VOL. XLI. No. 8 AUGUST 1956

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with Extending Ladder
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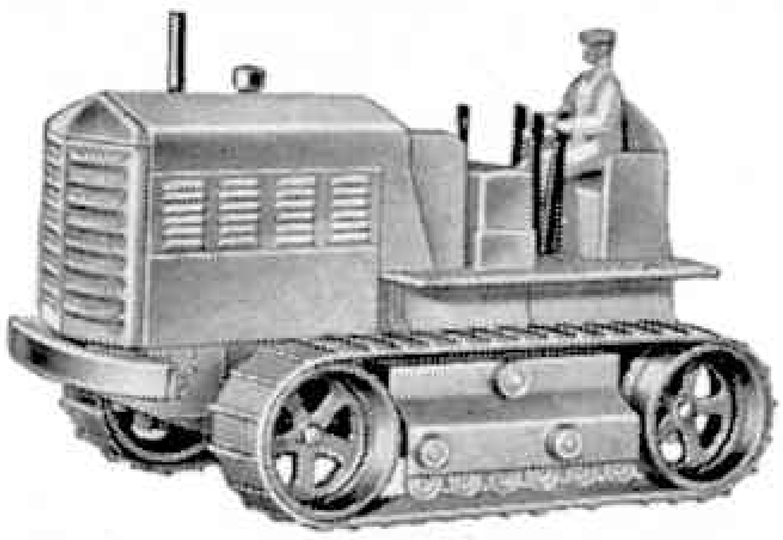

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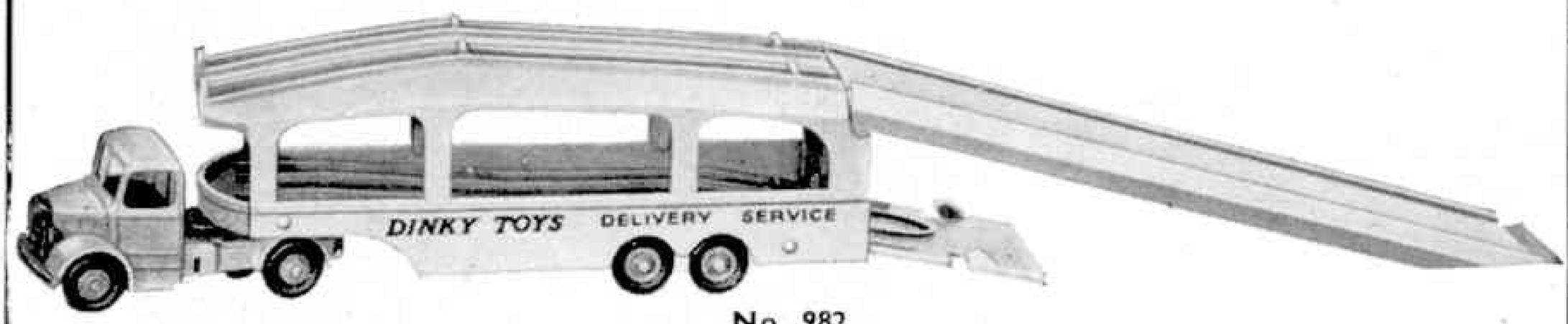

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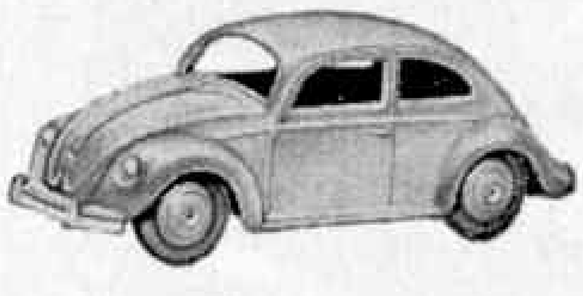


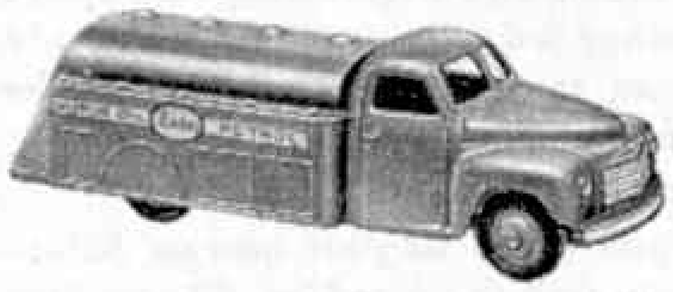
No. 181
Volkswagen
Length 3 9/16 in. **2/6**

No. 163
Bristol 450 Sports Coupé
Length 3 1/16 in. **2/9**

No. 159
Morris Oxford Saloon
Length 3 5/8 in. **2/9**

No. 190
Caravan
Length, excluding tow bar, 4 in.
3/11

No. 735
Gloster Javelin Delta Wing Fighter
Wing Span 3 1/4 in. **2/11**



No. 442
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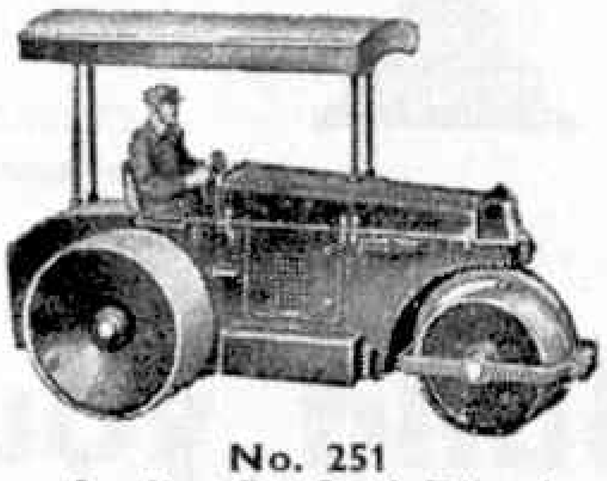
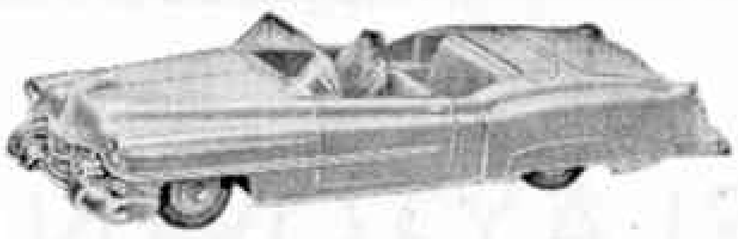


No. 251
Aveling-Barford Diesel Roller
Length 4 3/4 in **4/6**



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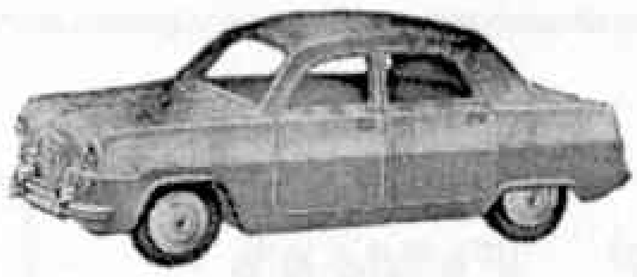

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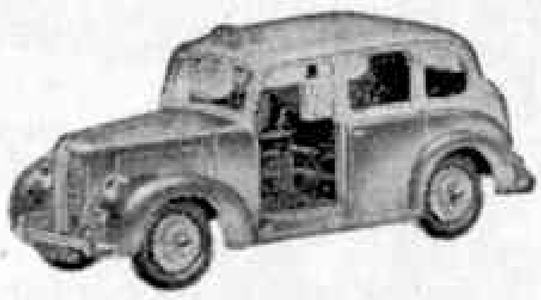

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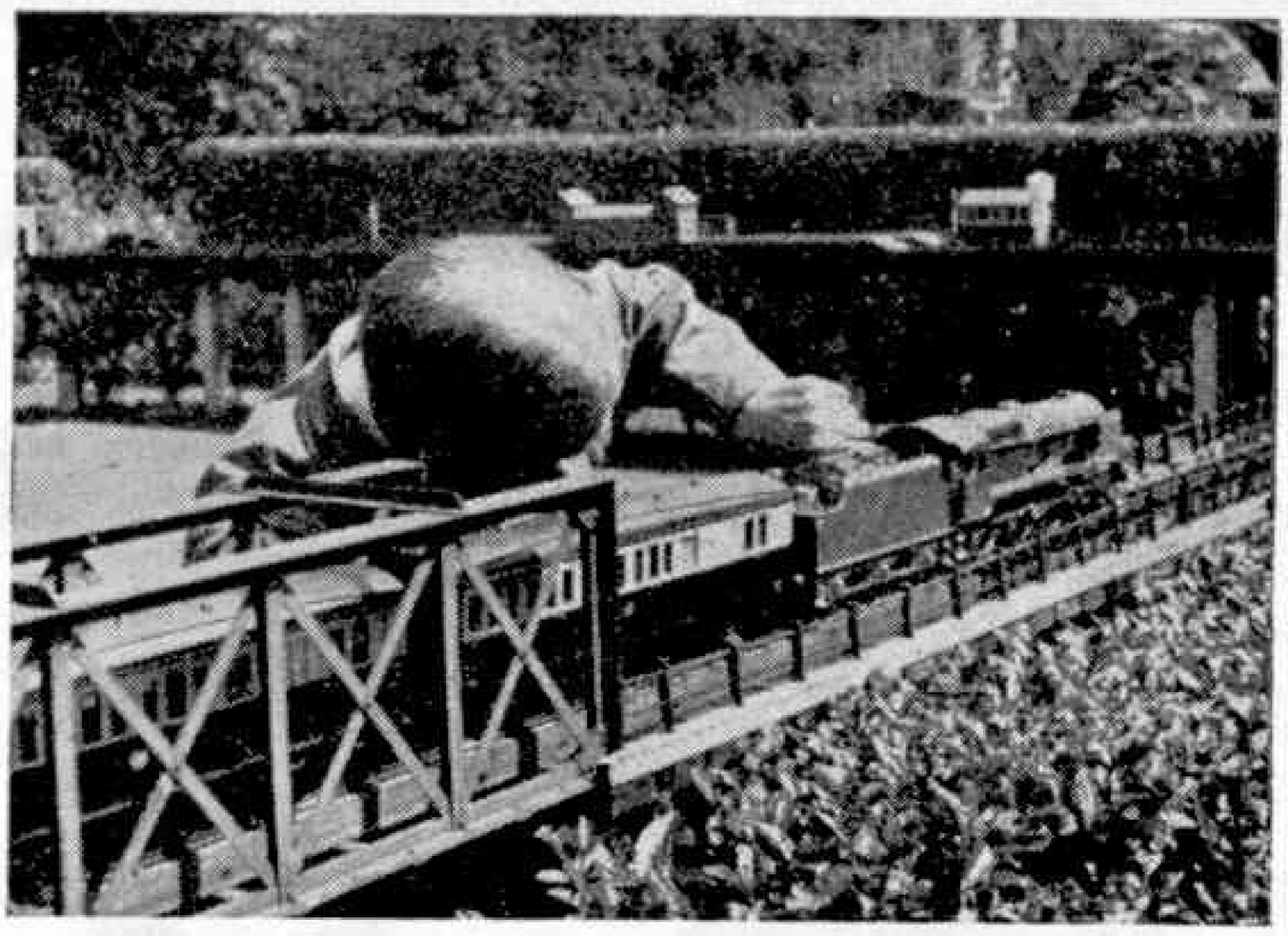

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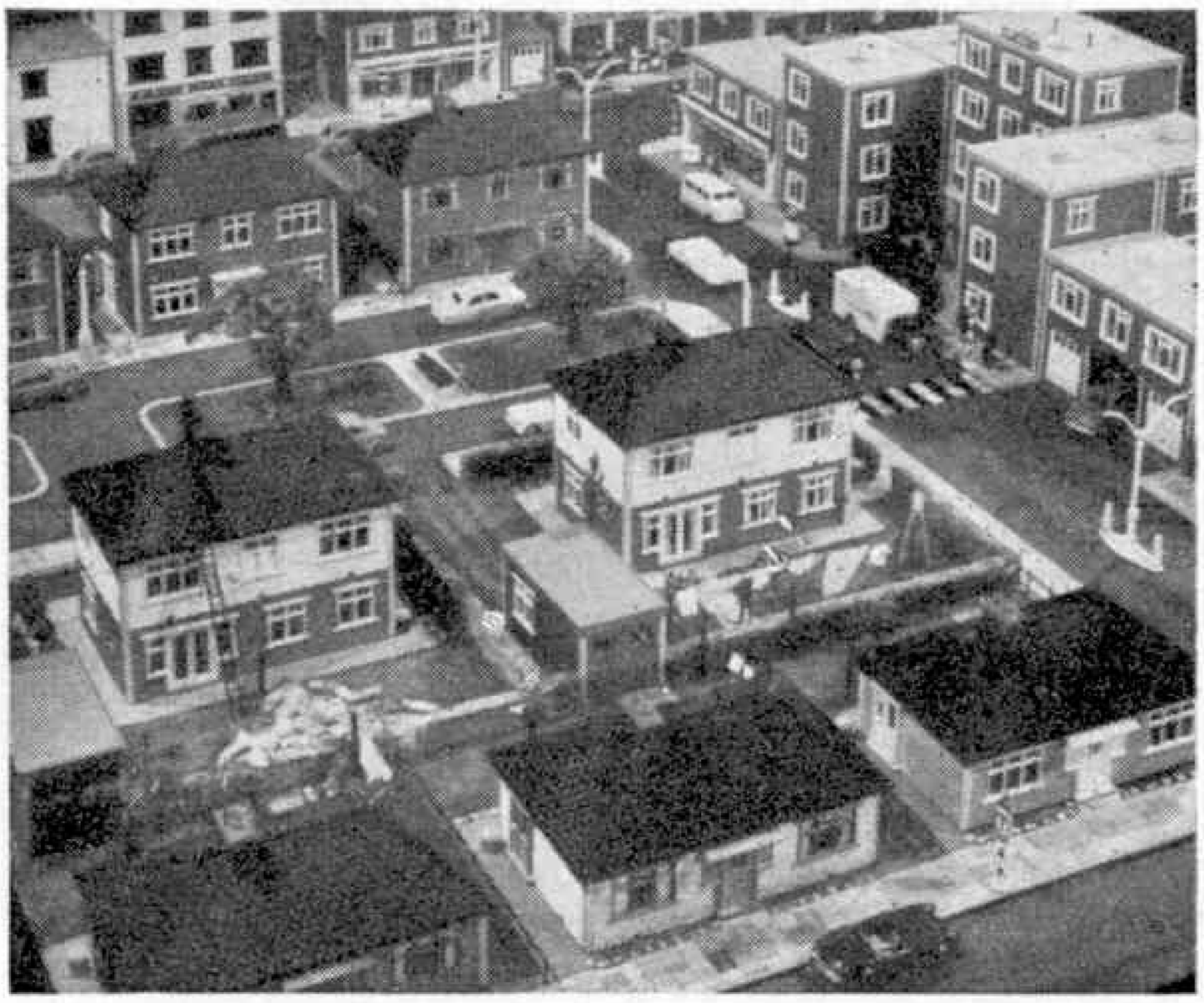

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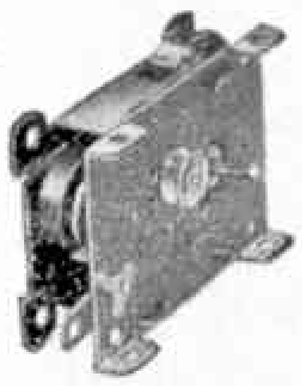

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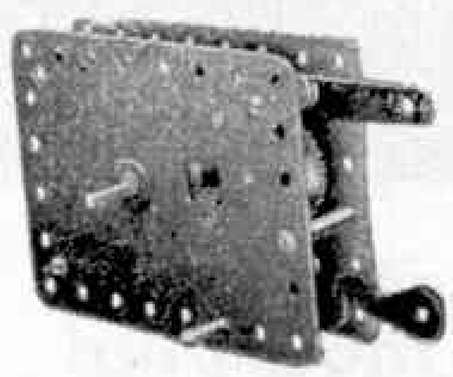

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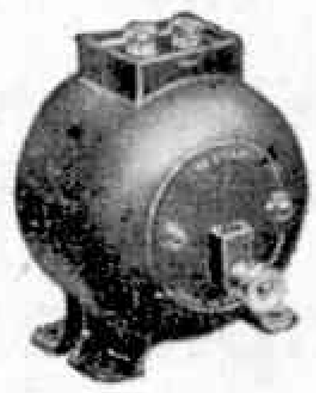

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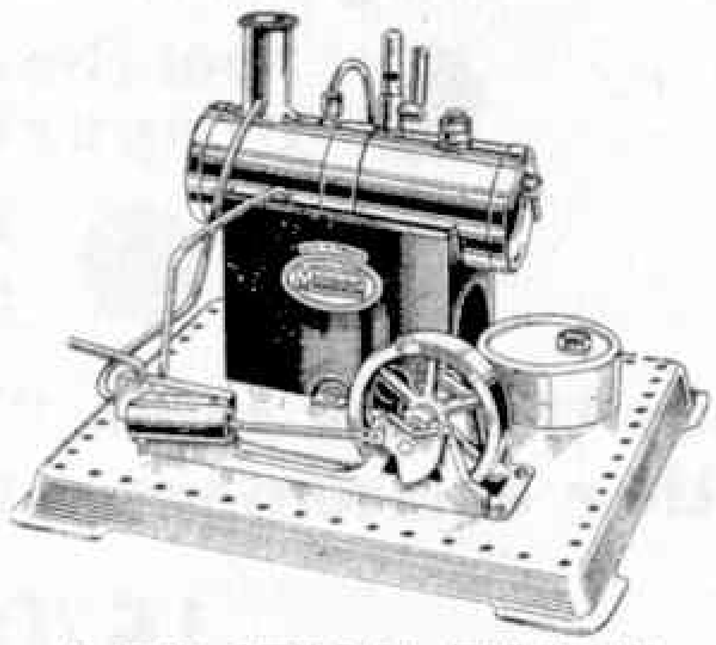

