and diverging lines. British Railways Official photograph.

A modern type of route indicator is also shown in the illustration on this page. It is fixed over a four-aspect colour light signal and consists of a V-shaped arrangement of five lunar white lights, three only of which are illuminated to indicate a route. Thus if a route to the extreme left were set up, the centre white light would be illuminated, and the two on the left arm of the "V" and so on.

Some engineers have advocated the abolition of signals altogether in favour of a complete system of automatic train control whereby the driver would be absolved from all responsibility regarding obedience to signal aspects. This has been done on the Post Office tube railway, but this line carries only mail.

The Anderton Boat Lift

OUR cover this month shows the canal boat lift at Anderton, Cheshire, the only structure of its kind in Great Britain. The Weaver Navigation system connects Winsford with the Mersey, 20 miles away, and is the navigable length of the River Weaver. Along it there are four sets of locks, and it approaches the Trent and Mersey canal at Anderton. The canal is 50 ft. higher, and the lift has been built to connect the two waterways, so that barges can pass freely between them.

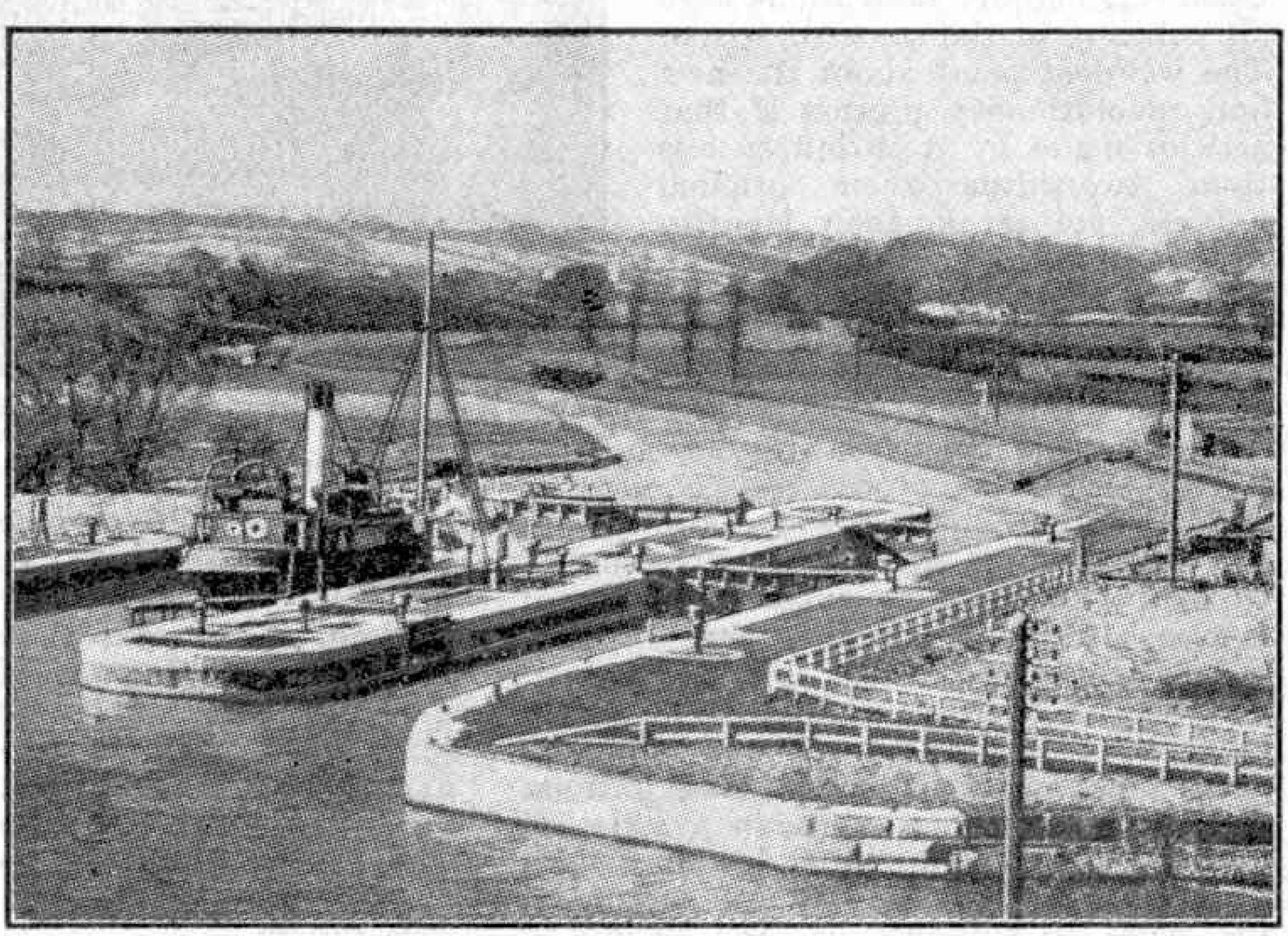
The lift was hydraulic in operation when it was completed in 1875, but is now electric. It is connected to the canal by an aqueduct, 162 ft. 6 in. long, divided into two channels each 17 ft. 2 in. in width. These form approaches to the two 75 ft. tanks of the lift itself, the shafts of which are side by side.

When the lift was hydraulic the tanks were supported on rams 3 ft. in diameter working in the cylinders of hydraulic presses, and one tank was at the foot of the lift when the other was at the top. A barge to be transferred from the canal to the river was floated into the tank at its own level, and water-tight gates at the open end of the tank were then closed. In the meantime a similar operation was carried out at the lower tank, if a barge was there waiting to be lifted from the river to the canal. A small quantity of water was drawn from the lower tank, making the upper one the heavier of the two, and valves connecting the presses were then opened, so that water could flow from one to the other. The heavier tank then moved downward and the lighter one was raised. The watertight doors were opened when the tanks finally came to rest, so that the barges could proceed on their way.

Although each tank when full weighed 252 tons, only a small difference in weight was necessary to bring about the change of level. Actually it provided about five-sixths of the power required; the rest was provided by a smaller ram used to assist in working the lifts.

In this form the Anderton boat lift did splendid work for many years, but early in the present century extensive alterations and renewals became necessary, and it was decided to make it electrical in operation. Now each tank is suspended by wire ropes passing round overhead pulleys, and counterweights consisting of 252 tons of cast iron hang from the free ends of the ropes. Because of this, little power is required to raise a tank, although the total weight moved, including the pulley wheels, is about 570 tons. An electric motor of 30 h.p. actually does the work.

The change to electric working reduced the cost of operations and speeded up the transfer of barges from one waterway to the other.



Saltersford Locks, on The Weaver Navigation system. For this picture, and the one on which our cover is based, we are indebted to the Docks and Inland Waterways Executive.

Glass that Defies Heat

By M. Lorant

AN entirely new method of glass manufacture, yielding products that can be brought to cherry red heat and then plunged into ice water without breaking, has been developed in the research laboratories of Corning Glass Works, Corning, U.S.A., where the great mirror for the world-famous 200-in. Palomar telescope was cast. The discovery itself, and the successful completion of preliminary research surrounding it, rank with the most remarkable glass composition developments of all time.

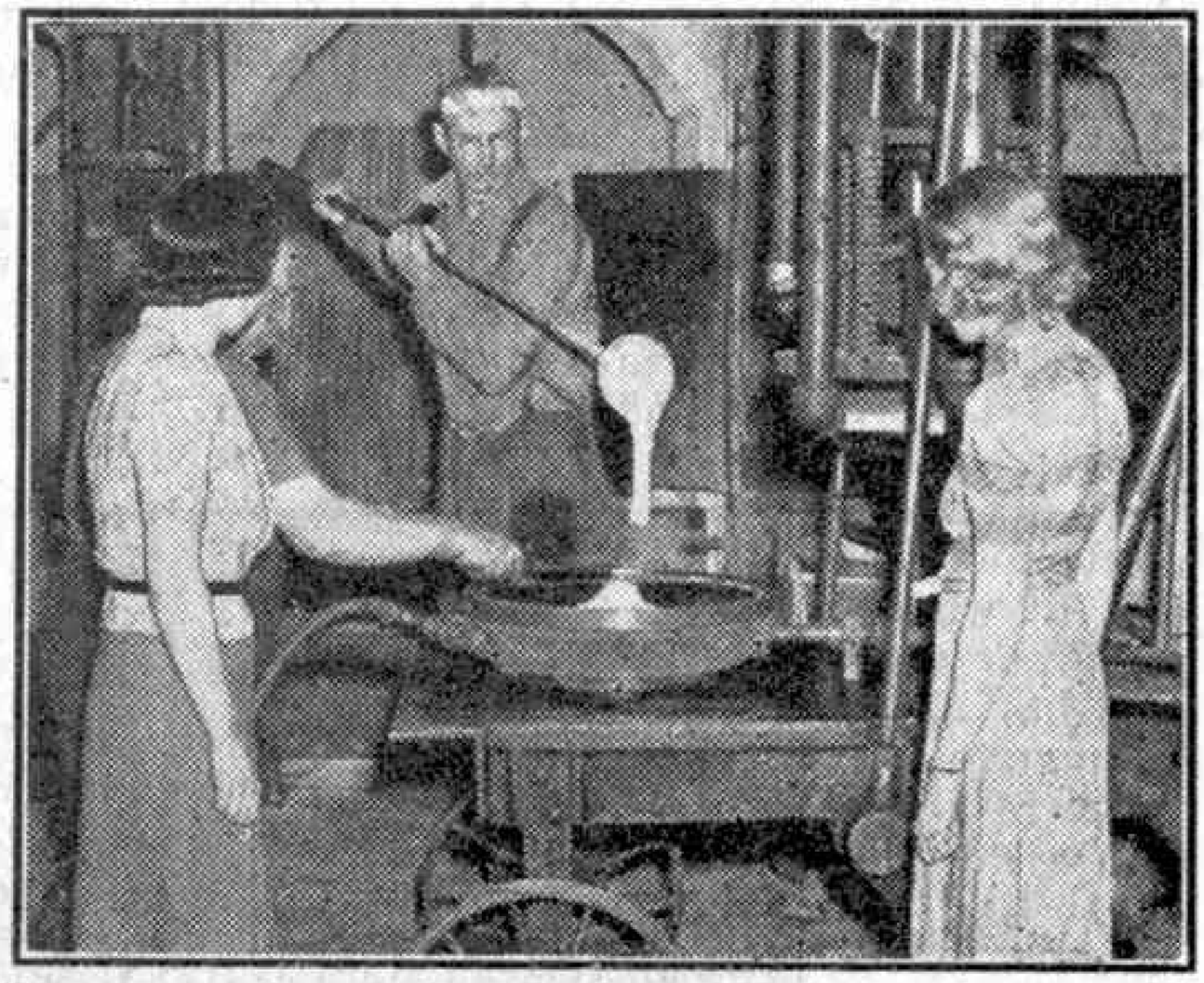
The achievement of this ultra-low-expansion glass is one of those amazing dramas of industrial research in which advance signallings of the undiscovered facts appear fragmentarily like will-o'-the wisps to various investigators, in this case over a period of 16 years. Finally it was found that these fragmentary indications were all pointing in the same direction. The weirdest point about the new and revolutionary process is that articles made by it shrink to less than two-thirds their original volume, yet retain their identity and suffer no distortion of form. This means a shrinkage in any one direction of about 13 per cent. For instance, if you want to end up with a dish 9 in. across, you first make one 10½ in. in diameter.

The new Corning process consists of a series of contrasting operations, and there are several alternative variations at the end which give an amazing variety of results. In simplest terms, what happens in the main process is this. A normal glass object such as a plate or beaker is made by the usual melting and moulding operations, but with a special glass formula to start with. Then, through a series of treatments, involving final leaching with dilute nitric acid, part of the structure of the glass is removed, leaving behind a skeleton, so to speak. Under further heat treatment the glass shrinks down to a volume that is 35 per cent. smaller than its original size.

As a matter of fact, during the acid treatment 36 per cent. of the body of the glass has been removed. The surface feels rough to the touch, but does not seem porous, although the glass at this stage has in it sub-microscopic capillaries or air spaces. On final heat treatment the glass body shrinks to a transparent, homogeneous state. In this completed state the glass can be heated to a bright cherry red colour, and then dipped into a vat of ice water with no injury whatsoever.

The outstanding significance of the new low-expansion glass is that it will offer in an economical price range a material similar to fused quartz, as it contains about 95 per cent. of silica, the oxide of the element silicon, of which quartz is a crystalline form. It was just over a hundred years ago, in 1839, when A. Gaudin, in France, showed that molten quartz could be worked like glass. A quartz crystal can be melted at the high temperature of the oxy-hydrogen flame, and in that manner can be formed into various vessels chiefly for laboratory use. The resulting silica glass stands sudden changes from hot to cold without appreciable injury.

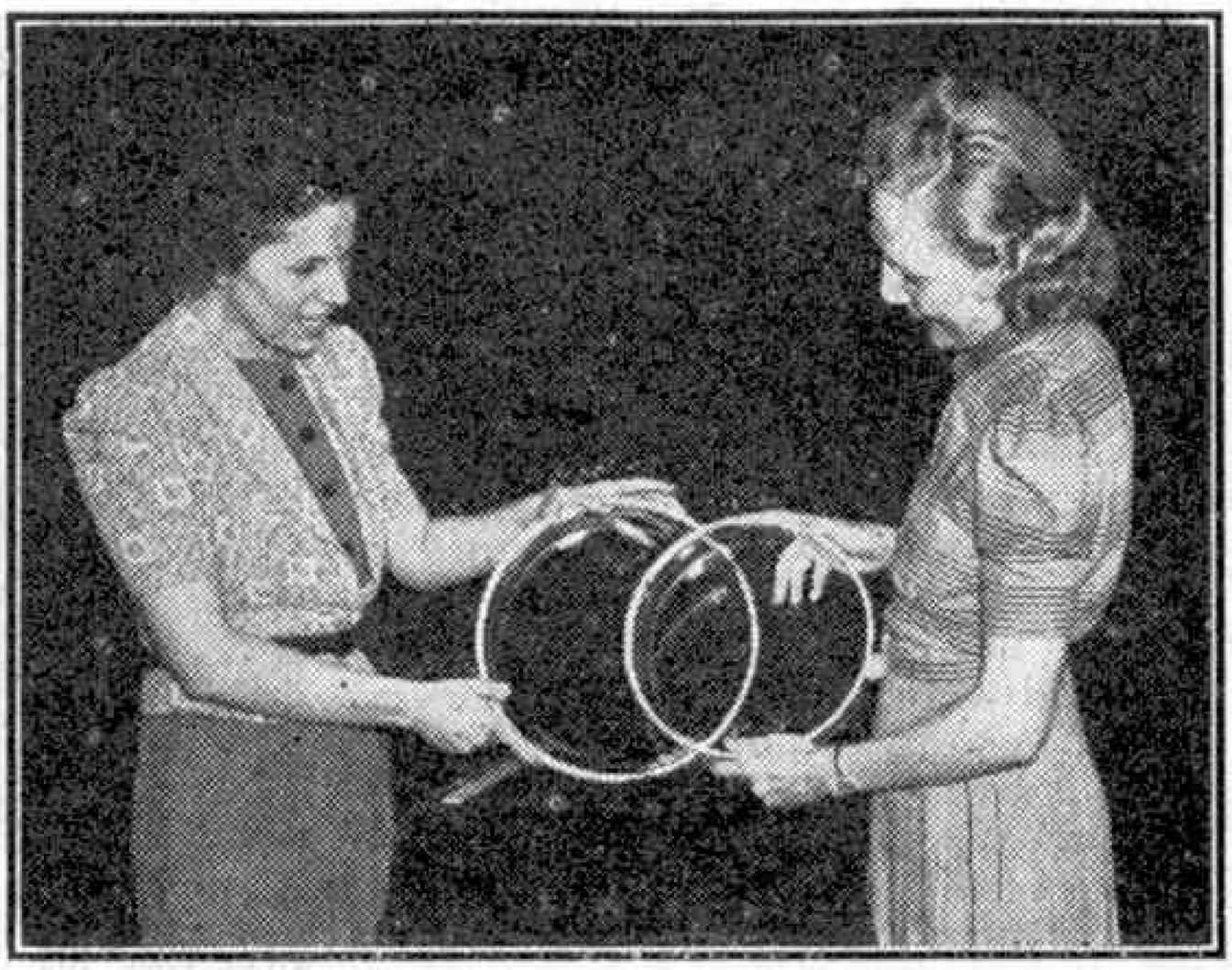
Fused quartz, or, better, silica glass, has not been found adaptable to mass production methods of fabrication, and hence its application outside of special fields has been curtailed. The new glass product is equal to fused quartz silica ware for practical purposes, and the indications are that it can be manufactured by mass production methods and at resultant low



Molten glass brought from the furnace to the hand press mould. A glass worker uses special shears to cut off the exact amount required, judging the moment to do this by long experience.

cost. The process has been definitely achieved from a research standpoint, but it is still subject to continuous experimentation with a view to standardization and improvement.

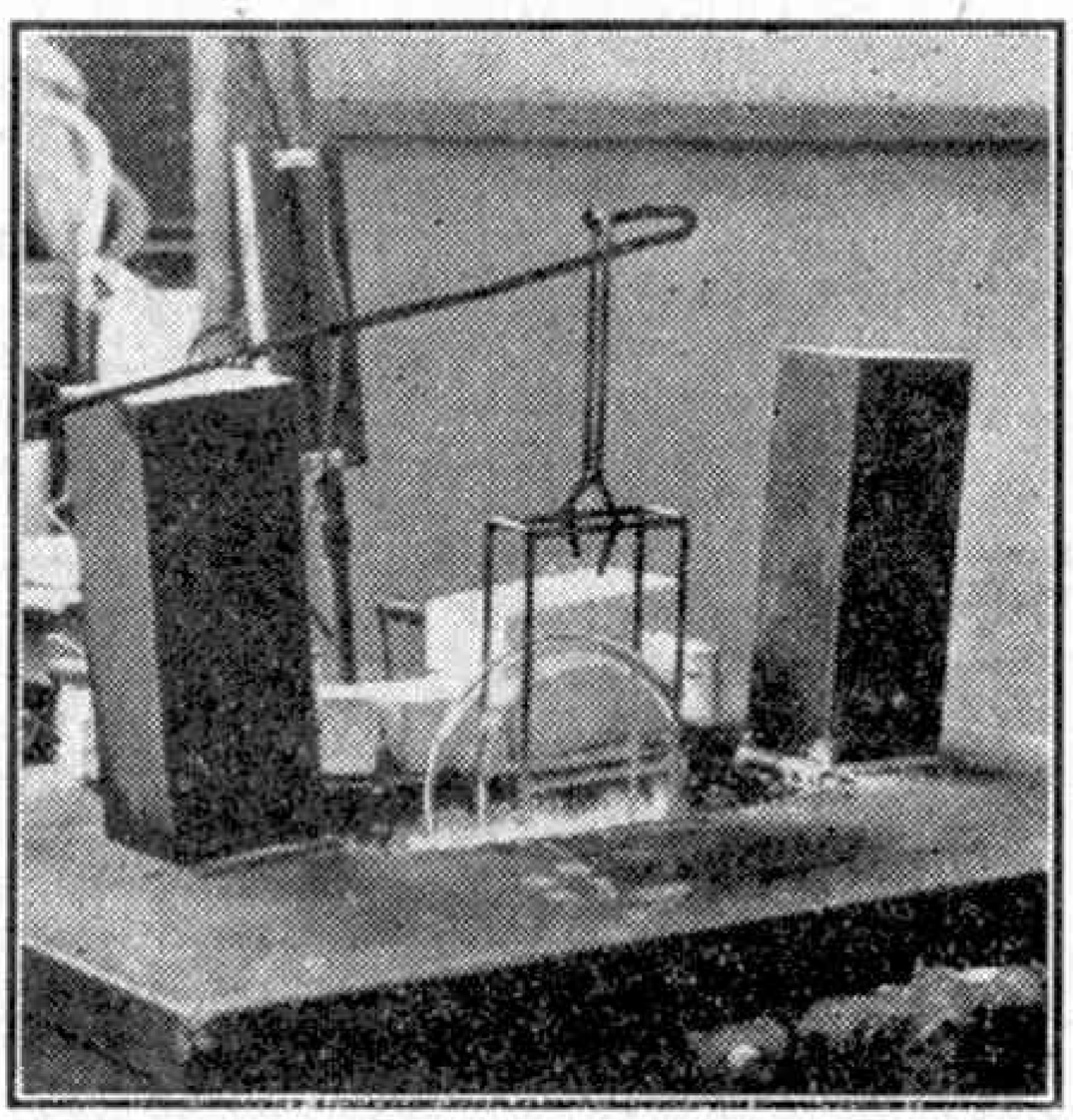
To understand the significance of this development one must recall that in olden days glass expanded so much when heated, and contracted so much when chilled, that it would invariably break when subjected to extremes of temperature. Fused quartz is practically shock-proof thermally, but is not a mass production commodity. The chief difficulties in fusing it are its high melting point, lack of suitable refractories in which to melt it, and the fact that the melting and vaporization points are close together. In price range it is relatively high.



Low expansion glass shrinks during the manufacturing process. Ware 12 in. in diameter after the preliminary operations is only 10½ in. across when the new process is complete.

Back in 1915, Dr. E. C. Sullivan, Research Director, and Mr. W. C. Taylor, Chief Chemist, of Corning Glass Works, invented a range of glasses known technically under the classification of borosilicate glasses. These glasses, which have received wide public acceptance under the Pyrex trade-mark, are highly resistant to thermal shock.

Until that time all laboratory glass in use in the United States had been imported from Europe, particularly from Jena. The imported vessels were thin-walled and broke easily under the pressure of a stirring rod. The Sullivan and Taylor glasses, in addition to offering thermal shock resistance, could be made with thicker walls than the German ware and hence were more durable.



Ware made of the new glass does not break when heated to a temperature of 950 deg. C. and immediately plunged into ice water.

The next milestone in heat-resistant glassware was announced by Corning in January of 1936. It marked the achievement of cooking utensils that would not only withstand oven heat, but also could be heated directly over the open gas flame or an electric heater coil. As a man in the street puts it, eggs could now be fried in glass, and you could look at their undersides while cooking! The present milestone marks the third big advance in progress toward overcoming completely one of the greatest limitations of glass, namely its tendency to break when suddenly heated and chilled.

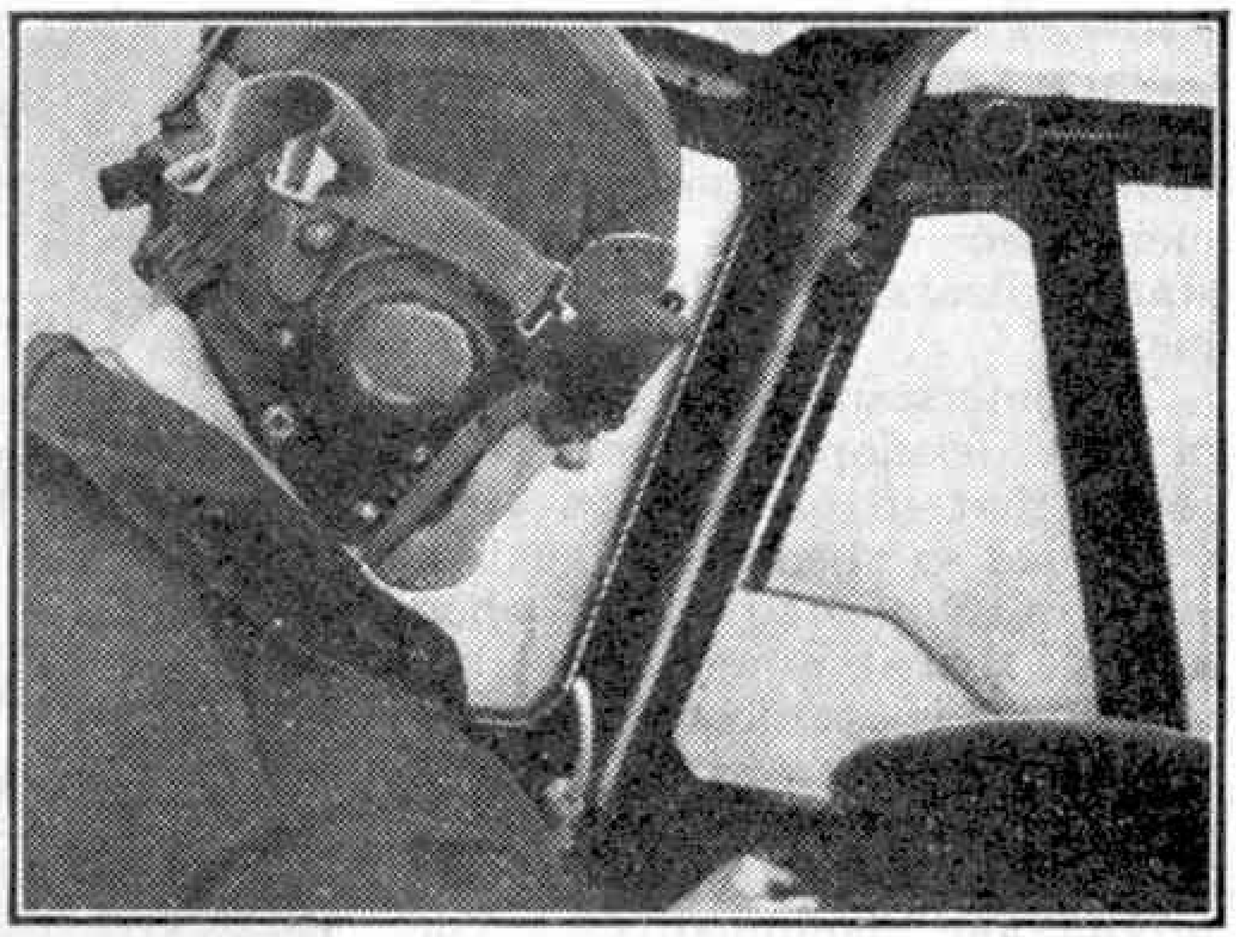
In the new Corning glass-making method the starting object, say a dish, flask, beaker, or tube, is produced from certain original types of borosilicate glasses that are somewhat unstable. By means of heat treatment these glasses are separated into two phases, one being rich in silica and highly stable, the other containing substantially no silica and being very soluble in the common acids. The second phase is then extracted by leaching in an acid bath for some period of time, which leaves a skeleton-like structure of high silica glass. This is then fired to condense the structure, which is porous, into a clear, solid mass. It is during this final heating that the ur anny shrinkage occurs

Night-Flying by Day

By John W. R. Taylor

MANKIND has sweated and toiled for countless centuries to find a way of turning night into day, and has achieved a high measure of success with such devices as mercury-vapour and sodium lights. It was inevitable that some bright person would one day want to go to the other extreme and seek a way of turning day into night.

As a matter of fact, the idea is not as silly as it sounds, for the Royal Air Force often has a very good reason for wanting to convert day into night.



A pilot receiving night-flying instruction in daylight. The combination of his blue-glass goggles and the amber panels fitted over the windscreen produces the required blackout. Illustrations to this article are by courtesy of the Editor of "Hunting Aviation Review."

It is little use having the world's best bombers and fighters—or civil air liners—if they can be operated only in daylight. It robs the bombers of their best protection—the night sky—and the air liners of 50 per cent. of their earning capacity. Consequently pilots must be taught night-flying, and that is where the trouble starts.

The ground looks very different at night, especially to a pupil pilot, and things were even worse during the war when blackout

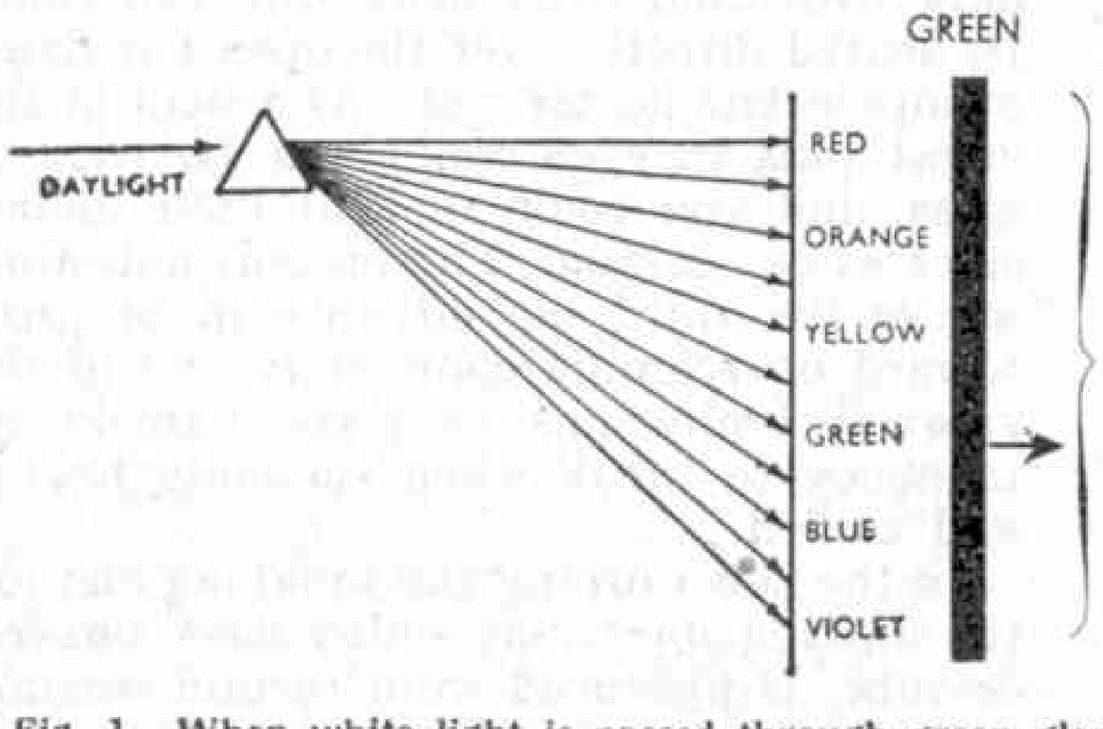


Fig. 1. When white light is passed through green glass, only green rays are transmitted; the remaining colours of the spectrum are cut out.

removed all the twinkling lights that had been a solace and help to peace-time pilots. Valiantly R.A.F. flying instructors tried to persuade their fledglings that external aids are not nearly so useful to a night-flying pilot as his cockpit instruments. The pupils discovered all too often that, during their first night flight, with a wide expanse of nothingness below them, all the instruments seemed to look alike, and not at all helpful. And there were an awful lot of bent undercarriages and broken wing-tips to be swept up at dawn.

What was wanted, in fact, was something to turn day into night, so that pupils could do their night-flying by day.

A method in use before the war had consisted of sitting the unfortunate pupil under a domed canvas hood in the open cockpit of a two-seat trainer, so that he could fly in daylight and yet see nothing outside the cockpit, which was lit by a frail glimmer of electric light. The psychological effect of flying along "blind" even at a modest 100 m.p.h., in a small "box" with only a few instruments for company, can be imagined. It made night-flying the most dreaded part of a pilot's training.

But it was the best that could be done, until one day an R.A.F. officer who happened to be a photographer and knew a thing or two about colour filters had a bright idea . . .

Experiments had already been made using dark glasses fitted over pilot's goggles, in an effort to simulate darkness. But this made the cockpit dark as well as the sky and the pilot could not see even his instruments. On the other hand, as any photographer knows, by fitting a coloured filter in front of a lens the passage of certain definite colours can be restricted while the others are let through quite normally.

The reason for this is that daylight is made up of all the colours of the spectrum —as we can see when it shines through

raindrop "prisms" and is broken up to form a rainbow. If we look through a green glass, however, everything appears green, because the glass takes out some of the colours of the rainbow and lets green predominate (see Fig. 1). The same

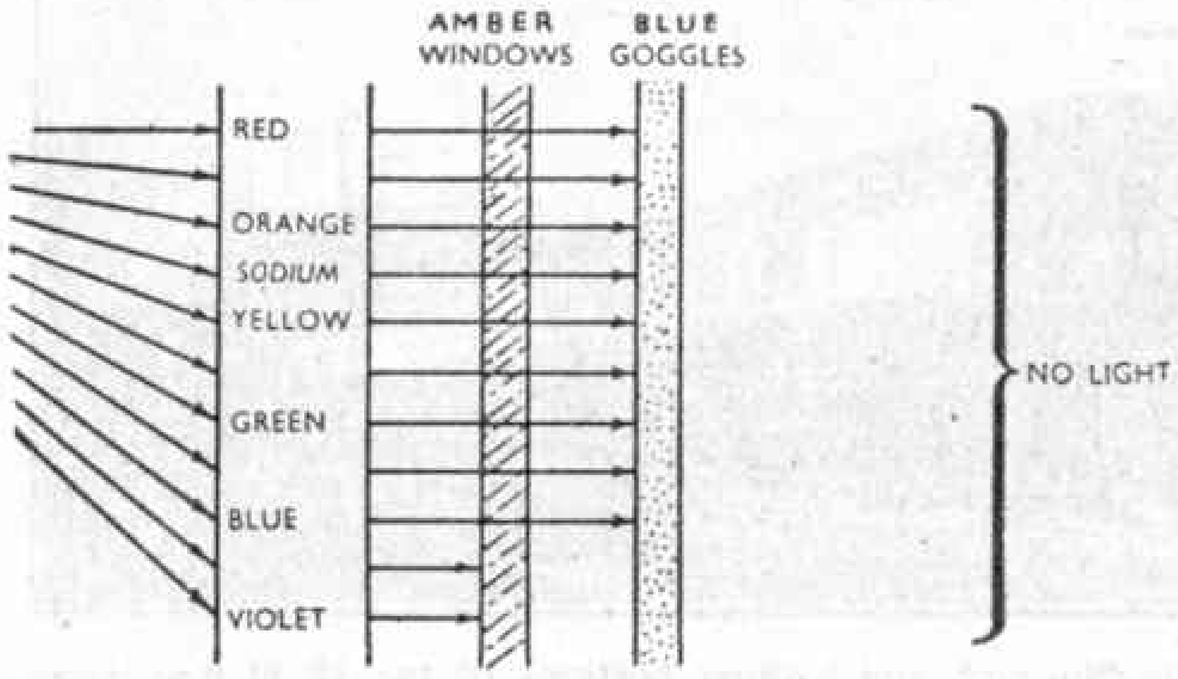


Fig. 2. The combination of an amber window with blue goggles cuts out all light.

thing happens with other colours.

So, by careful choice of coloured filters it is possible to cut out certain colours and, in fact, by making light pass through two or three different filters it is possible to reach the stage where only one colour is left. Consequently, argued the R.A.F. man, it should be possible to find a combination of filters that would restrict all colours and so achieve complete darkness in daylight, which was what Training Command wanted.

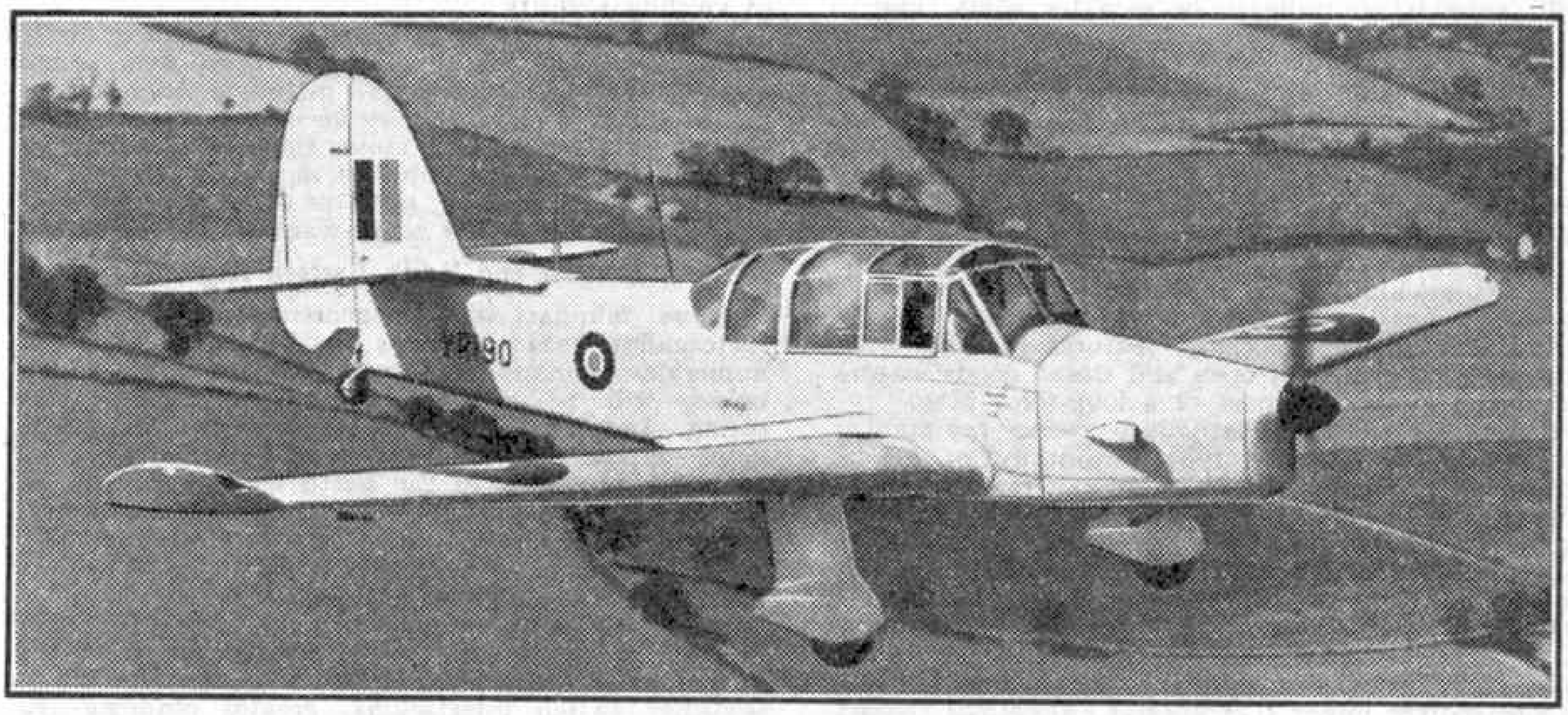
Unfortunately, it was not as easy as it sounded, and months of careful experiment followed. At last, however, the theory was proved correct, when a combination of amber and blue filters was found to produce a perfect blackout (see Fig. 2).

The scheme was tried out on a Service training aircraft, using amber panels fixed over its windscreen and blue glasses in the pilot's goggles. It worked perfectly; nothing was visible outside the cockpit, but, as the instruments were inside, the pilot's vision of them was only slightly impaired by the blueness of his goggles. Naturally, the amber panels were fixed so that they could be moved aside when not required, for night-flying forms only a small part of the training curriculum.

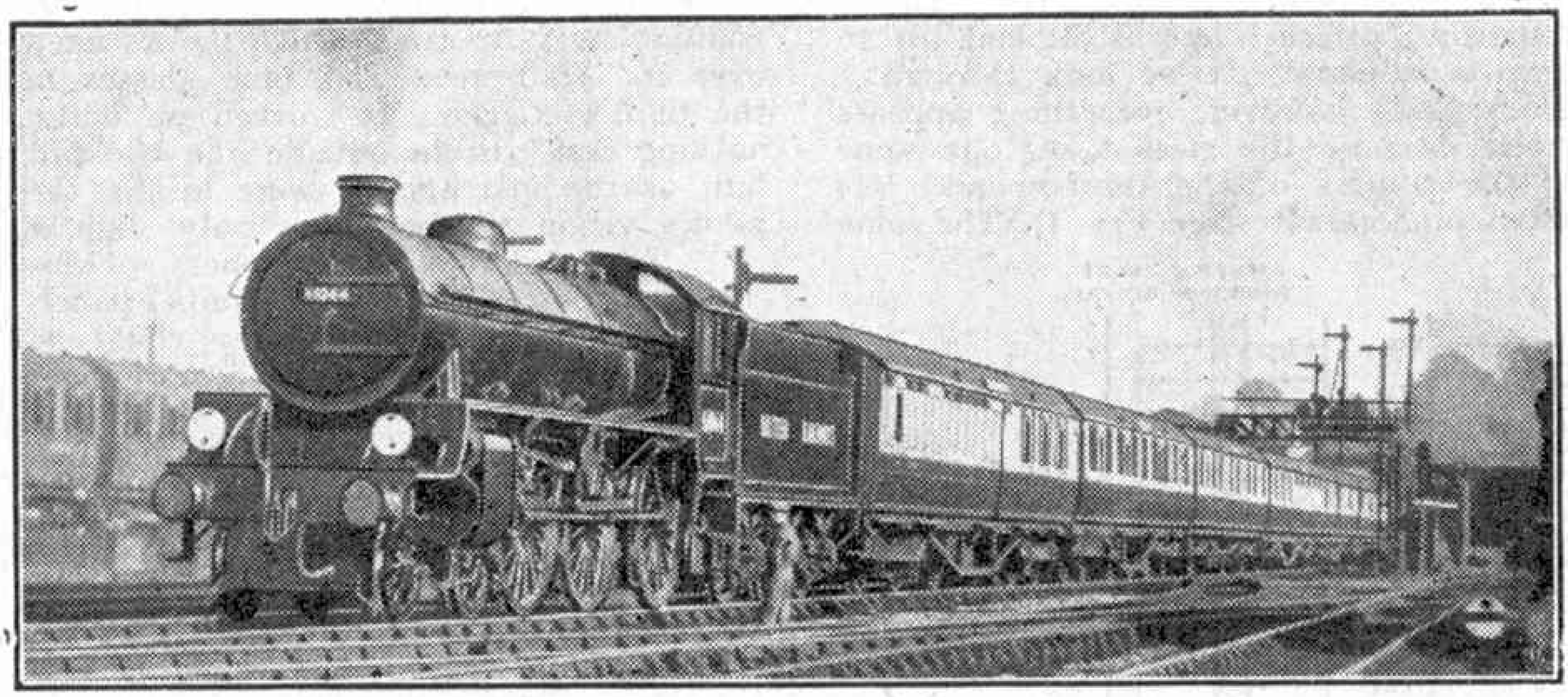
It was soon decided to adopt the scheme as standard for R.A.F. basic night-flying instruction; it was given the official name of "two-stage amber" and its fitting became a standard requirement for all new basic trainer aircraft.

First new aircraft to be equipped with two-stage amber was the Percival "Prentice" 3-seat trainer, illustrated below. In this case, the amber panels are designed to cover the four flat panels of the windscreen and the forward half of the side panels in the sliding hood. This achieves the necessary standard of blackout in front and to both sides of the aircraft, while letting in enough light over the pupil's shoulder to enable him to see his instruments clearly. When necessary, the amber panels over the windscreen can be moved aside with one hand in a few seconds.

Similarly, the R.A.F.'s two new trainers —the Avro "Athena" and Boulton Paul "Balliol"—are both fitted with two-stage amber equipment. So, night flying has lost its terrors, for by simply raising his goggles a nervous pupil can now at any time turn night back into day.



The Percival "Prentice," a 3-seat machine designed as an elementary trainer for the Royal Air Force.



British Railways 4-6-0 No. 61044 leaving Ipswich with Norwich and Cromer portions of the 12.30 p.m. from Liverpool Street. The train is finished in an experimental livery. Photograph by G. R. Mortimer, Manningtree.

Railway Notes

By R. A. H. Weight

British Railways New Liveries

The Railway Executive have now decided the future liveries of British Railways locomotives and passenger rolling stock. Blue, with black and white lining, is reserved for heavy-duty express passenger engines, while certain classes of passenger engines will be dark green, with black and orange lining. Other passenger and mixed traffic locomotives will be black, with red, cream and grey lining; freight engines will be unlined black.

Main line corridor stock will be crimson lake with cream upper panels, but local steam stock and passenger type vans will be crimson lake only. Multiple-unit electric stock will be green.

The decision follows the experiments begun last year with various tentative schemes. The new liveries are to be adopted gradually as circumstances permit, so that the previous standard, and temporary or experimental finishes as referred to elsewhere in these "Notes," will probably continue to be seen for some time.

National and Scottish News

As part of an extensive programme for standardizing the locomotives and rolling stock of British Railways in order to secure, gradually, more economical production and maintenance, various designs are being drafted of vehicles suitable for mass production. A standard all-steel railway carriage type is being evolved, while designs are well advanced for the first two standard types of British locomotive. Work is also in hand on a diesel shunting engine, and the most suitable constructional features and materials for standard classes of open and closed goods wagons are being studied as part of a long-term plan.

It may be possible eventually to reduce the number of different locomotive types ordinarily in use to about 12, instead of the 400 now existing among the 19,726 engines that represent many year's practice, as developed by the Chief Mechanical Engineers or Locomotive Superintendents of numerous independent companies. This would not mean, however, that new ideas or improvements would not be considered as they arise, or that long-existing standards would necessarily be swept away if they had proved of value.

The Motive Power (Locomotive Operating) Departments of each Region have been raised in status, and their Executives report direct to the Chief Regional Officer or the functional members of Railway Executive concerned. In the Scottish Region, for commercial, engineering and other administration, each appropriate Superintendent will control lines and rolling stock of the former L.M.S. and L.N.E. systems, there having been a general merger north of the Border.

The former Cheshire Lines Committee tracks and traffic working have now come under control of the London Midland Region. Formerly, locomotives for that separately-managed, jointly-owned group of lines had been provided by the L.N.E.R.

We learn that the Midland type 4–4–0 Compound engines have been doing good work on the difficult Dumfries-Stranraer route.

The B.S.A. Truck Mover

B.S.A. Cycles Ltd., Birmingham, have marketed an ingenious mobile Truck Mover for use in railway goods yards or sheds. As may be seen from our illustration, it can be handled by one man, being self-propelled by an air-cooled petrol engine, which also operates the powerful hydraulic ram that locks the truck mover securely between the rail and the underbody of the wagon. The appliance can then move the wagons, up to 10 at once if necessary. A three-speed gear-box permits operation over gradients of varying severity.

The truck mover is fitted with solid rubber tyres on its two steel wheels. It can travel over rough ground as well as on rails including traversal of points and crossings. It may be used to turn wagons on a turntable, also to move them in a siding or depot. Thus it is available at any time when there might be no locomotive, horse or other motive power available, and so fulfils many wants.

Eastern and North Eastern Regions

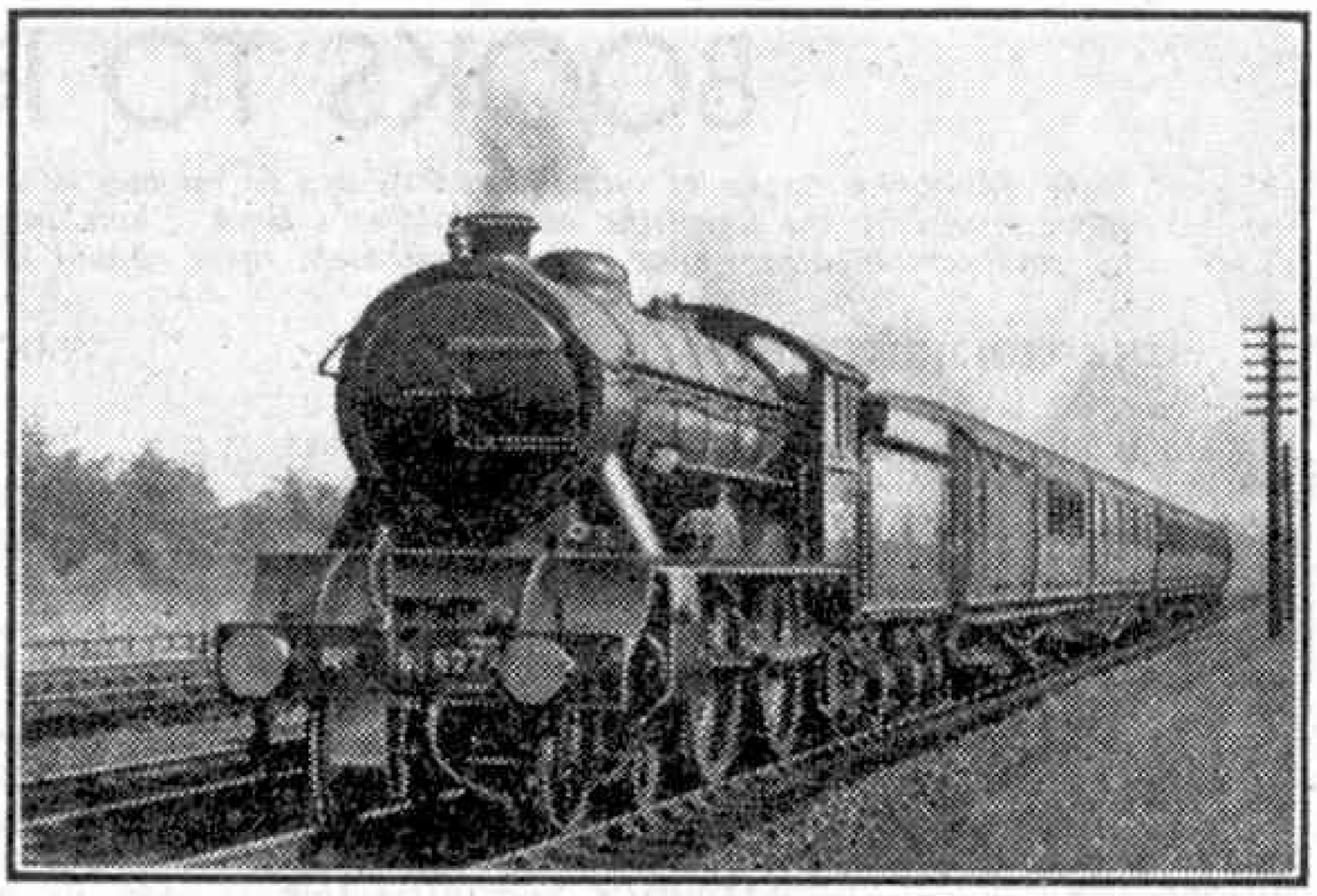
Those familiar with Doncaster station and its surrounding maze of lines, with their almost innumerable semaphore signals worked from many boxes, will be observing enormous changes this spring. Indeed it is possible that by the time these notes appear in print the whole traffic working, including junctions to the north and south, will be controlled by colour-light signals, with points power-operated from one or other of the new electrically equipped signal boxes. These are replacing six mechanical boxes of the old type.

The panels in the new cabins show track layout in diagram form. Routes are set up and points moved in groups by means of an entirely new system of sequence switch interlocking, greatly reducing the number of lever movements necessary as well as

abolishing the fatigue due to pulling hundreds of levers manually every hour as hitherto required.

"B1" 4–6–0 engines are working through regularly from Cleethorpes to Birmingham and back, in charge of L.M.R. crews west of Nottingham. The route is via Lincoln (Midland), the Newark level crossing of the East Coast main line, Nottingham and Leicester. Rebuilt G.E. 4–6–0s run from the former M. & G.N. Joint line stations to Leicester, L.M.R.; they have also been noted at Nottingham on excursion work. Ten "B1s" are building at Gorton, numbered 61340–9. New "A1" 4–6–2s are stationed at York, whence they work through to King's Cross.

A recent innovation is the allocation of several "L1" 2–6–4Ts as new engines to Grantham shed. "A3" class 4–6–2s "*Tranquil*" and "*Harvester*" have left Works again, painted experimental blue with red lines. "*Gladiateur*" and "*Galopin*," of the same class, are the first "Pacifics" stationed at Darlington. Class "F7," small 2–4–2T, is now extinct.



A York-Leeds train headed by No. 62743 "The Cleveland" of the D49 "Hunt" class. Photograph by C. Ord, York.

At least two G.N. Section London suburban set trains are painted a rather bright red. The green "B2" 4–6–0 No. 61671 "*Royal Sovereign*" hauled the Royal Train in January last and is often seen on Cambridge-King's Cross buffet car expresses.

London Midland Regional News

A Euston-Manchester express has been recently formed of coaches painted cream and carmine; the latter hue is described as "something between Post Office and Midland red" so provides a pleasing effect. Engine No. 45503 is now named "*The Royal Leicestershire Regiment*"; No. 45536 "*Private W. Wood, V.C.*" is rebuilt to "6P" and is running with a "Jubilee" type tender. Self-contained steam railcar No. 29988, just withdrawn, was the last of its kind to remain in service. It was built in 1906 and belonged to a type once popular and in considerable use in Britain.

With a view to clearing drifts of snow before they become serious, on bleak or mountainous stretches of line such as Settle-Carlisle, 76 engines of the 4–6–0, 2–8–0, and 2–6–0 types are fitted with new-style snow ploughs, carried entirely beneath the buffers, which can remain in position all winter without interfering with ordinary running duties. For coping with worse conditions, new all-welded larger ploughs have been devised for attachment in front of "4F" 0–6–0s.

Western and Southern Tidings

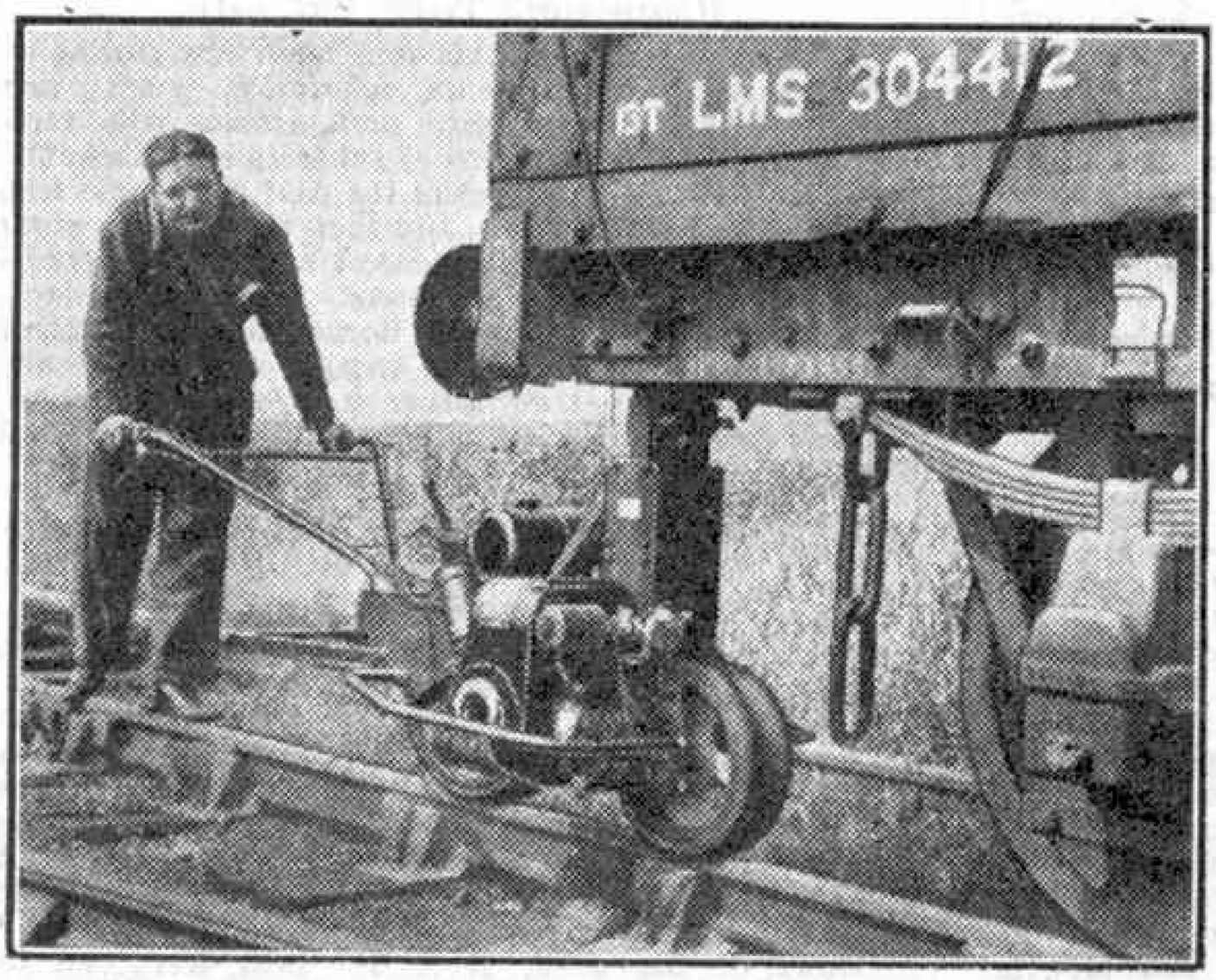
It is interesting to note that the famous "Castle" class has attained its silver jubilee, as it was introduced by the G.W.R. at Swindon in 1923 as an enlargement of the 4-cyl. "Star" class 4–6–0. The design proved an instant success, and "Castles" have distinguished themselves over the difficult grades of Devon and Cornwall, as well as in exceptionally fast running between Swindon and Paddington. There are 151 of them, 145 built as "Castles," the remainder brought into the class on rebuilding. The most recently completed example is No. 7017, "*G. J. Churchward.*"

The only alterations as compared with the original design to be seen in the most recent batches are a shorter chimney, enlarged super-heating surface, and the addition of mechanical lubricators. "Kings" are now shedded at Bristol, Bath Road. Many mixed traffic tender and tank engines are painted black, with lining.

On the Southern Region, the batches of new 4–6–2 locomotives lately under construction were almost completed at the time of writing, the last engines being No. 35030 of the "Merchant Navy" type and No. 34090 "Battle of Britain" class. Several of the former have been finished in yellow-lined malachite green and provided with 6,000 gall. tenders, going to Bournemouth shed and so releasing some "Lord Nelsons." These have gone to Eastleigh depot, though still engaged on similar Bournemouth - Waterloo duties. Nos. 35022–3 respectively are named "*Holland-America Line*" and "*Holland-Afrika Line.*"

"Battle of Britains" Nos. 34087–90 are allocated to Ramsgate, several changes having taken place in the shedding of earlier light 4–6–2s. Apparently none of the 4–cyl. Drummond "Paddlebox" 4–6–0s is working. Nos. 445, 459 and 460 recently left Eastleigh for the scrap yard.

"Battle of Britain" No. 34078 has been named "*222 Natal Squadron.*"



The B.S.A. Truck Mover in action. This appliance is described in the accompanying notes. Photograph by courtesy of B.S.A. Cycles Ltd.

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, and certain others that will be indicated, these should be ordered through a bookseller.

"THE CHILDREN'S BOOK OF LONDON"

By L. G. Bullock (Warne. 7/6)

This is the wonderful story of how London has become the greatest city in the world. It is told in simple fashion, taking us back through the 2,000 years of the city's history from the days of the ancient Britons through those of the Romans, Saxons and Danes down to the present time. With the author we travel along well-known highways and byways while he tells us about the interesting places in them, and the great men who have made them famous. There are many black and white drawings for illustrations, with sectional maps in colour, and at the back of the book there is a complete folding children's map of London. An unusually interesting and attractive book of its kind.

"WORLD OF LIVING THINGS"

By Kenneth Sparrow
(Vawser & Wiles. 7/6 net)

This little book is intended for those coming to the study of biology for the first time, but it is not by any means a text book, even an elementary one, for it is written easily and lightly, as one would expect from Mr. Sparrow, and is at once practical and pleasant to read. A large number of reproductions of photographs by Mr. Harold Bastin, whose work has often appeared in the "*M.M.*," help to make a very attractive book that will not only give its young readers a useful survey of living things of all kinds, but also will show them in a novel and interesting way how to go on to learn more for themselves.

"MODELLED ARCHITECTURE"

By P. R. Wickham
(Percival Marshall. 12/6 net)

Mr. Wickham is an experienced model-builder whose knowledge of both materials and methods is extremely wide. In this book he deals with the modelling of buildings, and has produced what is probably a complete account of the subject. He takes his readers through all the essential details of a fascinating pastime, beginning with notes on scales and advice on tools and materials, and continuing with details of windows and doors, walls and roofs. He gives useful information on the construction of period buildings, churches and cathedrals, cottages and shops, and the whole is rounded off with suggestions on complete layouts and large scale work.

The book will be invaluable to all interested in architectural modelling, and may persuade others to take up this special branch of model construction.

"CATERPILLARS OF BRITISH MOTHS"

Series I and II
(Warne. 15/- each)

This book, in two volumes, has been planned and arranged on lines similar to the previous volume on the caterpillars of British butterflies. It is compiled and arranged by W. J. Stokoe and edited by G. H. T. Stovin, who has contributed special articles based on his long experiences as a collector and breeder. All the important families of British moths are described and illustrated, with details of their eggs, chrysalids and food plants as well as the caterpillars themselves.

The illustrations are particularly valuable. There are 1,191 photo-micrographs and drawings, and of these 441 are in full colour, from water colour drawings by J. C. Dollman, R.W.S. From the text and the illustrations the reader should have no difficulty in identifying the various species and following their fascinating life stories.

"LOCOMOTIVES THROUGH THE LENS"

By P. Ransome Wallis
(Ian Allan Ltd. 7/6)

For many years past Dr. Ransome Wallis has been engaged in the self-imposed task of recording with his camera every locomotive type and modification of it that appears in this country. Some of the results are seen in the book under review, in which appears a selection of views from what must be a very remarkable collection. The choice of subjects has been limited, with one exception, to photographs obtained during the 25 years of railway grouping. The subjects chosen have been classified according to wheel arrangement and as several views appear on each page in many instances, the book presents some remarkable contrasts and provides opportunities for interesting comparisons. Reproduction on the whole is very good, and each view is accompanied by a remarkably informative caption.

Copies are available from leading booksellers at 7/6, also direct from the publishers, Ian Allan Ltd., 33, Knollys Road, Streatham, London S.W.16, price 7/9 post free.

"SECTIONAL MAPS OF THE BRITISH RAILWAYS"

(Ian Allan Ltd. 8/6)

Ian Allan Ltd. have had the happy idea of publishing an atlas showing the lines of British railways before they were nationalized. In it there are 39 maps covering England, Scotland and Wales, section by section. The maps are reproduced from official Railway Clearing House maps, and the routes of different companies are shown in appropriate colours.

For railway and ordinary reference the atlas will be found most useful, especially as there is an index showing where to find any station desired.

Copies of the book can be obtained from leading booksellers, price 8/6, or direct from the publishers, Ian Allan Ltd., 33, Knollys Road, Streatham, London S.W.16, price 8/9 post free.

"THE LASTING VICTORIES"

(Lutterworth Press. 12/6 net)

Gathered together in this fine book are stories of many triumphs over disease, ignorance, cruelty and prejudice, told by the men and women who took part in them. The diversity of subjects is remarkable. We begin with the glimpses of the past that those who dig up history reveal to us, and then take part in polar exploration, visit an African forest hospital and travel over seas, mountains and deserts. American Indians, Chinese and Sea Dayaks of Borneo also have their places in the book, as well as engines and motor cars, ships and aeroplanes and other creations of mankind.

These true stories are illustrated by 63 pages of photographs.

"WESTERN AND SOUTHERN REGION LOCOMOTIVE REFERENCE BOOK"

(British Locomotive Society. 3/-)

This reference book is on similar lines to that dealing with L.M.R. locomotives reviewed last month. It gives in numerical order the various classes of locomotives on the Western and Southern Regions of British Railways. The depot to which each engine belongs also is shown and space is provided alongside each column for any notes. Named engines are listed separately, and diesel railcars, electric units and service locomotives also are dealt with.

Copies of the book, price 3/- post free, can be obtained from British Locomotive Society, 84, Toronto Road, Horfield, Bristol 7.



A Midland-built "Jenny Lind" engine No. 728 at Chesterfield Station in 1867-8. The story of this photograph and of the engine shown is told on this page. British Railways Official Photographs.

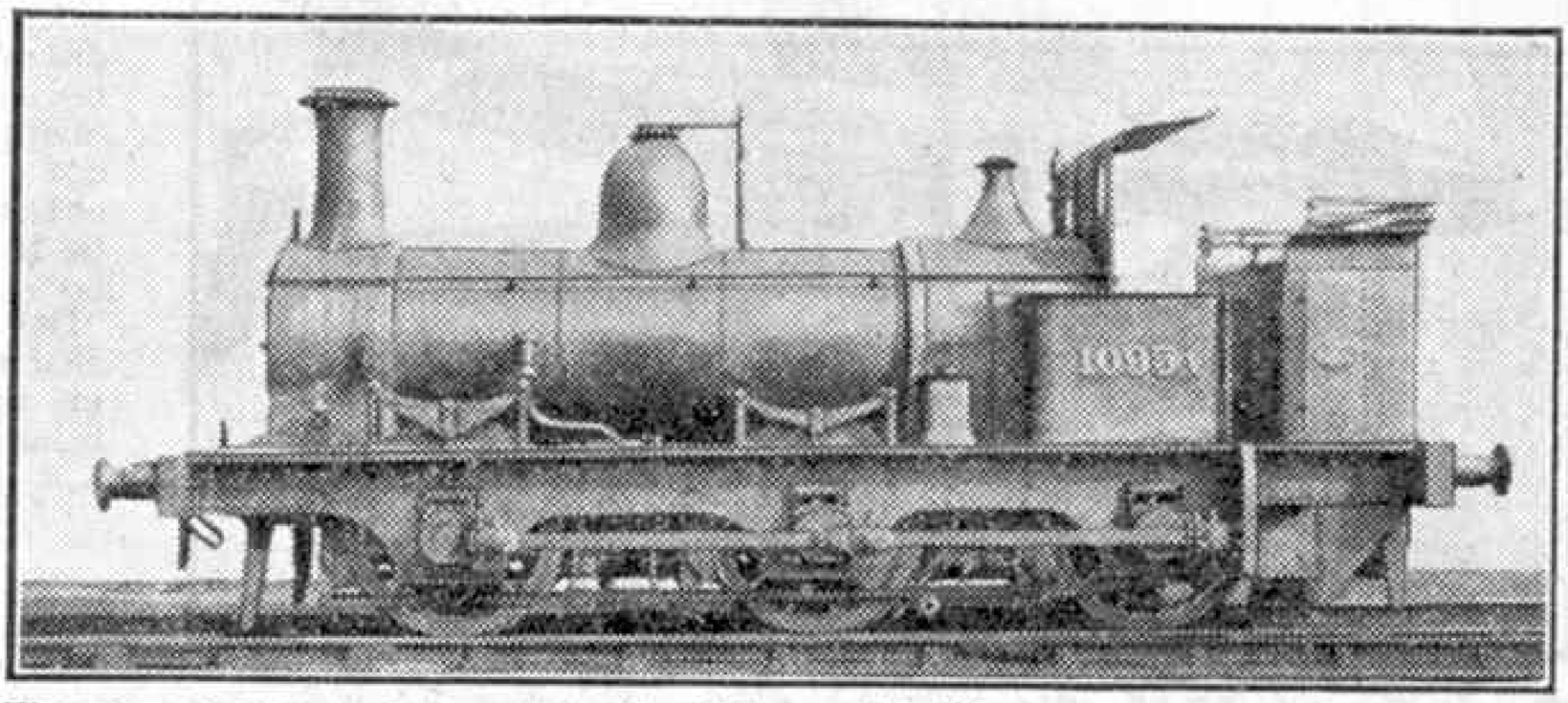
A Historic Locomotive Photograph

THE upper illustration on this page, showing Chesterfield Station on the former Midland Railway, came to light in the course of recent research as an old and rather faded print. After being examined and restored by the London Midland technical staff at Derby, the interest of the photograph was found to be even greater than was at first thought. For the engine shown is one of the 2–2–2 "Jenny Lind" type built by the Midland at Derby under Matthew Kirtley and provided with his type of boiler and fittings. It is considered, on excellent authority, that this is the only photograph in existence showing a Derby-built "Jenny Lind" in this condition.

The "Jenny Lind" design, which became quite a standard in use on several railways, was noted for power, economy and elegance. It originated with the Leeds firm of E. B. Wilson & Co., who were well known a century ago. Some engines of this design were built by them for the Midland between 1847 and 1849, while others were built at Derby from 1851 onward. The engine in the photograph began its career in May 1855 as Midland Railway No. 8. From 1862 onward it underwent various renumberings; and, as it only carried the number shown in the illustration, 728, between September 1867 and September 1868, this determines the period in which the original photograph was taken—80 years ago.

Later it became No. 1006, and in 1871–2 it was completely reconstructed as a double-framed 0–6–0 well tank and then largely confined to shunting duties at Burton-on-Trent. By 1884 it had become No. 1095A, and as such it appears in the lower illustration.

Finally, in the big renumbering of Midland engines that took place in 1907, it became No. 1603, and this number it carried until it was broken up in September 1920, after a total life, in its various forms, of nearly 70 years.



The shunting tank into which the "Jenny Lind" was converted. In this form it was in service until September 1920.



Air-India International "Constellation" air liner "Rajput Princess" at London Airport, being prepared for flight on the twice-weekly London-Cairo-Bombay service.

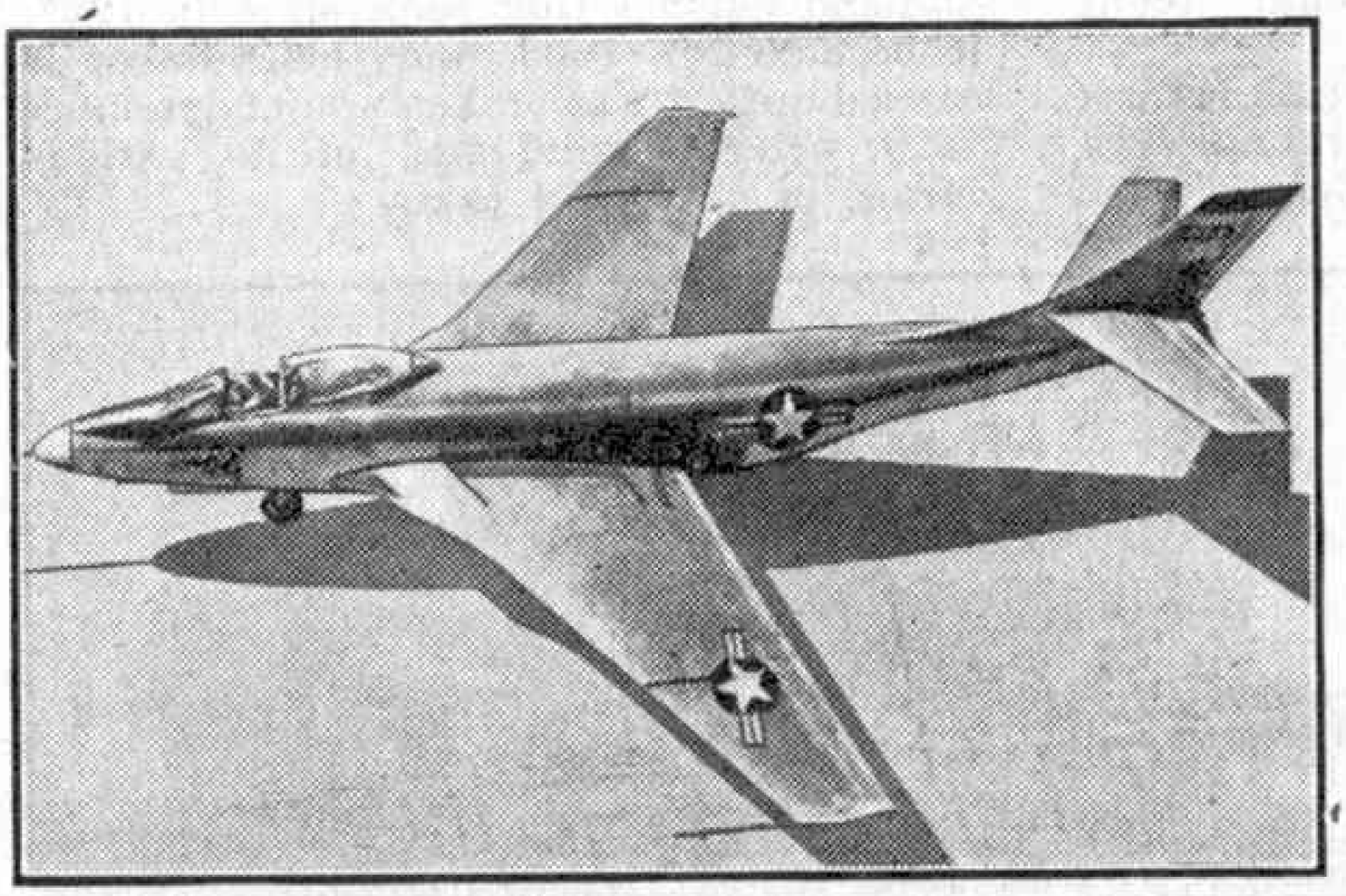
Air News

By John W. R. Taylor

More News of B.E.A. Helicopter Unit

Although the B.E.A. Helicopter Unit is no longer flying an experimental mail service, its Sikorsky and Bell aircraft are being used on other vitally important work, including the development of instruments specially designed for helicopter night flying and blind flying.

Naturally, many standard instruments used by fixed-wing aircraft, which maintain a relatively high forward speed in flight, will not function satisfactorily in a helicopter, which may sometimes need to grope its way very slowly towards a landing in thick mist, and which can hover motionless and even fly sideways or backward, if necessary. Some standard instruments, for instance, depend on the use of a gyroscope driven by the force of the wind blowing into a specially-shaped tube as the aircraft flies along. On a slow-moving helicopter this type of instrument would not operate. Good progress has already been made in this work, and it is expected that before long B.E.A.'s Helicopter Unit will be in a position to maintain an all-the-year-round scheduled service with machines equipped to fly regularly in darkness and in winter fogs.



The McDonnell XF-88 "Voodoo" jet fighter described on this page. Photograph by courtesy of McDonnell Aircraft Corporation, U.S.A.

The McDonnell "Voodoo"

The McDonnell XF-88 "Voodoo," illustrated on this page, is the first of a new class of U.S.A.F. "penetration" jet fighters, designed to operate deep into enemy territory on fighter-bomber or bomber-escort missions. Requirements for such duties are high speed, long range, heavy fire-power and ability to carry a large weight of special radio and radar sets. It is a great tribute to the "Voodoo's" designers that they have successfully included all these features in an aircraft small enough to be flown by one man. This design team have already produced such varied aircraft as the XF-85 "Goblin" parasite fighter, "Little Henry" ram-jet helicopter, "Phantom" and "Banshee" naval fighters, and the world's first twin-engined helicopter.

To permit use of a thin swept-back wing in the "Voodoo" it was decided to instal pilot, twin engines and all operational equipment in the fuselage, including the undercarriage when retracted. This has resulted in a rather large fuselage, over 54 ft. long, but the job has been done so neatly that the machine does not look big or in any way clumsy. Its twin jets are carried in the bottom of the fuselage, with intakes in the wing roots and exhausts under the tail. Radar equipment and six guns are in the fuselage nose, under the pressurized cockpit, which is fitted with an ejector-seat to catapult the pilot clear of the 'plane in an emergency. Details of the "Voodoo's" performance are still secret.

Flying Motor-Cycles

To-day's film makers are sticklers for absolute authenticity of scenery and properties they use. In "*I was a Male War Bride*," 20th Century production co-starring Cary Grant and Ann Sheridan, some scenes of which were filmed in Germany, two German motor-cycles and sidecars were used. Then it was discovered that motor-cycles would be required for later shots at Shepperton. The producer was not content to have locally-obtainable machines; they had to be the same as those used before. So a British European Airways "Dakota" freighter was specially chartered to fly to Stuttgart, pick up the German motor-cycles and bring them to England.

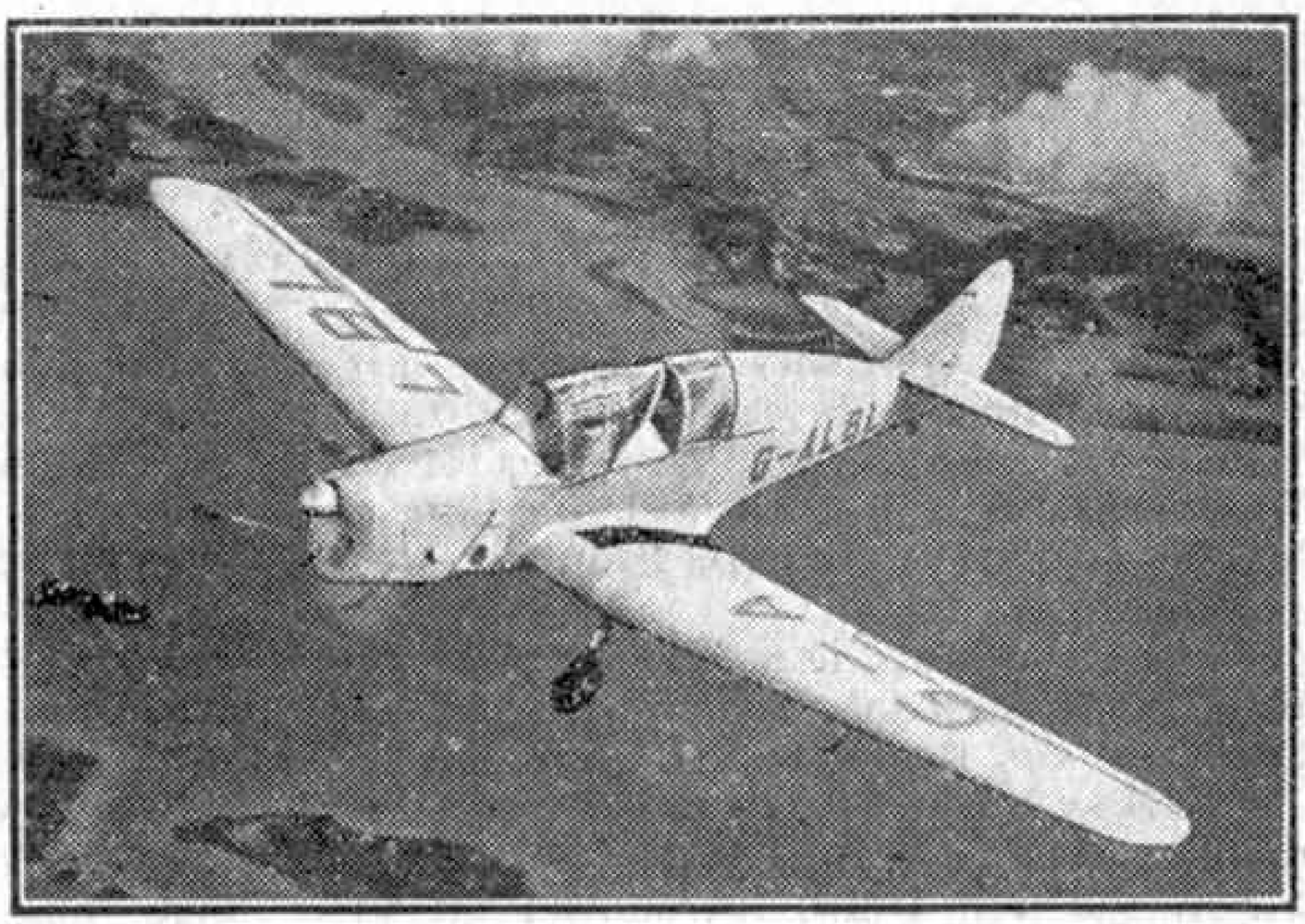
"Vampire" 5 Fighters for South Africa

The South African Government have decided to buy de Havilland "Vampire" 5 ground-attack fighters for the S.A.A.F., and have placed an initial order for 10 machines.

Night Taxying Aid

Pilots making night flights from Schiphol Airport, near Amsterdam, home base of the K.L.M. fleet, are now helped by a new system of taxying aids introduced on all the main runways. As the pilot taxies out for take-off with his lights on, the runway is clearly delineated by two white lines, and at the beginning of the runway two figures denoting its direction also light up. When, after landing, he taxies to the passenger apron, there are white lines guiding him to it.

These lines and figures have been introduced at Schiphol as an experiment with a new sort of paint. It is an American patent that has been used for some years in the United States on roads, traffic signs, railways, vehicles, airfields and for advertising purposes. The paint is prepared by a special method, the secret of which is strictly protected by the manufacturers. Minute glass marbles, the size of grains of sugar, are strewn in the paint while it is still wet. These glass marbles are peculiar in that they reflect rays of light back in the direction from which they originate. Normal types of paint apply themselves to only a very small area of the glass marbles, but the paint in question, as it were, creeps on to the marbles, with the result that they are firmly held in position. A line of this paint may be expected to remain in good condition for about six years. Schiphol is the first European airport to use the new technique.



The first picture of the production type Fairey "Primer" training aircraft, which took only 98 days to build. Photograph by courtesy of The Fairey Aviation Co. Ltd.

U.S. All-Weather Jet Fighter

Now that the U.S.A.F. have had an opportunity to test jet fighter squadrons under operational conditions, it has been decided to develop four distinct classes of fighter aircraft—jet and rocket-powered interceptors for short-range defence; penetration fighters for long-range escort and attack; all-weather fighters for day and night operation in all climates; and highly specialized types like the McDonnell "Goblin" parasite.

First-prize winner in a recent U.S.A.F. design competition for an all-weather fighter was the Northrop XF-89, illustrated on this page. Successor to the famous "Black Widow" night fighter, it gives the impression of being just two large engines, mounted on a wafer-like wing, with a slender upswept boom to carry its tail surfaces. Although performance figures are not available, the U.S.A.F. claim that it is sufficiently fast and formidable to track down other aircraft or search out ground installations by day or night in all kinds of weather.

Sleek lines belie its large size, for the two-seat XF-89 is a 15-ton aircraft with a wing span of 50 ft. The pilot and radar operator are housed in a pressurized cabin, and have ejector seats for emergency use. The Northrop XF-89 has been designed with the emphasis on structural simplicity, so that production of the initial 48 machines already ordered for the U.S.A.F. should be speedy and trouble-free.

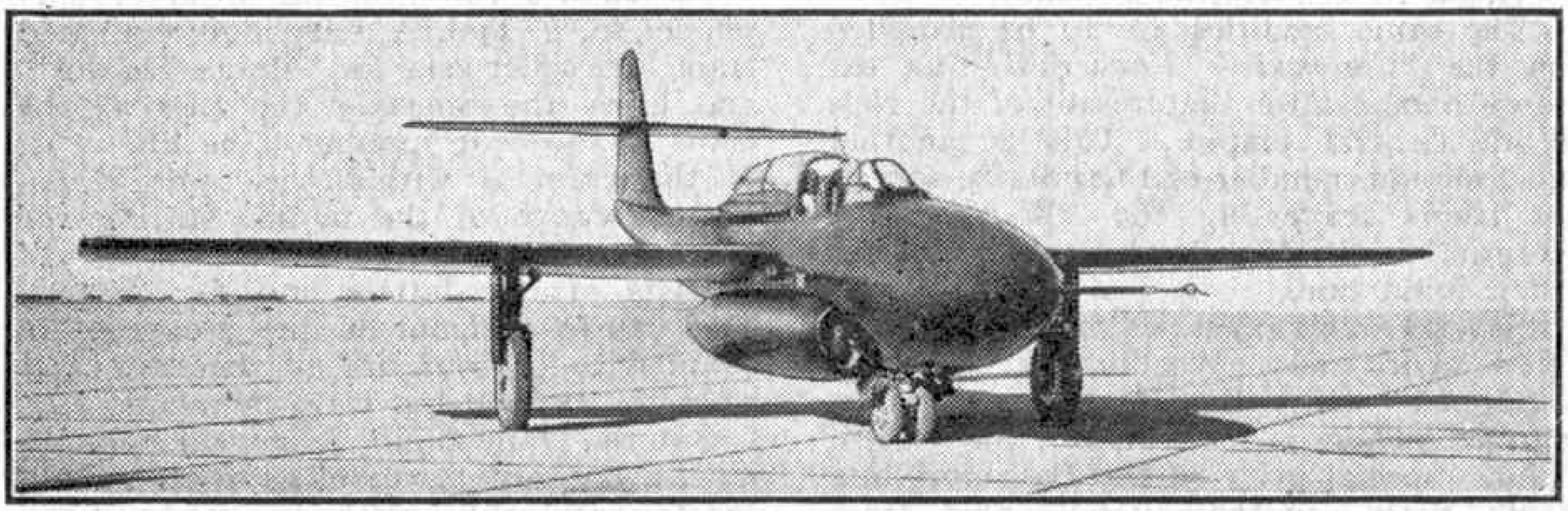
New Swissair Service

The Swissair Company are now operating a twice-weekly direct service between Zurich and Manchester, in order to extend air traffic between Britain and Switzerland, and to enable people from the Midlands and Northern England to fly quickly to Switzerland. The service is proving very attractive to businessmen in Manchester, Leeds and Liverpool who carry on important export business with Switzerland.

Prototype Costs

Lecturing to the Royal Aeronautical Society on the development of new aircraft, Mr. G. R. Edwards, Chief Designer of Vickers-Armstrongs, said that new civil aircraft to-day cost between £2 10s. 0d. and £3 a lb. of their loaded weight. Development of the prototype cost an extra £30 to £35 a lb. of gross weight, and production tooling another £10 a lb.

Expenditure of £40 to £45 for every lb. of the machine's gross weight had therefore to be faced, and a manufacturer hoping to build a new machine of "Constellation" size was confronted with an outlay of at least £4,000,000.



Northrop XF-89, the U.S. Air Force's new all-weather fighter, showing the razor-thin wing and distinctive tail assembly. Photograph by courtesy of Northrop Aircraft Inc., U.S.A.

Radio Telephones in U.S. Trains

By Francis J. Knight

AMERICAN railways are pushing ahead with a new radio-telephone "Phone while you Travel" service. For the first time, telephone calls can be made to or from a speeding train to any part of the United States and it is also possible to 'phone a friend in another train hundreds of miles away.

Pioneers in this new service were the New York Central, the Baltimore and Ohio and the Pennsylvania railroads.

The New York Central Railroad installed mobile telephone service in the observation car of the new trains introduced for the "*Twentieth Century Limited*" in September last. The "*Century*" is one of the show pieces of the New York Central, a thoroughly up-to-date all-Pullman train with a tradition of special service. It links New York overnight with Chicago, and since 1946 it has been diesel-hauled over the main portion of its 960-mile run. Between Harmon, the engine-changing point now as in steam days, and Grand Central Terminal New York, it has an electric locomotive. The mobile telephone will be available throughout the 436 miles between New York and Buffalo.



The telephone operator on the "Twentieth Century Limited" putting through a call for a passenger. Illustrations to this article are by courtesy of the New York Central System.

The same facilities are to be provided on the "*Commodore Vanderbilt*," an express named after the creator of the New York Central empire. This is another all-Pullman member of the notable service of trains traversing the "Water Level Route," as the New York Central describe their main line.

Several crack expresses running between New York and Washington also are equipped with the mobile telephone service. There is for instance, the "*Royal Blue*," special pride of the Baltimore and Ohio route, another diesel-hauled train providing a daytime service over the 223.6 miles between the Union Station, Washington, and Jersey City Terminal.

The other Washington services involved are on the Pennsylvania Railroad and run via Wilmington and Baltimore. "*The Potomac*" provides an afternoon service with parlour and dining cars. "*The Legislator*" is a morning train in each direction with buffet, dining and lounge facilities. Finally "*The Congressional*" has a late afternoon departure and carries similar accommodation.

These trains are used largely by business men and Government officials, among whom the new facility has been extremely popular. The mobile telephone is a boon also to journalists, who can now telephone news stories from a moving train to the editorial office. A section of the lounge car on each train has been redesigned and set apart to afford privacy to passengers using the service. Railway attendants are on duty to place calls and to locate persons on the train who are being called. The radio telephone equipment on the trains was designed specially for the purpose by the Bell Telephone Laboratories.

To make a call from an ordinary telephone to a mobile telephone equipped train, the caller asks for "Mobile Service," and gives the operator the title of the train or the code number if he knows it. If the train is within the radio transmitting range of the mobile station the operator dials the number, which always consists of two letters and five figures. This causes a signal on the proper radio channel to be sent out to the train and rings the bell on the train telephone.

But the train might be several hundred miles away from the mobile station making the call, and well outside the range of the 250 watt transmitter which these stations



The New York Central "Twentieth Century Limited" in its latest form headed by a twin-unit diesel locomotive. Radio telephone service is provided on this all-Pullman New York-Chicago flier.

use. To overcome this difficulty it has been necessary to build a series of receiver/transmitter land stations along the routes covered by the trains. The mobile service operators know from the timetables supplied to them roughly where the wanted train is, and if it is outside their range they pass the call over ordinary direct telephone lines to the nearest land station. The operator here dials the number and sends out the radio-telephone signal to the train.

When the train attendant picks up the handset to answer, the radio-telephone transmitter on the train automatically comes into action, her voice is picked up by the receiver at the land station which sent out the call, and the circuit is complete. Similarly, a call made from a moving train goes out by radio-telephone to the nearest land station where the wanted number is obtained over the ordinary telephone lines.

On the Washington-New York run, for example, these receiver/transmitter stations have been built at Washington, Baltimore, Philadelphia, Newark and New York, so that the train is always within range of one or other of the stations.

The service is not unduly expensive. Calls in the local mobile service area cost an average of 35 cents for three minutes, and long-distance calls to or from the train are charged at the ordinary person to person rates.

Mobile service is proving so popular on the trains already equipped that the progressive American companies will no doubt extend the service as fast as they are able to obtain the equipment. Before very long, the Chesapeake and Ohio Railroad hope to have the new mobile telephone service in their express trains "The Chessies," running between Washington and Cincinatti.

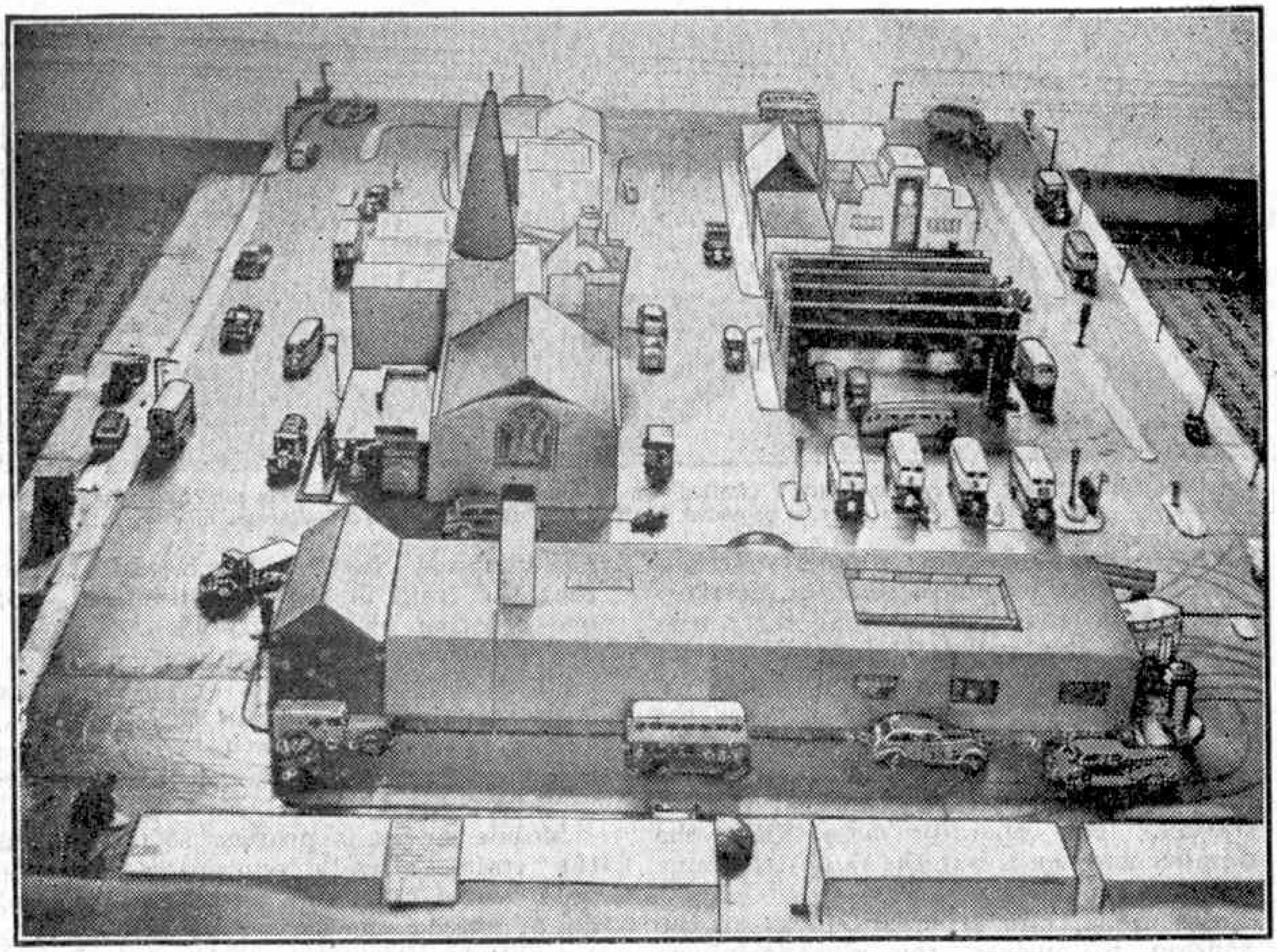
Although intended primarily for public use, the mobile telephone is available to the train crew in an emergency. Full details of any accident or breakdown can at once be given to the nearest control centre. This is, in itself, a great point in its favour in the eyes of the Operating Managers.

The Six Nations in Canada

Those of us who have revelled in the American Indian stories of Fenimore Cooper and other writers have a hazy notion of what is meant by the Six Nations, the famous confederacy of Indian tribes who fought against the earliest settlers in North America. But how many can give the names of the six Indian tribes included in the confederacy? This began with the Mohawks, Oneidas, Onondagas, Senecas and Cayugas, and later the Tuscaroras were added to complete the six tribes.

During the American revolutionary war the Six Nations took the British side, and at the end of the conflict they left their homes in what had then become the United States and migrated to Canada, where they were awarded six miles of land on each side of the Grand River, Ontario, to hold "as long as the sun shines and the water runs."

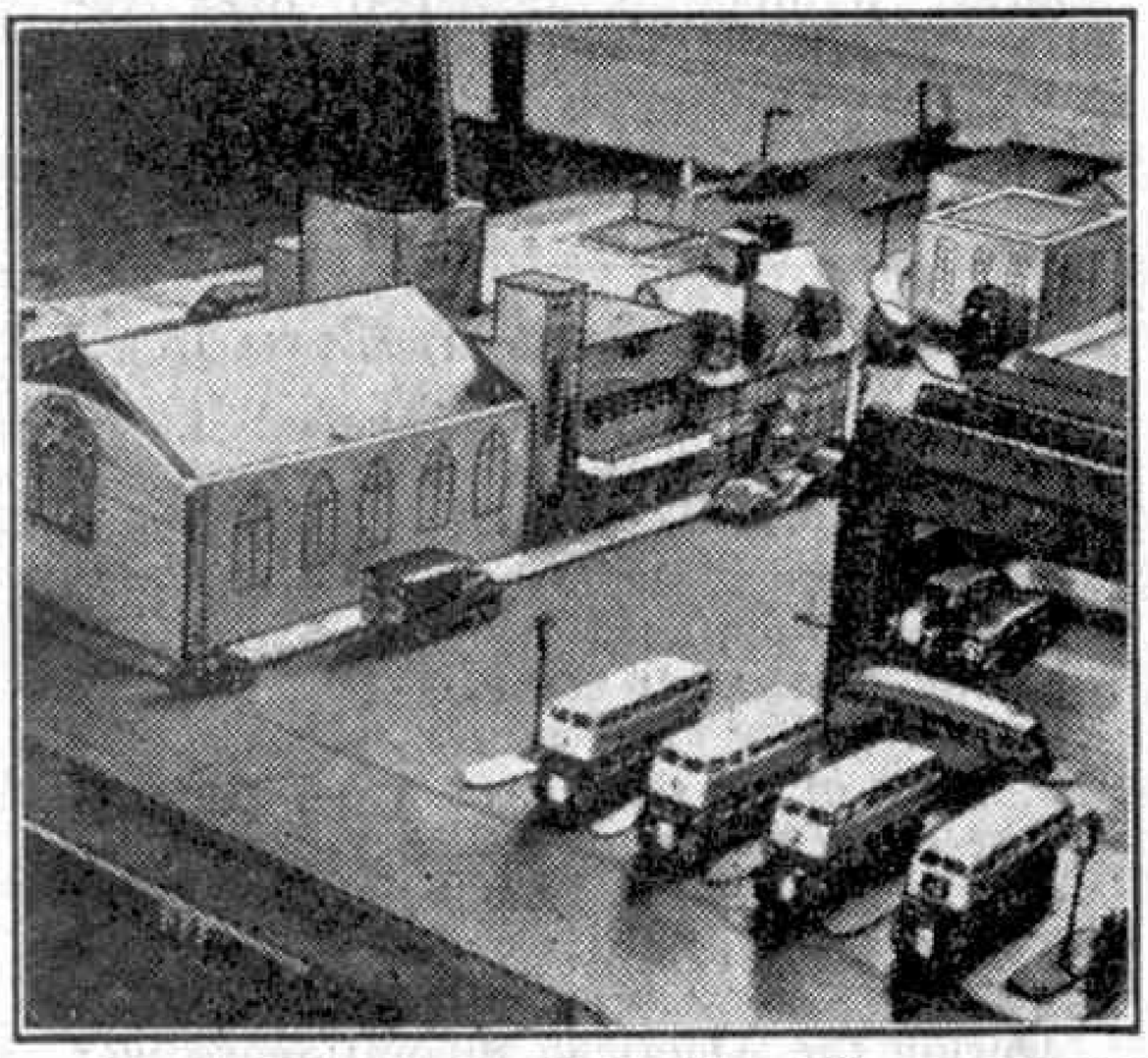
Descendants of the Six Nation braves who then entered Canada are still there on the land granted to them, and a year or two ago they celebrated the 160th anniversary of the signing of the treaty. Wearing their ancient costumes, said to be the finest preserved by any Indian tribes, their chiefs led several hundred of them in a parade that was followed by a banquet at which the Chief of the Onondagas welcomed the crowd in his native tongue.



The Busy Roads of "Lanville"

Traffic in a Dinky Toys Town

MANY Dinky Toys enthusiasts have discovered for themselves that they can get the greatest fun from their hobby by building up layouts on which to operate them. One of the finest and most extensive of these is the model town of Peter G. Lindsay, Liverpool. A general view of this is reproduced at the head of this page, and sections of special interest are shown in the other three illustrations. The designer calls his model town "Lanville." It is constructed on a baseboard, 7 ft. 6 in. in length and 4 ft. in width, made of planks fitted on a framework of 3 in. by 2 in. wood. This has roller-casters fitted at the corners so that the whole model can be rolled out of the way when it is not in use. No packing is necessary, and the "town" is ready to spring to life as soon as the board is pulled out from its resting place.

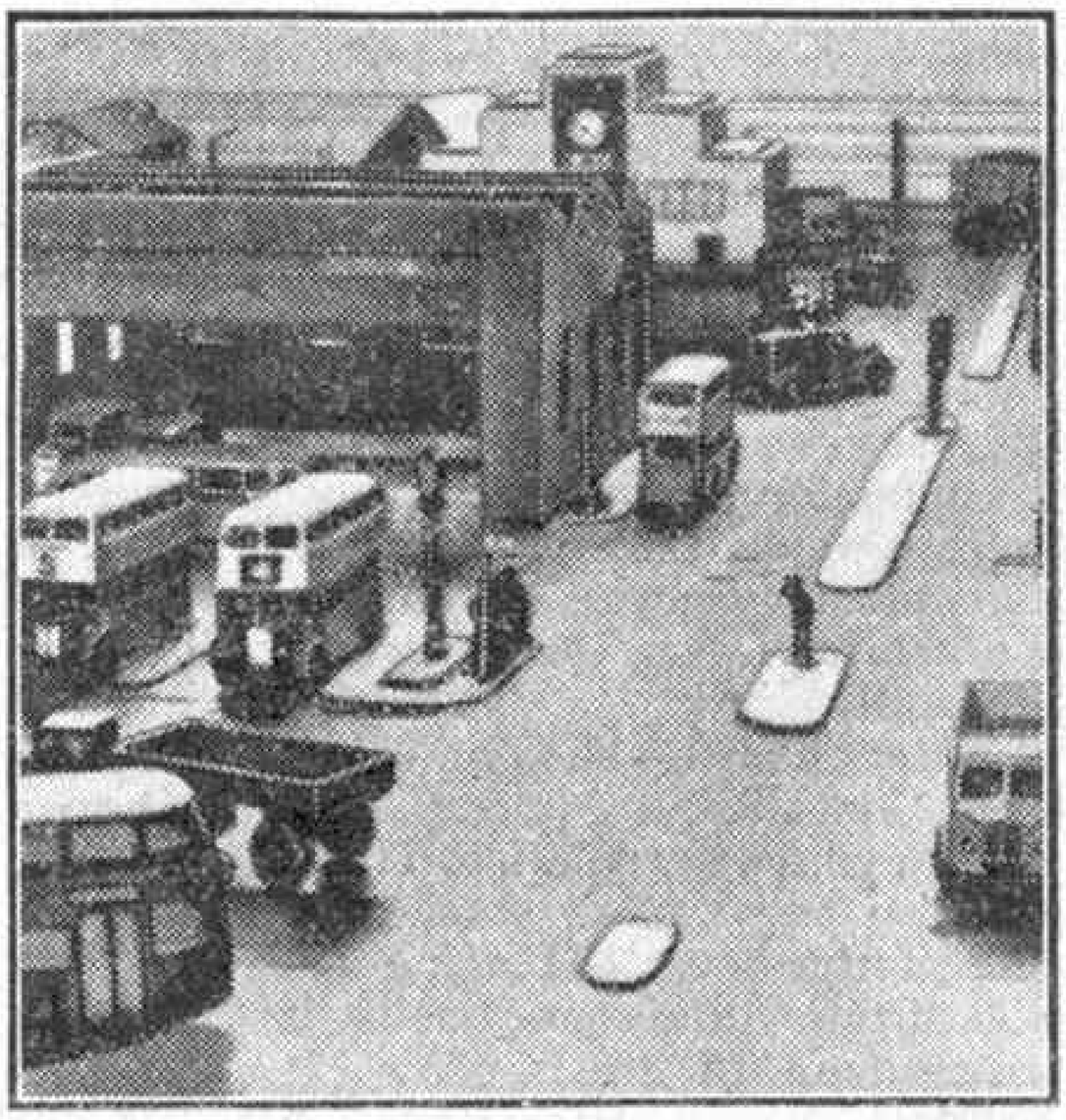


The Church, "Lanville," with the Royal Cinema entrance alongside. On the right is part of the bus depot, with four Double Deck Buses waiting in the bays of the station.

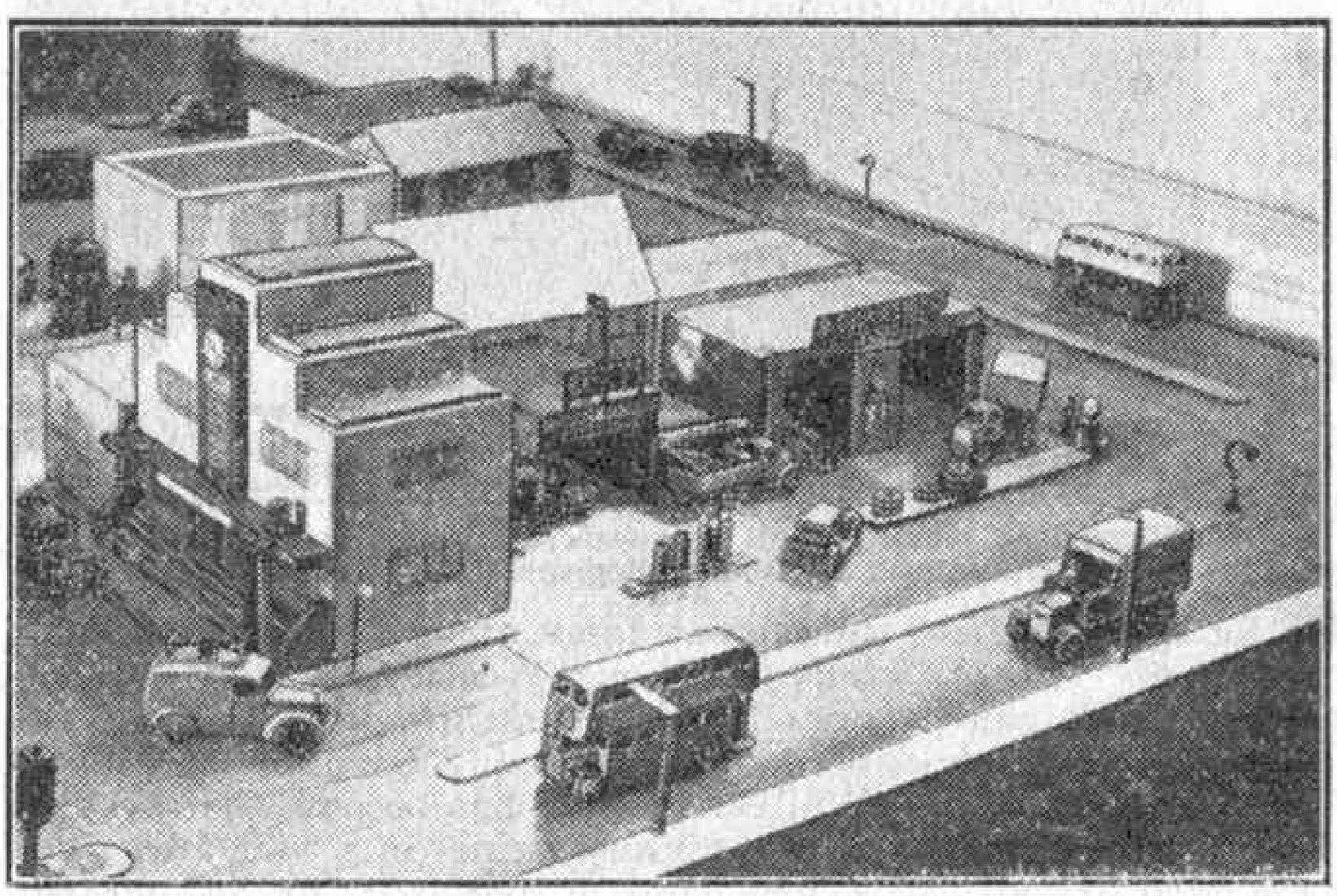
As will be seen from the general view, "Lanville" has three main roads, Lanville Road and Huntmen Street on the left and right, with Preston Road down the middle, and there are three main cross roads. It will be noticed that Preston Road does not extend the full length of the layout, a feature that introduces a pleasing variety. There are two other streets, hidden by buildings, one of which runs at an angle between Lanville Road and Preston Road. These highways are painted flat grey, and their pavements are made of card, with lines scored on to represent flagstones.

The buildings of the town include a church, a cinema, a fire station and an hotel, with various offices, a garage, filling station, factory, shops and houses. The church, which has a tall spire, is of wood. The Hornby-Dublo Station building makes a fine hotel, and cardboard and similar materials have been put to good use in constructing other buildings.

The roads of "Lanville" are very busy, for there are no less than 57 Dinky Toys at work on them! Of these 16 are public transport vehicles, 19 are private cars, and the rest are lorries, motor bicycles, etc. The public services are a special feature of the town. There is a large bus depot, in front of which is a station with bays where buses for four different routes fill up. Double Decker Buses, 10 in number, are used for the regular services, and they also do good work as football specials. In rush hours the service is augmented by the running of four single decker buses. All vehicles are provided with route indicators in the shape of numbered cards slipped into holders fitted in front of them. The Transport Department of "Lanville" still operates tramcars. These are home-made and cover three routes, on one of which there is a stretch of reserved track where speedy running is possible.



Looking along Huntmen Street, "Lanville."



A busy corner of "Lanville," showing the hotel and garage and filling station.

Lindsay has paid great attention to little details that help to give an air of completion to his model. For instance, stained glass windows have been provided for the church by glueing cellophane over the window openings and applying water colour paints, which have had the effect of contracting the cellophane and pulling it tight. Constructing lamp posts presented a problem, but this was solved in a very simple manner by cutting wood pipe-lighter spills to the required length and bending one end over to form the arm from which the lamp is suspended. Small rolls of paper fixed on the arms with glue represent the shades.

The addition of more model people would increase greatly the realism of the model, and Lindsay intends shortly to give "Lanville" more life by including them.

A Dales Rope Maker

Where an Old Craft still Flourishes

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

IT may seem difficult to think of any connexion between the bales of coloured cotton waste sent out from the mills of the industrial north and the farmers of the Yorkshire Dales, but the link is there all right.

Enter the little shed of W. R. Outhwaite and Son, Rope Makers, in the upper Wensleydale township of Hawes, and you will see these bales stacked high against one of the walls. Hanging from the roof and from numerous hooks is a varied assortment of ropes, cow halters, horse backbands and other products, and the fact that these are made from strands of different bright colours never fails to surprise those accustomed only to the greyish ropes of other parts of the country.

"Cotton waste is made up of all kinds of colours," the proprietor explains, "and by mixing the strands we get quite a pleasing appearance." Throughout the Yorkshire Dales and even further afield you can recognize Outhwaite's ropes by the colour schemes that seem to imply something of the pattern weaver's art.

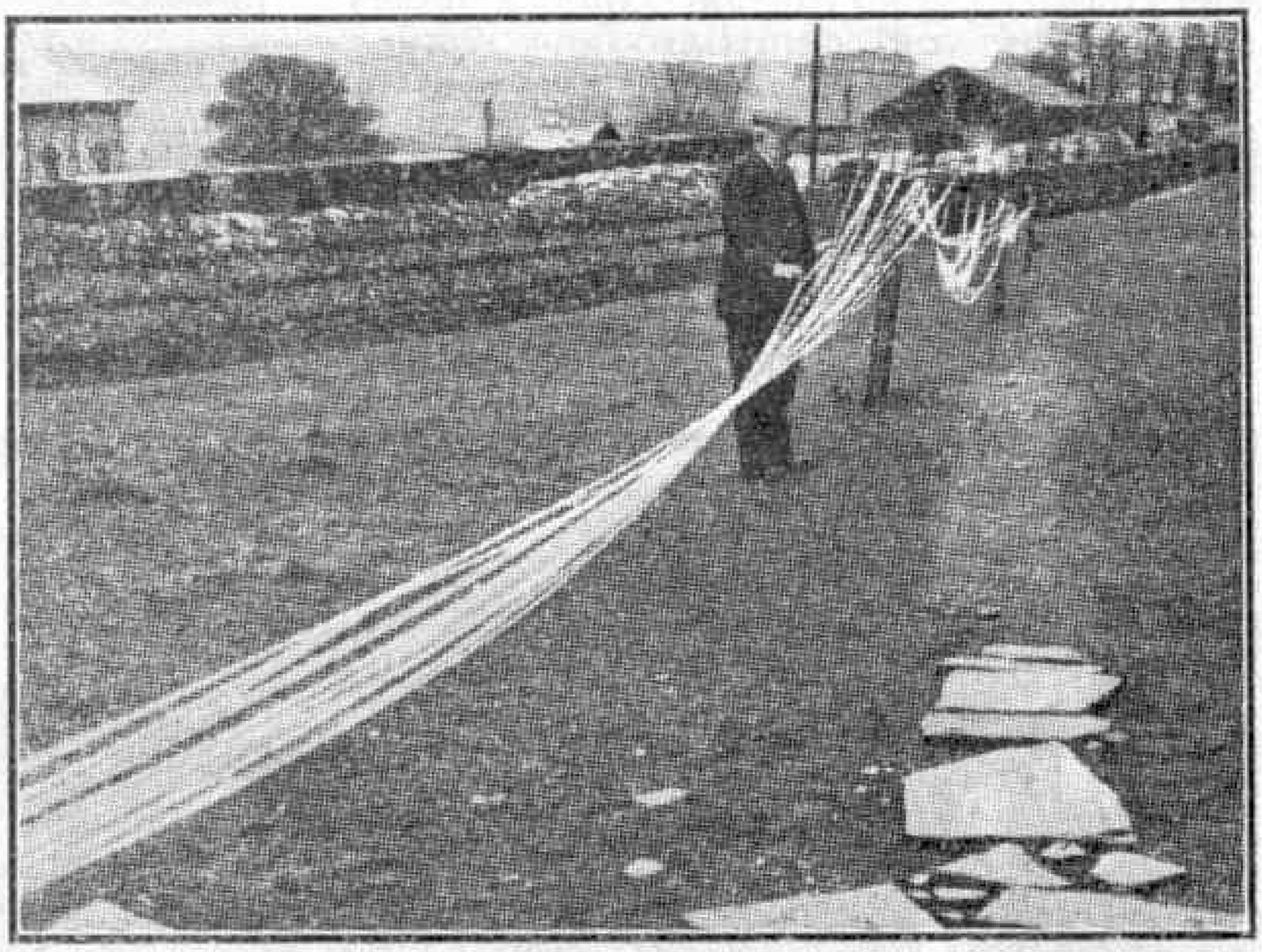
The cotton waste comes along in bales, and the strands must be spun or twisted into yarn suitable for use in rope making and other forms of work. This is done by means of a twisting frame consisting of a large hand-turned wheel, not unlike that of the old spinning frames, which sets four pulleys, known as "twirls," into rotation. The fibres are fixed to hooks at the end of these pulleys and then passed over a series of arms out of the shed and across an adjoining field to a fixed end. The large wheel is turned, and so the fibres are twisted into the yarn.

Once the yarn is there, making a rope from it is a job of only a few minutes. The twisted strands are passed from a set of rotating hooks to a fixed hook some yards away, then a ratchet and cog sends them whirling round, and in next to no time there is a new rope, again in those different colours that add such a touch of distinction to Mr. Outhwaite's work.

An interesting feature of this is that the twist now imparted is in the opposite direction to that bestowed by the preliminary spinning, and greatly adds to the strength of the rope.

Modern machinery finds no place in Mr. Outhwaite's little workshop. He has been spinning ropes by hand for nearly 40 years, and his methods have earned him great fame among the farmers, not only of his own Wensleydale, but throughout North Yorkshire and across the borders of adjoining counties. "Send to Will Outhwaite" has become the accepted phrase for any farmer in a wide area when a new rope is required, or an old one shows signs of wear through prolonged use, and never once during that 40 years has he been unable to meet the request.

Halters for cows and backbands for horses, the latter used mainly for hay sleds in the Dales country, are woven on a primitive loom, which doubtless accounts for an appearance so like that produced in pattern weaving. The origin of the loom seems lost in time. "It's no use asking me how old it is," Mr. Outh-

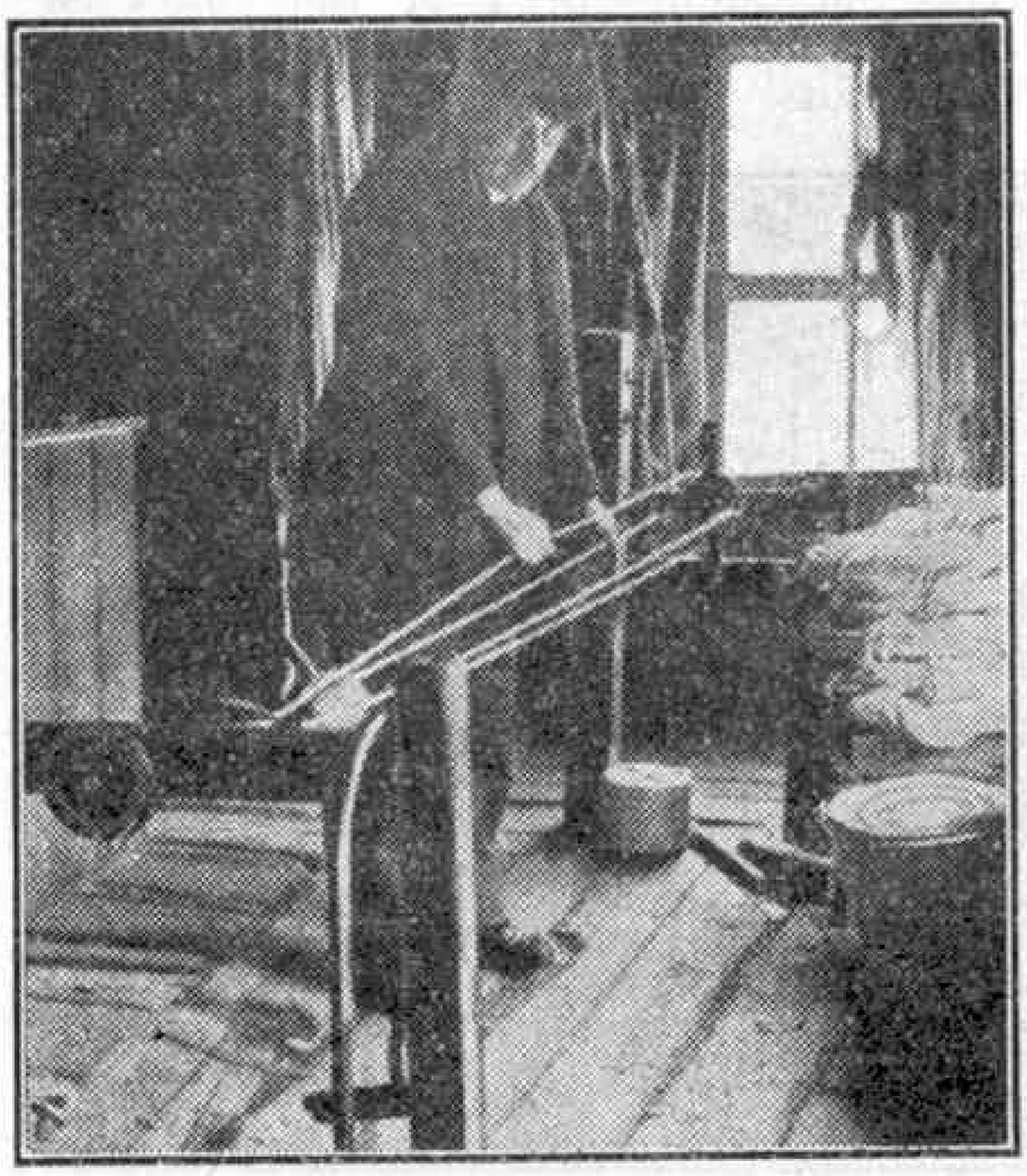


Village rope maker on his rope-walk at Hawes, in Wensleydale. The illustrations are from photographs by G. Bernard Wood.

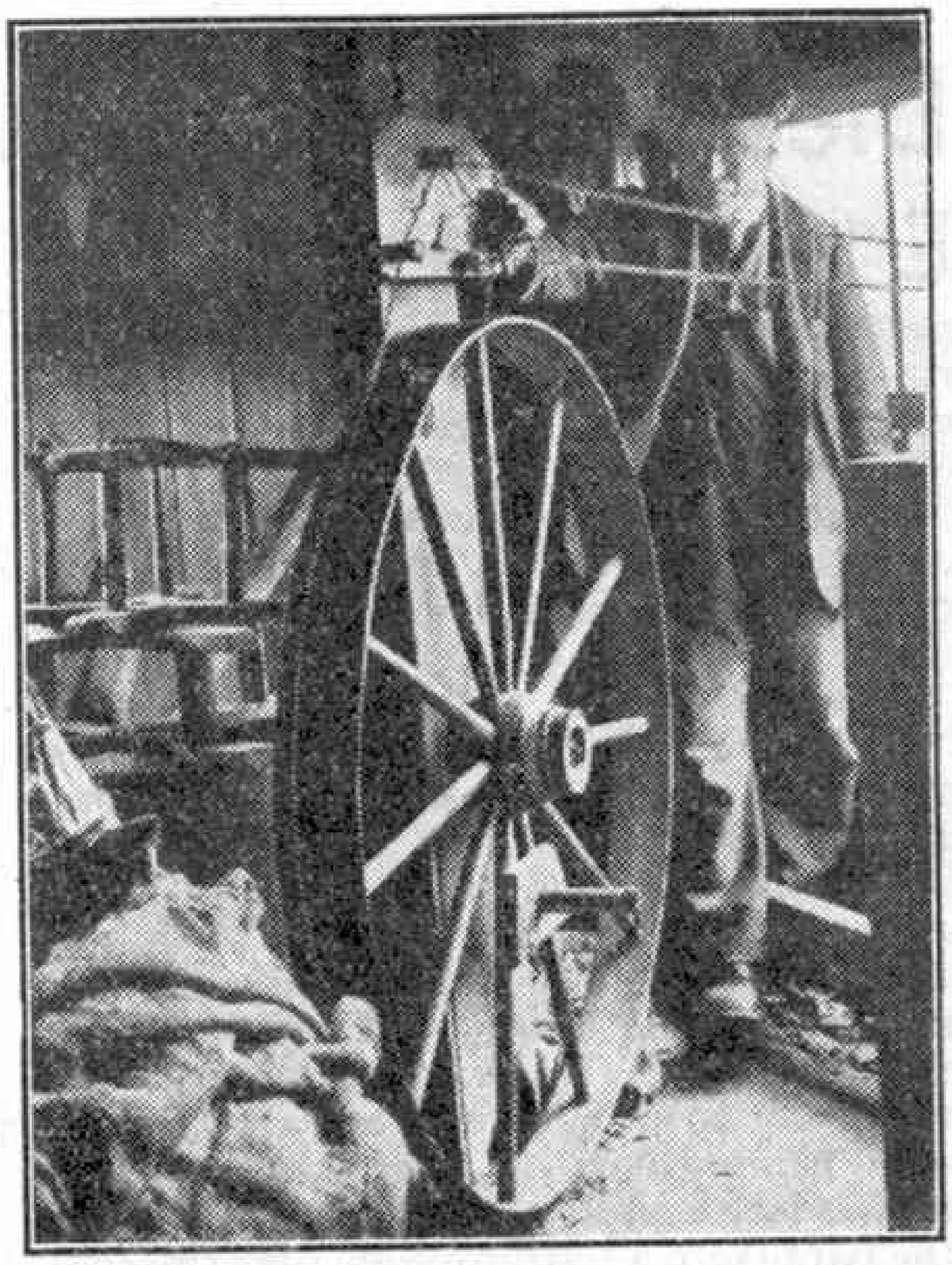
waite puts in; "I've had it over 30 years and it was not a new one then."

There are other products from this little shop that find their way throughout the Dales. Among the Pennine fells are places where winter food for cattle and even sheep has to be carried by means of creels, and these too are made in Mr. Outhwaite's workshop. To make them hazel boughs obtained locally are bent into semi-circular form, and then a lattice-like arrangement of tarred twine is woven round, so that the finished product is not unlike a child's bedstead. The fodder is placed inside the creel, and a strong rope is fixed from the tops of the boughs to carry the load to the heights. One has only to stand outside the workshop and look at the heights of Great Shunnor Fell, separating Wensleydale from mountainous Swaledale, or the grim fells that act as a barrier between the Ure and Ribble, to see how steep their slopes are and how in times of snow any form of wheeled transport could never hope to cope with the feeding situation. Pulling a load of hay in a creel is a strenuous job, but the dalesmen who do it are as tough and wiry as the black-faced Swaledale sheep that roam the uplands, summer and winter alike.

Dales sheep are notorious for their agility in jumping the drystone walls of the northern fells, so that ties are made for hobbling them and thus confining them to their own runs and pastures.



A primitive but very efficient twisting machine.



The spinning wheel of the Hawes rope maker.

Rabbit nets also are made from time to time, and even traps are cunningly devised from wire and twine. "I never knew a rabbit escape from one of Will Outhwaite's traps," a dalesman informed me. So the waste from the cotton mills is playing its part in ridding the Dales farms of their rabbit population.

Market day in Hawes brings in farmers from all the Dale, and the stall that stands in front of Mr. Outhwaite's shop on this day is always the centre of a busy throng. It is a picturesque affair, with its ropes of different coloured strands, its halters, backbands and creels, with the odd rabbit net and trap displayed in readiness for those seeking something to deal with that age-old agricultural pest. Indeed, until I saw it myself, I could never have believed that a rope maker could possibly exhibit so colourful and varied a display.

Before the war, however, Will Outhwaite was not a little worried. His son had decided to take up another trade, and it seemed as though the old business would eventually follow that of many other rope-making establishments in the Dales. Then, after a spell in the Army, the son decided to follow in his father's footsteps, and now it looks as though W. R. Outhwaite and Son will continue to furnish this link between cotton and agriculture for many more years to come.

Diesel Boat that Pushes Canal Barges

EVER since canals came into existence barges on their waters have been pulled, first by horses walking along the tow path, and later by tugs driven by steam and diesel engines. In addition, engines have been fitted on many barges. Now a revolutionary idea has been introduced in the form of a propelling unit that pushes barges along instead of pulling them.

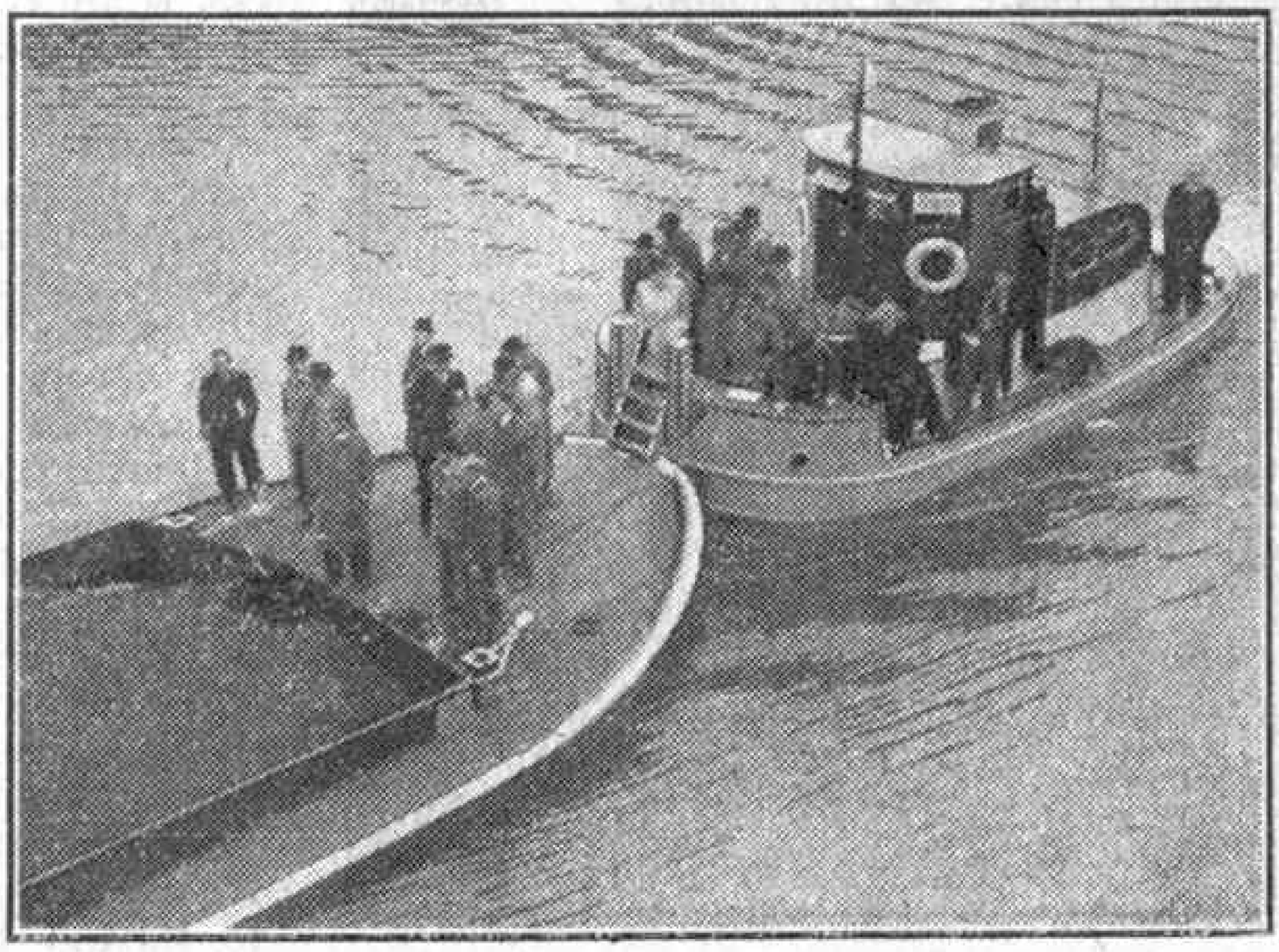
The new craft, to which the name "*Bantam I*" has been given, has been designed by E. C. Jones & Son (Brentford) Ltd. The illustration on this page shows how it works. It is manœuvred up to the stern of the barge that it is to push, and hawsers from its head are taken round bollards on the barge back to winches on the "*Bantam.*" The wires are then wound in tightly to bring the two craft together, care being taken to keep them exactly in line fore and aft. In effect this changes the barge into a self-propelled unit throughout its voyage. The steering position has been built sufficiently high to allow the helmsman to see over the top of an empty 250 tons barge in front of him, and abaft of the wheelhouse is a cabin to accommodate two men.

This interesting scheme has many advantages. To begin with, the measure of control over the most cumbersome barge will allow working in flood conditions with greater safety than has previously been possible. A substantial increase in power to manœuvre also is gained. With the "*Bantam*" there is no difficulty in turning a barge round unaided from the shore when there is sufficient room and depth of water; when towing is in operation this involves taking a line to the bank.

Time also is saved when working through lock systems. A further saving is in cost, for the "*Bantam*" does the steering and barges suitable for use with it can be built without the expensive and troublesome rudders now employed. Existing barges with rudders can be used with the new unit, however; all that is necessary is to put the rudder over out of the way. Another gain arises from the fact that barges have not to be worked through the wash of a propeller in front of them, which means a saving in engine power.

The new system has a very important advantage over the use of self-propelled barges. When these are heavily loaded their propellers are often very near the bed of the canal and liable to cause damage. On the other hand, when the barges are empty the propellers are too high in the water to be really efficient. With the "*Bantam*" these difficulties are avoided, for the simple reason that the propeller of the pushing unit is always at the same depth, which can be chosen to provide the greatest efficiency in working. The new craft also has the great advantage that its power unit need not be kept idle while cargo is being taken on board its barges or unloaded from them. While one barge is being dealt with the "*Bantam*" can be used for pushing another.

"*Bantam I*", the first of the new barge pushing units, is built of steel and welded throughout. It is 30 ft. long and 12 ft. broad, with a depth of 5 ft. 6 in. It is provided with a 100 h.p. Ruston diesel engine, driving a four-bladed manganese bronze propeller through reduction gear remotely controlled from the wheel house. The maximum speed of the "*Bantam*" alone is 10 knots, and that with a barge is 6 knots. The fuel capacity is 750 tons.



"Bantam I" secured to a barge and pushing it along. Photograph by courtesy of E. C. Jones and Son (Brentford) Ltd.

The Story of "Adams No. 563"

As related to the Editor

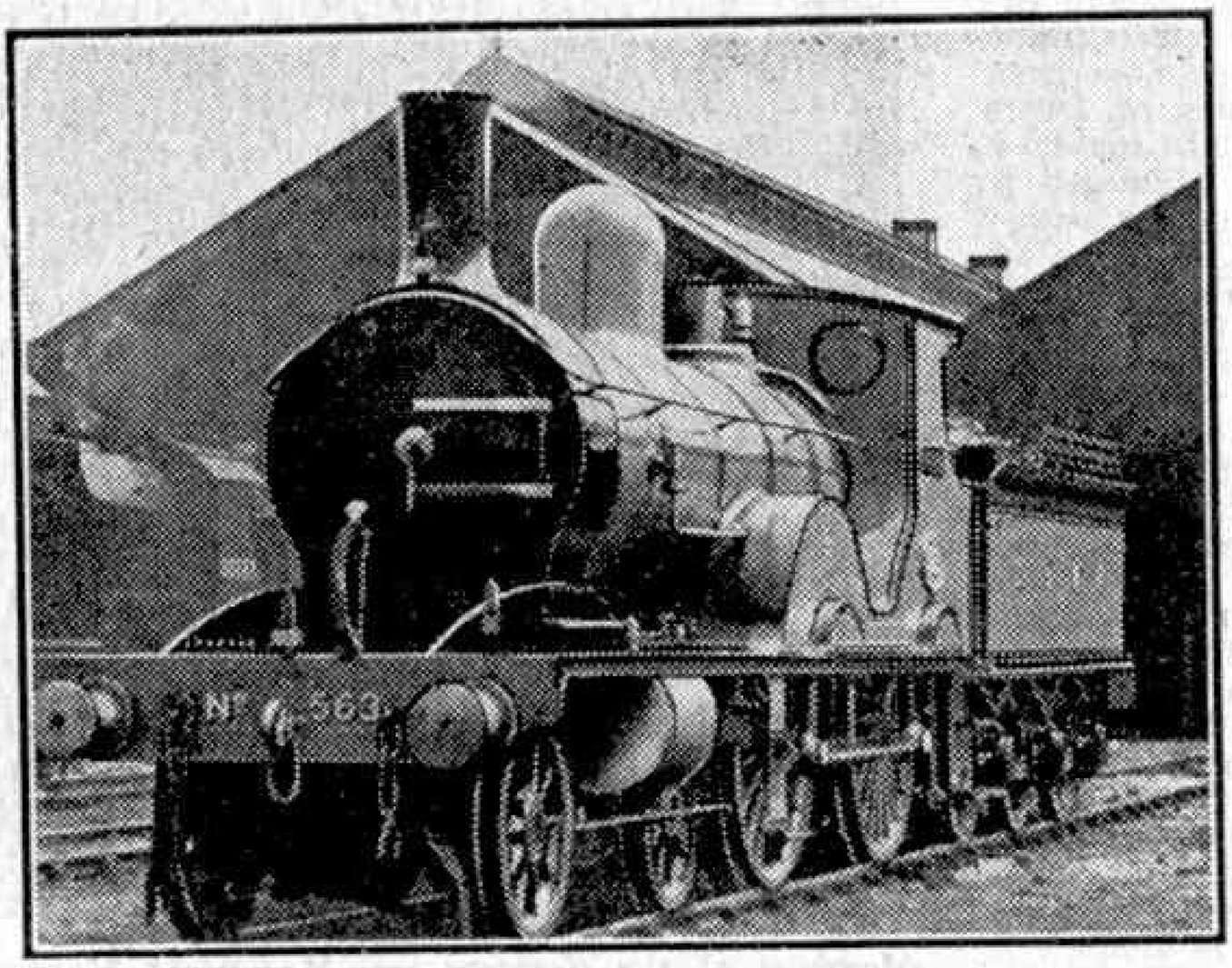
"I was born at Nine Elms in 1893, of a line of famous 4–4–0 express engines designed for the former London and South Western Railway by Mr. Adams. I had 59 sisters. Thirty of us had 6 ft. 7 in. coupled wheels; the other 30 had 7 ft. 1 in. wheels, and were always considered to be more graceful, but we all did good work and achieved a great reputation.

"Shortly after I had started life, Mr. Drummond became Locomotive Superintendent, and they said that his new engines would drive us off the road, but they didn't; in fact Mr. Drummond took a liking to us, put crests on our splashers, and painted us more lavishly than before.

"By the time the Southern Railway took us over, in 1923, I could boast of having run every kind of train—expresses, boat trains, race specials, and I've run to Weymouth and Exeter just as fast as they do to-day, but with lighter coaches, of course. During the last 20 years, however, I've pottered around Surrey and Hampshire with stopping trains and pick-up goods trains, doing any odd jobs in the way of strawberry specials, empty stock trains and so on. I've often given some of the "modern" drivers quite a surprise; they would climb on my footplate and make rude remarks to their firemen about "this old crab"; but when they left me, it was usually with compliments.

"By 1945, my career was finished. I stood on the scrap siding at Eastleigh Shed for two years, with several sisters and some 0–4–2 "Jubilees" and old Brighton engines. In 1947 they decided we were a nuisance and we were parked out in the country, in the Test Valley, where birds found nesting places on us. From time to time enthusiasts came on bicycles to take our photographs; we had lost our brass parts, and some, like me, had various bits secured with rope. We looked a sorry sight!

"Then one day, some officials I recognised came along and looked us up and down. I heard them say that one of us was to appear at the Centenary Exhibition at Waterloo Station. At length they said that I looked the best of the bunch; and a day or two later I was hauled, groaning in my rusty joints, back to Eastleigh Works. Here they stripped the paint off me, finding in the process one of my original coats of L.S.W.R. green paint underneath many others. They decided to dress me in the style of the 1900 period, and gave me a stove-pipe chimney, two crests and two brass number-plates. At last I was finished, and they compared me with a number of old photographs, just to make sure. They were a bit anxious, I could see, when it came to the trial run, as they could not afford to spend money on renewing all my working parts, and I had not worked under my own steam for a long time. But I was all right, and away we went up the main line again.



Adams 4-4-0 No. 563 restored to L.S.W.R. style of about 1900. The engine tells its own story on this page.

"I duly appeared at the Waterloo Centenary celebrations, and it was just as well that they had taken so much trouble to make sure that I was correct in every detail, for experts from all over the country were there to examine me. I can't give you my present address as it is only temporary, but later on they will find me a place in the Museum, where I shall be proud to represent that fine old railway, the London and South Western!"

Club and Branch News

WITH THE SECRETARY

DUTCH CLUB ENTERTAINS BRITISH VISITORS

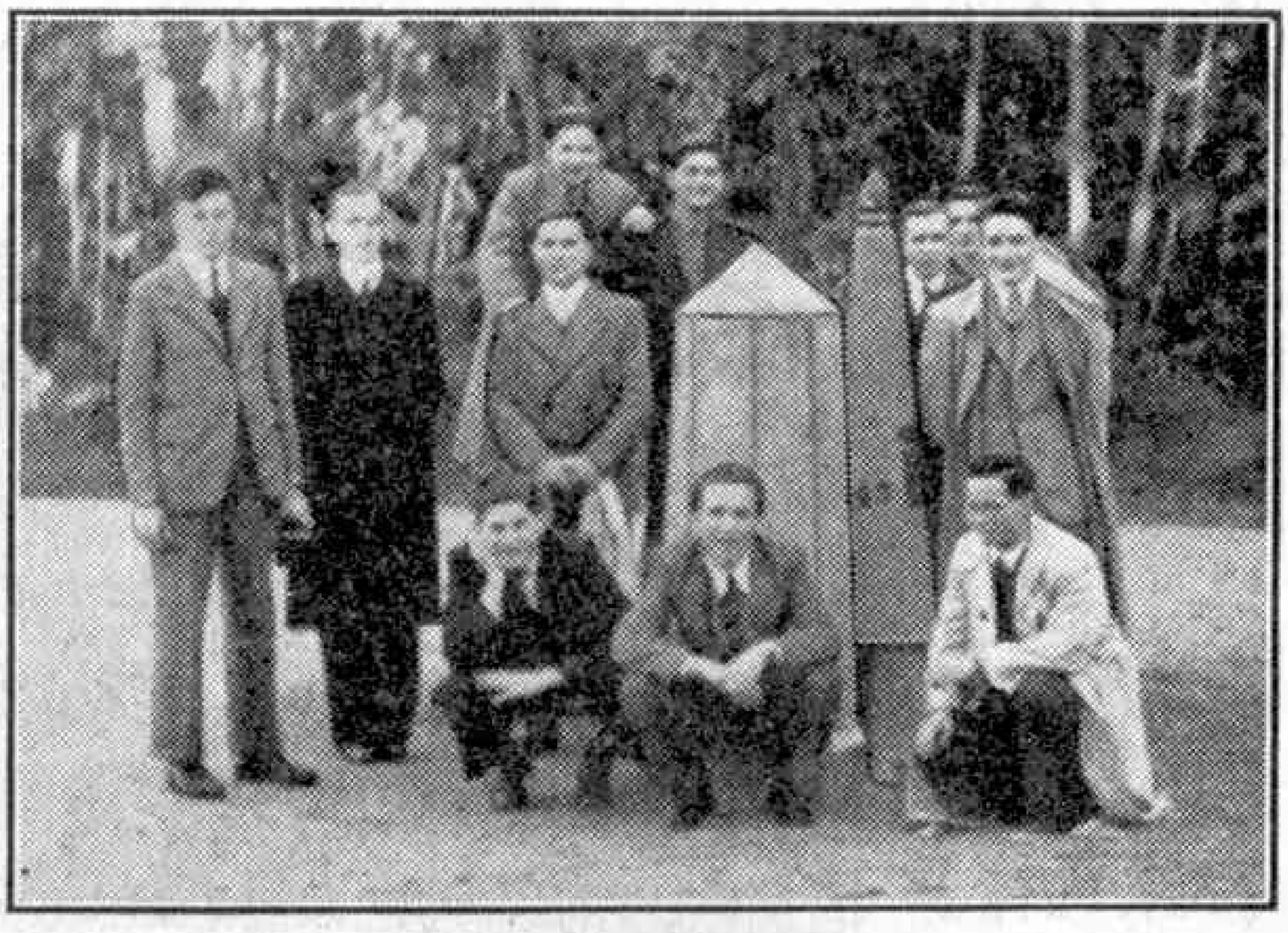
In the autumn of last year Mr. W. J. Wyse, President of the Norbury M.C., Mr. C. B. Chapman, Leader, and two members of the Club spent an enjoyable week with Mr. Bingen and the members of the Maastricht M.C. I have been greatly interested in a brief account of the visit that Mr. Wyse has sent me, and here give extracts from this that I am sure will interest other Club and Branch members.

"We lived with Dutch members in their homes, and made extensive tours of the Maastricht area, which is rather like our own Surrey countryside. Our journey to Maastricht was via Ostend and Liege, and was very interesting.

"It was a very fine experience to stay in the homes of Dutch people. On the Club night at Maastricht we were privileged to see a film strip showing the history of the Maastricht M.C. The Club has a permanent Club Room with its own Meccano and Hornby trains, tools, such as a lathe and a drill, a large steam engine, and a first-class drawing board; in fact everything that a Club could desire.

"We went on various outings with the members of the Dutch Club. One day we explored the dungeons of Fort St. Pieter and the Limburg Grottoes. These grottoes consist of thousands of passages, extending many miles. During the war they were both a shelter for the Maastricht inhabitants and a factory for V-weapons, and we saw wonderful carvings, drawings and paintings on the walls made by those who sheltered in them.

"We also visited the 'Three Lands Point' at Vaals, where the frontiers of Germany, Belgium and Holland meet. The nationals of all three countries can reach this point without any barrier or Customs shed, so it is very fascinating to the insular-minded Briton. Of course we all walked a few yards into Germany, and were photographed together at the frontier stones."



Members of the Norbury and Maastricht Meccano Clubs photographed together at the point where the territories of Holland, Belgium and Germany meet. Mr. Bingen, Leader of the Maastricht M.C., is second from the left, and Mr. Chapman, Leader of the Norbury M.C., is on the right of the stone marking the "Three Lands Point." P. A. Knight, formerly Secretary of the Norbury M.C., is on the extreme left, and M. Rose, another British visitor, is standing behind the boundary stones.

Other visits were made to engine sheds, and to a steam tramway in Belgium.

The visitors greatly appreciated the hospitality of the Maastricht M.C. and of the members and their parents with whom they stayed. Later this year members of the Dutch Club will pay a return visit to Norbury, and I am sure that this will be as happy an event as the trip of Mr. Wyse and his companions to Holland. The friendship between these two Clubs is splendid. Even if such an exchange has to stop at correspondence it is of the greatest benefit to all concerned, and when friendly visits also can be arranged the result is delightful.

CLUB NOTES

WINCHMORE HILL COLLEGIATE SCHOOL M.C.—Model Yacht and Model Aeroplane Sections have been formed. A lantern is included in the Club's equipment and Lectures and Talks with slides are given regularly. Table Tennis is the favourite game, regular Tournaments being held for possession of a cup. A Visit has been made to the Science Museum, South Kensington. Club roll: 26. *Leader:* G. Watts, Collegiate School, Winchmore Hill, London N.21.

HUNTINGDON M.C.—A New Year Party has been held, for which Mr. H. J. Hibbin, President, has provided refreshments on a generous scale. Model-building and Hornby Train operation continue on a large scale, members being awarded prizes for good efforts. Open Nights at which parents can see what the members are doing also are held regularly. Club roll: 55. *Leader:* Mr. J. C. Deaves, 12, Tennis Court Avenue, Huntingdon, Hunts.

ABERDEEN GRAMMAR SCHOOL M.C.—New members are being enrolled. All bring Meccano Outfits to the Club room for model-building, and good models and interesting mechanisms are closely examined by all. One member has perfected a steering gear for use in a tractor. Club roll: 10. *Secretary:* D. N. Angus, Knoyle, Coronation Road, Culter, Aberdeen.

BRANCH NEWS

WEYMOUTH AND DISTRICT—Regular weekly meetings are held, and one of these each month is devoted to Dinky Toys, new models being displayed and their uses being discussed. The Branch track has taken final shape. It includes a terminus, with a goods platform, sidings and a locomotive depot, and there are also a through station and a wayside halt. Refreshments are provided on Track Nights. *Secretary:* A. J. Brown, 68, Wyke Road, Weymouth, Dorset.

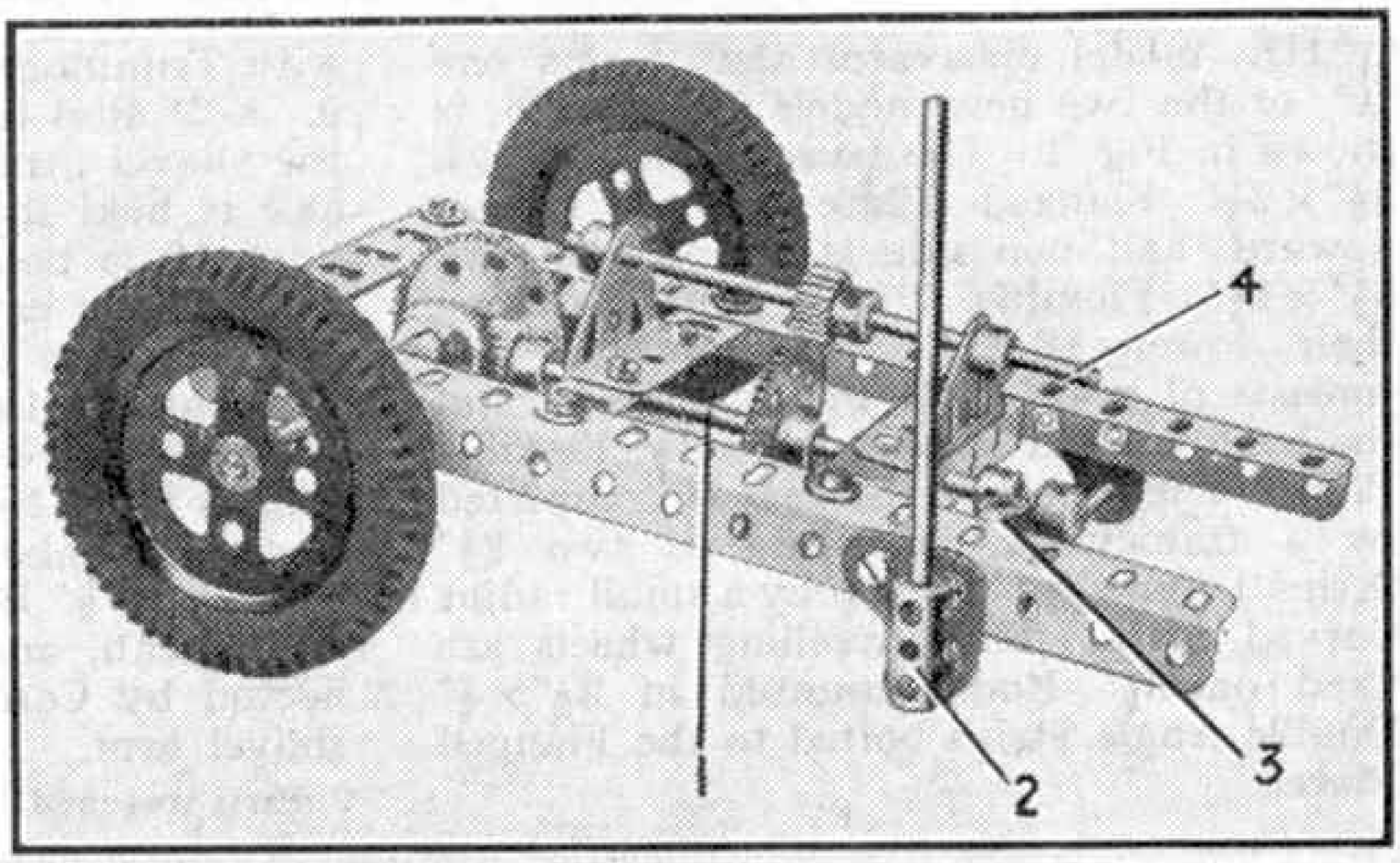
SHIRLEY AND DISTRICT—The Club's Exhibition before Christmas was very successful. The display included Meccano models and a large Hornby Railway, and a Dinky Toy Competition interested visitors, who numbered 350. *Secretary:* D. J. Hancock, 26, Wickham Avenue, Shirley, Croydon, Surrey.

Among the Model-Builders

By "Spanner"

A Compact Reverse Gear for Model Vehicles

The top illustration shows a compact reversing mechanism incorporated in the final drive unit of a model vehicle. The arrangement of the gears in this mechanism is such that an increased gear reduction is provided for movement in the reverse direction. This allows greater control of the vehicle, and the mechanism is particularly suitable for such models as a mechanical horse, in which the tractor unit is required to back on to the trailer.



Compact reversing mechanism for small model vehicles.

The rear axle of the vehicle is fitted with a $\frac{3}{4}$" and a $1\frac{1}{2}$" Contrate, arranged with their teeth facing. The driving gear is a $\frac{1}{2}$" Pinion fixed on a Rod 1 mounted in the chassis cross-members. This Rod is free to slide within limits in its bearings, and is controlled by a lever locked in a Coupling 2. The Coupling is fixed on a transverse Rod fitted with a second Coupling 3, and a $\frac{3}{8}$" Bolt held in the Coupling 3 engages between two Collars fixed on Rod 1. The drive from the engine unit is taken to a Rod 4 and transmitted to the Rod 1 by a $\frac{1}{2}$" Pinion and a 57-teeth Gear.

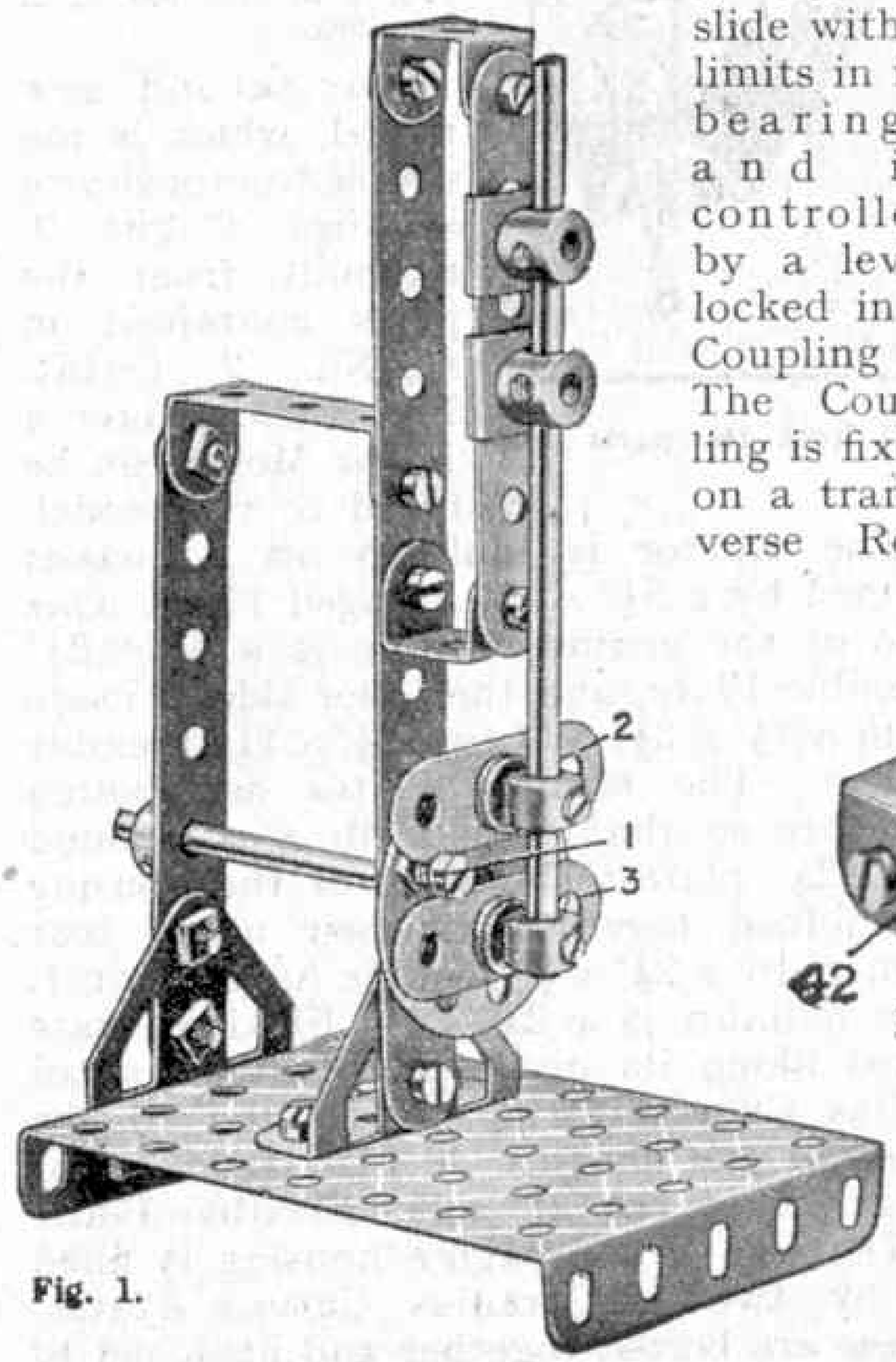


Fig. 1.

How to Use Meccano Parts

Slide Piece with Boss (Part No. 50)

The Slide Piece is particularly usefu as a guide for sliding mechanisms, such as lift cages and engine crossheads. It has a slotted portion that fits freely over any Meccano Strip, which can then be used as a guide bar. Two examples of the use of Slide Pieces in this way are shown in Figs. 1 and 2. In Fig. 2 they serve as the crosshead slippers of a model horizontal steam engine, sliding to and fro on Strips; while in Fig. 1 they form the sliding portion of an interesting crank movement.

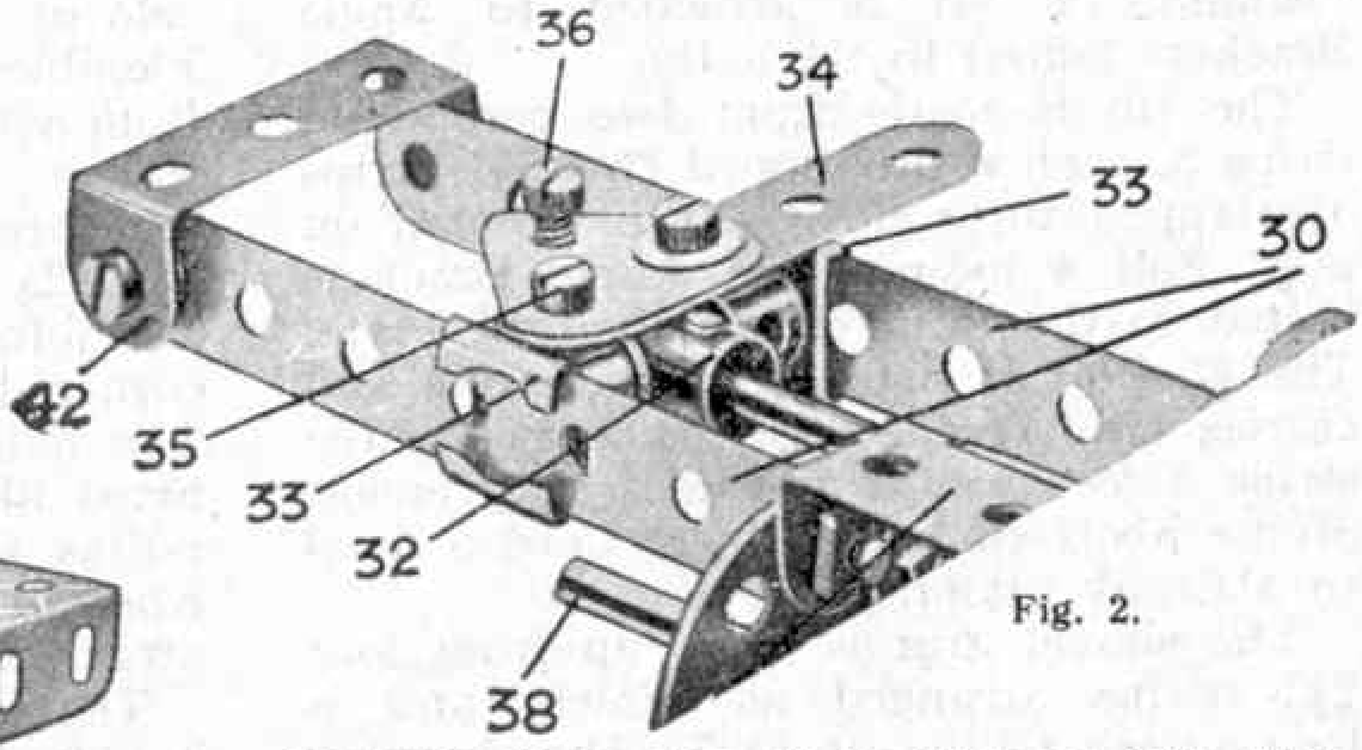


Fig. 2.

Examples of the uses of the Meccano Slide Piece, which are referred to on this page.

New Meccano Models

Mechanical Excavator—Tractor

THE model excavator that forms one of the two new models this month, is shown in Fig. 1. The base of the cab is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate placed flanges upward, and one side is formed by two $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates joined along their lower edges. The opposite side consists of a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate, and the back is filled in by a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate. The front of the cab is completed by a framework consisting of two $2\frac{1}{2}''$ Strips 1 joined at the top by a small radius Curved Strip. The travelling wheels are fixed on $3\frac{1}{2}''$ Rods mounted in $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips bolted to the Flanged Plate.

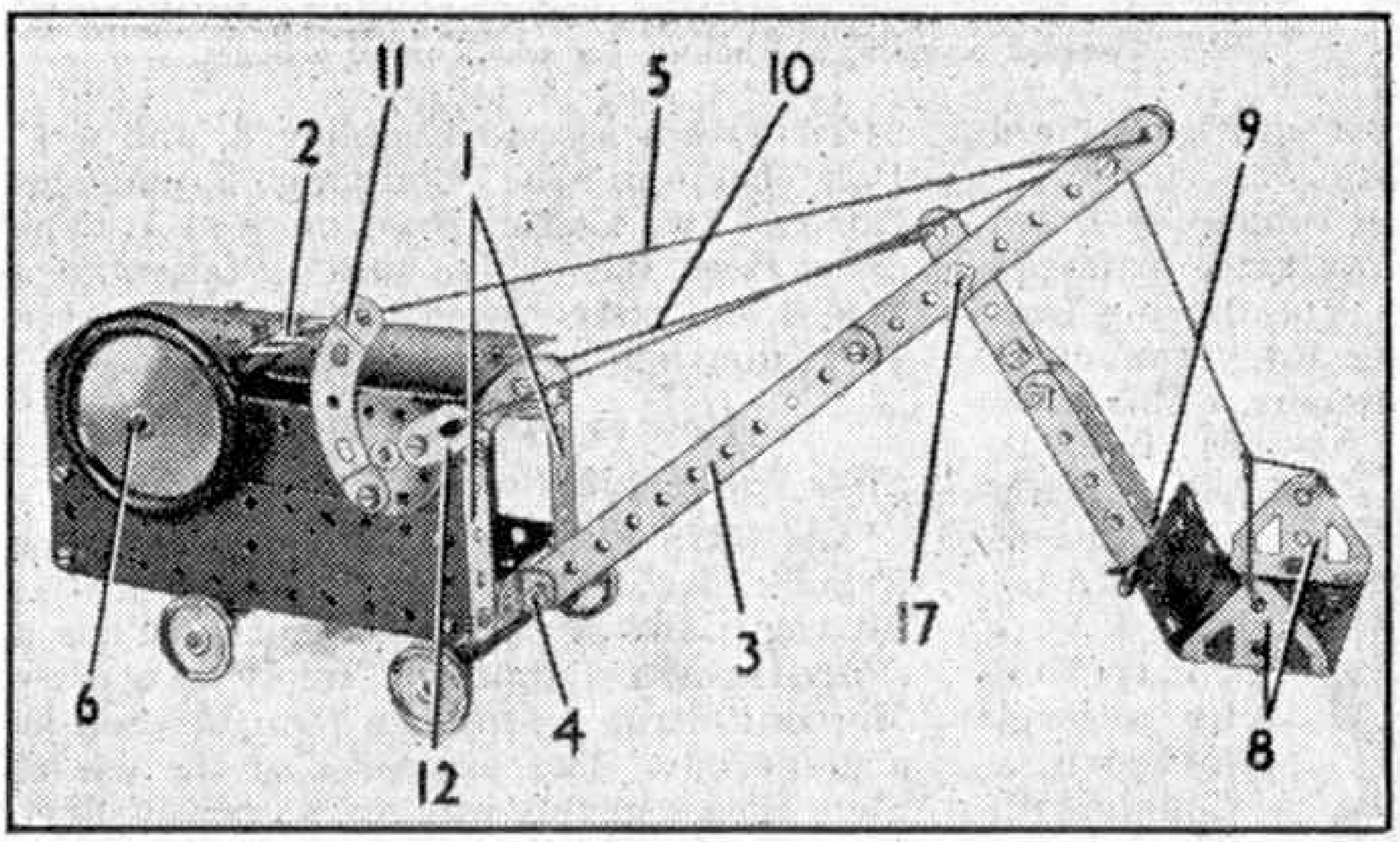


Fig. 1. This working model of an excavator can be built from the parts in Outfit No. 2.

The roof is formed by two $1\frac{11}{16}''$ radius Curved Plates connected by a Flat Trunnion 2. It is attached to Angle Brackets bolted to the sides.

The jib is made from two compound strips 3, each consisting of two $5\frac{1}{2}''$ Strips overlapped three holes. It is pivoted on a $\frac{3}{8}''$ Bolt 4 mounted in Angle Brackets bolted to the front of the Flanged Plate. The $\frac{3}{8}''$ Bolt is fitted with lock-nuts and carries two Washers placed between the strips 3 for spacing purposes. Movement of the jib is controlled by a Cord 5 fixed to a Crank Handle 6.

The shovel arm is built up from four $2\frac{1}{2}''$ Strips arranged as shown, and is lock-nutted to the jib at 7. The shovel is made from a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate fitted with Trunnions 8 and two Angle Brackets 9. A 2″ Rod is passed through the end of the shovel arm and the Angle Brackets 9 and is held in place by Spring Clips. A Cord 10 is tied to the shovel and to the front of the cab. The length of this Cord is adjusted so that when the jib is lowered it imparts a digging motion to the shovel.

The shovel arm is raised by a lever 11. This is fixed to a Bush Wheel that carries also a Fishplate 12. The Bush Wheel is fixed on a $\frac{3}{8}''$ Bolt passed through the side of the cab, and the Fishplate 12 is connected by Cord to the upper end of the shovel arm.

Parts required to build the model Excavator: 4 of No. 2; 6 of No. 5; 1 of No. 10; 8 of No. 12; 2 of No. 16; 1 of No. 17; 1 of No. 19g; 4 of No. 22; 1 of No. 24; 3 of No. 35; 45 of No. 37a; 38 of No. 37b; 4 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 4 of No. 111c; 1 of No. 125; 2 of No. 126; 2 of No. 126a; 1 of No. 187; 2 of No. 189; 2 of No. 190; 1 of No. 191; 2 of No. 200.

Our second new model, which is the simple tractor shown in Figs. 2 and 3, is built from the parts contained in a No. 2 Outfit. Fig. 3 shows how a *Magic* Motor can be fitted to the model.

The tractor is built-up on a chassis formed by a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. One side of the engine housing is a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate, and the other side is made from a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ and two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates. The smaller Plates are bolted together so that they form a compound $4\frac{1}{2}'' \times 2\frac{1}{2}''$ plate. The sides of the housing are joined together at their upper rear corners by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 1. The radiator is a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate fitted along its upper edge with a small radius Curved Strip, and bolted to the front of the chassis. A Flat Trunnion is attached to the $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate.

The top of the engine housing is filled in by two $1\frac{11}{16}''$ radius Curved Plates. These are bolted together and attached to

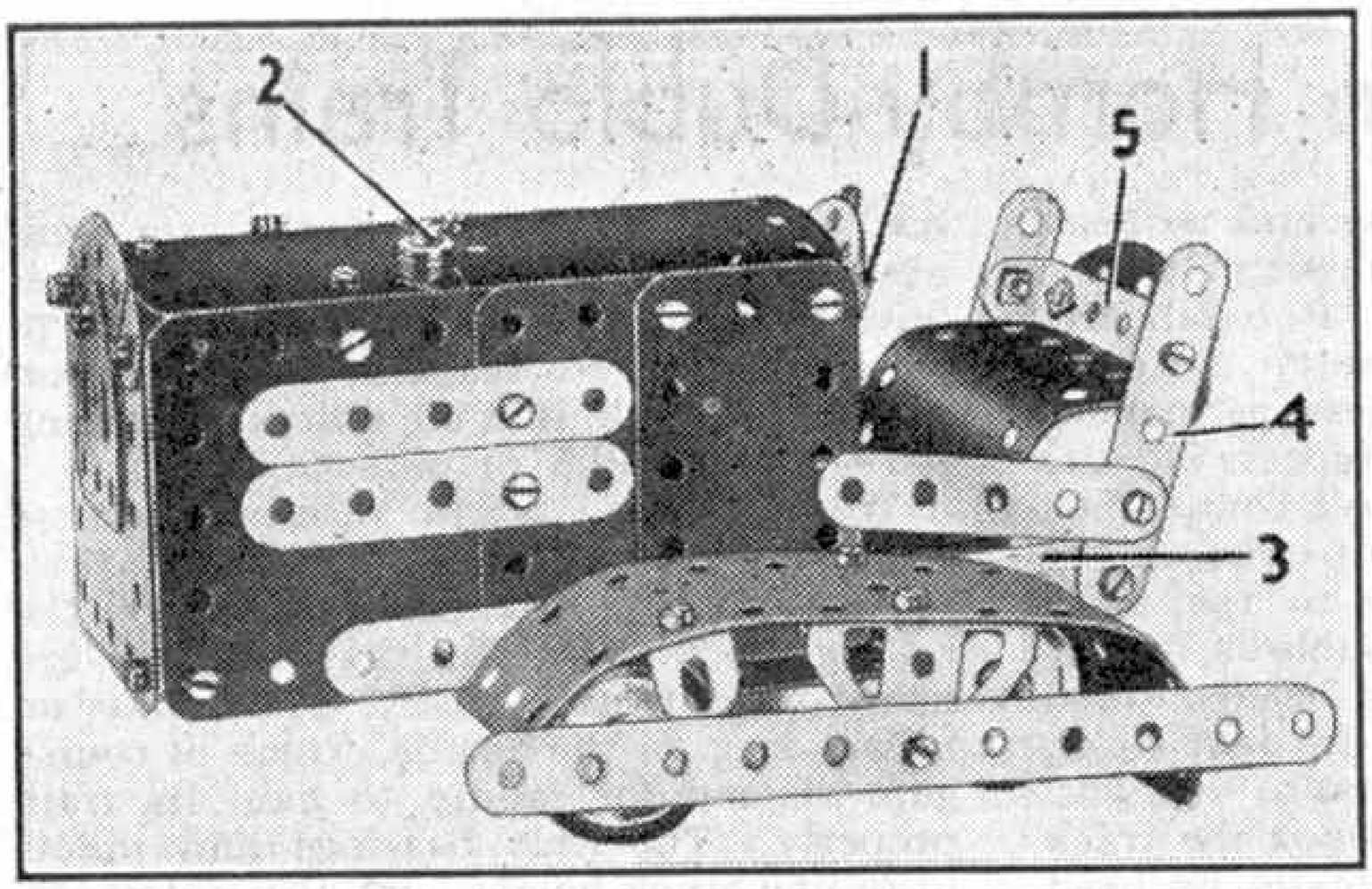


Fig. 2. Outfit No. 2 contains all the parts required to build this realistic model tractor.

the sides and to the radiator by Angle Brackets. A $\frac{3}{8}$" Bolt 2 fitted with four Washers represents a vertical exhaust pipe from the engine.

The $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate of the chassis is extended by a $5\frac{1}{2}"$ Strip 3 bolted along each of its longer sides. The Strips are fixed in position so that they overlap the rear of the Flanged Plate by two holes, and they support a $2\frac{1}{2}"$ Strip 4 on each side that forms part of the driving seat. The $2\frac{1}{2}"$ Strips are connected at their upper ends by a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip 5 fitted with a small radius Curved Strip. The seat proper is a U-section Curved Plate that is opened out slightly and attached to the rear of the Flanged Plate. Two further $2\frac{1}{2}"$ Strips are fixed as shown to complete the sides of the driving compartment. The track covers are $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates curved at each end and attached to Angle Brackets bolted to the chassis. A $5\frac{1}{2}"$ Strip is fixed to each of the $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates by a Trunnion.

The steering wheel is a Bush Wheel fixed on a $\frac{3}{8}"$ Bolt passed through the $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip 1, and the front of the driving compartment is partly filled in by a Flat Trunnion also attached to the Double Angle Strip. A control lever is represented by a 2" Rod held in an Angle Bracket fixed to one of the $2\frac{1}{2}"$ Strips.

The travelling wheels are 1" Pulleys fitted with Rubber Rings, and they are fixed on $3\frac{1}{2}"$ Rods mounted in Fishplates bolted to the chassis. A *Magic* Motor can be attached to the $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate between the axles, and connected to a $\frac{1}{2}"$ Pulley on the leading axle by a $2\frac{1}{2}"$ Driving Band.

Parts required to build model Tractor: 4 of No. 2; 6 of No. 5; 4 of No. 10; 6 of No. 12; 2 of No. 16; 1 of No. 17; 4 of No. 22; 1 of No. 23a; 1 of No. 24; 40 of No. 37; 4 of No. 38; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 2 of No. 111c; 2 of No. 126; 2 of No. 126a; 4 of No. 155; 1 of No. 186; 2 of No. 188; 2 of No. 189; 2 of No. 190; 1 of No. 191; 1 of No. 199; 2 of No. 200. 1 *Magic* Motor.

Special "Outfit" Competition

Our competition this month will appeal specially to the owners of small Outfits, as entries are limited to models built from the parts contained in Outfit No. 4. It is not necessary to use all the parts in this Outfit.

Competitors may build any kind of model, but the more original the subject the better will be its chance of success. When the model is completed a photograph or a sketch of it should be made and sent to "*Meccano Outfit No. 4 Contest, Meccano Limited, Binns Road, Liverpool 13.*" Each illustration submitted must have the competitor's age, name and address on the back, and a list of parts used in the model must be attached.

Entries will be divided into Section A, for competitors in the British Isles, and Section B, for competitors Overseas. Closing date for Section A, 30th April; for Section B, 30th July.

The following prizes will be awarded in each Section. First, Cheque for £3/3/–; Second, Cheque for £2/2/–; Third, Cheque for £1/1/–. There will be also five prizes each consisting of a P.O. for 10/6 and five prizes each of 5/–.

Prize-winning entries become the property of Meccano Ltd. and are not returnable to senders.

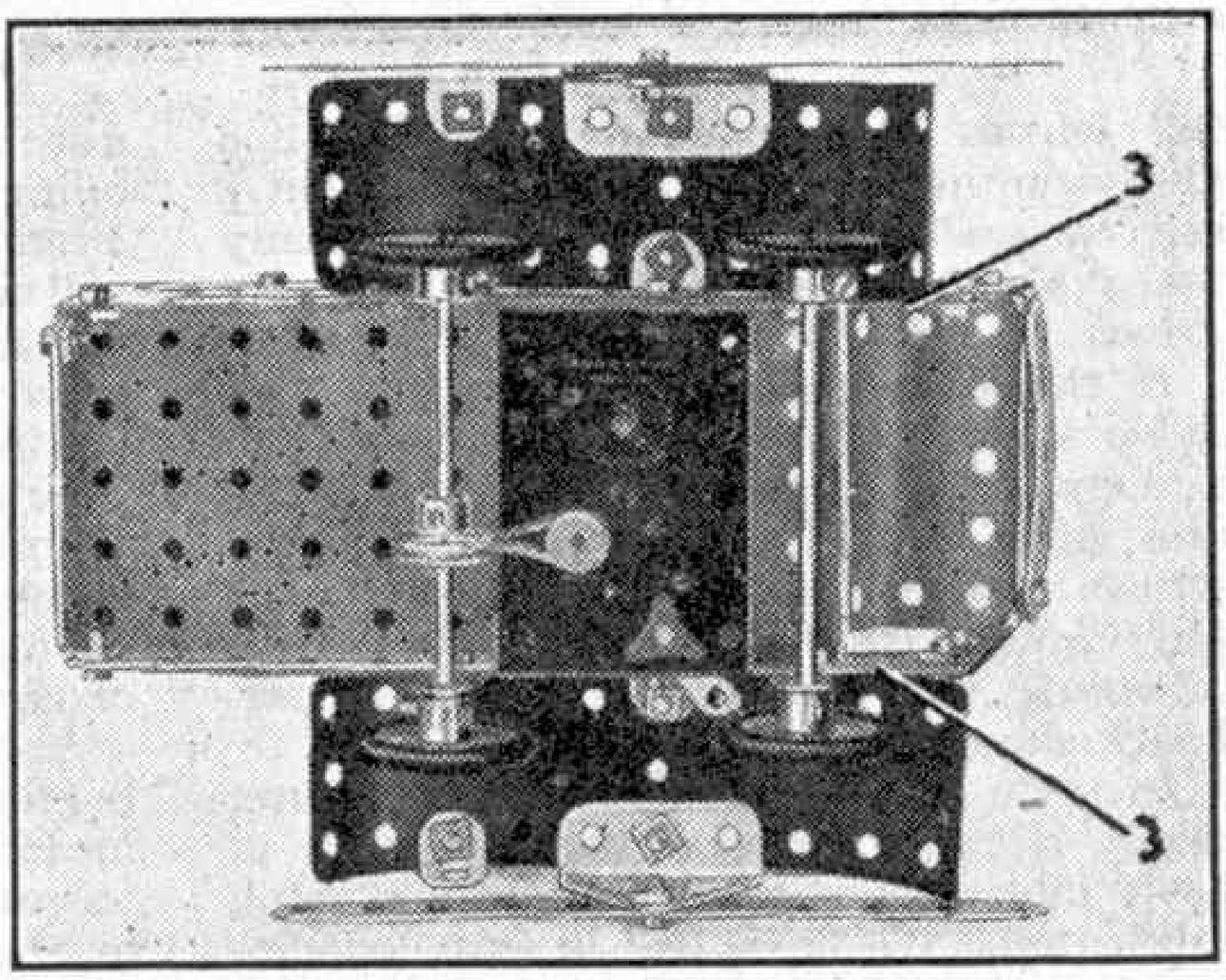
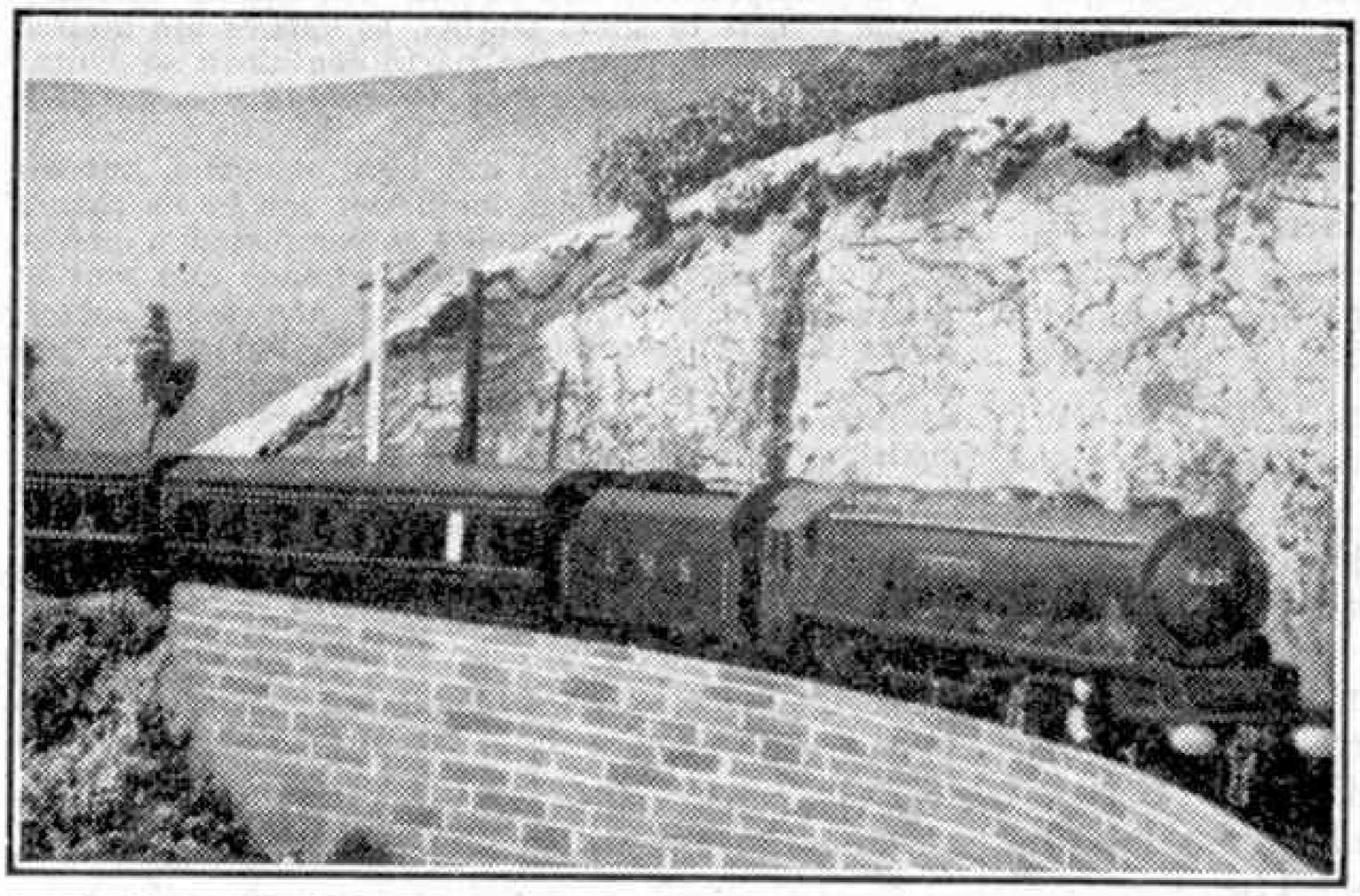


Fig. 3. An underneath view of the tractor showing the position of the Magic Motor.

Notes on Hornby-Dublo Trains

WE have recently had several requests for advice about screwing down a Hornby-Dublo layout to a baseboard. Except where lineside scenery is to be introduced as a more or less permanent feature, the screwing-down process is quite simple; but some readers have complained of short circuits that did not exist on the layout before it was fixed to the baseboard. Sometimes the trouble is due to the actual screwing. Round-headed wood screws No. 2 size, $\frac{3}{8}$" long, are just right, but they must be driven quite straight. A screw put in crooked can put the track out of line, and in extreme cases its head may actually touch the collector shoe of the engine, thus causing a short circuit.



A Hornby-Dublo "Duchess of Atholl" Locomotive and train on the layout of E. K. Ellis, Belfast.

On curves the leading collector shoe always projects to one side of the centre rail to some extent, and it may easily touch the head of a screw not properly driven.

If the screws are slack the track can move slightly as a train passes, and then a screw head may touch the centre rail and cause trouble. Therefore drive the screws well home, but not so far that they cause distortion of the track. It is of course very important that the baseboard should be firm and level.

In spite of all instructions and advice, many Hornby-Dublo owners still fail to keep their locomotives and rolling stock lubricated. We have had several locomotives returned to us with a complaint that they would hardly run at all, and inspection has shown that the mechanism was absolutely dry. As soon as these engines have been lubricated they have started to run perfectly. No machine or mechanism will operate well, if at all, unless its moving parts have a film of oil.

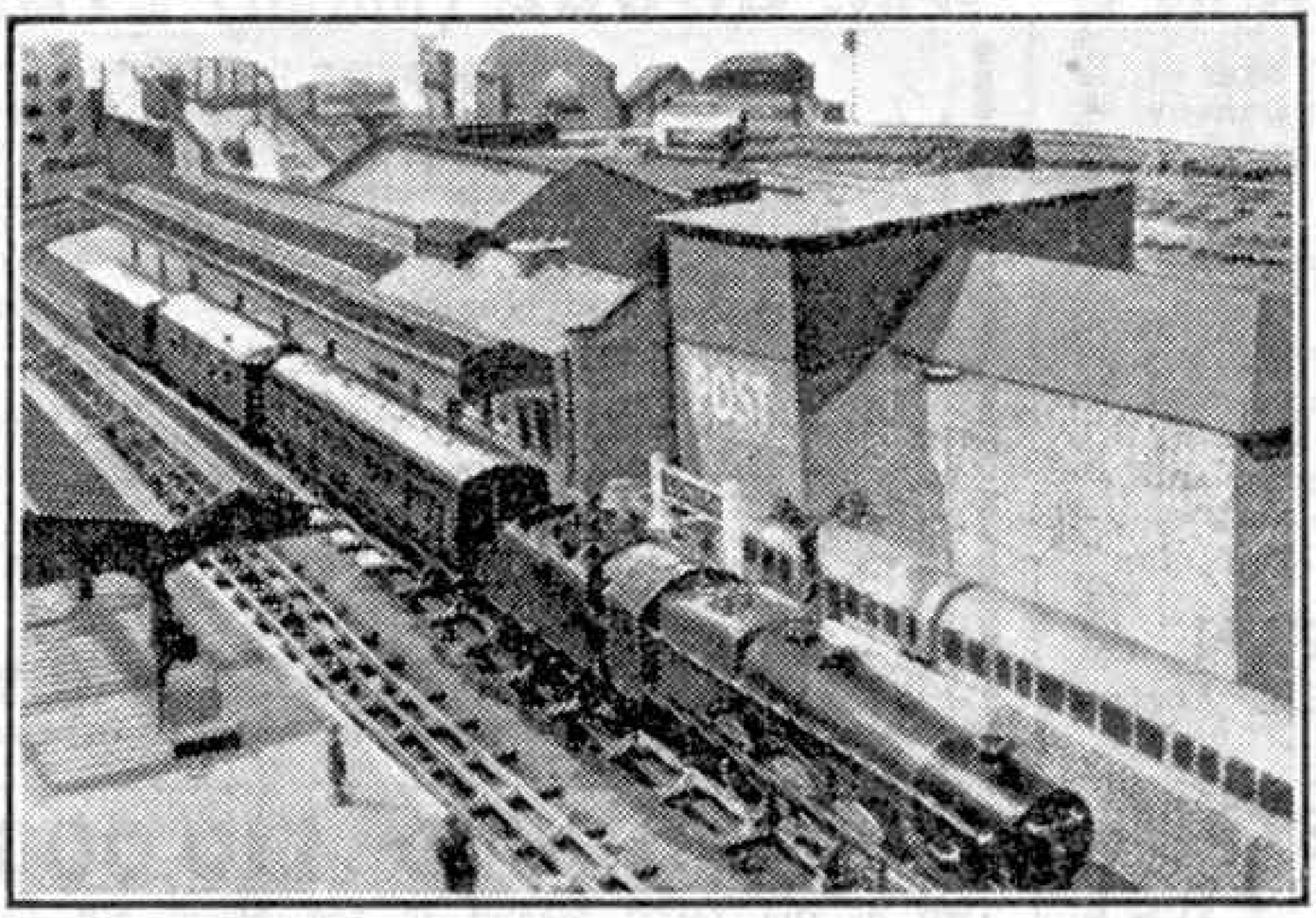
We have also found that while most Hornby-Dublo owners lubricate their engines, there is a tendency to neglect the rolling stock. Vehicles that run dry are noisy, do not move easily, and impose an unfair drag on the engine, which of course gets blamed for failure to haul its train properly. The axle bearings and pivots of rolling stock bogies, and also automatic couplings, should all have their little drop of oil, applied by the wire dipper provided in the oil bottle supplied with the train set. By the way, when the supply in this bottle has been used up do not throw bottle and dipstick away; refill the bottle with a light oil of good quality such as is used for sewing machines. The dipstick is far better than an oilcan; by means of it oil can be placed just where it is wanted, and in the small quantity required. If by chance you have lost your dipstick, a matchstick sharpened to a point will do quite well.

While a small film of oil is necessary on all moving parts, one should not be too generous in its use, as over oiling can cause a great deal of trouble. From the axle bearings, for instance, it will find its way round the wheels and on to the track, with the result that the driving wheels of the engine slip. If, however, this happens the only cure is to wipe over all rails and wheels very thoroughly with a clean dry cloth. If the excess of oil is great, this wiping may have to be repeated after further spells of running.

Lubrication of the armature spindle top bearing is specially important, as neglect means harsh, poor running. Here again too much oil will lead to trouble, this time in the form of a dirty commutator and brush gear. These parts must be kept free from oil.

A Hornby Electric Railway

THE pictures on this page show part of the gauge 0 electrically-operated layout owned by "*M.M.*" reader Sgt. S. E. Tomlin, at present serving in the R.A.F. The system has an oval double track main line well suited to continuous running. An inner pair of tracks branch off from the main circuit at the junction shown in the lower illustration; and after passing through one side of the station they resolve themselves into a series of sidings.



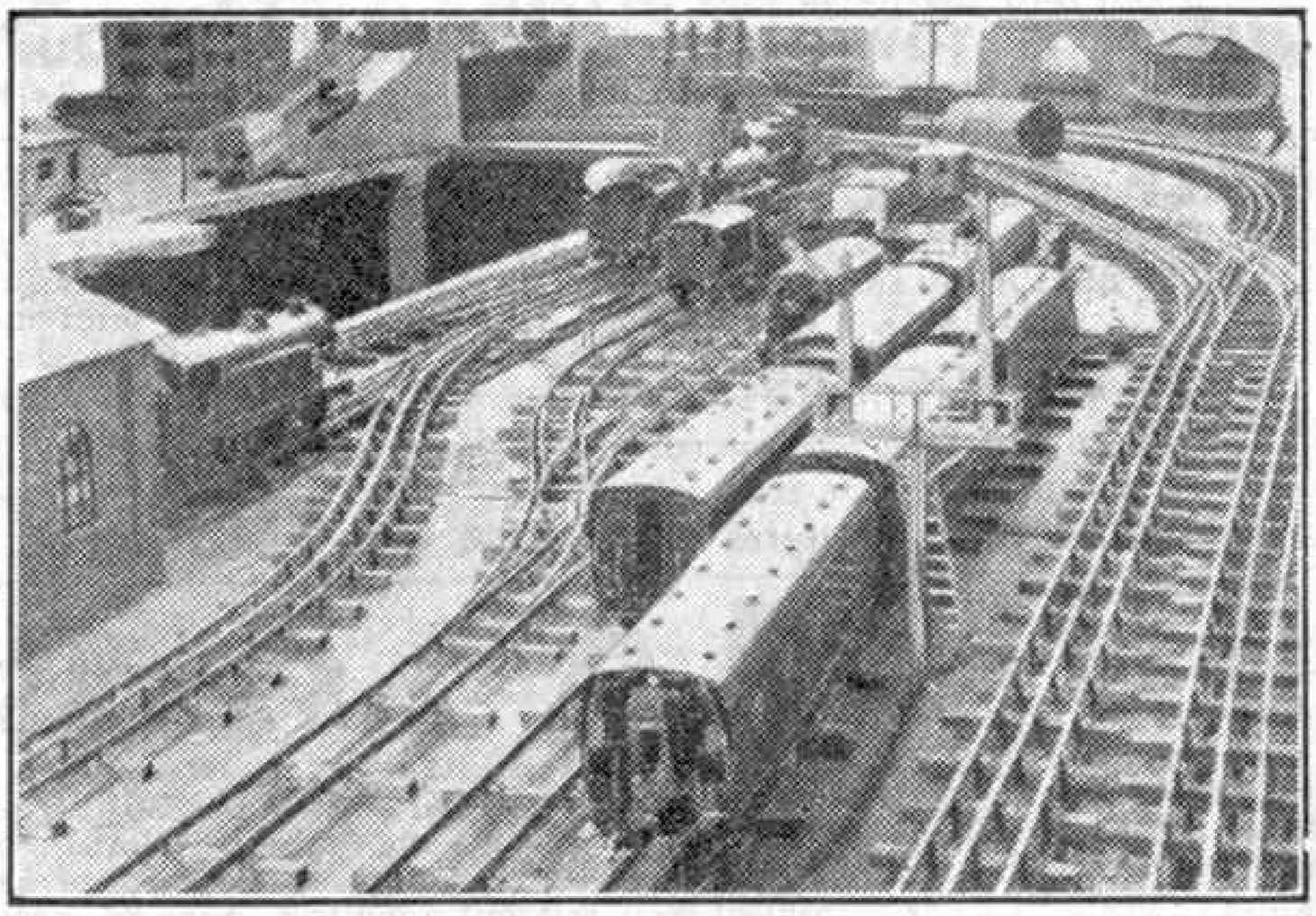
"London," the passenger station on the layout of Sgt. S. E. Tomlin, R.A.F. The engine is a Hornby "Princess Elizabeth." Photographs by H. Carter, Ealing.

The passenger station has four main line platform faces and part of them can be seen in the upper photograph. An interesting feature at the end shown is a bay platform specially provided for "Underground" trains. The track serving this represents a short surface section of an underground electric system. After leaving the station, it dives away down under the sidings to the supposed "Tube" level. The London Transport type train standing in the "Underground" bay is thus more or less an ornament, but it does give quite an "inner suburban" look to the station. The latter incidentally is called, simply, *"London."*

Each main track has its own 20-volt Transformer, there being insulating gaps at the junction to keep the circuits separate. The sidings as a whole form another separate section and special switch arrangements allow them to be powered from either transformer according to the requirements of the moment. The sidings and the platform lines are divided into sections so that an engine can be held almost anywhere on a given stretch of track. This allows a main line train to arrive headed by the 4–6–2 *"Princess Elizabeth"* shown in the station view; the section on which the engine comes to rest can be switched out and so another engine can come on at the other end and draw the "empty" train away to the sidings.

Hornby locomotives and rolling stock are used almost exclusively in the working of the line, the principal engines being the 4–6–2 *"Princess Elizabeth,"* and a 4-4-2 E220 Special Tank. Buildings, stations and various accessories have been made at home in wood. This material also was used for the "Underground" train and also for one or two motor buses among the road traffic.

Dinky and Supertoys vehicles are used in the yards and on lineside roads.



A general scene across the sidings in which Hornby locomotives and rolling stock are prominent.

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For other Stamp Advertisements see also pages 120 and xi.

Stamp Collecting

Scouts and Guides on Stamps

By F. Riley, B.Sc.

THE Scout stamp from Australia illustrated in last month's "*Stamp Gossip*" draws attention to Boy Scout and Girl Guide stamps in general, which probably are more numerous than is realized by the average collector. There are in fact more than 50 of them. Others no doubt will follow, and a good collection well displayed undoubtedly will always be of the greatest interest.

Needless to say, no Scout stamps have appeared in Great Britain, where special commemorative stamps of any kind have been very few in number. For stamps in the collection we have in mind it is necessary to go overseas, and the first that should be mentioned come from South Africa. These were two stamps produced in Mafeking during the siege of 1900. This of course was before the foundation of the Scout movement, but one of the stamps bears the portrait of General Baden-Powell, its founder, and the other shows Sergt.-major Goodyear on a bicycle. The Sergt.-major acted as messenger during the siege. The two stamps are perhaps beyond most junior collectors in price, but if they can be obtained they should certainly head the collection.



Scouting began in 1908, but it was not until 1925 that another stamp for a Scout collection made its appearance. This happened in Hungary, where a series of stamps showing sporting scenes was issued in that year. One of these, the 1,000 kr. value, shows a bugler in a Scout camp. Like the rest of the set it was sold at twice its nominal rate; the premiums were used to aid sports associations in Hungary.



This beginning was followed eight years later by the appearance in the same country of an entire set of five Scout stamps, celebrating the 1933 International Jamboree. One design, showing a leaping white stag, was used throughout the series. This good example was followed in 1939 by a set celebrating a Girl Guides' rally at Godollo, to which the name "Pax Ting" or Parliament of Peace was given.

In the meantime Scout stamps had begun to appear in other countries. One of the strangest examples came from Russia. There the Scout movement was officially banned in 1922, but seven years later two stamps were issued to mark what was called the first All-Russian Gathering of Pioneers. The design shows a trumpeter sounding the assembly, and he is wearing Scout uniform. The neighbouring country of Lithuania, then independent, did better than this in 1938 by issuing a set of four stamps,



sold at a premium in aid of a fund for national camps for Scouts and Guides. The designs were those of a National Olympiad issue of the same year, and to mark their special nature two of the stamps were overprinted with words meaning "Scouts' National Camp," and the others with an inscription meaning "Guides' National Camp."

The country that has been most active in the issue of Scout stamps is Rumania, a land of many commemorative issues. The first series came in 1931, and four others appeared by 1938, making altogether 31 stamps. The designs are all excellent from the Scout point of view. Stamps of the first issue show a Scout encampment, recruiting and rescue work. The set of the following year commemorated a national Jamboree, and these stamps were even better, the four lowest values showing Scouts in camp, a signaller at work, cooking by the camp fire and trailing. Six stamps of 1934 repeated these designs, with the overprint "*Mamaia 1934*," the place and year of the Jamboree celebrated by the issue, and yet another Jamboree, this time at Brasov, was celebrated in 1936 by three stamps, the designs of which show various Scout badges. Then in 1938 came a set of 11 stamps, seven of which carried premiums in aid of Scout funds, although the designs showed portraits of famous Rumanians. This set presumably will be the last of the Scout issues of Rumania, which is now under Russian domination.



Of the countries of Western Europe only Holland and France have distinguished the movement by direct recognition on stamps. The Fifth World Jamboree was held at Vogelenzang, in Holland, in 1937, and to celebrate it there was an issue of three stamps. Of these the 1½ c. value shows the Scout Tenderfoot badge; on the 6 c. a hand beating a drum is seen, with flags behind; and the 12½ c. value portrays the head of Hermes, the messenger of the Gods of Ancient Greece. These stamps appeared on 1st April, 1937, and were followed a month later by two Scout stamps issued in the Dutch Indies. French recognition came in 1947, the year of the Jamboree of Peace held in the Forest of Moisson. There was only one stamp, and the principal feature of the design was the Scout arrowhead.



Our last example of a Scout stamp comes from Turkey, the 8 k. value of a series issued in 1938. The New Zealand Health stamps of 1944 also are suitable for our collection, as on them Princess Elizabeth and Princess Margaret Rose are shown in Sea Ranger and Guide uniforms.



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Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

THERE is supposed to be less money about this year, though bank figures do not bear out this belief, so it was reasonable to think that prices for postage stamps would fall. Nothing of the kind has actually happened as far as the majority of stamps are concerned, and alas it looks as though it is going to cost us more than ever to fill those blanks. Some writers on philately are beginning to wonder where it will all end. They need not worry, for such things automatically adjust themselves, and in the meantime we shall be acting sensibly if we just confine our purchases to stamps which we can afford. After all, stamp collecting is just a hobby.



Some time ago it was mentioned that it took thousands of dollars to send an ordinary letter through the post in China. Mr. Tan King Meng, a reader in Malaya, has kindly sent a cover which had stuck upon it two stamps of 50,000 dollars each, and another for a million dollars. This is by no means a record, for it is mentioned in the "*Stamp Mirror*" that a letter received in Singapore actually had stamps affixed to the value of 105 million dollars. At the time this little lot was worth about four Malayan dollars, or 9/4 in British currency. Now all those fantastic figures are altered for the moment by the issue of a new currency based on the Gold Yuan.

Collectors were very perturbed when all those high values were announced for the "Silver Wedding" anniversary, and our Crown Agents, who had nothing whatever to do with the decision, received letters of protest from all over the world. It is said that those which came from the U.S.A. were the most pungent, for collectors there imagine that they will be taking most of the stamps sold to stamp enthusiasts and thus think that they have something to do with the calling of the tune. As a matter of fact they will not buy 10 per cent. At the same time the authorities apparently have taken some notice of somebody's protests, for while several commemorative sets have been announced recently, in each case they have been for stamps of modest face value.

A case in point is the splendid little set issued on 12th January for British Honduras. Six stamps are concerned, and the total face value is only about 1/10. As can be seen from the illustration, the stamps are quite handsome; very different from the Eleutherian set of Bahamas, which is still being criticised. The Honduras set commemorates the 150th anniversary of the Battle of St. George's Cay. Truth to tell, we probably issued this set to remind certain quarters that we have been in that part of the world a very long time indeed, and by inference we can see that we are going to remain too. As a matter of fact, small as was the battle of St. George's Cay by modern standards, it was really a great victory against odds.



A rather surprise announcement was the notice of the Crown Agents that a long set of stamps—13 values, plus seven postage dues—were to be issued for use in the former Italian Colony of Cyrenaica. At the time these notes are being written it has not been decided if we shall retain our occupation of this territory, but this set of definitive stamps seems to point to the fact that at any rate we expect to get the mandate. Stamps up to 20 mils will be of the same size as our own 1d. stamps, whereas those above this will be larger, like our own high values. All the stamps will have the same design, which will be a picture of a Mujahid, or native warrior.

Another surprise was the news that Jamaica is to have a £1 stamp. It will be a pictorial, with brown centre and violet border, and apart from the King's head the design will illustrate tobacco growing and cigar making. This is not to be wondered at, for most governments are fully alive to the publicity possibilities of postage stamps, and as can be seen from our own tobacco shops, Jamaica is striving hard to oust Cuba, which is in the dollar area, as our first supplier of fine cigars. Cuba does not forget her cigars when planning stamp issues, as one of our illustrations shows. The stamp is one of a set of three issued in December 1948.

Apparently the mail load at Christmas and New Year was heavier than ever, not only at home but in some of the Dominions as well. Canada, ever up and doing, has shown a good deal of enterprise in trying to educate the public to "Post Early." An idea used there might well be tried by our own authorities. In Canada the Post Office prepared a number of slides and these were shown in various theatres. One quoted by "*Linn's Weekly Stamp News*" reads as follows: "*A late gift looks like an afterthought—Post Early.*" Those of us who have had to scuddle round trying to find a Christmas card to match one which has been received unexpectedly from a friend, who did not receive one from us, will feel the appeal of that apt slogan.



The fact that Gibbons have priced the cheapest "Penny Black" at 60/- has caused quite a stir among most collectors. Of course, if you have a copy—and many readers have, for the stamp is really quite common—which has not got four clear margins, etc., it is not likely to be worth anything like that sum. It is amazing how the value of this stamp has zoomed since the days, in this writer's lifetime, when nice copies were to be had for 6d. each.

Our last illustration shows a stamp issued in the United States in honour of Juliette Gordon Low, founder of the Girl Scouts over there. This lady established the first American company of girl guides in Savannah, Georgia, in 1912.



Photography

Making Your Pictures Tell a Story

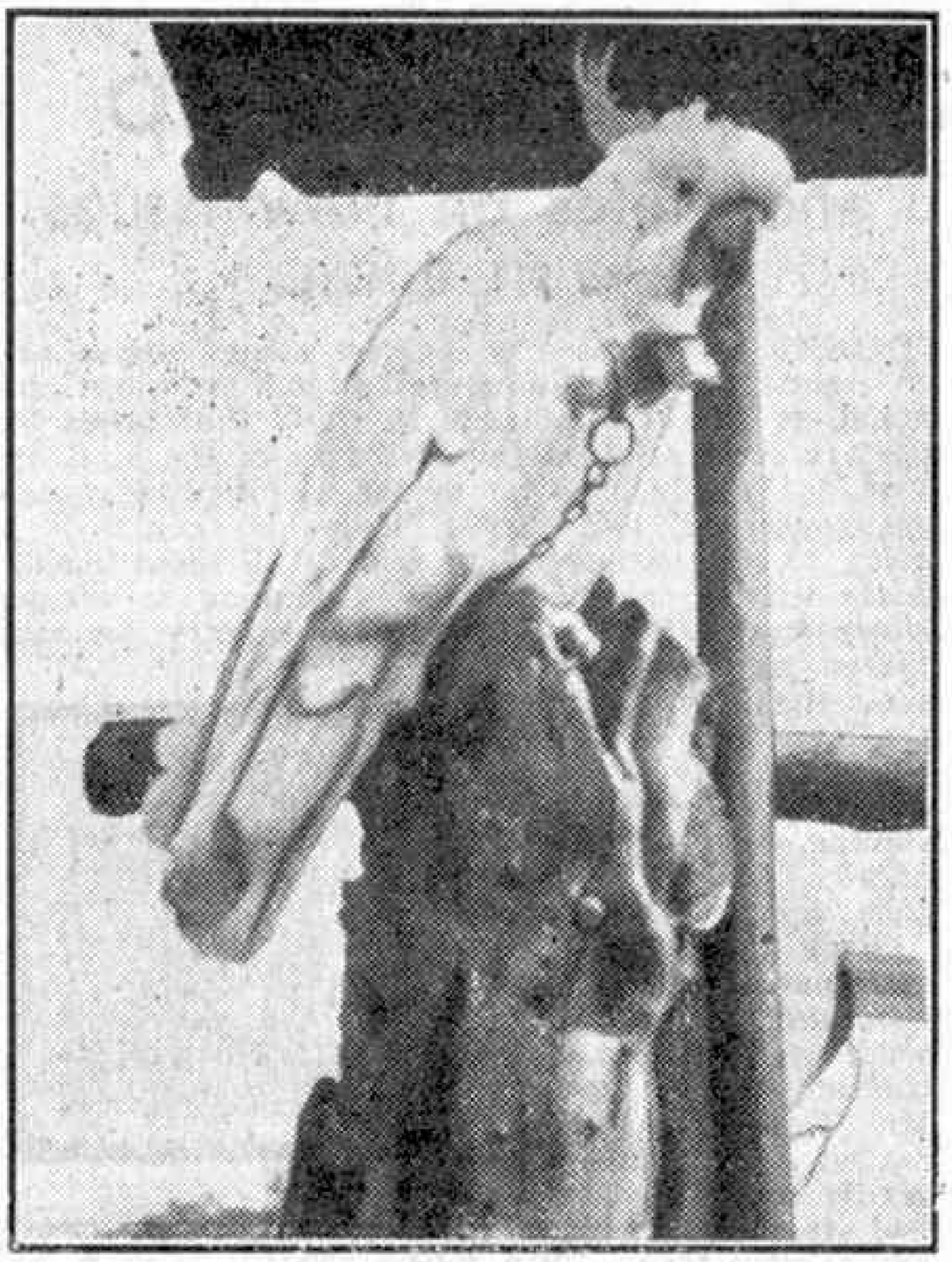
THE photographing of whatever takes one's fancy is very enjoyable and fills the album with a remarkable variety of subjects, but I think much more interest can be had by taking series of pictures of special subjects. For instance, if you have a pet dog or cat—or may be a rabbit!—you can take a series of photographs showing it in different attitudes and moods. A group of related pictures of this kind makes a most attractive page in the album.

If you are a football enthusiast the camera can give you a lasting record of your favourite team, individually and collectively, in action, with pictures such as the excellent one at the foot of this page to remind you of exciting moments in matches you have attended.



Daffodils. Photograph by R. Wrigley, Clitheroe.

Perhaps you are interested in old churches and historic buildings; then your camera can be a most useful ally in recording your "discoveries." Many years ago I secured a most interesting set of pictures, including both interior and outside views, of an old priory that was about to be demolished to make way for a housing estate. I revisited the old place several times while demolition was in progress and took photographs of its gradual disappearance, until, in the final picture, all trace of the old priory has gone, and the erection of the first of the houses indicates the coming of the "new order." The taking, developing and printing of those photographs gave me the utmost enjoyment, and the complete set of prints proved of great interest to many of the people who came to live in the new houses



A Yellow-crested Cockatoo photographed at the London Zoo by B. B. Foskett, East Putney, London S.W.15.

In most hobbies photographs can add greatly to the interest by enabling one to compile a pictorial record. This is particularly true of nature study, any branch of which has endless possibilities.

Most indoor hobbies lend themselves to photographic illustration, and I often wonder why collectors of various articles—stamps, coins, etc.—make so little use of their cameras. This applies also to Meccano model building. When a really good model has been built it is surely worth while recording it by one or more photographs before taking it to pieces and starting on a new model. The interesting pictures of Hornby railways that appear month by month in the "*M.M.*" show that this hobby also has great photographic possibilities. The most successful pictures of this kind are those that show only a portion of the layout. Three or four really sharp views of sections of the railway are usually much more interesting than a photograph taking in the whole scheme.



No goal! A fine action photograph by T. F. Rice, Rushden, Northants.

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.

BERE REGIS CHURCH

Almost hidden from sight in the little Dorsetshire village of Bere Regis is one of the most famous churches in Wessex. This is famous in history and literature, and also for its wonderful handwork in stone and wood.



The interior of Bere Regis church, showing four of the 12 wooden figures of the Apostles erected on the carved beams of the roof. Photograph by J. J. Curtis, Leigh-on-Sea.

The edifice is very old. In 1480 the incumbent was John Morton, a great figure in English history at the time of the Wars of the Roses. He was a Lancastrian, and at one time was banished from the country by the Yorkist king. Later he helped to arrange the marriage of Henry Tudor, and he played a great part in setting Tudor on the throne as Henry VII. He became the king's chief minister and was appointed Archbishop of Canterbury in 1486. Three years later he became a Cardinal.

The roof of the church is of carved oak beams and is adorned with twelve outstanding figures of the Apostles, each jutting out from the side walls and looking down and across the nave. It is said that Morton brought these figures from Flanders and had them erected in their present position. They are life-size, beautifully carved and painted, and despite their age they are in extremely good condition.

In the centre of the chancel wall is a large plaque with a carving of a man's head on it. According to local report this represents the head of John the Baptist. On each pillar grotesque faces are carved in the stone work, and these and the Norman arches are in a wonderful state of preservation.

The church figures in literature, for Thomas Hardy mentions it in "*Tess of the D'Urbervilles*," and the tomb of one branch of that family is to be seen in the south aisle of the church.

The accompanying illustration shows four of the Apostles and the plaque already mentioned also can be distinguished.

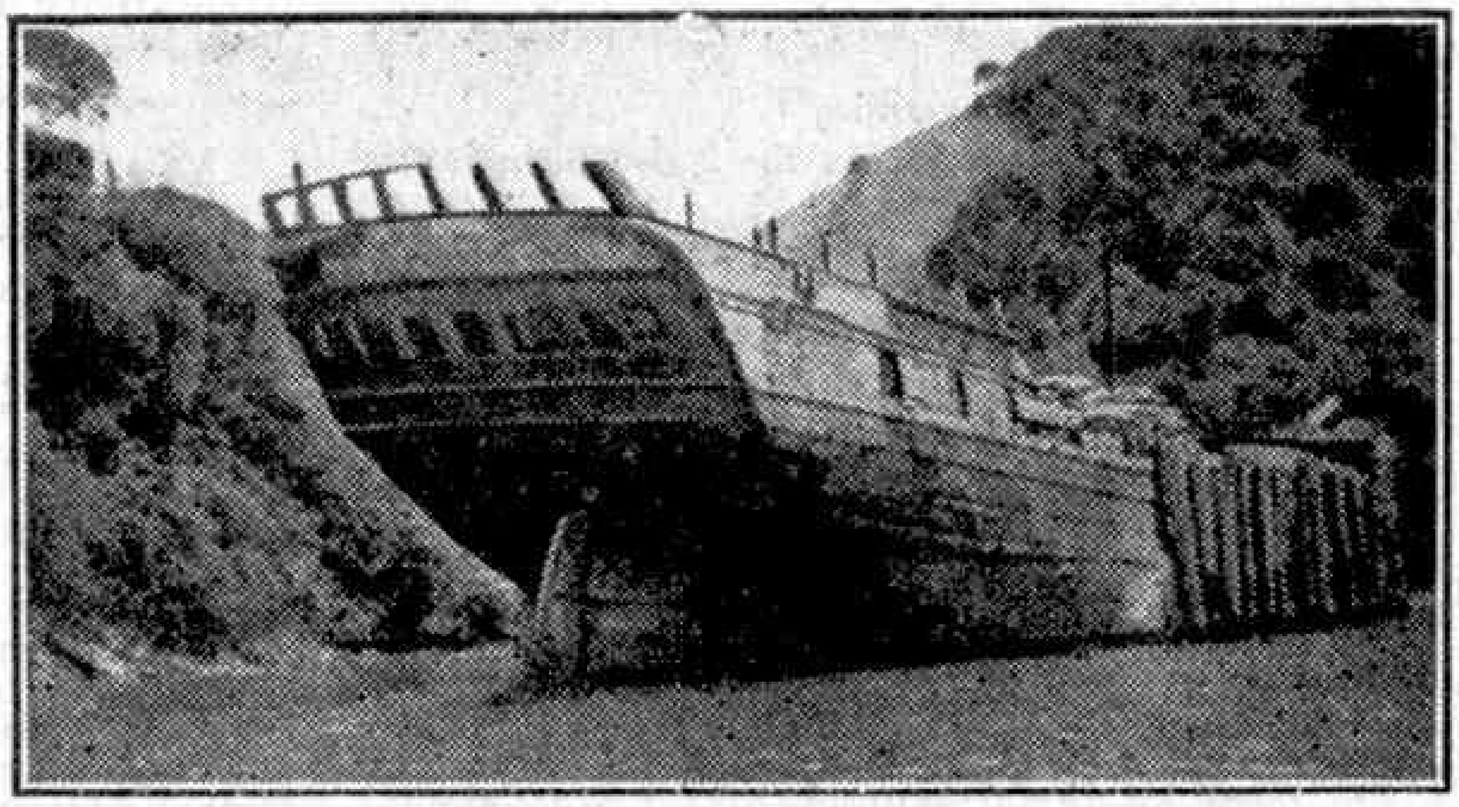
J. J. Curtis (Leigh-on-Sea).

THE "EDWIN FOX"

Lying in the shallow waters of Queen Charlotte Sound, near the freezing works at Picton, South Island, New Zealand, is the picturesque hulk of the "*Edwin Fox.*" This vessel was built at Calcutta, Bengal, in 1853 for the famous East India Company, but was registered at Southampton. The vessel spent most of her very useful career on the Indian run. She was chartered by the Government to carry troops during the Crimean War, and in 1861 she carried rice from Bangkok, Siam, to India to help the starving natives of the North West Province. Eight years later she was sold and began running to New Zealand carrying emigrants to that country.

After she had sailed the seas for 32 years, the vessel, still sound, started a new life. She was fitted for refrigeration and sent first to Port Chalmers, and then to three different ports in New Zealand. On 12th January 1897 she arrived in Picton after being towed by a collier for four days from Port Chalmers. In Picton she was used to freeze the sheep carcasses which came from Spring Creek, some 15 miles away. In 1899 freezing works were built ashore and the freezing machines were removed from the "*Edwin Fox.*" Since then she has done duty as a landing stage and a storehouse for coal for the works. To-day only her hulk remains, her masts and deck structures having been removed, but her teak planking is as solid as on the day she was built and is a testimony to the good work of her builders. Many other noted sailing ships were finally converted into hulks, but of most of her contemporaries we have nothing but dim memories.

R. Mathewson, (Picton, N.Z.).



The hulk of the "Edwin Fox" in Queen Charlotte Sound, New Zealand. Photograph by R. Mathewson, Picton, N.Z.

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Doublets

This month we return to Doublets for our principal competition. Many readers of the Magazine will already be familiar with the idea of these, but for the benefit of others they may be simply explained as follows. In a Doublet there are two words, and one of them is to be changed into the other through a series of intermediate words or links, each of which differs from the link before it by one letter only. The two words in a Doublet therefore must have the same number of letters, and the idea is to make the change in as few steps as possible.

Change	**RAIN**	**to**	**HAIL**
Make	**SHAM**		**REAL**
Bring	**HEAD**	**to**	**TAIL**
Send	**WIRE**	**to**	**MOON**
Find	**CASH**	**for**	**RATE**
Can you	**PIPE**	**a merry**	**NOTE?**
Make	**WOOD**	**into**	**POLE**
and	**LAND**	**into**	**PARK**
Change	**FOUL**	**to**	**PURE**
Spend	**LOAN**	**on**	**FOOD**

An example will make this quite clear. Change LEAD into GOLD: here the intermediate steps or links could be bead-bend-bond-bold, four in number. Actually it is possible to pass from LEAD to GOLD with fewer links than four, and in finding the solutions to the Doublets shown in the panel on this page entrants should always examine their first efforts carefully to make sure there are no short cuts. Finding these may help to win a prize.

In making links only English words appearing in a standard dictionary may be used, and the names of persons or places are not allowed. In judging, one mark will be given for each link, and the prizes will be awarded to the senders of the lists in which the total number of links is lowest. In the event of a tie, preference will be given to the entry or entries with the neatest or most novel arrangement.

The Contest is divided into two sections, for Home and Overseas readers respectively, and in each prizes to the value of 21/–, 15/– and 10/6 will be awarded for the best solutions. Entries must be addressed *"March Doublets Competition," Meccano Magazine, Binns Road, Liverpool 13."* The closing dates are: Home Section, 30th April; Overseas Section, 30th July.

A Railway Quiz

Can you answer the 12 railway questions given below? You will certainly enjoy trying to answer them, and finding the solutions should not be beyond "*M.M.*" readers, although some of the queries are not quite so simple as they look.

1. What are the chief points served by "*The South Yorkshireman*" and which Region operates this train?
2. What is a "motor train?"
3. Which railway first used the 2–6–0 locomotive in Great Britain?
4. What is a Mansell wheel, and which railway first used this type?
5. What is the highest summit level reached by a British main line? Where is this?
6. The term "pilot engine" can have several meanings; how many do you know?
7. What were "Parliamentary" trains?
8. A famous G.W.R. engine once had a bogie tender; which was it?
9. On a rail journey between two cities it is possible to see two transporter bridges. What are the cities and where are the bridges?
10. What line did the initials C.K. & P.R. stand for?

Competitors should not trouble to write down the whole of each question on their entries. It will be sufficient to give the numbers of the questions and set down the answers against these.

There will be the usual two sections in this competition, for Home and Overseas readers respectively, and in each prizes will be awarded of 21/–, 15/– and 10/6 for the best entries in order of merit. In addition, consolation prizes will be given for good efforts that fall just short of the prize-winning standard. Closing dates: Home Section, 30th April; Overseas Section, 30th July.

March Photographic Contest

The third of our 1949 series of photographic contests is a general one, in which we invite readers to send in prints of any subject. There are only two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of the print must be stated exactly what the photograph represents. A fancy title may be added if desired.

The competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate sections for overseas readers, and in each section prizes of 21/–, 15/– and 10/6 will be awarded.

Entries should be addressed "*March Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 31st March; Overseas Section, 30th June.

Competition Results and Solutions

HOME

OCTOBER 1948 CROSSWORD PUZZLE

1st Prize: N. S. Raine, Newcastle-on-Tyne 3. 2nd Prize: M. A. Corley, Hull. 3rd Prize: J. Fry, London N.20. Consolation Prizes: A. Jones, Romford; G. W. Wilson, Wallington; G. D. Pickering, London N.14; J. H. Boyes, Manchester 21.

OCTOBER 1948 RAILWAY TERMS CONTEST

1st Prize: C. E. Wrayford, Bovey Tracey. 2nd Prize: E. A. Dudley, Gatley. 3rd Prize: A. Chatfield, Brighton 7. Consolation Prizes: D. King, Liverpool 19; B. E. Timmins, Birmingham 24; D. J. Parry, Worsley; J. K. Watson, Burley-in-Wharfedale.

NOVEMBER 1948 STORY CONTEST

1st Prize: M. X. Tranfield, Sheffield 11. 2nd Prize: R. Smith, Edinburgh 7. 3rd Prize: M. Lustig, London N.W.4. Consolation Prize: K. Adams, Reading.

NOVEMBER 1948 LOCOMOTIVE SHADOWS CONTEST

1st Prize: S. Newton, Birstall. 2nd Prize: P. L. Boskett, Bromsgrove. 3rd Prize: R. Francis, Nantwich. Consolation Prizes: R. Sumner, York; R. A. Clarke, Manchester.

NOVEMBER 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: H. Swindlehurst, Padiham; Section B: B. B. Foskett, London S.W.15. 2nd Prize, Section A: S. S. Pethybridge, Newton Abbot; Section B: A. Hobbs, Exeter. 3rd Prize, Section A: J. Brooks, Saltcoats; Section B: K. Dexter, London N.21. Consolation Prizes: R. Miller, Purley; D. E. Wareing, Luton; E. D. G. Mason, Romford; E. Richardson, W. Bridgford; D. J. W. Brough, Cheam.

DECEMBER 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: J. H. Boyes, Manchester 21; Section B: P. Johnson, Colwyn Bay. 2nd Prize, Section A: C. H. Thomas, Aldershot; Section B: B. Evans, Llanfairfechan. 3rd Prize, Section A: S. S. Pethybridge, Newton Abbot; Section B: D. Reed, Aberdovey. Consolation Prizes: B. J. Kinsella, Hyde; D. W. Pratt, Shipley; G. Barras, Nelson.

OVERSEAS

APRIL 1948 THRILLS CONTEST

1st Prize: L. Whalley, Auckland, W.1., N.Z. 2nd Prize: R. Hardy, Hastings, N.Z. 3rd Prize: J. Ward, Bombay, India. Consolation Prizes: L. Squires, Boksburg, Transvaal, S.A.; E. Stack, Dublin, Eire.

APRIL 1948 LOCOMOTIVE CONTEST

1st Prize: A. G. O. Guthrie, Taranaki, N.Z. 2nd Prize: J. A. Markham, Windsor, Ontario, Canada. 3rd Prize: J. A. Gomes, Bombay, 20, India. Consolation Prize: R. Ashby, Palmerston North, N.Z.

MAY 1948 STORK FIGURES CONTEST

1st Prize: B. Barrett, Taranaki, N.Z. 2nd Prize: R. D. Moffat, Dunedin W.1, N.Z.; 3rd Prize: D. Hills, North Canterbury, N.Z. Consolation Prizes: I. Boocock, Oxford, N.Z.; D. King, Matamata, North Island, N.Z.; P. Mathias, Sliema, Malta, G.C.

MAY 1948 RAILWAY CONTEST

1st Prize: D. J. White, Christchurch N.1, N.Z. 2nd Prize: J. A. Gomes, Bombay 20, India. 3rd Prize: B. Biswas, Calcutta, India. Consolation Prize: H. Garnet, Sydney, Australia.

MAY 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: J. M. Demanuele, St. Julian's, Malta, G.C.; Section B: S. H. Stevens, Vancouver, Canada. 2nd Prize, Section A: N. P. Milne, Hawke's Bay, N.Z.; Section B: G. Roberts, Bombay, India. 3rd Prize, Section A: B. Wills, Brisbane, Australia; Section B: J. Wilson, Halifax, Canada. Consolation Prizes: W. N. Tucker, Auckland S.E.2, N.Z.; N. A. Macdougall, Victoria, Canada; A. Holcroft, Invercargill, N.Z.

JUNE 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: N. Tasker, East Malvern S.E.5, Australia; Section B: D. Wise, Kimberley, S. Africa. 2nd Prize, Section A: J. M. Demanuele, St. Julian's Malta, G.C.; Section B: J. Perry, Ismailia, Egypt. 3rd Prize, Section A: N. Allcock, Dublin, Eire; Section B: S. Royden, Hamilton, N.Z. Consolation Prize: J. Cooper, San Francisco, U.S.A.

JUNE 1948 CROSSWORD PUZZLE

1st Prize: L. R. Dickson, Brooklyn, S. Africa. 2nd Prize: A. J. H. Smith, Kimberley, S. Africa. 3rd Prize: W. W. Jenson, Wellington, N.Z. Consolation Prizes: S. F. Noble, Invercargill, N.Z.; G. E. McKinnon, Sydney, Australia; R. A. Lederer, Cape Town, S. Africa.

JUNE 1948 SPORTS CONTEST

1st Prize: C. Lovett, Dublin, Eire. 2nd Prize: I. Miranda, Bombay, India. 3rd Prize: C. O'Sullivan, Dublin, Eire. Consolation Prizes: R. Rohr, Rondebosch, S. Africa; F. Searson, Dublin, Eire.

SOLUTIONS

MAY 1948 STORK FIGURES CONTEST

One thousand two hundred and ninety-four.

MAY 1948 RAILWAY CONTEST

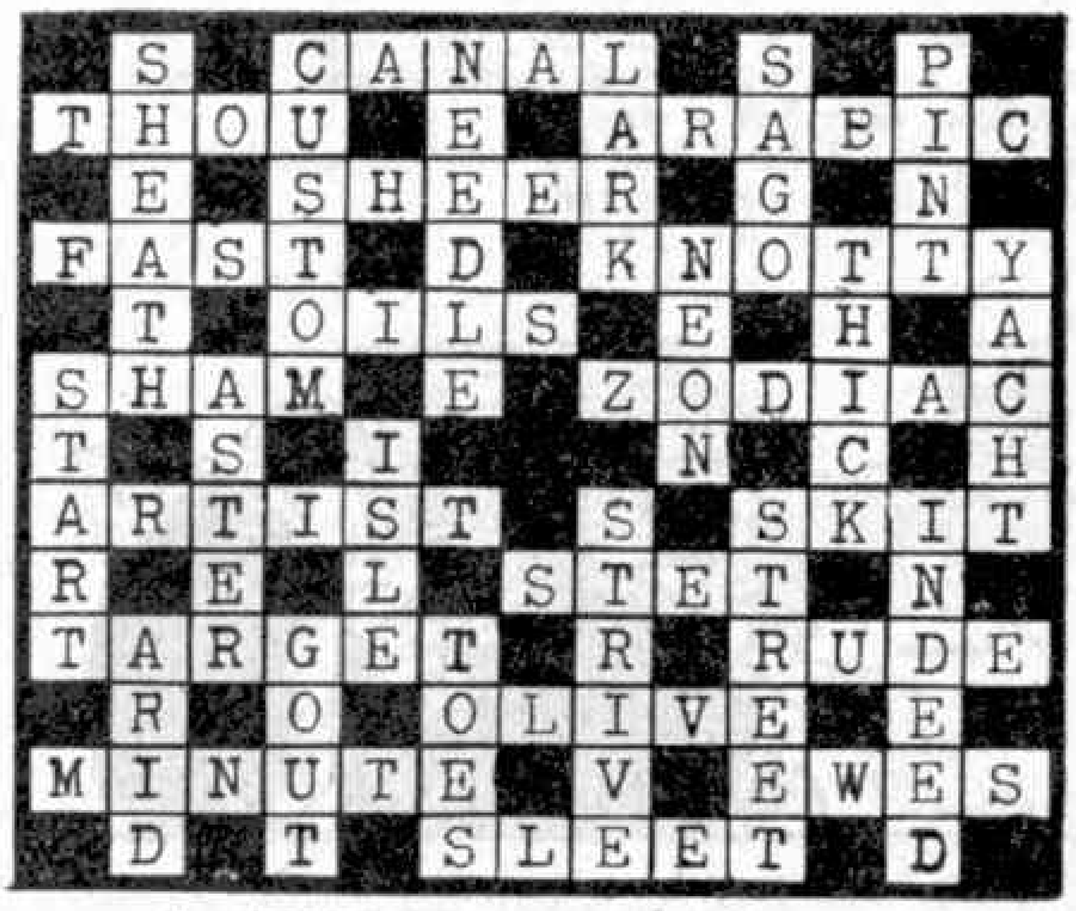
Aberdonian, L.N.E.R.; Golden Arrow, S.R.; Royal Scot, L.M.S.; Devon Belle, S.R.; Comet, L.M.S.; Pines Express, L.M.S.; Cornishman, G.W.R.; Queen of Scots, L.N.E.R.

JUNE 1948 SPORTS CONTEST

1st. Cricket; 2nd. Cycling; 3rd. Swimming; 4th. Tennis; 5th. Rowing; 6th. Running; 7th. Walking; 8th. Bowling.

JULY 1948 "BIRD WORD" CONTEST

1. Jaywalker; 2. Railway; 3. Duckboard; 4. Henbane; 5. Swiftsure; 6. Crowbar; 7. Swanshot; 8. Swallowtail; 9. Larkspur; 10. Titbit.



June 1948 Crossword Puzzle Solution.

Fireside Fun

Conductor: "Hi, you upstairs! I thought you wanted the Town Hall."
Passenger: "Yes, that's right."
Conductor: "Come down for it, then. I can't get it up the stairs."

• • • •



"Have you got another razor?"
"Why?"
"I want to defend myself."

• • • •

"They weigh the anchor every time the ship leaves port."
"What a silly idea. It surely doesn't grow heavier or lighter when it is in harbour."

• • • •

"Do you know you are 10 minutes late, Smith?"
"I wasn't so late really, sir. I was five minutes outside the door trying to think of a good excuse."

• • • •

"Do we take this bus to the Bank, conductor?"
"No, mum. The driver will do that. You just sit inside."

• • • •

"You know, that man spells fantastically."
"Good. I should be sure to get it wrong if I tried."

• • • •

"If you gave your little brother five liquorice allsorts and then took three of them away, what would that make?"
"It would make him yell, sir."

• • • •

"I say, that's about the 10th cigarette you've smoked to-night. I thought your doctor allowed you to smoke only five a day."
"Yes, but I fixed that. I went to another doctor, and he allows me five too."

• • • •



"Golly. I've lost my voice, Sid."
"Don't worry. You'll find it in my ear."

BRAIN TEASERS

KNOWN EVERYWHERE

Of the letters of a certain word, the 3rd, 7th and 6th form a word meaning study, the 4th, 5th, 6th, 7th and 2nd one meaning a vessel, and the 1st, 5th, 3rd and 2nd one meaning a spice. There are seven letters in the word, which is a name of world-wide fame, What is it? K.J.B.

• • • •

PENSIVE WORK

A farmer made four square sheep pens in a row, using 13 hurdles in all to construct them. Then he wished to increase the number of pens to seven, all of the same shape and size, and managed this with only one additional hurdle. How did he do it? All the hurdles were of the same size, and the pens of the second set were of a different shape and size from the first. S.W.C.

• • • •

QUEER MONEY!

In Simplitanian money a gloof is the same as 20 rambics, and 36 quertons would be a quarter of a drulitch; a drulitch is 25 rambics. Which would you rather have, a drulitch or a couple of gloofs? How many quertons would you want in exchange for a gloof?

• • • •

EASING THE WAY

The following line of letters has been made by omitting all the E's from a sentence of seven words, and then closing all the letters together:

THLPHANTMRGDFROMTHVRGRNFORST

Can you make this read sense by restoring E's in the right places? B.I.N.

• • • •



"Had an accident, George?"
"No sir."
"Then how did you get this way?"
"Bull tossed me over the hedge."
"Sounds like an accident to me."
"But the bull did it on purpose, Sir."

• • • •

SOLUTIONS TO LAST MONTH'S PUZZLES

Of the four batsmen in our first puzzle last month, Arthur made 42 runs, Bill 36, Charles 18, and Dick 12.

The pictures jumbled in our second puzzle are OLIVER TWIST; THE WAY TO THE STARS; LIFE WITH FATHER; FALLEN IDOL; and BULLFIGHTERS.

In Dizzy Village the baker is Mr. Porter, the porter is Mr. Baker, the doctor is Mr. Butcher and the butcher is Mr. Doctor.

• • • •

THIS MONTH'S HOWLER

A pathologist is a man who walks about in a public park to keep people off the grass.

A FASCINATING NEW PROCESS BY WHICH AMATEUR PHOTOGRAPHERS CAN MAKE PRINTS IN BRIGHT RICH COLOURS VERY EASILY.

JOHNSON COLOURFORM

BY this process it is possible to make prints in a very wide range of colours. It is not a toning process nor are the effects obtained by dyeing or staining. Almost any colour can be predetermined and actually formed by development. The exact shade can afterwards be matched, with certainty, and repeated whenever it is required. Every step is under perfect control. The colours do not fade. This COLOURFORM process will appeal to amateur photographers who wish to break away from conventional black and white and produce results that will excite admiration by their sheer beauty.



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(Mention "Meccano Magazine")

Charming purple-browns, cool olive-blacks, delicate yellow-greens, mauves, blues of the richest quality and an endless variety of browns, from the palest sepia to the deepest nigger-brown, are all attainable. The possibilities are literally unlimited.

GET THIS OUTFIT FROM YOUR DEALER

For those who wish to experiment with this process the Johnson COLOURFORM OUTFIT is available. It contains enough colour developer to make up eight 10 oz. quantities. Three bottles containing the primary red, yellow and blue colour-formers—to be added to the developer One packet of bleaching compound to make 20 oz. of solution (which may be used repeatedly). A glass measure and a book of instructions.
PRICE **15**/- *COMPLETE*

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2 good things

MODELCRAFT
Magazine No. 9

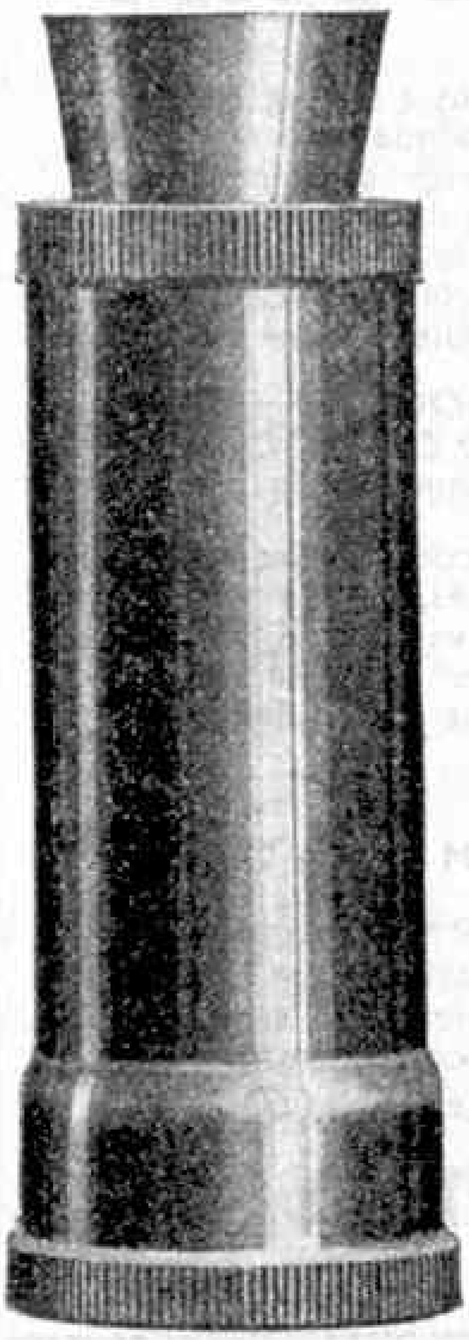
MODELCRAFT
List for 1949

IN order to make the best possible use of our paper ration we are now publishing our magazine and list separately. The list now contains over 500 items, plans, plan-books, kits and accessories, and in order to do justice to them we have run to 48 pages and many more illustrations. The additions to the list every quarter will form a supplement to the magazine which will also be considerably enlarged. The complete list for 1949 and the magazine cost 1/- each from your modelshop or post free direct from us. A subscription for four issues of the magazine and the complete list, however, is only 4/6 post free.

Modelcraft Ltd.
77 (H), Grosvenor Rd., London S.W.1

Two jolly good 'pals' for your outings!

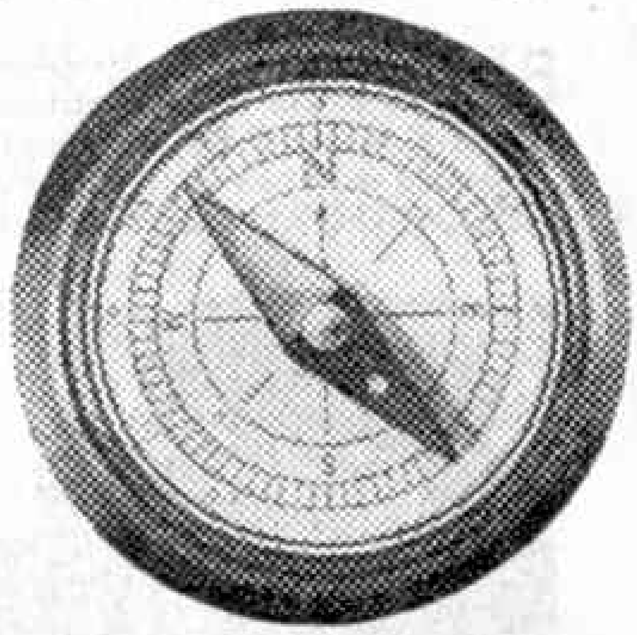
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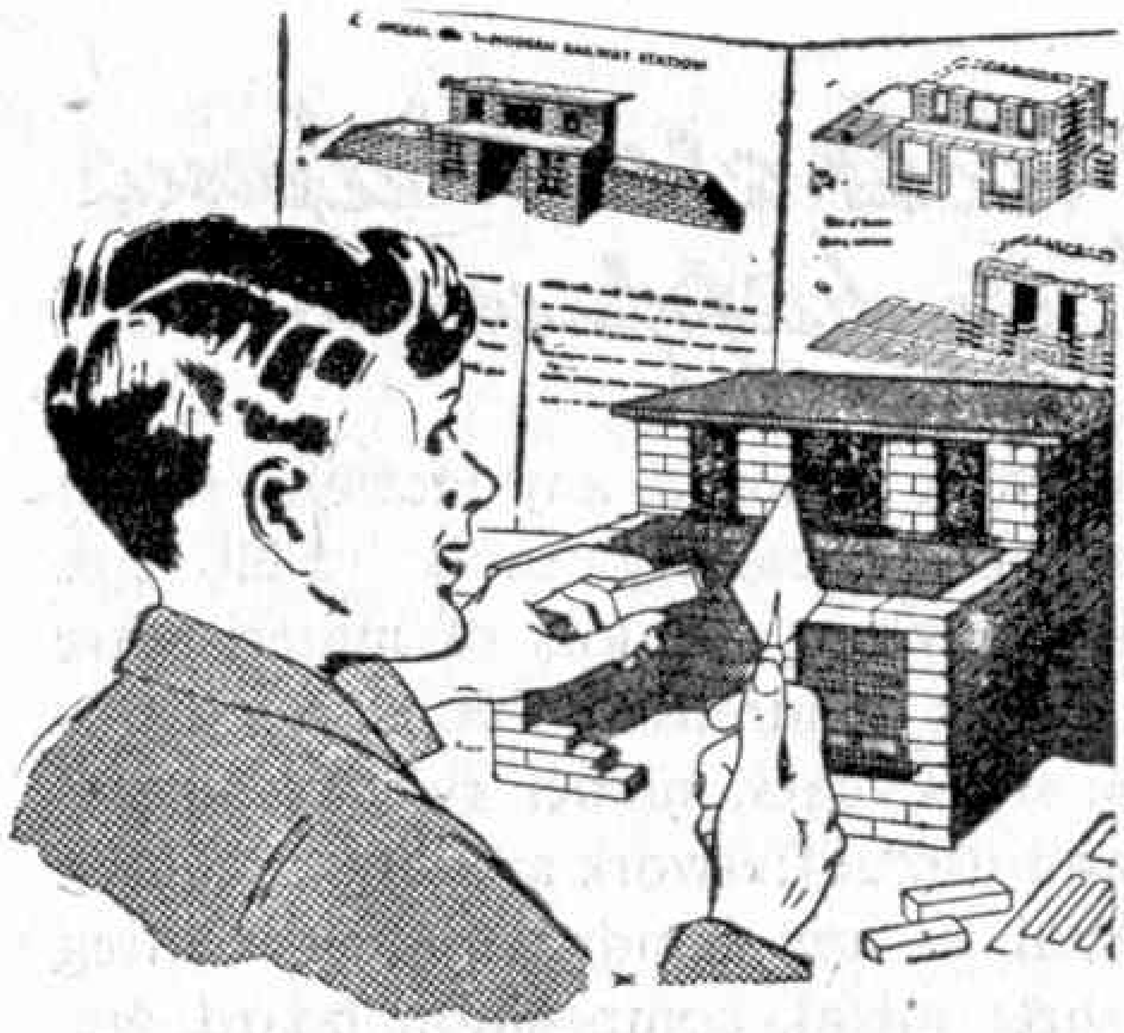
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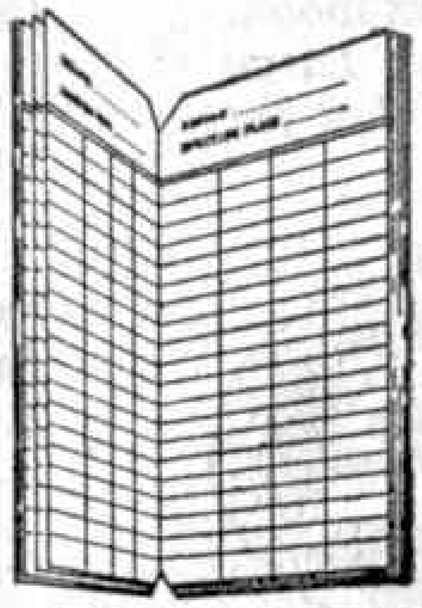


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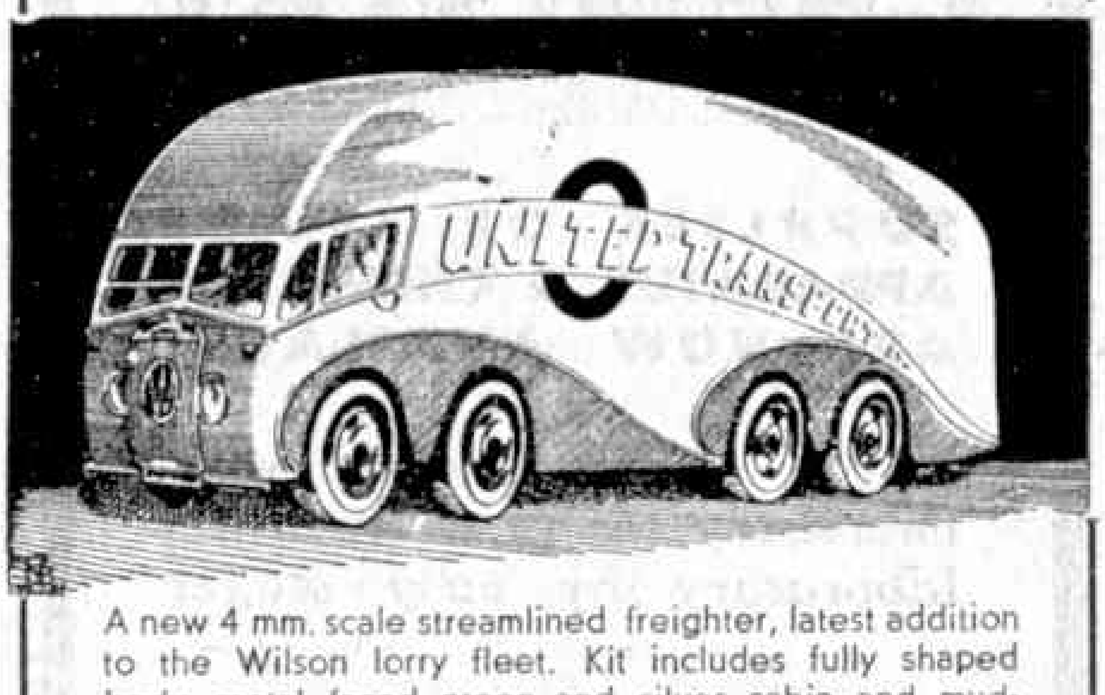
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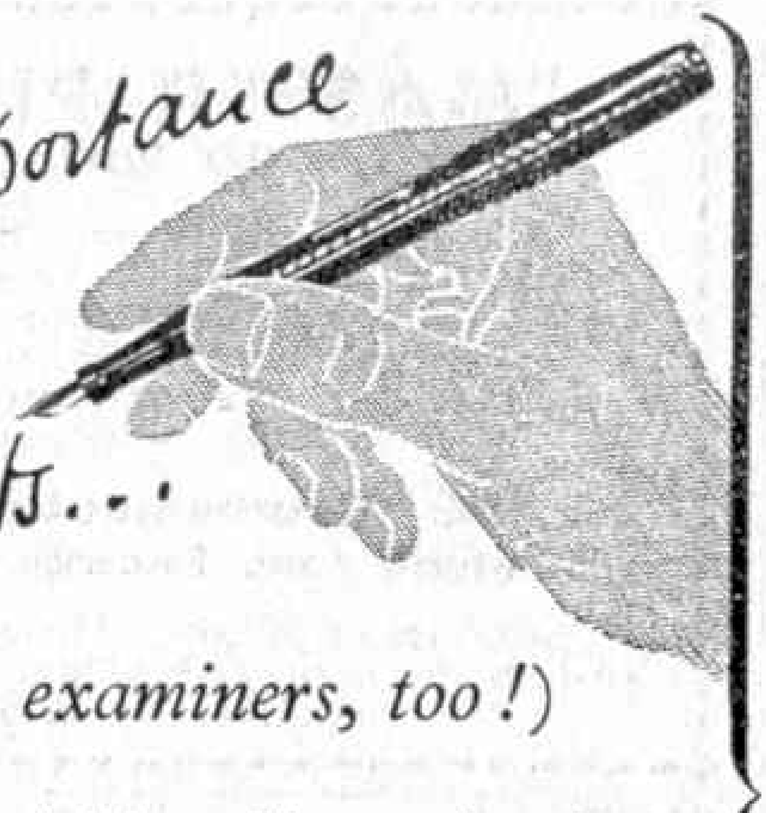
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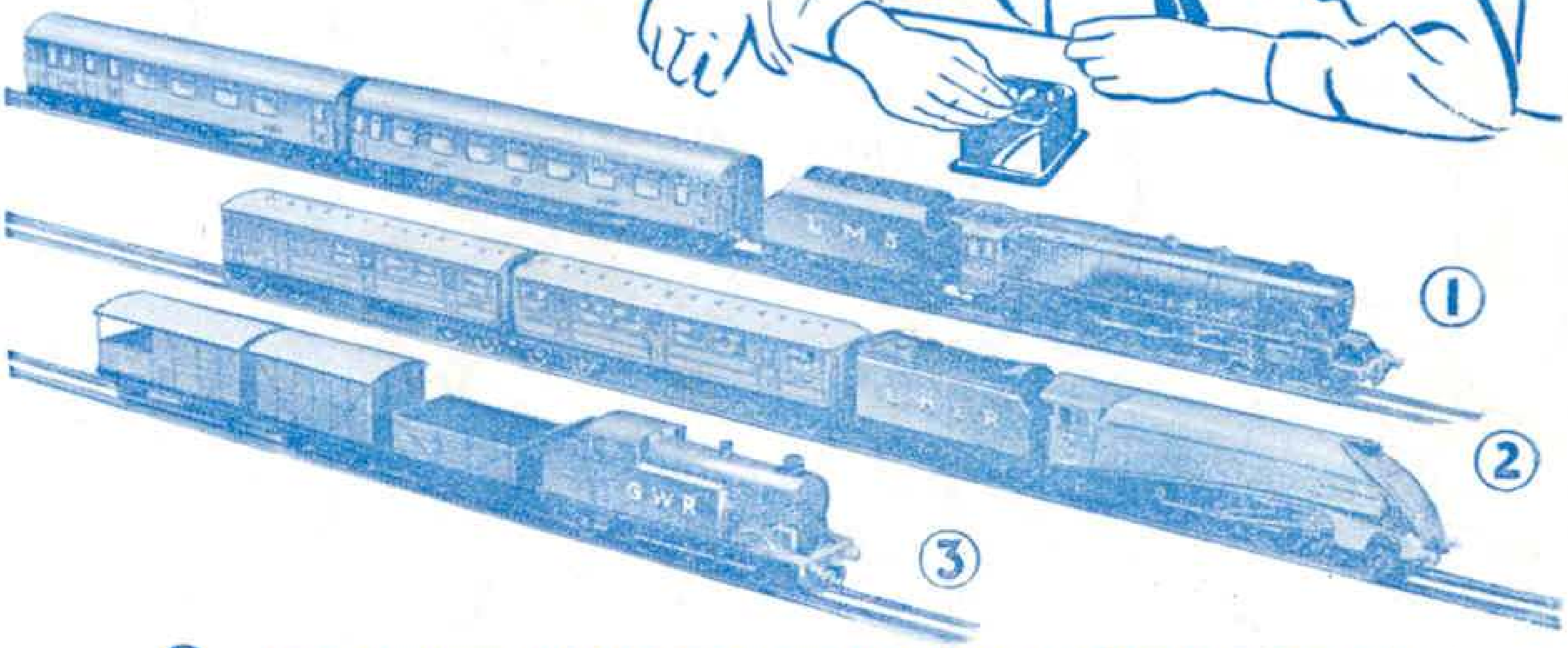
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MECCANO MAGAZINE

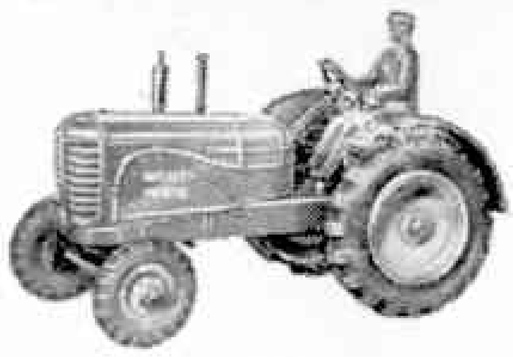
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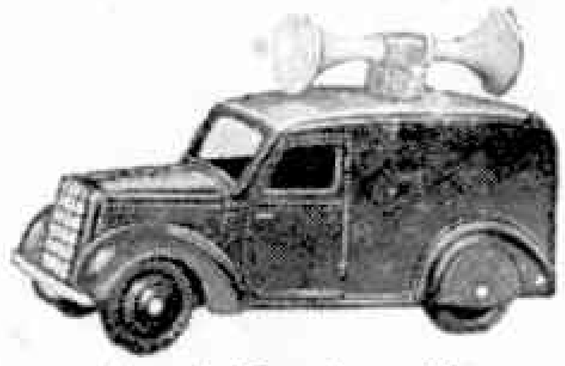
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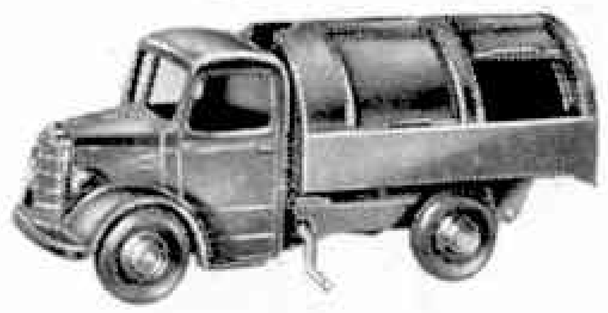
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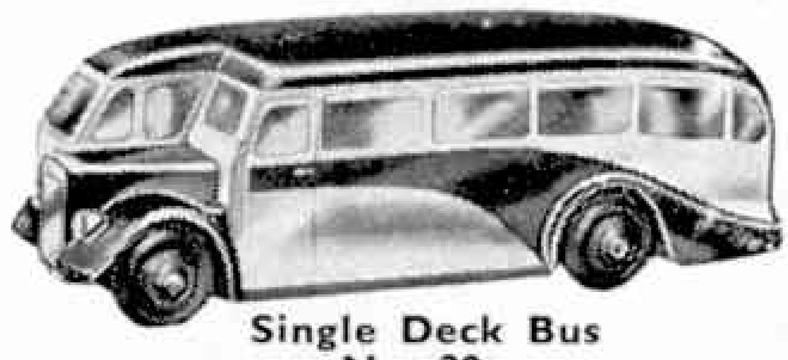
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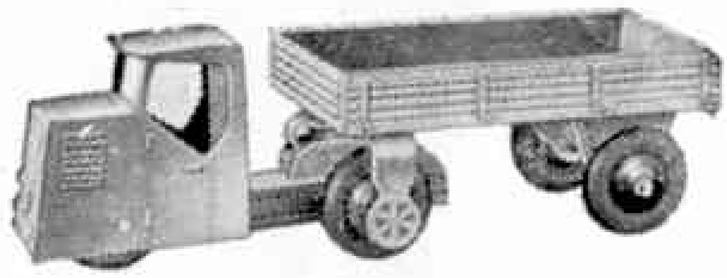
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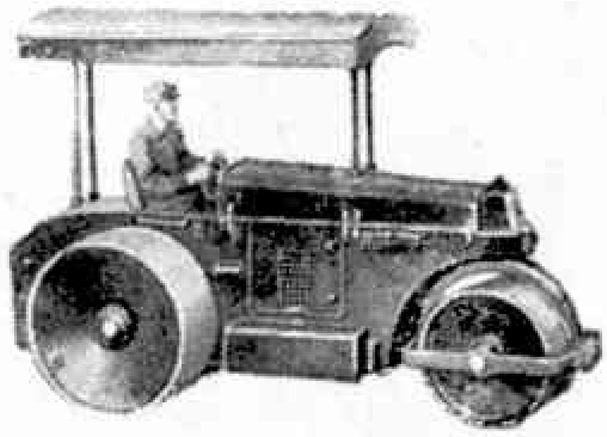
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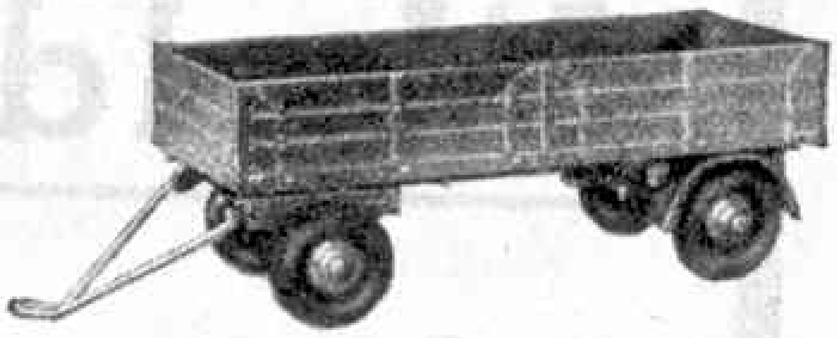
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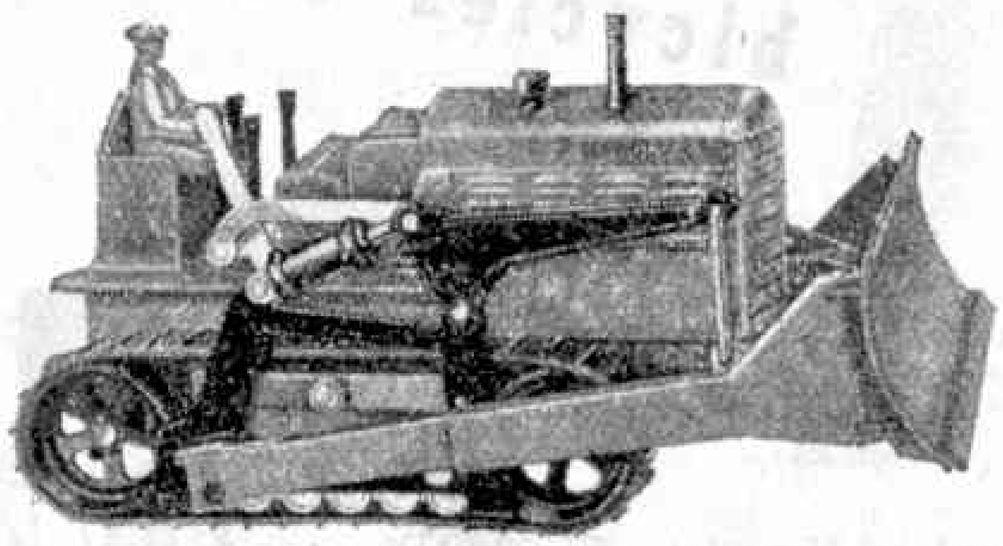
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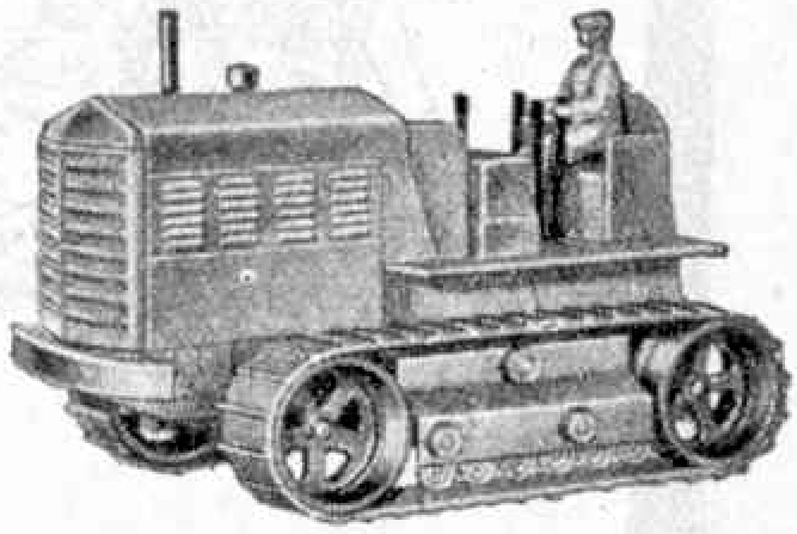
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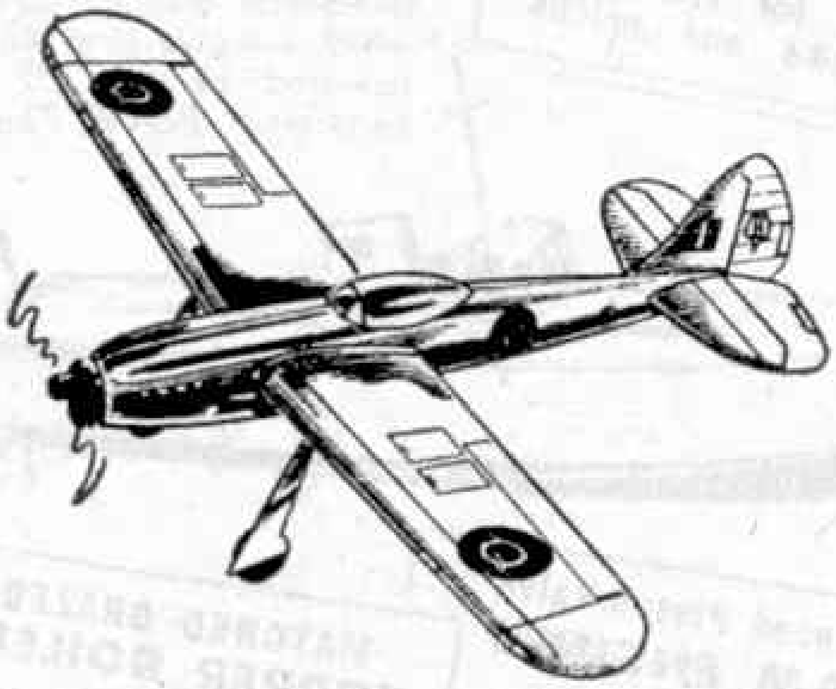
TRADE MARK

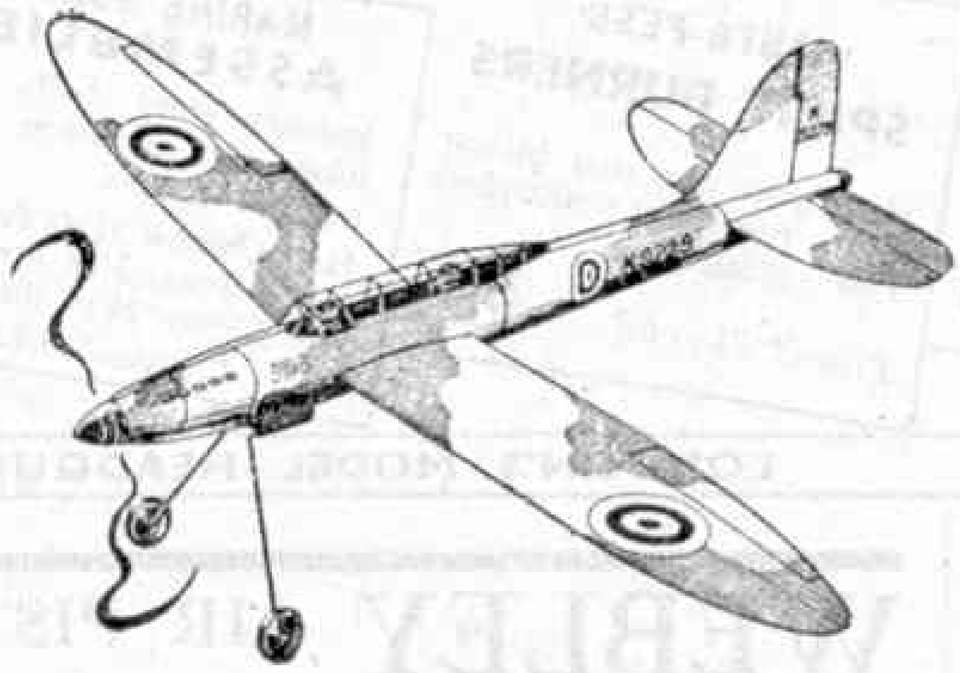
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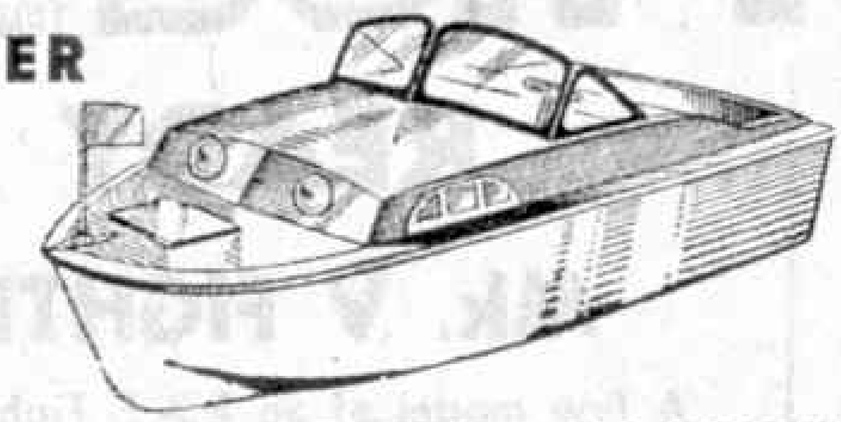
GAMAGES

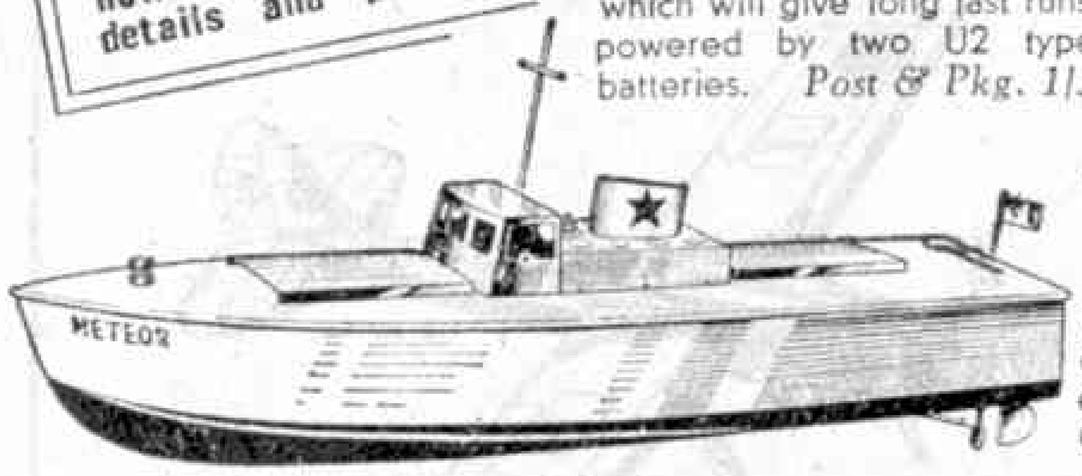
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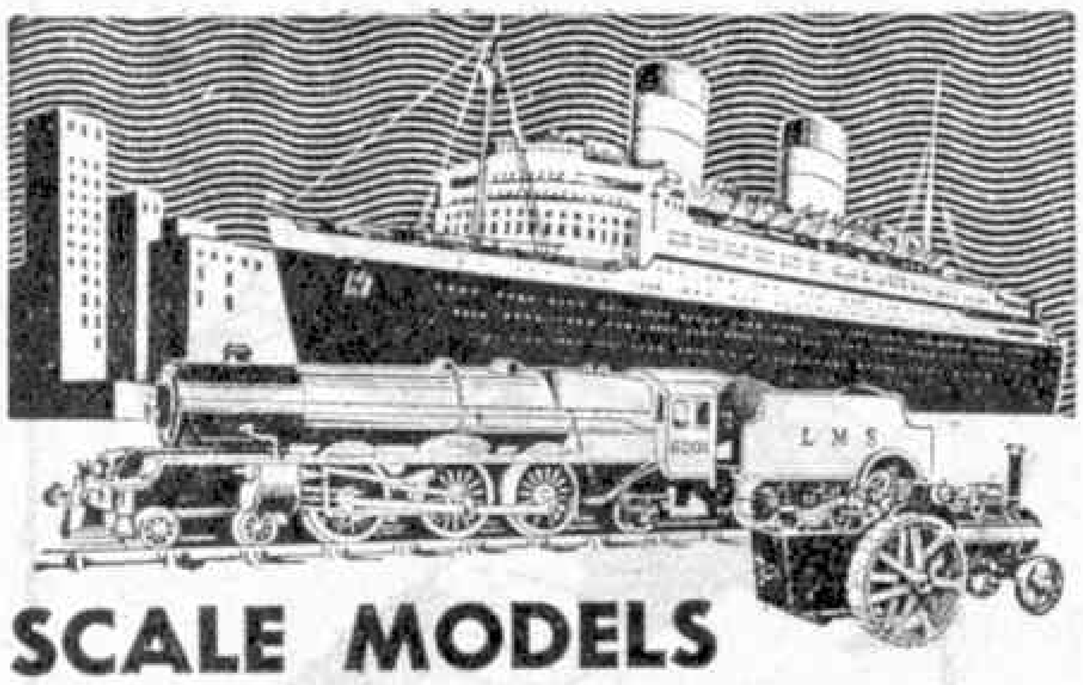
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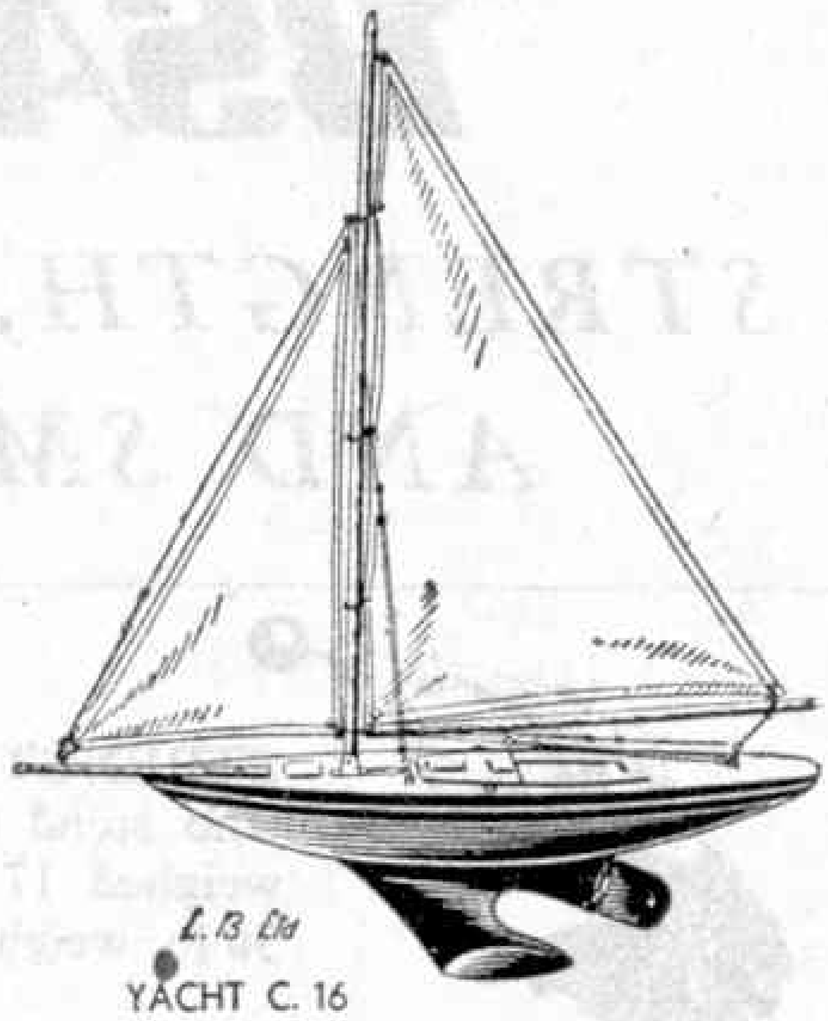
YACHTS

AND

SPEEDBOATS

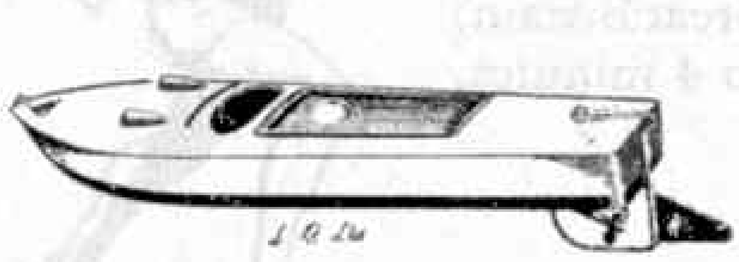
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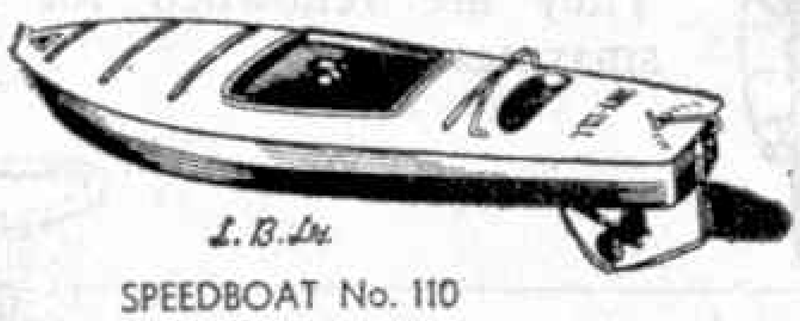


YACHT C. 16

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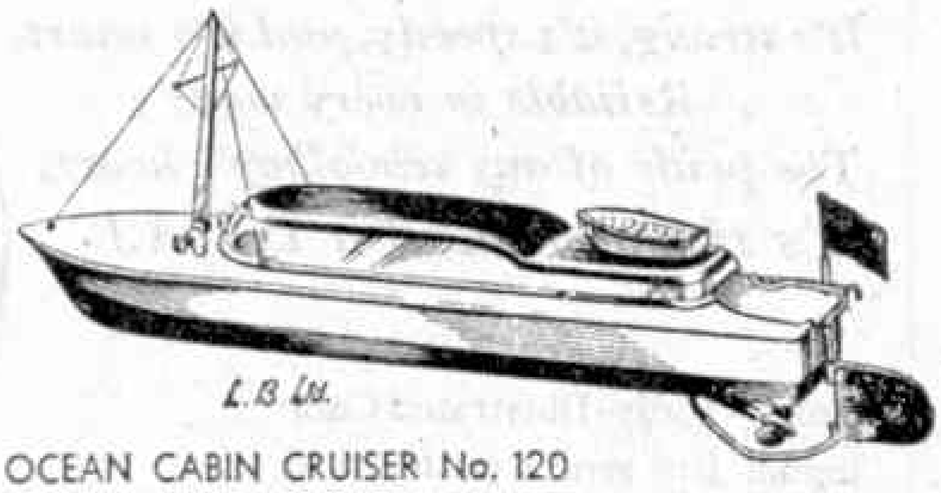


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Next Month: "CROSS-CHANNEL PACKET BOATS." By A. Gaunt, F.R.G.S.

MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

Vol. XXXIV
No. 4
April 1949

With the Editor

The Berlin Air Lift

When an R.A.F. "York" transport "overshot" Gatow airfield in bad visibility on 19th February, it broke one of the most important rules of the Berlin Air Lift by landing on a second attempt. But this was no ordinary flight, for the "York" carried as part of its cargo the one millionth ton of food and supplies flown into the German capital since the operation started in June 1948.

As this seemed a good time to sum up the achievements and lessons of the Air Lift, I invited Mr. John Taylor to write the article which appears on pages 134–6.

Since his article was written it has been revealed that the cost of flying into Berlin those one million tons was about £4,000,000 for the British "Operation Plainfare" and £26,000,000 for the American "Operation Vittles." It had involved 130,072 aircraft sorties, totalling more than 70,000,000 miles, and the labour of 57,000 British, American, and German personnel. It had cost the lives of 10 British and 26 U.S. airmen.

This is a high price to pay for the right to stay in a city that was a target for our bombers a mere four years ago; but it is less than the cost of two days of modern war. If it can help to prevent the present "cold" war from developing into the shooting kind, the aeroplane will indeed have proved itself as great a blessing to mankind as its creators 46 years ago hoped it would.

Visitors to L.M.R. Engine Sheds

The London Midland Region report that 43,432 enthusiasts visited the 125 engine sheds on the region last year. Among them were schoolboys, grandfathers, engineering students and railway fans of all ages. Londoners topped the poll—more than 16,500 of them went to Willesden, Cricklewood and Camden and other depots.

This total is a record, and shows that the railway engine maintains its hold on the public imagination. To go behind the scenes to see the servicing of giant locomotives is still a major thrill to the mechanically minded.

* * * *

Our cover picture gives a strikingly realistic impression of an electric arc welder fabricating the stator of a huge turbo-generator for the Battersea Power Station. For the photograph on which this cover is based I am indebted to the Metropolitan-Vickers Electrical Co. Ltd. For next month I have in preparation a very interesting article on welding.

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Ships' Flags, Past and Present

By Frank C. Bowen

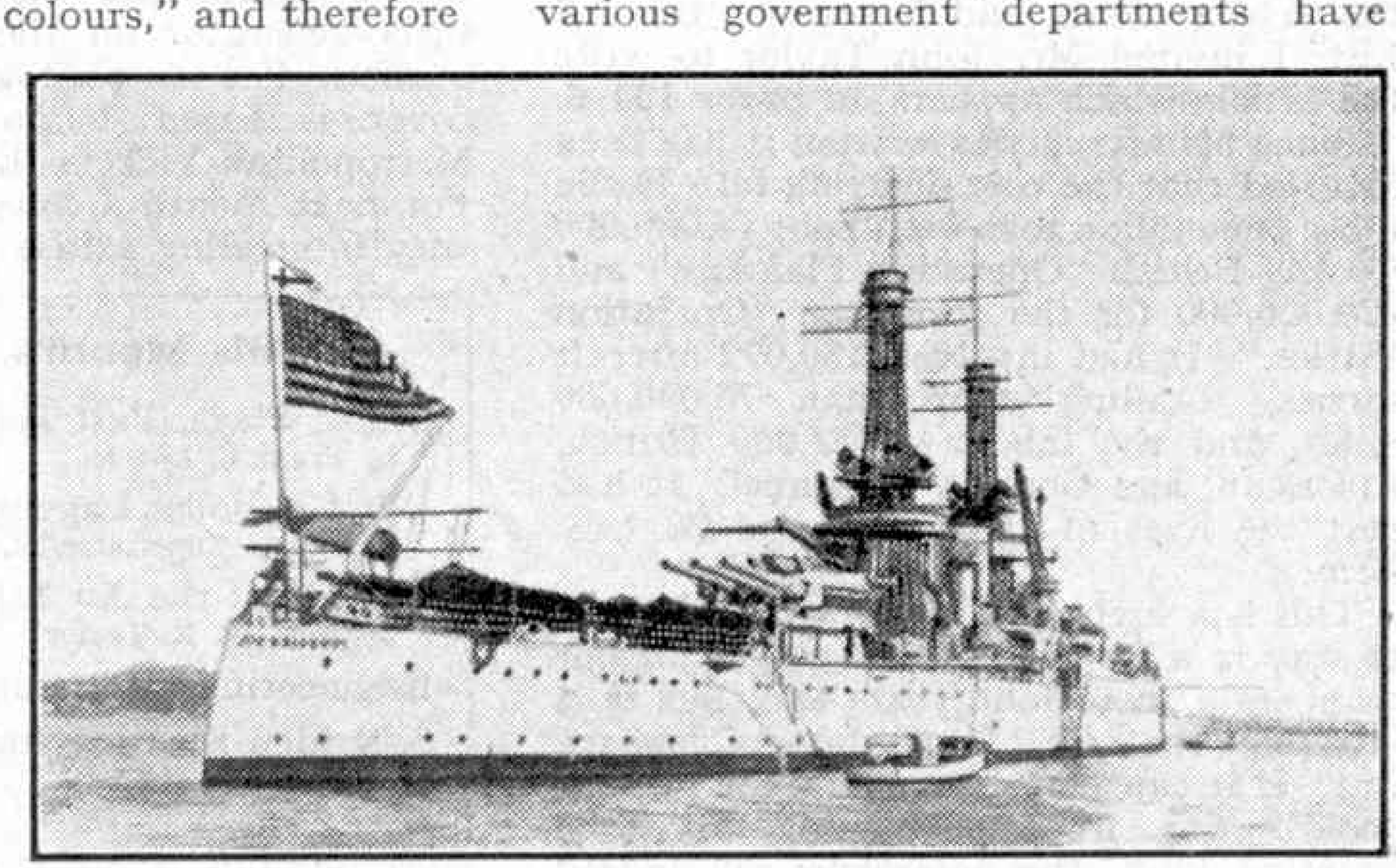
FROM time immemorial the flags which are worn or flown by a ship have been a matter of great interest. On the picturesque side their importance is obvious and has been appreciated from mediæval days, when flags made an important part of the ship's inventory, to the present time when ladies ashore consider that they look very pretty. Their serious use must go back nearly as early, first to distinguish ship from ship by the heraldic devices of the knights in charge and friend from foe by national insignia, and second to let the admiral control his fleet by having a means of passing his orders.

Customs so deep rooted in antiquity have naturally collected round them a strict etiquette and nothing condemns a merchant ship so completely in the eyes of professional sailors, or a yacht in the eyes of yachtsmen, as disregard of flag etiquette. This applies to all flags, but particularly to the official ones like the National Ensign which are, properly speaking, a "suit of colours," and therefore are "worn" by a ship and not "flown." The misuse of the National Ensign is naturally by far the most serious offence, and it entails not only the contempt of professionals but a very smart penalty. In war-time a fighting ship may hoist false colours as a ruse, but may not fight under them or she becomes a pirate; in peace-time the ensign may be worn only by the ships to which it properly applies.

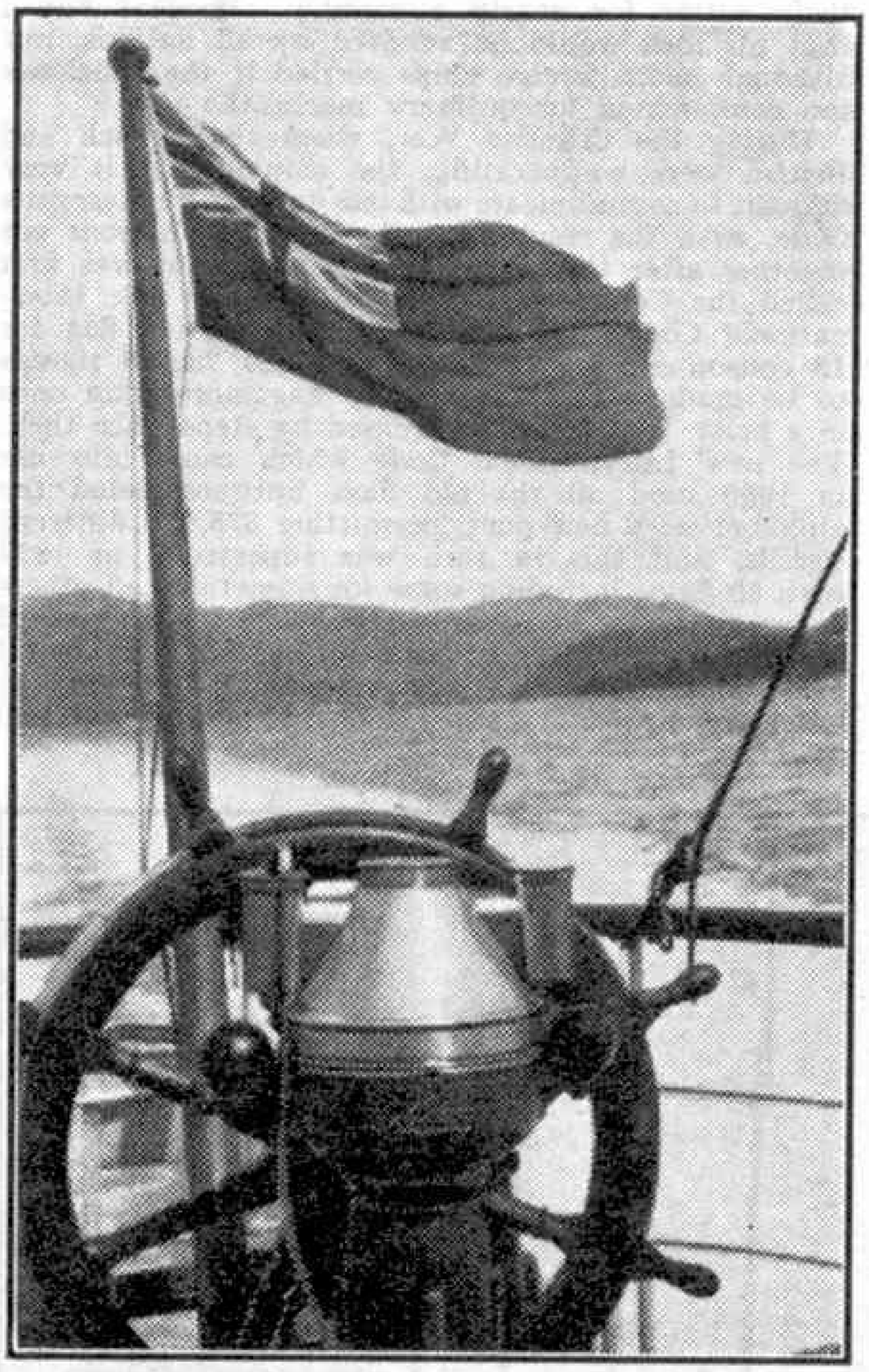
Many countries, for instance France, the United States, Russia and others, have the same ensign for all purposes, while others have a different one for different types of ship. Britain is the only country to have three—the Red, White and Blue Ensigns inherited from the old naval squadrons and dating from the seventeenth century. Each appertains to certain services. Broadly speaking, the division is the White Ensign for the Navy, the Blue Ensign for the Royal Naval Reserve and government services like the War Department or Customs, and the Red Ensign for all others. There are, however, certain exceptions to the general rule. Members of the Royal Yacht Squadron are allowed to wear the White Ensign like a man-of-war, but they must not combine it with the long whip pendant at the masthead. Members of many of the established yacht clubs may wear the Blue Ensign, but the distinction is a purely personal one and subject to a personal warrant which applies to the one member only.

The White Ensign is never "defaced," but the others are on many occasions. In the old days there were some variations, for instance the East India Company's ensign was a gridiron of red and white stripes which supplied the origin of the United States Ensign of to-day. The various government departments have their crest in the fly—the outer end—of the ensign, such as a crown for the Customs, and many yacht clubs have their ensigns, whether Blue or Red, "defaced" by their crests.

The Union flag, popularly the Union Jack, is strictly reserved to the Navy. All H.M. ships wear it as a jack on a small staff in the bows, while at the



The church pendant flying over the ensign of a U.S. battleship—the only flag which ever does—to keep visitors away while Divine Service is in progress. Photographs to this article by Nautical Photo Agency.



The national flag for all British vessels without special privileges; the "Old Red Duster."

masthead it signifies an Admiral of the Fleet, the highest rank in the Navy. Anybody else who flies it afloat is liable to a very heavy fine, and as it is the national flag a good deal of feeling is aroused by that. A jack forward greatly adds to the smart appearance of a ship and there is no law as to what flag shall be used as long as it is not the Union flag. Many ships use the pilot jack, a Union flag with a white border which is normally one of the signals to call a pilot, so that the result might be embarrassing unless it is balanced by a red and white flag elsewhere to show that there is a pilot on board.

With regard to national flags and the protection that they give to a ship, it may be mentioned that several countries have laws which prevent foreigners owning shares in ships, but nothing to prevent their owning shares in the companies which own the ships, so that the protection of the flag may be grossly misapplied. That often occurred during the American prohibition period and led to a lot of bad feeling.

At the present time Panamanian registry, and the right to wear their pretty red, white and blue flag, is granted to a large number of ships for various purposes. Very frequently, naturally, it is to evade expensive regulations made for safety, the welfare of seamen, etc., but sometimes it is for a more legitimate purpose.

As a matter of courtesy a merchant ship wears the national ensign of the country which she is visiting at the foremast head, and as a signal when she is about to leave port, the ensign of the next country that she will visit. Every British ship must wear the ensign when in a foreign port or entering or leaving it, sometimes at a gaff from the aftermost mast and sometimes from an ensign staff right aft. At the masthead of a ship entering a British port it is the signal for the Customs to come on board and search.

Men-of-war naturally have a more intricate system of flags. Apart from making them easily distinguished from merchantmen, by the long whip pendant at the masthead of ships which do not carry admirals, each senior officer in authority flies his flag, a square flag for admirals of various grades and a "swallow-tail" for senior captains acting as commodores in command of a group of ships. For further distinction each man-of-war has its own identifying flags. One set is for naval use, while another is in the International Code in which every merchant ship has her "numbers." The pendant numbers and letters of naval small craft, which are built in such numerous classes of exactly similar appearance that identification is difficult, are painted on the side of the hull forward.

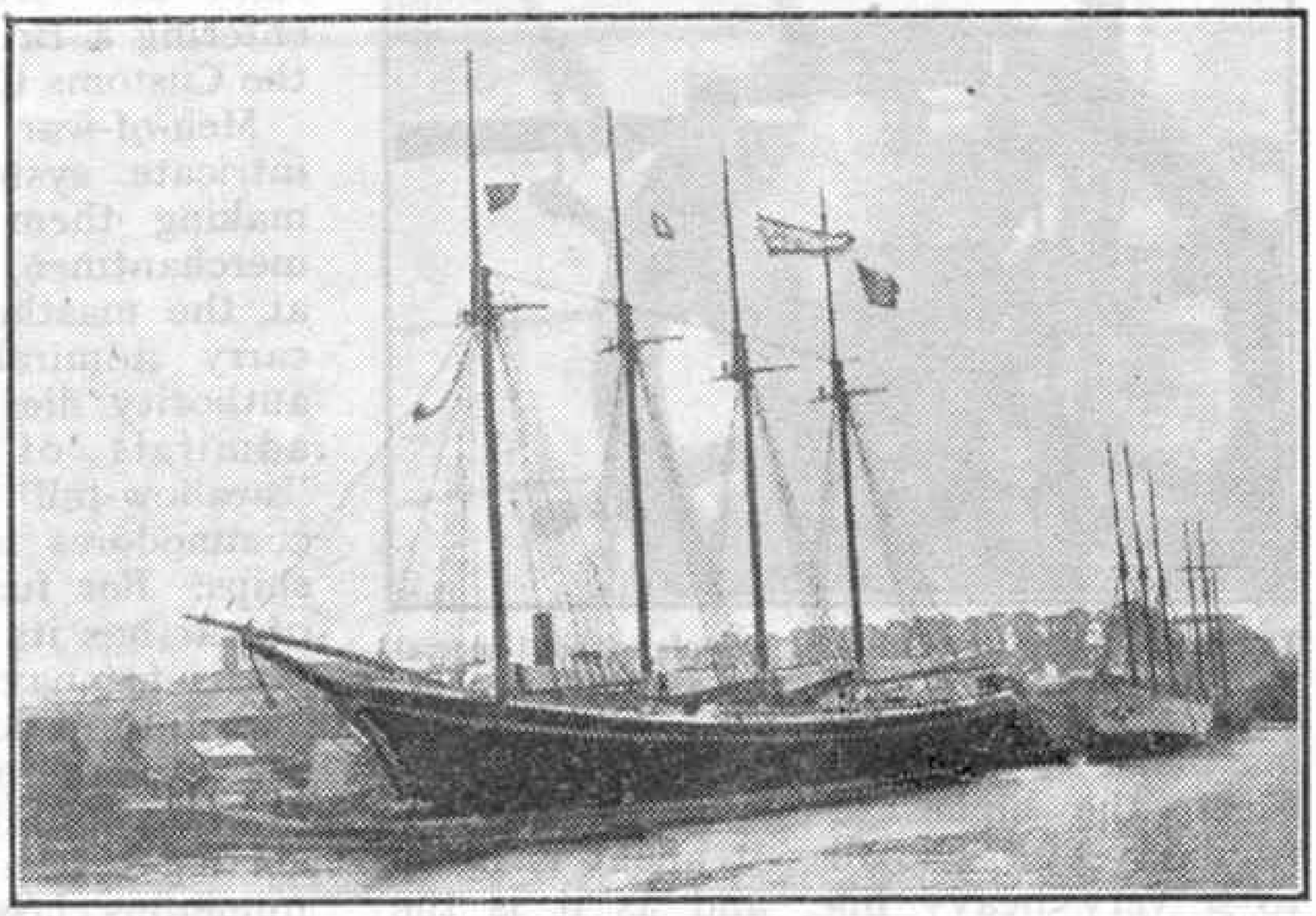
A merchant ship flies her "numbers," four flags whose letters bear no relation to her name—the "*Queen Mary's*" numbers are GBTT—only when she is communicating with another ship or passing a signal station which will report the ship to her owners. But she flies the company's house flag at her masthead practically all the time, at sea or in port, and these flags make a most interesting study. The P. and O. house flag, for instance, is quartered diagonally, and combines the blue and white of Portugal with the red and yellow of Spain, the two countries to which the company ran in its earliest days. The Anchor Line carries an anchor with four links of chain cable, signifying the four Henderson brothers who started it.

When choosing a device for the flag, owners always have to remember that the

sailor is an irreverent soul with a very quick mind for parody. The Cunard flag bears a lion rampant holding the globe in its claws, which the sailor calls "the monkey and the nut." The American Line most appropriately carries the American eagle with its traditional open beak, but that has earned it the nickname of the "Hungry duck line," although that is not heard as often as it used to be. Initials are dangerous. The "P. and G." of Messrs. Pollock and Gilmour was parodied as "Poverty and Grief," while the "S. and S." of Smith and Sons became "Slavery and Starvation" in sailing ship days, although both companies looked after their crews unusually well for the period.

The custom of distinguishing individual ships with a long pendant bearing the ship s name in big letters was formerly in very general use. Nowadays it is practically confined to excursion steamers and is rather held in contempt by the deep sea sailorman, although it has a very practical purpose in identifying the ship to those who are not able to recognize her by structural features as a sailor would.

In addition to her ensign, a yacht belonging to a recognized club flies its burgee at the masthead—generally a triangular pendant for private members and a swallow-tail for the flag officers —with the club's crest on it. In the old days all yacht owners also had their private flags, often very ingenious, which were flown by their yachts whenever they were on board, but the number has declined. Sometimes the same flag is also used for racing, but in most cases a special racing flag is devised for each yacht, designed to be as simple as possible in order to be recognizable at a long distance. It is only flown when racing, usually in place of the club burgee, and in miniature in port during the racing season when yachts carry them in a string from the masthead, one for each prize which has been won during the season. They are divided by coloured square flags into first, second and third prizes, and a successful yacht will have a wonderful display by the end of the year. As Prince of Wales, King Edward VII used the Prince of Wales' feathers as the "*Britannia's*" racing flag, while Sir Thomas Lipton had the Irish shamrock for all the "*Shamrocks.*"



The American 4-masted schooner "Joseph B. Thomas," in mourning, flies all her flags at half-mast including one with her name in big letters.

Flags for identification are very much older than flags for communication, which were first introduced into the Navy in the eighteenth century in a very primitive form. They were used principally to permit the admiral to give orders to his followers, and as naval manœuvres became more complicated so the number of flags was constantly increased to allow more signals to be made. One such increase was made shortly before the Battle of Trafalgar, but it was overlooked for years, and H.M.S. "*Victory*" on successive Trafalgar days flew Nelson's immortal signal in flags which had been superseded in 1805. That has now been put right, and the numerous hoists which she exhibits on 21st October show how cumbersome the code was in those days.

It was Captain Marryat, the author of "*Mr. Midshipman Easy*" and other classics, who first thought it worth while to provide a code by which merchant ships could communicate with one another. It was a numerical code, and as it was principally used by sailing ships meeting one another at sea, with the understood object of their position being reported to their owners at the first opportunity, the flag signals for ships' names are still referred to as their "numbers," although they have really been their letters for nearly a century. Marryat hoped that his idea would be adopted by all nations, but although some foreign ships carried it the code was too complicated for ordinary mercantile use.

During the Crimean War, when the French and British were co-operating, the ships found it very difficult to communicate with one another by Marryat's Code, with the result that the maritime nations got together after the war and produced what was first called the Commercial Code, but is now the International Code. The first had a distinctive flag for 18 consonants only, which permitted 78,660 signals to be made without using any flag more than once in a hoist. It has been increased by steps since then. The new International Code which came into use in 1900 used all the old flags but completed the alphabet with new ones, permitting 375,076 different signals; and this in turn was superseded in 1934 with 40 flags, including some for numerals and others to permit flags to be repeated. That was devised in consequence of experience during the First World War, and the Code Book was designed to be used in wireless telegraphy and Morse signalling as well as flags.

Although each flag represents a letter, they do not spell out words. The Code Book which goes with the flags is worked out in seven languages. Four flag signals beginning with certain letters are immediately recognized as the ship's name and are looked up in a separate list. A few special signals are made with one or two flags only; they are always the most urgent ones, so that they are easily memorized and need not be looked up in the book. There are single-flag signals to show that a ship is on trial and to request other ships to get out of her way; that she is loading or carrying high explosive cargoes, or that she has plague on board. Two-flag signals are generally calls for help, and there is an old story of the excitement on board a P. and O. liner carrying a number of officers among her passengers when she passed a lighthouse in the Red Sea which was flying a two-flag signal indicating "being attacked by savages." The rescue party were very annoyed to find that it was only the initials of the lighthouse keeper's small son, flown to celebrate his birthday.

The disadvantage of signalling by flags is that, if the wind is blowing directly between the two ships, they will be very difficult to read by any but experts like the signal ratings in the Royal Navy. On the other hand it has the great advantage of being exhibited for an

(Continued on page 164)

Have You Ever Thought About This?

What is Boiler Lagging?

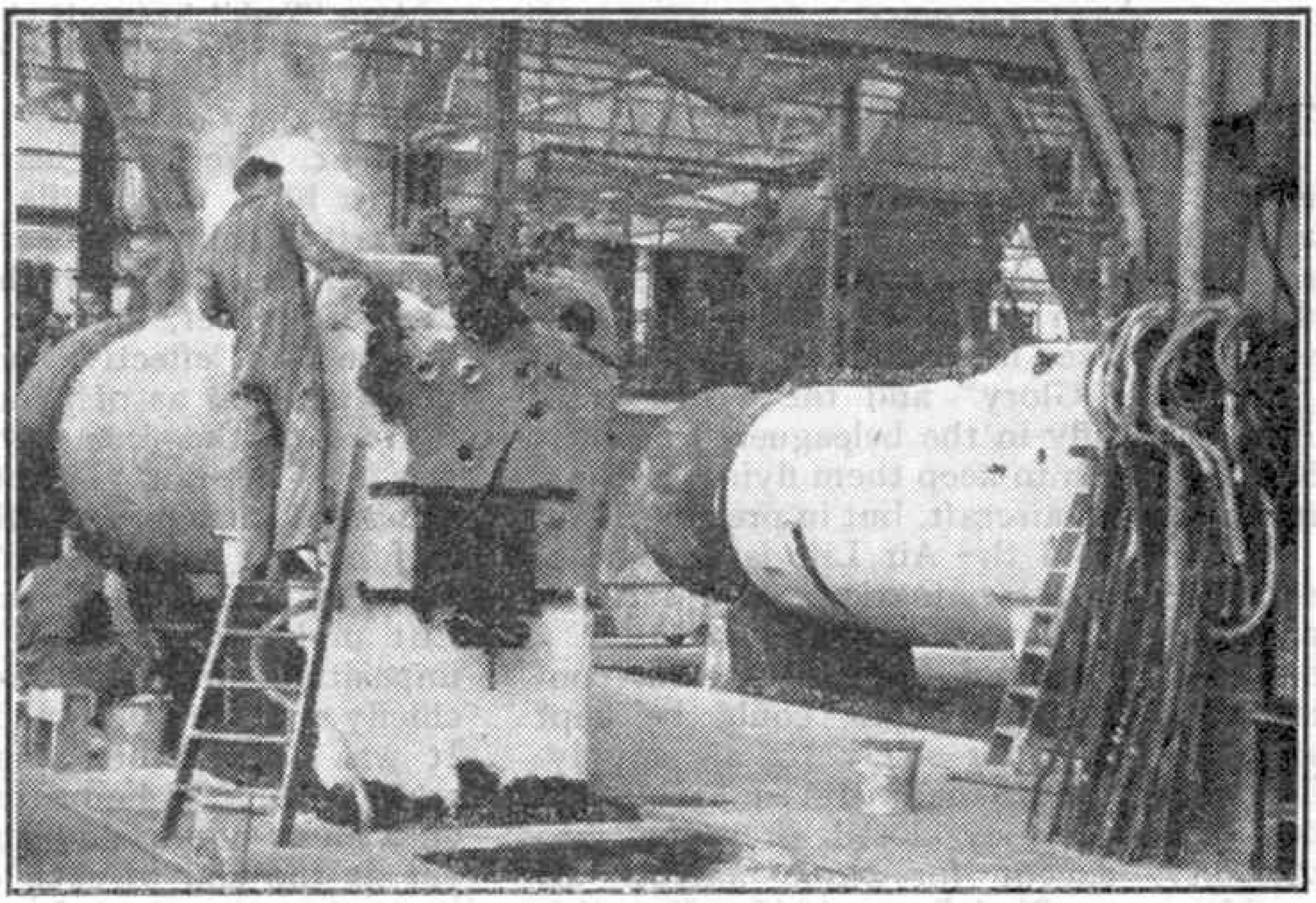
By "Shed Superintendent"

THE term "Lagging Gang," applied to men in a Locomotive Repair Shop, might be taken by the uninitiated to refer to a gang that has fallen in arrears with its work! The men in this gang are, as a matter of fact, usually on top of their job! They are responsible for wrapping the boilers with various materials to protect them from the weather, to provide heat insulation, and to secure a good finish to the external surface of the engine. This clothing process is known as lagging.

On early locomotives, strips of wood were commonly used as lagging. These strips were bound in position with brass bands and polished, as seen in old pictures. The wood, of course, soon deteriorated in the process of being wetted by rain and dried by the heat of the boiler, so an outer covering of sheet iron was added to protect the wood and to take the layers of gorgeous-coloured paints which distinguished the engines of the old railway companies. There are a few engines still in service with wood lagging.

At the beginning of this century asbestos came into commercial production, and it has been used on locomotive boilers either in the form of slabs about 2 in. thick, or in the form of a plastic composition. The photograph shows composition being applied to boilers at Swindon Works, and it will be noticed that the boilers are warmed, to dry the material. Slabs were preferred by some railways, as they can readily be removed and replaced when the boiler undergoes examination and repair; but they were liable to breakage, and woven asbestos mattresses, specially "tailored" to fit the boiler, are now found to be more satisfactory. These mattresses are readily removable when required.

Asbestos is an imported material, however, and attempts have been made to find a substitute. As air is a poor conductor of heat, fairly good heat insulation can be secured by enclosing the boiler in air! The War Department engines, built in 1943, dispensed with lagging as an economy measure, and an air space was left between the boiler and its casing. The Southern Region "Pacific" boilers are lagged with mattresses of spun glass, which holds myriads of tiny air cells. Mattresses of crumpled aluminium foil have also been tried on the same principle.



Lagging composition being applied to a boiler at Swindon Works.

The outer casing nowadays is made of thin sheet steel, and care must be taken to enclose the lagging material completely, otherwise it may become soaked with oil splashes. A spark is then liable to cause a serious fire, fanned by the air currents around the moving engine.

External pipes are left uncovered but train heating pipes are wrapped with felt.

Lessons of the Air Lift



by John W. R. Taylor

Avro "York" transports at Gatow Airport, Berlin. Photograph by courtesy of A. V. Roe and Co. Ltd.

THE Berlin Air Lift has entered its 10th month. For 280 days never-ending streams of British and American aircraft have poured food, clothes, medicine and fuel into a city that their pilots once deluged with bombs. Because those streams have never ended, the Union Jack, "Old Glory" and the Tricolour of France still fly in the beleaguered city. It has cost much to keep them flying, not just in money and aircraft, but in precious lives.

The story of the Air Lift is an epic of courage and determination. Few but our air chiefs believed a year ago that a district the size of Western Berlin, containing 2,500,000 people, could be kept alive and at work solely by air supply. Certainly the Russians did not think it possible when they closed all routes into the city, except for three narrow air corridors, on 21st June 1948. Yet this prodigious Air Lift has been so successful that it is accepted as part of our everyday life that can go on for ever if need be. Unfortunately that is not true, and one day Allied commanders, and the Russians, will have to face the fact.

Meanwhile, what have we gained from the Air Lift?

The political and strategic benefits are obvious; not so apparent are the lessons being learned the hard way by R.A.F. Transport Command and the United States Military Air Transport Service, yet they are just as important. Precious minutes lost in loading bulky sacks and boxes through small doors intended only for passengers have taught lessons that will make our new transports more efficient. We have learned a great deal about how to handle vast streams of aircraft quickly and safely, and we have been given another, perhaps final, warning that air power, and air power alone, can be the most effective means of preserving peace as well as of winning wars.

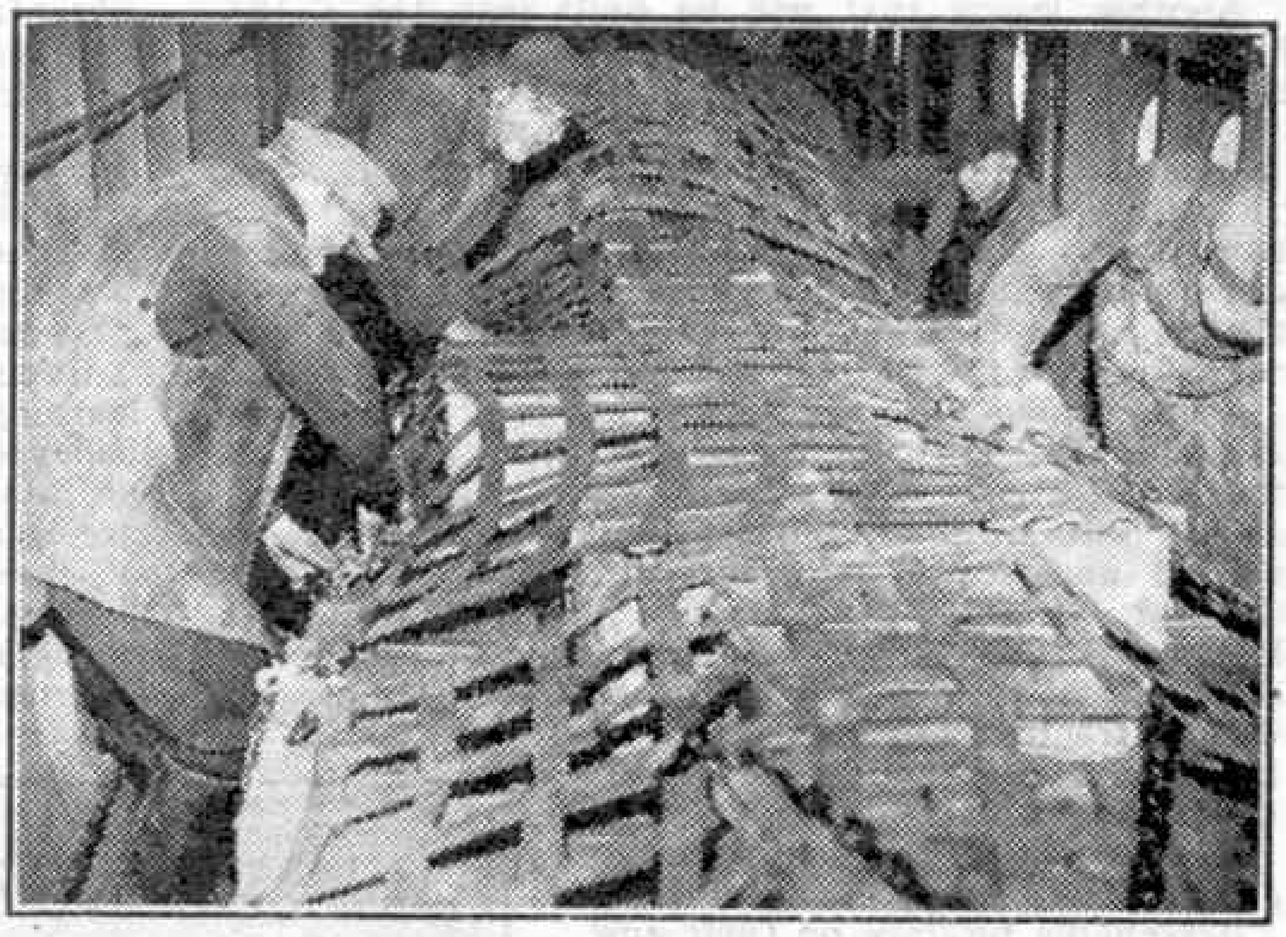
Hero of the first days of the Air Lift was the veteran "Dakota." By plucking grounded airmen from their desks and by digging out every available "Dak," the R.A.F. and U.S.A.F. were able to get the Lift under way within five days of the imposition of the blockade, carrying chiefly milk for children, flour and medicine. It was a heart-breaking business. Some crews spent 28 hours on duty, slept for only eight hours, and then started again; yet at the end of each day they realized that what they had flown into Berlin was only a dribble of the 4,500 tons needed daily to maintain life in the city. More and bigger aircraft, and fresh crews, were needed desperately.

They soon arrived, from every corner of the world—R.A.F. "Yorks," M.A.T.S. "Skymasters," more "Daks." Later, Transport Command introduced several of their new "Hastings," with great success. Then British civilian operators took a hand, under the guidance of British European Airways, whose own "Vikings" maintained a regular passenger service into Berlin even after one was rammed by a Soviet fighter, with the loss of all on board. The charter companies contributed "Haltons," "Wayfarers," "Vikings,"

"Hythe" flying boats and still more "Dakotas." Flight Refuelling Ltd. sent along "Lancastrians" and a "Lancaster" to carry liquid fuel into the city. A surprise arrival was Air Vice-Marshal D.C.T. Bennett with a "Tudor" 2 belonging to his newly-formed Airflight Company, soon joined by more "Tudors" flown in by Airflight and B.S.A.A.

As an experiment, the Americans tried out their giant Douglas C-74 "Globemaster" on the run; it proved still more conclusively that the future of air cargo is not in high speed but in big aeroplanes, driven by powerful but economical and reliable engines. On 18th September, for example, it remained airborne for 20 hours out of 24, and carried 120 tons of supplies into the city in six round trips. The "Tudors," too, soon proved their worth, by averaging four trips a day for days on end, carrying 10 tons of freight each time. When the "Globemaster" was withdrawn they were, and still are, the biggest load-carriers on the Air Lift—a great tribute to an aeroplane that has been too often criticized.

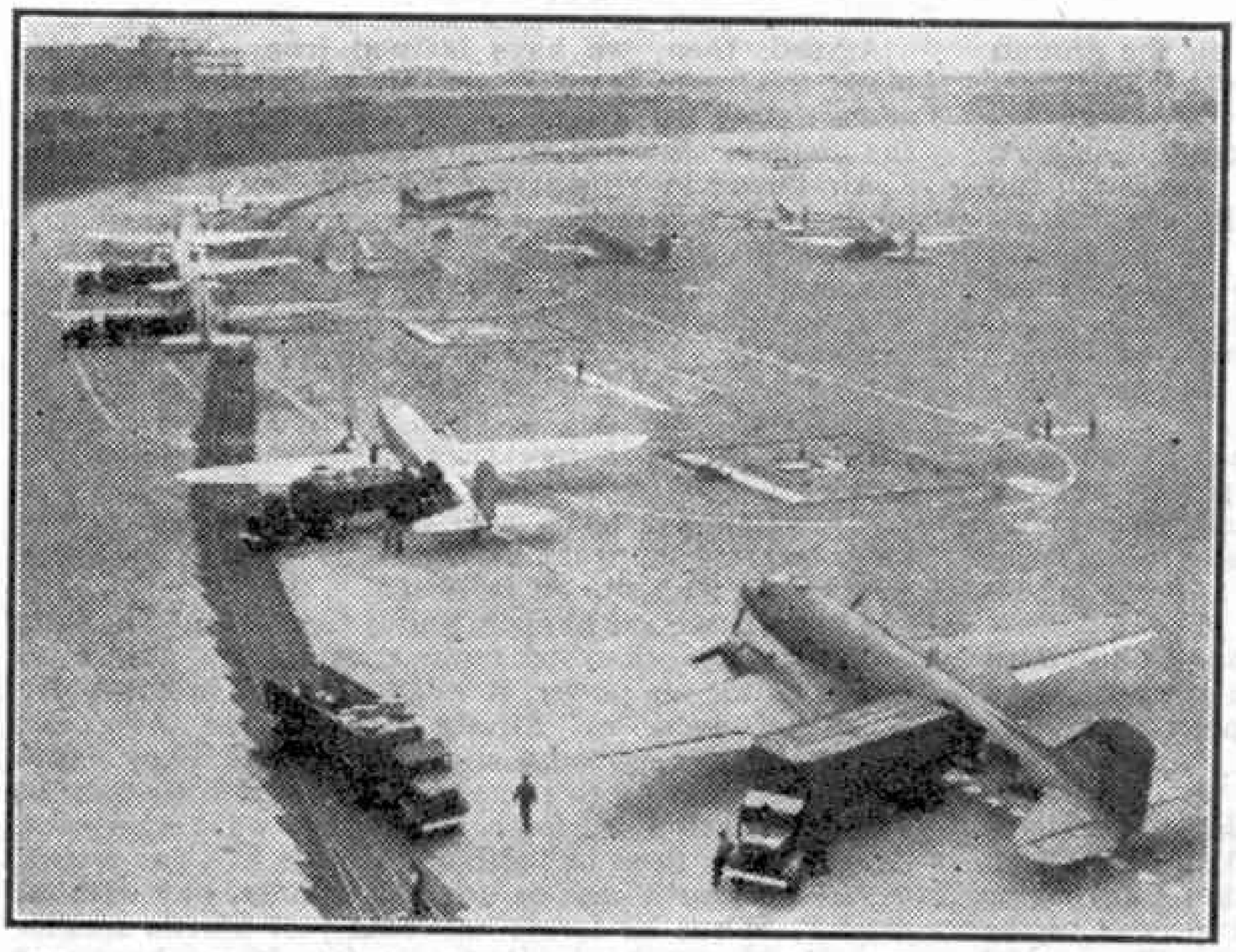
But the British flying boats, operating from Hamburg to Havel Lake, have probably impressed the Russians more than anything else. By carrying great loads of supplies into Berlin and hundreds of under-nourished children out of the city, they have re-affirmed that the large flying boat, far from being finished, will probably be the cheapest and most practical way of coping with ever-increasing air traffic of the future.



This Avro "York" load of beef fillets and of butter occupied the full length of the fuselage and weighed nearly 7½ tons. Photograph by courtesy of A. V. Roe and Co. Ltd.

The Americans have issued impressive figures to demonstrate the economy of using large aircraft. They point out that a task force of only 68 "Globemasters" could haul in the 4,500 tons needed in Berlin each day. It takes 178 "Skymasters" or 899 "Dakotas" to do the same job. Similarly, the "Globemasters" would need to fly only 16,200 hours a month to do the whole job, compared with 42,888 in the "Skymasters" or 158,824 in the "Dakotas." One hundred and eighty "Globemaster" crews would be needed, compared with 465 for the "Skymasters" and 1,765 for the "Daks." And finally, the "Globemasters" would use only 6,804,000 gallons of fuel, compared with 8,577,600 needed by the "Skymasters," or 14,294,000 by the "Dakotas."

These figures do not minimize the magnificent achievements of the "Skymasters" and "Dakotas" on the Air Lift. They do teach an important lesson however—one that is already being exploited by the American Government, who have ordered many giant new Douglas C-124 transports, each two and a half times as big as a "Skymaster," but able to take off from the same short airfields.



Douglas C-47 "Dakota" transport aircraft of the U.S. Army unloading food cargoes into waiting lorries at Tempelhof Airport, Berlin.

Another lesson that will be built into the C-124 has been well proved by the Bristol "Freighters" on the Air Lift. Each aircraft is allowed, on average, only 15 minutes for unloading at Gatow, Tegel and Tempelhof airfields in Berlin; as a result, the "Freighter's" nose-loading doors and low level floor have given it an immense advantage over other aircraft with normal side-loading doors. In fact only the Fairchild "Packet," with tail-loading doors, can compare with the "Freighter" for speedy turn-round.

This business of quick turn-round is of course just as important for commercial operators as it is on the Air Lift, for time wasted on the ground eats deeply into airline profits. The new generation of British and American transports, typified by the General Aircraft "Universal Freighter" and the Douglas C-124, will all have large nose or tail doors; in addition they will carry their own ramps, up which tractors, lorries, cars or tanks can be driven straight into the capacious cargo-holds.

The Fairchild Company plan to go one better, however, by utilizing a detachable fuselage on their new XC-120 transport, on the same lines as that of the well-known Miles M-68 "Box-Car," but on a much larger scale. The XC-120 is similar in general appearance to the "Packet," but its fuselage is in two portions—a small flight-deck nacelle attached to the wing and a large detachable container that fits snugly underneath. The aircraft will fly with or without this container.

The advantages of such a lay-out are obvious. The XC-120 could fly a completely-equipped radio station into a battle-zone, packed inside a container, unhook it and fly back with another container packed with 36 stretcher-patients and their attendants. There need be hardly any time spent on the ground, as the containers could be packed while the machine is airborne, so that they would be all ready for hooking on and flying away as soon as it landed.

They could be made in several different shapes, and having a capacity of 2,900 cu. ft. could be used on the ground as emergency hospitals, messes, mobile headquarters and so on.

So the Air Lift is benefiting our aircraft designers. But, however efficient the aircraft, aircrews and ground personnel might be, the Air Lift would have been impossible without the high skill of the ground controllers, whose radio beams have guided these vast armadas of aircraft to and from Berlin in all weathers, without any time wasted through "stacking" (waiting turns to land over an airport) and without a single collision.

Every pilot is under strict instructions to maintain a rigid flying schedule. He is told the precise altitude and speed at which he must fly, and throughout the journey simply flies down the beams of a series of radio beacons that guide him to a point where he can either see the airfield, or where airport control can "talk him down" with G.C.A. (Ground Controlled Approach) radio in bad weather. As a further safety measure, he must send out regular reports giving his identity, position, altitude and time.

The aircraft fly in "blocks," made up of units of five machines. Taking off at three-minute intervals, the aircraft of each unit fly at 5,000, 6,000, 7,000, 5,500 and 6,500 ft. respectively. Another unit begins to take off three minutes after the last aircraft of the previous one. So there is never less than 15 minutes' flying time between aircraft at the same height.

Of course the Berlin controllers have one great advantage over their opposite numbers at, say, London Airport, as the aircraft approach each airfield from one direction only, following the radio beams, so that they can be brought in to land as soon as they arrive. What is more, if an aircraft is more than half a minute late it is forbidden to land, and has to fly back to its starting point—a procedure that certainly would not please airline passengers who had just flown over from America.

Even so, civilian controllers are undoubtedly learning much from the Air Lift, for it was always believed that G.C.A. landings could not be made at intervals of less than 20 minutes. Now aircraft are being brought into Berlin airfields day after day at three-minute intervals. What this means to the airlines is obvious, for every one of the hundreds of crews on the Lift could form a cadre around which an instrument flight training school could be set up.



Air Vice-Marshal D. C. T. Bennett leaving his Avro "Tudor" 5 at Gatow. Diesel oil totalling 1,500 gall. is being discharged through the flexible pipe leading out of the fuselage door. Photograph by courtesy of A. V. Roe and Co. Ltd.

Agreed, then, we have learned from the Air Lift many lessons to improve aircraft and airline efficiency and safety. But if that is all we have learned, then the greatest lesson of all will have been lost.

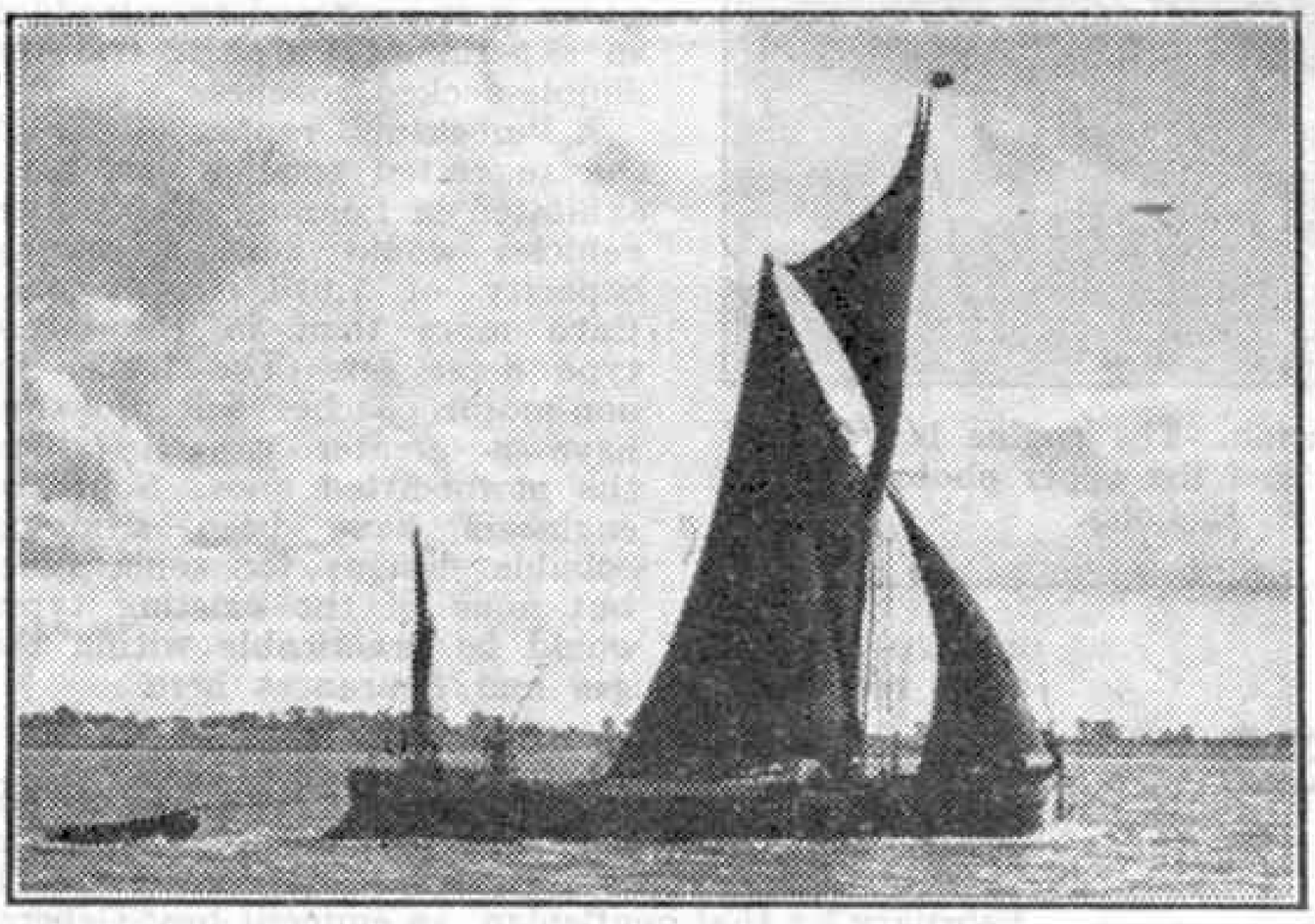
Air Power in World War 1 was a useful adjunct to land and naval power. By the end of World War 2 it had grown to such an extent that, with two devastating atomic strikes, it was able to end that war, making costly land and sea attacks on Japan unnecessary. Having won the war, our air forces were slashed to a mere shadow of the weapons to which we owed our survival. Fortunately the Air Lift was needed before they disappeared altogether. But even now, as Lord Douglas, one of the R.A.F.'s great wartime leaders, said recently: "Unless urgent steps are taken, it looks as if the Royal Air Force will before long die on its feet."

That must never happen, and if the Air Lift has done nothing more than to remind us of the still vital necessity for air power, it will have been worth every ounce of sacrifice. Strong British and American forces threaten nobody, and as Mr. C. G. Grey wrote recently: "It is up to everybody to become air-minded and *want* a strong air force, just as they want cigarettes, or movies, or beer, or football pools, or five-day weeks, or holidays with pay, or, for that matter, pay without work." If our air forces had been just a little smaller we should not be in Berlin to-day. If we have not learned this great lesson of the Air Lift, we may have none of those other things we want to-morrow.

Our Vanishing Sailing Coasters

Spritsail Barges of Thames and Medway

SAILING vessels are fading away from the coastal trade round our shores. The disappearance of these picturesque craft will cause many regrets, and none will be missed by sail enthusiasts more than the spritsail barges of the Thames and Medway. Some of them still survive, but the class is clearly heading for extinction, and those who in days to come remember these vessels will be glad to turn to this splendid book.*



"Henry and Jabez," 46 tons, in the Thames Estuary.

Mr. March has spared no effort to photograph the Thames spritsail barges, to learn more about them from those who built or sailed them, and to record their histories. He does not claim to tell the full story, but his book, which runs to 300 large pages, is a storehouse of accurate information, based on original sources. The author's enthusiasm is infectious, and he writes easily and well, with a wealth of anecdote and reminiscences of men who sailed the barges in their days of prosperity.

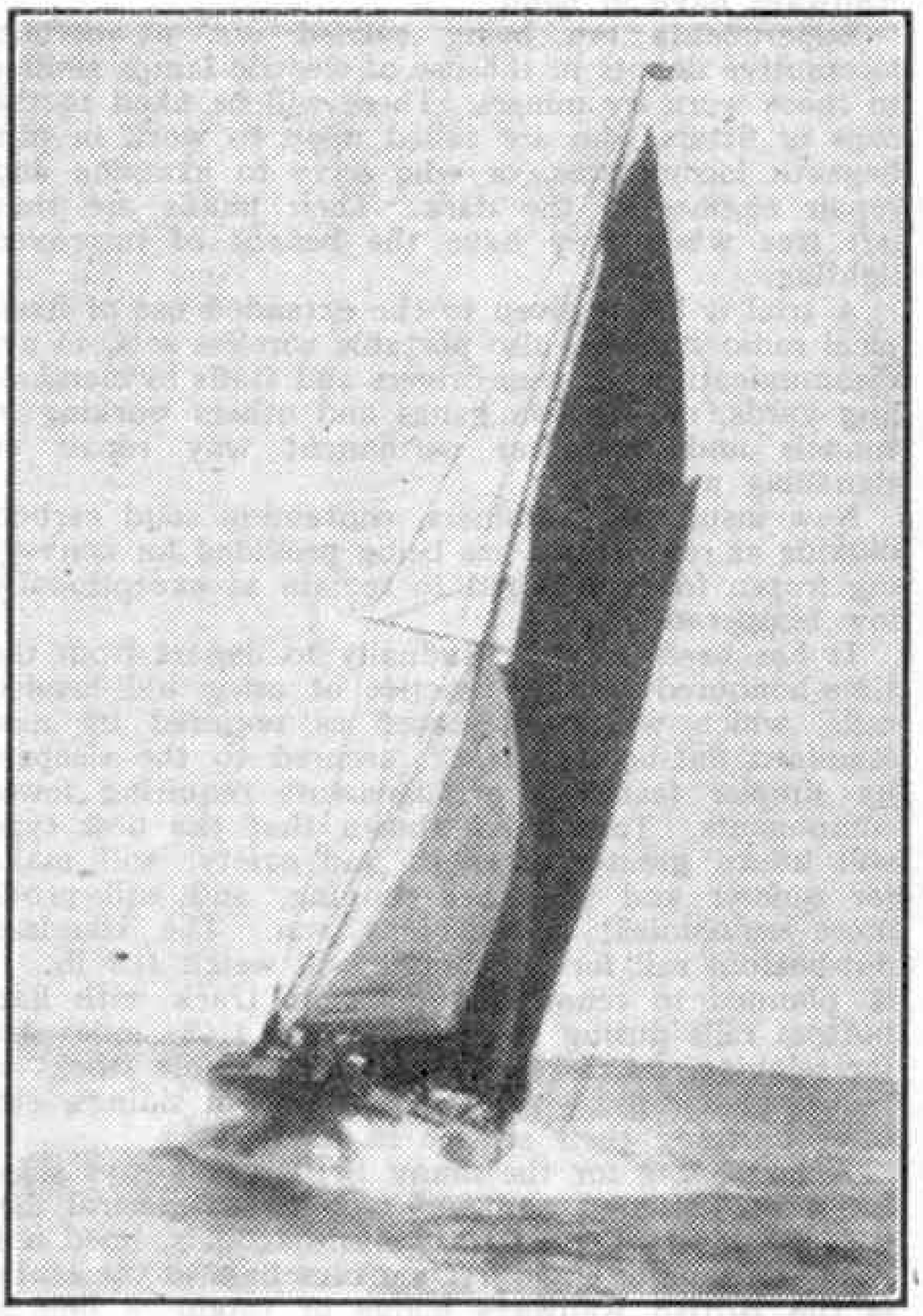
The illustrations are as attractive as the story. There are 129 reproductions of splendid photographs in which every type of Thames sailing barge is seen—sailing along with a fair wind, entering harbour, loading or unloading bricks, concrete and other cargoes, or undergoing re-fitting or repair. Some are even shown as wrecks, but all make brave pictures on which the ship lover will dwell with pleasure. In addition there are many fine drawings.

Mr. March traces the origin of the Thames barge, giving brief descriptions of early examples, with drawings, and then proceeds to explain the difference between stumpies, river barges and coasters, the three main classes. A long and fascinating section on the river barge is followed by one on the coaster, after which we turn to Whitstable and the Kentish barge centres, with attractive stories of the building of barges, and of their cargoes—grain, cement, stone, coal, and even hay, which was carried in great piles on deck, making the barges look like floating stacks. Then follow stirring stories of the great sailing matches of the Thames and Medway, real sporting events. No races have been held since the war, and they may not be revived. If they are, it may be necessary to take the propellers off the entrants, for the barge of the future seems to be one fitted with an auxiliary engine.

We go on through stories of wreck and salvage to the section of the book that deals with construction. Here the expert can revel in the finer points of rigging and sail plans. The characteristic of these barges is the enormous sprit, or "spreet" as the bargemen call it, which holds up the peak of the mainsail. This arrangement allows a topsail to be set over a brailed-up mainsail, a handy arrangement for working across a crowded dock or up a wooded creek. The topsail catches air going over warehouse roofs or treetops and so gives steerage way.

Mr. March also gives readers the benefit of his experience in the making of water-line models, with valuable suggestions for constructing display cases and providing scenic backgrounds. Scale drawings are given of "*Kathleen*" and two other typical spritsail barges, one the ketch "*Martinet*," and the other "*Giralda*," probably the most famous of all racing barges, winner of the Thames race on seven occasions and of the Medway race on five. The book ends with a complete record of these races. There is an excellent index.

Mr. March is to be congratulated on his fascinating book. It is a really delightful production.



"Ash" winning the 1911 Medway Race.

*"*Spritsail Barges of Thames and Medway,*" by Edgar J. March. M.S.N.R. Published by Percival Marshall 30/- net*



A north to west express passing Flax Bourton. The engine is "Castle" class No. 5044 "Earl of Dunraven." This and the upper photograph on the next page are by C. R. L. Coles.

Railway Notes

By R. A. H. Weight

National News

We are able this month to announce several interesting innovations and developments which British Railways have in hand.

Experiments are being carried out at certain locomotive depots in the use of electric lamps similar to those worn by miners. These will be fixed to the caps of fitters who are called upon to work in pits beneath locomotives, or who have to examine and repair engines in the dark. Their hands are thus left free while they have the benefit of improved lighting.

A trial is being given to the extended use of fixed local radio stations, also portable wireless sets, to aid communication between drivers and staffs in marshalling yards, or between gangs and others working in tunnels and on other permanent way repair or signalling work.

New insulated containers, containing solid carbon dioxide as refrigerant, are being provided for conveying frozen foods required to remain at exceptionally low temperatures.

It has been decided gradually to depart from the time-honoured British practice of using bull-headed rails, which will be replaced as required by new standard flat-bottom track, secured to the sleepers by simpler fastening arrangements requiring fewer components. Tests have shown that the new type will afford greater strength and safety, will make for quieter and smoother running, and will prove more economical in the long run. The standard flat-bottom rail for fast traffic will weigh 109 lb. It is planned to renew 463 miles of track with flat-bottom rails during 1949, out of the 1,484 miles due for relaying, as there are still considerable stocks of bull-headed rails, which can be used in sidings, etc. after finishing their service in main lines.

A house flag for the many British Railways ships has been designed and will soon be in general use; it has a blue ground with white diagonals, lined red, with white outer edging. On a blue base in the centre is the British Railways badge or totem, a lion in yellow astride a wheel in red and white.

Double Decker Trains to be Tried

Double-decker railway coaches have been used a good deal around Paris, in the U.S.A. and in places where platforms are lower and clearance gauges more generous than in Britain. By various means the British railway companies have greatly intensified their capacity for handling passenger traffic at peak hours with both steam and electric traction, but on certain routes there is still overcrowding. This is so on the S.R. London-Dartford lines, where it is proposed to introduce an experimental electric train of double-decked coaches.

A "mock-up" replica of one of the suggested coaches has been exhibited in London. Eight such vehicles would have a seating capacity of 1,016, about one-third more than in the latest type 8-car set. The trailer or non-motor coaches will probably have a greater capacity than the motor-fitted ones. Southern engineers have been studying possible designs for some time, but none of the existing types in other countries would be practicable within the more restricted gauges and clearances here.

Southern Locomotive News

The latest "Battle of Britain" class 4–6–2 No. 34090, painted and lined in S.R. passenger style, was named *"Sir Eustace Missenden"* at Waterloo in February by that gentleman, an eminent past General Manager of the Southern Railway and now Chairman of the Railway Executive. A guard of honour was formed by members of the staff who distinguished themselves by brave acts during the recent war. The engine carries the coat-of-arms of the Southern Railway on the side sheeting as a tribute to the past. The new British Railways' totem appears on the tender of this engine and of "Merchant Navy" No. 35024, named *"East Asiatic Company,"* which is painted light blue, with black and white lining in place of the horizontal red lines first used.

Names recently affixed to light "Pacifics" include No. 34030, *"Watersmeet"*; No. 34028, *"Eddystone"*; No. 34032, *"Camelford"*; No. 34033, *"Chard"*; No. 34044, *"Woolacombe"*; No. 34045, *"Ottery St. Mary"*; No. 34063. *"229 Squadron"*; No. 34077, *"603 Squadron"*; and No. 34088, *"213 Squadron."*

Eastern and North Eastern Regions

"A3s" Nos. 60050–1, 60054 and 60111 are at Neasden and Nos. 60048–9, 60053–4, 60061, 60090 are at Leicester, thus inaugurating a "super-Pacific" era on the named expresses and other trains of the Great Central Section. The last N.E.R. "Atlantic," No. 2970, has been withdrawn. It was of class "C7," of which there were originally 50, all with three cylinders, forming the well-known and handsome North Eastern "Z" class. Two were rebuilt by the L.N.E.R. with articulated boosters as class "C9." Prior to the three-cylinder engines 20 two-cylinder N.E. "Atlantics" had been built, and two compounds. These were classed by the L.N.E.R. "C6" and "C8" respectively; both classes are now extinct, as is class "J75," Hull and Barnsley 0–6–0T.

New "A1" 4–6–2s lately completed were No. 60123, built and shedded at Doncaster and No. 60142, built at Darlington, allocated to Gateshead. "A3s" are working from Leeds Neville Hill shed. Some rebuilt and unrebuilt "Sandringhams" are being painted green. Those fitted with 225 lb. per sq. in. boilers and retaining three cylinders have a tractive effort of 28,553 lb.

Some 170 engines stationed at former Cheshire

Lines Committee sheds, have been transferred, on loan, to the London Midland Region, Trafford Park District. They are mostly G.C.R. types, including nearly all the "D9" and "J10" engines, and the remaining "B9" 4-6-0s.

Another Midland "Jenny Lind" Picture

Last month, in the article "*A Historic Locomotive Photograph*," we described the smart little 2-2-2 "Jenny Lind" locomotives popular on our early railways nearly 100 years ago. Our illustration then used of Midland "Jenny Lind" engine No. 728 was a reproduction of what was thought to be the only such photograph in existence. Another has been discovered by a Motive Power official, however, and this we are glad to reproduce here, as it shows more detail. The engine shown, No. 1010, became so numbered in 1868, having been built in 1856 as M.R. No. 112, with 6 ft. driving wheels and 15 in. by 20 in. cylinders. The engine number appears on the side of the boiler.

London Midland and Scottish Notes

New engines have been placed in service as follows: class "5" M.T. 4-6-0; Nos. 44728-9, stationed at 23C, Southport; class "4" 2-6-4 M.T. tank, No. 42183, 16C, Leicester; Nos. 42184-5, 16A, Nottingham; 2-6-0, Nos. 43023-5, 2D, Nuneaton; and No. 43026, 5B, Crewe South. No. 45534 "*E. Tootal Broadhurst*" is another "Patriot" converted to "6P."

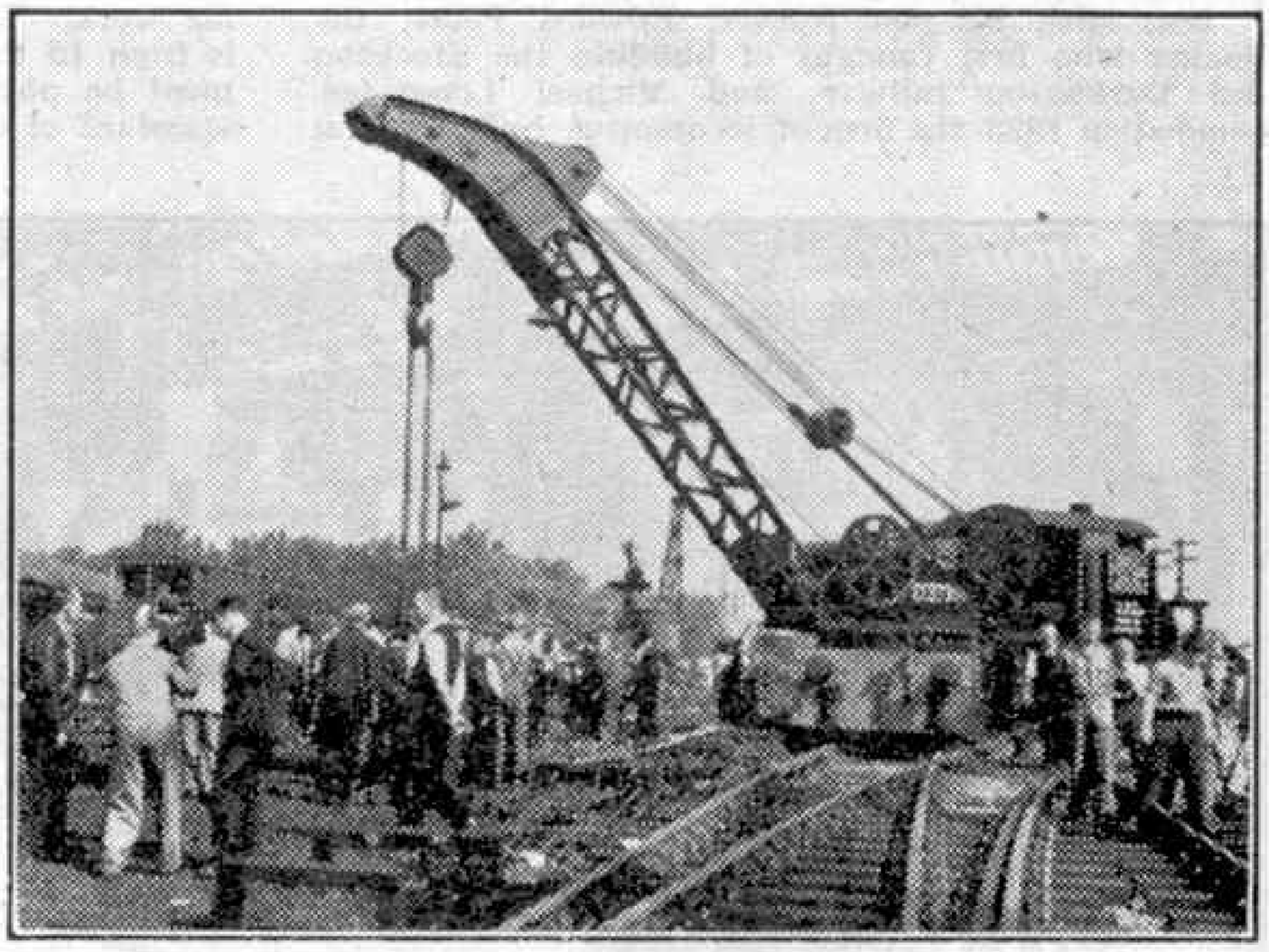
Large scale track relaying and lineside repair works have recently been in hand. A tunnel subsidence caused temporary closing of the Leicester-Birmingham line.

In the Scottish Region, the Motive Power districts have been reorganized, like other administrative departments, to include former L.M.S. as well as L.N.E.R. depots. The numbers range from 60 to 68, followed by letters indicating separate sheds within each district.

Western Tidings

Further modified "Halls" in service are numbered 6996-8, and named respectively "*Blackwell Hall*," "*Bryn-Ivor Hall*" and "*Burton Agnes Hall*." Construction is continuing with Nos. 7900-29, following on No. 6999. New 0-6-0T engines Nos. 6766-9 also have been completed. "Castle" class No. 5075 "*Wellington*" is stationed at Chester, from which shed there is a regular passenger train working to Oxford and back.

No. 2935 "*Caynham Court*," of the later "Saint" class two-cylinder 4-6-0 series, lately withdrawn, had since 1931 been fitted with rotary-cam poppet valve gear as an experiment. The use of this gear was not developed on the G.W.R.



Track relaying in progress with the aid of a steam breakdown crane. This view was obtained in the course of the relaying of the approach to St. Pancras station some time ago.

More London "Tube" Extensions

The London "tubes" are getting farther out into the open air. Extensions of the Central line at each end were brought into use just before the end of 1948. Westward, in Middlesex, trains now run on from Greenford to Northolt and West Ruislip over new electrified tracks alongside the former Great Central and Great Western Joint main line to the North. Eastward, in Essex, the Central services have been extended from Woodford to Loughton and also to Hainault, running over ex-L.N.E.R. suburban tracks and replacing Liverpool Street steam services which, apart from a few night goods and similar trains, are now restricted to the Loughton-Ongar run, farther out of London.

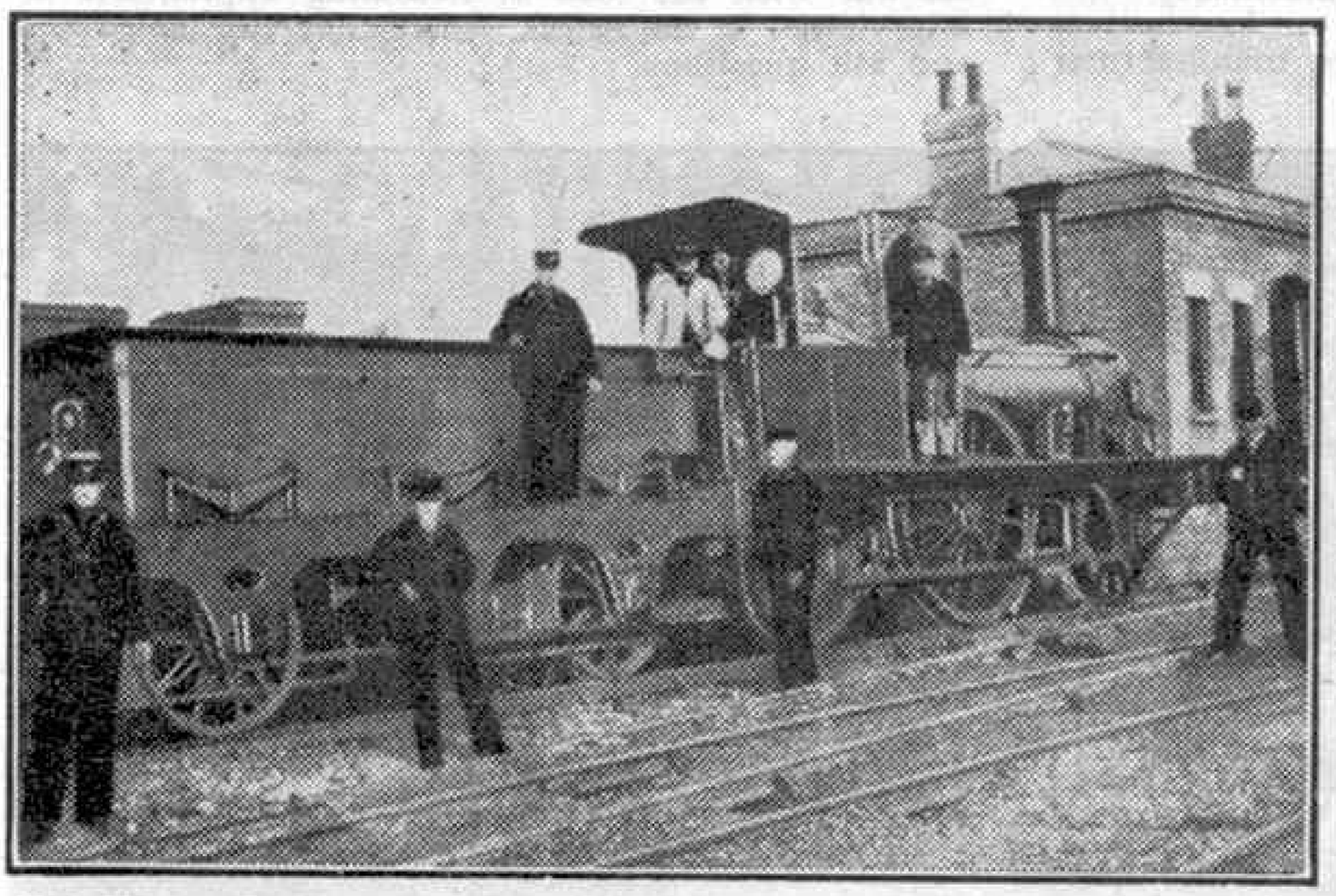
Central line trains now serve 40 miles of route and 46 stations, including those in the heart of the city and west end of London. Much remarkably rapid and difficult engineering and constructional work was involved.

Naming of Locomotives

The Railway Executive have no intention of removing the existing names on locomotives, or of discontinuing the general practice of naming locomotives in suitable cases.

* * * *

Satisfactory progress is being made on the Liverpool Street-Shenfield electrification scheme. It is expected that electric train services will be fully in operation by the end of the year. New electric nine-car trains are in course of delivery to Ilford depot.

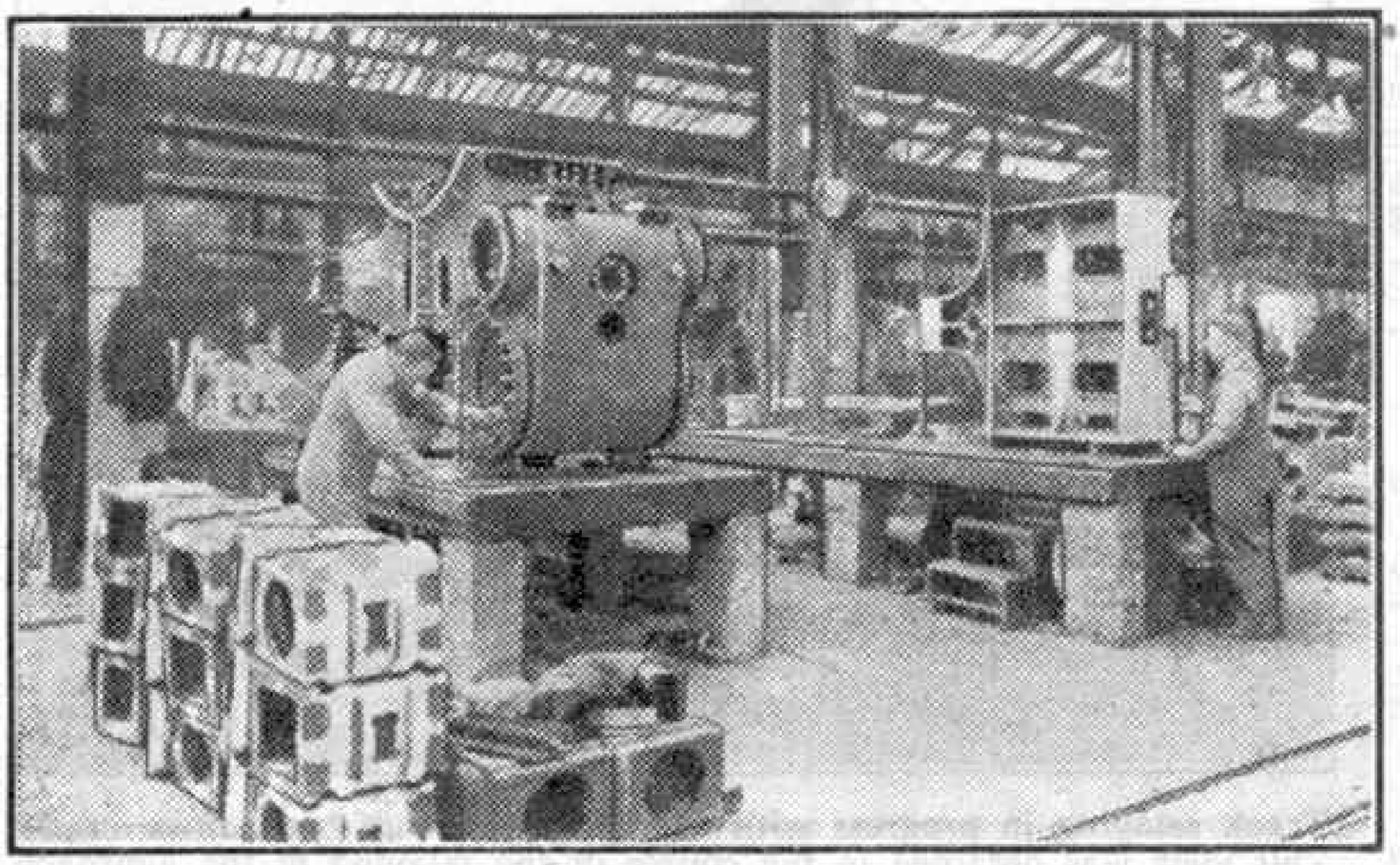


This illustration is taken from the most recently discovered view of a Midland "Jenny Lind" locomotive referred to in the accompanying paragraph. British Railways official photograph.

Engineering Opportunities

Apprenticeships in Locomotive Building

IN the very early days of railways, George Stephenson, with his son Robert, Edward Pease, the Quaker who first thought of building the Stockton and Darlington railway, and Michael Longridge, founded in 1823 the firm of locomotive builders that became known as Robert Stephenson and Co. Ltd., with works at Forth Street, Newcastle-on-Tyne. Later a second factory was built at Darlington, and in 1937 came a union with R. & W. Hawthorn Leslie and Co. Ltd., of Newcastle-on-Tyne, another pioneer firm of locomotive builders. The joint enterprise is now known as Robert Stephenson and Hawthorns Ltd., and engines built by the two firms have hauled trains not only in Great Britain, but also in practically every country in the world.



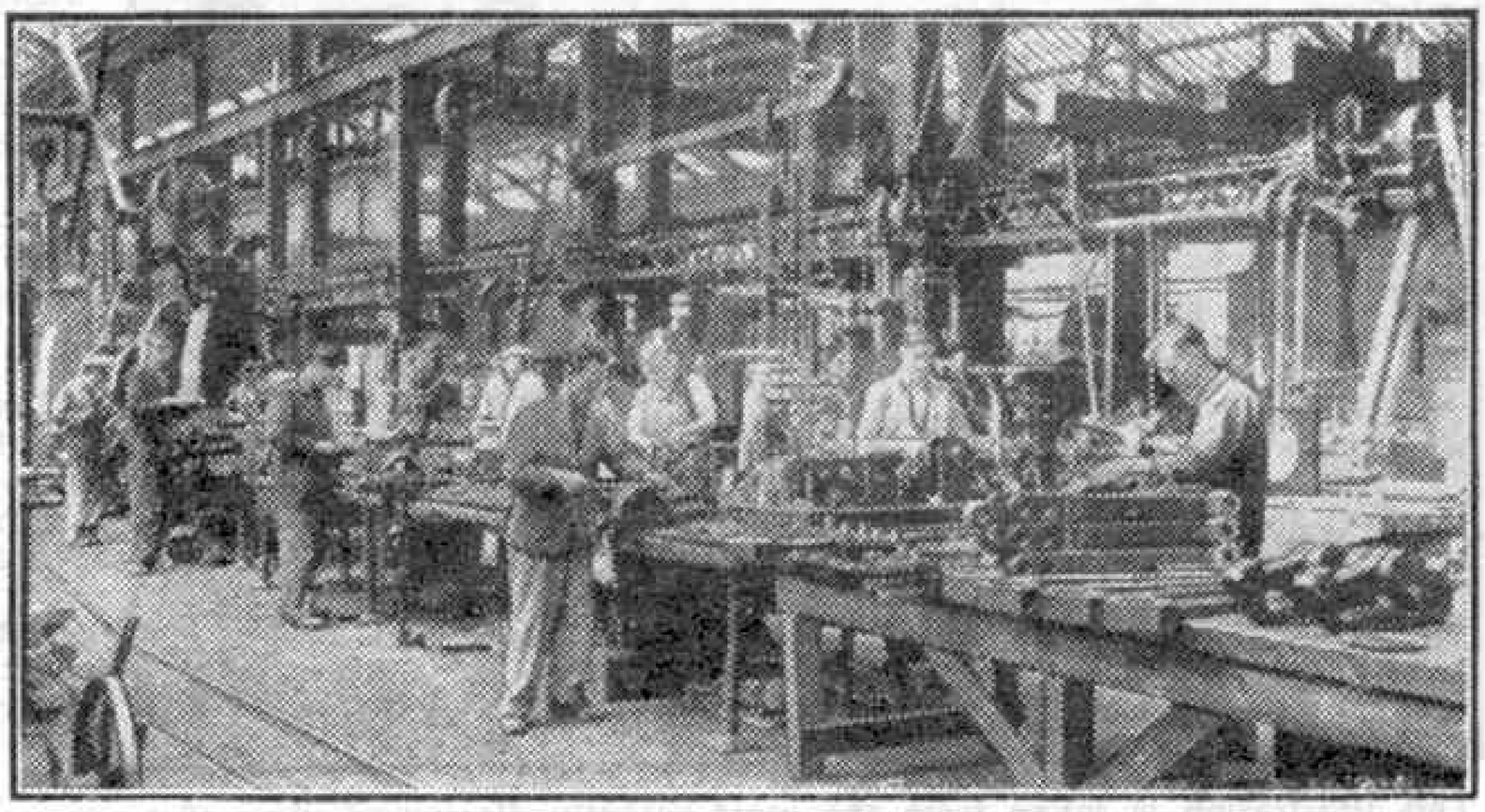
Checking a locomotive cylinder on the marking out table. The illustrations to this article are reproduced by courtesy of Robert Stephenson and Hawthorns Ltd., Darlington and Newcastle-on-Tyne.

An order for 50 engines is considered a good one, and because of this limitation it would not be economical to build up the special machinery with which partly skilled labour could turn out locomotives by mass production. The locomotive manufacturer therefore must rely on the skill of engineering craftsmen, from the forging of connecting rods and similar components and the shaping of plates for boilers to the final assembly of the parts into a working engine.

The locomotive builder begins his career as an apprentice, and Robert Stephenson and Hawthorns Ltd. have a well-planned scheme by which the modern boy can enter this great industry. There are two types of apprenticeship, known respectively as engineering and trade apprenticeships. An engineering apprentice is given a suitable period in most departments of the works and learns something of most trades, qualifying himself by experience and study for general engineering work. The normal period of his apprenticeship is from 16 to 21 years of age, and to begin with he must be physically fit and have attained a certain standard of education. No premium is required, but there is a probationary period of three months, the main purpose of which is to make sure that the boy himself is satisfied that he wishes to undergo the training.

Trade apprenticeships also are open to boys of 16, but boys wishing to begin earlier may do so. Employment is then found in offices, stores and shops, and in this way they gain valuable insight into the various trades open to them. This is helpful when they have to decide which of the many engineering trades, such as boilermaking, forging, moulding, fitting and erecting, to mention only a few, they will enter. Apprenticeship continues for five years, and at the end of this period the boy has become a craftsman skilled in the trade he has chosen and usually with some knowledge of another, while the trade apprentices who show the necessary skill and aptitude may become engineering apprentices. All are expected to attend night classes at the local technical college, and in certain instances they take day classes one day in the week. Fees are paid by the firm, who also give bonuses to apprentices who pass the course examinations and attend regularly. A five-day week of 44 hours is worked and normal rates of pay are given, with the usual paid holidays.

Any reader of the "*M.M.*" who is interested in the prospects of entry into this interesting industry can obtain further information on these apprenticeship schemes by writing to Robert Stephenson and Hawthorns Ltd., at Locomotive Works, Darlington, or Forth Banks Works, Newcastle-on-Tyne. All who set out with the idea of becoming apprentices are interviewed at the works, where they can look round and ask questions.



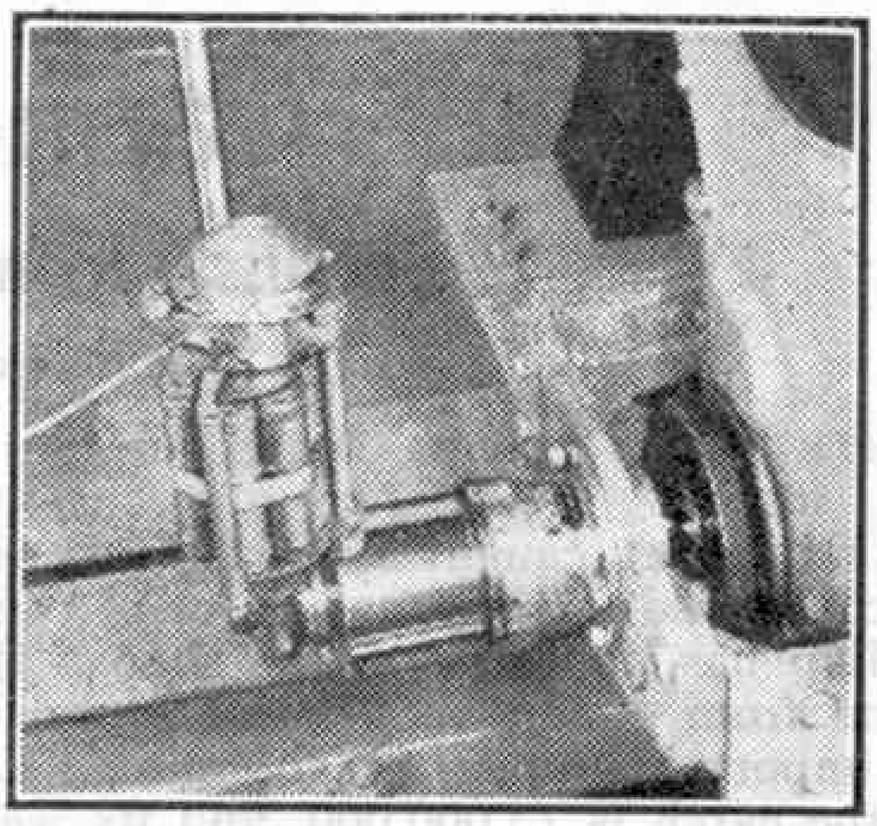
Fitting valve motion details in the fitting shop

Cartridge Starting

For Diesel and Petrol Engines

PETROL and diesel engines cannot start by themselves; they have to be turned in some way. The earliest, for example the petrol engines of motor cars of the beginning of the century, were started with handles, and swinging these to start an engine, especially on cold mornings, was often hard work and uncertain in results. As engines became larger and more powerful, self-starters were introduced. This name is not really accurate, for what was installed was an electric motor driven by a heavy battery.

An electric starter is satisfactory on motor cars and lorries, for which electrical equipment, including a battery, is necessary for other purposes, but there are many larger types of engine for which the provision of such equipment is wasteful. Now a very simple and easy means of starting internal combustion engines of all types is available in which no motor or battery is needed, thus giving a great saving in weight and also in cost. The power required in this simple method is provided by the burning of a slow explosive packed in a cartridge. The pressure of the hot gases produced is used to push a piston along a cylinder, and this travels along shafts that are provided with spiral splines and consequently are turned round.

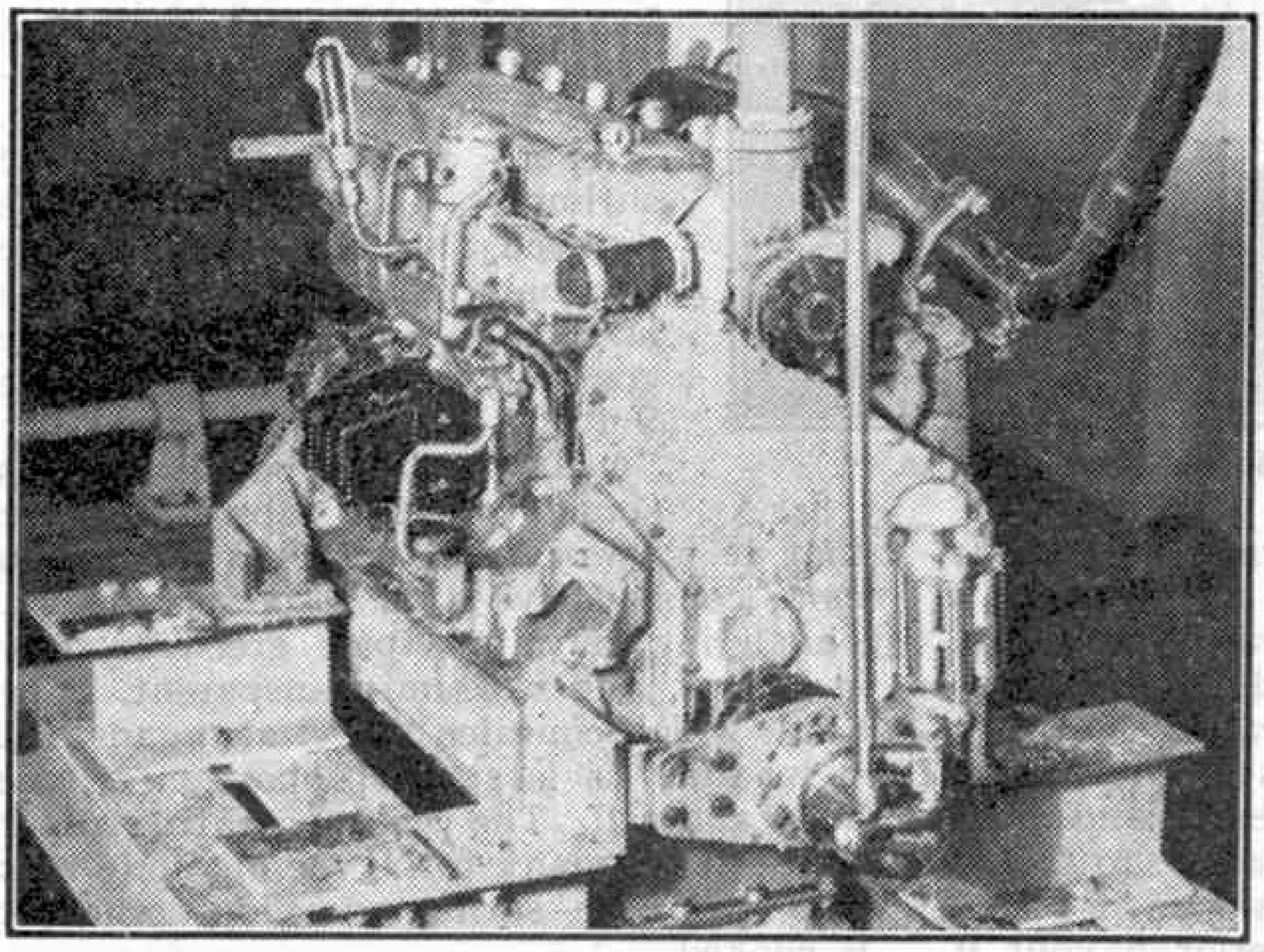


Plessey cartridge starter mounted on an engine. Illustrations by courtesy of the Plessey Company Ltd., Ilford.

The first movement of the piston brings the teeth of a starter jaw at the end of the shafts into mesh with teeth on the end of the crankshaft of the engine to which the starter is fitted, with the result that the engine itself is given two or three turns at a very high rate.

The equipment is the product of the Plessey Company Ltd., Ilford, and the upper illustration shows a typical Plessey cartridge starter mounted on an engine, with the teeth of the starter jaw showing on the right. Above the opposite end of the starter cylinder is a revolving breech that carries a magazine of six cartridges, each of which in turn can be brought into position for operating the starter by means of the control provided. The point from which the unit is controlled may be in any position remote from the starter, and the only time when the unit requires handling is when the breech needs re-loading with cartridges. The cartridges are charged with the slow burning explosive and are fired electrically from a dry battery with push button control, or by percussion, in which case a cable control is used. Low temperatures do not affect them; recent tests on a diesel engine have given satisfactory results at 15 deg. C. below freezing point.

Cartridge starters are now available for every type of internal combustion engine.



This Perkins diesel engine was easily started by a Plessey cartridge starter at a temperature of 15 deg. C. below freezing point.

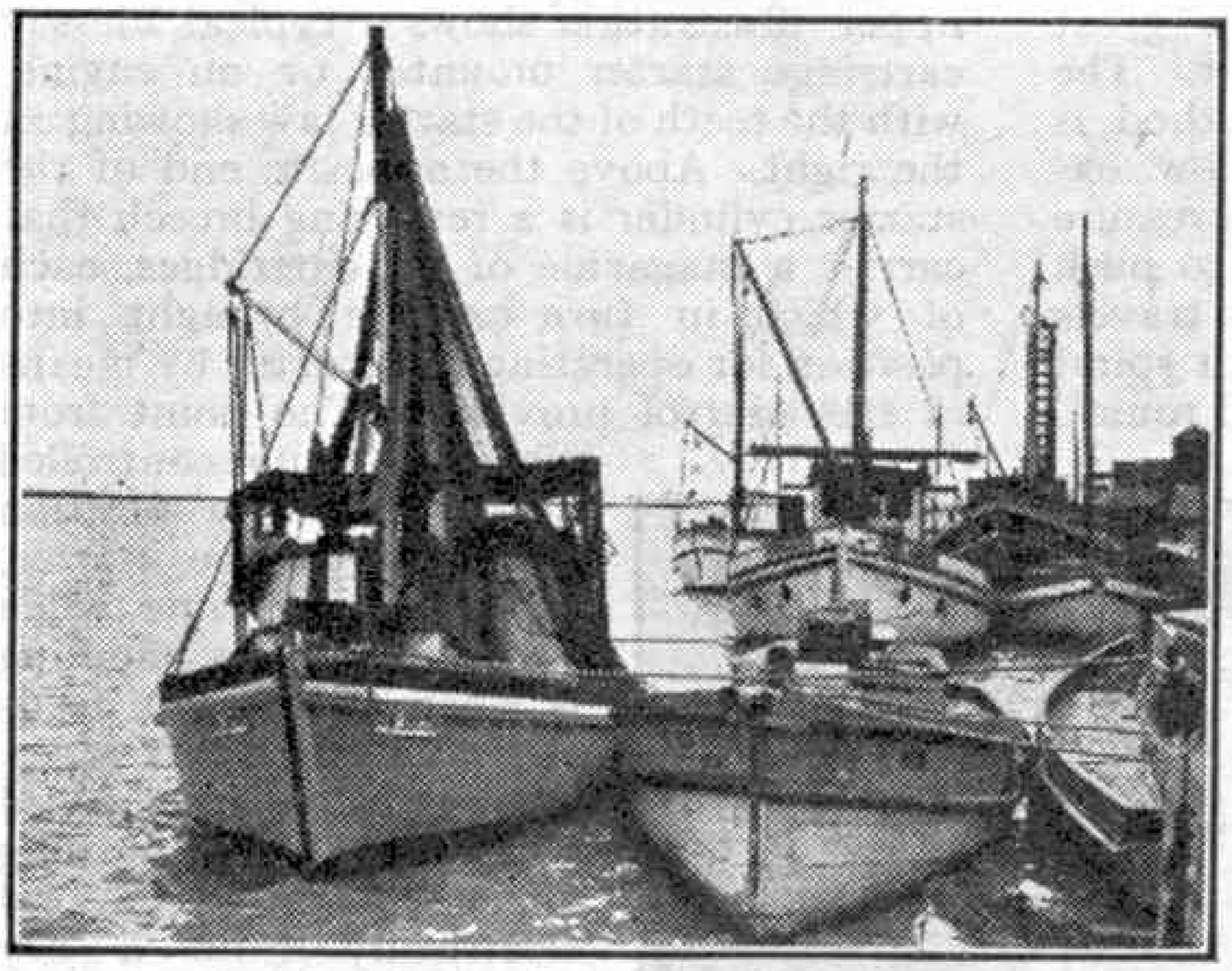
Canned Shrimp

Shellfish from the Gulf of Mexico

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

THE fresh shrimps which are on the market in this country are, for the most part, caught by Dutch fishermen. Recently, however, a new form of canned shrimp has appeared in the shops. These come from America. There shrimping is an important industry. The annual value of the catch is £3,000,000, and its weight 150,000,000 lb.

The pleasant sight of holiday-makers going shrimping with push-nets has led to the mistaken belief that the shrimp is a shallow water fish, and that it is natural for him to be found among the pools in the rocks on the sea-shore. But this is not so. If you mention the subject to a real shrimper he will soon tell you that push-netting is a seaside amusement. Shrimp-catching is a highly skilled occupation and, like fishing generally, is fraught with danger.



A shrimp fishing fleet in the Gulf of Mexico.

Half a century ago the shrimp was little known in America outside the regions bordering the southern waters where it makes its home. Now it is in demand all over that great continent, and the demand is rapidly spreading to other countries. The shrimp has gained recognition because of the superior flavour it imparts to many dishes, the high nutritive quality of its protein, and its high content of essential minerals.

Shrimping is by far the most important fishing industry in the waters of the Gulf of Mexico. Some 85 per cent. of all the shrimps caught in American waters come from the Gulf, the waters of the State of Louisiana contributing no less than 66 per cent. The shrimp industry has added greatly to Louisiana's commercial progress. It provides work for most of the population of Terrebonne parish, either in the catching or in the processing in the factories at Houma. Terrebonne, a name that in French means "good earth," is the largest parish in Louisiana, with an area of 1,284,230 acres.

Until some eleven years ago Louisiana fishermen sought their shrimps in the State's rivers and lakes. The supply was sufficient for them to build up a considerable industry, with dried shrimp a leading product for export. Then the Florida fishermen, finding the large or "jumbo" shrimp getting scarce in their waters, pushed farther into the Gulf waters south of Louisiana to find great shoals of large shrimps, a veritable marine gold-mine in fact. This has revolutionised the industry. The shrimp is taken well off-shore in water 30 to 90 ft. deep.

There are several kinds of shrimps, the common, the grooved and the sea-bob. The first-named variety is much larger than the shrimp as we generally know it, being from 9 to 11 in. in length and very "meaty." In appearance it is similar to the lobster, except that it is very much smaller and much more conservative with respect to claws. The living shrimp is pale green or grey in colour and is semi-transparent. The head, which contains the vital organs and is inedible, is large in proportion to the body and tail. The pink or reddish colour assumed by many to be the characteristic colour of the shrimp develops when it is cooked.

The shrimp's span of life is a very short one of from one to two years. It spawns



Shrimp frozen in blocks of 120. They were caught and frozen at Brownsville, Texas, and shipped to Los Angeles, Calif., where this photograph was taken.

in offshore waters, sometimes as far out as 50 miles, and estimates indicate that a shrimp may lay as many as half a million eggs during the season. These are very tiny; a hundred of them, side by side, would just span an inch, and they are as transparent as glass. They sink to the bottom and probably remain there for the 12 to 15 hrs. between spawning and hatching.

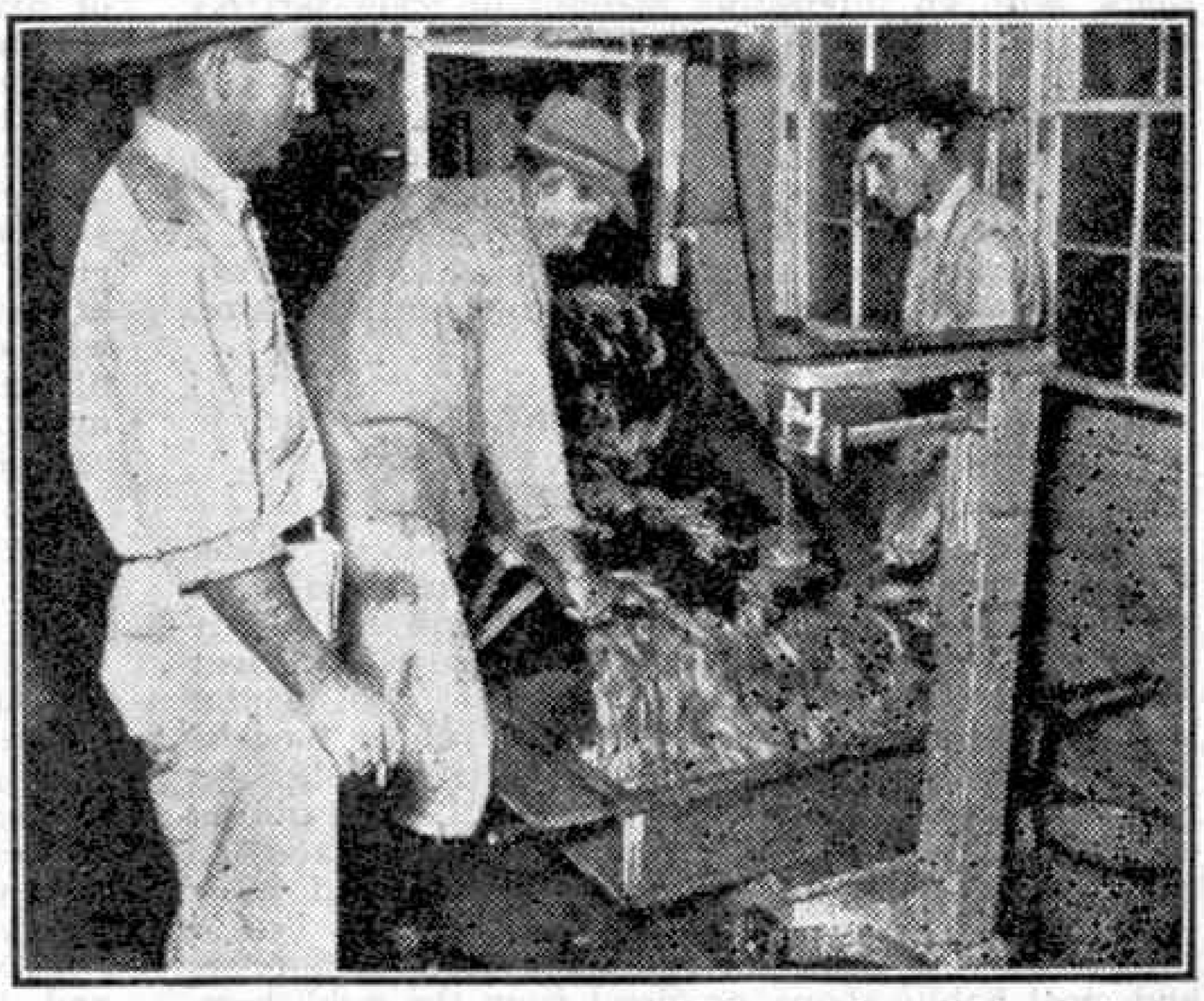
The shrimp can swim from the moment that it is hatched, but the little creatures do not look at all like the parent shrimp. In a few days they grow to a length of about a quarter of an inch and they quickly make their way to the surface waters, where they are carried along by the currents, eventually making their way to the protected bays and other inshore waters. As they approach the adult state they abandon surface travel and become bottom feeding like their parents.

The spawning season of the shrimp extends from March or April until August or September, so that young shrimp are arriving in the inland waters throughout the entire summer. Those earliest to arrive reach commercial size during July, and by September, practically the entire catch, as far as inland shrimp are concerned, is made up of shrimp spawned the previous spring. The smaller shrimp spend the winter in the protection of the inland waters, but the larger ones seek escape from the cool water of the bays and lakes in the warmer water of the Gulf.

Shrimping is of such commercial importance to the States bordering the Gulf of Mexico that a great effort is made to protect the fisheries from unwise exploitation. The States concerned have adopted conservation laws, designed to protect the shrimp. In Louisiana, for example, there is a close season between 15th December and 15th March on the inland waters, and on both inland and outside waters there is a close season between 10th June and the second Monday in August.

There is a distinct difference between inshore and offshore fishing. The inshore fishing boat is smaller and is manned by a crew of two, the captain and a helper. It is about 30 ft. long and has a beam of 8 ft. The cabin is aft and there is a mast, but no boom. The larger offshore boat carries a crew of three or four as well as a captain and an engineer. It is about 60 ft. long and has a beam of 18 ft. and is powered by a diesel engine. There is a winch for handling the heavy nets. The cabin is forward and there is a mast with a boom. Inshore boats rarely stay out for more than two or three days, but offshore boats will be provisioned and iced for much longer voyages, a month or more. The catch of an inshore boat, if luck is good, is 60 barrels of shrimp, and for an offshore boat 100 barrels.

A variety of nets are employed for catching the shrimp. It depends whether it is inshore or (*Continued on page 164*)



Shrimps being thoroughly washed before going on the scales.

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, and certain others that will be indicated, these should be ordered through a bookseller.

"THE HELICOPTER"
By Col. H. F. Gregory
(Allen and Unwin. Price 18/-)

Col. Gregory, the author of this book, of which we are reviewing the British edition, was one of the first men in the United States to recognize the importance of the rotating-wing machine or helicopter, and to study and promote interest in it. He has made many outstanding flights, including the first transport of air mail by helicopter in that country, the first helicopter landing on the deck of a moving steamship, and record altitude and long-distance flights by helicopter.

After very briefly surveying the earliest experiments in helicopter construction and flight, the success of the first Sikorsky helicopter in 1909, the book deals almost entirely with helicopter development in the United States, from the first U.S. Army helicopter built in 1922 to the several types in production in 1947. Barely five and a half pages suffice for the author to summarise British and French achievements in helicopter research and development, a summary dismissal that will disappoint many who know of the success that has been achieved on this side of the Atlantic. As a history of American helicopter development, however, the book is a welcome addition to aeronautical literature. It is illustrated with many interesting half-tone photographs and line drawings.

"A HISTORY OF THE COCKERMOUTH, KESWICK AND PENRITH RAILWAY"
By W. McGowan Gradon (5/-)

Mr. Gradon has followed up his books on the Furness and the Ravenglass and Eskdale Railways with this story of the Cockermouth, Keswick and Penrith line. This small system owed its existence to the iron trade, carrying iron ore and pig iron from West Cumberland to Penrith for transport to Durham and South Yorkshire, and bringing back coke for the West Cumberland blast furnaces. This mineral traffic has had its day, but the line still provides a useful link for passenger traffic purposes.

The book first deals with the pre-grouping history of the line, and then follows a description of the route, with an interesting account of train services and working practices. A series of post-grouping notes brings the story to a close.

A map and gradient profile make it easy to follow the account, and well-reproduced illustrations help to give something of the special atmosphere of the route, which still has an "old-time" aspect.

Copies can be obtained from the author at Pear Tree Cottage, Oldfield Lane, Altrincham, Cheshire, price 5/4 including postage.

"MODEL PLANES ANNUAL"
Edited by B. Dean and R. Warring
(Ian Allan Ltd. 2/6)

This is the second book in Ian Allan's "Model Aviation" series, and model aircraft enthusiasts in search of new aircraft to construct will find in it details and plans of 10 first-rate models designed by acknowledged experts. There are also helpful articles on balsa, airfoil sections for rubber models, control-line flying and radio-controlled models, and news of model aircraft activities in all parts of the country. The book is illustrated by many excellent half-tone photographs of model aircraft and their constructors.

Copies of this book are obtainable from booksellers and most hobby shops, or direct from the publishers, Ian Allan Ltd., Mail Order Department, 33, Knollys Road, London S.W.16, price 3/- including postage.

"FROM AIRSHIP TO JET PROPULSION"
By Bonner W. A. Dickson
(Naldrett Press Ltd. 8/6)

Although this book sets out to tell no more than the story of one firm in the British Aircraft Industry, Vickers Armstrongs, it covers such a wide field that there is scarcely an aspect of the development of flying that is not included in its 78 pages. Vickers' interest in aviation dates back to 1908, when they began work on their first airship, H.M.A. No. 1. Three years later they extended their activities to cover heavier-than-air machines, and also formed a Flying School at which such famous airmen as Marshal of the Royal Air Force Lord Trenchard and Air Chief Marshal Lord Dowding were trained. Supermarine, the other company now forming Vickers-Armstrongs' Aircraft Section, came into the story in 1912, and from the start specialized in sea-going aircraft.

Famous exploits by aircraft built by the two companies are recalled—the first award of a Victoria Cross to a pilot of the Royal Flying Corps, the first non-stop flight across the Atlantic, and the first flights from Britain to Australia and South Africa. Then there were the Schneider Trophy victories and World Speed and Long-Distance Records. All these led up to the development of the "Spitfires" and "Wellingtons" that did so much first to save Britain in 1940, and then to enable her to hit back at our enemies. The book is splendidly illustrated by more than 90 excellent half-tone photographs. J.W.R.T.

"RAILWAY AND OTHER STEAMERS"
By C. L. D. Duckworth and G. E. Langmuir
(Shipping Histories Ltd. 30/-)

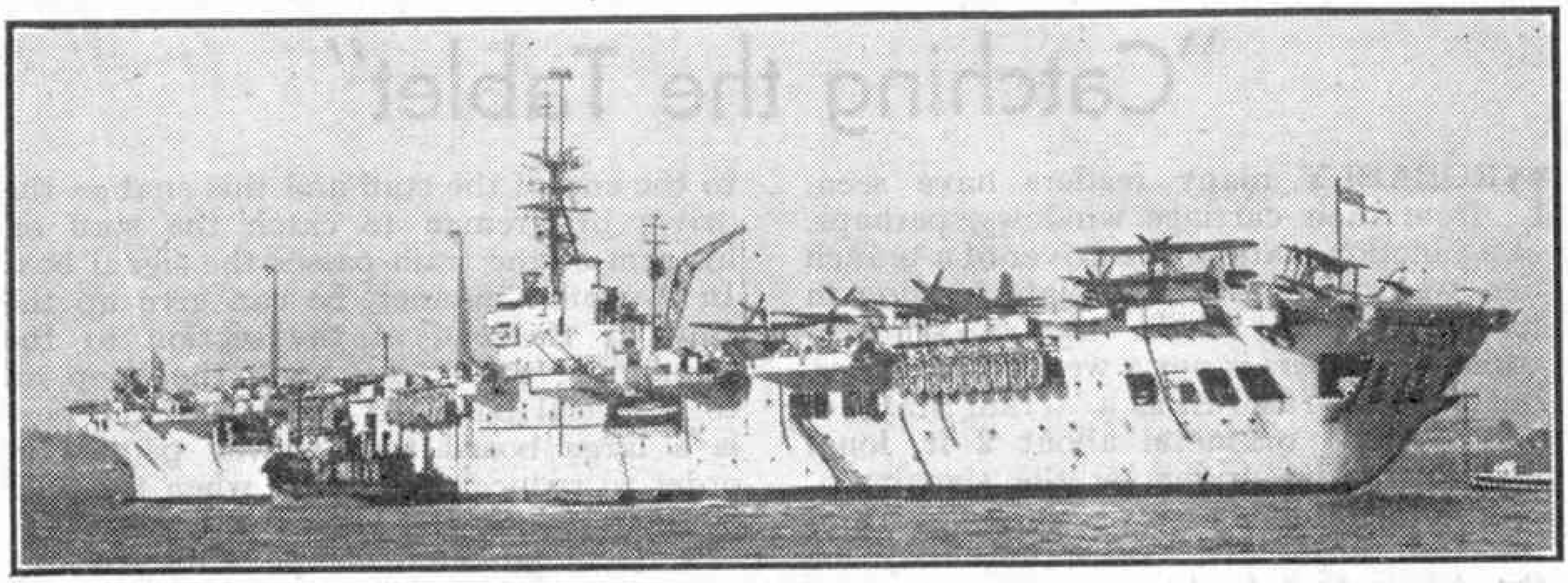
The authors have established a reputation for their careful and accurate surveys of the steamers of the Clyde, West Highland and other districts, and their latest book enhances this. It follows the same general arrangement as its predecessors, each of the many vessels dealt with being treated individually in an account that is compact and is the result of a complete and painstaking investigation. The illustrations are in keeping with the text. They consist of 100 excellent reproductions of photographs, showing a wide variety of coastal steamers of the past as well as those of to-day.

Each of the regions of British Railways is dealt with in turn, and a survey of the steamship services of the Irish railways follows. Then we pass to those of certain British and Continental companies closely associated with our railways. Interesting details are given in all cases, with many stories of special events or features of the services described, and the book ends with extensive fleet lists giving the names and chief dimensions of the vessels dealt with, makers' names, notes on machinery and other details. There is an excellent index.

"THE A.B.C. OF BRITISH RAILWAYS LOCOMOTIVES"
(Ian Allan Ltd. 8/6)

The four "*ABC*" books dealing with the locomotives of British Railways reviewed in these pages last January are now available as a combined volume. This gives lists, on the usual "*ABC*" lines, of all locomotives running on standard gauge public railways in this country. The combined volume idea is good, making ready reference easy, while the book is of handy pocket size and is strongly made.

Copies can be obtained through leading booksellers and Ian Allan agents at 8/6; or direct from the publishers at 33, Knollys Road, Streatham, London S.W.16 for 8/10 including postage.



H.M.S. "Vengeance."

Shipping News

Argentine Liner Built in Britain

Our lower illustration shows the launch of "*Presidente Peron*," the first of three sister vessels to be operated by an Argentine company. She was built by Vickers-Armstrongs Ltd. at Barrow-in-Furness, and launched in November last year. The three vessels planned are intended for a new fast service between London and Buenos Aires, and the "*Presidente Peron*" is expected to begin this service in May.

The new vessel is of 18,300 tons displacement, with an overall length of 529 ft. 6 in. and a moulded breadth of 71 ft. She is fitted with two sets of Parsons geared turbines driving twin screws, and the total power for continuous service at sea will be 13,500 s.h.p., with a maximum of 14,500 s.h.p. She will carry 74 first-class passengers.

Arctic Experiments

The illustration at the head of the page shows H.M.S. "*Vengeance*" at Portland before her trip to the Arctic to study the effects of very cold weather on men and weapons. In addition to their normal complement, the ships that took part in these trials carried scientists who made various experiments on the effects of cold. Tests also were made with aircraft in Arctic conditions.

A New Type of Life-Boat

A new type of life-boat has been introduced, the largest and most powerful in the R.N.L.I. fleet, and another vessel of the type, the "*Charles Henry Ashley*," was due to arrive at her station, Porthinllaen, in March. She is 46 ft. 9 in. long, weighs just over 20 tons, and is fitted with two 40 h.p. diesel engines. In addition to a cabin below deck she has one on deck, in which there are seats for 11 persons and a cooking stove. The superstructure of the boat, the deck cabin, a shelter for the mechanics, the mast and the ventilators are made of aluminium alloy instead of wood or mild steel, which saves a weight of more than a quarter of a ton. The exhausts of the engines are carried up through the mast.

The last of the sailing life-boats in the R.N.L.I. fleet has now ended her career. She was the "*William Cantrell Ashley*," and was built in 1907. For the last 41 years she has been stationed at New Quay, Cardiganshire, where her place has been taken by the "*St. Albans*," of the light Liverpool type. This new vessel is a gift from the people of St. Albans.

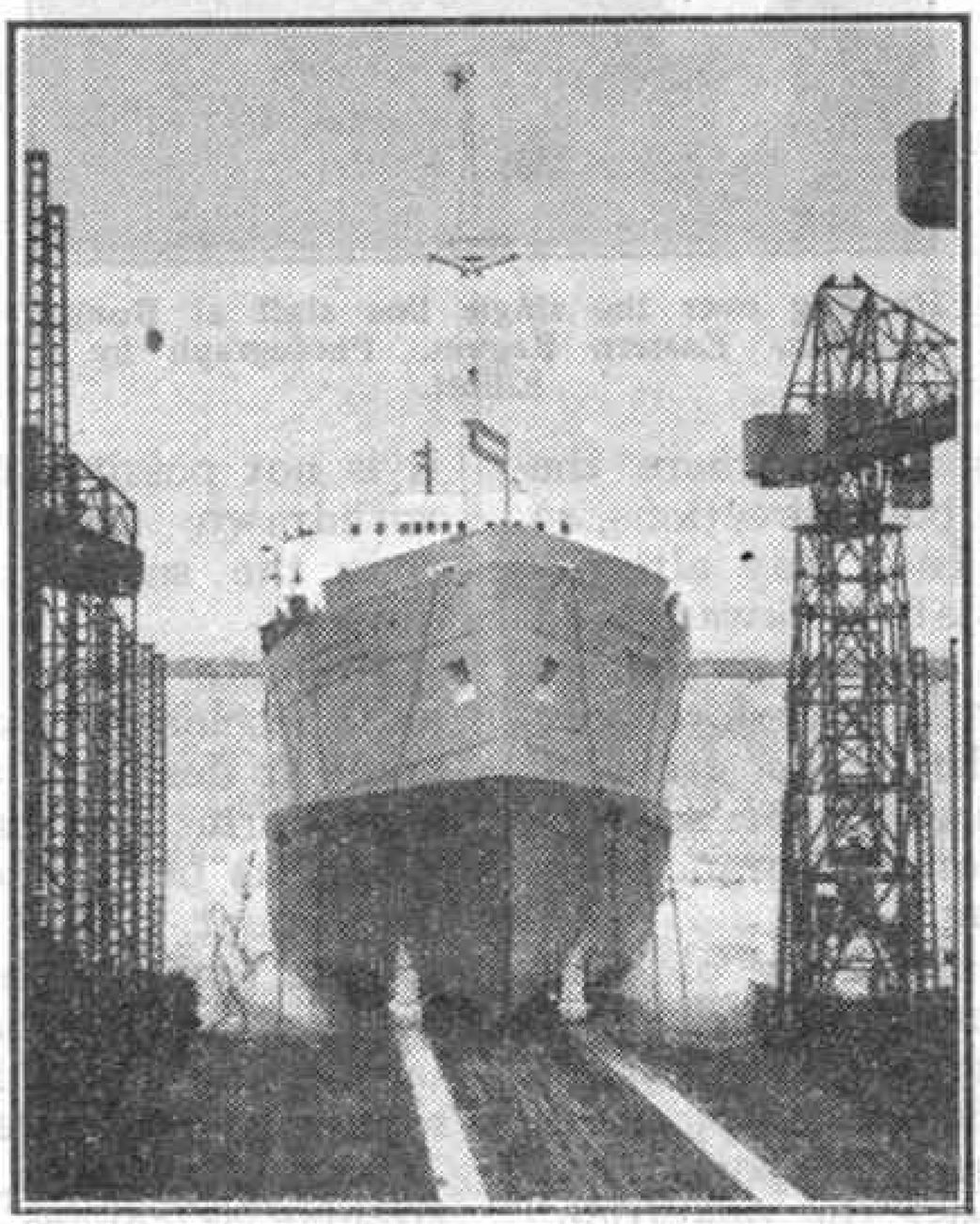
The New Cunard White Star Liner

The shipbuilding event of 1948 was the completion of the twin-screw passenger steamship "*Caronia*," built by John Brown and Co. Ltd., Clydebank, for the Cunard White Star Line. This handsome vessel is of 34,183 tons. She has a well raked stem, with plates rounded and fashioned in a graceful curve, and a cruiser stern. A large oval funnel is fitted, with a tripod mast.

The "*Caronia's*" funnel retains the familiar red and black so long associated with the Cunard line, but pale shades of green are used for the hull and superstructure above the red boot-topping at the water line. Her light colours will make her cooler in the tropics, where she will go when on cruises.

The twin propellers of the "*Caronia*" are driven by geared Parsons impulse reaction type turbines, steam for which at a pressure of 600 lb. per sq. in. and a temperature of 800 deg. F. is supplied by six Yarrow type boilers, with the most modern oil burning equipment.

The "*Caronia*" was launched in October 1947 by H.R.H. The Princess Elizabeth. She underwent her trials in December of last year and entered the North Atlantic service on 4th January. Later she began a series of cruises that will continue until May, when she will return to the North Atlantic service.



Launch of "Presidente Peron" at Barrow. This is the first of three vessels that will provide an express service between London and Buenos Aires.

"Catching the Tablet"

PROBABLY many readers have seen, from their carriage windows, perhaps, at a junction station, the driver of a branch line train mount his footplate holding in his hand what looks like a kind of truncheon. This is not a weapon, however, but is what is known as a "Train Staff," a bar of wood or metal about 2 ft. long, handed to the driver by the signalman. The branch line is a single track only, and the staff forms the visible authority for the driver to take his train over the single line section.

There is only one staff for the section, so that there can only be one train in it at once. Thus the dread possibility of head-on collision between two trains on the single line is removed, so long as the rules are observed. The fact that a driver is in possession of the staff does not entitle him to disregard ordinary signals, where these are installed, as they are sure to be where the branch joins the main line. He must obey them in the usual manner, even although he knows that no other train has authority to be in the section.



Handing over the single line staff at Bungay Junction. Eastern Region. Photograph by C. Elliott.

This method of working is quite satisfactory where the train service is equal in both directions, so that trains may work each way alternatively and carry the staff backward and forward from one end of the section to the other. The system is therefore only employed on lines where one train is working to and fro through the section, as occurs in the operation of a branch line by "one engine in steam."