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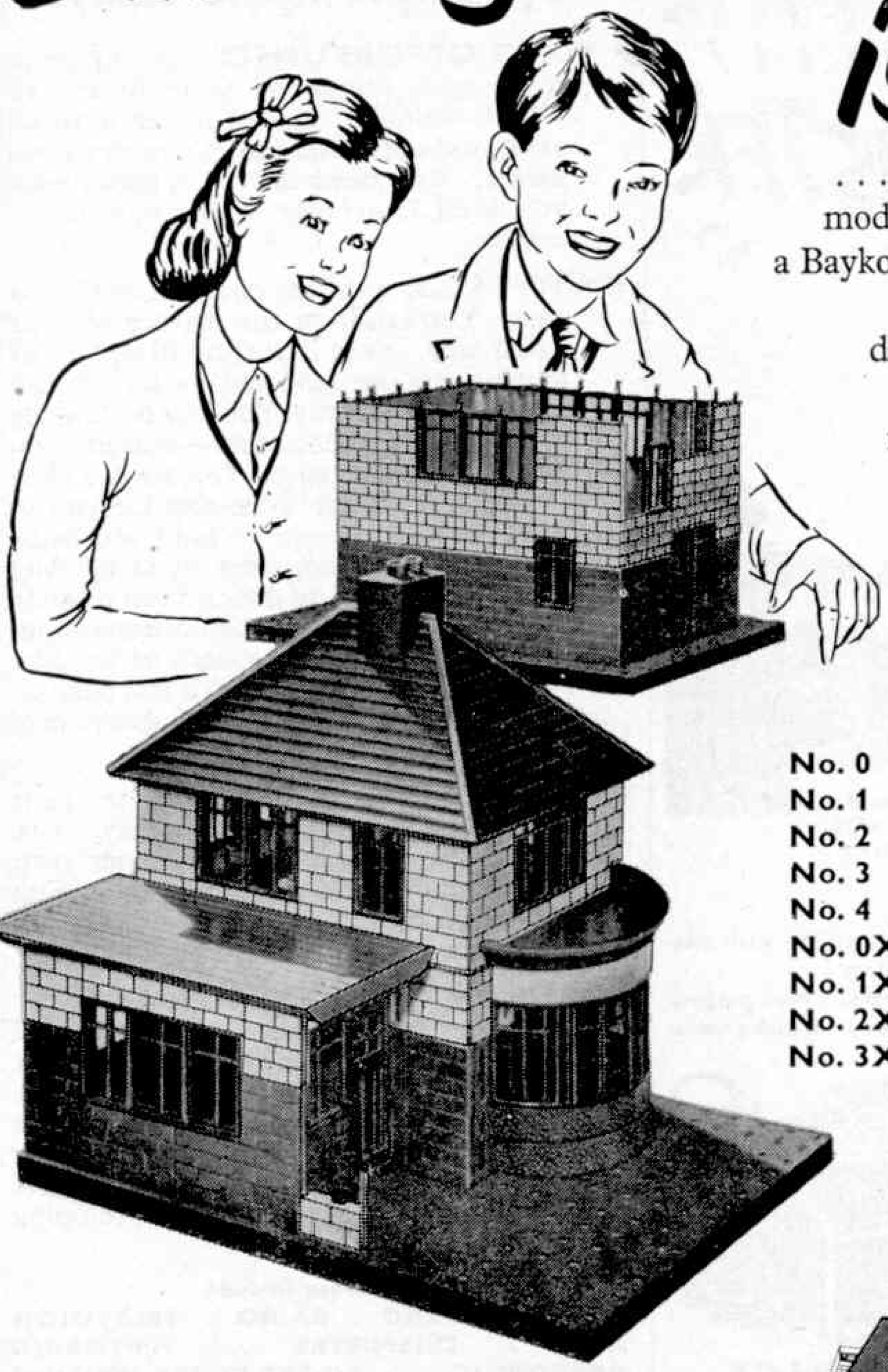

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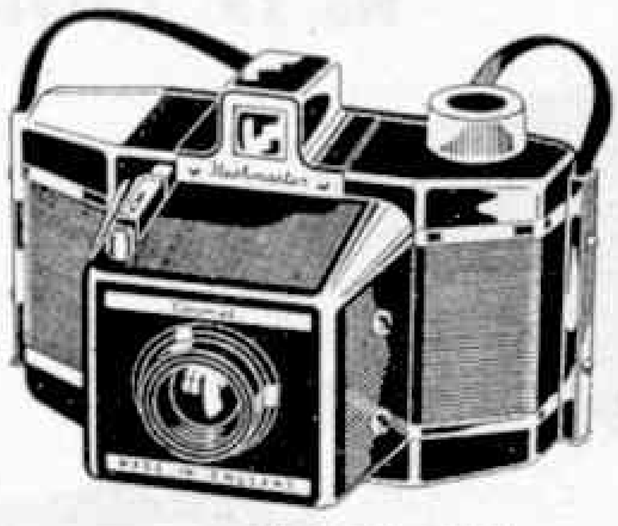

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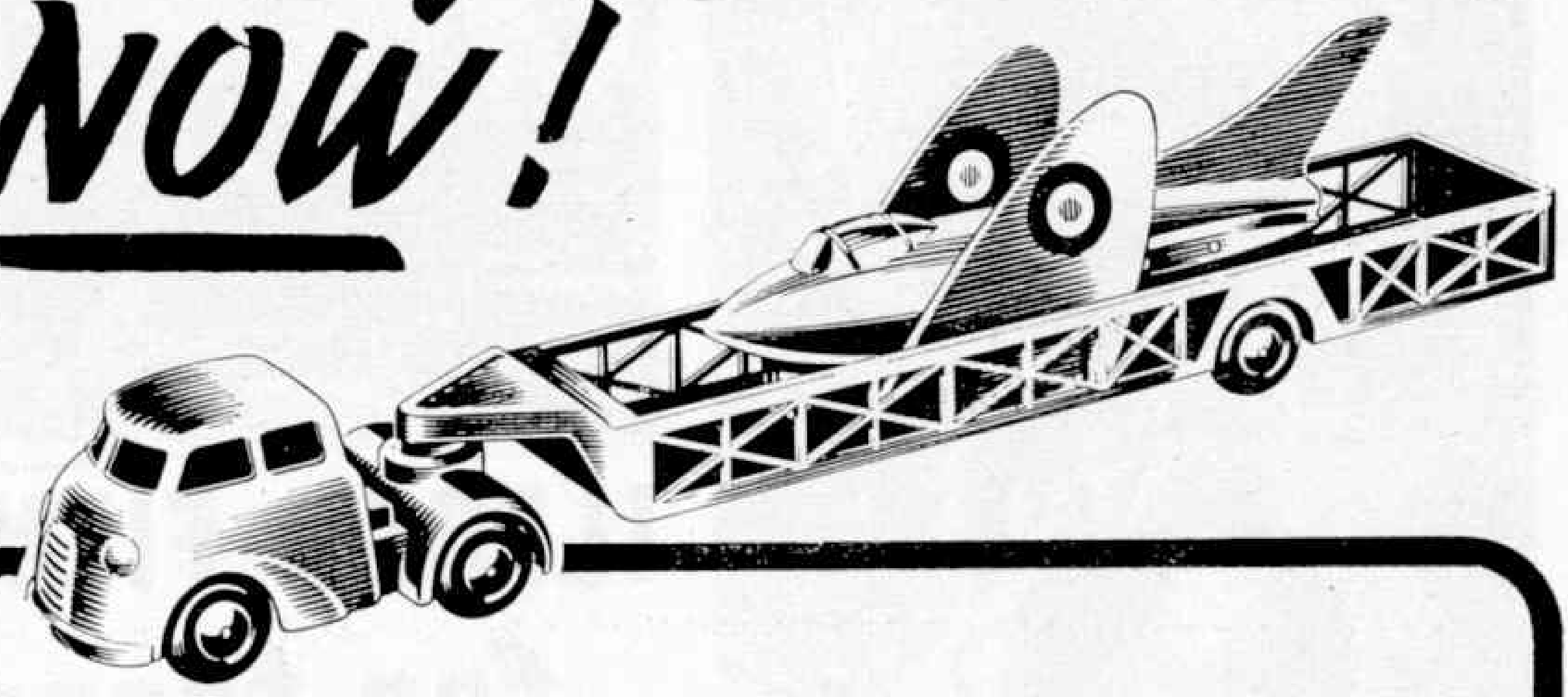

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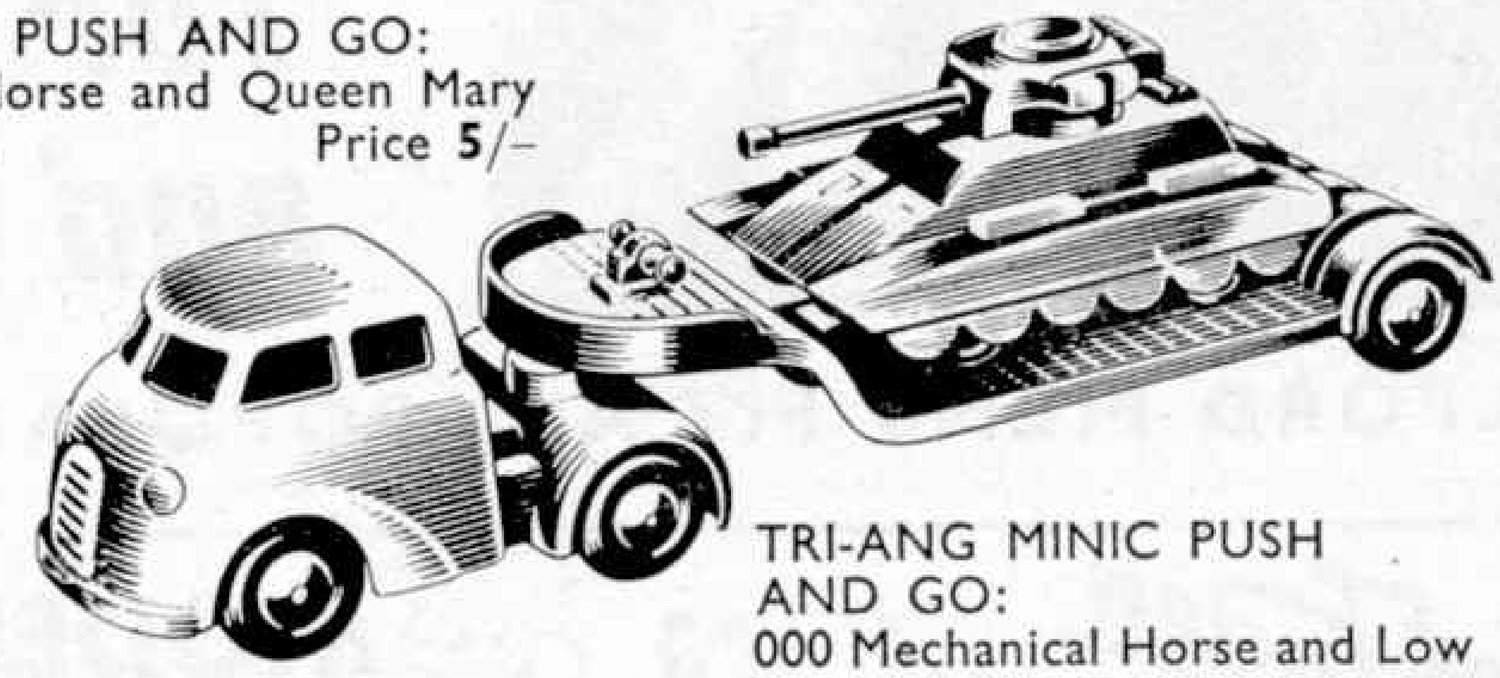

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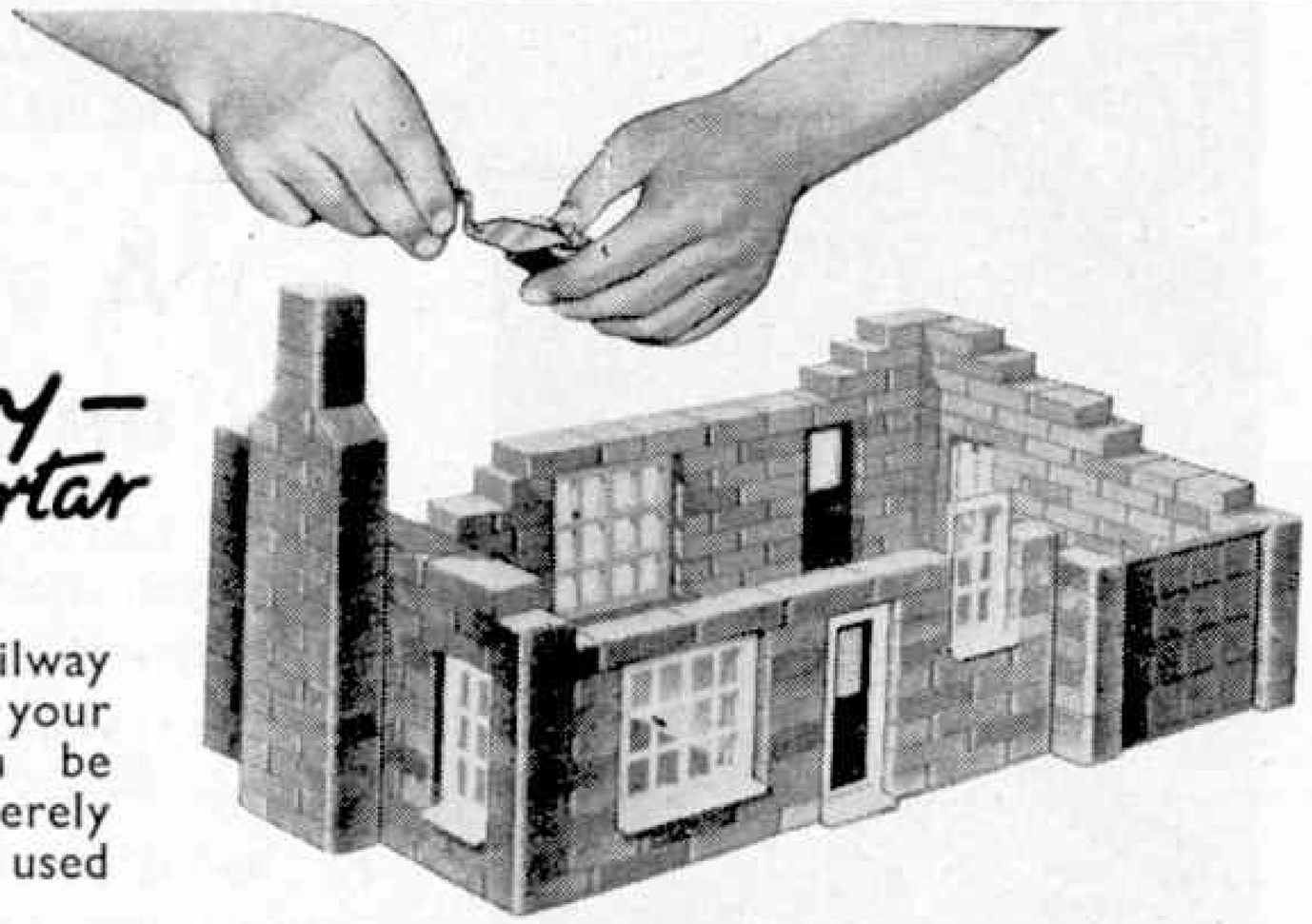

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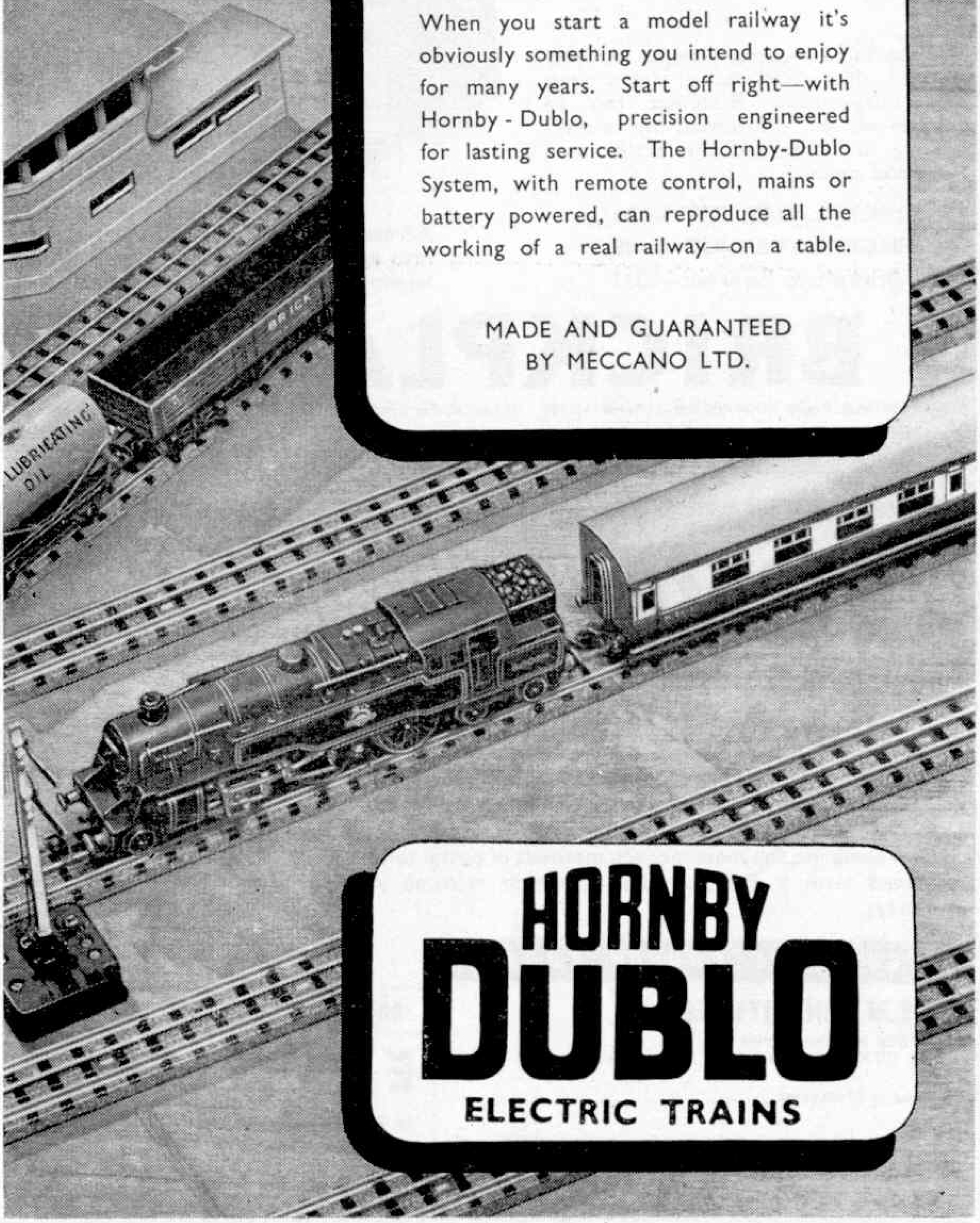

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Editorial Office:
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EDITOR : FRANK RILEY, B.Sc.

Vol. XLI
No. 8
August 1956

John Charles Writes for the *M.M.*

By September the new football season will be in full swing, and the September *M.M.* will have a special attraction for all of you who are interested in the Association game, in the form of a fine article by John Charles.

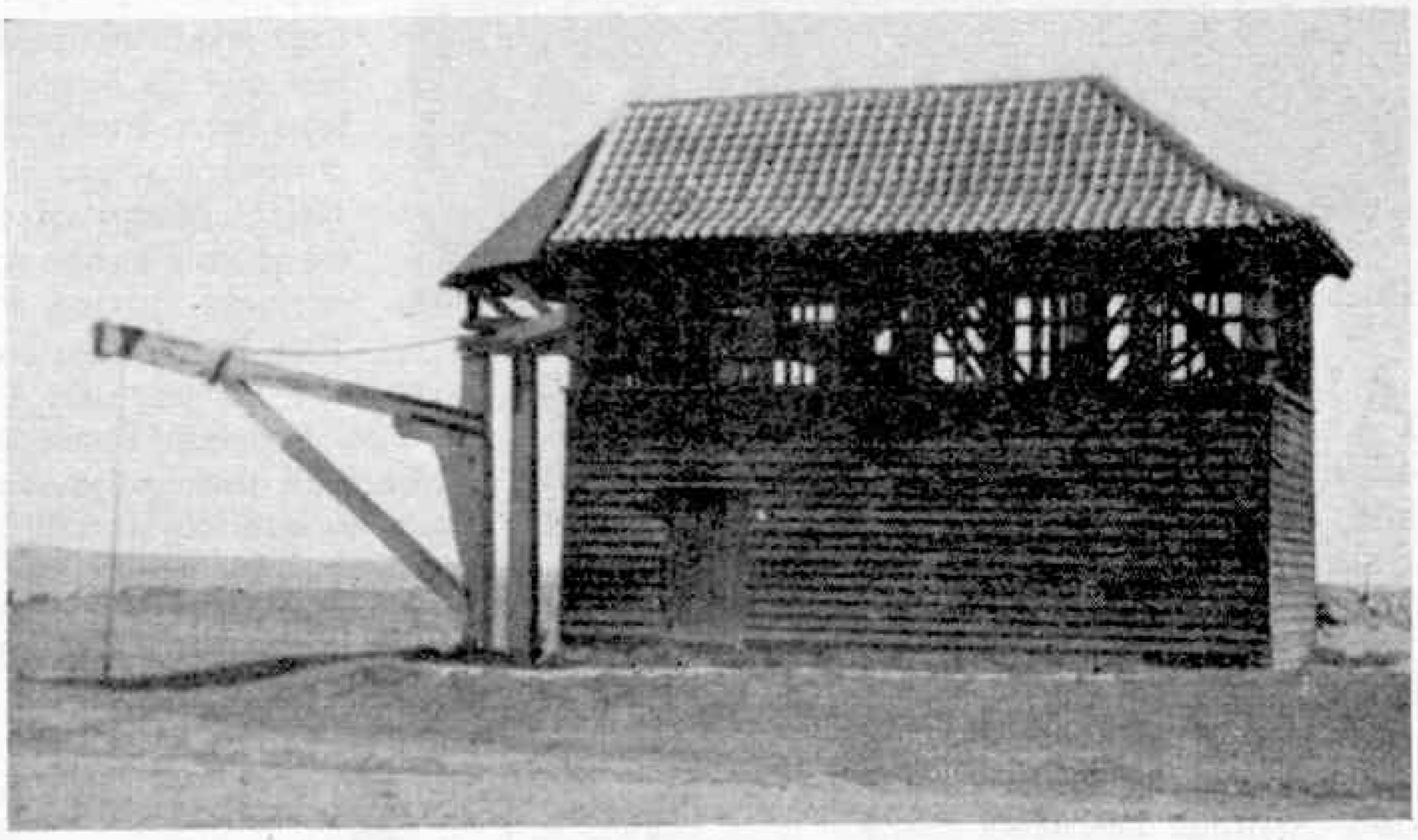
There are few today to whom it is necessary to introduce John Charles, for this fine Welsh international, who plays in the Football League for Leeds United, is acclaimed as an outstanding example of the modern footballer. He seems to be capable of holding almost any position on the field with distinction, and is a welcome visitor wherever he goes among those who recognise and value fine play and good sportsmanship.

So do not forget to order your copy of the September issue, and let your friends know about the splendid article that it will contain.

A Crane of Long Ago

Believe it or not, the contraption you can see in my picture is a crane, and is the only one of its kind believed to be still in existence. It is a wooden one, built before the days of the application of steam or electricity, for it was erected by the Admiralty at the Royal Naval Shipyard in Harwich as long ago as 1667.

Now that cranes are so varied in character, and many of them so enormous, I could not resist introducing this ancient machine to you by way of contrast with those of today. It was operated on the treadmill principle by men inside the wheels, perpetually climbing ladders but never getting any higher. The wheels can be distinguished through the lattice-work of the cage or building. They are 16 ft. in diameter and 3 ft. 10 in. wide.



This interesting picture was contributed by M. L. Hall, Dovercourt, who also gave me the details of the ancient crane shown in it.

Needless to say, this crane has not been in use for many years. In 1930 it was dismantled and re-erected on Harwich Green, where it attracts interested visitors. Many of them no doubt reflect on the change from the days when shipyard men used it to raise heavy weights to the age of automation in which we are living today.

The Editor

A London RTW bus, the 8 ft. version of the RT type, in Parliament Square. Photograph by W. H. R. Goodwin.

London's Buses

Carrying Nearly 10 Million Passengers a Day

By J. Wyndham

ALL rail and road passenger transport services in and around London, except main line railways and taxi-cabs, are owned and operated by The London Transport Executive. This body was formed in 1948, on nationalisation, succeeding the London Passenger Transport Board that had come into existence in 1933. It serves an area of about 2,000 square miles. This includes two whole counties and parts of seven others, while its services also extend to certain places outside that defined as the London Passenger Transport Area, including part of yet another county. There are 10,000,000 people within its limits, almost a fifth of the total population of the United Kingdom, and the greatest distance across it is the 65 miles between Baldock and Horsham.

A few more figures will illustrate the extent of this undertaking. It provides 11½ million passenger journeys a *day*, nearly 10 million of them on over 8,000 buses and coaches and 1,750 trolley buses, and the remainder on 4,000 electric railway cars. It has nearly 90,000 employees and its operating expenses amount to £70 million a year.

It is with the road section of the work of London Transport that this article is concerned. The first London bus, drawn by horses, appeared on the streets of London 127 years ago and ran between Paddington Green and the Bank of England. This service was started by George Shillibeer, a London coach builder. Other operators followed his example, and in 1856 the London General Omnibus Company began operations, eventually absorbing practically all its rivals. The first petrol motor bus in London was licensed in 1897, and the capital's first standardised petrol vehicle, the famous B type which had 34 seats, was introduced by the General, as the company was popularly called, in 1910. Many of the company's buses went to France and Flanders as troop carriers during the first World War. The last horse bus to run in London was not withdrawn until 1914.

The London Passenger Transport Board inherited many types of bus when it came into existence in 1933, but since then the policy has been to standardise design. Experiments as long ago as 1930 showed that in performance oil engines are superior to those using petrol, and that they are cheaper to run and maintain, so today oil engined buses only are in use. The decision to adopt them came in 1934; the war delayed the conversion scheme and the last petrol bus was withdrawn only six years ago. The whole of the fleet is now of standard pattern, with 90 per cent. of its vehicles double-deckers.

The standard double-deck bus now running in London is known as the RT, and the fleet is the largest and most highly standardised group of buses in the world. The RT seats 56 passengers, 26 on the lower deck and 30 on the upper, and is equipped with a 115 b.h.p. oil engine,

An RT bus, the current standard London type, at London Airport. London Transport Executive photograph.

steering column pre-selective gear control and fluid flywheel transmission. Compressed air braking and automatic lubrication are provided and nearly all parts are interchangeable. The width of 500 of the buses, which form the RTW type, is 8 ft., instead of the usual 7 ft. 6 in., and all are 26 ft. long.

The RT type was introduced in 1939 and was designed throughout by London Transport's engineers, in association with the Associated Equipment Company Ltd., the makers of the A.E.C. Regent chassis, and the makers of the bodies, chiefly Park Royal Vehicles Ltd. and Weymann's Ltd. Both chassis and bodies were modified to the requirements of London Transport's engineers, and in particular special care was taken that bodies should be interchangeable.

Some of the vehicles of the RT type have had interesting histories. An example is RT19, which toured England and Scotland as a demonstration vehicle for the Associated Equipment Company Limited, but was eventually brought back and placed in service in London. This bus had a chassis modified to carry the body of the first vehicle of the series, RT1, and was used as the prototype for the post-war RTs. RT4 and RT39 took part in the mechanised column of the Victory Parade of 1945.

RT97 was heavily bombed in July 1944 and was then rebuilt, with doors enclosing the platform, as a "pay-as-you-board" bus and later as a Green Line coach. In February 1949 it was further rebuilt and emerged from Chiswick Works as RTC1, an experimental luxury double-decker for Green Line Service, but is not now in use.

Leyland vehicles also figure in the London fleet. Of these there are two types, the RTW and the RTL. The former are fitted with the Leyland 9.8 litre oil engine and bodywork of Leyland mainly metal construction. They were at first in service in the outer central London area because of their width of 8 ft., but are now on some central area routes and work there very satisfactorily. All are fitted with air-brakes and have pre-selective gear boxes and fluid flywheels. Two of the class, RTW421 and RTW422, went to Germany in 1950 and were worked by German crews to and from the Berlin Trade Fair. On their return they went into normal service; now both carry G.B. plates at the rear and on their front bulkheads are plaques giving details of their continental visit.

The RTL type is a Leyland Titan, also

RT2481 at Mill Hill in north-west London.

equipped with the Leyland 9.8 litre oil engine, pre-selective gear box and fluid flywheel. These vehicles are 7 ft. 6 in. in width. The prototype bus, RTL501, is interesting in being the only one in the class to have what is called a "Top Hat", which is a roof route number box. The bodywork on almost all of both types is by Park Royal and is of mainly metal construction. RTL1307 has a Weymann body and was one of the three buses used on the 12,000 miles "Come to Britain" tour of the United States and Canada in 1952.

The Routemaster, the standard London bus of the future. London Transport Executive photograph.

London Transport's engineers are always looking ahead and again they have designed a bus of the future. This is the Routemaster, the type lettering of which is RM. One reason for its appearance is the decision to replace London's trolley buses when they begin to fall due for replacement in 1958, which means that more oil engined buses will be required. The new type has been designed throughout by London Transport's engineers, and the first prototype was built in association with A.V.C. Ltd.

The bus presents a handsome appearance, as can be seen from the cover of this issue, which is based on a London Transport photograph and shows the first of these vehicles entering Oxford Street from Orchard Street while undergoing a thorough test in London traffic conditions. At the time of writing four prototypes have been or are being built, but only one so far has been brought into use in this way on various routes.

The Routemaster has been designed for maximum capacity, minimum weight, and ease of control, servicing and overhaul. Its length is 27 ft. and its width 8 ft., and it has a wheelbase of 16 ft. 9 in. It has seating for 64 passengers, 8 more than the RT bus.

No conventional chassis frame is used. The body structure serves as the main load carrying unit, with small sub-frames at the front and rear, to mount the mechanical units. These are so arranged that they can be easily removed for overhaul. There is independent front suspension, and a patented form of coil spring rear suspension that gives a wider roll centre and so promotes stability and gives improved riding characteristics.

The use of aluminium alloys, fibreglass and other weight saving materials has brought the unladen weight down to less than 7 tons, and when fully laden the Routemaster is several hundredweights lighter than the present standard bus, although it carries more passengers.

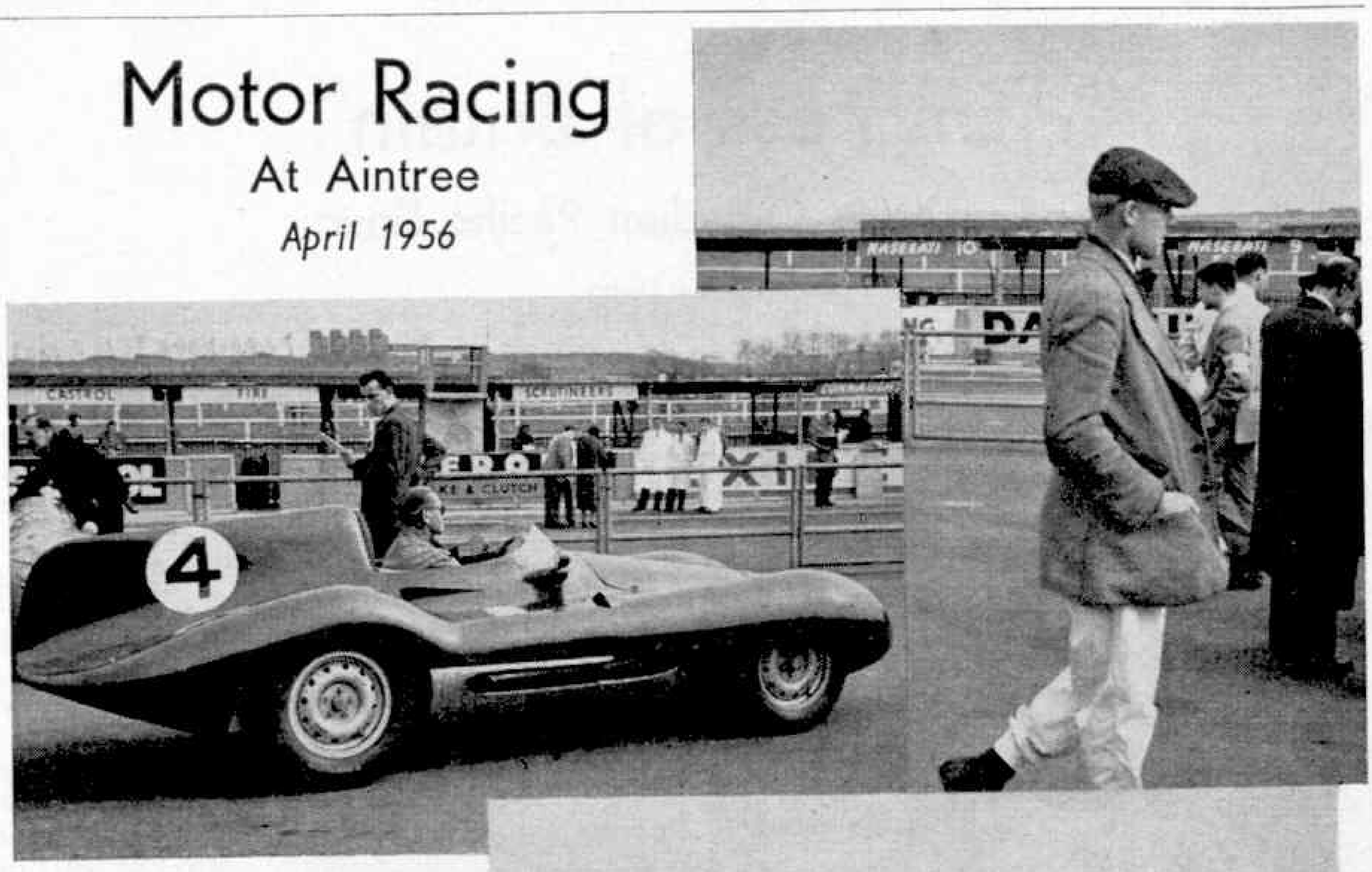
The engine is the well known A.E.C. 9.6 litre direct injection unit slightly modified to suit the special requirements of the Routemaster, and is basically the same as the unit used in existing London Transport buses. Transmission is through a fluid flywheel and an independently mounted epicyclic gear-box.

Gear selection is carried out by electro-hydraulic valves operated by a lever mounted on the steering column, and there are only two control pedals, one for the accelerator and the other for the brake. The radiator is under the main floor to the right of the engine and behind it and is in an almost horizontal position.

Motor Racing

At Aintree

April 1956



Above, the F.I. Connaught is being driven to the course, on the far side of which are the pits.

In the top corner is Mike Hawthorn, seemingly in thoughtful mood. He was first in the 1,000-2,000 c.c. Sports Car Race, in a Lotus-Climax.

Above are the winners in the Unlimited Sports Car Race. In the centre, No. 33 Aston-Martin, driven by Roy Salvadori, first; on its left, No. 22, Jaguar, driven by D. Titterington, second; and No. 21, Jaguar, N. Sanderson, third.

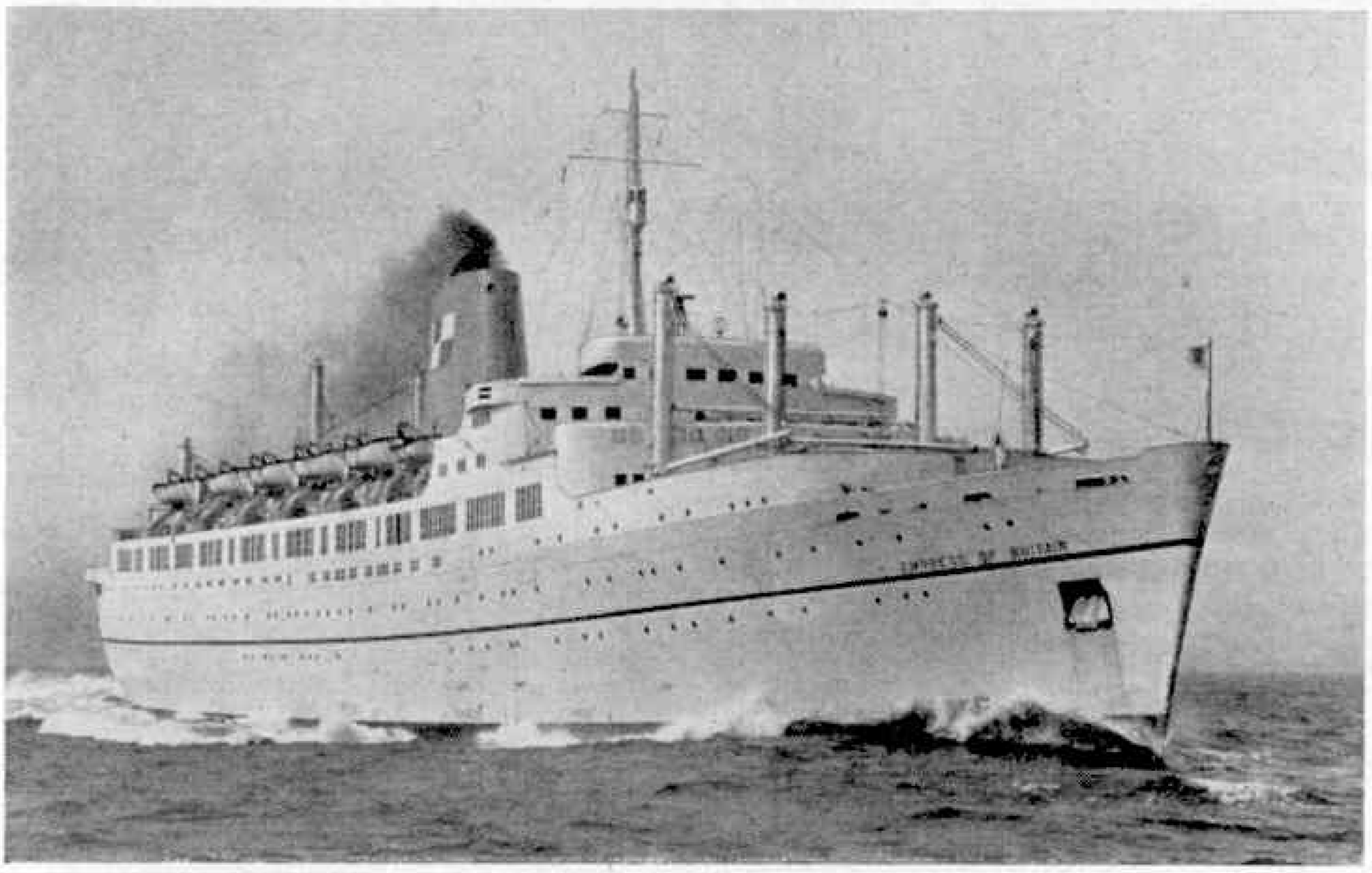
On the left is C. A. S. Brooks in the B.R.M., second in the International 200. A familiar figure—the winner of the race—is seen in No. 7.

"Empress of Britain"

The New Canadian Pacific Liner

By the Editor

THE handsome vessel seen in the illustrations on these pages is the C.P.R. *Empress of Britain*, a very interesting modern liner that started her maiden voyage, from Liverpool to Montreal, in April last. She was built on the Clyde by the Fairfield Shipbuilding and Engineering Co. Ltd., and is operated by the Canadian Pacific Steamship Company. She will be employed on the run between Great Britain and Canada, and indeed will be the third vessel bearing her name to enter this service.



The Canadian Pacific liner "Empress of Britain," which began her maiden voyage from Liverpool to Montreal on 19th April last. C.P.R. photograph.