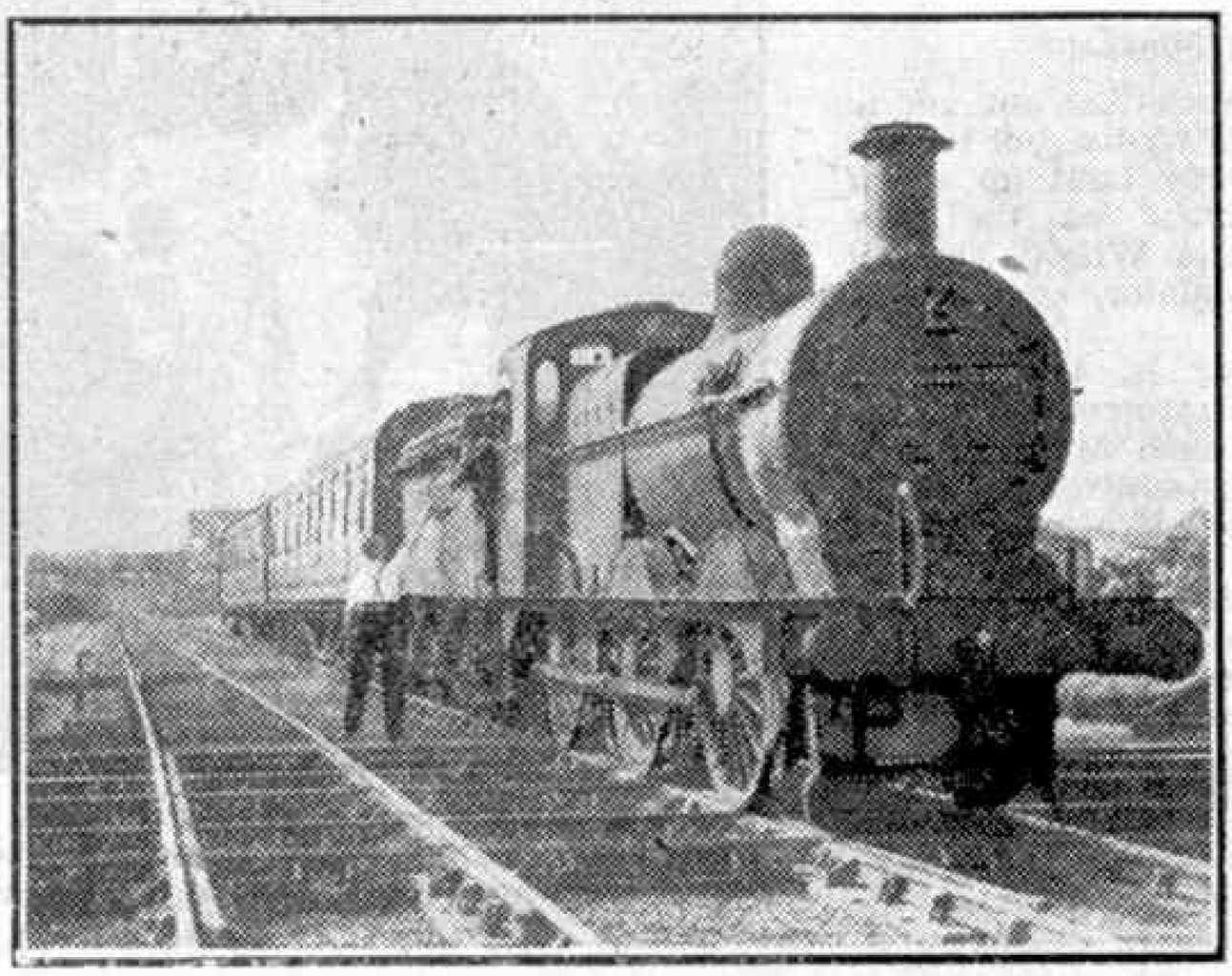
Quite often with this form of staff working, the staff is simply handed over, as is shown in the illustration on this page. This can take place at the station platform if convenient or at a suitable point near the signal box. To assist the operation, especially where it is carried out with the train in motion, a hoop may be attached to the end of the staff and this enables the driver or fireman to catch the staff on his arm as the train passes the signal box. In a similar manner, he can give up the staff at the end of the section to the signalman, or he can hook the hoop on to a special post. At the top of the post is a large board that is well padded in order to reduce the impact when the staff is deposited on the hook.

A development of simple staff working is the electric staff system. This involves special staff instruments, one at each end of the section, in which the staffs are kept. If a train is waiting to enter the section, the first signalman asks for permission from the second to withdraw a staff from the apparatus. If the second man knows that the line is clear, that is the preceding train has passed his box, he transmits to the first apparatus an electric current that permits a staff to be withdrawn and handed to the driver of the waiting train. When this train reaches the other end of the section the staff is given up, and until it is placed in the instrument at that end it is not possible for a second staff to be withdrawn from either instrument, so that the safety of the arrangement is obvious.

In more recent times the development and acceleration of train services have made it desirable to have a less cumbersome form of apparatus, and as a result there has been produced a miniature staff instrument, with 8 oz. staffs each less than 1 ft. in length. This is an ingenious piece of mechanism, and is complete with a tapper and bell for the despatch and receipt of bell code signals.

Instead of staffs, metal "tablets" either circular or square in form may be used. These fit into a slide in the signalbox instrument, and if one is withdrawn from

the instrument at either end of the section a further one cannot be issued until the first one is again placed in an instrument. The principle of the tablet system is the same as that of the staff system, but the construction of the instruments is necessarily different. The tablets are usually placed in a leather pouch with hoops attached for the purpose of exchanging them. The upper illustration on this page shows a tablet arranged in this way being picked up by the engineman.



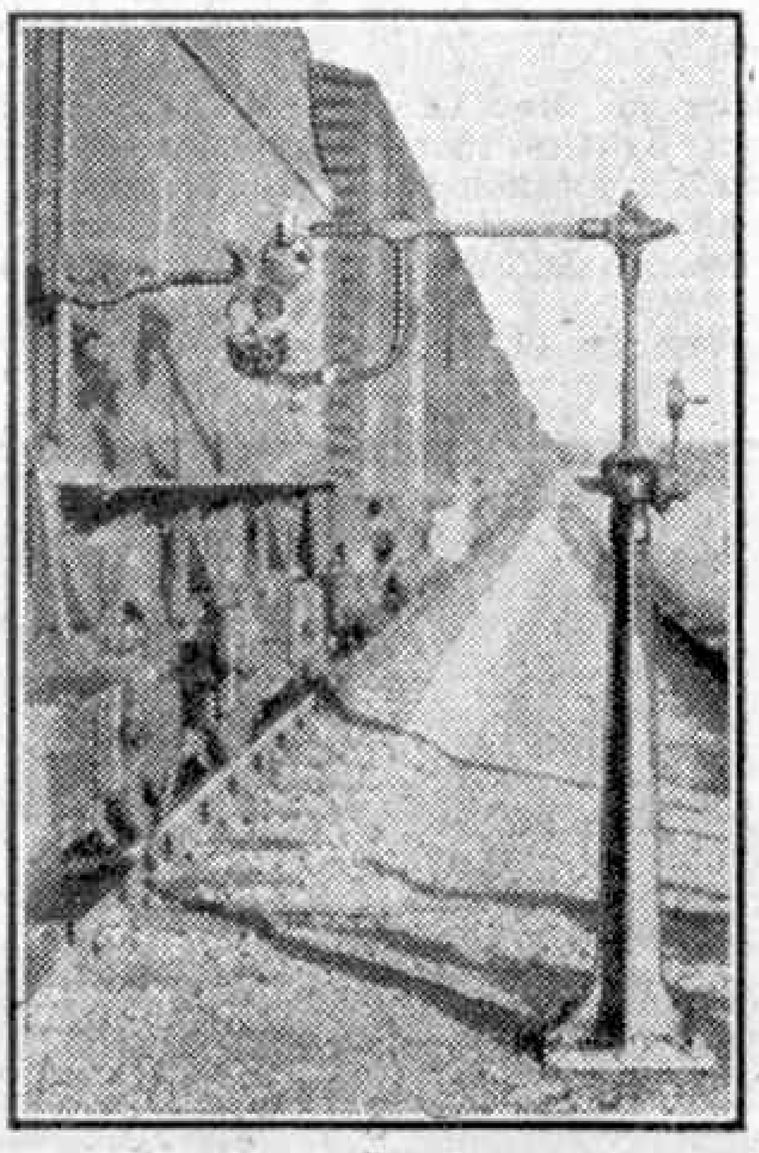
Catching the tablet by hand, the tablet being enclosed in a leather pouch with a hoop. Photographs on this page are by W. S. Garth.

On some lines "tokens" are used in a similar manner to staffs and tablets to give permission to enter a section. Special rotary locks are provided in the instruments that accommodate the token. These completely prevent the issue of more than one token at once.

On single lines where any system of hand exchange is in use, a reduction of speed is necessary at the moment of making the exchange, otherwise the men would run considerable risk of injury. With the smaller staffs automatic exchange is commonly practised, and is carried out at speeds as high as 50 or 60 m.p.h. Automatic exchange at speed has long been a feature of the Somerset and Dorset Joint line, the Highland Section of the former L.M.S. and the Great North of Scotland section of the L.N.E.R. and continues in use to-day.

The lower picture shows tablet exchange on the Somerset and Dorset line. The apparatus used there is that introduced in 1905 by Alfred Whitaker, for many years in charge of mechanical matters on that railway. The arm projecting from the side of the engine, when set for exchange, has at its outer end a pair of jaws fitted with triggers that prevent the steel hoop on the pouch from rebounding off the jaw after being caught. The rear end of the jaw is constructed to carry the tablet about to be given up, the pouch being held in a spring clip. The ground exchange column shown is a combined "deliverer and receiver" and has two arms, the upper one to receive the tablet and the lower one to carry the tablet to be picked up. For operating a section of single line there would be at the commencement of the section a "deliverer" at one side of the line, and a combined "deliverer and receiver" at each side of the line at intermediate crossing places; and a "receiver" at one side at the end of the sections.

The arms on the columns normally stand parallel to the running track, but when it is required to exchange tablets, they are swung out at right angles to the line into such a position that they are ready to engage with the corresponding apparatus fixed on the locomotives. The moment the tablets are exchanged, the arms automatically swing back clear of the line to their normal position.

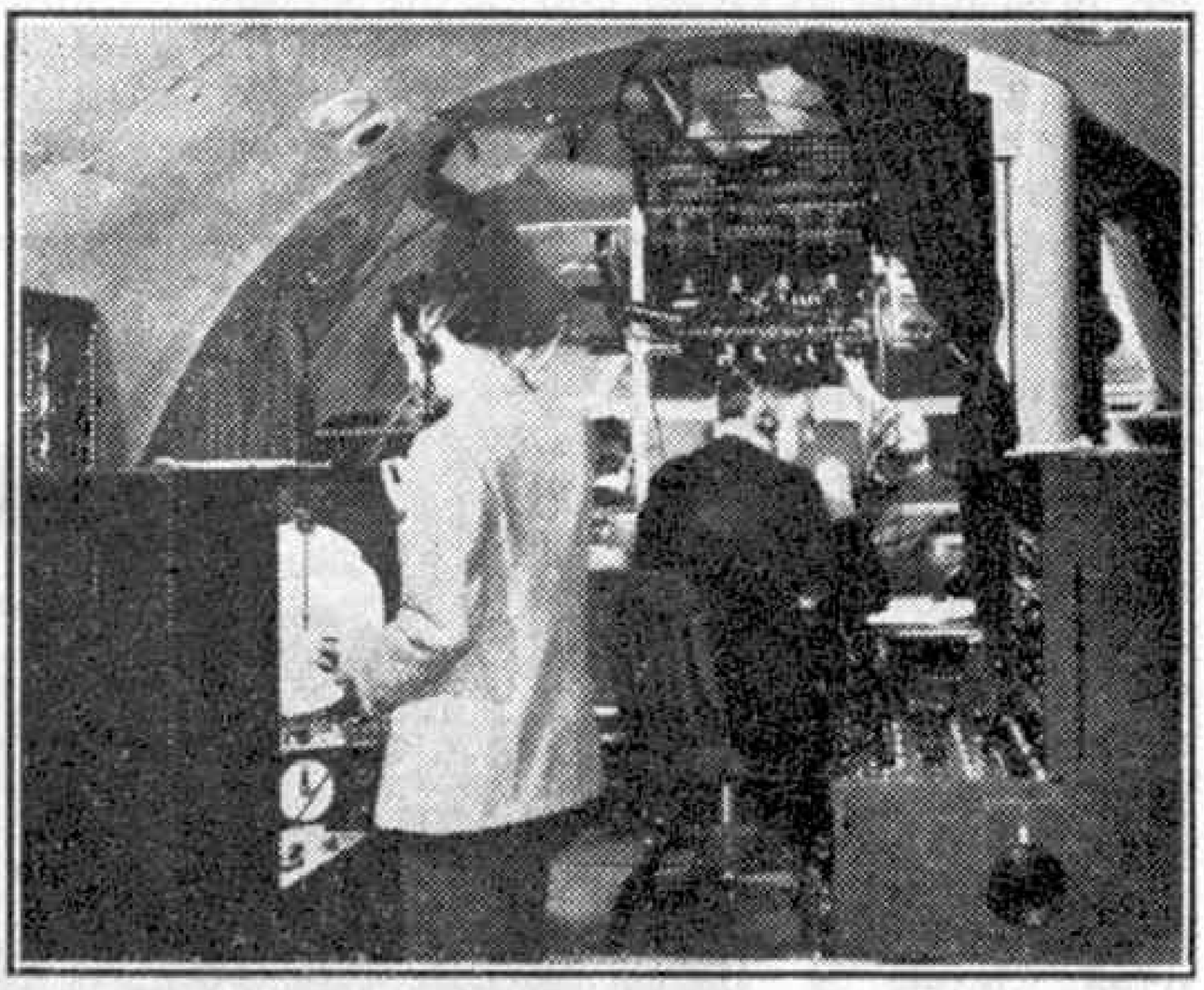


Mechanical exchange of tablets on the Somerset and Dorset line.

Manson's apparatus, introduced on the G.N.S.R., includes a fixed ground column with extending head. On the latter and on an extending arm fitted to the engine are mounted two sets of forked spring prongs of different strengths, so arranged that the "delivery" prongs always yield the tablet to the "receiving" ones.

Air News

By John W. R. Taylor



Instructor supervising a simulated flight in the Curtiss Wright Dehmel Electronic Flight Simulator, with a Pan American World Airways crew. Photograph courtesy Pan American World Airways.

Dehmel Flight Simulator

The Boeing "Stratocruiser" is not yet in service on the world's air routes, but several airline crews have already built up a fair number of "flying hours" on the type by means of the Curtiss Wright Dehmel Electronic Flight Simulator, shown on this page.

The Flight Simulator is, in effect, a complete dummy "Stratocruiser" flight deck. All components such as flying controls, instrument panels, control pedestals, switches, radio aids, seats, lighting, etc., are actual "Stratocruiser" parts. Every item of equipment is activated by an electronic computor that is able to duplicate the flight characteristics and even the "feel" on the flying controls under various conditions of flight. Thus crews can be taught exactly what it is like to fly a "Stratocruiser," without ever leaving the ground, and can even practice emergency action in perfect safety. They can be trained to a high degree of efficiency in two-thirds of the time, and much cheaper than by flying the real aircraft. Initial cost of a Dehmel Flight Simulator is high (£56,000), but it has been estimated that it will save £3,150 per crew in training costs over a 5-year period—a considerable saving for a large airline.

B.O.A.C. Service to Tokyo

First scheduled British civil air service between the United Kingdom and Tokyo is now being operated by B.O.A.C. with 22-seat Short "Plymouth" flying boats. The 10,000-mile flight from Southampton to the Japanese capital takes just over seven days, night stops being made at Augusta, Alexandria, Karachi, Calcutta, Bangkok, Hong Kong and Iwakuni. The service previously terminated at Iwakuni in the zone of the British Commonwealth Occupation Force, after which passengers to Tokyo were faced with the prospect of a 24-hr. train journey.

Two-Seat "Shooting Stars"

So urgent does the U.S.A.F. consider the need for squadrons of efficient all-weather jet fighters that it has awarded the Lockheed Aircraft Corporation a contract for 110 two-seat F-94 "Shooting Stars" to fill the gap until the new Northrop F-89s are delivered late in 1950.

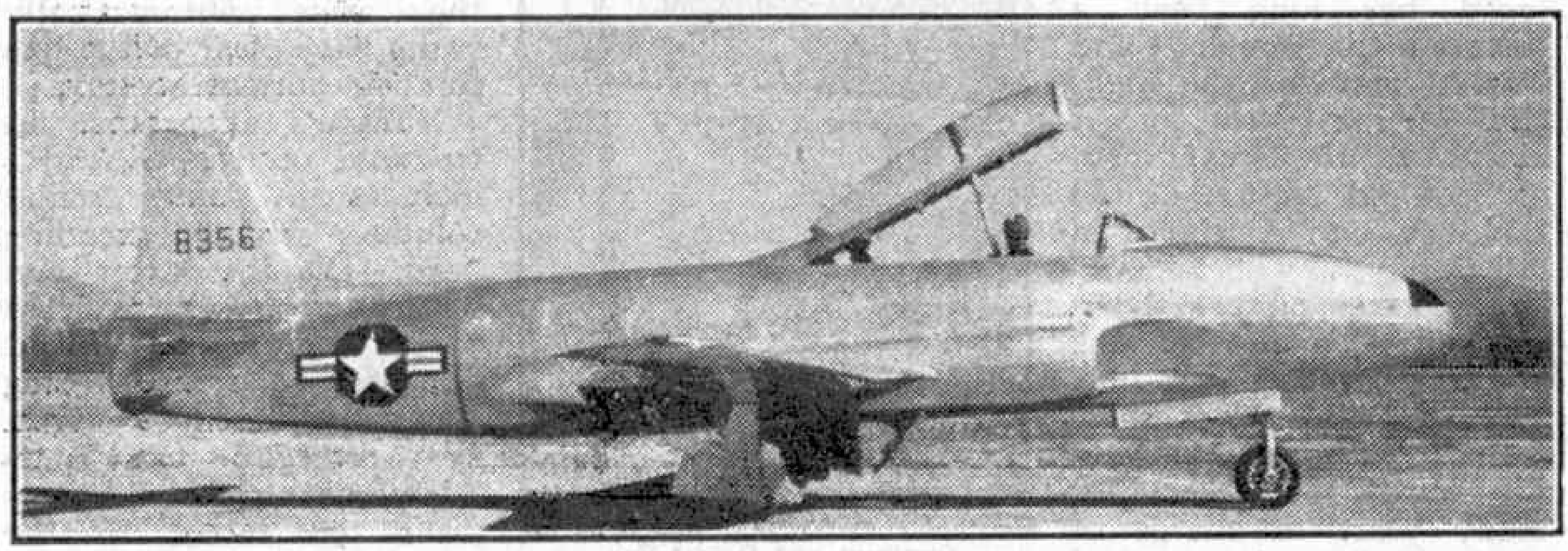
In general, the F-94 will be similar to the TF-80C "Shooting Star" jet trainer illustrated on this page. It will be powered by an Allison J-33 engine similar to that fitted in the P-80R which held the World Speed Record at one time, and should have a top speed of around 600 m.p.h. Its fuselage will be some 38 in. longer than that of a standard "Shooting Star," to house the second cockpit and extensive radar and radio equipment needed for night interceptor duties.

High Altitude Speed Course

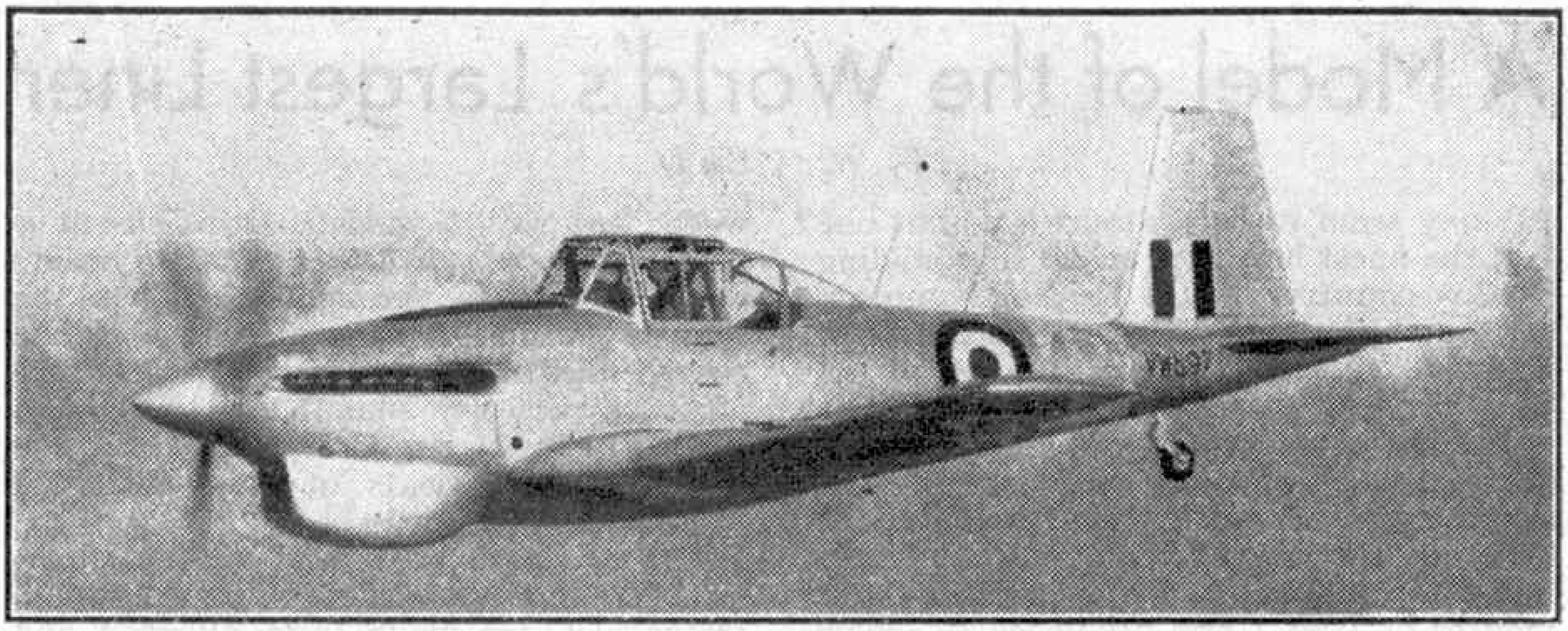
The official regulations governing attempts on the World Speed Record specify that speed runs must be made at a height not exceeding 75 metres (246 ft.). This was all very well in the days of "stick-and-string" biplanes, but the dangers of flying jet aircraft at such low altitudes, at speeds approaching that of sound, can be well imagined.

Now it is reported from America that the U.S.A.F. are planning a high-altitude speed course at Muroc Dry Lake, California, using a special radar timing system that they hope will be adopted officially by the Federation Aeronautique Internationale, the body governing all international flying records.

Radar units at each end of the course will direct beams vertically upwards. Penetration of these beams by an aircraft will automatically stop high-precision



Lockheed TF-80C "Shooting Star" two-seater jet trainer. Photograph by courtesy of U.S. Air Force, Wash., D.C.



The Boulton Paul "Balliol" 2 military training aircraft, described on this page.

clocks and so record the starting and finishing times. Additional equipment will ensure that the pilot does not dive his aircraft while on the speed run. The U.S.A.F. is satisfied that the new equipment will measure speed with a maximum error of less than 1 per cent., making it better than the low-altitude equipment now in use.

The "Balliol" 2 Trainer

A new British military trainer aircraft, the Boulton Paul "Balliol" 2, was recently dived at more than 450 m.p.h., a speed greater than that of many war-time fighters. The dive, which was comparatively shallow, started at 10,000 ft.; it was part of the trainer's preliminary trials, and proved that the aircraft retains its fine handling qualities even at extreme speeds.

The "Balliol" 2, illustrated above, is a direct development of the original Boulton Paul P.108, which made such a spectacular appearance in the 8th S.B.A.C. Flying Display at Radlett in September 1947. The P.108 had a Bristol "Mercury" air-cooled engine and was intended chiefly as a flight-test machine, to reveal any faults in the airframe before the prototype "Balliol" 1, powered by a "Mamba" propjet, was completed.

It was expected that the "Balliol" 1 would be put into production for the Royal Air Force as standard jet trainer equipment. But the immediate requirements of R.A.F. Flying Training Command are for a fast two-seat piston-engined trainer, and so the basic airframe has been adapted again to take a "Merlin" engine, the new version being designated "Balliol" 2. Boulton Paul have been awarded a development contract for a batch of "Balliol" 2s for test by R.A.F. Flying Schools in Great Britain and overseas, and delivery will begin soon.

B.O.A.C. Sell Flying Boat Fleet

British Overseas Airways Corporation have sold 12 of their Short "Hythe" class flying boats to Aquila Airways, of Loudon and Southampton, who will use them for air charter work. Some of these "Hythes" are still flying on B.O.A.C.'s U.K.-Australia route, but they are being replaced by "Constellations," and as they come off the service they will be handed over to Aquila Airways.

First used to keep open the Empire routes during the war, each of the "Hythe" class boats has, on an average, flown a million miles. In their original form, they were operated to an austerity standard of comfort, but at the end of the war they were re-equipped to peacetime standards and re-introduced on routes to Africa, India, and Australia, proving extremely popular.

Aquila Airways plan to strip most of the aircraft for freight work, and, in fact, operated three "Hythes" on the Berlin Air Lift between Hamburg and Havel Lake, Berlin, with great success until ice stopped flying boat operations in December last.

First Helicopter Loop

The first helicopter loop in history was accomplished recently by a Piasecki HJPH-1 "Rescuer" during a test flight near the Company's factory at Morton, Pennsylvania, U.S.A. The pilot was testing the ability of the helicopter to pull out of steep dives, and after two successful pull-outs he decided to see what would happen if he pulled the "stick" right back and applied full "up" pitch to the rotor blades at the same time.

He soon found out, for the "Rescuer" began to climb in a vertical position—a thing that no self-respecting helicopter ever does! He decided that the best way of recovery would be to continue on through a loop, which he did without any structural damage to the aircraft.

The twin-rotor 10-seat "Rescuer," in quantity production for the U.S. Navy, Marine Corps, and Coast Guard, has a 600 h.p. Pratt and Whitney engine.



A mass air rescue demonstration by a Piasecki transport helicopter. Photograph by courtesy of Piasecki Helicopter Corporation, U.S.A.

A Model of the World's Largest Liner

By W. M. Hardy

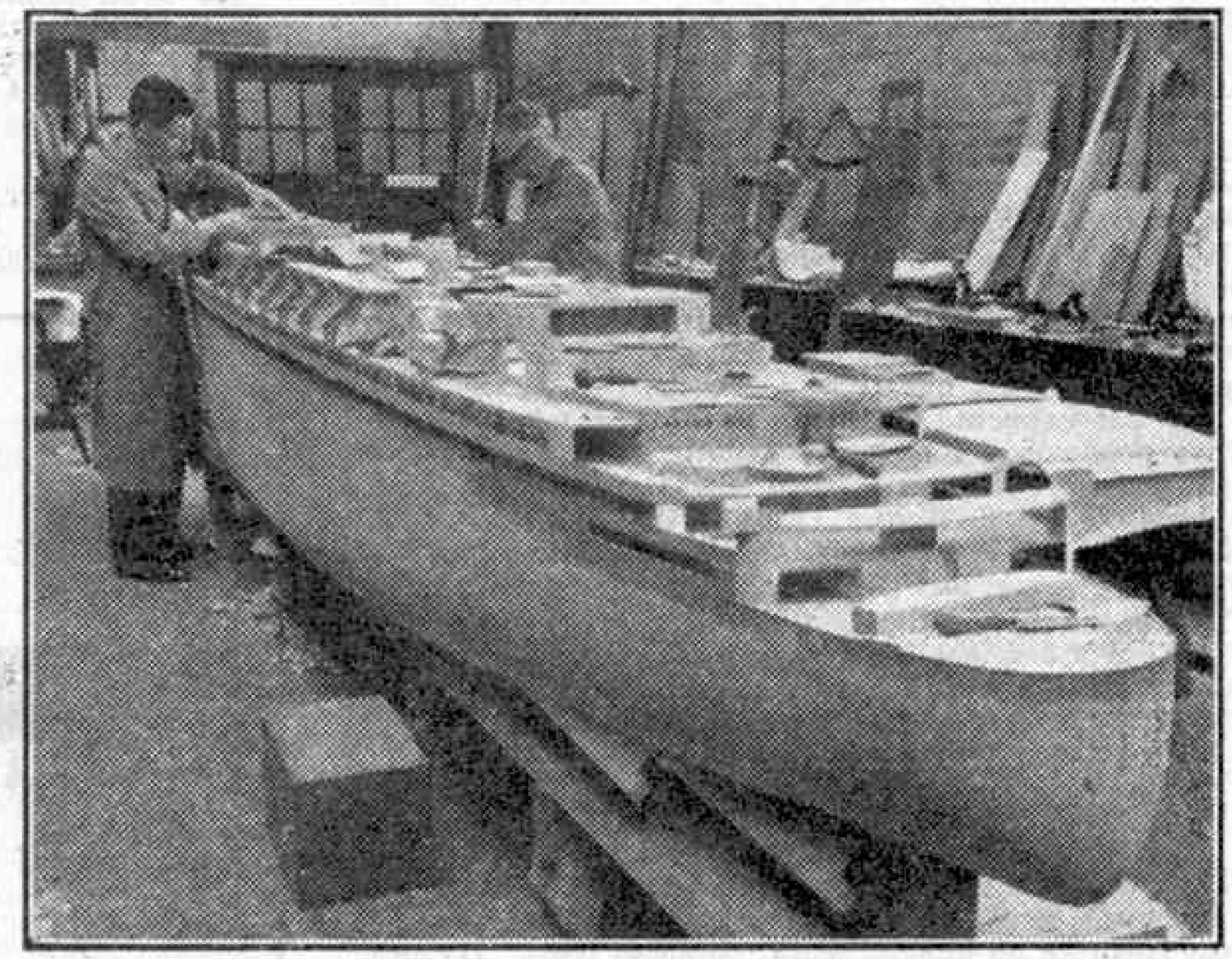
IT may seem rather paradoxical that one of the finest homes of model shipbuilding in this country should be Northampton, a town that claims to be in the centre of England and the furthest point of all from the sea! On reflection, however, our island is so small that nowhere is so very far from the sea, and everyone of us is interested in our worthy maritime heritage and no less in present-day Naval and Merchant shipping. During the later months of 1948 I was privileged to follow progress in the building of a huge scale model of the largest liner in the world, R.M.S. *"Queen Elizabeth,"* at the Northampton craft works of Bassett-Lowke Ltd.

This experience proved to be memorable in being a revelation of the skilled craftsmanship still to be found in our country in these days of mass production. Ship models, either for publicity or for exhibitions, cannot be turned out like ninepins; ships are essentially individual and this quality must be reflected in any ship model that claims to be an exact miniature reproduction. Thus every model is made singly with expert care over accuracy and detail, combined with due regard for the marine atmosphere. In most cases the original ship's drawings are used, as the cost of producing special drawings for the model would be disproportionately high. If the ship is already launched, then numerous photographs are also used by the modelmakers, and are especially helpful in large-scale models, where fine degrees of detail are required. A great number of photographs taken aboard the *"Queen Elizabeth"* were at the disposal of Bassett-Lowke's craftsmen during work on the model illustrated here, which is to a scale of $\frac{1}{4}$ in. to 1 ft., or 1/48th actual size.

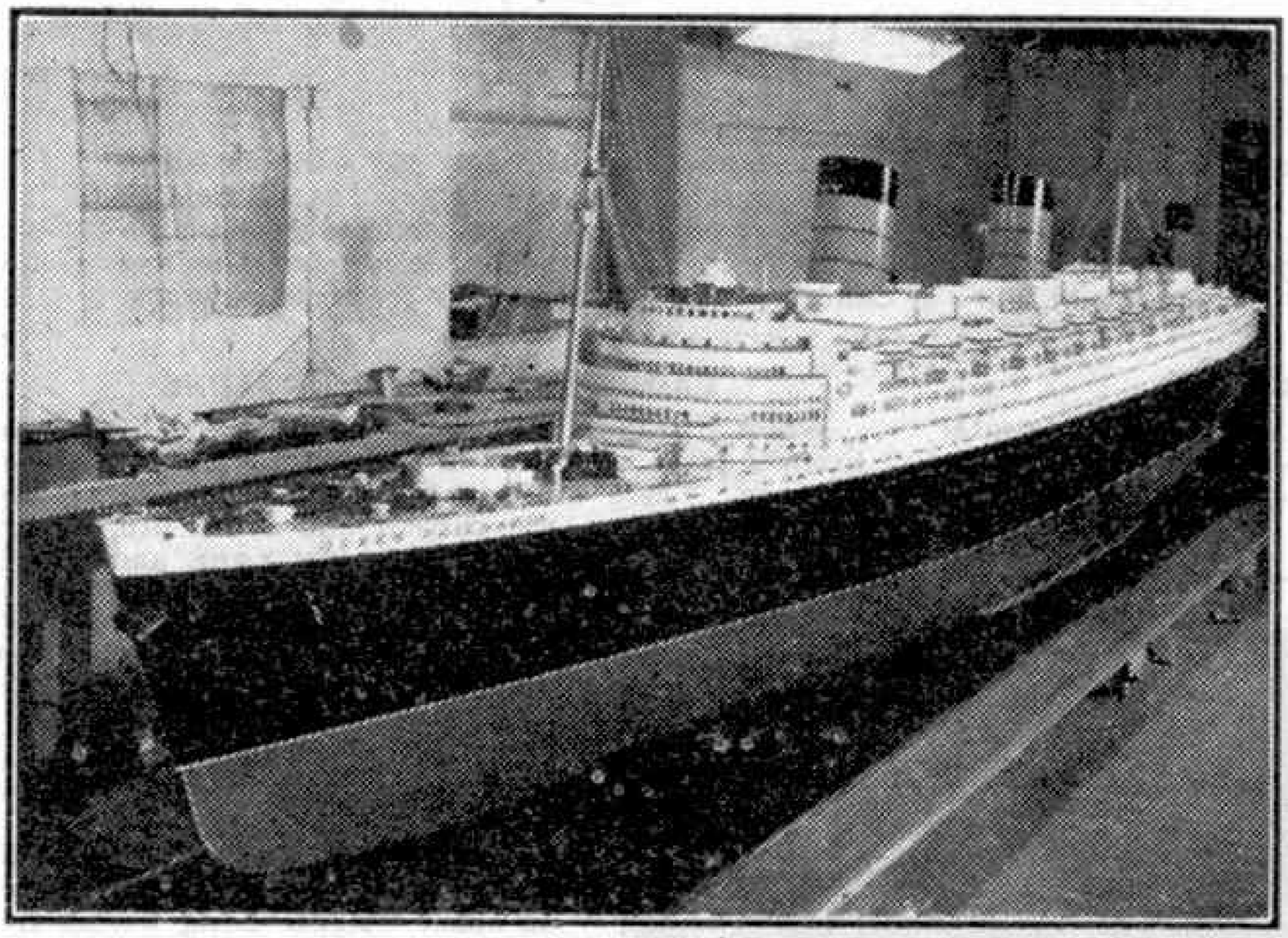
Some 22 planks, cut from a single log of African white mahogany, form the laminated hull of the model, firmly secured with glue and about 2,000 screws. Smaller hulls can be made from a single block of wood, but with a model of this size it is necessary to use planks in order to ensure a uniform grain throughout. When the hull is fashioned to represent the fine curved lines of the ship herself, the surface must be perfectly smooth and without a single blemish, in order to take the extremely thin coats of paint that are subsequently applied.

The ship's 26 boats and all the superstructure are modelled from plywood. Decks also are made from plywood and are lined by hand to give a realistic effect of planking. All the small fittings are metal, made by the craftsmen from sectional drawn brass rod or from sheet brass. Such fittings include the ship's name on bows and stern, propellers, anchors, rudder, masts, navigating instruments on the bridge and the numerous other items that complete the ship's gear. Most of the metal fittings are plated, oxidized or chemically treated according to the finish required, while a few of the larger ones are stove-enamelled in the correct colours. Two thousand scale model stanchions are on this model, every one drilled for the threading of the fine wire which represents the handrails.

The painting is a highly skilled job, for it must be remembered that as the model is 1/48th full size, a coat of paint 1/48th in.



At work on the model of the "Queen Elizabeth." The hull is complete and craftsmen begin to build up the superstructure on the liner's decks.



The finished model, conveying all the resplendent majesty of the proud ocean liner, awaits shipment to New York.

thick is equal to a 1 in. thickness of paint on the actual ship! Believe it or not, this model of the *"Queen Elizabeth"* had 20 coats of paint before the final application of varnish, each coat being rubbed down to a perfectly smooth surface before the next was applied. The hull markings of Plimsoll line, draft marks and the white riband, typical of all Cunarders, are handpainted.

After painting there follows the final assembly. In case you think this is a simple task of just putting so many parts in their right places, I would assure you that the successful assembly of a ship model is one of the most difficult jobs of all, and is entrusted only to skilled and experienced craftsmen, who have a general knowledge of ship design. The model must convey to onlookers something of the individual atmosphere of the ship herself, and it is up to the craftsmen to instil this quality into the model as they build it up, as well as to ensure that every detail is accurate and every piece of gear and equipment in its proper place.

By the time you read this the *"Queen Elizabeth"* model will have arrived in New York, its eventual destination, where it is to be displayed in the offices of the Cunard White Star Ltd. In the same office is a pre-war model of that other giant Cunarder, the *"Queen Mary,"* to the same scale, and which also originated, in 1935, from the Bassett-Lowke craftworks "in the centre of England."

What Keeps the Clouds Up?

EVERYONE who has watched the clouds floating along in the sky before a brisk breeze must have wondered at some time what keeps them up. The answer to this question is concerned with their formation. Actually they do fall, but they consist of drops of water that are too small to fall at an appreciable speed. The smaller the drop the lower its rate of fall, owing to the resistance of the air. For instance, a drop about a twelfth of an inch in diameter, which is the size of a heavy raindrop, will fall at the rate of nearly seven yards a second, while one that is only a thousandth of an inch in diameter will take 450 times as long to fall through the same distance.

This accounts for clouds staying apparently suspended in the air, but what happens to make them fall eventually in the form of rain? The full answer to this is not known, but it is believed that the formation of tiny particles of ice in the upper parts of a cloud is one cause. This part of a cloud is of course at a great height, where the temperature is low, the height for instance at which the wings of an aeroplane tend to become iced up. The vapour pressure around a drop of water is greater than that around a tiny particle of ice, and this causes the ice particles to grow at the expense of the water drops until they are big enough to fall quickly, melting into rain on the way.

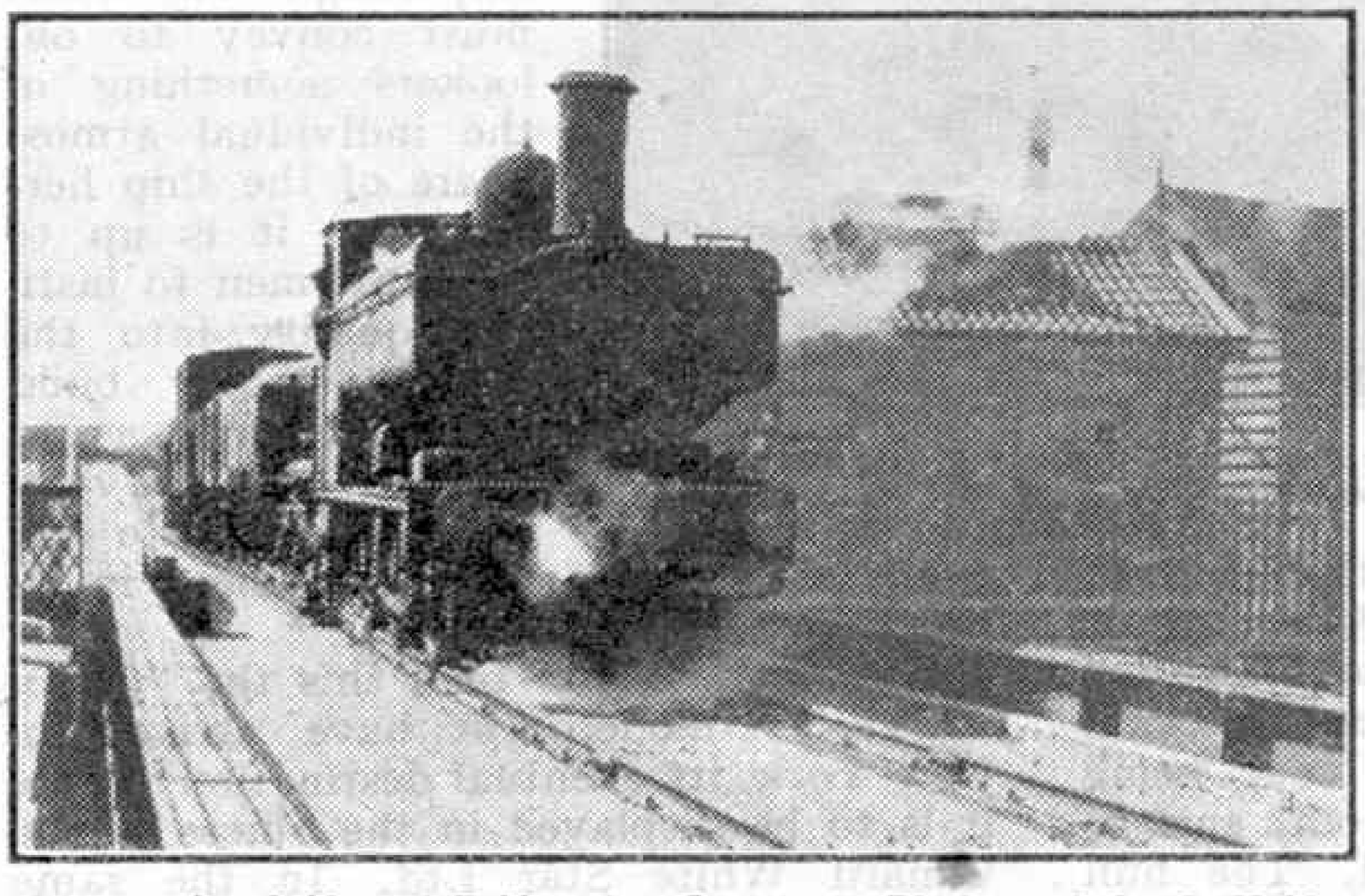
Rain has actually been caused by scattering dry ice, which is frozen carbon dioxide, on the tops of clouds from aeroplanes. Successful experiments on these lines have been made on several occasions in Australia. Sprinkling dry ice at 70 deg. below zero on chosen clouds caused water drops in them to freeze, and rain then fell. From 40 to 50 lb. of dry ice was found sufficient.

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.

A TELESCOPIC BRIDGE

There is an unusual type of bridge at Bridgwater on the Western Region of British Railways. It spans the River Parret and provides a connection between



A retracting bridge at Bridgwater, Somerset. Photograph by J. Hobbs, Exeter.

Bridgwater station, on the main Taunton-Bristol route, and the railway owned docks on the western side of the stream. The accompanying photograph shows a transfer trip of freight wagons passing over the bridge on its way to the main line.

The bridge has three spans, one on the western bank of the river that is immovable, a central one that retracts to the eastern bank, and an eastern one that moves to one side to make room for the central span. In the illustration the engine house is shown, with its short stack, and the space into which the third portion of the bridge is virtually side-tracked also is shown.

This peculiar type of bridge was necessary to give passage for ships to the quays on the south side. These are no longer used, and the bridge, still equipped with its railway signals and shipping navigation lights, remains permanently across the river. J. Hobbs (Exeter).

PEVENSEY CASTLE

Pevensey Castle has a wonderful history. The first structure was built by the Romans and added to by William the Conqueror after the Battle of Hastings in 1066. The outer wall, 12 ft. thick and 30 ft. high, is Roman and is much admired because of its preservation and size. It is one of the largest of castle walls, and encloses over nine acres of ground.

The inner wall of the Castle is shown in the accompanying illustration. It had a drawbridge, a keep, and a dungeon, and on one side there are three turrets. This part of the castle has a moat on three sides of it.

P. G. Nash (London S.E.12).

CARP FISHING ON THE SAONE

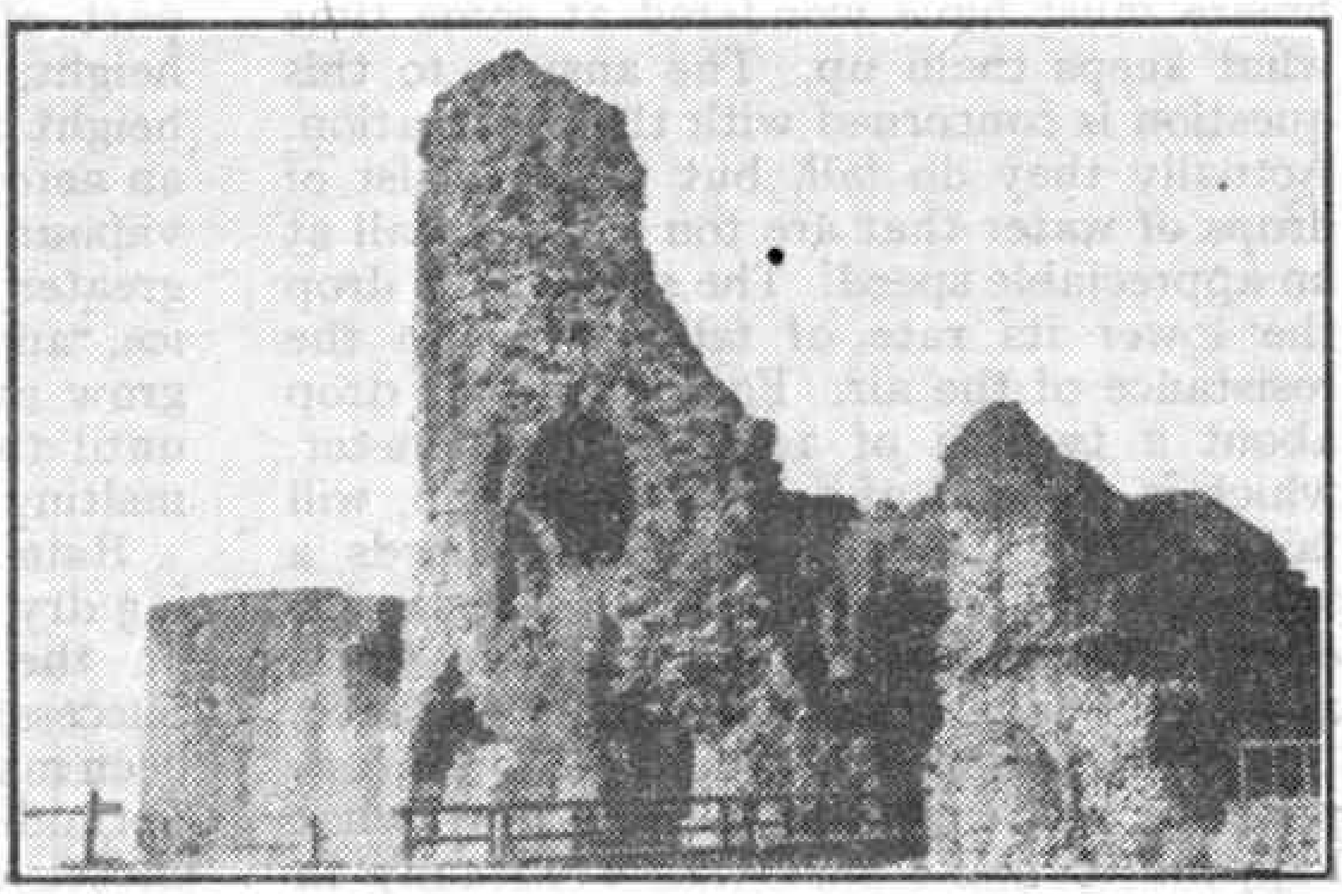
When I stayed in a little town on the Saone, in France, I was interested in the method used in fishing for carp. There was one particular spot where both the current and the depth, about 12 ft., were just right, and where carp had been fished for many years. Week after week the spot is continually baited, with clay soil mixed into a paste with boiled potatoes, boiled wheat and beans, and made into balls the size of a hen's egg. These are thrown in over the desired spot.

A fairly large-sized hook is used and about 10 in. above it is tied an ounce weight. Long worms are used, and worm and hook are pushed into a hole in one of the balls, which is closed up round them. The line is cast gently, and the rod is wedged under a seat and then the fisherman waits. The slightest touch on the hook makes the end of the rod vibrate, and at the right moment the fisherman jerks the line.

Now the work starts. To "land" a carp above 9 or 10 lb. there are two possible ways. If the fisherman has a reel he uses it in the ordinary way, but as most of them have none they do an odd thing. They just let the whole lot go. Having thrown rod and all into the water they row after it, and pick it out now and again to play the fish. It is remarkable to see the whole population out on the bridge and banks watching a chase. In some instances such a pursuit has been three quarters of a mile in length.

The Saone is in eastern France and runs southward to join the Rhone at Lyons. Carp up to 35 lb. in weight have been caught in the stream at the town where I stayed, but these are exceptions. Fish weighing 10 to 20 lb. are quite often caught, however.

B. Langford (Oundle).



The ruins of Pevensey Castle. Photograph by P. G. Nash London S.E.12.

Club and Branch News

WITH THE SECRETARY

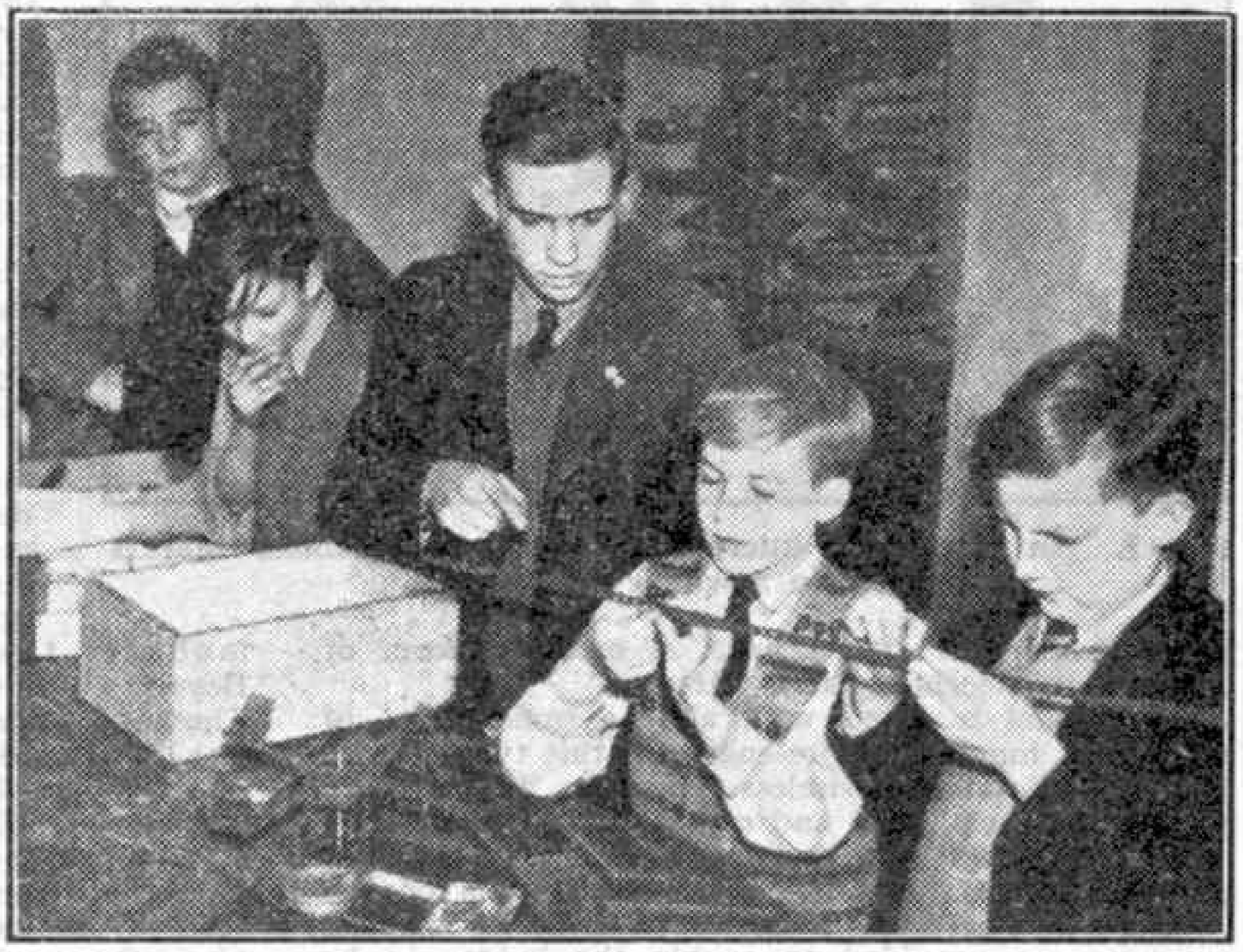
CLUB MONEY

In most Clubs the amount of money required is very small indeed, but whether this is large or not, it is important that the financial side of a Club's work should be well organized and kept thoroughly in hand. In many Clubs the Leader himself is Treasurer, but a better plan is to appoint a senior member to this post. He collects subscriptions and keeps records, so that he can let the Leader and officials know at any time exactly how the Club stands, in order that they may keep expenditure within bounds. At the end of each session a balance sheet should be posted in the Club room, so that members can see what is being done with the common funds of the Club, and a copy of this balance sheet should be sent to Headquarters.

Club funds are used for paying the necessary expenses of the Club room, such as lighting and heating, and equipment with tables, shelves and cupboards. Beyond that, money may be required for Club stocks of Meccano Parts and any other materials needed for the hobbies included in the programme. If subscriptions do not bring in sufficient for these purposes, other ways of raising funds should be tried.

FUNDS FOR OUTINGS

At this time of the year members are looking ahead to summer excursions, some of which will involve a little expense. It is as well to begin saving the necessary money immediately. Members should be invited to make small weekly payments to the Treasurer for the Outings Fund, in which of course each member's contributions will be used for paying his share of the expenses for the various trips arranged. If such a scheme is started straight away it will be found that, even with payments of only a few coppers a week, a surprisingly useful sum of money can be accumulated by the holiday season. The Outings Fund of course should be kept entirely separate from general Club funds.



Members of the Caer Urfa (South Shields) M.C. during a meeting in the Club Room. On the left is Colin Mather, Treasurer, and third from the left is Geoffrey Burrows, Secretary. This Club was affiliated in October 1945. Leader, Mr. A. Fyall. Its proceedings are noteworthy for excellent model-building, and realistic operations are carried out on the Hornby Railway of the associated Branch of the H.R.C., No. 484.

CLUB NOTES

HORNSEA M.C.—Membership at present is restricted to boys of 12 years of age and over, and all sections follow an intensive programme, which includes Hornby Train operation. Nature Talks are popular, and Film Shows and Talks illustrated by Lantern Slides also are given. Club roll: 47. *Secretary:* R. Lancaster, Carlton House, Carlton Avenue, Hornsea.

MILDMAY ADVENTURERS (LONDON N.1) M.C.—This Club is the successor of the Holy Trinity (Barnsbury) M.C., and is open to both boys and girls. A splendid Exhibition has been held. The models displayed included the Tower Bridge and a Revolving Crane, and prizes were presented by Mr. Stuart Wilson, founder of the Holy Trinity M.C. in 1918. Mr. Wilson has given "The Founders Cup," to be awarded annually to the member rendering the best service to the Club. *Secretary:* Miss D. Medlycott, 79, Ronalds Road, Highbury, London N.5

NEWCASTLE ROYAL GRAMMAR SCHOOL M.C.—This enterprising Club has been formed under the Leadership of Mr. G. L. Beech. Of recent meetings two comprised model-building contests; entries in one of these were exhibited at the School Speech Day. Discussions on the further programmes have been arranged. Club roll: 11. *Secretary:* F. J. Curtis, 6, Hartside Gardens, Jesmond, Newcastle 2.

CUDDINGTON CROFT M.C.—Preparations are being made for an Exhibition, at which each member is expected to show two models. A Hornby Railway Layout is to be demonstrated by the member who owns it, and it will be provided with suitable scenery, including Meccano models. A Dinky Toys Layout, with suitable accessories, also will be on view. Club roll: 12. *Secretary:* R. V. J. Chadder, St. Davids, 16, Sandy Lane, Cheam, Surrey.

BRANCH NEWS

STROUD—Track Nights have been held regularly, at one of which a Hornby-Dublo track was operated. The local station also has been visited for locomotive observations. Members are interested in Treasure Hunts and Quiz Programmes, always attractive features of the recreation of Clubs and Branches. A Branch Magazine has been started. *Secretary:* D. Hargest, 6, Folly Lane, Stroud, Glos.

NEW ROAD MODEL RAILWAY (SOUTH CHINGFORD)—Branch Headquarters are at New Road Schools, New Road, South Chingford, E.4. Steady progress continues to be made. The Hornby Layout is being extended and made more efficient in working. A terminal station to be called "New Road Central" has been commenced; it will have four tracks and two platforms. Re-wiring is in progress on the electrical layout. *Chairman:* Mr. G. C. Flowers, 21, Boxted Close, Buckhurst Hill, Essex

Among the Model-Builders

By "Spanner"



G. Taylor, Slough, won First Prize in a recent "M.M." Model-building Competition.

A FINE MODEL FIRE-ENGINE

One of the illustrations on this page shows a fine model fire-engine built by W. A. Nixon, Liverpool. It is 2 ft. 7 in. in length overall, and is driven by a 6-volt Electric Motor mounted at the front of the chassis. The whole of the rear portion of the body is constructed in the form of a compact storage locker, and access to it is obtained by a door placed under the rear part of the escape. A modified form of Ackermann steering gear is fitted.

The model is fitted with all the main items of equipment found on a fire-engine of this type. These include a searchlight, wireless apparatus, bell, pressure gauges, and head, side and rear lights.

The escape when fully extended reaches to a height of nearly 50 in., and will stand in position on the carriage at angles from 70 to 85 degrees. Special supports are provided to enable the ladder to be used at angles of less than 70 degrees.

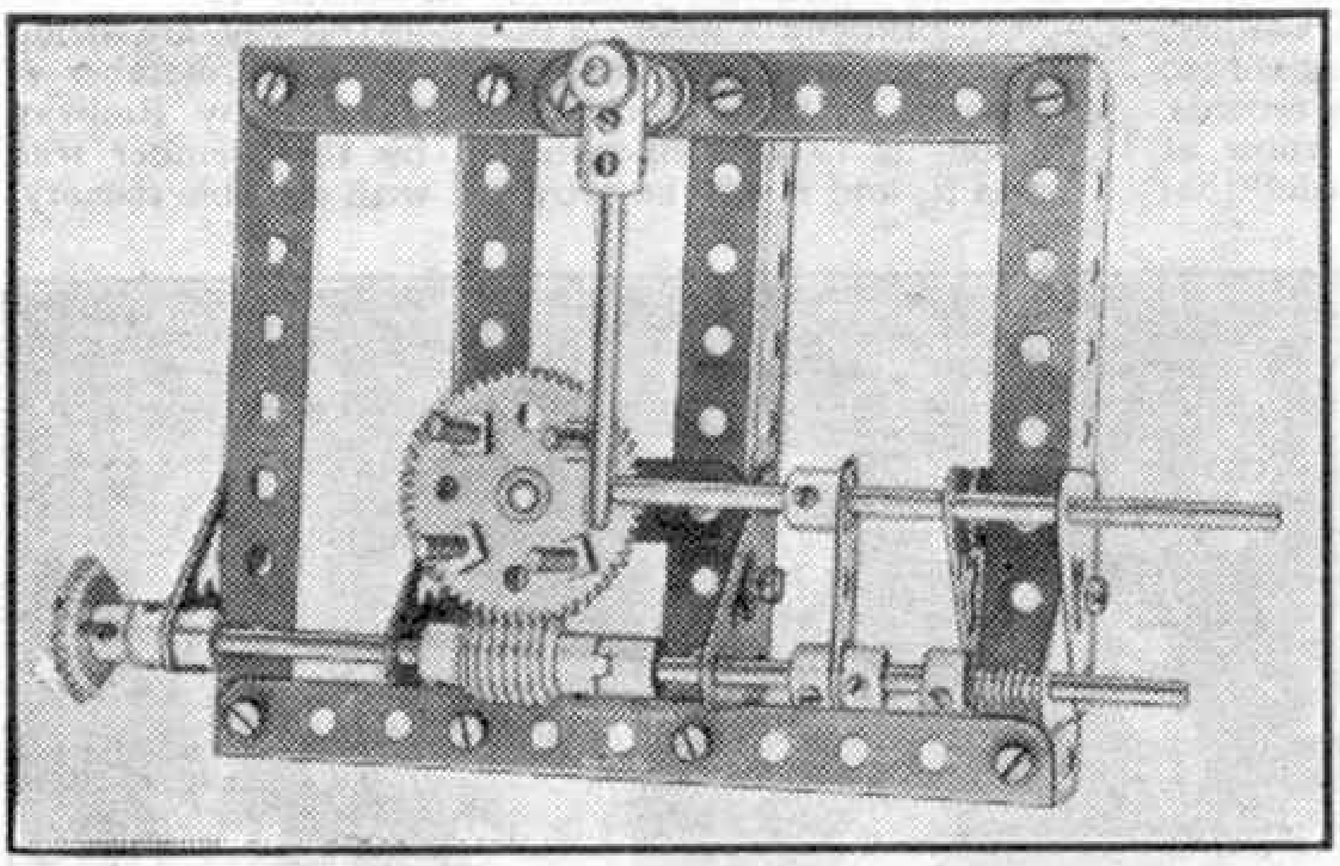


Fig. 1. An interesting intermittent motion mechanism that is simple to assemble and operate.

AN INTERMITTENT MOTION MECHANISM

By means of the mechanism shown in Fig. 1, intermittent motion can be imparted to a rotating Rod, of almost any duration and in a variety of sequences. A 57-teeth Gear, fitted with four ½" Bolts is mounted on a vertical Rod and driven by a Worm that is in constant engagement with the Gear. The Worm is fixed on a Rod that is rotated through Bevel Gears from another Rod running at right angles to it. The end of the Rod protruding from the Worm carries one half of a Dog Clutch, the other portion being fixed to the inner end of a sliding Rod. A Compression Spring on this Rod maintains contact between the two sections of the Dog Clutch when the drive is being transmitted. As the Rod, driven by the Bevel Gears, rotates, however, the Bolts in the 57-teeth Gear come into engagement with a tappet rod. The movement from this is transmitted through a sliding Rod and Crank to the Rod carrying the Compression Spring, and in this way the members of the Dog Clutch are drawn apart.

The duration and sequence of the drive to the output Rod can be varied easily by altering the number and position of the ½" Bolts in the 57-teeth Gear.

A NOVEL REVERSING GEAR

N. C. Ta'Bois, Woodford Green, sends the following suggestion for a simple reversing gear. It is illustrated in Figs 2 and 3. Fig. 2 shows the reverse drive and Fig. 3 the straight through drive position. The Bevel Gear 1 is mounted on a short Rod 3 and normally is held in engagement with the other two Bevel Gears as in Fig. 3 by a Compression Spring 2. A Collar 6 limits the depth that the teeth can engage. A 2½" small radius Curved Strip pivoted on a 1½" Bolt bears against a Collar 4 and carries at its other end a Fishplate. A Rod 8 has a Collar and a Threaded Pin 9 fixed at its end, the Threaded Pin riding against the Fishplate and Curved Strip. The other end of the Rod 8 is connected to Rod 5 by a short Rod, a Handrail Coupling, a small Fork Piece and a Collar as shown. The Rods 5 and 8 are free to slide laterally. As they are moved to the right the two Bevels acting as a dog clutch disengage, and the Threaded Pin 9 slides along the Fishplate. When the two Bevels have separated almost sufficiently to accommodate the Bevel 1 the Threaded Pin has reached the Curved Strip, and further movement of the Rod 8 allows the Curved Strip to rotate slightly anti-clockwise and the Bevel 1 to engage the two other Gears, under the action of the Compression Spring, thus providing the reverse drive. In the position shown in Fig. 3



A fine model fire-engine and escape built by W. A. Nixon, Liverpool.

the Bevel 1 is well clear of the other Bevels.

It was found in practice that the Bevel 1 tends to jump out of engagement when transmitting a heavy drive in the reverse. This can be prevented by mounting a further Collar and Threaded Pin on the Rod 8 in a similar manner to the Threaded Pin 9, but placed approximately at the point 7. When the Rod 8 is moved to the extreme right this additional Threaded Pin will touch the Rod 3, but will be on the opposite side of the Collar 4 to the Curved Strip, and will effectively prevent lateral movement of the Rod 2.

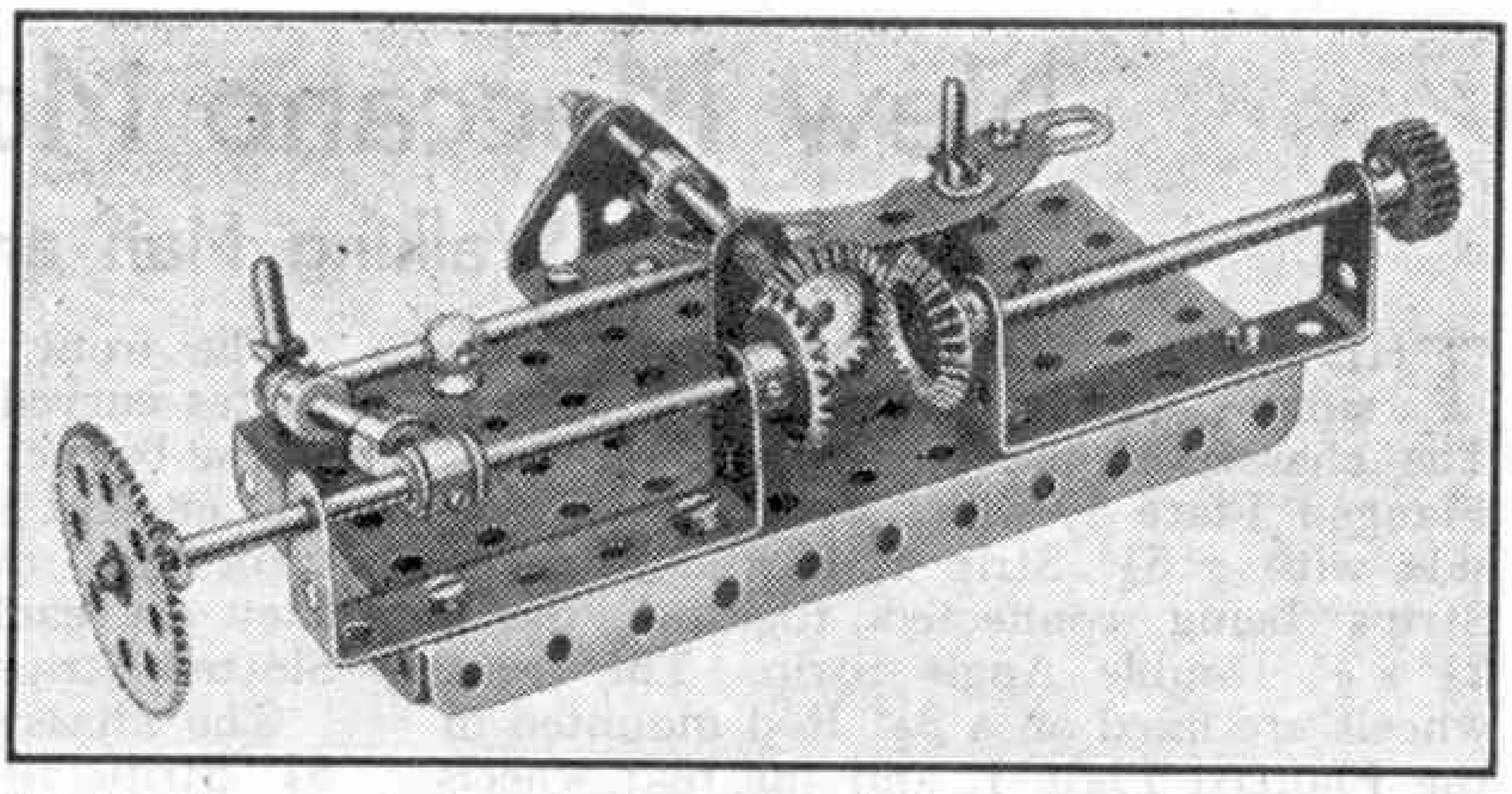


Fig. 2. The reversing mechanism designed by N. C. Ta'Bois, which is described in these pages. The illustration shows the gears in the reverse drive position.

HOW TO USE MECCANO PARTS

Pinions in Gear-Box Design

The Meccano ½" and ¾" Pinions are seldom used together, as their centres are not a standard distance apart when mounted on Rods, in holes in Plates or Strips, etc. and for this reason it is generally found necessary to build up a complicated framework in order to accommodate them. It is, however, occasionally possible to use them together to good effect, as shown in Fig. 4. In this example several ½" and ¾" Pinions are used together to form a very compact three-speed and reverse gear-box, the overall measurements of which are only 3" × 1" × 1". This probably is the smallest gear-box of its type that can be built from standard Meccano parts.

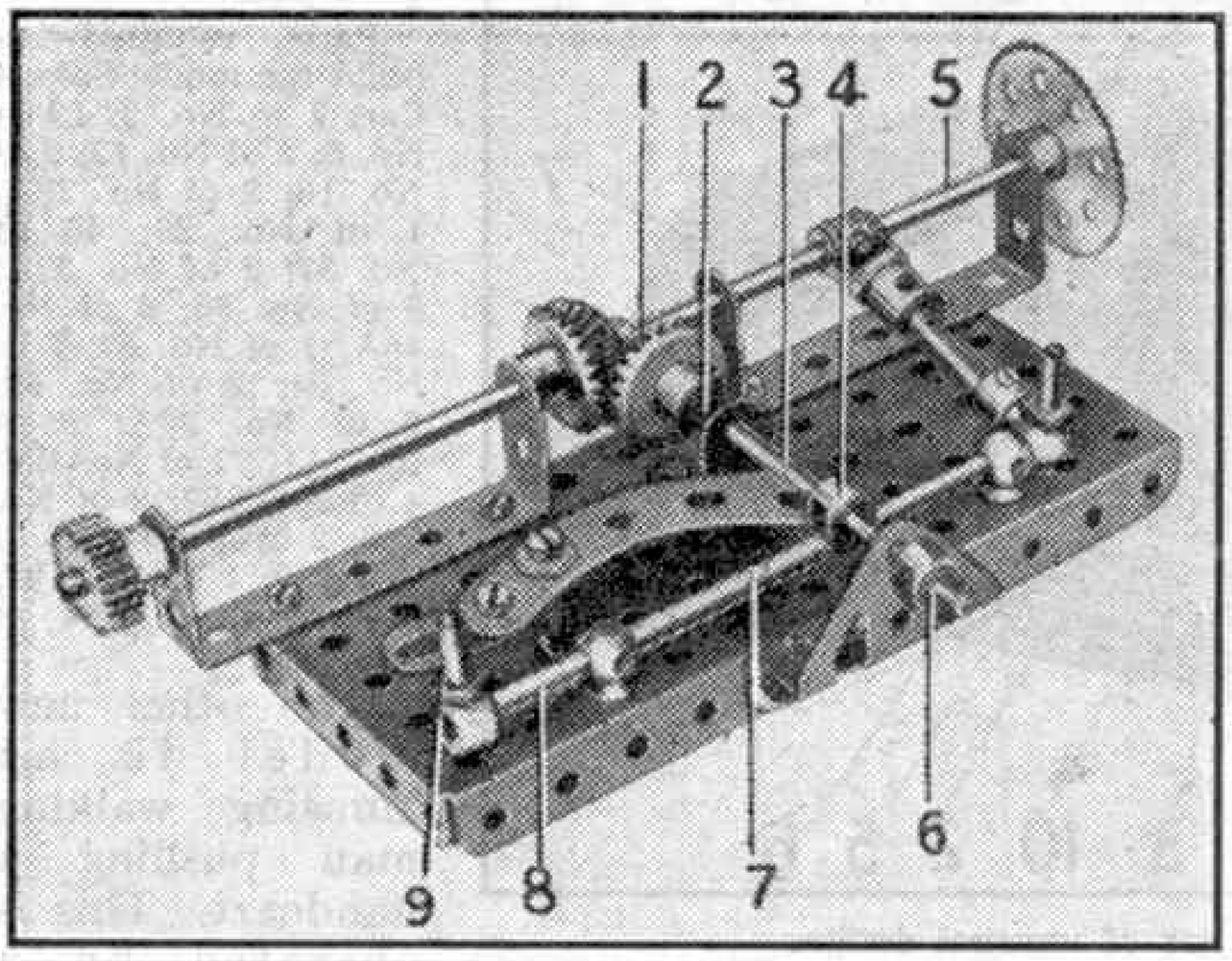


Fig. 3. Ta'Bois reversing mechanism in the straight through driving position.

The end of the Rod 1 is inserted in the bore of the ½" Pinion 4 that is carried on a separate Rod 2 from which the final drive is taken. Rod 2 carries also a ¾" Pinion and Collar. The sliding lay-shaft is a 4½" Rod on which are mounted a ½" Pinion 5, a ¾" Pinion 6, and a ½" Pinion 7. A ½" Pinion 8 is carried on a ¾" Bolt screwed into the transverse bore of a Threaded Boss and locked by means of a Grub Screw inserted in the opposite end of the bore. The Threaded Boss is rigidly attached to the gear-box frame by a ½" Bolt 9, but is spaced by a Collar and two Washers.

The movement of the sliding shaft is controlled by a ½" Bolt 10, the head of which fits between the bosses of the Pinions 6 and 7. The Bolt is fixed in a Collar on the end of a 3" Rod forming the gear change lever, and pivoted to a 1" Triangular Plate by a further Collar. The Collar is fixed in place on the Rod by its Grub Screw, and carries also a bolt whose shank passes through one of the holes in the Triangular Plate.

In the illustration, first forward speed is in engagement, the drive passing through the ½" Pinion on the driving shaft 1 to the ¾" Pinion 6 on the layshaft. The ½" Pinion 7 engages the ¾" Pinion on the driven shaft, so that there are two stages of reduction gearing between driving and driven Rods. By sliding the layshaft to the right the Pinion 7 disengages, but Pinion 6 remains in engagement with its ½" Pinion and at the same time meshes with Pinion 4. This gives straight through drive. Further movement of the sliding Rod brings into engagement Pinions 3 and 5, and 6 and 4, in this case providing two step-up stages for top gear. Reverse drive is obtained when the Rod is slid over to the extreme left, and the drive then goes through Pinions 3 and 8, which are in constant mesh, to Pinion 6, Pinion 7 engaging the ¾" Pinion.

The construction of gear-boxes is a very interesting and instructive part of the Meccano hobby, and considerable ingenuity is required to assemble a workable unit in the smallest possible space. We should like to hear from model-builders who have constructed small mechanisms of this kind and to receive details and illustrations of their work. Any really good examples submitted will be illustrated in future issues of the "*M.M.*"

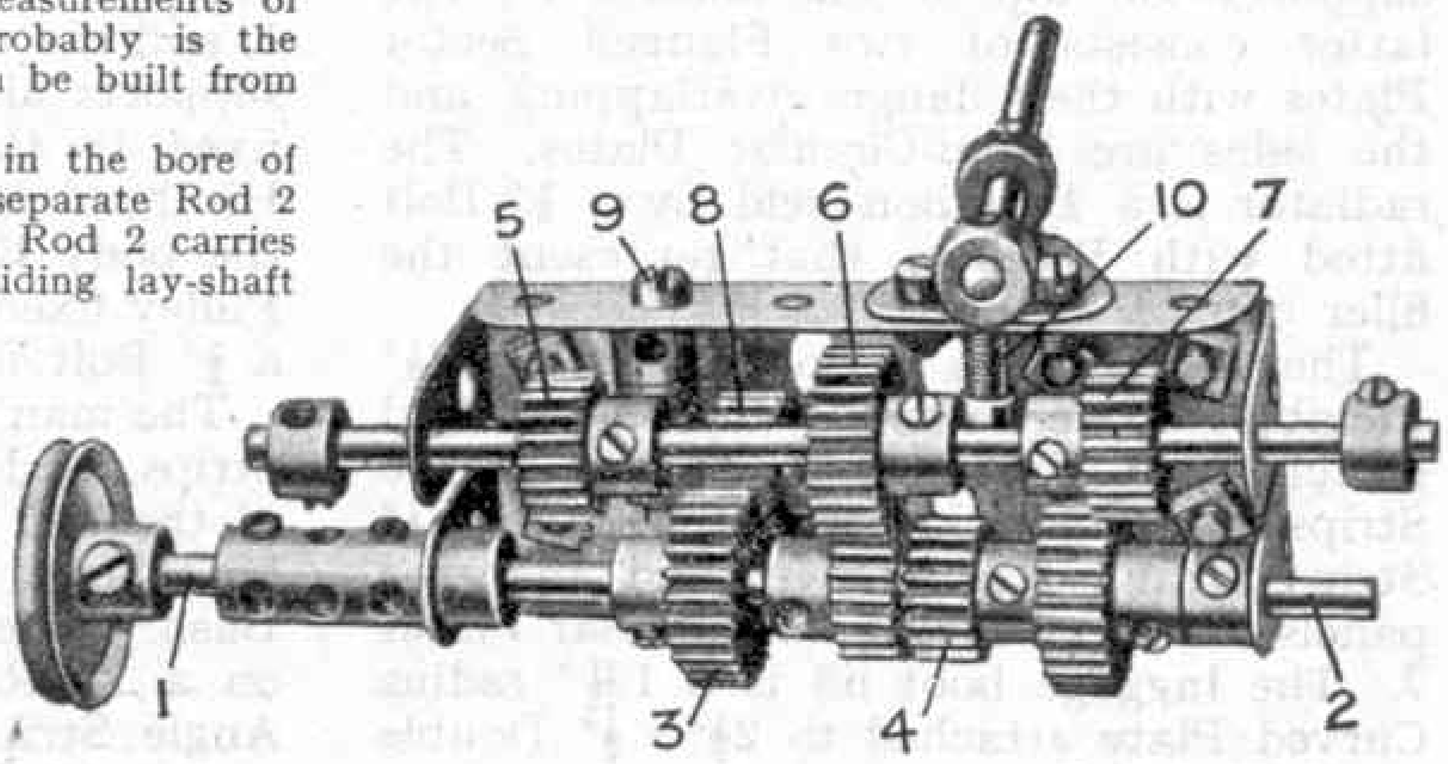


Fig. 4. A compact gear-box built up from Meccano Pinions.

New Meccano Models

Saloon Car—Walking Man and Cart

THE first of our two new models is the simple saloon car shown in Fig. 1. The chassis of the model is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate 1, which is fitted at each side with a $5\frac{1}{2}''$ Strip 2, the ends of the Strips being connected together by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip. The front wheels are fixed on a $3\frac{1}{2}''$ Rod mounted in the Flanged Plate 1, and the rear wheels are attached to a similar Rod mounted in the Strips 2.

Each side of the car body is formed by a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ and a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate.

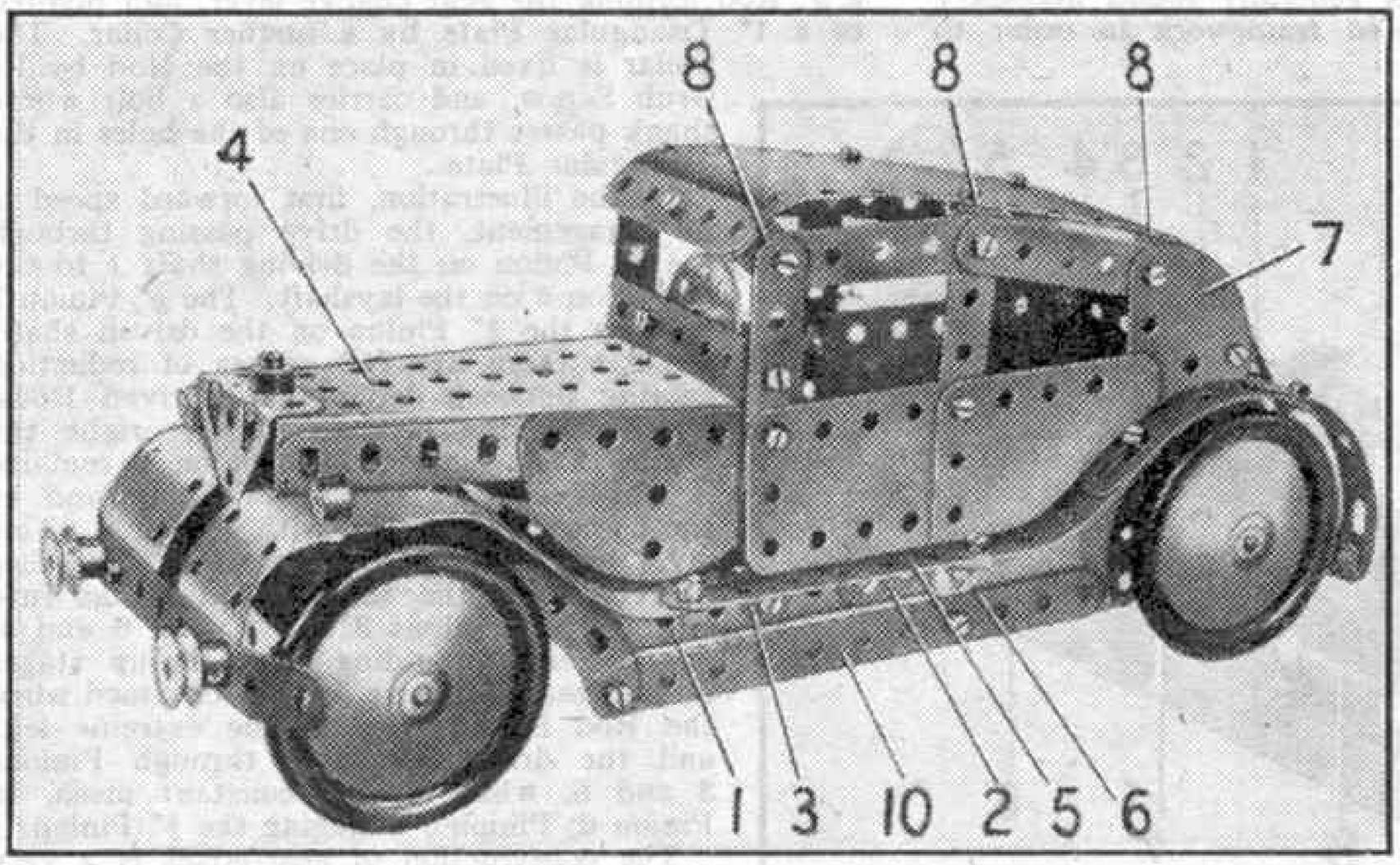


Fig. 1. A simple model saloon car of unusual design.

The $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Plate is fixed to the Strip 2, and the $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Plate to a compound strip 3, which is formed by two $2\frac{1}{2}''$ Strips overlapped three holes. The Strip 3 is bolted to the Flanged Plate 1, and supports the top of the bonnet 4. The latter consists of two Flanged Sector Plates with their flanges overlapping, and the sides are Semi-Circular Plates. The radiator is a Trunnion held by a $\frac{3}{8}''$ Bolt fitted with Washers that represent the filler cap.

The roof of the saloon is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate curved to shape and attached to the $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 8. The window frames are $2\frac{1}{2}''$ Strips arranged as shown, and the rear panels are formed by Semi-Circular Plates 7. The luggage boot lid is a $1\frac{11}{16}''$ radius Curved Plate attached to $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 9.

The front wings are $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates curved over the wheels and bolted to the bonnet and to the $5\frac{1}{2}''$ Strips 5. The rear ends of Strips 5 are curved upward to form part of the rear mudguards, and they are each extended by two Formed Slotted Strips.

The chassis is extended downward by $5\frac{1}{2}''$ Strips 10 fitted at their forward ends with small radius Curved Strips. The Strips are bolted to the $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates of the sides. The front bumper is a $5\frac{1}{2}''$ Strip bolted to the wings, and the headlamps are $\frac{1}{2}''$ Pulleys fixed on $\frac{3}{8}''$ Bolts.

Parts required to build the model Saloon Car: 7 to No. 2; 13 of No. 5; 2 of No. 12; 2 of No. 16; 2 of No. 23A; 1 of No. 29; 48 of No. 37; 2 of No. 37A; 5 of No. 38; 6 of No. 48A; 1 of No. 52; 2 of No. 54; 2 of No. 59; 2 of No. 90A; 6 of No. 111C; 1 of No. 126; 4 of No. 187; 2 of No. 188; 2 of No. 189; 3 of No. 190; 1 of No. 192; 4 of No. 214; 4 of No. 215.

The other new model is an amusing walking man pushing a handcart. This is operated by a *Magic* Motor, and when set in motion the man walks with a very funny kicking movement that is most amusing to watch. The model can be built from Outfit No. 1.

The man's body is made by bolting together two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 1, and the upper bolt used for this purpose supports also a Trunnion 2. A $2\frac{1}{2}''$ Strip fixed to the Trunnion fills in the back. His head is a Flat Trunnion attached to the body by an Angle Bracket, and a 1" Pulley fixed to a second Angle Bracket by a $\frac{3}{8}''$ Bolt forms his hat.

The man's arms are small radius Curved Strips, and the legs are $2\frac{1}{2}''$ Strips. One of the $2\frac{1}{2}''$ Strips is bolted tightly to the body, and the other is lock-nutted to a Bush Wheel 3. The Bush Wheel is fixed on a 2" Rod 4 mounted in the Double Angle Strips 1. The feet are Fishplates, and a 1" Pulley 5 fitted with a Rubber

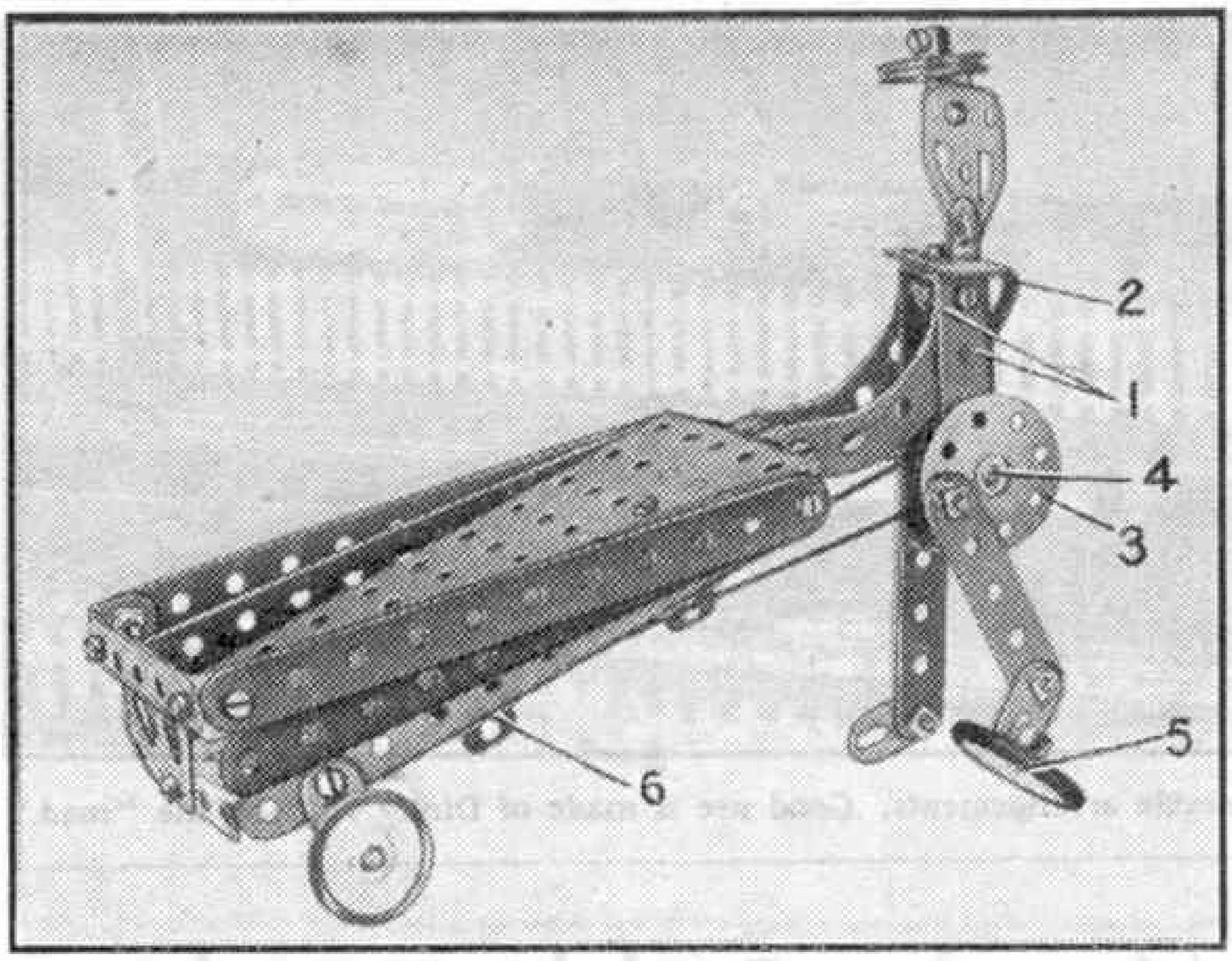


Fig. 2. An amusing walking man and handcart which can be built from Outfit No. 1.

Ring is fixed to one of the Fishplates at a slight angle.

The cart is formed by a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate fitted at each side with two $5\frac{1}{2}''$ Strips arranged as shown. The upper Strips are connected by a $2\frac{1}{2}''$ Strip and Angle Brackets, and the $2\frac{1}{2}''$ Strip is bolted to a Flat Trunnion attached to the Flanged Plate. The wheels are fixed on a $3\frac{1}{2}''$ Rod mounted in Fishplates. The man's arms are attached to the cart by Angle Brackets.

A *Magic* Motor 6 is bolted to the underside of the Flanged Plate, and is connected by a Driving Band to a $\frac{1}{2}''$ Pulley fixed on Rod 4 between the Double Angle Strips 1. When the Bush Wheel 3 is turned by the Motor the leg attached to it moves and pushes the cart along. The Rubber Ring on Pulley 5 enables it to grip the ground, and its position should be adjusted until the most satisfactory angle for operating the model is found.

Model-builders will find it interesting to design other models using a walking figure of the type described here.

Parts required to build the model Walking Man and Cart: 4 of No. 2; 4 of No. 5; 4 of No. 10; 6 of No. 12; 1 of No. 16; 1 of No. 17; 4 of No. 22; 1 of No. 23A; 1 of No. 24; 1 of No. 35; 3 of No. 37A; 23 of No. 37; 1 of No. 38; 2 of No. 48A; 1 of No. 52; 2 of No. 90A; 2 of No. 111C; 1 of No. 126; 2 of No. 126A; 1 of No. 155; 1 *Magic* Motor.

A COMPETITION REMINDER

Prizes for Outfit No. 4 Models

Readers are reminded that there is still time to submit entries for the special "Outfit" Model-Building Competition announced in last month's *"M.M."* In this contest prizes are offered for the best and most original models built entirely from the parts included in a No. 4 Meccano Outfit. There are no other restrictions, and it is not necessary to use all the parts contained in the Outfit.

When the model is completed a photograph or a sketch of it should be obtained and sent to *"Meccano Outfit No. 4 Contest, Meccano Limited, Binns Road, Liverpool 13."* Each illustration submitted must have the competitor's age, name and address on the back, and a list of the parts in the model must be included with the entry.

Entries will be divided into two Sections, A, for competitors in the British Isles, and B, for competitors Overseas. Closing date for Section A, 30th April; for Section B, 30th July.

The following prizes will be awarded in each Section. First, Cheque for £3/3/–; Second, Cheque for £2/2/–; Third, Cheque for £1/1/–. There will be also five prizes of 10/6 and five of 5/–.

Unsuccessful entries will be returned to senders if a suitably stamped and addressed envelope is enclosed with the entry.

Prizewinning entries become the property of Meccano Ltd., and are not returnable.

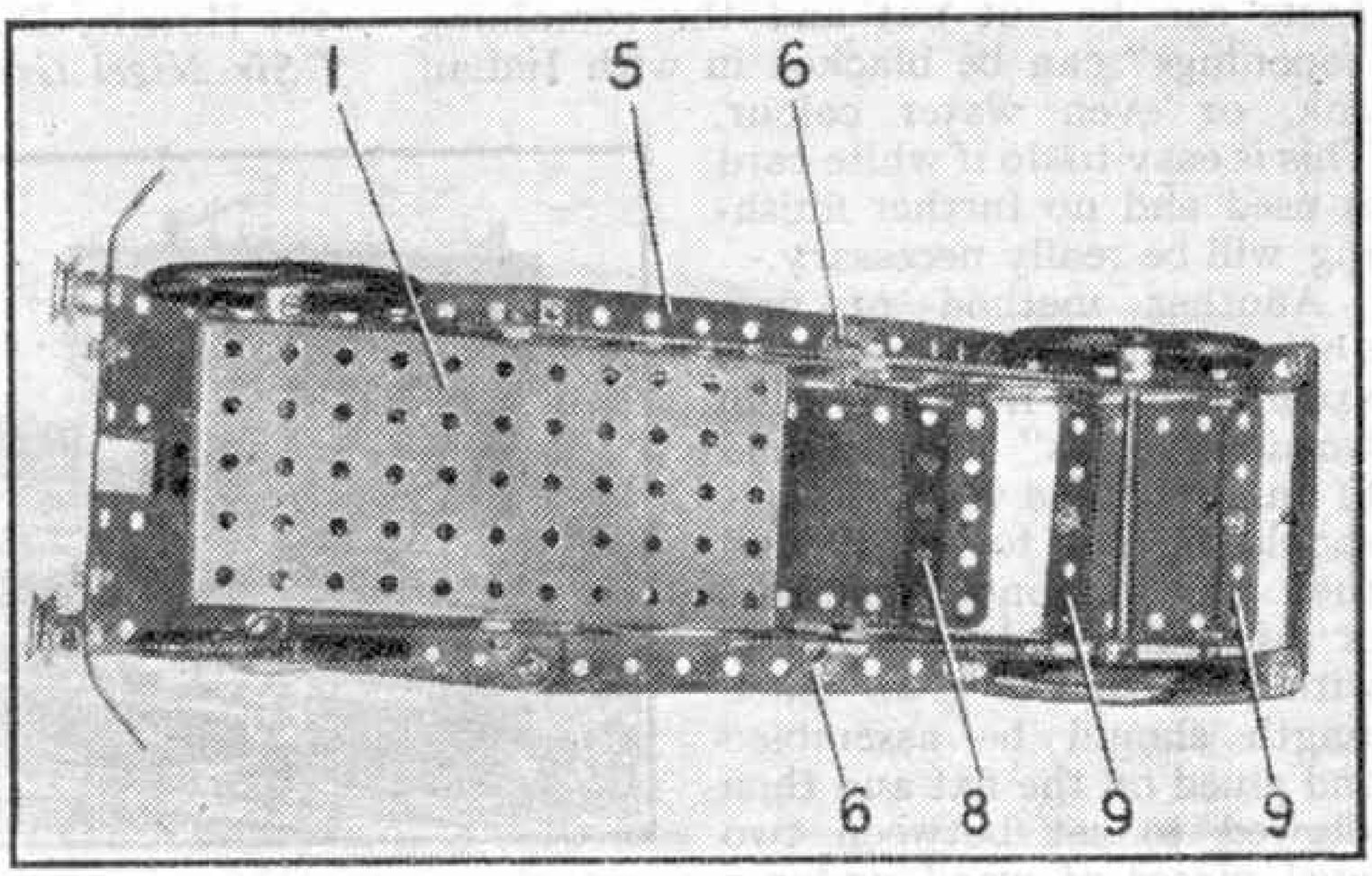
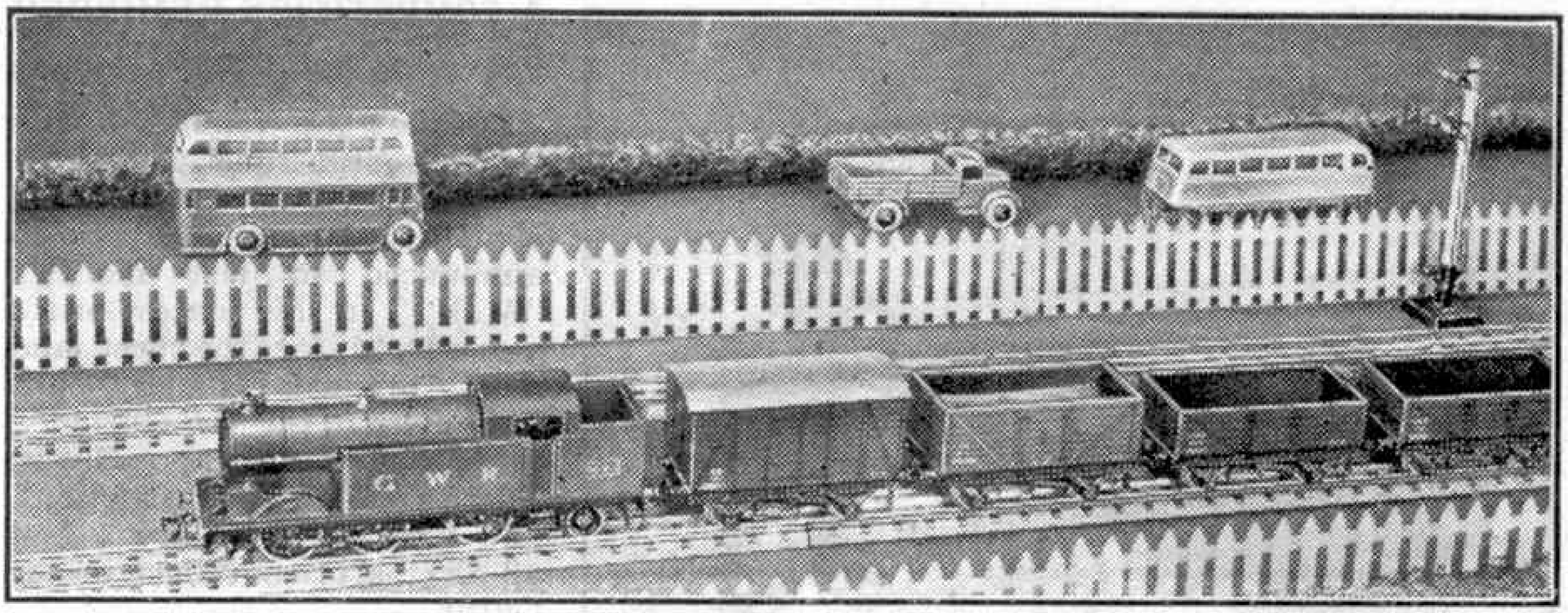


Fig. 3. An underneath view of the chassis of the car seen in Fig. 1.



A Hornby-Dublo railway with effective lineside arrangements. Good use is made of Dinky Toys on the "road."

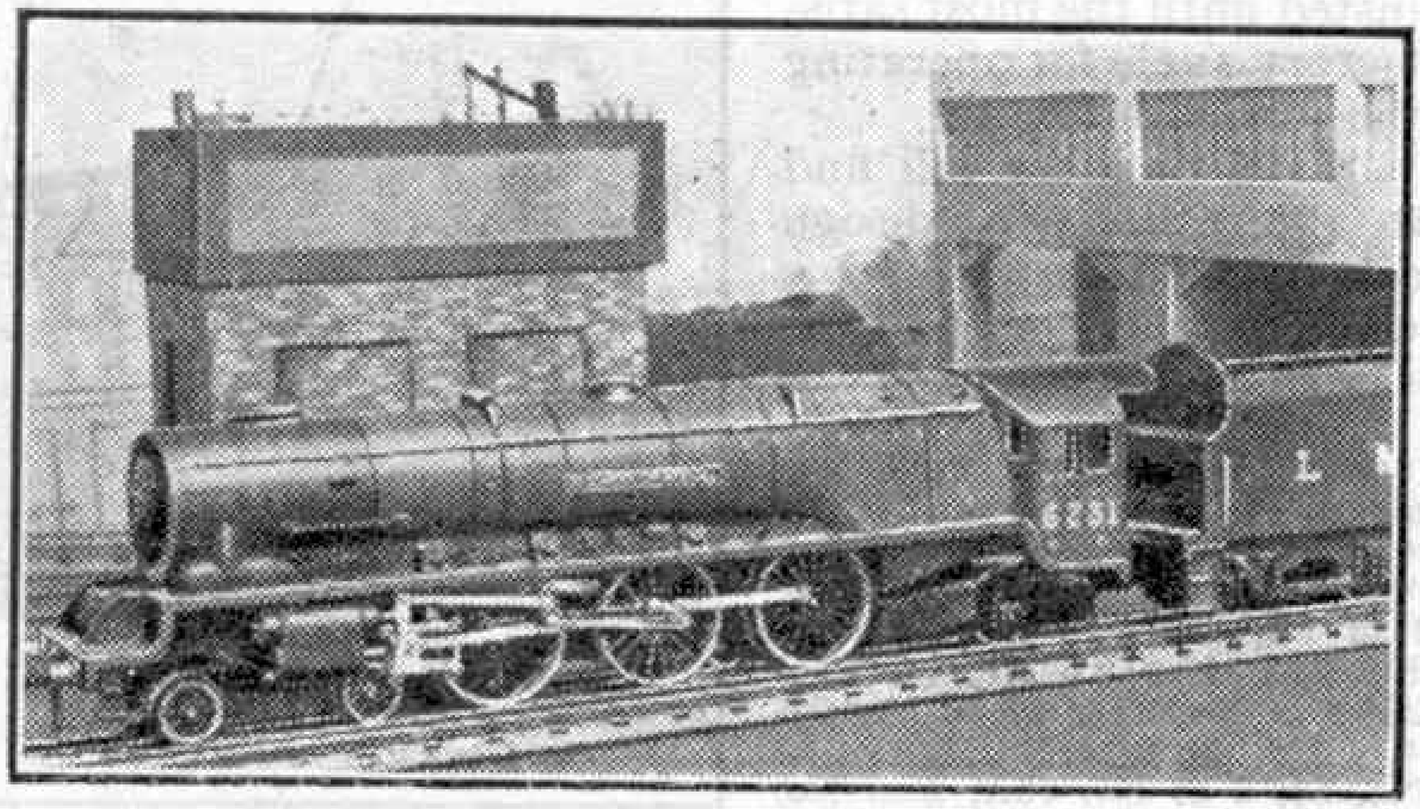
Round the Hornby-Dublo Track

THE illustrations on this page both show improvements made to Hornby-Dublo layouts by some attention to the lineside. Even a few simple additions can help toward turning a plain track into a miniature railway. One or two lineside buildings, a wall or length of fencing, and a few Dinky Toys working in conjunction with the trains are all items that can be used for this purpose with both portable or permanent railways.

Fencing of the kind shown in the upper illustration is not at all difficult to make. It can be drawn out on card in complete lengths and the spaces between the vertical posts can be cut out with a sharp penknife guided by a metal ruler. Alternatively, just the pointed tops of the posts can be cut out and the remaining "openings" can be blacked in with Indian Ink, or even water colour. This is easy to do if white card is used and no further finishing will be really necessary.

Another method of producing fencing is to build it up in lengths from the thin wooden "spills" usually sold in bundles. The vertical posts should be cut to length and then the horizontal members or rails can be stuck to them with Seccotine or glue. Each length should be assembled and glued on the flat and then allowed to set between two level pieces of wood under a weight. Otherwise this prefabricated fencing is sometimes liable to "curl" or to become distorted. A narrow wood base should be provided for each length of wall or fence.

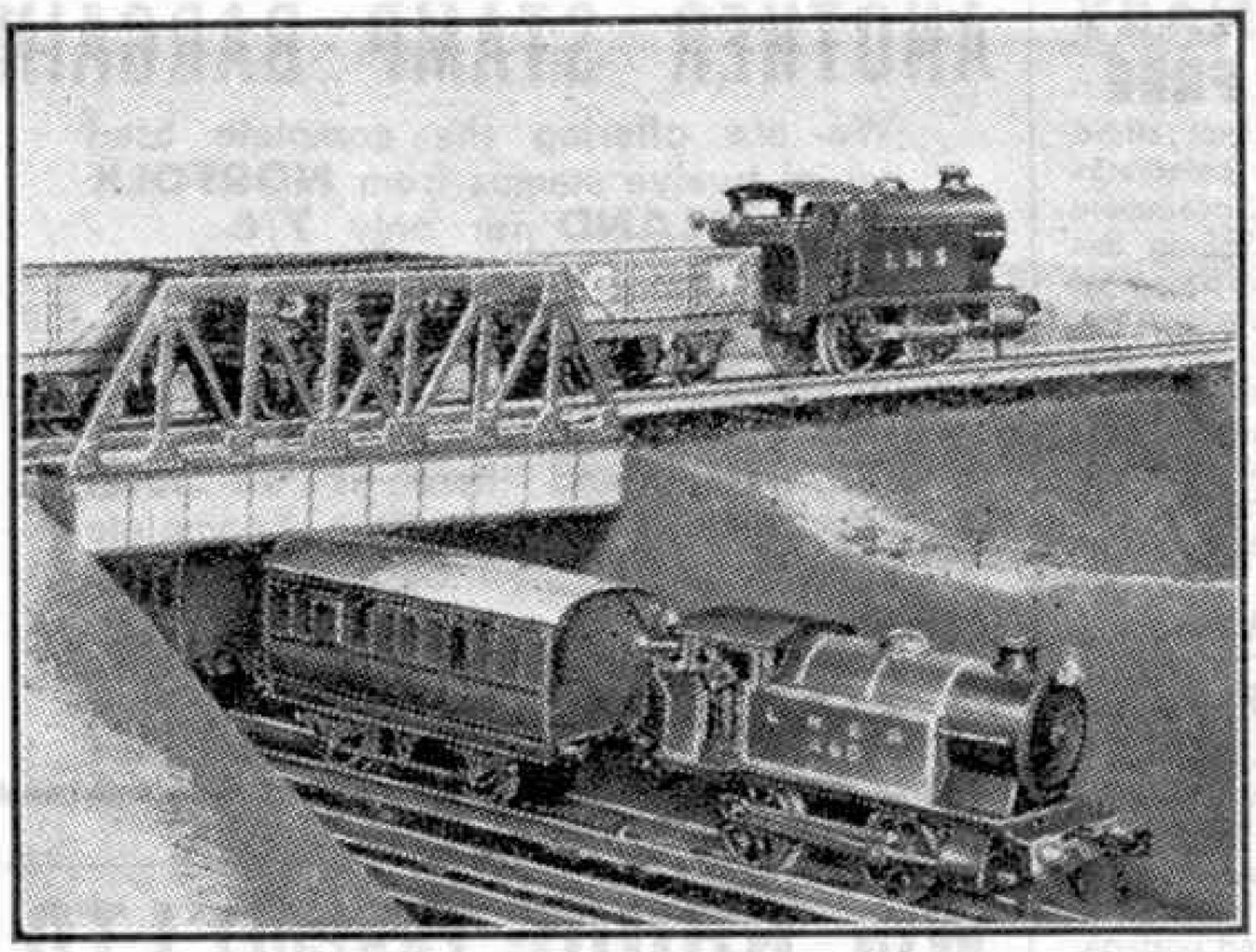
Walls, and structures like the water tank shown in the lower illustration, can be marked out, assembled and painted complete if the builder is able to carry out the finishing touches successfully. Alternatively, brickwork or other construction can be represented by means of the printed sheets that can be obtained for this kind of work at many toy or hobby shops. The water tank and engine shed shown here are the work of *"M.M."* reader W. A. Gittoes. Together they form part of an attractive locomotive depot, well fitted to accommodate such distinguished engines as the Hornby-Dublo *"Duchess of Atholl"* and *"Sir Nigel Gresley."*



"Duchess of Atholl" in a realistic setting on the layout of W. A. Gittoes, Basingstoke.

Running Hornby Clockwork Trains

TO run any trains successfully a good track is essential. This is particularly so in miniature practice, especially with clockwork engines, where the power of the mechanisms is relatively limited. Miniature railway operators, therefore, must make sure that their layouts are arranged on a good level surface and that the rails are all properly connected. Rail joints must be tight and true, and assembled either with Connecting Plates or Clips according to the type of track in use. Slack joints without Connecting Plates or Clips lead to poor running, and after some use the rails at such joints are liable to work apart and a derailment is certain to take place.

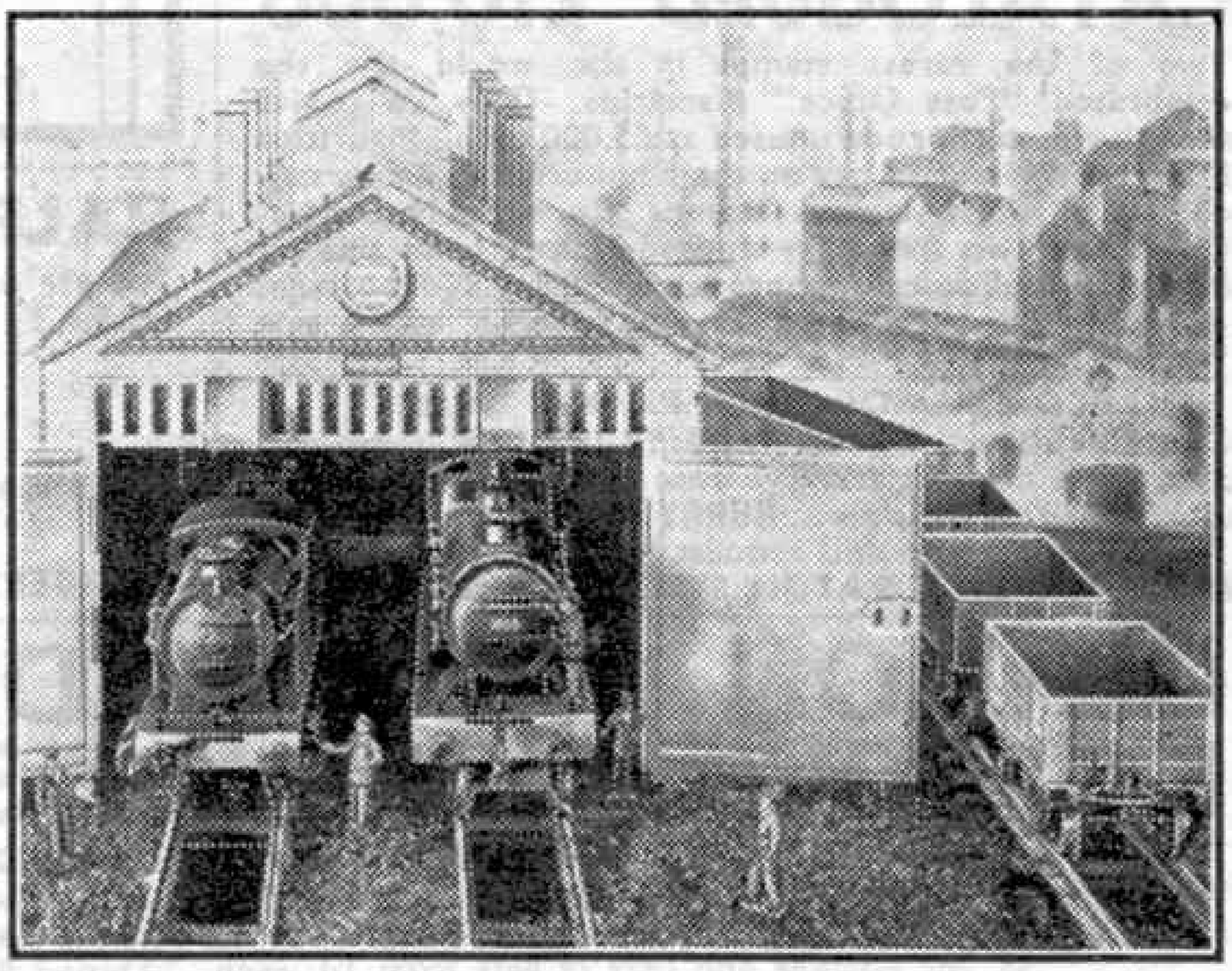


Hornby Clockwork Tank locomotives at work. These engines are suitable for a wide range of duties.

A point sometimes neglected in making additions to a Hornby Train Set is that the curves and points obtained should be of the same radius as those included in the Set. Thus, for example if the Set has 2 ft. radius curves —12 to a circle—the new material should correspond. Otherwise the layout cannot be developed properly, as curves and points of a different radius will not fit in. Many engines and vehicles intended for 2 ft. radius track will not run on rails of the smaller radius. Some of them might just get round at low speeds, but others would certainly be derailed.

Even with a perfect track it is impossible to obtain satisfactory running unless the engines and stock are in good order. Most people recognize that a clockwork engine should be lubricated; but in doing so many use the wrong kind of oil, or too much of it anyway, in spite of the instructions packed in every Train Set. A thin oil of good quality is required, such as is used for sewing machines. Axle bearings, gears and such points as the side rod pins of the engine all need a little oil, applied preferably by means of that favourite weapon the wire dipper, or even a sharpened matchstick. An ordinary oil can really delivers too much for the job.

Many Hornby Train owners who look carefully after the running of their trains are apt to be careless about putting them away after use. Particular care should be taken when putting the different items into a box or drawer to leave plenty of room for them. If this is not done, the parts, especially the rails and rolling stock, are liable to be damaged. Rails may be bent, while the wheel frames and couplings of vehicles also may suffer.



Hornby engines "at home." Regular attention at the depot ensures satisfactory and reliable working.

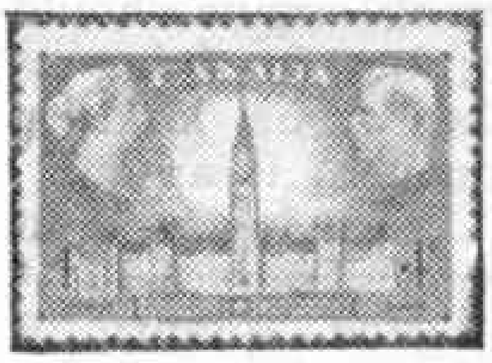
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Stamp Collecting

Canadian Pioneers

By F. Riley, B.Sc.

OUR stamp tour of the Empire now brings us to Canada, the great Dominion stretching across the American continent and from the Great Lakes to the Arctic. The number of Canadian stamps is very large, and they include a good proportion of issues illustrating the life of the country and its history. When Canada is mentioned many younger boys think immediately of Niagara, and perhaps also of the Royal Canadian Mounted Police, the famous Redcoats who "always get their men." Those whose ideas of the Dominion do not yet go further than this will be specially interested in two of the stamps illustrated on this page, which show these Canadian institutions. These are the 10 c. and 20 c. values of a set issued in 1935.

When the first Canadian stamps appeared, in 1851, four of the provinces now included in the Dominion did not make use of them. Canada then was a colony, as were Nova Scotia and New Brunswick, and the two latter issued their own stamps and continued to do so until 1868, the year after the three had become united as the Dominion of Canada. Some of these early issues are very highly priced, and most of them will be beyond the pocket of the ordinary young collector, but they are none the less interesting. The first stamps of Nova Scotia and New Brunswick were diamond-shaped, a very unusual form. Those of New Brunswick included one showing an early wood burning locomotive and another showing an early steamship, but in some respects the most interesting was one showing a portrait of Charles Connell. Connell was the postmaster, who seems to have seized upon the opportunity to immortalize himself, but there was trouble about his enterprise and the stamp was withdrawn. The few copies remaining to-day are very highly priced.



British Columbia also was at first independent as far as stamp issues were concerned. Beginning in 1860, they were withdrawn in 1871, when the colony entered the Dominion of Canada. The most interesting of the stamps issued there was one with a design incorporating a capital letter V, in the two arms of which were representations of the Morse signal for this letter. Its appearance was recalled during the war, when the Victory "V" sign became familiar. In 1873 Prince Edward Island also entered the Dominion and then withdrew its own stamps, all of which had been of the portrait variety, beginning in 1861.



The Canadian stamps of 1851 were three in number. Two bore portraits of Prince Albert and Queen Victoria, but the third was really Canada's first pictorial, for its design showed the beaver, the sagacious little animal that is so characteristic of Canada's rivers and woods. Other portrait stamps followed, including two showing Jacques Cartier, the pioneer French explorer and discoverer, and then, on 1st July 1867 the Dominion of Canada was formed. The 50th anniversary of this confederation was celebrated in 1917 with a 3 c. stamp reproducing a painting, "*The Fathers of Confederation*" by Robert Harris. The subject of the painting was the Quebec conference of 1867 that finally settled details. A stamp with a similar design, together with portrait stamps of Canadian statesmen and a map stamp, appeared in a further celebration 10 years later.



In the meantime the stamp roll of the Dominion had been growing, chiefly with portrait stamps, and a striking map stamp of the world, showing British possessions in red, marked the coming of imperial penny postage in 1898. Canada's first commemorative set was issued in 1908. This celebrated the 300th anniversary of the founding of Quebec in 1608. Great names such as Champlain, Montcalm and Wolfe distinguished this issue. Samuel de Champlain penetrated further west than Montreal, discovered Lake Champlain and founded Quebec. He became Governor of Canada for the French king. Montcalm and Wolfe were the two generals who fought out the battle on the Heights of Abraham near Quebec which finally decided that Canada should be British. Wolfe was killed in the battle and Montcalm was mortally wounded. The two are shown together on one stamp, the 7 c. value. Champlain's house in Quebec appears on the 5 c. value, there is a view of the city in 1700 on the 10 c. value, and on the 15 c. stamp Champlain is seen setting out on one of his expeditions to the west.

The greatest name associated with this issue, however, is that of Jacques Cartier, the St. Malo seaman who discovered and explored the eastern coasts of Canada in 1534, and in 1536 entered the St. Lawrence and made his way to what is now Montreal. The great discoverer is seen also on a stamp of 1934 celebrating the 400th anniversary of his discovery and landing. This stamp is illustrated here.



Our remaining illustration shows a stamp issued to mark the centenary of a very interesting episode in Canadian history, the crossing of the Atlantic Ocean by the "*Royal William*" in 1833.

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500	Do.	6/6	25	Bulgaria	1/-	50	France	1/-
1000	Do.	15/-	50	Do.	2/-	100	Do.	2/-
100	Br. Em.	2/-	100	Do.	5/-	200	Do.	5/-
200	Do.	5/-	200	Do.	15/-	300	Do.	15/-
300	Do.	8/6	20	Croatia	1/-	25	Gt. Brit.	1/-
500	Do.	20/-	25	Do.	1/6	40	Do.	2/-
50	Austria	1/-	50	Do.	5/-	65	Do.	5/-
100	Do.	2/-	100	Do.	10/6	100	Do.	10/-
200	Do.	5/-	50	Czecho-S.	1/-	25	Greece	1/-
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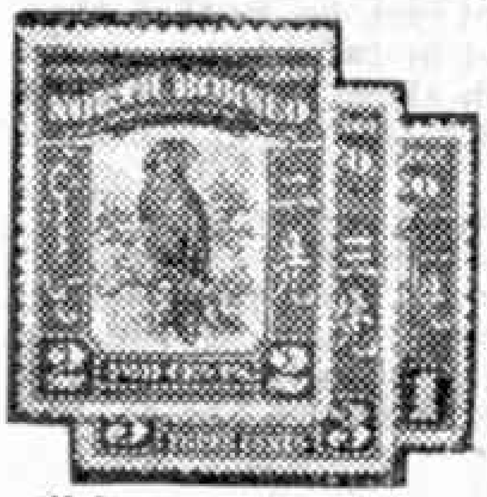
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Beautifully printed complete set of 4 stamps commemorating the Nawab's Silver Jubilee. Large bi-coloured Pictorials showing "Cotton," "Wheat," the "Sahiwal-Bull," etc. The set of the year which everybody will want. Our price 5d., blocks of four 1/8, post free with our famous "½d. Upwards" Approval Selections. Our latest illustrated price list of Packets and Mixtures will be sent free on request. Write to-day to:—
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For other Stamp Advertisements see also pages 160 and xi.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

GOVERNMENTS are quite aware how much money is to be obtained by catering for the hobby; alas, some do a bit too much catering. At the same time it is rather stupid for collectors to talk about exploitation—we heard a terrible lot of this when the "Silver Wedding" stamps were announced—when the most any post office does is to issue stamps for collectors to buy, *if they wish*.

Some of the philatelic papers have printed the news that the proceeds of the sale of a special stamp issued in Hungary are to be used against the Greeks, and that people are being forced to buy this stamp. There isn't a word of truth in the allegation, and it is to be sincerely hoped that no post office will ever issue postage stamps which *must* be bought, for then indeed the collecting of modern stamps will cease to boom. In the meantime the average collector can hardly afford to collect the older issues, if he or she wanted to, for each new edition of the standard catalogues shows rising prices which leave old and new collectors alike aghast. Who would have thought that the cheapest "Penny Black" would be listed at £3 a copy? But there it is.



Fortunately there are plenty of cheap and beautiful modern stamps available, and the writer of these notes, who has been staying for some time in Central Europe, has been amazed to see some of the beautiful collections of stamps of Austria, Hungary, Germany, France, etc., which have cost very little to get together. Modern Austria is an old favourite, and now that there is once more a good deal of correspondence between this country and our own, used stamps are freely obtainable and at low prices too, so that those who like their collection to be made up of stamps which have done genuine postal duty can easily find plenty to collect. This of course applies to other European countries. For example, the three stamps of Austria, Hungary and France illustrated were all taken from ordinary commercial correspondence, and cost only sixpence for the lot.



Of course, our own Commonwealth issues are by far the most popular with British collectors, and rightly so; but unless one's pocket is fairly well lined, stamps from the smaller colonies take a bit of getting. Still there are the large Dominions and used stamps from these countries are cheap and attractive. But please be sure to collect only copies that have been nicely cancelled and are well centred. Don't be fobbed off with poor copies, or your collection will never be worth showing, and certainly will never be worth much if you wish to sell.



Two collectors have recently asked the same question. Is there any investment future in modern Russian stamps? And the answer is no. One of these collectors had spent a considerable sum on his collection, and when he tried to sell it in a large provincial city he was politely told to offer it to the dealer from whom he had bought the stamps. He then tried in London and got a bid which amounted to only about one-third of the sum he had spent. Well, the writer was not surprised to hear that; the average dealer is not keen on modern Russian stamps, for he knows that the Russian Government keeps stocks of all or most stamps it has issued, and can probably go on printing more *ad infinitum* if it wishes to do so. It would certainly wish to do so if prices rose! By all means collect Russian stamps if you feel like it, and if you don't mind what the selling price of those stamps is likely to be.

As predicted, the "Silver Wedding" stamps look like turning out to be a first-class investment, so complete your set as quickly as you possibly can. Now that they are out of the way, all eyes are turned on the forthcoming stamps to be issued by the colonies—or so it is said—to commemorate the 75th anniversary of the "U.P.U.," or Universal Postal Union. At the time of writing there are no official details, but most countries will issue a set, and the first country to announce what it proposes to do is Czecho-Slovakia. Apparently this country will issue a set and not a single stamp, and as a complete collection of the stamps to be issued for the event might prove valuable property, particularly used, collectors could do worse than try and get one together.



Sweden is a country that issues fairly attractive commemorative stamps from time to time. It does so in such an unobtrusive manner that little publicity comes its way, but the latest set issued in honour of the centenary of Strindberg is surely worth notice. The set comprises three values, of 20, 30 and 80 ore respectively. As usual they are most likely to be found used, and there should be plenty about, for unlike Russian commemorative stamps, Swedish stamps get distributed all over the country. Most will be imperforate on two sides. This is because stamps are mostly sold in rolls in Sweden, though stamps in booklets are perforated on all four sides. August Strindberg is Sweden's greatest, or at least best known, author. He is chiefly known abroad for his plays, but he is an international figure by any standard, and a set of these stamps will be a welcome addition to any "literature" collection.

A final word. "Silver Wedding" stamps have already been mentioned, but as the tip of the month, try to obtain any that you need for your collection as soon as you can, for they are going to be very rare indeed, at least in the high values. Of course, these stamps may be beyond the pockets of many of us, so there remain the low values. These are likely to prove anything but scarce, but still they will be worth having.

Ships' Flags, Past and Present—

(*Continued from page 132*)

indefinite time, giving ample opportunity for the man who is not an expert to read it without calling for a repeat. Flag signalling is undoubtedly going out of favour, and many seamen prefer the semaphore for short distances and a lantern using the Morse code for longer, with wireless when the ships are outside visual range. The decline in flag signalling is a matter of concern to the authorities.

Warships have long used a set of flags which includes some of those in the International Code, although with different meanings and many additional flags, so that the total was 86. Naturally the Code Book is a very closely guarded secret. In 1948 an Admiralty Committee went into the matter with the object of simplifying the code and decided that International Code flags should be used—the ships all have them on board for the purpose of communication with merchantmen or foreign warships—so that the signalmen should not have to keep so much in their memories although, it must be admitted, the naval signal rating very seldom finds any difficulty in that, and his work is the admiration of every seafarer.

The ensign hoisted half way up the staff or mast is a sign of mourning; when it is "dipped" by being lowered to the half mast position and then rehoisted it is the usual salute between ships meeting, and is acknowledged in the same way. The Navy's "church pendant" and the yachtsman's "mess flag" indicate that the tactful visitor should keep away unless his business is very urgent.

Finally there is the use of flags for decorative purposes, normally by dressing the ship over all, or "rainbow fashion" as it is sometimes called. When ships had two or three masts this could be done very effectively, but now that so many have only one the effect is rather spoiled. Code flags, both International and Navy, are used, and in the Navy there are very strict instructions as to the order in which they are to be hoisted to prevent signalmen sending humorous messages to those who are "in the know." In merchantmen or yachts there is no definite order, but square flags and pendants are hoisted alternately as far as possible. The National Ensign is hoisted at the principal masthead, but when the ship is dressed as a compliment to a foreign country its ensign is substituted.

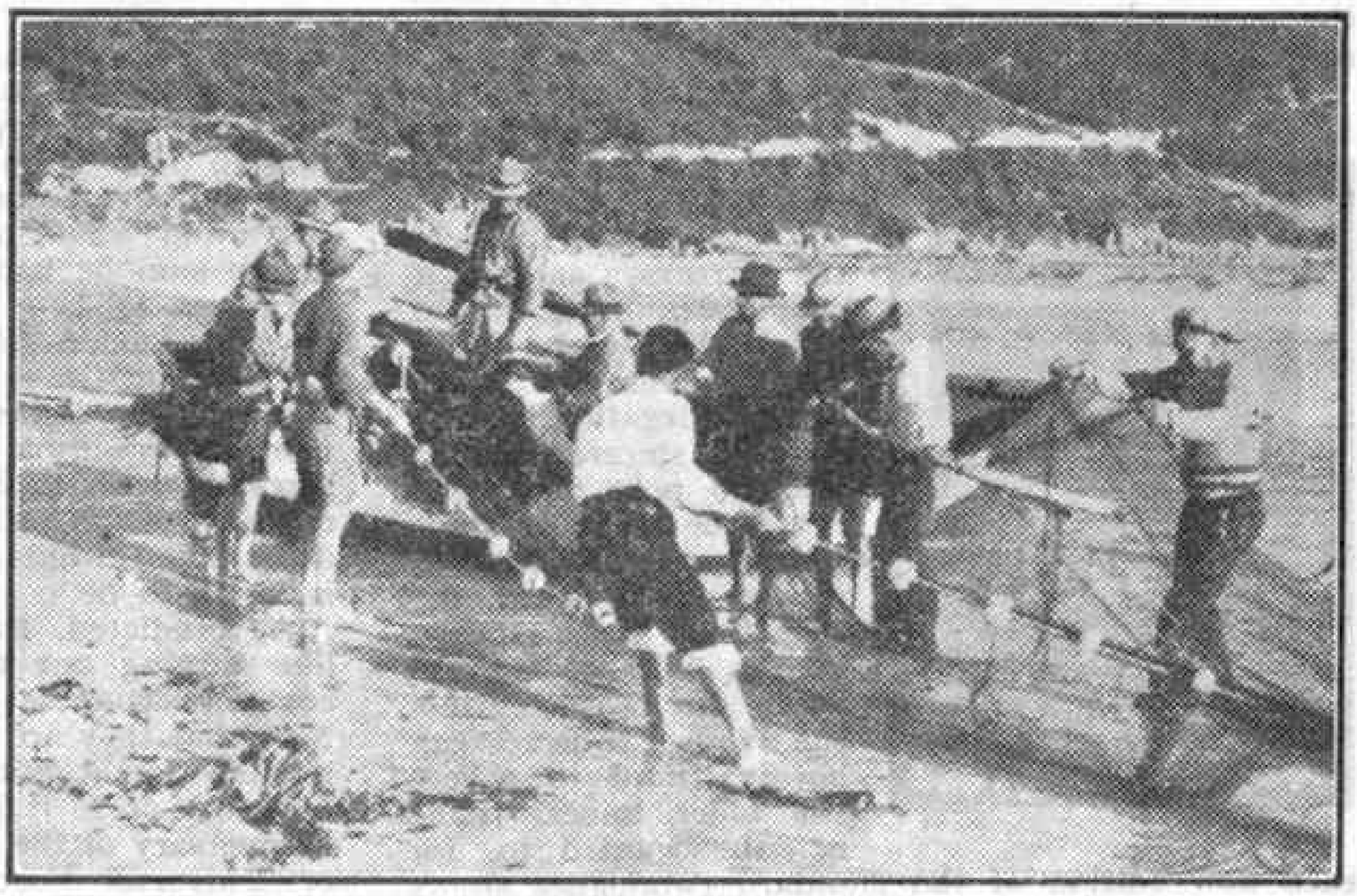
Canned Shrimp—(*Continued from page 143*)

offshore fishing. The trawl favoured is a bag-shaped net held open at the mouth by a wooden beam with shoes or runners at each end, and it is so designed that the bag is kept open by the pressure of water as it is pulled along the bottom. When the net is full it is dragged to the side of the boat and its contents transferred to the hold by dippers. This is the procedure in inshore fishing. In offshore fishing a "try net" is first put down to ascertain what shrimp are about. If conditions are favourable the large trawl net goes down. A reasonable catch in an hour and a half or two hours of trawling would be four or five barrels of shrimp. The net is hauled on board by a winch. The crew then sort the fish, using wooden rakes to prevent injury from crabs, stingarees and catfish, as well as from the spines of the shrimp themselves. The catch is then stored in the hold between layers of ice.

Some 46 per cent. of the catch is sold fresh, 25 per cent. is canned, 15 per cent. frozen, 10 per cent. dried, and 4 per cent. cooked and peeled. When shrimp is to be sold fresh the heads are removed, and the body and tail are washed and packed in ice to keep them in prime condition during the journey to market. For long distance markets the shrimp are conveyed in special motor trucks that travel day and night to reach their goal. A van has two drivers, with provision for one to sleep while the other carries on driving.

From the moment that the shrimp arrive at the factory they travel very fast and seldom stop until they are safely inside a can. A belt conveyor is lowered into the hold of the boat within reach of a man who shovels the shrimps into it and tries to keep a steady flow. The shrimp are tipped off the belt into a flume and carried in running water into a washing vat. Here they are picked up by a metal inspection belt, from which girls pick out and remove any defective shrimp. If the load looks old, or rejections number more than five per cent., the whole of it goes into meal.

If the shrimp are passed they are placed in a wire basket and rolled into the picking room, where the heads and shells are removed. The remaining meat part goes through a series of six washings and then passes along another inspection belt, before reaching the "blanching" process. This consists of pan-boiling in large wire baskets in water about three times as salty as the sea. The strictest rules of hygiene are observed throughout the various processes, so nobody need be nervous of having a shrimp "out of a can."



Coloured fishermen at Hout Bay Cape, South Africa, hauling in their nets after a successful catch. This interesting photograph by J. H. Credie, of Kempton Park, Transvaal, South Africa, was awarded a prize in an "M.M." Photographic Competition.

COMPETITION RESULTS

HOME

DECEMBER 1948 ADVERTISEMENT CONTEST

1st Prize: G. L. Groom, Pinner. 2nd Prize: Miss E. Yail, London N.W.11. 3rd Prize: K. E. Mathews, Orpington.

DECEMBER 1948 QUIZ CONTEST

1st Prize: R. Smith, Ilford. 2nd Prize: M. J. Wootton, Newthorpe. 3rd Prize: I. S. Wick, Enfield.

OVERSEAS

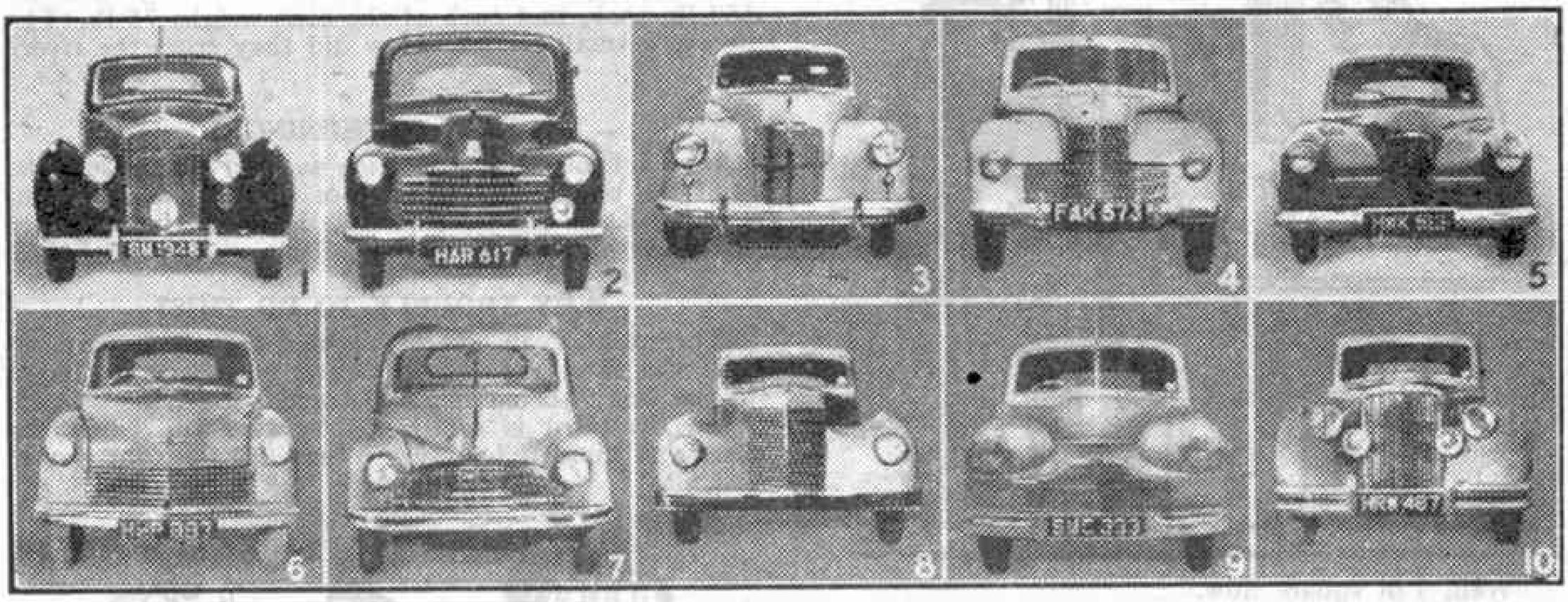
JULY 1948 FIGURE DRAWING CONTEST

1st Prize: S. Wylynks, Winnipeg, Canada. 2nd Prize: H. Rawlings, Otorohanga, N.Z. 3rd Prize: G. Grainger, Bromley, E.2, N.Z.

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographhic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Do You Recognize These Car Faces?



Motoring enthusiasts have learned to recognize the designs of radiator grilles, the lines of wings, and the positions of lamps, bumpers and other details that give each car its own individual "face," and they can tell at a glance what is the make of practically any car they meet. In fact, to the average boy the car is something alive and personal, and not merely a piece of mechanism. Interest in car faces is perhaps greater than ever just now, when new shapes are making themselves evident. While some makes keep more or less closely to the classical lines of the past, others have become modern, with heavier grilles set low down, alligator bonnets and wide wings merging into the general lines of the body. A competition based on car faces therefore is timely, and here it is.

In the illustration on this page we show the fronts of 10 modern British cars, which we ask readers to recognize. The 10 pictures are numbered, and in their entries readers must state with each number the name of the car that it represents. Sufficient must be given to identify the model completely. For instance, it would not be enough merely to give such a name as "Morris" or "Austin," as there is more than one design in production with each of the two firms concerned, and indeed with others represented in our contest.

Prizes of 21/–, 15/– and 10/6 will be awarded to the competitors who send in the best entries in order of merit, and in the event of a tie the judges will take into account the neatness and novelty of the entry. There will be a section for overseas readers, in which prizes of the same value will be awarded. Consolation prizes will be given to other deserving efforts in both sections.

Entries must be addressed "*Car Faces Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home, 31st May; Overseas, 31st August.

An Aircraft Drawing Contest

This month we invite readers to take part in the last of the present season's drawing contests. Competitions of this kind are always very popular, and we are sure that readers will thoroughly enjoy another opportunity of showing what they can do in this respect.

What am I to draw? That is the question that readers will already have asked. The answer is an aircraft of some kind. Practically every reader of the "*M.M.*" will have some aircraft in which he is specially interested, and that is what he is asked to show in his entry. It may be an air liner or a military machine, a famous aircraft of the past or a modern one, a fast one or a slow one, in fact any machine that can rise into the air and move there will serve as the subject. The helicopter of course is not excluded, and in view of the rising interest in this type of machine, no doubt a large number of entries will give it due prominence. Drawings of gliders also will be accepted, and if any reader is specially attracted by dirigible balloons he can send in a drawing of one of these.

Machines may be shown either on the ground or in flight. Colour may be used if desired, but the prizes will be awarded on skill in drawing.

The contest is divided into two sections, for Home and Overseas readers respectively, and in each prizes to the value of 21/–, 15/– and 10/6 will be awarded for the best drawings. Entries must be addressed: "*Aircraft Drawing Contest, Meccano Magazine, Binns Road, Liverpool 13.*" The closing dates are: Home Section, 31st May; Overseas Section, 31st August.

April Photographic Contest

In the fourth competition of our 1949 series we invite readers to submit photographs dealing with a special subject. This is SPRING, and any photograph that suggests the coming of this season will be eligible.

The only conditions in this contest are 1, that the photograph must have been taken by the competitor, and 2, that on the back of the print must be stated exactly what the photograph represents. A fancy title may be added if desired.

The competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate sections for overseas readers, and in each section prizes of 21/–, 15/– and 10/6 will be awarded.

Entries should be addressed "*April Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 30th April; Overseas Section, 30th July

Fireside Fun

"My head's burning, doctor. Have I got brain fever?"
"Well, not exactly. Just fever."

• • • •



"Well, I'm square now."
"Yes, sir, and I hope you'll be round again soon."

• • • •

"One tree that would remain after a forest was burned out is the ash."
"That's nothing. I know one that would still be there after the seas had stormed over it."
"What tree is that?"
"The beech."

• • • •

"Yes, I'm well off now, but once I was glad to be down and out."
"When was that?"
"After an aeroplane trip in a fog."

• • • •

"If you're hungry, just cut up that wood and I'll give you a meal."
"I'm only hungry, mum, not desperate."

• • • •

"Jones doesn't want you to say anything about his black eye."
"Wants to keep it dark, I suppose."

• • • •



"Good, but where is its tail?"
"It's still in the ink pot, miss!"

BRAIN TEASERS

A FISHY PROBLEM

The tail of a fish weighs 2 lb. Its head weighs as much as the tail and half the body, and the body is as heavy as the head and tail together. What does the fish weigh?

• • • •

FORWARD AND BACKWARD

A man and his wife, two sons and a dog have to cross a stream in a boat that can carry a load of 150 lb. only. The man and his wife weigh exactly 150 lb. each, and each of the sons weighs 75 lb. The dog is a small terrier. How did they cross the river?
S.W.C.

• • • •

EASY RECKONING

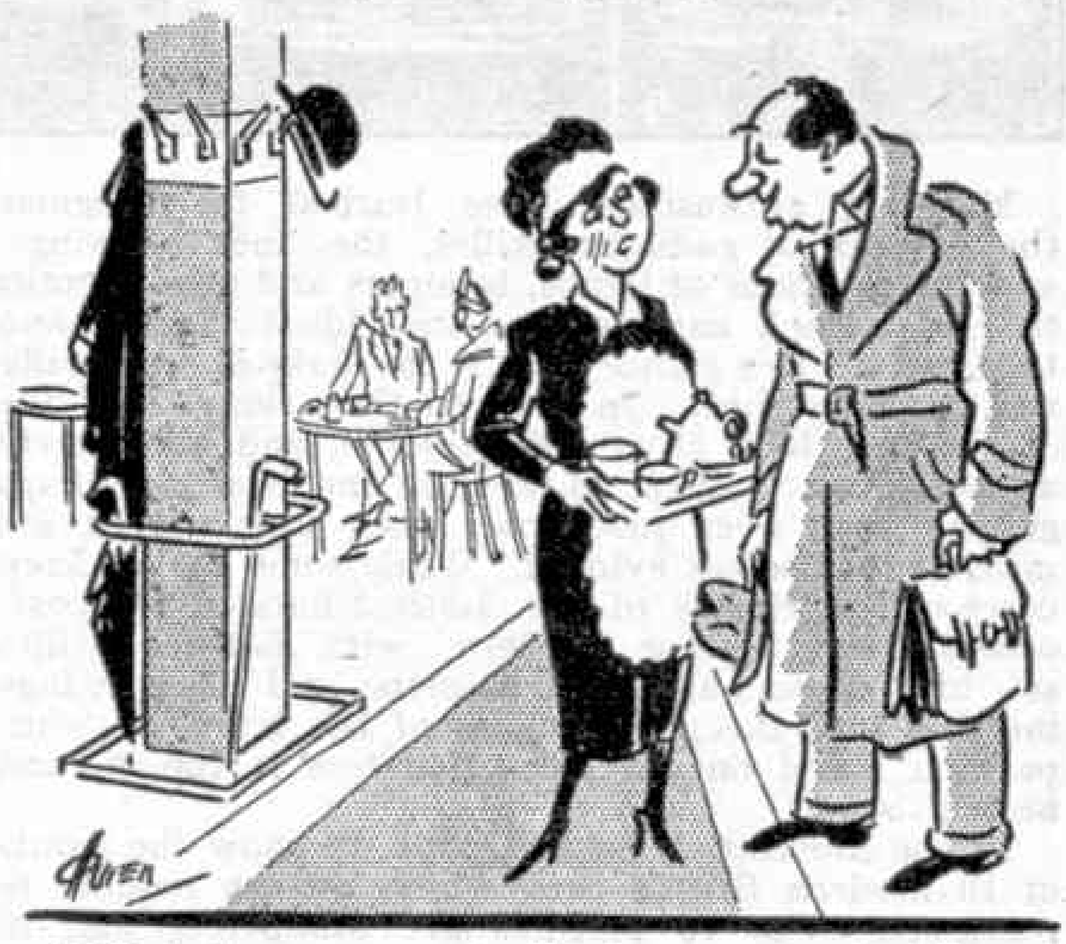
In a school there are twice as many boys as girls. Half the boys and a quarter of the girls learn Latin, and the Latin classes total 65. How many pupils are there in the school?
B.I.N.

• • • •

WHY TROUBLE TO DO THIS?

The number 39 can be divided into four parts so that the same result is obtained when two is added to the first, when two is subtracted from the second, when the third is multiplied by two and when the fourth is divided by four. What are the four parts?

• • • •



"Did I leave an umbrella here, yesterday?"
What kind, Sir?"
"Oh any kind; I'm not fussy."

• • • •

SOLUTIONS TO LAST MONTH'S PUZZLES

The three words indicated in our first puzzle last month were CON, CANOE and MACE. Placed in their proper positions the letters in these make up the word MECCANO.

The new pens made by the farmer in our second puzzle were triangular in shape, each side being made of one hurdle. Twelve hurdles were used in making up six pens in the form of a regular hexagon and with the remaining two hurdles another pen was added on one of the sides of the hexagon.

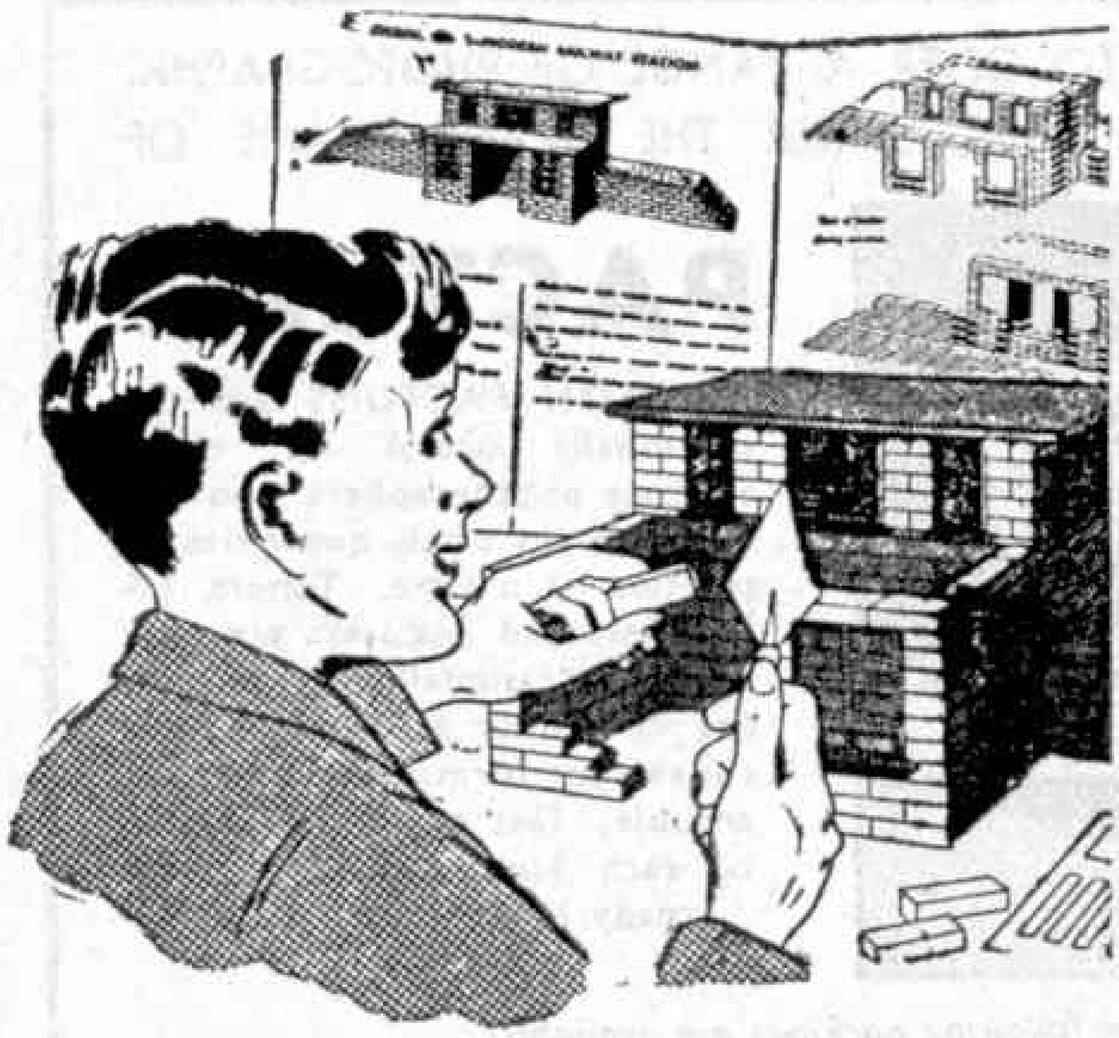
A drulitch is only 25 rambics, while a couple of gloofs is 40 rambics and therefore are to be preferred. That of course is easy to work out. Gloofs to quertons is more complicated. One gloof is clearly four-fifths of a drulitch, which is 144 quertons, so that the exchange for a gloof is 115 1/5th quertons. It is easier to stick to pounds, shillings and pence!

By inserting 12 E's in the line of letters of our fourth puzzle we get THE ELEPHANT EMERGED FROM THE EVERGREEN FOREST.

• • • •

THIS MONTH'S HOWLER

A sentry is a man who has lived a hundred years.



JOHN IS BUILDING HIS MODEL VILLAGE WHY NOT YOU?

If you are the lucky owner of a BRICKPLAYER KIT you will have spent many enjoyable hours building the models. As you know, you can dismantle them if you wish, and use the bricks for other buildings. But why not leave them standing and keep on building until you have a complete little village of your own. It will give you ample opportunity to use your skill and initiative and lots of pleasure.

Your local stockist will gladly supply you with the following accessory packs.

ACCESSORY PACKS

No. 100. Contains 100 Full-size Bricks ..	2/6 each
No. 101. Contains 52 ¾-size and 72 ½-size Bricks	2/6 each
No. 102. Contains 42 Full-size and 16 ½-size Gable Bricks and 4 Peak Bricks	2/6 each
No. 111. 4 sheets Roof Tiles, 11¾ x 5¾ in., and 2 lengths of Capping Tiles	2/- each
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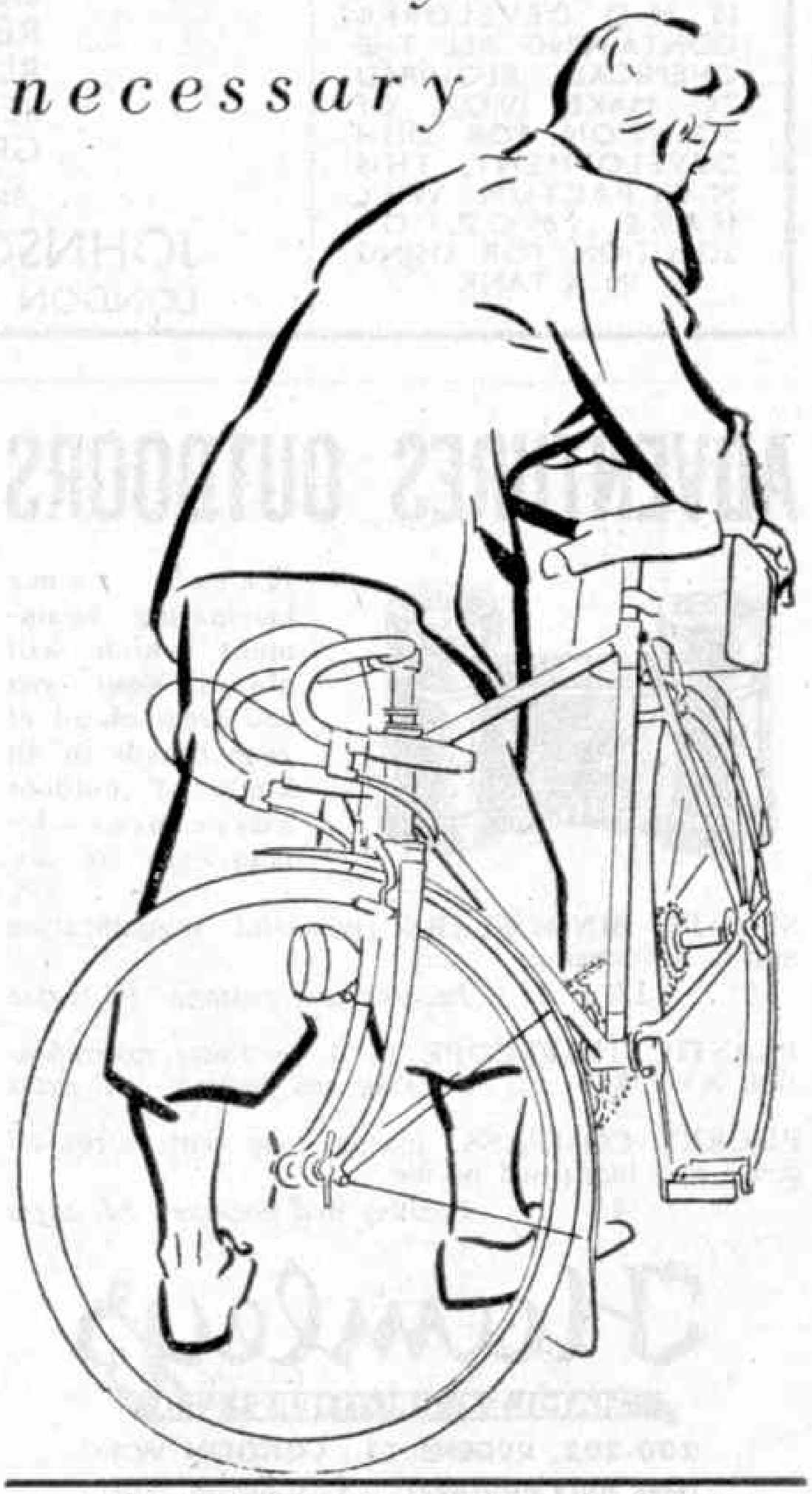
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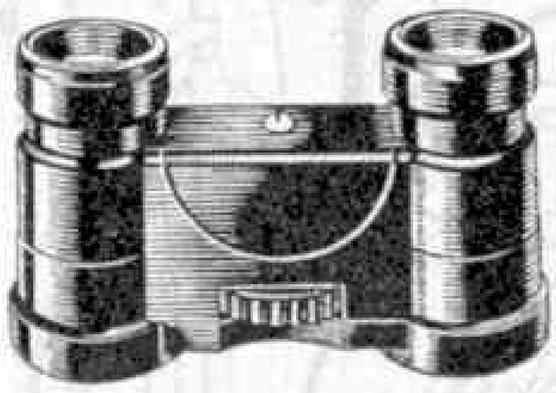
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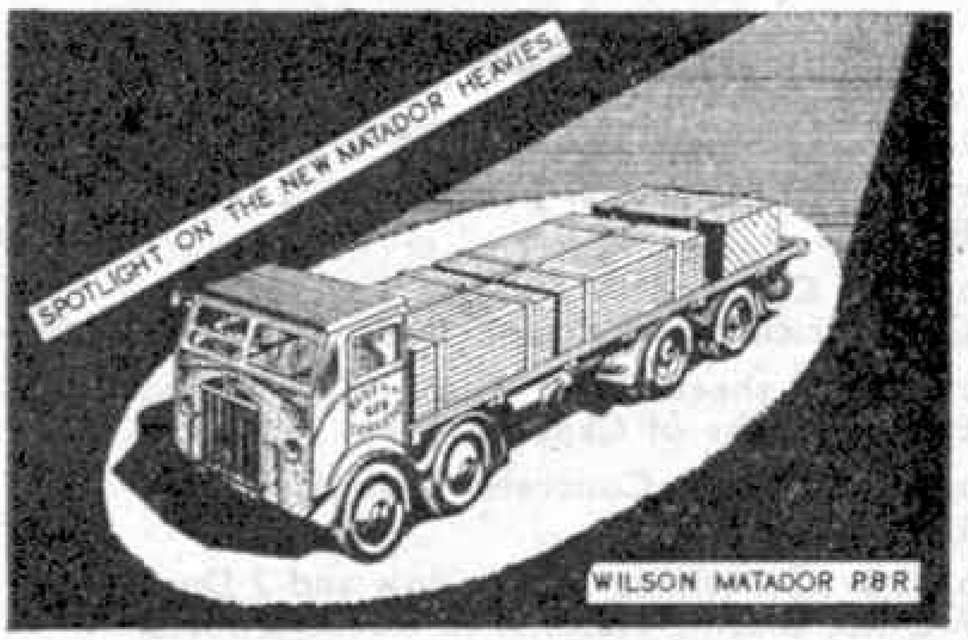
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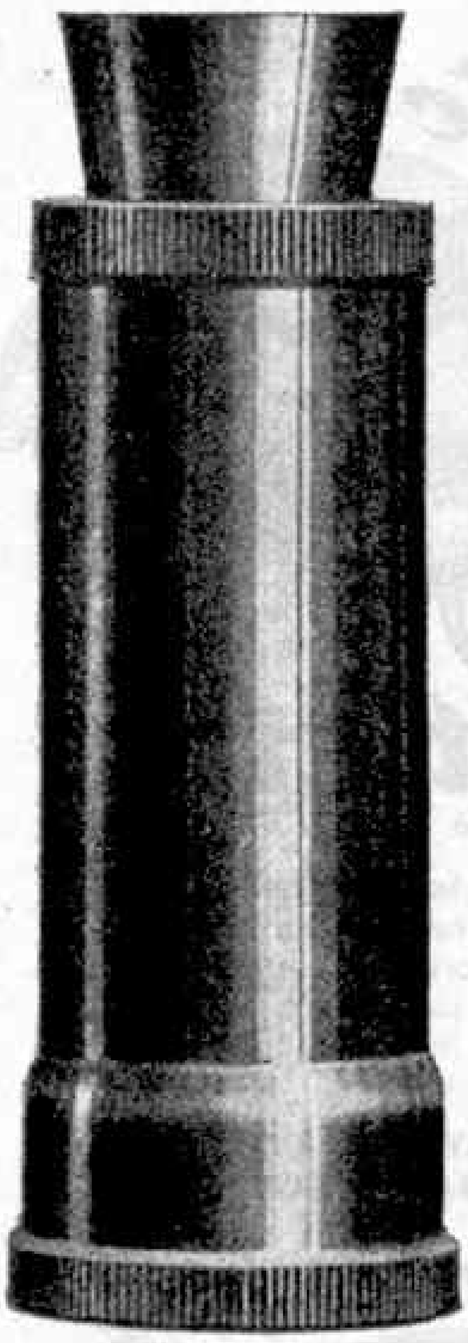
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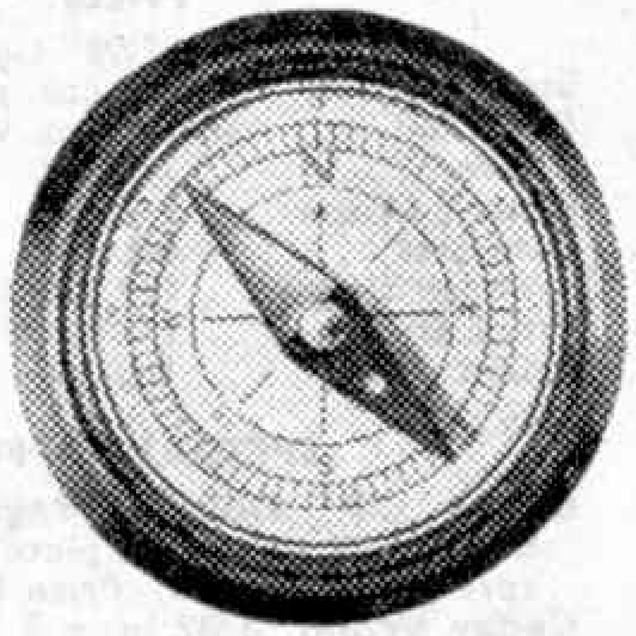
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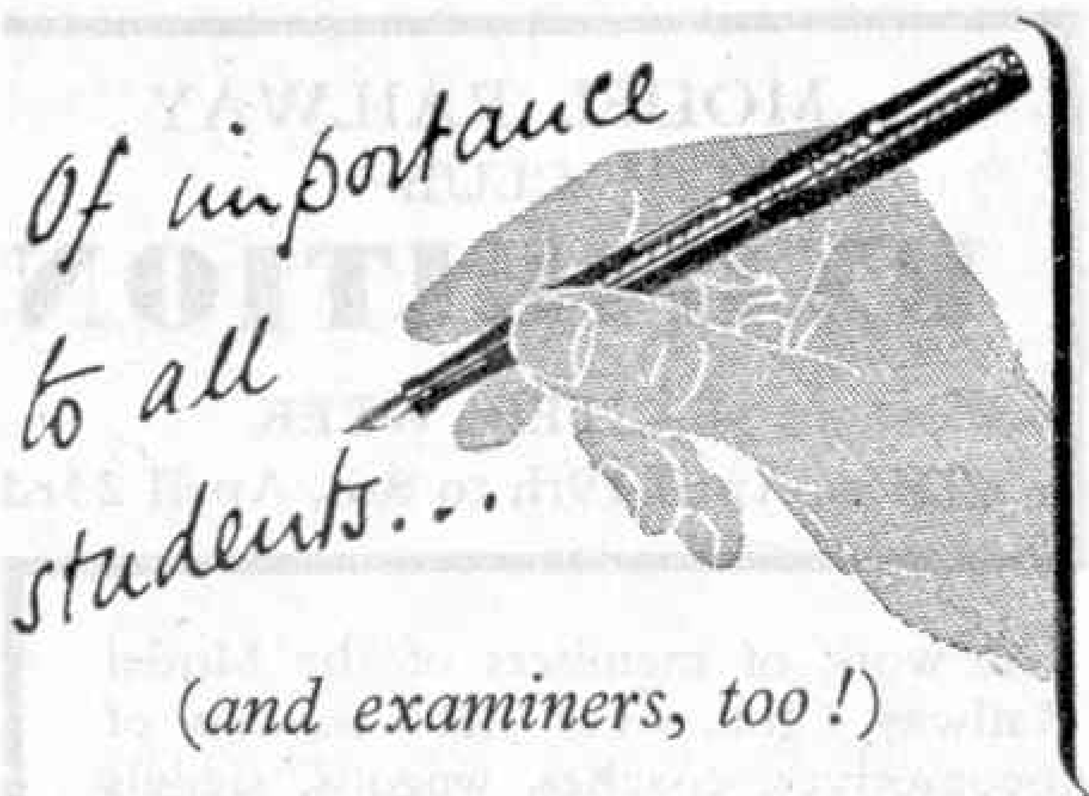
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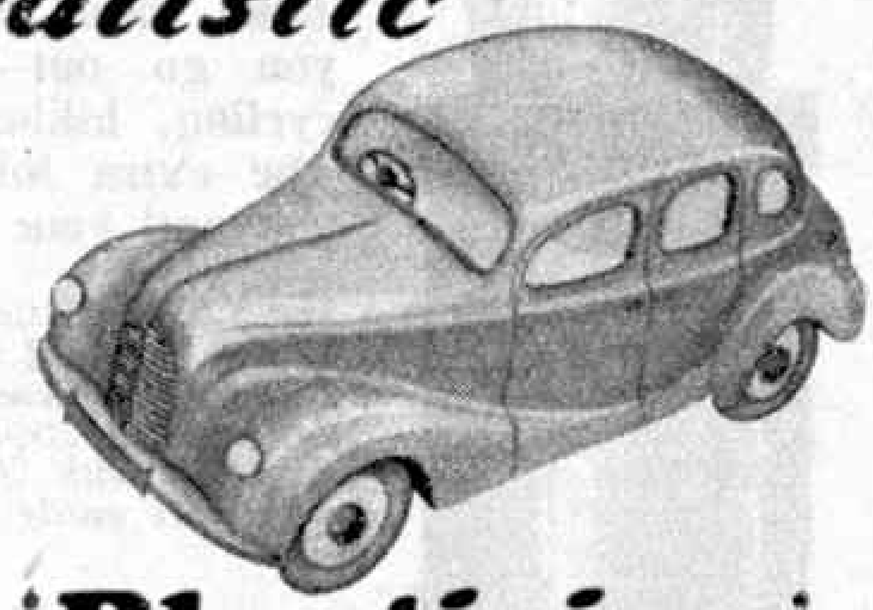
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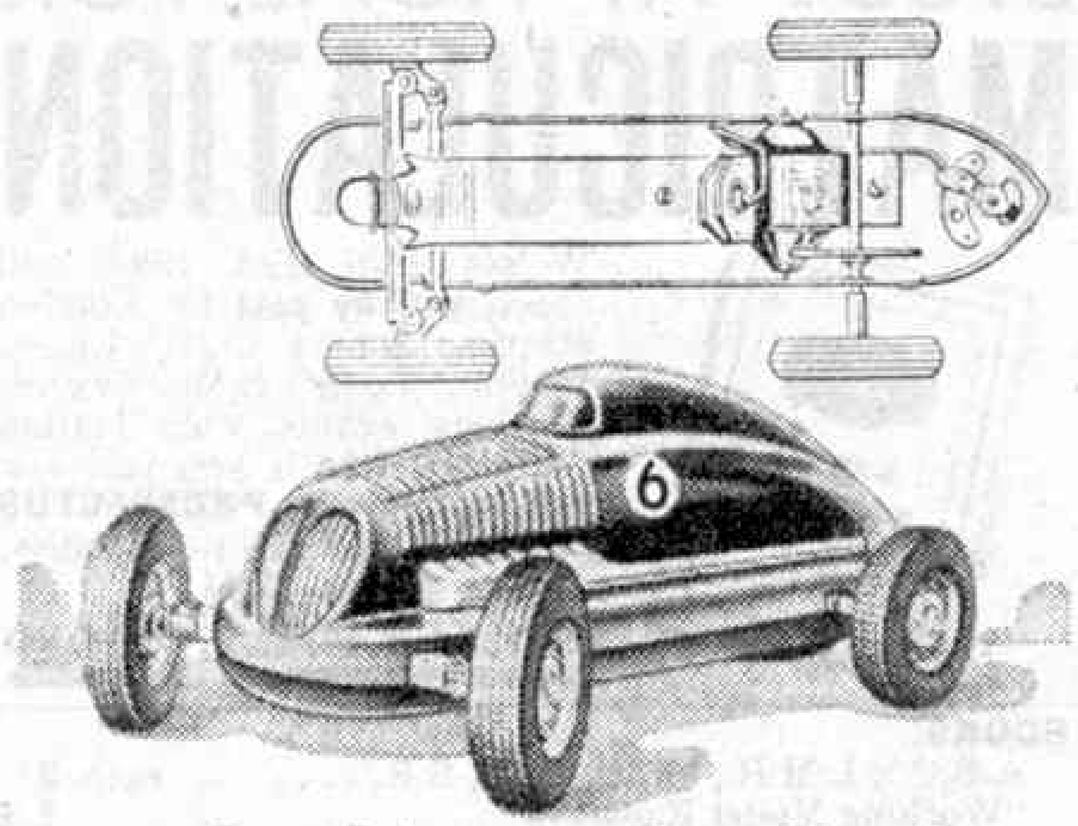
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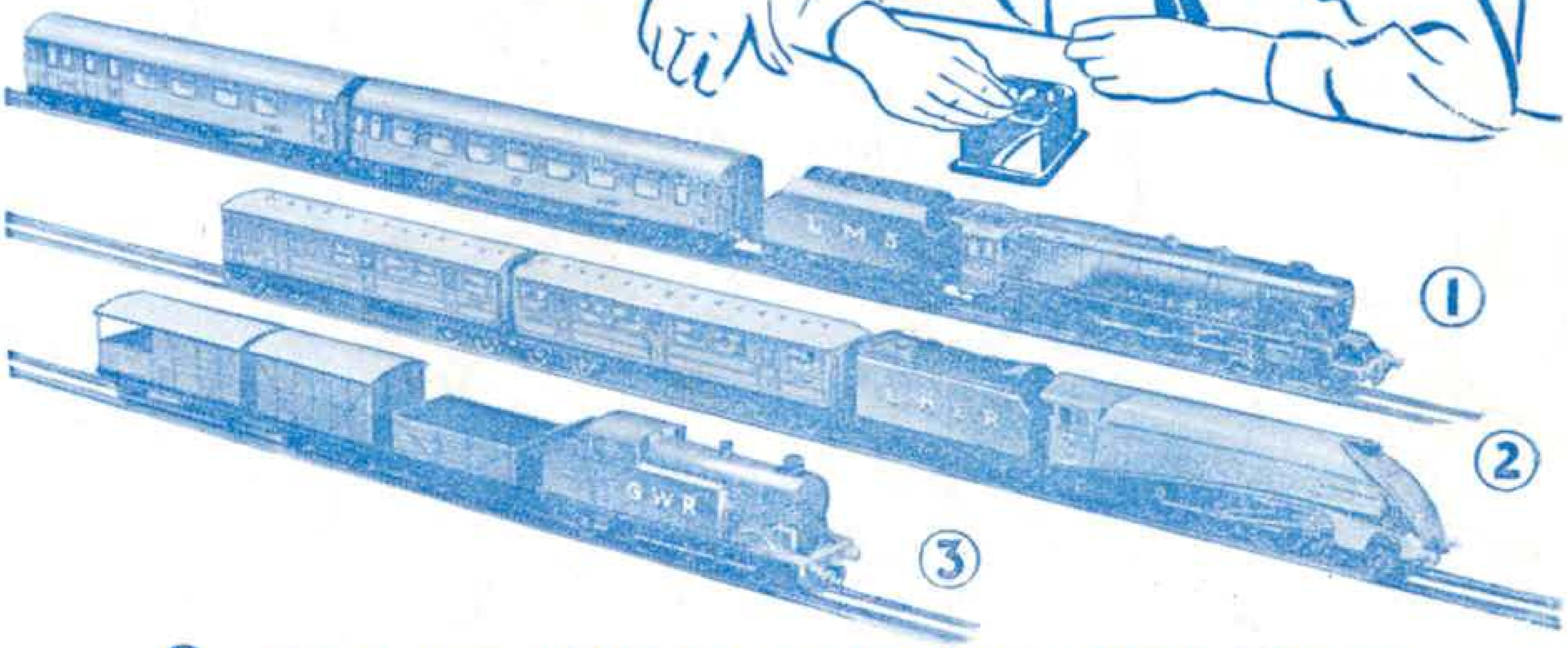
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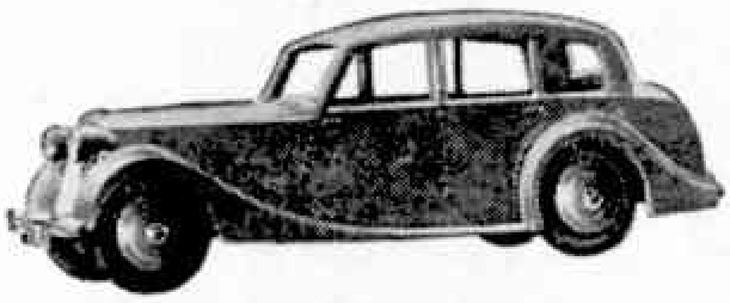
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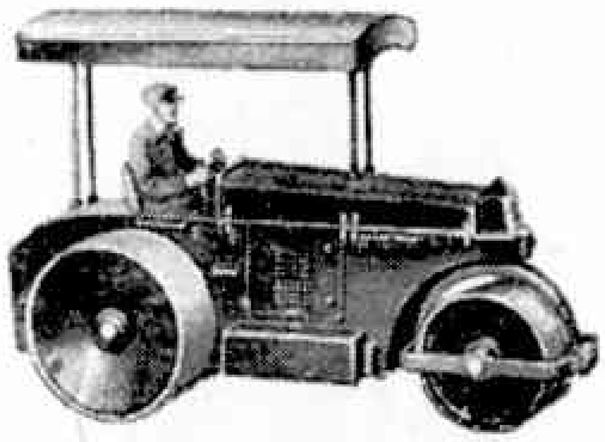
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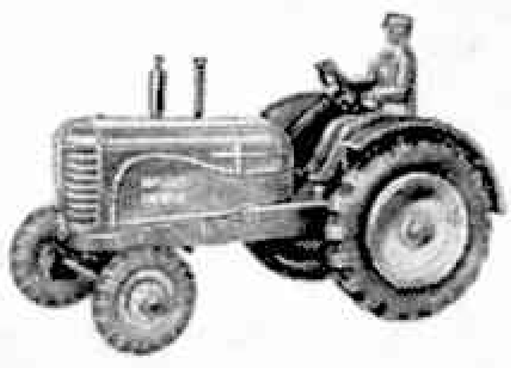
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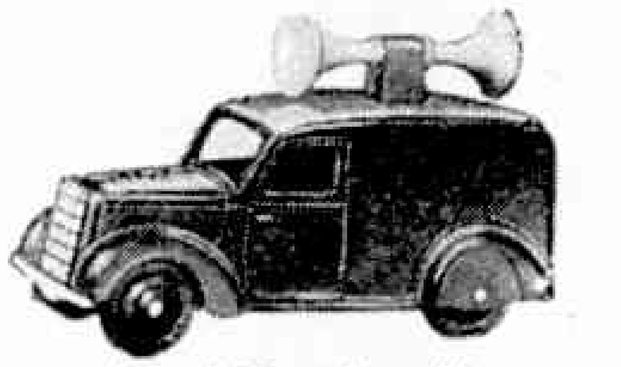
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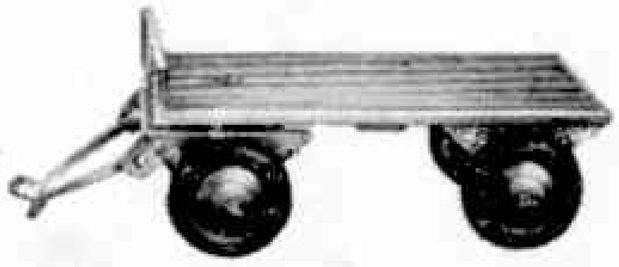
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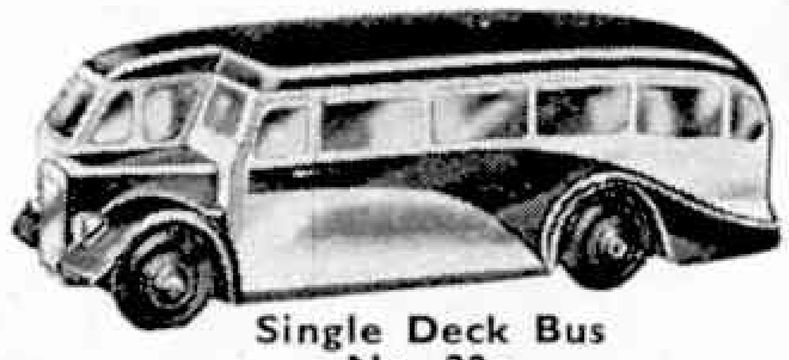
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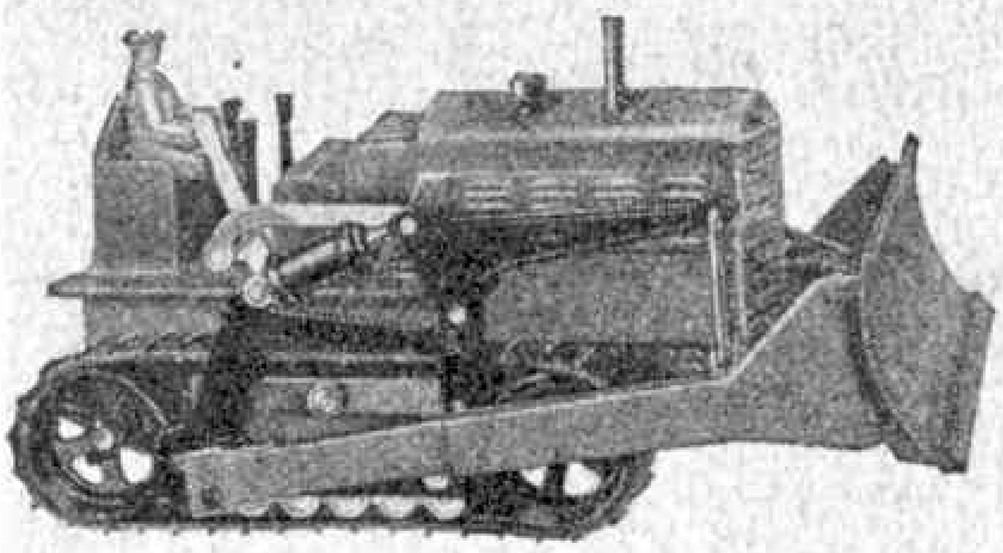
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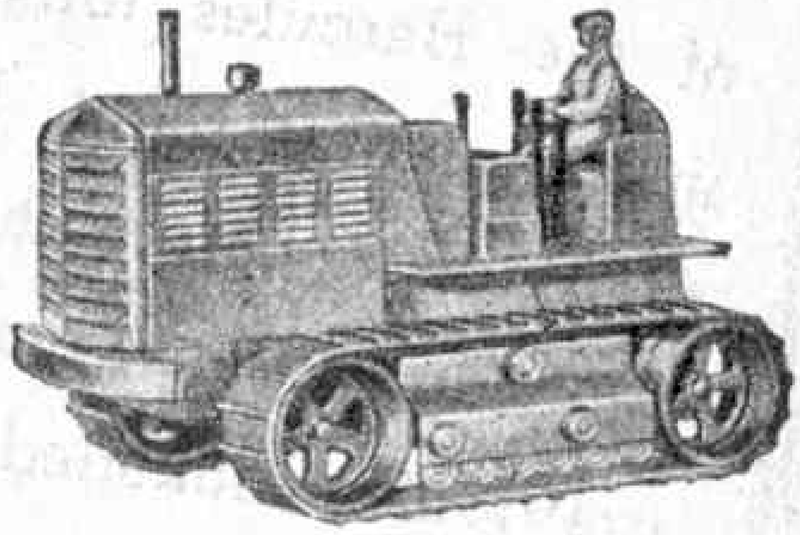
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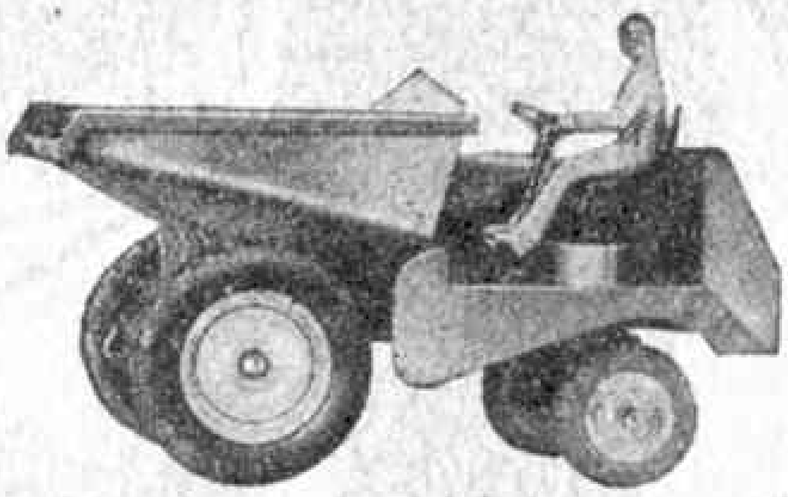
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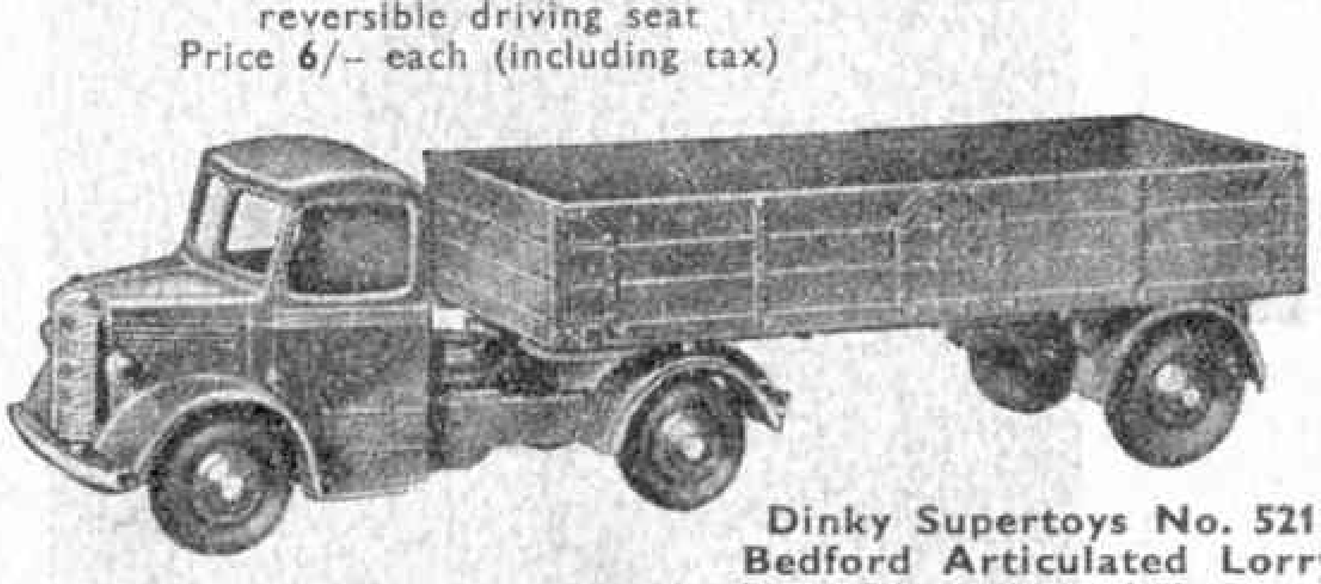
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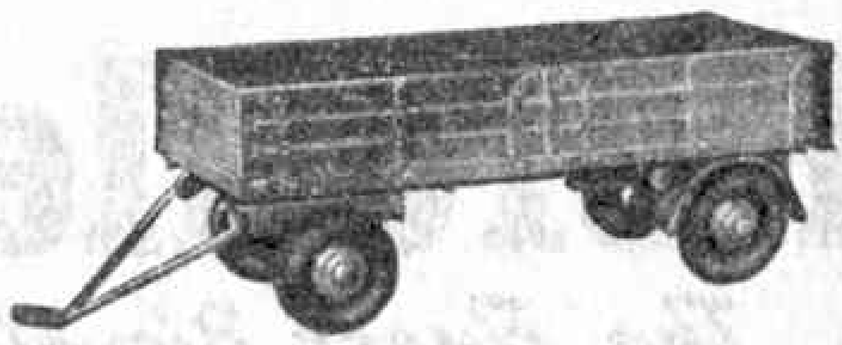
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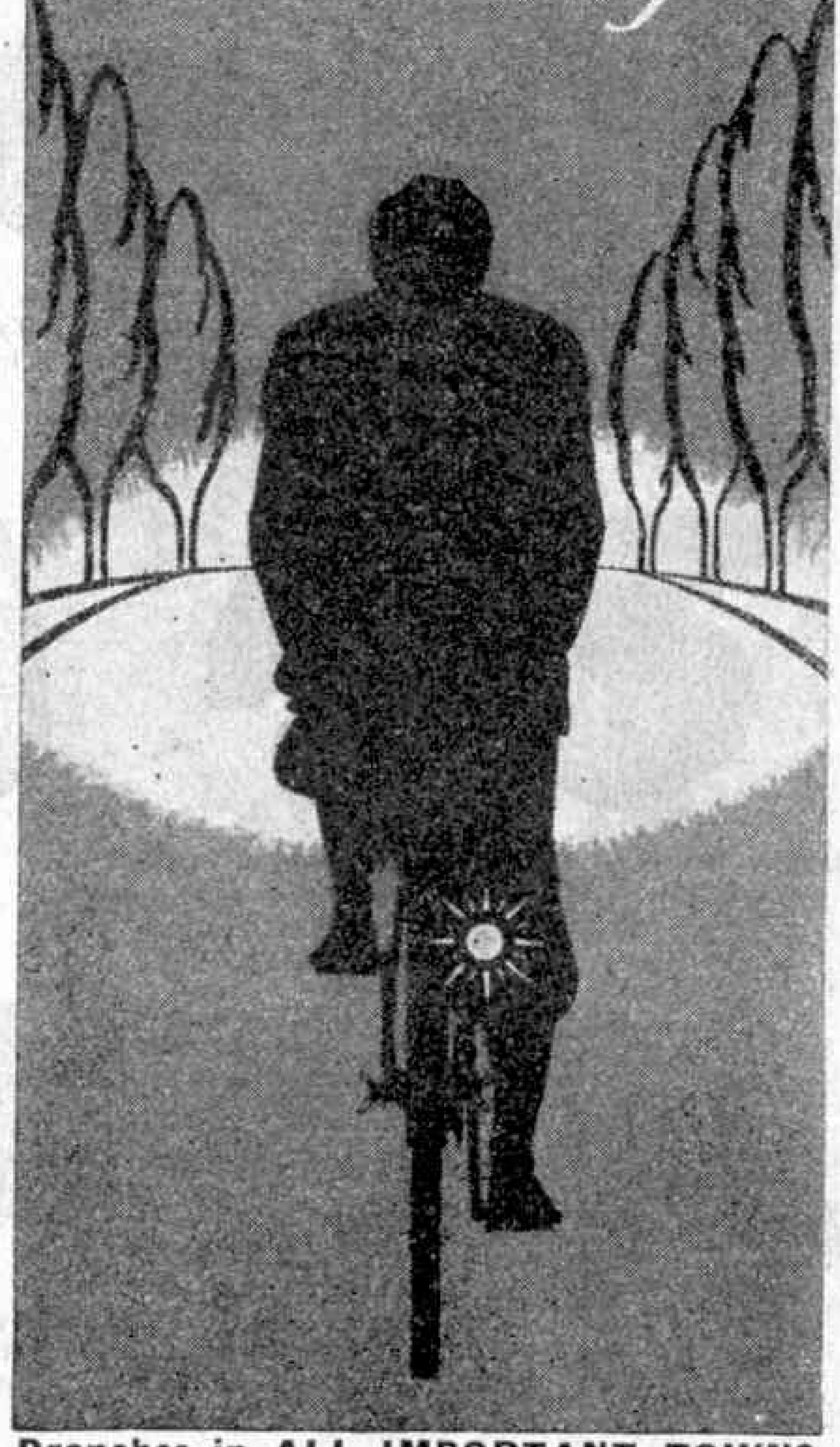
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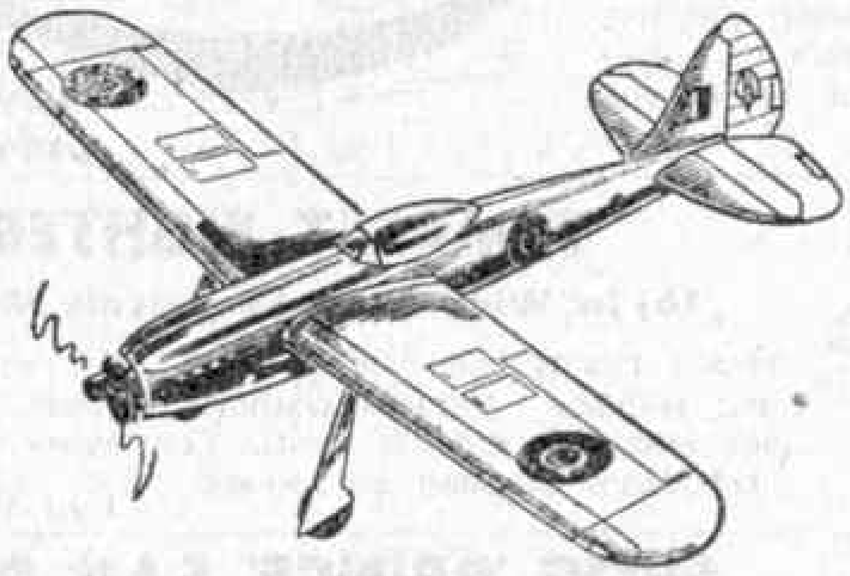
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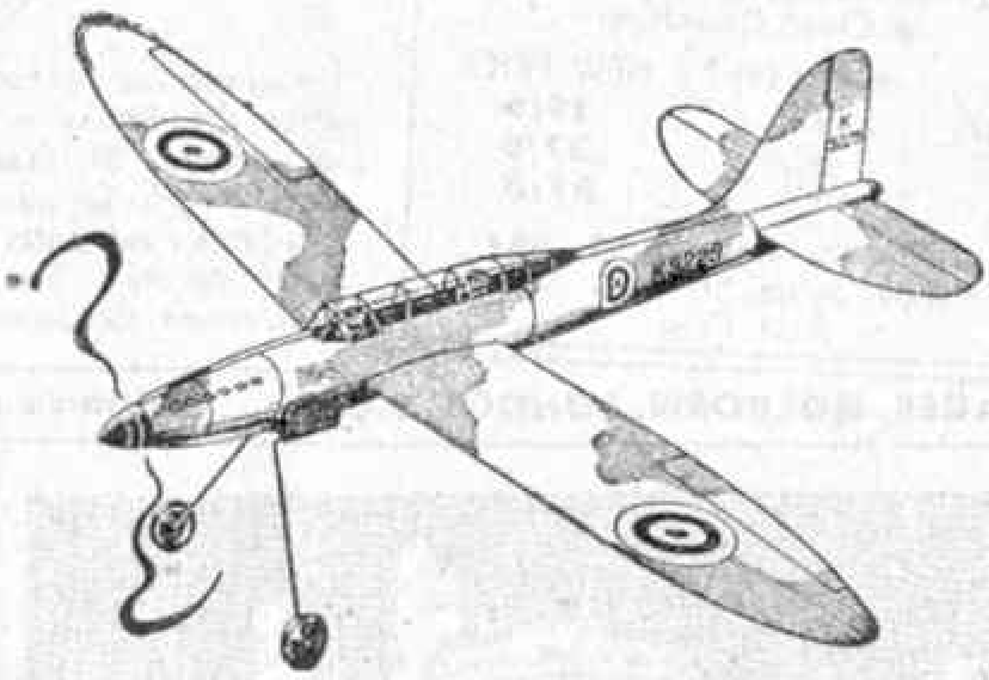
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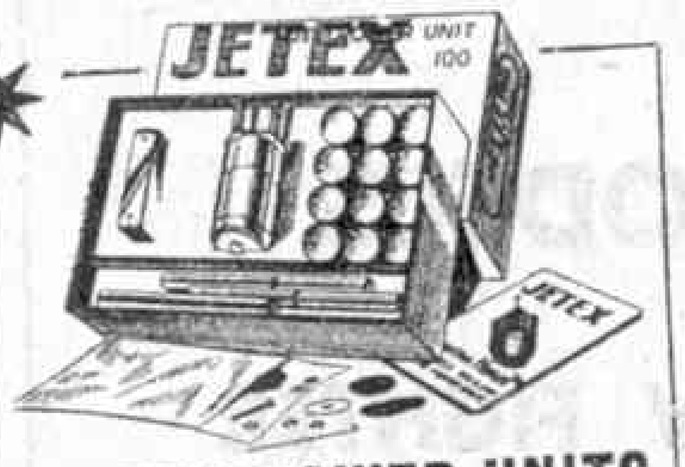
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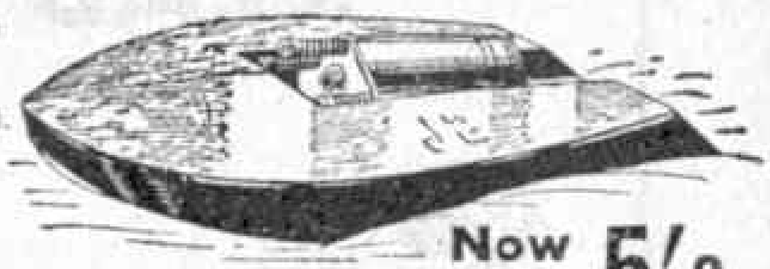
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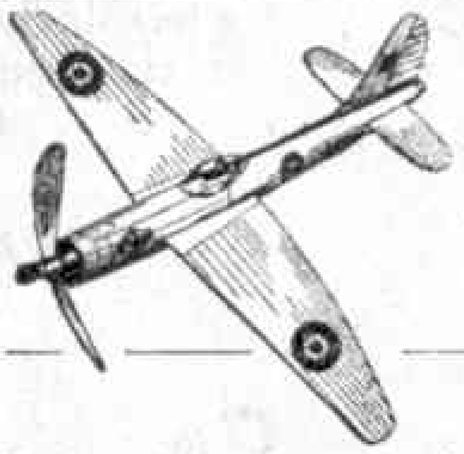
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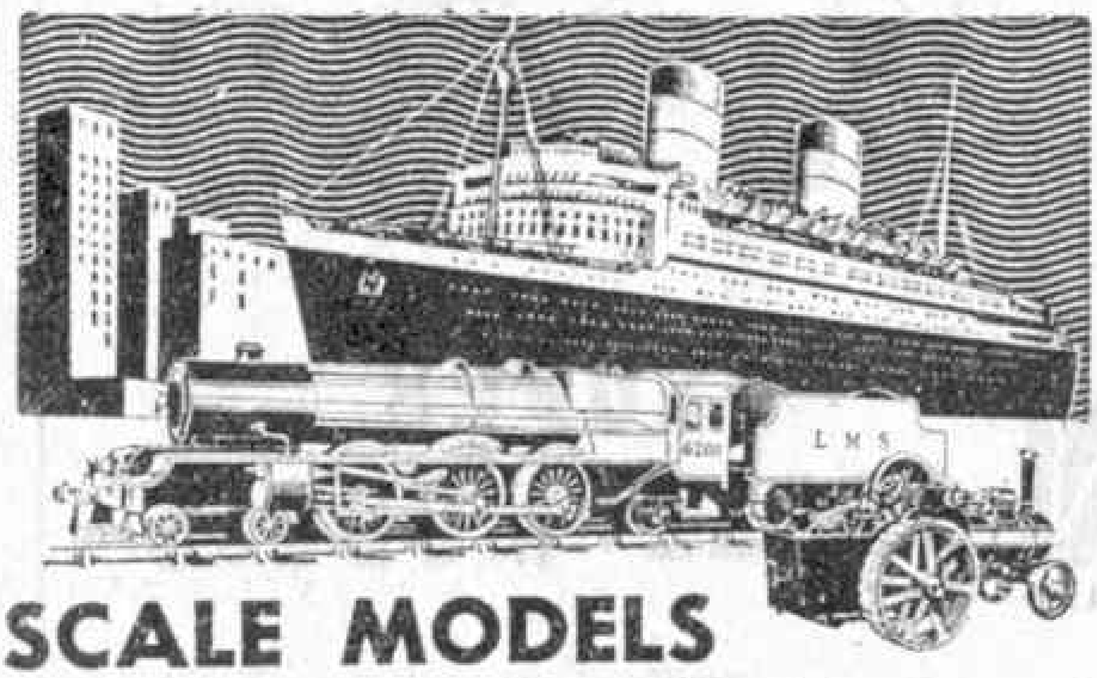
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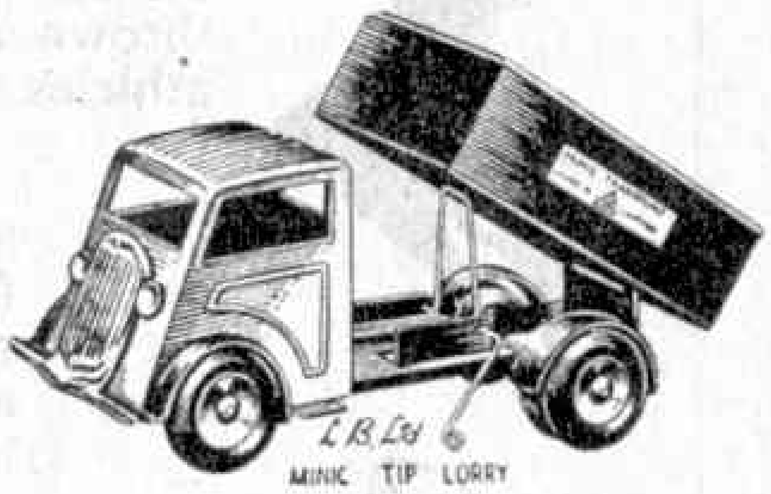
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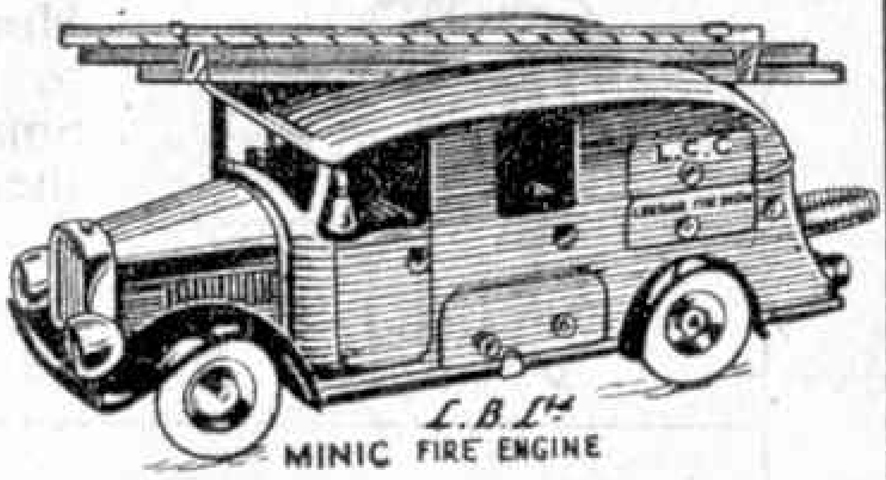
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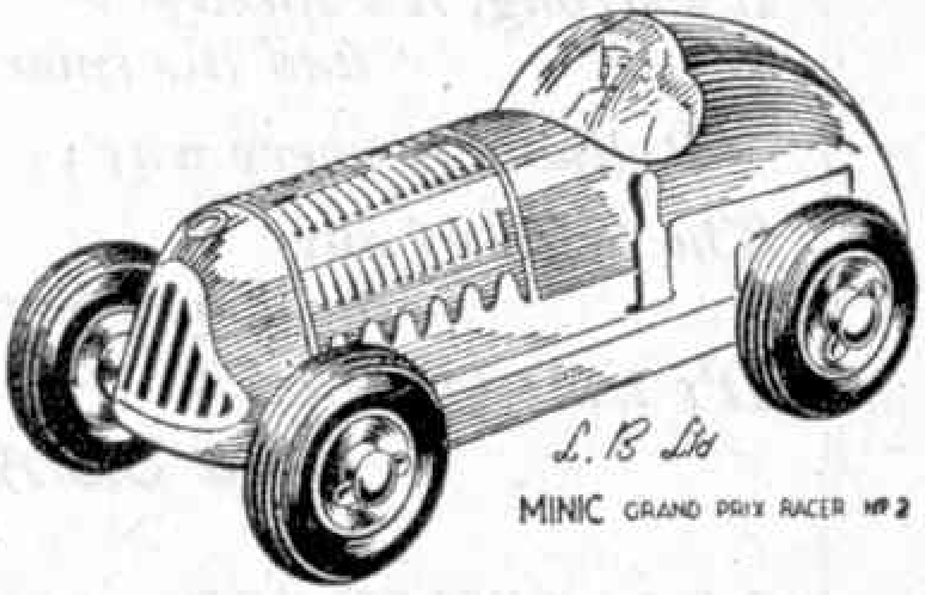
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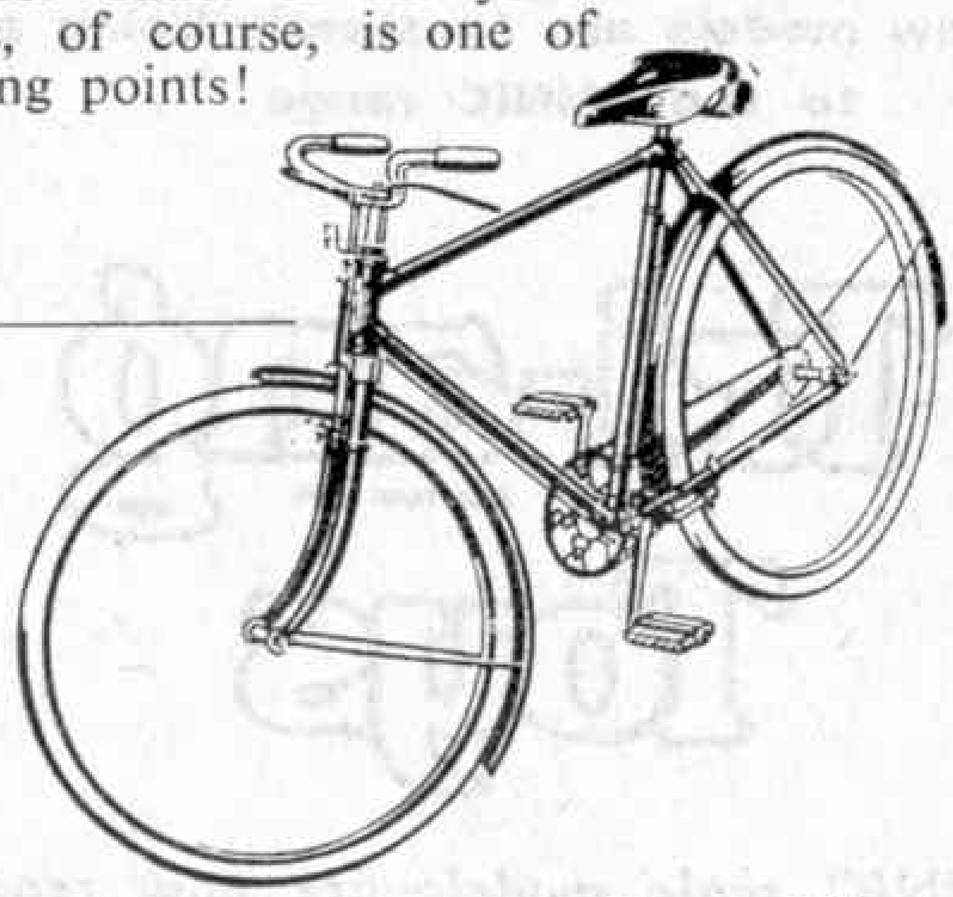
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Next Month: "MAPPING BRITAIN." By W. H. Owens

MECCANO MAGAZINE

Editorial Office:
Binns Road
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Vol. XXXIV
No. 5
May 1949

With the Editor

Canadian Water Power Scheme

Canada has an immense power potential in her great waterways. Many schemes have been under consideration in recent years but progress was halted by the outbreak of war and the urgent need for concentration on production for war purposes. Now, however, Canada is forging ahead with the development of her water power. One of the rivers that will soon be supplying power on an enormous scale is the Ottawa. Two great dams and power stations are now being built in the course of this river, and they will be described and illustrated in the *"M.M."* in the near future.

By way of contrast to the Ottawa scheme is the development of the Shipshaw power station in Quebec, the construction of which was actually brought about by wartime needs. This station was built at high speed and in the greatest secrecy during the war to provide power for the production of aluminium required to make the "Lancasters," "Hurricanes," "Spitfires" and other aircraft that did so much to bring about the downfall of Hitler. It houses the greatest concentration of power ever gathered together under one roof, for the 12 hydro-electric generating units that were installed in the powerhouse have a combined capacity of 1,200,000 h.p. The Shipshaw story will be told in next month's *"M.M."*

Instruments of George III's Day

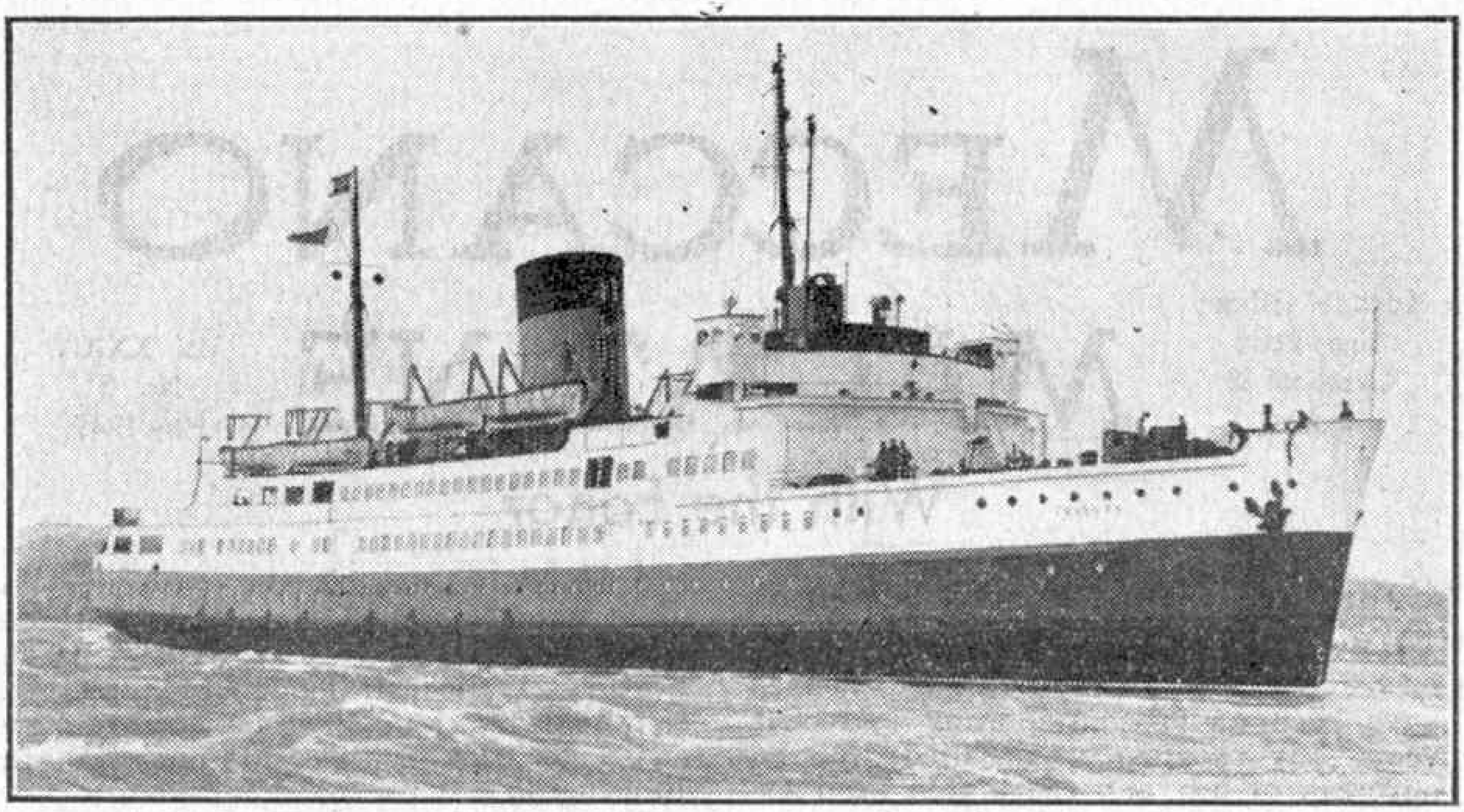
If Meccano had been available in his day, King George III would probably have been an enthusiastic model builder. In his youth, as Prince of Wales, he showed great interest in mechanics, astronomy and scientific experiments of all kinds. Encouraged by this Royal interest, leading instrument makers of the period made many models for the instruction of the Royal children between 1750 and 1800. Fortunately the instruments were preserved as a collection, and they are now on view again at the Science Museum, South Kensington.

The long reign of George III, 60 years, saw many great industrial advances. Watt's improvements to the steam engine; the spinning machinery of Hargreaves, Arkwright and Crompton; Cort's invention of the puddling-furnace which gave such impetus to the manufactures of Birmingham and Sheffield; the invention of lithography in 1811; Wedgwood's artistic pottery; the Davy safety-lamp; the Bridgewater Canal between Manchester and Liverpool—all these were important features of this era, known to us as the period of the Industrial Revolution.

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The "Invicta," one of the present fleet plying between England and France.

Cross-Channel Packet Boats

By Arthur Gaunt, F.R.G.S.

ALTHOUGH you can fly from England to France in a matter of minutes nowadays, the packet boats which cross the English Channel are still performing an important service. Since the end of the war, indeed, new vessels have been added to the cross-Channel fleet, both to replace those lost by enemy action and to improve the speed and comfort with which passengers may travel to and from the Continent.

At the beginning of the present century, less than a million persons travelled by this route each year. The million mark was first attained in 1905, and by 1937 the number of passengers had risen to two million. No new records are likely to be set up this year, but an increasing number of passengers are expected to use this historic service during the summer.

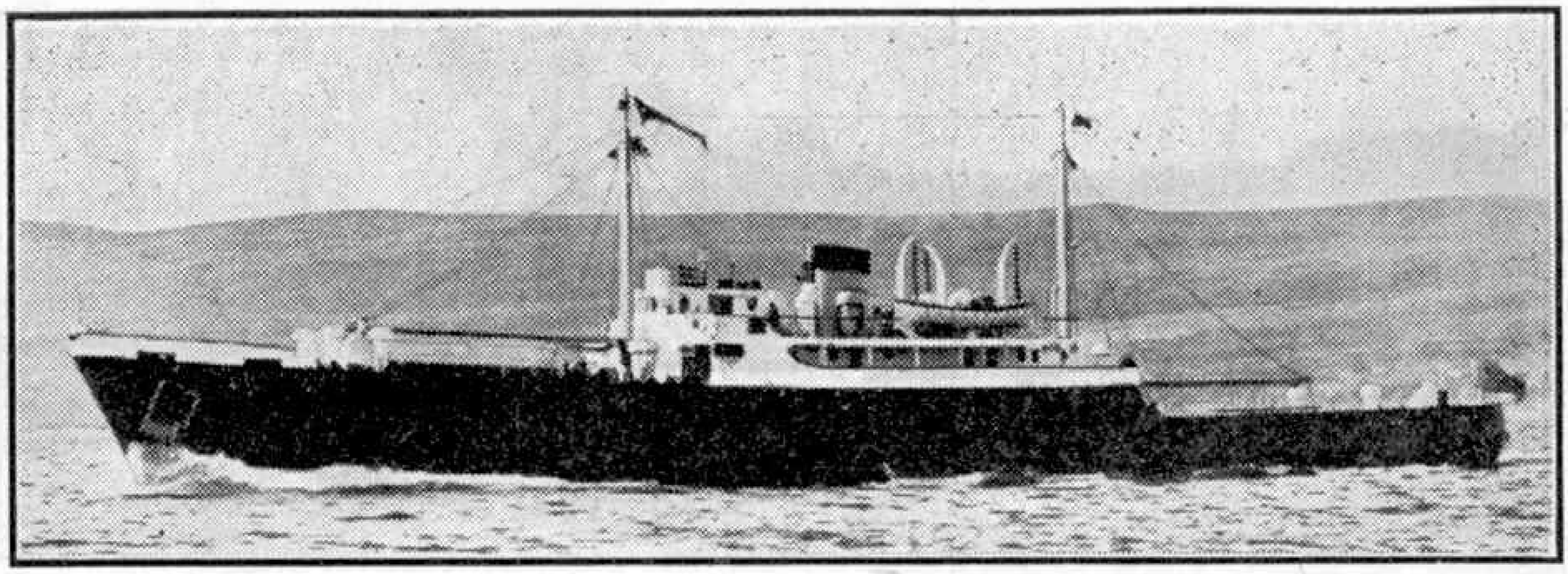
Among the latest and most interesting ships on the cross-Channel route are the *"Maid of Orleans"* and the *"Falaise."* The latter was the first post-war vessel of the Southern Railway fleet; the *"Maid of Orleans"* was launched last September to replace the well-known pre-war ship of that name, which was lost in the Normandy invasion of 1944.

The *"Falaise,"* named after the ancient Normandy town which figured in the liberation of Europe, was specially designed to serve on any of the cross-Channel routes either by day or by night. Her overall length of 314 ft. and her gross tonnage of 3,710 make her the largest vessel to run on the Southampton routes. Her speed of 20½ knots also gives her the speed record for ships using these routes.

Again, she has greater sleeping accommodation than any other vessel built for the Southampton routes to the Continent. She can carry 1,400 passengers. Her two sets of turbines are of 10,000 b.h.p., and she is fitted with two bronze propellers. Turbine-driven generators give her ten times the amount of electricity of the older vessels on the cross-Channel services, and this current supplies power or lighting not only to the deck machinery, but also to the engine room auxiliaries and the galley.

She is equipped with the latest aids to navigation, including radar, so that she can continue running even in thick fog. The wheelhouse instruments include devices showing both the speed of the ship and the distance run.

So that the *"Falaise"* may be brought into harbour stern first if necessary, a rudder is fitted at the bow as well as at the stern, and this rudder can be controlled from either wing of the bridge. Still another aid is a Denny Brown stabilizer,



The "Winchester," a cruiser-like cargo ship plying between Southampton and the Channel Islands. She has diesel propulsion.

which considerably reduces the rolling of the ship. The *"Falaise"* was only the second cross-Channel boat to be fitted with such a stabilizer, and great improvements have been made since the first vessel was so fitted.

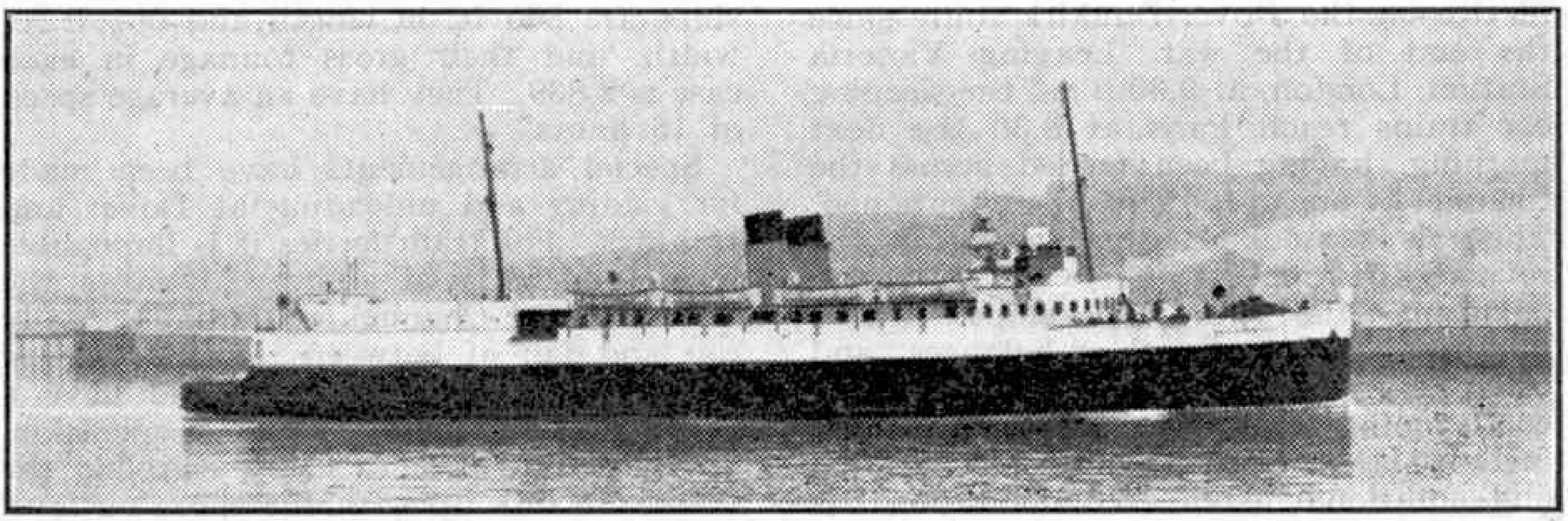
Air conditioning makes it unnecessary to open port holes and windows. The covered deck lounge has armour plate-glass windows, giving excellent visibility, and fluorescent fittings in the upper deck lounges and smoke rooms give shadowless lighting.

The new *"Maid of Orleans,"* like the *"Falaise,"* has a stabilizer. The success of this device in practically eliminating rolling when it was installed in the *"Falaise"* prompted the designers of the second vessel to adopt it too. Similarly she has been equipped with a radar installation, and has a bow rudder. Like the one at the stern, it is of the electro-hydraulic type.

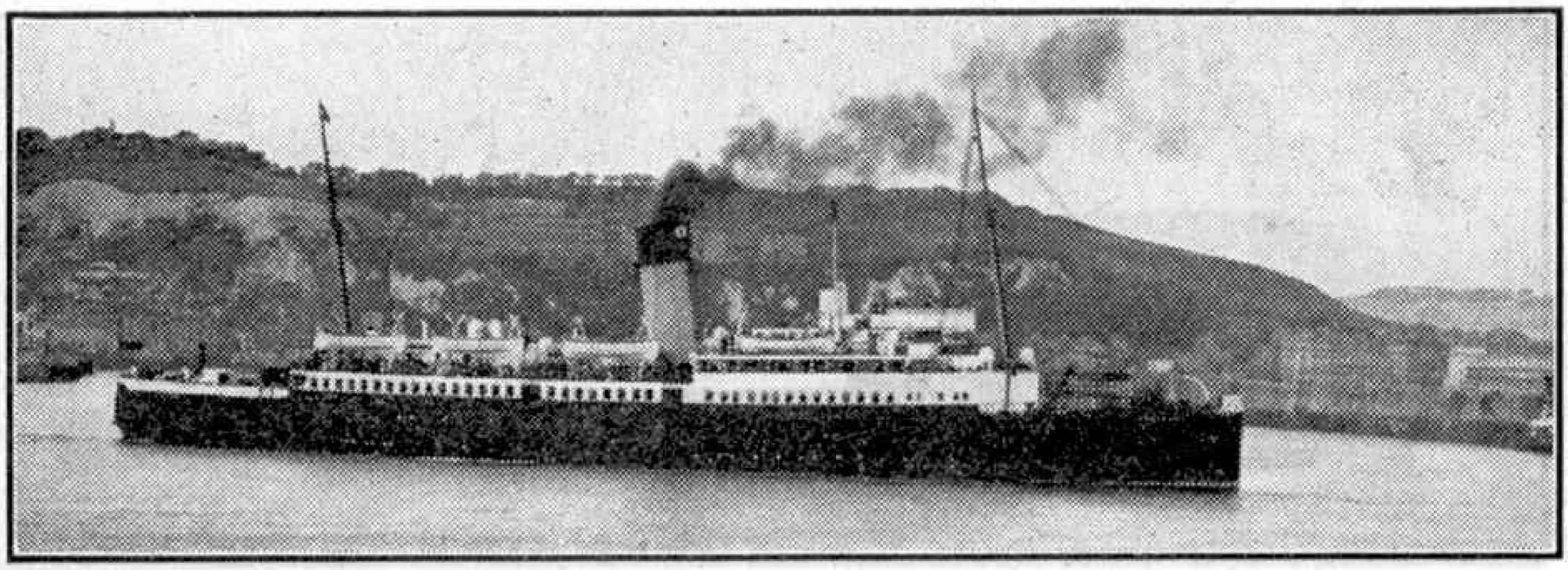
The run of the *"Maid of Orleans"* is on the popular "short routes" to the Continent from Dover and Folkestone. She can carry more than 1,000 passengers. Her overall length is 341 ft., her breadth 50 ft. and her depth 18 ft. She has a gross tonnage of 3,700, and is probably the smartest vessel of her class afloat at the present time, having a raked stem, a cruiser stern and one streamlined funnel. She is faster than the *"Falaise"*; her steam turbines develop 11,000 h.p. and give her a speed of 22 knots.

Even more interesting in some ways is the *"Dinard,"* the largest motor car carrying ship on the Southern Railway cross-Channel services. She can carry 70-80 cars, and has accommodation for 300 passengers.

The *"Dinard"* is a ship with a history, too. She was put into service on the Southampton-St. Malo run in 1924, but during the war became a hospital ship. In that capacity she survived bombs, shells, and torpedoes at Dunkirk, and on D-Day she had an exciting journey to the Normandy beaches, for she struck a mine off the French coast; after all-night efforts she was towed back to Southampton. Hurried repairs enabled her to be put into service again in seven days, and she did valiant work with Cherbourg as her base.



The "Twickenham Ferry," built to carry trains across the Channel, thus giving London a direct railway link with Paris.



S.S. "Canterbury" leaving Dover for the Continent. The port has had a regular cross-channel service since 1782.

Between the Dunkirk evacuation and the landings in Normandy she visited 30 ports in the Mediterranean area, covering 30,000 miles in nine months and carrying nearly 8,000 patients.

The conversion of the "*Dinard*" into a ship for carrying cars to and from the Continent was undertaken during the winter of 1946–1947, and she took up her new job in July of the latter year, when she started an entirely new service between Folkestone and Boulogne. The work of reconstruction included the repair of fairly extensive mine damage, the removal of troop equipment, the fitting of a new bridge and upperworks, and the construction of two car decks. Improved passenger accommodation also was provided, such as a dining saloon for 90 persons, a chauffeurs' room, and A.A. and R.A.C. offices. There is also a special loading space for two motor coaches, and a turntable for cars. Facilities for loading and unloading at three points are another noteworthy feature.

The "*Twickenham Ferry*," the "*Shepperton Ferry*," and the "*Hampton Ferry*" are three pre-war train-ferrying ships which have been modernized and put back into service on the Dover-Dunkirk route since the end of the war. Leaving Victoria Station, London, at 9.30 p.m., the sleeping car trains reach Paris at 9.30 the next morning, having been ferried across the Channel by one of the ships just mentioned. There is a similar daily journey in the reverse direction.

During the war the ships carried munitions, locomotives, ambulances, and other weighty cargoes to France. Reconditioning and improving them has included their conversion to oil-burning, and additional cabin accommodation has been provided. Each ship can carry twelve sleeping cars, for which four sets of rails have been provided on the train deck. At the stern the lines converge into two tracks, by which the trains pass from ship to shore across a drawbridge at the end of the dock. There is also accommodation for 25 cars, and several heavy lorries and motor coaches can be carried.

The locomotives of the night ferry trains carry a special headboard, with a background of deep blue with moon and star decorations. There is also a day ferry service, by which loaded wagons carrying such exports as steel, machinery, motor cycles and wool are transported direct to the Continent.

The rolling stock carried by the night ferry service consists of sleeping cars specially designed by the Compagnie Internationale des Wagons-Lits. The all-steel coaches measure 62 ft. 11 in. over all and are just over 9 ft. wide, with a height of 12 ft. 9½ in. from rail level. A special feature is that the sleeping coaches can be used either as first-class or second-class carriages. The first-class arrangement allows for one passenger in each compartment and the second-class arrangement for two.

The "*Twickenham Ferry*" and her sister ships are 360 ft. in length and 60½ ft. in width, and their gross tonnage in each case is 2,839. They have an average speed of 15 knots.

Special arrangements have been made for loading and unloading at Dover and Dunkirk. For train ferries it is impossible to use an inclined slipway, because the waters on the Channel coasts have a daily rise and fall of between ten and twenty feet. A slipway therefore would have a gradient too steep for railway operation. So the alternative of locks, enabling the vessels to link up with the shore on level terms, has been adopted.

New cargo ships (*Continued on page 202*)

Fun with Dinky Toys

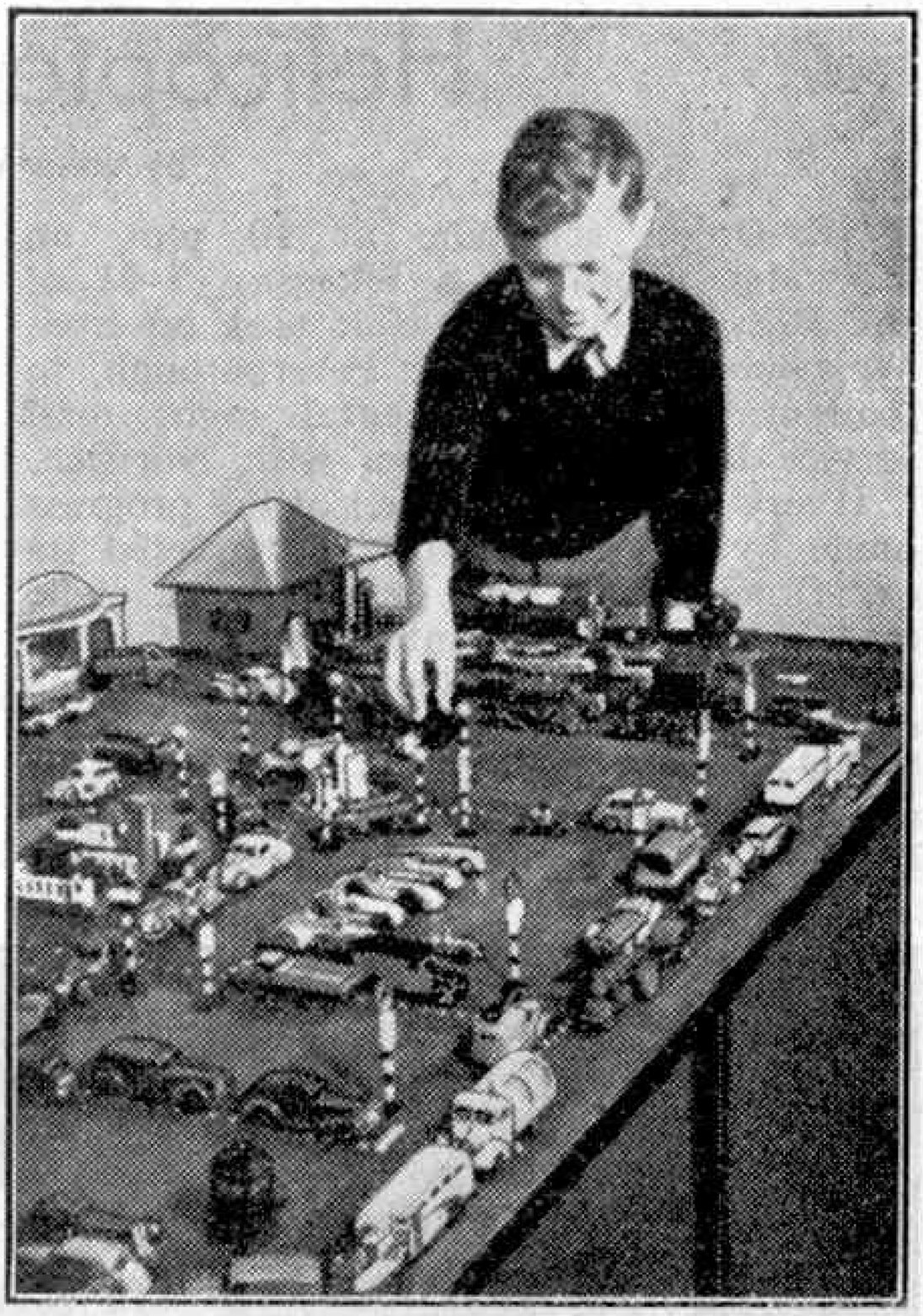
Thrills of a Model Town

ERIC KENYON, Blackburn, gets more thrills out of his Dinky Toys than out of any other toys he has ever had. One reason for this is that he has built a fine layout on which to run them.

Kenyon's interest in Dinky Toys began on a holiday, when he made friends with a boy who had about half a dozen Dinky Toys motor cars. He decided that he would take up the hobby himself, and now he has a complete set, not only of Dinky Toys, but also of Dinky Supertoys. He soon realized the need for a layout, and after trying various schemes he hit upon the idea of laying a green rubber ground sheet, 6 ft. long and 3 ft. wide, on a large table of exactly the same size to form the base. On this he marked out main and cross roads, with roundabouts at some of the intersections. These he painted black, the rest of the base being left green to represent fields, and down the middle of each road he painted little white spots to represent cat's eyes.

No road layout is really satisfactory without proper buildings, and Kenyon has provided his with bus stations, garages and taxi stands. Some of these were constructed by the owner in three-ply wood, and painted in bright colours; the others were made up from various building sets of suitable proportions. The general effect is splendid, as can be seen from the two photographs reproduced. An unusual feature seen in the lower picture is a bridge that at one point carries a cross-road over a busy main highway in order to simplify traffic problems. This was made very easily from a block of wood. A piece was cut out of the centre to form the span over the main road, and the ends were then planed down to ground level. Split pins and lengths of bicycle spoke made excellent railings for each side of the bridge.

On this road system Kenyon's Dinky Toys move about with complete realism, the final touch being provided by giving loads to lorries and open vehicles generally. For instance, his Guy 4-ton flat truck carries a load of timber made by drying twigs and cutting them into 3 in. lengths; while an equally realistic load was provided for his Bedford Articulated Lorry by cutting a brush handle into lengths of 1 in. that could be stacked easily and safely on the vehicle.

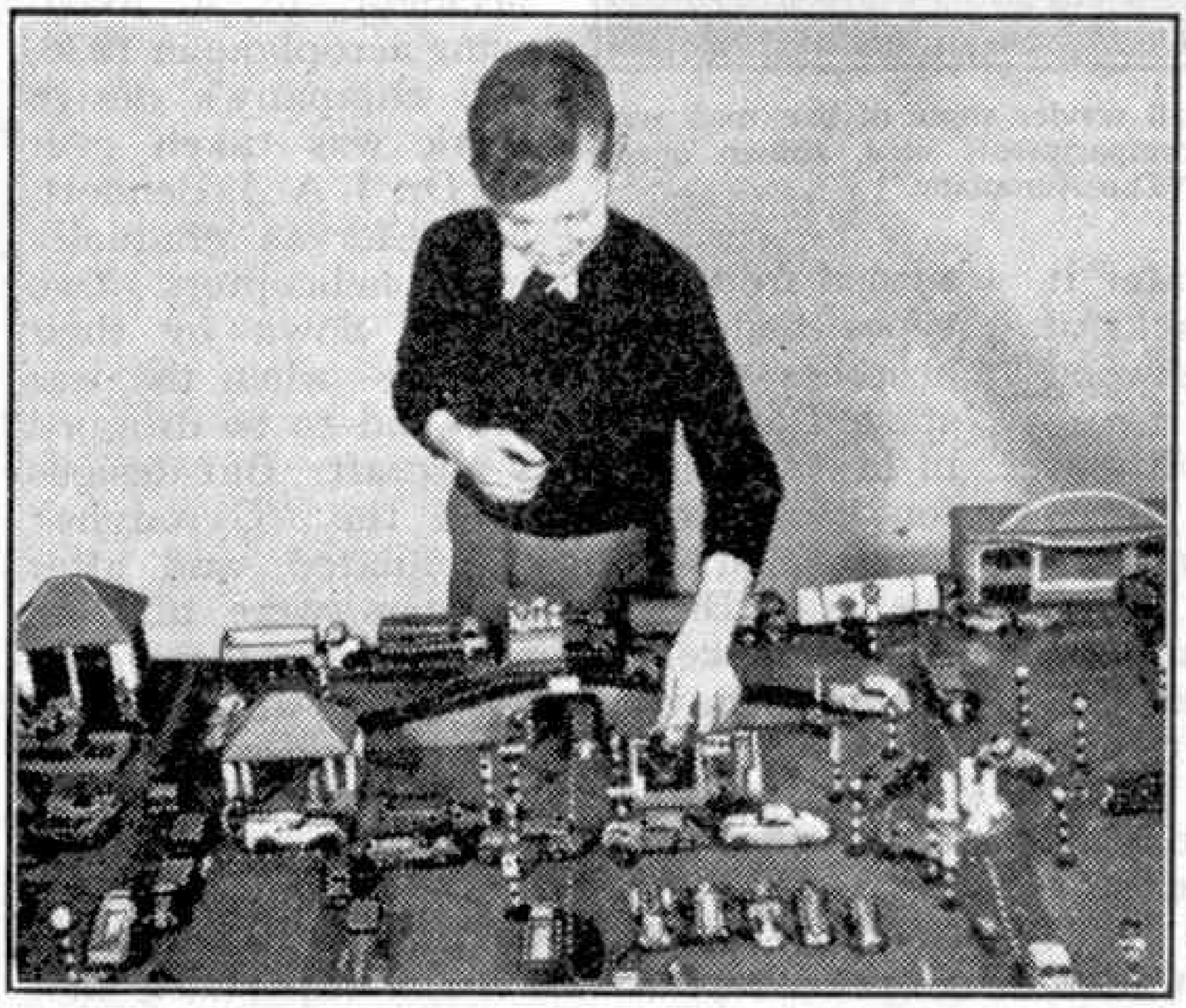


Eric Kenyon, Blackburn, carrying out operations in one corner of his Dinky Toys town. All roads have white spots painted on them to represent cat's eyes, and are provided with road signs.

There is always some part of the road system under repair and this gives opportunity for making realistic use of the Aveling-Barford Diesel Roller and the Bedford End Tipper, the latter bringing material and tipping it to be spread out ready to be consolidated by the former. Warning is given to traffic by means of danger signals consisting of ¼-in. squares of red celluloid pinned at the ends of the section being dealt with. At one end of the layout is the flying field, on which various Dinky Toys aircraft are placed, and next to it is the army section, complete with tanks, jeeps and other suitable Dinky Toys.

It is easy to pack up the whole outfit and put it away after a spell of operations. The ground sheet folds up without cracking the paint, and indeed can be washed without harm, so that Kenyon's Dinky Toys town is always spick and span. The whole outfit is a model of neatness.

The complete realism of the layout has made it of the greatest value in developing the road sense of its maker's schoolfellows. Kenyon was asked to take it to school for demonstrations with this end in view, and it aroused the keenest interest.



Another view of Kenyon's model town, showing the bridge that carries traffic from side streets over a particularly busy main road.

Helicopter Progress

By John W. R. Taylor

DEAD on schedule, at 10 p.m. on 21st February, a Sikorsky S–51 of the B.E.A. Helicopter Unit took off from Westwood Airfield, near Peterborough, to inaugurate an experimental night mail service linking that town with Norwich.

If any proof were needed of the progress made by the Unit since it completed its experimental daylight mail service eight months ago (see September 1948 "*M.M.*"), this take-off provided it, for conditions could not have been much worse. Despite half a gale and driving rain, the S–51 went up steadily, like a lift, turned slowly and then set off down-wind for Norwich, some 70 miles away. Fifty-six minutes later it landed at its destination, and the sacks of dummy mail put aboard at Westwood were unloaded.



On the first experimental helicopter night mail service some of the mail was carried in the Sikorsky helicopter's rear compartment, here shown open. Photograph by courtesy of "The Aeroplane."

Although the flight was made without ceremony, watched by only a few dozen people, it nevertheless made history; for when the S–51 landed again at Peterborough at 2.56 a.m., after a 66-minute battle with the gale, it completed the first scheduled helicopter night mail round-trip in history.

The fact that B.E.A. are able to start scheduled night services, even experimentally, is a great tribute to the pilots and engineers who, for many months, have worked hard to perfect the special instruments and equipment that make it possible. New radio and radar aids will soon include the Decca Track Control Unit, which shows not only whether the aircraft is to left or right of its course, but also how many miles it is from its destination.

Development work in night-flying and blind-flying in this country was begun by pilots of The Fairey Aviation Company and the Ministry of Supply on Sikorsky R–4B helicopters shortly after the war. B.E.A. carried on the good work after completing their daylight mail service, with the result that this country is more advanced in blind-flying technique than the Americans.

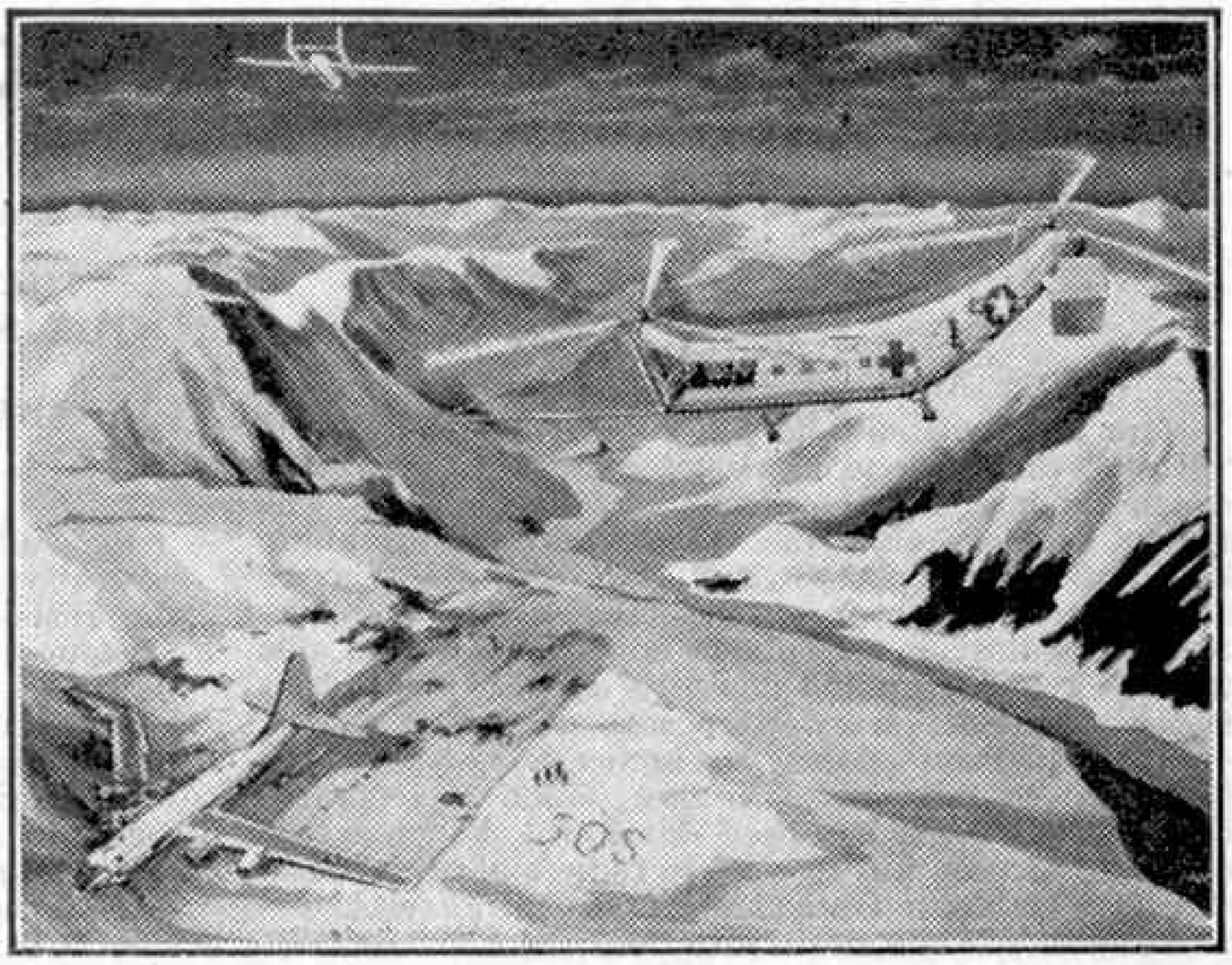
In fact it is fairly safe to say that, although America is ahead in helicopter production, Britain now leads the world in most branches of helicopter development. This is not altogether surprising, as the British Cierva Company built the first successful rotating wing aircraft more than 20 years ago.

When Juan de la Cierva was killed in an accident to a fixed-wing aeroplane in 1936, the company's design work was taken over by Dr. J. A. J. Bennett, and Ciervas gradually turned from Autogiros to helicopters. Two types had already been flown by their licensees—G. and J. Weir—when the war started and helicopters had to be dropped in favour of military aircraft. But designs for such machines as the "Gyrodyne" had already been formulated, and after the war British designers were able to start at once making up for six lost years, Sikorsky having proved in America that helicopters were both practical and useful.

Within three years our companies had built the world's fastest and largest helicopters—Dr. Bennett's Fairey "Gyrodyne" and the Cierva "Air Horse" respectively. Even more important, new safety features built into the "Gyrodyne" and Bristol 171 promise to make them

the safest aircraft in the world. Having recently flown in the "Gyrodyne," I can also confirm that it is extremely comfortable, its cabin being more like the interior of a luxury motor car than an aeroplane. Thus British helicopters are being built around the three prime requirements of safety, high performance and comfort.

These British machines, together with the Cierva "Skeeter," the forthcoming Bristol 173, Firth "Atlantic" and a secret jet-helicopter of unknown make, should keep Britain in the forefront of helicopter progress, and it may not be many years before we see 24-seat, twin-engined helicopters flying all B.E.A.'s internal services.

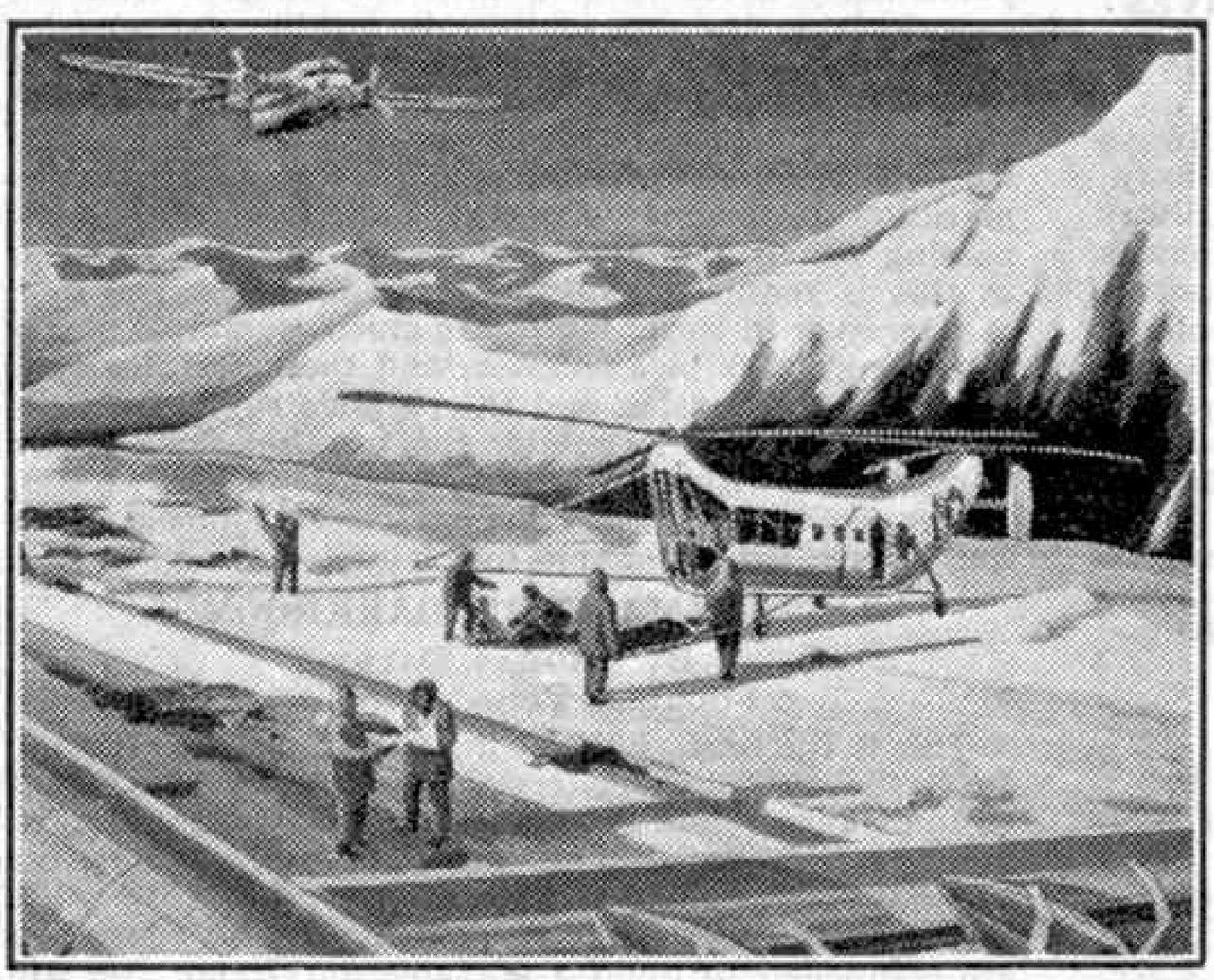


An artist's impression of the Piasecki helicopter coming down under its own power near a wrecked machine, after severing connection with the towing aircraft. The illustrations on this page are by courtesy of the Piasecki Helicopter Corporation, U.S.A.

A major headache is the fact that it has already cost the aircraft industry hundreds of thousands of pounds to develop British prototypes, for several are "private venture" designs, and unfortunately the aircraft companies have not unlimited financial resources. So it is now up to the Government to become really helicopter-minded. It is one thing to pay for a single test aircraft, and another to place production orders for 10, 20 or 50 and so put the industry on its feet. At the moment, the R.A.F., Army and Navy are only dabbling with helicopters, trying to find uses for them at a time when the Americans are already using Sikorskys and Piaseckis for dozens of different jobs, which they do better than anything else in the world.

Most important of these jobs is, of course, rescue work. Time after time in the last few years, helicopters have saved the lives of air crash victims in all parts of the world from the Arctic to the tropical jungle of Nicaragua, usually in circumstances that have made rescue by other means impossible.

Unfortunately, the helicopter's short range has often necessitated its dismantling so that it could be flown in a large transport aircraft to within operating distance of its objective. This wastes a lot of time, and there is seldom much time to spare in a race to prevent death from injury or exposure.



The crash victims being carried as stretcher cases into the helicopter, prior to it taking off to re-connect with the towing 'plane in the air.

News of a more practical solution to the problem of getting helicopters quickly to where they are needed has just come from America, where it is being investigated by the U.S.A.F. at Wright Field. It consists of towing an auto-rotating helicopter behind a transport aircraft, and so extending its range to that of the tow 'plane.

Preliminary flight tests, made with a conventional single-rotor helicopter, have already proved the practicability of the scheme. Tests with a Piasecki HRP–1 "Rescuer" helicopter, now beginning, should (*Continued on page 202*)

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With certain exceptions which will be indicated, these should be ordered through a bookseller.

"ATOMS IN ACTION"

By G. R. HARRISON
(George Allen and Unwin Ltd. 12/6 net)

Here is a splendid book for older readers of the "*M.M.*" who wish to know something of the way in which modern science affects our daily lives. The author remarks that the wheels of civilization are kept running by energy, and that this, whether we draw it from oil, coal or any other source, has come to us from the Sun. He shows how we have been able to tame this energy and how it is changed to make it suitable for our special purposes.

Prof. Harrison covers an immense range in the book. From him we learn how sound is recorded, how the telephone has been developed, and how the electron has been put to work in radio and in electrical control equipment. Optical instruments from telescopes to cameras also are dealt with, and there are sections dealing with the weather, with science in war and after, and with the entry of the atom into the practical world of energy production. Examples are given throughout, and we have many of these from the home, the farm and the factory. The final chapter gives us a glimpse of what is yet to come.

The book has 18 full page illustrations.

"MODEL AEROPLANE HANDBOOK"

By F. J. CAMM (Newnes. 12/6 net)

This latest book on the "how and why" of model aircraft construction is by one of the pioneers of the hobby in this country, and so has the stamp of authority. It begins with an interesting short history of model aeronautics, and subsequent chapters cover fully the design, construction and flight of all types of model aeroplanes, whether powered by engine or elastic. The model types described include gliders, autogiros and even ornithopters, or flapping wing models.

The book contains such a wealth of explanatory note and detail in its 300 or so pages that it is literally a pocket encyclopædia on this subject. It is illustrated with nearly 250 excellent line drawings and plans and over 60 half-tone photographs.

"LIGHT AND NARROW GAUGE LOCOMOTIVES"

By R. W. KIDNER
(The Oakwood Press. 3/–)

Light and narrow gauge engines, like the railways on which they run, have a fascination of their own, and this book, No. 8 in the series of Light Railway Handbooks issued by the Oakwood Press, provides a general review of the development of locomotive power for such systems. A comprehensive table of dimensions is given, and the interesting illustrations feature ancient warriors such as the Tal-y-Llyn locomotives of 1865, and such curiosities as the twin-boiler mono-rail engines on the Lartigue system.

With the eclipse of so many light or narrow gauge lines, and the disposal or breaking up of the engines, the book forms a useful record. Copies can be obtained from the Oakwood Press, Tanglewood, South Godstone, Surrey, price 3/2½ including postage.

"MICKY"

By AUBREY DE SELINCOURT (Routledge. 8/6)

We have previously met Robin and Anthony, Elizabeth and Ann, whose adventures afloat have been told by the author in various books, and here we meet them again in "*Tern*," their little half-decked sailing boat. In their cruise on White Whale Lake, Micky, a runaway orphan, is a complication who provides a mystery and opportunities for action in a story in the author's best manner. Line drawings form the illustrations.

"THE BISHOP'S CASTLE RAILWAY" (5/6)
"THE HUNDRED OF MANHOOD AND SELSEY TRAMWAY" (4/6)
"THE BASINGSTOKE AND ALTON LIGHT RAILWAY" (3/6)

By EDWARD C. GRIFFITH, B.A.

Each of these booklets deals with the history of a now abandoned railway of standard gauge. Of these the Bishop's Castle perhaps had the most colourful existence. It never completed its original course but remained tucked away in a remote corner of Shropshire, dogged by financial difficulties throughout its existence. Its locomotives and rolling stock included some veritable museum pieces, but some of these managed to run more or less regularly until 1935.

The Hundred of Manhood and Selsey Tramway, a rather ponderous title, was an eight-mile light railway from Chichester to Selsey. This had its period of prosperity until a decline in traffic, due to the general growth of road transport, finally caused it to cease operation in 1935.

The Basingstoke and Alton Light Railway was a branch of the former L.S.W.R., providing a connection across country between the West of England and the Portsmouth routes of that company. It was closed during the 1914 war and its track was removed and shipped abroad for Army purposes. It was restored in 1924, but not for long, passenger traffic ending in 1932 and goods traffic four years later.

Each of the lines had an interesting story, into which Mr. Griffith has delved thoroughly. He gives details of train services, with sketch maps, plans, gradient profiles and excellent illustrations, and enthusiasts with a leaning toward the unusual in railway history will enjoy his booklets. Copies can be obtained from the author, Mr. E. C. Griffith, B.A., 23, Downing Street, Farnham, Surrey. The prices shown above include postage.

"WIRELESS FOR BEGINNERS"

By C. L. BOLTZ (Harrap. 7/6)

Mr. Boltz is well-known to readers of the "*M.M.*" as the author of elementary books on wireless. He is particularly fitted to deal with this subject from his experience in training soldiers during the war, and his present effort is a reply to many requests for a book that is really suitable for a beginner, telling him what are the parts of a receiving set and how they work, without going into technical details or using mathematics. He begins with the names of the parts, passing on to a simple account of electricity as far as this is required and then explaining each section of a receiver in turn. Notes are given on simple means of tracing faults in a receiver, and there are also brief accounts of television and the cathode ray tube.

A beginner in wireless construction, or indeed anyone who wishes to have some idea how a wireless set works, will find the book very useful indeed. It is well illustrated by simple diagrams.

"THE AMATEUR'S DARKROOM"

By THOMAS DALBY
(Fountain Press. Price 2/–)

This is the ninth booklet in the "Photofacts" series. In it the author considers the darkroom in different circumstances, and suggests methods to enable the photographer to produce the best results. Whether you have to "make do" with a large cupboard, utilise the back kitchen, bathroom or the "spare room," or are compelled to build a portable darkroom, you will find the suggestions and plans given in this handbook a valuable and practical guide. The book is illustrated with excellent line drawings and half-tone photographs of darkroom equipment.

"PATENT APPLIED FOR"

By F. Coppersmith and J. J. Lynx
(Co-ordination Ltd. 10/6)

We read with keen interest the stories of famous inventors, but seldom give a thought to those who have not become famous because their inventions, however ingenious, have not really been wanted, or were not sufficiently practical in character. The authors of "*Patent Applied For*" here give us what they call a light-hearted cavalcade of 100 years of inventions of this kind, with ample illustrations.

Those who worked out the ideas dealt with in this lively and amusing book certainly meant well. There are hundreds of quaint novelties, such as a rocking chair that worked a butter churn and a baby's cradle, and a sewing machine that could be taken about in luggage as easily as a pocket electric iron is carried to-day. Strange modes of progress along the road also are represented, such as the Danish hunting bicycle, consisting of a huge wheel with its owner seated inside; and a large array of queer ships meant to abolish sea-sickness, and generally to improve comfort and safety at sea, provide entertaining reading. Musical instruments, weird horseless carriages, and a device for escaping from the top floors of hotels on fire are included among the many gadgets and novelties described and illustrated here. We laugh at them now, but it is certain that there are many more to come, and no doubt things that seem clever and important to us will appear equally ridiculous to future generations.

"ELECTRICITY IN THE SMALL WORKSHOP"

By Ian Bradley and Norman Hallows
(Percival Marshall & Co. Ltd. 3/- net)

In the small workshop, whether maintained for a hobby or for more serious purposes, electricity is ideal for providing power as well as for lighting and heating. How this is most conveniently arranged is here explained in detail, with a special section on wiring and the provision of safety switches and other necessary devices.

The whole subject is covered with the use of a small generating plant in mind as well as mains supplies, and the treatment is of a practical character. Diagrams illustrate various points, and there are also reproductions of photographs of electrical plant and equipment. There is a good index.

"PEDLAR'S PROGRESS"

By B. M. H. Goddard (Harrap. 7/6 net)

Ben Lovell was a pedlar who travelled far and wide throughout the countryside, and was welcomed by country people wherever he went, not merely for the good things he had for sale, but also for his delightful nature and his willingness to help others. Early in the story he is given a splendid opportunity, for chance brings into his path an evacuee London boy who has failed to settle down in the country and has determined to run away. Ben not only encourages the boy to return, but later takes him on his round of the countryside, and by the end of the journey the boy has lost his selfishness. An interesting and appealing story, with a coloured frontispiece and other illustrations in line by Bay Robinson.

"A.B.C. OF MOTORCAR SPOTTING"

By Graeme L. Greenwood
(Ian Allan Ltd. 2/-)

This booklet deals with eight popular makes of car, showing how they have developed from 1935 down to 1948. They are the Austin, Ford, Hillman Minx, M.G., Morris, Standard, Vauxhall and Wolseley. In each case a series of photographs at different stages within this period is given, with brief but adequate descriptions drawing attention to important changes. This is followed by a list of registration letters, and a number section in which entries can be made of cars seen.

Copies of the booklet can be obtained from leading booksellers, price 2/-, or direct from the publishers, Ian Allan Ltd., 33, Knollys Road, Streatham, London S.W.16, price 2/2½ post free.

"THE SECRET OF THE CAVERNS"

By C. A. Gedge (Harrap. 6/- net)

Mr. Gedge can be relied upon for a sound and really thrilling story, and in this book he has maintained his reputation. The scene is set in Derbyshire, where the hero spends a holiday during the grim summer of 1940. A fight with a local boy ends in an alliance between the two, who are then led by events into conflict with a gang of fifth columnists preparing to wreak destruction by blowing up a great dam. Caves and underground passages play a great part in the story, and there are exciting scenes below ground when the villains are finally trapped.

The story is well written and fascinatingly worked out. There is a coloured frontispiece and a map of the district.

"SIMPLE WORKING MODELS"

By C. E. Page
(Percival Marshall and Co. Ltd. 3/- net)

For those who are handy with tools there is a special fascination in constructing working models from various odds and ends, and perhaps one or two items specially obtained for the job. In this book there is a good variety of suitable subjects for the exercise of their skill in working wood or metal. Seven models are dealt with, including a simple reversing sand motor, a hot air engine, a large garden windmill and pump, and two types of water-wheel. Diagrams and dimensioned sketches are given, and the keen mechanic should have little difficulty in achieving the desired results if he follows out the methods detailed.

"DESIGNING AND BUILDING '00' TRACKWORK"

By Ernest F. Carter
(Percival Marshall and Co. Ltd. 3/- net)

The author's name will now be well known by "*M.M.*" readers for a variety of handbooks dealing in a practical manner with a wide range of miniature railway construction subjects. The present book specialises in the treatment of "00" gauge track laying, and will be found useful by those who favour the rather exacting form of exercise that the construction of track from raw materials provides. The book contains many useful diagrams, with suggestions and explanations on layouts, points, etc., and is therefore not without value for miniature railway enthusiasts who have no occasion to put the schemes dealt with into practice.

"COAST WATERS"

By Philip Briggs
(Lutterworth Press. 5/- net)

Four friends set out to spend their summer holiday on the East Coast, and on the way find a yacht for sale. They decide to buy it but first it is necessary to raise funds for the purpose and they set about this task in various ways. One is to give trips in a motor boat to holiday makers, and their first fare lands them into a series of complications, for they discover him secretly taking photographs of a yacht that is being altered in readiness for an important race.

The race plays a great part in the story, for a very unpleasant individual has resorted to these underhand tactics in order to score a win for himself. Needless to say, he is thwarted in this by the efforts of the four boys, who get their yacht as a result.

"SPACE SHIP TO VENUS"

By John Nicholson (Venturebooks. 6/6 net)

Here is a story book, a thriller, in which readers accompany a formidable scientist who selects four companions for a trip to Venus in a rocket ship that he has created. The journey across space is decidedly interesting, and there are many surprises for the travellers when their rocket is slowed down and allowed to come to rest on Venus itself. In the trip the scientist and his accomplices make on that planet they meet many weird creatures, and pass through thrilling adventures in which they narrowly escape death. We leave them camped round a fire, wondering what new hazards will confront them.



A Manchester express climbing Camden bank behind former L.M.S. 4-6-0 No. 6122 "Royal Ulster Rifleman" of the converted "Royal Scot" Class.
Photograph by F. R. Hebron.

Railway Notes

By R. A. H. Weight

New Locomotive Liveries

It is announced by the Railway Executive that the various types of locomotives to be painted in the new liveries, already announced, are as follows. To be blue, lined black and white: L.M.R. "7P" 4-6-2; E. and N.E.R. 4-6-2s classed "A1," "A3" and "A4" and 4-6-4 "W1"; W.R. 4-6-0 "King"; S.R. 4-6-2 "Merchant Navy." To be green, lined orange and black: L.M.R. "6P" and "5XP" 4-6-0s of "Royal Scot," "Jubilee" and "Patriot" classes, including rebuilds; E. and N.E.R. 4-6-2, all "A2" series, and "B2," "B17", "B3" 4-6-0s; W.R. 4-6-0, "Castles" and "Stars"; S.R. all light "Pacifics" and "Lord Nelson" and "King Arthur" 4-6-0s. This will also cover the Scottish Region where applicable.

All other passenger tender and tank engines as well as mixed traffic tender or tank engines will be in the new lined black style, while freight tender or tank types will continue to be plain black. Existing supplies of paint will be used in most cases before starting on changed liveries. The lined black is already in considerable evidence on various lines, and will become the commonest in many areas.

"Austerity" Locomotive Renumbering

The numerous Ministry of Supply freight 2-8-0s are being taken into British Railways' stock and renumbered from 90000-90732 (733 engines); 101 built by the North British Locomotive Company which had been E. and N.E.R. 63000-63100 become 90000-90100; 321 previously "on loan" constructed by the same firm become Nos. 90101-90421 in building date order. The 99 former L.N.E.R. locomotives built by Vulcan Foundry Ltd. change from 63101-63199 to 90422-90520; the remaining Vulcan 2-8-0s become 90521-90732.

There will certainly be some reallocation of these engines among the regions. Those sold out of Britain or not to be employed here are ignored in the latest numeration. British Railways have also taken over some 2-10-0s for service in Scotland, Nos. 90750-90774. They will all be known as class "8" W.D. engines.

A Fine "Bournemouth Belle" Run

Details have reached us of a splendid run by the London-bound "*Bournemouth Belle*" Pullman express hauled by No. 21C 14 "*Nederland Line*," when the 79¼ miles from Southampton to Waterloo were covered unchecked in 83¼ min., or 6¾ min. less than quite a fast schedule. When an average of 55½ m.p.h. was sustained up the long gradual rise past Winchester and Micheldever, a mean speed of 71½ was maintained over 36 miles between Basingstoke and Surbiton, and the first 69 miles were covered in 69 min., it was hard to realize that the "Merchant Navy" had a 12-car load weighing fully 500 tons in all. To pass Basingstoke, 31½ miles, in 37¾ min. with so heavy a train and be already well ahead of time was a fine achievement, followed immediately by very fast travel right into the London area.

Manchester-Sheffield Electrification Progress

In addition to the Liverpool Street–Sheafield electrification scheme, now well on towards completion, the Eastern Region is pushing ahead with its other large scale plan, also employing overhead current lines, with the intention of operating all traffic, including many coal and freight trains, over the difficult Manchester–Sheffield main line, as well as certain branches, exclusively with electric traction by the end of 1952. The new three-mile tunnel at Woodhead beneath the Pennines should soon be under construction. This will be one of the biggest engineering tasks of its kind undertaken in England for many years. There will be multiple unit trains for local working, together with a large stud of main line electric locomotives.

Western and Southern Tidings

New locomotives lately placed in service from Swindon Works were "Halls" Nos. 6999, "*Capel Dewi Hall*"; 7900, "*St. Peter's Hall*"; and 0-6-0T No. 9673, allocated to Laira, Plymouth. Among withdrawn engines were No. 9091, "*Thames*," formerly 3291, of the old "Duke" 4-4-0 type, and one of the larger inside-cylinder "Bulldog" 4-4-0s, No. 3441, "*Blackbird*" lately stationed at Worcester.

There will probably be several blue "Merchant Navy" engines in service this spring. There was still a good deal of work to be done on the new "Leader" class double-ended and all enclosed mixed traffic 0-6-6-0 locomotives when the writer saw them under construction at Brighton in March last. Several Marsh "13" 4-4-2Ts are being given intermediate repairs.

The once famous Stirling 7 ft. 4-4-0 class, lately known as "F1," will soon be extinct; a good deal of scrapping of various types is going on. It is understood that 20 more light "Pacifics" are to be built, also that two more "02" small 0-4-4Ts, S.R. Nos. 181 and 198, are to work in the Isle of Wight, carrying names and renumbered W35-6.

Additional names lately noted are: "West Country" No. 34029, "*Lundy*"; No. 34038, "*Lynton*"; No. 34041, "*Wilton*"; No. 34046, "*Braunton*"; No. 34047, "*Callington*"; and "Battle of Britain" No. 34062 "*17 Squadron*" and No. 34075, "*264 Squadron.*"

High mileages since last in shops have been attained by "Lord Nelson" class 4-6-0s, including No. 863 "*Lord Rodney*" with a probable mileage of 120,000.

London Midland and Scottish Regional News

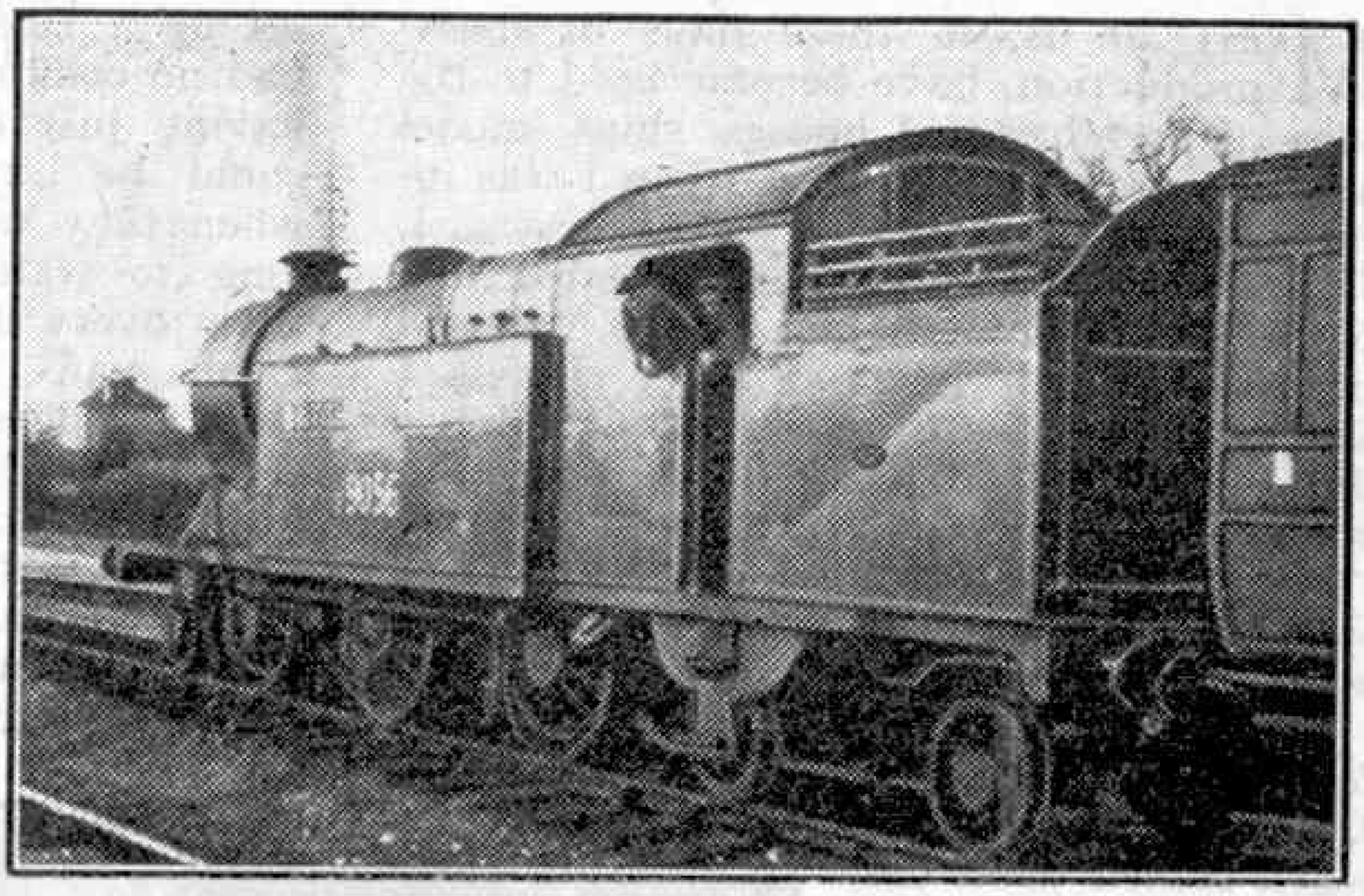
New class "5" 4–6–0 mixed traffic locomotives built at Crewe have been placed in service in the Lancashire area as follows: No. 44730–3, shedded at 24E, Blackpool; No. 44734 at 26A, Newton Heath. No. 42185, another 2–6–4T class "4" mixed traffic, is at 16A Nottingham.

At Derby was built 0–6–0 diesel electric shunter, No. 12050, sent to 5B, Crewe South, where are stationed the latest reported class "4" 2–6–0s numbered 43026–7, constructed at Horwich.

Withdrawn locomotives include the last of the original L. and Y. "Dreadnought" 4–6–0s, No. 10412, and two Highland "Ben" 4–4–0s, No. 14397 "*Ben-y-Gloe*" and No. 14403 "*Ben Attow*." "Patriot" 4–6–0 No. 45522 "*Prestatyn*" has been rebuilt to "6P" standard.

Rebuilt "Scot" No. 46120 "*Royal Inniskilling Fusilier*" was recently running on York-Derby-Bristol expresses.

Caprotti-fitted class "5" 4–6–0s and rebuilt "Patriots" have added to the locomotive variety observable in Birmingham. L.M.R. 4–6–2s have lately been prominent at Shrewsbury, where much interchange between former L.M.S. and G.W.R. engines and rolling stock takes place.



One of the massive and unusual Robinson 2-6-4 tanks originally intended for Great Central mineral traffic. Here the engine is on a passenger train. Photograph by D. W. Backhouse.

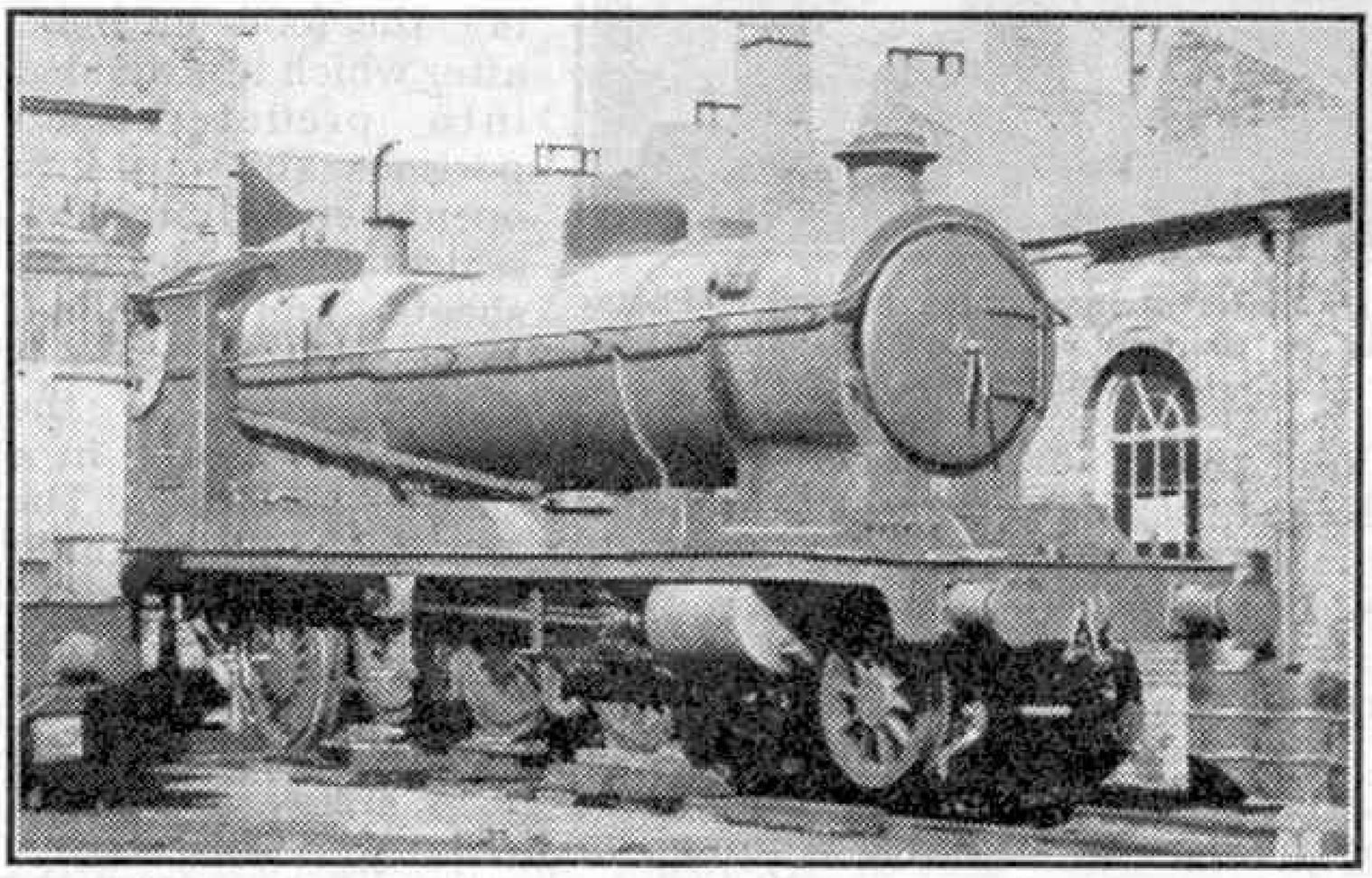
Eastern and North Eastern Regions

We understand that the shed numbering code applying in the North Eastern Region will run from 50A to 54D, the principal districts being indicated by the letter A for the main depot, followed by B, C, etc. denoting sub-sheds, as the former L.M.S. practice is to become general. Eastern Region sheds will probably be numbered 40–46 similarly.

Some Tyneside electric train sets have been painted green in accordance with the new standard. New "A1" 4–6–2s built at Darlington are stationed as follows: Nos. 60142–3, Gateshead; and No. 60144, Doncaster, where also is allocated No. 60123, built there. "L1" tank engines stationed at Grantham work on main line slow services and on cross-country or branch trains. On the latter, "A5" G.C. 4–6–2Ts are also seen, together with 0–6–0 locomotives of several classes as the G.N. 4–4–2 and 4–4–0 engines so long familiar, become more rare. We lately received a startling report that the monster L.N.E.R. "Garratt" 2–8–0: 0–8–2, No. 69999, had left its usual duties banking heavy coal trains in Yorkshire for similar main line work up the famous Lickey Incline on the Midland Division of the L.M.R., possibly as a trial. All the 138 engines operating the London, Tilbury and Southend section of the L.M.R. are transferred to Eastern Region control, including 43 4–4–2Ts and 62 modern 2–6–4Ts, with a few 0–6–0 tender and other engines.

We illustrate one of the G.C. inside cylindered 2–6–4Ts built chiefly for heavy freight work in 1914–17, now known as class "L3" and sometimes seen on passenger trains along the Aylesbury joint line. When first appearing they were regarded as a decidedly unusual type and were indeed very big engines in their heyday, having boilers similar to those on the "Director" 4–4–0s.

During the recent war, express passenger haulage was shared successfully and somewhat indiscriminately between the three classes of "Gresley Pacific" then operating and the "V2" 2–6–2s. Now the latest "A1" Peppercorn 4–6–2s work many principal trains; the smaller-wheeled varieties of "A2" are also considerably in evidence as well as the stout "A3" and "A4" engines. Many of the latter make long runs on successive days, reaching totals of several thousand miles a month and often recovering considerable time lost by rather frequent engineering or repair slacks unavoidable in recent months.



A "Great Westernised" Robinson R.O.D. 2-8-0 of the first world war. The engine is raised up on packing and the rear coupled wheels have been dropped from the frames. Photograph by John Hobbs.

* * * *

A programme of week-end Channel cruises by S.R. S.S. "*Falaise*" begins again this month. This post-war vessel of 3,710 tons was specially designed for Continental day and night service, and is one of the most comfortable cross-Channel ships.

* * * *

On April 1st operation of the 705-mile Newfoundland Railway between St. John's and Port aux Basques was taken over by the Canadian National Railways. C.N.R. mileage now totals 24,109.

Prefabricated Food

By John W. R. Taylor

MOST of us, in these days of mass-production, have become used to the idea of prefabricated houses, ships, model aeroplanes and so on. But when I was invited to Cadby Hall to see how Messrs. J. Lyons, the famous caterers, "prefabricate" food for eating in the clouds, aboard international air liners, I must confess I said that the idea of an embalmed kipper did not appeal to me. Now I am quite willing to eat not only my words but the "prefabricated" food; in fact, many of you have probably eaten it often without even knowing it.

The idea of marketing frozen cooked food was conceived by Lyons back in 1941, when skilled chefs and new kitchen equipment were in short supply. They aimed to cook food in the best restaurant manner and then freeze it, so that when it was heated up again the dish tasted as though it had come straight from the kitchen.

As a start they asked some of their best chefs to devise dishes that could be subjected to the new process. The high quality of the results was probably influenced by the fact that the chefs knew that they were to be the first to sample them!

For 18 months the frozen food never travelled beyond the doors of Cadby Hall. Many different meals were cooked, frozen, thawed, heated and eaten. They were sometimes left frozen for months and exposed to a great variety of conditions before being tested for quality in the laboratory and in the tummy. It was found that the food lost nothing in the process, and Lyons prepared to sell their new discovery under the name of "Frood."

A golden opportunity presented itself in 1943, when the United States Army set up a Headquarters in London. They had no cooking facilities of their own, and having just come from a land of plenty could be expected to know good food when they tasted it. They did not have long to wait; "Frood" was supplied to them every day in the familiar dark blue Lyons vans, and they liked it.

As supplies increased, Lyons began to serve "Frood" in more and more of their own restaurants in the London area, and since the war it has been in such demand for hotels, canteens, schools and hospitals that thousands of pounds worth of additional equipment has had to be installed at Cadby Hall to produce it. But the scene there is very different from that in some mass-production industries, for every item of food is carefully inspected before cooking and must be of the very highest quality.

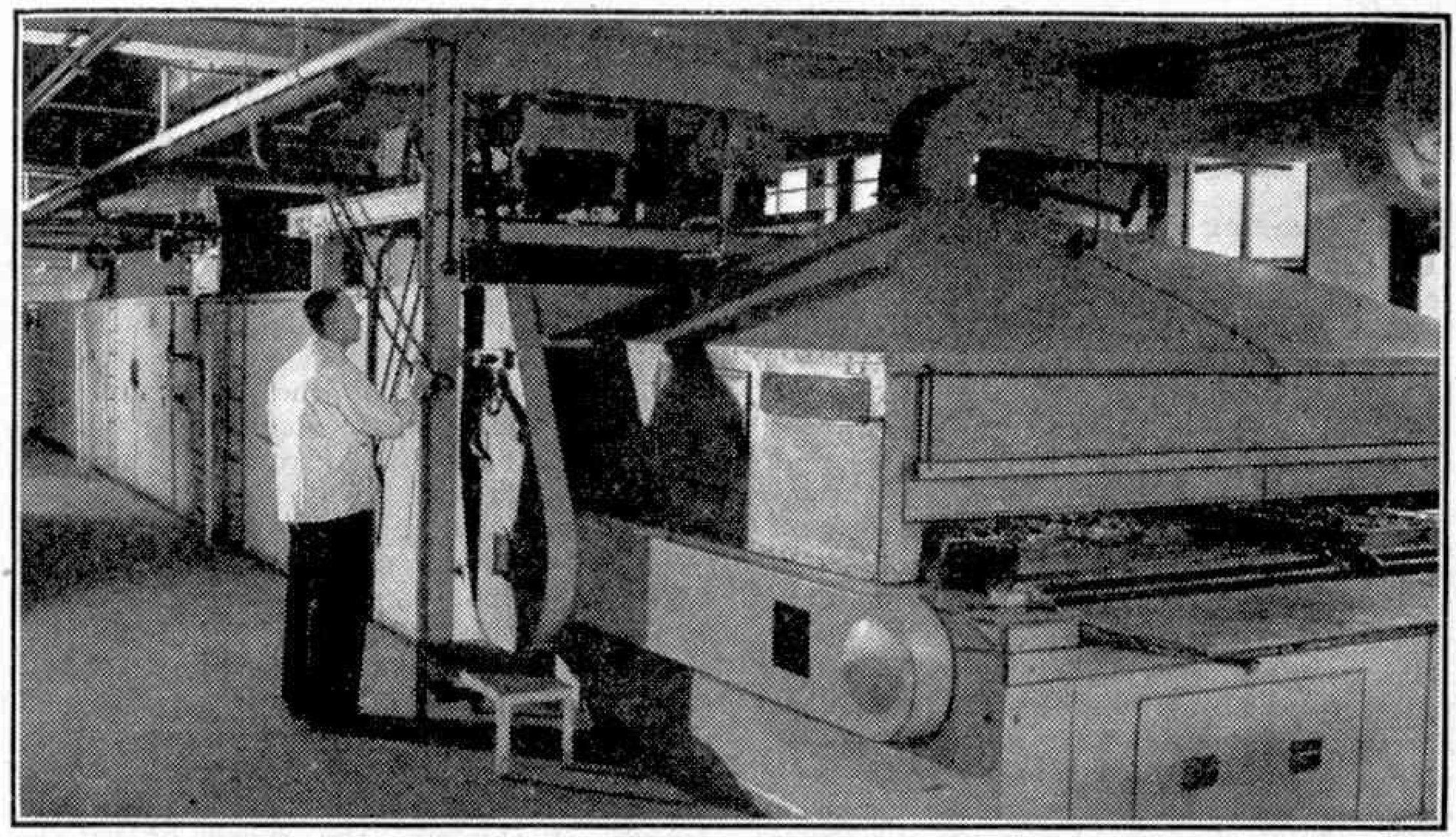


An air hostess preparing the "Frood." Photograph by courtesy of J. Lyons and Co. Ltd., London.

Almost every dish imaginable can be supplied as "Frood," and I was able to watch everything from curried chicken to chocolate sponge puddings and shepherds pies being converted into neat frozen blocks.

First stage is cooking the food in bulk, after which it is divided into predetermined portions and put into open metal containers, sealed with cellophane sheets and labelled. While still warm it is passed down to the refrigerator room and quickly frozen in a temperature of 52 degrees of frost. The speed ensures that the food juices cannot dry or the flavour deteriorate. I joined the "Frood" in the refrigerator room for a few seconds, and immediately lost all ambition to be an Arctic explorer!

Once frozen it can be stored indefinitely until required, in the form of hard blocks, some of which look very different from the description on the label. A big advantage, of course, is that it makes possible the



A scene in the Cadby Hall "Frood" kitchens. Photograph by courtesy of J. Lyons and Co. Ltd.

serving of dishes out of season. For example, milk puddings can be cooked and frozen in summer when milk is plentiful, and served in the winter; similarly, dishes containing apples and plums can be prepared in the autumn and sold in the spring and summer.

It quickly became obvious that "Frood" was the answer to the problem of feeding airline passengers on long flights. There is little room for proper cookers, pots and pans in an aircraft galley, but the availability of food that needs only to be heated up in a small oven for a few minutes before serving is obviously a very different proposition.

Representatives of the airlines went along to Cadby Hall and told Lyons what they wanted, and how much space they could spare for ovens and food storage aboard 'plane. Then, in conjunction with the General Electric Company, Lyons designed a special lightweight oven for heating "Frood" meals in aircraft, together with little trays called "Skyplates" on which a complete meal for one person could be arranged ready for serving.

The oven is only 2 ft. 6 in. high, 18 in. long and weighs 75 lb., yet it will heat 24 complete meals in 28 min. from the frozen state, or in 14 min. if first de-frosted.

It is a great tribute to Lyons' ingenuity that "Frood" is now served not only by British airline companies, including B.S.A.A. and Skyways, but by three of the world's greatest international carriers—Royal Dutch Airlines, Pan American Airways and Trans-Canada Airlines.

To demonstrate the qualities of airborne "Frood" to new customers, Lyons and G.E.C. have converted a "Horsa" glider to resemble the interior of a modern luxury air liner, complete with seats, tables, galley, cloakroom and toilet. It serves a dual purpose, as it also provides a realistic setting for training air hostesses in "Frood" service.

I could not help thinking that if the R.A.F. equipped its "Horsas" in the same style, complete with kindly stewardess and "Frood," there would be no shortage of volunteer paratroops.



A special "Horsa" glider cabin with tables laid for a "Frood" meal. Photograph by courtesy of General Electric Co. Ltd.

The "*Mammoth*"

Merseyside's Giant Floating Crane

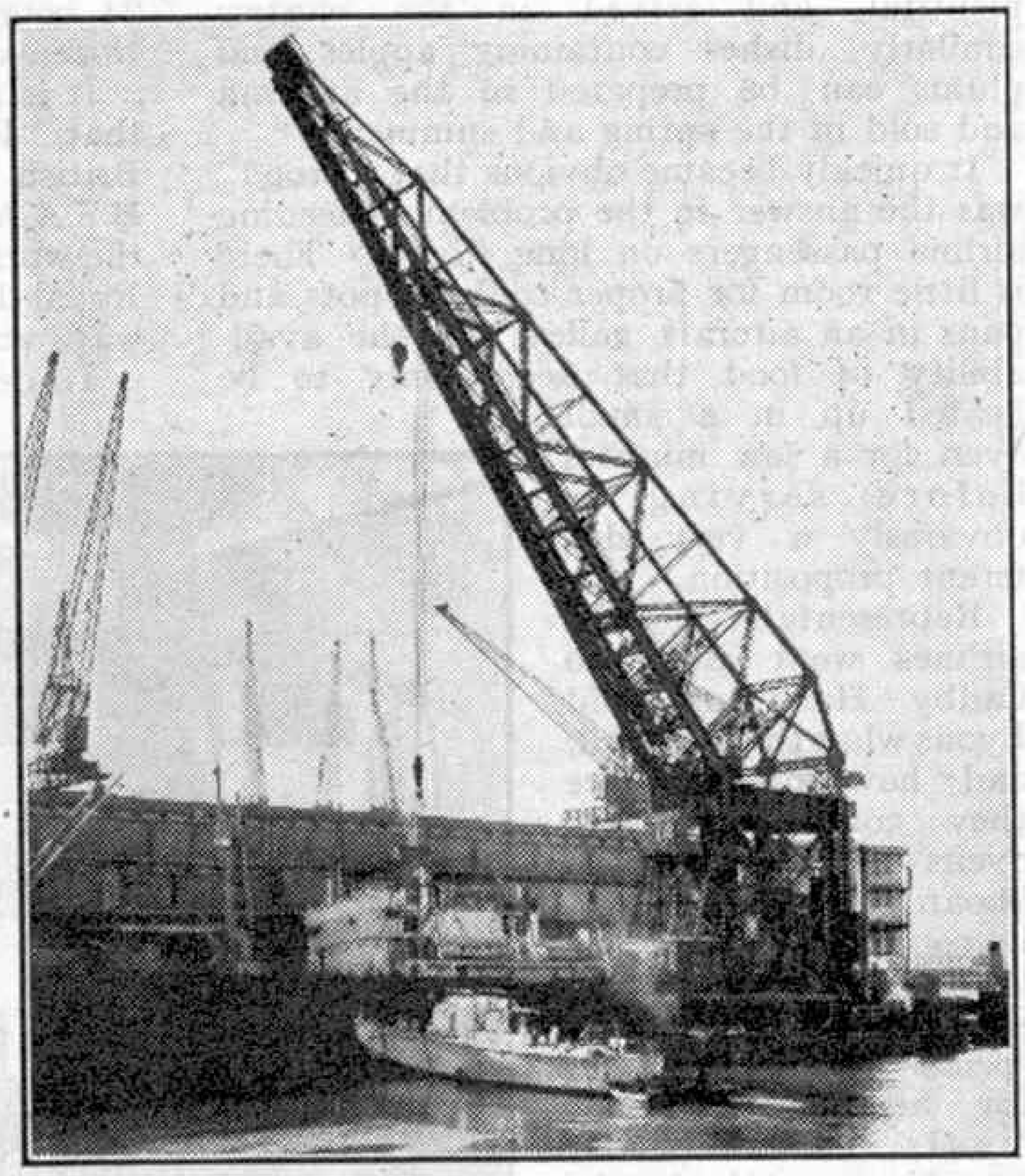
THE floating cranes that are used in estuaries and harbours have many features of outstanding interest. They are usually of immense power, ready to take over almost any lifting task involved in the construction of harbours and docks, the building of ships and the loading of vessels. They are notable too on account of their range and the variety of their applications. A floating crane can travel anywhere where there is depth for it, and to see one of these giants moving slowly and majestically along such waterways as the Mersey and Thames Estuaries is a very thrilling sight, especially if it is carrying one of the huge and spectacular loads for which these cranes have been designed.

The floating crane shown on our cover is a splendid example of this type. It is the 200-ton crane "*Mammoth*" of the Mersey Docks and Harbour Board, to whom we are indebted for the photograph on which the cover is based and also for the illustrations reproduced on these pages. This is capable of slewing or turning round through a complete circle—the rotating weight is over 600 tons—and the jib can be moved up and down over a wide angle, so that it can be used in an extensive range of positions. The crane structure is mounted on a pontoon 154 ft. long and 88 ft. 6 in. in beam, and it is so placed that the greatest outward reach of the jib is either over the side of the pontoon or over its stem. An advantage of this is that the crane can deal with lifts in narrow entrances and in restricted places. Its ability to deal with heavy loads over the gates of the large graving docks of the Mersey Docks and Harbour Board system makes it of great value in ship repairing.

The scope of the crane indeed is exceptional in regard to height of lift and radius of action. It is capable of lying alongside the largest vessel afloat and delivering loads up to 60 tons from the hold of the vessel on to the quay, or in the reverse direction. The height of the lifting blocks used in lifts of this weight ranges from 115 ft. to 197 ft., according to the position of the jib.

Details of the lifting powers of the "*Mammoth*" are interesting. Loads of 60 to 200 tons are handled by two 100-ton lifting blocks fixed on the crane jib, and a load of 200 tons, the maximum, can be dealt with at a radius of from 95 to 110 ft., which gives a clear overside and overstem distance of from 50 ft. 9 in. to 65 ft. 9 in. The radius is greater for loads of 60 to 150 tons. The speed of lift for all these heavy loads is 3½ ft. per min. and the height of the lifting blocks above water ranges from 98 to 170 ft.

With loads of 60 tons or less, which can be handled by two 30-ton blocks on a trolley that can be moved along the full length of the jib, the speed of lift is 16½ ft. per min., and the radius of action is increased to 120 to 185 ft. The trolley speed is 12 ft. per min. With loads of all magnitudes the lifting blocks can be



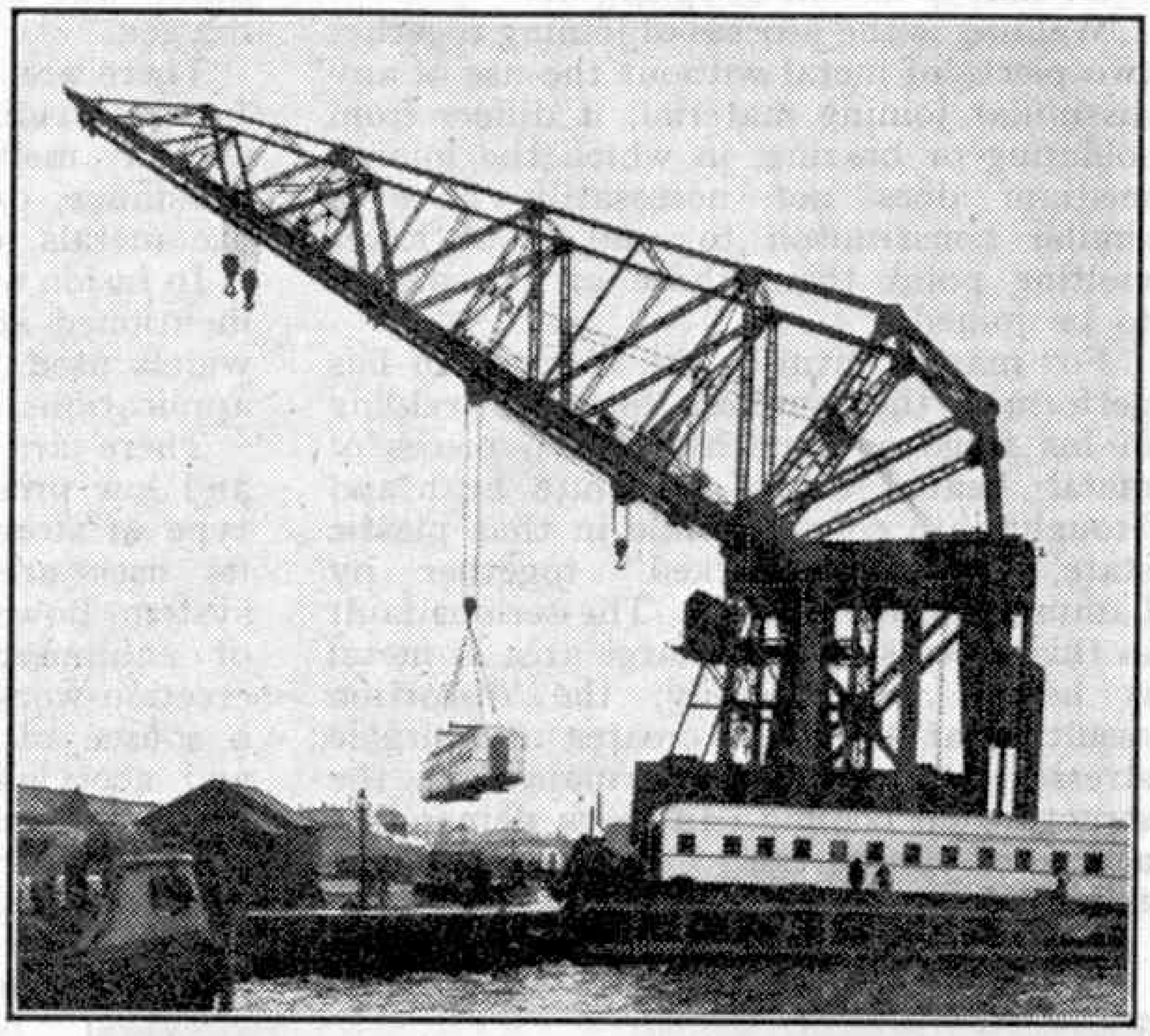
The Mersey Docks and Harbour Board floating crane "Mammoth," preparing to lift a 75-ton ex-R.A.F. launch aboard the Houlder Line steamship "Elstree Grange" for shipment to Buenos Aires. The cradle in which the launch was lifted added 10 tons to the weight raised.

used singly when the weight to be lifted is half the maximum.

All these crane movements are electrically operated, and are under precise control at all speeds. For each there is a separate electric motor, and there are 10 of these, all interchangeable.

The hull of the vessel is divided into 18 compartments. On the after part of the deck is an area of about 300 sq. yds. that is specially strengthened, so that it can receive in safety heavy loads in transit. The illustration on this page demonstrates the use of this space. In it the crane is seen lifting railway coaches from the quayside on to the deck of the vessel, from which later they will be transferred to the steamer transporting them overseas.

The crane is driven by two sets of triple expansion marine type engines, working at a pressure of 150 lb. per sq. in., each of which can be uncoupled from the propeller shaft of the vessel and used for driving generating plant that provides the current for the crane movements. A separate steam-driven generator furnishes the energy for lighting the vessel, which can be done very effectively in order to make work at night possible.



Railway coaches for export being lifted from the quayside to the deck of the "Mammoth," ready to be transferred to the vessel in which they were to travel overseas.

The *"Mammoth"* is a striking feature when seen in the docks on Merseyside, with its giant jib towering over the great ships and warehouses; and it is even more impressive when it is seen making its stately way, at its speed of nearly 5 m.p.h., on the waters of the estuary, especially when it is carrying some giant load. On one occasion it carried part of a lock gate weighing 190 tons across the Mersey. This was the gate of the Alfred Dock, Birkenhead, which required strengthening and repairing and was removed to the Brunswick Dock, Liverpool, for this purpose. When the necessary work had been completed the two halves of the gate were taken across the river in turn without difficulty. On each occasion the half gate was swung from the dock wall to the deck of the floating crane, where it rested in an improvised cradle during its voyage.

The *"Mammoth"* also played an important part in the removal and replacement of bridges connecting the floating stages of the Wallasey Ferries at Egremont and New Brighton. Some years ago a bridge weighing 152 tons was placed in position at New Brighton with its aid. Later an existing bridge was removed for reconstruction, and the rebuilt bridge, weighing 110 tons, was taken by the floating crane down the Mersey from the place where it was fabricated, and lifted into position. In work of this kind the state of the tide has to be taken into consideration, the connection being made at the moment when the tide has risen to its full height.

During one of the many air attacks on Merseyside during the war, a bomb hit the deck of the *"Mammoth"* while she was in the Birkenhead docks and she sank, with her giant jib still towering above water. Salvaging the vessel presented a very difficult problem. To make it easier to raise the pontoon it was decided to remove the jib. For this purpose two travelling steel towers 100 ft. in height were erected, and on these two powerful derrick cranes were mounted for use in dismantling the structure. Then the pontoon itself was raised and repaired, after which the cranes on their towers were employed in rebuilding the jib. This work was carried out by Sir William Arrol and Co. Ltd., Glasgow.

Welding

Modern Developments of a Centuries-Old Process

"TO weld" is the same verb as "to well," that is to boil or spring up.

Welding is the process of joining together two pieces of metal without the use of any dissimilar joining material; it differs from soldering or brazing, in which the joining medium does not necessarily have a similar constitution to, and is of lower melting point than, those of the metals to be joined.

For many centuries the blacksmith has performed the simplest form of welding in his forge or "smithy." Two pieces of metal, heated to red or white heat and brought into contact while in that plastic state, can be "worked" together by hammering on the anvil. The serious fault in this process is that a large area of metal is heated unnecessarily; the distortion resulting at the joint creates undesirable stresses which become permanent in the structure on cooling. In work demanding accurate proportions this cannot be tolerated.

Hence, before welding could become a realizable engineering proposition, a means had to be devised of quickly heating as small an area of the metal concerned as possible. Two such high-temperature heat sources capable of being directed on to a restricted area of surface were found satisfactory. One was electric power, the other was the gas acetylene, burning in oxygen.

There are two main forms of welding—fusion welding, in which the metal is actually melted before joining occurs; and resistance, or pressure, welding, in which the metals are joined in a plastic state.

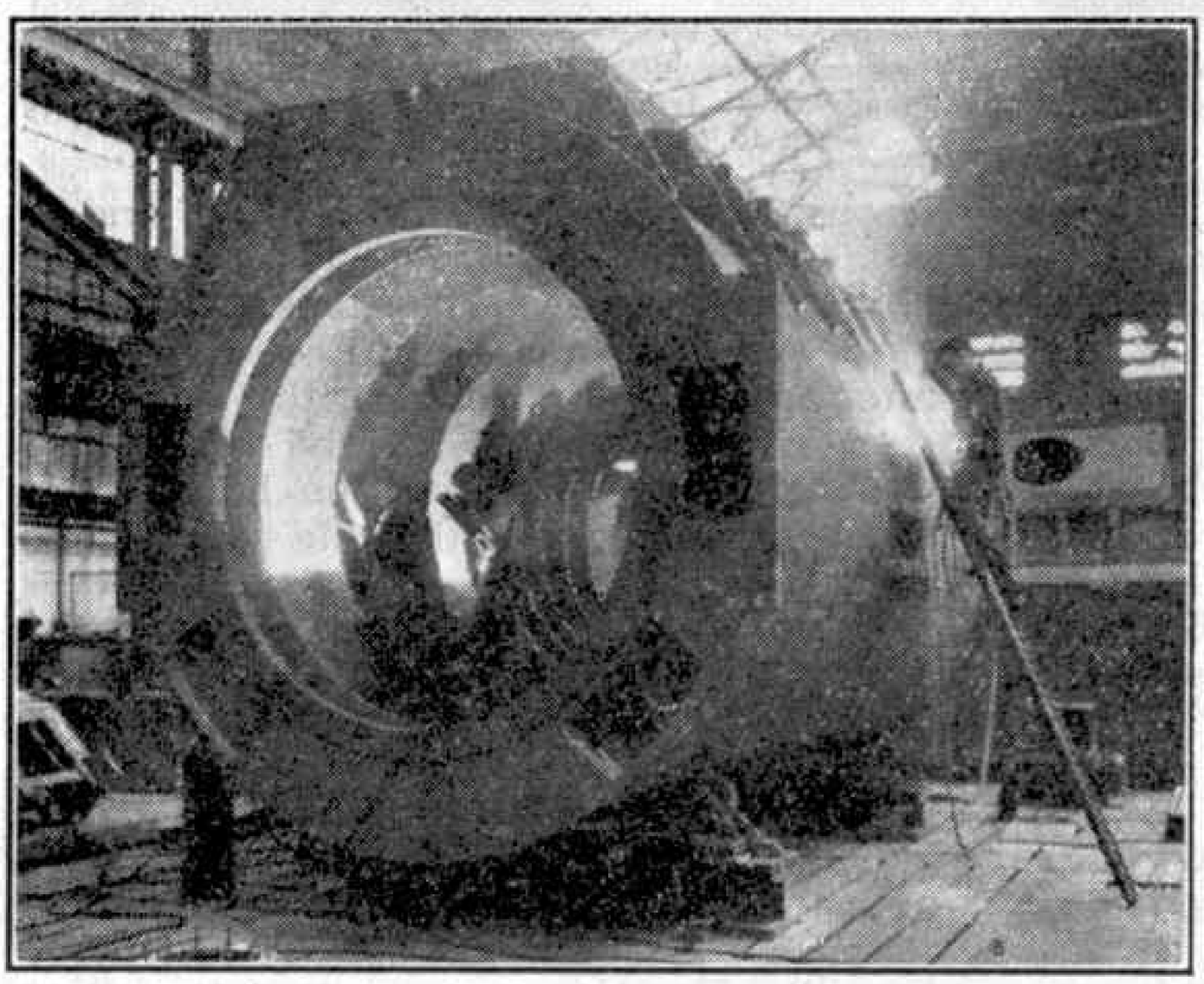
In fusion welding, of the two heat sources mentioned above oxy-acetylene is the less widely used, though it has its own peculiar applications.

There are two systems, high pressure and low pressure. In the former a larger type of storage container is required and its uses are limited. The low-pressure system, however, provides a portable form of equipment, and is very useful for erection-work on sites far removed from a source of electric power. The oxygen and acetylene are stored under pressure in metal bottles. To each bottle the welder attaches a pressure gauge and from each of these a rubber tube leads to a metal nozzle in which the acetylene mixes with the oxygen. The gas is released from each bottle by a key, and the flow through the nozzle controlled by taps on the nozzle handle; by this means the type of flame required on each occasion can be set precisely.

In welding by the oxy-acetylene process a filler wire is melted into the joint at the time of fusion, leaving that "wave-form" ridge along the line of joint that is a feature of a weld. It is suitable for thin, mild or stainless steel, bronze, copper and aluminium, and is used a great deal for repair work in cast iron. The welder wears goggles, tinted to requirements, as a protection from the glare of the nozzle flame.

The other heat source referred to, electric power, is the one used in all the processes now to be described.

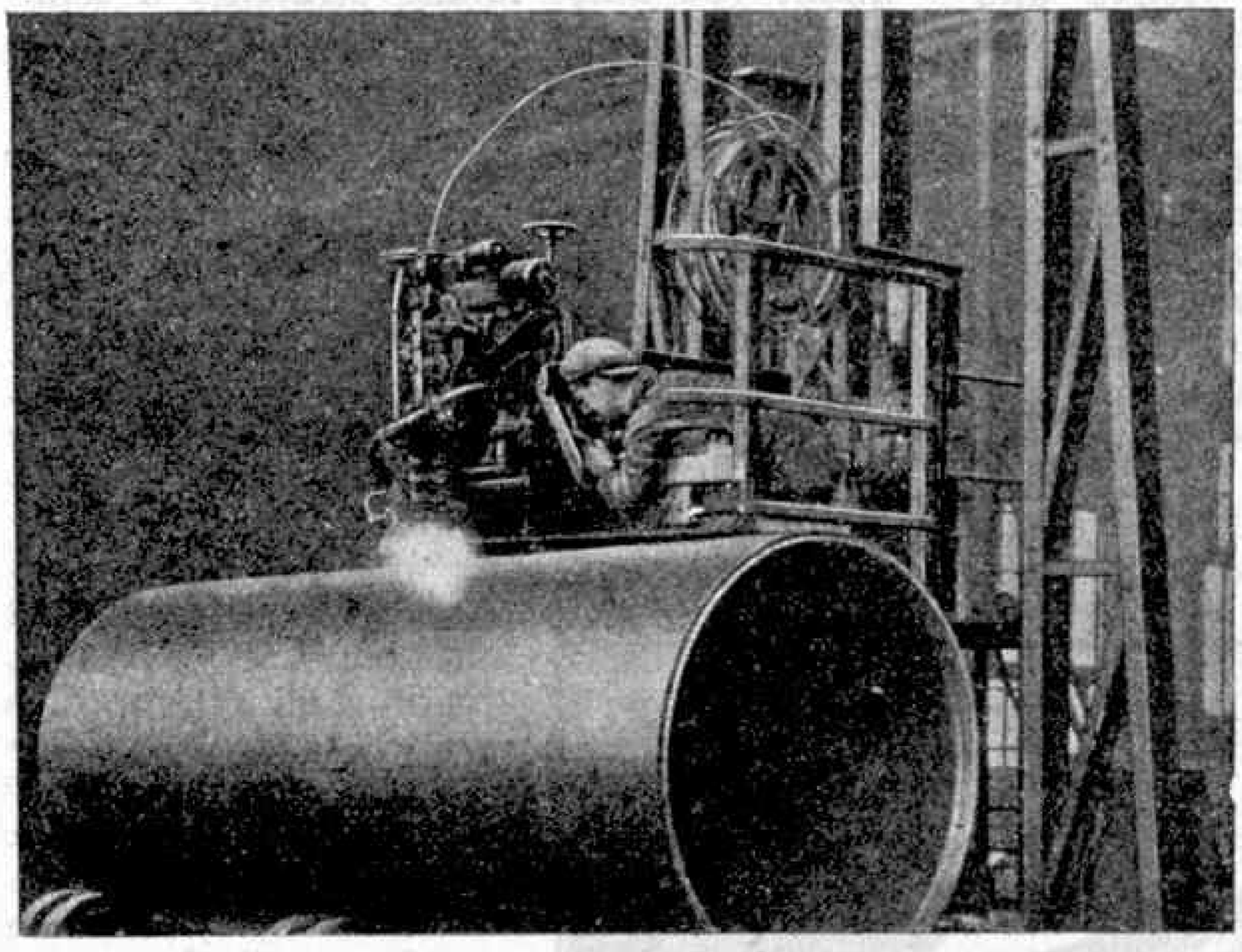
The power, adaptability and convenience of electric arc welding have given it pre-eminence in most fields of welding construction. The procedure is much



Welding construction approaching completion on the stator frame of the generator shown on last month's "M.M." cover.

faster than in gas welding, and thus produces less widespread heating and consequent distortion.

The electric circuit is composed of the welding machine, the conductors to and from the job, the electrode, and the job itself. Simply, the process is this. The electrode is held so close to the seam between the two pieces of metal comprising the job that the current jumps across the gap. This arc is maintained, and the tiny gap then becomes, in effect, a furnace in which the metals concerned melt and intermix. Again the wave-form trail is laid along the line of weld.



An automatic arc welding machine in operation in a Boiler Works.

There are two types of arc welding, metallic arc and carbon arc. In the former the electrode is metallic and melts into the weld, making provision against contamination; the latter employs a carbon electrode and any extra metal required in the weld is supplied by a filler wire. In both cases the welder uses a protective metal shield with a tinted glass window, either attached to his head, or held before him as shown in last month's cover picture.

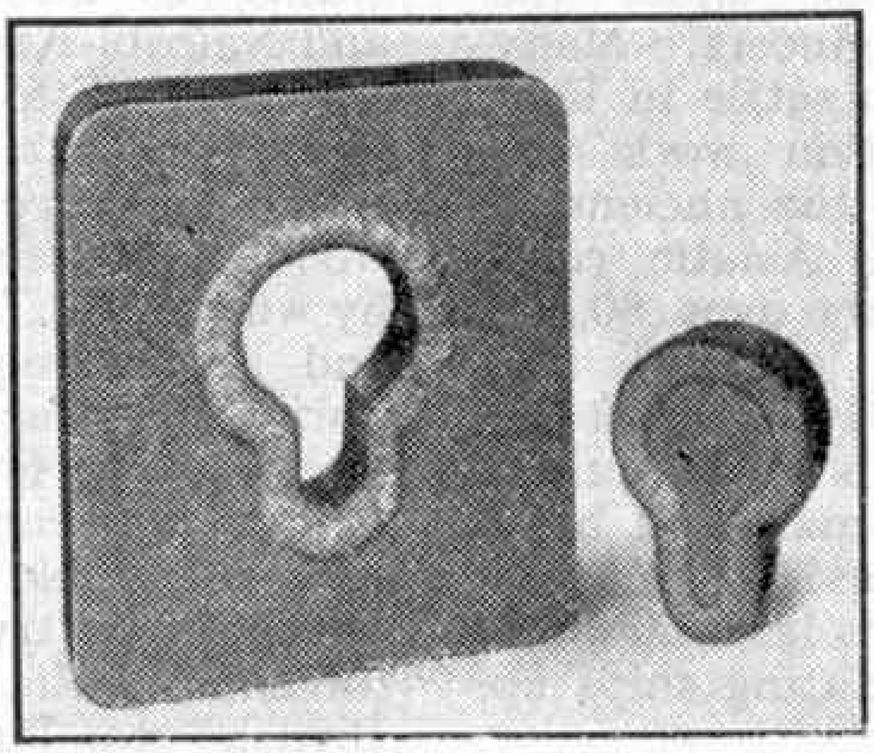
Resistance welding is essentially forge welding brought up to date; the two pieces of metal are heated to a malleable state by electric power and, when pressed together by mechanical force, they fuse.

Spot welding is chiefly used for thin metal sheets. The sheets to be tacked together are clamped under pressure between a pair of tips of small area, and as the current passes between the tips the "spot" between them becomes hot and fusion takes place.

In projection welding a projection is formed at the point to be welded, and when the two pieces are heated electrically to a plastic state and pressed together locally, they unite at that point. Projection welding is being widely used in the making of the tubular furniture to be seen in most furniture stores to-day, because the crossed tubes form ideal localized points. It is always a useful method when many welds are needed inside a small area or awkwardly shaped component.

In seam welding the clamps are in the form of wheels and the sheets pass between, while an intermittent current traverses the revolving wheels. By varying the current impulse the spacing of the welds may be regulated. Butt and flash welding are similar processes, with the advantage that they cause very little distortion.

This article has not exhausted the various welding practices in vogue. In all cases the temperature is the important factor. It should be high enough to render the surfaces involved workable; yet, if excessive, it causes unwanted oxidization. A well-executed weld should normally have similar mechanical properties to the parent metal.



In this illustration is shown a punch and die after the depositing of tool steel. Note the "wave-form" peculiar to all welds.

A word of caution to enthusiasts: When watching a welder at work, always wear suitable protection against the glare, or injury to the eyes may result.

* * * *

For the information on which this article is based, and for the accompanying photographs, we are indebted to the courtesy of Metropolitan Vickers Electrical Company Limited.

The Kenya and Uganda Railway

By Capt. A. H. Woollen, B.Sc., R.E.

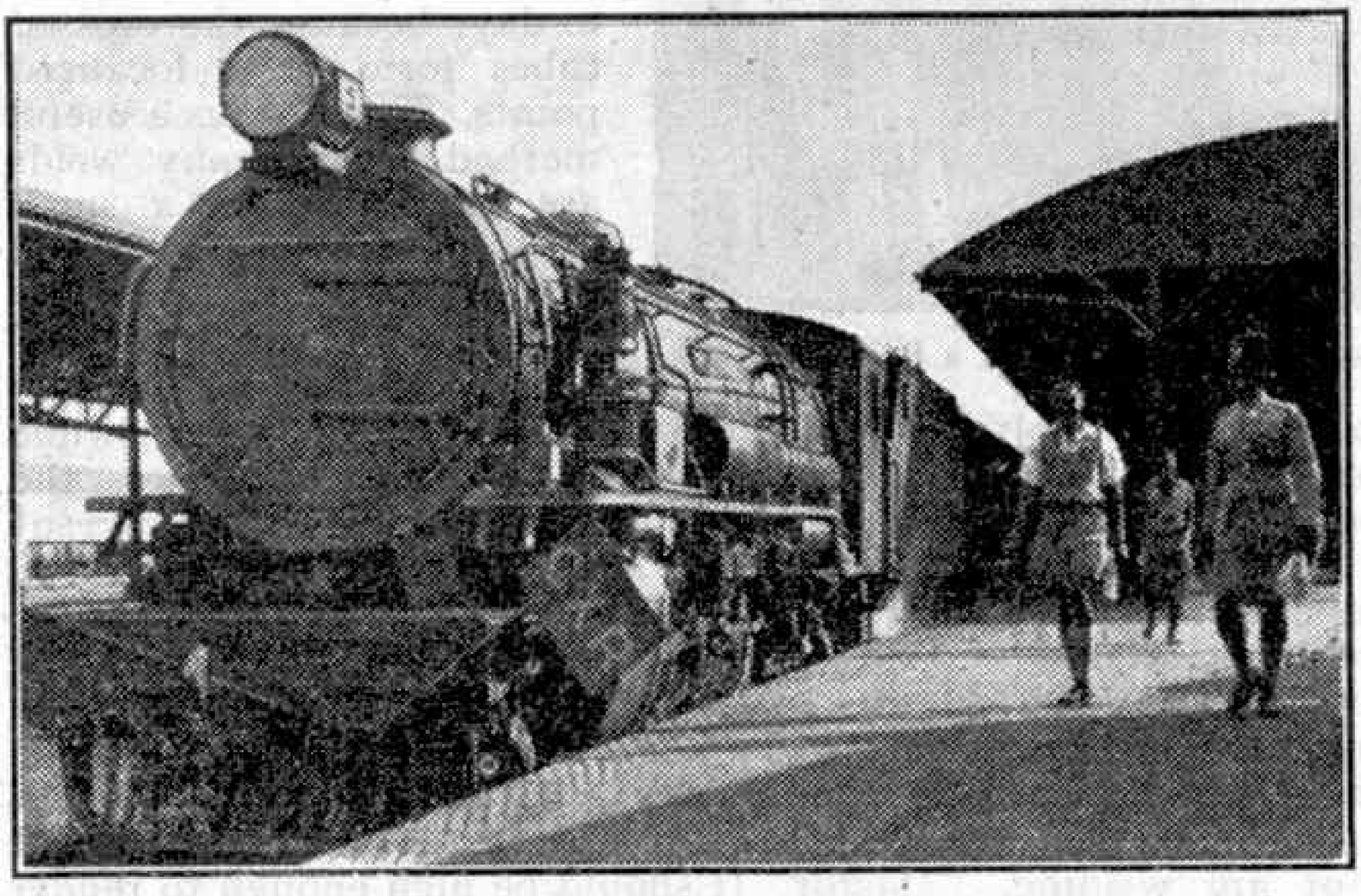
THE construction of the Kenya and Uganda Railway was begun in 1895 for the purpose of opening up the interior of British East Africa, which was then unexploited country. The first section, Mombasa to Kisumu on the north-eastern shore of Lake Victoria, was opened in 1903. From Kisumu, connection was made to Uganda across the lake by shallow-draught lake steamers. Direct rail connection to Uganda was completed in 1931.

The construction of the railway was an interesting piece of Empire-building beset with many difficulties and hazards. Most of the track-laying was done by Indian labourers, mainly Punjabis, under the supervision of British engineers. Many of these Indians decided to settle in East Africa after the construction work was finished, and these formed the nucleus of the vigorous and growing Asiatic community which now numbers over 80,000 in Kenya alone.

Mombasa, the seaport of Kenya and the terminus of the railway, is built on an island connected with the mainland by a causeway over which passes the railway, and a floating bridge. It has large modern docks capable of accommodating ships up to 40,000 tons.

The railway was laid approximately on the line of the ancient caravan and slave route from Uganda to the coast. For about 100 miles inland stretches a semi-arid region of thorn-scrub and bush, the haunt of lion, elephant, and rhinoceros. Pushing the line through this was no mean feat, especially during the dry season when the problem of water-supply was acute. Often water had to be brought to the rail-head from a stream many miles farther down the line.

At Tsavo, about 120 miles from Mombasa, the construction camp was terrorized for several months by two man-eating lions. During that time they each devoured over a score of Indians and an unrecorded number of Africans, eluding all attempts to trap them. At one period the panic they caused was so great that construction ceased entirely for three weeks, until they were eventually shot by Colonel Patterson, one of the engineers in charge of construction.

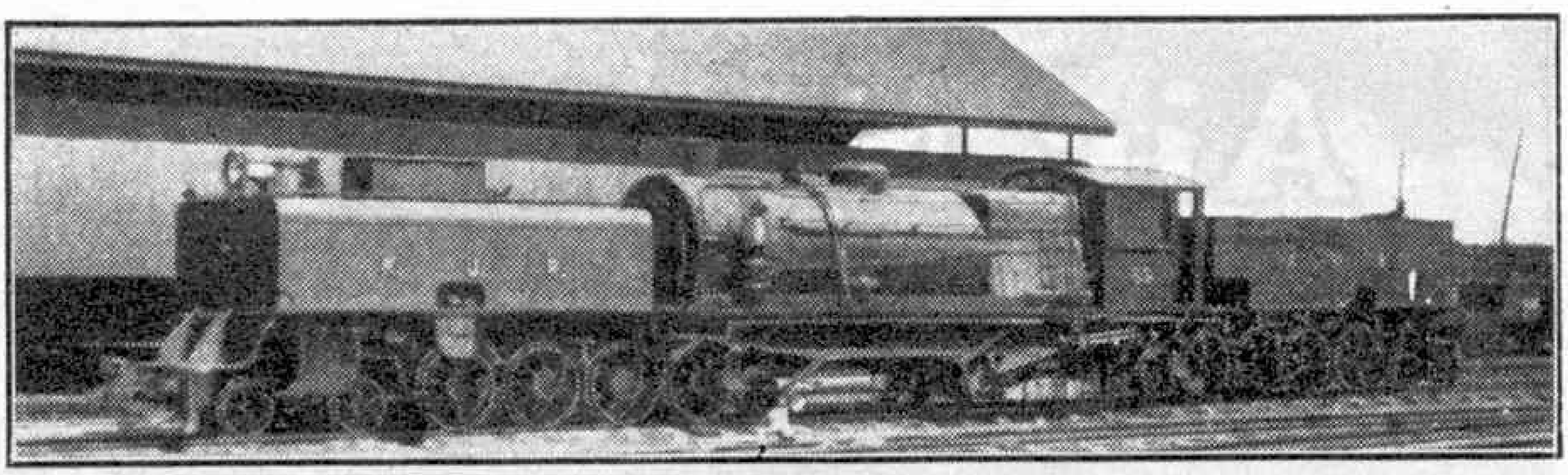


A Mombasa train waiting to leave Nairobi. Note the large proportions of the engine and its prominent headlight.

The line is metre-gauge and single-track throughout. The track is doubled at stations and halts to permit the passing of trains, although by British standards traffic is extremely light. For example, the Mombasa-Nairobi section is traversed once daily in each direction, apart from special boat trains, as also are the Nairobi-Kisumu and Nairobi-Kampala sections. The service from Nairobi to Nanyuki is operated thrice weekly in each direction.

Metal sleepers are universally used; wooden sleepers would quickly be eaten by white ants. To keep capital expenditure and labour requirements to a minimum during construction, cuttings and embankments are as few as possible, and the line follows the contours of the countryside, with the result that in the hillier sections of the country it takes an extremely tortuous path. Gradients are terrific by British standards, 1 in 50 being not uncommon.

Between Mombasa and Nairobi the country is flatter, permitting long straight



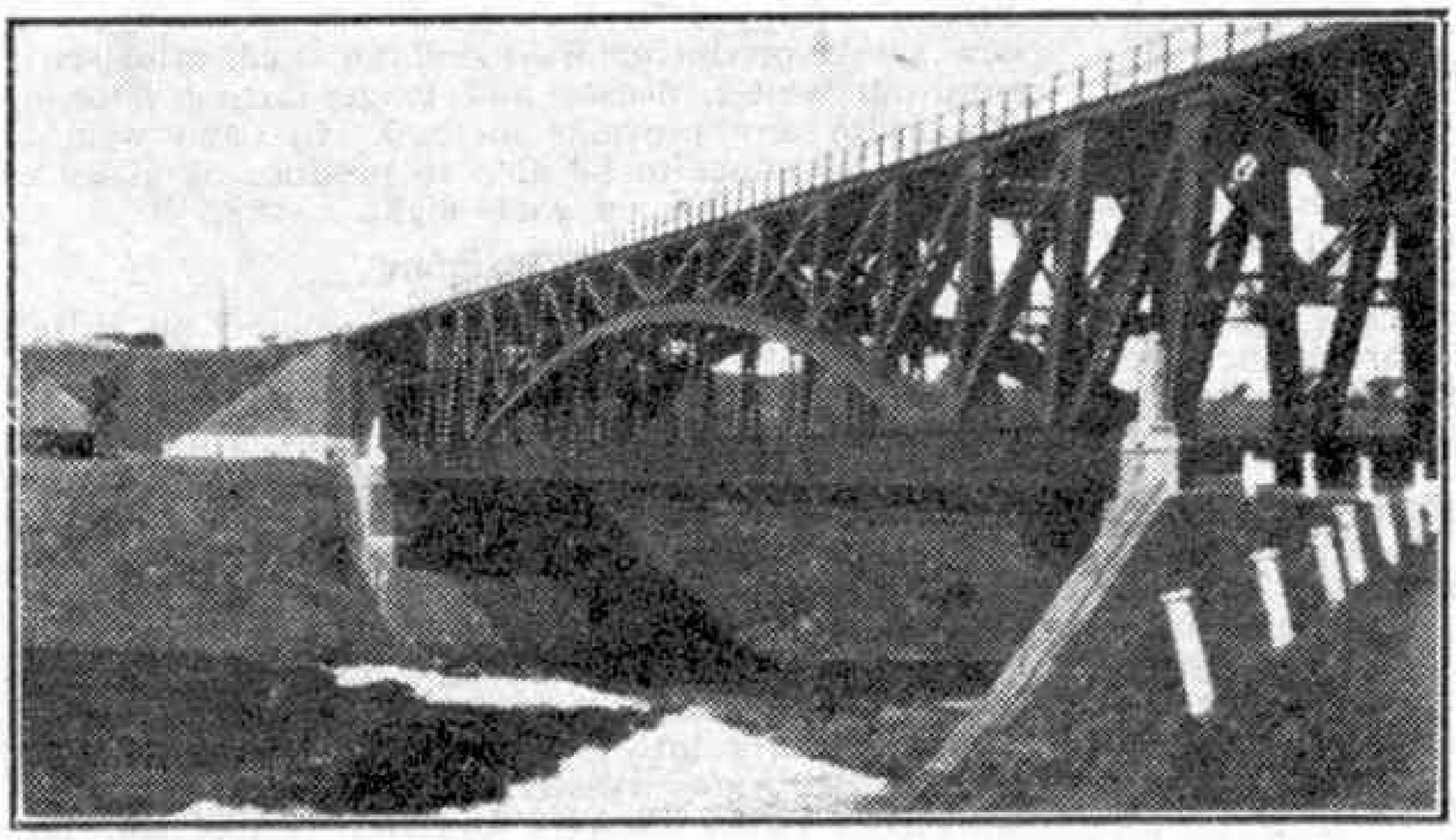
A 4-8-2 : 2-8-4 "Beyer-Garratt" locomotive of the Kenya and Uganda Railway, with its rods and motion removed while under repair at Nairobi.

stretches on which speeds of 40 m.p.h. and more are maintained. There is only one tunnel in the system, a very short one, said, no doubt slanderously, to have been built to meet the wishes of a prominent English lady who could not envisage a railway without a tunnel!

To the newcomer to East Africa a journey on the mail-train from Mombasa is of absorbing interest. Leaving the palm trees and plantations of Mombasa in the evening, the train soon enters the 100-mile stretch of thorn-scrub wilderness. At dawn next day the train is entering the Athi Plain, which extends south-eastward of Nairobi for about 50 miles. The Plain is a game-reserve, and at this time of day the vast herds of antelope, kongoni, wildebeeste, zebra, and giraffe which roam the Plain are feeding. They take no notice whatever of the train, and a magnificent view of African wild life can be obtained. An occasional lion can also be seen if the traveller is very lucky.

This region is also part of the reserve of the Masai tribe, an interesting race of warriors who lead a semi-nomadic existence and whose chief diet is a mixture of bullocks' blood and milk. Nairobi, the capital of Kenya, is reached at about 9 a.m. Beyond Nairobi the line enters the hilly Rift Valley region, and so the "Pacific" which has hauled the train from Mombasa is replaced by a "Beyer-Garratt" articulated engine.

The region of the Great Rift Valley provides some of the grandest scenery in Kenya, and the descent, in zig-zag fashion, of the Kikuyu Escarpment of the eastern side of the Rift is a long business. On the floor of the Valley is Nakuru, a centre for the European farmer-settlers in the neighbourhood, and the junction of the two branches of the railway which go respectively to Kisumu and Uganda. The Kisumu line is the original line opened in 1903; the Uganda line crosses the gigantic Mau Escarpment, as the western wall of the Rift Valley is known, nine miles to the north of the Kisumu line. On the summit of the Mau Escarpment the railway reaches the highest altitude of all railways in Africa, 8,321 ft.



The combined road and rail bridge over the river Nile at Jinja, Uganda completed in 1931.

Kisumu, the terminus of the original line, is a pleasant place on the shore of Lake Victoria, the centre of the lake fishing trade, and a stop on the flying-boat route to South Africa. Steamers operated by the railway company ply between the three principal lake ports, Kisumu, Entebbe in Uganda, and Mwanza in Tanganyika.

On crossing the border into Uganda one cannot help noticing the marked change in vegetation.

(*Continued on page 202*)

Air News

by John W. R. Taylor



Refuelling a British Overseas Airways "Constellation" transport.

"Vampires" to be Built in Switzerland and France

Following extensive service tests with four de Havilland "Vampires" over the last two years, the Swiss Government have decided not only to adopt the "Vampire" as Switzerland's standard defence fighter, but to build the type under licence.

The initial four aircraft were Mark Is, of which one had been modified to carry rockets and bombs for ground attack duties, in addition to high-altitude fighting. As the Swiss were particularly pleased with the dual-purpose type, de Havilland developed for them the special "Vampire" 6, which is similar to the R.A.F.'s "Vampire" 5 but has a "Goblin" 3 engine of 3,300 lb. thrust, instead of the 3,000 lb. thrust "Goblin" fitted to the Mark 5.

The first 75 "Vampires" for the Swiss Air Force are being built by de Havilland at Hatfield, and will be followed by an initial series of 100 Swiss-built machines for which the engines will be supplied from England.

France is also arranging to build "Vampires" along the same lines as Switzerland.

"Pluto" becomes "Plume"

Sections of the original "Pluto" (Pipe Line Under The Ocean) pipe-line system laid on the bed of the English Channel in 1944 from the South Coast to France, for supplying petrol to the Allied liberation forces, have just started a new lease of life in connection with the Berlin Air Lift. Locally known as "Plume" (Pipe Line Under Mother Earth), the pipes have been laid, by Control Commission engineers, from R.A.F. Station, Gatow, to the shore of Lake Havel 1½ miles away.

Petrol is discharged from "Plainfare" tanker aircraft into underground tanks at Gatow, from which it can now be pumped at the rate of 100 gall. a minute into tanks at Lake Havel. It is then transferred to barges and taken by canal to points in the British sector of Berlin, a far more economical system than the former method of distributing petrol from Gatow by tanker lorries.

News of the B-36

On 29th January last a Convair B-36B six-engined bomber of the U.S.A.F. dropped two 20-ton bombs, the first from 35,000 ft. and the second from over 40,000 ft., at a distance of 1,200 miles from its take-off point. This is by far the greatest bomb load ever carried by a single aircraft.

General Hoyt S. Vandenberg, Chief of Staff of the U.S.A.F., stated recently that the B-36, flying at 40,000 ft., cannot be intercepted by American jet fighters of current design. What is more, experience has shown that if a jet fighter attacks the B-36 from astern its engine is liable to blow up in the turbulent slipstream from the bomber's six giant engines.

Bearing this in mind, the U.S.A.F. recently cancelled contracts for other types of bombers and fighters in favour of more B-36s. Some of them will probably be fitted with four additional under-wing jet engines to make them the fastest, as well as the longest ranging and highest-flying bombers in service anywhere.

Skywriting Again

The first post-war advertising by means of skywriting is scheduled to take place soon on behalf of Pye Radio, of Cambridge. It will be undertaken by Mr. Alistair Fraser, who owns the only aircraft in Britain equipped and licensed for skywriting. A new smoke-producing fluid will be used, which will turn out whiter, denser and longer-lasting lettering than with any previous method. In calm weather Mr. Fraser hopes to be able to produce as many as 12 or more letters on each flight.

Civil "Plainfare"

The fleet of civil aircraft administered by British European Airways which joined the Berlin Air Lift last Summer, carried an average of over 200 tons of fuel, food and other supplies into the German capital each day during its first 200 days of operation. Nearly 8,000 sorties were flown in that time, lifting a total of over 45,000 tons, which is more than the whole of the freight load carried by British scheduled air services for the 20 years before the war.

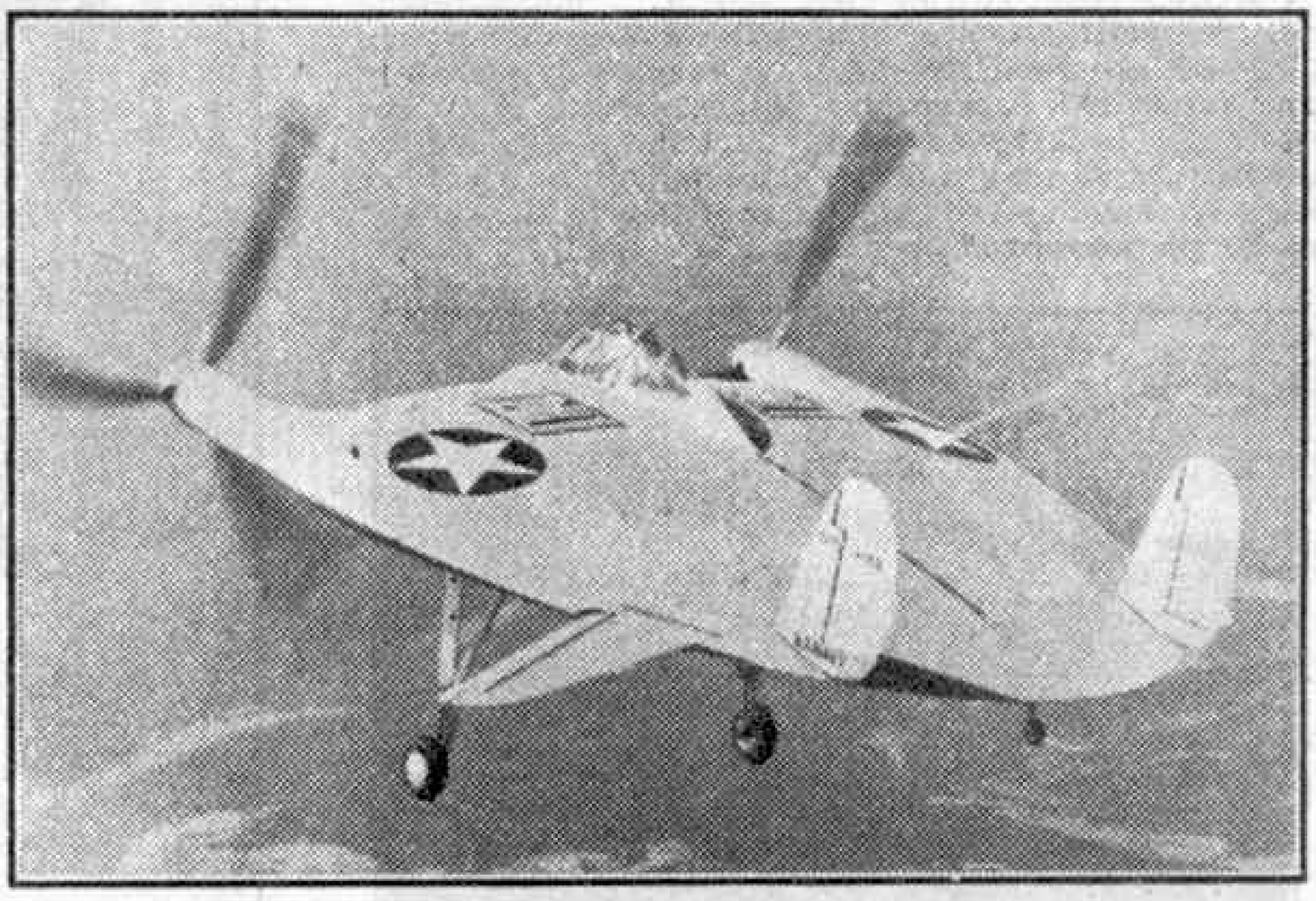
Greatest achievement of this mixed fleet of converted bombers and transport aircraft has been its ability to carry into Berlin every drop of liquid fuel used in the three Western Sectors in the last few weeks, for power stations, factories, homes, transport and the military and civilian services. In this respect the seven "Tudor" aircraft operated by B.S.A.A. and Air Vice-Marshal Bennett's Airflight Company have proved particularly successful.

Flying Saucer

A year or two back, when many people saw (or thought they did) "Flying Saucers" of various shapes and colours, there was in fact one genuine "Flying Saucer" on test in America. It was the little Chance Vought V-173 all-wing aircraft, illustrated on this page.

The V-173, which was designed as a full-sized, low-powered, light-weight flying "model" of the XF5U-1 naval fighter, was developed from a tiny twin-engined 7 ft. span "saucer" built by Charles Zimmerman, of Chance Vought, in 1934. Advantage of the novel layout is that it offers both extremely high speeds and low speeds in one machine. In fact, Chance Vought believe that a jet-powered "saucer" would be able to hover at zero m.p.h., helicopter fashion, or on the other hand achieve speeds of over 500 m.p.h.

Although neither the V-173 nor the XF5U-1 advanced beyond the prototype stage, they proved the soundness of Zimmerman's theories. It is significant that Chance Vought's latest production type, the revolutionary, swept-wing "Cutlass," which will be described in next month's "*Air News*," is a jet fighter of flying-wing layout.



The Chance Vought V-173 all-wing aircraft. Photograph by courtesy of United Aircraft Corporation, U.S.A.

Trout Eggs by Air

Fifteen thousand Brown Trout eggs have been flown by B.S.A.A. from Britain to Montevideo (Uruguay), destined for the Falkland Islands, where they are to be used to replenish the trout in the Islands' rivers and streams.

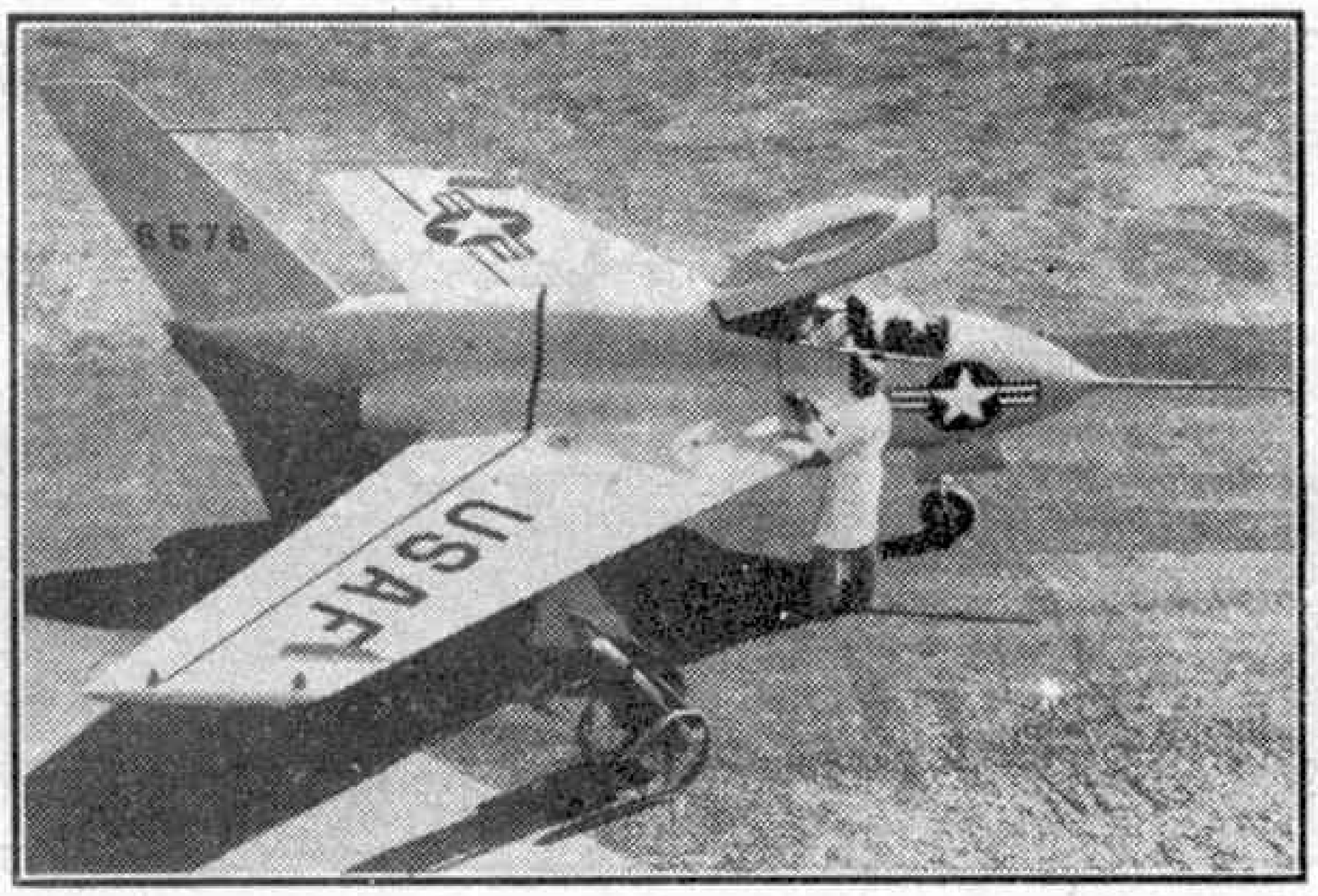
Weighing only a pound, the eggs were safeguarded on their 7,000-mile flight by 47 lb. of packing, including a metal container surrounded by cork chippings and 10 lb. of ice to keep them cool and so prevent their hatching *en route*. At Montevideo one of the ships operating the infrequent service to the Falklands awaited the cargo to carry it the remaining 1,000 miles by sea.

Ingenious Maintenance Trolley

Mr. D. J. Stapleton, Aer Lingus Station Engineer at Northolt Airport, has designed a mobile Maintenance Unit that, since put into service, is estimated to have cut turn-round maintenance time by 25 to 50 per cent.

In effect, the Unit is a mobile workshop which carries all tools and spare parts necessary for routine maintenance. It has a small petrol motor which combines a charging unit for the batteries and current supply for portable hand-lamps fitted with wandering leads and flood lights. There is a work-bench and vice, a tool rack and drawers carrying sparking plugs, locking wire, etc. It is also fitted with fire extinguishers, first aid kit, containers of hydraulic and de-icer fluids and a full range of measures and funnels. The top of the Unit can be used as a work platform, allowing engineers to work directly on the aircraft's engines while the machine is on the apron, thus saving hangar time.

The first Unit, which was built by Stapleton and some colleagues in their spare time from scrap material, is said to have cost less than £10.



The dart-shaped Northrop X-4 research aircraft described on this page. Photograph by courtesy of Northrop Aircraft, Inc., U.S.A.

Sonic Speedster

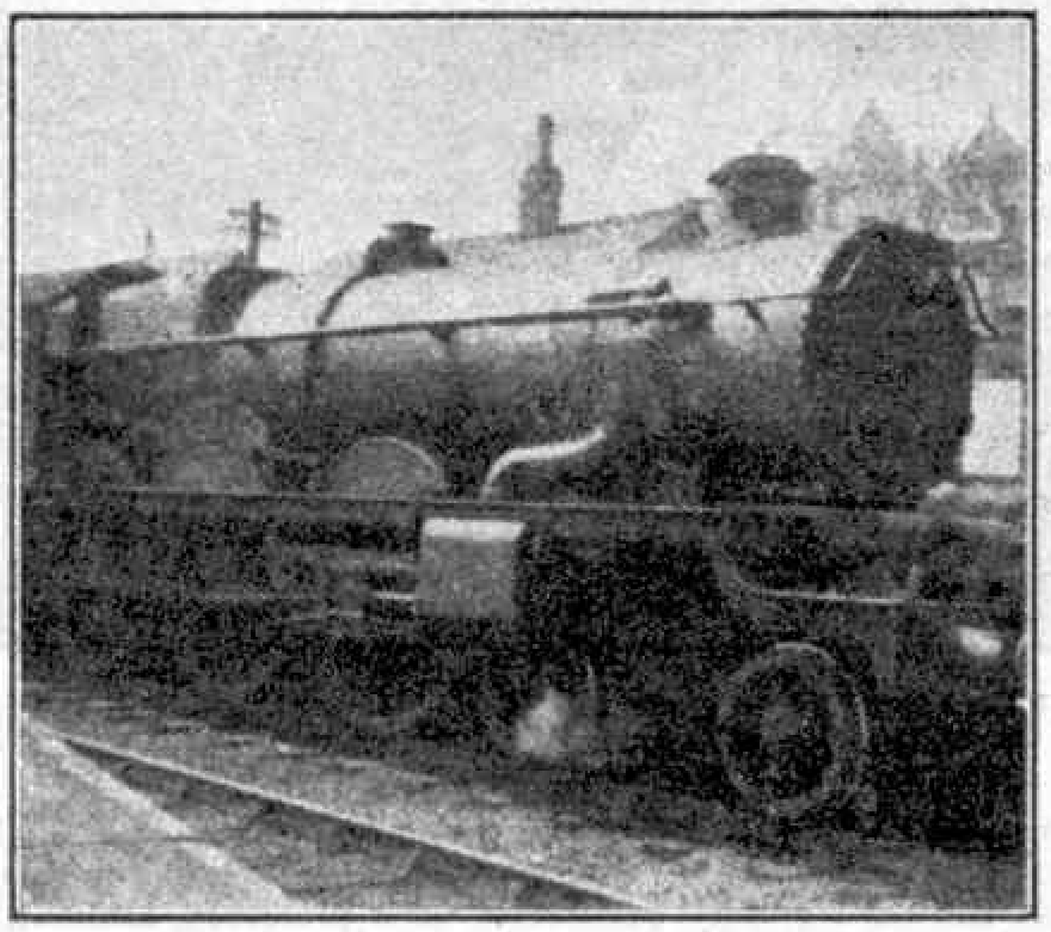
One of the smallest aircraft ever built for the U.S. Air Force, the Northrop X-4, shown at the foot of this page, has a wing span of only 25 ft. and weighs about 7,000 lb. It is very similar in general appearance to the de Havilland 108 and, like the British machine, has been designed for high-speed flight research; but its two Westinghouse jet engines give it rather more power than the 108's single "Goblin."

The American Bell X-1 and the D.H. 108 have already proved that flight at speeds greater than that of sound is possible, but the X-1 has always been flown through the critical band of speeds lying immediately on each side of sonic speed as quickly as possible, to minimize the effects of the compressibility shockwaves that can batter aircraft to pieces in a few seconds. What is more, the X-1's rocket motor gives it an endurance of only 2½ min. at full power, whereas the X-4 should be able to carry a pilot and elaborate instruments into this "trouble zone" of sonic flight, and keep them there long enough to find out a great deal more than is now known about its dangers.

Photography

Background and Foreground Faults

AMONG the entries for "*M.M.*" photographic competitions are almost always some which, although otherwise excellent, are spoiled by unsightly and unwanted background details. Quite often the unseemly background could have been avoided by moving or turning a little more to left or right, or slightly changing the angle of approach to the subject to be photographed.

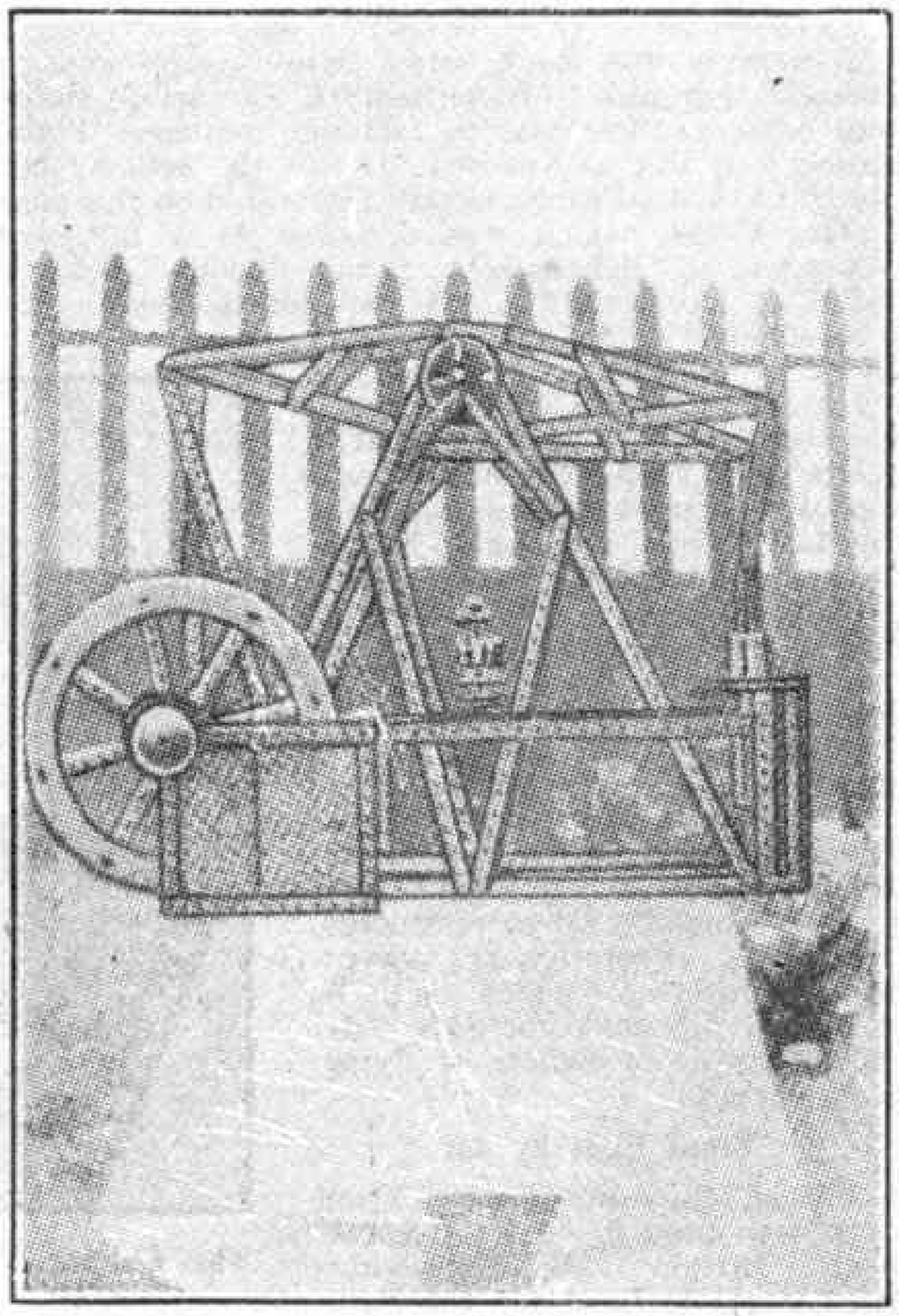


The telegraph pole and roof chimney are not really sprouting from the locomotive!

It is surprising how many otherwise first-rate photographs of stationary locomotives are taken in such a position that chimneys, telegraph poles or electric lamp standards appear to be sprouting from the boiler or cab! An example of this fault is shown on this page.

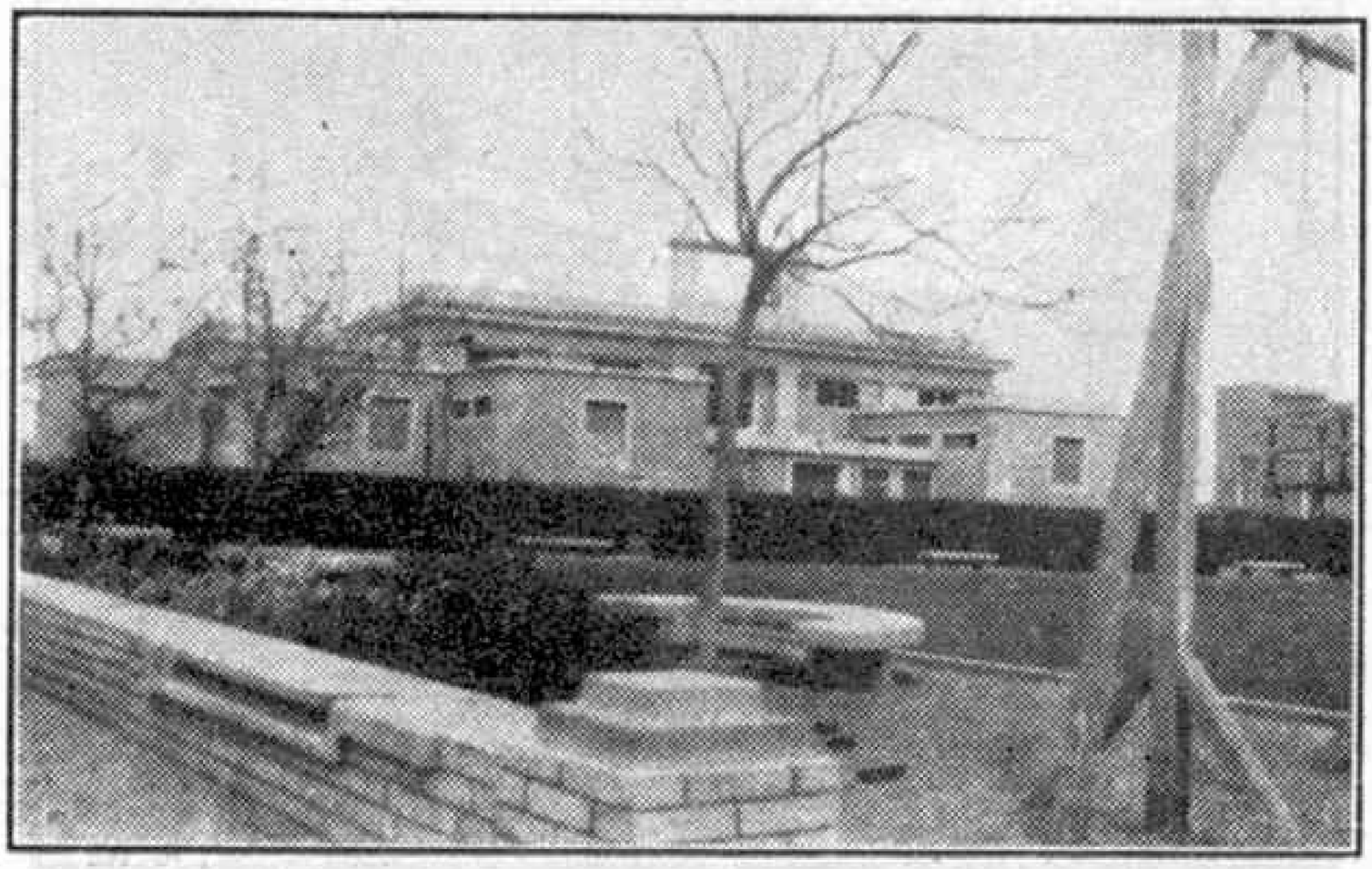
Meccano model photographs seem to be particularly liable to this background trouble, and often in model-building competitions we receive prints of really excellent models which, having been taken out-of-doors, appear to be entangled in a mass of foliage, or are almost invisible against a background of brickwork or railings. In the top picture the railings are so mixed up with the Strips and Girders of the model that it is difficult to make out its general outline, and the finer constructional features are lost. Similar confusion occurs when a model is posed on a chair with an ornamental back.

The best background for a small Meccano model that is to be photographed is a sheet of white cardboard or rough-surfaced paper, such as cartridge drawing paper. If the model is a large one, such as a crane or other vertical structure, a white sheet might be hung behind it. A light neutral background of this sort causes the structural details of the model to stand out boldly, and greatly improves the photograph.



This picture shows the effect of photographing a Meccano model against an unsuitable background.

Sometimes it is the foreground that causes the trouble. In photographing buildings, for instance, a foreground requires careful consideration. It may be of such a nature as to add to the general attractiveness, and it may even be essential to include a fair amount of foreground to produce the right pictorial effect. More often, however, the foreground details are definitely not wanted. In the bottom photograph the foreground details, the trees and the swing in particular, distract attention from the building and are simply irritating.



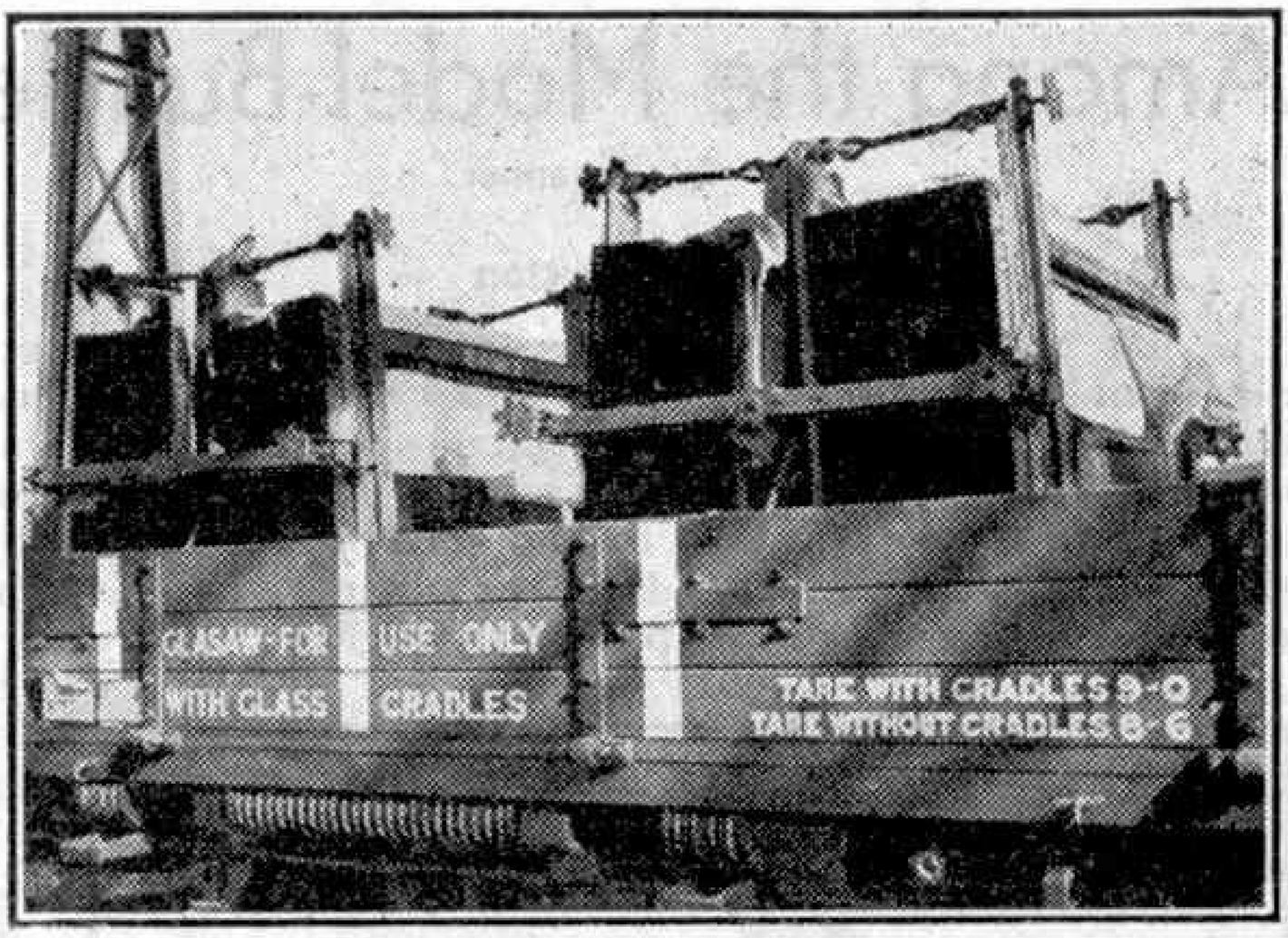
This view of the gymnasium of the English School, Cairo, is spoilt by the trees and swing in the foreground.

Glass by Rail

THE carriage of glass by rail has long required the provision of special equipment owing to the fragile character of such loads. In recent times the container system has improved the handling of small glassware. A container can be packed at the manufacturer's works and then travel with its contents undisturbed by road, rail, and perhaps road again before reaching its destination.

For large glass sheets special wagons fitted with trestles for supporting the load in a sloping position are well known. Often they are of the well type, thus allowing taller sheets to be dealt with. Other wagons for glass sheet traffic have special vertical stanchions, between which the sheets, crated or cased, can be clamped.

Recent developments on the London Midland Region, following up experiments begun in 1946 by the former L.M.S. and Pilkington Brothers Ltd., the glass manufacturers of St. Helens, will enable window glass to travel from St. Helens, Lancs., more speedily, without packing, and better still, without damage. This has been made possible by new-type cradles carried in special shock-absorbing railway wagons. The new idea is to load sheet glass in two equal packs on either side of the felt-padded centre support on each cradle and to hold it in position with clamps.



A pair of new glass-carrying cradles loaded on a special shock-absorbing wagon. The photographs and information on this page are by courtesy of British Railways, London Midland Region.

The cradles are removable and can be carried in both road and rail vehicles. They are of light weight and easily accessible, both for loading and unloading. All clamping and securing of the glass is performed by mechanical means, without ropes or loose packing.

Each pack of glass is independently clamped by a felt-covered detachable steel frame, housed in sockets at the base and tightened at the top by screws which in turn are connected to the centre supports.

To prevent any longitudinal movement of the glass a swivelling adjustable steel beam is attached to the centre supports by a screw and is further secured at each end to the side frame by a screw clamp.

The shock-absorbing equipment of the new wagons, which allows the body in which the glass cradles are fitted to "float" on rubber springs, totally eliminates damage to sheet glass due to any violent movement during transit by rail. Each wagon can carry 8½ tons of sheet glass in two cradles as compared with the load of three to five tons of glass packed in crates and carried by former methods.



A loaded glass cradle being lowered on to the deck of a road motor vehicle.

Among the Model-Builders

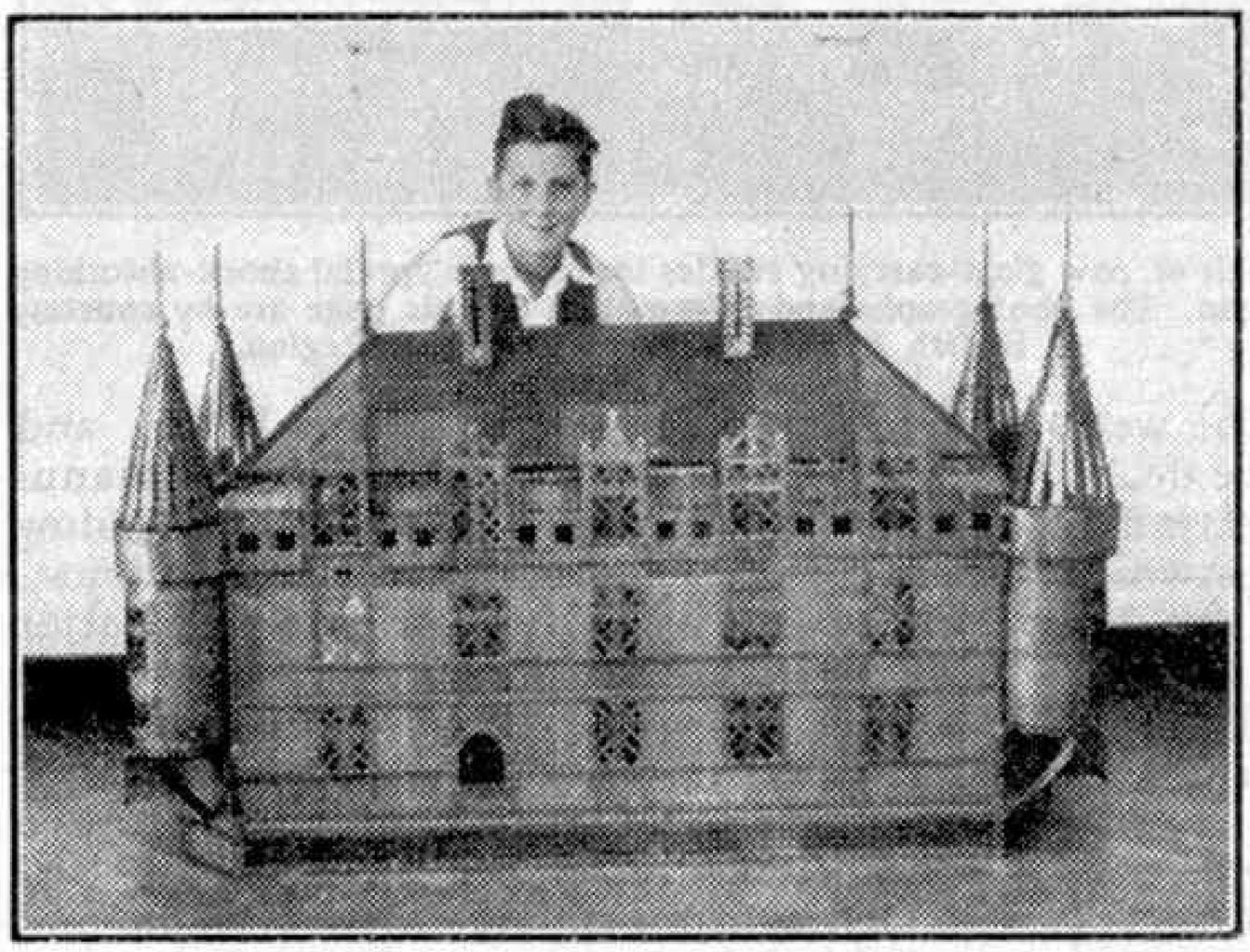
By "Spanner"



C. G. South, London N.13, one of the contributors to "Among the Model-Builders" this month.

A Young Reader's Suggestion

C. G. South, London N.13, sent me details of a simple suspension device for the rear axle of a model vehicle. It consists of a 2½" Strip attached at one end to an Angle Bracket lock-nutted to the side of the chassis. The other end of the Strip is supported by a ¾" Bolt, passed through its end hole and then fitted with a Compression Spring. The Bolt is locked at its extreme end in the round hole of a second Angle Bracket pivotally attached to the side of the chassis three holes away from the Angle Bracket already mentioned. The Strip is then free to move up and down the shank of the Bolt against the tension of the Spring.



A fine model of a famous French chateau, "Azay-le-Rideau," by Raymond Hassan, Alexandria, Egypt, who is seen putting the finishing touches to his work.

The rear axle is carried in a Double Bracket bolted to the underside of the 2½" Strip.

How to Use Meccano Parts

Screwed Rods (Parts Nos. 78 to 82)

The Meccano Screwed Rods are available in nine different lengths ranging from 1" to 11½" in length. Their chief function is the conversion of rotary motion to longitudinal motion, but in models where a very long bolt is required, one of the shorter Screwed Rods can be used for the purpose.

Several Meccano parts are specially designed for use with the Screwed Rods, and these include the Threaded Boss, Threaded Crank and Threaded Coupling. If one of these parts is attached to a model and a Screwed Rod threaded through it, then the latter can either be made to move longitudinally as it rotates, or its endways movement can be prevented and instead that portion of the model carrying the Threaded Boss or other threaded part can be caused to move up and down the Rod. This usage is very valuable and can be applied in many different kinds of models. When it is required to fix a Threaded Boss or Threaded Coupling on a Screwed Rod, a nut should first be placed on the Rod and then screwed tightly against the part. Any other Meccano Wheel, Pinion, etc., can be attached rigidly to a Screwed Rod by gripping it tightly between two nuts threaded on the Rod.

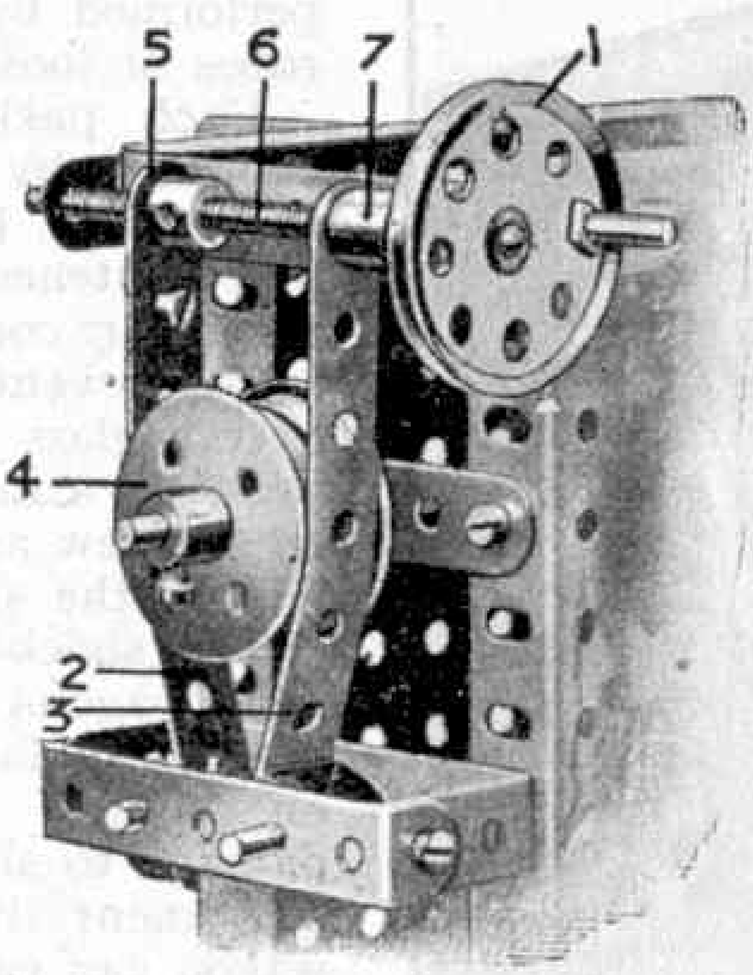


Fig. 1. This simple brake illustrates one of the many uses for a Meccano Screwed Rod.

When it is required to journal a Screwed Rod so that it can rotate like an Axle Rod, it should be connected by Threaded Couplings to Rods so that the latter can be journalled in the bearings instead of the Threaded Rod.

Screwed Rods prove invaluable as a means of increasing the available power, although at a considerable loss of speed of operation. Fig. 1 shows a Screwed Rod used to expand or contract the bands of a brake.

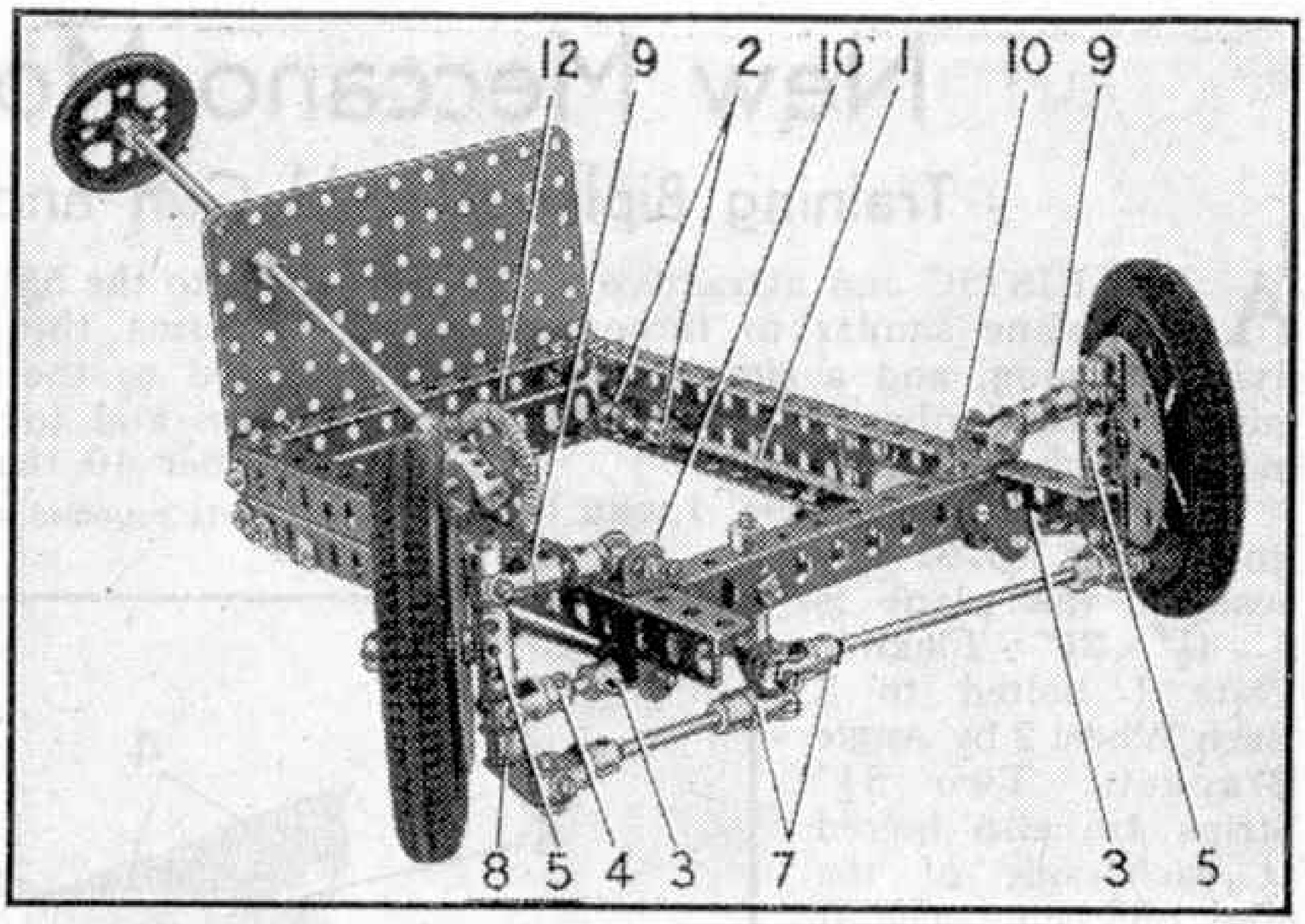


Fig. 2. The torsion bar suspension system described on this page. Its inclusion in a modern vehicle will greatly increase the realism and interest of the model.

Torsion Bar Suspension for Vehicles

One of the outstanding features of motor car design since the war is the almost universal adoption of independent front wheel suspension. This system allows one road wheel to be deflected by irregularities of the road surface without affecting the other wheel. The general use of independent suspension has resulted in almost complete disappearance from the fronts of modern cars of the once familiar axle beams and leaf springs, and their replacement by coil springs or torsion bars. Coil spring suspension units have been described in the *"M.M."* from time to time, and their construction is quite simple. The torsion bar system is rather more difficult, however, as this arrangement depends for its springing effect on the resistance to twisting set up in a steel bar. The illustrations on this page show a method of constructing such a unit sent to me by W. Johnstone, Liverpool.

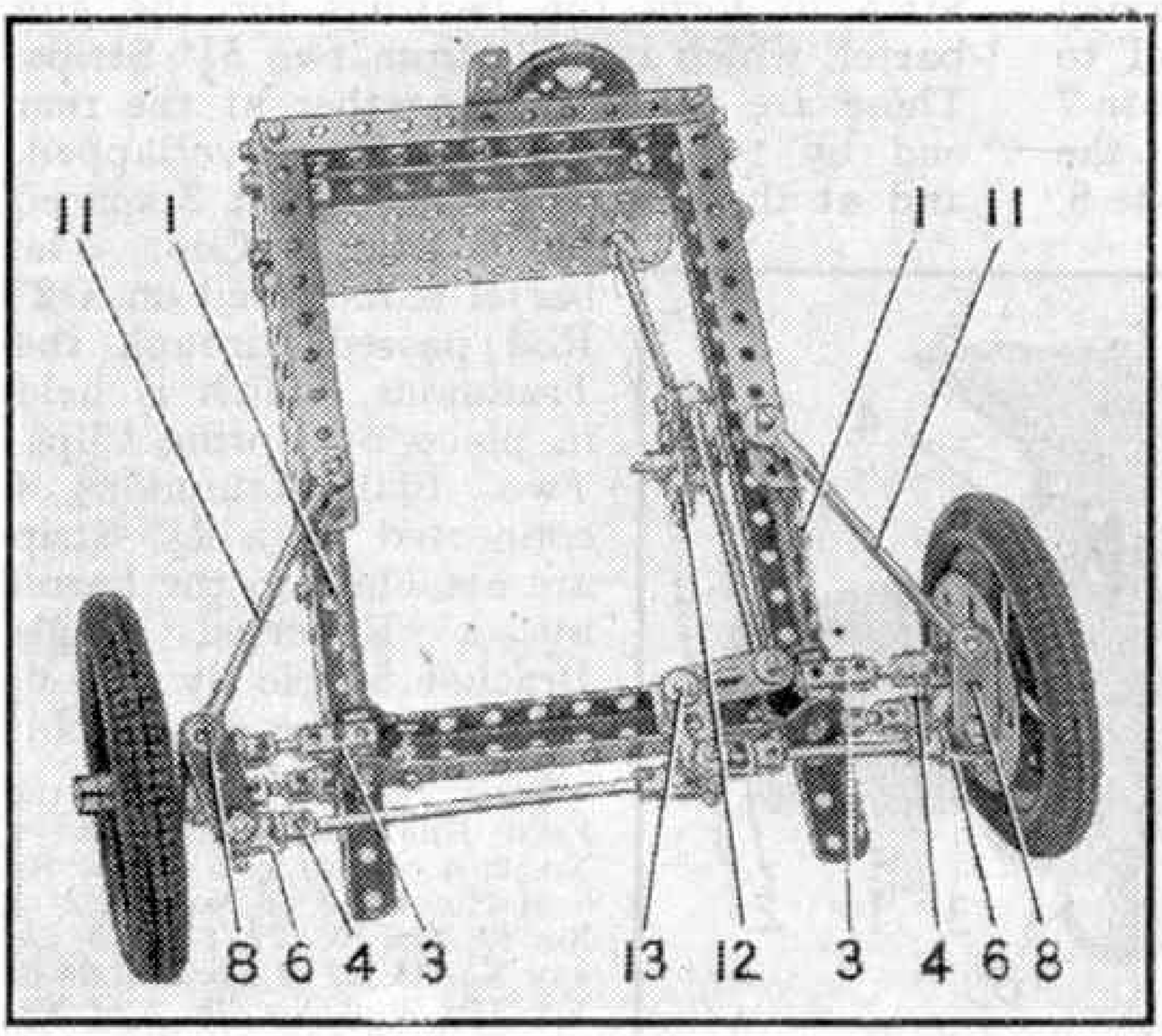


Fig. 3. An underneath view of the torsion bar suspension arrangement.

An 8" Screwed Rod 1 is fixed firmly to the chassis by two Threaded Bosses 2 which are attached to the chassis by Bolts spaced by Washers. The nuts must be tight enough to prevent the Screwed Rod from turning.

The opposite end of the Screwed Rod is mounted in two 1" Corner Brackets, and carries a Coupling 3. The Coupling is also fixed on the Screwed Rod by nuts, and it carries a 1" Rod fitted with a Swivel Bearing 4. A second 1" Rod fixed in a Coupling 5 is free to turn in the "spider" of the Swivel Bearing, and is fitted with a Crank 8. The Coupling 5 carries also a further 1" Rod that is free to turn in the "spider" of a Swivel Bearing 9. The Rod is held in position by a Collar, and the Swivel Bearing is connected by a 1" Rod and a small Fork Piece to a Double Bracket 10. The stub axles are 1½" Rods fixed in the Coupling 5. The links on each side are braced by radius rods 11.

Movement of the road wheels is controlled by a drop arm consisting of a Fishplate bolted to a 1½" Bevel Gear 12. The Fishplate is connected by a Rod and Collars to one arm of a Bell Crank with boss 13. The other arm is linked to the Cranks 8 by Rods and Swivel Bearings 6 and 7.

New Meccano Models

Training Biplane—Field Gun and Limber

A REALISTIC and attractive model of a biplane similar to those used for flying training, and a simple model field gun and its limber, form the two new models this month.

The biplane, seen in Fig. 1, can be built from Outfit No. 3. The nose of the plane is a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate 1 bolted to a Bush Wheel 2 by Angle Brackets. Two $5\frac{1}{2}''$ Strips are also bolted at each side of the nose, one being seen at 3, and to these are fixed two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 4 and two $2\frac{1}{2}''$ Strips held by bolts 5 on each side. These form supports for the upper wing. Two $2\frac{1}{2}''$ Strips 6 are bolted to the $5\frac{1}{2}''$ Strips.

The upper wing is filled in by two $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates and one $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate. One half of the lower wing is formed by a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate, and the other by two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates and one $1\frac{11}{16}''$ radius Curved Plate.

The remainder of the fuselage is formed by four $5\frac{1}{2}''$ Strips joined at one end to the $2\frac{1}{2}''$ Strips 5. A Semi-Circular Plate 7 is bolted between the ends of two of the $5\frac{1}{2}''$ Strips, and a $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate 8, held to the $5\frac{1}{2}''$ Strips by an Angle Bracket 9, forms the tail-plane. A Fishplate is bolted to the ends of the two lower $5\frac{1}{2}''$ Strips and to this is attached a $\frac{3}{4}''$ diam. Washer 10 that forms a tail wheel.

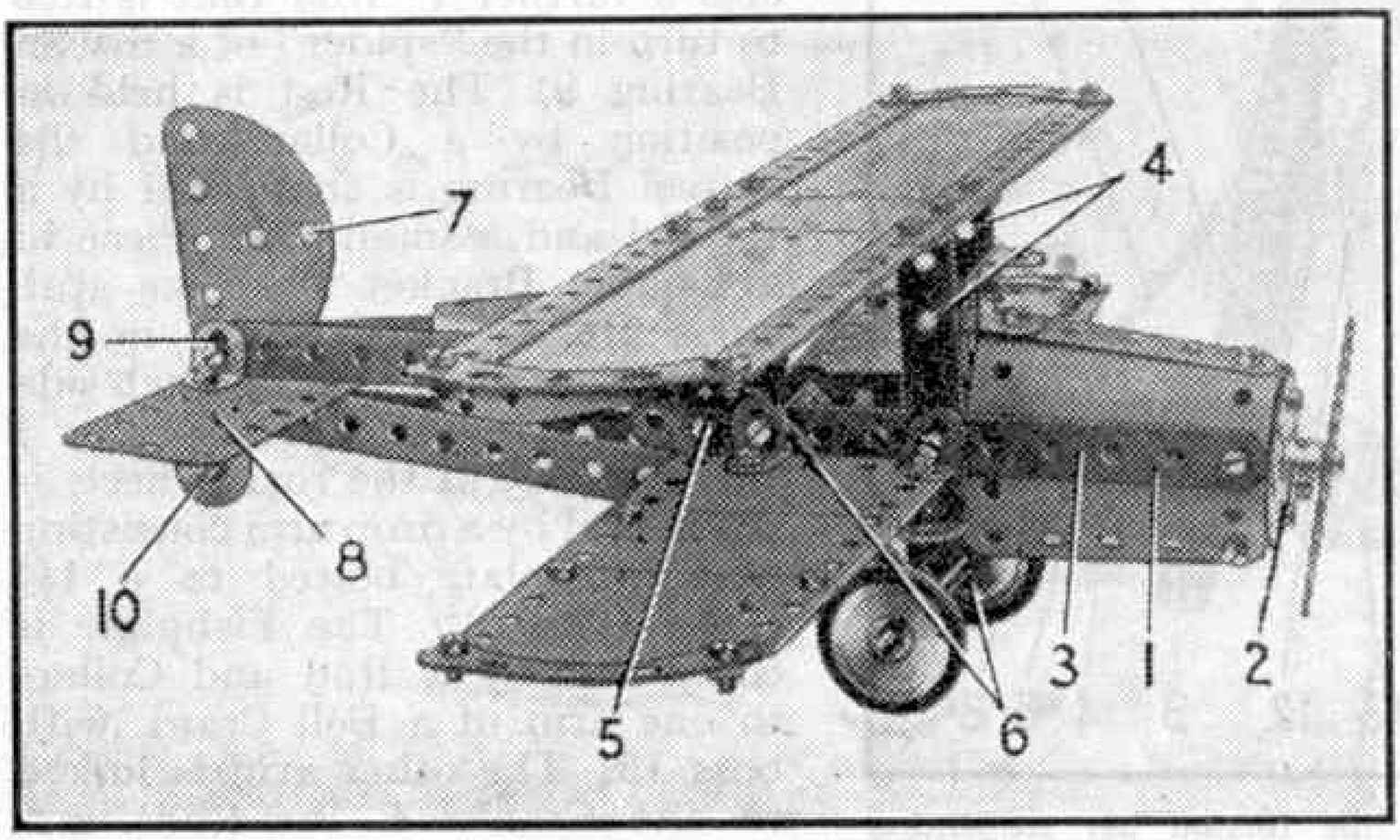


Fig. 1. An attractive model of a training biplane designed for Outfit No. 3.

Parts required to build the model Biplane: 2 of No. 1; 6 of No. 2; 9 of No. 5; 1 of No. 10; 1 of No. 11; 8 of No. 12; 1 of No. 16; 2 of No. 22; 1 of No. 24; 50 of No. 37a; 48 of No. 37b; 1 of No. 38d; 2 of No. 48a; 4 of No. 90a; 2 of No. 111c; 1 of No. 126a; 2 of No. 155; 2 of No. 188; 1 of No. 189; 2 of No. 190; 2 of No. 191; 2 of No. 192; 2 of No. 200; 1 of No. 214.

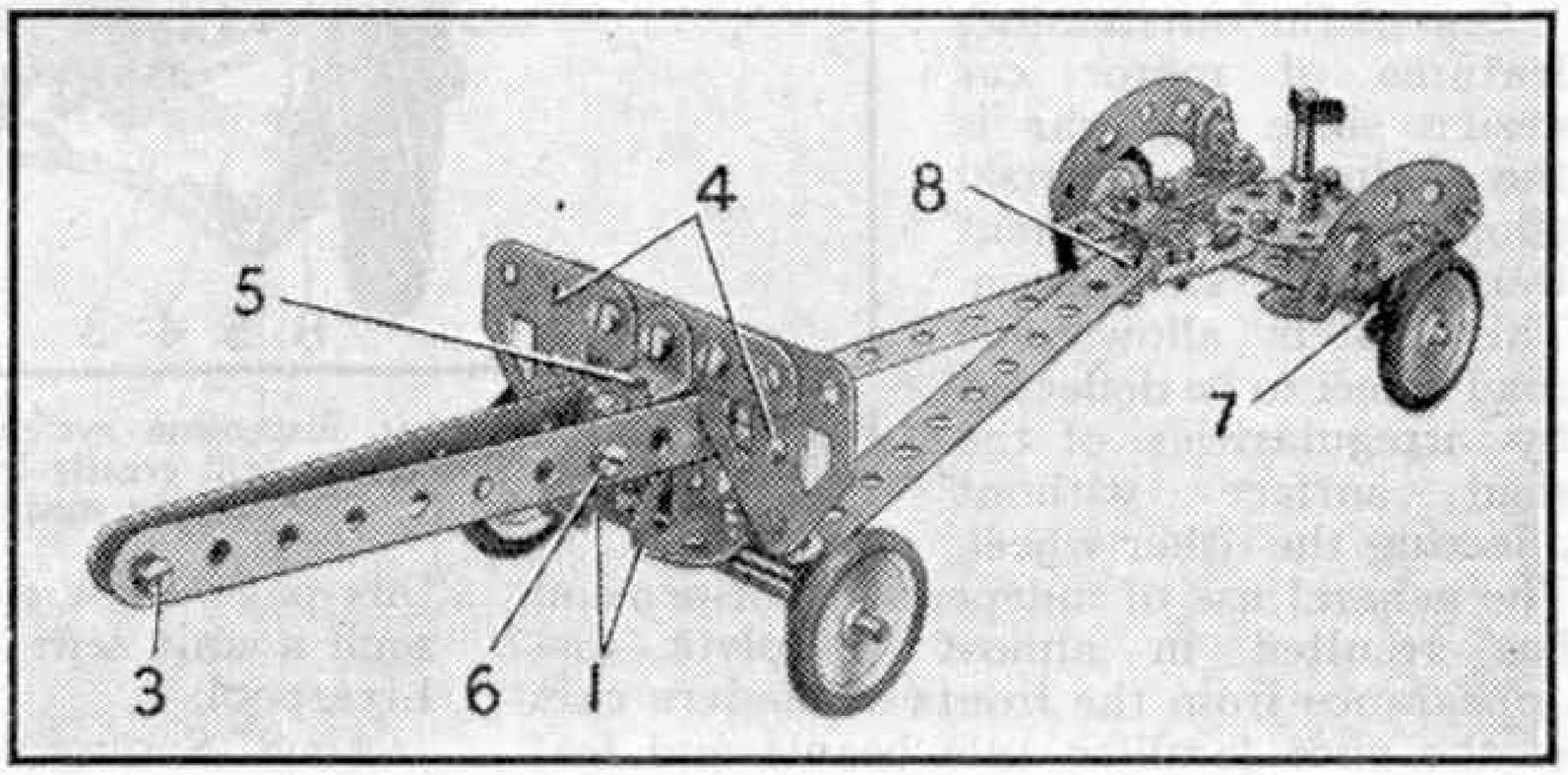


Fig. 2. A simple model of a field gun and its limber.

To build the Field Gun shown in Fig. 2 it is best to commence by bolting two Trunnions 1 to a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip to form the bearings for the gun barrel, which is built from two $5\frac{1}{2}''$ Strips. These are connected together at the rear end by two Angle Brackets overlapped, and at the muzzle by a $\frac{3}{8}''$ Bolt 3 spaced by a Spring Clip. The barrel is mounted on a 2" Rod passed through the Trunnions, which is held in place by Spring Clips. Two Flat Trunnions 4 connected by a $2\frac{1}{2}''$ Strip are attached to the barrel by a Reversed Angle Bracket 5 held by Bolt 6. They form the gun shield.

Parts required to build the Field Gun and Limber: 4 of No. 2; 4 of No. 5; 2 of No. 10; 6 of No. 12; 2 of No. 16; 2 of No. 17; 4 of No. 22; 1 of No. 24; 4 of No. 35; 27 of No. 37a; 24 of No. 37b; 4 of No. 38; 2 of No. 48a; 2 of No. 90a; 2 of No. 111c; 1 of No. 125; 2 of No. 126; 2 of No. 126a; 4 of No. 155.

Club and Branch News

WITH THE SECRETARY

AN EXHIBITION NOTE

A successful exhibition organized by the Thatcham M.C. has illustrated the advantages of an attractive and workmanlike display. All the models shown were of a very high standard, excellent Hornby and Hornby-Dublo layouts were operated with real efficiency, and there was a very effective Dinky Toys layout. A display of railway photographs provided an excellent background, and after seeing the exhibits visitors were given information about the Guild and the H.R.C., with leaflets to take away for further examination. One result of this good work was that the local newspaper published a splendid account of the exhibition. Another was that many visitors made special contributions to the Club's funds in token of their appreciation of the efforts of officials and members.

There is no reason why similar results should not be achieved in other quarters. An exhibition is a Club's shop window, and no pains should be spared to make it fully effective.

A SUMMER PROGRAMME SUGGESTION

The time has come to look closely into the summer programme. In many Clubs, cricket, cycling and other outdoor pursuits are followed, but there remain others, especially those newly formed and not yet strong in numbers, where these recreations cannot be arranged. This does not mean that a summer programme cannot be followed. One good way of keeping members together during the outdoor season is to arrange a series of local rambles for Saturday afternoons. Each of these should have some definite object in view, and Leaders and officials should make a survey of their neighbourhood immediately as a guide to possible excursions. There are historic and interesting places within reach of practically every Club.

Every excursion should end in some place where members can enjoy games and other amusements, with refreshments, before returning. Buns and ices are very useful for rounding off a successful trip.

* * * *

Our picture of members of the Caer Urfa (South Shields) M.C. in their Club room in last month's "*M.M.*" was reproduced by courtesy of the "*Shields Gazette.*"



A group of members of the Plymouth M.C. in their Club room at Swarthmore Hall. This Club was affiliated in October 1926. The Leader is Mr. W. J. Ellis, and the Secretary D. M. Cundy. The Club has a long record of splendidly varied activities, including many successful Exhibitions, and its success is due to wise leadership, and the energetic support and co-operation of its members.

CLUB NOTES

THATCHAM M.C.—The Club's Exhibition was an outstanding success. An excellent report appeared in the local newspaper, and many visitors were so pleased with the Meccano models, a Hornby-Dublo Railway and a Dinky Toys Layout on view that they gave donations to Club funds. Previously a visit had been made to a model railway exhibition at Reading. Club roll: 25. *Secretary:* B. M. J. Ambrose, 51, Southend, Cold Ash, Nr. Newbury, Berks.

1ST MARTOCK SCOUTS M.C.—More Senior members have been enrolled. Models built at meetings have included a Mechanical Shovel and a Diesel Engine, and Model Aircraft also have been made. A Model Excavator is now under construction. One meeting was devoted to the flying of model aircraft. Club roll: 10. *Secretary:* J. Aplin, 13, Stapleton, Martock, Somerset.

BORDEN GRAMMAR SCHOOL M.C.—Mr. Weekes, Leader, gave a Talk on his experiences while training for the R.A.F. in America. The Secretary has given a Talk on the making of Crystal Receivers. Model-building continues, and Film Strip Displays are being arranged. Club roll: 14. *Secretary:* S. Wood, 20, Harold Street, Queenborough, Kent.

SOUTH AFRICA

MALVERN (JOHANNESBURG) M.C.—Club meetings continue on the usual lines, Mr. E. W. Sykes again acting as Leader. The Christmas Party for children of the Epworth Homes was very successful. Ordinary meetings have been devoted to model work and to games. Club roll: 30. *Secretary:* Miss E. McMurray, P.O. Box 8, Cleveland, Johannesburg.

BRANCH NEWS

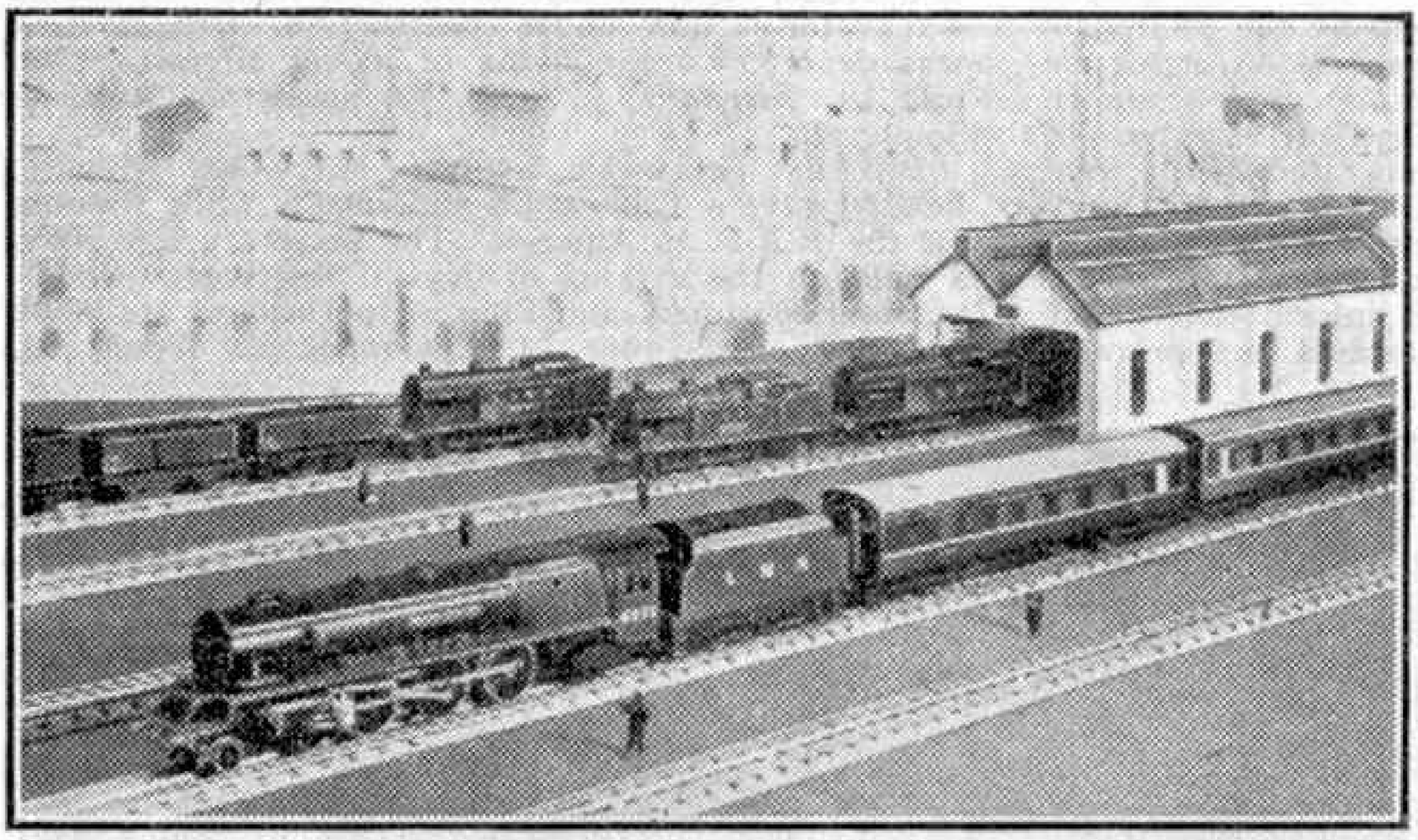
WEYMOUTH AND DISTRICT—Meetings are now held in a new and larger Branch room. Extensions have been made to the Branch layout, and further additions are hoped for. *Secretary:* A. J. Brown, 68, Wyke Road, Weymouth, Dorset.