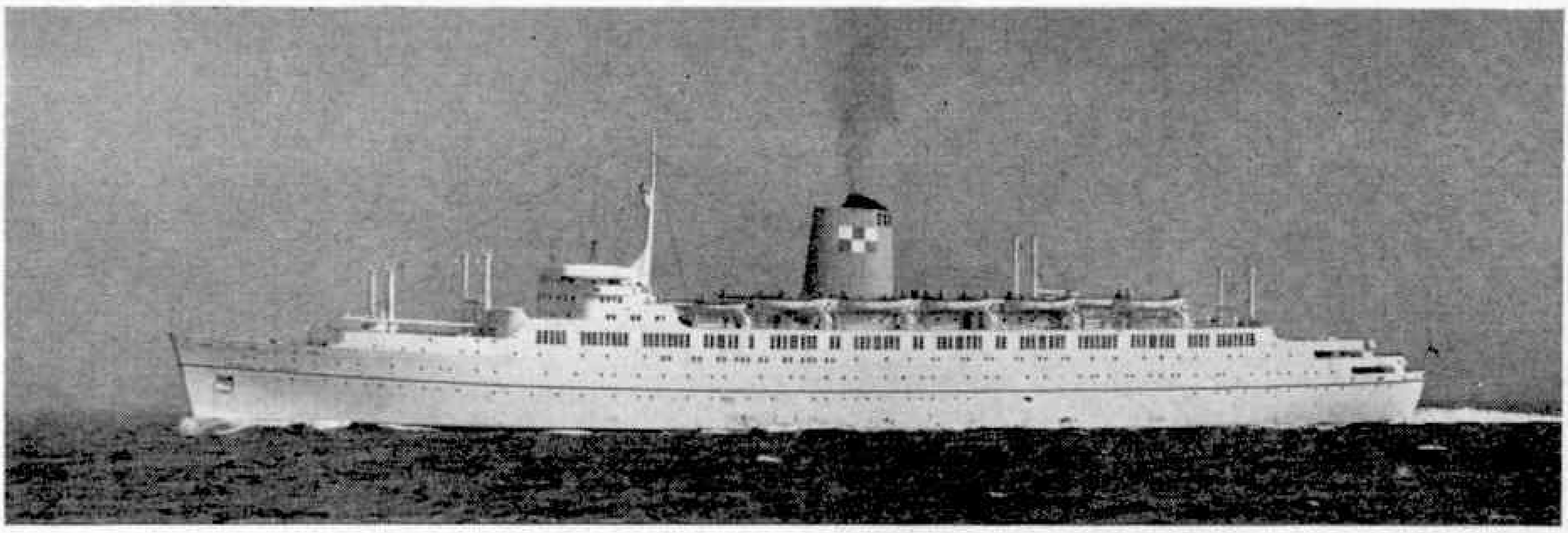
The new *Empress of Britain* has a gross tonnage of 26,000, whereas that of the previous bearer of her name was 42,350. She is 640 ft. in length, with a beam of 85 ft. and a depth of 48 ft. Her normal draught is 29 ft., and her service speed is 20 knots. She is splendidly fitted and provides accommodation for a total of 1,050 passengers, 150 First Class and 900 Tourist, while her crew numbers 464.

A glance at the illustrations on these pages show how gracefully streamlined the new vessel is, from her raked stem to her cruiser stern. Her hull is gleaming white, with a green riband, plainly shown in the pictures, stretching on each side from stem to stern. Her boot topping, the part of her hull structure below the waterline, is seen to be green when the movement of the water reveals it, and a characteristic distinguishing feature is the red and white checkered house flag of the Canadian Pacific Line that is painted on each side of her funnel.

This funnel is worthy of a second glance, and indeed is so unusually shaped, compared with the funnels of liners of the past, that a second glance must always be taken. It is carefully streamlined, and in fact its form is the result of a long series of tests in the National Physical Laboratory, and the Aero Dynamics Laboratory of Great Britain. Many alternative forms were tried in wind tunnels before the actual shape of the funnel was decided. It is made chiefly of aluminium, for lightness, stiffened inside with steelwork to avoid the use of the stays necessary with older types.

Perhaps the most interesting feature of the *Empress of Britain's* funnel, however, is the centre ridge at the top. This is described as a cock's comb, and is also spoken of, rather irreverently, as the "fireman's helmet." Actually it serves a very useful purpose, for it has been carefully designed to keep smoke from the decks of the vessel, no matter what the force and direction of the wind. It is 6 ft. high, and the funnel's total height is 51 ft.

The mast also is interesting, as it is an integral part of the navigating bridge, and has no stays or guy wires. It carries a



This view of the graceful new liner shows her funnel, with its house flag marking and the "fireman's helmet" on top and the mast, which is integral with the bridge. C.P.R. photograph.

crow's nest observation post, which is heated and provided with glass for the protection of the lookout man, who is in direct telephone communication with the bridge.

One interesting feature of the *Empress of Britain* is that in profile she is low in comparison with recent ships of her own size. One result of this avoidance of the modern tendency to build the superstructure up helps to give the streamlined appearance that carries with it a suggestion of her speed.

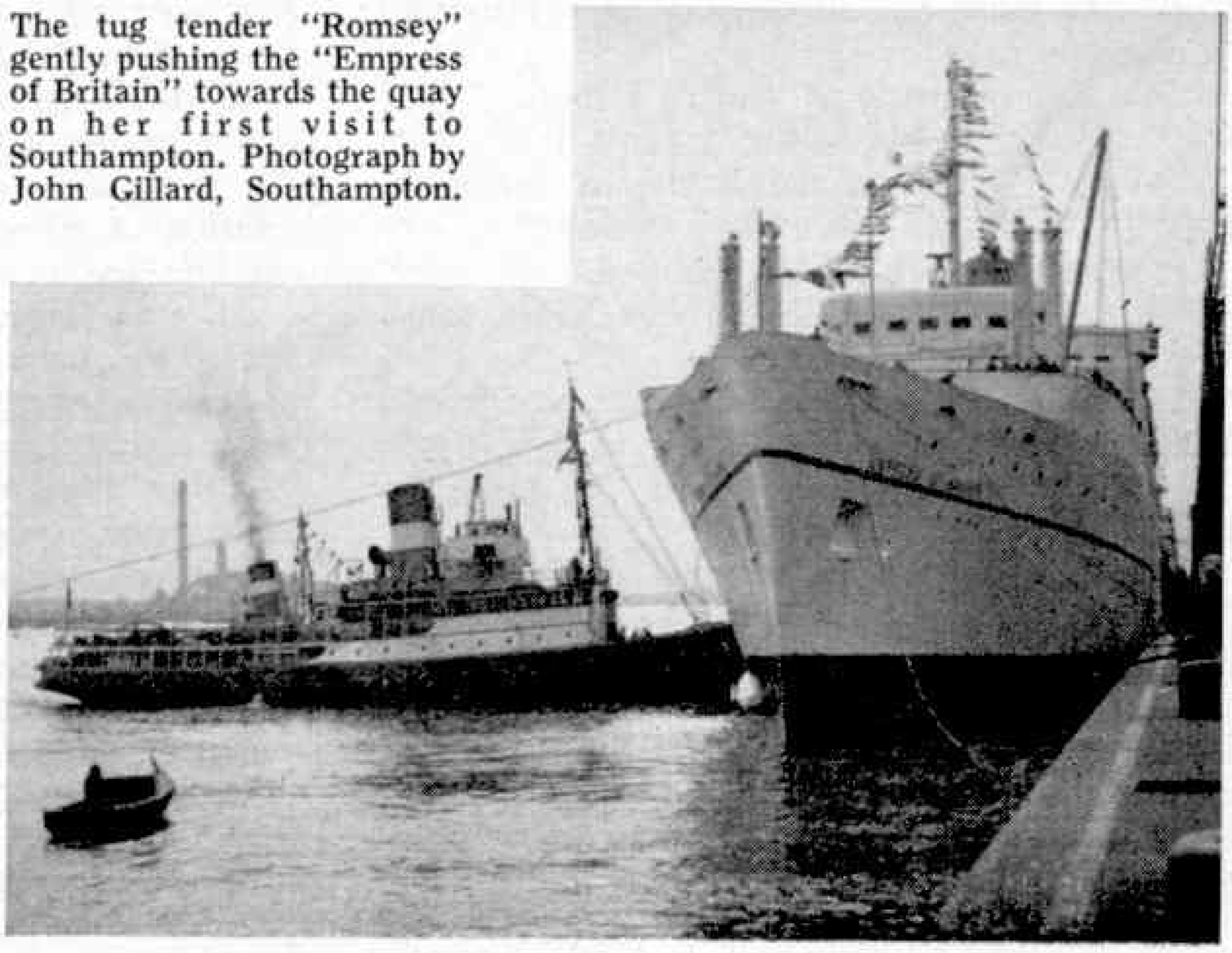
In design the vessel is a combination of transverse and longitudinal framing and in building her extensive use was made of welding. The frames in all cases are riveted, but with the use of welding on an extensive scale there are only four riveted seams on each side of the vessel. More than 7,500 steel plates, weighing 6,500 tons, were used in her construction and over a million feet of welding were incorporated in her hull.

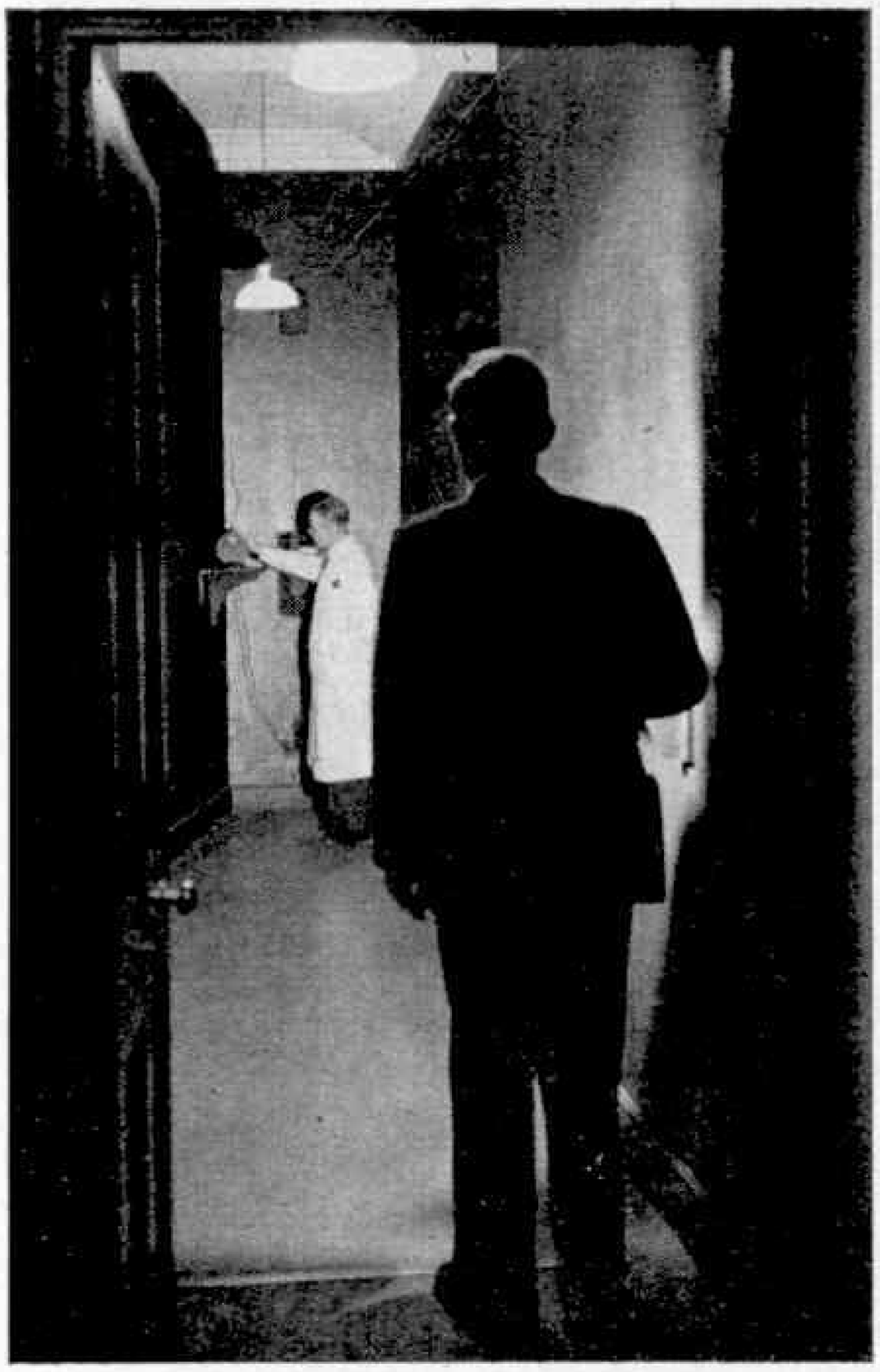
The *Empress of Britain* is propelled by double reduction geared turbines of 30,000 shaft horse power, operating through four-bladed twin screws each 19 ft. 6 in. from tip to tip. The main propelling units consist of high pressure and intermediate pressure turbines arranged in tandem, and a low pressure turbine. Both of the former are of the impulse type, while the low pressure turbine is of the reaction type. The Fairfield re-heat system is incorporated with a view to giving high efficiency. In this the exhaust steam from the high pressure turbine is returned to a re-heat boiler, where its temperature is raised to the 850 deg. F. at which it entered the high pressure turbine, before it is admitted to the intermediate pressure turbine. The machinery also includes a high pressure astern turbine; the low pressure turbine is of the double flow type, for use either when going ahead or going astern.

Steam is provided by two Foster Wheeler type controlled superheat boilers and one re-heat boiler. Each of these is designed for a steam pressure of 650 lb. per square inch and a temperature of 850 deg. F. The re-heat boiler is so arranged that it can supply superheated steam to the main range when the ship is steaming ahead at moderate or full power.

The steering gear consists of two units. With one unit in operation the rudder can be moved through its full movement of 170 degrees in 45 sec., and with both units in 25 sec., while steaming full speed ahead.

The tug tender "Romsey" gently pushing the "Empress of Britain" towards the quay on her first visit to Southampton. Photograph by John Gillard, Southampton.





Carrying out a distance test for colour vision. The illustrations to this article are reproduced from British Railways photographs.

Are You Colour-Blind?

By Leslie E. Wells

MY friend indicated his newly-painted house proudly.

"Did it myself," he said. "Do you like it?"

I blinked at the bright blue, so strident that it claimed attention a thousand yards away.

"You've painted it well," I said. "But the colour. A bit violent, isn't it?"

"What?" He regarded me in astonishment. "You call dove grey violent?"

It was my turn to be amazed.

"You think that's dove grey? Why, man, it's a brilliant blue."

It took some time to convince my friend that I was quite serious.

"If you're right," he said, "I must be colour-blind."

That, of course, was the answer, and he had lived nearly forty-five years without being aware of the defect. He is by no means alone in this. Colour experts of the British Physical Society say that some house-owners have painted their houses a bright blue in the belief that they were decorating them a pale green.

The great chemist Dalton, who had all the quiet tastes of the Quaker, once surprised his mother by giving her a pair of bright scarlet stockings for her sixtieth birthday! He was under the impression that they were grey.

Colour blindness is on the increase. So much so that the number of colour-blind men has risen from 3 per cent. to 12. Four out of every hundred men in Britain cannot distinguish between red and green. Women are less prone to colour-blindness, only one woman in every 200 being unable to decide which is which. Inability to make the distinction between red and green is the most dangerous form of colour-blindness. It is a hereditary defect, handed down from grandfather to grandson, and the daughter of a colour-blind man, though perfectly sighted herself, can transmit the deficiency to her sons.

How can you make sure that you are not colour-blind? Simply by applying to yourself what is known as the Holmgren Wool Test. There are now other tests, one of which is described later, that are more accurate and informative, but this is very simple, and calls for nothing more than some differently coloured pieces of wool and the presence of a friend who is not colour-blind.

The different colours of wool required for this test are light and dark green, fawn, orange, yellow, a variety of browns, blue, blue-green, purple, violet and light and dark red. Your friend holds up a green piece of wool and asks you to match it. You are required to pick out all the shades of green that are piled in a heap on the table.

If you have normal vision, you will make the selections unerringly, but if you are colour-blind the green will be "matched" with greys, browns and other drab colours.

Your next task is to match a piece of rose pink wool with the pieces on the table. If you have failed the previous test you will confuse this with wools that are blue, blue-green, grey and violet.

Finally, you are required to match a piece of bright red wool with other pieces of a similar shade. You will respond by selecting dark greens, olive green, browns and perhaps a dark grey. In this case, you are very definitely colour-blind and

will be quite unable to distinguish between red and green traffic lights.

Normally sighted persons who witness these tests on a colour-blind person find them really startling.

Another simple test is called the Ishihara, and for this you need a series of cards on which are printed many coloured dots of varying hues. Among them is a figure in a primary colour. A perfectly sighted person can see the figure plainly, but for the colour-blind the numerals are partly concealed in the dots and only part of them can be distinguished.

Because of this, the colour-blind person will announce that a figure **6** is a **5**, that an **8** is a **3** and that a **4** is a **7**. The numeral is merged in colours that he cannot distinguish; hence his errors in identifying the numbers.

It may seem surprising that many people go through life quite unaware that they cannot differentiate between colours. The reason for this is simple. During childhood they learn that grass is green, that the sky is blue and that tomatoes are red. Knowing that certain things have certain colours, when they think of these things they assume the colour although they cannot see it. And they learn to distinguish between green, blue and red more by the intensity of the shade than by the colour itself.

Testing colour vision with the Ishihara colour charts, as explained in this article.

Although colour-blindness is hereditary, it can be intensified. Some people find that, in later life, their colour-sense begins to decline. This is particularly true with those people who smoke a pipe, chew tobacco, take snuff or work in a tobacco factory. If they stop doing these things they find that, in as little as a week, there is a marked improvement in their powers to distinguish colours.

The danger of colour-blind men being employed on the railways is obvious. But all people use the roads, and the ability to distinguish between red and green is important to safety. Among the four million motorists in Great Britain there may be some 150,000 who cannot distinguish between a STOP and a GO signal except by its position on the post or by reading the words on the lights. The words, however, are only readable at a short distance. This means that these drivers are much more of a menace than the normally-sighted drivers. They are unable to see red, the form of colour-blindness now the most dangerous of all.

Happily, bulls cannot see red, either. They do not attack a person because he is wearing a scarlet garment and they don't like the colour. Bulls, like cows, cats, horses, dogs and sheep, are colour-blind. On the other hand, monkeys and apes can distinguish colours, and birds see all colours except violet. Flies can detect colour and are highly allergic to blue. Thus a room decorated in blue is almost certain to be free of flies.

Is there a cure for colour-blindness? Happily, there is in some cases, especially when the aberration is only slight. Recent tests have revealed that lack of vitamins A, B2 and C can impair colour sight. Cod liver oil and foods containing a high proportion of vitamin A are considered most beneficial for improving colour sense and give remarkable results if taken in sufficient quantities during adolescence.

Flying Weathermen

By John W. R. Taylor

AT this moment thirteen U.S.A.F. airmen are probably on their way to or from the North Pole in a specially-equipped Superfortress bomber to help in forecasting the sort of weather we shall have in the next week or so.

Thousands of miles to the south, another crew, flying from Bermuda, may be keeping track of a hurricane that would kill dozens of men and women if warning of its approach could not be given.

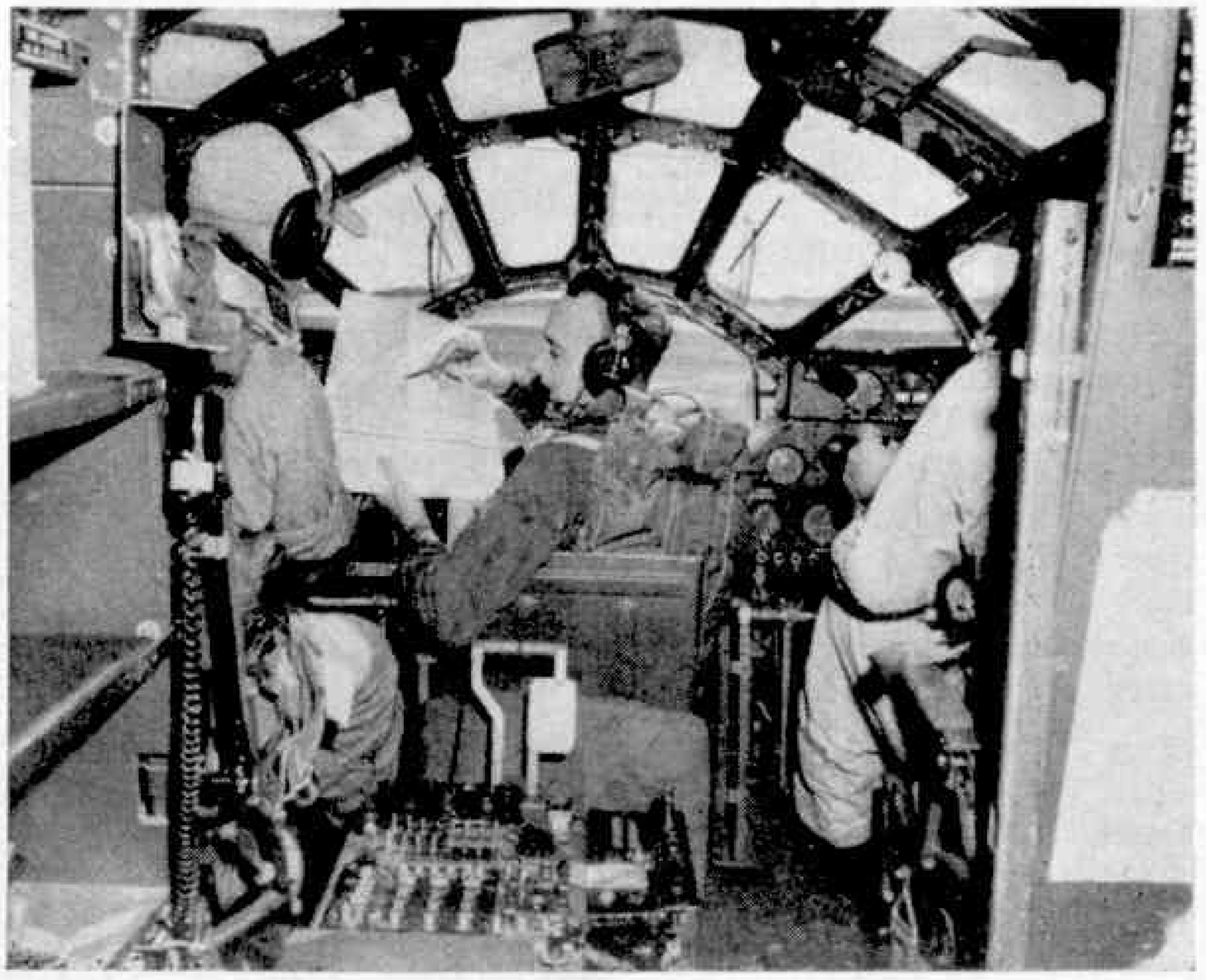
It was not until airlines began to span the world in the 1920's and 30's that accurate weather forecasts became of vital importance, so that pilots could avoid the danger of flying through storms. Since then, the sciences of aeronautics and meteorology have grown up side-by-side, with the help of new developments in radio and radar.

At first, when airline journeys were short, all that was needed was a radio message from the airport at the other end to say that weather conditions were all right. Even when routes became longer, weather stations could give pilots most of the information they wanted. Then came World War II, and the bomber fleets that set out from England could no longer be certain that good weather would await them over their target. Even worse, there was no assurance that the weather over Britain would not change, so that they would return, tired and with very little fuel in their tanks, to find their airfields hidden under a dense blanket of fog.

Such changes could turn a successful night's bombing into a tragedy as, one by one, the aircraft ran out of fuel and crashed. Accurate weather forecasting became a key to victory in the air, and the R.A.F. built up special weather reconnaissance units whose job was to fly out day after day, often far over the Atlantic, to discover what kind of weather was on the way. By 1944, the R.A.F. had 125 aircraft at work checking the weather around our coasts and *en route* to and over the chosen targets. When America entered the war, the U.S.A.A.F. too formed its first weather unit, which began experimental operations across the North Atlantic in 1943.

After the war, when airlines began flying regular transatlantic services, weather ships were stationed at intervals across the ocean: but surface stations cannot replace the flying weathermen. Already, air liners cross the Atlantic at a height of around 20,000 ft., to give passengers a smooth ride "over the weather." In 1958–59, when jet-liners enter service, they will fly at up to twice that height, taking advantage of the strong winds, including jet streams, that can add over 100 m.p.h. to their cruising speed.

The course of upper air winds cannot be mapped accurately by weather ships or land stations. Even the big meteorological balloons that go up to 100,000 ft., radioing back valuable data, are not always so useful as a piloted aircraft, whose crew can change course any time they wish. Furthermore, there will be a growing number of long-distance "great circle"



A weather observer seated between two pilots in the nose of a Superfortress of the U.S.A.F. Air Weather Service.

"Bermuda Sunshine," the first WB-50 Superfortress delivered to the U.S.A.F. Air Weather Service.

airline flights between Europe and the Americas, saving time, fuel and money by flying over the icy wastelands of the Arctic where there are few if any surface weather stations.

At the moment, the Arctic is important mainly as the shortest atomic-bomber route between the United States and Russia. A great chain of radar posts known as the DEW-line is being built along the fringe of the Arctic Circle across the whole breadth of the North American continent, and the Superfortresses that fly out every 48 hrs. on weather reconnaissance flights are part of a never-sleeping defence system. But, in time, all these military operations will benefit the airlines, just as wartime developments in radar ground control, jet engines, new aircraft metals and equipment have helped to make flying safer, faster and more comfortable for all of us.

Here several men of this Service are seen at one of the North Pole caches set up by the American explorer, Robert E. Peary.

Most of the aircraft used for weather reconnaissance are four-motor bombers or transports, because they must carry fuel for a very long range and be roomy enough for their crew-members to move around checking and operating a lot of special equipment. The R.A.F. uses Hastings Met. Mk.1 aircraft, similar to the Hastings troop-carriers of Transport Command. The U.S.A.F. and U.S. Navy use mainly versions of the B–50 Superfortress and Super Constellation, with a number of six-jet RB–47K Stratojet bombers now entering service as dual-purpose weather-photo-reconnaissance aircraft.

The U.S.A.F.'s Air Weather Service machines are stationed at Guam, Tokyo, Sacramento (California), Burtonwood (England), Bermuda, Hawaii and Fairbanks (Alaska), and there is no hour of the day or night when at least one of them is not gathering data in the huge air masses over oceans or the Arctic, where much of the world's worst weather is born.

Typical are the routine daily "Lark Foxtrot" flights made by WB–50 Superforts of the 55th Weather Reconnaissance Squadron from McClellan Air Force Base, Sacramento. Taking off at 8 a.m., they fly west past the Golden Gate bridge to the Farallon Islands, then follow a N.W. heading for 800 miles, during which they climb to 18,000 ft., and finally complete a triangular course back to base. At 100-mile intervals the meteorologist takes readings from his instruments, and these are radioed back to San Francisco. Four times during the 14-hr. flight he releases a dropsonde—a small radio transmitter which floats down slowly under a parachute, transmitting data on the temperature, humidity and pressure of the atmosphere at every level.

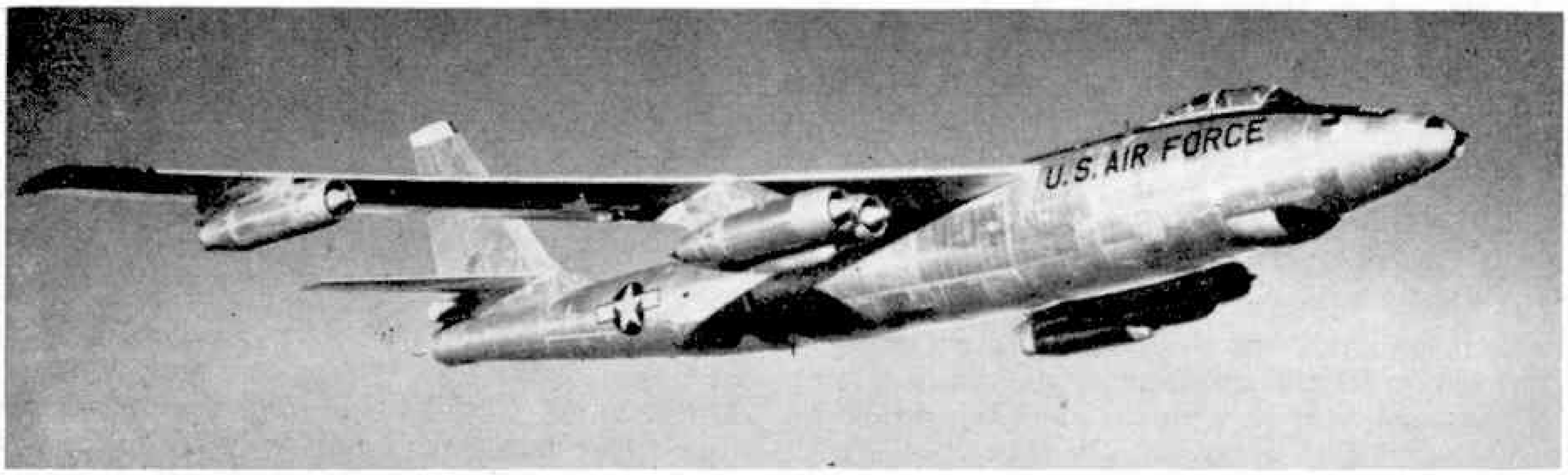
In this way, a single WB–50 can do the job of 27 surface weather stations. The data it radios back are flashed to weather bureaus and weather-map makers all over the world, affecting the lives of people in every walk of life, from the airline pilot who plots a new course around a storm to the housewife who takes an umbrella when she goes shopping.

Even the flights over the North Pole are mere routine for crews of the 58th Weather Reconnaissance Squadron at Fairbanks, who have become immune to ice fog, spinning compasses and horizonless instrument flying in more than 1,700 polar missions. During their 16-hr. journeys on the 4,000-mile "Ptarmigan" route they fly through the weather factory from which emerge the cold air masses that can produce a dangerous squall along the Atlantic seaboard of America or a blizzard that will bring death and disaster to the eastern States.

Yet even their flights are less dangerous than some of those made from the warm and beautiful island of Bermuda or from Guam during the hurricane and typhoon seasons, for the Air Weather Service crews deliberately fly their aircraft into the storm areas to measure the force of the winds and plot their course. The following extracts from a report of such a flight by Major Leland Farnell, skipper of a Superfort from Guam, gives an idea of what can happen:

"The weather was very good until we were within 150 miles of the forecast position of the storm. We then encountered moderate to severe turbulence and lightning flashes. The 'eye' of the typhoon was shown by our radar to be about 30 miles in diameter. It was approaching sunset and we planned to circumnavigate the eye. But three minutes after taking a new heading we entered the most severe turbulence we have ever encountered, read about or heard about.

"For the next seven minutes, we three pilots had our hands full. We attempted to fly straight, keep our airspeed around 200 m.p.h. and gain some altitude, but it was difficult to read the instruments and we varied from 160 to 260 m.p.h. The altimeter showed 4,300 ft., but radar told us we were down to 1,500 ft. and probably lower. The gust velocities were so great that a good grip on the controls was difficult and the aeroplane seemed to be coming apart.



An RB-47K Stratojet making its maiden flight. These Boeing swept-wing, 600 m.p.h., dual purpose weather-photo-reconnaissance aircraft are now going into service with the U.S.A.F. Strategic Air Command.

"There was a great amount of water around the cabin, and once we thought we were in the ocean. How close we came we will never know, because the weather observer had a difficult time staying in his seat and was little help in giving us our true altitude. We called for more power and the third pilot managed to increase the r.p.m. on one of his 'trips' between the ceiling and the floor."

That is only part of what happened in the longest seven minutes of Major Farnell's life. When the Superfort was inspected next day, its fin was buckled, the skin was cracked on the wings and rivets were pulled in the fuselage, wings and tail. Yet it still flew.

The value of the reports radioed back from such operations are obvious. When a typhoon of average size caught units of the U.S. Navy without warning off Luzon in December, 1944, three destroyers capsized, 790 men were lost, 28 other ships were heavily damaged and 156 aircraft smashed aboard wildly-plunging aircraft carriers. Today, weather reconnaissance would almost certainly give the ships sufficient advance warning for them to

(*Continued on page 440*)

A Famous Canadian Lift Lock

By James Montagnes

A CANADIAN hydraulic lift lock that takes motor boats, small cargo boats and sail boats 65 feet up in the air is believed to be the highest hydraulic lift lock in use anywhere in the world. It is in use at Peterborough, Ontario, Canada, to allow small vessels to travel between Lake Ontario and the Georgian Bay along the Trent Waterway, a distance of 240 miles.

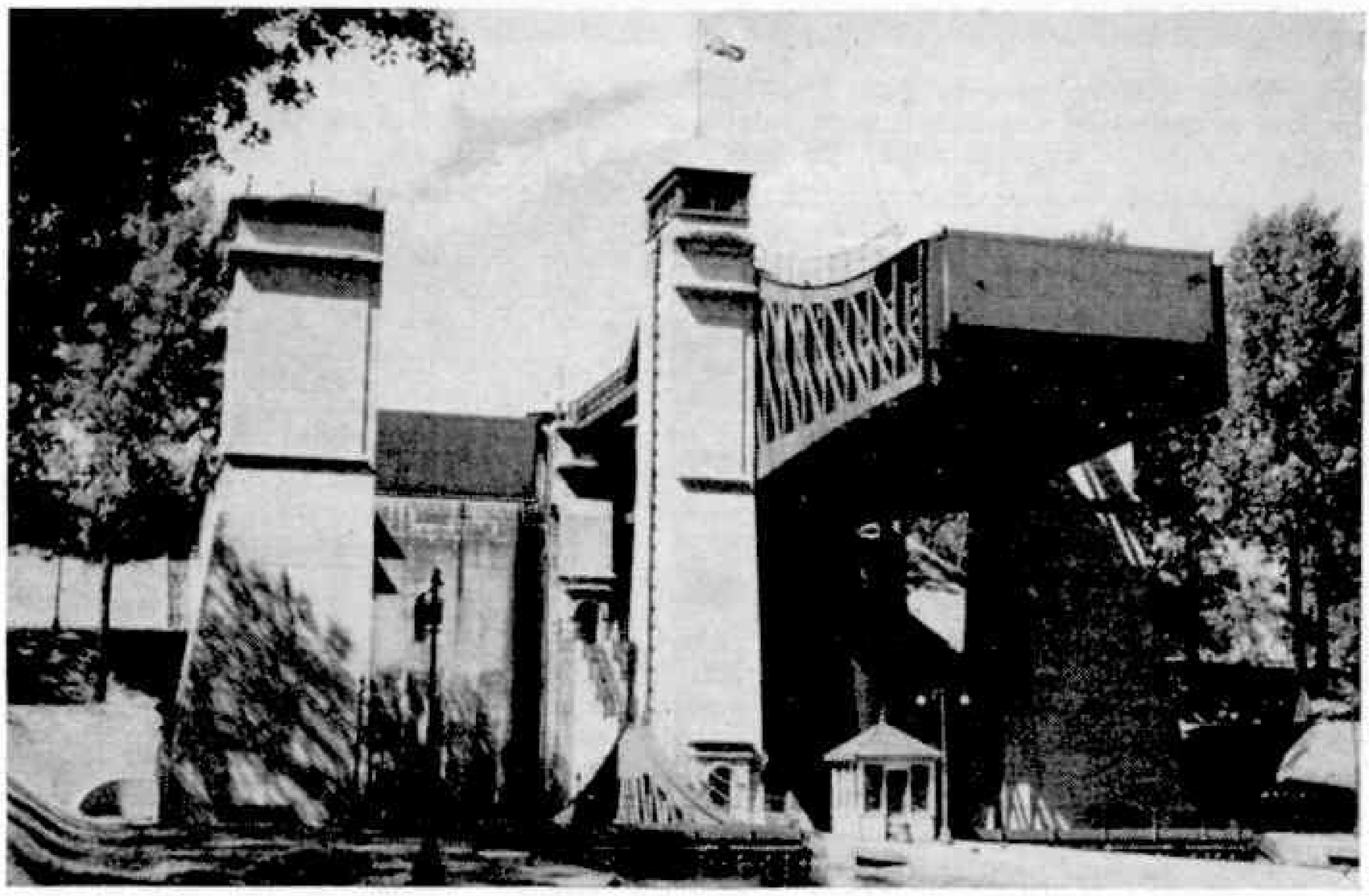
The lock was built early this century and has been in constant use. In its early days more commercial traffic was lifted on it than at present, when most of the traffic is summer pleasure boats. It elevates or lowers boats from one stretch of the Otanabee River to another, and can take vessels up to 140 feet in length in either of its two chambers, which are 33 feet wide and almost 10 feet deep.

The two chambers are raised or lowered by hydraulically operated cylinders 8¼ feet in diameter. They will raise or lower the water-filled chamber and boat the full 65 feet in a minute and a half.

From the time a boat enters the lock until it reaches the upper level, or the lower level as the case may be, the entire operation takes 12 minutes. In this time the lift chamber is filled with water, the boat goes into the lift chamber, the gates are closed, and the hydraulic ram lifts or raises the entire chamber. As the lift goes up or down, water cascades in a shower from one end of it. The lift chamber cannot be totally sealed against water leakage.

The Peterborough lift lock is located in a park with grass plots and numerous trees. It is easily seen because of the three concrete pillars that house the machinery and have the two lift chambers placed between them. The central tower has a glass-enclosed operating room, from which the engineers raise or lower the two chambers.

A boat lift that formerly worked in the same way as that at Peterborough is to be seen at Anderton, in Cheshire. This was opened in 1875 to connect the River Weaver with the Trent and Mersey Canal. The latter is 50 ft. 4 in. above the river, so that the lift was not as high as that at Peterborough. It continued to be operated hydraulically for 30 years or so, and was then rebuilt as an electric lift. The tanks in which the boats are carried are smaller than those of the Peterborough lift. A curiosity of this lift is that it is built on an island in the river, reached from the canal by an aqueduct 162 ft. long.



The lift lock at Peterborough, Ontario, is believed to be the highest of its kind in the world. It raises barges through a height of 65 ft.

It is interesting to compare both these boat lifts with one at Niederfinow, in Germany, which is a more modern structure. It was opened in March, 1934, and is the largest in the world. It is designed to deal with barges up to 1,000 tons in displacement and lifts these to a height of 116 ft. in five minutes. Thus it is considerably higher than the lifts at Peterborough and at Anderton, but it has always been electrically operated.

An elderly Midland 0-6-0, B.R. No. 43222, at the head of the special train on the occasion of the Stephenson Locomotive Society Rail Tour referred to on this page. Photograph by J. S. Davies.

Railway Notes

By R. A. H. Weight

King's Cross to Euston 267 Miles!

The two great London termini, King's Cross and Euston, are less than a mile apart, but I recently travelled from one to the other in a circular tour special train that covered 267 miles in the process! The tour was organised by the Stephenson Locomotive Society for members and friends. Our route and our locomotives were fascinatingly unusual.

Starting from King's Cross behind an ex-G.E.R. rebuilt "Claud Hamilton," D16/3 4–4–0 No. 62605, brought up specially from Cambridge, we travelled down the main slow line to Wood Green, and were then diverted by way of a flying junction to the suburban and loop route through Enfield Chase and Hertford North back to the East Coast main line south of Stevenage, making the first stop at Hitchin.