SHIRLEY AND DISTRICT—Meetings are being held in a new Branch room, where better attendances are expected. Track Nights have been held. Both passenger and goods trains run at all meetings. *Secretary:* D. J. Hancock, 26, Wickham Avenue, Shirley, Croydon, Surrey.

MAGDALEN COLLEGE SCHOOL (OXFORD) — The number of members is increasing satisfactorily. Useful additions include three L.M.S. Tank Engines, and a Crossover. A tunnel also has been constructed. *Secretary:* R. A. Bowen, 33, Richmond Road, Oxford.

Background Scenes in Hornby-Dublo

FOLLOWING the lineside details considered last month, the accompanying pictures show how a Hornby-Dublo layout is improved by the addition of some form of background scenery. It is often thought that scenery can only be provided satisfactorily on permanent layouts. Certainly these give more scope for scenic effects, but even a small temporary layout is improved if a scene of some kind can be arranged behind the whole layout, preferably on the side opposite to the operating position.



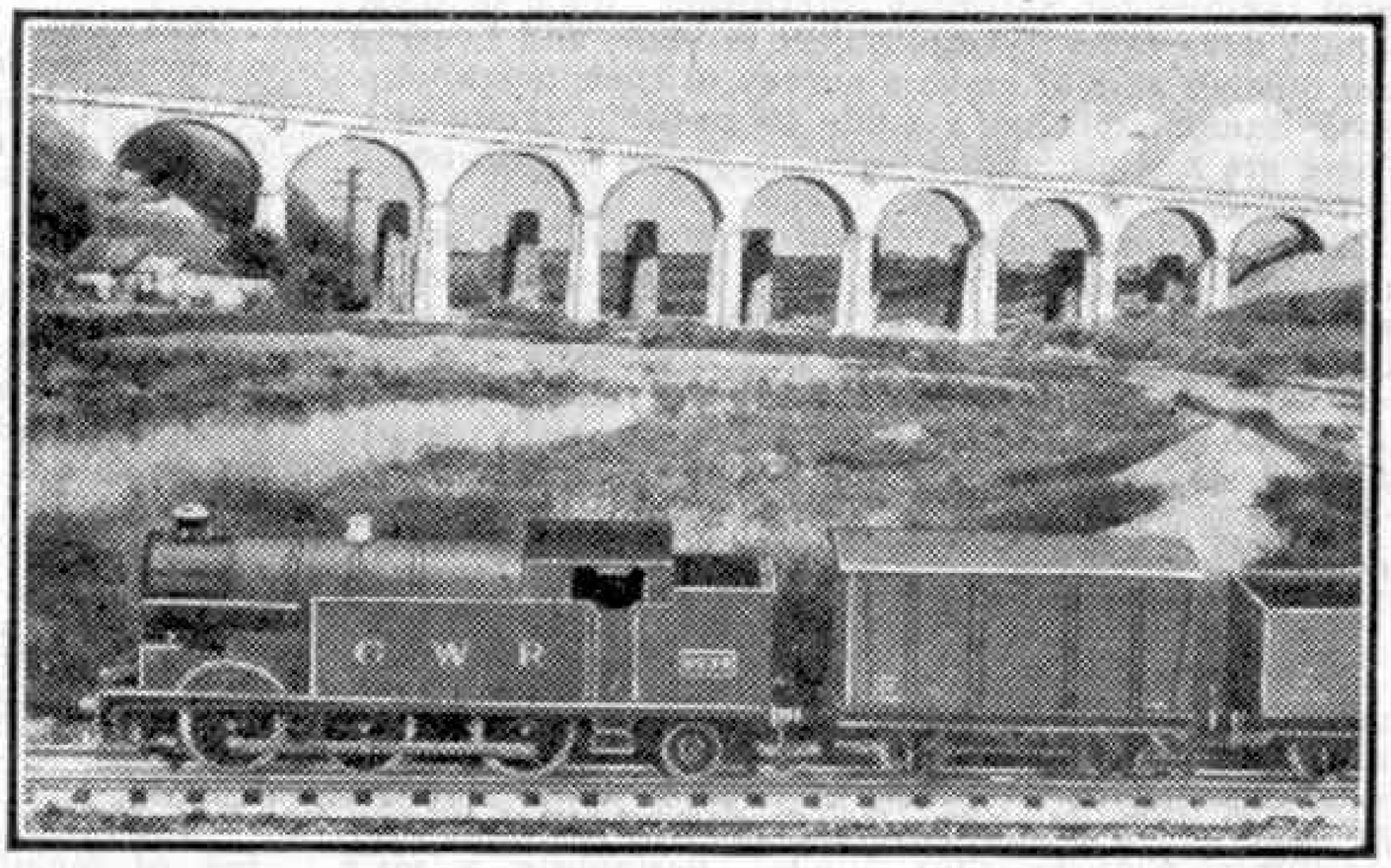
Part of a Hornby-Dublo layout with an industrial city background. The "Duchess of Atholl" 4-6-2 is prominent in this picture.

The lower illustration shows an instance of this kind of setting. Here quite a small oval track is arranged in front of a large view, in this case actually a photograph of a Cornish viaduct. The background scene gives the suggestion of depth to the layout and provides an attractive general setting for the line.

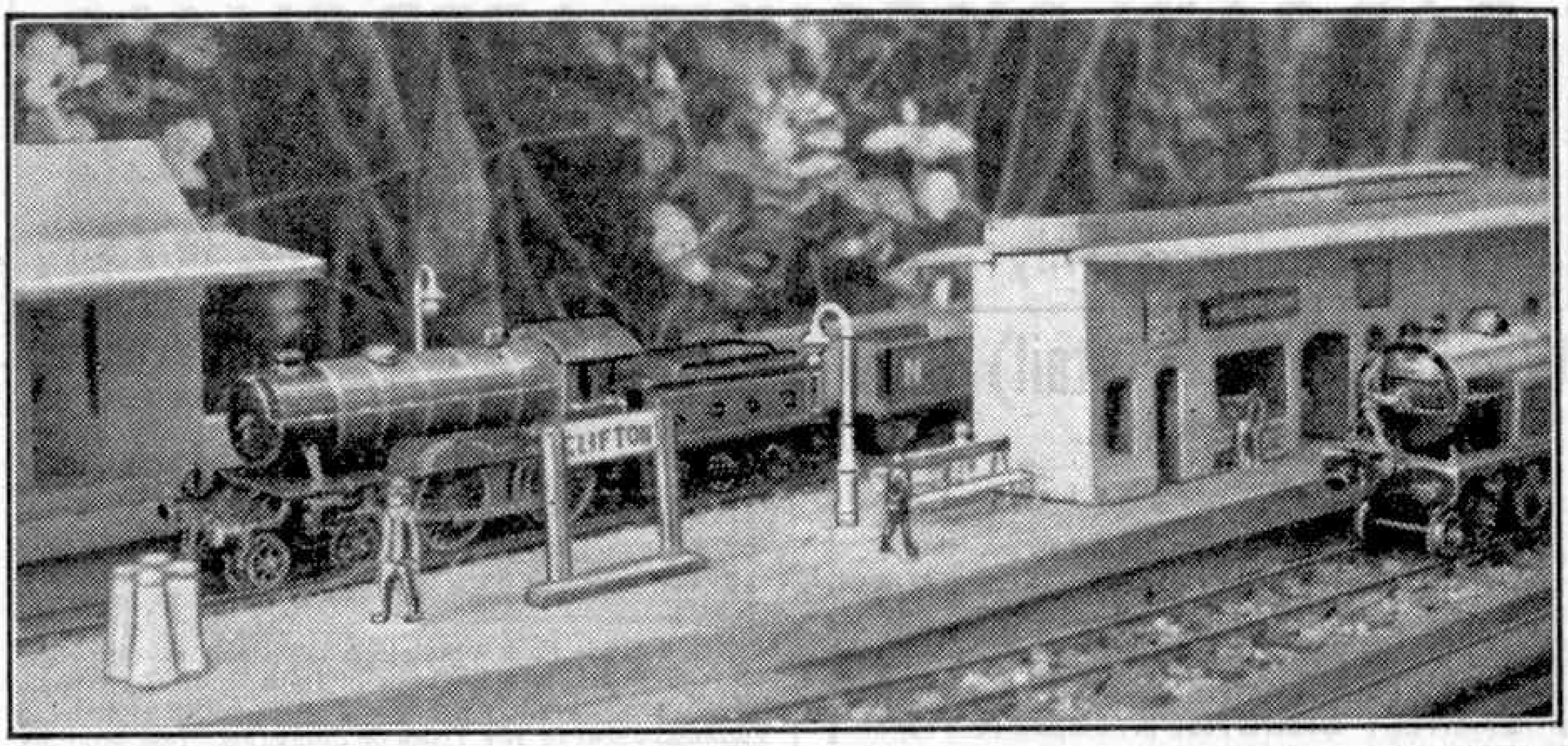
Sometimes ready-made scenes such as this can be made use of, but frequently the Hornby-Dublo owner has his own particular ideas as to the type of country or district his railway is supposed to serve. Then he has to sketch out his ideas and colour them either with paints or even coloured chalks. If there is a sheet of plywood or something similar to work on this will do very well. If not, a sheet or more of thick card will have to do instead. It is surprising what effective results can be obtained if a little care is taken with items of this kind. It is usual to include some sky in the background; alternatively, the outlines of any buildings or other features on the horizon can be cut out with a fretsaw.

It is often possible to "build-up" a scene from coloured cuttings collected from various periodicals. A certain amount of repetition may be unavoidable, but such features as trees, houses and so on can safely be repeated. Some cutting and adjustment of the various pieces will almost certainly be necessary to fit them together.

Permanent layouts naturally have the advantage where scenic work is being undertaken. The background can be more or less continuous and its features can be varied; and it can be made to tone in with the structural effects of the line, such as tunnels, bridges and so on. Lineside details, roads and so on as suggested last month can be introduced between the railway and background.



A Hornby-Dublo goods train posed in front of a realistic background. The latter is provided by a British Railways official photograph of Carnon Viaduct (Western Region).



"Clifton" Station on the layout described on this page, belonging to our reader "Rosco." The outdoor situation gives a realistic aspect to the line.

"Cragside" to "Clifton" by Hornby

An Outdoor Clockwork Railway

"CLIFTON" Station, part of which is shown in the photograph reproduced on this page, is on the outdoor miniature railway system operated by our reader *"Rosco."* The railway is a gauge 0 system and has passed through several stages since previous accounts appeared in the *"M.M."* a number of years ago. The present formation has been in existence about three years, and construction work of various kinds is still in progress.

The railway is raised on an average 2 ft. 3 in. from the ground, and rests on a series of tables supported by wooden posts driven into the soil. The whole affair is fixed and permanent, and there is no question of "putting away" at the end of a period of running, except for the locomotives. The rolling stock is shunted away by the engines into a small shed, which is subsequently closed up and forms a perfectly waterproof and sound shelter. Five parallel roads about seven feet long are provided for goods and passenger vehicles and these are approached by a single line from *"Cragside"* station. Thus the vehicles never leave the track—barring accidents!

"Cragside" station has two island platforms, one on each side of the main line, while a loop line passes round each platform. Thus four trains can be accommodated at one time, though it is the practice to accept no more than three, thus leaving one road clear for an engine to "round" its train.

The goods depot for *"Cragside"* is separate and is to one side of the main line. Goods traffic does not enter *"Cragside"* station at all, but is diverted immediately at *"Cadley"* into the yard. Here five tracks take off and are available for marshalling goods trains.

Beyond *"Cadley"* the main line runs straight ahead to *"Clifton."* Here three or four trains can be accommodated at once and facilities for engines to run round their trains exist.

The locomotive power is clockwork and the backbone of the system is a stud of pre-war Hornby locomotives. These have done an enormous amount of running and comprise an L.N.E.R. "Hunt" class 4–4–0, two 4–4–2 No. 2 Special Tanks, and a *"Flying Scotsman."* All the locomotives are capable of hauling four or five bogie coaches between the two terminal stations, 33 yards apart, on one winding.

Thanks to the trip fitted to Hornby engines, by means of which they can be reversed from the track, most train movements are effected without the locomotive being touched by hand. This is achieved by installing, at strategic points in the track, home-made reversers controlled from the lever frames.

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For other Stamp Advertisements see also pages 200 and xi.

Stamp Collecting

Canada's Fine Pictorials

By F. Riley, B.Sc.

LAST month I gave examples of early Canadian stamps, dealing chiefly with the discovery of the country and great events in its history. The more recent issues of Canada include many pictorial stamps of excellent design and printing that are fully worthy of the collector's attention. They illustrate the land itself, with its mountains, lakes and rivers, and also tell us something of the country's industries



The Canadian Rockies are a wonderful region of mountains, glaciers and rivers, and the development of great national parks in the area have helped to make their beauties better known all over the world. They first appeared on stamps in 1928, a series of pictorials then including a stamp showing Mount Hurd, flanked by representations of the famous totem poles of the Indians of British Columbia. In 1930 another pictorial issue included a representation of Mount Edith Cavell.

Also in the 1930 issue was a striking picture of the old citadel of Quebec with the St. Lawrence flowing in front of it, and this brings us a reminder of the stamps illustrating the mighty rivers and great lakes of Canada. The St. Lawrence had already appeared on a stamp showing the Quebec Bridge in the 1928 issue. In 1933 the preliminary meeting of the Universal Postal Union Congress was marked by the appearance of a special commemorative stamp showing the Parliament Buildings from the Ottawa River. In the pictorial issue of 1927 we find a view of the River Mackenzie, 2,300 miles long, which flows into the Arctic Ocean. A river steamer is seen in the picture, with a seaplane flying over it. In the far north of the country is the Great Bear Lake, which drains into the Mackenzie and is famous as the scene of the discovery in 1930 by Gilbert Labine of valuable deposits of uranium and radium. A picture of this lake appears on the 10c. value of a pictorial issue of 1946 marking the return of peace.



Canada has many great ports, and the entrances to the harbours of two of these, Halifax on the Atlantic Coast and Vancouver in the far west, are illustrated on stamps of the 1937 issue. This issue also includes a picture of the Gate of Fort Garry, Winnipeg, a historic monument and a reminder of the work of the pioneers who opened out the Canadian prairies. In the same issue is a picture of an old chateau in Montreal, and another interesting historical stamp also reminding us of the association of the French with the early days of Canada is the 50c. value of the 1930 issue. This shows the Acadian Memorial Church and the statue of Evangeline at Grand Pre, Nova Scotia. These names will be familiar to all who have read Longfellow's poem '*Evangeline*,' which tells the story of the removal in 1755 of French settlers from Acadia, as they called Nova Scotia, which had become British in 1713.





In the same issue, that for 1930, there was a prairie harvesting scene, which is a reminder of the immense importance of Canada's agriculture, especially the growing of wheat. Picturesque farm scenes appeared in the war effort issue of 1942 and in the 1946 series, the latter including also a representation of a prairie harvest scene in which the modern combine, which both reaps and threshes, is shown at work. One of the giant elevators in which grain is stored while awaiting shipment is shown on the 4c. value of the 1942 issue. Lumbering is another great Canadian industry, and the 50c. value of the 1946 issue illustrates logging operations in British Columbia.

Canada's interests at sea were suggested by the stamp illustrating the "*Royal William*" referred to and illustrated last month. Another side to these interests is shown by the 50c. stamp of the 1928 series, which features the fishing smack "*Bluenose*."

Naturally the 1942 issue, which commemorated Canada's war effort, deals with a wide range of industries. Canada made munitions and built corvettes and other ships, and the country was the home of a great air training scheme for Empire pilots. All of these activities are illustrated in this fine series of stamps. The peace issue that followed in 1946 included a stamp with a design showing a river power station. This is a reminder of the ever greater use that Canada is making of her magnificent waterways in the production of electric light and power. Although this issue, like that of 1942, was largely industrial in character, a pleasant note was introduced by the 7c. value, an air stamp that shows Canada geese in flight.

The royal portrait stamps of Canada also are notable. Since 1932 these have included portrait issues of other members of the Royal family in addition to well selected portraits of George V and George VI. Among these have been excellent portrait stamps of Queens Mary and Elizabeth, Princess Elizabeth and Princess Margaret Rose. Princess Elizabeth's portrait first appeared in the Silver Jubilee issue, one stamp of which portrayed our present King when he was still Duke of York. A double portrait stamp of the Princesses formed one of the stamps of the Royal Visit of 1939, and the marriage of Princess Elizabeth was celebrated by the very fine stamp illustrated here.



It is impossible in two short articles to explore thoroughly Canada's stamps, but sufficient has been said to show their range and interest. A representative collection would be a prized possession.

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100	Do.	15/-	100	Do.	5/6	25	Turkey	1/-
20	Liechten	2/-	200	Do.	21/-	50	Do.	2/6
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For other Stamp Advertisements see also pages 198 and xi.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

IT has been previously mentioned that our colonies, as well as Great Britain, would issue a set of stamps to commemorate the 75th anniversary of the Postal Union. This is now confirmed officially, and the values will be the same as those for the Olympic Games held in London last year, that is 2½d., 3d., 6d. and 1/–. Quite enough too, for we have had plenty of high value stamps already. As a matter of fact, not only will our colonies be issuing stamps, but most of the other countries all over the world also, and all will appear on 10th October.

All the rage just now is for the despised "Wedding" stamps. Most dealers left their purchase or otherwise to the judgment of their customers. This was a wise move, for customers of those who spoke against the stamps, unnecessary as they undoubtedly were, are likely to get very cross now that the stamps are rising so rapidly in price. Perhaps they will cost £100 a set in a few months. If they do, not many of us will be able to muster the cash, so why worry what happens? Altogether the set was far too expensive from the start for the average collector.



We mentioned the probability previously that all the Windward Islands at least are changing their stamps to fit in with the new dollar currency, and now we have proof. There seems to be a doubt whether the Leeward Islands will follow suit. The Crown Agents have announced a new set of St. Lucia. Consequently collectors should fill their KG. VI blanks of this colony as soon as possible, and they should not overlook the 1d. stamp which recently came out in a new perforation, 14½ × 14. This stamp is within the reach of all pockets, as is the 8d., which will not have a long life. The 3/– and £1 values are the two stamps to go for, if one can afford them.

Colonial stamps are all right, and a good deal of attention is given to them owing to their all-round popularity, but many collectors are also interested in what they call foreign. A widely collected country, both at home and abroad, is Belgian Congo, and a really attractive lot can be got together for a small sum. A stamp which merits popularity among "*M.M.*" readers is one issued recently, part of a commemorative set, showing a real old time puffing-billy. Belgian Congo has issued a number of equally beautiful stamps, and as many of them are also instructive, one could do a good deal worse than form a small collection from this romantic part of Africa.

The Panama Canal Zone has a nice lot of stamps to its credit. Its used stamps are more popular perhaps in America than in Great Britain. Here it is not possible to import the stamps mint owing to currency restrictions, but the used are grabbed up quickly by home collectors, or so dealers say. We are illustrating a real quaint item which appeared some months ago. It was issued solo to commemorate the 25th anniversary of the establishment of the Canal Zone Biological Area. These Canal Zone stamps get into dealers' stockbooks, and as they can be picked up for a copper or two they are generally good bargains.



One of the most beautiful sets issued recently is the new definitive set of Burma, which actually appeared in January. Some of the designs are really "superb," and had they been bi-coloured they would have been outstanding. We call them definitive stamps, but with Burma in the political melting pot maybe they will not have a very long life after all. Anyhow, used copies are trickling through and it would be a good idea to try to complete a set. There are 14 values, from 3p. to 10 rup., and 12 of these have been overprinted in Burmese characters for official use. De La Rue and Co. Ltd. are the printers, and they have employed the recess process for the printing.

When Jamaica brought out a set in 1945 to commemorate their new constitution, collectors started to criticize the designs and they have gone on criticizing them ever since. Now just compare this new Burma set with that of Jamaica, and you will see how justified collectors were in complaining. Of course, some of the anna values of the Burma set are a bit too small for so much detail, but under a magnifying glass they look superb. As an anticlimax we illustrate one of the two stamps recently issued by Ceylon. They are half of a set of four, the other two of which have not yet appeared, that is being issued to commemorate the first anniversary of their independence. This 4c. stamp actually looks worse in colour, yellow, carmine and brown, than it does in the black and white illustration, and readers will agree that that is bad enough.



We are used to countries pouring out new stamps, but it has been left to Chile to put up a productivity record that probably will last for all time. At least one can hope so. To commemorate a book on Chilean plants and animals issued 100 years ago, three values, 60c., 2p. 60c., and 3 p., were issued in sheets of 100 stamps and 25 different designs used four times on a sheet. Phew! How many different stamps does that make? Frankly we couldn't count so high.

And now to a saner topic. Our own Falkland Island Dependencies has issued a single 2½d. stamp, but as postal rates have changed in that part of the world, if there is any postal matter to change, the life of this stamp may be brief. So if you cannot afford the hundreds of new Chilean stamps, go east a little, dear reader, and buy a copy of this humble value.



Cross-Channel Packet Boats—(*Cont. from page 172*)

are also operating on the cross-Channel routes. The twin-screw diesel-driven "*Winchester*" was launched in November 1947, and has been designed for carrying bulky cargoes on the Southampton-Channel Islands service. With a raked stem and full cruiser stern, she has a speed of 15 knots, and can carry cattle and horses as well as general cargo. Each hold also has 5-ton derricks and winches.

The history of the cross-Channel services has many entertaining aspects. The first regular service was started in 1782, with eight vessels, four English and four French, plying between Dover and Calais. They were, of course, sailing ships, and the real development of the service did not begin until the 19th century, when the first steamships were built. The first of these were paddle steamers, and three of the pioneers of this type were the "*Rob Roy*," the "*Majestic*," and the "*Marjory*."

The cross-Channel route has been the scene of several experiments in ship design, some of them bizarre efforts. An oddity was the "*Castalia*," launched in 1874. She had two half-hulls separated by a 26-ft. gap spanned by a superstructure. The two paddle-wheels worked in the space between the hull sections, each wheel being driven by a steam engine in the hull nearer to it. The scheme was far from successful, and the ship eventually became a hospital, moored in the Thames.

Another cross-Channel curiosity was the "*Bessemer*," which had a suspended saloon, intended to overcome the rolling and tossing. But the designers omitted to take into account the effect on the steering, and this ship too ended her short sea-going career ingloriously. She was partly dismantled, and the saloon went to be a lecture hall at a college. More successful was the "*Calais-Douvres*," designed rather like the "*Castalia*" except that her hulls were complete. She plied between England and France for nine years.

Designers do not believe that finality has yet been reached in the matter of experimental vessels for the cross-Channel services. They have in mind the possibility of building huge speedboats, capable of travelling at 50 knots and doing the voyage to and from France so swiftly that restaurants and saloons are unnecessary. If that day dawns, the cross-Channel service will indeed be a true ferry service.

Helicopter Progress—(*Continued from page 175*)

give even better results, as its tandem rotors make it much easier to control under tow.

Normal procedure will be for the "Rescuer" to take off first under its own power, and so remove slack from the 300 ft. towline connecting it with the towing aircraft—usually a Fairchild "Packet." Then, as the "Packet" begins its take-off run, the helicopter pilot will open his throttle and fly as fast as possible above and behind the transport, so reducing drag on the towline during the critical take-off period.

When both aircraft are flying steadily on course at an altitude of several hundred feet, the helicopter pilot will slowly decrease rotor pitch, close the throttle and ease into auto-rotative flight. Finally, the helicopter's engine will be cut and it will continue the flight as a rotating-wing "glider," until near the "target," when the engine will be re-started, pitch increased and the tow-line cast off so that the helicopter can be landed under full control.

Having unloaded survival equipment, food, doctors and medical supplies, the helicopter could begin a shuttle service to any town or landing strip within 100 miles of the accident, carrying 10 passengers or six stretcher cases at a time. If no hospital facilities were available, casualties could be loaded into the "Packet," after which both aircraft would return to base, following the procedure used at the start of the rescue mission.

Alternatively, if there were no suitable landing field for the "Packet," it would have to cruise overhead until casualties had been taken aboard the "Rescuer," which would then have to take off and re-engage the towline in mid-air, probably with a rocket-line similar to that used in flight refuelling.

The complete scheme calls for a high degree of flying skill, particularly on the part of the helicopter pilot. But it is possible, and could be the means of saving many lives that otherwise would be lost.

So, in Britain and America, helicopter development continues to make great progress. The next few years should be extremely interesting, for it is certain that our lives will be more and more influenced by these strange aircraft that, so far, have never been used to destroy life, only to maintain and save it.

Kenya and Uganda Railway—(*Cont. from page 187*)

Uganda is a hotter and wetter country than the highlands of Kenya by virtue of its lower altitude and nearness to Lake Victoria, and the vegetation is in consequence more tropical in appearance. One notices too from the railway carriage the huge bulk of Mt. Elgon some ten miles to the north. Mt. Elgon is an extinct volcano 14,000 ft. high, and the Kenya-Uganda border passes through its crater. Just over the border lies the town of Tororo, from which a branch line runs northward for 80 miles to Soroti, whence there is a road connection to Juba in the Sudan.

The main line continues its way through Uganda, passing the numerous cotton smallholdings of the natives, until Jinja, on the northern shore of Lake Victoria, is reached. An interesting sight just outside Jinja is a vast sugar-cane plantation, which stretches as far as the eye can see. Jinja, which is noteworthy for being the location of the Ripon Falls where the Victoria-Nile flows out of Lake Victoria, was the terminus of the railway until the road and rail bridge over the Nile was opened in 1931. This single-span steel bridge has two levels, the lower one for the road and the upper one for the railway. Fifty miles beyond Jinja the line reaches Kampala, the administrative capital of Uganda, which is nine miles inland from Lake Victoria. The line terminates at Port Bell, the "port" for Kampala.

An interesting branch of the railway is the 130-mile section from Nairobi to Nanyuki, a farming settlement on the lower slopes of Mt. Kenya. This line passes through the reserve of the Kikuyu tribe, an industrious people principally devoted to the cultivation of maize and bananas.

The bulk of the work on the railway is performed by 4-8-2:2-8-4 articulated locomotives, aided by "Pacifics" for the coastal run, and a variety of wood-burning types. The fuel for the latter is provided by the large pine forests in the Kenya Highlands, planted for the purpose by the railway company.

WHAT BUBBLES OF AIR CAN DO

The designers of a water filtration plant for a city in the north west of the United States foresaw the possibility of trouble caused by freezing in their outdoor units. They knew that an engineer had already succeeded in keeping a pond in Wisconsin open in hard weather for migrating ducks and other wild fowl by bubbling air through it and decided to try the plan themselves. In their plant the water passing through the settling basins and the sand filters is agitated with compressed air whenever the danger threatens. Control is automatic, a thermostat starting the compressor when the thermometer drops below zero, so that bubbles of air stream through the water until the surroundings warm up again.

A NEW LORRY CONSTRUCTIONAL KIT

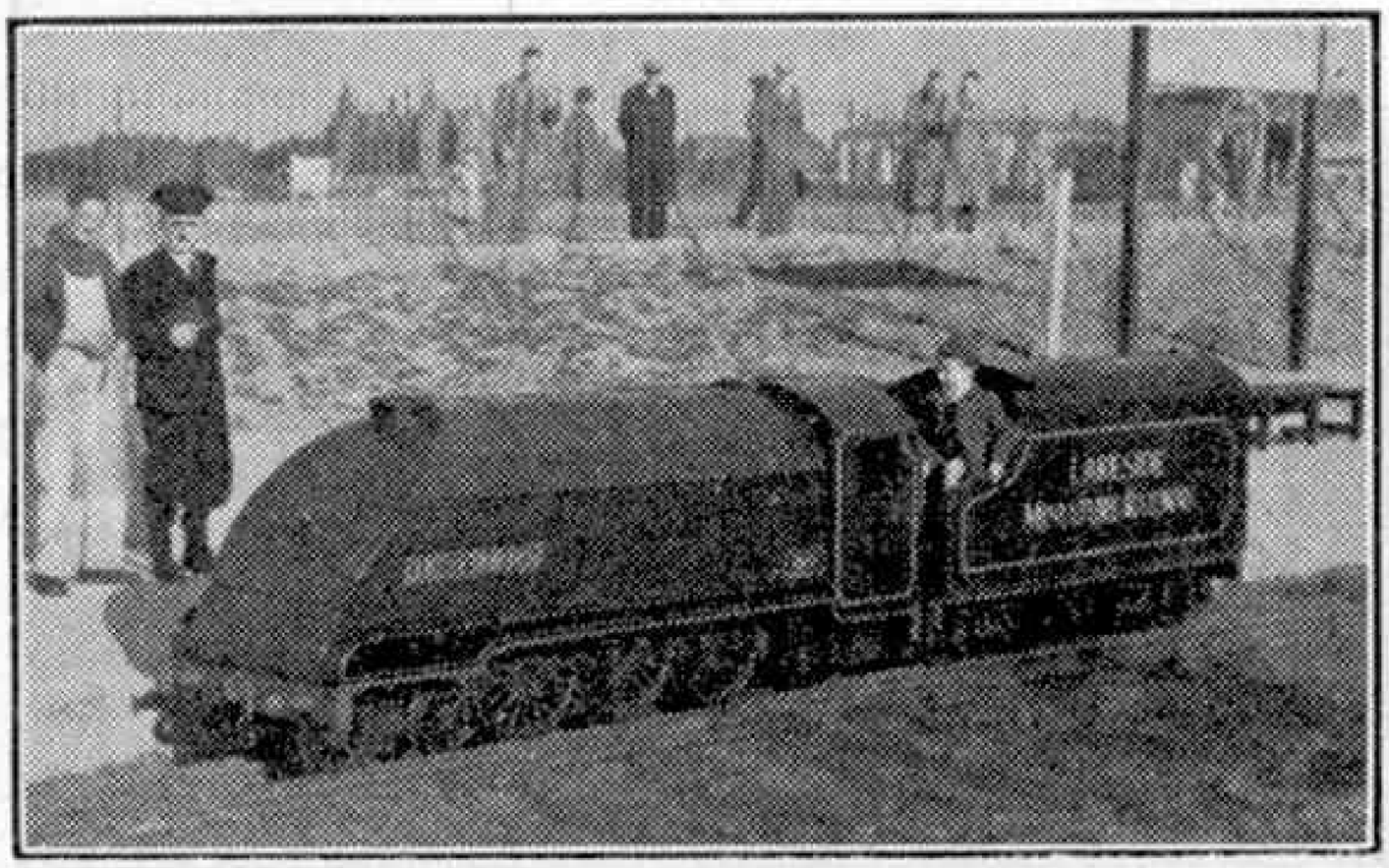
A fine new constructional kit for building a model of the Foden diesel 6-ton platform lorry is being introduced by our advertisers, Wilson's Lorries Ltd. This is reasonably priced and incorporates up-to-date features, including an all-plastic cabin. Full details can be obtained from Wilson's Lorries Ltd., 1, Great Winchester Street, London E.C.2.

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.

A PETROL-ELECTRIC LOCOMOTIVE

An interesting development on the 15 in. gauge Lakeside Miniature Railway at Southport, Lancs., was the introduction last year of a new locomotive, christened "*Duke of Edinburgh*" by a former Mayoress of the town. Some interesting particulars of this have kindly been supplied by Mr. H. N. Barlow, the sole proprietor of the railway, and the engine is shown in the accompanying photograph.



The steam-outline petrol-electric narrow gauge locomotive "Duke of Edinburgh" on the Lakeside Miniature Railway, Southport. Photograph by Frank Mills, Kearsley.

"*Duke of Edinburgh*" is a 4–6–2, with six-wheeled tender, built in Mr. Barlow's own workshop from his own designs, and it is the culmination of an idea he has had for several years. The prime mover is a petrol engine, but instead of a clutch and gear-box transmission, a compound-wound 110-volt dynamo is coupled to it. The current thus generated is used to drive a series-wound electric motor. The final drive is through reduction gear, chains and sprockets to the middle driving wheels, the six wheels being coupled as in the normal practice.

In actual running this locomotive has been very popular with the public, and is ideal from the operator's point of view. The colour scheme is green with pale lining and lettering, the name being on an embossed plate.

It is understood that a similar locomotive, now under construction, is to be called "*Prince Charles*," and it is expected to be in service this season.

FRANK MILLS (Kearsley).

HOLIDAY IN CAPE TOWN

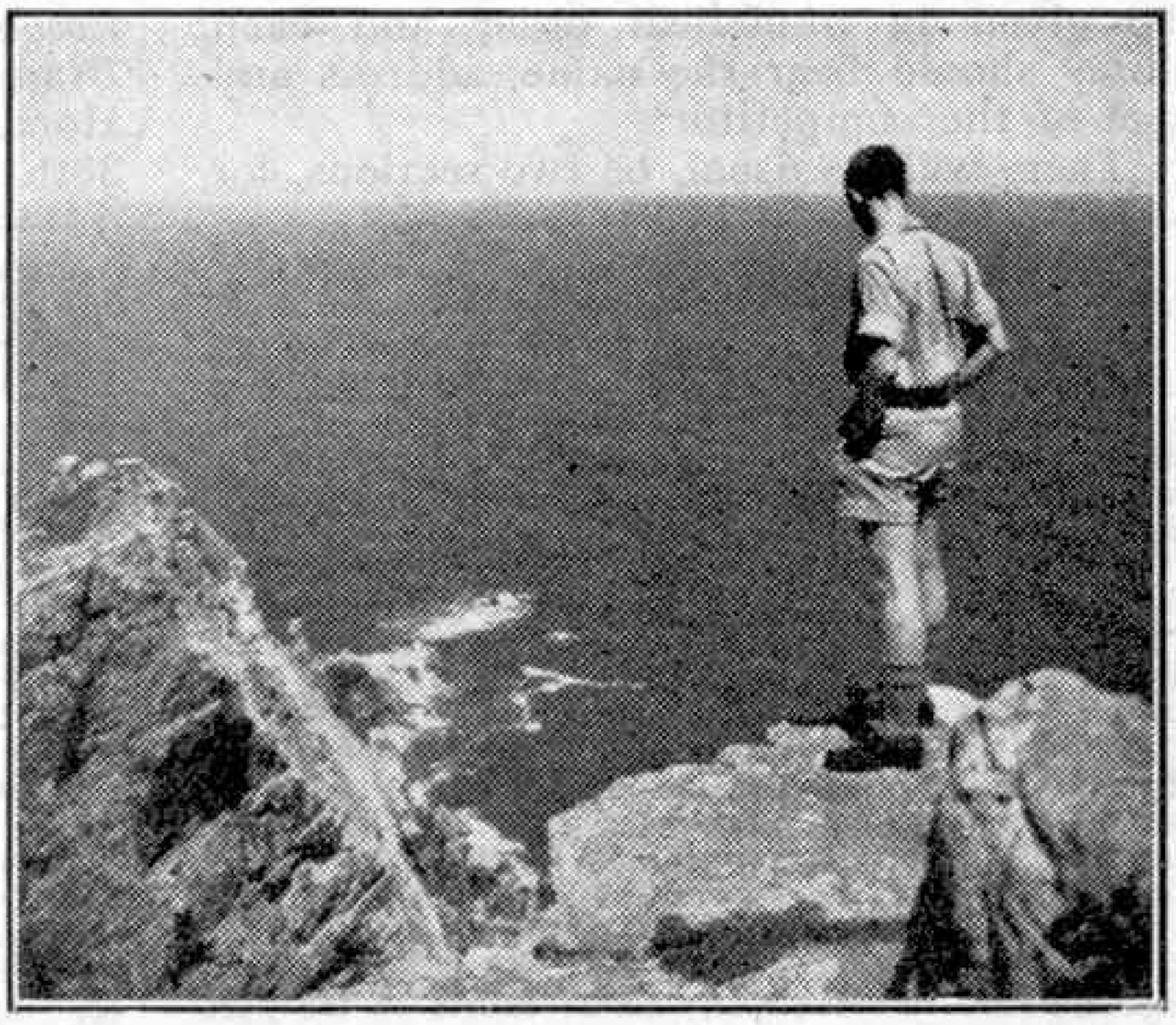
My home is in Benoni, a small town near Johannesburg that is the centre of the gold mining industry in the Transvaal, and to travel to Cape Town entails a journey of nearly 1,000 miles, a distance covered by train in about 36 hours. Even when the train was several miles from its destination, I was able to see the majestic outline of Table Mountain.

One of the most enjoyable trips to be made from Cape Town is a luxury motor bus tour which takes one right round the Cape Peninsula. Leaving Cape Town it proceeds south down the west coast of the Peninsula along Camps Bay, which has as its background a range of mountains called "the Twelve Apostles." Further south the road becomes what is known as Chapman's Peak Drive, and here it has been cut right into the side of the mountains. At frequent intervals there is a sheer drop from the side of the road into the sea below. After passing through the Cape of Good Hope Native Reserve, where wild flowers and animal life are preserved, the bus eventually arrives at Cape Point, where a lighthouse and wireless station are situated. At this southern tip of the Cape Peninsula one may look either east to the Indian Ocean or west to the Atlantic Ocean.

The bus returns to Cape Town via the east side of the Peninsula. It passes through Simonstown, the South African Naval Base, and through many small holiday resorts, nearly all of which have beautiful sandy beaches where there is ideal bathing in the warm water from the Indian Ocean. Further north much of the land the bus passes through is devoted to the growing of grapes, which are used chiefly for making the wines for which the Cape is famous.

After spending nearly three weeks in and around Cape Town and the Cape Peninsula I became sure that this is "the fairest cape in the whole circumference of the globe," to use an old-time description of this peninsula.

H. P. BOYCE (Benoni, Transvaal).

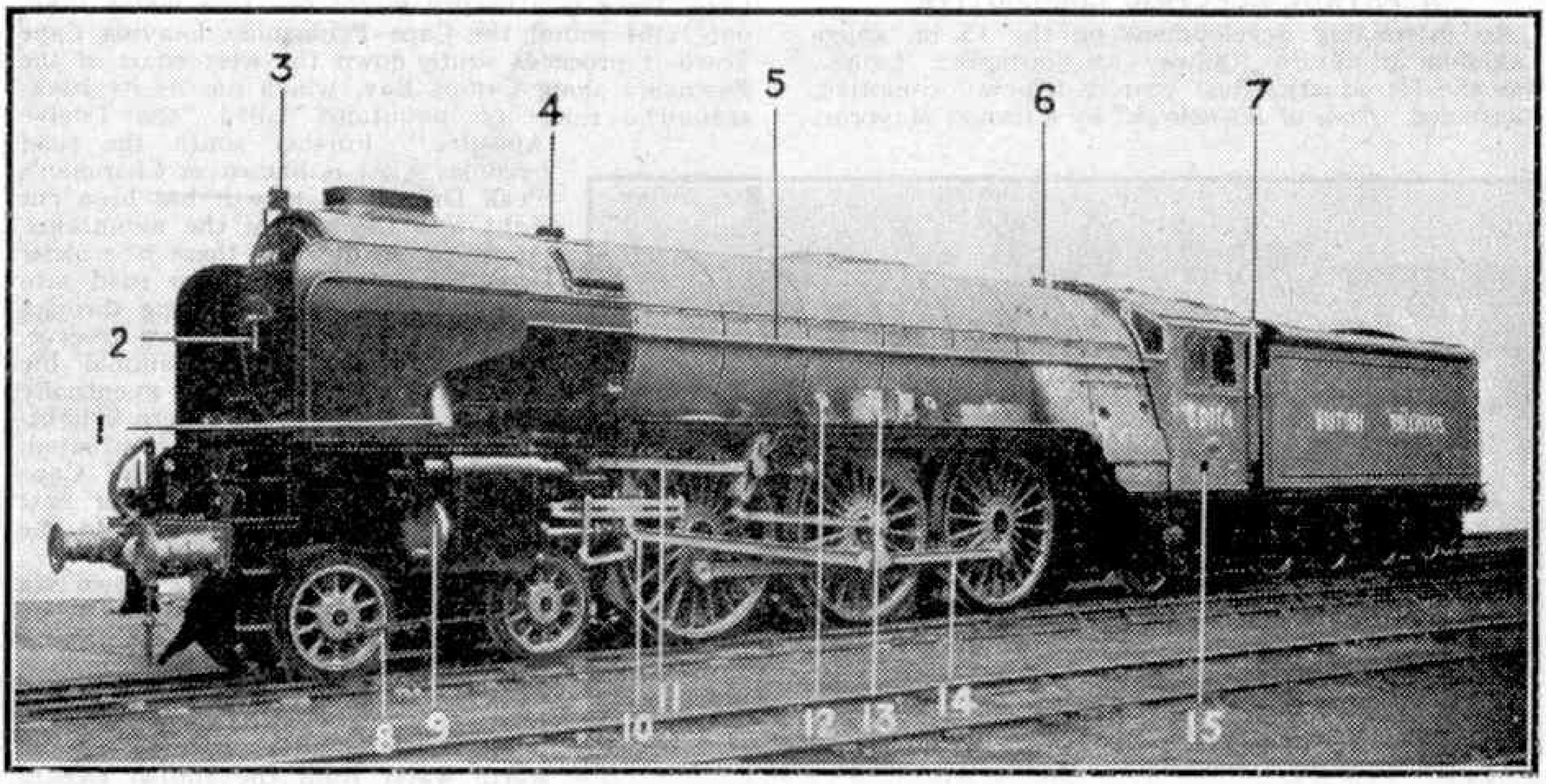


Looking seaward from the Cape of Good Hope, where the Atlantic and Indian Oceans meet. Photograph by H. P. Boyce, Benoni, Transvaal.

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Name These Locomotive Parts



Here is an interesting competition in which all readers can join. The illustration on this page shows a British Railways "Pacific" locomotive, various parts of which have been numbered. Competitors are asked to say what these parts are and to add in each case a brief note stating their purpose. The list of the parts should be given in numerical order and each entry should bear the name, address and age of the competitor.

There will, as usual, be two sections, for Home and Overseas readers respectively, and in each there will be prizes to the value of 21/–, 15/– and 10/6, together with a number of consolation prizes. Neatness and novelty of the entries will be taken into consideration in the event of a tie for any prize.

Entries should be addressed *"May Locomotive Contest, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates: Home Section, 30th June; Overseas Section, 30th September.

Invent a Slogan

A slogan is a rallying cry. The word comes from a Gaelic expression used to call men of Highland clans to the defence of their standard when it was in danger of capture. To-day slogans figure largely in advertisements, and in fact they are the advertisers' battle cries.

It is good fun to try to think out suitable slogans for the many products that are advertised in the *"M.M.,"* and this month we ask readers to try their skill in this fascinating pastime. They should keep in mind that a slogan must be easily remembered and therefore should consist of as few words as possible. Besides being short and snappy, a good advertising slogan must draw very pointed attention to the merits of the product concerned, while many of the finest slogans have been humorous in character.

Any product advertised in this issue of the *"M.M."* may be chosen as the subject for an entry, and we look forward to some really smart efforts on the part of readers. Entries should be addressed: *"Slogans Contest, Meccano Magazine, Binns Road, Liverpool 13."* There will be the usual two sections, for Home and Overseas readers respectively, and in each prizes of 21/–, 15/– and 10/6 will be awarded for the efforts considered the best. Closing dates: Home Section, 30th June; Overseas Section, 30th September.

May Photographic Contest

The fifth of our 1949 series of photographic contests is a general one, in which we invite readers to send in prints of any subject. There are only two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired.

The competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate sections for overseas readers. In each section prizes of 21/–, 15/– and 10/6 will be awarded. Entries should be addressed *"May Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates: Home Section, 31st May; Overseas Section, 31st August.

Competition Results

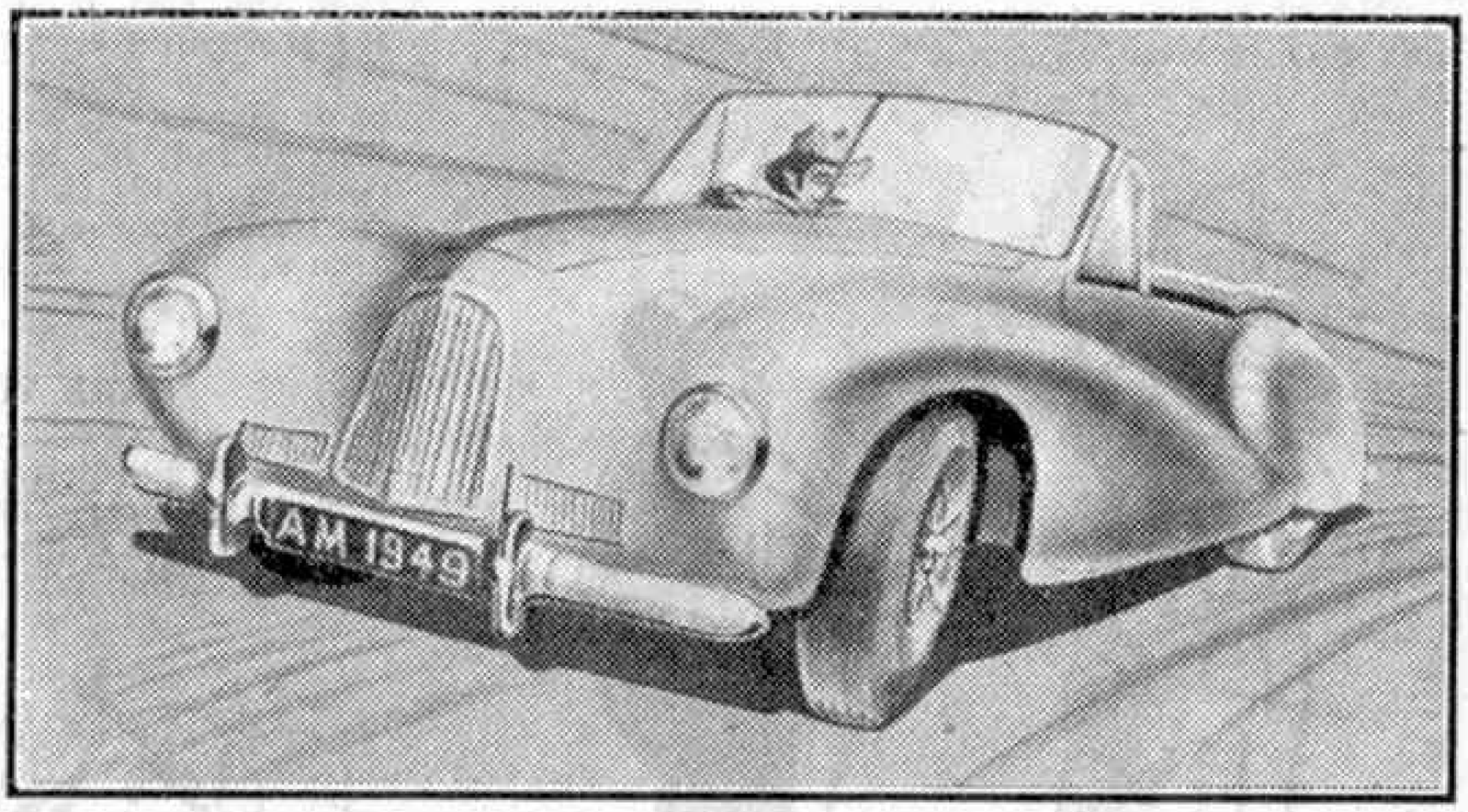
HOME

JANUARY 1949 COVER VOTING CONTEST (1948 Covers)

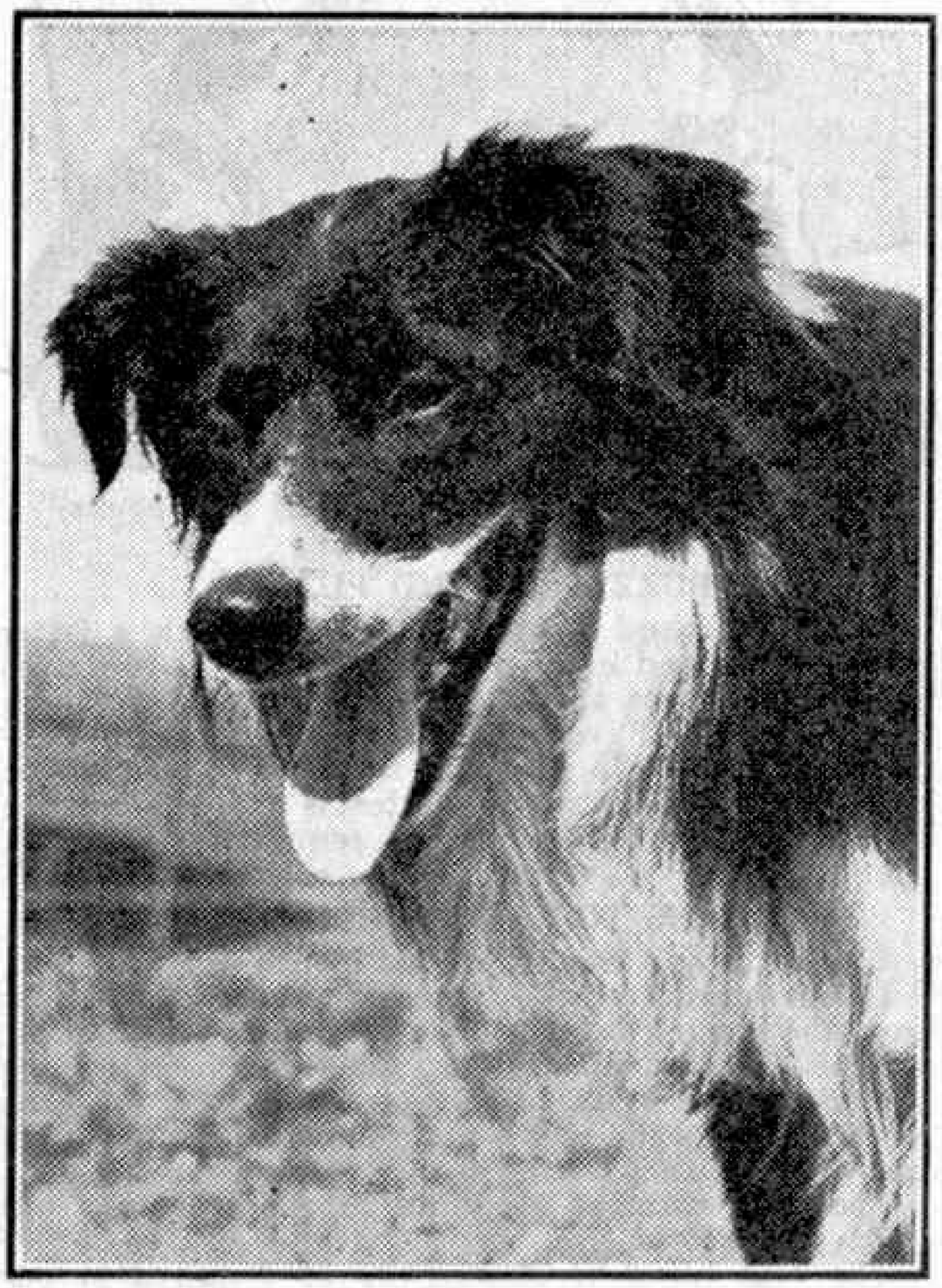
1st Prize: A. F. Sinnott, Liverpool 23. 2nd Prize: M. Hunt, Birmingham 13. 3rd Prize: E. Howey, South Shields. Consolation Prizes: N. N. Deacon, Leicester; M. S. Essam, Kettering; Mr. Spalding, Ipswich.

JANUARY 1949 DRAWING CONTEST

1st Prize, Section A: K. G. Rush, Luton; Section B: M. J. Darlington, Worthing. 2nd Prize, Section A: K. R. Pargeter, Stourbridge; Section B: J. D. Roche, Oswestry. 3rd Prize, Section A: D. Warner, Warwick; Section B: M. Wright, Edgware. Consolation Prizes: J. C. Smith, Selsdon; R. Francis, Nantwich; A. Grant, Aberdeen; B. R. Oliver, Taunton; J. E. Davies, Bristol 6; W. H. Robertshaw, Bradford; I. I. Macfarlane, Stafford; K. Petchell, Leicester; J. Greenwood, Accrington; A. G. Parkin, Peterborough; A. Hobbs, Exeter.



An excellent drawing by K. G. Rush, Luton, of an Aston Martin sports car. Awarded 1st prize in the January (Section "A") Drawing Contest.



This life-like photograph entitled "Hot Work" was awarded 1st prize in the January (Section "A") Photographic Contest. Submitted by J. McMath Neish, of Glasgow C.3.

JANUARY 1949 PHOTOGRAPHIC CONTEST

In view of the large number of really good entries submitted for this contest two special and several extra consolation prizes were awarded.

1st Prize, Section A: J. McMath Neish, Glasgow C3; Section B: P. Clifford, Wembley. 2nd Prize, Section A: R. R. Bushell, Hoddesdon; Section B: D. C. Mills, Cannock. 3rd Prize, Section A: R. C. Smith, North Harrow; Section B: A. Hobbs, Exeter. Special Consolation Prizes: W. Forsch, Stoke-on-Trent; J. R. Norris, Nottingham. Consolation Prizes: C. H. Thomas, Aldershot; A. R. Brown, Isleworth; E. J. Elphick, Hastings; A. J. Wilshere, Littleover; H. J. Edwards, Tunbridge Wells; R. Atkins, Eccles; C. E. Lowe, Derby; D. A. Brockies, London S.E.9; I. Palmer, Blackpool; R. J. Hooker, Oxford; N. M. Wade, Birkenhead; C. Hasler, Reigate; P. J. Stone, Calstock; T. G. Hopkins, Gedling; D. I. Fry, Weymouth; L. A. Tripp, London S.E.26; P. Lowe, Derby; W. Turnill, Stamford.

FEBRUARY 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: Mrs. I. Hardwick, Burnham-on-Sea; Section B: R. H. G. Simpson, Oxford. 2nd Prize, Section A: C. F. Stott, Brentwood; Section B: E. R. March, Upminster. 3rd Prize, Section A: Mrs. V. Neish, Pinwherry; Section B: C. E. Richardson, Mansfield. Consolation Prizes: A. M. Finnie, Leicester; R. E. L. Morgan, New Malden; J. McMath Neish, Glasgow C.3; S. L. Connors, New Malden.

OVERSEAS

JULY 1948 "BIRD-WORD" CONTEST

1st Prize: N. Burke, Paris, France. 2nd Prize: J. Bate, Galway, Eire. 3rd Prize: G. E. McKinnon, Sydney, Australia. Consolation Prizes: H. P. Chinoy, Bombay, India; I. Thake, Birkirkara, Malta, G.C.; C. A. Adams, Durban, South Africa.

JULY 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: P. L. Stringer, Hastings, N.Z.; Section B: S. Ives, Oslo, Norway. 2nd Prize, Section A: R. A. Murtagh, Dublin, Eire; Section B: J. K. Williams, Hong Kong. 3rd Prize, Section A: R. H. Philpott, Mowbray, S. Africa; Section B: J. Vernon, Copenhagen, Denmark. Consolation Prizes: J. C. Carter, Stellenbosch, S. Africa; G. Lynch, Rathgar, Eire; N. P. Milne, Hawke's Bay, N.Z.

Fireside Fun

"What's that big building, dad?"
"I don't know."
"Well, what are all those people doing at that corner?"
"How on earth should I know?"
"Say, dad, you're not annoyed when I ask questions, are you?"
"No, of course not, sonny. Asking questions is the only way to learn anything."

* * * *



"Why does that fellow pull his barrow instead of pushing it?"
"He tells me he hates the sight of it."

* * * *

"What kinds of birds are kept caged up, Smith?"
"Jailbirds, sir."

* * * *

"Do you know what men sentenced for smash and grab raids have to do in prison?"
"No. What do they do?"
"Grab sledge hammers and smash rocks."

* * * *

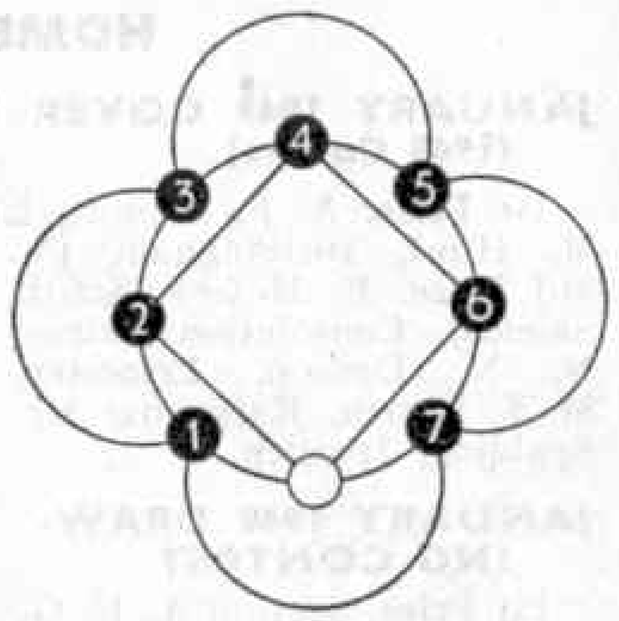


"What! Going on holiday again?"
"No. My wife's running the local jumble sale so I'm bringing my clothes to the office till it's over."

BRAIN TEASERS

PLAYING TRAINS

The accompanying diagram shows the tracks of a railway system around a large city. There are eight stations, represented by the small circles, and trains at seven of them, numbered 1 to 7. In how many moves can you reverse the order of the seven trains, so that the first is in the position of 7, the 2nd in the position of 6, and so on, the 7th ending in the position of 1? Only one train moves at a time.



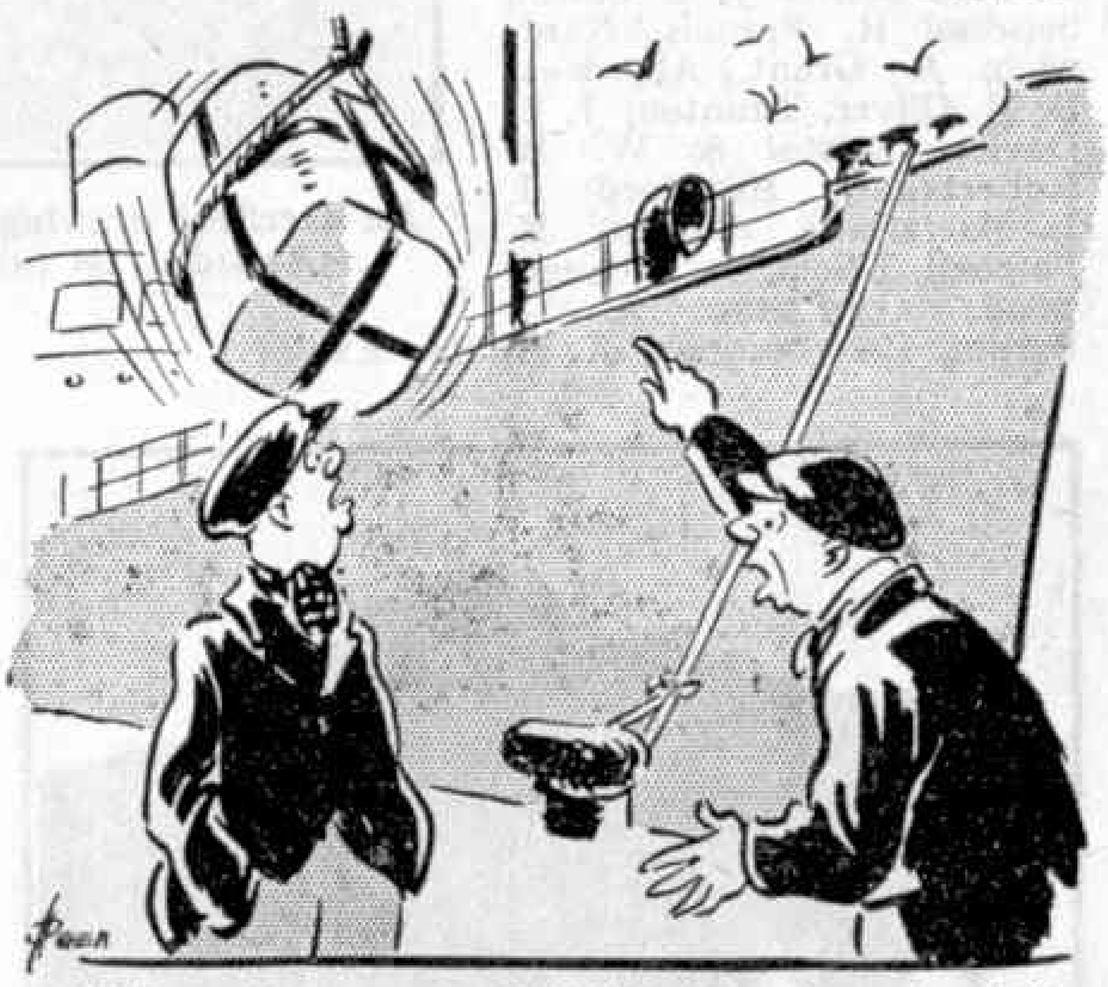
S.W.C.

* * * *

ARE YOU CLEVER, TOO?

The other day I asked Jones how old he was. He didn't tell me directly, but said that if he had been 8 years younger, then 20 years ago he would have been only half as old as he actually was. This seemed very confusing, but I worked it out. Can you?

* * * * K.J.B.



"What d'yer mean, DUCK? They're seâgulls!"

* * * *

PUZZLE TO END PUZZLE

Here is a word pyramid, beginning with a letter of one word and ending with one of six. The clues for the six words are as follows: Vowel; Preposition; Posture; Film Favourite; Local Government Payments; Puzzle. In passing from one line of the pyramid to the next one letter is added, and the letters are then re-arranged as required. M.H.K.I.

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The fish in our first puzzle last month weighed 16 lb.

In our second puzzle last month the two sons first cross the stream; one son then returned with the boat and his father crossed alone, the second son coming back with the boat. A similar procedure took the mother over. Finally the two sons crossed the stream and one returned to fetch the dog.

The total number of pupils in the school in our third puzzle was 156.

The four numbers making up 39 required in our fourth puzzle were 4, 8, 3 and 24.

* * * *

THIS MONTH'S HOWLER

Words written in hysterics are specially important.

FOR THE PRODUCTION OF MONOCHROME PRINTS IN A VERY WIDE VARIETY OF ATTRACTIVE COLOURS.

JOHNSONS NEW PROCESS
COLOURFORM

BY this process it is possible to make prints in a very wide range of colours. It is NOT a toning process nor are the effects obtained by dyeing or staining. Almost any colour can be predetermined and actually formed by development. The exact shade can afterwards be matched, with certainty, and repeated whenever it is required. Every step is under perfect control. The colours do not fade. This COLOURFORM process will appeal to amateur photographers who wish to break away from conventional black and white and produce results that will excite admiration by their sheer beauty.



WRITE FOR ILLUSTRATED BOOKLET GIVING FULL DETAILS AND METHOD OF PROCEDURE
(*Mention "Meccano Magazine"*)

Charming purple-browns, cool olive-blacks delicate yellow-greens, mauves, blues of the richest quality, and an endless variety of browns from the palest sepia to the deepest nigger-brown, are all attainable. The possibilities are literally unlimited.

GET THIS OUTFIT FROM YOUR DEALER

For those who wish to experiment with this process the Johnson COLOURFORM OUTFIT is available. It contains enough colour developer to make up eight 10 oz. quantities. Three bottles containing the primary red, yellow and blue colour-formers—to be added to the developer. One packet of bleaching compound to make 20 oz. of solution (which may be used repeatedly). A glass measure and a book of instructions.
PRICE **15/-** *COMPLETE*

JOHNSONS OF HENDON LIMITED
MANUFACTURERS OF FINE CHEMICALS LONDON N.W.4 *Established 1743*

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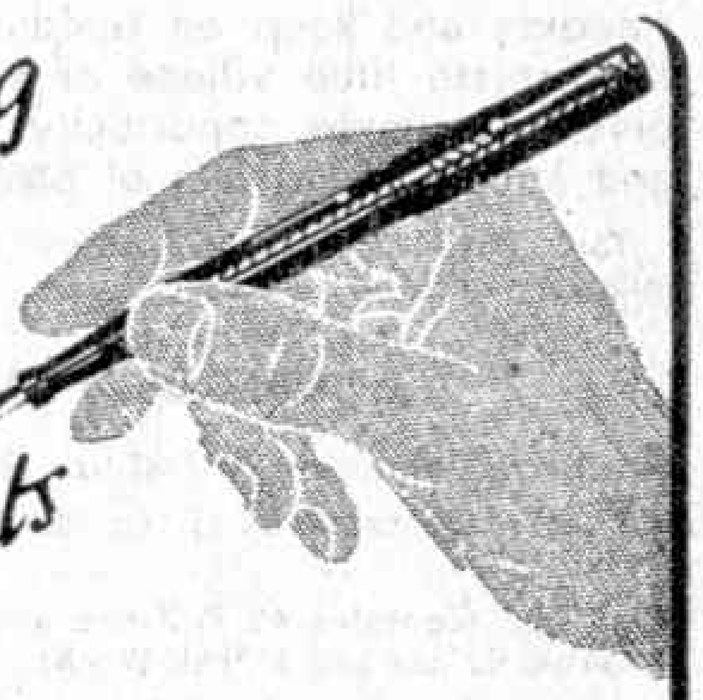
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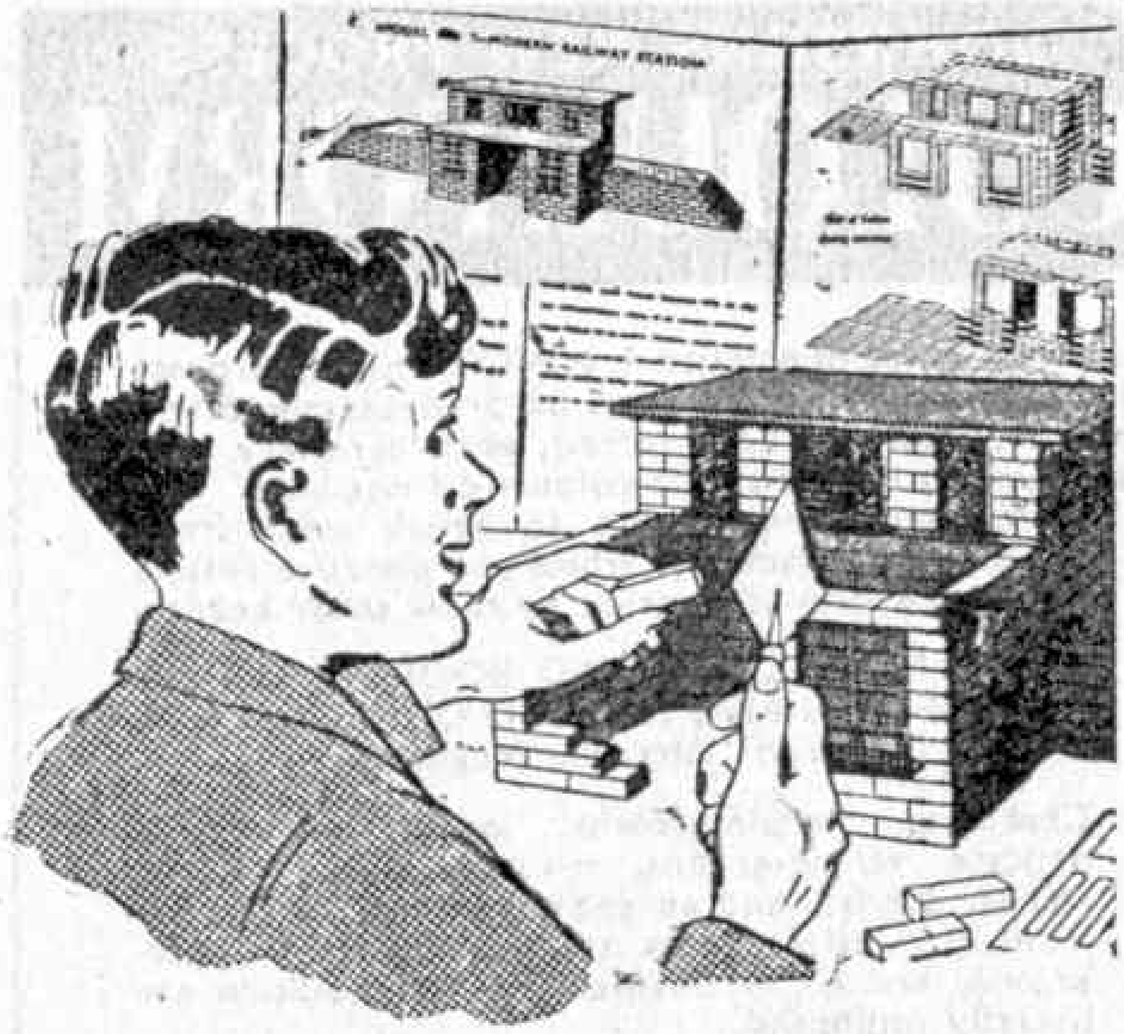
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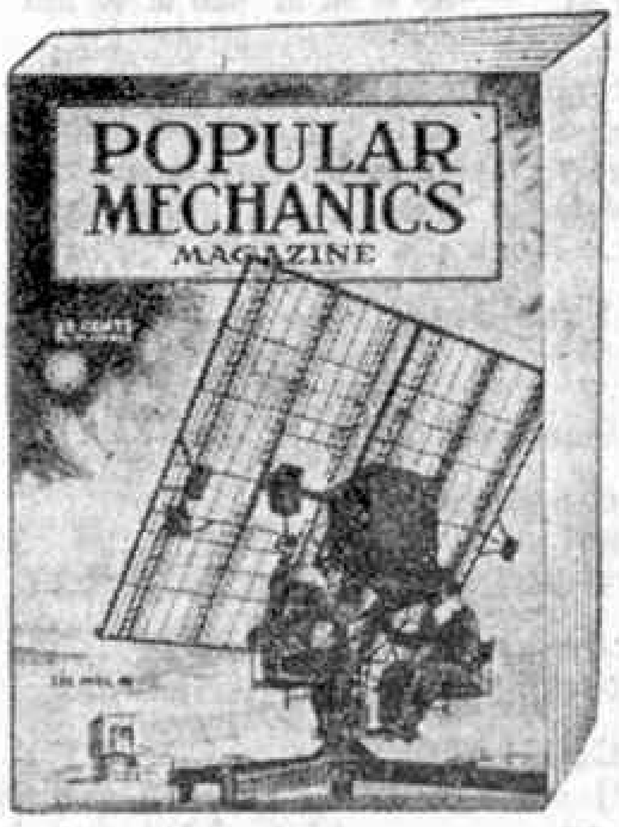
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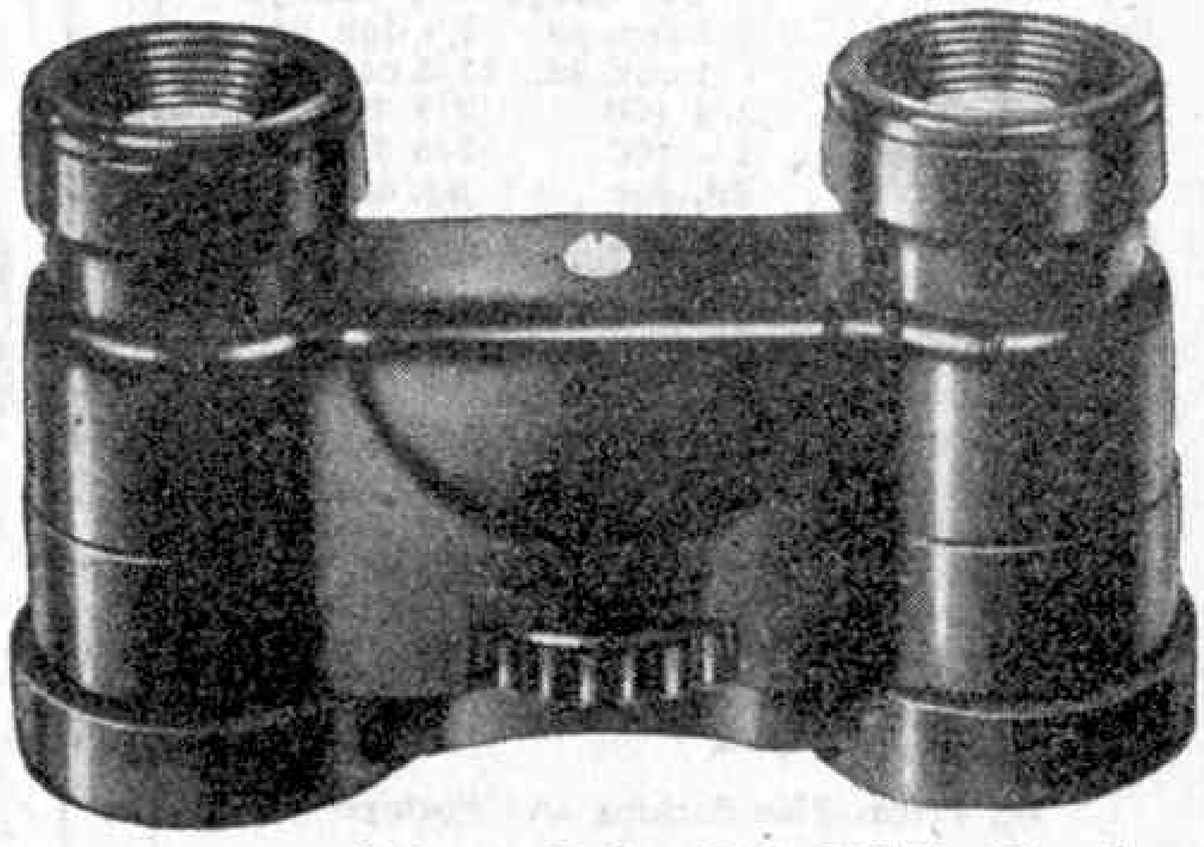
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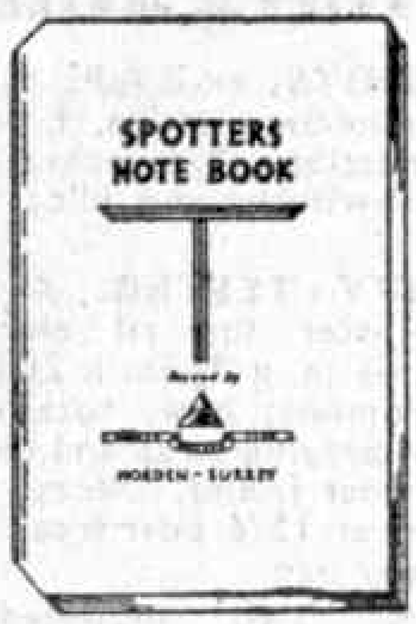
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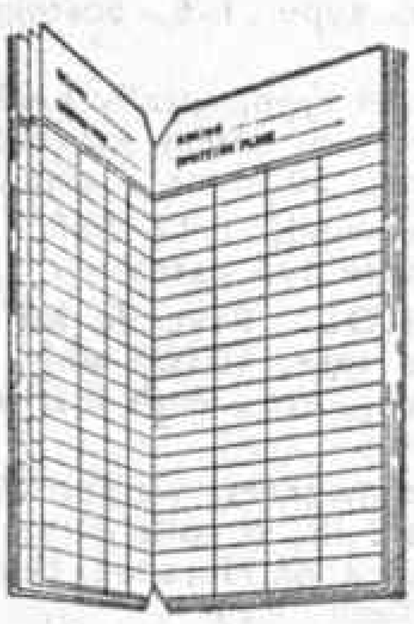
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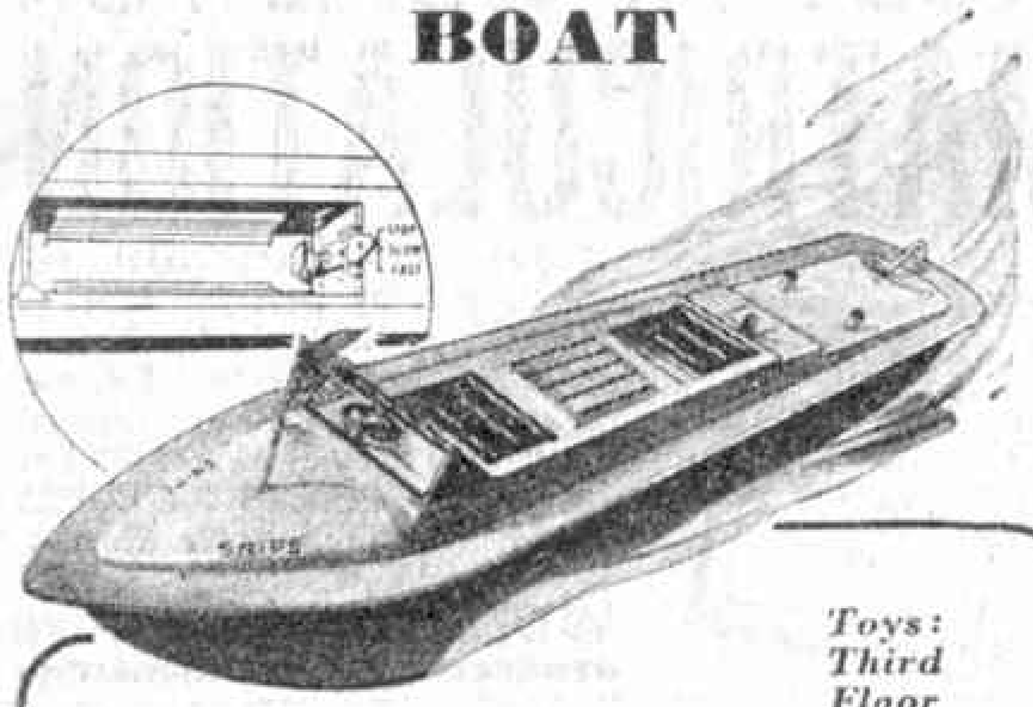
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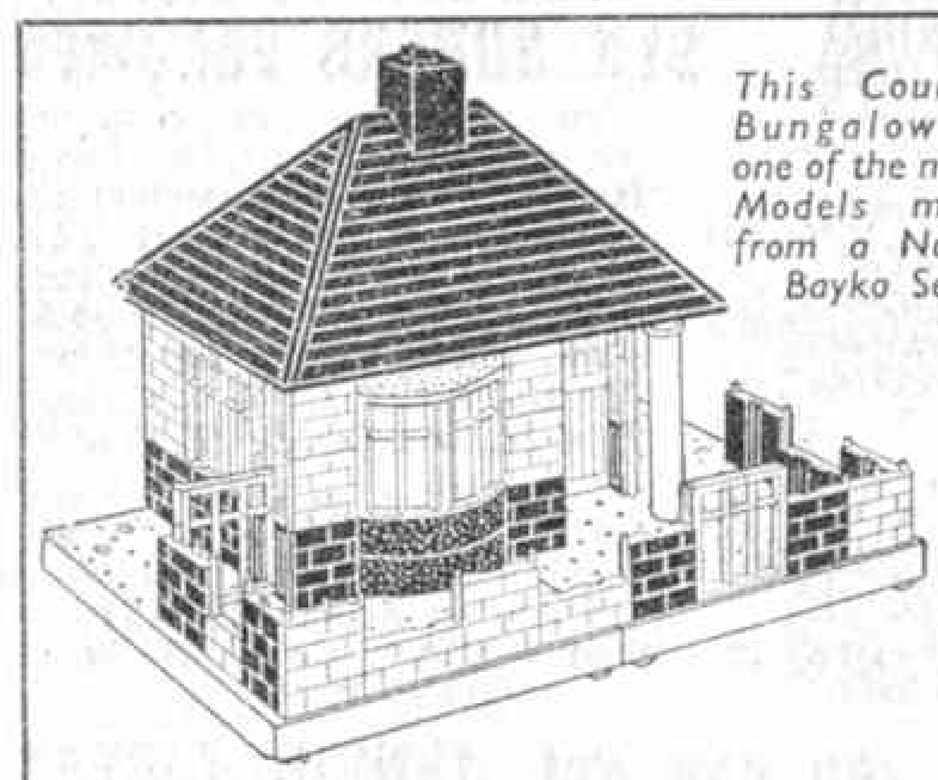
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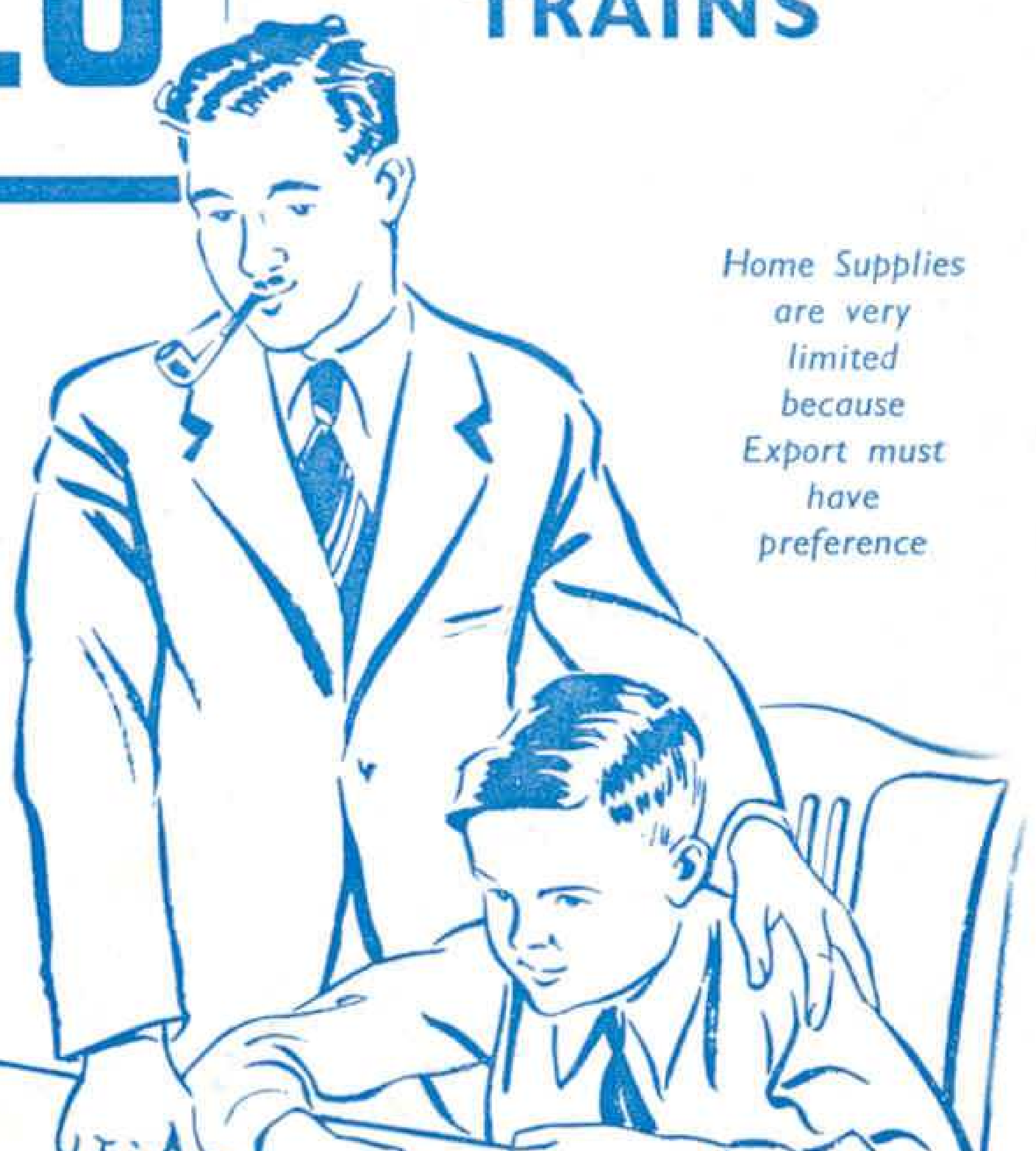
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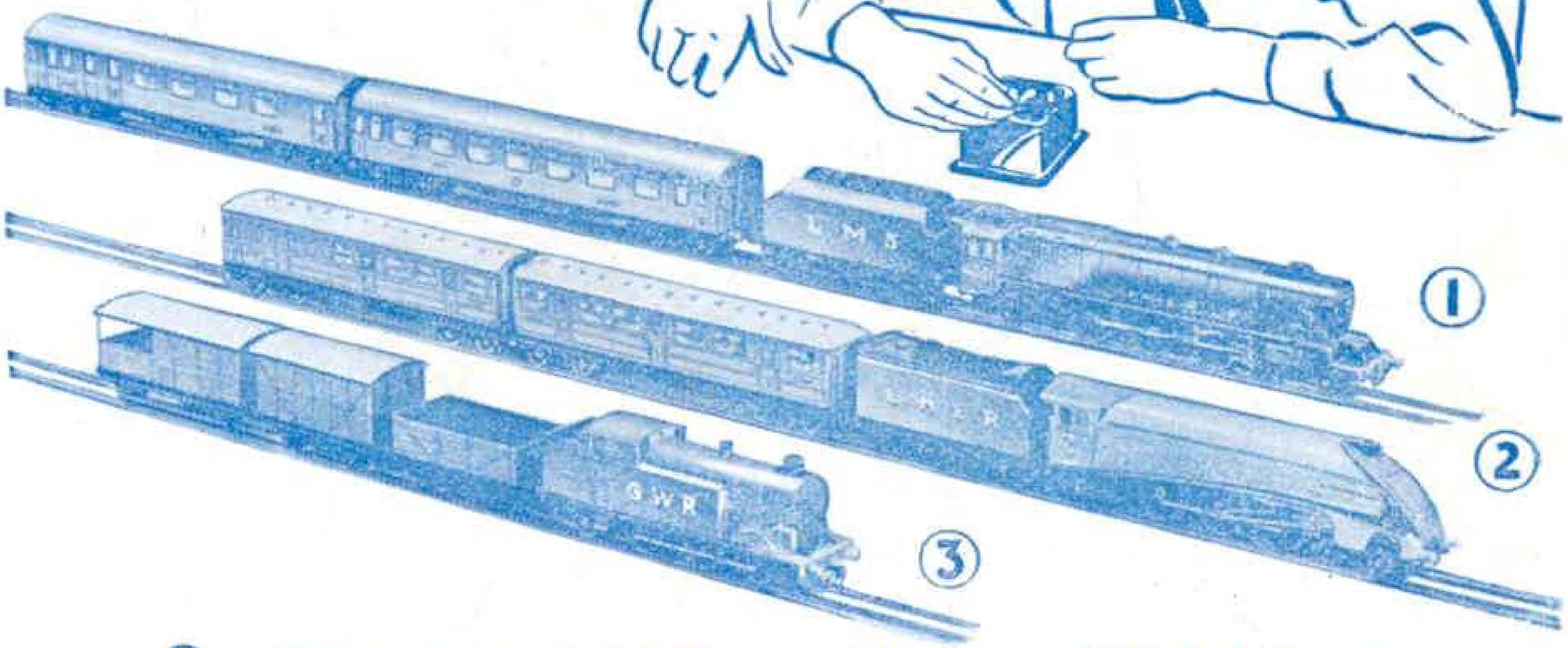


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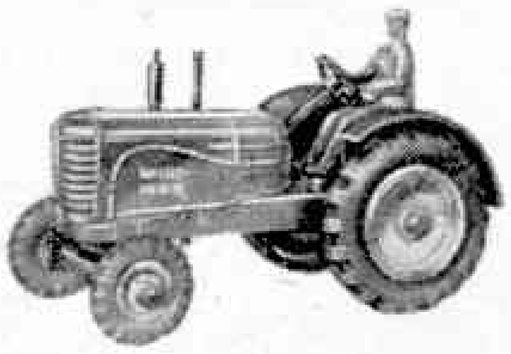
VOL. XXXIV. No. 6 JUNE 1949

MECCANO MAGAZINE

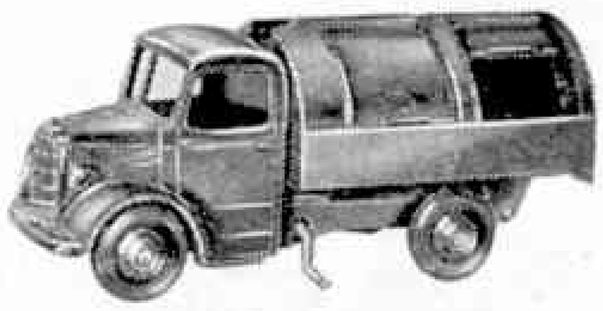
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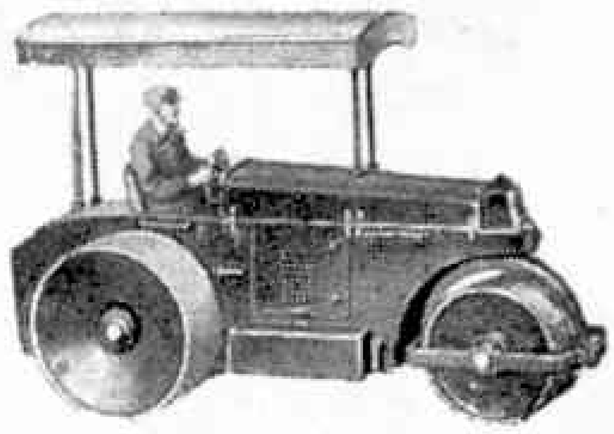
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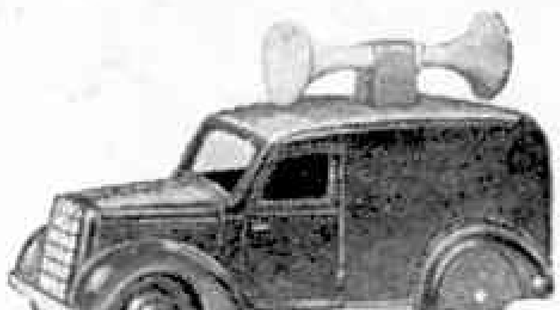
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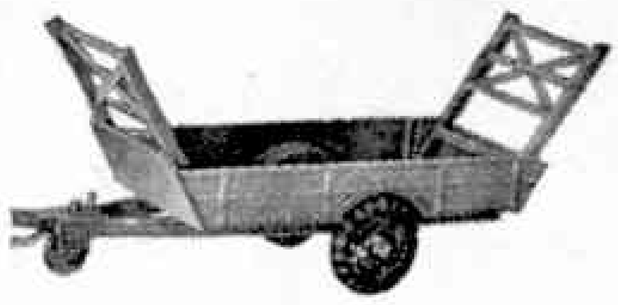


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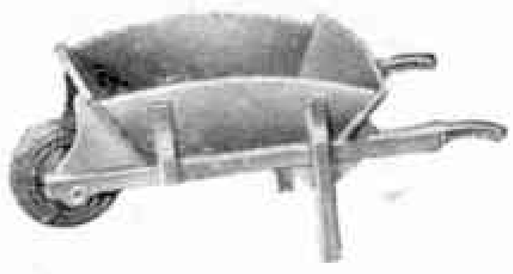
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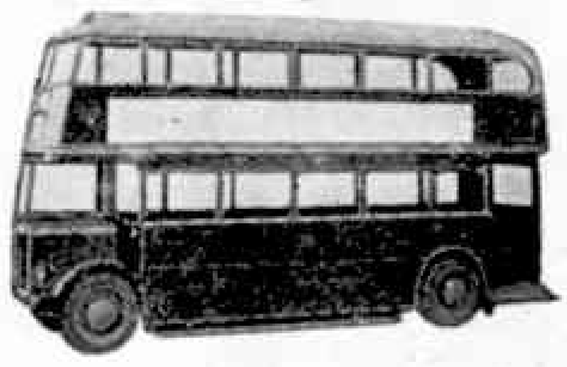
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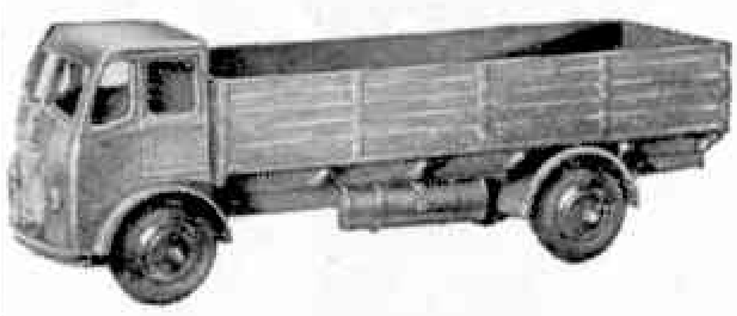
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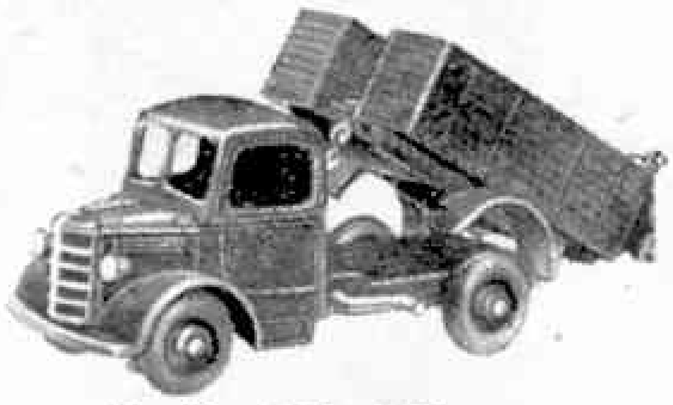
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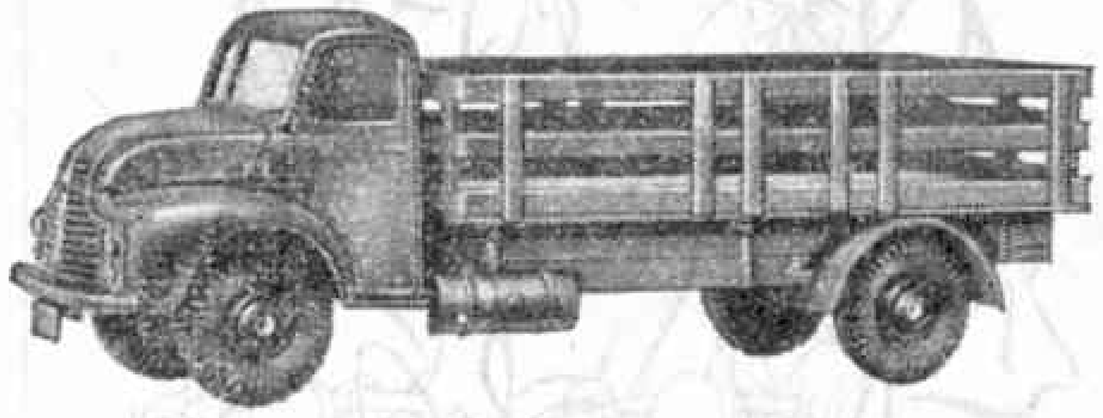
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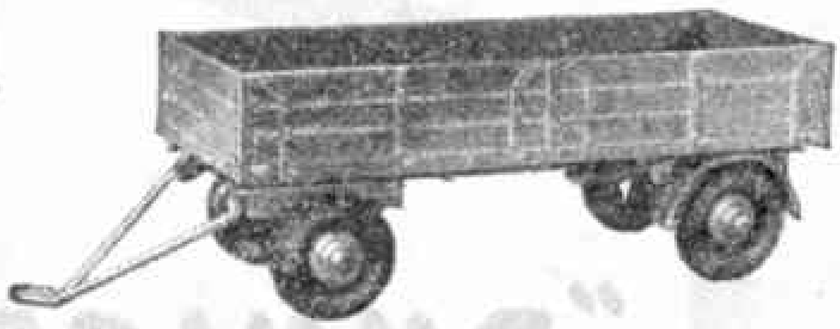
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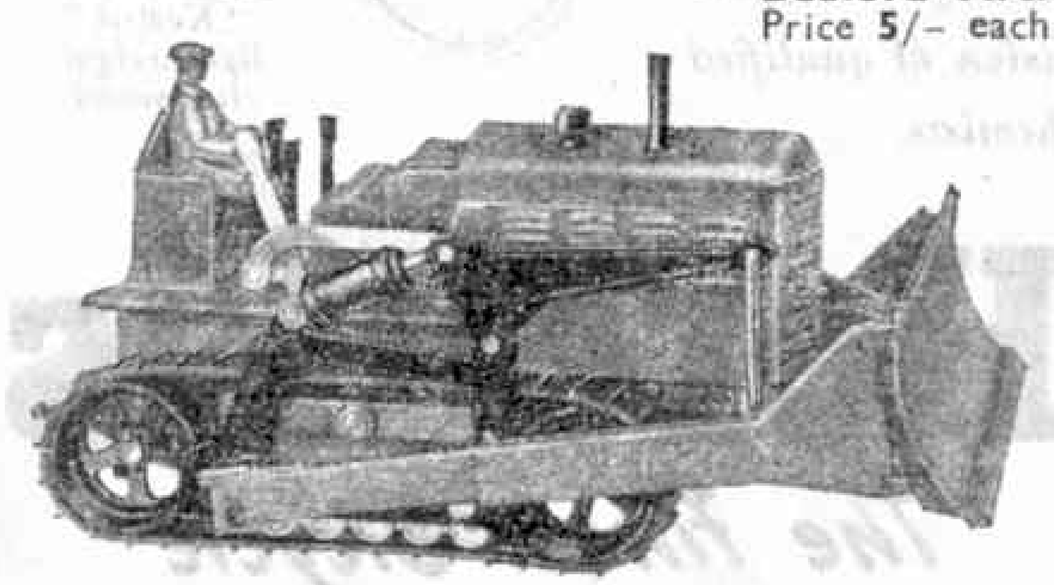
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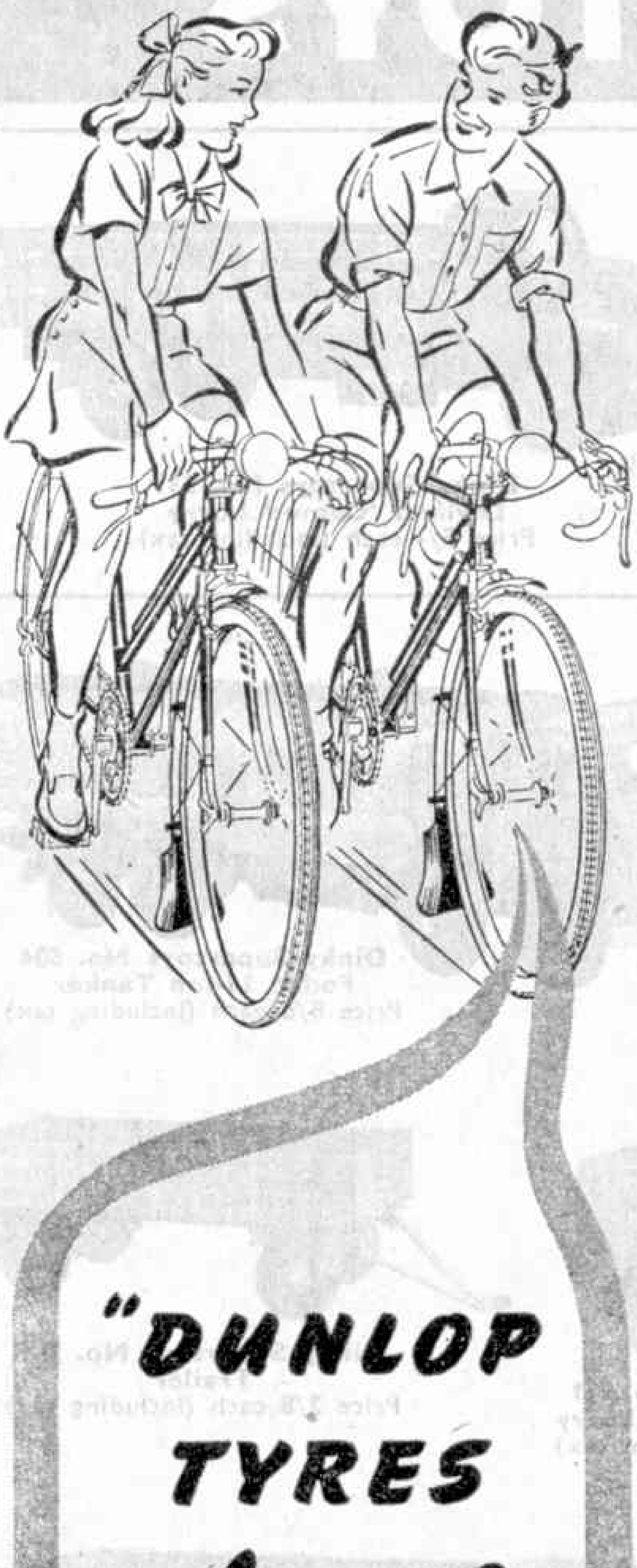


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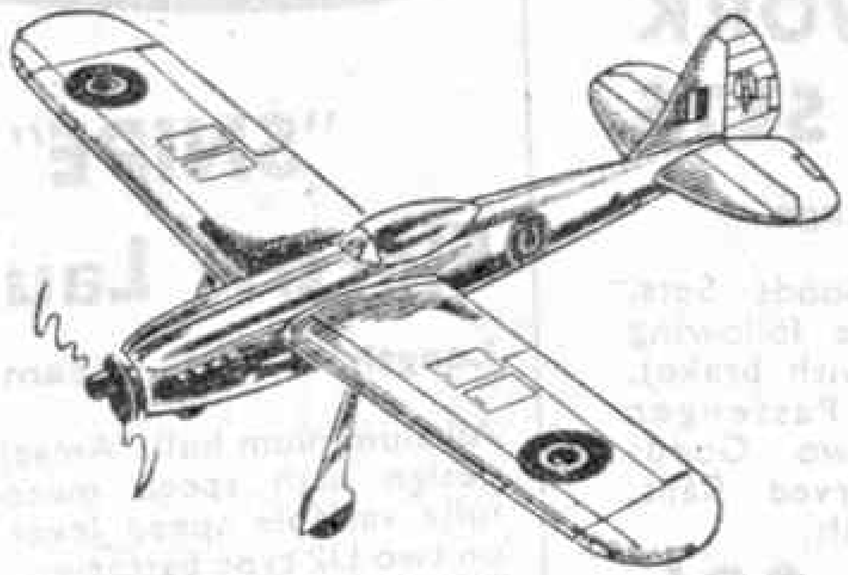
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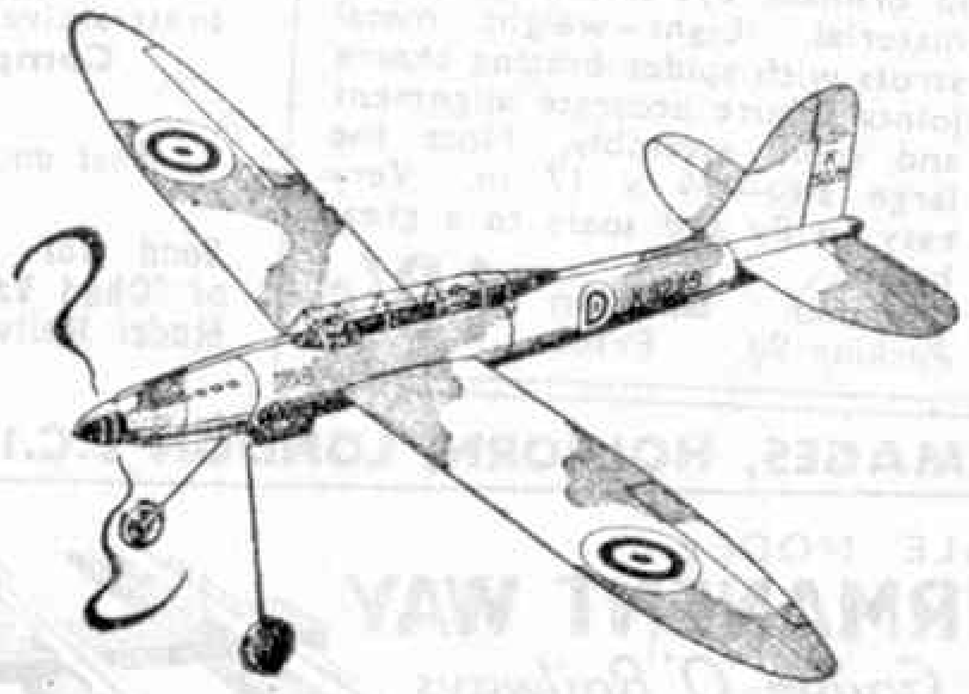
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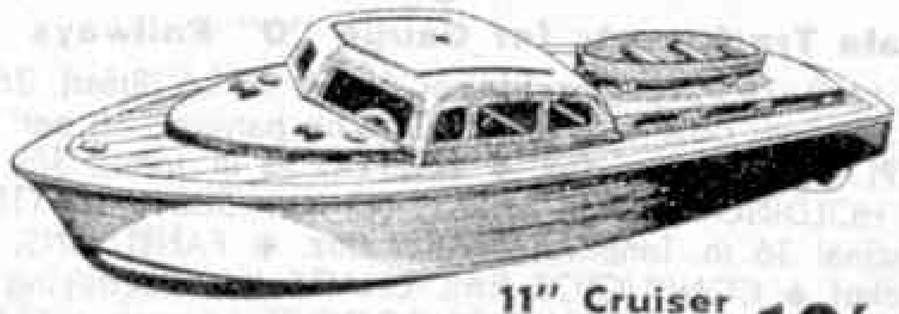
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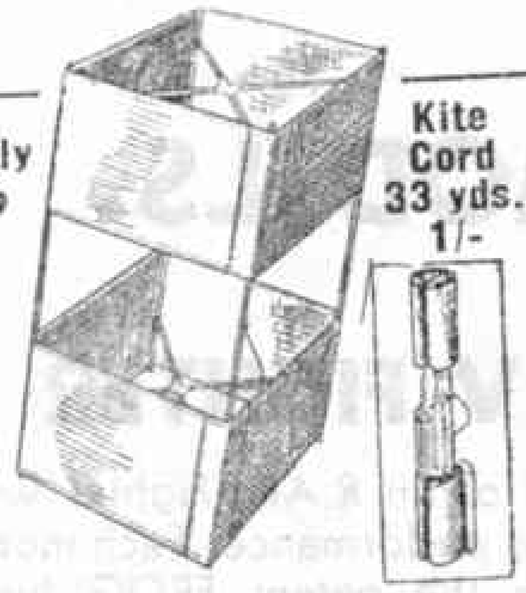
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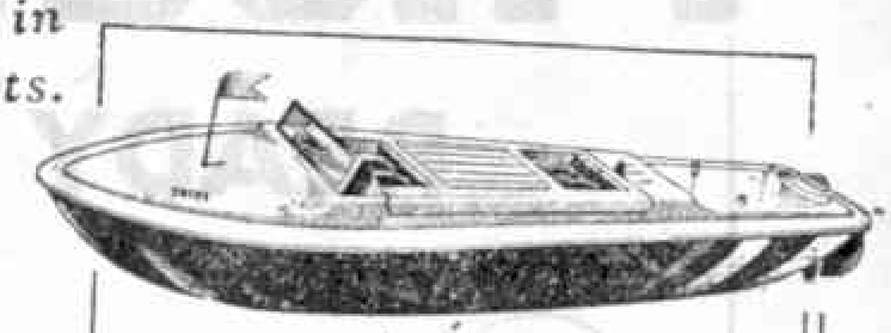
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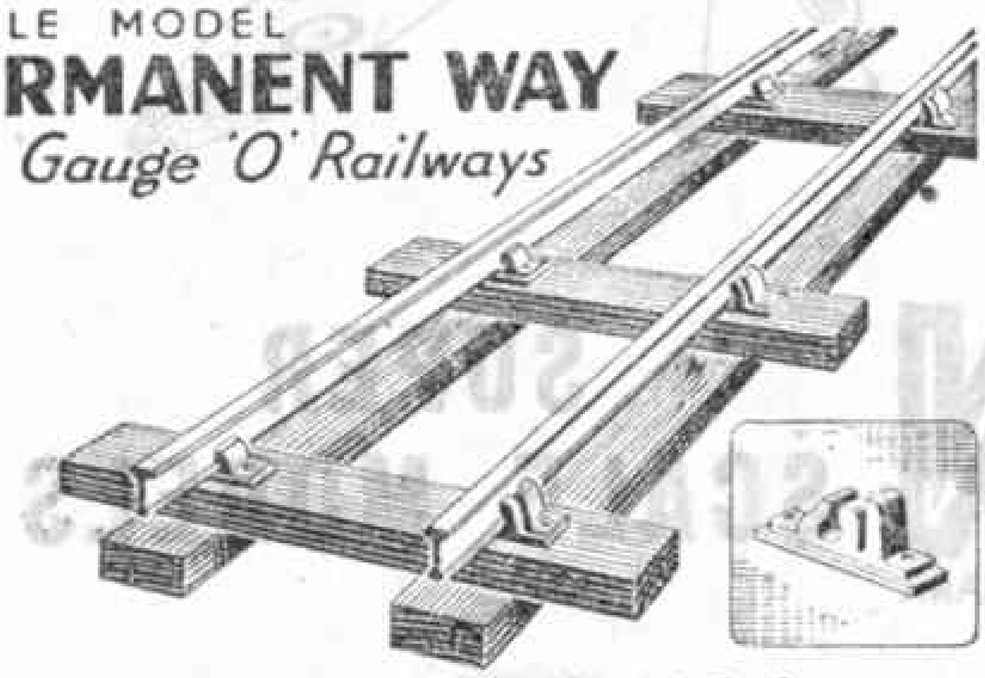
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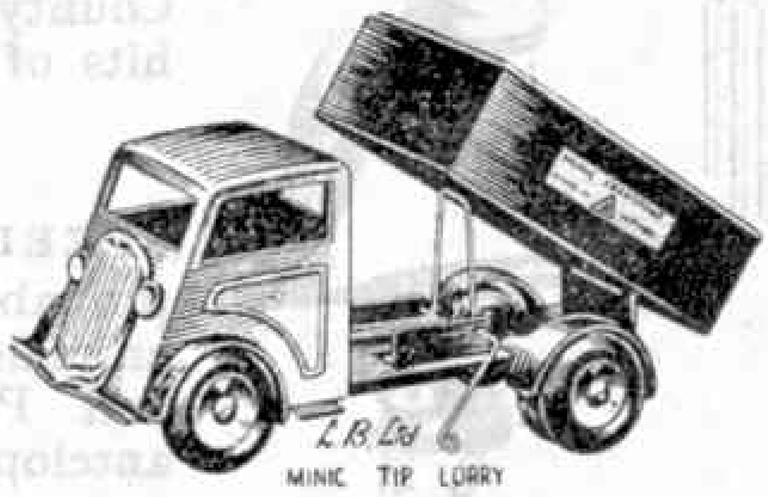
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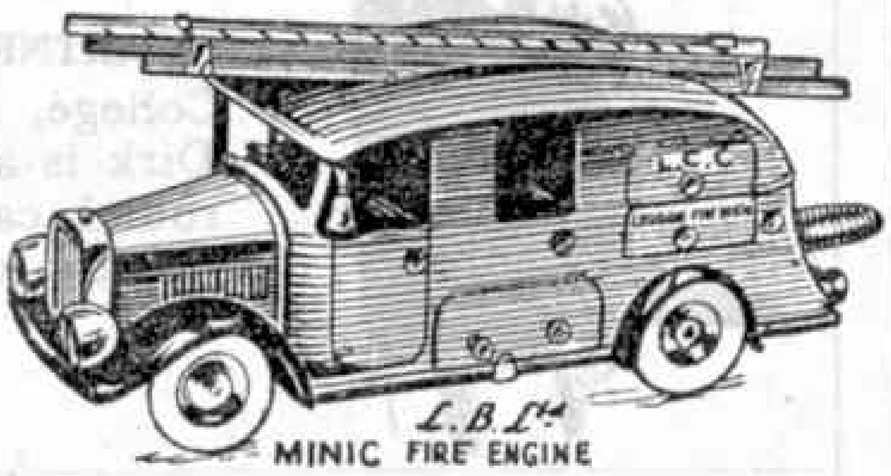
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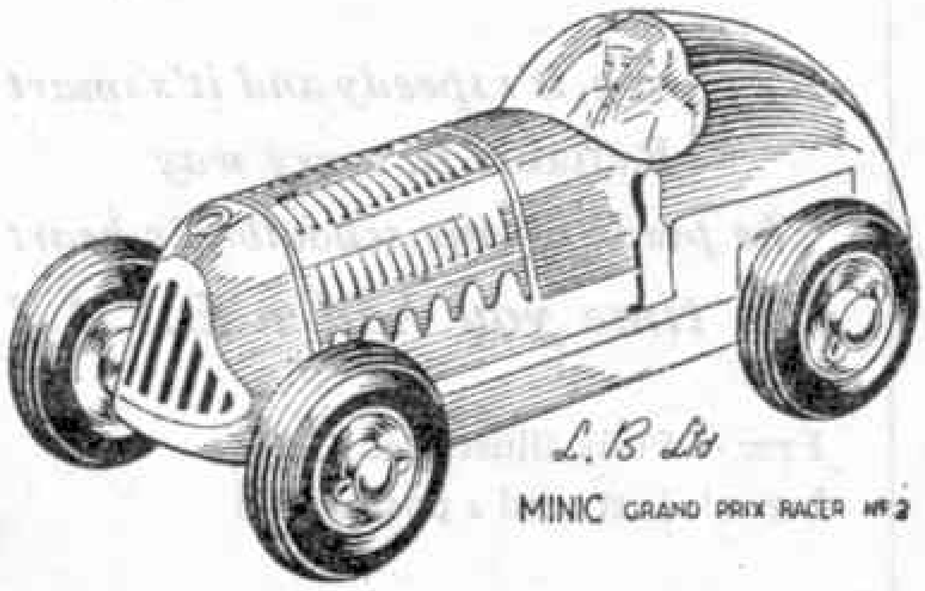


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MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

Vol. XXXIV
No. 6
June 1949

With the Editor

Ship-Models

Whether interest in ship-models begins with trying to find out how a miniature of a three-masted vessel, complete with rigging, ever got inside a bottle, or merely with whittling crude craft from any handy piece of wood, it certainly persists, and good models everywhere have their enthusiastic admirers of all ages. Many sailormen have given hours of their spare time to the construction of models of ships they have sailed in, and it is not surprising to find that captured French sailors of the Napoleonic era employed their enforced idleness in this way. Some of their wonderful models are illustrated on page 228, on which appears an article describing them and explaining how they came to be made.

Shooting and Mapping

We are all familiar with what are known as Ordnance Survey maps, but how many of us know why these official maps have this name? The word "ordnance" means artillery, and at first glance there seems little connection between shooting and mapping. The explanation is simple.

At the time of the rebellion of 1745, when the Young Pretender made the last effort to seize the throne for the Stuarts, the Army authorities realized that they could not give their Generals reliable maps, and decided that something would have to be done about it. The Master-General of Ordnance was given the task of surveying the country and so the mapping of Great Britain and Ireland began under military control. The Ordnance Survey is now a department of the Board of Agriculture, but the old name continues and is a guarantee of the highest accuracy and quality.

How the surveyors set about their task is explained in an article on page 210 of this issue, and this will help readers to understand the meaning of mysterious columns that are to be found on hilltops, certain steel towers set up in flat country, and various marks or stones on walls and in prominent places in built-up areas, all of which are reference points used in making these splendid maps. The removal or defacement of these points is rightly forbidden, and the survey officers must be allowed to enter any place in which they wish to make measurements or set up their marks. We realize how valuable this work is when we ramble or motor through the countryside with the maps as guides, and they have many other uses that are unsuspected by most of us.

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Field party at work in a London suburb.

Mapping Britain

How the Ordnance Survey Works

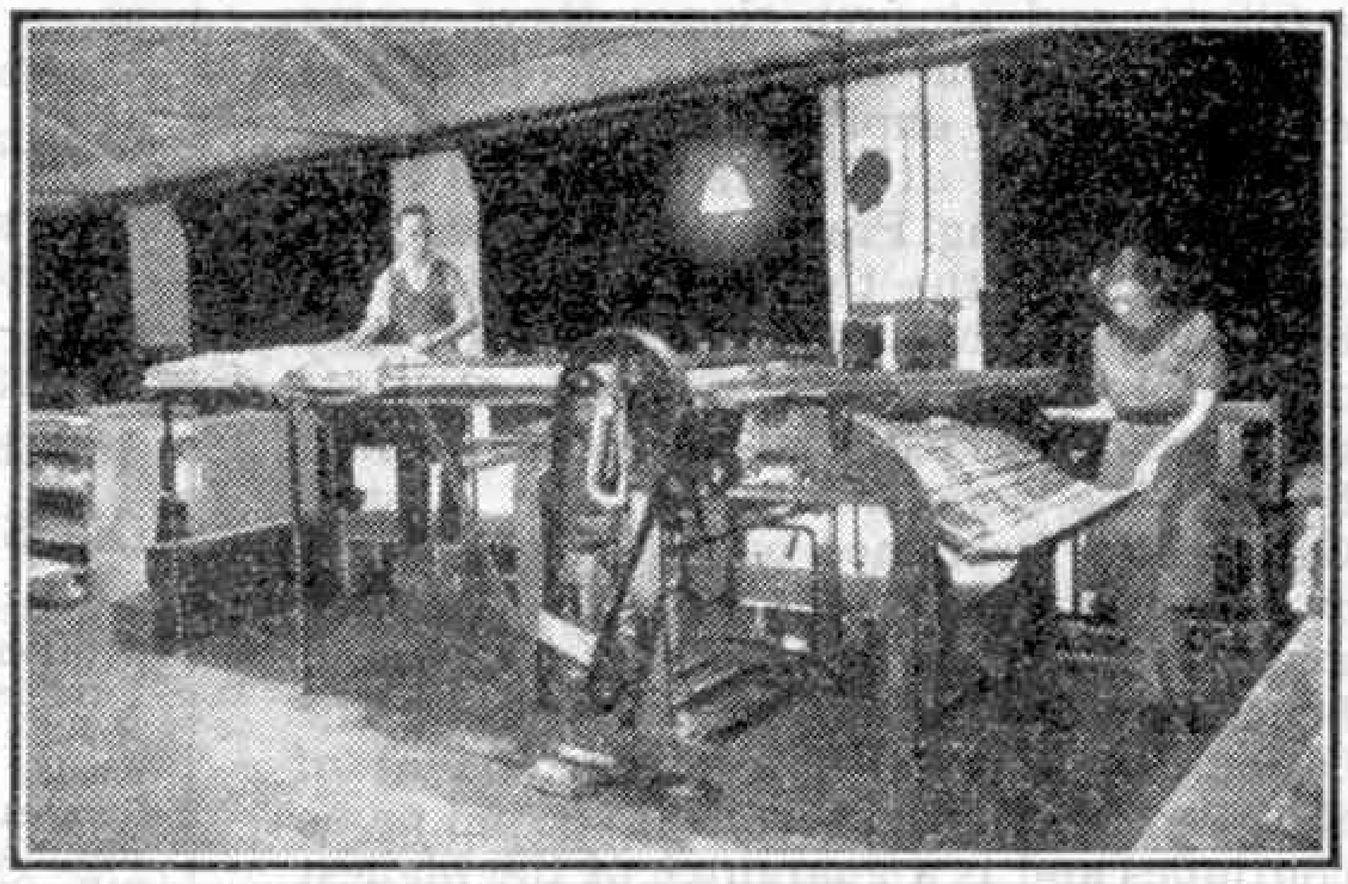
By James Worth

TO re-map most of Great Britain accurately, mile by mile and yard by yard, suggests a very long and laborious task. And indeed it is so. But a large and enthusiastic army of Ordnance Survey experts are now making good progress with the biggest mapping programme that has been undertaken in this country for the past 30 or 40 years. Besides revising thousands of its own existing maps and preparing many new ones, the Ordnance Survey, as the chief authority, provides up-to-date material to all the other British map publishers.

Although Britain has been more thoroughly mapped than any other country of the world, most of the 51,000 basic Ordnance sheets have become seriously out of date since the first World War. This is hardly surprising, for in the 20 years after 1918 building development took place on a rapid and unprecedented scale, while a highly trained Ordnance Survey staff was drastically reduced in the interests of national economy. As a result, our map-makers could not hope to keep pace with all the changes.

A start was actually made on the revision of the National map in the late 30s, but another war came before any results could be shown. Immediately hostilities began all civilian mapping came to an abrupt standstill, as the staff was switched over to vital military duties, and during six years still more changes occurred all over this island, with airfield construction, bombing and so on.

All this will help to give you an idea of the magnitude of the job on hand, and explain why the map men will be busy for many years to come. Since the war large numbers of new men have been trained for this interesting work. Of the four thousand now employed, about two-thirds form the field survey parties and



A map folding machine at work. This is the last stage in the production of Ordnance Survey maps. The illustrations to this article are reproduced by courtesy of the Ordnance Survey.

revising teams outdoors. The rest are engaged on the various stages of map reproduction at the Ordnance Survey offices at Chessington, in Surrey, and Southampton.

The main task at present is to complete the revision of the basic Ordnance maps. These comprise a detailed reference map of Britain on the large scale of 25 in. to the mile, as against the popular one-inch cycling and footpath maps with which most of us are familiar. The basic maps show literally everything of significance on the surface of Britain's landscape; every building, every road, track and footpath, and even the different kinds of trees to be found growing in the woodlands. It is from these elaborate plans that the various small and medium scale maps are reproduced and re-drawn, although the one inch series is now being revised separately.

Yet even the 25-inch maps are not the most detailed made. The Ordnance Survey programme includes the production of entirely new town plans on twice the basic scale, that is on a scale of more than four feet to the mile. These plans, which will show the position of every house and garden wall in every street, will be of the greatest value to local authorities, and all who are concerned with town planning, new housing schemes or industrial development. Nor will they be allowed to get out of date, as they will be revised constantly by surveyors living and working in each district.

While the general principles of map-making have remained the same for many years, new scientific methods and wonderful plotting instruments help to ensure that the new maps will be dead accurate, or as near so as not to matter. Mathematical calculations, which play an important part in the work, are now checked and re-checked by mechanical computation. Moreover, all map plotting and drawing is done straight on to metal squares instead of on paper, and this obviates the risk of distortion.

All our maps, of course, are based primarily upon a system of triangles. In fact, the whole science of map-making depends on the simple fact that a triangle, unlike any other geometrical figure, can never be distorted. So without triangles there could be no accurate maps.

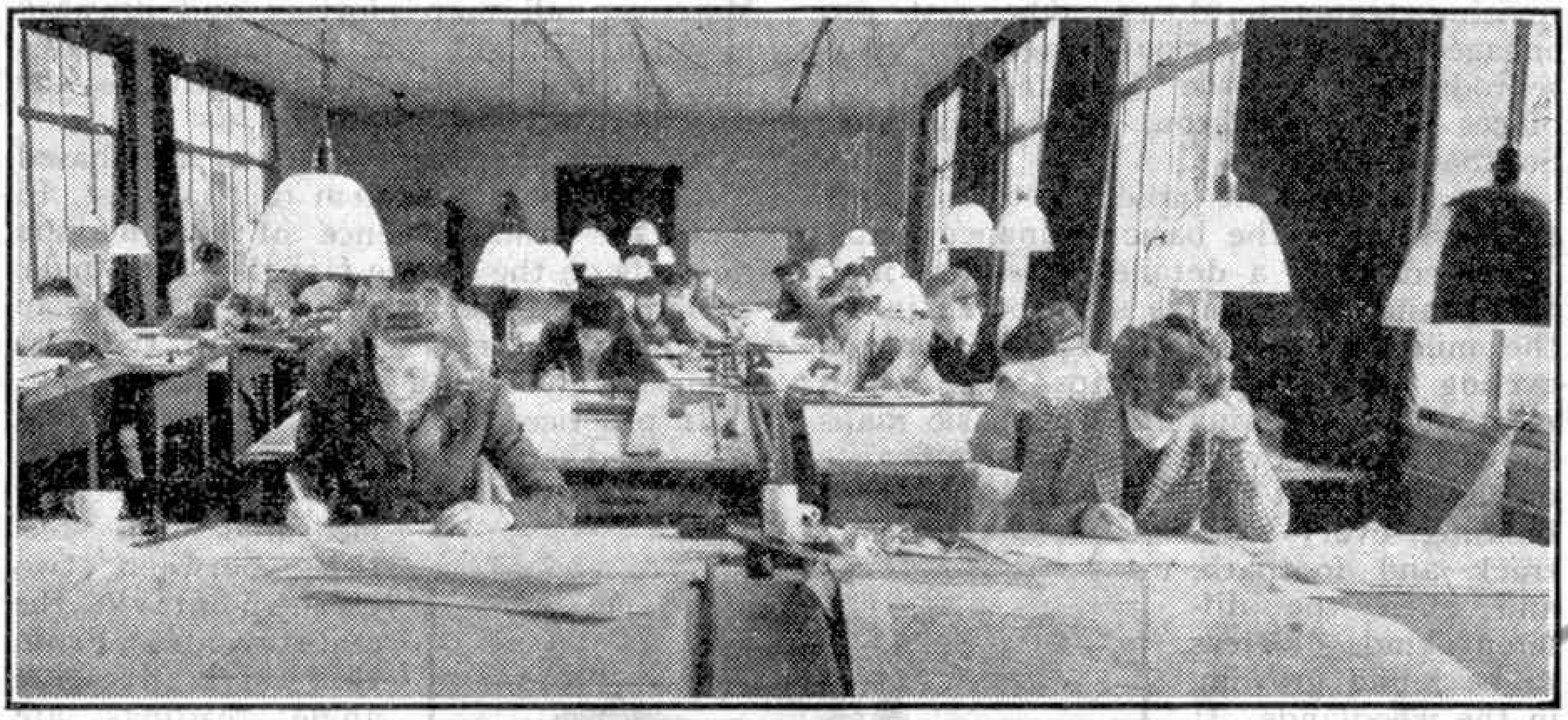
In practice, the method of triangulation is worked out in the following way. First, the base line of the triangle is precisely measured with steel tape between two given points in the countryside. From this straight line angle readings are taken with the theodolite, the surveyor's sighting instrument, on some fixed point, such as a hill top or a church spire, which is selected as the apex. Then by simple calculation both sides and the area of the triangle are measured. The margin of error in present-day surveying is infinitesimal. It is not more than a quarter of a second of an angle, or the equivalent of about one inch at a distance of 12 to 13 miles.



A field surveyor of the Ordnance Survey taking readings with a theodolite.

From the first measured triangle can be built up a continuous network such as that which covers Great Britain to-day. What is known as the "Primary Triangulation" of this island was actually begun in 1792, the year after the Ordnance Survey had been set up by the Government to prepare a military map of England and Wales on a scale of one inch to the mile. The larger scales were not introduced until much later. The original base line was measured over five miles between Hounslow Heath and Bushey Park, in Middlesex, but to-day all Ordnance measurements and calculations are based upon two lines, one on Salisbury Plain and the other in Scotland.

Under the Primary Triangulation, which



In the map drawing office at Ordnance Survey headquarters.

took 70 years to complete, the country was divided into some 250 triangles, each having sides 25 to 30 miles long. But gradually these original triangles have been broken down into much smaller ones, allowing for considerably greater accuracy in surveying than was thought possible in bygone years. All the new maps, in fact, are guaranteed accurate to within three feet.

There are hundreds of concrete pillars, four or five feet high, scattered widely about the British countryside to-day. You may have come across some of them on the hill tops, where as a rule they are most clearly seen. Each of these pillars marks the corner of a measured triangle, and each appears on every published Ordnance map as a tiny open triangle coloured red. They are the fixed points from which surveyors take their observations of the various features of landscape that will form the skeleton of the detailed map.

Surveyors take readings and measure angles between hill tops wherever the nature of the country makes this possible, and all such readings are checked from opposite points by means of heliograph rays. Before the war much of this work was done at night with the assistance of beacon electric lamps.

In quite flat countryside, where tall trees or buildings may obstruct clear views over the landscape, temporary observation pylons are set up at vantage points. Some of these towers, constructed of latticed steel, are over 100 ft. high, but they are so designed that there can be no risk of any swaying movement while sighting is in progress. Church towers were formerly used for this purpose, but they had many disadvantages which the temporary pylon has overcome.

Much of the present mapping work, however, is being concentrated in and around the towns and cities, where changes have been most widespread, and especially in places that suffered heavy bomb damage during the war. In a built-up area control at close intervals is necessary, so the town is broken up into convenient areas by a traverse framework. From fixed points within this framework the field parties measure straight lines through the streets with a surveyor's chain, and also measure off the distances of objects at right angles to the chain.

The fixed points of the towns, known to the experts as "Revision Points," are located on stone walls, kerbstones or anything that is likely to remain fixed for a number of years. Each is given a reference number, which appears in the key maps of the Ordnance Survey, and is photographed together with a board showing that number. When it is necessary to revise a town plan, or any section of it, much time and labour will be saved by the rapid location of fixed points from which any revision must begin.

Most of what has been said so far refers to areas where extensive developments or other considerations have made fresh trigonometrical surveying necessary. But in those rural districts where little change has taken place since the last survey revisers go over the ground very thoroughly with copies of the existing map to mark in whatever corrections may be necessary. Since every detail of landscape and building, every road and footpath must be checked up, it may take a reviser many weeks to cover quite a small area. The map copies upon which he makes his corrections are printed on permanent enamelled squares, which fit together with machine-tested precision and are conveniently carried in a flat wooden sketching case.

Backing up the work of the survey teams outdoors are a whole series of technical and reproduction departments at the Ordnance Survey offices. These are staffed by highly skilled draughtsmen and lettering artists, trained map examiners, photographers, retouchers and the rest. One by one, each group has its own important contribution to make to the marvellous design and accuracy of the finished maps.

One busy department at Chessington is concerned with checking all the readings and measurements sent back by the field parties. A few hundred calculating machines of the latest type are used in this work. Readings are checked and re-checked, and if more than tolerable discrepancies are found they must be taken again in the field until the required accuracy is achieved. In another room are the co-ordinatograph machines, which take the results and plot out a skeleton plan on blank map squares of the area under survey.

Among the most fascinating sections at Ordnance headquarters is that which studies the results of aerial map surveying. Air photography is becoming an increasingly important factor in modern map-making, and one which has made remarkable technical advances in recent years, even since the end of the war. In many parts of the world the aeroplane has revolutionized large-scale surveying; in North America, Africa, Australia and elsewhere it has been the means of assessing the natural resources of undeveloped areas for the first time. Indeed, the possibilities of air mapping are enormous.

But in a country so well mapped as Great Britain the air camera cannot be used so extensively, though it has proved most valuable in the discovery of archæological sites. And since the war it has been used by the Ordnance Survey to speed-up preparatory work on the mapping of built-up areas. Air photograph mosaics of towns and (*Continued on page 244*)

The Tay Ferries

By M. H. Waller, B.Sc.

THE Tay Ferry between Dundee and Newport provides one of the most important services of this kind in Great Britain. Although in a way the ferry is as old as Dundee itself, very little attempt was made to organize a regular service until 1713, and the first step towards the present service was taken in 1817, when the ownership of the ferry passed to Trustees, and the first steamboat was tried in 1820.

The present owners, the Dundee Harbour Trustees, bought the ferry in 1873. Improvements to the landing stages were made immediately, new offices and waiting rooms were built, and by 1878 the service and its administration had been completely modernized.

In the process of modernization, a new steamer, the "*Dundee*," was built, and with the "*Fifeshire*," already in use, this maintained the service until 1910, by which time the rapidly increasing volume of road traffic made the building of a larger vessel imperative. The "*Dundee*" then became the third or relief boat, and was sold in 1919 to the Tay Steamboat Co. for pleasure trips on the Tay. This firm shortly afterwards sold the "*Dundee*" to the North British Railway for the Queensferry passage on the Firth of Forth, where she still plies. The veteran "*Fifeshire*" was finally sold to a firm of shipbreakers at Alloa. This vessel was built in 1858, and her 70 years of service with the Tay Ferries had given her the distinction of having the longest service of any ferry boat in Great Britain.

The new vessel added to the fleet was the "*Newport*," and a sister ship, the "*William High*," later renamed "*Sir William High*," appeared in 1924, to be followed in 1929 by the "*B. L. Nairn*." The two latter ships are still in service.

During the 1930s the amount of road traffic increased considerably. The greater length of vehicles also caused difficulty, restricting the number that could be accommodated on deck, and making very careful packing necessary. In 1939 therefore a new vessel of a revolutionary design was introduced. This was the "*Abercraig*," built by Leming and Ferguson Ltd., Paisley.

This vessel is 166 ft. long, with a breadth of 36 ft. 1 in., and on her 5,050 sq. ft. of deck space she can carry twice as many vehicles as the old vessels in the service. She is powered by two specially designed horizontally-opposed piston engines, manufactured by the Brush Electrical Engineering Co. Ltd., Loughborough. These drive two Voith-Schneider propellers, which steer as well as drive, no rudder at all being needed. This propeller consists of a horizontal disc to which six vertical blades are attached. In action the disc is rotated and the blades themselves rotate on their own axes. At one point in their movement the blades turn to give the maximum thrust against the water in the direction required, and steering is effected by altering the point at which this is done. Control is effected completely from the bridge and a vessel fitted with the drive is highly manœuvrable.

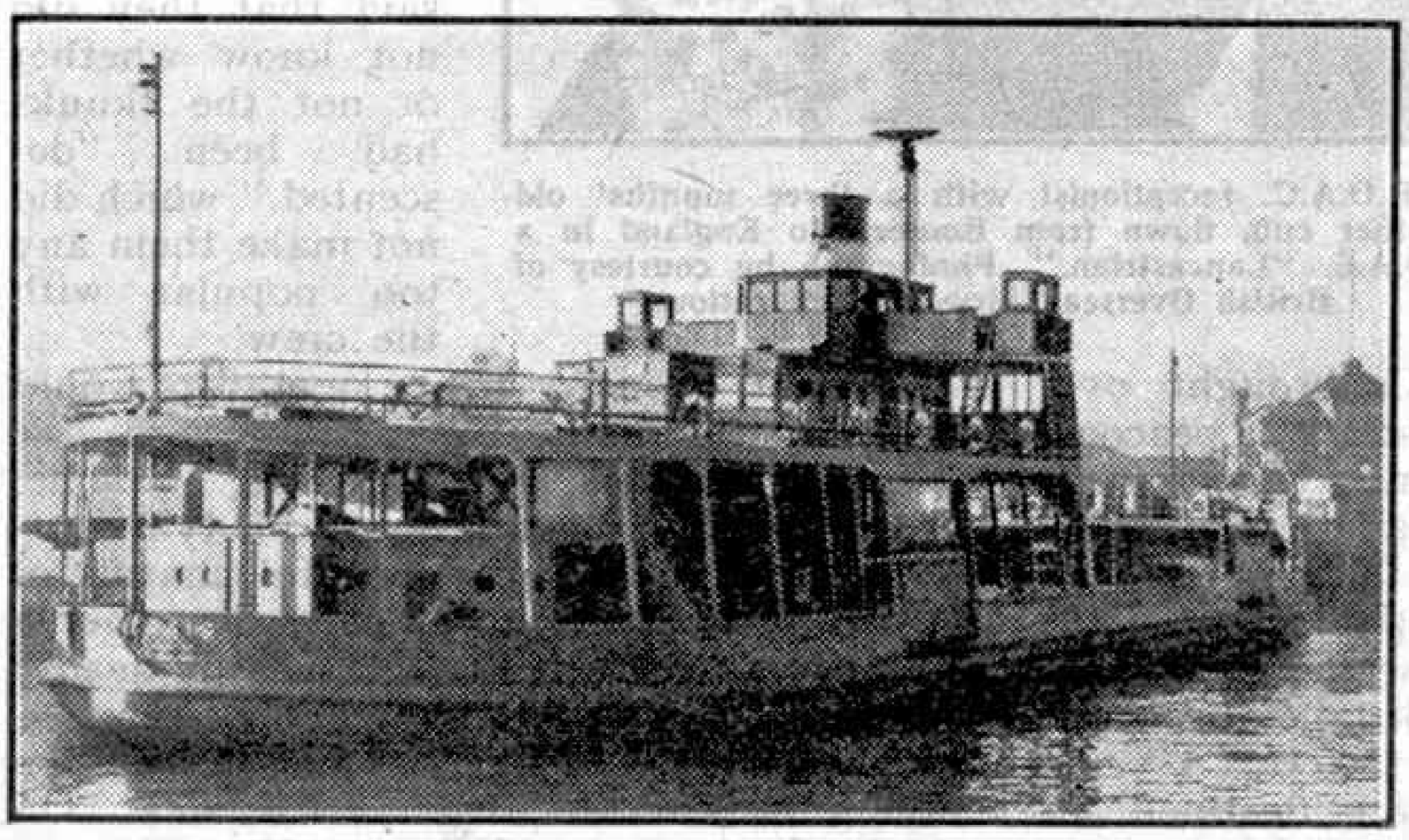
The "*Abercraig*" has been a great success. On her arrival the "*Newport*" became redundant, and was sold in 1941.

Though the Tay is not a particularly fog bound river, it was decided at the end of the war to fit the "*Abercraig*" experimentally with ocean-going radar. This had to be of a very special type. As the main trouble in the Tay to-day is the constant shifting of sandbanks, the system had to give a picture of the river and also point out the sandbanks.

The system finally installed allows the display to be rotated so that images at the top of the screen are those in the line of travel, whether going ahead or astern. The "*Abercraig*" was fitted first, by A. C. Cossor Ltd., and was in service with radar early in 1947. The result was highly successful, and all the Tay Ferry vessels are now fitted with the system, which allows them to be navigated in the densest fog.



Looking at the radar screen of the Tay Ferry vessel "Abercraig." The illustrations to this article are reproduced by courtesy of A. C. Cossor Ltd. and the Dundee Harbour Trust.



The radar scanner of the "Abercraig" is mounted on a mast on the bridge.

Noah Takes Wings

By John W. R. Taylor

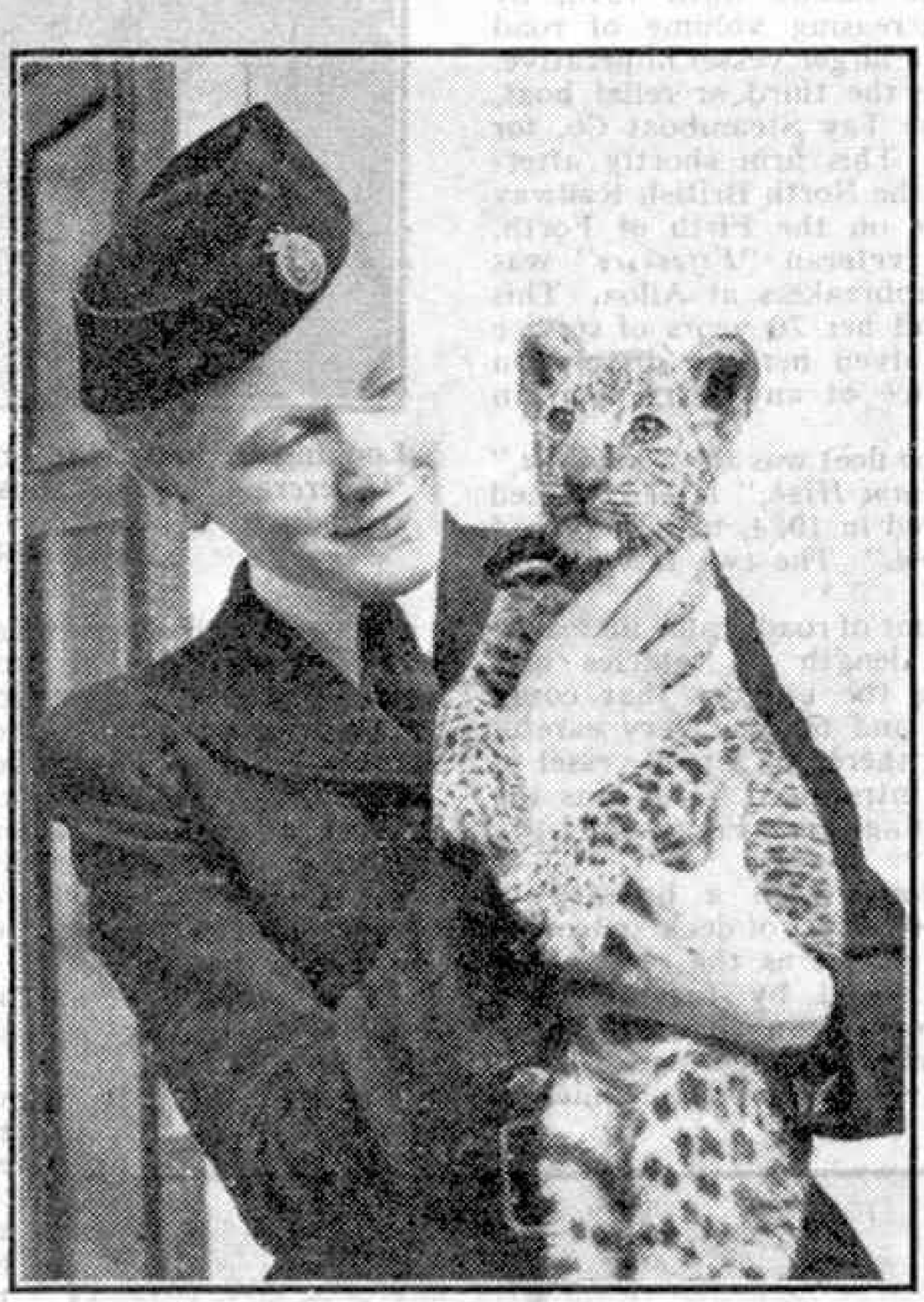
A FEW weeks ago a passenger aboard a B.O.A.C. air liner was taken ill while en route to London Airport from the Far East. As a result, on arrival he was rushed to the nearest home able to treat his particular illness, where he made such good progress that B.O.A.C. received a telephone call next day to say that their passenger was fully recovered. When they called for him, they found him sitting in an armchair with a blanket round his shoulders, enjoying a television programme.

Before you say "So what?," it may be as well to explain that the passenger was a large orang-outang ape from the jungle of Borneo. This, of course, was very special treatment for a Very Important Orang-outang, but great care is taken of every one of the many thousands of animal passengers who travel nowadays with B.O.A.C. and all the other airline operators.

Animals have, in fact, become such enthusiastic air travellers that never a week goes by without some representatives of the animal kingdom arriving in Britain by air. In the same week that the Very Important Orang-outang came to Town, B.O.A.C. brought over also a honey bear from Australia, a peacock, 300 monkeys from India and a consignment of live mink from Canada. The mink were for English fur farms, and the monkeys part of a consignment of 6,600 green Rhesus monkeys which are to be flown by B.O.A.C. to Britain this year, en route from India to the U.S.A.

Most of the animals are destined for zoos, and B.O.A.C. have carried kangaroos from Australia and bees from South Africa, bound for Moscow Zoo, while probably the most famous animal air traveller of all time was the black and white panda, Miss Lien Ho, a gift from the people of China to Britain and now a firm favourite with children at London Zoo.

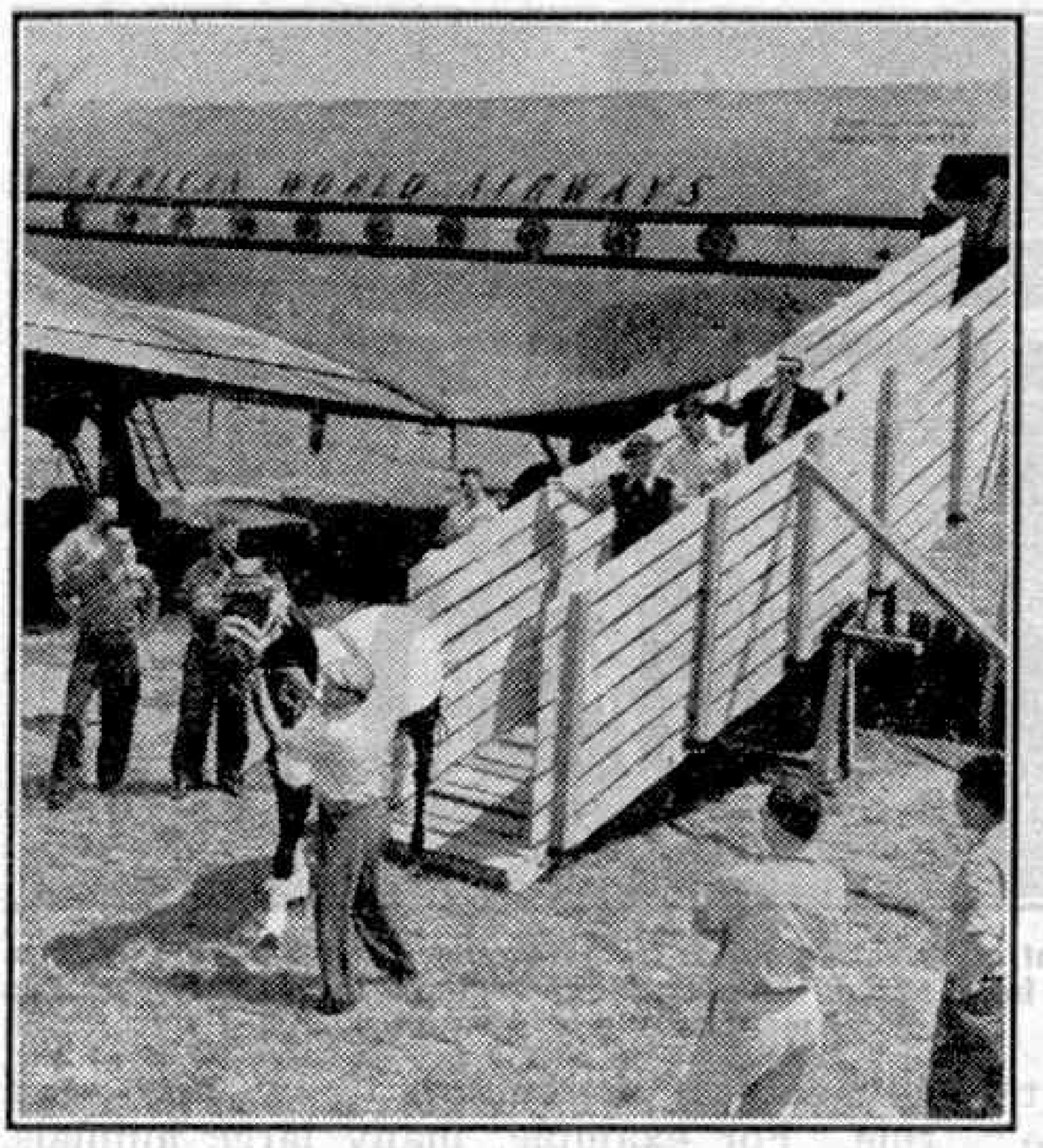
B.O.A.C. are by no means the only people who regularly fly animals in their air liners. Recently, Pan American World Airways carried across the Atlantic in a single "flying Noah's Ark," 13 crates of reptiles, birds and fur-bearing animals to help restock London's war-depleted Zoo. Included in this strange cargo were 13 horned lizards, five gila monsters, two boa constrictors, a variety of other snakes, frogs, turtles, chameleons, sparrows, bluejays, robins, 10 prairie dogs and two skunks. Zoo attendants, who accompanied the animals to La Guardia Airport, New York, for a last feeding before take-off, said that they did not know whether or not the skunks had been "descented," which did not make them any too popular with the crew!



A B.O.A.C. receptionist with a three months' old panther cub, flown from Bombay to England in a B.O.A.C. "Lancastrian." Photograph by courtesy of British Overseas Airways Corporation.

In fact, as many airline operators would be first to admit, they still regard live cargo as a rather mixed blessing. No-one, least of all the stewardesses and lady receptionists, could deny the wistful charms of a cuddly leopard cub or baby deer; but a shipment of spirited racehorses or deadly cobras is a very different proposition.

As a matter of fact, animals have been flying in aircraft longer than men. On 19th September 1783, at Versailles, a



An Argentine thoroughbred being landed at La Guardia Airport, New York, after a 6,850 miles' flight from Buenos Aires in a cargo "Clipper" of Pan American World Airways, by whose courtesy this photograph is reproduced.

sheep, a cock and a duck were carried nearly two miles in a basket suspended under a Montgolfier hot-air balloon, a month before an intrepid Frenchman named de Rozier went up in a similar balloon and so became the world's first airman.

But from a commercial standpoint the story of airborne animals started only some 20 years ago, when farmers began sending boxes of hatching eggs hundreds of miles by air. They soon realized that chicks already hatched weighed just half as much as the eggs, when crated and ready for shipment. Less poundage meant less cost to the farmers, so thousands of baby chicks began flying the airlines instead of eggs.

Breakage of eggs had sometimes been as high as 30 per cent., but casualties among chicks were negligible. What is more, baby chicks require no feeding of any kind during their first 72 hours, so airlines usually stipulate now that they must be delivered to the airport not later than 24 hours after they are hatched, guaranteeing delivery to their overseas destinations before the chicks are 72 hours old, thus saving the weight of food and water trays.

A poultry expert, an aircraft engineer and a traffic man co-operated to design the lightweight paper cartons—miniature "apartment houses"—in which chicks travel aboard P.A.A. aircraft. In this way as many as 200,000 chicks have been carried aboard a single cargo *"Clipper."*

Of course all this does not mean that you will share your seat with a box of chirping chicks or a cow next time you fly, for in most cases animals enjoy their own specially-designed accommodations when they take to the air. Chicks are in fact about the only livestock ever carried in passenger aircraft, and they travel in the cargo compartment. Another exception is a "seeing-eye" dog, which is allowed to accompany its blind owner.

Dogs are perhaps the next most frequent animal passengers to chicks, and unfortunately they present many more problems. Most aircrew members assigned to the handling of dogs and other larger livestock undergo special training under a "vet," when they learn, for example, that dogs and horses are apt to be nervous during take-off and landing, since changes of altitude affect them just as they affect humans.

Highly-strung racehorses and many kinds of dogs are inclined to remain nervous while in flight and are generally

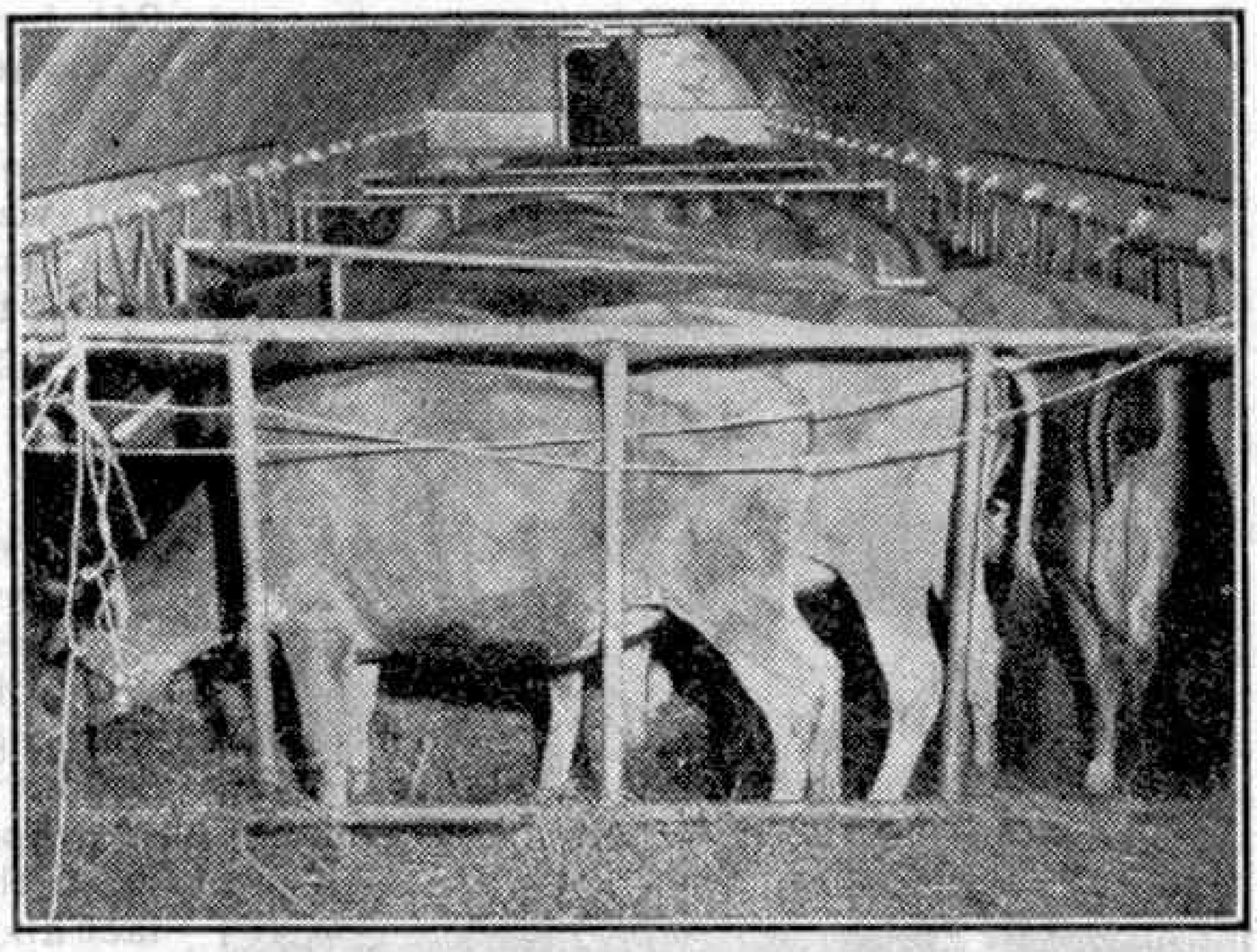


Receptionists holding two of five whippets which were flown from Southampton to Karachi in a B.O.A.C. flying boat. Photograph by courtesy of British Overseas Airways Corporation.

not fed aloft; but small dogs seem to take flying very calmly and enjoy reguiar meals of dog biscuits and milk. Incidentally, air-sickness among dogs is virtually unknown. They normally travel in crates big enough for them to stand up and turn round in, and must be provided with a collar, leash and muzzle, so that they can be exercised at intervals if on a long journey.

One member of the cargo staff at La Guardia now looks twice before he exercises a dog. Apparently one day he chose to take for an airing a husky animal of the sheep-dog variety, sent home by an American soldier serving in Europe. En route the animal was offered a drink of water, which it proceeded to swallow in great thirsty sips. Another cargo man, who had been raised on a farm, happened to remark that it was the first dog he had ever seen inhaling water; in fact, he had always been told that dogs and other animals lap water with their tongues, and that wolves are the only sippers in the animal kingdom. Back into his crate went Brother Wolf in double quick time—and the cargo staff do not know yet what the soldier *thought* he was sending home to amuse his kiddies!

The bigger the animal, the greater the



A shipment of 32 calves, flown from Toronto, Canada, to Montevideo, Uruguay, in a cargo "Clipper." Photograph by courtesy of Pan American World Airways.

advantages of sending it by air, as a rule. For example, many large animals, especially horses and mules, are very prone to sea-sickness, which is sometimes fatal and always involves weeks of convalescence after landing. On the other hand, apart from a certain nervousness, they do not seem to be adversely affected by air travel. In fact racehorses have been flown to Britain from France, and even across the Atlantic, and have been ready to compete a few hours after arrival.

Normally such large animals travel in stalls provided by their owners, and they must be accompanied by an attendant familiar with their handling and able to inject calming hypodermics in an emergency. The attendant must also make sure that the animal does not drink too much water at a transit stop, as cases have been known where a horse has drunk so much water that his increased weight has overloaded the aircraft.

Loading is often a problem, and animals sometimes have to be put aboard aircraft such as a "Skymaster" with the aid of an elevator truck, which tends to increase their nervousness. That is where aircraft like the Bristol "Freighter" and Miles "Aerovan," with nose or tail-loading doors and a low floor, score every time. But one would-be air traveller in Ceylon recently proved too much even for the capacious

(Continued on page 244)

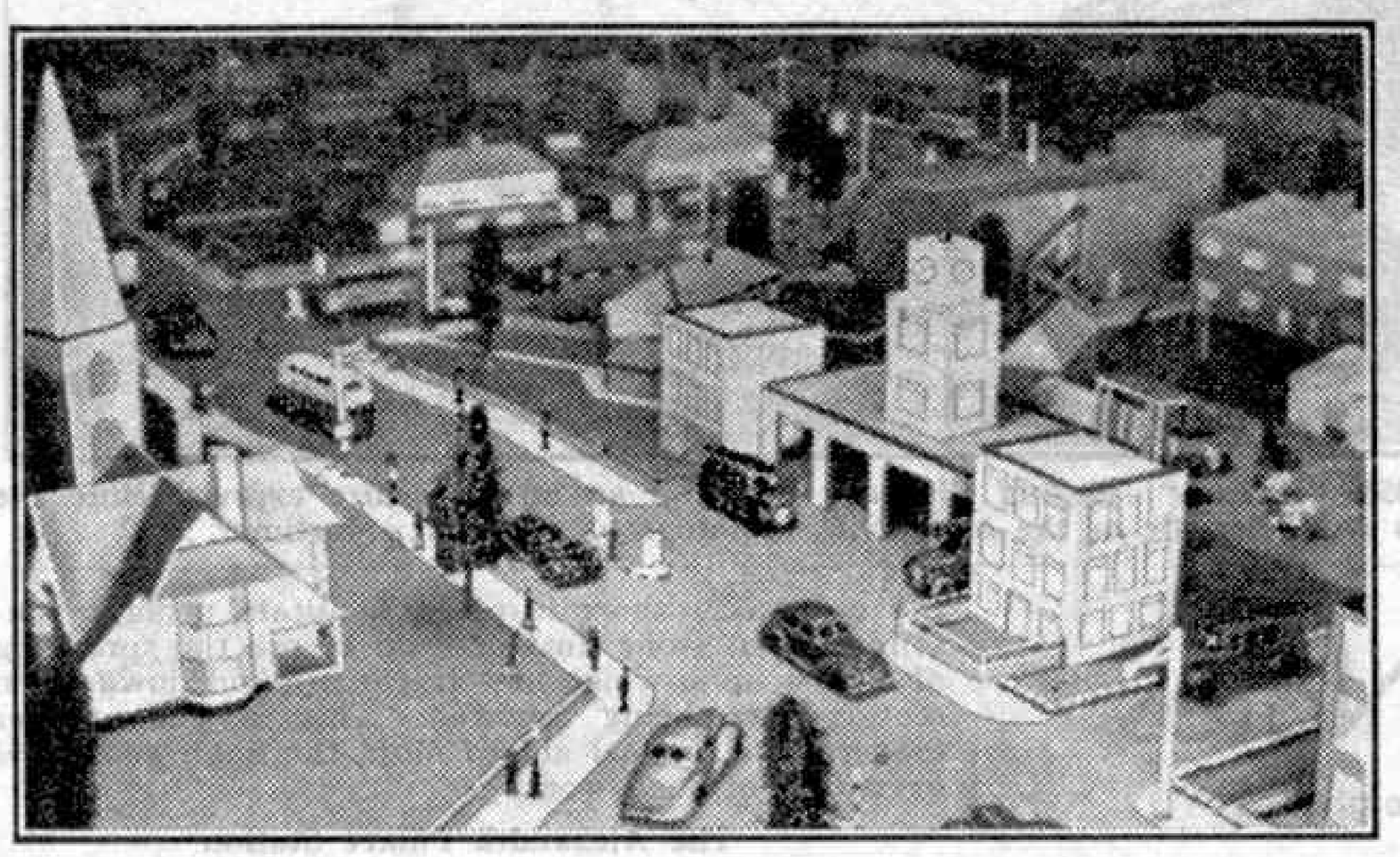


A baby chimpanzee on arrival by air from West Africa. Photograph by courtesy of British Overseas Airways Corporation.

A Road and Rail Layout

Dinky Toys Town with Hornby-Dublo Railway

THE practice of building up road layouts on which Dinky Toys can be operated is growing, and many splendidly realistic schemes have been planned by readers of the "*M.M.*" One of the most interesting of these has been constructed by J. M. Young, Putney. Its outstanding feature is that it is at once a Hornby Dublo Railway and a Dinky Toys town with an extensive road system. In addition there are a country section and a small dock system, so that the model gives ample opportunities for interesting play of a very varied character.



J. M. Young, Putney, operates a large combined Hornby-Dublo and Dinky Toys layout. This picture shows part of the town section of his layout, which includes also a country area and a dock scene.

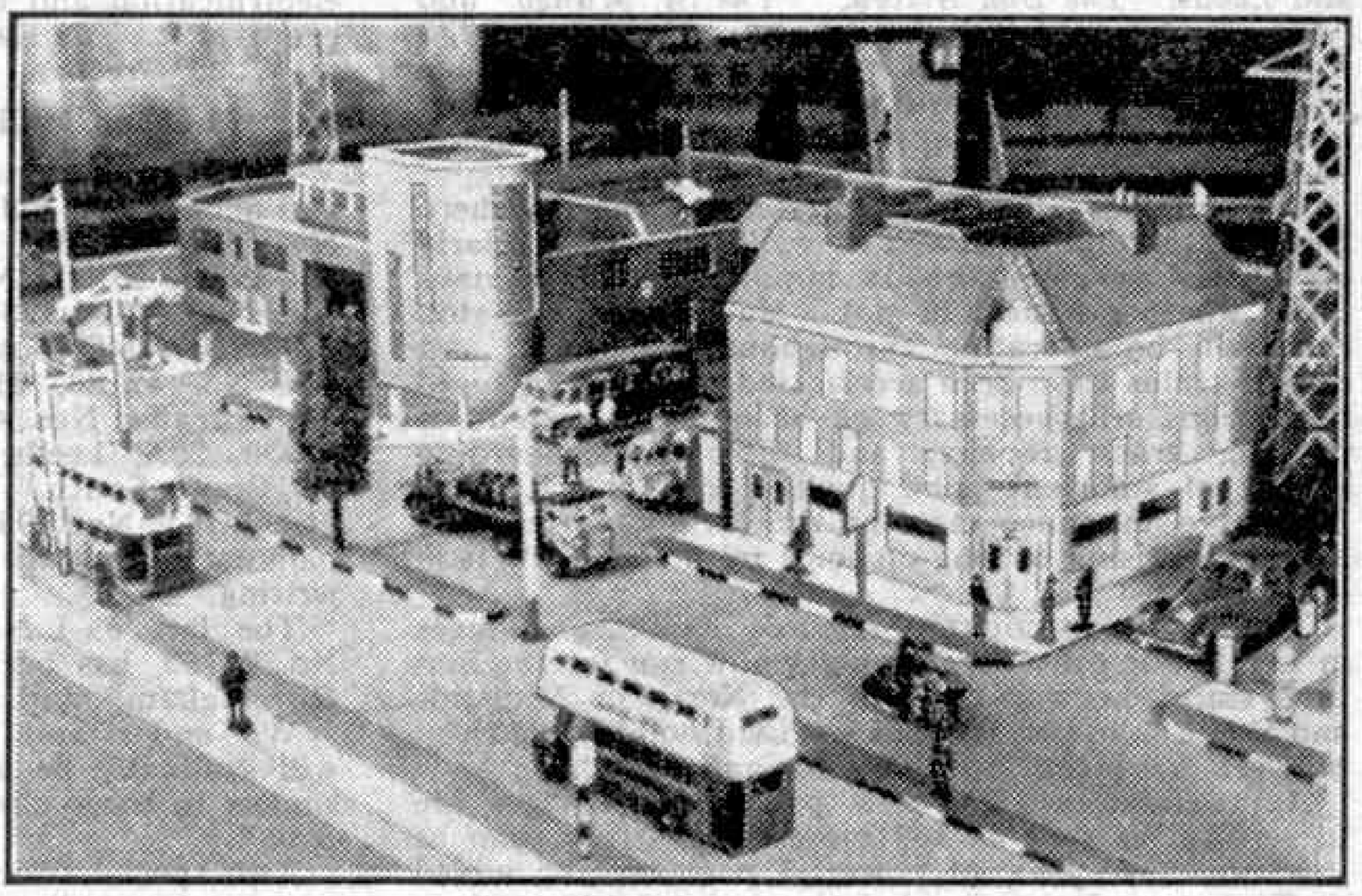
Some idea of the nature of Young's layout is given by the two photographs reproduced on this page. It is built up on a base of plaster board, supported at a height of almost 3 ft. on a strong wooden frame. The board measures 15 ft. in length and 9 ft. in width, and so is roomy enough for the many details required in a combined model of this kind.

Of the three sections of the layout the town area is the largest, and it is well provided with a well arranged series of buildings of the kind that one can usually see in any town. Houses figure largely. These are chiefly semi-detached houses of the standard type, but there are also "pre-fabs" to give a topical touch. There is a church, with which a vicarage is associated, and the public buildings include a post office and bus, police and fire stations, with a picture house. Representations of a bowling green and tennis courts, complete with pavilion, add a very pleasant touch to the layout, and a windmill is a further attraction. The docks are on the bank of a river that flows across one corner of the layout, and there a large warehouse has been erected.

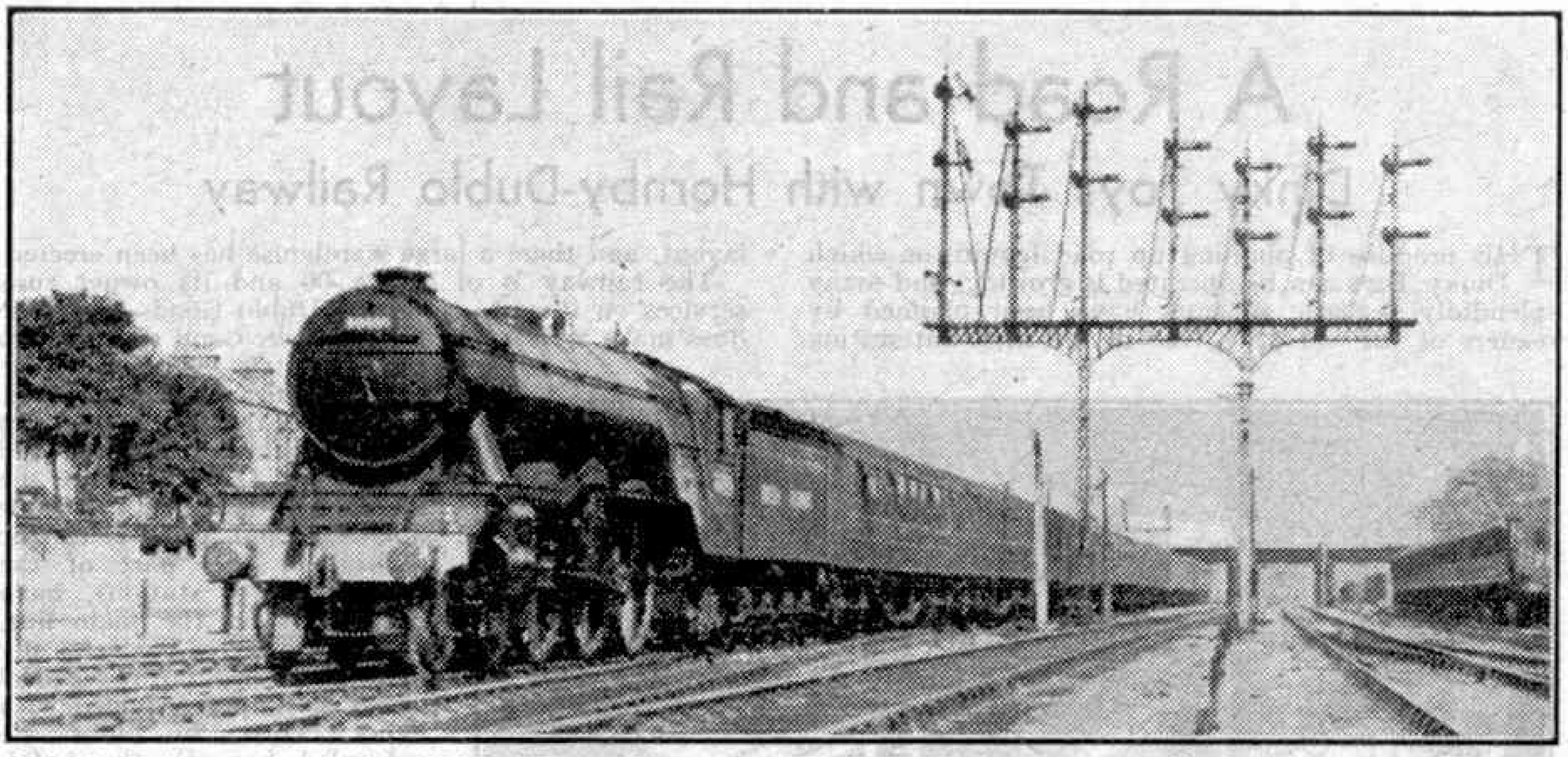
The railway is of Gauge 00 and its owner runs services on it with a Hornby-Dublo Goods Set. The lines make a circuit of the town area and run through the country section, while there is a branch to the docks. Altogether there are 65 ft. of track, and the distance travelled in making the circuit of the town itself is 33 ft. Suitable buildings add greatly to the realism of this part of the layout. Two stations have been built on the main line, and each of these is electrically lighted. The entire model indeed is amply provided with lights. Over 20 bulbs are concealed beneath the buildings, and the model is a great sight when it is lit up, while night operations on the railway and with Dinky Toys in the town area are great fun.

The many buildings, most of which of course are in the town area, were constructed by Young himself of balsa wood, and when completed were covered with brick paper and provided with other accessories in order to achieve realistic detail. On the roads there are the usual traffic signs, and the inhabitants of this interesting town, who number 275, can readily find telephone kiosks when they wish to make calls. Police boxes also are provided, and there are 80 vehicles, including motor cars, lorries, etc., running on the streets.

An extensive layout of this kind, suitable for both rail and road operations, naturally takes some time to complete, and readers will not be surprised to learn that Young has spent the spare time of two years in the construction of his model. The task of building it has given him the greatest pleasure.



Another view of J. M. Young's layout. Most of the buildings were constructed of balsa wood.



British Railways 4-6-2 No. 60059 "Tracery" passing Finsbury Park on an up Yorkshire express. Note the "somersault" signals characteristic of the old G.N.R. Photograph by G. R. Mortimer.

Railway Notes

By R. A. H. Weight

National News

British summer timetables began to operate this year on 23rd May, earlier than in 1948, and will continue until 25th September with increased services during the holiday peak period, when over four million passenger train miles will be run weekly. There will be considerably more trains, especially on Saturdays; on more than 500 of them every weekday restaurant cars will be provided, and seats may be reserved in advance.

New or revived named trains include: "*The Pines Express*," between Manchester and Bournemouth; "*The Devonian*"—Bradford, Torquay and Kingswear; "*The Capitals Limited*"—a fast portion of the "*Flying Scotsman*" King's Cross—Edinburgh service; "*The White Rose*" and "*The West Riding*"—King's Cross and Leeds; "*The Bon Accord*," "*The St. Mungo*" and "*The Granite City*"—all Glasgow—Aberdeen; "*The Fife Coast Express*" and "*The Irishman*"—between Glasgow and St. Andrews, and Glasgow and Stranraer respectively; and "*The Fenman*"—Liverpool Street and Hunstanton.

The summer Pullman expresses on the Southern Region are running again, as well as those regularly established services already familiar on the various lines, whether named or not. Many long non-stop runs will be operating throughout the season and certain trains have been accelerated. In view of speed restrictions still necessary on account of current or pending track repairs, and difficulties regarding supply of sufficient good quality coal, the Railway Executive announce that the time is not yet ripe for a general raising of long-distance train speeds to 1939 levels.

Through cross-country services avoiding changes in London or other large centres now run for the first time since the war between the North or Midlands and South Coast or West of England holiday districts; between York and South Wales and elsewhere.

Approximately 1,350 new passenger carriages are in service, as well as 167 more locomotives than at this time last year, of powerful passenger or mixed traffic types. It is intended to repaint 1,166 stations during 1949.

An order has been placed with a British firm for six petrol-driven "frog-rammers." These move over the ground in short leaps to facilitate prompt consolidation of stone dust or sand before the spreading of ballast upon which new tracks are laid down when sections are being renewed. This is yet another modern, mechanical aid to more thorough and rapid execution of such work.

The Alexandra Palace Station

We are able to reproduce an interesting photograph this month depicting the west end of the Alexandra Palace (whence television programmes are transmitted, though from the east end). The Palace is a prominent landmark on the hills of north London. The photograph shows a suburban train in the branch terminus station ready to depart behind a former G.N.R. "N1" 0-6-2T, running bunker first. This engine, now numbered 69467, was one of the two of the type taken over for hauling armoured trains on Scottish coast lines during the 1914-18 war. It was off the G.N.R. strength for some years and returned to the L.N.E.R. in 1923. Lately trains between Finsbury Park and Alexandra Palace have been worked by G.C. 2-4-2 or G.N. 4-4-2 tanks, on the pull-and-push basis. The branch is scheduled for electrification and then London Transport trains will run over it. The East Coast main line is not far away, at Wood Green.

London Midland, and Scottish, Regions

New engines recently placed in traffic were numbered and allocated as follows: Class "5" 4-6-0 mixed traffic: Nos. 44718-9, 8A, Edge Hill, Liverpool; No. 44720, 5A, Crewe North; Nos. 44735-6, 26A, Newton Heath; and No. 44737, 23C, Southport. Class "4" 2-6-4T; No. 42107, 24C, Lostock Hall; No. 42108, 23D, Wigan; and No. 42186, 21B, Bournville. Class "4" 2-6-0 mixed traffic: Nos. 43028-9, 5B, Crewe South; and No. 43030, 20A, Leeds; diesel electric 0-6-0 No. 12051, 5B, Crewe South. The former L.N.E.R. 2-8-0:0-8-2 "Garratt," No. 69999, is on loan to Bromsgrove for banking duties up the Lickey incline at the time of writing.

The last ex-L.N.W.R. "Prince of Wales" 4-6-0, No. 25752, has been noted working from Stafford to Birmingham, and also to Manchester.

We understand that all converted "6P" 4-6-0s will gradually be fitted with smoke deflector plates, similar to those already on No. 46115, "*Scots Guardsman*."

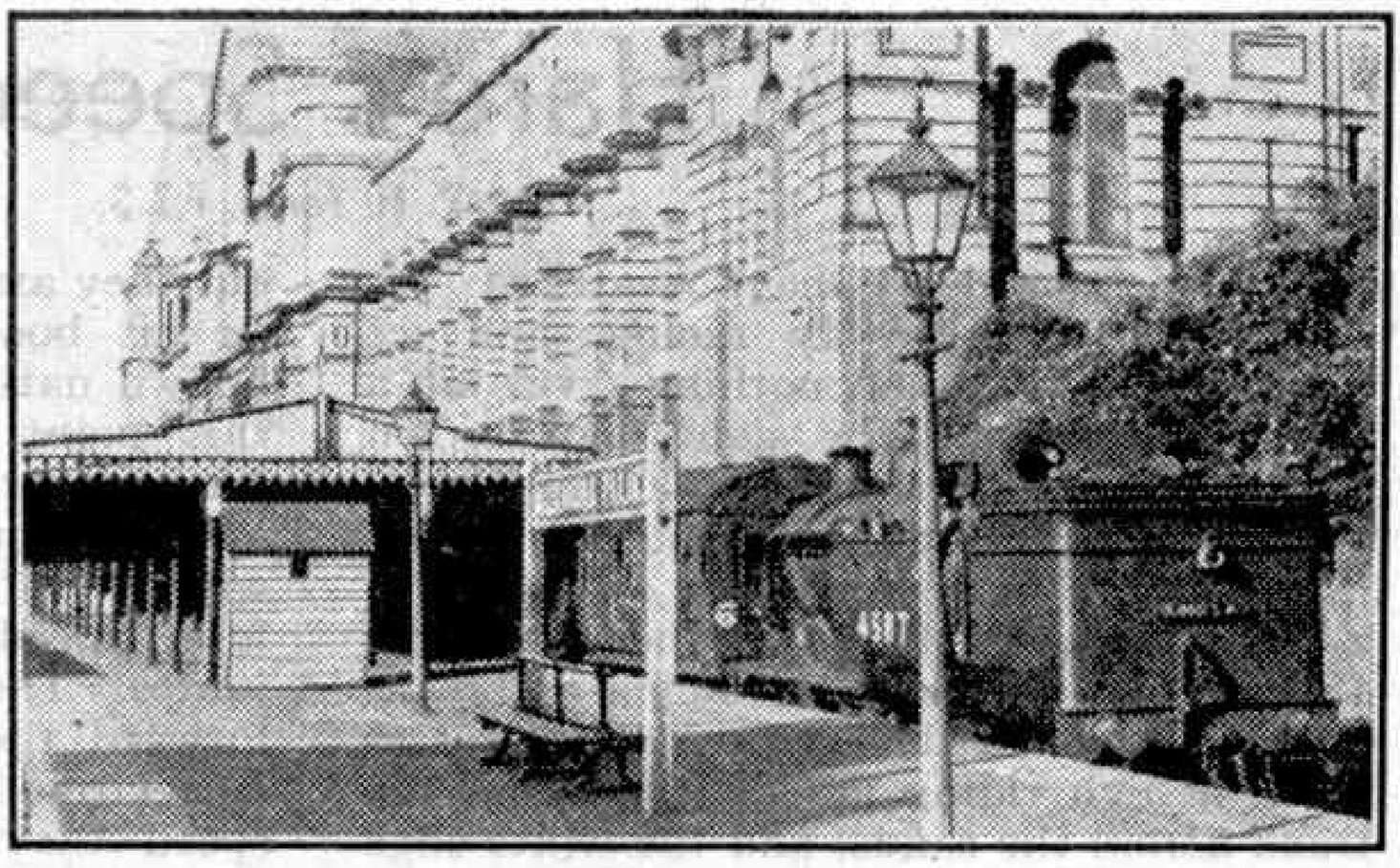
Two special trains, largely composed of restaurant cars, were run direct from Euston to Castle Bromwich station, Birmingham, while the British Industries Fair was in progress.

Britain's first all-steel, welded corridor passenger

coaches are now in production on a considerable scale at Derby Works. In appearance and internal finish they are almost exactly the same as those lately built with timber body framing, metal panels and steel frames.

"Royal Scot" as well as rebuilt "Patriot" 4-6-0s have been reported working over the Central Division between Leeds and Liverpool. W.D. "8F" locomotives are now more prominent in the East Lancashire—West Riding area, as the long-lived ex-L. and Y. 2-4-2T engines still are.

In Scotland L.N.E.R. "J38" 0-6-0s have been running trials over the Highland system. We have received favourable comment upon the high standard of cleanliness maintained on many engines in the Scottish Region, including express types shedded at Haymarket and Eastfield and renumbered green "B12" 4-6-0s on the Great North of Scotland section, in addition to various former L.M.S. engines.



A King's Cross suburban train at Alexandra Palace. The engine is one of the familiar condensing "N1" 0-6-2 tanks. Photograph by H. C. Casserley.

One of the latest new "B1" 4-6-0s built at Gorton, No. 61344, hauled the southbound "*Queen of Scots*" from Glasgow to Edinburgh on 15th April last; "A3" No. 60041, "*Salmon Trout*" took over at Edinburgh, Waverley.

News from the Western Region

Continuing construction of modified "Halls" at Swindon, Nos. 7901-2 have been placed in service, named respectively "*Dodington Hall*" and "*Eaton Mascot Hall.*" New 0-6-0Ts Nos. 9674-7 also have been completed for service in South Wales.

A new type of heavy duty 0-6-0T shunting engine to be known as the 15xx class is in hand, having outside cylinders and Walschaerts valve gear. The 16xx class will be a lighter inside-cylinder 0-6-0T design, to replace withdrawn members of the "850" and "2021" classes. Designs have also been completed for four tenders equipped with a coal weighing apparatus in order that fuel consumption tests may be conducted in ordinary service. It is understood that 10 more "Castles" will be built. Construction and improvement of rolling stock are also proceeding.

American Locomotive Developments

Locomotives in the United States are for the most part conceived on a gigantic scale. They can be much heavier and longer than is customary here, as clearance gauges are on a more generous basis. Loads are often enormous, necessitating types and wheel arrangements unknown in Britain.

Some huge turbine-driven locomotives in various forms are being tried by the Pennsylvania and Chesapeake and Ohio Railroads. General service express engines frequently possess eight-coupled driving wheels. One example is the 4-8-4 "Niagara" type on the New York Central, which is provided with a 14-wheeled tender! Coal and water consumptions are very high, so carrying capacities must be correspondingly vast to deal with fast trains weighing perhaps over 1,000 tons.

Two very large outside cylinders are normally favoured, with Baker or Walschaerts valve gear. Boiler working pressures are often as high as 275 lb. per sq. in. and are tending to rise to as much as 310, which must be a considerable tax on materials and maintenance. Articulated heavy service freight engines are seen, such as the 2-8-8-2, having two sets of outside cylinders. More unconventional still are the 2-6-6-6 "Mallet" coal engines of the C. and O. among other giants, which have tackled 160 loaded cars of coal. They have a wheelbase, including 14-wheeled tender, of 113 ft.

Diesel-electric as well as electric traction is being developed further, but the American steam locomotive is thought still to present considerable spheres of usefulness. Roller bearings, together with other valve gears on trial, thermic syphons, mechanical stokers, and ingenious mechanical features, are playing their part to that end.



Ready to go! A converted "Royal Scot," L.M.S. No. 6147 "The Northamptonshire Regiment," at Lime Street, Liverpool, on a London train. Photograph by R. Whitfield.

Southern Tidings

The lined black finish is now much in evidence on many types of tender and tank engines. Many enthusiasts deplore the fact that "Schools" are now painted in this manner, and would like to see them ranking with "King Arthurs" as selected passenger engines, in green.

The last "F1" Stirling 4-4-0, No. 1231, although withdrawn, was still intact at Ashford at the time of writing. More "D3" 0-4-4-Ts are being broken up, and the dumps at Eastleigh are also being cleared.

Hare's Speed

By R. H. Ferry, F.Z.S.

WITH crowds I have watched the Derby, speedway racing, and ice hockey; but for speed nothing gives me a greater thrill than the sight of a brown hare legging it over a dew-drenched meadow in the early morning, with the rosy round face of the Sun peering over a hedge like a country yokel as the only other spectator. I like too to watch hares racing at break-neck speed from the whippy dune grasses when a high riding moon flood-lights the track across the sands, and the white edge of the ebbing tide is the finishing tape.

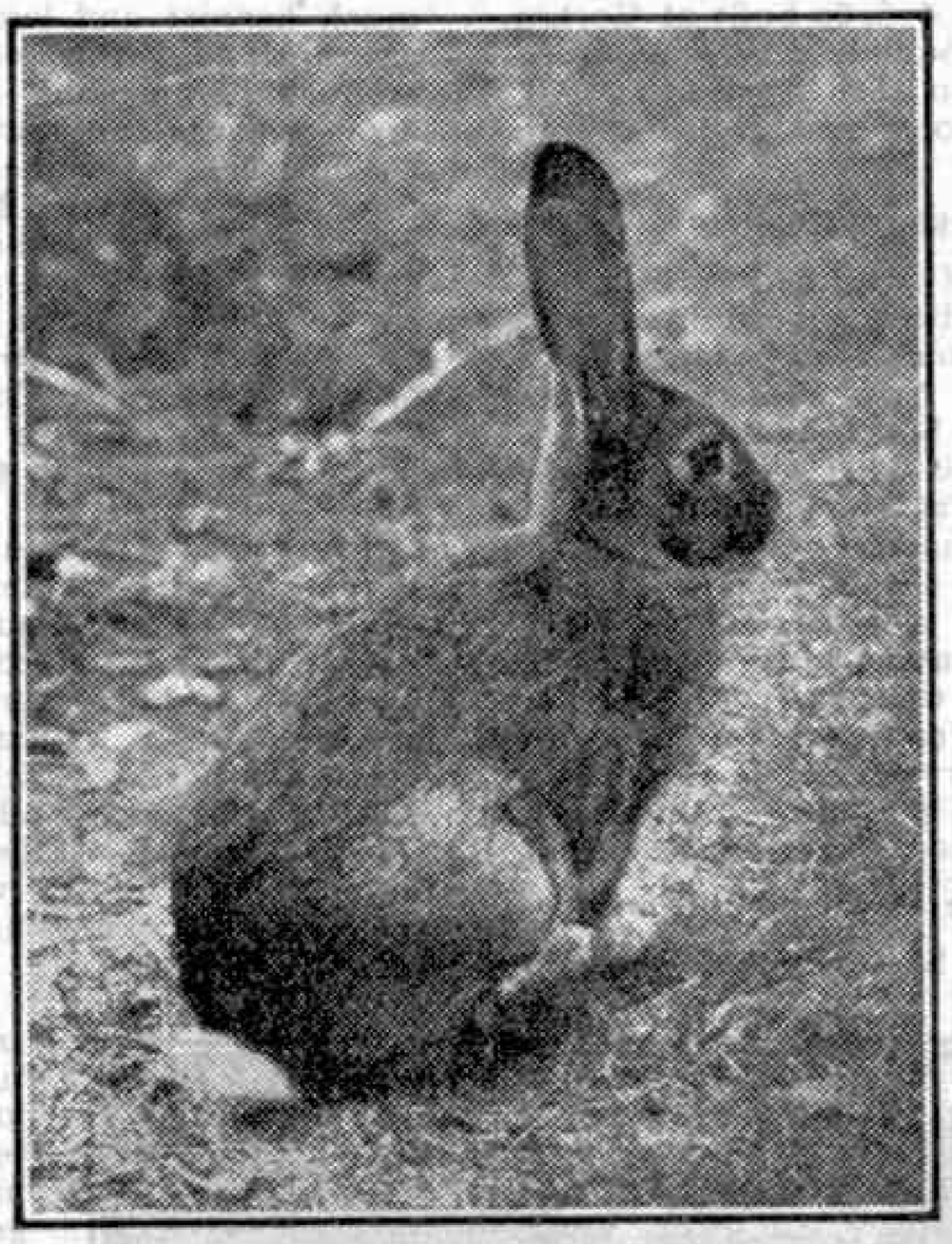
There is something stirring about the speed of these creatures which is hard to set down on paper, and men have always been fascinated by it. About 350 years before Christ the Greek Xenophon wrote that the mountain hares in his country were more swift than those bred on the plains and that March hares were the slowest of any; it is true even now that March hares go hay-wire in the Spring, and think more of fighting and courting than racing.

Boadicea, the famous British Queen, realized that the sight of a hare going all out would have a good psychological effect on her slow-footed soldiers when she held one concealed in her bosom and released it immediately before her last battle with the Romans. The Britons followed swiftly and light-footed on the firm track picked by the hare and won an easy victory.

It was Mark Twain who said of the Jack Rabbit, the hare's American cousin, "Long after he is out of sight you can hear him whiz." But our brown hare is by far the fastest small animal in the world. And of the bigger animals only cheetahs and black buck can beat it.

The true fact of the matter is that hares cannot walk or saunter along; their slowest speed is fast, and when going all out they are able to accelerate to 45 m.p.h. In his book *'It's My Delight'* the well-known naturalist Vesey FitzGerald makes this point quite clear when he writes "At all speeds, even the slowest, the method of progression is a series of jumps with the hind legs and skips with the fore. Speed is attained by lengthening the jumps. The quicker the pace the farther forward the foot prints of the hind legs in relation to those of the fore. At full speed they are well in front of them." This gait is very similar to the leg action of greyhounds.

There is a fine line between genius and madness in the hare's mental make-up, but physically everything goes to make "Puss" a top line athlete. It prefers to sit tight in a form and only sprints under compulsion; its heart is so adjusted that the animal is able to get into top speed in the fraction of a second. And the strong hind legs, nearly twice as long as the fore, enable it to run fastest up hill and make sideway jinks to avoid pursuing hounds.

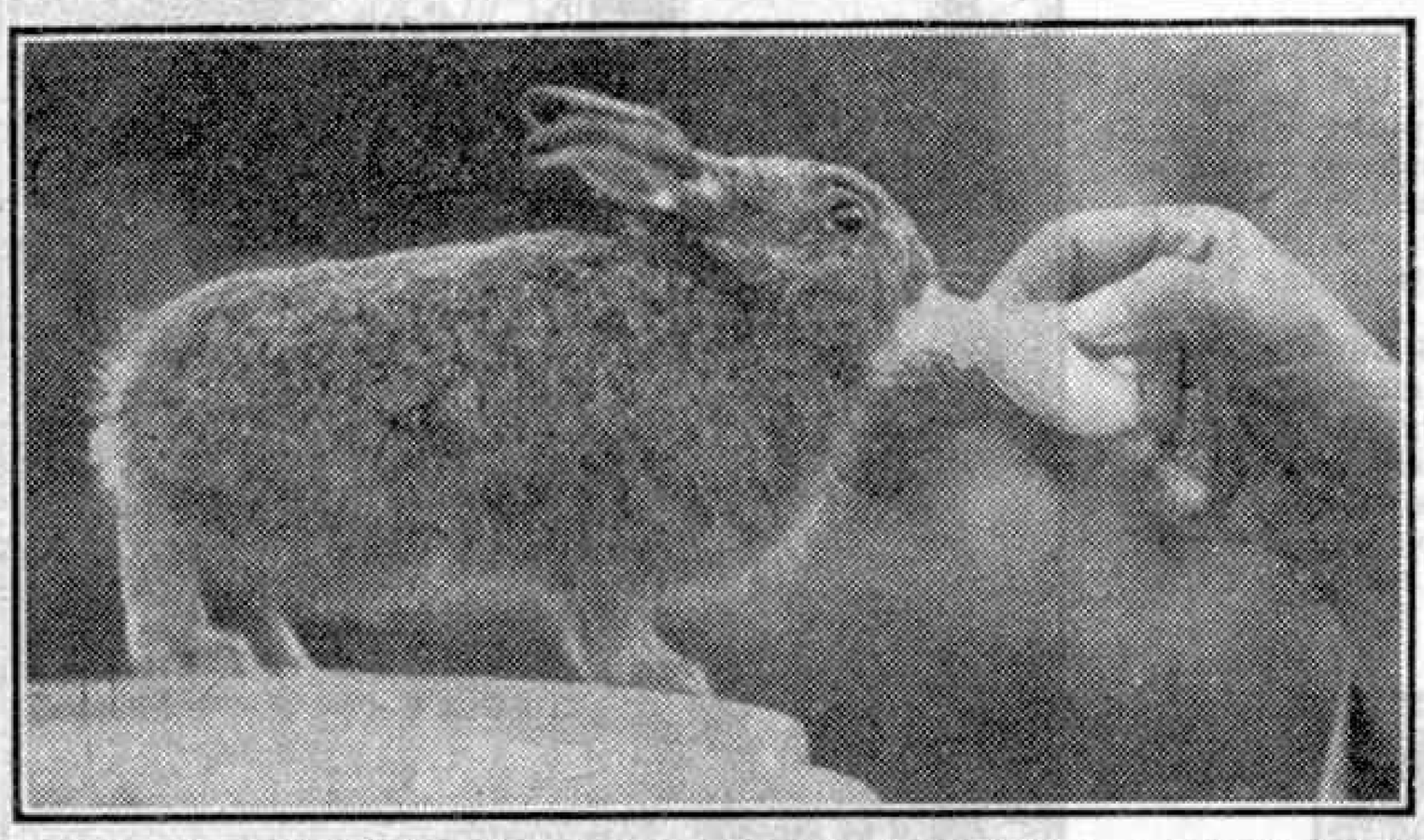


The hare, listening but always ready to speed away in a flash. Photograph by Oliver G. Pike.

Very few animals can change gear like hares to suit the ground over which they are travelling, ploughed furrows or springy turf. Frank Lane records the case of a hare changing completely from forward into reverse gear! A hare was pacing a man driving along a road at 30 m.p.h., but slowly it began to lose ground. "Suddenly, without any apparent slacking of pace, the hare turned a somersault and legged it up the road in the opposite direction."

In lieu of spikes in shoes the hare has hairy padded feet, which prevent it slipping on short dry grass and act as snow shoes in severe winter weather. They also prevent sinking in marshy ground. When it is hurtling its 7 lb. weight along,

one might well expect the danger of speed wobble, as there is no tail to speak of to act as a rudder. Believe it or not, the hare steers with its ears. When hounds are close upon it, the hare lowers one of its black tipped ears, on the side from



Feeding the baby. The photographs reproduced on this page are by W. S. Berridge, F.Z.S.

which danger is apprehended, and in this way the body banks over, making the dog lose distance by several yards. A greyhound's speed is only 40 m.p.h., so matched singly against a hare a dog has small chance of killing.

Except in the Spring hares are not so mad as they are made out to be. Like all good cross-country runners, they know how to conserve their strength, and once in a good lead they do not waste energy unnecessarily. In fact, their running technique is a masterpiece of judgment. A mother hare with young leverets rarely makes off, but dodges about or runs on a familiar circular track. Only the bold old bucks go away like a fox in a straight line of country. When a hare is going all out its body is stretched low to the ground, and the scent is strong and less likely to be blown away. If hard pressed, hares often slow up deliberately in a suicidal fashion, but this allows them to run higher on the legs and the scent automatically becomes patchy. The hare then sprints on, leaving the hounds baffled and blown. Setting its own pace in this way an Essex hare once led hounds "up the garden path," covering 18 miles in three quarters of an hour.

There is an old country belief that hares speed so fast that they run themselves blind, but the real explanation of this superstition is that the big bulbous eyes of the hare are so placed in the head that it can see far better to either side than to front or rear. And the only fault in technique of this champion is the occasional habit of turning to look back. This results in fatal crashes into wire and posts.

With great speed and powerful legs, hares are expert long and high jumpers. Long jumps of 20 ft. are common and one jump of 26 ft. has been officially recognized. As a rule a hare prefers to make an exit from a field under a gate, but if the bottom bar is painted white the beast will hop over the top, taking it in its stride, like a horse over a hurdle. A hare put up by some steeplechasers on the Aintree course was once seen to run ahead and show the way over a National jump, not a bad performance on a small daily ration of grass and tree bark!

There is a rule in Nature's animal Olympiad that the more timid and defenceless an animal the faster it must be able to run. In this respect the hare with all its queer ways runs true to form, but perhaps the strangest thing of all about it is that no effort makes it puff or blow.



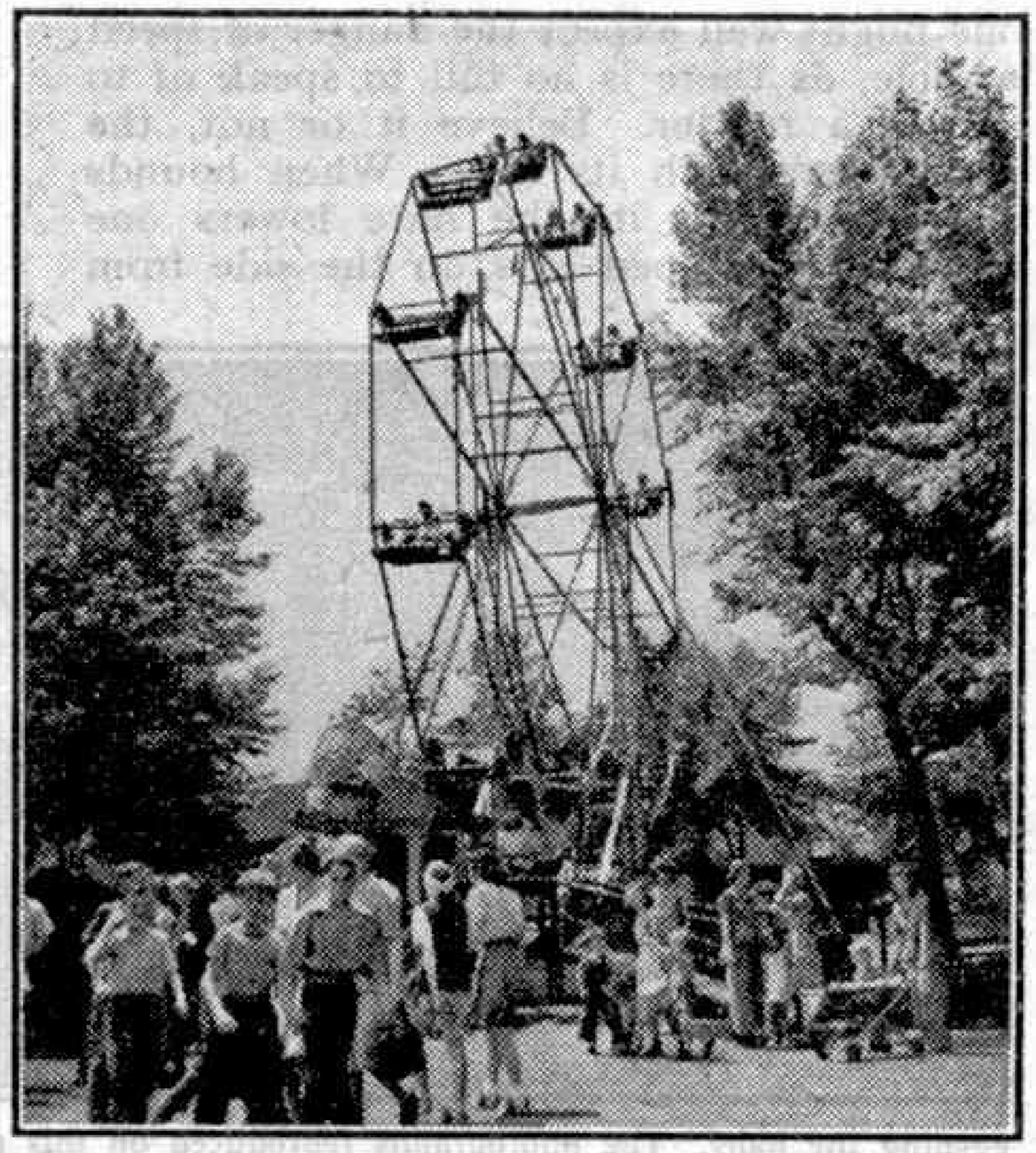
Those long ears have other uses besides listening. A running hare uses them to help him to bank over to one side.

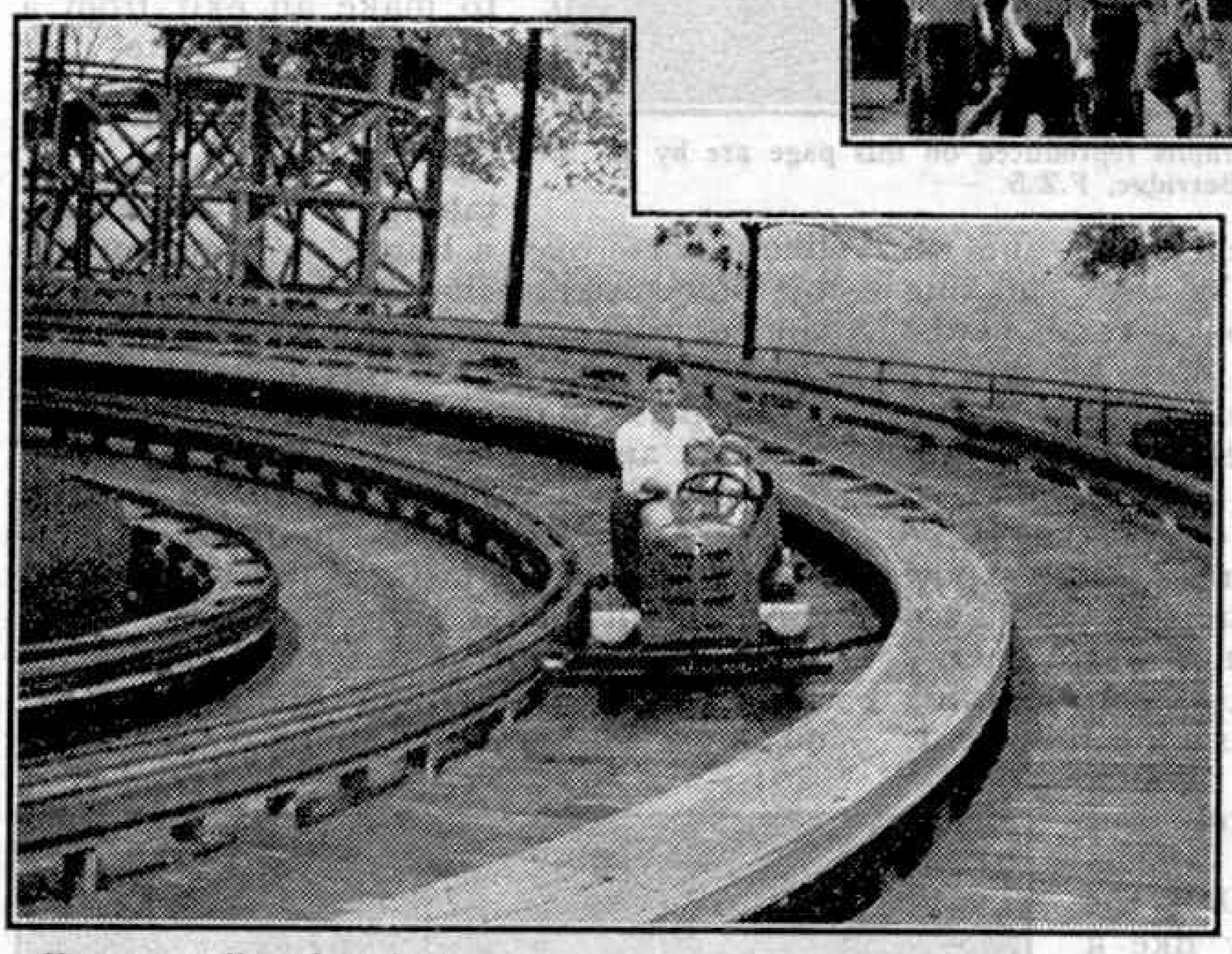
Electric Motors for Fun

By M. Lorant

AT Kennywood Park, Pittsburgh, U.S.A., one of the world's largest amusement parks, some 125 motors are needed to make the rides go round or up and down. They range from the large 150 h.p. unit that powers the Racer roller coaster to the ½ h.p. midgets that operate gadgets in the park's "fun" centres.

Practically everything in the park but the ponies runs by motors, and most of the motors bear the trade mark of the nearby Westinghouse plant. In addition to the motors, transformers and related apparatus, the park puts thousands of lamp bulbs into service. On the giant merry-go-round, claimed to be the largest in the world, there are 1,800 lamps, most of them 10 and 25 watts.





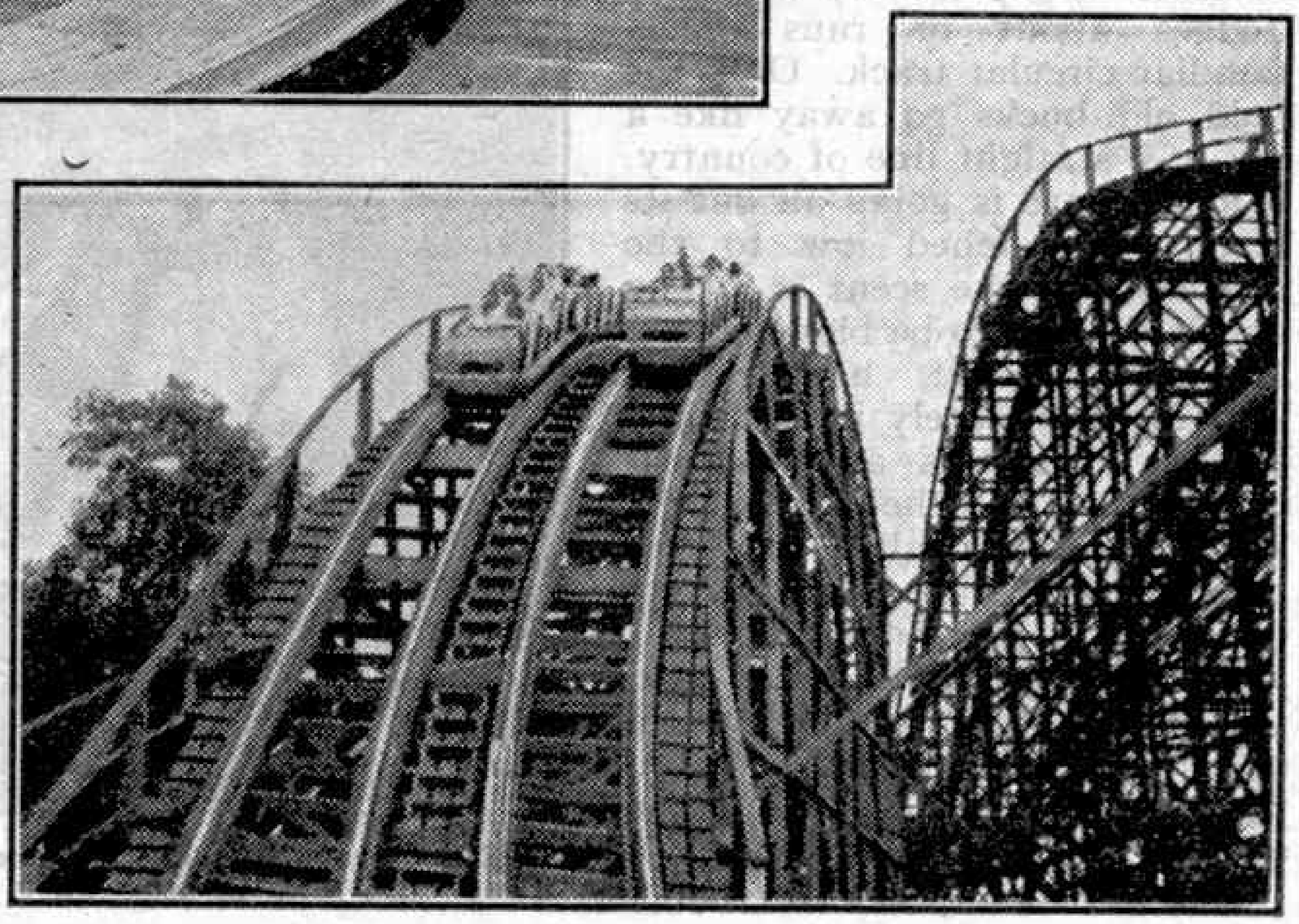
Without its electric motors, transformers, fuses and all that goes with them, an amusement park would be as useless as a lorry without wheels.

Passengers get to the top of the Ferris Wheel at Kennywood Park, Pittsburgh, shown above, because there is a 10 h.p. motor to turn it.

The Roaring Racer seen below would not provide a single thrill without its 150 h.p. motor, the largest at Kennywood Park, and each of the cars that give a more sedate ride on the track on the left is driven by a 1½ h.p. motor.

Kennywood's electrical rating is 1,800 kVA. One-third of this is used for power, and the other two-thirds for lighting and for appliances in the park restaurant. The keystones of the system are six tiny substations, which the park call transformer vaults. These are arranged so that power flows in two interconnecting rings, and in case of a line failure, the load can be shifted from one ring to the other without interrupting a single amusement.

Unless you are looking for it, you could walk through the Park for years without seeing any evidence of the electrical system. The substations are tucked away in concealed spots, and virtually all the wiring is underground.



BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With certain exceptions, which will be indicated, these should be ordered through a bookseller.

"THE HEAVENS DECLARE"

By I. O. Evans (Warne. 6/-)

One of the greatest heroes of science was Galileo, who lived in the Italian city of Pisa just over 300 years ago. His story is full of interest, from the time when as a young man of 18 he watched a swinging lamp in Pisa Cathedral, through his conflict with the church and down to his last days, when he was still full of ideas on science and mechanics.

There were many dramatic moments in Galileo's life. One came when he showed that cannon balls dropped together from the top gallery of the Leaning Tower of Pisa reached the ground at the same time, whatever their weight, thus disproving a belief that had been held for centuries that the heavier an object the more quickly it fell. Mr. Evans has had the excellent idea of telling us about this and other dramatic discoveries of Galileo in a story, in which some of the students, workmen and other characters are imaginary, while the deeds of Galileo and his words and thoughts are real. The result is excellent and readers will enjoy such stories as the discovery of the mountains of the Moon, the satellites of Jupiter and the rings of Saturn, and will sympathize with Galileo in the conflict with the Inquisition to which these and other scientific achievements led.

There is a coloured frontispiece, and many drawings in the text illustrate events in the life of this great pioneer.

"THE PICKWICK PAPERS"

By Charles Dickens (Harrap. 6/- net)

The publishers have had the happy idea of issuing reprints of important works of both fiction and non-fiction in a new series, known as "The Holborn Library." The series is to include books by Thackeray, Scott, Stevenson and other famous authors, and here is one of the novels of Charles Dickens that also will appear in it. Most readers of the "*M.M.*" already know Mr. Pickwick, Sam Weller and the host of wonderful characters who crowd the pages of this book, and younger readers who wish to explore this wonderland as well as the older ones who now return to it will find the new edition admirable. The text is complete and authentic; the paper, although thin in order to provide a book of reasonable size, is of good quality; and the type is easily read.

"KING ARTHURS AND LORD NELSONS OF THE S.R."

By S. C. Townroe, A.M.I.Mech.E.
(Ian Allan Ltd. 2/9 post free)

Readers who obtained copies of Mr. Townroe's "*Book of the Schools Class*," reviewed in the "*M.M.*" in January 1948, will not be disappointed in the present volume by the same author. "King Arthurs," numbering 74 all told, have been familiar on all Southern main lines for nearly 25 years and the class, with its minor variations, spread over four groups of engines, is a typical example of the growth of a design over a period of years. The "Nelsons," a smaller, but select band of 16 engines of greater power, have been more restricted in their travels, but they have, and still do, put in very big mileages on the heaviest trains.

The author with his specially intimate knowledge of Southern locomotive matters gives a fair and careful account of the career of each class. Special attention is given to the names of engines of the two classes and to performance on the road. For each there is a line drawing and a footplate chart with numbers indicating the various fittings, and other illustrations comprise reproductions of individual engines and of trains hauled by them.

"L.S.W.R. LOCOMOTIVES"

By F. Burtt, M.I.Loco.E.
(Ian Allan Ltd. 6/9 post free)

This is a comprehensive survey of the locomotives of the former London and South Western Railway from 1873 to the end of 1922, on similar lines to those followed in the "*Brighton*" and "*South Eastern*" books by the same author. In it the products of such well-known locomotive men as Beattie, Adams, Drummond and Urie are described and illustrated.

L.S.W.R. locomotive design seemed to pass through alternating periods of complication and simplicity. Engines of the earlier Beattie period were fitted with numerous special devices; the Adams engines were plain and straightforward; the Drummond period which followed brought with it complexities of four-cylinder propulsion, fire-box water tubes, steam dryers, tender feed heaters and numerous other appliances; and finally there came the rugged simplicity of the Urie engines, many features of which have been continued in standard Southern design. The different locomotives of these periods are dealt with class by class, with numbers, building dates and notes on individual engines, the 1914 war adventures of some of the Adams 0-6-0s and other matters, and notes are included on the careers of "Chiefs" who ruled at Nine Elms and later at Eastleigh. The many illustrations show a representative selection of the locomotives dealt with.

"HOW TO BUILD AND MANAGE A CANOE"

By A. R. Ellis and C. G. Beams
(Brown, Son and Ferguson)

In the foreword to this book Mr. Ellis expresses the belief that the real way to happiness for a boy is to engage in an occupation that demands the skilled use of his hands and appeals to his spirit of adventure and love of the open air. Canoeing is one way of attaining this end, and Mr. Ellis is a splendid guide for those who adopt it. With Mr. Beams he gives the fullest instructions for the building of a 16 ft. rigid canvas-covered canoe, with drawings and photographs to help the constructor. The practical experience of the authors is drawn upon for details of canoe management in various circumstances, and there are sections dealing with every other phase of canoeing, including camping, cooking and a survey of waters on which the sport can be enjoyed.

A separate volume comprises a full size set of drawings to show the finer working details. The price of each volume is 7/6.

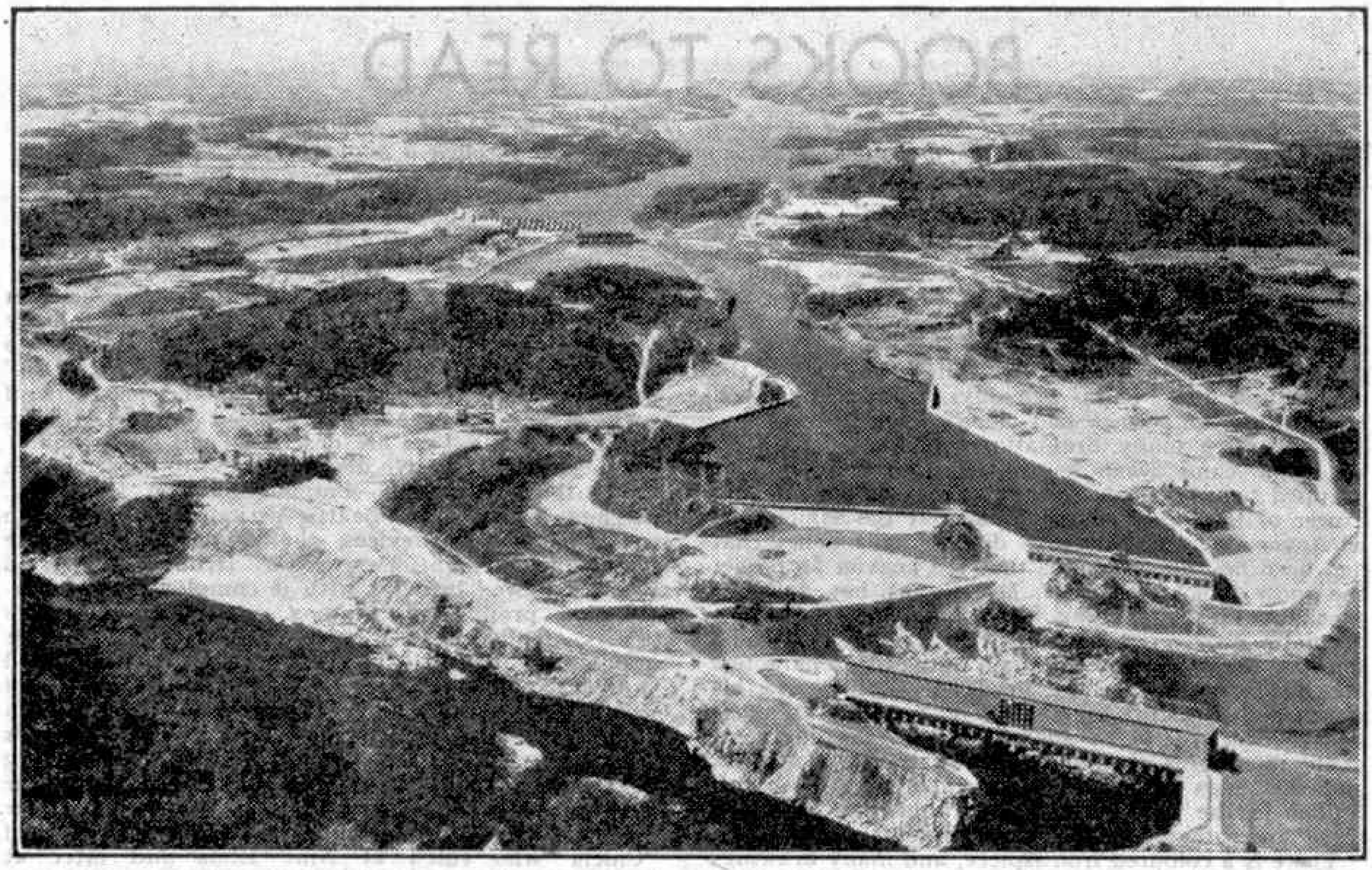
"THE RAILWAY DIGEST"

(George Lapworth and Co. Ltd. 2/6)

It is clear from the Spring issue of "*The Railway Digest*" that this is fully maintaining the interest and variety of the railway subjects dealt with in its pages. So far it has appeared twice a year, but in future there will be three issues, commencing with the one under review. The next will be published in July.

The present issue consists of 64 pages, well packed with material of railway interest. Apart from the items that are of a "news" character there is a condensed account of a statement made by Sir Herbert Walker, K.C.B., on that regular source of discussion, the Channel Tunnel, and descriptions of locomotive testing on a stationary plant and on the road. "*How Railways Do Fascinate*" is an amusing article on the railway hobby; and a notable repair by welding of a locomotive crank axle also is described.

"*The Railway Digest*" is obtainable from the publishers at Vernon House, Sicilian Avenue, London W.C., price 2/9 including postage.



The Shipshaw Power Stations

A Great Canadian Hydro-Electric Development

CANADA is a land of wonderful lakes and rivers. Its discoverers and settlers approached the country up the mighty estuary of the St. Lawrence, and for centuries this waterway and its tributaries provided the only way of penetrating into the heart of the land. In their bark canoes traders made their way far inland in search of furs, and in time the brigades travelled far inland when the Spring thaw came in order to collect the skins gathered by trappers during the winter.

Not all the rivers of Canada lent themselves to travel, for many of them were broken by rapids and waterfalls, and past these the voyagers could only make progress by portaging their belongings, carrying them over land to a new stretch of navigable water. Some rivers were particularly difficult. For instance, between Montreal and Quebec the St. Maurice enters the St. Lawrence through three channels, the origin of the name of the town of Trois Rivieres, or Three Rivers, at the mouth of the stream. The river pours down from the forested highlands of Quebec over innumerable falls and rapids, and to-day full advantage is taken of these to provide hydro-electric light and power for large areas of Quebec.

Conditions for the development of hydro-electric power in this part of the country are indeed ideal. There is ample rainfall, with a steady run off of water that reaches its highest point in spring, when the snow and ice melt, and dams built to store flood water maintain a regular supply throughout the year.

One of the most remarkable of Canada's hydro-electric power schemes has been put into operation on the Saguenay River. This enters the St. Lawrence about 150 miles below Quebec through a wonderful gorge with rock faces from 150 to 1,500 ft. in height that in places overhang the river. More than 50 years ago it was realized that here was a river that could provide hydro-electric power on an enormous scale. The first idea was to build works in which this could be used for transforming the nitrogen of the air into fertilizers. This scheme was not pursued, but plans were then made for producing aluminium with its aid. A new town, Arvida, sprang up on the banks of the Saguenay just below a point where the Shipshaw, a tributary of the river, flows into it, where works were established in which aluminium ore was electrolysed to produce the shining new metal.

At the top of the page is a general view of the Saguenay River, showing the two Shipshaw power stations, and the canal that leads water to the lower one.

The first step of course was to provide the necessary electric power. The Saguenay emerges from Lake St. John, about 30 miles above the mouth of the Shipshaw, and at a point below the lake dams were built to control the flow of the water, and a power house with the capacity of more than 500,000 h.p. was completed in 1926.

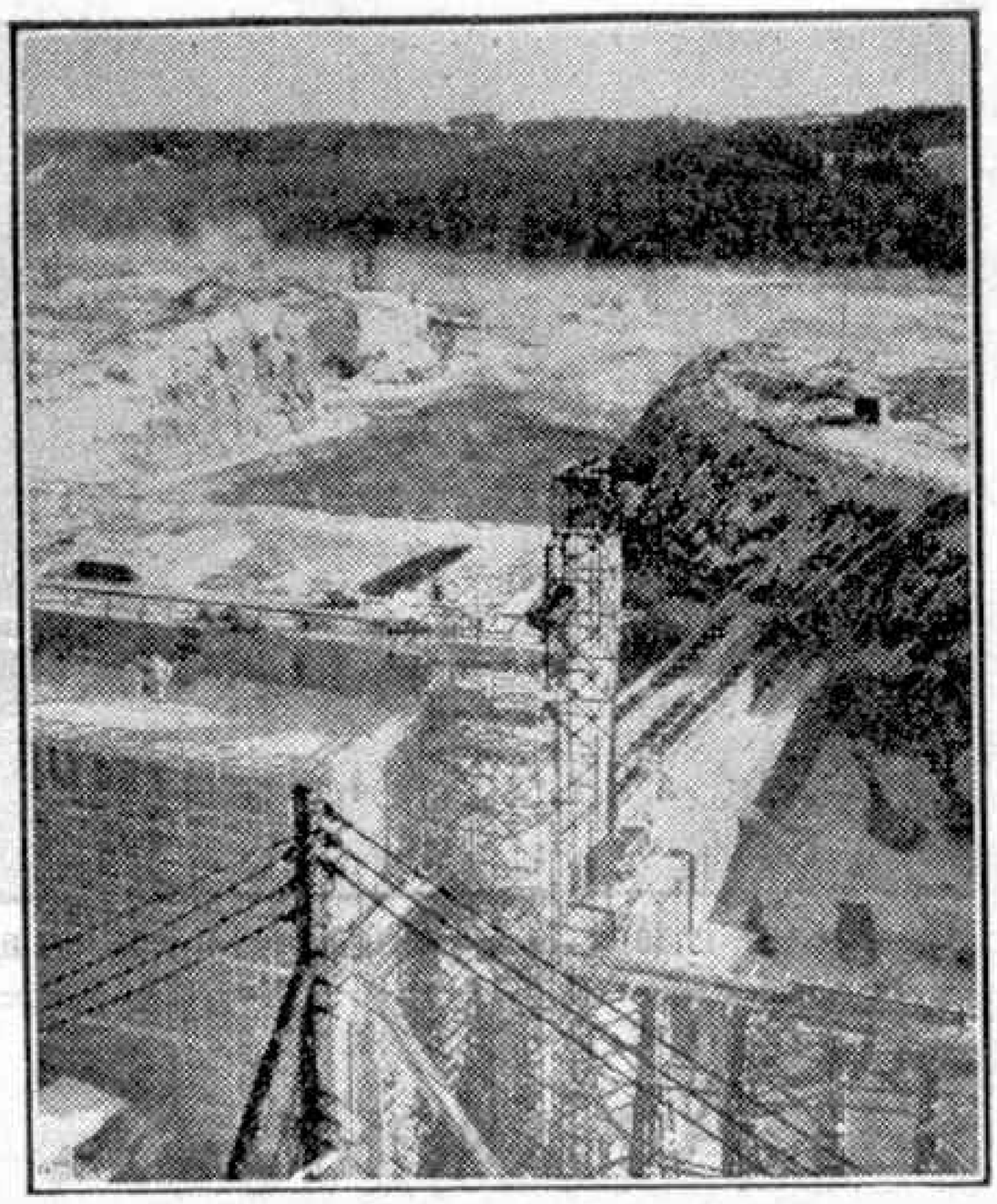
This was only the first stage in the Saguenay scheme. The second began two years later when a dam was built across the river just above rapids at Chute-a-Caron, a project that was completed in 1930. This dam was intended to serve two purposes. One was the diversion of the water of the river into a canal that would feed a great hydro-electric station in the valley of the Shipshaw. The other was to provide power immediately, and for this purpose a power house was built at one end, the water passing through the turbines of this, flowing through a new channel that returned it to the Saguenay River itself. To-day this station is known as Shipshaw No. 1 and it has a capacity of 300,000 h.p.

A very interesting part of the construction of Shipshaw No. 1 was the diversion of the river into a temporary channel leading through part of the dam while the section across its bed was being constructed. For this a great column of concrete was built on the bank of the river. This was 92 ft. high and weighed nearly 11,000 tons, and its river face was carefully shaped to make it fit the curves of the bed in which it was to rest. When all was ready a small supporting pier in front of its base was blasted away by explosives, and the huge mass slowly toppled over and fell exactly into the position designed for it. Water in the river bed acted as a cushion, and although wooden shuttering on the column was split off and thrown as far away as 300 ft., the towering mass hit the solid river bed with no more force than that if it had dropped only four inches.

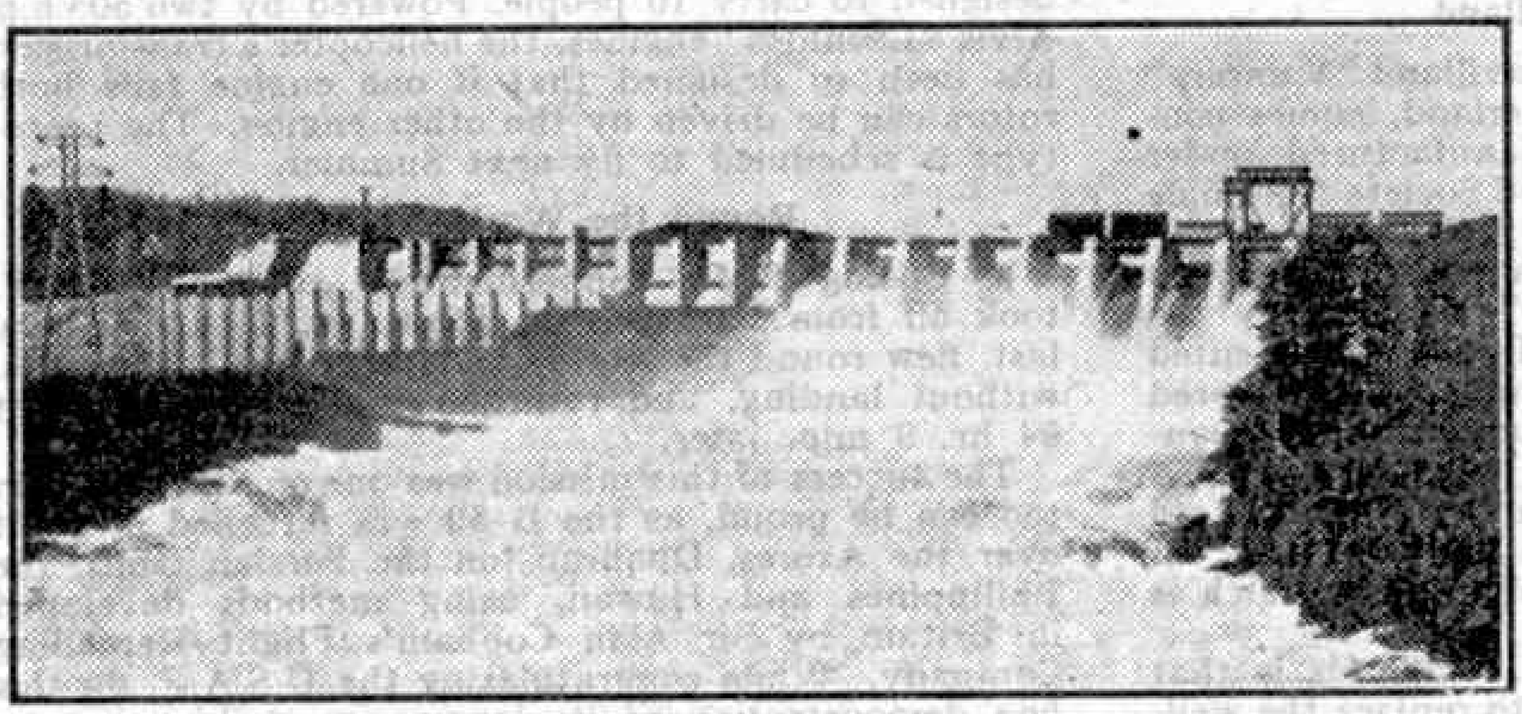
The depression of the 1930's came along at the time when Shipshaw No. 1 was completed, and the construction of the larger power station in the Shipshaw Valley had to be abandoned for the time being. The outbreak of war led to a sudden dramatic change. The demand for aluminium, chiefly from Great Britain, increased enormously, especially after the fall of France in 1940, and the aluminium works were greatly extended. Shipshaw No. 1 was incapable of supplying the enormously increased power needed, and for a time this was transmitted by land lines from the stations erected on the St. Maurice River.

In the meantime construction of Shipshaw No. 2 was started in the greatest secrecy in order to avoid every possibility of air attack on a project that was so vital. The work was pushed forward with tremendous energy. By the end of 1942 the first of the 12 giant 100,000 h.p. units to be installed was in action, and a year later, only 30 months after work was started, the remaining 12 had been completed and the station was ready to furnish 1,200,000 h.p. of electrical energy. The great building in which these units were installed housed the world's greatest power concentration under one roof, and the completion of the gigantic scheme in so short a time was one of the greatest triumphs of the engineer.

Some idea of this amazing development is best obtained by following the course of the water that provides the hydro-electric power. The canal that



Shipshaw No. 2 power house under construction. Beyond is the tail race, through which water finds its way back to the Saguenay. Photograph by courtesy of the Aluminium Co. of Canada.



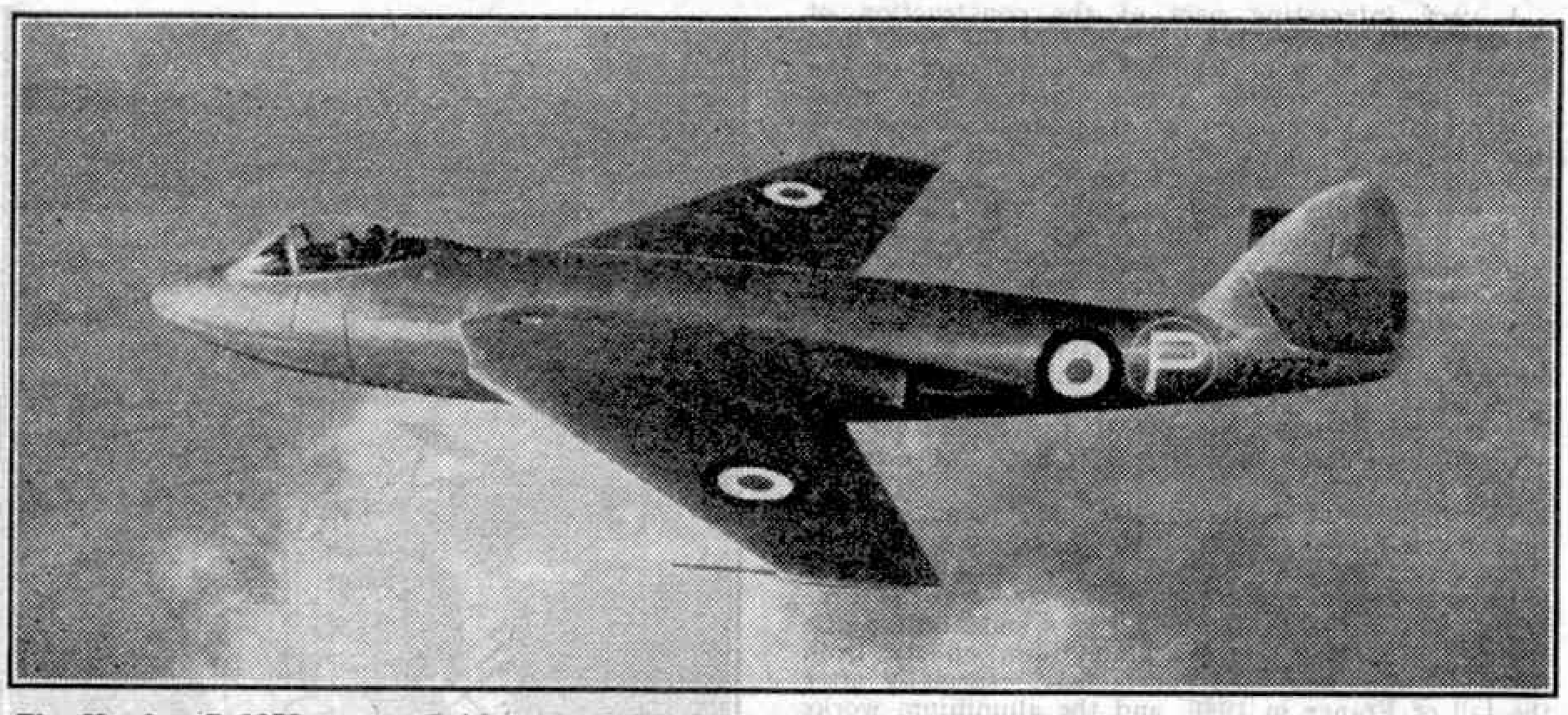
The spillways and power house of the Shipshaw No. 1 station. Photograph by courtesy of the National Film Board, Canada.

carries it to the power station is nearly a mile and a half long. It was excavated mostly through earth and gravel, but large sections had to be cut in rock, and in certain places where the ground level was low it was necessary to build concrete dams to retain the water. The finished channel has a minimum width of 500 ft. in earth section and 300 ft. in rock. The greatest depth of excavation was 105 ft.

The canal is 33 ft. deep and is large enough to accommodate most ocean liners. It ends in a forebay at the site of the great dam. This is not on the bank of the Shipshaw, as originally planned, but is about half a mile up the Saguenay, where there is a ledge of rock that provides a suitable foundation for the power house. Six shafts were driven down through the rocky slope from the headblock and these joined six tunnels, the shafts and tunnels forming the tubes, each 30 ft. in diameter, through which water from the canal passed to the power house. One reason for using them instead of great metal tubes, or penstocks, was to reduce the possibility of damage by air attack. At the time there was always the possibility that the plant would be a target for enemy bombers, and fighter aeroplanes of the Royal Canadian Air Force as well as anti-aircraft batteries were stationed in the neighbourhood right to the end of the war.

Most of the excavation required for the foundation of the power house and for the tailrace, through which the water ran after giving up energy to the turbines, was in gravel; but there was enough rock not only to ensure a solid base for the power house, but also to provide a sure anchorage for the steel penstocks that led from the ends of the tunnels to the machines. Excavation for the tail race stopped when a rock plug of 18,000 cu. yds. remained between the site and the river, into which water from the power house was to be discharged. Holes drilled into this were packed with explosive, and the charges were fired in order to demolish it at a single blow. The water on the river side of the plug was 21 ft. higher than that on the tailrace, introduced to cushion the fall, and this caused the rock to fall inward. Most of it fell exactly as planned into a trench specially dug to a depth of 10 ft. in the tailrace. Nearly 40 tons of dynamite were exploded in this tremendous blast.

The two Shipshaw power stations have a combined maximum capacity of 1,500,000 h.p., with a firm output of 925,000 h.p.



The Hawker P 1052, a new British sweptwing jet fighter. Photograph by courtesy of Hawker Aircraft Ltd.

Air News

By John W. R. Taylor

First British Sweptwing Fighters

Britain's determination to maintain her present lead in the design of single-seat fighter aircraft is exemplified by two new sweptwing jet fighters now being test-flown. The first of these is the Hawker P1052, illustrated above, which is basically a sweptwing version of the Hawker N7/46, and even faster. The other machine is the Vickers-Supermarine 510, a sweptwing development of the well-known "Attacker." Both aircraft are powered by a Rolls-Royce "Nene" turbojet; all other details are secret.

News from de Havilland

Following the news that the de Havilland "Vampire" jet fighter is to be built in Switzerland, comes confirmation that it will also be manufactured under licence in France, by the State-owned Societe Nationale de Construction Aeronautiques du Sud-Est.

The French Air Force has already taken delivery of a small number of "Vampires," supplied by the British Government, and these will be supplemented within the next few months by many more delivered from stocks and from British production lines. Meanwhile the Aero Sud-Est factory will be equipped to produce two versions of the "Vampire," the standard Mark 5 with a "Goblin 2" engine and the Mark 51 fitted with the Rolls-Royce "Nene" engine, which is already in production in France.

Another item of news from de Havillands is that the "Chipmunk" has been selected to replace the well-loved "Tiger Moth" at all Royal Air Force Reserve Flying Schools. A contract for several hundred "Chipmunks" has already been received, and tooling for quantity production is now going right ahead for both home and export sale.

Big Game Hunting by Air

The article on pages 214-6 tells how unusual animals are often brought to Britain for people to look at. Scandinavian Airlines System operate a service in the other direction, taking the people to the animals. In fact, if you want to go off and look for rhinoceros or hunt big game they will arrange everything for you.

You can fly by S.A.S. to Nairobi, where a representative of African Safaris Ltd. takes over. He equips you with a gun, tent, cameras and cooking utensils and then acts as guide during your big game hunt. A month's safari costs about £950, on top of which there is a slight outlay on each animal you shoot—but what is £50 compared to the glory of "bagging" an elephant in Kenya? If you think that is too expensive, then you can go to Tanganyika where it will cost you only £20.

Rhinoceros are £10 apiece, giraffes £15, and to provide for when you are running short of money monkeys are only 10/- each. Alternatively, if you prefer to spend your time a little more quietly, you can always stay at one of the first-class African hotels for about 18/- a day—just under two monkeys in fact!

Twin-Engined Helicopter

The French air journal "*Les Ailes*" reported recently that the Bristol Aeroplane Company have completed the mock-up of a twin-engined two-rotor helicopter designed to carry 10 people. Powered by two 505 h.p. Alvis "Leonides" engines, the helicopter's transmission has been so designed that if one engine fails both rotors can be driven by the other engine. The prototype is scheduled to fly next Summer.

Round the World Non-Stop

A Boeing B-50 "Superfortress" of the U.S.A.F. took off from Fort Worth, Texas, on 26th February last, flew round the world, a distance of 23,000 miles, without landing, and returned to its starting point 94 hr. 9 min. later.

The success of this mission was one of which Britain too can be proud, as the B-50 was refuelled in flight over the Azores, Dhahran (on the Persian Gulf), the Philippines and Hawaii, using methods developed in Britain by Sir Alan Cobham's Flight Refuelling Company. While congratulating the U.S.A.F. on this fine demonstration of its long-range striking power, we can only regret that our own Government, with all Sir Alan's resources at their disposal, lacked the initiative to make this first round-the-world non-stop flight an all-British affair.

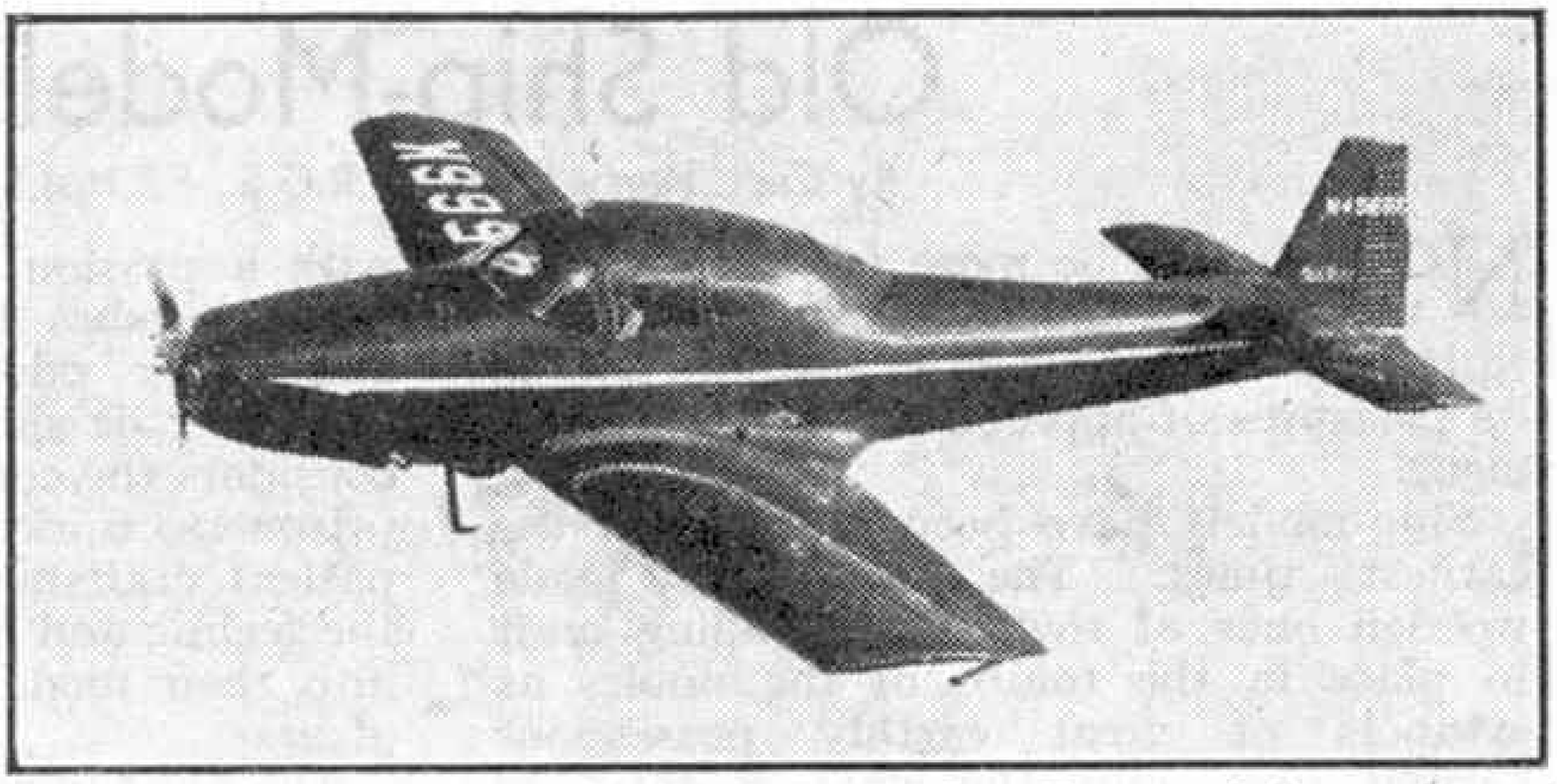
Safety Record

In March last American Airlines completed three full years of operations without a passenger fatality, during which time they flew a total of 4,154,637,050 passenger-miles. This figure means that if a pilot could have taken off in the year 1 A.D. in an aircraft that flew constantly at 200 m.p.h., he would not amass that total until the year 2371. The same company also announced on 1st April that they had become the first airline to operate an entire 300 m.p.h. fleet of aircraft. By that date they had retired the last of their "Dakotas," leaving a fleet of 50 Douglas DC-6s

and 75 "Convairliners." Their transatlantic subsidiary company, American Overseas Airlines, continue to operate "Constellations" on the London–New York run and "Skymasters" within Europe, but the "Skymasters" will gradually go into retirement in the Autumn, when A.O.A. receive their first giant Boeing "Stratocruisers."

Ryan's 1949 "Navion"

The Ryan "Navion," shown in the upper photograph on this page, is generally acknowledged to be the ideal 4-seat personal 'plane. It was designed originally by North American Aviation, to mark their entry into the post-war light aircraft market. Unfortunately the expected boom in private flying did not materialize, and N.A.A., who had spared no expense to develop their idea of a perfect 4-seater, lost so much money on the deal that they decided to end production and build only military aircraft.



Ryan "Navion" 4-seat personal 'plane in the air. Photograph by courtesy of Ryan Aeronautical Company, U.S.A.

That might well have been the end of the "Navion" had not the Ryan Aeronautical Company's executives been smart enough to buy complete rights to build it, thus getting a thoroughly proven aircraft without the costly business of developing it themselves. They redesigned some features, put it in production and soon began to sell satisfactory numbers of "Navions" at £2,250 each.

In its latest form the machine has a 205 h.p. Continental engine, which gives it a maximum cruising speed of 155 m.p.h. and enough power to get it off the ground in well under 200 yd. with a full load. The cabin is sufficiently roomy for passengers to change seats in flight, and there is space for 180 lb. of luggage behind the rear seat. Alternatively, after removing three seats the aircraft can be used as a freighter with a half-ton payload.

New Dublin-Birmingham Air Service

Last month, the Irish Aer Lingus Company inaugurated a new daily air service between Dublin and Birmingham. Flights leave Dublin Airport at 9.25 a.m. each week-day, arriving at Elmdon Airport, Birmingham, at 10.50. Return flights leave Elmdon a half-hour later, reaching Dublin at 12.55.

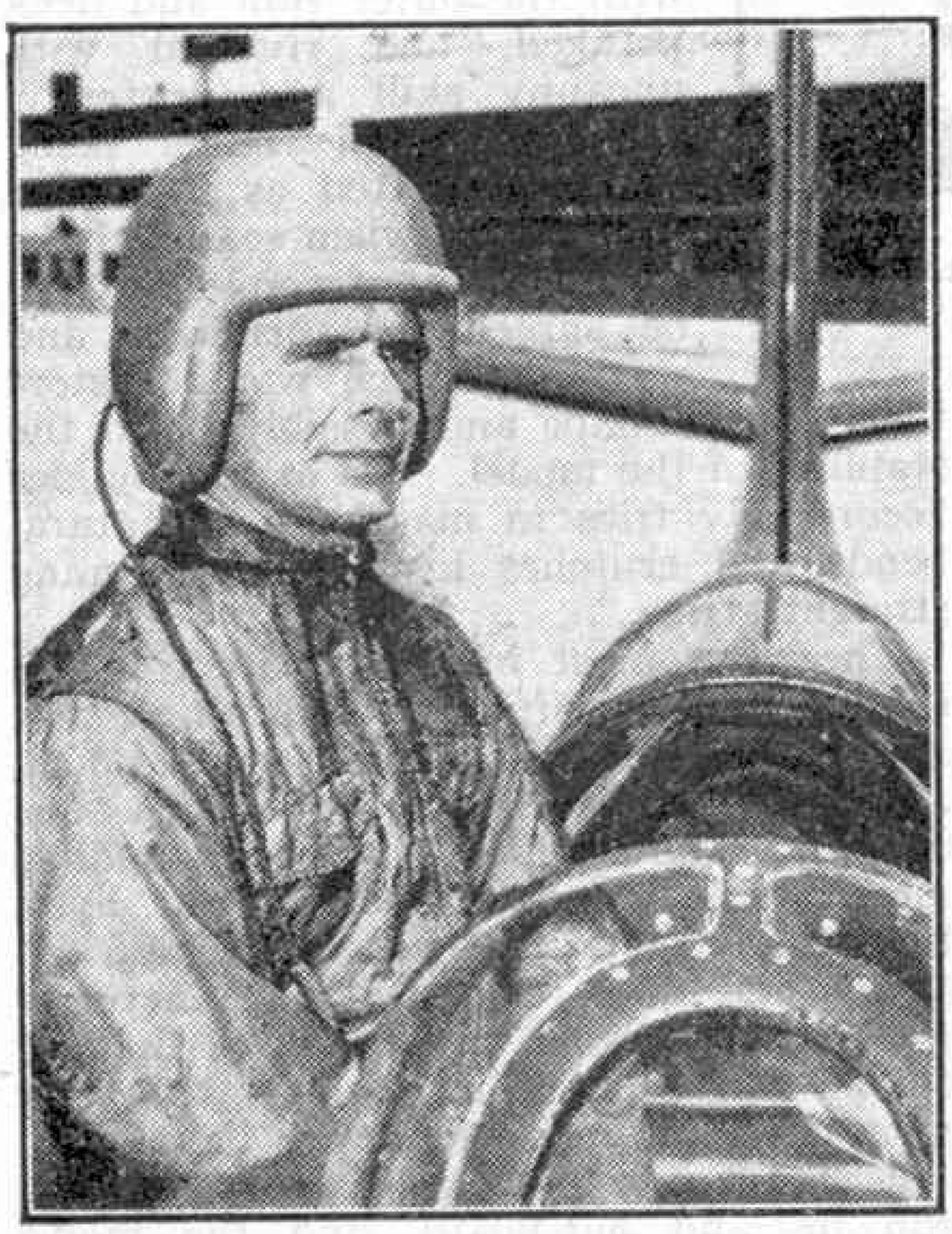
The service is very useful as it provides a new link between the industrial Midlands and Ireland. It should also prove an asset for Midland holiday-makers in search of Irish steaks, and for Irish tourists visiting the Shakespearean country, as Elmdon is within 20 miles of Stratford-on-Avon. Fares are £6/0/0 single and £10/16/0 return.

Made-to-Measure Helmets

Realizing that head injuries in aircraft crashes constitute about half the total injuries, six American Aircraft companies contributed funds to the Aero-Medical Laboratories of the School of Medicine, University of Southern California, for the development of new types of helmets for pilots. They asked for a helmet that would guard against skull fracture, brain concussion, penetrating wounds from shrapnel, harmful vibratory forces, high temperatures and wind blast. Yet it had to be of minimum size and weight, reasonably comfortable and present minimum interference with radio communication.

The result of the research is illustrated on this page—a 34 oz. helmet with a one-half to one inch spacing between the head and helmet shell, filled with cellular cellulose acetate energy-absorbing lining material. An inside layer of sponge rubber covered with chamois leather is provided, which combines with ventilation holes and rubber padding round the edge to make the helmet reasonably comfortable. Earphones are built into "pockets."

The helmets cost about £55 each, and at present are built up individually with the aid of plaster of paris moulds made on each pilot's head, but later they may be produced in a range of standard sizes.



The new "crash-proof" helmet for pilots, described on this page. Photograph by courtesy of McDonnell Aircraft Corporation, U.S.A.

The Chance Vought "Cutlass."

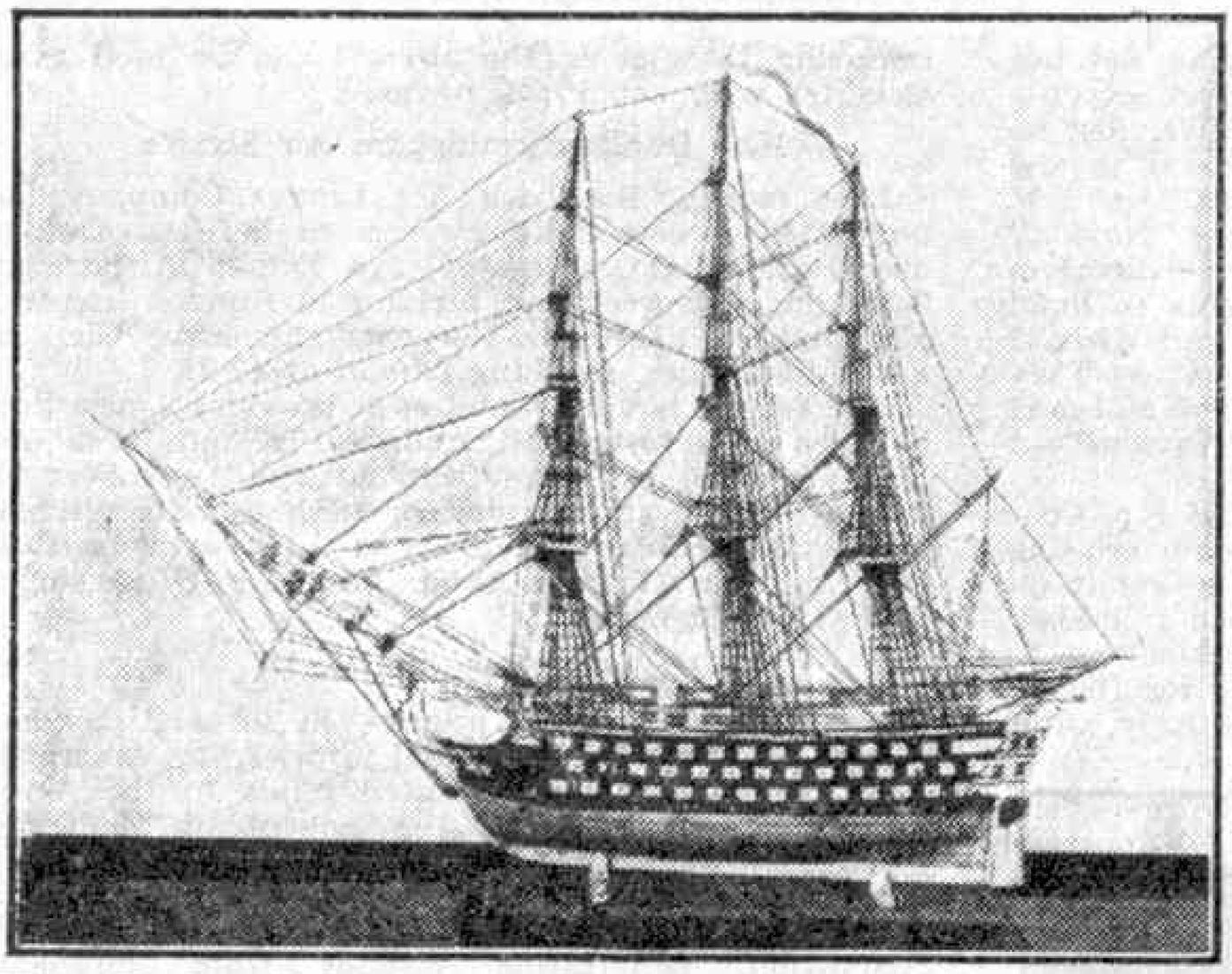
The Chance Vought XF7U-1 "Cutlass" is a new U.S. Navy twin-jet fighter designed for carrier operation. It is tailless, with sharply swept-back wings, and two powerful Westinghouse turbojets mounted in the rear of its slim fuselage—features which combine to make it one of the world's fastest aircraft. The "Cutlass" has two vertical fins and rudders at the trailing edge of its wing, but is controlled mainly by two "ailavators," combined ailerons and elevators. To relieve physical strain on the pilot through forcing over the controls at high speeds, all controls are worked through a hydraulic "boost" system. The cockpit is pressurized and fitted with an ejector seat.

Old Ship-Models

By Capt. Harry Parker, F.R.G.S., F.R.Hist.S.

NO study can be more fascinating than that of old ship-models, and those new to it may welcome a brief introduction to its pleasures of appreciation and appraisement.

Ship-models have been made from the earliest times. The Egyptians made wooden ones of rowing and sailing craft to place in the tombs of the nobles as symbols of great earthly possessions carried over into the next world. As offerings to the gods, spirits or demons controlling currents, storms, and calms—to ensure favourable weather for the real ships, their prototypes—they figured in a primitive rite still practised in West Cornwall, Eire and Guernsey on Good Friday, when every fisher-boy, following traditional custom, sails his toy-boat to herald the opening of the fishing season.



The "Barfleur," British 98-gun ship of 1768. Planked hull, masts and spars fashioned entirely from bone. Rigged with black cord. Guns fashioned from copper and fitted with a device enabling them to be run in and out. Length 13 in.

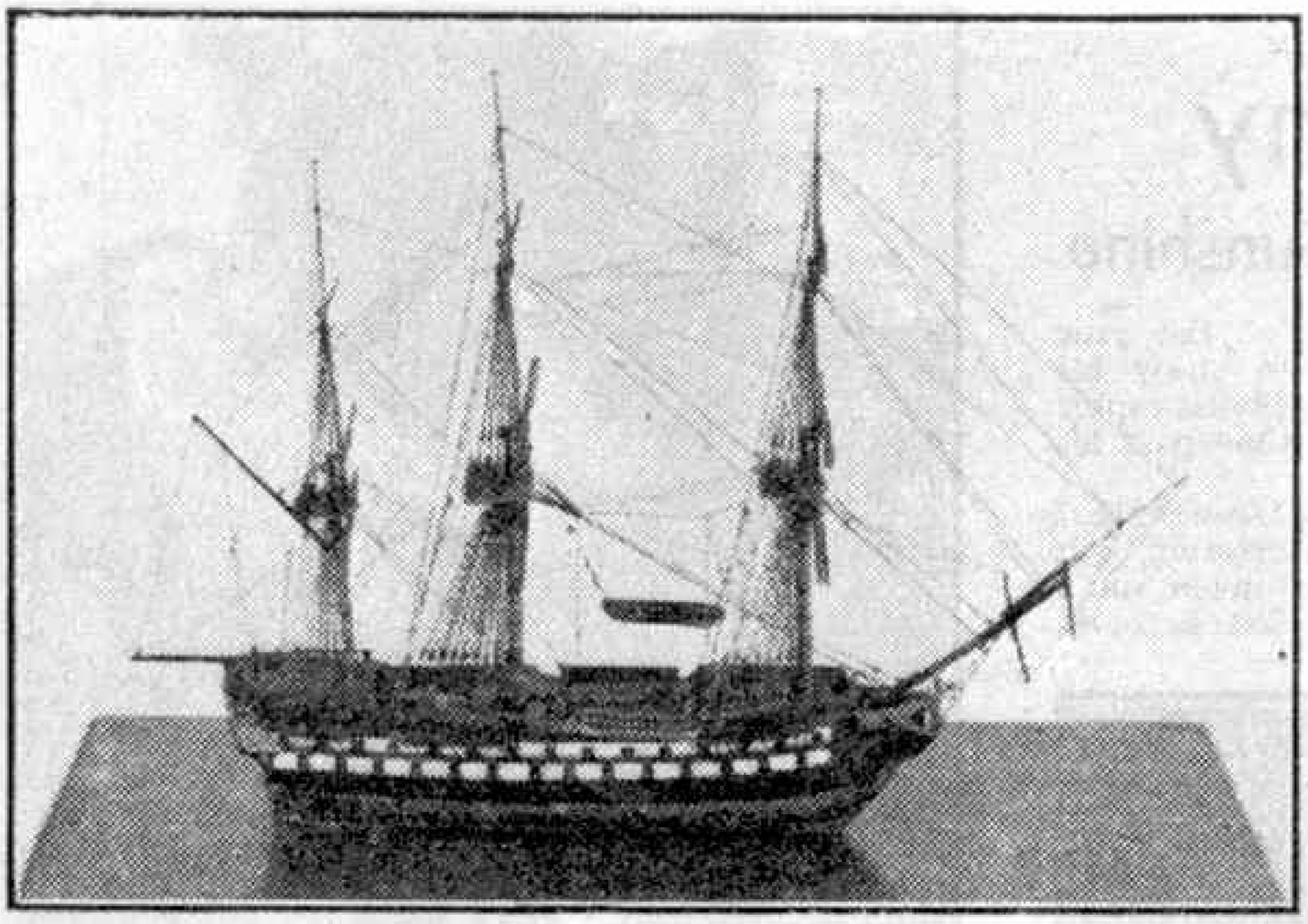
The most remarkable of these maritime antiques are the Napoleonic Prisoners-of-War bone and ivory models of the late 18th and early 19th centuries. Men who had sailed and fought in the prototypes wished to commemorate their ship's record, so they constructed—as a labour of love—the most faithful miniature a pocket-knife and other crude tools and materials could improvise.

Seamen have always been handymen with a passion for making things in the quiet watches from bits of wood, twine and other oddments begged from the carpenter or ship's stores. But when one considers the conditions under which these prisoners worked one marvels at their patient craftsmanship and ingenuity, and the feeling and character that they infused into their models make them true works of art.

The most important factors are accuracy of detail and finish. Think of the meticulous care necessary in building a model to the approximate scale of an eighth-of-an-inch to the foot—1 in 96—or even smaller. By the time you get down to capstans you are dealing in match heads; a bolt-eye may resemble the eye of the finest needle. Yet everything must be proportionate.

The basic item on which all ornament and superstructure is founded is the hull. The finest are built of frames and beams from the keel upwards, with the outer skin and deck planked, and rivetted with uncanny skill and dexterity, each individual timber being separately fitted as in a real ship. Even when seasoned the slender strips of wood used may be subject to shrinkage and warping, which would distort the queenly shape and possibly harm the stability of the model. The expert builder accordingly tries to make use of natural bends and crutches instead of steaming straight strips.

The next most important item is the rigging. The uninitiated might think that any tangle of ropes would serve as long as it looked realistic; but when one examines the rigging of these incredible models—the minute blocks, dead eyes, lanyards, cleats, splices, eyes and so forth—one finds that they are actually *workable* and exact miniatures of the real thing. All the running rigging, as distinct from the standing or fixed, can be worked; sails can be handled, in some cases guns run in- and out-board, and the model manipulated in the same way as the prototype ship.



The "Scipion," a French ship of 74 guns. Model constructed by French prisoners-of-war. Length 13 in.

A quality model can also be judged by the superior artistry of her stern galleries, figure head, gun ports, lanterns, belfries, balustradings, the finish imparted to deck structures, and the tapering of her masts, spars and booms.

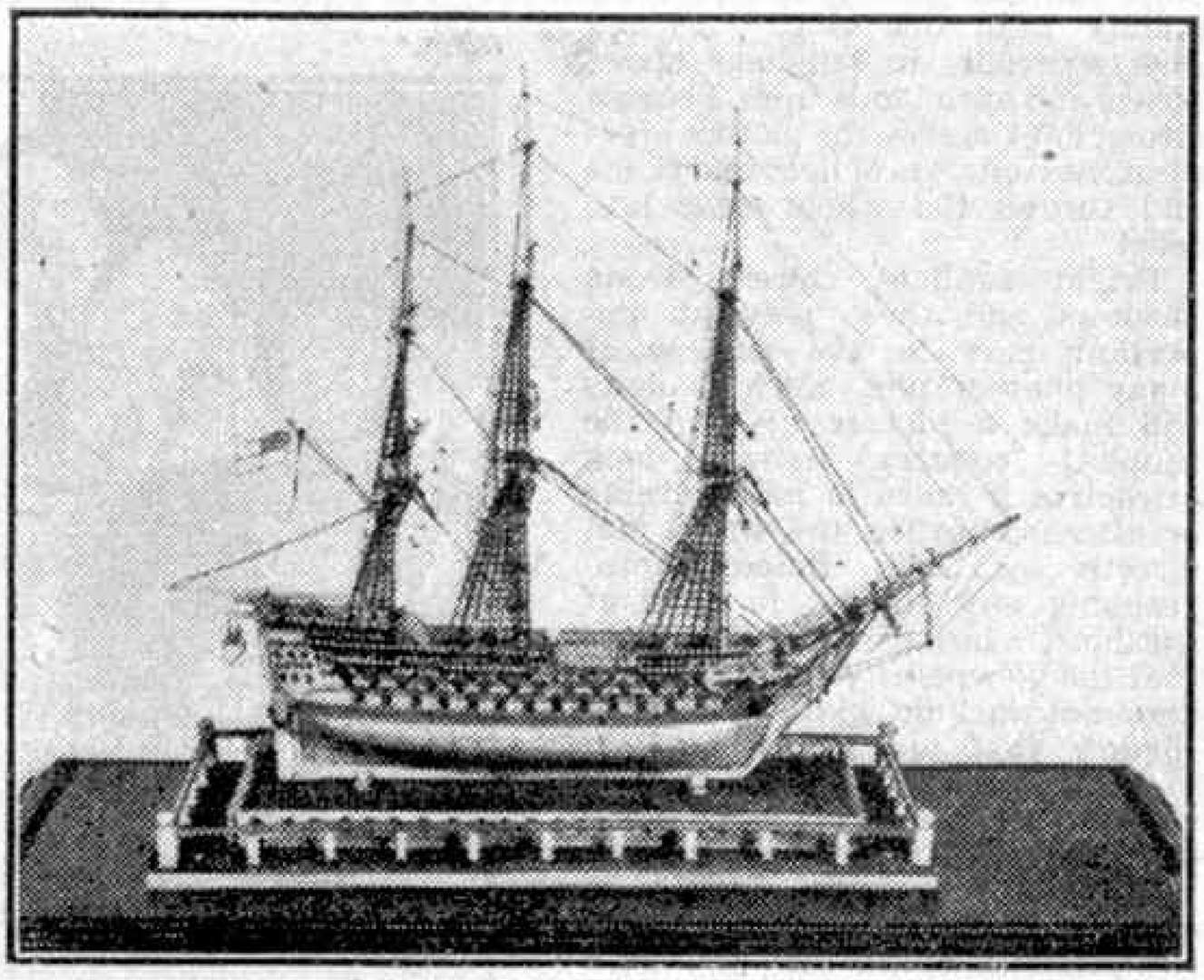
A few surviving models have every detail down to the last bolt or tree-nail in the hull, the last lashing in the rigging, as exact as in the original, so that to run over the model thoroughly is like going over the actual ship. These Napoleonic models are not only factually right but things of joy, superb and unique ornaments that defy imitation. They were made mostly with ivory or animal bone saved from prison rations, then sawn into "timbers" and fastened together by brass pins; fitted and rigged with anything salvaged from camp dustbins or passed in by visitors.

The prisoners made them whilst confined in Porchester, Princetown, Caernarvon, Norman's Cross, Peterborough, Taunton and elsewhere during the wars with France. Among them were many skilled craftsmen such as carvers and ivory workers from West Africa who had been pressed into the French Navy when Nelson and his gallant comrades were becoming a menace. Breton jet-carvers, Dieppe jewellers and watch-makers, all joined in the task of whittling down the bones and shaping them with home-made saws, chisels, and other tools. Finally the old professional French sailors got to work erecting the wonderfully intricate rigging—sometimes at the expense of the craftsmen's pigtails! Gold ear-rings and other personal trinkets were hammered out to provide strapping for the masts, hinges for the rudder and similar minute metal parts.

When the working parties had assembled the models they were sold to prison officials, Naval officers, or local curio dealers, many of whom were not above smuggling small tools and material into the prisons in the hope of acquiring one of the finished masterpieces.

Contemporary models of old-time ships are to-day very rare and precious. Most have found permanent homes in the world's museums, especially in the U.S.A. Others have been destroyed—the whole of one London collection comprising about fifty was totally blitzed—and a great number ruined by neglect. The few that remain are keenly sought after, and when in fine condition, are of considerable value—for an historic object which is rare goes up in value with the years, never down. It is the rare things of beauty that help to make our life worthwhile, redeeming it from everyday drabness and monotony.

Without these models, (*Cont. on page 244*)



The "Glory," British 98-gun ship, of 1788. Bone model constructed by French prisoners-of-war. Set on original inlaid wood base and in a glass case. Length 15¼ in.

Photography

Making the Most of Sunshine

THE long sunny days at this time of the year invite the amateur photographer to enjoy his hobby to the full, and with more photographic supplies now available than for a long time past his opportunities are greatly increased.

Sunshine gives life and sparkle to scenes that otherwise would appear dull and uninteresting, but it does not follow that every picture taken on a sunny day will be successful just on that account.



Rhododendrons. Photograph by Miss A. Roe, Sheffield.

Even with correct exposure pictures taken with the sun right behind the camera are generally disappointing, as they tend to have little life. The details all come out equally clear and there are no points of interest. Most subjects photograph best when they are lighted mainly from one side. This applies especially to buildings, street scenes and open landscapes, because strong light across the picture gives pleasant contrasts of light and shade and throws the whole scene into relief.

Bright sunlight causes strong shadows and these play an important part in the success of many photographs. Such shadows will make a picture of even the simplest country cottage look attractive if taken in mid-morning or afternoon when the sun is not directly overhead. Before photographing any subject in brilliant sunshine, however, make sure that the viewpoint you have chosen does not include black masses of shadow that are not wanted; if necessary move a little to the right or left to avoid them. If the scene is one that you are very keen on taking, it may be well worth while waiting an hour or two until the positions of the shadows alter.

Beginners are often advised not to take photographs with the sun directly in front of the camera, as the direct rays of the sun will



Planning the route. Photo. by AC1 R. Atkins, Eccles.

be reflected and scattered by the lens, thus causing the peculiar and unpleasant effect known as halation. This is wise counsel up to a point, but if one takes the precaution of shading the lens so that the sun does not shine directly upon it, very striking effects can be obtained sometimes by photographing against the sun.

A cloud passing across the face of the sun temporarily destroys the pleasant contrast of sunlight and shadow. If you have the tantalizing experience of this happening just when you are ready to take a good subject, be patient and wait until the sun is clear again. The picture you get will amply repay you for the delay.



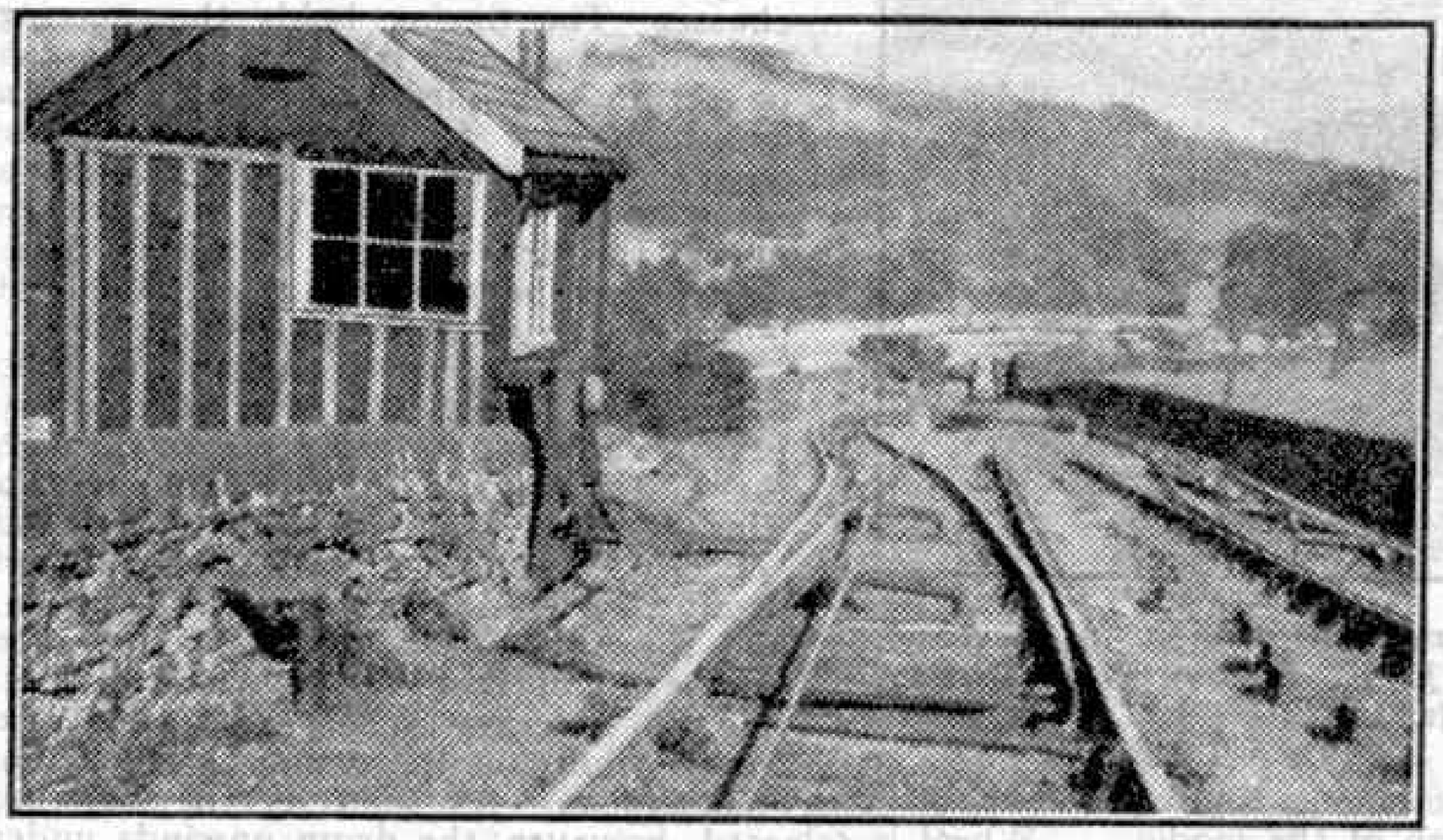
"Four friends." This delightful picture from New Zealand was taken by Miss H. Milne, Hawkes Bay.

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.

A PIT FOR RUNAWAY TRAINS

The appearance in the January "*M.M.*" of a description and photograph of the Cromford and High Peak Section of the B.R., (L.M.R.), reminded me of a visit I made there in 1937. This has one very interesting and unusual feature shown in the accompanying picture, which was taken on the incline above the road overbridge.



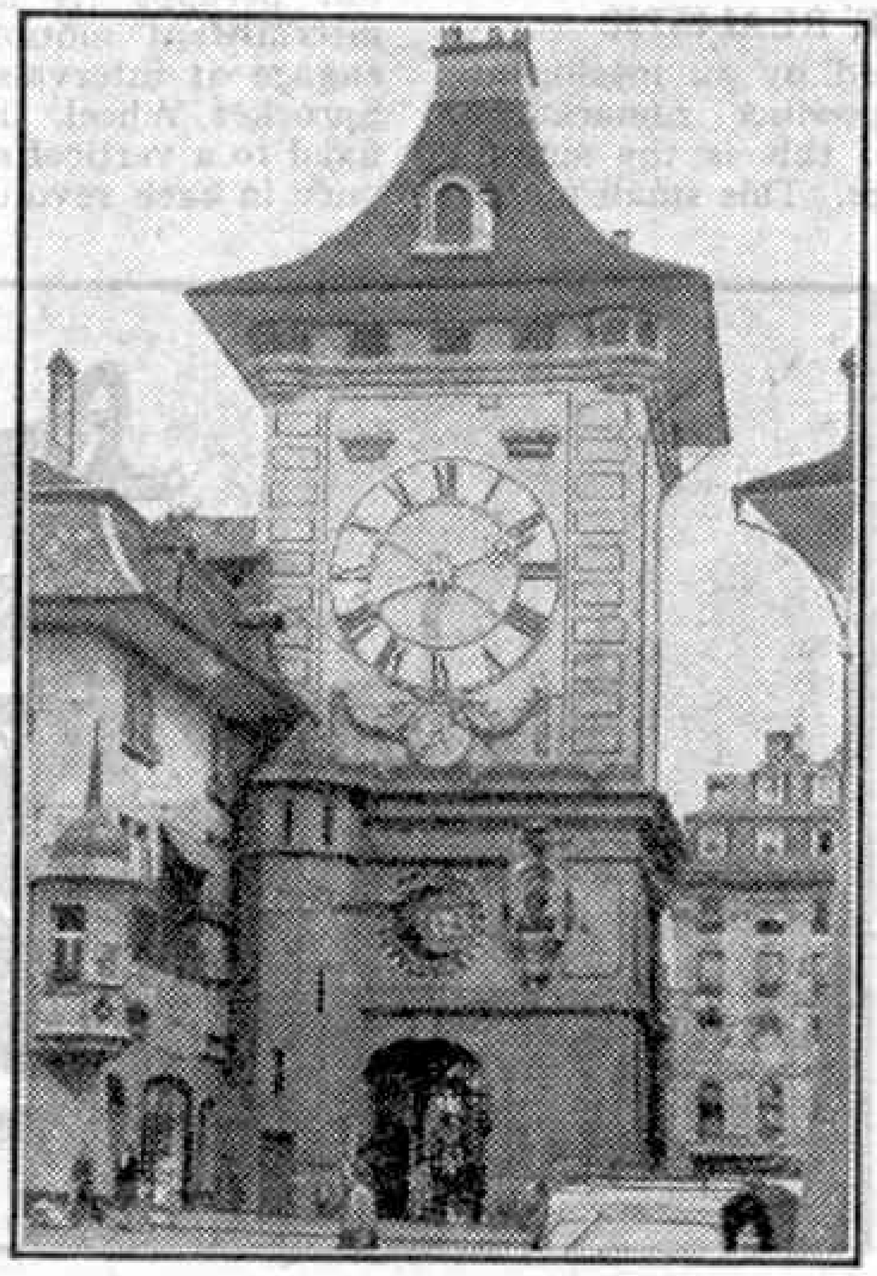
Safety points on the Cromford and High Peak Railway. Photograph by D. O. Whitehead, Derby.

It will be seen that a pair of points is included in each track; the turnout of each curves back again to pass under the road bridge and so into the yard at the foot of the incline. The straight portions, however, end abruptly, and the points normally are set for this direction. The idea is that if a train, either ascending or descending, becomes out of control and runs away down the incline, it will pass off the end of the rails. It would then fall into a pit, and so damage in the yard below would be avoided. When a descending train has reached a point close to that shown in the photograph, and is known to be under control, the points are moved over, operated from the cabin seen on the left, and the train continues via the turnout into the yard below. I have no information as to whether use has ever had to be made of this safety precaution.

D. O. Whitehead (Derby).

A WONDERFUL CLOCK

The clock tower of Berne, the Swiss capital, stands in the mediæval part of the city. It is at the junction of four ancient and picturesque cobbled streets with arcaded pavements and window boxes that in the summer are gay with geraniums or petunias. In the middle of the streets are playing fountains, brightly coloured, and with grotesque figures.



The clock tower of Berne, Switzerland. Photograph by E. C. Ive, Reading.

The clock was built by Caspar Brunner, a master clock-maker, about the year 1530. It shows the time on the large dial, and a smaller dial shows the day of the month, the month and the signs of the Zodiac. To the right of the smaller dial is the "musical box." In the centre of this is the seated figure of a King holding an hour glass. On one side of him is a cock and on the other a lion, while beneath his feet is a bear. Above his head is a jester with two small bells.

Quite a little crowd gathers when the clock is about to strike, and this is what happens. Four minutes before the hour, the cock crows and beats his wings. Then the bear comes out and circles round beneath the king, and the jester rings his bells. The hour is struck by a knight right at the top under the steeple. As he strikes the bell the king turns his hour glass and counts the strokes. Afterwards the cock crows again.

E. C. Ive (Reading).

RED RAIN

The idea of red rain seemed to me fantastic until I actually saw it fall in Melbourne. There the heat can be terrific and unless you happen to be an Australian, conditions become rather trying. You begin to feel limp and to wish that it would rain. Then all at once the wind springs up and a change in the weather arrives. So does the dust, which is red and comes from a district called the Mallee, north of Melbourne, where the soil is brick red and very fertile. Unfortunately it is also bone dry, and unless it is irrigated from the Murray River, one of the slowest in the world, little will grow there except mulga wood and clumps of stunted gum trees.

As a result at certain times of the year, when the wind is in the right mood, this red dust is swept up into the air and carried along, to settle in the city streets. Eventually the rain begins to fall, and to your surprise it is quite red. When the rain stops the air is clean and fresh again and the Sun begins to shine, while the red mud on the streets is swept up and carted off as soon as it is dry.

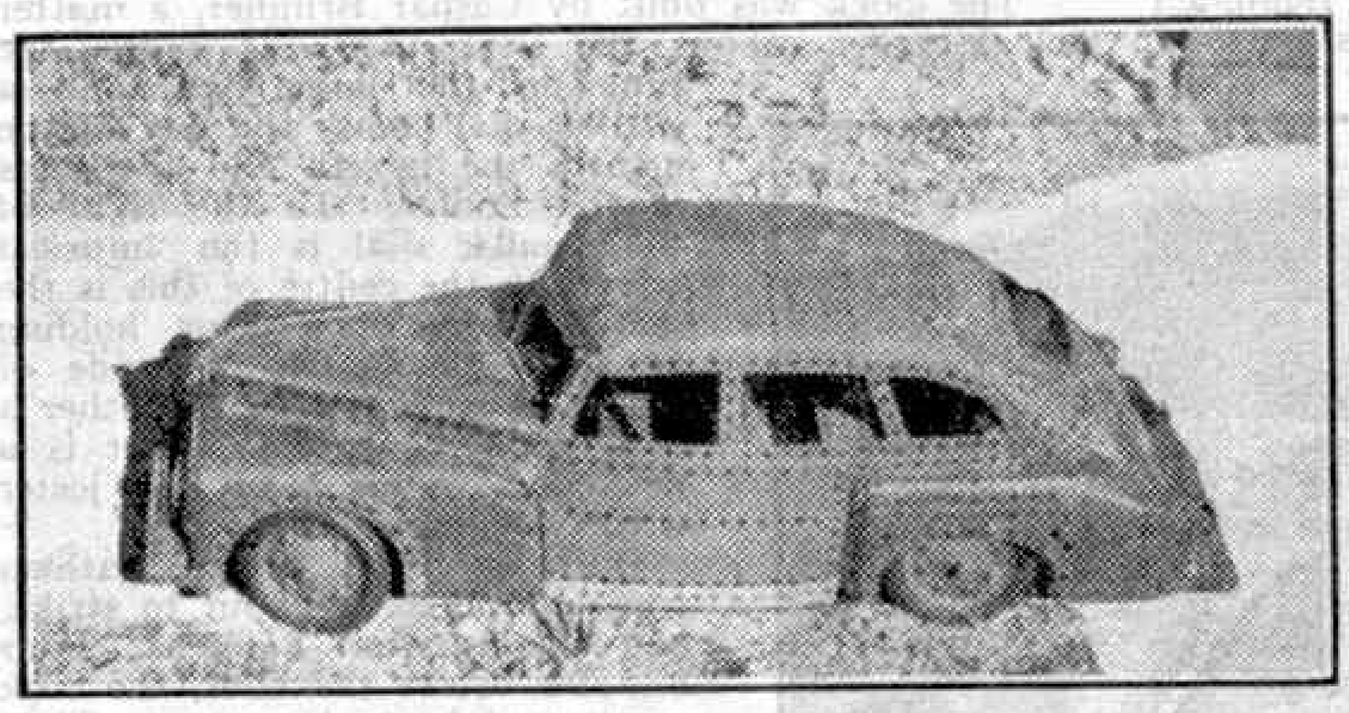
John G. Crawford (Bishop Auckland).

Among the Model-Builders

By "Spanner"

AN AUSTRALIAN RE'.DER'S FINE MODEL CAR

Owing to the super streamlining of most American cars considerable skill is required to model them realistically without bending too many of the Flexible Plates and Strips used in their construction. I was therefore particularly interested in a fine model of this kind built recently by J. K. Saxton, Neutral Bay, N.S.W., Australia. A photograph of the model, which represents a Dodge Sedan designed for use in Australia, is reproduced on this page. The model is 30 inches long and 10½ inches wide. No mechanism is fitted in the chassis, except Ackermann steering gear, as Mr. Saxton wished to concentrate on reproducing the bodywork as neatly and accurately as possible. I think readers will agree that he has been very successful in his efforts.



A fine example of modern bodywork construction in Meccano. This realistic car is the work of J. K. Saxton, Neutral Bay, N.S.W., Australia.

SIMPLE MODELS CAN BE REALISTIC

A few Meccano parts assembled by an intelligent and knowledgeable boy can produce remarkably realistic results. An example of this is the simple little bulldozer shown on this page. This small model was built by Peter Lewis, Flamborough, and I think it is a very good effort for a boy just over 10 years of age. The model is most realistic in appearance, and within the limits allowed by the few parts used, the constructional details are very neatly carried out. I shall look forward to receiving more good models from this contributor and I congratulate him on his work.

REMOTE CONTROL STEERING

S. Wood, Queenborough, Kent, an enthusiastic model-builder and Secretary of the Borden Grammar School M.C., has sent me details of the interesting device for operating the steering mechanism of model vehicles by remote control illustrated on the opposite page.

A 7½" Angle Girder fitted at each end with a ½" Reversed Angle Bracket 1 is used for the front axle beam, and a 1½" Rod is mounted at each end in the Angle Girder and the Reversed Angle Brackets. Each of these Rods is fitted with a Coupling 2 and a Crank 3. The Cranks are connected by a 7½" Strip held by lock-nutted bolts.

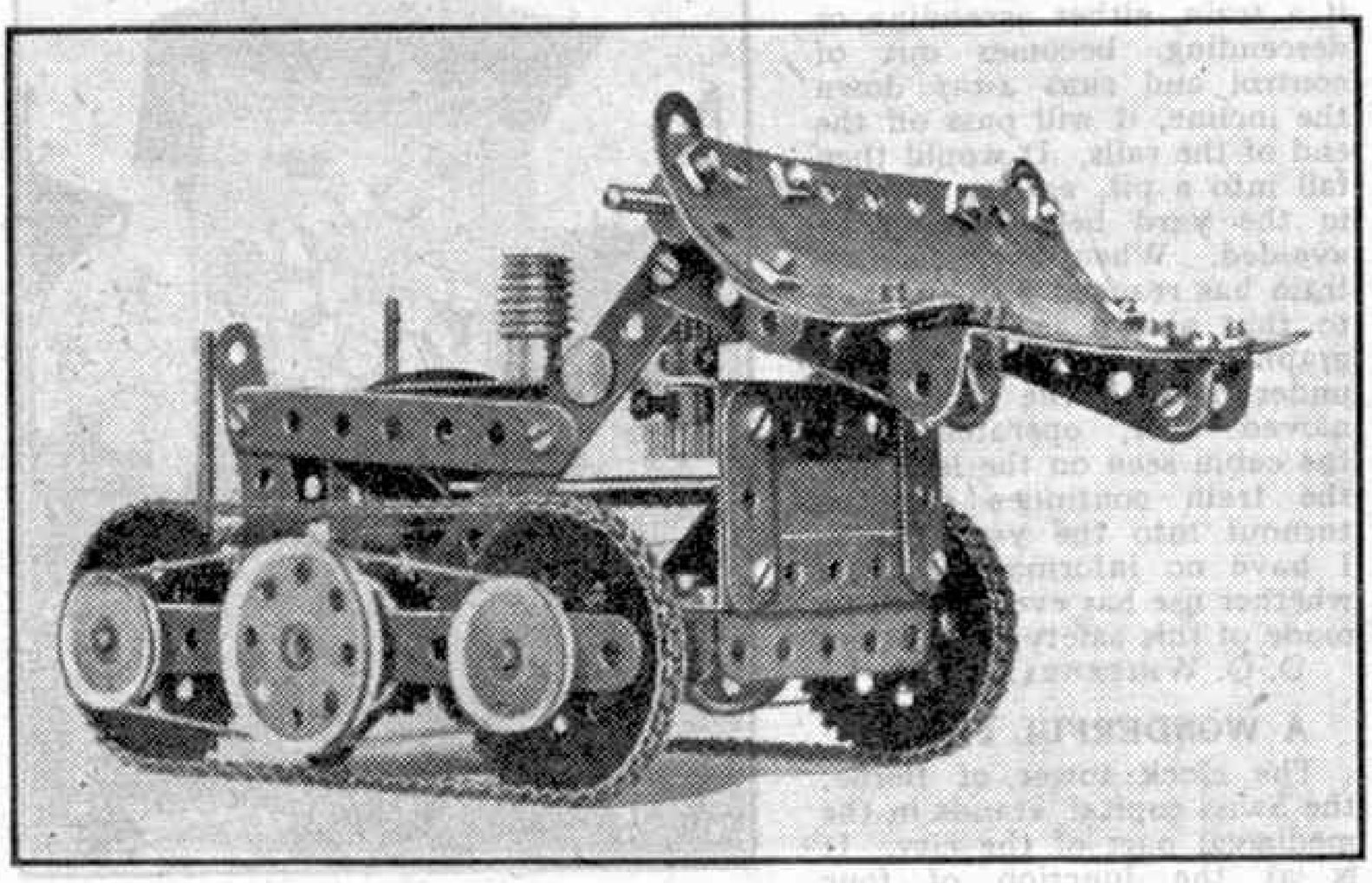
A 2½" Rod 4 is fixed in one of the Couplings 2, and one end of a Tension Spring is passed over the Rod and held in place by Collars. The other end of the Spring passes over a Rod mounted at the front of the chassis. The Spring holds the steering mechanism at full left lock, but it can be set in any position by means of a length of wire 5. This wire forms the inner core of the control cable, and is attached to the Rod 4. The wire is then passed through a length of Spring Cord, which may be fixed at any convenient point in the chassis by Collars.

The steering unit consists of two 2½" × 1½" Flanged Plates connected by Flat Trunnions. A Rod 6 passes through the Flat Trunnions, and is fitted with a winding drum formed by two ½" Flanged Wheels. One end of the wire 5 is clamped firmly between the Flanged Wheels, and the Spring Cord is attached to one of the Flanged Plates by two Collars. As the Steering Wheel is turned the wire 5 winds on the drum, thus turning the steering mechanism. As soon as the Steering Wheel is released, however, the drum unwinds under the action of the Tension Spring.

HOW TO USE MECCANO PARTS

Centre Fork (Part No. 65).

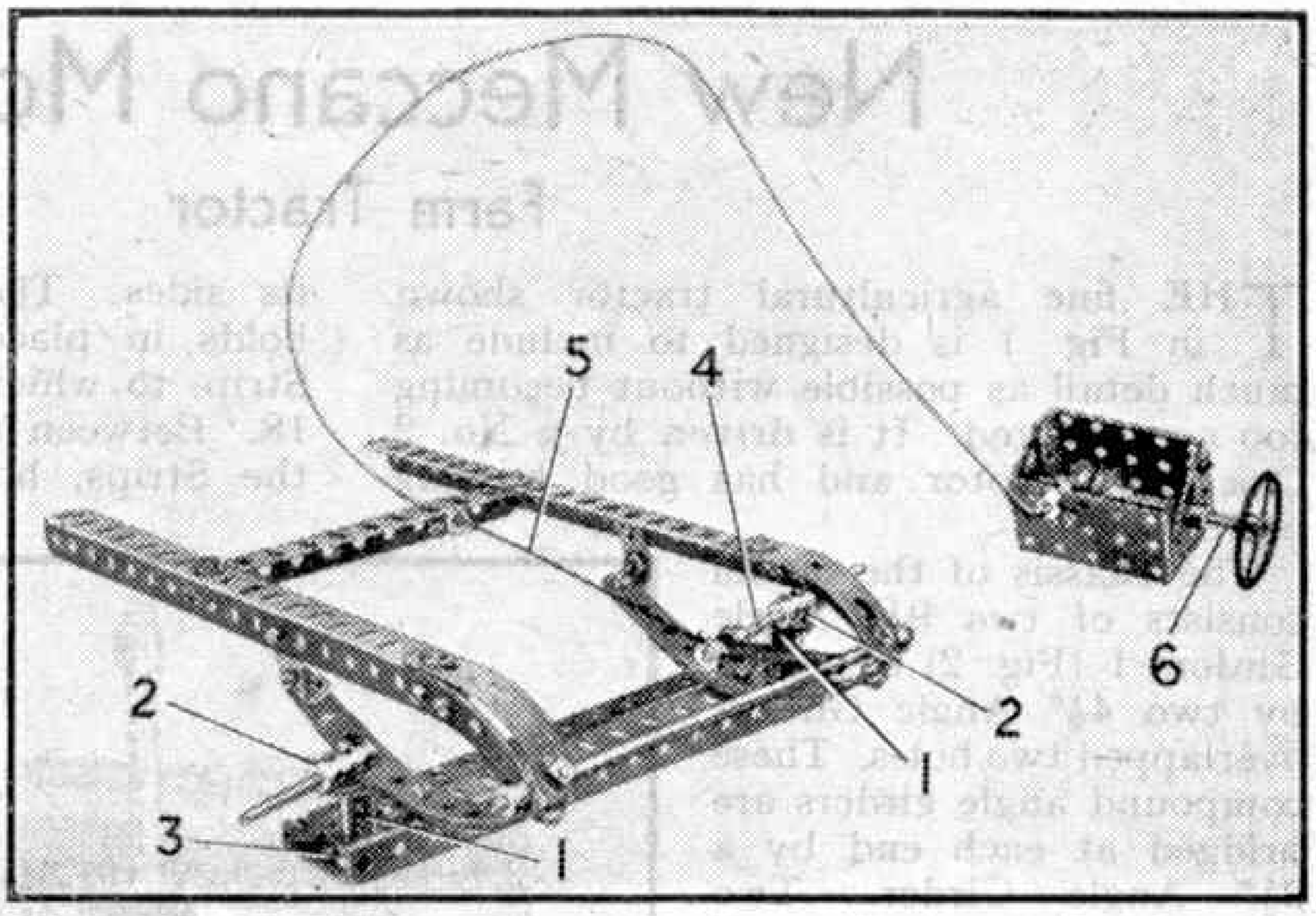
The Centre Fork is a part that many model-builders seem to overlook, but it has many very useful functions. For example, it can be used as a small pointer in certain Meccano indicating appliances, but perhaps its most important application is in intermittent motions where it can be arranged to engage at intervals the teeth of a Meccano Gear or Sprocket Wheel. For this purpose the part can be fixed to a vertical rotating Rod, and arranged so that once in each revolution of the Rod, the Centre Fork



A simple model bulldozer that consists of only a few parts. It was built by Peter Lewis, Flamborough.

engages with and partially turns a Sprocket Wheel fixed on a second vertical Rod.

Another use for the Centre Fork is in making a "knife edge" bearing, a type of bearing required in models such as weighing machines and harmonographs. It is used in this way in the illustration below which shows the pivot of the beam in a Meccano platform weighing machine. Two Centre Forks are fixed in a Coupling mounted on the beam, and their points rest between the teeth of two Pinions supported on a Rod mounted in the column of the machine. The beam is thus able to rock freely about the point of support.



A remote control steering device for motor vehicles. It was suggested by S. Wood, Queenborough, Kent.

Advanced Model-Builders Competition

A CHANCE FOR MECCANO EXPERTS

In reply to many requests we announce a competition designed specially to interest advanced and expert model-builders. It is not likely that beginners in Meccano will have the necessary knowledge or technical skill to compete successfully in this contest, but there is nothing to prevent them from sending in entries if they wish to do so. If this contest is a success a series of competitions on similar lines will follow.

In these contests we intend to state a particular mechanical problem, and to invite competitors to try their skill in solving it. This month's problem is as follows: A machine is required to fill continuously small round boxes, each with 10 pills, and to place a lid on each box. Competitors are asked to submit Meccano models of machines suitable for carrying out these operations. There are of course many different methods by which the work can be done, and competitors will find plenty to exercise their ingenuity and skill in designing a machine based on their own ideas.

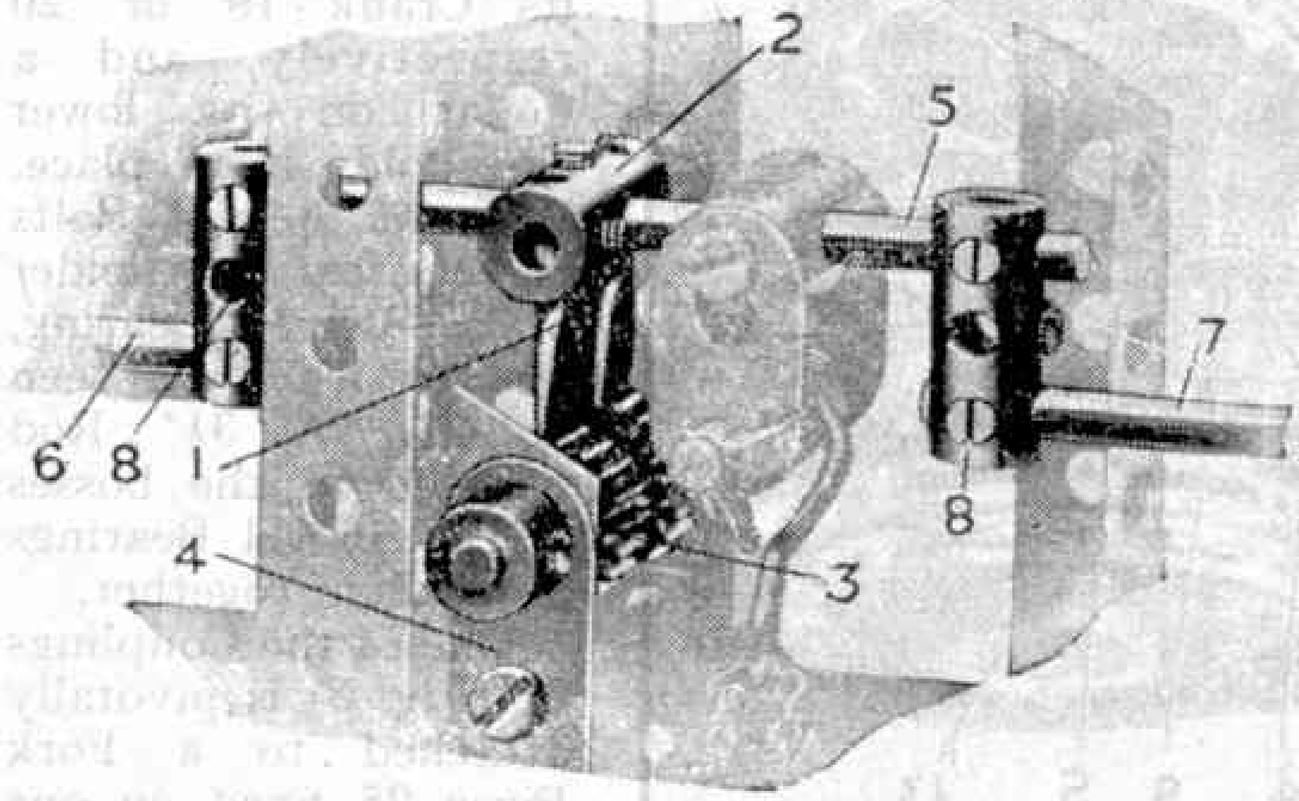
Only the essential parts of the mechanism, sufficient to show how the various operations can be performed, need be built. For example, a machine of the kind required by the conditions of this contest would include (1) a storage hopper and feeder conveyor for the empty boxes; (2) mechanism for counting out 10 pills into each box; (3) mechanism for placing the lid on the box and; (4) some means of removing the filled box to allow another to take its place; entries therefore must show how these movements are obtained.

The prizes to be awarded for the best entries are as follows: First, Cheque for £3/3/-. Second, Cheque for £2/2/-. Third, Cheque for £1/1/-. There will be also five prizes each of 10/6.

The competition is open to readers in any part of the world and will remain open for entries until 30th November next. The extended closing date will give model-builders ample time to think out and build their models and prepare illustrations.

Photographs or good sketches of models, together with a written description of the essential mechanism, are all that is required.

Entries should be addressed: "*Advanced Meccano Competition No. 1, Meccano Ltd., Binns Road, Liverpool 13.*"



Centre Forks used to provide a knife edge bearing for the beam of a weighing machine.

June Meccano Competition

OPEN TO MODEL-BUILDERS OF ALL AGES

This month we announce a new general model-building contest for Meccano models. Models may be of any size and description, but competitors should look out for new and unusual subjects for their models.

Original, well-designed models of this kind, even if they use only comparatively few parts, will be preferred by the judges to large ones displaying no originality in the use of parts or in the choice of subject.

After completing their models competitors should obtain suitable illustrations and send these to "*June General Model-Building Contest, Meccano Ltd., Binns Road, Liverpool 13.*" A photograph is preferable, but a reasonably clear sketch will be satisfactory. The competitor's age, name and address must be written on the back of each illustration submitted.

Entries will be divided into two Sections, A, for model-builders living in the British Isles; and B, for Overseas competitors.

The following prizes will be awarded in each Section: First, Cheque for £3/3/-; Second, Cheque for £2/2/-; Third, Cheque for £1/1/-. Five prizes each of 10/6 and five prizes each of 5/-.

Closing dates: Section A, 30th July; Section B, 30th November.

New Meccano Models

Farm Tractor

THE fine agricultural tractor shown in Fig 1 is designed to include as much detail as possible without becoming too complicated. It is driven by a No. 2 Clockwork Motor and has good hauling power.

The chassis of the model consists of two 9½" Angle Girders 1 (Fig. 2) extended by two 4½" Angle Girders overlapped two holes. These compound angle girders are bridged at each end by a 2½" Angle Girder. Two 2½" × 1½" Flanged Plates 2 and 3 are attached to the compound girders in the positions shown, by three ¾" Bolts 4, and the space between the Plates is bridged by a 2½" × 2½" Flat Plate 5. Two Flat Trunnions 6 are bolted to each side of the chassis.

The model is driven by a No. 2 Clockwork Motor, which is supported on two Screwed Rods fixed in the apex holes of the Flat Trunnions 6 by nuts. One of the Screwed Rods is seen at 7. The Rods are passed through holes in the Motor sideplates, and the Motor is fixed centrally on them by nuts screwed tightly against its sides. The front Screwed Rod also holds in place a 2½" × ½" Double Angle Strip, to which are bolted two 3½" Strips 18. Between the Double Angle Strip and the Strips, however, are two Cranks 19 and 20. These overhang the 3½" Strips by one hole at each end.

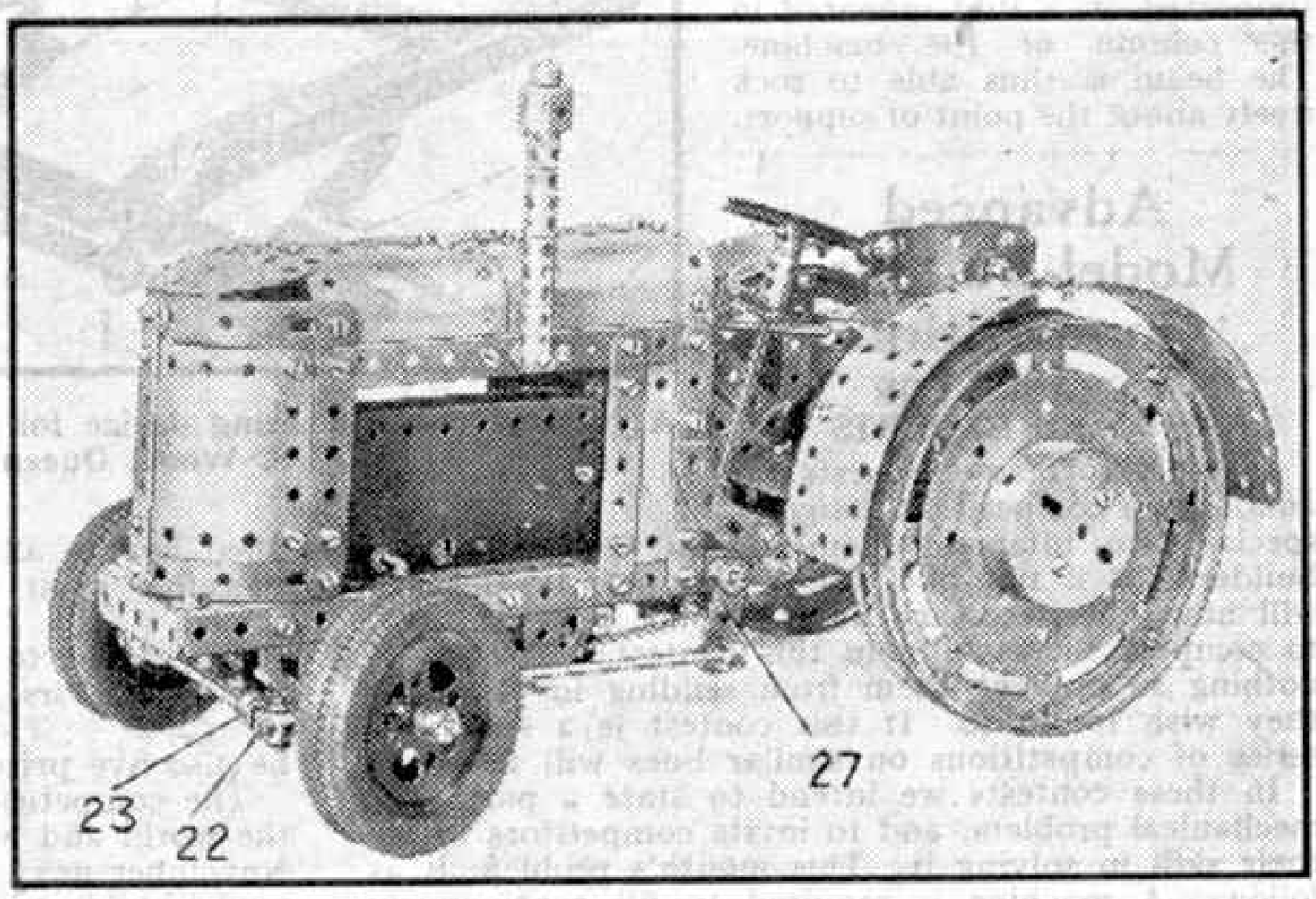


Fig. 1. A powerful farm tractor driven by a No. 2 Clockwork Motor.

Each of the front wheel units, consisting of two 2" Pulleys fitted with Tyres, is mounted on a 2" Rod held in a Coupling 21. This Coupling pivots on a 1" Rod passed into its central transverse bore, where it is gripped by a 1⅛" Bolt 22. The Rod is free to turn in the boss of its Crank 19 or 20 respectively, and a Collar on its lower end holds it in place. Each of the 1⅛" Bolts 22 carries the spider of a Swivel Bearing, one of which is seen at 23. A 3½" Rod inserted in the bosses of the Swivel Bearings links them together.

One of the Couplings 21 (Fig. 3) is pivotally attached to a Fork Piece 25 fixed on one end of a Rod 26. The rear end of the

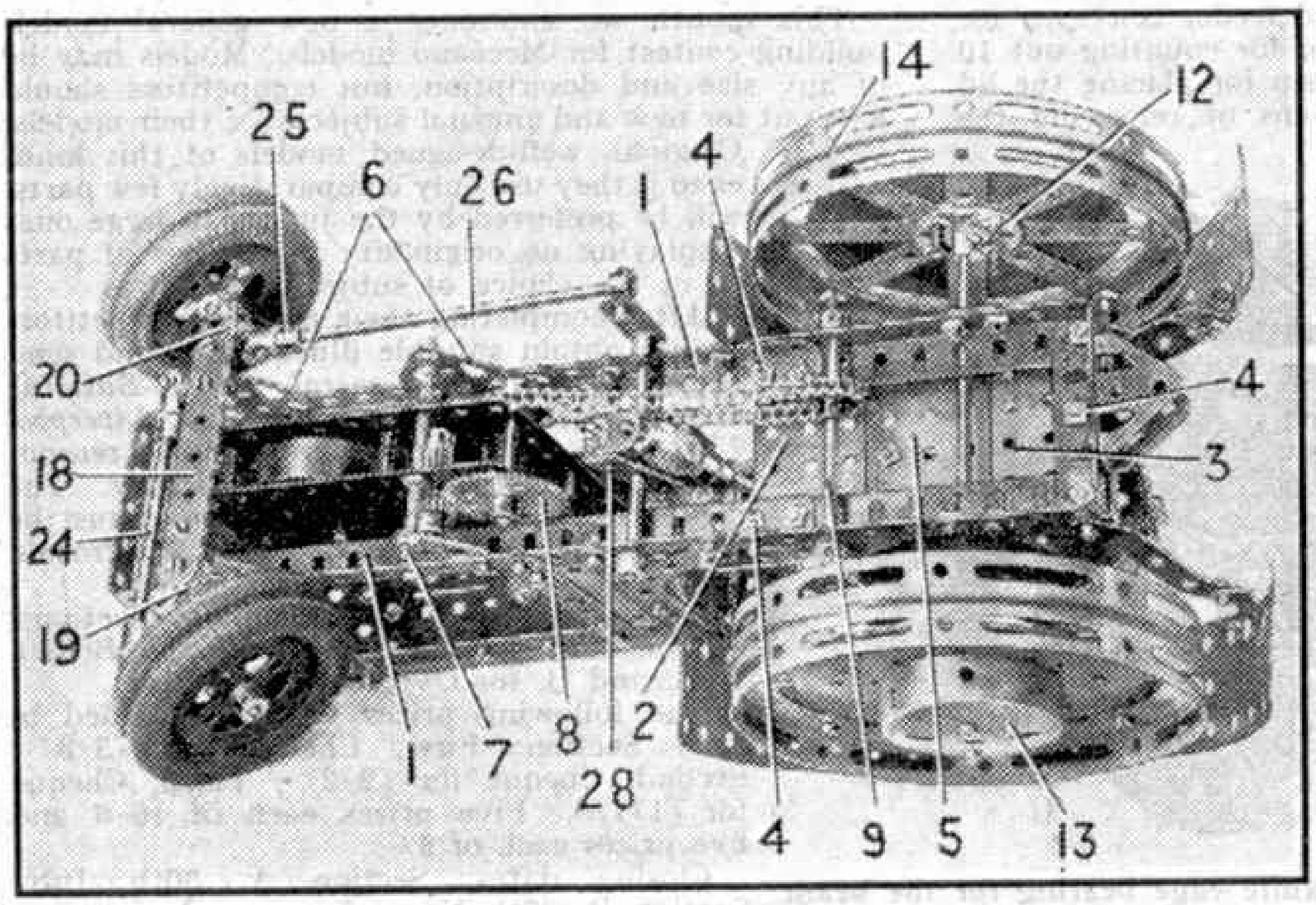


Fig. 2. An underneath view of the tractor.

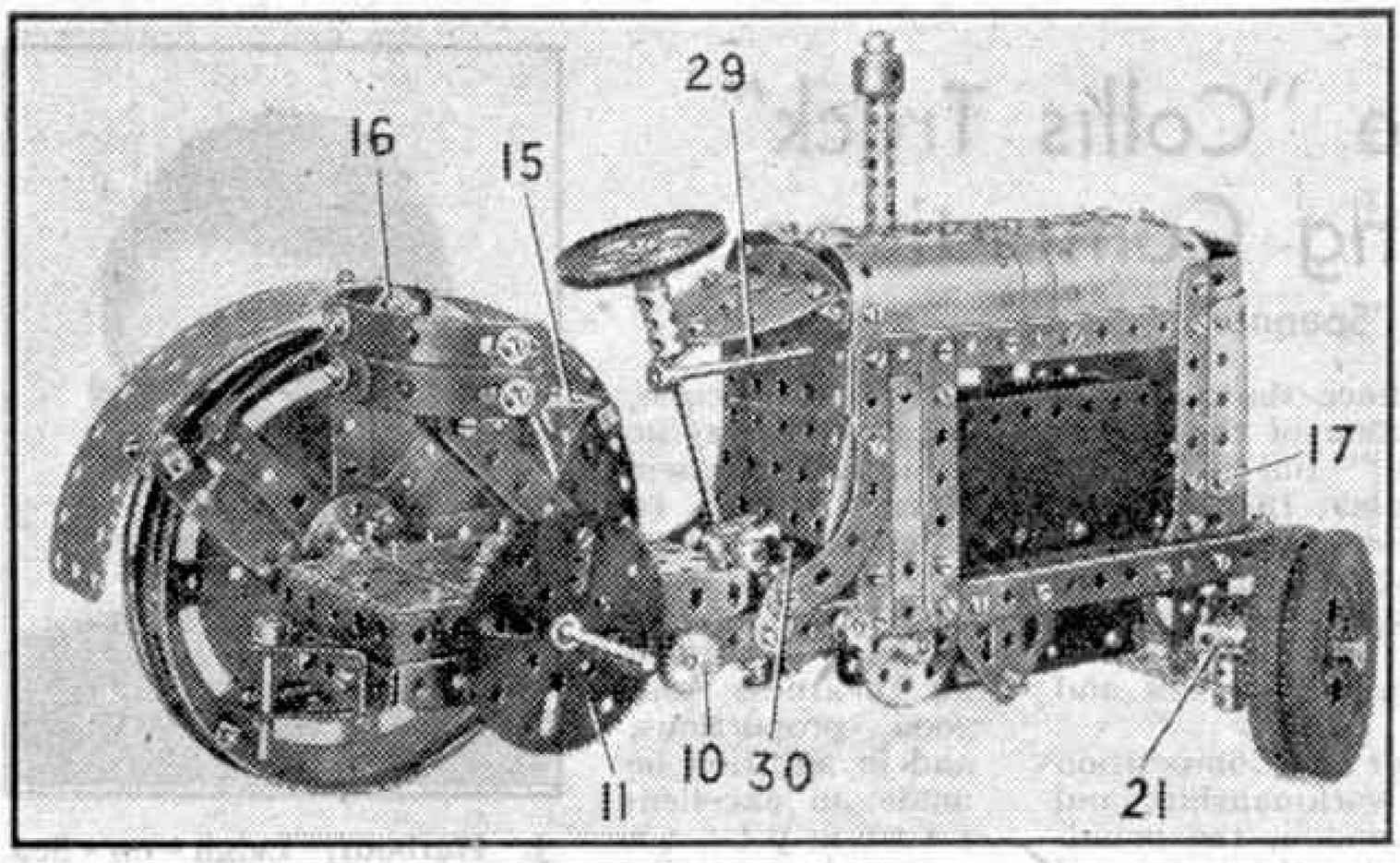


Fig. 3. The tractor with one of the rear wheels removed to show the drive arrangement to the rear axle.

Rod is gripped in a Collar, which is screwed by one of its threaded holes on to a Bolt fixed by a nut in the end hole of a Crank 27 (Fig. 1). The Crank in turn is fast on a Rod mounted in the chassis side members, and it carries at its centre a $\frac{1}{2}$" Pinion and a cage 28 consisting of two $1\frac{1}{2}$" $\times \frac{1}{2}$" Double Angle Strips bolted together and carrying at each end a Fishplate. The Pinion is placed on the Rod inside this cage.

The steering column passes through a $1\frac{1}{2}$" Strip attached to a Semi-Circular Plate at the rear of the engine housing, and at its lower end through two Fishplates attached to the cage 28. Between the Fishplates it carries a Worm that engages the $\frac{1}{2}$" Pinion in the cage. The column is held in place by two Collars placed against the sides of the upper Fishplate.

The driving shaft of the Motor carries a $\frac{1}{2}$" Pinion that engages a 57-teeth Gear 8 on a Rod journalled in the Motor sideplates. This Rod carries at its other end a $\frac{3}{4}$" Sprocket Wheel, which is connected by Chain to a second $\frac{3}{4}$" Sprocket mounted on a Rod 9 journalled in the chassis and held in place by Collars. Rod 9 carries a $\frac{3}{4}$" Pinion 10, and this engages a $2\frac{1}{2}$" Gear Wheel 11 on the axle of the rear wheels. Bearings for the Rod are provided by two 1" Corner Brackets, bolted one to each of the chassis sidemembers.

Each of the rear wheels consists of two Hub Discs bolted together. On the inner side of each wheel is a Bush Wheel 12 and on the outer side a 4" Circular Plate and a Boiler End 13. Two $1\frac{1}{8}$" Bolts hold the Boiler End, Circular Plate and Bush Wheel in place. The Bush Wheel is also held by two ordinary Bolts. A Rubber Driving Band 14 is fitted to each wheel, to enable it to grip the ground.

The driver's seat consists of a Semi-Circular Plate to which is bolted a $2\frac{1}{2}$" $\times 1\frac{1}{2}$" Flexible Plate 15, Fig. 3. An Angle Bracket at each side of the seat is extended by a Fishplate 16. The back and sides of the seat are formed by pairs of Formed Slotted Strips.

Construction of the bonnet sides is clear from the illustrations, and the top consists of six $2\frac{1}{2}$" $\times 2\frac{1}{2}$" Flexible Plates, with a Semi-Circular Plate at the front end. The curved front is formed by two further $2\frac{1}{2}$" $\times 2\frac{1}{2}$" Flexible Plates fastened by Bolts 17 at each side to Fishplates attached to the vertical $3\frac{1}{2}$" Strips.

The reversing lever of the Motor is attached by an End Bearing to a Rod that has a Collar at its end to serve as a handle. A Corner Angle Bracket is bolted to the brake lever of the Motor, and to the free lug of the Bracket a Fishplate 30 is bolted. A Slide Piece representing a foot pedal is then attached by a $\frac{1}{2}$" Bolt to the elongated hole of the Fishplate.

The details of the reaper can be followed quite easily from Fig. 4.

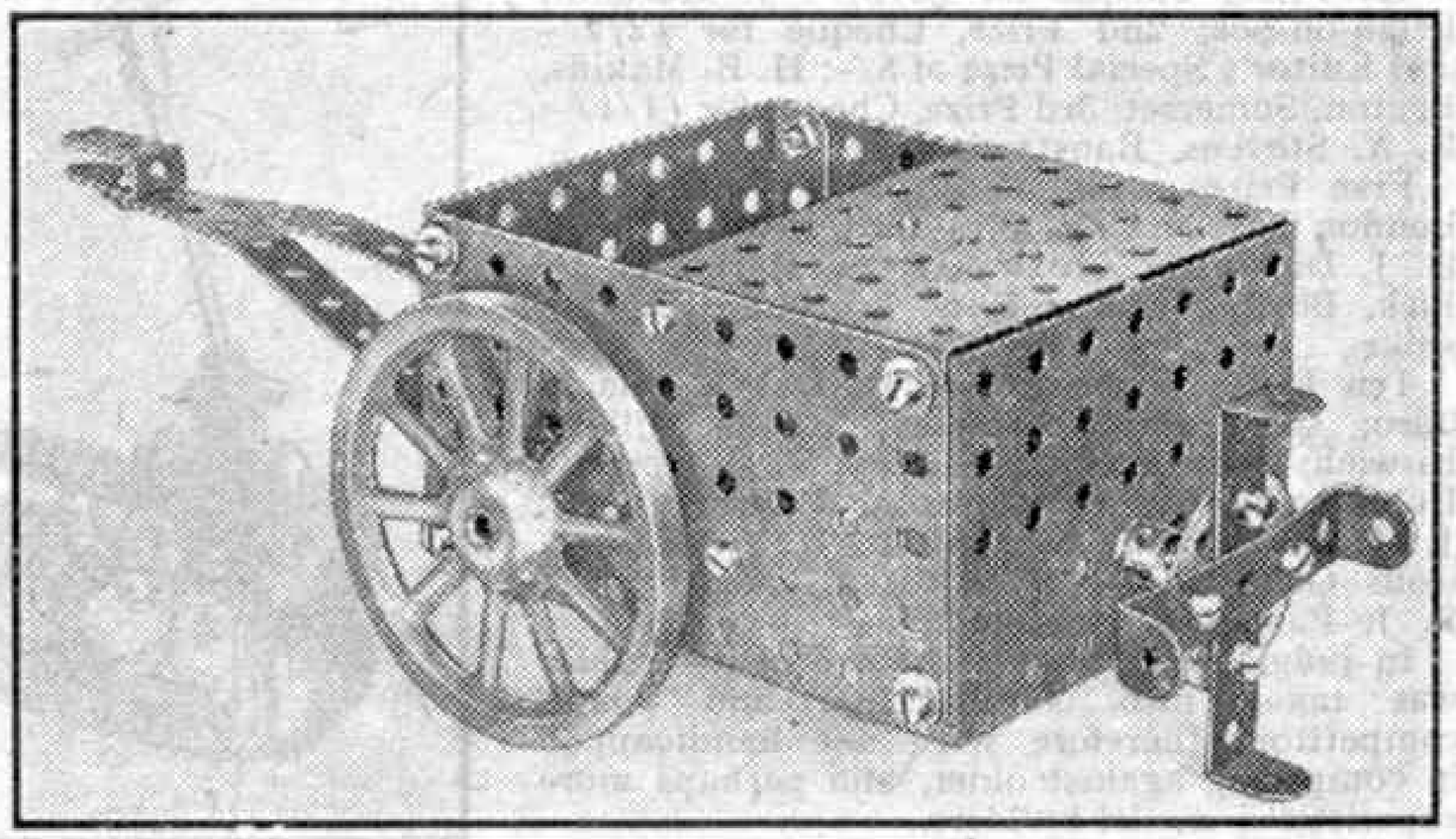


Fig. 4. This potato reaper forms an interesting implement for use with the tractor.

Results of the "Collis Truck" Model-Building Competition

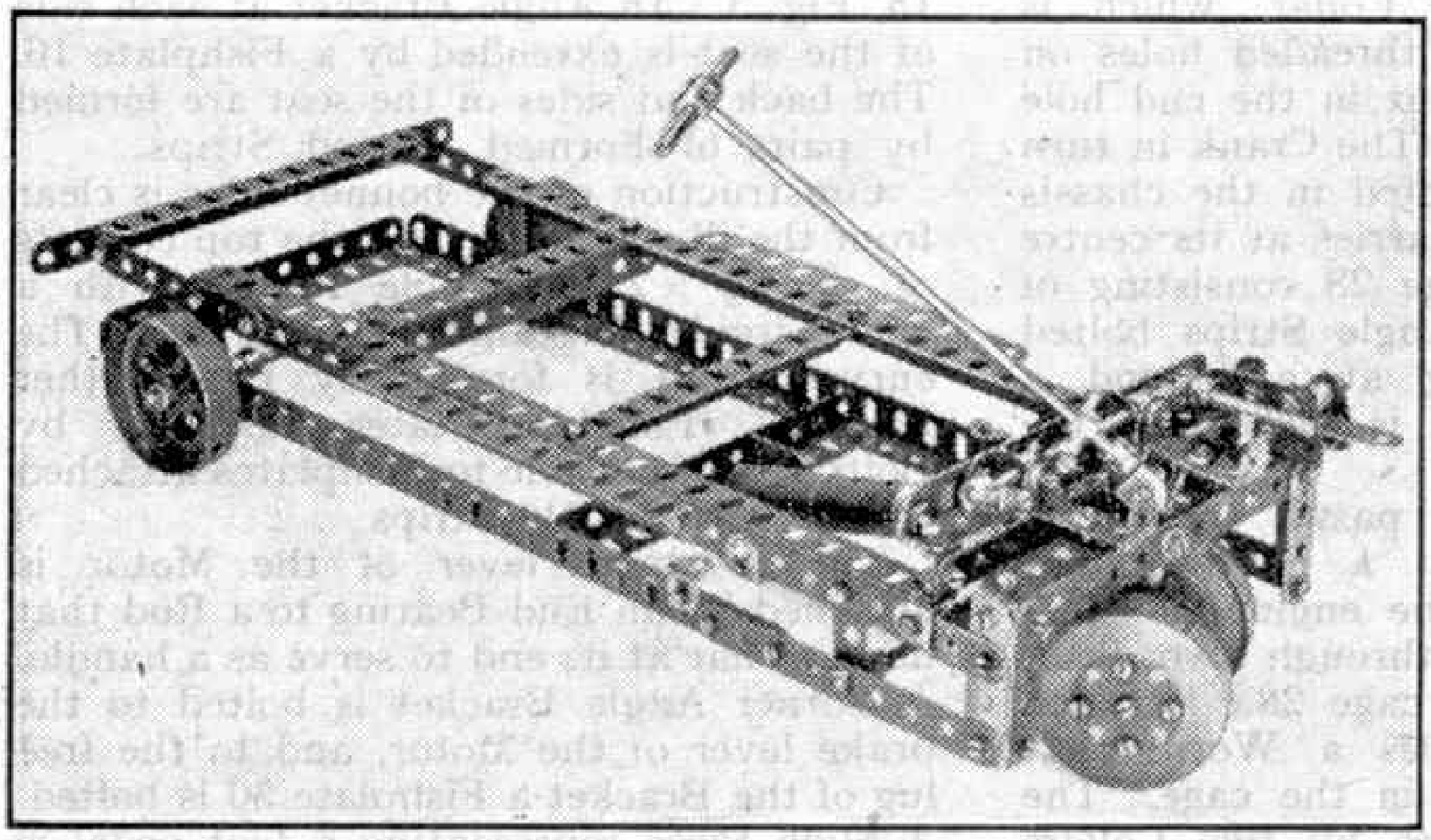
By "Spanner"

THIS month I am able to announce the names of prize-winners in the Home Section of the "Collis Truck Model-Building Competition," full details of which were published in the November, 1948 issue of the *"M.M."* In this Competition model-builders were invited to try their skill and ingenuity in building models of the "M" Type Collis Truck, a very popular mechanical truck used for lifting and transporting raw materials or finished products in factories and workshops.

Many of the models submitted for the Competition reached a very high standard of workmanship, and Messrs. J. Collis and Sons Ltd., London, the manufacturers of Collis Trucks, were greatly impressed with the realism and accuracy with which the mechanical details of their product were reproduced.



J. Harbour, Leigh - on - Sea, winner of First Prize in the "Collis Truck" Contest.



J. Harbour's prize-winning entry in the "Collis Truck" Competition.

The entries were judged jointly by Messrs. J. Collis and Sons Ltd. and Meccano Ltd., and the distribution of awards in the Home Section of the Contest was as follows:

1st Prize, Cheque for £5/5/–: J. Harbour, Leigh-on-Sea; 2nd Prize, Cheque for £2/2/– and Editor's Special Prize of 5/–: H. B. Makins, Bruton, Somerset; 3rd Prize, Cheque for £1/1/–: E. A. Stevens, Banstead.

Five Prizes, each of 10/–: P. T. Bellamy, London S.W.20; C. E. Wrayford, Bovey Tracey; D. J. Dickinson, Croxley Green, Herts.; B. H. Pick, Boston, Lincs.; P. S. Prismall, Basingstoke.

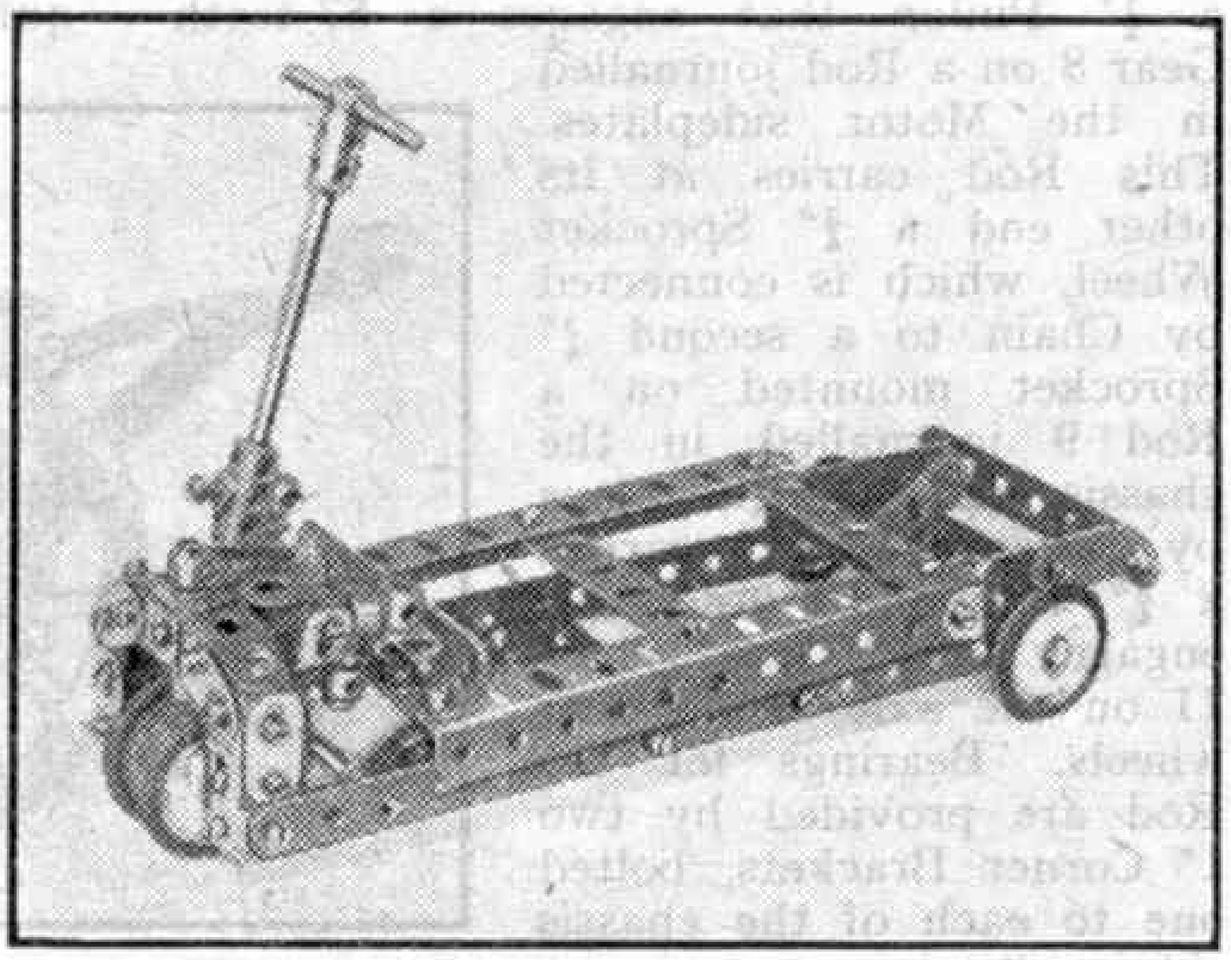
Ten Prizes, each of 5/–: D. DeWit, Blackburn; G. Crabtree, Shipley; R. J. Hilling, Ipswich; D. R. Holmes, Burnley; N. D. Horsley, Bulwell, Notts.; J. McIntosh, Edinburgh 10; J. Hollins, London N.W.7; J. K. Carter, Goffs Oak, Herts.; M. R. B. Clarke, Epsom; P. J. Patterson, Southsea.

In judging each model the age of its builder was taken into consideration and young competitors therefore were not handicapped in competing against older, and perhaps more experienced model-builders.

First Prize was won by a 14-year old boy, John Harbour, Leigh-on-Sea, whose portrait appears on this page. I wish to congratulate him on this success, because it is no mean feat to win First Prize in competition with many older enthusiasts. His model was notable for neatness and good proportions, and in addition he made an excellent attempt to reproduce the mechanical features of the Collis Truck. The model is shown in one of the accompanying illustrations.

An older competitor, H. B. Makins, Bruton, won Second Prize, and in addition to the excellence of his work in building the model itself a notable feature of this entry was the very detailed manner in which the model was described and illustrated. The illustrations consisted of really explicit and neatly executed sectional drawings, and in view of the patient work done in preparing these the Editor decided to award this competitor an extra Special Prize of 5/–.

Third Prize went to E. A. Stevens, Banstead, whose model also is shown on this page. Its chief claim to distinction is compact and neat construction, and the fitting of so much detail in such a small space is a fine achievement.



A very neat and compact model of the M-Type Collis Truck, which won Third Prize for A. E. Stevens, Banstead.

Club and Branch News

WITH THE SECRETARY

CLUB AND BRANCH PICTURES

Films are more plentiful now than they have been for a considerable time. One result of this should be an increase in the activities of Photographic Sections of Clubs and Branches, and the introduction of photography in the programmes of those in which this hobby is not at present pursued. A photographic record of Club and Branch life, especially in the outdoor season, cannot fail to be both interesting and valuable.

Where there is a Photographic Section it is easy to get good pictures of places visited and of members enjoying themselves on outings. In Clubs where there are not a sufficient number of camera owners to justify the formation of a Photographic Section there is usually at least one official or member who can be relied upon to undertake this interesting duty. This can be done without any extra expense, for members are willing to pay small sums for prints of photographs in which they appear, and the amount to be paid can easily be arranged to cover the cost of films and processing.

I shall look forward to seeing more pictorial evidence of summer season activities. Good photographs sent in will be reproduced on this page if they are suitable.

The possibilities of indoor photography also should not be overlooked. Pictures of members at work in the Club room, or demonstrating models and operating Hornby and Hornby-Dublo Layouts at Exhibitions, also form suitable subjects for reproduction in the "*M.M.*" Officials and members of a Club or Branch are always delighted when pictures of themselves appear on this page, and take pride in showing visitors copies of the issue in which they appear.

THE NEW CLUB BOOKLET

The new edition of the booklet "*How To Run a Meccano Club*" is now ready. It explains exactly how the Guild and Club movement began, and gives a full account of the manner in which a new Club is started. In addition there are many valuable suggestions for the Club programme at all seasons of the year. These are of a very practical character, as they are based on the experience of Clubs in all parts of the world.

The booklet is amply illustrated with photographs of Club groups, including many showing members at work in their Club rooms. I shall be glad to send a copy to anyone interested in the formation of a Meccano Club on receipt of a 2d. stamp.

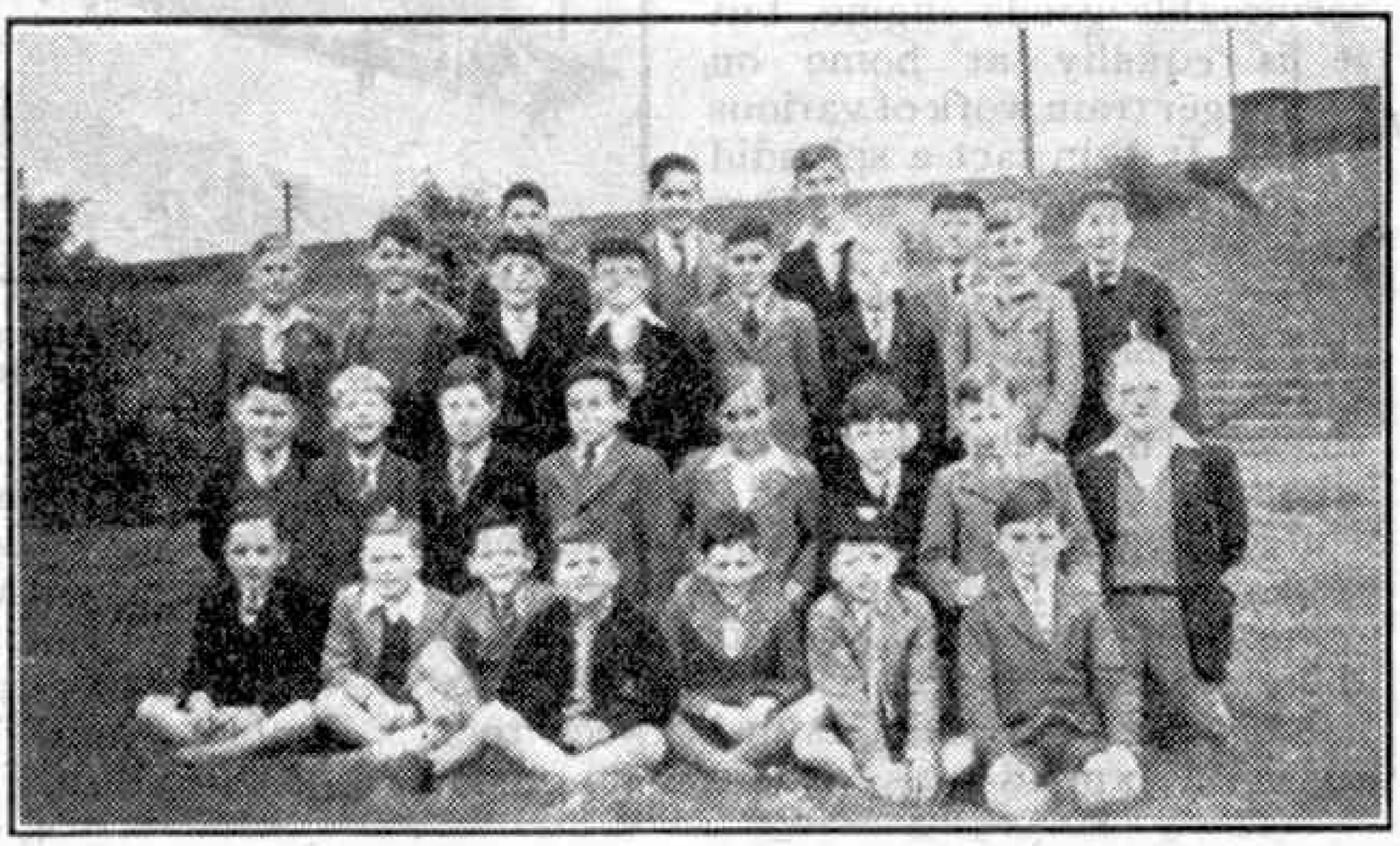
CLUB NOTES

WATERLOOVILLE AND COWPLAIN DISTRICT M.C.—An Electric Section has been formed, and members have established communication by telephone between the two buildings in which the Club meets. Land yachts have been built and tested in readiness for a race. Mr. A. J. Nicholson, President, has given a Talk on the E6 Electric Motor, with demonstrations of its use. An Exhibition is planned and several outdoor events have been arranged. Club roll: 13. *Secretary:* Mr. A. J. Nicholson, 213, Sultan Road, Buckland, Portsmouth.

WHITGIFT SCHOOL (CROYDON) M.C.—Enthusiasm is growing, particularly among the younger members. Special meetings have included a Visit to Kenview and a Quiz in which small prizes were awarded. An excellent Library, including a good stock of copies of the "*M.M.*," is now available. Club roll: 26. *Secretary:* P. J. Cousins, 20, Langley Oaks Avenue, Sanderstead, Surrey.

MAREHAM-LE-FEN M.C.—Excellent progress is being made by this new Club. Meetings are held weekly, and a good model-building programme is being pursued. Club roll: 7. *Secretary:* M. Bye, 1, Watsons Yard, West Street, Horncastle, Lincs.

SOUTH HARRINGAY PRIMARY SCHOOL M.C.—Intensive model-building is carried on. Set subjects are announced and members build models partly at home and partly at meetings. In this way excellent model lorries, windmills and aircraft have been constructed. Marks are awarded for each entry. Club roll: 30. *Secretary:* T. Newbold, South Harringay Primary School, London N.4.



Members of the Huntingdon M.C. photographed during a ramble. This Club, which was affiliated in October 1945, is under the Leadership of Mr. J. C. Deaves, Secretary, F. Saddington. Its programme is noteworthy for excellent model-building on an extensive scale, and for the many successful Exhibitions it has organized. The good work of the Club has been recognized in appreciative reports in the local press.

BRANCH NEWS

RYDAL SCHOOL (COLWYN BAY)—Recent activities have included the building of track and of scenery, and plans for a central control point for the Branch Layout are being carried out. A Debate on "*Railway Nationalization*" has been held, and two Railway Films have been shown. A visit to Crewe is planned, and preparations for the Annual Exhibition are being made. *Secretary:* K. L. Holgate, Crusaders, Rydal School, Colwyn Bay.

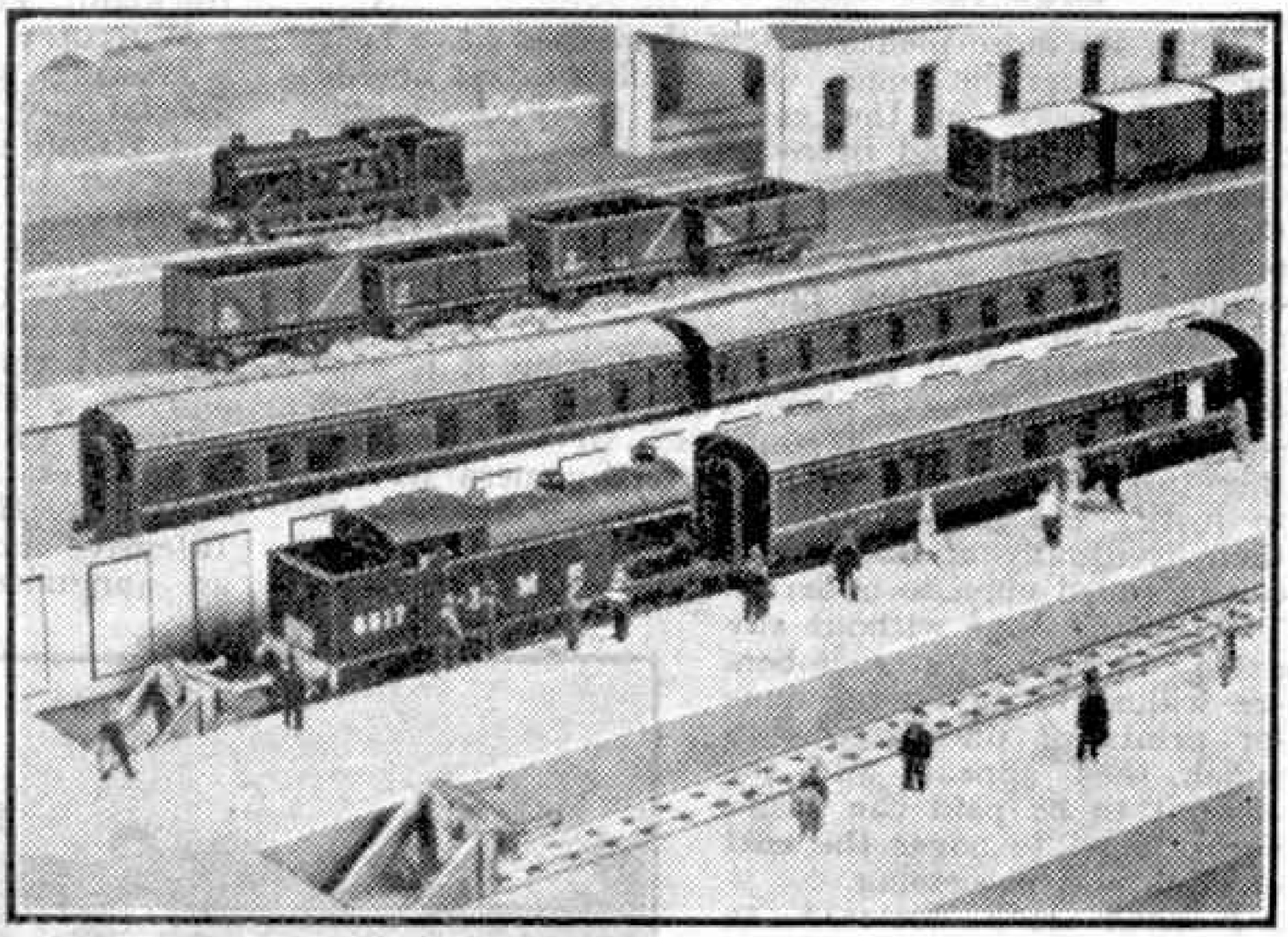
SLOUGH—An outdoor line is being constructed in picturesque surroundings. Embankments have been made, and a pond included in the scene has a miniature Suspension Bridge across it. A Signal Box is now being constructed. *Secretary:* W. Eisele, 335, Farnham Road, Slough, Bucks.

The Hornby-Dublo Tank Locomotive

THE Hornby-Dublo Tank engine is one of the most useful miniature locomotives imaginable. A tank engine, being self-contained, is always a handy unit and this is specially so on miniature layouts. It does not take up much room, and as it can run equally well either forward or backward the necessity for turning it at the end of the journey does not arise.

It is sometimes thought that the Hornby-Dublo Tank Locomotive is suitable only for freight duties because it is supplied in the standard Goods Train Set. It is a very serviceable goods engine, but it is equally at home on passenger train work of various kinds. It is in fact a splendid mixed traffic engine for other than main line duties.

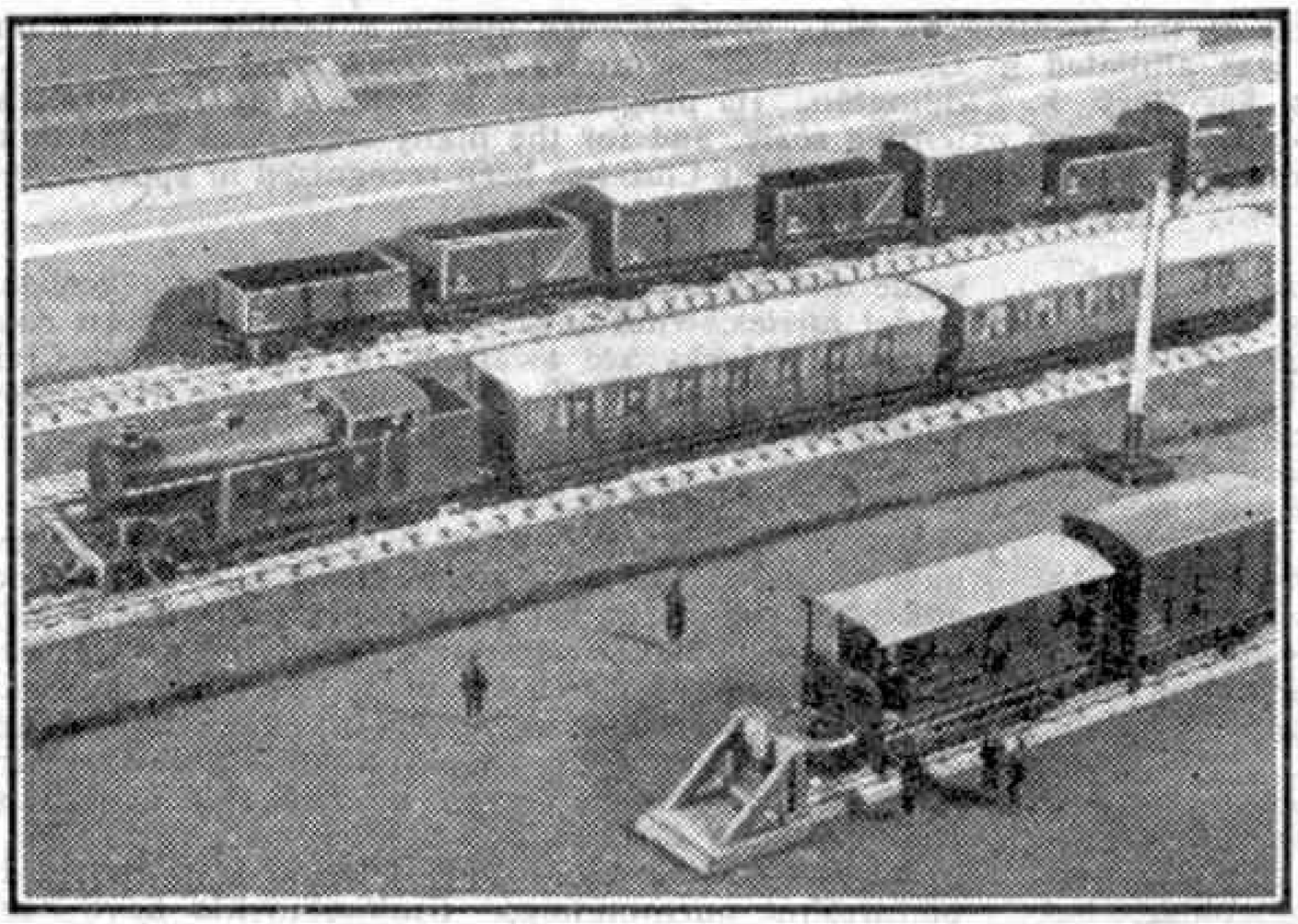
Both the illustrations on this page show Hornby-Dublo tanks at work with passenger stock. The vehicles shown are of the standard corridor types of the Hornby-Dublo range because, so far, compartment type vehicles are not available. To represent suburban and stopping trains, therefore, the Hornby-Dublo owner must use his main line vehicles in between their turns on express runs. There is no reason why this should not be done. In actual practice, main line corridor sets are sometimes made use of to form a stopping train when being worked from their stabling point to an important terminus before taking up a main line run.



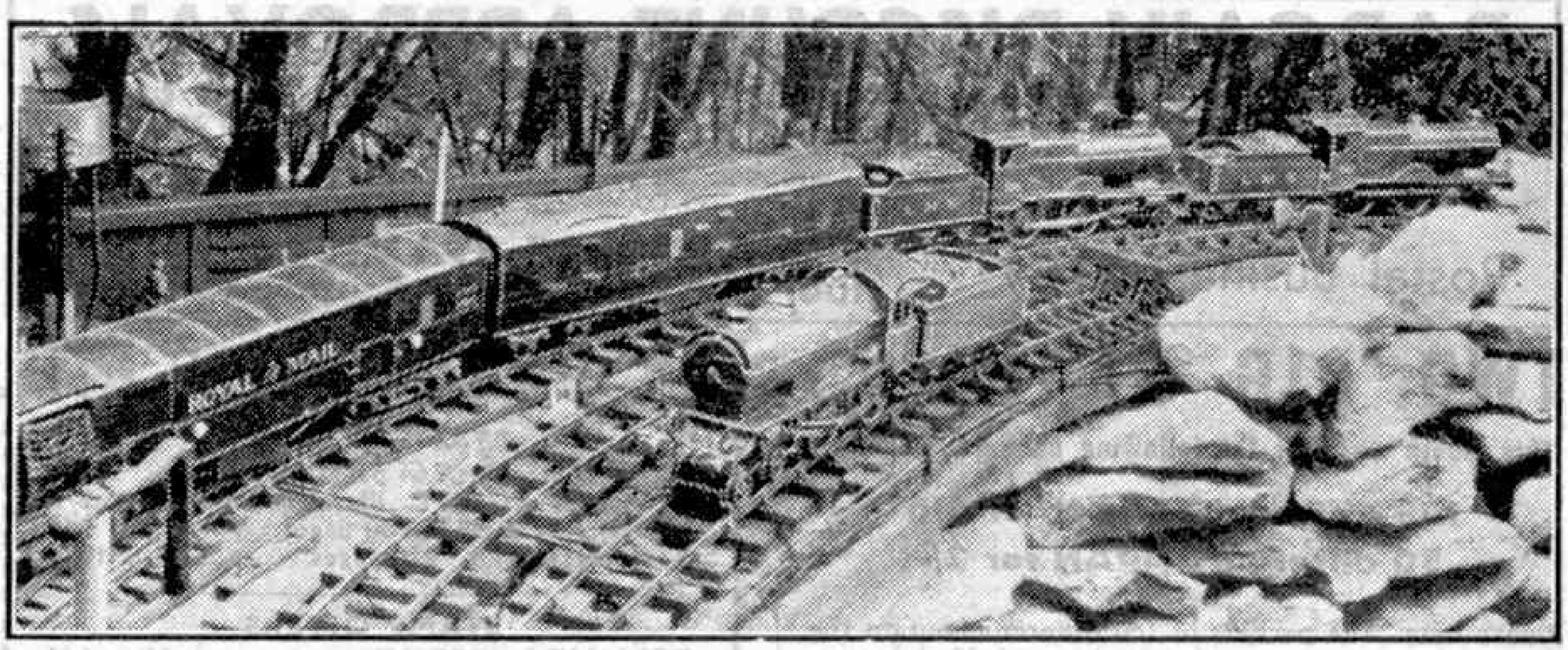
A passenger terminal scene in Hornby-Dublo. The 0-6-2 Tank with a train of empty stock ready to form an out-going express.

Besides work of this kind, the running of "empties" such as the disposal of main line trains at the end of their run, can quite well be carried out with the Hornby-Dublo Tank. On larger layouts at important terminal or through stations it is a realistic scheme to have the tank locomotive acting as "station pilot." An engine on this work performs any shunting movements that may be necessary, and will frequently marshal passenger trains ready for departure.

The general appearance of the station will be made more realistic by the presence of an engine employed in this way, as shown in the upper illustration. Although this typical station scene includes miniature figures on the platforms to give an appearance of life and bustle, it must be pointed out that these attractive little accessories are not yet available, but they will re-appear in the Hornby-Dublo range later on.



A stopping train represented by Hornby-Dublo L.N.E.R. stock headed by a standard 0-6-2 tank. The latter is an excellent engine for this type of work.



A double-headed mail train rounding a curve on the outdoor layout of Mr. C. B. Smith, Lincoln. Each of the engines shown is a Hornby 4-4-0 of pre-war manufacture.

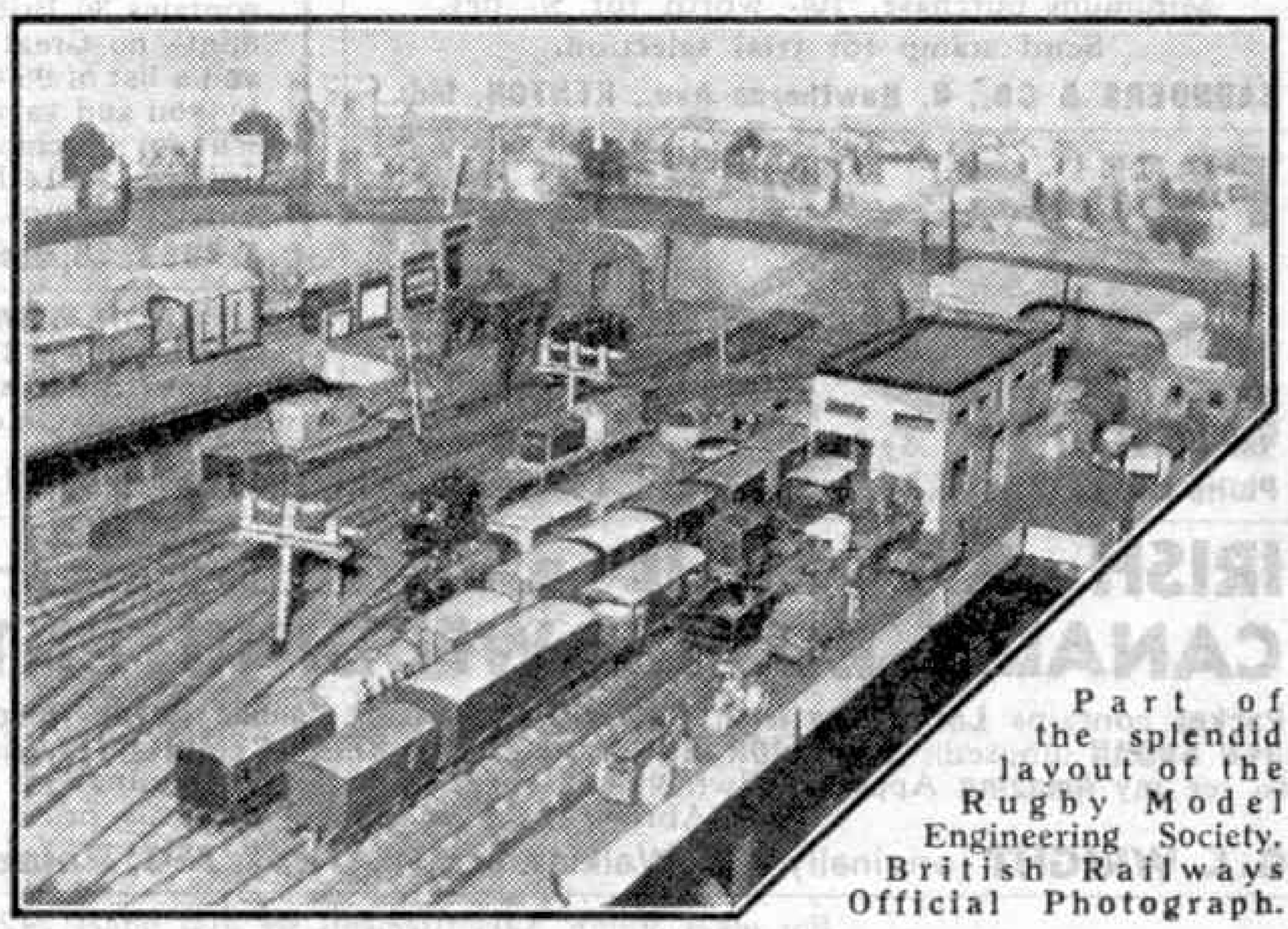
Hard Work by Hornby Locomotives

EACH of the photographs on this page shows part of two realistic miniature railways on which Hornby Clockwork Locomotives carry out a great deal of hard work. The upper picture shows the curve at *"Lakeside"* on the outdoor system of Mr. C. B. Smith, Lincoln, which has been referred to several times in these pages as the *"Bincliff, Lakeside and Shedley Railway."* The two L.M.S. 4–4–0 engines shown heading the "Royal Mail" train have been in continuous service since well before the war and must have covered many actual miles.

The other engine shown is also a Hornby Locomotive of pre-war L.N.E.R. type that is employed chiefly on fast freight traffic. Clockwork is the principal motive power on the *"Bincliff"* line, although two steam locomotives are in use and experiments have been made with electric traction. For the time being however, the bulk of the regular train services are clockwork hauled.

The layout in the lower photograph is situated at Rugby and it includes 150 ft. of track, five signalboxes, four stations, a coaling stage, a locomotive testing station and automatic level crossing gates. This is owned by the Rugby Model Engineering Society and its construction has been principally inspired by Mr. Frank Renshaw, a Locking Fitter on the London Midland signal maintenance staff. Mr. Renshaw, who started the Rugby Society ten years ago, spends all his spare time in this fascinating pursuit.

On Track Nights his "staff" operate this miniature railway, manning the signal boxes, "Control" and the marshalling yards. Goods trains and passenger trains including various Hornby locomotives and rolling stock are run, calling at stations in accordance with the working arrangements. Signalmen exchange messages by bell codes and, in fact, practically the whole of the real Rule Book comes to life.



Part of the splendid layout of the Rugby Model Engineering Society. British Railways Official Photograph.

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For other Stamp Advertisements see also pages 242 and xi.

Stamp Collecting

An Inventors and Explorers Issue

By F. Riley, B.Sc.

ALMOST an avalanche of stamps has poured in from certain Eastern European countries in recent months. It is at least doubtful if most of these have been intended to serve any real postal purpose; they seem rather to have been issued either for propaganda or just to raise money for various purposes. They include many commemoratives of men and events that may be of genuine interest in the countries concerned, but are practically unknown to the rest of the world. Occasionally remarkable claims have been made on behalf of those portrayed. One strange example came from Yugoslavia, where a series of four stamps marked the 80th anniversary of the death of Laurence Kosir, described as "the idealogical creator" of the first postage stamp, whatever that may mean. Stamp collectors and the world in general no doubt will continue to pay tribute to Rowland Hill and to Britain's famous "Penny Black."



One of the countries that has joined in this spate of commemorative stamps is Hungary, but here a different view of subjects appears to have been taken in certain instances. Various purely Hungarian matters of course have been commemorated, but in addition there have been issues with a much wider outlook. One of them was devoted to such famous writers as Shakespeare, Byron, Goethe, Voltaire and Tolstoy, with the Americans Mark Twain and Edgar Allan Poe also included. This set appeared in September of last year, and prior to that there was a set that will be of real interest to readers of the "*M.M.*," as its 10 stamps carry portraits of famous inventors and explorers. In each of these two series at least one local name was included, presumably out of patriotism, but the other figures concerned have all received world-wide recognition.



Both sets of stamps are described as air stamps, and they are certainly attractive, for they are handsomely printed in photogravure and the designs too are quite good. In view of this there seems no reason why they should not be included in our collections, which they will certainly brighten, for they are in 10 different colours, ranging from vermilion and magenta to carmine and violet.





A good start is made with the lowest value of the inventors and explorers issue. This is the 1 filler stamp, which celebrates the invention of printing from movable types by John Gutenburg. The stamp is illustrated here; its design sets the pattern of the whole series, for in addition to the portrait there is a representation of a very early printing press and one of a modern machine. The 4 fi. value has a portrait of Robert Fulton, the American steamboat pioneer, and here the design includes representations of Fulton's first steamer "*Clermont*" and a modern liner. The 5 fi. value has special interest for British readers, for on it is a portrait of George Stephenson, the great pioneer of railways. Stephenson has never been commemorated by British stamp issues, but there have been previous stamp celebrations of his achievements in various European countries. The present effort is certainly one of the best. In the design the "*Rocket*" appears in front of a real ironclad of a steam locomotive, a ponderous engine that reminds us of the streamliners introduced on the New York Central Railroad a year or two before the war.

Two inventors figure on the 6 fi. value. One is Zeppelin, whose airships led the way in the bombing of this country in the war of 1914–18. With him is D. Schwarz, for whom the claim of having invented a balloon of some kind is made. We return to inventors of greater fame with Edison, shown on the 8 fi. value with a cinematograph projecting a picture of the Statue of Liberty on a screen. On the 30 fi. value is a portrait of Kalman Kando, a Hungarian for whom the claim apparently is made that he invented the electric locomotive, and a locomotive of his design is shown with a modern example. Alexander Popov, a Russian scientist, is portrayed on the 40 fi. value, with symbolic features of radio in the design. Popov cannot fairly be described as the "inventor of radio," but he certainly did excellent work in the early days of this form of communication.



Two of the remaining stamps of the series picture explorers, both excellent selections. The first is Columbus, on the 2 fi. value. On this stamp the portrait is flanked by a fine picture of the "*Santa Maria*," the vessel in which he first crossed the Atlantic to the New World, a map of which also is included in the design. The second is Roald Amundsen, the Norwegian who was the first to reach the South Pole. His portrait is seen on the 12 fi. value.

The portrait on the remaining stamp, the 10 fi. value, is that of Louis Bleriot, who perhaps has been included because in a way he was both an inventor and an explorer. He was the first to cross the English Channel by air.

DOG TEAM and HITLER FREE



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One stamp is from **SAINT PIERRE and MIQUELON** (as illustrated) and depicts a Team of Newfoundland Dogs harnessed to a sleigh in the Frozen North. Another most interesting stamp depicts **Adolf Hitler,** and was issued during the war by **CZECHOSLOVAKIA (Bohemia and Moravia).**

To get these **ABSOLUTELY FREE,** send 3d. stamp to Windsor Stamp Co. for their postages and ask also to see an Approval selection (no obligation to purchase any) and **Dog Team and Hitler Free Packet.** Send now.

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For other Stamp Advertisements see also pages 240 and xi.

Stamp Gossip
and Notes on New Issues

By F. E. Metcalfe

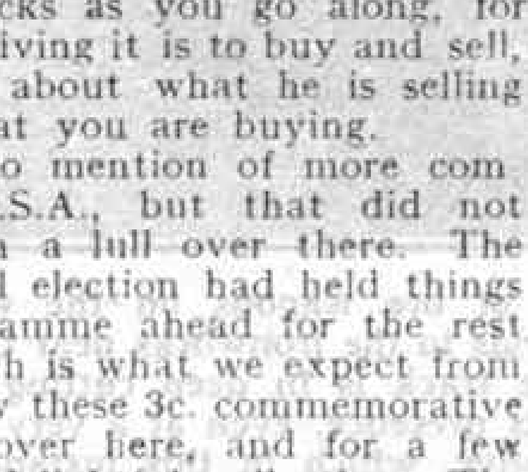
LAST month we had something to say about the rising prices for the "Silver Wedding" stamps, which are still going up and up. One or two collectors who cannot afford the high values have asked if the low values are ever likely to be valuable. To be candid the answer is an emphatic no, for many were bought by dealers and many collectors bought a number of sets. We are referring of course here to mint stamps. Used will be much better, but even thus they are never likely to be very costly, but that should not deter the genuine collector from buying a set, if one is faucied.

This question of investing in postage stamps crops up from time to time, and as many collectors spend a good deal more on stamps than they can afford to throw away on a hobby, it is only natural that they want to consider the re-sale value of what they buy. They are quite wise to do so, but please don't make that the end all and be all of your collecting; otherwise you will miss most of the fun which this grand hobby can provide. Invest if you will, but don't call it collecting or even consider yourself a stamp collector, and also be prepared for some nasty knocks as you go along, for generally the seller, whose living it is to buy and sell, knows a good deal more about what he is selling than you know about what you are buying.



Last month we made no mention of more commemoratives from the U.S.A., but that did not mean that there had been a lull over there. The upset from the Presidential election had held things back a bit, but the programme ahead for the rest of 1949 is stupendous, which is what we expect from our genial cousins. Anyhow these 3c. commemorative stamps are very popular over here, and for a few shillings one can form a delightful collection. The writer of these notes saw one of these collections the other day, which had only cost a few shillings to get together. Each pictorial stamp was given about a quarter of a page. None had cost more than 3d. and some had been obtained for nothing, and though the collector could not print, he had neatly written under each stamp the why and wherefore of its appearance.

Without a doubt German stamps are popular with a number of junior collectors, but these are setting themselves a task in trying to complete sets, for apparently a new one comes out every week. However, they are mostly cheap—some will be scarce—and a catalogue has recently been issued at 3/6 which gives good lists of these and other modern European stamps. A copy can be obtained at most stamp shops, and it is real good value. One thing that collectors will note is the fall in prices of German stamps issued during the regime of Hitler. Large stocks were found and brought over to this country. Our government also auctioned off a lot, but there may come a time when German collectors will be allowed to buy them—at present Hitler stamps are taboo in Germany itself—and that will make a great difference.



Appropos the Belgium Congo stamp illustrated last month, which depicted a railway engine, a reader asks which are the most popular stamps, those showing ships or railway trains. Ships have it by a long way. Of course there are many more of the former than the latter and it is thus a good deal easier to get a "Ships" collection together, which may account somewhat for their popularity. At the same time we British do all love ships. One of the finest of these collections was shown last year at the exhibition in Switzerland, but alas it did not obtain a prize, which is not surprising, for the only chance one generally has of getting mention at such functions is to show something which has cost a lot of money. It doesn't matter much, for few of us ever aspire to land a gold medal, or even a tin one with our collections; but that does not prevent our collecting, or enjoying the hobby to the full.



Regarding the recently issued air set of Iraq, a collector asks how many stamps were actually issued. He said he saw an advertisement where eight stamps were offered, yet in his favourite philatelic magazine only six were listed. The number eight is correct. Apparently only six values came out at the start, 3f., 4f., 5f., 20f., 50f. and 100f., but these were followed by two more, 10f. and 35f., making the eight values stated. Iraq is quite a popular country with British collectors, and a good show of used stamps can be picked up cheaply, so those looking for a new country to dabble in might like to try Iraq. Be sure the stamps collected are good clean copies, for many have heavy cancellations and look bad when they are mounted.



More than one collector has asked for details about a mysterious "lamp" which more learned philatelists talk so much about in these days. To explain the matter simply, a black metal container contains a quartz lamp and under this, when switched on, one can place a stamp. If it has been repaired, or a pen cancellation erased, this will show up under the lamp. Stamps printed with aniline ink show up in an amazing manner. Red stamps become a glowing orange, etc., and if you saw some of your stamps under the lamp you simply would not believe your own eyes, so changed do some of the colours become.

Cuba has recently issued a nice set, and as used copies are about, note might be taken of the values. There are ten stamps, from 1c. to 1 peso, and they have been recess printed by Waterlows to commemorate the centenary of General Antonio Maceo.

Our last illustration shows the stamp issued to commemorate the inclusion of Newfoundland as a Province of Canada. The ship on it is the "*Matthew*," in which Cabot sailed when he discovered Newfoundland in 1497.

Mapping Britain—(*Continued from page 212*)

suburbs built up from rectified enlargements of air films are extremely useful in such areas as large-scale railway sidings, where ground surveying is particularly difficult and slow.

On this work the Ordnance Survey collaborate with the R.A.F. Air Photography Unit. Electrically-operated air cameras used for mapping are carried in light aircraft equipped with gyroscopic control to keep the machines flying on a dead straight course and even keel. Air photographs taken must overlap one another by at least 60 per cent.; in other words, every spot on the ground will appear on at least two, and probably three successive photographs.

When the resulting mosaics are compared under a stereoscope with existing maps of the same area, the changes that have occurred since the last survey are clearly and immediately revealed. Such methods have been particularly useful in assessing the changes in town areas caused by wartime bombing. Speed is another great advantage of air over ordinary ground survey; indeed, the whole of Great Britain could, if necessary, be mapped by a squadron of aircraft in the fine days of a single summer. Yet despite these merits, the air camera can never provide a survey so detailed and complete as that made on the ground, though it gives a reasonably accurate first estimate. Air mapping —still a new science—will surely become more and more useful as it develops. But the ground surveyor with his theodolite and steel rule will remain the backbone of map-making.

Old Ship-Models—

(*Continued from page 229*)

and the old pictures and prints, we should know little of the grace and glory of the lovely old ships and the traditions that have been handed down to our modern Navy. We could not enter so fully and vividly into the lives of the sailors who fought and suffered to give Britain the lordship of the seas.

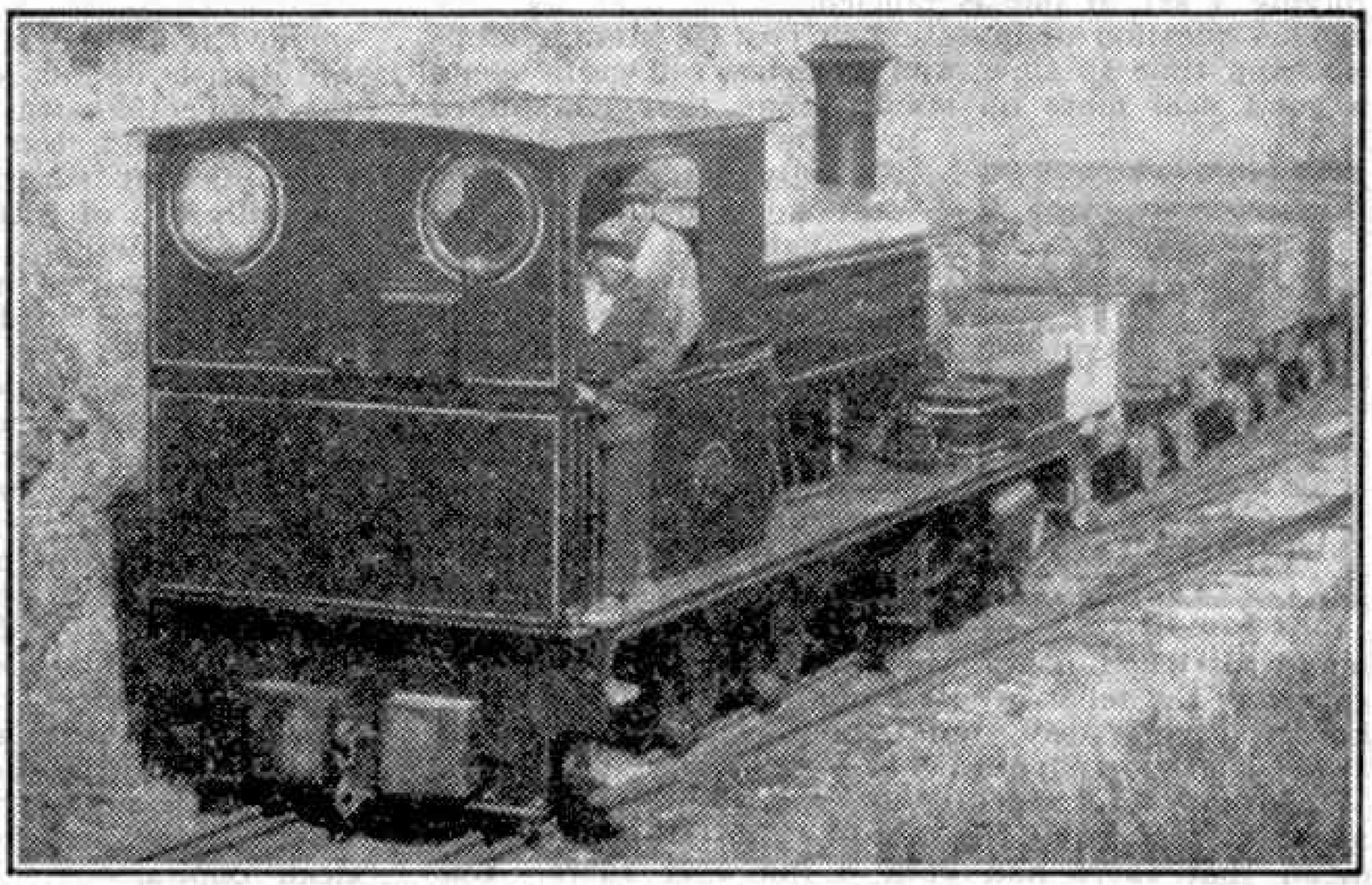
The model ships illustrated on pages 228-9 are three of those shown in a fine exhibition of old ship-models held recently at the Parker Gallery, 2, Albemarle Street, London W.1.

Noah Takes Wings—(*Continued from page 216*)

"Freighter." For a stunt, it was decided to carry a three-ton elephant inside this particular aircraft—the biggest animal ever to fly. Unfortunately, although the loading ramp stood up magnificently under the load, Jumbo was just a little too tall to get inside the machine. So Air France, who recently flew a baby elephant from Indo-China, still hold the unofficial weight-lifting championship.

There is hardly an animal species in the world that has not been carried by air at some time or other. In Australia, a 4 ft. crocodile and 10 ft. python were recently flown to Melbourne from Townsville, Queensland, and a porcupine from Perth to Melbourne. Air Contractors Ltd. have carried pedigree calves and pigs from Blackbushe to Nairobi, Kenya. B.S.A.A. flew trout eggs to South America. Penguins, baby alligators, sea lions, ducks, swans, kangaroos and a wildcat have travelled by P.A.A.; tigers, leopards, panthers, bears, squirrels and jackals by B.O.A.C.

Aircrews are by now quite accustomed to hearing assorted animal noises coming from the cabin behind them; but one Scandinavian Airlines System crew recently had to fly from Copenhagen to Buenos Aires carrying a baleful-eyed panther in a crate in their cockpit where they "could keep an eye on it." It may be a coincidence that the journey to South America broke one or two speed records but, on the other hand, it might not!



A narrow gauge train of ore wagons on the way from Rothwell in the Northamptonshire ironfields to the ironworks near Cransley. Like many similar lines in the district, the track is in deep cutting through agricultural land. Often the only clue to its presence, even at a very short distance away, is the smoke from the locomotive, which in this instance is a sturdy 0-6-0 saddle tank. This photograph was taken some years ago by K. Bishop, Leicester.

Competition Results

OVERSEAS

AUGUST 1948 NAME SQUARES CONTEST

1st Prize: T. Searson, Salisbury, S. Rhodesia. 2nd Prize: H. A. M. Cooper, Rock Bay, British Columbia, Canada. 3rd Prize: M. Pachnatz, Oxford, N.Z. Consolation Prizes: C. Tan, Singapore; M. Koliasnikoff, Brakpan, Transvaal, S. Africa.

AUGUST 1948 OLYMPIC QUIZ

1st Prize: F. Callanan, Dublin, Eire. 2nd Prize: J. A. Gomes, Bombay, India. 3rd Prize: G. Ennis, Taranaki, N.Z. Consolation Prizes: J. P. Barnes, Bridgetown, Barbados; M. Bear, Windsor, Canada.

AUGUST 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: B. Campbell, Naples, Italy; Section B: D. Swart, Pretoria, S. Africa. 2nd Prize, Section A: J. Keith, Rangoon, Burma; Section B: A. Addison, Durban, S. Africa. 3rd Prize, Section A: K. J. Milne, Hastings, N.Z.; Section B: N. A. Macdougall, Victoria, B.C., Canada. Consolation Prizes: A. K. Banerjea, Calcutta, India; C. Formby, Johannesburg, S. Africa; J. Bush, Blenheim, N.Z.

SEPTEMBER 1948 SHIPS CONTEST

1st Prize: W. Armstrong, Auckland, N.Z. 2nd Prize: 21073323 Spr. D. J. Lawther, Kuala Lumpur, Malaya. 3rd Prize: R. Burton, Dublin, Eire. Consolation Prizes: D. J. Write, Christchurch, N.Z.; L. Poole, Melbourne, Australia.

SEPTEMBER 1948 PHOTOGRAHPIC CONTEST

1st Prize, Section A: S. H. Gerald, Wexford, Eire; Section B: C. Formby, Johannesburg, S. Africa. 2nd Prize, Section A: T. L. Fleming, Montevideo, Uruguay; Section B: I. C. Dyer, Bombay, India. 3rd Prize, Section A: F. Haughton, Brisbane, Australia; Section B: M. White, Napier, N.Z.

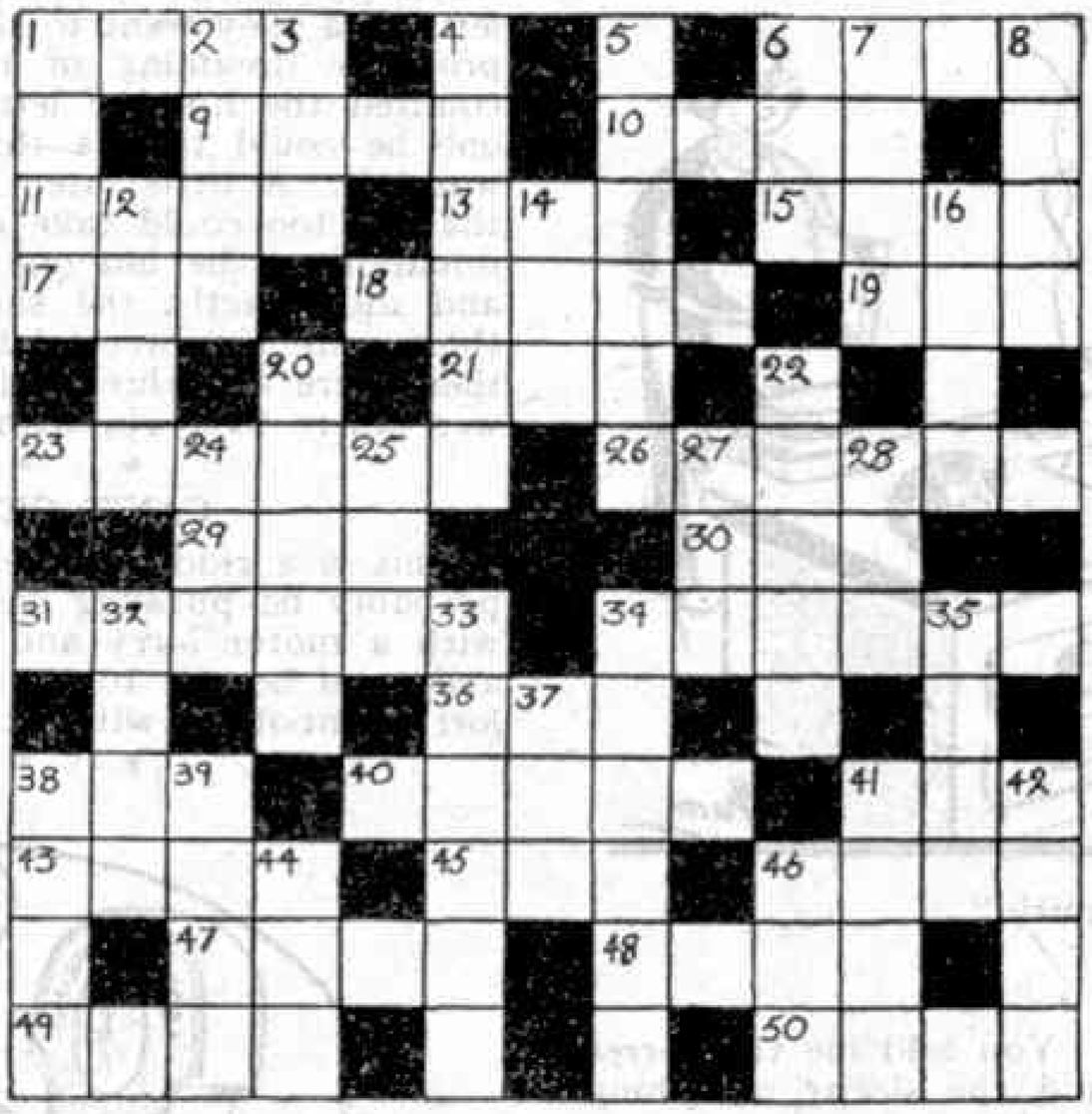
Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

June Crossword Puzzle

CLUES ACROSS

1. Small stretch of water.
6. Judge.
9. Rude peasant.
10. Arab title.
11. Particular place.
13. Turn shortened.
15. Manner or style.
17. Golf term.
18. Heathen.
19. Fixed.
21. Head movement.
23. Bring to light.
26. Obliquely.
29. Former British railway.
30. Organ.
31. Underground way.
34. Occupies space.
36. Sheep.
38. Observe.
40. Hard precious stone.
41. Animal.
43. Increases.
45. River.
46. Support.
47. A separate article.
48. Strands twisted together
49. Girl's name.
50. Impetuosity.



CLUES DOWN

1. Plague.
2. Musical instrument.
3. Destiny.
4. Wandering.
5. North American State.
6. Not clearly seen.
7. Famous statue.
8. Come together.
12. Rind.
14. I myself.
16. Church dignitary.
20. Spectacle.
22. Cover thinly with metal.
24. Hostelry.
25. Anger.
27. Salt water.
28. Human skill.
32. Employed.
33. Plant of pea family.
34. Measuring instruments.
35. Rest from work.
37. Armed contest.
38. Bag.
39. Prepare for publication.
41. Bible character.
42. Stupefy.
44. Animal enclosure.
46. Animal.

This month's crossword puzzle will be found to follow the lines of previous ones set on this page, all of which have proved remarkably popular. There are no traps or alternative solutions; the clues are all straightforward, and every word used, apart from names, can be found in a standard dictionary.

There are two sections in the competition, for Home and Overseas readers respectively, and in each prizes of 21/–, 15/– and 10/6 will be awarded for the best solutions. If necessary the judges will take neatness and novelty into consideration when making their decisions.

Entries should be addressed *"June Crossword, Meccano Magazine, Binns Road, Liverpool 13."* The closing date in the Home Section is 30th July; that in the Overseas Section is 31st October.

A Railway Enthusiast Goes Wrong

A railway enthusiast proceeding on his holidays has given us the following short description of his journey. Apparently he travelled too quickly to get all the names of stations and locomotives correctly, and even the numbers of the engines are mixed. Can you put these right for him?

"I started from NSUTOE. The train was hauled by a 4-6-0 locomotive numbered 07540 and named "INATNBAIR." On the journey it passed through several well-known stations, including BGRYU, TNNAUNOE and TDOASFRF.

"The train eventually drew in at EPTNRSO, where I had to change. I had a wait of about half an hour, and spent the time looking round the station. I saw many well known types of engine. First of all a 2-4-2 Tank appeared. This was numbered 47626 and once belonged to the LAWRIR WARAILY. A minute or two later a freight train passed, hauled by No. 50454 "LRYOA SGNSAIL."

"The train for CALBLOKOP at length drew in, and I got aboard. The engine was No. 45505 of a class known as the 'DSREAHTDUGON' and this made a speedy run. On arrival at the terminal station I looked round and saw several express engines; among them were Nos. 60114 'RGINRDEEA AGRMNADUS,' and 65254 'BTARALE.' Then I gave up railway recording, and went on the sands."

There will be the usual two sections in this contest, for Home and Overseas readers respectively, and in each prizes of 21/–, 15/– and 10/6 will be awarded for the best correct versions of this remarkable railway journey. The judges will take the neatness and novelty of entries into account in the event of a tie for any prize.

Entries must be addressed *"June Railway Story, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates: Home Section, 30th July; Overseas Section, 31st October.

June Photographic Contest

In this competition, the 6th of our 1949 series, readers are asked to submit photographs of flowers or gardens. At this time of the year there is a bright and colourful display in the garden, and competitors may send in either a garden scene—figures can be included if desired—or a set flower photograph.

The only conditions in this contest are 1, that the photograph must have been taken by the competitor, and 2, that on the back of the print must be stated exactly what the photograph represents. A fancy title may be added if desired.

The competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate sections for overseas readers, and in each section prizes of 21/–, 15/– and 10/6 will be awarded.

Entries should be addressed *"June Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates: Home Section, 30th June; Overseas Section, 30th September.

Fireside Fun

"Putting a pin on a fellow's chair is a worn out joke."

"Oh, I don't know." It still has its point."

• • • •



"Get my brokers, Miss Smith."

"Stock or pawn, Sir?"

• • • •

"I want my money back. You told me this ferret was splendid for rabbits, and the sleepy old thing just won't bother with them."

"That's right. It's splendid for rabbits, isn't it?"

• • • •

"Now boys, here in England I am called Mr. Key. What should I be called in Germany?"

"Herr Key, sir."

"Good. Now in France?"

"Monsieur Key, sir."

"Splendid. And in Spain it would be . . . . . ?"

"Donkey, sir."

• • • •

"What are you looking so glum for, Jones? Here I've been telling the class funny stories, and everybody sees the jokes and laughs but you."

"I don't have to laugh, sir. I'm leaving on Friday."

• • • •

"So now you're a policeman! You must find it different from being a stores assistant."

"Yes, ma'am. What I like about it is that now my customers are always wrong."

• • • •



"Why do you always sit there when visitors are due? Everyone knows you can't play!"

"Neither can anyone else while I'm here."

BRAIN TEASERS

FAMOUS FIGURES

The following sets of figures represent the names of three eminent men: 1, 20, 12, 5, 5; 3, 8, 21, 18, 3, 8, 9, 12, 12; 20, 18, 21, 13, 1, 14. Who are they?

• • • •

A SWEET PUZZLE

When sweets went off the ration, Tom, Dick and Harry took care to provide themselves with plenty when they went camping, but not very many were left when they went to sleep. During the night Tom, probably dreaming of unlimited sweets, woke up, counted the number left, and found that if he hid one he could take a third, his due share, of what was left. A little later Dick also awoke and found that he too could take a third of the number then remaining if he hid one. Before dawn Harry woke and did exactly the same thing. In the morning there were six sweets left in the bag, and of course there were also three hidden ones. How many sweets were there to begin with?

• • • •

CAN'T GET RID OF IT

This is a riddle, rather than a puzzle, but it will probably be puzzling enough. What is it that goes with a motor lorry and comes with a motor lorry, and is of no use to the motor lorry, yet the motor lorry cannot go without it? S.W.C.

• • • •



CAN YOU REVERSE?

There is a certain number of two figures such that if the figures are added together and the result is multiplied by itself, another number of two figures is obtained, in which the figures are the same as that of the original number, but reversed. What is the number?

• • • •

SOLUTIONS TO LAST MONTH'S PUZZLES

In our first puzzle last month one of the eight stations represented by circles is always without a train. To solve it trains from the following stations in order are moved along the appropriate lines to whatever station is vacant: 1, 7, 1, 2, 4, 5, 1, 6, 2, 6, 1, 3, 5, 4, 6. The number of moves is 15, and this is the least number in which the change can be made.

Jones is 36 years old, so that 20 years ago he was 16. If he had been 8 years younger he would have been only 8 years old 20 years ago.

The successive words of the pyramid in our third puzzle are A, AT, SAT, STAR, RATES and TEASER.