From Hitchin the former Midland single line branch was followed to Bedford, crossing on the level the L.M.R. Bletchley-Bedford-Cambridge tracks. Now on the St. Pancras main line for a short distance, we followed the northbound *Thames-Clyde Express* with Jubilee 4–6–0 *Sierra Leone* at its head, and then off the Northampton branch went on to the lengthy single-track "S.M.J." or one-time independently owned Stratford-upon-Avon and Midland Junction Railway, now used for freight only and never much in demand as a passenger route. We crossed over or under the Euston, Marylebone and Paddington-Birmingham main lines, seeing a King go up with a 12-coach express on the last named, noting several existing or now defunct junction tracks and a number of 0–6–0 W.D. tanks by Edge Hill Military Depot. After a pause at Shakespeare's Stratford, the elderly Midland 0–6–0 that took us 107 miles from Hitchin to Birmingham, with stops to change train staff and negotiating many gradients and curves through pretty country, ran on past Redditch to the L.M.R. main line at Barnt Green and so into busy Birmingham, New Street.

A new B.R. class 5 4–6–0, No. 73099, stationed at Patricroft, Lancs., took us along the London main line to Coventry, which was rejoined at Rugby after a diversion through Leamington Spa. Following delays due to track repairs and awaiting regular expresses, travel at some 70–75 m.p.h. down from Tring concluded a jolly day.

New Engines Added to Stock

B.R. 2–6–4Ts numbered 80135–6 have joined others at Plaistow shed, 33A. The next two completed at Brighton, while running-in, were on through Midlands and local trains at Eastbourne or Hastings during June.

More 2–10–0s for 18A, Toton, were Nos. 92079–81, and for 15A, Wellingborough, Nos. 92082–4. W.R. 0–6–0T No. 3406 has been delivered by the Yorkshire Engine Co. Ltd. With others of the series No. 3404 has been assigned to 88B, Cardiff East Dock.

New six-wheeled diesel-electric shunters include Nos. 13304–6, stationed at 34E, Neasden, and 13307–8, 34A, King's Cross; six-wheeled diesel-mechanical No. 11140, 30F, Parkeston, Nos. 11144–6, 6C, Birkenhead and No. 11157–8, 35A, Peterborough.

E.R. Locomotive Performance

Hauling a special Pullman car and corridor circular tour express filled with enthusiasts, mainly of mature age, and named for the occasion the *Pennine Pullman*, making a load of about 385 tons behind the tender, the famous streamlined Pacific *Silver Link*, on unfamiliar ground took us from Marylebone to Sheffield by way of High Wycombe and Leicester where a stop was made before time. Running was very fast for that route after restarting, and Nottingham (Victoria), 23½ miles was passed in 23½ min.

On to Sheffield there are many gradients and speed restrictions, but time was in hand. Up the long climb to the new Woodhead Tunnel, Co:Co electric locomotive No. 27002 was the impressive steed, maintaining round about 56–58 m.p.h. steadily, far higher than I have ever recorded behind a steam engine. From the outskirts of Manchester we ran over a considerable stretch of L.M.R. line, with stops, climbs and curves, affording an astonishing variety of hill, moorland, valley and industrial scenery, round to the E.R. Rotherwood Sidings, near Sheffield. Two ex-Great Central Director 4–4–0s, *Princess Mary* and *Prince of Wales*, were capably in charge.

From Rotherwood *Silver Link* was again in front. From a restart on the junction curve north of Retford, a main line non-stop run was made to King's Cross, 138¾ miles in 148 min. as booked, including some 8–9 min. lost by signal or track-repair slowings and a sustained maximum speed of 90–91 m.p.h. The total journey from Marylebone to King's Cross was no less than 442¼ miles!

Friends have told me of many time-gaining runs and early arrivals at King's Cross and elsewhere, and of a good standard of average punctuality by other than express trains when travelling and observing between London and Doncaster or beyond during May or June. Among fast long-distance trains were the *Tees-Tyne Pullman*, which averaged about 65 m.p.h. for 227 miles southbound and was well ahead of its mile-a-minute booking on different days when the respective A4 engines were *Sir Nigel Gresley* and *Walter K. Whigham*. The heavy *Flying Scotsman*

gained considerably on schedule and averaged 60½ m.p.h. from Grantham to Finsbury Park hauled by *Silver Link*, and made up some time between Newcastle and Grantham, as well as south thereof with A3 original Gresley type Pacifics in charge, on the winter timing.

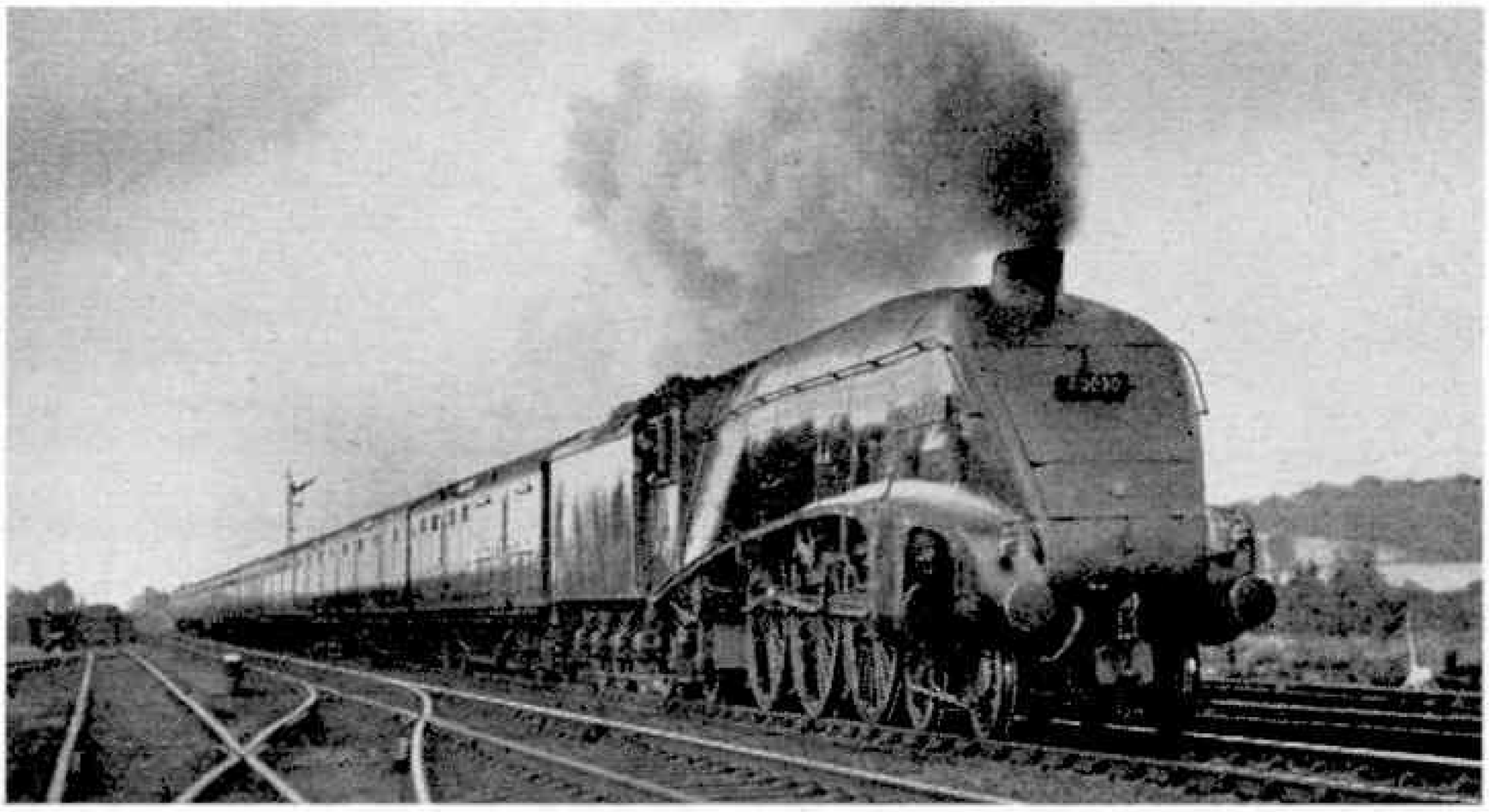
On the first day of its summer accelerated non-stop run from Newcastle to King's Cross, the *Flying Scotsman* hauled by *Mallard* was ahead of time, as were a number of southbound principal trains including the *West Riding* and *Yorkshire Pullman*, worked by A1s *Kittiwake* and *Osprey*, respectively, and the 12.55 arrival from Hull and York, last stop Doncaster, by V2 No. 60889.

Expresses Away Every Five Minutes

Of London termini, Paddington handles the largest number of ordinary day express and main line steam trains, so that there are a good many busy periods with a number of arrivals and departures within, say, one hour, round about 11.0 a.m., 6.0 p.m. and so on. The current time table shows an exceptional batch of departures of this kind, however, as during the holiday season a long-distance train leaves every five minutes from Mondays to Fridays between 8.45 and 9.15 a.m. The series begin with the *Bristolian*, which is followed at 8.50 and 8.55 by South Wales expresses, the *Inter City* to Birmingham and Wolverhampton at 9.0, and trains to Bristol at 9.5, Birkenhead at 9.10, and Taunton semi-fast via Bristol at 9.15. With the exception of the 8.50, these are regular all-the-year services, though there are variations on Saturdays, when many additional summer expresses operate but there is less demand for fast businessmen's trains.

There are instances of long-distance arrivals and departures at approximately 10-minute intervals during busy times of the day at several of the other principal termini as well as Paddington.

Cheltenham Spa Express is now the title of the 8 a.m. from Cheltenham and the 4.55 p.m. down.



A fine view of the down "Flying Scotsman" leaving Welwyn Viaduct, with A4 No. 60030 "Golden Fleece" in charge. Photograph by M. W. Earley.

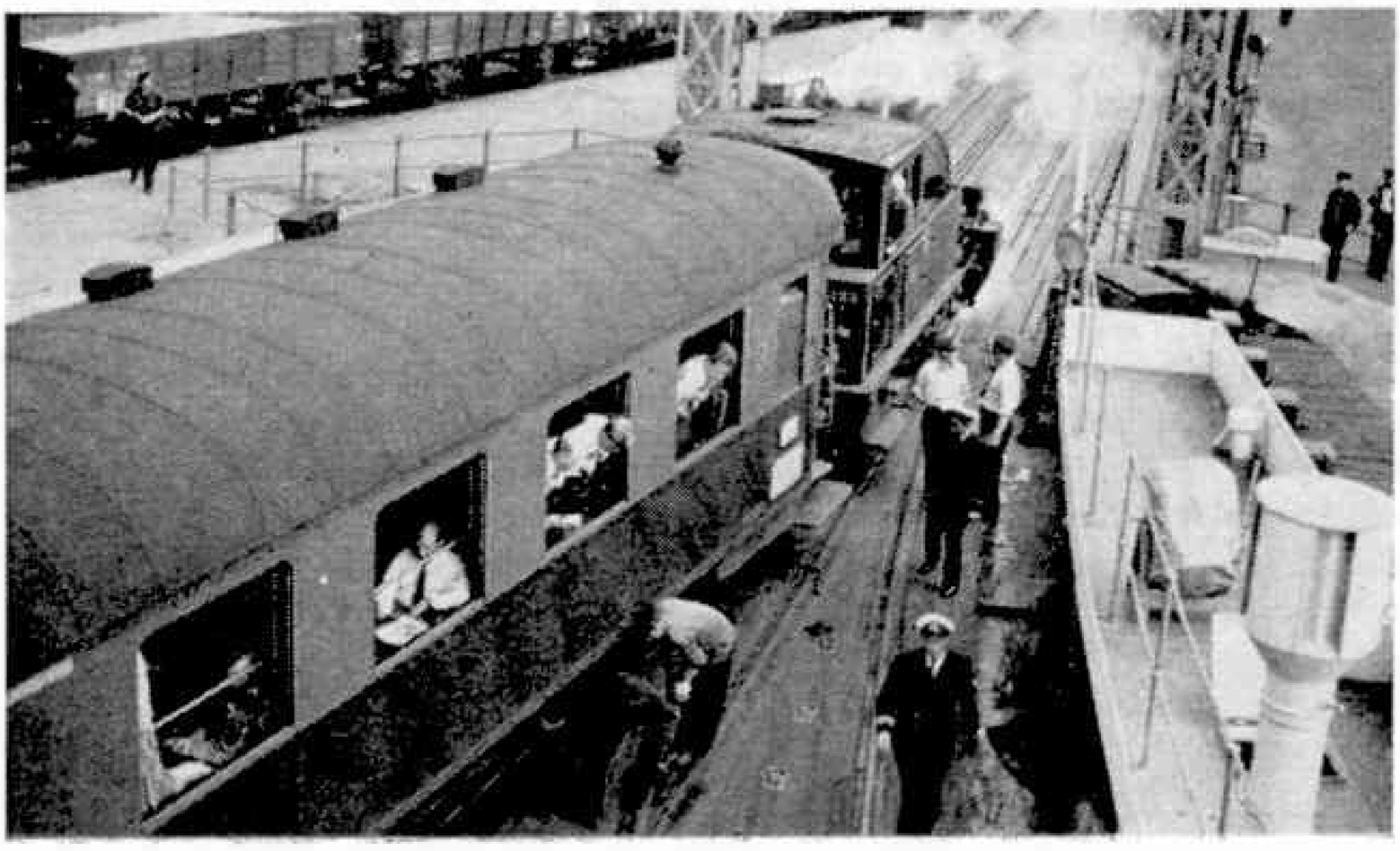
Locomotive Royal Occasions

As announced previously more of the larger express and mixed traffic locomotives are being painted green, especially at Swindon, but it was rather surprising though gratifying to learn that the W.R. 2–6–0s Nos. 6372 and 6385 smartly turned out to haul the Royal train to Barnstaple over a North Devon secondary line in May were also green and were lined out. Several S.R. N. class Moguls in pairs, in the customary black finish, hauled the special train during that tour, including Nos. 31830 and 31845.

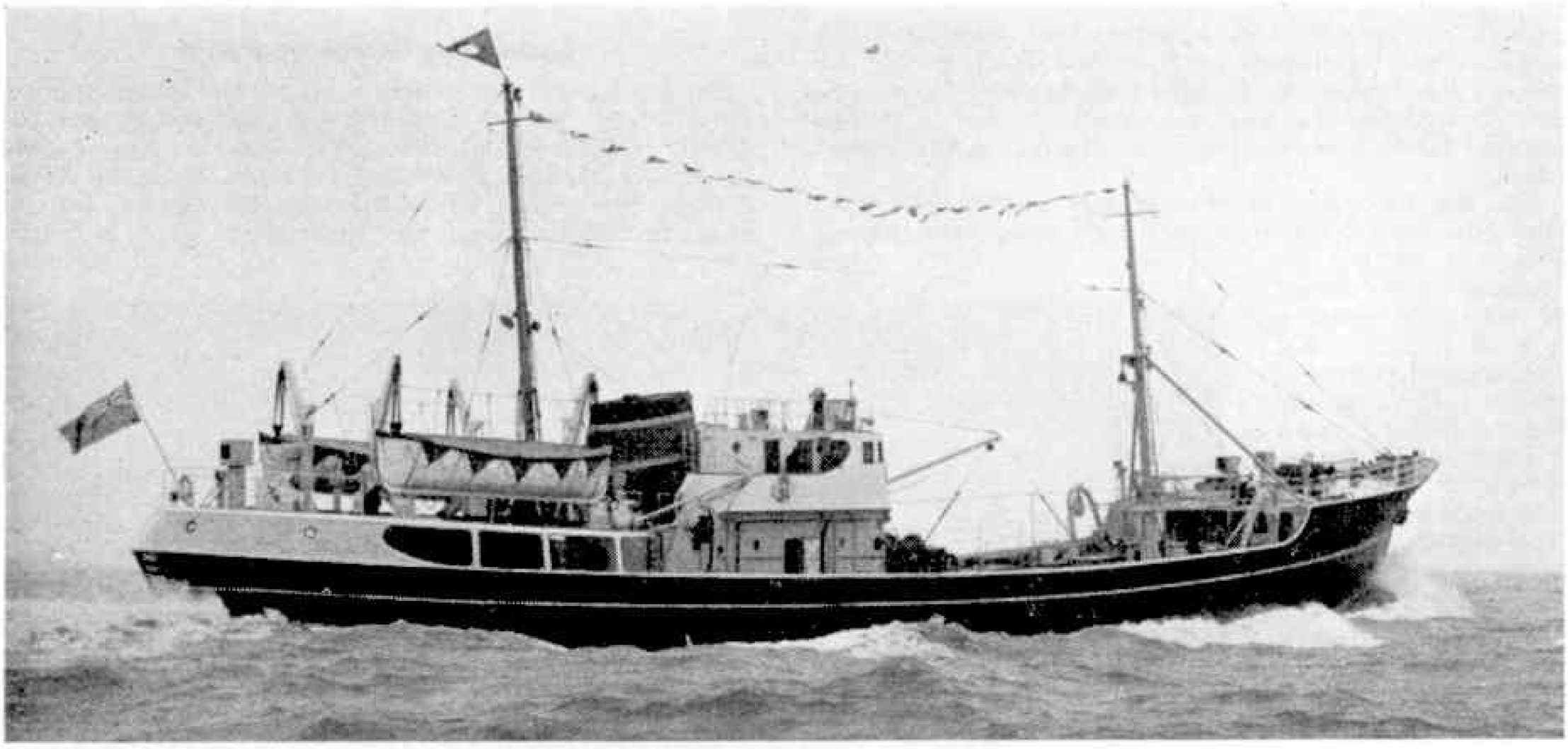
A4 Pacific *Sir Nigel Gresley* took H.M. The Queen's train, formed largely of the same L.M.R. rolling stock and including day and night saloons, from King's Cross to York early in June on the way to the North East coast. A reader reported recently that Brighton built 2–6–4T No. 80110 was frequently on Scottish Deeside trains between Aberdeen and Ballater, the station for Balmoral Castle.

British Railways' New Badge or Totem

Commencing with 70016 *Ariel*, a Britannia 4–6–2 attached to the Western Region lately overhauled at Crewe Works, locomotives are, when repainted or new, displaying a more impressive badge depicting the British lion holding between its paws a silver locomotive wheel. The design includes an heraldic crown of gold, on which are arranged the rose, the thistle and the leek, and the oak-leaf, as representative of the whole of Great Britain. Power coaches and certain passenger stock will carry the same badge.



A Belgian Composite Coach forming part of the southbound "Nord Express" being propelled on to the Great Belt Train Ferry at Korsor, Denmark, for the voyage to Nyborg, on the island of Funen. The engine is Danish State Railways 0-6-0T No. 493. Photograph by J. C. W. Halliday.



The "Pioner"

Trawlers for Russia Built at Lowestoft

By the Editor

NO, there is nothing wrong with the spelling of the name of the ship seen in the picture at the head of the page. She is a Russian vessel, and I am sorry that I cannot reproduce her name in Russian characters, for then you would see that in a way the curious name is just a representation of the Russian form, which can be distinguished on the stern of the vessel in the upper picture on the opposite page, but unfortunately is too small to be clearly made out.

The *Pioner* is the first of 20 diesel-engined trawlers that are being constructed by Brooke Marine Ltd., Lowestoft, to the order of B/O Sudoimport, U.S.S.R., and is the first vessel to be built in the United Kingdom by contract from Moscow. The value of the 20 vessels comprising the order is about £6,000,000, and Brooke Marine Ltd. built an entirely new shipyard at Lowestoft in order to carry it out.

The fine vessel seen in the illustration at the head of the page is the motor trawler "Pioner," the first of 20 being constructed for the U.S.S.R. by Brooke Marine Ltd., Lowestoft. The trawlers are designed to work on the icy waters of the Barents Sea. This and the other illustrations on these pages are reproduced by courtesy of Brooke Marine Ltd.

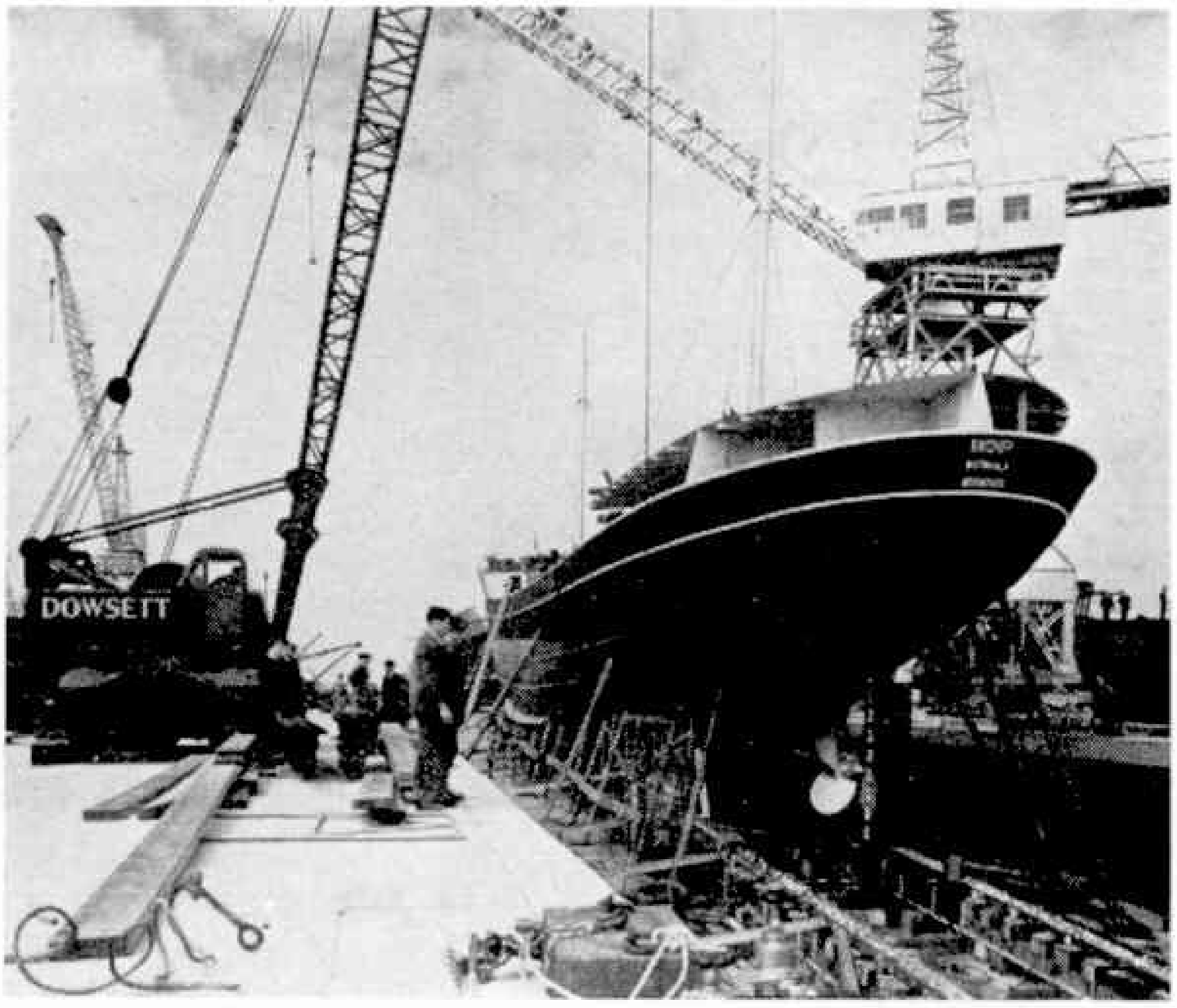
The trawlers are designed for operation in the White Sea and in the Barents Sea. Ice is the enemy of trawlers fishing in these northern waters, so the greatest care had to be taken to ensure the stability of the vessels if they become iced up. The weight of masses of ice on the decks and superstructures of trawlers has been responsible for several losses of trawlers in Arctic waters. To make sure of averting such disasters the Russian trawlers are being built to allow for an additional top weight of 20 tons of ice, as well as for the weight of wet nets on the decks and heeling movements due to wind pressures. In addition, steam valves and hoses are provided at various points along the deck for use in melting ice forming there. The hull of the vessel, the rudder, shafting and propeller have been specially strengthened for safety during navigation in ice, and other special steam de-icing arrangements also have been installed.

The *Pioner* is of the flush deck type, and has four watertight and two oiltight bulkheads. These separate the large fish holds, two in number, the tanks in which oil for the diesel engines and for the boilers is carried, the fish processing plant, the engine room and the crew accommodation. There are also double bottom tanks beneath the fish holds in which additional diesel oil and fresh water supplies are carried.

The full length of the *Pioner* is 189 ft. 9 in., and her moulded breadth and depth

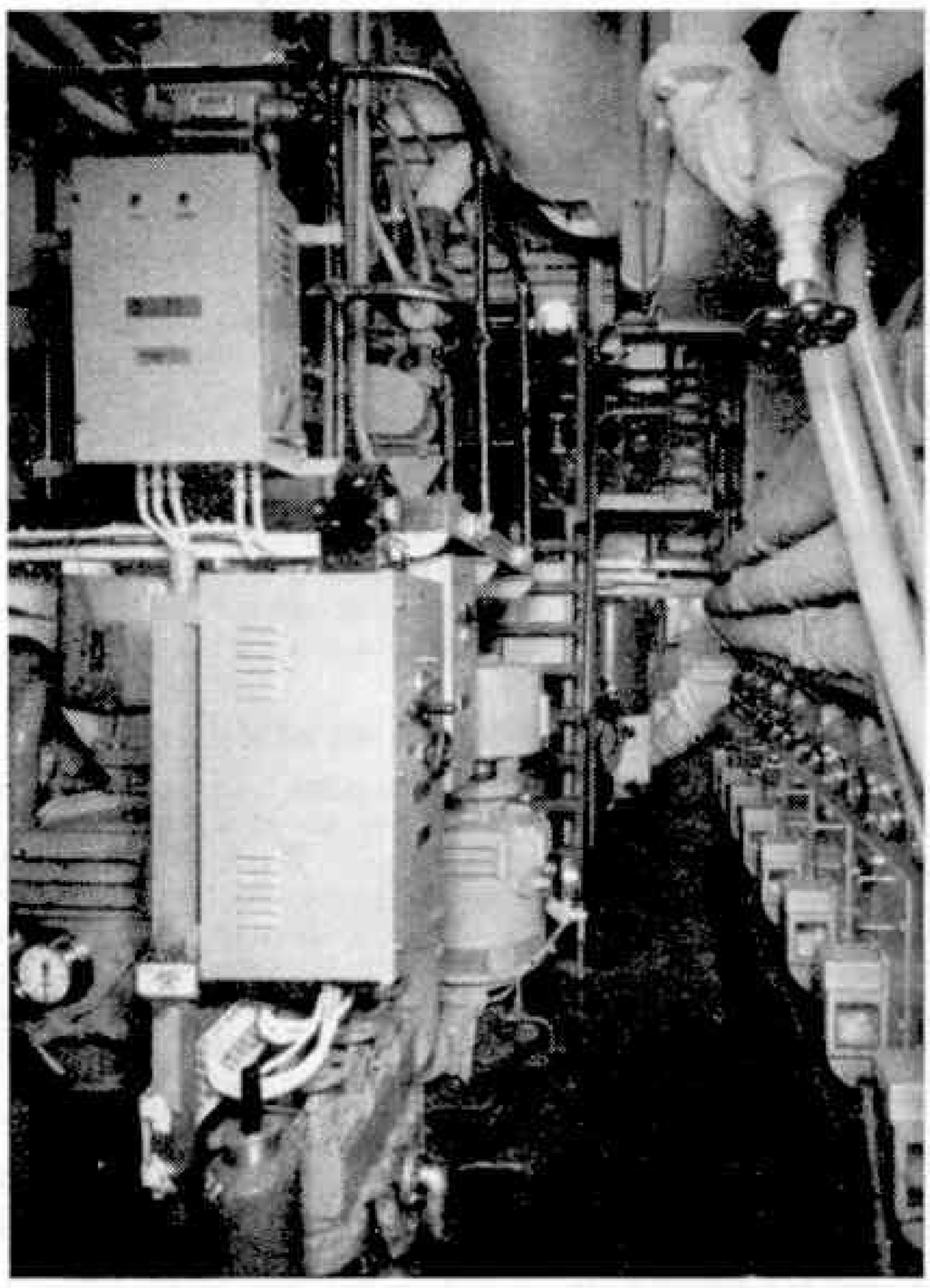
are 32 ft. and 16 ft. respectively. The rudder is streamlined and semi-balanced, and electro-hydraulic steering gear is fitted. This allows for steering either by power or hand from the bridge. Aluminium alloy lifeboats are carried, and the superstructure too consists of this material.

The accommodation for officers and crew is of a very high standard, and indeed can be described as luxurious. All external walls of the living accommodation and those alongside cold spaces have been insulated, and hot air is provided to maintain a temperature within the vessel of 64 deg. F. when the air temperature outside is as low as 54 deg. F. below freezing point.



The "Pioner" under construction in the fine modern shipyard built at Lowestoft by Brooke Marine Ltd.

The captain has a fine suite on the bridge, where the chief engineer also is accommodated, and for the ten officers there are four double rooms and two single rooms on the lower deck aft. The crew are accommodated forward, and here again cabins are provided, with two or four berths. The mess rooms for officers and crew are in the deckhouse aft, and the upper part of the bulkhead between them can be removed to transform the combined space into a large room for use as a cinema. The galley, which is aft of the crew's mess, is well equipped, with an oil fired cooker having ovens capable of baking about 450 lb. of bread a day.



In the engine room of the "Pioner." Part of the main engine is seen on the right.

The trawl is operated by means of an electric winch fitted on deck. This has two barrels, each capable of holding 1,200 fathoms of 3 in. wire rope. The winch motor develops 175 b.h.p. at 600 r.p.m. Automatic guiding gear is provided for each barrel, and the motor has a magnetic brake with a hand release lever, for which extended control to the wheelhouse above is provided.

Provision of space for the catch of course is of great importance in a trawler, especially one that may make lengthy voyages. The two fish holds of the *Pioner*, are capable of storing nearly 15,000 cubic feet of fish. They are well insulated and each is divided into sections, or pounds, by corrugated aluminium boards that are fitted into slotted aluminium posts and are interchangeable. The refrigeration plant maintains the required temperature automatically, and each hold has in it a thermometer that gives distant readings of temperature on gauges in the wheelhouse.

(*Continued on page 440*)

Air News

The picture above shows the first of six Folland Gnat lightweight fighters ordered by the Ministry of Supply.

By John W. R. Taylor

Gnat Ready for Service

The first of six Folland Gnat lightweight fighters ordered by the Ministry of Supply for evaluation flew on 26th May last. Illustrated above, it was built in less than nine months after the contract was placed, and can be distinguished from the prototype by its slightly deeper fuselage, standard Fighter Command camouflage and the two 30 mm. Aden guns which are mounted so that they fire through the leading edge of each air intake duct.

At its present stage of development, the Gnat's Bristol Orpheus turbojet gives about 4,000 lb. thrust; but the Mark 3 version will develop 4,850 lb. thrust, which will make the Gnat supersonic in level flight. It will almost certainly be built in India, and several other foreign air forces are reported to be on the point of placing production orders for the standard Gnat or its carrier-based development.

Railway Survey

As part of the British Transport Commission's 15-yr. £1,200 million scheme to modernise British Railways, Fairey Air Surveys Ltd. have been awarded a contract for aerial mapping of 19 railway stations and many miles of track in the Southern and Eastern Regions.

Flying operations started in the spring of this year, and the speed of air survey methods is shown by the fact that all mapping is due to be completed early in 1957. The track is being photographed from a height of about 1,500 ft., to provide maps to a scale of 1:1,250. Surveys of the stations will be drawn nearly three times as large, to a scale of 40 ft. to the inch, from photographs taken at about 1,200 ft. The maps will be used to plan new sections of track.

More Pioneers for R.A.F.

Following the successful use of Scottish Aviation Pioneer aircraft to carry troops and supplies into jungle forts in Malaya, the R.A.F. is forming two more Pioneer squadrons at Dishforth in Yorkshire and at Aden. Their main job will be to transport troops of the Army Strategic Reserve, which is specially trained for Colonial internal security and police duties.

Helicopters will still be used when vertical take-off is essential; but the five-seat Pioneers need little more room to take off and land than a helicopter and have much better performance and payload. What is more, they can themselves be taken to pieces quickly and flown to an overseas scene of operations aboard the Blackburn Beverley freighters now coming into service with Transport Command.

The Aden unit will probably be re-equipped eventually with twin-engined Twin Pioneers, which have the same quick take-off ability as the Pioneer but can carry up to 16 troops or 3,000 lb. of freight.

Spot the 440

The first of the new Model 440 Metropolitan versions of the Convair-liner have been delivered and can be seen at London Airport in the insignia of Finnair, S.A.S., Sabena and Swissair. Externally, they look little different from the Convair-340, except that they have a single letter-box-shape exhaust outlet at the rear of each nacelle instead of the twin circular pipes on the earlier machines. The re-designed engine cowling and other detail improvements give a 5 m.p.h. increase in cruising speed and reduced noise level in the cabin.

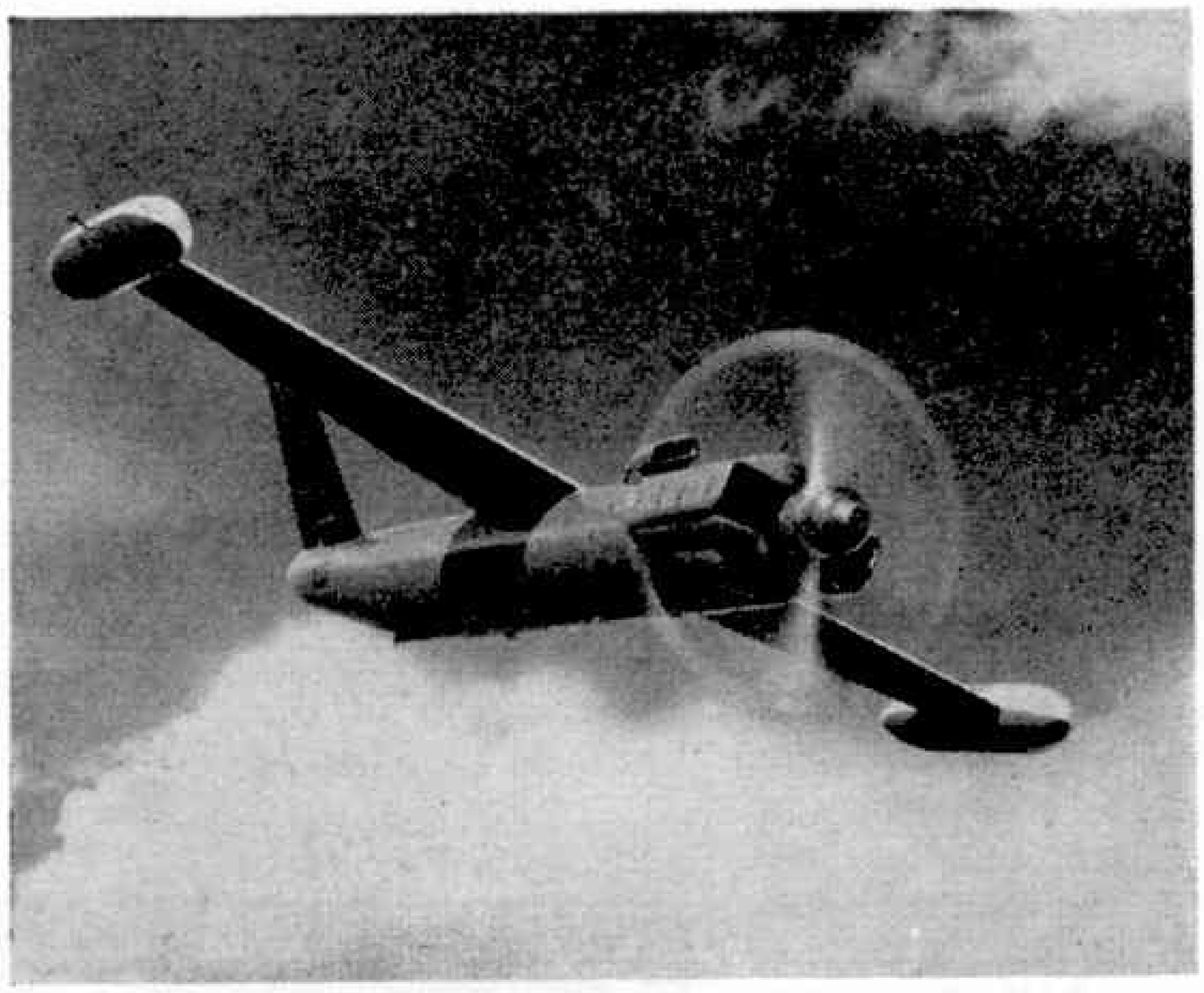
The standard version of the Metropolitan has 44 seats and is powered, like the Model 340, by two 2,400 h.p. Pratt and Whitney R-2800-CB16 piston engines. For high-density routes, two more rows of seats can be installed at the front of the cabin, making a total of 52; and 2,500 h.p. R-2800-CB17 engines are offered as an alternative to the CB16's. With the latter engines, the Metropolitan has a maximum loaded weight of 48,000 lb., and will cruise for 1,040 miles at 289 m.p.h. with a reduced payload.

Isaac Newton in Reverse

Most exciting research programme ever undertaken by aircraft companies is the new U.S. attempt to perfect an anti-gravity device. Both Martin and Convair have opened laboratories for basic experiments in electro-magnetic field physics, and if a method of overcoming the force of gravity is discovered it will offer a means of vertical take-off far beyond the present hopes of aircraft designers. Even space-flight would become an immediate possibility.

£55,000 Pilots

It was stated in the House of Commons recently that the cost of training an R.A.F. pilot up to the time he joins an operational V-bomber squadron is about £55,000. This may sound a lot of money; but only the best pilots are good enough to fly aeroplanes that cost a million pounds each.



One of the Beech XKDB-1 pilotless target aircraft which are being tried out at the U.S. Navy's Missile Test Center in California.

U.S. Navy Testing Pilotless Target

The new Beech XKDB–1 target drone, shown in the photograph reproduced alongside, is the kind of "model aircraft" that would delight any boy from eight to eighty years of age. Powered by a turbo-supercharged 120 h.p. McCulloch engine, it weighs less than 600 lb., has a wing span of 12 ft. and can fly for more than an hour at a speed of 320 m.p.h. at above 30,000 ft. under radio control from the ground.

Beech have built the all-metal XKDB–1 as a pilotless target aircraft for ground-to-air and air-to-air firing practice, and the first production models are now under evaluation at the U.S. Navy's Missile Test Center, Point Mugu, California. Special features include reflectors in its wing pods and tail-cone which give the effect of a much larger aircraft when picked up by radar tracking and weapon firing systems in fighter 'planes or on the ground. Visual "spotting" is made possible by vapourising oil which produces a smoke trail. The aircraft can be kept under perfect control at ranges of over 100 miles and, at the end of its flight, is lowered gently by parachute to the ground. If it alights at sea, it will float until picked up.

Although it is quite small, the XKDB–1 has been designed also as a pilotless reconnaissance aircraft, carrying a battery of cine-cameras in its fuselage. Beech claim that the cameras could be replaced by television equipment, with which the XKDB–1 could transmit an up-to-date picture of enemy positions or the course of a battle while it was actually being fought.