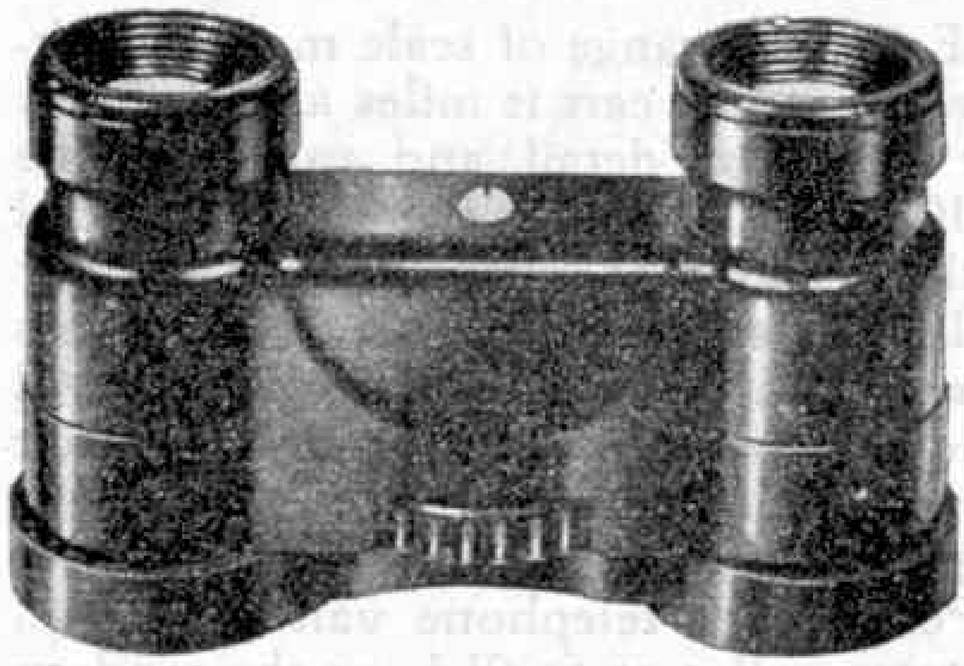
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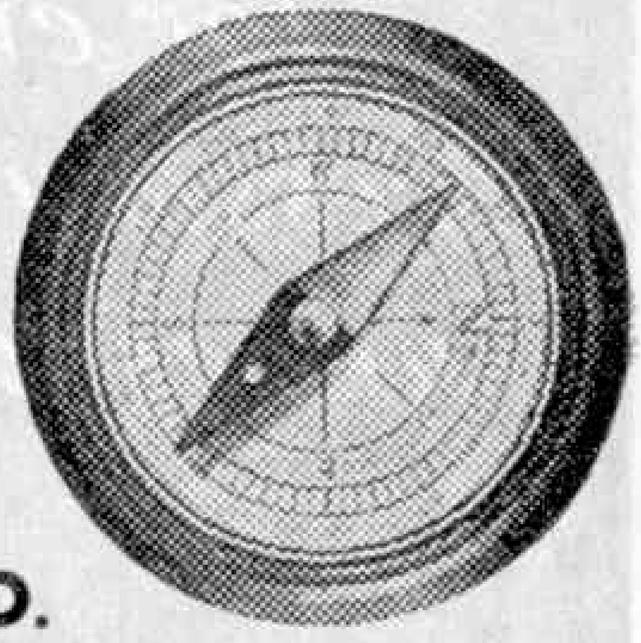
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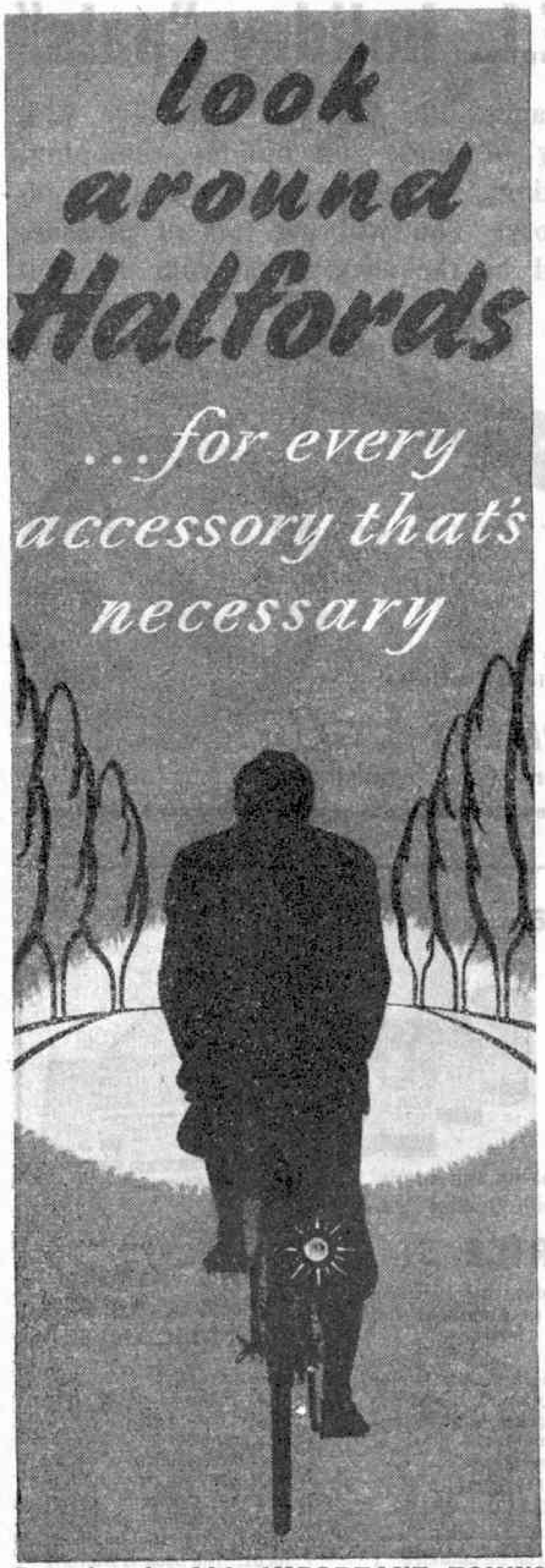
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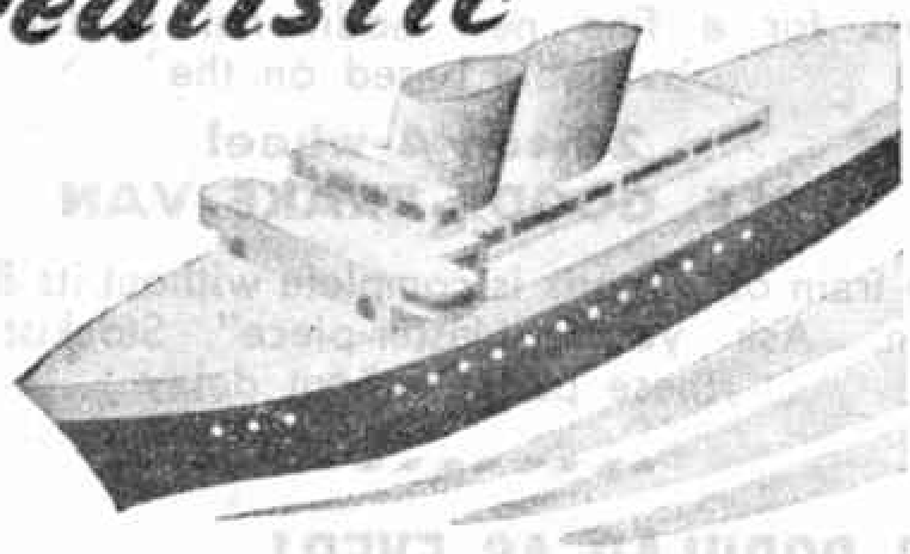
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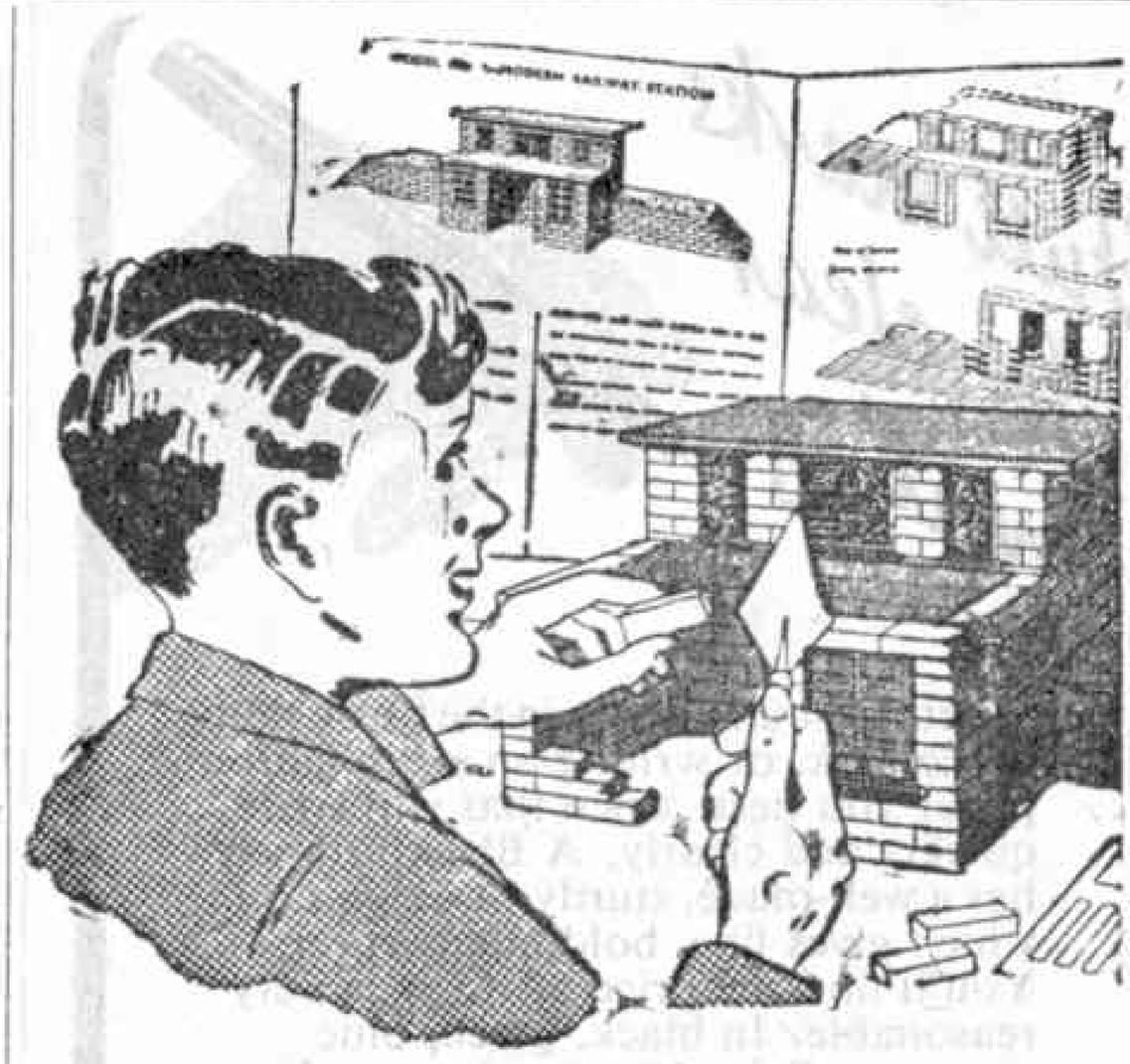
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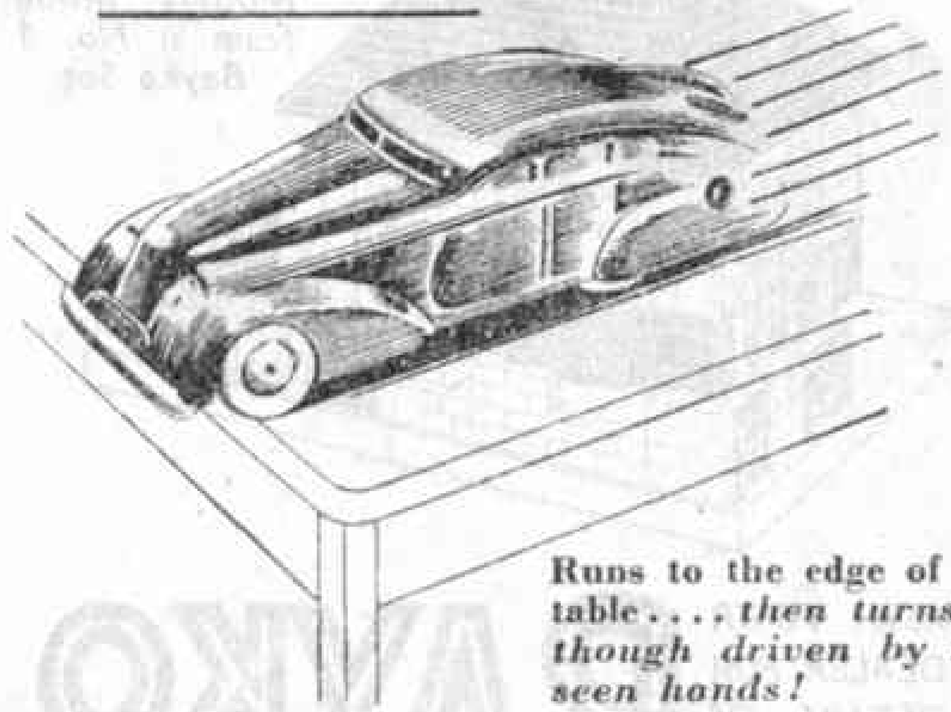
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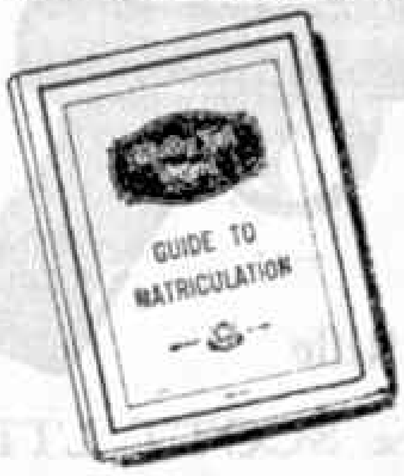
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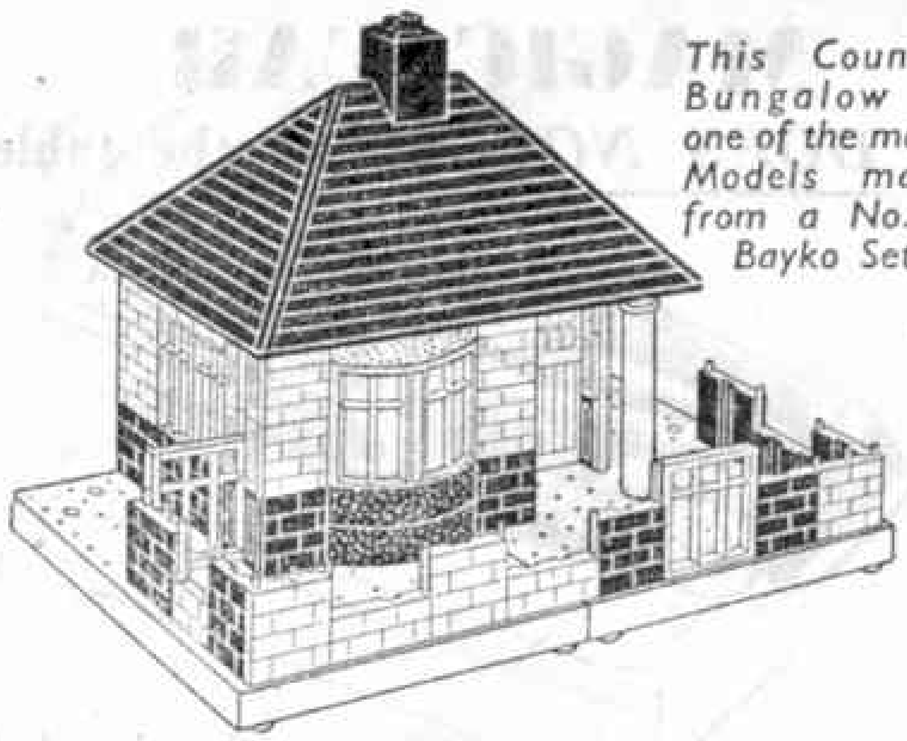
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Telegrams: "Meccano, Liverpool."

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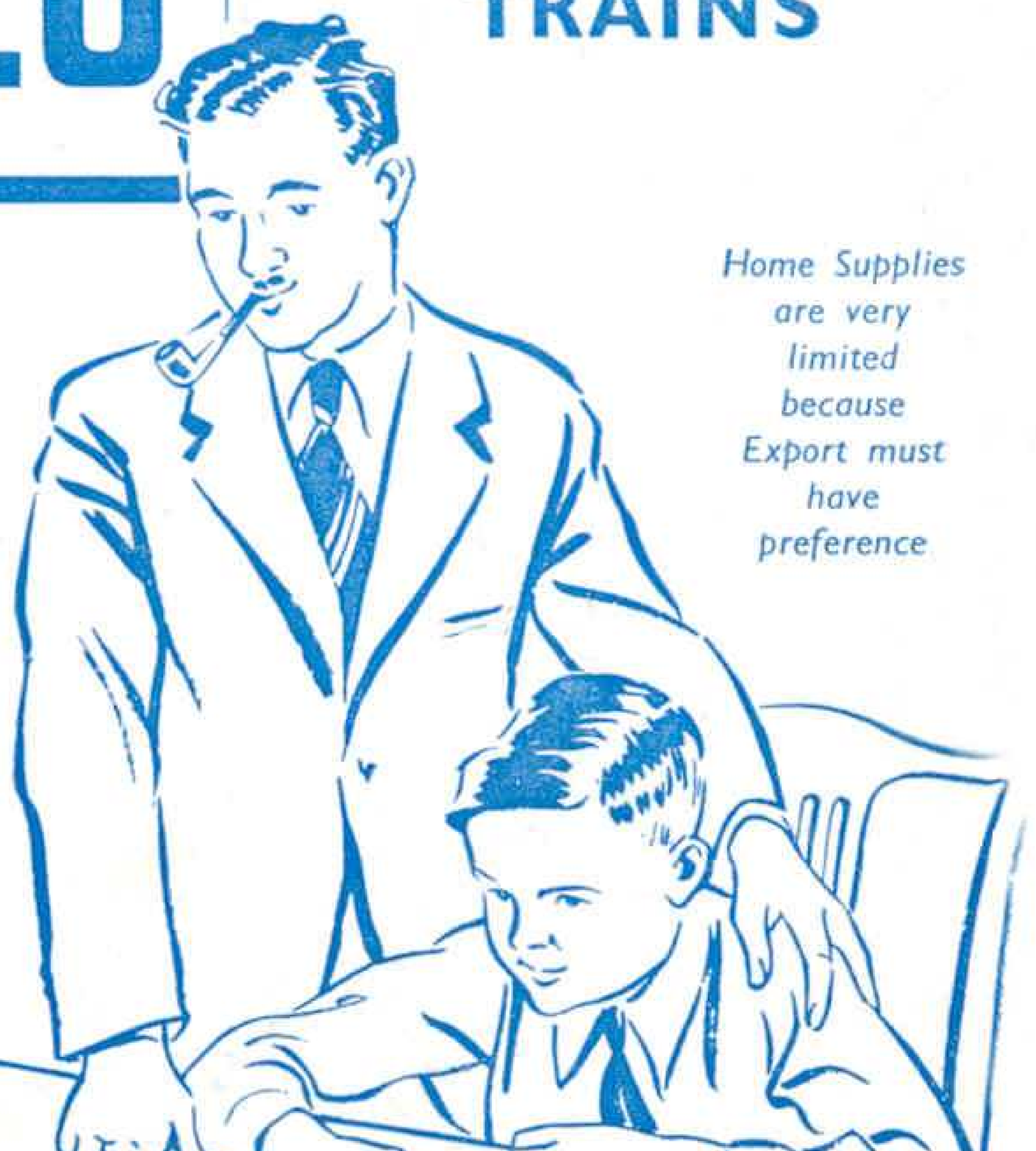
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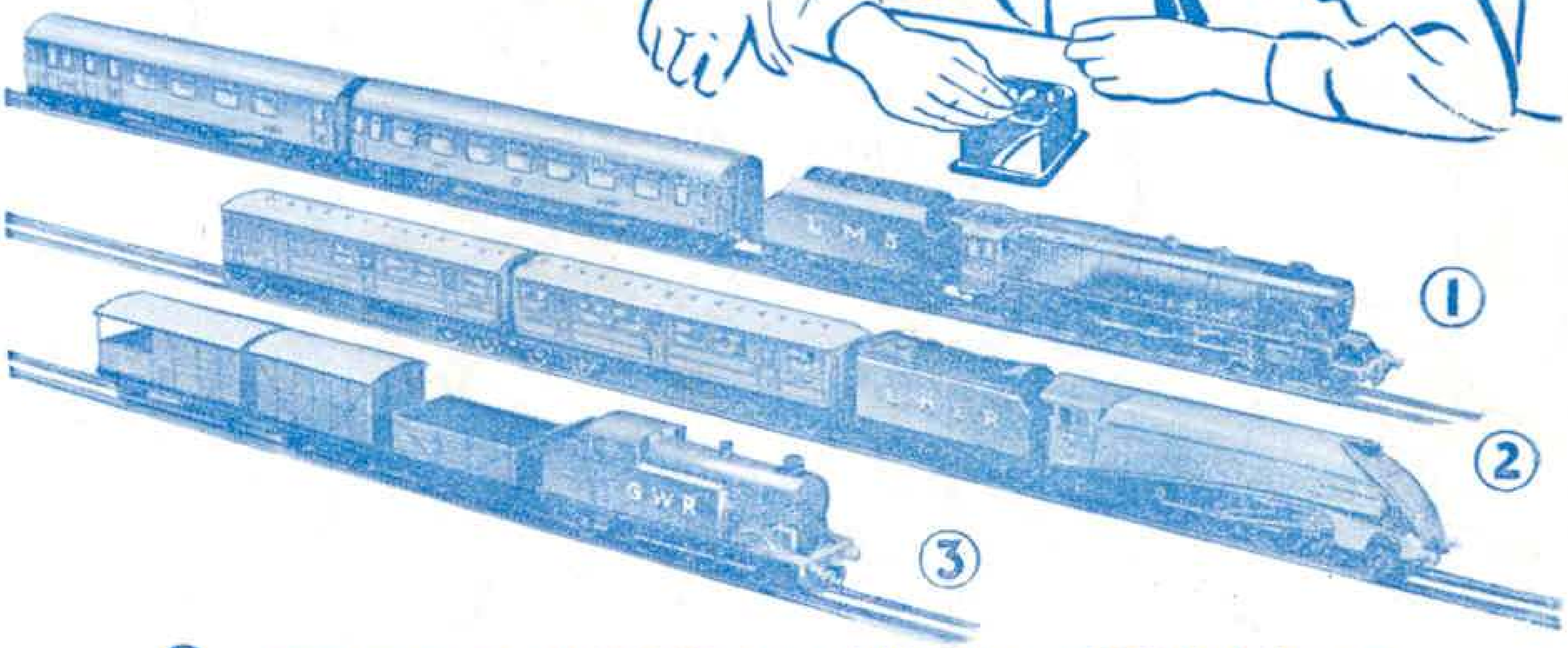


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VOL. XXXIV. No. 7

JULY 1949

MECCANO MAGAZINE

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6D.

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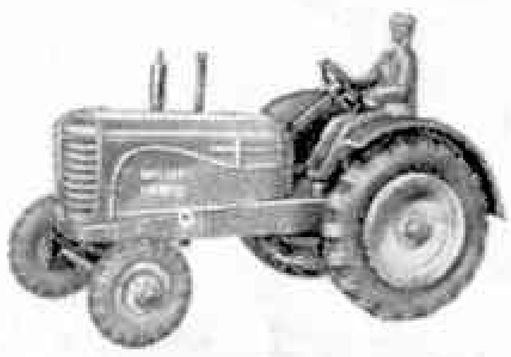
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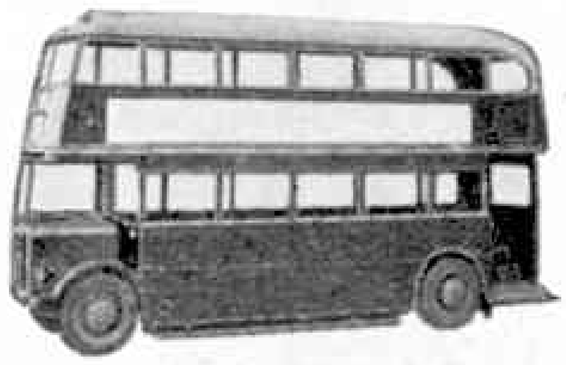
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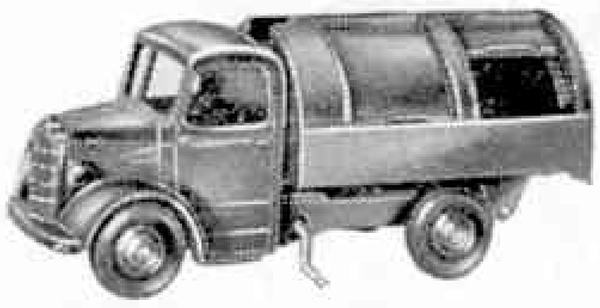
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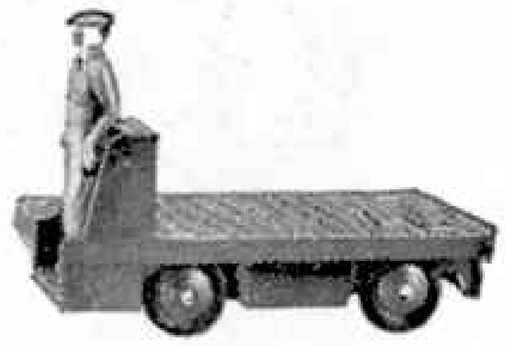
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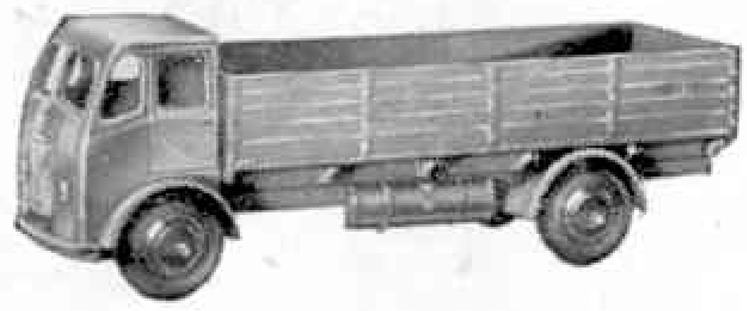
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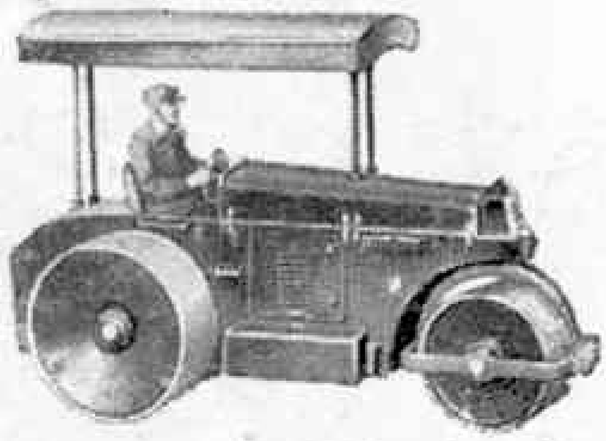
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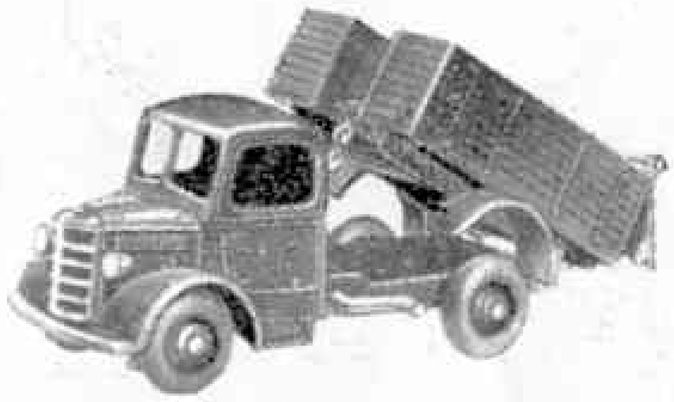
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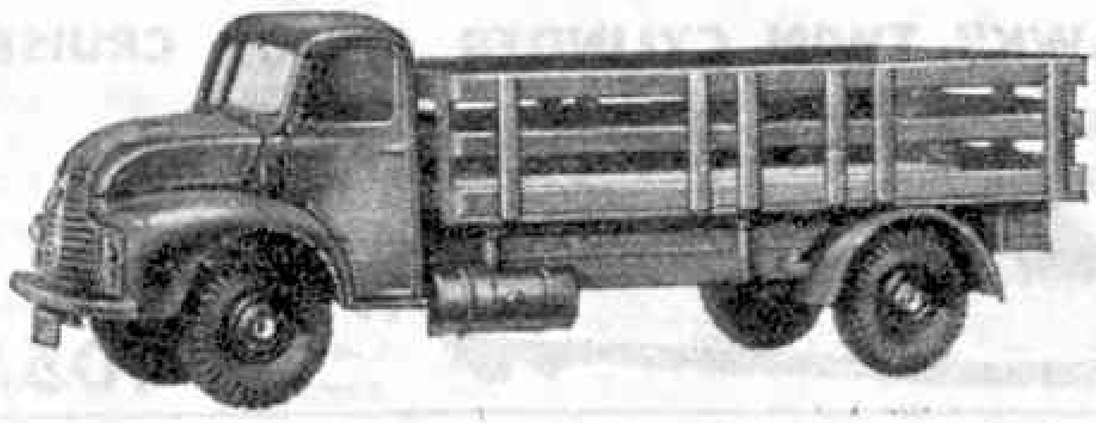
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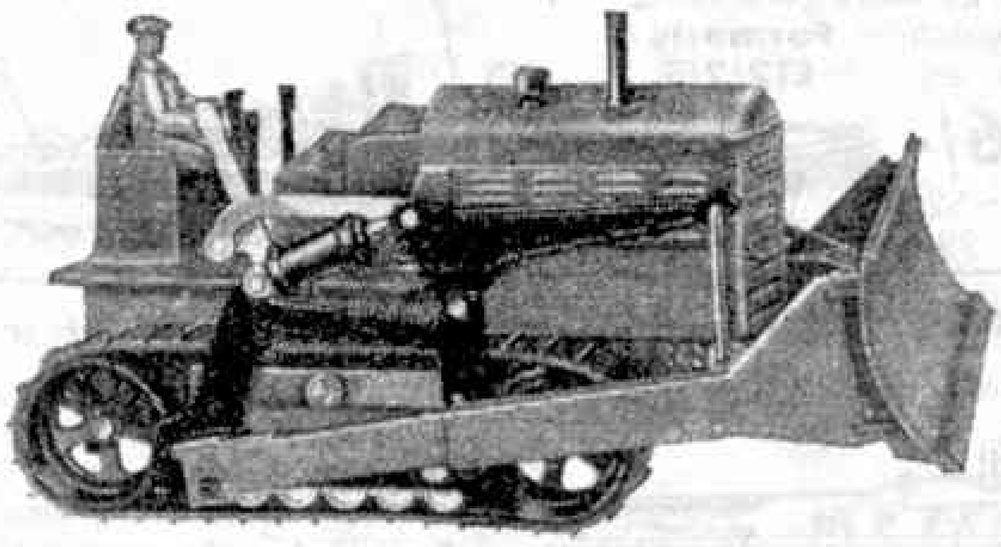
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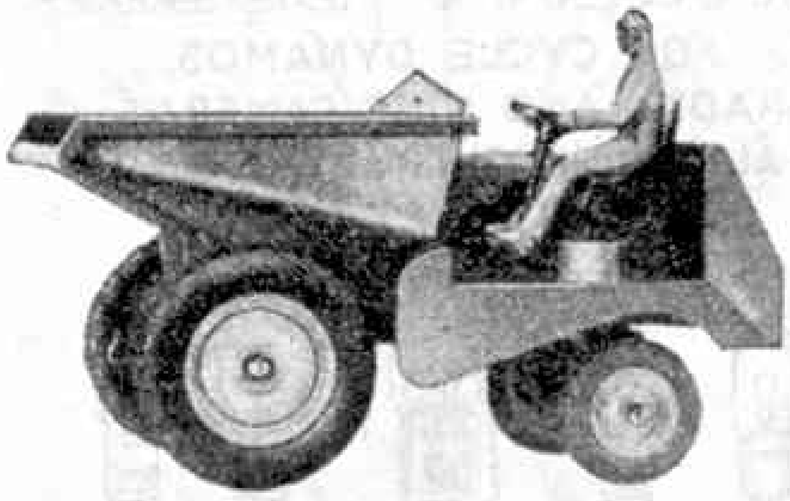
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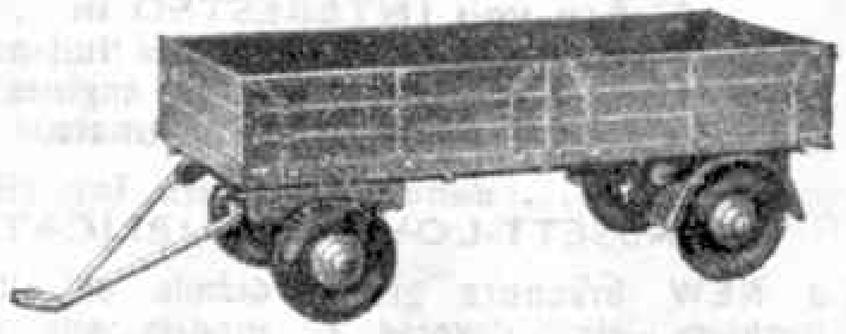
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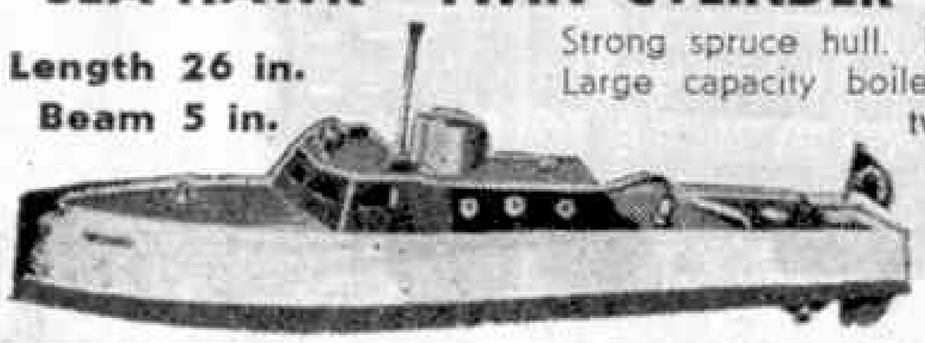
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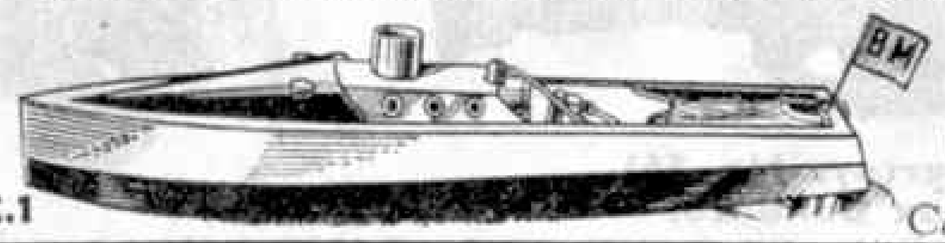


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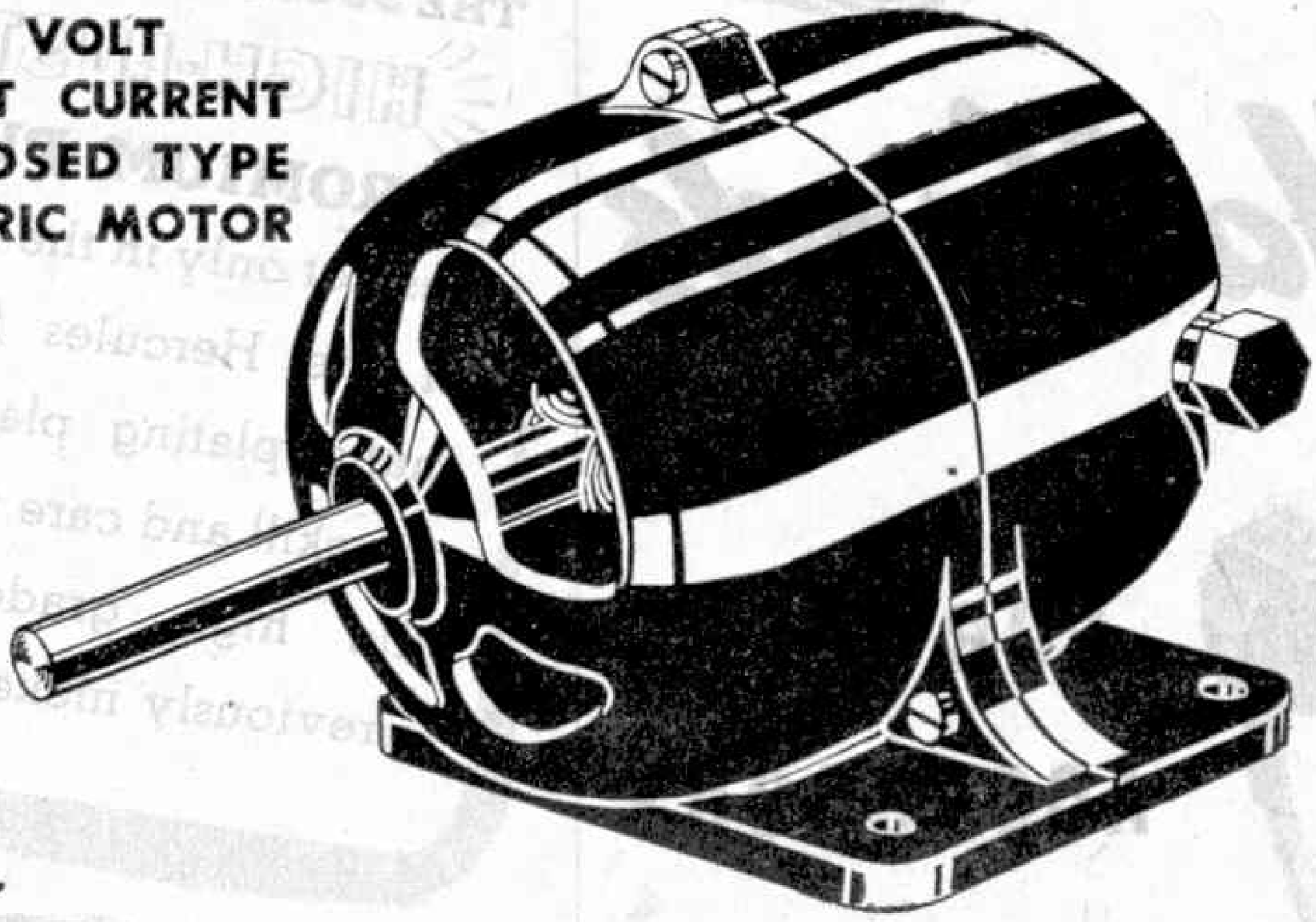
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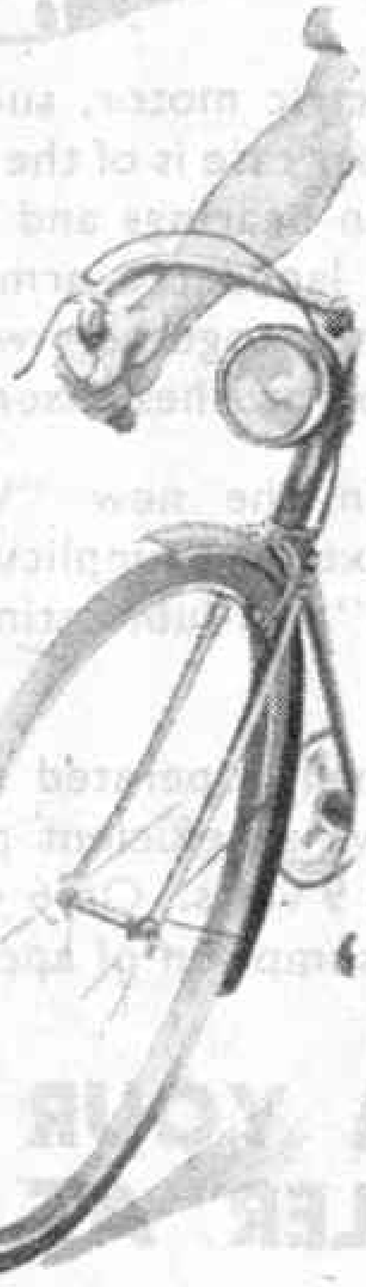


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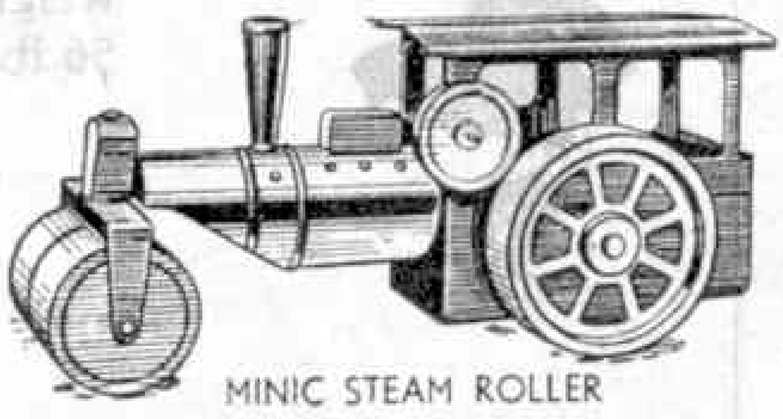
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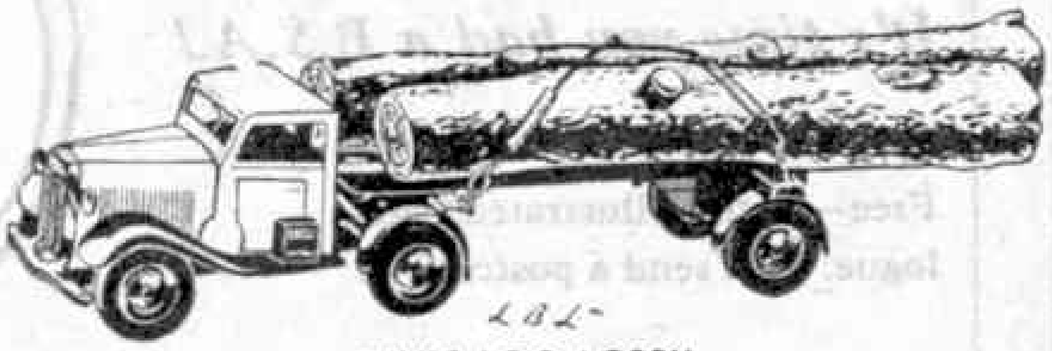
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Next Month: "HOW ELECTRIC TRAINS ARE DRIVEN." By B. K. Cooper

MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

Vol. XXXIV
No. 7
July 1949

With the Editor

By Diesel to Glasgow

A notable British Railways event last month was the through running for the first time of a diesel-hauled train between Euston and Glasgow. Motive power was provided by the black and silver London Midland diesel-electric units, Nos. 10000 and 10001, coupled to operate as a single 3,200 h.p. locomotive.

The journey was undertaken to prove the capacity of the units for sustained running, and in the course of the trip the train had to be hauled over Shap 916 ft. above sea level, and Beattock Summit, where the altitude is 1,014 ft. There were 16 temporary speed restrictions in force due to relaying operations, colliery subsidences and so on, in addition to the normal restrictions at various curves and junctions. Even so, the sixteen-coach "*Royal Scot*" train, resplendent in the new standard crimson lake and cream livery, ran in two minutes early after its 401¼ mile journey. Enginemen were changed on the run, this being possible by means of the gangway connections between the locomotive units and the train.

More Record British Flights

A few weeks ago a Hawker "Fury" fighter piloted by Neville Duke flew 908 miles from London to Rome in 2 hr. 32 min., some 19 min. faster than the previous record *set up by a jet aircraft.* Less than 13 hours later Duke landed the "Fury" at Karachi, where it was delivered to the Royal Pakistan Air Force, having also beaten the old 3,938-mile London-Karachi record by 3 hr. 50 min.

Next day Hawker's chief test pilot, Trevor Wade, flew the new sweptwing P 1052 jet fighter from London to Paris in 21½ min., at an average speed of 618 m.p.h., to set up yet another city-to-city record. Commenting on this flight afterwards, Mr. T. O. M. Sopwith, Chairman of the Hawker-Siddeley Group, said that had conditions been better the P 1052 would have averaged over 700 m.p.h., which means that it is almost certainly the fastest jet fighter in the world.

Of course, speed is only one of the characteristics of a good fighter, but the fact that the "Fury" flew nearly 4,000 miles in 15 hr. 24 min., and that the P 1052 was used to set up a speed record so early in its development prove that both aircraft are also thoroughly reliable. The "Fury's" record is a reminder that we should be unwise to discard all our "old-fashioned" piston-engined fighters too hastily, for in range and fire-power they are still more than a match for jets.

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The Development of the Destroyer

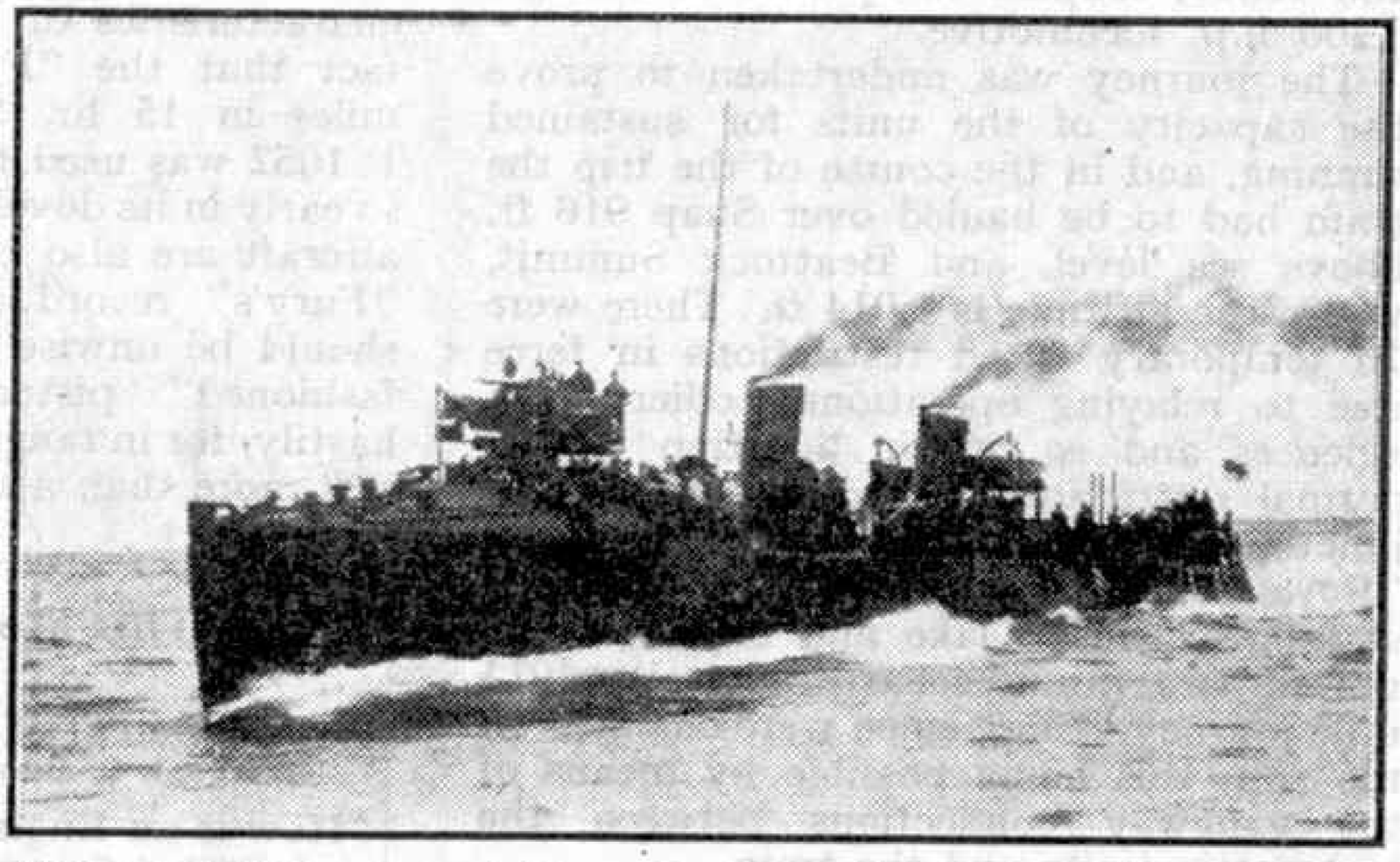
By Frank C. Bowen

THE destroyer, or the torpedo boat destroyer to give her the full name which is now seldom used, is one of the most interesting naval types and it is quite appropriate that the names of the sloops, brigs and cutters which did such dashing work in Nelson's day should be chosen for modern destroyers. They are often called the Navy's maids-of-all-work and they live up to it.

The torpedo boat was introduced in the seventies, at first no more than a launch; but by the mid-eighties she had grown into a very efficient little ship and Continental navies had built up such large fleets that measures had to be taken against them. There were plenty of pessimists who considered that the British battle fleet was doomed. A hybrid type was evolved called the "torpedo catcher," but she was not successful because she could not be built fast enough on the lines of a small cruiser. In the early nineties, after a great deal of money had been wasted on the catchers which could not catch, the Admiralty were persuaded that the only solution was an enlarged torpedo boat, fast enough to run down a torpedo boat in all weathers, carrying guns that could destroy her with ease, and torpedo tubes to let her act the part of torpedo boat herself in weather too bad for the smaller craft.

When the decision was taken in 1893 the finest torpedo boats afloat were about 120 to 130 tons with a speed of 25 knots in a few exceptional cases, although the majority were considerably smaller and slower. The Admiralty asked the builders who could tackle such a job to provide their own designs for this super torpedo boat within a rather loose specification. The speed was the main thing; if they were fitted with locomotive boilers they had to contrive 26 knots on trial, but if they had the new fashioned watertubes 27 knots was the minimum. They all looked like enlarged torpedo boats, the great majority designed to present as small a target as possible to the enemy's defensive fire, although one or two builders gave higher freeboard to make them more seaworthy. The first armament laid down by the Admiralty was one 12-pounder gun mounted in the "bandstand" which did duty as a bridge, three 6-pounders on deck, with two torpedo tubes on revolving mountings on deck and a third fixed in the bow under the curved turtle-back deck. The last-named was very soon abandoned on account of the danger of the destroyer ramming the tail of its own torpedo, and two more 6-pounder guns were substituted.

The first destroyer was H.M.S. *"Havock,"* 220 tons displacement on dimensions

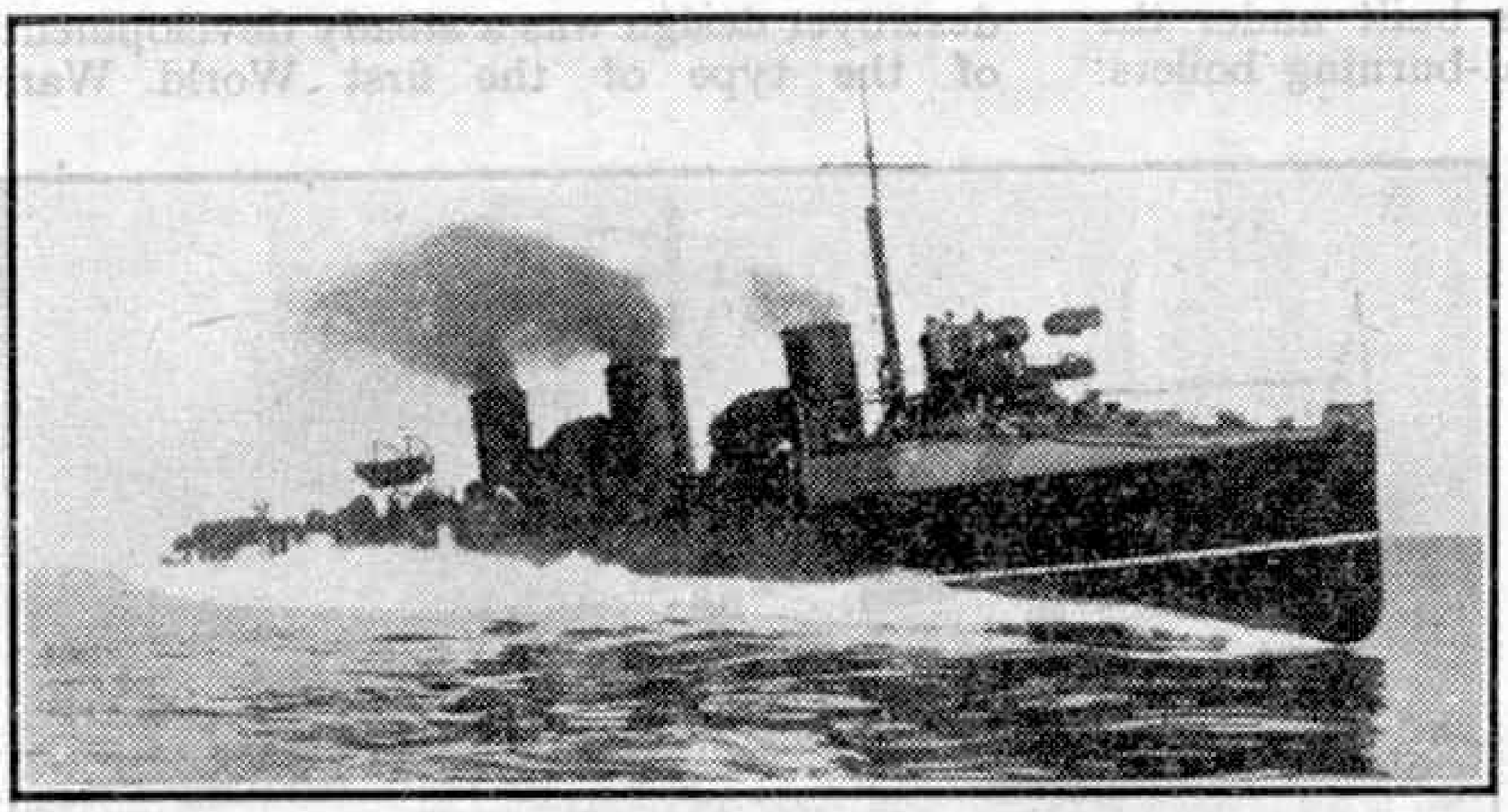


The first destroyers were built on the lines of contemporary torpedo boats, somewhat enlarged.

180 ft. by 18 ft. 6 in., with twin screws driven by engines of 3,500 horse power for a speed of 26 knots. Into the small hull, mostly machinery, a crew of 43 were packed. They were bound to be very uncomfortable and fully earned the "hard lying money" intended to compensate them, but the service was tremendously popular from the very first with all ranks.

With watertube boilers the 27-knot destroyers contrived trial speeds up to nearly 30 knots, although the conditions were much easier than they later became. Some of them had two funnels, some of them three and some four. They were all

driven by triple expansion engines, which were sadly liable to break down with the hard work which the boats had to tackle. That was largely due to the very limited size, which also caused their speed to fall off rapidly in any sort of a sea. When the weather was anything like heavy their speed would drop down to about 20 knots and they would smother themselves with spray, but the torpedo boats, being smaller still, could still be caught without difficulty.

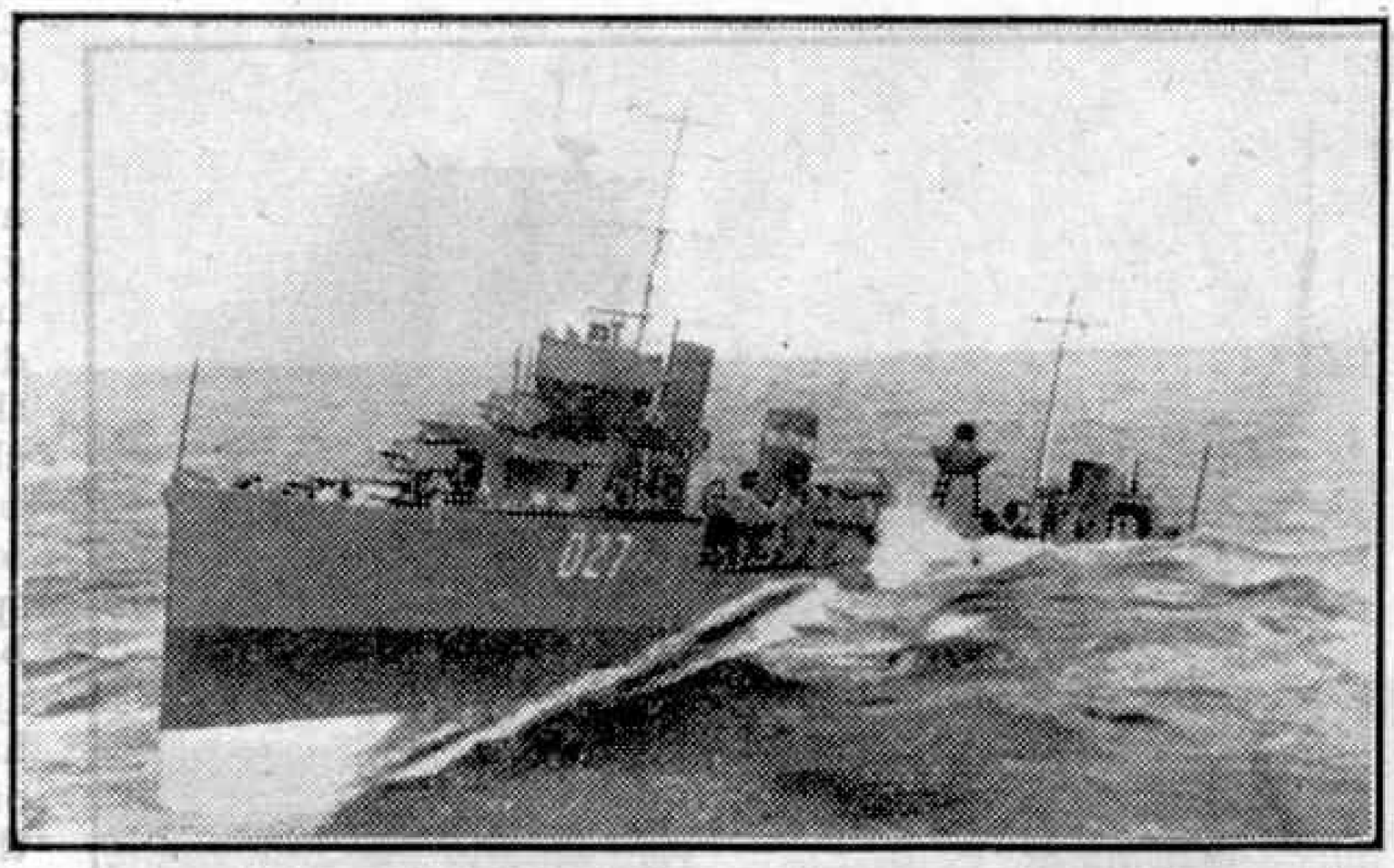


The "Viper," with which Parsons reached a speed of over 37 knots.

The remarkable things which the happy-go-lucky crews of the 27-knotters did with their little ships made the Admiralty realize that they could do much more if they were given better material. So the 30-knot type was introduced, ships which were not only faster but bigger, more comfortable, and better seaboats with higher freeboard and able to carry more coal. In their general principles they were precisely the same as their predecessors, with the same armament.

At the Diamond Jubilee Naval Review in 1897 Charles Parsons had created an immense sensation by dashing through the lines in the little experimental yacht *"Turbinia"* fitted with the turbine engine which he had patented and was trying to get adopted. It was just the thing for a destroyer, but as the Admiralty would not listen he had two boats built on speculation. Public opinion forced the Navy to buy them. The first out was the *"Viper,"* with the ordinary hull of a 30-knotter. Parsons was considered rash to guarantee a speed of 31 knots, but she averaged 34.67 in bad weather and covered the measured mile at over 37. She was wrecked in a fog, and the second ship, the *"Cobra,"* proved to be too lightly built for her tremendous power and broke in two in the North Sea.

While experiments with turbine engines were proceeding slowly the Admiralty took a step which seemed to be retrograde. They reduced the contract speed to 25½ knots, but at the same time insisted on the hull being bigger and much more strongly built, and replaced the turtle-back deck forward by a high forecastle. The result was that in bad weather the 25½-knot "River" class could maintain 24 knots while the 30-knot boats dropped down to 22 or 23. After the lessons of the Russo-Japanese War had been digested the turbine was firmly established, and the 6-pounder gun was abandoned as being too light to be useful. Turbines and oil-fired boilers gave the first "Tribal" class, from 865 to over 1,000 tons, a speed of 33 knots. The first were armed with five 12-pounder guns and the later ones with two 4-inch, in addition to two torpedo tubes. The 2,170-ton *"Swift,"*



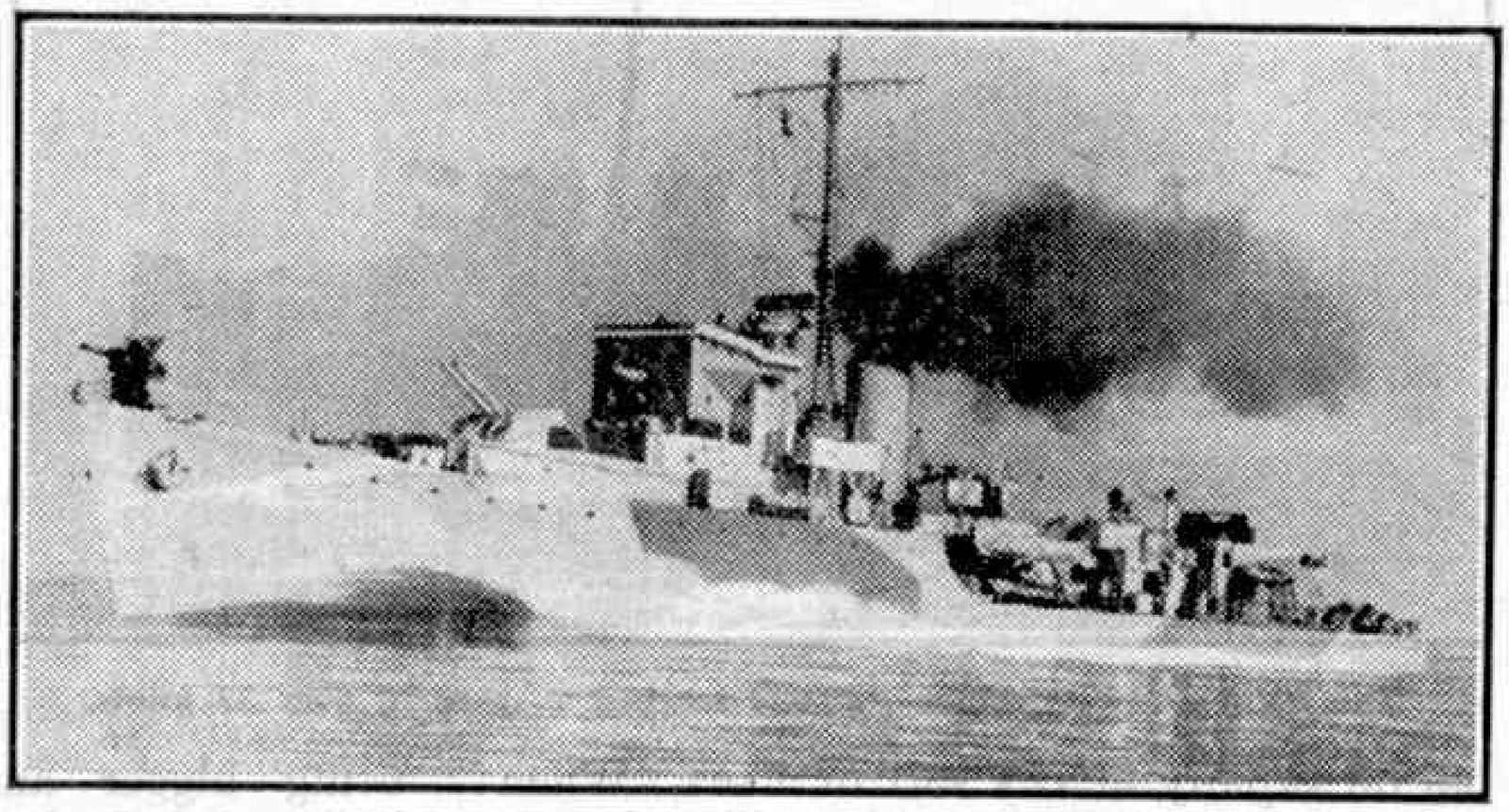
A destroyer of the first World War, with stem designed for ramming submarines.

with a designed speed of 36 knots, was regarded as being too expensive and the design was not repeated.

The cost of the 33-knot "Tribal" class and fears for the supply of imported oil fuel, caused the Admiralty to drop back to 27 knots in the ships built under the 1908 estimates, with coal-burning boilers. The next classes returned to oil fuel, the saving in weight permitting the displacement to be reduced; but by the time the first World War broke out in 1914 the latest ships had a displacement of nearly 1,000, a speed of 29 knots, and an armament of three 4 in. guns with four 21 in. torpedo tubes. At that time the Admiralty were supplying the designs instead of accepting the ideas of each individual builder.

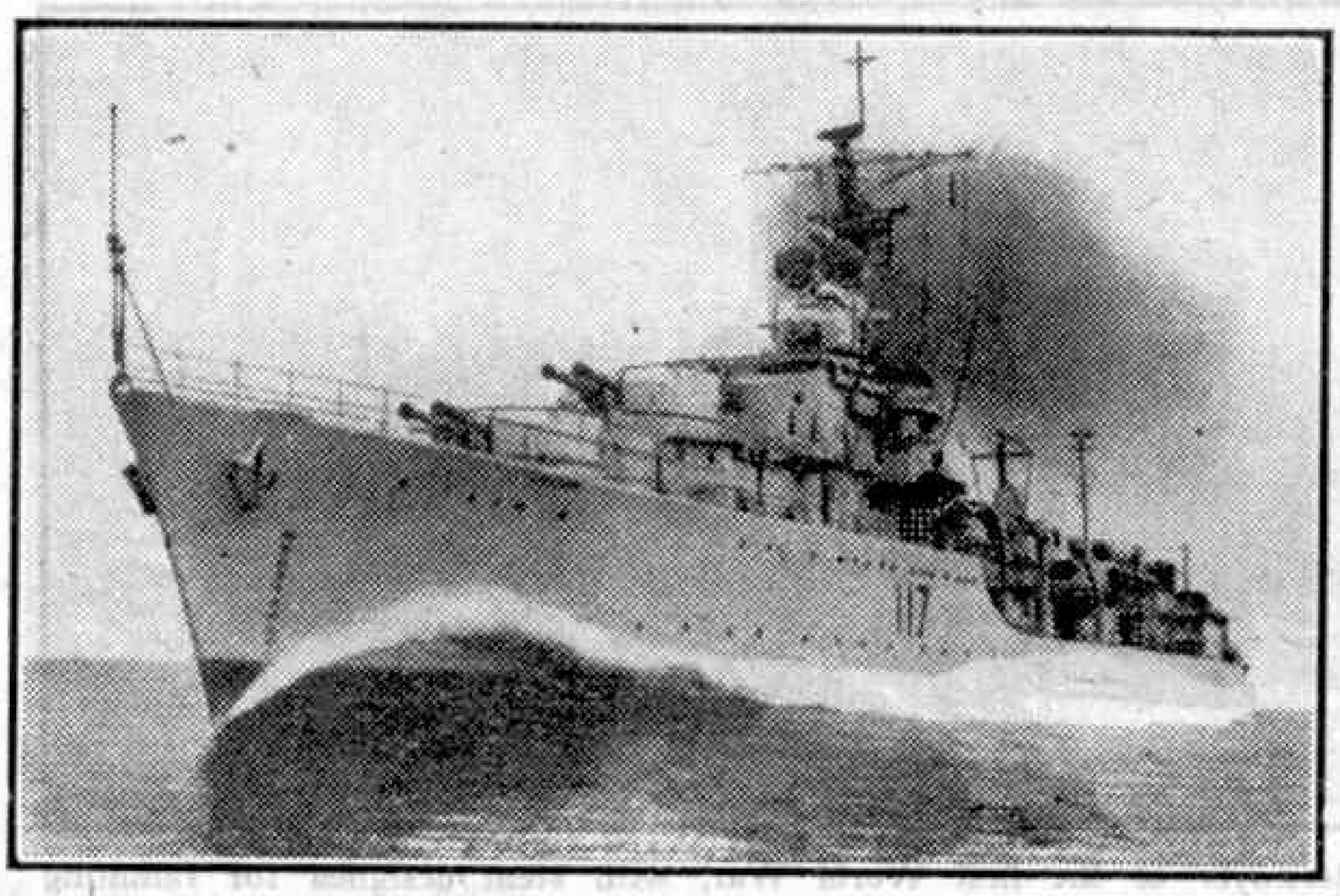
During the first World War the destroyer was used for every imaginable duty. The activities of the German submarine fleet did immense damage, and the destroyer was found to be the best antidote. Additional duties demanded higher speed, a bigger armament and numerous features which, in their turn, demanded more displacement. So, by the end of the war, destroyers had a displacement of 1,500 tons with all their load on board, were armed with four 4.7 guns and two 2-pounder pom-poms against aircraft, with six 21 in. torpedo tubes, and could steam at 34 or 35 knots. They had comfortable quarters for officers and men and, although their motion was lively, they could keep the sea and carry on with their duties in any weather.

Between the two wars the flotilla destroyer design was a steady development of the type of the first World War,



A destroyer of the "Hunt" class.

successive classes being given names beginning with the initials "A" to "I." Technical improvements permitted the displacement to be reduced. They were all 2-funnelled ships, the "I" having a tonnage of 1,370, a speed of 36 knots and four 4.7 in. guns in addition to a number of small anti-aircraft pieces and 10 torpedo tubes which were reduced to five when new fittings such as radar added to the topweight during the war. They cost £320,000 each, and it was then decided that the duties of the destroyer had become so numerous that subdivision was necessary. So the second "Tribal" class was built primarily for gunfire—1,870 tons, 36½ knots with an armament of six 4.7, two 4 in. and numerous small anti-aircraft guns, but only four torpedo tubes. To carry out the duties which were within their power the very much cheaper "Hunt" class was built, beginning with 1,000 tons displacement, 27½ knots speed and four 4 in. guns backed by small anti-aircraft pieces. The first type had no torpedo tubes but two or three were mounted in the later ones.



H.M.S. "Alamein," designed to operate against the Japanese.

The flotilla destroyers of

(Continued on page 282)

Have You Ever Thought About This?

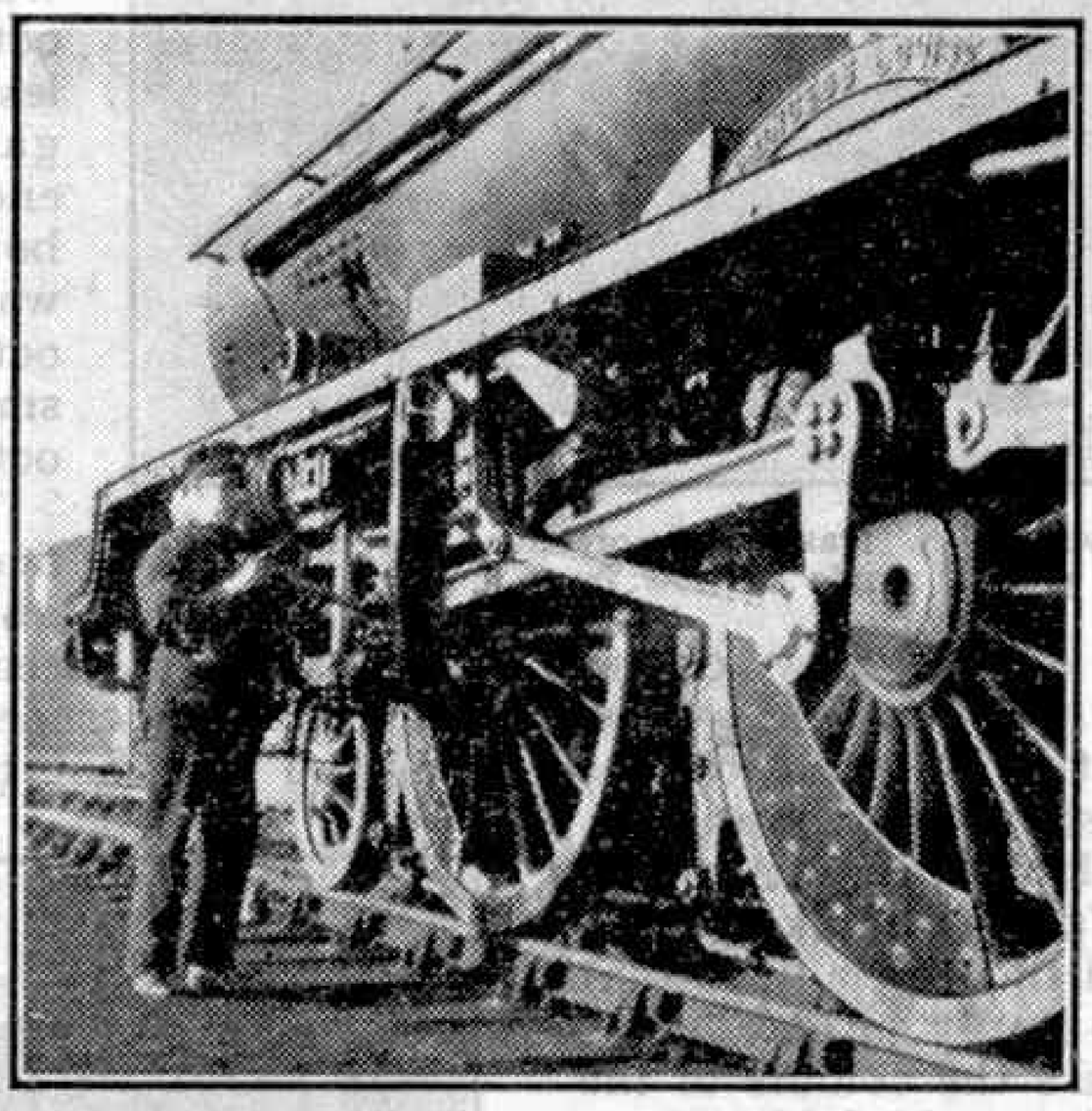
How is an Engine Lubricated?

By "Shed Superintendent"

WHEN a driver prepares a locomotive for service, he is responsible for attending to the lubricators. For a modern four-cylinder engine he is supplied with about 10 pints of oil for every 100 miles the engine is to run. Four pints of this will be for lubricating the internal parts such as valves and pistons, and as these parts are exposed to high-temperature steam the oil is of heat-resisting quality. The other six pints of engine oil are for lubricating the external parts including the axle boxes, coupling and connecting rods, valve gear parts, etc., and as each bearing is fitted with an oil box, there may be 80 or 90 of these to fill with his oil can.

A few of the Southern Region engines have the valve motion and inside big-ends enclosed in an oil bath holding 35 gallons of oil; but the majority of engines in this country have independent oil boxes on each part. Each oil box contains a piece of worsted wound on a twisted wire, known as "trimming"; the worsted passes a small supply of oil, by capillary action, from the oil box to the bearing, enough to maintain a film on the working parts.

In theory, a film of oil of microscopic thickness is sufficient to keep bearing surfaces from metallic contact; and provided the bearing is in good condition, very little oil is used in practice. Grease lubrication is used extensively in hot countries for external parts, as it does not run out of the bearings and pick up grit, like oil does. Grease-packed roller bearings are occasionally seen in Britain: the return crank bearing visible in the photograph is an example.



The driver of a London Midland 4-6-2 busy with his long oil feeder before a run. Photograph by courtesy of Churchill Machine Tool Co. Ltd., Manchester.

The coupled-wheel axleboxes, being heavily stressed and subjected to horizontal thrusts as well as vertical loading, are fitted with worsted pads, to wipe the journal with oil from underneath, in addition to a supply of oil to the "crown" or top of the bearing. Axlebox supply pipes are either fed from large oil boxes on the footplate or from a mechanical lubricator.

To force oil into the internal parts, against steam pressure, either a mechanical or hydrostatic lubricator is necessary. A mechanical lubricator consists of a box containing plunger pumps, submerged in oil and operated by a camshaft. The camshaft is driven by ratchet and pawl mechanism, the pawl or pawls deriving their movement by a rod connected to any convenient part of the motion. These pumps are capable of forcing oil into the valve chests and cylinders against steam pressure, but because single drops of oil are of little use to lubricate the large surfaces of the cylinder barrels the oil drops are atomised by steam jets before entry.

An alternative lubricator for valves and pistons is the hydrostatic type, consisting of a container from which oil is displaced by condensed steam. A sight-feed glass is provided for each valve and cylinder, through which drops of oil pass at the rate of two or three a minute. The oil drops are then mixed with steam to atomise them and to force the mixture into the main steam pipes. Hydrostatic lubricators are always fitted on the footplate, so that the enginemen can watch the sight-feeds.

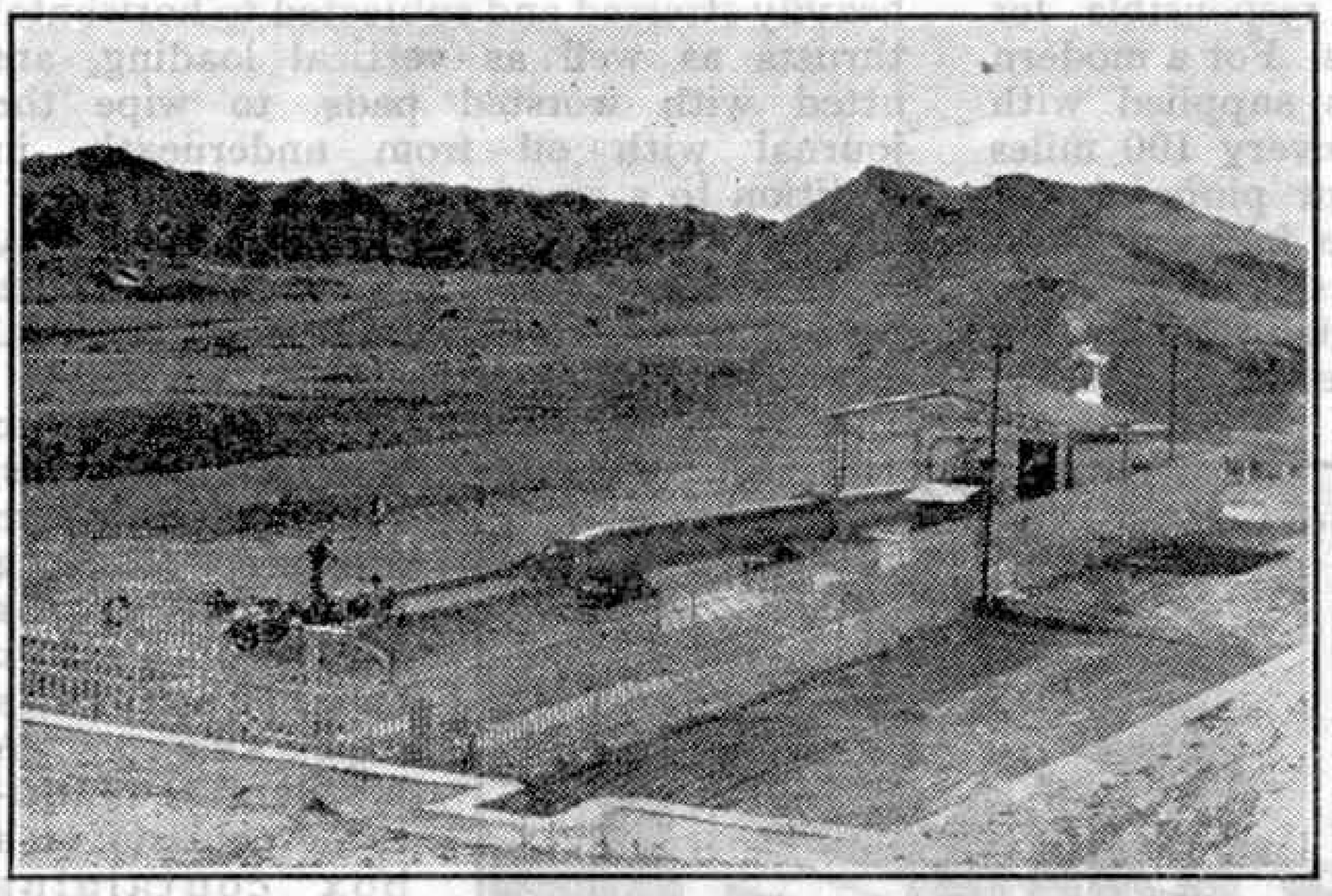
Fuelling the World's Airlines

THERE is a story of two men making their first air journey. Their 'plane touched down in Paris and a smart green and yellow fueller truck sped out to fill up the tanks. The 'plane flew on to Marseilles and again a green and yellow truck dashed out to it. The next stop was Rome, and again the same thing happened. The first passenger looked at his watch and remarked, "This 'plane is making good time." "Yes," replied the other, "but that truck isn't doing too badly either."

Green and yellow are the colours of the B.P. aviation service. Airfields from Iceland to Australia are equipped with these smart fuelling tankers, many of them Leyland Hippo six-wheelers, manned by trained crews in green uniforms, ready to fuel an aircraft as soon as it touches down. When the war ended, the Anglo-Iranian Oil Co. realized that the impetus it would give to air travel, in the form of increased speed, safety and comfort, would have to be matched by increased efficiency in ground servicing, including fuelling. They set out to re-build and expand the B.P. aviation service to cover the eastern hemisphere, until to-day B.P. spirit can be obtained at airports throughout the principal countries of Europe, in the Middle East and Australasia—and this is only the beginning of their expansion.

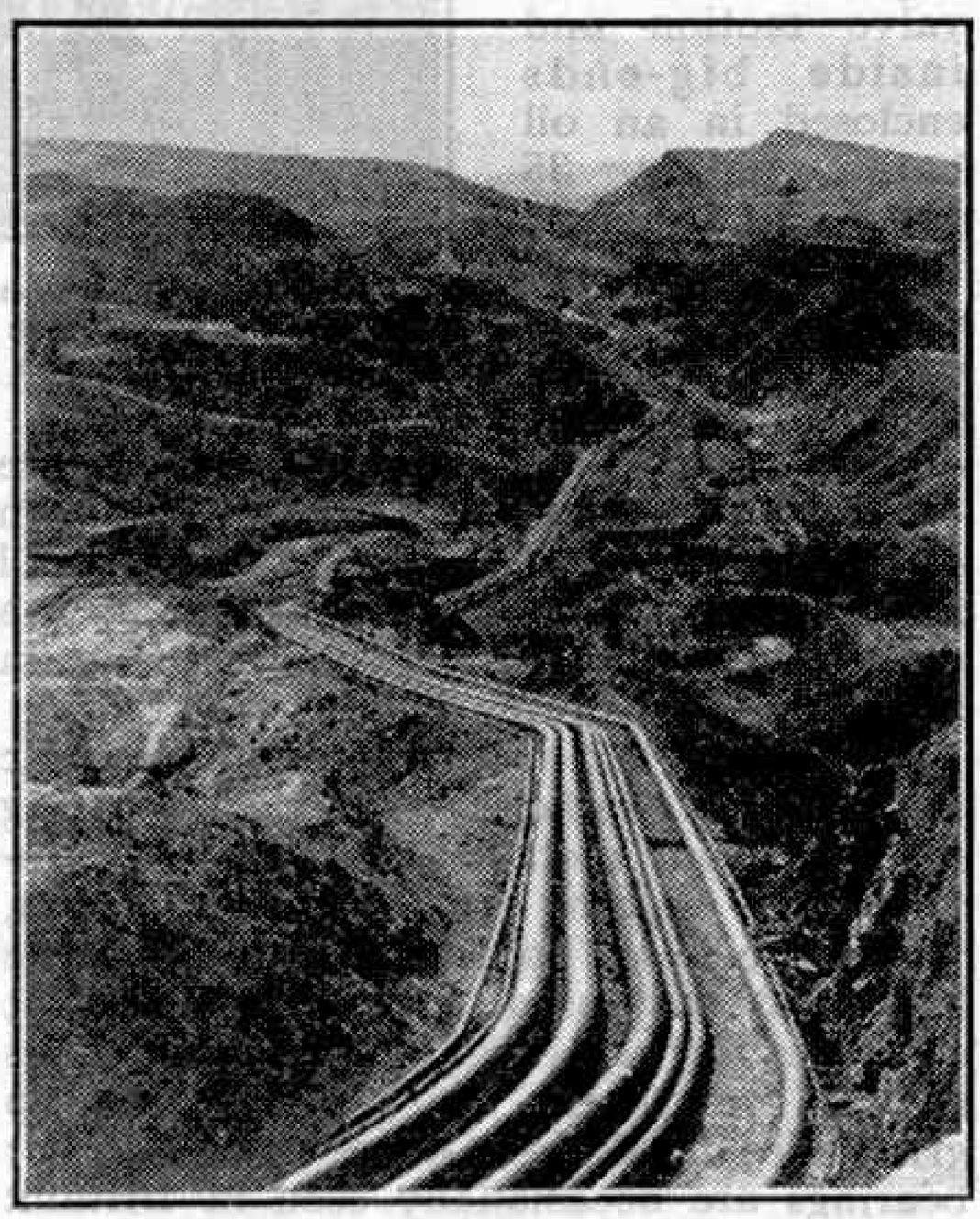
Abadan, at the head of the Persian gulf, is the main link in this chain of world-wide distribution, supplying not only aviation spirit but also kerosene fuel for jet engines.

During the war the Anglo-Iranian Oil Co. developed plant at the Abadan refinery, largest in the world, to process crude oil from the nearby oilfields of Southern Iran and convert it into aviation spirit for the British and U.S. air forces in the Mediterranean and Far East. Yet at the start the total world output of 100-octane aviation spirit was less than half-a-million gallons a day—not enough for a single major bombing raid; Abadan was producing no 100-octane spirit and only small quantities of lower-octane aviation spirit.



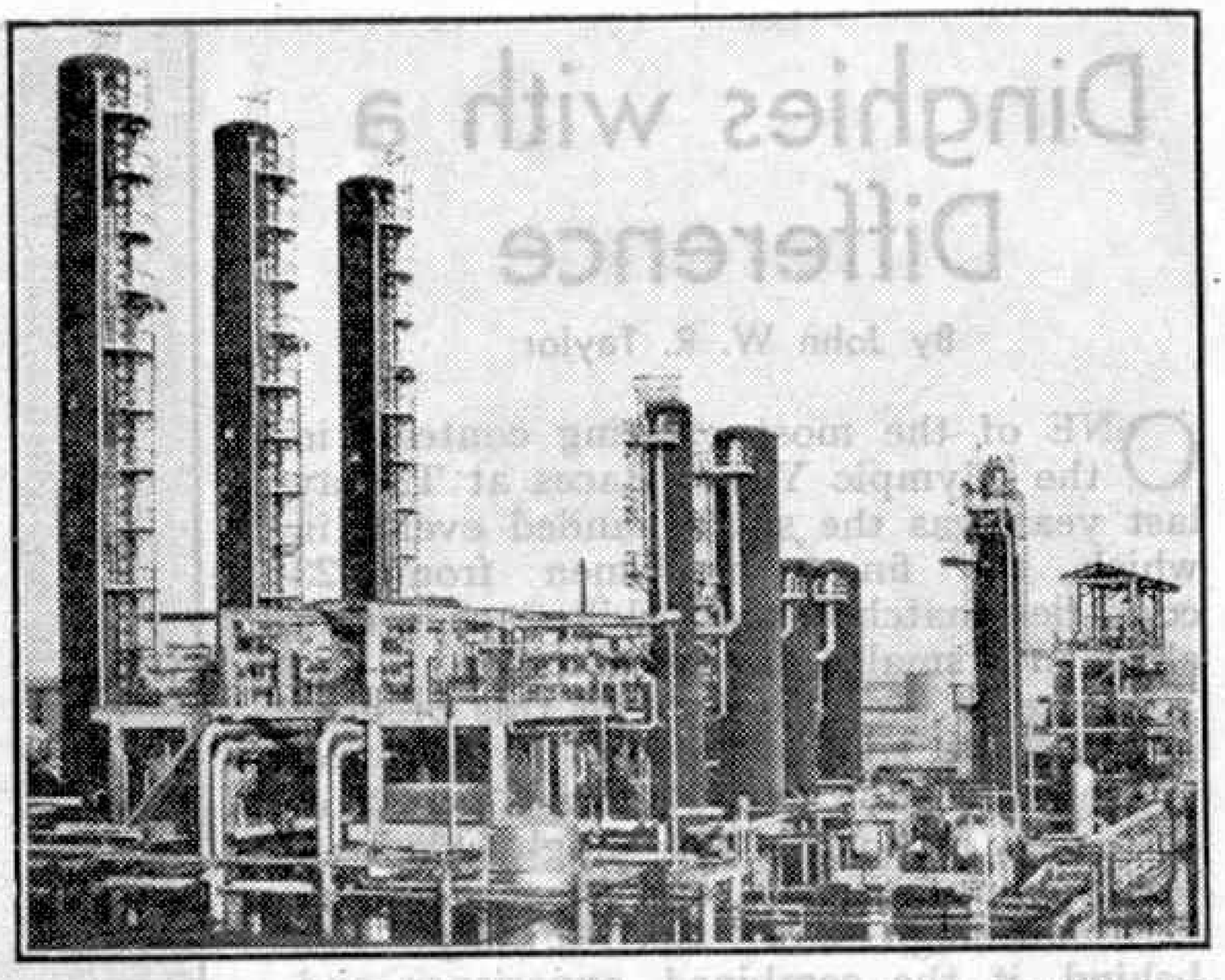
A typical oil-producing well in S. Iran. Unimpressive, but millions of gallons a year of crude oil flow from it.

Then came the R.A.F.'s decision to standardize on 100-octane spirit. Anglo-Iranian already knew that spirit from Iranian crude oil could be further "cut up" so that the better parts would



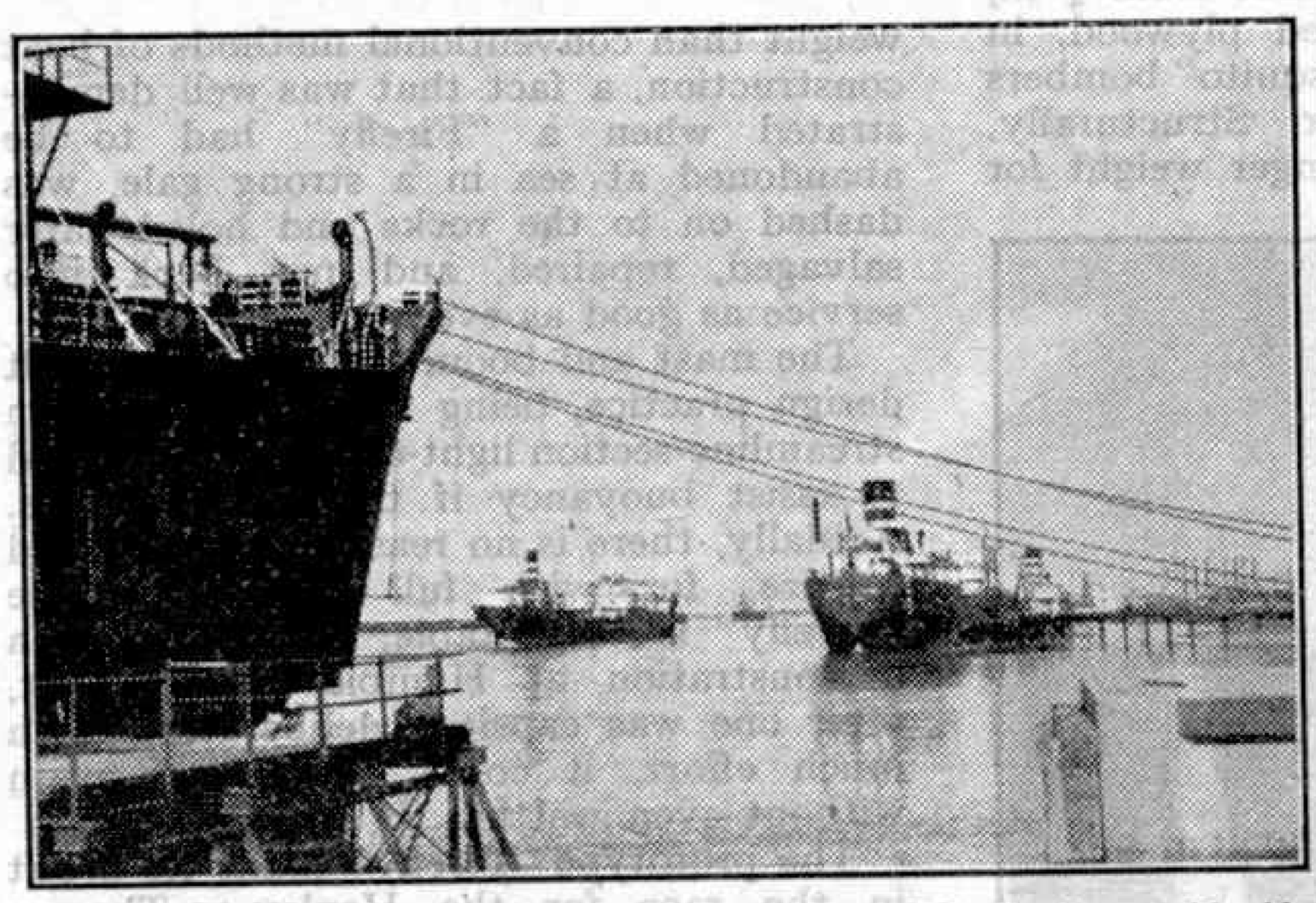
Snake-like oil pipe lines carry crude oil from the Iranian oil fields through the barren hills to Abadan.

yield an aviation spirit of an improved octane value, and back-room boys at their Sunbury-on-Thames research station discovered a method, known as the alkylation process, of obtaining much larger quantities of equally good spirit from the same amount of crude oil. Almost simultaneously, two other companies working on the problem discovered the alkylation process too. Further work at Sunbury made it clear that refining plant already installed at Abadan could be used to extract from motor spirit certain aromatic hydro-carbon compounds of great value in aviation spirit.



An alkylation unit at Abadan. This new process made possible bulk production of high-octane spirit and helped the R.A.F. to establish air superiority over the Luftwaffe during the war.

These discoveries led to a vast increase in the production of aviation spirit at Abadan, and by V.E. day the refinery was turning out one million gallons a day. To-day that output is diverted largely to civilian use, and spirits of even higher quality are being produced. Greater production, both of aviation spirit and of other petroleum products, is expected from Iranian oil in the near future. This output is a substantial dollar earner, since some is sold directly for payment in dollars, and some in markets which would otherwise have to be supplied from dollar sources.



Anglo-Iranian Oil Co. tankers at Abadan, first link in the world-wide distribution chain of B.P. aviation spirit.

Although Abadan is the main centre of aviation spirit production, the key to its activities is held in London. To London the company's customers, the airlines of the world, send their estimated demands for aviation spirit, and on the collation of these estimates the movement of the sea tankers from Abadan depends. The tankers feed the main installations of each country on its sea-board, and thence the spirit flows to local depots, sometimes by road, sometimes by rail and sometimes by water, according to the transport facilities and geography of each territory. In Switzerland the main installations are fed by barge up the Rhine from the great North Sea ports, and Italy utilizes railcar tankers for onward distribution. At each airfield are bulk tanks for storage of the spirit. At regular intervals throughout the long journey from the refinery the spirit is filtered and tested, to reduce the possibility of deterioration or contamination; rigid rules for control ensure that the high quality of the fuel is maintained. Every unit of transport that handles the spirit is provided with a built-in system of filtration.

The last line in the distribution chain is forged when an

(*Continued on page 282*)

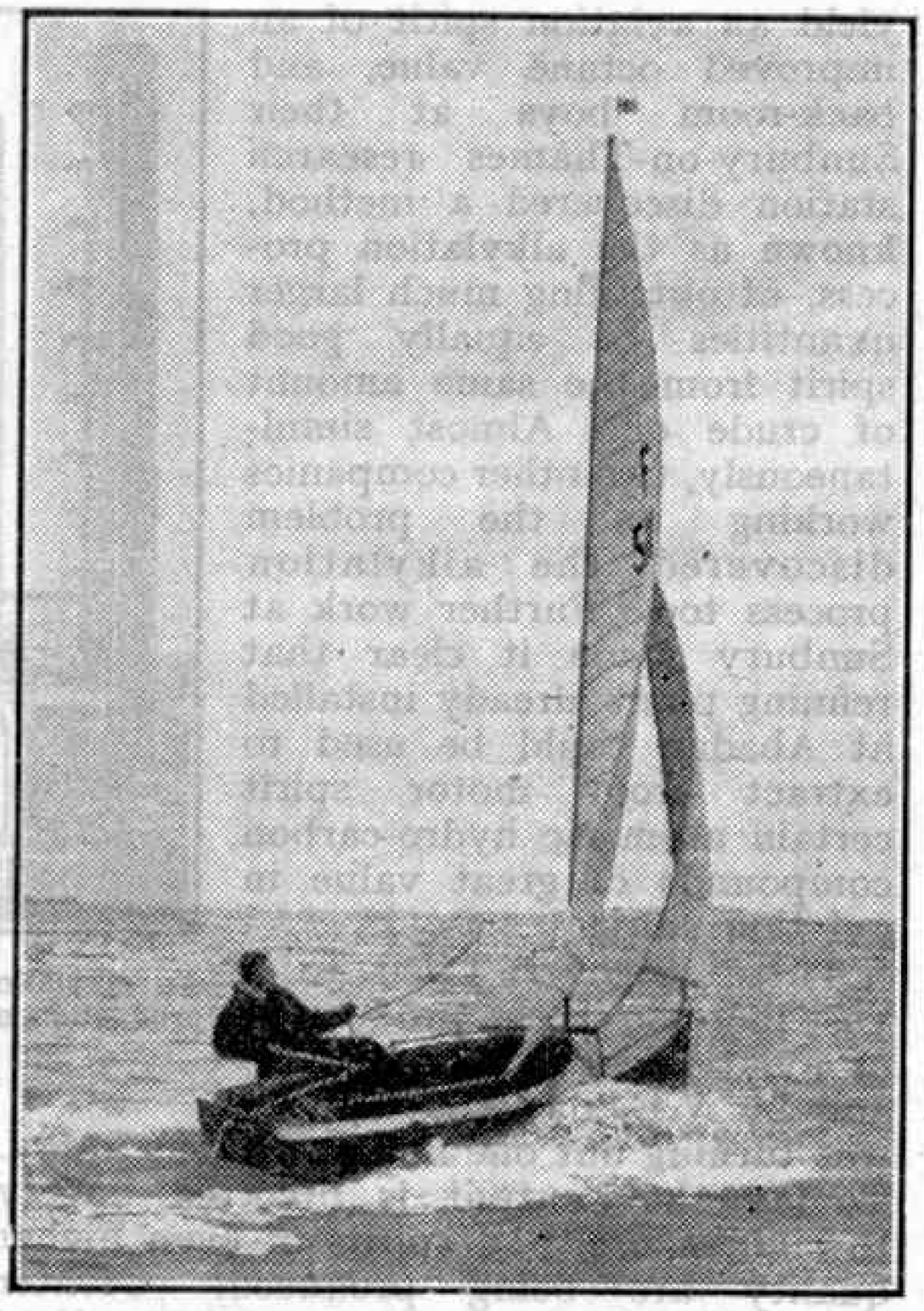
Dinghies with a Difference

By John W. R. Taylor

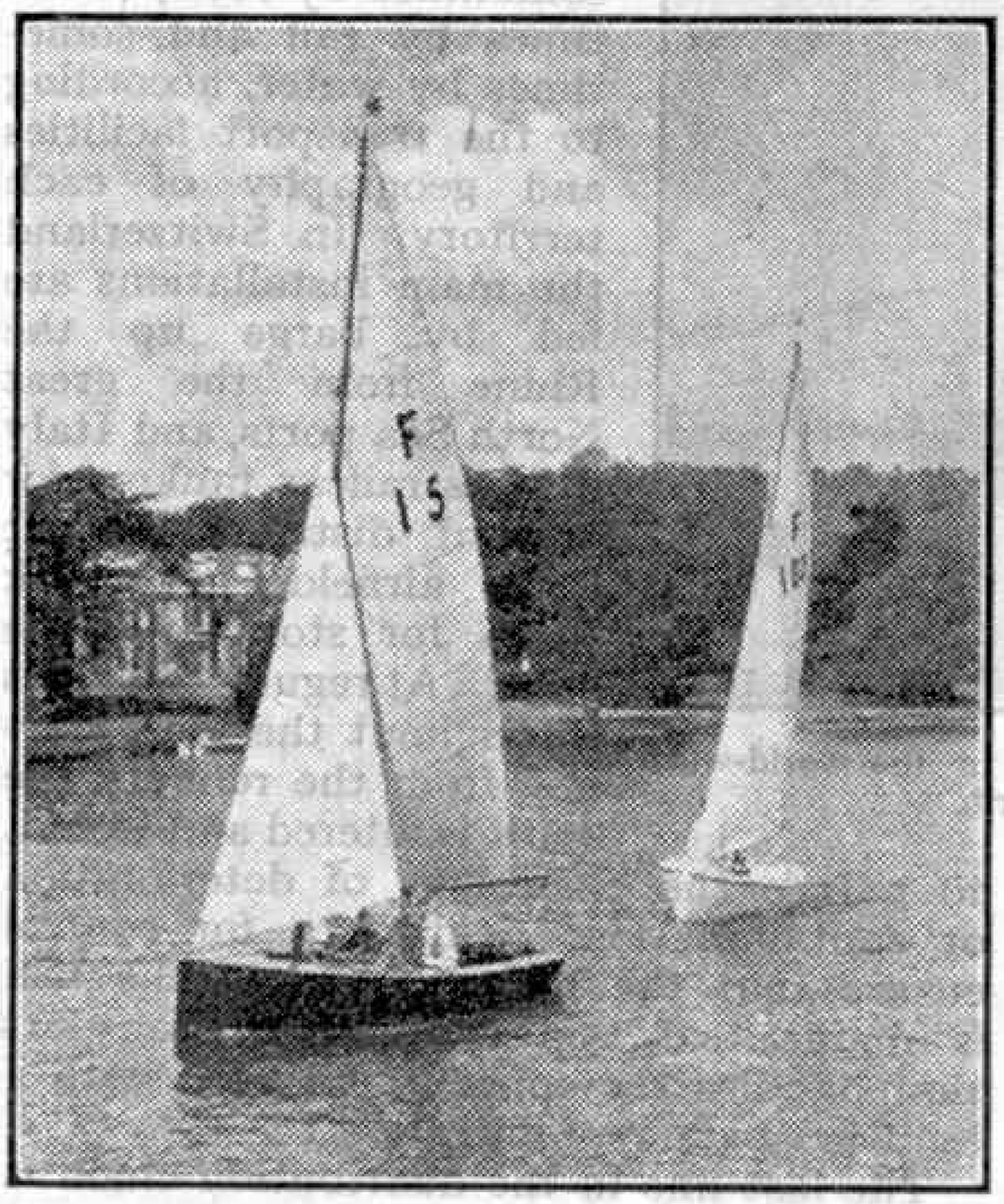
ONE of the most exciting contests in the Olympic Yacht Races at Torbay last year was the single-handed event, in which the finest helmsmen from 23 countries matched their skill, each racing alone in a small "Firefly" dinghy.

Choice of the "Firefly" for this premier international contest followed its adoption by the British Yacht Racing Association as a new National 12-ft. dinghy class—a high honour for such a revolutionary design. But, although new, the "Firefly" has behind it the combined experience and resources of its internationally-famous designer, Uffa Fox, and the Fairey Aviation Company, whose subsidiary Fairey Marine Ltd. build the boats at Hamble, in Hampshire.

As might be expected from such a parentage, the "Firefly" has several distinctly aeronautical features, which helps to explain its spritely performance. For example, its hull is made from $\frac{1}{4}$ in. thick resin-bonded moulded plywood, in much the same way as "Mosquito" bombers were made during the war. Structurally, moulded ply is much stronger weight for weight than conventional methods of boat construction, a fact that was well demonstrated when a "Firefly" had to be abandoned at sea in a strong gale, was dashed on to the rocks and holed, later salvaged, repaired, and put back into service as good as ever.



In the hands of an expert the "Firefly" will skim along like a speedboat, at 10 knots in a fresh breeze.



"Firefly" Dinghies on the Thames.

The mast and boom also reflect aircraft design practice, being manufactured from streamline-section light-alloy tubing, sealed to assist buoyancy if the boat capsizes. Actually, there is no reason why it should capsize, for with full racing rig the "Firefly" is very stable; what is more, a demonstration at Hamble proved that, after one was capsized deliberately, with much effort, it could be righted again without even wetting its crew!

The prototype "Firefly" made its debut in the race for the Henley-on-Thames Challenge Trophy in May 1946, finishing first in its heat the first time it sailed in a race. In the final, against opposition from expert crews in familiar boats, it finished a good second. Fairey Marine no longer had any doubts of the quality of their new dinghy, but restrictions on raw materials and labour shortages generally prevented quantity production that year. So the first batch (*Continued on page 282*)

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With certain exceptions, which will be indicated, these should be ordered through a bookseller.

"SELECTED FOR ENGLAND"

By R. J. CANNON
(Ian Allan Ltd. 2/-)

Ian Allan Ltd. have broken new ground with this excellent little book on England's Test Match cricketers, in which every boy will revel. After a foreword by Alec Bedser, it gives in compact form details of the careers of the greatest of English test cricketers of recent times, with notes on their records and accomplishments not only in Test cricket, but also in county matches. These interesting accounts are supplemented by figures of batting or bowling averages, in certain instances both, throughout their careers, in county matches and in Tests against Australia, South Africa, West Indies and New Zealand.

For each of the great cricketers concerned there is a good photograph, many of the illustrations being action shots. "*M.M.*" readers interested in the great national game will thoroughly enjoy every line of the booklet, and the wealth of information on cricket records given in it no doubt will be put to good use in settling arguments on cricket facts.

Copies may be obtained from leading booksellers or direct from Ian Allan Ltd., 33, Knollys Road, Streatham, London S.W.16., price 2/2½ post free.

"LOCOMOTIVES WORTH MODELLING"

By F. C. HAMBLETON
(Percival Marshall & Co. Ltd. 10/6)

Frequently when delving into locomotive history we are seized by the idea of modelling a particular engine. We may not have seen the original. Perhaps it was broken up long ago, and even if it still exists it may be difficult to obtain sufficient details. With the present book in hand we should find no such difficulty in modelling any of the engines shown therein. The drawings are excellent and numerous supplementary views and sections give exact proportions of chimneys, whistles, lubricators and so on, with their elusive curves.

The book also is good as a contribution to locomotive history for those not likely to model any of the engines shown, as in it there is a wealth of information on famous engine classes and their designers that helps to build up the "atmosphere" so necessary for their proper appreciation. The author tells his story attractively, bringing to life each engine in turn from the great railway days of the past.

"PRACTICAL HINTS TO SCOUTERS"

By LEONARD G. ATTRILL
(Brown, Son and Ferguson. 2/6)

Many problems beset the path of the Scoutmaster, and all who have taken up the post will welcome this new edition of the book written by the late Rev. R. P. E. Cheesman, brought up to date by Mr. Attrill, for the wisdom and knowledge that these officials of the Scout Movement have gained from experience will help them to avoid blunders into which they may fall. It will do more than this, however, for it will also provide them with a method that will ensure the development of the right atmosphere in their Troops.

The book covers the entire subject, from the enrolment of recruits and the working out of a programme of Troop work to the co-operation between the various divisions that mark the Scout Movement. It is very practical in character, covering actual details of programmes for Wolf Cubs, Scouts, Senior Scouts, Sea and Air Scouts and Rovers, and the ideals and principles of the movement are kept well in the forefront all the way through. A useful feature is a good index.

"THE A.B.C. OF PHOTOGRAPHY"

By F. and M. PARTINGTON
(Fountain Press. 3/6)

This latest addition to the wealth of literature now available on the photographic hobby is intended for the beginner, and is on similar lines to the well-known "Photofacts" series of pocket handbooks from the same publishers. It is written in a frank and friendly style that will appeal to the newcomer to this fascinating hobby. After explaining the "how and why" of box and roll-film cameras, the authors deal with lenses and shutters, films and filters, loading and unloading a camera, and, of course, the very important matter of exposure. The amateur enthusiast who likes doing everything for himself will find practical chapters on developing, printing, enlarging, mounting and spotting, and there is also a short chapter on indoor photography. Neat diagrams and several full-page half-tone photographs add to the value and interest of this excellent handbook.

"WATCH ESCAPEMENTS"

By Dr. J. C. PELLATON
(N.A.G. Press. 10/6)

This account of a subject of the greatest interest to all watchmakers is a translation by S. Paris of part of a course in watchmaking in use in the Swiss horological schools. It is intended to play a part in the revival of watchmaking in England, and is precise and methodical, with most drawings 20 times the actual size of the parts illustrated, and others on an even larger scale. Only in the last few years has it been realized that the modern mass production of watches in Switzerland owes its success to exact knowledge of the geometry of the escapement, and this account of the subject should prove of the greatest value.

"MODEL GLOW PLUG ENGINES"

By Lt. Col. C. E. BOWDEN, A.I.Mech.E.
(Percival Marshall. 3/6 net)

"Glow plug ignition," states the author, "is a new adaptation of one of the earliest forms of ignition for internal combustion engines." The model glow plug engine has been an immense success in the United States. Lt. Col. Bowden believes that it will also enjoy great popularity over here when its advantages and disadvantages are fully understood, and his handbook is an endeavour to promote this understanding by giving a complete explanation of its working, with useful operational hints.

Explanatory diagrams, sectional drawings and many half-tone illustrations add to the interest and value of the book.

"BASIC TECHNICAL ELECTRICITY"

By H. COTTON, M.B.E., D.Sc., M.I.E.E.
(Cleaver-Hume Press Ltd. 8/6 net)

Nowadays we all need to know something of electricity for use in our daily work or in our hobbies and pastimes. The Cleaver-Hume Electrical Series, of which this book is the first, is intended to supply this need in a thoroughly modern and scientific manner.

From a discussion of the nature of electricity we pass to accounts of sources of current, the electric circuit, the chemical effects of electricity, and accumulators. Then follow sections on the heating effect of electricity, magnetism and electro-magnetism, electrical measurements and static electricity. The book is simply written and excellently illustrated and it gives the essential knowledge on which later books in the series will be based.

Railway Notes

By R. A. H. Weight

National News

Standard types of signs or notices to be used at British stations will be rendered in Gill Sans type on a background of the Regional colour. Signs will consist of enamelled metal plates designed to give clear indications. Large signs bearing the station name in 12 in. letters are to be fixed at the incoming ends of platforms at all stations on main trunk routes, also at principal stations on subsidiary lines. Smaller name signs will continue to be displayed at intervals along platforms; these will usually be 3 ft. long, having letters 3 in. high.

British Railways 1949 locomotive building programme provides for 465 new engines, 156 of which are to be constructed by contractors, the remainder in various railway works. Some are already in hand, while others will be put on order as materials become available later. There are to be 32 L.M.R. mixed traffic 4–6–0s, 10 each W.R. "Castles" and "Halls," 28 L.N.E.R. type "B1" 4–6–0s and 28 "A1" 4–6–2s, with two "Merchant Navy" and 15 "Battle of Britain" 4–6–2s for the S.R. For the latter region are also ordered the five "Leader" special type mixed traffic tanks, one diesel-mechanical shunter, 15 diesel-electric shunters of 350 h.p., and two main line diesel-electric locomotives.

New 2–6–0 mixed traffic engines include 27 L.M.R. class "4," and 70 L.N.E.R. type "K1," the latter being the two-cylinder higher-pressure version of the smaller Gresley 2–6–0, originally built with three cylinders for West Highland service. There will be 54 L.M.R. type 2–6–4Ts to come, and 30 of their 2–6–2Ts, as well as 10 more 2–6–2Ts for the W.R., which is also to have 95 additional 0–6–0Ts including a new outside-cylinder class. Fifteen 0–6–0Ts are to be built by the E. and N.E. Regions. There may be, in time, some further interchanges of engines between Regions, and those now about to be constructed may not all work on their native metals.

Current plans include the provision of 1,685 steam train passenger carriages, 839 to be corridor coaches for main line service including some restaurant and sleeping cars. Vans or miscellaneous vehicles built for passenger train service will number 287, in addition to 500 electric train coaches.

The orders for 27,225 freight train vehicles of all kinds include 10,215 mineral wagons being constructed by contractors, and 400 fish vans for the East Coast route.

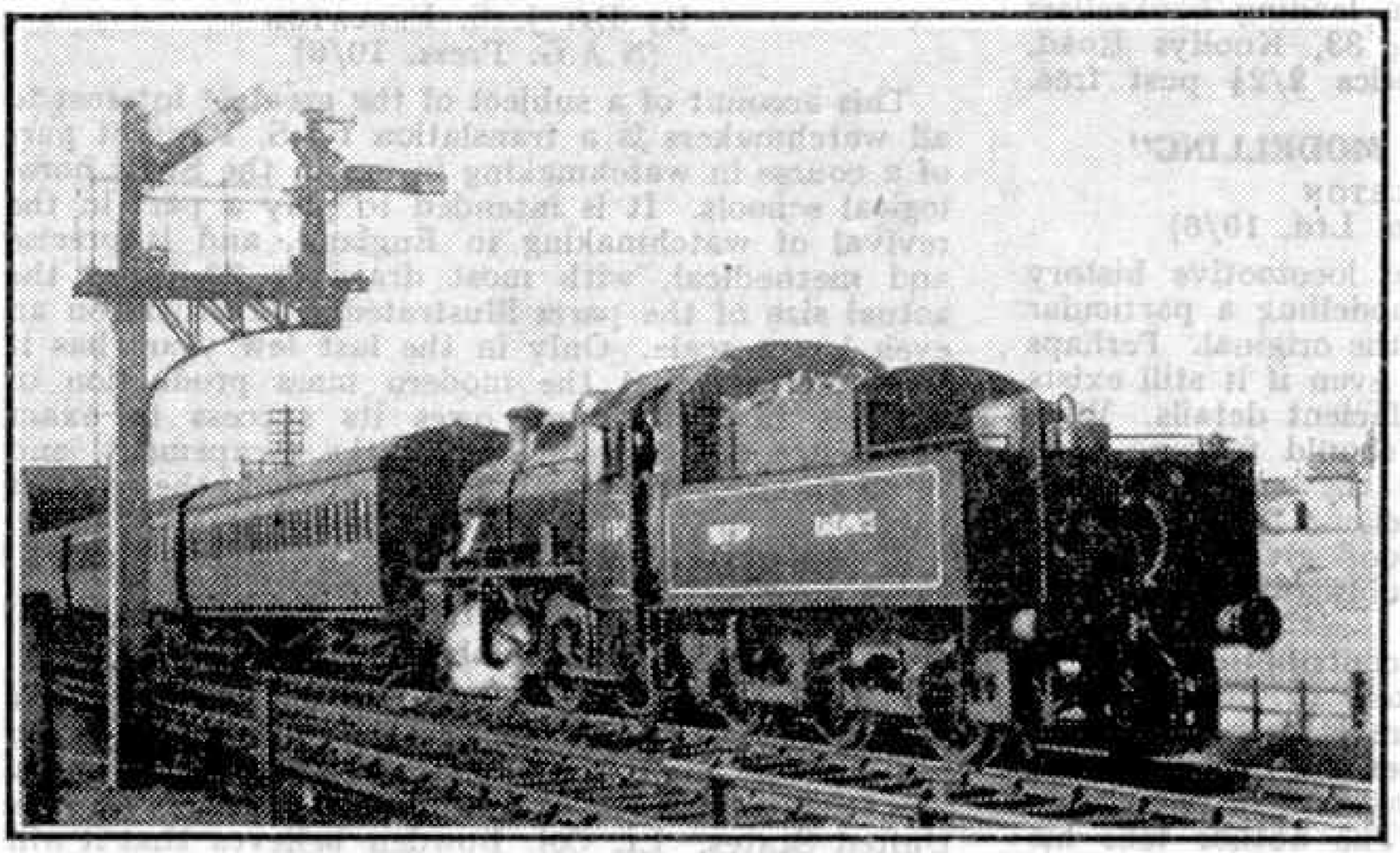
Various interesting examples of inter-working using lines or rolling stock of the former L.M.S. or L.N.E.R. have lately been reported from Scotland. The Glasgow-Oban (L.M.S.) and Glasgow—Fort William-Mallaig (L.N.E.) routes are both famous for scenery. Some of the grandest of both may be enjoyed while travelling by the 9.31 a.m. from Glasgow, Queen Street, to Oban, which goes over the former L.N.E.R. route past Helensburgh, Loch Long, Loch Lomond, to Crianlarich, thence by way of Loch Awe and Connel Ferry (formerly L.M.S.) to Oban, returning similarly in the evening.

Several interchanges of locomotives are taking place on other Scottish lines. Though a good many green ex-L.N.E.R. engines are still about, lined black is more in evidence as the finish for mixed traffic or older passenger locomotives.

There is a Tavern on the Train

Eight novel and splendidly appointed "Tavern Cars" are being built at Eastleigh Works for selected express services on the Eastern and Southern Regions; some are already running. They are designed to run attached to a restaurant of the latest type, and contain kitchen and pantry, with attendants' compartment; bar and snack counter with stainless steel and plastic fittings; refrigerator and ice-cream conservator. The internal decoration resembles that of an old-world inn, with white-washed walls, oak beams, wooden settles and tables, small-paned high windows, hanging old type metal lanterns, and a floor covering imitating the black and red tiling of the country inn. Externally the lower half of the cars, painted in the new crimson lake livery, is lined out to represent brick-work. The cream upper section is broken by vertical black panels giving the impression of an old half-timbered house.

Each of the new cars will carry painted "Inn" signs externally and internally, the names chosen being: *"White Horse," "Jolly Tar," "Dolphin," "Three Plovers," "The Bull," "The Salutation," "The Green Man," "The Crown."*

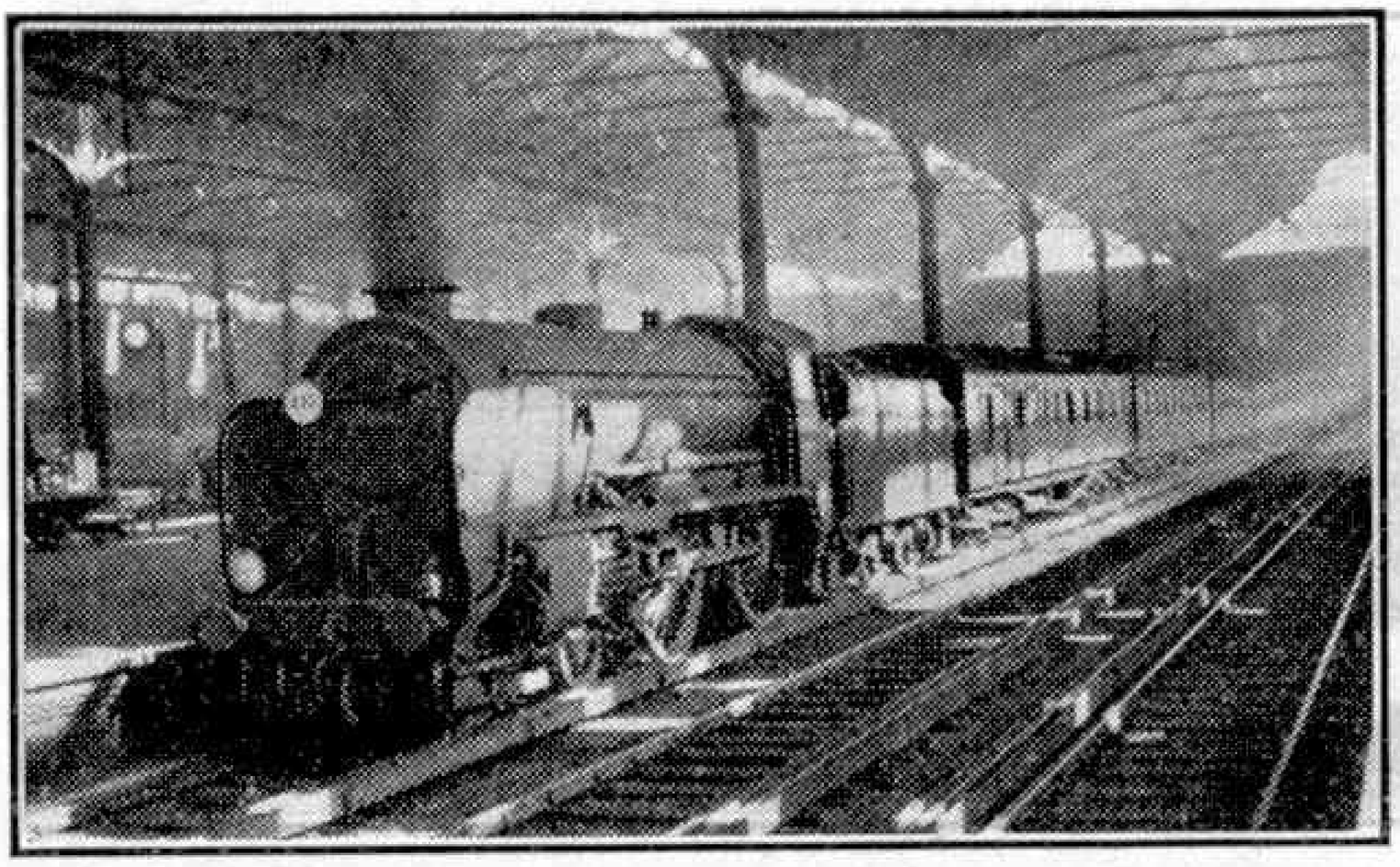


A London Midland light 2-6-0 No. 46434 at work on the Wigan branch of the former L.N.E.R., now under London Midland control. Photograph by W. S. Garth.

The ordinary dining car has redesigned seating accommodation of extremely comfortable type. These new sets will operate in the S.R. *"Atlantic Coast Express,"* the *"Master Cutler"* and *"South Yorkshireman"* expresses to and from Marylebone, the *"White Rose"* between King's Cross and Leeds; the *"Norfolkman"* between Liverpool Street and Cromer, via Norwich, and also in the cross-country boat trains running between Liverpool, Manchester, Ipswich and Harwich.

The First Penny Timetable

Just 100 years ago, Andrew Reid published at Newcastle-on-Tyne the first penny railway timetable ever printed. To celebrate its centenary of production, *"Reid's Railway Guide"* lately reproduced a facsimile of the original cover, with specimen pages from an early issue. Reid followed up his pioneer timetable with a series of "Reid's Railway Rides," illustrated with engravings, describing journeys from London to Glasgow, Edinburgh and Dublin, in the form of long folding maps. His descendants produced the first pictorial railway posters in colour.



Southern No. 30929 "Malvern" at Victoria on the Newhaven Boat Express during the last week of steam operation. Photographs on this page are by W. Philip Conolly.

It is interesting to recall in this connection that for many years prior to the 1914–18 war the largest English railway companies published bulky general timetables, with maps and much other information, at the modest selling price of one penny. They are of great interest to study nowadays. The G.N.R. summer timetable for 1914 is on the writer's desk at the moment; it contains some 230 pages, each 1 ft. deep.

Southern Tidings

Speedy replenishment of carriage water tanks is much facilitated at Victoria Station, London, S.R. by a new battery-driven mobile pump, with storage capacity for 275 gallons of water.

A notable development in May was the regular haulage of the London-Newhaven boat expresses by new main line electric locomotive No. 20003, which is painted green. The ordinary coaches of the train appeared for the first time on 15th May in new crimson lake and cream livery, though the Pullman refreshment car, of course, retains its normal colours. It is intended to continue the use of one of the three electric engines, at any rate on the day boat trains, the engine being utilized also for goods work during much of the remainder of each 24 hours. The haulage of a through W.R. train each way between Eastbourne and Brighton is fitted in as well on summer Saturdays.

Although "Schools" 4–4–0s had been the usual motive power during the last nine months, an "Atlantic" was seen in full cry with 380 tons on the London-bound boat train only a few days before the change-over was rostered. These famous L.B.S.C. 4–4–2s had been a mainstay of the service for many years. Various types of express, mixed traffic and tank engines share the haulage of the through steam trains between the Midlands and Brighton—Eastbourne—Hastings.

On the Reading-Redhill line 4–4–0s from each of the separate pre-grouping companies may be seen, including S.E.C.R. "B1s," L.B.S.C. "B4x," and L.S.W.R. "L11s" or "T9s." Some "Paddlebox" 4–6–0s are in service again, together with other engines of different classes ex store. Most of the shunting in the Eastleigh neighbourhood is performed by "E4" radial tanks on account of considerable "G6" withdrawals. Some "M7" 0–4–4Ts fitted for motor train working are running from Horsham shed, while 67-year-old "D1" Stroudley 0–4–2T No. 2253 was still working merrily from Tunbridge Wells at the time of writing.

"Battle of Britain" No. 34059 "*Sir Archibald Sinclair*" was making trial runs in May last with special or ordinary trains from Liverpool Street to Norwich, Parkeston Quay (Harwich) and elsewhere on the Eastern Region. These lines have seen little of "Pacific" operation hitherto, as the Gresley or other Doncaster types are too big.

New Western Region Locomotives

Latest modified "Halls" are No. 7903, "*Foremarke Hall*," No. 7904, "*Fountains Hall*" and No. 7905 "*Fowey Hall*"; 0–6–0Ts Nos. 9678–80 also have been completed.

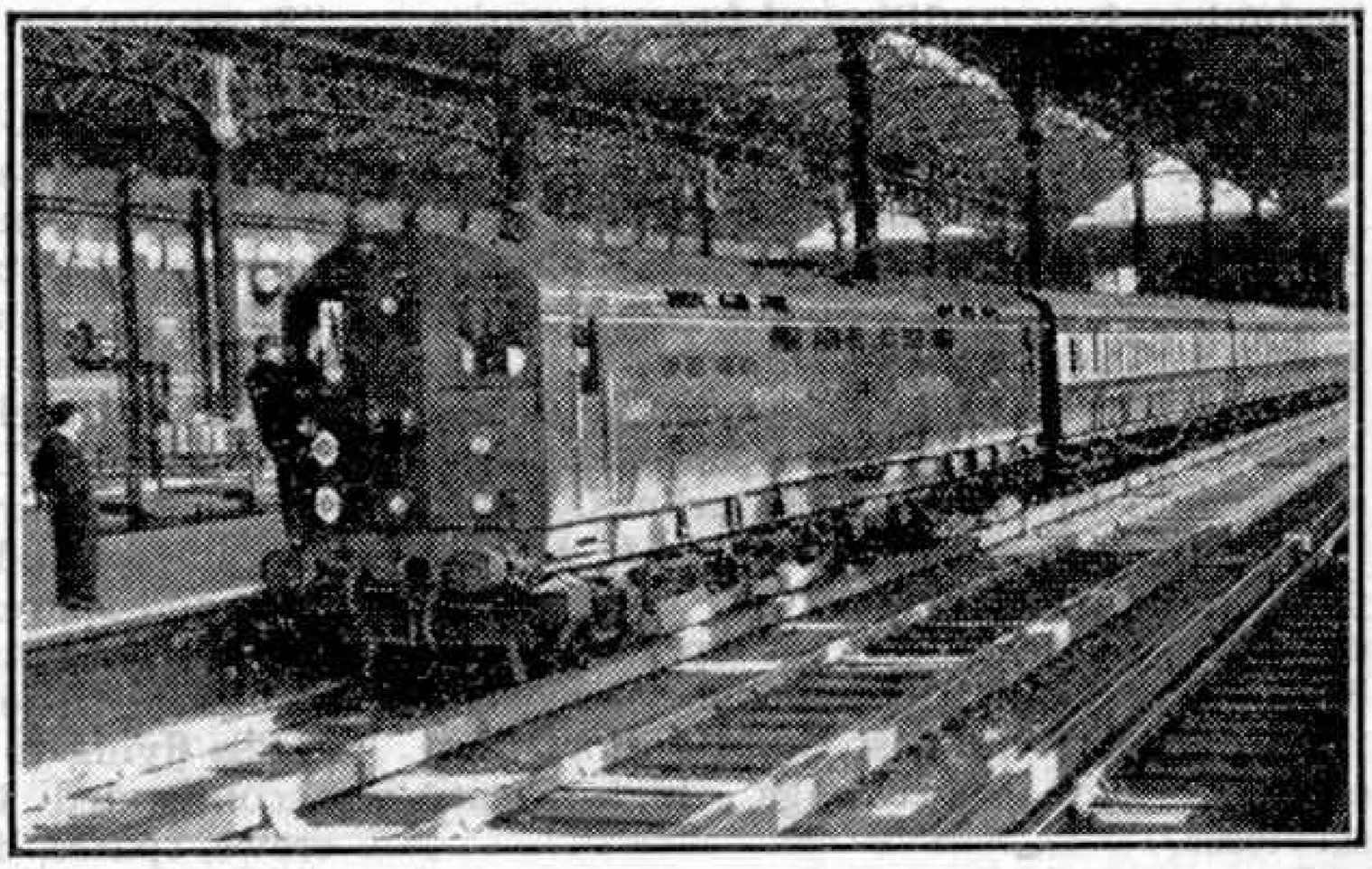
London Midland Regional News

As on other Regions, numbers of plain tenders are noted on repainted engines, as the British Railways crest is not yet much in use. The new carriage colours, however, are beginning to appear.

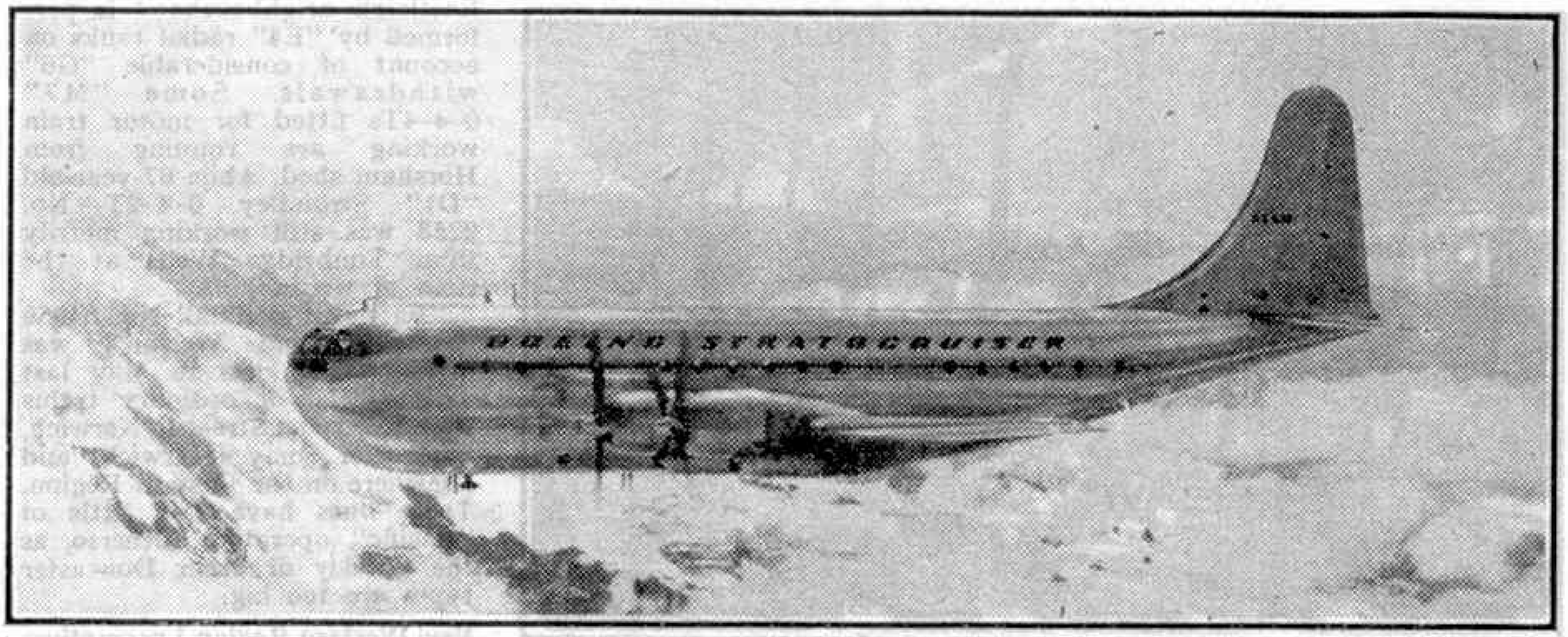
The diesel-electric express locomotive No. 10001 lately achieved a long continuous spell on round-trip Manchester—St. Pancras working; little had been seen of 10000, but the two together ran from Euston to Glasgow non-stop on 1st June with "*The Royal Scot.*" This trip was the longest non-stop run yet made in Great Britain with diesel traction and it saw the first appearance of the diesel units on British Railways in Scotland.

This Month's Cover

Railway enthusiasts will be specially interested in this month's cover. This shows a Western Region goods train being directed into a relief or loop line ahead by the small "doll" of a characteristic Great Western bracket signal. The original photograph by J. G. Hubback appeared as a half-tone reproduction in "*Studies in Steam No. 2.*" By courtesy of the publishers, Ian Allan Ltd., this striking scene is now used as an "*M.M.*" cover.



Southern electric No. 20003 on the Newhaven Boat Express. The coaches are finished in British Railways crimson lake and cream.



Double-Decker of the Air

The Boeing "Stratocruiser"

By John W. R. Taylor

"MUST the brief glory of the sailing Clippers end this great nation's role upon the seven seas? Or may we draw from this rich heritage the inspiration for new ventures, with Yankee Clippers sailing forth again?"

When those words were written many years ago, their American author little realized that one day a young man named Juan Trippe would take up his challenge and send forth new fleets of Clippers, not upon the seven seas but through the skies above them. For when Trippe laid the foundations of his great Pan American Airways network in 1927, he decided to give each of his air liners a "Clipper" name.

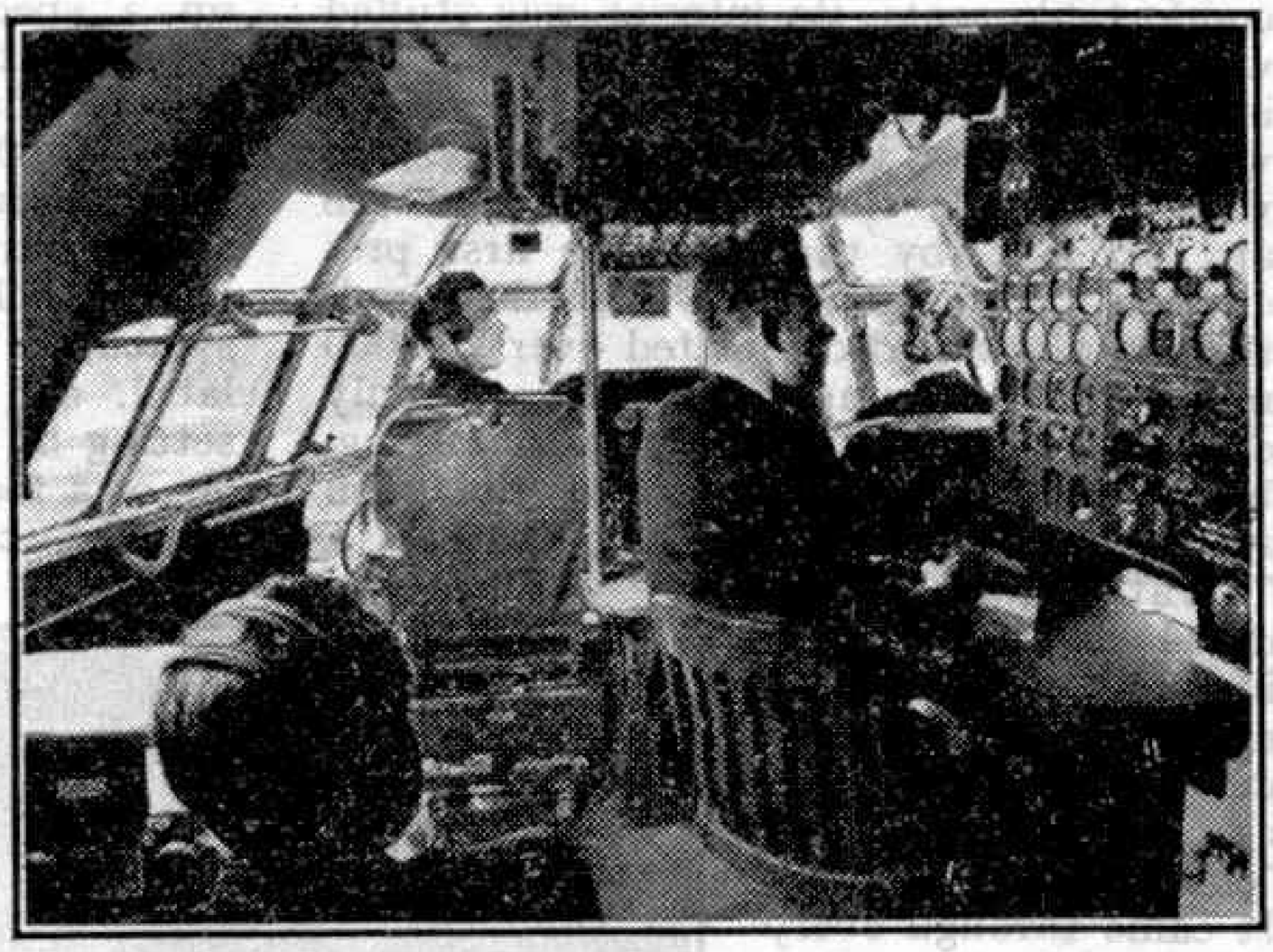
Pan American has grown from small beginnings in a tradition of free enterprise, using always the finest aircraft available. And when *"Clipper Flying Cloud"*—first of P.A.A.'s new fleet of giant Boeing "Stratocruisers"—touched down at London Airport on 4th April last it was obvious that the tradition is being maintained. The "Stratocruiser" is undoubtedly the finest air liner in regular service anywhere to-day, superseding the "Constellation" as flagship of the world's airlines. As a luxury liner it is the first aircraft able to fly direct from New York to London, carrying 61 passengers at speeds up to 340 m.p.h.; as a 100-passenger "skycoach" it can bring new speed, comfort and economy to short-range high-density services.

Pan American is the only airline operating "Stratocruisers" at present, but soon it will be joined by four others, including our own British Overseas Airways Corporation which has six on order from Boeings and recently bought four more from the Scandinavian Airlines System. So we shall be seeing a lot of these 71-ton, double-decker aircraft in the next few years.

The success of the "Stratocruiser" is no mere coincidence, for its development began indirectly no less than 13 years ago when Boeings started work on a bomber to supersede the B-17 "Flying Fortress," which had just gone into production. The new bomber was destined to achieve fame during the second World War as the B-29 "Superfortress," and the "Stratocruiser" was conceived in 1944 as the C-97, its military troop and cargo-carrying team-mate.

The idea was to build the two aircraft in parallel, using B-29 wings, undercarriage, engines and tail unit on the C-97, but with a fuselage of greatly increased capacity, created in effect by building two B-29 fuselages on top of each other. This gave the U.S.A.A.F. a unique bomber-transport team which at the same time simplified production, squadron maintenance and spares problems and meant that, as the two aircraft possessed virtually the same range, speed and flying characteristics, B-29s flying to an advanced base could be accompanied by C-97s carrying ground crews, spares, fuel, bombs and equipment. In this way, the squadron could go into action almost immediately on arrival.

The sudden collapse of Japan prevented operational use of the bomber-transport team idea, but improved versions of both aircraft are still in production at Boeing's Seattle factory, in the shape of the B-50A "Superfortress" and C-97A "Stratofreighter." The "Stratocruiser" is the civil passenger version of the C-97A. Although externally similar to the old B-29 and C-97 the B-50, C-97A and "Stratocruiser" are in fact 75 per cent. new, with more powerful Pratt and Whitney "Wasp Major" engines, each developing 3,500 h.p., higher performance and payload.



In the roomy control cabin on the upper deck of the Boeing "Stratocruiser" air liner. The illustrations to this article are by courtesy of the Boeing Airplane Company, U.S.A.

The creation of the "Stratocruiser" by taking a "Superfortress" and putting another fuselage on top of the existing one sounds very nice and simple. Actually it was far from easy, as no airline navigator wants a couple of machine-guns poking him in the ribs all day, and passengers usually object to riding hooked inside a bomb-bay. So it is hardly surprising that the story of the four and three quarter million hours of design, development and testing that went into the "Stratocruiser" makes fascinating reading.

Every component went through a rigorous test programme to ensure that it would stand up to years of hard work on the airlines. In some cases they were fastened to complex instruments of torture that stretched, compressed, shook, banged or rubbed them, imposing years of normal wear and tear in a few hours. For example, a complete undercarriage unit was mounted on one machine and thumped into the ground 41,500 times to prove that it would not fracture under continued heavy landings.

Other parts were installed on B-29s for test under flying conditions. In this way the ailerons were flown 2,840 miles and the elevators 7,171 miles before the "Stratocruiser" itself left the ground.



Part of the main passenger cabin of a "Stratocruiser" built for Pan American World Airways. Half-way along on the right a spiral staircase leads to the lounge on the lower deck, and at the far end of the cabin is a large galley.

Further airflow tests were made with models of the "Stratocruiser" and "Stratofreighter," which spent 720 hrs. in wind tunnels, during which tests were conducted at speeds as high as four-fifths the speed of sound. One 10½ ft. span model, complete even to movable control surfaces, extendable wing flaps and powered propellers, helped Boeing engineers to predict accurately the aircraft's performance and handling characteristics long before the prototype flew.

When it did take off for the first time on 8th July 1947 it was very different from the aircraft now in service with P.A.A. Instead of

comfortable seats, its interior was stuffed with three tons of special precision test instruments able to record every minute vibration, stress, temperature and pressure variation while the machine was in the air. In fact, by the time the first production "Stratocruiser" was delivered, the prototype had completed over 250,000 miles of test flying, including not only every conceivable type of airline flying, but also stalling, diving and flying in icing conditions. In one test a "Stratocruiser" was dived at 498 m.p.h.; in another, one of its engines was purposely cut on take-off, just as the fully-loaded 'plane became airborne. It came through every phase of the programme with flying colours.

Extensive tests of this nature cost a lot of money, and inevitably put up the initial cost of production aircraft, but they contribute immeasurably to safety, for, as a large notice in the Boeing factory claims: "It's what you don't see that counts." Passengers in a "Stratocruiser" can be certain that all the complex mechanical and structural devices outside the four walls of their cabins are as good as skilled engineers and long years of experience can make them.

On the other hand, an aircraft manufacturer who failed to realize that what you *do* see counts too would sell very few aeroplanes, and the "Stratocruiser's" passenger accommodation is as luxurious as its structure is sound. To test the comfort of the sleeping bunks, Boeing's Vice-President in charge of engineering and sales, Wellwood E. Beall, and other prominent executives took off their jackets and went to sleep in them. But even Boeing cannot afford to pay its executives to sit down in the passenger seats, stand up, sit down again, and so on for hours on end, to see how the materials will stand up to wear and tear. So they devised a machine to subject the chair fabric to scuff tests and so reproduce the effect of a passenger sitting down in one of the chairs time after time.

As a matter of fact, the company set up a special section of its Engineering Division to do nothing but design the aircraft's reclining seats, spending more than 100,000 man-hours and £125,000 on the job. In its finished form each seat has a miniature control panel on the armrest, which includes a call-bell, reading light switch, an "occupied" placard, seat number label, ash tray, lever for adjusting the setting of the back, and a socket for the leg of a food tray; one version can also be quickly converted into a comfortable sleeping berth, 6 ft. 4 in. long and 3 ft. 6 in. wide.



A Boeing "Stratocruiser" flying over Puget Sound, near Seattle, where these giant air liners are built.

Foam rubber padding ensures comfort and helps to keep down the weight of a pair of seats to 75 lb. The results, according to Boeing, are that "whether you're a petite blonde of 100 lb. or a buxom bread-and-butter and egg man of 300 lb., you'll be equally comfortable. The same seat which comfortably supports the 100 lb. blonde without springing her up into the luggage rack is equally pleasing to the 300-pounder without sinking him to the floor."

An outstanding feature of the "Stratocruiser," however, is that passengers are not compelled to spend hour after hour of flight rooted to their seats. In fact, there is a small cocktail lounge on the lower deck, reached by means of a spiral staircase from the main cabin, for the benefit of passengers who want to stretch their legs or have a quiet drink with some friends.

The overall impression throughout the "Stratocruiser" is one of spaciousness, from the flight deck (*Continued on page 282*)

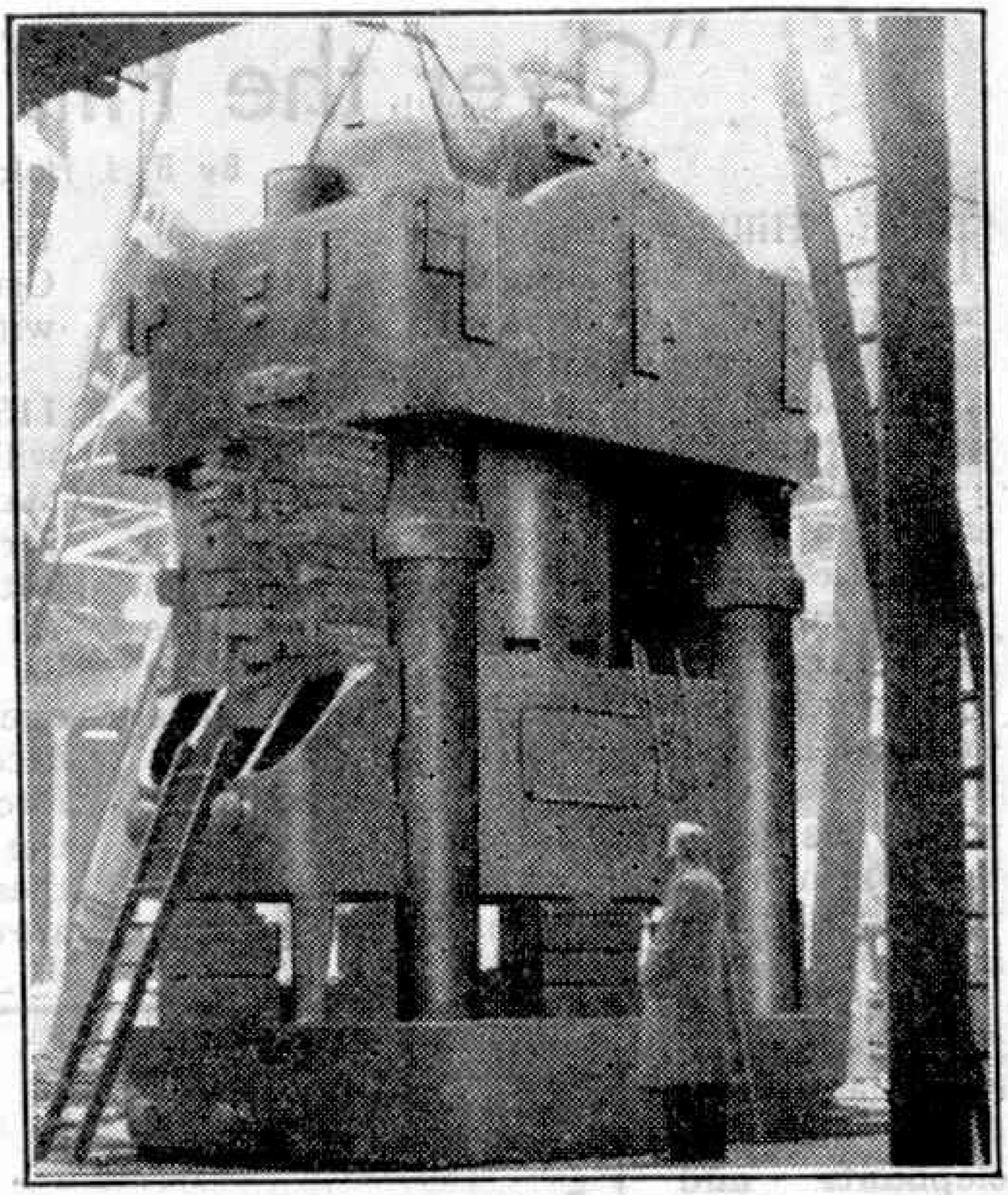
Engineering Notes

Moving a 350-ton Press

Handling heavy machinery is always a difficult task, particularly when it has to be dismantled in the factory where it is at work and moved to another position without interfering too much with operations in progress. How this was accomplished with a 5,000 ton rubber die press, weighing 350 tons, makes an interesting story.

The press is shown in the upper illustration on this page. It has three main sections, a head piece weighing 75 tons, a platen of 65 tons and a base of 85 tons. For lifting these it was decided to use the oldest method in the world, employing two very heavy ship's derricks, 60 ft. long, which were erected through an opening made in the roof of the factory directly above the press. When the derricks were rigged the head piece was lifted 7 ft. to 8 ft. above the top of the columns of the press, and then lowered 20 ft. to the ground. Two 10-ton winches supplied the lifting power, and two 6-ton winches the luffing power for the derricks. All of them were hand operated, and with them 12 men lowered the headpiece to the ground in 3½ hours.

There were no trolleys big enough to carry the three heavy pieces of the press. Old main line metals therefore were laid on their sides, and steel balls were inserted on them, with heavy plates laid on top to give a roller base action. With this arrangement the sections were moved 400 ft., including two turns at right angles, in about half a day, without interfering with production or with machinery in the immediate vicinity.



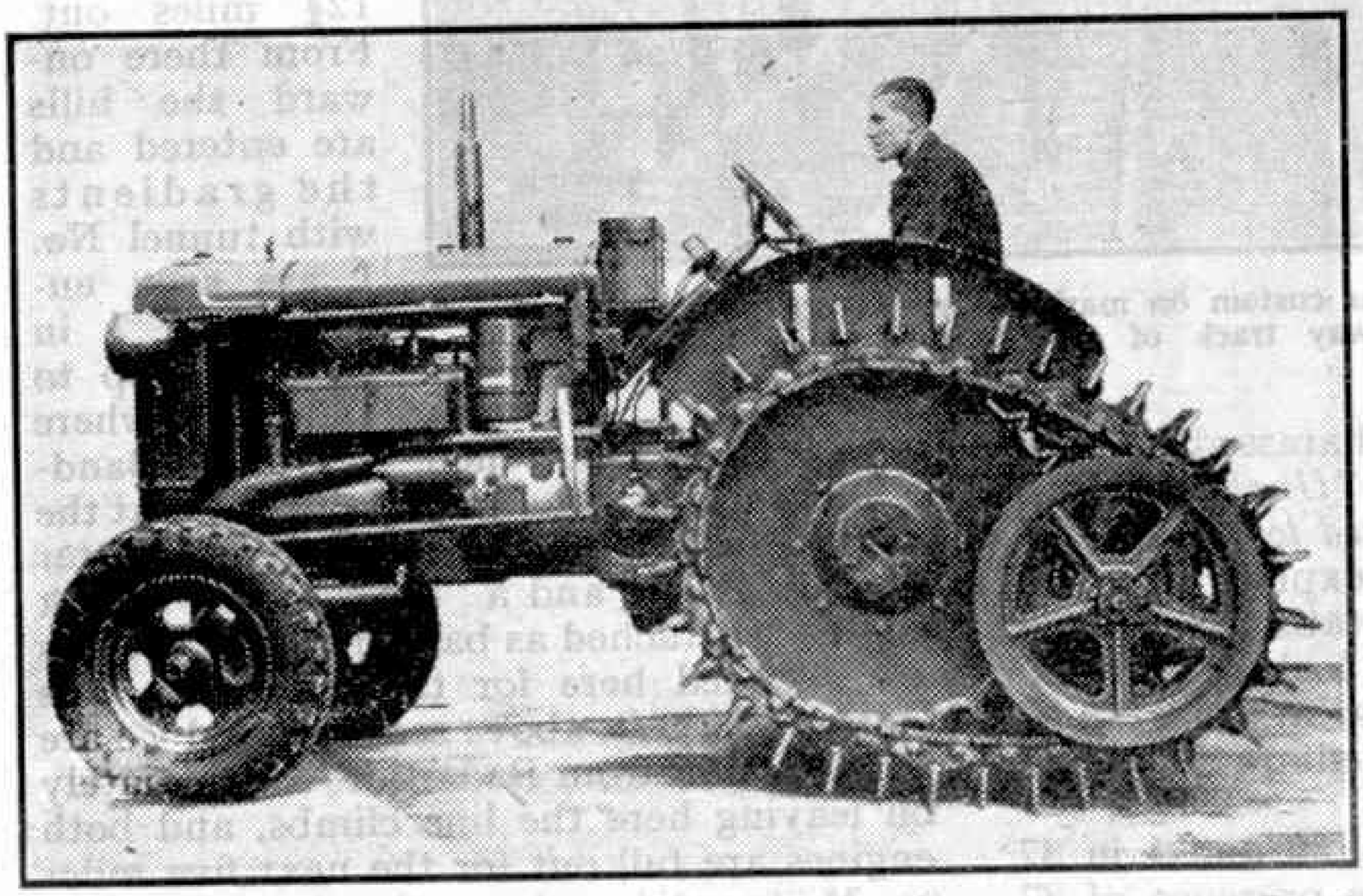
Dismantling a heavy press for removal to a new position. The three main sections were lifted by ship's derricks and hand winches. Photograph by courtesy of Machinery Installations Ltd., Acton.

A Roadless Track Development

The lower illustration on this page shows an interesting development of the D.G. Half Track introduced by Roadless Traction Ltd., Hounslow, the original form of which was illustrated and described in the "*M.M.*" for October 1946. In operation the track is in effect the rigid rim of an immense wheel. When assembled it is equivalent to a wheel of 15 ft. diameter, and after a period it settles down to a curve that is the same as that of a wheel of 20 ft. The effective diameter and efficiency then slowly increase with wear, for a period that as yet is not known.

The new Skeleton type D.G. track, as it is called, retains all the advantages of the big wheel, but instead of ground plates it has spud plates fitted on each link. These support the tractor on their lower edges, as can be seen in our illustration. They are ⅝ in. thick. Half of them are 12 in. wide and the other half 6 in., so that the area of support is considerable. As a result a tractor equipped with them does not sink deeply into the soil, and in soft ground the load is taken at a point 2 in. to 3 in. below ground level. After it has passed over a loose, fine seed bed in dry conditions the impressions made by the spud plates tend to fill up and their track can scarcely be seen.

The new track is much lighter than the standard one already in use, and gives excellent results on a greasy surface. It is not intended to replace standard track, but in difficult conditions it has many advantages.



The Roadless Fordson Major fitted with the new skeleton type D.G. Hall Track described on this page. Photograph by courtesy of Roadless Traction Ltd., Hounslow.

"Over the Hill" in Assam

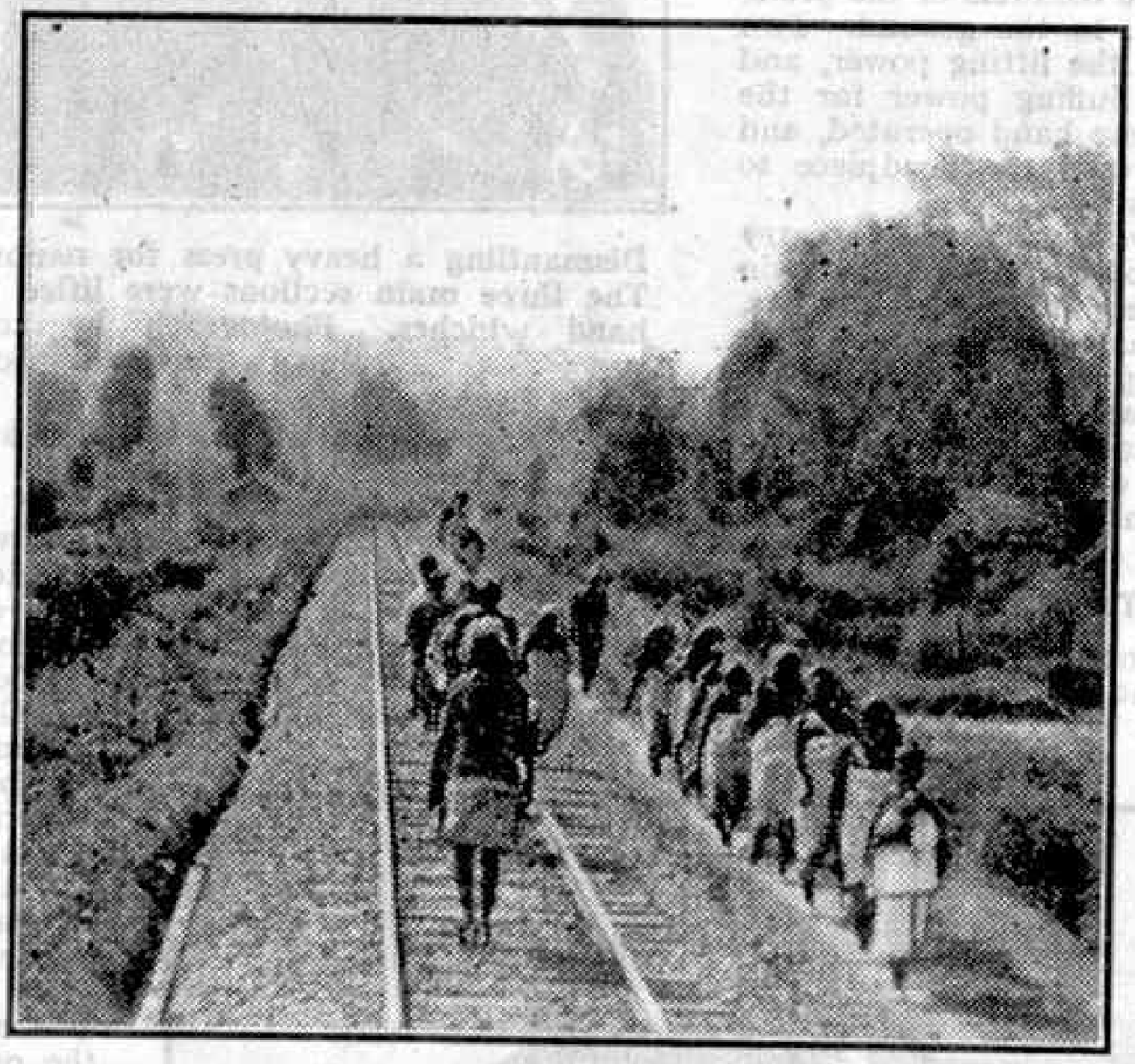
By B. J. Holden

THE "Hill" section of the metre gauge portion of the Bengal Assam Railway connects Badarpur in south Assam with Lumding in the Assam Valley and passes through country covered with dense jungle intersected by mountain torrents and rivers. The section is packed with interest to engineers and railwaymen. The natural difficulties encountered in the construction of this railway were considerable, and the local Naga tribes had to be reconciled to this encroachment of their territory. The drainage and engineering maintenance has to be of a very high order. A constant watch has to be kept for earth slips during the monsoon season, which is an anxious time for traffic and engineering departments alike.

There are further natural obstacles in the form of wild elephants and tigers. Before the introduction of the heavy "Garratt" engines, the former were known to pit their strength against trains and cause derailments; but the "Garratts" hold their own against these animals, and in September 1944 an elephant was killed near Hatikhali. Tigers cause trouble in various ways. On one occasion a wire from a harassed Station-master read as follows:—"*Unable to cross trains owing to staff confined to quarters for fear of tigers.*" I should explain that the points, as at a crossing station, are hand worked and have to be locked and unlocked by hand keys, similar to the arrangements for working intermediate sidings in this country.

Grades and tunnels abound and 1 in 37 is the steepest grade. The presence of 37 tunnels amid the worst malarial district of Assam alone presents a problem of its own to the railway and medical authorities. Great strides have been made by treatment with mepracrine.

To describe, briefly, the line over the 115¼ miles from Badarpur to Lumding we will start at the former station, where the Mail train connection from Calcutta via Seraganj arrives in the morning, having left that city at 10.0 a.m. the previous day. All trains going "over the Hill" have to be vacuum braked and brakes must be effective on 75 per cent. of the whole train, according to the special instructions in force over this section. All staff working on the section must pass an examination in these rules and regulations. Before trains are despatched from Badarpur and Lumding trains are examined on pit lines at those stations and the brakes are specially tested by vacuum testing plant.



A regular custom on market day; hillmen and their wives use the railway track of the Bengal Assam Railway to reach Maibong village.

On leaving Badarpur the line swings northward across the River Barak by a box girder bridge and is generally level to Chandranathpur, 12¾ miles out. From there onward the hills are entered and the gradients with tunnel No. 1 are soon encountered, 1 in 65 ruling up to Damchara where water is taken; then on past Bandarkhal and Ditokcherra to Harangajao at the foot of the 11-mile climb of 1 in 37. Water is again taken, and a "C" class 2-6-2 tank engine is attached as banker; these engines are shedded here for this purpose. This station is 489 ft. above sea level and we are now 30 miles from Badarpur. Immediately on leaving here the line climbs, and both engines are full out for the next five miles to Mailongdisa where the banker takes water, now at 1,060 ft.

On resuming, we climb past Khanladisa



A petrol train at Ditokcherra headed by a heavy "Beyer-Garratt" locomotive. In accordance with the regulations, special protection vehicles are marshalled next to the engine to keep the petrol tanks away from the front end.

to Jatinga, the summit of this 1 in 37 grade. Here the banker comes off, having reached 1,855 ft. From this point the line falls through Haflong Hill and Robi to Lower Haflong where the only refreshment room on the section is situated. This station is the principal one intermediately and is almost half-way, at an altitude of 1,505 ft. Shortly after leaving here the track descends through a tunnel and emerges on to the high Dyang Viaduct which spans a deep jungle gorge, a fine engineering feat. From this point the grade is up again to Mahur at 1 in 65, a picturesque station with Naga tribespeople selling their fruit and wares on the platform. For the next 15 miles it is almost continuously downhill at 1 in 60 through Phaiding, Dhautaja and Wading to Maibong. At one point it is possible to look down and see the line at a lower level as it circles round and down from the hills. At Maibong there is a native bazaar, and a medical post. Hill people on bazaar days walk the track into this village.

The line has fallen 920 ft. from Mahur in 15 miles and is now only 899 ft. above sea level. From Maibong the grades are more undulating onward to Lumding, but the jungle encroaches very close to the railway and it is in this part of the line that the elephants give trouble, especially near Hatikhali. There are several stations in this region, including Lumding, a junction 465 ft. above the sea, which joins up the Pandu-Tinsukia line over which flowed very considerable traffic in the War years 1942-45 to feed the railheads at Manipur Road and Lido for the Burma campaign.

The working of traffic over the Hill section depends on how quickly trains can be moved up and down the 1 in 37 grade. The headway between these points therefore governs the headway of despatch from Badarpur and Lumding, providing of course trains can be examined and passed fit within that time. To save unnecessary running over that section, bank engines returning from Jatinga to Harangajao are coupled to down trains; in fact, it is a Hill section rule that down passenger trains must have the returning bank engine attached "inside" the train engine to assist in braking down this steep grade.

The speed of down trains must be continually checked, and at four places there are runaway "catch sidings." These are cut away into the hillside, and the entrance points are manned and set for the "straight" only when up trains approach, and when down trains are actually brought to a stand at a "stop" post by the points. This ensures that down trains descending the grade are under control.

In July 1944 a down special goods train got out of control between Mailongdisa and Harangajao; luckily the engine kept the rails, but the centre 12 wagons swung off the track and were hurled down the hillside. Eight were recovered, but the other four remain there to this day. As a result of this accident the line was blocked for 24 hours.

On another occasion a down train was waiting in the loop at Mailongdisa to cross an up train which was a long time in section. The up train eventually arrived, but the down train was set in motion due to brakes leaking off and the vibration of the up train running on the main line. The driver of the down train engine was not aware he was moving until he crashed into the up train, striking it in the centre so that the train crew were unimjured, the heavy front end of the "Garratt" protecting the enginemen of the down train. The loop here has no trap points.

Dinky Toys and Supertoys

Garden Implements and a New Style Lorry

THIS month we have a fine array of additions to the range of Dinky Toys and Supertoys. The new models, six in number, are illustrated on these pages, and a glance at the pictures will show how varied in type and interest these are.



Wheelbarrow, Dinky Toys No. 105b.

Four of the new products are Dinky Toys, designed for gardening or farming operations. The first, Dinky Toys No. 105b, is a neat reproduction of the homely but indispensable wooden garden wheelbarrow, with ample capacity in the barrow itself, sturdy handles and legs, and a wheel of the rubber-tyred type now popular. Next comes the Sack Truck, Dinky Toys No. 107a. This delightfully simple model also is very strongly constructed. It is provided with a good back, or "foot iron," that can readily be pushed underneath a miniature sack to enable it to be lifted on to the truck.

Dinky Toys owners will soon find many uses for these models, and their inclusion in Dinky Toys layouts of various types will add a neat touch of realism. This applies also to the 4-wheel Hand Truck, Dinky Toys No. 105c, which is shown at the foot of this page. This is a really delightful product, fine in appearance and with plenty of movement to increase its interest. The front wheels are mounted on a swivelling bogie, so that the truck can be turned in a small space and can readily be manœuvred into awkward places. The handle also is hinged, and when not in use can be turned upright, leaning against the front of the truck, out of the way. In the garden the prototype of this model is employed for moving boxes and pots carrying seedlings and plants, and anything else the gardeners require in their work.



Sack Truck, Dinky Toys No. 107a.

The last of our Dinky Toys this month is the Harvest Trailer, Dinky Toys No. 27b, the novelty of which gives it a very strong appeal. Its original is designed for carrying hay, straw or sheaves of corn, and to enable this to be done with ease and safety it is provided with end racks that are detachable, so that they can be removed when corn in sacks and other loads that are not so bulky are being carried. This feature is reproduced in the model, the end racks of which are easily removed and yet are solidly in position when inserted in their guides. The Harvest Trailer can readily be hitched on to a Dinky Toys tractor or lorry, and it has a small wheel on which its front rests when it is not connected to its towing vehicle.

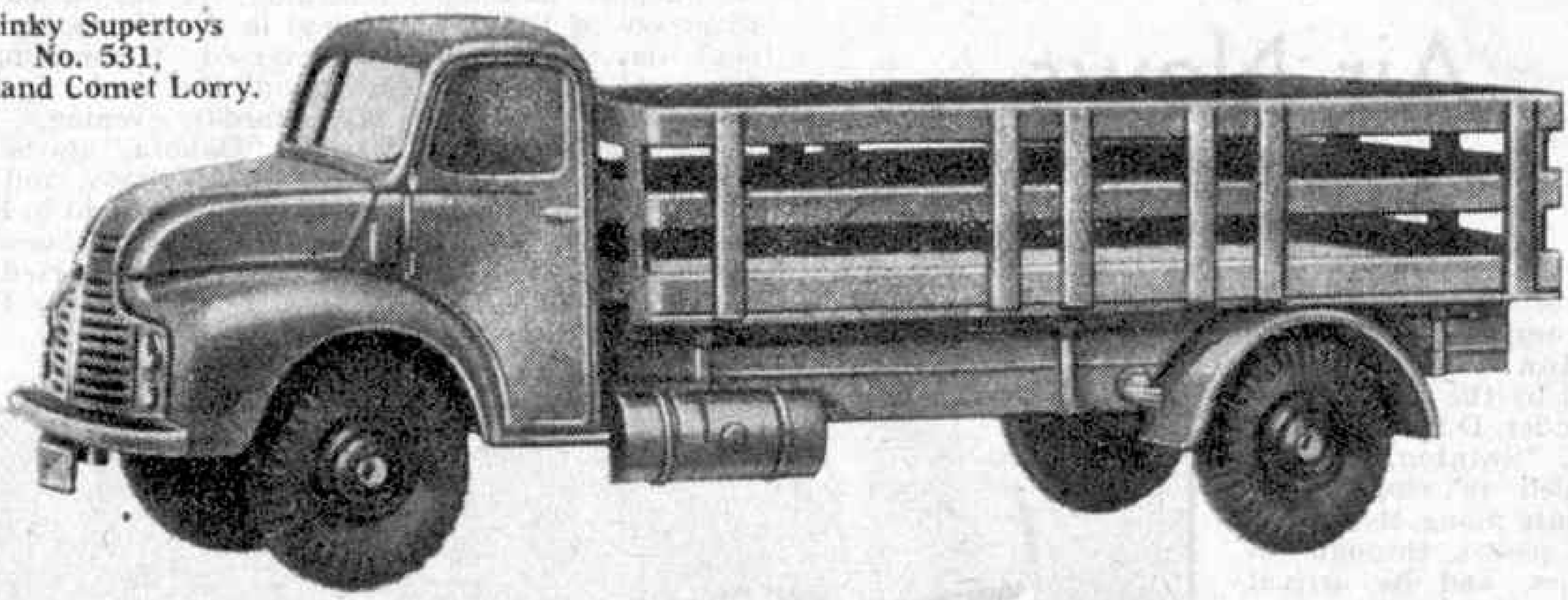


Harvest Trailer, Dinky Toys No. 27b.



4-wheel Hand Truck, Dinky Toys No. 105c.

The remaining new products are both Dinky Supertoys. One is the magnificent



Dinky Supertoys No. 531, Leyland Comet Lorry.

miniature Leyland "Comet" Lorry, No. 531, seen at the head of this page. It is a representative of an entirely new range of medium weight diesel-engined export models, to be made available in limited numbers at home, that has been introduced by Leyland Motors Ltd. In these an entirely new appearance has been given to Leyland products. The familiar radiator has been dispensed with. Instead there is a concealed stack, and a bonnet and front end that are decidedly modern in style are incorporated. Access to the engine is given by raising the "crocodile jaw" bonnet, and behind this is a pressed steel cab of modern styling, the smoothly flowing lines of which blend into the new front end.



Dinky Supertoys No. 751, Lawn Mower.

The Dinky Supertoys miniature of this new Leyland reproduces these features in splendid style, and the effect of the design, with its semi-forward cab, is to give a vehicle that is well balanced and striking in appearance. This is a model that will make a splendid show on the roads of the layouts that many enthusiasts have constructed for displaying their miniatures in action.

The inspiration for the second of this month's Dinky Supertoys, No. 751, comes from the garden. It is a very handsome miniature Lawn Mower, with roller drive. The roller is correctly split to allow the Lawn Mower to be turned in a little space without damage to the Dinky Toys layout lawns on which it will be used, and it drives the cutting cylinder through gearing. The cylinder has seven blades, and in correct position underneath is a miniature sole plate. In front there is a representation of the small roller that in practice is used for varying the height of the cutter, while a detachable grass box also is fitted.

How realistic this excellent model is can be seen from the two pictures on this page showing it from different angles. The upper one shows the cutting cylinder well and also illustrates the sturdy framework, which is correctly braced. In the lower one the grass box is seen in position. It is removed for emptying the grass by just raising it in its slots, and it can be put back again as readily as that of a real lawn mower.



Another view of the Dinky Supertoys Lawn Mower, with the grass box in position.

Air News

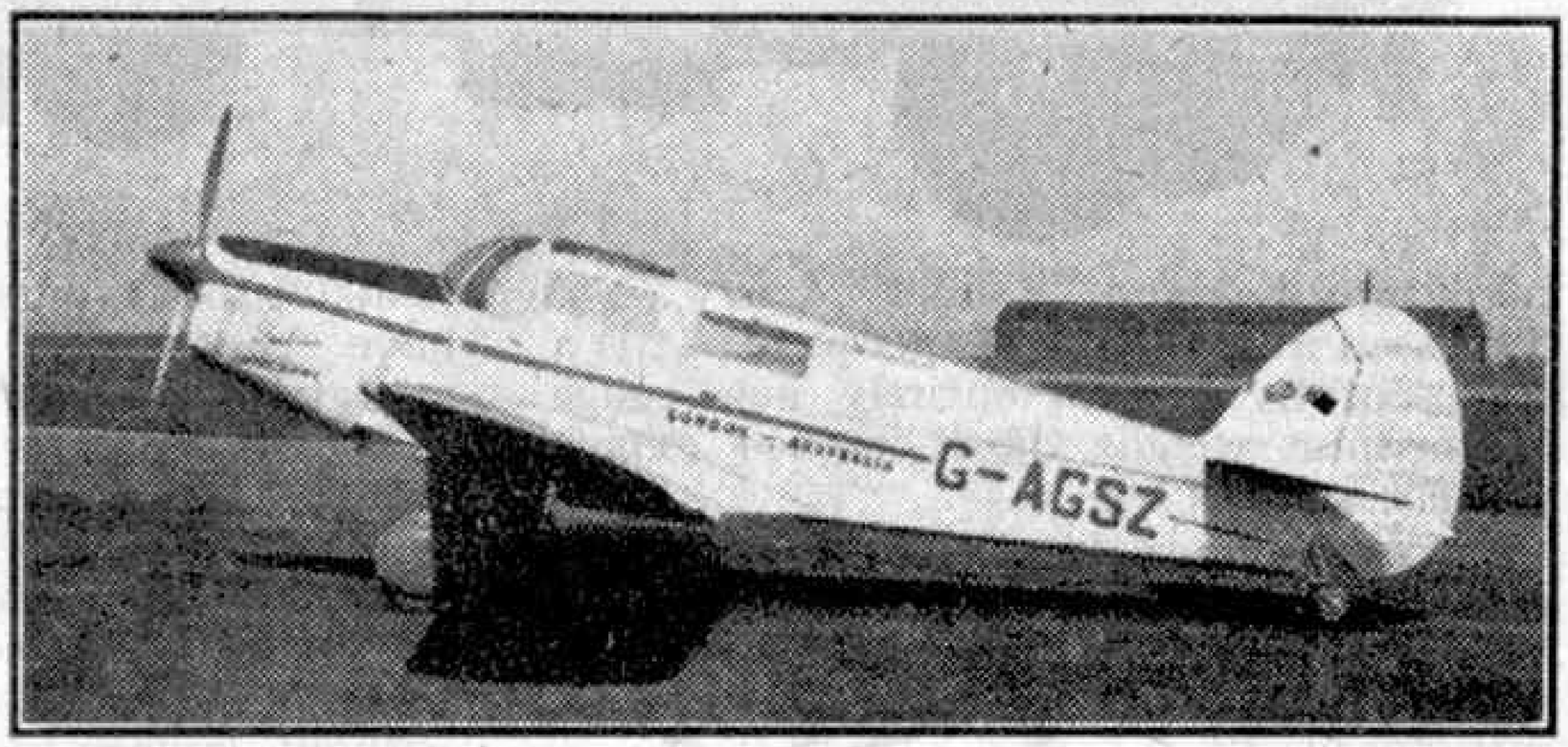
By John W. R. Taylor

Sponson Developments

By the time you read this the little Percival "Proctor" light 'plane illustrated on this page should have completed a special flight of 13,500 miles from Croydon to Australia, piloted by the Hon. Simon Warrender, D.S.C., and Mr. C. N. Swinton. It is scheduled to stop at 42 keypoints along the route, which passes through 16 countries, and on arrival will be delivered to an Australian Aero Club.

The main purpose of the flight is to investigate the possibilities of overseas markets for the "Tribian" amphibian, the prototype of which is now being built by Sponson Developments Ltd., a new British Company of which Mr. Warrender is Sales Director. The flight will also give further proof of the sturdiness and reliability of the "Proctor," and its "Gipsy Queen" engine, in particular and British light 'planes as a whole.

The Sponson "Tribian" is a promising little 3–4 seat all-metal amphibian, powered by either two 145 h.p. "Gipsy" Majors or two 155 h.p. "Cirrus" Majors. With a range of 800 miles at 140 m.p.h. it will offer new standards of usefulness to the private owner and for such jobs as mosquito control or air taxi work.

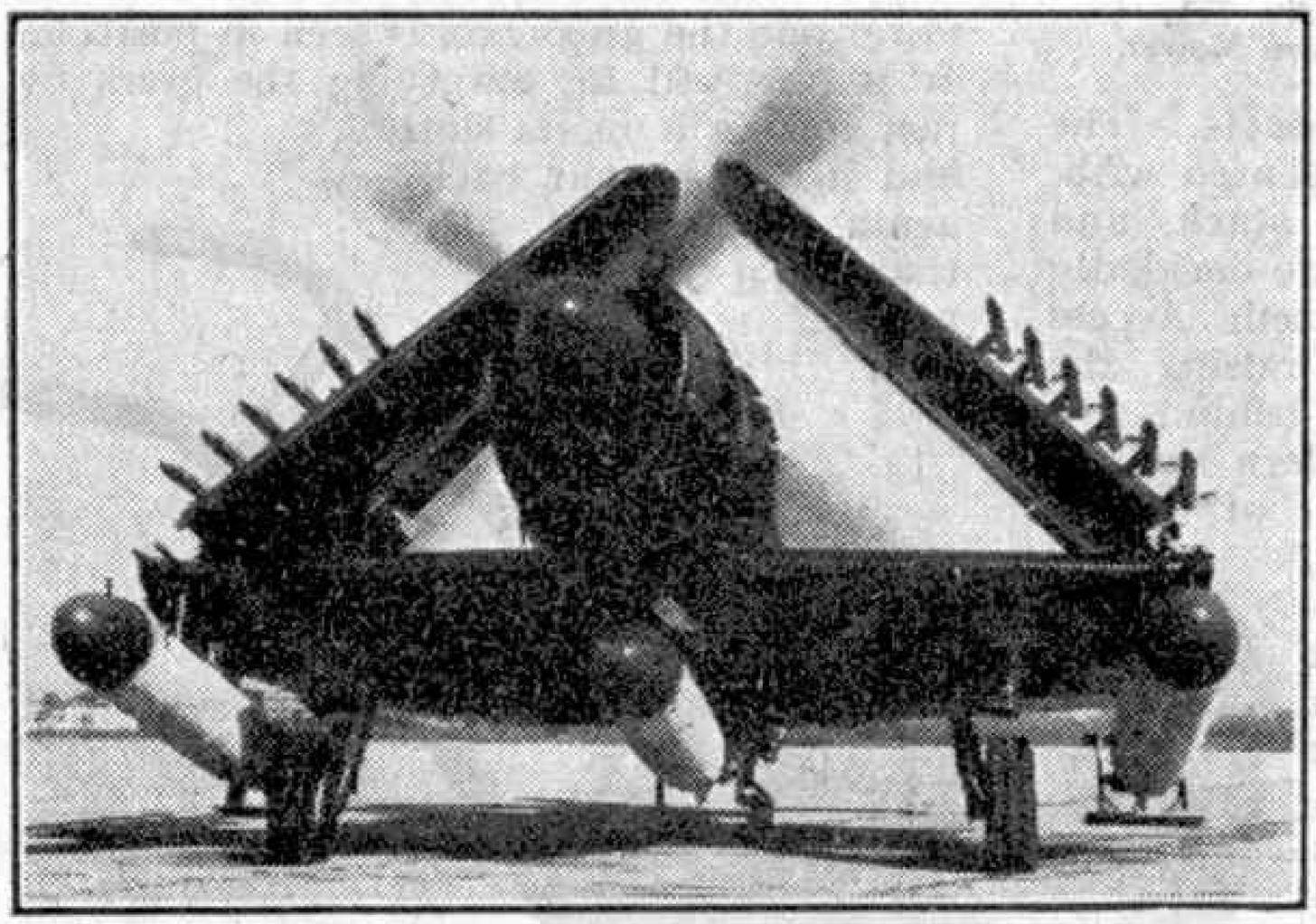


The Percival "Proctor" V used for the 13,500-mile flight to Australia referred to on this page. Photograph by courtesy of Sponson Developments Ltd.

New B.E.A. Services

The first post-war scheduled air services from Birmingham and between North and South Wales are now being operated by British European Airways. The latter service, flown by D. H. "Rapide," starts from Liverpool and flies to Cardiff via Hawarden on Monday mornings, returning via Hawarden and Liverpool to Valley (Anglesey) in the afternoon. The next day the service is reversed, terminating at Liverpool, and so on throughout the week, finishing at the Liverpool base on Saturday evening.

The other service, operated by "Dakota," starts from Manchester, and on Mondays, Wednesdays, and Fridays calls at Birmingham on the outward flight to Paris, returning non-stop to Manchester. But on Tuesdays, Thursdays and Saturdays the process is reversed, and the aircraft flies non-stop from Manchester to Paris, calling at Birmingham on the return flight.



The formidable armament of the Martin AM-1 "Mauler," which is here seen with wings folded. Photograph by courtesy of the Glenn L. Martin Company, U.S.A.

"Able Mabel"

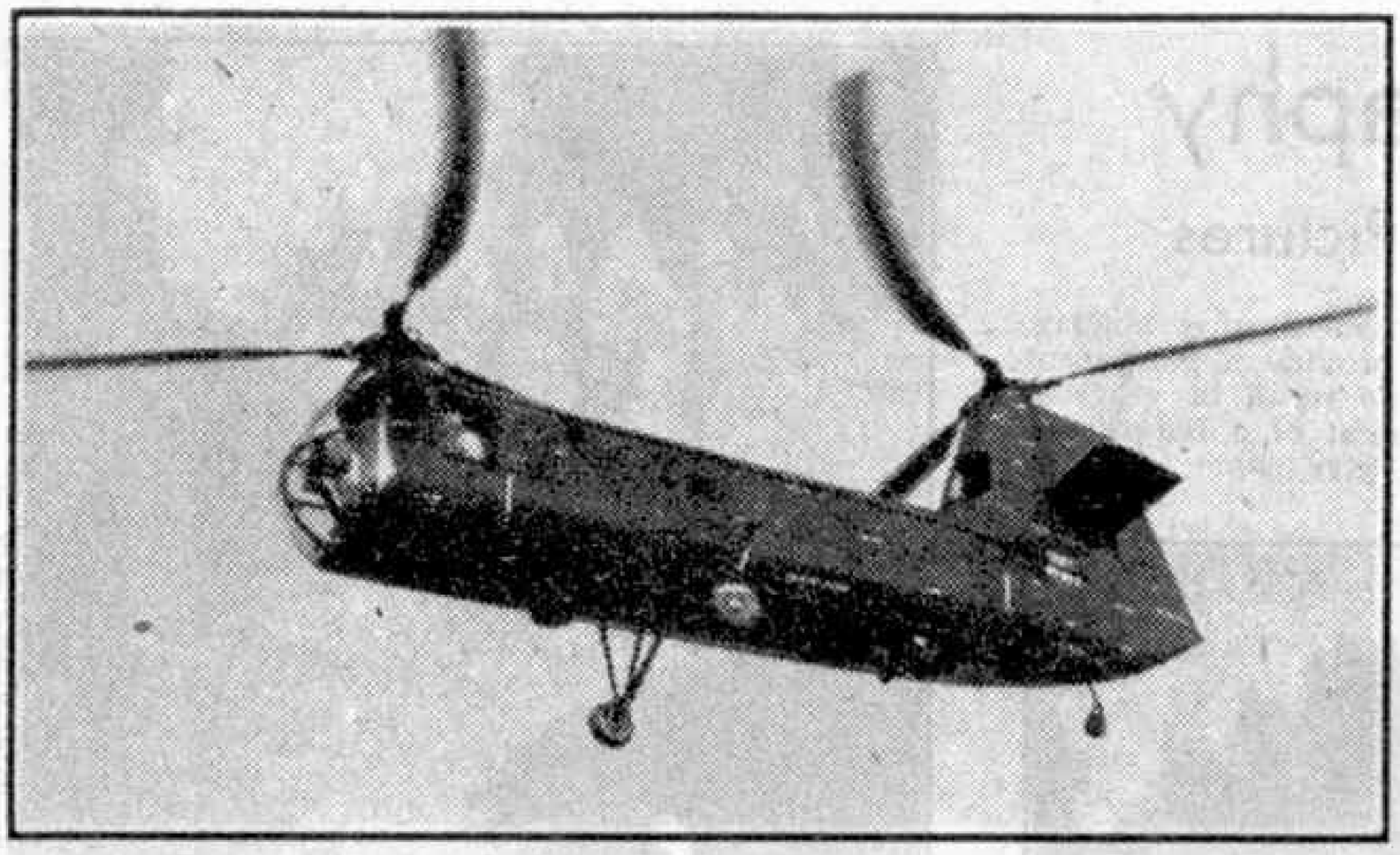
The Martin AM-1 "Mauler," illustrated below, is one of the most formidable single-engined "strike" aircraft in the world. Because of its ability to operate from carrier decks with a payload of more than 9,000 lb., pilots of the U.S. Navy, with which more than 100 "Maulers" are already in service, have dubbed it "Able Mabel."

With its normal warload of 12 five-inch rockets, three 2,200 lb. torpedoes and four 20 mm. cannon, the "Mauler" weighs over 25,000 lb., and is thus the heaviest single-engined aircraft ever flown. Even this figure can be exceeded by 4,000 lb. under overload conditions, giving the aircraft a six-ton payload over a considerable range. At either weight the "Mauler" takes off at a bigger weight and carries a greater payload than the average 21-passenger, twin engined air liner, and in spite of this pilots report good controllability even at low speeds.

The "Mauler" is powered by a 3,000 h.p. Pratt and Whitney "Wasp Major" engine, has a top speed of 350 m.p.h., and a maximum range of over 2,000 miles with external fuel tanks.

Supply-Dropping in Malaya

Since the beginning of this year Royal Air Force "Dakotas" have dropped some 50,000 lb. of supplies each month to troops and police operating against bandits in Malaya. The amount may be insignificant compared with the vast effort of the Berlin Air Lift, but if it were not for these "Daks," whose aircrews can accurately place supplies of rations, ammunition and equipment on tiny dropping zones often surrounded by jungle, the range of action of the troops would have been severely restricted.



A new picture of the Piasecki XHJP-1 twin-rotor helicopter. Photograph by courtesy of the Piasecki Helicopter Corporation, U.S.A.

Latest Piasecki Helicopter

The new Piasecki XHJP–1 helicopter, illustrated above, is designed for operational duty with the U.S. Navy, and combines the tandem rotor layout of the well known Piasecki "Rescuer" with sleek all-metal construction and special new features to improve efficiency on rescue missions. The XHJP–1 won a Navy design competition in 1946, for a compact, high-performance helicopter specifically designed to operate from aircraft carriers, battleships and cruisers under rigorous sea-going conditions. The finished aircraft exceeds the original requirements, having a top speed of over 130 m.p.h. and being compact enough to go down the smallest carrier's lift without folding its rotor blades, although the blades do fold to facilitate stowage below deck.

Because of its spacious cabin the XHJP–1 can carry with ease three stretcher patients as well as pilot and co-pilot. A rescue hatch near the pilot's seat is big enough to permit passage of a loaded stretcher, which can be lifted straight up into the cabin by means of a hydraulically-operated hoist mounted above the hatch. Alternatively five passengers can be carried instead of three stretchers, the tandem rotor arrangement permitting them to move about in flight without adverse effect on control.

The XHJP–1 is powered by a 525 h.p. Continental engine, and has a maximum payload of over a ton. It will replace catapult aircraft, and even destroyers, for many naval duties.

Round the World Air Service

For the first time in aviation history anybody can now fly round the world by any one of a thousand alternative air routes, at a fixed cost. The fare of £421/17/- via the North and mid-Pacific routes, or £491/15/- via Australia covers all the expenses of the journey, provided the traveller does not stay longer than 48 hrs. at any hotel en route and does not retrace his footsteps. No extra fare has to be paid if he wishes to stay longer than two days at any point of his route, although, naturally, he has to pay the additional hotel expenses; and he must complete the journey within a year.

The scheme is operated by 17 of the world's leading airlines, including all three British Corporations, and reaches more than 165 cities in 40 different countries in all five continents. It should be of inestimable value to business men seeking new markets overseas, as well as to people who just want to see the world in comfort. Passengers can change their itineraries *en route* just as they please, and can take 40 kg. of free luggage, compared with 30 kg. on normal airline routes.

The Shape of Wings to Come

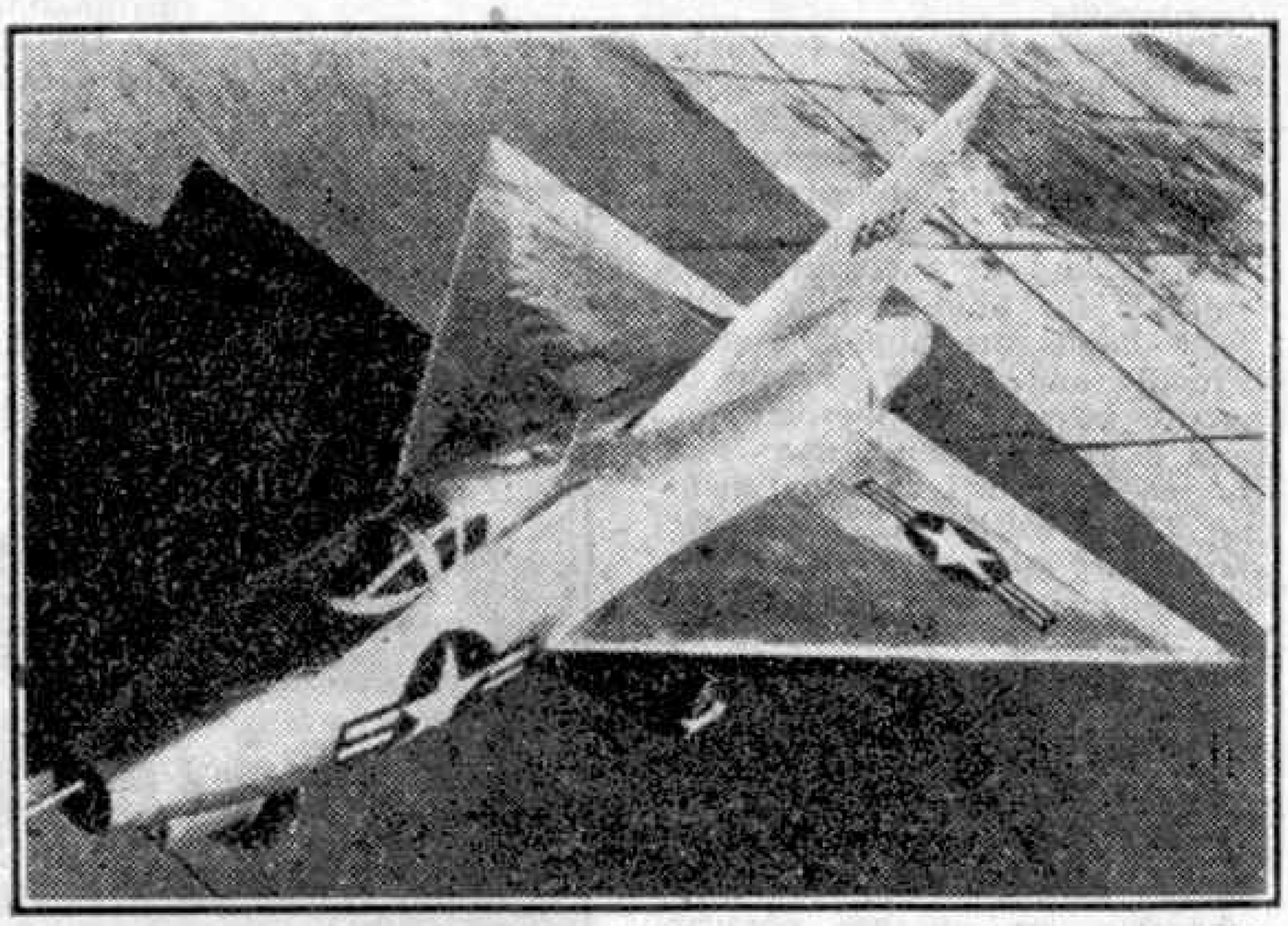
The Convair Model 7002, shown in the lower photograph on this page, is probably the most advanced aircraft ever built. Designed purely for research, it is being used to explore the stability and control characteristics of the Delta Wing—so called through its resemblance to the triangular Greek letter Delta.

Delta-wing models have been under test in wind tunnels for several years, particularly in Germany, where Alexander Lippisch designed several revolutionary jet fighters basically similar in layout to the new Convair. These tunnel tests indicated that the wing offered both low drag and better control at transonic and supersonic speeds, but the theories were never put to practical test in flight until the Model 7002 flew for the first time early this year.

The machine is powered by a 5,200 lb. thrust Allison J-33 turbo-jet, and has 60 deg. of sweep-back on its wings, which have combined full-length ailerons and elevators along their trailing-edges. These eliminate need for a tail unit, but a fin and rudder are fitted to improve directional control and stability. No performance details have been released.

U.S. Fighters Named

World speed record holder, the North American F-86 sweptwing jet fighter, has been named "Sabre." Another of the U.S.A.F.'s latest aircraft, the Northrop F-89 all-weather jet fighter, is to go into service as the "Scorpion," a most appropriate name in view of its slim upswept tail.

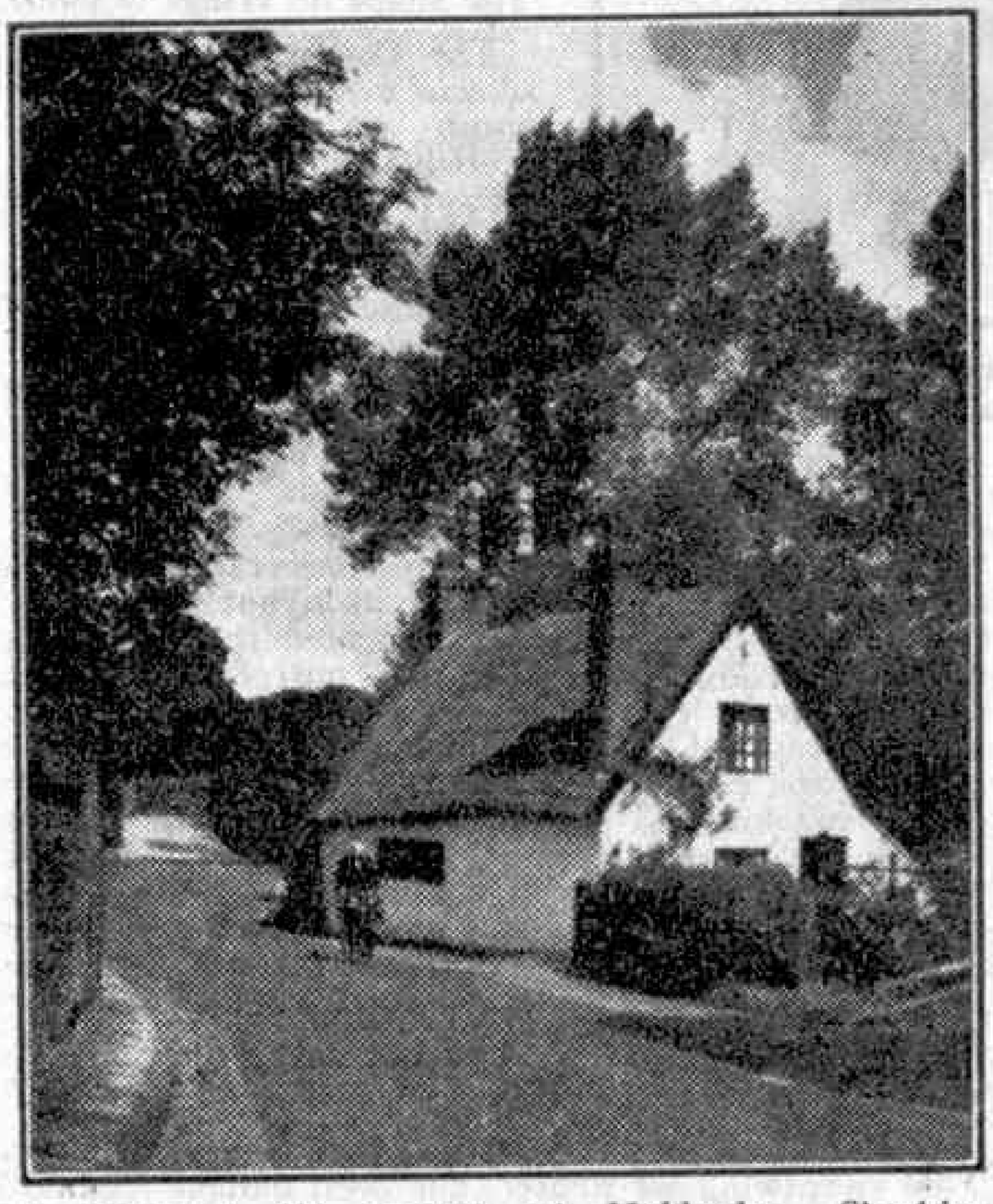


This view of the Convair Model 7002, newest research aircraft of the U.S. Air Force, shows the unusual wing design. Photograph by courtesy of U.S. Air Force, Wash., D.C.

Photography

Countryside Pictures

A CAMERA doubles the enjoyment of a holiday, as the snapshots obtained provide a permanent record that enables its owner to recall in years to come the pleasures and excitement of a happy and carefree time. This month we give some hints for

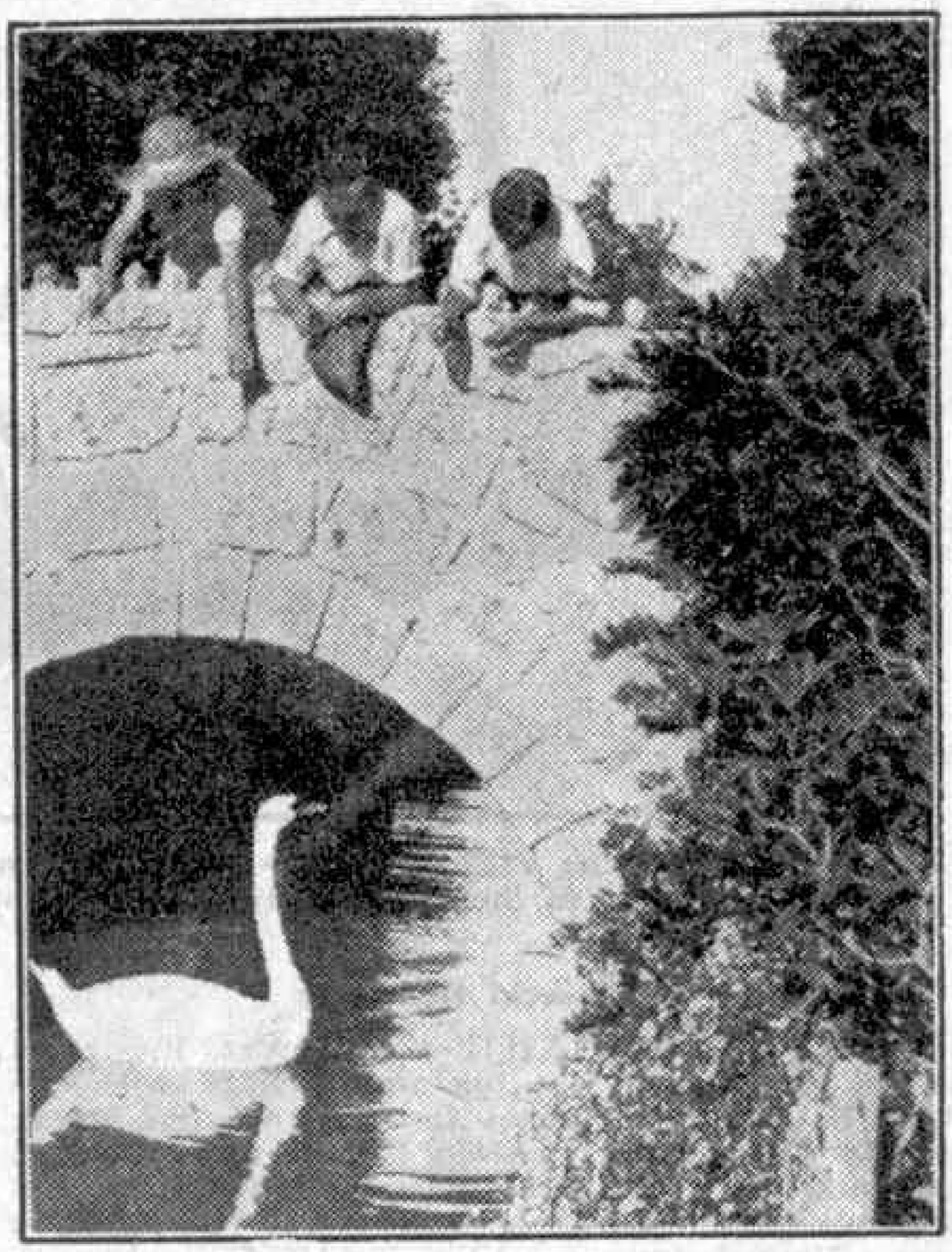


A 450-year old cottage at Mobberley, Cheshire. Photograph by McKenzie Cullen, Wythenshawe, nr. Manchester.

readers who are spending their holiday in the countryside.

Obviously the subjects to be photographed there must depend very largely upon where one stays, and the nature of the neighbourhood. If you have the good fortune to stay at a farm, almost everything around you will be of interest and at the same time suitable for photography. The farm hands are almost always friendly and willing to help to secure interesting photographs, and of course they always like to receive prints showing them at their work. If by some mischance your photographs are a failure, just send the persons to whom prints have been promised a few lines explaining what has happened.

Old-fashioned cottages in picturesque settings make attractive subjects for the camera, as one of our illustrations shows. Old country churches are another popular subject. In photographing them, or indeed any tall structure, remember to keep your camera level. If you cannot include

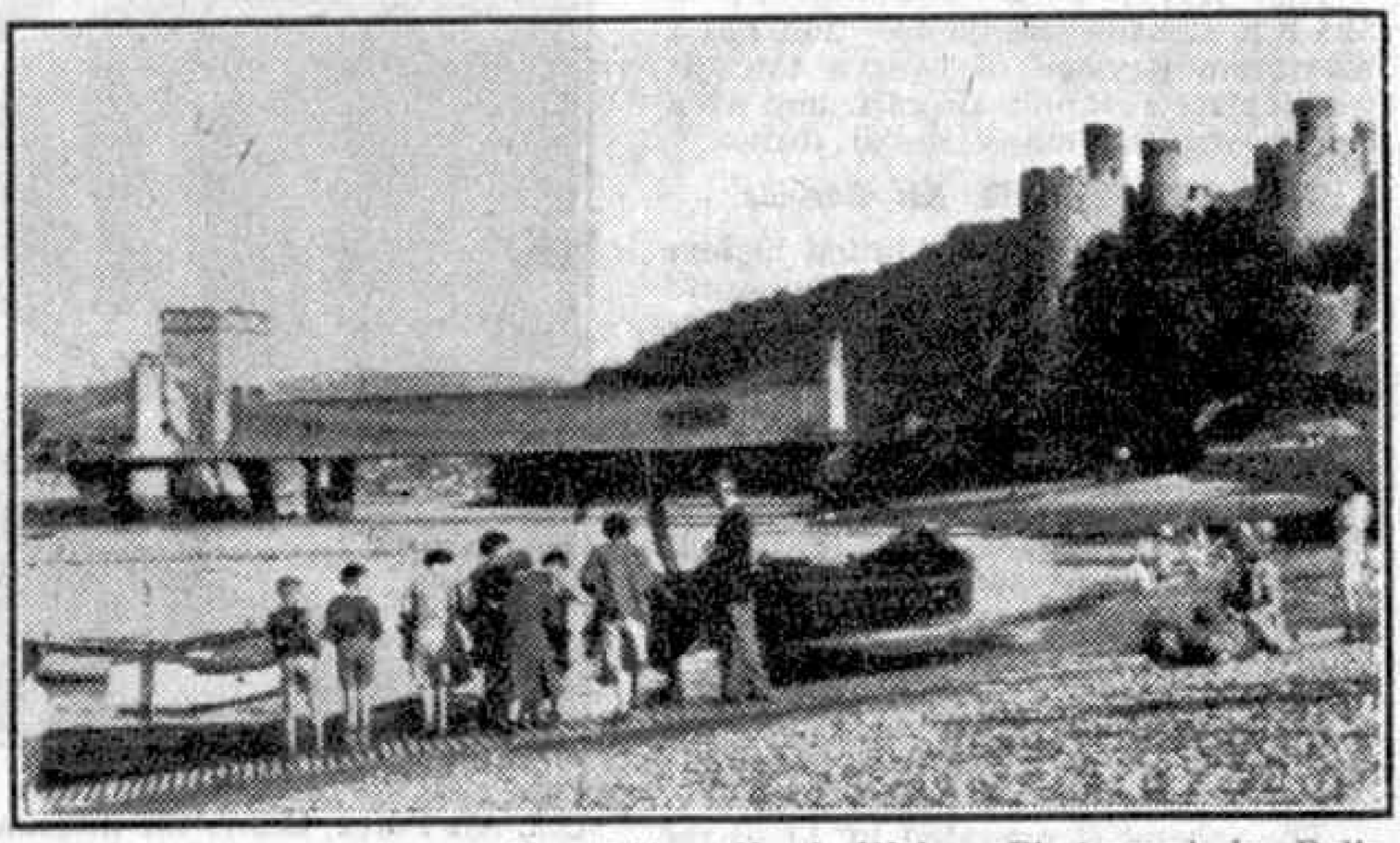


Feeding the swan. Photograph by Miss N. P. Milne, Hawkes Bay, New Zealand.

all the building by so doing you should try a fresh viewpoint. Do not tilt the camera upward, as this will result in a photograph showing the building apparently leaning backward.

Many delightful scenes are to be found in woods, but the light under the trees is greatly reduced. Shafts of sunlight here and there, breaking through the high foliage, may give an effect of plenty of light, but this is deceptive, and it is very desirable to use an exposure calculator to give you the correct exposure.

Waterfalls in a woodland setting also are very attractive, but they are not easy to photograph satisfactorily as an exposure long enough for the surrounding rocks and trees is generally too long to give the effect of moving water. Even a moderately good photograph of such a scene is worth having.



Conway Castle and Suspension Bridge, North Wales. Photograph by Delia O. Woodford, Petworth.

Club and Branch News

WITH THE SECRETARY

A LIBRARY WITHOUT A LIBRARIAN

When looking over the 1948 report of the Maylands M.C., the well-known Australian organization, I was delighted to read in it the words "We have dispensed with a librarian, and strangely enough our list of missing books has been considerably reduced as a result."

At first glance this may seem a minor detail in the story of the club, and in itself it is perhaps of little importance. Yet it seems to me to show that the members of the Maylands M.C. have the true Guild and club spirit. They certainly need no check on their dealings with the volumes in the library, and I am sure that they show the same trustworthiness and sense of responsibility in other branches of club activity.

The system used is simple. Each member has a card on which he enters the numbers of the books he borrows. Once a month volunteers run through the stocks and make up a list of books not recorded, and when this is seen by members the missing books almost invariably turn up at once.

A PARENTS' ASSOCIATION

The report in which this interesting note is to be found is a very long one, and deals fully with many important points in the organization and conduct of a successful club. The most striking feature, described by Mr. V. Malmgreen, Leader, as possibly the most important development in the history of the Club, is the account of the formation of a Parents' and Friends' Association. The immediate purpose of this is to help to raise funds for providing better accommodation, but it is quite clear that the members are determined to give the Club support in every way possible, and to encourage its officials to extend the good work they are doing.

The formation of such an Association may not be possible in all Meccano Clubs, but the lesson of Maylands is one that can be applied in various ways. Parents and friends of members can be interested in the actual work of a Club by putting on good shows at Exhibitions and Open Nights, and if at all possible they should be invited to attend ordinary meetings of the Club whenever they wish, if only to prove that members do not make great efforts only on special occasions.

Officials of Branches of the Hornby Railway Company also should keep this is mind. There must be few parents of either Meccano or Hornby Train enthusiasts who would not be delighted to see something of the good work that members of Clubs and Branches are doing, and who would not be ready to give support in some way to the activities of these organizations. Opening the Club or Branch room to them is one of the best ways of ensuring this.



Members of the Waterlooville and Cowplain (Portsmouth) M.C., with a Meccanograph and other models built by them. Mr. A. T. Nicholson, President, is on the right, and Mr. A. A. Foster, Leader, on the left. This Club was affiliated two years ago this month, and its members have distinguished themselves by steady progress in model-building, which has now reached a high standard. An Electrical Section has now been formed, and its members have established telephone communication between the two huts in which the Club meets.

CLUB NOTES

HORNSEA M.C.—A wide variety of hobbies is pursued in addition to steady Meccano model-building. Recent events have included Talks on the telephone, electricity and other scientific subjects, while Gardening also is receiving attention. A Demonstration of soldering methods by Mr. R. W. Shooter, Leader, was another interesting event. Games played are Cricket and Bowls. Club roll: 26. *Secretary:* R. E. Lancaster, Carlton House, Carlton Avenue, Hornsea.

NORBURY M.C.—Meccano Nights, Competitions, Discussions and Talks continue to be the central features of the programme. Visits are many and attractive, recent ones including Rambles to various districts for observation of buses, trolley buses and trams. Club roll: 29. *Secretary:* J. W. Taylor, 186, Mersham Road, Thornton Heath, Surrey.

CAER URFA (SOUTH SHIELDS) M.C.—Steady progress is being made with model-building and other regular pursuits of members. Model boat building is now being encouraged. In an interesting contest entrants were required to arrange scenic details on the Club's model railway. Stamp topics have been introduced. Club roll: 25. *Secretary:* G. Burrows, 113, Quarry Lane, Cleadon, South Shields.

BRANCH NEWS

HASLEMERE AND GODALMING—An outstanding event has been the Annual Exhibition. This was open for two days, and in addition to a Hornby Train Layout it included a Display of Meccano and other models, with Dinky Toys. *Secretary:* T. Ash, Lower Birtley Farm, Witley, Surrey.

STROUD—Two separate Hornby Train Layouts have been designed and operated with success. It is hoped that a Visit to a coal mine will be arranged. A new Branch room is now in use, and Hornby Train enthusiasts in the neighbourhood are invited to join. *Secretary:* D. Hargest, 6, Folly Lane, Stroud.

Among the Model-Builders

By "Spanner"



Hugh Makins, Bruton, Somerset, winner of Second Prize and a Special Editor's Prize in the recent "Collis Truck" Model-Building Competition.

HOW TO USE MECCANO PARTS

Crankshaft (Part No. 134)

The Meccano crankshaft is particularly suitable for use in simple model engines. Its purpose is to convert rotary motion to reciprocating motion or vice-versa. It gives a stroke of 1 inch, and an ordinary Meccano Strip is intended to be used as the connecting rod. The Strip is slipped into place in the centre of the crank portion and held in position by Spring Clips.

A more elaborate connecting rod can be built up as shown in Fig. 1. This consists of a Rod 2, carrying a Coupling 1. Two 1½" Strips are attached to the Coupling and are held in place by a ½" Bolt 3, passed completely through the end transverse hole of the Coupling, and by a pair of Set Screws 4, which grip the connecting rod in the Coupling. The position of the connecting rod in the centre of the crank is maintained by a Spring Clip 5 placed between two Washers.

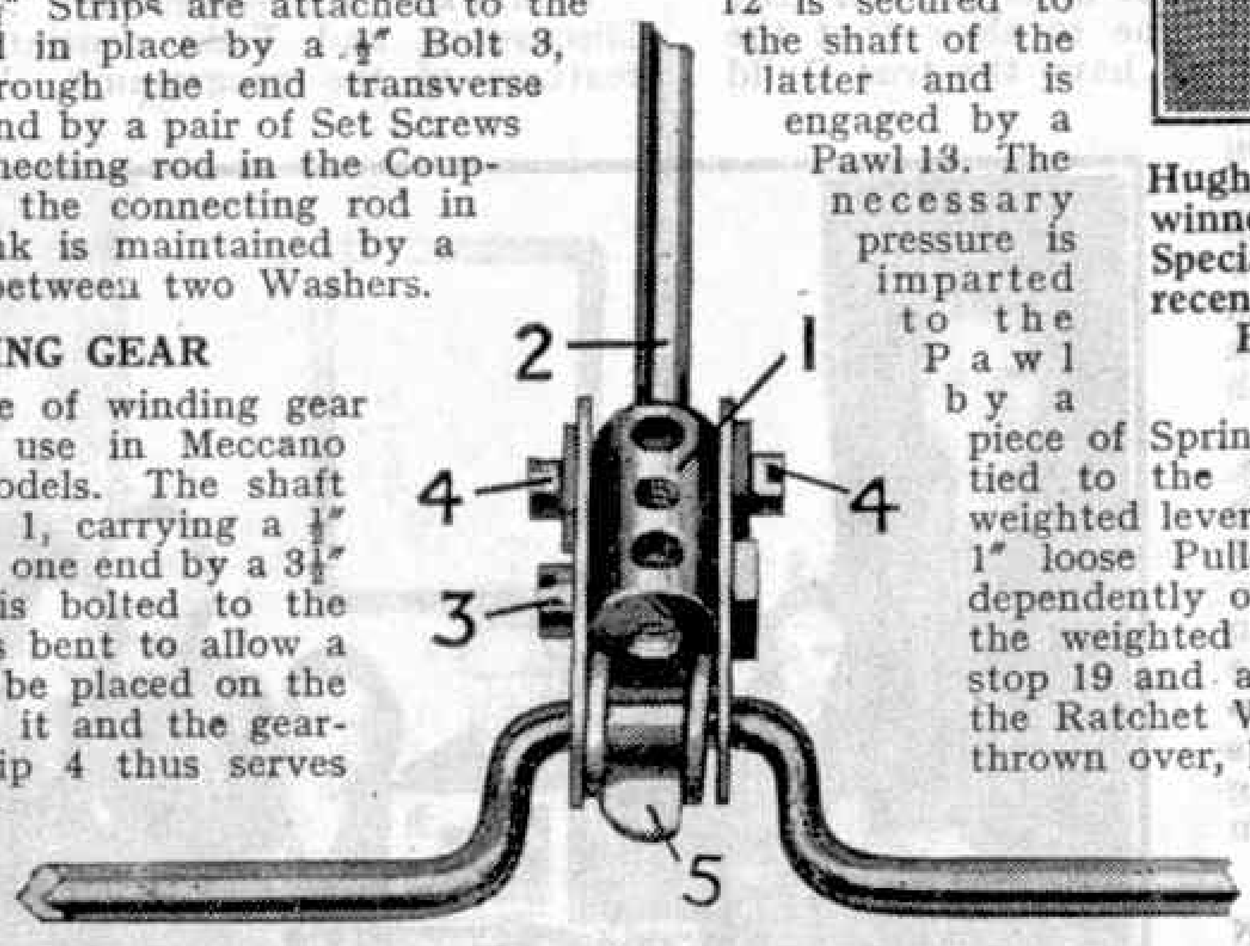


Fig. 1. A simple method of building a connecting rod "big-end" for use with the Meccano Crankshaft.

CRANE WINDING GEAR

Fig. 2 shows a type of winding gear specially suitable for use in Meccano cranes and similar models. The shaft of the winding handle 1, carrying a ½" Pinion 2, is engaged at one end by a 3½" Strip 4. The latter is bolted to the framework at 5 and is bent to allow a Collar and Washer to be placed on the winding shaft between it and the gear-box frame. The Strip 4 thus serves as a spring which tends to retain the operating shaft in such a position that the Pinion 2 is out of engagement with the Gear Wheel 3 on the winding drum shaft. Consequently in order to rotate the drum the wheel 1 must be pressed inward while it is rotated; immediately it is released the Strip 4 returns it to its former position, throwing the Pinion 2 out of gear with the Gear Wheel 3.

On the other end of the drum 6 is a Flanged Wheel 7 and Bush Wheel 8. These form a small drum around which the brake band 9 is wound. One end of the latter is tied to a Fishplate mounted on a Rod 10, whilst the other is given a few turns round the Rod, and secured to a bolt inserted in a Collar. On operation of a crank 11, the Rod 10 winds up the Cord 9, so exerting a braking effect on the winding drum.

A Ratchet Wheel 12 is secured to the shaft of the latter and is engaged by a Pawl 13. The necessary pressure is imparted to the Pawl by a piece of Spring Cord 14. The Cord 15 tied to the Pawl is connected to a weighted lever 16, and is guided over a 1" loose Pulley 17 that revolves independently on the Rod 10. Normally the weighted lever 16 rests against a stop 19 and allows the Pawl to engage the Ratchet Wheel 12. If the arm 16 is thrown over, however, its weight raises the Pawl clear of the teeth of the Ratchet and so leaves the winding drum free to revolve. A piece of Cord 18 anchors the weighted lever to the frame of the gear box.

A FINE CRANE BUILT IN TANGANYIKA

Cranes have always been one of the most popular subjects for Meccano models and many very fine examples have been illustrated in the *"M.M."* Recently another fine crane model came to my notice and I am illustrating it in Fig. 3. This model represents an overhead gantry crane and was built by Mr. C. J. Aberdeen, Tanga, Tanganyika, who has been a Meccano enthusiast since childhood. It is a large model, measuring 5 ft. long, 2 ft. wide and 2 ft. 6 in. high, and it contains about 2,500 nuts and bolts. It is complete with all the movements found in a real crane of this kind, and the only non-Meccano parts used in its construction are a few strips of wood, which are used for the flooring of the gangway of the gantry.

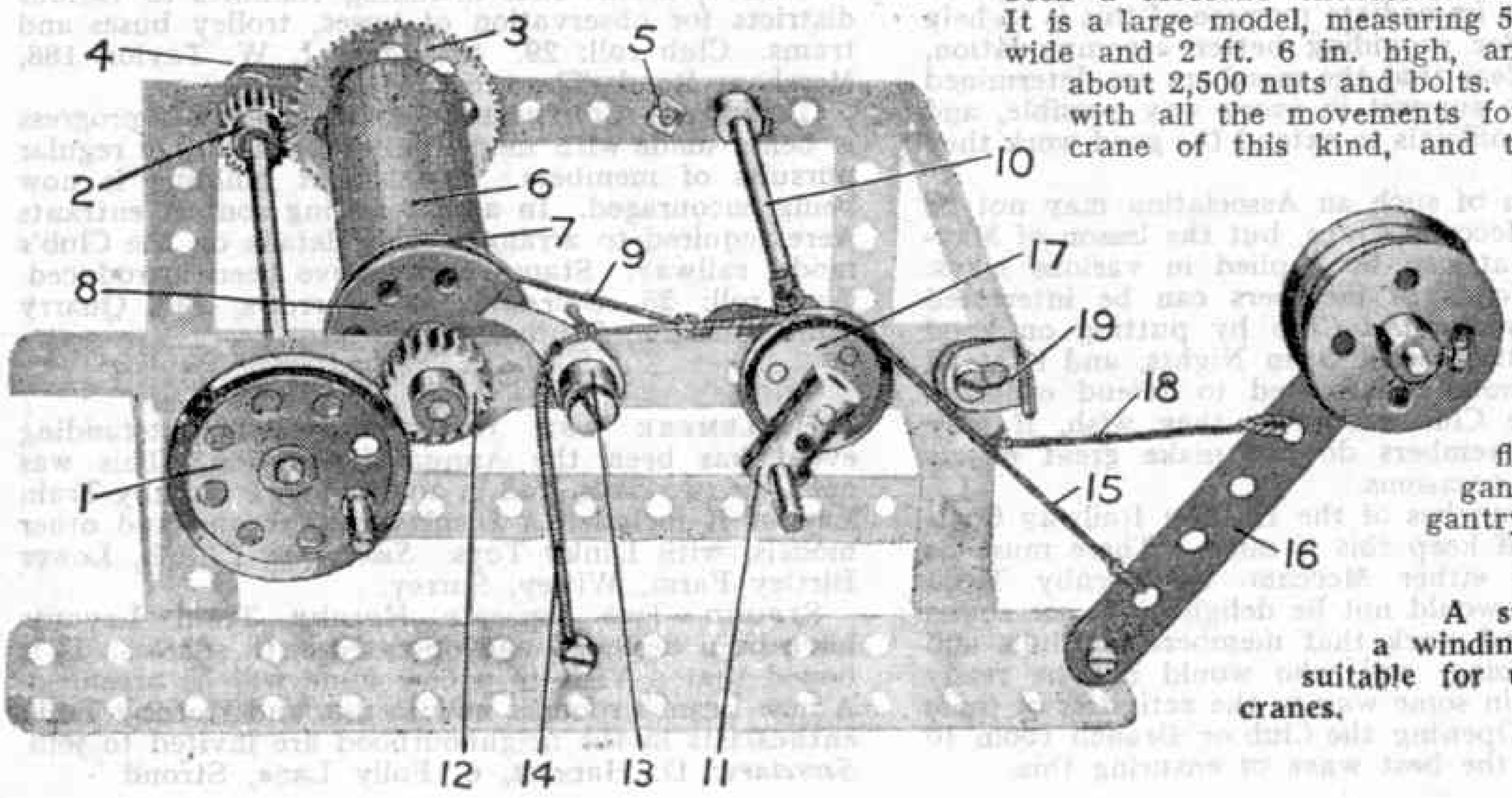


Fig. 2. A suggestion for a winding mechanism suitable for use in model cranes.

A HIGH-SPEED WINDER FOR RUBBER POWERED AEROPLANES

I am sure that aircraft enthusiasts will be interested in the neat high-speed winder illustrated in Fig. 4, details of which were sent to me by Mr. B. T. Gillyatt, Chesterfield. The device reduces the time required to wind rubber motors to a few seconds.

The step-up gearing is housed between two end plates, each consisting of two Semi-Circular Plates connected by 1½" Strips. A 2½" Strip 1 is bolted between the Semi-Circular Plates, and the end plates are joined by two 1½" × ½" Double Angle Strips. A winding handle formed by two Cranks bolted together is fixed on a 1½" Rod mounted in a Double Bent Strip 2 and in the rear of the housing as shown. The 1½" Rod is fitted at its inner end with a 57-teeth Gear 3 meshed with a ½" Pinion on a 2" Rod 4. Rod 4 carries also a 57-teeth Gear 5 meshing with a ½" Pinion 6 on a 1½" Rod mounted in a Double Bent Strip 7 and in the front of the housing. The Couplings 8 engage the propeller of the aircraft.

A ratchet device prevents the motor from unwinding if the handle is released accidentally. A Pawl without boss 9 is held by a ½" Bolt, and engages the teeth of Pinion 6. A Driving Band holds the Pawl against the teeth.

If required the mechanism can be completely enclosed by two 5½" × 1½" Flexible Plates. These should be bolted to one of the 1½" × ½" Double Angle Strips, and curved around the Semi-Circular Plates. The opposite ends of the Plates are held by a bolt screwed into a Threaded Coupling 10.

The winder unit can be bolted to one end of a framework suitably shaped to hold the model aircraft so that its propeller engages the Couplings 8 on the high-speed shaft. The framework should be built up from Strips and Angle Girders, and fitted with adjustable clamps to hold the aircraft in position.

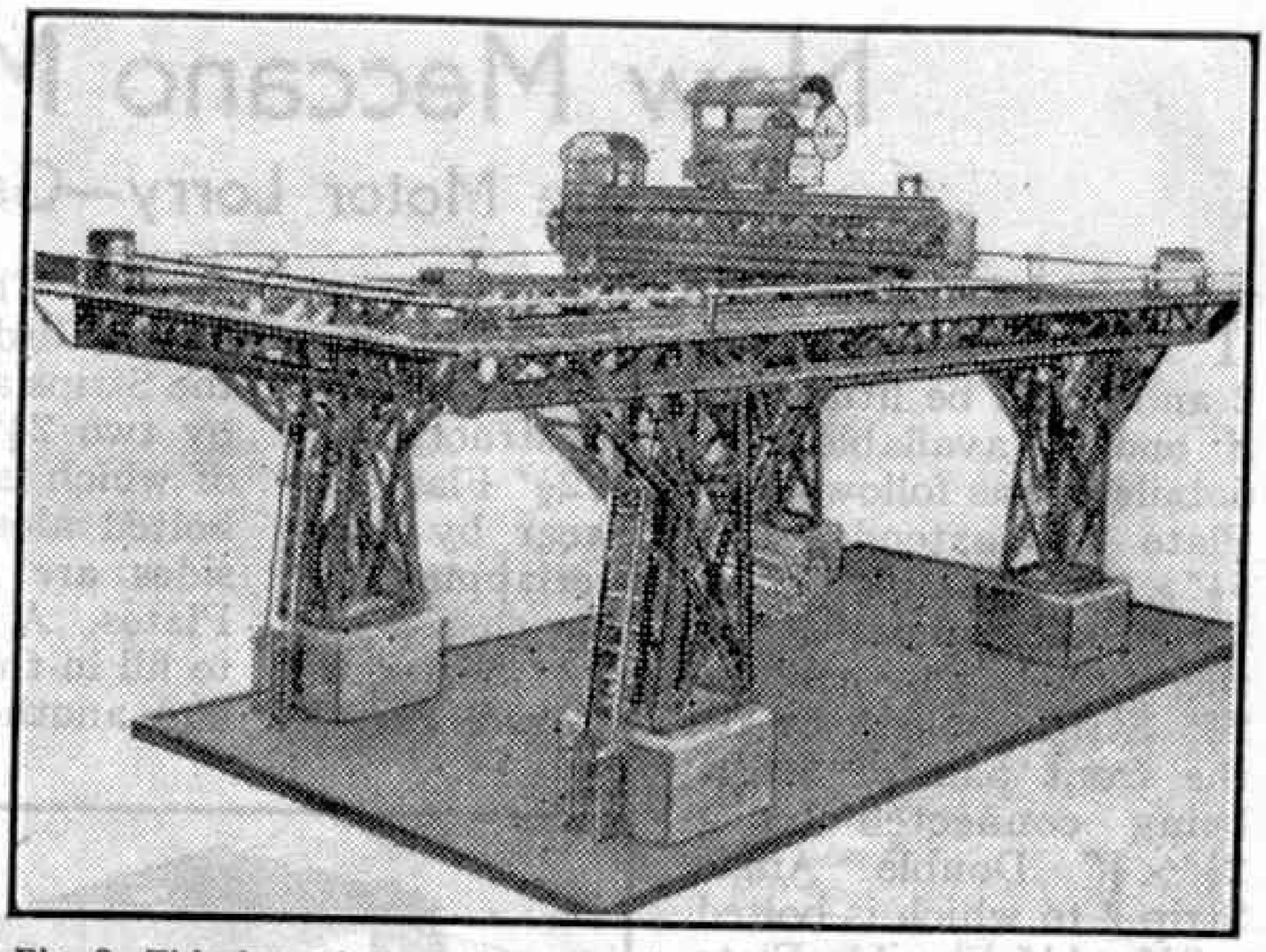


Fig. 3. This imposing gantry crane is the work of Mr. C. J. Aberdeen, Tanga, Tanganyika. It represents an actual crane having a lifting capacity of 450 tons.

MECCANO COMPETITIONS

JUNE GENERAL MODEL-BUILDING CONTEST

We wish to remind readers that the General Model-building Contest announced in last month's issue of the "*M.M.*" is still open, and intending competitors should send in their entries as soon as possible. The contest is open for models of any size and subject, and readers of all ages may compete. The actual model should not be sent; a photograph or a good sketch is all that is necessary.

Entries will be divided into two Sections. A, for competitors living in the British Isles, and B, for readers living Overseas. The closing dates are: Section A, 30th July; Section B, 30th November.

The following prizes will be awarded in each Section: First, Cheque for £3/3/–; Second, Cheque for £2/2/–; Third, Cheque for £1/1/–. There will be also five prizes each of 10/6, and five prizes each of 5/–.

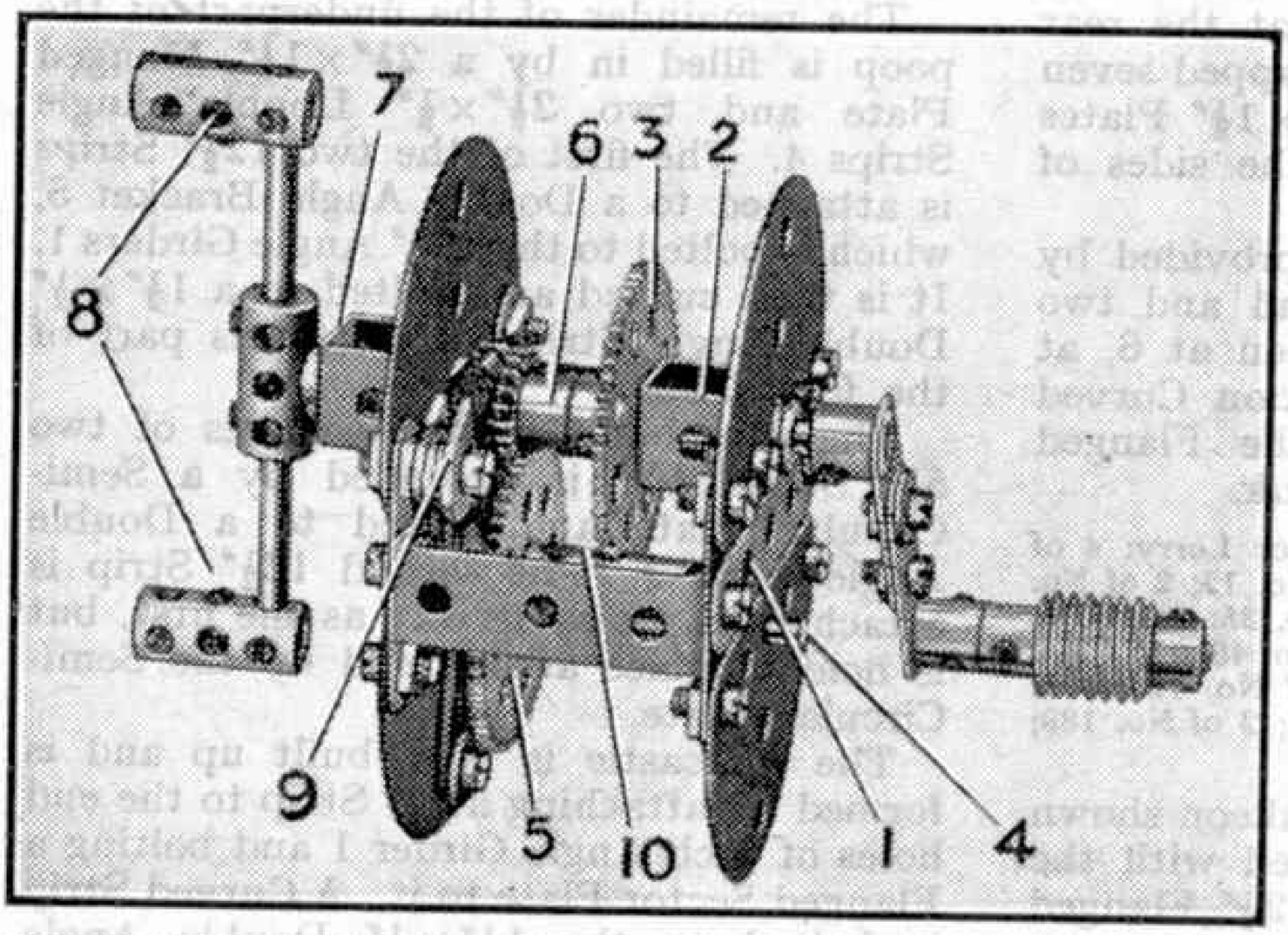


Fig. 4. A compact high-speed winder for winding the rubber motors of model aeroplanes. It is designed by B. T. Gillyatt, Chesterfield.

ADVANCED MODEL-BUILDERS COMPETITION

The first Advanced Model-builders Competition was announced in the June issue of the "*M.M.*" In this contest competitors are invited to design a machine capable of filling small round boxes, each with 10 pills, and placing a lid on each box. The competition is intended specially for older and experienced model-builders. It is not likely that beginners will have the necessary knowledge and skill to compete successfully, but there is nothing to prevent them from submitting entries if they wish to do so.

Only the essential parts of the mechanism need be built, but there must be sufficient to show how the various operations are carried out.

The competition is open to readers in any part of the world, and the closing date is 30th November. Photographs or good sketches of models, together with a description of the essential mechanism, are all that is required.

The prizes to be awarded are as follows: First, Cheque for £3/3/–; Second, Cheque for £2/2/–; Third, Cheque for £1/1/–. Five prizes each consisting of 10/6.

Entries should be addressed: "*Advanced Model-Builders Competition No. 1, Meccano Ltd., Binns Road, Liverpool 13.*"

New Meccano Models

Simple Motor Lorry—Galleon

THE simple motor lorry shown in Fig. 1 is built from the contents of Outfit No. 2 and could be fitted with a *Magic* Motor if one is available. The constructional details are as follows. A $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate 1 is extended at the rear by two $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates overlapping it seven holes, and this forms the chassis of the lorry. The cab is built from four $2\frac{1}{2}''$ Strips bolted to the Flanged Plate, the front pair of Strips being connected by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 2 to which is bolted a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate that forms the roof. A $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Plate 3 attached to the roof and to the $2\frac{1}{2}''$ Strips by Angle Brackets closes in the back of the cab. The front of the vehicle is a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate bolted to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate also and to a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 4 that connects the $2\frac{1}{2}''$ Strips. A Flat Trunnion is fixed to the $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate to represent the radiator. A Bush Wheel held on a $\frac{3}{8}''$ Bolt 5 forms the driving wheel.

Two $5\frac{1}{2}''$ Strips bolted at the sides to the $2\frac{1}{2}''$ Strips and extended at the rear by two further $5\frac{1}{2}''$ Strips overlapped seven holes, are attached to the $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Plates by Angle Brackets to form the sides of the lorry.

Bearings for the wheels are provided by two Trunnions at the rear end and two Fishplates, one of which is seen at 6, at the front. A $2\frac{1}{2}'' \times 2\frac{1}{2}''$ U-Section Curved Plate 7 bolted underneath the Flanged Plate represents the petrol tank.

Parts required to build model Motor Lorry: 4 of No. 2; 6 of No. 5; 3 of No. 10; 8 of No. 12; 2 of No. 16; 4 of No. 22; 1 of No. 24; 4 of No. 35; 41 of No. 37a; 38 of No. 37b; 4 of No. 38; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 3 of No. 111c; 2 of No. 126; 1 of No. 126a; 4 of No. 155; 2 of No. 188; 2 of No. 189; 1 of No. 190; 1 of No. 199.

Construction of the model galleon shown in Figs. 2 and 3 is commenced with the building of the poop. A $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate is extended down at one end by two $3\frac{1}{2}''$ Strips, and at the other by two $5\frac{1}{2}''$ Strips. These are bolted to two $12\frac{1}{2}''$ Angle Girders 1, and the spaces between the Strips and the Angle Girders are braced by two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips, one of which is seen at 2. Two $5\frac{1}{2}''$ Strips are bolted along the Flanged Plate, and the sides are filled in by $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates. A $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate is used to fill in the fore and aft walls of the poop, and another similar part forms the floor.

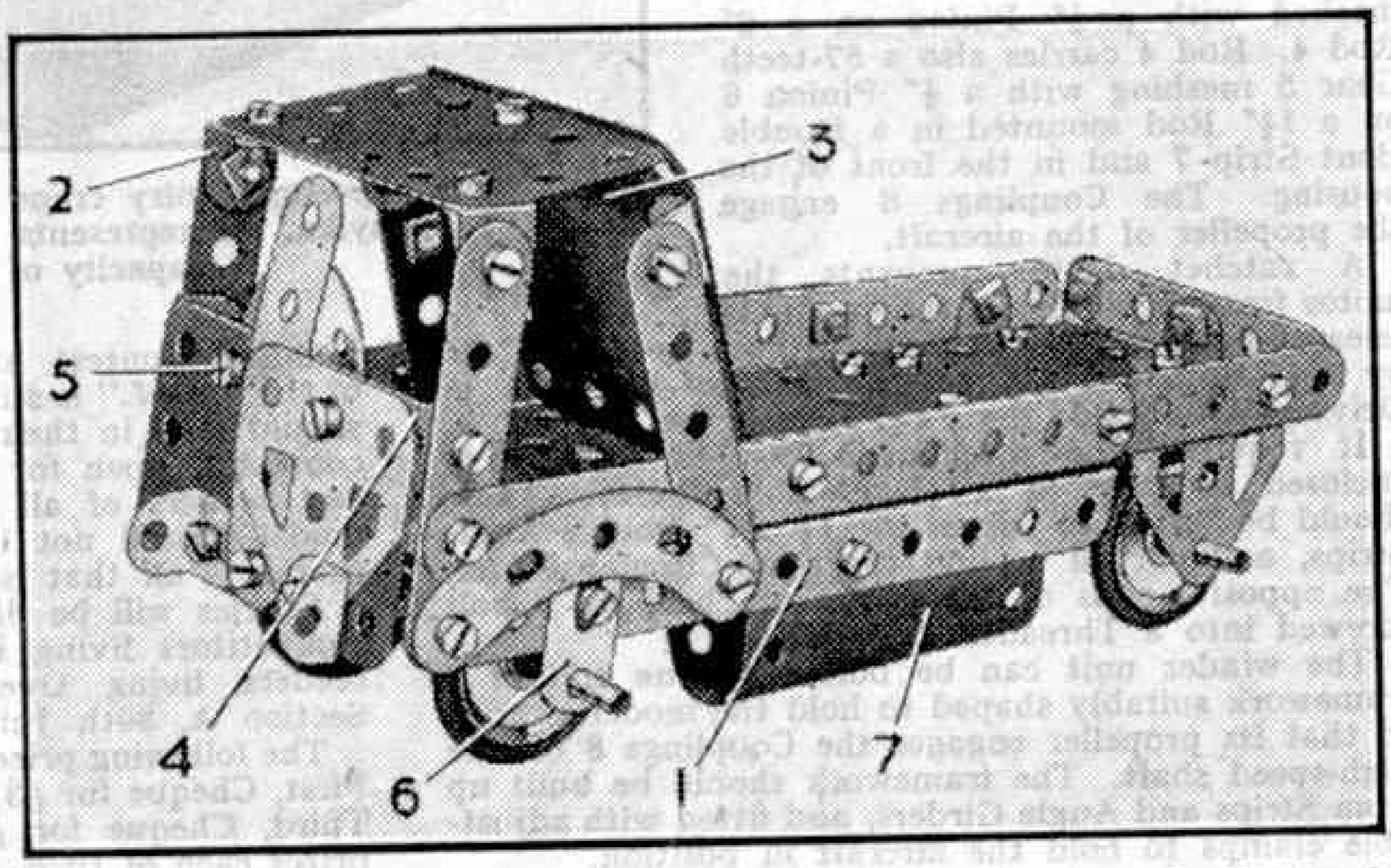


Fig. 1. A simple model motor lorry that can be built from Outfit No. 2.

A $1\frac{1}{2}''$ Strip bolted to the Angle Girder 1 on each side has two $12\frac{1}{2}''$ Strips and one $10\frac{1}{2}''$ compound strip 8 bolted to them.

The remainder of the underpart of the poop is filled in by a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate and two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 4. The first of the two $12\frac{1}{2}''$ Strips is attached to a Double Angle Bracket 5, which is bolted to the $12\frac{1}{2}''$ Angle Girders 1. It is then curved and bolted to a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 6 that forms part of the forecastle.

The compound strip 8 consists of two $5\frac{1}{2}''$ Strips and is extended by a Semi-Circular Plate and bolted to a Double Angle Strip 7. The second $12\frac{1}{2}''$ Strip is attached in the same way as the first, but is held in place at one end by the Semi-Circular Plate.

The forecastle is next built up and is formed by attaching a $2\frac{1}{2}''$ Strip to the end holes of each Angle Girder 1 and bolting a Flanged Sector Plate to it. A Curved Strip is bolted to the $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 6 and is attached to the Flanged

Sector Plate. A $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate fills each side of the forecastle, and another similar Plate bolted to the $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 6 and Flanged Sector Plate, is bent to repeat the curve of the Curved Strip. A Trunnion is bolted to the end of the Flanged Sector Plate.

The hull is built up on a framework of Strips, and is ribbed by Formed Slotted Strips. The $2\frac{1}{2}''$ Strip shown at 9 is extended downward by a Formed Slotted Strip, which overlaps another one by two holes, and is joined to a similar $2\frac{1}{2}''$ Strip on the other side of the model. Two $5\frac{1}{2}''$ Strips, one of which is seen at 10, are bolted along the bottom and two Formed Slotted Strips are attached to them. Two compound plates made by overlapping a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate and a $1\frac{11}{16}''$ radius Curved Plate are bolted to the $12\frac{1}{2}''$ Strips, and bent round to produce the curve of the hull. The remainder is filled by two U-Section Curved Plates slightly flattened.

A Wheel Disc and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate 11 fill the back and are held by a $1'' \times 1''$ Angle Bracket. The rudder, which is represented by a Flat Trunnion, is attached by an Angle Bracket to the Wheel Disc.

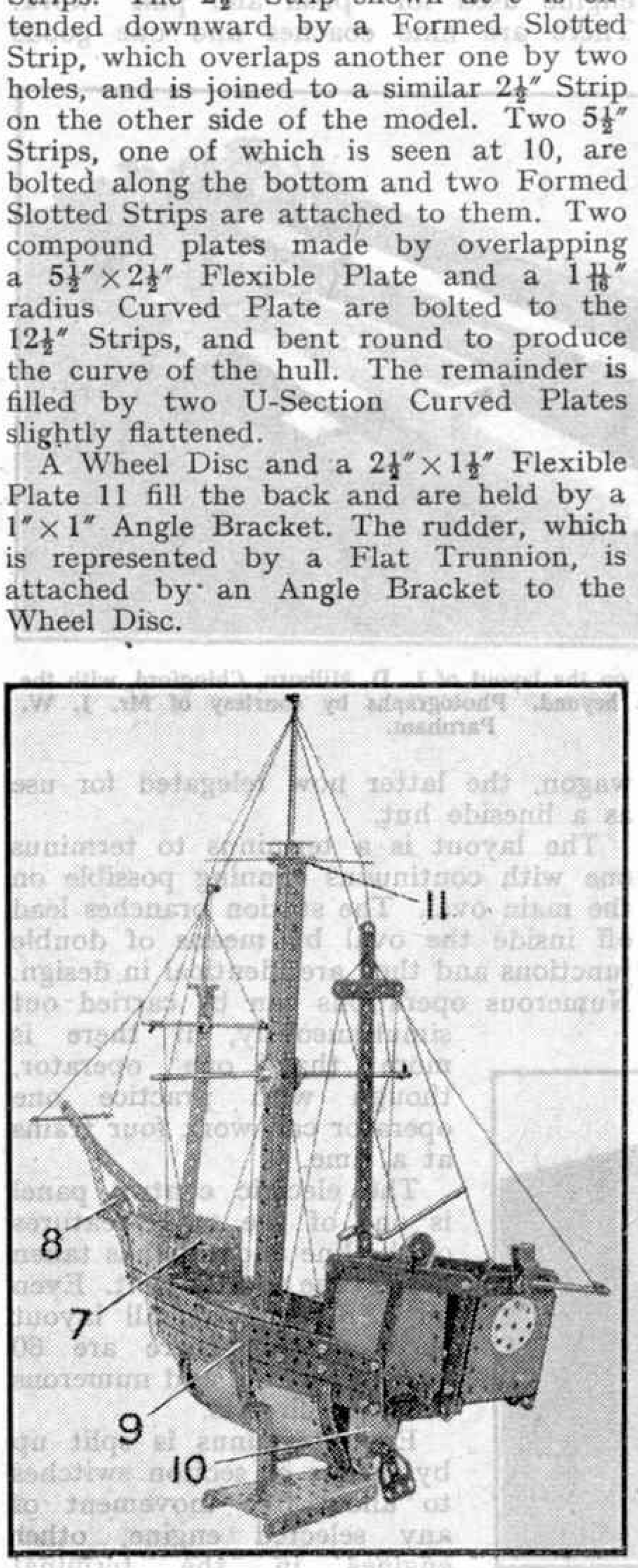


Fig. 3. Another view of the sailing ship showing details of the stern.

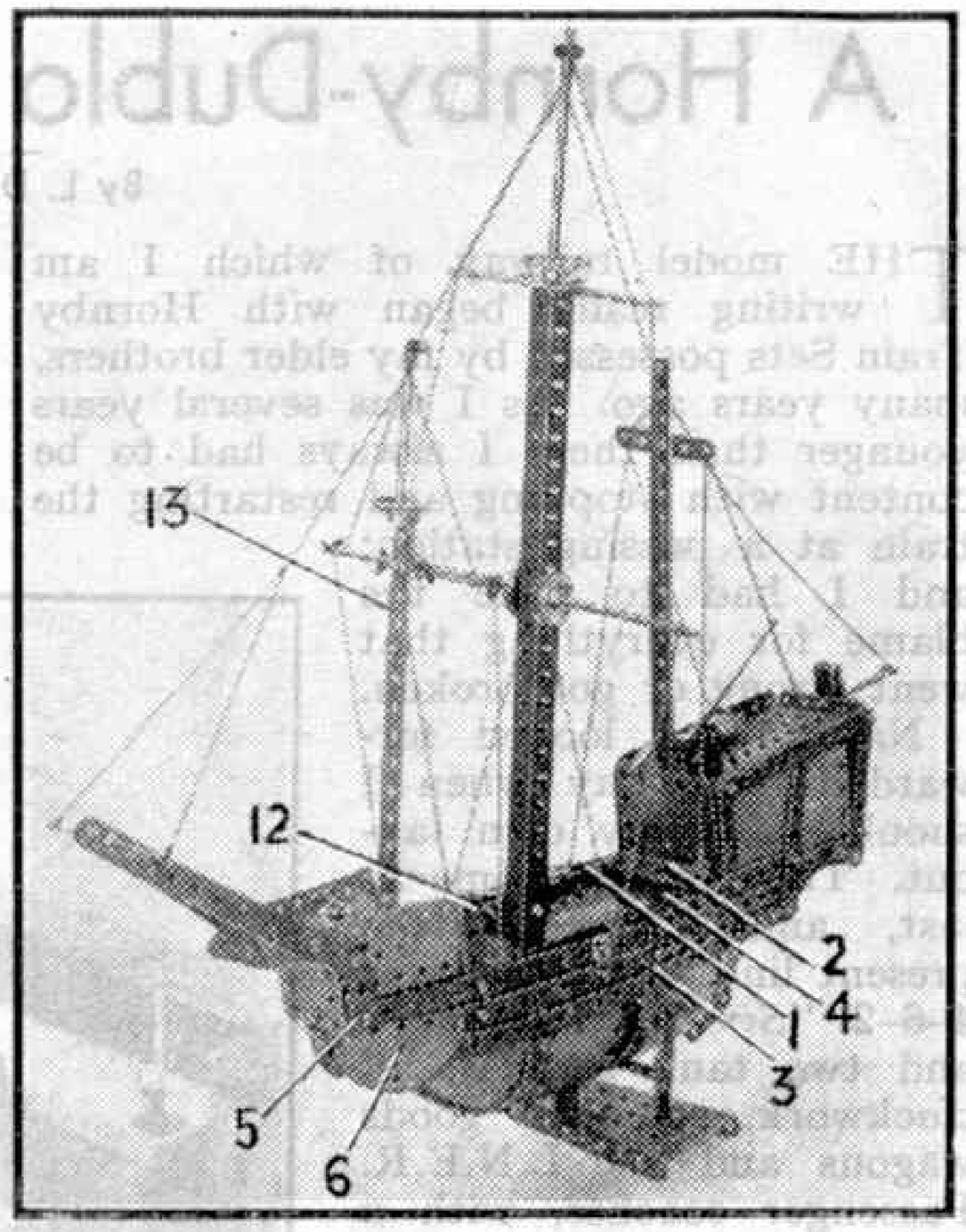


Fig. 2. A realistic old time sailing ship. It is designed for Outfit No. 5.

The ship's wheel is made by locking a 1″ Pulley on a Threaded Pin passed through a Trunnion bolted to the Flanged Plate. A $\frac{1}{2}''$ Pulley and four Washers form a capstan.

The main mast is built by joining two $12\frac{1}{2}''$ Angle Girders, and for this a Double Bracket and a Double Bent Strip 12 are used. The Double Bent Strip 12 is bolted to the mast, and a $5\frac{1}{2}''$ Strip and a Bush Wheel are attached to it. The mast is extended upward by a 5″ Rod locked in the Bush Wheel. The lower cross-spar is a compound rod made with a 5″ and a $3\frac{1}{2}''$ Rod connected with a Rod Connector 13, and is locked to the mast by two 1″ Pulleys. The mast is connected to the deck by a Reversed Angle Bracket bolted to the Angle Girder 1, and spaced from the mast by four Washers. Two $12\frac{1}{2}''$ Strips form the aft mast and two $5\frac{1}{2}''$ Strips the fore mast, which is extended by a $4\frac{1}{2}''$ Rod in a 1″ Pulley connected to the mast by an Angle Bracket 14, bolted to its boss.

Parts required to build the model Galleon: 6 of No. 1; 14 of No. 2; 2 of No. 3; 12 of No. 5; 2 of No. 6a; 4 of No. 8; 1 of No. 10; 4 of No. 11; 5 of No. 12; 2 of No. 12a; 2 of No. 15; 1 of No. 15a; 1 of No. 16; 1 of No. 19g; 3 of No. 22; 1 of No. 23; 1 of No. 24; 3 of No. 24a; 12 of No. 35; 90 of No. 37; 8 of No. 37a; 12 of No. 38; 1 of No. 40; 1 of No. 44; 1 of No. 45; 1 of No. 48; 8 of No. 48a; 1 of No. 51; 1 of No. 52; 2 of No. 54; 2 of No. 80c; 4 of No. 90a; 1 of No. 111a; 4 of No. 111c; 1 of No. 115; 2 of No. 125; 2 of No. 126; 1 of No. 126a; 1 of No. 147b; 4 of No. 188; 4 of No. 190; 2 of No. 191; 3 of No. 192; 2 of No. 199; 2 of No. 200; 1 of No. 212; 2 of No. 214; 4 of No. 215.

A Hornby-Dublo Layout Develops

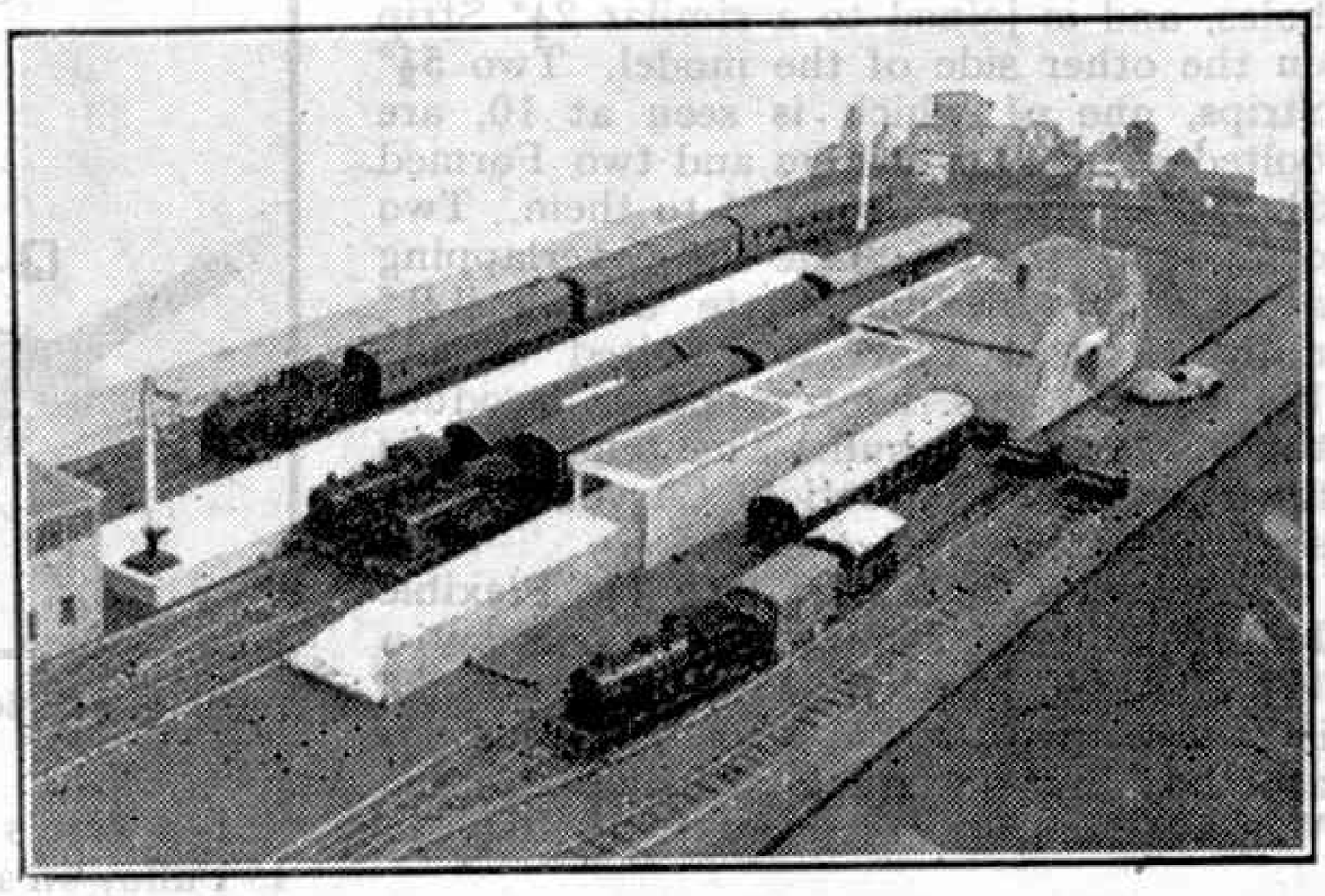
By L. D. Milburn

THE model railway of which I am writing really began with Hornby Train Sets possessed by my elder brothers, many years ago. As I was several years younger than them I always had to be content with stopping and restarting the train at a passing station; and I had to take the blame for everything that went wrong or got broken.

Naturally I looked forward to the day when I should have my own layout. The day did come at last, and I began the present line with a pre-war 4–6–2 "*Sir Nigel Gresley*" and two tank engines, all clockwork, some 14 goods wagons and six L.N.E.R. Passenger coaches, with a fair amount of track and points.

Later I decided to have a permanent electric system. The outer line of a double track oval was got running, and the inner line followed, with one Hornby electric tank engine as well as the clockwork stock. The layout was modified several times but, although the line was never really "complete" until last April, it was in the main operative in its present form.

The clockwork engines and stock were used for a time with the electric stock, which was added to by degrees. There were then six L.N.E.R. engines, two of them 4–6–2s and four tank engines. The present stock consists of six Hornby-Dublo tank engines and one old Continental engine used for "push and pull" work. There are nine coaches and one goods wagon, the latter now relegated for use as a lineside hut.

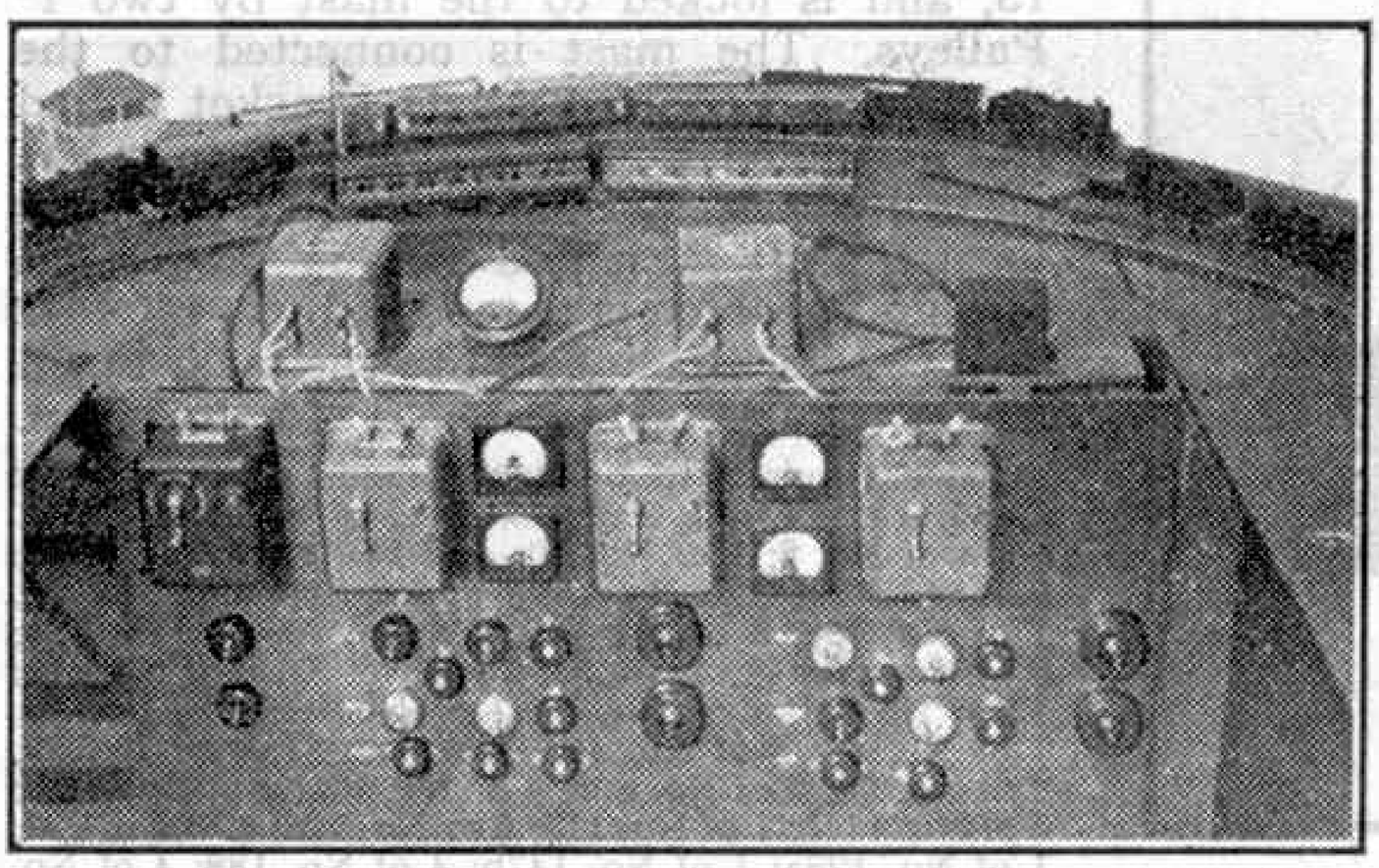


One of the stations on the layout of L. D. Milburn, Chingford, with the through main line beyond. Photographs by courtesy of Mr. J. W. Parnham.

The layout is a terminus to terminus one with continuous running possible on the main oval. The station branches lead off inside the oval by means of double junctions and they are identical in design. Numerous operations can be carried out simultaneously, if there is more than one operator, though with practice one operator can work four trains at a time.

The electric control panel is one of the main features of the line and this has taken much time and thought. Even on a relatively small layout such as this there are 60 yards of wiring and numerous different circuits.

Each terminus is split up by means of section switches to allow free movement of any selected engine, other engines in the terminal section being switched out until required.



The control panel situated at one end of the layout, with everything convenient to the operator's hand.

Hornby Railways Out of Doors

AT this time of the year a subject that frequently crops up in the correspondence dealt with at H.R.C. Headquarters is the use of Hornby layouts in the garden. Therefore the following notes may be of interest to any readers who are thinking of laying down their railways out of doors.

It must be stated straight away that Hornby railway components are designed essentially for indoor use. They are not suitable for permanent use outside. There is, however, no reason why a Hornby layout should not be operated in the open air on a fine dry day. In this way it is possible to enjoy the warmth and sunshine while carrying out a programme of train operations. There are various precautions to be observed, but as long as due care is taken, outdoor railway working could be a regular feature during the summer months.



Alan Macintyre of Alloway, Ayr, with his Hornby Train layout in the garden. Alan is an enthusiastic M1 train owner.

Outdoor railwaying has various advantages over indoor working. The amount of space available for a layout is more generous than is usually possible inside the house. Another point is that natural scenic effects are provided in a ready-made form by the garden itself. Before starting to lay down the track, it is wise to get permission to do so from the garden authority!

It is tempting to lay down the rails on the lawn, if there is one, but it is very necessary to make sure that this is dry and that the grass is short enough to permit the trains to run successfully. Another point is that a level site is desirable or there may be trouble with derailments. Any serious ups and downs here and there are likely to upset the train running arrangements.

If the rails can be laid on a concrete pathway or tiled walk the levels are almost certain to be satisfactory. It is a good plan, before putting down the track on such surfaces, to sweep up the area that is to be covered in order to get rid of any loose dust. This will help to prevent grit being picked up by the more or less oily mechanisms and bearings of the engine and rolling stock.

Although the engine and stock have probably been lubricated and cleaned up before use, it is always well to examine them thoroughly after a spell of outdoor running, and to remove any traces of dust and so on that may have been picked up in the course of the day. This looking-over also applies to rails and any accessories that may have been in contact with the ground and so may have become slightly damp during the time they have been laid down. A careful wipe over each item with a slightly oily rag will avoid any trouble through possible rusting.

If the model railwayman is unfortunate enough to be caught out with his trains in a sudden shower, he should take particular care that the equipment is well dried before the final oily wipe. A little shaking will help to get rid of any loose drops of water, and the drying-off should be done with a piece of material that soaks up rather than spreads the remaining moisture. A little of this sort of thing goes a long way; so watch the weather!

A scheme that saves a lot of trouble in assembling and in the subsequent taking-up of the system is to screw down the rails on a suitable baseboard more or less permanently. This idea is useful indoors, but it is even more so when the line is to be moved outside frequently and then brought in again after use.

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Stamp Collecting

United States Commemoratives

By F. Riley, B.Sc.

IN recent years a flood of new designs commemorating a wide range of events of all kinds has appeared in the United States and has aroused considerable comment. Criticism is perhaps inevitable when some 29 new commemorative stamps are issued in a single year in one country alone, as happened in the States in 1948, but it must be remembered that there the population exceeds 130,000,000, so that an enormous number of stamps are required. Those who object to commemoratives of any kind are really the only ones who can feel particularly aggrieved. The rest of us can welcome these issues generally, although we hope that future years will not be so prolific as 1948. After all, stamps honouring the poultry industry and certain others of last year seem out of place alongside commemoratives of outstanding events in U.S. history.



A collection of all United States stamps would be a really bulky affair, for the Gibbons catalogue numbers reach well over 1,100. It is comparatively simple to classify the stamps in groups, however, and enthusiasts can set about forming collections of one or more of these groups that interest them. All of us of course will pass over the very earliest of United States stamps, particularly those issued by postmasters of certain cities and towns before 1847, for these are scarce and highly valued. Some of the general issues that followed from 1847 also are costly, but the time soon came when stamps appeared that in used condition at least are within the pockets of ordinary collectors, apart of course from stamps that for special reasons have acquired high values.



The earliest stamps bore portraits of Franklin, Washington and other pioneers of American Independence who later became Presidents, and here is the hint for the first group of those already suggested. Presidential portraits of various kinds continued to appear, and in 1938 the issue began of a special Presidential series, all of similar design. With the exception of Herbert C. Hoover and Franklin D. Roosevelt, every President of the United States up to that time was included in this issue, along with Franklin and Martha Washington. Both exceptions were living in 1938, but President Roosevelt died in 1945, and his portrait graced the four stamps of a special issue of 1945-46.



The United States authorities have not been slow to recognize other great Americans, and a few less well known, and the Presidential series can easily be extended with good results into a portrait gallery that includes many famous figures. A well arranged collection with good notes would be really interesting. Its subjects would range from Christopher Columbus, the discoverer of America, to Will Rogers, the famous humorist who said "I never met a man I didn't like," words reproduced on the Rogers portrait stamp issued in November of last year.

Historical events of great importance in the story of the United States provide another interesting section of the commemorative stamps of the country. Most of these are straightforward commemorations. An outstanding example was the issue of three stamps in 1920 to celebrate the 300th anniversary of the landing of the Pilgrim Fathers. The 150th anniversaries of various battles of the War of Independence provided other stamps from 1925 to 1933, when there was a special issue, with a design showing Washington's Headquarters during the War, celebrating the proclamation of peace at the end of the great struggle.

In 1944 a stamp illustrating the 75th anniversary of the completion of the first railway across the North American Continent appeared. The discovery of gold in California in 1848 was celebrated last year by the appearance of a special stamp, which shows Sutters Mill, Coloma, where the famous discovery was made that started the great gold rush to the Far West.



Another good example of a commemorative of this kind is the stamp marking the 200th anniversary of the founding of what is now Washington and Lee University, in Virginia, as it bears the portraits of the two great Virginians after whom the University is named. Yet another celebrates the 50th anniversary of the formation of the celebrated Rough Riders, raised by Theodore Roosevelt for service in the Spanish-American war. The design of this stamp shows a statue of Capt. "Bucky" O'Neill, a Rough Rider who was killed while leading his men in battle in Cuba.



An interesting series of U.S. commemorative stamps celebrates anniversaries of the formation of the States of the Union. There are nearly 50 States, and (Cont. on page 282)

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For other Stamp Advertisements see also pages 278 and xi.

Stamp Gossip
and Notes on New Issues

By F. E. Metcalfe

JUST now a number of collectors will not be so active as far as their hobby is concerned, for after all there is a lot to do outside in July. Yet if you collect modern colonial stamps, and many do, don't overlook those new varieties which are popping in and out all the time. They will cost a lot more when winter comes, and after all, winter is never very far behind as far as Great Britain is concerned.

The writer of these notes recently made a trip to Turkey, and he was able to buy in the post office, which makes a set so much more interesting, a set of the new air stamps, issued a short time ago. There are six stamps in the set, and they were printed in photogravure by the Swiss firm of Courvoisier.



There are various designs and the one illustrated is exceedingly interesting, for it shows the old Turkey as well as the new, which typifies this country in its present state of development. The buildings show the citadel, which is the old part of Ankara, the capital, and the very modern looking bridge is to be found in the public park, in the new part of the city. As everybody knows, Ataturk decided to leave Istanbul, the old capital, and form a new one on the Anatolian plateau. He selected Ankara, which was little more than a ramshackle village, and mapped out a fine city. Ankara is, in parts, a fine city to-day, after only 20 years, which isn't long for creating a city.

We are illustrating another stamp of Turkey, which shows a statue of Ataturk. This statue is in one of the new streets, named by our British Tommies Big Horse Tail Street—they couldn't master the Turkish name. They get the name from the fine bronze horse on which Ataturk is astride. Altogether Turkey is an interesting country to collect. Used stamps are fairly easily come by, and many are quite attractive.

A collector sent in a stamp from Iraq, with an overprint which had had an addition horizontally, and wanted to know what it was all about. Well, as there are many copies of this stamp, and no doubt other readers are wondering about the same thing, we may as well illustrate it and explain that actually three stamps have been treated similarly by the Iraqi Post Office. The values concerned are the 2f, 3f and 5f., and the addition to the overprint has to do with the tax which is being imposed to help Arab troops against Jewish forces. The stamps are still being used apparently, though there can be little need for them now.



Collectors have been intrigued by the stamps which are appearing for the various Malayan States. Eleven sets to five dollars are scheduled to come out, and already several have actually appeared. It is the perforation which has caused the surprise, and this is so fine—17½ × 18—that the usual perforation gauges cannot measure it. Now collectors are wondering if there will be a change in subsequent prints. It is best to buy your sets now to make sure, for if there is a change these present printings will turn out scarce indeed.



Another country which is generally in the philatelic news is Switzerland, and the ultra-modern stamp recently issued that is here illustrated will interest many "*M.M.*" readers. A glider is depicted on this dark purple and yellow stamp, and an attempt has been made in the design to symbolize aerodynamic buoyancy. The stamp was only on sale for a few days in April, and it was for use for special flights in Switzerland.

There is no doubt about it that Switzerland is making a good thing out of postage stamps, not only by issuing them, but also by printing them for other countries, such as India, Turkey, etc. Technically, these Swiss printed stamps are first class, but one soon gets tired of photogravure productions for some reason or other. There is nothing to touch line engraved stamps really, and our own printers cannot be beaten in this class of work.

Probably the most popular group of stamps in the world are those of our own Commonwealth of the present reign, and lots of attempts have been made to calculate how many collectors there are of these stamps in the world. The latest statement of Gibbons, the great stamp firm which a few months ago published for the first time a K G VI catalogue, is that they have sold 90,000 copies in a few months. There are of course many collectors who either use other catalogues or none at all, so the number of collectors of the stamps in question must be very large indeed. Incidentally Gibbons state that the next edition of their catalogue will be published in the autumn, and a number of changes are predicted. Lots of collectors will be tip-toe from now on.



Collectors are getting very restive over the forthcoming U.P.U. stamps, and dealers say that they are booking many orders, but there is no need for panic, for dealers can be depended upon to get supplies, even from countries which are outside the sterling area.

Things are warming up now for the great international exhibition which is to be held in London next year. Australia and New Zealand also announce exhibitions for 1950, so the pot hunters look to be in for a great time.

And now for a tip. Try to complete your sets of modern South African stamps, either in mint or used pairs. Very soon the whole current set will be replaced by new ones.

The Development of the Destroyer—

(*Continued from page 252*)

the "J" class had only two boilers exhausting into a single funnel; their displacement was 1,540 tons, their speed 36 knots, their armament four 4.7, several small anti-aircraft guns and four torpedo tubes. During the war that design was developed down to the "Z" class of 1,710 tons with four of the new 4.5 in. guns, a bigger high-angle battery and eight tubes.

Towards the end of the war it was once again necessary to build specialized types. For Arctic service in connection with the Atlantic and Russian convoys the "Weapon" class was of 1,980 tons, steamed 34 knots and mounted four 4 in. and numerous anti-aircraft guns, with 10 torpedo tubes. Against the Japanese in the Pacific the "Battle" class had a displacement of 2,325 tons, a speed of 36 knots, and an armament of five 4.5 in., 14 anti-aircraft guns and 10 torpedo tubes. The "D" class were an enlarged edition of the "Battle" class, 2,610 tons normal displacement but no less than 3,500 with all their weights on board, 36 knots speed, and the earlier ships' armament increased by an extra 4.5 and two more anti-aircraft guns.

The contracts for many ships of these three types were cancelled immediately after VJ-Day; many of them were towed straight round from the builder's yards to the scrappers'; but doubts are now being entertained as to the wisdom of that move.

Fuelling the World's Airlines—

(*Continued from page 255*)

aircraft lands and the B.P. fueller moves off to meet it. The tanks are never found to be empty, since a generous safety margin is carried, so that usually one road tanker is enough to meet its demands. Nevertheless a minimum of two fuellers is kept at each airport, and often several others. A "Dakota" carries 3,000 gallons, including storage, and the latest type of four-engined craft accommodates 6,500 gallons; the giant "Brabazon" holds no less than 9,000 gallons. To cater for these demands, 2,400-gallon four-compartment tanks are provided on the fleet of 19H1 Hippos that is now being built up. Two pumping units deliver fuel to the aircraft by boom gear at a rate of 60 gallons per minute each. The vehicles are finished in the green and yellow of the B.P. aviation service and carry its distinctive winged emblem.

This article is reproduced from "The Leyland Journal" by courtesy of the Editor.

Dinghies with a difference—

(*Continued from page 256*)

of "Fireflies" was used for demonstration and rigorous all-weather tests, during which one boat was filled with stones and left awash by the tides in Hamble River, in and out for nearly two years including the savage winter of 1946, without marked deterioration.

As raw materials became available and clubs began to realize that the "Firefly" offered a chance to resume pre-war activities at comparatively low cost, the demand for these dinghies became very great. As a result more than 500 were built at Hamble in 18 months, a record output of one type by one boat builder in so short a time, only made possible by the simple moulded construction, which also ensures that all "Fireflies" are identical in hull form. Total production is now well over 600, and boats have been delivered to clubs as far apart as Argentine and Iraq, Sweden and Singapore.

Although the "Firefly's" high performance makes it a favourite for racing, that is by no means the limit of its usefulness. It is in fact a delightful little dinghy for less hectic sailing on the Broads, rivers, reservoirs or the open sea. Roomy, and docile enough to be handled by children, for whom the makers supply a special reduced rig, it represents a pioneer effort to bring the open-air thrills of real sailing within reach of everyone's pocket.

Double-Decker of the Air—(*Cont. from page 262*)

in the nose to the galley in the tail.

The bad old days when aircrews worked in a cramped cell surrounded by a jungle of instruments, levers and gadgets, have gone. P.A.A. pilots had a hand in designing the flight deck, which is the most spacious ever built into a commercial landplane. Normal provision is made for a crew of five consisting of pilot, co-pilot, flight engineer, radio operator, and navigator, but for short-range "skycoach" services a crew of three would be adequate. Crew members can walk around during flight, converse easily because of the low noise level, and have their own toilet facilities.

Immediately behind the flight deck in the P.A.A. version is a luxurious stateroom for eight people, ideally suited for a large family or group of business men who want a certain degree of privacy. On either side of the aisle leading back from here to the main cabin are beautifully-fitted out dressing rooms for men and women, each able to accommodate six people at a time.

The main cabin has double rows of seats on each side of a centre aisle, with the circular staircase to the lower deck midway along its length. Like the other passenger compartments, it is fully air-conditioned, and pressurized to enable the aircraft to operate with complete passenger comfort at heights up to 25,000 ft., well above most bumpy weather or storms. Finally we come to the galley, which is as big as the average household kitchenette and can serve all the passengers and the crew with three complete meals during a 12 hr. flight. The equipment includes two ovens and four refrigerators.

On the lower deck are a forward cargo compartment with a capacity of 520 cu. ft. and a rear luggage compartment of 325 cu. ft. Both are pressurized, and together they accommodate up to five tons of freight. Passengers can even take their pets with them if they wish, as the rear compartment can be warmed or cooled as required.

Stamp Collecting—(*Continued from page 279*)

these commemoratives alone will provide quite a nice little collection that should be very attractive if well done. The Minnesota stamp on page 279 is an interesting example. The procedure was to organize an area or district as a territory first, and when this territory was well-established, with responsible government, it became eligible for admission as a State. Minnesota became a territory in 1849, and so enters the list of commemoratives this year. The design of the stamp features the Red River ox cart, which was the chief mode of transport in the territory 100 years ago and received its name from one of its principal rivers, which flows north into Canada. Minnesota became a State in 1858, and presumably we can expect another stamp to celebrate that event in nine years time.

The natural features of the United States provide a real wealth of material for the designer of pictorial stamps. The outstanding stamps of this kind are those of the National Parks issue of 1934, which illustrate such well-known places as the Grand Canyon, the Yosemite Valley and Yellowstone Park. With these as a centre a very fine collection can be made of stamps showing scenic wonders in the States, including some picturing great works such as Boulder Dam. The air stamps of the United States form another excellent series. It is interesting to find that one of these stamps, which appeared in 1923, shows a de Havilland biplane.

In this article I can only touch on a few of the various schemes that may suggest themselves to those looking for special corners of the stamp world in the issues of the United States. Such collections can be extended by taking into account the stamps of the Philippines and other associated countries. For instance, stamps are being issued this year in the Panama Canal Zone that will add to the story of the California gold rush illustrated by the 1948 commemorative already referred to. Many of the "Forty-niners" reached the diggings by way of Panama, and their passage is illustrated and commemorated by this issue.

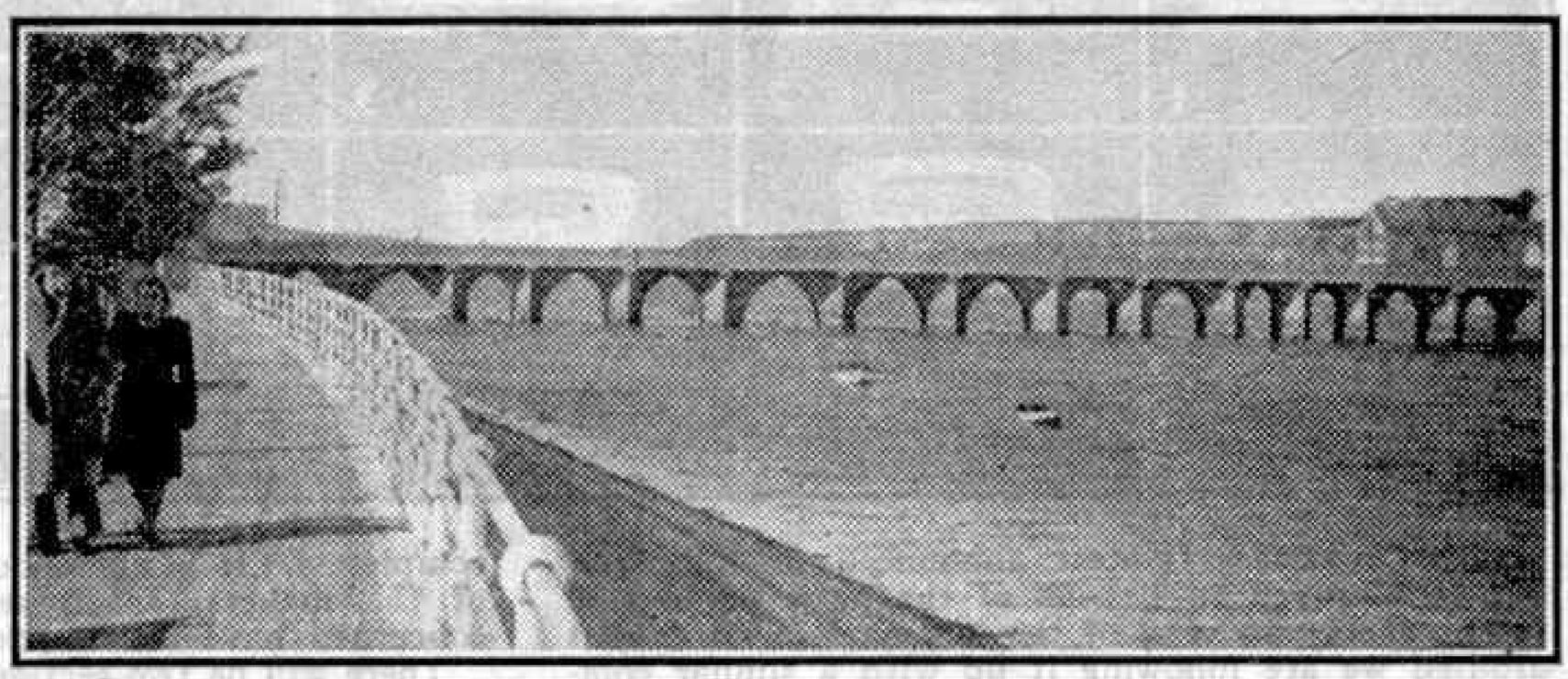
From Our Readers

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.

BIDEFORD'S ANCIENT BRIDGE

During a recent holiday I had the luck to visit Devon and in particular, the town of Bideford, the ancient borough so well known to all readers of Charles Kingsley's "*Westward Ho.*" Part of this story of Elizabethan times was written at Bideford, which was the birthplace of Sir Richard Grenville, who in his "*Revenge*" fought a famous battle against an overwhelming Spanish fleet at Flores, in the Azores.

While at Bideford I was particularly interested in the old bridge that spans the estuary of the Torridge, the river on which the town stands. "Everyone who knows Bideford cannot but know Bideford Bridge," wrote Kingsley, and it is certainly worthy of the attention of every visitor.



The famous bridge at Bideford, in North Devon, now an ancient monument. No two arches of this structure are of the same span. Photograph by A. Gulati, London S.W.11.

The early history of the bridge is not very clear, but legend ascribes its beginning to a dream of the parish priest, in which he saw a suitable site for the foundations of the bridge in the tide-swept sand and mud of the Torridge. The queer variation in size of the 24 arches—no two are the same width—has been accounted for by the quaint suggestion that the poor built the narrow ones and the rich the wide ones, but it is more likely that the foundations of the piers were set where the presence of rock made it possible.

The first structure was of wood and was erected about 1280. This was replaced by a stone bridge about 200 years later. Since then the structure has been widened and altered, but the original form has always been retained. The present width and graceful parapet were engineered in 1925 and its approaches also were improved. The bridge has now been made an ancient monument.

A. Gulati (London S.W.11).

SNAKE CHARMING IN INDIA

Snake charmers are familiar figures in Southern India. They are mainly occupied in providing entertainment but they have more useful work at times. Some 20,000 Indians die every year from snake bites and snake charmers are often employed to rid dwellings of these deadly reptiles.

The accompanying photograph, taken by my friend John Scrivener while he was in India, shows a snake charmer at work. The musical instrument used is generally 15 in. long, with a hollow bulb carved out of the stem. Most snake charmers appear to resist the effects of a snake bite; in some cases this is believed to be possible because they have been bitten so often that they have become immune to the poison. Others, who do not wish to run any danger, extract the snake's teeth, through which the poison is injected, while quite a few continue to carry pamboo-kaloo, or snake-stone, which apparently heals a cobra's bite when it is placed on the wound for a short time.

The belief that snakes can hypnotize people and animals is a fallacy. It seems to be due to the absence of movable eyelids, which give snakes a stony stare that is apparent even when asleep.

Although the cobra continues to cause havoc among human beings in India, it is still worshipped by many Hindus, particularly in Southern India.

S. A. Bennett (Birmingham 23).

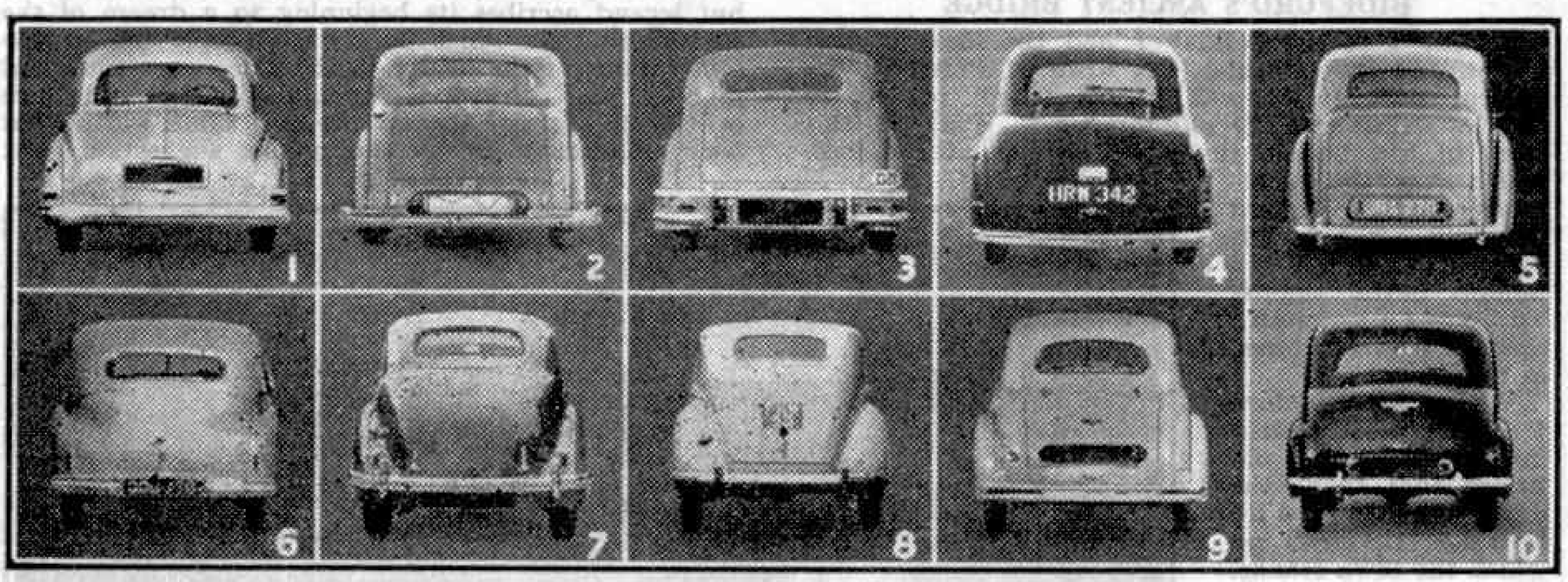


Indian snake charmers giving a performance with their cobras. Photograph by J. Scrivener.

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Seen from Behind



The Car Faces Contest announced in the April "*M.M.*" proved to be one of the most popular of recent years. In view of the intense interest that it aroused we are following it up with a similar competition that we are sure readers will welcome, even if some of them find it a little more difficult. In this contest we are giving entrants 10 pictures showing direct rear views of modern British cars and we ask them to say which cars are represented.

The pictures are numbered 1 to 10, and in their entries readers must state for each number the name of the car that the corresponding picture represents. As in the previous contest, sufficient information must be given to identify the model completely. It is not enough just to give the names of the makers, as in several instances the firms concerned have other models in production.

There will be two sections in the contest, for Home and Overseas readers respectively, and in each of these prizes of 21/–, 15/– and 10/6 will be awarded to the competitors who send in the best entries in order of merit. If there is a tie for any prize the final award will be based on the neatness and novelty of the entry.

Entries must be addressed "*Car Rear View Contest, Meccano Magazine, Binns Road, Liverpool 13.*" The closing dates are 31st August in the Home Section, and 30th November in the Overseas Section.

A Locomotive Square

For our second competition this month we have a novel word square competition, devised by our reader C. G. Groom, Pinnock, in which the names of well-known locomotives of British Railways are involved. The square involved is shown below. It has 64 spaces, like a chess or draught board, and the horizontal lines are to be filled with the names of the locomotives indicated by the following clues:

1. Peeress now nationalized.
2. Church dignitary, Scottish in origin.
3. Famous battle.
4. Famous battleship.
5. Should it wear a halo?
6. Recently won promotion in League.
7. West Country town.
8. Its deflector plates must really be wings, it seems.

When the correct names are inserted in the rows of the square the name of yet another locomotive will be spelled out by the letters in the diagonal beginning at the top left-hand corner.

For their entries in this contest competitors are asked to send in the complete square. They must not cut out the square printed on this page, but instead must draw a copy on a sheet of paper or card.

The competition is divided into the usual two sections, for Home and Overseas readers respectively, and in each of these prizes of 21/–, 15/– and 10/6 will be awarded for the three best entries in order of merit. If necessary the judges will take the neatness or novelty of the entry itself into consideration.

Entries should be addressed "*July Locomotive Square, Meccano Magazine, Binns Road, Liverpool 13.*" The closing dates are 31st August in the Home Section, and 30th November in the Overseas Section.

July Photographic Contest

In this month's Photographic Contest, the 7th of our 1949 series, readers are asked to submit general summer outdoor photographs. These may include not only lake, woodland and mountain scenes, but also pictures taken in towns or villages in which the summer aspect is clear. It is left to entrants themselves to decide whether to include figures or not.

There are only two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired.

The competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate sections for overseas readers. In each section prizes of 21/–, 15/– and 10/6 will be awarded. Entries should be addressed "*July Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 30th July; Overseas Section 31st October.

Competition Results and Solutions

HOME

FEBRUARY 1949 ENGINEERING CHOICE CONTEST

1st Prize: D. Houlker, Accrington. 2nd Prize: J. Bradbury, Taunton. 3rd Prize: A. R. Young, Bournemouth. Consolation Prize: P. G. Taylor, Leicester.

FEBRUARY 1949 STATIONS CONTEST

1st Prize: W. Hinam, Sheffield 8. 2nd Prize: C. E. Wrayford, Bovey Tracey. 3rd Prize: C. J. Burnley, Chester. Consolation Prizes: B. L. W. Polley, London S.E.24; A. Conway, Loughborough.

MARCH 1949 DOUBLETS COMPETITION

1st Prize: J. G. Hayman-Joyce, Abingdon. 2nd Prize: R. A. Hands, Nottingham. 3rd Prize: G. Cope, Upminster. Consolation Prizes: R. G. W. Napier, Edinburgh 9; P. D. Cottrell, Isleworth; J. H. Brodie, Glasgow, N.W.

MARCH 1949 RAILWAY QUIZ

1st Prize: C. E. Wrayford, Bovey Tracey. 2nd Prize: A. J. Wood, Birmingham 32. 3rd Prize: F. Mills, Kearsley. Consolation Prizes: B. J. Holden, Burgess Hill; B. E. Timmins, Birmingham 24.

MARCH 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: P. W. Lang, Sevenoaks; Section B: R. Whitehead, Ulverston. 2nd Prize, Section A: J. S. Stone, Barton-on-Sea; Section B: R. J. Welch, London S.E.21. 3rd Prize, Section A: W. Forsch, Stoke-on-Trent; Section B: B. B. Foskett, London S.W.15. Consolation Prizes: H. J. Edwards, Tunbridge Wells; C. H. Thomas, Aldershot; J. P. Nicholson, Lincoln; D. C. Thorby, Spalding; C. F. Stott, Brentwood; S. L. Connors, New Malden; D. E. Dore, Greenford; R. A. Surch, Birmingham 22c; P. Anthony, Worcester; D. R. Davies, Harrow; B. Gett, Glossop; K. Rapley, Ilford.

OVERSEAS

SEPTEMBER 1948 ERRORS CONTEST

1st Prize: L. G. Poole, Melbourne, Australia. 2nd Prize: A. R. Tinckam, Sydney, Australia. 3rd Prize: J. A. Gomes, Bombay, India. Consolation Prizes: H. Harder, London, Canada; G. M. Reoch, Gadzema, S. Rhodesia.

OCTOBER 1948 CROSSWORD PUZZLE

1st Prize: W. W. Jenson, Wellington, N.Z. 2nd Prize: A. C. Hughes, Johannesburg, S. Africa. 3rd Prize: J. T. Pope, Lower Mitcham, S. Australia. Consolation Prizes: G. P. Fennell, Dublin, Eire; T. Searson, Salisbury, S. Rhodesia.

OCTOBER 1948 RAILWAY TERMS CONTEST

1st Prize: S. H. Walsh, Auckland, N.Z. 2nd Prize: B. Simmons, Colombo, Ceylon. 3rd Prize: K. Knowles, Durban, S. Africa. Consolation Prizes: L. G. Poole, Melbourne, Australia; J. A. Gomes, Bombay, India.

OCTOBER 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: A. R. Tinckam, Sydney, Australia; Section B: J. Nordwald, Pietermaritzburg, S. Africa. 2nd Prize, Section A: E. de Sincay, Lausanne, Switzerland; Section B: W. Clare, Bray, Eire. 3rd Prize, Section A: R. M. Cox, Tauranga, N.Z.; Section B: G. Burns, Warragul, Australia. Consolation Prize: R. D. Boyle, Hawke's Bay, N.Z.

NOVEMBER 1948 STORY CONTEST

1st Prize: C. Burman, Vicksburg, U.S.A. 2nd Prize: T. S. Leander, Valetta, Malta, G.C. 3rd Prize: M. J. Ring, Mount Eden, N.Z. Consolation Prizes: R. Saunders, Durban, S. Africa; K. Kempster, Eire.

SOLUTIONS

AUGUST 1948 OLYMPIC QUIZ

1. J. E. Lovelock, New Zealand. 2. U.S.A. 3. 10.3 secs. 4. Berlin, 1936. 5. Finland. 6. 26 miles, 385 yards. 7. K. Son, Japan. 8. R. M. N. Tisdall, 400 metres hurdles. 9. 800 metres, T. Hampson and 50,000 metres walk, H. H. Whitlock. 10. 100 metres, 400 metres, 1,500 metres, 110 metres hurdles, high jump, long jump, pole vault, discus, javelin, weight.

AUGUST 1948 NAME SQUARES CONTEST

Astra Pharos Ltd., B.S.A., I.C.S., and Hercules.

SEPTEMBER 1948 SHIPS CONTEST

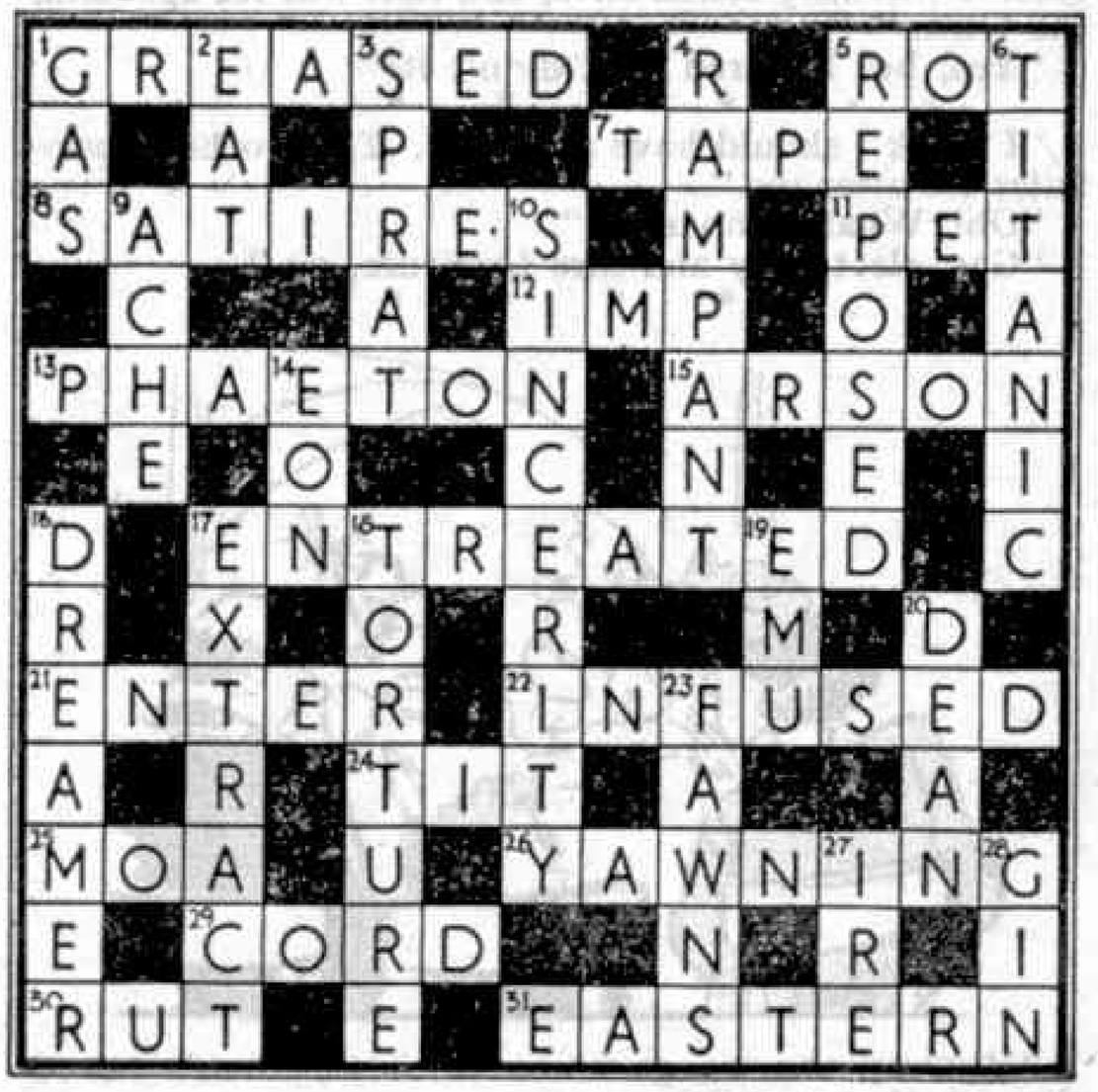
1. Queen Elizabeth. 2. Vandyke. 3. Derbyshire. 4. Nieuw Amsterdam. 5. Asturias. 6. Andes. 7. Highland Chieftain. 8. Franconia. 9. Beaverdell. 10. Rangitata. 11. Worcestershire. 12. Clan Cameron.

OCTOBER 1948 RAILWAY TERMS CONTEST

1. Signal arm. 2. Clamp and screw device for bending rails. 3. Damaged wagon. 4. Space between the tracks of a double line. 5. Ground disc signal. 6. Locomotive or vehicle off the rails. 7. Train going into a yard or sidings. 8. One or more wagons uncoupled from a train for shunting purposes. 9. Signalman. 10. Smoke deflectors; or, sometimes, backlight vane of signals. 11. To draw up the fire of a locomotive with the steam blower; whistle for signals; creating a vacuum in the brake system. 12. Permanent way. 13. Set of coaches permanently coupled together. 14. A long poker with an arrow-shaped head, used for breaking up clinker. 15. Delivery pipe of a water tank; brake or feed pipe hose connection.

NOVEMBER 1948 LOCOMOTIVE SHADOWS CONTEST

1. Southern Region "T9" 4–4–0 (Ex-L.S.W.R.). 2. Western Region "Bulldog" 4–4–0 (Ex-G.W.R.). 3. L.M. Region "5XP" 4–6–0 (Ex-L.M.S.). 4. Southern Region "King Arthur" 4–6–0 (Ex-S.R.). 5. L.M. Region "3P" 2–6–2 Tank (Ex-L.M.S.). 6. Western Region "94XX" 0–6–0 Tank (Ex-G.W.R.). 7. L.M. Region "Clan Goods" 4–6–0 (Ex-H.R.). 8. N.E. Region "C7" 4–4–2 (Ex-North Eastern Railway). 9. G.N.R. Stirling 4–2–2 8 ft. "Single."



October 1948 Crossword solution.

Fireside Fun

"Whatever made you think of working hard eight hours a day?"
"I didn't. The boss thought of it."

* * * *



"Say driver, can you take a joke?"
"Sure! Where do you want to go?"

* * * *

"You've finished your letter, I see. What are you looking so worried about?"
"Well, I had it on the tip of my tongue, but it's gone."
"Just think hard for a minute and it will come back."
"Not this time. I mean the 2½d. stamp."

* * * *

"Yes, the greens were in a terrible state, and the fifth tee was just a sloppy mess."
"You should go to a better place for lunch and, anyway, why have so many cups of tea if it wasn't fit to drink."

* * * *

"Just look at that typist! Fast asleep again!" exclaimed the insurance office manager. "I'll sack her."
"No, don't do that, sir. Just put a printed notice on her, telling people they can sleep safely like this if they insure with us."

* * * *

"No, corporal punishment is wrong. Look at my case. I was only caned once, and that was for speaking the truth."
"Yes, but it cured you, didn't it?"

* * * *

"I think I should have a rise, sir. Three other companies are after me."
"Oh! What companies?"
"Gas, electricity and hire furniture, sir."

* * * *



"Mummy can we go home when the man's sawed through that wood?"

BRAIN TEASERS

TRY THIS BY YOURSELF

The square of 25 letters shown below has a very mixed appearance. The letters have been very carefully arranged, however, so that by starting in a certain square and moving in turn to any square adjoining it, up, down or diagonally, a well-known proverb can be spelled out. What is the proverb?

Y	N	E	B	H
A	C	H	T	R
M	O	T	T	O
O	O	O	P	L
K	S	S	I	O

S.W.C.

* * * *

A WEIGHTY PROBLEM

A customer buying potatoes was surprised to find that the greengrocer had only four weights. When she mentioned this the greengrocer said that he could weigh any number of pounds of potatoes up to 40 lb. What were the four weights?

* * * *

SAFETY MEASURE

A crazy genius set out to encircle the Earth at the Equator with an iron band, presumably to hold it together. When he had finished he found that the band stood up a foot above the surface. How much would he have to cut out of it to make it fit snugly? As he was a genius, although crazy, he had of course first removed all mountains!

* * * *



"You ought to get heavy damages after a crash like that."
"Damages! It's repairs I want."

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The three names disguised in our first puzzle last month were Atlee, Churchill and Truman. The code employed is the obvious one in which each letter is represented by the number showing its order in the alphabet.

The number of sweets left when Tom, Dick and Harry went to sleep was 25.

It is noise that comes and goes with a motor lorry, is always with it but is no use to it.

The figure required in our fourth puzzle is 18. When the two digits are added together and the result squared the number 81 is obtained.

* * * *

THIS MONTH'S HOWLER

Crematorium is Latin for a dairy.

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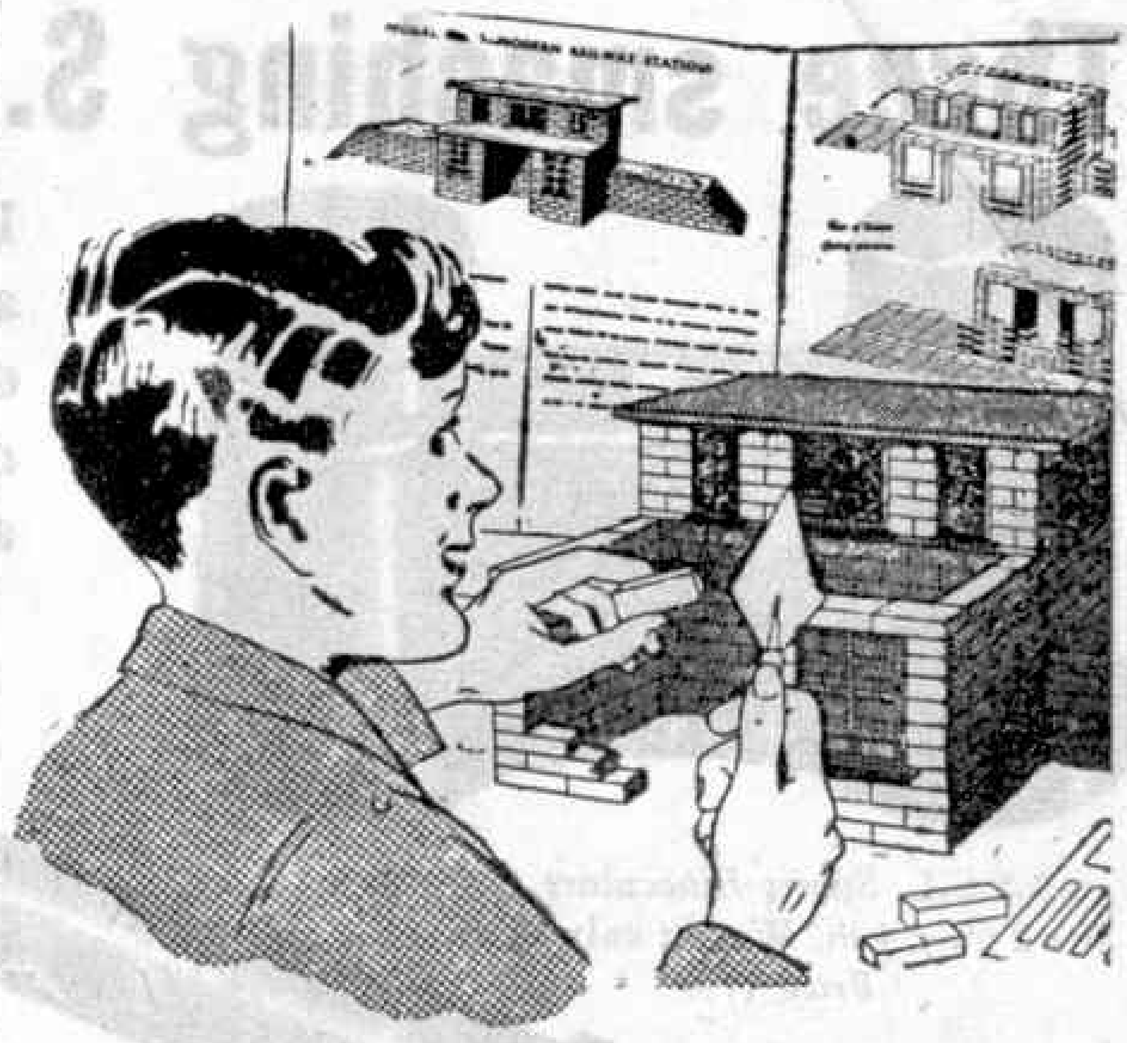
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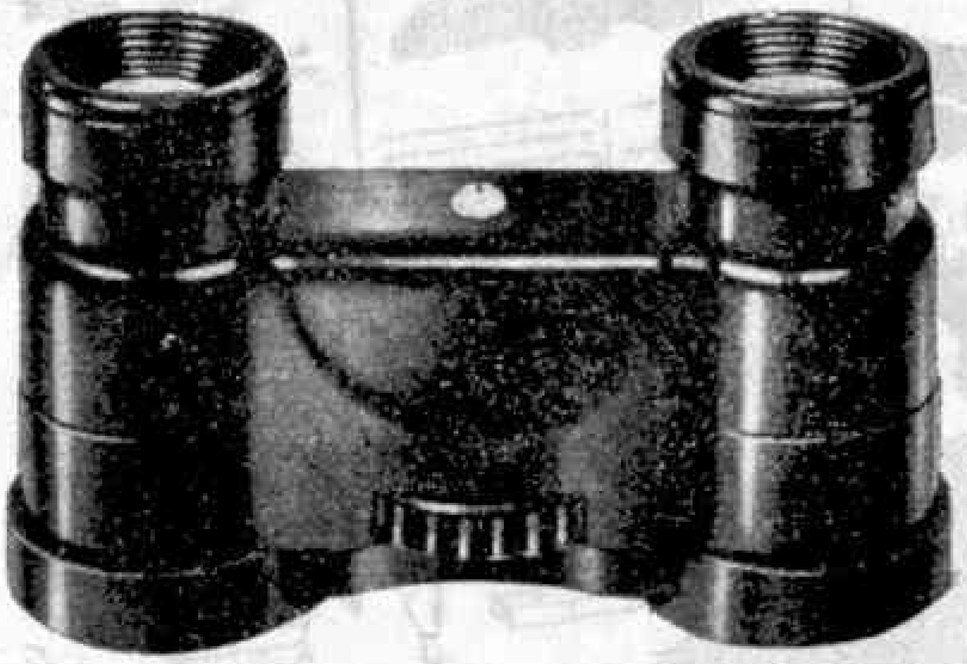
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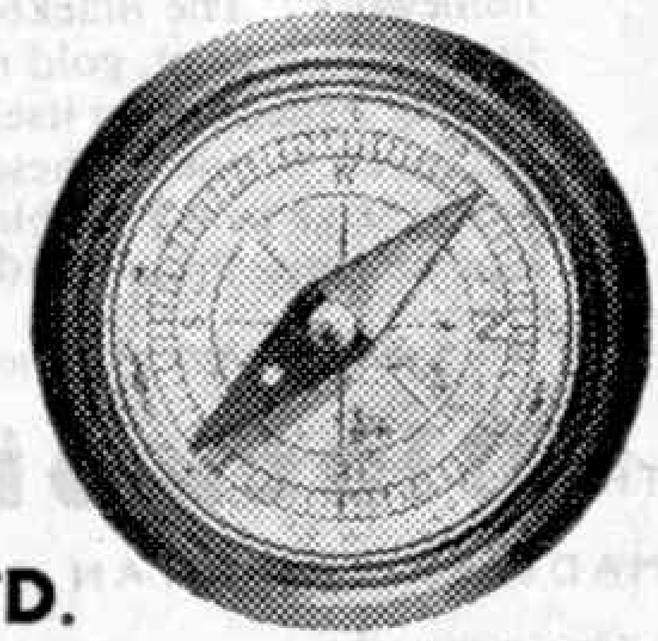
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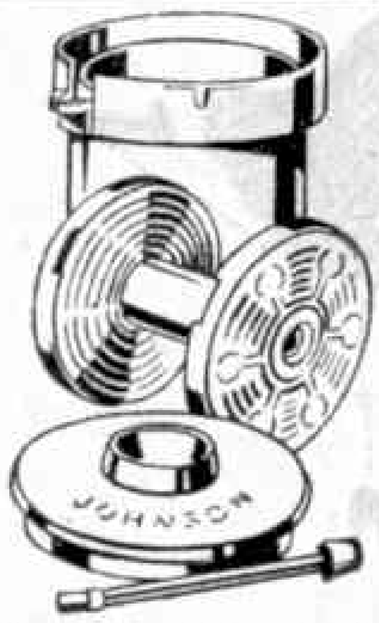
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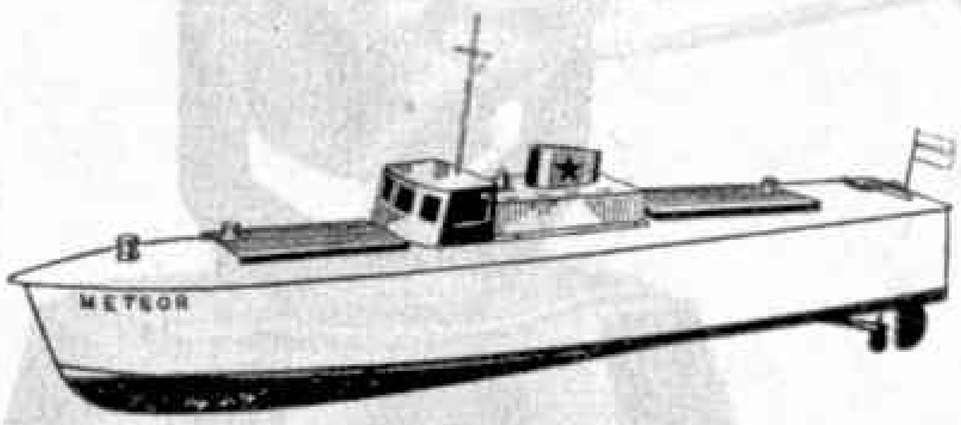


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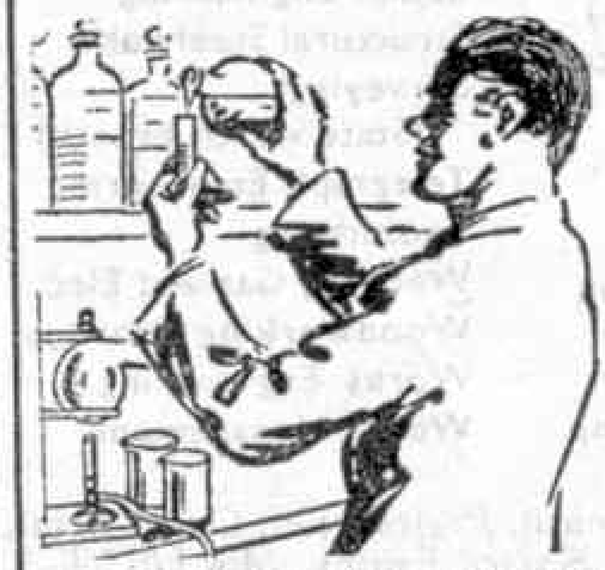
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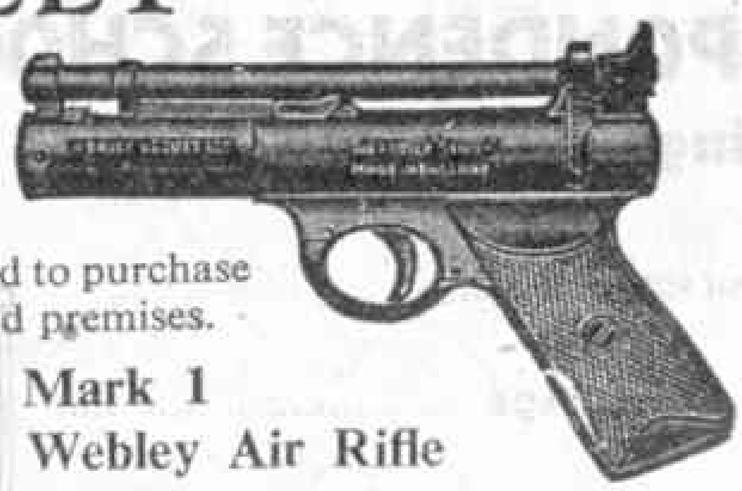
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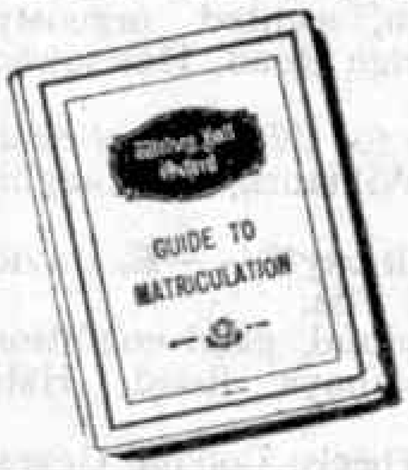
(See also pages 278 and 280)

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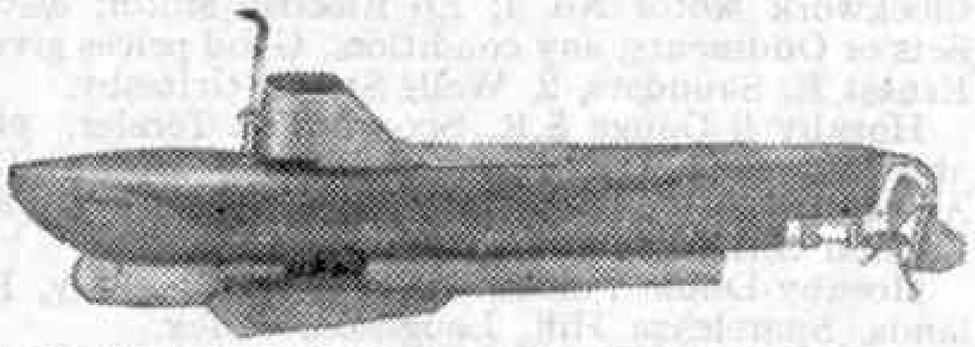
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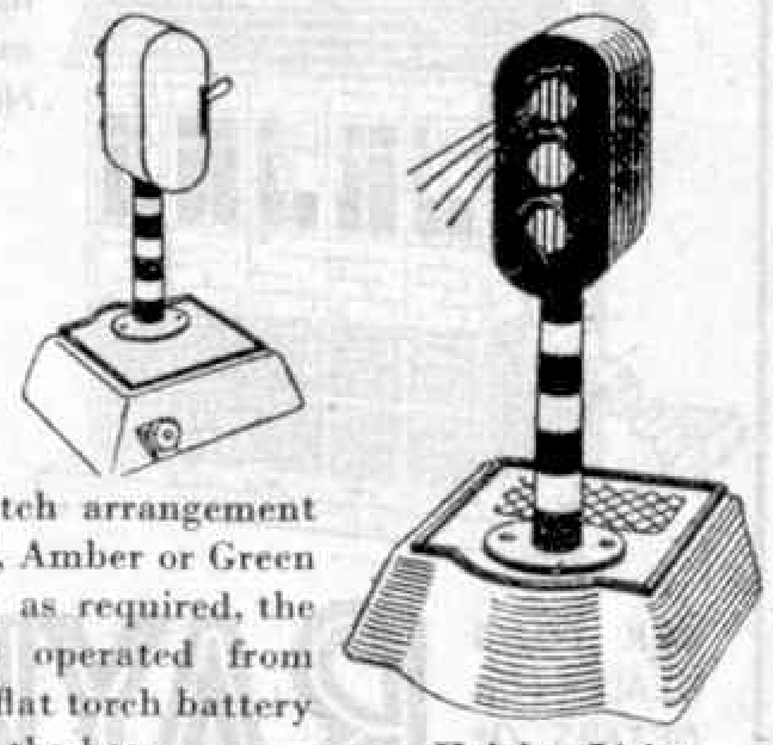
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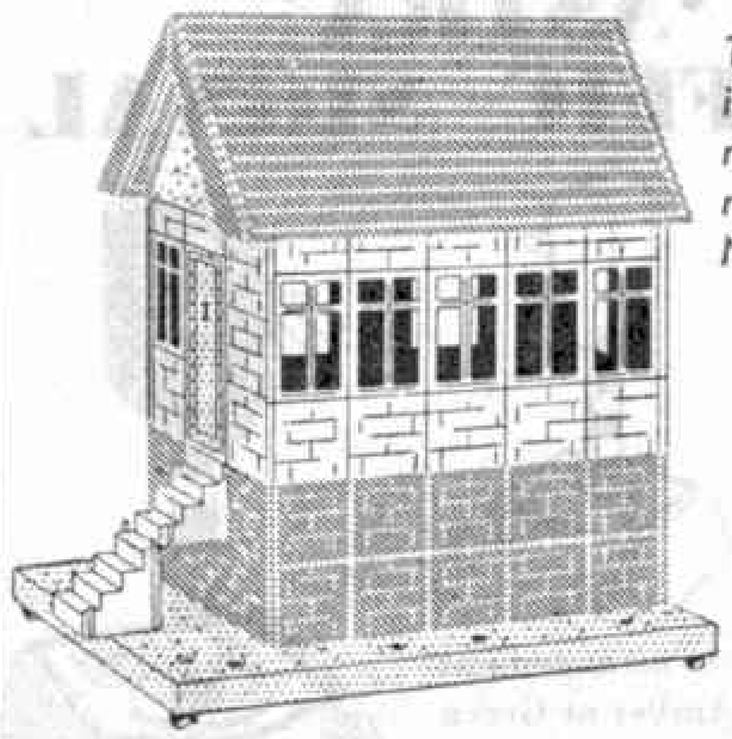
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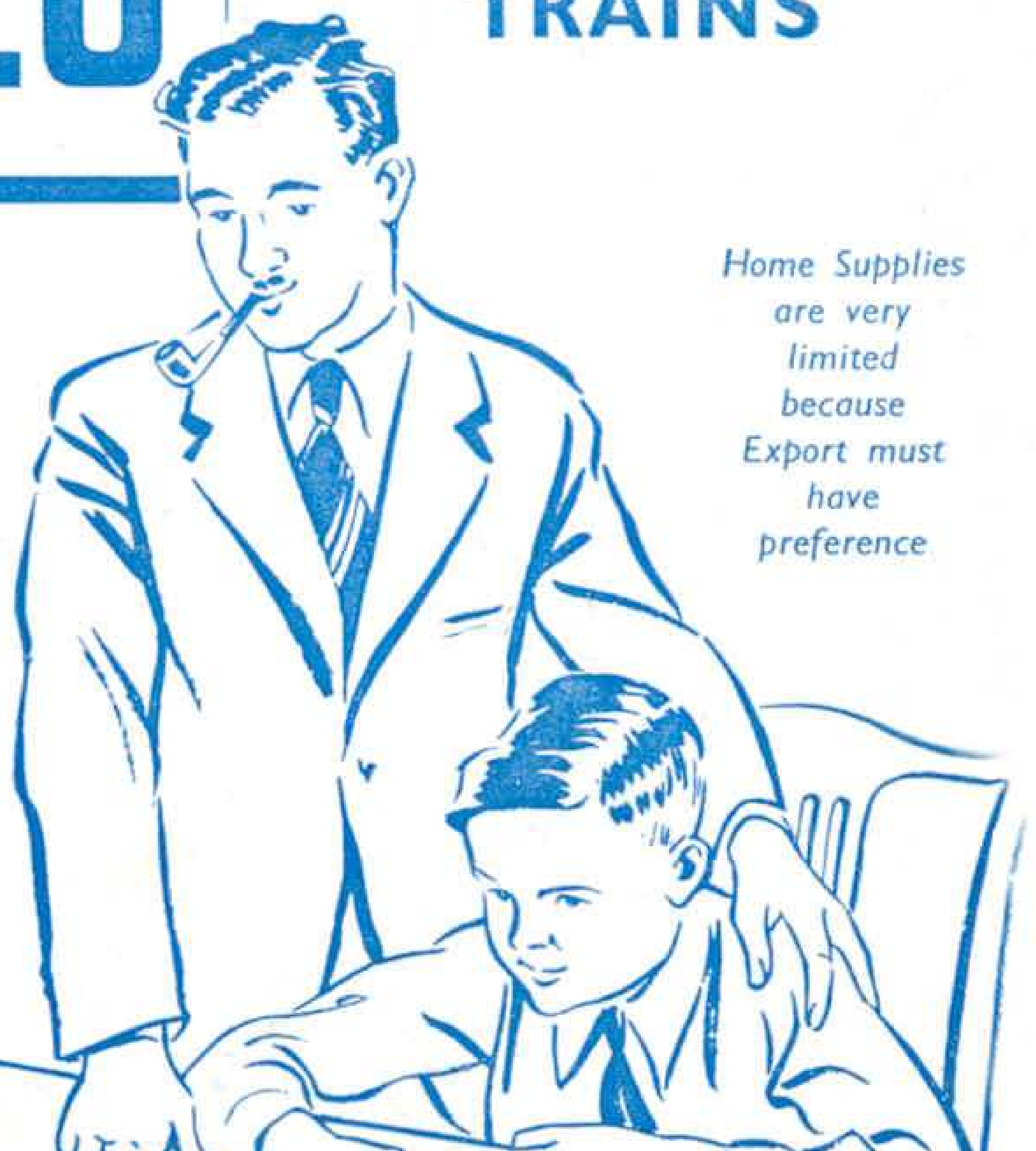
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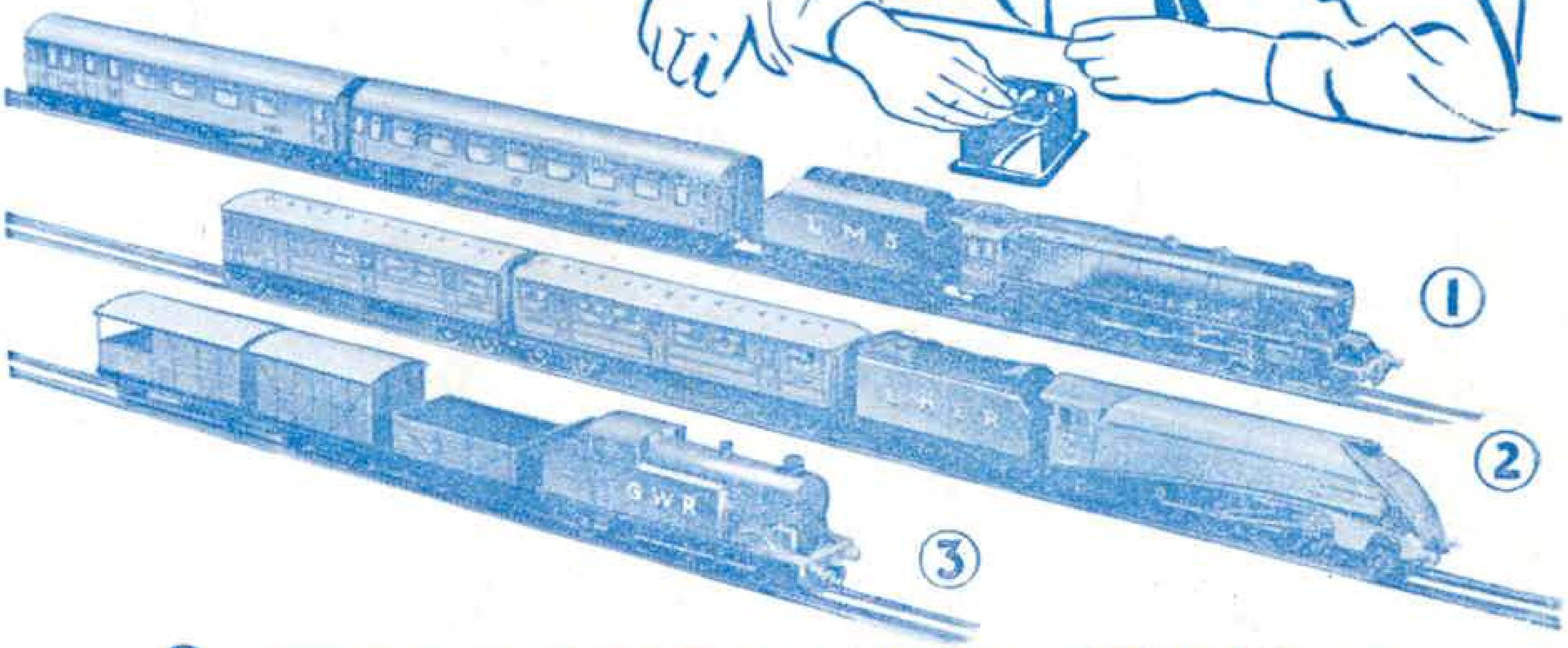


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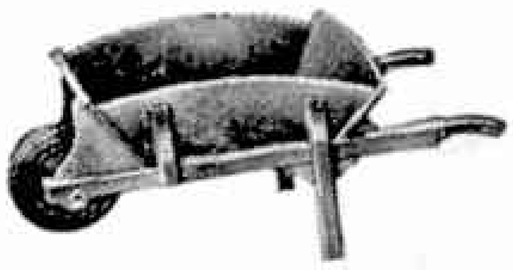
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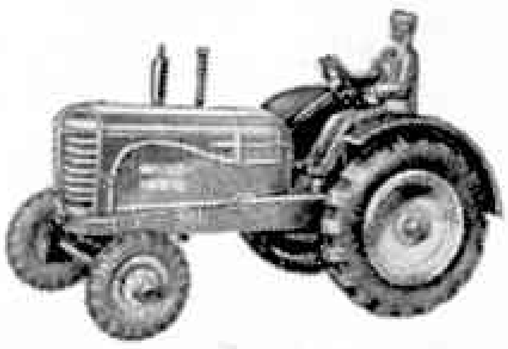
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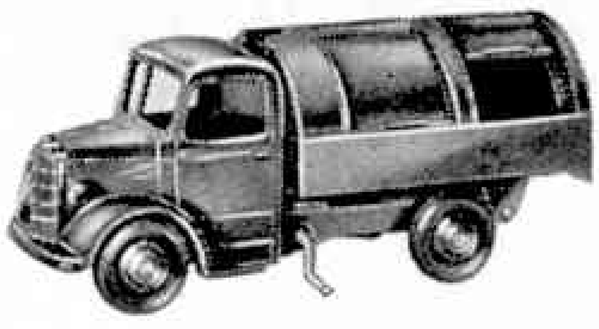
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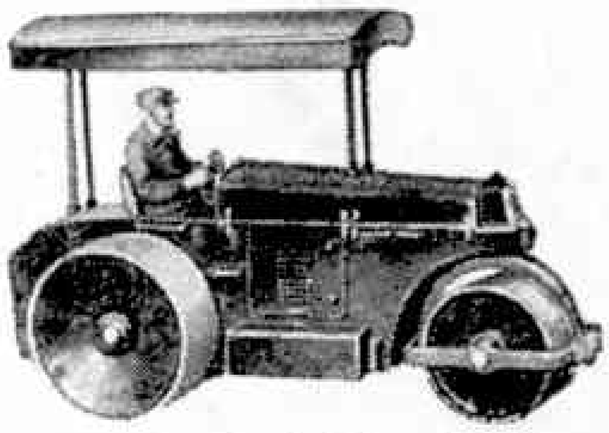
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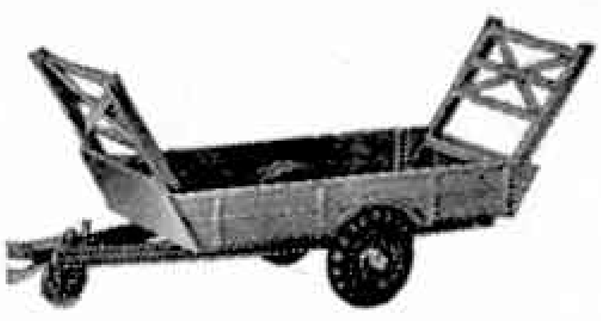
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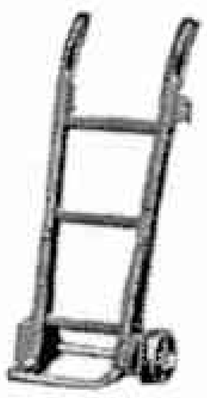
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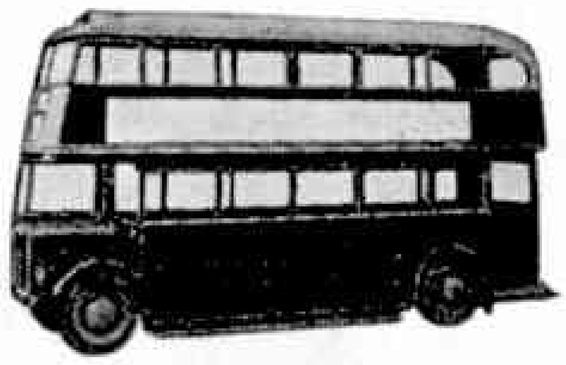
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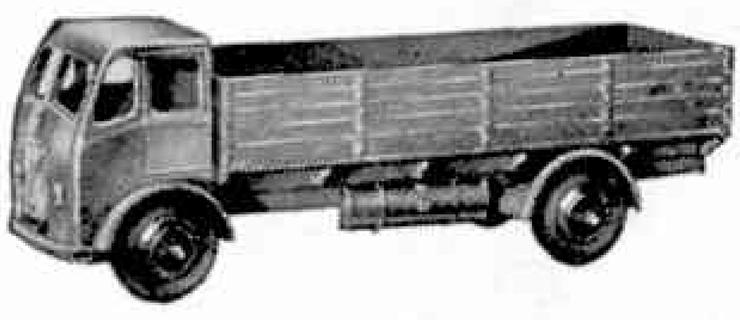
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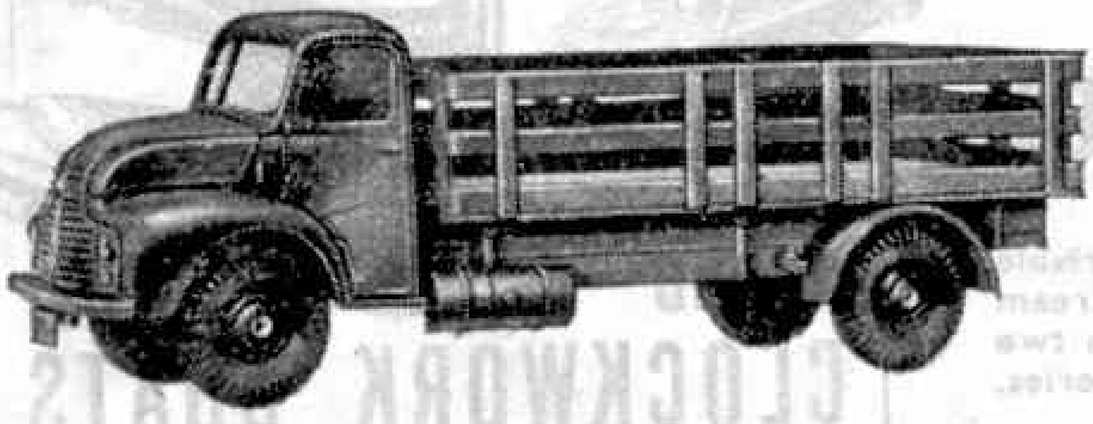
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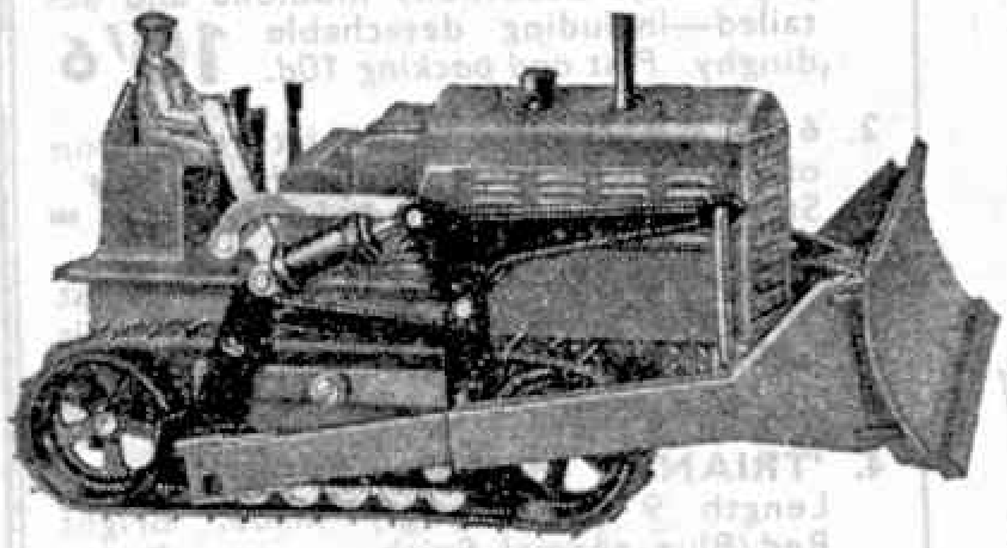
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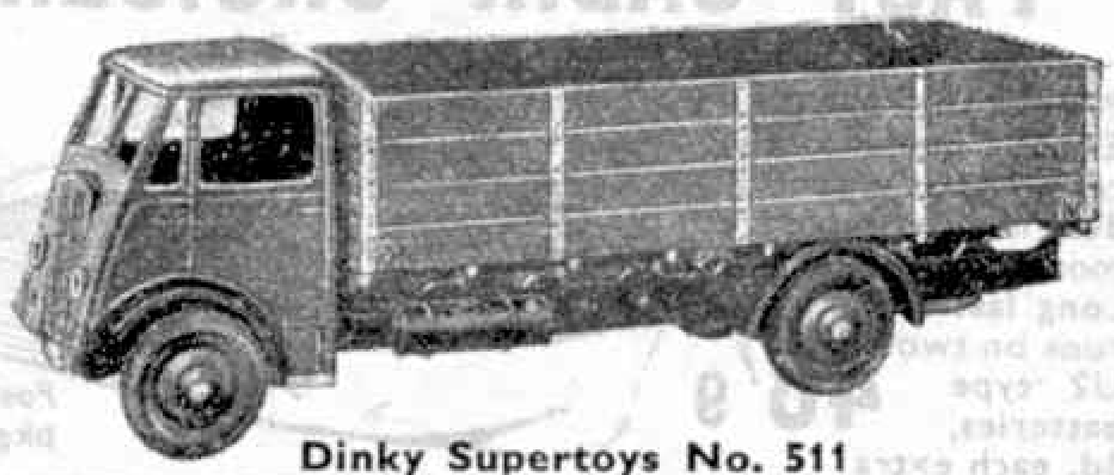
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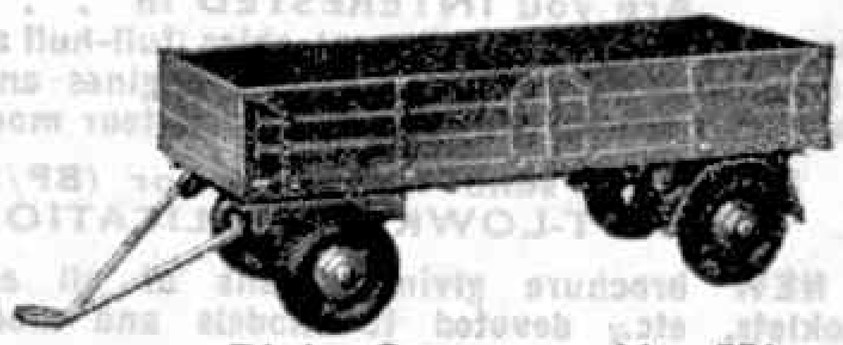
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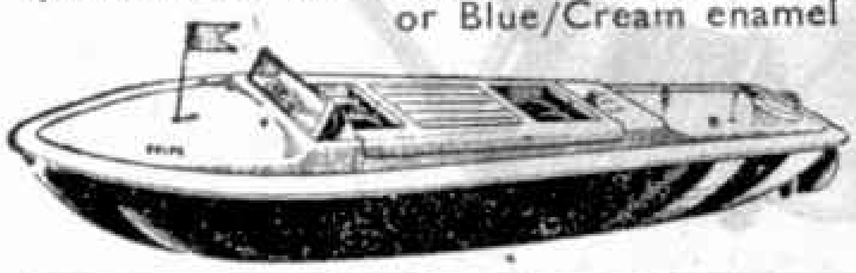
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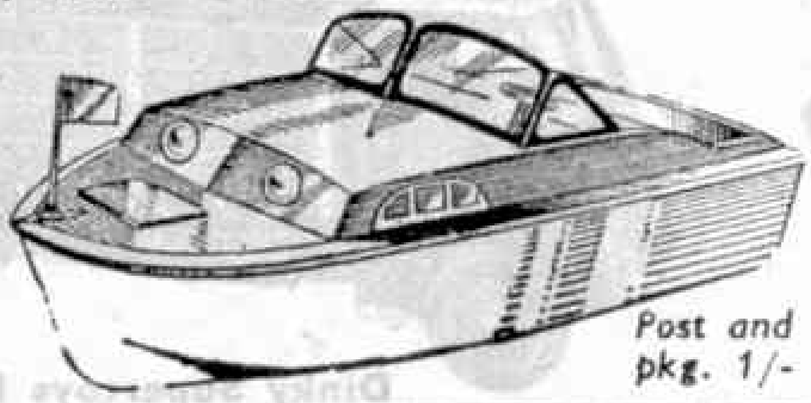
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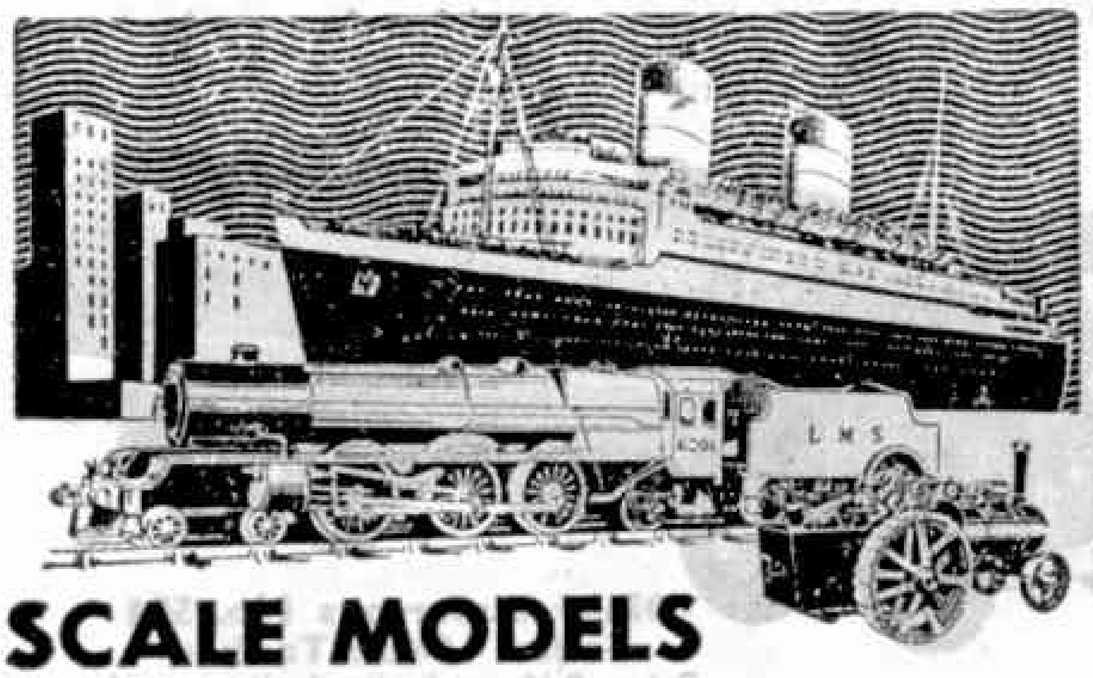
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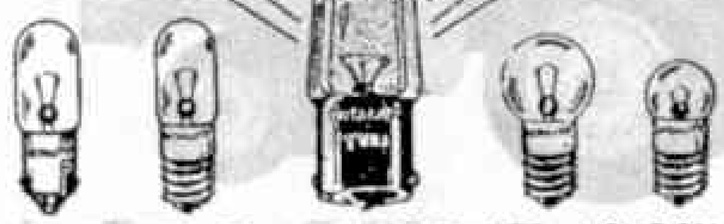
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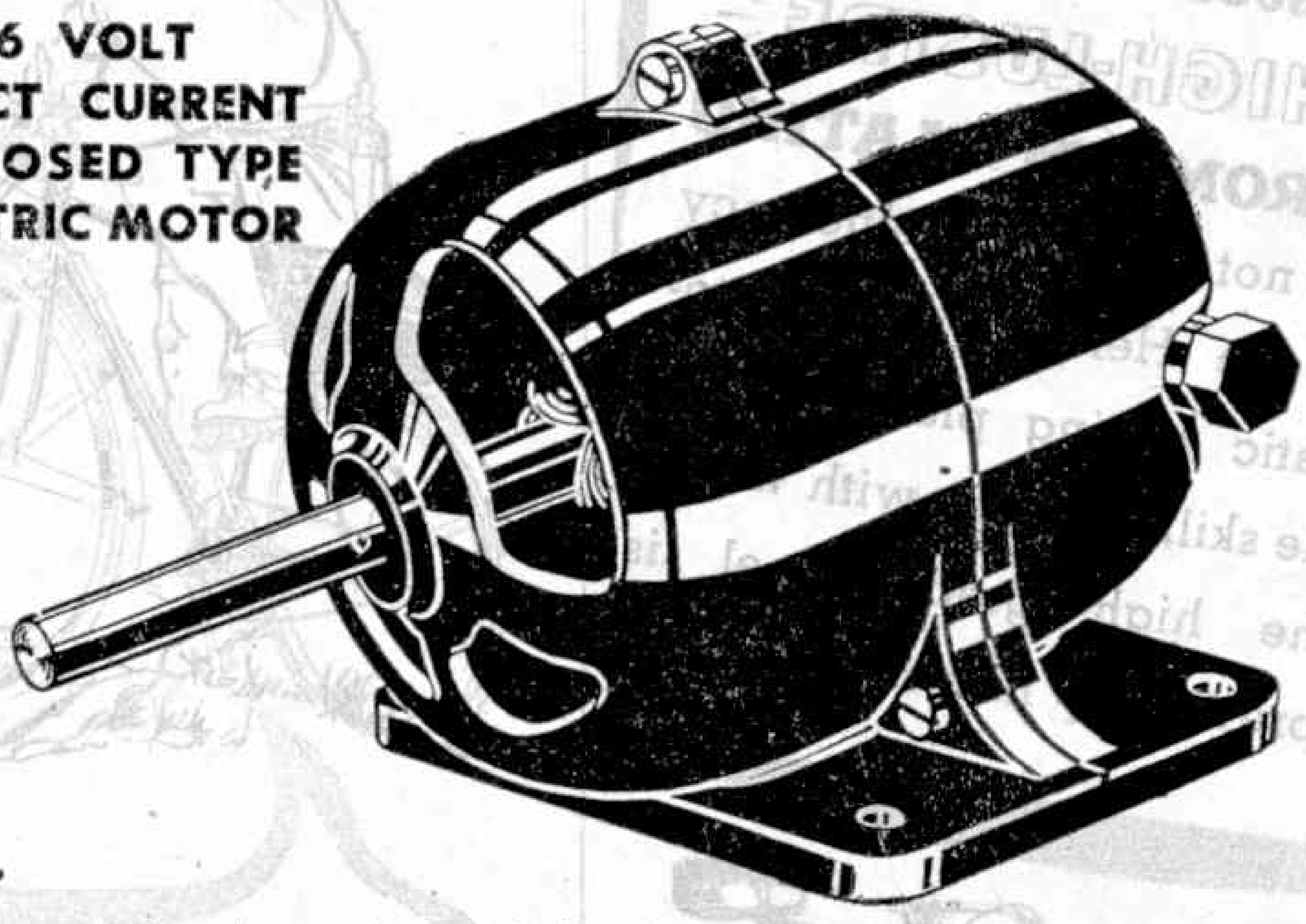
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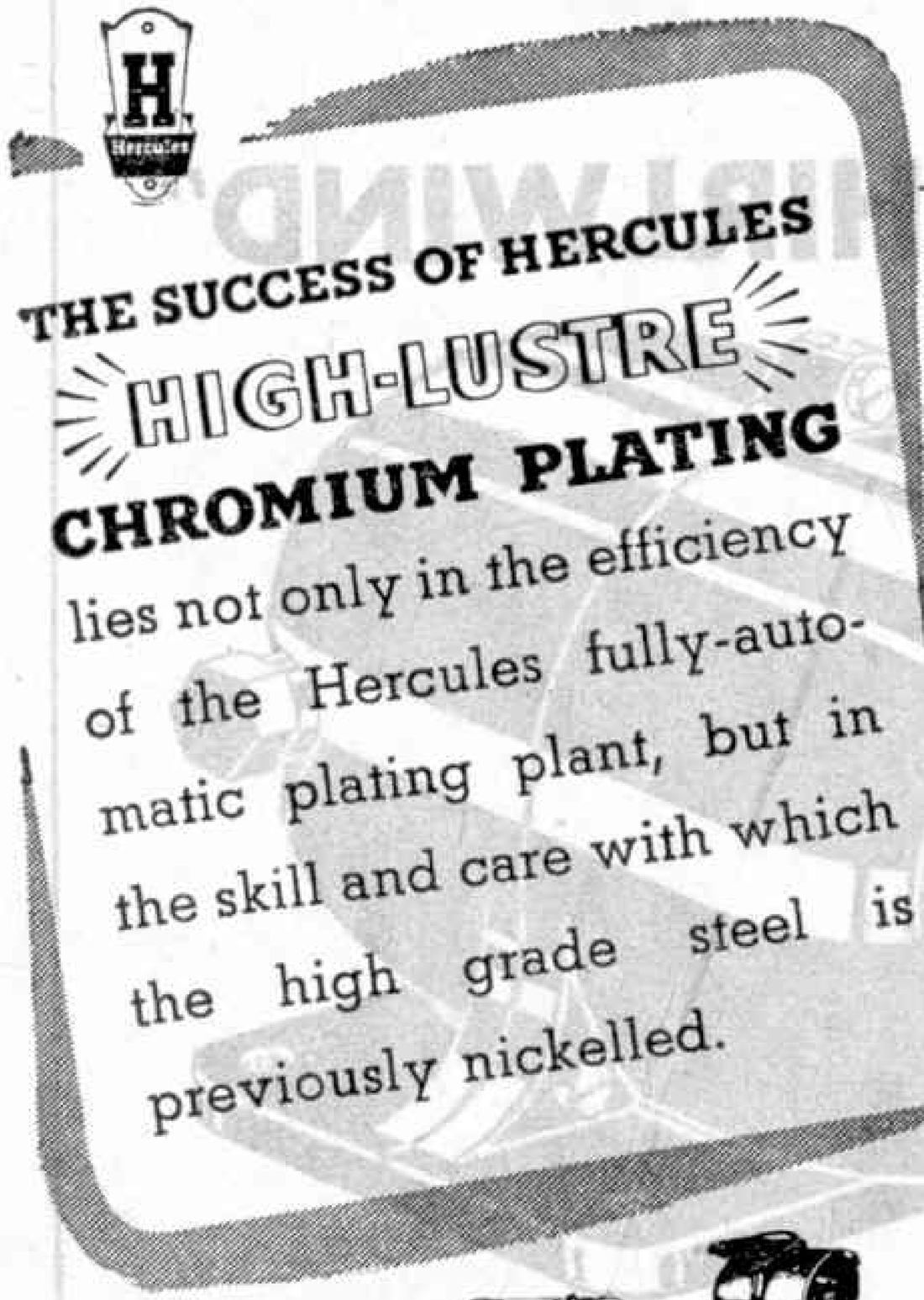
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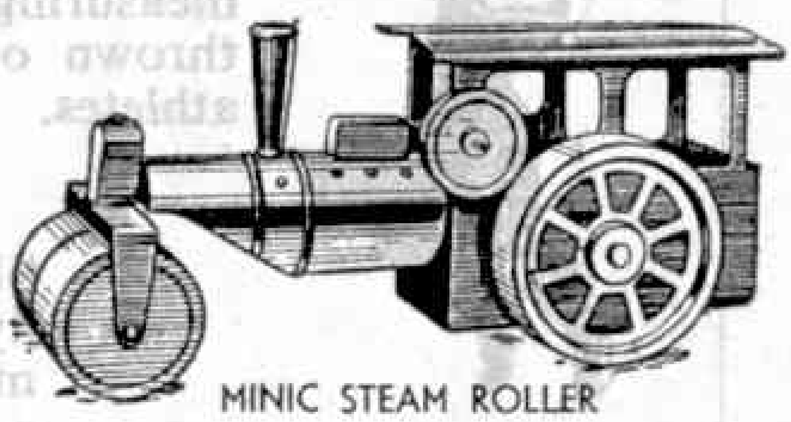
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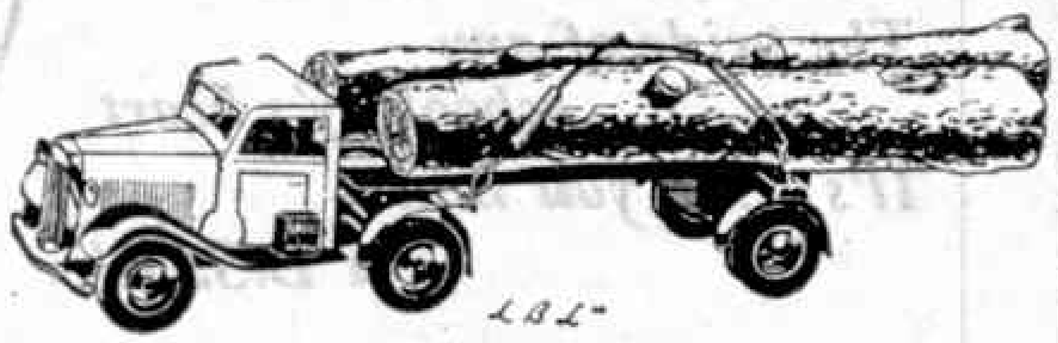
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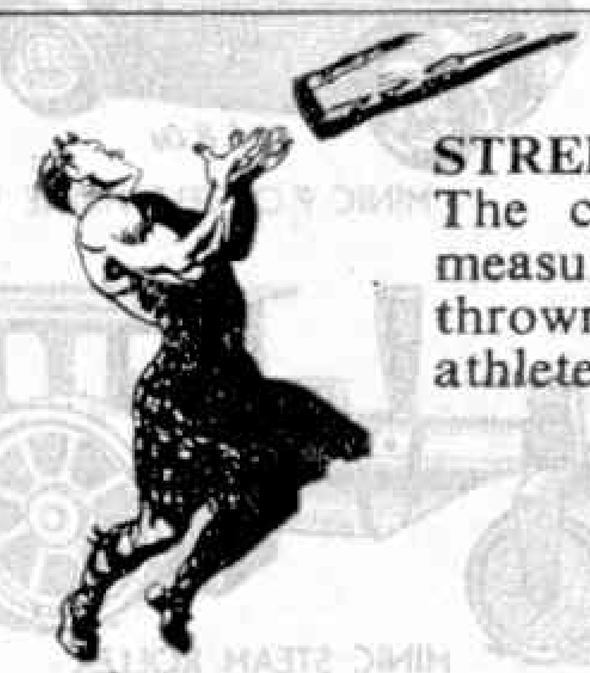
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Next Month: "THE STORY OF THE LIGHTSHIP." By Frank C. Bowen

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With the Editor

Electric Locomotive Types

The splendid article on page 304 of this issue will be read with interest by all "*M.M.*" readers who are keen on electric locomotives and trains. Although the electric train lacks the external appeal of the steam train, it has a special interest of its own, whether it is of the familiar multiple-unit or motor-coach type, or is hauled by a separate locomotive.

The electric locomotive, although commonly used overseas, is not yet typical of the British railway scene, but there have been various examples at work for many years in this country. The double-bogie engines of the London Transport Metropolitan line occur to mind; and at last one of the modern Southern Region Electric locomotives has begun regular main line passenger working.

Some readers of the article may be puzzled by reference to electric locomotives of the 1–Co+Co–1 and the 2–Do–2 types. These unfamiliar descriptions are based on a special system that has been devised for electric locomotives, which cannot be correctly dealt with in the same simple way as steam locomotives. An electric locomotive may have a separate driving motor for each axle, or alternatively certain axles only may be driven, the others being simply carrying axles.

In the special electric system letters describing the total of driving axles replace the figures of the system usually used for steam types. Thus "A" stands for a single driving axle, "B" means two driving axles coupled together, "C" means three axles coupled, and "D" four. If each axle has its own motor, and the wheels therefore are not coupled, an "o" is used after the letter. Any carrying axles in front or in rear of the driving axles are referred to by number.

In this country all electric locomotives have separately driven axles. Thus the big Southern Electric locomotives, which have two six-wheeled bogies with all axles driven separately, are referred to as "Co+Co." A double-bogie eight-wheeled engine like the Metropolitans already referred to, having each axle of each bogie directly driven, is described as "Bo+Bo." In many foreign countries, however, there are electric locomotives of both the separately-driven axle and the coupled axle types, with or without front and rear carrying axles. A typical Swiss electric locomotive with eight coupled wheels, leading four-wheeled bogie and a trailing two-wheeled truck, would be described as a "2–D–1."

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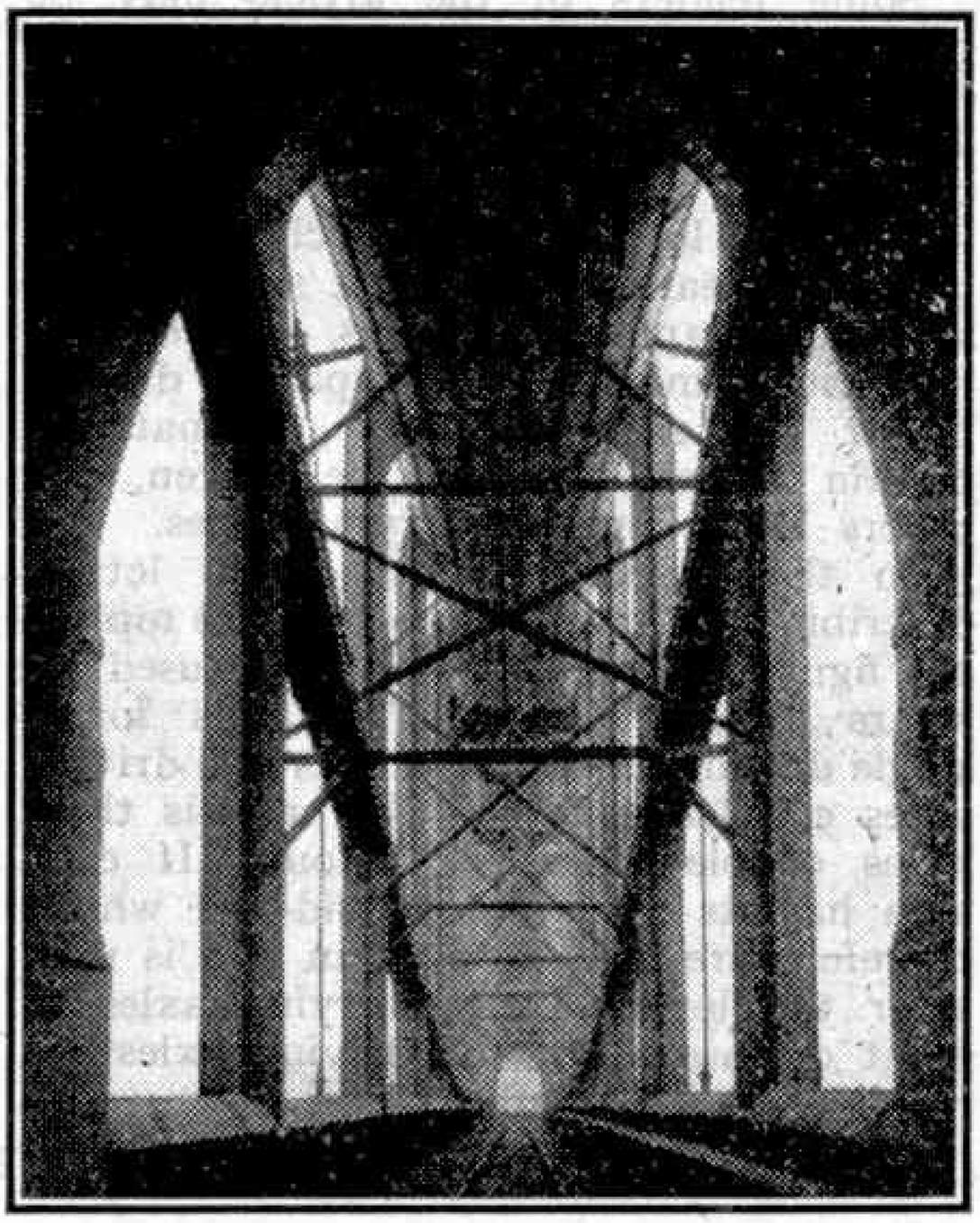
Royal Albert Bridge, Saltash

Brunel's Masterpiece

ROYAL Albert Bridge, spanning the Tamar to link Devon with Cornwall, and brought into use 90 years ago this year, is usually acclaimed as the masterpiece of Isambard Kingdom Brunel, the first Engineer of the Great Western Railway. Brunel conceived projects boldly on a grand scale and he had a flair for the unusual and artistic in design. This does not mean that his works were brilliant rather than lasting; Royal Albert Bridge is ample evidence of this. The "Kings" alone excepted, it can still be used by the most modern engines that Swindon has produced, while the weights of the rolling stock using the structure have considerably increased. It remains the only single-line stretch of railway on the route from Paddington to Penzance.

Royal Albert Bridge is a notable example of practical utility and engineering skill combined with imaginative treatment in design. The bridge not only does its job to-day, as it has for the past 90 years, but it looks well in its beautiful setting. Its seemingly delicate lines suit the scenery flanking each bank of the broad Tamar. It was Brunel's last great work and it carries the following inscription in bold letters cut into the portals: "*I. K. Brunel, Engineer, 1859.*"

The necessity for bridging the Tamar arose in the course of the extension of what became the railway empire of Paddington into the far west. After several schemes had to be rejected, Brunel finally decided to employ two main spans each of 455 ft. with a central pier and the necessary approach spans. The 70 ft. of Tamar

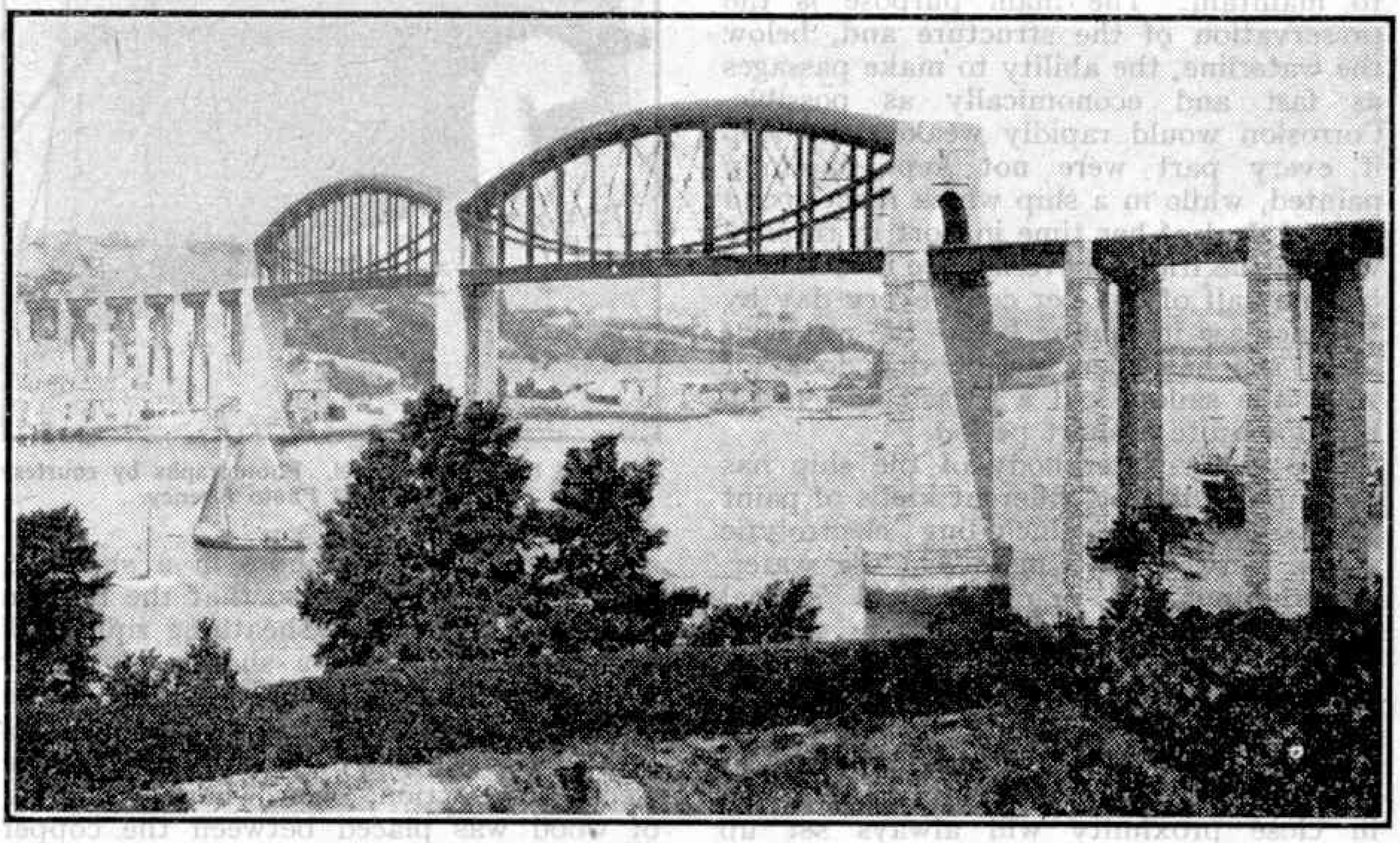


View through one of the portals of Royal Albert Bridge, showing the connections between the upper tubular "bow" and the girders supporting the track.

water over a thick bed of mud constituted a challenge to Brunel, who explored the bed of the estuary by means of a large wrought-iron cylinder in order to provide a foundation for the central pier. Armed with the knowledge thus gained, he completed his plans, and work was begun in 1853 on the most important and the most difficult task of building this pier. For the purpose Brunel used another cylinder that was, in effect, a cofferdam and diving bell together, arranged so that after the central pier had been built inside it, the cylinder could be divided and removed.

pontoons were then filled with water, and as they settled, the ends of the spans rested on the piers. Brunel himself personally directed the placing of the western span, which was dealt with first. Then came the lifting of the span in stages by means of hydraulic jacks, while the piers were built up until the final position some 100 ft. above high water was attained.

Unfortunately, on account of ill-health, Brunel was not able to be present when the second span was placed; and in fact when in May 1859 the bridge was opened by the Prince Consort from whom it gets



An attractive structure in pleasant surroundings. Royal Alberi Bridge crosses the Tamar between Devon and Cornwall. Photographs by courtesy of British Railways (Western Region).

It is the two main spans or trusses, however, that really capture the imagination. Oval "bowed" iron tubes with their ends connected by suspension chains of link plates form the top members of each span. The bow and chains are joined by vertical members diagonally braced as shown in the lower illustration on page 290. The horizontal girders carrying the road bed are slung from these vertical members. Each span is 455 ft. long and 56 ft. high at the centre, and weighs over 1,000 tons.

The installation of these spans was a big job. Both spans were built on the Devon shore and by means of pontoons were floated out into position so that their ends came over the pier bases. The

its name, he was abroad undergoing treatment. He lived to see his last great work completed, however, and on his return he was taken slowly across the bridge for the first and last time.

In 1905 some new cross girders were put in, and the first two land spans at the Cornish end were reconstructed so that the up and down tracks at Saltash station could be extended. Then in 1928 the remaining 15 approach spans were renewed, a special "erection wagon" being developed for the job. This could not only deal with the side girders, but could also support the flooring of each span in turn while the actual change of girders was being made. The whole operation was a notable example of careful planning.

The Painting of Merchant Ships

By Frank C. Bowen

THE painting of merchant ships makes a very considerable item in the shipowner's expenses; appearance is a very secondary purpose, although it is important to a passenger firm or any other company with a reputation for smartness to maintain. The main purpose is the preservation of the structure and, below the waterline, the ability to make passages as fast and economically as possible. Corrosion would rapidly weaken the ship if every part were not kept carefully painted, while in a ship which must spend a good deal of her time in port in tropical waters, the frictional resistance is increased by one half of one per cent. every day by the increase in fouling below the waterline after she has been out of dry dock for what the sailors call a "wash and brush up" for quite a short period.

The under-water body of the ship has to be protected by different kinds of paint against corrosion, including electrolytic action between two metals in sea water, and fouling by vegetable and animal growths. Anti-corrosive paint is always applied first, different in nature from that put on the topsides, and covered by an anti-fouling composition to check the growth of weeds and marine creatures of various kinds. Copper and iron or steel in close proximity will always set up electrolytic action which deteriorates the ferrous metal very quickly. It is not necessary for them to be touching; steel ships with bronze propellers must have the hull round them painted with a special composition to supply a watertight skin which will insulate the hull and rudder. That composition is frequently black, and accounts for the patch on the stern of many ships whose boot-topping, the section of the hull just above the water, is red or green.

The anti-fouling composition is perhaps the most interesting of all the paints which are applied to ships. In the old days of wooden hulls the teredo and other boring worms eating into the hull were the ship's greatest enemies, so that those making long voyages were given a sheathing of soft wood to give the worms a meal without endangering the structure of the ship. When the sheathing was riddled the ship would be put ashore in a sheltered anchorage, hove down so that the bottom was exposed, and the sheathing ripped off and replaced. Later a sheath of copper was substituted with much more satisfactory results, although it was expensive; but when ships had iron hulls the electrolytic action, even when a padding of wood was placed between the copper and the iron, caused it to be abandoned in all but exceptional cases, and anti-fouling compositions took its place.



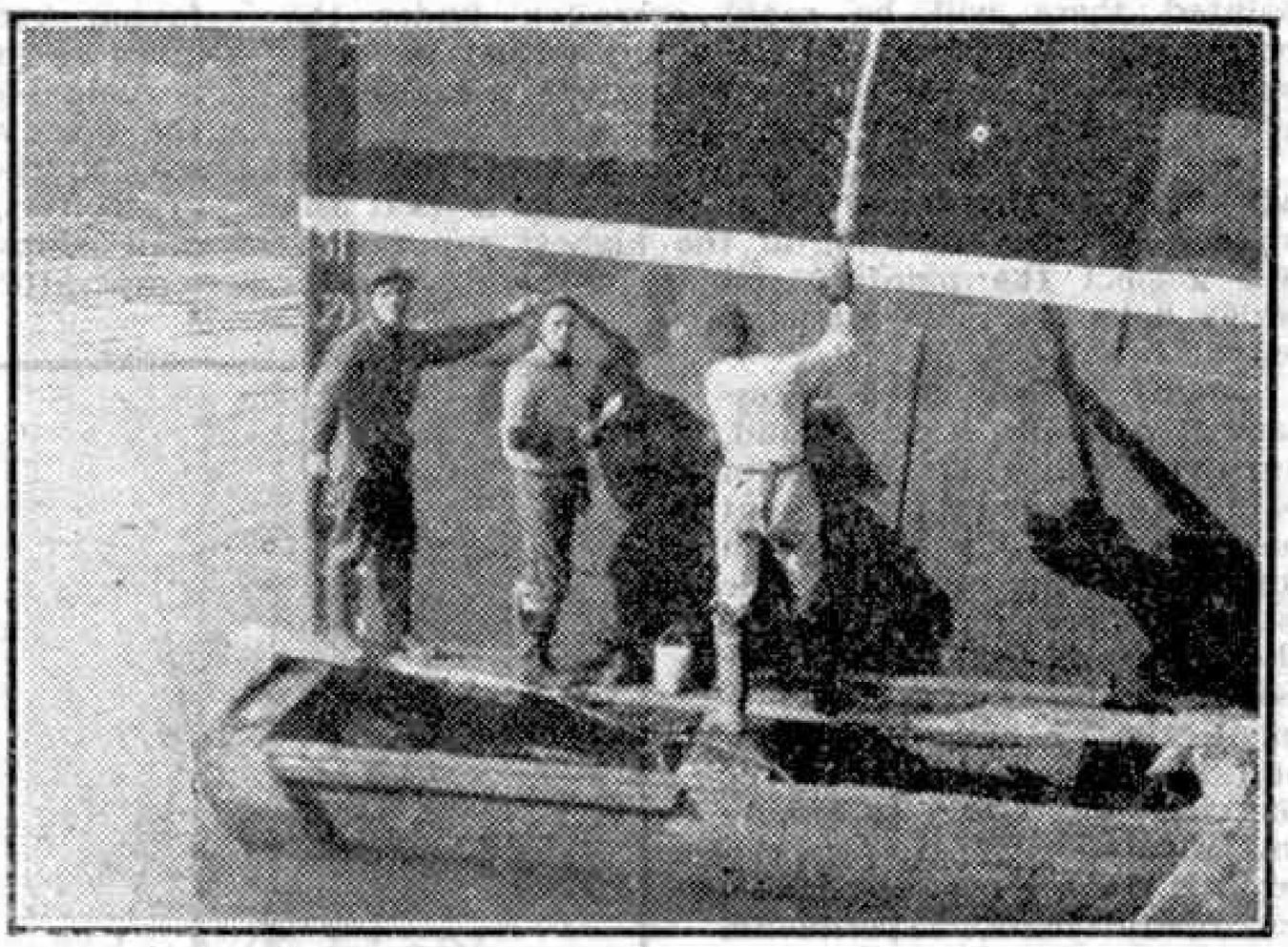
Painting the ship's funnel. Photographs by courtesy of the Nautical Photo Agency.

Anti-fouling composition has to deal with a very wide range of both vegetable and animal growth. Practically all the former is on the waterline or a few feet below it, for it cannot thrive without light and air and is therefore much more troublesome in clear water than in muddy. The sailor calls it all grass, but it includes an enormous variety of seaweeds. They begin with microscopic spores which rapidly develop into a slimy layer and then into long grasses or weeds. They can make a very big difference to the ship's progress through the water, but they are not as troublesome as the animal growths because, being flexible, they lay back along the ship's side as she moves. The animal growths are much more troublesome

because they project straight out from the ship's side. They also exist in enormous variety. Barnacles are the best known, but there are also tube worms, sea squirts, polyzoa, hydroids and, only really troublesome in laid-up ships, mussels and oysters. All these creatures are exceptionally tenacious.

The essence of all anti-fouling compositions is poison, generally mercury, which is twice as effective as copper against weed and three times as effective against barnacles, but is very expensive. They are mixed with a special quick-drying paint and applied when the ship is in dry dock, although they lose a good deal of their power if she is not immediately put afloat. The paints gradually wear away, so that a continuous supply of poison is available on the surface to be protected. Care is naturally taken to make the wastage as slow as possible, but all compositions have a limited life and have to be frequently renewed, 12 months being the outside limit for the strongest to function effectively. After that the fouling gets the upper hand, and the ship's speed goes down while the fuel bills go up. Some of the most effective poisons corrode steel rapidly, so that the layer of anti-corrosive paint under the anti-fouling must never be neglected.

So much fuel was wasted during the war through ships getting foul that all countries carried out some interesting experiments. Colour has a big influence; white below the waterline seems to repel both animal and vegetable growth, the trouble getting worse as the colour gets darker. Barnacles and other sea creatures cannot live in fresh water; even the brackish water in the River Plate kills them in millions, while for many years past ships have locked into the fresh water Union Canal behind Seattle to get rid of animal fouling. The shells remain after the creature is dead, but they soon become brittle and can be scrubbed off quite easily.



The white cutting-in line between the boot-topping and the paint on the ship's hull is one of the "tiddley jobs" that the sailor loves.

The boot-topping—it was called "boot-hose topping" in the seventeenth century—is the space between the load line and the ship's waterline when she is absolutely light. That does not require anti-fouling composition, but it is particularly troubled with vegetable growth, while rust forms very rapidly on the waterline. It is painted with a special composition, usually red or green, which is not as expensive as the anti-fouling composition but costs more than the paint normally used on other parts of the hull. The colour adds considerably to the smart appearance of the ship, particularly if she has a white "cutting-in line" between the boot-topping and the topside paint, although that line is most difficult to paint and its effect is completely spoiled if it is at all wavy.

Although it is not necessary to contend with vegetable and animal growths above the waterline,



Time in port for the handling of cargo gives the opportunity for the crew to repaint the sides of the ship.

painting is just as important to preserve the fabric from corrosion. It starts when the ship is on the building slip and continues at very frequent intervals as long as she is afloat. Unless measures are periodically taken to remove the layers of old paint and get right down to the steel, there is not only a danger of rusting under the protection, but in an old ship the weight of the paint may become sufficient to impair her carrying capacity by a surprising number of tons.

During the manufacture of steel plates a layer of oxide, called mill-scale, forms on the surface, and unless this is carefully removed before the ship is painted there will be rapid corrosion under the protection. It is usually done by means of acid, and the whole of the ship is then given a coating of genuine red lead before being painted.

One of the main anxieties of the superintendent who watches the construction of a ship is that the builders, if they are not of the highest reputation, will neglect the painting, for it is the first coats which have the most influence on the life of a ship.

Quality is even more necessary at sea than it is on land, and while different kinds of paint are needed for different parts of the ship, and often for the service on which she is engaged, their principles are the same in that the four essentials are always the pigment, the binder, the thinner and the drier. Owing to the scarcity or cost of many ingredients which have been regarded as the best obtainable for many years, experiments were started during the war, and are continuing, to find substitutes, some of which promise to be more satisfactory than the original ones.

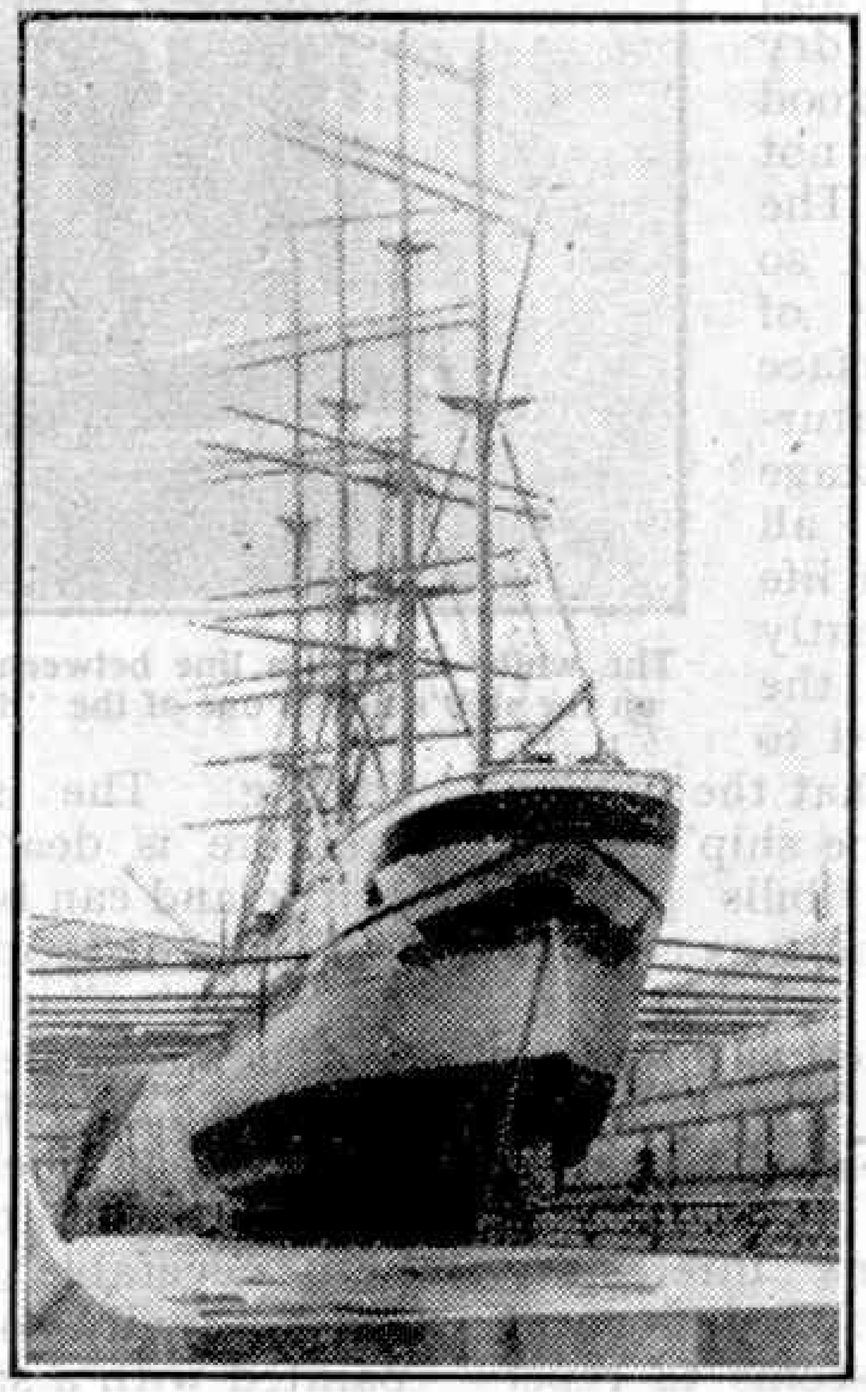
The pigment supplies the colouring, and can be mineral such as white lead, zinc oxides, barytes and many others, vegetable such as logwood and saffron, or aniline dyes extracted from coal tar. Titanium and antimony oxides are being tried instead of lead and zinc and are proving stable and able to keep their colour well.

The binder is used to bind the pigment down and prevent it working out. Vegetable oils have been the normal method for years, and boiled linseed oil is generally regarded as the best, although it must not be used for white paint or it will dry a cream colour. Dehydrated castor oil or tung oil are sometimes used instead of linseed, and in recent naval experiments linseed has been partly replaced by synthetic resin media of the alkyd type. The experiments with this are still in progress but it promises to make the paint last much longer.

The thinner is intended to make the painting easier; American turpentine or white spirit derived from petroleum are among the best known.

The driers have no protective qualities; acting on oil but not on the pigment they accelerate the hardening, although if they are too generously mixed in with the paint they shorten its life. Red lead or terebene, raw linseed oil, gum copal, monoxide of lead and other things are among the most popular. The drier has to be added to the paint just before it is to be used as it forms a skin very quickly. There are a number of patent driers on the market, some of which are admirable. Others have their disadvantages as, for instance, the type which was very popular in the Navy until the gas which it gave off while stored in the paint locker caused an explosion which destroyed H.M.S. *"DOTTEREL"* with heavy loss of life. Some contain acid which reduces the protective value of the paint.

The colours chosen for the hull are very much a matter of uniform; quite a number of companies have distinctive hulls either by the colour itself or the particular tint. Where the tint is important the paints are generally mixed on board, and the ships carry a small plate painted with the exact shade to act as a copy. The Union Castle Company's lavender grey is unique, but a large number of companies favour grey of different tints. For one thing it gives an impression of size without clumsiness, which is valuable for impressing passengers, but it has the disadvantage of a tendency to "chalk" under sea conditions, the pigments breaking out. A number of fruiters, liners on yachting cruises and certain mail ships have white hulls, generally for internal temperature or a yachty appearance. The disadvantages are that constant attention is necessary to keep it looking well; it tends to make the ship invisible in fog, which is embarrassing to other vessels meeting her, and it often goes badly with the company's funnel paint, particularly if that is red. Black hulls are still in the majority and black paint is the cheapest. It costs less than most coloured paint to begin with, and it can be thinned more than any other, permitting the same quantity to cover a much larger area.



Different kinds of paint are needed for the section of the hull which is always submerged, the section which is sometimes submerged, and the section which is always out of the water.

Paint is applied either by shore gangs between voyages or by the crew in ports of call or at sea. Although the seamen always prides himself on his skill with a paintbrush, the former is generally the more successful. Not only are the men more practised, but when the crew do the work there is seldom time for the cleaning and smoothing that is really necessary for the best results, and unless the surface is absolutely dry when the paint is applied the sun will soon draw out the moisture and cause it to blister. That causes a lot of the painting done at sea during the homeward voyage to have a very short life.

Spraying machines worked by compressed air are frequently used instead of brushes for large areas. This saves both time and paint, but it does not adhere as well as brushwork and is liable to have pinholes owing to the aeration of the paint. Patent brushes supplied with paint by compressed air are sometimes used.

The most difficult part of the modern hull to paint is the bow, owing to the flare or outward curve of the plating which makes it necessary to bowse the stages in to the ship's side with ropes. In the older types the plating under the counter was another very difficult part and some types of cruiser stern can be awkward.

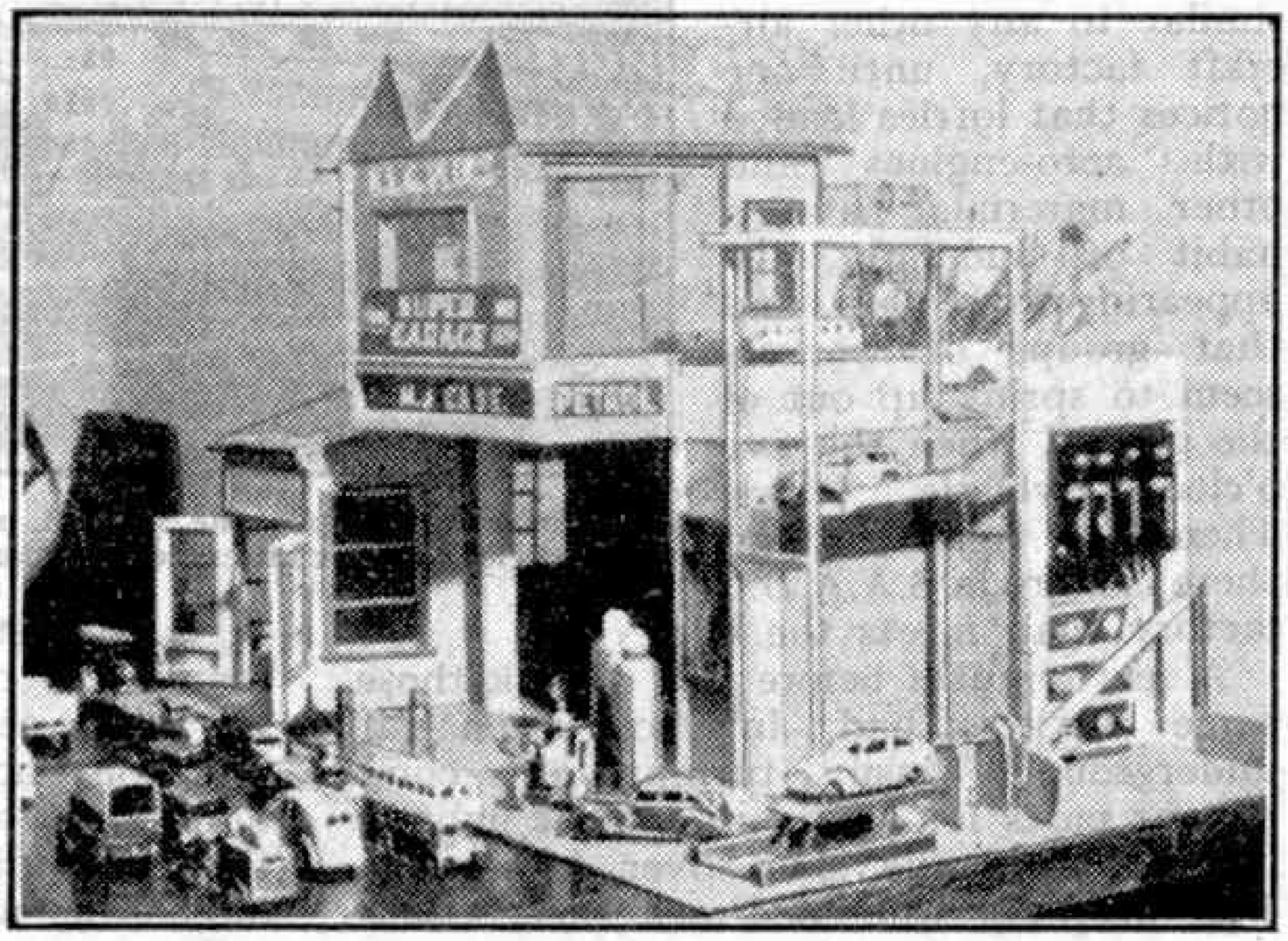
The superstructure, deckwork and houses of ships, particularly passenger vessels, demand special care as they are under observation at all times. In liners covering tropical routes the colour is carefully selected to reduce eyestrain, and various colours have been used as alternatives to white. A very pale green has proved successful, and various shades of light grey have also been tried. Enamel paint or a protective covering of (*Continued on page 324*)

Fun with Dinky Toys

Layout with a Well-Equipped Garage

A NOVEL scheme for play with Dinky Toys has been worked out by Michael Case, Mitcham, who had the bright idea of building a garage as the central feature of a Dinky Toys layout of roads, constructed in association with a Hornby Railway. It will be realized that the combination gives its designer a wealth of opportunity for interesting operations of a varied kind. He gets real fun from his Hornby Trains, runs cars and lorries on his road layout, much of this traffic carrying passengers and goods to the station of his railway, and in addition he has the pleasure of realistic working at his garage, which he has made as complete as possible in the limited space available.

The interesting garage section of Case's layout is shown in the illustration on this page. It stands on a three-ply board, 29 in. long and 18 in. wide, the edges of which have been planed down so that cars can run on and off easily. The building itself is constructed on a $\frac{1}{4}$ in. $\times$ $\frac{1}{4}$ in. wood framing, which has been covered with cardboard. The walls have on them brick paper to give the right appearance, and tile paper makes the roof look like the real thing.



This fine garage is part of the Dinky Toys layout of Michael Case, Mitcham.

The general effect is excellent, and many little details add greatly to the realism of the building. For instance, the windows are made of mica in wooden frames that stand out from the walls in which they are inserted, and are carefully lined out. All pillars are painted cream to represent stone work. The repair shop, on the upper floor, has doors that are suspended on runners and can be folded back in exactly the same way as those of many real garages.

Special attention has been given to lighting. The petrol pumps, which are home made of wood, have domes at the top, which contain small electric light bulbs. The nameboard over the entrance also is illuminated, and both the show room and the repair shop are fitted with electric lighting. The current required is obtained from bell batteries housed in a special section at the back of the model.

As will be seen from the illustration, there is a ramp on which cars can be raised for greasing and other necessary attentions, exactly as in real garages, and there is also an ingenious lift by means of which vehicles can be taken up to the repair shop. The lift is driven by a Meccano Electric Motor of the reversing type, with gearing to give the correct speed, so that excellent control is given both up and down. The lift itself is made of thin aluminium and thin brass strips of the type that can readily be purchased from stores. A special hand winch and brake is fitted for use with heavy loads.

The equipment of the garage also includes a Breakdown Lorry, while among the Dinky Toys to be seen on the layout when this is in operation is an Ambulance. A full service of Single Deck and Double Deck Buses also is run, and of course private cars and commercial vehicles are always moving along the roads, especially in the direction of the station. The lorries used are provided with loads consisting of pieces of wood. To add to the fun Case has introduced "speed cops," who keep a sharp eye on road users.

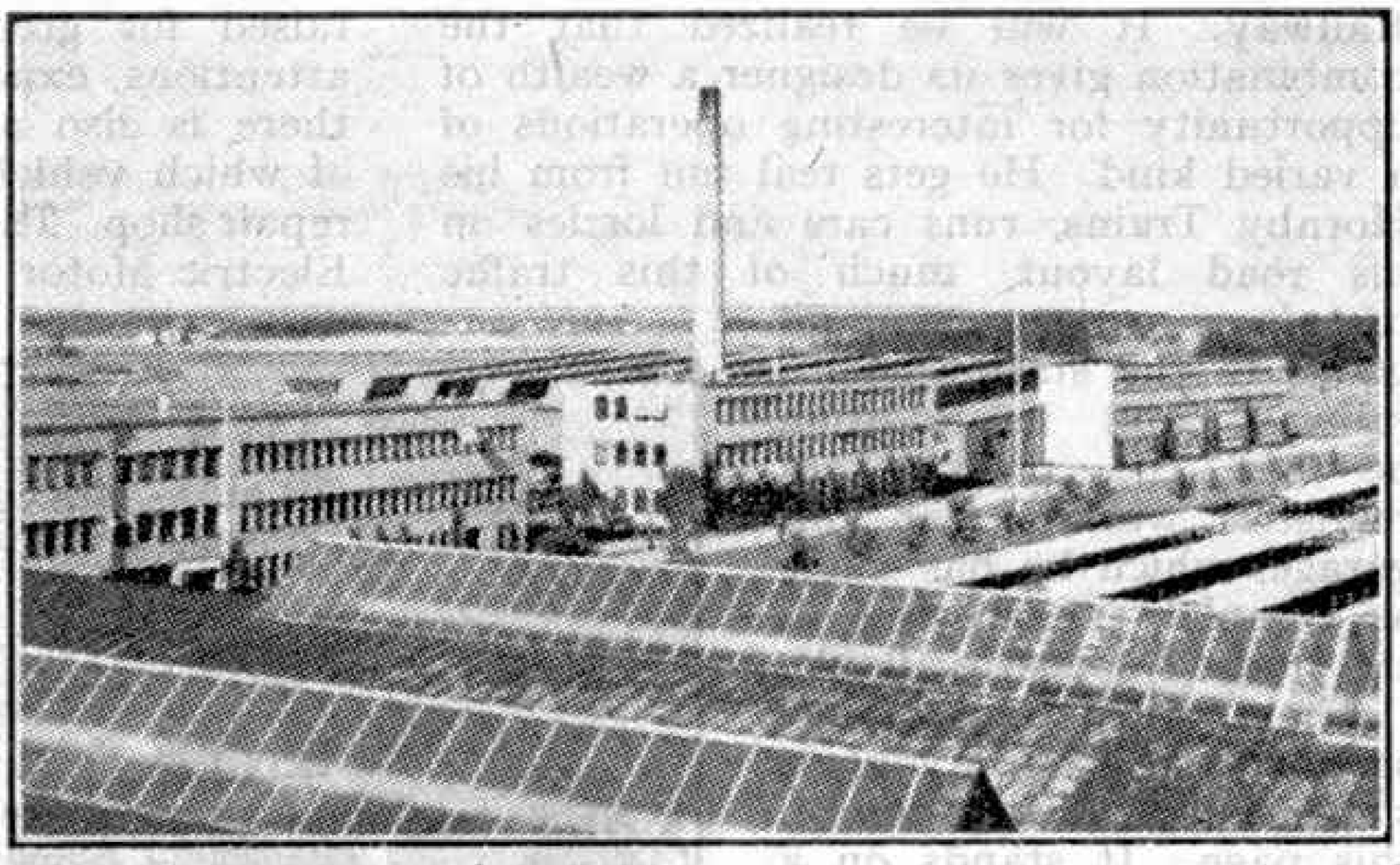
Building Aircraft Underground

By John W. R. Taylor

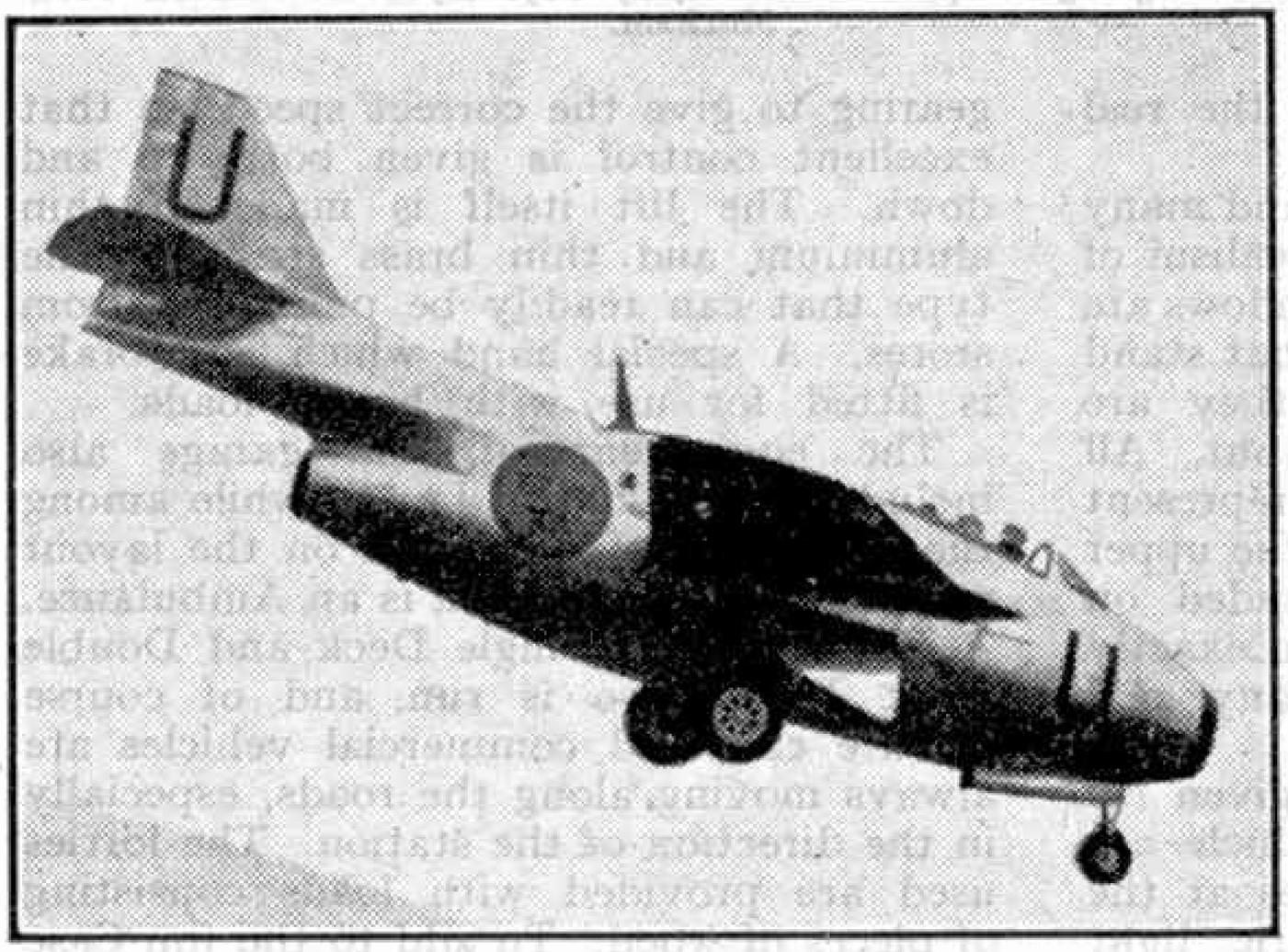
AT first sight, the S.A.A.B. Aeroplane Company's factory at Linkoping, in Sweden, looks just like any other modern aircraft factory. Clean white office buildings and rows of workshops lead out on to an airfield, above which perhaps a neat twin-engined air liner flies peacefully on a routine test flight, or a tiny barrel-shaped jet fighter zooms up in a spectacular rolling climb, to disappear into the clouds.

Yes, it is all very similar to any other aircraft factory, until one notices that lorries loaded with aero-engines and other materials have a habit of suddenly disappearing from view, and that groups of workers seem to spring up out of the ground when the five o'clock whistle blows. Then one realizes that there is more in S.A.A.B.'s factory than meets the eye.

A few minutes before five o'clock those same workers had, in fact, been far underground, busily turning out component parts for air liners and jet fighters like those in the skies over Linkoping. For deep in the bed-rock near their airfield, S.A.A.B. have carved out a self-contained factory with modern workshops quite as good as any above ground, and complete with dining and conference rooms, reception halls and all the other refinements of a normal factory. In fact it is almost impossible to believe that many feet of solid rock lie between the workshop ceilings and the outside world, until one notices that there are no windows anywhere and that the clocks on the wall indicate the state of the weather outside as well as the time.



The surface buildings of the S.A.A.B. plant at Linkoping. The illustrations to this article are by courtesy of Svenska Aeroplan A.B., Linkoping, Sweden.

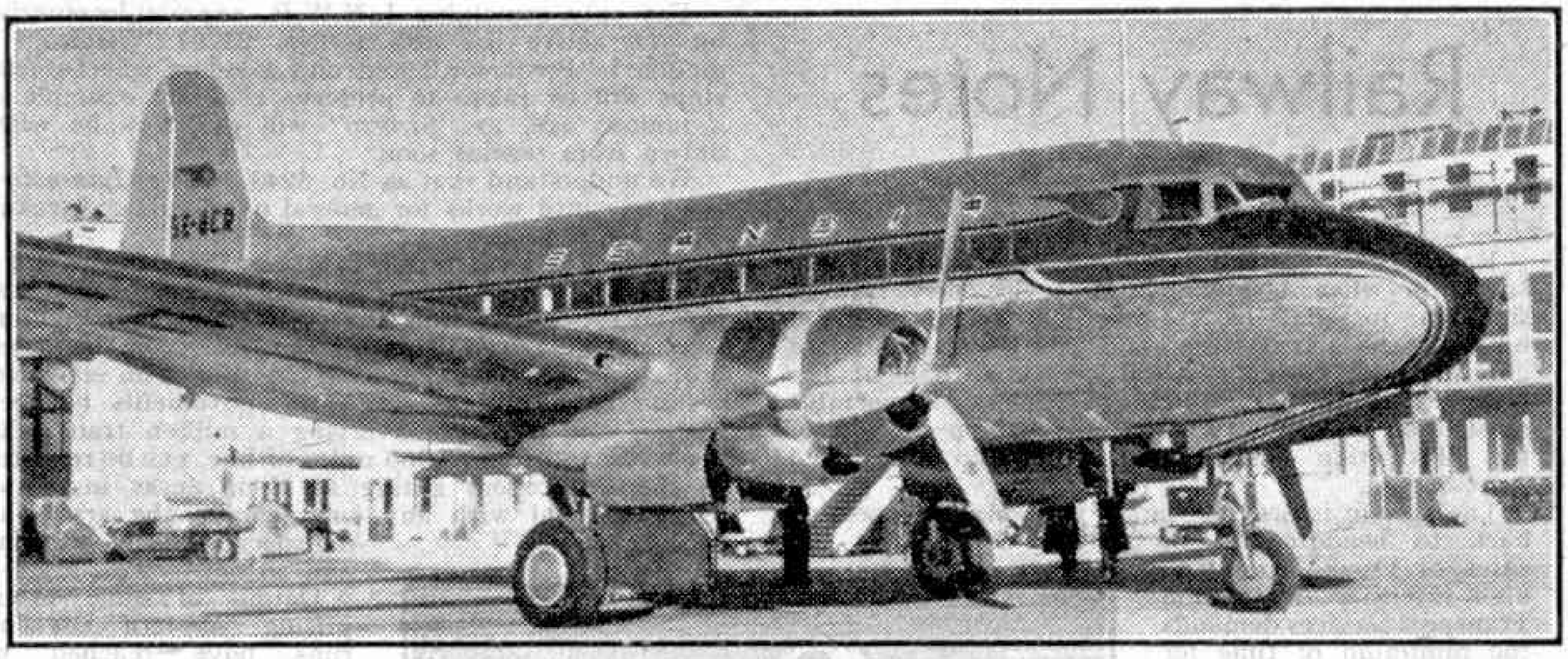


The SAAB-29, one of the world's fastest jet fighters. It is powered by a de Havilland "Ghost" engine.

This is by no means the first underground aircraft factory, but it is almost certainly the finest ever built.

Living precariously in neutral Sweden during the war, S.A.A.B. had plenty of opportunity to study the effect of air bombardment on their neighbours, Germany and Russia. What they saw convinced them that, unless they put their assembly lines beyond the reach of bombs, Sweden would probably lose her entire aircraft industry within a week if she were attacked. So they decided to move a large part of their factory underground.

Having made up their minds, they set to work at once blasting caves in the bed-rock,



SAAB "Scandia" twin-engined 24-32 passenger transport.

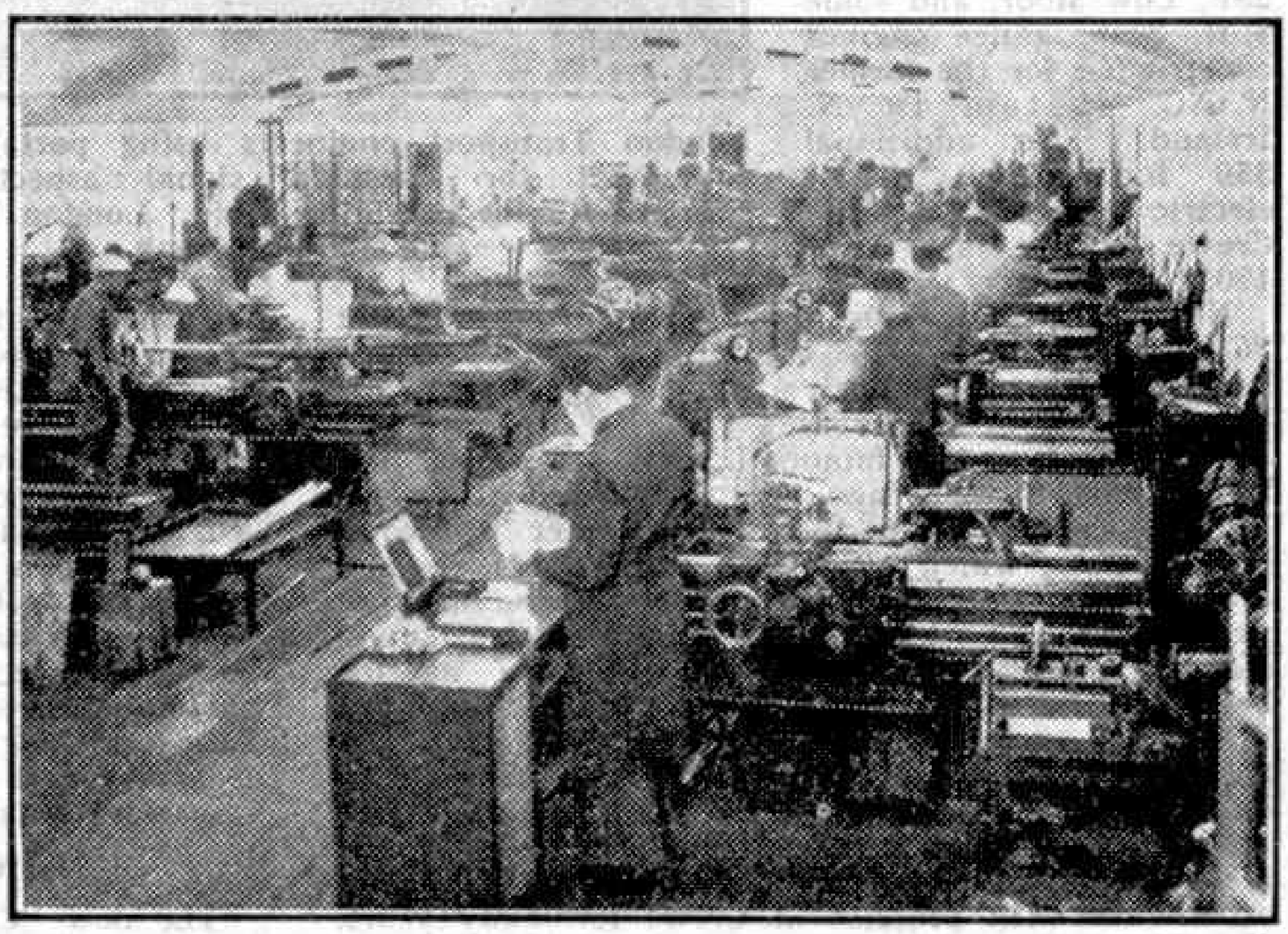
into which they built concrete workshops, together with self-contained air-conditioning, lighting, fire-fighting and drinking-water plant. Progress was so rapid that production in the factory started well before the end of the war, at the time when the company were making SAAB-18 twin-engined medium bombers for the Swedish Air Force. It was soon apparent that workers suffered no ill effects from working below-ground; in fact they liked the pure air and constant temperature of the new workshops. The experiment was a success.

Since VE-Day, work has continued underground at full pressure, chiefly on component parts and sub-assemblies which are made up into complete aircraft in the above-ground factory. But in the event of war, final assembly too would move underground, out of reach of even the most powerful bombs.

To-day S.A.A.B. are building a complete range of civil and military aircraft at Linkoping, in addition to a neat little 4-seat motor-car—the SAAB-92. Already they have supplied Swedish Airlines with their first Swedish-designed air liner, the "Scandia," and it is probable that other European airlines will adopt this aircraft too, as it combines good performance with ability to operate from small runways in rugged country. S.A.A.B.'s 3-seat light 'plane, the "Gipsy" - powered "Safir," has also proved highly successful and has been exported to India, South America, Africa and several European countries.

The SAAB-21 twin-boomed fighter and its "Goblin"-engined jet development, the SAAB-21R, are both in large-scale service with the Swedish Air Force. They will almost certainly be followed by squadrons of the new "Ghost"-powered SAAB-29, for this tubby little fighter is one of the fastest aircraft in the world, with a speed of over 650 m.p.h. The de Havilland "Goblins" and "Ghosts" are built under licence in Sweden, so there are no supply problems.

With a series of first-class aircraft already to their credit, Svenska Aeroplan A.B. have every right to feel proud of their past achievements and confident about the future.



Workshop bay for slide lathes, in the underground part of the factory.

Railway Notes

By R. A. H. Weight

Radio in Railway Service

Radio is extensively used by London Transport engineers when bringing into service new railway signalling installations. Communication is established between the signal cabin and points or signals for checking the correct setting and operation of the latter. The picture on this page shows a portable radio used in this way. The engineer on the left of the illustration has his portable radio set closed for carrying.

The system is proving highly valuable for reporting back to headquarters in cases of breakdowns. The high intensity of London Transport services demands the minimum of time for repairs, and radio on the spot is of special value in reporting progress or for calling reinforcements, equipment and so on.



London Transport engineers using portable radio equipment for checking signal aspects at a station with the operating cabin. London Transport Official Photograph.

London Midland Region

Continuing new locomotive construction, Crewe Works have completed class "5" mixed traffic 4–6–0s numbered 44721–7, fitted with steel fire-boxes and allocated to 5A shed, Crewe North. No. 44658, which begins a fresh series, with electric lighting, has been placed in service at 14B, Kentish Town.

Class "4" 2–6–0s built at Horwich for the Midland Division were as follows: No. 43031, 17A, Derby; No. 43032, 19A, Sheffield; No. 43033, 16A, Nottingham; and No. 43034, 20H, Lancaster.

New 2–6–4Ts from Derby Works include Nos. 42109–10, stationed at 25F, Low Moor, and some 5 ft. 3 in. gauge engines constructed for the former N.C.C. system in N. Ireland. Two additional 350 h.p. 0–6–0 diesel-electric shunters at 5B, Crewe South, are Nos. 12052–3.

Notable withdrawals have included the last "Claughton" "5XP" 4–6–0 rebuild, No. 6004, which had been the sole survivor of her type for some time, running in red livery.

The last of another famous L.N.W. 4–6–0 class first introduced 38 years ago also has been withdrawn. This was No. 25752, of the inside-cylinder "Prince of Wales" class, which by 1924 comprised 246 engines. Many of these were then engaged on the heaviest passenger work. About 100 "Princes" carried names, and "*Lusitania*," which was withdrawn at the beginning of 1949, was the last named survivor. The "Princes" carried numbers between 25600 and 25845 in recent L.M.S. days; five were fitted with outside Walschaerts valve gear, an unusual feature in conjunction with inside cylinders and valves; the rest had Joy valve gear between the frames in accordance with practice at Crewe for many years. No. 25752, like other recently surviving "Princes," was stationed at Stafford.

The only remaining L.N.W.R. express locomotive on the active list now is No. 25297 "*Sirocco*," a modified "Precursor," and one wonders whether any steps will be taken to preserve this last example of a famous age, as "*Sirocco*" will probably be withdrawn from service soon.

We understand that as No. 6243 "*City of Lancaster*" has gone into works for general overhaul, no streamlined 4–6–2 is now running.

A new 154-lever frame has been installed in No. 5 signal box, controlling the busy traffic working at the north end of New Street Station, Birmingham. A remarkably well-equipped Control Room has been brought into use at Crewe. By means of an elaborate system of telephones, all train movements between Euston and Carlisle, involving a million train miles per week and some 2,400 miles of line, can be reported to the Controllers sitting at their desks in Crewe ready to deal with any emergencies, the arranging of special traffic working and so on.

Details of some enterprising Western Division runs have reached us lately. Hauling the down "*Royal Scot*" before the introduction of the summer schedules, 4–6–2 No. 46225 "*Duchess of Gloucester*," in charge of a Camden driver with a 16-coach train weighing about 535 tons gross, gave a fine performance well beyond the requirements of present timings. A minimum of 55 m.p.h. was sustained up the gentle rise to Tring, passed in 2½ min. less than the 41 min. allowed from Euston. A maximum of 77 was attained down the descent to Leighton Buzzard, followed by an average of 70 over the easily undulating 14¼ miles on to Castlethorpe, providing impetus to carry this heavy train over the Roade rise at 58 m.p.h. Despite a short signal stop, Rugby, 82¾ miles, was reached two min. before the booked arrival time. Good running continued on to Crewe.

A Sunday run with a 13-coach train bound for Blackpool, also manned by a Camden crew, was considerably delayed owing to a long diversion to slow line on account of relaying operations, 50½ min. being taken to Tring, 31¾ miles. Modified "6P" 4–6–0 No. 6168 "*The Girl Guide*" more than recovered all lost time by averaging 69 m.p.h. over the 33 miles between Cheddington and Weedon, with maxima of 83, 76 and 74 m.p.h. at different points. The net time from London to Rugby, for which 101 min. were allowed, was probably no more than 88 minutes, allowing for delays.

Another reboilered "Scot," No. 6160 "*Queen Victoria's Rifleman*," with 15 on, 500 tons, gave a good run unchecked to the outskirts of Rugby, passing Blisworth 2¼ min. early in 68¼ min. from Euston after a maximum of 76 m.p.h. near Bletchley, so having time well in hand. Engines and men in each case were making long runs to the north.

Western Region Locomotive Notes

The new "Castles" are coming into service fairly rapidly. The first three of the latest series are No. 7018 "*Dryslwyn Castle*"; No. 7019 "*Fowey*



A Yarmouth train at Bentley, Eastern Region, hauled by "B1" class engine, L.N.E.R. No. 1119. Photograph by G. R. Mortimer.

Castle"; and No. 7020 "*Gloucester Castle.*" The newest examples are seen a good deal in South Wales, where "Counties" have recently been more in evidence, several appearing in lined black finish, as are certain "Hall" or other types. No. 6000 "King George V" of Bristol shed, was noted freshly painted blue at Swindon at the end of June. Further 0-6-0Ts recently completed at Swindon were Nos. 9681-2, allocated to Tondu and Tyseley respectively.

The 47xx 2-8-0 mixed traffic engines are still sometimes used for working passenger trains, and locomotives dating back to the Dean period even take a share. We noted 0-6-0 No. 2245, working a 9-coach Filton Junction-Bristol-Weston excursion; also 0-4-2T No. 3575 operating the Swindon-Highworth branch, perhaps the last of her kind to be so employed. The "Aberdare" 2-6-0s are becoming rare, though one or two may still be seen on freight workings in the West Midlands.

The heavy West of England holiday traffic continues to provide much locomotive interest at summer week-ends along the lines between Paddington and Devonshire, but if only the majority of engines were cleaner how much easier it would be to note names and numbers as they pass! The 45xx or similar types of 2-6-2T handle much of the branch line working in the West; "Granges" are used a good deal in Cornwall; 2-6-0 engines work through Reading over Southern metals to Redhill on summer Saturdays. The first gas-turbine locomotive was expected to appear shortly at the time of writing.

News from The East Coast Route

The North British Locomotive Company is turning out "K1" 2-cylinder 2-6-0s for the Eastern and North Eastern Regions. The design is similar to the rebuilt "K4" engine latterly numbered L.N.E.R. 1997, named "*Mac Cailin Mor*," having boiler, cylinders and motion of the Thompson standard "B1" type. Nos. 62001-5 formed the first batch allocated to Darlington.

Some of the "A1" 4-6-2s are painted blue. Recent allocation of new "Pacifics is as follows: Nos. 60126-7, Heaton; No. 60128, Copley Hill, Leeds; Nos. 60142-3, 60145, 60147, Gateshead; Nos. 60144, 60146, Doncaster; and Nos. 60148-9, Grantham. Several "A3s" are blue, with black and white lining, having the British Railways emblem on tender, while the latest darker green finish, with black and orange lining, is beginning to appear on "A2" engines. "B1" 4-6-0s from the G.C. Section are seen at Swindon (W.R.) and at Nottingham and Leicester (L.M.R.).

"Pacifics" of various classes amass very large mileages, making regular double trips such as King's Cross—Leeds or York, or vice-versa, and Grantham-Newcastle. Instances are: "A3" No. 60106 "*Flying Fox*," built as an "A1" in 1923, 5,371 miles in two weeks; and No. 60107 "*Royal Lancer*" 1,392 miles in three days, including the haulage of the "*Tees-Tyne Pullman*" from London to Newcastle. Various new "A1s" have covered well over 8,000 train miles in four weeks.

Three "A4" engines and "A3" No. 60039 "*Sandwich*," stationed at Grantham, have been maintaining for a long period continuous operation of two-day rosters, working the "*Flying Scotsman*" and other East Coast expresses between Grantham and King's Cross, then Grantham-Newcastle. "A4" No. 60027 "*Merlin*," of Haymarket shed, regularly hauled the new "*Capitals Limited*" non-stop train between Edinburgh and London on alternate days over a long period during June.

"A3" No. 60097 "*Humorist*," on the 10.25 a.m. down Leeds, following a late start from King's Cross with 15 coaches, recently gained 7 min. to Peterborough.

A Mobile Window Washer

The mobile window washer seen in action below is used for cleaning the windows of passenger trains during their stops at Pocatello, Union Pacific Railroad. The machine was designed and built in the Union Pacific's car department at Pocatello and is operated by one man. It works fast enough to be driven down one side of a 12-car streamliner such as "*City of Portland*" and back up the other side in eight minutes, cleaning the windows as it goes. The principle is simple: water is sprayed on the windows—30 gallons are used on the "*City of Portland*"—and the glass is scrubbed by a revolving brush.



Cleaning a streamliner's windows during a stop at Pocatello on the Union Pacific Railroad. The mobile washer sprays the windows and scrubs them clean by means of a revolving brush. Union Pacific Railroad Official Photograph.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With certain exceptions, which will be indicated, these should be ordered through a bookseller.

"THE LOCOMOTIVE EXCHANGES 1870-1948"

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.
(Ian Allan Ltd. 12/6)

Locomotive exchanges have given Mr. Allen the opportunity of telling the kind of story in which he excels, allowing full scope for typically careful comparisons of recorded runs of a series of engines over various routes in turn.

The great exchanges of 1948, which caused such a stir among railway enthusiasts, occupy some two-thirds of the book, and the account of this is preceded by details of earlier exchanges, particularly of the historic G.W.R. "Castle" and L.N.E.R. "Pacific" contest of 1925, and of various earlier trials. Readers will be interested to note that the first of these occurred in 1870. The author explains the reasons behind these locomotive contests, and their influence or otherwise on subsequent practice, and engaging details are included of runs made by competing engines in various exchanges. Many of these runs were timed by Mr. Allen himself, and as usual his descriptions of these are full of interesting detail. Comparative tables of dimensions and of individual performances add to the interest of the account.

The book is fully illustrated, particularly with regard to the 1948 exchanges. Copies can be obtained at 13/3 each from book shops and agents of the publishers, or direct from Ian Allan Ltd., at 33, Knollys Road, Streatham, London S.W.16.

"HOLIDAY PHOTOGRAPHY" (Price 2/-)

"CAMERA-TIPS FOR EVERYONE" (Price 1/-)

By F. and M. PARTINGTON
(Fountain Press)

The first-mentioned is No. 14 in the "Photofacts" series of pocket handbooks, and has appeared just in time to be of value to the thousands of amateur photographers in search of practical advice on holiday photography. Excellent guidance is given on choosing the right photographic equipment for the particular kind of holiday travel that has been planned, on the intelligent use of guide books and maps to help in locating good subjects, and on estimating the pictorial possibilities of these when they are found. The full-page half-tone photographs reproduced are excellent, as is usual with the books of this series.

"Camera Tips for Everyone" contains alternate pages of text and half-tone illustrations, each page of text containing hints on a particular aspect of photography. The subjects touched upon in this way include focussing, exposure, portraits, landscapes and seaside and city scenes, and series of pictures that tell stories. There are also many general hints designed to help the amateur to get good sharp pictures.

"THE RAILWAY MODELLERS' HANDBOOK"

(Gaskell and Christian Ltd. 2/6)

This book is intended particularly for those whose interests are specially concerned with railway constructional modelling, but it contains also hints that will be found useful by readers who operate ready-to-run standard commercial components.

There are four main chapters by different writers. The first of these deals with the scenic side of railway modelling. Another is concerned with the photography of model railway subjects which, as most readers of the *"M.M."* will know, is a rather specialized business, and miniature steam locomotives and American-style model railroads are the subjects of the remaining chapters.

Several tables and diagrams add to the usefulness of the book, while various illustrations in line and half-tone bring out the different points that are considered.

"THE BEGINNER'S BOOK OF STAMP COLLECTING"

"THE SPLENDID BOOK OF POSTAGE STAMPS"

By STANLEY PHILLIPS
(Sampson Low, Marston. 5/- each)

Mr. Phillips is a great stamp expert, and boys who are starting to collect stamps, and those who have already made some progress, could have no better guide in the hobby. In these two books he gives both classes of collectors a great amount of information of exactly the type they want.

In the volume for beginners he tells how stamps are produced, explains how to identify them, and deals with such matters as inscriptions, surcharges, overprints and postmarks. The best way to mount and arrange stamps is fully described, with many other interesting and useful details; and there is a practical account of the best way of forming a stamp club in a school or among beginners, a practice that the author strongly recommends.

The second book will open new worlds to the collector and will put him on the right lines to get the greatest pleasure and amusement from a study of stamps and their designs. It begins well with a section on stamps of adventure, commemorating the exploits of pioneers and explorers of all kinds, and then deals with sport on stamps, and a wide range of other subjects of design. The book is full of interesting stories of stamps and stamp collectors, and ends with a stamp quiz that will help to illustrate the wide range of attractions and the wealth of information that stamps can give.

"BOADICEA"

By C. H. ABRAHALL (Harrap. 7/6 net)

This fine story has for its subject the fierce struggle of the first famous British Queen, who tried to free her country from the domination of the Romans. The author has based it on historical facts, and around these she has woven an attractive and interesting adventure story by following the fortunes of two British youths, pages of Boadicea, who undergo many hardships and enjoy several triumphs on special missions before the rising is finally crushed by the Romans. They themselves are carried to Rome as prisoners, but at last return to their native country and help to establish peace and prosperity there.

The book has a coloured frontispiece and other illustrations in line, and there is a good map on which the adventures of the boys and the progress of the war can readily be followed.

"FILM-STRIP PROJECTION"

By CECIL A. HILL
(Fountain Press. Price 5/- net)

This latest book by Mr. Hill, a practical man with years of experience in sub-standard cinematography, is intended for beginners and also for those who may be called upon to use some of the many different types of film-strip and film-slide projectors now available. The information given is therefore of a general nature and applicable to different types of projectors.

The aspects of the subject dealt with include slide and strip specifications, the preparation of film-strips and slides, and safeguards against film damage. The construction of a typical projector, its operation and maintenance are explained in detail, and there are descriptions of six representative current types of projectors. The book also includes a chapter on finding and correcting faults.

Lists of film-strip producers and distributors and film-strip projector makers are given, and there is a good index. Excellent half-tone illustrations and line drawings amplify the text.

"THE COMPLETE HANDYMAN"

(Odhams Press. 8/6 net)

The man of all work may have almost disappeared from trade and business, but in the home and garden he is more active than ever before. Here is a book that has been written for his special benefit, providing him with expert information and advice on almost any task that may confront him, and luring him on to greater triumphs in his endeavour to make home life easier and happier.

The range of the book, which runs to nearly 600 pages, is very wide. It begins with a section on wood and wood-working tools, and on the making of wooden articles large and small, including kitchen fitments and even bedroom furniture. A section on metalwork follows, in which motor car and motor cycle adjustments are dealt with, and after this we turn to radio, house decoration and repair, and work in the garden and small holding, finishing with a useful section on making a model railway and other miniatures.

The book is written in simple language, and no special skill or knowledge on the part of the reader is assumed. There are many illustrations in half-tone and line, with useful working drawings, and beginners and more experienced handymen alike will find that the book will repay its cost many times over.

"CONTROL-LINE FLYING"

"STUNT CONTROL-LINE FLYING"

By R. H. Warring

(Percival Marshall. Price 10/6 each)

Since its introduction into this country from the United States in 1945 control-line flying of model aircraft has become tremendously popular, and now rivals free flight in this respect. These two books are the first and second of a series of three planned to cover the whole subject of this pursuit. In the first of them the author draws on his extensive practical experience for the benefit of his readers. He deals very fully with control systems, control-line model types and their construction, operation and flying technique, motors, flying scale models and, finally, with sport flying. The book is well illustrated with line drawings and excellent half-tone photographs.

The second book in the series deals comprehensively with the design of stunt models, covering wing and power loading, design layout, component shapes and proportions, control systems, rigging angles and balance. Airframe construction is dealt with under specific headings, together with motors and stunt tanks, and a special feature is the inclusion of 18 general arrangement drawings of outstanding stunt models by world experts. There are more than 100 line illustrations, and appendix tables summarizing design and constructional data for over 40 models.

"THE LANCASHIRE AND YORKSHIRE RAILWAY AND ITS LOCOMOTIVES"

By R. W. Rush

(Railway World Ltd. 25/-)

This work contains in over 150 large-sized pages a great deal of information regarding the former Lancashire and Yorkshire Railway. It deals chiefly in detail with the locomotives of that line, but other sections summarize the history of the system and its services.

The locomotive section gives notes, dimensions, numbers and so on in regard to L. and Y. engines, from the Bury and Forrester creations of the earliest days to the 4-6-0 "Dreadnoughts" that appeared just before the end of the company's independent existence. Withdrawals under the L.M.S. and British Railways are noted up to May 1948, and the engine shed code used in Lancashire and Yorkshire days and the works numbers of engines turned out at the old works at Miles Platting and later at Horwich are given.

For a book of this scope the illustrations are somewhat disappointing. Line drawings alone are used, so that the book has a rather austere appearance throughout.

"FLYING SCOTSMAN"

By Alan Anderson

(Brockhampton Press. 3/6)

This book is introduced as "*Famous Train Journeys No. 1*," and in it the reader is taken on a typical journey by the "*Flying Scotsman*" from King's Cross to Edinburgh and Aberdeen. In the course of the run we learn a great deal about "the road" and its notable engineering structures, and the signals that guard the train, which itself is well described, with special attention to the restaurant service, long a special feature of the "*Flying Scotsman.*" Mention of the engine and its working and details of the footplatemen's duties lead to useful notes on what goes on in locomotive works and sheds to make sure that engines are well up to their work.

The plentiful illustrations consist of neatly-executed sketches of scenes of interest on the way. The reader can follow the journey accurately from the point-to-point timings of the summer schedules of the 1949 "*Flying Scotsman*," and inside the covers there is a pictorial map in two sections, with the mileages alongside the route. The general contour of the route is shown by a gradient profile diagram.

"PHOTOGRAPHY"

By Arthur Nettleton

(W. and G. Foyle. Price 2/6)

This book, written in a chatty way, is primarily for the newcomer to the photographic hobby, and technicalities have been kept to the minimum. It begins with notes on the different types of cameras and their operation, and passes on to the "how and why" of lenses and shutters; how to obtain correct exposures; the use of supplementary lenses and other aids to good photography; and films and film speeds. Architecture and landscape photography are touched upon, and for those who like to do things for themselves there are instructions on daylight and gaslight printing, on mounting and tinting, and arranging and indexing a film storage album.

Other useful chapters deal with tracing faults in photographs, care and overhauling, and on how to make photography a profitable hobby. The book is illustrated with 14 full-page half-tone photographs.

"MODEL AERONAUTICS"

Edited by B. Dean and R. Warring

(Ian Allan Ltd. Price 2/9 post free)

This new addition to Ian Allan's "*Model Aviation*" series contains details, plans and drawings of 10 model aircraft, which include rubber, glider, and power models, and machines of free flight and control-line types. An article of special value to the newcomer to model aircraft construction explains how to enlarge the plans given in books of this kind to the correct size for working, if you do not wish to purchase the full-size scale plans which are available. Other articles deal with radio control, aerobatic aerofoils, and power model construction, and there are pages of pictures of interesting model aircraft.

"THE RAILWAYMEN'S YEAR BOOK"

By G. Morris

(Railwaymen's Publications Ltd. 2/6)

The 1949 edition of this useful guide seems to us an improvement on its predecessors. It contains a great deal of information that the railwayman requires to have in connection with his job, with many facts and figures, important dates in railway history, and details of various railway organizations, educational schemes and union matters. There are also chapters on the crack trains of Britain and electrification on British railways, and other attractions include a gardening section, with a complete gardener's calendar.

An index completes the tale of the contents of this useful "Year Book," which can be obtained for 2/9, including postage, from Railwaymen's Publications Ltd., Vernon House, Sicilian Avenue, London W.C.1.

New York's Greatest Tunnel

Underwater Highway Over Two Miles Long

EVERY day an avalanche of motor vehicles descends on the business centre of New York from the various boroughs that make up the city, and from even farther afield, and one of the greatest of the many problems that have confronted the authorities there has been that of making this immense traffic easily possible. The chief difficulty is due to the fact that Manhattan, the central borough, is an island. On one side is the broad Hudson River, where are the great piers at which "*Queen Mary*," "*Queen Elizabeth*" and other Atlantic liners are berthed; on the other is the East River, and the Harlem River connects the two at the north end of the island, the southern tip of which faces New York Bay.

Giant bridges and underwater tunnels have been provided, but even these are insufficient to provide for the multitudes of motor vehicles that travel into or from Manhattan, and yet another gigantic tunnel, the largest of those yet built, is now under construction from Battery Point, at the southern tip of Manhattan, under the waters of New York Bay to Brooklyn.

Work on the Brooklyn-Battery Tunnel, as the new highway will be called, began in 1940, but had to be suspended in 1942, and was not resumed until December 1945, following the end of the war. Now it is being pressed forward vigorously and it is hoped to complete the project some time this year. It is in direct line with express highways and parkways in and around New York, making passage by road across the city swifter and easier, and more than 9,500,000 cars are expected to pass through it during the first year of its operation, a figure that will increase to its maximum of 16,000,000 annually in 10 years' time.

The Brooklyn-Battery Tunnel, like the three already existing under the Hudson and East Rivers, will consist of twin tubes, each of which will carry a double line of traffic in one direction. They will have an outside diameter of 31 ft., and between their terminal plazas they will have a length of 11,100 ft., or more than two miles. The distance under land and water between the actual portals will be 9,117 ft., and the tubes will dip to a maximum depth of 125 ft. below mean high water in New York Bay. The actual roadway width in the tubes will be 21 ft. 4 in.

Excavation was started from two points. On the north side, in Battery Park, Manhattan, a shaft was sunk to the required depth and finished with heavy concrete walls, and from its foot the twin bores were driven towards the Bay. The initial headings were 20 ft. by 20 ft. in size, and the two went forward at about the same rate. This section of the work was in rock, but at one point an underwater valley filled with soft ground had to be crossed, and there the men worked in compressed air to exclude water.

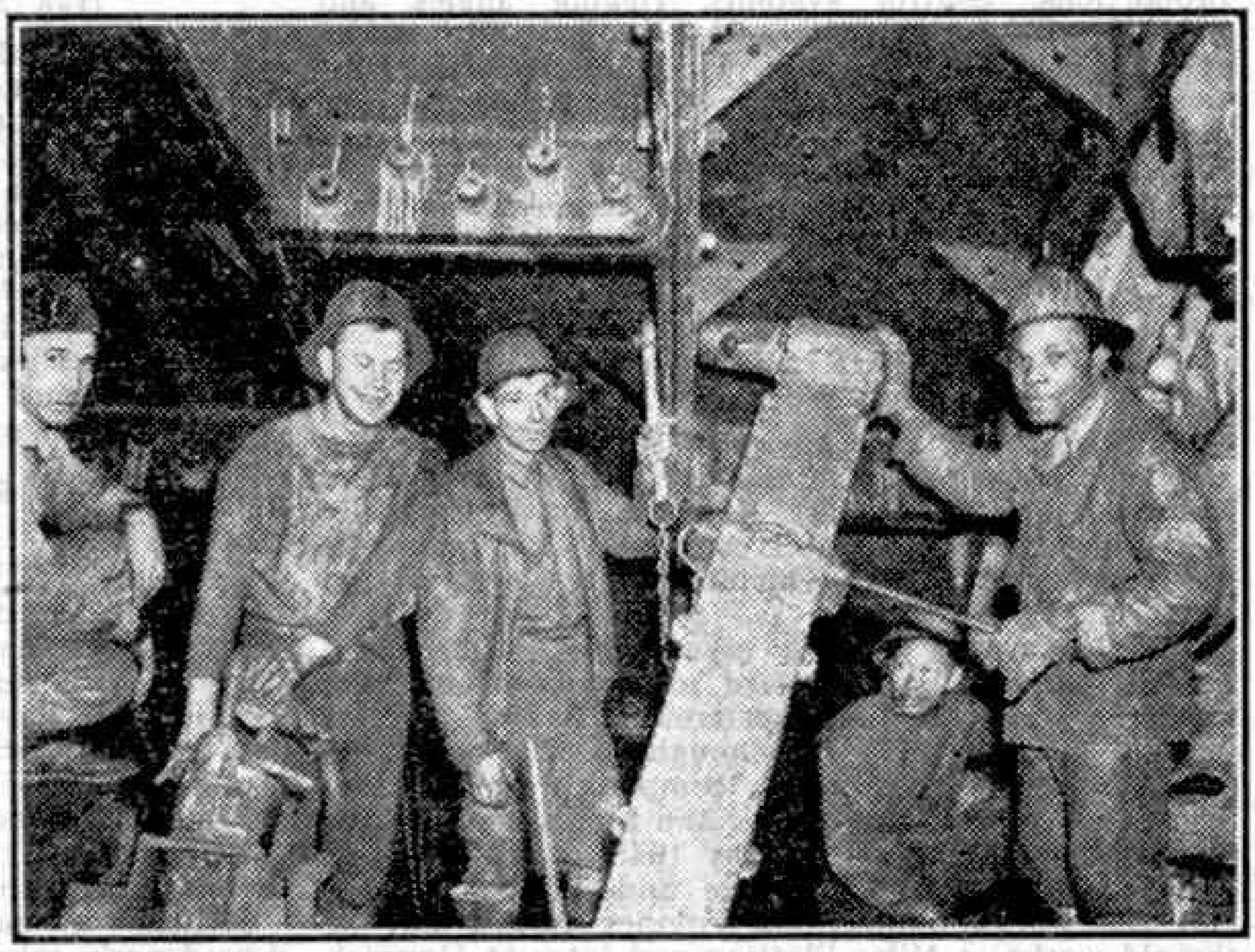
When the headings had been driven 2,800 ft. southward the entry of America into the war stopped further progress, and the tunnel was allowed to flood with the water seeping into it. Three years later it took two weeks to pump out the water so that excavation could be continued.

By March 1946 the two bores had reached a position about half way across to Brooklyn. The pioneer tunnels were then enlarged and the lower surface or "invert" was covered with concrete. The tunnel was lined with cast iron rings, which were bolted together by means of a special mechanism using compressed air. The final stage in the completion of this section of the tunnel will be the concreting of the lining.

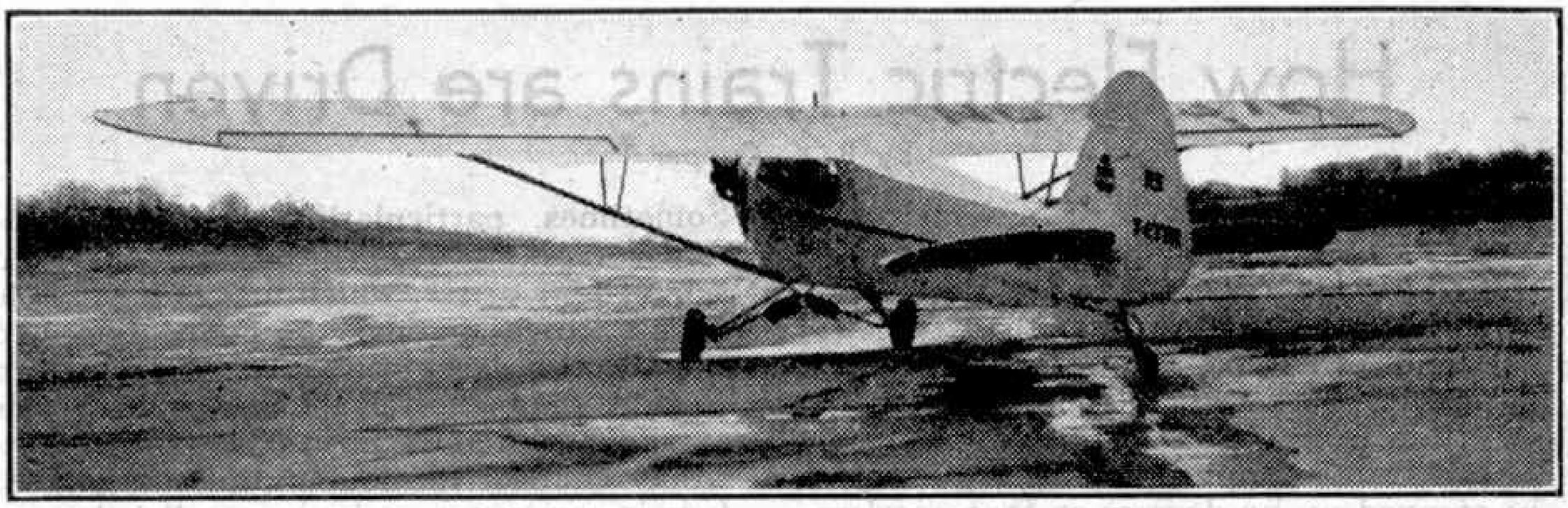
In the meantime boring had commenced from a shaft sunk in Brooklyn, at the south end of the tunnel. This section of the tunnel was driven through soft ground, as the rock bottom of New York Bay dips near the Brooklyn shore. This meant that excavation in the tunnel section had to be carried on in compressed air behind a bulkhead provided with air locks for the passage of men and material. The work was done with huge shields provided with cutting edges, which were pushed forward in stages by hydraulic jacks. Each push gave room for the addition of another segment of the lining, which was then used as the base for the 28 jacks that pushed the shield forward.

Excavation was carried on until a 20 ft. barrier of rock remained between the sections, to be excavated later. A hole was driven through this, and measurements then showed that there was a departure of only $\frac{1}{8}$ in. from the prescribed line.

One of the ventilation buildings of the tunnel is to stand on an artificial island midway along its course. This was made by dumping sand and clay to a depth of more than 50 ft., just enough to bring the top clear of water at high tide. A steel caisson was sunk until its lower cutting edge rested on bed rock, into which it was sealed, and the material inside was removed by dredging. An oblong shaft was then driven down to below the tunnel level. The ventilation building will be octagonal, and will be supported by the shaft walls and eight steel cylinders sunk to bed rock outside the shaft.



Tightening the bolts connecting a cast iron lining segment of the Brooklyn-Battery Tunnel with the one previously placed in position. A mechanism driven by compressed air was used for this purpose. Photograph by courtesy of the Triborough Bridge and Tunnel Authority, New York.



A New Angle on Landing

By John W. R. Taylor

ONE of the chief drawbacks to private flying is the amount of space required to land and take off even a light aeroplane. It is usually fairly easy to clear enough space for a single runway strip; but that is not sufficient if the aircraft owner wants to do a lot of flying, because an aeroplane must take off and land more or less into wind, and thus a single strip is useless whenever the wind is blowing across instead of down it. Even farmers, who are among the most enthusiastic light 'plane users, often find it difficult to spare enough of their valuable land for more than one runway.

The problem is even worse for airline operators, of course, and that is why an airport like Heath Row has to have several runways, all running in different directions of the compass and sprawled over miles of countryside.

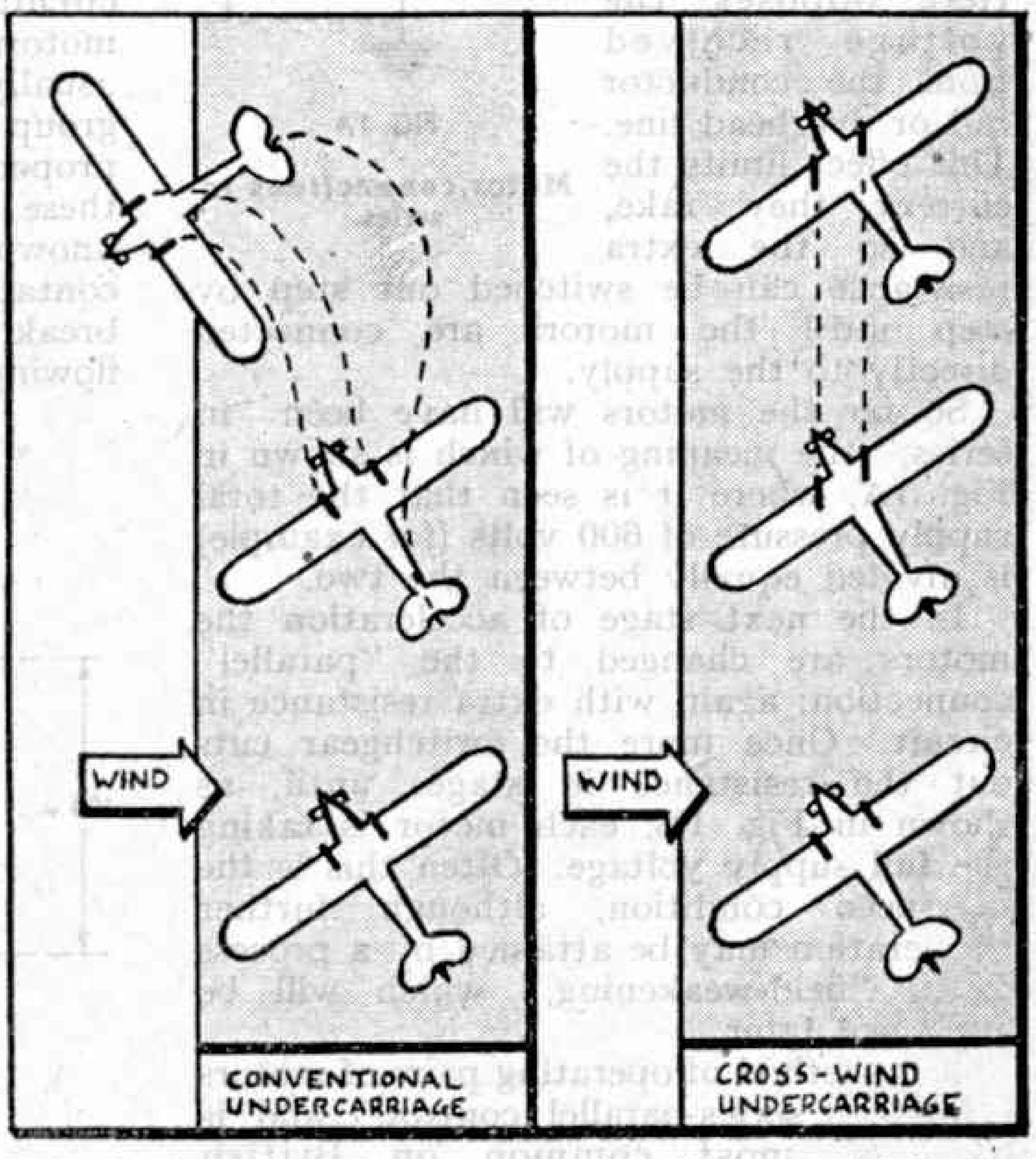
The answer to the problem has always been obvious; in fact Bleriot tried it out on one of his aircraft many years ago. You all know the castering wheels fitted to furniture, which ensure that, no matter which way you push your settee, the wheels are free to turn round until they lie in the direction in which you are pushing. If they were fixed, you would be able to push the settee in only two directions, forward or backward.

The same is true of aeroplanes. Because their undercarriage is fixed rigidly to the airframe, and because the aircraft must take off down the runway into wind, the pilot with a single strip has choice of only two directions for take-off. Now, if we fit castering wheels to the aeroplane, like those on the settee, the whole picture is different. The runway is still fixed and the wheels must run down it, but they are free to turn in relation to the fuselage. As a result, if the wind is off to one side, there is no reason why the aeroplane should not face into wind during take-off, while its wheels caster round and race off happily down the runway.

The result looks a little strange, as you can see in the picture at the top of this page, for it seems that the 'plane is going one way and its wheels another, which is more or less true. But it is quite safe, and means that a private owner, or even an airline operator with only a single runway at his disposal, can now fly almost regardless of wind direction.

It has taken many years to develop an efficient cross-wind landing gear, much of the pioneer work being done in Britain by Mr. O. F. Maclaren. Now the first practical type suitable for production has been put on the market by the American Goodyear Company. It has proved completely successful for most types of aircraft from small personal 'planes to light amphibians and even a "Dakota," and can be obtained as standard fitting on British Auster and American Cessna light aircraft at a cost of £130 in Great Britain.

As well as simplifying runway problems, it has eliminated the danger of ground-looping (being turned over by the wind), which often happened in the past when pilots tried to land their aircraft cross-wind. The castering undercarriage is thus another step towards making flying safe enough and cheap enough for all.



This drawing shows how an aircraft with cross-wind landing gear can land safely in a wind which would overturn one with normal gear.

How Electric Trains are Driven

By B. K. Cooper *

WHEN the motorman of an electric train receives the "right away" and moves his controller handle, he sets in motion apparatus that, more often than not, will carry qut of its own accord all the complex switching processes involved in accelerating the train from standstill to full speed.

The voltage applied to the motors must be stepped up by degrees so that acceleration may be smooth, and to avoid a rush of current that at first would amount almost to a short circuit. Motors at rest present a very low resistance to the passage of current. Some extra resistance must therefore be included in the circuit when power is switched on.

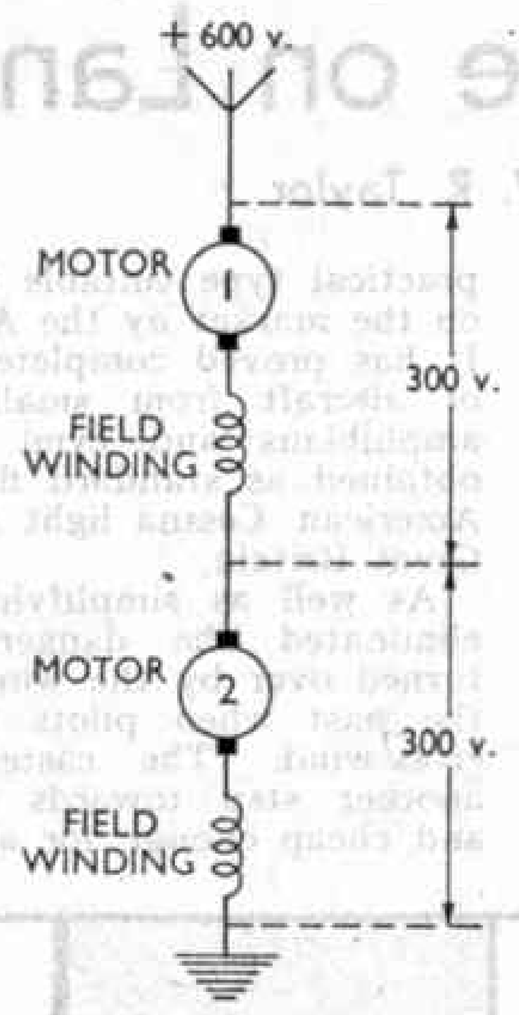


FIG. 1A

Motor connections in series.

As the motors speed up, they develop a voltage that opposes the voltage received from the conductor rail or overhead line. This effect limits the current they take, and so the extra resistance can be switched out step by step until the motors are connected directly to the supply.

So far the motors will have been "in series," the meaning of which is shown in Fig. 1A, where it is seen that the total supply pressure of 600 volts (for example) is divided equally between the two.

In the next stage of acceleration the motors are changed to the "parallel" connection, again with extra resistance in circuit. Once more the switchgear cuts out the resistance in stages until, as shown in Fig. 1B, each motor is taking the full supply voltage. Often this is the full-speed condition, although further acceleration may be attained by a process called "field-weakening," which will be explained later.

This method of operating pairs of motors is called "series-parallel control," and is the one most common on British multiple-unit trains, including tube stock.

Sometimes, particularly in electric locomotives, motors may be controlled in sets of four or six, which makes it possible to use three methods of connection. In the electric locomotives for the Eastern Region, Manchester-Sheffield line, for example, different positions of the controller connect the four motors as follows: four in series; two pairs in parallel (known as series-parallel connection); and four single motors in parallel. An advantage of this arrangement is that in three, instead of two, controller settings all the electrical power is being converted into mechanical energy at the motors instead of some of it being wasted as heat in resistances, so that three efficient running notches (with no resistance in circuit) are provided. The motorman can therefore use these positions, each of which represents a different speed, for as long as he likes, whereas he must run only for a limited time with resistances in circuit because of overheating.

In the early days of electric traction the controller itself made the various circuit changes as it was rotated by the motorman's handle. To-day the controller usually switches a small current so that a group of contactors is operated in the proper sequence as described below. In these circumstances the controller is known as a master controller. The main contacts of the contactors make and break various circuits for the current flowing to the traction motors, and are

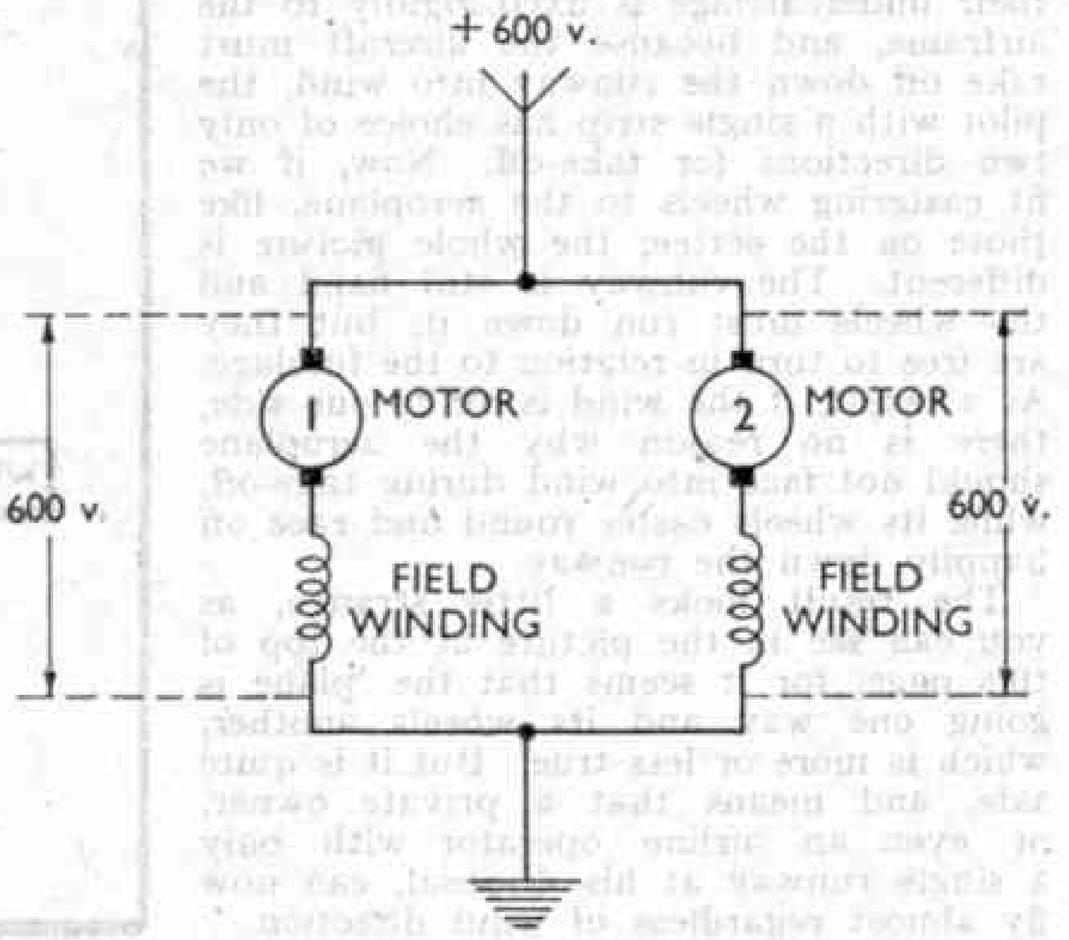
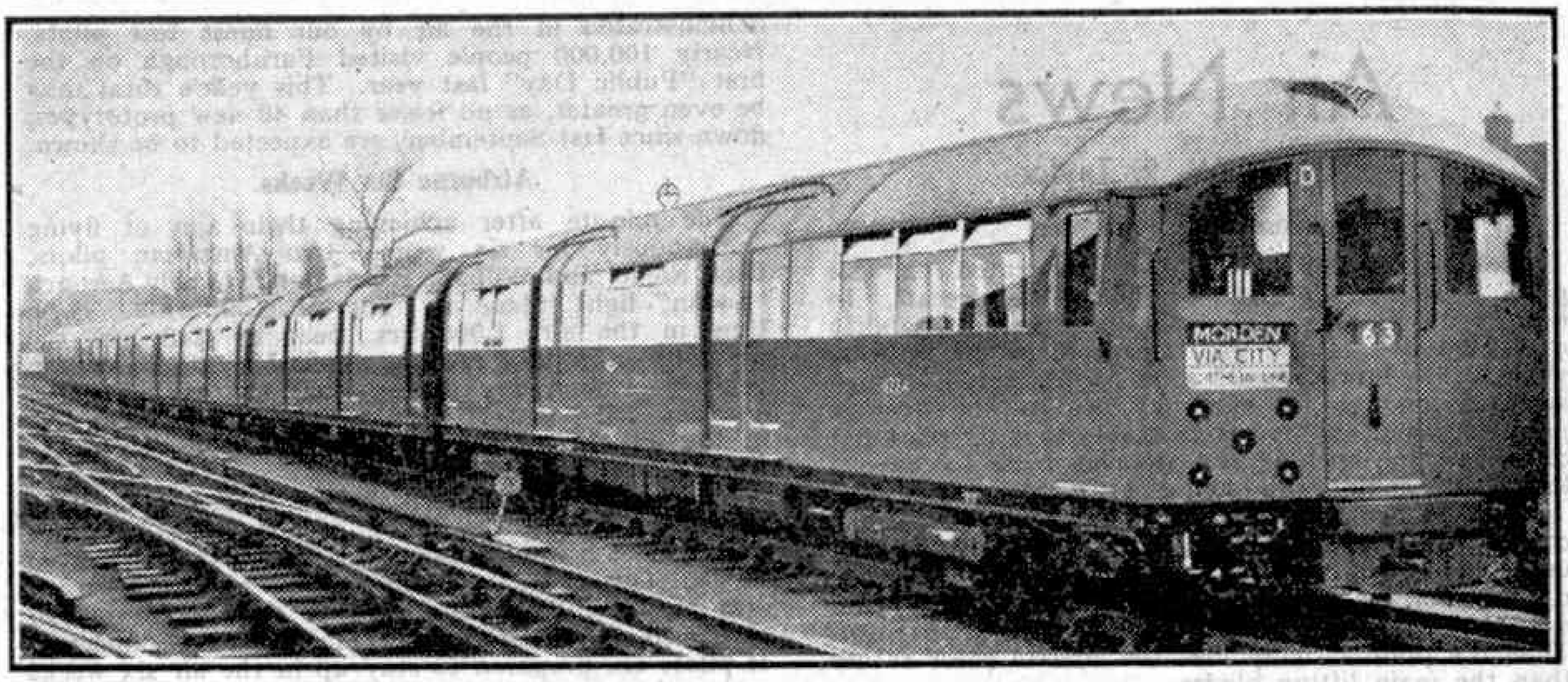


FIG. 1B

Motor connections in parallel.

* *The General Electric Co. Ltd*

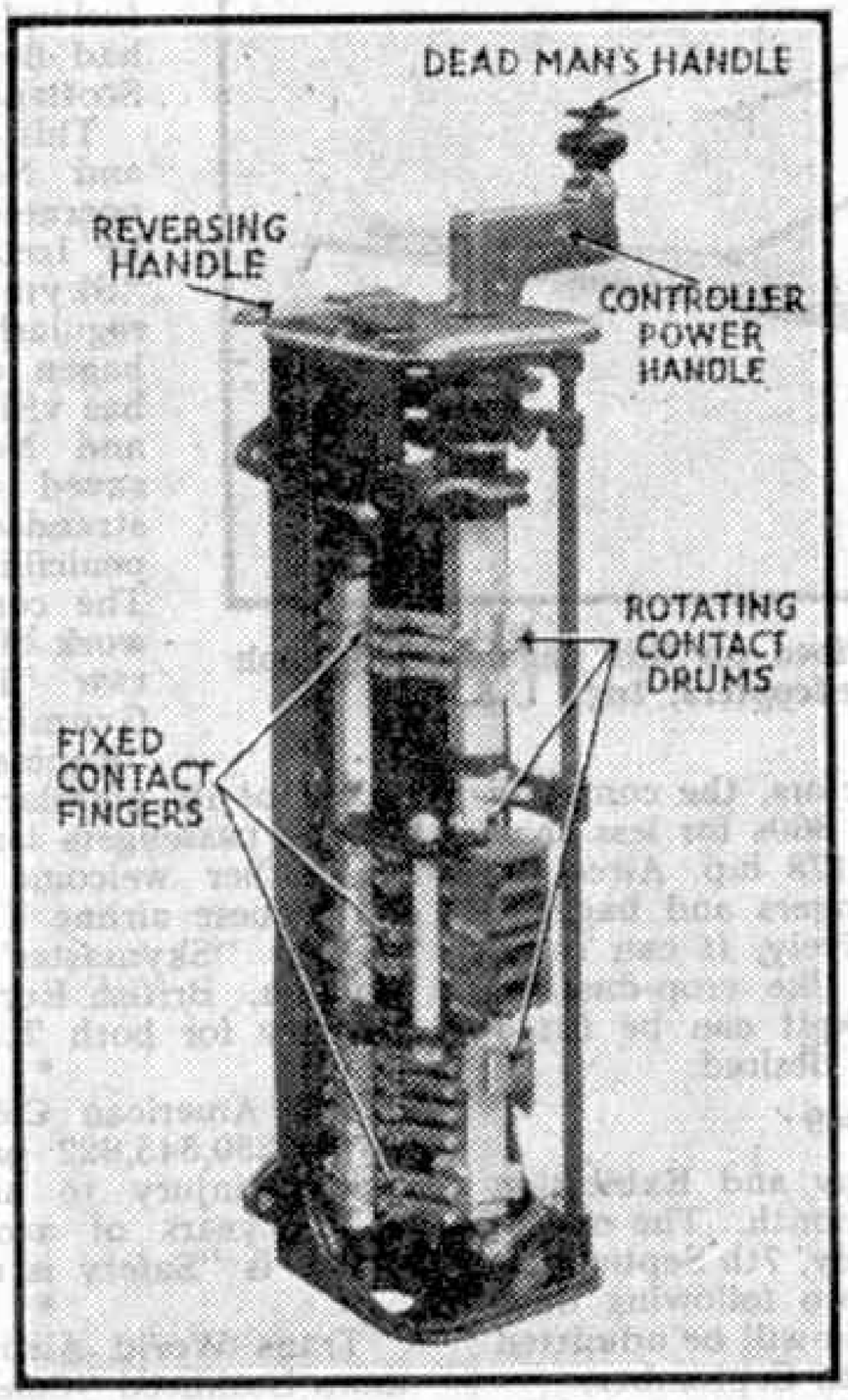


A London Transport "tube" train equipped with camshaft control gear. This is carried on the underframe and leaves the whole of the coach body for passenger accommodation. The illustrations to this article are by courtesy of The General Electric Company Limited.

connected up so that they cut out or switch in the resistances, change the motors from series to parallel, and so on.

Contactors may be operated directly by electromagnets energized from the master controller, or the electromagnets may control air valves that admit a compressed air supply to close the contactor contacts. A third system, found on the latest design of London Transport tube stock, is to work the contactors by means of cams on a camshaft that is rotated by air and oil pressure, the valves governing its movement being operated electromagnetically from the controller.

Whatever system is used, the master controller in the leading motor coach can be connected to the groups of contactors on all the other motor coaches in the train so that all work in unison. This is known as multiple-unit control, the trains being made up of units each consisting of one or two motor coaches and a certain number of trailers. A similar form of remote control may be employed when two electric locomotives are coupled together.



A G.E.C. master-controller with its casing removed. Note the "dead-man" type of control handle.

It is quite common when sitting in an electric train to hear the "click" of the contactors as they operate. Usually in multiple-unit equipment resistance is cut out in some 10 or 12 steps, but this does not mean that the master controller handle need have a corresponding number of positions. Most of the steps occur automatically, and the controller has three or four positions (called "notches") which govern how far the process of automatic acceleration is allowed to proceed.

The foregoing is easier to understand by taking as an example the controller notches and their effect in modern Southern Region suburban stock. They are as follows:

Notch 1. Motors in series and all resistance in circuit.

Notch 2. Automatic acceleration until all resistance has been cut out, the motors remaining in series.

Notch 3. Motors transferred to parallel, and resistance put back in circuit.

Notch 4. Automatic acceleration until all resistance has again been cut out.

At any time while

(*Continued on page 324*)

Air News

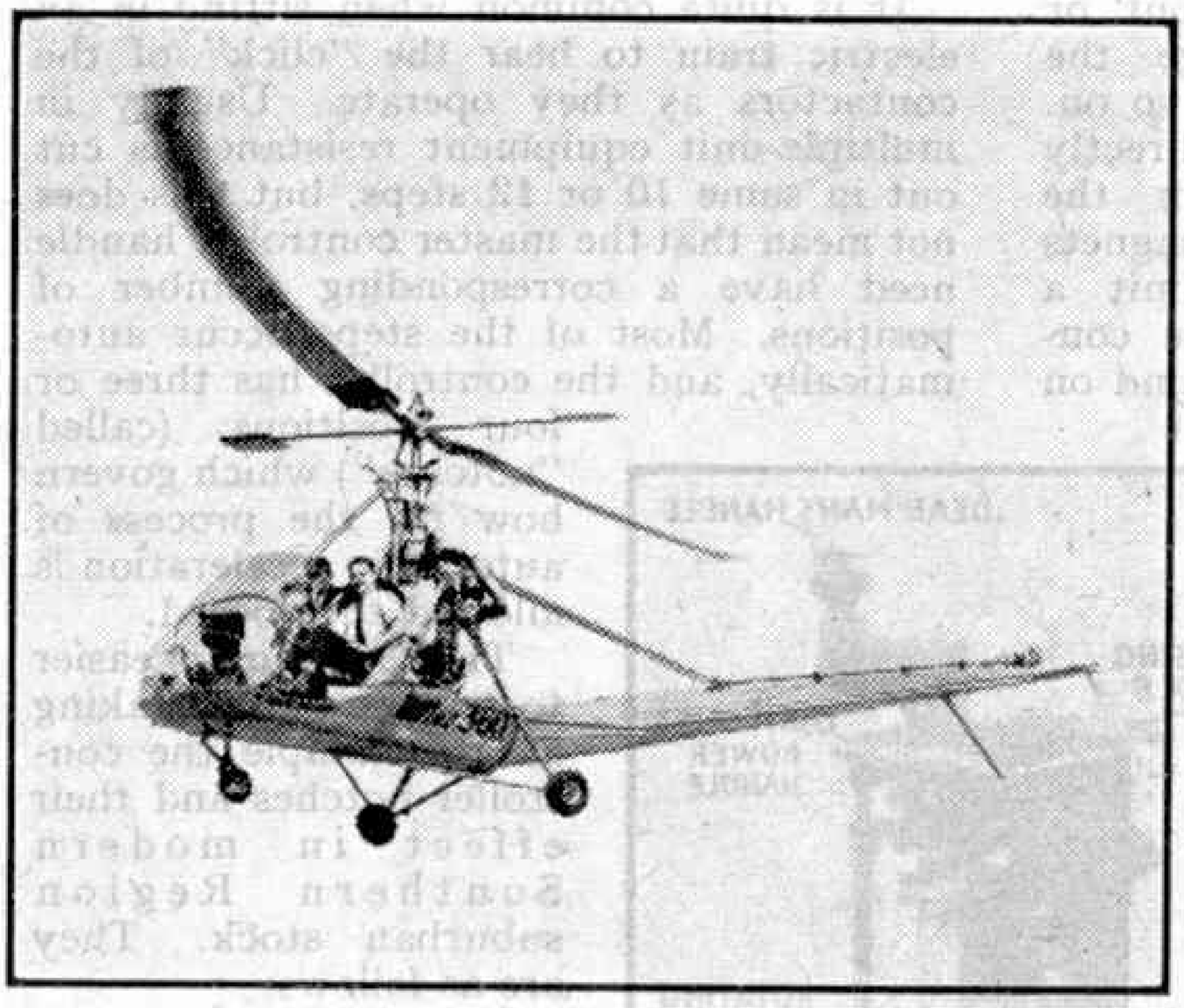
By John W. R. Taylor

A Promising Helicopter

The "Hiller 360" helicopter, illustrated on this page, is in many respects a remarkable aircraft. To begin with its simple controls and inherent stability overcome two of the greatest problems of rotating wing flight—how to build a helicopter simple enough and safe enough for everyday use by the average pilot. In fact, the 360 is so stable that its pilot has often left the cockpit and stepped back to have a look at the engine while flying at several hundred feet!

The main control consists of an overhead "stick" connected to the control rotor, so eliminating the usual cables, pulleys and levers. In turn, the control rotor, which has a small control surface at the end of each of its short "blades," controls the main rotor. Thus the pilot actually flies the control rotor rather than the main lifting blades.

The "Hiller 360" was developed by United Helicopters, Inc., entirely as a "private venture," without any Government support. But by careful design and putting out manufacture of 92 per cent.



The "Hiller 360" helicopter described on this page. Photograph by courtesy of United Helicopters, Inc., U.S.A.

of the aircraft parts to sub-contractors, the company have been able to offer production 360s for less than £5,000 each. It is powered by a 178 h.p. Aircooled engine, and can carry three passengers and baggage for 2½ hrs. at 76 m.p.h. Alternatively, it can carry over 500 lb. of payload on jobs like crop-dusting. Although normally open, the cockpit can be fitted with a complete Perspex cover, if desired.

S.B.A.C. Display 1949

The 10th S.B.A.C. Flying Display and Exhibition will be held at Farnborough next month. The official opening will take place on Wednesday, 7th September, admission on that date and the two following days being by invitation only. The public will be admitted on Saturday, 10th and Sunday, 11th September.

Without a doubt the S.B.A.C. Show is the finest air display in the world, with all Britain's newest civil and military aircraft, engines and components available for inspection on the airfield, and demonstrated in the air by our finest test pilots. Nearly 100,000 people visited Farnborough on the first "Public Day" last year. This year's total may be even greater, as no fewer than 40 new prototypes, flown since last September, are expected to be shown.

Airborne Six Weeks

One minute after achieving their aim of flying continuously for six weeks, two American pilots, Dick Riedel and William Barris, landed their Aeronca "Sedan" light 'plane at Fullerton, California. Their time in the air, 1,008 hrs., beat by 248 hrs. the previous endurance record, which had stood for ten years. Twice a day during their six weeks in the air they had had to come down to within a few feet of the airfield to take aboard fuel, food and water from a fast-moving jeep.

Such a record is normally of little significance, proving only the reliability of the little 145 h.p. engine, which kept running for six weeks without a break. This record attempt, however, was intended also as a publicity campaign to draw attention to the need for better airfield facilities at Fullerton. If pilots are prepared to stay up in the air six weeks rather than land there, the airfield must need a lot of improvement!

Australian Rockets

It is reported that The Fairey Aviation Company will carry out research on anti-aircraft rockets and guided missiles in Australia, in co-operation with the Australian and British Governments. The exact nature of the research cannot be divulged, but it is worth recalling that Faireys designed and built Britain's first radio-controlled, rocket missile, the "Stooge," which was described in the July 1947 *"M.M."*

New Airlines Serve London

A few weeks ago Iceland Airways made airline history by inaugurating the first scheduled air service between Iceland and London. Previously they had flown only as far as Prestwick, in Scotland.

This new service between Reykjavik and Northolt Airport has since been operated once a week in each direction by Iceland Airways' single 40-passenger "Skymaster," which also operates regularly between Reykjavik, Copenhagen and Oslo. On charter flights it has visited Lebanon, Venezuela, Finland and New York, and, last December, saved the life of a Danish scientist stranded in Greenland by dropping penicillin to him when he had pneumonia. The company also operate over a network of internal routes in Iceland, using two "Dakotas," three "Catalinas" a Grumman "Goose," de Havilland "Rapide" and Noorduyn "Norseman." Proof of its popularity is that the company carried 26,000 passengers last year.

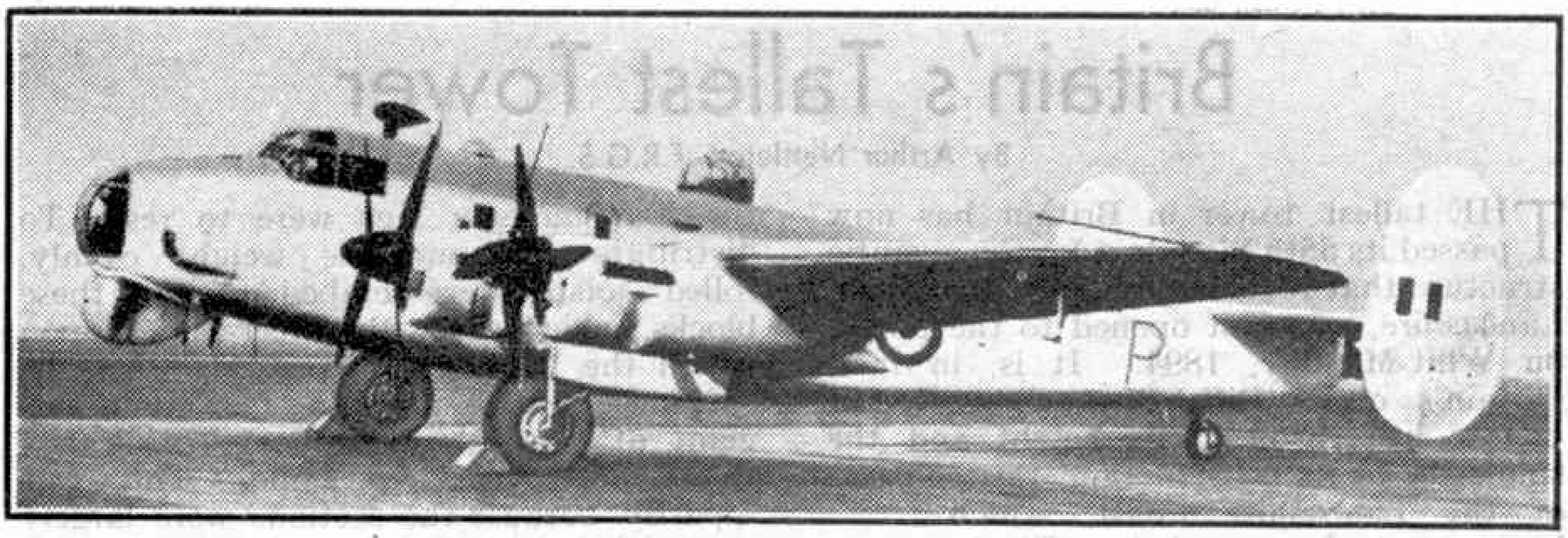
Another welcome newcomer to Northolt is the Portuguese airline T.A.P., which is now operating a weekly "Skymaster" service between Lisbon and London. British European Airways are agents in this country for both T.A.P. and Iceland Airways.

* * * *

The American Colonial Air Lines company have flown 250,545,622 passenger-miles without death or serious injury to any passenger or crew member in 19 years of accident-free flying. The airline's motto is "Safety is no Accident."

* * * *

Trans-World Airline of America have bought 30 more Lockheed "Constellation" air liners, at a cost of £5,000,000. Already the world's largest operator of "Constellations," with 35, TWA will possess the largest standardized fleet of four-engined aircraft in the world as a result of this purchase.



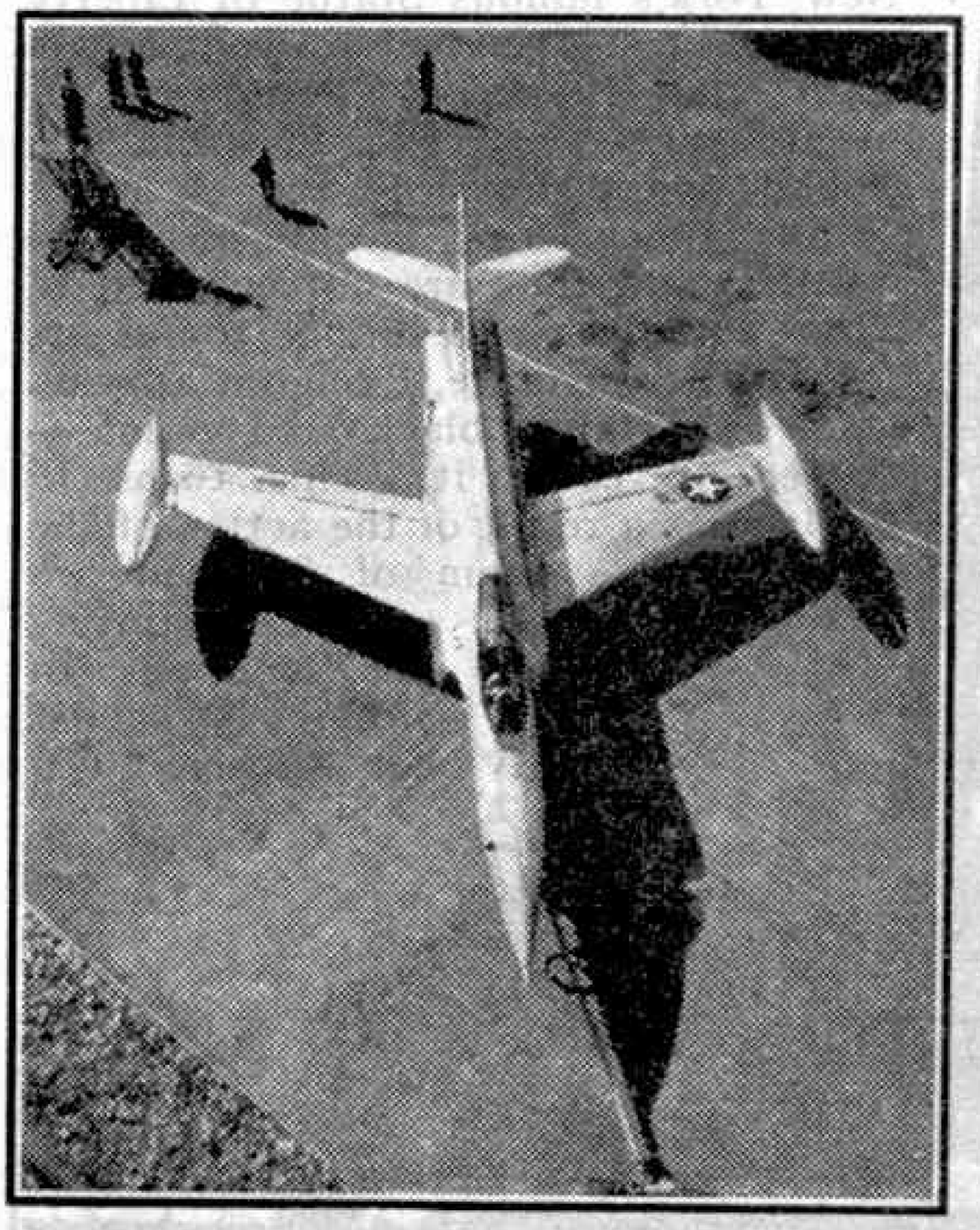
Avro "Shackleton" long-range reconnaissance-bomber, the R.A.F.'s most powerful piston-engined aircraft. Photograph by courtesy of A. V. Roe and Co. Ltd.

The Avro "Shackleton"

The new Avro long-range, over-water reconnaissance-bomber, shown above, has been named "Shackleton," in honour of one of Britain's most famous explorers. It is not a handsome aeroplane, its profusion of propellers and bumps contrasting sharply with the streamlined elegance of modern jet bombers. But the "Shackleton's" job is to search out and destroy submarines and surface raiders, perhaps the most vital of all military aircraft duties, and one which calls for long range and great striking power rather than speed.

The four Rolls-Royce "Griffon" engines of the 'Shackleton," each of which drives a six-bladed contra-rotating propeller, give a total of nearly 10,000 h.p. without entailing the high fuel consumption of jets. This ensures a long range. The "old-fashioned" tail-wheel undercarriage facilitates bomb stowage and also leaves the nose free for installation of the radar scanner and two remote-controlled forward-firing 20 mm. cannons, one on each side of the bomb-aimer's windows. Other defensive armament includes a dorsal turret mounting two 20 mm. cannons and a tail turret with two .5 in. guns.

Coastal Command's "Shackleton" is roughly the same size as the avro "Lincoln," Bomber Command's standard "heavy," to which it bears a strong family likeness. It carries a crew of ten; all other details, including performance, are still secret.



Lockheed F-90 penetration fighter. Photograph by courtesy of Lockheed Aircraft Corporation, U.S.A.

Training the R.I.A.F.

The announcement that a Technical Training College for the Royal Indian Air Force is to be established and operated in India by Air Service Training, of Hamble, is further evidence of India's intention to model its Air Force on British standards and experience.

Both apprentices and technical officers will receive instruction at the college, which will be staffed initially by British personnel, accommodation being provided in the wartime hospital town of Jalahalli, near Bangalore. After five years, however, it is expected that sufficient Indian Air Force officers and instructors will have been trained to take over the work, in new college buildings which are to be put up a short distance away, at Yellahanka.

New Lockheed Fighter

The new Lockheed F-90, illustrated on this page, is the second of the U.S.A.F.'s new "penetration fighters," designed to penetrate deep into enemy territory, seek out and attack specific targets and yet be fast enough and manœuvrable enough to evade defence fighters. First aircraft of this type was the McDonnell F-88, described in the March 1949 *"M.M."*

Powered by two Westinghouse J.34 jet engines, the single-seat F-90 is a large machine, weighing more than a fully-loaded "Dakota." But half of its weight consists of fuel needed to give it a long range for penetration missions. In fact, its fuel alone weighs as much as Lockheed's earlier jet fighter, the well-known F-80 "Shooting Star." The F-90 is armed with six 20 mm. cannons, and special care has been taken to make its structure strong enough to withstand damage it may receive in low-flying attacks on enemy targets.

"Meteors" for "Western Union"

The Government of Denmark have ordered 20 Gloster "Meteor" 4 jet fighters for the Royal Danish Air Force, and deliveries will start soon. In addition Danish pilots and ground crews will receive instruction in Britain in flying and servicing the "Meteor."

This contract is further proof of the intention of Western European countries to re-equip with standard R.A.F. jet aircraft. Belgium has already ordered 48 "Meteor" 4s and three "Meteor" 7 two-seat trainers, Holland, as well as ordering 34 "Meteor" 4s and seven "Meteor" 7s from this country, has arranged for the Fokker Company to build Mark 4s in Holland under licence from Glosters.

Britain's Tallest Tower

By Arthur Nettleton, F.R.G.S.

THE tallest tower in Britain has now passed its 55th birthday, for the gigantic structure that rears itself above Blackpool, Lancashire, was first opened to the public on Whit-Monday, 1894. It is, in fact, Britain's own "Eiffel Tower"—and not merely by reason of its height and the similarity of its construction; this colossus of the Lancashire Coast, which has come to be regarded as Blackpool's "trade mark," owes its origin partly to its French counterpart.

The idea of building such a tower at Blackpool first came to a Blackpool visitor to the Paris Exhibition in 1889. He observed that the Eiffel Tower was an enormous attraction, and the notion of providing his home town with a similar magnet arose in his mind. Two years later a company to carry out the project had been formed, and the foundation stone of the Blackpool Tower had been laid. £65,000 was spent on acquiring the necessary land, together with the property standing there, and Lord Mayors and Mayors from various Lancashire and Yorkshire cities and towns attended the stone-laying ceremony.

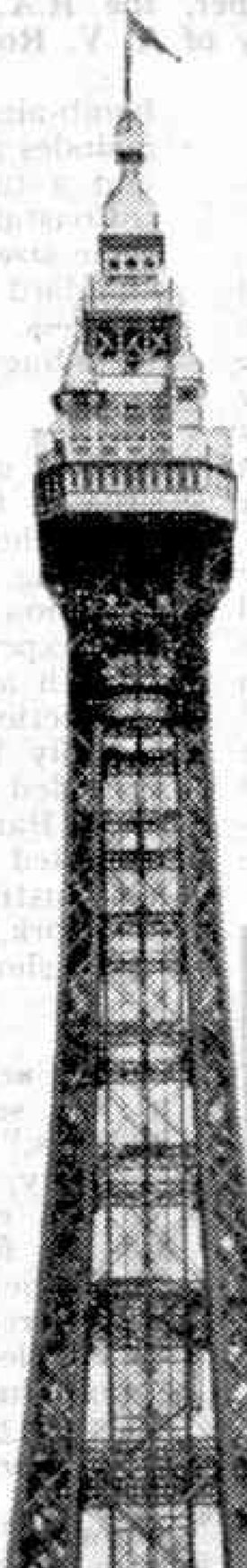
The erection of the structure then went forward rapidly, though it was an enterprise of a kind never before tackled in this country. First a thick layer of boulder clay was provided, and a huge concrete block, 35 ft. square and 12 ft. thick, was placed in each of the positions on which the four monster legs were to rest. To distribute the immense weight evenly, rolled joists were embedded in these blocks, which carry the steel plates upon which the base girders rest.

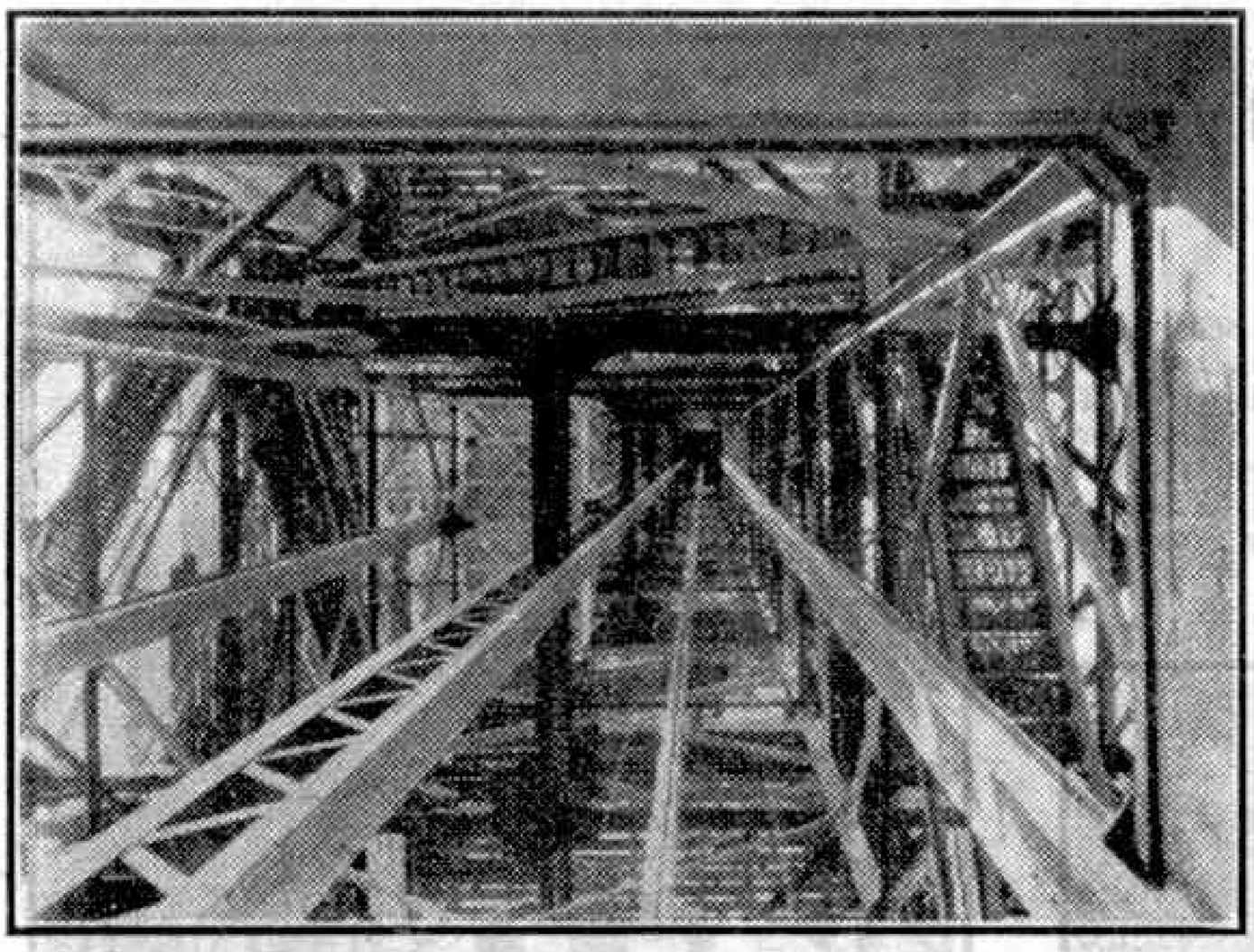
Not the least astonishing fact about this giant of Lancashire is that it took less than three years to build. This was partly because the sections were largely pre-fabricated and brought to the site ready for bolting together.

The tower, with its lifts and other appurtenances, weighs more than 2,500 tons, 2,493 tons of steel and 93 tons of cast iron being used by the builders. With the buildings round the base, it covers an area of more than 6,000 square yards.

Nowhere else in Britain can you climb so far above ground level. Blackpool Tower has to concede nearly 500 ft. to the Eiffel Tower, yet its height of 518 ft. to the top of the flag pole gives it the record for Great Britain. It is 202 ft. higher than the Clock Tower of the Houses of Parliament, and 153 ft. higher than the cross on the dome of St. Paul's Cathedral. New York's famous Statue of Liberty seems almost a midget by comparison with the Blackpool structure, for it measures only 305 ft. from the foundation pedestal to the torch.

Blackpool Tower has its own curiosities, and they are not confined to the aquarium and circus round its base! For instance, though it appears to be painted black, red paint is used to cover it. This turns to black as a result of the action of the sea air. A team of 30 men are continually at work painting the hundreds of girders. No sooner has it been given





Looking up the lift shaft of the Blackpool Tower. Hydraulic power is used to run the elevators.

a complete coat than the job is started again. Constant supervision and repair work keep the structure safe. The engineers and painters require steady nerves and often have to do their job in a stiff wind.

This British skyscraper — it is nearly half as high as the Empire State Building, New York, and as high as some of the other skyscrapers there—is outstanding not only for its dimensions, but for the extensive views it affords as well. Objects and places more than 50 miles away can be seen from the crow's nest, 480 ft. above the ground. From this eyrie, which is covered with white and coloured glass, beacons on the Lakeland mountains and Pennine heights have been seen. Incidentally, the Tower itself became a beacon one day while it was being built, the top catching fire!

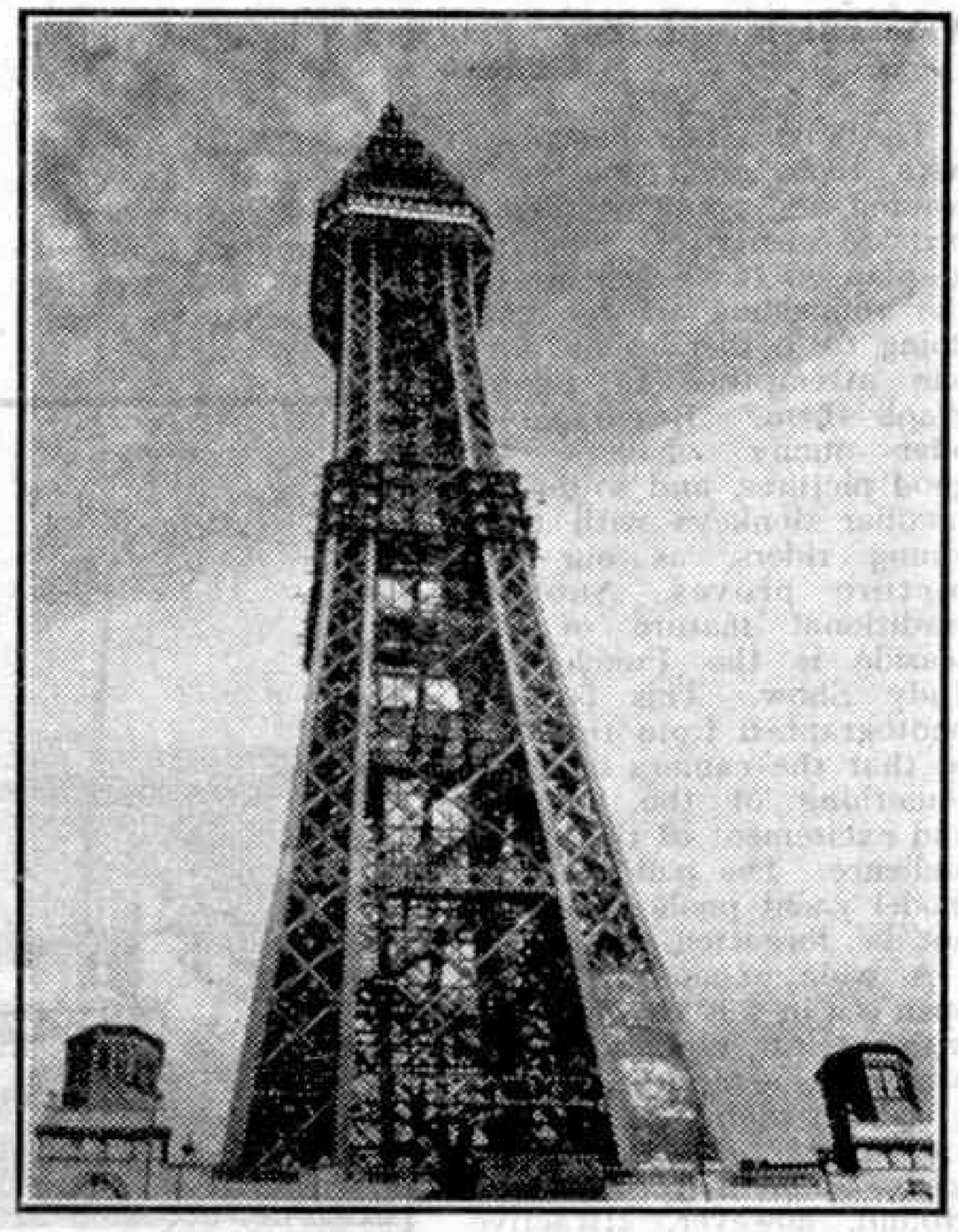
Hydraulic elevators run from the central hall to a point 100 ft. below the crow's nest. Above the latter viewpoint the visitor may climb to platforms at 400 ft. and 420 ft. by stairs and ladders. Superb panoramas are obtained from these points, the prospect including a long stretch of the Lancashire Coast, the peaks of the Lake District, the villages of the Fylde area, and the Pennine Range.

A radio broadcast took place from this elevated spot in August 1946, when the Tower was re-opened to the public after being closed during the war. There was good reason for that closure. In the late conflict the Tower was used as a radar base. It had the further unique distinction of being illuminated during the black-days, a light being kept burning at the top for the safety of aircraft. During World War 1, submarine "spotters" manned the crow's nest, keeping watch for any enemy underwater craft that might venture towards the Lancashire Coast.

Though this giant structure is not as high as the skyscrapers of New York, in one way it does score over them. On Blackpool Tower you are on top of a single spire, with the next highest buildings far below; at New York the scene is obscured by other skyscrapers.

The circus for which the tower is famous is built between the four supports of the structure. This entertainment centre, which can accommodate 3,000 people, was opened on the same day as the Tower itself.

A novelty of the arena is that the ring can be flooded, thus forming a pool for water spectacles. This centre for "spangles and sawdust" entertainment, indeed, has often led the way for such shows throughout the world.

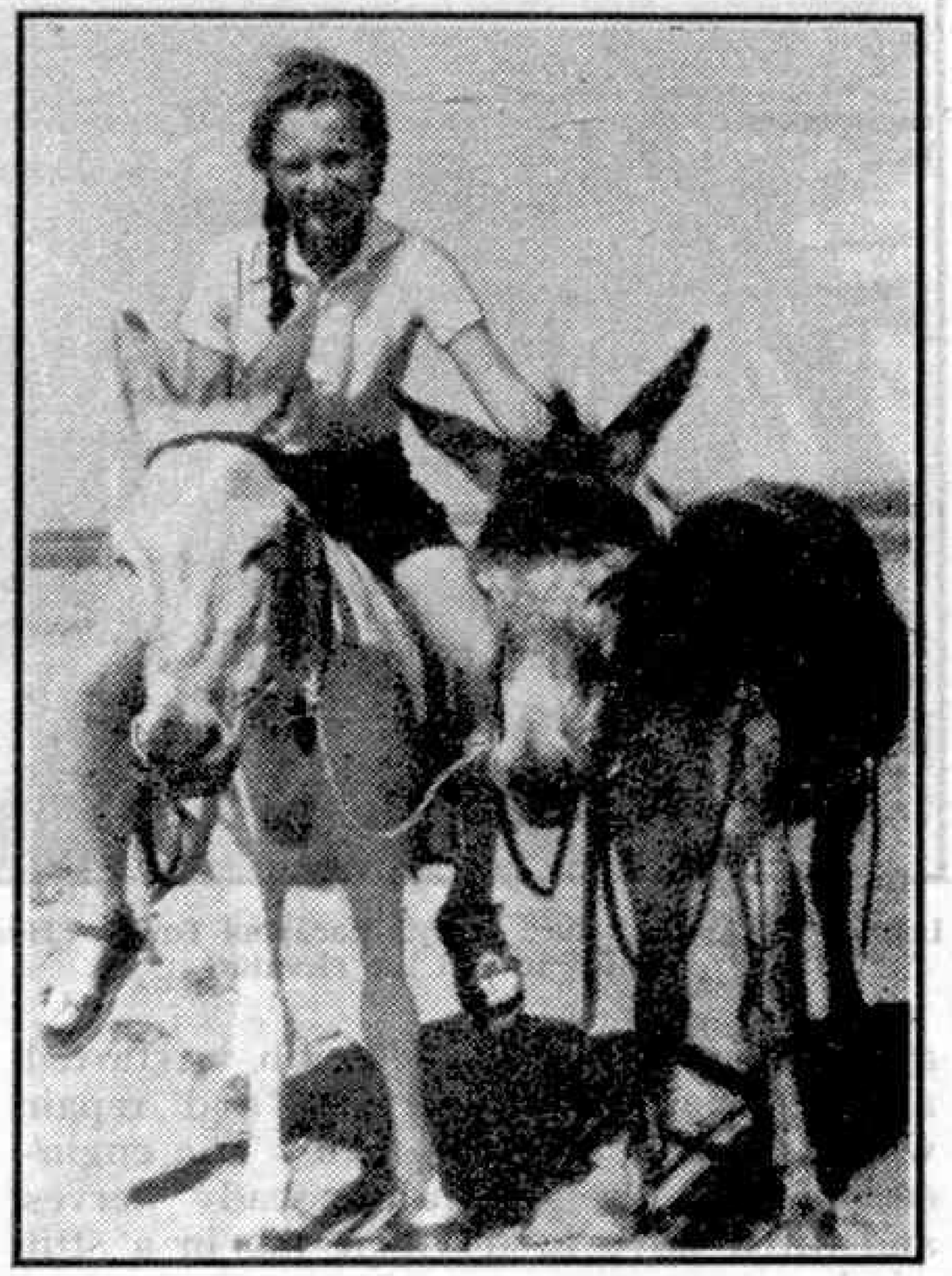


A close-up of the Blackpool Tower, showing the intricate construction. The platforms half-way up are for the use of the maintenance staff.

Photography

At the Seaside

READERS who are on holiday at the seaside will find a fascinating variety of subjects to photograph. Most of these subjects will be well within the scope of the cheapest cameras, as even when there is not actual sunshine the light by the sea is usually strong enough for snapshots of all kinds. This does not mean, however, that the exposure meter or calculator should be ignored.



On the Sands. Photograph by S. Sebba, London N.20.

popular subjects and worth taking a good deal of trouble to obtain. Here again some kind of foreground is essential for a good picture.

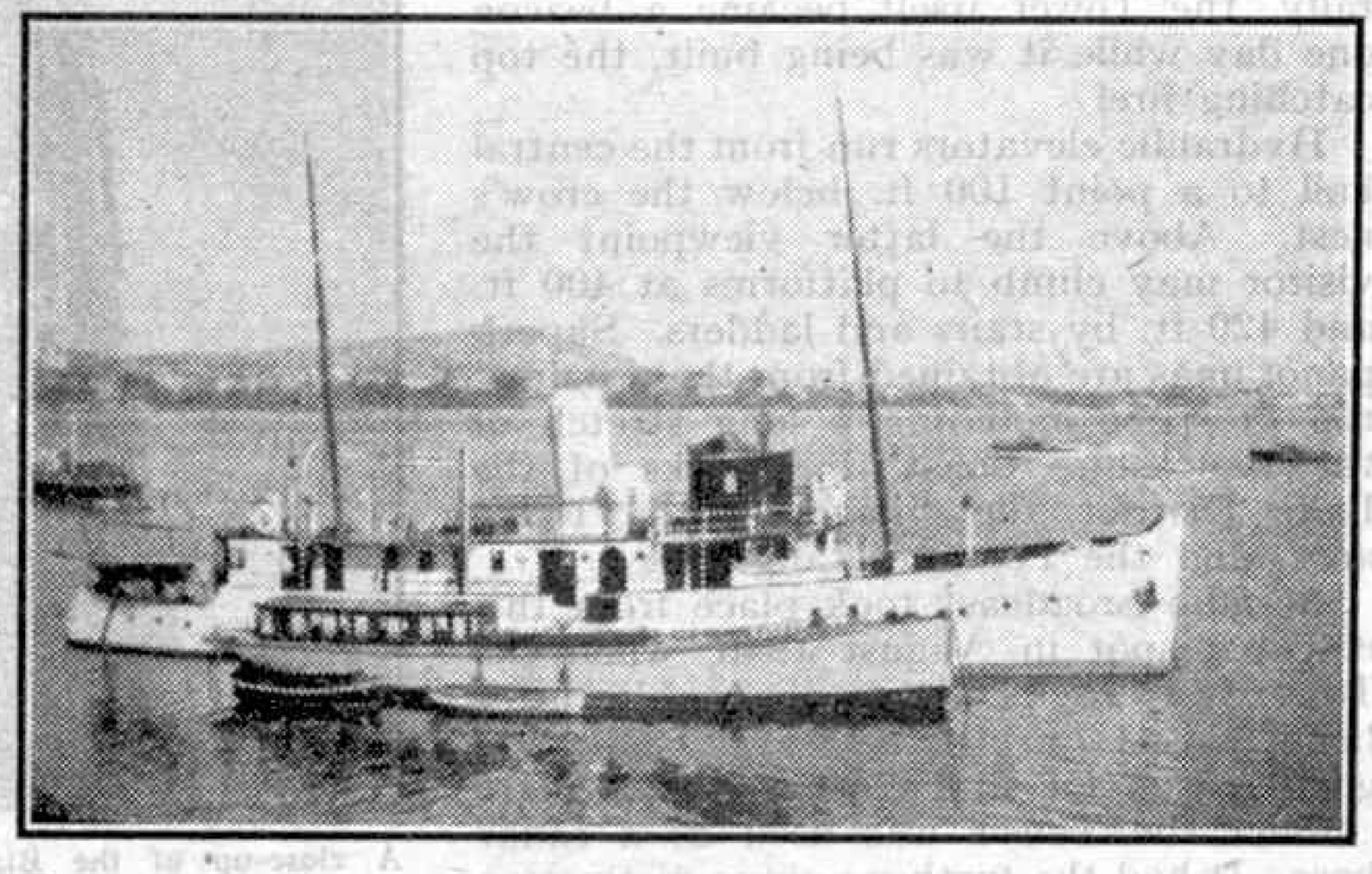
Waves breaking on the shore are always a tempting subject. Many pictures of this kind fall short of expectations by being taken from a high viewpoint; this has the effect of "flattening" the waves and making them appear insignificant in size. The camera should be held low down; the lower it is the bigger will the waves appear to be. Do not point the camera straight at the incoming line of waves, but photograph it at an angle. If possible choose a part of the shore where there are rocks on which the waves break with a great display of foam.



A Seaside Investigation. Photograph by R. Wrigley, Clitheroe.

The long sandy beaches at many popular resorts, with their great variety of amusements and the coming and going of small sailing and motor boats, provide plenty of scope for one's camera. Children at play on the beach are ideal subjects, as generally the youngsters are too engrossed in what they are doing to bother about anyone attempting to photograph them. Beach games offer many chances for good pictures, and so do the familiar donkeys with their young riders, as our top picture proves. Another traditional feature of the seaside is the Punch and Judy Show. This is best photographed from the side, so that the camera captures something of the laughter and excitement of the young audience. The paddling and model yacht pools also must not be forgotten.

A wide expanse of calm open sea in full sunshine and with a clear blue sky overhead looks delightful, but as a photograph it is disappointing. If there are rocks or boats in the foreground, however, attractive pictures are easily obtainable. Sunsets viewed from the beach or promenade are



Boats on the Conway Estuary, North Wales. Photograph by C. C. Dixon, Wilmslow.

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.

THE LADDER BICYCLE

The Ladder Bicycle seen in the accompanying illustration was one of those purely freak machines that make their appearance from time to time, the rider sitting about 8 ft. above the road. As far as I could ascertain it was of no value for utilitarian cycling, but no doubt it has its advantages for publicity, for when ridden it attracted a great deal of attention.

This is by no means the first example of a real high bicycle, for I have a photograph, taken about 1890, of a freak tandem known as "The Eiffel Tower," on which the front rider was seated over 12 ft. above the ground. I understand it was actually ridden in London streets on several occasions, probably as an advertising stunt.

C. R. Rowson (Liverpool).



A freak bicycle, on which the rider is about 8 ft. above the road. Photograph by C. R. Rowson, Liverpool.

A SIGN OF THE TIMES

The Ship Inn at Morecombelake in Dorset boasts a sign of the times, illustrating change. On one side of the signboard is an old-time sailing ship, and on the other a modern liner, as the accompanying illustration shows.

I once noticed a comparable sign in Berkshire. On one side of this a plough was being pulled by horses, and on the other by a tractor.

J. D. U. Ward (Abingdon).

THE PARIS UNDERGROUND

The first section of the Metro, or Metropolitan Railway, the underground system of Paris, was built when an Exhibition was to be held in the city in 1900, and because of its success the line was extended and became a permanent means of travel. Trains through its tubes run at intervals of 2½ min., and travel on it is inexpensive, a single ticket which enables one to travel anywhere on the system costing only 2½d.

There are 14 lines, which run from one side of the city to the other. They form a sort of network and pass beneath the Seine several times. The route mileage is over 80. The track is double throughout, and stations are frequent, giving access to any place in the city. The largest are Etoile, Chatelet and Nation, but at all of them the platforms can take trains of five vehicles. Most of them have white tiled roofs, and many advertisements, and all are simple, without frills or decorations.

The trains consists of four or five coaches, and take current from a third rail. The interiors are painted cream, with wooden seats for 20 people, and standing room for nearly 80. Doors have to be opened by hand, but close automatically. There are only two classes. The first-class cars are painted bright red and second-class ones green. Speeds are not so high as in the London tubes.

The tunnels were originally light grey, but through many years of use they have turned black. There are lights on one side at frequent intervals, and cables on the other.

M. J. Rogers (Salisbury).



An inn sign that tells a story. It is at Morecombelake, in Dorset, and the other side shows an old-time sailing ship. Photograph by J. D. U. Ward, Abingdon.

THE "LUCY ASHTON"

The former North British Railway Clyde passenger steamer *"Lucy Ashton"* celebrated her diamond jubilee last year. She was launched on 24th May 1888 from the yard of T. B. Seath and Co., Rutherglen.

The *"Lucy,"* as she came to be known, is a passenger paddle steamer, 190 ft. long and 21 ft. 1 in. wide. She was built with short saloons fore and aft, and with large paddle boxes bearing at the centre a carved head of Lucy Ashton set in gold relief. The steering wheel, worked by hand, was on the promenade deck between the paddle boxes. In later years a bridge was erected with a steering wheel and binnacle. She appeared first on the Holy Loch run, and became associated with the Gareloch and Greenock Ferry service.

In 1902 the original engine was removed and a compound diagonal engine was fitted, with a high pressure boiler (110 lb.). In the following year her saloons were renovated and extended, and she was also given new paddle boxes, which were slightly smaller than before.

During the first world war the *"Lucy"* remained on the Clyde to maintain the necessary services when most of her contemporaries had departed, and by 1939 all the younger vessels were on war service, leaving the "Old Lady" to carry on the work by herself once more. She ran summer and winter, with only a total of a week off for overhaul, and from 3rd September 1939 to 8th May 1945 she steamed 143,297 miles and carried 1,128,258 passengers.

"Lucy" celebrated her diamond jubilee year by being nationalized, for on 1st January 1948 she was taken over by British Railways. To the people of Craigendoran the "fine old lady" is "worth her weight in gold."

J. S. Buchanan (Port Glasgow).

Among the Model-Builders

By "Spanner"

JIB RADIUS INDICATOR FOR MODEL CRANES

The load capacity of a jib crane varies according to the angle at which the jib is working, for as the jib approaches the horizontal position there is an increasing tendency for the crane to overbalance. To prevent dangerous accidents and speed up luffing movements a radius indicator is sometimes fitted to tell the operator at a glance the position of the jib, and the maximum load that he can handle safely without increasing its angle.

A radius indicator of this kind built in Meccano is shown in Fig. 1. It consists of a Coupling 1 that is free to turn about the 1½" Rod 2, which is gripped in the boss of a Crank 3 bolted to the upturned flanges of the jib girders.

The Coupling carries in its upper end a further 1½" Rod 4, and in its lower end a 1" Rod on which is secured the Worm 5. The weight of the latter serves to keep the Rod 4 always vertical, no matter in what position the jib is placed. A dial 6, which may be shaped from a piece of stout cardboard, is bolted at 7 to an Angle Bracket attached to the jib.

The Rod 2 passes through a hole in the dial and carries two or three Washers to space the Coupling 1 away from the card so that the Worm 4 clears the edges of the girders forming the jib.

When an indicator of this type is fitted to a model crane, the jib should be placed in different positions and the radius of the circle of travel of the load hook for each position of the pointer, marked on a card.

If desired, the pointer can be made to operate an electric switch when it reaches the maximum radius mark, so as to set in motion either an audible warning signal such as a bell, or a relay by means of which the Motor is switched off automatically to prevent damage to the crane.

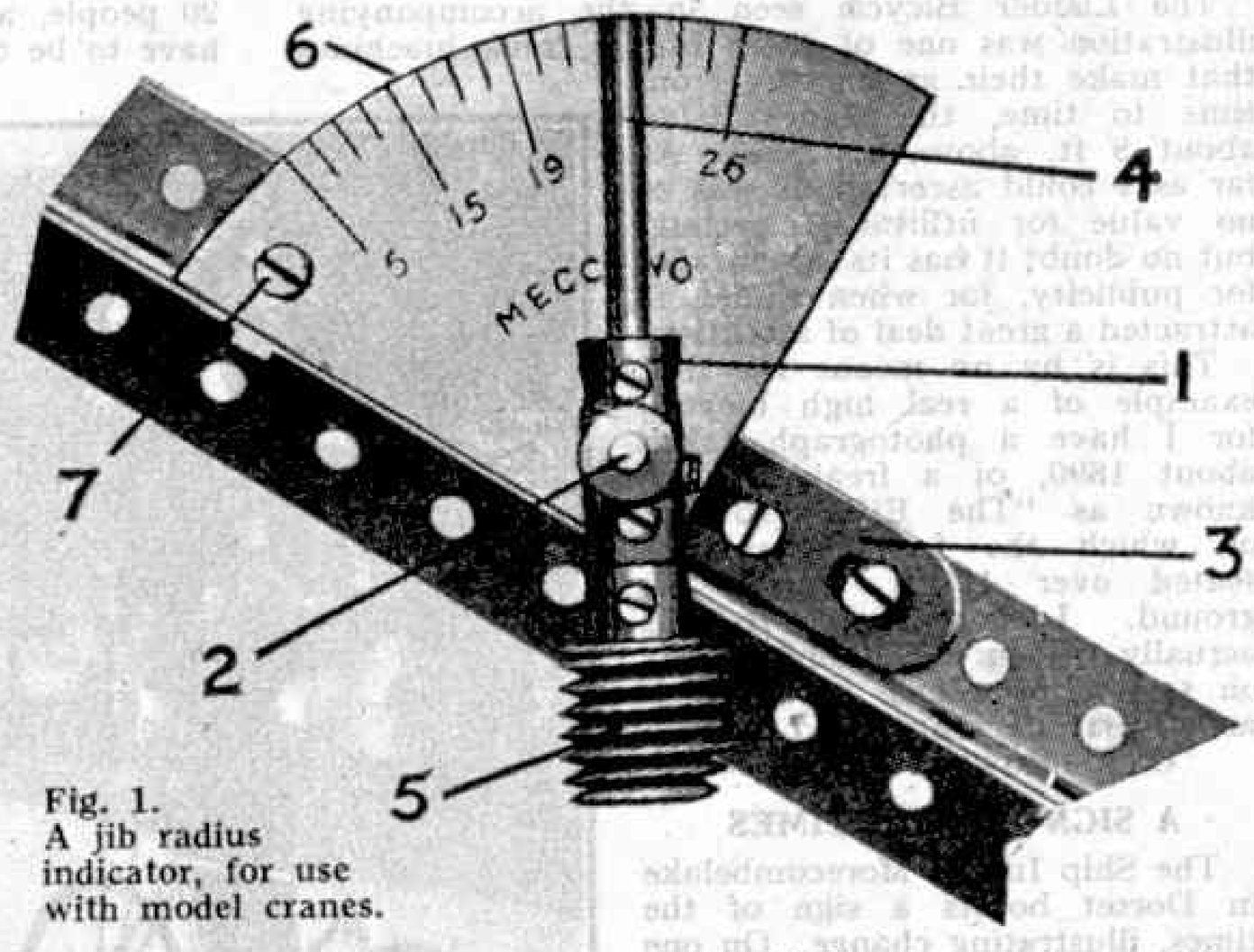


Fig. 1. A jib radius indicator, for use with model cranes.

HOW TO USE MECCANO PARTS

Ball Bearing, Complete (Part No. 168)

The complete Ball Bearing consists of three sections, namely one Flanged Ball Race, one Toothed Ball Race, and one Ball Cage complete with Balls. Fig. 4 shows how the complete Ball Bearing can be used in the construction of a small crane. The Flanged Ball Race 1 is secured to the Flanged Plate 2, and the Toothed Ball Race 8 is fastened to the swivelling structure. The Ball Cage is placed between these two parts so that the Toothed Ball Race rests upon the Balls. A short Rod, passed through the centre of the Ball Races 1 and 8 and maintained in its position by Collars, holds the unit together. The superstructure is rotated by means of Sprocket Chain passed round the teeth of the Toothed Ball Race 8 and engaging a 1" Sprocket Wheel 3, which is secured to a driven Rod 4.

It is sometimes desirable to substitute spur gearing for the sprocket driven ball race already described. A suitable way of obtaining this is shown in Fig. 2. In this example the place of the Geared Ball Race is taken by a 3½" Gear Wheel 2. The Gear is screwed to the base of the model by four ½" Reversed Angle Brackets 4 that rest on the longitudinal Girders 3.

Slewing of the crane is accomplished by securing a ½" Pinion 5 to the end of a Rod that may be driven, at will, from the gear-box. The Pinion meshes with the 3½" Gear.

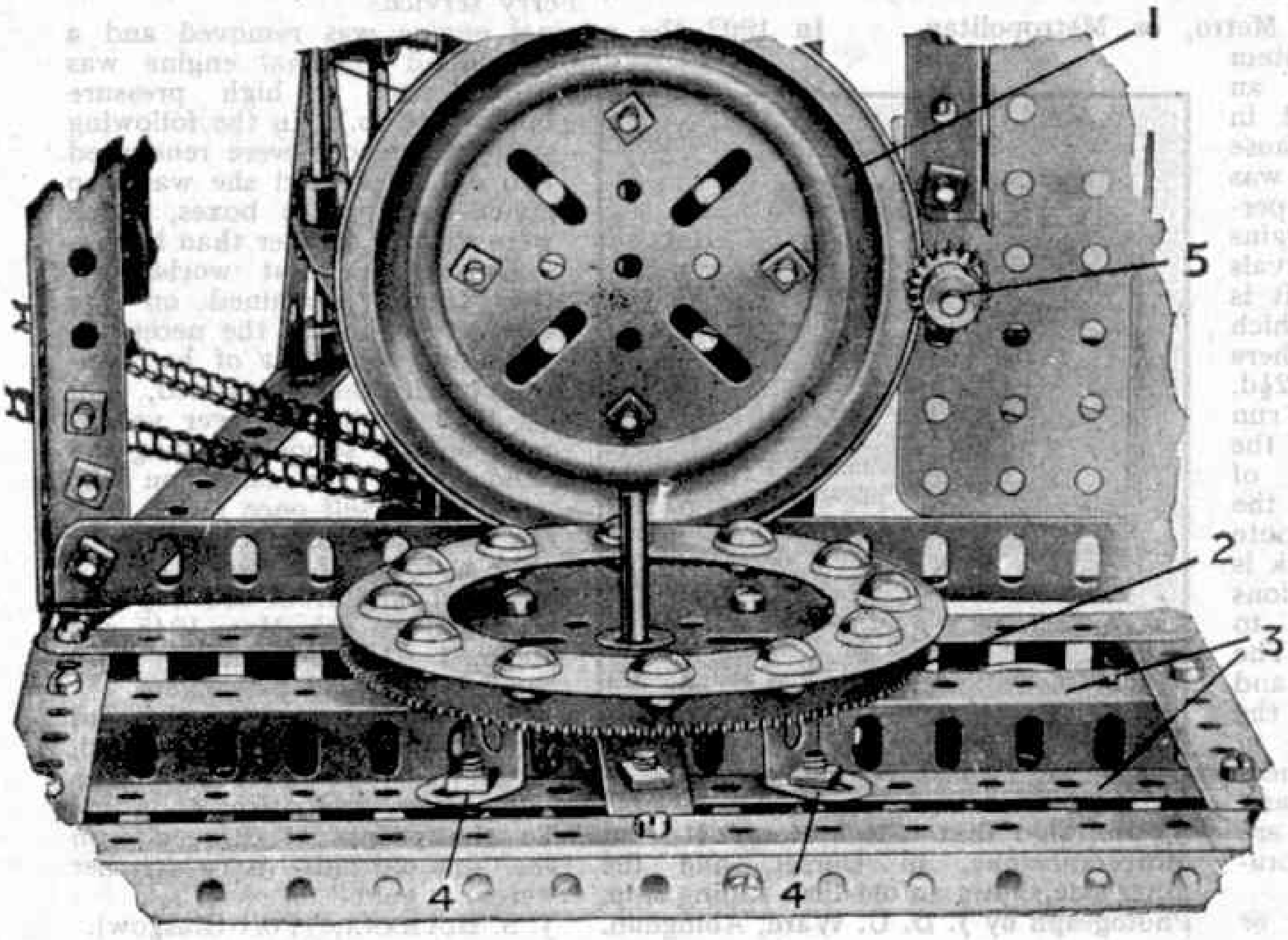


Fig. 2. The Meccano Ball Bearing fitted to a model crane, showing the method of drive to the swivelling jib.

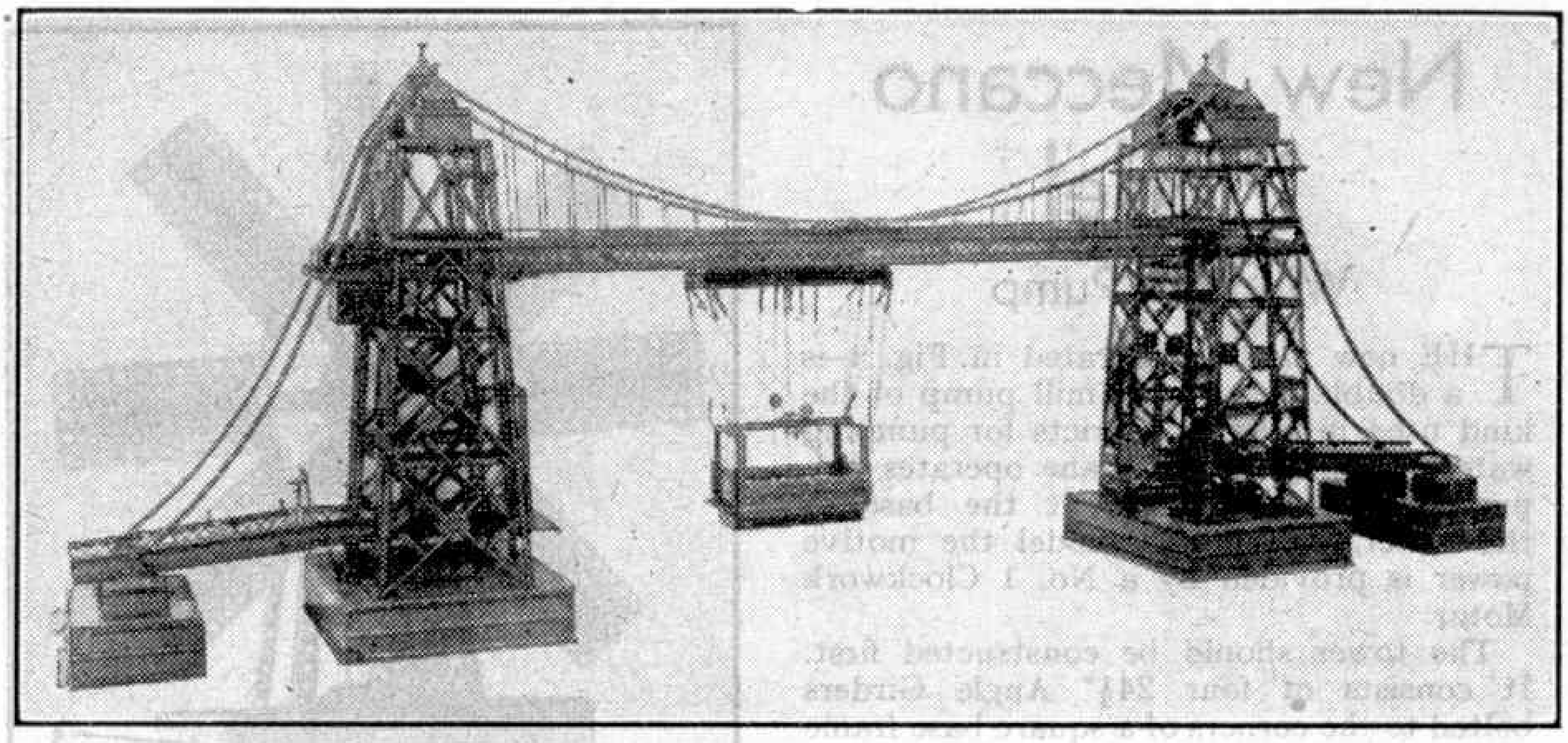


Fig. 3. A 14 ft. model transporter type bridge, which was a great attraction at the 1949 British Industries Fair. Some details of the model are given on this page.

MECCANO AT THE B.I.F.

One of the attractions at the British Industries Fair at Olympia, London, this year, was an imposing model of a transporter type bridge, which was a prominent feature in the exhibits of Meccano Ltd. This interesting model, which is shown on this page, is one of the largest ever built in Meccano, and it worked continuously throughout the Fair.

The model resembles the famous Transporter that spans the River Mersey between Runcorn and Widnes, but it differs from this in the design of the towers. It is 14 ft. in length, and the towers are nearly 5 ft. in height. Each of the great suspension chains that support the span is built up from 500 Strips and weighs 10 lb. The transporter car is capable of carrying a load of 15 lb., and during the period the Exhibition was open it travelled a total distance of nearly 10 miles!

The model is driven by a high voltage motor, and is equipped with 30 electric lamps operated from the mains through Meccano Transformers. There are also lights in the Transporter car, and these are supplied from batteries housed in a special recess provided in the base of the car. Nearly 5,000 nuts and bolts are used in the construction of the model.

The car slowly traverses from one end of the bridge to the other, and after a pause of 15 seconds at each pier it commences its return journey. The mechanism by means of which this automatic reversing is effected proved a fascinating attraction at the Fair. The car and the approach roadways are fitted with rising and falling gates that open automatically as the car arrives at the piers and remain open during the 15 seconds pause before the car travels in the opposite direction. The gates close as soon as the car leaves the piers. The mechanisms operating the automatic reverse and the gates are simple, and proved outstandingly reliable throughout the length of the Fair.

Readers of the "*M.M.*" may be interested to know that the model was built by "*Spanner*" and his colleagues.

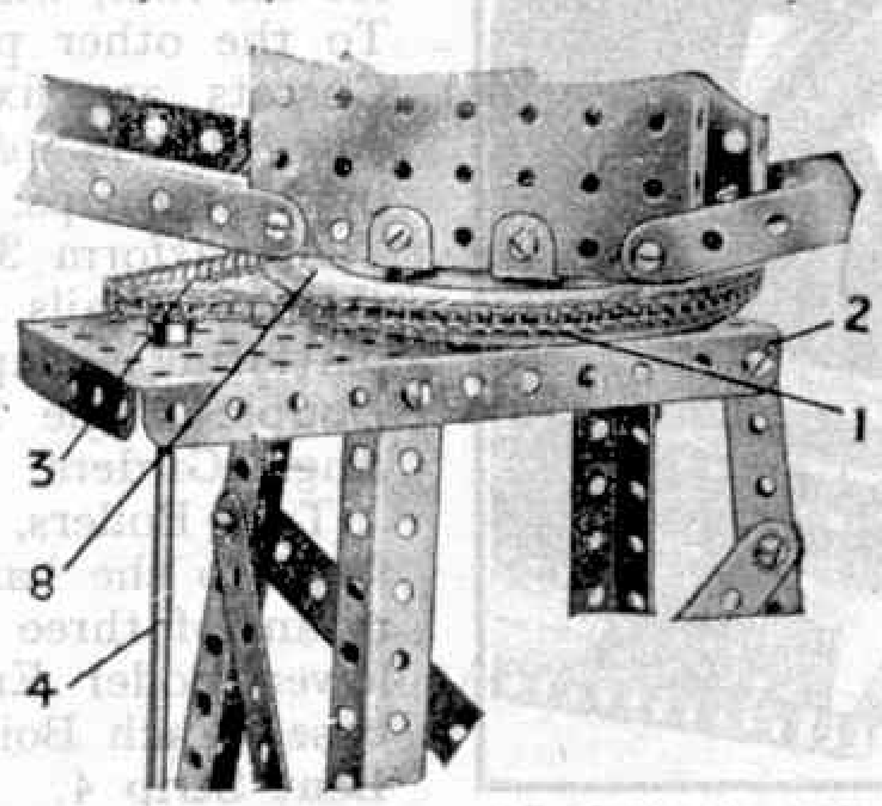


Fig. 4. A method of mounting the Ball Bearing for carrying the jib of a crane.

SPECIAL SUMMER COMPETITION

"MOST USEFUL MECCANO PARTS" VOTING CONTEST

At this time of the year most boys spend a good deal of their time out of doors, and with this in mind we are announcing a special voting contest that does not require any actual model-building yet enables Meccano enthusiasts to keep in touch with their hobby. The only items of equipment required are a pencil and a postcard, so that competitors can prepare their entries just as easily while outdoors or on holiday as at home.

From the list of 10 parts named below competitors are asked to decide (A) the part they personally think is the most useful and that can be used in the greatest variety of ways in model-building, and (B) to arrange the parts in the order in which they think the parts will be placed when the "A" votes of all competitors are totalled.

The following is the list of parts included in the contest: 1. Part No. 10, Fishplate; 2. Part No. 108, Corner Gusset; 3. Part No. 165, Swivel Bearing; 4. Part No. 24, Bush Wheel; 5. Part No. 62, Crank; 6. Part No. 133, Corner Bracket; 7. Part No. 147a, Pawl; 8. Part No. 11, Double Bracket; 9. Part No. 59, Collar; 10. Part No. 137, Wheel Flange.

Prizes will be awarded to competitors who forecast most accurately the six parts that receive the highest number of votes and arrange them in order of popularity. In the event of a tie for any of the prizes the neatness of the entry will be taken into account.

As usual there will be separate sections for Home and Overseas competitors, and the following prizes will be awarded in each section. First, Cheque for £2/2/–; Second, Cheque for £1/1/–; Third, Cheque for 10/6. There will be also ten awards each of 5/–.

Entries should be written on Postcards only.

Entries should be addressed "*Meccano Parts Voting Contest, Meccano Ltd., Binns Road, Liverpool 13.*"

The closing dates are, Home Section, 30th September, Overseas Section, 31st December.

New Meccano Model

Windmill Pump

THE new model illustrated in Fig. 1 is a double action windmill pump of the kind used in remote districts for pumping water supplies. A windvane operates two pumping units situated at the base of the tower, and in the model the motive power is provided by a No. 1 Clockwork Motor.

The tower should be constructed first. It consists of four 24½″ Angle Girders bolted to the corners of a square base frame assembled from four 9½″ Angle Girders. The base is partially filled in with 5½″ × 3½″ Flat Plates supported on 9½″ Angle Girders fixed across the base frame.

At the top the 24½″ Angle Girders are joined together by four 3½″ Angle Girders, and each side pair is braced by a 7½″ Angle Girder 1 and by a 7½″ and two 2½″ Strips.

Two of the 3½″ Angle Girders at the top of the tower support two 2″ Strips 2 which are bent slightly to form supports



Fig. 1. A double cylinder windmill pump. It is operated by a Clockwork Motor.

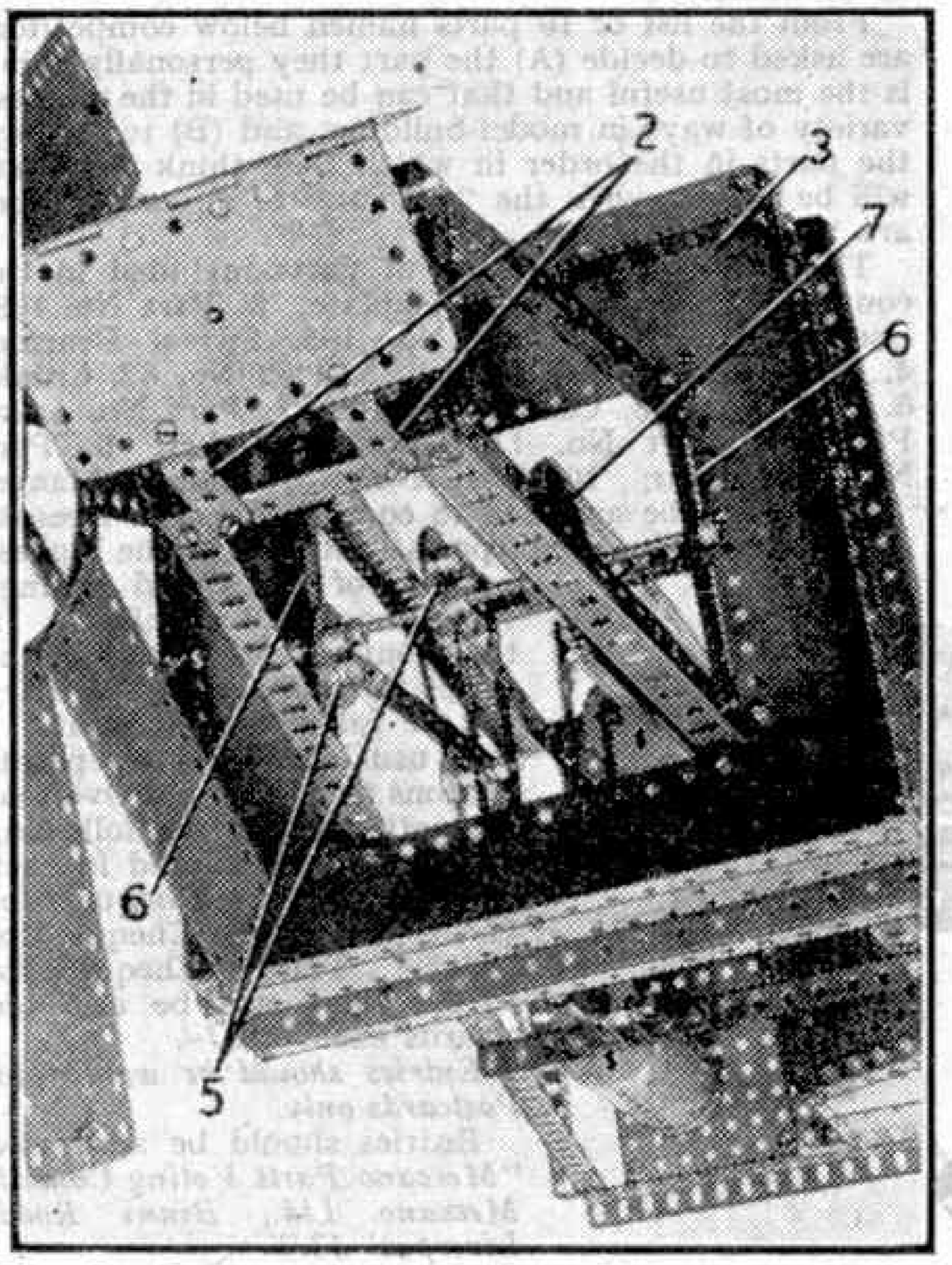


Fig. 2 A view of the platform that surrounds the tower.

for the roof, which is a Hinged Flat Plate. To the other pair of 3½″ Girders Corner Gussets are fixed. The front and rear pair of 24½″ Angle Girders are braced by 12½″ Strips.

A platform 3 is built round the tower and its details are shown in Fig. 2. The platform is supported on eight 2½″ × ½″ Double Angle Strips bolted to the 24½″ Angle Girders.

Two Boilers, complete with Ends, are fixed to the base. They are attached by means of three Bolts passed through the lower Boiler End and the Plates of the base. Each Boiler is fitted with a Double Bent Strip 4.

The No. 1 Clockwork Motor that drives the model is concealed in a housing built

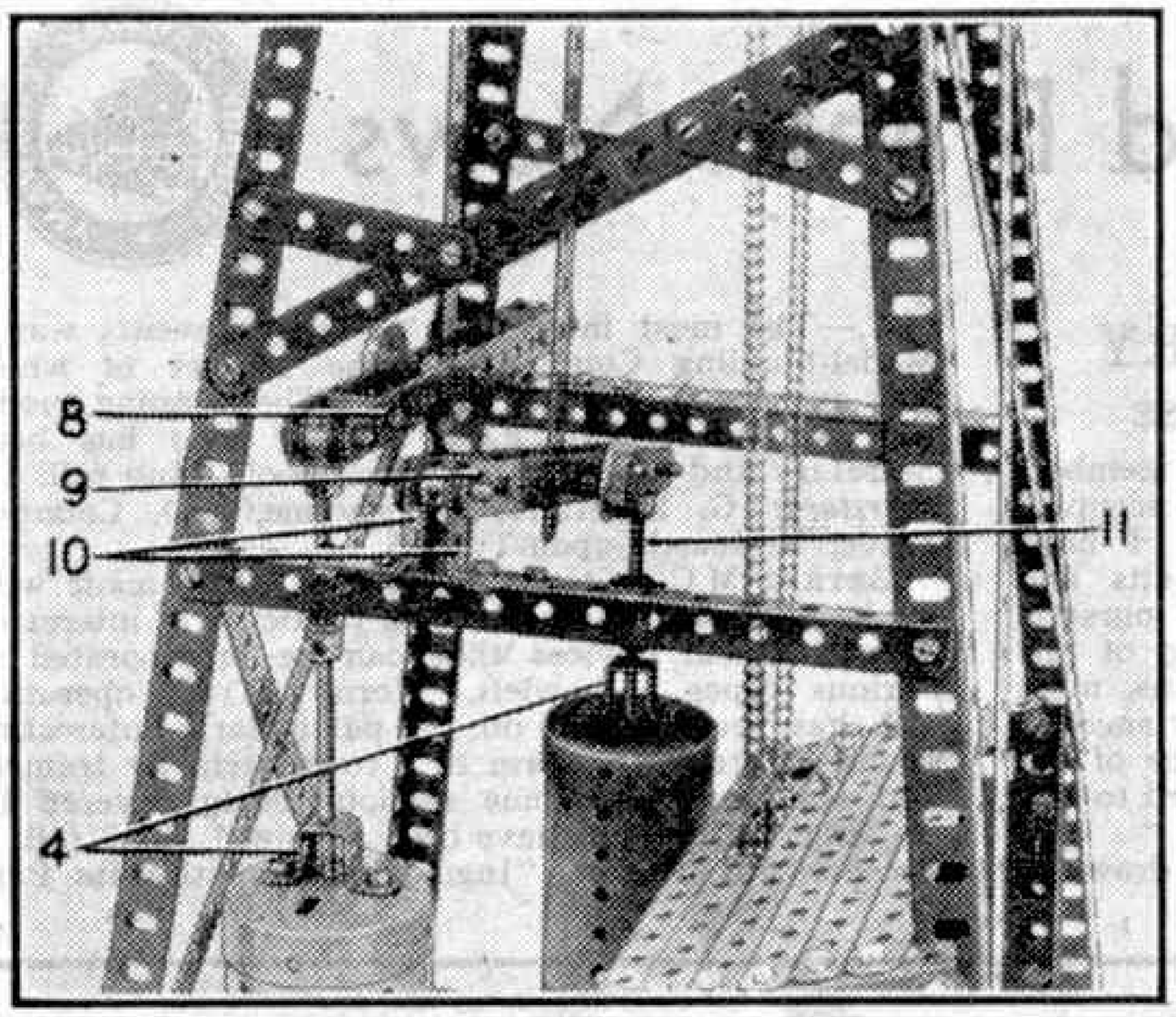


Fig. 3. A close-up showing the details of the pumping gear crossheads.

up from Strips, Angle Girders and Flexible Plates. The constructional details are quite simple and can be followed from the illustrations. The Motor driving spindle should be fitted with a ¾″ Sprocket Wheel *before the Motor is bolted in position.*

The pump operating gear is assembled as follows. Two Eccentrics **5** (Fig. 2) are mounted on a Rod journalled in 5½″ Strips 6 fixed to the back and front Angle Girders of the tower. This Rod carries also a 3″ Sprocket Wheel 7 and a ¾″ Sprocket Wheel, and is held in place by Collars. The ¾″ Sprocket is connected by Chain to a second ¾″ Sprocket on a Rod journalled in the Corner Gussets at the top of the tower. This Rod carries the windvane. The 3″ Sprocket Wheel is connected to the ¾″ Sprocket on the spindle of the Motor.

The arm of each Eccentric carries a 7½″ Strip that forms a connecting rod and links the Eccentrics with the pump crossheads 8 and 9 (Fig. 3). Each crosshead consists of a pair of 7½″ Strips spaced by two Double Brackets, and at one end is pivoted on a 1″ Rod mounted in a pair of 1″×1″ Angle Brackets 10 fixed to one of the 7½″ Angle Girders at the sides of the tower. Washers and a Collar are placed on the Rod to position the crosshead correctly. The other end of the crosshead is pivotally attached to the pump rod by a large Fork Piece, which carries in its boss a 1½″ Rod 11. This Rod in turn is held at its lower end in the spider of a Swivel Bearing fixed on the end of the pump rod.

The 7½″ Strips attached to the Eccentrics are connected to the centre holes in each crosshead by a 1″ Rod, which passes through the crosshead and through the second hole from the lower end of each 7½″ Strip. The Rod is fitted with a ¾″ Flanged Wheel to give a decorative effect.

To build the windvane start by bolting a Bush Wheel to the centre of a 4″ Circular Plate. Now bolt to the Plate, in the positions indicated, eight 7½″ Strips. A Circular Strip is attached to the eight 7½″ Strips, each of the bolts holding the Circular Strip holding also a 5½″ Flexible Plate. The outer ends of the Flexible Plates are bolted to the ends of the 7½″ Strips. The windvane is fixed to its spindle by tightening the Bolt in the Bush Wheel. The lower ends of the windvane blades pass between the platform and the tower, and care must be taken that the blades do not foul the main structure.

Parts required to build the model Windmill Pump: 4 of No. 1; 8 of No. 1A; 23 of No. 1B; 6 of No. 12; 1 of No. 3; 4 of No. 5; 4 of No. 6; 2 of No. 6A; 4 of No. 7; 10 of No. 8A; 4 of No. 8B; 2 of No. 9; 2 of No. 9A; 10 of No. 9B; 2 of No. 9F; 4 of No. 11; 1 of No. 12; 4 of No. 12A; 2 of No. 12; 2 of No. 15A; 2 of No. 18A; 6 of No. 18B; 2 of No. 20B; 1 of No. 24; 280 of No. 37; 24 of No. 38; 2 of No. 45; 8 of No. 48A; 4 of No. 52A; 12 of No. 59; 2 of No. 70; 1 of No. 94; 1 of No. 95A; 4 of No. 108; 2 of No. 116; 8 of No. 124; 2 of No. 130; 1 of No. 145; 1 of No. 146A; 2 of No. 162; 2 of No. 165; 8 of No. 189; 4 of No. 180A; 2 of No. 191; 9 of No. 192; 4 of No. 196; 1 of No. 198.

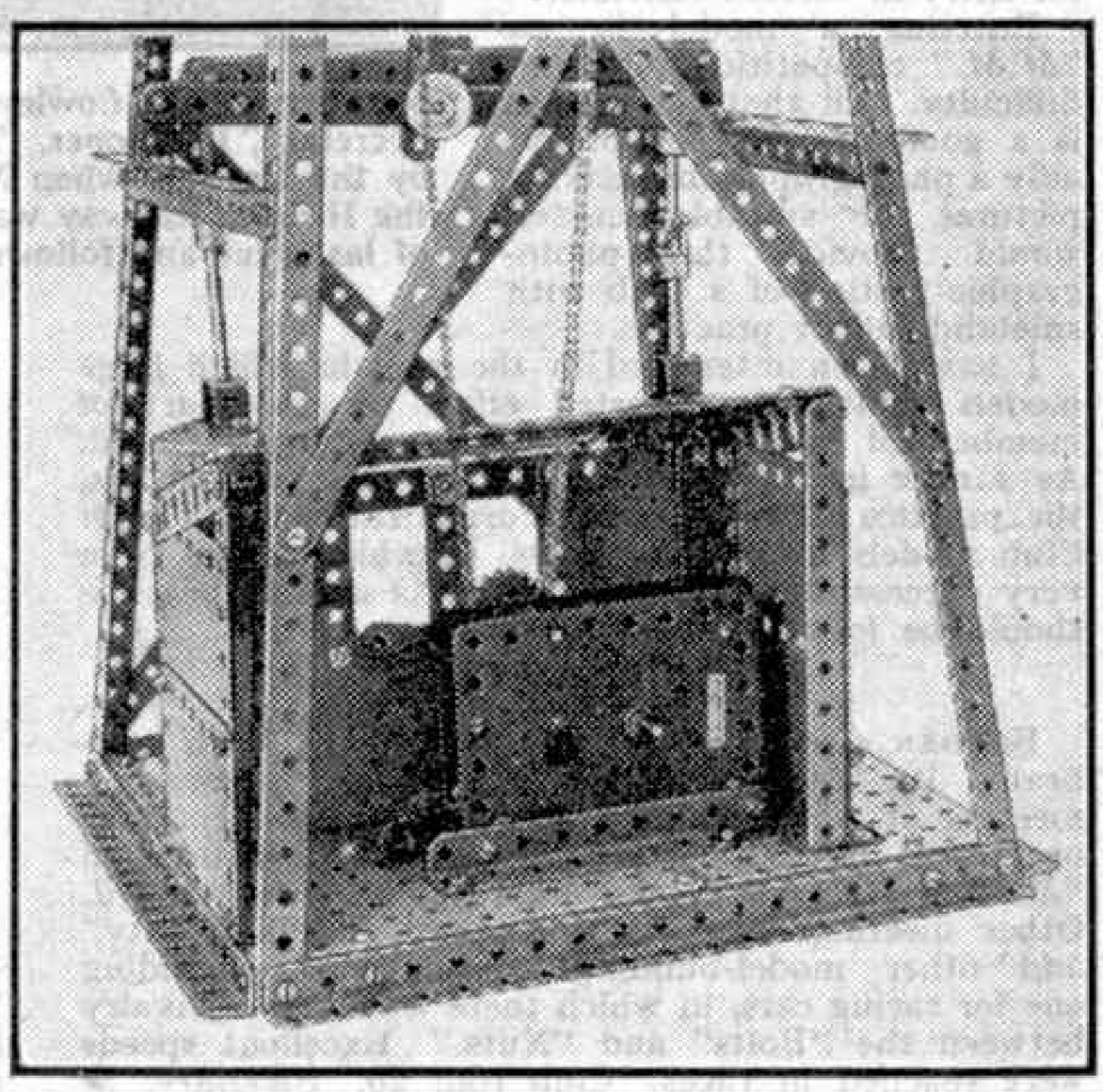


Fig. 4. The base of the windmill pump tower showing the housing for the No. 1 Clockwork Motor.

Club and Branch News

WITH THE SECRETARY

MODEL-BUILDING WITH A PURPOSE

This is the month above all others when members meet out of doors, and the Club Room is occupied chiefly when the weather is unfavourable. I hope that every Club will enjoy outdoor pursuits and excursions this present month, but these pursuits should not prevent officials from thinking of the coming autumn and winter months. Plans must be ready in good time if they are to be really successful, and some idea should be formed at once of the programme to be followed, especially in regard to any new features that may be contemplated.

There is one point to which I should like to draw the attention of Leaders in connection with this. It concerns model-building, always the core of Club activities. It is splendid to see members building good models, large and small, especially in Club competitions, but I am sure the interest would be greatly increased if model-building were carried on with some special purpose beyond this. In many Clubs this is provided for to some extent by arranging Exhibitions, a splendid practice. There are other ways of making the best of excellent productions, however. One is to enter them in the Model-building Competitions announced in the "*M.M.*" These vary considerably in scope, and in practically every Club there must be models under construction at any time that would be suitable for entry in current contests.

Entering a model in an "*M.M.*" competition offers no difficulty. All that is required is a good drawing, or preferably a photograph, and making pictures of suitable models would provide the photographic section of a Club with splendid indoor practice.

I have been interested in the way in which large models built by concerted effort on the part of members of the Kimount M.C., Vancouver, are used. As a note in the Club Reports on this page shows, the practice of this Canadian organization is to enter Club models in Hobby Shows, in which it has been very successful. Wherever possible a similar practice should be followed.



Members of the Cowley (Oxford) Branch, No. 511, Chairman, Mr. F. Cooper, Secretary, D. Cooper. This photograph was taken at an Exhibition arranged by the Branch, when Meccano models built by members were on view and the Hornby Railway was in operation. The Branch was incorporated in June of last year and follows a varied programme, of which Track Nights are the central feature.

CLUB NOTES

BORDEN GRAMMAR SCHOOL M.C.—The Club celebrated its 20th Birthday by a party, following a meeting at which Talks were given by the Secretary on "*Ideas for New Models*," and the Treasurer on "*Making Meccano Clocks.*" Cricket also was played. Other meetings have been devoted to "Simplicity" and other model-building competitions, including one for racing cars, in which there was intense rivalry between the "Bolts" and "Nuts." Excellent speeds were reached in races. Club roll: 20. *Secretary:* S. Wood, 20, Harold Street, Queenborough, Kent.

ROYAL GRAMMAR SCHOOL (NEWCASTLE-UPON-TYNE) M.C.—The most interesting of recent events was a Model-building Competition, the subject of which was any type of wheel vehicle. The winning model was constructed by F. J. Curtis, who has been Secretary and has now left the school. Club roll: 11. *Secretary:* G. S. Miller, "Fairholme," 10, Countess Drive, Newcastle-upon-Tyne 5.

BETHEL M.C.—Steady progress is being made with model-building, members being particularly interested in mechanical devices that can be incorporated in various types of models. Hornby Train operation also has been carried on. A particularly interesting Excursion took the form of a round trip by tramcar and steam railcar, some sections being covered by walking. Other trips have been arranged. Club roll: 7. *Secretary:* B. Davies, "Ingoldsby," Crosthwaite Park South, Dunlaoghaire, Co. Dublin.

CANADA

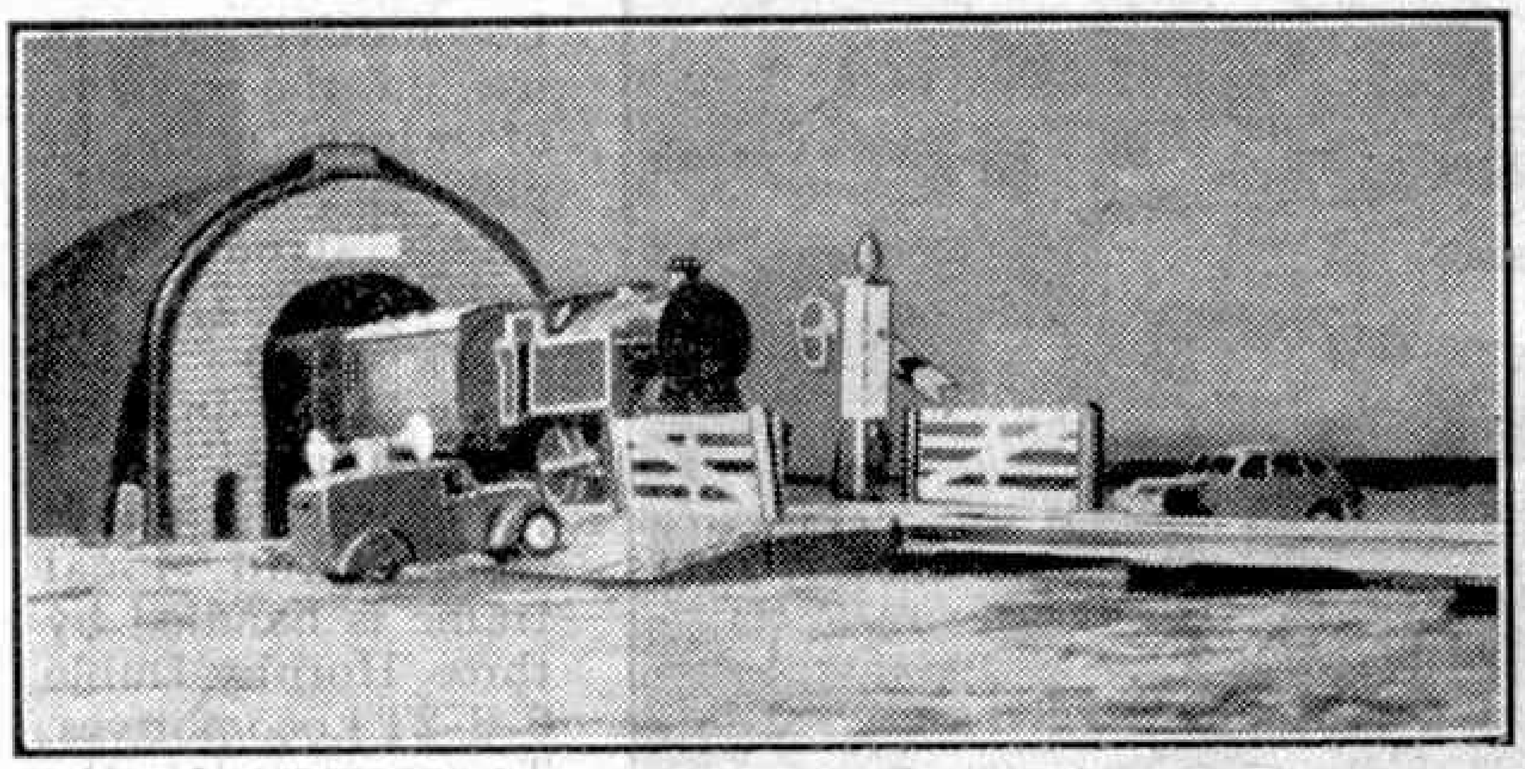
KIMOUNT (VANCOUVER) M.C.—Models have been built and displayed in the Hobby Show of the Vancouver Boys' Club Association, when six prizes were won. Members were kept busy demonstrating the models and answering questions on model-building from visitors. A Meccano Parts store has been constructed; members intending to build models make up lists of parts required, which are then issued to them. *Leader:* B. I. Kersbaw, 405, West Fourteenth, Vancouver, B.C.

BRANCH NEWS

NEW ROAD MODEL RAILWAY (BUCKHURST HILL).—Members worked steadily to complete the Branch layout in readiness for the Exhibition. Standard lamps have been fitted to light up the circuit and red stop lights also have been introduced. Additional rolling stock has been placed in service. *Chairman:* Mr. G. C. Flowers, 21, Boxted Close, Buckhurst Hill, Essex.

An "East Anglian" Hornby Railway

THE Hornby railway system shown in the illustrations is jointly owned and operated. Three keen *"M.M."* readers and Hornby railway enthusiasts, J. E. Tyers, B. R. Owen and P. Smith keep traffic moving on this layout, to which each has contributed rails, rolling stock and accessories. Although it is not an elaborate system, it is an extensive one on which realistic traffic operations are carried out.



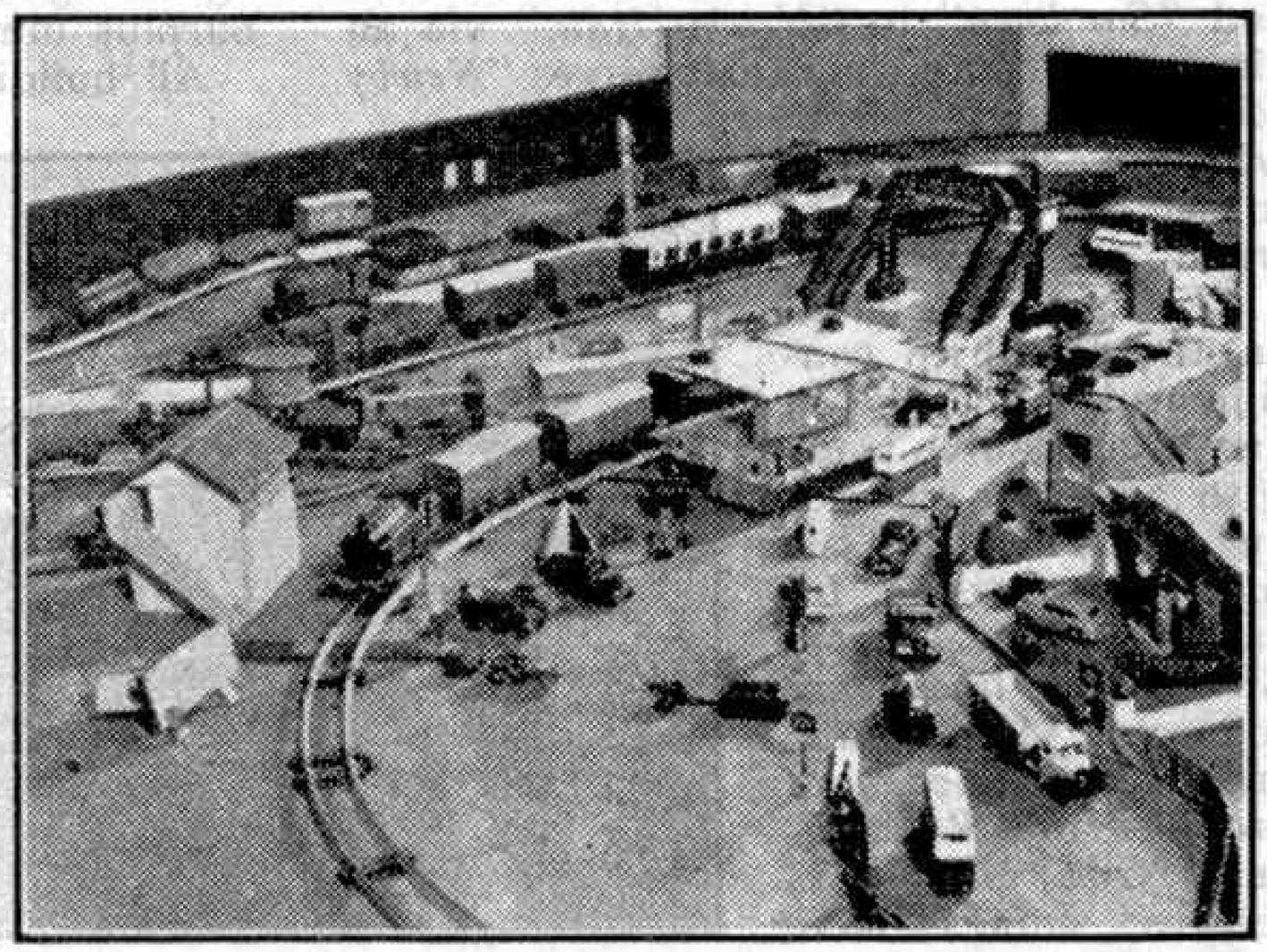
A typical scene at "Lyndhurst Crossing" on the layout described on this page. Photographs were taken by "M.M." reader W. Turnill.

The railway represents an imaginary section of the L.N.E.R., now Eastern Region, in East Anglia. The main line is roughly oval in form and it has an inner loop. The station where the main and inner routes diverge is named *"Everingham Bridge Junction."* This has two platforms, one for each route, and both platforms are linked with the roadway system that forms an important part of the lineside effects. This roadway, as befits the rural character of the district, crosses the different tracks in three separate places by means of level crossings. The roadway also serves a goods platform situated on a branch from the outer main line near another station, which has the realistic name of *"Market Bleaching."* This is a combined terminus and through station.

A more industrial area, too, is served by another line that follows the general oval contour of the main track. It leaves this at another station named *"Lyndhurst,"* runs with it for some distance, and ends up at a factory building that has a covered goods bay of its own.

"Everingham Bridge" is quite an important centre and a model town has been developed there. The main street is electrically lit and there are shops and a garage, the last very necessary in view of the fleet of motor vehicles that operate on the roadways generally.

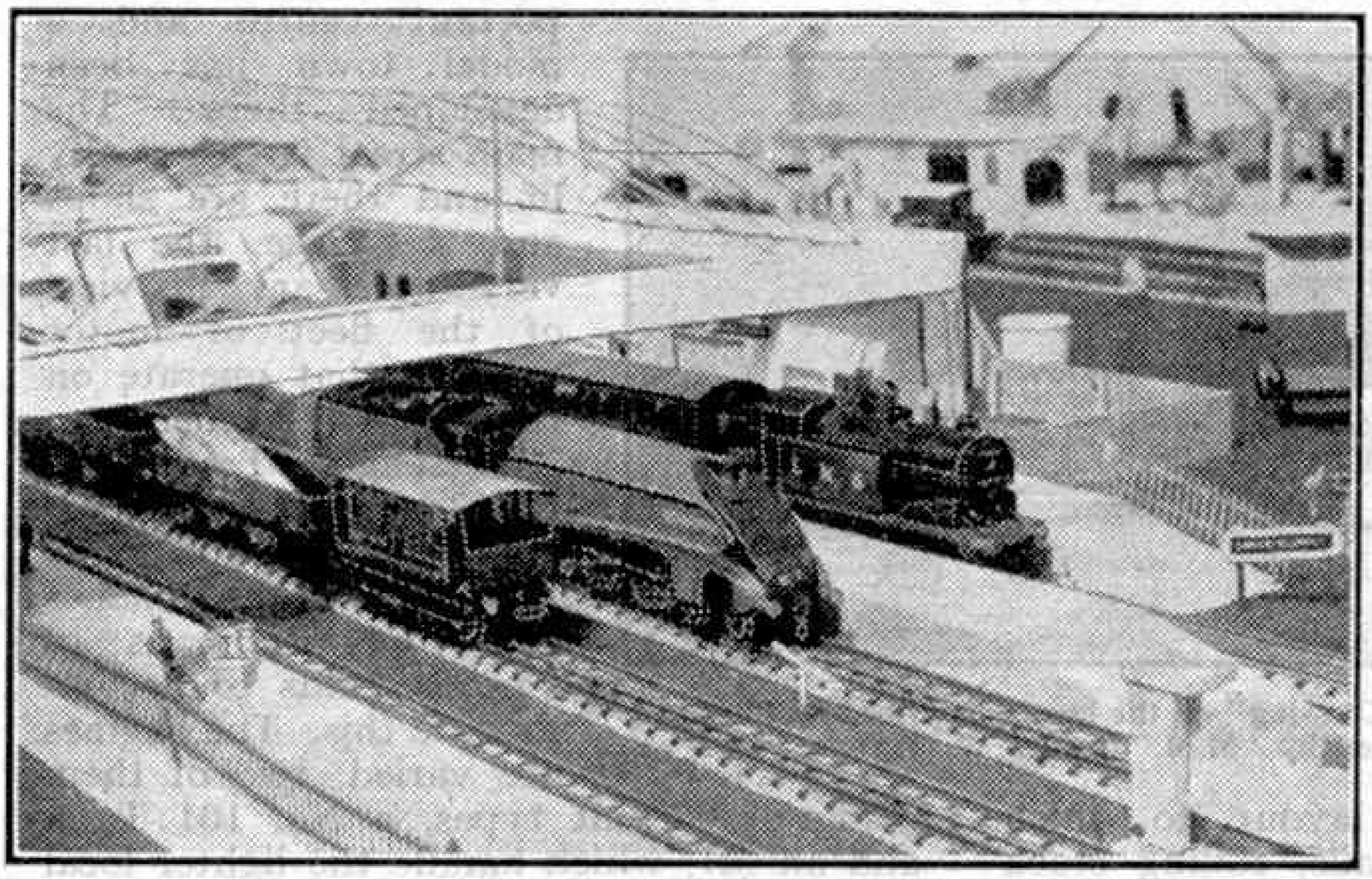
Passenger Traffic on the layout is considerable and there are three Hornby No. 1 Coaches and four Pullmans of various kinds to accommodate this. The engines are varied, two of them being of current types, a No. 101 Tank and an M1, which handle the lighter local traffic. Pre-war designs also are represented, as there is a No. 1 Special for heavy freight and a large 4–4–2 tender type engine. The coal and raw materials are conveyed to the factory district in trains of open wagons. Typical country district traffic is provided for by Milk and bogie Luggage Vans. In case of emergencies, a Breakdown Crane unit is stationed at *"Market Bleaching."*



A general view of "Everingham Bridge" showing the junction station and its busy surroundings, both rail and road.

The Hornby-Dublo "Rutland Railway"

THE *"Rutland Railway"* is a Hornby-Dublo layout owned by Mr. J. M. Davenport, of Walton, near Warrington. The system represents a railway supposedly in Eastern England, owned jointly by the former L.N.E.R. and L.M.S. According to the description supplied by the owner, the line runs from *"East Point Harbour"* where ships sail to the Continent, to *"Rutland,"* which is the headquarters of the system; thence to *"Sandown."* A local passenger service runs between *"Rutland"* and *"Sandown"* to *"Newby Halt,"* via an alternative route. This halt serves *"Newby Main Colliery"* from which coal trains form an important traffic.



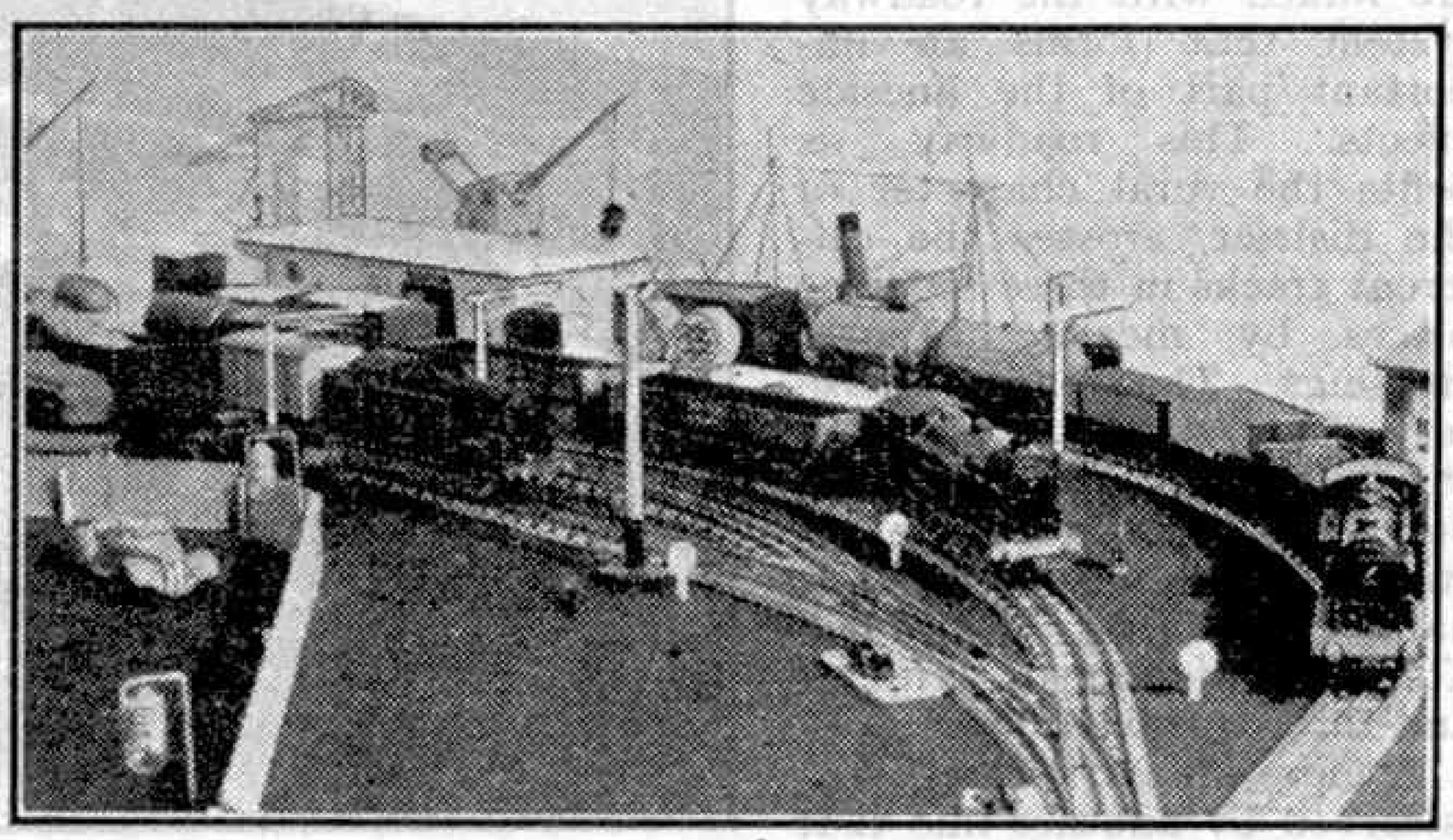
Passenger and goods trains at the main station on the "Rutland Railway" layout of Mr. J. M. Davenport. Photograph by Mr. R. G. Garner.

The layout is based on the favourite continuous track, the main line being double track with an outer line for suburban traffic running alongside for most of its length. All three lines are connected by points, and loop lines are provided at *"Rutland"* and *"Newby Halt."* Extensive sidings have been built at the harbour docks, with adequate warehouse accommodation, and there are light and heavy cranes on the quays. The Locomotive Department at *"Rutland"* has an engine shed, turntable and water towers.

Six Hornby-Dublo Locomotives are in use on the system, of which pride of place is taken by an "A4" streamlined 4–6–2 No. 7, *"Sir Nigel Gresley."* Next come two pre-war "Pacifics" for passenger work. Goods and local traffic is handled by three Hornby-Dublo 0–6–2T Locomotives. To accommodate the traffic there are eight passenger coaches, and over 25 goods vehicles of all types.

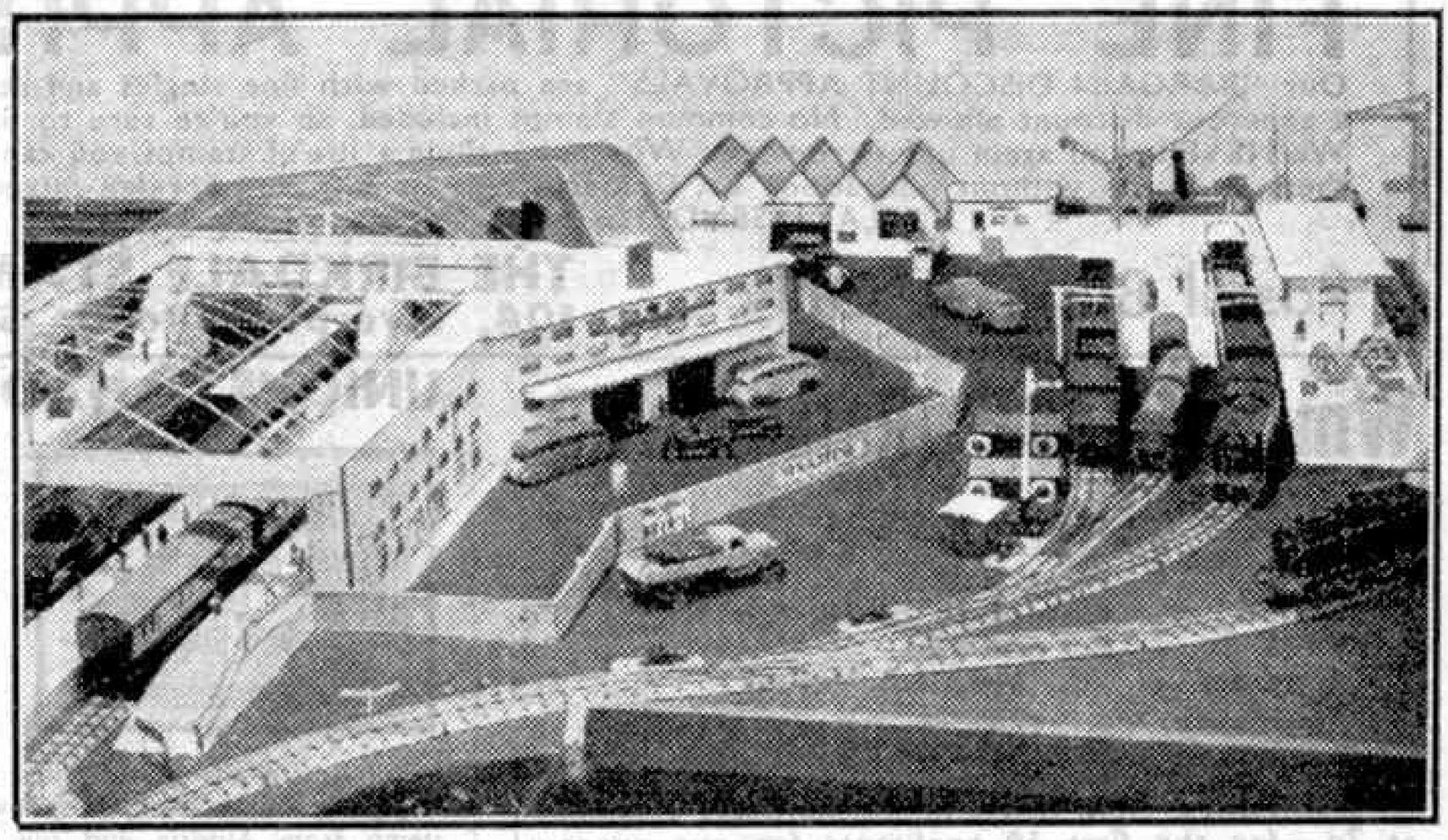
Control over the 20 separate sections into which the layout is divided is centralized at a switchboard near *"Rutland"* station. Four Hornby-Dublo Controllers look after the main sections. On the main line Dublo electric signals have been interlocked with the points. *"Rutland," "Sandown"* and *"Newby Halt"* are controlled by colour-light signals made from Government Surplus miniature bulbs.

All buildings are of home construction,



A goods yard and dockside view on the railway. Freight traffic of various kinds is evidently plentiful.

the archspan roofs of the main stations being made up of thin strip steel. Roads enclosed by strip steel fencing link up the stations, and there are bridges and level crossings. Effective use is made of miniature figures and Dinky Toys. Buildings and roads are illuminated, a separate circuit from a Meccano Transformer providing the current. Those coaches that have glazed windows are also provided with illumination.



A general view showing the main station, the road approach and goods yard. Dinky Toys motor vehicles are effective at the lineside.

The whole layout is built up on shelving around a spare room measuring 10 ft. by 10 ft. and the boards are covered with green felt. This not only adds to the scenic effect but also serves to reduce noise. There is ample room for further development, but this must of course depend on the availability of material.

A Gauge 0 Irish Postal Van

READERS will remember the remarkable gauge 0 miniature railway system of Mr. C. L. Fry, of Dublin, that was described in the January 1947 "*M.M.*" In addition to thoroughly up-to-date stock, the railway boasts numerous locomotives and complete trains of a "period" character and so presents in attractive model form the progress in rail transport over the past century or so.

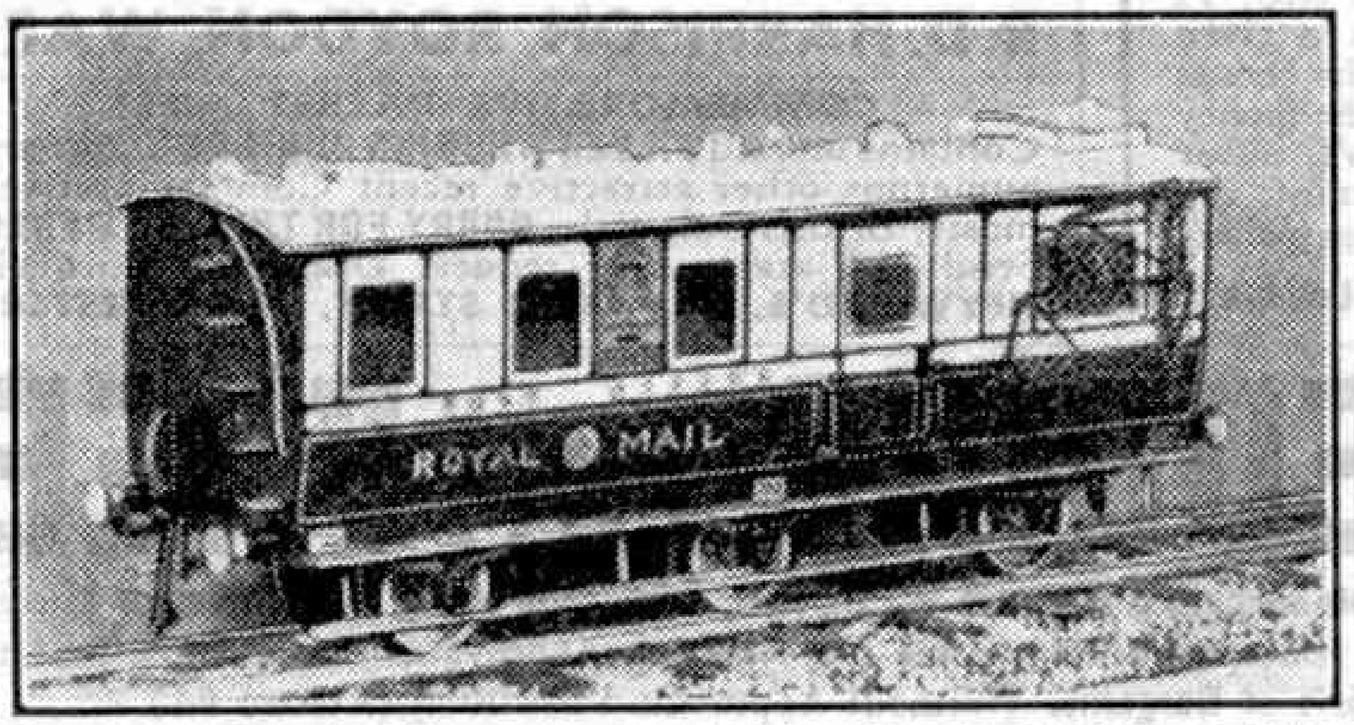
A typical historic rolling stock model is shown here. This represents a Travelling Post Office mail van put into service in 1887 by the former Midland Great Western Railway of Ireland.

The model, like the real van, has the characteristic proportions of 6-wheeled stock that was running on most British railways at one time. Like many real vehicles of this kind it has special axle-box arrangements to allow it to run round curves of 2 ft. 6 in. radius.

The mail net on the side of the van extends so that the actual exchange of postal pouches can be carried out when passing the miniature lineside apparatus.

The net is operated from a track ramp alongside the centre rail. As was usual in older postal vehicles the roof has two typical skylights in addition to the usual ventilators and lamp tops and it also carries a dummy water tank.

The model is finished in the handsome blue and white livery once used by the Midland Great Western Railway. To agree with this finish the Royal initials "*E.R.*" lend an attractive "period" touch to the posting box on the side of the vehicle.



An attractive Postal van constructed by Mr. C. L. Fry, Dublin. The net extends for the exchange of mail pouches.

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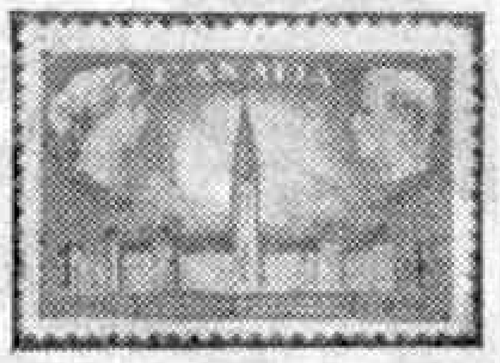
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For other Stamp Advertisements see also pages 322 and xi.

Stamp Collecting

A Holiday in Switzerland

By F. Riley, B.Sc.

WE cannot all spend a holiday in Switzerland, that wonderland of mountains, glaciers and lakes, but every stamp collector can transport himself in spirit to that country by gathering its stamps and browsing over them. Many of these picture the giant mountains and lakes, illustrate the simple life of Swiss country folk, draw upon stirring episodes in the country's history, and show also some of the splendid railways for which the Swiss have become famous.



Let us begin with Geneva, an ancient and world-famous city. This stands on both sides of the Rhone where this river flows out of Lake Geneva, and it has had a wonderful history. It became a city of refuge for Protestants in the days of the Reformation, and it will always be associated with John Calvin, who gave his name to a religious creed. After the first world war it became the home of the League of Nations.

The central stamp on this page is a reminder of a famous episode in the story of Geneva. It shows the castle of Chillon, at the head of Lake Geneva, where Byron's famous prisoner was immured for six years. The name of the prisoner was Bonnivard. According to Byron's poem he was a Protestant who suffered imprisonment on account of his religion. The story is tragic enough, but appears to be largely imaginary. The real Bonnivard seems to have been a political prisoner who only became a Protestant after his release.



Another outstanding event in the story of the city was a convention held there in 1864 to establish rules for dealing with the sick and wounded in war. The originator of the scheme then arranged was a young Swiss, Jean Henri Dunant, and the outcome of his efforts was the famous Red Cross organization, which derives its name from its distinctive flag. This shows a red cross on a white background, and is indeed that of Switzerland itself with the colours reversed.

Two stamps issued in 1939 marked the 75th anniversary of the Geneva Convention. They were of the same design, one in red and buff and the other in bright blue and grey, and one of them is reproduced at the head of this page. The design appropriately shows Geneva itself from the lake, and in one corner is a shield showing the Red Cross of the organization set up in 1864. A portrait of Jean Henri Dunant is to be seen on one of a special children's fund series in 1928. This is a reminder of the now famous charity stamps issued in Switzerland every year at Christmas, which are known as the Pro Juventute series. This began in 1913 and many striking and beautiful designs have appeared in it. Two of these are reproduced on this page. The upper one, which was issued in 1929, shows sunset over Lake Lugano, with Mt. San Salvatore in the distance; the reproduction gives no idea of the brilliant colouring of the sky and its reflection in the water. The lower one shows a more rugged but equally characteristic scene, for it illustrates the Wetterhorn, a peak in the Bernese Oberland. This has three summits, the highest of which is 12,166 ft.



The Pro Juventute stamps have included a fine range of pictorials of a similar type to the two illustrated, together with a host of portraits of famous Swiss and a collection of designs showing the arms of the cantons of Switzerland. In themselves the stamps provide a splendid subject for a side-line collection, and every one of them shows some aspect of Switzerland that would interest us greatly in a holiday there. For instance, the arms of the cantons of Uri and Schwyz would remind us of the romantic origin of Switzerland, for the men of these cantons, with those of Unterwalden, now divided into Obwald and Nidwald, were the first to bind themselves together to resist the tyranny of the Hapsburg rulers of the country. It was in Uri that the famous William Tell lived. Whether the story of how he shot an apple from the head of his son with a bolt from his crossbow is true or is just a legend, it is one that arouses the greatest possible interest and deepens our admiration for the sturdy men of the cantons who founded the independence of their country. Tell's Chapel on Lake Lucerne is shown on a stamp issued in 1938, and a portrait of Tell himself is seen on a stamp of 1914 issued in various values and colours.

These are only a few of the wonderful stamps that illustrate the people, mountains and lakes of Switzerland. There is no space here to deal with them in detail, but I must add a reference to the last of the stamps illustrated, which shows one of the country's electric railways. The Swiss are great engineers as well as watch and clock makers, and they have taken full advantage of the many falls in the country to develop hydro-electric power on a large scale, and to use this for transport purposes. This last stamp therefore illustrates yet another side of Swiss life that would certainly be attractive to "*M.M.*" readers who could visit the country.







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Stamp Gossip
and Notes on New Issues

By F. E. Metcalfe

EVEN though we are in the middle of summer new stamps continue to pour out. In the old days collectors could put away their stamp albums when they took out their cricket bats and bathing suits, knowing that when they came to reverse the action in autumn they would soon be able to catch up, and the few stamps they had missed would be easily obtainable.

Alas, the same conditions do not obtain to-day, for stamps are in and out in a flash, and sets which cost coppers when they appear soon need as many shillings if they are to be purchased. A case in point is the set of Ascension, which recently appeared perforated 14. Only three low value stamps were concerned, with a total face value of 4½d., and for a week they were on offer at 6d. a set. Then the news got round that the Crown Agents in London had no more stock and up zoomed the price. Anything from 2/6 to 10/– was asked and obtained from the multitude of collectors who had missed the boat.

Several other instances could be given, but probably enough has been said to show that it is unwise to forget one's collection entirely during the months when one would rather be outdoors.



The best way is to join a new issue service, and put the stamps carefully away until the inclination to collect returns, as it surely will, when the cold wet days are back again.

As I have remarked before, stamps depicting ships are by far the most popular, and hosts of collectors will welcome a real peach of a stamp which was recently issued by South Africa, to commemorate the centenary of the first settlers in Natal. There was a good deal of criticism of the design in South Africa on the grounds that the rigging of the ship was all wrong, but an ex-sailing vessel hand was quick to point out, when he saw the stamp, that there was nothing whatever wrong with the rigging. Anyhow, right or wrong, collectors of "ship stamps" have gleefully added the newcomer to their collections, and that's all that matters really.

Australia has provided us with a new and rather handsome stamp, though not everybody will agree that the latest design is superior to the one replaced.



It is understood that this new design will be adopted also for the new 10/–, £1 and £2 values which are to appear sometime in the near future.

We have remarked previously how badly centred Australian stamps generally are, and this recent addition is no exception. Dealers who have to handle them are very annoyed, and have awarded to Australia the distinction, hitherto not very proudly held by Spain, of being the country issuing the worst centred stamps. Speaking of Spain, this country is now producing a number of quite attractive stamps, and as most are readily obtainable used quite cheaply, no doubt some of their old-time popularity will return. A quite extensive collection of used Spanish stamps can be gathered at low cost, and while their investment possibility is not great, there is no need to spend much on modern Spain, at any rate.



Another country which went out of fashion during the last war, but which is now returning to favour, is Japan. The quality of Japanese stamps, as far as the paper used is concerned, is shoddy in the extreme, but some of the designs are delightful, and apart from the special issues, where one gets the handsome pictorials, even the ordinary postage stamps are well worth collecting for their designs.

We are illustrating one of these. It is not a pretty stamp, or even of nice design, but how significant the design is. Here we see a worker, with some kind of a pick over his shoulder, and all that on a Japanese stamp. Who would ever have thought before the second world war that an ordinary worker would be depicted on a stamp of aristocratic Japan?

The U.P.U. 75th anniversary commemorative stamps, which are being issued by all our colonies as well as Great Britain, are not due until 12th October, but other countries are simply teeming out sets, and very popular some of them are going to be. In fact, many collectors are taking all the issues, and as apparently every country which is a member of the Postal Union has issued or intends to issue a set, they will have a task on their hands to complete their collections. But this will be well worth while, for most of the sets, if not all, will be of low face value and some attractive designs can be expected. At the time these notes are being written nothing is known regarding the design selected for our own colonies, but it should not be difficult to produce something more attractive than the "Victory" stamps, and if our country does not beat the "Olympic" stamps designs, well it isn't trying.

We haven't written much lately about the stamps of the country which generally gives us such superb designs—France. Of course new issues are coming out every week. The government owns a most expensive printing plant and it has to be kept busy. The stamp we are illustrating is a fair sample of the handsome stamps it turns out. One excuse is as good as another, and this time homage to the U.S.A.—hence the "Stars and Stripes" on the left shield—is the raison d'etre. Great Britain is to be similarly honoured.



One more country we would like to mention this month is Portugal, which has just issued a really magnificent set. In the next issue of the *"M.M."* we hope to have room to illustrate one of these stamps. They have been printed in Switzerland by the famous Courvoisier firm, and depict portraits of the great men of Portugal during its finest periods of history. Portugal has a proud past, and these stamps worthily honour it.

The Painting of Merchant Ships—

(*Continued from page 294*)

varnish are frequently used for wooden deck structures and look very well when they are thinly and evenly applied; they are seldom used for steel except where deckhouses, etc., are grained as in the Ben Line, where Chinese painters are always carried. The use of aluminium alloy for deckhouses and other fittings in order to save weight, which is rapidly coming into fashion, calls for new paints which are still in the experimental stage.

Special paint is demanded by the funnels owing to the hot gases passing through them. Ordinary paint will flake and fall off, and paint with lead in it will be discoloured by the sulphur. Soot round the tops of the funnels must always be scraped off carefully, and most companies choose a design with a black top to hide it. Raking funnels, like masts, can be very awkward to paint, and in doing them men have often been scalded, sometimes fatally, through steam suddenly blowing off owing to the engineers not having been warned to keep the pressure down. Ventilators are often as distinctive in their colouring, inside and out, as the funnels. The life-boats demand special care, partly for their appearance but largely to keep them watertight even if they have been exposed to a hot sun. Care is also demanded on the davits lest the working parts should be "painted up."

Not all the problems are on the outside of the ship, for there are many internal spaces such as bunkers, double bottom compartments and the like where there is a danger of very rapid corrosion owing to changes of temperature. Bituminous paints, with particular care that there is no chance of corrosion starting under them, are often used for such spaces, as well as water tanks, for their virtue of setting very hard and lasting for years. They are also frequently used for the tanks of bulk oil carriers, particularly those used for spirit which corrodes steel, especially round rivet heads, very rapidly. There are many other troublesome cargoes; sugar, for instance, gives off a gas which discolours the interior paintwork of the holds, and certain cargoes demand that the paint should be perfectly dry and hard before they are shipped. As one instance, if cotton comes into contact with oil or grease there is the possibility of spontaneous combustion and a disastrous fire.

One way and another, it is not surprising that paint enters so much into the calculations of the shipowner and the seaman.

How Electric Trains Are Driven—

(*Continued from page 305*)

accelerating in notches 2 and 4 further acceleration can be suspended by moving the handle back to Notch 1 or Notch 3. However, this will leave some of the resistance in circuit, and motormen must beware of running in that condition for long because of overheating.

The device that effects automatic switching out of the resistances is the accelerating relay, which operates each time the current taken by the motors falls to a chosen level, and completes the circuit to close another contactor.

Often the setting of this relay can be altered by a "rate switch" in the motorman's compartment, so called because, according to whether it is "on" or "off," it allows two rates of acceleration to be selected.

Sometimes, after the accelerating relay has made the change to parallel motor connection and cut out all resistance, it effects one or more stages of further acceleration by weakening the magnetic field in which the motor armatures rotate. This may be done by connecting a resistance across the field windings to divert part of the current they take, or by means of tappings on the windings, or by a combination of both methods. Contrary to what might be expected, a weakened field causes the motors to run faster. Usually the motorman can choose whether or not he will let acceleration continue through these extra stages by operating a switch that cuts them out at will, or by using a particular forward setting of the reverser handle alongside the master controller.

In modern multiple-unit trains it is usual practice for the groups of contactors, relays and resistances to be assembled in cases carried on the underframes of the motor coaches. There is still plenty of rolling stock to be seen, however, in which such apparatus is carried in a compartment behind the motorman. In electric locomotives it occupies the high-tension compartment in the body, and cooling of the resistances is often assisted by passing over them some of the air from the blowers that ventilate the traction motors.

Resistances in electric locomotives are usually rated to carry heavy currents for longer periods without overheating than those in multiple-unit trains, and there may be many more notches in the accelerating sequence. A considerable range of economical running speeds can be provided by combining weak-field operation with different motor connections: for example, the use of full-field and three weak-field steps in series, series-parallel and parallel, giving 12 running speeds in all, as is being provided in some 1–Co + Co–1 locomotives now being built for South Africa jointly by the North British Locomotive Co. Ltd. and The General Electric Co. Ltd. Automatic acceleration is rarely employed in locomotives, and the total number of accelerating steps may amount to as many as 57, as in the French 2–Do–2 locomotives running on the Paris-Bordeaux main line.

There are methods of doing without resistance control, as in the Southern Region electric locomotives and the metadyne trains of London Transport. It is not necessary, either, where alternating current is used, as on the electric railways of Sweden and Switzerland for example. Recent and pending electrifications in Great Britain, however, are all direct-current (only one British line is still worked with a.c.), and so the methods of control described in this article are likely to be seen in our electric trains and locomotives for a long time to come.

A MINIATURE PERMANENT WAY HANDBOOK

Many "*M.M.*" readers will be acquainted with "Peco" range of permanent way material for 00 and HO gauge and similar railways. This is manufactured by the Pritchard Patent Product Co. Ltd., Sidmouth, and provides for the more advanced model railwaymen in these miniature gauges the necessary parts for assembling track at home. There are two closely related main systems known respectively as "*Peco-Way*" and "*Peco Individulay.*" In the former the sleepers and ballast are represented by a ready-embossed and punched card track base with a corresponding card underlay. The "*Peco Individulay*" system involves the use of separate sleepers, positioned according to a printed foundation tape, and actual ballast.

Full details of the use of the two systems, illustrated by clear diagrams and some photographic reproductions, are contained in "*The Peco Platelayer's Manual*" by R. Watkins Pitchford, which forms a complete guide to these track products. It also contains useful observations on the relationship of gauge and scale, and hints on other allied topics.

Although the "Peco" system is primarily intended for use in conjunction with stock equipped according to M.E.T.A. standards, provision is made for the special circumstances arising when either Hornby-Dublo or Trix trains are in use. But stock or track of each of these varying types cannot be mixed together.

Copies cost 4/9 each, from shops where "Peco" products are stocked.

BACK NUMBERS OF THE "M.M."

A few copies of the following issues are available price 8d. each, including postage, etc.—January 1946; January, April, July, August, September, October, November 1947; May 1948; February and July 1949.

Readers wishing to obtain copies of these issues should write immediately to the Editor.

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Make Up A Simple Crossword

Here is an interesting competition for the holiday month. It is a kind of cross-word puzzle, but competitors are asked to make this up for themselves. There are 25 squares in the diagram to be used, with no blanks. Only 25 letters therefore are required and the longest word can have only 5 letters in it, while within limits entrants can choose their letters themselves.

The idea of the competition is to choose from this issue of the "*M.M.*" a sentence or phrase containing 25 letters, and to re-arrange these to form a square like the one shown in the diagram on this page. The aim is to form as many complete words as possible in both the rows and columns of the square. For each word of five letters in one line, horizontal or vertical, 10 points are awarded. The number of points for a word of four letters is 5, and for words of three and two letters the points are 2 and 1 respectively. A line containing two words, one of three letters and the other of two, is allowed 3 points. The greatest number of points that can be scored is 100.

In this contest only English words in current use may be used, and names, slang and coined words are not eligible. Short words forming part of a longer word in the same line do not count in reckoning up the score.

To make the meaning of this quite clear we have taken the phrase "scope of the cheapest cameras," which will be found in the fourth line of the photographic article on page 310, and from the letters of this phrase we have constructed the square reproduced on this page. The points scored in each row and column are shown, together with the total.

	10	5	2	5	10
10	S	C	A	R	E
5	H	A	T	E	P
1	A	F	O	S	O
5	M	E	E	T	C
—	S	E	P	C	H

TOTAL 53

Competitors must indicate the line and page from which the phrase or sentence they use in this contest has been taken.

There are two sections, for Home and Overseas readers respectively, and in each prizes of 21/–, 15/– and 10/6 will be awarded for the best efforts. In the case of a tie for any prize the neatness and originality of the entries will be taken into account.

Entries should be addressed "*August Pointword, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 30th September; Overseas Section, 31st December.

Choose Your Sport

August brings us to the peak of the outdoor sports and games season, and for our second competition this month therefore we are arranging a voting contest in which these provide the candidates.

Below we give the names of 10 of these sports and games, and we ask each reader, A, to tell us which is his favourite, and B, to try to forecast the relative popularities of the 10 pursuits as they will be shown by the votes of the competitors.

Each of the 10 sports is numbered, and entrants are asked to use these numbers, so entries can readily be made on a postcard. It is not essential that the sport chosen by any competitor as his favourite shall be placed at the head of the list given below.

Here are the 10 sports and games: 1, Cricket; 2, Cycling; 3, Golf, 4, Motor Car Racing; 5, Motor Cycling; 6, Rounders; 7, Rowing; 8, Swimming; 9, Lawn Tennis; and 10, Walking.

As usual there will be two sections in this competition, one for Home readers and the other for those living Overseas. In each of these there will be prizes of 21/–, 15/– and 10/6 for the entries that most nearly forecast the comparative popularities of the 10 Sports.

Entries must be addressed "*August Sports Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 30th September; Overseas Section, 31st December.

August Photographic Contest

For this month's Photographic Contest, the 8th of the 1949 series, there is a very obvious choice of subject. August is the holiday month, and we are therefore inviting readers to submit holiday photographs. As usual, the merits of entries as pictures will be taken into account by the judges, but photographs sent in must show the real holiday spirit.

The competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate sections for overseas readers, and in each section prizes of 21/–, 15/– and 10/6 will be awarded.

Entries should be addressed "*August Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 31st August; Overseas Section, 30th November.

Fireside Fun

"Only a man with plenty of real gut can tackle this job with success."

"Why, what is it?"

"Stringing tennis rackets."

* * * *



"Hi! Come away from that crumbly cliff edge, or else give me that bag. It's got the sandwiches in it."

* * * *

"Shall I take little Willie to the Zoo to-morrow, daddy?"

"No. If the Zoo wants him let them come and fetch him."

* * * *

"I hear Jones was fired for lying. I didn't think he was as untruthful as that."

"He wasn't. His lying was done in bed, which made him late in the morning."

* * * *

"Well, my 'man, what are you going to do when you are released from prison?"

"Open a shop or two, sir."

"Open a chain of shops? Have you enough money for that?"

"Yes, sir. It will only cost about half-a-crown to get a jemmy."

* * * *



"How long have you been interested in the blind, Mr. Smith?"

"Ever since the old one got torn, mum."

BRAIN TEASERS

TURNOVER NOT EVERYTHING

A fishmonger's assistant sold a lady a herring for 4½d. The owner of the shop rebuked him for not telling the lady that the herrings were sold at 3 for 1/- and persuading her to take three. The assistant then pointed out that the profit on the one herring was the same as if he had sold three at the cheaper rate. What price did the owner pay for the herrings?

* * * *

ODD WORDS

Here is a sentence in which is hidden a message of interest to "*M.M.*" readers. Can you find it?

DUE USE TEA ADD IRISH INK TAKER EYE FACTORS FOR AYE PRESENT AWE VEHICLE ATE THE BUILDINGS DUE BASEBOARD ALL HOT STATION ARE TAN HIT ONE ASS.

M.H.K.I.

* * * *



Country Policeman: "Somebody told me an aeroplane came down here. Do you know anything about it?"

Small boy (with catapult): "No, sir. I've only been shooting at sparrows."

* * * *

A MAGIC SQUARE

Now for an easy word square of 16 letters. The clues horizontally are 1, Character of a sound; 2, On top of; 3, Not far; and 4, Makes a mistake. When the right words have been found the four vertical columns will have in them the same words as the four rows.

B.I.N.

* * * *

POETIC PUZZLE

In the following verse the missing words contain the same four letters. What are they?

When the . . . . all seek the shore,
The . . . . have trouble then in store,
O may no evil . . . . prevail
To foil their . . . . where'er they sail.

S.W.C.

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The well-known proverb of our first puzzle last month was TOO MANY COOKS SPOIL THE BROTH. It can easily be traced out in the square, beginning with the letter T in the centre.

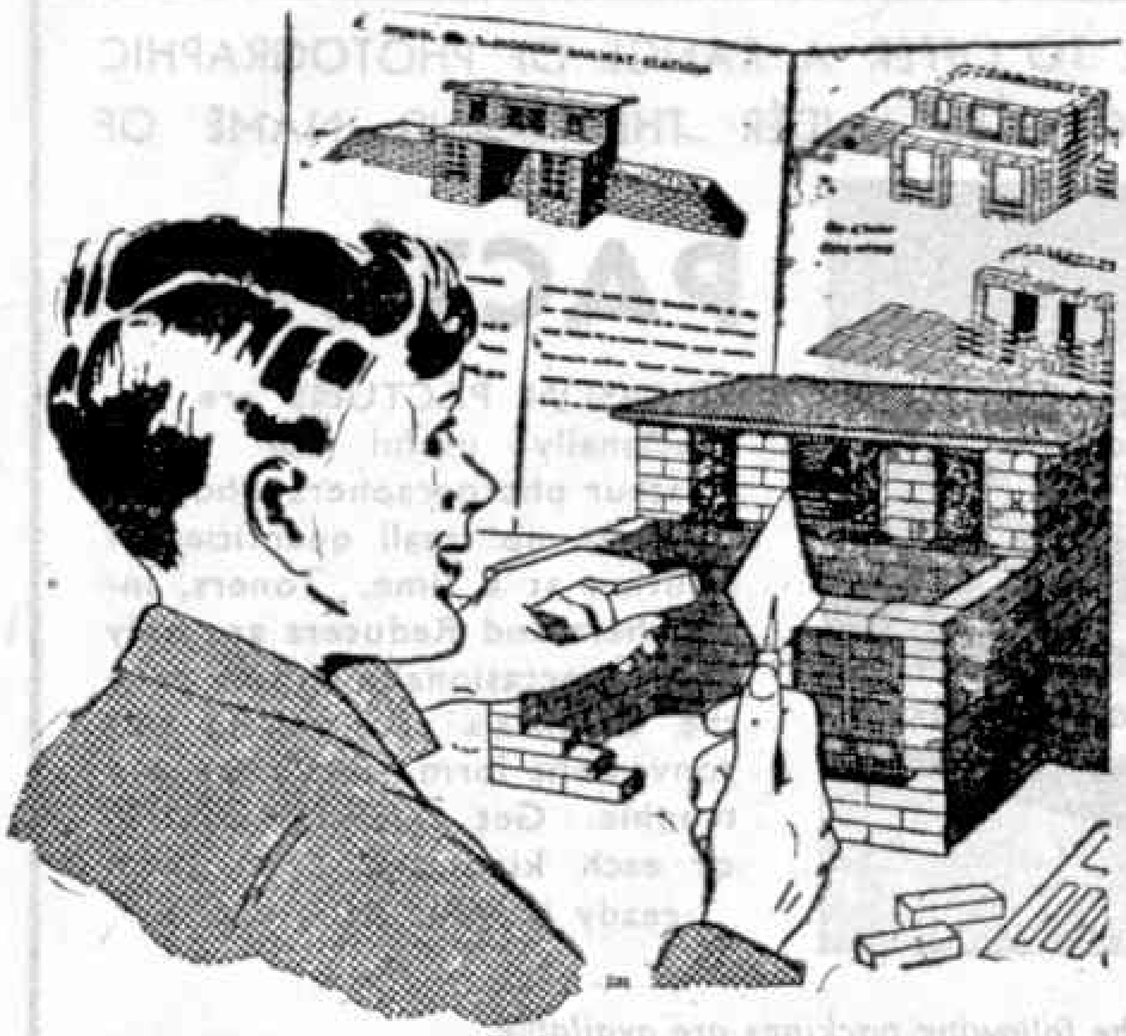
The greengrocer of our second puzzle used weights of 1 lb., 3 lb., 9 lb., and 27 lb.

The circular iron band of our third puzzle had a diameter 24 in. too great, so that its circumference was too great by a distance of 24 multiplied by 22/7 in., that is 75 3/7 in., and this is the length that would have to be cut out of it.

* * * *

THIS MONTH'S HOWLER

Great Britain is in the temporary zone of climate.



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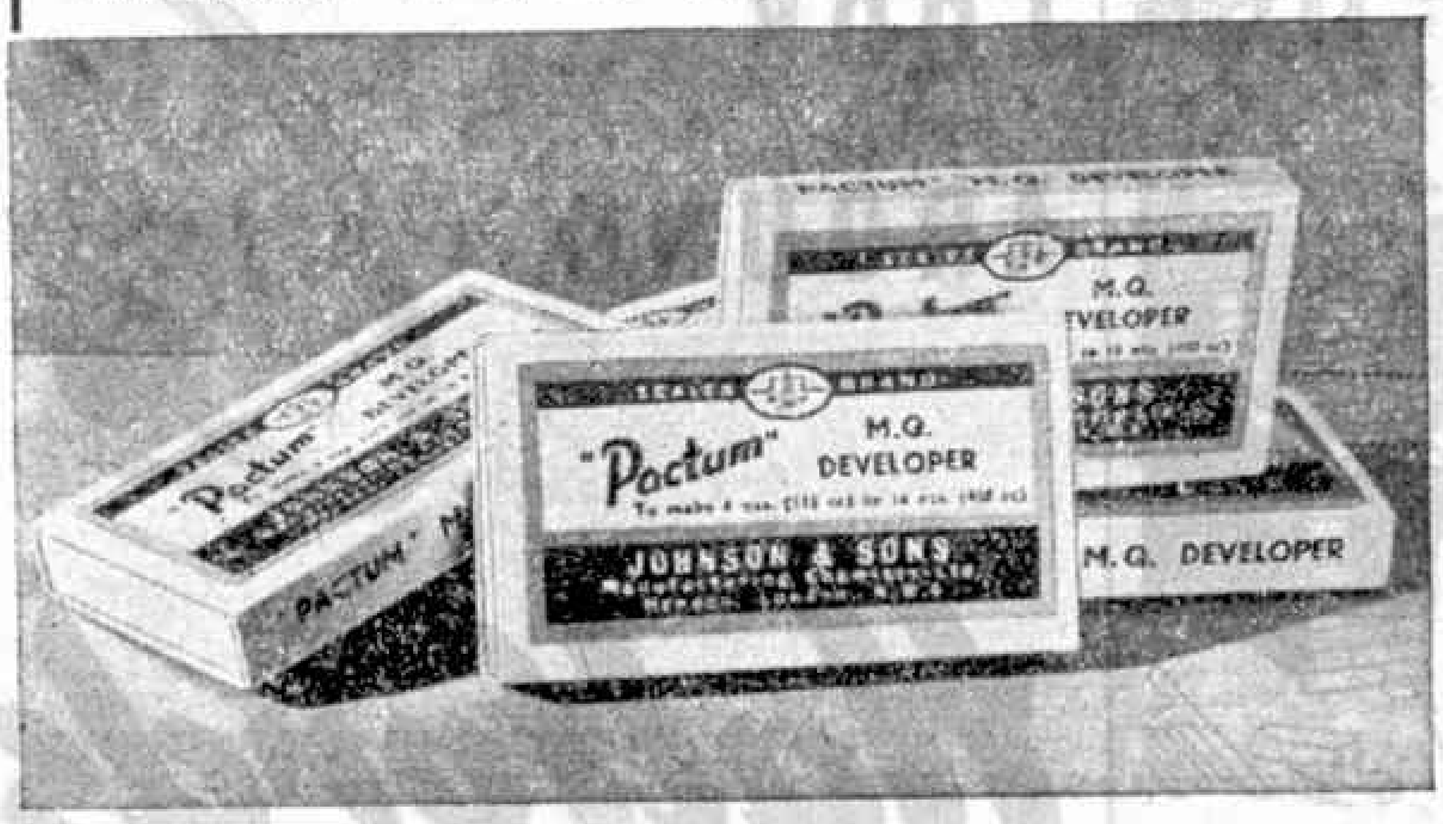
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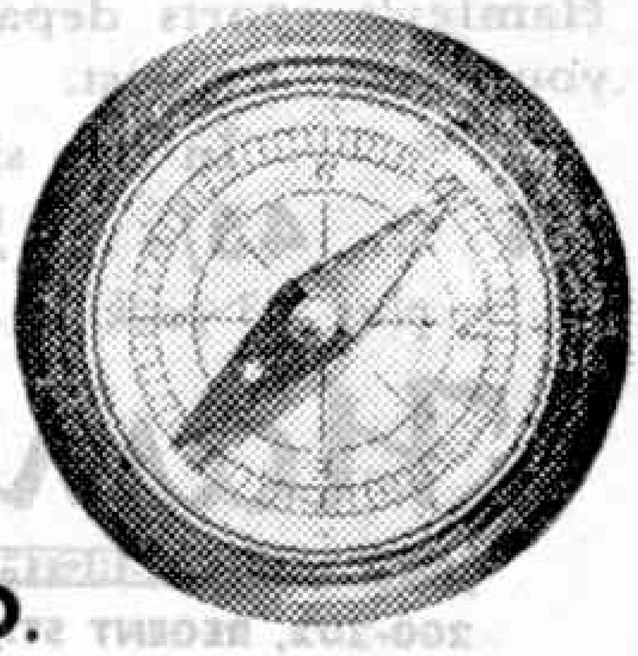


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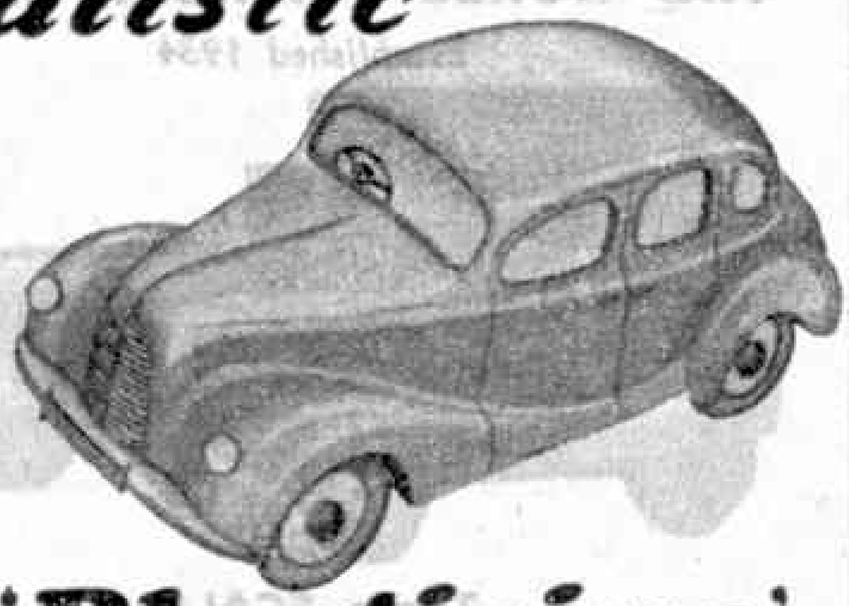
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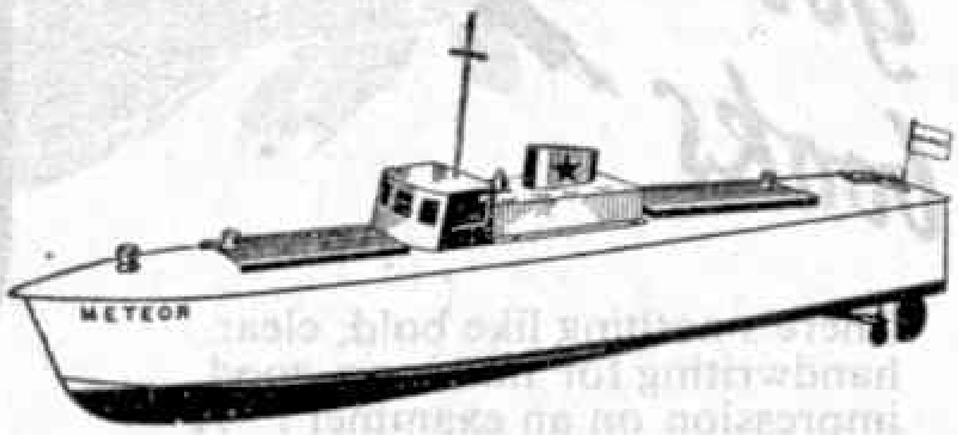
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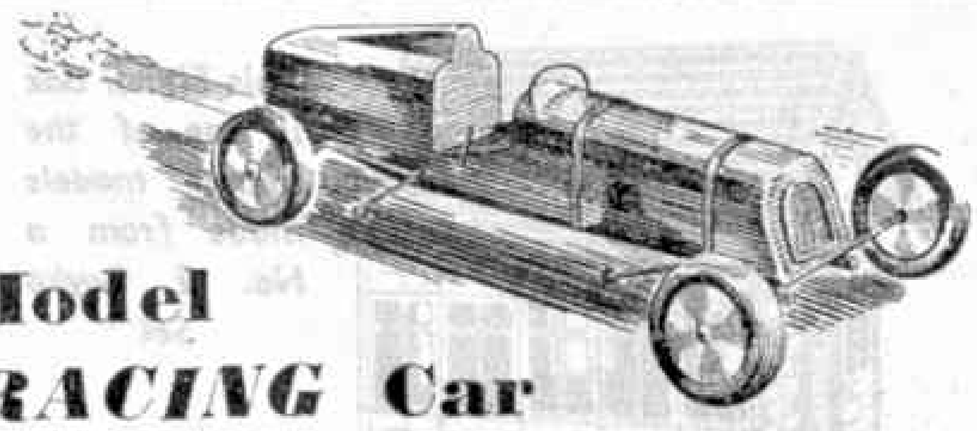
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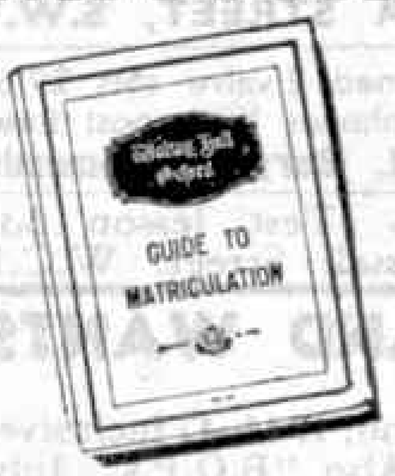


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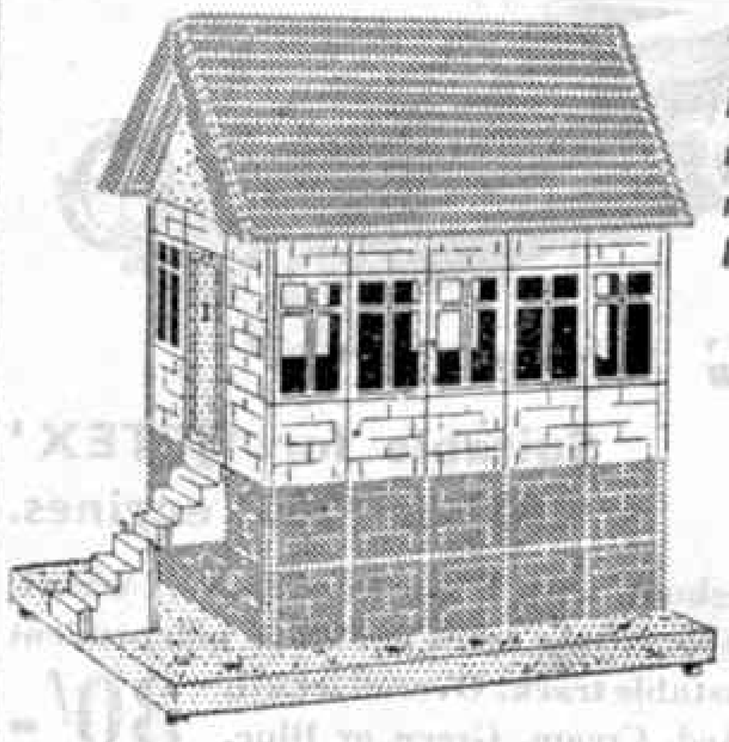
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Telegrams: "Meccano, Liverpool."

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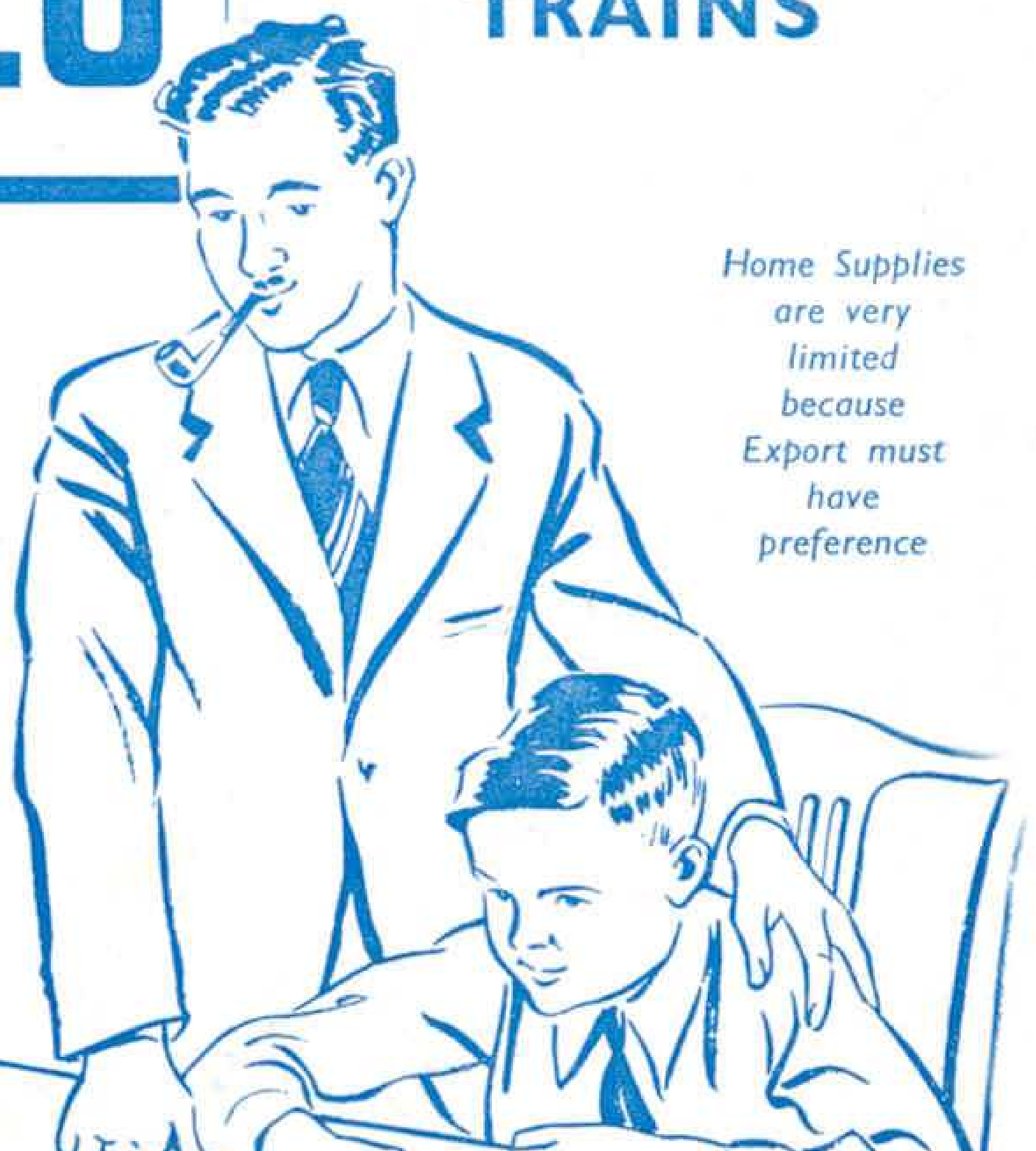
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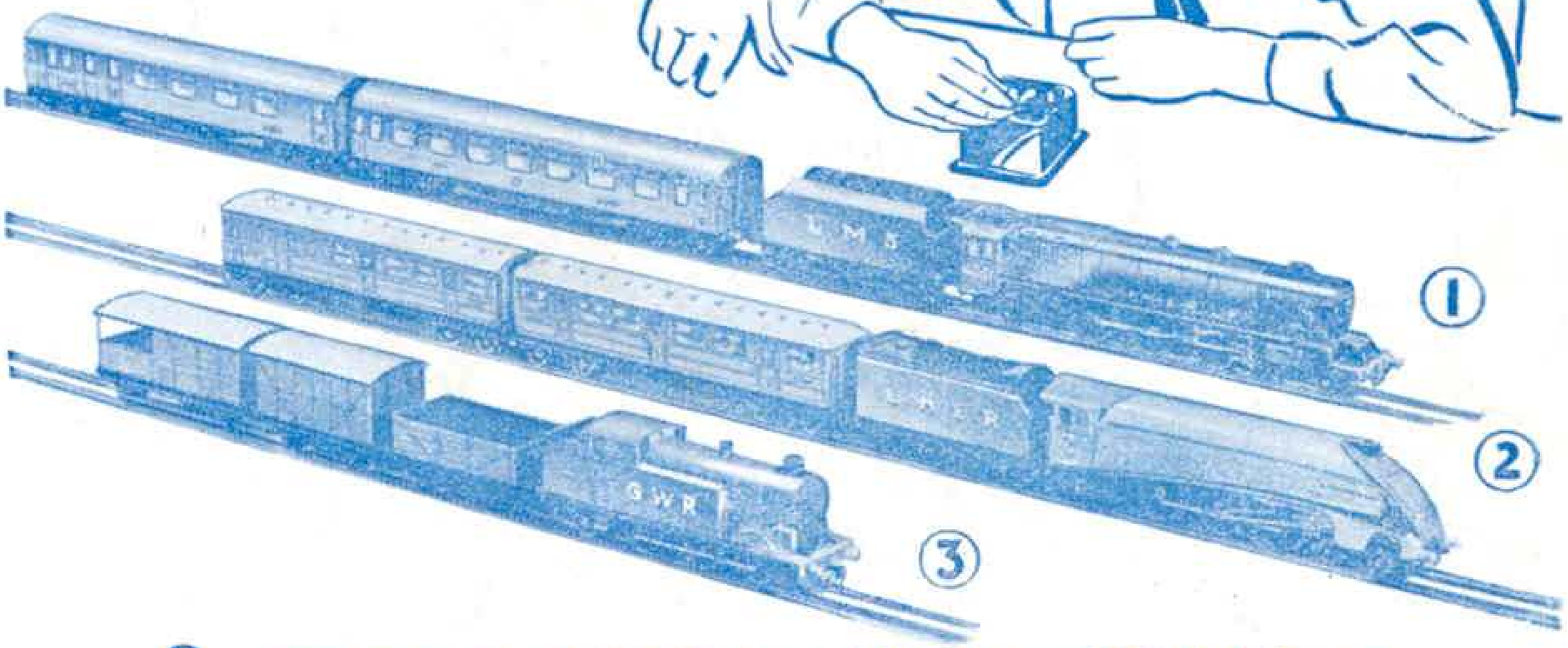


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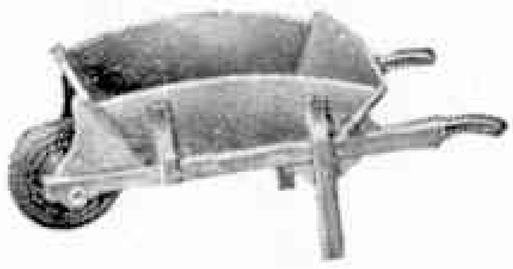
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MECCANO MAGAZINE

"CATALINA" AT MOORINGS

6D.

DINKY TOYS



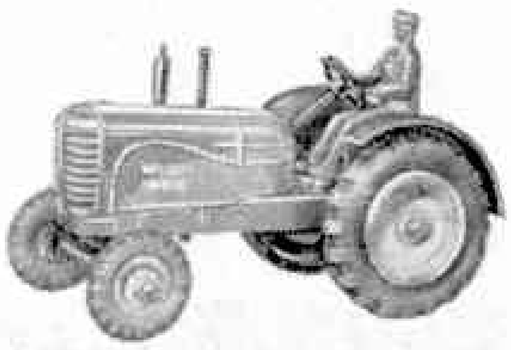
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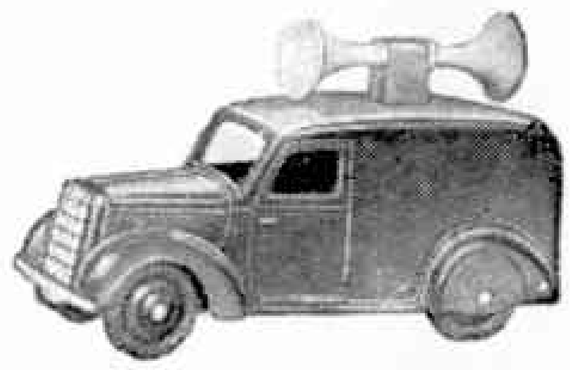
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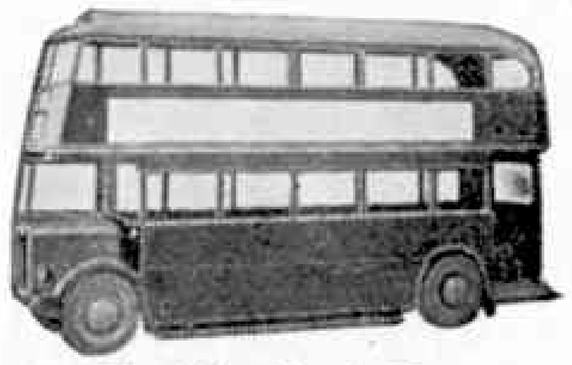
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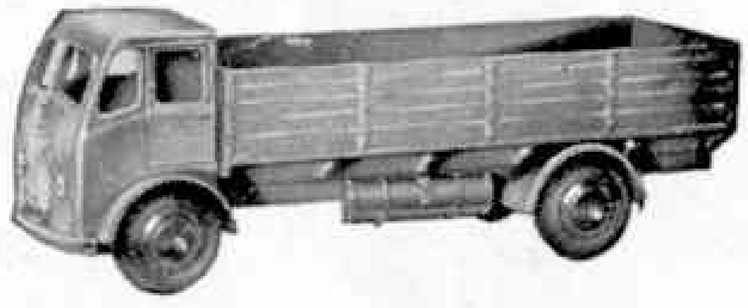
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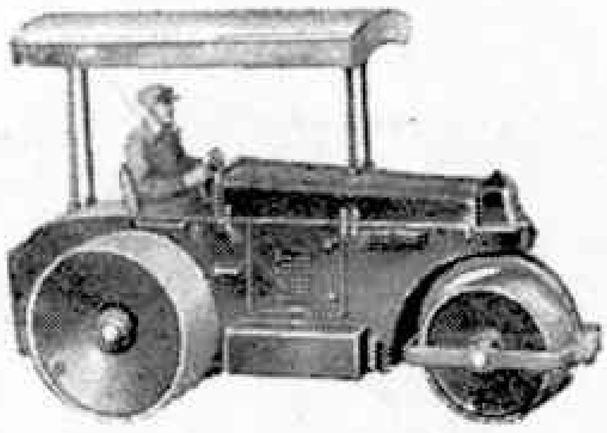
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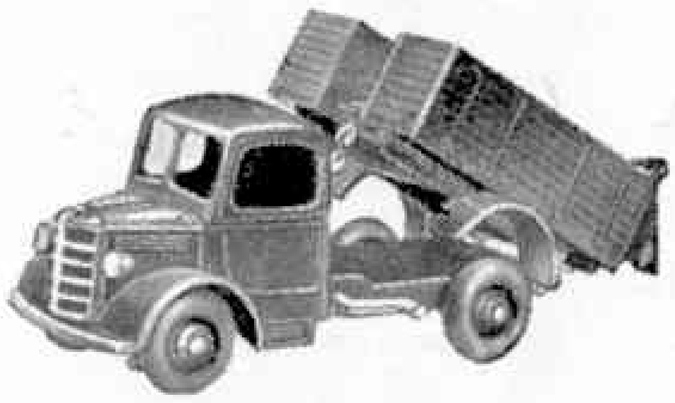
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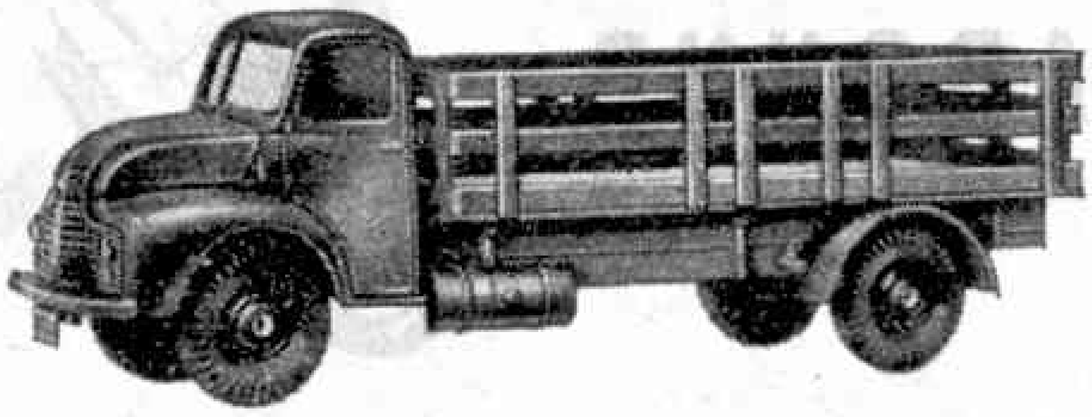
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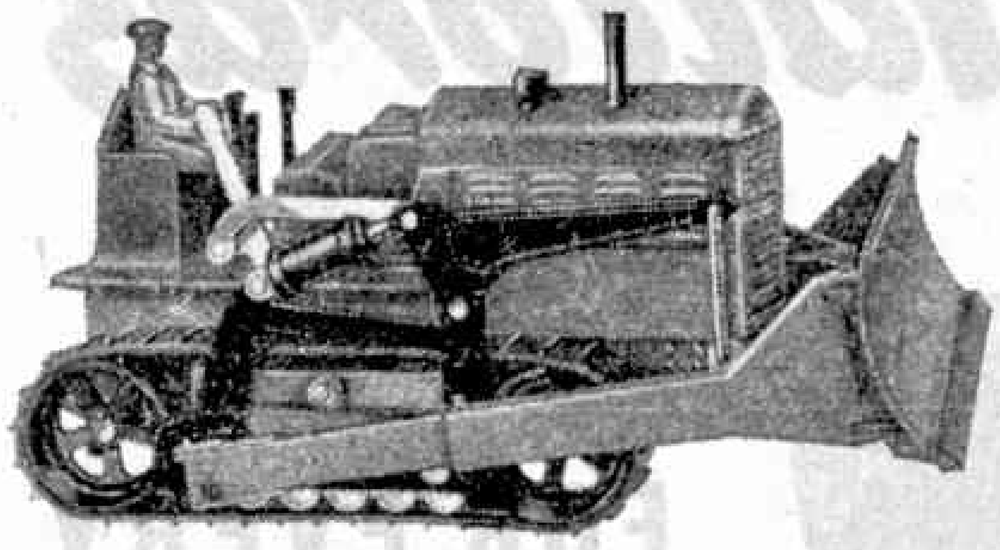
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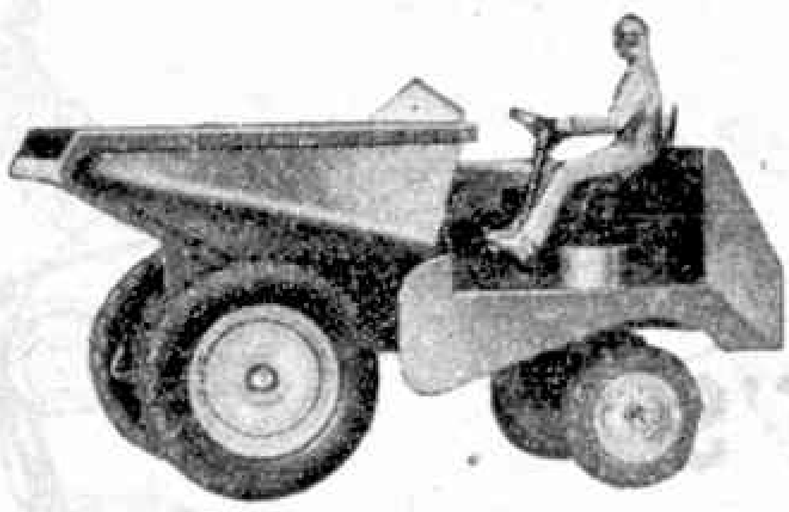
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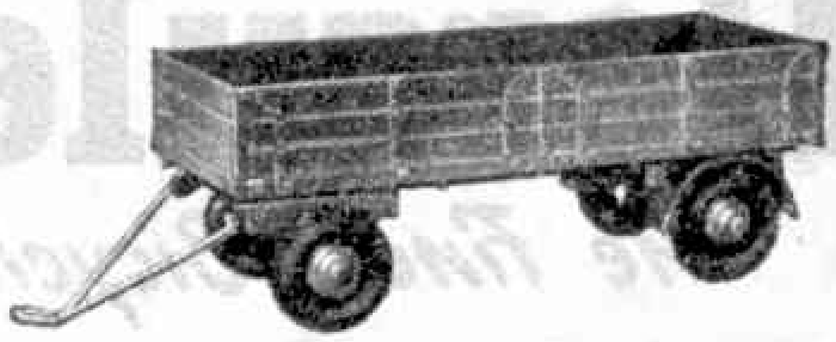


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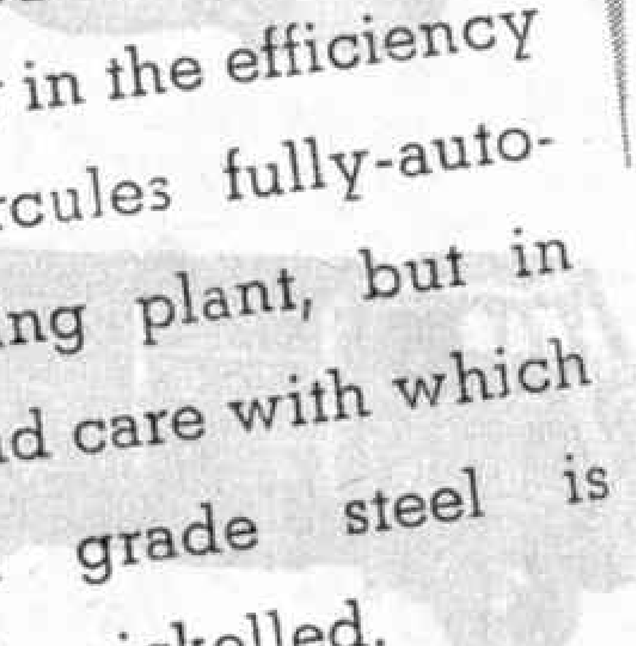
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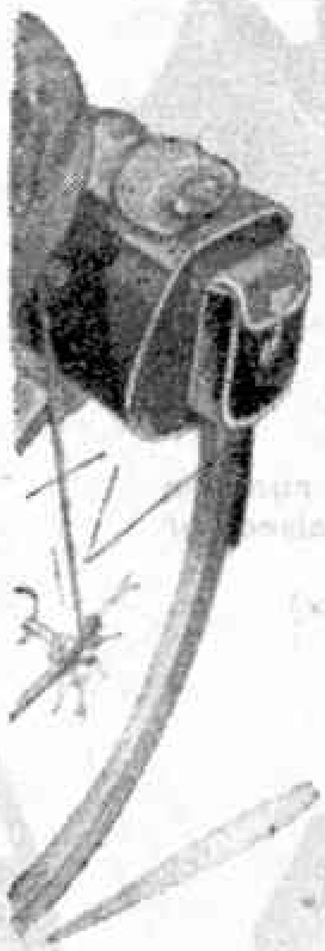
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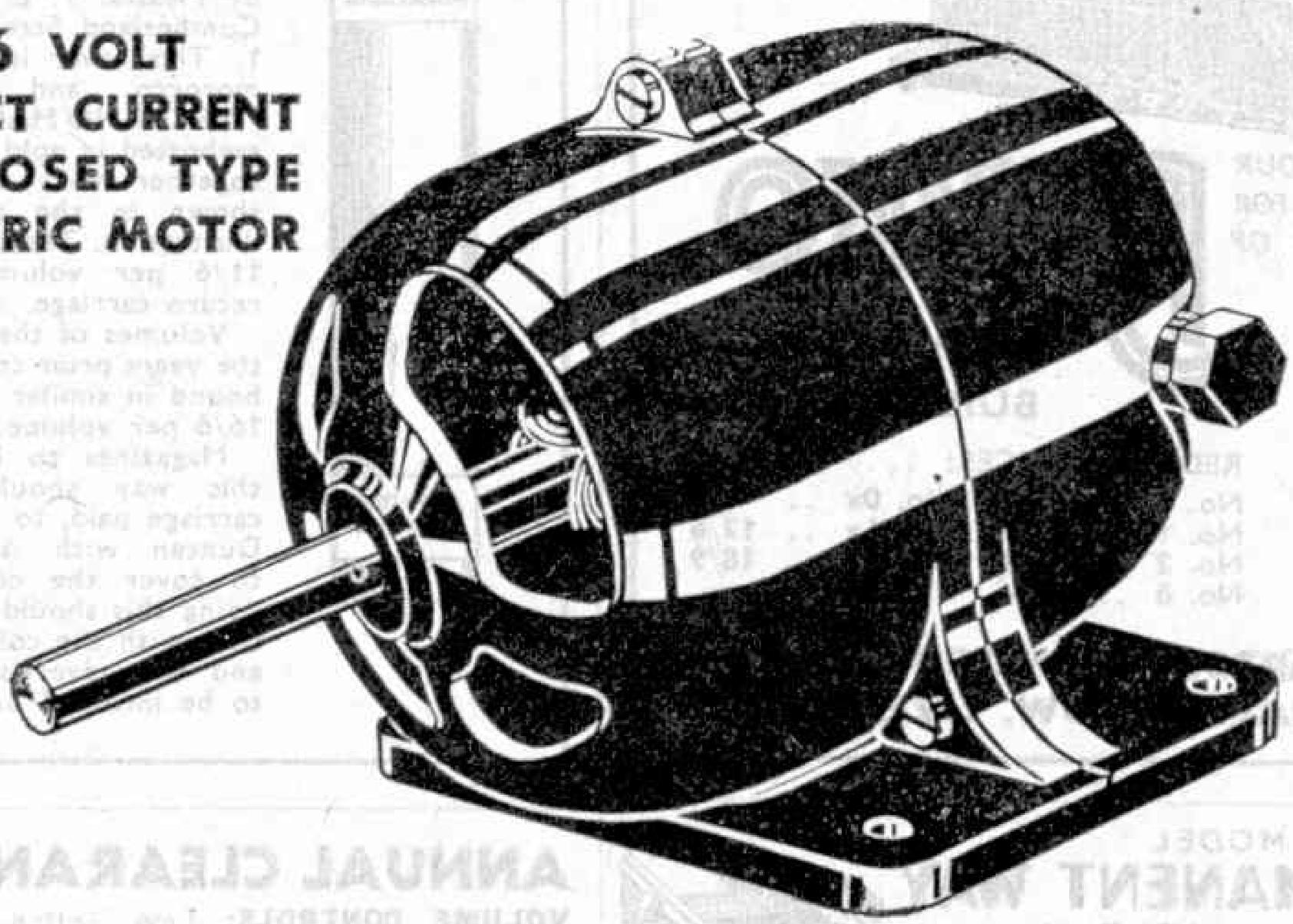
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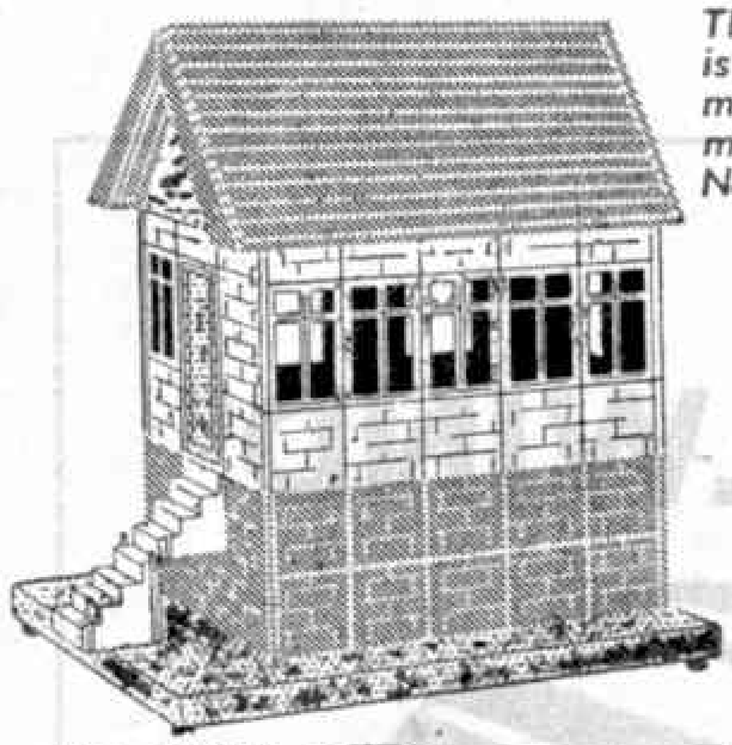
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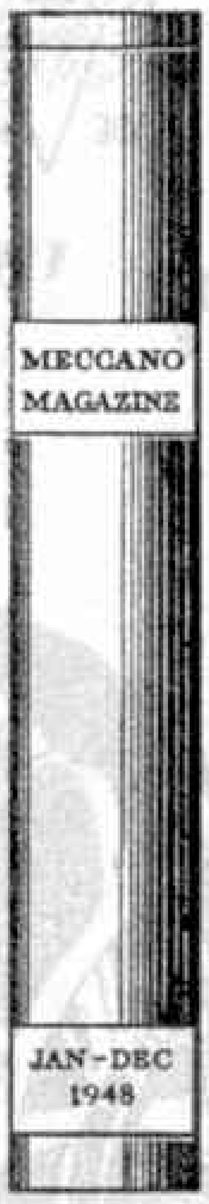
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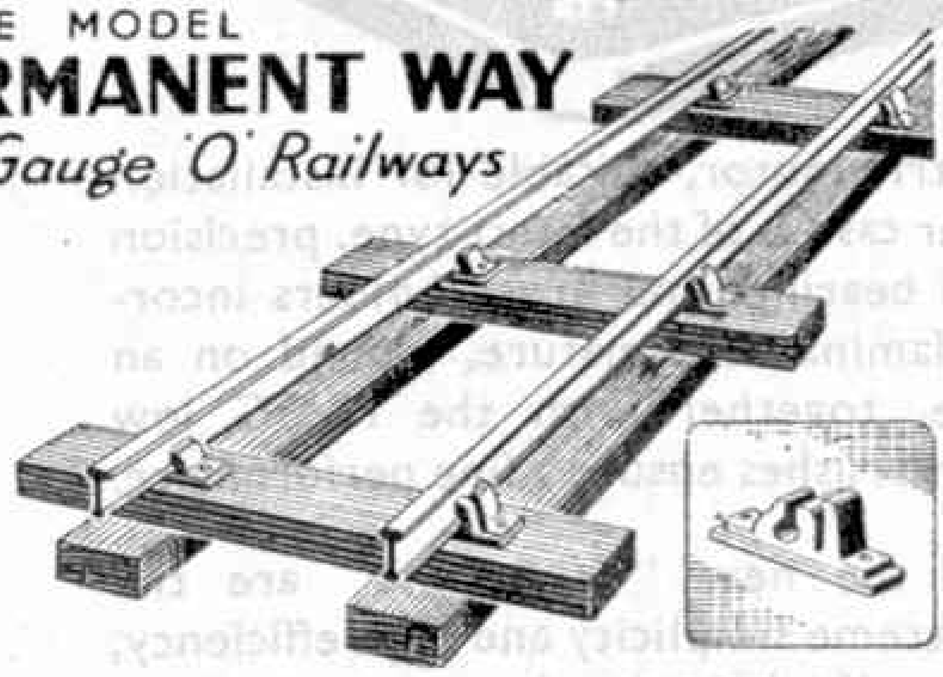
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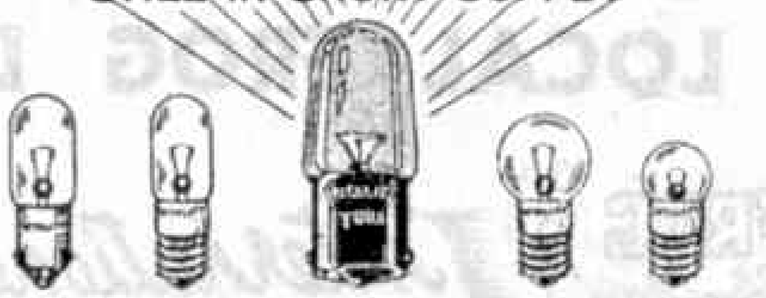
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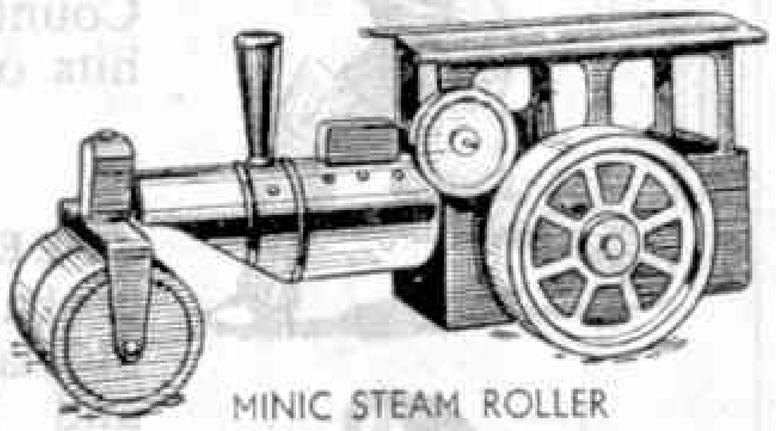
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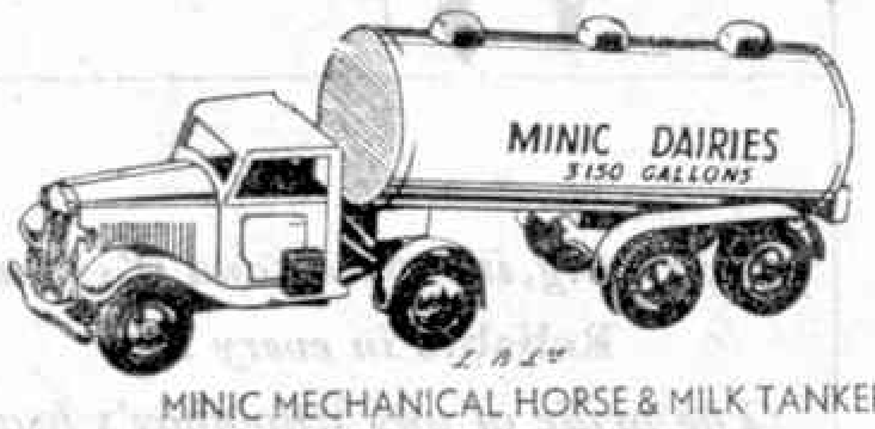
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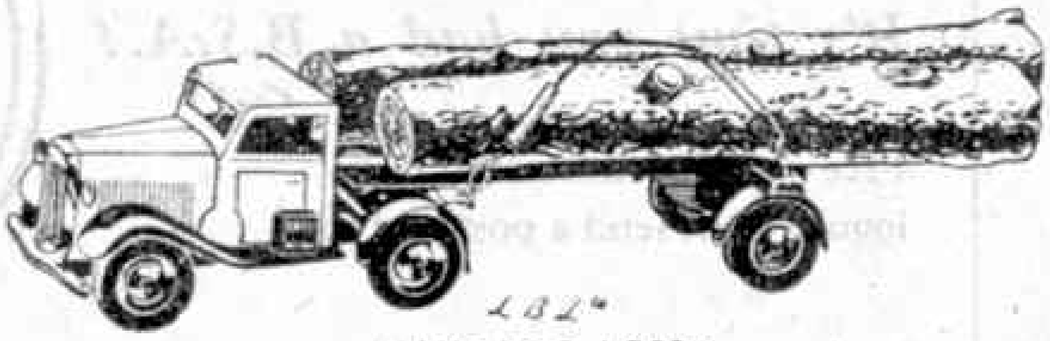
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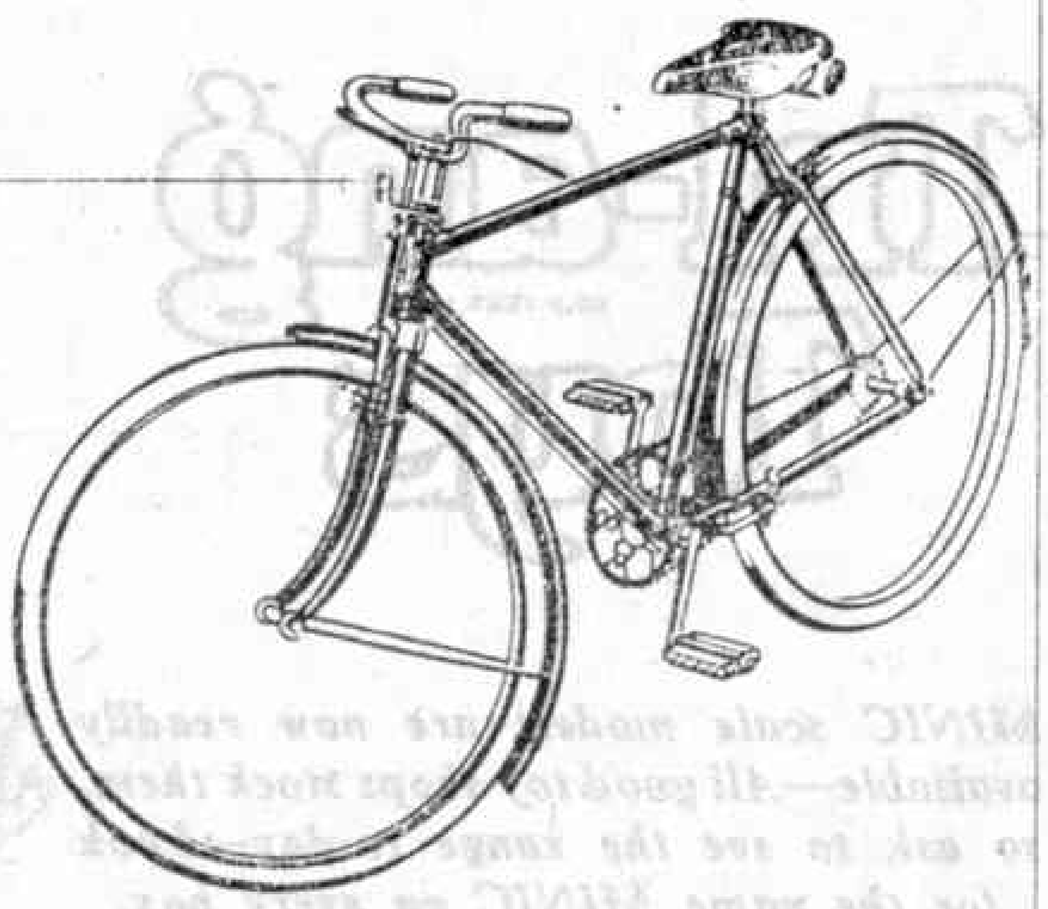
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Next Month: "ON THE FOOTPLATE IN PALESTINE." By D. S. Currie

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With the Editor

Britain's Jet Fighters

Since the early years of the first World War, British fighter 'planes have been second-to-none in the world. So it is hardly surprising that many people were shocked a few weeks ago to read about an alleged United States Air Force official report which claimed that our jet fighters failed to intercept "obsolete" American "Superfortress" bombers in recent exercises over England. Subsequent half-hearted American statements denying knowledge of such a report have done little to restore confidence in Fighter Command's abilities.

The truth is that in the recent Exercise "Foil," Fighter Command claimed one interception for every sortie flown against this country by "enemy" bombers, including "Superfortresses." That does not mean that every bomber was intercepted, for some were attacked and "destroyed" several times, while occasional fast bombers inevitably slipped past our defenders. Nevertheless, the fact that our fighters were able to deal effectively with everything from ancient "Ansons" to "Vampires" posing as jet bombers proves that they are not so useless as the American report seemed to indicate.

Nobody, least of all Fighter Command, would wish to hide the shortcomings of our jet fighters. Their endurance is short compared with wartime piston-engined fighters, and the small wing area of the "Meteor" 4 tends to prove a disadvantage sometimes at very high altitudes. But its phenomenal rate-of-climb and fire-power enable it to make such a devastating first attack that prolonged fighting would often be unnecessary. Furthermore, the more lightly-loaded "Vampire" maintains its manœuvrability at far greater heights than those at which a "Superfortress" operates.

In fact, the "Meteor" and "Vampire," supported by our splendid "Hornet" and "Mosquito" piston-engined fighters, form a team capable of tackling every type of bomber in service anywhere. They will soon be joined by formidable new jet fighters, with greatly increased operational endurance and radar "eyes" to search out enemy bombers by day or night.

In this atomic age it is disquieting to think that even one bomber can get through to a target in Britain unmolested. But we can be assured that our fighters are *still* as good as the world's finest designers and engineers can make them. If they had been shooting with bullets instead of camera-gun film in Exercise "Foil," it is certain that a very large proportion of the attacking crews would have had slim prospects of reaching home to write reports, accurate or otherwise.

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The Story of the Lightship

By Frank C. Bowen

CONSIDERING their obvious value in warning ships away from dangers offshore, it seems curious that lightships were not established long before they were. It has to be remembered, however, that most ships were small enough to hug the shore, where a number of lighthouses had been established since Roman days, and that they would anchor at night or in fog. Time meant very little to navigators for centuries.

In spite of those factors a lightship was suggested by Sir John Clayton for the Nore, to guide ships through the dangerous sandbanks at the mouth of the Thames, as early as the reign of Charles II. As he intended it to be a private speculation, paid for by a toll on every ship which made use of it, and as Trinity House depended largely on its income from navigation marks to carry out the numerous duties with which it had been saddled, its protests against the scheme were successful, and the Nore Shoal continued to be marked only by an unlighted buoy.

In 1731 a speculator named Hamblin patented an "improved distinguishable light," although after the fashion of the time the specification lodged to secure the patent was so vague that it was quite worthless for showing what he had in mind. Nevertheless, it secured him permission to place the first British lightship on the Nore Sand. Whatever might have been in his mind when he secured the patent, the light was certainly not distinguishable, for it was nothing but a candle lantern slung on the yard arm of a 40-ton merchantman named the *"Experiment."* She was obviously too small for the weather to be expected in the mouth of the Thames, and within a few months she was replaced by the merchantman *"Good Intention,"* whose burthen of 100 tons made her rather more efficient, but which was of little service to passing shipping. Hamblin tried to get his money back by inviting every ship which passed into or out of the London River to make a voluntary contribution to the upkeep of the ship, but very few of them obliged him.

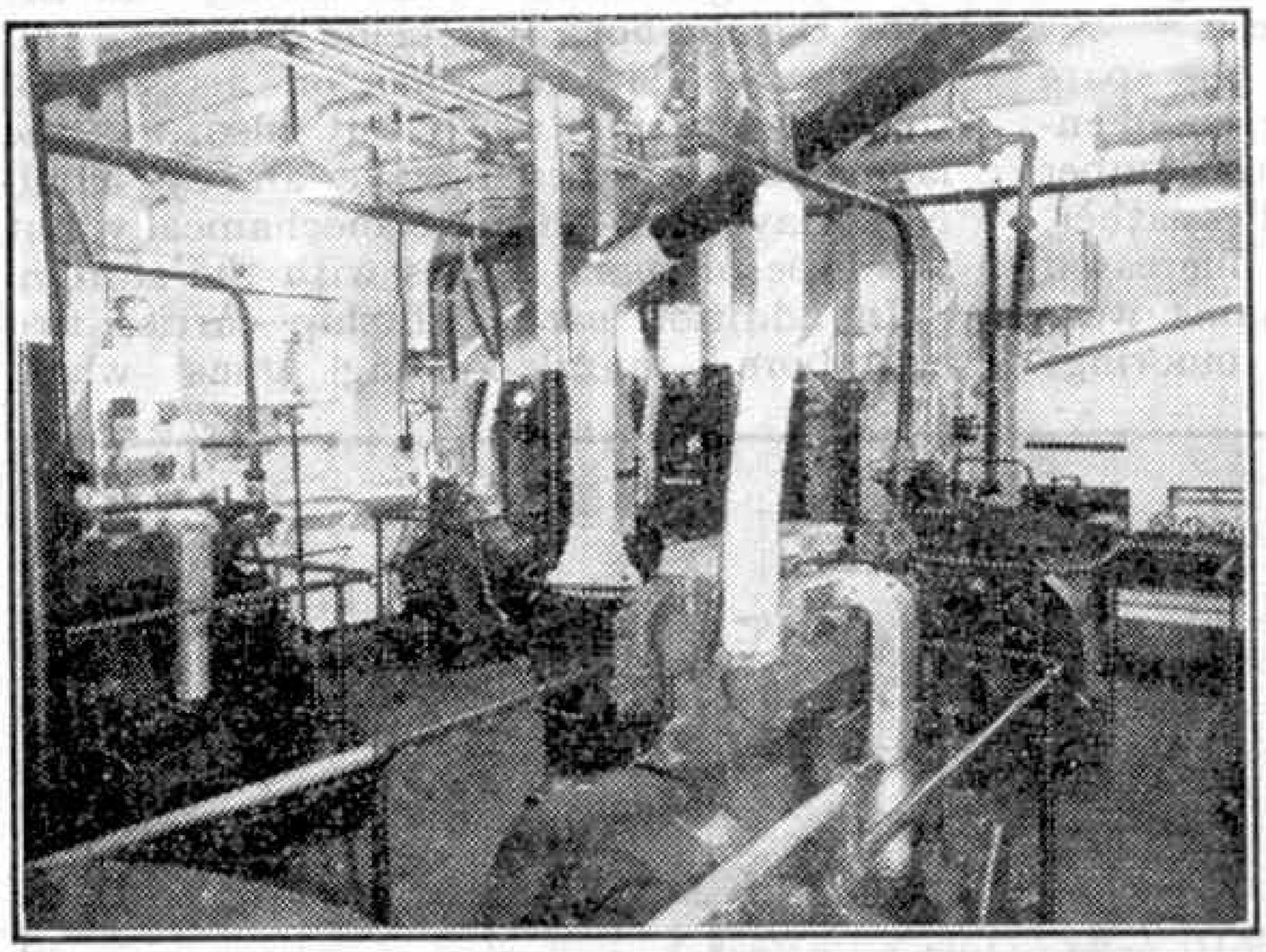
On the other hand there were any number of shipowners who complained bitterly that the lightship was so inefficient that, far from making shipping safer, it was often an added danger. The candles, seldom lit to the promised number, were constantly being blown out by the wind, so that ships coming up Channel and looking out for the promised light were liable to find themselves on the sandbanks all round it. Furthermore, it was constantly breaking its hemp cables, and its light might be sighted miles away from its station, with the ship being carried along by the wind and tide and all its crew fast asleep.

Within a few months of the establishment of the Nore light, therefore, the Corporation of Trinity House secured a licence to establish an efficient lightship, and prepared to fight Hamblin's concession. Having found that it was not profitable he sold it to David Avery, who very wisely made friends with Trinity House and worked in conjunction with them; when the concession expired Trinity House took it over.

The Corporation certainly did better with the Nore and other early ships than any private speculator who was only out



The most modern type of lightship with the lantern on a latticed tower and wireless slung between the two masts. Photograph by Philip and Son, Dartmouth.



The engine room of a modern lightship. Photograph by Philip and Son, Dartmouth.

before anybody thought of using a specially designed ship; old merchantmen were considered good enough for the Dudgeon station when it was established in 1736, and for the first Mersey lightship in 1813.

The first great improvement was the substitution of lamps burning whale oil in place of the clusters of wax candles. They gave a far better light and were not nearly so liable to blow out.

The Goodwin Sands—the "Great Ship Swallower" of the monkish chroniclers—were a terrible danger to shipping which naturally suggested the possibilities of lightships. The first suggestion was made in Stuart days, but the idea was dropped when its sponsor was drowned. A converted coaster was placed roughly where the *"North Goodwin"* is moored nowadays, in 1795, followed by the *"Gull"* inside the sands in 1809. That was at the special request of the Admiralty, to lead the frigates stationed in the Downs during the Napoleonic Wars through the Gull Stream. The *"South Goodwin"* followed in 1832 and the *"East Goodwin"* in 1874. By that time Trinity House had placed a number of lightships on station.

In the early days, as has been mentioned, each lightship had a yacht as a tender based on the nearest harbour. Immediately the lightship broke adrift, which was constantly happening, she took out new cables and helped her to get back to station; when that was impossible, or the lightship was under repair, the tender would go out to her position and anchor there, showing the necessary light, until she could be replaced. Each of these tenders had a permanent master, but otherwise they were manned by the lightship crews who were having a spell ashore. In due course these sailing tenders were replaced by steamers, one attached to each district instead of to each lightship. The early ones were paddlers, but later a very handy type of screw steamer, admirably seaworthy, was adopted and attended to the buoys and other navigation marks as well as relieving and storing the lightships. Between the two wars diesel tenders were tried with success, but the latest ones have reverted to steam.

Long before the sailing tenders were replaced by steamers, the use of converted merchantmen, which were very hard on their cables, was abandoned, and they were replaced by specially designed lightships with hulls carefully planned to ride as easily as possible. The first of these was built in 1825.

For a long time all the hulls were built of wood, with the strongest possible construction, sheathed with copper or muntz metal below the water to check fouling. Iron hulls for greater strength were tried in the Liverpool approaches in 1842 and on the North Goodwin station in the fifties, but the crews generally preferred wooden hulls as being more comfortable both in summer and winter. Composite hulls, wooden planked on an iron frame, were also tried for some time, but all the modern ships are steel with precautions against sweating inside.

In 1807 Robert Stevenson, grandfather of "R.L.S." the novelist, invented the multiple lantern encircling the mast and giving a far better light. The earliest ones were lowered on to the deck at daybreak to be cleaned, and hoisted by a hand winch at nightfall; but later they were replaced by lanterns permanently fixed to the masthead. Whale oil was replaced by colza, then by petroleum vapour, and later, between the two wars, by electricity generated on board by diesel dynamos. Early in the present century the slim

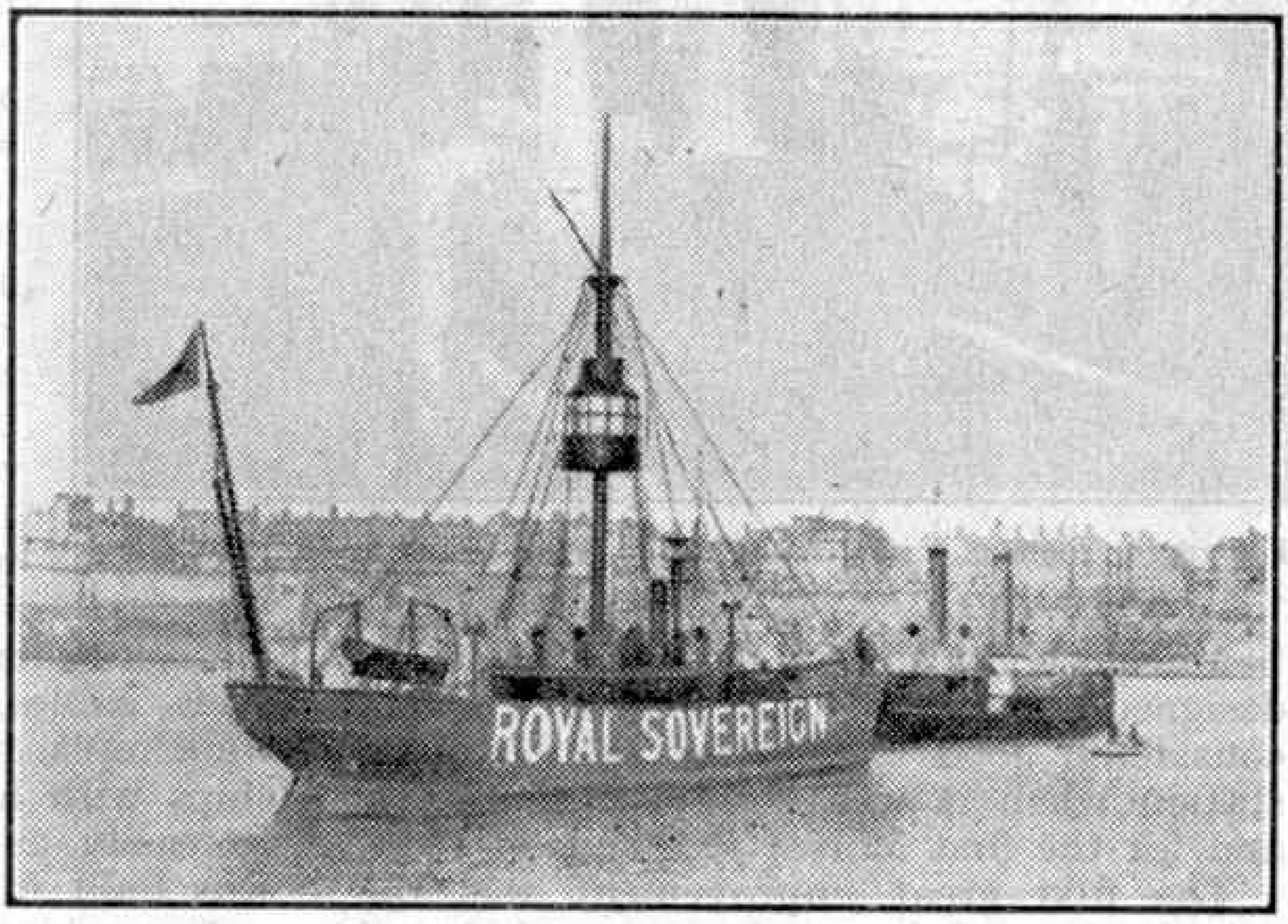
mast was replaced by a cylindrical tower, and in the most modern ships the light is on a big girder structure. Each lightship now has a quite distinctive light which cannot be mistaken for that of any others in the neighbourhood, and with the help of reflectors and scientific lenses they have been given a range of many miles.

Chain cables, at first only for the spare anchors, were introduced in the eighteen-twenties and greatly reduced the number of ships breaking adrift in bad weather. The care given to the moorings increased rapidly; none but the finest chains were employed, and for years the moorings consisted of two or three mushroom anchors spread out with a ground chain between them having a swivel in the centre leading up to the ship. Latterly anchors of good modern patented types are preferred to the mushrooms, but in every case the moorings receive the greatest care for they always have to stand a tremendous strain in bad weather. Actually the depth of water is not the principal factor in that; local conditions in shallow water may be far worse than depth.

A conspicuous feature of all the old lightships, with their lantern on a mast, was a shape above the lantern, generally a ball, but sometimes one or two cones when there was any chance of confusion. This was partly to identify them to passing shipping, in addition to the name written in big letters on their sides, and partly as a distress signal to observers on shore; if anything went wrong the shape was lowered. Other signals are provided for lightships off their station. Nowadays they are not so necessary as every lightship can communicate with the shore by some means, generally by wireless telephony. Before that was perfected many of them were connected with the shore by telephone cables; these were always being broken, but the regular test message from the nearest Coastguard station every Saturday evening was a boon to the lightsmen for letting them know the day's football results.

However efficient a lightship's lantern may be on a clear night it is useless in fog, and they are all provided with sound signals. In the early days these were heavy bells, or gongs specially imported from China on account of their noise; but a hundred years ago fog signals were tried and proved effective. They were soon improved and their character was made different for each station. In the old days the crew got extra "noise money" all the time the fog-horn was being sounded, and they earned it not only on account of the ear-splitting noise but also for the labour of compressing the air by hand. Nowadays it is all done mechanically but the type of signal varies with the station.

In addition each lightship carries two large-bore, muzzle-loading guns which



An up-to-date lightship in the First World War, with the lantern permanently at the masthead. Photograph by Nautical Photo Agency.

are fired as a warning if a ship is seen to be standing into danger. They are similar to those used at Trafalgar, but although it has often been suggested that they should be changed for more modern types, the old muzzle-loader has been pronounced by far the most effective on account of the tremendous bang that it gives.

During the recent war, for the first time in history, German aircraft deliberately attacked lightships, which had no means of defending themselves, with the result that they were withdrawn from their stations. In some cases they were replaced by untended floats, miniature lightships whose lamps were kept burning with acetylene for a very long period, and one or two of the old lightships were fitted with automatic gear to run without a crew. Altogether 16 lightships were lost during the war, while the replacement of worn out or obsolete ships was held up These are now being replaced as quickly as possible by steel

(Continued on page 362)

Fun with Dinky Toys

A Well-designed Bus Station

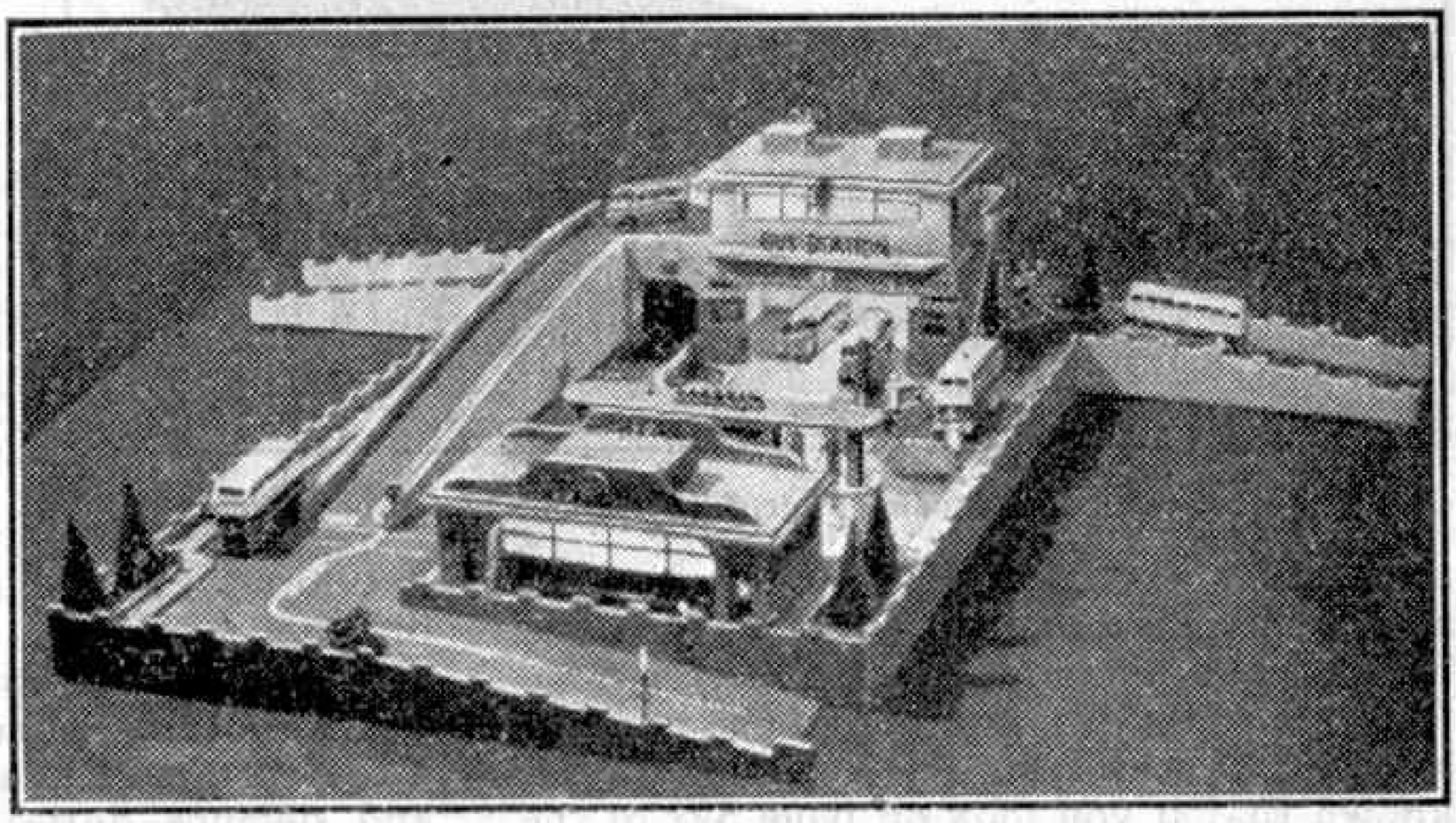
THE thoughts of many Dinky Toys owners planning a layout turn naturally to the running of buses and the construction of a road system that includes a bus station. V. Halliday, Ludlow, is one of these, and he became so intent on his idea that in the end he built the delightful bus station that is illustrated on this page. This has bays at which passengers can conveniently leave or enter buses, with shelters alongside and a waiting room at one end. There is also a garage for the buses, over which is a repair and maintenance station. There are even clocks, placed in positions where they can easily be seen, so that passengers can tell whether the services they use are running to time or not.

The main base of this bus station is of hard boards, reinforced with 2 in. by 1 in. battens, and the overall size, apart from the end ramps, is 33 in. by 20½ in. The layout itself was not made to any particular scale. Its builder decided on the sizes of buildings, widths of roadways, etc., by constantly comparing these dimensions with those of the Dinky Toys Double Deck Buses that were intended to make use of them. The result is a really practical layout, with many features of outstanding interest.

The buildings are constructed chiefly of plywood, but ordinary wood from boxes also has been pressed into service. The finished structures were given a coating of glue, and then various grades of bird and silver sand were sprinkled over them. When dry and painted the models had a good roughcast appearance that along with their excellent modern design gives a very pleasing result. A similar plan was followed with the small gardens included in the layout. Here sawdust was sprinkled on the glue and fir trees of the kind purchased for Christmas decorations provided the vegetation. For windows plastic material was used.

Lighting of course is important in a model such as this. This was no problem to Halliday, who fitted flash lamp bulbs into small bakelite holders placed where required, and arranged a switchboard in a convenient position at the back of the model. A bell transformer provides current.

All the vehicles that pass through the Station, together with the Petrol Pumps, Traffic Signals and Road Signs, are Dinky Toys. To adapt the Road Signs to the layout their bases were removed and they were sunk to the extent required to make them of the desired height. The words "*Bus Station*" appear over the clock on the main building. The letters for this and other inscriptions were cut out of three-ply wood on a fretsaw machine.



A general view of the fine bus station designed and constructed by V. Halliday, Ludlow.

White lines on the roads act as guides to the drivers of vehicles entering and leaving the bus station. Entry can be made only at the left-hand side, looking from the main building, and the right-hand side road is reserved for buses leaving. The words "*No Entry*" painted in correct places on the road warn drivers of vehicles.

The Garage has proved a completely fascinating plaything to many young friends of its constructor. He encourages them to run Dinky Toys buses around the layout, and has noted how helpful this can be in developing the beginnings of road sense.

Handley Page's Forty Years

By John W. R. Taylor

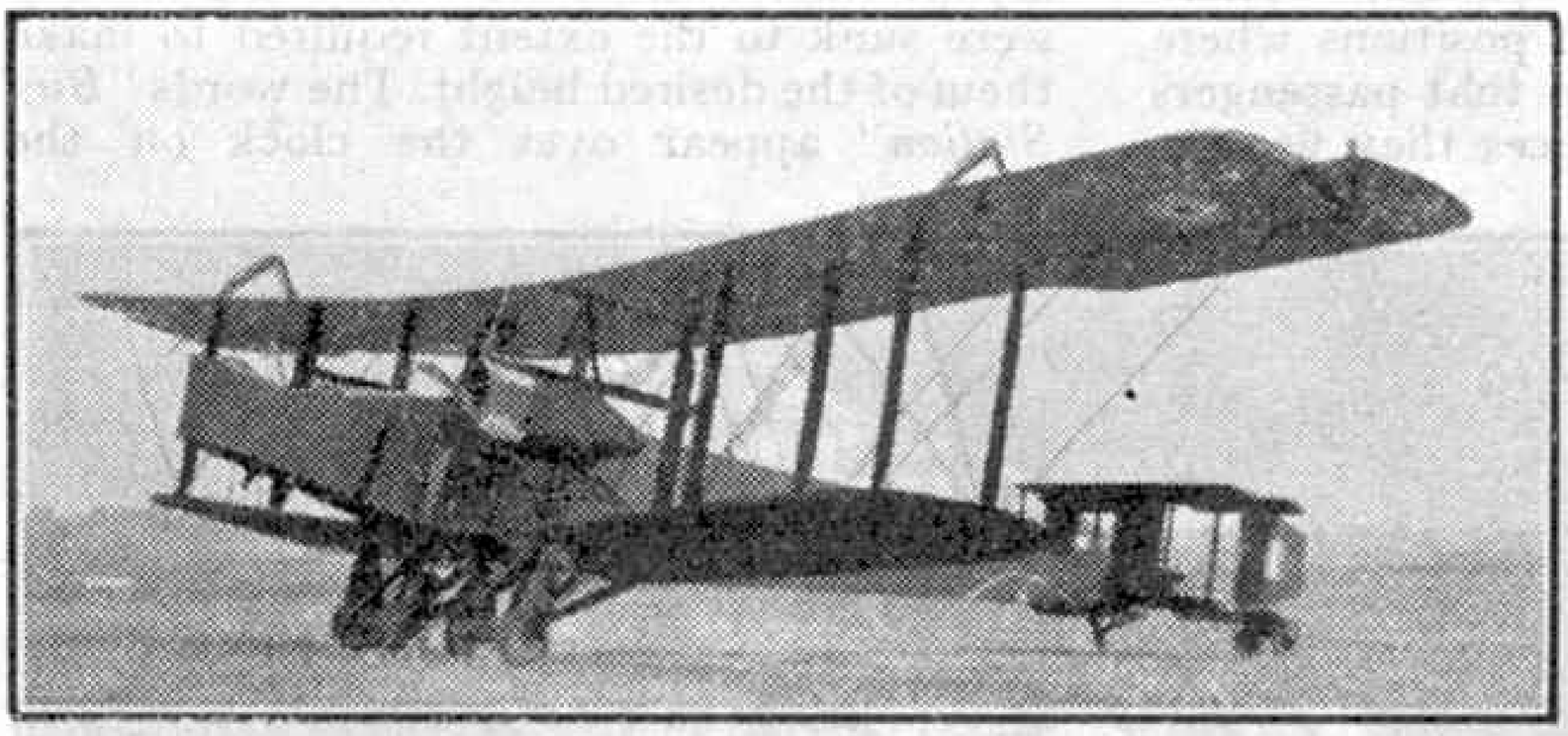
IN the early Summer of 1909, a young man named Frederick Handley Page registered a new company "to manufacture, let for hire, repair and deal in aeroplanes, hydroplanes, airships, balloons, aeronautical apparatus and machines, automobiles, motorcars, etc." All of which must have sounded very impressive and prosperous, until one learned that his factory at Barking consisted of a wooden shack with a corrugated iron roof, built on dump-heaps of clay excavated from London's underground railway tunnels.

Nevertheless, Handley Page Ltd. was the world's first aircraft limited company, and what its founder lacked in finances he more than made up in ability. As a result, it has grown into one of the greatest aviation concerns in the world, so well-known that if you look on page 522 of the "*Concise Oxford Dictionary of Current English*" you will find "Handley-Page, n. Type of large aeroplane. (maker)." Few other manufacturers have achieved such fame in 40 years that their name has become part of our language.

At first the Company's lack of resources proved a handicap, but by building strange contraptions for other would-be aviators "H.P." was soon able to make enough money to develop aircraft to his own ideas. Most of them were gliders, because the primitive engines available in 1909 were seldom powerful enough to lift an aeroplane off the ground. Even if they did, they often stopped at inconvenient times, so gliders were much safer.

When Handley Page did eventually build a powered aeroplane, the "Blue Bird," it proved almost as safe as the gliders, as it refused to climb more than a few feet. But it incorporated several advanced features, including sweptback wings of a crescent shape which may well be resurrected on high-speed aircraft in the next few years.

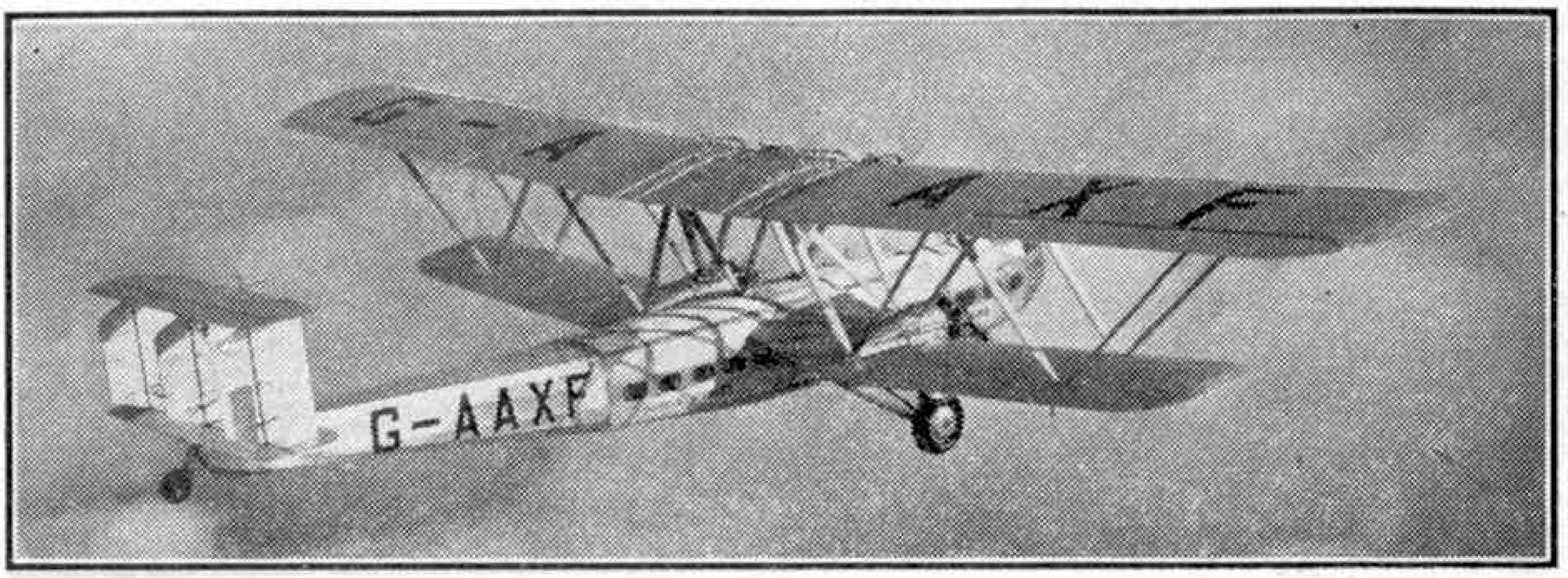
His first really successful aeroplane was a monoplane built in 1911 which, because of its virulent colour, was usually referred to as the "Yellow Peril" or "Antiseptic." This machine achieved fame by flying over London, and on the strength of his success Handley-Page moved to a bigger factory at Cricklewood. He has been there ever since.



One of the famous Handley Page 0/400 bombers of World War I.

Fortunately, by 1912 the Government was getting worried by the importance given to military aircraft abroad, and decided that it was time it had a few aeroplanes of its own. "H.P." was one of the lucky manufacturers to benefit from this decision, receiving an official order for five military aircraft. At the same time he developed a remarkable crescent-wing biplane, the HP-7, which started life as a joy-ride machine but was taken over by the Admiralty when war started in 1914. They stationed it at Hendon for training and defence duties, armament consisting of one Webley revolver worn by the pilot. Before long its sweptback wings got it into trouble, when a group of conscientious London gunners mistook it for a German Taube and thoroughly riddled it with bullets. But it survived, and continued to give good service until written off in August 1915.

Meanwhile Handley Page had already begun to think in terms of the big bombers that were destined to bring his Company world-wide fame. His chance came late in 1914 when Commodore (now Rear-Admiral Sir) Murray Sueter asked him to go ahead with the design and construction of four giant twin-engined bombers for the Royal Naval Air Service, each able to carry six 112 lb. bombs. So enthusiastically did the Company tackle its first important job that the prototype of the world's first



Probably the world's safest air liners, Imperial Airways' "Hannibal" class were a fine Handley Page type.

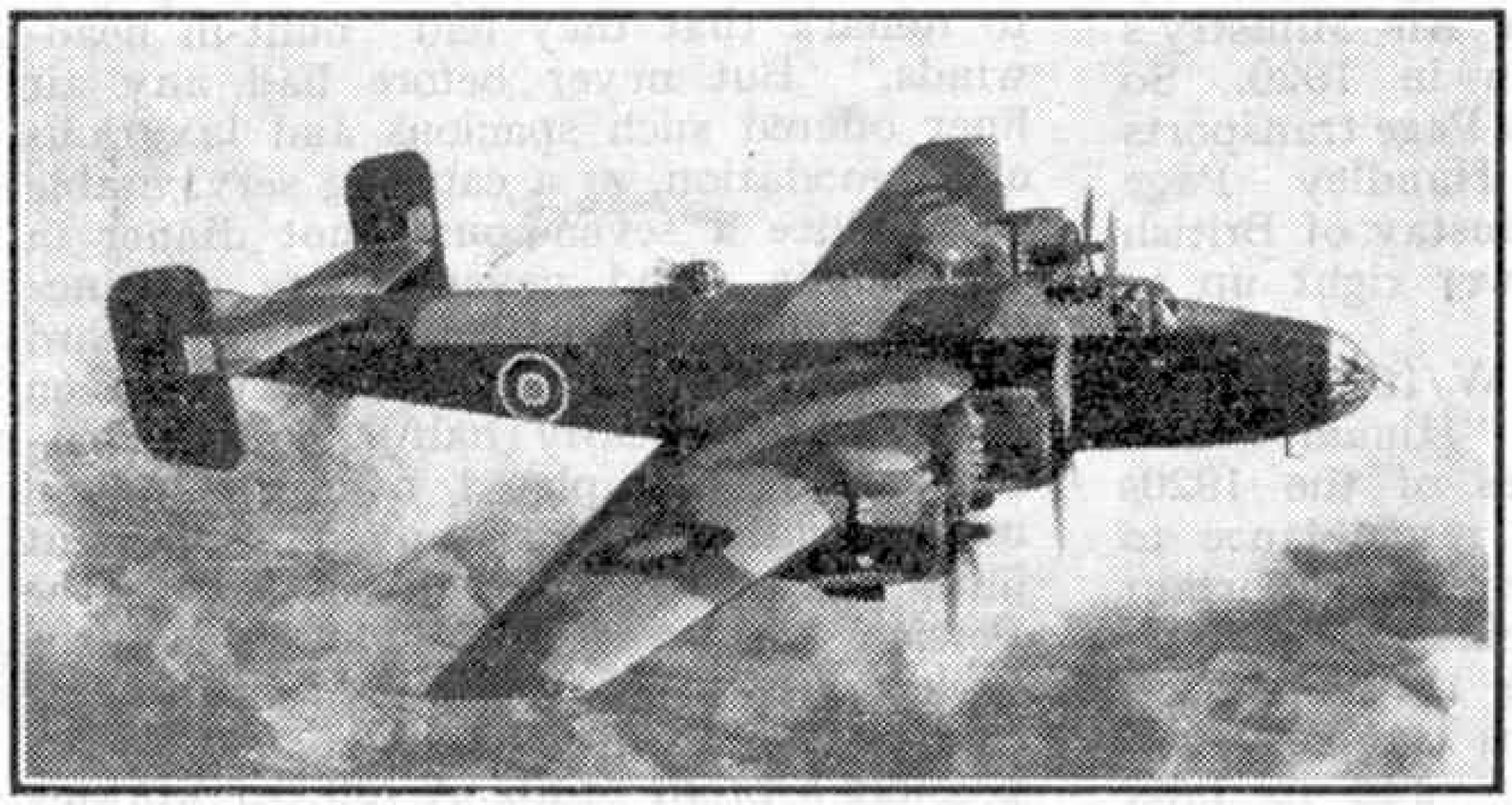
really successful big bomber—the Handley Page 0/100—was flying a little over a year later. Until that time aeroplanes had been considered useful only for reconnaissance or limited defensive duties: the 0/100 opened up an entirely new concept of aerial warfare, by proving that strategic bombing could be developed to the stage where it would have a decisive effect on land campaigns.

Altogether forty 0/100s were built for the R.N.A.S. Most of them were stationed at Dunkirk, from where they attacked targets inside Germany as well as U-boat bases at Ostend, Zeebrugge and Bruges. Unfortunately, as seemed to be a habit in those days, one of them was delivered to the Germans by mistake. The pilot lost his way and, seeing some French soldiers in a field, landed to ask where he was. It turned out that they were prisoners; so were the crew of the 0/100 a few seconds later, with the result that the Germans were able to incorporate features of the 0/100 in their Gotha bombers, which were used to raid London.

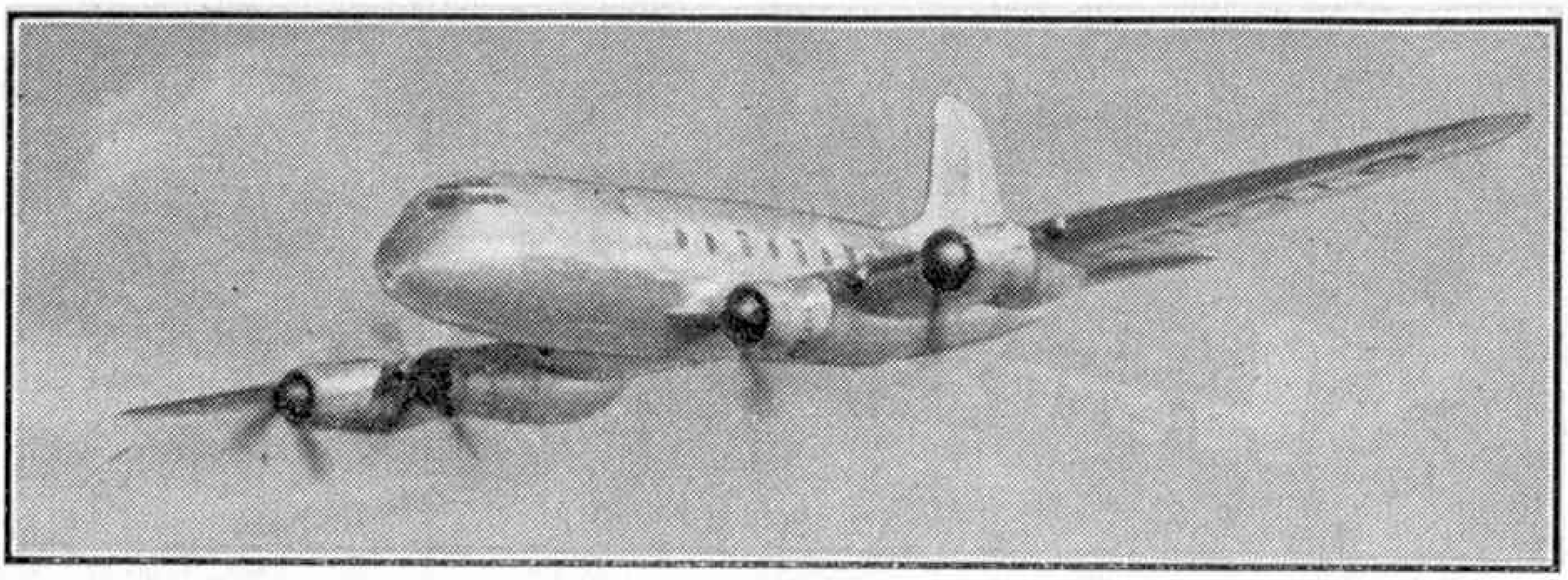
From the 0/100 Handley Page developed the famous 0/400, some 400 of which saw service with the R.N.A.S. and R.A.F. in the first World War. They formed the backbone of Trenchard's Independent Air Force in 1918, the first strategic air force in history, and were responsible for the intense bombing of German towns in the Rhineland, mostly by night. Others were sent east to fight the Turks and Bulgarians, and one of them flew in support of Lawrence's Arabs in Palestine. In his "*Seven Pillars of Wisdom*" Lawrence writes that it stood "majestic on the grass at Um el Surab, with Bristols and 9A, like fledglings beneath its spread of wings. Round it admired the Arabs, saying: 'Indeed, and at last, they have sent us THE aeroplane, of which these things were foals'."

But even the 0/400 was dwarfed by Handley Page's next bomber, the four-engined V/1500, which was designed to bomb Berlin from British bases and had a bigger wing span than the "Lincoln" of to-day. Powered by four 350 h.p. Rolls-Royce engines, it could carry a crew of six, thirty 250 lb. bombs, machine-guns and enough fuel for an endurance of 12 hrs. at 90 m.p.h.

Realizing the enormous power of its new weapon, the newly-born R.A.F. ordered 255 of them to carry the war into the heart of Germany. By November 1918, only 13 months after their design was started, the first three were ready to take off for Berlin.



Handley Page "Halifax," one of the main types of heavy bomber used by the R.A.F. in their bomber offensive in the second World War.



The prototype of the Handley Page "Hastings" military transport and "Hermes" air liner.

At that moment, however, the enemy asked for an Armistice, the war was over and, having just developed the world's most formidable warplane, Handley Page suddenly discovered that nobody wanted it.

Instead of maintaining enough military orders to keep the industry going, as a safeguard against future war, the Government immediately cancelled all contracts. Fortunately, it seemed possible that the demand for civil air transport might be sufficient to keep the two-legged wolves from the door. So, instead of shutting up shop, "H.P." formed one of the world's first commercial air transport companies—Handley Page Transport Ltd.—using converted 0/400s and a V/1500 for long-distance flights.

From the start the H.P. Transport company achieved high standards of efficiency on its services to Paris and Brussels, but its directors had no illusions and realized that to do the job properly they would need air liners designed as such from the start, and not just converted bombers. The result was the twin-engined W/8, a 12-seat biplane which gained easily the highest award in the Air Ministry's civil aviation competition in 1920. So began the series of Handley Page transports which, together with Handley Page bombers, have been a mainstay of British air transport and air power right up to the present day.

The W/8, W/8B and W/10 air liners and the "Hyderabad," "Hinaidi" and "Clive" military machines of the 1920s all bore a strong family resemblance to the 0/400, but each incorporated important new features to improve efficiency, safety, comfort and performance. For example, introduction of the famous Handley Page slot on the "Hyderabad," and its later application to all R.A.F. aircraft, reduced the accident rate in the Service by half. The "Hinaidi" marked the change-over to all-metal construction, coming shortly after the wooden "Clive," one of which achieved incredible records of efficiency with Sir Alan Cobham's air circus. In one day in 1933 it lifted 1,008 passengers, taking-off and landing 48 times.

Going back to 1924 for a moment, in that year the four major British air transport companies, which were having a rather lean time, combined to form the Government-sponsored Imperial Airways. Nine of the 14 aircraft operated by the new combine in its early days were Handley Pages, and, in fact, air liners designed at Cricklewood formed a major part of Imperial Airways' landplane fleet right until 1940, when the Company was merged with British Airways to form the British Overseas Airways Corporation.

Most famous of all Imperial Airways' landplanes were the Handley Page "Hannibals," which revolutionized air travel in 1931. "*Hannibal*" and its seven sisters were neither handsome nor fast, indeed the sight of one of them ambling to Paris, at about 98 m.p.h. led one person to remark that they had "built-in head-winds." But never before had any air liner offered such spacious and luxurious accommodation, or a catering service able to produce a seven-course hot dinner in the clouds. And never before or since has any air liner equalled the safety record of the eight "Hannibals," which between them carried nearly half a million passengers and completed over 10 million miles of flying, without any fatal accident until one of them disappeared over the Persian Gulf on its last flight home to be broken up. What is more, their large capacity and low running costs made possible a profit of about £30 per working hour in normal conditions, a sober thought in these days of

(*Continued on page 362*)

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With certain exceptions, which will be indicated, these should be ordered through a bookseller.

"BIRDS OF BRITAIN"

By J. D. MacDonald (Bell, 8/6 net)

Over 400 birds are recorded as occurring in Britain, but about half of these are rare, others are restricted in range, and the number of those that are common or fairly common is about 100. Many of us can recognize a proportion of these, but to be able to name most or all of them is a considerable accomplishment. Mr. MacDonald will help bird lovers to reach this high standard. He is accustomed to identifying birds from verbal and written descriptions, and as a result knows the most useful points for which to look in order to distinguish one bird from another that may nearly resemble it.

With identification in mind the author has arranged about 200 common and resident British birds in 20 groups such as the seed eaters, the small birds with thick bills, those that are seen clinging to tree trunks, those that forage on branches, and so on. Within each group the individual birds are described in such a way that they can readily be distinguished. Small sketches are given to help the reader, and there are also nine full-page plates, six of which are in colour.

The book will be of absorbing interest both to beginners and to more experienced birdwatchers, for it gives in concise form a wealth of information about the appearance and habits of the birds described and illustrated. It should become the constant companion of the bird lover.

"DRAKE'S DRUMMER"

By Capt. Frank H. Shaw
(Children's Books Ltd. 6/- net)

We have to thank Capt. Shaw for many fine adventure stories, and here is a new one from him that takes us back to the great days of Queen Elizabeth and Drake's famous voyage round the world. Roger Carey and his friend Robin Fry have the good fortune to save Drake from being ambushed by Spaniards eager to prevent him from penetrating the secrets of the New World, and as a result they find themselves in the "*Pelican*," Drake's own vessel during his wonderful adventure. They are among the first to land on the South American coast, endure the hardships of the passage through the Strait of Magellan, help in the capture of the great Spanish treasure ship off the Pacific Coast of the continent, and play parts in countless thrilling adventures, finally being presented to Queen Elizabeth herself at the close of the victorious enterprise.

There is not a dull page in the book, which is illustrated by seven excellent drawings.

"EAST KENT BUSES AND COACHES" 2/6

"MIDLAND RED BUSES AND COACHES" 2/6

(Ian Allan Ltd.)

These two booklets deal in a similar manner with the vehicles of two well-known provincial bus and coach operators. In each the evolution of the company concerned and its road services are dealt with, and the development of the various types of vehicles employed is carefully followed. The vehicles composing the present-day fleets of the two concerns are listed in some detail, while the depots responsible for them and the different services that they operate also are given.

Both books will be welcomed by bus enthusiasts, especially in the districts covered by the companies. Copies of each cost 2/6 from bookstalls or Ian Allan agents, or 2/9 including postage direct from the publishers at 33, Knollys Road, Streatham, London S.W.16.

"THE BOYS' BOOK OF CRICKET"

Edited by Patrick Pringle
(Evans Bros. 10/6 net)

This book on England's great summer sport has been specially written and produced for boys. It is an accurate and reliable guide for all who are interested in cricket, whether as players or onlookers.

Every side of the game is covered fully. Special articles are contributed by some of our greatest living cricketers, among them Denis Compton, Norman Yardley, P. G. H. Fender and the famous West Indian, Constantine, each of whom tells readers something of the features of the game in which he became distinguished. There are also a "cricket commentary" by Rex Alston, well known for his cricket broadcasts, general articles on cricket at home and overseas, and an account of an indoor training school. In addition to this useful information about first-class cricket there are sections giving advice on batting, bowling and fielding, with splendid action pictures of famous players whose methods serve as guides to those who wish to excel in the game themselves. Cricket stories, notes on the laws of the game, crosswords and quiz pages make up a book of wide variety, which includes also many drawings and humorous cartoons.

The book is large in size, with almost 200 pages, and every boy interested in cricket would revel in its articles, stories and pictures.

"REGIONAL ROUND"

No. 1 E. and N. E. Regions (Ian Allan Ltd. 2/6)

"*Regional Round*" is announced as the first of a series of booklets in which the reader is "taken the rounds" of the different Regions of British Railways. The Editor is G. Freeman Allen, and contributions are included from various well-known and authoritative writers. The scheme behind these "*Rounds*" is that each booklet will present a selection of articles and photographs dealing largely with the strongly individual practices of earlier, more colourful railway days, and with the various special characteristics that distinguished the principal main lines before the present age of standardization.

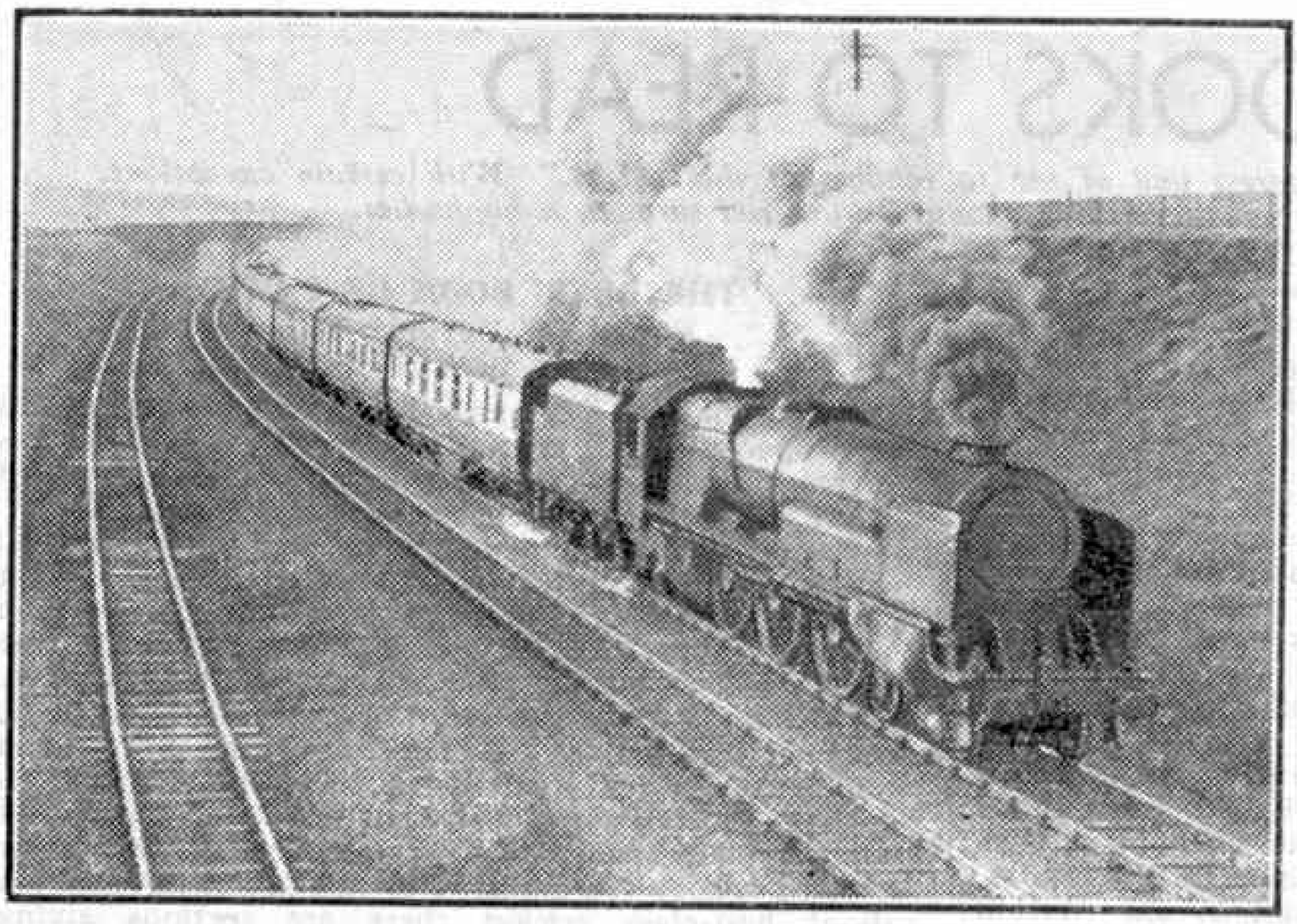
"*Round*" No. 1 gives a promising start to the series, the subjects including main line locomotive working of to-day in the two regions concerned. Various local railways and railway centres are described, and there are interesting chapters on pre-group coaching stock and signalling practice. The photographs are well reproduced.

Copies can be obtained from bookstalls and Ian Allan agents, or direct from the publishers at 33, Knollys Road, Streatham, London S.W.16, for 2/9, including postage.

"THE DRAGONFLIES OF THE BRITISH ISLES"

By Cynthia Longfield, F.R.E.S.
(Warne. 17/6)

Every reader of the "*M.M.*" must have been greatly impressed when seeing dragonflies, those biplanes of Nature, buzzing around in the Spring and Summer. For those who wish to know more about these wonderful insects this book will provide a store of good reading. It deals fully with every type, explaining the marvellous transformations that make up the life histories of the species concerned, and there are actual size photographs and many other illustrations that will enable each to be recognized. Methods of collecting, preserving and breeding also are explained, and a special attraction is a set of reproductions of original colour drawings of British dragonflies in the form of 12 full page plates.



The London Midland "Turbomotive" on the 5.25 p.m. up from Liverpool. Photograph by R. Whitfield.

Railway Notes

By R. A. H. Weight

National and Scottish News

As we write the holiday season is at its height in appropriately hot weather. The railways are busy, and many excursions and other pre-war facilities have returned, providing no end of scope for the railway enthusiast or lineside recorder, be he stationary or able to travel.

There are still many varieties of colour finish to be seen on locomotives and rolling stock. The new blue hue for principal express engines is not greatly in evidence yet. The dark green with orange and black lining, apart of course from the Western Region, has only been noted so far on a few "A2s" of the North Eastern or Scottish Region, but the lined black is to be seen on all sides, though certain Regions and Works thereon are not yet unanimous regarding the types to be so finished. The new red and cream, or plainer red style of painting is appearing more on passenger train vehicles, unless they are parts of electric train stock, when their dress changes if necessary to green. Samples of chocolate and cream as well as the other experimental plum and spilt milk style continue to add variety, as do Pullman cars or the former companies' own colours still much in use and intermingled.

Following recent satisfactory trials from Euston to Glasgow and back, the pioneer main line twin diesel electric locomotives, Nos. 10000 and 10001, began an intended regular service hauling a night express or the "*Royal Scot*" throughout over the 401¼ miles in July last. Some Peppercorn "Pacifics" have been allocated to the Scottish Region.

The annual Royal Highland Agricultural Show held at Dundee this summer necessitated special railway arrangements, which were carried through on a large scale. Esplanade Station, near the Tay Bridge on the East Coast main line, closed since 1939, was reopened, dealing with more than 53,000 passengers. Magdalen Green and Tay Bridge and West stations also handled heavy passenger, freight or livestock traffic in connection with the Show, which attracted a record attendance. Over 50 special passenger trains were run as well as a number conveying animals and other exhibits, not forgetting an enormous number of huts, stands or buildings packed in sections.

Southern Tidings

Diesel electric 0-6-0 shunting engines are coming into service from Ashford Works, numbered 15211-25. They are seen working from Norwood Shed and in yards near London. A diesel mechanical locomotive also is under construction.

The first "Leader" class 0-6-6-0, double-ended 6-cyl. steam locomotive of novel, all enclosed design, No. 36001, was completed at Brighton in time to commence trials at the end of June last; two more are in hand, a total of five being on order.

"Battle of Britain" 4-6-2s numbered from 34091 up are being built, mainly at Brighton. Five Wainwright "H" 0-4-4Ts have been fitted with pull-and-push gear for local service from Tonbridge, Tunbridge Wells or elsewhere. Most of the Tonbridge passenger longer distance duties are now worked by "L" class engines, several of which are lately ex Works in smart lined black finish.

No. 2423 "*The Needles*" is the first of the newer Brighton "H2" 4-4-2s to be scrapped; No. 32421 "*South Foreland*" is finished in lined black style, and has lately hauled extra Newhaven boat trains as well as through L.M.R. expresses between Brighton and Willesden Junction. A variety of tender, tank or mixed traffic locomotives is seen sharing the working between various points of the restored Midlands through trains to the Sussex coast resorts. On Saturdays, in between Newhaven boat train journeys, one of the electric engines also is employed. For example No. 20002 finished in blue was seen at the head of eight W.R. corridor coaches from Polegate to Brighton.

Several more L.S.W.R. 4-4-0s have been condemned. Some "T9s" were again assisting with Kent Coast summer traffic via Chatham, which route sees considerable usage of "King Arthurs" among other types. Many mixed traffic as well as some goods locomotives were seen on holiday trains.

A run on the 1.15 p.m. Kent coast express from Charing Cross to Ashford provided a good log behind "Schools" 4-4-0 "*Whitgift*," working through to Ramsgate in place of the usual "Battle of Britain" 4-6-2. A maximum of 78 m.p.h. was touched on the descent from Sevenoaks, Tonbridge being passed in 38 min. from Waterloo with 340 tons, and 70 m.p.h. was averaged from Paddock Wood to Headcorn through the Weald of Kent, producing a net time, allowing for permanent way slowing, of 64 min. for the 55½ miles to Ashford, allowed 65½ min. in the service time table.

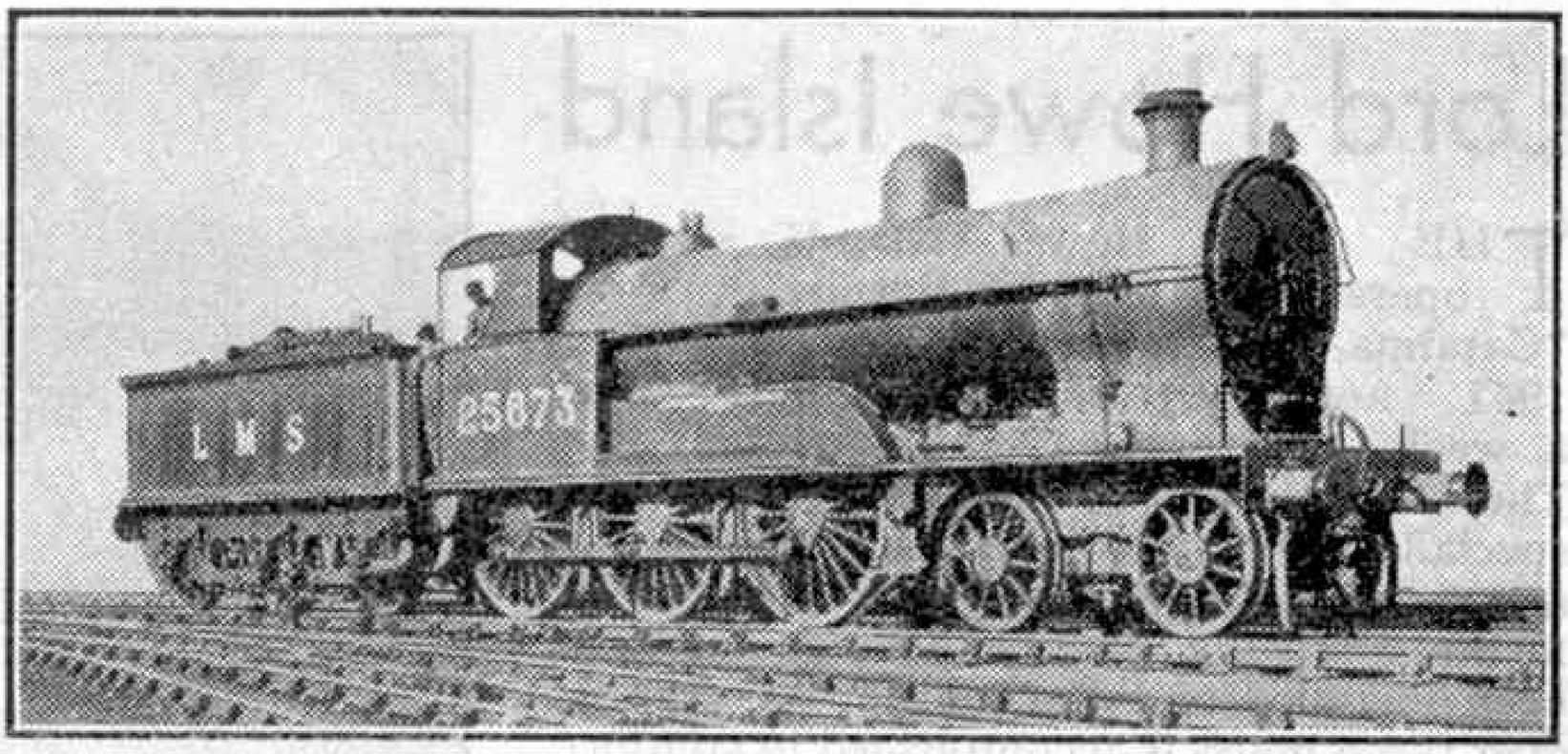
With the fast-timed 7.25 p.m. down over the difficult Hastings route with a lighter 8-coach train, "*Lancing*" left London Bridge 3 min. late, was checked by signal at Sevenoaks, but was almost punctual at Tunbridge Wells and quite so by the time Crowhurst was reached. Twice 74-75 m.p.h. was touched, though curves and speed restrictions give little opportunity for sustained high speed.

New Type Diesel Locomotive

A new type of 4-8-4 main line diesel locomotive is under construction at Derby, in which power from the engines is transmitted mechanically to the driving wheels instead of electrically. The engine will be numbered 10100, and will have driving cabs at each end. It will be provided with four supercharged diesel engines, each capable of developing 500 h.p.,

housed in pairs at the ends. They will be coupled to the driving wheels through a new patented system of transmission with fluid couplings and a gear-box, in such a manner that the main engine horse-power can be maintained as nearly constant as possible over the designed range of engine speeds, which will go up to 84 m.p.h.

The locomotive will be available for mixed traffic work over many routes, if present plans mature.

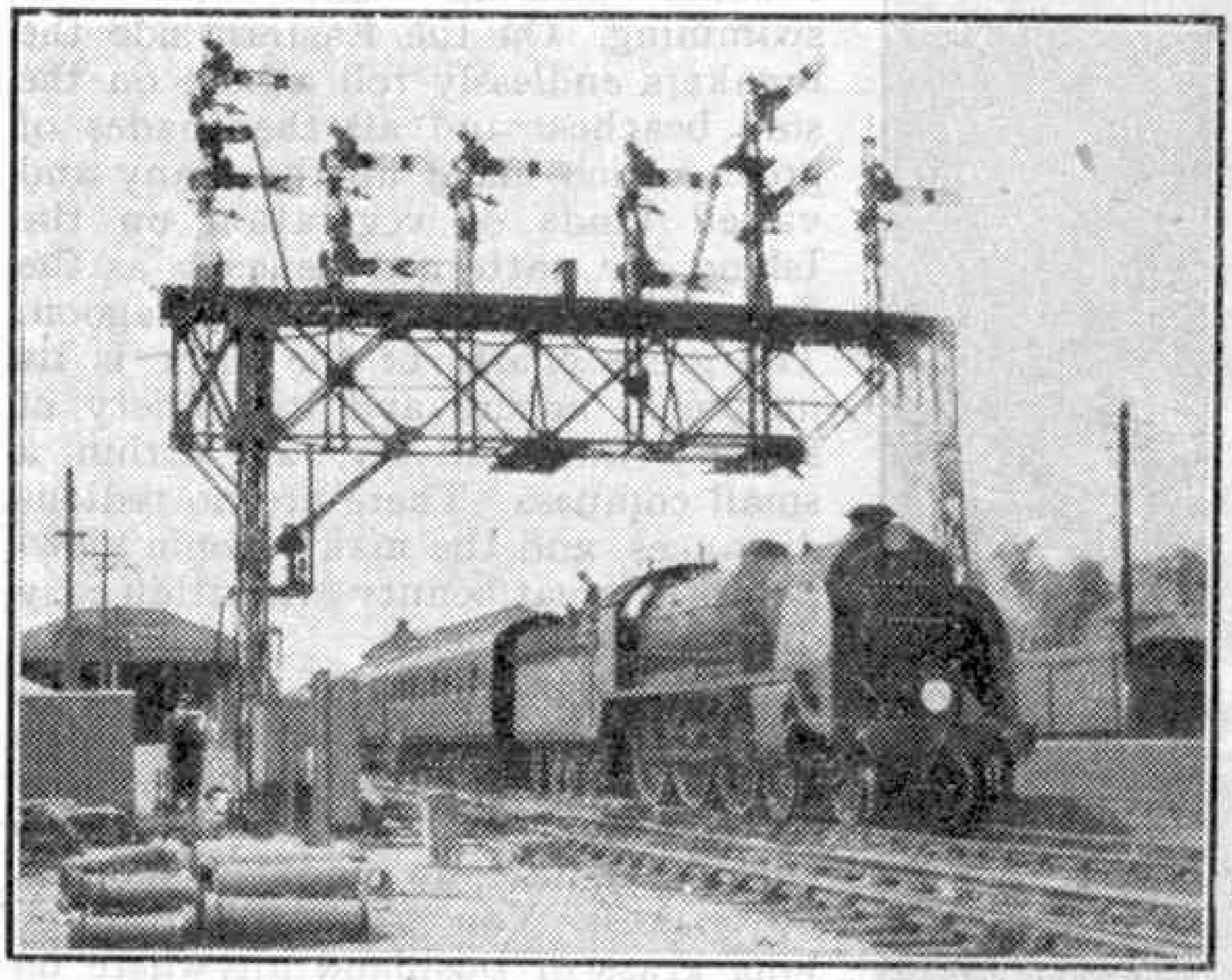


L.M.S. 4-6-0 No. 25673 "Lusitania." This was the last named engine of the now extinct L.N.W.R. "Prince of Wales" class. British Railways Official Photograph.

London Midland Regional Notes

During a recent visit to Camden Locomotive Shed, London, the writer saw an interesting variety of 4–6–2 engines standing close together. They included No. 46202, the "Turbomotive," No. 46211, "*Queen Maud*" of the first "Princess" series, No. 46256, "*Sir William Stanier, F.R.S.*," fitted with electric light and roller bearings, and two of the "Cities," one of which had lately had the streamlined casing removed, therefore displaying a differently shaped smoke-box. No streamlined locomotive is now running. Some had the "straw" lining, others were plain black. The British Railways' crest appeared on a few tenders. The newest class "5" 4–6–0 observed was No. 44665.

Hard upon the news that the last "Claughton" and "Prince of Wales" 4–6–0s had been withdrawn, comes tidings that the sole surviving "Precursor" 4–4–0, No. 25297 "*Sirocco*," is condemned. It was built in 1904 as L.N.W.R. No. 643, a simple 4–4–0, being one of Mr. Whale's first express class of 130 "Precursors," which rapidly replaced the Webb compounds. It was rebuilt with superheater in 1915, later becoming L.M.S. No. 5297, and then 25297. It is considerably older therefore than the "Claughtons" or "Princes," and belongs to the era preceding the "George V" 4–4–0s, now all scrapped. Many of the "Precursors" were modified to this superheated, larger cylinder, piston valve, extended smoke-box design, and fine work they did for their size.



An interesting Southern scene at Basingstoke. The engine on the up train is N15 4-6-0 "Queen Guinevere." Photograph by H. M. Madgwick.

Irish Railway News

From Northern Ireland we learn that the new "VS" 3-cylinder simple 4–4–0s have been fitted with smoke deflectors similar to those on the S.R. These engines haul the "*Enterprise*" Belfast-Dublin expresses, on which the "V" 4–4–0 compounds are also seen. Three of the latter have been fitted with Belpaire boilers, as on the latest "VS" type.

Five very old 0–6–0s were lately scrapped by the G.N.R. (I). This system has been partly merged in The Ulster Transport Authority, though operating responsibility may continue much as now.

Diesel-electric shunting or mixed traffic locomotives are in service, or nearly ready for it, on the C.I.E. system in Eire. One of the much-rebuilt Great Southern 4–6–0s No. 401 is now a 2-cylinder large-boilered engine with piston valves and Walschaerts gear, the Caprotti valves having been removed.

Western Region

Locomotives completed in quick succession, 4–6–0s No. 7021, "*Haverfordwest Castle*," No. 7022, "*Hereford Castle*," No. 7023, "*Penrice Castle*" and No. 7024, "*Powis Castle*" were in service by July last. The first two are stationed in S. Wales, as are Nos. 7018/20; No. 7019 is at Bristol, Bath Road.

New type 0–6–0T construction has begun at Swindon and Nos. 1500–2 are already in service. New 0–6–0T Nos. 8400–1 were received from outside builders during July.

Conversion from oil to coal burning, with restoration of previous numbers when necessary, continues to be effected.

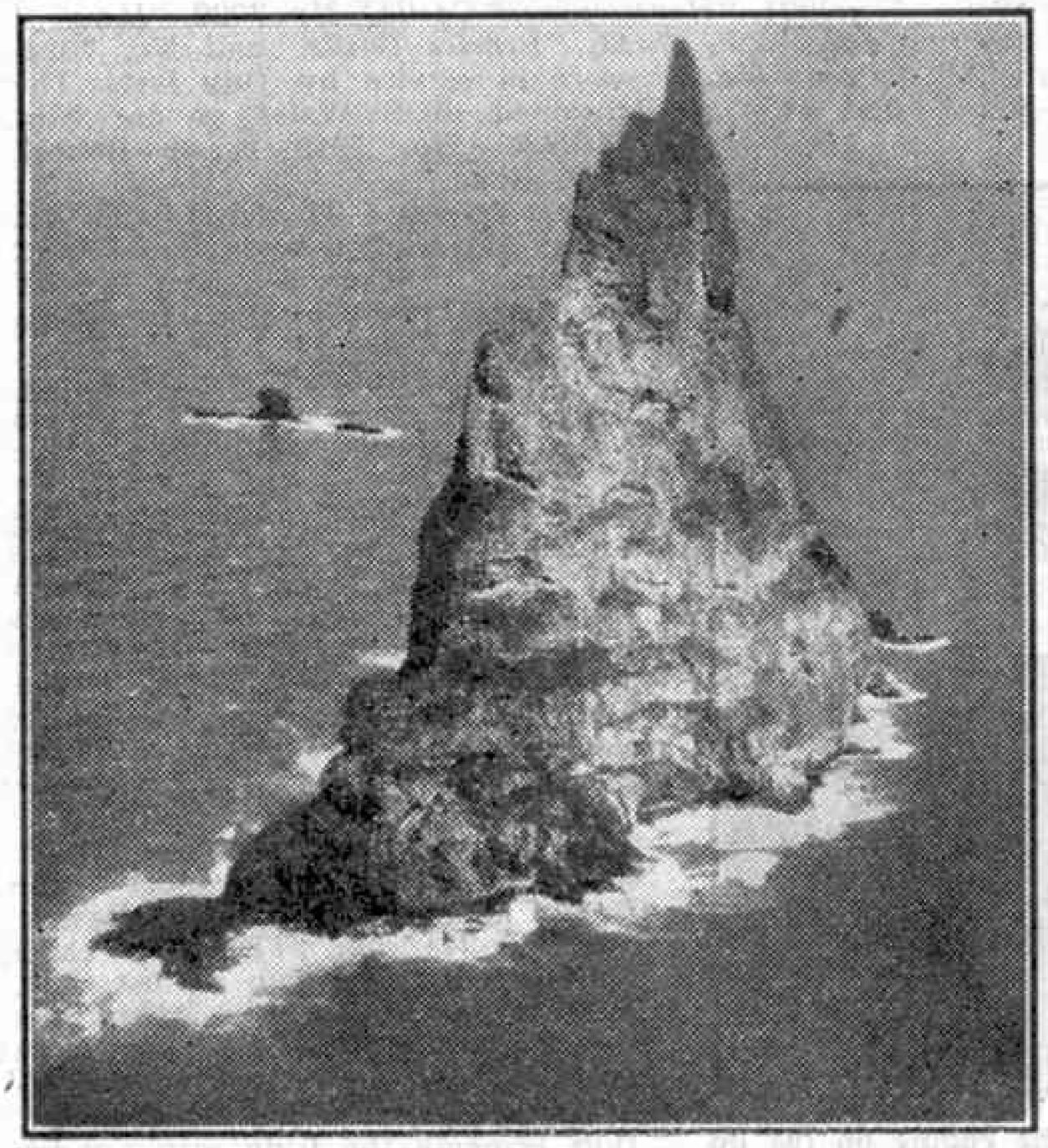
No. 7012 "*Barry Castle*," working through with the Swansea express due Paddington at 9.0 p.m. with a load of about 410 tons gross, left Newport 13 min. late, was badly delayed by signals before Severn Tunnel Junction, afterwards taking things gently up the steep rise from the Severn Tunnel and over the easier uphill stretches to Badminton. There was a signal check at Somerford, so the 50½ miles from Newport to the Bristol main line at Wootton Bassett occupied 71¼ min. Thereafter came a spirited bid to regain all lost time, since the 83½ miles into Paddington occupied only 78½ min., with an average of 66.8 m.p.h. over the favourable road between Swindon and Ealing, thus bringing the train into London punctually.

Lord Howe Island

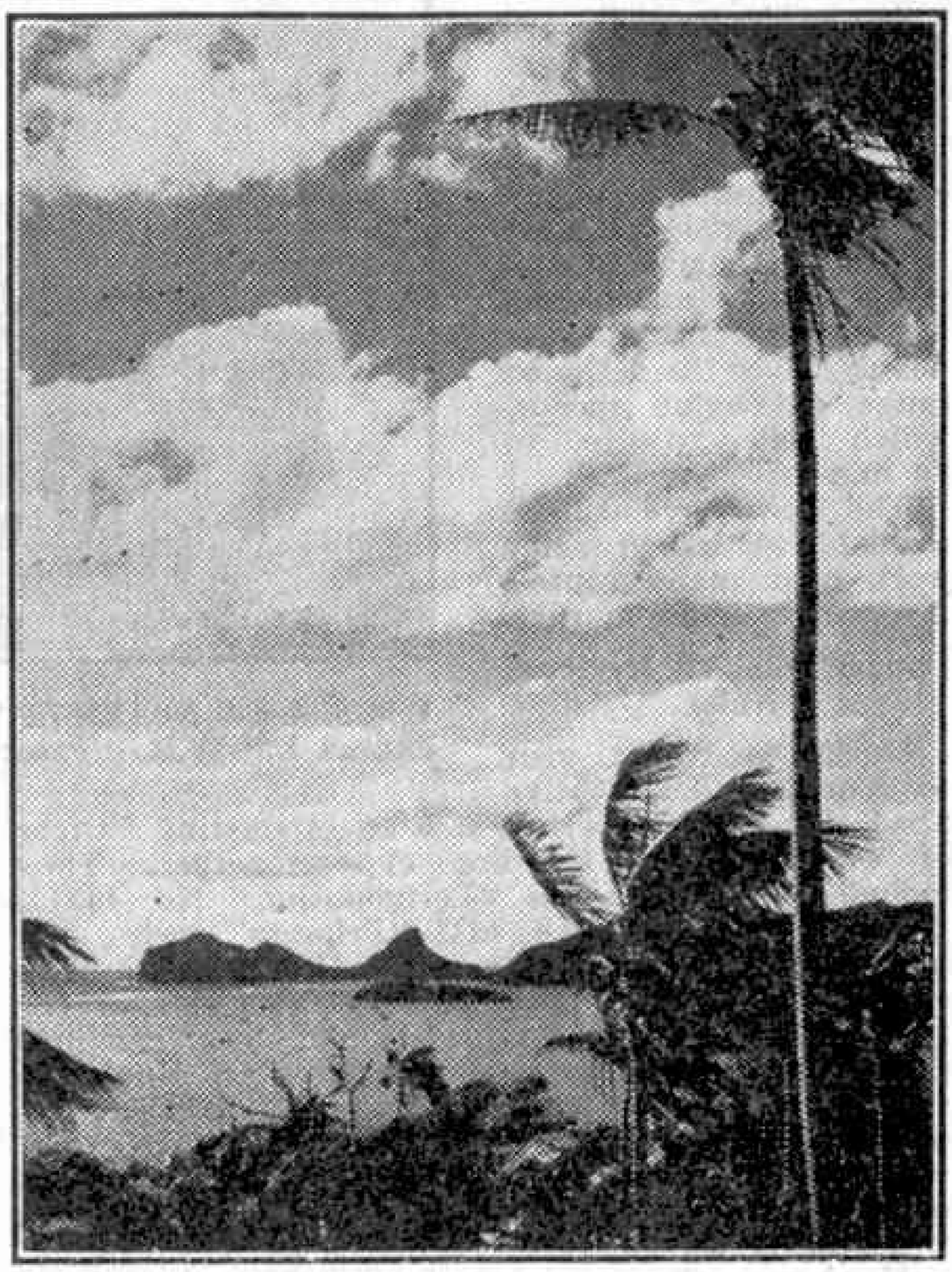
THE Lord Howe Island service, operated by Qantas Empire Airways "Catalina," commenced on 3rd December 1947. Actually, although regularly once a week, the service is a chartered one. The "Catalina" flying boat has been specially modified to suit requirements for a passenger service. Portholes and comfortable seating for 14 passengers have been installed and the journey of slightly over three hours is accomplished in comfort and with a wide view for seeing what there is to be seen.

The passengers who fly the 482 miles between Sydney and Lord Howe are mainly tourists, for this island is a delightful little pleasure resort complete with lagoon. Roughly crescent shaped, with a magnificent coral reef shielding the concave side, the enclosed lagoon offers a safe alighting and taking-off area for flying boats. Aircraft arrive at the Island at approximately high tide, thus accounting for some early morning departures from Sydney.

From the air the straightforward loveliness of the place is immediately apparent. The deep blue water changes to greens, browns, and golds where the corals come out of the ocean; and with white water



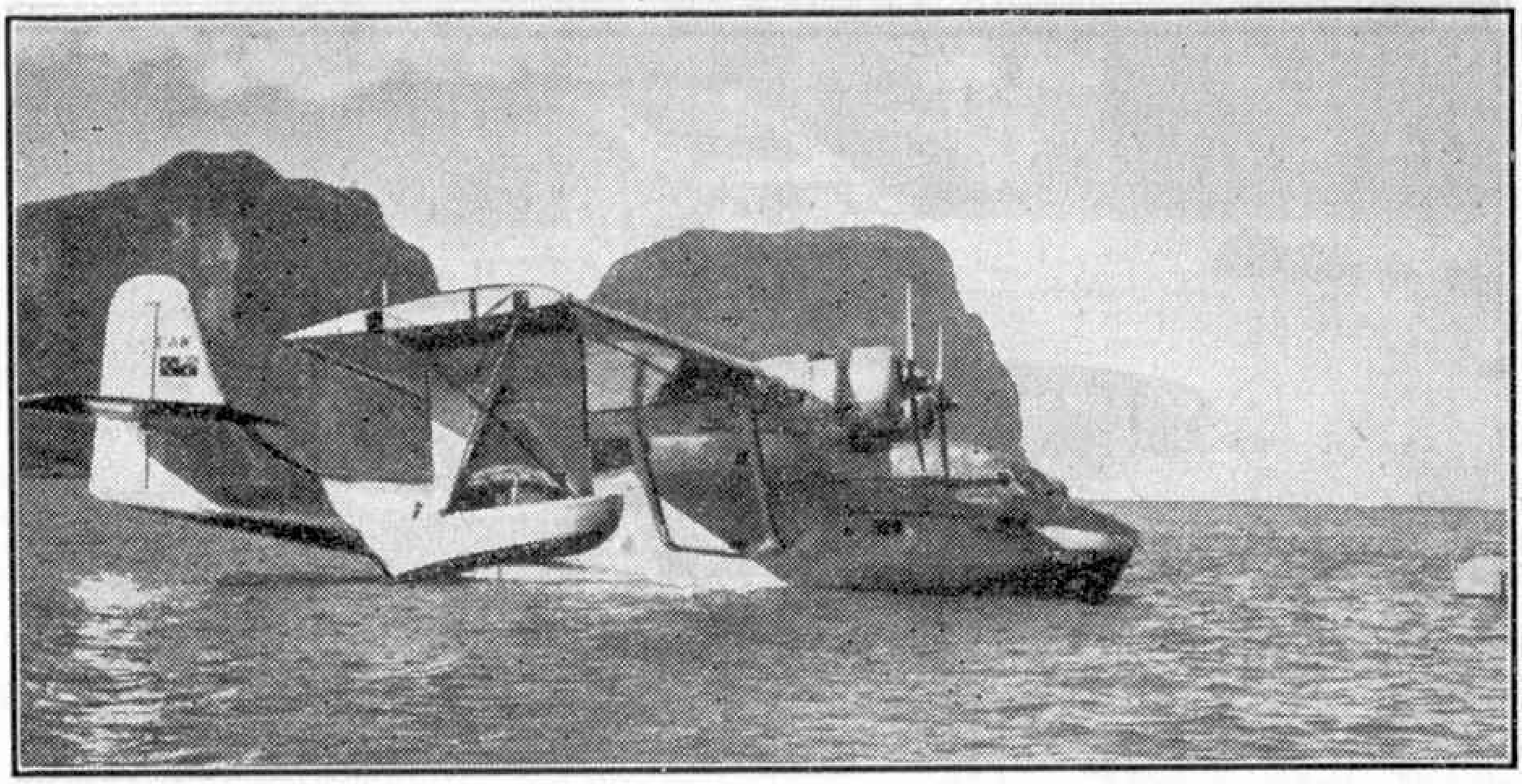
Ball's Pyramid, off Lord Howe Island.



Lord Howe Island, showing Rabbit Island in the lagoon and Mt. Eliza just beyond. For the accompanying photographs and that on which our cover is based we are indebted to Qantas Empire Airways Ltd.

fringing their bases, two great mountains nearly 3,000 ft. high fall sheer to the surge of the South Pacific. On the landward side they sweep down to the lagoon, an area of iridescent opal with over three miles of sun-bleached beaches offering safe still-water swimming. On the Eastern side the breakers endlessly roll ashore on the surf beaches, and all the shades of green which make up the many and varied kinds of vegetation on the Island are patterned beneath as the flying boat swings low to the lagoon. The great charm of the place is its unspoiled nature and its variety of scenery and activity, all within a small compass. There are no tedious distances, and the many scenic viewpoints of great beauty are within easy distance of home.

With its profusion of palms, great mountains and coral reefs it has a tropical appearance without any tropical disadvantages. There is no enervating heat, no sandflies, malaria, or snakes. You can walk through long grass or bushland anywhere on the Island with perfect safety. It is a place where you can be as busy as



Qantas Empire Airways' "Catalina" flying boat at Lord Howe Island.

you like or where you can laze the days away. A seabreeze blowing most of the time feels clean and fresh.

Naturally it is not always drenched in sunshine. Lord Howe lies in the North Tasman, and is subject at times to strong winds and high seas. It is never very cold, as the warm current responsible for the most southerly coral reef in the world helps to maintain an equable climate which rarely goes below 60 or above 80 degrees. Rainfall is about 75 in. annually. When it is windy on one side of the Island one can surf and sunbake on the lee side less than 30 minutes' walk from the house.

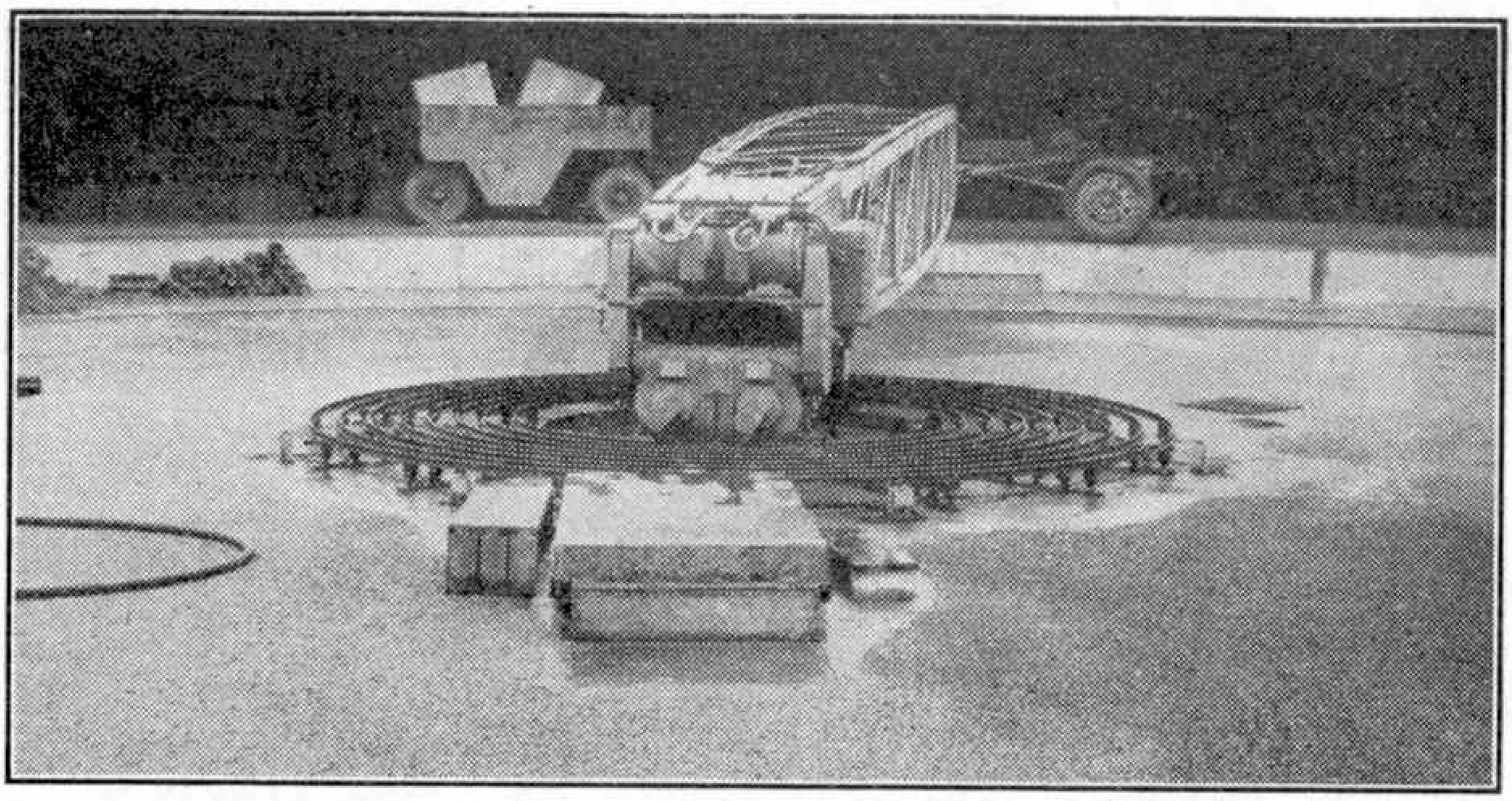
One of Lord Howe Island's greatest assets is fishing. About 300 square miles of water less than 100 fathoms deep surround the island, which are great feeding and breeding grounds for fish of various kinds. Kingfish, trevally, salmon, bonito and black rock cod and bluefish are plentiful. In recent years two black marlin up to 10 ft. long and Spanish mackerel up to 6 ft. long have been boated. Yellow fin tuna are taken every month of the year and average 60 to 80 lb., while some up to 250 lb. have been taken.

The World's Champion Diver

THE world's greatest animal deep sea diver and underwater swimmer is the bottle-nosed whale, which apparently thinks nothing of staying under water two hours. Whales generally are not fancy divers, but they are marvellously efficient, penetrating to enormous depths in their downward plunges. On one occasion a pressure gauge attached to a harpoon fired into a fin whale showed that a depth of 1,164 ft. was reached in one of its dives, and on returning to the surface the creature was still capable of towing a whaleboat for half an hour.

By comparison man is very feeble as a diver and underwater swimmer. He can get into the water by various graceful acrobatics, but can stay below the surface only for two to five minutes, and he cannot go very far down without being liable to an attack of bends or severe pains caused by the sudden release in the blood of bubbles of nitrogen on returning quickly to the surface. His lungs are capable of storing little more than 2,300 cc. of oxygen, or about four pints, and this will last for only about four minutes when he is swimming. The whale on the other hand has a capacity of something like 1,000 times this amount of oxygen, an amount that is sufficient to keep it going for nearly an hour when swimming under water. It is not greatly troubled by bends, possibly because pressure thickens the walls of its lung cells so much that the nitrogen cannot easily pass through them and so find its way into the blood.

In general the greater the animal the higher its power of swimming under water. Yet the hippopotamus can only remain completely submerged for about 50 sec., while the beaver and the seal, both much smaller creatures, are capable of remaining under water for as long as 15 minutes.



The road machine at the Road Research Laboratory, Harmondsworth. A lorry chassis is whirled round by an electrically-operated steel arm to make tests of road materials and surfaces.

Making Britain's Roads Safer

The Work of the Road Research Laboratory

By W. H. Owens

IN Britain's Road Research Laboratory at Harmondsworth, Middlesex, scientists are working to give this country the smoothest and safest roads in the world, along which traffic of all kinds may move expeditiously, economically and comfortably. By making continuous laboratory tests, combined with many experiments under normal traffic conditions on the open highways, these experts are finding out all they can about road foundations and surfacings, why roads fail or are dangerous to traffic, what causes road accidents, and so on.

The cost of this research is money well spent in the interest of the whole nation. Roads concern everybody nowadays, and in a densely populated country like Great Britain, where they are used by large numbers of motor vehicles all the time, safety and efficiency are of first-rate importance. More than £70,000,000 a year is spent upon the upkeep and development of our roads. Science can help to reduce this burden by finding out how roads can be built to last longer and give greater service to the community.

The Road Research Laboratory was founded by the Ministry of Transport in 1929 and became a branch of the Department of Scientific and Industrial Research in 1933. As a result of the work already accomplished, lasting improvements have been made to main highways in many parts of the country.

A wider knowledge of our native soils and of road-making materials, more scientific methods of construction, and the development of more durable anti-skid surfacings have helped to reduce not only highway costs, but also the heavy toll of road accidents. Road failures of all kinds have been investigated and the causes of these failures have been made known.

The Harmondsworth scientists have even assisted road engineers in many parts of the British Empire by undertaking the analysis of tropical soils, and so on. During the war they assisted materially with emergency road and airfield construction. And it was these experts who analysed samples of soil taken by Commandos from the Normandy beaches chosen for the D-Day invasion, thereby providing the Allied Command with advance information on the tank and vehicle bearing properties of those landing places.

Road research embraces a very wide field of investigation, ranging from soil mechanics to the study of the behaviour

of road vehicles and road users themselves. But since every good road must depend, first and foremost, upon good foundations, the study of soils is a fundamental problem. While the pioneers of our modern road system realized the importance of soil in supporting traffic loads, they were greatly handicapped through lack of knowledge of the properties of different soils and could not devise the means to measure them. In fact, it is only within the last 15 years that the necessary knowledge has begun to be acquired.

Soil experiments at Harmondsworth are concerned largely with the problem of compacting and stabilizing soils, so as to provide a firm foundation that will bear the road and its traffic loads over a long period. In a country of such diverse rocks as Great Britain the soils vary considerably in composition, and consequently in bearing power. So an important task being undertaken is the examination of the full range of British soils and the classification of these according to their properties.

To do this work the scientists must collect soil samples from all over the country, and for this purpose they use specially designed and equipped mobile laboratories. Such laboratories, incidentally, play an important part in the whole research programme. They are used not only for collecting soil or road samples, but also for various laboratory experiments of a kind that must be carried out on the actual site. The vehicles range from a simple light van to a heavy 4-wheel trailer equipped with a 100-ton testing machine. Field laboratories are also set up, where required, in temporary huts.

Back at Harmondsworth a series of physical and chemical experiments are made with the soil samples, and they undergo compaction tests as a means of finding out how the bearing power of each may be increased. The amount by which a soil can be usefully compacted depends on the kind of soil and the amount of water it contains; and for each soil there is a definite moisture content at which the best results can be obtained. So tests are made to determine what this is in each case.

The compaction tests are made with a large Road Machine installed at the Laboratory. This consists of a lorry chassis, pivoted on an electrically-operated steel arm, which draws various types of compaction roller over sections of soil laid on a wide circular track. After each series of passes the density of the soil is scientifically determined. Experiments are repeated for a variety of moisture contents, and in this way valuable information is being accumulated about the whole range of typical British soils.

On all big highway constructional schemes nowadays it is usual for a soil survey to be carried out beforehand. The Road Research Laboratory undertook such surveys on several trunk road sites before the war, but since then simpler and more rapid methods have been evolved. By means of the soil survey the engineer is able to explore the nature and types of subsoil along the line of the road and to design his road structure accordingly. It is an insurance against trouble caused by unforeseen foundation conditions.

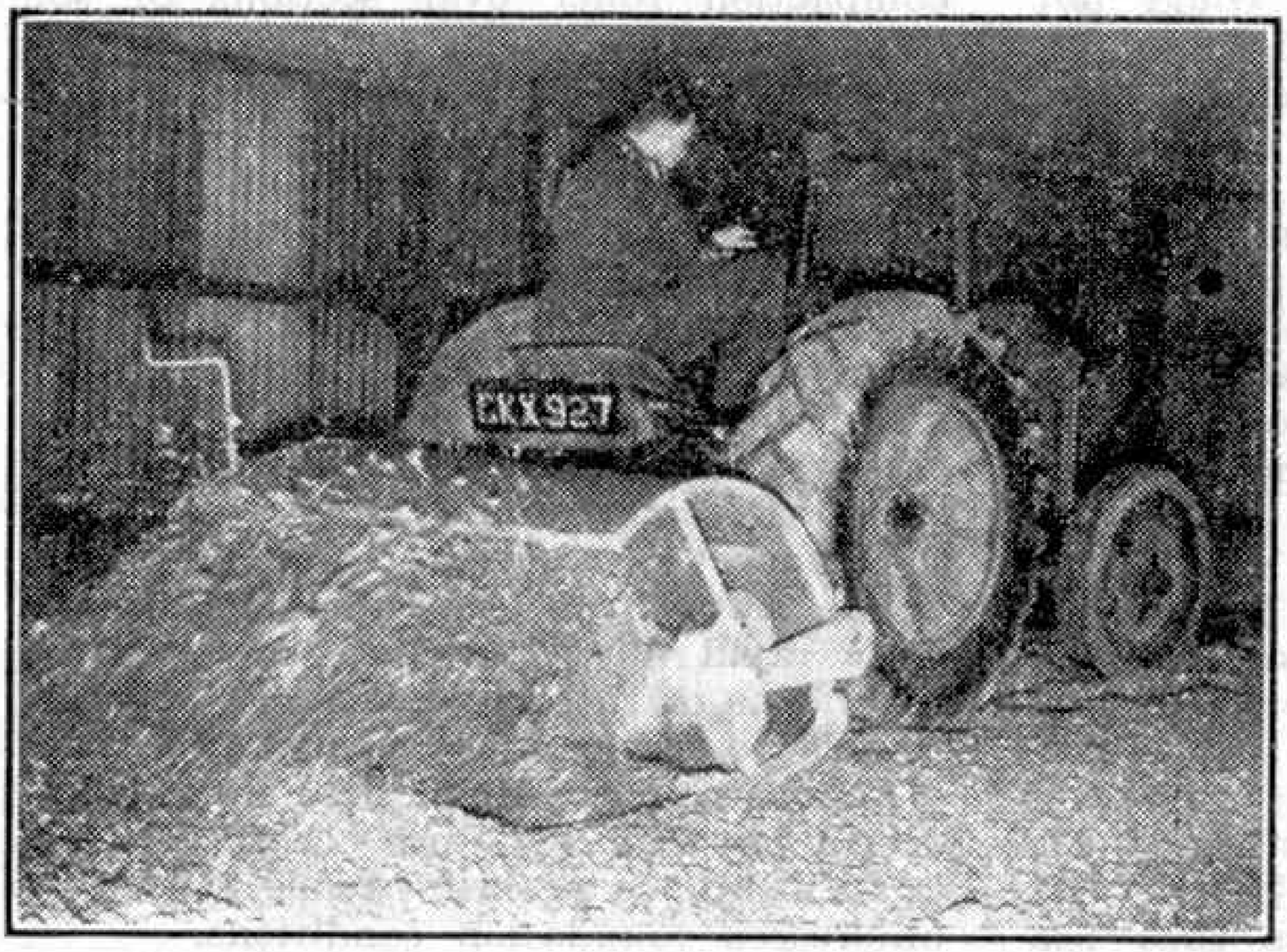
Finding out the best way to use bituminous materials in road construction occupies the time of another group of scientists at Harmondsworth. The physical and chemical properties of the constituents of these materials are investigated under controlled temperature conditions in the laboratory. Experimental non-skid surfacings are designed as a result of these preliminary investigations, and the



The control room for the working of the road machine.

surfacings undergo rigid tests, not only indoors, but also on the highways under ordinary traffic and weather conditions. The outdoor tests serve to check the results of the laboratory investigations.

An extensive series of full-scale road experiments are undertaken in co-operation with the Ministry of Transport and local authorities. On about two miles of the Colnbrook By-Pass section of the London to Bath Road, which runs by the gates of the Harmondsworth headquarters, upwards of one thousand short sections of different thin surfacing compositions have been examined over the past twelve years.



Mixing soil before rolling in tests of its suitability for road making.

Other road experiments of this kind are in progress on more than 30 other sites in England and Scotland, each of which is made with the primary object of solving local problems in connection with road surfacings. The first experiments in Scotland were made during the war to find out to what extent the results obtained on the Colnbrook By-Pass could be applied to localities with more extreme climatic conditions. Much attention is given to the problem of designing surfacings suited to local conditions of traffic and climate, and using local road stones and binders.

Yet another group at Harmondsworth is concerned with investigations into the problems and deficiencies of concrete roads. Concrete is a widely used material for modern highway construction, but there have been a good many failures due either to poor mixing, bad laying, or deficiency in the standard of materials. In the past, local authorities had no means of checking up on the quality of concrete work laid down by their contractors, and they had no redress if the road failed to achieve the results expected of it. Now, however, the Road Research scientists help by testing samples of newly-laid concrete roads to obtain satisfaction that the material has been laid according to contract.

A lorry equipped with concrete-boring apparatus is sent out to collect sample 6-inch cores from road sections requiring investigation. When they are returned to the Laboratory, the cores are placed in turn in testing machines, which exert pressure on them to the point of destruction. Results of these and other tests show whether the concrete has been properly mixed and is of the required strength, if the steel reinforcement is good, and if the expansion joints are in order.

All the Laboratory's work on concrete roads is done in close co-operation with road engineers and the Cement and Concrete Association. This side of the research programme involves study of the problems of concrete mixing, of mixer design and performance, and also of the compaction of concrete by vibration. For the purpose of experiment large numbers of concrete specimens have to be made and tested under accurately controlled conditions in the Laboratory.

Another aspect of concrete road research concerns the design of road slabs, and spacing and construction of joints, and the properties of jointing materials. Experimental concrete carpets are laid down on Ministry of Transport highways, so that full-scale trials may be carried out. As in the case of bituminous surfacings, scientists examine the results under traffic wear and exposure to weather over specified periods, and check up these results with their laboratory findings.

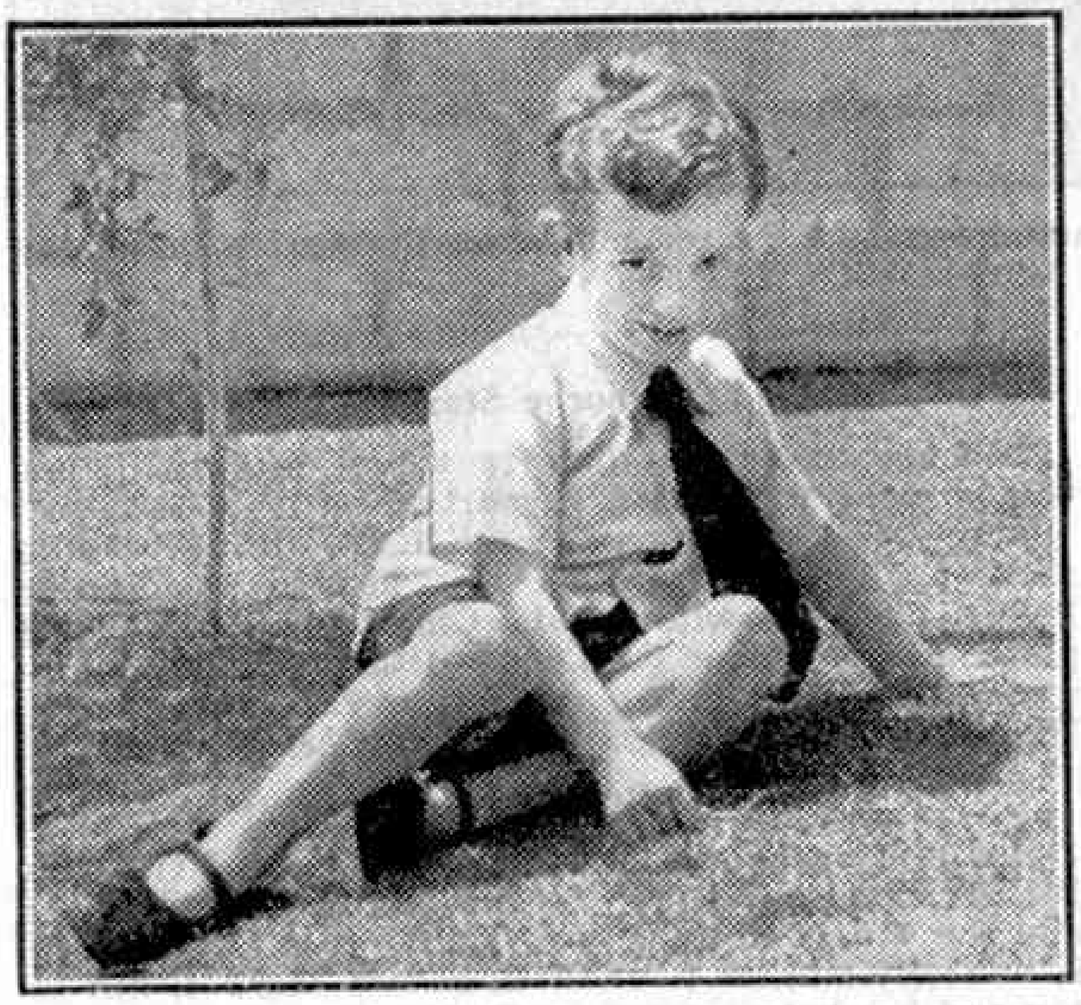
The study of roads from the angle of safety involves research and experiment of a different kind, much of it done outdoors on site. Road safety research has been embarked upon only in the last few years and is therefore very much in the preliminary stages. At present it is being studied under three main headings; namely, the Road, the Vehicle and the Road User.

Under the first of (*Continued on page 362*)

Photography

Preparing the Holiday Album

THE improved supplies of photographic materials will have enabled many "*M.M.*" readers to make good use of their cameras this summer, and by now they probably have a good stock of holiday prints. These prints should not be kept lying about loose, as they soon become soiled and crumpled, and then cease to give pleasure. They should be looked over critically, and the best selected and put into an album. This will keep them clean, and provide a fascinating permanent record of summer activities.



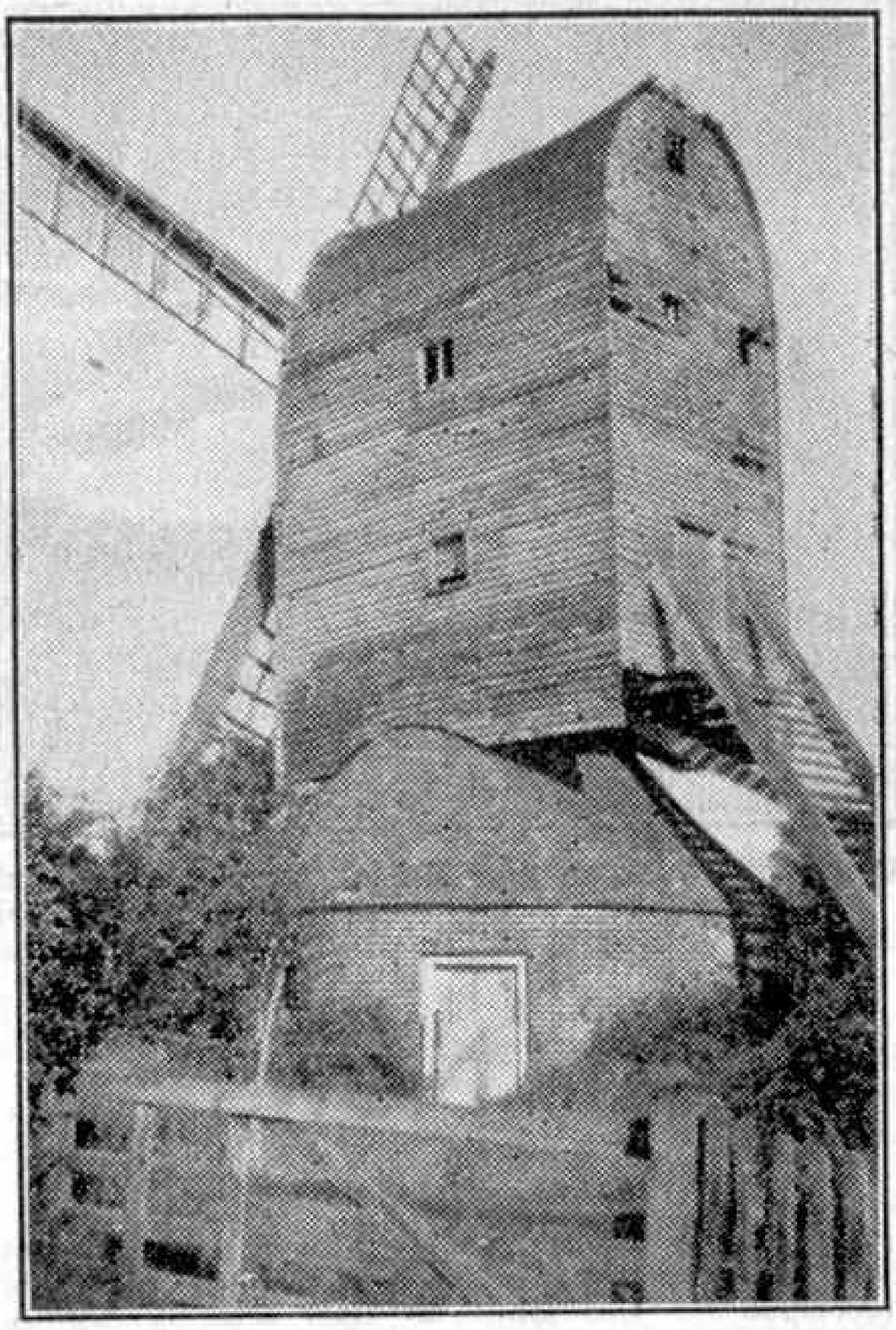
"Chris." Photograph by B. Chulindra, Helland Bridge.

Some readers prefer the "slip in" type of album, in which the pictures are inserted into openings provided for them on the page. A drawback to this sort of album is that the size and shape of the openings are fixed, and quite often do not show one's prints to the best advantage. The alternative is the "paste-on" album, which allows us to trim our prints to the most effective proportions, and by getting rid of uninteresting expanses of sky or foreground bring into prominence the best part of the picture.

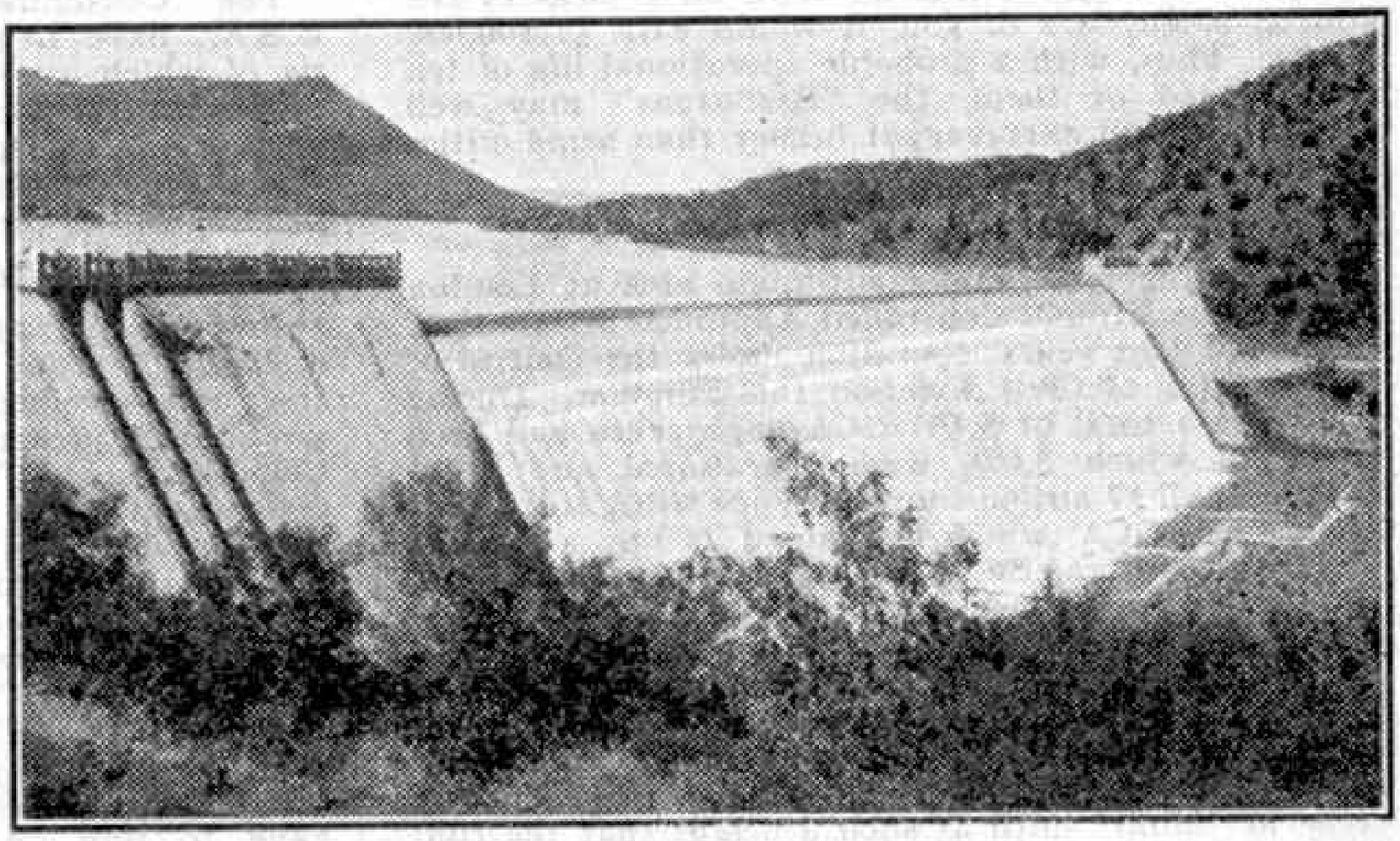
In trimming, care should be taken that the edge of the print is parallel with the horizon or any buildings that happen to be in the picture. The actual cutting should not be done with scissors, but with a sharp pocket knife and a steel straightedge, unless of course you are the fortunate possessor of a print trimmer. Another point, readers who prepare their own prints should not trim them until they are quite dry or they will tear in the process.

The layout of the album pages should be planned before actually mounting the pictures, by moving the chosen prints about on the page until the most suitable arrangement is found. A series of pictures "telling a story" should have a page to themselves, and care be taken to arrange them in the correct sequence. The actual mounting of the prints can be done easily and cleanly with one of the ready-made mountants obtainable from any photographic chemist. When all the prints that are to be mounted at the time are finished, the album should be placed under light pressure, such as that of a few books. This will prevent the leaves and prints from "cockling" as the mountant dries. It should be left like this for a day or so.

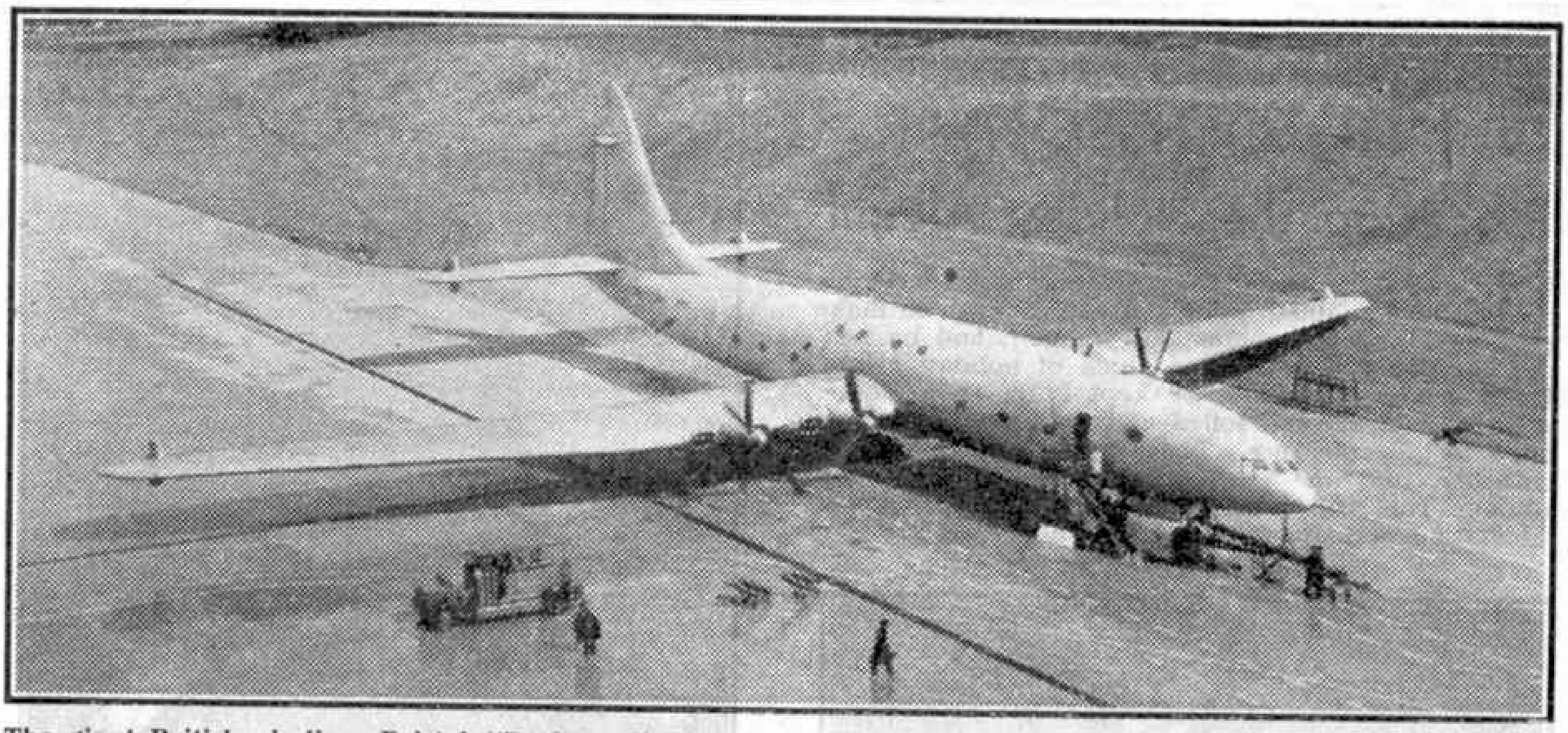
A holiday album prepared in this way is a lasting source of pleasure both to ourselves and our friends. Its attractiveness is increased if the title is neatly written beneath each print. The place and date of the photograph should be added.



The Village Flour Mill. Photograph by R. L. Barnes, Ealing.



Loskor Dam, Eastern Transvaal. Photograph by R. R. Vrnjas, Johannesburg.



The giant British air liner Bristol "Brabazon" I. This photograph and the upper one on the next page are by courtesy of The Bristol Aeroplane Co. Ltd.

Air News

"Brabazon" Progress

Latest news of the "Brabazon" I is that a Bristol twin-"Centaurus" power plant of the type especially developed for this giant air liner has successfully completed its Air Registration Board 150 hrs.' type test. It is the first coupled power plant to pass the A.R.B. test; before passing it no engine may be fitted to a passenger-carrying aeroplane.

For the purpose of the test the two coupled engines, which are geared to drive counter-rotating propellers, were mounted in a test rig representing a 21 ft. wide section of the "Brabazon's" wing. They were then run for the full 150 hrs., 80 of them at maximum climb power, afterwards being stripped for examination. All components were found to be in perfect condition, without any sign of the vibration trouble experienced with earlier coupled units.

In view of past criticism of the "Brabazon's" high initial cost, some operating costs recently published are of particular interest. They show that if the "Brabazon" carries 100 passengers between London and New York and operates at an average throughout the year of 65 per cent. full load, on a basis of the present single fare of £80, it would earn £1,300,000 a year. Thus, with a probable operational life of ten years ahead of them, the "Brabazons" may well prove less of an extravagant luxury than some critics have led us to believe.

GCA at London Airport

One of the most important radio aids at London Airport, the Ground Controlled Approach installation, completed two years' operation under the control of the Ministry of Civil Aviation this Summer. During that time a total of 5,161 GCA approaches had been made, of which 3,020 were operational and 2,141 practice. All 17 airline companies operating to London Airport use GCA, which is manned 24 hrs. a day.

GCA is used chiefly to aid aircraft approaching the airport in bad weather, and is operated by controllers in a special mobile van situated at the end of the runway in use. By means of elaborate radar apparatus, they can see the position of the aircraft relative to the runway, and are thus able to tell the pilot what course to steer and height to fly, enabling him to come in "blind" until at such a height that the runway becomes visible.

Airborne Stars

The first large film unit to travel entirely by air was brought to London Airport recently aboard two "Skymasters" belonging to K.L.M., Royal Dutch Airlines. The unit, which was headed by Tyrone Power and his wife Linda Christian, included 94 passengers and over £200,000 worth of filming equipment. Previously it had spent 10 weeks in Marrakesh, Morocco, making a film entitled "*The Black Rose.*"

New British Fighters

Preliminary details have been released of two new British high-speed fighters, the Gloster "Meteor" F8 and the Westland "Wyvern" TF2. The "Meteor" F8 is basically similar to the well-known Mark 4, but its tail end has been revised by fitting a more sweptback, square-cut tailplane, flattening the top of the fin and rudder and dispensing with the under keel surface or tail skid. In addition, it has a new single-piece cockpit hood and extended front fuselage, giving promise of even higher performance than the Mark 4.

Little may be said yet about the "Wyvern" TF2, except that it is powered by an Armstrong-Siddeley "Python" propjet and is a carrier-based torpedo-fighter.

The B-36 Freighter

The Consolidated-Vultee Aircraft Corporation, U.S.A., have developed an all-metal cargo carrier, six of which can be accommodated in the bomb-bay of one of their huge B-36 bombers, enabling it to operate as a transport with a payload of up to 35 tons. The United States Air Force have awarded the Company an initial contract for 190 of these carriers.

Turboprop Transports

Proof of the rapidity with which the propjet engine is emerging from the experimental stage is given in the announcement that two special "Theseus"-powered "Lincolns" operated by R.A.F. Transport Command have between them logged more than 600 hrs. of flying since May 1948. These operations have proved the claim that propjets require less maintenance than piston-engines of comparable power. In fact, new "Theseus" engines require practically no servicing of any kind during their first 200 hrs. running.

Each "Lincoln" has two piston-engines as well as its two "Theseus" propjets, but the piston-engines were retained only because no suitable gearbox had been designed for the "Theseus." So the aircraft have to rely on the piston-engines for all their electrical, hydraulic and other "services."

British European Airways' German Services

A fact not widely known is that for several months British European Airways have been providing not only frequent services between London and the main centres of Western Germany, but also a network of internal services linking those centres with each other.

Throughout the whole period of the Air Lift, except for one short break for technical reasons, B.E.A. have been the only airline operating daily into and out of Berlin from London. They have also operated regular normal services to Hamburg, Frankfurt and Dusseldorf. But their German internal services represent a completely new task for a British airline. The aircraft used on the routes are 27-seat "Vikings," except between Hamburg and Berlin, where special radar-equipped "Dakotas" have to be used to conform with Air Lift requirements.

"Constellation" With Knobs On

Few aircraft have been treated so unkindly as the normally-handsome Lockheed "Constellation" illustrated at the foot of this page. As well as two huge radomes mid-way along the top and bottom of its fuselage, this machine has a lengthened nose and a row of antennae running like spikes along its fuselage, fore and aft of its "humps." The United States Navy, for whom it was built, will release only a few details of this strange "Connie," which is designated PO-1W. But they do admit that it will be used "to test advanced electronic systems designed for installation on service machines"—which is fairly obvious!

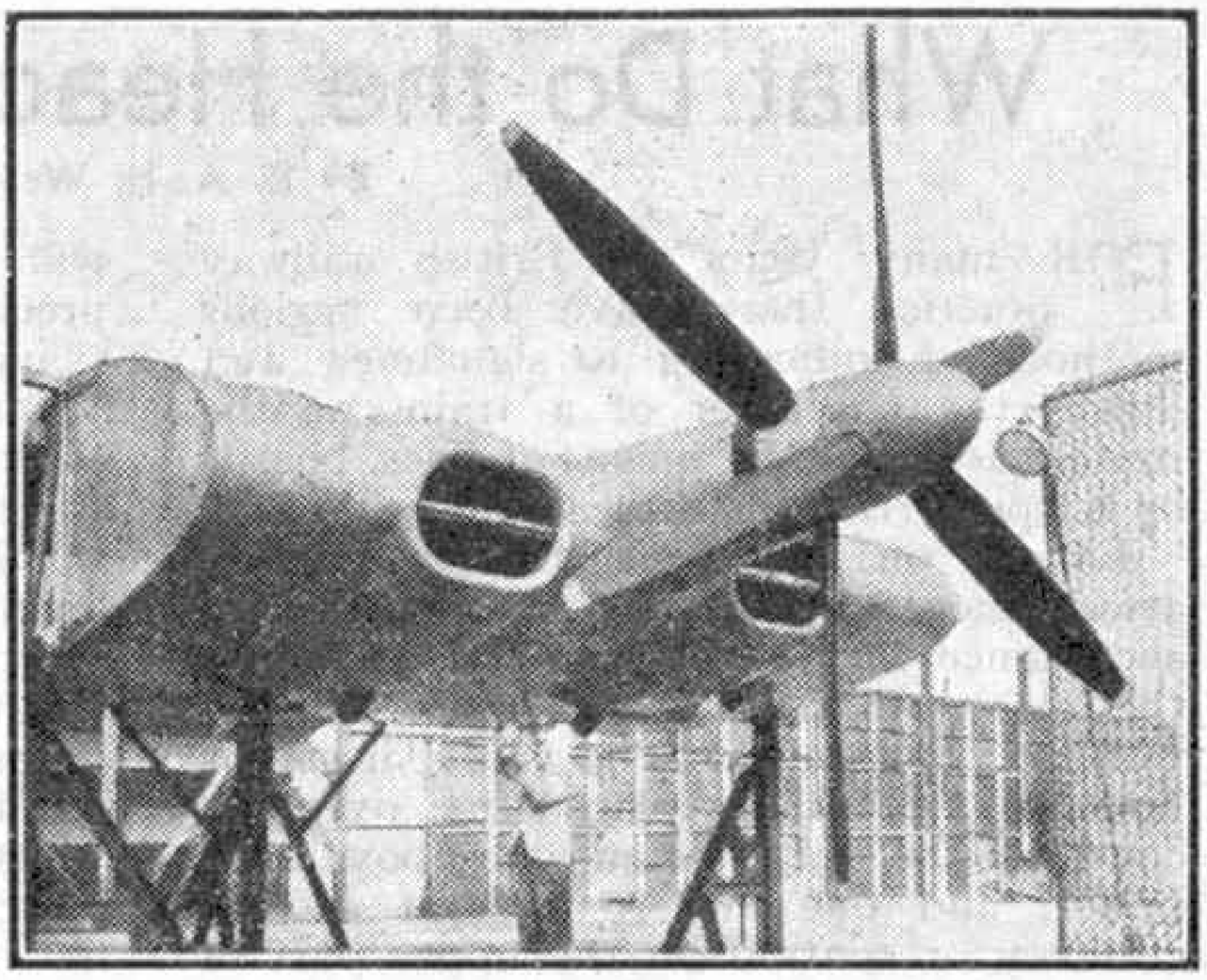
Normal flight crews are carried. In addition, facilities are provided in the cabin for technicians and electronic equipment operators, together with bunks for relief crew members on long flights. An interesting fact is that despite the bulky external equipment Lockheed claim that the "Constellation's" performance has not been materially reduced.

Proposed Emigrant Air Service

A group of 15 former American servicemen are planning to operate a migration service from Naples, Italy, to Sydney, Australia, using three 89-passenger Boeing flying boats. The Boeings will be the largest aircraft serving Australia and will carry 200 emigrants a month.

£10 Return Fare to Paris

Special excursion fares between London and Paris have been introduced by the two principal cross-Channel airlines, British European Airways and Air France. Costing only £10, compared with a normal return fare of £14 . 8 . 0, they are available for 30 days and entitle passengers to the full normal baggage allowance and reduction for children's fares. Thus, they compare favourably with the pre-war fare of £7/10/–. The only snag is that passengers must travel during the off-peak hours, between 10 p.m. at night and 8 a.m. in the morning.

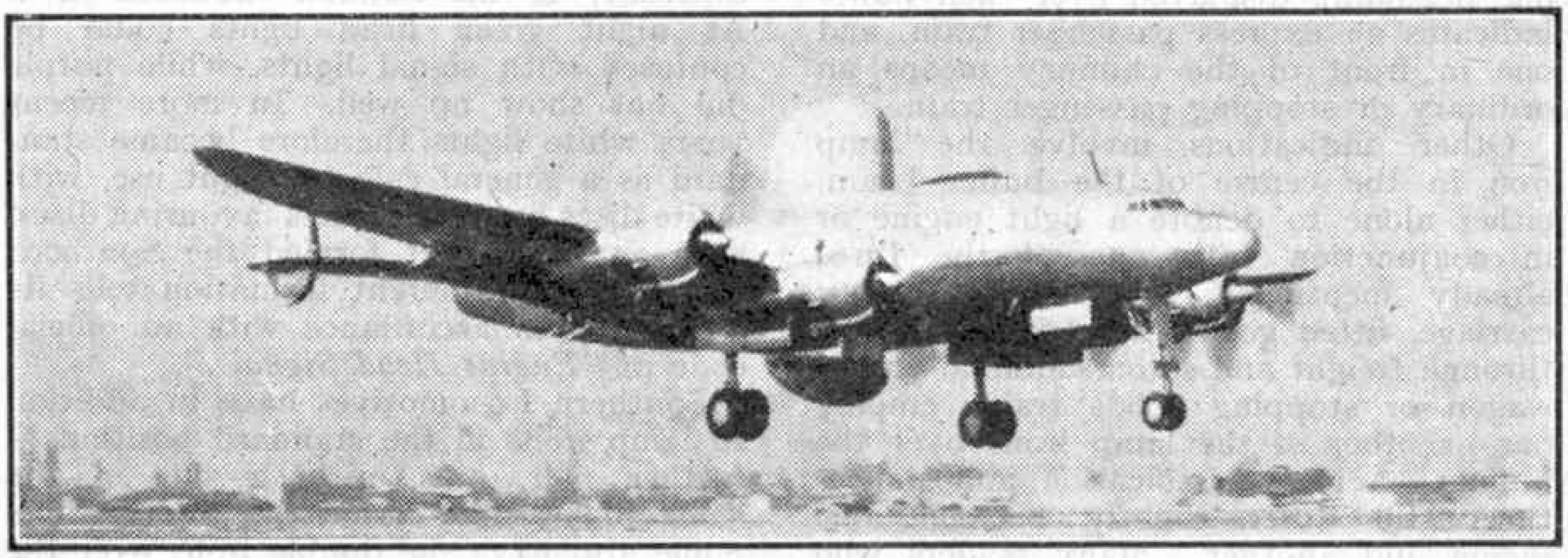


The "Brabazon" "wing section" rig just before the start of the engine running trials referred to on the previous page.

Propeller Training Unit

So complex are modern propellers that pilots require special training to enable them to use to best advantage such features as constant-speeding, reversible pitch to reduce landing runs, automatic feathering to reduce drag to a minimum in the event of engine failure, and electric de-icing. To assist pilots destined to fly the giant new Boeing "Stratocruisers," Hamilton Standard Propellers have built a special test rig which enables pilots to practise "Stratocruiser" landing and take-off technique while on the ground.

An operating panel complete with throttle, engine instruments, airspeed indicator and control column enables the pilot to "fly" by manipulating a scale model of the aircraft. The model changes its attitude and the instruments register in response to movements of the controls. On the top panel of the rig, a full-size cutaway specimen of the "Stratocruiser's" Hamilton propeller operates exactly as the four propellers of this giant air liner would operate under similar conditions of flight.



U.S. Navy's PO-1W Lockheed "Constellation" taking off for its first test flight. This version of the famous "Connie" is designed to test airborne electronic devices.

What Do the Headcodes Mean?

By R. A. H. Weight

FOR many years in British railway practice there have been various methods of indicating to signalmen and others the character of a train, or the route it is taking, by means of discs, boards or lamps carried on the engines.

Except on the Southern Region the arrangement of engine headlamps in accordance with a standard code indicates the class of train as scheduled in the working time-table. The lamp irons or brackets are usually placed one over the centre of the buffer beam, one above each buffer, and one either in front of the chimney or centred on the upper part of the smoke-box door. Brackets are fitted in corresponding positions at the rear of tenders or bunkers. Lamps are usually carried in the appropriate positions by day and night, though they are only lighted when necessary. White discs are, however, used by day on the Great Eastern Section of the Eastern Region, and they are also seen sometimes on ex-L.N.E.R. locomotives that happen to be fitted with fixed electric headlamps.

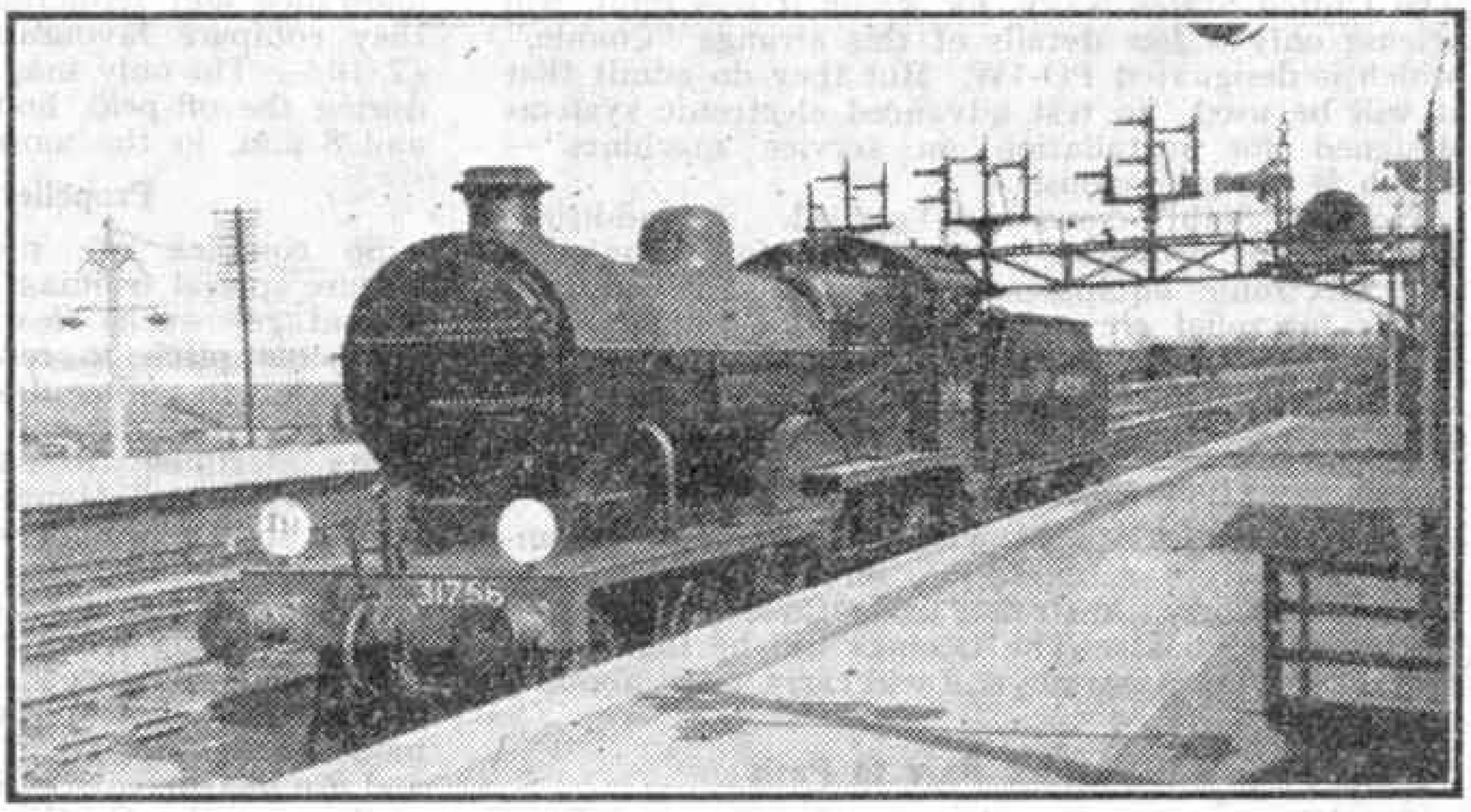
The general rule on most lines in Britain, always excluding the Southern system, is that one headlamp displayed over each buffer indicates an express passenger train, and one in front of the chimney means an ordinary or stopping passenger train.

Other indications involve the lamp iron in the centre of the buffer beam, either alone to denote a light engine or in conjunction with one of the three already mentioned, to describe empty carriage, fitted goods, milk or fish trains, through freight and so on. Mineral empty wagon or stopping goods trains employ one or other of the lamp irons over the buffers. Actual classification and indications still differ slightly between one region and another. Many readers who are accustomed to observing train running will have become familiar with the more precise interpretations in their own particular districts of the standard headcode.

On the Southern Region there is the complicated and almost innumerable variety of routes available from the London area, involving lines or connecting links built to meet heavy traffic or provide competitive services in years gone by. On this account Southern engine headcodes still indicate the route being followed, not the class of train.

On some of the formerly independent lines, prior to the grouping of the railways in 1923, elaborate codes of differently marked or coloured discs by day, or lamps at night, were developed to indicate the many varieties of route followed. This, however, became rather too complicated, especially in the London suburban area. At night green head lights could be confused with signal lights, while purple did not show up well. In more recent years white lights therefore became standard as a general rule for night use, with white discs by day on lines favouring discs, such as those that formed the Southern group. Each different formation tells its own story in accordance with an official code of *"Engine Head Signals."*

Southern Locomotives have in addition to lamp irons in the standard positions a further pair, one on each side of the smoke-box front about its centre line. Some also have the double irons over the buffers that used to be employed a good



Southern 4-4-0 No. 31756 at Ashford. Note the duty number on one of the route-indicating discs. Photograph by the late A. C. M. Clements.



An imposing array of discs and lamps typical of L.B.S.C. practice. The engine is one of the well-known 0-4-2 "Gladstones," bound for London Bridge. Photograph by H. Gordon Tidey.

deal by the L.B.S.C. The codes generally seen nowadays only employ one or two discs but there are at least twenty different possibilities with six lamp irons.

Where routes do not overlap, the same headcode can be employed in a number of instances with different meanings on different sections of line. For example, the first illustration shows an "L1" 4–4–0 fresh from Ashford Works, carrying discs to show she is about to traverse the Tonbridge-Redhill or Reading line. This head signal is also carried by boat expresses between Victoria and Kent ports via Orpington and Tonbridge. Trains from Cannon Street to Faversham or beyond via Chislehurst loop and Chatham; also between Bournemouth and Weymouth carry the same indication.

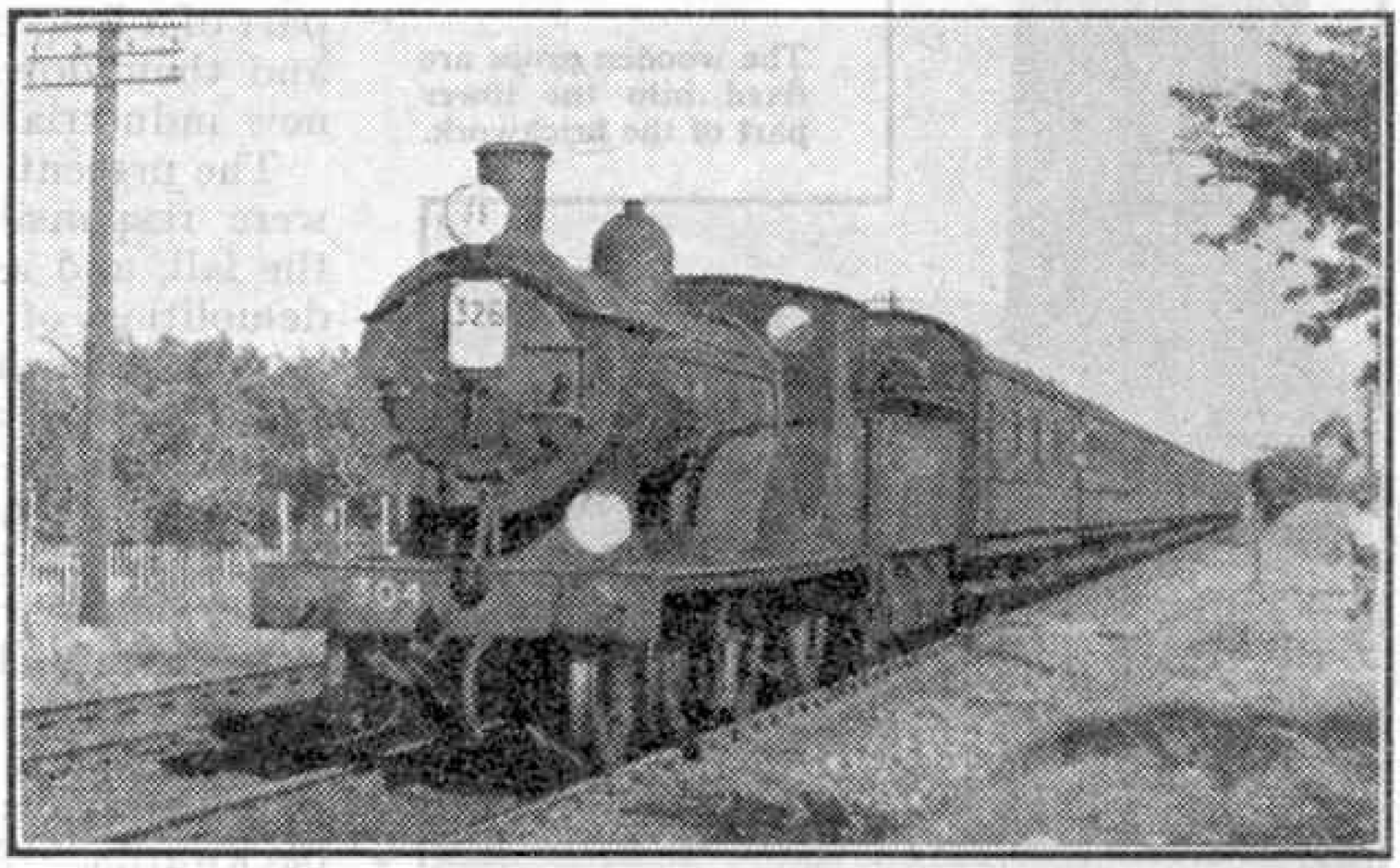
The headcode as seen when facing the engine in the third photograph is used by trains between Victoria and Ramsgate via Chatham; Cannon Street, or Charing Cross and Hastings direct; and by boat trains between Waterloo and Southampton (old) Docks.

Waterloo-Bournemouth engines carry one disc on the right smoke-box bracket and one over left hand buffer; those running along the West of England main line have one at the foot of the chimney and one in the centre of the buffer beam.

It will be observed that one of the discs in each case carries a number. This is another Southern speciality. It is the number of the "duty" upon which the locomotive is engaged for the day. If one knows the code the engine's home-shed can normally be deduced from this number; unless, as sometimes happens for various reasons, an engine is temporarily from another depot. To give a few typical examples, Western Section duty numbers start at 1 for Nine Elms; 101 for Feltham and 380 for Bournemouth.

On the Eastern Section, 1 belongs to Stewarts Lane, 80 to Bricklayers Arms; 340 to Ashford; 400 to St. Leonards and 465 to Ramsgate. On the Central Section there are 501 and 530 respectively for Stewarts Lane and Bricklayers Arms; 655 for Tunbridge Wells and 735 for Brighton. Principal passenger duties come first, then local passenger, fast goods, slow goods, etc. Thus duty 33 operates from Stewarts Lane (London) and 355 from Ashford.

On summer Saturdays and on other busy days S.R. trains traversing main lines display their running numbers used for reference in staff special working notices. These are carried on extra headboards, such as 326 in the picture below, which was the 3.36 p.m. from Ramsgate to Victoria.



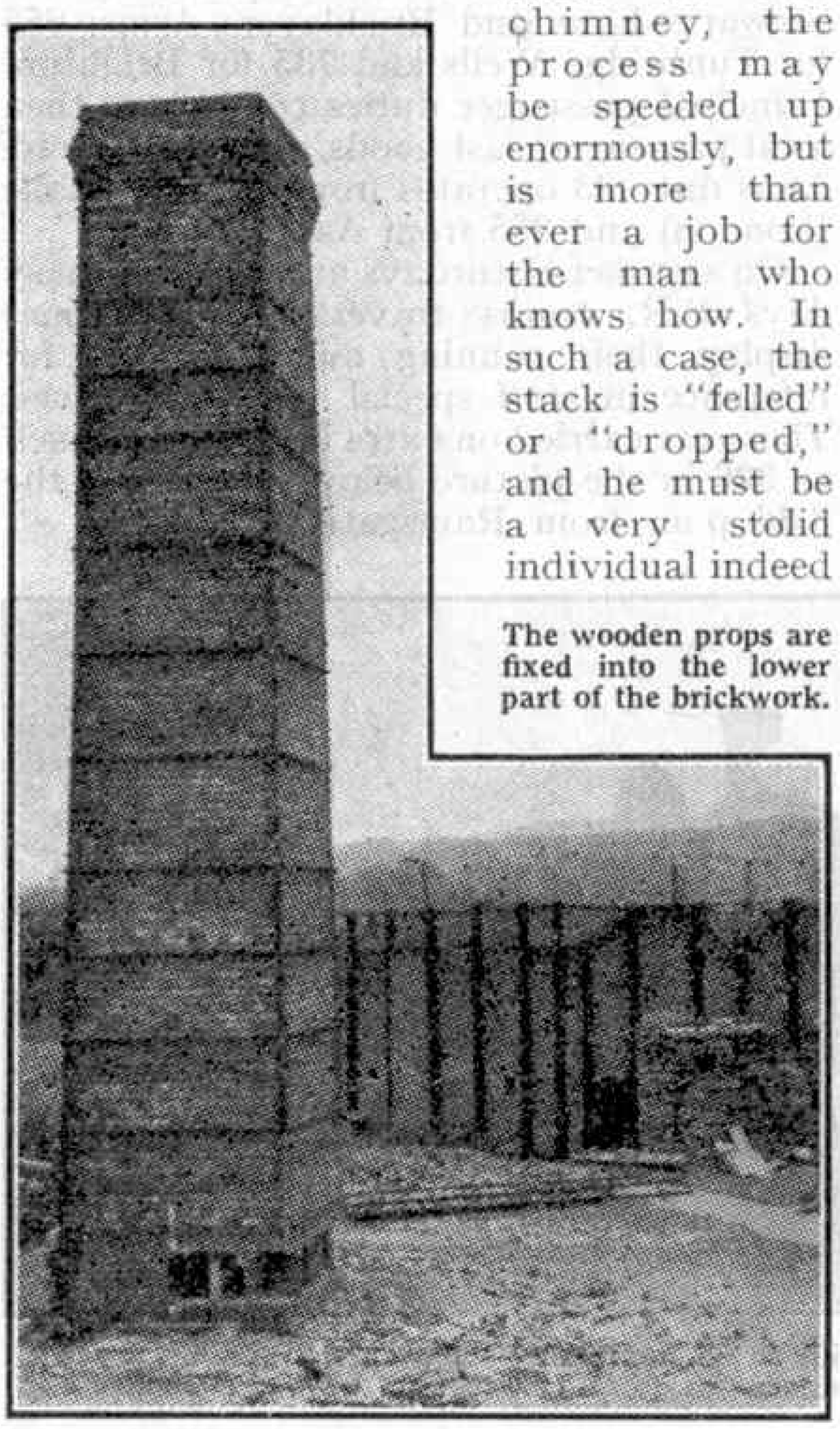
A Drummond 4-4-0 with an up Ramsgate holiday special carrying the train number on the smoke-box front. Photograph by D. L. Bradley.

Felling a Chimney Stack

By Frank Harris, A.R.P.S.

EVERY town-dweller has long since learned to regard a forest of factory chimneys as a familiar part of the landscape and, if he is blessed with something of the artistic temperament, to dismiss them as a necessary evil. There they stand, and will continue to stand, until scientific progress renders them as obsolete as the rushlight and the bow and arrow.

Although at the present time many new and even loftier stacks push their smoke-plumed heads into the sky, it does happen that old chimneys are found to be in the way and are marked down for demolition. The order to remove a tall stack is easier to issue than to execute, and the destruction of even a small chimney is a matter for experts. In a thickly built-up area it may be necessary to start at the top and remove the bricks one by one, a long and costly business. Where there is adequate space around the base of the chimney, the process may be speeded up enormously, but is more than ever a job for the man who knows how. In such a case, the stack is "felled" or "dropped," and he must be a very stolid individual indeed who finds himself unmoved by so exciting an operation.



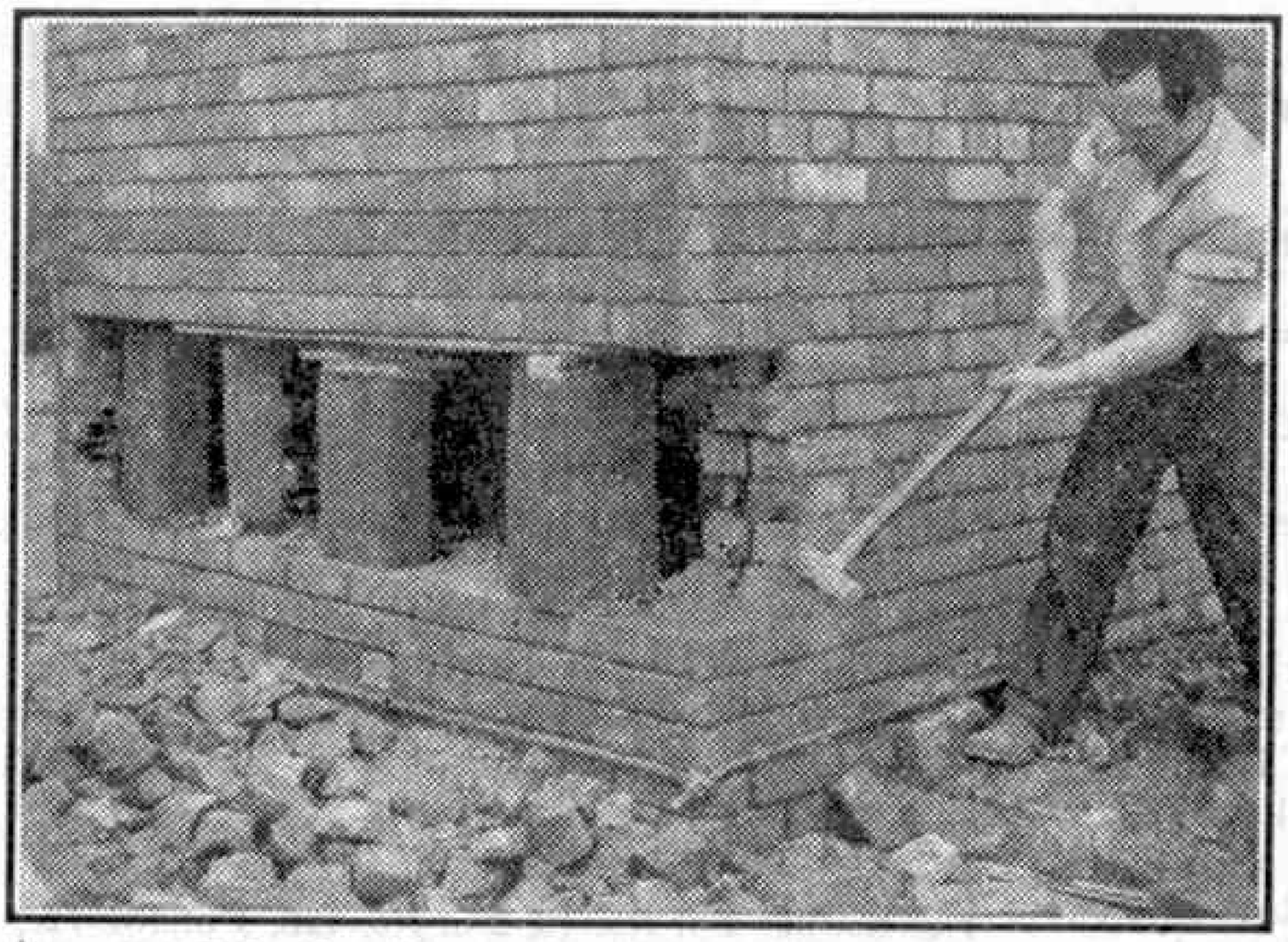
The wooden props are fixed into the lower part of the brickwork.

The primary consideration is to decide exactly where the stack is to fall and to ensure that there is space enough to receive the fallen giant as it lies prone on the ground. Fortunately the direction of fall can be determined to very fine limits, and accidents are rare.

First, a hole is made in the brickwork of the stack at ground level and a piece of timber is firmly wedged into the hole. This done, the aperture is enlarged a little at a time, and as it increases in size more and more pieces of timber are inserted, as shown in the accompanying pictures. By the time this part of the work is complete, a large portion of the original brickwork has been replaced by the wooden props, which are now the chimney's sole support, and alone prevent it from toppling in the pre-determined direction. If the stack is a tall one the wooden supports are set on fire, and when they are burned through down comes the chimney with a frightening crash and, usually an all-enveloping cloud of dust.

Sometimes, with a smaller stack, the props are not burned but are merely knocked away with heavy sledge-hammers, which must call for a good deal of nerve and confidence on the part of the man with the hammer. This was the method employed in connection with the chimney shown in the illustrations, which was one of two 60 ft. square stacks—mere babies! —scheduled for demolition. They were part of a long-disused pottery in Lancashire and their downfall had to be filmed for a new industrial picture.

The present writer and several colleagues were responsible for the photography of the fall, and as none of us had ever seen a demolition of this kind, we were a little hazy as to what we might expect. However, as the result of a discussion with the engineer-in-charge—a well-known steeplejack, by the way—we were able to plan our activities. One of the two cameramen was posted on a low roof, immediately behind the doomed stack. He was perfectly happy until one of the felling experts mentioned, quite casually, that chimneys had been known to "kick backwards." After learning this particular trade secret, the poor photographer became convinced that, at best, he could only look



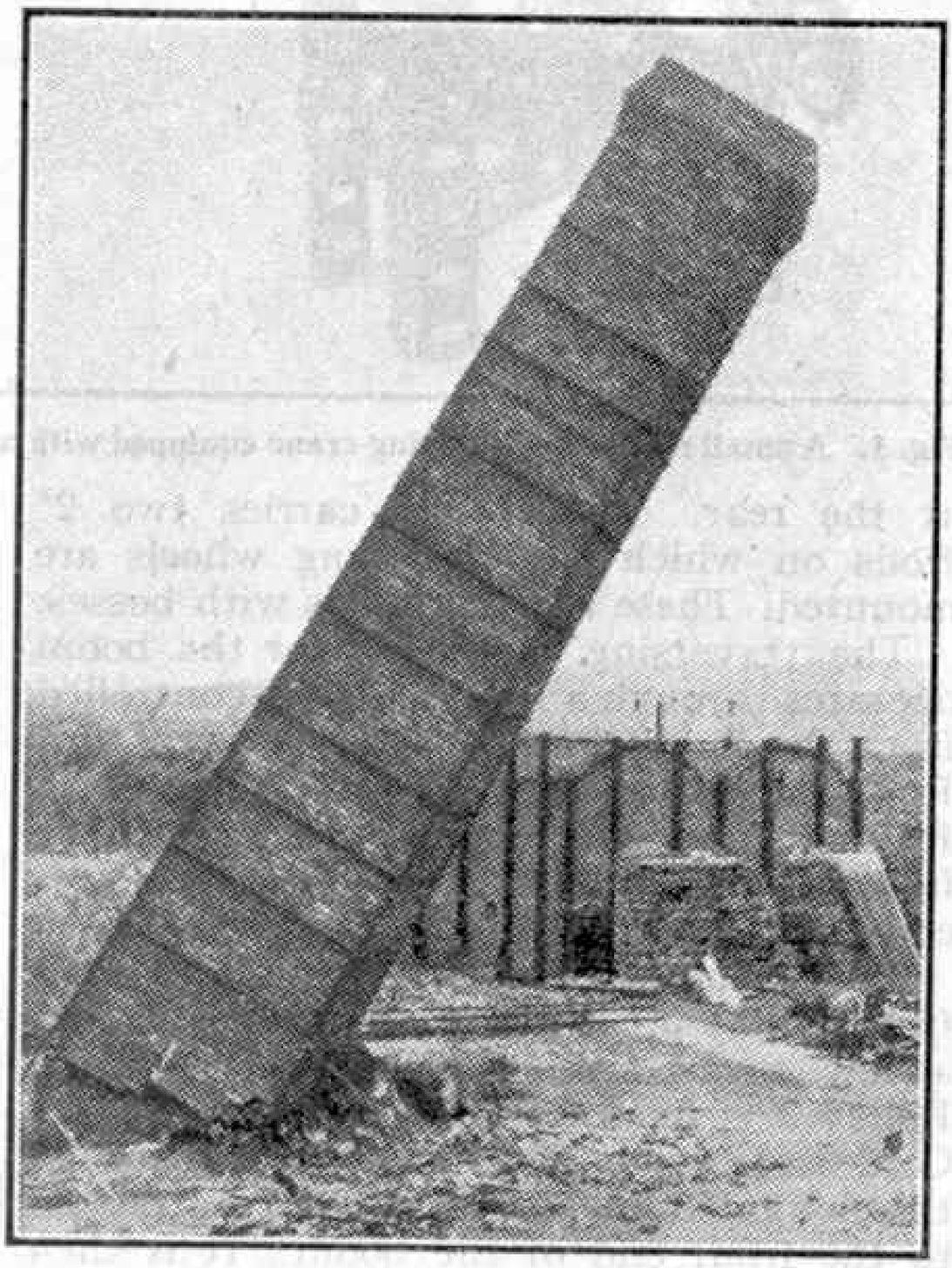
Enlarging the aperture to receive more timber.

forward to several years in hospital, and took a lot of comforting. The second cameraman was placed almost in front of the chimney, naturally at a distance deemed perfectly safe. When the chimney began to totter and the cameras were running, he naturally kept his eye glued to the viewfinder. Unfortunately, this brought everything much closer than was actually the case, and created a vivid impression that the falling stack was heading straight for the camera. When, about halfway down its descent, the operator found himself looking right into the mouth of the stack, the sight was too much for him. Probably breathing a last farewell to his family he closed his eyes, but fortunately kept the camera running. Apart from a solitary brick which rolled merrily along and struck the tripod leg, nothing serious happened and the films were excellent.

The sound-recording department were less fortunate, as the shock when the chimney struck the ground temporarily dislocated their delicate apparatus, while the blanket of brickdust which covered their instruments took some time to remove.

It is most unusual for events to proceed other than as planned by the experts, but things have been known to go wrong, and a memorable example was told to the writer by Steeplejack Taylor of London. He was engaged to fell a 320 ft. stack in Huntingdonshire. There was ample room for the big fellow to fall, but the chimney itself was built on a kind of square ornamental plinth, 30 ft. high. Mr. Taylor proceeded to cut away part of the brickwork and to fill in with wooden props in the normal way. When all was ready, he drenched the temporary supports with petrol, set fire to the structure and "retired immediately" as the firework labels advise. Slowly the wooden props burned away and fell from the aperture, but the chimney remained erect.

Realizing that he had cut away insufficient brickwork, the steeplejack took the only course open to him, which meant climbing the plinth to knock out more bricks. Taking his heaviest sledge, he began his nerve-racking task, while bystanders watched anxiously from safer vantage points. Scarcely had he begun to remove the bricks than the whole stack commenced to creak and groan as it started its headlong rush to the ground. With no time to hesitate, Steeplejack Taylor leapt from the 30 ft. plinth and landed with nothing worse than a shaking. A second or two later a mass of brickwork weighing hundreds of tons struck the earth with an impact that is likely to be remembered by the people of Godmanchester for a long time to come.



The props have been knocked away and "down she goes!"

New Meccano Models

Novel Miniatures—Crane and Tractor

THE miniature block-setting crane shown in Fig. 1 is only about 10 in. long and 6 in. high, yet it is fitted with traversing and load-lifting movements, and the crab or trolley from which the crane hook is suspended can be moved to and fro along the boom.

The constructional details of the model are very simple and most of them can be followed from the illustrations. The crab or trolley carrying the crane hook consists of two Channel Bearings bolted together. To its top side two 1″ Triangular Plates are bolted, one at the front end and one at the rear. The trolley carries two 2″ Rods on which the travelling wheels are mounted. These are ½″ Pulleys with bosses.

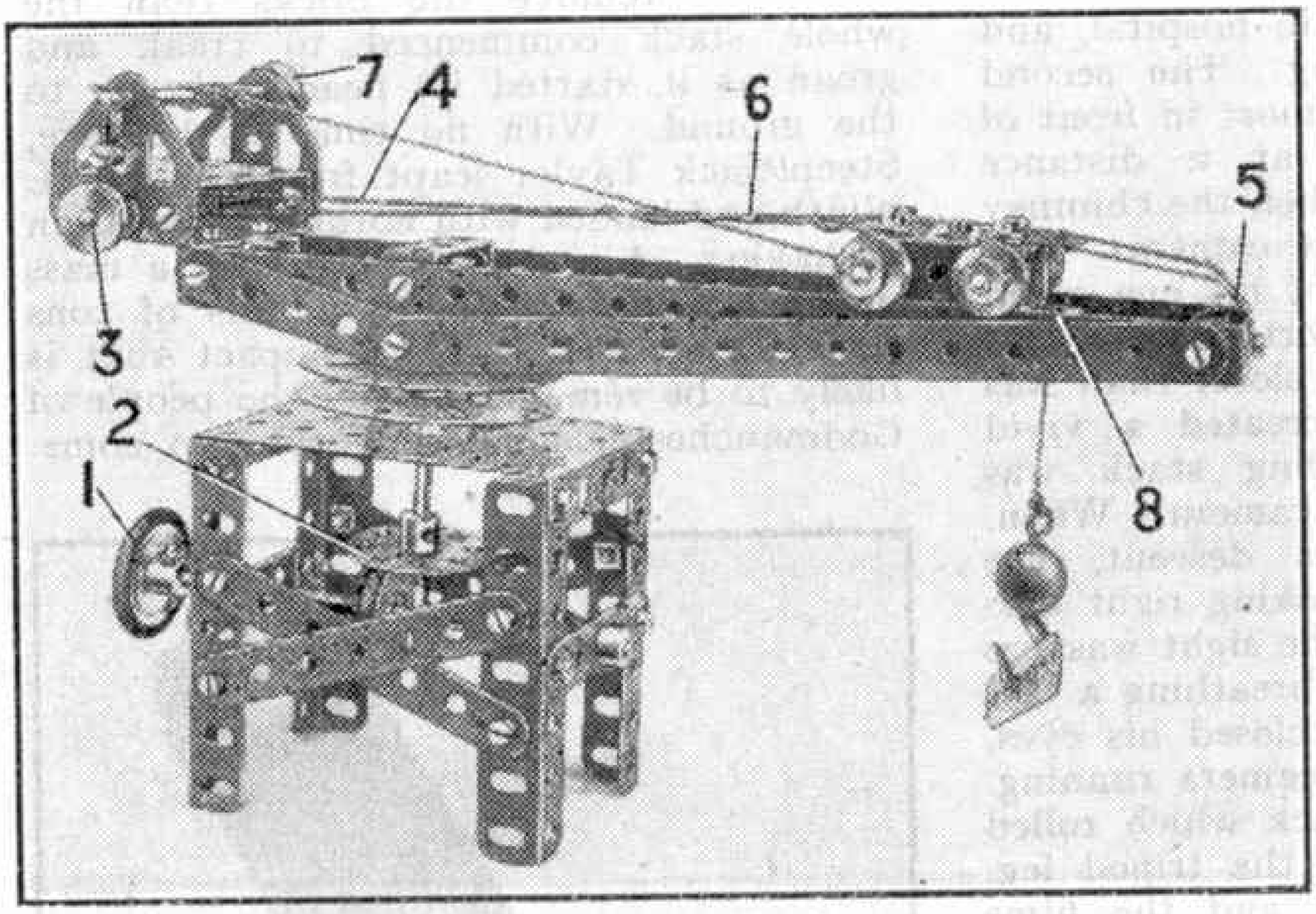


Fig. 1. A small model block-setting crane equipped with all the usual movements.

The traversing movement for the boom operates through a friction drive, controlled from the handwheel 1. This is fixed to a Rod and fitted with a 1″ Pulley with Rubber Tyre. The Pulley bears against the face of a Bush Wheel 2 fixed on the lower end of the shaft on which the boom pivots.

Traversing of the trolley is operated from Pulley 3. A piece of Cord 4 is wound a few turns around the Rod to which Pulley 3 is fixed, and then one end of the Cord is led over the trolley and through the elongated hole of a Fishplate 5 attached to the front end of the boom. It is then led back and tied to a 1″ Triangular Plate at the front of the trolley.

The other end of Cord 4 is tied to a short Driving Band 6 fixed to the rear end of the trolley as shown.

Hoisting and lowering of the load is carried out by turning Pulley 7. The Rod to which this Pulley is fixed carries a Cord Anchoring Spring. A length of Cord is tied to the Spring and then is led under the axles of the trolley and passed through the free hole of a 1″ Triangular Plate 8 fixed to the trolley.

Parts required to build model Block-setting Crane: 2 of No. 1a; 2 of No. 1b; 4 of No. 3; 4 of No. 5; 4 of No. 9b; 2 of No. 12; 2 of No. 12b; 1 of No. 12c; 1 of No. 15; 2 of No. 16; 2 of No. 16a; 2 of No. 22; 6 of No. 23a; 1 of No. 24; 2 of No. 35; 44 of No. 37; 20 of No. 38; 1 of No. 40; 3 of No. 48; 2 of No. 51; 1 of No. 57b; 3 of No. 59; 3 of No. 77; 2 of No. 109; 3 of No. 111c; 2 of No. 126a; 2 of No. 155; 2 of No. 160.

The small tractor illustrated in Figs. 2 and 3 is a good example of the realistic effect that can be obtained using only a few carefully chosen parts.

The chassis is made by joining two 4½″ Strips by four 1½″ × ½″ Double Angle Strips, one at each end of the chassis as shown at 1 and 2 in Fig. 3, and two in the centre indicated at 3. A *Magic* Clockwork Motor is bolted to one of the 4½″ Strips at a position one hole from the front of the chassis.

Each side of the bonnet consists of two 2″ Strips connected at their upper ends by a 3″ Strip 4, and joined to the opposite side by two 1½″ × ½″ Double Angle Strips. The top of the bonnet is made from two 2½″ × 1½″ Flexible Plates.

The rear axle is a 3″ Rod mounted in 1½″ Flat Girders bolted to the chassis. The Rod carries a 1″ Pulley 5, and two 1″ Sprocket Wheels, and is held in position by a Collar. The leading Sprocket Wheels are free to turn on Pivot Bolts fixed by two nuts to Fishplates bolted to the chassis.

The *Magic* Motor pulley is connected by a short Driving Band to a 1″ Pulley fixed on a 2½″ Rod 6. This Rod is mounted

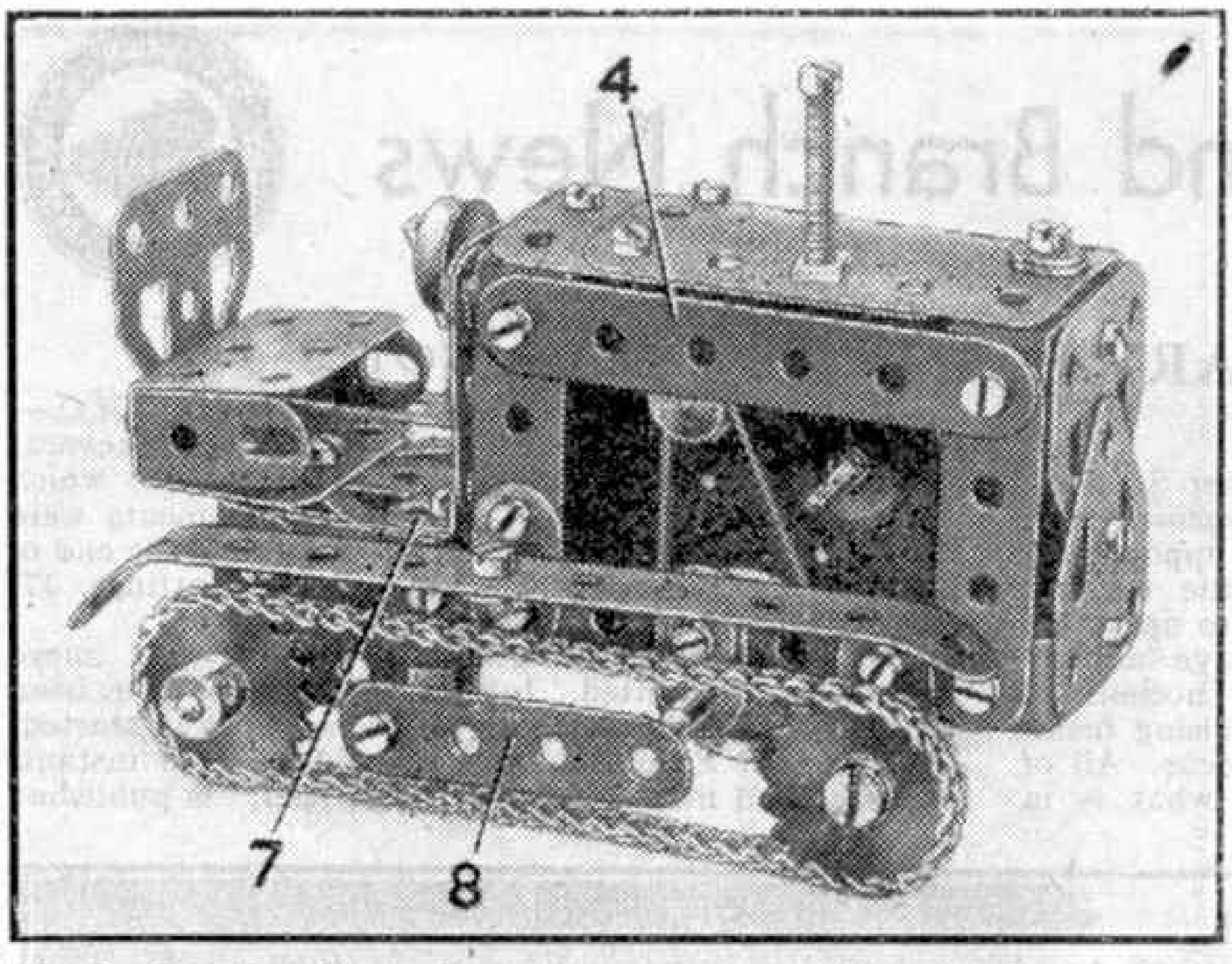


Fig. 2. Sprocket Chain forms the creepers of this simple and easily built tractor.

in Fishplates bolted to the chassis, and carries a ½″ Pulley that is connected by a Driving Band to the Pulley 5 on the rear axle. A 1″ Rod is attached to the brake lever of the Motor by a Rod and Strip connector, and projects inside the cab.

The seat is attached to the Double Angle Strip 2 by an Angle Bracket, the bolt fixing the seat holding also a Flat Trunnion that forms the floor of the cab. A vertical 1½″ Strip is attached to the front of the Flat Trunnion by an Angle Bracket 7, and two horizontal 1½″ Strips bolted to the vertical Strip shield the Motor from the cab.

A 1½″ Strip is attached to one side of the chassis between the Sprockets by a ¾″ Bolt, and a 2″ Strip 8 is similarly fixed to the opposite side. The model is completed by adding the tracks and track covers. The tension of the tracks can be adjusted by pivoting the Fishplates supporting the leading Sprockets.

The tractor is capable of hauling a trailer or any suitably designed agricultural implement. Model-builders will find wide scope for their ingenuity in constructing attachments for use with the model.

Parts required to build model tractor, 2 of No. 2, 2 of No. 2a; 2 of No. 4; 5 of No. 6, 4 of No. 6a, 5 of No. 10; 4 of No. 12, 2 of No. 12b; 1 of No. 16a; 1 of No. 16b; 1 of No. 18b; 2 of No. 22; 1 of No. 23; 1 of No. 23a; 37 of No. 37; 14 of No. 37a; 16 of No. 38; 6 of No. 48; 2 of No. 59; 1 of No. 94; 2 of No. 103h; 4 of No. 96; 2 of No. 111; 1 of No. 111a; 1 of No. 111c; 1 of No. 111d; 4 of No. 126a; 2 of No. 147b; 1 of No. 160; 2 of No. 188; 1 of No. 212.

"MOST USEFUL MECCANO PARTS" VOTING CONTEST

The special voting competition announced in the August "*M.M.*" is still open for entries.

From the list of 10 parts given below competitors are asked to choose (A) the part they think is the most useful and that can be used in the greatest variety of ways in model-building, and (B) to arrange in the correct order the six parts that they think will receive the most votes when the "A" votes of all competitors are totalled.

The following is the list of parts included in the contest: (1) Part No. 10, Fishplate; (2) Part No. 108, Corner Gussett; (3) Part No. 165, Swivel Bearing; (4) Part No. 24, Bush Wheel; (5) Part No. 62, Crank; (6) Part No. 133, Corner Bracket; (7) Part No. 147a, Pawl; (8) Part No. 11, Double Bracket; (9) Part No. 59, Collar; (1) Part No. 137, Wheel Flange.

Prizes will be awarded to competitors who forecast the six parts that receive the highest number of votes and arrange them in the correct order of popularity. In the event of a tie for any of the prizes the neatness and originality of design of the entry will be taken into account.

The closing date for entries from readers in the British Isles is 30th September, and for entries from readers living Overseas 30th November. Entries should be addressed, "*Meccano Parts Voting Contest, Meccano Ltd., Binns Road, Liverpool 13.*" Competitors must make sure that their age, and name and address are written clearly on their entries.

The following prizes will be awarded in each section. First, Cheque for £3/3/-; Second, Cheque for £2/2/-; Third, Cheque for £1/1/-. There will be also five prizes of 10/6 and five awards of 5/-.

"ADVANCED MODEL-BUILDING COMPETITION No. 1"

We wish to remind readers that entries can still be accepted for the special Advanced Model-Builders Competition, full details of which were announced in the June and July issues of the "*M.M.*" This contest will remain open for entries from any part of the world until 30th November next.

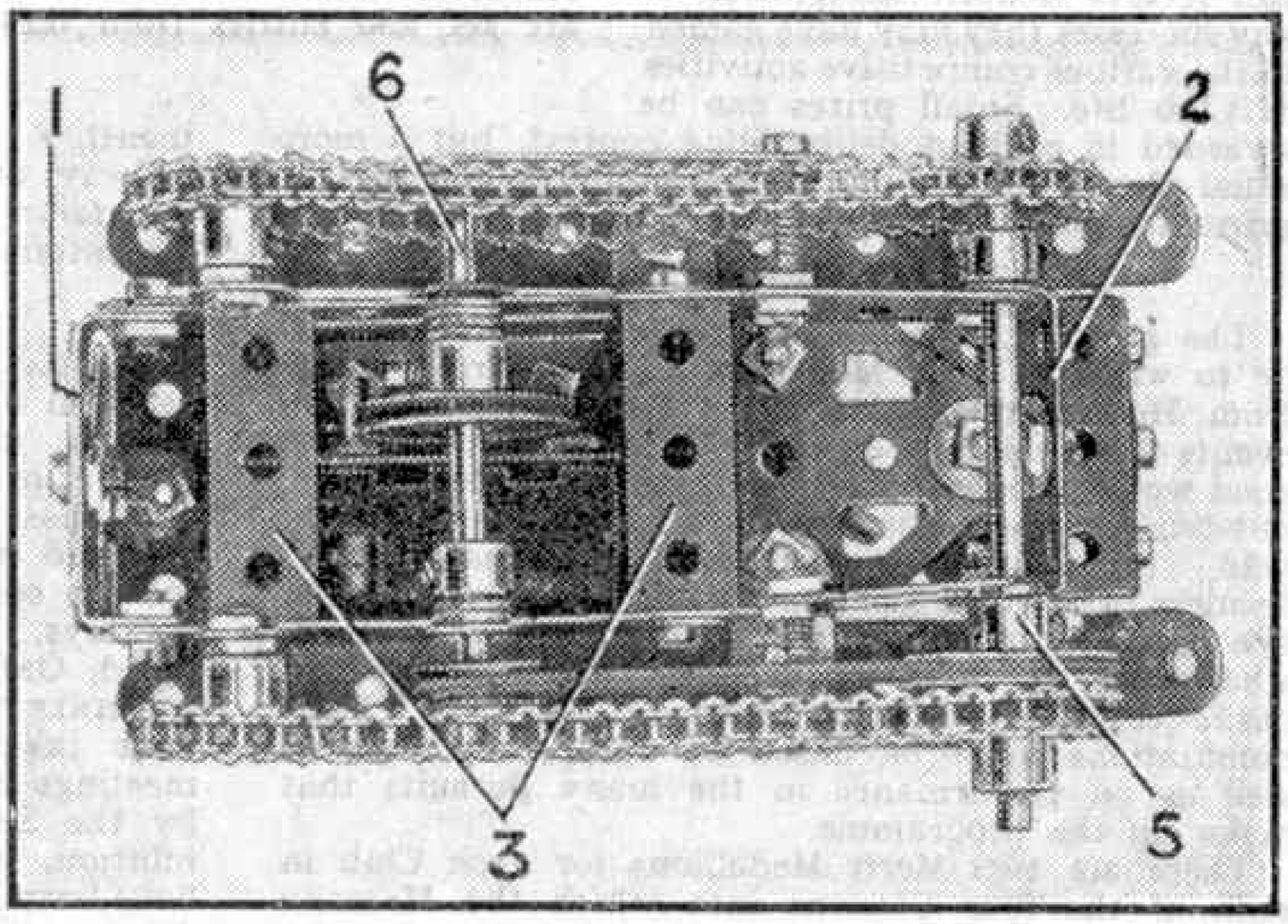


Fig. 3. The tractor is driven by a Magic Motor fitted as shown in this underneath view of the completed model.

Club and Branch News

WITH THE SECRETARY

FOOD FOR THOUGHT

We are now on the verge of the Winter Sessions. While the weather is good Clubs may continue with outdoor games, and there may yet be opportunity for a pleasant excursion to wind up the outdoor season, but the time is at hand to put into operation the plans for Club room work that have already been formed. Officials will have good notions of what is to be done, and no doubt enterprising members will come along with other bright ideas. All of these should be given consideration at what is in certain respects the most important event of the year—the general meeting at which details of the programme for the coming months are settled. An outline of what is suggested should be passed round among members, before the meeting if possible, so that they can think things out for themselves.

When members are busy building models, taking part in debates, giving talks or enjoying games, Leaders and seniors should always be at hand to give them the benefit of their experience. Boys join Clubs because they are full of enthusiasm for all that Club life means, and in their first Sessions particularly this enthusiasm must be encouraged and directed. There are many ways in which this can be done. A cheery word from the Leader often spurs a member on to greater efforts, and of course full use must be made of the various awards for good model-building or for achievements in other directions. The actual value of these awards is a small matter. The important thing is that they provide a way in which members can receive definite recognition of any successes they may have gained in the various competitive activities of Club life. Small prizes can be awarded in each model-building contest, but a more usual plan is to give marks to each entry and present prizes to members who win most marks in a Session.

MERIT MEDALLIONS

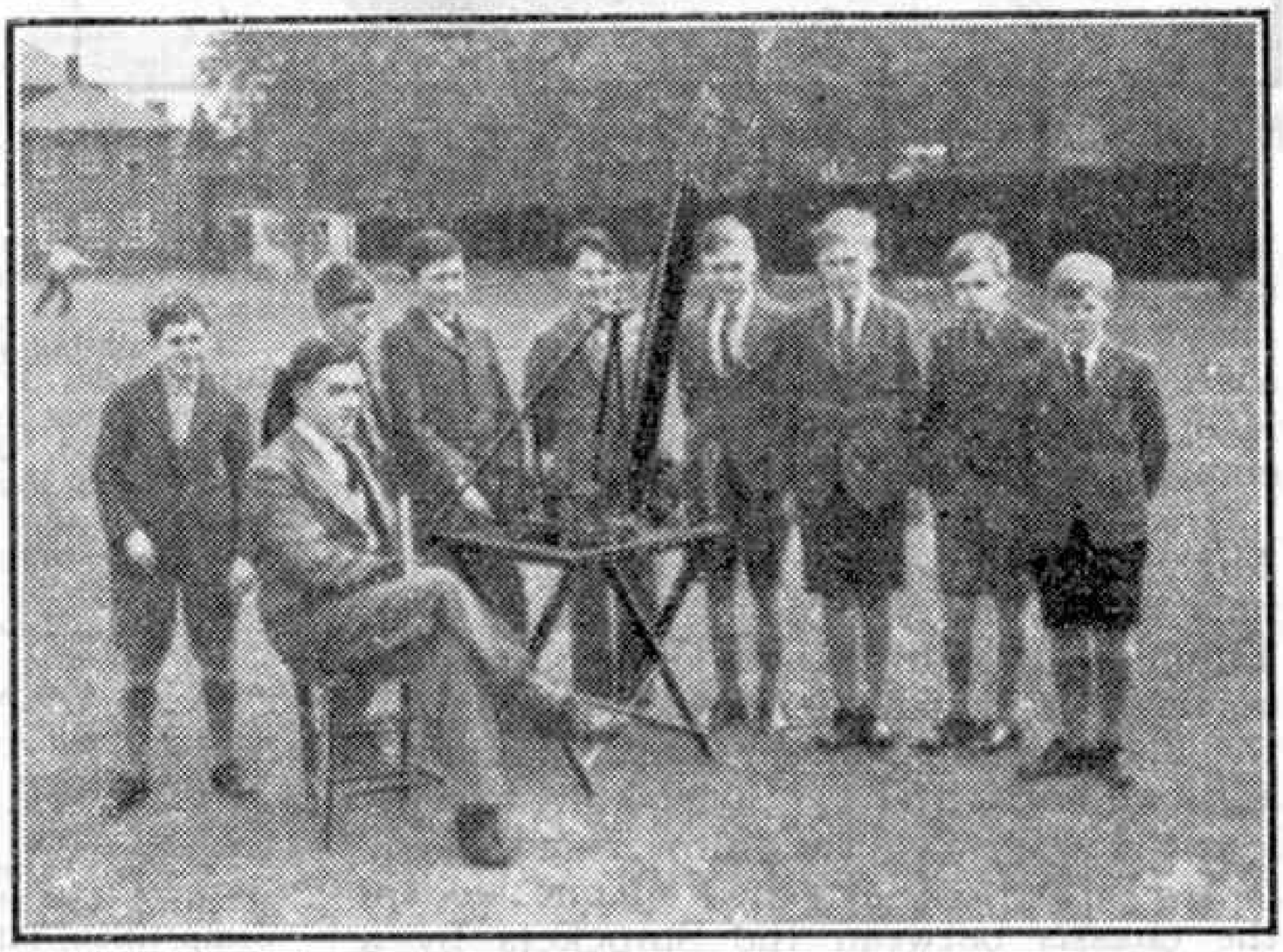
The greatest ambition of any Club member must be to win the Merit Medallion. This award is made from Headquarters and differs from prizes in Club events in that it is the mark of general and sustained good work on behalf of the Guild and the Club instead of being the reward of a special effort in one particular field. It is awarded on the recommendations of Leaders, who at all meetings should keep an observant eye on their members in order to pick out those who show the greatest keenness and the greatest desire to advance the interests of the Club. Their nominations must be based on this observation as well as on performance in the many pursuits that make up the programme.

There are two Merit Medallions for each Club in each of the four Sessions into which the Meccano Club year is divided, and before Christmas I want to receive two nominations from the Leader of every active Meccano Club.

CLUB NOTES

CRYPT GRAMMAR SCHOOL (GLOUCESTER) M.C.—This recently affiliated Club has arranged several interesting Model-building Competitions, in which good entries have been secured. Arrangements were made for exhibiting models in the School at the end of last term. Club roll: 20. *Secretary:* D. Gettings, 17, Riversley Road, Gloucester.

NORBURY M.C.—Progress is steady, but more members are wanted. Interesting outings have been arranged, and the Cycling Section has been re-started. The Annual Exhibition will be held on 17th instant. A successful magazine, the "*News Reel*," is published monthly. Besides Club notes, it contains interesting railway, bus and other transport news. Club roll: 29. *Secretary:* John W. Taylor, 186, Mersham Road, Thornton Heath.



Mr. G. Beach, Leader, with members of the Newcastle Royal Grammar School M.C. and models built by them. G. S. Miller, Secretary, is third from the right. The Club was affiliated in November of last year. A special feature is made of Model-building Competitions, in which special subjects are set, and entries from these Contests have been exhibited on School Speech Day.

BRANCH NEWS

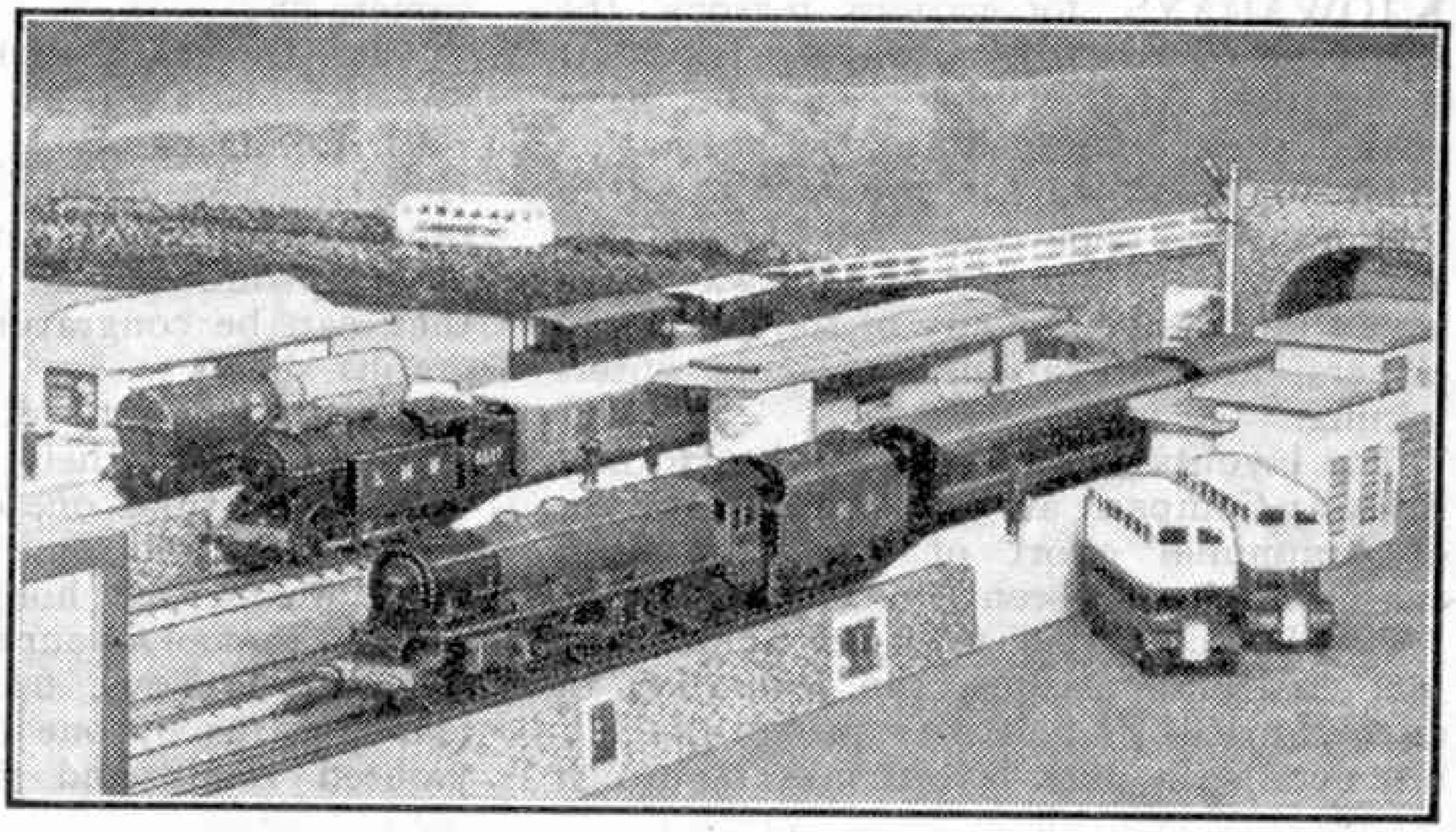
MAGDALEN COLLEGE SCHOOL—Special interest was taken in a Visit to the Swindon Works of the Western Region, where members saw various stages in the making of locomotives and rails. More constructional work has been undertaken, and the layout has now assumed its final form. A competition was arranged for the construction of accessories during the School holidays. *Secretary:* R. A. Bowen, 33, Richmond Road, Oxford.

SHIRLEY AND DISTRICT—On Track Nights members have taken turns in conducting operations. Other meetings have included a Railway Quiz and a Talk by the Secretary on the Model Railway Club Exhibition, which members later visited. Games also have been played, Monopoly being a general favourite. All meetings end with refreshments and a short period in the Library. *Secretary:* D. J. Hancock, 26, Wickham Avenue, Shirley, Surrey.

Planning Hornby-Dublo Operations

THE Hornby-Dublo owner usually begins his train operating by getting accustomed to the control of the train. This is quite an easy matter because starting, stopping, and reversing are all controlled by the movement of a single handle on the Controller. In addition, a fine degree of speed regulation is afforded so that the train can be started up gently and then gradually accelerated to full speed. After a spell of running a corresponding reduction in speed can be made by degrees, just as if the train were a real one preparing to make a station stop.

Simple operations of this kind give the Hornby-Dublo train owner a good opportunity of observing the working of his engine and running of the stock. Practice in these matters can be quite good fun and the skill acquired will be valuable in later more involved operations. For the best results it is essential that the track should be well laid and clean and that the lubrication of the engine and stock should have been attended to as detailed in the instructions packed with every train set.



An interesting view on the layout of I. W. C. Cosens. Express and local trains are in use and the Dinky Toys buses are effective.

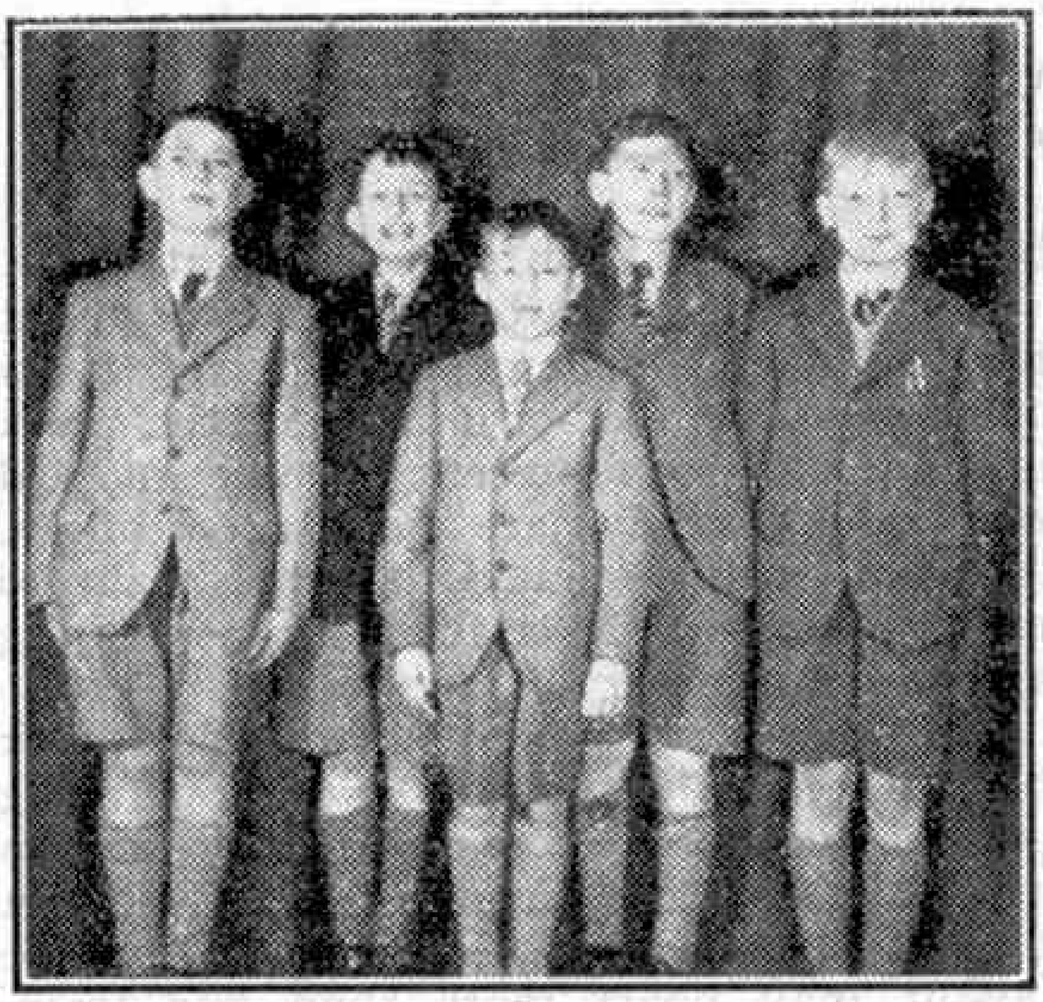
Once the Dublo owner has become more accustomed to these elementary operations he is ready to begin running his train in accordance with some definite scheme. It is very little fun simply to send the train around the track without much idea behind it. Even on the simplest oval track, such as that provided in the train sets, it is possible to carry out entertaining running. Most Hornby - Dublo owners usually attempt to reproduce the working of some section of real line that they know, and one of the earliest requirements is to arrange a platform alongside the track where the train can stop. This can be quite an elementary affair, such as a box lid or even a couple of books of suitable thickness. Many miniature railways have begun with just such primitive stations.

Some enthusiasts work to what we might term a mileage scheme; that is to say, a convenient number of circuits of the track is supposed to represent a mile of real track and journeys are made accordingly. Another arrangement is for the train to make a stop at the station after covering a definite number of circuits.

As the layout develops and the track becomes more extensive, so the operating possibilities are increased. The station arrangements are usually more perfect under these conditions and possibly the layout may boast more than one train. If this is so, and if both trains can be run at the same time, each on its own track, connecting services can readily be arranged.

This is the situation shown in the illustration on this page, which shows a realistic station layout. The express train, headed by the impressive Hornby-Dublo "*Duchess of Atholl*" locomotive, is pulling out after a stop. At the further platform the Hornby-Dublo Tank and its coaches represent a typical branch or slow-line train providing a connecting service with the main lines.

Incidentally the photograph shows some of the many realistic possibilities that are afforded to the Dublo owner. A special feature can be made of road traffic using the Meccano Dinky Toys motor vehicles. The Motor Buses shown are particularly good examples.



The "Directors" of the Hornby railway described in this article.

A Hornby Railway in an Attic

NOWADAYS, for various reasons, the type of Hornby railway system that is operated by several boys who have pooled their equipment in the formation of the line is growing in popularity. Given the necessary space, a more extensive system can be laid out in this way than would be possible for any of the individual owners, and operations are more entertaining.

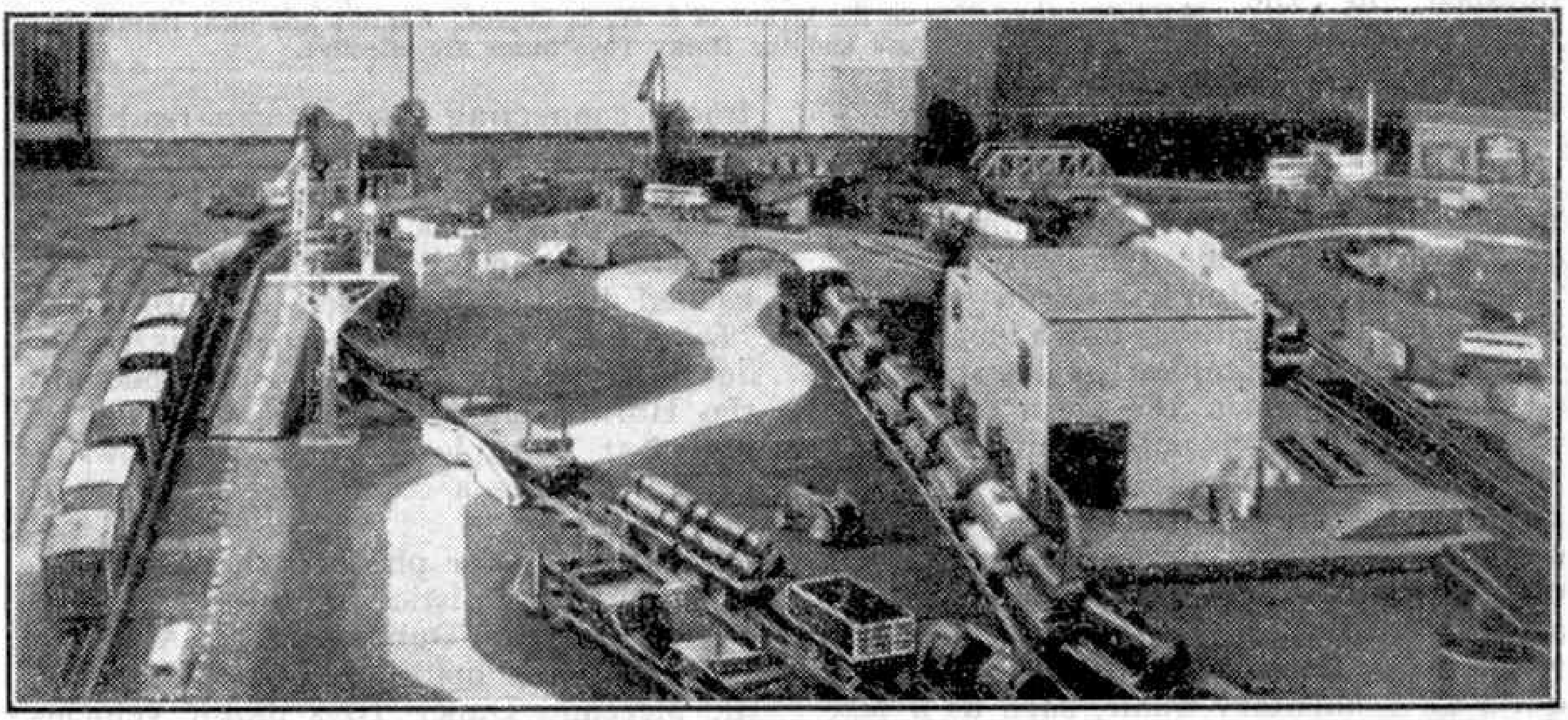
The layouts of Branches of the Hornby Railway Company are well-known instances of communal effort of this kind, and examples have been described in the *"M.M."* from time to time. Sometimes, for particular reasons, the formation of an organized Branch may prove difficult; but even so a joint layout may be owned and operated by several boys together with success, and such an association may easily develop into a Branch.

Recently we received details and photographs relating to an excellent example of this kind of railway, situated in an attic room in the home of one of the "Board of Directors" of the system, hence the title at the head of this page. These boys are lucky in having such a fine site for their line. It is interesting too, that among the photographs submitted was one showing the joint owners, and this is reproduced on this page. All too often those responsible for interesting layouts are remarkably camera-shy!

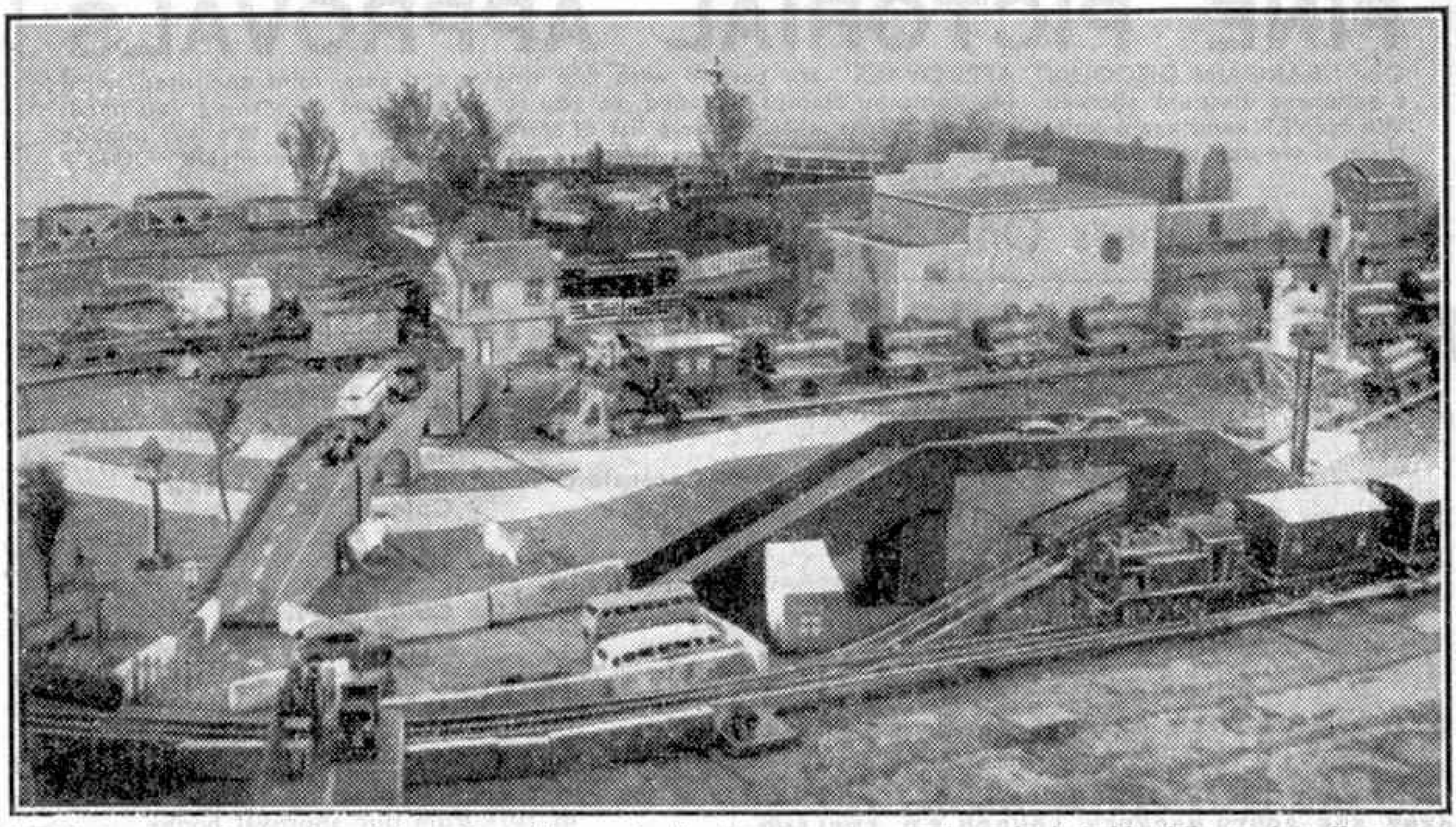
The "Directors" of this attic system are *"M.M."* readers J. M. Leonard, C. J. Vyle, R. I. Collinson, A. J. Harrison and J. A. Hewitt. Considering their ages, which range between 9 and 12 years, they have produced a system on which they can be congratulated, as the photographs show.

It is only fair to let them tell the story of their line in their own way:

"At Christmas one of us got a Hornby Tank engine and some trucks. This started the fun and last holidays the five of us decided to pool all our engines, rolling stock and Dinky Toys, using an attic kindly loaned to us by one of our mothers. We painted roads and fields on the floor-



A general view of the centre of the system showing the "river", and the goods warehouse with a train of tank wagons in one of the sidings.



Looking across the tracks of the attic railway. In the foreground a goods train is held while road traffic passes over one of the home-made level crossings.

boards, and in the middle of each road we painted a dotted white line. We then made viaducts, as the rails crossed a "river" in several places. We made these with a moulding outfit in which you use plaster of Paris strengthened with strong wire.

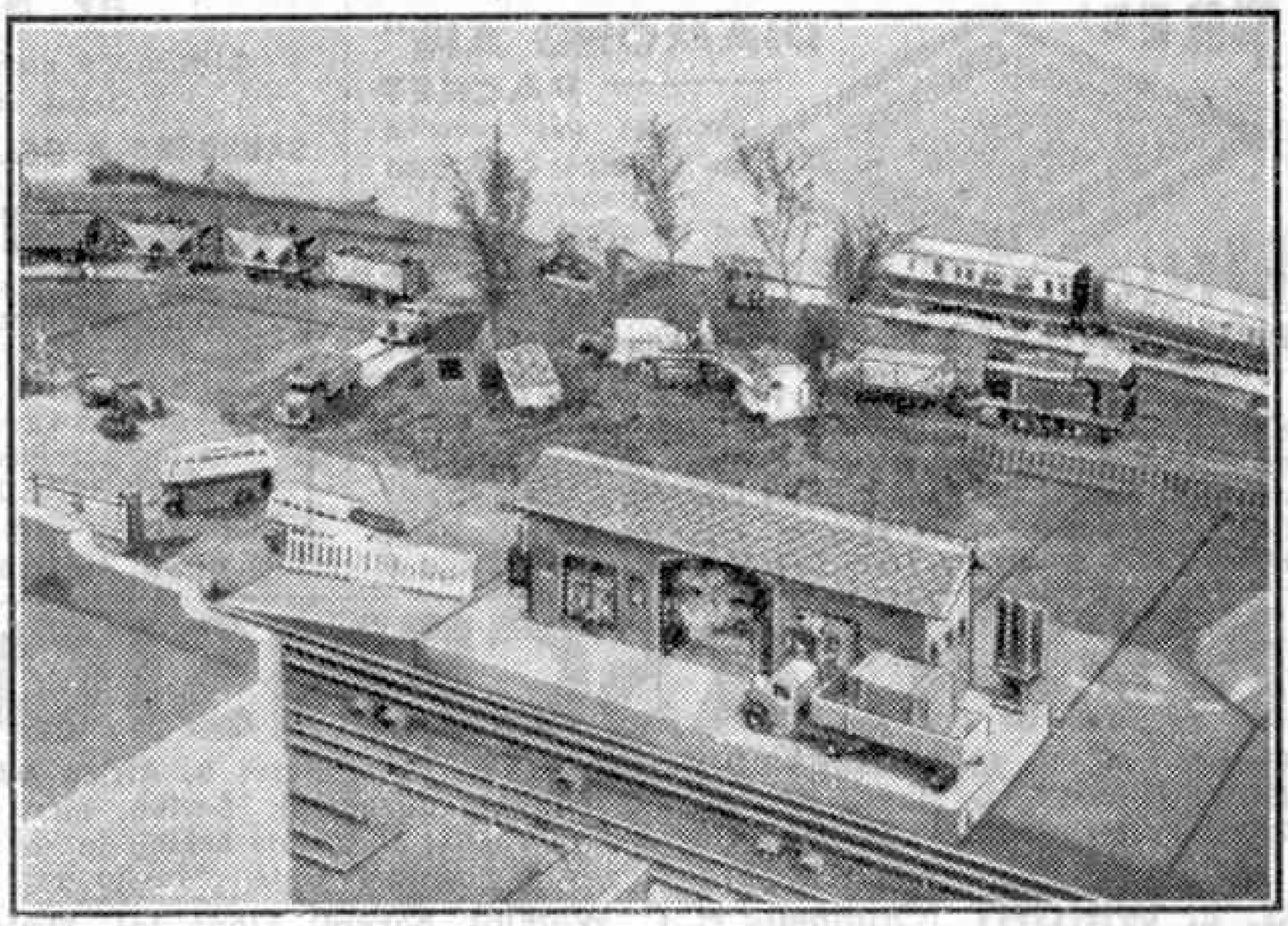
"To add to the scenery we thought it would be a good thing to have a quarry, so we put a shallow cardboard box on the floor in which we placed soil. With a few "trees," a home-made office, and several Dinky Toys, including a Supertoys Blaw-Knox Bulldozer, we built a very realistic quarry.

"The whole system is electric, so the stock is largely pre-war, and we have four Hornby 20-volt engines. There are three Hornby stations, and a home-made wayside station. Round the stations we painted flower beds with aeroplane "dope," which was found very effective. A large toy garage is used as a goods station and warehouse.

"We have a Hornby Viaduct, and one Hornby two-road Level-Crossing. Really we want more level-crossings, but we have had to use wooden ones like British Railways have at many stations.

"Our public transport service is run with Dinky Toys and consists of six double-deck buses and two single-deck buses. We hope to fit all our double-deck buses with indicator boards.

"As we had one 12-volt engine but not a 12-volt transformer, we thought we would fit up a long wire from the battery of the car, the 20-volt engines being off the track for the time being. This worked perfectly, but we could not regulate the speed of the train. Altogether we have a very good time with our railway."



One of the Hornby Stations, with the quarry and its siding beyond. Note the motor vehicles on the roads.

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For other Stamp Advertisements see also pages 360 and xi.

Stamp Collecting

The Norwegian Scene

By F. Riley, B.Sc.

LAST month we visited Switzerland, the land of giant mountains. This month let us take a trip to another country renowned for its heights, not perhaps as great as those of Switzerland, but none the less massive and interesting. This is Norway, which has a long broken coast line and is remarkable for fiords that penetrate far inland between precipitous heights.



The stamps of Norway have many interesting features. The earlier ones were either of the portrait type or had formal designs. They are attractive to keen stamp experts because of their technical features, but young collectors also will study them with interest, as far as they are available. They will note the prominent posthorn in one of the formal designs used over many years, and find that this appears also in the watermark. This watermark indeed has persisted, and can be seen on most of Norway's stamps.

Pictorials did not come until 1914, 59 years after the appearance of Norway's first stamp. In that year the country celebrated the 100th anniversary of its independence by issuing three stamps bearing a reproduction of a picture of Norway's constitutional assembly of 1814. Until that year the country had been a Danish province for a long time, but it was then transferred to Sweden. The Norwegians fought against this, and before giving in they won the right to a large measure of independence. Complete separation came only in 1905, and portraits of the newly elected King Haakon VII then appeared on Norway's stamps, on which the Swedish Kings had previously been pictured.



The next commemorative was a very interesting one. It was an air stamp issued to mark the famous flights in which Amundsen, the Swedish explorer, tried to reach the North Pole by air. The stamp was not a very ambitious effort. Its design was simple, practically its only feature being a white polar bear.

Norway of course extends well into the Arctic Circle, and it is not surprising to find that the North Cape figures on one series of Norwegian stamps, issued in 1930 with a premium, or extra charge, for the benefit of the Norwegian Tourist Association Fund. The North Cape is a bold headland, well shown on the stamp—on which a vessel, presumably carrying tourists, also can be seen—and is usually regarded as the most northerly point of Europe. The same design appeared again in 1938 on two stamps of rather smaller size, which also bore premiums in aid of the fund.



The reindeer is an animal that is always associated with Norway, and this creature duly appeared on one value of a tourist propaganda issue of 1938. The 20 öre value of this issue showed a Stav or Stave Church. The churches of this type are among the most remarkable timber buildings in existence. As the stamp shows, they are of very unusual design, eastern in style. Some 300 were constructed in the 10th and 11th centuries, chiefly near the fiords, and many of them are still in existence.



Several very interesting stamps commemorate famous Norwegians. One issued in 1928 marked the centenary of the famous dramatist Henrik Ibsen, and it was followed a year later by another commemorating the death in 1829 of Niels Henrik Abel, who lived only 27 years, but in his short life won undying fame as a profound mathematician. A more widely known figure included in this series is Nansen, the famous polar explorer, whose portrait is seen on a stamp issued in four values in 1935, on which a premium was charged in aid of the Nansen Fund for refugees. After the first World War Nansen was director of an international scheme for returning prisoners of war to their homes and later he was actively engaged in famine relief in Russia.



An interesting stamp reproduced on this page is concerned with an exploit of another Norwegian who took part in polar exploration. This is Tryggve Gran, who was a member of the Scott Antarctic expedition of 1910. The feat commemorated had nothing to do with polar exploration, however. It was the first crossing of the North Sea by air, made by Gran in 1914. The flight was made in a Bleriot monoplane, which later was bought by the Norwegian Government and used by Gran on the outbreak of the 1914–18 war in patrolling the Norwegian fiords to detect German submarines resting in their sheltered waters.



Two years ago Norway celebrated the tercentenary of postal services in the country by the issue of a special series of 11 stamps. The designs included portraits of King Haakon and Queen Maud on the highest values, with portraits of Norwegians connected more or less remotely with postal matters during the period. Various ways of carrying mail are illustrated, and one stamp has on it portraits of Nansen and Amundsen, Norway's famous polar explorers.



SCOUTS' STAMP FREE

ABSOLUTELY FREE. This very lovely little stamp, as illustrated, was issued by **AUSTRALIA** to commemorate the International Boy Scouts' Jamboree, at Yarra Brae, Wonga Park, Victoria, Australia. We will willingly send **YOU** one **ABSOLUTELY FREE**; it will enormously add to the interest of YOUR COLLECTION.

It depicts a uniformed Scout, and was on sale in Australia for a very short time only—from Nov. 15th, 1948, to Jan. 9th, 1949. We have purchased a small supply, and whilst this supply lasts, offer one Absolutely Free to each Approval Applicant.

To get YOUR stamp, just write and ask for this wonderful Free Scout Stamp, and also ask for our Price List and a selection of our Stamps on Approval (no obligation to purchase any). You must send 3d. stamps to cover our postages. Write NOW.

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12 Danzig	25 Do. Colonies	15 San Marino
50 Denmark	12 New Caledonia	8 Saudi Arabia
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12 Guadeloupe	20 New Zealand	8 Serbia
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For other Stamp Advertisements see also pages 358 and xi.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

THIS is the month when stamp collectors are thinking about getting out those albums which were put away earlier in the year. This looks like being a season of all seasons for collectors of colonial stamps, for between next month and the end of the year over 70 sets will be issued to commemorate the 75th anniversary of the Universal Postal Union.

And that isn't the end of the story, for we have new sets galore pending for various colonies. But we had better leave it at that for the time being, as those "U.P.U." sets will take up most of our pocket money.



As the colonial issues are only to be on sale for three months at the outside, there will be no time to waste if we are to gather them all. Fortunately most of the sets are of low face value, but both the Seychelles Islands and the Falkland Islands have overdone it, and there can be no justification for sets with face values of 5/10 and 3/7 respectively for such relatively insignificant countries when all the rest of the colonies are satisfied with sets of less than 2/- face value. It is sheer exploitation of collectors, for the authorities of the two countries in question know that collectors will have to take all to complete their collections.

Still we suppose it could have been worse. We might have had a lot of sets topped by high values like the "Silver Wedding" issues, and then the collecting of K.G. VI issues, now so popular, would probably have been given a death blow, for collectors in general could not have stood the pace. After all, there are other things in the world which one must buy besides stamps.



Of course one must not be too pessimistic, for those who did manage to afford a set of the "Silver Wedding" stamps have assured a very handsome profit for themselves, if they ever want to sell. That does not necessarily mean that there is a profit waiting for all purchasers of the "U.P.U." issues. Yet from an investment point of view, and one can hardly spend the £8 or £9 which a complete set will cost without taking into consideration the monetary side of the transaction, the stamps should be worth while. We may have more to say about this next month.

The U.S.A. continues to issue attractive commemorative stamps, but apparently the selection is now to be left to the Postmaster General himself. The limit has to be 12 per year, and quite enough too. Without a doubt, if our own Post Office followed this lead stamp collecting would boom as never before, for attractive commemorative stamps of low face value as distinct from long sets, or stamps of high face value, do foster interest. The U.S.A. commemorative stamp which we are illustrating this month was issued to commemorate the tercentenary of Annapolis.

Australia has given us another stamp. The man honoured this time is H. A. Lawson, who was born of Norwegian parents at Grenfell, New South Wales, on 17th June 1867. Actually his parents' surname was Larsen in the first place, but later it was Anglicised at the instigation of Mrs. Larsen herself. Henry Lawson had a rather tough boyhood, but later he became one of Australia's great poets and writers. The stamp, if rather insignificant for a commemorative, is attractive.



Few countries are more popular with British collectors than Canada and a commemorative from there is always welcome. The one we are illustrating, honouring Halifax, is no exception. Canada produces on the whole beautiful stamps, which was probably the reason why Bahamas went there for its set to commemorate the Eleutherians. Alas, the set wasn't a success, but the "Halifax" stamp certainly is. A set of low face value stamps was to have been issued in June, on the date of the King's birthday, but when they were almost ready it was found that the designs were inadequate, so the emission was delayed, not for several years as would probably have happened over here, but for a month or two.

There was a time when the South and Central American countries were the only ones to issue stamps in any quantity for sale to collectors. European post offices held their noses high, and refused to consider such methods of raising the wind. But what a change to-day! A stamp dealer showed the writer of these notes recently a letter which he had received from a customer, who was packing up his collection of French and Belgian stamps and going in for South American stamps, as these latter were, as he put it, "not prepared so much for collectors." How the old continental collectors would stare if they could see the multitude of issues that their countries issue almost every week!

What that collector wrote is true enough. South and Central American countries are completely outclassed in the time-honoured custom of tapping collector's pockets by issuing lots of pretty stamps. It is true that countries like Argentina do bring out a fair number of stamps, but they are genuinely used for postal purposes, and emitted in the first place to honour or commemorate some real event, such as the stamp we are illustrating. This is a beautiful stamp, one of a pair brought out earlier in the year to commemorate the holding in Buenos Aires of the 4th meeting of the Pan-American Cartographers. This stamp is being illustrated because some time ago we held up a stamp from the same country as an example of all a stamp should not be.



When Argentina reforms and produces beautiful stamps, well, it's only fair to report it, for the country is exceedingly popular.

The Story of the Lightship—(*Cont. from page 332*)

ships of the latest design, with very comfortable accommodation for their crew and quite an elaborate engine room for working the lantern and the fog horn.

A concluding word must be said for the lightsmen, who are a magnificent body. The normal crew consists of 11, two officers and nine men, but only seven are on board at one time, an officer and six men. They are relieved monthly, so that the officers have a month afloat and a month ashore, and the men two months afloat and then a month's holiday. They are all old sailors, some from the Navy but most of them from the Merchant Service; and in addition to keeping their ships scrupulously clean and in a wonderfully efficient condition they have all the sailor's traditional skill at handicrafts, making rugs, model ships and many other things to pass away their spare time. Needless to say, they find a ready market for such things when kindly yachtsmen or holiday-makers pay them visits with newspapers or fresh bread and vegetables.

Handley Page's Forty Years —

(*Continued from page 336*)

profitless nationalized airlines.

The ten years during which the "Hannibals" were in service saw the German Luftwaffe grow from a few gliders to the mightiest air force in the world. To meet the growing threat, Handley Page built an interesting series of bombers in the 1930s. First came the unorthodox "Heyford" night-bomber, then a bomber-transport development of the "Hannibal." But by 1935 it was obvious that the biplane had had its day, and this aircraft was converted into the H.P. 51 twin-engined monoplane, which in turn became the "Harrow," the R.A.F.'s first big monoplane bomber. "Harrows" remained in service as transports throughout the second World War, their most notable action being the evacuation of wounded paratroops from Arnhem. They were the only large aircraft able to take off from the small fields in that area.

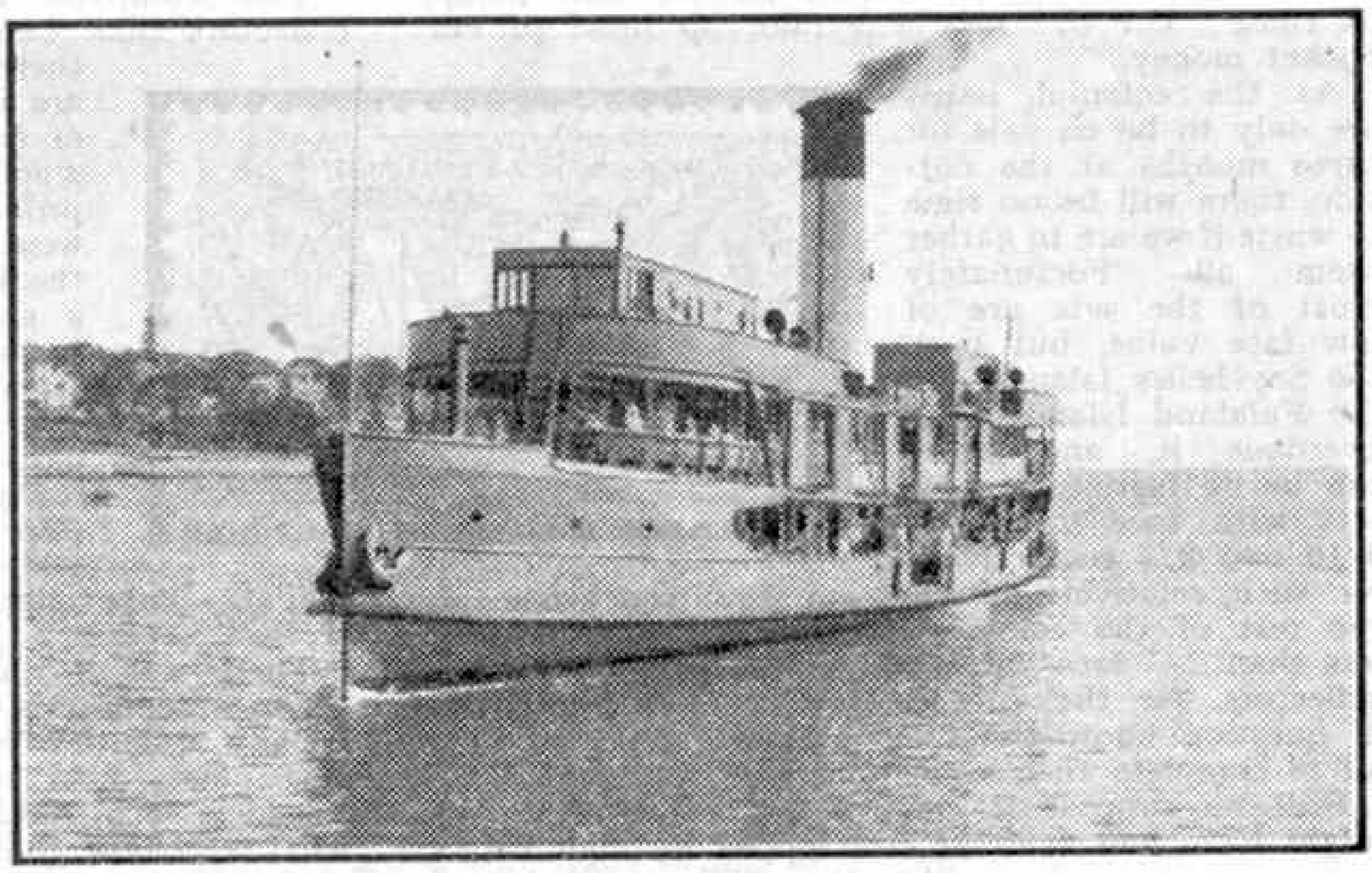
Most famous Handley Page bombers of World War 2 were the "Hampden" and "Halifax," whose magnificent war record is too well-known to need recalling in detail. "Hampdens" were among the first aircraft to attack Germany; later they operated as Coastal Command torpedo-bombers and were used to lay parachute mines. "Halifaxes" shared with Avro "Lancasters" the main burden of the R.A.F. bomber offensive. In all 6,176 of them were built, representing more than 40 per cent. of Britain's heavy-bomber production. At the time of its peak strength, Bomber Command had 76 "Halifax" squadrons in action; between them they made about 76,000 bombing sorties and dropped nearly a quarter of a million tons of bombs.

"Halifaxes" were used also as glider-tugs and military transports, and by Coastal Command for anti-submarine work and meteorological patrol. When the war was over they were converted into "Halton" air liners for B.O.A.C. and "Halifax" Freighters for the charter companies. Several of them have been back on the "Berlin Run" in the last year, each carrying 1,500 gall. of oil to help break the Russian blockade of the city.

Flying alongside them on the Air Lift are the fine new Handley Page "Hastings" military transports, forerunners of the "Hermes" air liners which will soon operate many of B.O.A.C.'s Empire routes. These aircraft, at the beginning of their service life, have already been superseded on the drawing boards at Cricklewood by secret, highly-advanced designs, for which the little "Manx" tailless research aircraft of 1945 may well have provided much useful data. Still guided by its founder, now *Sir* Frederick Handley Page, there are plenty of indications that Handley Page's second forty years will be every bit as momentous as their first forty.

Making Britain's Roads Safer—(*Cont. from page 344*)

these headings, scientists study the problems of road surface characteristics and their relation to the safety of moving traffic. For instance, information about the anti-skid properties of different road surfacings is of great importance. To obtain this riders go out on special motor cycle combinations, the outer wheel of which leans over at a quite terrifying angle while tests are in progress. The skidding resistance of any surface to wheels moving at speeds up to 60 m.p.h. is automatically recorded on instruments carried in the sidecar. For tests at higher speeds a 50 h.p. car has been used, the skid-recording apparatus being towed behind it.



A harbour ferry at Sydney, New South Wales. This interesting picture was submitted by R. Briggs, Bradford, in an "M.M." Photographic Contest.

Another machine used for road surface experiments is an American invention known as the "Roughometer." This single-wheeled apparatus is towed along behind a small motor van, and compares the riding qualities of selected stretches of road. By this means it can be discovered how some kinds of surfacings develop bumps and hollows more quickly than others.

Research into the safety of road vehicles includes the study of such important characteristics as vehicle lighting, braking and steering, in all of which the Laboratory maintains close touch with the Motor Industry Research Association; and also of the question of headlamp dazzle as a factor in road accidents, a problem that is being carefully investigated.

HAVE YOU ANY SPARE MECCANO PARTS?

Are there any readers of the "*M.M.*" who have Meccano Outfits that they do not use? If so, these would be welcomed by Mr. D. Uttley, Sale, who is urgently in need of them for use in training deaf children. Gifts of Outfits or Parts would be gratefully received by Mr. Uttley, and would be of the greatest value to the boys among whom he works, whose need for aid in developing skill and resource are obviously greater than those of ordinary children. Any spare parts that can be presented for this purpose should be sent to Mr. D. Uttley, 46, Winstanley Road, Sale, Cheshire.

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.

LUXEMBOURG'S STREET TRAINS

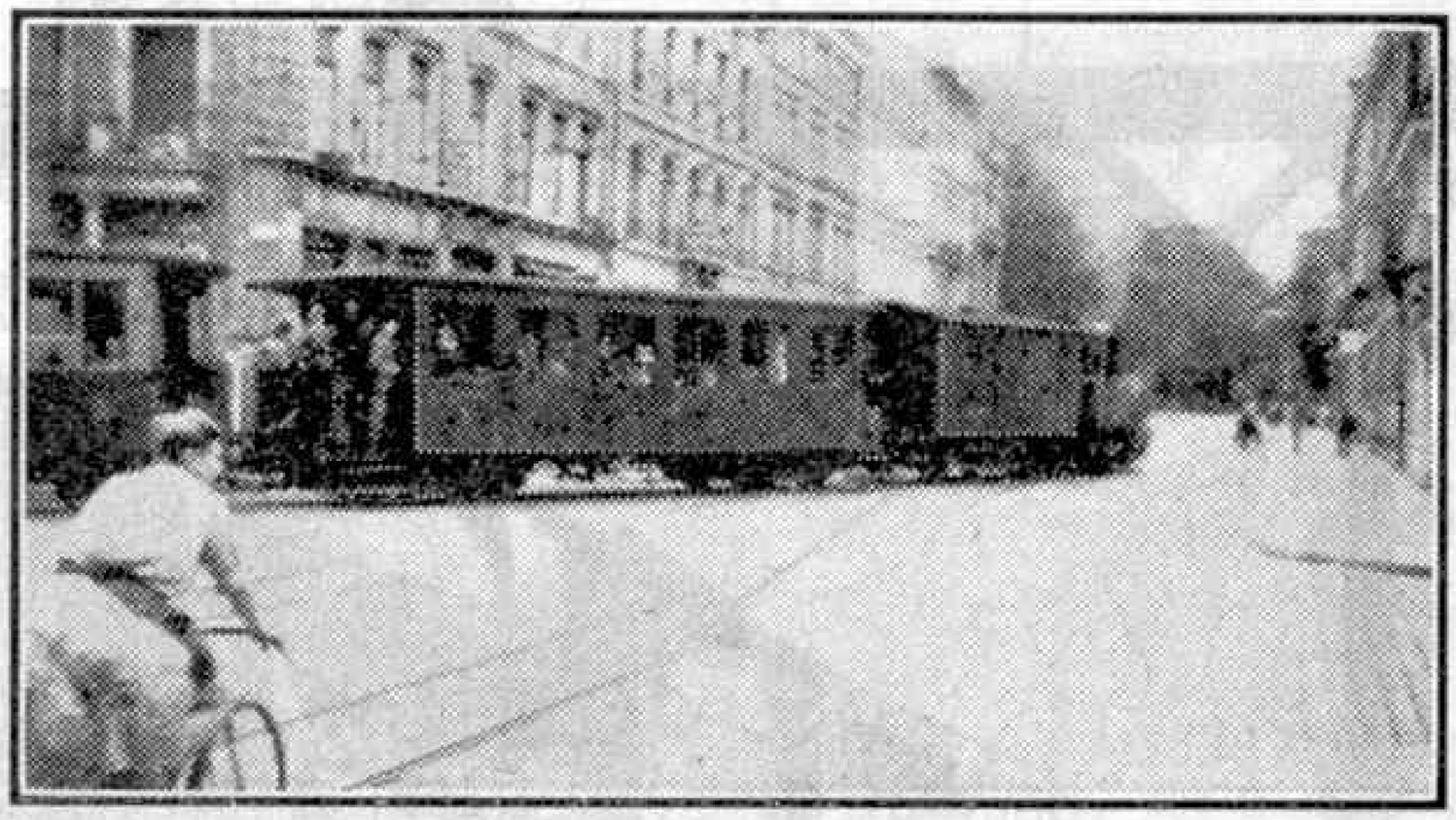
In Luxembourg, capital city of the little Grand Duchy of the same name, a sight can be seen to-day that must be unique as far as the capitals of European countries are concerned. This is a steam train running through the main streets.

There are two trains that provide this spectacle. One runs from the capital to Mondorf, and the other to Echternach, a small town that changed hands several times in the Rundstedt offensive during the War and was very badly damaged. Both trains start from the main station, and the one that goes to Echternach runs on the tram lines straight up one of the main streets, blowing smoke and steam in all directions and at frequent intervals dropping large lumps of burning coal from the fire-box. With continuously clanging bell, and preceded by a single coach electric tram to operate the points, this small locomotive with a full train of first, second and third class coaches makes two more stops before it finally leaves the town. There it changes to a normal narrow gauge track with sleepers.

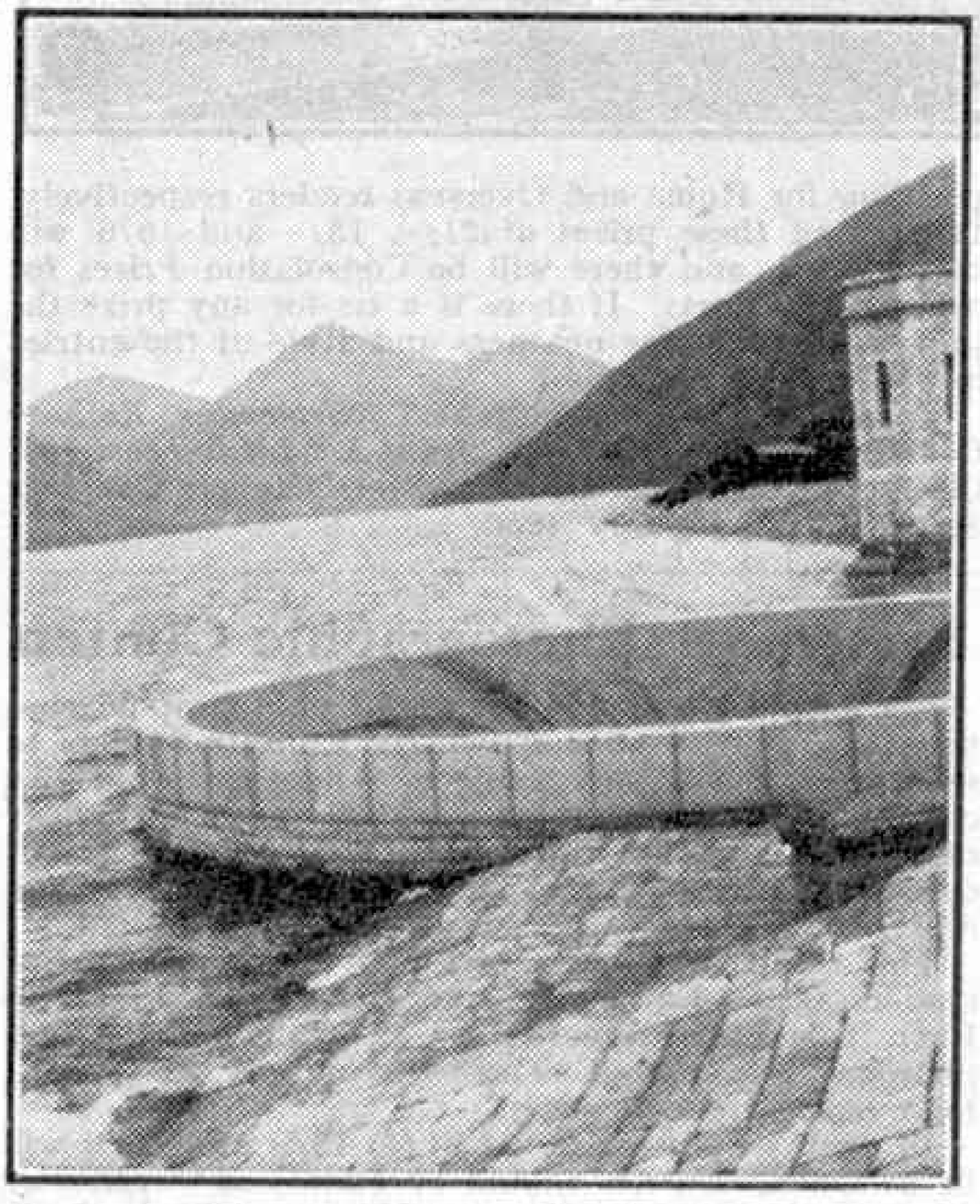
Signals are not provided, but the policemen on point duty at the cross roads wave the train on when it approaches and do their best to stop other traffic.

The accompanying illustration shows the locomotive under full steam rounding the bend at the Avenue de l'Arsenal, a point where it has been known to part company with the rails, fortunately without any serious mishap. Among the Luxembourgers the locomotive is affectionately known as "*Charlie*," after one of their Princes.

R. A. H. BURMAN (St. Margarets, Middlesex).



A steam train running through the streets of Luxembourg. Photograph by R. A. H. Burman, St. Margarets, Middlesex.



The dam of the reservoir in the Silent Valley, in the Mountains of Mourne. Photograph by W. Turner, Belfast.

IN THE SILENT VALLEY

While cycling with a friend in the Mountains of Mourne, on the East Coast of Northern Ireland, we visited the reservoir in what is known as the Silent Valley. At the narrow end of the valley a small river flows from the mountains, and this is dammed by a giant ramp, along the top of which a small road for pedestrians has been built. The accompanying photograph shows the dam and the overflow pipe, which was very far above the water level at the time of our visit. A tunnel was then being driven under the mountains so that the water supply could be supplemented from another reservoir.

The valley is a mile and a quarter long and a quarter of a mile wide. The reservoir supplies the City of Belfast, 40 miles away, with its main water requirements.

W. TURNER (Belfast).

LYDFORD GORGE

Lydford Gorge, which has recently been taken over by the National Trust, is a little distance from Tavistock. One can walk for nearly three miles along the side of this winding gorge, admiring the rugged beauty of the canyon, and of the river Lydd seething and frothing over innumerable little waterfalls at its base. One magnificent waterfall, formed by a tributary of the Lydd, is over 100 ft. high.

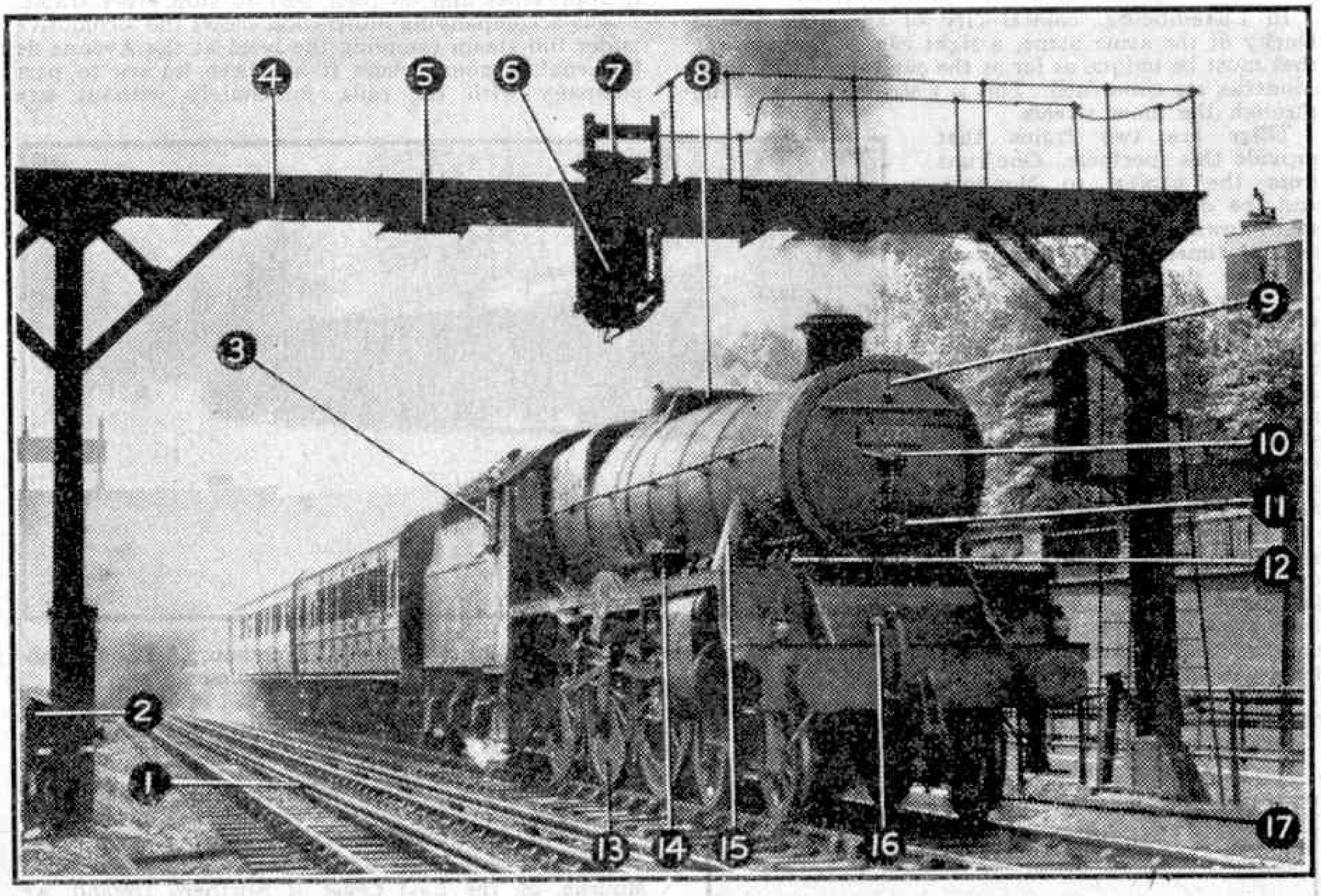
Descending to the mouth of one of the potholes to be seen in the gorge, where a jet of swirling, angry water is continually carrying out its age-old task of wearing away the rock, is a great thrill. It is reached by walking along narrow wooden planks, and looking up from it a small patch of sunlight can be seen at the top of a smooth circle of rock that rises high overhead.

P. J. STONE (Calstock).

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

What Are They For?



The splendid photograph reproduced on this page has as its central feature L.M.S. No. 5574 "*India*," of the "5XP" class. Parts of this locomotive and of the track, etc., have been indicated by lines and numbers, and for our first competition this month we ask readers to tell us what these parts are and to indicate their purpose. It is not necessary to explain at great length; just sufficient should be given to show that the competitor knows exactly what each part does.

As usual, there will be two sections in this competition, for Home and Overseas readers respectively. In each of these prizes of 21/–, 15/– and 10/6 will be awarded, and there will be Consolation Prizes for other good efforts. If there is a tie for any prize the judges will take the neatness and style of the entries into consideration.

Entries should be addressed "*September Railway Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 31st October; Overseas Section, 31st January 1950.

Holiday Drawing Contest

Most readers will now have completed their holidays and in their thoughts will often return to the pleasant times they have had and the interesting things they have seen. We invite them now to send in drawings of anything novel or attractive that they have seen during the holiday season. There is no restriction in regard to subject, which may be an interesting scene at the seaside, a locomotive, a ship or dock scene, some novel rock formation, and so on.

The contest will be divided into the usual two sections, for Home and Overseas readers respectively, and in each of these there will be prizes of 21/–, 15/– and 10/6. Consolation Prizes will be awarded for other good efforts.

Entries should be addressed "*Holiday Drawing Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 31st October; Overseas Section, 31st January 1950.

September Photographic Contest

The ninth of our 1949 series of photographic contests is a general one, in which we invite readers to send in prints of any subject. There are only two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired.

The competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate sections for overseas readers.

In each section prizes of 21/–, 15/– and 10/6 will be awarded. Entries should be addressed "*September Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" The closing dates in the competition are: Home Section, 30th September; Overseas Section, 31st December.

Competition Results and Solutions

HOME

APRIL 1949 CAR FACES CONTEST

1st Prize: J. C. Smith, Selsdon. 2nd Prize: B. McKenzie, Sheffield 10. 3rd Prize: D. W. Pratt, Shipley. Consolation Prizes: J. D. Rhodes, Shipley; P. Hodge, Cleckheaton; D. C. Wood, Glasgow; V. E. Madeley, Stoke-on-Trent.

APRIL 1949 AIRCRAFT DRAWING CONTEST

1st Prize: D. Pratt, London N.W.6. 2nd Prize: J. Hellings, Cuddington. 3rd Prize: K. G. Rush, Luton. Consolation Prizes: R. Francis, Crewe; K. R. Pargeter, Stourbridge; B. H. Croft, Pudsey; R. G. Holding, Colwyn Bay; J. E. Holding, Colwyn Bay; I. Cockburn, Ventnor, I.O.W.

APRIL 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: S. S. Pethybridge, Newton Abbot; Section B: D. Bottomley, Isleworth. 2nd Prize, Section A: Mrs. I. Hardwick, Burnham-on-Sea; Section B: P. J. Stone, Calstock. 3rd Prize, Section A: J. McM. Neish, Glasgow C.3; Section B: A. E. W. Hobbs, Exeter. Consolation Prizes: F. G. Reynolds, Sidcup; G. S. Finlayson, Southampton; W. Forsch, Stoke-on-Trent; R. A. Rees, Cardiff; M. Rapley, Ilford; G. M. James, Sandbanks.

MAY 1949 SLOGANS CONTEST

1st Prize: R. M. Ruegg, Leeds 6. 2nd Prize: D. Sisman, Falkirk. 3rd Prize: C. M. Laird, Glasgow S.3. Consolation Prizes: B. Sheppard, Croydon; R. Rann, London N.13; P. J. Taylor, Leicester.

MAY 1949 LOCOMOTIVE CONTEST

1st Prize: B. E. Timmins, Birmingham 24. 2nd Prize: N. B. Watson, Market Rasen. 3rd Prize: A. J. Peacock, Darlington. Consolation Prizes: M. J. Hodgson, Sheffield 6; D. H. Muir, Glasgow; A. Darlow, Sheffield 5.

MAY 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: L. H. Hobbs, Exeter; Section B: M. Fox, Ilford. 2nd Prize, Section A: C. K. Benington, Ballymoney; Section B: P. Clifford, Wembley. 3rd Prize, Section A: P. Tilbrook, London N.13; Section B: D. Elliott, Portaferry. Consolation Prizes: H. Fox, Ilford; P. Howard, Waddon; J. R. Norris, Nottingham; H. O. Thomas, Aldershot; R. H. Weeks, Carlisle; H. Meyer, Chandler's Ford; J. McWhor, Meols; C. E. Richardson, Mansfield; J. S. Walker, Crook

OVERSEAS

NOVEMBER 1948 LOCOMOTIVE SHADOWS CONTEST

1st Prize: R. Thompson, Madras, India. 2nd Prize: J. MacDonald, Dublin, Eire. 3rd Prize: T. F. Houston, Cairo, Egypt. Consolation Prize: E. H. Parker, South Otago, N.Z.

NOVEMBER 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: T. Burke, Dublin, Eire; Section B: J. Russell, Sarnia, S. Africa. 2nd Prize, Section A: Miss N. P. Milne, Hawke's Bay, N.Z.; Section B: B. R. Helsby, Alexandria, Egypt. 3rd Prize, Section A: J. A. Watkins, Mysore, India; Section B: F. Thomas, Washington, U.S.A. Consolation Prize: D. Hicks, B.A.O.R. (1)

DECEMBER 1948 ADVERTISEMENT CONTEST

1st Prize: F. Jensen, Copenhagen, Denmark. 2nd Prize: R. Fields East London, S. Africa. 3rd Prize: P. V. Hughes, Nedlands, W. Australia. Consolation Prizes: A. F. Woodbury, Dunedin, N.Z.; J. Pope, Lower Mitcham, S. Australia; B. K. Jeffrey, Jesselton, North Borneo.

DECEMBER 1948 QUIZ CONTEST

1st Prize: H. Singh, Madras, India. 2nd Prize: K. T. Bedster, Melbourne, Australia. 3rd Prize: L. Tooms, Ohio, U.S.A. Consolation Prize: K. R. Cassells, Wellington, N.Z.

DECEMBER 1948 PHOTOGRAPHIC CONTEST

1st Prize, Section A: P. T. Rogers, Halifax, Canada; Section B: K. Lynch, Johannesburg, S. Africa. 2nd Prize, Section A: A. Hufford, Waterford, Eire; Section B: B. Jessup, New Orleans, U.S.A. 3rd Prize. Section A: J. C. Carter, Cape Town, S. Africa; Section B: R. T. Young, Kilwa, Tanganyika. Consolation Prize: Miss N. P. Milne, Hawke's Bay, N.Z.

SOLUTIONS

DECEMBER 1948 ADVERTISEMENT CONTEST

Allan, Astra, Baer, Bond's, B.S.A., Dinky Toys, Drydex, Halford, Hamley, Hercules, Hobbies, Hornby, I.C.S., Meccano, Rush, S.E.L., Selfridges, Windsor, Wolsey.

DECEMBER 1948 QUIZ CONTEST

1. Andover. 2. Wrexham. 3. Burnham. 4. Newquay. 5. Tooting. 6. Kew. 7. Barking. 8. Sevenoaks. 9. Crewe. 10. Kirton. 11. Staines. 12. Paignton. 13. Lancing. 14. Newport. 15. Felixstowe.



"Rosebud and Roses." A prize-winning entry in the June Photographic Contest. Taken by L. H. Hobbs, Exeter, who brightened his print by using oil colours.

Fireside Fun

"The doctor tells me I need a change of air, Tam."
"Well, lassie, the radio says there'll be a change in the wind in the morn, so mebbe ye'll be better then."

* * * *



"Your husband's a poor sailor, isn't he?"
"Not at all. He's a rich manufacturer!"

* * * *

"Tell me about your exciting duties. Have you had any thrilling experiences?"
"Yes, my most thrilling escape was when I fell from a 50 ft. ladder," said the fireman.
"Really! But it doesn't seem to have done you much harm."
"No, it didn't. You see, I was only on the bottom rung."

* * * *

"Yes, that ship can steam more than 20 knots."
"How nice for the sailors!"
"What difference does it make to them?"
"They must find it easier to untie the knots when they are steamed."

* * * *

"Oh, policeman. I've just found my watch missing."
"Don't be silly, mum. If you've found it how can it be missing?"
"Oh, dear. I mean I haven't found it missing."
"Well, then, there's nothing for me to do about it."

* * * *

"Yes, sir, I was sent to prison for telling the truth."
"Dear, dear. How did that come about?"
"They asked me if I was guilty an' I said I was."

* * * *



Optician: "Can you read the bottom line on the chart?"
Old Countryman: "No."
Optician: "Good. I'll fix you up so that you can."
Old Countryman: "Wonderful. Eddication an' specs an' both free. I never learned to read when I was a boy."

BRAIN TEASERS

MIXED MOTORS

Below are given five sets of names of well-known motor cars. From each set make up the name of another car by taking one, two or three letters from each of the names in the group, but where two or three are taken these must be consecutive.

1. TRIUMPH, WOLSELEY.
2. AUSTIN, HILLMAN, DAIMLER, FORD.
3. CHEVROLET, MERCURY, CROSSLEY, SINGER.
4. LANCHESTER, ALVIS, RILEY.
5. ALVIS, LAGONDA, FORD. T.R.D.

* * * *

ANY PAINTED ON FOUR SIDES?

A cube measuring 12 in. in each direction is painted. Then it is cut into cubes with edges 1 in. long. How many cubes will be painted on 1, 2 and 3 sides respectively, and how many will not be painted at all?

* * * *



Barber (surveying customer thoughtfully): "Hair cut or polish, sir?"

* * * *

QUICK WORDS

Each of the following clues when taken very literally leads to a common English word. What are the four words?

1. Doctor near stern forms selection.
2. Graduate of rank seems to be ill.
3. Officer made contact in the sky.
4. Diana's sport is on exhibition.

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The herrings of our first puzzle last month cost the fishmonger 3¾d., so that the profit was ¾d. whether one was sold at 4½d. or three were disposed of for 1/–.

The hidden message in our second puzzle is made up of the middle letters of the words given, each of which has in it an odd number of letters. It reads USE DINKY TOYS WITH DUBLO TRAINS.

The solution of the word square problem is shown in the accompanying illustration.

T	O	N	E
O	V	E	R
N	E	A	R
E	R	R	S

The four words required in our last puzzle are RATS, TARS, STAR and ARTS.

* * * *

THIS MONTH'S HOWLER

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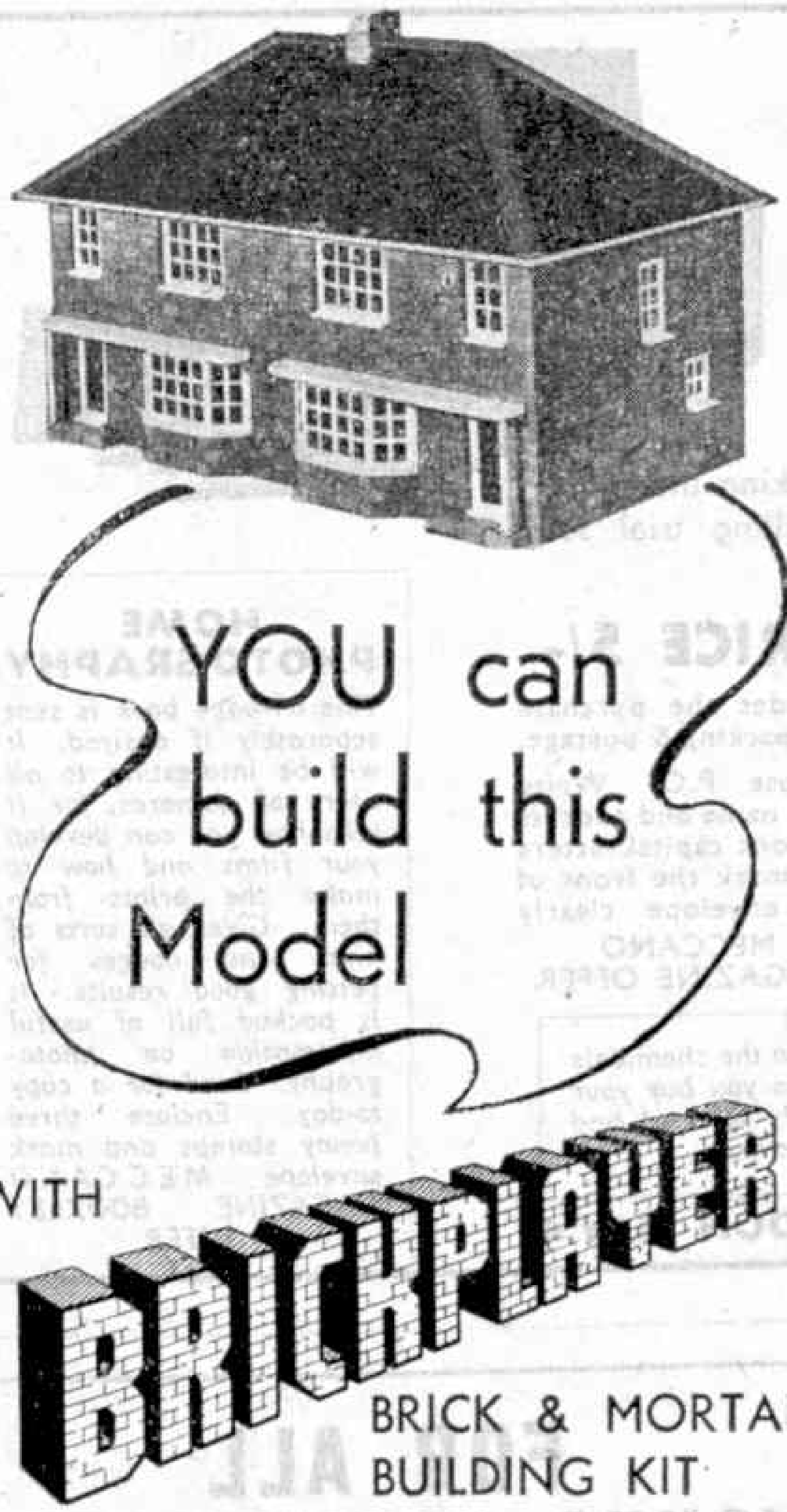
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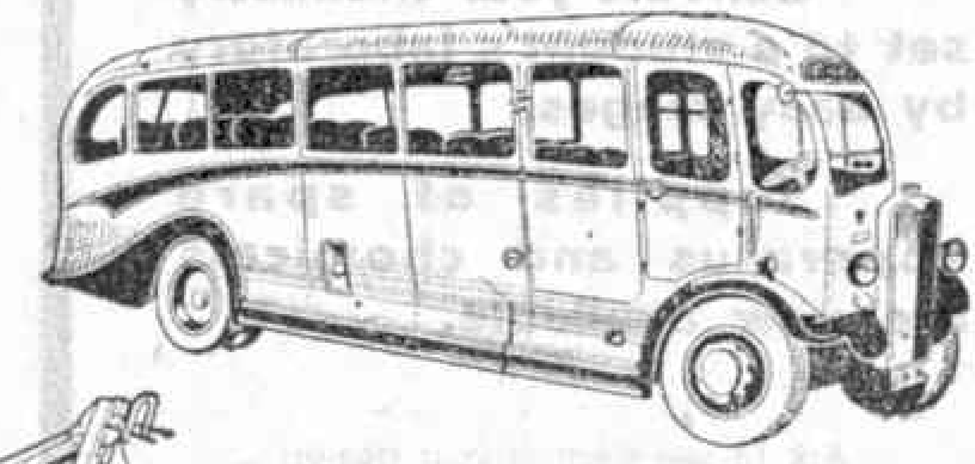
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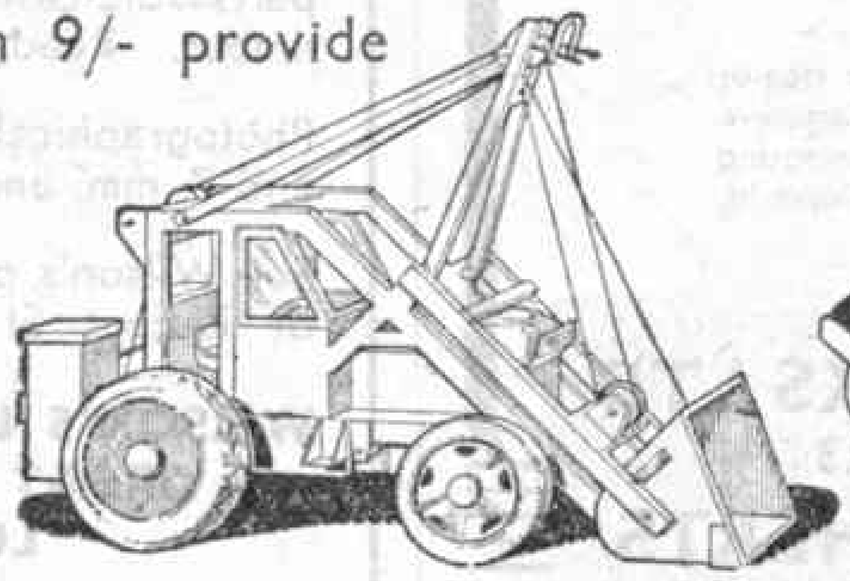
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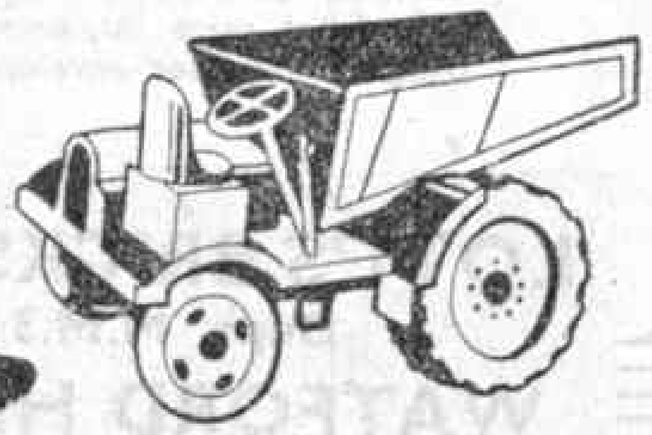
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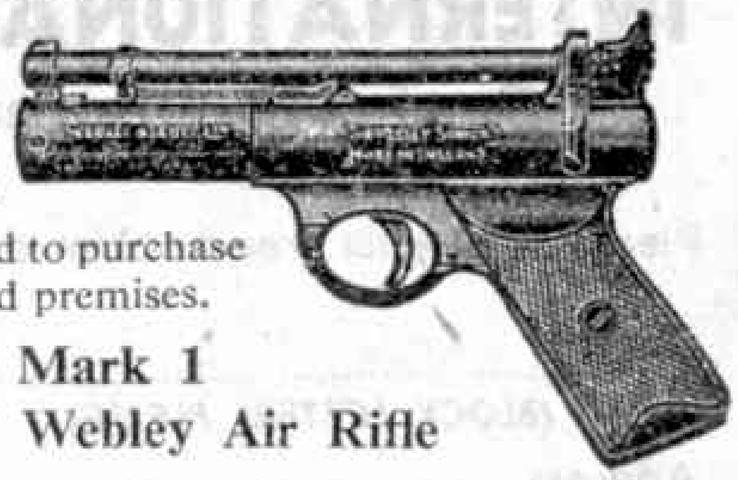
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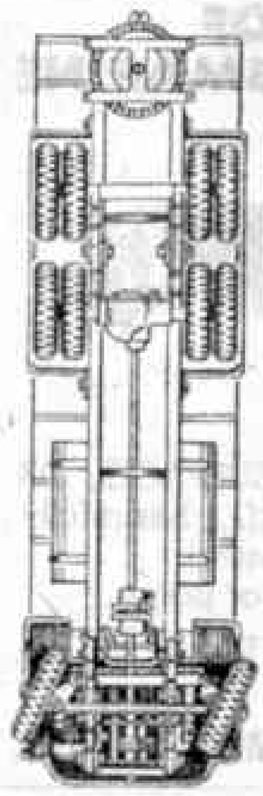
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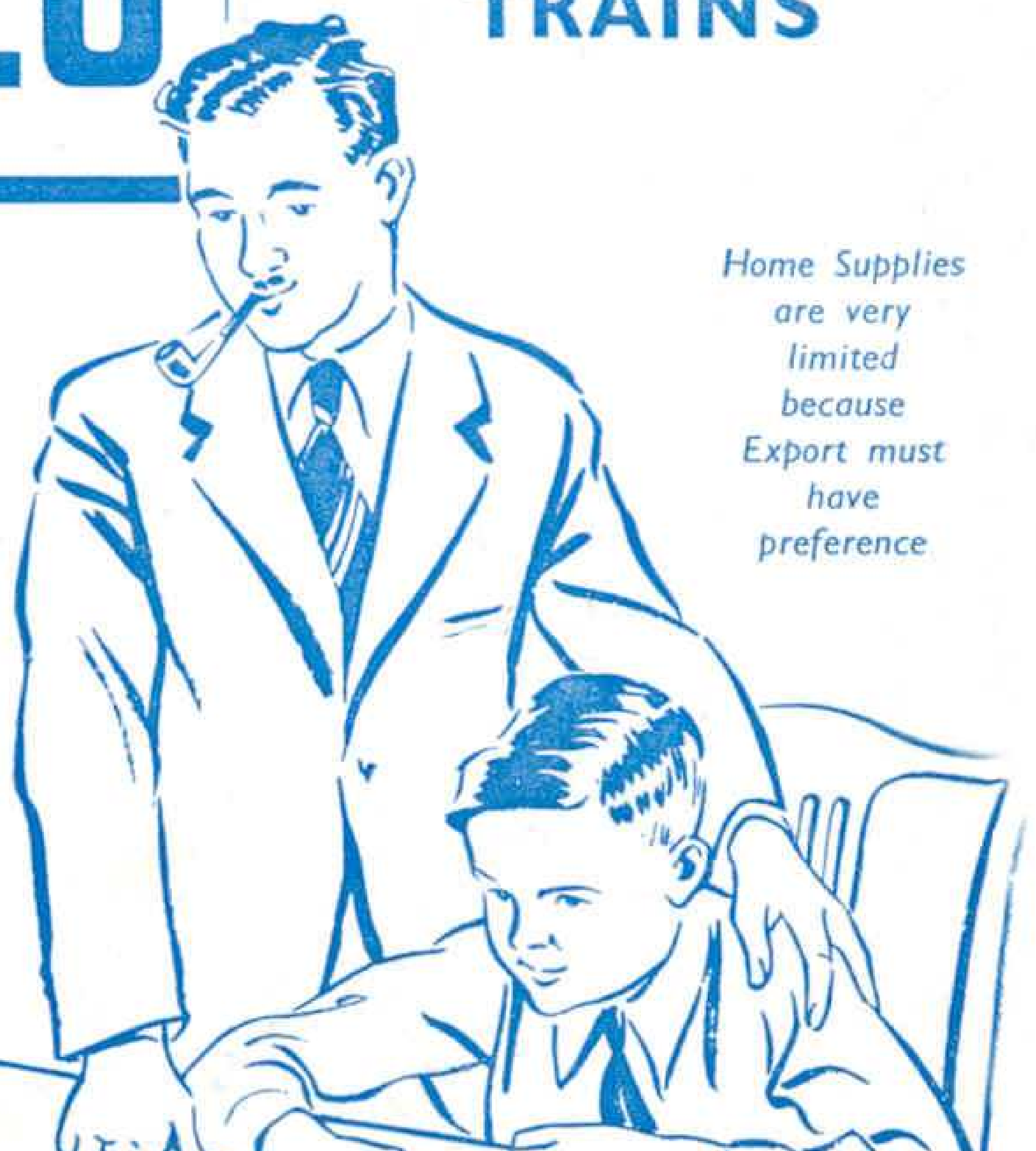
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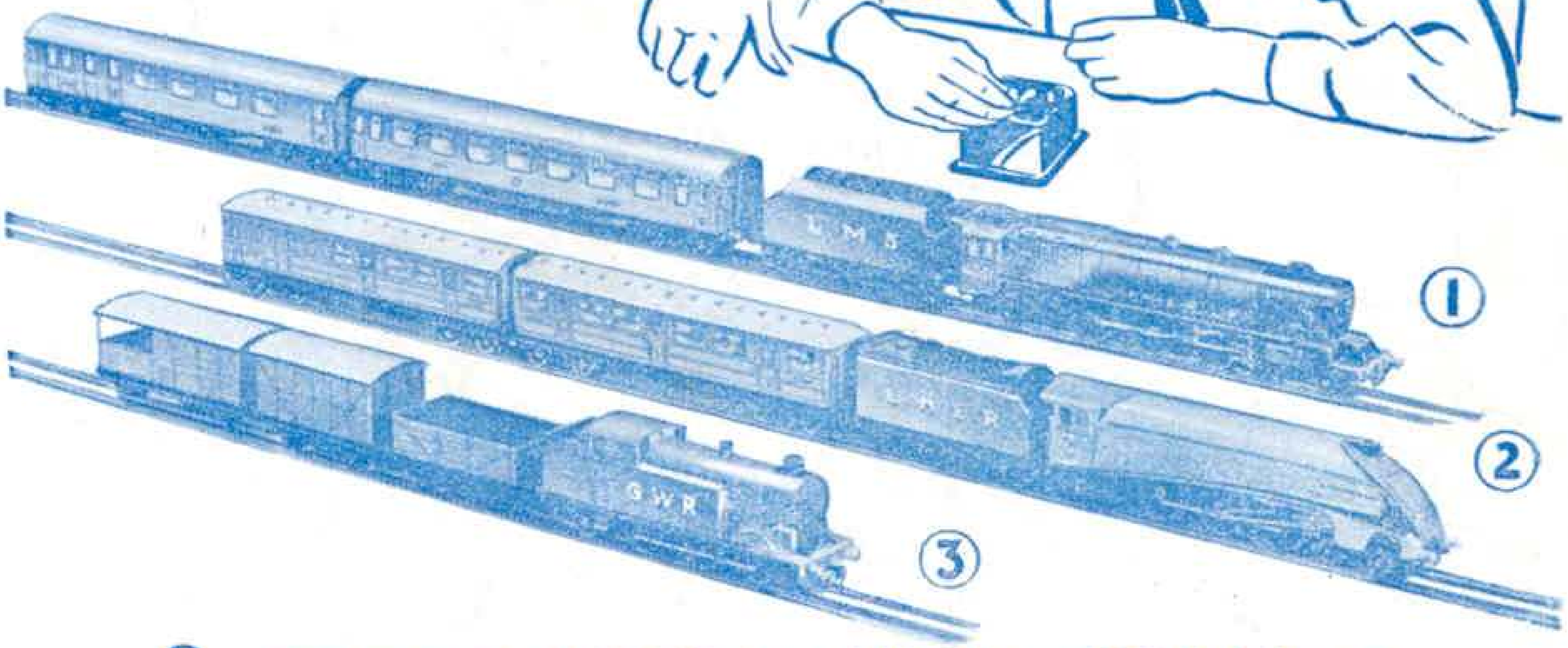


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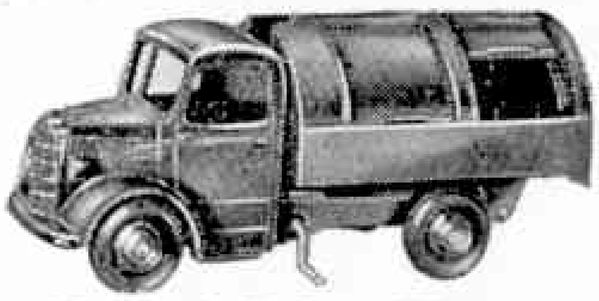
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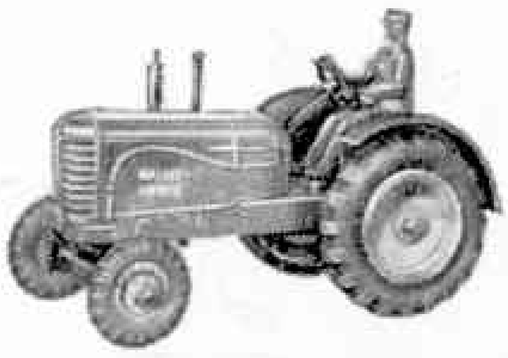
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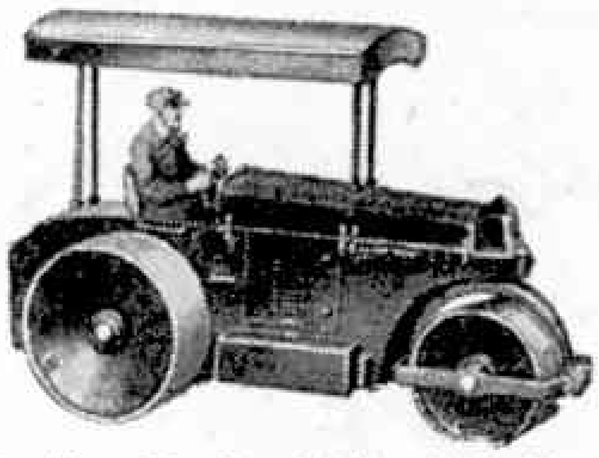
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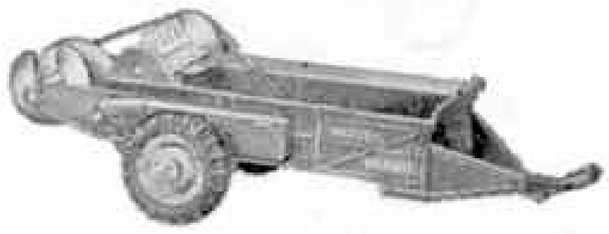


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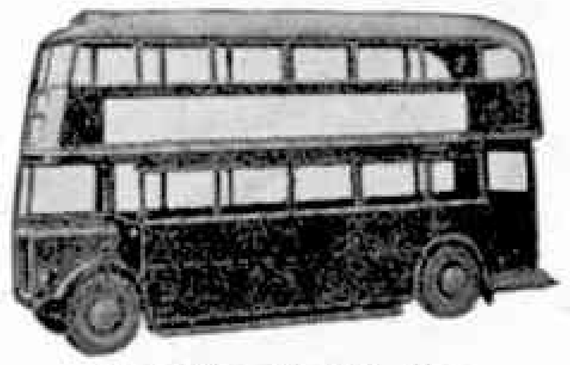
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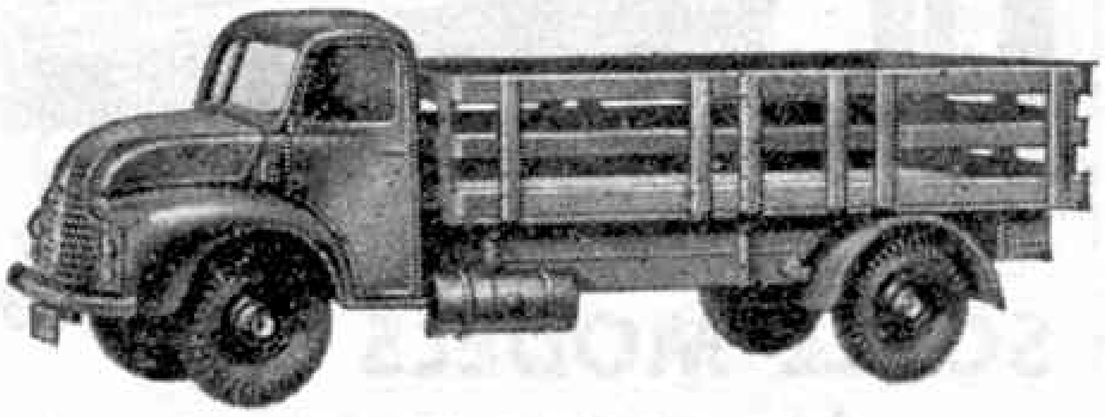
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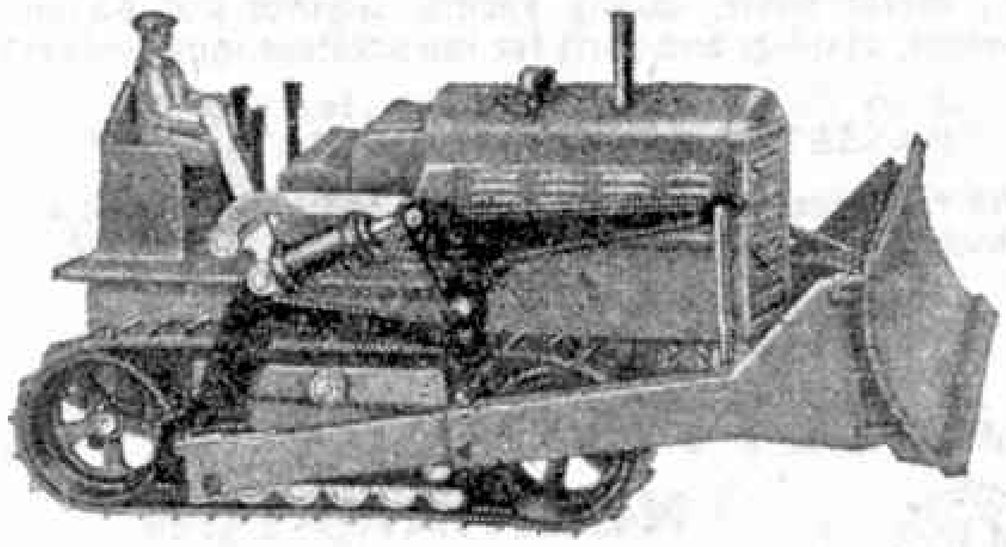
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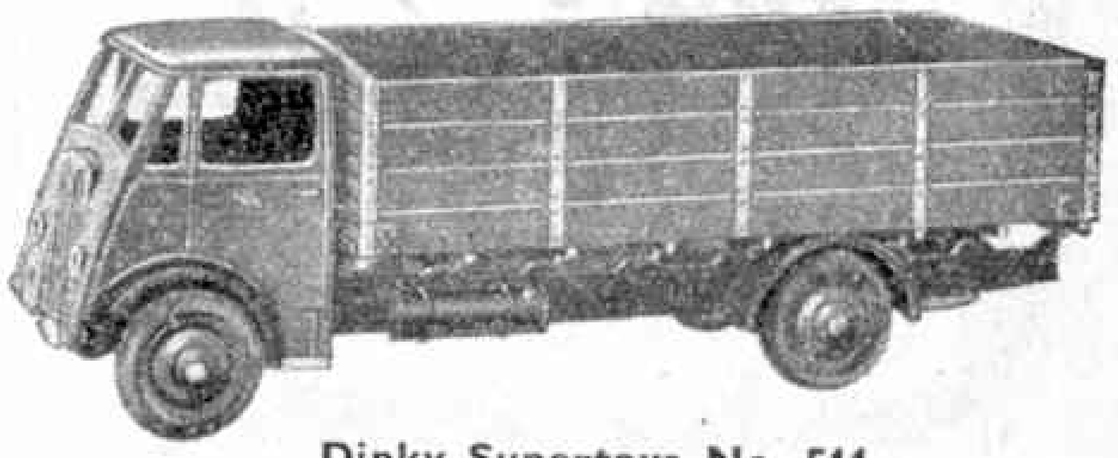
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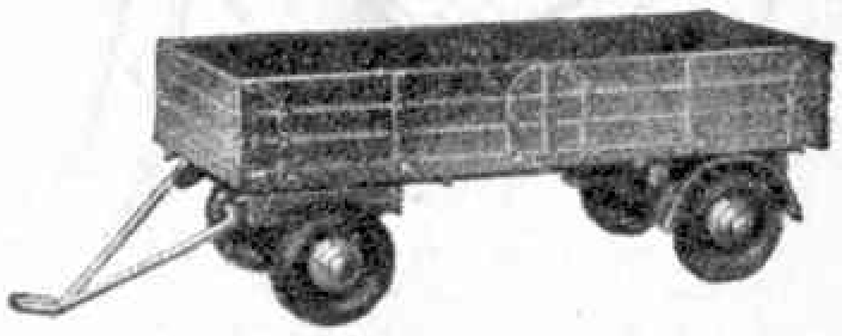
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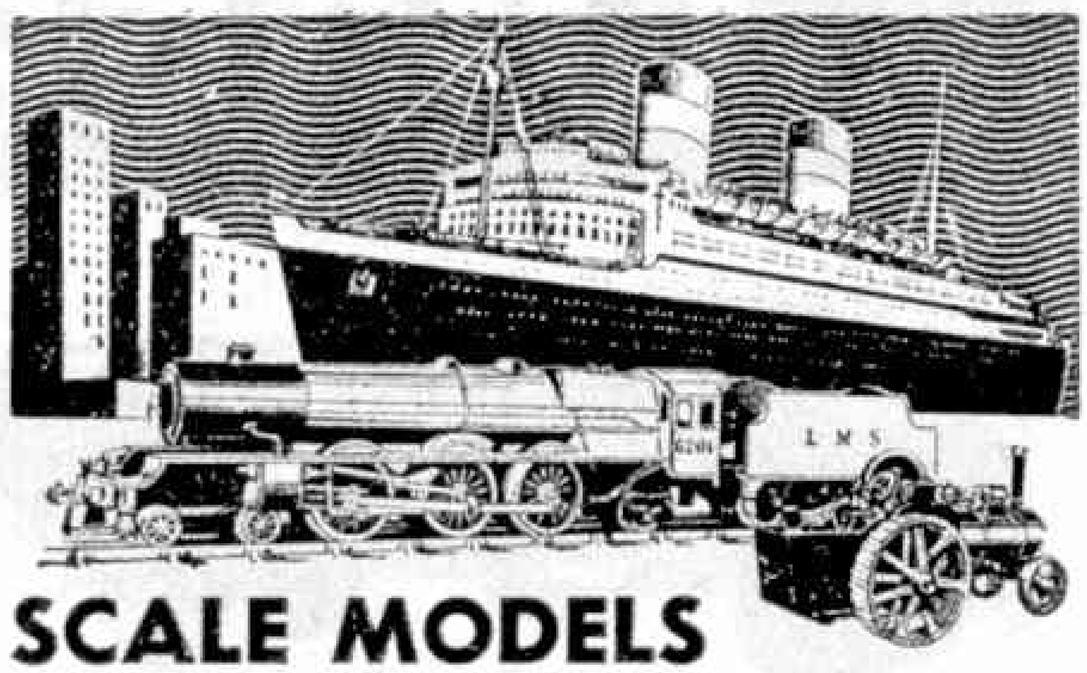
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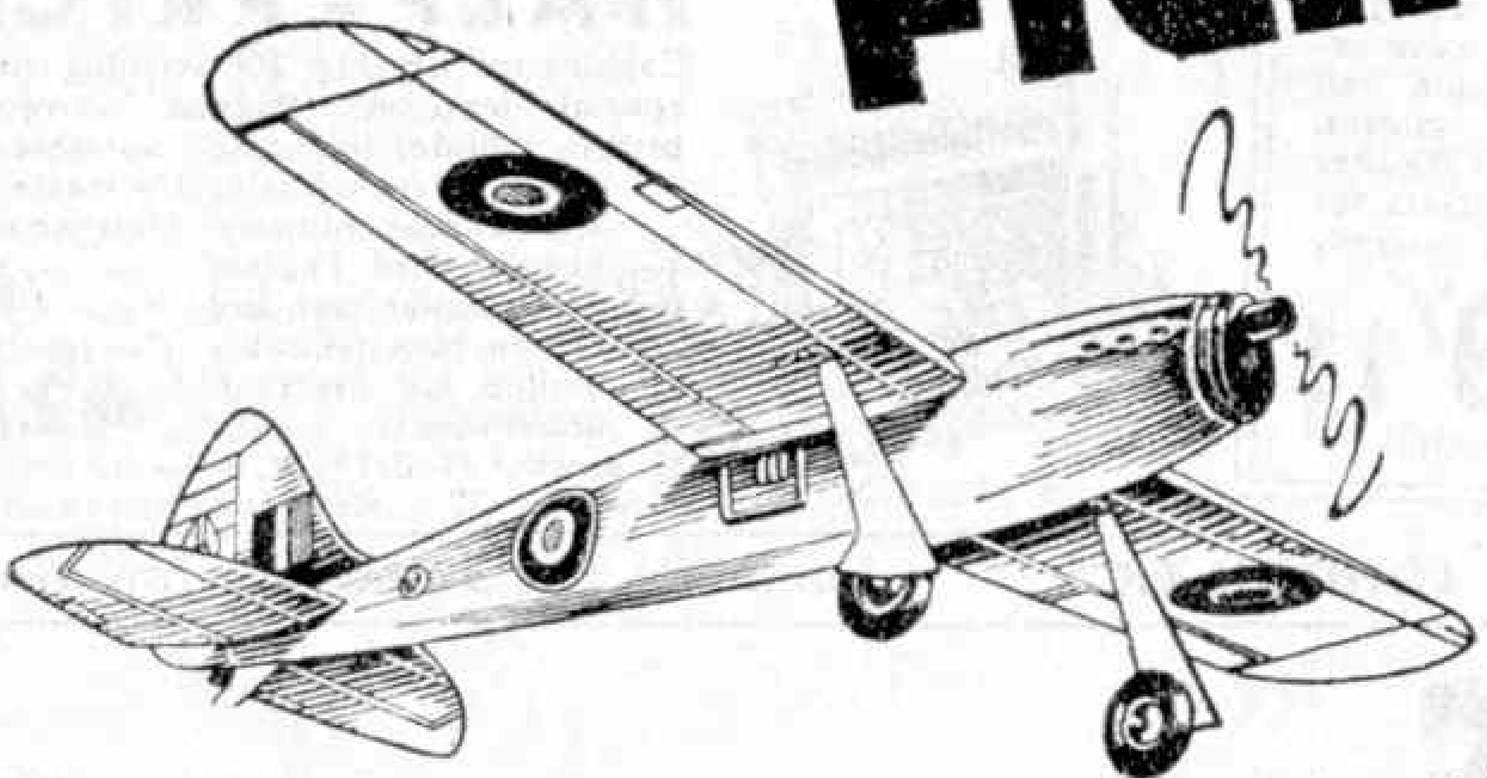
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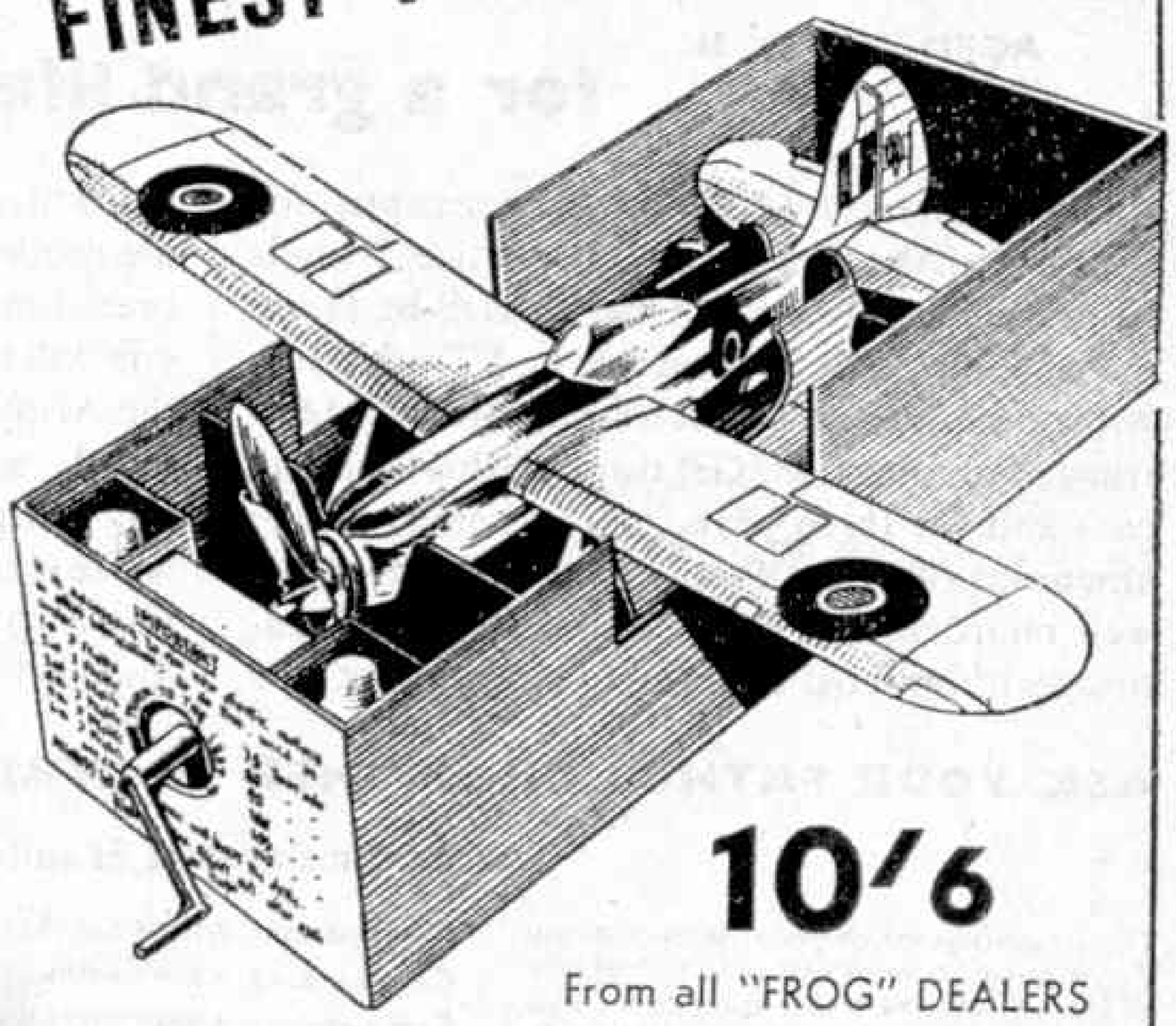
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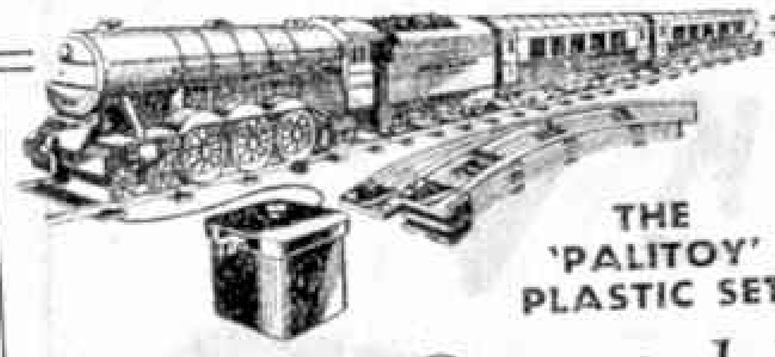
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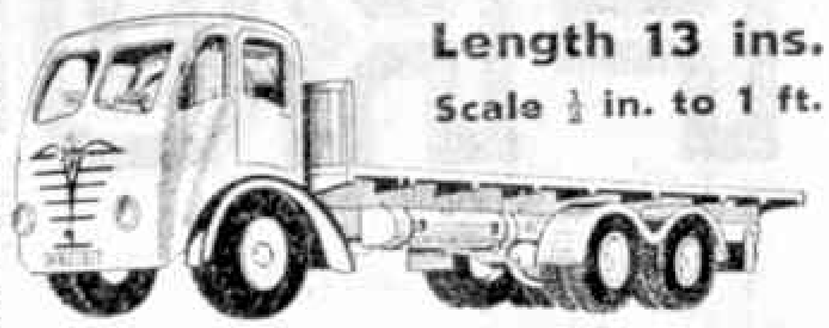
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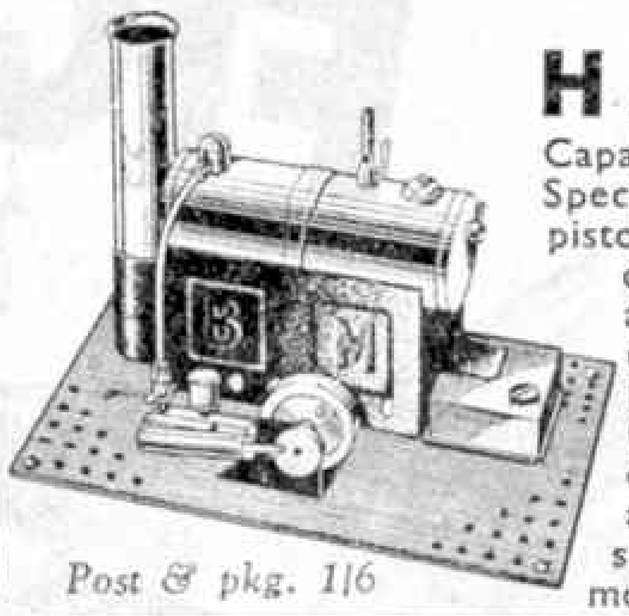
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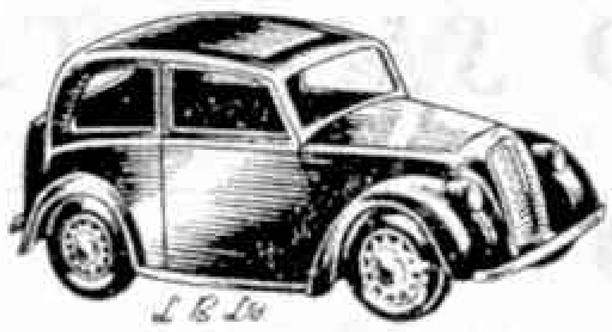
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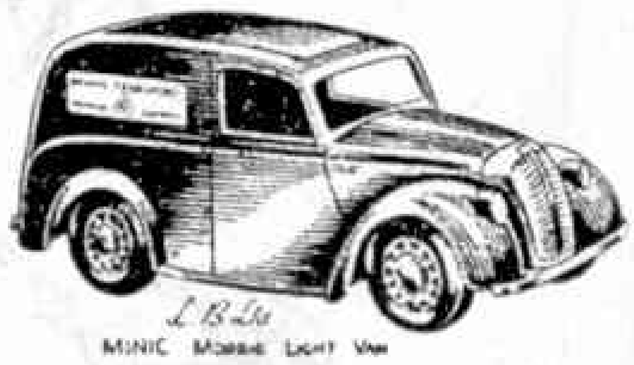
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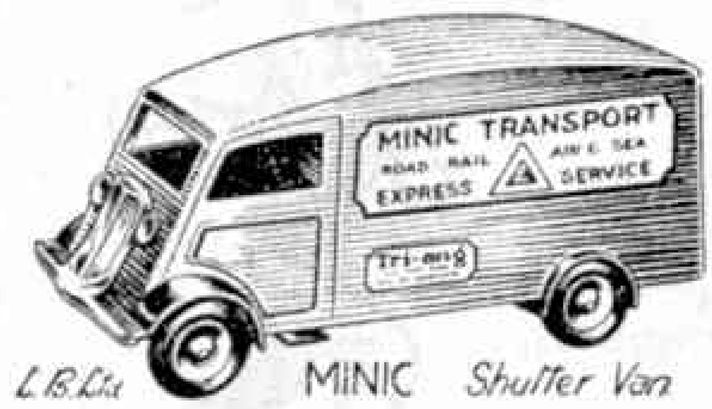
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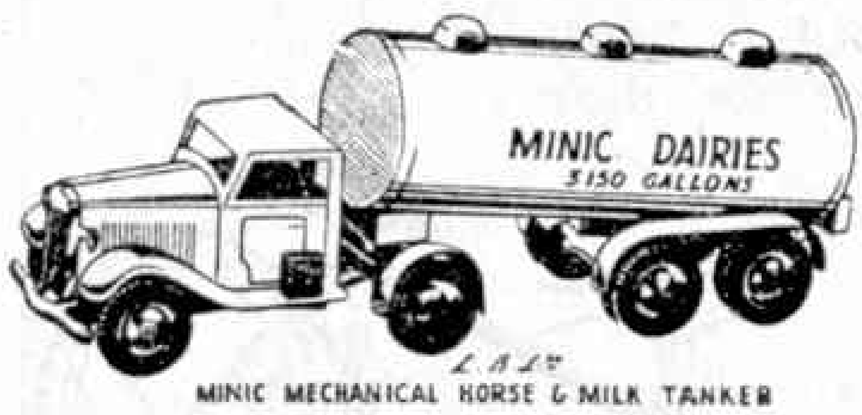


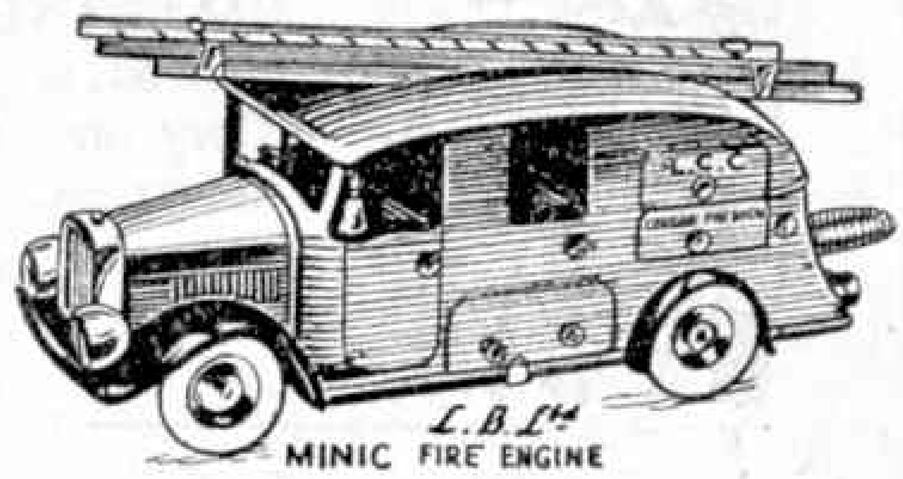
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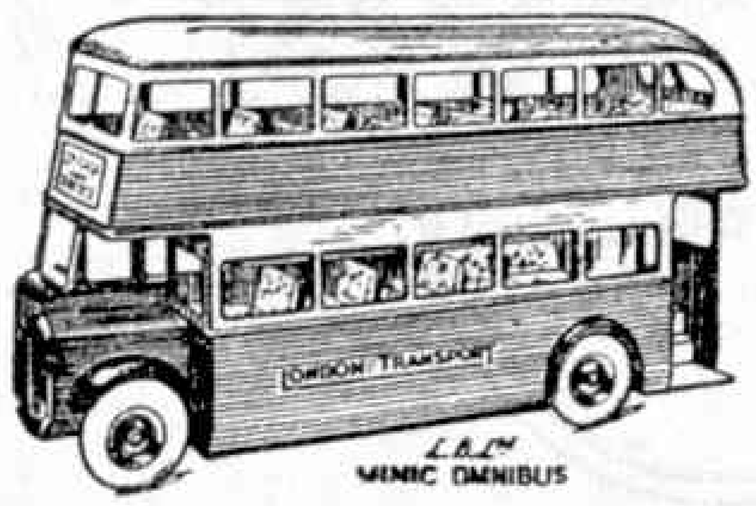


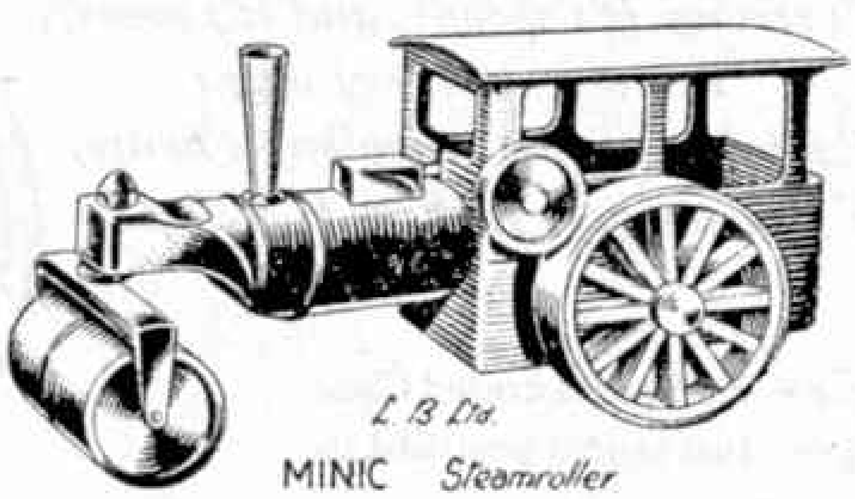
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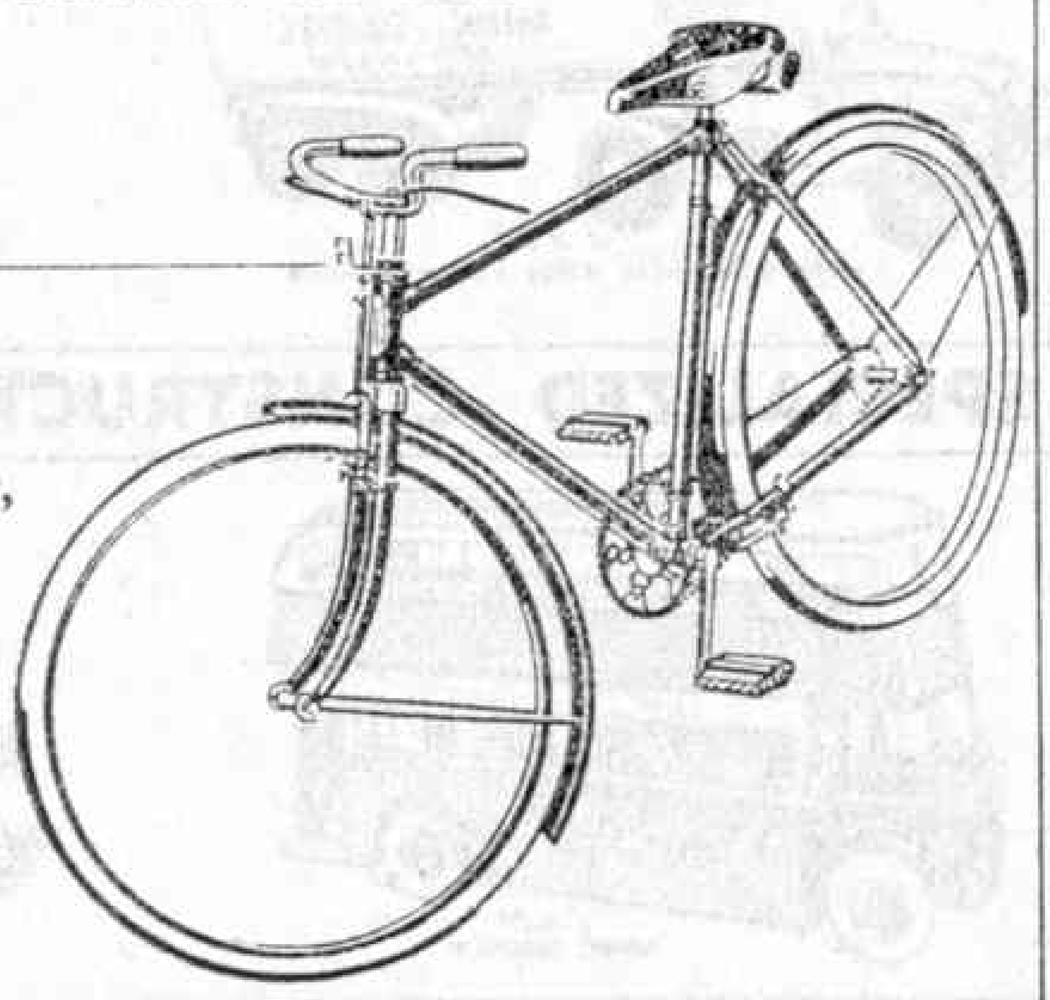
STRENGTH Matt McGrath, who stood 6 ft. in height, and weighed 17 st. 10 lb., threw a 56 lb. weight 40 ft. 6¾ in.!

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Next Month: "THE RAILWAYS OF FRANCE"

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No. 10
October 1949

With the Editor

Ice-Cream by the Ton

The article *"Ice-Cream by the Ton,"* by our popular contributor Mr. T. R. Robinson, set me thinking of the tremendous changes that have taken place in the supply of this chilly commodity. My thoughts go back to a time when ice-cream was distributed in our towns by wooden vehicles of various sizes, all conspicuous by their hideous livery of red and yellow paint. The ice-cream was contained in a wooden tub carried in the middle of the vehicle, and ladled out as required by means of a big wooden spoon wielded by a not always clean hand. Much of it was made in small houses in dingy back streets in places where cleanliness and sanitation were definitely absent. All this has gone. The contrast between such ice-cream "factories" and the one described by Mr. Robinson is difficult to realise.

The quantity of ice-cream eaten to-day must be enormous. A recent visit to a famous Lancashire holiday resort gave me the impression that at least half of the vast happy throng on the promenade, from toddlers to grown-ups of all ages, were actively engaged with ice-cream cornets. Whether it is good for their insides I do not know, but they certainly enjoy it hugely.

And, on the quiet, so do I.

Locomotive Footplate Trips

Probably the dearest wish of many of my readers is to make a trip on the footplate of a locomotive. Unfortunately the privilege of riding the engine can only be granted in special circumstances, and most of us have to be content with reading accounts of such runs. I have published many of these accounts in the *"M.M."* from time to time, and they have always been greeted with general approval. Most of them have dealt with trips in the British Isles, but there have also been some stories of journeys in Canada and the United States. In this issue appears another account entitled *"On the Footplate in Palestine,"* which breaks new ground. The unusual conditions, or even hazards at the time of the journey, an all-day jog-trot beginning at 5.30 in the morning, much of it across the desert, make the description an outstanding one that I am sure all readers will enjoy.

I have in preparation another good footplate story that will appear in an early issue. This deals with a night run on a Norwegian locomotive, and provides a great contrast to the Palestine trip.

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The Smith Mobile Excavator Crane

Powerful Machine with Many Uses

OUR cover this month shows a remarkable mobile crane at work during the erection of one of the large cranes used in docks for loading and unloading ships. The mobile crane itself is mounted on a lorry chassis, so that it is capable of travelling at the rate of 20 m.p.h. or even more, and it is ready for work immediately it reaches the end of its journey to the place where it is to be used. The jib is built in six sections, so that lengths of 30 ft., 45 ft., 60 ft., 75 ft. or 90 ft. can be employed, to suit the immediate requirements of the task allotted, and with the 30 ft. jib a load of 12 tons can be hoisted at a radius of 10 ft.

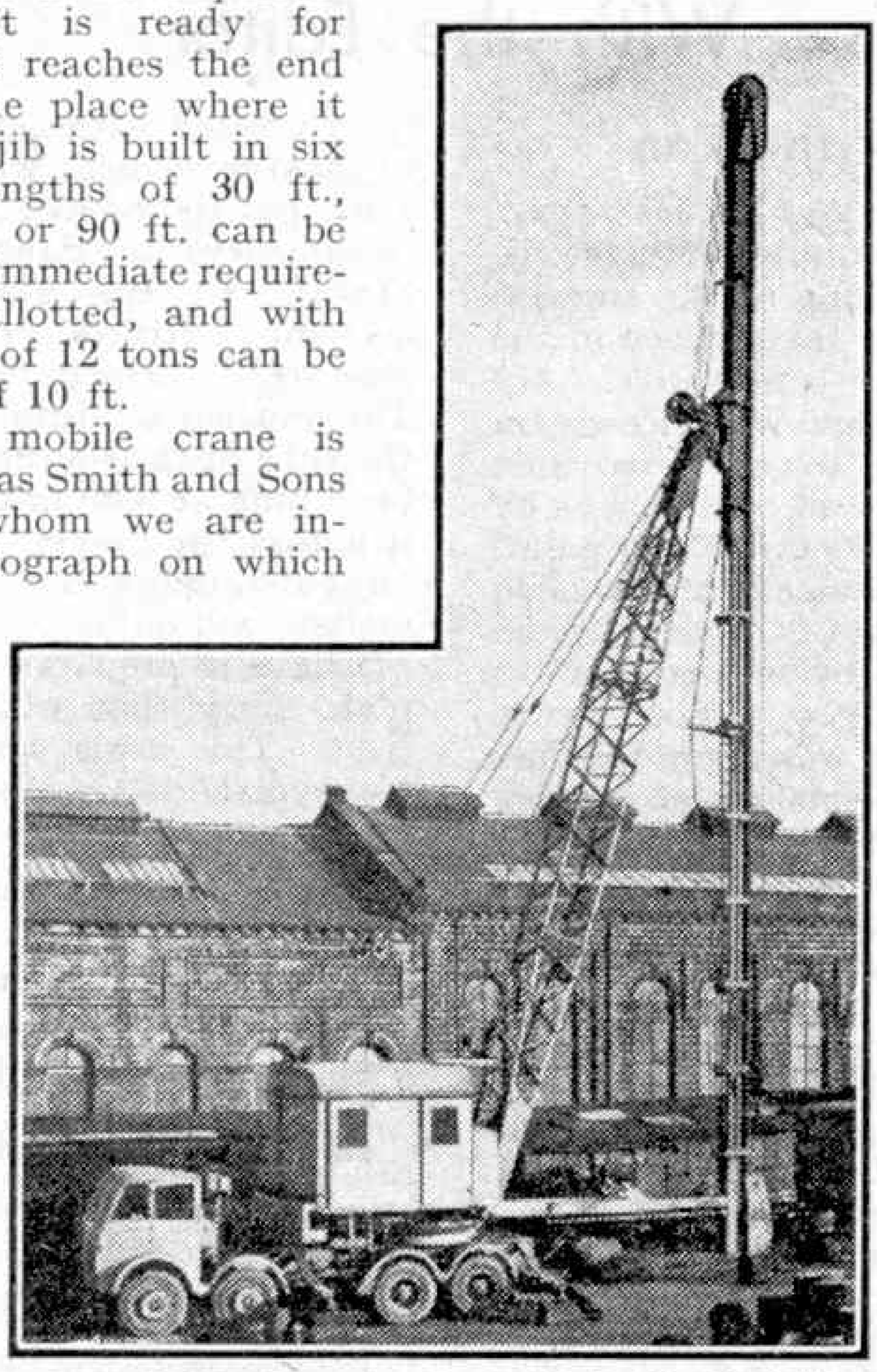
This remarkable mobile crane is constructed by Thomas Smith and Sons (Rodley) Ltd., to whom we are indebted for the photograph on which our cover is based. It is known as the Smith 12-ton Mobile Excavator Crane, as the revolving crane portion is chiefly made up from the excavator design of the firm.

The first cranes of this type used the Foden eight wheel chassis. An E.R.F. also was used, and further cranes are being built using the Leyland six-wheel chassis. All the chassis employed use standard components, with a special heavy frame built into them. The frame incorporates the turret on which the crane portion rotates, and also embodies the draw beams which are extended for lifting heavier loads.

The crane portion is a fully revolving structure that rotates on a live ring of tapered rollers and is connected to the chassis by a centre spigot and three hook rollers. It has a separate engine, a plan that gives a longer engine life and avoids the transmission complications that would be encountered if the lorry engine were required to provide power for hoisting and other crane movements.

The engine of the Foden mounted cranes is a Fowler 5B 55 b.h.p. diesel unit. That of the cranes on Leyland chassis is a Leyland six-cylinder unit. All are provided with a hydraulic coupling instead of a plate clutch for transmitting power. Interlocked hand and foot levers are provided for the engine throttle, giving well graduated control of engine speed in order to vary the rate of hoisting, slewing or derricking as required. Hoisting and lowering of loads is attained by means of a toggle clutch and the engine hydraulic coupling. Power for slewing is smoothly transmitted through flat plate friction clutches, which are also used for speedy derricking of the load.

For road travel purposes the jib is 30 ft. long, and it is slung over the cab of the lorry on which the crane is mounted, as shown in the upper illustration on the opposite page. The units that can be added to extend the jib are each 15 ft. in length, providing altogether five different lengths of jib, with loads varying from the 12 tons of the 30 ft. jib at a radius of 10 ft., to the 3½ tons of the 90 ft. jib, a load that can be lifted at a maximum radius of 25 ft. Hoist blocks with a mechanical advantage of four to one are used for



A Smith Mobile Excavator Crane fitted with pile driving equipment used in constructional work and civil engineering projects. The illustrations to this article are reproduced by courtesy of Thomas Smith and Sons (Rodley) Ltd.



The Smith M.E. Crane ready for the road, with its tubular steel jib in travelling position.

the heavier loads and those for lighter loads have an advantage of two to one. The derrick ropes lead to pulleys carried on a special frame at the extreme rear of the machine in order to keep stresses in the jib and in the ties as low as possible.

For dealing with the heaviest loads, up to 12 tons, jacking beams are provided, These are carried in boxes and are withdrawn by hand to give a base width of 13 ft. Screw jacks are fitted at their ends to clamp down on blocks. Without the use of the jacking beams, that is with the lorry resting freely on its tyres, a load of four tons at a radius of 10 ft. can be lifted on the 30 ft. jib.

The original jib was made up of high tensile steel angles, but owing to the lack of this material a tubular steel jib has been developed. This is of less weight and greater strength than the high tensile steel jib, and has proved so successful that there will be no return to the latter. The main tubes of the new type of jib have an outside diameter of $4\frac{1}{2}$ in., with bracing of $1\frac{3}{8}$ in. diameter; and its weight of $2\frac{1}{2}$ tons is half a ton less than that of the high tensile steel jib it has replaced. A feature of the new tubular jib is that the sections are joined by means of steel pins, which provide a very rapid and convenient method of assembly. Accuracy of manufacture is ensured by means of jigs.

The machine is primarily intended for crane duties, but it will take all the usual digging equipments, so that it can be used as a navvy shovel, a dragline, a skimmer scoop, a drag shovel or a grab. One particularly interesting application is in pile driving. For this purpose the special attachment shown in the illustration on the opposite page has been designed to the order of John Mowlem and Co. Ltd., one of the contracting firms making use of the Smith Mobile Excavator Crane. This equipment can handle piles up to 90 ft. in length, and provides racking in the full circle. The leader is made up in sections and is swivel mounted at the jib end. A brake band is fitted around the circular crane turret to prevent rotation of the crane. The same firm has made excellent use of another Smith Mobile Excavator Crane as a dragline, using the 75 ft. jib and a bucket with a capacity of half a cubic yard.



A Smith M.E. Crane fitted with short jib helping in the erection of prefabricated houses.

The Development of Aeronautics

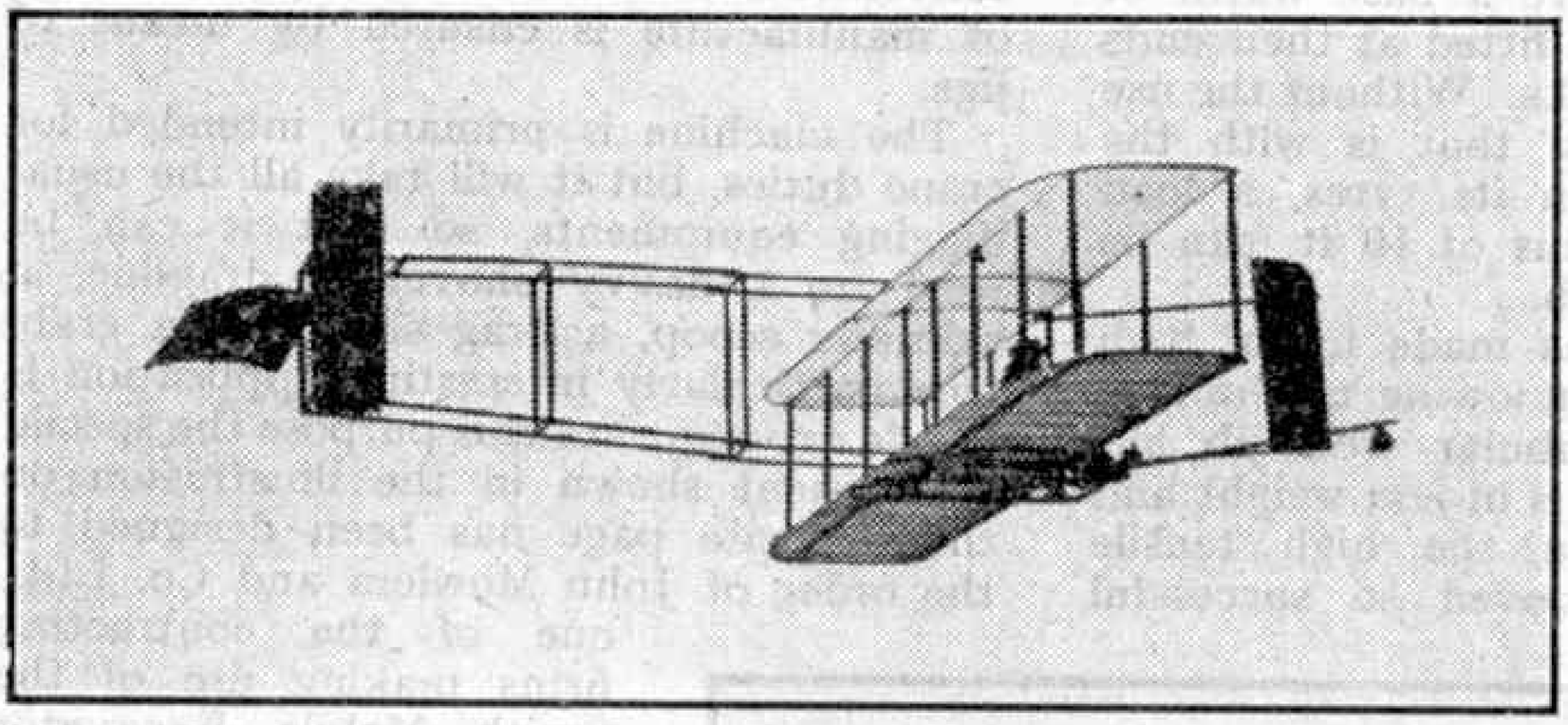
In War and Peace

By C. G. Grey

Founder of "The Aeroplane" in 1911, Editor till 1939
Editor of "All the World's Aircraft" 1915-1941

OMITTING the legends of flying in days when history was even less to be trusted than it is to-day, such as the stories of Daedalus, who flew from Crete to Sicily or Italy, and Icarus, his son, who flew so high that the sun melted the fixings of his wings, so that he fell in the sea and was drowned, and omitting also the fantasies of the Italian Leonardo da Vinci, who thought so far in front of his times that he could not make the things he invented, we may say that aeronautics began in France in 1790 A.D.

Gas-filled balloons were invented and were used as observation posts by the armies of the French Revolution. Napoleon Bonaparte, the Great Emperor, did not use them, and nobody has explained why.



An early Wright Brothers' glider flying at Kitty Hawk, U.S.A.

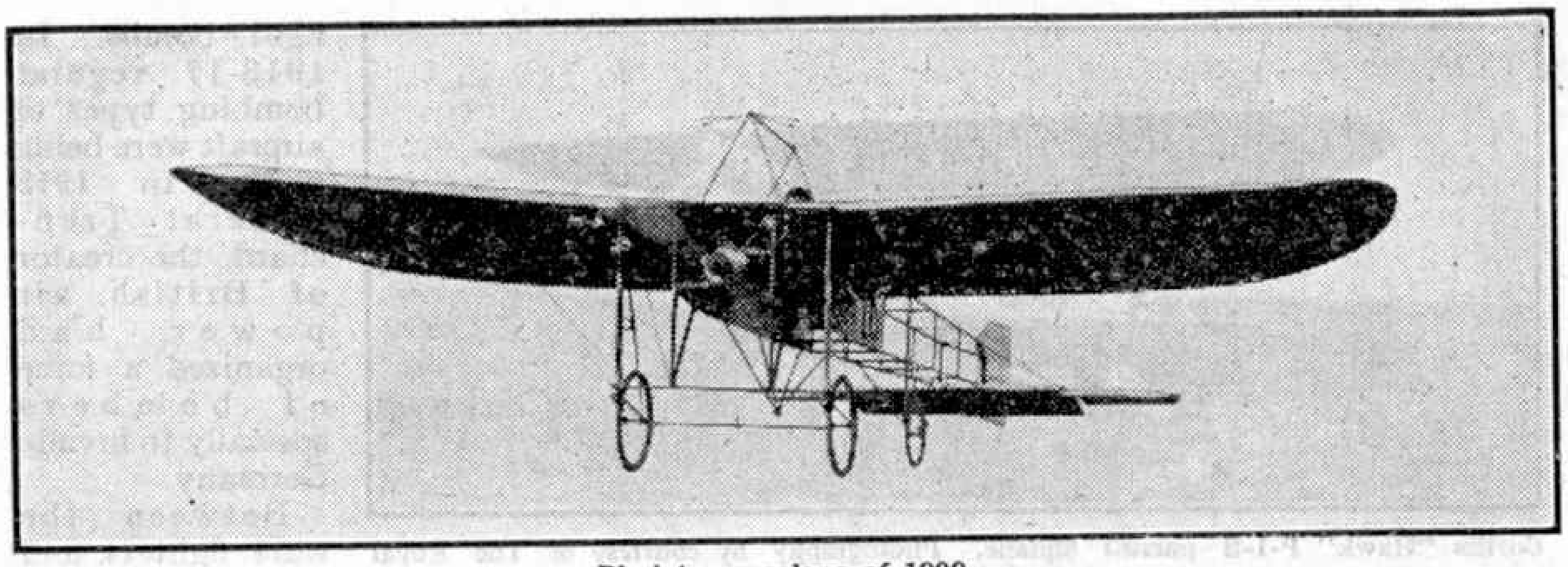
From the early balloons, 90 years later, the German Count Zeppelin, after many other inventors had failed, developed the airship, which made considerable voyages over Germany before anybody flew on an aeroplane, or heavier-than-air craft.

Note that airships, full of hydrogen or helium gas, float because they are lighter than the air they displace. Aeroplanes are lifted by the suction of the air which is deflected upward by the curve of the wings. Both airships and aeroplanes are controlled in an upward or downward direction, or sideways, by almost flat horizontal or vertical surfaces, which act on the air exactly as do the rudders of boats on water.

The first men to fly a heavier-than-air craft driven by its own engine, were the Wright Brothers of Dayton, U.S.A. But before them many men had left the ground on "gliders," that is to say aeroplanes without engines. There were Lilienthal, a German; Chanute, a French Canadian; and Pilcher, an English Naval officer, and many others. The first flight by Orville Wright was a mere hop, in 1903. The 'plane was launched from a rail by catapult and only travelled a few yards. In 1906 another hop covered some hundred yards. But by 1908 both Wilbur and Orville Wright were flying for an hour or more at a speed of 30 to 35 miles per hour. The tragedy of their story is that Wilbur died in 1912, and the type of design they produced could not be developed progressively. Therefore they made no advance after 1912, and Wright aeroplanes ceased to exist after 1914.

During 1908 and the following years Farman and Blériot in France; Glenn Curtiss in the U.S.A.; Short Brothers, Handley Page, Sopwith, Blackburn, Vickers, Avro, de Havilland, in England, made remarkable progress. Speed went up to 100 miles an hour. In fact in 1912 a French pilot in a Deperdussin monoplane flew 120 miles in one hour—the first time a human being travelled for an hour at more than two miles (3.22 kilometres) per minute.

Of all these pioneers the one who stands out as having had the greatest influence personally on aeronautical development is Glenn Curtiss. He had made a big name before 1907 in the U.S.A. by building and riding record-breaking motor bicycles. He was induced to join a private syndicate of Canadians, the head of which was Dr. Graham Bell, the inventor of the telephone. With his famous motors



Bleriot monoplane of 1909.

they built and flew successful aeroplanes in 1908, and by 1909 Curtiss had done many notable flights. In August 1909 he won the International Gordon-Bennett Cup in France. In 1912 he built and flew the first aeroplane off and on to water. It was mounted on floats (pontoons). Soon afterwards he built a small boat with wings. From that are descended directly all the great flying-boats of to-day, such as are familiar sights in Asia and Africa, Australia and New Zealand and America. And from them the English firm of Saunders-Roe have in the past year developed the biggest flying-boats in the world, with gas turbine engines.

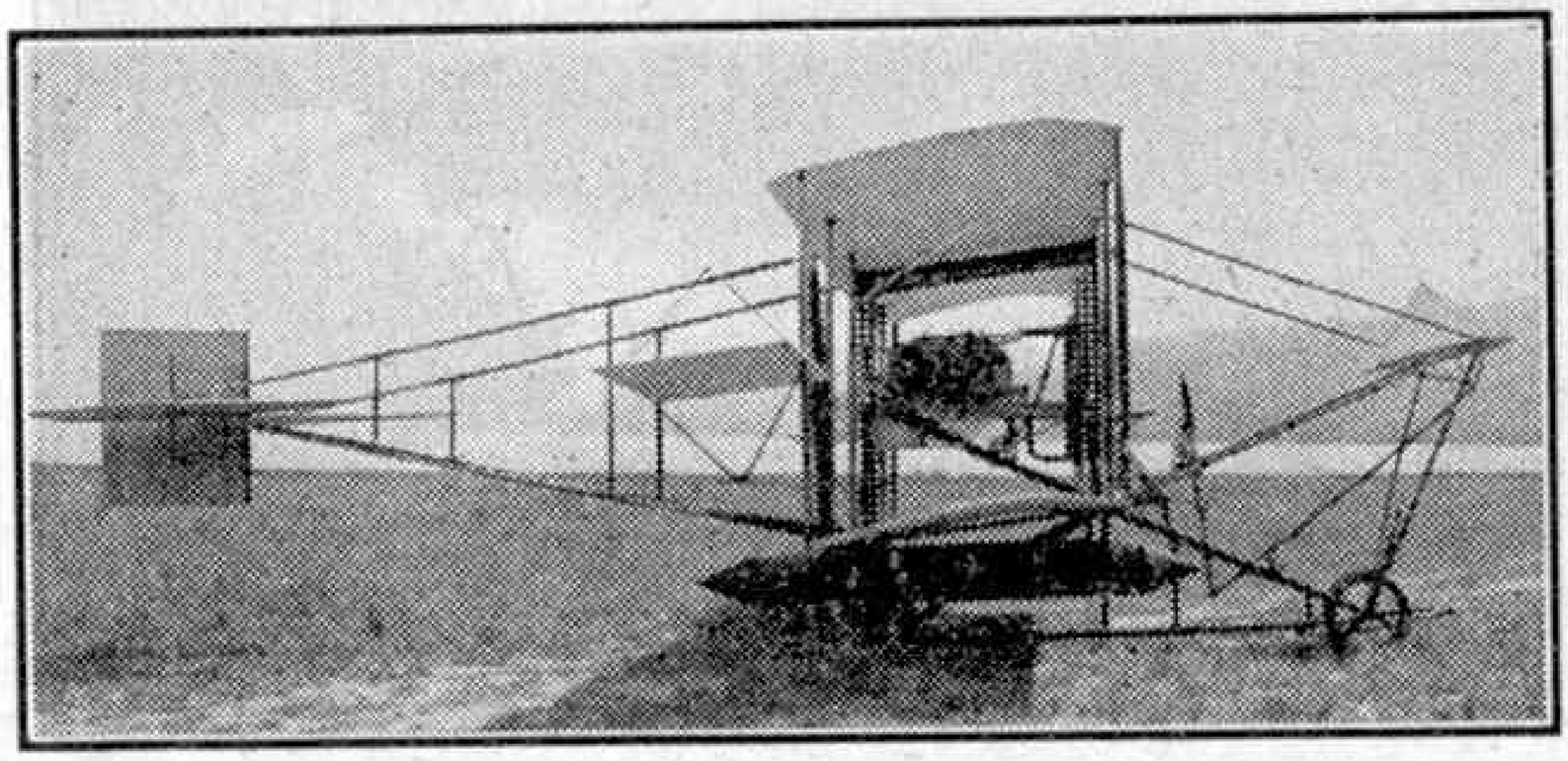
During the war 1914-18 Curtiss sold many big flying boats to the British Navy. They did splendid anti-submarine patrols, and in following years were developed greatly for the Royal Air Force. A Curtiss boat was the first aircraft to cross the Atlantic. Curtiss aeroplanes were also the first to fly off and on to warships, which started the idea of aircraft-carrying ships, such as in the U.S. Navy are replacing battleships.

Also during 1914 - 18 Curtiss built thousands of small biplanes for training, and from the little engines he made for them he developed his famous D.12 type motor, which broke many world's records and, being a 12-cylinder Vee-type engine with cylinders in one block of six on each side, it set the pattern to the world. In these days the type is only being displaced by the gas-turbine, which is used either for jet propulsion or to drive air-screws, more commonly known as propellers.

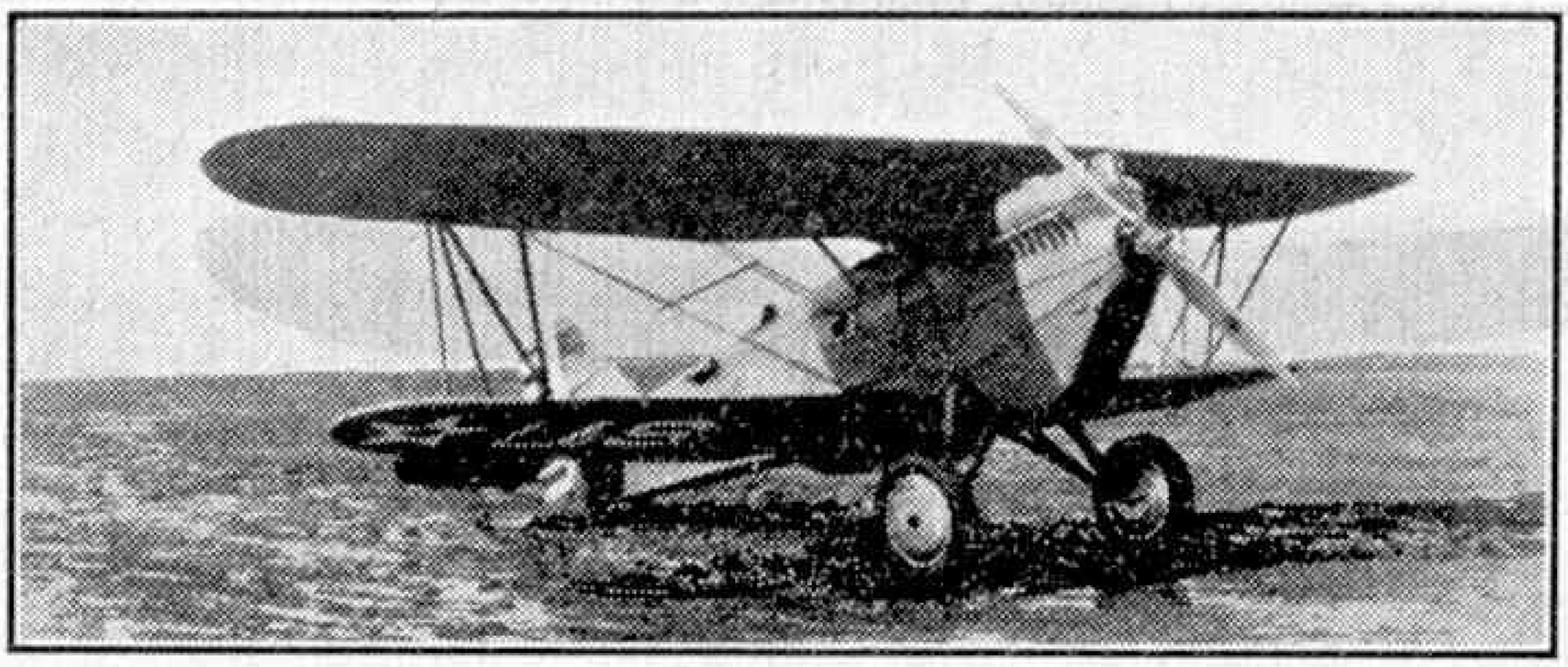
The development of Glenn Curtiss's original designs are in fact a history of the world's developments in aeronautics. But naturally other people had other ideas which developed at the same time.

In France Louis Blériot developed the monoplane and in 1911 had great successes. His aeroplanes won the great Circuit of Britain Race, and the Circuit of the European Capitals, and Paris-Rome and Paris-Madrid. He himself had already made history in 1909 by flying from Calais to Dover across the English Channel —thus showing the world that England was no longer an island.

An interesting point is that in those early days a high proportion of the pioneer pilots were officers of the armies or navies of their respective nations. Which was natural, for the officer class 40 years ago had money and time to spend, and were trained to risk their lives in war. So, as there was no war in 1908-1914, they were willing to attempt the conquest of the air. The Governments of the various countries began to understand, by 1912, that aircraft, both heavier and lighter than air, would play a big part in any future



Curtiss biplane of 1909. Photograph by courtesy of The Royal Aeronautical Society.



Curtiss "Hawk" P-1-B pursuit biplane. Photography by courtesy of The Royal Aeronautical Society.

war. So the armies and navies bought aircraft and trained officers and men to fly them—but mostly officers, because by mental and athletic training, and by higher education, they were better suited to the responsibility of observing the movements of enemy armies or ships—for in those days air-pilots were regarded as scouts (vedettes) rather than as fighting men.

The British Army formed the Royal Flying Corps in 1912. The British Navy's airmen were trained with them until August 1914, when the Royal Naval Air Service was formed just before the war against Germany. In 1918 (April 1st), by which time bombing and air fighting had been highly developed, the R.F.C. and the R.N.A.S. were formed into one Air Service and called the Royal Air Force.

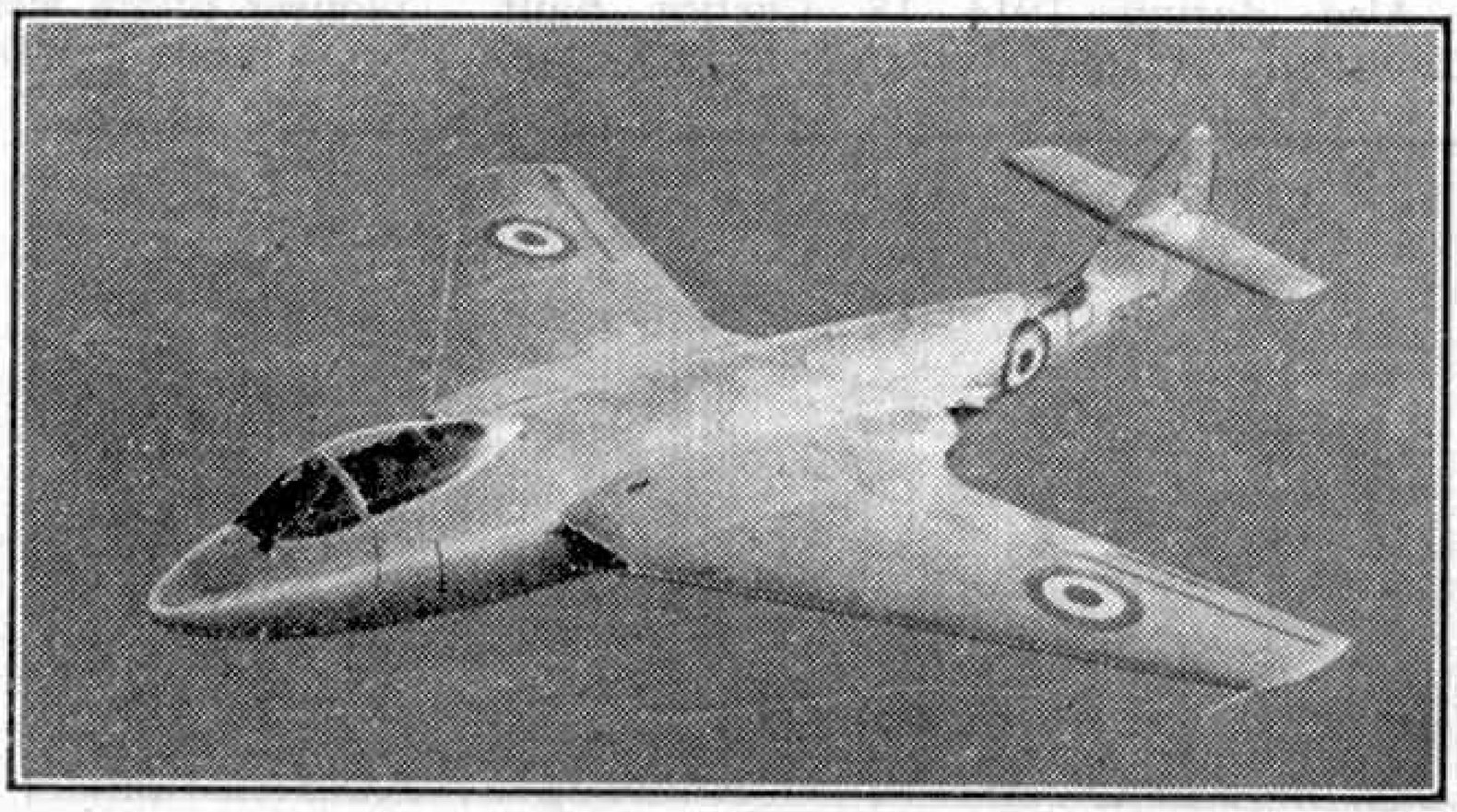
From that day to this the R.A.F. has been recognized as the spear-point of our fighting forces. In these days we do not talk of Defence Forces, for we know now that *defence* is the first stage of *defeat*. We know that only a strong striking force will prevent, or deter, aggressors from attacking us. So we call our striking or attacking Air Force, our deterrent or preventive force. If forced to war our Royal Air Force will attack, it will not defend, as in the historic Battle of Britain in 1940.

The development of aviation in war has been logical. In 1914 we regarded aircraft as scouts. In 1915 they were fighting one another and dropping light bombs. In 1916-17 regular bombing types of aircraft were being built. In 1918 General Trenchard, the creator of British air power, had organized a force of bombers specially to invade Germany.

Between the wars fighters and bombers became more distinct types. Bombers with two or three engines, such as the German Junkers, became common. In Civil Air Transport big passenger craft with two or three engines, and even four, were developed, and in the 1930–39 period we had big flying boats with four engines, cruising at nearly 200 m.p.h.

When war began in 1939 our bomber speeds (and those of the Germans) were up to 250-300 m.p.h. and fighters were near 400. By the end of the war, when our bombers and those of the U.S.A. were coming out of the factories in thousands, they wrecked the German output of war material and our fighters kept the German fighters on the ground. In the great battles in Normandy our newest fighters, firing rockets, smashed the German armour (tanks) and mobile guns, and won the war.

To-day we are developing turbo-jet fighters, bombers, and passenger craft; and perhaps more important from the passengers' view, airscrews driven by gas turbines, which seem likely to bring in a new era of air transport.



Hawker P1052, Britain's first sweptwing jet fighter. Photograph by courtesy of Hawker Aircraft Ltd.

The Story of the Life-boat

More than a Century of Life-saving at Sea

IN December 1948 the last of the sailing vessels of the Royal National Life-boat Institution's fleet left her station at Newquay, on the Welsh coast where her place was taken by a modern motor life-boat; and now there is not a station around the British Isles where power is not used for driving the vessels in which the men of the life-boat service go to the rescue of seamen and others in distress. Altogether there are 156 motor life-boats in service. These do the work that 40 years ago was carried out by 276 pulling and sailing vessels and four steam life-boats.

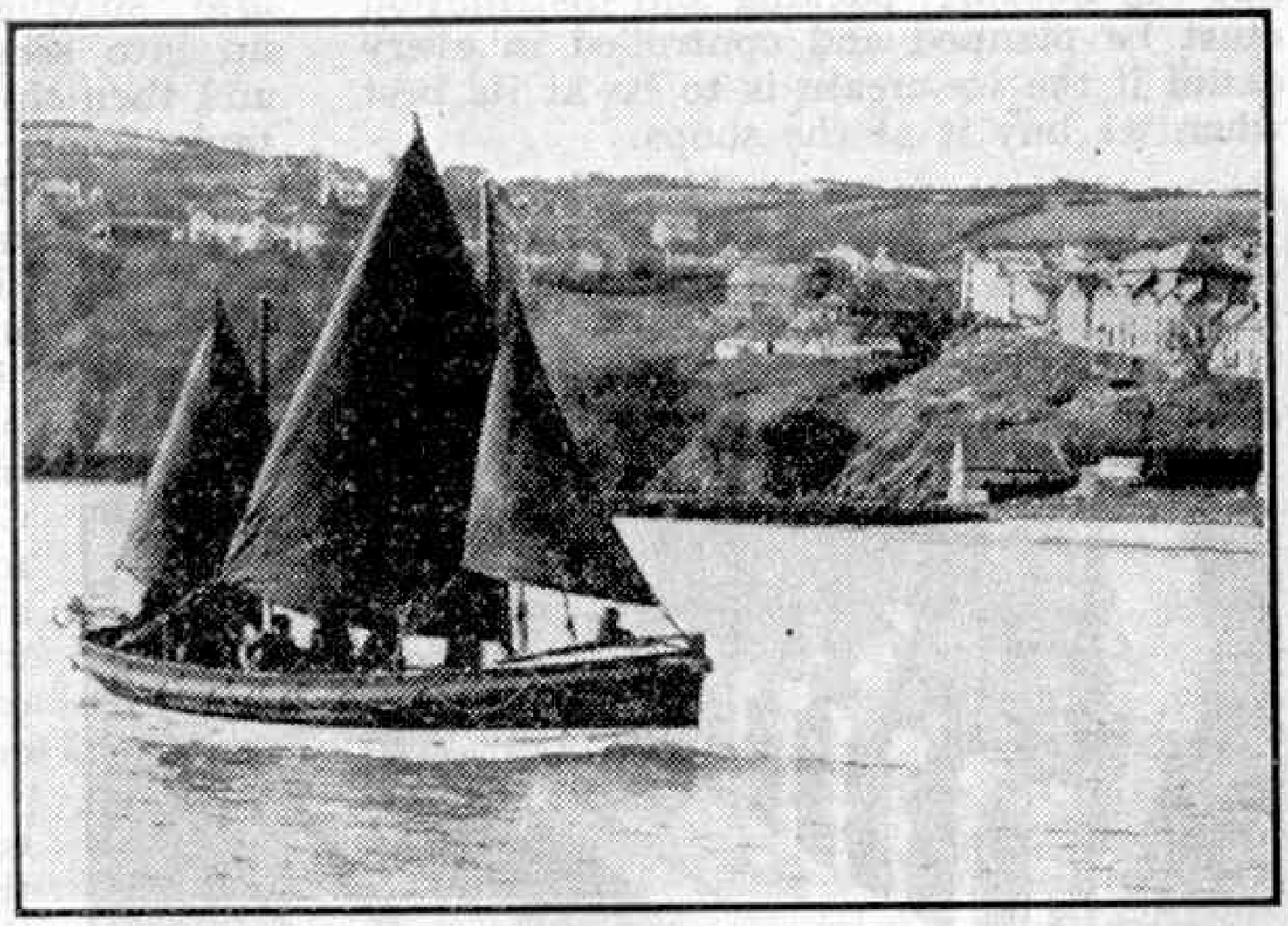
It is interesting to look back upon the history of the R.N.L.I., as outlined in a recent booklet.* The very first life-boat of all was based on a model designed by a house painter and teacher of music, William Wouldhave, and was built by a ship's carpenter, Henry Greathead. Wouldhave's model had the capacity to turn right way up again if it were capsized, and this has been a feature of many of the vessels since built. It is attained by fitting high air chambers at the bow and stern. But self-righting life-boats are narrow and have the disadvantage that they are less easy to handle in heavy weather. Above all things a life-boat must be sturdy and capable of manœuvring, so later more stable and seaworthy boats were built, trust being placed in the skill of the life-boatmen to keep them from capsizing. To-day only 21 of the 156 motor life-boats of the fleet are self-righting.

Needless to say, all life-boats are capable of taking the hardest knocks. They are built of specially chosen woods, each noteworthy for some quality that makes it specially fit for a particular part of the boat. All are capable of freeing themselves from water breaking over them, and however badly damaged they will not sink, as all empty spaces are filled with air cases, which are boxes of red cedar, covered with glue, stretched calico and paint. A life-boat has from 100 to 160 of these air cases, which would keep her afloat if 20 holes were knocked in her and she were full of water.

The first experiments with motor life-boats were made in 1904, and many problems had to be solved before real success was achieved. The engine itself had to be watertight, reliable and automatic, with simple controls that could be distinguished by touch in the blackest night. It had to work and keep itself oiled in all positions, even with the boat literally standing on end. Yet it had to stop automatically if the life-boat capsized, for otherwise it would carry away the boat without the crew when the vessel came up again. All these difficult conditions were triumphantly satisfied, and to-day the Institution possesses a fleet of superb vessels, worthy of the brave men who sail in them.

Still the search for improvement continues, and with the completion of the mechanisation of the fleet a new type of life-boat has been introduced that has many remarkable features. This latest type is 46 ft. 9 in. long, and is fitted with two 40 h.p. diesel engines To save weight the superstructure, mast and ventilators are made of aluminium alloy instead of wood, and this material is used also for a shelter for the mechanics and a deck cabin, a new feature.

While the work of providing better life-boats continues the dangers of the sea remain. It is easy to forget these until we are tragically reminded of them by a disaster such as that of April 1947, when the life-boat stationed at The Mumbles, near Swansea, capsized in a hurricane with the loss of her crew of eight, while 41 men of the vessel to the rescue of which she had gone also lost their lives. The spirit of the life-boat service also remains, however, whatever the dangers. More men of the village of The Mumbles at once came forward to take the place of those who had gone, and a new boat was in readiness for any call only eight weeks later.



"The William Cantrell Ashley," the last of the sailing life-boats to remain in service, sails away from Newquay, Cardiganshire, where she has been replaced by a new motor vessel.

The previous occasion on which a life-boat had been lost with all her crew was 20 years earlier, at Rye Harbour. In the intervening period life-boats went out on service over 9,000 times and saved nearly 12,000 lives, and more than 90,000 life-boatmen took part in these life-saving efforts. This is a wonderful record, for every life-boatman is a volunteer. Only the motor mechanic at each station is a paid servant of the Institution, the rest of the crews earning their living by fishing and in other ways. They know the seas around their stations, and respond nobly and instantly to every call for aid.

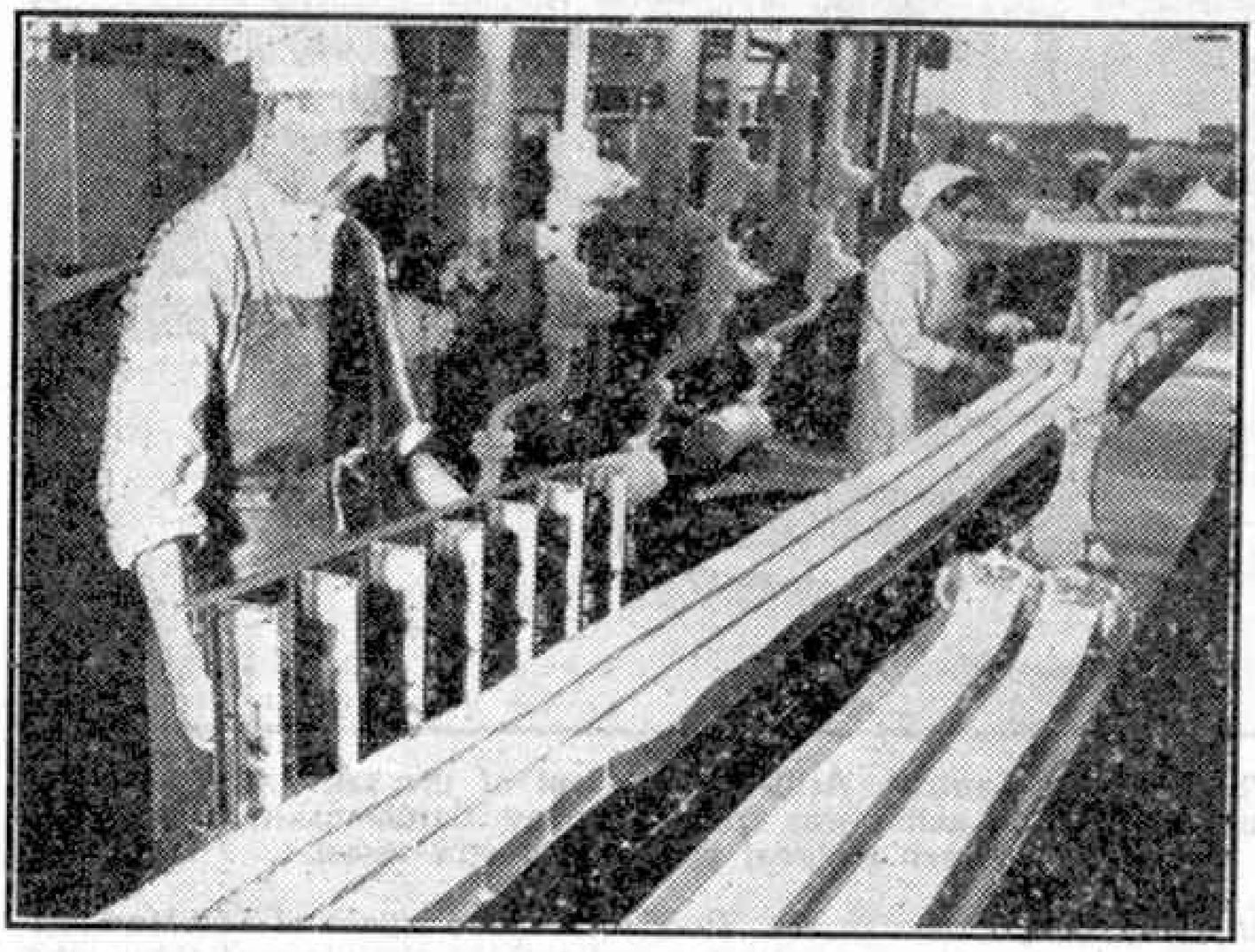
It is remarkable that such a wonderful service is provided and maintained entirely by voluntary subscriptions. On rewards, pensions and other payments to its coxswains, crews and launchers the Institution now spends over £106,000, and the whole annual cost is over £650,000. Those who contribute to this huge sum will find justification in the knowledge that the great array of men, women and children saved in the 125 years of the Institution's work would form a massive column, marching three abreast, that would fill over 28 miles of road and would take 8 hrs. to pass any given point.

*"*The Story of the Life-boat, 1824-1949." Royal National Life-boat Institution, Life-boat House, 42, Grosvenor Gardens, London S.W.1. Price 1/-.*

Ice-cream by the Ton!

By T. R. Robinson

ICE-CREAM is a frozen confection, once a luxury, that nearly everyone likes, and in recent years it has become so popular that its manufacture has grown into a large industry. Some factories, such as that of T. Wall and Sons Ltd. at Acton, the activities of which are dealt with in this article, measure their daily output in tons, and to make ice-cream in such large quantities is a most exacting business. Not only must the quality of all the materials be of the very highest, but the freezing, packing and distribution must be planned and controlled in every detail if the ice-cream is to be at its best when we buy it at the shops.



Ribbons of ice-cream leaving the extruders are cut into the required length as they travel forward on the conveyors. The illustrations to this article are reproduced by courtesy of T. Wall and Sons Ltd., Acton.

The main ingredients are fats, sugar, milk powder and flour, and all these have to be blended into a smooth even reconstituted cream, which can be frozen to the exact degree necessary. Unless every process is correctly carried out, it is impossible to produce a perfect ice-cream.

The first stage of manufacture begins at the unloading bank, where the supplies are unloaded from the delivery lorries. Here, too, is the sugar-syrup pipe-line, through which the sugar, which arrives in liquid form, is pumped to the factory storage tanks from road tank wagons. Samples taken as each delivery arrives are checked for quality and purity in the factory laboratory, and no ingredient is released for use until tests have shown it to be of the required standard. If all is as it should be, the ingredients are transported to the mixing room, which is at the top of the building so that the cream mixture may flow from one process to another with as little pumping as possible.

In the mixing room are two groups of machines, one type dealing with the fats, and the other with the rest of the ingredients. Large blocks of fat are fed into "shiving" machines, which slice them up into sections that will melt rapidly, and then tip these into heated, glass-lined tanks each having a capacity of about 250 gallons. Paddles or beaters in these tanks continually stir the contents, to ensure perfect mixing. Meanwhile somewhat similar mixing operations are proceeding with the rest of the ingredients in other machines. Carefully weighed and measured quantities of each are fed through chutes into mixing tanks, and here again continuous stirring by paddles ensures perfect blending.

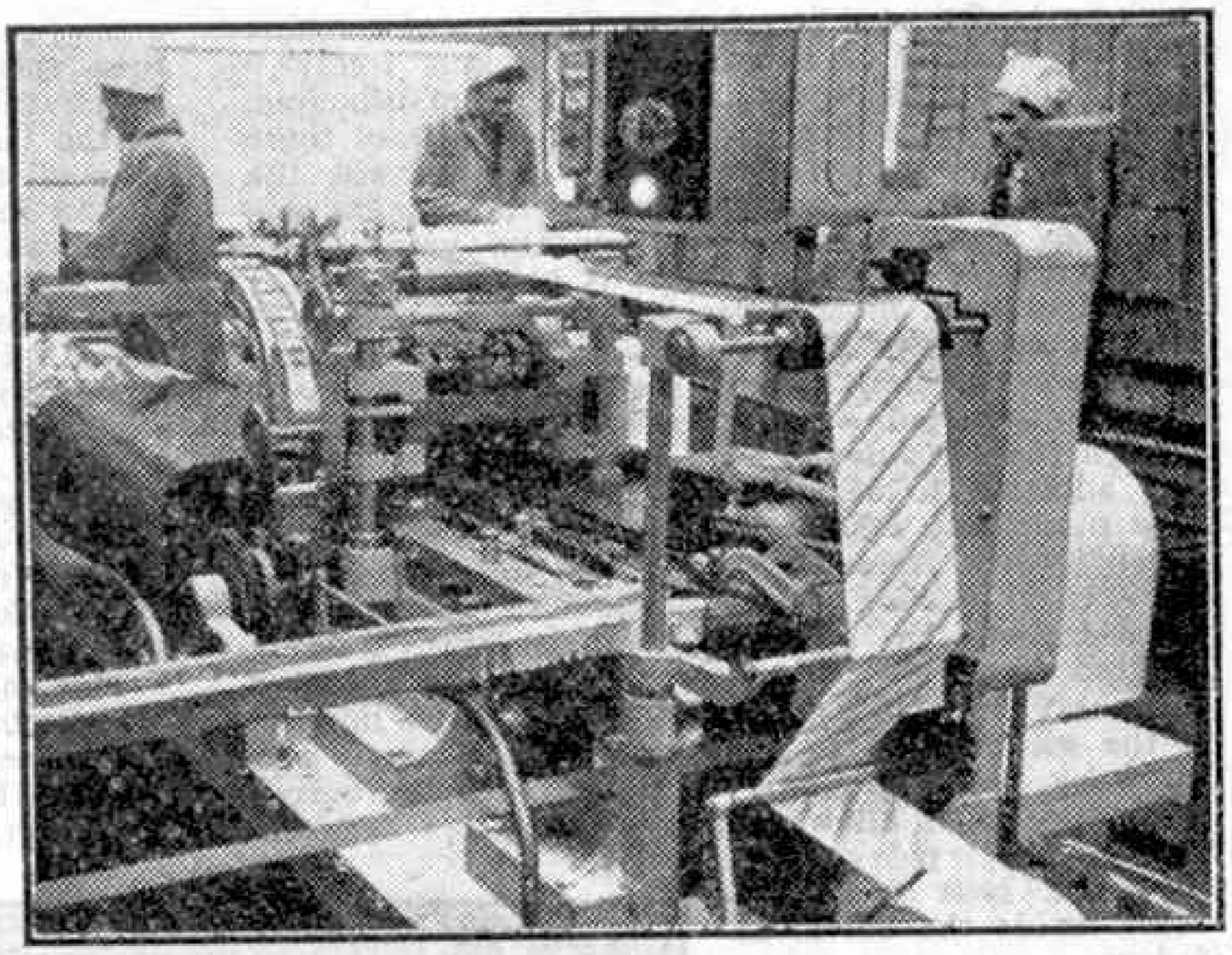
When the preliminary mixing is complete, the contents of the tanks are pumped into the pasteurizing room. Here the flour mixture first gets a special additional heat treatment, or "cook," which converts as much as possible of the starch in the flour into sugar. Once this is done, the melted fats are added, and the whole of the ingredients are blended in one or other of a group of stainless-steel pasteurizers. Pasteurization is the process by which any harmful bacteria that may be present in the raw materials are destroyed, and it is carried out by heating the mixture to 150 deg. F. and holding it at that temperature for 30 min. Time and temperature are automatically checked and recorded by instruments fitted to each pasteurizer. In order to avoid local scorching of the mixture the heat is applied by hot water sprays, enclosed in special jackets, a system that gives very even and controlled heating. Slow stirring by paddles during the process assists in even heat

distribution and keeps the mixture smooth. In the ice-cream industry the mixture at this stage of the process is called the "mix."

When pasteurizing has been completed the mix is pumped, as a safeguard, through a set of filters, which remove any undissolved particles that may be present, and then passes on to the "viscolizers" or "homogenizers."

It is at this point in manufacture that one of the most important processes of all takes place, for the "emulsifying," or complete blending of the fats with the rest of the ingredients is carried out in this group of machines. Up to this point the fat, though mixed with the sugar, milk and flour before pasteurization, has not been intimately blended into the mix. The completion of the mixing is done by the viscolizers, and the method used is to force the mix through tiny apertures at a pressure of 2,000 lb. per sq. in. The effect is to break up the fat into minute globules and to distribute these evenly throughout the cream. After this treatment the fat has no tendency to separate out from the other ingredients, and so spoil the mixture.

The preparation of the cream "mix" is now complete, and the next stage is that of cooling, in preparation for the actual freezing process. When it leaves the viscolizers the mix is still at pasteurizing temperature, and to reduce its temperature to a point slightly above actual freezing it is passed over a Mojonnier cooler. In construction this rather resembles a giant copy of the milk coolers that are often seen on farms. It is constructed of stainless steel, and is arranged so that the cream flows from top to bottom over corrugated surfaces. The top half of the cooler is water-cooled, and the lower part uses ammonia as a coolant. By this means, the cream is cooled in two stages as it flows over the corrugations or "leaves," and is reduced from 150 deg. F. to 35 deg. F. in a few seconds.

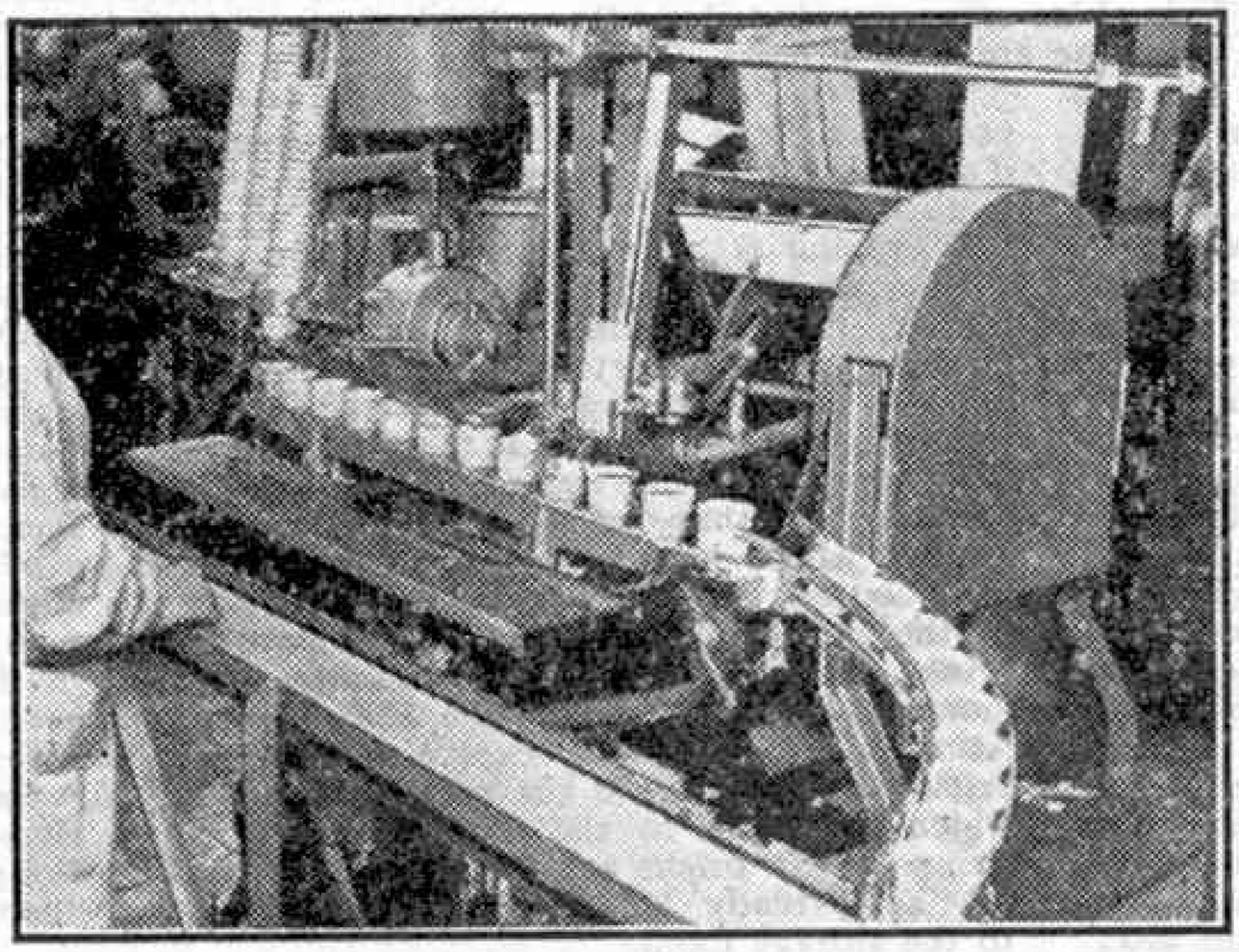


This machine is capable of wrapping 180 ice-cream brickettes a minute.

Having traversed the cooler, the cream flows by gravity to one or other of five large holding, or "ageing" vats on the floor below. Each of these vats has a capacity of 4,000 gallons, is glass-lined and is fitted with instruments for recording time and temperature. The mix is allowed to remain in these vats for a few hours in order to mature, and is kept at a temperature of 40 deg. F. This treatment brings it to just the right state for the freezing process.

In addition to the five main vats, there are three smaller vats, each of a capacity of 900 gallons, which are similarly used for ageing the flavoured mixtures used for special kinds of ice cream. These smaller vats are in a special bay at the end of the ageing room, and are fed by their own system of pipe-lines. In all other respects they are similar to the larger vats.,

When the mix has matured sufficiently it is drawn off and passed by pipe-lines to the freezers,



Filling tubs with ice-cream.

which are on the next floor below. The type of machine used for freezing is called a "continuous freezer," and all the machines operate on the same principle. Mix arrives at a hopper tank or vat, and from there passes to the first of two pumps. This feeds the cream to the second stage pump, on the suction side of which is an adjustable air intake valve. The construction of the two pumps is so arranged that the second runs much faster than the first, and so this second pump is able to take up not only the cream-mix supplied by the first pump, but also a carefully adjusted amount of air, which it draws through the air valve.

In addition to aerating the mixture, the second-stage pump also forces it forward into the "mutator barrel" of the freezer, and it is in this barrel that the actual freezing takes place. As the mixture passes through the barrel it is whipped into a finely textured cream by two scrapers, which are mounted on a shaft and make about 600 revolutions a minute. As the whipping takes place the aerated mix is also frozen by liquid ammonia that surrounds the barrel. This ammonia is allowed to boil away at a carefully controlled pressure, extracting heat from the cream inside the barrel as it does.

This action causes the cream to assume a stiff plastic consistency, and so prepares it for the subsequent packing and shaping processes. The air which has been incorporated by the pump gives to the resulting ice-cream a fine velvety texture, and the increase in volume of the cream due to the aeration is known as "over-run." The amount of this over-run is important in its effect on the finished product, and so it is constantly checked by special meters or scales.

When the cream leaves the freezer it is dealt with in one or other of several different ways, depending on the kind of packing used for the particular batch. Large cans of ice-cream are filled direct from pipe-lines fed from the freezers, the can being held in line with a suitably shaped delivery nozzle on the end of the pipe. Cartons are dealt with in much the same way, the nozzle in this case being rectangular, in order to eject, or "extrude" the cream in a proper shape for direct insertion into the carton itself.

Tubs are dealt with on a most ingenious machine of the conveyor type. The tubs are drawn from a magazine and placed on a horizontal conveyor that transports them to the filling point. There the pipe-line from the freezer terminates beside an oscillating filling-head, which resembles a drum and is pivoted so that it can turn alternately right and left through a semicircle. In the drum are two pockets, each of which when full contains exactly the right quantity of ice-cream to fill a tub. Cream from the pipe-line is forced into the pocket that is in line with the filling nozzle, and then, as a tub arrives below the drum, the latter makes a half turn and the cream in the pocket is ejected into the tub. As this takes place, the other pocket is being filled ready for the next tub, and when this arrives the drum moves back to its original position, and the whole cycle is repeated.

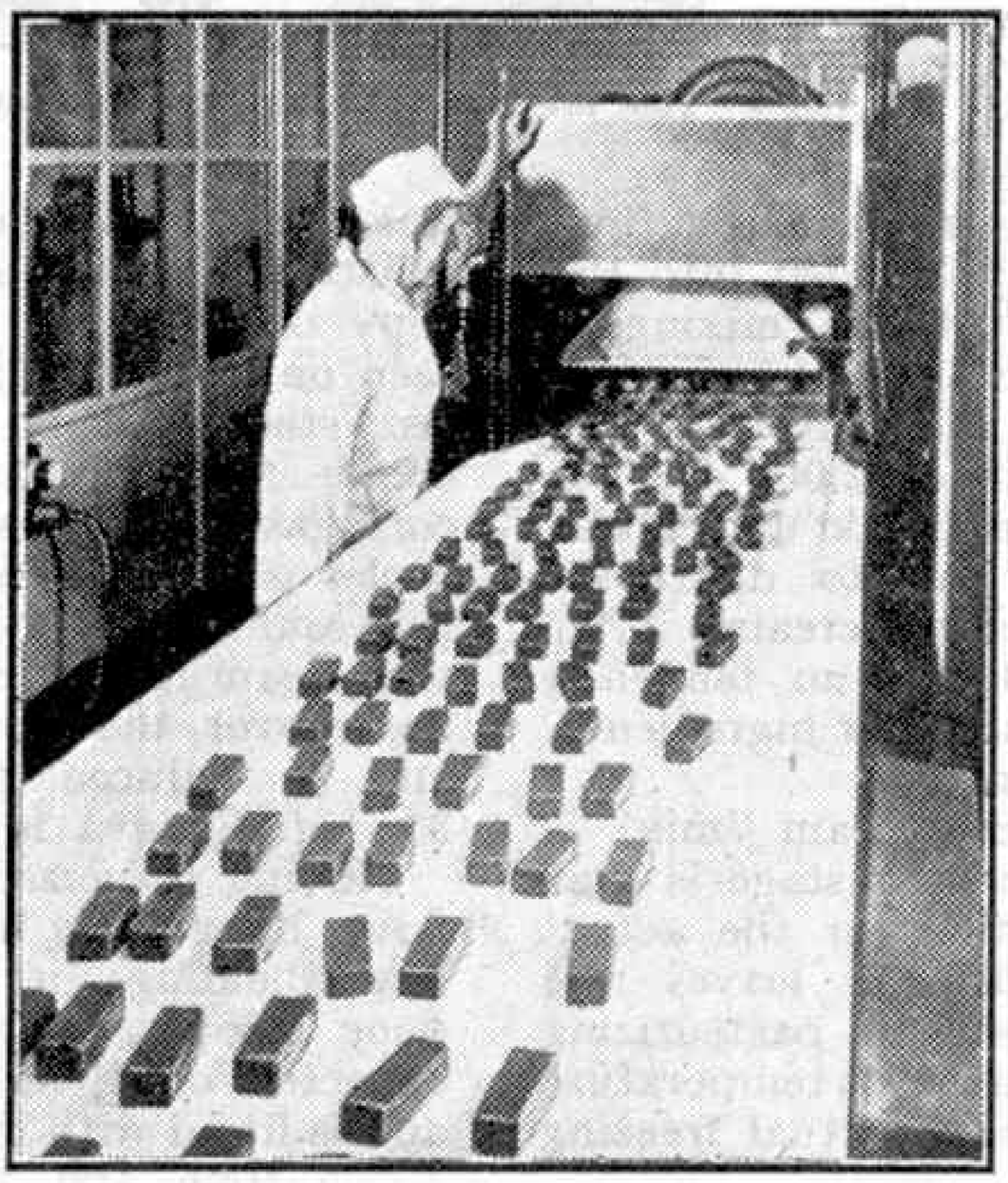
The filled tubs move along the conveyor and next arrive under a further magazine, from which a lid is fed and placed in position by an automatic arrangement of steel fingers. The filled and sealed tubs then move onward to yet another conveyor, which takes them away for packing and transport to the hardening tunnel.

In all these forms of packing, the ice-cream is still in the form of a plastic cream when it is inserted in its can, carton or tub, and to make it finally ready for despatch it requires another freezing process. This takes place in the hardening tunnel just mentioned. In the tunnel the various kinds of packings move slowly along, and as they do so they are subject to a blast of cold air at a temperature of 20 deg. F. below zero. The effect of this blast, during the 50 min. that the packages take to traverse the tunnel, is to harden the cream completely. The rapidity of the hardening is a most important point, for it allows only very fine ice crystals to form and so retains the correct texture.

The method of production used for bricks and "brickettes" is not quite the same as for other packs. For these the ice cream is extruded in the shape of a long thick ribbon. As this ribbon emerges from the extruder nozzle it falls on a conveyor, and if it is to be used for bricks it is then cut into the required lengths by a multiple knife, which shapes 18 bricks at a stroke. These cut sections then pass along conveyors to the hardening tunnel.

Brickettes and choc-bars are not cut into their final lengths at this stage, and the ribbons for them are sent to the hardening process in long sections. When these have passed through the tunnel, they are conveyed to the various machines which will cut, coat and wrap them.

Brickettes only need cutting and wrapping, and ribbons for these are first fed to a guillotine cutter, which divides them into sections of the correct size. They are then automatically transferred to a further conveyor, moving at right angles to the first. At this point any sections which are too large or small are rejected, and only the correct sized brickettes reach the wrapping mechanism. This operation is most important, for the machine could not operate correctly if wrongly sized brickettes were to reach the wrapping section.



Chocolate coated bars of ice-cream moving along the conveyor after the enrobing process.

Wrapping is a most interesting process. A wheel with a number of pockets spaced round its circumference moves round, step-by-step, and, as each pocket reaches a certain point, a piece of wrapping paper is cut from a roll and inserted in it. The wheel then moves forward, and at the next point a brickette is inserted into the paper, which is suitably held ready by the shape of the pocket. Further movement of the wheel brings each brickette and its paper into contact with fingers that fold over the edges of the paper, and then another forward movement brings the partly wrapped brickette into line with more fingers that fold in the ends of the wrapping. At the next step the pocket opens slightly, and the brickette drops out of the pocket on to the conveyor which moves it to the final packing point. Here, groups of six bricks are wrapped in an outer packing of paper, ready for the conveyor that takes them to the storage room.

The automatic devices on this machine are most ingenious. If a pocket on (*Continued on page 389*)

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, and certain others that will be indicated, these should be ordered through a bookseller.

"ELECTRICAL TIMEKEEPING"

By F. Hope-Jones, M.I.E.E., F.R.A.S.

(N.A.G. Press Ltd. 21/-)

Electric clocks are so familiar to us that we hardly ever think of the vast amount of work that has been devoted to bringing them to their present high efficiency. The story of their development, and of the way their correct construction was evolved, is quite fascinating, and no one is better qualified than Mr. Hope-Jones, who has himself made some of the most notable improvements in electrical horology. The account he gives is an excellent one, which starts right at the beginning, and then goes stage by stage through the growth of the electric clock until it arrives at the wonderful perfection of the Shortt-Synchronome "Free-Pendulum," which remains the most accurate pendulum clock in the world.

The book is a second edition, thoroughly revised and brought up to date, and every chapter has been checked and the wording improved where possible. Each new development that has come along since the first edition was published has been added to the story, and as a result the book is remarkably complete. The inclusion of an account of the Horstmann-Clifford magnetic escapement is an example of this, the principles being well described and illustrated. An entirely new chapter has been added to deal with the quartz crystal clock, and though the principles involved in its operation are somewhat complex, the description is very good indeed, and clearly understandable.

Almost every line drawing has been re-drawn, and the new illustrations are a great improvement, being clearer and more uniform in style. One or two have been added, and are very helpful indeed. It is a pity that the drawing of Grimthorpe's gravity escapement was not redrawn, for it is not quite correct in detail, and could be improved considerably.

Several new plates, mostly portraits of inventors, have been added, and there is a very good illustration of the mechanism of a "Free-Pendulum" master clock, which gives an excellent idea of its construction.

Altogether, the book is one of the best of its kind. It should prove most useful to those who are interested in clocks of all kinds, and the excellent style of the author should help considerably in a clear understanding of the way in which electricity has given us such an accurate means of measuring time.

T. R. Robinson.

"THE OBSERVER'S BOOK OF HORSES AND PONIES"

By R. S. Summerhays (Warne. 4/6)

Even in this mechanical age most of us are interested in horses and ponies, and will welcome this very interesting and handy little volume. It is claimed that never before has the subject been compressed into a book that can be carried in a pocket, and the reader who is not an expert will be astonished not only by the amount of information given, but also by the number of breeds of horses described in it. There are 90 of these, each with its own special features, and it is very interesting to realize how they have been developed with particular purposes in mind, or to suit conditions in widely differing parts of the world.

The descriptive matter is excellent, and each breed is illustrated by means of a good half-tone photograph. The book is one that should be in the hands of all who have any interest in horses, and reading it will help to increase their admiration for man's most useful friend in the animal world.

"THE 'KINGS' AND 'CASTLES' OF THE G.W.R."

By O. S. Nock, B.Sc. (Ian Allan Ltd. 3/6)

This recent Ian Allan publication forms No. 5 of the "Famous Locomotive Types" series, several numbers of which have already been referred to in the "*M.M.*" Mr. Nock has frequently contributed to our pages in the past. He is a real locomotive enthusiast, with a specially intimate acquaintance with the engines here dealt with, and he tells his story with his usual efficiency.

To appreciate any locomotive class, it is necessary to know something of its background and pedigree. So we begin with the predecessors of the "Castles," going back to the early years of this century. The development of the "Castles" themselves and of the bigger "Kings" is then explained, and notable performances by both classes under test and in every-day service are given. The remarkable runs recorded with the "Cheltenham Flyer," an exclusive "Castle" duty for many years, are fully dealt with.

The multiplication of the "Castles" to form practically the standard Great Western express engine from 1923 to the present time brings the reader to the final chapter in which notes are given on individual "Castles" and "Kings." Tables giving dimensions, names and numbers, diagrams of footplate arrangements and general arrangement drawings of both classes complete the technical details.

As usual with Ian Allan books there is a wealth of interesting half-tone illustrations. The book can be obtained from booksellers, or direct from Ian Allan Ltd., 33, Knollys Road, Streatham, London S.W.16, price 3/9 post free.

"A.B.C. OF LONDON'S TRANSPORT"

No. 1, Buses and Coaches (3rd Edition) 2/-

No. 2, Trams and Trolley Buses (2nd Edition) 2/-

(Ian Allan Ltd.)

The popularity of previous editions of these handy booklets, and the increasing interest in the various vehicles operated by London Transport, have made these further editions necessary. Each follows the usual "A.B.C." system and includes well-reproduced illustrations of typical vehicles of London's road transport system.

Copies cost 2/- each from bookstalls and Ian Allan agents, or 2/2 including postage direct from the publishers at 33, Knollys Road, Streatham, London S.W.16.

"MODEL CAR MANUAL"

By G. H. Deason (Drysdale Press. 7/6)

This book is an excellent introduction to the growing modern hobby of building and racing miniature cars. The author, who is the Editor of "*Model Cars*," gives step-by-step instructions for the building of a nice variety of cars, so that the Manual is a thoroughly practical guide to the solution of the problems of power units, chassis design, steering gear and transmission that arise in the construction of miniature cars that really work.

Some of the designs are free-lance in character and others follow definite prototypes. There are simple models for beginners with rubber as the motive power, and internal combustion, rocket, jet and electric power units all have their places in the book. Attention also is given to the building up of cars from commercial kits. Remote control as applied to miniature motor cars is given special consideration and track matters are dealt with in some detail. Excellent illustrations complete a useful book.

Railway Notes

By R. A. H. Weight

Good Timekeeping of Passenger Trains

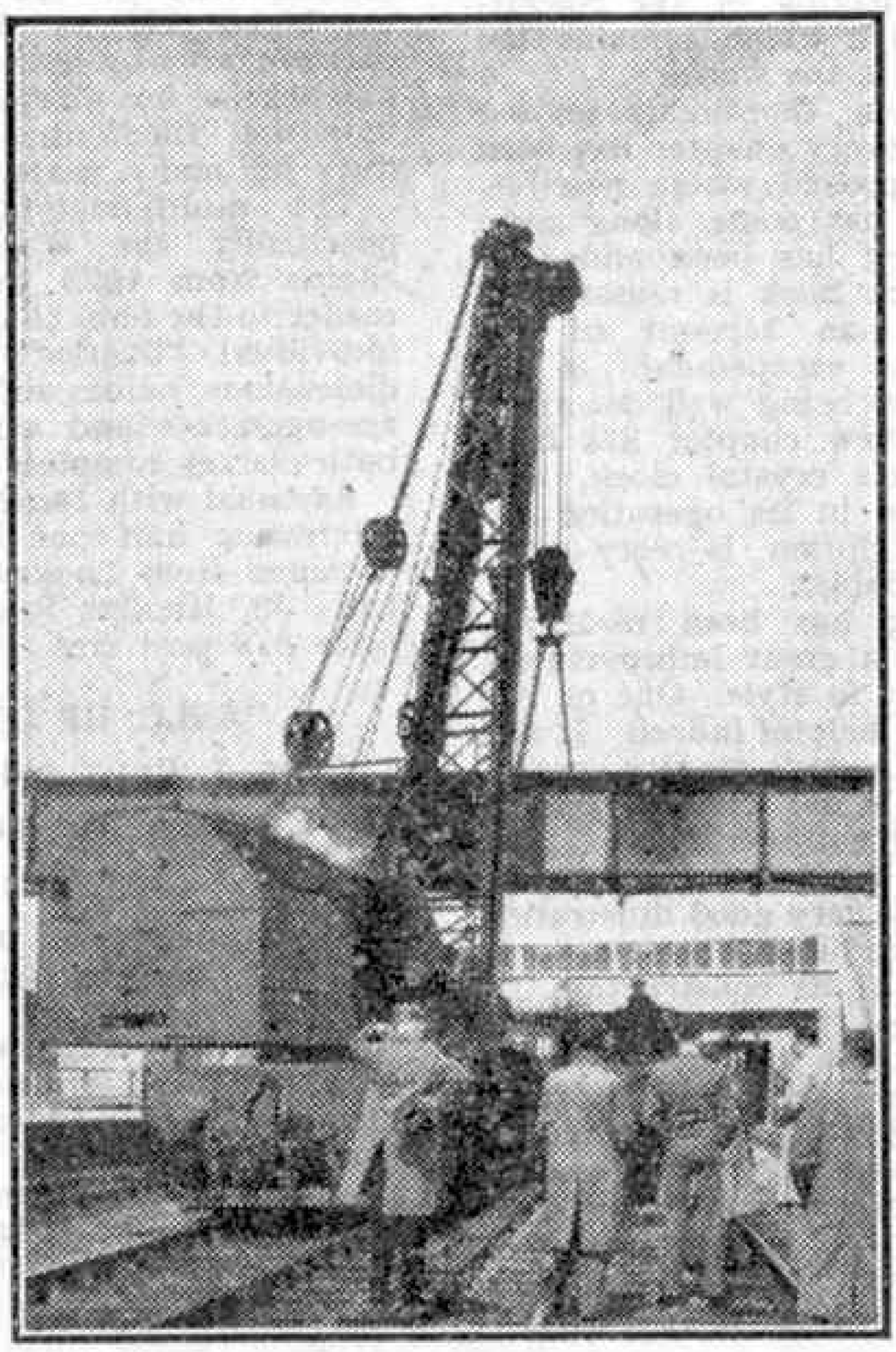
British Railways' trains are more punctual now then at any time since before the war, the Railway Executive recently announced.

A careful check was made during a four-weekly period in early summer when, of the 608,146 passenger trains run, 94 per cent. arrived punctually or within 5 min. of their booked arrival time. Express services were 61 per cent. punctual while 81 per cent. were no more than 5 min. late. The figures for all other trains were 79 per cent. on time throughout the four weeks, which is very creditable in view of the many possible causes of delay which may crop up in the course of long or short journeys.

In this connection it is interesting to learn from the "*Southern Region Magazine*" that during the same period both steam and electric trains averaged only just over half-a-minute late at destination. On one day the average late arrival of all trains in the Region was only 0.36 min., a post-war record. Freight working has also greatly improved in punctuality compared with the busy and difficult times just after the conclusion of hostilities.

Analysing the work of the different steam train crews, a S.R. Motive Power Department announcement indicates that of the principal passenger engine sheds, St. Leonards (Hastings) secured top place with a mean loss of only 2.01 min. lost per 1,000 miles run. Next came Exmouth Junction (Exeter), Eastleigh, Nine Elms (London, Western Sec.), Bournemouth, Salisbury, with average losses of no more than 2.19 to 4.30 min. per 1,000 miles, the other chief Eastern Sec. depots being on that occasion lower down the list.

Now that the height of the holiday season has passed, we may hope that similarly good service may again be to the fore.



A footbridge being lifted by a 36-ton crane during rebuilding operations at West Ruislip Station. Photograph by C. R. L. Coles.

Transformation at Liverpool, Lime Street

The important L.M.R. terminus known as Lime Street in Liverpool, which was for many years before grouping a grey and solid looking local headquarters of the former London and North Western Railway, afterwards becoming the main Liverpool station of the Western Division, L.M.S., had in recent years become greatly in need of modernization and improvement in order that present-day long trains, engine movements, also heavy traffic working generally, could be dealt with more efficiently. The greater part of the station as well as the approach lines, largely through tunnel or cutting from Edge Hill, 1½ miles away, was originally excavated out of solid rock. Much more hard material of this kind has had to be cut away in order to provide space for the new 70 ft. turntable and new signalling installations now in use as part of the modernization and extension just completed.

The old signal box was awkwardly situated between running lines. Its successor in a new location is a fine brick and concrete, three-storied edifice with the latest electric operation in connection with a new installation of colour-light signalling, track circuits, route and "right-away" indicators to help drivers. Lengthening of platforms and improvements in track layout have also formed part of a bold plan, difficult to carry through on account of the confined location. But for the war this scheme would probably have been completed some eight years ago.

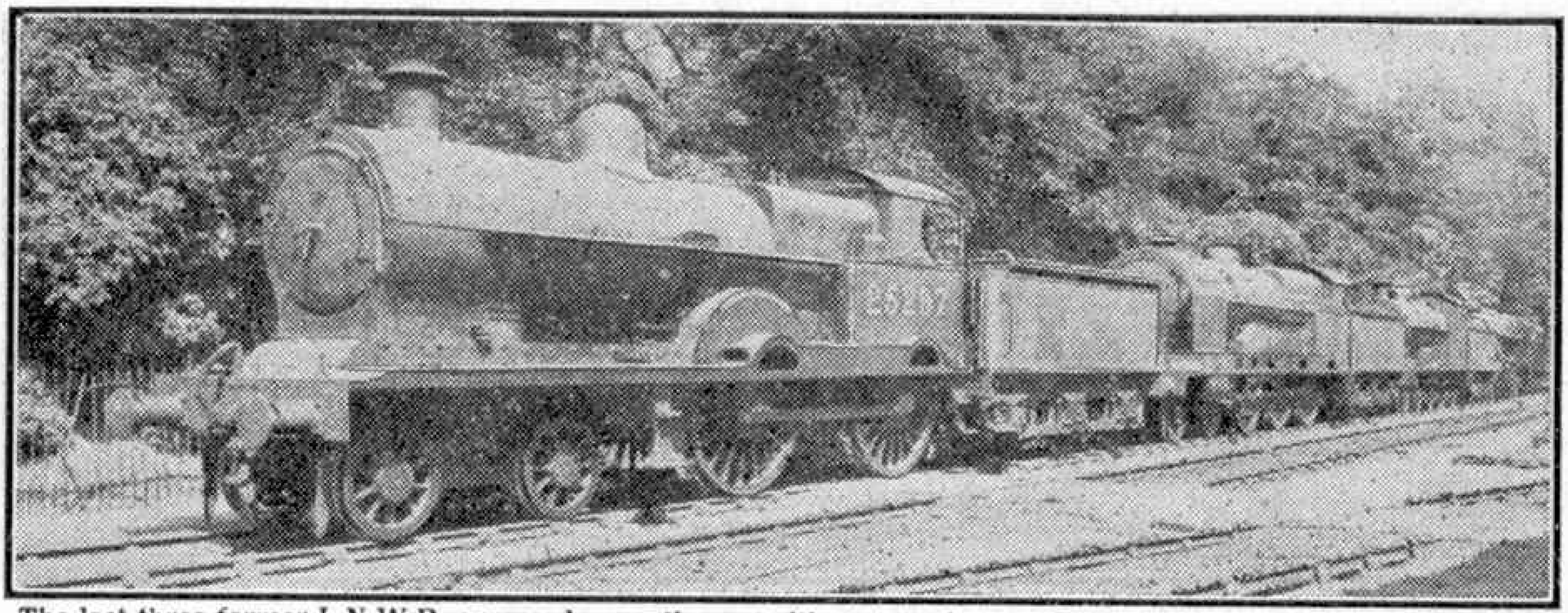
Pennsylvania Progress

The great railroad system of the U.S.A., the Pennsylvania, has achieved substantial progress with its new locomotive and rolling stock programme despite delays caused by material shortages and other factors. The stock of diesel electric passenger locomotives, as well as diesel shunting engines, has been considerably enlarged while the stud of steam standard types of very large size continues to perform heavy work over many sections. Many of the famous named expresses, such as the "*Broadway Limited*," "*Trail Blazer*" or "*Pittsburgher*," are being provided with new sleeping, observation, dining or lounge cars which are of a size and weight considerably beyond British limits.

London Midland Region News

We are able to reproduce this month an official photograph taken at Crewe of the sole surviving "Precursor," "Claughton" and "Prince of Wales" class engines before they proceeded to the breaking-up yard. These were the last representatives of L.N.W.R. express engines and have recently been condemned in quick succession. Brief details have been given in recent issues of the respective numerous classes to which these last survivors belonged. With the "George the Fifth" 4-4-0s, the superheated version of the "Precursor" class, these engines were the mainstay of the West Coast Route in England, and its principal branches, for many years from the early part of the present century.

New locomotives have lately been placed in service as follows:—4-6-0, class "5" mixed traffic: Nos. 44659-60, allocated to 21A, Saltley; No. 44661 to 17A, Derby; No. 44662, 16A, Nottingham; No. 44663, 15C, Leicester; Nos. 44664-5, 19A, Sheffield; No. 44666, 20A, Leeds, Class "4" 2-6-4T; No. 42111, 25F, Low Moor; Nos. 42112-6, 5D, Stoke, on loan to Low Moor. Class "4" 2-6-0 mixed traffic; No. 43035, 20H, Lancaster; No. 43036, 22A, Bristol; Nos. 43037-8, 19A, Sheffield; No. 43039, 20A, Leeds. Diesel electric shunters, 0-6-0: Nos. 12054-5, 5B, Crewe South. Four more Midland Compounds withdrawn were Nos. 1008, 1010, 1013, 1042. Certain interchanges or loans of locomotives are taking place between Regions, including the Scottish, which now has a separate administration and stock allocation, but Scottish engines are numbered in L.M or E. and N.E. series.



The last three former L.N.W.R. express locomotives awaiting scrapping at Crewe. They are No. 25297 "Sirocco" (L.N.W.R. No. 643), No. 6004, (L.N.W.R. No. 42 "Princess Louise"), and No. 25752. British Railways Official Photograph.

Eastern and North Eastern Regions

The latest Darlington built "A1" 4-6-2s are Nos. 60150, stationed at Heaton; 60151 at Gateshead; 60152 at Haymarket (Edinburgh), Scottish Region, where Peppercorn engines are now seen more freely. No. 60129, constructed at Doncaster and painted blue, is at York. Further "A1s" are in hand at Doncaster, including some with roller-bearing axleboxes.

Speeds up to 80 m.p.h. are allowable again over sections of the old G.N.R. main line, though there are still stretches restricted to 60 or 70 m.p.h. on account of heavy traffic or condition of roadbed.

A typical day's observation of the Saturday traffic along the East Coast main line to and from King's Cross n the height of summer showed that the invaluable "V2" 2-6-2 engines still take a considerable share in express haulage, although more of the new "A1" type are now in evidence. Gresley "Pacifics," streamlined and otherwise, were working many of the principal long-run turns; "A4s" being on the "*Capitals Limited*," the "*Flying Scotsman*" and the "*Yorkshire Pullman*." The 4-6-4, long known as "*No. 10000*," now 60700, went north in fine style on the 1.35 p.m. Hull express. "B1" 4-6-0s were on 12—or13—coach holiday trains as well as on Cambridge or similar workings also shared by "Sandringhams" and new "L1" tanks. The colourings of rolling stock are many and varied, the L.N.E.R. teak predominating.

Some excellent performance has again been recorded on the "*South Yorkshireman*" with heavy loads behind "B1" No. 61185 of Leicester shed. On the trip southbound, with about 430 tons full, Rugby was left 4 min. late and the 36½ miles to passing Grendon Underwood Junction were covered in 39 min. over a road by no means easy, with minimum speeds of 40½ at Charwelton, then 30, owing to a permanent way slack after Culworth. Maxima on descents after Brackley were 79, then 83½ m.p.h. After a signal stop, Aylesbury was reached in 54 min. though the overall time would have been no more than 50 with a clear road, compared with a fast booking of 52 min. Northbound from Marylebone with a heavier 13-coach train, probably 450 tons and well over the rostered load, time was well in hand in spite of two track repair slacks.

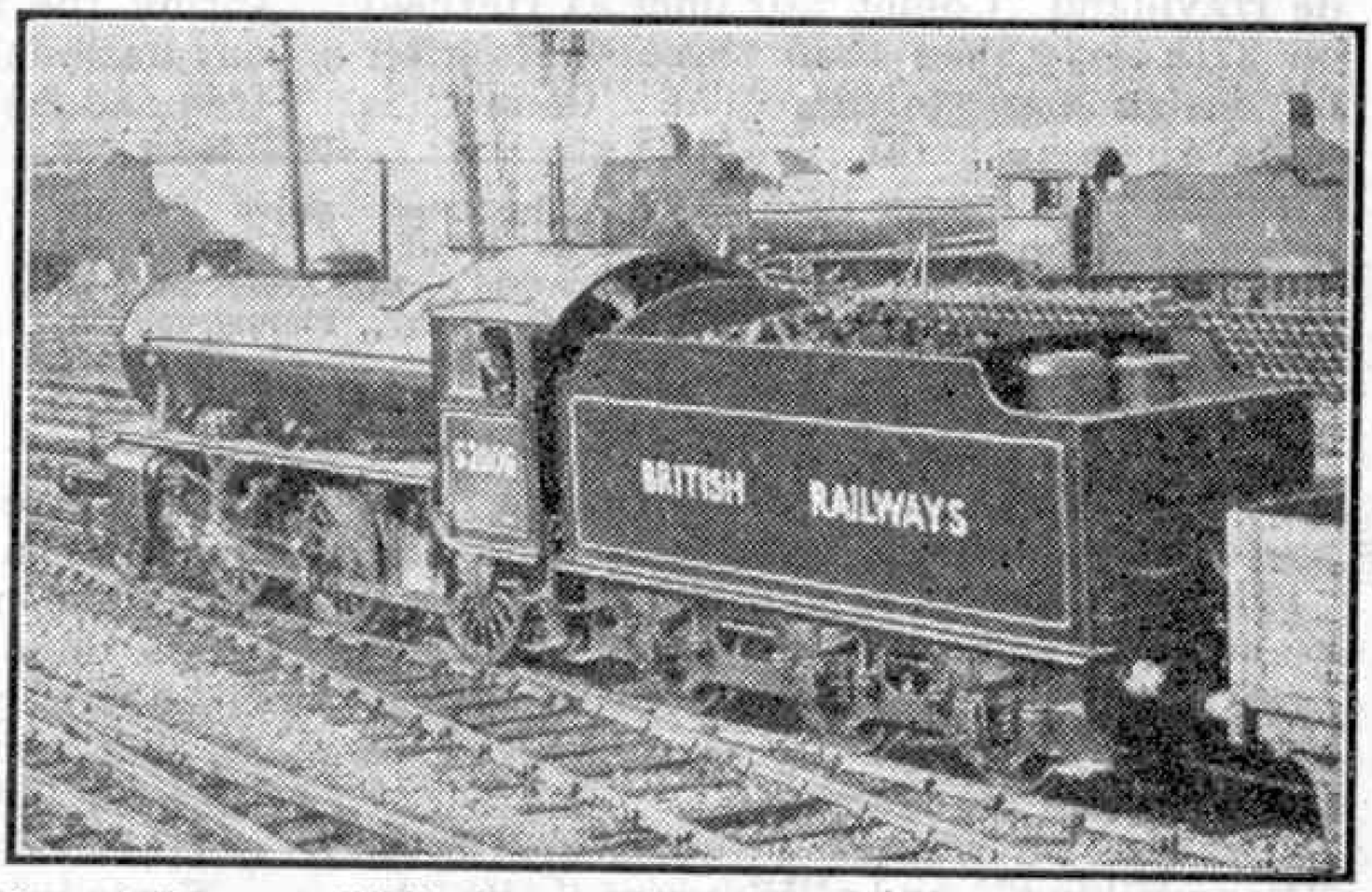
"A3" and "V2" engines are seen on the G.C. Section a good deal, also on the Harrogate main line of the N.E. Region. L.M.R. 2-6-0s and class "5" 4-6-0s have worked through specials to Scarborough, where several "K3" 3-cylinder 2-6-0s have lately been noted together with a good many "B16" and "B1" 4-6-0s, 4-4-0 "Shires" or "Hunts" and 4-6-2Ts.

Irish Railway News

We are informed that the statement in last month's "*Railway Notes*" that the Great Northern Railway (Ireland) had been partly merged into the Ulster Transport Authority is not correet. As a matter of fact we believe that the G.N.R. (I) is the sole remaining main line railway undertaking controlled by private enterprise in Great Britain and the Republic of Ireland.

Southern Tidings

Four different L.B.S.C. "Atlantics" were recently noted at work on one day. Engines of this class as well as "King Arthurs," "West Countries" and "Moguls" have been hauling relief Newhaven boat trains, some of which are also worked electrically. The first "Leader," No. 36001, was running trials on the Uckfield line in August when holiday coastal traffic was at its height, with much interesting locomotive variety in evidence.



One of the new "K1" class 2-cylinder 2-6-0 of L.N.E.R. design at Eastfield (Scottish Region). Photograph by H. C. Casserley, Berkhamsted.

Among recent withdrawals were: crane tank 0-4-0, No. 1302, originally built by Neilson for the S.E.R. at Ashford Works, in 1881; "T1" 0-4-4T No. 30001 (L.S.W.R. No. 1); rebuilt Stirling 4-4-0 Nos. 1446 and 1455, originally built in 1898/9.



ELEVEN months ago I wrote an article for the "*M.M.*" entitled "*British Jets are Still the Best*," a title that is even more appropriate to-day. At that time we had the finest jet fighters and the only medium-range jet air liners in the world, powered by the best pure-jet and propjet engines ever built. Now we can claim also the first long-range jet air liner, a whole series of new and advanced fighters, a promising jet bomber, and new engines of phenomenal power to fit into still secret aircraft in the experimental shops and on the drawing boards of our aircraft industry. Small wonder that the American Deputy Air Force Chief of Staff admitted some months ago that Britain is two years ahead of the rest of the world in the development of jet aircraft.

One of the most significant events of recent months was the first flight of the de Havilland "Comet" air liner at Hatfield on 27th July, less than three years after its design was started. The "Comet" is more than just the world's first real pure-jet air liner, for it offers such a tremendous increase in performance that American airline operators, who have no comparable American aircraft available, may well be compelled to "fly British," just as we now reluctantly have to fly American.

There is an old saying that if an aeroplane looks right then it is right, in which case the "Comet" should be a world-beater, for its lines are elegant even by de Havilland standards.

Drawing on Vickers' experience with the "Nene-Viking" and "Viscount," its designers have kept the 36 passenger seats forward of the exhausts from its four giant "Ghost" engines, to reduce noise level to a minimum for all passengers. Although this has resulted in the passenger windows being placed over the wing, it does not matter very much in the case of the "Comet," as it will cruise at 40,000 ft., from where there would be little chance of seeing the ground anyway.

It will naturally be some time before the 14 "Comets" ordered for B.O.A.C. and B.S.A.A. are in passenger service, but de Havillands can be relied upon to keep delays to a minimum. Meanwhile, B.O.A.C.'s Chairman, Sir Miles Thomas, left no doubt of his views on the subject when he said recently that "the 'Comet' represents a notable milestone in the progress of British civil aviation. Flying at 400 m.p.h. or so over Commonwealth routes before she tackles the longer trans-atlantic stages," he continued, "the 'Comet' will blaze a new trail of glory. It should make the world seem a very shrunken globe."

Even more important, it should help to shrink the financial losses being made by our nationalized airlines, for in spite of its tremendous power, and consequent heavy fuel consumption, the "Comet" is definitely a sound business proposition. High power results in high speed, and high speed will enable it to fly more miles per year than a piston-engined transport, and so carry more ton-miles of payload in that period. In addition, jet-engines require much less maintenance than piston-engines, while their lack of vibration also reduces considerably wear and tear on the airframe, so that airframe maintenance too can be reduced. All this means big savings in overhead expenses.

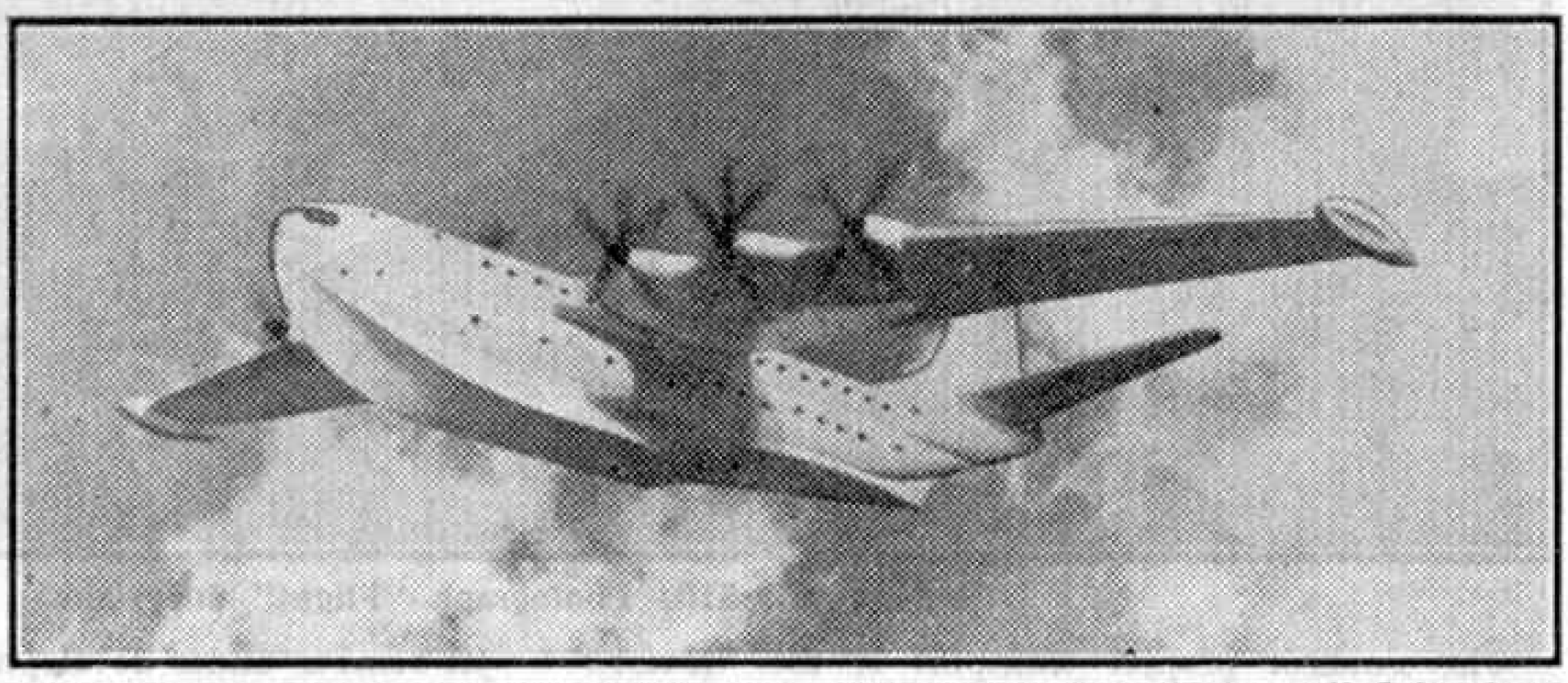
Illustrated above is the de Havilland "Comet," the world's first real pure-jet air liner. Photograph by courtesy of de Havilland Enterprise.

Some interesting facts on this question of economy were given recently by George Edwards, designer of the "Viscount." He said that, from the point of view of fuel, payload and cost per ton-mile, on ranges of up to 1,000 miles, propjet air liners are at least as economical as comparable

piston-engined types. Pure-jet aircraft, however, are useless over short distances as they would have to carry such enormous fuel reserves, to cater for "stacking" over their destination or diversion to an alternative airfield in bad weather, that they would be able to carry no payload. Over longer ranges, there is little to choose between jets and propjets from the point of view of economy, but both are far superior to piston-engines.

As Britain has both reliable jets and propjets, we can "pay our money and take our choice". This gives us a great advantage over American designers, for although Pratt and Whitney are building the Rolls-Royce "Tay," one of our best pure jets, under licence in the United States, the Americans have no satisfactory propjets. The reason for this is probably that they have had so much vibration trouble with their latest square-tipped, hollow-blade propellers that they are suspicious of any engine with a propeller on the front. Anyway, the Americans have no propjet air liners flying, whereas we have four—the Vickers "Viscount," Armstrong Whitworth "Apollo," Handley Page "Hermes" V and Handley Page (Miles) "Marathon" 2.

This too is a matter of great rejoicing for our aircraft industry, for these aircraft, together with the magnificent 100-passenger Saunders-Roe "Princess" flying boats and the Bristol "Brabazon" 2 landplanes now under construction at Cowes and Filton, ensure that Britain will have jet air liners suitable for every type of airline service.



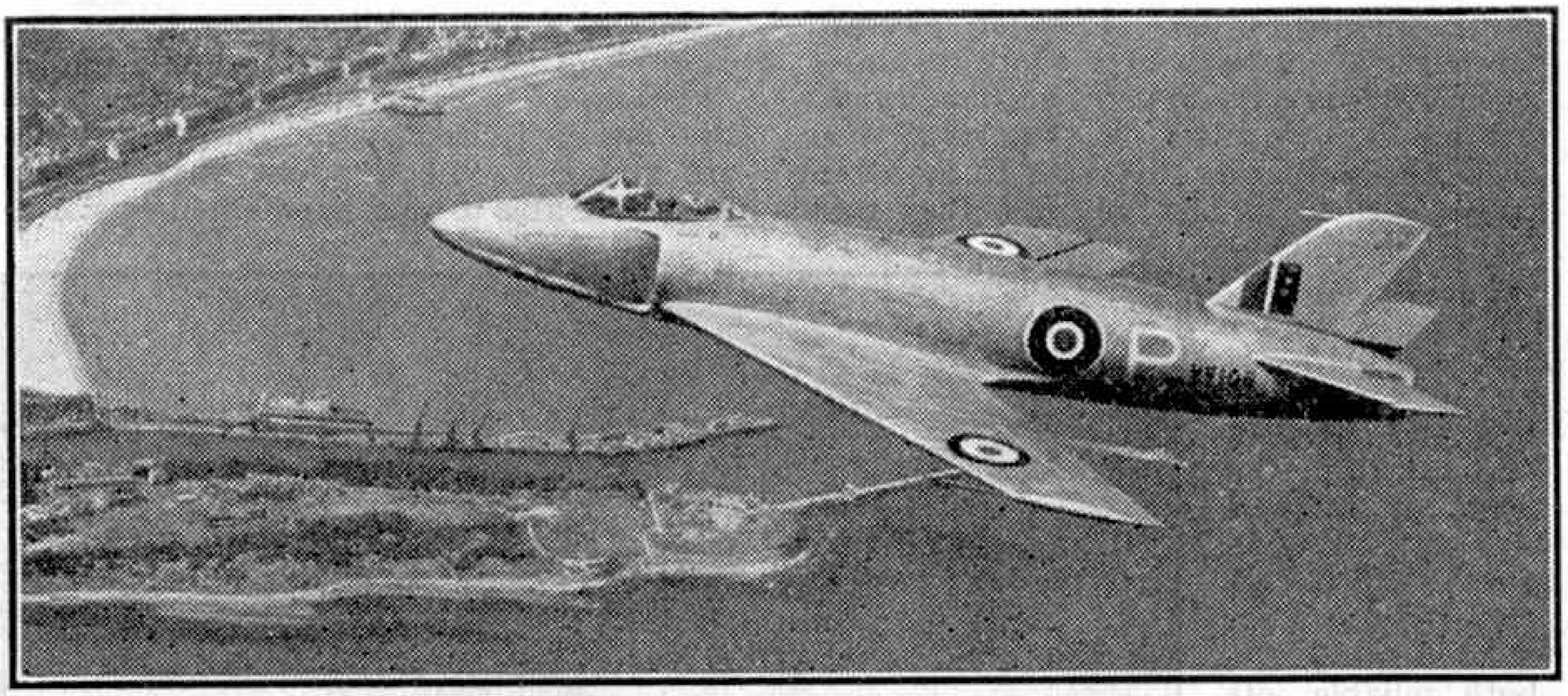
An impression of the magnificent 100-passenger Saunders-Roe "Princess" flying boat, the prototype of which will fly in 1951. Photograph by courtesy of Saunders-Roe Ltd.

Several foreign airlines may follow the example of B.E.A. and B.O.A.C., and order "Viscounts," which is hardly surprising as the latest Rolls-Royce "Dart" propjets are giving so much power that Vickers have been able to offer an enlarged version—the "Viscount" 700—with accommodation for up to 53 passengers. When one considers that four "Darts" cost little more than two "Centaurus" piston-engines, which give about the same power; that the propjet gives a smoother and faster ride at no extra cost; and that it uses kerosene, which is both cheaper and much safer than petrol, the reason for all the enthusiasm is apparent.

The "Apollo," which is in the same class as the "Viscount," offers a high degree of versatility. To start with, it will be available in seven versions, including an executive travel type complete with conference room and stateroom, normal 24-45 seat passenger air liners, a freighter with a 5-ton payload, military ambulance with accommodation for 20 stretchers and four attendants, and paratroop transport able to carry 45 fully-equipped soldiers. Furthermore, each version can be fitted with either "Mamba" propjets or "Merlin" or "Wasp" piston-engines.



Armstrong Whitworth "Apollo," Britain's second propjet transport. Photograph by courtesy of Sir W. G. Armstrong Whitworth Aircraft Ltd.



Supermarine 510. Photograph "Flight" Copyright.

The smallest propjet transport is the "Mamba-Marathon," which is a twin, unlike the standard "Marathon" I ordered for B.E.A., which has four "Gipsy Queen" piston-engines. As each "Mamba" gives over 1,000 h.p., it has available some 640 h.p. more than the standard type, giving it a cruising speed of 260 m.p.h.—roughly double the speed of air liners at present in service on our internal air routes. What is more, as the "Mambas" weigh 1,000 lb. less than the "Gipsy Queens," enough fuel can be carried for an extra 200 miles range.

At the other end of the size scale is the "Hermes" V, powered by four "Theseus" propjets. At present, it is intended purely as an experimental aircraft, but it is basically similar to the piston-engined Mark IV, 25 of which will soon be in service with B.O.A.C. This adds significance to a recent Handley Page statement that it would be comparatively easy to convert all "Hermes" IVs into Mark Vs if flight tests showed that benefits to be derived outweigh the cost and trouble of conversion. As the "Hermes" V promises to cruise 50 m.p.h. faster than the Mark IV, and, because of the low weight of its "Theseus" engines, could carry an extra ton of payload, we may well see much more of it.

Side-by-side with these fine civil aircraft, British designers have developed new jet fighters and bombers second to none in the world. Pride of place must go to the English Electric A.1, because it is the first of our anxiously-awaited jet-bombers. At first glance it looks a little disappointing, lacking advanced features such as swept wings and buried engines that many people expected. But looks are often deceptive, and one should not forget that there are some 7,000 lb. of thrust packed into each of its two "Avon" engine nacelles, while its sleek fuselage is big enough to hold a very formidable bomb load. Anyway, it is already in production, and the fact that it is to be named "Canberra" seems to indicate that assembly lines may not be restricted to this country.

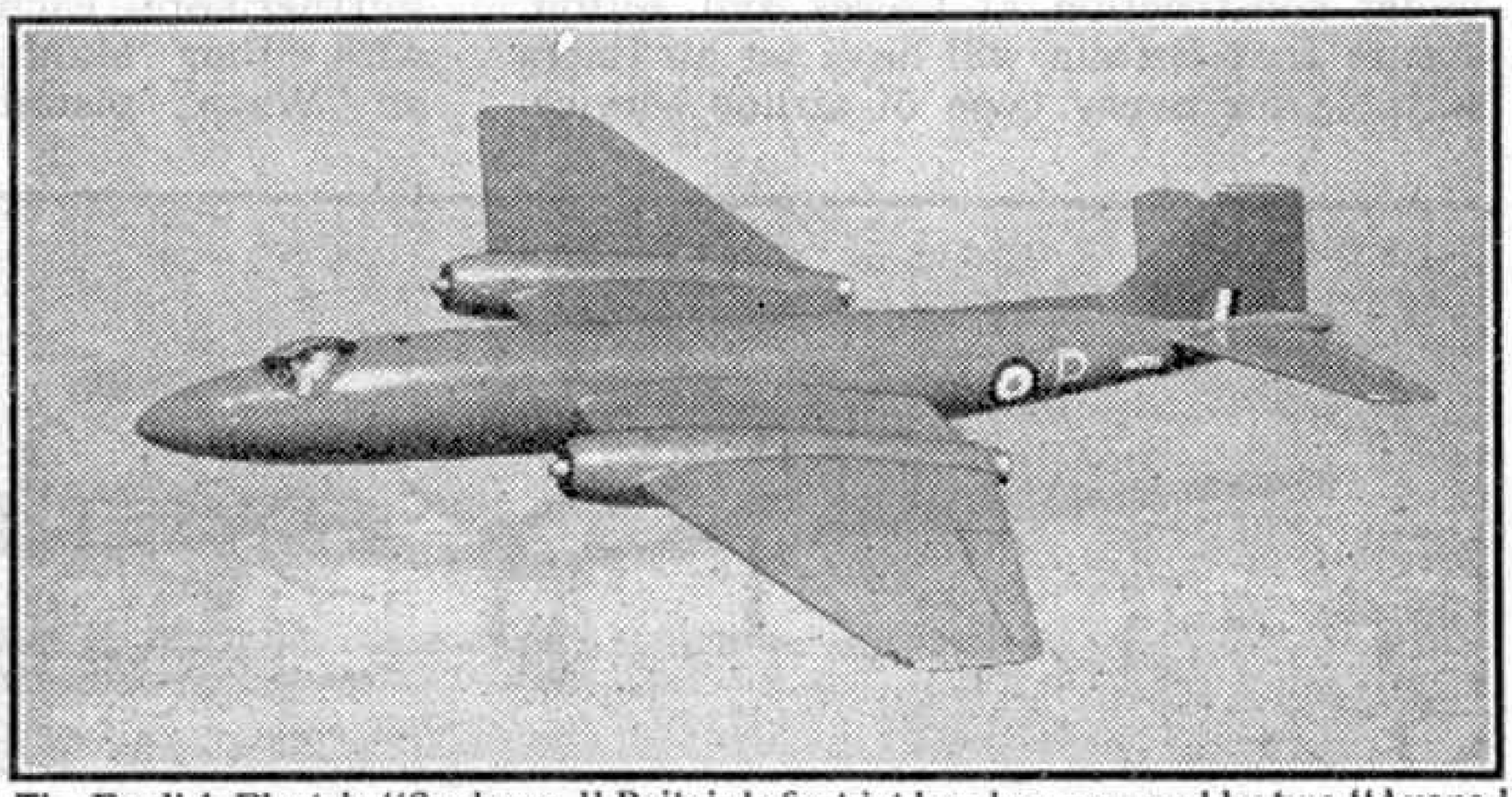
What is more, those people who want something less orthodox may not have long to wait, for it is by no means the only jet-bomber under development in Britain!

Meanwhile, we are easily maintaining our traditional lead in fighter design, as was proved when the veil of secrecy was lifted from *some* of our new prototypes at the S.B.A.C. Show last month.

Like all old soldiers, it seems that the "Meteor" and "Vampire" will never die, for the latest versions of both aircraft at Farnborough looked by no means out of place among newer designs. As more powerful engines have come along, Gloster and de Havilland have simply modified the airframes to house them, without any apparent trouble. Thus the "Meteor" design has advanced from two 1,700 lb. "Wellands" to the stage where it is now flying with two 7,000 lb. "Avons," the most powerful aero-engines in the world. When one realizes that the "Beryl-Meteor" has been known to climb 7½ miles in as many minutes, it is obvious that the "Avon-Meteor" must have a truly phenomenal rate of climb.

The same must be true of the de Havilland "Venom," which is basically our old friend the "Vampire" with thin wings and a "Ghost" engine. No hint of its performance may yet be given, but it looks very much like the world's finest high-altitude jet-fighter.

No less important is another variant of the "Vampire," the "Goblin" powered D.H. 113 night-fighter, which also made its debut at Farnborough. It is the first of our two-seat jet night-fighters and, like the "Canberra," has been eagerly awaited, for there has been repeated criticism of our night defences. Much of this criticism is unjustified, (*Continued on page 389*)

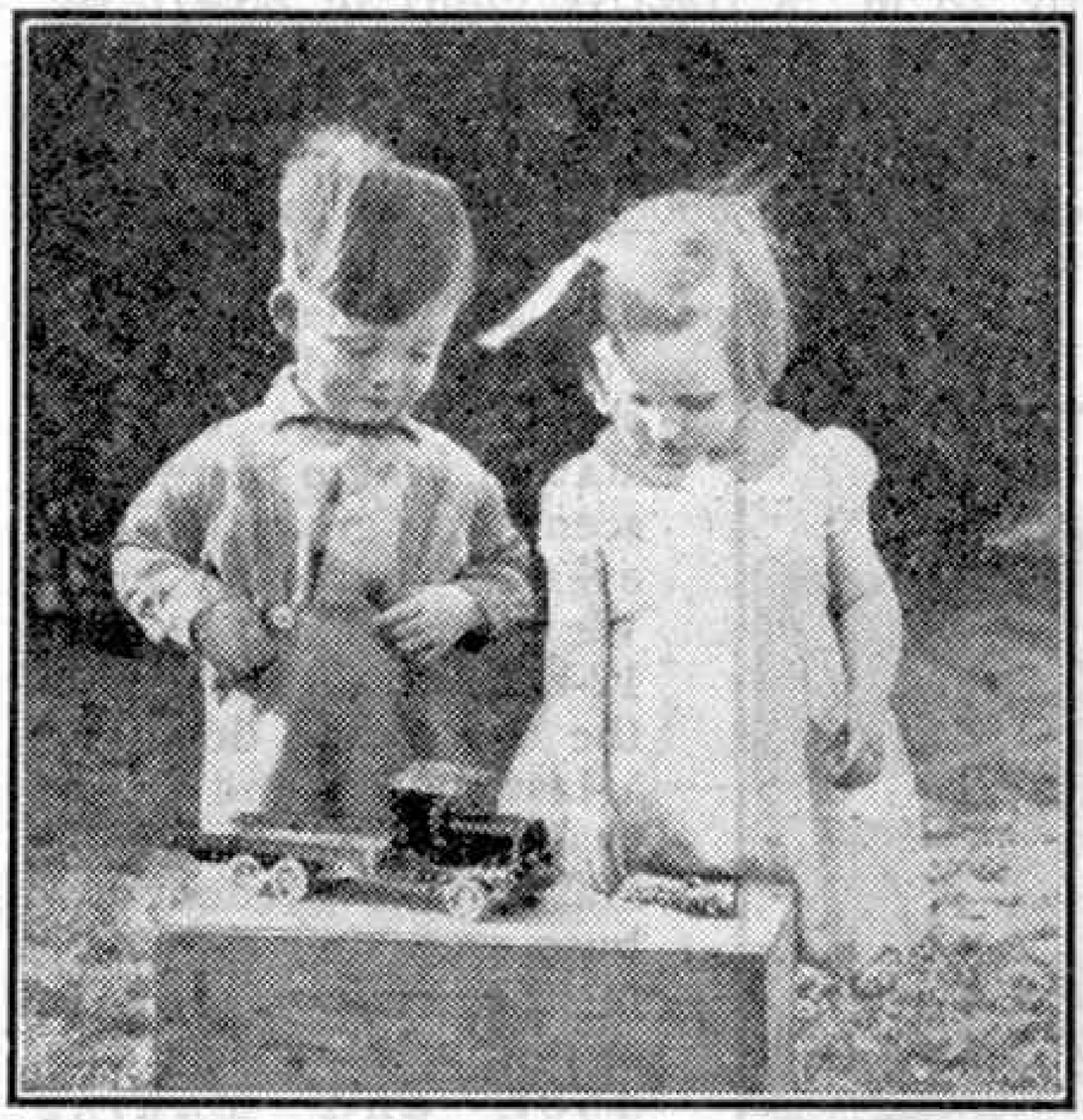


The English Electric "Canberra," Britain's first jet bomber, powered by two "Avons." Photograph by courtesy of English Electric Co. Ltd.

Photography

Gaslight Printing Hints

IT is always exciting to collect a wallet of new prints from the chemist or photographic dealer who has made them, but it is much more fun to make one's own prints, and have the thrill of seeing the picture appear on the paper as this lies in the dish of developer. Making gaslight prints is quite easy, and if the instructions packed with the paper are followed no trouble should arise. Nevertheless, as our correspondence shows,



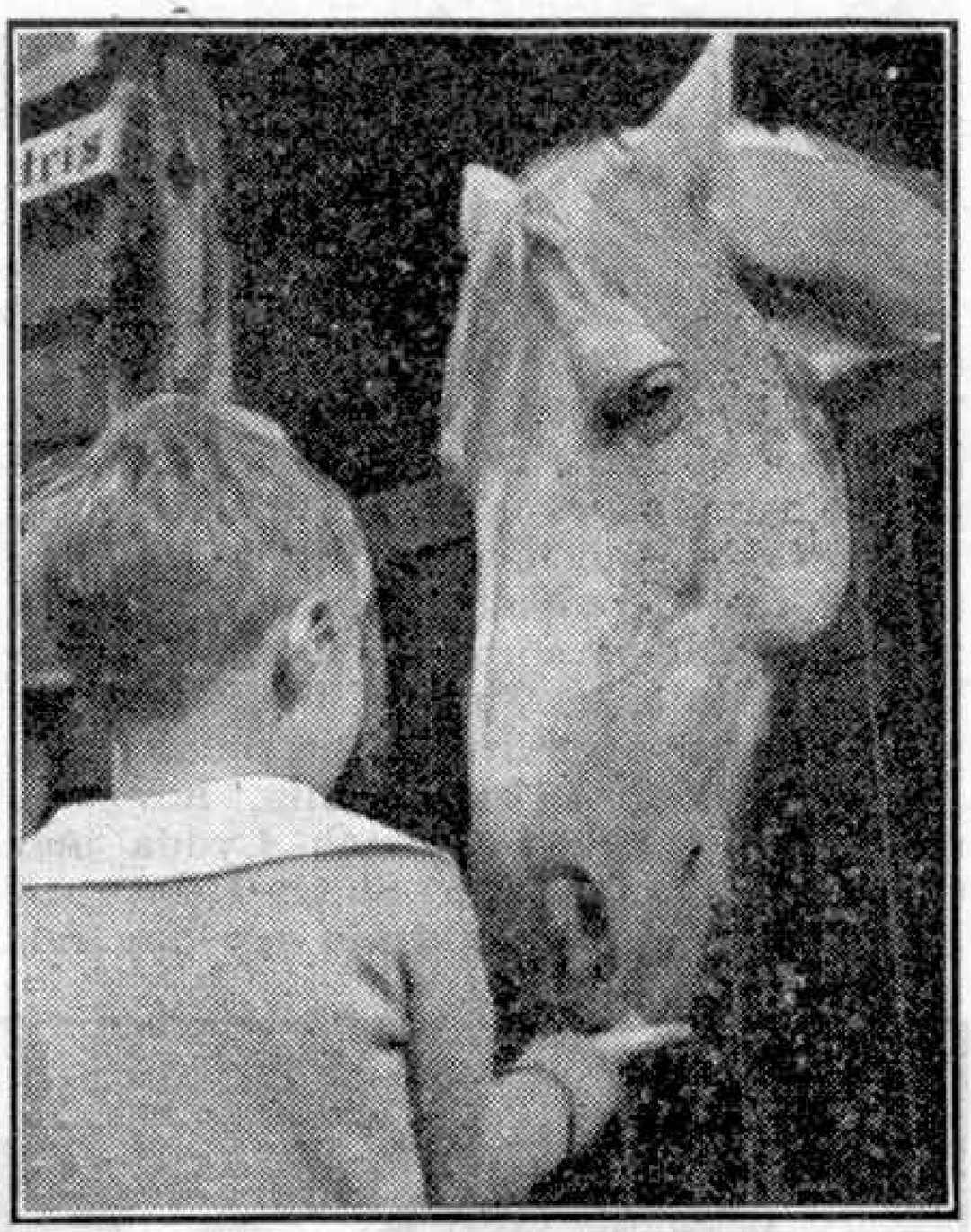
A dual display. Photograph by L. Humm, Geraldine, New Zealand.

failures do occur, and in this article I propose to give a few hints that may be helpful.

The commonest trouble is that of stains appearing on the prints. This may arise from various causes, among which is stale or overworked developer. The developer should be regarded with suspicion when it begins to turn brown, and if possible new solution should be put into use. Another sign that the developer is losing its effectiveness is that the blue-black colour of the prints begins to acquire a greenish tinge.

All readers who have developed prints will have noticed that there is always a slight reluctance on the part of the developer to flow quickly and evenly over the whole surface of the print, so that, unless the dish is actively tilted, development of the whole print will not begin at exactly the same moment. This trouble can be overcome by the addition of a small quantity of what is known as a wetting agent. How these mysterious agents work I do not know, but their effect is to ensure that the liquid flows instantly and freely over the surface of the gaslight paper. The Johnson "326" liquid wetting agent, or the Burroughs Wellcome wetting agent in "Tabloid" form, are excellent for the purpose.

It is a good plan to add a wetting agent to the last lot of water that is used in washing prints, in order to make the water run evenly off the surface of the prints.



"Morning Snack." Photograph by P. W. Lang, Sevenoaks.

I have recently found another mysterious liquid known as Johnson "142" of distinct advantage. When added to developing solution for gaslight prints, it prevents staining from whatever cause. It is particularly useful with gaslight paper that has been kept a long time and is becoming rather elderly.

The Johnson "Universal" liquid developer is very useful for making gaslight prints, as it contains a suitable proportion of the Johnson "326" and "142."

As regards fixing, use one of the commercial acid-hypo solutions, see that each print is fully immersed when you put it into the dish, and move it about from time to time. Prints lying still on top of one another on the bottom of the dish cannot fix properly. I use an old wooden paper knife for moving the prints about; this prevents my getting hypo on my fingers and having to wash them before proceeding with printing.



"Forty Winks." Photograph by R. Atkins Eccles.

On the Footplate in Palestine

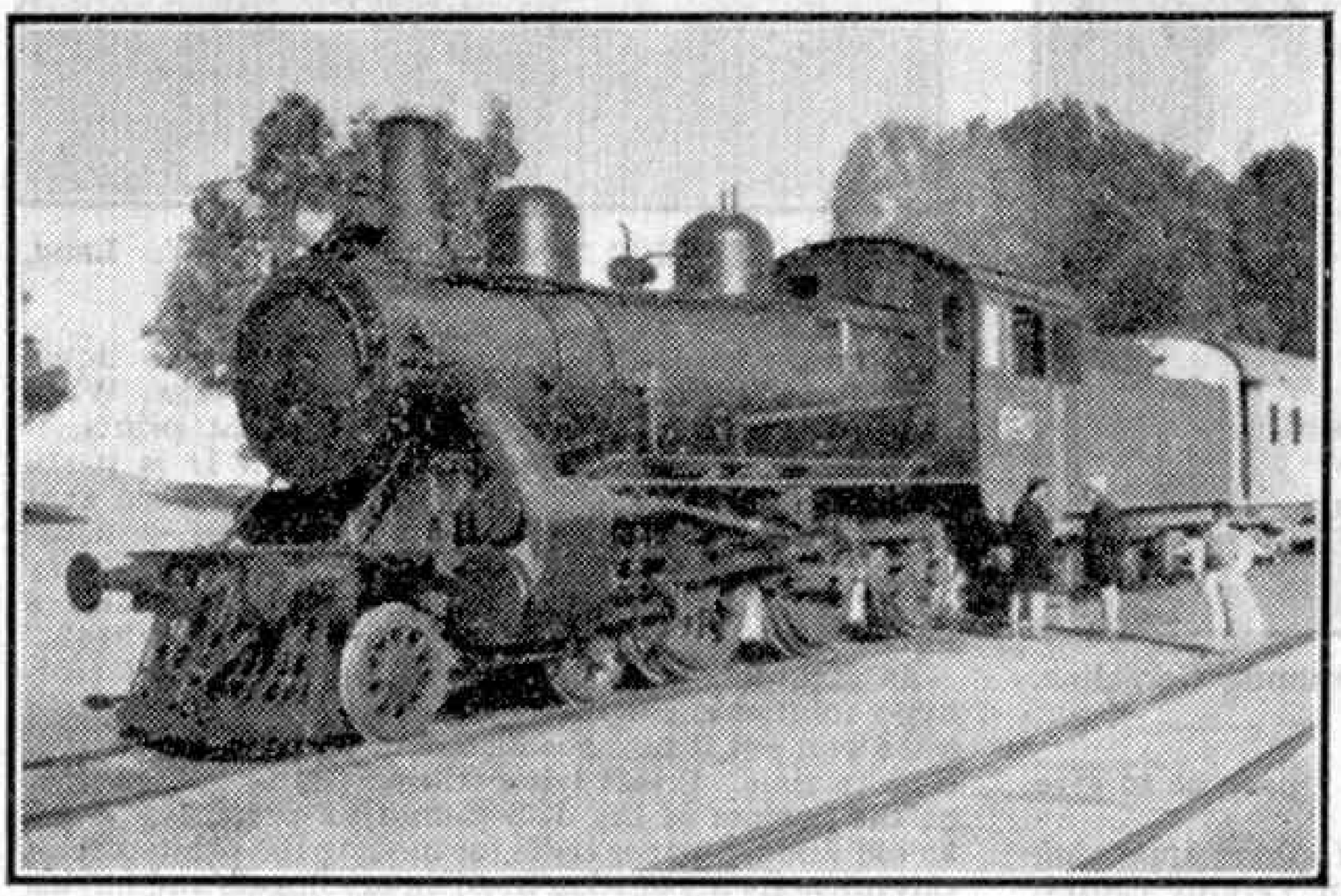
Impressions of a Desert Journey

By D. Stewart Currie, G.I.Mech.E., G.I.Loco.E.

IF you look at a map of Palestine you will see that the railway system consists of one main line running North and South, and several branch lines. From Haifa, a line that was completed during the recent war leads to the north. This line forms a through route to Turkey, but since the war there has been little or no traffic on it.

The main line from Haifa, however, runs to the South, through Lydda and Gaza, then over the Sinai Desert to Egypt. One passenger train per day ran between Haifa and Cairo during the British Mandate, and this conveyed both military personnel and civilians. The train left Haifa early each morning, and was due into Cairo about midnight. It was timed so that the Palestine part of the run was done in daylight, in order to minimize the risk of attack by the Irgun Zvai Leumi and the Stern Gang, but in spite of this the train was blown up on several occasions by mines detonated electrically or by contact with the wheels.

Such were the conditions when, one morning, I climbed aboard engine No. 891 at Haifa shed ready for the trip South. This locomotive could not be called modern as she had been built by the Baldwin Locomotive Works, U.S.A., in 1918. Still she was in good condition, and looked fine with the early morning sun glistening on her black paintwork. Her wheels have a diameter of 5 ft. 6¾ in. and the boiler pressure is 190 lb. per square inch. She has two outside cylinders 20½ in. by 28 in., a tractive effort of 28,470 lb., and a water capacity of 6,500 gallons carried in an eight-wheeled bogie tender. The fuel oil, known locally as mazout, is carried in a 1,500-gallon tank mounted on the tender.



Palestine Railways 4-6-0 No. 880, on which the author rode. The driver is standing next to the cab.

It was just on 5.30 a.m. when we came "off the shed" and ran slowly down to the station, where there were scenes of great activity even at that early hour. We backed on to a 12-coach train and Abdul the driver got down for a last look round to see that all was in order. Hassan the fireman was busy watching the flame in the fire-box through a peephole in the fire-door, and making adjustments to it by varying the amount of oil or steam to the burner.

Back along the platform I could see the usual bedlam of a Middle East station. Dozens of small urchins were attempting to sell anything from Coca-Cola to watches to troops in the train, while other individuals in flowing robes, which had once been white, were carrying large quantities of baggage to the luggage van, under the extremely wary eyes of the owners. At length everything appeared to be ready, and Abdul took up his position at the regulator. The guard blew his whistle, and we slowly moved off on our journey.

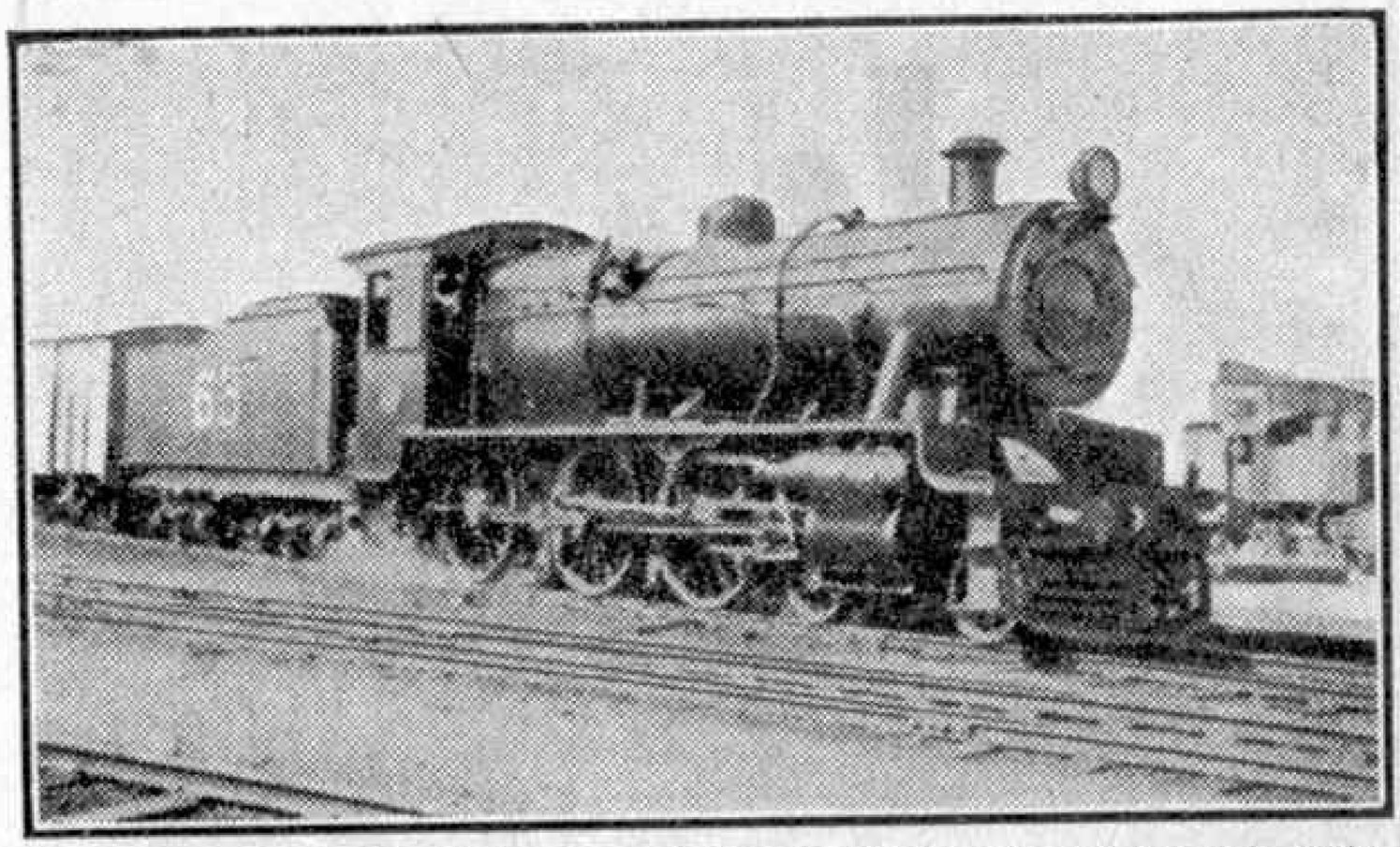
Hassan busied himself with the fire, and the roar of the oil burner increased considerably. We travelled slowly alongside the Mediterranean, past the wreck of an illegal Jewish immigrant ship which lay on the rocks, and as we cleared the suburbs under the shadow of Mount Carmel we began to gather speed. Ahead

of us lay the Biblical Plain of Sharon, while to the east were high mountains beyond which lay the River Jordan. We had several short stops at wayside stations, such as Atlit, Zikhron Ya'acov, Hadera, and Ras El Ain, and at each place a large percentage of the population was waiting, either out of curiosity or in an attempt to sell Jaffa oranges, dates, Turkish delight, or peanuts to the passengers.

Speed was obviously not essential on this trip and we jogged steadily along, taking just under three hours for the 110 kilometres between Haifa and Lydda. We came to a stand at the latter, a busy junction, just before 9 a.m., and here I said farewell to my two friends Abdul and Hassan, who took No. 891 to the shed to get ready for the return journey to Haifa. Another locomotive of the same class, No. 880, now came on for the run of 303 kilometres to Kantara on the banks of the Suez Canal. I soon made friends with the new crew, who introduced themselves as Mohammed, the driver, and Abdou, the fireman. While we were standing in the station a small youth made his appearance carrying an enormous basket which he handed to Mohammed. It contained a large quantity of Jaffa oranges, and I gathered from Abdou that this was Mohammed junior.

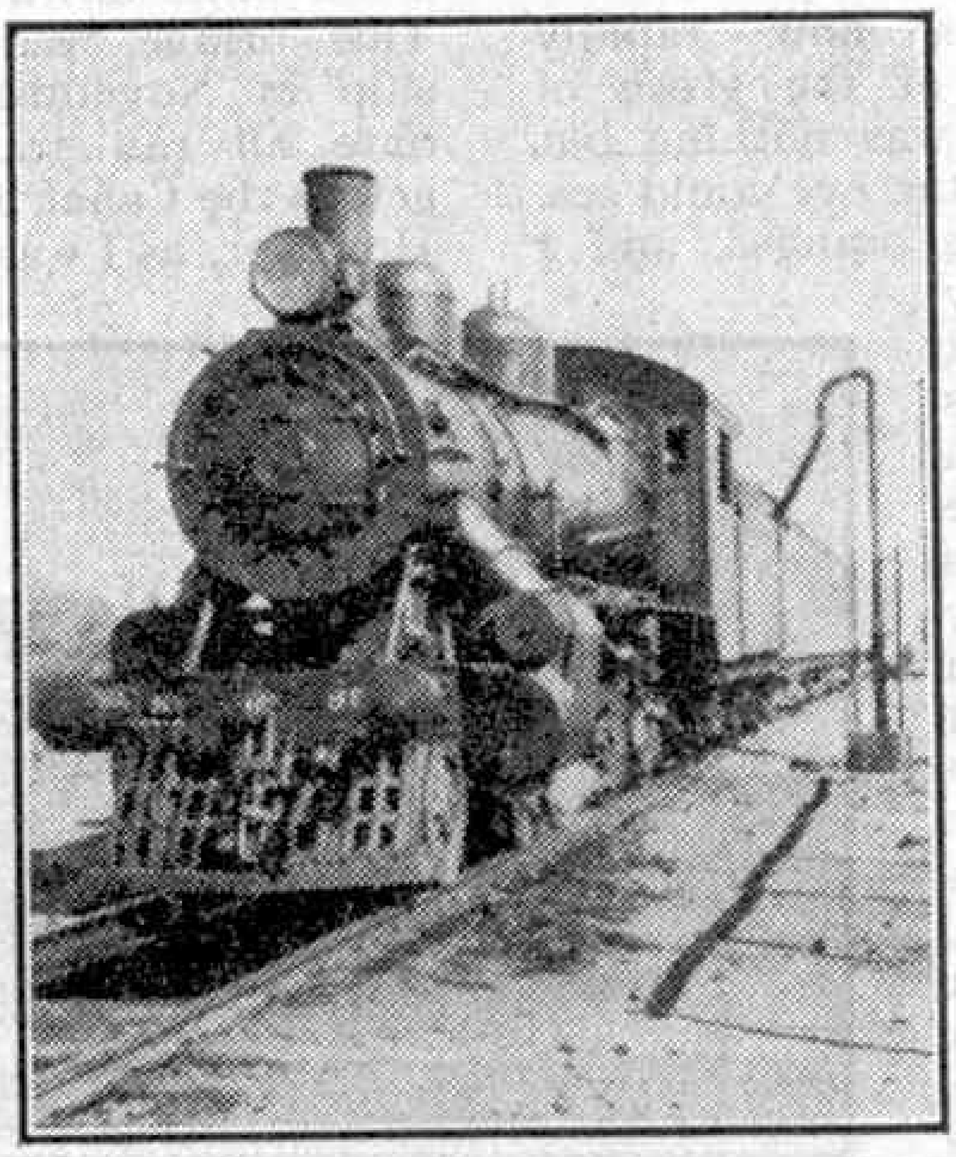
At another platform I could see a large tank engine standing so I asked Mohammed where it was going. He told me it was taking the Jerusalem train and that the locomotive had to be "*plenty strong*" to get up the hills to Jerusalem. As this train was timed to do the 66 kilometres between Lydda and the Holy City in two hours and ten minutes, one can guess what the gradients were like.

After a half-hour halt at Lydda we got the road and Mohammed gently opened the regulator. We moved slowly off through the orange groves, with the lovely smell of the orange blossom penetrating even into the oily atmosphere on the footplate. We quickly picked up speed, only to brake again after passing Beer Ya'acov for a permanent way restriction. This had been caused by a passenger train being derailed a few days previously by Jewish Terrorists, and as we passed the spot I saw the wreckage of several coaches lying on the lineside. Then once again we were off, with Abdou saying something in Arabic about terrorists, which I gathered was not very complimentary.



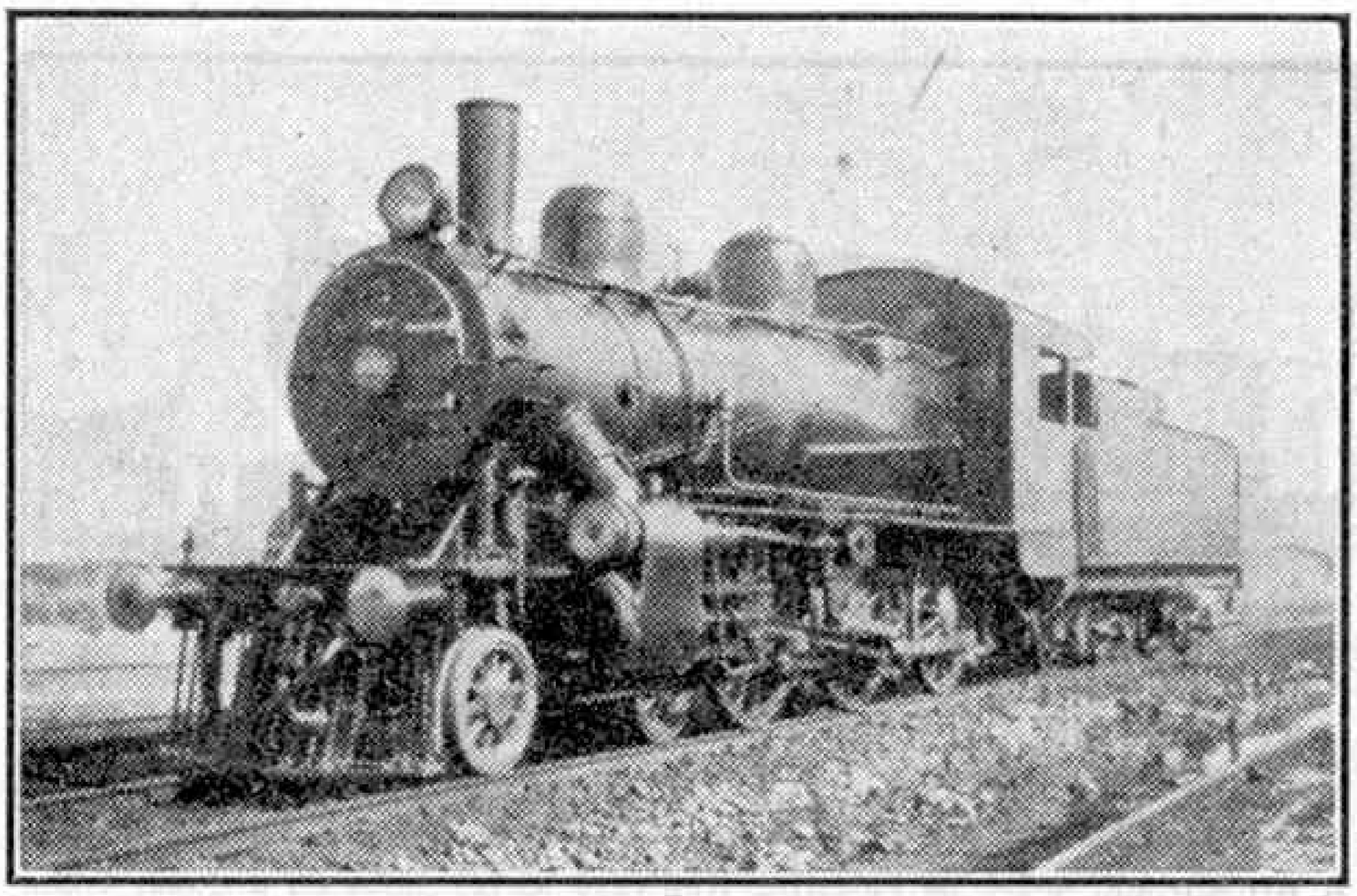
A British-built 4-6-0 of Palestine Railways leaves Jaffa on a goods train.

Mohammed was obviously anxious to show me what his engine could do, and just north of Gaza he opened her out until we were doing over 70 k.p.h., which was very fast by his standards. But that did not last long, and soon we were rolling gently to a halt beside the water column at Gaza, about five minutes ahead of time. We all descended, and I took the opportunity of going back along the train to the restaurant car for a meal, while the engine took water. The dining car was owned and staffed by the "Compagnie



No. 880 on the Haifa to Cairo express taking water at Gaza.

Internationale des Wagons Lits" and I was served with an excellent lunch by a dusky Arab waiter, dressed in a spotless white robe which reached to his ankles, and wearing a fez. As the train stood at



Palestine Railways No. 902 of the same class as No. 880 referred to in this article. Apart from the buffers and screw couplings it has a typical American appearance.

Gaza for only 40 minutes, I had to hurry, and soon I was back again on the engine.

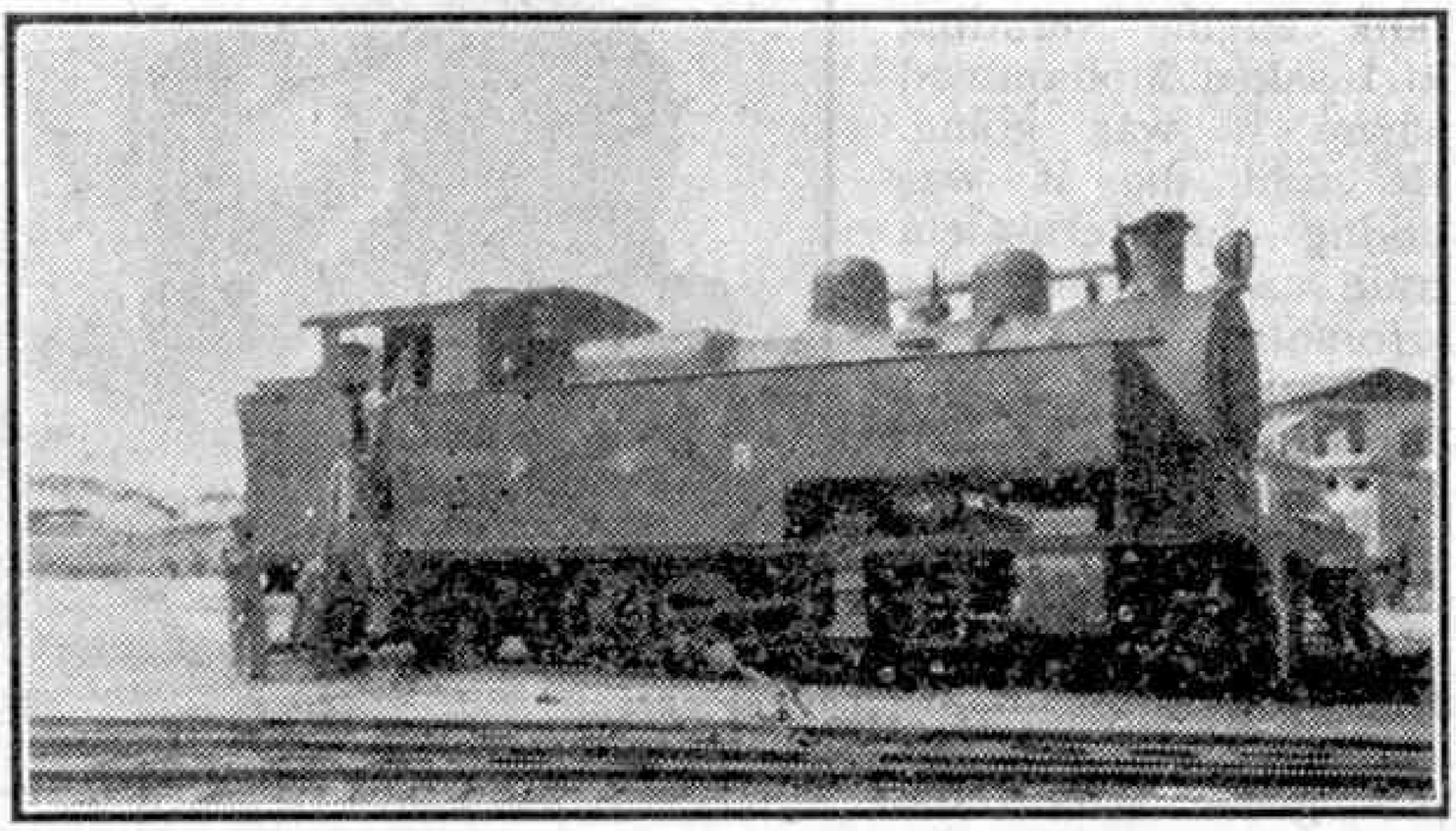
At midday we left Gaza, on the first part of our run across the desert, and as we passed a small dome-shaped tomb by the lineside Mohammed pointed to it, and thumping his chest with his fist said *"Samson."* Later I made enquiries, and found that it was actually the tomb where Samson is believed to be buried.

The countryside was now rapidly changing, and in place of the green of the orange groves there was nothing but sand stretching as far as the eye could see. Mohammed produced the oranges, and I found them extremely refreshing, as the dust was now rising in clouds from the wheels. When I looked back along the train the rear coaches appeared to be practically enveloped in a brown haze, and I wondered how the occupants were faring.

So we continued at a steady 45 k.p.h. to Rafah, which was the Egyptian frontier. Abdou kept a close watch on his fire all the time, and was constantly turning wheels and peering into the fire-box. About once every hour he took a large scoopful of sand from a container, and as Mohammed opened his regulator to its fullest extent, Abdou let the sand be drawn into the fire-box through the peephole in order to clean the tubes.

The run across the Sinai Desert was not very interesting, and we had several stops, including half an hour at Mazar to take water. Speeds were not high and the average was about 40 k.p.h. My eyes grew tired with the constant glare from the sand, and when at last Abdou pointed ahead and said *"Kantara, Effendi"* I looked at my watch and saw that it was 5.25 p.m. We slowly passed Kantara East Cabin, then the Depot, finally coming to rest in the Dock Platform of Kantara East Station.

At this point the train was reversed, and as we stood in the station we saw the Egyptian State 4–4–2 No. 56 *"King Fouad"* backing down on to the other end. This engine, with its unusual nameplate, was illustrated in the *"M.M."* in November 1947. She would be in charge for the last lap of the run to Cairo, crossing the Suez Canal by the El Firdan swing bridge, a few miles down the canal from Kantara. This bridge was damaged by a Dutch ship in November 1947, and since that date all rail traffic has been conveyed across the Canal by two ferries at Kantara. However, as I was not (*Continued on page 389*)



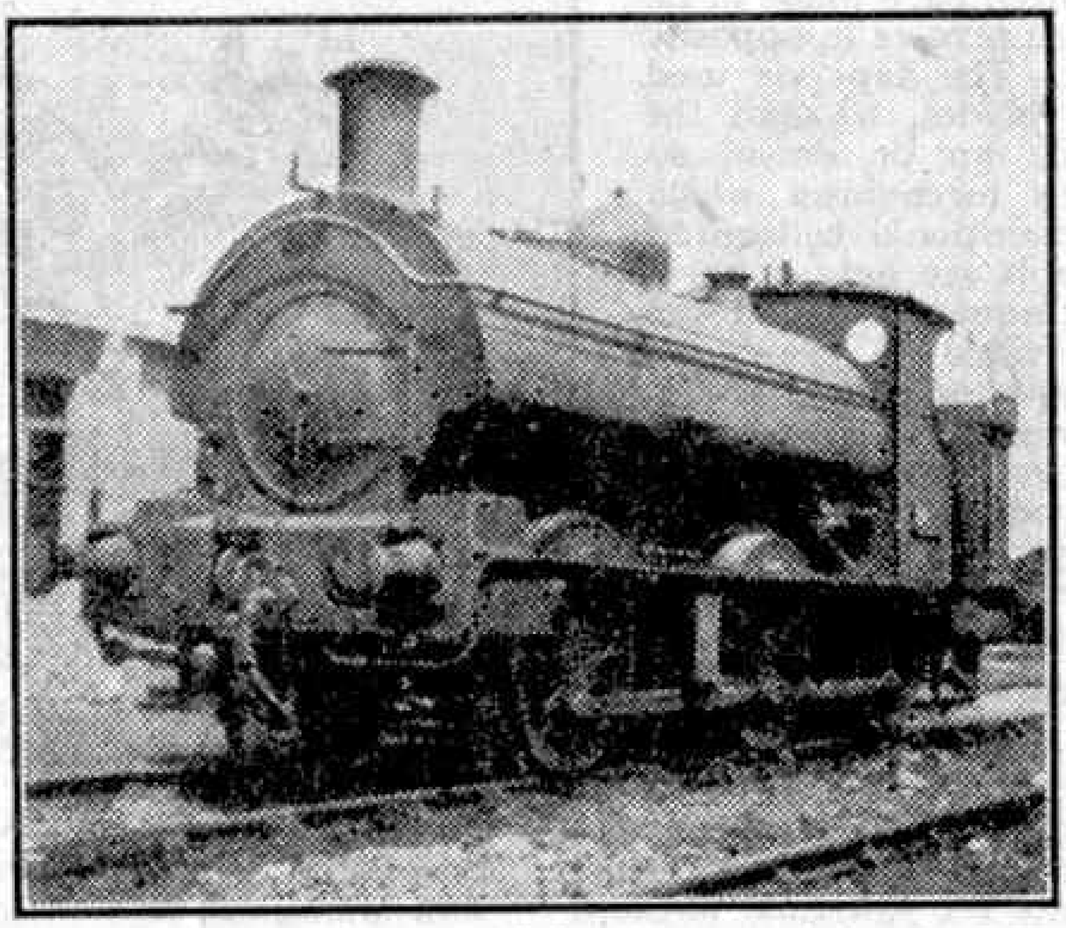
A big Palestine Railways tank locomotive at Jaffa. The engine is a 2-8-4, conspicuous for the cut-away shape of the side tanks.

Ice-cream by the Ton!—(*Continued from page 378*)

the wheel does not receive its piece of wrapping paper, no brickette is fed to it; similarly, if a pocket on the final conveyor does not contain a group of six brickettes, no wrapping paper is taken from the magazine at that point.

The making of choc-bars is perhaps the most remarkable process in the whole factory, for it involves the coating of frozen ice-cream brickettes with hot melted chocolate! Hardened ribbons of cream are fed to the vertical columns at one end of the machine, and are cut off by horizontal guillotine cutters. The cut sections fall on a belt, which slowly carries them to a part of the machine called the "enrober." Here they pass under a shield, and are immediately drenched with melted chocolate which is falling in a continuous curtain.

It would seem that in this operation the ice cream would be melted at once, but it is not. Instead it receives an even chocolate coating, and then passes out along a further conveyor that takes it to the wrapping machines. The secret of the process is that the bars are on conveyors that are kept at freezing temperature right up to the point where the chocolate falls on them, and also immediately afterwards. This not only keeps the ice-cream frozen, but also cools the chocolate very rapidly and sets it. At the end of the coating machine, the bars are transferred to a machine that wraps them in tin foil, and they are afterwards again packed in groups and sent to the store rooms.



Engine No. 1925, one of the two surviving 0-6-0T of G.W.R. origin with round-topped saddle tanks. It was built at Wolverhampton in 1884. This photograph, by A. R. Brown, Isleworth, won a prize in the January 1949 "M.M." Photographic Competition.

On the Footplate in Palestine—

(*Continued from page 388*)

travelling further, I saw No. 56 steam out, and then I said good-bye to my two companions who had made my trip so interesting.

As I crossed the Canal a few minutes later I caught my last glimpse of No. 880, with Mohammed and Abdou looking out of the cab, as she slowly ran back to the shed for a well-earned rest after a hard day's work.

New British Jets—(*Continued from page 384*)

for Fighter Command's present "Meteors," "Vampires," "Hornets" and "Mosquitoes" are unmatched for efficiency. But it is good to know that we have a new generation of day and night fighters in existence to carry on the good work.

In these days of jet-bombers and atom-bombs, the ability to "get upstairs" quickly is a primary requirement for jet-fighters, but this demands enormous power. Unfortunately, once the fighter is at its operating altitude, high power is a decided drawback until the enemy is engaged, as it burns up fuel at an alarming rate. To get over the trouble, designers in both Britain and America are now resorting to the use of after-burners, which at first were tried out on a "Meteor" as long ago as 1944, and both a "Meteor" and a "Vampire" with after-burners were demonstrated at Farnborough.

What happens, in simple terms, is that fuel is injected into the exhaust gases in the jet tail-pipe, and burned there at extremely high temperatures. The terrific heat energy created provides greatly increased thrust, although at the cost of fantastic fuel consumption. But the after-burner need be used only for take-off and in combat, enabling the fighter to cruise on the comparatively low power of its jet-engines during normal flight. After-burners can, in fact, double the power of jet-engines for short periods, for an addition of only 20 per cent. to the weight of the engine installation.

As well as these new versions of the "Vampire" and "Meteor," we have the fine Hawker N7/46 and Supermarine "Attacker" fighters, with their swept-wing counterparts, the P1052 and Model 510 respectively, and new versions of the Westland "Wyvern" strike-fighter fitted with Rolls-Royce "Clyde" and Armstrong-Siddeley "Python" propjets. The "Attacker" and "Python-Wyvern" are already in production for the Royal Navy, and there are persistent rumours that the P1052 will be built in Australia for the R.A.A.F.

Perhaps the most amazing fact of all is that almost every new British aircraft mentioned in this article has made its first flight within the last six months. There is little reason to suppose that the next six months will prove any less exciting.

A SCOTTISH LOCOMOTIVE SOCIETY

A new organisation for students of locomotive design and performance, with headquarters in Glasgow, is being formed under the title "*Scottish Society of Students of the Locomotive.*" The founders are satisfied that this Society will fill a gap in the serious study of the locomotive not at present provided for by any other organisation.

The Acting Secretary is Mr. R. C. Menzies, 3, Victoria Park Drive South, Glasgow W.4.

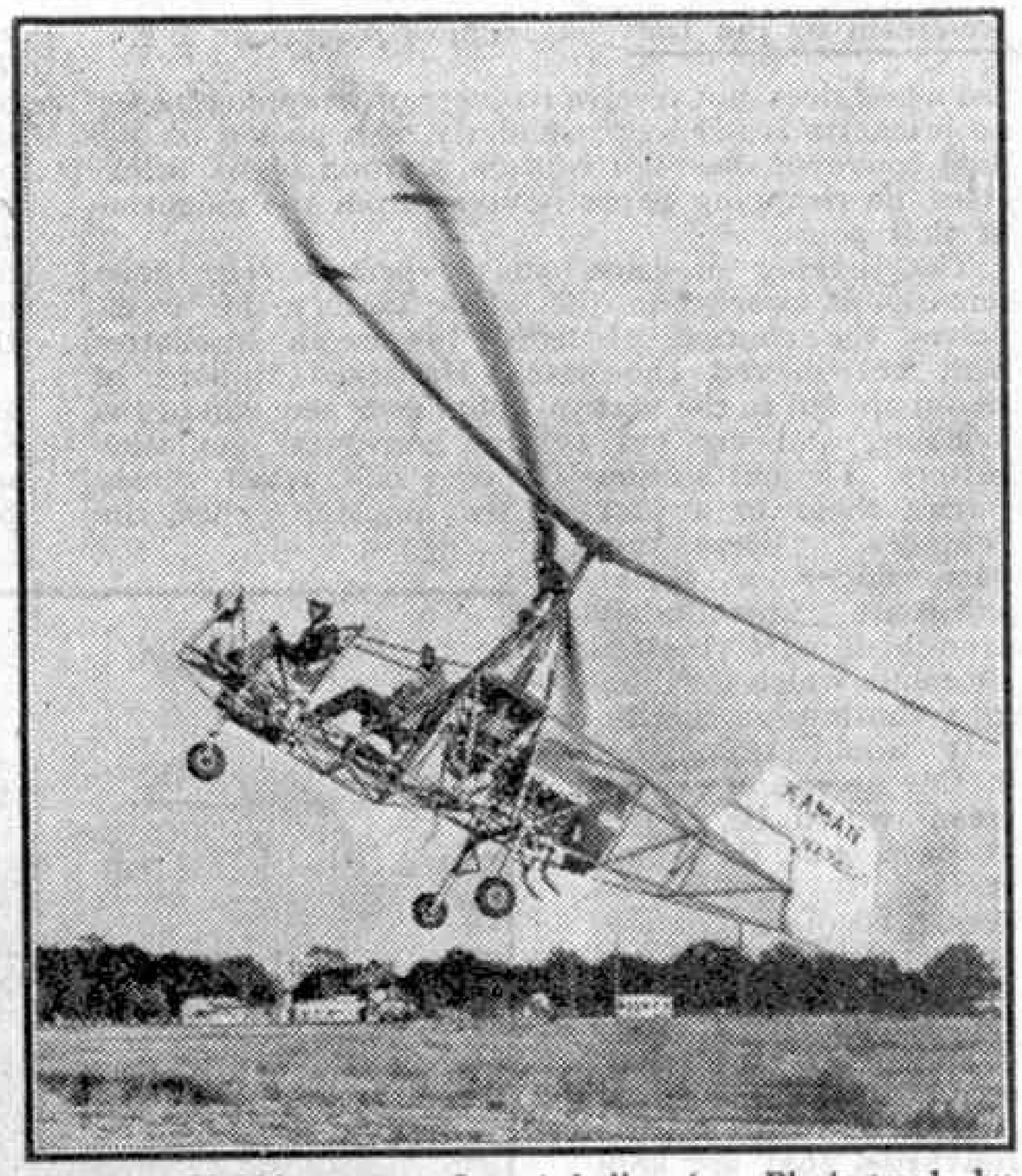
A METAL OF THE FUTURE

Some day supplies of such metals as lead, tin, zinc and copper will run out, especially if we have more "scientific" wars like the last one, in which enormous quantities of these and other metals were used up. Fortunately there are other metals that so far have not been needed, and in the years to come some of these may become better known to us. This has already happened with aluminium and magnesium. Another metal that at present is well behind these in the queue for exploitation is titanium. This is unfamiliar to us, not because of its scarcity—titanium is more plentiful in the Earth's crust than either lead or tin—but because it cannot so easily be extracted from its ores.

Titanium has been recognized as an element for more than 150 years, but until comparatively recently no particular use had been found for it, and it was of interest only to chemists. Then it was discovered that titanium oxide, a combination of the metal with the oxygen of the air, could be made into a splendid white paint that is outstanding for its covering power. Interest in the metal grew further when it was found that mechanically it was similar to stainless steel, although it is much lighter, and there are hopes that its alloys will be as superior to the metal itself as steel is to iron.

Air News

By John W. R. Taylor



Kaman K-190, a new 3-seat helicopter. Photograph by courtesy of Kaman Aircraft Corporation, U.S.A.

Another New Helicopter

The Kaman K–190, illustrated on this page, is certainly not the most handsome helicopter ever built, but its makers claim that it is the most manœuvrable and easiest to fly. Judging from newsreel films of it shown in this country, they are probably right.

Secret of the K–190's success is the novel servo-control flap fitted near the tip of each blade of its two intermeshing rotors, which revolve in opposite directions like an egg-beater. The flaps are used to control the pitch of the blades, to send the machine forward, backward, up or down, so dispensing with the complex mechanism which controls the blades of a conventional helicopter. As a result, the pilot's controls are lighter, there is no need for a tail anti-torque rotor and the aircraft is unusually manœuvrable.

The K–190 is a 3-seater, powered by a 190 h.p. Lycoming engine, which gives it a top speed of 85 m.p.h. Production this year will be limited to about 20 aircraft, intended mainly for crop-spraying work, and costing £6,250 each. By next year, however, Kaman hope to reduce the price by half.

R.A.F. Re-Equipment Overseas

Considerable progress has been made with the re-equipment of R.A.F. squadrons overseas. Jet aircraft have replaced piston-engined types in a number of squadrons, while various other units are receiving modern replacements for war-time aircraft.

Three fighter squadrons in Germany now have de Havilland "Vampire" 5 jet fighters, and squadrons in Malta and Cyprus have the "Vampire" 3. The R.A.F.'S new light tactical bomber, the Bristol "Brigand," is in service in Iraq, at Aden and Kuala Lumpur, and a meteorological flight of "Brigands" has been formed at Negombo, Ceylon.

As part of the complete re-equipment of Transport Command, five "Dakota" squadrons in the Middle East will receive Vickers "Valetta" medium-range transports by the end of the year.

Pan American Anniversary

When Pan American World Airways Flight 100 took off from New York for London on 28th June last it completed 10 years of regular transatlantic passenger service. The first passenger flight, with 22 passengers aboard the "*Dixie Clipper*," took off from Port Washington, Long Island, on 28th June, 1939, and landed on the Tagus River, Lisbon, just under 24 hrs. later, reaching Marseilles the next day.

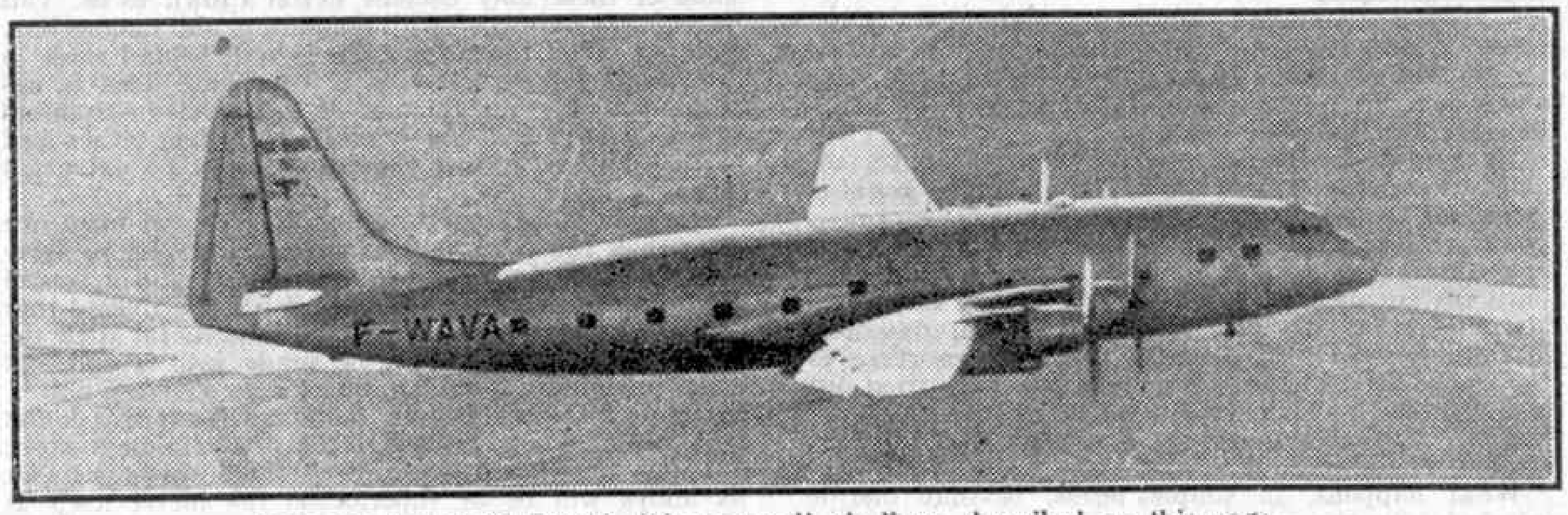
In the 10 years following that inaugural flight, P.A.A. flew over one billion passenger miles, carrying 413,148 people between New York and London, Lisbon, Barcelona, Vienna, Frankfurt, Shannon, Brussels and Marseilles, and on to Calcutta and Johannesburg.

Giant French Air Liner

The Aerosudest SE 2010 "Armagnac" air liner, illustrated at the foot of this page, provides striking proof of the progress made by French designers since the end of the war. It is by far the largest Continental landplane yet flown, with accommodation for 98 passengers and a loaded weight of 75 tons, ten tons more than the well-known Boeing "Stratocruiser." Like that American air liner, it has four 3,500 h.p. Pratt and Whitney "Wasp Major" engines, which give it a top speed of 335 m.p.h. and a range of 2,470 miles at 276 m.p.h. with full load. A total of 25 "Armagnacs" are on order for Air France.

Jet-Powered B-36

To improve take-off and combat performance, the giant American Convair B–36 bomber is now being fitted with two jet-engines under each wing-tip, giving it a total of ten engines, developing 21,000 h.p. plus 20,000 lb. of jet-thrust. The four General Electric J.47 jets are mounted on "stalks" in the same way as the engines of the Boeing B-47 jet bomber.



The big 4-engined French "Armagnac" air liner, described on this page.



Bristol 170 "Freighter." The illustrations on this page are by courtesy of the Bristol Aeroplane Co. Ltd.

Good Service by "Freighters"

From all over the world come reports of continued fine service by Bristol "Freighters," which are now being operated in 15 different countries. One "Freighter" owned by Australian National Airways, for example, made 48 flights in a trial period of 14 days. During that time it was in the air for 117 hrs., carried nearly 400,000 lb. of freight and logged 18,000 miles of flying. As a result, A.N.A. ordered two more.

The Royal Australian Air Force, impressed by demonstrations during a "Freighter" tour of Australasia, ordered three to transport men and material to and from its Woomera rocket range, where landing facilities are of the most primitive kind, quite unsuitable for aircraft which require proper runways.

On the Berlin Air Lift a single "Freighter" carried 76,400 lb. in one day. Over a period of 10 days, it carried 292,700 lb. into and out of Berlin.

Typical of the awkward loads transported by "Freighter" was a 3¼ ton air compressor flown from Britain to Saudi Arabia, which was at work within four days of leaving England. In Ecuador, an eight-ton oil well vehicle of massive proportions was partly dismantled and flown in two trips to an oil well site in the heart of jungle territory, inaccessible to other forms of transport.

Silver City Airways is running a car ferry service across the English Channel with two "Freighters." In three months these aircraft carried nearly 400 cars and 1,500 passengers between Lympne and Le Touquet, taking only 20 minutes for the journey, which is operated 16 times a day in each direction.

Greatest tribute of all, however, is the fact that the "Freighter's" design has set a fashion for cargo-carrying aircraft that has been followed by designers all over the world.

American Air Tours of Europe

American Overseas Airways has begun to operate special "See Europe in a Fortnight" trips designed to attract a completely new class of American tourists who aim, through transatlantic air travel, to spend their two-week holidays overseas.

One 14-day tour offers two days in London, one in Windsor, two in Paris, one in Versailles, two in Brussels, and a day each in Ghent and Bruges, the Hague and Amsterdam. Ten-day tours give passengers an intensive trip to Ireland and London, Scotland and London, or England and France. Americans interested in Scandinavia can choose tours throughout Norway, Sweden and Denmark.

"Cherub" Aero Engine's Fine Record

A letter received by the Bristol Aeroplane Company from Mr. Vincent Boyes of Gippsland, Victoria, reveals that a Bristol "Cherub" aero engine which left the factory in July 1925 is still in active use in Australia after 24 years' continuous service.

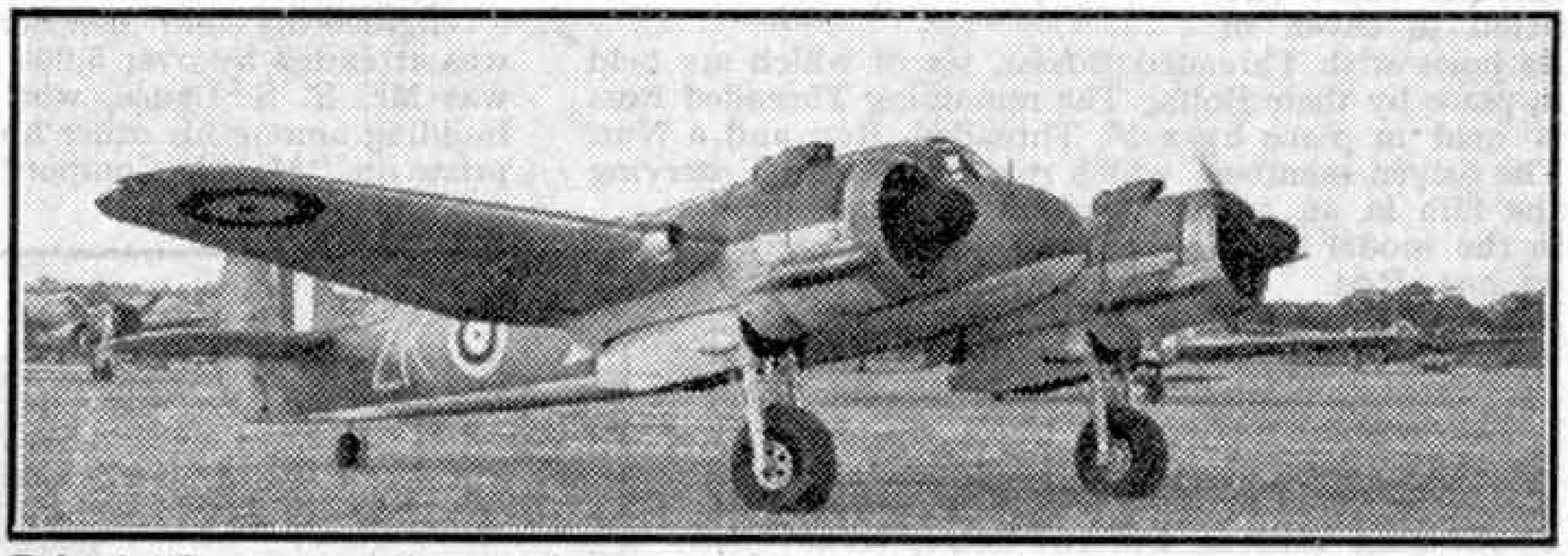
The "Cherub" is flying in the Beardmore "Wee Bee" monoplane which won chief prize at the Lympne Light Aeroplane Competitions in 1924, and is a two-cylinder horizontally-opposed engine developing 25 h.p. The last one was built by Bristols in 1926.

The "Beau" Retires

One of the most famous R.A.F. wartime aircraft, the Bristol "Beaufighter," is being withdrawn from operational service after an active career of nearly nine years. The prototype "Beau" first flew in July 1939. The first production aircraft, equipped with Airborne Interception radar, came into service in September 1940, and five night-fighter squadrons were equipped with the type by the Spring of 1941. They inflicted steadily increasing casualties on German night bombers until *Luftwaffe* attacks died down.

Also in 1941 "Beaufighters" were allotted to North Sea patrol and escort duties, later machines being adapted to carry torpedoes and rockets which were used with devastating effect.

Others were sent to the Middle East, where their ground strafing activities in the Western Desert became one of the highlights of that campaign. In the Far East, Japanese soldiers called the "Beaufighter" "Whispering Death," the combination of a low approach and quiet engines often making its presence over the enemy felt and seen before it was heard.



Bristol "Beaufighter," one of the R.A.F. types that became famous in the second World War and is now being retired from operational service.

Among the Model-Builders

By "Spanner"



W. T. Taylor, Leigh, Stoke-on-Trent, who won First Prize in the No. 4 Outfit Model-Building Competition.

HOW TO USE MECCANO PARTS

Threaded Pin (Part No. 115)

The smooth portion of the Threaded Pin terminates in a squared shoulder and short threaded shank. The shoulder permits of the Pin being secured rigidly with the aid of a spanner. The part is intended primarily for use as a handle or as a fixed pivot for a ½" or 1" loose Pulley, but it has many other valuable uses. For example, in Fig. 1 it serves a useful purpose in the construction of a small Maltese Cross mechanism, a device that is very largely used in cinematograph machines for pulling the film through the projector in a series of intermittent movements, so that each tiny picture is made to pause for a moment behind the lens. If the film were pulled through in a continuous movement the screen would have the appearance of a confused series of pictures instead of the familiar clear and steady picture.

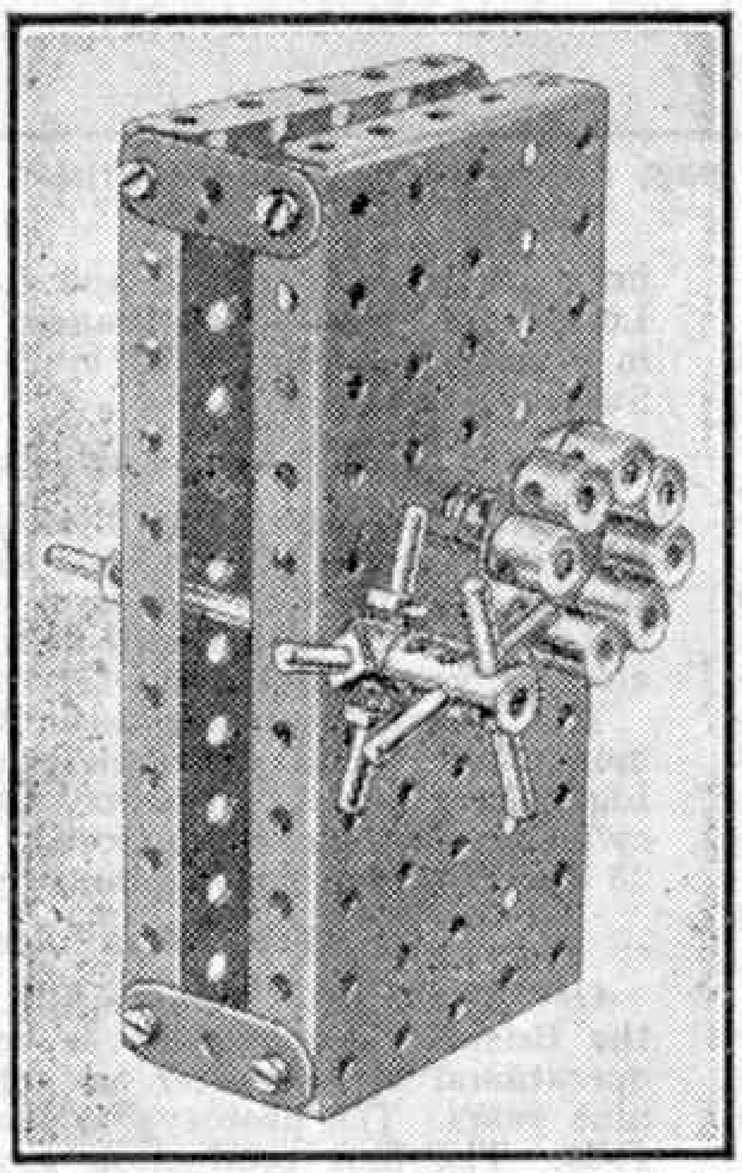


Fig. 1. The Meccano Threaded Pin is used to good purpose in this interesting Maltese Cross Mechanism.

The driving member consists of a Bush Wheel mounted on a suitable shaft and fitted in seven of its holes with Threaded Bosses, six of which are held in place by their Bolts. The remaining Threaded Boss is held in place by a 1" Threaded Rod and a Nut. The driven member, which rotates the drum carrying the film in an actual machine, is represented in the model by two built-up fittings carried on one Rod. The inner fitting consists of a "spider" taken from a Swivel Bearing, carrying four Threaded Pins. These Threaded Pins lock the "spider" securely to the Rod.

The second fitting is built up from a Coupling carrying two 1½" Rods. These parts are fitted at right-angles to each other by securing them in the two outer, transverse holes of the Coupling.

The operation of the movement is as follows. As the driving member rotates, the Threaded Rod strikes one of the Threaded Pins on the driven member, and at the same time the gap in the circle of Threaded Bosses allows one of the 1½" Rods to pass. Except when the Threaded Rod rotates it, the driven member is locked in position by the Rods in the Coupling as they bear lightly against the Threaded Bosses fitted on the Bush Wheel.

A SIMPLE FREE WHEEL DEVICE

A free wheel device of some kind is often required in Meccano mechanisms and fortunately there are many ways in which such a device can be built up. When space permits, the idea shown in Fig. 2 might be found useful. In this arrangement a Sprocket Wheel is mounted freely on a Rod, and is fitted with two ⅜" Bolts, each of which carries a Spring Clip. The Clips are arranged on the Bolts so as to contact the teeth of a Ratchet Wheel fixed to the Rod against the face of the Sprocket. The Ratchet Wheel and Sprocket are held in place by a Collar. The lugs of the Clips must be adjusted so that they permit the Ratchet to revolve in one direction but prevent movement in the other by engaging the teeth. If a little oil is applied to the Ratchet the device will be found to work quite smoothly and reliably.

THE GAINSBOROUGH SOCIETY OF MODEL ENGINEERS

At the Annual Exhibition organized by the Gainsborough Society of Model Engineers a prominent feature was the Meccano model section in which several fine exhibits were on view. One of the most interesting was an ingenious "Penny-in-the-Slot" machine for delivering boxes of matches, which was awarded First Prize. There was also a well-designed motor lorry, which has previously won a prize in an "*M.M.*" competition, and a giant crane. A photograph showing a few of the exhibits is reproduced on the following page. There were many other sections covering all branches of model engineering and handicrafts, and the exhibition was attended by over 5,000 people. One of the judges was Mr. E. S. Druce, who includes Meccano model-building among his other hobbies and has won several prizes in "*M.M.*" Competitions.

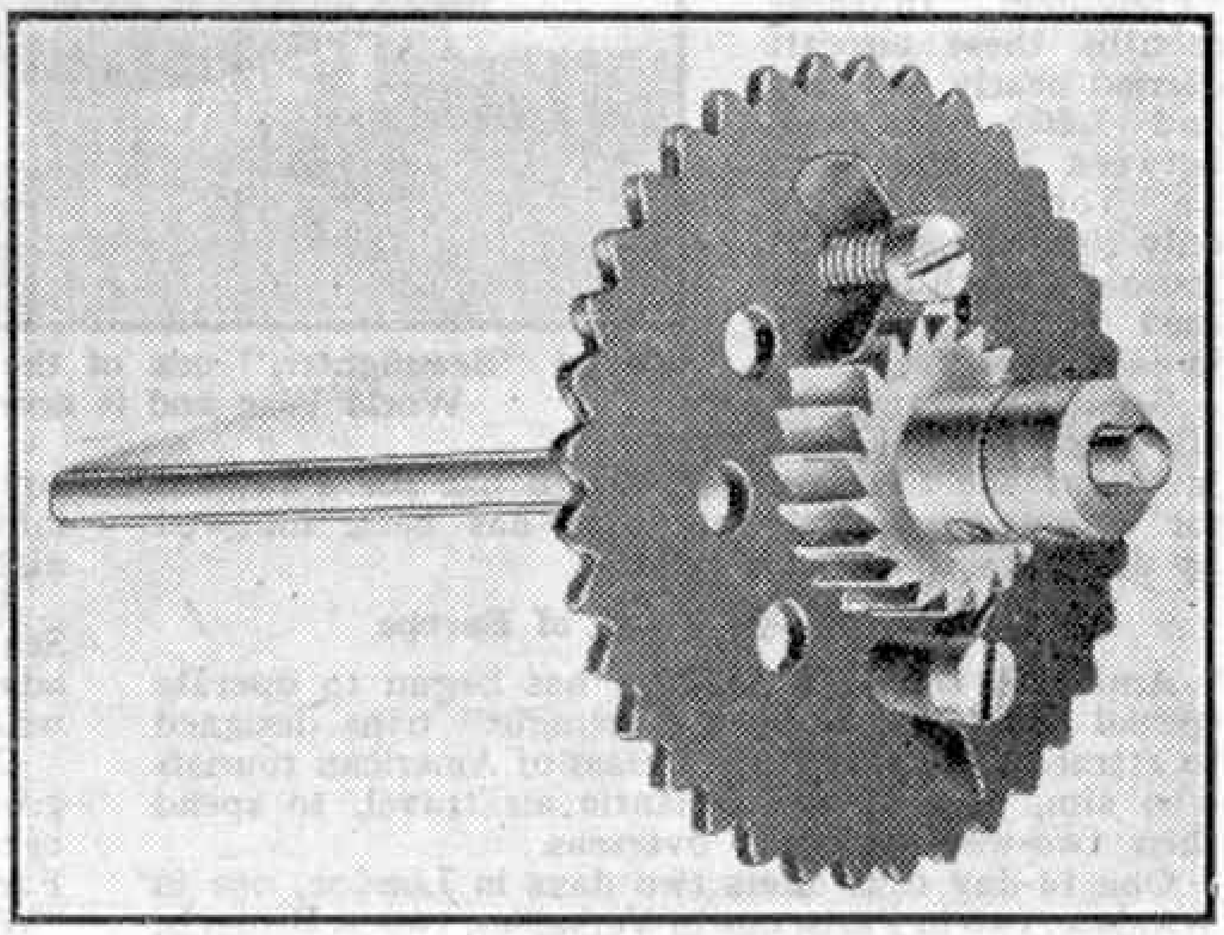
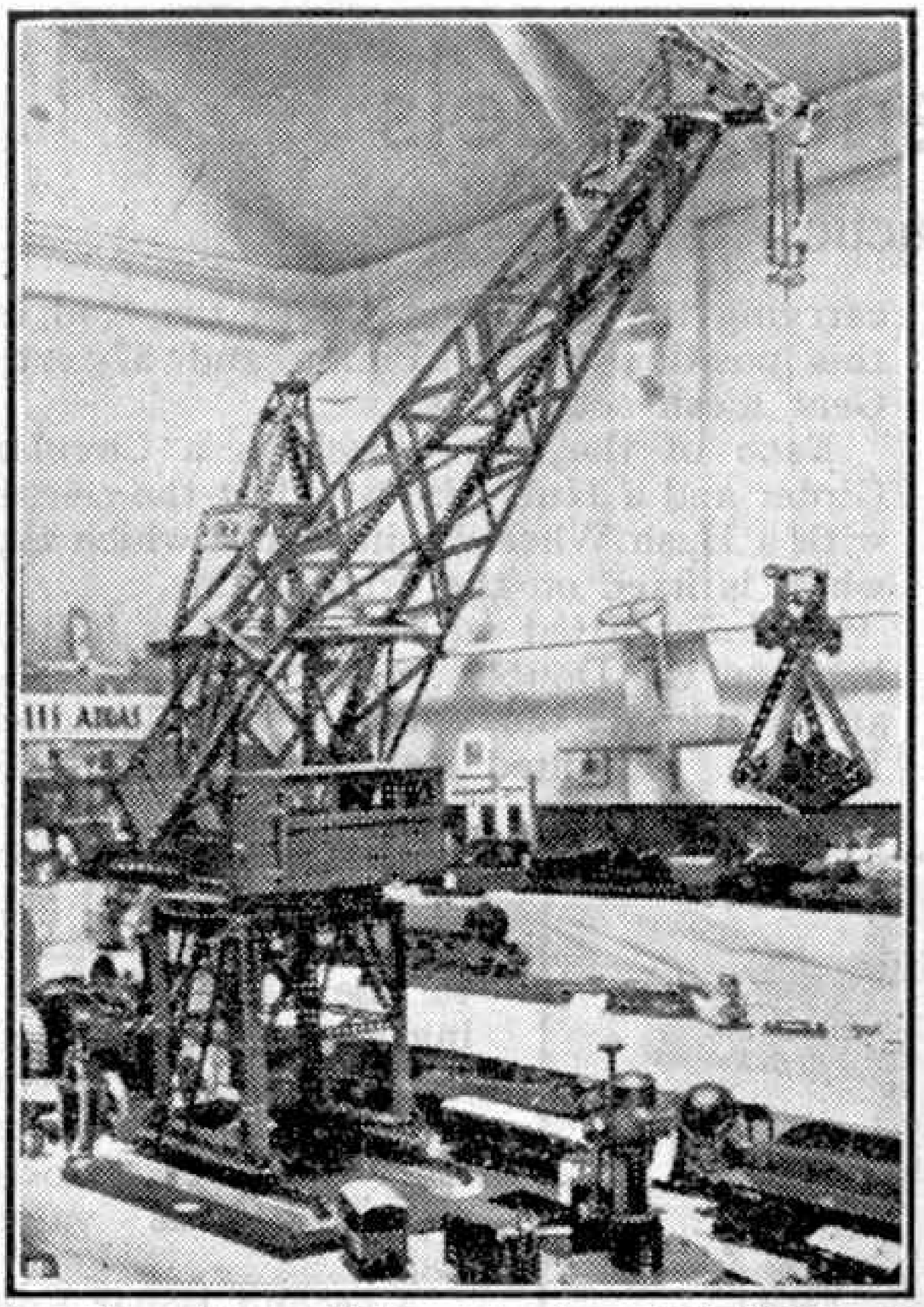


Fig. 2. A simple free wheel device in which Spring Clips are put to novel use.



A section of the exhibits at the Annual Exhibition of the Gainsborough Society of Model Engineers. The fine Meccano crane was built by Mr. E. S. Druce.

HEAVY DUTY CLUTCH

The single plate clutch shown in Fig. 3 is capable of transmitting a drive of considerable power, and is specially suitable for use in large models of heavy lorries, buses, etc. The motor shaft 1 is fitted with a Face Plate 2, but the Rod projects only part of the way into the boss of the Face Plate. The output shaft occupies the free part of the boss.

The shaft 2 carries a 1½" Pulley 3, a Bush Wheel 4 and a second Bush Wheel bolted inside the Wheel Flange 5 by four 1⅛" Bolts 6. Compression Springs are placed on the 1⅛" Bolts between the Bush Wheel 4 and the Wheel Flange, and a Motor Tyre to fit a 1½" Pulley is carried inside the rim of the Wheel Flange. The 1½" Pulley and the Wheel Flange are free on Rod 2, but the Bush Wheel 4 is fixed so that the Compression Springs force the Wheel Flange against the Motor Tyre and the Face Plate.

The withdrawal mechanism is operated by a foot pedal 7 that is linked by a Strip to a Crank 8. Crank 8 is fixed on a transverse Rod mounted below the Rod 2, and carries two Couplings 9. A Centre Fork fixed in each Coupling engages the rim of Pulley 3, so that when the pedal is depressed the Pulley is withdrawn against the action of the Compression Springs.

It is important to make sure that the Compression Springs apply equal pressure to the Wheel Flange, and that the Centre Forks engage the rim of Pulley 3 simultaneously. The rim of the Pulley should be oiled to reduce friction when the clutch is disengaged, and light machine oil should be applied also to the 1⅛" Bolts. The oil should be used sparingly, however, as there is a tendency for it to be flung on the friction surfaces as the assembly rotates.

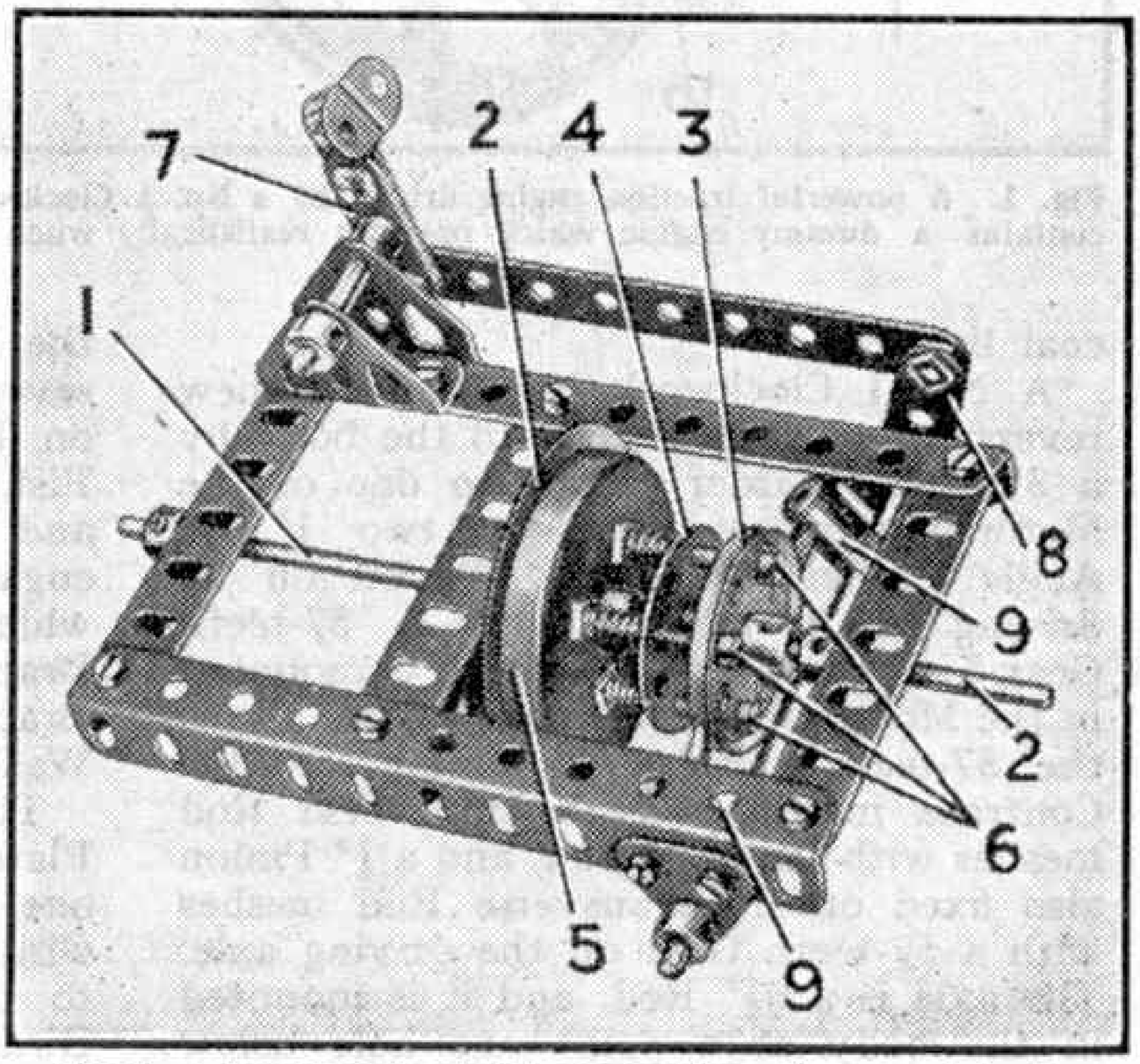


Fig 3. A heavy duty clutch mechanism of unusual design.

MODEL-BUILDING COMPETITION RESULTS

We announce below the names of prize-winners in recent Meccano model-building competitions. Several of the successful competitors were taking part in a Meccano contest for the first time, and I am very pleased that they have managed to obtain prizes at their first attempt.

No. 4 Outfit Contest (Home Section)

First Prize, Cheque for £3/3/–: W. T. Taylor Stoke-on-Trent. Second Prize, Cheque for £2/2/–: D. R. Davies, Harrow. Third Prize, Cheque for £1/1/–: G. M. Taylor, Slough.

Six Prizes each of 10/6: G. P. Hughes, Prenton; I. Mills, Cheltenham; D. Atkinson, Boston; L. E. Adams, Oldbury; C. J. C. Harden, Cambridge; P. J. Skellern, Northolt.

Four Prizes each of 5/–: D. S. Lewis, Gwernogle; N. C. Gray, Bawtry; I. Macfarlane, Stafford; G. R. Parkes, Birmingham.

"NEW YEAR" COMPETITION

Home Section

First Prize, Cheque for £3/3/–: K. L. Walker, W. Worthing. Second Prize, Cheque for £2/2/–: F. Coltman, Loughborough. Third Prize, Cheque for £1/1/–: W. A. Picken, Gainsborough.

Five Prizes each of 10/6: M. G. Slater, Newcastle-on-Tyne 3; I. A. Heywood, Macclesfield; W. Norfolk, Feering; M. E. Cane, Fleet; G. Hyde, Llanelly.

Five Prizes each of 5/–: I. Macfarlane, Stafford; G. Hayward, Wickham Market; C. E. Wrayford, Bovey Tracey; T. Lyford, Didcot; G. Wyeth, Alton.

Overseas Section

First Prize, Cheque for £3/3/–: A. W. Dickie, Dunedin. Second Prize, Cheque for £2/2/–: G. Burns, Warragul, Australia. Third Prize, Cheque for £1/1/–: B. Williamson, Karori, Wellington.

Five Prizes each of 10/6: L. Phillips, Westport, New Zealand; J. Lowndes-Yates, Calgary, Canada; S. Wall, Gibraltar; J. B. Thompson, Nimbin, Australia; M. M. Maffei, S. Paul, Brazil.

Five Prizes each of 5/–: S. Reid, Quebec; K. Tighe-Umber, Dunedin; G. Ellis, Johannesburg, S.A.; G. T. Jones, Kingston, B.W.I.; J. Sutcliffe, Nairobi, Kenya.

New Meccano Models

Clockwork Traction Engine

OUR new model this month is a powerful traction engine operated by a Clockwork Motor. It is simply designed and easy to build.

Each side of the body consists of a $5\frac{1}{2}'' \times 3\frac{1}{2}''$ Flat Plate, bolted at the rear to a $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate 1 and at the front to $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 2 and 3. The sides are extended by $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates joined by three $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips which represent the coal bunker.

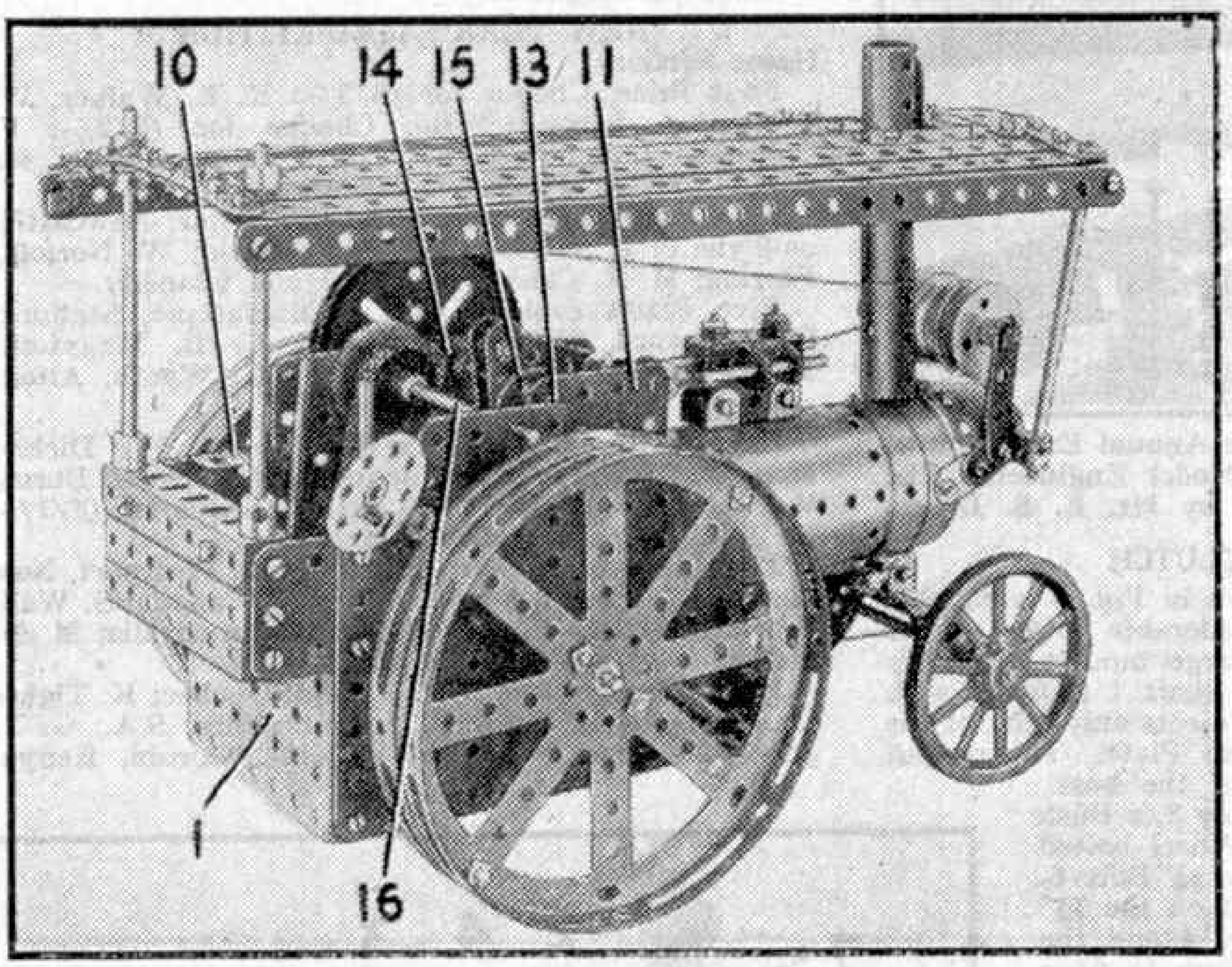


Fig. 1. A powerful traction engine driven by a No. 1 Clockwork Motor. It contains a dummy engine which operates realistically when the tractor is in motion.

A No. 1 Clockwork Motor of the new reversing type is attached to the body by a 3″ Angle Girder bolted to one of the Motor side-plates, and by two $1'' \times \frac{1}{2}''$ Angle Brackets 4. A $\frac{1}{2}''$ Pinion on its driving shaft meshes with a 57-teeth Gear 5 on a $2\frac{1}{2}''$ Rod 6. Rod 6 is mounted in the Motor side-plates, and carries above the 57-teeth Gear a $\frac{1}{2}''$ Pinion. A $1\frac{1}{2}''$ Contrate mounted on a transverse Rod meshes with the $\frac{1}{2}''$ Pinion, and a $\frac{3}{4}''$ Pinion also fixed on the transverse Rod meshes with a 57-teeth Gear on the driving axle. The axle is a $6\frac{1}{2}''$ Rod, and it is mounted in the body at a point one hole below and three holes in front of the Rod carrying the $\frac{3}{4}''$ Pinion. With the Rod in this position the $\frac{3}{4}''$ Pinion and 57-teeth Gear mesh accurately.

Each of the rear wheels is a Circular Girder and a Hub Disc fitted at the centre with a Bush Wheel by means of which the wheel is fixed on the driving axle.

A Boiler fitted with one End is bolted between the Double Angle Strips 2 and 3, and a cylinder block formed by a Channel Bearing is bolted to Double Brackets fixed to the boiler. Bearings for the piston rod are provided by Angle Brackets fixed to the Channel Bearing, and a Rod carried in a Double Bracket bolted to the side of the cylinder block represents the valve rod.

A second Boiler End is attached to the front of the Boiler by $\frac{3}{4}''$ Bolts, and is fitted at the top with a Chimney Adapter and at the bottom with a Double Bracket 7. A further Double Bracket bolted to the Bracket 7 provides support for the front axle, which consists of a 5″ Rod held by Collars in a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip. A short length of Cord is tied at each end to the Double Angle Strip, and then passed several times round three Couplings fixed on Rod 8. This Rod is passed through Fishplates bolted to the front of the body, and on it is a $\frac{1}{2}''$ Pinion 9. The Pinion engages a Worm on the steering column, which is a $6\frac{1}{2}''$ Rod mounted in Angle Brackets fixed to the body. The Angle Brackets are spaced from the body by two Washers on each bolt holding them.

The upper edges of the $5\frac{1}{2}'' \times 3\frac{1}{2}''$ Flat Plates are fitted with $5\frac{1}{2}''$ Angle Girders, one of which is seen at 10. A $3\frac{1}{2}''$ Flat Girder is bolted across these Girders and to the Double Angle Strip 3, and the Girders are also joined by a $3\frac{1}{2}''$ Strip placed at a point three holes behind the

Flat Girder. The Girder Brackets 11 provide bearings for the crankshaft and are bolted to the 3½″ Strip and the 3½″ Flat Girder.

The crankshaft is a 2″ Rod 12 and a 1″ Rod 13, each of which is fitted at its inner end with a Double Arm Crank. Rod 12 carries a ¾″ Pinion 14 and Rod 13 an Eccentric 15. The connecting Rod is a 2″ Strip pivoted on a ½″ Bolt passed through the slotted holes of the Double Arm Cranks. The Bolt is fixed to each of the Cranks by nuts. The connecting rod is linked to the piston rod by a Rod and Strip Connector, and the Eccentric 15 is connected to the valve rod by a second Rod and Strip Connector.

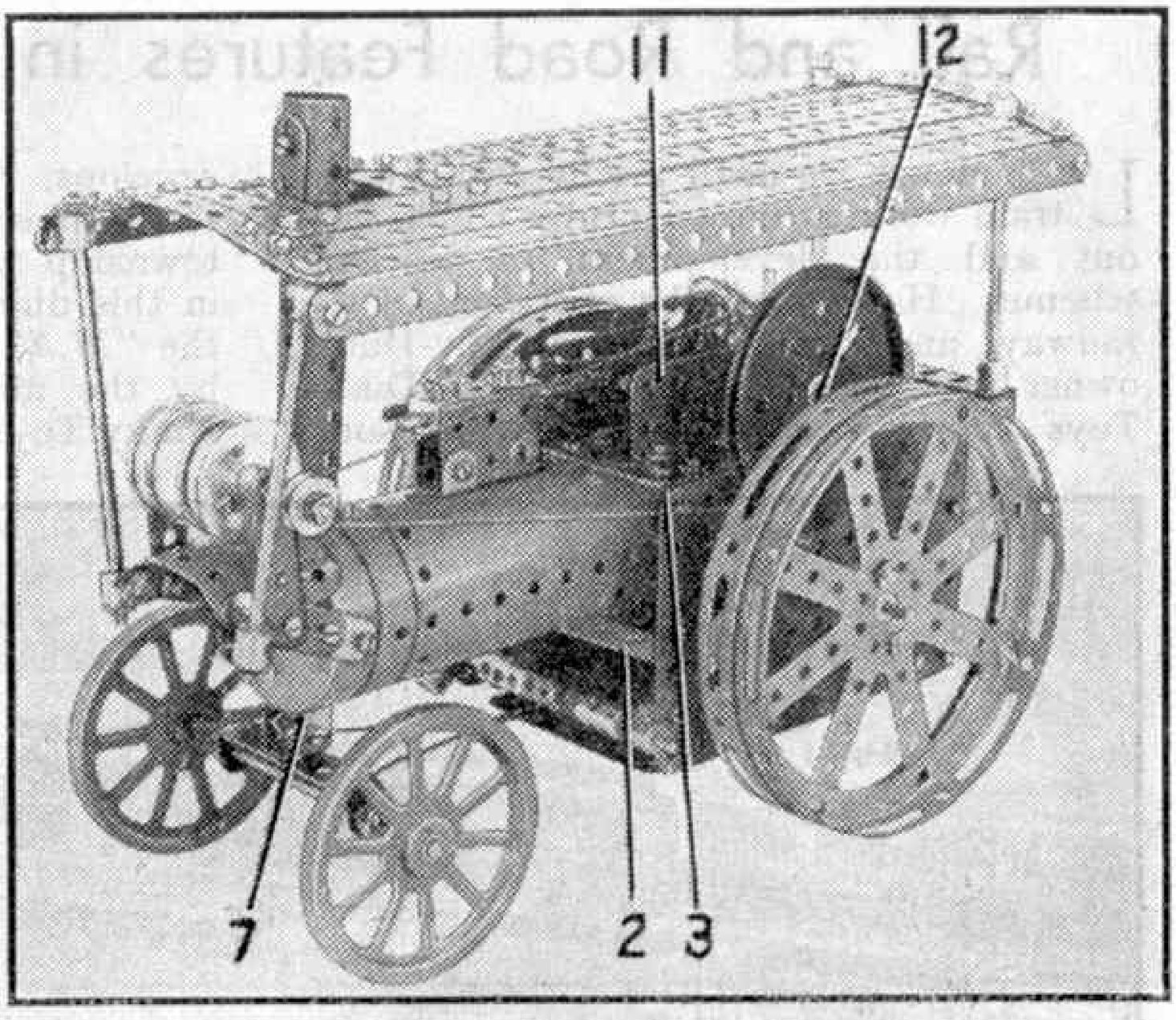


Fig. 2. Another view of the traction engine.

The ¾″ Pinion 14 meshes with a 50-teeth Gear on Rod 16. This Rod is mounted in Girder Brackets bolted to the 5½″ Angle Girders 11, and is fitted with a 1″ Sprocket. The Sprocket is connected to a similar Sprocket on the Rod carrying the 1½″ Contrate.

A 2½″ × 1½″ Flexible Plate forms a platform for the dynamo and is attached to the boiler front by a Fishplate at the top and by a 1½″ Strip extended by a Fishplate at each side. The dynamo is made up of four 1⅛″ Flanged Wheels fixed on a 3″ Screwed Rod. A ½″ Pulley at the end of the Screwed Rod is connected by Cord to the flywheel on the crankshaft. The dynamo is held between 2″ Strips bolted to the platform.

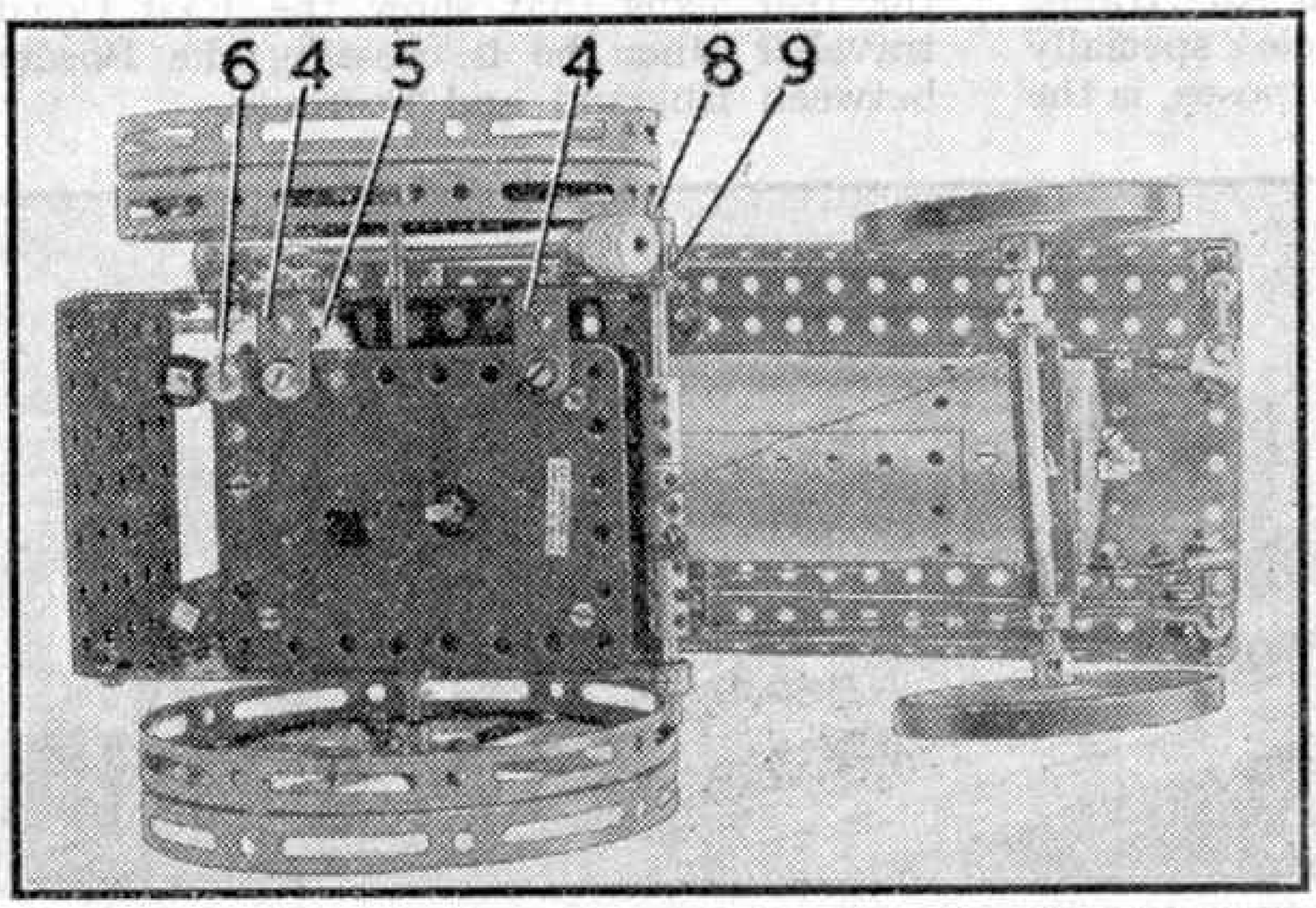


Fig. 3. An underneath view of the tractor showing how the Motor is fitted.

OCTOBER GENERAL MODEL-BUILDING COMPETITION

This month usually brings the start of the main model-building season of the year, and with this in mind we are announcing a new General Model-Building Contest. These competitions have always been very popular, and in view of the approaching long dark evenings we are looking forward to receiving a record number of entries.

The competition is open for models of all types built from Meccano parts, and there is no restriction on the size of Outfit or number of parts that may be used. The main points the judges will look for in entries are originality in the choice of subject, neatness in design, and novelty in the use of parts.

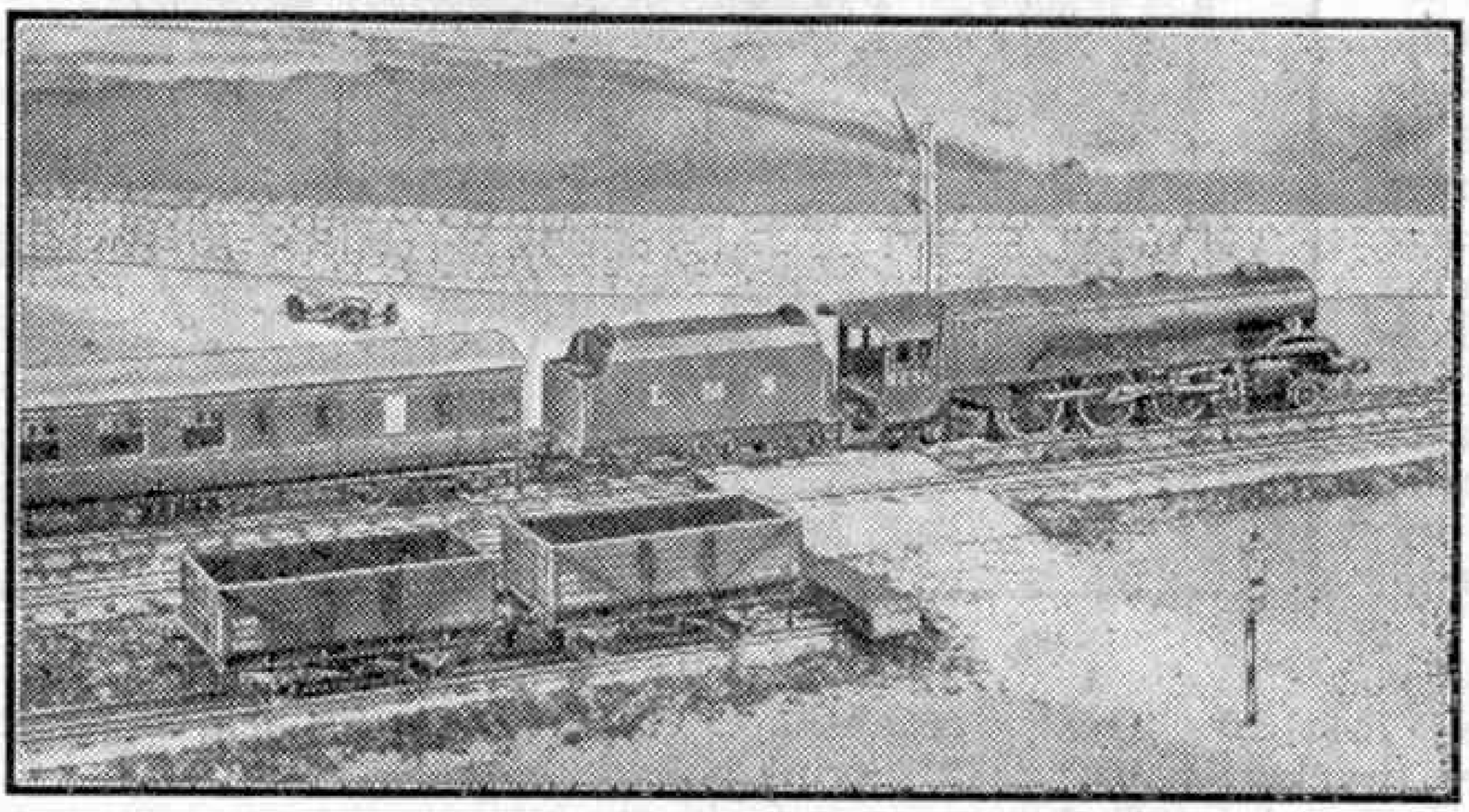
Actual models must not be sent. All that is required is a clear photograph or sketch, together with a few brief notes covering the main points in design and any interesting constructional features.

The contest will be divided into two sections, for Home and Overseas readers respectively. The closing date in the Home section will be 30th November, 1949; entries in the Overseas section will be accepted until 31st January, 1950. Entries must be addressed "*October General Model-Building Contest, Meccano Ltd., Binns Road, Liverpool 13,*" and the competitor's age, name and address must be written clearly on the back of each photograph or sketch submitted.

The following prizes will be awarded in each Section of the Contest. First, Cheque for £3/3/–; Second, Cheque for £2/2/–; Third, Cheque for £1/1/–. There will be also five prizes each of 10/6 and five of 5/–.

Rail and Road Features in Hornby-Dublo

LAST month we dealt briefly with simple train working on a Hornby-Dublo lay-out and the development of working schemes. Having got the operation of the railway under way, the Hornby-Dublo owner usually makes good use of Dinky Toys motor vehicles to provide some additional life and movement about the layout.



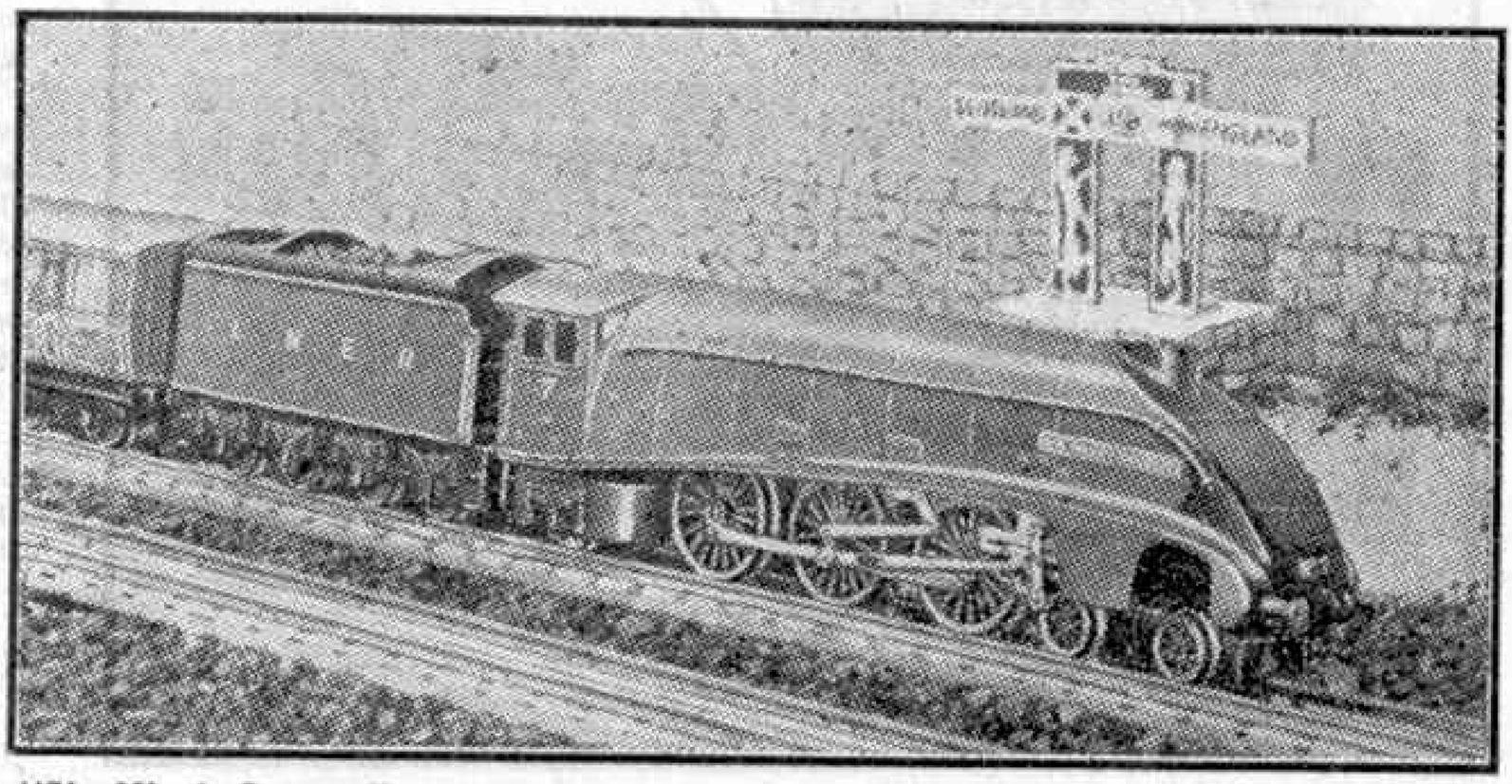
The Hornby-Dublo "Duchess of Atholl" and its train passing a wayside siding. The scenic background and wall are very effective.

The Dinky Toys Double Deck Bus mentioned last month can be supplemented by the Single Deck Bus for certain services. They can be supposed to be operated by the railway authorities, or they can represent stock of an independent operator. Whichever arrangement is favoured, the running of the buses can be made to connect with the operation of trains. Another Dinky Toys vehicle specially suitable for Hornby-Dublo purposes, is the Forward Control Lorry. Some Hornby-Dublo owners make a prominent feature of their road services and the younger members of the staff are usually only too willing to do the necessary "driving".

So it becomes necessary to separate the railway from the road, usually by means of simple fencing or walls made up in wood or card. As the general scheme develops, buildings almost always make their appearance, until quite a miniature township is the result. The possibilities in this direction have been well shown in the "*M.M.*" on several occasions recently by the miniature towns constructed by Dinky Toys enthusiasts.

Lineside, or road-side, structures are usually made of card. Sometimes it is possible to use a box or carton for the main part of the building, various additions being built on as required. Plain boundary walls, which are needed to some extent on most layouts, can be simple strips of wood or card; some boys may prefer fencing, but walls are easier to make. As with buildings, the finishing can be done by painting, and then different styles of construction can be readily shown. The lineside walls in the illustration on this page were made in this way; the actual "stones" are represented by ink lines.

The lineside sign in the lower illustration is an unusual feature typical of the numerous items that a keen Hornby-Dublo owner can make for himself. It is made in fairly thick card and its design is based on that of the real signs that show the East Coast traveller when he is crossing the Border between England and Scotland.



"Sir Nigel Gresley" crossing the "Border" on a Hornby-Dublo layout. The lineside sign and the boundary walls are good examples of home-made accessories.

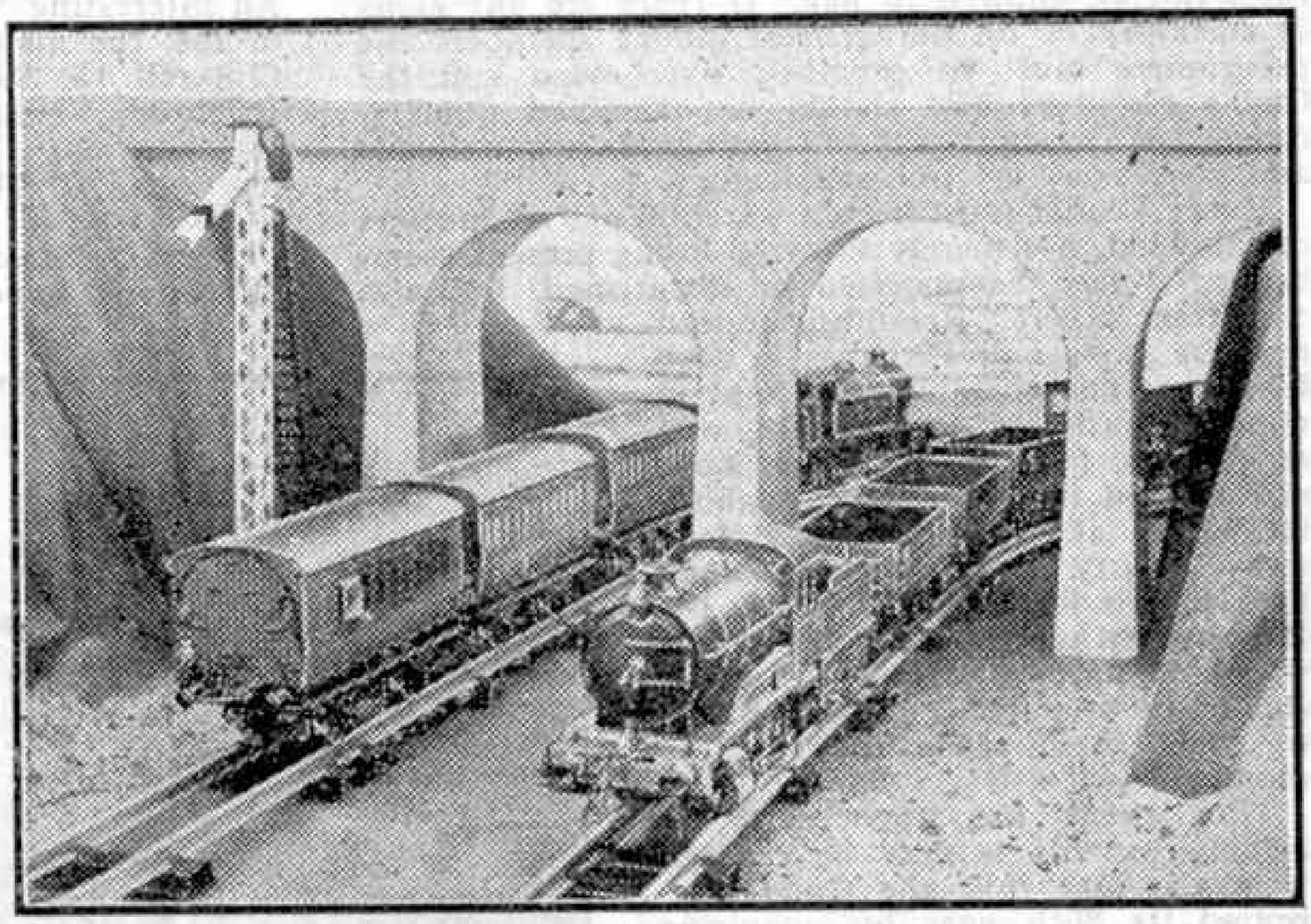
Head and Tail Lamps for Hornby Trains

LAMPS of various kinds are used for many different purposes in railway working, but probably those that we notice most, as lamps, are carried at the front end of engines or at the tail of their trains. These are always fascinating, and in last month's "*M.M.*" the article "*What Do the Headcodes Mean*" dealt with the different arrangements of lamps and route indicating discs, the latter being a special feature of Southern Region operations.

Naturally the keen Hornby railway owner attaches considerable importance to the correct indicating of his trains. All Hornby Locomotives from the No. 101 upward are provided with lamp brackets or "irons" and a set of lamps. As the lamps are separate fittings, and detachable, their positions can be varied just as they are in real practice to indicate different classes of trains. The H.R.C. booklet, as all members will know, contains a diagram of the head lamp code. We soon become familiar with the head lamp positions that we see and use regularly, but it is handy to have the booklet to look at when we are making up a kind of train that we run only occasionally.

The upper illustration on this page shows a through freight train taking its load intact to destination; so the two lamps used are respectively one in front of the chimney and the other in the centre above the buffer beam. The stopping train going the opposite way would have a single lamp in front of the chimney. This indication, and that on the engine of express trains—a lamp over each buffer—are probably the best known.

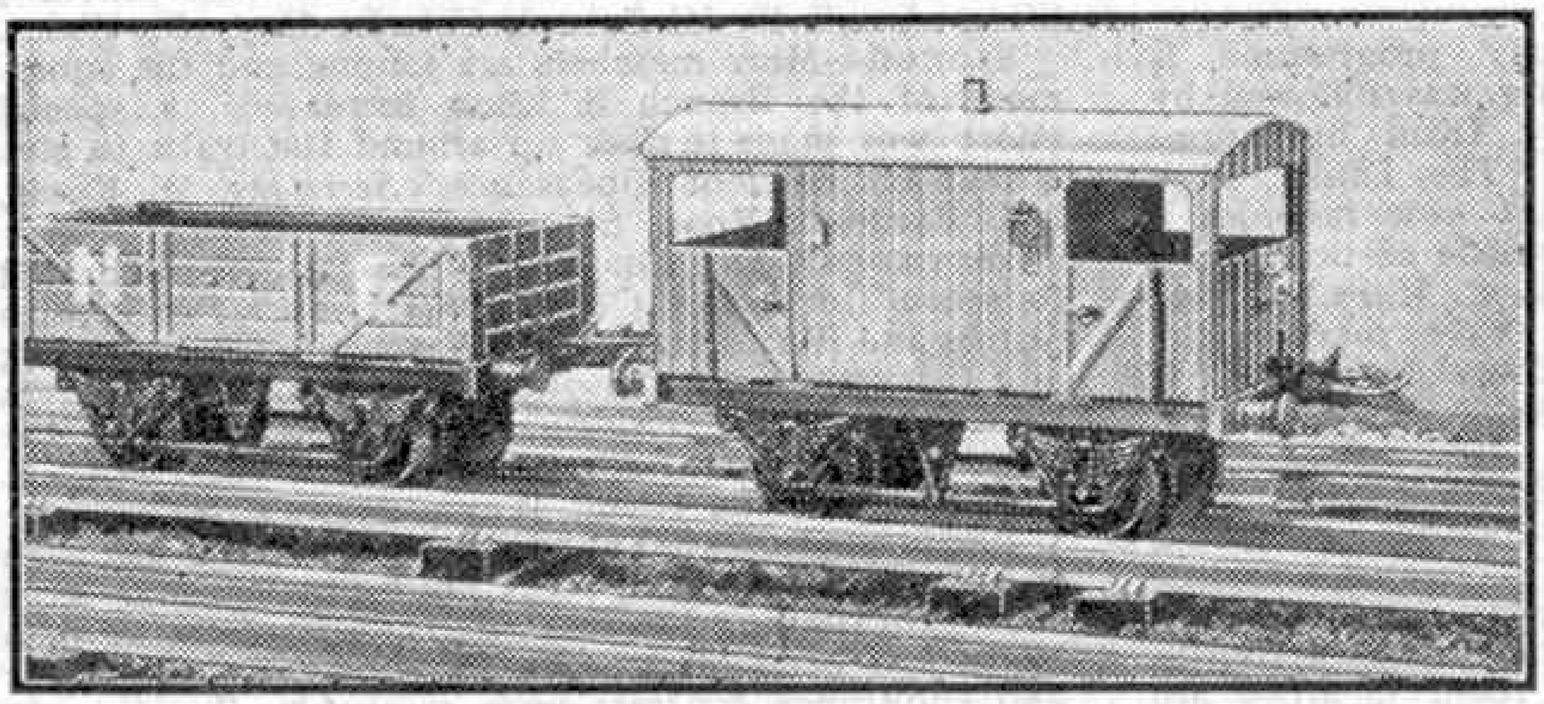
Trains have to carry a tail lamp to show that they are complete and the presence of the lamp must be checked by the signalmen as the trains pass them. So the Hornby No. 101 and 501 passenger train sets have their No. 1 rolling stock fitted with lamp brackets, and tail lamps are provided. Coaches as well as the Passenger Brake Van have brackets, because at times an ordinary coach may have to be the last vehicle of a train.



A through goods train and a stopping passenger train on a Hornby layout pass one another in a realistic cutting.

The fitting of lamp brackets is being extended to Goods Brake Vans of the Hornby range. Real goods brakes display quite an array of lamps, as side lamps are carried in addition to the tail lamp. The side lamps at night each show a white light ahead so that the driver can tell on looking back that his train is complete. The usual red light is shown to the rear. The lower illustration shows a Hornby Goods Brake with side and tail lamps.

At present, spare lamps are not available, so that Hornby train owners must be careful not to lose any.



A Hornby Goods Brake Van showing side and tail lamps in position.

Club and Branch News

WITH THE SECRETARY

THE GUILD'S THIRTIETH BIRTHDAY

All is now well set for the indoor season in Clubs and Branches. The first meetings of the Autumn Session have actually been held in most cases, and the greatest enthusiasm prevails everywhere. This must not be allowed to flag. If there are any signs of slackness or discouragement among members the programme must be promptly overhauled and the Club's resources also should be examined quickly, for good work is impossible if meetings are not enjoyable and conditions are not satisfactory.

Every Leader must keep a watchful eye on matters of this kind, not merely to avoid losing present members who feel disappointed or dissatisfied, but also to attract others. Recruiting indeed remains an ever present task in Club life. It is one that must be kept in mind by ordinary members as well as officials, for unless younger boys are brought into a Club throughout its career it will eventually fade away. Plenty of new members should be available for all Clubs among the Meccano enthusiasts in their districts who have not yet joined, and plans should be made to reach these and to bring them along to the Club room.

How great the opportunity of gaining recruits is may be realized from the fact that the Guild celebrated its 30th year by acquiring 13,000 new members. Its formation was announced in the September-October 1919 issue of the "*M.M.*" and in its lifetime it has enrolled altogether more than 150,000 members.

The Hornby Railway Company is younger, but is equally vigorous. During the past 12 months this organization has gained nearly 20,000 members, and the flow of recruits continues. This should mean greater prosperity among Branches, and splendid opportunities for forming new ones, while Meccano Clubs should find it easier to add to the attractions of their programmes by forming Hornby Train Sections.

CLUB NOTES

THATCHAM M.C.—A very busy programme is followed. The successful Exhibition was followed by intensive Model-building, Hornby Train operations and Stamp Collecting meetings. The Dinky Toys layout also has been extended; it now includes a miniature wood, a town, a countryside section and a coast line with a miniature "*Queen Mary*." Cycle runs, Rambles and Paperchases have marked the summer season. Club roll: 30. *Secretary:* B. M. J. Ambrose, 51, Southend, Cold Ash, Nr. Newbury, Berks.

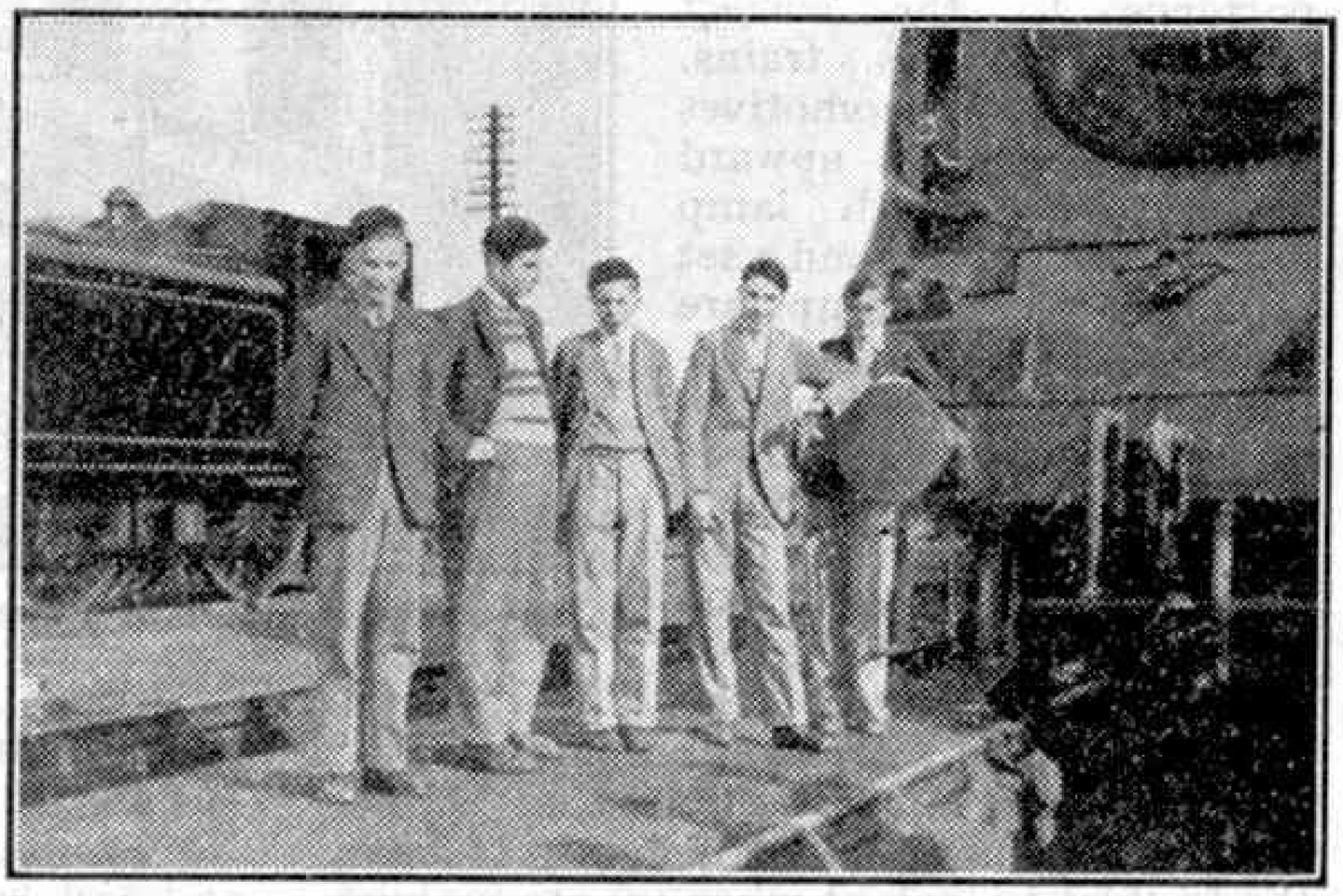
WHITCHURCH (GLAM.) M.C.—Group models have been constructed, notable productions including a hammerhead crane, a mechanical excavator, a tractor and a combination lock. Photograph and Aquarium Sections are being started, and model railway activities are in prospect. Increased club room facilities are making excellent work possible. An extensive telephone system has been installed. Club roll: 8. *Secretary:* F. G. Butler, 6, Mervyn Road, Whitchurch, Glam.

AUSTRALIA

BRIGHTON (VICTORIA) M.C.—This newly affiliated Club has made a fine start, with excellent model-building and model aeroplane construction and flying. A Hornby Dublo railway is being installed. An interesting Visit was paid to the Essendon Aerodrome, the main air transport centre for Melbourne. Club roll: 15. *Secretary:* J. Stamp, 11, Menzies Avenue, Brighton, Victoria.

BRANCH NEWS

RYDAL SCHOOL (COLWYN BAY)—Minor track alterations have included the re-laying of points.



Committee members of the Borden Grammar School M.C., Leader, Mr. J. H. Weekes, Secretary, S. Wood, visiting the Ashford Works of the Southern Region, British Railways. This fine school Club was affiliated in May 1929, and under the guidance of Mr. Weekes has entered upon a new period of intense activity. The programme includes Model-building, Talks, Film displays, and Visits, and a very successful Exhibition in conjunction with the School Arts Festival.

A general overhaul is in progress, and plans are being made for extensive alterations, including the building of a high level terminus. The Annual Exhibition was held at half term. *Secretary:* R. H. Wolstenholme, "Crusaders," Rydal School, Colwyn Bay, N. Wales.

SLOUGH—More members are joining and the equipment of the Branch is being increased. A special effort was made to clear up around the track to give a neat and efficient appearance. *Secretary:* W. Eisele, 335, Farnham Road, Slough, Bucks.

WEYMOUTH AND DISTRICT—The Branch celebrated its second birthday at Headquarters by a Party, with Games and Refreshments. Members enjoyed Swimming and Cricket during the outdoor season. Locomotives were inspected at close quarters during a visit to the Salisbury Motive Power Depot. *Secretary:* A. J. Brown, 68, Wyke Road, Weymouth, Dorset.

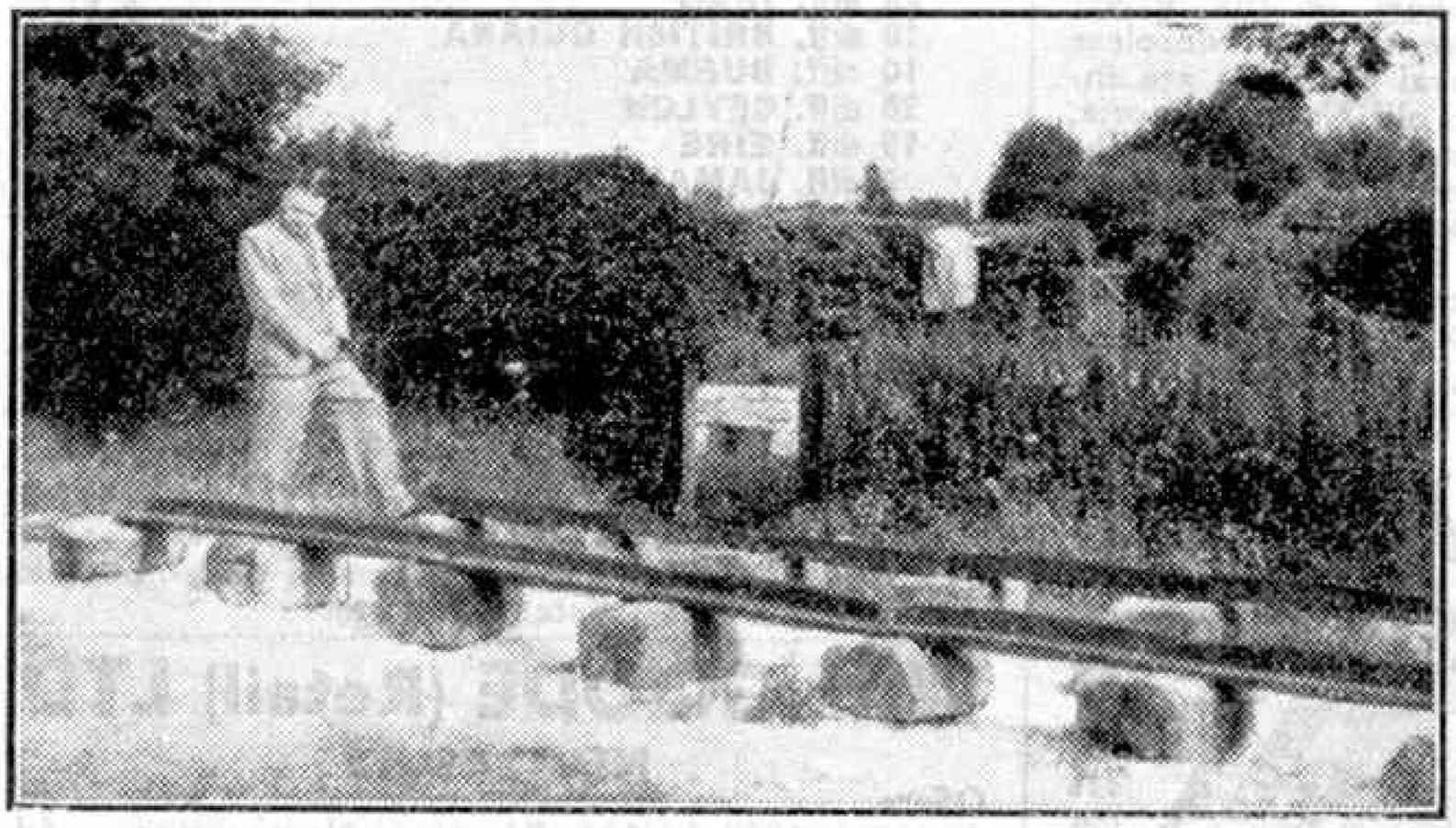
BEDDINGTON CRUSADERS—The Club track has been re-laid and more rolling stock has been acquired. More successful running has followed these changes. A Gala Night has been held, when locomotive speed, power and endurance contests were arranged. *Secretary:* B. Sheppard, 11, Cherry Hill Gardens, Waddon, Croydon.

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.

THE WORLD'S FIRST PUBLIC RAILWAY

The first railway ever to receive an Act of Parliament was the Surrey Iron Railway, opened in 1803, which ran from Wandsworth to Croydon. A Bill authorizing the construction of an extension to Reigate, with a branch to Godstone, was then promoted. The title of the extension was "The Croydon, Merstham and Godstone Iron Railway Company," although its main line was to run from Croydon to Reigate. The line was opened as far as Merstham in 1805.



Old Croydon, Merstham and Godstone Railway permanent way at Merstham. Photograph by D. J. W. Brough, Cheam.

To-day little can be seen of the old Surrey Iron Railway, as the district through which it ran has been largely built over; but traces of the continuation line still remain. Recently I spent an enjoyable afternoon walking over the course of the old Croydon, Merstham and Godstone Railway between Coulsdon and Merstham. This district is still comparatively open, and the route can be followed without much difficulty. The major engineering work was a cutting, over a mile in length, that runs parallel to the main Brighton road, and most of it is still more or less intact. Three brick bridges, which carried roads over the railway, also survive, but two of them are now almost buried by earth.

Some of the original permanent way is still in existence, and a short length has been preserved in the recreation ground at Purley. Another short length can be seen at Merstham, and this is shown in the accompanying photograph. It will be noticed that the rails are flanged. This was necessary, as the wheels of the wagons had no flanges.

The rails are of cast iron, and are about 3 ft. long. They bear the initials of the railway. The sleeper blocks are of stone, and each has a hole drilled through it into which a wooden peg was inserted. The rails were held in place by iron spikes driven into the pegs. Many of the stone sleeper blocks can still be seen in the vicinity. Some have been used for building walls, and others have been incorporated in rockeries in private gardens. The gauge of the railway has never been definitely established, but the available evidence suggests that it was about 5 ft.

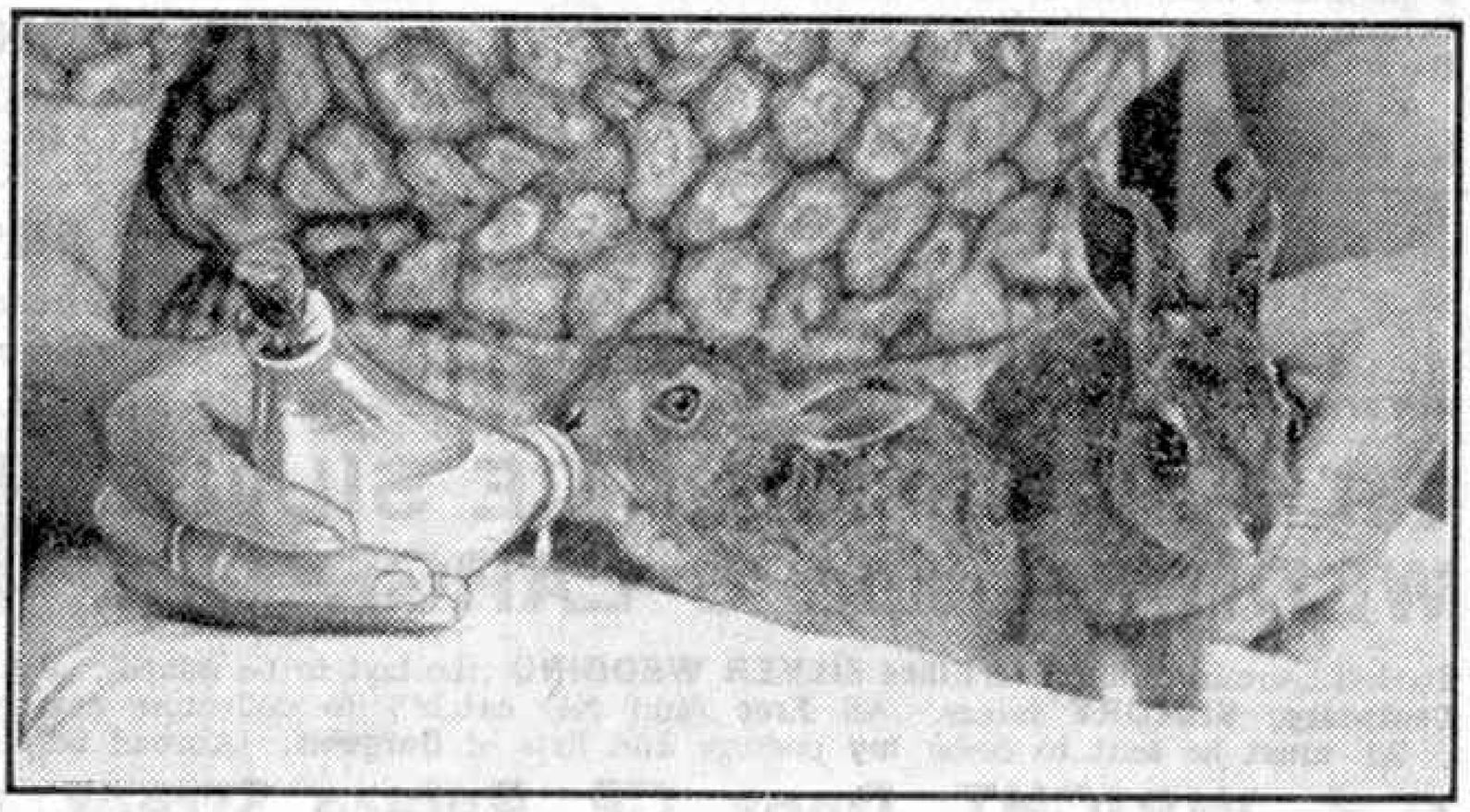
D. J. W. Brough (Cheam).

HARE-RAISING EXPERIENCE

The leverets shown in the lower photograph on this page are the survivors of a litter of four, discovered the day they were born when grass was being cut with a rip-hook. They had been deserted by their mother, so they were taken to Mrs. C. Hoskins of Chandlersford, who keeps rabbits, to be cared for. After seven days the two weaker ones died, but the other two throve on three ounces of milk a day fed through the valve of a small baby's bottle, and eventually began to nibble greenstuff.

The baby hares were the main topic of conversation in the School Lane area in Chandlersford, near Southampton, where Mrs. Hoskins lives. It is apparently very rare for wild hares to live in captivity, and in fact some people say it is impossible. Anyway these little fellows grew from about 2½ in. to about 6½ in. long in thirty days, and from the way they fought over that milk bottle it was easy to see they meant to go on living!

G. S. Finlayson (Shirley, Southampton).



Leverets reared on the bottle. Photograph by G. S. Finlayson, Shirley, Southampton.

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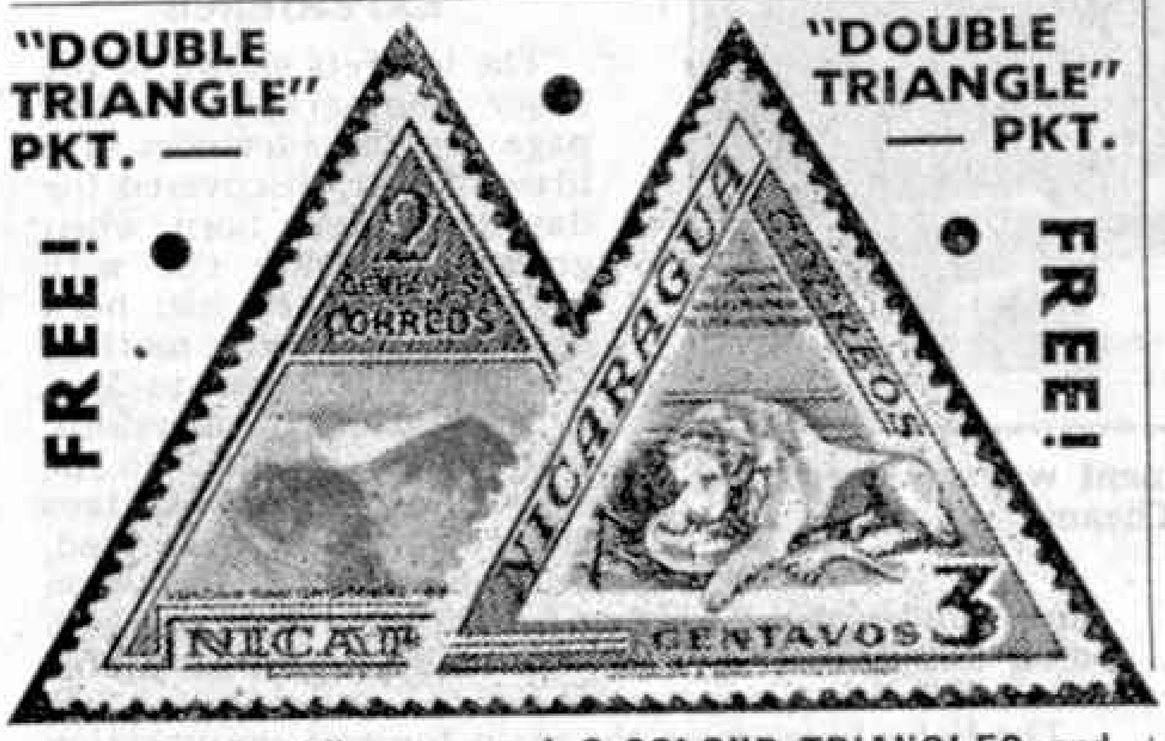
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For other Stamp Advertisements see also pages 402 and xi.

Stamp Collecting

The Universal Postal Union

By F. Riley, B.Sc.

NOWADAYS we can write letters to most corners of the globe, put on stamps of reasonably small value, and send them away with confidence that they will be taken to their destination easily and quickly. Posts were not always as convenient and reliable as that, however. For instance, little more than 75 years ago there were six different rates for letters from London to Constantinople, varying from 8d. to 1/7d. per ½ oz. The postal charges for such letters were sometimes paid by the sender, sometimes by the receiver, and in some cases were shared; and delays were frequent, for the letters themselves had to be weighed and complicated calaculations made in order to find the costs.



The first suggestion to bring this chaos to an end came from Dr. von Stephan, the head of the German Post Office 80 or so years ago, who had the idea of calling a universal congress to improve matters. The Franco-German War prevented immediate progress, and it was not until 1874 that a congress actually met, at Berne in Switzerland, and the Universal Postal Union was founded. Since then a congress to discuss international postal affairs has been held every five or six years. The number of countries represented at Berne 75 years ago was 22, all European except the United States and Egypt. Other countries joined later, and by 1928 those included in the Union were responsible between them for 40,000 million letters a year, a number that since then must have increased considerably.



It is only natural that the U.P.U. should have been recognized by the issue of stamps to mark its beginning and progress, and it is not surprising to find that it is now the custom for a country in which a congress is being held to issue special stamps in honour of the occasion. Even Great Britain has done this, although commemorative stamps are exceedingly rare here. The congress celebrated in this way was the 9th, of 1929, in connection with which five stamps appeared. Four of these are low values, from ½d. to 2½d., and are not particularly attractive in design, as the example shown on this page indicates. The fifth is a £1 stamp, a much larger one, on which is a splendid picture of St. George and the Dragon.

Other countries have given us much finer designs for U.P.U. Congress Stamps. One of the most interesting of these, reproduced here, came from Switzerland in 1924, when the U.P.U. celebrated its Jubilee. There were two stamps in the issue, both showing the building in which the first Congress was held in 1874. Another Swiss U.P.U. stamp reproduced on this page marks the 75th anniversary of the formation of the U.P.U., an event that is being celebrated by a world-wide issue, as readers will already have learned from notes in "*Stamp Gossip*."



It is interesting to look back over previous congresses, not only for the stamps that they have occasioned, but also as a help to a realization of the world-wide character of the Union. The Fifth Congress was held at Washington in 1897, and for that occasion sets of United States stamps were overprinted with the words "*Universal Postal Congress.*" These stamps were not issued in the ordinary way. Their number was limited and they were presented to the delegates, so it is practically impossible for collectors to obtain examples. The stamps indeed do not appear in the catalogues.

Other countries issuing stamps in connection with congresses followed the more usual course, and most of their products are readily available at reasonable prices. Sweden marked the Eighth Congress, held in 1924 at Stockholm, by issuing no less than 15 different values in two designs. The 12 low values of this series show the old city of Stockholm, while the three high values reproduce a portrait of King Gustav V. As the U.P.U. celebrated its Jubilee at the same time, Sweden issued 15 more stamps to mark this special occasion. Again the 12 low values had the same design, showing a post boy on horseback, grasping a posthorn and looking surprised by the appearance in the top left corner of the design of an aeroplane, the most modern form of letter carrier. The three high values show a carrier pigeon bearing a letter and flying over the globe, part of which only is included in the design. Incidentally, Germany celebrated the U.P.U. Jubilee by issuing stamps bearing the portrait of Dr. von Stephan.



Other congresses have been held in Egypt the Argentine and France. Cairo was the scene of the Tenth Congress in 1934, when 14 portrait stamps were issued by the Egyptian hosts. In 1939 the Argentine was the scene of the Eleventh Congress, for which a very fine series of stamps were issued. The 5c. value shows the globe encircled by a posthorn. Symbols of postal communications provide material for the design of the 1p. value, and other stamps of the issue show scenes in the Argentine.



The most recent Congress was held in Paris last year, and five excellent stamps celebrated the occasion. One is an air stamp, and all show views in the French capital city. The highest value, the 10 f., is reproduced here.

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For other Stamp Advertisements see also pages 400 and xi.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

IT was a relief to collectors and dealers alike when the last "Silver Wedding" set was released at the end of August. Of course, it is appreciated that the Gilbert and Ellice Islands, the colony to issue the last set, are a long way off, and some time had to elapse before their set could be placed on sale, but there was really no logical reason why so many months were taken. There had been slackness somewhere, and the authorities, who on their own admission had issued the "Silver Wedding" stamps to raise extra revenue, had shown very little consideration for those who were providing that revenue. Actually the issue itself for all the colonies had been ill conceived in the first instance, and carried out in a slovenly fashion; and there we can leave the whole business with the hope that our authorities have learned a little common sense after the experience they gained.



In the meanwhile the numerous issues to commemorate the 75th anniversary of the founding of the Universal Postal Union will be out soon after these words are in print, and collectors who are able to spend the necessary pounds will probably find that they have made a good investment in the long run, as did those who bought the "Silver Wedding" stamps. One is not likely to be able to buy the set to-day and sell it to-morrow at a profit, so unless you are prepared to keep your set for a year or two do not buy as a speculation.

The writer of these notes recently flew to Central Europe. The journey was broken at Prague, and a few hours were spent in that fine old city. The stamp shops there received due attention, but very few old "classics" were to be seen; however, the Post Office itself was well worth a visit, for there one can buy at face value many obsolete stamps, and as modern Czech stamps are mostly beautiful productions the writer was able to add some nice items to his collections.

Czech stamps have always been very popular in Great Britain, and collectors who cannot spend too much on their hobby might do worse than take up this country. There is no need to go to Prague for supplies, as our own stamp dealers generally have good stocks, and as a rule these are priced reasonably. So if you want a change try Czechoslovakia.



With so many new stamps coming out, only a collector with an exceedingly deep pocket can afford to buy extra stamps as well as these new issues, which to some extent may account for the decline in sales—we won't call it a slump—in K.G. V issues. Whatever the cause, there has been a drop in the demand, but issues of the present reign are at least as popular as ever, and that popularity covers all countries in the Commonwealth. There was a time when stamps of colonies like Samoa were in very poor demand, but that is all changed now. A dealer mentioned the other day that he had sold over 400 copies of the recently issued 5d. stamp of Western Samoa, and he is not a big dealer either. Our issues are exceedingly popular in America as well as at home, and that helps the demand considerably. It is doubtful if there are half as many K.G. VI collectors over there as there are here, however, yet to hear our American cousins talk everything is cooked up to attack their pockets. They are quite wrong, but we are glad to get their support.



France continues to issue beautiful stamps, but they have undoubtedly overdone it, and there is nothing like the demand for French stamps in Great Britain to-day that there was before the war, in spite of the fact that there are now many more collectors than ever before. Yet their stamps are such handsome productions that it is a pity to neglect them.

Swiss stamps on the other hand maintain their popularity. Technically they are fine productions, but from an artistic point of view they are not to be compared with the French. Most of them do get used postally, which is more than one can say about French stamps; and as a lot of correspondence passes between Switzerland and our own country they can be bought cheaply, which may account for their popularity. Moreover, the postmarks are generally light, and a page of modern Swiss stamps, used, looks quite nice.

Alas, that is more than one can say about a lot of our modern colonial stamps. Gold Coast recently went in for a handsome pictorial set. Why, after one of the postmasters has applied a postmark, is it impossible even to see the design? Nigeria is another colony which utterly ruins its stamps, once they have been cancelled.



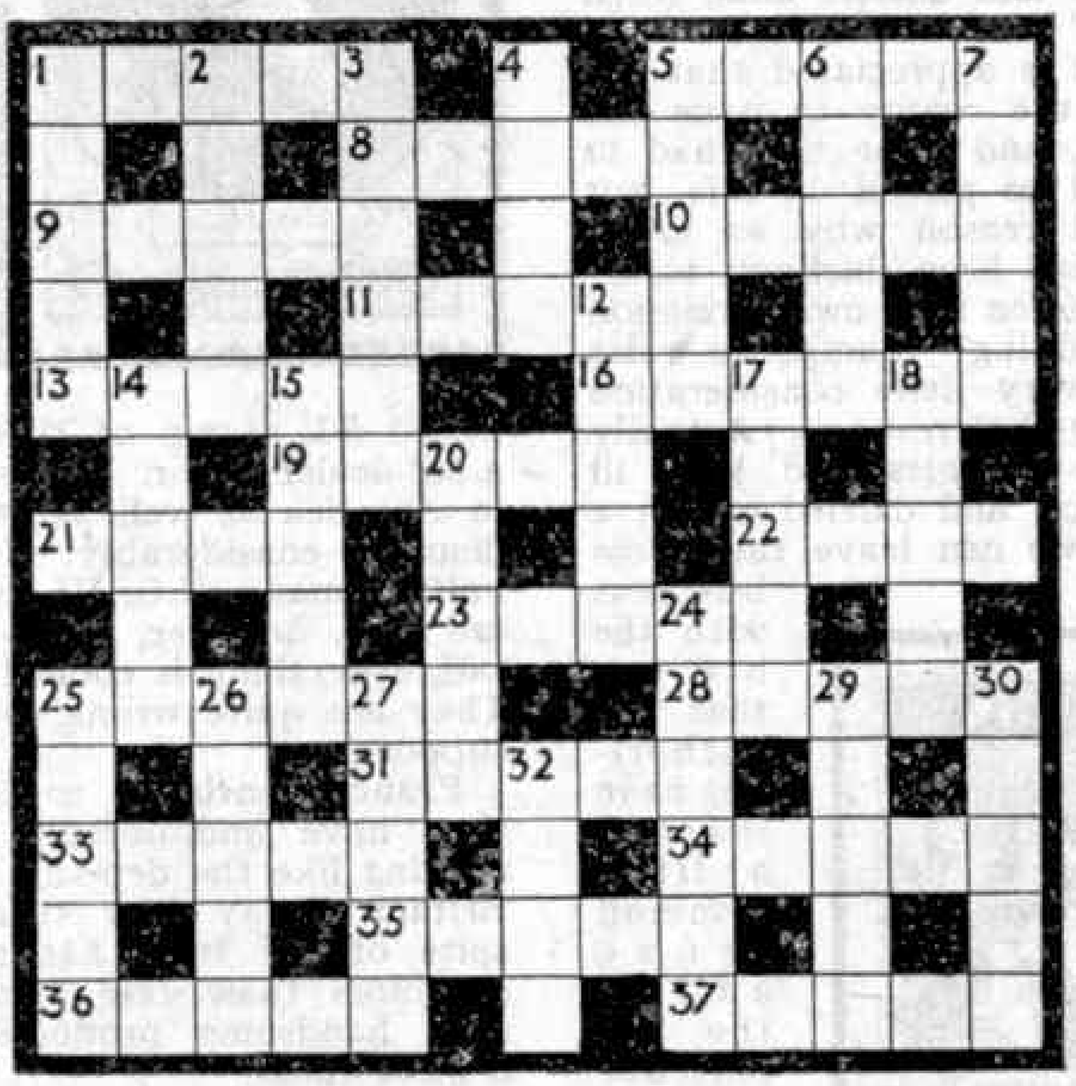
The handsome "Archæological" stamps which India has issued go up to 15 rup. A complete set is beyond the pockets of some collectors, but with a little patience a complete set, used, may be obtained for a few shillings, for huge quantities of used India stamps come to this country.

If you are finding that there are too many general issues of K.G. VI stamps for you to tackle, why not go in for a collection of special issues only? Gradually a fine selection of these are appearing, and the latest of these are the three stamps for Brunei issued on 20th September to commemorate the Silver Jubilee of the Sultan. A really beautiful collection of these special issues can be made and its cost is not excessive, *as yet*. Take that as a tip.

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

October Crossword Puzzle



Clues Across

1. Skip
5. Cycle part
8. Flower
9. Lazes
10. Willow
11. Tends
13. Smooth soft mass
16. Sets again
19. Eat away
21. Metal
22. Boast
23. Command
25. Concord
28. Bird's homes
31. Creature
33. Courageous
34. Hard precious stone
35. Prick
36. Bailiff
37. Mistake

Clues Down

1. Curl
2. Sticks
3. Slice
4. Asterisk
5. Ordinary writing
6. Force along
7. Pranks
12. Terror
14. Scottish isle
15. Cares for
17. Weapon
18. Characteristic
20. Gas
24. Gain for service
25. Pigment
26. Angry
27. Fat
29. Steps
30. Lance
32. Bird

Our crossword puzzles are great favourites with "*M.M.*" readers. In them there are no traps or alternative solutions. The clues are all direct, and apart from names, every word used can be found in a standard dictionary.

This month we give our readers another of these puzzles, contributed specially by T. K. Chaplin, also a reader. In it there are two sections, for Home and Overseas readers respectively, and we offer prizes of 21/–, 15/– and 10/6 for the best solutions. If there is a tie for any prize the judges will base their decisions on the neatness and novelty of the solutions concerned.

Entries in this contest should be addressed "*October Crossword Puzzle, Meccano Magazine, Binns Road, Liverpool 13.*" The closing date in the Home Section is 30th November; that in the Overseas Section will be 28th February 1950.

What Locomotives are These?

Competitions dealing with engine names and numbers have always been extremely attractive to "*M.M.*" readers, and here is another that they will enjoy. Below we give twelve short sentences or phrases each of which is a pointer to the name of a British locomotive, and competitors are asked to find the names of the locomotives to which these clues lead. In their entries they are also asked to identify the engines completely by giving the number, wheel arrangement, class and Region of British Railways concerned.

Here are the 12 clues, each indicating the name of a British locomotive:

1. **Saint of Wales**
2. **Designed the "Terriers"**
3. **Famous Lighthouse**
4. **Fast Train**
5. **Head of the Abbey**
6. **He built the line to the West**
7. **Ships cross this**
8. **Heavenly Bodies, here seen together**
9. **A Knocker Up?**
10. **Famous G.W. old-timer**
11. **Suggests locked doors**
12. **Coloured object which twinkles**

As usual the competition will be divided into two sections, for Home and Overseas readers respectively, and in each section prizes of the value of 21/–, 15/– and 10/6 will be awarded for the best efforts. There will also be several consolation prizes, and if there is a tie for any prize the neatness and novelty of the entries will be taken into account.

Entries should be written on one side of the paper only and addressed to "*October Locomotive Names Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Do not forget to give full name, age and address.

The closing date in the Home Section will be 30th November, and that in the Overseas Section 28th February 1950.

October Photographic Contest

The tenth of our 1949 series of photographic contests is a general one, in which we invite readers to send in prints of any subject. There are only two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired.

The competition will be in two sections, A, for readers aged 16 and over, and B, for those under 16. Each competitor must state in which section his photograph is entered. There will be separate sections for overseas readers.

In each section prizes of 21/–, 15/– and 10/6 will be awarded. Entries should be addressed "*October Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" The closing dates in the competition are: Home Section, 31st October, Overseas Section, 31st January 1950.

Competition Results

HOME

JUNE 1949 CROSSWORD PUZZLE

1st Prize: K. F. Wilkins, Woking. 2nd Prize: D. Pomeroy, Beckenham. 3rd Prize: E. J. Sinton, Aberdeen. Consolation Prizes: D. Howe, Glasgow; F. O'Gara, Harwood; D. A. P. Rice, Newry; R. A. Higgins, Castle Bromwich.

JUNE 1949 RAILWAY STORY CONTEST

1st Prize: P. Morath, Greasby. 2nd Prize: R. M. Owen, Liverpool 20. 3rd Prize: W. A. C. Smith, Kilmacolm. Consolation Prizes: R. Holmes, Manchester 20; E. Wilson, Dundee; A. Phillips-Smith, Birmingham 27; R. K. Evans, Hessle.

JUNE 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: H. D. Martineau, Woodhall Spa; Section B: H. Wilkinson, Whitefield. 2nd Prize, Section A: T. E. H. Weeks, Carlisle; Section B: A. C. A. Benda, Winchester. 3rd Prize, Section A: I. J. Adgie, Walton-on-Thames; Section B: R. P. Woods, Harrow. Consolation Prizes: L. H. Hobbs, Exeter; M. J. Taylor, Greenford; H. D. Thomas, Aldershot; D. Sibley, Denbigh; P. H. Hill, London S.E.6; M. Williams. Rawcliffe.

JULY 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: E. Whitaker, Liverpool 22; Section B: G. Leaf, Hull. 2nd Prize, Section A: E. Gordon, South Chingford; Section B: T. Hamilton, Manchester 9. 3rd Prize, Section A: W. R. H. Temple, Upminster; Section B: R. Brown, Saltcoats. Consolation Prizes: D. H. Tomkinson, Crewe; G. P. Clark, Tavistock; R. R. Bushell, Hoddesdon; L. Williams, Petersfield; R. Hields, Leeds 8; M. Blench, Shipley.

OVERSEAS

JANUARY 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: K. R. Cassells, Wellington, N.Z.; Section B: J. P. Palmer, Wellington, N.Z. 2nd Prize, Section A: Miss A. Neilson, S. Canterbury, N.Z.; Section B: P. Jackson, Maritzburg, S. Africa. 3rd Prize, Section A: L. D. Goldblatt, Randfontein, S. Africa; Section B: A. Beadle, Boksburg, S. Africa. Consolation Prizes: R. W. Wilson, Green Point, S. Africa; T. P. Mansergh, Auckland, N.Z. D. F. Sutherland, Dunedin, N.Z.; J. Tertzakian, Cairo, Egypt; L. Wordsworth, Auckland, N.Z.; I. Blaxland, Hutt City, N.Z.; J. Xuereb, Valletta, Malta G.C.

JANUARY 1949 DRAWING CONTEST

1st Prize, Section A: E. B. Becker, Tunis (F.N.A.); Section B: D. F. Sutherland, Dunedin, N.Z. 2nd Prize, Section A: P. Hughes, Perth, W. Australia; Section B: G. Noble, Pretoria, S. Africa. 3rd Prize: Section A: R. J. Garner, Bukuru, B.W.A.; Section B: G. Jost, Victoria, Australia. Consolation Prizes: K. V. Narayanan, Johore, Malaya; E. Flores, Birchircara, Malta, G.C.; D. A. P. Rice, Naas, Eire; G. Keuck, Bellville, S. Africa; D. Johnston, Clontarf, Eire.

JANUARY 1949 COVER VOTING CONTEST

1st Prize: T. Searson, Salisbury, S. Rhodesia. 2nd Prize: A. W. Meagger, Cork, Eire. 3rd Prize: T. Bisseker, Kokstad, S. Africa. Consolation Prize: I. Blaxland, Hutt City, N.Z.

FEBRUARY 1949 ENGINEERING CHOICE CONTEST

1st Prize: B. Carpinter, Christchurch, N.Z. 2nd Prize: H. P. Chinoy, Bombay, India. 3rd Prize: T. Searson, Salisbury, S. Rhodesia. Consolation Prize: P. Partridge, Salisbury, S. Rhodesia.

FEBRUARY 1949 STATIONS CONTEST

1st Prize: M. T. Hewitt, Ontario, Canada. 2nd Prize: D. Crowley, Durban, S. Africa. 3rd Prize: K. C. Bell, Wellington, N.Z. Consolation Prize: M. J. Myers, Cape Town, S. Africa.

FEBRUARY 1949 PHOTOGRAPHIC CONTEST

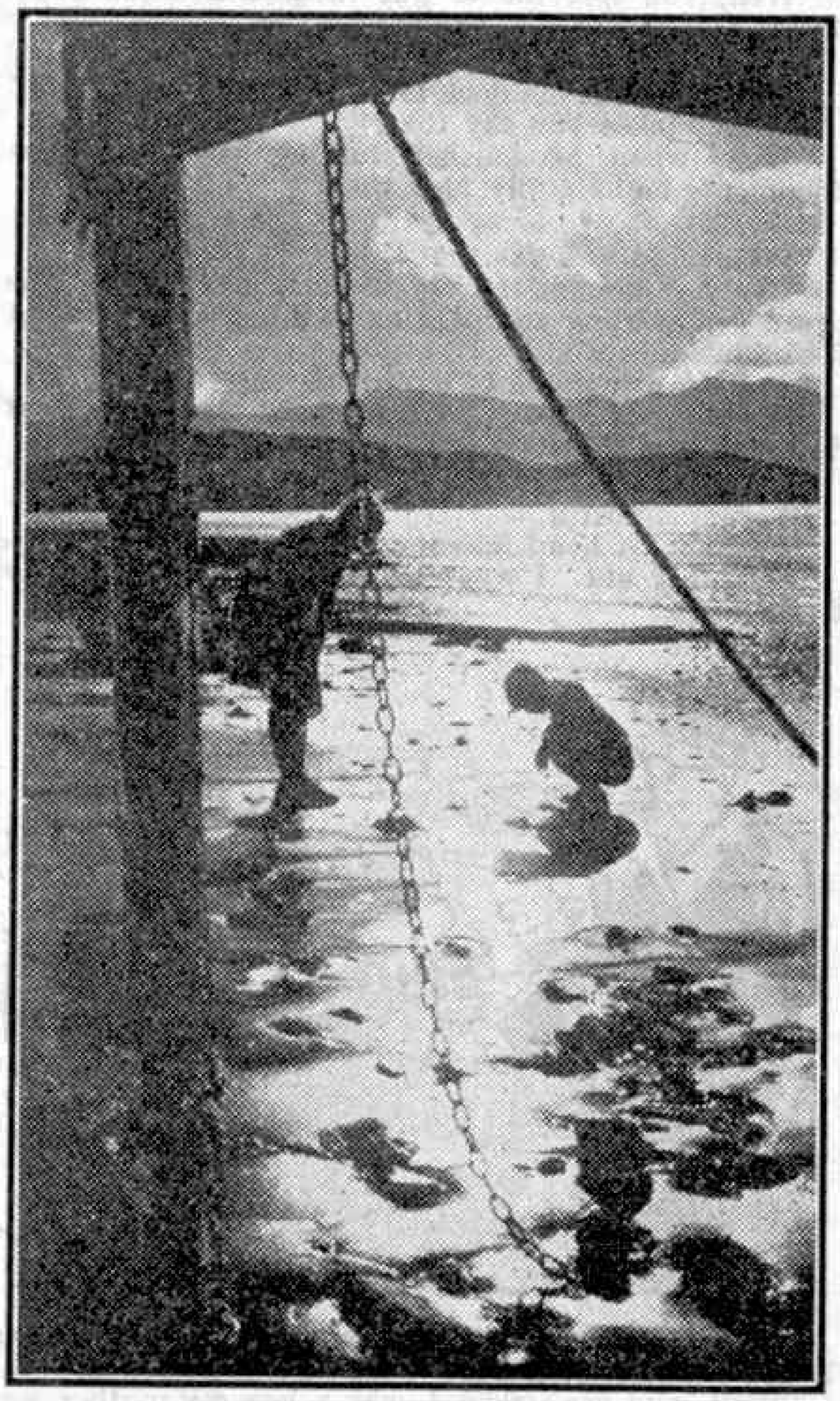
1st Prize, Section A: E. O. L. Woodward, Bombay, India; Section B: A. Mold, Johannesburg, S. Africa. 2nd Prize, Section A: W. Thomson, Cape Town, S. Africa; Section B: S. H. Williams, Cairo, Egypt. 3rd Prize, Section A: J. Bellis, Dublin, Eire; Section B: G. Ball, Auckland, N.Z. Consolation Prize: S. Wallace, Dunedin, N.Z.

MARCH 1949 DOUBLETS CONTEST

1st Prize: G. Thake, Birkirkara, Malta G.C. 2nd Prize: M. K. Daly, Auckland, N.Z. 3rd Prize: R. Vickers, Auckland, N.Z. Consolation Prize: P. Askew, Nelson, N.Z.

MARCH 1949 RAILWAY QUIZ CONTEST

1st Prize: W. A. Johnston, Pretoria, S. Africa. 2nd Prize: T. W. Robinson, Wellington, N.Z. 3rd Prize: J. H. Bates, Toronto, Canada. Consolation Prize: K. Aston, Washington, U.S.A.



A very unusual beach photograph taken in the late afternoon sunlight by P. H. Brett, New Zealand. Awarded 1st Prize in the Section A, March 1949 Photographic Contest.

Fireside Fun

"Why isn't your usual centre forward playing to-day?"

"He's got measles."

"Then he should have been here. Our centre half would have knocked the spots off him."

* * * *



"Good gracious Billy! How dare you eat those new cakes?"

"Well, you told me to put them where the baby couldn't get them."

* * * *

"That fellow in the dock must be a good mechanic."

"What makes you say that?"

"Well, when he finished forging all those false documents he carefully filed them."

* * * *

"Where did you get that dog?"

"I've just bought it from the man next door. The brute was howling and barking so much all night that I couldn't sleep."

"And are you going to have it destroyed?"

"No fear. If I keep it in my yard the fellow next door will lose his sleep now, won't he?"

* * * *

"I want a mirror."

"Yes, sir. A hand mirror, I suppose."

"Certainly not. I want to shave, not to polish my finger nails."

* * * *



"Dear me, Jones! Couldn't you find a better job than looking after a car park?"

"Well, you see, when I was a boy my mother was always telling me to mind the cars."

* * * *

THIS MONTH'S HOWLER

Gorgon is a kind of cheese of horrible aspect.

BRAIN TEASERS

MAKE YOUR OWN MAGIC SQUARE

A word square without clues will give a chance to readers to show their initiative and enterprise. One of the words is given, with seven other letters, as shown in the square below. Can you complete this, remembering that the six words across must be the same as the six words down?

C	I	R	C	L	E
I				E	
R			E		
C		E			E
L	E			E	
E			E		

S.W.C.



"Lady, if you give us a penny my little brother will imitate a hen."

"What will he do?" asked the lady. "Cackle?"

"No, anybody could do that. He will eat a worm!"

* * * *

A FINE FINISH

Tom and Dick ran a mile race on a track with a length of 220 yards. When Tom had covered six laps Dick had only covered five, but Dick then doubled his pace. Who won?

B.I.N.

* * * *

IT CAN BE DONE!

It is proverbial that a square peg cannot be fitted in a round hole. Can you do the opposite, that is fit a round peg exactly into a square hole, each side of which measures say $\frac{1}{2}$ in?

* * * *

IN AND OUT

At its first stopping place a quarter of the passengers in a bus got out and 10 entered. At the next stop half the passengers left and 20 more passengers came in, making the total then 37. How many were there in the bus to begin with?

* * * *

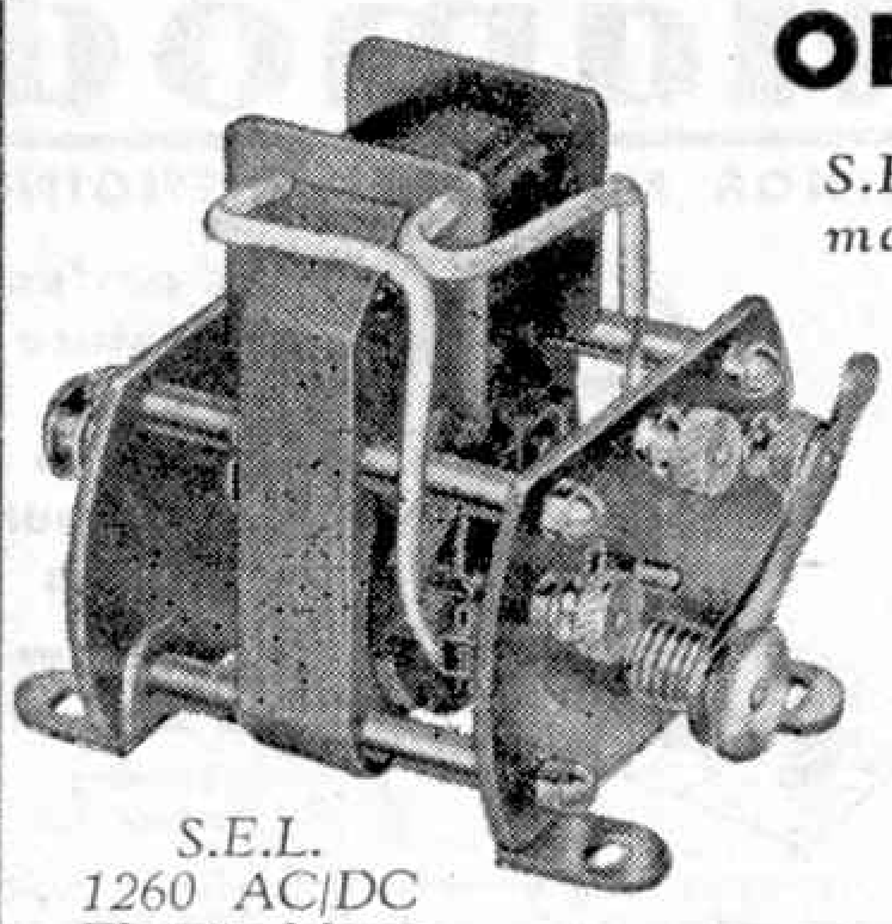
SOLUTIONS TO LAST MONTH'S PUZZLES

The six motors of our first puzzle were: RILEY, STANDARD, CHRYSLER, HEALEY and ALLARD.

Of the 1,728 small cubes in our second puzzle there were none painted on four sides! The number painted on one side was 600, the number painted on two sides 120, and the number painted on three sides was 8. This leaves 1,000 not painted at all.

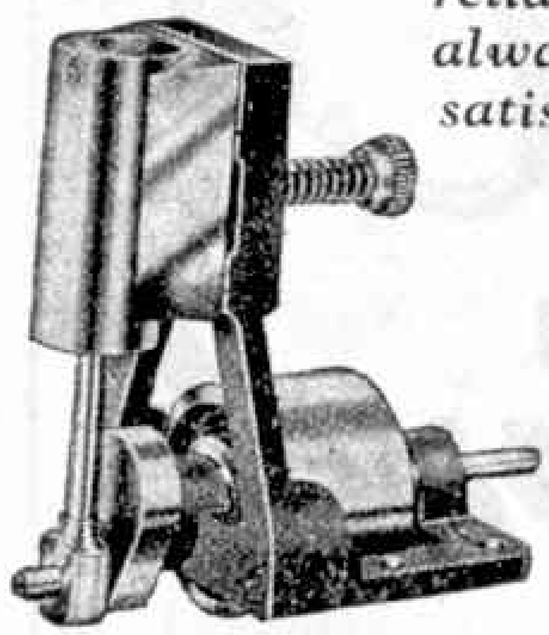
The four words to which the clues in our third puzzle lead are DRAFT, MALADY, COMET, and DISPLAY.

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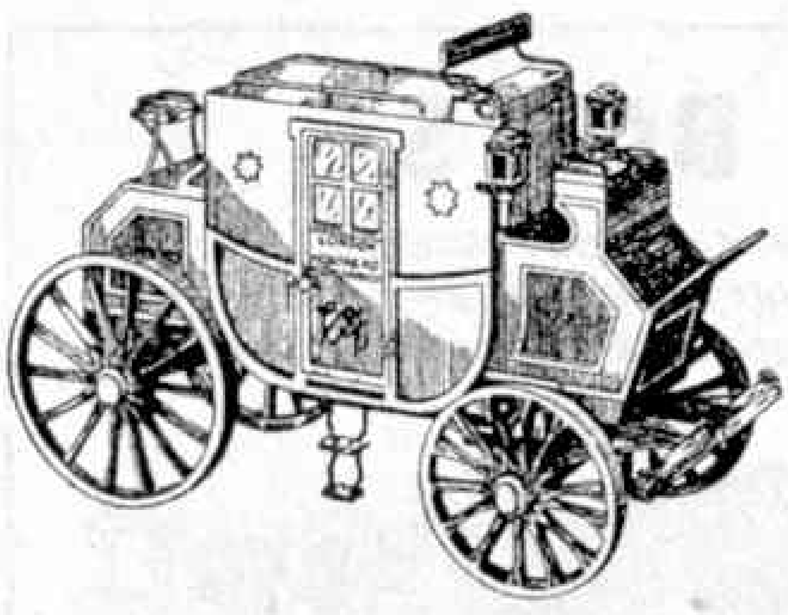


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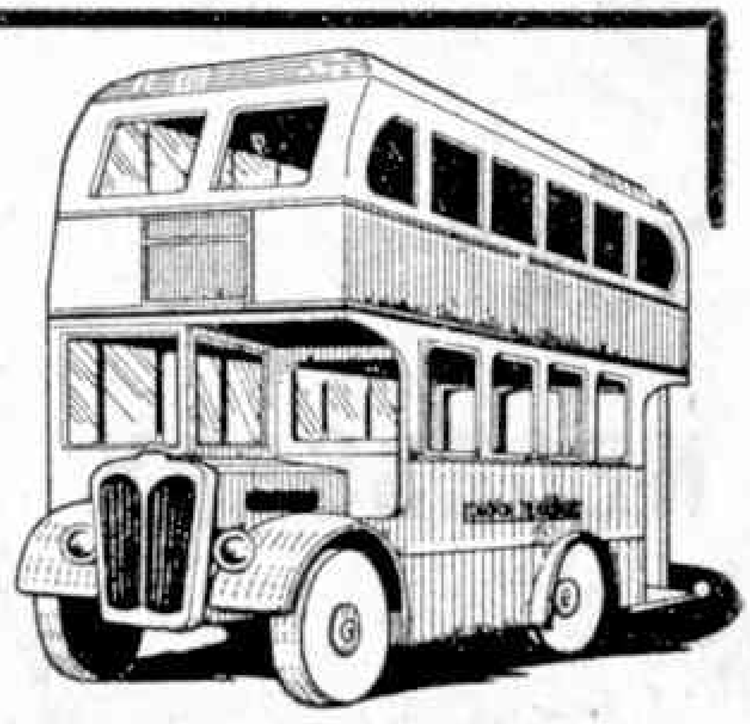
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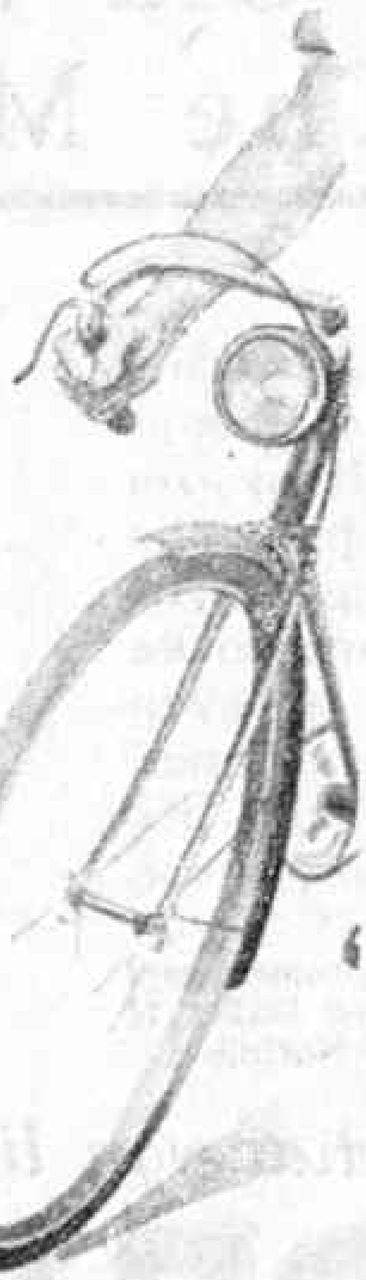
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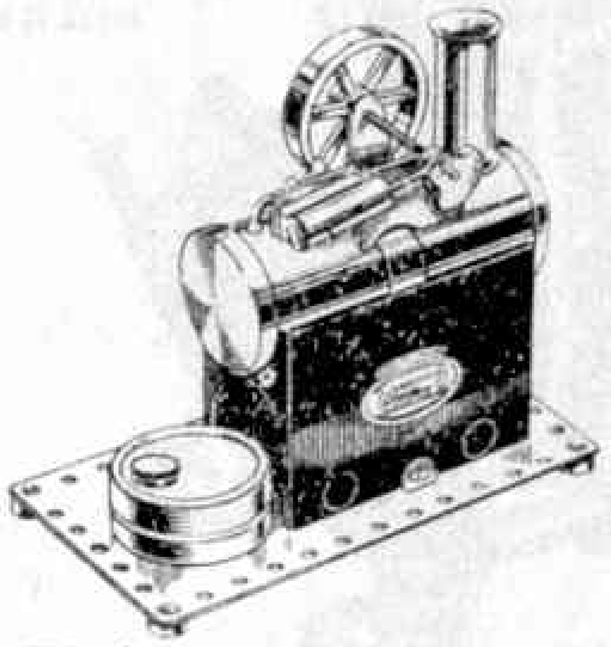
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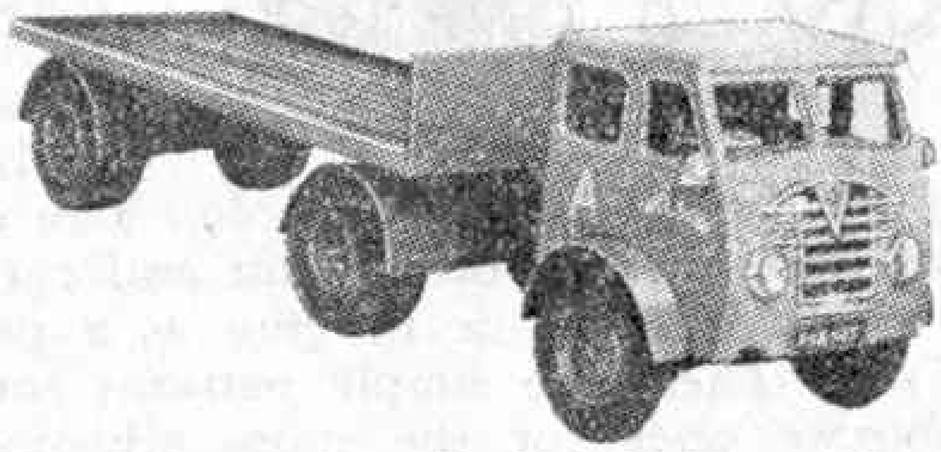
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Draughtsmanship
(State which branch)
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Electrical Engineering
Eng. Shop Practice
Fire Engineering
Fuel Technology
Heating and Ventilation
Hydraulic Engineering
Hydro-Electric
Illumination Engineering
Joinery
Journalism (Free-Lance)
Machine Designing
Marine Engineering
Mechanical Drawing
Mechanical Engineering
Mine Surveying
Mining Electrical
Motor Engineering
Motor Mechanic
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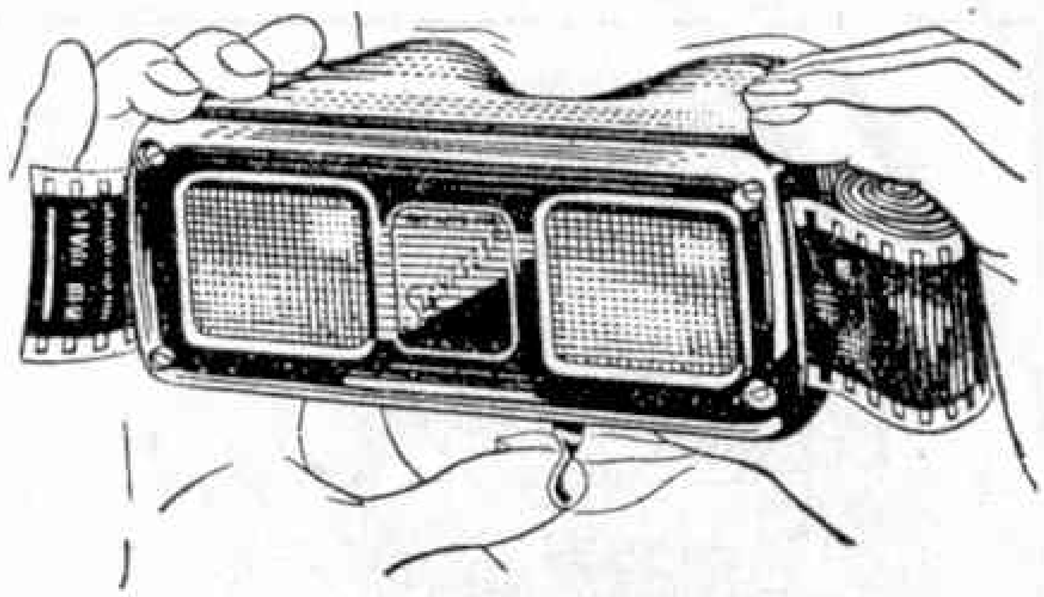
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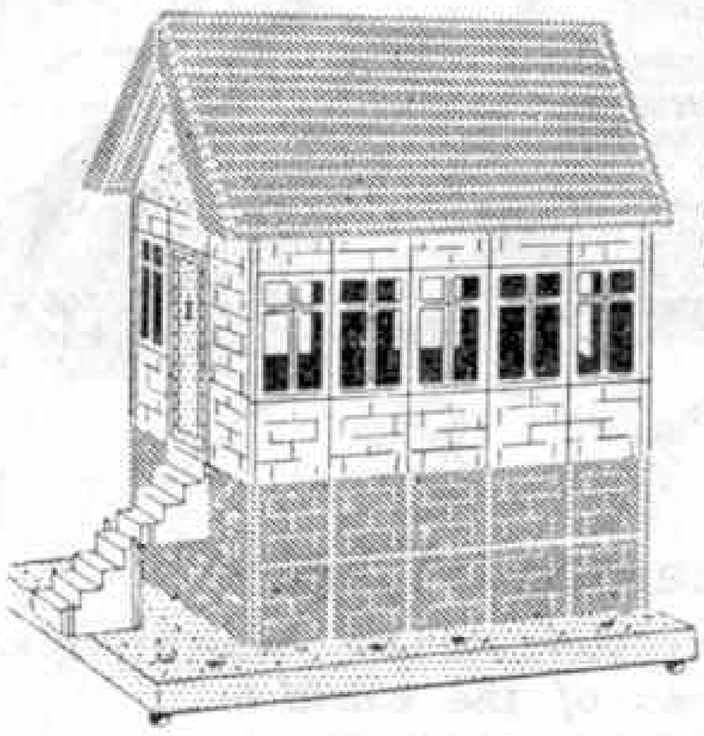


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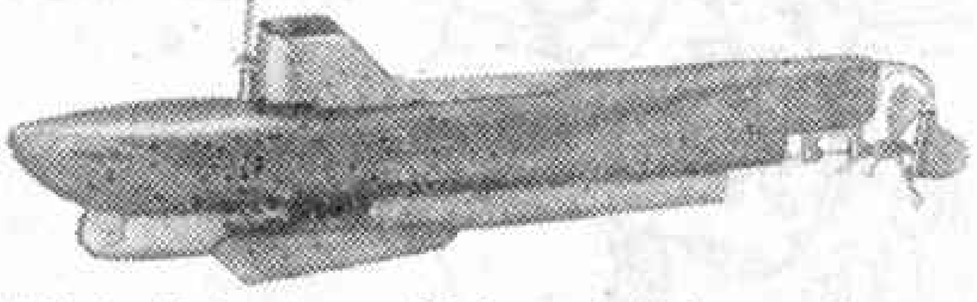
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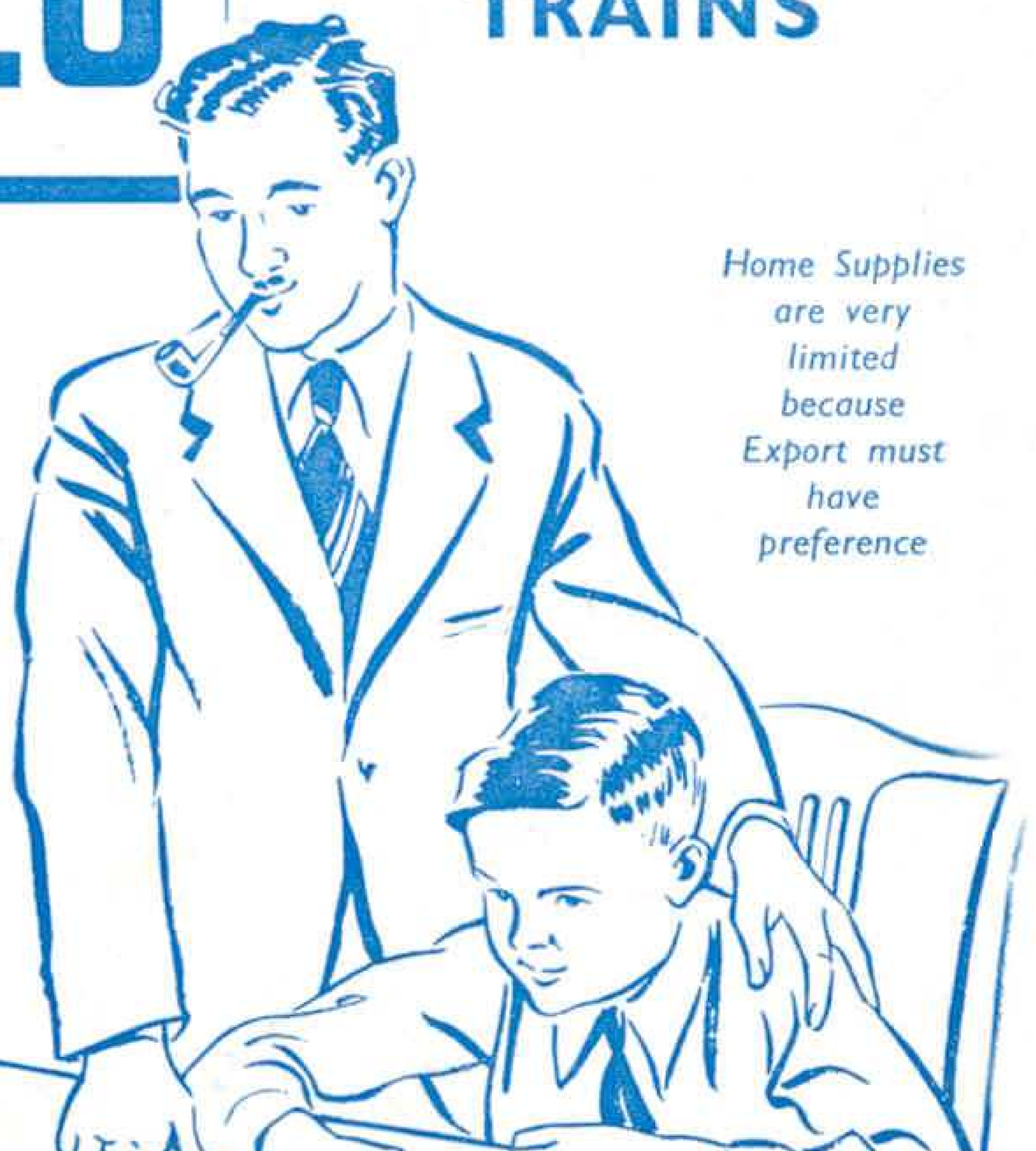
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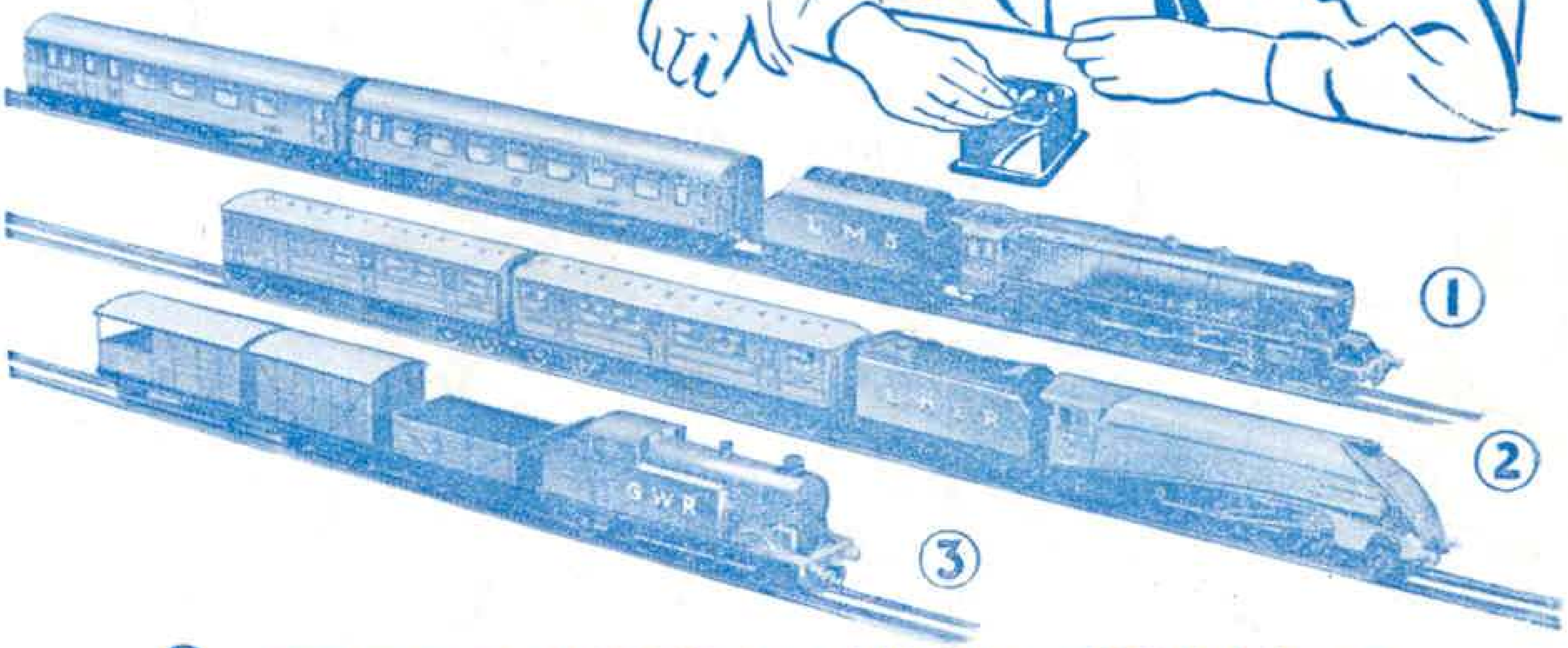


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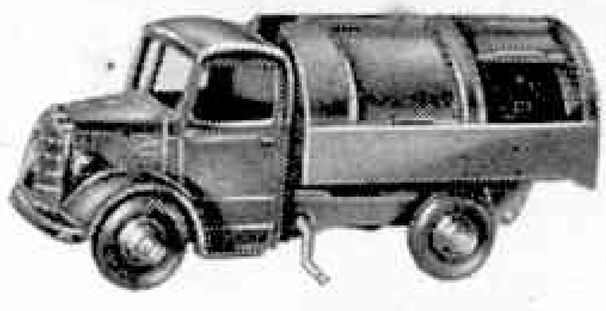
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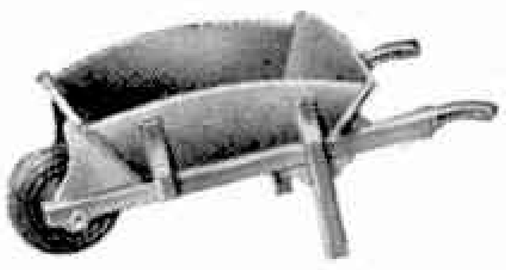
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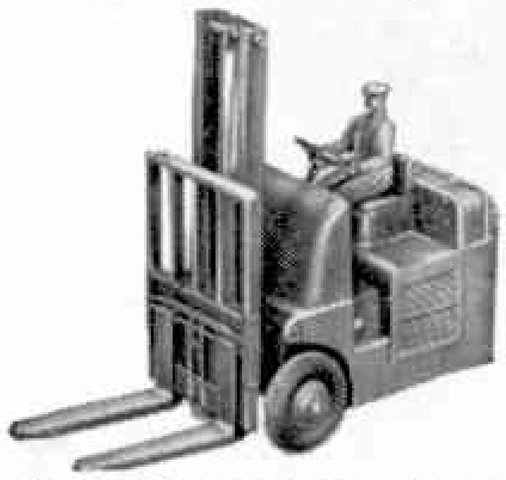
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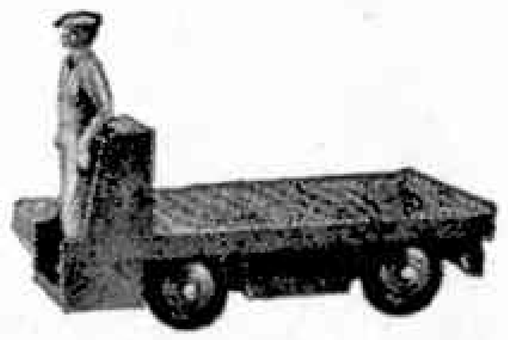
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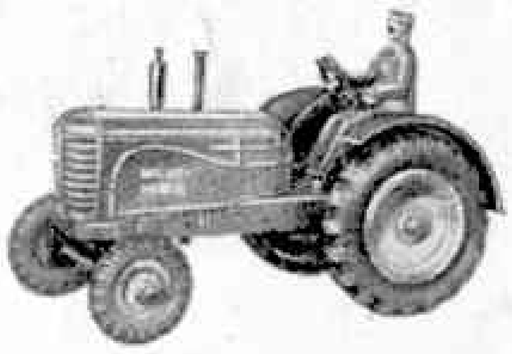
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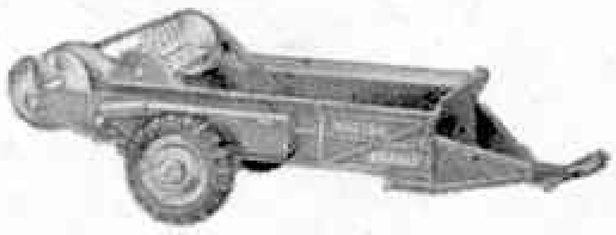
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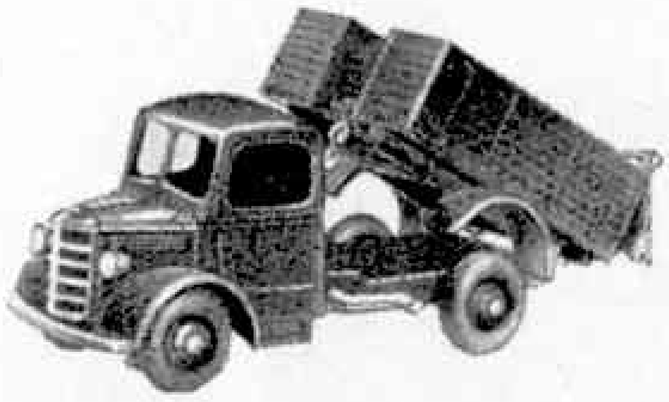
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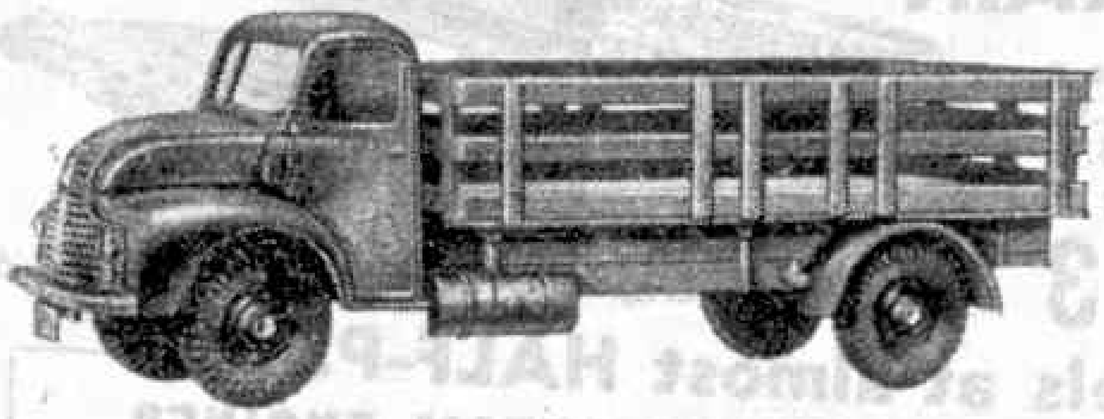
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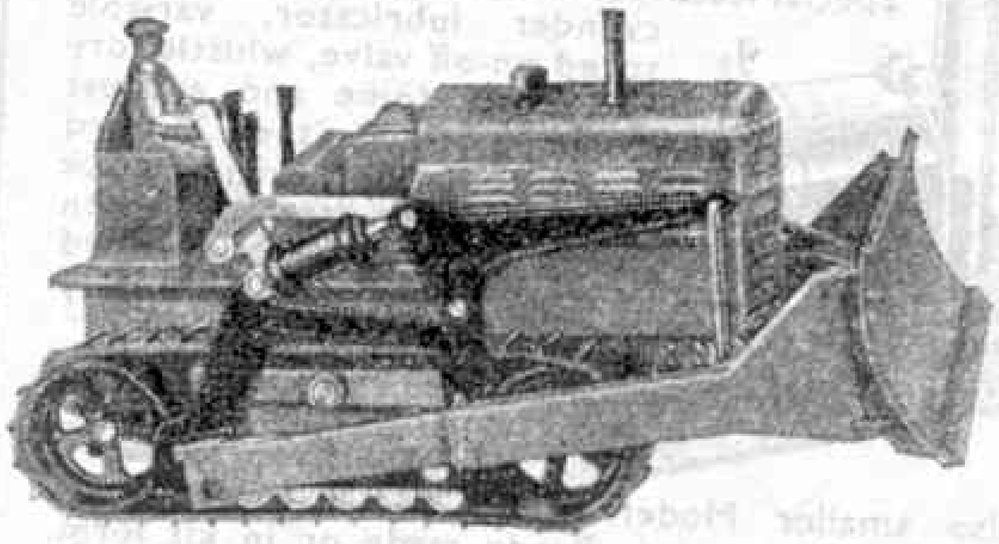
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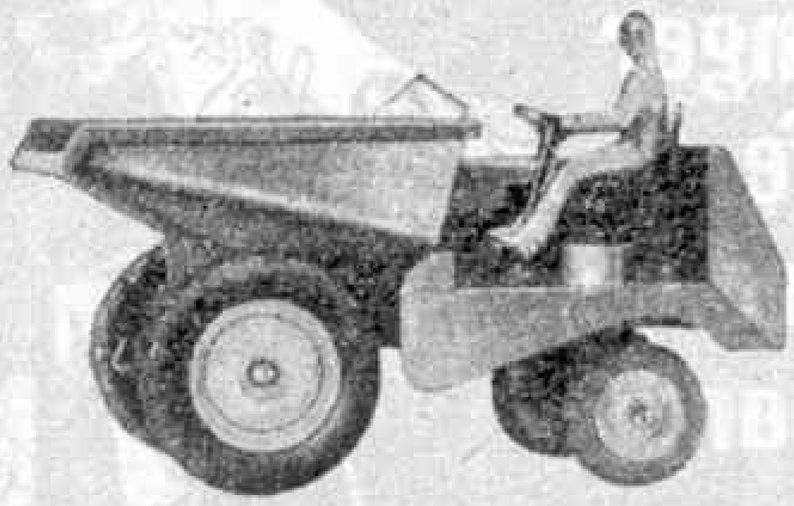
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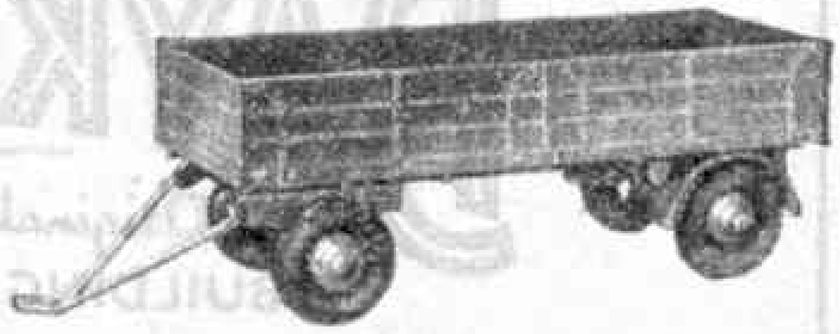
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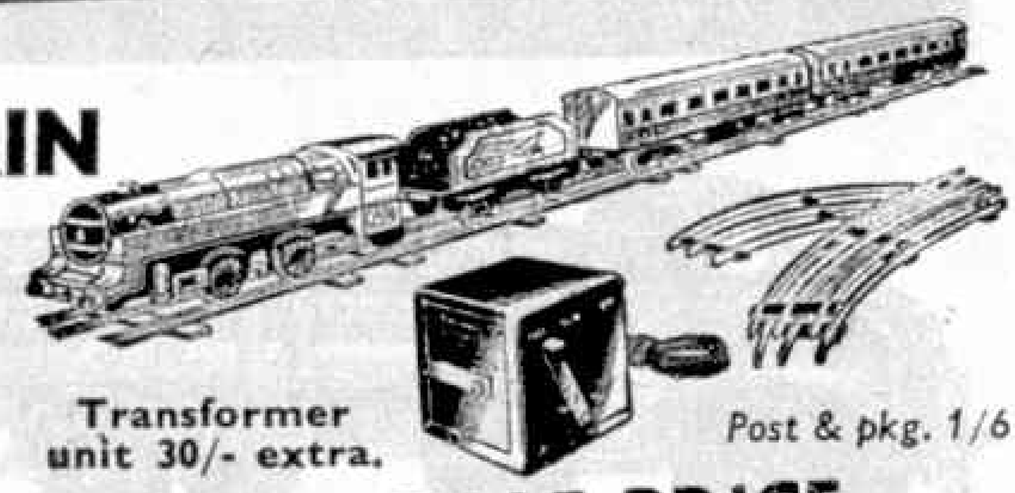
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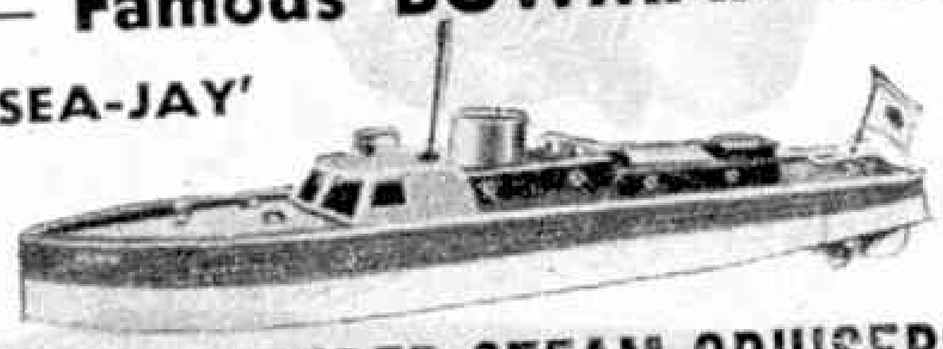
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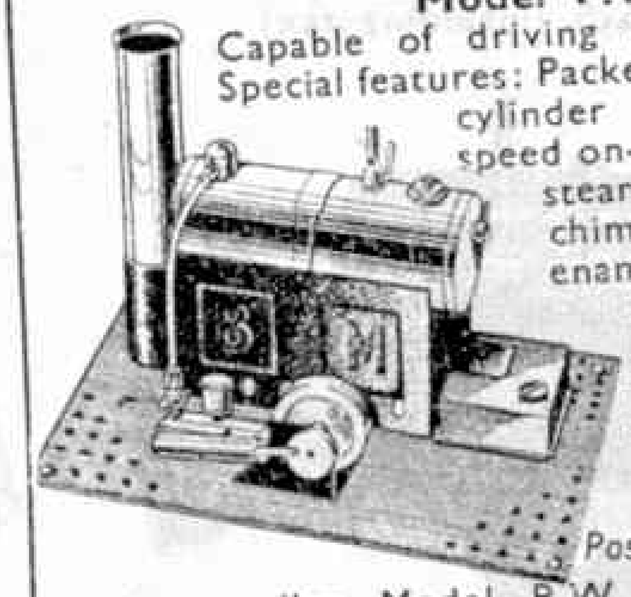
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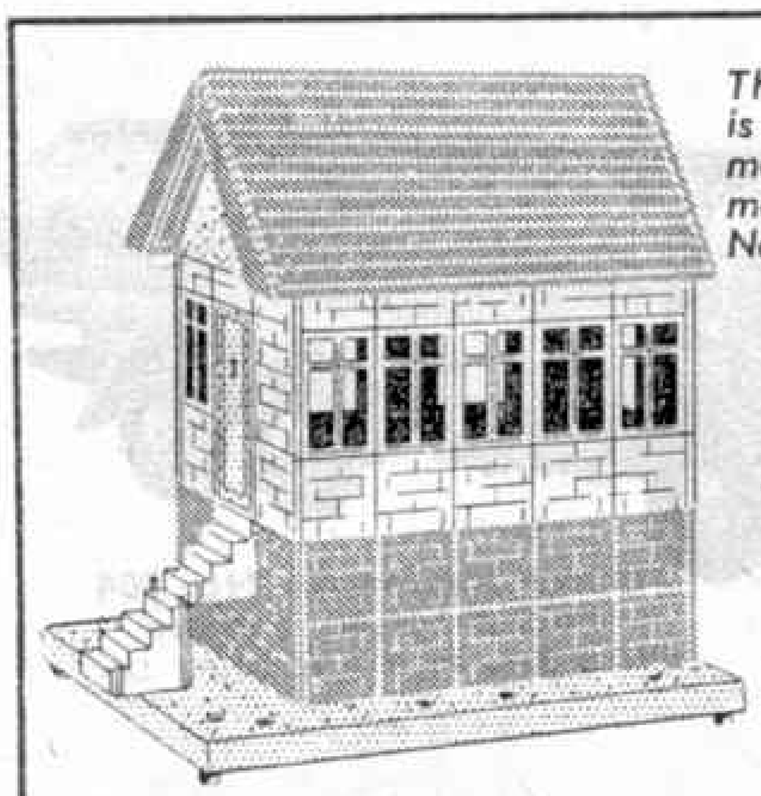


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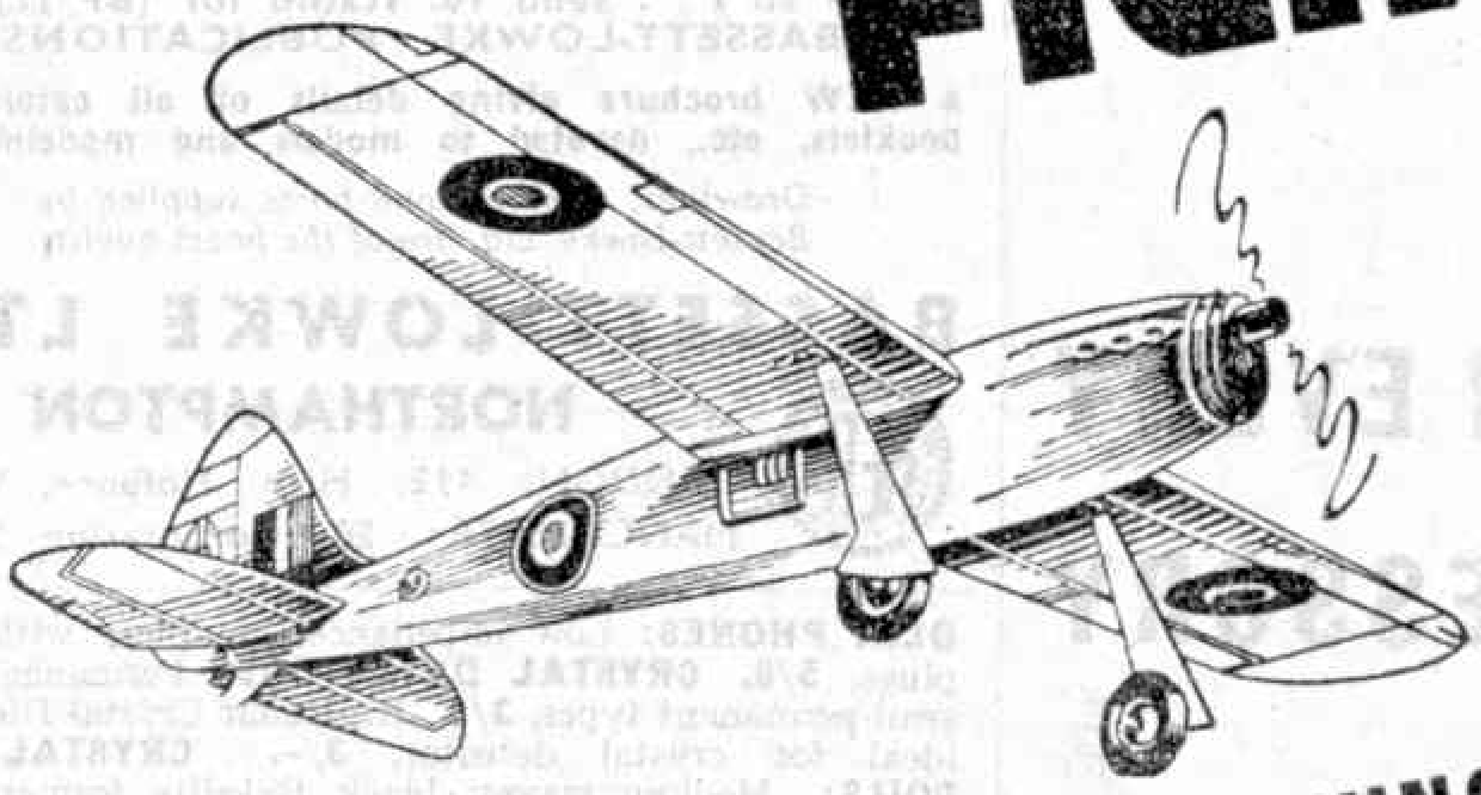
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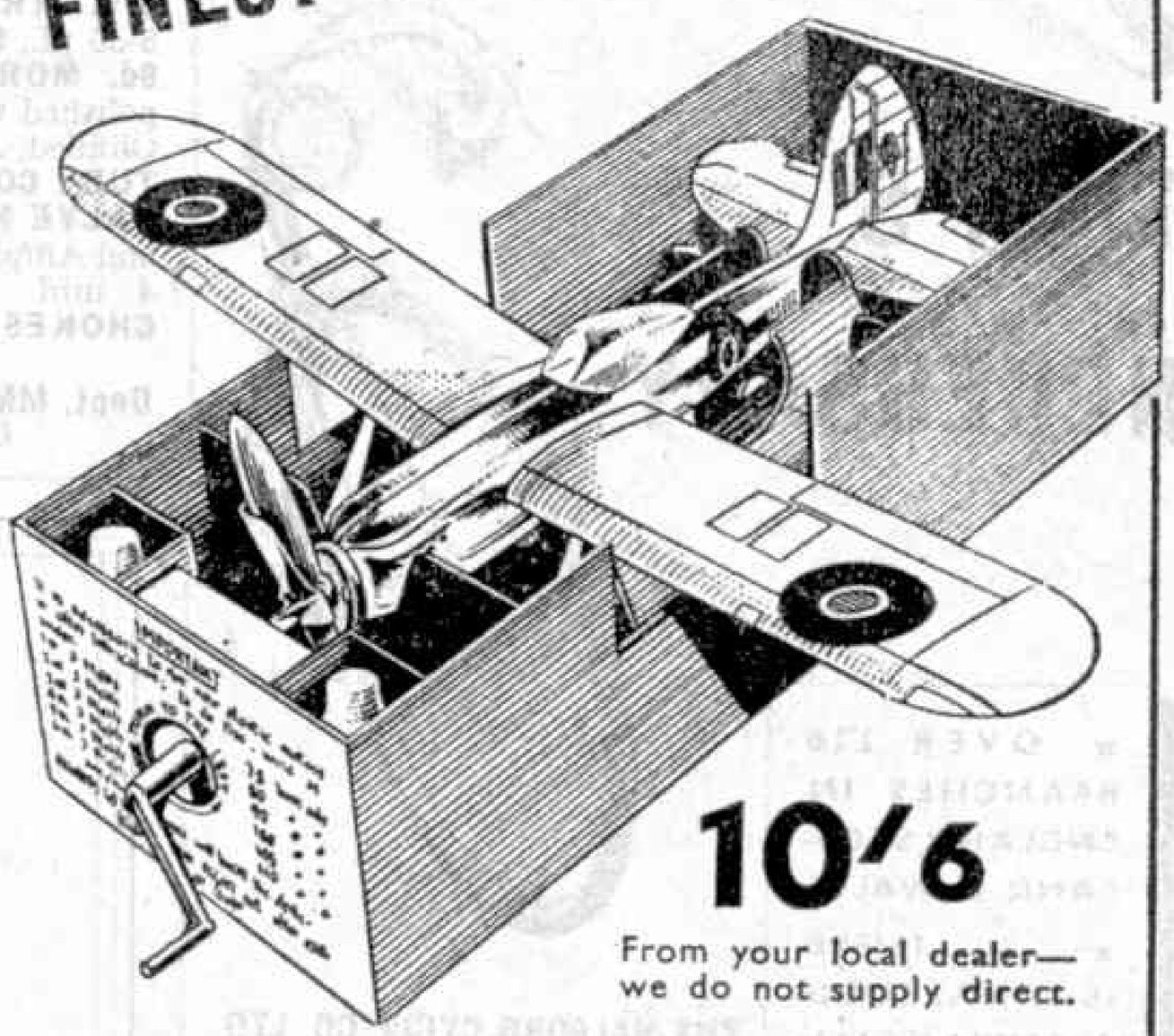
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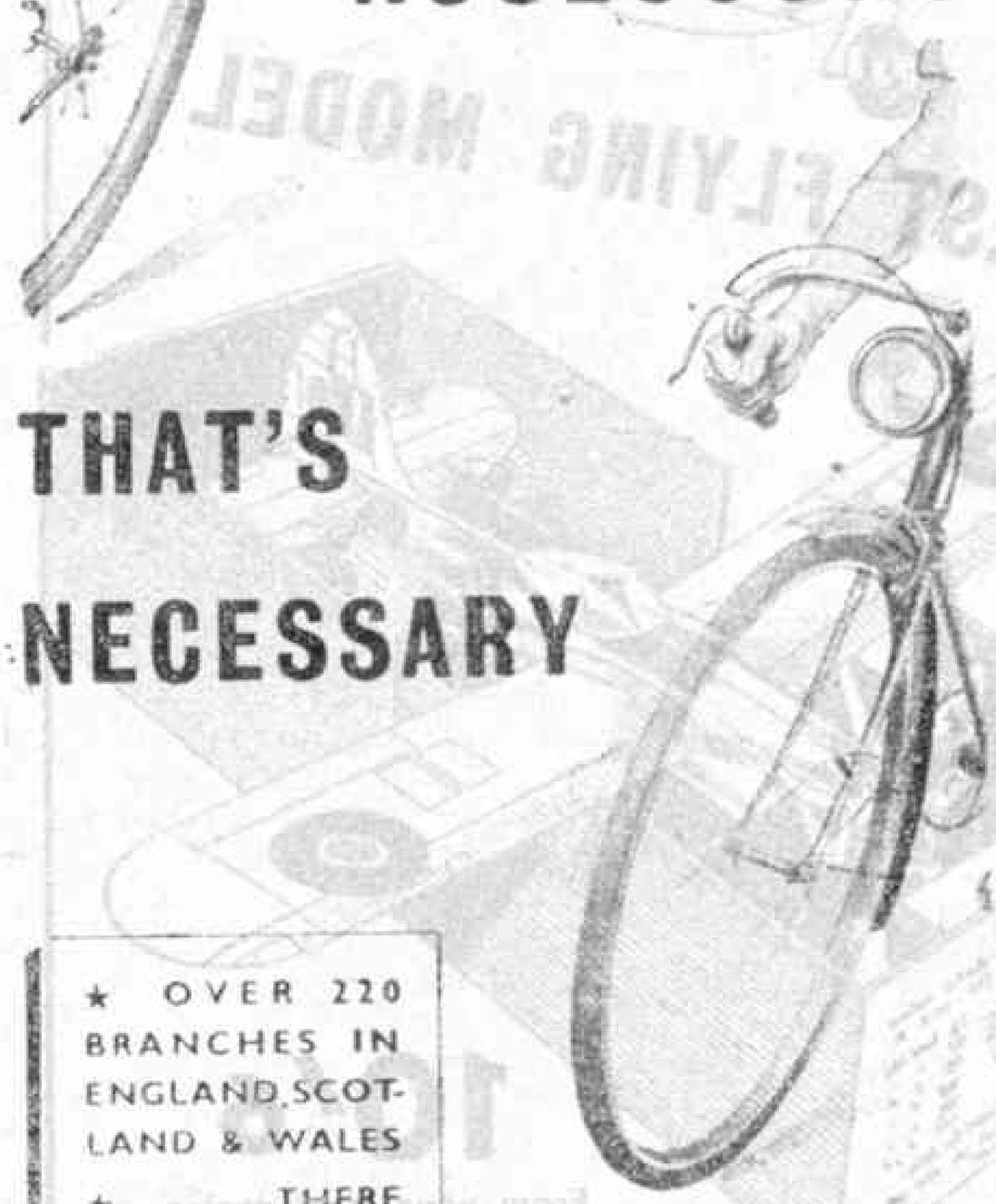
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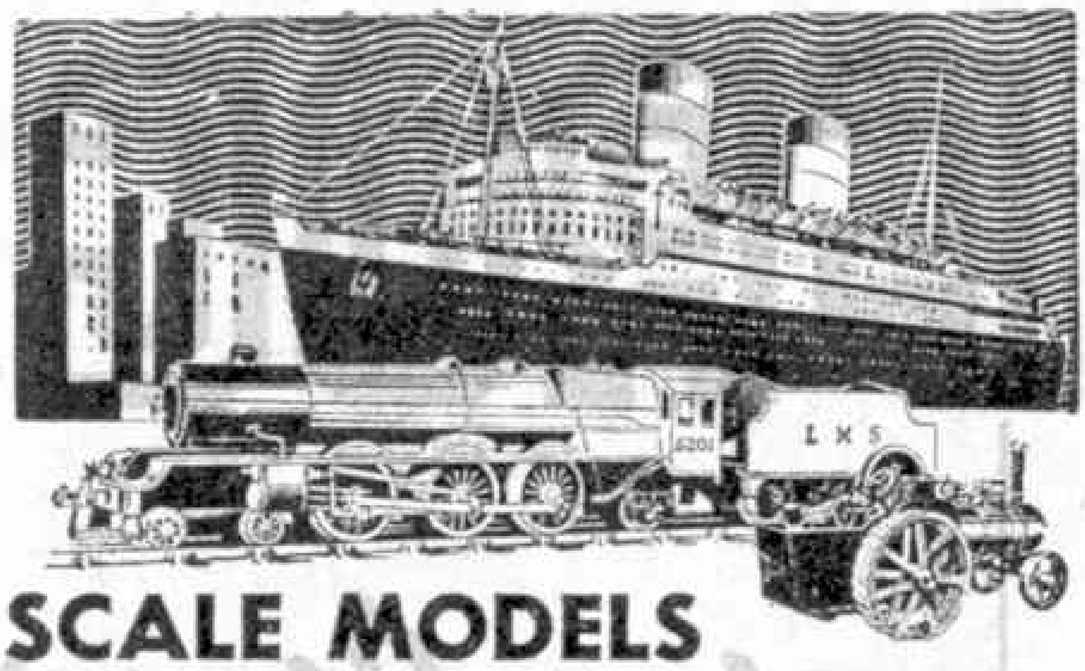
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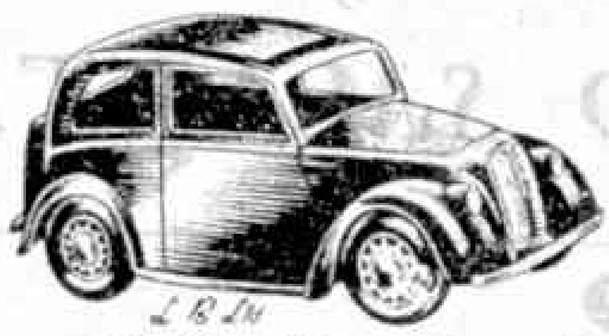
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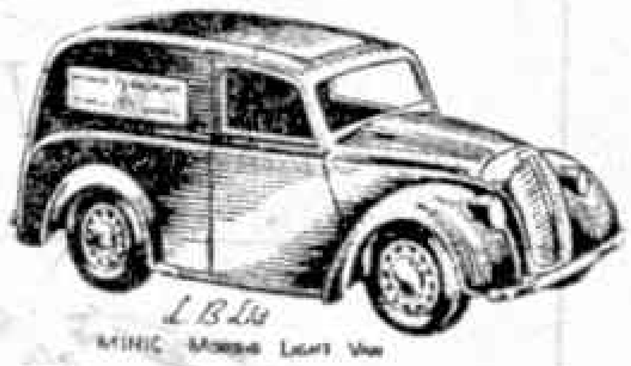
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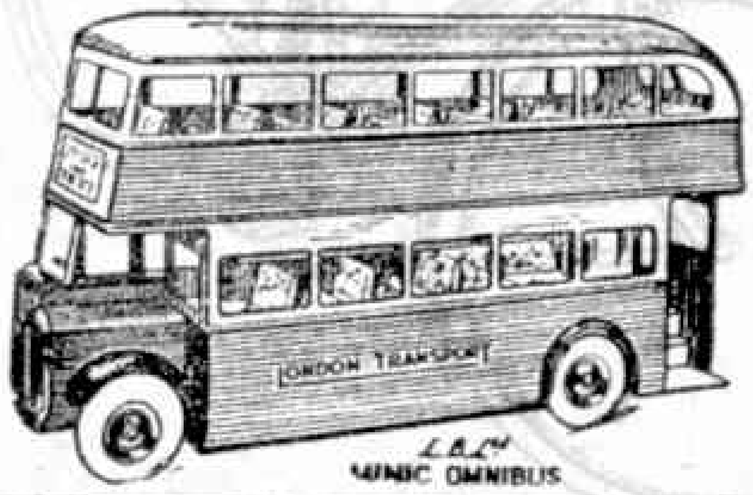


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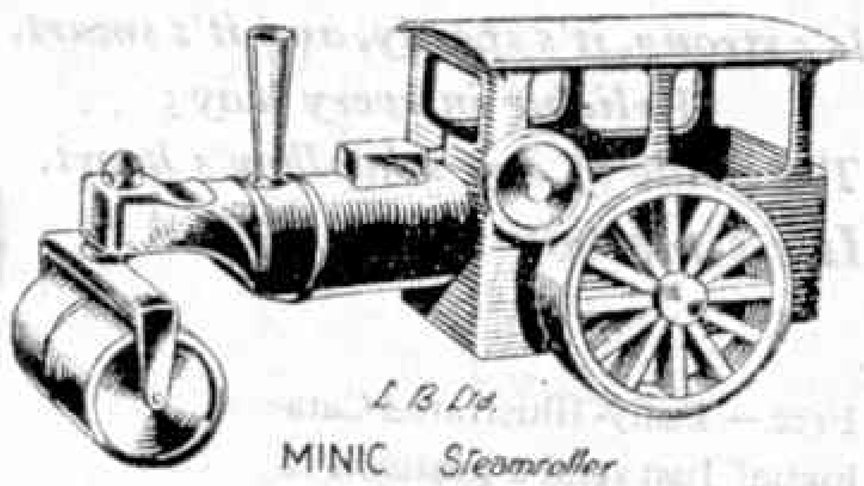


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MECCANO MAGAZINE

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With the Editor

Guided Missiles

Few of us took any interest in guided missiles until 1944, when the Germans launched their V.1 flying bomb and V.2 rocket attacks on London. A year later the Americans dropped the first atomic bombs on Japan, and "experts" at once began to tell us that it was merely a matter of time before super-V.2 rockets with atomic warheads would replace bombers in the world's air forces, and that conventional fighter aircraft would give way to guided interceptor rockets. The term "push-button warfare" was coined, and we all began to wonder uneasily what the future might hold in store for us.

That was four years ago, and yet the air forces of to-day look very like those of 1945. In fact, the "Superfortress" and "Meteor," early versions of which were used in the war, are still the spearheads of Western Nations' attack and defence. Some progress with push-button warfare has been made, as John W. R. Taylor explains in his article on page 424; but on the whole it remains a dream, or rather, nightmare of the future.

Meanwhile, we should remember that rockets are not merely vehicles of death and destruction. Like most of man's inventions, they have powers for good or evil, according to the way they are used. Even now they are bringing back invaluable scientific data from heights up to 140 miles, and scientists claim that special rockets may one day enable us to control the weather. Furthermore, level-headed people like Lord Brabazon believe that the day is not far distant when we shall be able to fly by rocket to the Moon.

There is in fact little doubt that, for better or for worse, rockets and guided missiles are going to play a big part in our lives in future.

British Railways Prize Scheme for Best-Kept Lengths of Track

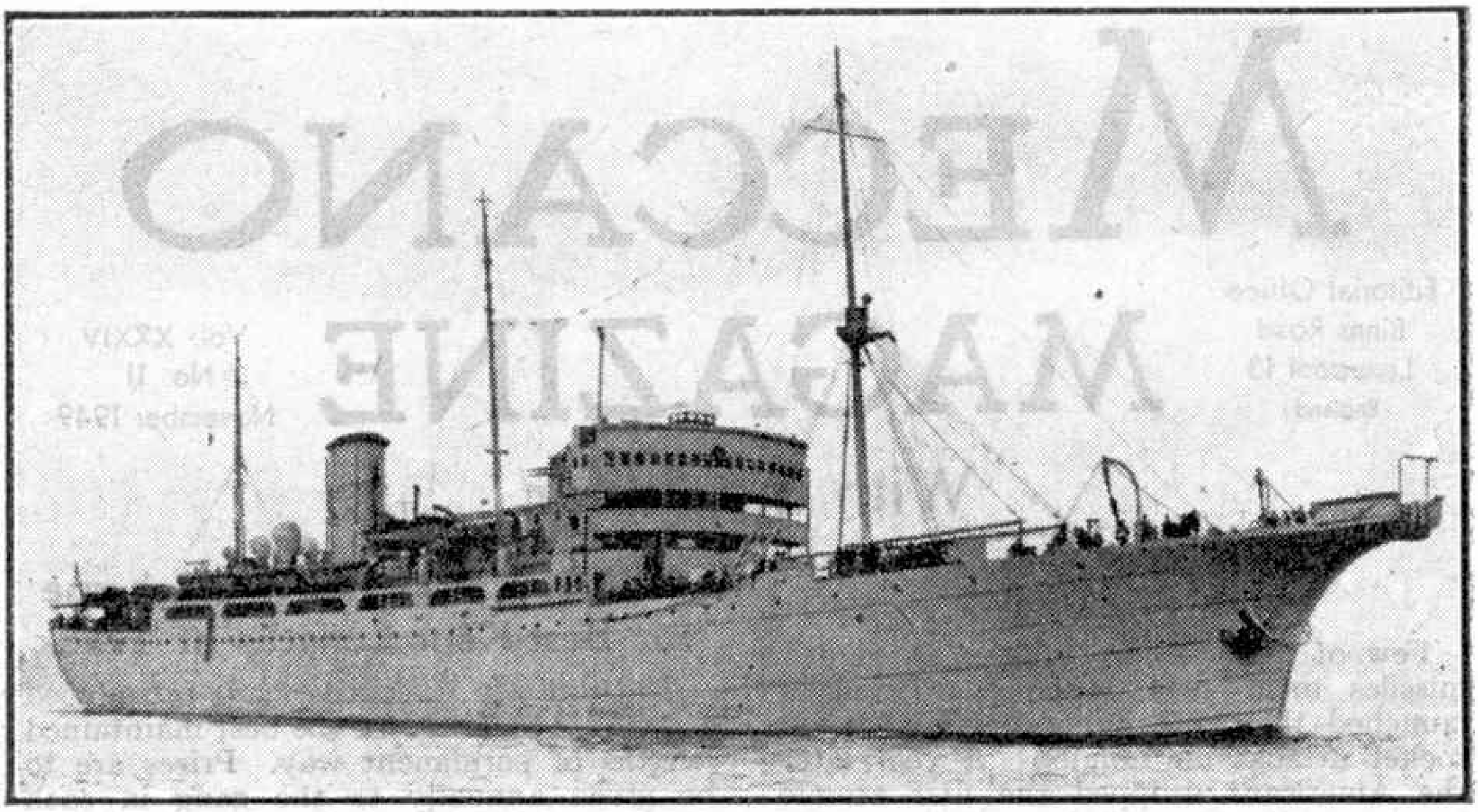
The Railway Executive have introduced a system of awards for the best maintained lengths of permanent way. Prizes are to be given annually to the gang in each district whose length is adjudged, by a uniform system of marking, to be the best maintained length in the whole district. Further prizes will be awarded to gangs who have achieved the most satisfactory results when factors over which they have no control are taken into consideration as well as the marking.

The permanent way inspector of each district getting the highest average marking per length is to be awarded a cup to be held for twelve months, also a miniature cup for his retention.

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The Post Office "Navy"

By W. H. Owens

EVEN in this age of radio-telegraphy the life and progress of the civilized world still depends to a very important degree upon the submarine cable system. Nearly 360,000 miles of sea cables encircle the globe to-day, and in some parts of the oceans they lie at a depth of three to four miles. The big commercial cable companies and various Government administrations own fleets of cable repair ships which are voyaging the seas all the time, in fair weather or foul, to maintain these essential communications.

From the coasts of Great Britain a cable network fans out to link this busy island with the rest of the world. Apart from the Transatlantic cables there is, as it were, an inner web, which provides direct line communications with Continental Europe, the Channel Isles, Ireland, the Orkneys and Shetlands, and all the various smaller islands scattered around our shores. The maintenance of all these cables in home waters is the responsibility of the British Post Office which, during the last 80 years, has built up one of the biggest cable-laying and repairing organizations in the world.

Nowhere is there such an extensive or intricate system of submarine cables as that which burrows under the narrow seas that girdle Great Britain. While the cables are well protected in stout waterproof casing, damage may nevertheless be caused in stormy weather, or through the impact of drifting rocks, anchors or fishermen's trawling gear. Cables have sometimes been cut as a result of volcanic disturbances which occur from time to time on the sea bed.

Because a broken or damaged cable may cause serious hold-ups, if not chaos, on the busy trunk or Continental telephone services, cable ships must be ready and equipped to undertake emergency repairs by day or by night at the shortest notice. In the course of a year the Post Office ships steam several thousands of miles while engaged on cable-laying and repair operations off the British coastline. Sometimes they voyage much farther afield.

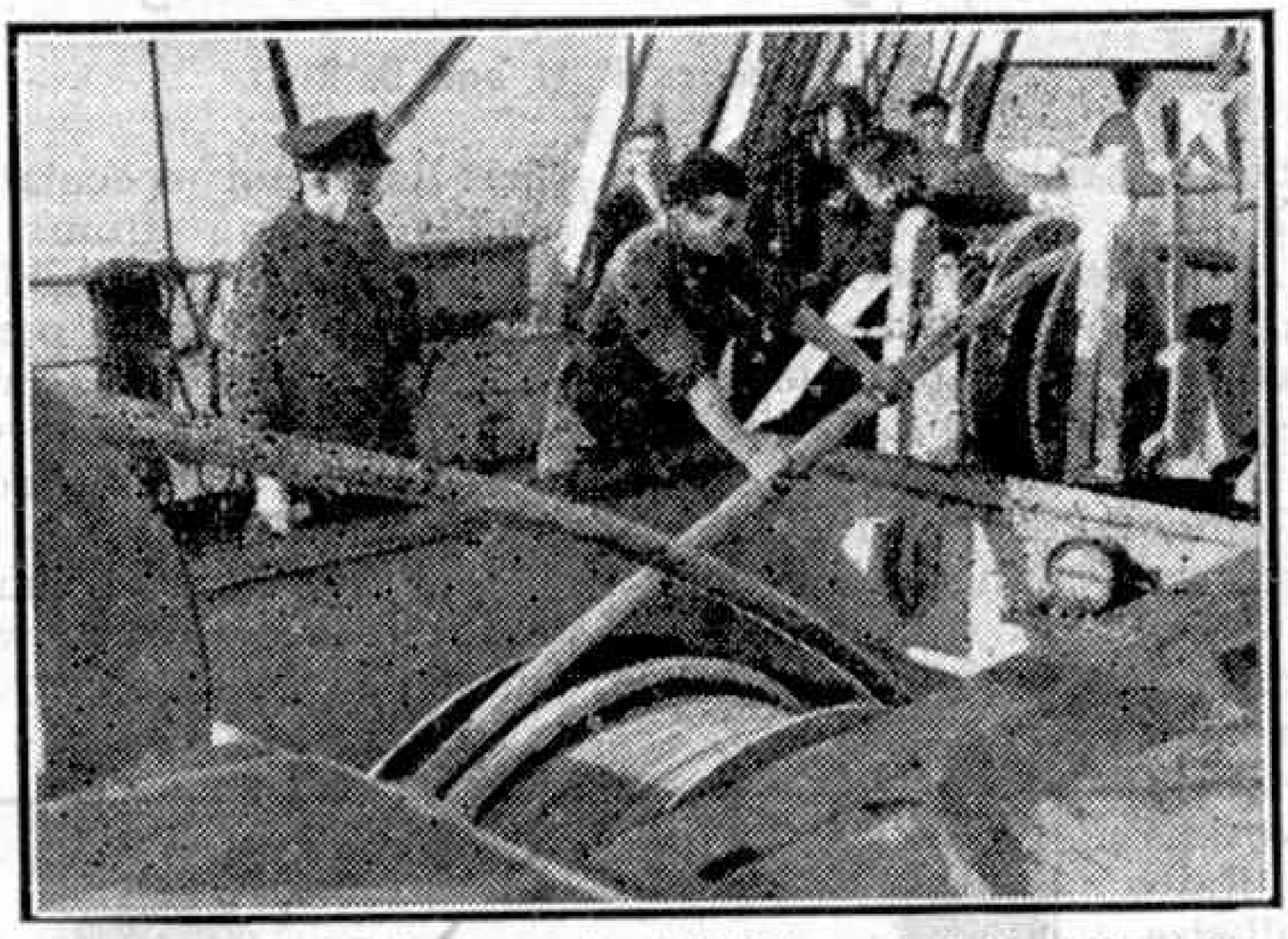
The Post Office deep sea cable-laying ship "Monarch," 8,050 tons, the largest and most up-to-date cable ship in the world. The illustrations to this article are reproduced by courtesy of the Postmaster General.

The Post Office cable fleet comprises four modern ships, officially styled His Majesty's Telegraph Ships, and each flies the Blue Ensign superimposed with this Government department's own crest. This crest, which was registered in 1883, represents Father Time seated on a coil of rope on the seashore, watching the shore end of the first submarine cable being landed.

Senior vessel of the fleet is H.M.T.S.

"*Monarch*," 8,050 tons, which is now the largest and most up-to-date cable ship in the world. She was put into commission only two or three years ago, and was designed specially for deep sea cable-laying, so that besides serving in home waters she is available for loan to the commercial companies when required for some specific ocean task.

The "*Monarch*" is oil-fired and carries about 2,600 nautical miles of deep sea cable in four huge cylindrical tanks below the decks. She is the first cable ship to be fitted with electrically-operated cable-winding gear, and this, together with every modern scientific device for cable inspection and repair work, makes for a high standard of efficiency in any conditions at sea. Actually this vessel was built originally for cable-laying operations between the Pacific Islands during the recent war, but victory over the Japanese was achieved before she was completed.



Paying out a cable between Great Britain and Holland from the "Alert," of the Post Office cable-laying fleet.

Three smaller Post Office cable ships, "*Iris*," "*Ariel*" and "*Alert*," are of about 1,500 tons gross, and each can carry some 600 tons of cable. These are particularly useful for cable work close inshore, though they are all capable of undertaking repairs in depths of 1,500 to 2,000 fathoms.

As soon as a cable fault is reported, its approximate position can be located by means of instruments in the Post Office huts which are sited round the coasts at every point where a cable comes ashore. The position is calculated on a chart, and then the bearings are wirelessed to the nearest repair ship, which steams at full speed towards the place.

The damaged cable may lie embedded in sand or be caught up in rocks, but the five-pronged grapnels carried by the ship will soon find it and haul it to the surface. A grapnel is dragged along the sea-bed and hooks its prey as the ship steams across it. As soon as the grapnel "bites," the ship is stopped, the cable is raised, and secured with chains by two of the crew lowered over the bows in a bosun's chair. This is difficult work at any time, but its hazards in stormy weather when high seas are running can be imagined.

Once aboard, the cable is sawn in two and each part is tested to find the fault. The sound part is sealed and thrown back into the sea with a buoy attached to mark its position. Then the other part is slowly hauled in until the breakage appears on the surface. Should the cable have been so damaged that it is broken in two, the grapnel is put in action again to pick up the other part. When the repair is completed the ship retraces its course to gather up the buoyed end, and after a final test of each part the cable is joined together again.



Section of the Anglo-Dutch cable laid in December 1947, showing the insulation and protection.

Apart from emergency repair jobs and routine inspections of submarine cables, the Post Office lays down new cables every year. Where such an operation has to be carried out across the North Sea or some comparable stretch of deep water, months of exacting preliminary work will be carried out by divers and deep sea engineers, and thousands of echo-soundings may be taken.

The most important undertaking carried out by the Post Office since the war was the laying of the new Anglo-Dutch cable in 1947. This is a new type that can carry 84 simultaneous telephone conversations without submerged repeaters, each transmitted on a different wavelength.

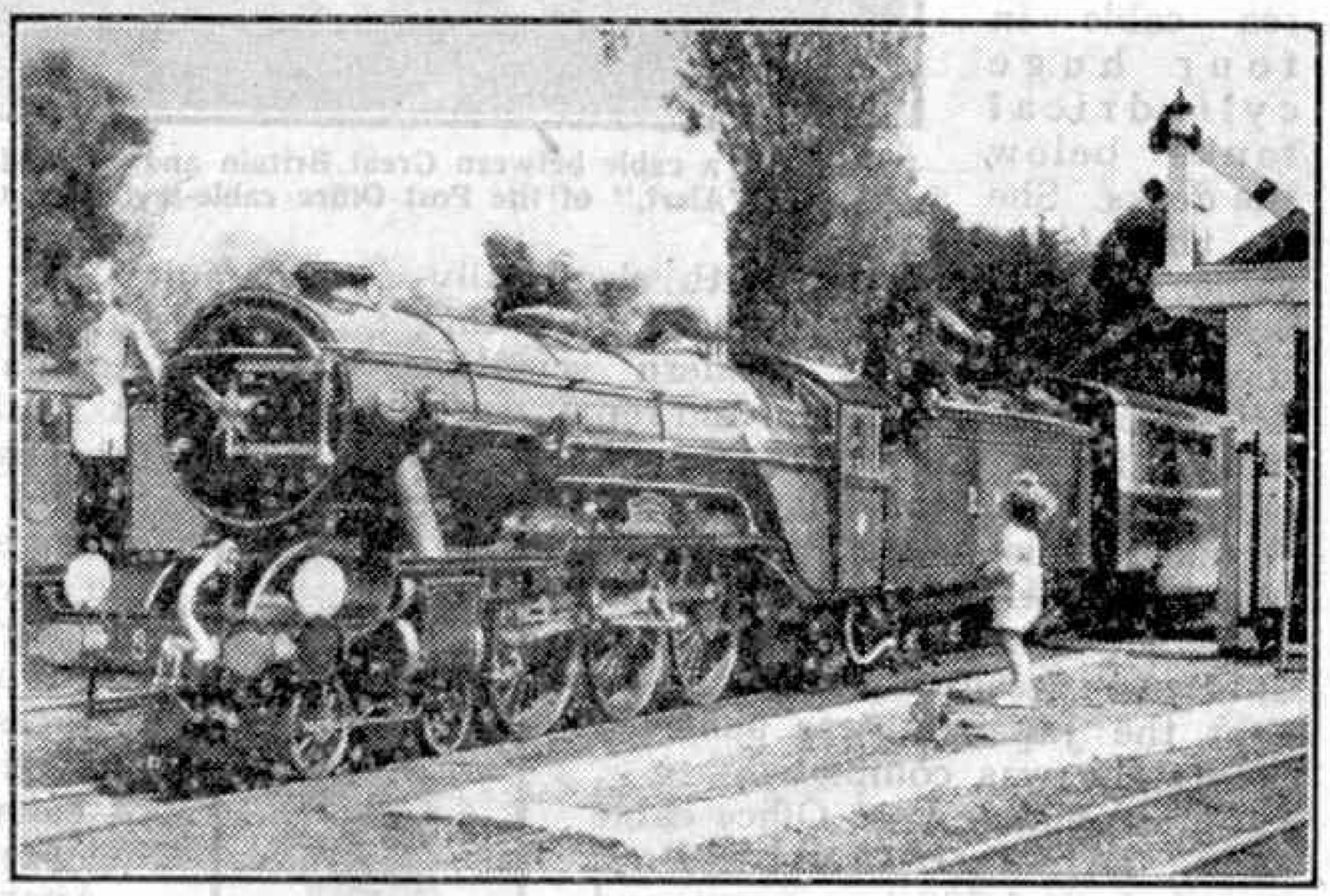
The World's Smallest Public Railway

Keeping the Wheels Turning

By R. A. Leeder (R. H. and D. Rly.)

DOWN on the Kentish coast is the Romney, Hythe and Dymchurch Railway, a 15 in. gauge system serving the places named in its title, with an extension to Dungeness, making a total length of about 14 miles. The railway dates from 1927 when the first section was opened between New Romney and Hythe, the Dungeness extension taking place in 1928-9.

With its one-third full size engines and its two-a-side rolling stock, the line, which is known as the World's Smallest Public Railway, does a full-size transport job for the area it serves. Its train services appear on a page to themselves in *"Bradshaw."* The system owes much of its popularity to the fact that its operation is carried out by real coal - burning steam locomotives that look just like real express engines scaled down. The admiration these excite is well shown in the cover to this issue, which has been prepared from a prize-winning photograph submitted by *"M.M."* reader P. W. Lang, Sevenoaks.



R. H. and D. 4-6-2 No. 8 "Hurricane" being admired by a youthful enthusiast talking to the driver at Hythe Station. Photographs to this article are by Raphael Studios, Hythe.

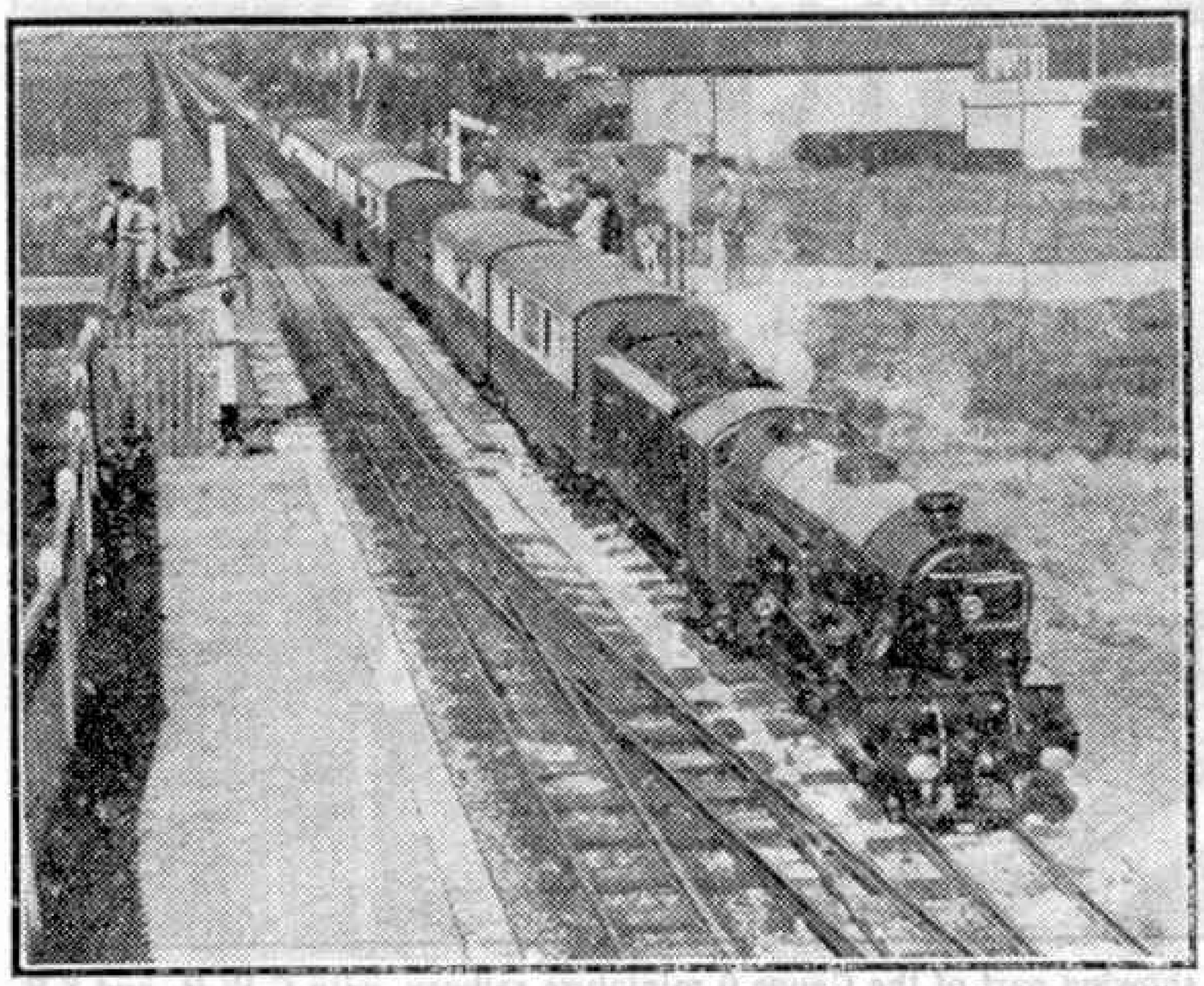
Any day during the summer months folk in the Romney Marsh area of Kent can hear the steady beat of the R. H. and D. locomotives as they wend their way from Hythe to Dungeness. Local people come to know them individually by their beat or whistle, and each engine can be identified by the railway personnel long before reaching New Romney.

Probably few of the travellers in the cosy well-sprung coaches realize the amount of work and organization necessary to keep these engines and rolling stock working at full pressure for six months of the year. Perhaps, when leaving New Romney bound for Hythe, they glance at the building on their left and speculate at the strange sounds issuing from it. A pneumatic riveter going at full blast, the sound of machinery running, perhaps an engineer outside cutting rails with oxy-acetylene plant. This is the shop where all our locomotives and rolling stock are maintained in first-class condition.

Here it is that the mighty little giants are refreshed every winter after their summer's labours. Two lines run into this shop. Overhead two 3-ton gantries span the roof and allow engines to be lifted clear of the rails. The shop is completely equipped with modern machinery and capable of dealing with any repairs, overhauls or rebuilds. A deep roomy pit enables us to work underneath the engines with ease.

The engineering staff are all enthusiasts and take a personal pride in turning out a first-class job. We do all our own machining, fitting, copper pipe work and boilersmith's work, castings and materials being the only things bought outside.

When necessary a locomotive is stripped down and completely rebuilt. It emerges from the paint shop, at Hythe, later, gleaming with fresh paint, polished steel



"Green Goddess" R. H. and D. No. 1 brings a train from Hythe over the level crossing into Dymchurch Station. Note the sturdy permanent way.

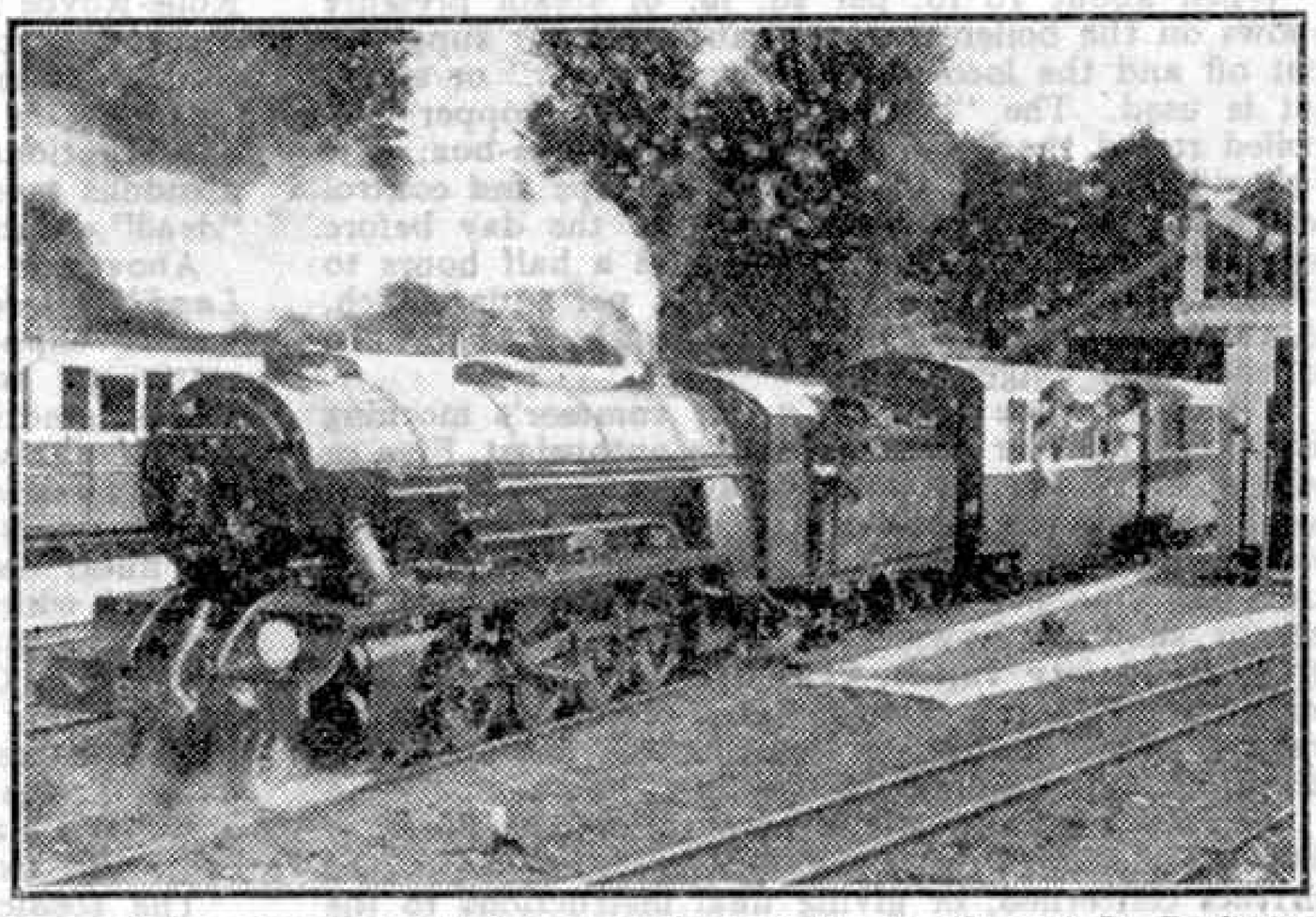
and copper; a thing of beauty guaranteed to bring exclamations of delight from our public, and well worth the efforts involved.

In the running sheds after a day's running you would hear many words strange to the layman spoken by Foreman Driver George Barlow and his drivers. How in the hot summer days the "road" (track) was bad at a certain place due to heat expansion of the metals; how the "pegs" (signals) were held against them, of sheep roaming on the road at certain places, and so on. Seldom are heard any complaints about the performance of the locomotives. Perhaps an injector has been giving trouble, usually by foreign matter getting through the filters into the suction cone and causing the injector to blow back; or maybe a sticking clack valve, or a leaking gauge glass is reported. These are troubles which may occur at any time, and they will be duly entered in the Report Book and attended to by the engineering staff.

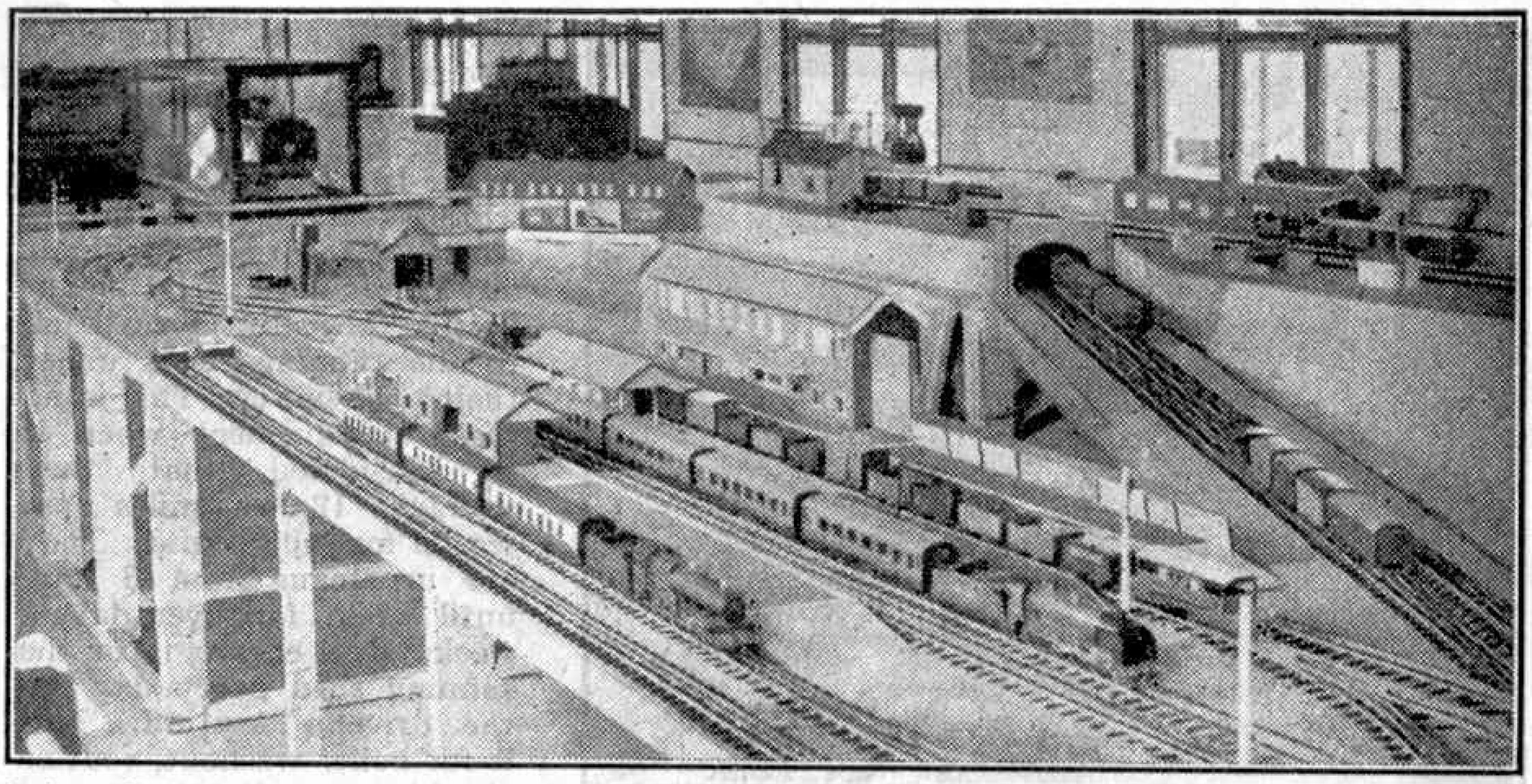
One of the worst enemies of the driver is poor steaming, usually caused by slatey coal making excessive clinker in the fire-box and thereby preventing the fire drawing properly. The only remedy is to wait until the terminus is reached, then break up the clinker with the pricker, and remove it with a long-handled fire shovel. In bad cases the fire-bars get completely covered with a hard substance not unlike almond rock.

Our engineers are proud of the fact that due to winter overhauls our engines run the whole of the season without any major mechanical breakdown; they always get back to the running sheds under their own power. This is no mean achievement when it is considered that they average 12,000 miles per season for each engine. They are in steam from 6 a.m. until 9 p.m. for seven days a week. One engine is in the running shed every day, on the driver's day off. This is for boiler washout, routine checking up, adjustments and any minor repairs such as replacing burnt-out fire-bars, grinding in steam valves that "weep," replacing any broken springs and repacking glands and similar jobs. This ensures that every engine is examined by an engineer every eighth day at least throughout the season.

An engine due for washing out next day finishes the day's run and is put in the shed just as usual. At 4.0 a.m. when the firelighters arrive they look at their engine roster, and note, say, that *"Typhoon"* is for washout that day. They then remove the washout plugs, and allow the boiler to drain off. This gives the boiler until 5.0 p.m. to cool off sufficiently for washing out. At 5 p.m. water is injected through the washout plug holes at high pressure,



One of the powerful 4-8-2 locomotives of the R. H. and D. Railway, No. 6 "Samson," leaving Hythe with a merry load.



A view of "Model Land" at New Romney, showing part of the Gauge 0 miniature railway, with G.W.R. and S.R. trains in the foreground.

and wires are inserted in the plug holes to rake out all sediment caused through hard water. After washout the boiler is filled with clean water until the water gauge shows "half-a-glass"; the washout plugs, having been previously graphited to make the work of removing them easy next time, are then replaced.

The firelighters noting the engines in service for the day set about preparing them. The fire-box is cleaned out and any clinker removed from the fire-bars, the boiler tubes are swept, an operation known as "tubing," and the smoke-box is cleaned out. After the water gauge glass shows that the water level is correct, wood, cotton waste soaked in paraffin, and coal are put in the fire-box and the fire is lit.

An extension chimney is fitted to the existing chimney of the locomotive lit up. This chimney is a length of steel tube about two feet long and the same inside diameter as the chimney; inside is a copper ring with three $\frac{1}{16}$ in. holes drilled in it facing upward. The compressed air supply is coupled to this ring. The air blowing upward through these small holes creates a vacuum in the smoke-box, and draws air through the boiler tubes, thus drawing the fire.

When about 15 lb. per sq. in. of steam pressure shows on the boiler pressure gauge, the air supply is cut off and the locomotive's own "blower" or steam jet is used. The "blower" is a similar copper ring coiled round the blast nozzle in the smoke-box; it is fed with steam from the boiler via a pipe and control valve in the cab. An engine in use the day before will take from one hour to one and a half hours to raise a working pressure of 180 lb. per square inch. A cold engine, on the day after washout, will take considerably longer.

The locomotive shed on a fine summer's morning is a fine sight for any locomotive enthusiast. Five or six engines with 180 lb. pressure, a lazy curling of smoke from the chimneys, and a faint haze of steam over the safety valves, can usually be seen standing outside. One perhaps is blowing off hard, a jet of steam shooting upward with a loud hissing noise from the safety valves. The drivers are busy oiling round and cleaning. One engine is coaling up, another taking water, a third is shunting the day's coaches from the many sidings to the main line.

All round is the bustle of preparation, the Foreman Driver checking over the engine turns with the drivers concerned, or giving final instructions to the Station Staff regarding a non-stop special train, or perhaps discussing the drivers' reports on yesterday's running with the engines.

New Romney is the nerve centre of the Railway. We have here the General Manager's Offices, Stores, Engine Sheds, Carriage Sheds, Coaling Dump and the Engineer's Department. Captain Howey, the Managing Director, a very keen locomotive enthusiast, can usually be seen around here. He often drives his own special engine "*Hurricane*" on the non-stop "*Bluecoaster*" run from Hythe to Dungeness. He takes a great personal interest in the working of the whole system and in the Staff.

Captain Howey personally supervises and inspects all the platelaying, for he holds himself responsible for the safety of the permanent way. Winter and summer in his special form of transport he is to be seen directing operations, one day levelling off a length of track, the next day perhaps a complicated set of points or a crossover is installed under his direction.

A few words on his mode of transport may be of interest. He uses a locomotive of unusual design. The main frames have the 4–4–0 wheel arrangement; the rear wheels are coupled together by driving chains, the front wheel arrangement is a standard bogie. A Rolls-Royce petrol engine of 40 h.p. complete with gearbox supplies the motive power. The whole unit is enclosed in a streamlined body painted in blue and cream. This "locomotive" is reputed to be capable of exceptionally high speeds, together with a tremendous tractive effort. I have seen it hauling five "dead" steam engines without any apparent effort.

Above the carriage sheds at New Romney is "*Model Land*." Here is a fine collection of scale models; yachts, clipper ships and a liner rub shoulders with stationary engines, marine engines, traction engines and locomotives of all gauges. Many of these fine models enclosed in glass cases can be seen running under electric power.

Two-thirds of "*Model Land*" is devoted to one of the finest Gauge 0 electric railways in this country, part of which is shown in the accompanying illustration. A star feature of this fine layout is a beautiful model of a G.W.R. "King," which can be seen any day hauling its scale coaches along. Goods and passenger trains pass and re-pass each other all day long. Trains pull into stations and start off again until it is hard to believe one is looking at models controlled from a switchboard.

The scenic effects, tunnels, sidings, goods yards, factories and rows of shops, all combine to make a fascinating, realistic display.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With certain exceptions, which will be indicated, these should be ordered through a bookseller.

"LOCOMOTIVE PRACTICE AND PERFORMANCE IN THE TWENTIETH CENTURY"

By Cecil J. Allen, M.Inst.T., A.I. Loco.E.
(W. Heffer and Sons Ltd. 21/-)

No more suitable author than Mr. Cecil J. Allen could be found to deal with this subject. His deep knowledge of locomotive design and its influence on performance on the road, gained by close observation in the course of almost constant travel for over 40 years, gives an authoritative background for the contents of the book.

As is pointed out in the introduction, there has been hitherto no systematic published collation of the most outstanding performances of British locomotives on the road, and to many of the younger railway enthusiasts great locomotive feats of the past are almost legendary. So the author sets out to repair this lack, and in this task he is most successful. Actually he does very much more. In the course of its 300 pages his book deals competently and fully with the design and building of British locomotives, and their servicing, and with performance, taking the locomotives of each group in turn and giving attention to engines of pre-grouping days. The two great rivals of steam, electric traction and diesel-electric power, also are fully dealt with, and there are interesting sections on the locomotives of the Continent and North America and their performance, which provide interesting comparisons.

Mr. Allen also gives readers valuable guidance in train timing, based on his own long experience; and British main-line gradient profiles, tables and many other useful items add to the attractions of his work. There is a wealth of excellent half-tone illustrations and diagrams, and the book is one that can be heartily recommended to all who are interested in our railways.

"MODERN SHIPS"

By F. E. Dean (Temple Press. 8/6 net)

Ships never lose their interest, whether they are old-time sailing vessels or up-to-date steamers or diesel-engined ships, and there is a sure welcome for any good book dealing with them. Mr. Dean's story of the steel ships of to-day certainly answers this description, and it will be appreciated by every boy eager to learn something of the secrets of the fascinating art of the shipbuilder. The author tells how a ship is built from steel plates, girders and enormous castings, and explains how it takes to the water. The various types of engines that drive it and supply power for so many different needs are then explained in simple language, after which details are given of auxiliary equipment, including modern steering gear, electric generators and navigating instruments. Finally come sections on the "Queens" and other big ships, long-distance liners, refrigerating cargo ships, tankers, coasters and other types of vessels.

Excellent reproductions of photographs and line drawings add to the attractions of the book.

"THE BOYS' BOOK OF SOCCER"

(Evans. 10/6 net)

The 1950 edition of this annual is fully up to the standard of previous issues. It contains stories of the chief matches of last season, and includes portraits in colour of famous players, with details of their careers. Football tactics, training and other practical details of the game itself are also dealt with, and there are stories, puzzles and cartoons.

Pages of soccer records, oddities of football and the laws of the game complete a very fine volume, which is well illustrated by reproductions of photographs, line drawings and diagrams.

"MY BEST RAILWAY PHOTOGRAPHS"

(No. 14). By H. Gordon Tidey
(Ian Allan Ltd. 2/-)

Mr. Tidey has made an excellent selection from the many fine pictures he has taken during the 42 years he has devoted to railway photography. With him the reader progresses from the times when slim "single-drivers" could still be seen on main line trains, through the period of stately yet elegant "Atlantics" and 4-6-0s to the day of the modern "Pacifics," and there are many contrasts in rolling stock and in signalling installations for the enthusiast who has an eye for these things.

Copies can be obtained from bookstalls or bookshops at 2/-, or direct from the publishers at 33, Knollys Road, Streatham, London S.W.16, price 2/2½ including postage.

"CHEMISTRY EXPERIMENTS AT HOME"

By H. L. Heys, M.A. (Harrap. 10/6 net)

Simple chemistry is really good fun for boys and girls. It not only gives them opportunities of making things and carrying out experiments, but also has the right air of mystery about it. Mr. Heys gives full instructions for carrying out a wonderfully attractive series of experiments that are both interesting and safe, and any reader who carries them out will thoroughly enjoy himself. He will also learn a good deal about chemistry in a far more attractive way than is possible with school lessons only as a guide.

The volume is of good size, and contains so much of interest that it is impossible to indicate fully what its contents are. These include notes on apparatus and its use, details of chemical operations, including glass working, and a host of experiments on simple chemicals that introduce the reader to interesting gases, crystals, simple chemical tests, dyeing and the uses of common chemicals in the home. There is a special section on chemical tricks, guaranteed to amuse and mystify onlookers, another on electric cells, and one on plastics.

The excellent illustrations include eight full page plates and 73 drawings.

"ALL STATIONS TO MANCHESTER"

By Stanley Chadwick
(The Venturers Press. 1/6 net)

A recent railway centenary of considerable local interest has inspired this book, which tells the story of the Huddersfield and Manchester Railway, opened in 1849. The local and political squabbles common to many early railway schemes were not absent from the early history of this line. They form the subject of the first two chapters of the book, and in the rest we see how the line to Manchester was completed, and that to Penistone built.

The book has two very good half-tone reproductions showing respectively the Marsden entrances to the Standedge Tunnels and the Lockwood Viaduct, and the cover shows two views of Huddersfield station.

"SMUGGLER'S BAY"

By E. E. Ellsworth
(Lutterworth Press. 4/- net)

Stories of the great days of smuggling never lose their relish and Mr. Ellsworth's book is an interesting addition to their number. Dan Tarry comes from London to live with his grandfather in a Sussex fishing village. The real business of the village is smuggling, and it is not long before Dan runs into real trouble, for efforts are made to force him to join the gang. How the dangers he encounters are overcome makes up a good story that readers will enjoy. There is a coloured frontispiece.

The Fork Lift Truck

Handling and Stacking Made Easy

AT practically every stage of almost every industry things have to be handled. They must be picked up and carried, hoisted, stacked, taken down and loaded on trucks at successive stages of the processes through which they pass. This handling begins with the raw materials taken into a factory and continues right to the delivery of the finished goods.

It is surprising to find how much time and labour go into all this. Reliable figures indicate that more than a fifth of the average cost of producing the world's manufactured articles lies in handling charges, and nearly a third of the time required to produce all manufactured goods is devoted to picking up, carrying, putting down and similar operations. In certain industries the proportion of time and cost spent in this is astonishingly large. For instance, it has been calculated that in mechanical engineering 59 tons of material have to be handled for every ton of manufactured product.



A Coventry Climax fork lift truck raising a motor car on its lifting carriage. The illustrations to this article are reproduced by courtesy of Coventry Climax Engines Ltd.

It must be borne in mind that handling costs add nothing to the value of a product, although of course they increase its price. In addition they absorb a large amount of labour that could be used in other ways to far better advantage. Means of reducing handling time and labour therefore are of the greatest importance. One of the finest aids in bringing this about is the fork lift truck, which every day is finding more and more uses in industry.

The beginning of the development of the fork lift truck can be traced back to the ordinary hand truck, something like a porter's barrow. This allowed material to be moved with reasonable speed and ease, but there still remained the problem of loading it and unloading it, to say nothing of the handling still necessary for stacking or in making ready for work on it. The next step was to design a truck with a low platform that could be run under the material resting on battens so as to leave the necessary space beneath it. A mechanical device operated through the handle of the truck then raised the platform sufficiently to lift the load off its battens, and a similar reverse movement lowered it into the new position to which it was taken. In many instances the materials to be dealt with were loaded on pallets, platforms of wood with battens fitted underneath, and they stayed on these during transfer and storage.

The final stage in the development of the fork lift truck came when the need for raising the load to greater heights was realised. The first machine of this type was developed in Liverpool docks during the first World War, but no further progress was made for some years, as labour was then comparatively cheap. Growing costs revived the idea and gave us the fork lift truck as we have it to-day. In this the truck platform is replaced by forks that can be inserted under the load to be moved, and the forks are mounted on a carriage that can be raised to any convenient height on a mast. The addition of this vertical movement gave a machine for which countless uses in the handling of material can be found, and greatly reduced the time and labour required for these operations.

An outstanding example of the modern



Stacking with the fork lift truck. The cases are carried on pallets, which are raised and placed in position by the machine.

fork lift truck, made by Coventry Climax Engines Ltd., Coventry, is shown at work in the illustrations on this page, and on page 422 there is an illustrated description of the fine model of this truck now included in the Dinky Toys Series.

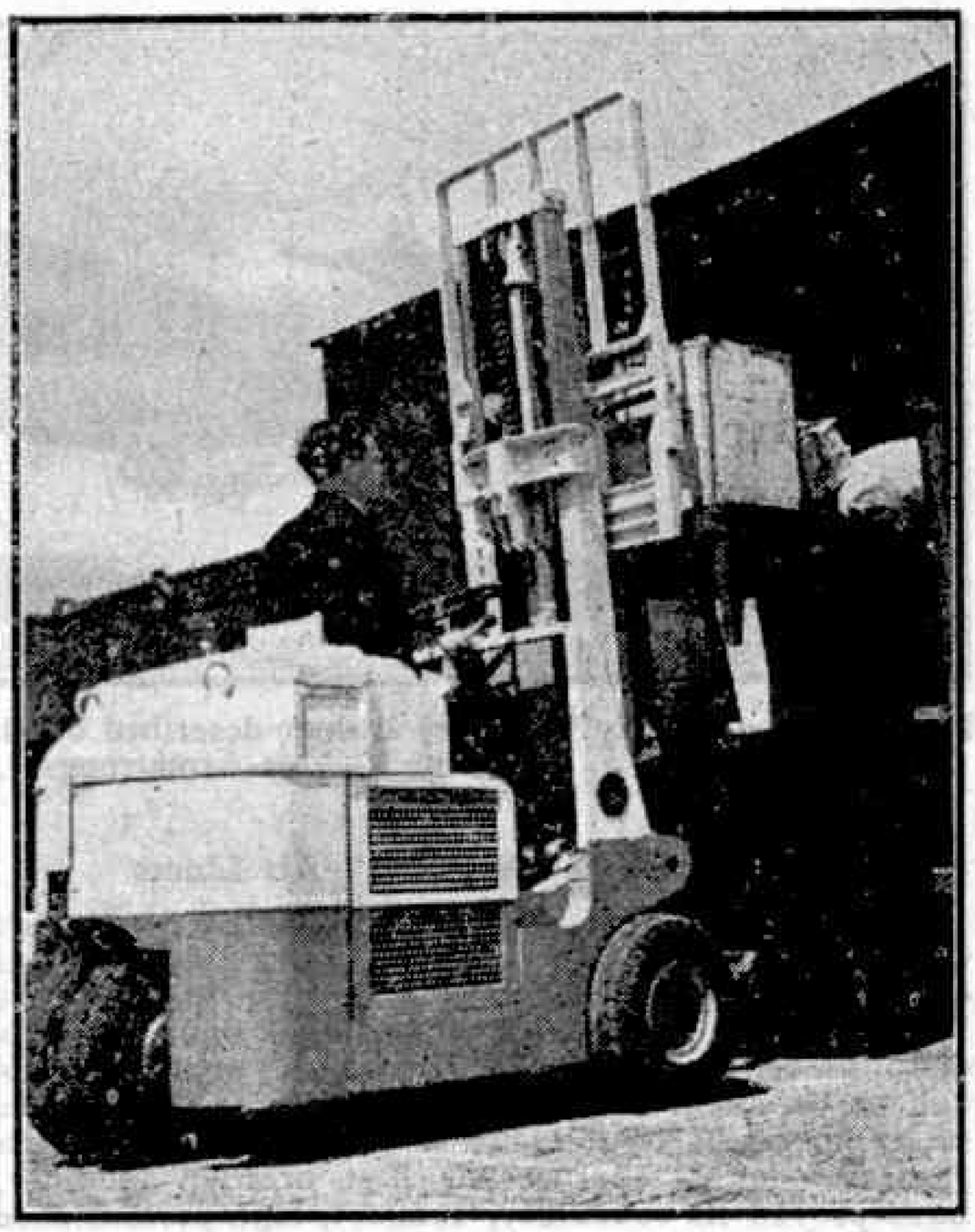
In this fork lift truck a petrol or diesel engine provides the power required both for running and for lifting. The machine is made in a range of models handling up to 6,000 lb., or nearly 3 tons, and raising loads to heights of up to 12 ft. It is provided with pneumatic tyres on its three twin wheels. Steering is effected through the twin rear wheels, and the truck is driven in exactly the same way as the motor car. The use of closely spaced rear wheels gives what is practically a three point contact with the ground, a plan that results in stability when moving over an uneven surface.

A special feature of the truck is the hydraulic steering mechanism, which avoids the use of linkage joints, which are liable to wear and require constant maintenance. Another effect is the elimination of road shocks to the steering wheels when travelling over rough ground. There are two forward speeds and two reverse, controlled by two gear levers, and the final drive is through a worm and worm-wheel and a differential. Hydraulic brakes are provided on the front driving wheels, and there is a hand brake for parking.

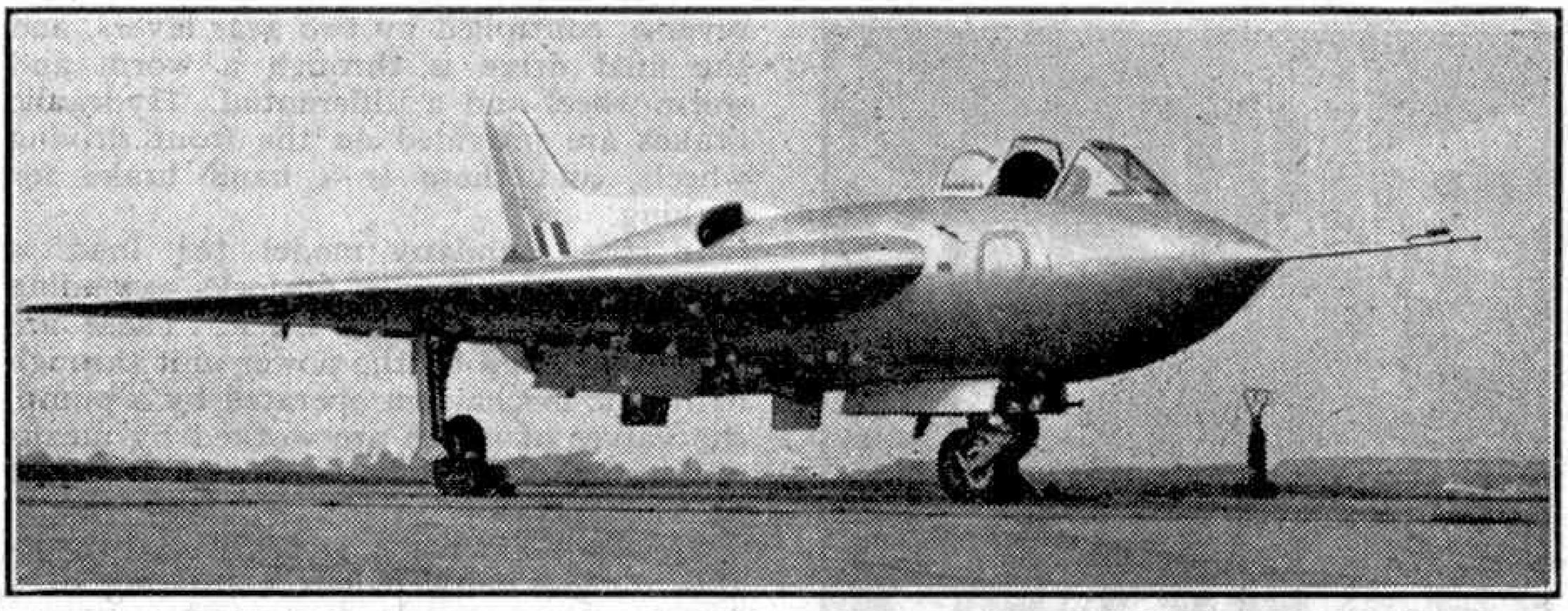
In the standard model the load is carried by two fingers or forks extending from the front of the truck. These are tilted and lifted by the power unit through hydraulic mechanism operated by a pump, the valves of which are worked by means of two hand controls conveniently placed for the operator.

The fork lift truck is particularly suitable for use with pallets consisting of a flat wooden or steel framework with an upper surface on which material is stacked and a lower one that rests on the ground. Between the two is a space into which the forks can enter, and the framework is suitably braced to give strength and rigidity.

It is interesting to watch a Coventry Climax fork truck in operation and to see how easily and speedily it carries out its work. When picking up a load the tilt lever is depressed so that the mast carrying the lifting forks tilts slightly forward, bringing the top surfaces of the forks parallel with the ground. The forks are then lowered sufficiently to enable them to enter under the load, which they do with the minimum of (*Continued on page 430*)



Loads can be placed inside a railway van, or taken out of it, by the fork lift truck.



Avro 707 delta-wing research aircraft. Photograph by courtesy of A. V. Roe and Co. Ltd.

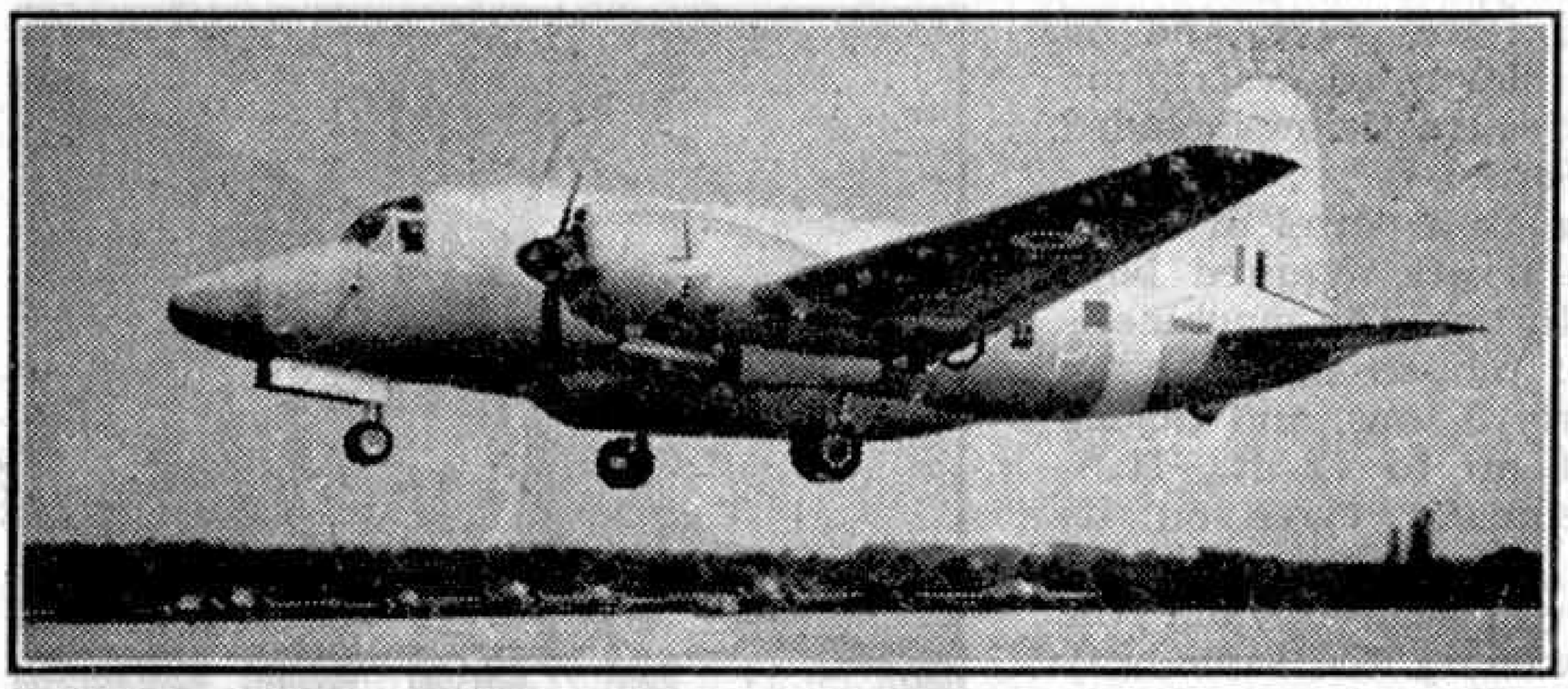
Air News

By John W. R. Taylor

Britain's First Delta-Wing

Most secret of all British aircraft shown at this year's S.B.A.C. Display at Farnborough was the little Avro 707 delta-wing research aircraft illustrated on this page. It was, in fact, taken off the secret list only one day before the Display opened, to give a preview of the advanced designs now taking shape in our factories, to follow our present range of world-beating military and civil jets.

Little may be said about the 707 yet, except that it is powered by a Rolls-Royce "Derwent" engine. It is thus in about the same class as the little Convair 7002 described in the July 1949 *"M.M."*



The Vickers "Varsity" military trainer described on this page. Photograph by courtesy of Vickers-Armstrongs Ltd.

First Order for "Viscount" Air Liners

At long last, both British European and British Overseas Airways Corporations have plucked up courage and placed a joint order for the Vickers "Viscount" 40-passenger "propjet" air liner. This is undoubtedly a bold step, for there are several questions yet to be answered on the economy and operation of jet air liners. But many hours of test flying with the "Viscount," the world's first propjet air liner, have proved its reliability, comfort, high performance and small maintenance requirements.

With 20 "Ambassadors" already on order for its short high-density routes, and the "Viscounts" for its medium and long-distance routes, B.E.A. will have one of the world's finest and most up-to-date fleets of aircraft in 1951–52. Together with "Rapide" replacements now being designed for secondary routes, they will enable the Corporation to increase by 50 per cent. its volume of traffic, with corresponding financial benefit to the tax-payer!

The "Viscounts" ordered by B.O.A.C. will be used by its associate Company, British West Indian Airways, which links the widely-separated islands of the Caribbean area with the United States, Central and South America.

It is almost certain that other airlines will follow the lead given by B.E.A. and B.O.A.C., and there have already been reports that the privately-owned Australian National Airways intend to fly "Viscounts" in direct competition with the "Convairliners" of their state-owned competitor, Trans-Australia Airlines. As the "Convairliner" is probably the best 40-passenger piston-engined air liner at present in service, the results would be very interesting.

New British Trainer

The Vickers "Varsity" military trainer, illustrated here, has been developed from the "Valetta" transport which is now in widespread service with R.A.F. Transport Command. It uses the same basic, well-proven airframe and "Hercules" engines, but has a nosewheel undercarriage and a large pannier under its fuselage containing prone positions for bombing instructor and pupil.

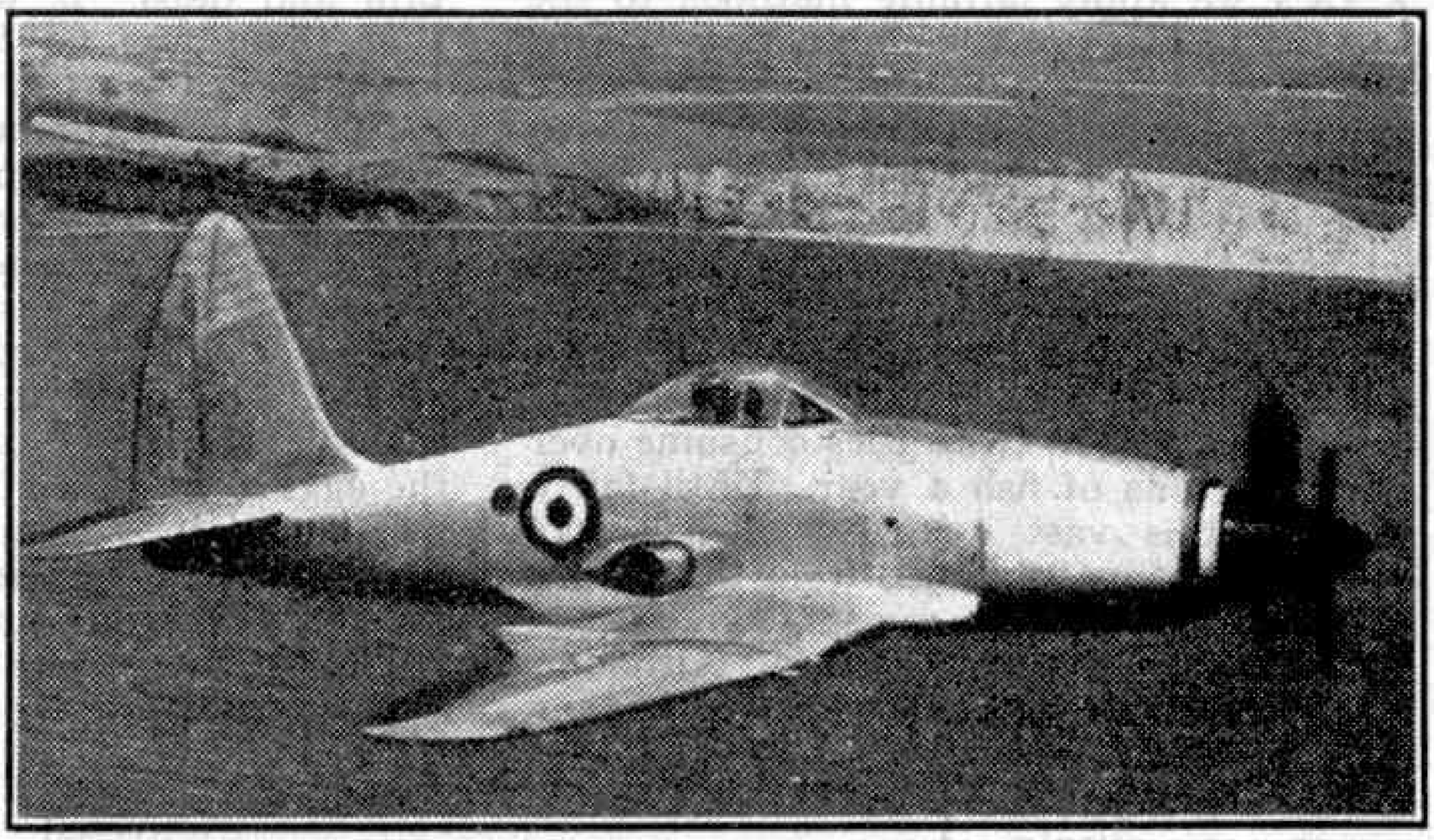
Object of the "Varsity" is to combine in one aircraft all the facilities necessary to train pilots, navigators, bomb-aimers and radio-radar operators. Long range and big payload enable a considerable amount of training to be accomplished during a single flight, with consequent saving in time and expense. Maintenance has been simplified by the adoption of "petal" rearward-opening engine cowlings. Safety features include a fixed tailwheel for protection in a taildown landing, fore and aft emergency exits and pull-in type cabin windows.

At present Vickers have orders for only two prototypes, but the "Varsity" could be put into production very quickly, if necessary, as it could be built largely of "Valetta" components on "Valetta" jigs.

Propjet Naval Fighter

The new Westland "Wyvern" TF2 single-seat strike fighter, shown on this page, has been developed for service aboard the Royal Navy's aircraft carriers, and is the first propjet-powered warplane to go into production anywhere in the world.

It is basically similar to the piston-engined "Wyvern" TF1, but the extra power and lighter weight of its 4,000 h.p. "Python" propjet should improve performance without detracting from any of the other qualities essential to a deck-fighter. The comparatively small diameter of the "Python" results in a cleaner nose and gives the pilot an excellent view forward and downward for landing. Powerful wing flaps help to keep touch-down speed to a minimum; the wings themselves fold for easy stowage aboard ship.



Westland "Wyvern" TF2, the first propjet military aircraft to be put into production. Photograph by courtesy of Westland Aircraft Ltd.

The under-wing radiators of the earlier version have gone, but an obvious addition is a large jet exhaust pipe on each side of the fuselage under the cockpit. Just behind and above the starboard one is what looks like a window for a reconnaissance camera. Fixed armament is probably four 20 m.m. cannons, while the aircraft's designation indicates that it can carry also a torpedo as alternative to rockets and bombs. Performance details are secret, but the "Wyvern's" speed should be higher than that of any comparable aircraft in the world.

The big advantage of jet engines for naval aircraft is that they operate on kerosene, which does not burn so readily as petrol. Consequently aircraft carriers need no longer be floating petrol stations, like their counterparts in World War II, which could be turned into an inferno with one well placed bomb.

Aircraft Combat Paralysis

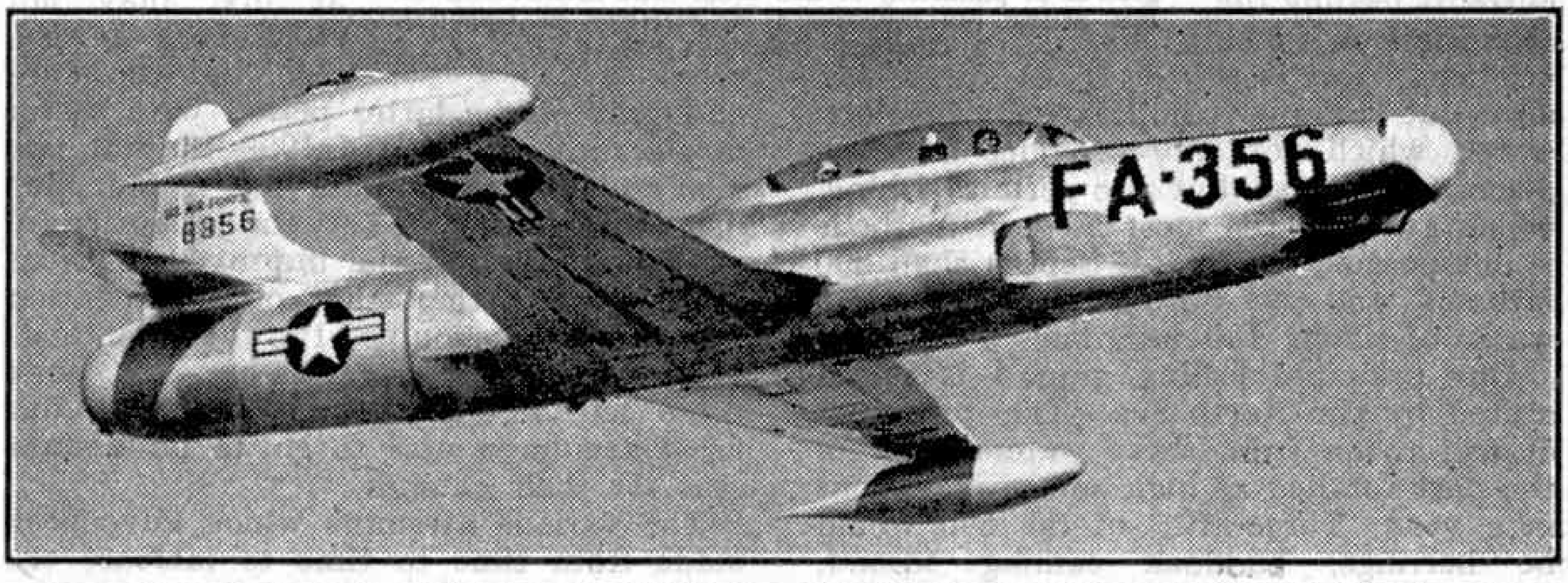
Alarmed by a sharp increase in the number of cases of infantile paralysis reported this year, several American townships have enlisted the aid of aircraft to help combat the disease. The south-western corner of San Antonio was sprayed with DDT by 16 "Mustangs" of the Texas Air National Guard, in an effort to wipe out the town's fly and mosquito population. Each aircraft carried enough spray in two tanks under its wings to cover a strip one-third of a mile long and 1,200 ft. wide. Together they achieved in 12 sec. what would have taken five days by ground-spraying methods.

The small town of Springville, New York, did not need a whole squadron of "Mustangs," so chartered a Bell helicopter to spread DDT spray over nearby swamps, stagnant pools, backyards, and a river which meanders through the town.

Rocket-Nosed "Shooting Star"

Lockheed have been experimenting for about two years with a rocket-nosed "Shooting Star" for the U.S.A.F. Looking like a stubby javelin projecting from the nose, the rocket is about 8-12 in. in diameter. The pilot is protected from its blast by a special firewall, the rocket flames being ejected through a hole in the underside of the aircraft nose. The idea is not altogether new, as the Germans mounted a battery of small rockets in the nose of their tiny "Natter" rocket-interceptor, but this is the first indication of American interest in the project.

Another new version of the "Shooting Star," illustrated below, is the F-94 two-seat night fighter. It is similar to the TF-80c two-seat trainer described in the April 1949 "*M.M.*," but has a redesigned nose containing radar search equipment, and an after-burner in the rear part of its fuselage.



First flight picture of the Lockheed F-94, the U.S. Air Force's new all-weather jet fighter.

Farming the Sea

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

CAN we apply farming methods to the sea to increase the production of fish? To find the answer to this question some interesting experiments are being carried out in one of the Scottish lochs, in which the sea is being treated with fertilisers to increase the supply of plankton on which fish feed.

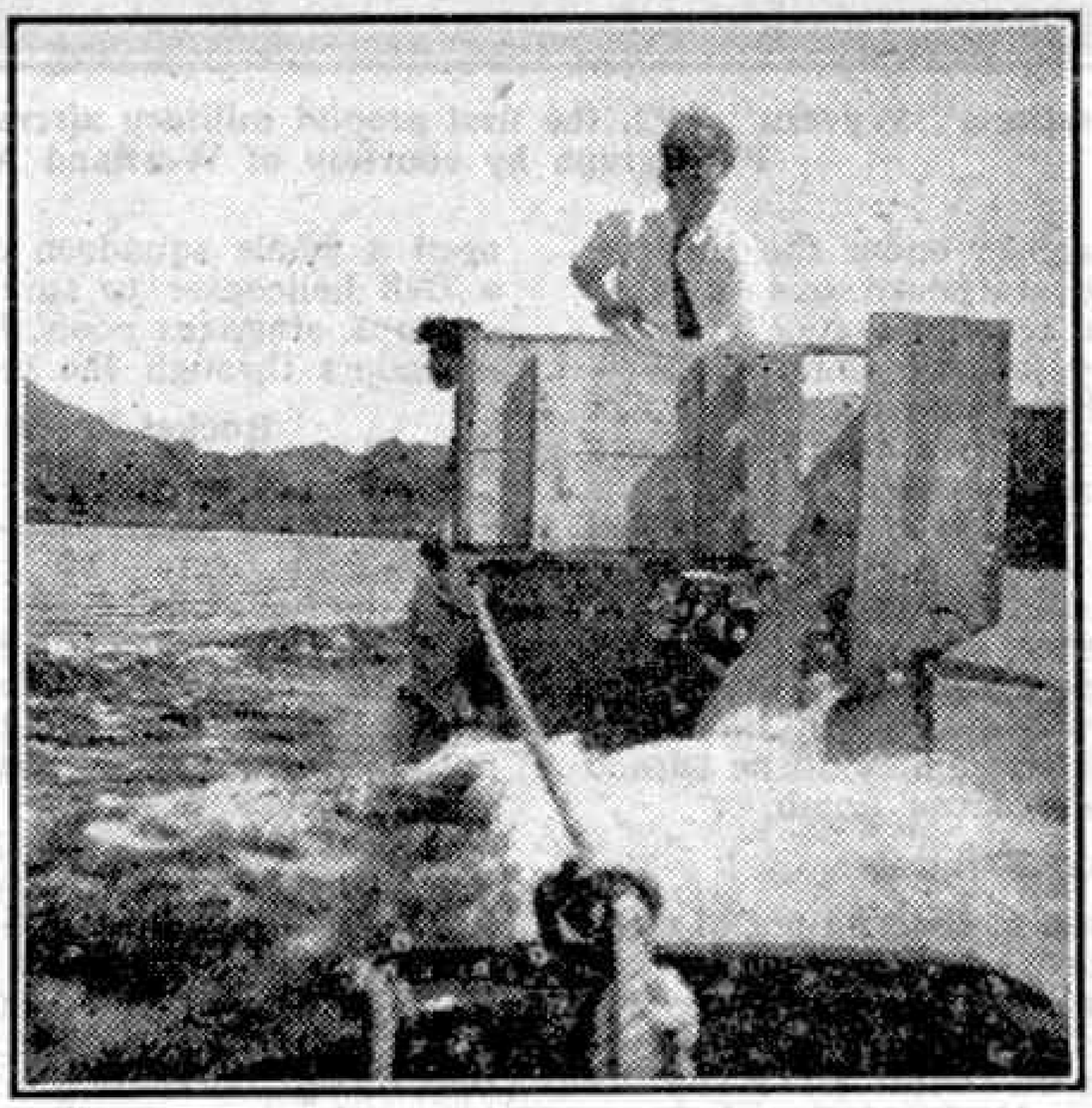
The question of increasing our food supply, be it fish or anything else, is important. We in these isles consume over a million tons of fish a year. Until fairly recently this vast quantity of fish was obtained by our fishermen from the fishing grounds around our coasts, which are among the richest in the world. Although the sea is distributed fairly evenly over the globe, the fish in it are by no means so evenly distributed. There are fish in every sea, but the great fishing grounds lie in the northern hemisphere, and the vast open spaces in the centres of the ocean are, comparatively speaking, unpopulated and unfinished.

Various reasons contribute to the richness of our home fishing grounds. We can trace it to the movements of currents feeding the organisms on which fish feed. But it is also due to the comparatively shallow water, which not only provides breeding places for the fish, but also permits fishing, which even by the most modern methods is not possible at greater depths than 300 fathoms and is mostly carried out in water of about 100 fathoms.

Our principal fishing ground is represented by the North Sea. The quantities of fish taken from these waters have in the past totalled as high as a million tons in a year. Three-fifths of the fish would be herrings, haddock coming second, followed by cod, plaice, turbot, whiting, brill and dabs. It was said at one time that there was no fear of the fish ever forsaking this great breeding ground or of the stock becoming seriously depleted, despite the fishermen's heavy toll, owing to the wonderfully prolific nature of these creatures. For instance, the turbot spawns 10,000,000 eggs a season, the codfish 9,000,000, the mackerel 700,000, the red gurnard 400,000, the brill 200,000 and the sole 85,000. But the wastage among the eggs and smaller fish is almost beyond belief, and it is calculated that only two eggs on an average from each pair of fish survive to the breeding age.

This means there is a limit to the quantity of fish in the sea, and the quantity also that can be taken. One cannot fish indefinitely and the great fishing grounds are now overfished. This is evidenced by the fishing returns. From 1909 to 1913 fishermen of every nationality in the North Sea took on an average fish, other than herrings, to a total of 434,000 tons a year. From 1929 to 1932, that is 20 years later, with all the improvements in ships and gear, they took 428,000 tons a year. True, the difference at first may not seem very noticeable, but the ships and gear of the latter period were so far in advance of those of 1909–13 that two men could catch as many fish as four men had done before. Yet the quantity of fish obtained with the improved methods was no more than that obtained earlier with much less trouble. Improved methods at first gave heavier catches, but soon these fell off, with the result that our fishermen have now to go to far distant seas for their catches.

The various attempts which have been made from time to time to increase the fish population by adding large quantities



Fertilising Loch Craiglin, Argyllshire, to encourage the growth of plankton, or fish food. The illustrations to this article are reproduced by courtesy of Imperial Chemical Industries Ltd.

of eggs or fish fry to selected areas and other devices have shown that it is entirely a question of providing suitable food. If the right food is forthcoming the fish increase. It was Dr. F. Gross, of the Department of Zoology at the Edinburgh University, who discovered how the food contents of the water may be increased by adding measured quantities of such inorganic fertilisers as nitrates and superphosphates. These encouraged the growth of those microscopic plants known as plankton, which float in the upper layers of the water and on which all fish feed.

The result of the discovery was a series of experiments carried out on the Scottish lochs. In 1942–3 Loch Craiglin, an arm of Loch Sween in Argyllshire, was used for these trials. It has a water area of some 18 acres. After a thorough hydrographic survey of the loch the first "dressings" of superphosphates and sodium nitrate were scattered over the water surface from a boat. While this fertilisation was going on about 3,300 young flounders were brought in. In the two years of the experiment, the total amount of fertiliser added at intervals was 600 lb. of sodium nitrate and 400 lb. of superphosphates.

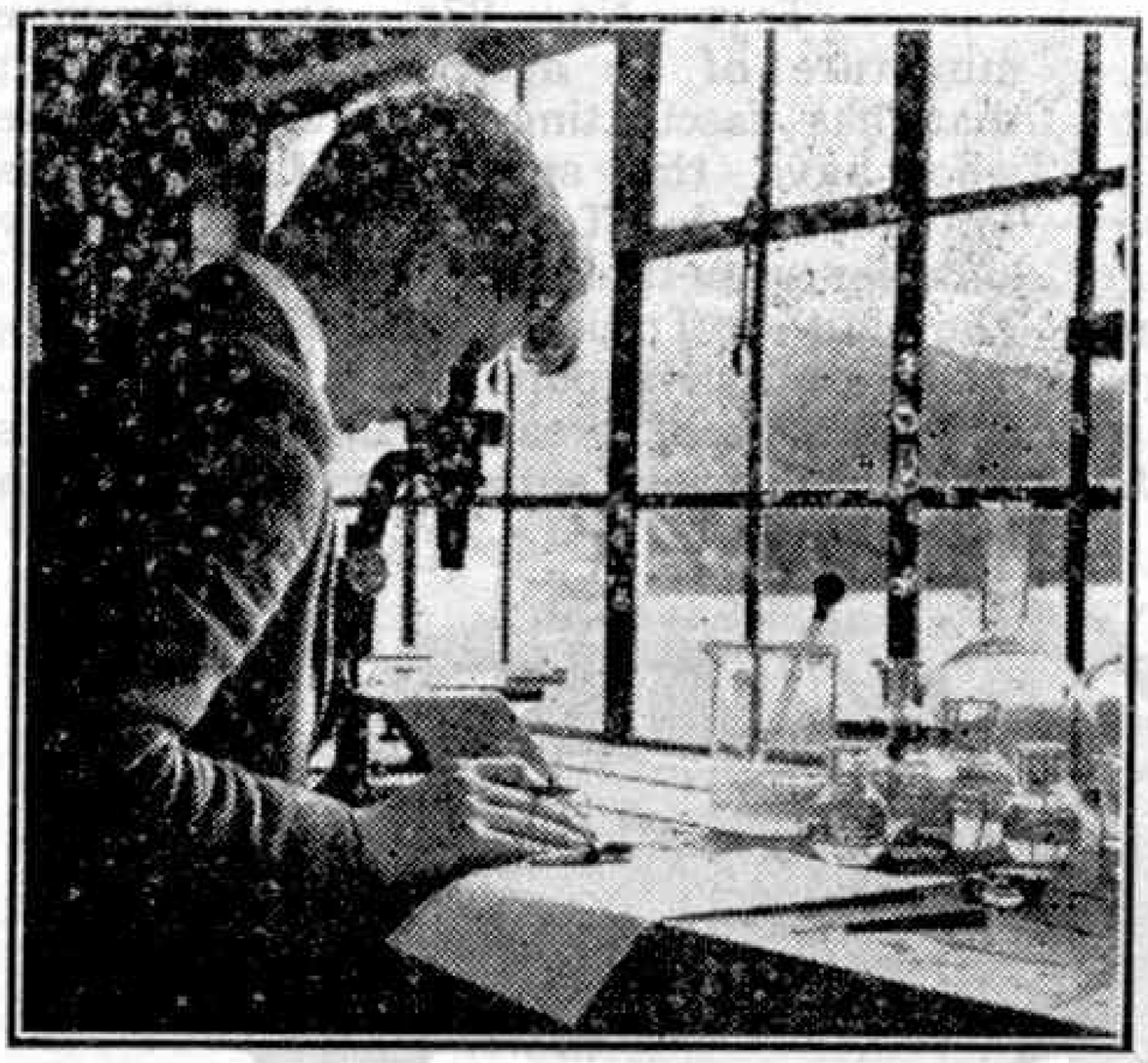
Analysis of the contents of the fish caught during the winter showed that they were feeding well. To put the matter simply, fish in Loch Craiglin were taking winter meals of 200 organisms, whereas in the neighbouring untreated open loch fish were having to make do with an average of 10 to 20 organisms per meal. In June 1943, at the height of the growth season, the fish were getting an average of 1,520 organisms per meal. In less than two years the fish had grown to a size and weight equal to that of fish in their original home of double their age. At one time the population of Loch Craiglin was more than 1,000 fish per acre, but owing to the fertilisation of the water there was sufficient food for all.



Emptying a water bottle after submersion in the loch. The contents of the bottle will be carefully examined later.

The experiment has been extended to Kyle Scotnish, an area of 200 acres, with immediate access to the open sea via Loch Sween. If the same successful results are achieved here a still larger loch will be tried, and the next logical step would be to try fertilising inshore waters. This would mean "farming" many valuable fish, particularly shell fish, on a large scale. There is the question of tides and currents, but scientists see no reason why these should not be surmounted and our sea food increased accordingly.

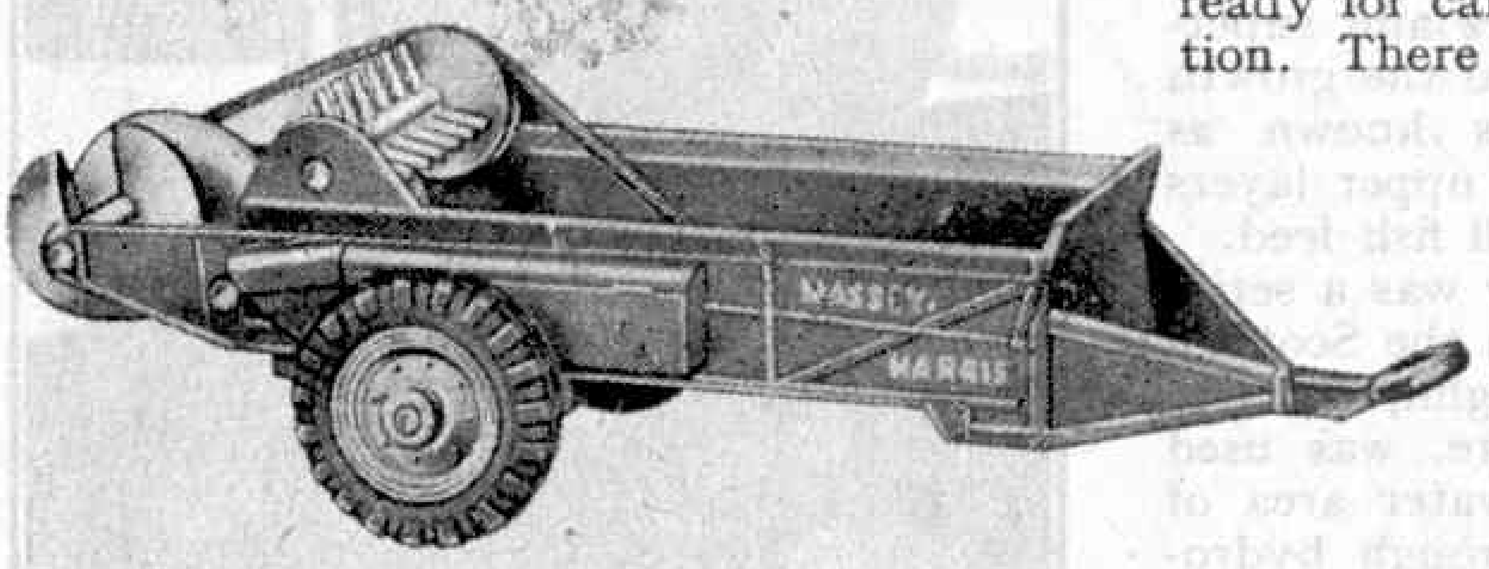
Experiments have shown that fish will seek those waters where food is plentiful. If therefore inshore waters are treated with the necessary fertilisers fish will resort to them. This would be to the benefit of the fishing industry, insuring good catches with the minimum of toil and risk. To-day our fishermen have to go far afield for their catches, which would not then be necessary. Indeed, farming the sea is full of possibilities. It would increase our food supply and render fishing less risky.



Estimating the plankton content of water with a microscope. The comparison of samples taken over a long period shows whether fertilisers are effective or not.

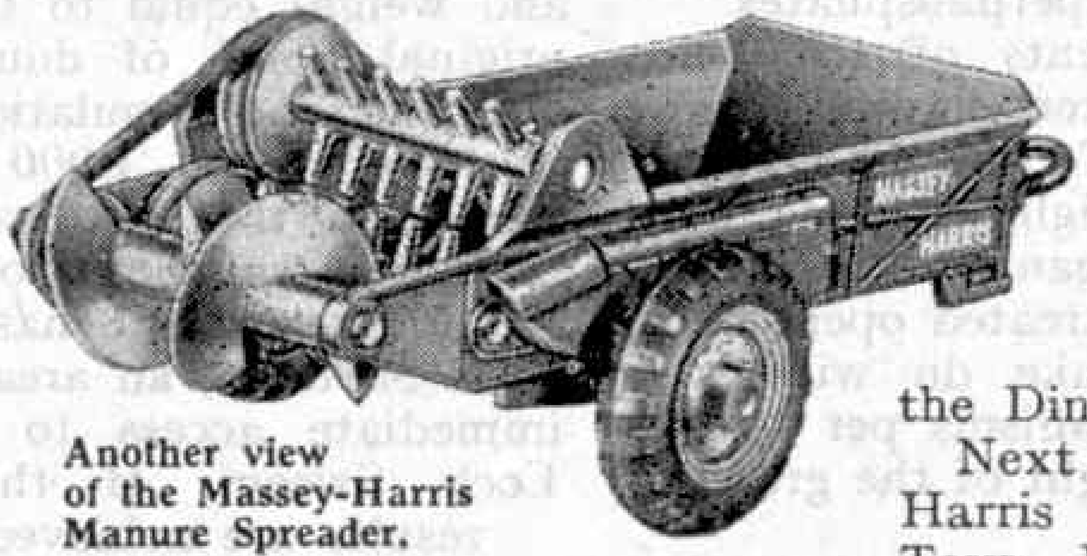
New Dinky Toys

Coventry Climax Fork Lift Truck, Ford "Fordor" Sedan, Massey-Harris Manure Spreader, Grass Cutter



Massey-Harris Manure Spreader, Dinky Toys No. 27c.

THIS month we have a good range of new Dinky Toys, all very interesting and entirely different in type. The first is the Coventry Climax Fork Lift Truck, Dinky Toys No. 14c, an outstanding production. Its prototype is the ingenious machine described and illustrated on page 416 of this issue, which has been introduced to reduce the handling costs of materials of all kinds and to speed up operations in works, warehouses and docks.



Another view of the Massey-Harris Manure Spreader.

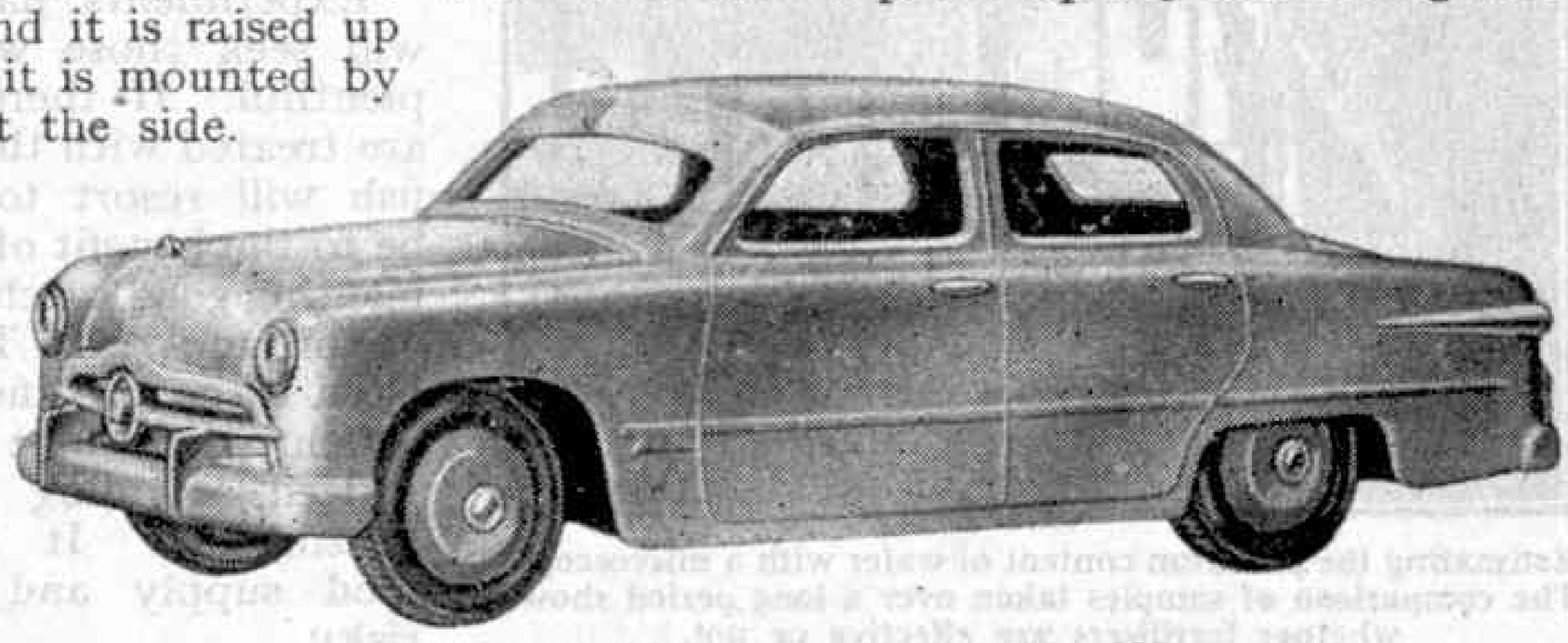
The Dinky Toy runs on three wheels, two in front and one behind, so that three-point suspension is provided, giving stability on uneven ground. A miniature driver is seated at the car type steering wheel. The carrying and lifting mechanism is in front of the machine. The carriage has a good backrest and two projecting fingers or forks that slide under the load to be lifted, and it is raised up the mast on which it is mounted by turning a handle at the side.

It is easy to run the truck forward, to pass the forks under the load to be lifted, and then to raise this by means of the handle until it is clear of the ground and ready for carrying to its intended destination. There if necessary it can be raised to the full height of the mast. This model is indeed a handsome addition to the Dinky Toys series.

The Grass Cutter, Dinky Toys No. 105e, is a simple but attractive addition to the gardening range. It is a miniature of the light type of lawn mower used in thousands of small gardens. The drive is taken from the side wheels instead of from the roller, as in the larger Lawn Mower, Dinky Toys No. 751. The cylinder, with its six blades, revolves in a most realistic manner, and underneath there is the sole plate over which the blades pass in turn.

This miniature will be recognised at once as just the companion for the Garden Roller and Wheelbarrow—already included in the Dinky Toys range.

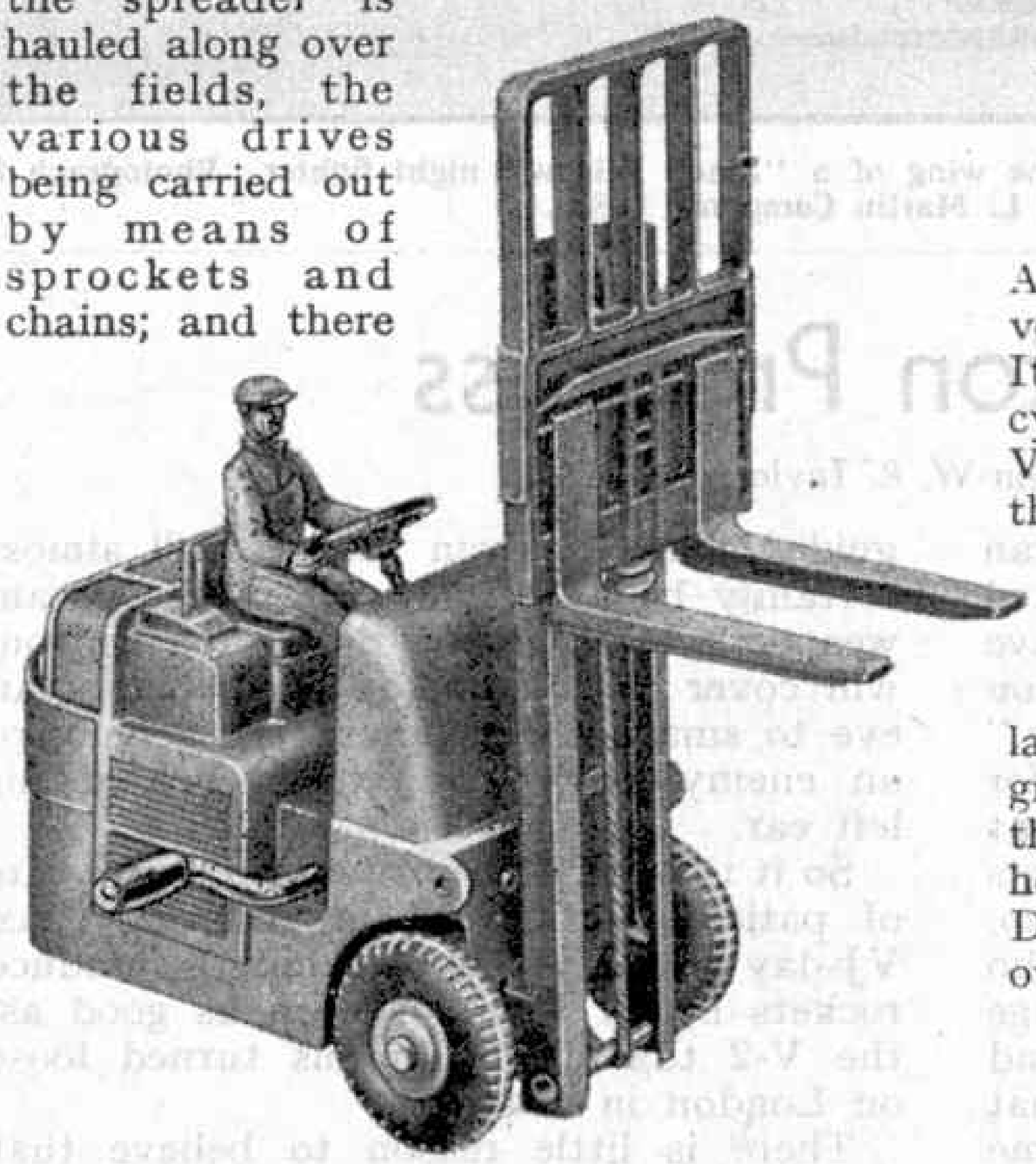
Next we come to the Massey-Harris Manure Spreader, Dinky Toys No. 27c, an attractive miniature of an agricultural implement that has fascinating movements. Those who have the splendid Massey-Harris Tractor, Dinky Toys No. 27a, naturally look for something to haul with its aid. The Harvest Trailer, Dinky Toys No. 27b, has proved very popular for this purpose. The Manure Spreader introduced this month will prove equally fascinating when



Ford "Fordor" Sedan, Dinky Toys No. 139a.

towed behind the Tractor, and its mechanism will give it added interest.

The original of this fine new model, like the Dinky Toys Tractor, is a Massey-Harris product. Its use saves hours of labour on the farm, while ensuring that the manure used is spread evenly over the fields. The actual spreading is carried out by means of a distributor worm mounted at the rear; and two cylindrical beaters provided with rows of teeth, one fitted above the other, beat out the manure and feed it on to the distributor worm. The distributor worm and the two beaters rotate smartly as the spreader is hauled along over the fields, the various drives being carried out by means of sprockets and chains; and there



Coventry Climax Fork Lift Truck, Dinky Toys No. 14c.

is also a mechanism that carries the manure backward in the body of the vehicle to supply the beaters.

The Dinky Toys miniature reproduces the chief features of the original in a strikingly realistic manner. There are the two beaters, armed with teeth and correctly placed, and behind them, right at the back of the implement, is the distributor worm. All of these are correctly driven from the two road wheels of the vehicle by means of Spring Cord passing over pulley wheels, which gives certain and attractive movement as the Manure Spreader is hauled along behind its Tractor.

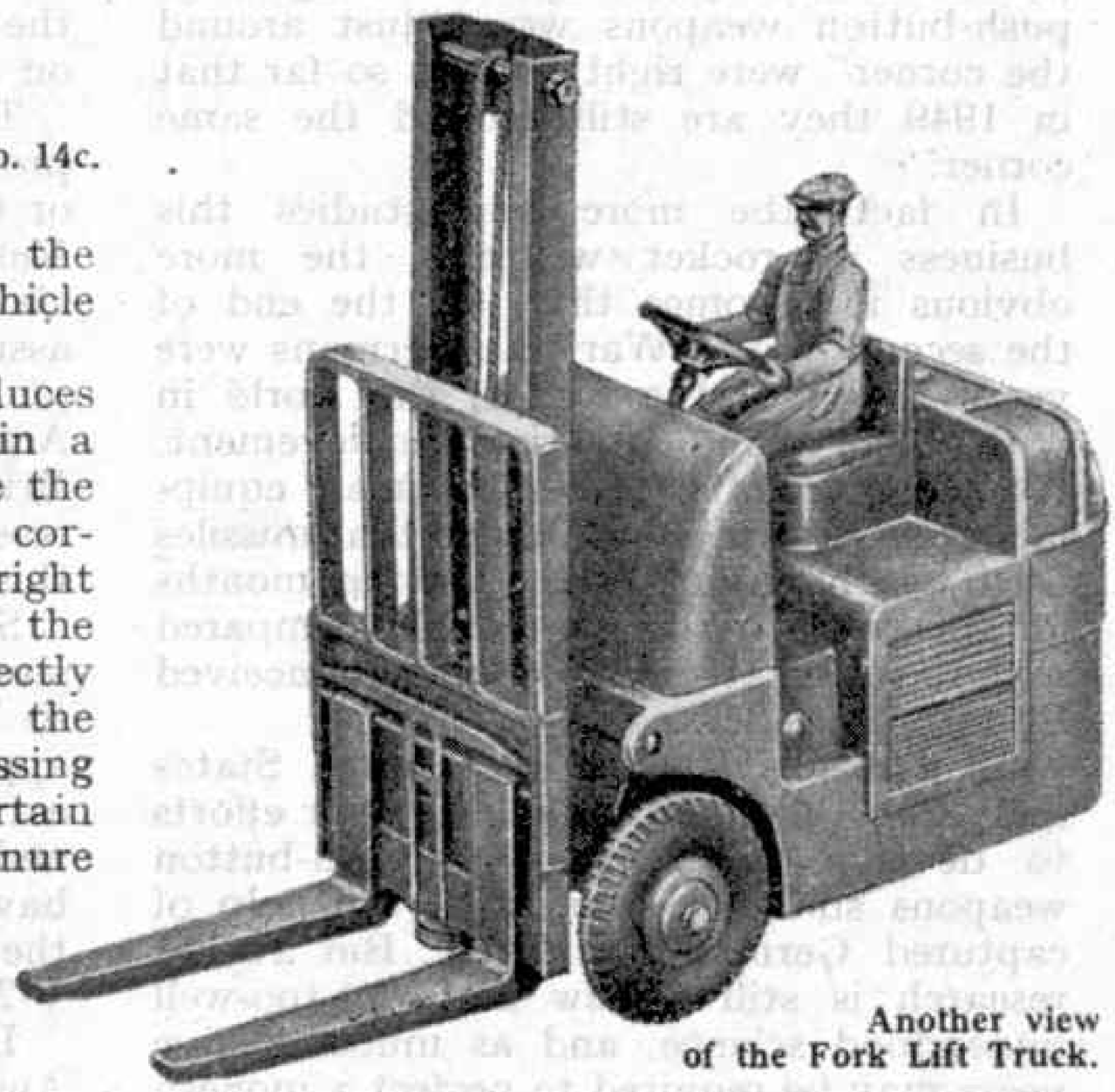
The body of the Manure Spreader is handsomely enamelled in red, with yellow wheels, and has the name of the makers on its sides. In front there is a substantial yoke with an eye that engages with the rear hook of the Massey-Harris



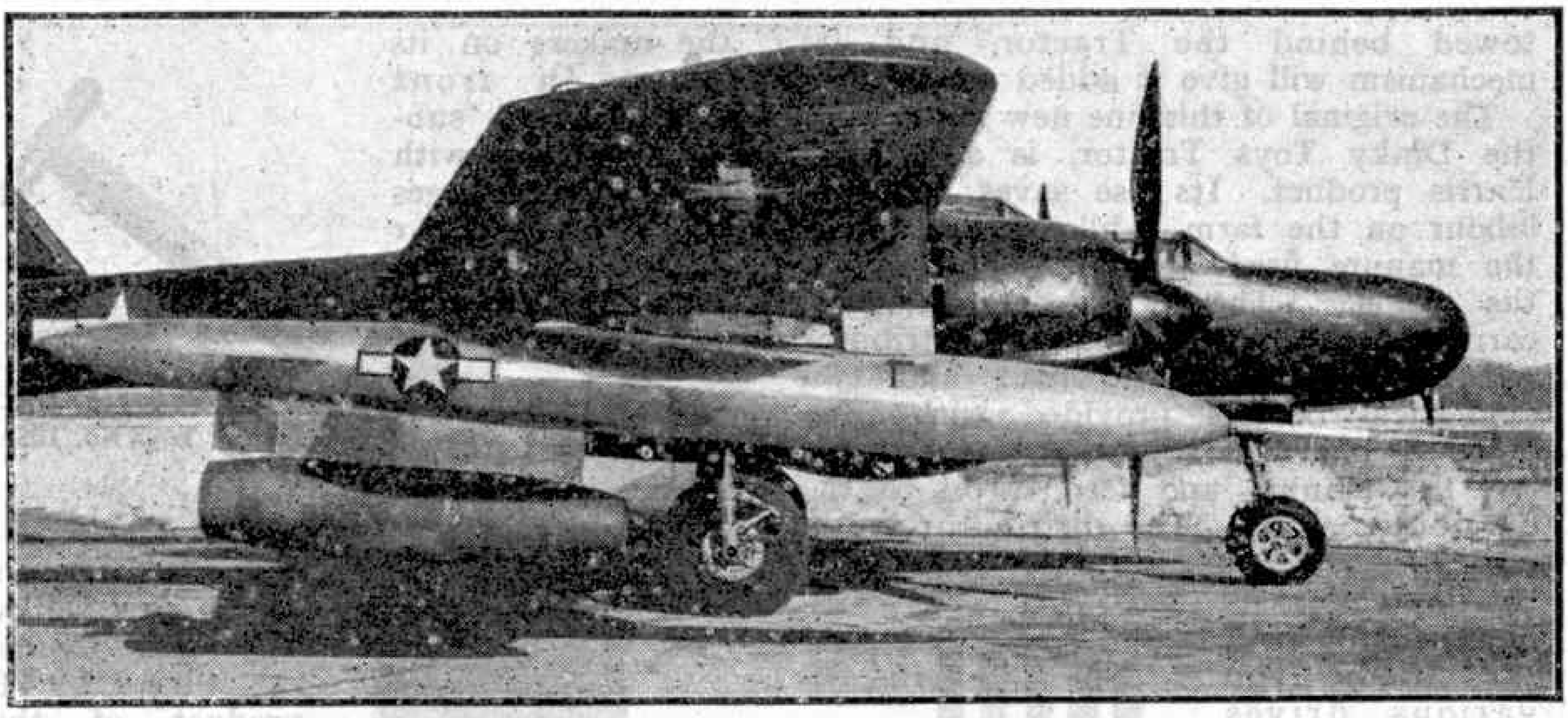
Grass Cutter, Dinky Toys No. 105e.

Tractor.

The car reproduced in our fourth new Dinky Toy this month is the 1949 product of the Ford Motor Company. This American car is a large and handsome vehicle with many outstanding features. Its 100 h.p. engine is v-shaped, with eight cylinders, and is of entirely new design. Various types of body are available and the one chosen for the Dinky Toys miniature is the "Fordor" Sedan, every external feature of which is beautifully reproduced. It has the up-to-date styling characteristic of many of the latest motor cars, with the now familiar grille set low in the front. In the model this is finished in correct tone, as are the heavy front and rear bumpers. Every Dinky Toy enthusiast will be delighted to own this outstanding miniature.



Another view of the Fork Lift Truck.



"Gorgon" missile in launching position, under the wing of a "Black Widow" night fighter. Photograph by courtesy of Glenn L. Martin Company, U.S.A.

Push-Button Progress

By John W. R. Taylor

IT was, I think, Cy Caldwell, the veteran American aviation writer, who remarked recently that "The U.S. Air Force have made great progress with push-button weapons. They've got the push-button."

Perhaps that was a little unkind, for American scientists have made great advances in the development of rockets and guided missiles in the last year or so. But the fact remains that experts who predicted three years ago that long-range push-button weapons were "just around the corner" were right only in so far that in 1949 they are still around the same corner.

In fact, the more one studies this business of rocket weapons, the more obvious it becomes that, by the end of the second World War, the Germans were years ahead of the rest of the world in both theory and practical achievement. Examination of captured German equipment and drawings has proved that missiles used by the Allies in the closing months of the war were amateurish compared with the efficient, deadly weapons conceived by our late enemies.

As a result, Britain, the United States and Russia have all redoubled their efforts to develop new forms of push-button weapons since the war, with the help of captured German scientists. But rocket research is still a new and not-too-well understood science, and as much as five years may be required to perfect a modern guided missile. Even then it will almost certainly be a long way from the dream weapon which, at the push of a button, will cover 5,000 miles in the wink of an eye to smack the commanding general of an enemy army two inches behind his left ear.

So it is hardly surprising that four years of patient hard work in America since VJ-day are only now beginning to produce rockets better than, or even as good as, the V-2 that the Germans turned loose on London in 1944.

There is little reason to believe that progress has been more rapid in Britain or the Soviet Union, although neither the Russians nor ourselves have said much about our latest developments. It can be assumed, however, that with the Ministry of Supply, and companies like Fairey, Armstrong Whitworth, de Havilland and Bristol, all actively engaged on weapon research, Britain is among the leaders in this branch of aeronautics.

Similarly, Norwegian airline pilots have seen and timed moving objects believed to be Russian rocket missiles, which appeared to follow the curvature of the earth instead of climbing to a great height and then falling like V-2. If the Russians have produced a missile which can do this, they will have solved the problem of V-2's short range.

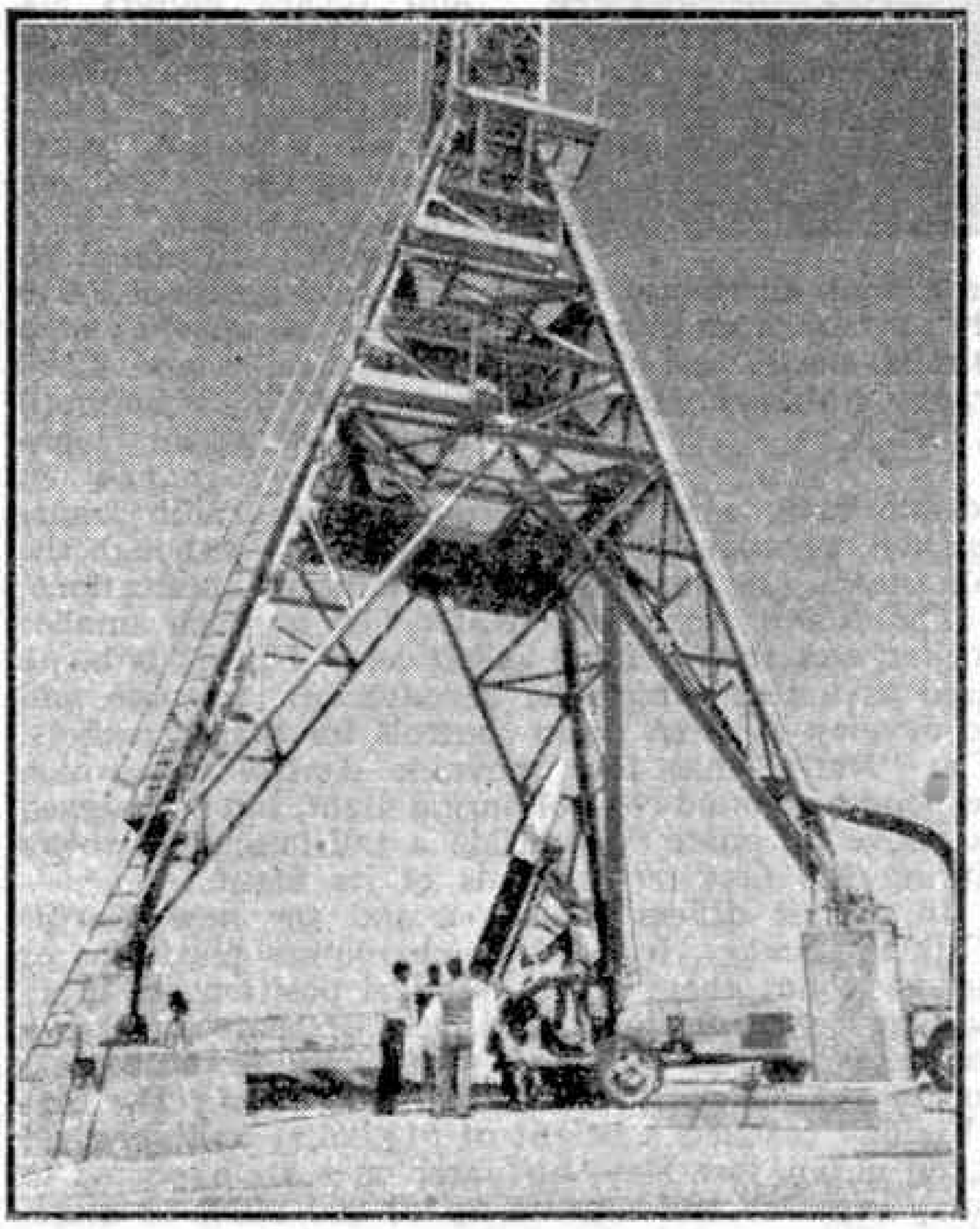
Dark horse in rocket development is Australia, which has the world's finest

testing range at Woomera. Few details of experiments carried out on this South Australian Rocket Range have yet been released officially, but the Australian air journal *"Wings"* claimed recently that "Over the past few months Australia has been carrying out extensive tests with guided missiles and other long range weapons." It continued: "Many new types still on the top secret list have been developed, including rocket bombs designed to carry automatic warheads, jet-propelled, radio-controlled flying wing bombs, homing bombs that follow a moving target such as a submarine, revolutionary faster-than-sound aircraft and an anti-tank weapon that is capable of destroying the largest tank."

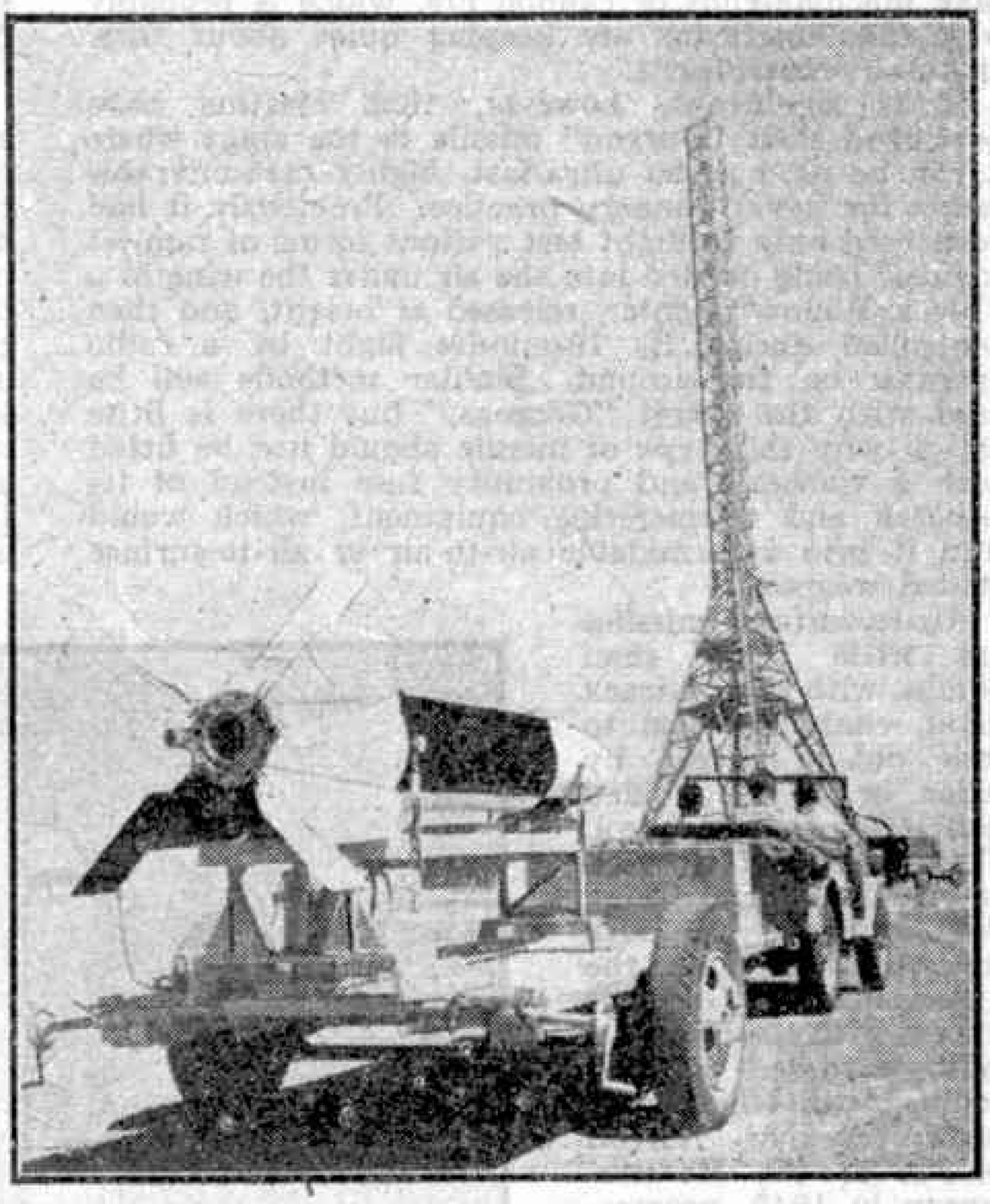
All of which sounds most impressive, and may mean that Australia, with the co-operation of the British Ministry of Supply and the Research Division of Fairey Clyde, is quietly setting the pace in push-button research.

Meanwhile, the only experiments that can be discussed in detail are those which have been announced by the U.S. Air Force and Navy. These fall into four categories—air-to-air, air-to-surface, surface-to-air and surface-to-surface missiles.

Air-to-air missiles are the smallest and simplest type, and it is probable that



The "Nativ" guided missile being raised into position in the launching tower.



"Nativ," a North American Aviation guided missile, on its way to the launching tower from which it will be test fired. The illustrations on this page are by courtesy of North American Aviation, Inc., U.S.A.

efficient ones are already in existence. The idea is not new, as the R.F.C. fitted Le Prieur rockets to some of its fighters in the 1914–18 War, for use against German aircraft and balloons. They looked like big 5th November rockets, and achieved little beyond poking a lot of holes in the skies over France. The Germans had rather more success when they revived air-to-air rockets in attacks on American "Fortress" formations in 1943, and by the end of the war they had developed a much more deadly weapon—the X–4—which could be guided to its target by a fighter pilot, by means of two control wires which streamed back from bobbins at the tips of its stubby wings.

The Americans presumably have picked up where the Germans left off, the problem being to pack a motor, controls, warhead, fuse and radar into a small airframe that can be carried under the wing of a fast interceptor fighter. When that problem is solved, the U.S.A.F. will have a defensive weapon of tremendous power, able to chase enemy bombers at supersonic speed, track them down and then blow them to pieces. Alternatively, American atom-bombers could use such missiles for defence against fighter interception. For either purpose they would be incomparably better

than machine-guns or cannon fire, which is probably why the Americans are keeping quiet about their air-to-air experiments.

It is significant, however, that Martins have developed their "Gorgon" missile to the stage where it can be used as an ultra-fast, highly-manœuvrable target for naval gunnery practice. Previously it had been used only to flight test various forms of ram-jet engines, being carried into the air under the wing of a "Black Widow" fighter, released at height, and then controlled during its 10-minute flight by a radio operator on the ground. Similar methods will be used with the target "Gorgons," but there is little reason why this type of missile should not be fitted with a warhead and proximity fuse instead of its research and telemetering equipment, which would turn it into a formidable air-to-air or air-to-surface guided weapon.

Air-to-surface missiles are little more than bombs with a one-track mind, enabling them to seek out a target by radar or to be guided into it by radio control. They were, in fact, used in primitive form during the last war by both the Germans and the Americans. The Germans started with the Henschel radio-controlled glider-bombs, with which they sank several Allied vessels in the Mediterranean in 1943, progressing later to the FX-1400 radio-controlled, armour-piercing rocket bomb.

American development has followed similar lines. The "Azon" 2,000 lb. bomb, which could be steered laterally by radio during its fall, was followed by the "Razon," which could also be controlled in a fore-and-aft direction, and then by "Felix," which had in addition a heat-sensitive homing nose, causing it to change course automatically in the direction of anything hot, such as a ship's funnel or a factory chimney.

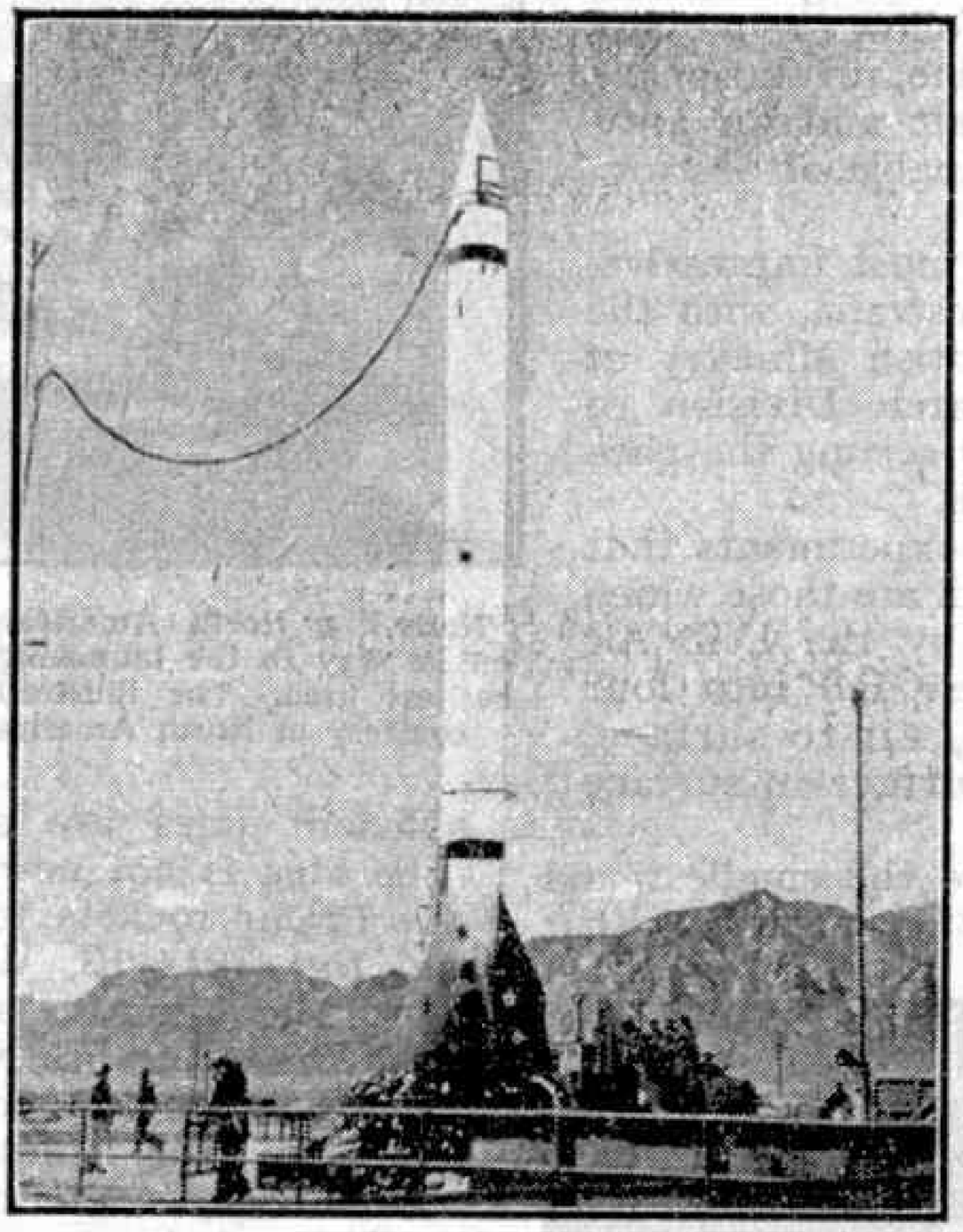
The U.S. Navy's "Bat" had the same pleasant little homing habits as "Felix," but did not need to have the home fires burning as it could chase by radar echo anything that got in its way. In fact, one chased and rammed a Japanese destroyer at a range of 15 miles from its mother-plane. As a point of interest, the "Bat" took 8,760,000 man-hours to perfect for operational use!

That is as far as we may take the air-to-surface story at the moment, but a combined "Bat-Gorgon" is an obvious naval development, while the U.S.A.F. is said to be building a series of radar-controlled, free-falling bombs up to a weight of 20 tons each.

Surface-to-air guided missiles were born of necessity in the last war, by the Germans who had to find a way of stopping the overwhelming Allied Combined Bomber Offensive, and by the Allies who needed an answer to the Jap suicide bomber. None of them progressed far by VJ-Day. German missiles such as the "Rheintochter" and "Schmetterling" were intended to use the Rheinland system of control, which employs two radar beams, one focussed on the rocket, the other on the target. The idea was to bring both beams together at the target and simply fly the rocket down one beam. The U.S. Navy's "Little Joe" probably used a much simpler radio directional control like that of the "Azon."

Unfortunately, such simple controls are not really efficient enough for anti-aircraft work, even when combined with a proximity fuse, which explodes the warhead as soon as a target is within a predetermined range of the missile. Consequently, an improved two-beam system like the Rheinland may be essential before ground-to-air missiles can become practical defence weapons. On the other hand, it is quite likely that the best answer to high-flying jet-propelled atom-bombers will be tiny *piloted* rocket interceptors like the German "Natter," carrying a battery of small rocket missiles in their nose. In fact, as there seems to be no defence at all against missiles like V-2, unless a means of detonating the warhead at a height of several thousand feet above the ground can be devised, piloted rocket-fighters may well prove a much better proposition than guided anti-aircraft missiles for a long time to come.

Surface-to-surface rockets are, of course, the ultimate developments in push-button research, for a super-V.2 carrying an atomic warhead and able to hit accurately any target within a range of 5,000 miles could create unimaginable destruction. Fortunately, there is little prospect of such weapons being developed for many years, for they will need electronic devices able to ensure accuracy greater than that of the finest scientific measuring instruments, and rocket motors six times more powerful than the biggest railway locomotives.



With the gantry removed after a final check-up, the Martin "Viking" rocket is ready for launching into the upper atmosphere. It landed 10 miles north-west of the firing point. Official photograph, National Military Establishment, U.S.A.

First American post-war rocket was the Navy's "Aerobee," which reached an altitude of 78 miles and speed of 3,000 m.p.h., compared with the 114 miles and 3,500 m.p.h. of V-2. It has been used chiefly for high-altitude research in cosmic rays, atmospheric composition, radio transmission, photography and spectroscopy, although the Americans are not blind to its military applications.

The North American "Nativ," is a much smaller rocket, less than a third as big as a V-2. It is being used as a test vehicle for aerodynamic research and to develop efficient radio controls for bigger rockets. The "Nativ" has four movable control fins which respond to ground control during flight, but is designed to move on guide rails inside a tall launching tower during the first few seconds of its flight.

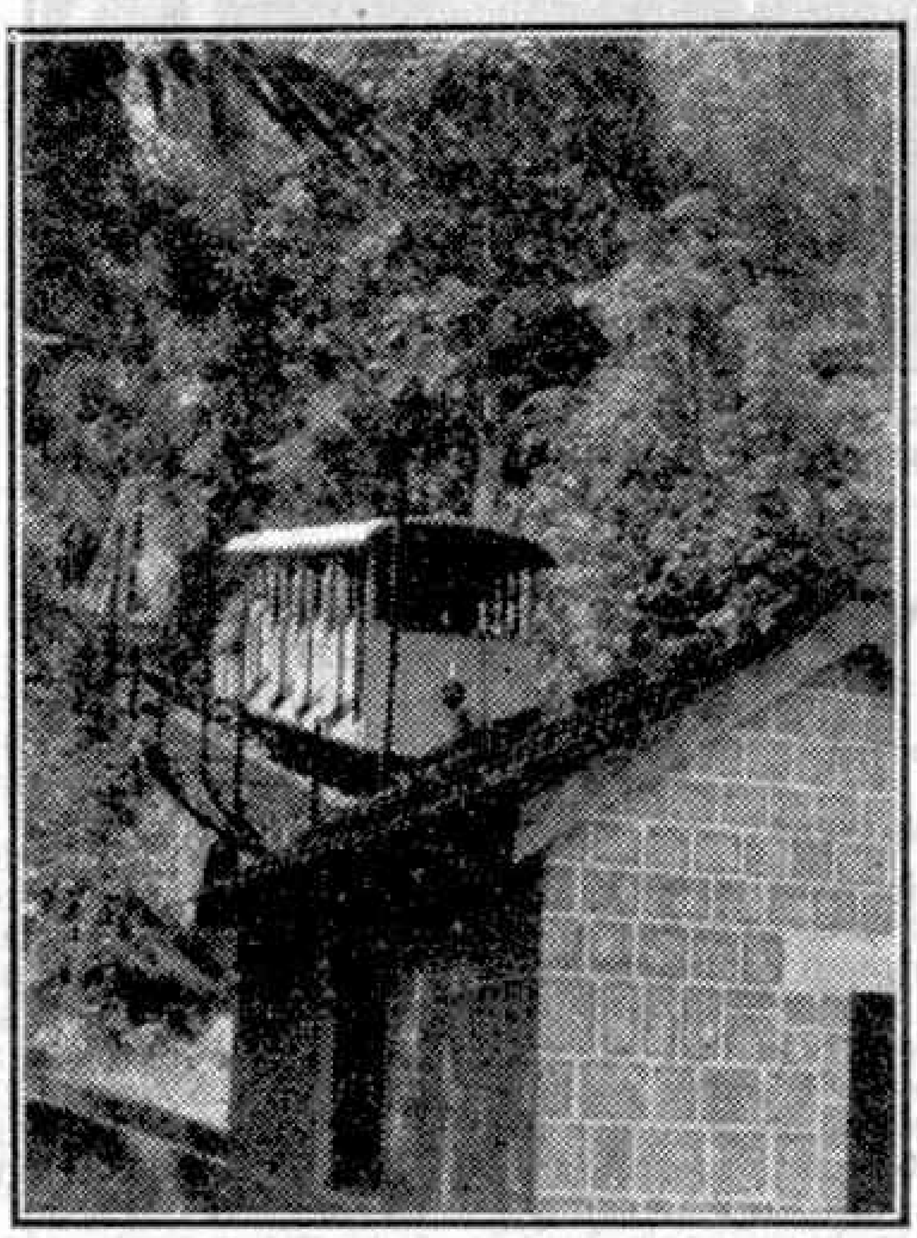
In this it differs from V-2 and the new Martin "Viking" rocket, both of which require platforms or hoists to put them into a vertical position for firing and for servicing, but stand clear of these structures for take-off. The "Viking," 45 ft. long, is the biggest rocket yet developed in the United States. The first "Viking" reached a height of 51½ miles and speed of 2,250 m.p.h. last May, but later ones are expected to carry research instruments up to 200 miles or more. No radio control is fitted, but the U.S. Navy claim that controls exist which could convert the "Viking" into an accurate guided missile.

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.

THE PENANG HILLS RAILWAY

One of the most interesting railways in the world is to be found on the island of Penang. This island, measuring 111 square miles in area, lies a mile west of the mainland of Malaya, and the hills which overlook the capital, George Town, are reached by the "Penang Hills Railway," which incidentally is the only railway on the island. It is of the funicular type, and extends to a height of some 2,500 ft. The track itself is built in two separate sections, and passengers have to change coaches half-way in order to complete the journey. It is single track except for two short sections where loop lines have been built to enable the carriages to pass each other. The carriages are quite small, about half the length of the type used on British railways, and they seat about 30 passengers, although this number is greatly exceeded at times, when hordes of natives swarm on to the train. The actual journey takes about 25 min., as the going is extremely steep, the gradient being sometimes 1 in 1.96, and the speed never exceeds four miles an hour.



The funicular railway on Penang Hill. Photograph by courtesy of the Malayan Information Agency.

As the small cable-drawn carriage slowly ascends, the view becomes positively breath taking. Penang is known as the "Gem of the East," and on looking down on it from the train one must agree that the name is fully justified. Spread out below, among the hills and plains, are acres and acres of coconut trees, while here and there show the roofs of the numerous Government and private residences, where it is possible to escape from the torrid heat down at sea level. On reaching the summit the whole island takes on a symphony of colour, with its red roofs and yellow stucco walls, and the ever present green of the jungle. It is possible also to see the mainland of Malaya stretching away into the distance while far below can be seen George Town.

S. A. Bennett (Birmingham).

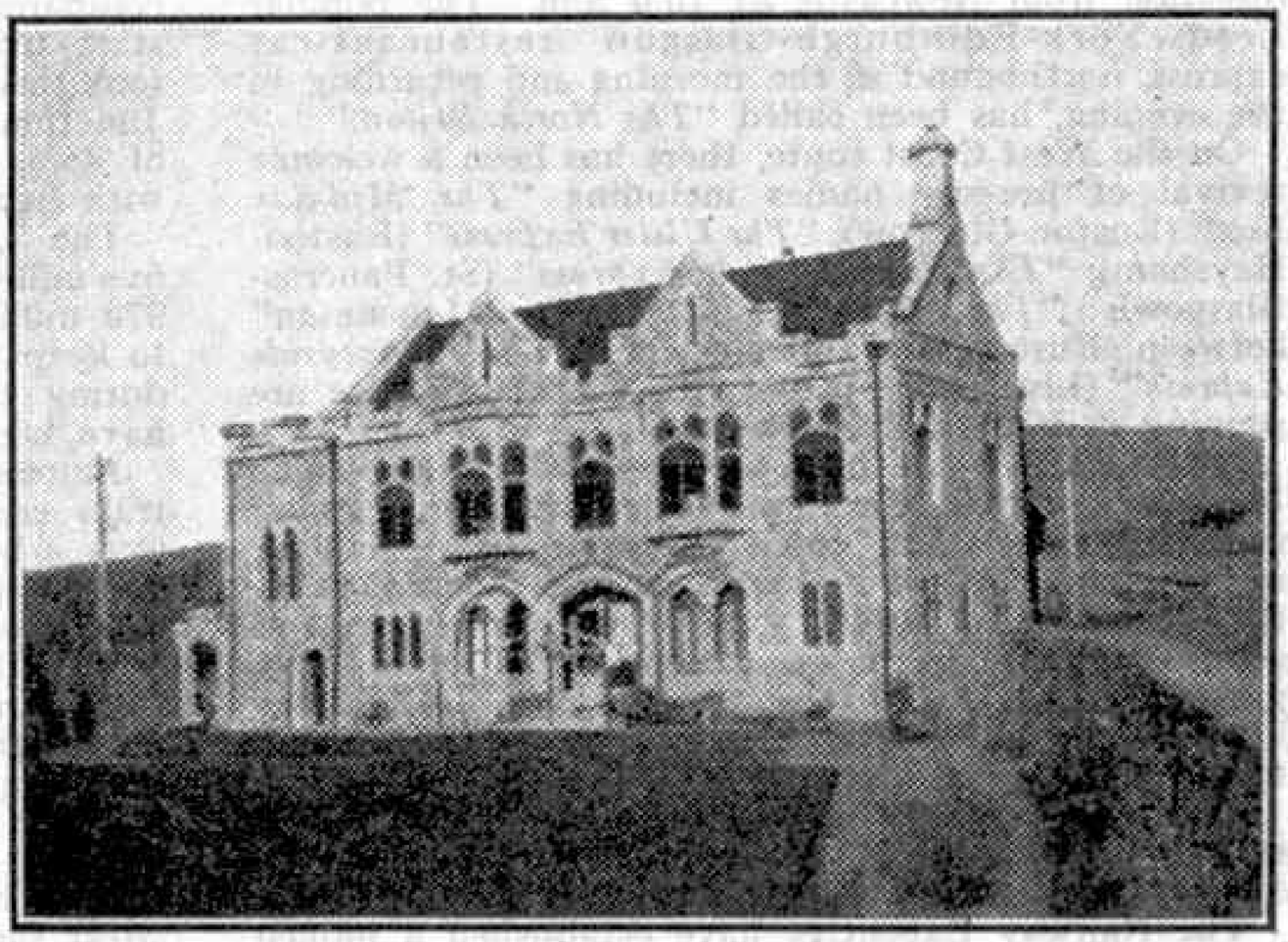
SIGN OF THE TAKAHE

Christchurch, the capital city of Canterbury, New Zealand, is separated from its port, Lyttelton, by a range of hills known as the Port Hills. A fine road crosses the hills and a tunnel provides a route for an electric railway. A tunnel road is shortly to be built. A tram runs from the city, up through the popular hillside suburb of Cashmere to the "Sign of the Takahe" high above the roofs of the city. This is a fine stone building erected in 1926 by a well-known Canterbury resident. It, and its companion the "Sign of the Kiwi" on the hill crest, were to be the first of half-a-dozen such buildings on the hills, catering for hikers and visitors. The "Takahe," with its coloured shields, stained glass windows, and relics of early Canterbury, was a great pre-war attraction. During the war years both buildings deteriorated badly and had to be closed. Recently, after extensive repairs, the "Takahe" re-opened its doors. Once more people can wander through the rooms, admiring the fine stone tracery and carving, the beautiful stained glass windows, the paintings and heraldry, and best of all, the marvellous woodwork.

From the "Takahe" it is 2¼ miles up the Summit Road to the hill crest and the "Sign of the Kiwi." This building has not yet been re-opened, but from it a beautiful view can be obtained of the blue water of Lyttelton Harbour and the Bays.

The Summit Road crosses the Bridle Path, the track used by the Canterbury Pilgrims when they arrived from England in the "first four ships" in 1850 and founded the city of Christchurch. The Bridle Path is marked by a stone memorial building bearing the words, *"They Passed This Way."*

R. J. Anderson (Christchurch, N.Z.).



"The Sign of the Takahe," in which are many relics of the pioneer days of Canterbury, New Zealand. Photograph by R. J. Anderson, Christchurch, N.Z.



A Southern express near Basingstoke headed by a 4-6-2 No. 21C 152 "Lord Dowding." Photography by E. C. Ive, Reading.

Railway Notes

By R. A. H. Weight

National and Scottish News

The winter time tables now in force provide for passenger trains covering nearly four million miles per week. There are still restricted coal supplies, and maintenance difficulties, but it has been possible to schedule more main line services than last winter. These include some over useful cross-country routes, with certain accelerations and re-timings in order to give better connections. About 700 buffet or restaurant car trains are running on each ordinary weekday, while facilities for reserving seats have again been extended and more cheap day or similar bookings introduced, often available by ordinary trains. Millions of passengers have already taken advantage this year of travelling at excursion or reduced fare rates.

A new named express is "*The Northumbrian*," leaving King's Cross at 12.20 p.m. for York and Newcastle, with a corresponding train in the opposite direction from Newcastle at 10.0 a.m. The popular Leeds-York-Edinburgh-Glasgow restaurant-car express, northbound in the morning and returning in the evening, has been called "*The North Briton*."

On the West Coast route, there has been a welcome revival of pre-war names including "*The Mid-day Scot*" (Euston-Glasgow); "*The Ulster Express*" (Euston-Heysham); "*The Thames-Clyde Express*" (St. Pancras-Glasgow); "*The Comet*" and "*The Mancunian*" between Euston and Manchester; "*The Merseyside Express*" (Liverpool-Euston). In each case these are running in both directions.

Many stations are in need of modernization; some 150 are scheduled for improvement and smartening up during the next three years or so, providing sufficient labour and materials can be secured. Since the beginning of 1948, some 2,000 passenger and goods stations have been repainted. More new passenger coaches of the latest types are coming into service, but it will be necessary for some time to use many of the older ones.

Several new steamships for railway-operated routes to the Continent and the Isle of Wight are under construction.

The Railway Executive have established a unified staff suggestions scheme with the object of encouraging co-operation in progress and development. Awards will be made, as had been done in the past by separate railways or regions, to those submitting suggestions regarded as being of greatest merit or use.

Two further "A2" 4–6–2s transferred to the Scottish Region are: No. 60525, "*A. H. Peppercorn*," No. 60531 "*Bahram*." An additional "B1" 4–6–0 at Kittybrewster, No. 61350, commences a fresh series under construction at Darlington.

London Midland Region.

We have received advice of new locomotives placed in service as follows: 4–6–0 class "5" mixed traffic, No. 44667, allocated to 17A, Derby; 2–6–2T, class "2," Nos. 41230–7, 5A, Crewe North; and No. 41238, 2D, Nuneaton; class "4" 2–6–4T: Nos. 42117–20, 5D, Stoke-on-Trent; 2–6–0, class "4" mixed traffic: No. 43040, 16A, Nottingham; Nos. 43041–2, 19A, Sheffield; 0–6–0 diesel-electric shunter: No. 12056, 18A, Toton.

Thirty-nine 2–8–0 engines have been acquired from the Ministry of Supply, including ten formerly in L.M.S. stock. The remainder were built to L.M.S. design by private firms for war service.

A lively run was recently reported over the picturesque North Peak line of the Midland Division from Chinley to Dore and Totley, thence into Sheffield, behind class "5" 4–6–0 No. 44986, fitted with coal weighing apparatus on the tender used for checking fuel consumption. A description of the tender in question appears on page 431 of this issue.

No. 44764 of the same class, fitted with a similar tender, has been on a special series of dynamometer car tests between Derby and Willesden with the L.M.R. Mobile Testing Units.

An extremely creditable performance was logged by Mr. N. Harvey when travelling from Rugby behind 4–6–0, No. 45741 "*Leinster*," hauling a 12-coach Birmingham-Euston semi-fast train. Time was gained on each stage between stops at Northampton and Watford although bookings in places are smart. The rise up to Tring was compassed at a minimum of 67 m.p.h., followed by a maximum of 76 before King's Langley, so the 48½ miles start to stop from Northampton to Watford were covered in 52¾ min. compared with the 55 allowed. A very smart re-start from Watford and a maximum of 80 m.p.h. took this comparatively heavy train through Willesden Junction, 12 miles, in 13 min.—decidedly reminiscent of some of the very fast runs of 1939 or earlier with lighter loads.

The London Midland Region annually consumes five million tons of coal, 290 million units of electricity, 970 million cub. ft. of gas. It is necessary therefore to keep the "Fuel economy" slogans well to the fore during the winter months. Some of these slogans have been suggested by members of the staff.

Among the 801,000 parcels or similar passenger train consignments handled at Euston in a month were a box of bees (some of which escaped, inflicting stings), a crate of live monkeys, a wolf, a leopard, a box of snakes and several live deer.

Weed-killing trains, travelling slowly and equipped with tank wagons from which solution is sprayed on to the tracks, have been running round again this autumn.

Southern Tidings

New light "Pacific" No. 34091, the first of the latest series built at Brighton, is painted dark green with orange and black lining, having British Railways crest on the tender. Its name, "*Weymouth*," suggests a return to "West Country" titles. Several other

engines of this type as well as a few "Lord Nelsons" and "King Arthurs" are appearing in the same green finish.

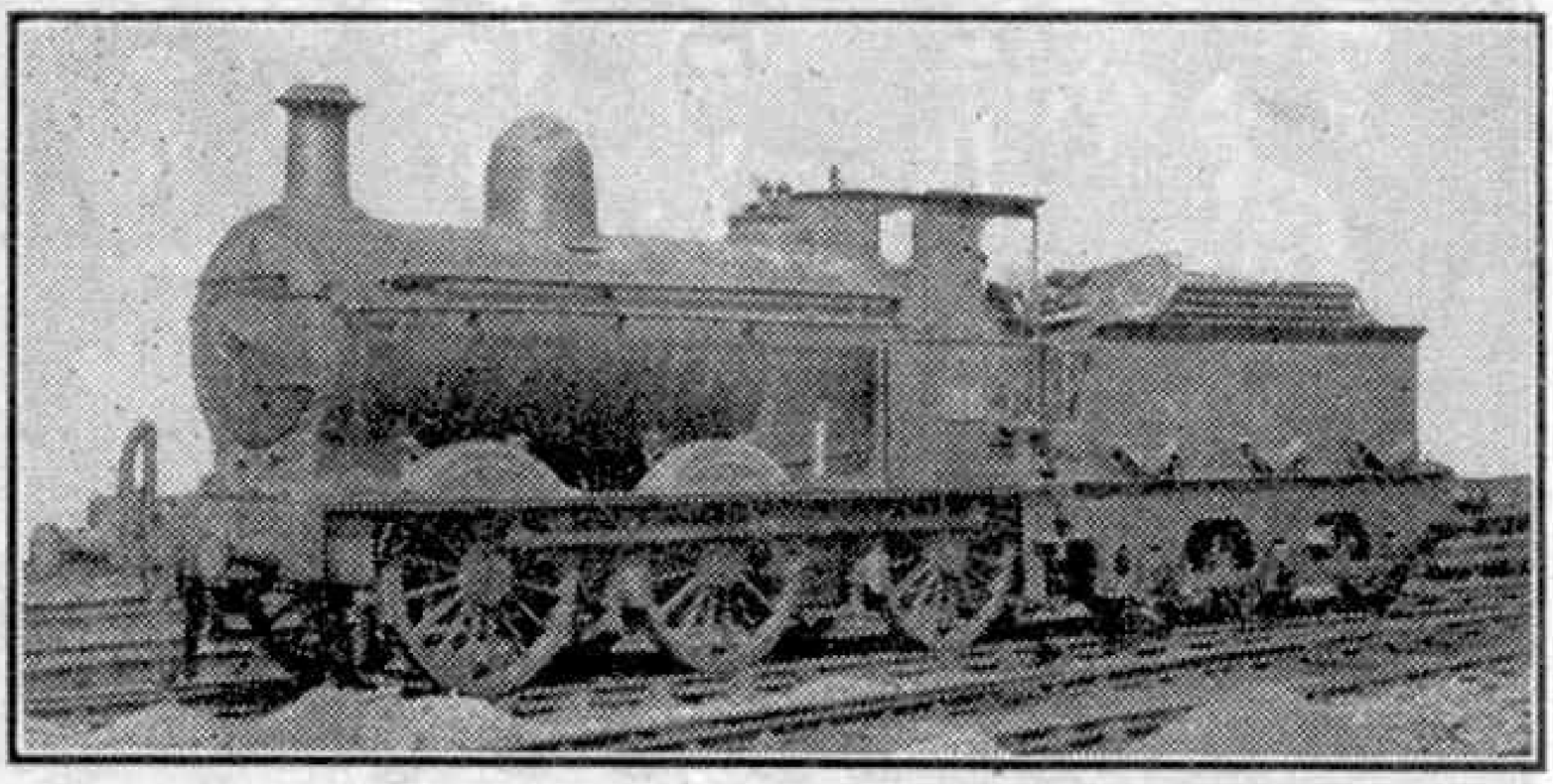
Lined black passenger or mixed traffic tender and tank engines are numerous. Many, however, carry no crest or lettering. The numbers, etc., now appear in white lettering of Gill Sans style, as a rule, when engines leave Works repainted.

During recent travels about the system, the writer sampled many kinds of train, travelling at speeds up to 70 m.p.h. in main line electrics and 75 m.p.h. by steam. A remarkable contrast from a 12-coach, restaurant-car, fast electric from Waterloo was the one-coach Hayling Island branch train hauled by the one engine in steam there for the day. This was "Terrier" 0-6-0T, No. 2655, built in 1875. There are few signalling or similar formalities on that single line. This crosses an arm of the sea by a low bridge on which weight limits are so strict that only "Terriers" are allowed. At busy holiday times two are used together sometimes on trains of more than five coaches.

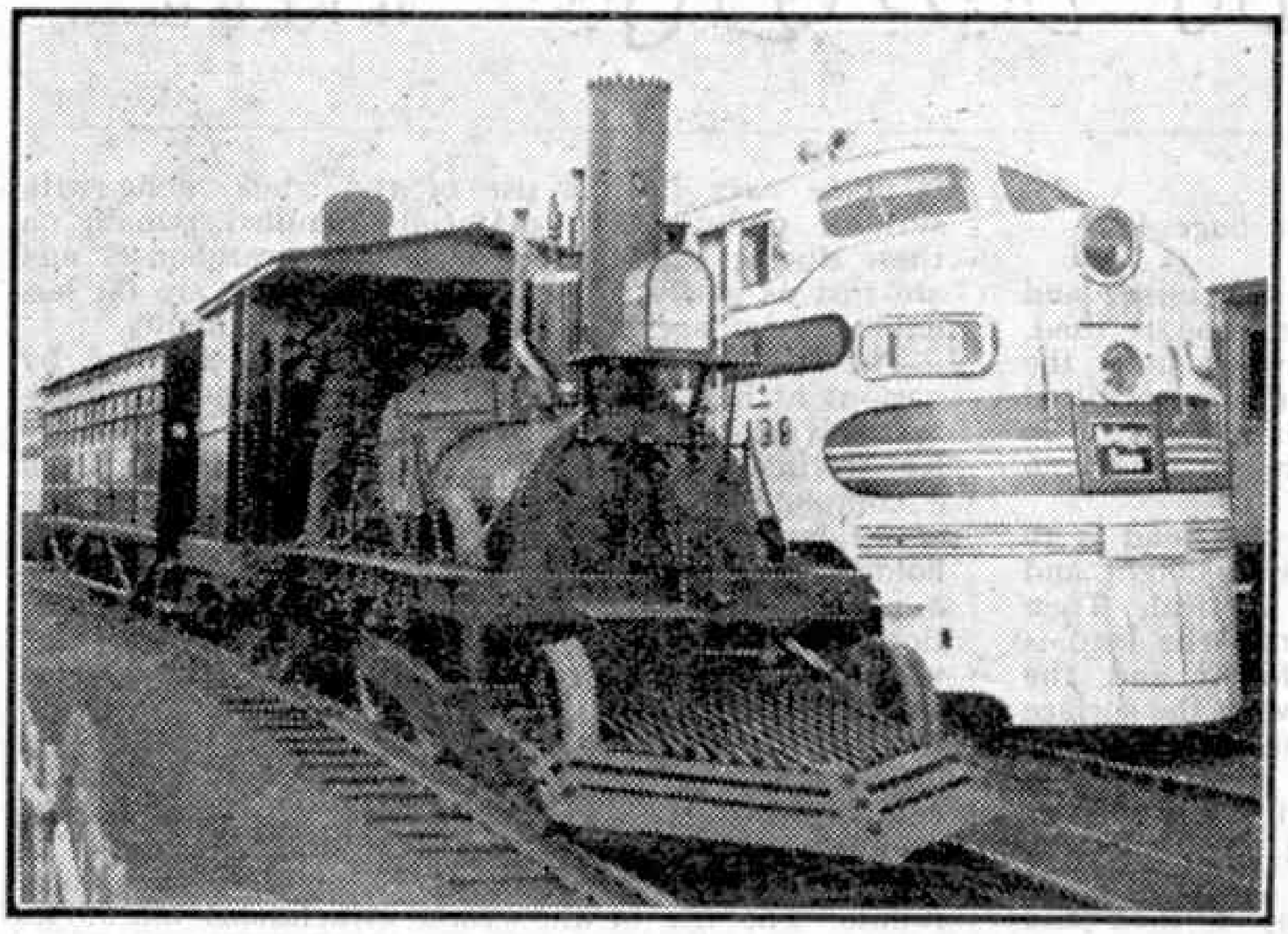
Many other journeys were made behind Wainwright "H" 0-4-4Ts in Kent or E. Sussex where they share semi-main line work. No. 31306, built in 1906, running bunker foremost, touched 57 m.p.h. downhill and 50 on the level, with a four-coach Hastings-Ashford train. A "King Arthur" No. 770, "*Sir Prianius*," made an unusual sight running tender first on the Ashford-Maidstone local. Class "Q1" and "C" 0-6-0s were seen on coastal or other passenger trains from Tonbridge in the summer. The "Q" type were common on similar Central Section duties, on which "C2x" 0-6-0s also appeared on occasion.

A L.B.S.C. "E4" 0-6-2T, No. 32518, built in 1901, did well to lose only 2 min. with the 330-ton Hastings-Birmingham through train, between St. Leonards and Eastbourne, where a "K" class "Mogul" or 2-6-0 took over. A Redhill "B4x" 4-4-0 was seen arriving at Brighton on this train in the opposite direction. Few of these engines are now working and they seldom run over the Brighton main line.

Stirling 0-6-0, lettered "E.K.R.No.2" (East Kent Railway, now an S.R. goods traffic local line), lately arrived at Ashford Works. Her S.R. number was formerly 1383.



Engine No. 31, a veteran 0-6-0 of the former N.C.C. at Belfast. It was originally built in 1878 and when photographed was still in use for dockside shunting work. Photograph by E. M. Patterson, St. Andrews.



"John Bull," the oldest locomotive in the U.S.A. preserved complete, alongside a modern diesel electric of the Burlington Route at the 1949 Chicago Railroad Exhibition. Photograph by C. E. Keevil, Chicago.

Western Region Locomotive Notes

Completing the latest series of "Castles," Nos. 7025-7 have been placed in service named respectively: "*Sudeley Castle*," "*Tenby Castle*," "*Thornbury Castle*." The first-named is allocated to Old Oak Common (PDN). New-type 0-6-0Ts having outside cylinders and motion are coming into service from Swindon numbered 1503 upward, while pannier tank construction is proceeding by contract; Nos. 8400-1 built by W. G. Bagnall Ltd., Stafford, are in service, and No. 8450 constructed by the Yorkshire Engine Co. Ltd.

No. 6019, "*King Henry V*" is now in the blue livery with black and white lining. A diesel-electric shunting engine was lately reported nearly completed.

New Electric Train Services

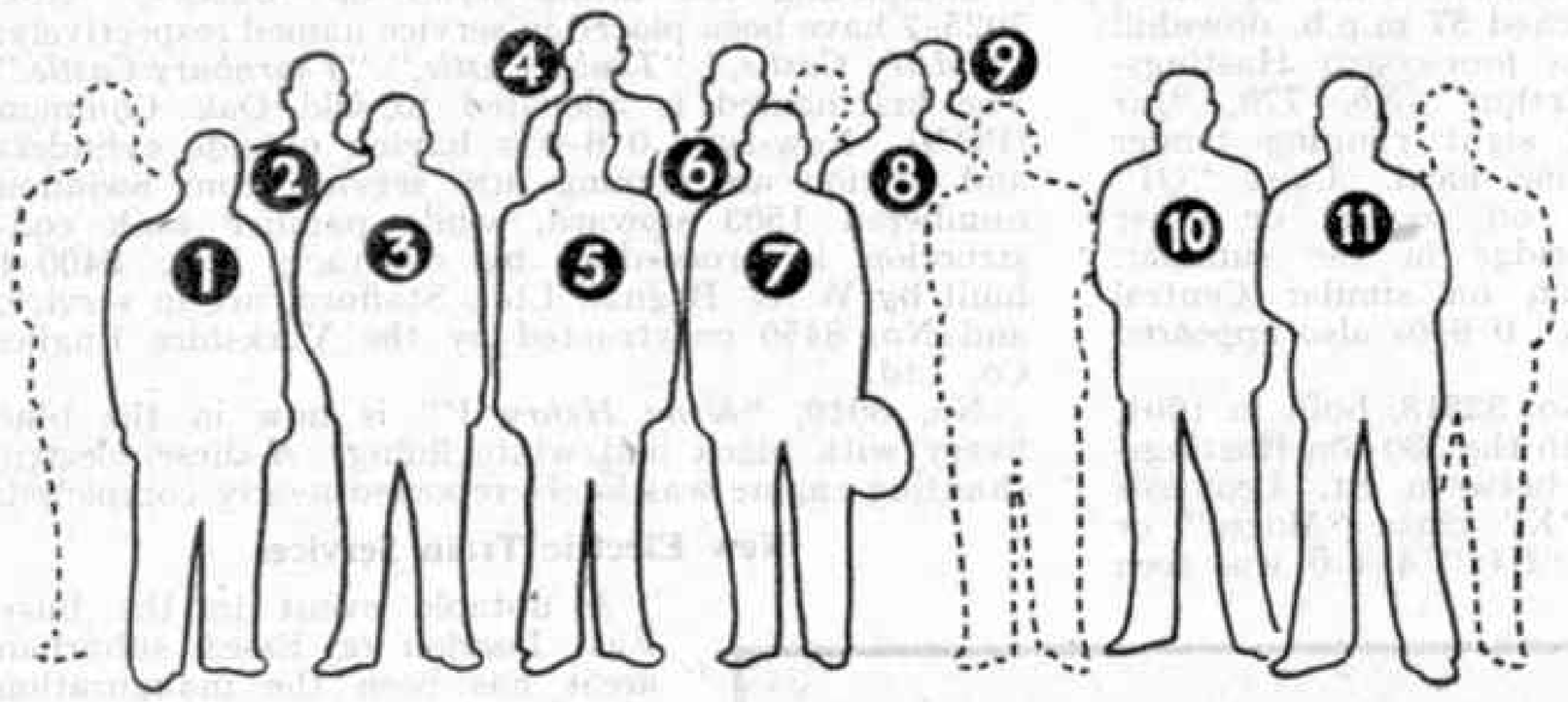
A notable event in the busy East London or Essex suburban areas has been the inauguration of electric train services with overhead traction between Liverpool Street and Ilford, Romford and Shenfield along the old G.E. main line of the Eastern Region where local services have long been liable to overcrowding. During November it is hoped to establish full electric working as far out as Shenfield with frequent, regular-interval trains.

Eastern and North Eastern Regions

Two more "A1" 4-6-2s with roller-bearing axleboxes, Nos. 60154-5, were ready at Doncaster by the end of September, No. 60153 being then stationed at York. Several "A2" 4-6-2s of the various series were recently undergoing general overhaul so their appearance in dark green paint will probably be more general by the time these notes are published. It may also be that more passenger tank engines will by then be running in black with lining instead of the plain black of recent times.



On Monday morning 22nd August, ten members of the New Zealand Cricket Team, with their Manager, Mr. J. H. Phillipps, paid a very welcome visit to the Meccano Works before going to the Aigburth (Liverpool) ground to continue their game against Lancashire. The picture was taken as the team were leaving the Works. The numbered figures below will enable readers to identify the players.



1. F. B. Smith
2. G. O. Rabone
3. B. Sutcliffe
4. V. J. Scott
5. W. M. Wallace (Vice Captain)
6. J. Reid
7. J. H. Phillipps (Manager)
8. J. A. Cowie
9. G. F. Cresswell
10. C. Burke
11. F. L. H. Mooney

The Fork-Lift Truck—(*Continued from page 417*)

friction with the ground, or between the upper and lower inside surfaces of a pallet when one is used. The truck is next driven slowly forward until the load touches the carriage backrest, the mast is tilted backward, and the carriage is raised sufficiently to lift the load clear of the floor so that it can be driven to the desired place.

On approaching the position where the load is to be deposited this is raised to the desired height and the mast is tilted forward until it is vertical. Then the truck is driven slowly forward until the load is exactly over the position intended for it and the forks are lowered until it is in contact with the surface on which it is to rest. On lowering the forks a little further they are relieved of the load and can easily be withdrawn, after which the truck is backed away and turned round, ready for speeding away to fetch another load.

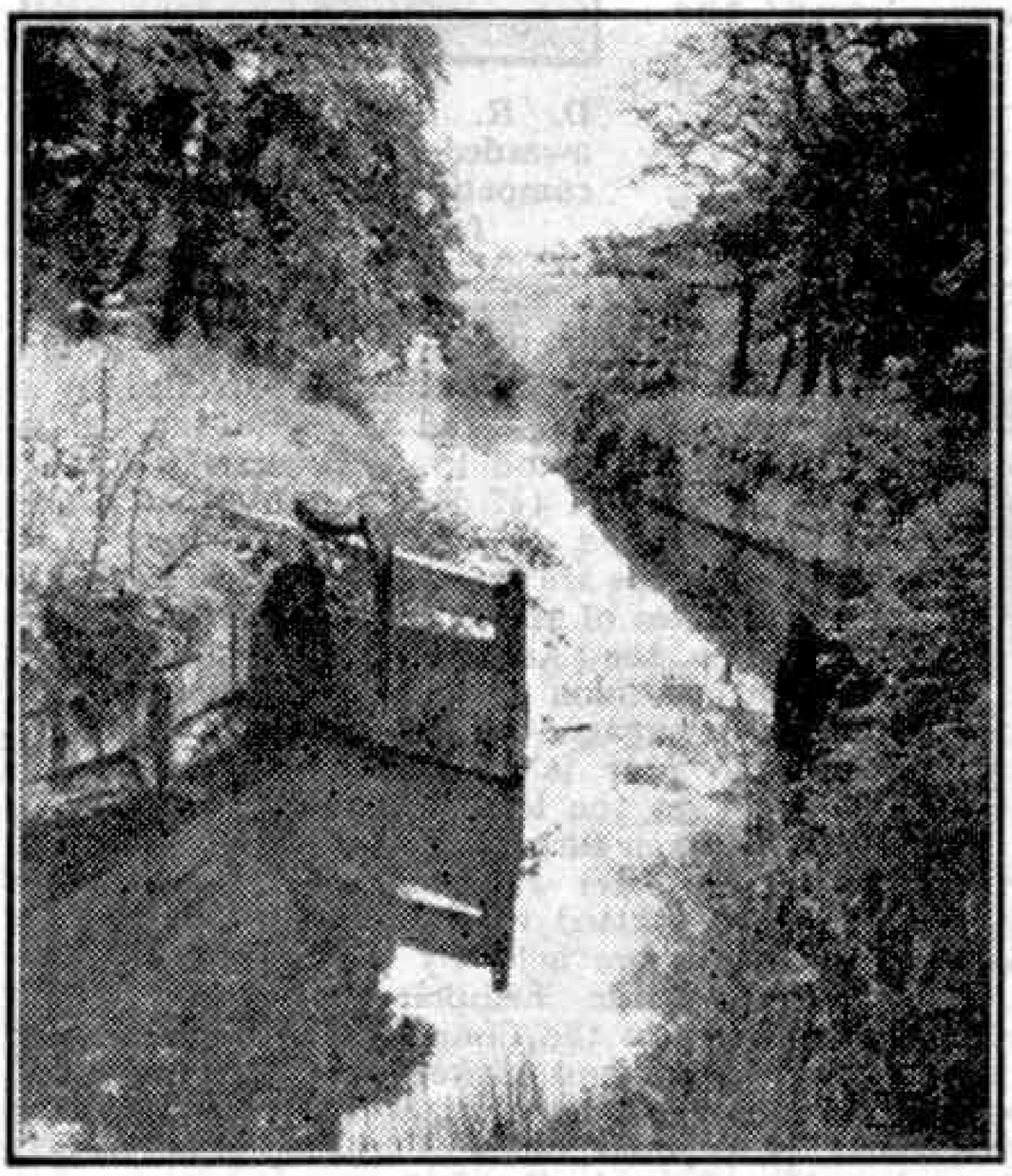
The whole operation of picking up a load and transporting it, and placing it where it is wanted, takes only a few seconds, even when the load has to be lifted well above the ground. Stacking in particular is made easy by the use of the truck along with suitable pallets. The materials handled remain on these during their stay in stores or warehouses and are just as easily lifted down, while they are far less liable to damage than when handled manually.

The uses of the fork truck can be extended by various fittings, including a standard crane, a shovel, a revolving scoop and a ram. It can also be used for towing purposes and altogether it is in itself a complete handling system. It is mobile and can easily be taken to any desired place, including the holds of ships for use in loading or unloading them, a purpose in which it is finding increasing application. The Coventry Climax fork lift truck is provided with lifting eyes so that it can readily be hoisted and lowered into a ship's hold. In conjunction with the use of pallets or battens for storage it is being used in the development of more rapid and convenient systems for loading and discharging that promise to reduce very greatly both the costs of these operations and the time required to turn ships round. The use of the crane attachment allows its employment for moving general packages of many different kinds that cannot be stacked or carried on pallets.

Photography

Toning Gaslight Prints

I OFTEN wonder why so few amateur photographers do any experimenting in regard to the colour of their prints. A gaslight print of good quality is capable of giving a very satisfactory rendering of almost any subject, but this is no reason why colour should not be tried by way of a change and to achieve special effects.



The old lock gate. Photograph by G. Leaf, Hull.

I am not now referring to hand colouring with the brush, which requires special ability and technique, but to such a simple process as toning.

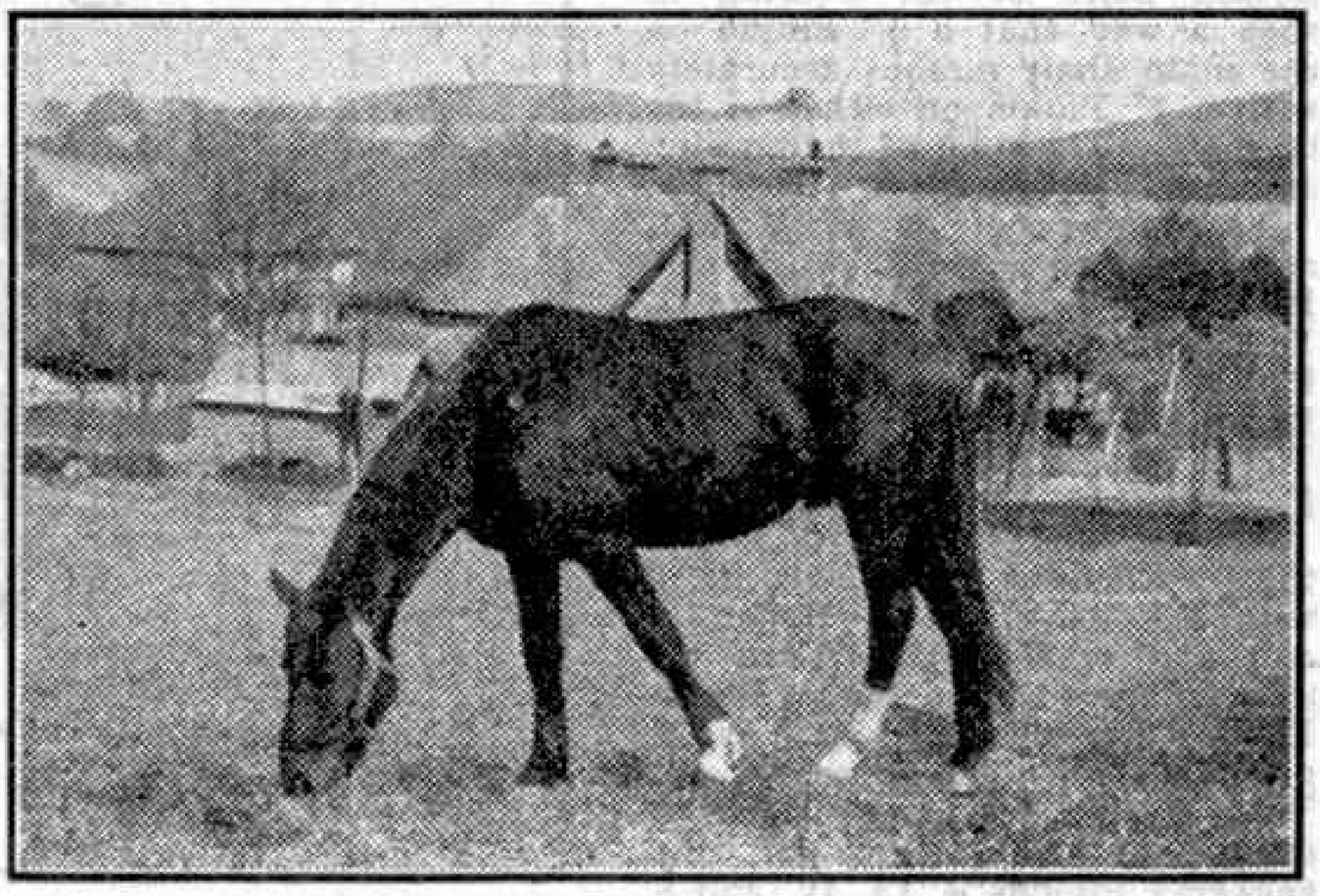
By immersing them in special solutions, gaslight prints can be toned to attractive shades of sepia, blue, or green, with very interesting results. A green tone is excellent for marine studies in general; blue gives a suggestion of coldness to snow scenes and Alpine pictures; and sepia, suggesting warmth of colour, is very suitable for pictures of old buildings of various kinds. I strongly advise readers to experiment with this toning business, and they can do this without difficulty by the use of Johnsons "Pactums," which provide in handy form



Portrait of a Friend, by R. Atkins, Eccles.

the materials for making solutions for copper, blue, green and sepia toning.

Once started on experiments in toning, I suggest that readers should try the Johnson "Colourform" process. The outfit supplied provides the necessary material for producing monochrome prints in a great variety of colours, including intermediate shades. A particularly interesting feature of the process is that the photographer can record the exact proportions of the colourformers required to produce any particular tone; and therefore, by consulting his records, he can reproduce on a later occasion any colour that he wishes.



"Charlie." Photograph by G. R. Brown, Hove.

Among the Model-Builders

By "Spanner"



D. R. Davies, Harrow, was awarded Second Prize in a competition for models built from Outfit No. 4.

THREE-SPEED AND REVERSE GEAR-BOX

The compact gear-box illustrated in Figs. 1 and 2 is designed to provide three forward ratios and a reverse speed, and its small overall size makes it suitable for use in most model vehicles. The gear-box is fitted with a particularly neat selector mechanism that closely follows the operation of the ball and socket gear levers used in actual practice.

The gear-box housing is made from two 3" Flat Girders bolted together through their round holes, and fitted at each edge with a 3" Angle Girder. Two

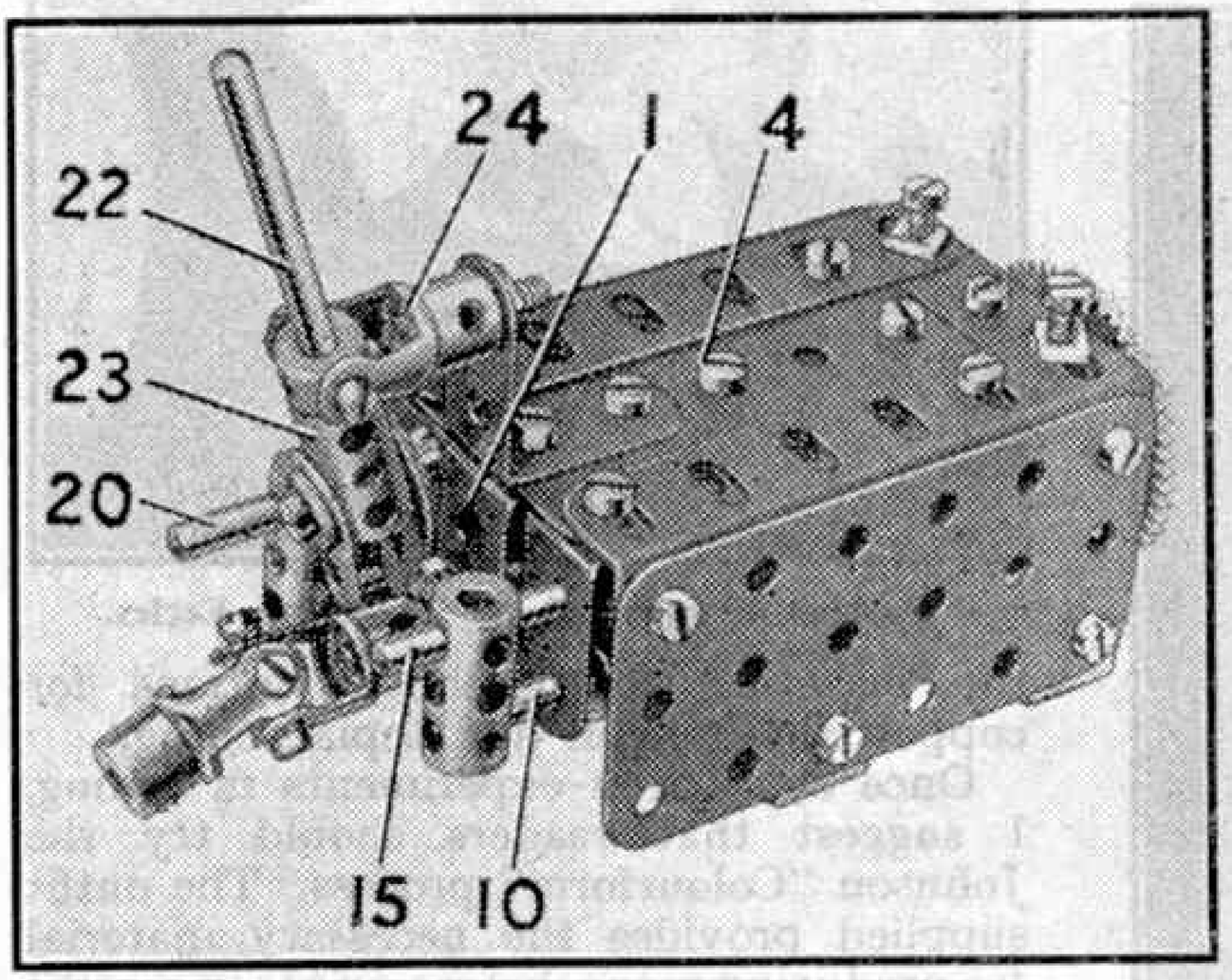


Fig. 1. A compact three-speed and reverse gear-box.

1" × 1" Angle Brackets, one of which is seen at 1, are used for the main shaft bearings, and bearings for the layshafts are provided by the 2½" × 1" Double Angle Strips 2 and 3. The main shaft is also supported at the centre of the housing by a 1" × ½" Angle Bracket held by the bolt 4. A Fishplate bolted to the Angle Bracket is used to locate the shaft in the slotted hole. Double Angle Strips 2 and 3 are fixed to the slotted holes of the housing in such a way that a ½" Pinion on the main shaft meshes accurately with a ¾" Pinion on either of the layshafts. The sides of the housing are 3" × 1½" Flat Plates.

The main shaft is a 2½" Rod and it carries a ½" Pinion 5, a ¾" Pinion 6 and a second ½" Pinion 7. The Rod projects about ⅛" beyond Pinion 7, and partly into a ½" Pinion 8 on the driving shaft. The driving shaft carries also a ¾" Pinion 9.

The layshaft for second and third gears is a 3" Rod 10, fitted with a Collar 11, a ¾" Pinion 12 and a ½" Pinion 13. When the shaft is moved to the right, Fig. 2, Pinion 12 engages Pinions 7 and 8, providing the second gear ratio. Third or top gear is obtained by sliding the shaft to the left, thus engaging Pinions 6, 13, 12, and 8. Movement of the shaft is controlled by a ½" Bolt 14, screwed into a Collar fixed on 4½" Rod 15. Rods 10 and 15 are also connected by a Coupling that is free on Rod 10 but fixed on Rod 15, so that the Bolt 14 is held between the Collar 11 and the Pinion 12 on the layshaft.

The layshaft for the first and the reverse gears is a 3" Rod 16 fitted with a ½" Pinion 17, a Collar 18 and a ¾" Pinion 19. The Rod is controlled by a 4½" Rod 20, connected to its layshaft in a similar way to Rod 15. A reverse Pinion 21 is carried on a 1½" Rod mounted in Angle Brackets fixed to 2" Slotted Strips. The Slotted Strips are attached by Angle Brackets to the sides of the housing, and the slotted holes in the Angle Brackets and Strips allow the Pinion 21 to be positioned so that it can be engaged with both Pinions 19 and 6. Reverse gear is obtained by moving the layshaft to the left, and the drive for first gear is taken through Pinions 5, 19, 17 and 9

The selector mechanism is provided by a Rod 22 fitted with a Coupling 23. Two Fishplates are held by Bolts in the Coupling, and the Fishplates pass over Bolts screwed into the Couplings on Rods 15 and 20. A ball and socket joint is represented by a Swivel Bearing 24 that is fixed to the gear lever, and is pivoted on a Threaded Pin passed through a 1" × 1" Angle Bracket.

The selected gears are held in mesh by the friction of ⅛" Bolts pressing slightly on shafts 15 and 20. Each Bolt is fixed in the housing by two nuts.

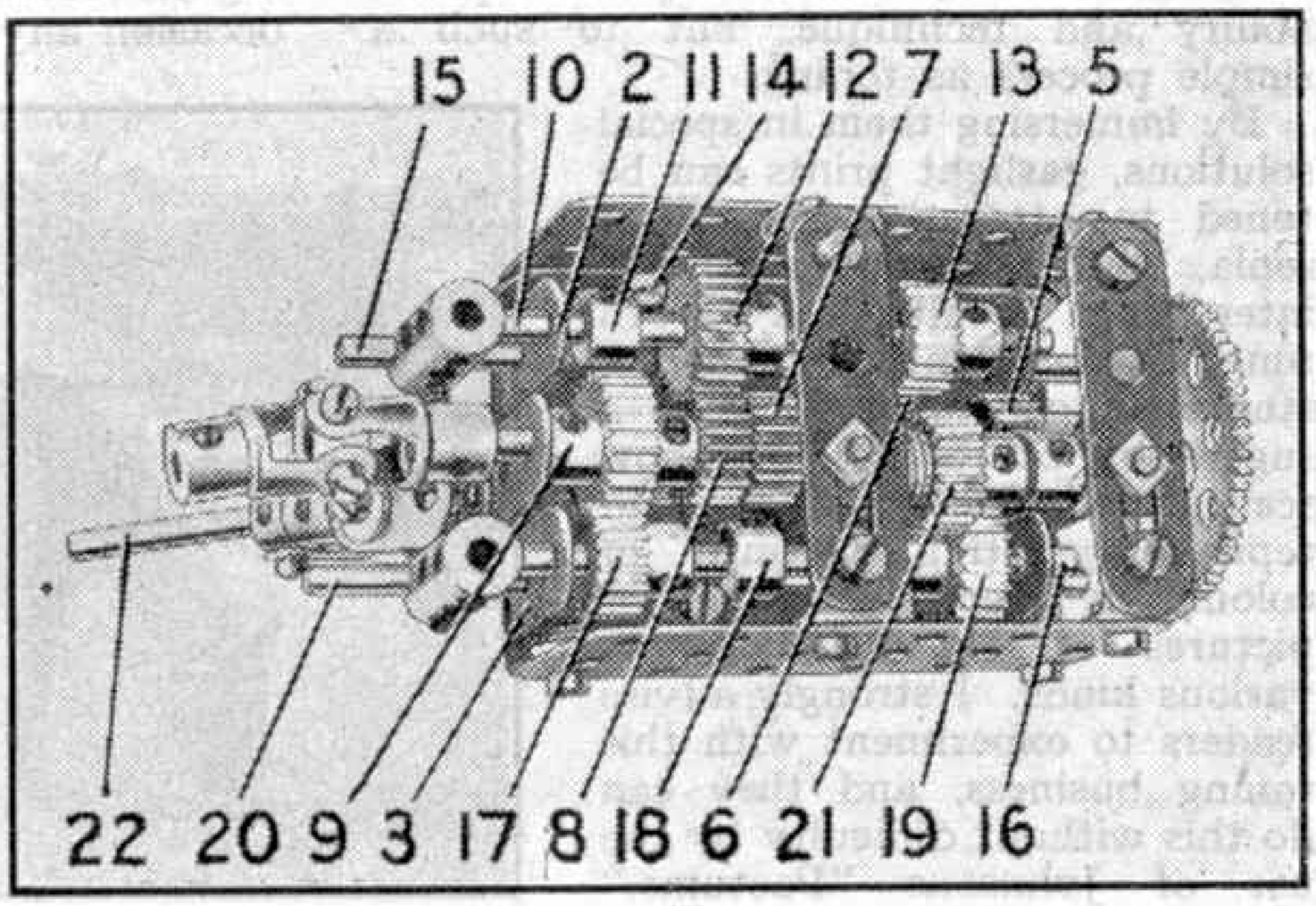
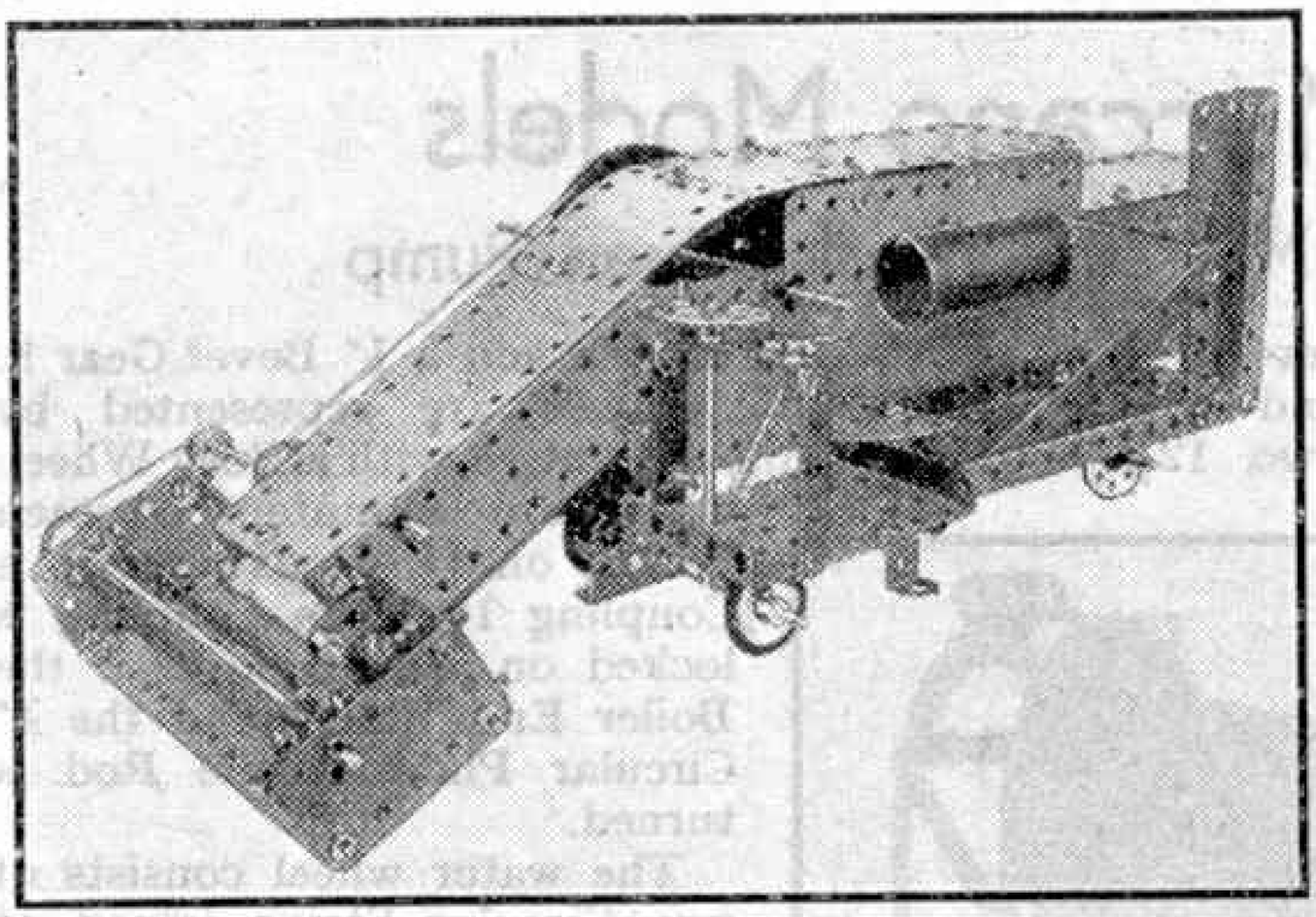


Fig. 2. The inside of the gear-box.



The model of a combine harvester referred to on this page.

A COMBINE HARVESTER BUILT FROM No. 6 OUTFIT

A combine harvester working on a farm in Bedfordshire gave a young Meccano boy an idea for a working model. He set to work with his No. 6 Outfit, and the interesting model that he ultimately completed is illustrated on this page. The boy is the nine-year-old son of Mr. L. E. Barnes, Marston, Bedford, and readers who are familiar with the Massey Harris Combine Harvester will, I think, agree that young Barnes is to be congratulated on his handiwork. The model is entirely the boy's own work, with the exception of the conveyor belt, which was made from a strip of canvas by his mother working to the boy's instructions.

HOW TO USE MECCANO PARTS

(Socket Coupling Part No. 171)

The Socket Coupling is a part of varied uses. While it is primarily designed to couple two wheels or gears together rigidly so that they can turn as a unit on a shaft, or alternatively remain stationary while the shaft carrying them turns in the Coupling, it can be used for several other purposes. The slots of the Coupling allow wheel bosses to be inserted without removing their Set Screws, while the Grub Screws of the Couplings are used to fix the bosses in position. The Socket Coupling is also provided with a circumferential groove that facilitates the fitting of a lever to slide the Coupling along a shaft.

An excellent method of using the Socket Coupling is found in the hour hand mechanism of a clock. In this case a Pinion can be arranged to drive the hour hand by engaging a 57-teeth Gear gripped in the Coupling by its boss. In the other end of the Coupling the boss of a Crank to which the hour hand is bolted is fixed, and the Socket Coupling is free to rotate on a Rod carrying the minute hand. The minute hand rod is driven separately through appropriate gearing.

Other uses for the Socket Coupling are shown in Figs. 3 and 4 on this page. In Fig. 3 the part forms the crosshead of a simple reciprocating engine. In each end of the Coupling is a Metal Ball, which is held freely in the cavity of the Coupling and slides between Strips as indicated.

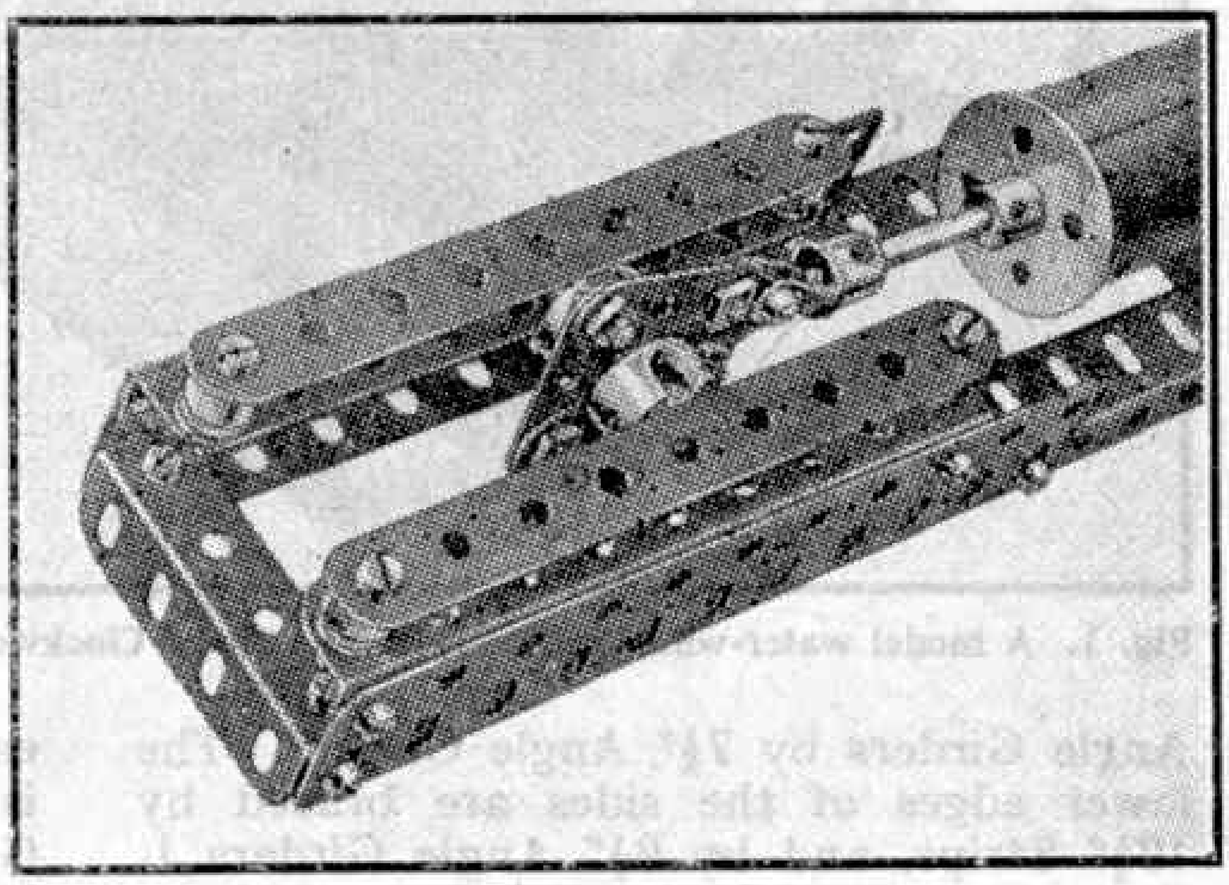


Fig. 3. A Meccano Socket Coupling used to form the crosshead of a small engine.

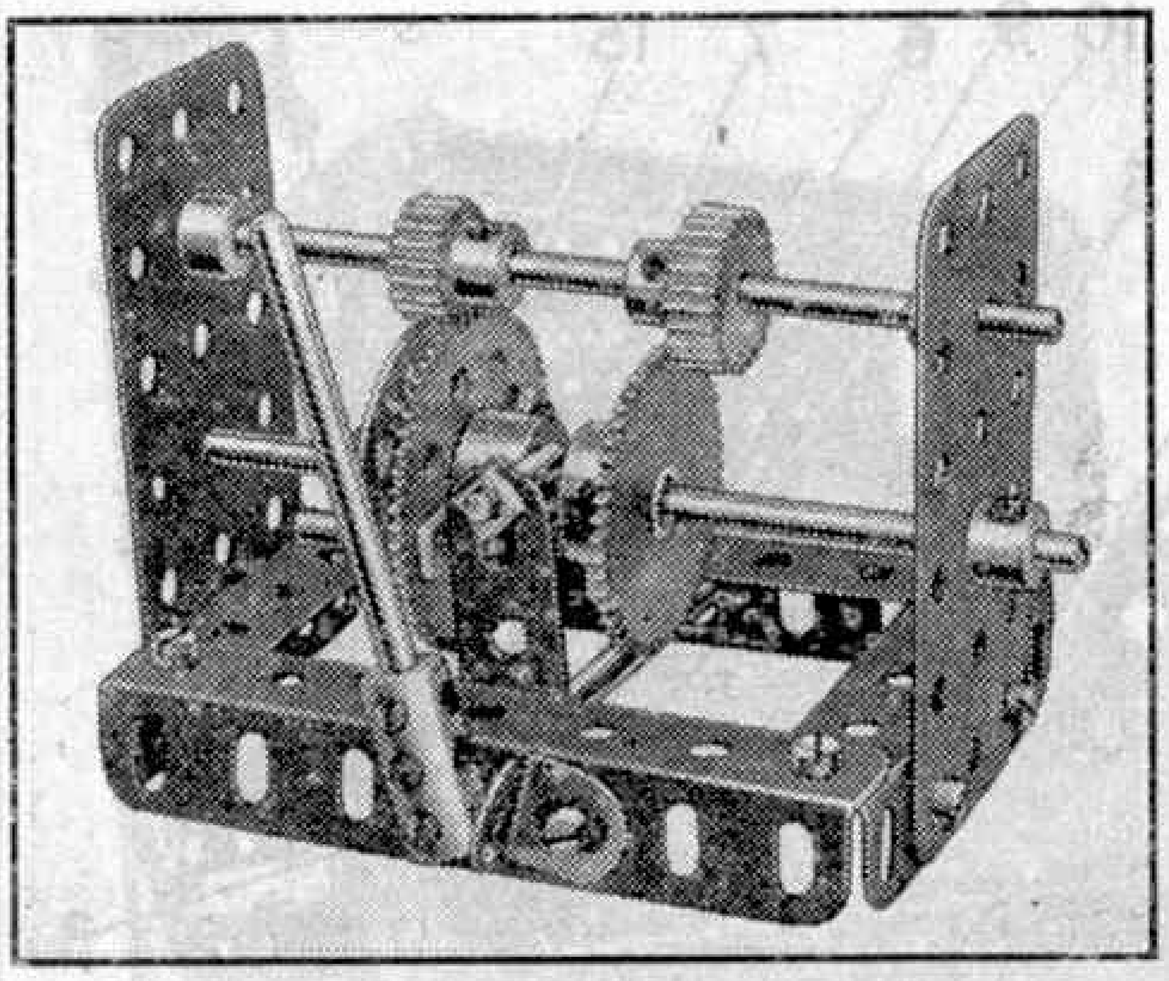


Fig. 4. A sliding change gear unit built up with the aid of a Socket Coupling.

In Fig. 4 a Socket Coupling is used to form a change gear unit in a simple two-speed gear mechanism. This example illustrates how the groove can be used to slide the Coupling by means of a pivoted lever fitted with a Threaded Pin.

PRIZES FOR MODELS OF ALL KINDS

The General Model-Building Contest announced in last month's "*M.M.*" is open for entries until 30th November. Models may be of any type and there is no restriction on the number of parts that may be used. The only condition is that models must be the unaided work of competitors. *Actual models must not be sent.* All that is required is a clear photograph or sketch, with a brief description.

The contest is divided into two sections, for Home and Overseas readers respectively, and the closing dates are: Home Section, 30th November 1949; Overseas Section, 31st January 1950.

Entries must be addressed "*October General Model-Building Contest, Meccano Ltd., Binns Road, Liverpool 13,*" and the competitor's age, name and address must be written on the back of each illustration submitted. The prizes in each Section will be: First, Cheque for £3/3/–; Second, Cheque for £2/2/–; Third, Cheque for £1/1/–; five prizes of 10/6 and five of 5/–.

New Meccano Models

Water-Wheel Mill and Wind Driven Pump

THE base of the model Water-Wheel Mill shown in Figs. 1, 2 and 3, is made by connecting together two 12½" Angle Girders by 7½" Angle Girders. The lower edges of the sides are braced by 12½" Strips, and by 9½" Angle Girders 1. The top is strengthened underneath by a 12½" Angle Girder 2.

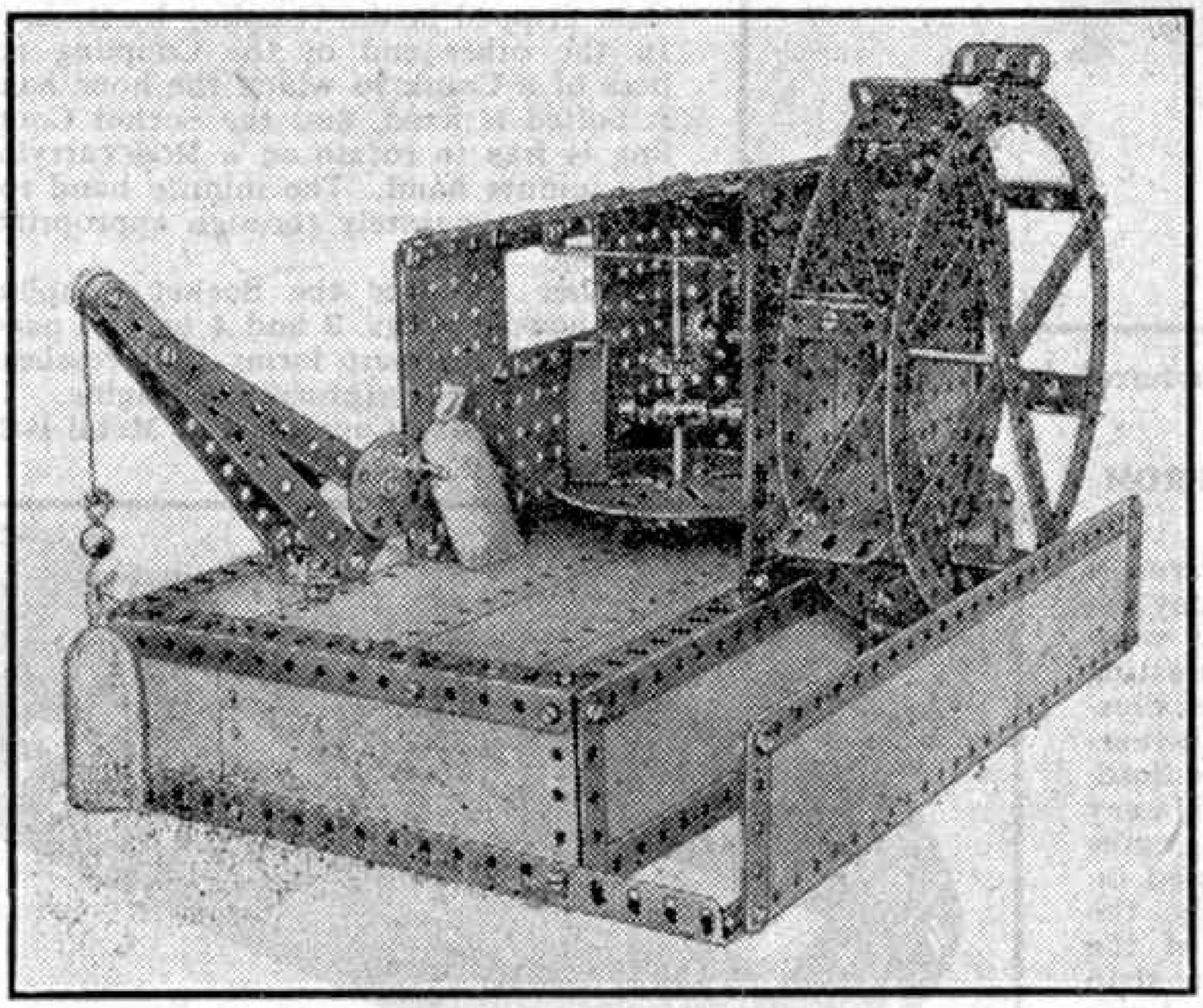


Fig. 1. A model water-wheel mill driven by a No. 1 Clockwork Motor.

The sides of the mill shed are made by bolting 7½" Angle Girders 3 and 4 to the base. Three 5½" × 2½" Flat Plates are bolted vertically to the Girder 3, and a 2½" × 2½" and two 4½" × 2½" Flat Plates are fixed to the Girder 4. The roof is made from 5½" × 2½" Flexible Plates, and the rear end is filled in by two 5½" × 2½" Flat Plates. The roof and the end are attached to the sides by Angle Brackets.

A 4" Circular Plate 5 is bolted to Double Brackets fixed to the base, and a 5" Rod 6 is passed through the Circular Plate and the base. The upper end of Rod 6 is mounted in a 5½" × ½" Double Angle Strip 7 bolted between the sides, and the Rod is fitted with a 2" Pulley 8 and a ⅞" Bevel Gear 9.

The mill stones are represented by Boiler Ends, each fitted with a Bush Wheel. They are mounted between Collars on 1½" Rods fixed in a Coupling 10. The Coupling is locked on Rod 6 so that the Boiler Ends roll round the 4" Circular Plate as the Rod is turned.

The water wheel consists of two Circular Strips joined at eight opposite points by 1½" × ½" Double Angle Strips. The paddles are 1½" Angle Girders bolted to the Double Angle Strips. Four spokes consisting of 7½" Strips are bolted across the wheel, and the inner set is fitted with a Bush Wheel so that the assembly can be fixed on Rod 15. This Rod is mounted in the side of the shed, and in a 1" × 1" Angle Bracket attached by ½" Bolts to the Double Angle Strip 7. A Collar and two Washers are placed on each Bolt for spacing purposes. Rod 15 is fitted at its inner end with a ⅞" Bevel Gear, which meshes with the Bevel 9 on Rod 6. The paddles of the wheel pass through a channel formed by a 12½" Strip

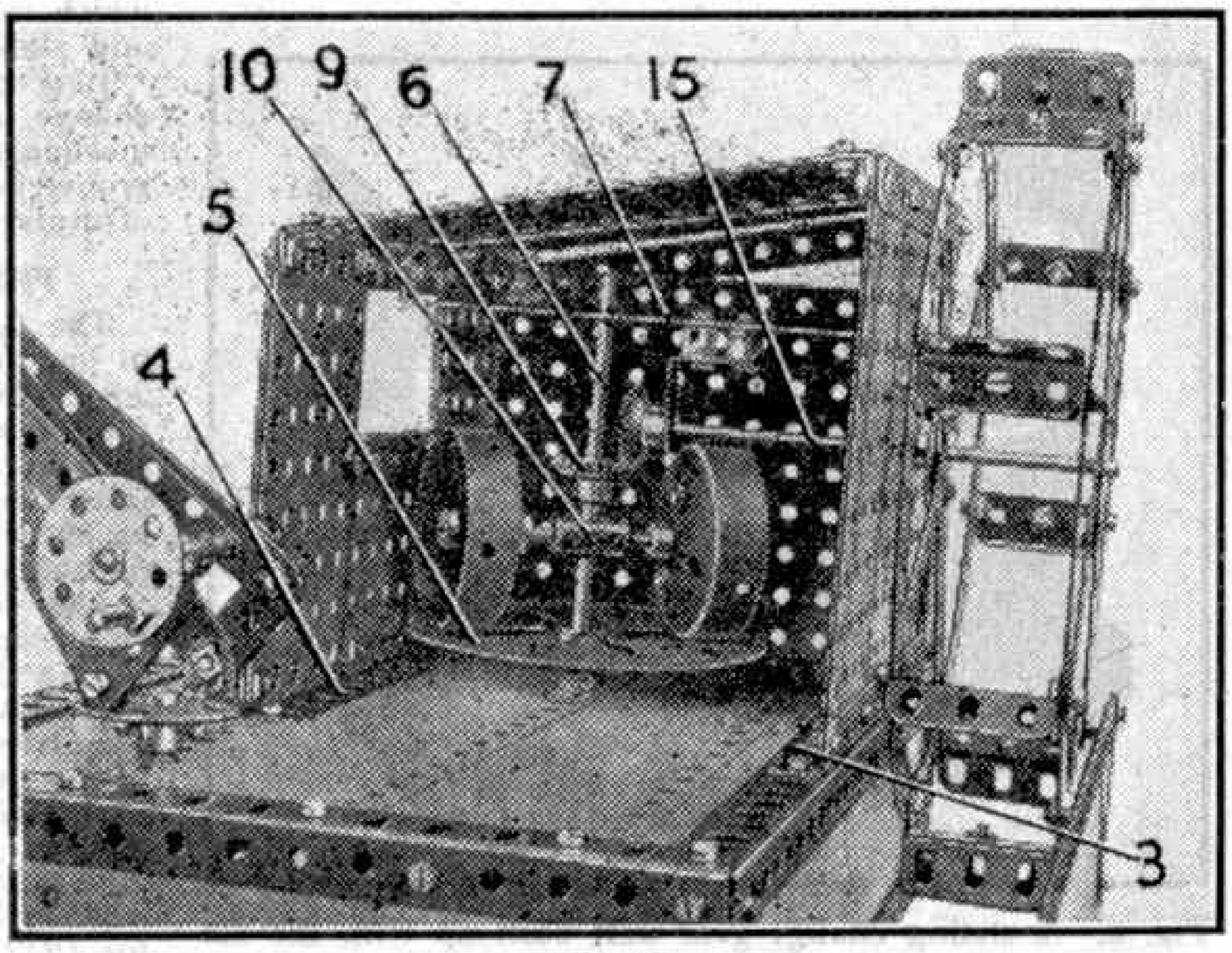


Fig. 2. Interior view of the mill, showing the mill stones.

Plate braced by Strips and attached to a 12½″ Angle Girder bolted between the Girders 1.

A No. 1 Clockwork Motor is fitted inside the base as shown in Fig. 3. The Motor is bolted to the 2″ Angle Girder 11 and the 3″ Angle Girder 12, and a ½″ Pinion 13 is fixed on the driving shaft. Pinion 13 meshes with a 57-teeth Gear on a 2″ Rod 14, and the Rod carries also a ½″ Pulley with boss fixed above the Motor side-plates. The ½″ Pulley is connected by a Driving Band to the 2″ Pulley 8.

The model is completed by adding a simple crane to allow the filled sacks to be handled easily.

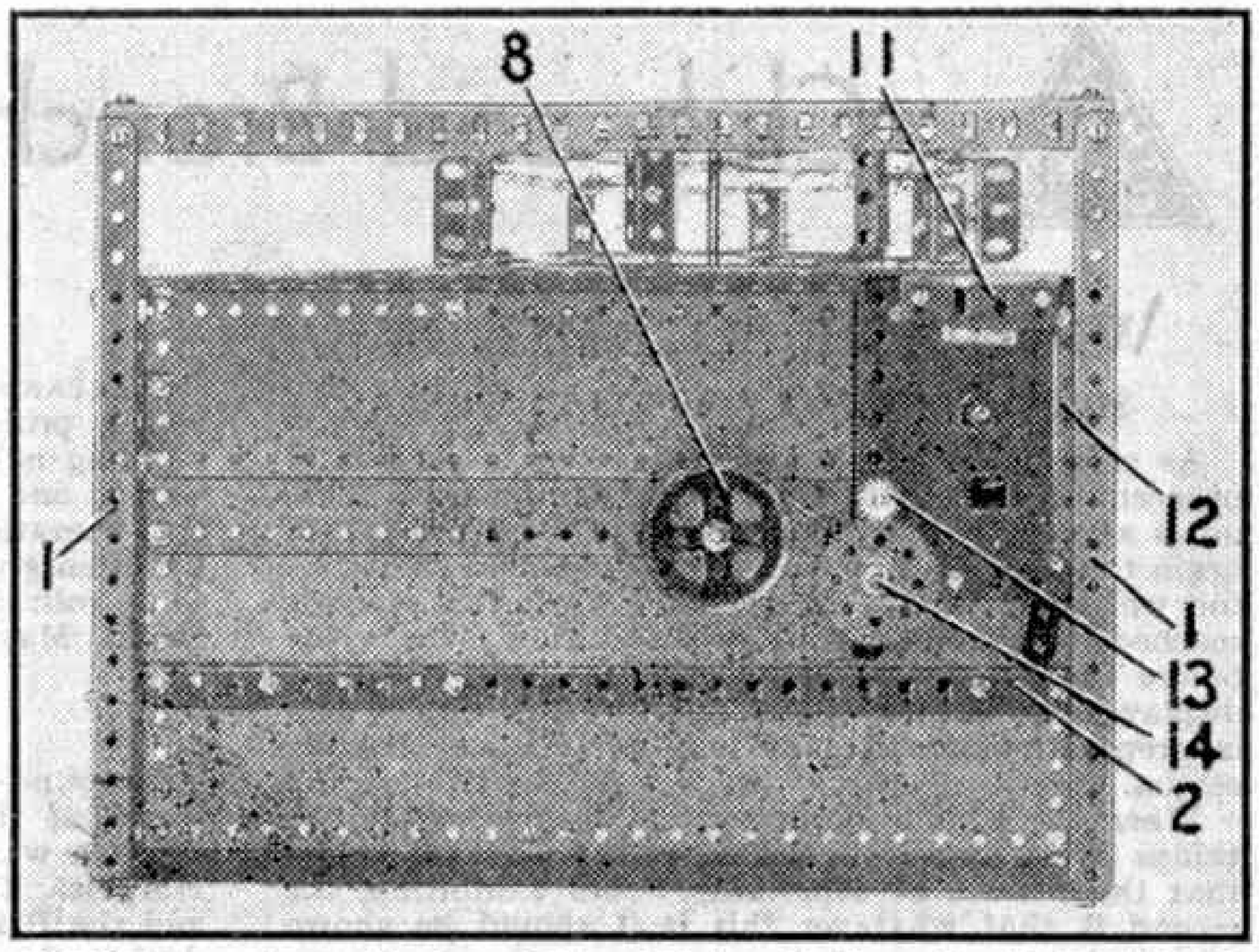


Fig. 3. An underneath view of the mill showing how the Motor drive is arranged.

Parts required to build the Water-Wheel Mill: 3 of No. 1; 6 of No. 1b; 7 of No. 2; 4 of No. 2a; 1 of No. 3; 8 of No. 5; 2 of No. 6a; 4 of No. 8; 2 of No. 8a; 4 of No. 8b; 1 of No. 9; 1 of No. 9c; 1 of No. 93; 8 of No. 9f; 2 of No. 11; 21 of No. 12; 2 of No. 12a, 2 of No. 15; 1 of No. 16a; 1 of No. 17; 2 of No. 18a; 1 of No. 20a; 1 of No. 22; 1 of No 23; 5 of No. 24; 1 of No. 26; 1 of No. 27a; 2 of No. 30; 151 of No. 37; 4 of No. 37a; 7 of No. 38; 1 of No. 40; 8 of No. 48; 1 of No. 48d; 2 of No. 53a; 1 of No. 57c; 7 of No. 59; 1 of No. 63; 5 of No. 70; 1 of No. 72; 1 of No. 111; 2 of No. 111a; 1 of No. 115; 2 of No. 145; 1 of No. 146a; 1 of No. 147b; 2 of No. 162a; 1 of No. 186; 7 of No. 192; 7 of No. 197; 1 No. 1 Clockwork Motor.

The simple windmill pump illustrated in Fig. 4 is designed for construction from Outfit No. 1, and can be driven by a *Magic* Clockwork Motor.

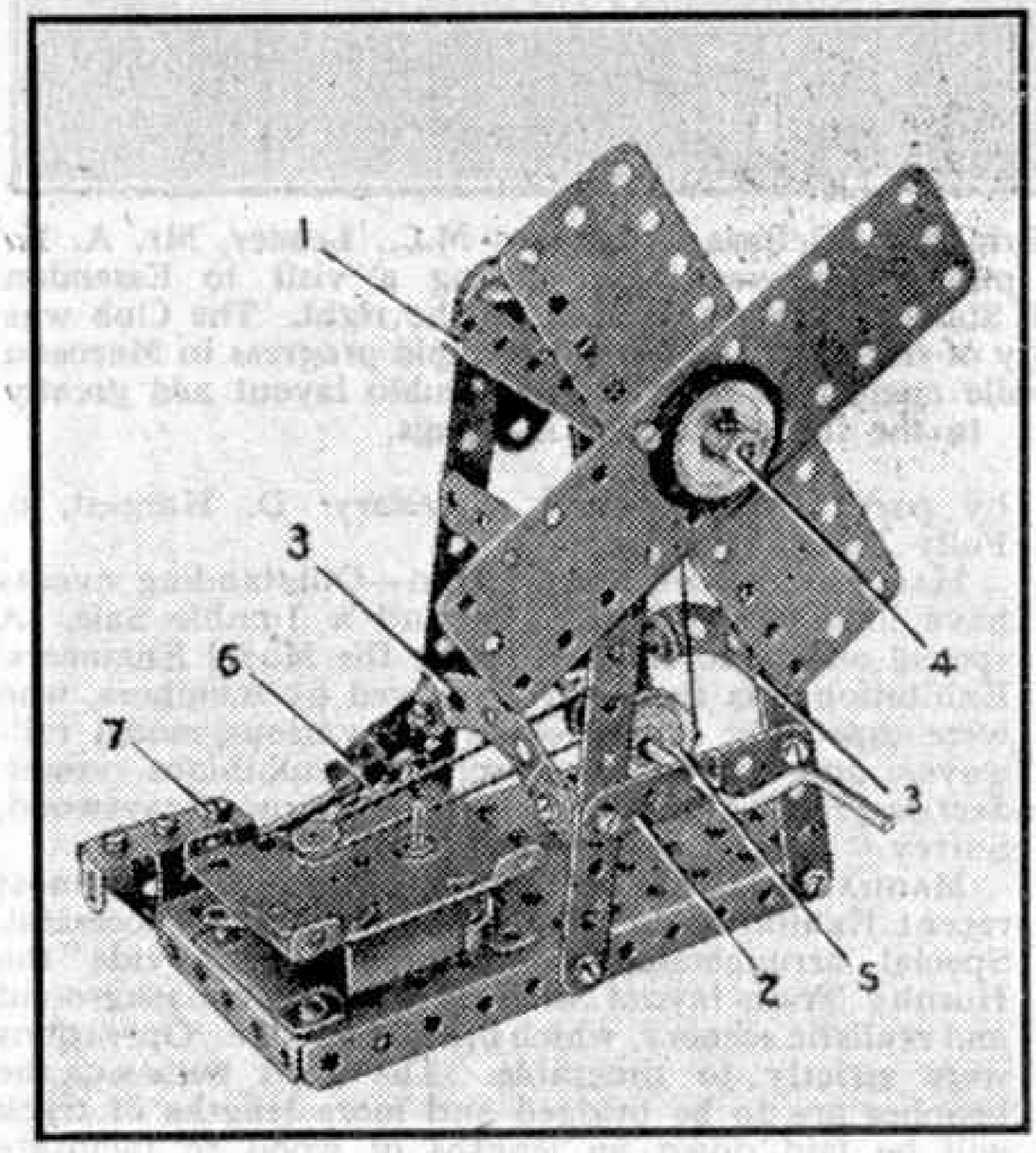


Fig. 4. A simple model windmill pump fitted with a Magic Motor.

A 5½″ × 2½″ Flanged Plate is used for the base, and four 5½″ Strips bolted to the Plate in the positions shown form the tower. The Strips on each side are connected at their upper ends by a Flat Trunnion, and are joined to the 5½″ Strips on the opposite side of the base by two 2½″ × ½″ Double Angle Strips, one of which is indicated at 1. The 5½″ Strips are also joined across at a point four holes from their lower ends by two 2½″ Strips 2 and two small radius Curved Strips 3, which are attached by Angle Brackets.

The windmill sails are 5½″ × 1½″ Flexible Plates, clamped at right angles on a 3½″ Rod 4 between a Spring Clip and a 1″ Pulley. The Rod 4 carries between the Strips of the tower a second 1″ Pulley, which is connected by a Cord belt to a 1″ Pulley 5 fixed on a Crank Handle.

A Bush Wheel locked on the Crank Handle outside the rear 2½″ Strip 2 is fitted with a 2½″ Strip held by a lock-nutted bolt. An Angle Bracket 6 is bolted to the opposite end of the 2½″ Strip, and a 2″ Rod is held in the round hole of the Angle Bracket by two Spring Clips. This Rod is free to slide in an Angle Bracket bolted to Trunnions 7.

A *Magic* Clockwork Motor can be bolted to the base and connected to a ½″ Pulley on the Crank Handle.

Parts required to build model Windmill Pump: 4 of No 2; 4 of No. 5; 8 of No. 12; 1 of No 16; 1 of No. 17; 1 of No. 19s; 4 of No. 22; 1 of No. 23a; 1 of No. 24; 4 of No. 35; 28 of No. 37a; 24 of No. 37b; 3 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 3 of No. 111c; 2 of No. 126; 2 of No. 126a; 1 of No. 155; 2 of No. 189; 1 *Magic* Motor.

Club and Branch News

WITH THE SECRETARY

MODEL DISPLAYS FOR EXHIBITIONS

As soon as a Club has settled down to its winter programme, as it will have done by the time these notes appear, a desire to show what they can do will begin to make itself evident among members. Officials too will share in this feeling, and when this stage is reached it is time to think of Exhibition plans. Just before Christmas is an excellent occasion for a good display and the proceeds of this will give timely help in preparations for a really jolly party in the holiday season.

When an Exhibition has been decided upon two things must always be borne in mind. The first is that there must be something worth exhibiting; the second is that whatever this is it should be shown effectively.

By this time Club Leaders have a very good idea of model-building possibilities, and they will have found in the "*M.M.*" and elsewhere many excellent suggestions for models suitable for Exhibitions. Variety of course is important. Large working models of an impressive character must be included, but it is a good plan also to show a few small models that will impress by their very simplicity, and if some of these can be given a humorous effect by an attractive movement so much the better.

Models of the kind usually built for Club Exhibitions are always admired, even when they are just placed in rows along a series of tables, but they are far more effective with some kind of scenic background. In fact, it is often well worth while to plan and build an entire scene to display a special group of models to advantage. What is done must be done well. As much thought and consideration should be given to the surroundings of really good models as to the line-side scenery of a first-class Hornby or Hornby-Dublo Train layout included in the same Exhibition.

I hope that every Club and Branch will be able to hold a good Exhibition before the end of the present year, and that this will be followed later by an equally successful party. Start preparations now.

CLUB NOTES

WATERLOOVILLE AND COWPLAIN (PORTSMOUTH) M.C.—An enjoyable day was spent at Southsea, where a glimpse was obtained of the "*Victory*" in dry dock. Members are busy making models at home for an Exhibition to be held this month. The Club at present is without a room, and the proceeds of the Exhibition will be used to secure one. The "*Queen Elizabeth*" model is still collecting for charitable purposes. Club roll: 10. *Secretary:* A. J. Nicholson, 213, Sultan Road, Buckland, Portsmouth.

HORNSEA M.C.—The usual Club room pursuits are being followed by all sections. Attention has now been turned to Football and excellent games have been enjoyed by members. Club roll: 27. *Secretary:* R. Lancaster, Carlton House, Carlton Avenue, Hornsea.

AUSTRALIA

MAYLANDS (PERTH) M.C. — A discussion on the year's projects has been held. The usual Model-building is now in progress, together with Fretwork, Games and Film Displays. Members have practised the operation of a film projector, and instruction has been given on the installation of lights on models. Club roll: 38. *Secretary:* V. Chester, 16, Kennedy Street, Maylands, Australia.

BRANCH NEWS

STROUD—Members enjoyed Games and Refreshments at the second Birthday Party of the Branch. The tea was kindly served by Mrs. Wotton and Mrs. Hargest. Track Meetings continue to be successful, and the Branch has certainly made excellent progress during the last year. The successful Exhibition in May gave evidence of this and of the interest shown by parents and friends. *Secretary:* D. Hargest, 6, Folly Lane, Stroud.



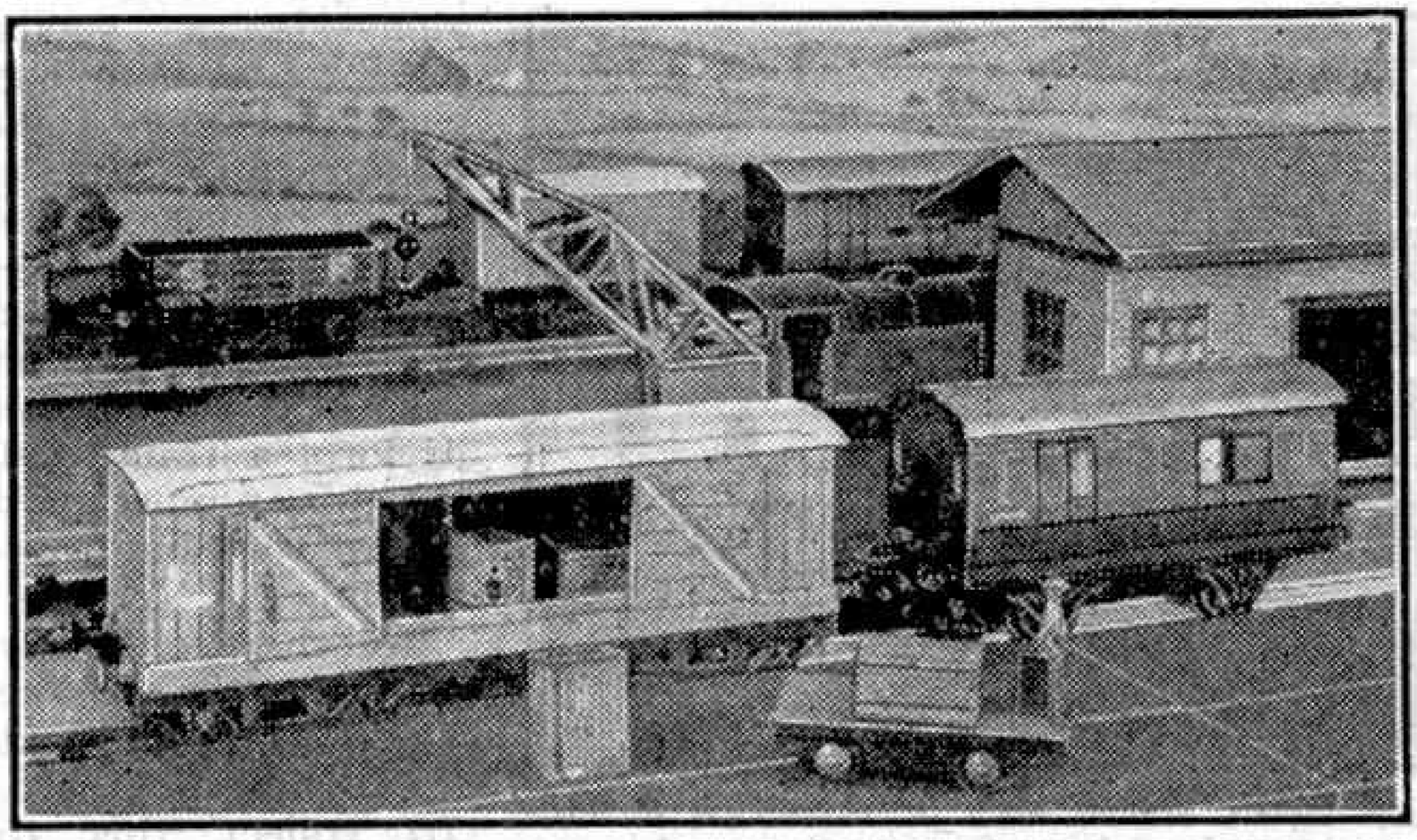
Members of the Brighton (Victoria, Australia) M.C., Leader, Mr. A. K. Ballantyne. Our photograph was taken during a visit to Essendon Aerodrome, and J. Stamp, secretary, is seen on the right. The Club was affiliated in January of this year and has made rapid progress in Meccano Model-building, while operations on a Hornby-Dublo layout add greatly to the interest of the meetings.

HASLEMERE AND GODALMING—Outstanding events have included a Film Show and a Jumble Sale. A special outing to London to see the Model Engineers' Exhibition was thoroughly enjoyed by members, who were especially interested in the various model railways, and a radio-controlled amphibious vessel. *Secretary:* T. Ash, Lower Birtley Farm, Grayswood, Surrey.

MAGDALEN COLLEGE SCHOOL (OXFORD)—The most recent Exhibition of this Branch was very successful. Special arrangements were made to provide the Hornby Train layout with an attractive background and realistic scenery, which included a lake. Operations were strictly to timetable. The gaps between the benches are to be bridged and more lengths of track will be laid down on lengths of wood to facilitate building and dismantling on Track Nights. *Secretary:* R. A. Bowen, 33, Richmond Road, Oxford.

Loading Hornby Goods Trains

AFTER a Hornby Train owner has become used to the running of his train and begun to develop his railway and the operations carried out on it, one of the first things he does, usually, is to provide loads of some sort for his goods wagons.



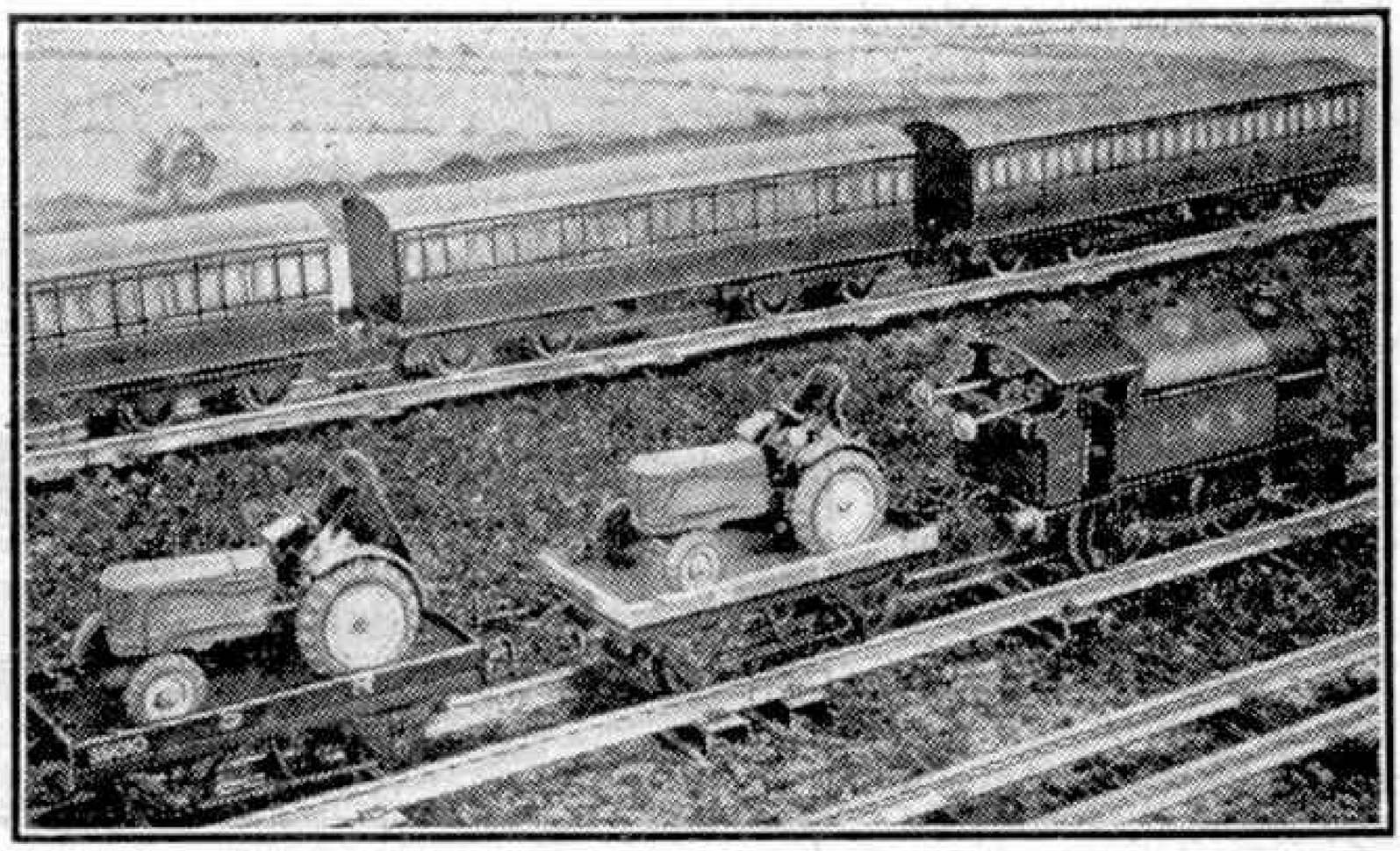
Parcels traffic in full swing. A Dinky Toys B.E.V. Electric Truck is a useful vehicle on a Hornby railway platform.

The simplest loads for ordinary open Wagons are found in quite common articles such as empty matchboxes, cotton reels and various similar things that can be found in every household. These can be used as they are, or ingenious boys can convert them with the aid of a little glue, card or wood strips and paint, into quite respectable cases, crates, drums and so on. Goods of this kind look well in wagons, or they can be loaded into Hornby Vans which have sliding or opening doors that make this possible. In addition a varied collection of such merchandise gives a fine busy look to the goods platform or loading bank.

These loads have the advantage of lightness so that they do not have any noticeable effect on the running of the engine. The power of clockwork engines is restricted, so we must arrange our loads accordingly. Many younger boys do tend to overload their wagons, particularly by filling them up with materials like small stones or sand; or even, on special occasions, with coal. Another point is that if a wagon filled with any of these loose materials is overturned, there is liable to be domestic trouble!

Such materials can be used in the form of a thin layer fixed in position. Cut and bend to shape a false bottom of card, something like the lid of a box, to fit inside each open wagon. The top surface of this "lid" should be coated with glue, and then have sand or stones, or other materials, sprinkled on. When the glue has set, the loose material should be removed.

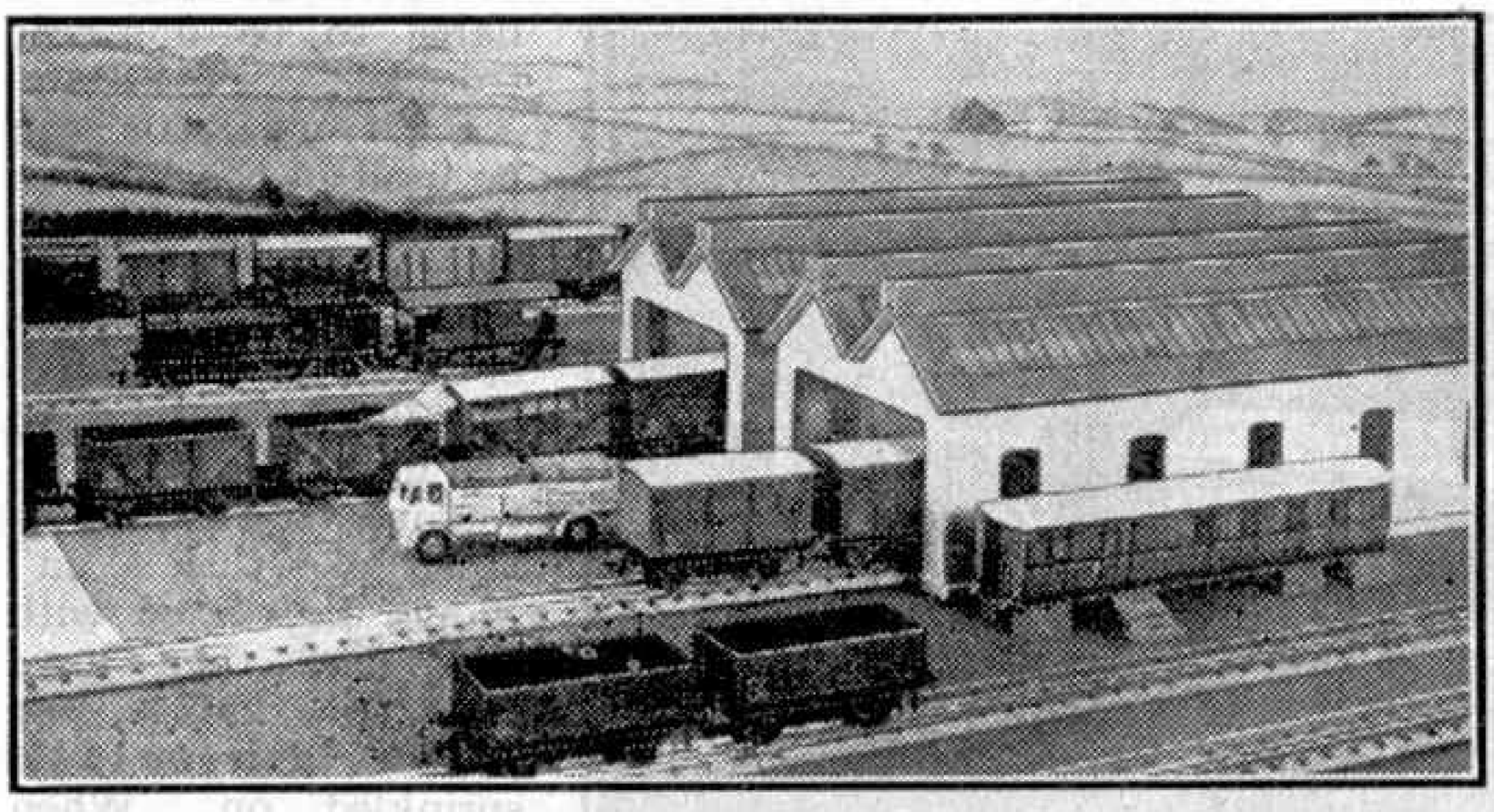
Good use can be made of various Meccano Dinky Toys for loads, as well as for their normal use alongside the railway. The lower illustration shows part of a consignment, in miniature, of Massey-Harris Tractors loaded on Hornby Flat Trucks. The upper picture shows an interesting use of the B.E.V. Electric Truck, which is a handy vehicle for either goods or passenger station work.



Dinky Toys Massey-Harris Tractors ready for their journey on a Hornby railway. The Hornby Flat Truck is ideal for such loads.

Engine Control in Hornby-Dublo

MANY owners of Hornby-Dublo Train Sets do not realise how much more fun is to be gained from the operation of a train when they have learned to control their engine movements. Operation of a Hornby-Dublo train is so simple that the owner of a new set is usually content to assemble his train on the track by pushing the engine and vehicles together, so that the couplings engage automatically as they are designed to do. Whether this operation is carried out gently or otherwise, the result is the same. The wagons are coupled together and the train is ready to go.

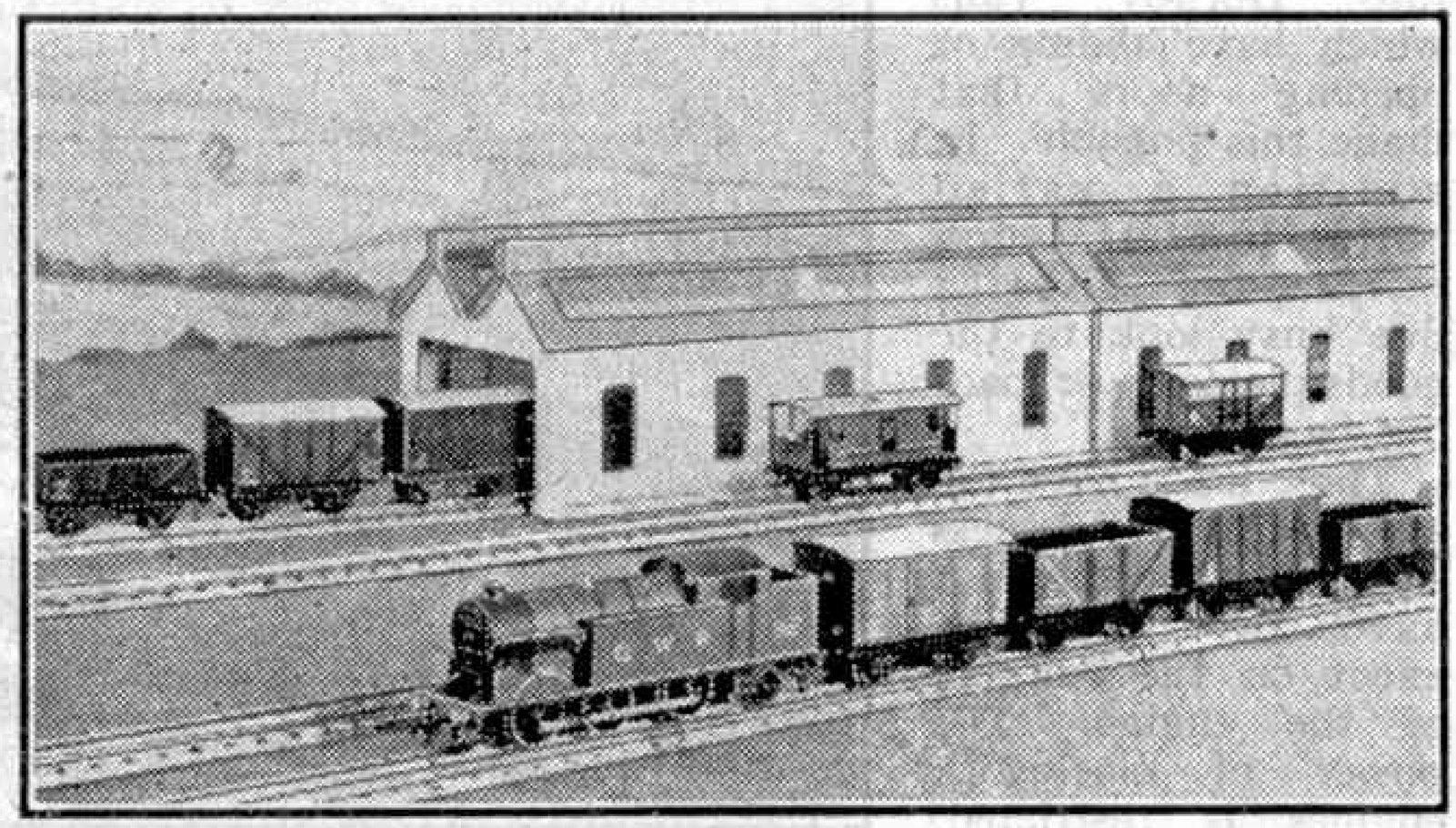


A goods yard on a Hornby-Dublo layout. Similar sheds or warehouses to those shown in these pictures can be made at home from wood or card.

It will be found much more fun to put the vehicles on the track and to back the engine on to them so that they are coupled one at a time; first the Wagon, then the Van and finally the Brake Van. With practice in handling the Controller, it will be found possible to bring the engine up to the first vehicle and couple up without touching the next one, even when the two are standing close together. It is, in fact, quite interesting to see how closely the vehicles can stand and yet still be coupled separately. A nice touch on the Controller handle makes a great deal of difference.

The improvement in operation that results from this kind of working can be of really practical use when we come to carry out more involved operations on an extended track layout. There will, perhaps, be a Van alongside a goods platform, or standing with a Dinky Toys motor lorry drawn up by it as if the load is being transshipped. A Wagon near to it is to be taken by the engine to form a train, and the driver must pick it up without disturbing the Van.

Another possibility is that the Brake Van is standing next to the Buffer Stop. To collect this to complete the train, the driver must check his engine at the right moment so that, as the engine stops, the end Wagon just couples to the Brake Van, and no more; otherwise the Van will be bumped against the Buffer Stop, which is bad operating. Similarly clean working in passenger train assembly is just as necessary. Although there are no passengers' feelings to be considered, there is no reason why Hornby-Dublo Coaches should not be put together as gently as real ones!

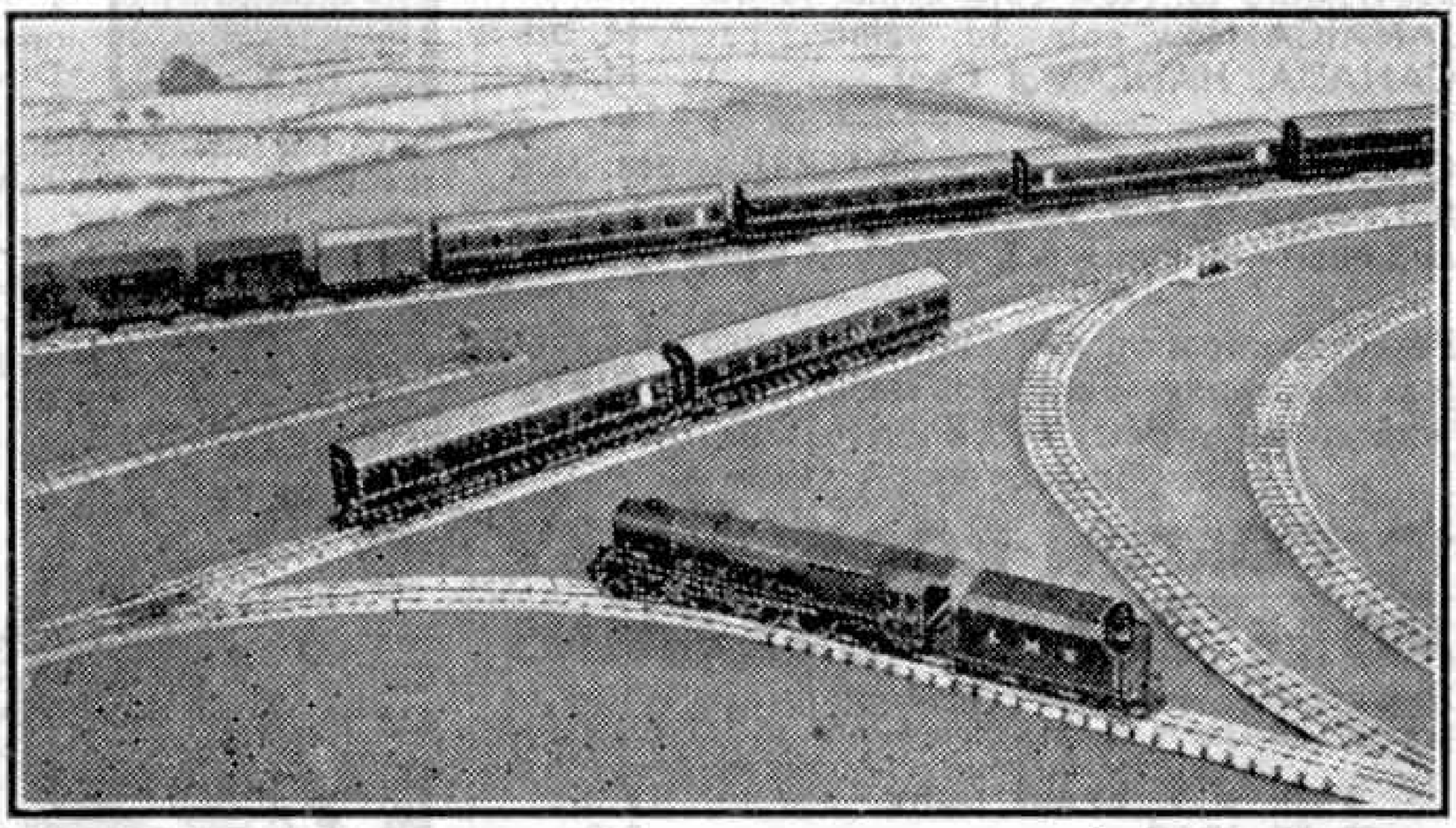


A goods train made up and ready to go, with a Hornby-Dublo standard 0-6-2 Tank Locomotive at its head.

A Junction Scheme in Hornby-Dublo

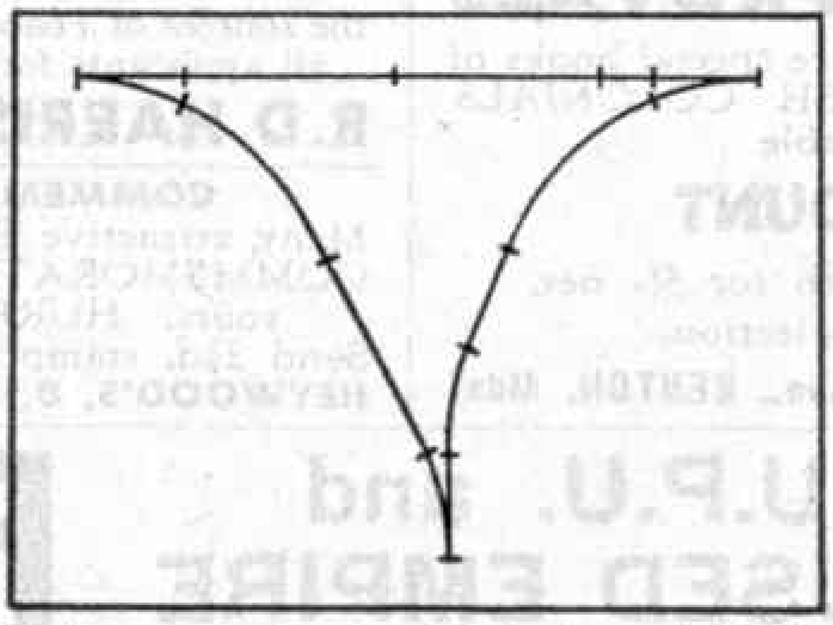
A JUNCTION layout that has various interesting possibilities is the subject of the picture and diagram on this page. It can form part of almost any system where there is a fair amount of space. It requires three sets of Points in its construction and exact details of its layout will be apparent from the diagram.

Many such layouts are found in actual practice, some of them being completely double-tracked. A special advantage of the three-sided or triangular junction is that it can be used to connect a main line with a branch in such a way that traffic in either direction on the main line can pass straight on to the branch. The branch line may lead to a station, perhaps; or an engine depot, or possibly a goods yard. Thus trains leaving the station or yard can reach the main line and proceed on their way without the need for any "running round" to get the engine at the right end of the train.



The Hornby-Dublo "Duchess of Atholl" being worked round the triangular junction described on this page. Its Coaches are standing clear of the main line Points.

In the diagram we will assume that the straight length of track at the top of the illustration forms part of the main line. Working in a clockwise direction, the R.H. Points in the left-hand corner are followed by two Straight Rails and a Straight Quarter Rail before the trailing end of the L.H. Points is reached. Beyond these Points, in the right-hand corner of the diagram, the main line can continue as before. The curved branch of these Points leads to a Curved Rail, then comes a Straight Half Rail and a Curved Half Rail, the latter being attached to the trailing end of the straight member of the L.H. Points in the bottom centre of the diagram. Between the curved branch of these and the curved branch of the Points where we started come a Straight Rail and a Curved Rail, in that order. Those who use this layout will find that it is not quite perfect geometrically, but it can be fitted together sufficiently well for practical purposes.



Rails required: 2 EDA1 Curved Rails, 1 EDA1½ Curved Half Rail, 3 EDB1 Straight Rails, 1 EDB1½ Straight Half Rail, 1 EDB1¼ Straight Quarter Rail, 1 EDPR Points (R.H.), 2 EDPL Points (L.H.).

Apart from its use in making traffic flow more easily to and from the branch line, which we will suppose is attached to the Points that directly face the reader of this page, the triangular junction is specially useful when operations require an engine or complete train to be turned round. To turn an engine, the train heads along the straight part of the triangle and stops so that the coaches are clear of the Points, as they are in the photograph. The engine is detached and runs forward clear of the switch rails. Then by working it round the other two sides of the triangle, the engine is turned and we are able to back it on to the opposite end of the train ready for the return journey.

An engine can only be run round if its train can stand between any two Points, but trains of any length can be turned complete.

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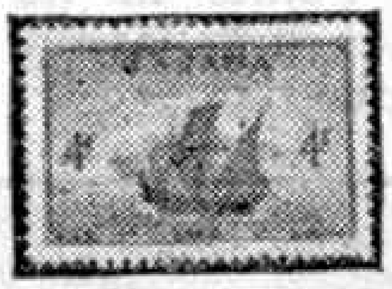
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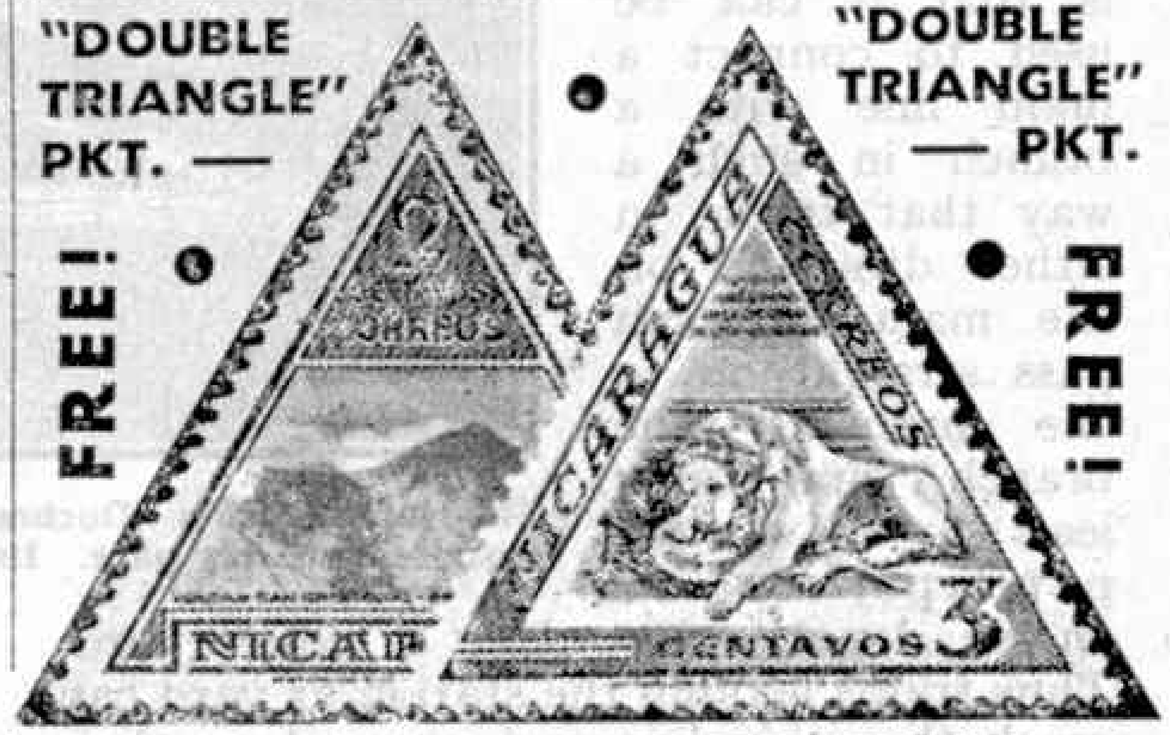
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For other Stamp Advertisements see also pages 442 and xi.

Stamp Collecting

India's New Issue

By F. Riley, B.Sc.

ONE of the most interesting of recent events in the stamp world is the appearance of India's first definitive issue. Apart from commemoratives and other special stamps, India so far has continued to make use of the King George VI series. These will be replaced by the new stamps, but will not be withdrawn. They will remain on sale until stocks are exhausted.

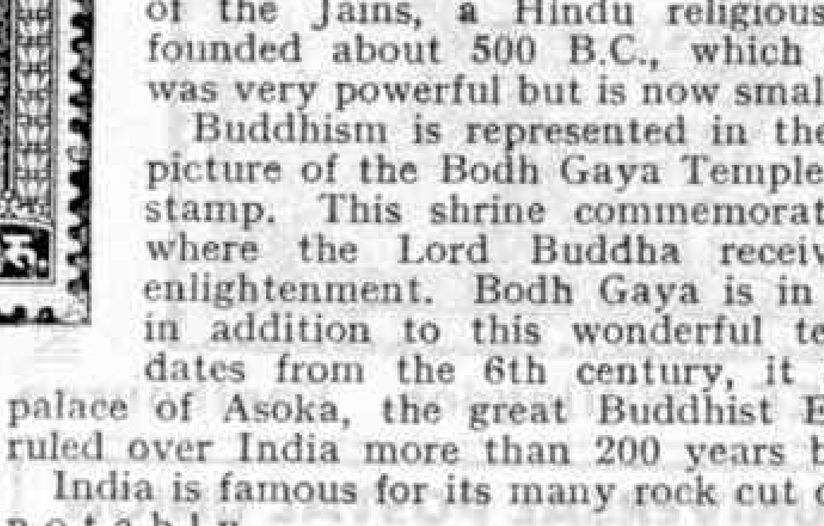
The new stamps also celebrate the second anniversary of India's independence. There are 16 of them, with values ranging from 3 pies to 15 rupees. The four highest values, of 2, 5, 10 and 15 rupees respectively, are printed by offset lithography and have borders in a second colour. The 12 lower values are produced by the letterpress process. All are being printed in India on paper with the multiple star water mark. They carry the words "*India*" and "*Postage*," and the values are inserted in two languages, English and Hindi.



The designs chosen for this long new issue depict subjects of archæological and historical interest. These include many remarkable sculptures, but most of them are great buildings that give a wonderfully vivid impression of the magnificent architecture of India through the ages. The 5r. value reproduced on this page provides a good example in a reproduction of what is regarded as one of the world's greatest wonders. This is the Taj Mahal at Agra, a famous Indian city on the Jumna, which flows into the Ganges. It was built by the Emperor Shahjehan about 300 years ago as a mausoleum for his wife Mumtaz Mahal, and he himself is also buried in it. The mausoleum is of white marble, standing on a platform of red sandstone overlooking the river, and it rises gracefully to a height of nearly 200 ft. It is surrounded by gardens, and sunlight penetrates into its interior through delicately carved lace-like screens of marble, while semi-precious stones are let into its walls.



Shahjehan was one of India's most famous Mohammedan Emperors and his reign is noted for the many great buildings erected in it. Another of these, illustrated on the 2r. value of India's new issue, is the great Red Fort at Delhi. An earlier monument in that ancient and famous city is shown on the 10r. stamp. This is the Qutb Minar, a great five-balconied tower of sandstone, erected six centuries ago, that rises to a height of 238 ft. Its colour ranges from red in the lower portion through pink to orange at the apex, and the tower has been described as the most perfect in the world.



Just as the great cathedrals of Europe bring us visions of the past, so in India great temples illustrate the magnificence of Indian religious architecture of former centuries. There are five of these wonderful structures among the designs of the new series. One of them is the Golden Temple of Amritsar on the 12 anna value, shown here. This temple was built nearly 400 years ago, and was rebuilt in 1776. Another is the Satrunjaya Temple, an ornate shrine in Palitana, one of the many temple cities of Western India. It is one of the sacred places of the Jains, a Hindu religious community founded about 500 B.C., which at one time was very powerful but is now small in numbers.

Buddhism is represented in the series by a picture of the Bodh Gaya Temple on the 3½ a. stamp. This shrine commemorates the place where the Lord Buddha received supreme enlightenment. Bodh Gaya is in Bengal, and in addition to this wonderful temple, which dates from the 6th century, it also has the palace of Asoka, the great Buddhist Emperor who ruled over India more than 200 years before Christ.

India is famous for its many rock cut cave temples, notably those in Ajanta and on Elephanta island. Ajanta is in Hyderabad, and its wall paintings are of very high standard and have preserved a wonderful record of Buddhism throughout eight centuries. from 200 B.C. to A.D. 600. The caves are represented in the new Indian series by the design of the 3 p. value, which shows a panel of one of the pillars, the outstanding feature of which is a wonderfully vivid representation of an elephant. Elephanta is an island in Bombay Harbour, and its name commemorates a stone elephant that formerly stood near the landing place. The art of the rock cut caves of the island is illustrated on the 9 p. value by a design showing a colossal image representing S'iva, the third person of the Trimurti, the trinity of Hinduism.





It is of course impossible to illustrate on this page all the stamps in this very fine series, but those shown will give readers some idea of its attractions. The stamps will certainly form a splendid addition to any collection. Owing to the inclusion of four high values the full set is of course somewhat expensive, but there should be ample supplies of used copies, as was pointed out last month in "*Stamp Gossip*," and every reader is strongly advised to make an effort to get as representative a set as he can.



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For other Stamp Advertisements see also pages 440 and xi.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

WHEN in May 1940 Great Britain commemorated the centenary of the "Penny Black," the country itself was too occupied by the war to do much in the way of celebrating. The authorities did provide a set of stamps, and while the single design used could hardly have been more moderate, that set of stamps was the forerunner of countless emissions which will go on appearing for many years yet, as our own country was well ahead of the rest of the world.

Of course there have been claims from time to time that our "Penny Black" was not the first postage stamp at all, but nobody seems to take much notice, and all the world still gives pride of place to our own effort.

Belgium, among other countries, has celebrated its postal centenary this year. The stamps of this country used to be very popular in Great Britain, but collectors got so tired of the numerous issues, particularly as some of them were of high face value, that most of them ceased to take any further interest in them. It's rather a pity, for many were very beautiful, but the postal authorities have only themselves to blame.



It was mentioned on one occasion how ordinary were most of the modern stamps of Argentina. Well, this country has excelled itself, for recently it issued a single stamp, to commemorate the taking of the National Constitution Oath, that was a real handsome affair indeed, and thereby showed that it can produce stamps worthy of the old "Rivadavias" when it pleases.

Most Argentina stamps which come out from time to time are quite easily obtained, used—it is not possible to import them mint except by barter—and collectors looking for a new country to work on might do worse than tackle this great republic, starting the collection say about 1920.

Collectors of KG. VI issues of course won't have time to think about taking up new countries just now, for they are up to the eyes in it with the numerous "U.P.U." issues. But just as a change they might consider buying a few sets of these same issues which are being emitted by countries outside the Commonwealth. All are quite attractive.

There is the investment angle also to consider. These "U.P.U." issues are of universal interest and in time no doubt will become quite valuable in a moderate sort of way. At any rate, they'll easily pay for their keep at least, which is more than one can claim for most other things that one buys for pleasure.

A collector asks why the writer of these notes rarely mentions Russian stamps. Well, to be candid, the real reason is that most of these are hardly



stamps at all as far as postal use is concerned. That more or less applies similarly to many modern stamps, but Russian stamps differ from all of these in one important particular—the Government holds the plates and apparently goes on printing further supplies as needed. In other words, these stamps have no chance of increasing in value, and however attractive a collection may be, its resale value has to be considered by most of us. These modern Russian stamps sell very badly indeed, so if we must spend money on stamps—and we get precious few without—it will have to be on those which by their appreciation in value enable us to sell them when we want to, at not too great a loss.

It was quite a shock to collectors of Egypt, Iraq, Transjordan and Burma when Gibbons announced that, in future, stamps which these countries issued while outside the Empire would be placed in the foreign section of their catalogue. Many thought that this would cause a slump in values, but apparently there has been very little of this, and more than one dealer has said that little difference has been noted.

The modern collector does think a good deal more for himself than did the old timer. There can be no question about the truth of that. For instance, the old collector was generally completely guided as far as buying prices were concerned by what the catalogue quoted. Many refused to pay more than one half or even one third of marked prices, but all that is gone by the board now. Many stamps cost more than the catalogue quotation, and the dealer of to-day refuses even to consider what the catalogue might say, which of course is only logical. Anyhow the point is that the stamps of the countries recently removed from the colonial section of the catalogue are going along almost as if nothing had happened, and without a doubt collectors are all the better for exercising their freedom.



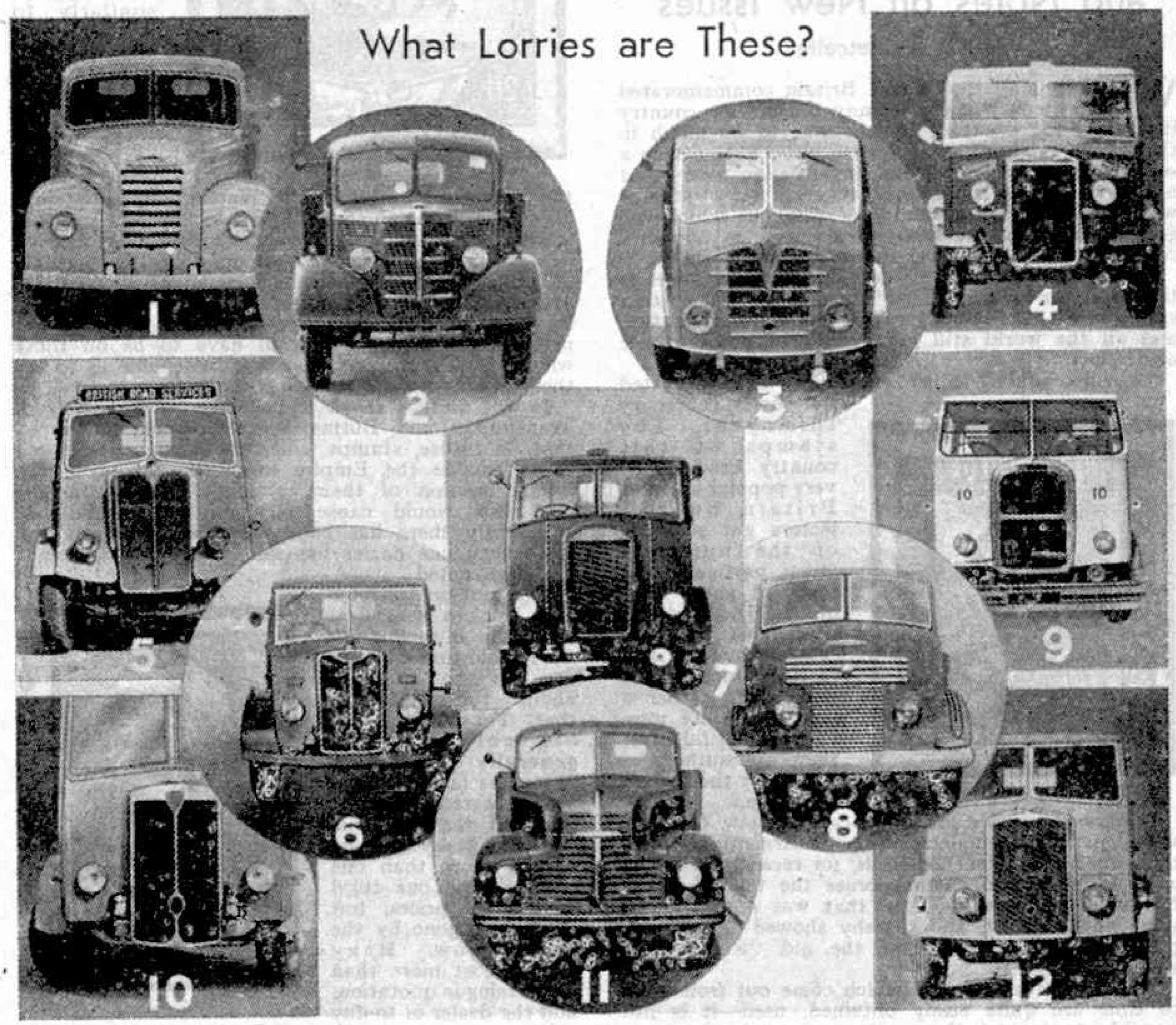
It would have been a pity to drop such colourful countries as Egypt and Burma, and as far as the latter country is concerned, maybe it will return to the Commonwealth at no distant future. What will Gibbons do about it then?

Our last illustration this month is of a finely engraved stamp from Hungary. Three stamps were issued recently to commemorate the death of their great poet and patriot Sandor Petoñ. It is not often that Hungary departs from the photogravure process for the production of its postage stamps, but the result has certainly justified the change. Nine million copies of each value have been issued, so used should be plentiful.



Competitions! Open To All Readers

What Lorries are These?



Two of the most successful "*M.M.*" competitions of recent months were those of April and July, in which readers were given photographs of the front and rear of well-known makes of motor car and asked to identify them. The welcome given to these contests suggested a further one of the same type in which lorries were concerned, and here it is.

On this page are 12 pictures, each of which shows a front view of a well-known make of British motor lorry. The names carried by some of these have been removed or obscured, to avoid making the contest too easy! Apart from this no change whatever has been made, so that readers should be able to recognise the makes by the characteristic radiators and other details. What they are asked to do is to send in a list giving the number of the pictures, and the names of the corresponding lorries and of the firms making them. Care must be taken to give sufficient information to show that in each case the model has been identified completely.

There will be prizes of 21/-, 15/- and 10/6 for the three best entries in order of merit, and in the event of a tie the judges will take neatness and novelty into consideration. There will be a separate section for overseas readers, with prizes of the same value, and in both sections Consolation Prizes also will be awarded. Entries must be addressed "*Lorry Faces Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 31st December; Overseas Section, 31st March 1950.

November Photographic Contest

The eleventh of our 1949 series of photographic contests is a general one, in which we invite readers to send in prints of any subject. There are only two conditions—1, that the photograph must have been taken by the competitor; and 2, that on the back of each print must be stated exactly what the photograph represents.

The competition will be in two sections, A, for readers aged 16 and over, and B, for those under 16. Each competitor must state in which section his photograph is entered. There will be separate Overseas sections.

In each section prizes of 21/-, 15/- and 10/6 will be awarded. Entries should be addressed "*November Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 30th November 1949; Overseas, 28th February 1950.

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd.

Competition Results and Solutions

OVERSEAS

MARCH 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: P. H. Brett, Christchurch, N.Z.; Section B: C. G. C. Cotesly, Cape Town, S.A. 2nd Prize, Section A: Miss E. F. Neilson, South Canterbury, N.Z.; Section B: D. Hicks, Minden, B.A.O.R. 3rd Prize, Section A: J. C. Carter, Stellenbosch, S. Africa; Section B: G. S. Shiroor, Bombay 7, India. Consolation Prizes: R. Thom, Broken Hill S. Africa; H. Arnold, Dublin, Eire; G. Ditchfield, Dunedin, N.Z.; R. M. Cox, Tauranga, N.Z.; S. P. Scott, Johannesburg, S. Africa; P. Keely, Dublin, Eire; P. Mathias, Sliema, Malta G.C.; A. Martley, Wynberg, S. Africa; C. Formby, Johannesburg, S. Africa.

APRIL 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: D. A. H. Bridson, Dunedin, N.Z.; Section B: M. Walsh, Auckland, N.Z. 2nd Prize, Section A: J. O. Craigie, Sydney, Australia; Section B: R. Rimmer, Cape Town, S. Africa. 3rd Prize, Section A: M. L. McAllister, Victoria, Australia; Section B: E. J. Ellis, Hamilton, N.Z. Consolation Prizes: Miss M. B. Bedlington, Auckland, N.Z.; L. F. Jones, Durban, S. Africa.

APRIL 1949 CAR FACES CONTEST

1st Prize: I. Stephenson, Auckland, N.Z. 2nd Prize: G. Hamilton, Auckland, N.Z. 3rd Prize: R. Kidd, Nairobi, E. Africa. Consolation Prizes: L. Alley, Durban, S. Africa; T. Coulter, Palmerston North, N.Z.

APRIL 1949 AIRCRAFT DRAWING CONTEST

1st Prize: R. J. Garner, Bukuru, B.W.A. 2nd Prize: T. B. M. Chicken, Cape Town, S. Africa 3rd Prize: I. Stephenson, Auckland, N.Z. Consolation Prizes: A. H. Louw, Worcester, S. Africa; I. C. Dyer, Bombay, India; D. Johnston, Dublin, Eire; M. Kennedy, St. George, Bermuda; E. Flores Birkirkara, Malta, G.C.

MAY 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: K. J. Milne, Hastings, N.Z.; Section B: J. Russell, Sarnia, S. Africa. 2nd Prize, Section A: C. B. L. Osborn, Demerara, Br. Guiana. Section B: V. Ayi Jibidar, Achimota, W. Africa. 3rd Prize, Section A: L. F. Jones, Durban, S. Africa; Section B: W. Clare, Bray, Eire. Consolation Prizes: H. Arnold, Dublin, Eire; D. Fennelly, Galway, Eire.

SOLUTIONS

JANUARY 1949 COVER VOTING CONTEST

1st June; 2nd August; 3rd November; 4th October; 5th July; 6th April; 7th December; 8th May; 9th January; 10th September; 11th February; 12th March.

FEBRUARY 1949 STATIONS CONTEST

1. Abbey Wood, Southern Region. 2. Badminton, Western Region. 3. Battle, Southern Region. 4. Forest Gate, Eastern Region. 5. Hook, Southern Region. 6. Hornby, London Midland Region. 7. Marble Arch, London Transport. 8. Maud, Scottish Region. 9. Palace Gates, Eastern Region. 10. Peak Forest, London Midland Region. 11. Banks, London Midland Region. 12. Tram Inn, Western Region.

MARCH 1949 RAILWAY QUIZ

1. London (Marylebone), Aylesbury, Rugby, Leicester, Nottingham, Sheffield and Bradford; E.R. and L.M.R. 2. A push-and-pull train consisting of a locomotive with one or more coaches, so arranged that it can be driven from either end. 3. The G.E.R. 4. A coach wheel in which the body between the boss and the rim is formed of hardwood blocks; South Eastern Railway. 5. 1,484 feet; Druimuachdar Summit, on the Perth-Inverness main line. 6. The assisting engine of a double-headed train; an engine which does station shunting as required and which also assists or even replaces the locomotive of a main line train in the event of engine failure or other emergency; an engine sent on before a train to clear its way. 7. Trains with seats and covered accommodation for third-class passengers, at a prescribed fare, and stopping at every station as compelled by the Railway Regulation Act of 1844. 8. "*The Great Bear*" (G.W.R. 4–6–2 No. 111). 9. Liverpool and Cardiff; at Runcorn and Newport. 10. Cockermouth, Keswick and Penrith Railway.

APRIL 1949 CAR FACES CONTEST

1. Bentley Mark VI Saloon. 2. Vauxhall Velox. 3. Austin, A.40 Devon. 4. Jowett Javelin. 5. Humber Hawk. 6. Hillman Minx. 7. Morris Oxford. 8. Armstrong Siddeley, Lancaster Saloon. 9. Standard Vanguard. 10. Jaguar Mark V Saloon.

MAY 1949 LOCOMOTIVE PARTS CONTEST

1. Cover of outside steam pipe that conveys live steam from superheater to steam chest. 2. Smoke-box door handle; keeps smoke-box door closed and air-tight. 3. Electric headlight; by night these denote class of train. 4. Snifting valve or anti-vacuum valve; allows air to circulate through superheater and cylinders when engine is coasting. 5. Vacuum ejector exhaust pipe; takes exhaust steam and air from ejector into smoke-box. 6. Safety valve; these allow excess steam to escape from boiler. 7. Cab side door; closes entrance between engine and tender. 8. Cylinder drain pipes; take away condensed steam from the cylinders. 9. Cap over cylinder cover and studs. 10. Connecting rod; transmits motion of piston to driving wheels. 11. Radius rod, transmits motion of expansion link to valve spindle. 12. Filler through which the sandbox is fed with sand.

JUNE 1949 RAILWAY STORY CONTEST

Euston; 45700 "*Britannia*"; Rugby; Nuneaton; Stafford; Preston; 46762; Wirral Railway; 45504 "*Royal Signals*"; Blackpool; 50455; "Dreadnoughts"; 46110 "*Grenadier Guardsman*"; 45562 "*Alberta*."



June 1949 Crossword Puzzle Solution.

Fireside Fun

"Yes, Old Brown looks prosperous, but I'll bet he has only half a shirt to his back."
"Oh surely not! What makes you say that?"
"Well, isn't the other half in front?"

* * * *



"What's the new addition outside?"
"It's a sundial."
"What's it for?"
"For telling the time."
"My! What'll they think of next!"

* * * *

Irate motorist: "I say, how long will this confounded train be?"
Crossing keeper: "Engine and six coaches, sir."

* * * *

"Coal is funny stuff, isn't it?"
"Why?"
"When you buy it it goes to the cellar."

* * * *

"Here, hide in this cupboard quick. If you are discovered you are lost."
"Silly! If I am discovered I am found, aren't I?"

* * * *

"My grandfather is 85 to-day. He's a wonderful man."
"He ought to be. He's been practising a long time."

* * * *



"I don't think much of him Dad. He's missed her again."

* * * *

"You've failed in your exam. again, Cuthbert, and I am sure you know enough to get through. Why don't you pass?"
"What's the use? When I pass it, you'll all make me work for another one."

BRAIN TEASERS

COLOURS FOR PETS

A man bought nine chickens, one for each member of his family. To distinguish them it was decided to fix coloured rings to their legs, with no more than one ring to each leg. What is the least number of colours needed? D.J.C. and D.M.C.

* * * *

A QUICK ONE

The following are clues to 10 words of three letters each, which differ only in their first letters. What are the words?

1, Prohibition; 2, Tin; 3, Name; 4, Cooler; 5, Human being; 6, Utensil; 7, Hastened; 8, Colour; 9, Vehicle; 10, Pale. S.W.C.

* * * *

D N G R

A printed notice with the above heading was seen outside a ruined house. The notice itself was as follows: NYBDYWSHNGTNTRDSSTHSWNRSK.
The printer apparently had no vowels or stops. What was the notice intended to say? B.I.N.

* * * *



"Tell your boss Hiram Johnson is here, and wants to see him at once."
"H'm. That's awkward."
"What do you mean, awkward?"
"He told me to throw you out when you came."

* * * *

WHICH WOULD YOU CHOOSE?

An office boy was being engaged at a salary of £50 a year. His employer said he would give him a rise of £5 every half year, or one of £20 every year, whichever he chose. The boy immediately elected to have a rise of £20 a year. Was he right?

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The six words forming the square of our first puzzle last month are CIRCLE, INURES, RUDEST, CREASE, LESSEE and ESTEEM. If these are written in square form it will be found that the columns give the same words as the rows. There may be other solutions, and readers who found them should send them in.

Of the two runners in our second puzzle Dick was the winner.

A round peg can be fitted into a square hole, each side measuring $\frac{1}{2}$ in., if the diameter of the peg is $\frac{1}{2}$ in. and it is $\frac{1}{8}$ in. in length. The trick is to insert it sideways.

The number of passengers who were in the bus to begin with in our fourth puzzle was 32.

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Entries must be sent to the COMPETITION DEPT., JOHNSONS OF HENDON LTD., HENDON WAY, LONDON N.W.4, and, for the Winter Competition, must reach there before DECEMBER 31st. Entries arriving after this date will be entered for the 1950 summer competition. A title panel from the wrapping of any Johnson chemical must be pasted on the back of each picture. You may send in as many entries as you like. No print should be smaller than 2¼ x 3¼ in. Prints should be mounted as they are then less likely to get damaged. Any camera may be used and the prints may be of any process, but you should have done the work yourself with Johnson Chemicals. Prints which win prizes are to become the property of JOHNSONS OF HENDON LTD. The negative remains the property of the competitor. NEGATIVES SHOULD NOT BE SENT WITH ENTRIES. Write full name and address in block capitals on the back of each mount. Details of film and developer used should be given. If the photographs are to be returned, you must send sufficient postage stamps (loosely attached) to cover the return postage. No correspondence should be enclosed with entries as the packages will not be opened until after 31st Dec. The decision of Johnsons of Hendon is final.

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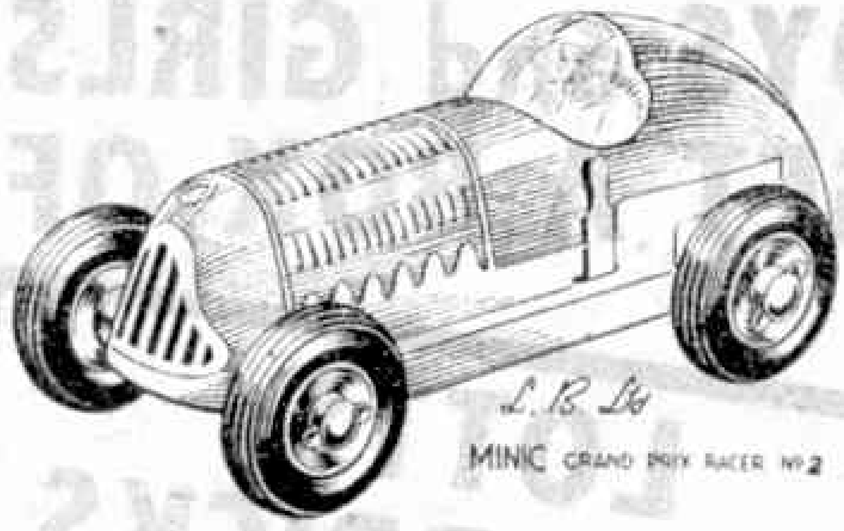
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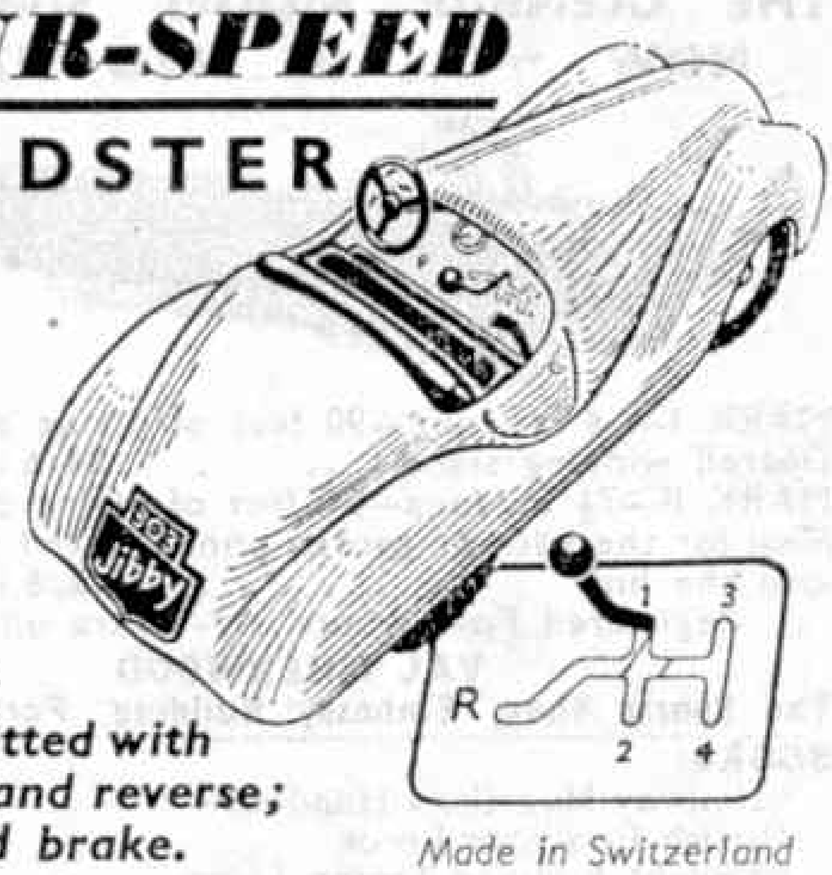
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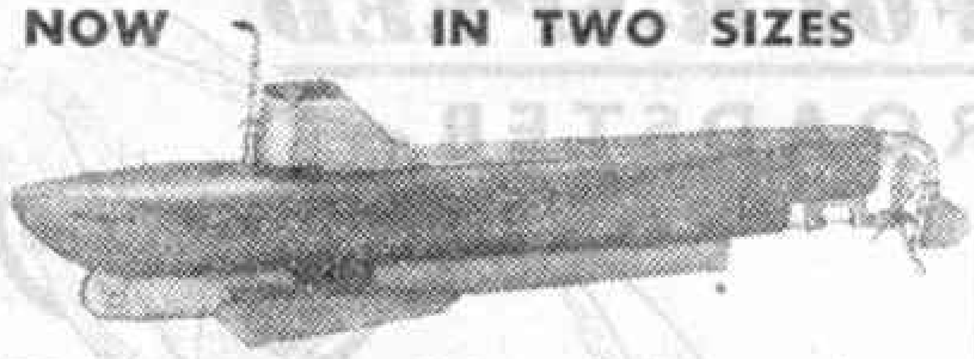


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Trix Twin large Layout, including Four Locos., Single and Double Transformers, 12 Goods Wagons, Nine Passenger Coaches, 125 Rails, Four Pairs Points, etc. Would separate. What offers.—Fisher, 7, Studley Drive, Ilford, Essex, "Valentine 2548."

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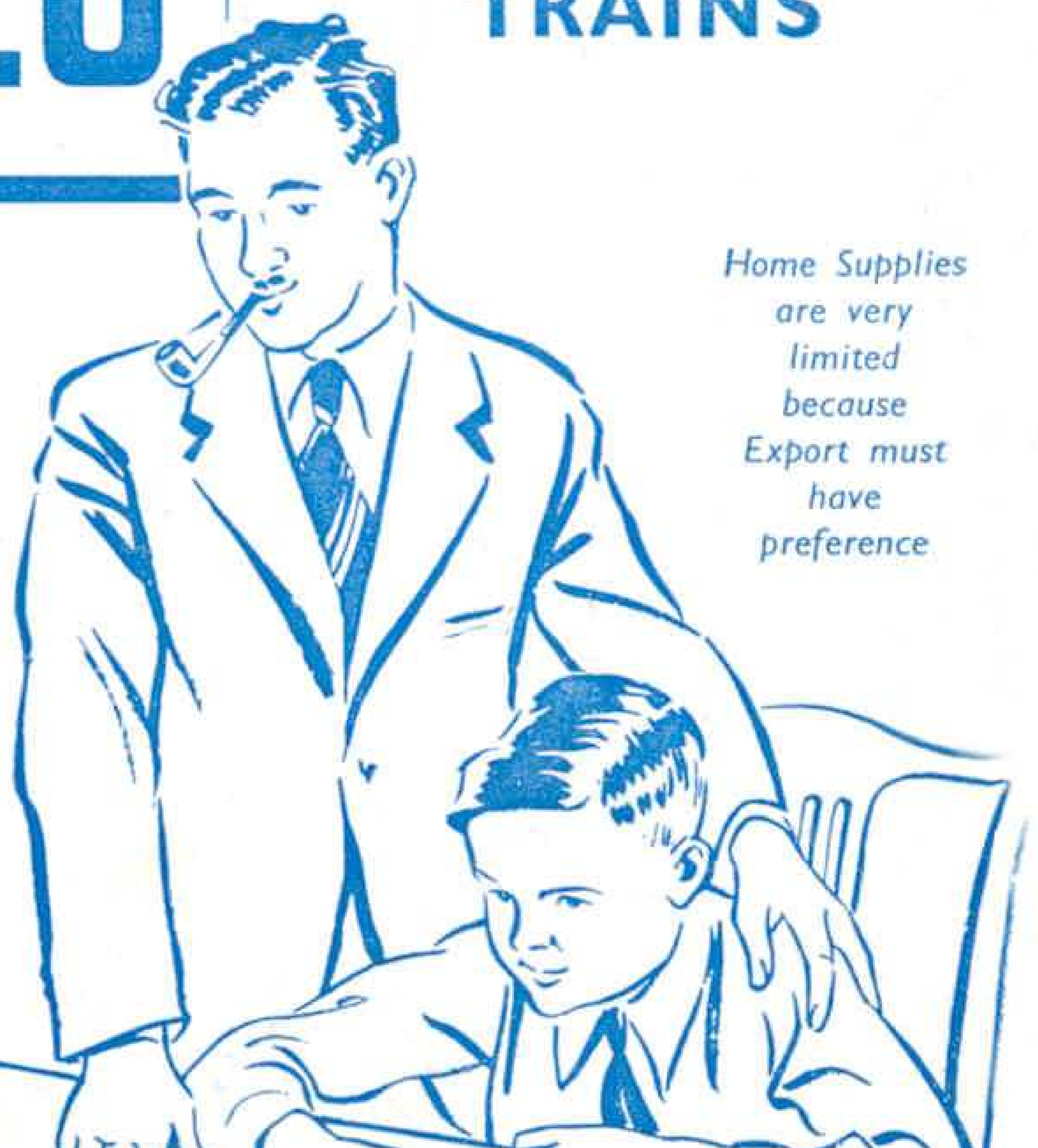
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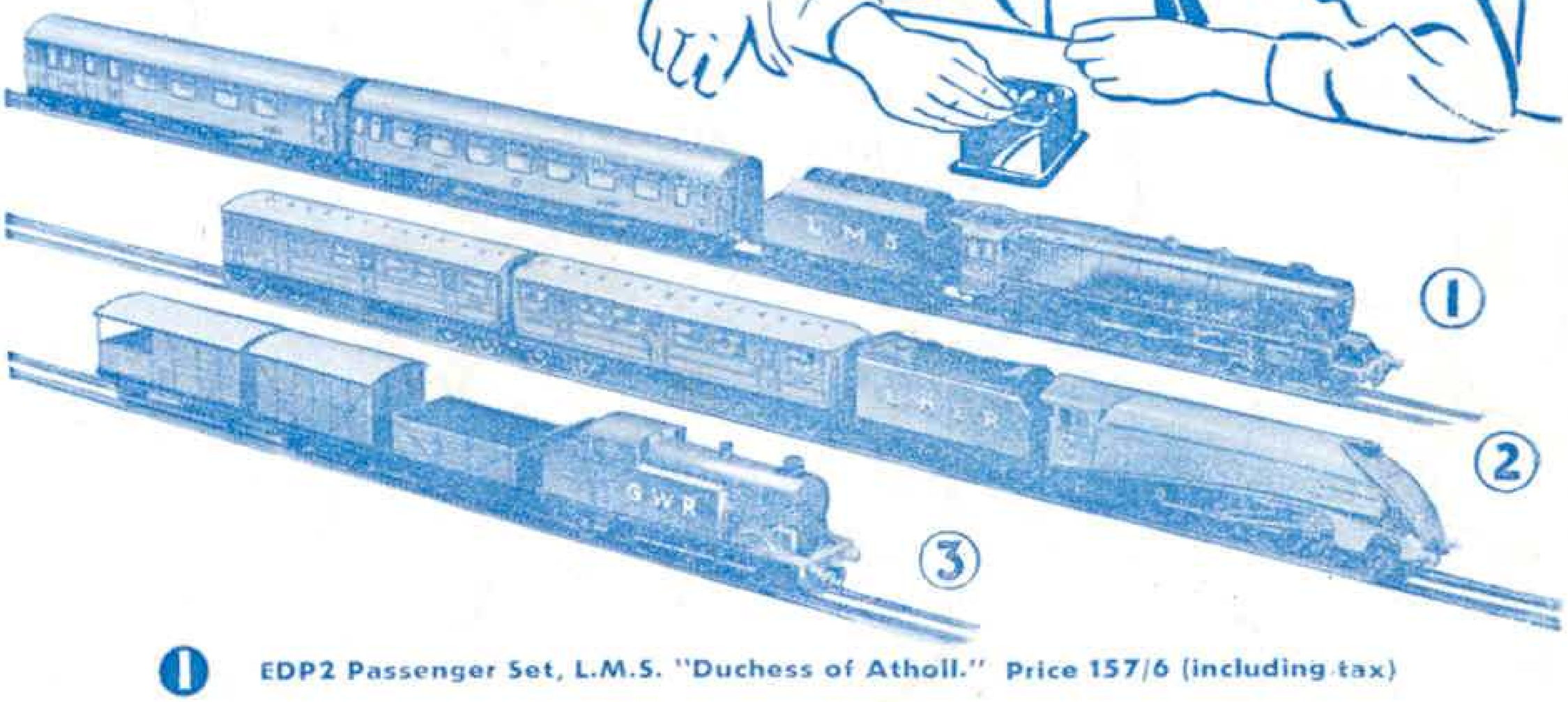


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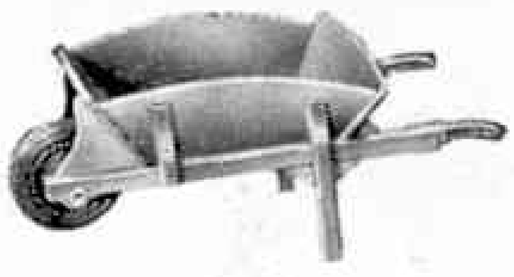
VOL. XXXIV. No. 12 DECEMBER 1949

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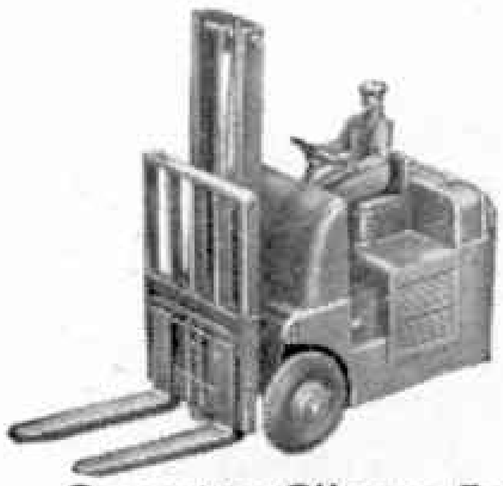
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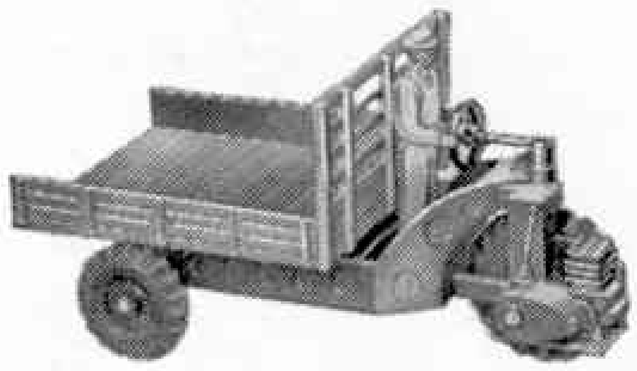
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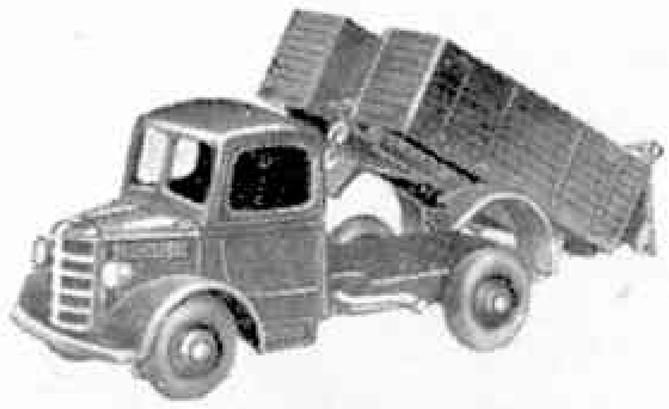
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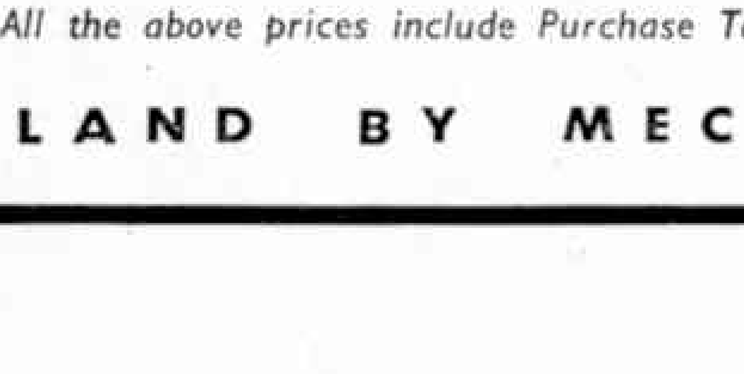
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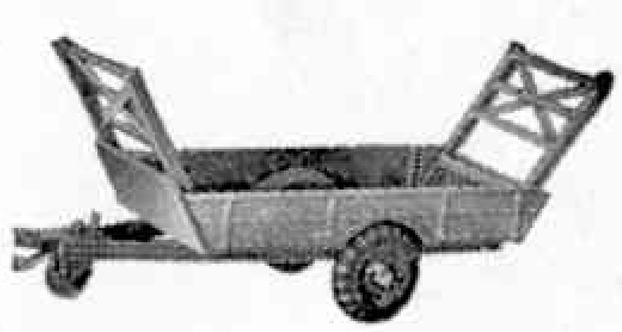
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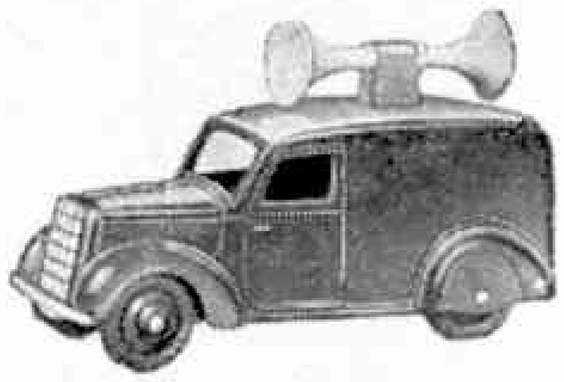
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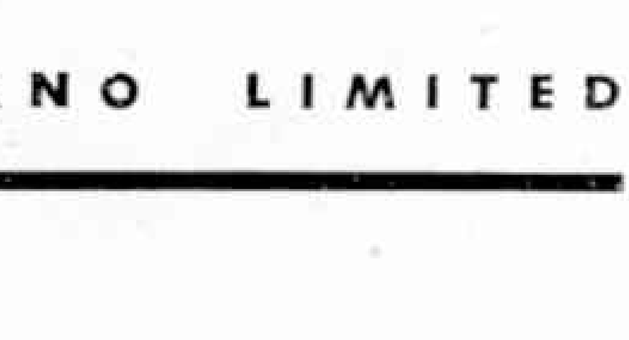
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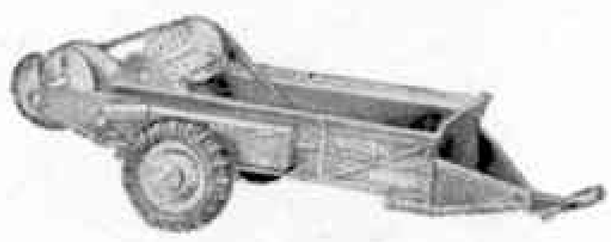
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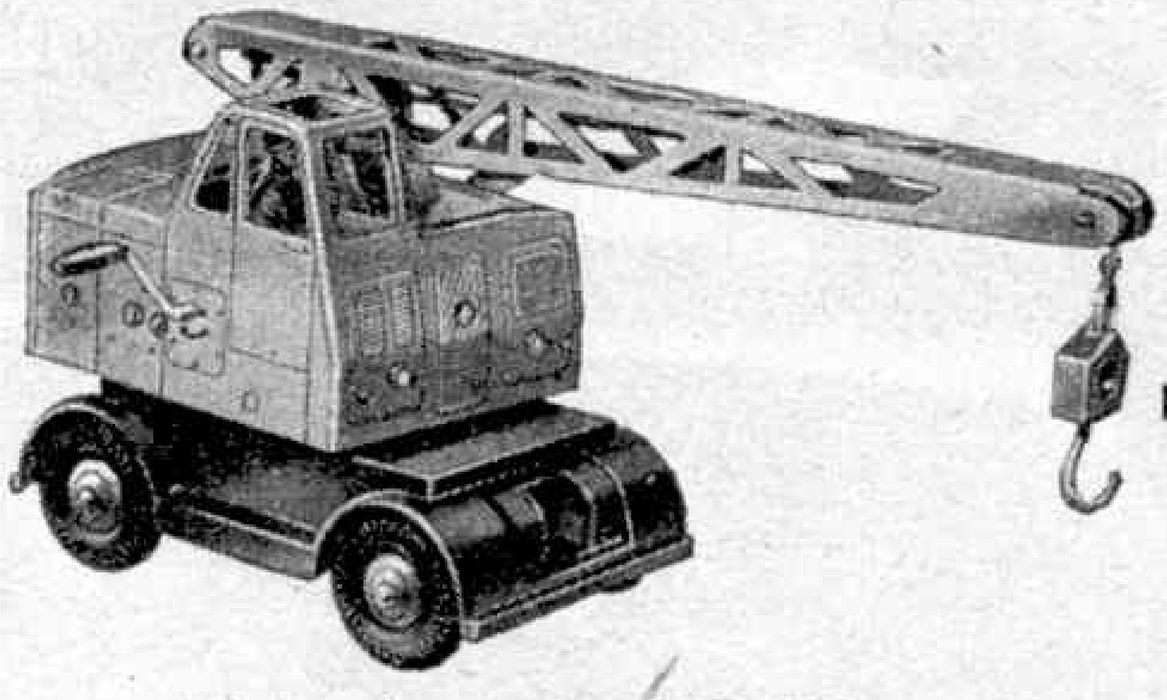


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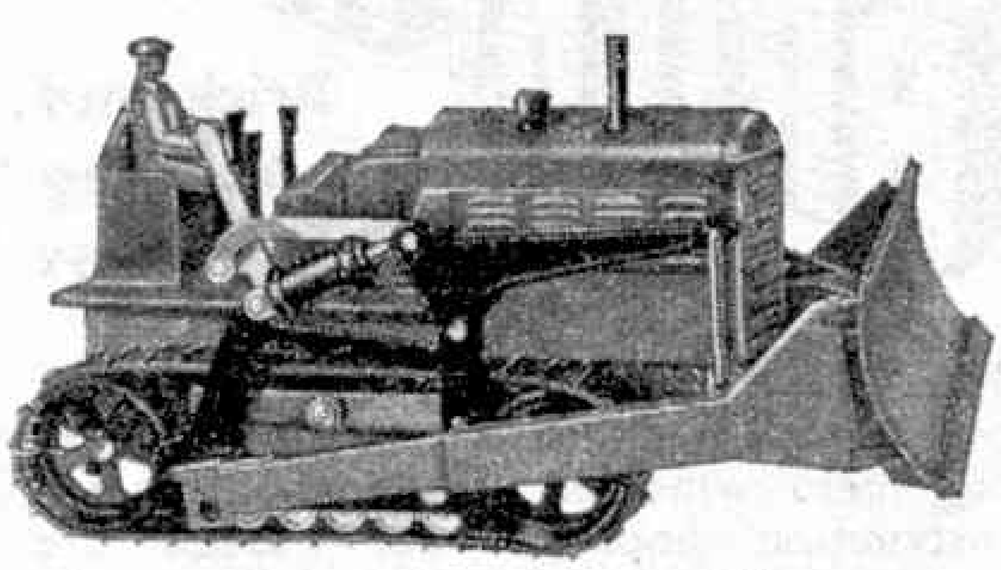
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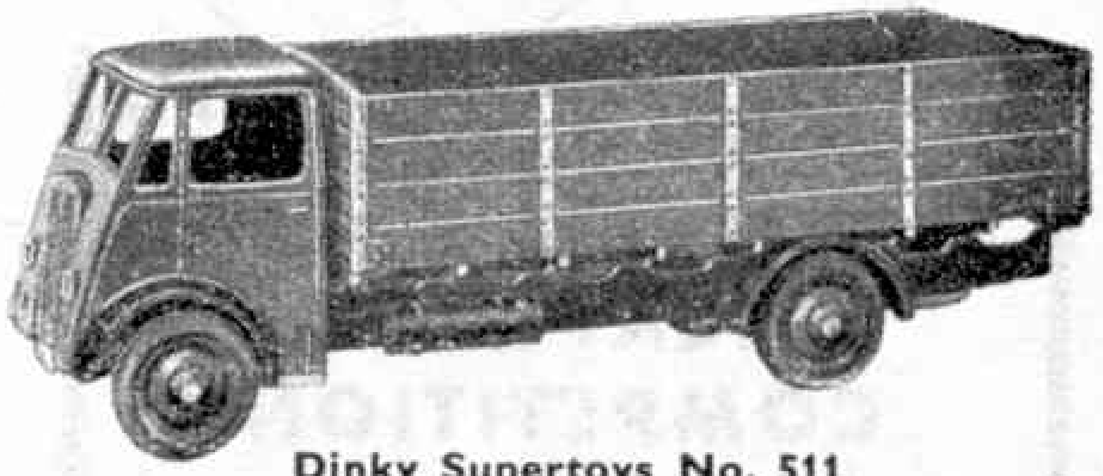
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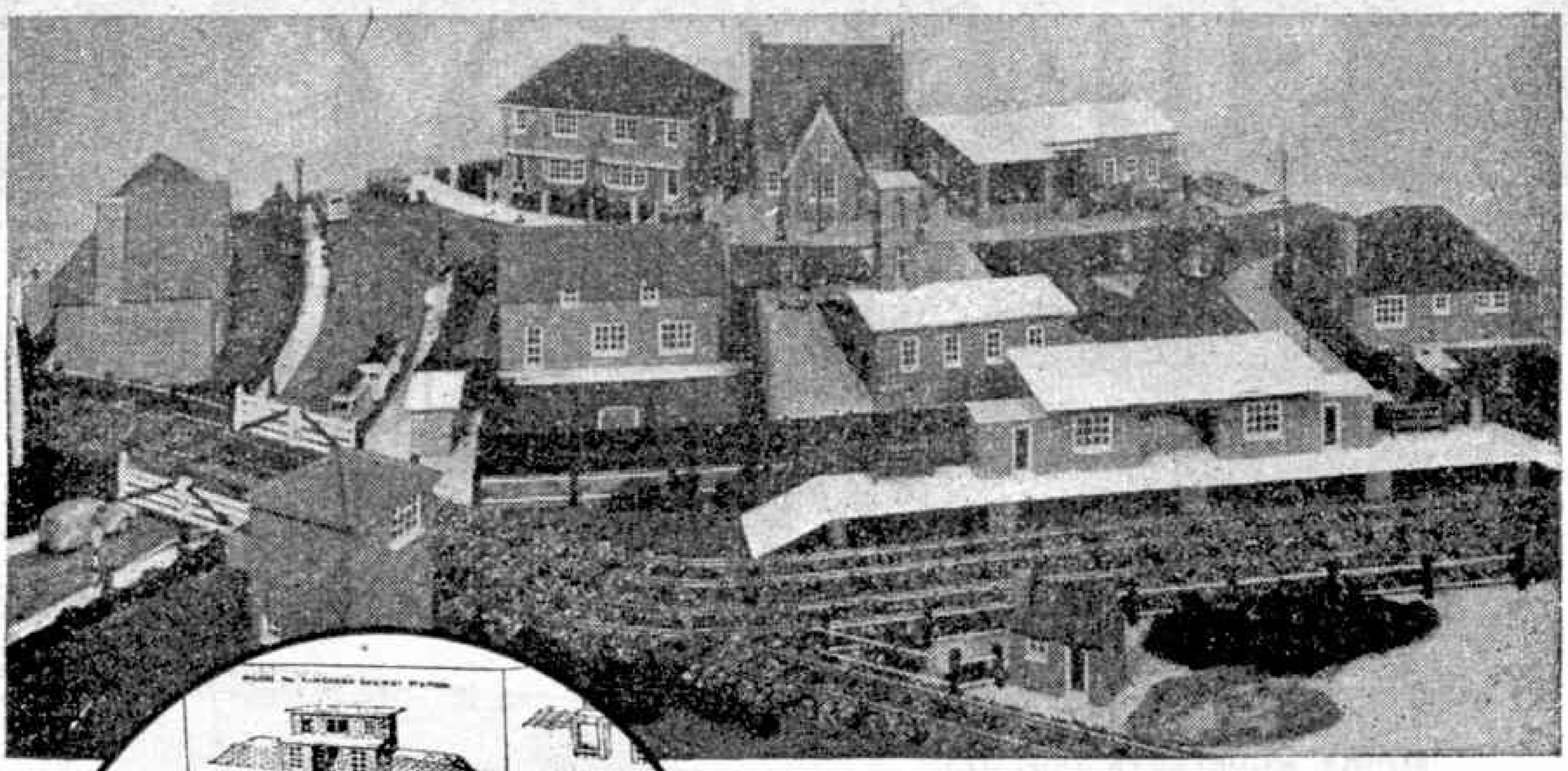
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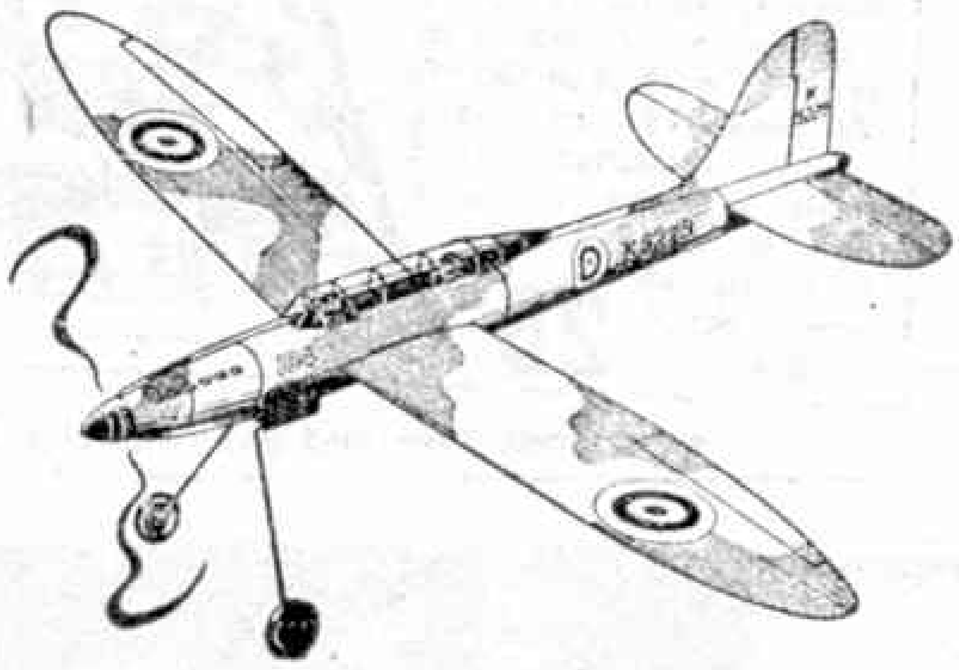
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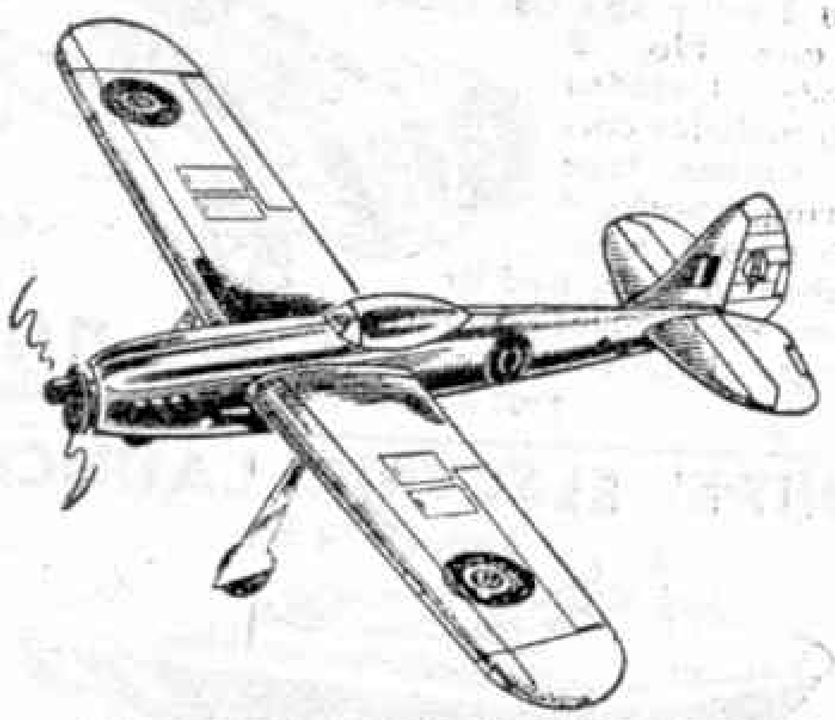
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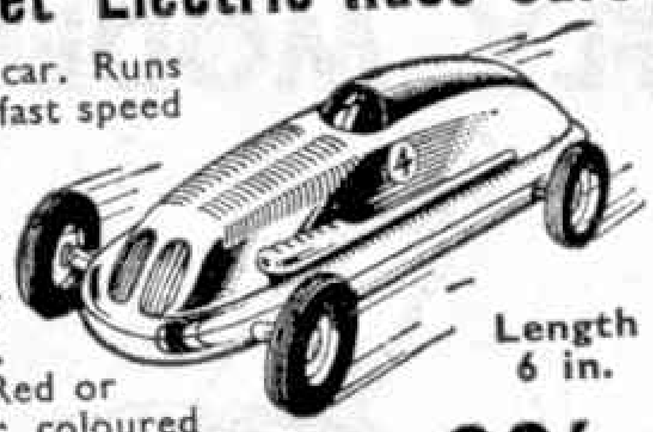
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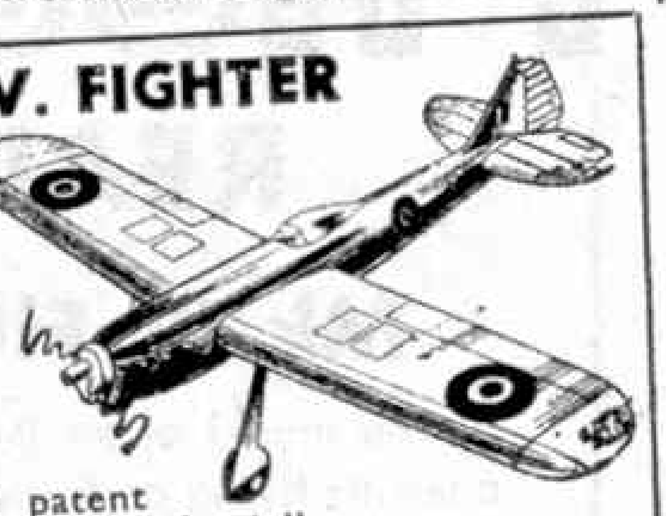


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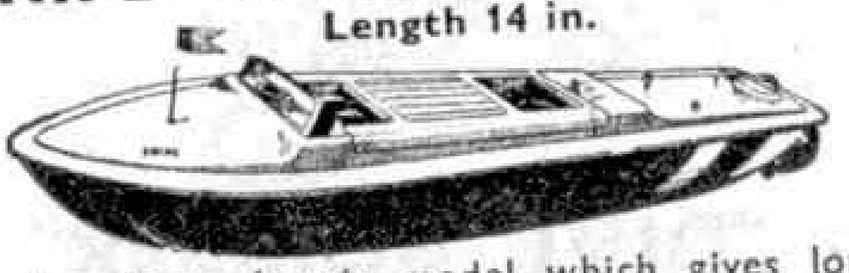
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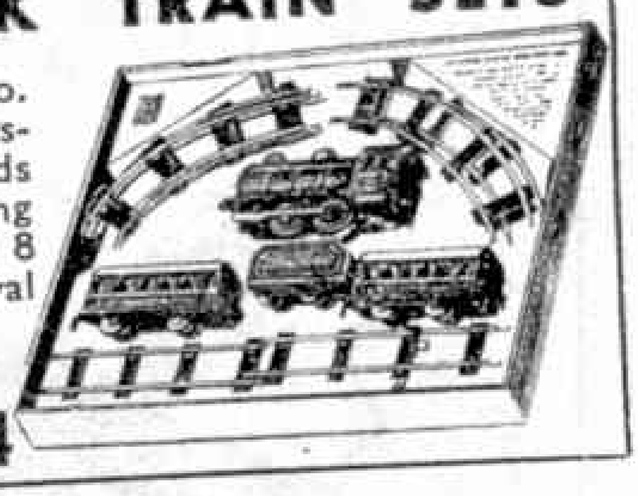
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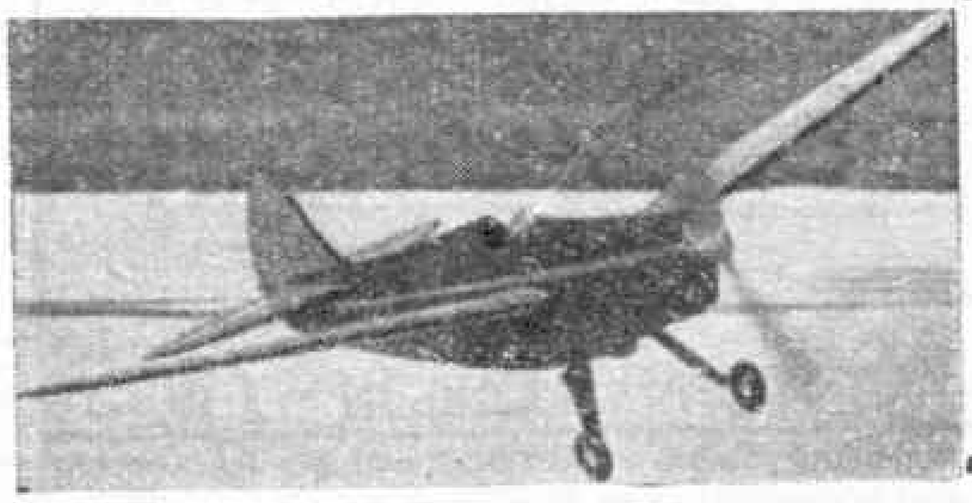
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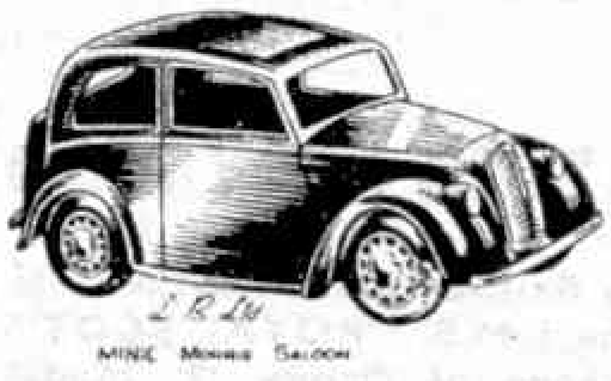
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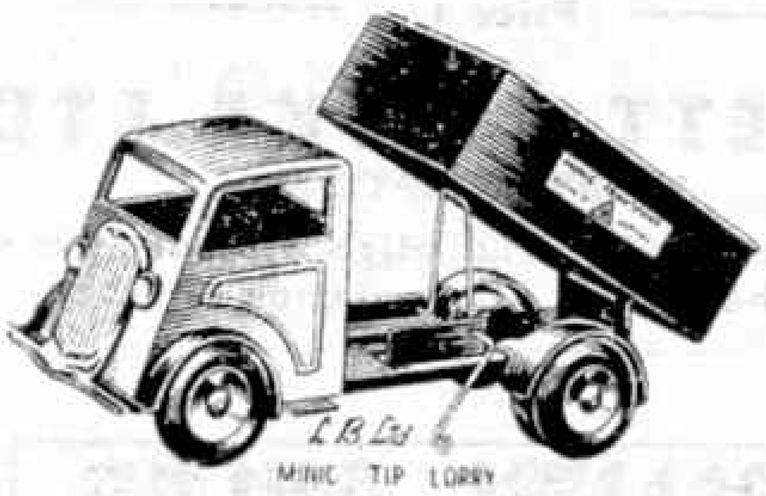
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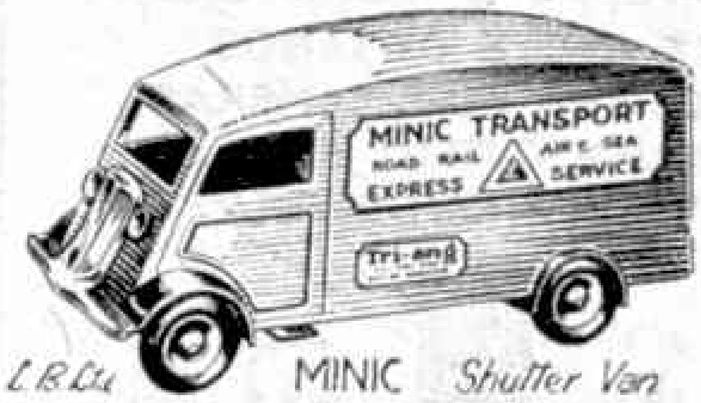
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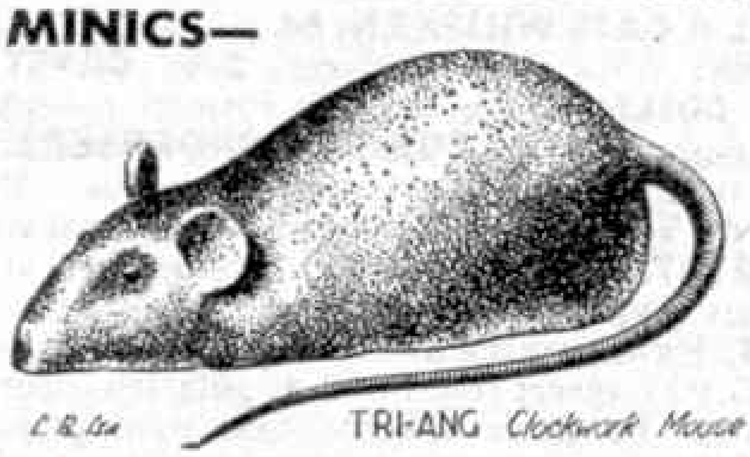
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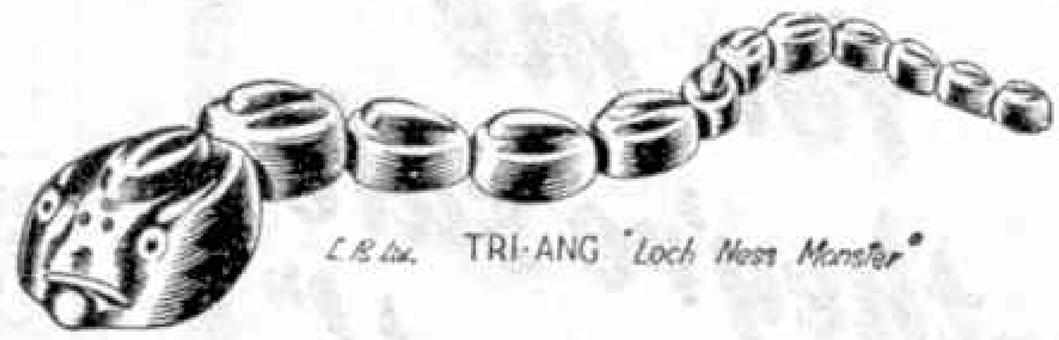
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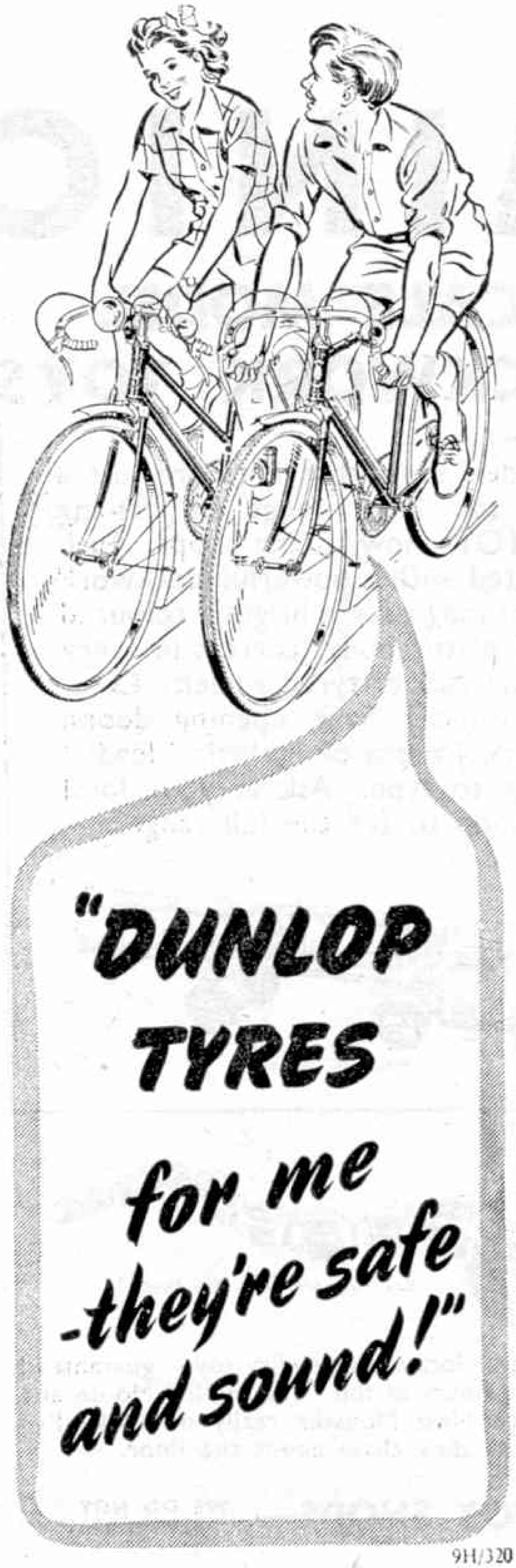
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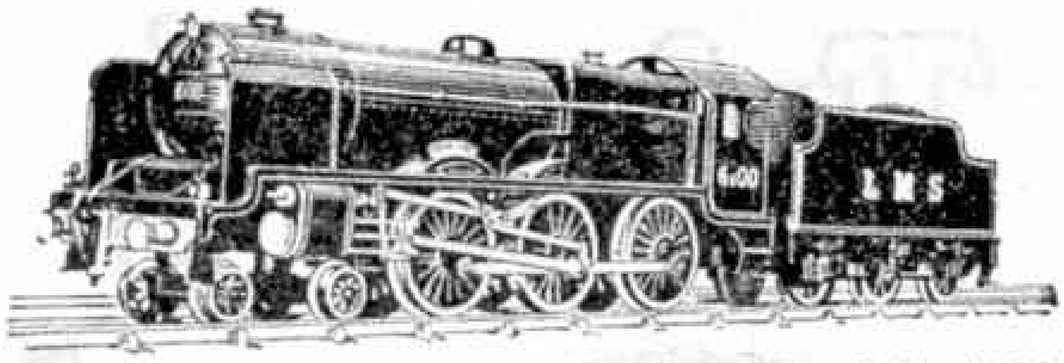
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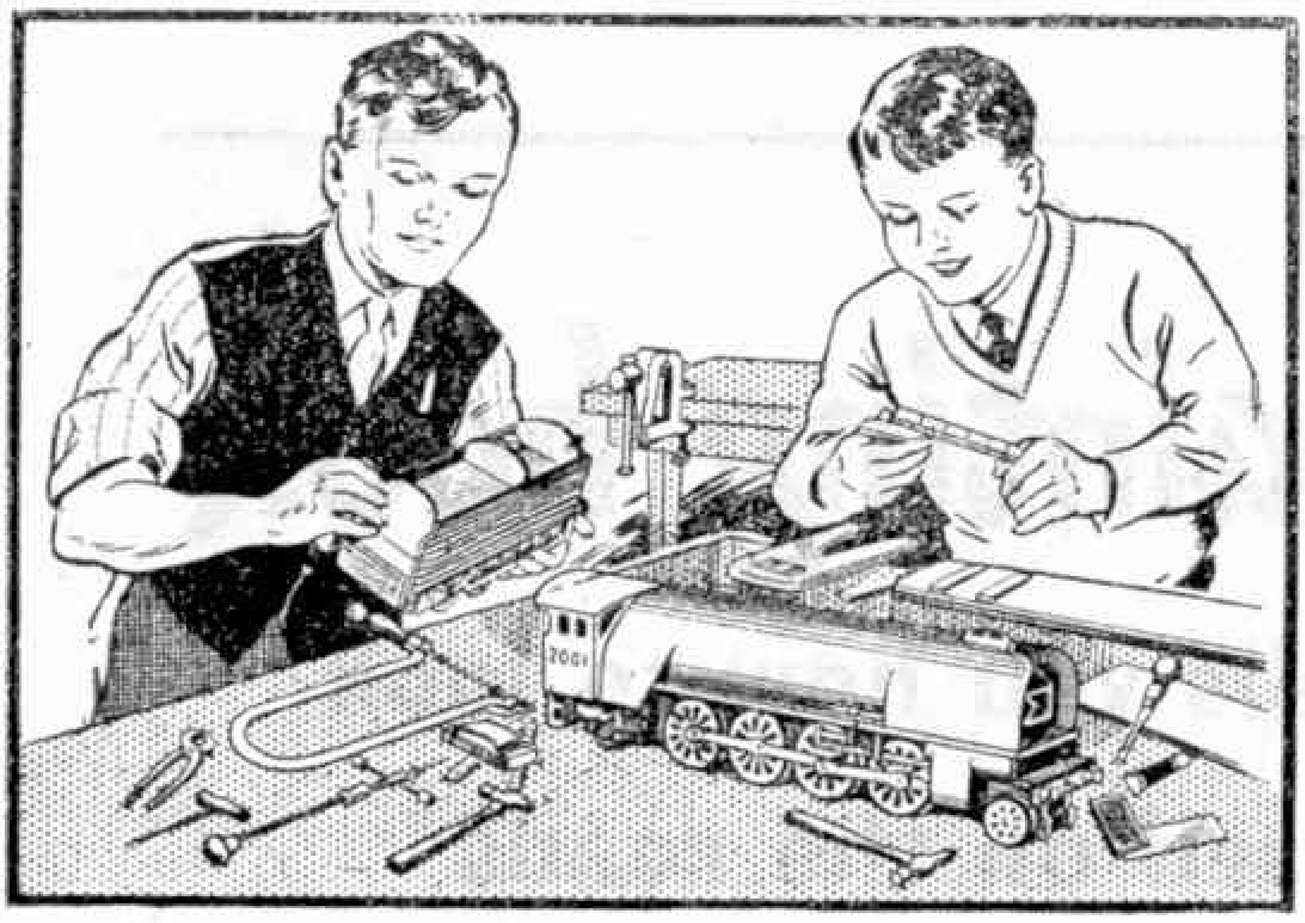
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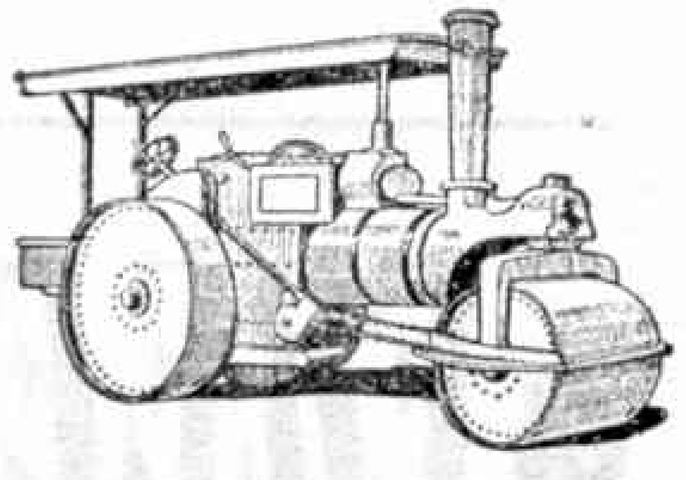
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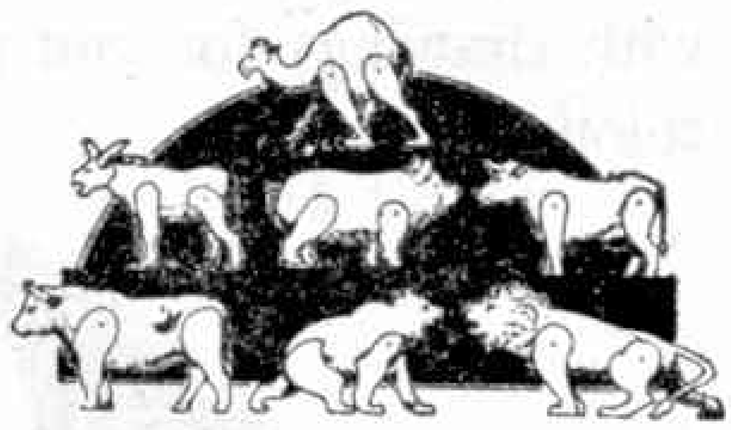
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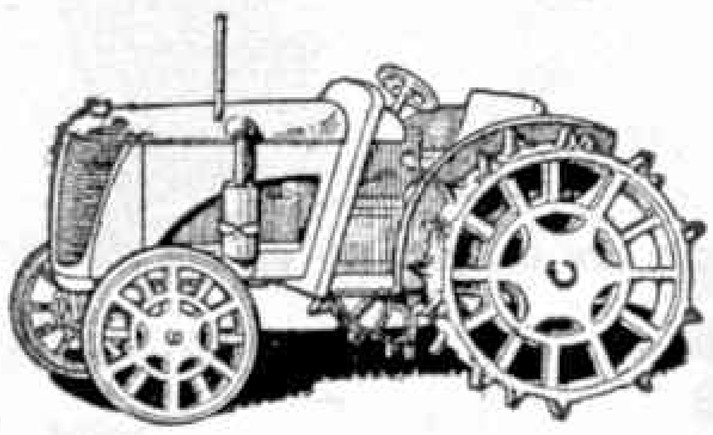
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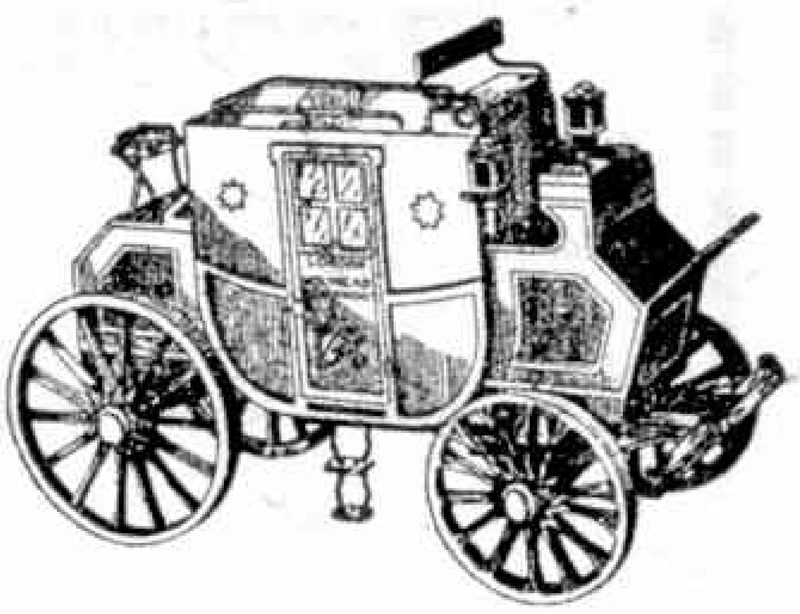


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Next Month: "SCIENCE AND CROP PROTECTION." By N. P. Harvey

MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

Vol. XXXIV
No. 12
December 1949

With the Editor

Next Year's "M.M."

Since the War ended I have had very large numbers of letters from readers calling for more pages in the *"M.M."* I am glad to be able to announce that such an increase is now possible. This month's *"M.M."* is a special issue containing 16 more pages; and beginning with the January issue there will be a permanent increase of 12 pages each month. These extra pages will enable me to give more space to the regular features. Meccano in particular has suffered from lack of room in recent years, and I am looking forward to providing details of the larger and more interesting models that are in such widespread demand. The Hornby and Hornby-Dublo sections will also be enlarged and made more interesting. In addition I shall be able to include more articles on general subjects, of the type that I know readers like. During recent months I have been reluctantly obliged to decline several articles of outstanding interest by first-rate writers—simply because there was no room!

Now I have to make an announcement that is not so good. For many years, and of course particularly since the War, the cost of producing the *"M.M."* has increased steadily. The price of paper and the cost of printing have risen to such an extent as to alter the financial position very seriously. In spite of this I have so far been able to keep the price of the *"M.M."* at 6d., but unfortunately this is no longer possible. Starting with the January issue the price will be 9d. per copy. There will of course be a corresponding increase in the subscription rate, which will become 11/- for twelve months or 5/6 for six months.

I am very sorry to have to make this increase, but I am sure that readers will realise the absolute necessity for it, and will continue to give the *"M.M."* the splendid support they have given it in the past. I shall welcome any suggestions during the coming year for new features or for the improvement of existing ones.

In the meantime my staff and I wish every reader

A Merry Christmas

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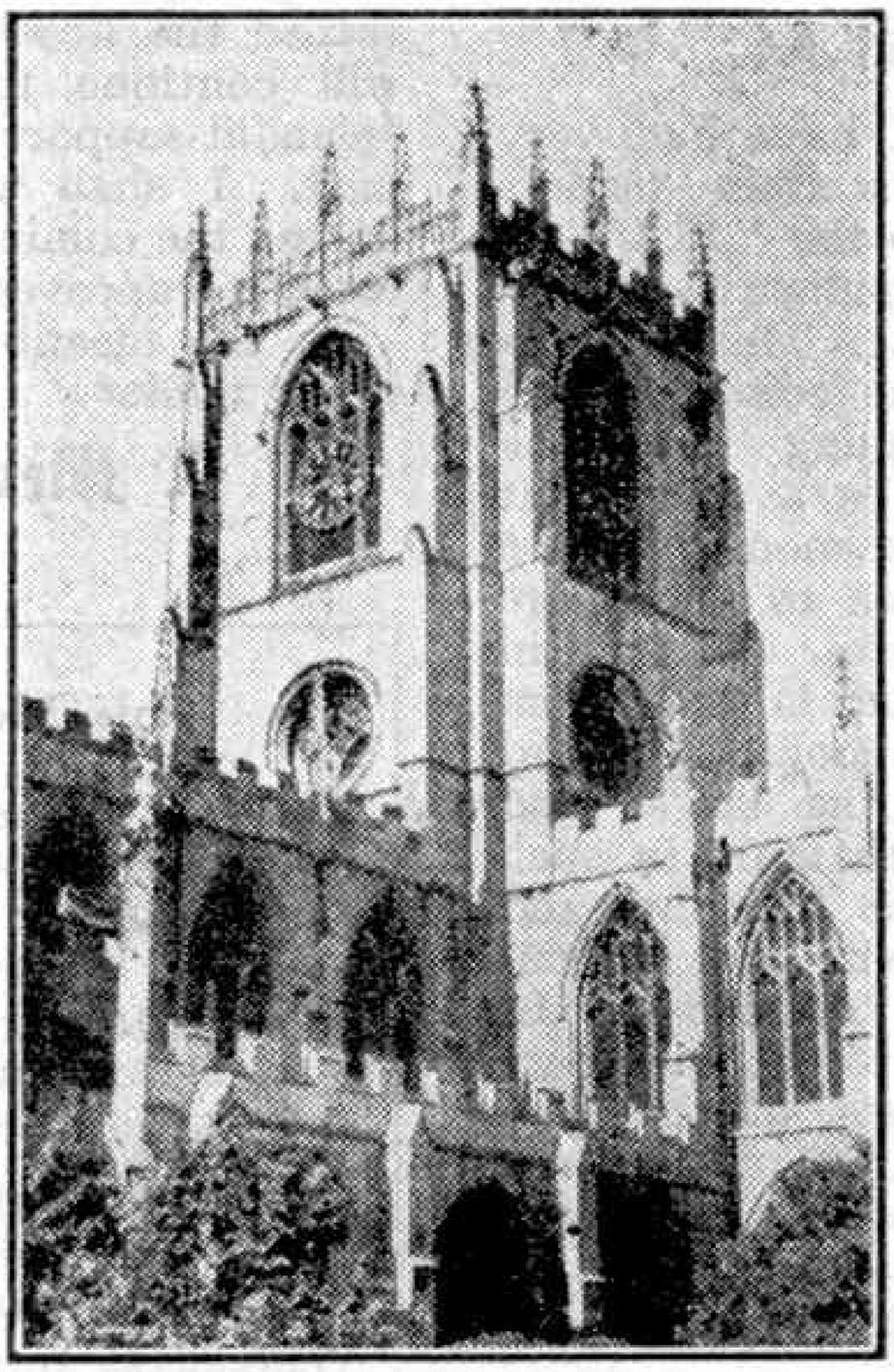
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Haunted Homes and Highways

By Arthur Nettleton

DO you believe in ghosts? Whatever your attitude towards them, the stories of Britain's spooky spots are at least entertaining, and Christmas is the traditional time to recount some of these tales.

Even in this scientific age, legends of supernatural happenings persist, and if some beliefs are to be accepted, the busiest places are not immune from the attention of phantoms. Central London is not excluded, and both the Tower and the Houses of Parliament are said to have spectres. A number of wraiths, in fact, are reputed to disport themselves in various parts of the Tower. Perhaps this is not very surprising, for the old building has been the scene of many tragic occurrences in real life.



St. Mary's Church, Beverley, which has a legend of a phantom coach.

Anne Boleyn, one of Henry VIII's ill-fated wives, was beheaded on Tower Green, and although there have been no reports of her walking near by with her head tucked underneath her arm, some queer events have been described from time to time. There is the tale told by a Captain of the Guard, who was making the rounds with a sentry. As they approached the chapel within the Tower, they were amazed to see that it was lit up. The chapel door was found to be locked, and the officer had no key, but he ordered his companion to bring a ladder so that he could climb up and peep through a window.

Then a cry of amazement came from him. A bluish-white glow lit the chapel, and in this eerie light he saw a procession of people walking slowly along the aisles. They were following a figure robed in Tudor dress, and the quaking soldier had no difficulty in recognising her as Anne Boleyn!

Then the light faded, and the chapel became dark and silent again, as though the wraiths had suddenly discovered that they were being watched.

If this were the only tale of uncanny happenings in the Tower, it might reasonably be dismissed as a hallucination. But there are several others. Some of the strange stories are actually confirmed by garrison records. For instance, there is the account of an unnerving affair in which three soldiers were concerned. Looking out of a window on a clear, moonlight night, two of them saw a white figure approaching one of the sentries outside. They heard him challenge the intruder, and saw him charge with fixed bayonet when no reply was given. They also saw him thrust the bayonet right through the figure and run full tilt into the Tower wall before he fell to the ground in a dead faint.

The incident was followed by a court-martial, but the sentry's story was so convincingly supported by the two witnesses that he was acquitted. Indeed, the ghost was subsequently seen on so many occasions that the spot acquired an evil name. Was the phantom that of Lady Jane Grey, another unfortunate victim beheaded on Tower Green, or was it the ghost of Guy Fawkes, who is believed to have been tortured in the Tower?

The Houses of Parliament have a less sinister spectre, the wraith of an old man who arrives in a rowing boat. But who he is, and where he comes from, nobody knows, though there is a tradition that his arrival always coincides with some big national crisis.

The ghost of Guy Fawkes, already mentioned in connection with the Tower, must be pretty active, since it is said to haunt places far removed from London

as well. Scotton, a village in Nidderdale, is among them. The arch-rogue of the Gunpowder Plot—or the scapegoat of the conspiracy, as some people regard him—was born at York, but his boyhood was spent at Percy House, Scotton. For a long time after his execution the villagers refused to believe in his guilt, so perhaps it is appropriate for his wraith to haunt the lanes near his boyhood home, as some Scotton folk say it does.

Northern England has many other ghost tales. There is the spectre of Temple Newsam, the great mansion now owned by the citizens of Leeds. It was the birthplace of Darnley, husband of Mary Queen of Scots, and his murder in 1571 has given rise to the tradition that he sometimes returns to Temple Newsam. A ghost hunt was organised to "lay" this phantom a few years ago, and although the spectre was not obliging enough to turn up, this does not necessarily mean that the story is untrue.



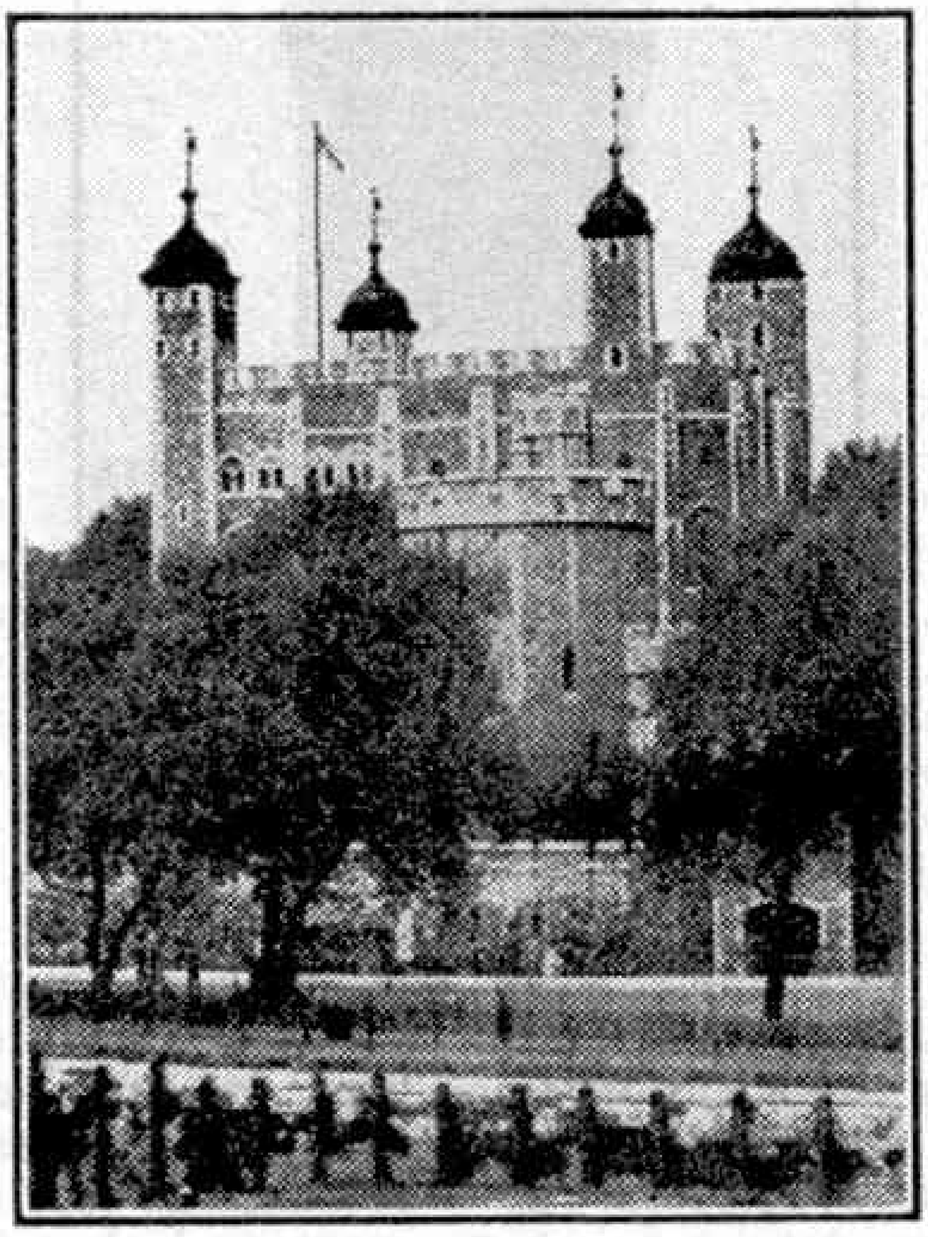
Burton Agnes Hall, near Driffield, in which a screaming skull is preserved as a souvenir of ghostly tradition.

An entirely different kind of apparition haunts Burton Agnes Hall, near Driffield, and here there is more evidence to support the tale.

In a niche inside the Hall is preserved a skull. This gruesome souvenir belonged in life to the daughter of the first owner of the Hall. That was the 17th century, and when the girl was attacked by a tramp and seriously injured, it was plain that she would linger only a few days. But before she died she extracted a promise that her head would be kept in the house for ever.

On one or two occasions the head has been removed, and in each instance the removal has been followed by extraordinary incidents. Doors have banged continuously without visible cause, and weird noises have been heard. The commotion has always ceased as soon as the skull of "Nance," as the villagers call her, has been restored to the house. So to-day it is kept there, and there seems little likelihood of its being taken away again, lest the unseen phantom should return and cause trouble.

Both famous folk and nonentities haunt other places, if legend is reliable. There is the bomb-damaged St. Michael-Pater-Noster-Royal Church, near Cannon Street, London. Its wraith is that of no other than Dick Whittington. He was buried in the church in 1423, and he slept soundly there until the Nazis seriously damaged the building and made it unusable. Nowadays, say some Londoners, the youth who thrice became Lord Mayor roams the vicinity at night, awaiting the restoration of the church.



The ghosts of the Tower of London number more than a dozen, and the stories of two of the Tower's strangest visitations are told in the accompanying article.

Beverley, the old market town near the Yorkshire Coast, provides an example of a much less-known spook. It is the phantom of a valet named Jocelin, who was (Cont. on page 473)

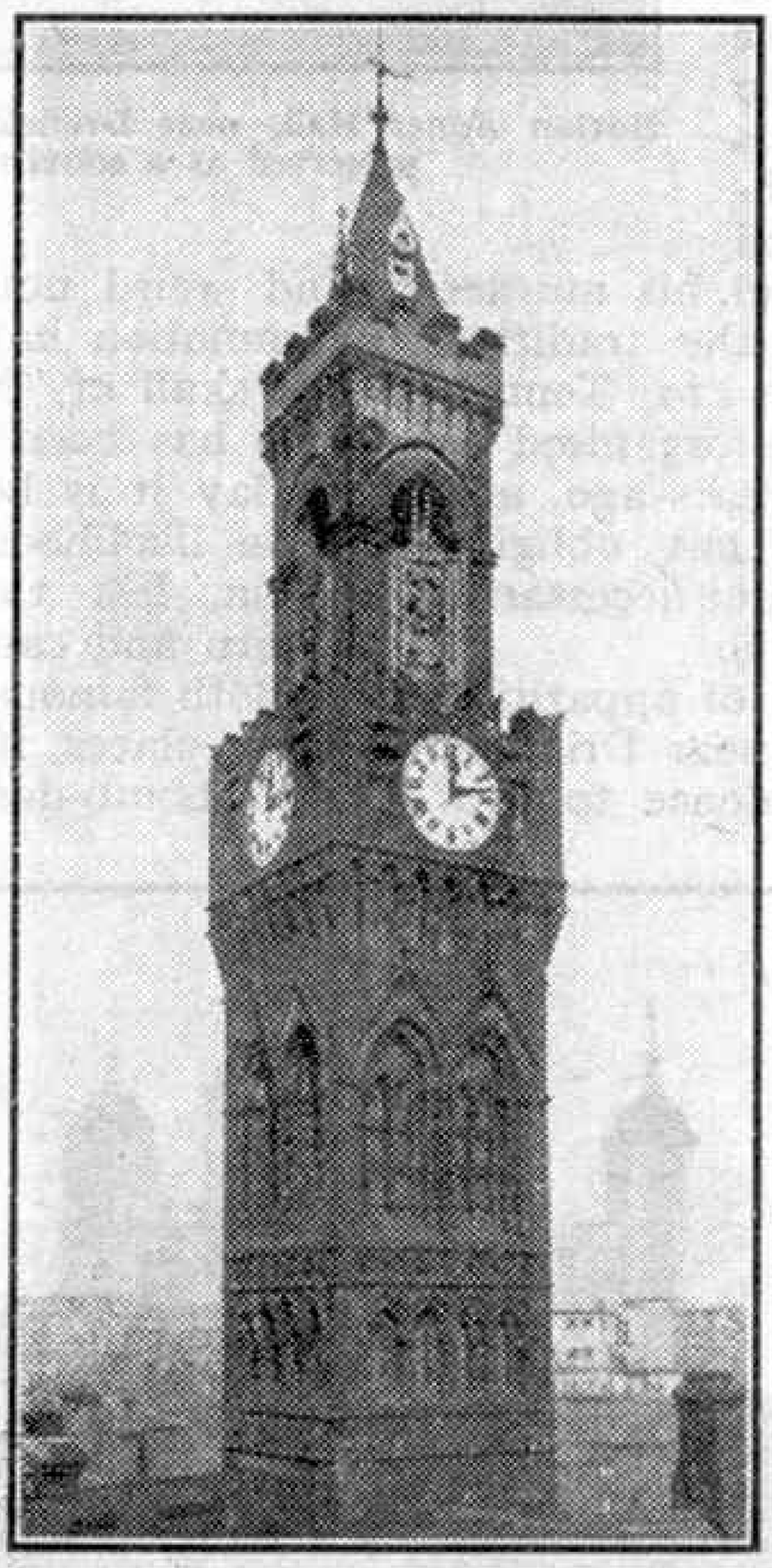
The Great Clock of Bradford

A Notable Electrical Timekeeper

By T. R. Robinson, F.B.H.I.

THE largest and most powerful clock and carillon machine to be installed in England for a number of years is that now at work in the tower of the Town Hall at Bradford, Yorkshire. Quite apart from its great size, the clock is unusually interesting, for it replaces an older clock erected in the tower by the same makers just over 75 years ago, and operates the dials and bells that were used by the earlier timekeeper.

The contrast between the old and new clocks is a remarkable illustration of the way in which **modern electrical** mechanism has taken the place of the massive driving weights used in the past, and in so doing has simplified upkeep and maintenance. The old clock was a large machine, of the kind still to be found in hundreds of church and town hall towers. Its timekeeping, chiming, and striking sections were all grouped together in one large "flat-bed" frame, each set of wheels, or "train," being driven by a heavy weight. The carillon machine was also weight-driven, and as the four weights totalled over three tons, and required to be wound up daily, the work of keeping the installation going took up a lot of time.



The clock tower of Bradford Town Hall, showing the great 10 ft. 6 in. dials.

During its three-quarters of a century of service, the old clock and carillon machine had become considerably worn, and this, together with the difficulty of arranging for daily winding, led to the decision to replace the whole mechanism with one of modern design. The scheme selected was to divide the mechanism into separate units, each controlled and synchronised by impulses transmitted from a master clock at half-minute intervals.

The powerful drive needed for operating the large and exposed hands is provided by the "timepiece" unit, consisting of a train of four wheels and pinions, driven by a weight of 4 cwt., equipped with automatic re-winding mechanism. This weight hangs from one loop of an endless length of roller chain, and drives the timepiece train by means of a large sprocket wheel mounted on the first spindle. At the top of the opposite end of the loop the chain passes over a smaller sprocket wheel, used for re-winding the weight, and the rest of it forms a second loop that hangs idly between the driving and re-winding sprockets. On this idle loop is hung a small weight, which steadies the chain and ensures that it follows the sprockets correctly.

The ratios of the wheels and pinions of the timepiece train are so chosen that the third wheel makes one half-turn while the train is advancing the hands on the dials one **half-minute space.** Mounted on the same spindle as this third wheel is a double-ended locking arm, the tips of which can engage in turn with an electro-magnetically released trigger lever, the magnet of which is energised by the master clock impulses every half-minute.

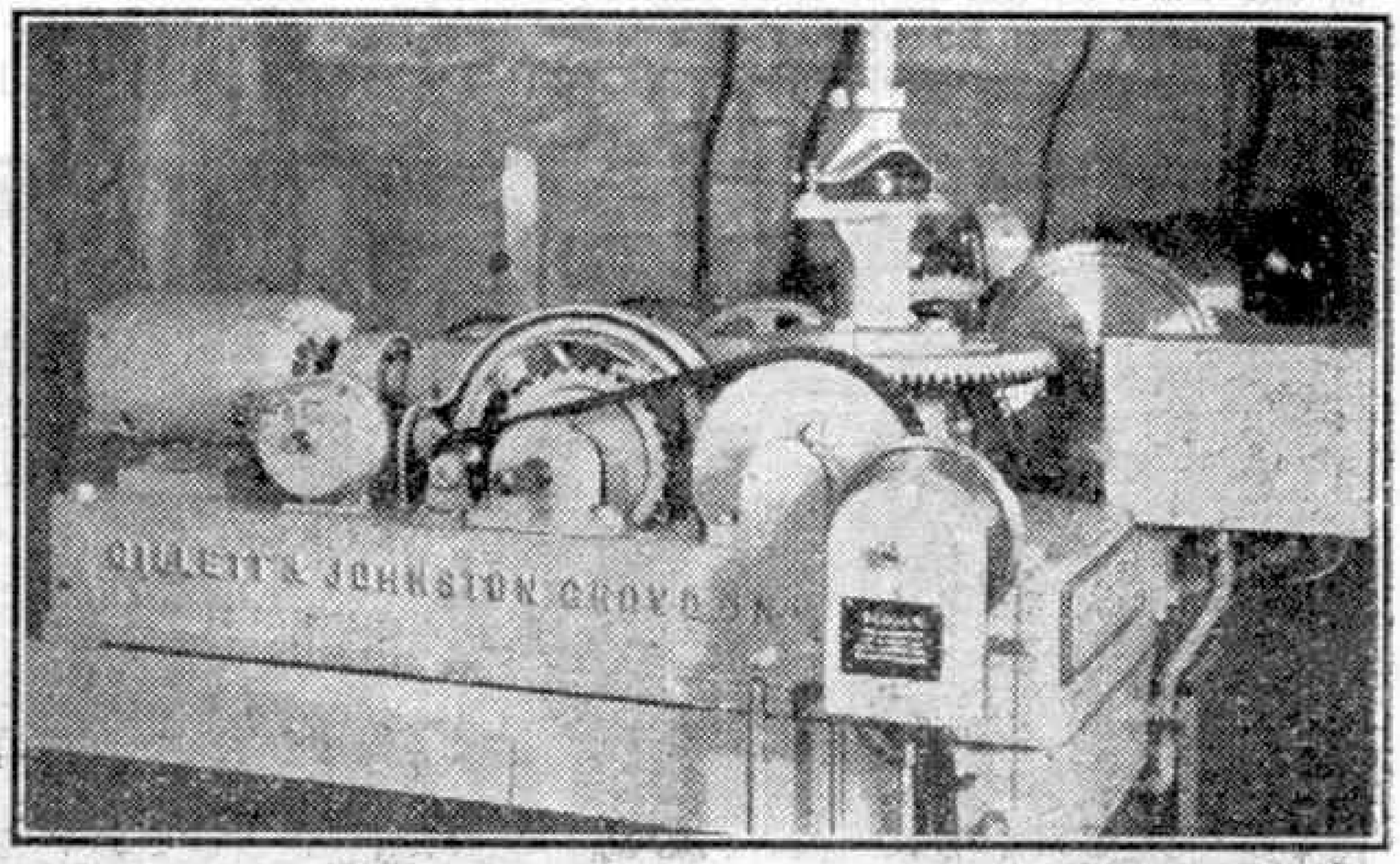
When the timepiece is operating, the weight drives the train at a controlled speed until one of the tips on the locking arm comes to rest on the trigger lever. This action then locks the train, and it remains at rest until an impulse from the master clock trips the trigger, unlocking the tip of the arm, and so allowing the weight to drive the train again. This continues until the tip of the other

end of the locking-arm engages with the trigger lever, whereupon the whole process is repeated.

The speed of the time train is controlled by an air brake, mounted on the final spindle. This is so adjusted that the train moves forward a step of half a minute in approximately 25 seconds, giving a pause of about five seconds between locking and releasing, and ensuring that the master clock and timepiece do not get out of step.

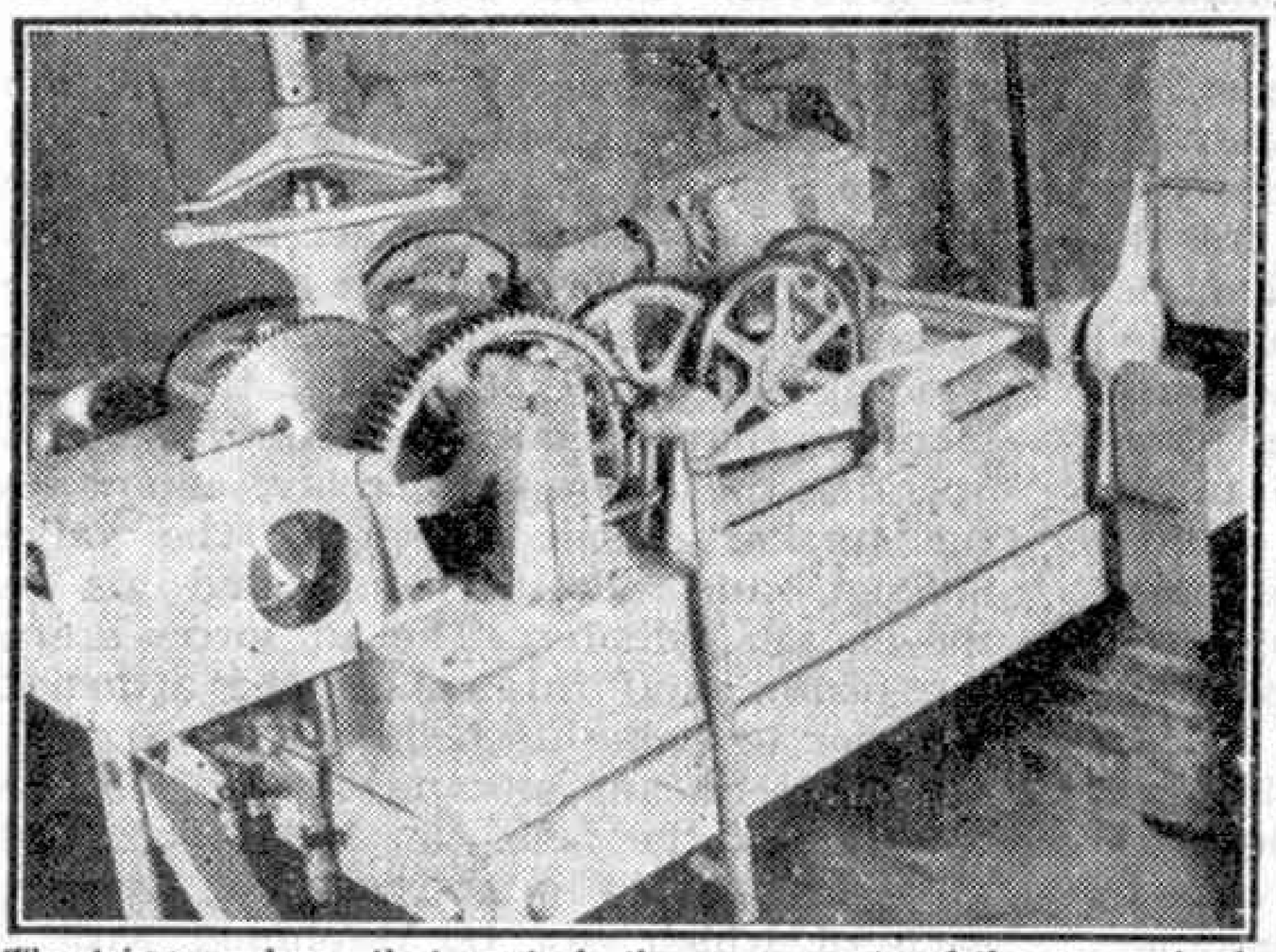
The main wheel of the timepiece is linked to the spindles of the hands by bevel wheels and a long vertical spindle, which leads upward to a group of bevel wheels in the dial room. In addition to operating the hands, the timepiece also controls the contacts that switch in the chiming and striking units and the carillon machine at the proper instants.

The automatic re-winding of the weight which drives the timepiece is most ingenious. When the running of the timepiece has caused the weight to descend to a certain pre-set point, a switch is tripped and the winding motor is started up. The motor, driving through reduction gear, then rotates the winding sprocket and so raises the weight without interfering with its drive to the timepiece. As soon as the weight has been fully re-wound it breaks the motor circuit, and the winding mechanism stops until it is again needed. An extra safety-switch is fitted to prevent any damage to the mechanism if this switching action should ever fail to cut off the current. This is tripped as soon as the weight is raised above its normal highest level, and once operated it not only locks itself in the "off" position, cutting off all current to the motor, but also sounds a loud alarm in the attendant's room. The winding mechanism then remains out of action until the safety switch has been unlocked, so a failure cannot pass unnoticed.



Winding side of the timepiece unit of the Bradford Town Hall clock. The chain that carries the driving weight is visible.

To provide for power failures the weight is able to descend well below its normal lowest level, and this gives the timepiece a reserve run of four hours to meet possible emergencies. If even this should prove insufficient, hand winding is provided for, and an alarm bell is sounded automatically if this becomes necessary.

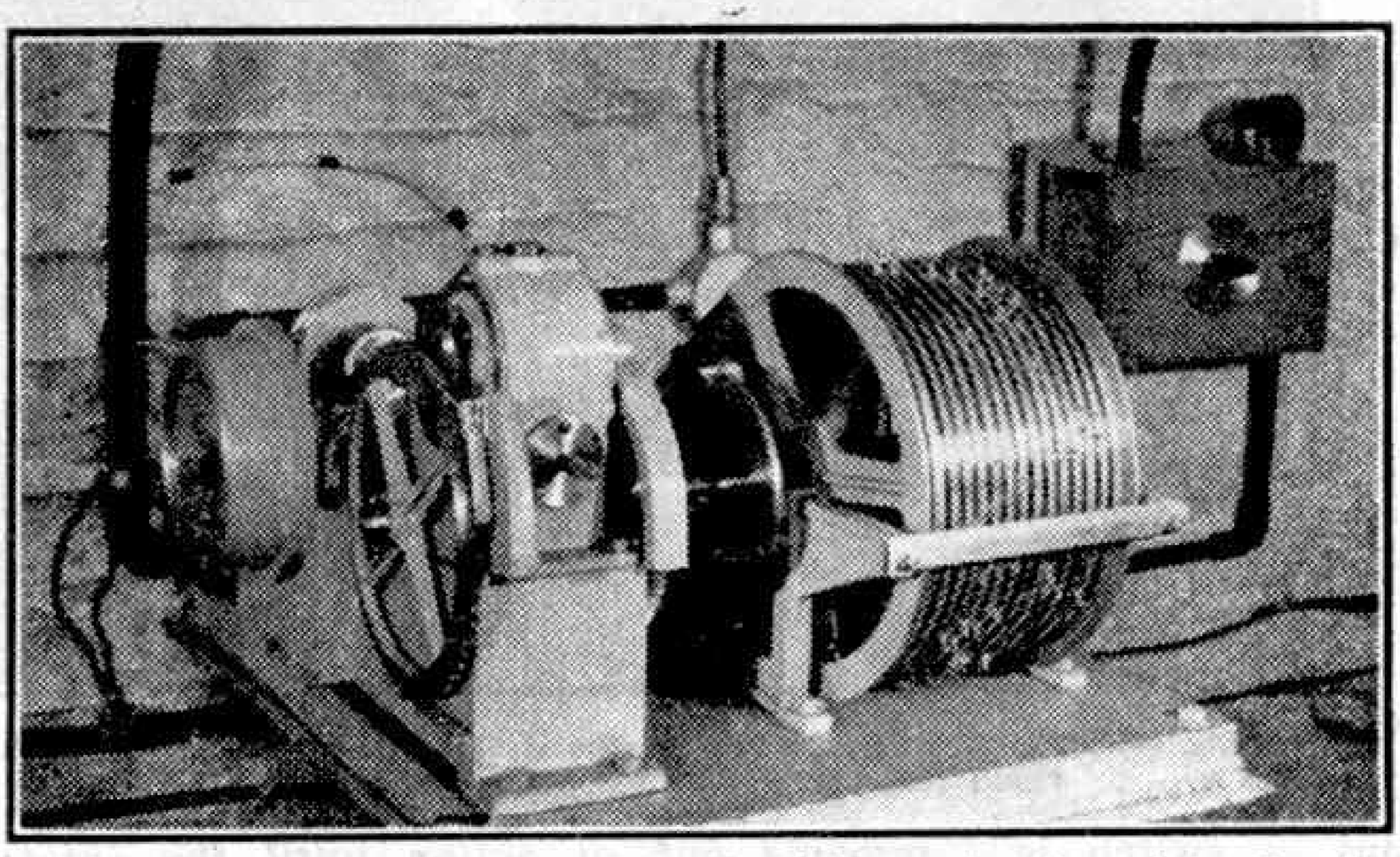


The trigger release that controls the movements of the gear wheel of the timepiece unit is seen in this view of the clock mechanism. On the right is the air brake.

The chiming and striking units resemble one another in general construction. Each is driven by a 1½ h.p. motor, which is coupled to an enclosed worm reduction gear through a centrifugal clutch, which enables the motor to start up under "no load" conditions and to pick up its drive steadily as its speed increases. The spindle of the worm wheel carries a pinion that engages with a large spur gear, and, in the case of the quarter chiming unit, a second pinion on the spindle of this gear engages

with a further spur gear on the spindle of the quarter chime cam barrel. The striking unit is without this second stage of spur reduction gearing, the large spiral cam which operates the striking hammer lever being fitted to the spindle of the first spur gear.

When the timepiece closes the contact that controls the chiming or striking unit, a rocker switch on the appropriate unit is tripped and its motor is started up. Then, as each group of notes at the quarter or the blow of the hour is sounded, a small cam on the spindle of the first gear wheel steps a "count-wheel" forward, tooth-by-tooth, until the chiming or striking is completed. At this moment a pin on the count-wheel trips the rocker switch back, and so stops the motor driving the unit.



The carillon machine. The barrel on the right can be changed to alter the tune rung out on the bells.

Both the quarter and hour hammers are of very unusual construction. Instead of being mounted outside their bells, and falling by gravity when released, they are fitted inside the bells and are linked to a group of powerful coil springs. As the cams on the units depress their hammer levers, they tension these springs and then, at the moment when the cams disengage from their levers, the power stored in the springs is delivered to the hammers, causing them to move smartly upward against their bells. This novel method of operation has been found to give better striking and more crisp action, producing a better note from the bell.

The carillon mechanism is of the most modern electro-pneumatic type. The tower contains 13 bells, and each is now fitted with an internally mounted hammer, linked by a wire rope to a piston in a pneumatic cylinder. The compressed air used to operate the pistons is at a pressure of 40 lb. per sq. in., and is provided by a two-cylinder compressor, driven by a 3 h.p. electric motor. As the compressor is quite capable of maintaining full pressure there is no need for any storage reservoir, an ample supply of air being contained in the three-inch distribution pipe and the air spaces in the bases of the groups of cylinders.

The entry of air to each cylinder is controlled by an electro-magnetic valve, and the circuits of the valve magnets are completed by a set of relays of the Post Office type. The relays themselves in turn are operated from the carillon machine, which resembles a small copy of the chiming and striking units. A fractional horse-power motor drives through a belt and pulleys to a worm reduction gear, and this gear rotates the spindle of the carillon barrel through a stage of spur reduction gearing. A neat coupling enables any one of a number of barrels to be fitted to the machine, and the replacement of one barrel by another is almost as simple as the changing of a gramophone record.

The barrels consist of bronze drums, around the circumference of which are 13 grooves. Small bronze pins can be inserted into these grooves, and locked at any position necessary to provide the selected tune. Mounted on the carillon machine, in line with the grooves on the barrels, is a bank of contact fingers, and as the drum rotates a pin set in any groove makes contact with the tip of its corresponding finger as it passes, thus completing that particular circuit. This operates the appropriate relay, completes the further circuit energising the valve magnet, and admits compressed air to the chosen cylinder. The air forces down the piston, and this causes the attached hammer to strike its bell.

By this means any melody within the compass of the bells can be played, and as there are 14 interchangeable barrels, each of which can be re-pinned with a fresh tune when required, an almost infinite variety of

(*Continued on page 469*)

General Repairs

By "Shed Superintendent"

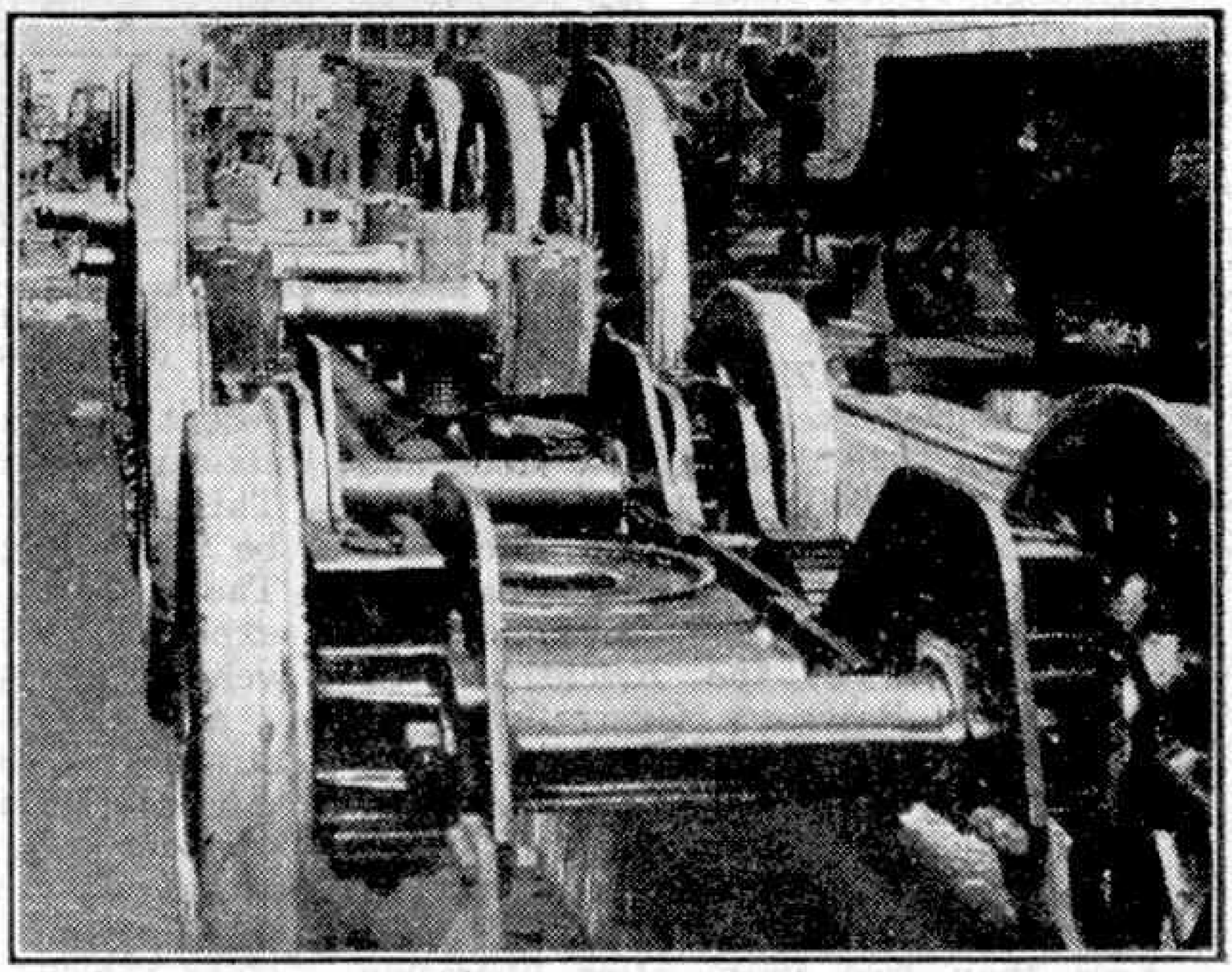
THE cover picture to this month's issue shows one of the Southern Region "West Country" class 4–6–2s undergoing the process of Works overhaul. A locomotive requires a complete overhaul, known as a general repair, after running 80,000 to 100,000 miles. An express locomotive may run this distance in less than two years; a shunting engine will take five or six years to complete the same mileage. The workshop capacity in each Region is of course limited and only a certain number of general repairs can be undertaken per year. Careful planning is therefore necessary to ensure that when locomotives become unfit for service, they can be accepted by the Works without deferment, if the general standard of mechanical condition of the engines in service is to remain satisfactory.

During the war repairs had to be deferred because the workshops were engaged on other work. Consequently engines rattled along to a merry tune from knocking big-ends and worn axleboxes, and the drivers sang out *"Any Old Iron."* At the end of the war the fleet of engines at work on the railways had been reduced to such a state that even now, after four years, it cannot be said that all the arrears of repairs have been overtaken. It takes a long time to repair 20,000 locomotives.

Since the formation of British Railways, a standard system of planning repairs to locomotives has been instituted. A central bureau on each Region keeps up-to-date records of the condition of every engine in service, by means of regular reports from the Motive Power Depots. These reports are made at agreed intervals according to the type of engine. A "Pacific," for example, is examined and reported at the end of twelve months after receiving general repairs. As the mileage of the engine increases, so the time interval between reports decreases, to maintain a close watch on the approach of the next impending overhaul.

The central bureau is able to keep the condition of the whole locomotive stock under review and can forecast the number of general repairs that will become due on a given date. This in turn allows a constant flow of work to be scheduled for the workshops, to keep them steadily employed at all seasons of the year. A considerable degree of foresight can be exercised in overhauling passenger locomotives in preparation for the Summer holiday period, for example. Engines of special types, such as Docks Shunters, must be withdrawn in rotation since they cannot be replaced temporarily by engines of other types. Engines surplus to requirements can be stored, after general repairs, to meet seasonal demands.

No doubt as unification of the railways develops, together with a reduction of the number of different classes of engine, it will be of advantage to pool the resources of all the railway workshops, so that an engine that cannot be accepted at one works can be switched to another. For the moment, each Region is independent, although the construction of new engines is being shared between the Regions.



The bogie and driving wheels of a 4-6-0 awaiting the engine after general repairs have been completed

The Railways of France

Some Remarkable Reconstruction Feats

IN 1939 the railways of France, which had become a unified system under the State a year or two previously, enjoyed a high level of technical efficiency. Owing to the effects of the war and of the occupation of their country by the enemy, the S.N.C.F., to quote the now familiar initials denoting the National system, found itself facing tremendous problems on liberation in 1944.

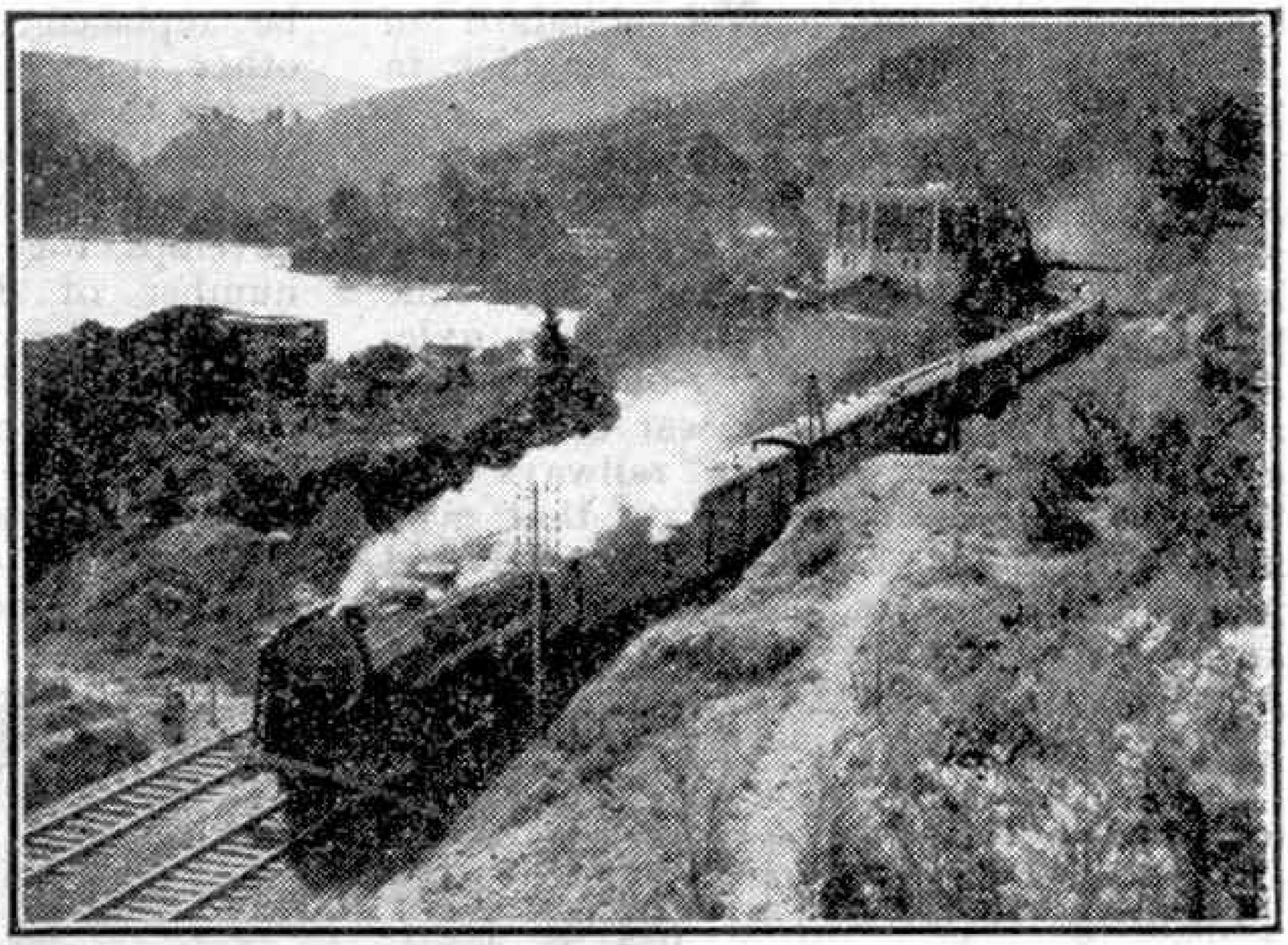
It would have seemed impossible, then, that by April 1945 traffic would have reached the level of 1938; or that by 1947 passenger and goods movements would be some 40 per cent. above that again. Yet this was so, in spite of the fact that after the liberation France was literally cut in two by the destruction of all the bridges across the river Loire below Roanne. Even the lines open to traffic (11,180 miles out of a total 24,800) were cut into sections isolated from one another; 2,603 bridges and viaducts had been destroyed and 70 tunnels blocked.

Although 17,058 steam locomotives were available at the outbreak of war, French Railways were only able to account for 10,500 in September 1944; and out of this figure, 3,000 only were in working condition. At the same time only 172,000 freight vehicles were in a serviceable condition; in 1939 the available stock had mounted to 478,000 vehicles.

The stock of electric locomotives had escaped requisition by the Germans as they could not be used on the single-phase electrified lines of the Reichsbahn or German State Railways. Generally speaking, all the motive power and rolling stock was in a very worn condition caused by excessive running, inadequate maintenance, and the use of poor quality lubricants for four years.

Less than two years after liberation nearly the whole of the S.N.C.F. system was again open to traffic, and by July 1948 a total of 2,491 bridges and viaducts had been rebuilt and 67 tunnels restored to traffic. To-day travellers agree that punctual, rapid and comfortable service is again the rule, in spite of the difficulties of these post-war times. The "*cheminot*" or French railwayman, both high and low, has indeed worked to some purpose.

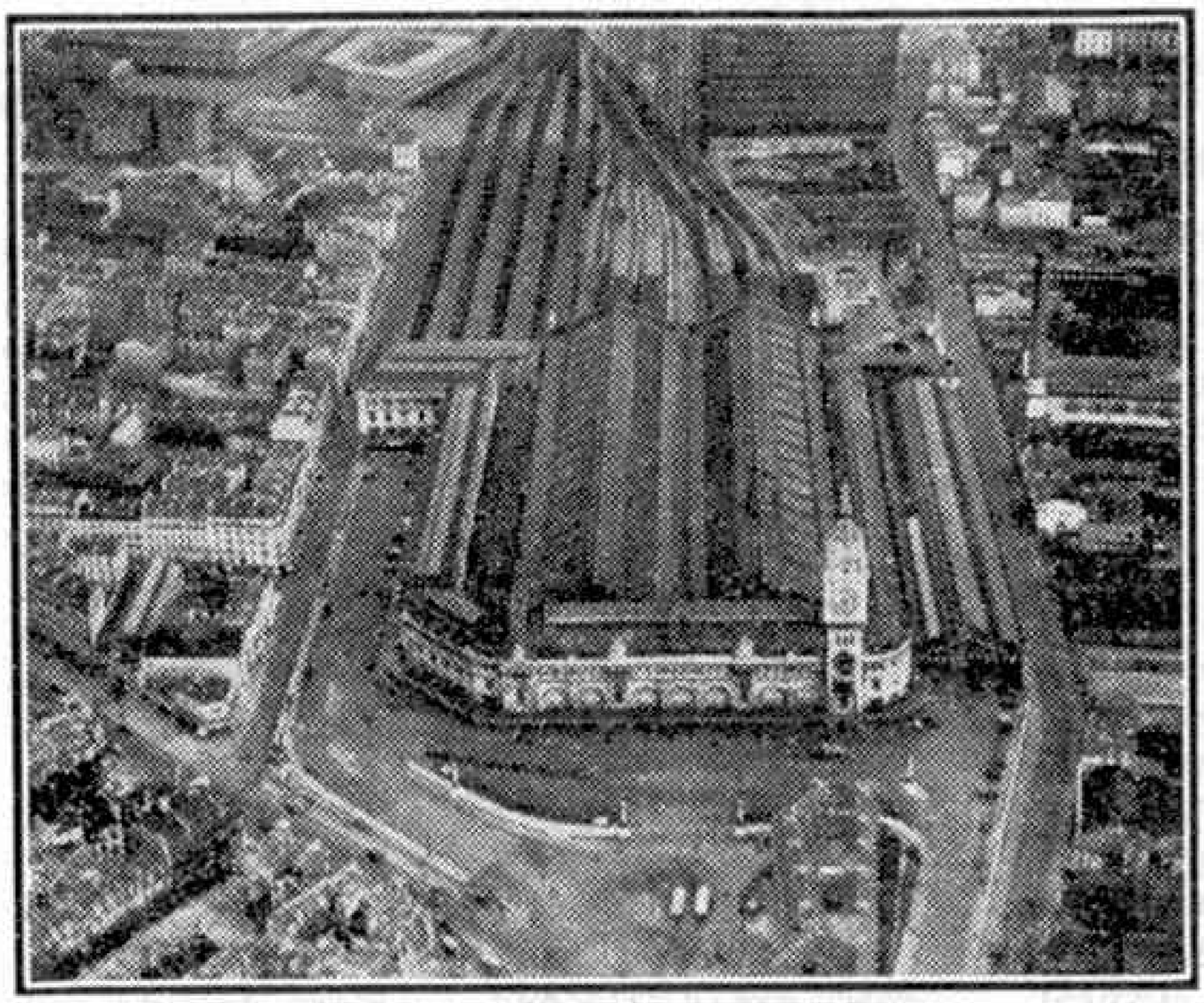
An extensive locomotive and rolling stock programme is in hand for future developments, and at the same time improvements and experimental features have been embodied in post-war reconstructions. One of the most interesting recent introductions has been that of a six-car train running on pneumatic tyres. This novel item of railway equipment will be the subject of a special article later. The provision of rubber tyres resulted from experience with various pneumatic-tyred vehicles of the railcar type.



A French Railways express in the Esterel, near Cannes. The photographs and much of the information in this article are by courtesy of the S.N.C.F. (French Railways).

All-metal coaches of new design constructed of lightweight alloys are being put into service. They are stronger than previous designs, and the saving in weight in the new type is such that four of these weigh the same as three of the older vehicles.

On the freight side, faster transit has been provided for some time for all goods



A striking aerial view of the Gare de Lyon in Paris, whence depart trains for the South of France, Switzerland and Italy.

requiring it, and freight operating methods have been improved. In general, the effect has been equivalent to adding many thousands of wagons to the stock. Among further developments that are being planned, in addition to the speeding up of ordinary goods traffic, is the introduction of road and railhead distribution services from selected centres that are to be linked by really fast 850-ton freight trains.

At the same time it is proposed to raise the passenger train speed limit on main lines to 87 m.p.h., with a higher figure still for railcars. Reference to the latter vehicles recalls the extensive use of railcars made by French railways even before the war, and the constant improvements that have been made. Nowadays, two power cars with a specially-designed trailer vehicle usually make up a train. The head and tail ends of these units incorporate a 410 h.p. diesel engine, coupled to a generator on the front bogie. This generator feeds the two electric traction motors mounted on the rear bogie.

France is traditionally the home of some very fine steam locomotives, having long outgrown the quaint and even eccentric designs common in earlier days. The de Glehn compound system, originated many years ago, can be said to have inspired much of the subsequent research and progress in steam locomotive design, and it is still successfully used. Among the best-known engines working on the de Glehn principle are the so-called "Super-Pacifics" developed by the former Nord system.

An interesting French locomotive refinement is the cab apparatus carried by many engines that charts a continuous record of every journey. The chart not only furnishes a time-speed record, but where a warning signal, indicating a "stop" signal ahead, is passed, and acknowledged by the driver, this also is shown on the record.

New designs of steam locomotives at present being built are mainly of standard types. There is the *"Type 241 P,"* or 4–8–2, for heavy express and *"rapide"* trains. *"Type 141 P,"* or 2–8–2, are mixed traffic engines for passenger trains at speeds up to 70 m.p.h., and accelerated freight trains up to 1,200 metric tons or heavy freight trains up to 1,400 metric tons. There are 2–10–0 designs for coal and mineral trains and 2–10–2 tank engines for heavy trains over short runs. *"Type 050 TQ"* are 0–10–0 tank engines for hump shunting work.

Future construction of electric locomotives will be devoted to direct developments of the types of electric locomotives at present in service. These include the 4,000 h.p. units of type 2-D-2 (4–8–4), having a top speed of 100 m.p.h. and capable of taking trains of 850 metric tons at 87 m.p.h.



A typical scene outside the Gare de Lyon, with an express just getting away from the platforms.

A Variety Entertainment for Christmas

By Norman Hunter (From Maskelyne's Mysteries)

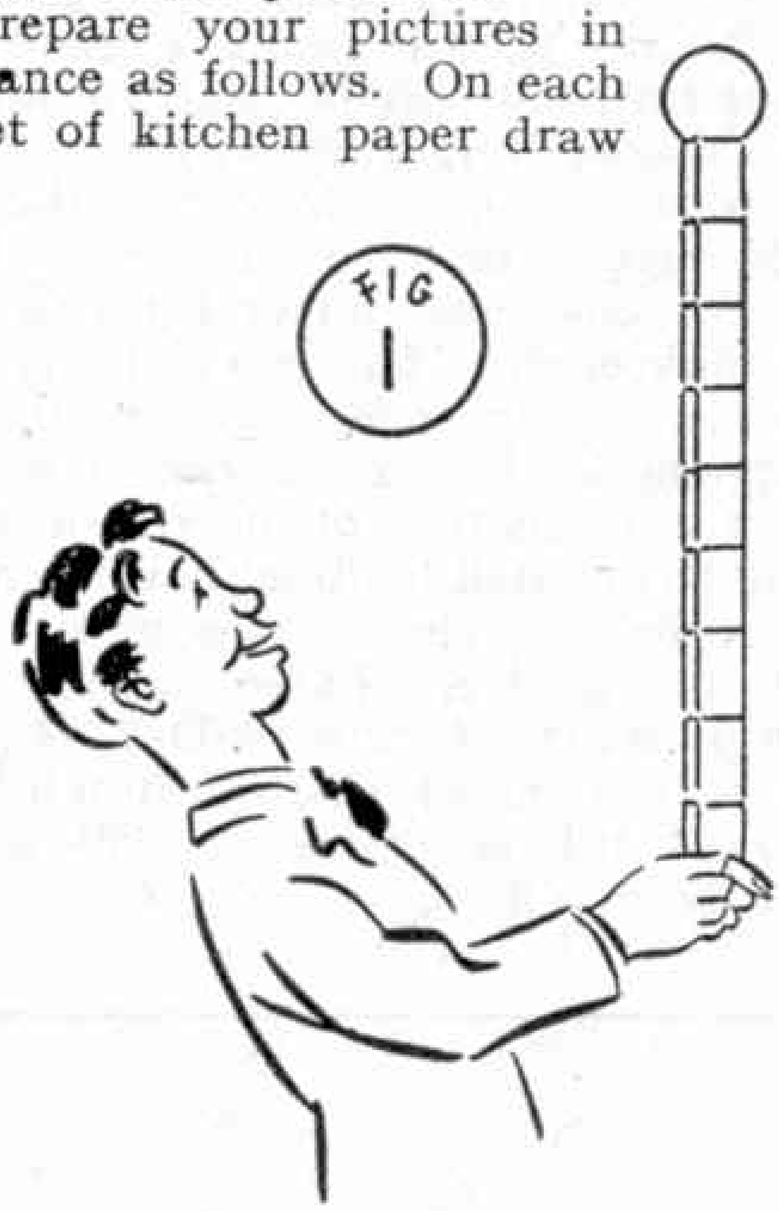
THE Editor has asked me to give you a change from my usual article on conjuring this Christmas, so I have decided to explain how you can give your friends a one-man variety show. We will start off with:

LIGHTNING SKETCHES

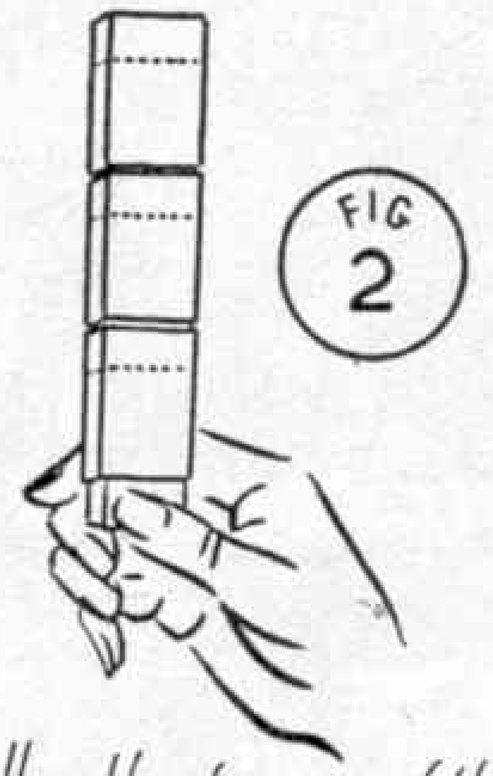
You do not have to be an artist to give this part of the show. You will need some large sheets of kitchen paper, a board to pin them on and some sort of easel to stand the board on. An ordinary chair makes a good easel if you stand it on a box to make it higher. You will also need some black chalks and a few coloured ones.

Your act will consist of making several rapid sketches in black and white, then one in colour. The last one is rather a mystery, until you finish it and turn the board upside down, when the audience see what the picture is.

Prepare your pictures in advance as follows. On each sheet of kitchen paper draw



very lightly with pencil a picture, copying, or tracing if necessary from a book or magazine. Then go over all the lines with Chinese white water colour, painting fairly broad lines. At a distance of a few yards the white lines will be invisible to the audience, but you will be able to see them easily and all you have to do is to go over them with your chalk. A good subject for the last picture would be a portrait of the King or of Mr. Churchill—you will find plenty to copy from. To put on the colour quickly, either shade with open parallel lines or else use the side of the chalk to cover the area rapidly. Don't try to put in a lot of detail, a bold outline drawing is most effective.



How the drawers of the boxes are interlocked

The second part of your show is:

JUGGLING

Here, too, no skill is needed. The first juggle consists of balancing eight or ten matchboxes one on top of another and finishing off with a tennis ball. Fig. 1 shows the effect, and Fig. 2 explains how you manage to do it without difficulty. As you place each box on top of the previous one you push the drawer down a little way, so that the boxes interlock. The tennis ball, or other fairly heavy object, on top, steadies the whole structure.

Of course you make a great show of keeping the affair balanced. Finally grasp the ball firmly, push up the projecting part of the bottom drawer, and all the boxes will fall apart and tumble about on the floor, convincing the audience that the balance was genuine.

The second juggle looks frightfully clever, and it's frightfully easy. You open a sunshade, balance a tennis ball on the edge, start the sunshade twirling round, and keep the ball running round the edge. No, this doesn't mean seventeen weeks' practice, it means a foot or so of black



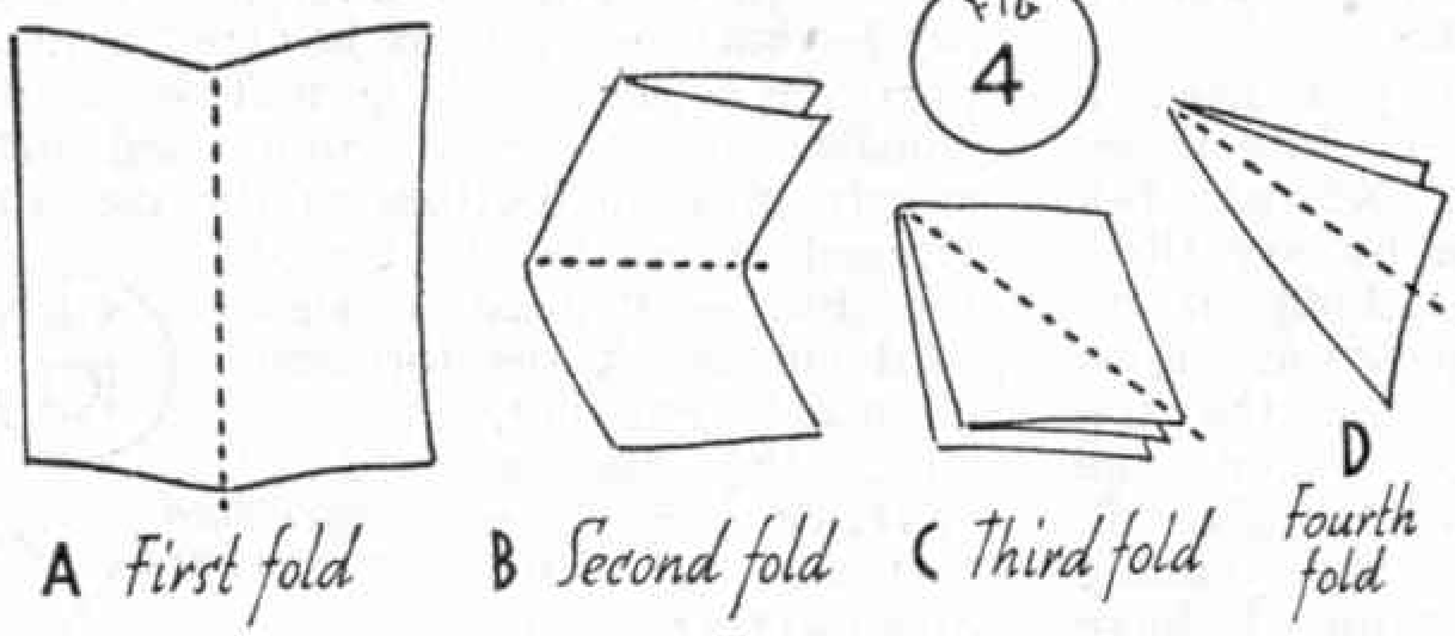


FIG 4

cotton and a little curtain ring. Tie one end of the cotton to the ring and fix the other end to the ball. The distance between ring and ball must be a little less than the distance from the ferrule of the sunshade to the rim.

To perform the juggle, open the sunshade. Then, under pretence of balancing the ball on it, slip the ring over the ferrule

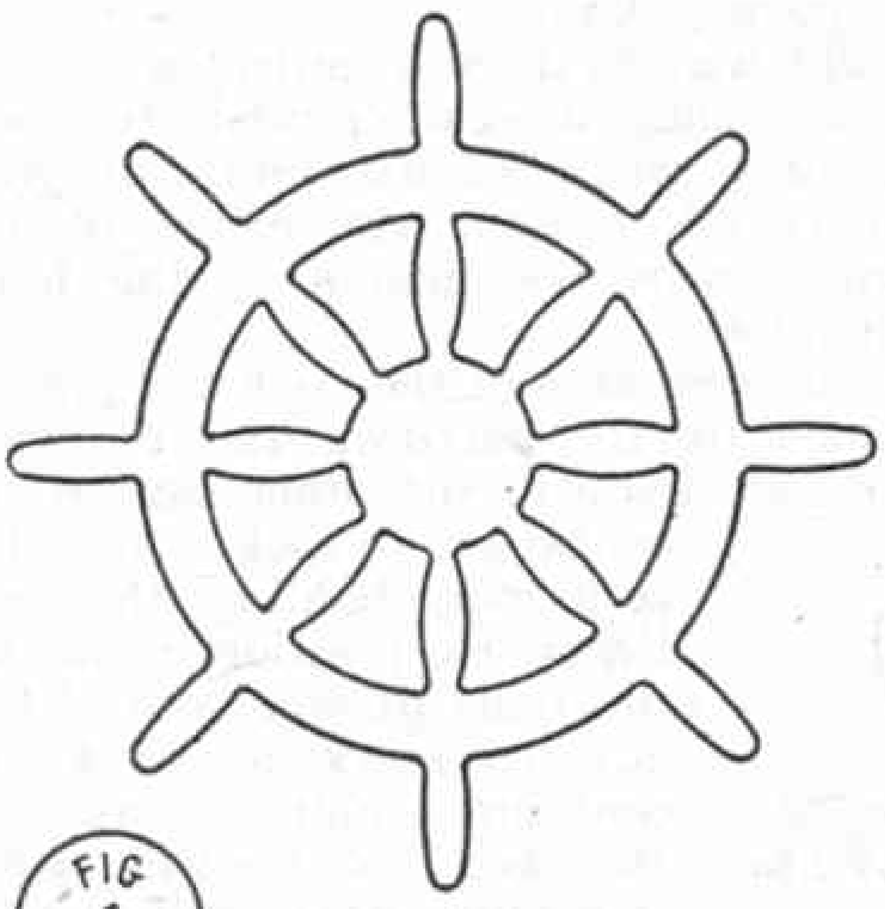


FIG 6

(if you use a Japanese sunshade you must drive a small headless nail into the wooden ferrule to take the ring). Now give the sunshade a sharp twirl with one hand as you let go of the ball. Keep the sunshade twirling and the ball will go bouncing round. Be careful to tilt the sunshade so that the trick looks possible; which as a matter of fact it is, in the hands of an expert. Finish the trick by tossing the ball into the air, thread and all, and close the sunshade. Fig. 3 will make everything clear.

The juggling act being over we pass straight on to:

PAPER TEARING

This always impresses an audience as being very skilful, but actually it's as easy as falling off a house, and hurts a lot less.



FIG 5

You begin by folding a large piece of paper into a sort of dart; tear off a few bits, open it out and you have a SHIP'S WHEEL.

Prepare your paper in advance. Take a square sheet of kitchen paper or thin coloured paper. Fold it in four, then fold diagonally; finally fold diagonally again as shown in Fig. 4, A to D. On the folded paper lightly draw the outline shown in Fig. 5. In this illustration the shaded part shows the part you tear away, but do not put this shading on the paper; the pencil outline is only to guide you and should not be seen by the audience.

Bring the paper on open, fold it into its folds, which will be quite easy as it will practically fold itself back. To the accompaniment of a little music proceed to tear round your pencil lines. The secret of getting a good clean tear is to tear round your thumb nail, tearing first round your right thumb nail, then round your left, according to which way the tear has to curve. Shake out the design and it will appear as in Fig. 6. "*A Life on the Ocean Wave*" or some other nautical sort of tune will help the effectiveness of the act. Hang the wheel against a dark curtain and proceed to

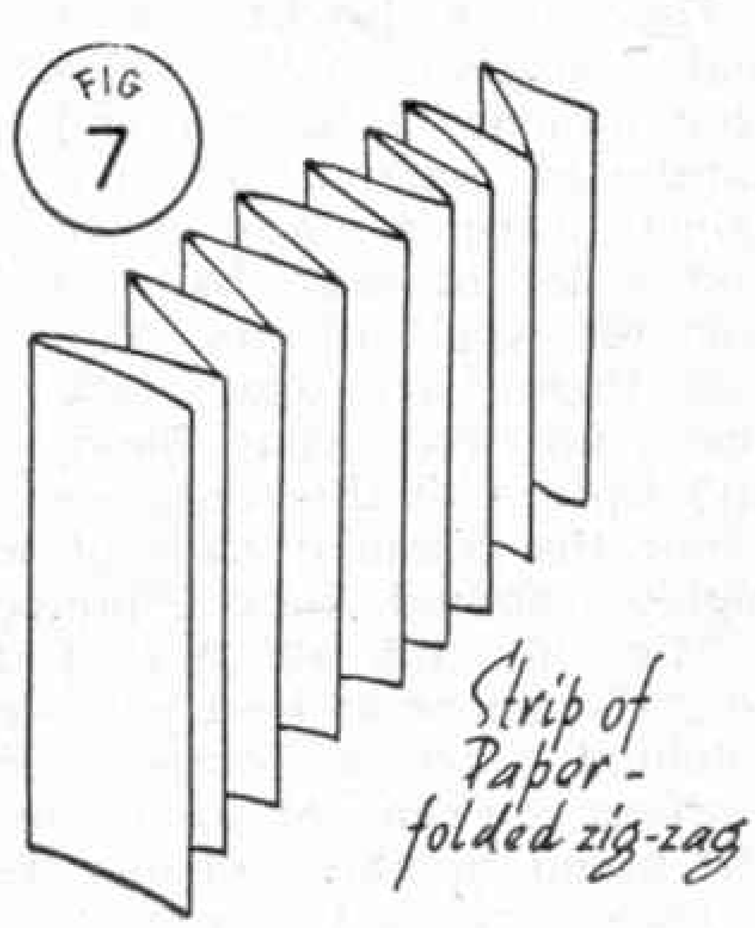
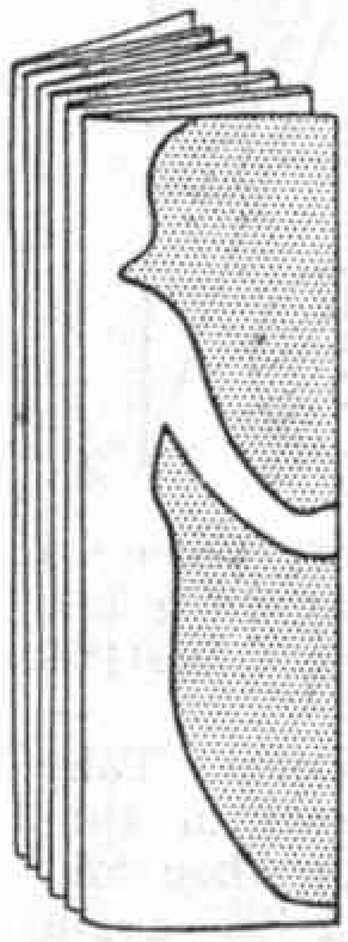


FIG 7

FIG 8

Design for tearing Jolly Jack Tars



the second item, JOLLY JACK TARS.

For this you need a long strip of white paper measuring about ten inches wide by say three feet long. Fold it in accordion pleats as shown in Fig. 7. On the top fold, lightly pencil the shape shown in Fig. 8. Here again the shading is not put on, I have included it to show you the parts you tear out. For this item you can bring on the paper ready folded, show it, tear out the pattern to a tune such as *"All the Nice Girls love a Sailor."* Then, when you open out the strip, you will find you have a row of little sailors standing hand in hand as if dressing ship.

One word of caution. Use thin, soft paper for this act. Ordinary kitchen paper is quite good. Tissue paper is too thin and fragile, but be careful not to use a hard or thick paper or you will find it too tough to tear easily. With kitchen paper or something similar it is surprising how many thicknesses you can tear through at once if you remember my previous tip, always to tear round your thumb nail, which acts as a sort of cutter.

Now I think, just to keep up the old tradition, we should have just one item of:

MAGIC

Here is a bright, quick and effective trick. You pick up one of those round cardboard waste-paper containers, turn it upside down and a lot of little balls of coloured wool fall out. You toss them back again, stir them up with your hand, and tip out of the container —not the coloured balls of wool—but a highly coloured knitted jumper or scarf.

The only difficult part of this trick is to get someone to lend you a nice fiercely coloured scarf or jumper. Failing that perhaps you can get round your sister or girl friend to knit you one specially.

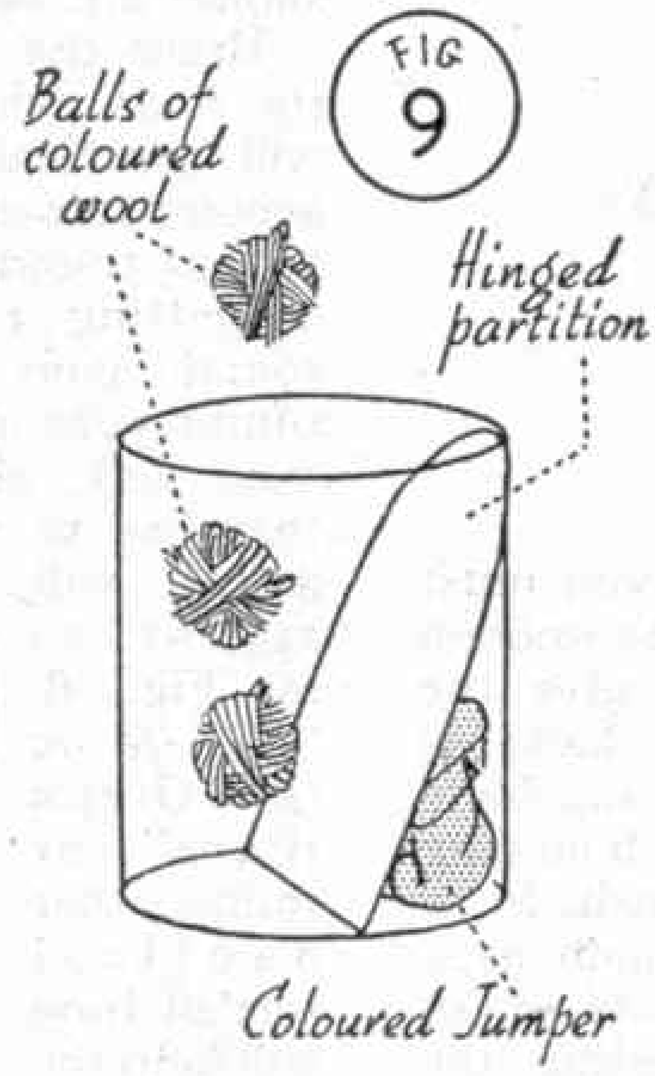
The cardboard container is just a cardboard cylinder of suitable size, closed at the bottom. Into it is fitted a hinged partition as shown in Fig. 9. This partition consists of a disc of stout card fitting snugly into the bottom of the container. Hinged across the centre of the disc is a piece of thin card curved at the top and of such length that, when the disc is resting on the bottom of the container, the partition lies slatwise inside, the top coming just below the rim of the container (Fig. 10). To be an exact fit, the hinged partition should really be half of a perfect oval; but if you do not happen to know the right way to draw a perfect oval, you will find that a semi-circular top will work quite well, because you can press the partition against the inside of the container with the fingers of the hand that hold it.

FIG 10



At the beginning of the trick the jumper is hidden by the partition and the balls of wool are loose in the other side of the container. Pick up the container, holding the partition in position, and tip the balls of wool out. It is not necessary to show the container empty, as the audience, not knowing what is coming next, will assume the container to be empty after seeing it turned upside down.

FIG 9

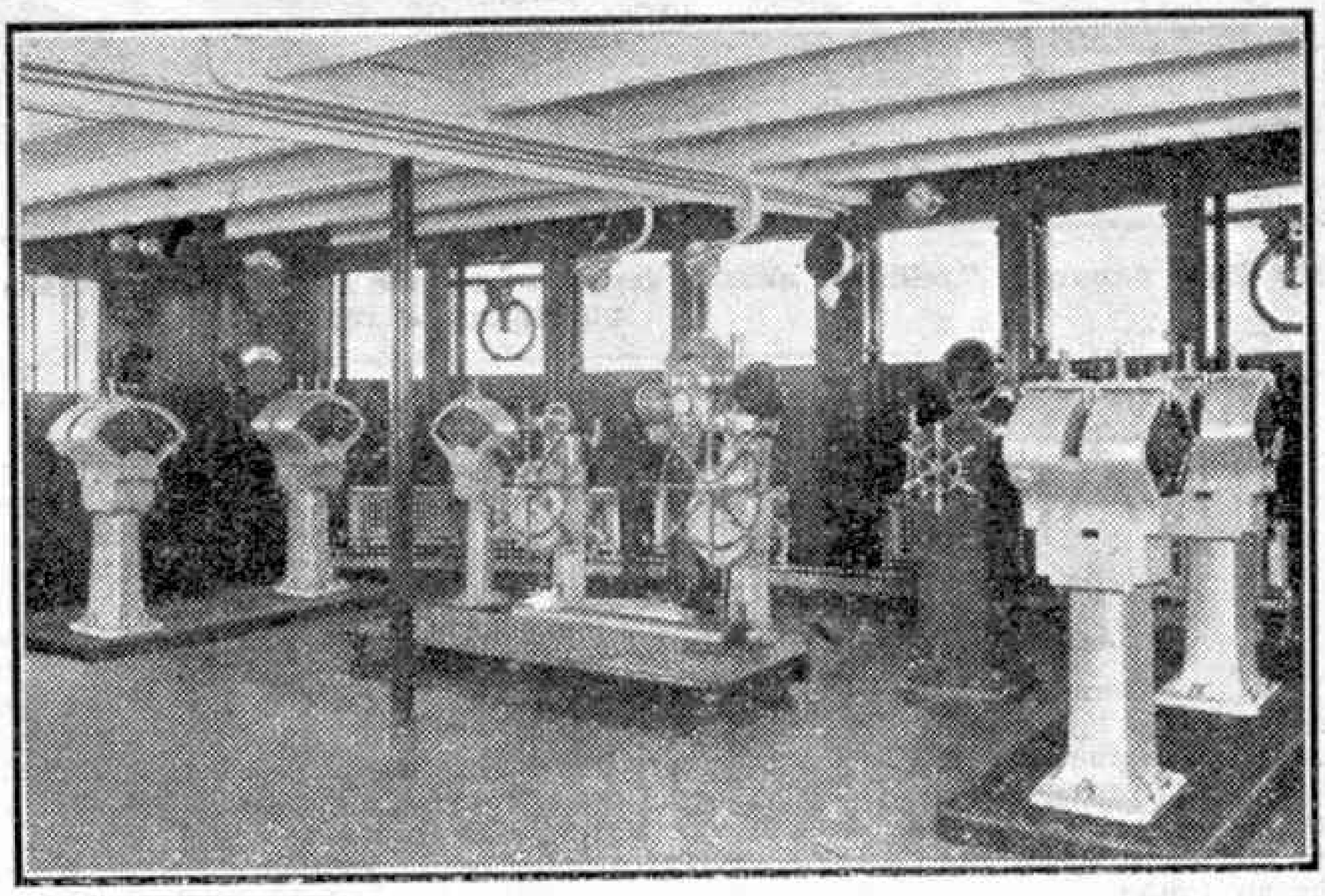


Now pick up the balls of wool, toss them into the air and catch them in the container. Stir them about with your hand, and under cover of this movement switch the partition over so that it covers the balls of wool and uncovers the jumper. Now grasp the container at the top on the side where the partition now rests, gripping the top of the partition with the fingers that hold the container. Swing the container over and toss the jumper out. Put the container aside, pick up the jumper and display it.

Before presenting your show rehearse it a few times so that it runs smoothly.

Electric Telegraphs for Ships

WITH the change-over from sailing vessels to steam-driven ships, a reliable and speedy method of transmitting orders from the bridge to the engine room became a vital necessity. Early records show that one of the first methods employed was for the Captain on the bridge to shout his order to a deck boy stationed at the top of the engine room skylight hatch, who in turn repeated the order to the engineer down below. This primitive arrangement was very soon displaced by the introduction of the old-fashioned speaking tube, but this also had its drawbacks, particularly regarding the confusion of tongues. This in turn was superseded by the mechanical telegraph which was welcomed by both bridge and engine room personnel.



Telegraphs in the wheelhouse of the liner "Queen Mary." A similar installation is fitted in the "Queen Elizabeth." Photograph by courtesy of Siemens Brothers and Co. Ltd.

Mechanical telegraphs have proved reasonably satisfactory on small craft, but when installed on larger ships the method of operating wire ropes or rods and gear wheels has serious limitations. Although the method of using wire ropes has the appearance of simplicity, the stretching of the ropes can frequently give rise to trouble. It will be appreciated that the heavy initial tension required on the ropes to enable the movement to be transmitted without appreciable stretching often causes them to break when being moved for sending an order, and in any case the tension requires frequent adjustment to ensure the accurate transmission of the necessary orders. Again, the methods of using rods and bevel wheels often presents difficulties arising from the torsion of the rods and backlash in the gear wheels. The high cost and inconvenience of fitting this equipment for mechanical telegraphs also arises in many instances, particularly in connection with ocean-going passenger ships.

With the Siemens electric telegraphs the disadvantages of mechanical operation are all overcome, and there is the further advantage that the instruments can be fitted in any desired position. The operation of these instruments is not affected in any degree by the distance between them, and the passenger accommodation does not need to be studied in running the necessary electric cable as is the case with the installation of the gear required for the operation of a mechanical telegraph. Furthermore, the installation costs of the necessary cable are lower, also the length of the cable need not be given serious consideration.

From time to time various methods of telegraphing by electrical means have been introduced which depended upon the ship's power supply for their operation, and for this reason they have been considered unreliable. The power required to operate Siemens telegraphs is so small that a dry cell battery is employed.

The action of this apparatus is quite positive and the orders are transmitted over any distance without lag or inaccuracy. The standard telegraph instruments, which are supplied for single and twin engines, can be operated from one transmitting position, or two transmitting positions coupled together for use on either side of the bridge as will be seen in the illustration on this page. They are mounted on suitably designed columns with provision made for ease of access to the cable and (*Continued on page 469*)



The 36-60 passenger "Jetliner" aircraft designed and built by A. V. Roe Canada Ltd., by courtesy of whom this photograph is reproduced.

Air News

By John W. R. Taylor

Avro Canada's "Jetliner"

The handsome aircraft illustrated above is the Avro Canada "Jetliner," which failed by only a few days to beat the "Comet" to the honour of being the world's first pure-jet air liner. Plans for its production are well advanced, however, and it will certainly be one of the first jet air liners in regular service on the air routes.

The "Jetliner" is a 36-60 passenger aircraft designed for short and medium-range inter-city routes. It is powered by four Rolls-Royce "Derwent" 5 (civil) engines, which give a total of 14,000 lb. thrust. Intended to fly fast and high, the "Jetliner" will normally carry 50 passengers and their luggage up to 500 miles at a cruising speed of 427 m.p.h. at 30,000 ft. It is thus a most useful addition to the range of Empire-built civil transports, and one of which Canada's young aircraft industry may be rightly proud.

Malayan A.T.C.

The first squadron of a new voluntary youth organisation, the Malayan Air Training Corps, has been formed at Singapore, and already has 150 members. It is organised on similar lines to the Air Training Corps in this country, is supported by the Government of Singapore, the Federations of Malaya and the Royal Air Force, and is open to youths between 16 and 18 of all communities. Members are trained in a range of flying subjects as a preliminary to entering the R.A.F. or civil aviation. Another aim is to provide recreational centres where boys of all races can meet.

During visits to R.A.F. stations, Malayan A.T.C. cadets are given flights in "Dakotas" and in "Sunderland" flying boats, and shown the working of Air Traffic Control Centres and Operations Rooms, as well as R.A.F. maintenance methods. Exceptional cadets may be awarded scholarships providing flying training up to "A" licence standard at the Royal Singapore Flying Club.

The "Avon"

Highlights of this year's S.B.A.C. Show at Farnborough were the aerobatic displays put up by the English Electric "Canberra" jet bomber and a special experimental version of the Gloster "Meteor" fighter. Each aircraft was powered by two of the new 7,500 lb. thrust Rolls-Royce "Avon" engines, which develop the equivalent of 12,000 h.p. each at 600 m.p.h., and are the most powerful engines ever flown.

The "Canberra" was displayed with the dash and agility of a fighter, but its capacious bomb-bay gave a good indication of its still-secret offensive power. The "Avon-Meteor" made a phenomenally-fast climb to 40,000 ft. in a fraction over four minutes, a performance which should be compared with that of the "Beryl-Meteor," which was hailed as little short of miraculous last year when it climbed to the same height in 7½ minutes.

The pilot of the "Avon-Meteor" demonstrated another of its virtues when he dived across the airfield with both engines shut off, trailing two greyish-green plumes of unburned kerosene. With the plumes still breaking from the jet-nozzles, he flattened out, then went into a rolling climb. Just as it seemed he must stall, the plumes vanished, the engines roared into life and the "Meteor" continued its climb. This was the first indication that Rolls-Royce have solved the problem of how to re-light jet engines instantaneously during flight—a problem that has cost several lives in the past and which has not been solved satisfactorily anywhere else in the world.

"Viscount's" C. of A.

An important stage in the development of the Vickers "Viscount" was reached on 15th September last, when it was granted a Certificate of Airworthiness, the first jet air liner in the world to achieve this distinction. The C. of A., which must be obtained before a British air liner can be used for airline passenger-carrying, automatically ensures compliance with the new International Civil Aviation Organization performance standards, which have just come into force.

In the 14 months following its first flight on 16th July 1948, the prototype "Viscount" flew for 290 hrs., during which time it covered over 50,000 miles and made more than 320 take-offs and landings.

Middle East Airlines

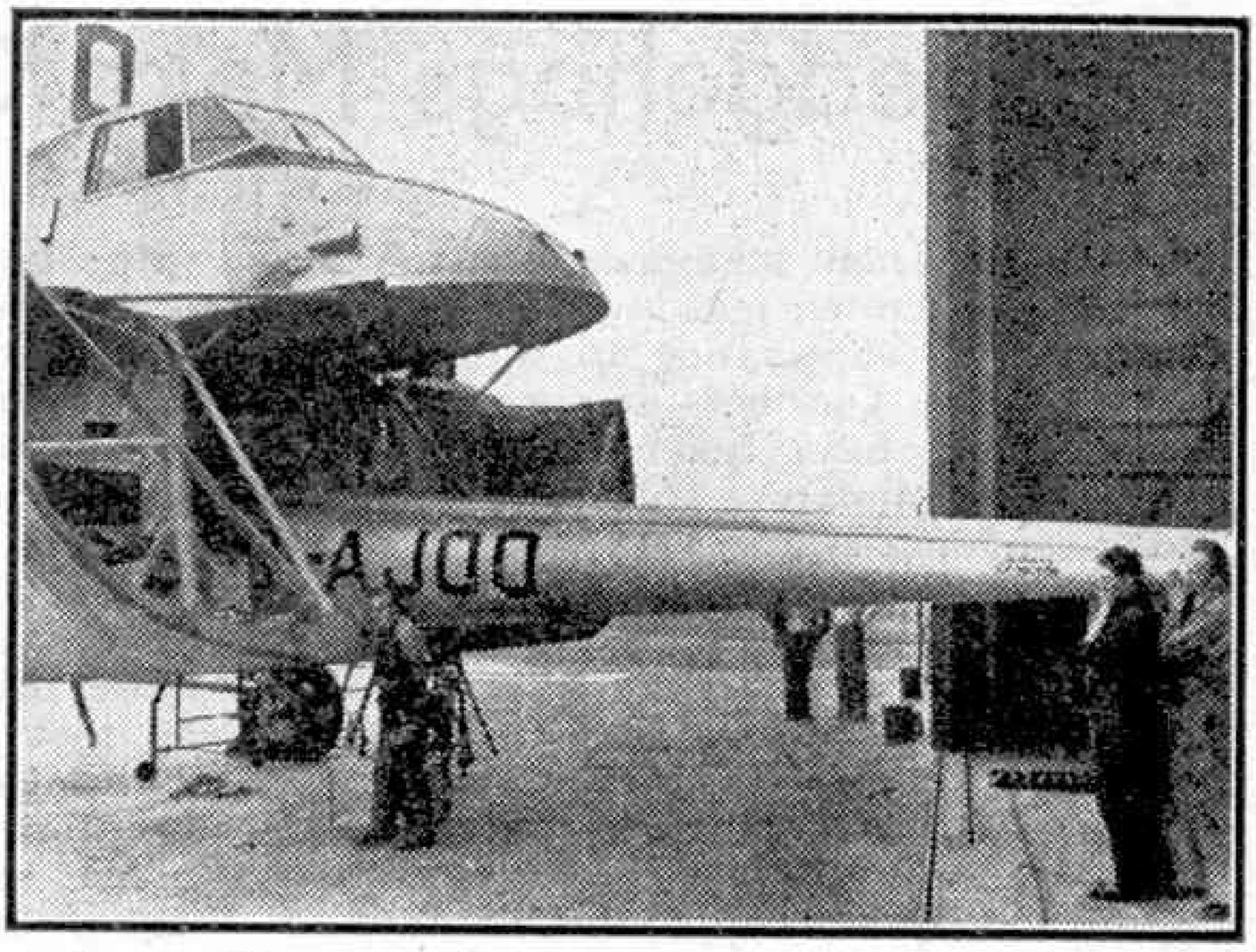
Pan American World Airways have acquired a 36 per cent. interest in Middle East Airlines in exchange for three "Dakotas," other materials and equipment.

The independent Middle East Airlines have consistently shown a profit, and have a perfect safety record after more than three years' operations. They operate scheduled flights from Beirut to Cairo, Damascus, Baghdad and Nicosia, Cyprus, with frequent charter services to the Persian Gulf and Turkey. The Company's schedules therefore link up with P.A.A.'s "Constellation" services at Damascus.

Australian "Vampires"

The Australians were given a striking demonstration of the performance of the R.A.A.F.'s latest fighter when an Australian-built "Vampire" recently set up new records in both directions between Sydney and Melbourne. In the face of a head wind, it flew the 460 miles from Sydney to Melbourne in 67 min. and, after refuelling, returned in only 55 min. The previous record time of 1 hr. 22 min. had been established by a "Constellation."

The two additional air intakes behind the cockpit hood, which distinguish the Australian-built "Vampires" from those produced in Britain, can be seen in the lower illustration on this page, showing the first "Vampire" completed "down under." These intakes are needed because the Australian version is powered by a locally-manufactured Rolls-Royce "Nene" turbojet, instead of the more usual de Havilland "Goblin."



Loading a "Spraycopter" helicopter into the hold of a Bristol "Freighter" for transport to the Sudan. (See special article on page 474 on the use of helicopters for crop spraying).

Flying Cinema

The U.S. Navy's 180-passenger Lockheed "Constitution" was used as a "flying cinema" recently when it cruised over New York at 15,000 ft. while the Navy showed films dealing with its work in locating destructive hurricanes. The "Constitution" is the largest air transport 'plane in regular service anywhere in the world, and normally is used for rapid transport of key U.S. Navy personnel and freight between the Atlantic and Pacific Fleets. For this particular mission it was specially equipped with a large silver screen against the forward bulkhead of its upper deck, which seats 92 persons.

The demonstration was more than just a stunt, for it is almost certain that the next generation of large air liners will feature a small cinema as part of their normal passenger amenities. In fact it has already been announced that the British "Brabazon" air liner and "Princess" flying boat will be so equipped.

Reduced Winter Fares

Aer Lingus have announced cheaper fares for their Winter services. On the main cross-Channel routes—between Dublin and London, Liverpool, Manchester, Birmingham and Glasgow—the present mid-week excursion fares will be available on every day of the week. This means that the week-end return fare between Dublin and London, which stood at £14 17s. in October last year, has been reduced to £11.

The Dublin-Isle of Man service for the first time will be operated through the Winter on a once-weekly basis, and the 17-day Winter fare of £4 return represents a considerable saving on the normal return fare of £5 8s. The Dublin-Paris fare has been correspondingly reduced to £23, which compares favourably with surface transport rates on this important route.

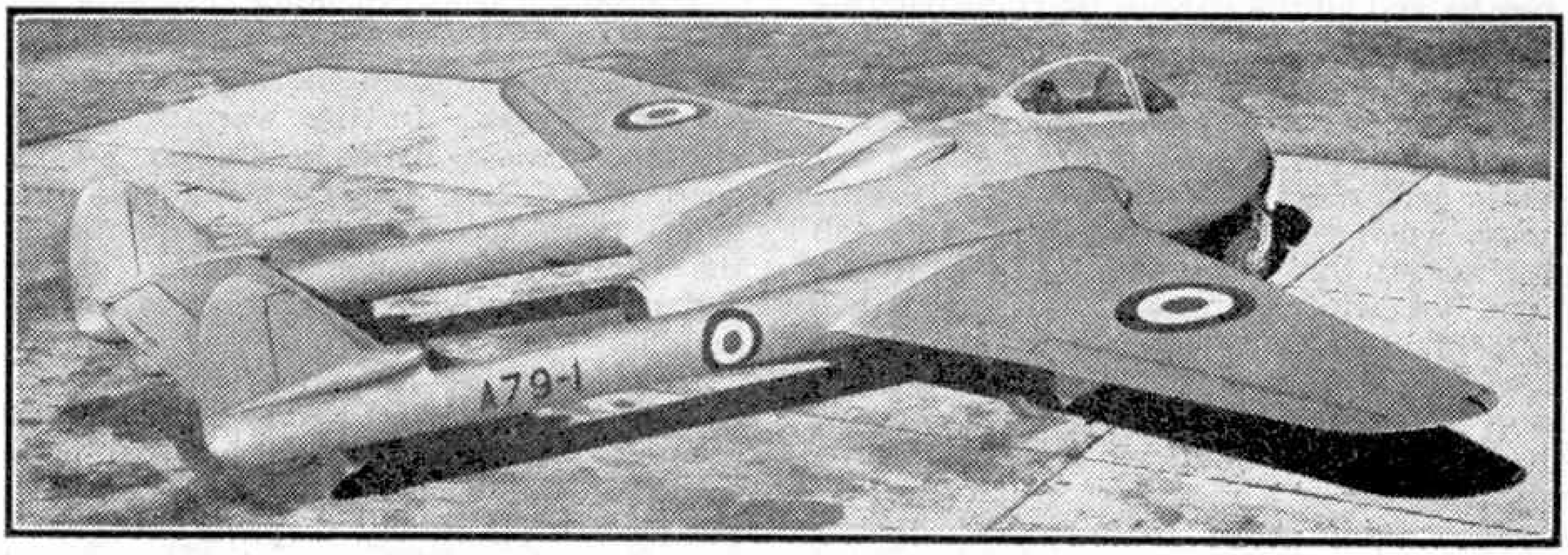
"A Girdle Round the Earth"

The Shakespeare Memorial Theatre Company, like Puck, are "putting a girdle round the earth" by making a flying tour to Australia and New Zealand, returning home across the Pacific and the United States. Even with B.O.A.C.'s help they will not be able to equal Puck's schedule of 40 min. for the trip, but will cover their 30,000-mile journey in about 100 hrs.' flying time.

The 33 members of the company, headed by Diana Wynyard and Director Anthony Quayle, left London for Sydney early in October, accompanied by 55 costumes for the play "*Much Ado About Nothing*." Scenery for this play and "*Macbeth*" had already left for Australia by ship. The company will fly home early in February, in time for the 1950 season at Stratford.

Flying Boat Feat

A "Hythe" flying boat of B.O.A.C.'s No. 4 Line recently flew 117 tons of agricultural machinery, including such things as harrows, disc ploughs, tractor wheels and brick-making machines, between Lindi, Tanganyika, and N'Kata Bay on Lake Nyasa, in connection with a Colonial Development Corporation project.



The first Australian-built "Vampire" jet fighter.

Hedgehogs Make Good Pets

By R. H. Ferry, F.Z.S.

OF all the small mammals that inhabit our hedgerows, meadows, and woods, none is more captivating to watch than the hedgehog. One feels at once that the Creator must have taken extra care in making this miniature wild pig, which is so self-confident and so well armed against the dangers of the outside world.

If you keep a fox cub, young badger, or otter-lit as a pet, the time will assuredly come when the "call of the wild" is felt, and the animal pines for its freedom. A hedgehog on the other hand is an ideal pet. It can be turned loose in a garden, where it will live quite happily in a state of semi-captivity, doing at the same time a great deal of good by eating slugs, snails, beetles and all the various pests destructive to plant life. To make the little beast content at home, it is a good thing to put a saucer of bread and milk, or a few broken dog biscuits, at the same time and place each day. The pet will soon become tame when treated in this way, and will run to get this easily won addition to the food for which it has to search; but a discontented hedgehog will break out of almost any enclosure. It will easily climb a 6 ft. wire netting fence, and burrow beneath the foundations of a wall in a night!

If it is intended to keep a hedgehog through the winter, a big wooden box filled with hay should be put in a sheltered position under a bush, and about November the hedgehog will choose this site for its hibernation. After this has happened, of course, no tit-bits of food will be necessary.

In the wilds hedgehogs certainly prefer to hunt by night, but in gardens they appear to extend operations, and it is quite possible to watch and follow them on their foraging expeditions on summer and autumn evenings. If one is fortunate in procuring a boar and sow they will breed in captivity, and three to four naked blue-skinned little youngsters will appear in early June.



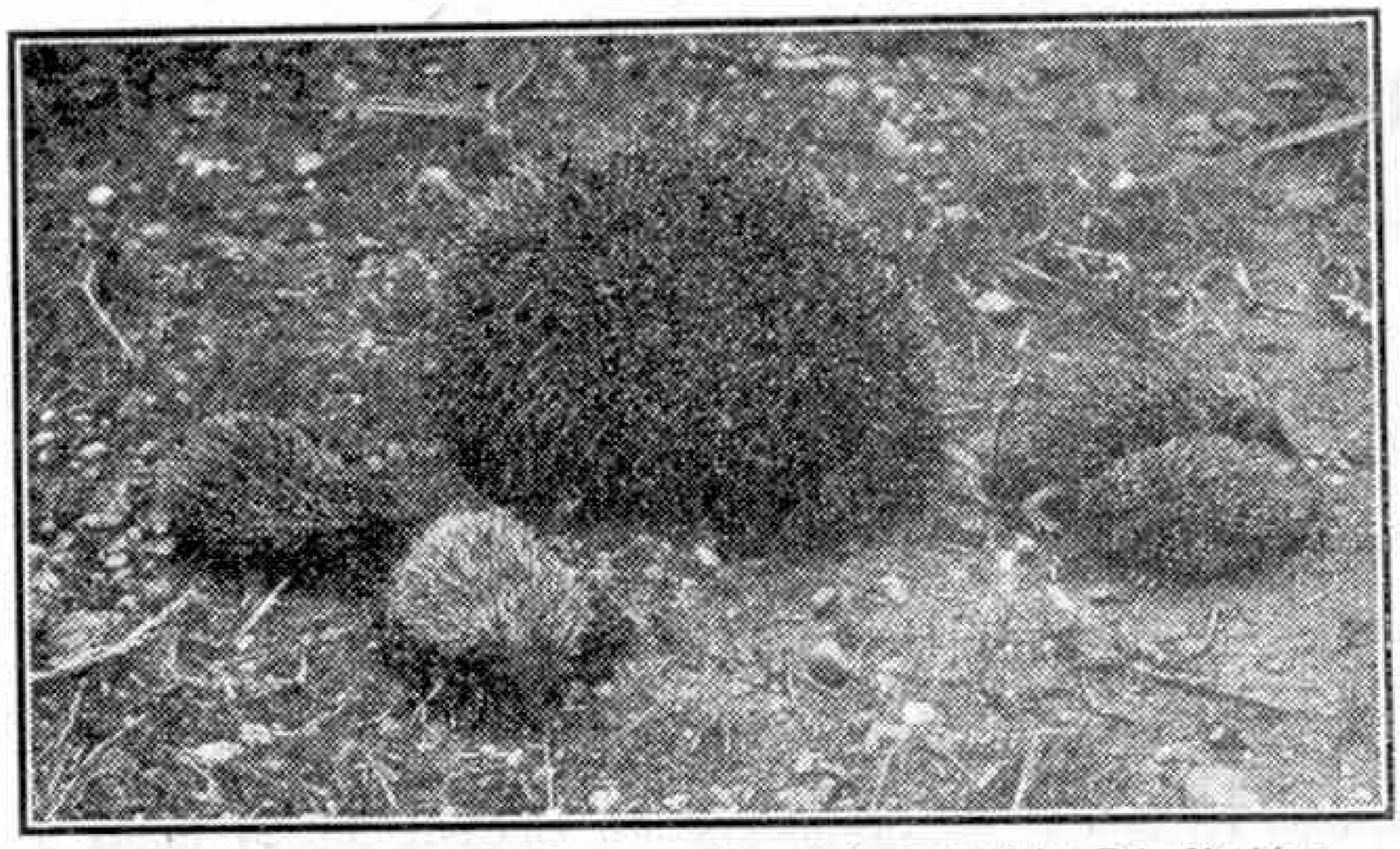
The hedgehog looks out, but is ready to roll himself into a spiky ball at a moment's notice. Photograph by Eric Hosking, F.R.P.S.

Hedgehogs are not popular with gamekeepers on big estates, as they will eat any eggs they come across, and also will attack young partridges and pheasants, so that they are fairly easy to come by in the country.

Just before the winter, in common with other hibernating animals, hedgehogs eat ravenously, and at this time of the year, when they are fat, gypsies catch and cook them, baking them in balls of clay. When the earth jacket is broken away, the spikes come off from the flesh and a tasty "urchin" steak remains. Even recently in a New York luxury hotel English hedgehog was the bonne-bouche on the menu.

A Romany friend of mine once gave me the good advice not to look for hedgehogs, but to listen for them snoring on a sunny woodside bank. In the warmth of the afternoon these little beasts go into a deep sleep, but their whereabouts are given away to anyone sitting quietly in the vicinity by snores, contented grunts and asthmatical breathing that is readily audible.

In olden times hedgehogs were treated as vermin, and many parish records show accounts of cash paid out for their destruction, the usual fee being about 2d. per head. But to-day they are recognised as extremely useful animal helpers and



A hedgehog brood, a family scene also photographed by Eric Hosking.

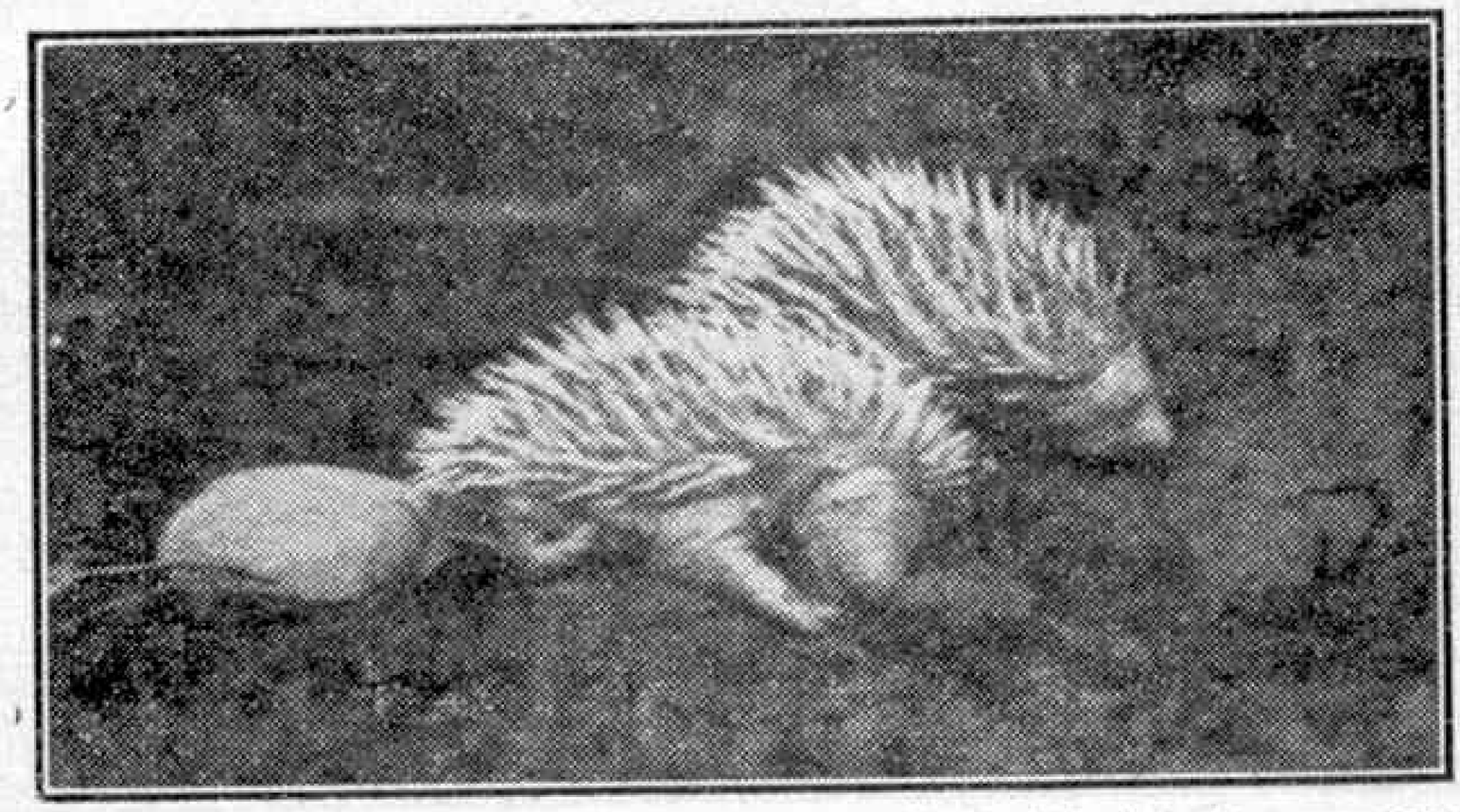
pest controllers in the great agricultural effort to grow more food. Nicknames are always a sure guide to popularity, and hedgehogs probably have more local names than any other wild animal in England. The Anglo-Saxons knew them by the name of "il." The most common country name of urchin is derived from the French name "herichun." Shakespeare refers to them by this name, and also as "hedgepigs." In Devon and Cornwall, where I live, the old farm hands call them "furzeaboar," and in the Midlands, where hedgehogs are probably more common than anywhere else in the British Isles, they are dubbed "furzemanpigs." In Somerset, a county where every beast seems to have an appropriate local name, hedgehogs are "perpentines," because of their resemblance to porcupines. There are literally scores of other names, and an interesting list pertaining to each county might well be compiled.

The spikes of hedgehogs are simply hollowed and hardened hairs. When the animal is running about they lie flat along the back like ordinary fur, and the hedgehog then appears very much like a tail-less rat—it does in fact belong to the rodent family. The spikes are only raised when the animal is on the offensive, or defensively rolled in a ball. The technique of rolling into a ball is done by contracting a wide band of muscle that runs right over the back; the body curls and the spikes automatically come into an erect position. Unlike porcupines, hedgehogs are unable to shed their spikes or leave them behind to fester in the flesh of a victim, as each is fastened under the skin at the base by a button of gristle.

Men through the ages have had a good many uses for the "hedgehog's back." The early Romans used the skin in lieu of a hair brush. Before pins were tin-plated and made of non-corrosive metal, medical students pinned out anatomical specimens under dissection with hedgehogs' spikes, as they did not rust.

Besides using them in ordinary defence against the attacks of dogs and cats, hedgehogs have other interesting uses for their spikes. When pursued and in fast retreat, the little creature will hurl itself without hesitation over any steep bank or precipitous drop, and on landing it bounces without apparent hurt, the spikes acting as "concussion springs." Just before hibernation the beast rolls in fallen leaves, thus gathering round itself a leafy eider-down to keep it warm in the long winter sleep.

As the hedgehog is one of the best known creatures in the country, it is not surprising to find a considerable amount of rural lore attached to it. In Anglo-Saxon times it was believed that hedgehogs possessed the evil eye, and (*Continued on page 473*)



These very young hedgehogs are already provided with defensive weapons. Photograph by J. H. Vickers.

Automatic Fire Extinguishers

How a Sprinkler Installation Works

By Richard Ounsworth

FIRE, an ever present enemy, causes immense damage to property and considerable loss of life each year. In 1948 Britain's bill for fire losses exceeded £18,600,000.

The best time to attack a fire is within a few seconds of the outbreak. If fire breaks out in a building at night when no help is available, ordinary fire appliances are useless. A fire may smoulder for hours before it is discovered, perhaps by a wisp of smoke seen by a passer-by, and the slightest draught is sufficient to make the smouldering material burst into angry, devouring flame.

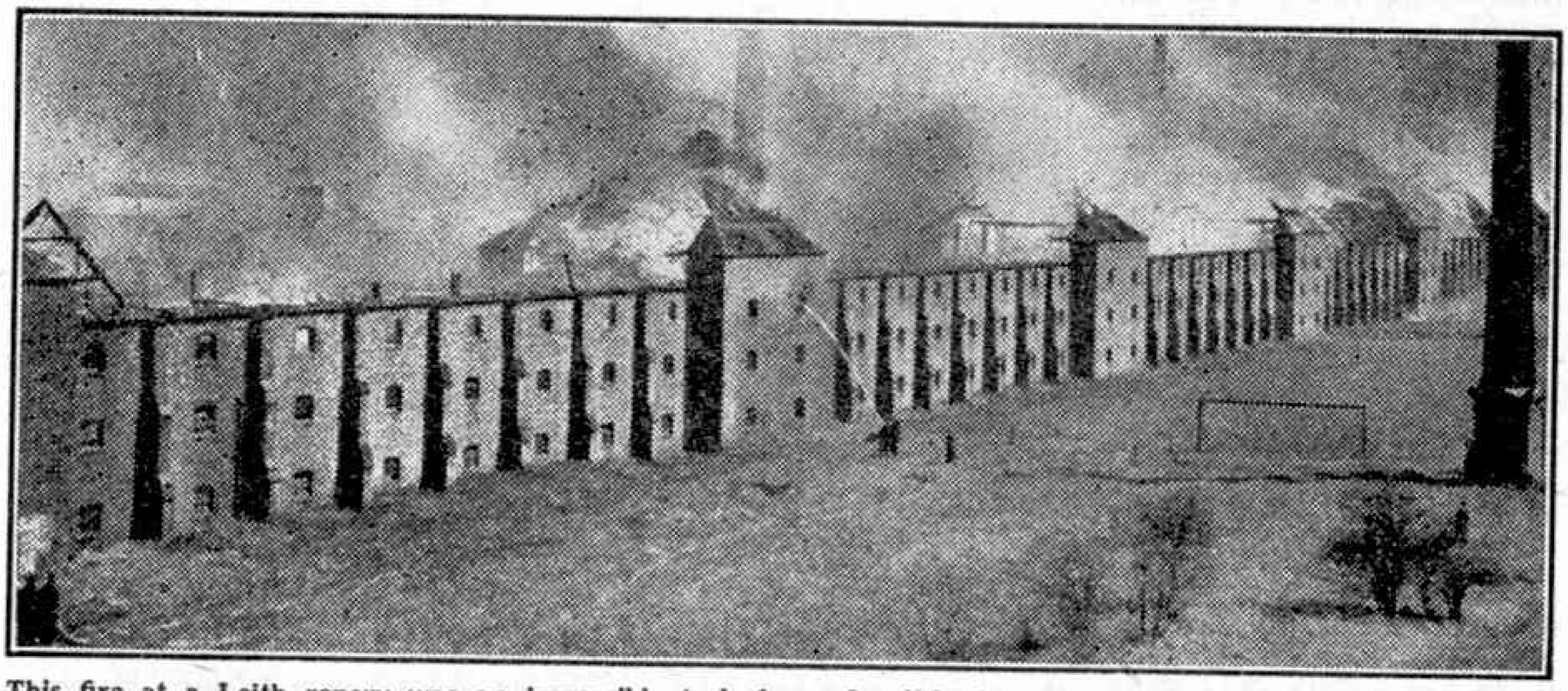
Thus it often happens that within minutes of an alarm being raised a large building becomes a mass of flame, making the task of the fire brigade well nigh hopeless.

Automatic sprinkler installations detect a fire within a few seconds of the outbreak, sound an alarm to summon help, and extinguish the fire, frequently before the arrival of the first fire pumps. They are unaffected by fumes and smoke, and will as readily tackle a fire in a confined space as one which can be reached from all sides. The official report on a recent fire in a cotton spinning mill affords striking proof, stating that they "extinguished fire when it was impossible to get near same for smoke and fumes."

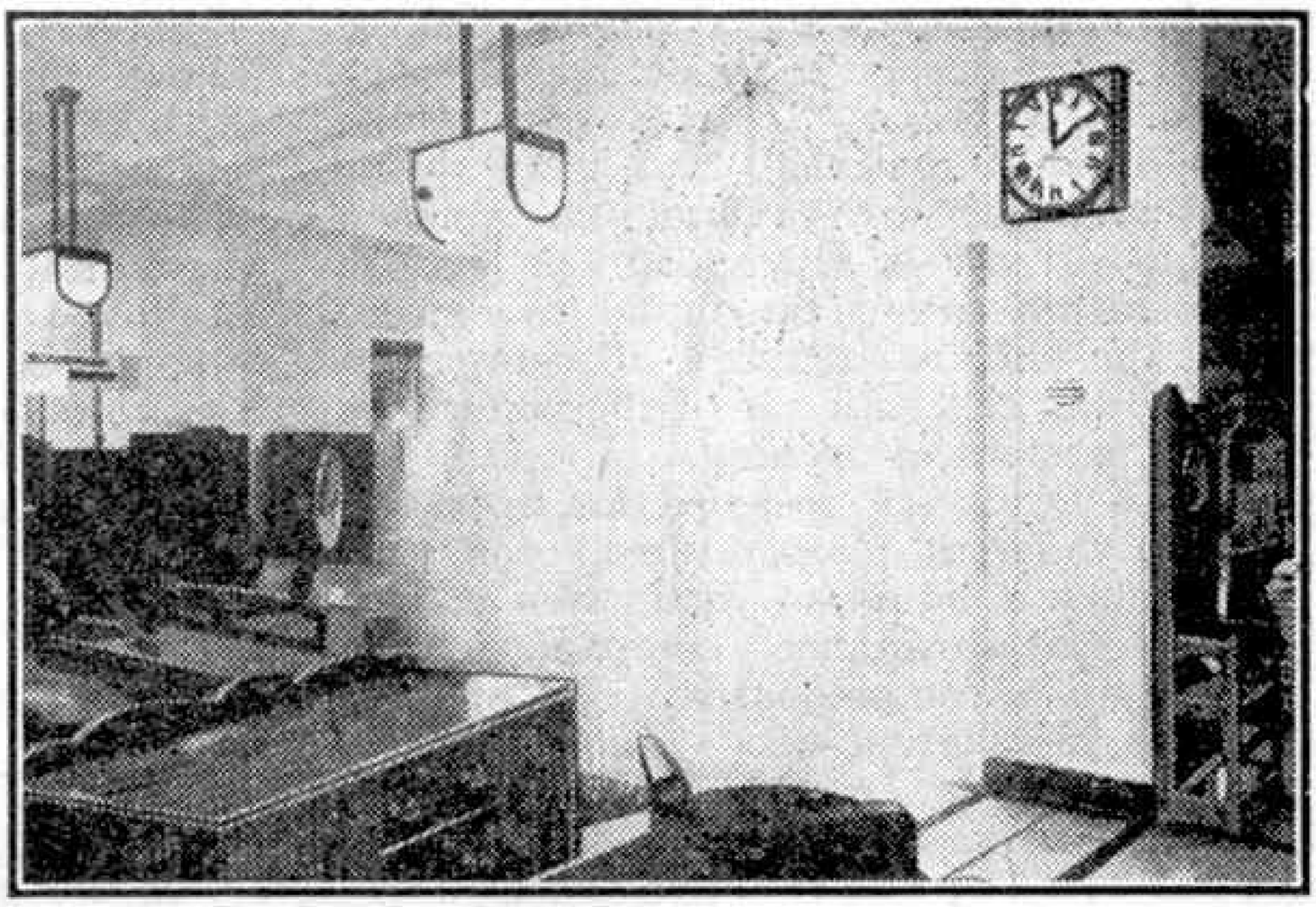
The installation comprises a network of pipes charged with water or air under pressure and suspended beneath ceilings and roof, in concealed spaces, under staircases and in every part of a building. At regular intervals along the pipe lines sprinklers are fitted, the usual requirement being one sprinkler for every 100 square feet of floor area.

Sprinklers are efficient for 24 hours a day, every day of the year, and have successfully extinguished fires 50 years after their installation. So reliable is the protection they afford that premises containing goods worth several millions are left unattended at night, the owners confident that any outbreak of fire will be speedily and efficiently dealt with by the sprinkler installation.

A large departmental store in London's West End contains stock worth a king's ransom. No night watchmen are employed, as the firm have complete faith in their sprinklers. In addition to the four alarm gongs to give immediate warning of fire—one for each sprinkler installation—there is a system of electric alarm bells that shrill a warning throughout the building as soon as the first sprinkler head opens. An alarm is also sounded in the nearest fire station, bringing the scarlet and gold pumps racing to the scene. These alarms are entirely automatic in action.



This fire at a Leith ropery was an impossible task for a fire brigade. The buildings were not protected by sprinklers. The illustrations to this article are reproduced by courtesy of Mather and Platt Ltd., Manchester.



A sprinkler head in action, with a curtain of water drenching the surrounding area.

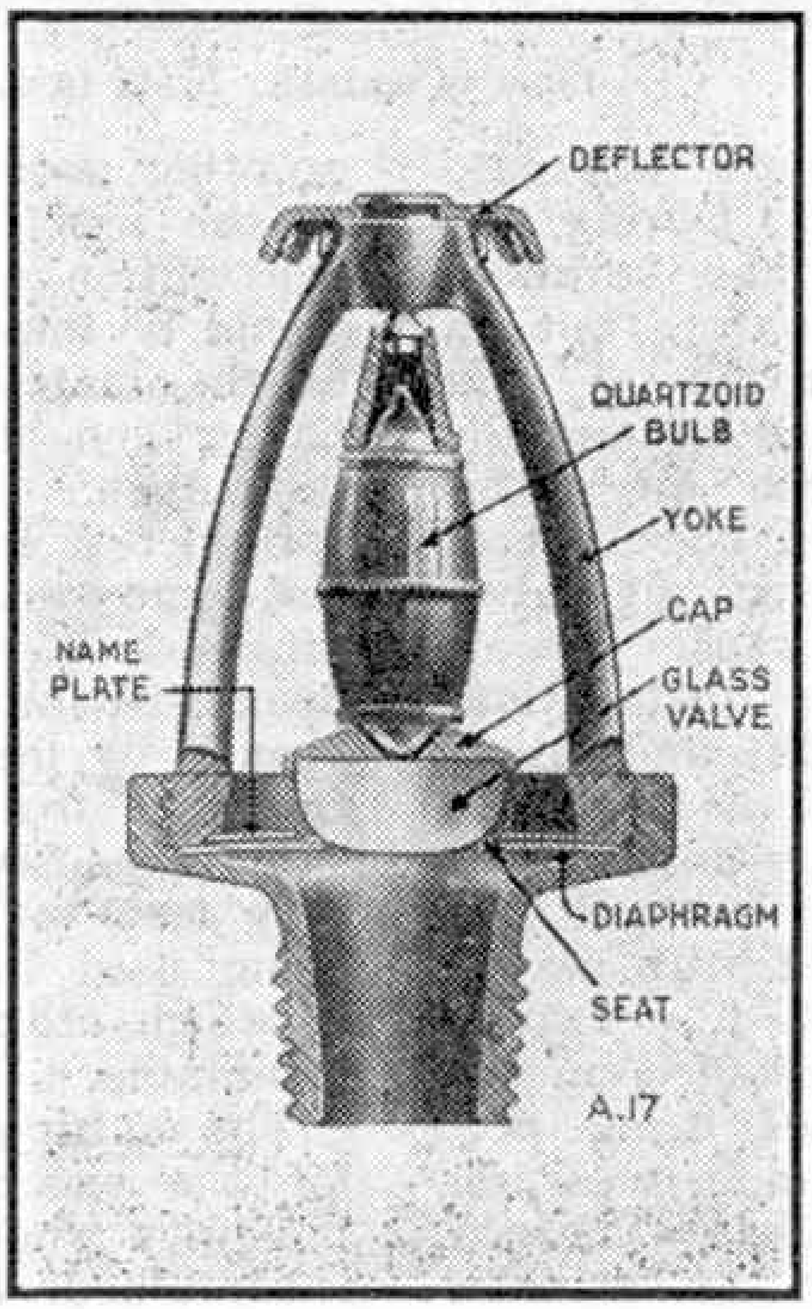
The first automatic sprinkler head was invented in 1864 by Major A. Stewart Harrison of the First Engineer London Volunteers. This pattern was not placed on the market, the first to be used commercially being an American design invented in 1874. The first installation in Britain was erected in a Lancashire cotton mill in 1882. Cotton mills have had many disastrous fires in their history on account of the dust and grease present in many of the processes, which enable a fire to spread with fearful rapidity. The most satisfactory early sprinkler head was one invented by another American, Frederick Grinnell, a few years after the 1874 type had been placed on the market. It was the forerunner of most modern designs.

Until a fire breaks out water is held back in the pipes by automatic valves forming part of the sprinkler heads. All sprinklers are made to open at a predetermined temperature, usually 155 deg. F. More suitable temperatures are used for situations where high temperatures are normally experienced, such as boiler and drying rooms, and for tropical countries.

When a fire causes the temperature in a room to rise above the predetermined figure, the struts of the affected sprinkler heads fall apart, allowing water to flow through the opened heads. The water is not projected on the fire in the form of a solid jet, but is broken by a deflector so that it descends in a drenching shower. If the fire spreads, additional heads open and the whole area involved by the fire is drenched with water. Within a few seconds of the opening of the first sprinkler a turbine gong is actuated by the water flowing through the pipes and the alarm sounds outside the premises protected. This alarm continues to ring until the supply of water to the turbine gong is turned off. A metal plate, always seen outside sprinklered buildings, bearing the words "SPRINKLER STOP VALVE INSIDE," indicates where the installation valves are housed, to avoid delay in shutting off the water supply when the fire has been extinguished.

Since sprinkler systems were first introduced over 100 different types of head have been designed, improving on earlier patterns. To-day there are upward of 20 different patterns approved by the insurance companies. The majority of these depend for their operation on the melting of a fusible link or strut under heat from a fire, when water is released. It has been found that in certain situations where corrosive fumes may be present, or where moisture-laden sea air has attacked the heads for a number of years, they become corroded and their efficiency often is impaired.

To overcome this difficulty the glass bulb sprinkler has been evolved. The bulb holds the valve in position until heat from a fire causes it to break up; water is then discharged on to the fire. The Quartzoid bulb



A Grinnell quartzoid bulb sprinkler head of the modern type in use to-day.

head manufactured by a leading firm of sprinkler engineers is proof against such forms of corrosion. It is of very strong and durable material, and after being filled is sealed with a liquid in which a bubble of gas is entrapped. A rise in temperature causes the liquid to expand until the bulb is shattered, all component parts being thrown clear of the waterways at the moment of opening.

These heads are designed for operation at five different temperatures, each type containing a liquid of distinctive colour.

The fire insurance companies have drawn up a comprehensive code of rules for the installation of sprinklers. A large building may require several separate installations to afford protection, each with its own set of installation valves and alarm gong, although all may be supplied from the same water mains. One installation does not as a rule serve more than 1,250 automatic sprinklers.

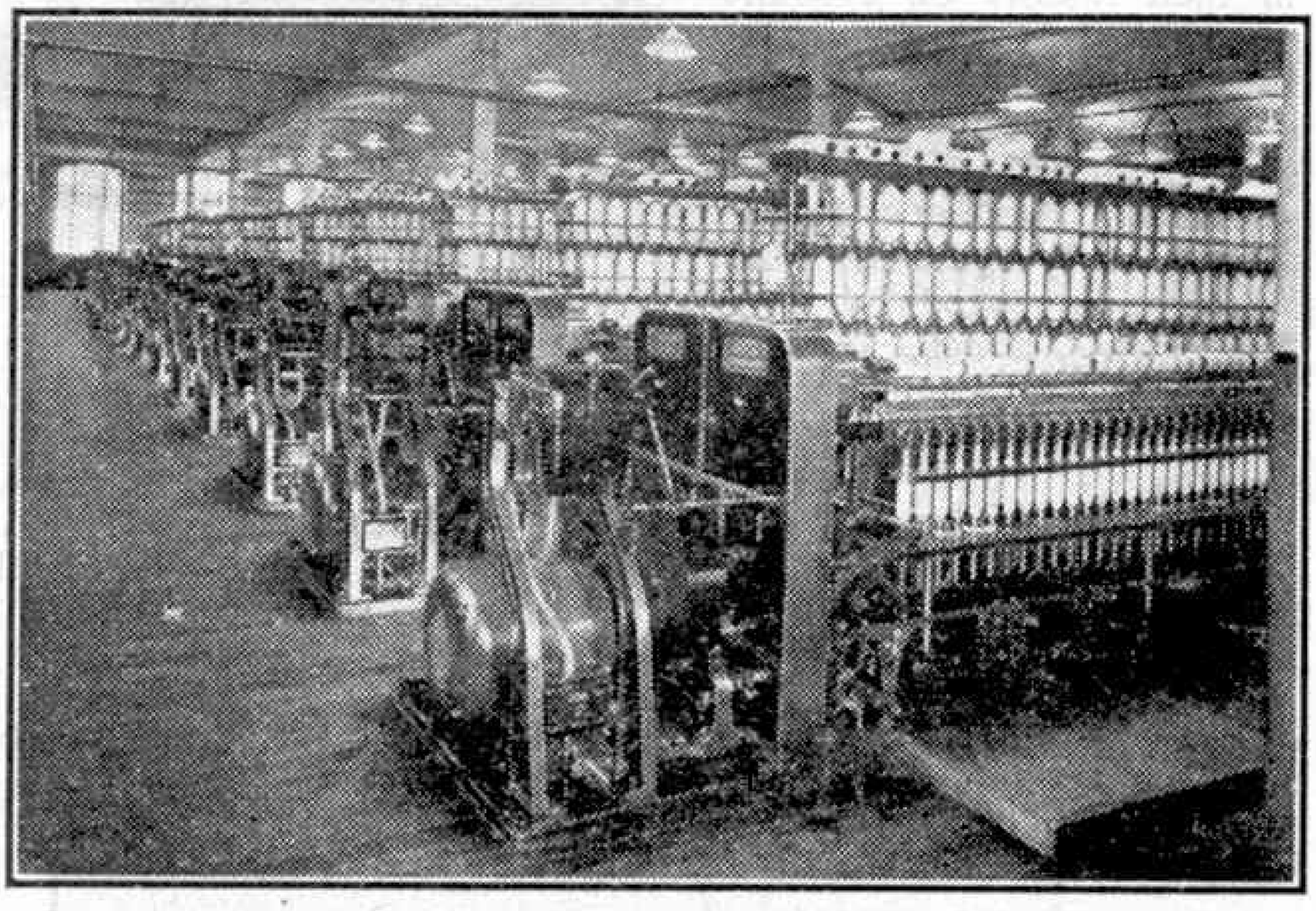
In situations where there is a risk of the water in the pipes freezing in winter, for example in bus garages, loading bays and other exposed sites, the sprinkler system can be erected on the alternate "wet" and "dry" system. During the period of warm weather the sprinkler pipes are charged with water, but in Autumn, before the approach of cold weather, the water is drained off and the installation is charged with air under pressure. The water is held back out of reach of frost by a differential air valve. The opening of a sprinkler causes the air to be released from the installation, allowing the air valve to lift and admit water to the system, which is then projected from the opened heads in the usual way. In Spring the air is released and the pipes are again charged with water. In Canada and other cold countries sprinkler installations are installed on the dry pipe system, the pipes being permanently charged with air under pressure.

Wet installations that are always charged with water are erected with the sprinkler heads fitted below the lines of distribution pipes, but alternative systems have their sprinklers fitted above the pipes. This allows the pipes to be drained of water without the risk of any pockets remaining which might freeze.

Insurance companies grant considerable discounts off fire insurance premiums for approved sprinkler installations, the amount of discount being dependent on the class of risk and the available water supplies. Not only do insurers inspect and test a new sprinkler installation before it qualifies for a rebate of premium, but tests are also carried out at regular intervals.

In certain risks such as tanneries, hides or other goods are often stacked so close to the roof or ceiling that the efficient distribution of water from the sprinklers would be impaired by the screening effect of the material. Multiple jet sprinklers have been designed to overcome such difficulties. Instead of the standard sprinkler a multiple jet control protects the same area. The control is coupled by pipework to a number of permanently open distributor heads, and when it is opened by fire, water is discharged on to the fire from the several distributors simultaneously. Multiple jet sprinklers may form part of a normal installation, being used for those portions of a risk in which ordinary sprinklers might prove unsuitable.

The multiple jet control is also employed for the external protection of parts of buildings where open electrical apparatus is contained. In such portions one or more multiple jet controls are provided, with the lines of open distributors surrounding



Lines of sprinkler heads in an Oldham spinning mill.

the room on the outside. If a control opens water does not fall on the electrical machinery, but is discharged around the room in which the fire is contained, while the alarm is sounded and help is obtained.

A form of sprinkler protection used on the outside of buildings in narrow city streets is the drencher system. Fire is readily transmitted from one building to another if the roadway is narrow. Drenchers are simply a type of sprinkler head erected on the outside of walls and along the edge of roofs, so arranged that heat from a fire in adjoining premises will cause them to open and guard the protected building against the entry of flames by wetting its exterior. They are usually provided over doors and windows, and will seal off a building from its burning neighbour.

A recent serious fire destroyed an old shop building in a busy London street, separated from a modern store protected by drenchers by a passage way only 8 ft. wide. Little more than the walls of the old building remained after the fire, but the store was unharmed. The only damage indeed was to a few panes of glass, which were cracked by heat before the drenchers opened.

Although modern sprinkler installations are extremely efficient they can be rendered ineffective if the water supply is prematurely turned off. Cases are also recorded of serious fires in sprinklered buildings where the water has been turned off at the main stop valve for repairs, or for other reasons, the fire breaking out before the water has been restored to the installation.

All classes of commercial and industrial premises are protected by sprinklers, not only in Britain but throughout the world. Shops, warehouses, factories, garages, theatres and cinemas are only a few of the many risks where sprinklers are found. Before the war the average cost of fires controlled by sprinklers was about £60 each. Without their protection a factory with its entire contents may be reduced to ruin in a few minutes.

In 1945 automatic sprinklers saved a factory we were trying to destroy! A celluloid factory at Castiglione Olona in Italy was attacked by four allied fighters, who fired thousands of rounds of explosive and incendiary bullets into the factory, which was full of celluloid waste and chips. At least 25 separate fires were started, but when the works fire brigade left the shelters after the attack they found that sprinklers had extinguished every fire.

The Great Clock of Bradford—

(*Continued from page 454*)

tunes is available.

The carillon machine is fitted with a count-wheel, which is stepped in the same way as those of the chiming and striking units, and this action automatically switches off the small driving motor when the tune has been played. All the other controls, such as those governing the starting and stopping of the compressor, and the time at which the carillon plays, are also fully automatic. The speed at which the carillon barrel rotates is adjustable to suit varying melodies, the correct setting being obtained by altering the position of the belt linking the motor to the reduction gear. Both the driving and driven pulleys have grooves of several differing diameters to enable this to be done.

In addition to the carillon machine, a small keyboard is provided, so that the carillon can be played by hand. To bring this into action, it is only necessary to operate a simple switch, which transfers the control of the relay circuits from the machine to the keyboard.

The chime of bells on which the carillon machine plays have been re-hung to suit the new equipment, and the position of some of them has been slightly altered, but no other change was necessary. The dials of the clock were also re-glazed and reconditioned, and an improved method of illumination has been fitted at their centres, in order to render them more legible at night.

The master-clock, which controls the timekeeping of the whole installation, is a battery-operated timepiece, fitted with a seconds pendulum having an "Invar" rod. It is located in a room at the foot of the tower, so that it can be easily observed, checked, and adjusted if necessary.

The whole clock was constructed and installed by Messrs. Gillett and Johnston Ltd., of Croydon, Surrey, and is maintained by Mr. W. Barton, F.B.H.I., Clock Superintendent to the Borough of Bradford, and the staff of the Clock Department. Thanks are due to both the firm and Mr. Barton for their kind assistance in the preparation of this account, and for permission to use the illustrations reproduced.

Electric Telegraphs for Ships—

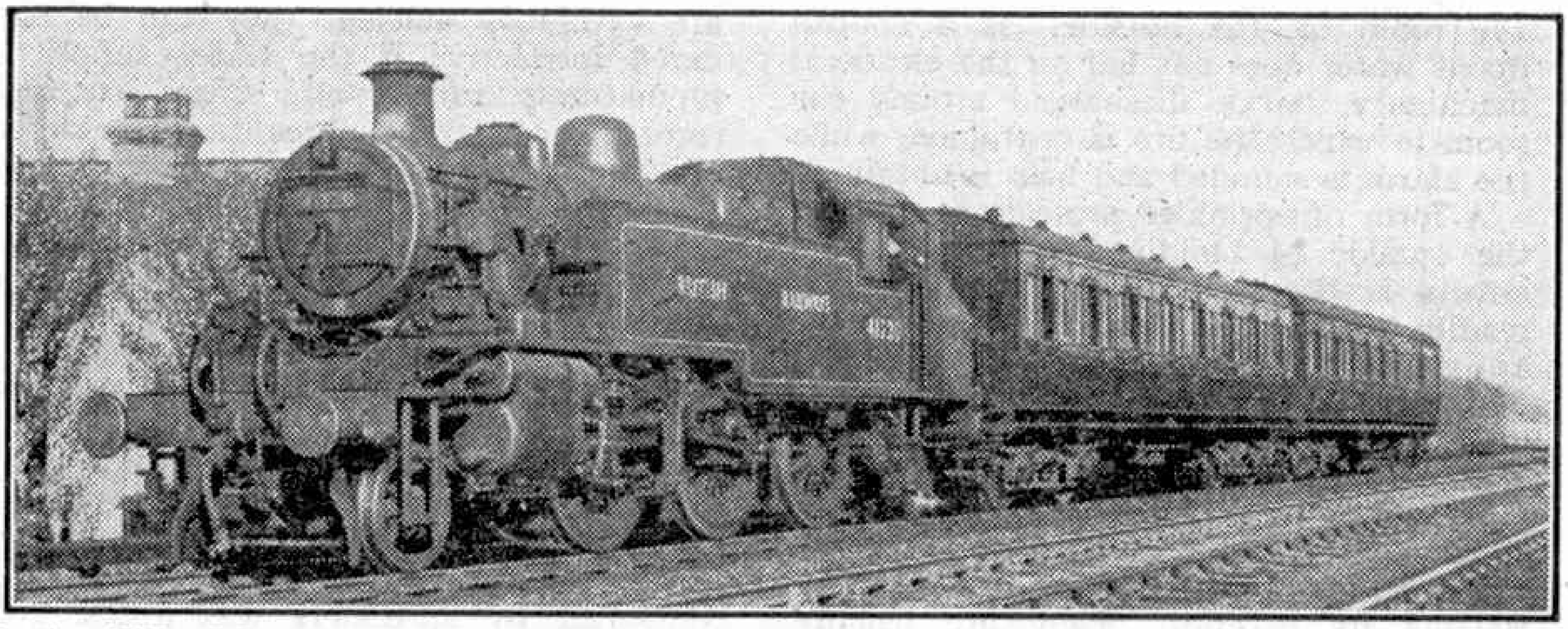
(*Continued from page 461*)

coupling connections. The engine room instrument is similar in appearance to the bridge instrument except that in place of the column it is provided with fixing lugs for mounting in any convenient position on the starting platform.

The usual reply bell is provided on the bridge instrument, and the engine room instrument is equipped with a loud sounding bell, and in the case of twin engines with a different tone for the port engine from that of the starboard engine. The latter bells are controlled by a relay with a switch in circuit fitted with holding on contacts, so that the bells will ring continuously until the circuit is opened by the movement of the handle of the instrument, sending the reply signal back to the bridge telegraph. This feature is a great advantage, because should the order be changed and the engineer on watch is not on the starting platform at the time, the warning is continuous until he acknowledges the order.

Since the introduction by Siemens Brothers of this type of electric telegraphs they have been fitted on board a large number of ships of all classes, among them the biggest ocean liners, "*Queen Mary*" and "*Queen Elizabeth*." They are also becoming popular on smaller vessels such as fishing trawlers, colliers, coasters and many classes of sea-going cargo vessels.

For the information in this article we are indebted to the "*Engineering Bulletin*" of Siemen Brothers and Co. Ltd.



London Midland Stanmore branch train approaching Harrow. The engine is light 2-6-2T No. 41220, specially fitted for push-pull working. This and the lower photograph on the next page are by C. R. L. Coles.

Railway Notes

By R. A. H. Weight

The European Timetable Conference

For many years, apart from wartime, annual international conferences have been held to discuss changes in through passenger train services and to make decisions on their continuance, development, acceleration and so on, for many of them run through two or more different countries on the mainland of Europe. Since 1923 an established organisation has provided for meetings that are usually held in different countries in turn, the administration in the main being in the hands of the Swiss Federal Railways. In 1948 the conference was held at Cracow, in 1947 at Istanbul, and in 1949, for the first time in Britain since 1931, at Brighton.

Over 20 nations or administrations were represented, railways, shipping and airways all being concerned, making an attendance of about 170 executive officials, including representatives of international restaurant and sleeping car companies. British Railways of course are important members in view of the rail and steamer connections provided between England and the Continent.

It was decided to accelerate next year, among others, the "*Arlberg-Orient Express*" between Paris and Vienna, several through expresses in Italy, and the "*Simplon-Orient Express*," which connects France with Belgrade, Istanbul and other cities of the Near East. Through carriage and re-marshalling arrangements were also decided upon, together with many other travel features which, if circumstances permit, will facilitate the movements of the business or holiday passenger in the coming year.

A special Pullman car train to Brighton conveying Continental visitors to the conference from one of the Kent Coast ports was observed passing through Hastings hauled by a Maunsell 2–6–0 locomotive.

Centenary of the M.S.J. & A.

The initials above stand for Manchester, South Junction and Altrincham Railway, which has just celebrated its centenary. It is a busy and important line near Manchester, being indeed one of the principal suburban and connecting-link routes in the vicinity of that city, passing Old Trafford of cricket fame, and running south-westward into Cheshire. In earlier years the joint owners were the L.N.W.R. and the G.C. (formerly M.S. & L.); after grouping in 1923 they were the L.M.S. and L.N.E.R., each company being responsible for operation of the line in turn. Now it is controlled by the L. M. Region and electric trains on the overhead wire system between Manchester and Altrincham run frequently.

Numerous steam passenger or freight workings with L.M.S. or L.N.E.R. type engines traverse all or part of the line, so that a good deal still remains of the varied locomotive interest for which the "South Junction" has long been famed. The local passenger services enjoy a high reputation for punctuality.

The London Midland Region now possesses a two-car diesel-propelled articulated unit comprising repair and maintenance van and staff and messing coach, to which an open truck carrying drums of wire can be attached, for use in connection with the installation or overhaul of overhead suspension equipment on these electrified lines. We hope to include a special article on this unit later.

It may be mentioned here that Midland type 4–4–0 engines, including Compounds, are now sharing Cheshire Lines duties with former G.C. and L.N.E.R. classes.

Western Tidings

The first ten 0–6–0Ts of the entirely new outside-cylinder type have been completed. These will be described and illustrated in a later issue. The latest allocations known are Nos. 1504–6 at PDN (Old Oak Common). A new light "1600" class of 0–6–0T has been put in hand and 2–6–2T construction is in progress at Swindon. Further inside-cylinder examples of the stout "9400" type have appeared from outside builders, including No. 8402–4 from Messrs. Bagnall's Works, Stafford, and No. 8451, from the Yorkshire Engine Co. Ltd., Sheffield.

No. 7018 "*Drysllwyn Castle*," hauling a 12-coach up South Wales express through from Swansea to Paddington, covered the last 56½ miles from Steventon in 54 min., gaining 15 min. on schedule. Several "King" 4–6–0s are now painted in the latest blue style.

A special train recently conveyed a farmer, his family and staff, household effects, 80 cattle and 200 sheep from Monmouthshire to Oxfordshire, in connection with the removal of a complete establishment, between milking times on Wednesday evening and Thursday morning.

Reviving a pre-war facility, rugs may be again hired by passengers on night trains at principal stations along the West of England main line at a charge of 2/6.

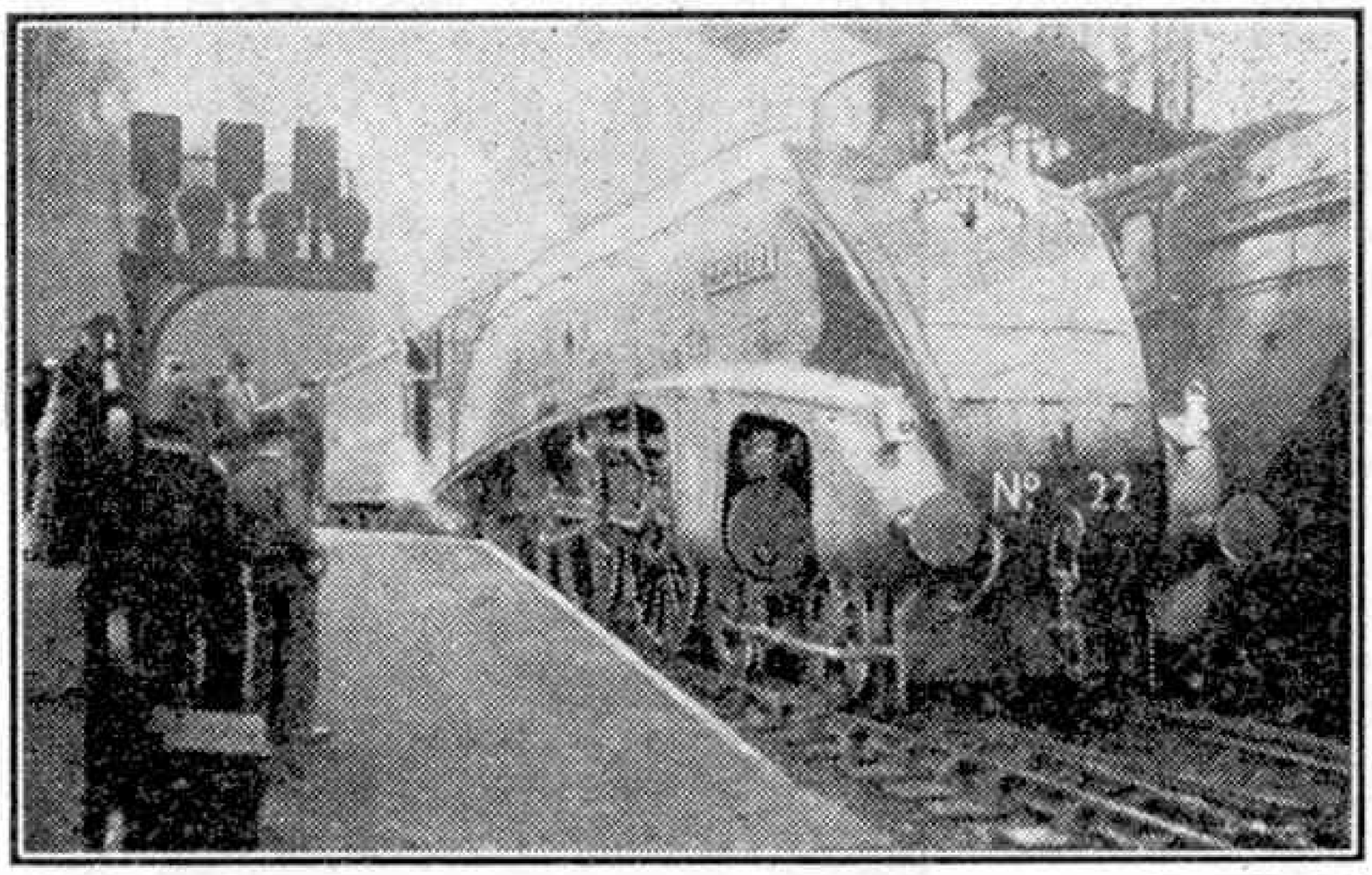
Scottish Engine Names Restored

Eleven of the 25 N.B.R. 0–6–0s, now classed "J36," which went overseas for service in France or elsewhere during the first world war, have had their commemorative names restored. Some had been removed when repainting took place. The names appear in transfer lettering on the driving wheel

splashers. Those restored are: "*Haig*," "*Horne*," "*Somme*," "*Maude*," "*Allenby*," "*Plumer*," "*Joffre*," "*French*," "*Mons*," "*Gough*," "*Byng*."

London Midland Regional News

The 39 class "8F" Stanier 2–8–0s returned from the Mediterranean area now being placed in service are receiving numbers between 48012 and 48297.



L.N.E.R. type streamlined 4-6-2 "Mallard" at King's Cross. In 1938 this engine attained the world's record maximum speed, for steam power, of 126 m.p.h. Photograph by J. Wyndham.

Some tank and tender engines, including dark green painted express 4–6–0s, are now running bearing the British Railways totem. Small 2–6–2Ts of the 412xx series are appearing from Crewe in considerable numbers. Class "4" 2–6–4Ts work many of the semi-fast main line trains between Euston and Northampton, or Rugby, etc., which cater for outer suburban traffic. New class "4" 2–6–0s are running on the Furness line.

A reminder of many local workings in the past was the recent sight of Webb 2–4–2T No. 6654, operating the push-and-pull service between St. Helens Junction and Town (Shaw Street). These engines have a number of features in common with the famous "Jumbos," the small L.N.W.R. 2–4–0s which rendered such sterling service in the past.

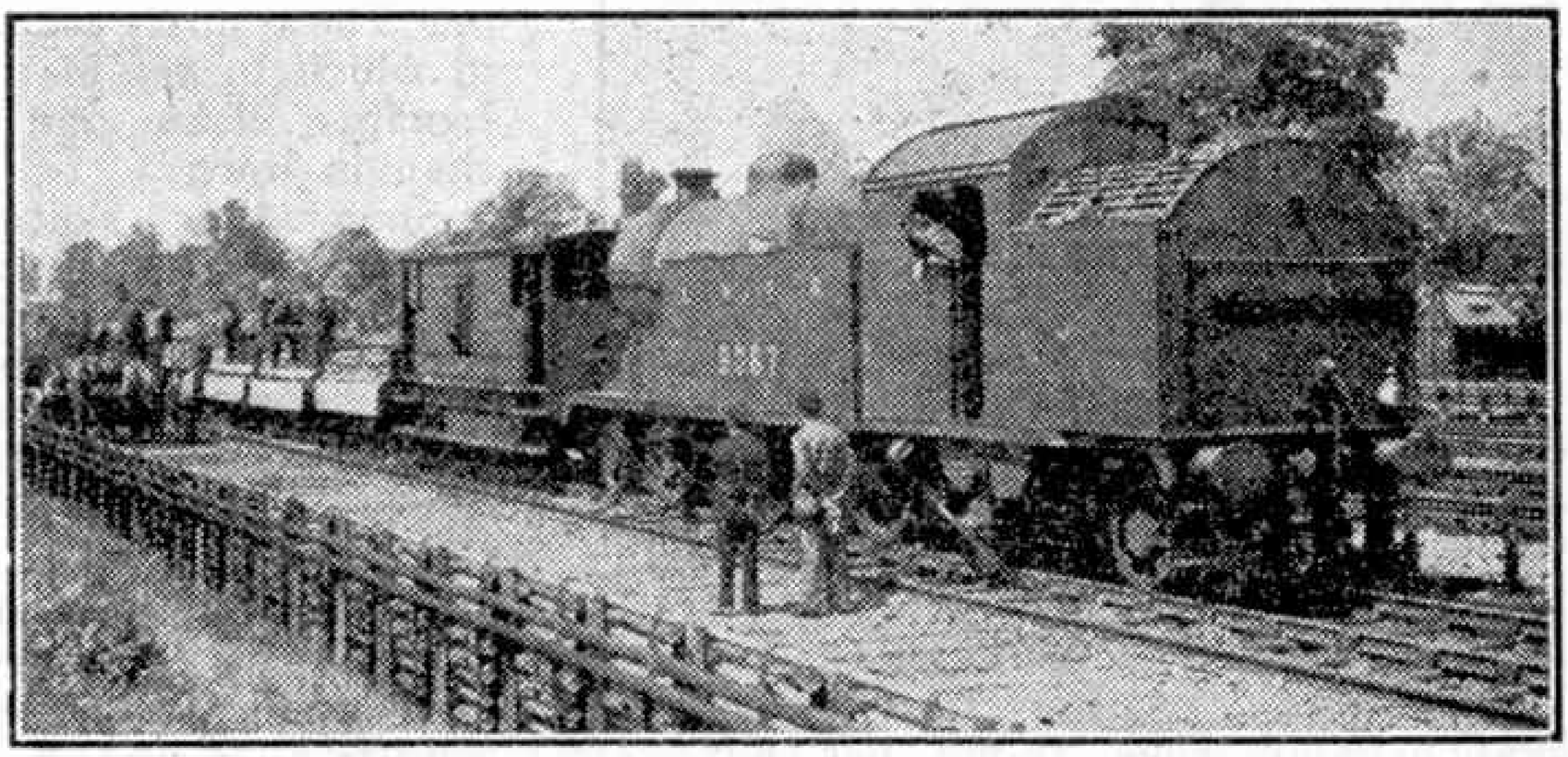
The writer has recently logged some most enterprising express runs on the Western Division. Reboilered "Patriot" "6P" 4–6–0s with double chimney figured in the first two, with Bushbury (Wolverhampton) engines and men, timed between Euston and Coventry. Northbound with a load of 13 coaches, about 400 tons full, No. 45526, "*Morecambe and Heysham*" covered 55¼ miles in the first hour before a severe engineering slack between Roade and Blisworth. Rugby was passed with 1½ min. in hand and in spite of a succession of signal checks the arrival at Coventry was comfortably to time: the 94 miles were covered in rather less than 107 minutes.

With a slightly lighter load on a Sunday train back to London, booked to call at Rugby, Northampton and Bletchley, No. 45536 "*Private W. Wood, V.C.*" started from Coventry and from Rugby some 11 min. late, attained 75 m.p.h. on the descent before Northampton, and then ran briskly on to Bletchley after regaining the main line. Combined effort by footplate crew and station staffs caused the departure from Bletchley to be punctual, but "slow line" travel was now required over the 6½ miles to Leighton Buzzard on account of relaying operations on the main line. Downhill after Tring, on the main line again, over 70 was averaged for 20 miles with a maximum of 78 m.p.h. This energy would have ensured an early arrival, despite a special stop at Willesden to set down, but signal delays occurred owing to tracks outside Euston being closed for repair. Still we arrived in No. 12 departure platform only 1 min. late in spite of all delays.

The first "7P" 4–6–2, No. 46200 "*The Princess Royal*" of Edge Hill shed, Liverpool, in charge of London driver Bassett, with 12 coaches including dining and kitchen cars, or about 400 tons, brought the 12.5 p.m. from Euston into Lime Street, Liverpool, 5 min. before advertised time, although delays totalling 15 min. had supervened. A merry 80 m.p.h. was attained on the descent from Tring, and high speed was soon reattained after long slowing north of Bletchley, so that by Tamworth, 110 miles out, we were over 4 min. early. Six miles further on, at historic Lichfield, came a sudden signal stop, due to a goods train ahead having developed a slight defect. This halt lasted for 3½ min.; there were two more out-of-course slowings before Crewe, with a maximum speed of 78, yet the arrival at the great junction station, which should have been the only stop, was only 2 min. behind time, though delays to that point had totalled about 13 min. Two more extra slowings and further recovery of time completed a fine trip, but with a .load less than usual to Crewe.

* * * *

Recently completed L.N.E.R. type "A1" 4–6–2s Nos. 60154–5, painted blue and having roller-bearing axle boxes, are stationed at Gateshead. They are often seen on the night "*Scotsman*."



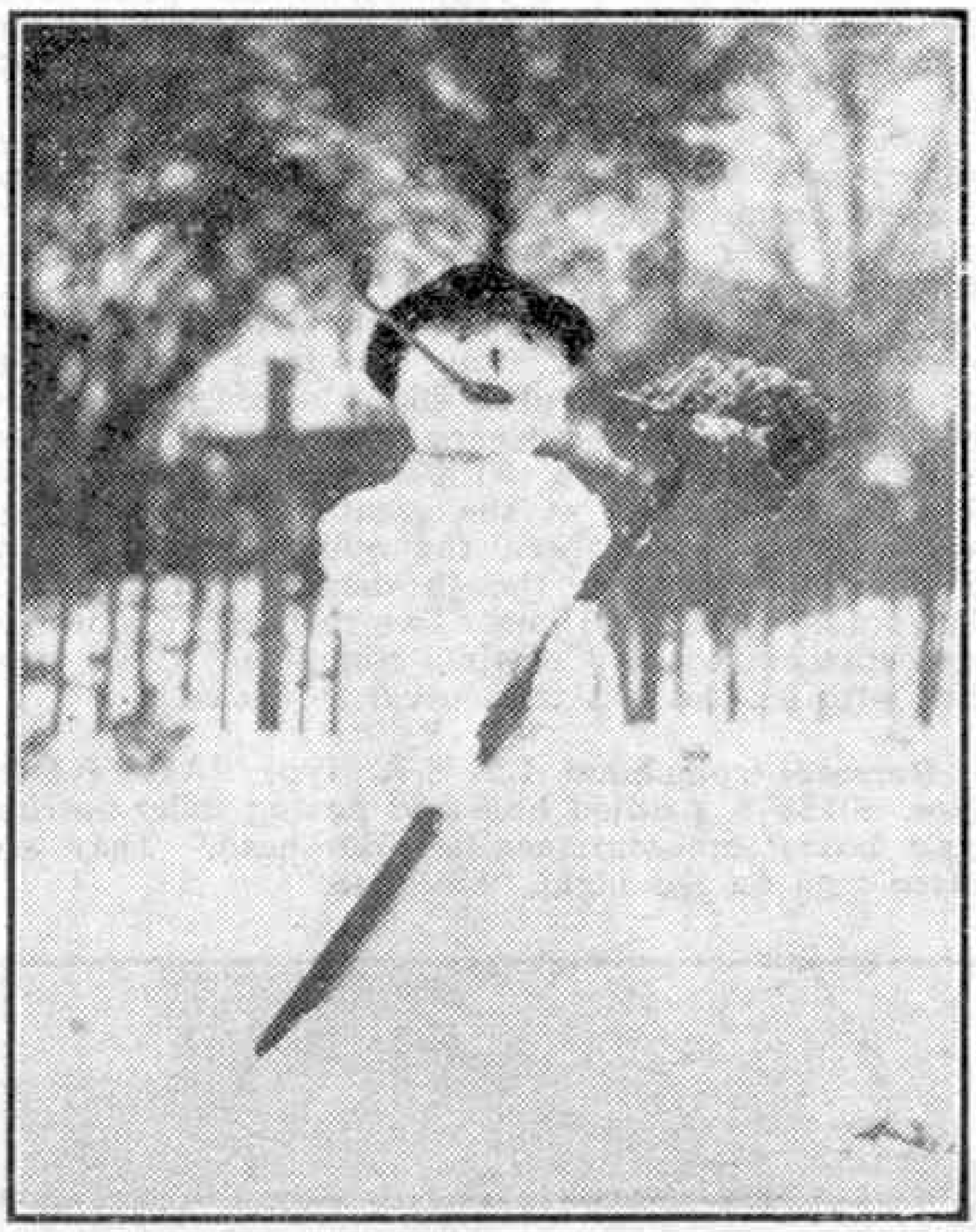
Permanent way operations in progress on the former L.N.E.R. (G.C.) line near Harrow-on-the-Hill. The materials train is in charge of one of the large inside-cylinder 2-6-4 tanks of Great Central origin.

Photography

Snow Scenes

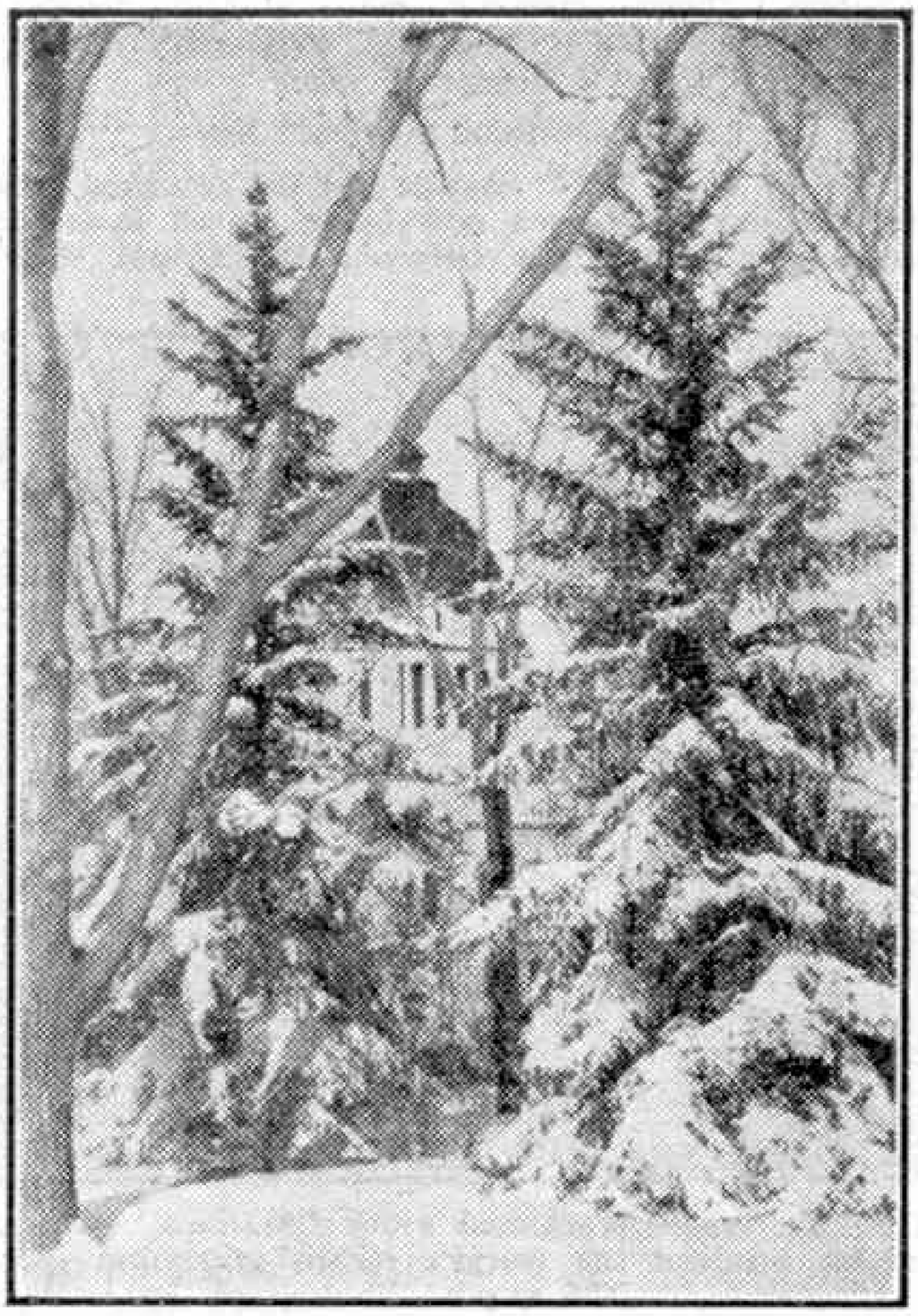
THIS is the time of year when we begin to wonder if we shall have an old-fashioned "white" Christmas, with a mantle of snow giving town and country that fairyland appearance that we see on Christmas cards. In this country a normal Winter does not bring many such opportunities, and therefore we should be ready to deal with those that do occur.

Almost any kind of camera will do, and panchromatic films or plates are recommended. Owing to the large amount of light reflected by the snow and the general absence of heavy shadows, the exposure required to produce a good negative is comparatively short for this time of the year. It is best to ascertain it from an exposure calculator or meter.



"Jimmy," the snow man. Photograph by G. Beabey, Portsmouth.

The most successful snow pictures, especially in a town, are taken in the morning when the Sun's rays are breaking through the mist but are not yet warm enough to melt the snow off the roofs or the powdery coating from twig and branch, and when traffic has not yet turned the clean snow to dirty slush. At this time even a town garden will provide better pictures than will be got by going farther afield later in the day. In photographing most snow scenes a sharply-defined foreground object, such as a building or tree, should be included.



A Winter scene in the grounds of the Provincial Parliament Buildings, Regina, Sask., Canada. Photograph by D. F. Sanderson, Regina.

Readers living in the country will not be slow to make the most of scenes featuring trees and hedges in which the snow-covered branches and twigs produce a striking effect. Then, too, there are the old cottages made unfamiliar by the snow on their thatched roofs; the village church likewise capped in white, and so on. The country reader also has more time in which to get his pictures, as the snow remains clean and undisturbed longer than in town.

Snowballing, skating and sledging are in many ways first-class subjects for the photographer. It must be borne in mind, however, that there is a great deal of very rapid movement in such subjects, so that a fast shutter speed is required. Bright sunshine in the middle of the day is therefore essential for reasonably full exposure, and of course sunshine is needed to give sparkle to the picture. The snow man makes his appearance in town and country alike, and at least one good portrait of this short-lived individual should be got for the album.

Special Service for Hornby-Dublo Owners

VEHICLES WITH THE NEW COUPLINGS

The automatic couplings fitted to post-war Hornby-Dublo Trains will not engage with the flat couplings fitted to trains of pre-war production. This means that many owners of Hornby-Dublo Trains who wish to add to their rolling stock find themselves unable to do so. "*M.M.*" readers will know that the change in the design of the couplings has been made necessary to bring into use the new Uncoupling Rail, which has enormously increased the real railway operations that can be carried out on a Hornby-Dublo layout.

In the "*M.M.*" for December 1947 we stated that a scheme was in preparation whereby owners of pre-war Hornby-Dublo Trains could return to Meccano Limited their rolling stock fitted with the old couplings, and obtain, on favourable terms, corresponding vehicles with new couplings. This scheme has now been put into operation. Those who wish to take advantage of it should write to Service Department, Meccano Limited, Binns Road, Liverpool 13, giving details of the vehicles they wish to exchange. They will then be told how much the transaction will cost them.

Two points should be noted. First, the scheme applies to the Hornby-Dublo Tank Locomotives, but not to the pre-war "*Sir Nigel Gresley*" Locomotive. It does apply to the tender (rear end) of the old "*Sir Nigel.*" Second, as the Articulated Unit is not now in production, any Units of this kind will be replaced by two separate L.N.E.R. D1 Coaches.

Finally, for information about this new scheme write direct to Meccano Limited, not to Dealers.

Haunted Homes and Highways—(*Cont. from p. 451*)

murdered by his master, a member of the Gilby family. The crime was undiscovered until workmen started to remove some of the soil from the grounds of the Gilby residence. The horses drawing the cart containing the soil came to a halt outside St. Mary's Church, Beverley, and refused to go any further. Suddenly the cart tipped up and a skull rolled out.

The murder was thus revealed, and there is a tradition that on the anniversary of Jocelin's violent death a phantom coach rumbles through the streets of the town. It is driven by a skeleton, and another skeleton sits inside. The apparition is that of the valet and his murderer, the assassin being compelled to drive his victim to St. Mary's Church burial ground once a year, as a punishment for denying him a decent burial after the murder!

There are other spectral coaches travelling occasionally along Britain's highways—so legend says. The most celebrated is that of the Turbervilles, which goes careering up to Wool Manor House, on the Wareham-Weymouth road, the home of the Turbervilles, who greatly enriched themselves by accepting plunder when Henry VIII turned the monks from the monasteries 400 years ago. The illgotten wealth is reputed to have brought a curse on the family. Whether the phantom coach is a result of that curse, or whether it originated when a later Turberville slew a friend in a coach, is undecided. But the vehicle is stated to contain a corpse, and to haunt the neighbourhood of Wool Manor House at Yuletide.

Some of these haunted houses can be visited by the public. Temple Newsam is open daily, and Burton Agnes Hall is open each Thursday during the summer months, at a small charge.

A further house with a wraith is East Riddlesden Hall, on the outskirts of Keighley. It is owned by the National Trust, and its spectre is that of a merchant who came to buy wool in the days when the hall was the home of the Murgatroyds. He was murdered for the bag of gold he carried—some accounts say the crime was committed by the family butler. Anyway, the victim's ghost is stated to peer out through the big circular window over the porch.

If you want a really Christmassy ghost story, however, there is the spectral monk of Kersal Cell, an old black-and-white house at Salford, Lancashire. The house occupies the site of a monastery; hence its name and its apparition. Its Yuletide associations lie in the fact that at Kersal Cell lived John Byrom, who wrote the words of the Christmas hymn, "*Christians, awake.*" The verses were, indeed, penned in his study at Christmas 1745.

Hedgehogs Make Good Pets—(*Cont. from page 465*)

certainly the piggy bright eyes have an impish and malignant look, into which it is hard for the human eye to stare. Some countrymen say that it is impossible to poison hedgehogs, and no doubt this idea is because they seem able to eat with impunity the cyanide of potassium commonly used in the destruction of wasps' nests.

It is quite true that hedgehogs eat our only poisonous snake, the adder. Though the viper often puts up a good fight, it really has not much chance against the urchin's battle technique. The adder strikes a futile blow at the prickles of its opponent, and in doing so spills a lot of precious poison. If the action gets too hot, the hedgehog simply rolls up till the snake wears itself out. Then suddenly it comes to life, rushes inside the reptile's guard, and crushes the spine of its victim just behind the skull with its razor-like teeth. It then sits down, and slowly devours the snake inch by inch!

Even in this enlightened age farmers sometimes accuse hedgehogs of sucking the milk from cows lying out in the fields at night. But if one looks closely at the cut-away shape of the under jaw, it will be seen that it is almost impossible for a mouth thus formed to take hold of a cow's teat. Milk often oozes out of the udders of cows lying down, and the warm sweet smell of it on the ground is soon picked up by the hedgehog's keen snout. This is the true explanation of hedgehogs being so often found in the vicinity of milking herds.

By the number of hedgehogs seen dead on the main roads as a result of being run over by cars, one might suppose that these short-legged animals are slow jay walkers, but in actual fact they are capable of a speed of two-and-a-half miles an hour. With cars the hedgehog always makes the not unnatural mistake of believing that it is impregnable if it rolls up. The little beast hears the car coming, rolls up instead of running, and the fatal accident occurs. In spite of all these night casualties hedgehogs are on the increase all over the country.

Making Gramophone Records—(*Cont. from page 479*)

it. After passing exhaustive tests the record is put into production.

Shellac, resin, copal (the juices of certain tropical trees) and other ingredients are mixed in machines until a fine texture is achieved. The refined material passes through heated rollers, which grade it to uniform thickness and mark the sheets into suitable sizes for either 10-inch or 12-inch records. When cool, these slabs, or biscuits, as they are called, are broken off and taken on trolleys to the press room, where the press man has already fixed two matrices in position from which to prepare a double-sided record. First he places the required label on the centre of each matrix, then from a heated slab beside his press he takes one of the "biscuits," rolls it into a ball, and places it on the centre of the lower matrix.

The press man then pulls a lever and the two matrices close with a relentless pressure of nearly 100 tons. As the pressure is applied steam is circulated behind the matrices, and this is followed up by water cooling. When the press is opened, there is the familiar, shining disc, imprinted with sound grooves numbering 130 to the inch. The disc is polished, the edges are buffed, and after a final inspection the new record passes to the stores to await despatch.

Crop Spraying by Air

By John W. R. Taylor

EVER since Man first learned to cultivate the soil he has had to fight a continuous war against pests, not the small two-legged variety which are so numerous near orchards in the Autumn but the very much smaller insects and diseases which can kill a whole crop long before it is ready for harvest.

For centuries the locusts, flies and beetles had their way, their ravages combining with drought and flood to destroy by famine hundreds of thousands of people all over the world. Not until the closing years of last century, in fact, did science bring much aid to the farmer, placing at his disposal efficient new insecticides and weed killers to protect his crops. Even then it was a slow business to spray or dust the whole of a large field by hand, and impossible to ensure satisfactory, even coverage.

The advent of horse-drawn and then tractor-drawn spraying equipment helped enormously, but often at the cost of a reduced harvest, for the wheels of the vehicles inevitably crushed a proportion of any interwoven or wind-laid crop. What was needed was a spraying machine which made no tracks, and the answer was obviously an aircraft.

As a result, several attempts were made before the last war to develop an effective method of aerial crop dusting, often with the help of military air forces, for it was obvious that an aeroplane which could spread a layer of weed killer over a field of wheat could easily do the same thing with poison gas over an enemy army! Many difficulties were experienced. It was often impossible to find a landing ground near the field to be sprayed; the aeroplane's comparatively high speed resulted in a lot of wasted time and petrol while it turned after each run over a field, and such turns were dangerous in hilly or wooded country; even worse, propeller slipstream often dispersed the insecticide dust cloud. Despite all the drawbacks, however, aerial crop dusting proved of undoubted value where speed and absence of tracks were of primary importance, especially as relatively cheap light 'planes could be adapted easily for treating anything up to 500 acres a day.

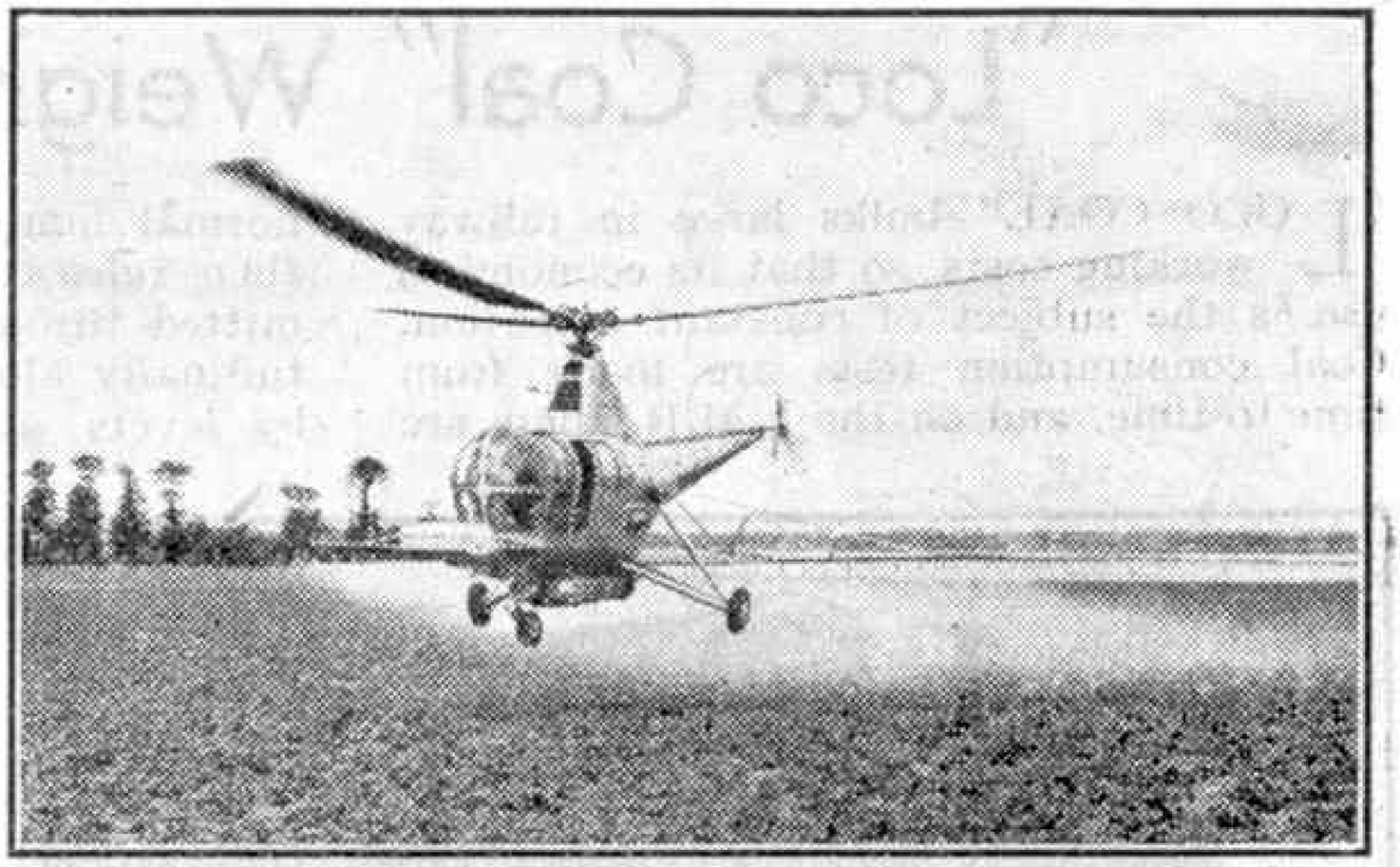
Then, in 1940, Igor Sikorsky flew his first helicopter, and the whole picture was suddenly changed, for here was an aircraft which could turn in its own length and operate from almost any small space in town or country. Britain's leading commercial crop spraying experts —Pest Control Ltd., of Bourn, in Cambridgeshire—were quick to recognise this fact, and with the help of British aircraft designers set to work to produce a form of spraying equipment which could be fitted to a helicopter. Incidentally, this distinction between spraying and dusting is important. Most of the work with light 'planes had been done with insecticide dusts, spilled from hoppers in the aircraft, and this dust was very much at the mercy of wind and slipstream. Pest Control planned to use a fine liquid spray of dissolved insecticide, which could be spread more evenly and would tend to "stick" better to the crops.

This development work took time, and it was not until 1946 that Pest Control were able to show the world what a spraying helicopter could do. All the usual disadvantages of aerial spraying



The "Spraycopter" Mark I, in which the spray-bays extend 17 ft. on each side of the fuselage nose. The illustrations to this article are by courtesy of Pest Control Ltd.

disappeared. The helicopter's mobility enabled it to operate anywhere and to travel from job to job with little loss in transit time. It could be used when ground equipment was immobilised by rain-sodden fields. What was more, instead of dispersing the spray laden air, the downdraught from the rotor tended to blow it down with such force that it rebounded from the ground, coating the underside of the leaf surfaces as well as the tops. Finally, despite the high initial cost of the helicopter, and the expense of training its highly skilled crew, Pest Control proved that air spraying need cost only a few shillings more per acre than ground spraying.



Crop spraying with the Mark II machine which, like the Mark I version, is a Sikorsky helicopter.

It took two more years to get the scheme ready for commercial use, by which time Westlands had started to build the Sikorsky S-51 helicopter under licence in Britain. So this aircraft was chosen as the "Spraycopter" Mark I, and adapted to carry 70 gallons of chemical in a tank under its fuselage, the spray being discharged through spray bars and nozzles extending 17 ft. on each side of the nose.

Pest Control decided to send out to each job a complete field unit, consisting of a "Spraycopter" and pilot, a tanker lorry containing spray chemicals and aviation fuel, two or three flag men, a supervisor and an engineer. Flying speeds varying from about 12 m.p.h. for tall crops to 30 m.p.h. for field crops were found to be best, the pilot being kept on the "straight and narrow" by the flag-men, using radio and Aldis lamps.

The first season's operations suggested a few improvements and these were built into the "Spraycopter" Mark II, illustrated on this page. It is basically similar to the Mark I, but has its spray bars behind the main wheels, and a compressed air system to force the spray chemical through the nozzles. The compressed air bottles are carried on the "frying pan" which can be seen protruding beyond the aircraft nose.

Pest Control have operated three of these "Spraycopters" this year with great success. In Britain, a serious outbreak of black fly in the East Anglian sugar beet crop was defeated. In France an all-out battle on the Colorado Beetle saved thousands of tons of potatoes. A "Spraycopter" was even taken to the Middle East to protect Sudanese cotton crops from the Jassid insect. This demonstrates another advantage of the "Spraycopter," for it can be sent out quickly to tropical climates during the British Winter slack season, and this helps to keep operating costs low by spreading them over 12 months instead of only eight.

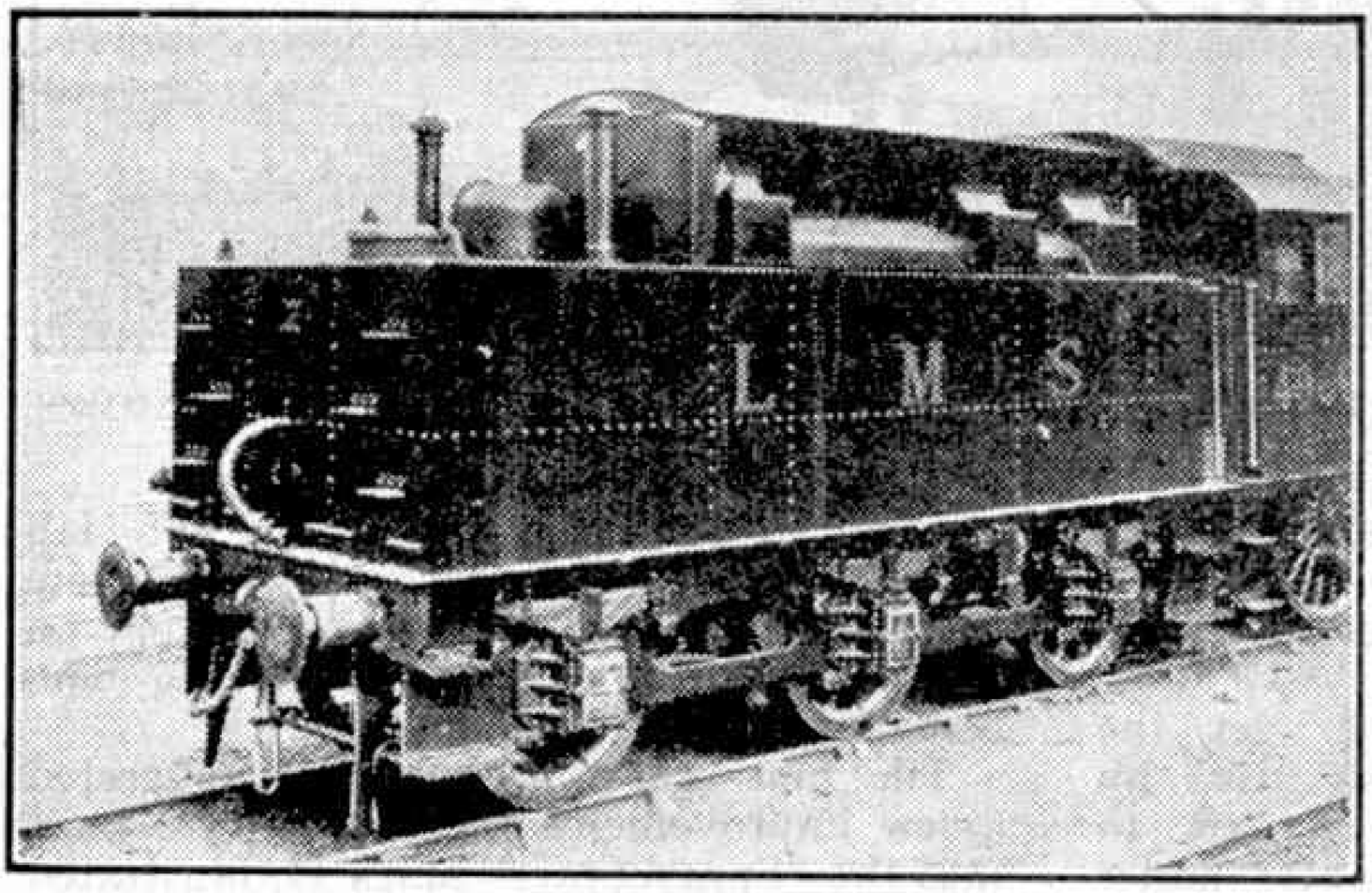
Chief disadvantage of the "Spraycopter" is its limited load-carrying capacity. But a crop-spraying version of the giant Cierva "Air Horse" helicopter is being developed. So it looks as if there is a bad time ahead for pests!



A closer view of the "Spraycopter" Mark II, showing the spray-bays behind the main wheels.

"Loco Coal" Weighs Itself

"LOCO COAL" bulks large in railway working costs, so that its economical use is the subject of constant attention. Coal consumption tests are made from time to time, and on the L.M.R. there are two dynamometer cars employed in carrying out such periodical tests.



Self-weighing tender with apparatus covers in position ready for a run. The illustrations are by courtesy of British Railways.

In these trials a known weight of coal is placed in the tender, sufficient for the test run to be made, and at the conclusion the coal remaining is removed and weighed. The coal used, with suitable allowances for lighting-up and standing time, is related to the units of work done by the engine on the train as recorded by the dynamometer car. Full-scale trials are usually undertaken on only a small number of engines of the same class.

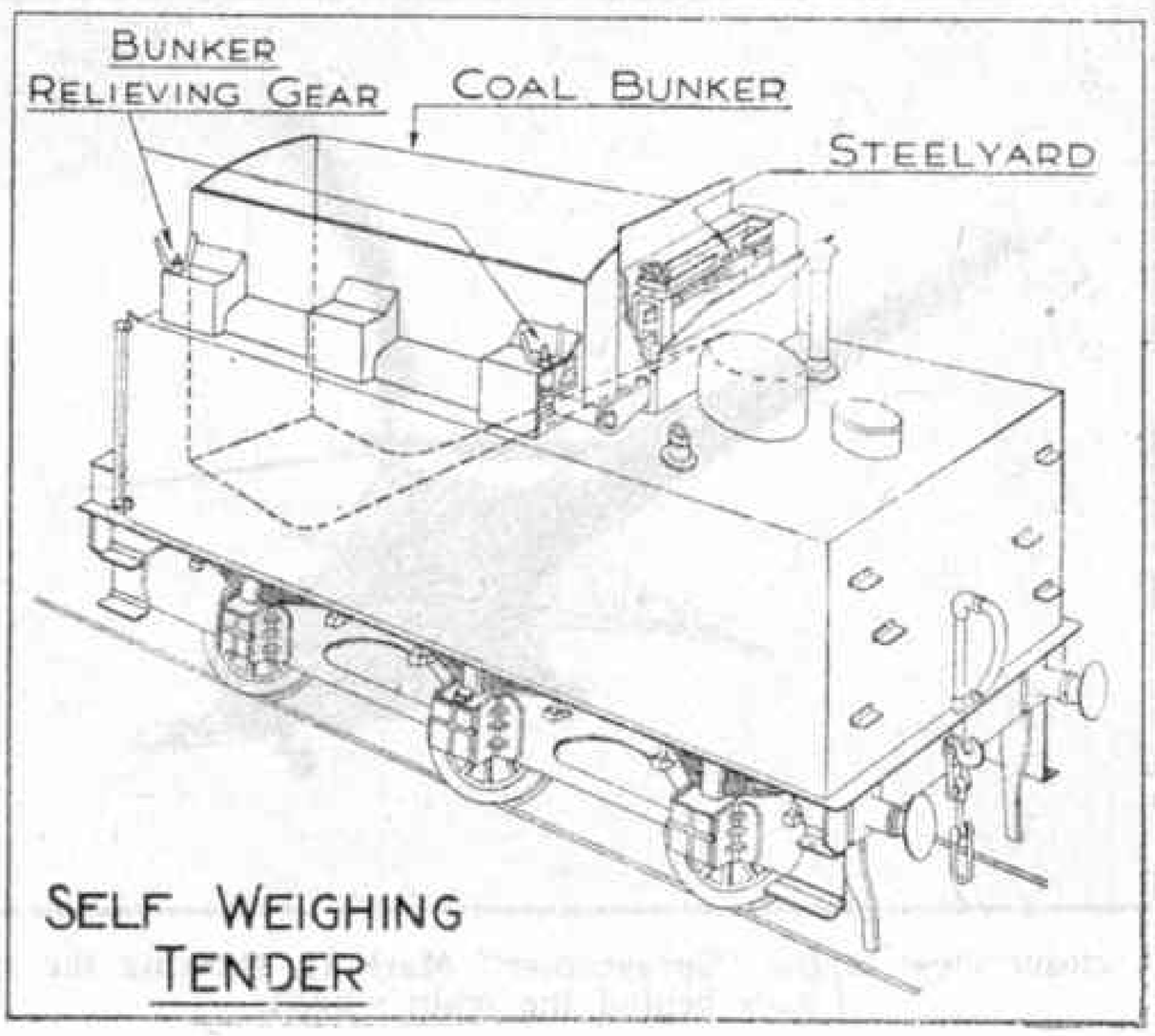
With a view to a closer study of the effect on consumption of methods of firing, of traffic delays and features of present-day operation, together with a closer watch on the effect of the varying qualities of coal, two special tenders with self-weighing bunkers were introduced by the former L.M.S. Each bunker normally rests on six cone seatings on brackets on the tank top and in this position it can be locked, to prevent movement and damage to the weighing mechanism.

In operation, with the bunker in the correct position and all locks engaged, the tender is coaled in the normal manner. The locking devices are then released so that the load is transmitted through two shafts running longitudinally along the tender tank top, and by levers at the rear of the coal space, to a steelyard where the amount of coal can be read directly in tons and quarter cwts. by the usual sliding weights. The locking devices are then returned to their normal positions and the cover that encloses the steelyard is replaced.

Locomotive Inspectors ride with the engines having these tenders whenever they are working a train. Coal weighing is undertaken so that the day's consumption can be split up as desired into that used for lighting-up, shed duties, shunting, working trains, and during any traffic delays which may occur. Variations in consumption due to firing and driving methods can be demonstrated to the crew, and the best means developed for using inferior grades of coal.

The underframes generally, wheels and axleboxes are of the standard pattern for the L.M.R. 4,000 gallon tender.

Following successful experiments with these two tenders, British Railways are to equip nine other tenders with coal-weighing apparatus.



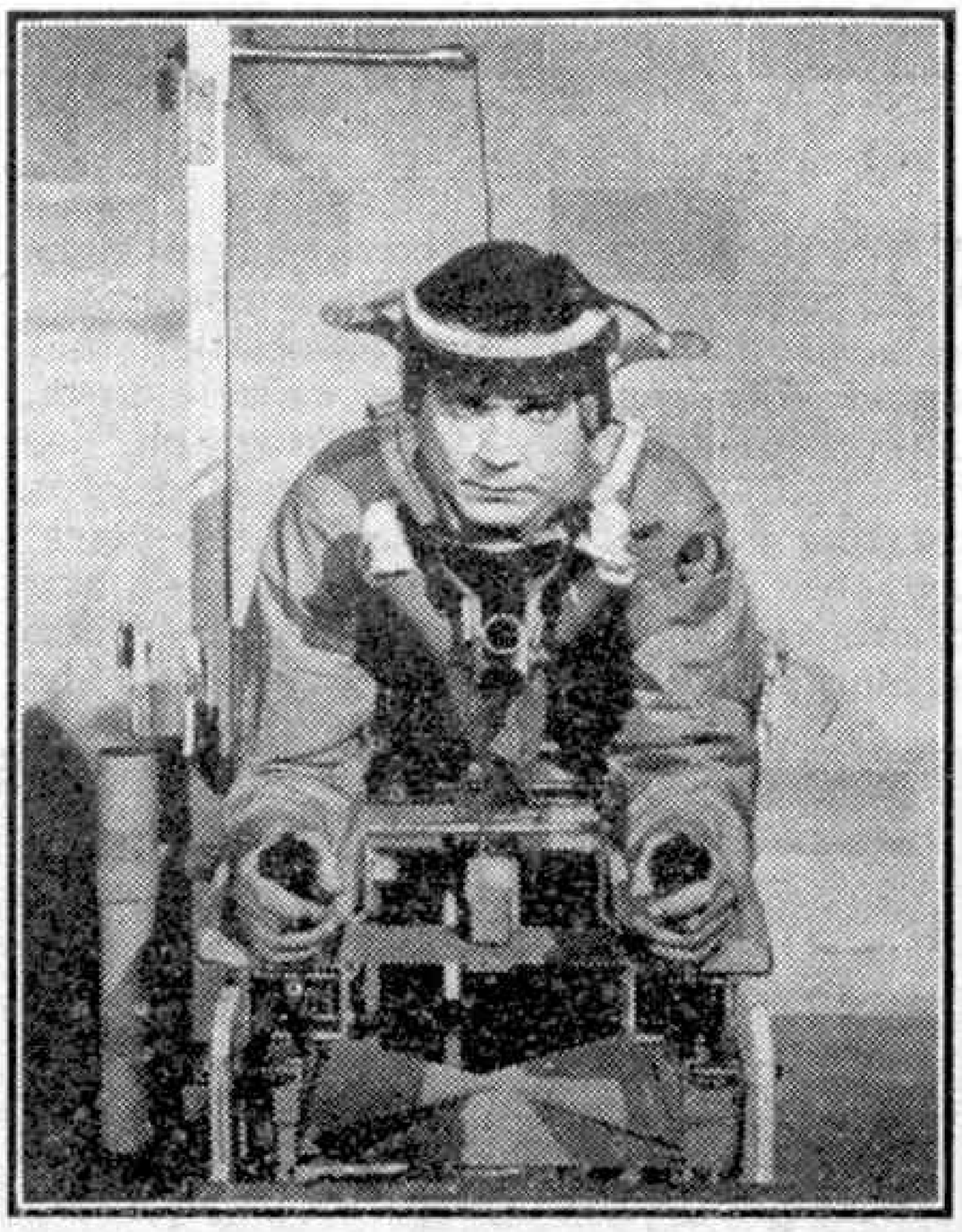
"The Flying Bedstead"

By John W. R. Taylor

THE unpleasant-looking contraption illustrated on this page is not a new type of electric chair, but the latest fashion in aircraft cockpit design from America. Nor is it as uncomfortable as it looks. In fact, pilots who have tested it at the Aero-Medical Laboratory of the U.S.A.F.'s Air Materiel Command claim that it is far more comfortable than the usual type of pilot's seat.

The need for some form of prone flying position has become increasingly apparent in the last few years, as the speed and range of military aircraft have increased steadily. During the Second World War, fighter pilots often had to spend eight hours perched on a rigid metal seat in a cramped cockpit. To make things worse, they found that centrifugal forces imposed on them during violent combat manœuvres at high speed often caused temporary "blackouts," which were both unpleasant and dangerous. The arrival in service of jet-fighters, with even higher speeds, brought matters to a head.

In an effort to remedy the trouble, the U.S.A.F. Aero-Medical Laboratory evolved the "bed" shown on this page, after tests on a "whirling arm" had proved that a reclining pilot can withstand forces three times as great as those which cause a blackout when he is seated. The bed also promises to solve the fatigue problem, as pilots have remained on it for periods of eight hours without experiencing any sign of backache or other discomfort.

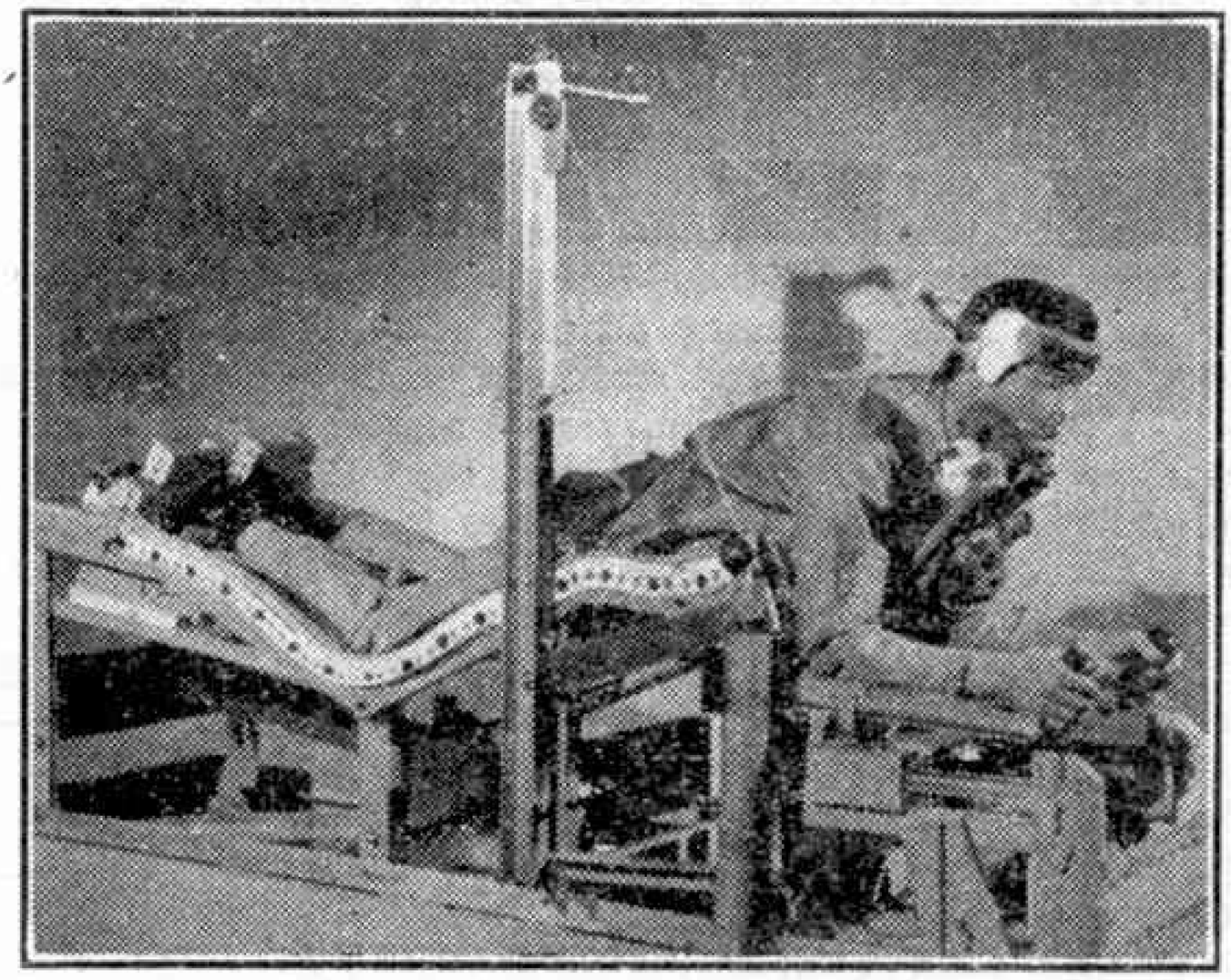


Demonstrating the prone position pilot bed evolved by the U.S.A.F. Aero-Medical Laboratory. Photographs by courtesy of the U.S. Air Force, Washington, D.C.

It consists basically of a length of extremely strong nylon netting stretched between two curved side-frames so as to conform to the body contours of an average pilot when supported on it. His head is cradled in an adjustable padded jaw-rest, neck-strain being further relieved by means of a counter-weighted head support which permits the pilot to turn his head even during high-speed manœuvres.

Special controls designed for the prone flying position consist of two movable rubber-padded armrests with adjustable hand-grips, which act as levers for steering the aircraft and incorporate mechanism which ensures ease of control even at high speed. The pilot's feet rest on pedals, which can be connected to either a rudder or brakes.

The prone position will benefit designers as well as pilots, for it requires less space for the cockpit than an ordinary vertical position.

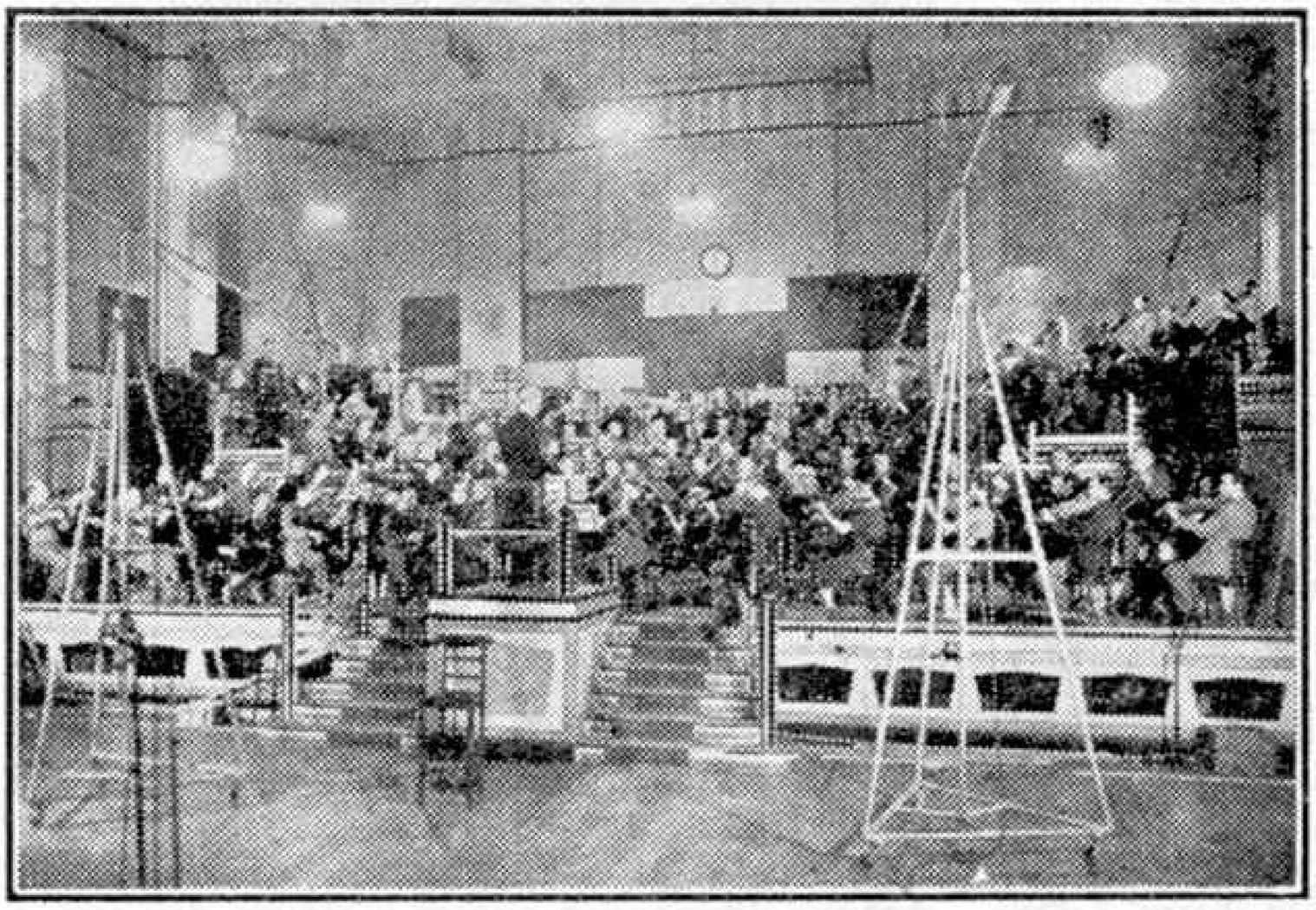


Another view of the prone position pilot bed.

How Modern Gramophone Records are Made

By Trevor Holloway

OVER ninety years have passed since Leon Scott de Martinville demonstrated at a meet of the British Association that sound vibrations could be written down, or "recorded." The "Phonautograph," as his apparatus was called, consisted of a rotating cylinder coated with lamp black. Attached to a diaphragm was a hog's hair bristle and when sounds were uttered into a mouthpiece the bristle reproduced the sound vibrations in the form of traces on the coated cylinder as it revolved. Scott drew attention to the fact that similar sounds produced similar traces.



The B.B.C. Symphony Orchestra, conducted by Sir Adrian Boult, recording in the E.M.I. Studios. The illustrations to this article are reproduced by courtesy of E.M.I. Ltd.

Twenty years passed before anyone seriously considered the possibility of converting the traces back into sound. Edison was the first to accomplish this. He had substituted a rigid point for Scott's bristle and covered the cylinder with tin foil instead of lamp black. When the needle was passed over the indentations made in the foil, the sounds originally made were reproduced. It is said that the first words ever to be recorded were "*Mary had a little lamb.*"

Edison's apparatus was called the "Phonograph," and the machines with their cylindrical records attained considerable popularity. The next outstanding advance was made by Emile Berliner who, in 1880, after experimenting with recording on glass discs, evolved a method of duplication from metal moulds on to discs made from a shellac compound.

Modern recording technique dates from 1925, when electrical recording revolutionised the industry. The various companies began to build their own soundproof studios, where acoustic troubles could be reduced to a minimum and outside noises excluded. In the old days many a recording at the Hayes studio of H.M.V. was ruined by the whistle of a passing express locomotive or the hoot of a factory siren. As a point of interest it may be said that much of the knowledge gained during the construction of recording studios was put to good use during the building of broadcasting studios.

We will imagine that the B.B.C. Symphony Orchestra, or perhaps the band of the Coldstream Guards, has arrived at one of these studios to make a recording. First come the rehearsals. Behind a glass panel in a soundproof room at the far end of the studio the recording engineer listens intently to the music, which comes to him via a microphone. He is in touch by telephone with a man seated close beside the conductor of the orchestra or band. The recording engineer is an exacting critic. "Too much bass . . . a little more trombone . . . trumpets too close . . .," and so forth. The conductor is informed, the necessary adjustments made, and the piece played through once more. If all is well, a buzzer sounds and absolute silence prevails. A red light glows—the recording engineer has lowered his cutter on to the wax disc and the first trial record is being made.

What is happening behind the glass panel? Here is an array of complicated-looking apparatus and dials innumerable. The recording machines, which look like big gramophone motors, are marvels of engineering science, yet strangely enough, that highly-polished wax disc on which will be engraved the "sound pattern" of

the music, is rotated in what seems primitive fashion—by means of a large weight and pulleys! Even in these days the pull of gravitation is the surest way of achieving unvarying speed. It is essential that the wax disc shall revolve at an absolutely constant speed throughout the whole recording.

When the recording engineer is satisfied with the rehearsals, he lowers the cutting stylus carefully on to the wax disc and then switches on the red light. The music begins, and with a quiet hiss the stylus begins cutting the sound grooves in the wax, the thin shavings it skims off being automatically removed by suction. Faithfully engraving every sound vibration which comes from the microphone, the stylus cuts its way ever closer to the centre of the disc.



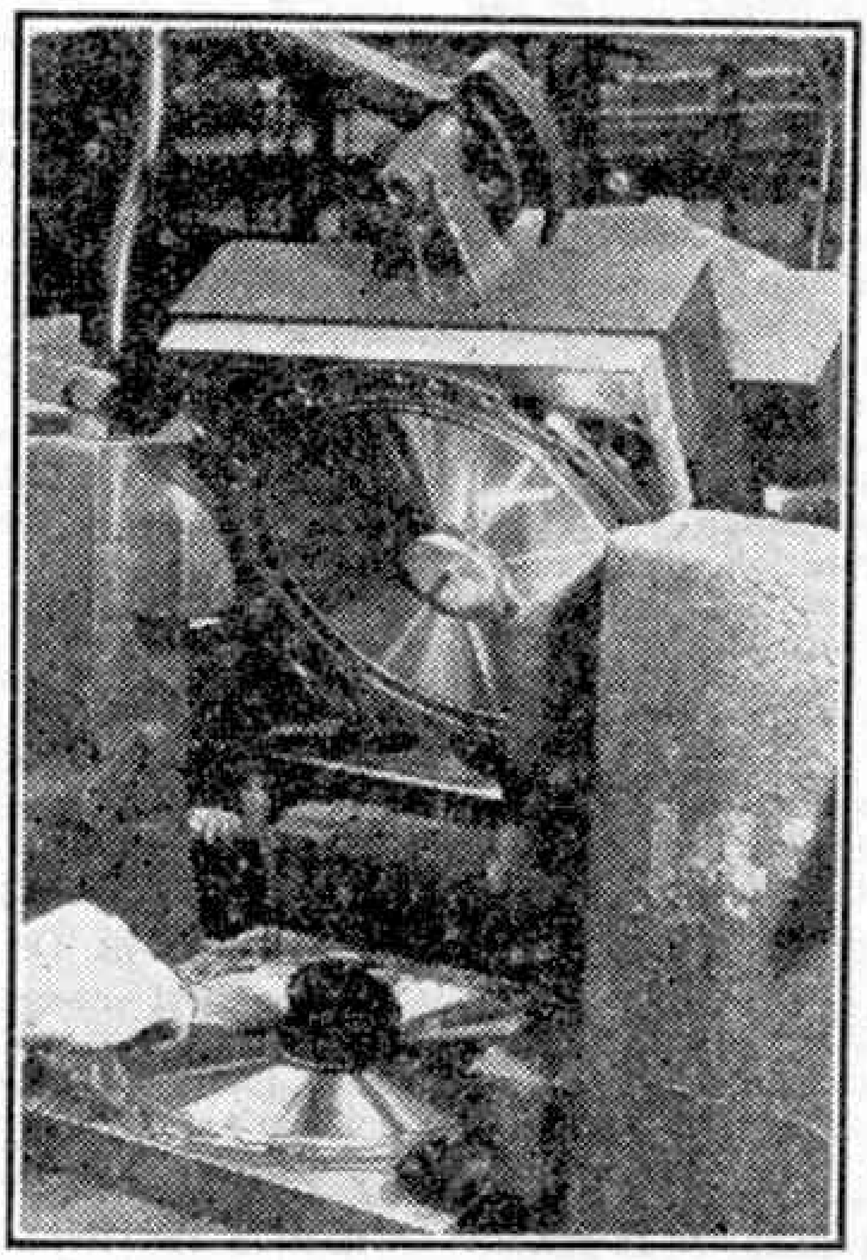
Engraving the "run in" grove, necessary to operate auto-brakes on turntable mechanisms, on a recorded wax disc.

Recordings are often taken in duplicate, so that one of the wax discs can be "played back" for the conductor and performers to criticise. The wax disc so used is, of course, ruined in the process, but if the performance is to everyone's satisfaction the second disc will be used for succeeding processes.

The recording engineer first carefully examines the surface of this disc through a magnifying glass, and if all is well he numbers the wax on the plain centre portion, packs it in a special container, and despatches it to the factory for copies to be made.

On arrival at the factory, the engraved wax is prepared for electrotyping by dusting the surface with metallic powder so fine that it does not affect the sound traces. This metallised surface attracts the particles of copper in the plating bath, and a thin but strong "negative" shell of this metal is deposited on the wax.

This first copper shell is called in the trade the "Master." As it is a "negative" the sound waves appear as ridges instead of grooves. It could be used to press records straight away, but in a short time it would begin to wear and to renew it the whole process of recording would have to be done all over again. So, to obviate this, a second copper shell called the "Mother" is now grown on to the master. This, of course, is a positive and therefore of no use for pressing records, so the mother goes back into the plating bath and a third and final shell is deposited on it. This third shell is called the working matrix and is the one actually used for making the records we buy. These matrices can be taken from the mother as often as necessary.



A gramophone record in the making. When the press is closed the rolled up "biscuit" is moulded into shape by the matrix faces above and below, and is cut to the correct size.

The master is then carefully filed in a fireproof vault, along with many thousands of others representing the best of recorded art for the past 40 years or so. It is of interest to record that working matrices of a number of famous speeches and musical performances have been deposited in hermetically sealed cases at the British Museum for the information of future generations.

The working matrix is now backed with a steel plate and sample records are pressed from

(*Continued on page 473*)

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With certain exceptions, which will be indicated, these should be ordered through a bookseller.

"NELSON THE SAILOR"

By Capt. Russell Grenfell, R.N.
(Faber. 8/6 net)

We can never learn enough about England's greatest sailor, whose victories saved Britain during the Napoleonic wars. As a seaman and a warrior Nelson was supreme. In the years that have passed since his wonderful achievements he has become an almost legendary figure of romance. There has been good ground for this, as his triumphs were fabulous in their extent, and he died at the moment of his greatest and most decisive victory. Yet the air of glamour that has spread over his life is liable to be misleading, and for that reason this story of his career will be welcomed, as the author has shown the great sailor exactly as he was. To record his weaknesses and failures does not in any way detract from his fame, and indeed the life story of Britain's naval hero actually gains in fascination and interest.

The most valuable feature of Capt. Grenfell's book is the wonderfully clear manner in which he demonstrates Nelson's genius for warfare. For instance, there is an admirably lucid account of his action at the battle of St. Vincent, when he broke the line of battle ordained by the British commander, an action that ensured a rousing victory. The story of the battle of the Nile is told with remarkable clarity, illustrating to the full Nelson's leadership and his power of inspiring the captains and crews who fought under him. Copenhagen and Trafalgar, and Nelson's dominating part in these battles, are dealt with no less admirably, and readers will have no difficulty in appreciating the moves that led up to these great conflicts as well as the battles themselves. The four great battles of course were the highlights of Nelson's career, but they were connected by a thread of achievement in many different fields of action, and from Capt. Grenfell's narrative we realise to the full the genius of this great sailor, fighter and leader.

The book contains five full page plates and four diagrams.

"MODERN LOCOMOTIVES"

By Brian Reed (Temple Press. 8/6)

"*Modern Locomotives*" is one of the first of a new series of illustrated books known as the boys' "Power and Speed Library." The author writes with a thorough knowledge of his subject, explaining exactly in simple language the various considerations affecting the steam locomotive, with reference to design and building, running and so on. Although the steam engine gets the lion's share of attention, other forms of traction are not neglected.

The book forms a most useful introduction to the subject for any boy who is setting out to study the locomotive seriously. It is fully illustrated with half-tones and line illustrations, but it is surprising to find among the pictures two Western Region locomotives numbered in the "60000" series allocated on nationalisation to former L.N.E.R. stock.

"CONQUEST OF THE NORTH ATLANTIC"

The Cunard White Star Company have had the happy idea of telling the story of the North Atlantic service of the past century in this booklet. The story begins with the coming of steam and the beginning of steamships, and shows how the first Cunarder, the "*Britannia*," was succeeded by ever larger and faster ships, including such famous vessels as the "*Campania*," the "*Lusitania*" and the "*Mauritania*," up to the coming of the giant "Queens," the largest and most luxurious ships of the present Cunard White Star fleet. Interesting details are given of famous Cunarders, and there are many excellent pictures.

"COMPANY OF ADVENTURERS"

By Louise Hall Tharp (Harrap. 8/6 net)

The adventurers of this absorbing story are the men who founded the Hudson's Bay Company and the early trappers and traders in the unexplored wilderness of the Canadian forests. When the Company was formed there were only a few settlements along the Atlantic Coast and on the St. Lawrence, and these were French. One famous Frenchman, Pierre Radisson, had his quarters in Three Rivers, between Quebec and Montreal, and travelled widely in the backwoods, often among hostile Red Indians. He was badly treated by his native France and as a result turned to the service of the English King, playing a great part in the foundation of the Hudson's Bay Company

Radisson's further adventures are well told in this book, and we have also the stories of many famous successors who helped to make the Company prosperous and famous, among them Henry Kelsey, Samuel Hearne, the first Arctic explorer, Alexander Mackenzie, who discovered the great Canadian river named after him, George Simpson and Donald Smith. One of the most interesting sections of the book tells the story of the settling of Manitoba by Scottish emigrants under Lord Selkirk, who for years endured great hardship, but led the way in transforming Canada's prairies into a wheat granary. The final sections bring us to the time when the Company surrendered its fur empire, which was transferred to Canada, and took on its present form.

The story is a wonderful one and is well told by an author who knows the remoter parts of Canada intimately. It contains many illustrations in line.

"MODERN BRITISH AEROPLANES"

By Charles Gardner
(Temple Press Ltd. Price 8/6)

Mr. Gardner, who for many years has been the Air Correspondent of the B.B.C., has concentrated in this book—designed for boys of 9 to 90!—on explaining the intricacies of the modern aeroplane in a chatty, amusing and easily understood way. The book is in two parts. The first part begins with a chapter explaining how an aeroplane flies, and one on how the piston engine works that leads naturally to another on the working of a jet engine. Then there is a most interesting chapter on modern navigation. Part two deals in detail with many of Britain's outstanding aircraft, and covers most of the problems associated with modern high-speed aeroplanes.

Throughout the work scientific explanations are simplified by the use of everyday comparisons, and the whole is not only fun to read but also teaches a lot in a light-hearted way. It is splendidly illustrated, with two plates in colour, 34 half-tone photographs and many explanatory diagrams. The book will make an ideal Christmas gift for any boy keen on aeroplanes.

"THE RISKY QUEST"

By Noel D. Harrower (Harrap. 5/- net)

The first interesting thing to be noted about this story is that its author wrote it before he had reached the age of 14 years. The next is that in spite of the writer's youth it is a vigorous yarn of exploration and warfare on a previously unknown island, claimed by both British and French. After conflict with natives the two nations agree to divide the island, but before they can take effective possession a Spanish pirate steps in and seizes it. How he is overcome is splendidly told. The story never flags in interest from start to finish. There is a map of the island and excellent illustrations.

"AIRLINERS"

By JOHN STROUD
(Penguin Books Ltd. Price 1/6)

There has long been a need in the excellent "Puffin Picture Book" series for a book on aircraft. This one, just published, is devoted entirely to air liners, and within its 30 pages contains details and illustrations of nearly 40 past and present types of passenger-carrying civil aircraft. These range from the Vickers Viking Commercial and other types of converted bombers, with which many European civil air routes began after the 1914–18 war, to the British Airspeed "Ambassador" and American Boeing "Stratocruiser" of to-day. The centre pages deal with the Lockheed "Constellation" and include an excellent cutaway illustration of one of Qantas Empire Airways' machines of this type. The book ends with notes on the Bristol "Brabazon" landplane and Saunders-Roe "Princess" flying boat of the future.

The text briefly summarises the main features of the machines and the principal routes on which the aircraft now in service are employed. The neat and attractive drawings, mostly in colour, are also by the author, whose skill in this direction is well known to "*M.M.*" readers interested in aeroplanes.

"TRAINS ANNUAL 1950"

(Ian Allan Ltd. 7/6)

The 1950 edition of this popular Annual is larger than those of previous years and contains an attractive selection of articles by a talented team of writers. The fact that the Editor is Mr. Cecil J. Allen, M.Inst.T., is a sufficient guarantee of the interest and accuracy of its contents. For the first time coloured plates are included, and there is a wealth of half-tone photographic reproductions, while a modern note is struck by the coloured jacket and cover, both of which show a London Midland express train hauled by a blue-painted Class 7 4–6–2.

We begin with a racy account of the "Stranraer Road" of the former G. and S.W.R., and further pre-grouping interest is lent by an attractive description of the South Eastern and Chatham line. Locomotive subjects get a good share of attention at the hands of various writers, a particularly interesting chapter being that on locomotive testing, with special reference to the Rugby Testing Plant. Railways in Ireland and in the Alps provide almost amusing diversity, while railway ticket collecting and the adventures of the cover artist in the course of several commissions are distinctly entertaining. The book ends with a very thorough account of the career of the train now again known as the "*Mid-day Scot*," for long years the 2 p.m. from Euston and distinguished by Euston men even yet by the nickname "*The Corridor*."

MODEL BUILDING BOOKLETS

We have received a series of constructional booklets issued by the well-known firm of Percival Marshall and Co. Ltd. These are well up to the standard set by this firm. They are written by experts in their own spheres, and amply illustrated with carefully drawn diagrams to guide the home constructor.

Mr. E. F. Carter writes on "*Locomotive Body Construction*" (3/–), with his usual care and attention to the detail that means so much in the success of model making of this kind. "*Models in Wood*" (7/6), by Mr. C. Baker, gives ideas for building miniatures and household novelties, many of them of a kind not usually dealt with in wood-working handbooks. An always attractive topic is dealt with in "*Period Ship Modelling*" (3/6), by R. K. Battson, who explains how to construct an Elizabethan galleon that is remarkably complete and realistic; and in "*Painting and Lining Models*" (3/–) R. C. Rogers shows how to give the finishing touches to models of all kinds, a valuable addition to the Percival Marshall series. Lastly we have "*Ships in Bottles*" (3/6), by J. P. Lauder and R. H. Biggs, who explain the mystery of coaxing fully rigged sailing ships into bottles with surprisingly small necks.

"THE MODERN WORLD BOOK OF RAILWAYS"

By PAUL TOWNEND
(Sampson Low, Marston & Co. Ltd. 8/6)

This is a good general book on the ever-interesting subject of railways, and is particularly suitable for younger readers. In its 17 chapters it manages to refer very fully to most aspects of railway equipment and working. The beginnings of railways and their development, the work that the railways do and the men who run them, occupy several of the earlier chapters; travel possibilities by rail, narrow-gauge systems and the building of "the road," with boat trains and London's Underground, form a further interesting section; and big station working, freight trains and the war effort of our railways also are given special attention.

Overseas railways have a chapter all to themselves. The design and working of the steam locomotive cover two chapters in different parts of the book, and the whole is fittingly concluded by a brief account of the elaborate maintenance organisation necessary to keep railways in working order.

The book is simply written, without a mass of confusing technicalities, and the illustrations, some in colour, are extremely comprehensive.

MATHEMATICS AND THE IMAGINATION

By E. KASNER and J. NEWMAN
(Bell. 15/– net)

There is much more in mathematics than the sums that we plough through laboriously at school, and unfortunately few of us ever realise the wonders of huge numbers, geometries that were never imagined by Euclid, famous puzzles that have tantalised great mathematicians and the almost mystifying laws of chance and probabilities. Here is a book that will entice the reader into the realm of higher mathematics and will show him that this is alive with interest. Even such a symbol as pi, a mere nuisance to the average schoolboy, turns out to have a romantic history of its own, while many strange things happen when we begin to twist and distort the sheets of paper on which we draw geometrical figures. The book indeed will open up a new world to older readers of the "*M.M.*" who have mathematical inclinations, and the parts that at first seem fantastic and even impossible will stimulate them to further thinking.

"THE AUSTRALIAN TRAMWAY ALBUM"

(Traction Publications, Australia. 6/–)

This interesting book contains a brief history of every Australian tramway system, with many photographs of tramcars and other tramway vehicles ranging from horse-drawn and steam passenger cars to rail grinders and water cars. Even a ferry boat for carrying tramcars over a harbour is featured.

Australian systems have a very large variety of tramcars of their own design as well as American and English types, including double deckers, which are rare outside our own country. Tramways remain the principal form of street transport there, and in 1945–6 tramcars carried more than half the total number of city and suburban travellers of that period. The various systems are well described, and the book will prove interesting to all who have tramway interests at heart.

Copies can be obtained from Traction Publications, 29, Seymour Grove, Brighton Beach, Victoria, Australia, price 6/– each post free. The number of copies available is limited, so those wishing to possess one should apply early.

"DIAMOND COAST"

By A. D. DIVINE
(Children's Books Ltd. 5/–)

Here is a dramatic story of a fight with ruthless diamond raiders of the South African Coast. The heroes are captured by the raiders, but succeed in freeing themselves, in finding the hiding place of the diamonds and in ensuring the rout of the raiders. A lively and interesting story, with seven full page illustrations.

Among the Model-Builders

By "Spanner"



A Meccano prizewinner from Australia. Our photograph shows G. Burns, Warragul, Victoria, who won Second Prize in a recent "M.M." Competition.

An Automatic Reversing Mechanism

Several model-builders have enquired for help in designing automatic reversing mechanisms as they seem to find such mechanisms rather difficult. Actually there are a great many different ways of arranging an automatic reverse and the particular method adopted will depend on the purpose to which the mechanism is to be applied. The most general requirement, however, seems to be a mechanism for reversing a lift cage at each end of its travel, and I am taking this opportunity of describing a suitable mechanism for this purpose. It is shown in Fig. 1 and I hope it will prove helpful to my correspondents and others who are interested in lift and hoist building.

By making the distance between the two blocks of a pulley system automatically variable, it is possible to cause the free end of the cord to be alternately extended and returned. This movement is utilised to operate an automatic lift cage and crane hook, or any other similar movement. In the example on this page it is shown in its simplest form, but can be elaborated at will.

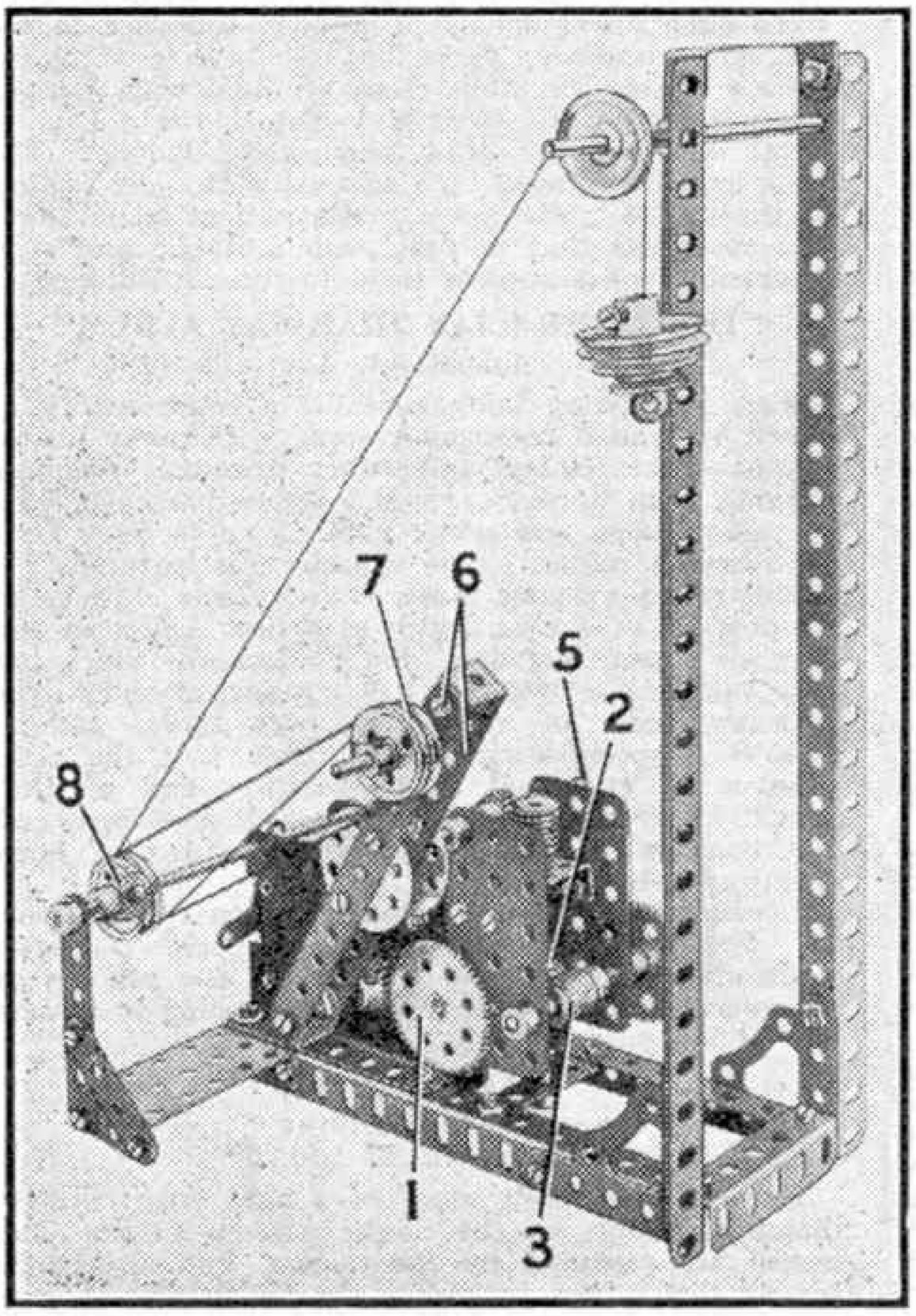


Fig. 1. An ingenious automatic reversing mechanism. It has many interesting uses in model-building.

The Electric Motor is fixed on a suitable base, and the armature shaft carries a ½" Pinion engaging with a 57-tooth Gear 1, connected by a second stage of 3:1 reduction gearing to a Worm 3 that is in mesh with a ½" Pinion 2. This Pinion is mounted on a vertical Rod, together with a second Worm engaging with still another ½" Pinion.

The Rod 5 on which this last-mentioned Pinion is mounted carries two Bush Wheels on its outer section, and these are attached to two 5½" Strips 6 as shown. One pair of Pulleys 7 is attached to the arm 6, and the other pair to a horizontal Rod carried in the Motor side-plates. One end of the Cord is tied to a Fishplate 8, and after passing round the various Pulleys is taken over a Pulley at the top of the lift shaft and fixed to the lift cage. As the arm 6 rotates the Pulleys 7 mounted on it alternately approach and recede from the fixed Pulleys.

How to Use Meccano Parts

Dog Clutch (Part No. 144)

The Meccano Dog Clutch consists of one male and one female section. The object of the complete unit is to enable two shafts to be engaged or disengaged with each other whenever desired. The shafts must be mounted end to end and one must be slidable in its bearings so that the clutch sections can be thrown in or out of engagement on operation of a suitable lever.

Alternatively, the Dog Clutch can be used in conjunction with a Socket Coupling, to enable a Gear Wheel or Pinion, etc., to be mounted on a shaft

so that it can either be carried round bodily with the shaft or allowed to remain stationary while the shaft carrying it turns in its boss.

Fig. 2 shows the Dog Clutch used in the construction of a reversing mechanism. In this mechanism either of the horizontal Rods can be used as a driving shaft. Each carries at its inner end a segment of a Dog Clutch 1 and 2, and one ¾" Pinion 3 and 4. The left-hand horizontal Rod is slidable in its bearings and is controlled by a suitable hand lever.

In the first position of the hand lever the ¾" Pinion 3 is caused to engage with a 1½" Contrate Wheel, as in the illustration, while in its second position the Pinion is thrown out of engagement and the clutch members are combined. The Pinion 4 remains in constant engagement with the Contrate, and in the second position of the lever the Contrate merely revolves idly.

Crane Jib Construction

The jib of a model crane must be made as light as possible consistent with strength. A strong and rigid jib can be constructed from Angle Girders, assembled to form a square section girder by means of Strips, additional Strips being added for diagonal bracing. A jib of lighter construction can be made from Braced Girders, and although not so rigid as the former type, it will be found sufficiently robust for most models. The Braced Girders are made to form a large box girder by bolting them together with Angle Brackets.

A NEW MECCANO COMPETITION

"Yuletide" Contest

The Christmas season, with all the fun and excitement it brings, will provide model-builders with countless subjects depicting humorous aspects of the festivities. There is great scope for ingenious model-building in this direction, and with this in mind we are organising a special "Yuletide" Competition for amusing models having a definite connection with the Christmas festival.

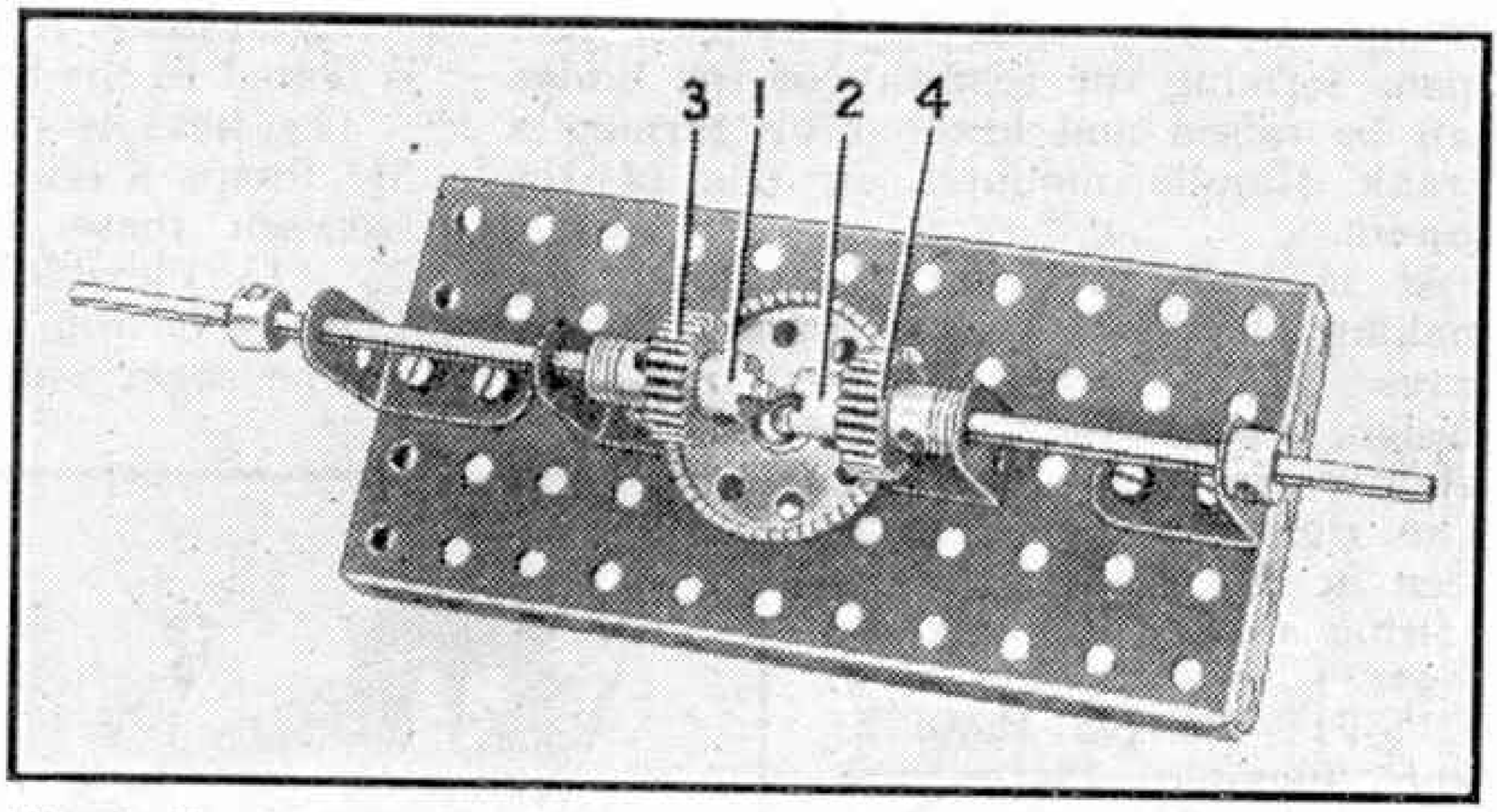


Fig. 2. The Meccano Dog Clutch used in the construction of a reversing mechanism.

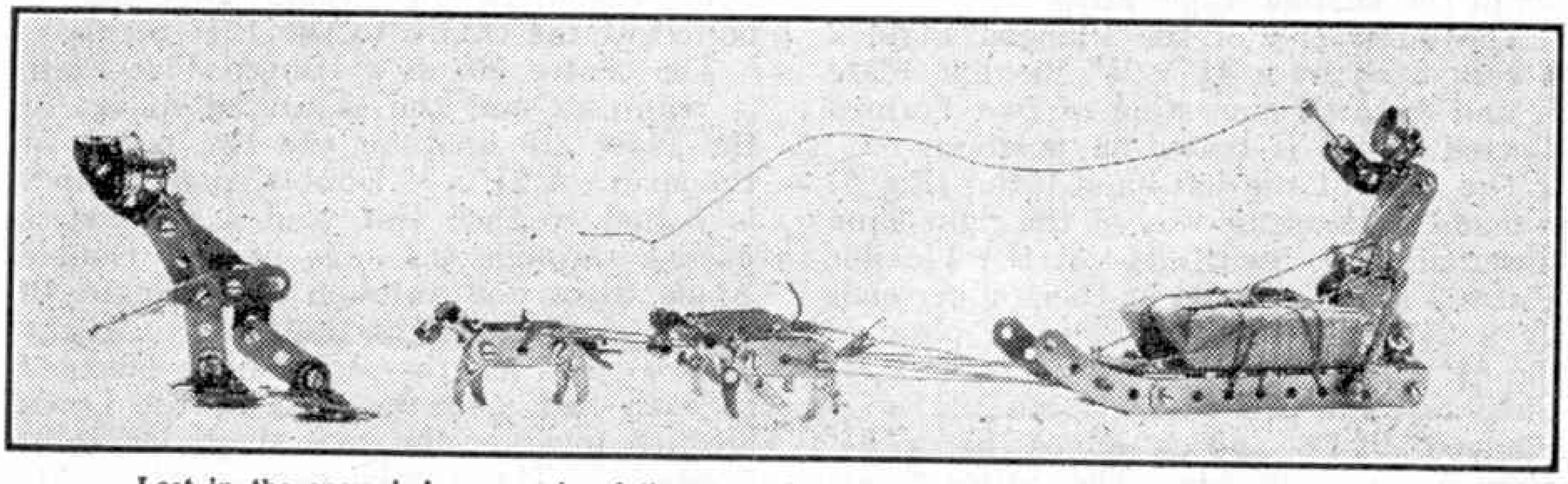
The illustration on this page is a good example of the type of model suitable for the Contest, and other subjects include carol singers, snowball fights and bringing home the Yule log! Many other subjects will readily suggest themselves. Readers should note, however, that entries need not necessarily be confined to outdoor subjects.

Competitors may use as many parts as they wish. Working models, in which the figures are brought into action by a Motor, Cord or levers, will be specially welcomed. Actual models must not be sent. A good photograph or drawing is all that is required.

The competitor's age, name and address must be written clearly on the back of each illustration submitted, and entries must be addressed, "*Yuletide Competition, Meccano Ltd., Binns Road, Liverpool 13.*"

Entries will be grouped into two Sections, for Home and Overseas readers respectively. The closing dates are Home, 31st January 1950, Overseas, 31st May 1950.

The following prizes will be awarded in each Section, First, Cheque for £3/3/–; Second, Cheque for £2/2/–; Third, Cheque for £1/1/–. There will be also five prizes each of 10/– and five prizes each of 5/–.



Lost in the snows! An example of the type of model suitable for the Yuletide Competition.

New Meccano Models

Bascule Bridge and Bagatelle Game

THE simple bascule bridge illustrated in Figs. 1 and 3 can be built with the parts included in a No. 4 Outfit. It is similar in design to the famous Tower Bridge, London, and the leaves or half spans forming the roadway of the bridge can be raised and lowered by turning a Crank Handle mounted in one of the towers.

It is best to begin construction by making the towers and approach roadways. Both towers are similar in general design, but they vary slightly in some details. The right hand tower as seen in Fig. 1 is made by bolting a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate 1 to each side of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate 2. The Flexible Plates are braced by $2\frac{1}{2}''$ Strips and small radius Curved Strips, and the Plates 1 on each side are linked by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip. A $1\frac{11}{16}''$ radius Curved Plate is flattened and attached to the Double Angle Strip and to the flange of the Flanged Plate 2. The base is extended upward by two $5\frac{1}{2}''$ Strips 3 on each side, and the space between these Strips is filled in by a $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate. A $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 4 is used to link the Flexible Plates together, and a $3\frac{1}{2}''$ Rod passed through the centre hole of the Double Angle Strip carries two Road Wheels, a Wheel Disc and a 1" Pulley. The Rod is held in place by a 1" Pulley fixed underneath the Double Angle Strip.

The outer end of the Flanged Plate 2 is supported by a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate 5, and an arch consisting of two Formed Slotted Strips is bolted in position.

The base of the left-hand tower (Fig. 1) is made in the same way as the right-hand tower already described, but the Flexible Plates 1 are connected at their upper ends by a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate in place of the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate 2. A $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate 6 is bolted to the $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate, and is edged by a $3\frac{1}{2}''$ Strip 7 on each side. The Strips 7 are connected to the Flexible Plate 6 by Angle Brackets, and the outer end of the Plate 6 is supported by a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate also attached by an Angle Bracket. An arch made from Formed Slotted Strips is bolted to the Strips 7.

The base is extended upward by two $5\frac{1}{2}''$ Strips 8 on each side, and the space between these Strips is filled in by a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate and a Semi-Circular Plate. The top of the tower is completed in the same way as its companion.

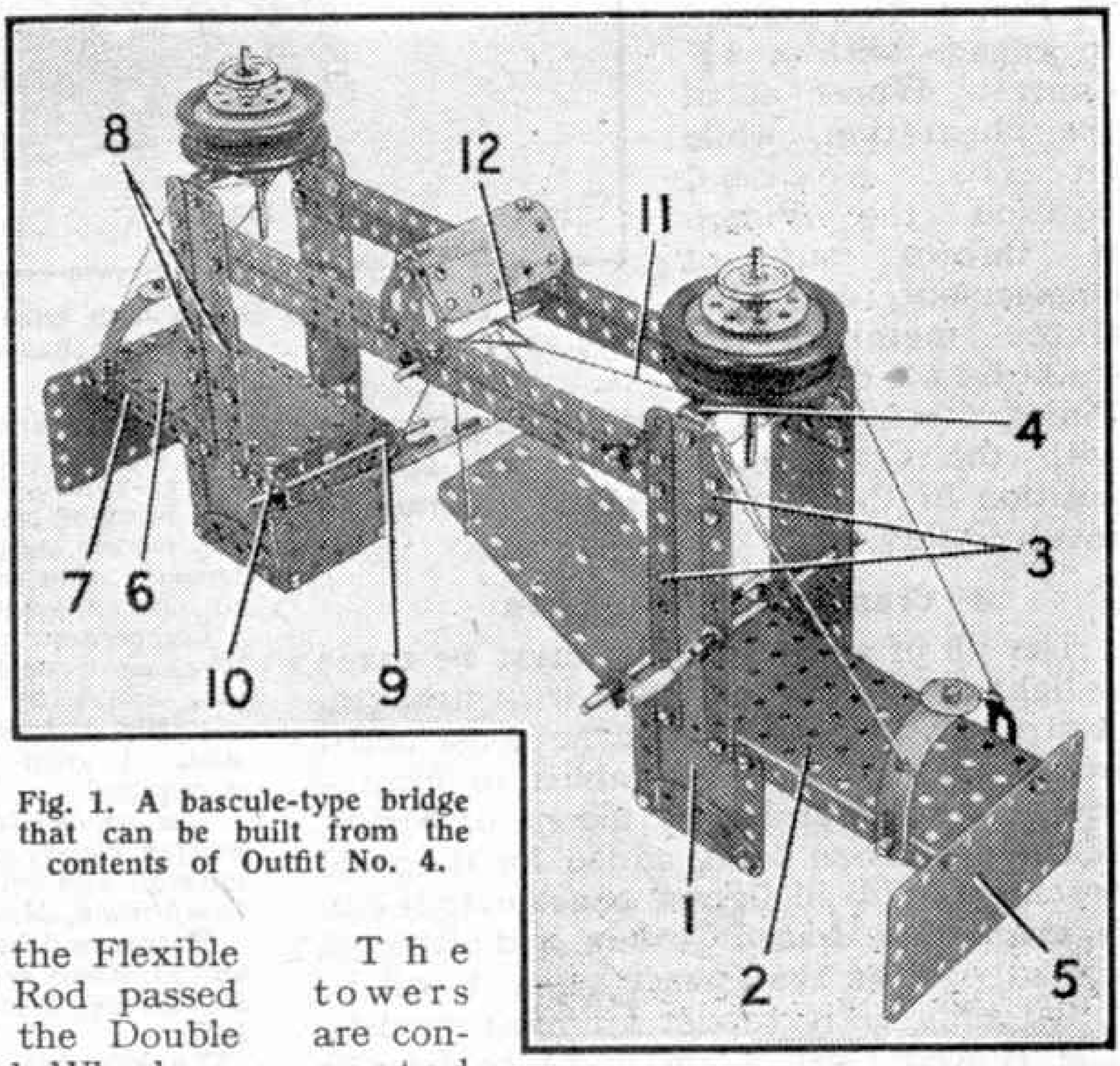


Fig. 1. A bascule-type bridge that can be built from the contents of Outfit No. 4.

The towers are connected together by two $12\frac{1}{2}''$ Strips on each side, and a U-section Curved Plate attached to Flat Trunnions by Angle Brackets is bolted at the centre to the $12\frac{1}{2}''$ Strips.

The centre pin of a Hinged Flat Plate is removed, and the separated halves of the Plate are used for the two leaves of the span. A $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 9 is bolted to each leaf, and a 4" Rod is passed through the lugs of the Double Angle Strip and through a Fishplate 10 bolted at each side of the base.

Two short lengths of Cord are fastened to each leaf, and the ends of the Cords are tied together and to a single length of Cord 11. The Cords pass over a $3\frac{1}{2}''$

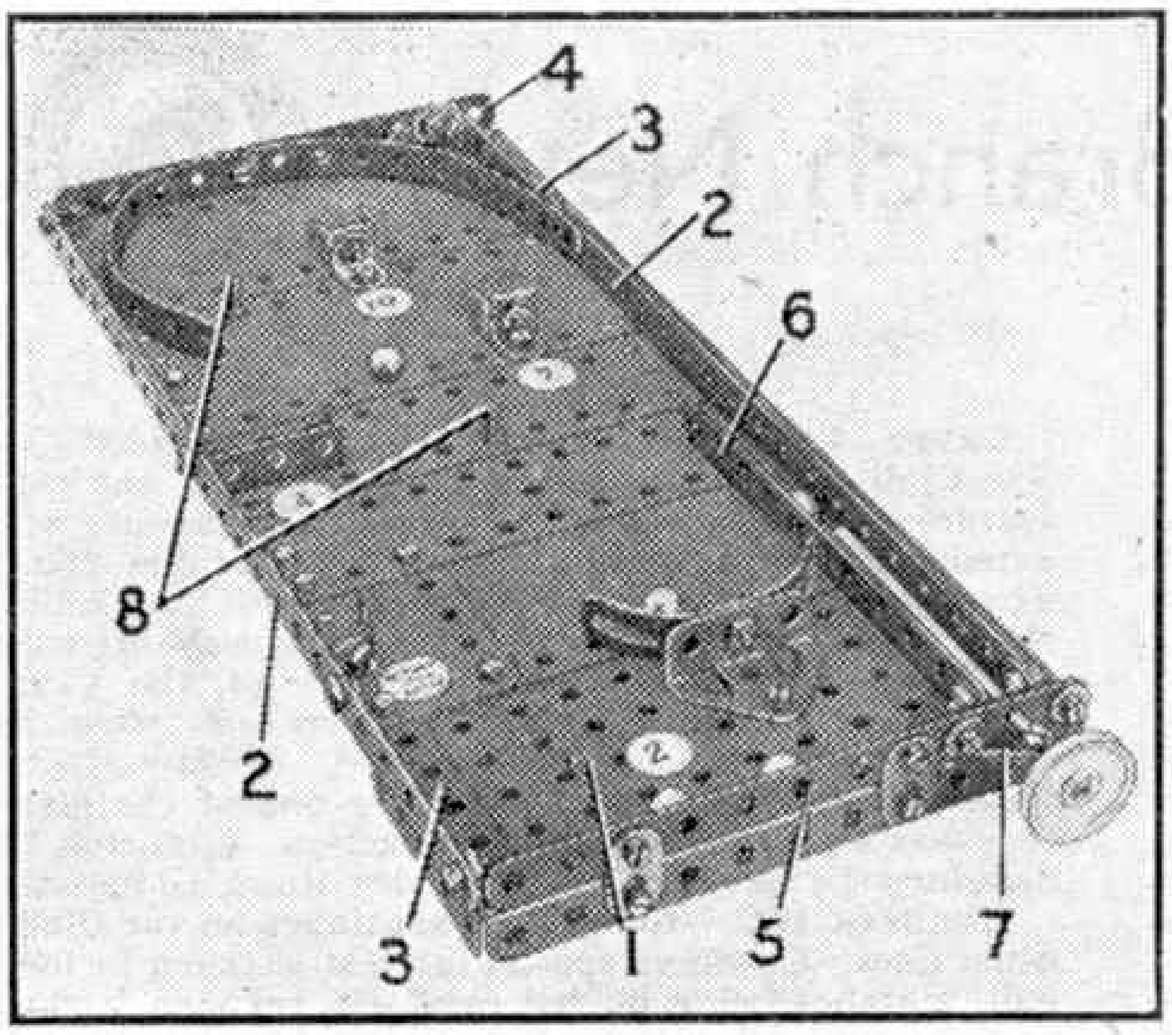


Fig. 2. A Meccano bagatelle game that will provide fun for the Christmas party.

Rod 12 mounted at the centre of the bridge, and Cord 11 is fastened to a Cord Anchoring Spring on a Crank Handle. The Crank Handle is mounted in the right-hand tower as shown.

Parts required to build the model Bascule Bridge: 4 of No. 1; 8 of No. 2; 2 of No. 3; 9 of No. 5; 4 of No. 10; 5 of No. 12; 2 of No. 15b; 4 of No. 16; 1 of No. 192; 4 of No. 22; 2 of No. 24a; 8 of No. 35; 80 of No. 37; 4 of No. 38; 2 of No. 38d; 1 of No. 40; 6 of No. 48a; 1 of No. 51; 1 of No. 52; 4 of No. 90a; 4 of No. 187; 2 of No. 188; 2 of No. 189; 4 of No. 190; 2 of No. 191; 1 of No. 192; 1 of No. 198; 1 of No. 199; 2 of No. 200; 2 of No. 214; 4 of No. 215.

An amusing bagatelle game forms the subject of our other new model this month and is shown in Fig. 2. It can be assembled with the contents of a No. 4 Outfit, but three or four ball bearings or small marbles are required for use with it. The model is simple to construct, and will provide plenty of amusement, especially to the younger members of the family. The balls are "fired" up the board by means of a spring-operated plunger, and with a little practice a surprising degree of accuracy can be obtained in directing them into the various numbered pockets.

The base of the model is made by bolting two $12\frac{1}{2}''$ Strips at their lower ends to a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate 1, and at their upper ends to a $5\frac{1}{2}''$ Strip. The $12\frac{1}{2}''$ Strips are indicated at 3, and the space between them is filled in by Flexible Plates. Two $5\frac{1}{2}'' \times 2\frac{1}{2}''$, two $5\frac{1}{2}'' \times 1\frac{1}{2}''$ and a compound $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates are used for the purpose. The compound plate is made from a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate bolted together.

The sides of the table are $12\frac{1}{2}''$ Strips 2 and they are attached to the Strips 3 by Angle Brackets. A $5\frac{1}{2}''$ Strip 4 is attached to one end of the table by Angle Brackets, and at the other end a $5\frac{1}{2}''$ Strip 5 is bolted to Fishplates. A further $5\frac{1}{2}''$ Strip 6 is attached to an Angle Bracket bolted to Strip 5, so that a channel wide enough to accommodate the balls easily is made between Strip 6 and the side of the table.

The plunger consists of a 4" Rod fitted with a 1" Pulley, and it is mounted in Strip 5 and in a Reversed Angle Bracket bolted to the Strip. The spring loading on the plunger is obtained by a Driving Band 7, which is bolted to the Strip 5 and is passed over two Bolts screwed into the boss of the 1" Pulley.

Two $5\frac{1}{2}''$ Strips are curved to the shape shown in Fig. 2 and they are attached to the Strip 4. The table is tilted slightly to allow the balls to roll freely to its lower end by bolting two Flat Trunnions to the Strip 4.

Five numbered pockets, arranged as shown in the illustration, are fitted to the table, and two $\frac{3}{8}''$ Bolts 8 are fixed to the Flexible Plates by two nuts on each bolt, so that any balls coming into contact with them as they roll down the table are deflected.

Parts required to build the Bagatelle Game: 5 of No. 2; 4 of No. 4; 4 of No. 10; 2 of No. 11; 8 of No. 12; 2 of No. 12c; 1 of No. 15b; 1 of No. 22; 44 of No. 37; 2 of No. 37a; 1 of No 48; 1 of No. 52; 2 of No. 125; 1 of No. 126; 2 of No. 126a; 1 of No. 188; 2 of No. 189; 1 of No. 191; 2 of No. 192; 1 of No. 215.

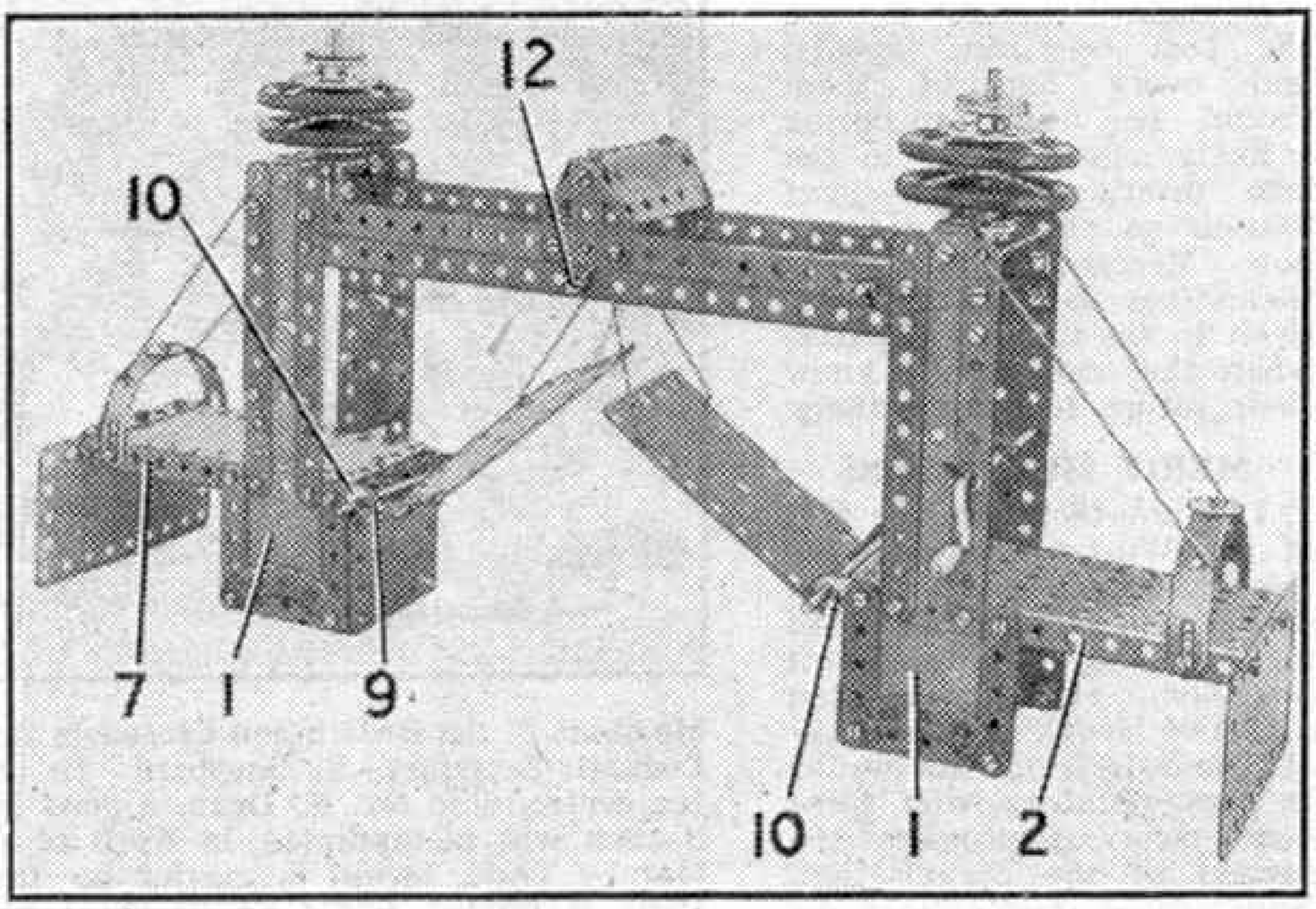


Fig. 3. Another view of the bascule bridge.

Club and Branch News

WITH THE SECRETARY

A MERRY CHRISTMAS

Once more I send my warmest Christmas greetings to members of the Guild and the H.R.C. in all parts of the world. From my correspondence I know that this happy season will be fitly commemorated in Clubs and Branches. Special Exhibitions are being held, and parties also have been arranged, to celebrate the completion of a period of good Club and Branch work. These events will have the further effect of increasing team spirit among members, and if there are any Clubs or Branches that have not yet fixed a date for one of these happy gatherings I urge them to do so at once.

A Social Evening does not require so much preparation as an Exhibition. The Club or Branch room should be decorated in some way to provide bright surroundings, and games and some form of entertainment should be arranged. It is good fun when members themselves provide entertainment, but if any of them has a friend who is capable of simple conjuring tricks or some other form of amusement he should try to get him to come along and help them all to enjoy themselves. Refreshments of course are necessary. There is no special difficulty about this important part of the proceedings, which need not be elaborate. In most organisations parents of members willingly take part in the preparations, and in any Club or Branch, however small, their help should ensure a really merry Christmas party.

NEW MEMBERS FOR MORE FUN

Another point that calls for special attention at this time of the year is the introduction of new blood. Many boys receive Meccano Outfits or Train Sets as Christmas presents, and those who are already enthusiasts often find their resources increased. This means that more boys are looking for ways of making the most of their hobbies, and all connected with Clubs and Branch should seize the opportunity of introducing them to the pleasures of Club and Branch life.

Members themselves are the best recruiting agents, and every one of them should be urged to bring a likely new member to the first meeting of the next Session so that he can see how Meccano boys enjoy themselves. Better still, invite them to the Christmas party, where they can learn to know their future fellow members.

MERIT MEDALLIONS

This month brings the first of the Winter Sessions to a close, and Leaders should now decide whom to recommend for the award of the Merit Medallion. In each affiliated Club two Medallions are available and the recipients should be the members who have done most to promote the success of the organisation. Nominations should reach me by the end of the month.

CLUB NOTES

CRYPT GRAMMAR SCHOOL (GLOUCESTER) M.C.—The Club held a very successful Exhibition, the chief feature of which was a Hornby Train Layout, with extensive lineside details, on which suitable Dinky Toys were prominent. All locomotives and rolling stock were thoroughly tested to ensure successful running. The Exhibition was part of the Crypt Parents' Association Fete, and proceeds were for the funds of the Association. A Hornby Dublo Layout displayed and operated by one of the members was a particularly great attraction. Club roll: 23. *Secretary:* D. Gettings, 17, Riversley Road, Gloucester.

HORNSEA M.C.—Good work continues on the Club's usual lines. Outdoors special interest is taken in football, matches being played regularly between various sections and all members receiving opportunities of joining in the fun. Club roll: 27. *Secretary:* R. Lancaster, Carlton House, Carlton Avenue, Hornsea.

WHITCHURCH (GLAM.) M.C.—Regular meetings for Model-building and other hobbies have been held. Other events have included operations on a Hornby Gauge 0 Railway, Outdoor Games and a Visit to a Power Station at Treforest. One Ramble resulted in the addition of fish and water plants to the aquarium of one of the members. Club roll: 9. *Secretary:* F. G. Butler, 6, Mervyn Road, Whitchurch.

BRANCH NEWS

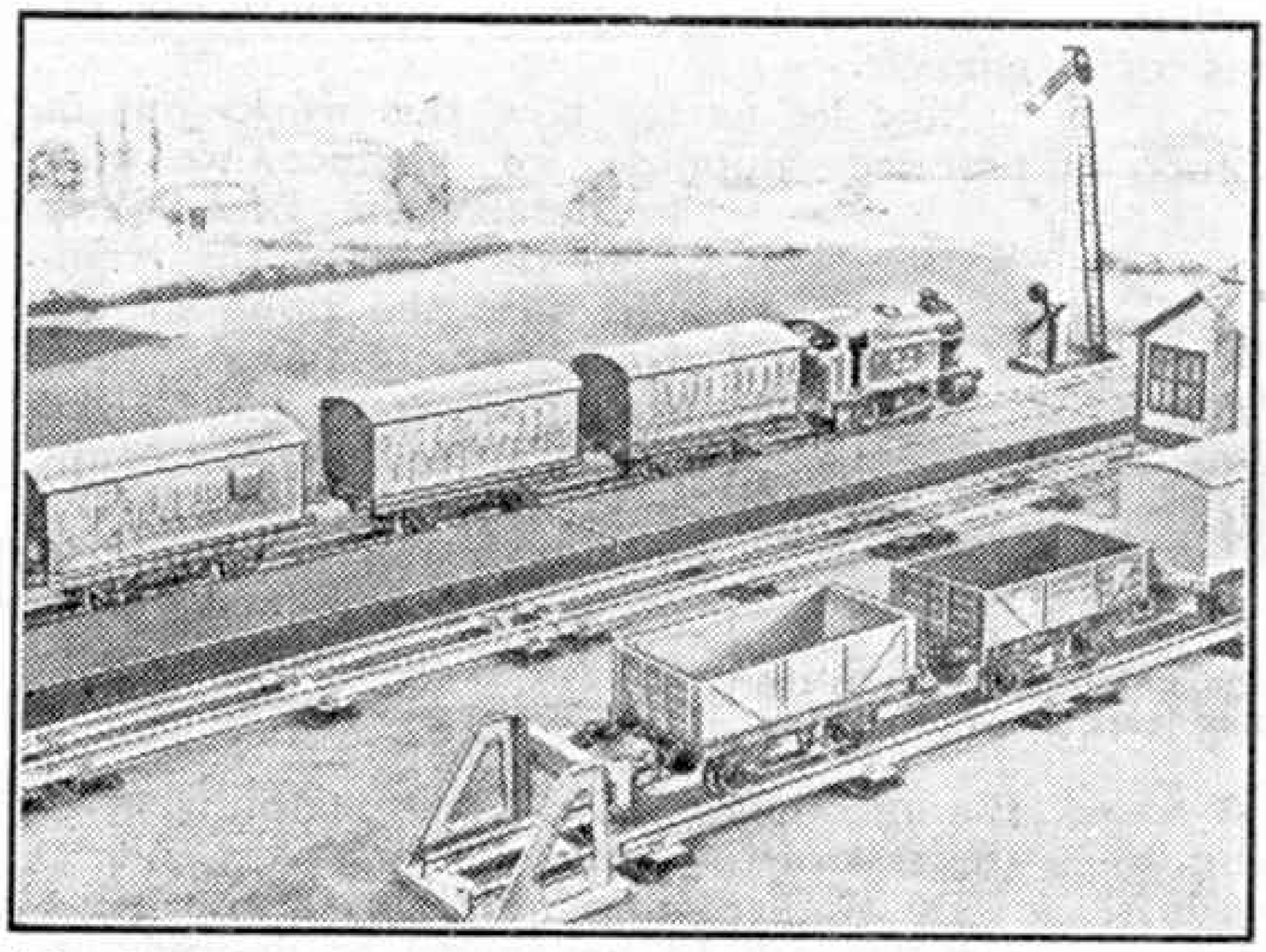
SHIRLEY AND DISTRICT—Most meetings have been devoted to Hornby Train operations. On two Track Nights members ran trains on the garden railway of Mr. H. C. Lavis, Chairman, taking turns in the operation of signals and points. Other events have included a Railway Quiz and Games. *Secretary:* D. J. Hancock, 26, Wickham Avenue, Shirley, Croydon, Surrey.



Members of the Beddington Crusaders Branch, No. 515, Chairman, Mr. A. A. H. Lockett, Secretary, B. Sheppard. In our photograph Mr. Lockett is seen in the centre, with Mr. K. Dean, a good friend of the Branch, on his right. This Branch was incorporated in April of this year. The extensive track of its Hornby Train layout is carried on trestle tables connected by bridges, and there is intense traffic on its three parallel lines, while a large goods yard forming part of the system is the scene of realistic operations.

Beginning the Hornby Railway Hobby

MANY boys will be receiving their first Hornby trains this Christmas and will want to know how to get the greatest enjoyment and the best results from their railways.



A local passenger train made up of the components of the Hornby No. 101 Train Set leaving a wayside platform.

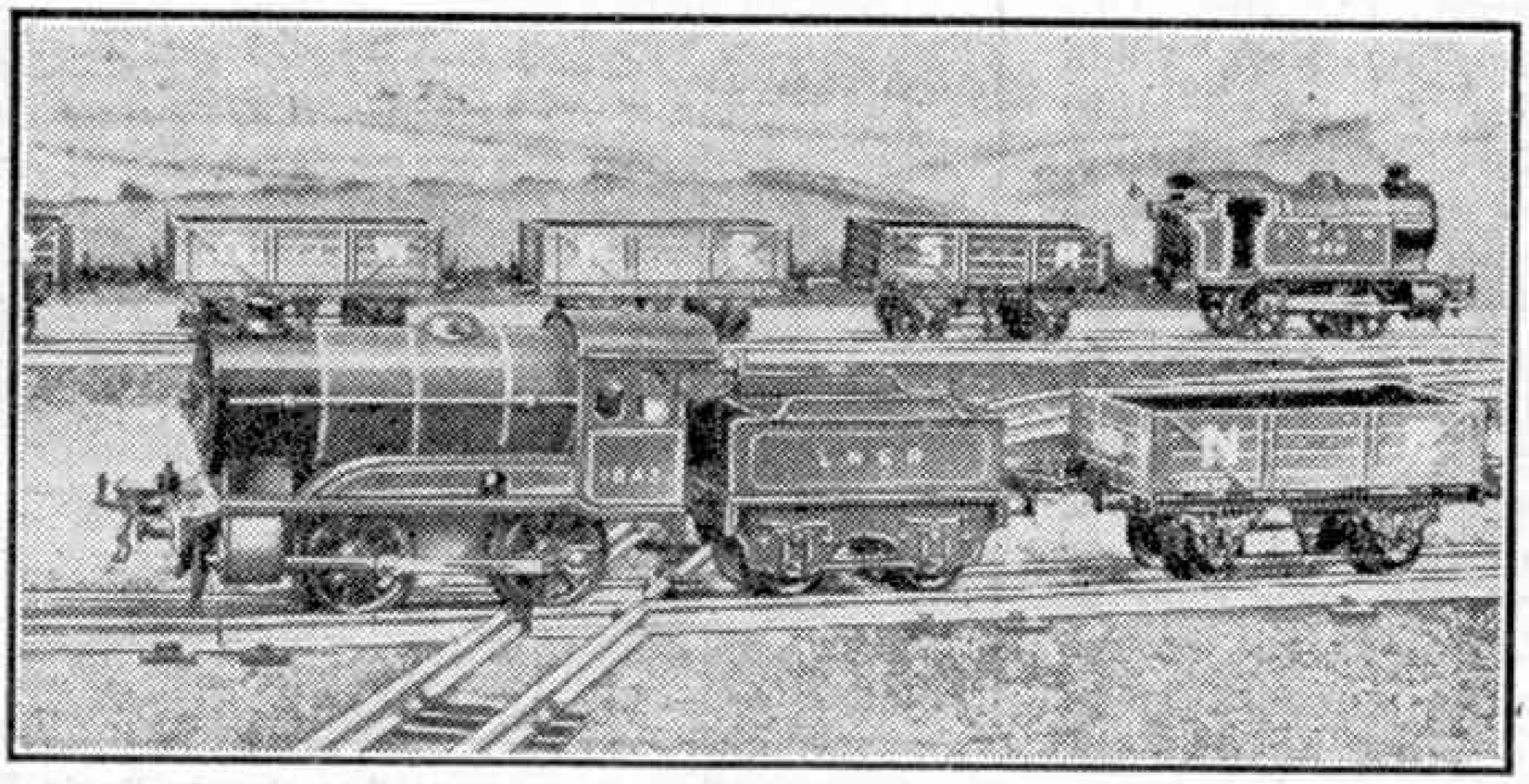
Each Hornby Train Set contains an oval track. Having assembled this, making sure that it is laid on a perfectly level surface and properly connected, the next step is to oil the Locomotive and Coaches or Wagons according to the instructions packed in each Set. This oiling should be repeated from time to time. It is a good idea also to lubricate, very sparingly, the coupling pivots, so that they may move easily from side to side. Oil should always be applied with a wire dipper or a sharpened match stick rather than an oil-can, in order to prevent over-oiling.

The engine should then be carefully wound, slowly at first, while we count the number of turns of the key required to wind the mechanism fully. After this first experiment, we should make it a rule to give one or two turns less than the maximum, in order to avoid the risk of overwinding.

All Hornby Train Sets contain a Brake Rail, and the Hornby No. 501 and No. 601 Sets are provided with a Brake and Reverse Rail. These Rails have movable trip pieces that can be made to engage with the braking or reversing mechanism of the engine according to its type. Only the Locomotives of the No. 501 and No. 601 Sets can be reversed from the track at present, but all types can be braked.

The Brake Rail has a single trip placed between the rails, while the Brake and Reverse Rail has two. In each case they are worked by a handle at the track side. The correct method of working these is to push the operating handle inward to its fullest extent, at the same time turning it much as one does with a door key. It is a good idea to apply a drop of oil to the handles where they pass through the rail, to ensure easy operation.

It is fascinating to see the engine brake or reverse itself without being touched by hand. When an engine is being reversed from the track the operator should of course draw the rail handle outward to put the trip out of action after the engine has passed it; otherwise the engine will be reversed a second time on passing back over the trip piece. The operator must act quickly but surely; so practice in using the brake and reverse trips will be found helpful in securing successful working.

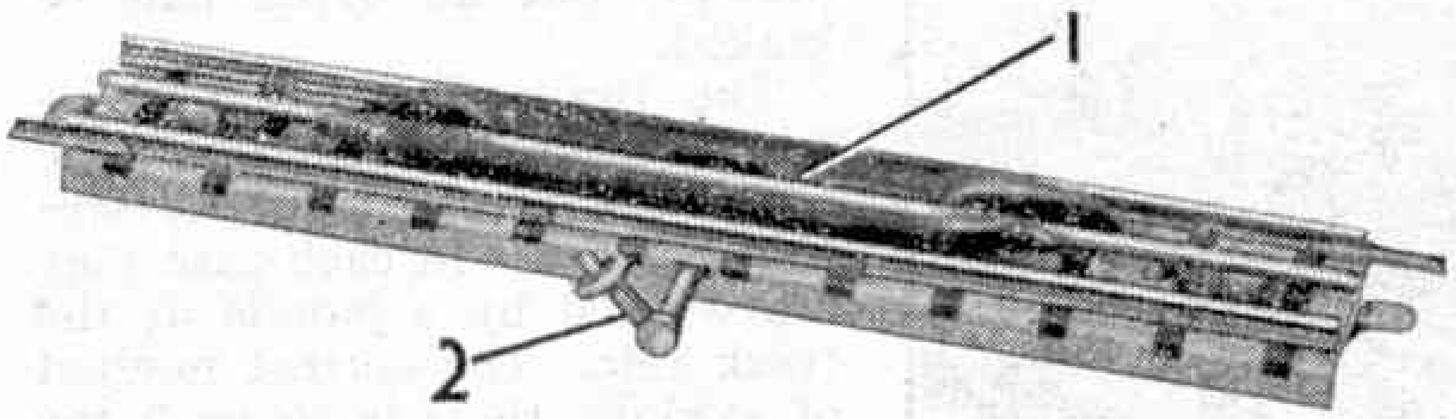


Two goods trains passing on a Hornby clockwork system. The engine in the foreground is a No. 501 type Locomotive.

The Hornby-Dublo Uncoupling Rail

ONE of the most important post-war developments in the Hornby-Dublo System has been the introduction of new and greatly improved automatic couplings. In pre-war days Hornby-Dublo Trains had automatic couplings that would engage when the vehicles were pushed together, but there was no automatic means of uncoupling them.

The new couplings engage instantly when the vehicles fitted with them are pushed together and it is fascinating to watch them do this. If for any reason it is necessary to remove a wagon from a train, this can be done by lifting it straight up off the track, without disturbing any of the other vehicles in the train.



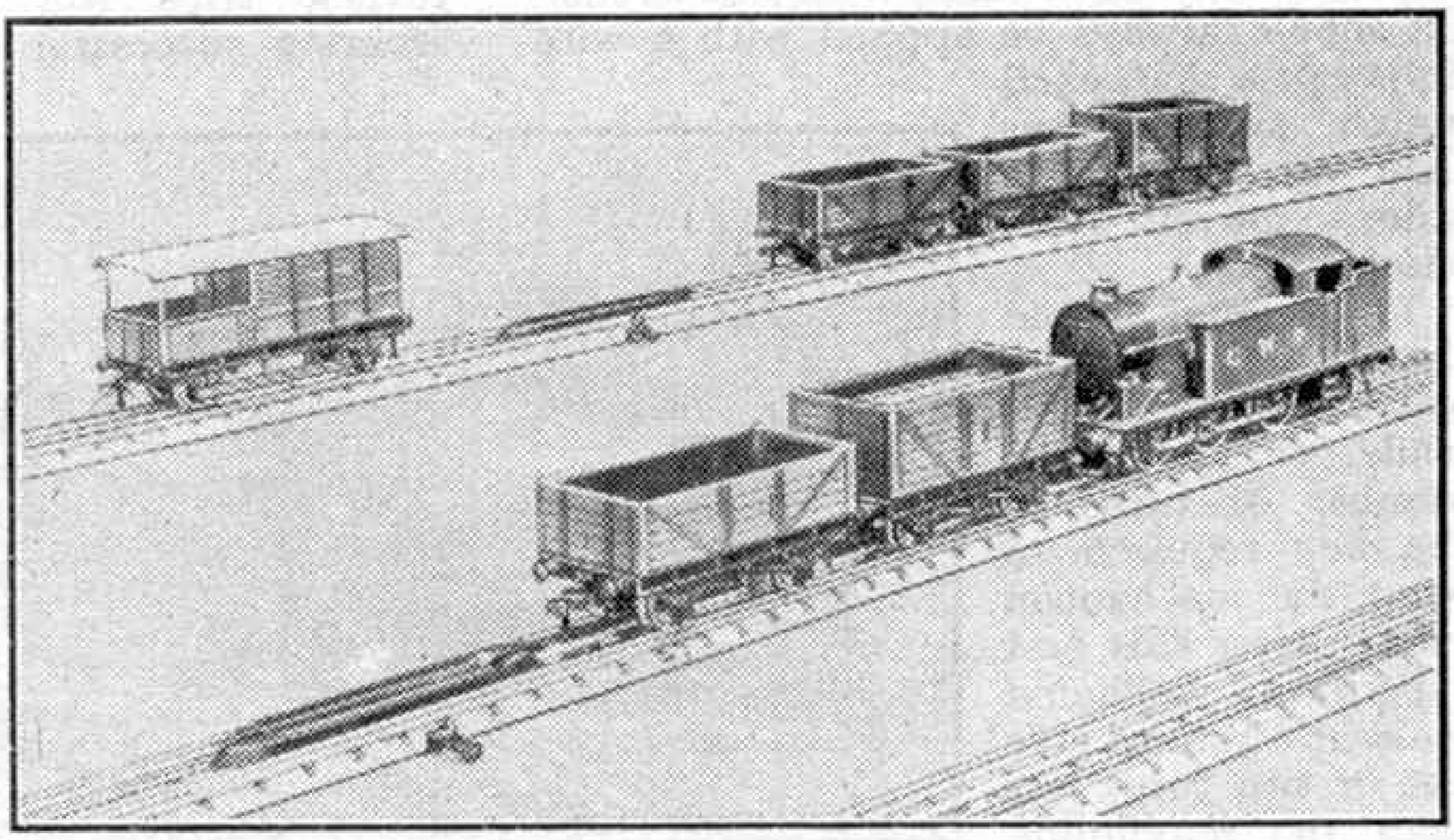
The Hornby-Dublo Uncoupling Rail showing the movable ramp 1, in the raised position, and the operating lever, 2.

The special advantage of the new couplings, however, is that they are designed to work in conjunction with the Hornby-Dublo Uncoupling Rail illustrated above. Purchasers of post-war Hornby-Dublo sets may have been puzzled by the downward projecting "tail" that is characteristic of the new couplings fitted to their trains. The purpose of this tail is to engage with the ramp of the Uncoupling Rail, when this is raised into the operating position by means of the hand lever at the side of the Rail. When the ramp is lowered to its normal position it is clear of the couplings, and so has no effect on them as vehicles pass over it.

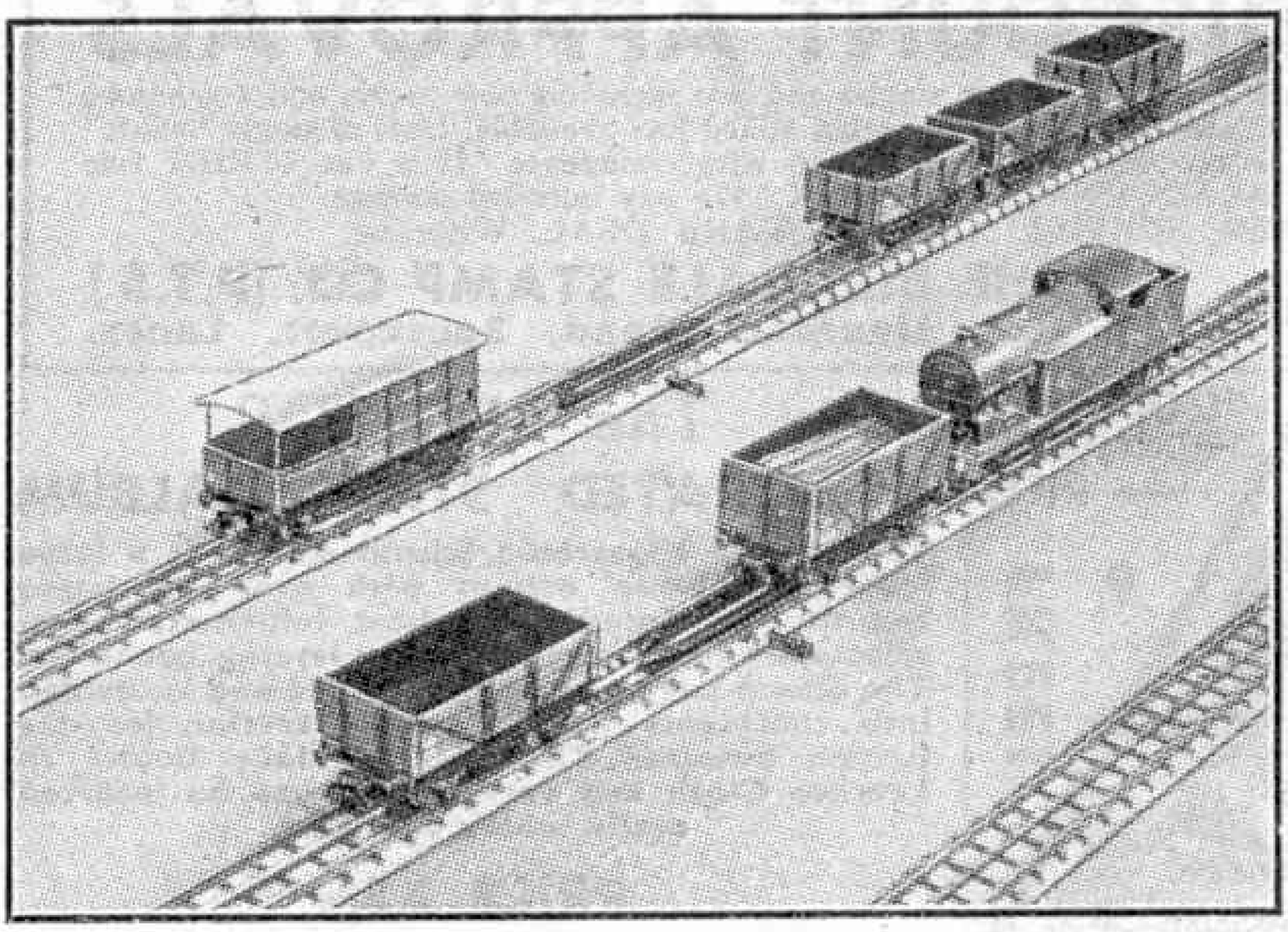
The action of the ramp when raised is to press against the tails of the couplings of vehicles that are passing over it, and so to part the couplings sideways. It continues to hold them apart all the time the vehicles are actually moving over it, and therefore during this period the vehicles are uncoupled. When the vehicles pass beyond the ramp the couplings automatically re-engage.

Now let us see how this works out in practice. Suppose, for instance, we wish to detach the Brake Van from the rear of the train. We raise the ramp of the Uncoupling Rail and then back the train on to the Rail. As soon as the couplings between the Brake Van and the next vehicle come on to the ramp they are automatically uncoupled. The locomotive is then quickly stopped, and the uncoupled Brake Van runs on clear of the rest of the train.

By similar train movements any other vehicles can be uncoupled as desired; we stop the engine quickly as soon as the couplings between the vehicles concerned are over the ramp. With a short train, even the beginner will find that, with a little practice, he can carry out a clean uncoupling each time. More practice is required to deal with a long train, but it is quite possible to uncouple separately any vehicle or groups of vehicles that can be accommodated in any siding or on a straight stretch of track. The interest



Shunting operations in progress. The Hornby-Dublo Tank Locomotive is pushing the last two wagons of a train towards the Uncoupling Rail.



The engine stops smartly and the wagon that is detached runs on from the Uncoupling Rail. The other wagon remains attached to the engine.

of movements in a long siding can be increased still further by the use of two Uncoupling Rails, with not less than two Straight Rails between them.

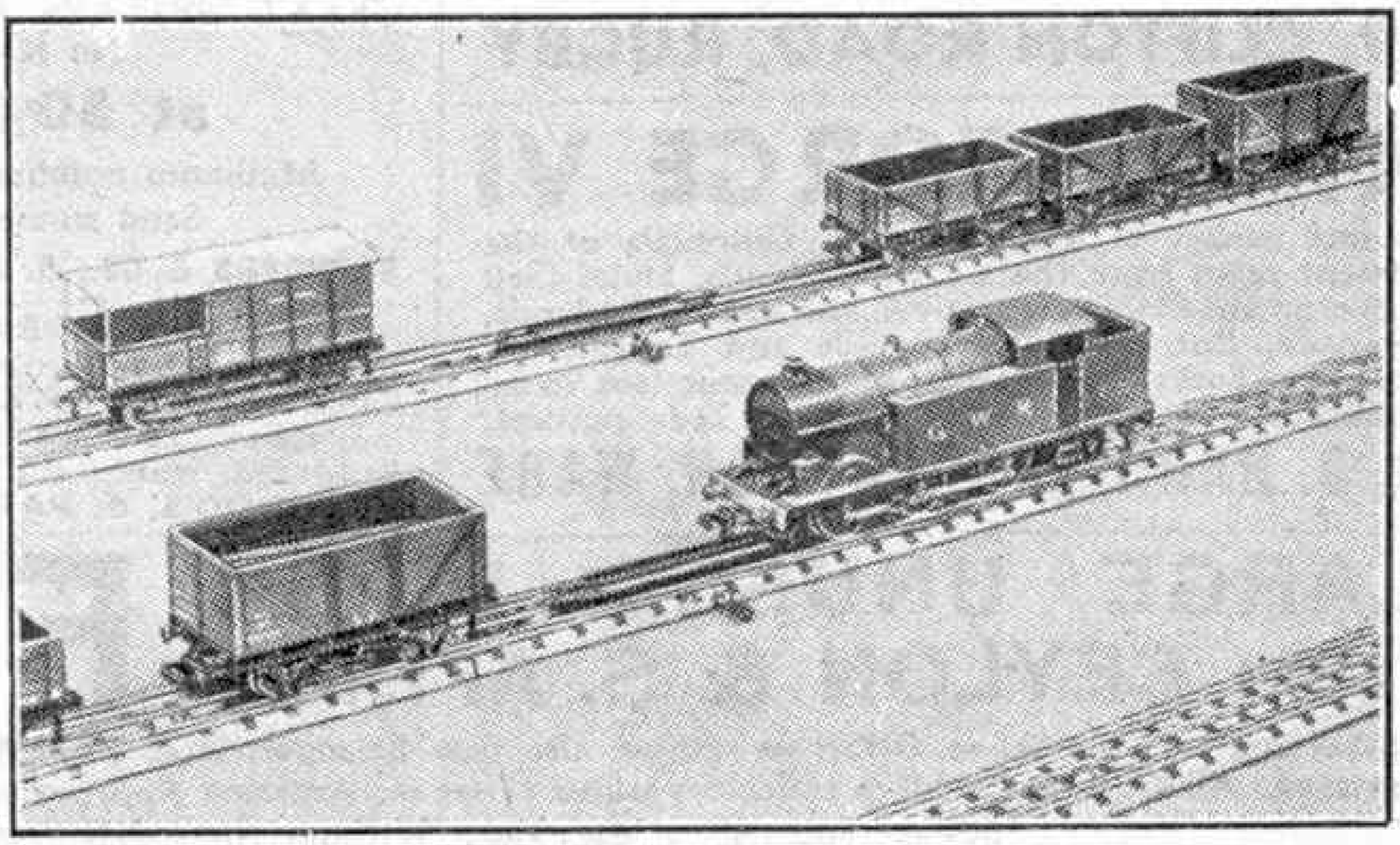
Where a great deal of shunting is done, each siding in a goods or marshalling yard may have an Uncoupling Rail. Then a train can be quickly broken up into sections or even individual vehicles, according to the operating programme. The exact position of the Uncoupling Rail in any siding will depend on the layout and the way in which the siding is arranged. In general, it is better if the Rail is approached by a short length of straight track, and it is certainly advisable to have the Rail followed by straight track. A point that should not be overlooked is that the hand lever operating the Uncoupling Rail should be on the side of the track nearest to the operator.

Care should be taken to prevent the rolling stock couplings from becoming bent out of shape. They should move freely on their pivots. The tails should be vertical, and the horizontal part of the couplings of all vehicles should be on the same level.

A slight smear of oil on the coupling faces and the lower end of the tails makes for sweet working. This is in addition to the normal lubrication of the axle bearings to ensure free running. The introduction of the Uncoupling Rail is a great step forward in the development of the Hornby-Dublo system. It makes possible for the first time a great variety of shunting operations similar to those in everyday use in real railways, and thereby adds very greatly to the interest and realism of model railway working.

Although shunting is generally associated most particularly with the working of goods trains, it plays an important part also in the running of passenger trains. Such operations as the running of engines round their trains by means of loop lines, or the shunting of empty coaches at the end of a run, become readily possible by means of Uncoupling Rails placed at strategic points.

Next month we hope to describe some useful shunting schemes based on the use of the Uncoupling Rail, for both passenger and goods operation. From these descriptions Hornby-Dublo owners will be able to work out schemes for their own use, suitable for the track and train material at their disposal. We shall be glad to help readers who find any difficulty in doing this, so that they will be able to make the best use of the new rail.



The final shunt; the last wagon is left in the siding but clear of the other wagon shunted off previously.

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For other Stamp Advertisements see also pages 492 and xv.

Stamp Collecting

Railways in the Stamp World

By H. H. Baetjer

IF you are a philatelist—in plain English, a stamp collector—and you have in your collection a 2c. carmine and black stamp featuring the world-famous locomotive No. 999 hauling the "*Empire State Express*" of the New York Central, you have one of the most intriguing stamps in any railway enthusiast's collection. But if the train is pictured upside down, you have something you can swap for an all-expense tour around the world! There are not many of these inverted "999" stamps in circulation, but the few that do exist are members of the Royal Family of Stampdom. One of them has been known to bring as high as $2,500—almost £900 at the current rate of exchange—at a stamp auction.



There is a tremendous fascination in collecting railway stamps. And there are lots of them, too. According to one authority, 78 different countries have issued well over 800 railway stamps to date, and these portray hundreds of different subjects. You will find beautiful reproductions of such things as locomotives, trains, railway bridges, track works, signal bridges, tunnels and train ferries, and even the wartime bombardment of a Danish railway junction.

New Brunswick holds the distinction of being the first country in the world to produce a railway stamp. Her 1c. stamp issued in 1860 admirably features a typical "puffer" of that period.

The second railway stamp to appear was issued by the United States Government. It was printed in 1869 and depicts a 4-4-0 type locomotive, with "balloon stack," which was so distinctive that it came to be known as the "American" type.

Twenty-five years passed before another United States railway stamp was to appear. In 1901 the "*Empire State Express*" stamp was issued to commemorate the Pan-American Exposition being held in Buffalo. The inverted train, already referred to, was produced as the result of the centre plate's being inserted upside down during the printing. Another curious feature of this stamp is that when the centre plate was reassembled, it was locked so loosely during printing that the train then appeared in a great number of varying positions. Collectors immediately spotted this oddity, and a few now take particular delight in arranging these stamps on pages so that the express train is shown in progressive stages of its run—first emerging in the right-hand corner of the stamp and finally disappearing at the left.



During 1912 and 1913, three parcel post stamps were put out by the United States depicting a railway postal clerk operating a catcher arm picking up a mailbag, a mail train, and a manufacturing plant showing freight cars on the siding. More recent issues include the 1944 commemorative featuring a painting of the golden spike ceremony of 1869, when the first transcontinental line was completed, two composites in 1947 of early and modern mail-carrying vehicles, and the 1948 stamp picturing a train passing over the railway bridge at Niagara.



Fourteen stamps in which railway motive power and other equipment are featured or shown incidentally have been printed by the United States to date, although only one of these stamps was issued to commemorate the important role which railway transportation plays in our daily lives.

When one considers that 76 different countries have issued railway stamps, it is indeed interesting to discover that tiny Belgium, with only 3,209 miles of track, has printed more railway stamps than any other country in the world. The first of Belgium's 244 stamps honouring her railways appeared in 1897, and more than 20 different railway subjects have been featured. Among the more interesting portrayals are winged wheels on rails, a track worker adjusting baseplates, an engineer in the locomotive cab, and a railway crossing.



Since railway transport in numerous countries of the world is about 100 years old, many special issues commemorating centennials and other anniversaries have appeared in recent years. For example, Bulgaria issued four colourful stamps in 1939 to mark the 50th anniversary of her state railways. One of the more well-known stamps in this series is a dark blue one showing Tsar Boris III, in military uniform, peering out of the cab window of a modern steam locomotive.

The development of the steam locomotive was first shown on a series of stamps in 1933, when the Egyptian Government authorised the issue of four stamps to honour the delegates to the International Railway Congress then meeting in Cairo. Although lithographed in rather sombre colours, the contrast between the "teakettle" of 1852 and the big "jack" of 1932 is indeed striking.

Strange as it may seem, the iron horse has been given recognition in a number of air mail issues. Approximately 33 railway stamps fall within this category, and without doubt the most delightfully humorous stamp in this group is the Costa Rica air mail issue of 1947. This blue-green and black engraving was issued to commemorate the 50th anniversary of the Ferrocarril del Pacifico—an *electric* railway—and it features a steam locomotive!





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103. CADMAN CRESCENT. WOLVERHAMPTON

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For other Stamp Advertisements see also pages 490 and xv.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

A COUNTRY which continues to issue interesting commemoratives is Turkey, and the set of six, one of which we illustrate, issued during the summer in honour of the "Fifth European Wrestling Championships," is well up to the usual high standard of Messrs. Courvoisier, the Swiss firm that produced them. All the stamps show special wrestling holds, at which the Turks are masters.

In Turkey they take wrestling very seriously, and when the writer was in Istanbul earlier in the year he heard in a cafe a very heated discussion. Apparently Sweden wanted to use the services of some of the Turkish trainers, and the party discussing the matter were divided whether these experts should be allowed to explain their tricks. Everybody of course was satisfied on the point that the Turks are the greatest wrestling experts in the world. Anyhow, the stamps are interesting enough, and a full set can be obtained for about 5/-.



Another country which is very much in the philatelic limelight once more is Japan. Collectors will remember those "National Parks" issues which came out regularly before the war. While there was a sameness about them, they were nevertheless interesting and artistic productions, and the latest set of four is in the old tradition. Our illustration shows the top value, and again these stamps are within everybody's reach, for the set only costs a few coppers. A collector with an artistic bent might take up Japan with profit; stamps are being turned out by the bushel, but most are interesting and they are obtainable for very little. Above all they have the merit of being genuine efforts of the country itself.

Liberia has long been a favourite of the junior collector, for in the past its colourful stamps were unequalled. Who will forget the joys of those rare and exotic birds, reptiles and animals? Nowadays many countries vie with each other to produce exciting stamps to catch the collector, but it was different when Liberia first issued its wonders. The country is still at it, but the latest set is a very circumspect affair. The U.S.A., which is the country that more or less runs Liberia, produced a long set of stamps, featuring its past presidents; now Liberia has followed suit, and we are illustrating one of these. The set goes up to $1 at present, but it may go higher in the end. It is fairly well produced, but hardly up to the usual standard of this country's stamps.

Opinions are very divided about the designs adopted for the "U.P.U." stamps by our colonies, but they are money spinners at any rate. When the pound was devalued collectors in the U.S.A. sat up and took notice, and London stamp wholesalers received



many fine orders. One, who had hitherto grumbled that he overordered, actually had to go to the provinces to buy more stock. This was all before the stamps were ever issued. Well, we can do with all those dollars, but there is hardly a dealer or collector who wishes to see another general set issued for all the colonies, for no matter how artistic the designs may be, a couple of hundred stamps all the same, except for colour and the country's name, grow very boring before they are all even mounted.

The last stamp to be illustrated this month is worth careful study. This particular copy was one bought by the writer in Athens to use on a letter to England, and it was only on return home that the design was noticed. It is a poignant picture indeed. Early in the year Greece issued a set of three stamps to draw the attention of the world to what was happening to her children. Thousands were carried off to Albania and the stamp shows some of these children gazing at a map of their own country. Such is war of to-day; such is our modern civilisation.



The stamps themselves are only worth a copper or so, but they provide one more illustration of the uses to which stamps can be put for propaganda purposes. Stamp collectors may think that they alone are interested in stamps, but governments have learned that all people take notice of the stamps which appear on their letters, even if they do not bother to keep them. Our own government is preparing a set to commemorate the forthcoming Exhibition in London—dealers hope sincerely that corresponding stamps will not be issued by all the colonies—and without a doubt these stamps will provide more publicity for the Exhibition than anything else. Moreover, there is even a profit to be gained from such publicity. Small wonder then that stamps are pouring out from all the world's presses. Yet it can be overdone, as countries like Belgium have already found out, for beautiful as are many new Belgium stamps, collectors in Great Britain at any rate are mostly leaving them severely alone.



Readers seem to like stamp tips, so here is one about a quite humble stamp of Barbados. Gibbons list as No. 251a the 2½d. stamp of the present reign in the blue shade, and it is priced at 6d. mint. It is worth several times that modest sum, and in a year or two may bring twenty times that amount. Used the stamp is well worth twice as much, for this shade was not sold in the colony and any used copies about had to be sent out to be cancelled.

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Familiar Names in Disguise

Christmas is now almost upon us, and at this time of the year readers scan our advertisement pages more closely than ever. With this in mind, our chief contest for December is one in which the names of advertisers or advertised products appearing in this issue are used.

In the centre of the page there is a rectangle of 80 letters. These have been so arranged that the names of certain advertisers or products can be read in them. The plan is to pass from one letter to the one above it, below it or to one side. No diagonal moves are possible, but movement in any other direction, up, down or sideways, is allowed. Every letter in the rectangle must be used at least once. Most are used twice, and in some instances a letter actually appears in three different names. Initials are used in certain cases, but this is only done when they are distinctive and actually appear in the advertisements concerned.

I	E	S	O	B	D	E	E	F	G
B	B	N	N	A	Y	K	O	E	R
R	O	H	D	C	C	E	G	S	R
N	J	A	S	T	R	M	A	S	E
B	L	A	P	E	A	A	U	N	D
Y	L	C	K	C	S	G	D	L	O
E	A	N	B	I	B	E	A	R	P
S	L	O	W	R	D	S	P	K	S

In their solutions entrants are asked to give the names of the advertisers or products that can be read in the rectangle, together with the numbers of the pages on which the advertisements referred to appear.

As usual there will be two sections, for readers at Home and Overseas respectively. In each there will be prizes of 21/–, 15/– and 10/6 for the best entries in order of merit, and Consolation Prizes also will be awarded for other good efforts. In the event of a tie, the judges will take novelty and neatness into consideration.

Entries must be addressed *"December Advertisement Contest, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates: Home Section, 31st January 1950; Overseas Section, 29th April, 1950.

A Station Puzzle

A Quiz is always an attractive feature of a party, and here is one that will provide good fun for railway enthusiasts at social gatherings, such as those organised by Meccano Clubs and H.R.C. Branches during the Christmas season, as well as for readers of the *"M.M."* everywhere. The 12 clues given below conceal the names of well-known stations on British Railways, and tracking these down will be an interesting piece of detection. In addition to the name of each station, the town or city served by it must be stated, together with the name of the Region of British Railways whose trains make use of it.

1. We hope you will not be so unfortunate as to meet yours.
2. A rise that traditionally is Christmassy.
3. The way to Scotland?
4. A station, not a head, and not in Wales either.
5. Must be by the sea, surely.
6. Slope covered with small trees.
7. One part of it is timber.
8. A Lancashire stronghold?
9. The trains are near the water.
10. There must be money by the seaside.
11. In spite of its name is a particular station in England.
12. The name is a novel one.

As usual in these Contests there will be two sections, one for Home readers and the other for those living overseas. In each of these sections prizes of 21/–, 15/– and 10/6 will be given to the senders of the best solutions in order of merit, and in addition there will be Consolation Prizes for other good efforts. If there is a tie for any prize the judges will base their decision on the neatness and novelty of the entry itself.

Solutions must be sent to *"December Quiz Contest, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates: Home Section, 31st January 1950; Overseas Section, 29th April 1950.

December Photographic Contest

For this competition, the last of the 1949 series, we return to a special subject that will still give considerable latitude to photographers. The subject chosen is a Christmas scene. This may involve an indoor or outdoor photograph, and indeed there is no restriction in regard to the character of an entry, except that somewhere in it there must be a suggestion of Christmas.

Two conditions must be observed. The first is that each entry must have been taken by the competitor sending it, and the second that on the back of each print the entrant must write his name and state exactly what the photograph represents. There are two sections in the competition, A for readers aged 16 and over and B for those under 16, and the appropriate section letter must be given on the back of each print.

Entries must be addressed *"December Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13."* There will be separate sections for overseas readers, and in each section prizes of 21/–, 15/– and 10/6 will be awarded, with consolation prizes for deserving efforts. Closing dates: Home Section, 31st December; Overseas Section, 31st March 1950.

Competition Results and Solutions

HOME

JULY 1949 CAR REAR VIEW CONTEST

1st Prize: P. R. Furniss, Sheffield 8. 2nd Prize: A. Kennedy, Stockton-on-Tees. 3rd Prize: J. M. Hinton, Bristol 8. Consolation Prizes: D. K. Richardson, St. Albans; J. Drake, Maidenhead; A. Sams, Redhill.

JULY 1949 LOCOMOTIVE SQUARE CONTEST

1st Prize: M. J. Ecclestone, Sheffield 9. 2nd Prize: W. Bradshaw, Doncaster. 3rd Prize: D. M. Ashley, Hull. Consolation Prizes: J. H. Boyes, Manchester 21; D. J. Parry, Worsley.

C	O	U	N	T	E	S	S
T	H	E	A	B	B	O	T
B	L	E	N	H	E	I	M
W	A	R	S	P	I	T	E
H	O	L	Y	H	E	A	D
H	U	L	L	C	I	T	Y
B	I	D	E	F	O	R	D
A	I	R	B	O	R	N	E

July 1949 Locomotive Square Solution.

AUGUST 1949 POINTWORD CONTEST

1st Prize: D. B. Candlin, Stockport. 2nd Prize: P. Ponsford, Welling. 3rd Prize: C. A. Williams, Plymouth. Consolation Prizes: D. D. Arthur, Glasgow S.4; C. Brent, Barking; G. J. Gilham, Sittingbourne.

AUGUST 1949 SPORTS CONTEST

1st Prize: G. Davies, Westbury-on-Trym. 2nd Prize: G. A. Pells, Ilford. 3rd Prize: F. B. Cowell, Blackburn. Consolation Prizes: F. Pycroft, Sidcup; Miss M. Koenigsberger, Manchester 20; M. Wright, Twickenham; J. Gordon-Farleigh, London S.E.13.

AUGUST 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: R. Atkins, Eccles; Section B: Miss S. Carruthers, Stocksfield-on-Tyne. 2nd Prize, Section A: R. Wrigley, Clitheroe; Section B: R. Hall, Aberdovey. 3rd Prize, Section A: P. F. Chapman, St. Leonards-on-Sea; Section B: M. Egerton, Uttoxeter. Consolation Prizes, Section A: Mrs. I. Hardwick, Burnham-on-Sea; C. E. Lowe, Derby; Section B: Miss A. Mounsey, Surbiton; P. Clifford, Wembley.

SEPTEMBER 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: B. W. Firman, Teddington; Section B: A. E. W. Hobbs, Exeter. 2nd Prize, Section A: A. E. Moat, London N.9; Section B: D. Coates, London S.W.16. 3rd Prize, Section A: R. D. Barrett-Lennard, London S.W.1; Section B: U. J. Hackett, Aberdeen. Consolation Prizes, Section A: J. H. Boyes, Manchester 21; D. H. Tomkinson, Wells Green; S. G. Bloore, London S.W.19; S. S. Pethybridge, Newton Abbot; C. K. Benington, Ballymoney, N.I.; L. H. Hobbs, Exeter; Section B: P. J. Stone, Calstock; D. Johnson, Birmingham; P. Gill, Upminster; D. D. Davies, Carmarthen; D. M. Crossland, Nottingham.

OVERSEAS

MAY 1949 SLOGANS CONTEST

1st Prize: J. R. Craigie, Auckland, N.Z. 2nd Prize: L. M. Hewitt, Johannesburg, S.A. 3rd Prize: A. A Mold, Toronto, Canada. Consolation Prizes: W. G. Williams, Wellington, N.Z.; K. S. Bell, Melbourne, Australia.

MAY 1949 LOCOMOTIVE CONTEST

1st Prize: M. Myers, Natal, S.A. 2nd Prize: E. A. Woodward, Auckland, N.Z. 3rd Prize: D. Crowley, Bombay, India. Consolation Prizes: F. Campbell, Durban, S.A.; J. E. Bate, Dunedin, N.Z.

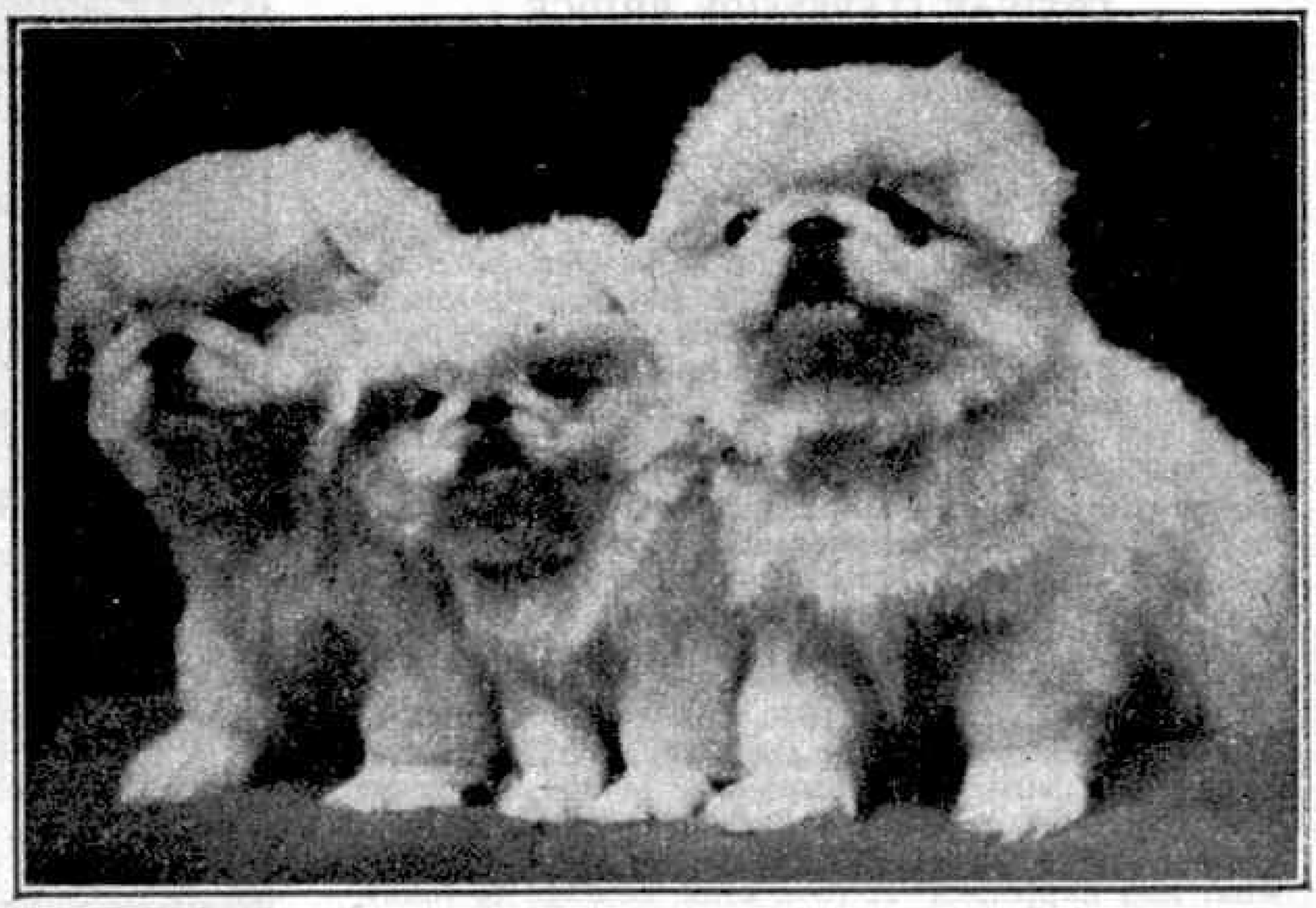
JUNE 1949 RAILWAY STORY CONTEST

1st Prize: B. Biswas, Calcutta, India. 2nd Prize: L. G. Poole, Melbourne, Australia. 3rd Prize: 22029333 Pte. D. Bullock, Rhine Army, B.A.O.R.1. Consolation Prizes: D. J. White, Christchurch, N.1, N.Z.; J. S. Thornton, Sao Paulo, Brazil.

SOLUTION

JULY 1949 REAR CAR VIEW CONTEST

1. Humber Hawk. 2. Armstrong Siddeley, Lancaster Saloon. 3. Jaguar MK. V Saloon. 4. Hillman Minx. 5. Bentley Mark VI Saloon. 6. Standard Vanguard. 7. Austin A40 Devon. 8. Jowett Javelin. 9. Morris Oxford. 10. Vauxhall Velox.



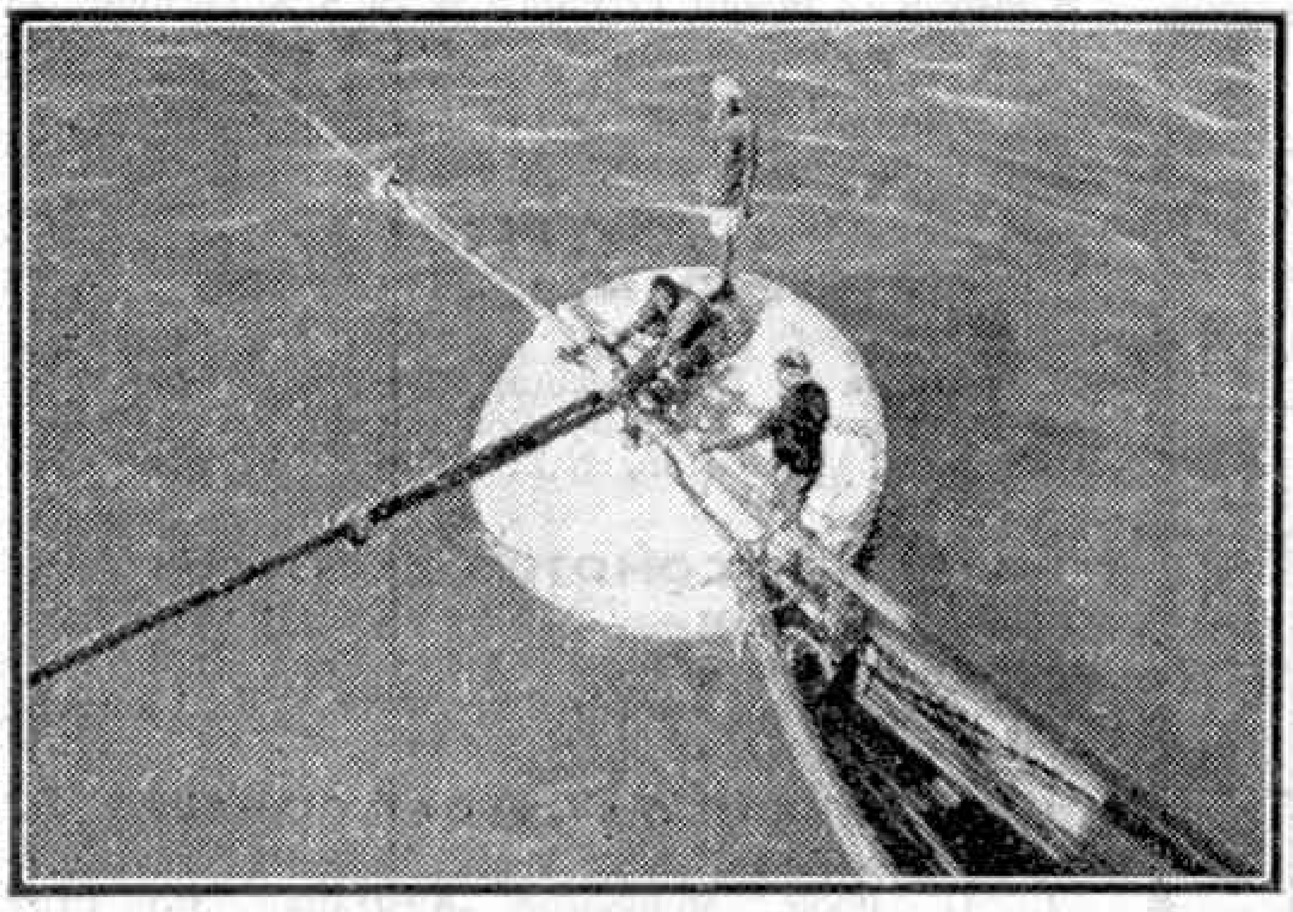
"See, Hear and Speak." A September Photographic prize-winning entry by Mr. R. P. Barrett-Lennard of London S.W.1.

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.

MOORING SHIPS IN ADEN HARBOUR

Ships going to India, Australia, and the Far East almost invariably call at Aden for fuel. There are no docks in the harbour, and for supplying oil barges fitted with pumps are brought out and pipe lines are connected up so that the oil can be pumped into the ship, which is moored in the harbour. Mooring buoys are provided for this purpose, and the accompanying illustration shows how a ship is moored to them by lascars sent out by the oil company for the purpose. This photograph was taken while a large ship was being moored and clearly shows the heavy hawsers necessary.



Lascars mooring a ship in Aden Harbour in readiness for refuelling. Photograph by E. A. Moreton, Worthing.

E. A. MORETON (Worthing).

CONWAY SUSPENSION BRIDGE

I have often seen pictures of Telford's splendid suspension bridge at Conway as seen from lower down the river, but I think I was most impressed by it when I saw it from the top of Conway Castle. The photograph reproduced here was taken from this point of view. The towers from which the bridge is suspended were built in keeping with the Castle, and those at the Castle end are prominent in the picture. The workmen also seen there were putting up hundreds of electric bulbs to light up the splendid lines of this structure.

On the extreme right of the photograph can be seen the tubular bridges designed by Robert Stephenson to carry the railway across the river and opened in 1848, and between these and Telford's structure is a smaller suspension bridge that carries water mains over the river. R. WRIGLEY (Clitheroe).

THE PAINTED CAVERN OF LASCAUX

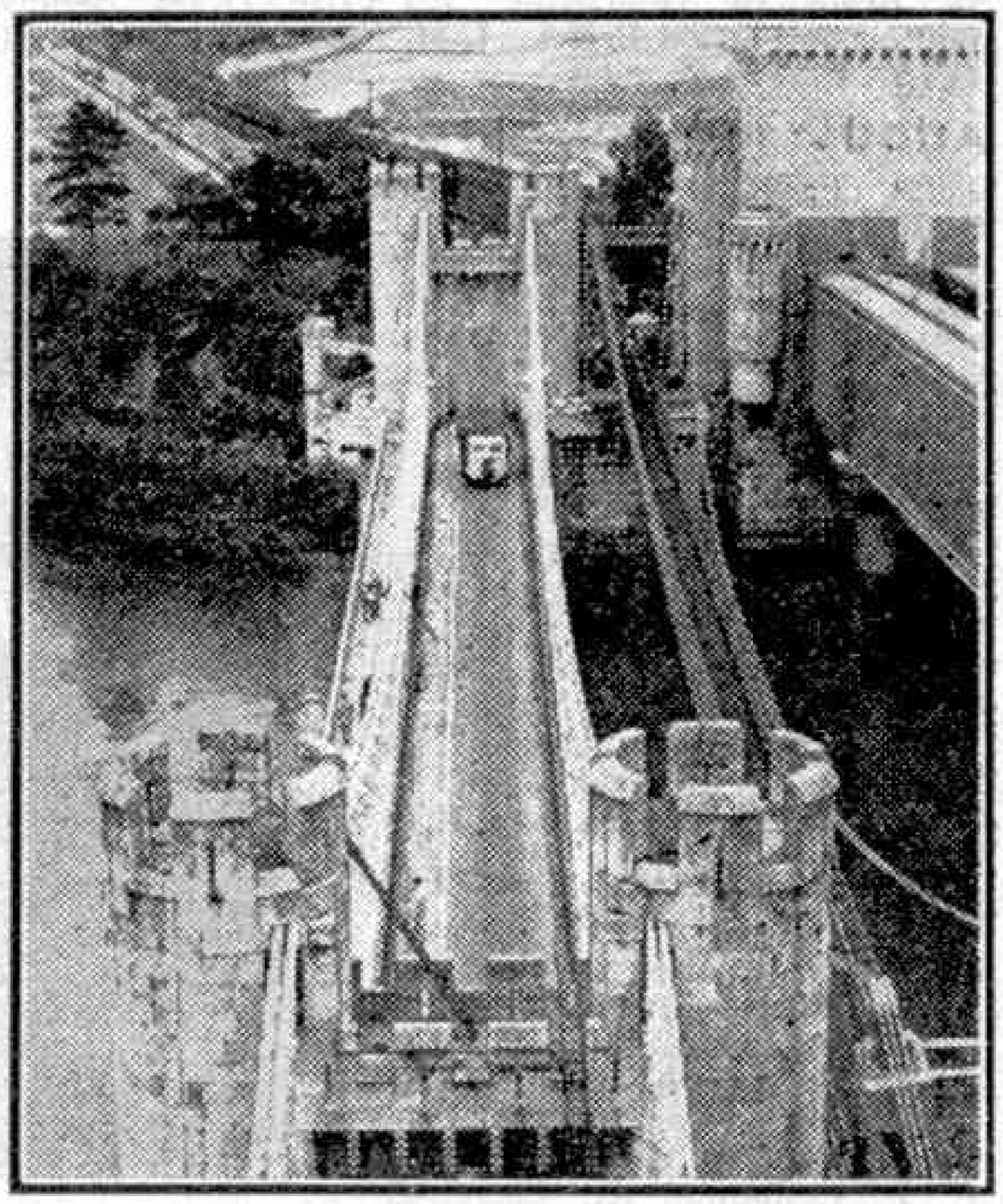
One September day in 1940 a boy, who with three companions was exploring the wooded hillside overlooking the village of Montignac, in the Dordogne region of France, lost his dog. It seemed to have disappeared into the earth. This was in fact exactly what had happened. It took some courage to follow the dog through the narrow aperture which the boys subsequently discovered under some bushes. When they did so they not only recovered their dog, but found also a large grotto, now famous as the painted cavern of Lascaux, which contains a series of remarkable prehistoric animal paintings.

I went to Lascaux this summer. The Great Gallery extends for about 30 yards, gradually getting narrower as it progresses. Near the entrance is a short connecting passage leading to a second gallery.

So vivid are the paintings that it is hard to realise that they are between 20,000 and 30,000 years old. Their preservation depends on the remarkable dryness of the air and the absence of stalactites. For the most part they depict hunting scenes, and among the animals represented are some no longer native to this climate, for example a small wolf and a bear with claws clearly visible. There is, too, a magnificent drawing of a herd of deer fording a stream.

Besides these conventional scenes there are some, more enigmatic, which suggest that the cavern may have been an ancient temple. One disquieting mythical beast, made up of parts of several recognisable animals, is perhaps the mask of a tribal sorcerer. Elsewhere are to be found engraved arrows and queer emblems which probably have a magic or religious significance.

At the bottom of a 30 ft. deep well-like shaft in the second gallery is the masterpiece of this prehistoric "Sistine Chapel." This depicts a man with a bird's head falling before an enraged and severely wounded bison. Beside them is a sort of totem pole surmounted also by a bird's head, while further off a rhinoceros is leaving the scene. A. F. A. STEWART (Belfast).



Conway Suspension Bridge seen from Conway Castle. Photograph by R. Wrigley, Clitheroe.

Fireside Fun

"I used to get 100 per cent. in history, and you can only get 30 per cent."

"Yes, dad, but there wasn't as much to remember when you were at school."

* * * *

"Who is the smallest sailor in this ship?"

"I don't know every man in it. Tell me."

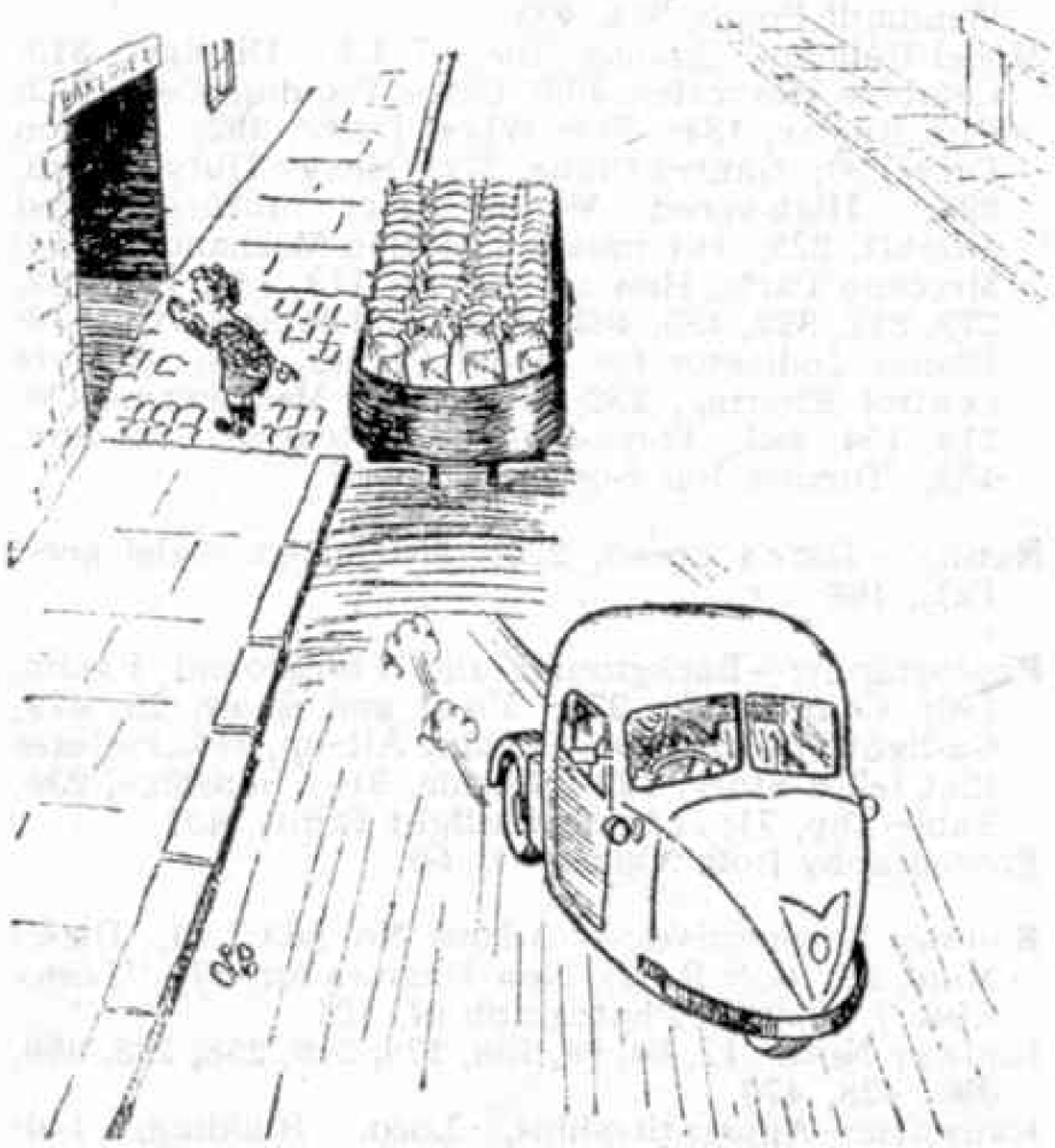
"Nobby Clark, of course. Didn't he go to sleep on a watch?"

* * * *

"Have you heard how Jones is this morning?"

"Oh, yes, a splendid report. They X-rayed his head yesterday, and found nothing there after all."

* * * *



"Hi! Mister, yer 'orse 'as bolted."

(By courtesy of "The Commercial Motor.")

* * * *

"Why did you put your hand in this man's watch pocket?"

"I wanted to know the time, your Honour."

"I can tell you that. It's six months."

* * * *

"I know all there is to know about football."

"Do you? Then tell me how many strings there are in a goal net."

* * * *

"You see that man over there. He was very lucky. He nearly got work in a Government department."

"That was unlucky surely. What went wrong?"

"There wasn't enough evidence."

* * * *

"You've given that door three coats of paint already, so I suppose you are putting on an overcoat now."

"Not at all. This is just a waistcoat."

* * * *

"The doctor has given you tablets this time, Bertie."

"Bother. I wanted pills."

"But tablets are just as good, dear."

"Are they! Have you tried shooting tablets through a peashooter?"

BRAIN TEASERS

THE KEYWORD HELPS

Here is a message hidden by means of a simple code in which letters are represented by numbers. It expresses my feelings to readers at the moment. A simple keyword of seven letters will help you to find the code.

14; 4, 14, 21, 13; 8; 17, 2, 6, 6, 3; 10, 13, 6, 14, 21, 22, 17, 8, 21; 22, 5; 8, 16, 16; 5, 11; 3, 5, 23.

K.J.B.

* * * *

THIS CAN BE DONE

Can you make 20 with three nines. No, the arithmetic is not at all crazy. B.V.

* * * *

A PROVERBIAL PROBLEM

Here are six sentences, in each of which is a hidden word. When read in order these words form a well-known proverb. What is it?

1. A naughty cat ran away.
2. They found a closely written roll in gathering up the rubbish.
3. This is the best one I have ever seen.
4. The rug at her side is not valuable.
5. He is an old friend of mine.
6. Amos saw through the trick quickly.

S.W.C.

* * * *

A MONEY SAVING CHOICE

Jones was offered two kinds of linoleum, one costing 2d. per square foot and the other 1/3 per square yard, to cover part of the floor of a room, measuring 7 ft. by 4 ft. The first kind was sold only by the square foot and the second only by the square yard. Which was the cheaper for him? B.I.N.

* * * *

A POINTED PUZZLE

In a football league Greenbank Paralytics, Redwood Rangers and Halfday Thursday have played 15 matches each. The Paralytics have won three more matches than they have lost, the Rangers have lost one more than they have won, and Thursday have won as many as they have lost. How many points has each team?

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The nine chickens of our first puzzle last month could be distinguished by the use of two coloured rings, say yellow and blue. One chicken had no rings, two others had yellow rings on the left and right leg respectively and two more had blue rings fitted similarly, while two others had two yellow and two blue rings respectively. One of the remaining chickens had a yellow ring on the left leg and a blue one on the right, while the other had these colours reversed.

The words in our second puzzle were VAN, CAN, DAN, FAN, MAN, PAN, RAN, TAN, VAN and WAN. Readers who had NAN for No. 3 can claim to have solved the problem.

The DANGER notice in our third puzzle read ANYBODY WISHING TO ENTER DOES SO AT HIS OWN RISK.

The office boy in our fourth puzzle made a mistake. In three years he will receive £210. If he had chosen the alternative he would have received £225 in the same time.

* * * *

THIS MONTH'S HOWLER

Harmonising is what you put on Christmas Cakes.

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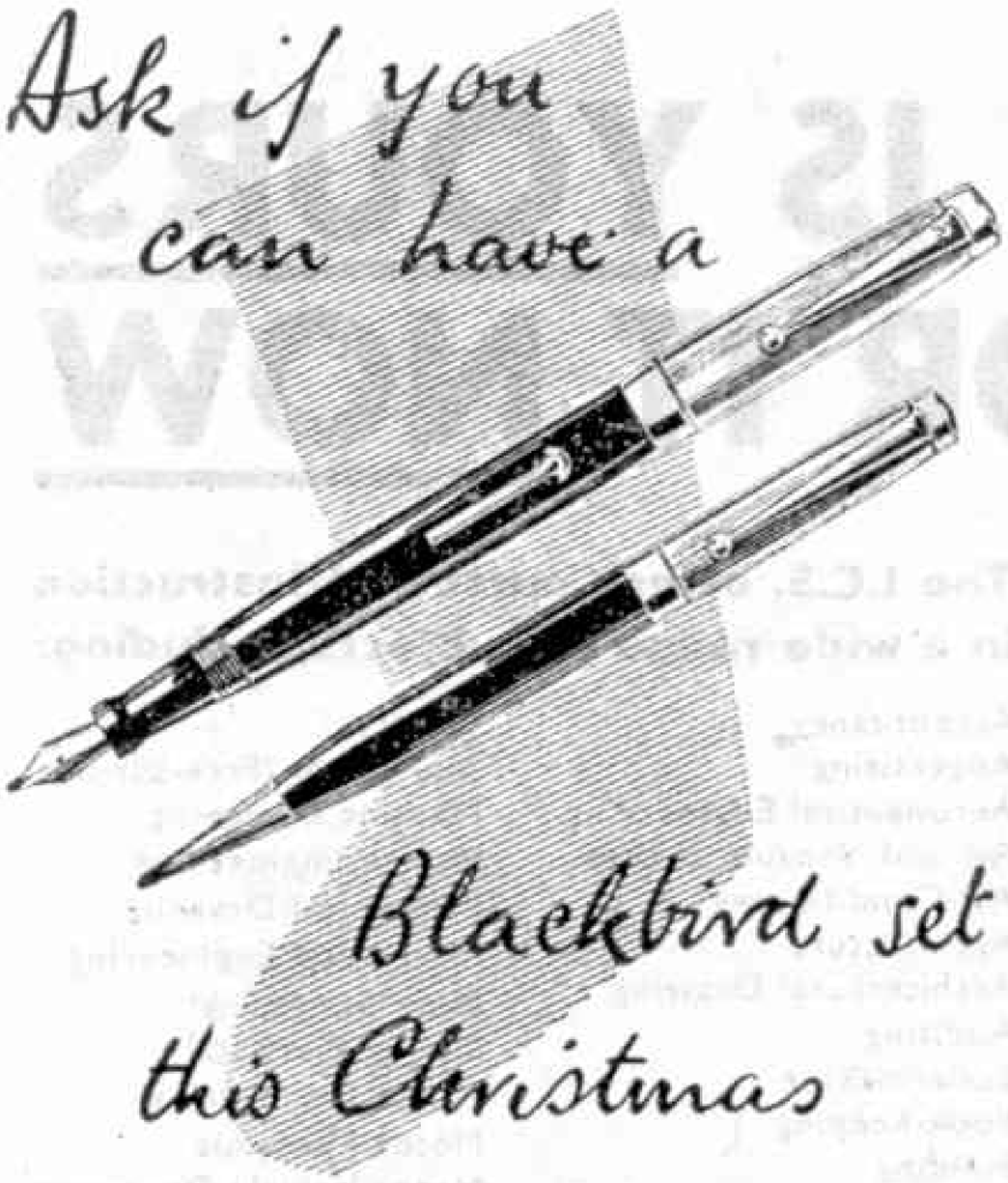
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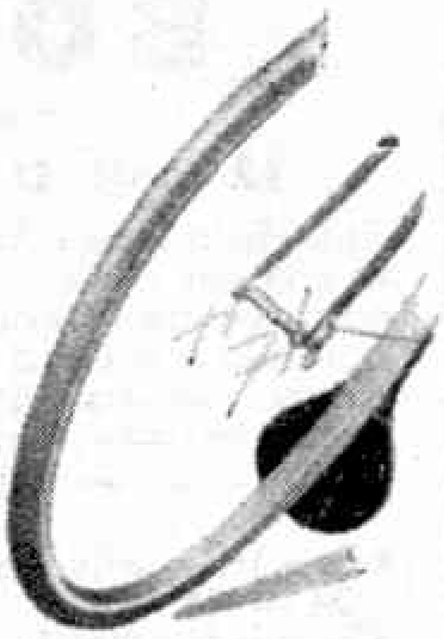
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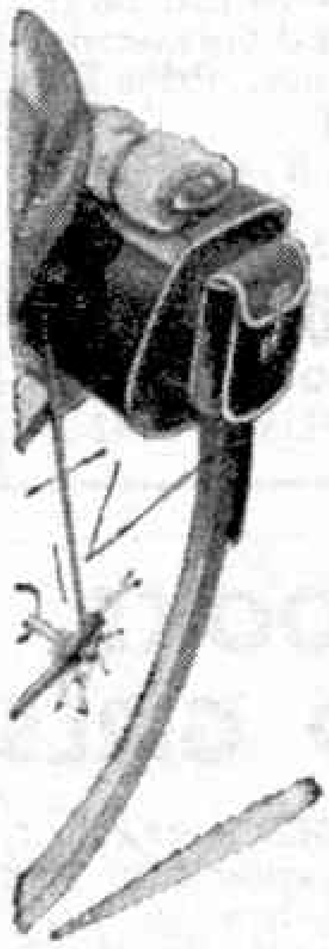
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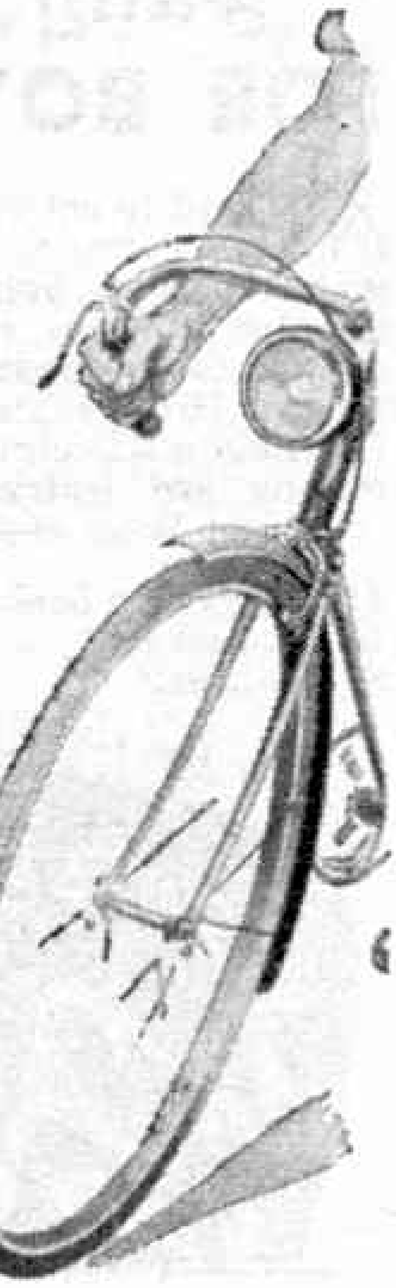
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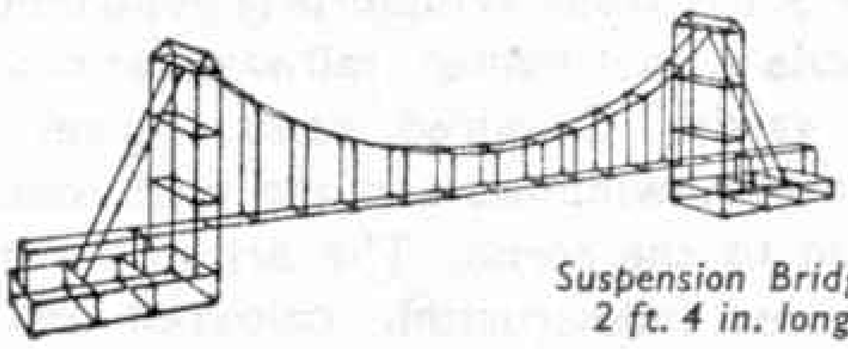
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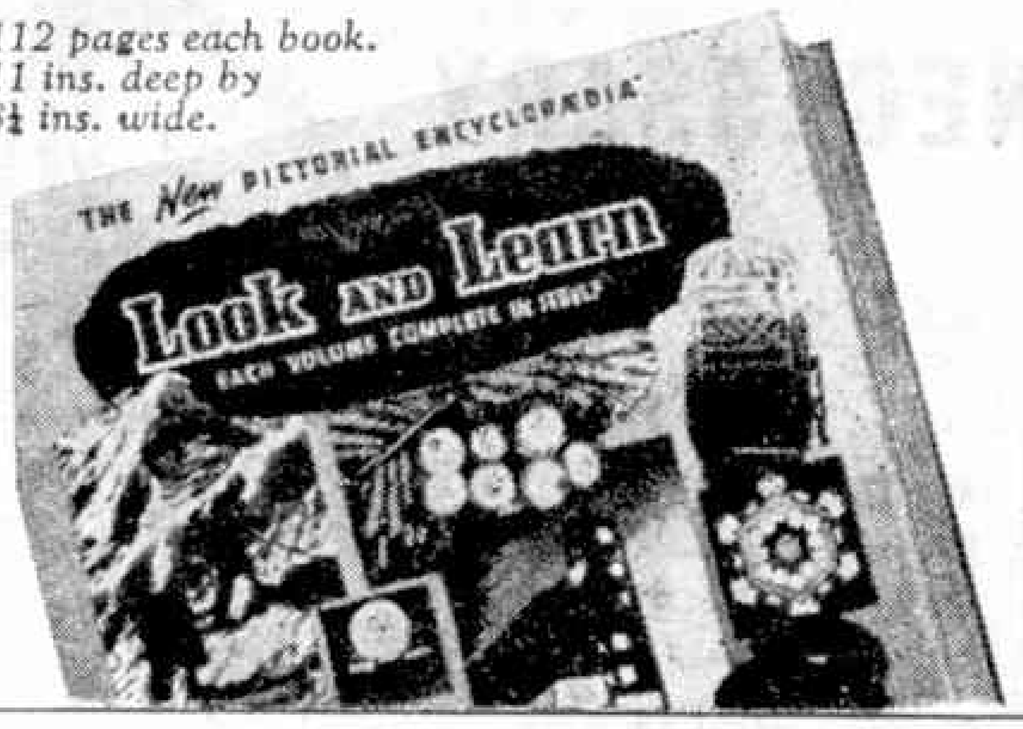
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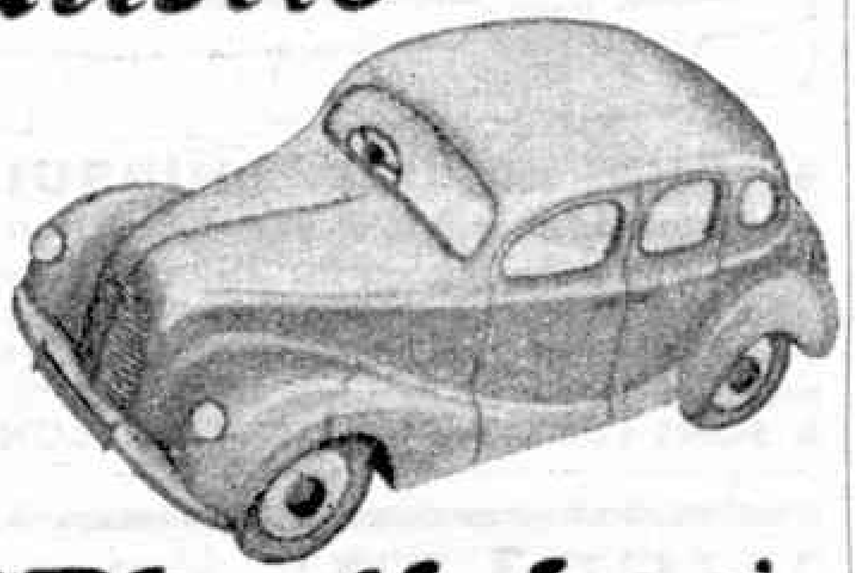
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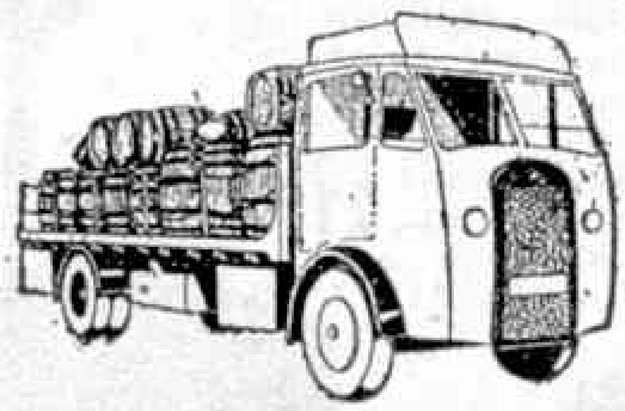
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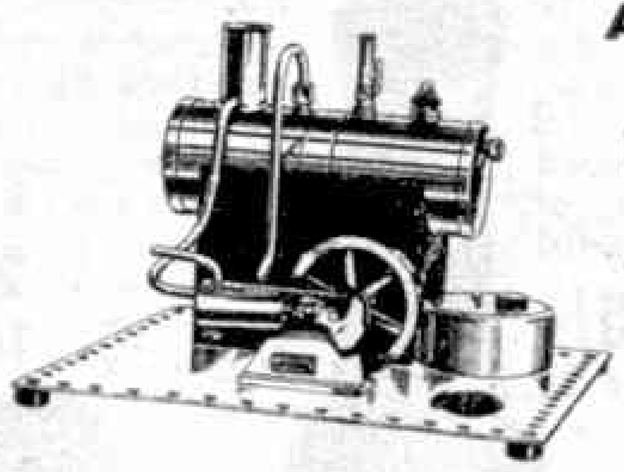
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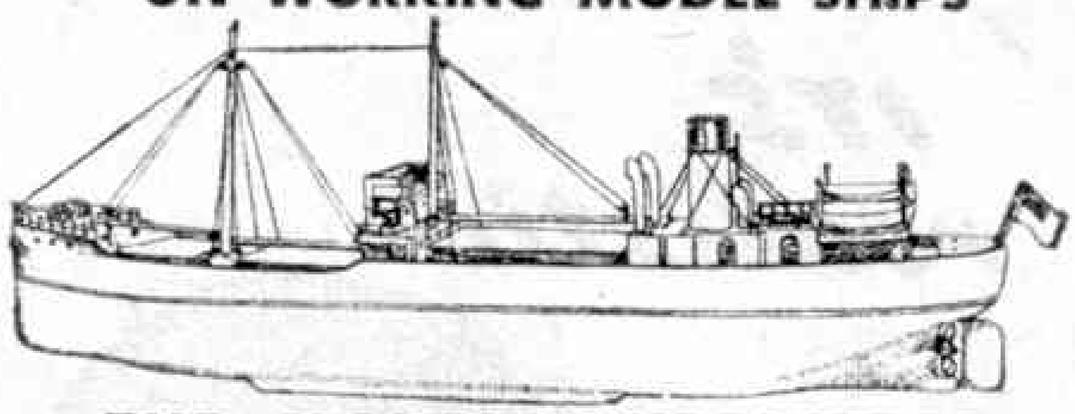
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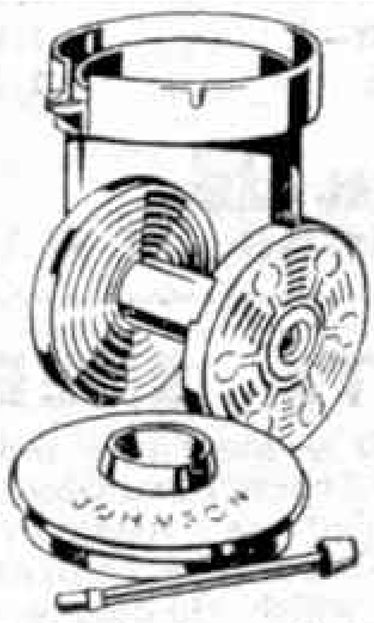
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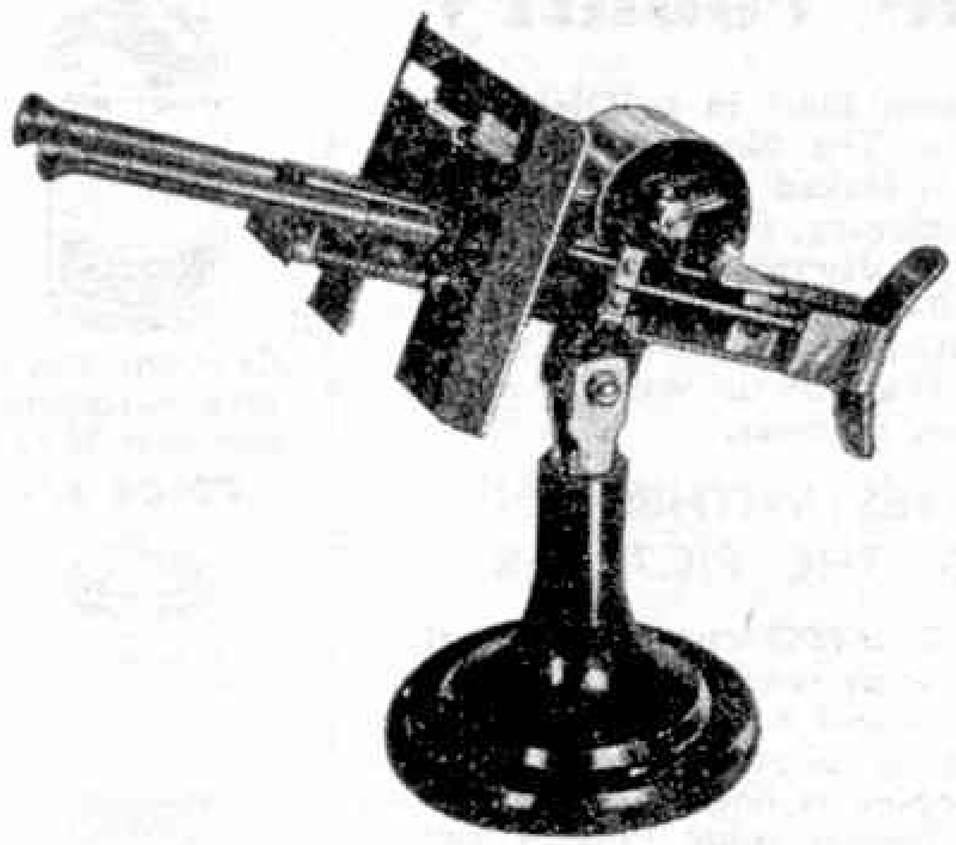


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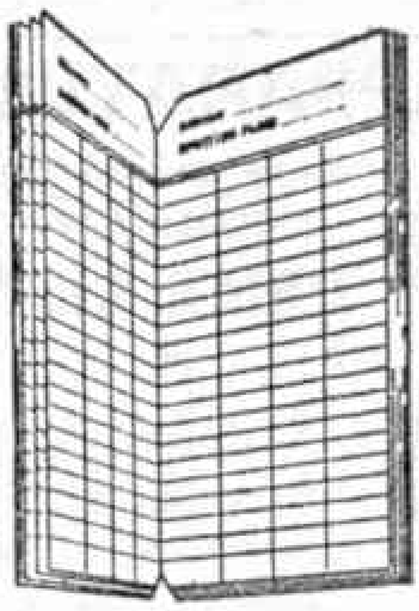
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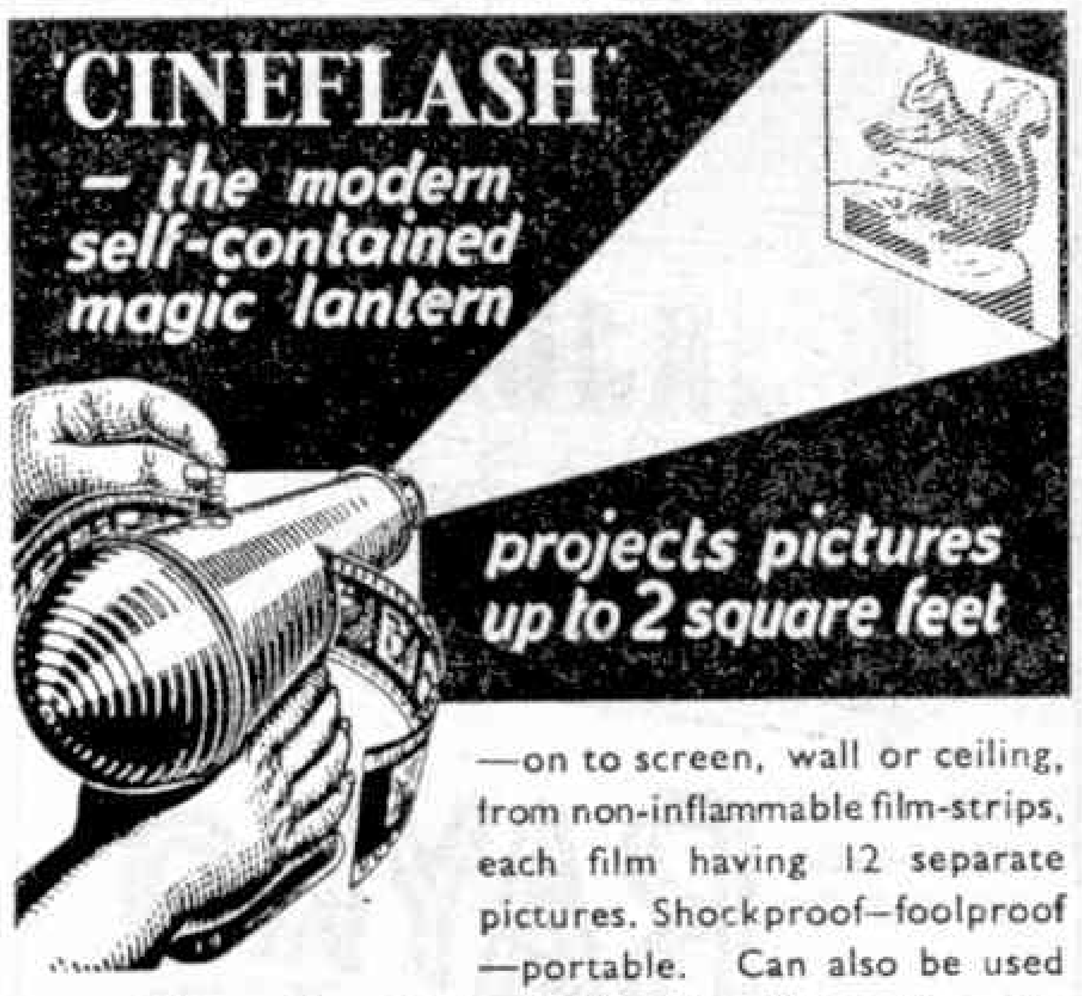
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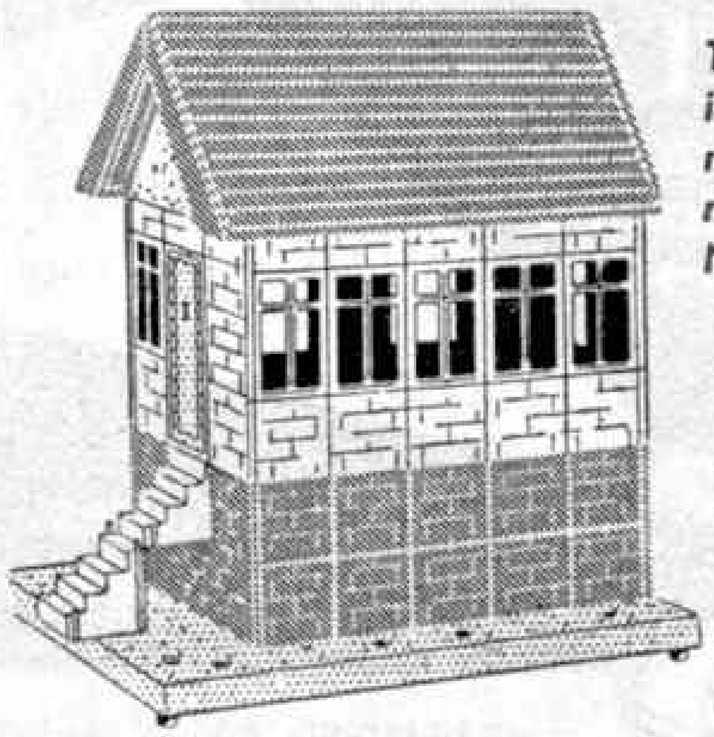
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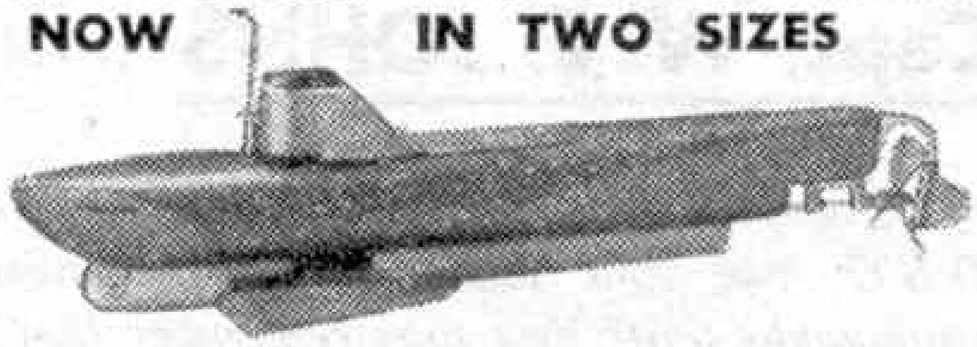
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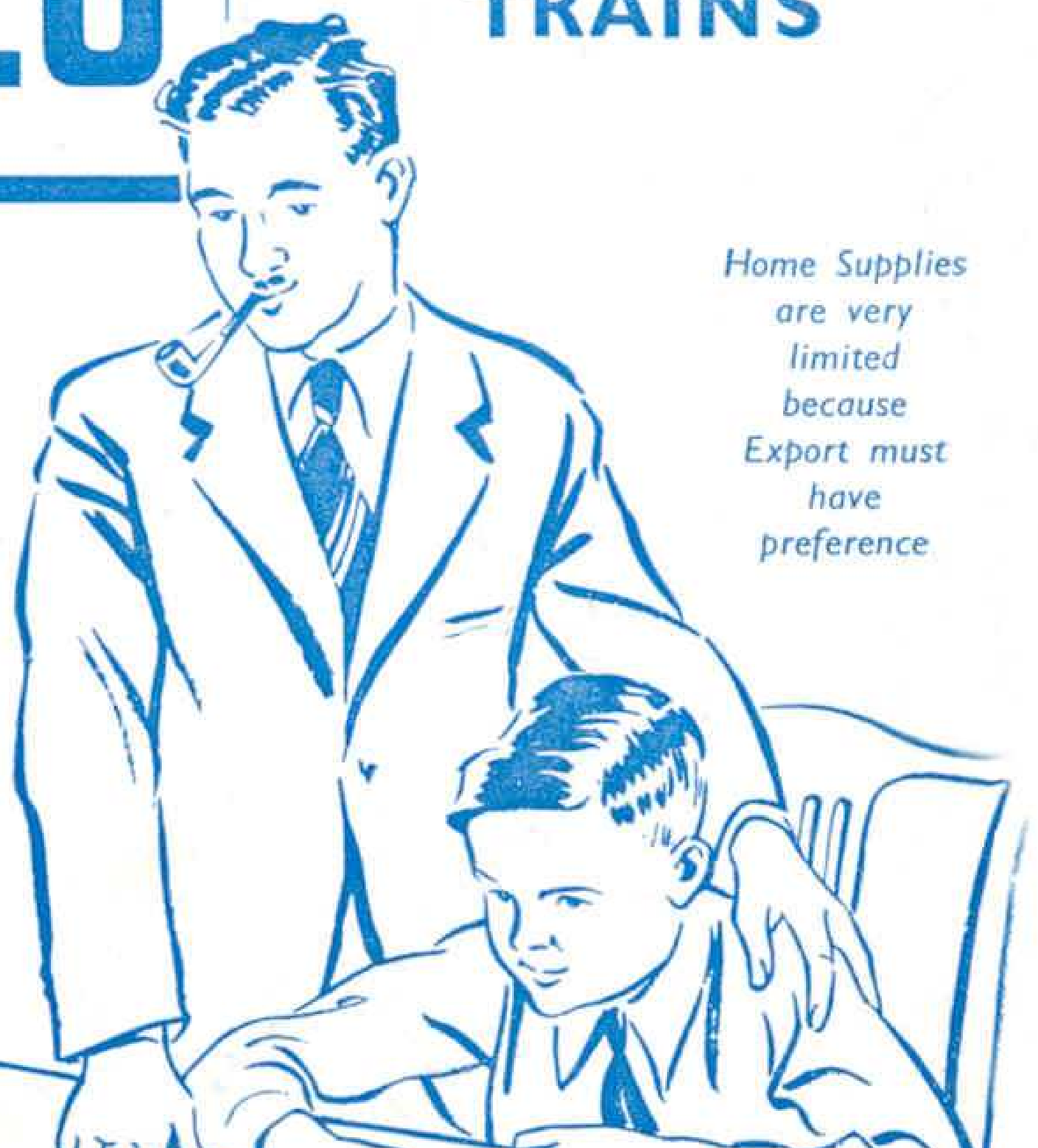
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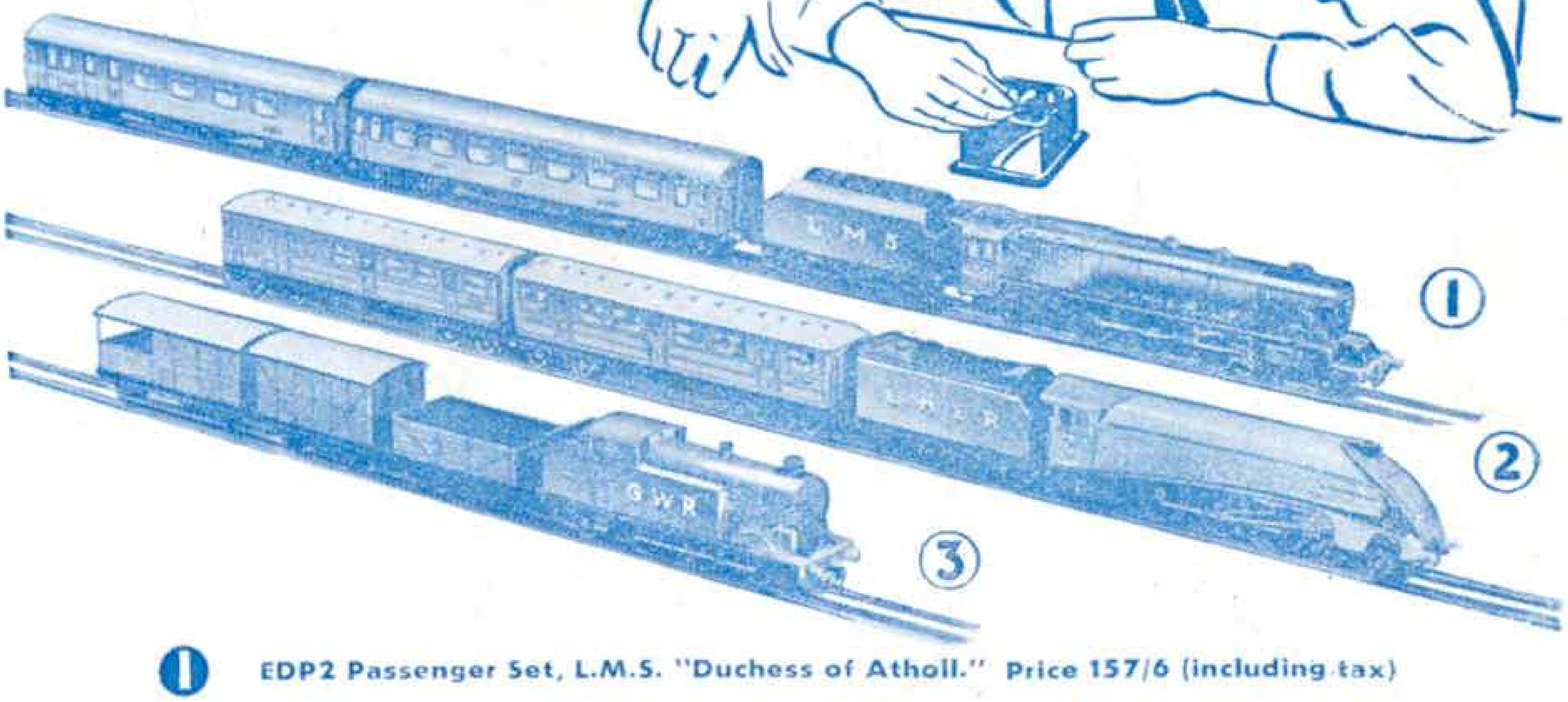


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