Helicopter Night Landing Aid

So that the Certificate of Airworthiness of the Whirlwind helicopter can be extended to include flight by night, Westland Aircraft have shown how the aircraft can make a safe emergency landing after an engine failure by the light of special parachute flares.

In a night demonstration at Yeovil, the Whirlwind was flown to a height of 1,000 ft., where a flare of 75 sec. duration was released from a tube at the rear of the fuselage. Simultaneously, the pilot stopped the engine and began an autorotational descent. At 500 ft., another flare, this time of 45 sec. duration, was released and its light enabled the pilot to make a gentle landing. The flares would not be needed for normal powered descents at night, as the Whirlwind has full night-flying equipment, including powerful landing lamps.

Agricultural Pipers

More and more aircraft are being used to help farmers in New Zealand, particularly in hill districts where surface transport is difficult. Among them are over 30 Piper PA–18A, Super Cub and Tri-Pacer lightplanes.

Typical is the Super Cub illustrated below, which has a large hopper behind its pilot's seat for spreading fertiliser over poor quality grassland. In addition, it has a light bomb-rack under each wing from which pre-stressed concrete posts and coils of barbed wire can be dropped from the air to speed fence construction on sheep farms in difficult country.

Powered by a 150 h.p. Lycoming 0–320 engine, the sturdy Super Cub can carry nearly half-a-ton of payload and has a top speed of 128 m.p.h.

R.C.A.F. Comets Fly Again

Following modification of the first of ten Comet 2 jet-liners for R.A.F. Transport Command, it has been announced that the Royal Canadian Air Force plan to put their Comet 1A's back into service as quickly as possible. The two aircraft are being flown to England by de Havilland crews, and will be rebuilt with cambered wing leading edges, circular strengthened windows instead of the present square windows, and other changes. Afterwards the Comets will be used for transport duties and to test the Canadian defences by acting as fast, high-flying "enemy" bombers during air exercises.

A Piper Super Cub being loaded with pre-stressed concrete posts for fence construction. The posts will be dropped from the air at a sheep farm in difficult country.

Railway Building in Uganda

By Dudley Hawkins

AN engineering project of considerable size and complexity will be completed this year in the Uganda Protectorate. It is the building of a new railway line from the thriving town of Kampala to the foot of the Ruwenzori range, the snow-capped Mountains of the Moon, near the border with the Belgian Congo—a task that has rivalled in difficulties construction of the original railway from Mombasa to Kisumu early this century.

Despite the use of the largest and most modern machinery and equipment, non-existent 50 years ago, construction of this new line has proved far from easy. From time to time size and weight of the necessary heavy equipment have proved to be handicaps in tropical African conditions, which can be as tough and formidable as any in the world.

Difficulties surmounted varied from the excavation of thousands of tons of rock, where the line descends down a steep escarpment, to the laying of an embankment containing 8,000,000 cu. ft. of earth across four miles of treacherous papyrus swamp. The machinery used in these operations included heavy Caterpillar, International Harvester, Onions and Le Tourneau units, large Ruston-Bucyrus excavators, Jones cranes, Ruston Diesel Locomotives and many others. Without them the construction of the Extension would have taken about 10 years instead of under five.

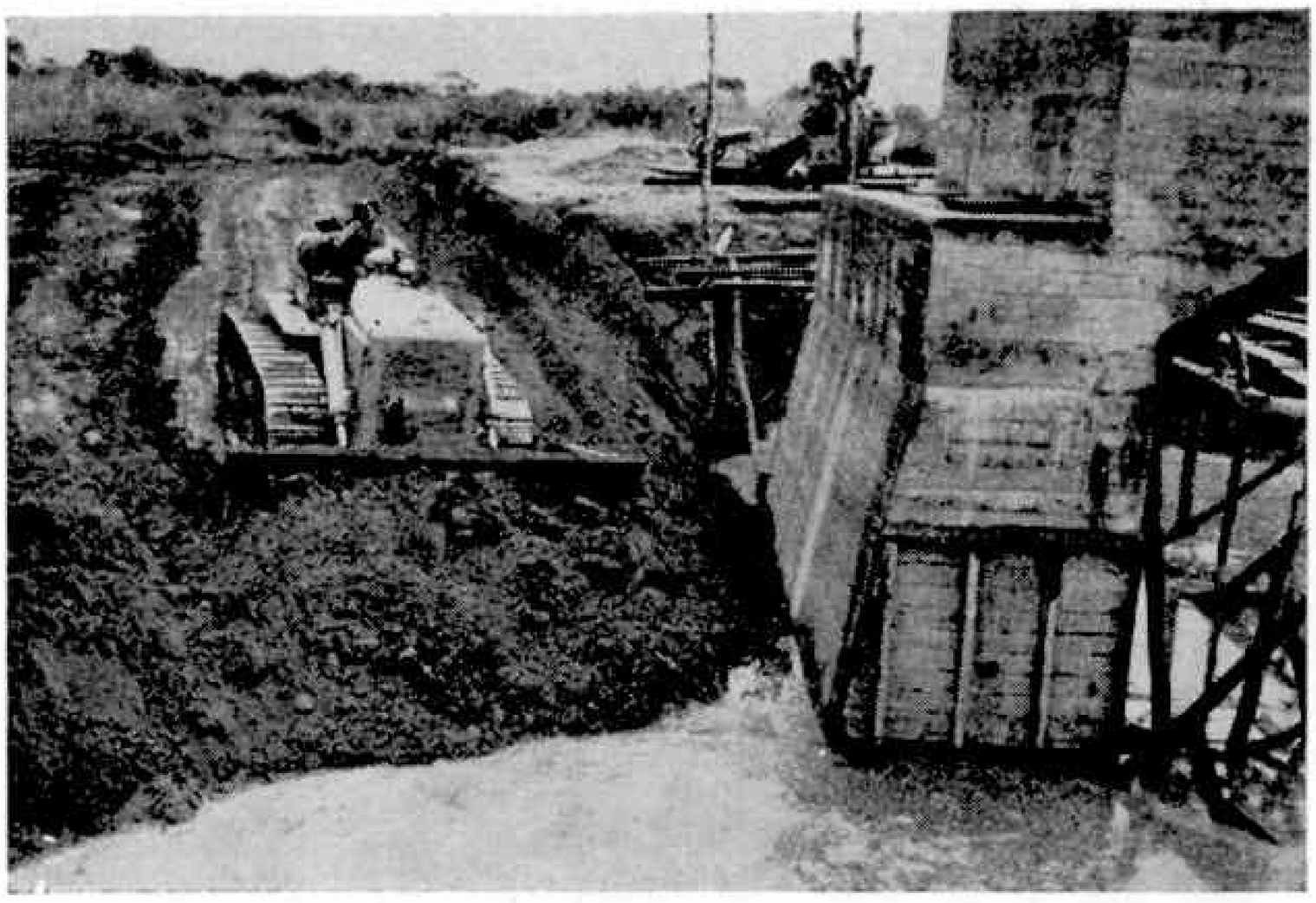
Some of the finest land in East Africa lies between Kampala and the Belgian Congo. Thousands of square miles of it are virtually uninhabited and unexploited, development having for years being prevented by lack of good, cheap, heavy transport. It was to open up this area for settlement and exploitation that in 1952 the Uganda Government authorised the East African Railways and Harbours Administration to build a new line westward linking Kampala with Kases, a small trading centre at the foot of the Ruwenzori mountains. This line—The Western Uganda Extension—is economically the most significant project in East Africa today.

A Land Rover fording the Dura River, over which a 20 ft. span high arch culvert was built. The illustrations to this article are reproduced by courtesy of the East African Railways and Harbours Administration.

The opening up of Western Uganda had been contemplated for years, but it was only after a report was made on the economic advantages of a new line that approval was given. The committee drew attention to the great agricultural and mineral potential of the area —which is roughly a quarter of Uganda —and stated that it cannot be fully developed without a railway. In addition, the railway will enable the mining of a copper deposit in the Ruwenzori, which in turn will provide an economic amount of freight for the line.

To date the building of the Extension has taken just over four years and the cost up to the end of October last year was £4,364,023 16s. When completed its length will be 208 miles, of which 102 will have been built by the East African Railways and Harbours Administration itself, and the rest by several contractors.

The terrain the line passes through includes many hills, long stretches of plains, patches of dense tropical jungle and scores of papyrus swamps, which formed about a



A Caterpillar engaged in work during bridge construction in the last section of the railway, which is between the Lake George Swamp and Kasese, near the Ruwenzori Mountains.

fifth of the whole route and presented the engineers with some of the most tedious constructional obstacles encountered in East Africa. When work began there were virtually no suitable access roads to the route chosen, and survey teams had to use African porters carrying head-loads. Sometimes they walked for days through mud and papyrus, and during the very heavy rains of 1951 and 1952 were at times cut off from base.

When construction started, owing to the inaccessibility of the route, much of the heavy equipment and machinery had to be stripped down and transported by lorry to work sites, where they were re-assembled. There Austin trucks and Land Rovers were widely used by the Administration. They performed extremely well, carrying heavy loads of men and equipment on temporary access roads under severe conditions, particularly in bad weather, when the roads were impassable to many other vehicles.

The first section of the Extension, the 45 miles from Kampala to Mityana, is the only developed part of the whole route. Despite this, the work was a severe strain on surveying, clearing and construction parties as 30 miles of the line is through a swamp valley and part through jungle.

After clearing teams had hacked a path through the papyrus swamp, previously marked with stakes by the surveyors, heavy earth moving machinery began building the railway embankment. Tractor-drawn scrapers hauled earth from cuttings and borrow pits to the edges of swamps and pushed the rubble in. The embankment gradually extended through the swamps at the rate of about 150 feet a day. At one stage heavy rain bogged down machinery for about six weeks.

Bridges and culverts were built before the earthworks reached them, and permanent bases for future maintenance parties were built every four miles. As the earthworks were completed, platelaying gangs laid sleepers and rails, and they were followed by first and second lift ballasting gangs and maintenance parties, who gave the final trim to the line.

Meanwhile construction was in progress simultaneously on other parts of the route. The scale of work and the difficulties were much the same from Mityana as far as Mpanga river, at mile 163. The route here traverses miles of undulating bush country, with intermittent swamps and hills. The heaviest earthworks were

Platelaying between Kampala and Mityana.

between mile 90 and mile 150, where the contractors, who use only Caterpillar tractors, removed about 2,750,000 cu. ft. of earth.

From Mpanga river the line drops down a 1,200-foot escarpment into rain forest and to the edge of a four-mile wide, deep, papyrus swamp capping the northern end of Lake George. This part necessitated the largest and most complicated earthworks of the entire route.

As the maximum permissible gradient along the Extension is 1.18 per cent., or about 1 in 84, a spiral had to be cut round a hill near the top edge of the escarpment, and the constructional plan called for a number of cuttings through the many ridges corrugating the escarpment face. Between the ridges lie valleys, some over 60 feet deep.

The line runs from the brink of the escarpment around the spiral, and then across several more valleys and cuttings before reaching two very deep cuttings, Dura East and Dura West, 95 and 80 feet deep respectively, flanking the Dura River, which flows along the bed of a deep valley 70 feet from the cutting floors. Just beyond the Dura West cutting is the Kyabandara station.

When work began it was found that the undersurface rock on the escarpment was shattered and crumbled easily. This meant that engineering plans had to be altered to allow a considerably wider angle of slope for the walls of all cuttings. Consequently the contractors removed much more earth and rock than was anticipated, a total of about 60 million cubic feet. At all stages of the spiral construction the cramped and confused conditions made the heavy work extremely difficult. There was the constant menace of rockfalls, and frequent avalanches were a continual danger to men and machines.

The contractors operated by first blasting, and then running teams of small capacity Le Tourneau scrapers to remove the rubble after it had been levelled by Caterpillar dozers. In the rocky escarpment areas wear and tear on even the heaviest machinery was extensive. Damage to the tracks of crawler tractors was universal, bulldozer blades were badly worn, the massive rubber tyres of scrapers were severely cut and the prongs of the giant rooters loosened. These unforeseen conditions retarded the work.

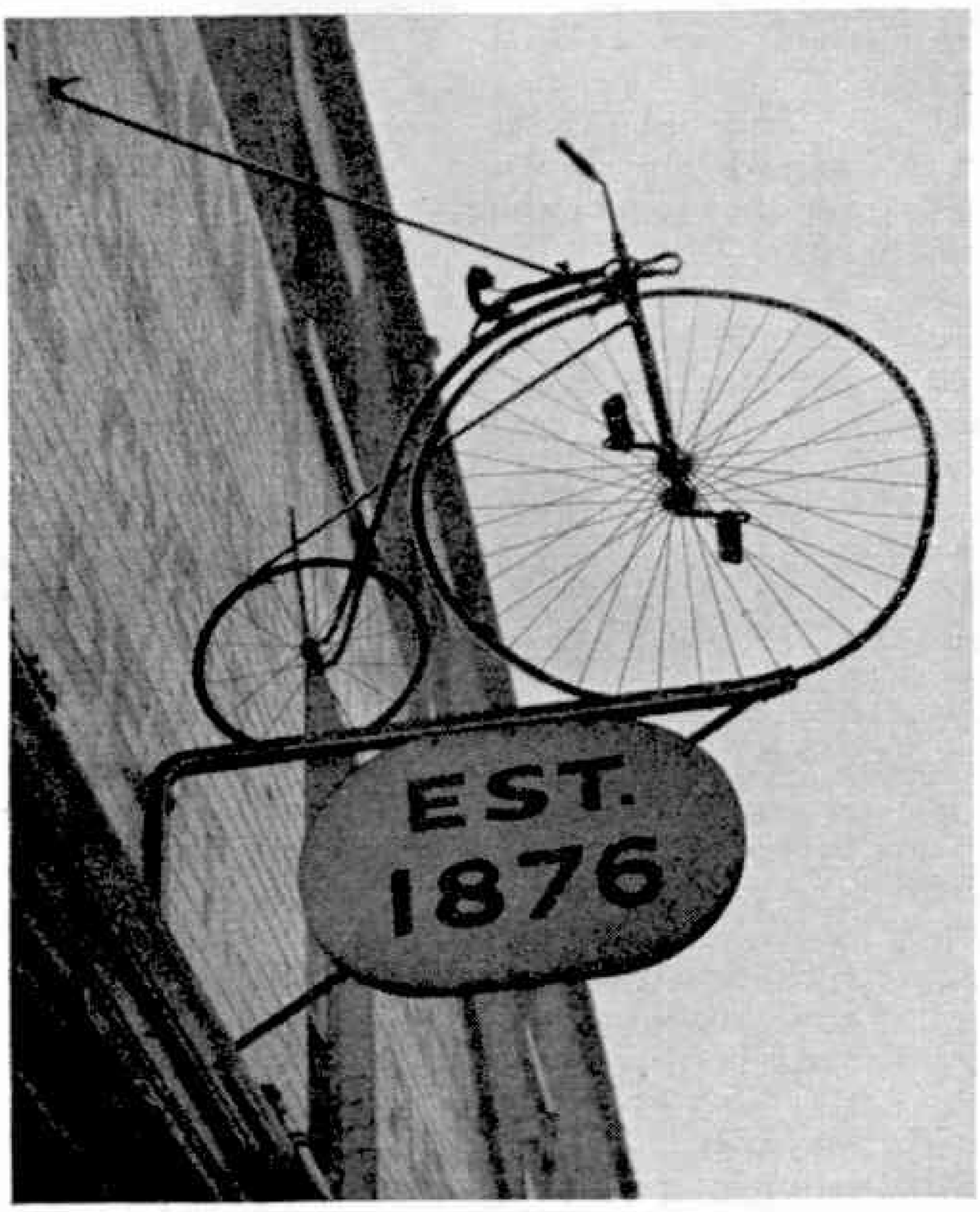
After the escarpment and the Dura cuttings the biggest obstacle was the Lake George swamp. This is four miles wide and densely packed with papyrus. Work was started simultaneously from both east and west banks, with bulldozers pushing out earth to form the embankment. As the embankment projected into the water light narrow gauge track was laid along it and Ruston diesel locomotives hauled trucks of earth out. When the embankment reached deeper water, sometimes over 20 feet deep, the rails were floated on pontoons.

The embankment was built 14 ft. wide across the top, and at a depth of 10 ft. the base is 44 ft. wide. When completed it contained more than 8,000,000 cu. ft. of earth, an amount that indicates the scale of this operation.

The Dura River arch culvert, which is between cuttings 80 and 95 ft. deep respectively.

The top of the causeway is 5 ft. above water level and will be raised another 2 ft. by a murram earth capping. Its four-mile length includes three 60 ft. span bridges as well as numerous smaller culverts. These bridges were difficult to construct, as they had to be founded on hollow reinforced concrete caissons sunk deep in the swamp bed. Each of these has walls 2 ft. 6 in. thick and is 8 ft. across, and they were filled with sand when in their final positions.

MECCANO MAGAZINE



An old trade sign still to be seen in Lincoln. Photograph and story by Mrs. M. U. Jones, Birmingham.

IN the past tradesmen made a practice of hanging out over their shop fronts a sign of some kind that showed at once to the passer-by exactly what they had to sell. Few of these remain. Among those that do is the old fashioned bicycle in the accompanying picture, taken in Lincoln. There is another one in Birmingham showing an early wooden penny-farthing bicycle, and it is an interesting commentary on the development of popular transport that this is outlined in fairy lights, and advertises a petrol filling station.

Junior Section

The Lincoln example is outside what is now primarily a motor cycle business. The metal-framed boneshaker might well have been taken from the current stock of the firm when it was founded in 1876. Both models suggest how tough a cyclist had to be in the days before ball bearings, pneumatic tyres and chain drive.

Gradient posts on our railways are common enough, and all of you must have looked out for them when travelling by train. The one shown in the lower picture on this page is a curiosity. Most of the posts give the figures in round numbers, but here is an example of real accuracy. But what practical difference is there between 1 in $718\frac{1}{4}$ and 1 in 718?

There may be other signs marked so conscientiously, and perhaps some of you can tell me about them.

THE EDITOR

A curious gradient sign in Perthshire. Photograph by W. S. Garth,

Fig. 1.
An example of one of the simple but realistic models that appear in the new Book of Instructions for Outfit No. 00.

Fun For The Youngest

By "Spanner"

A Meccano Outfit Made For Them

ONE of the most attractive features of Meccano is the fact that it appeals to boys of all ages. It is easy for anyone to join in the fun, however old he may be, because there is a splendid range of Outfits of all sizes, every one a box packed with fun and pleasure.

What is the best time to start? In truth, this is any age, for in the range of Meccano Outfits there is one of suitable size for anybody. But this month I want to talk to the very youngest readers. Skill and experience is not necessary to enter this magic world of model-building, and any boy or girl can start as soon as he or she can handle a screwdriver—and who can't, in this mechanical age?

Really it is all so very easy! Let us suppose you start with a No. 00 Outfit as many of the youngest model-builders do. This is the smallest of the 12 Outfits in the Meccano range, and it will give countless hours of fun to boys, or girls, of five or even less. There are no tedious rules to learn before it is possible to start making the model of your choice, and the only tools needed—a spanner as well as the screwdriver already mentioned—come with the Outfit. Also included is a fine Instructions Booklet, in which 20 different easy-to-build models are shown in pictures in such a way that you will find it quite simple to build them up from the parts in your 00 Outfit.

Two of these models are shown on this page—a simple chair (Fig. 1) and a Merry-go-round (Fig. 3), which can be set in motion by turning a handle. Among other workable models shown in the Instructions Booklet, are a Well Windlass and a jolly miniature of the High Flyers, an amusement device that you will no doubt have seen and probably enjoyed a ride on, in a seaside pleasure park. Now you can make a miniature one for yourself, and turn it too.

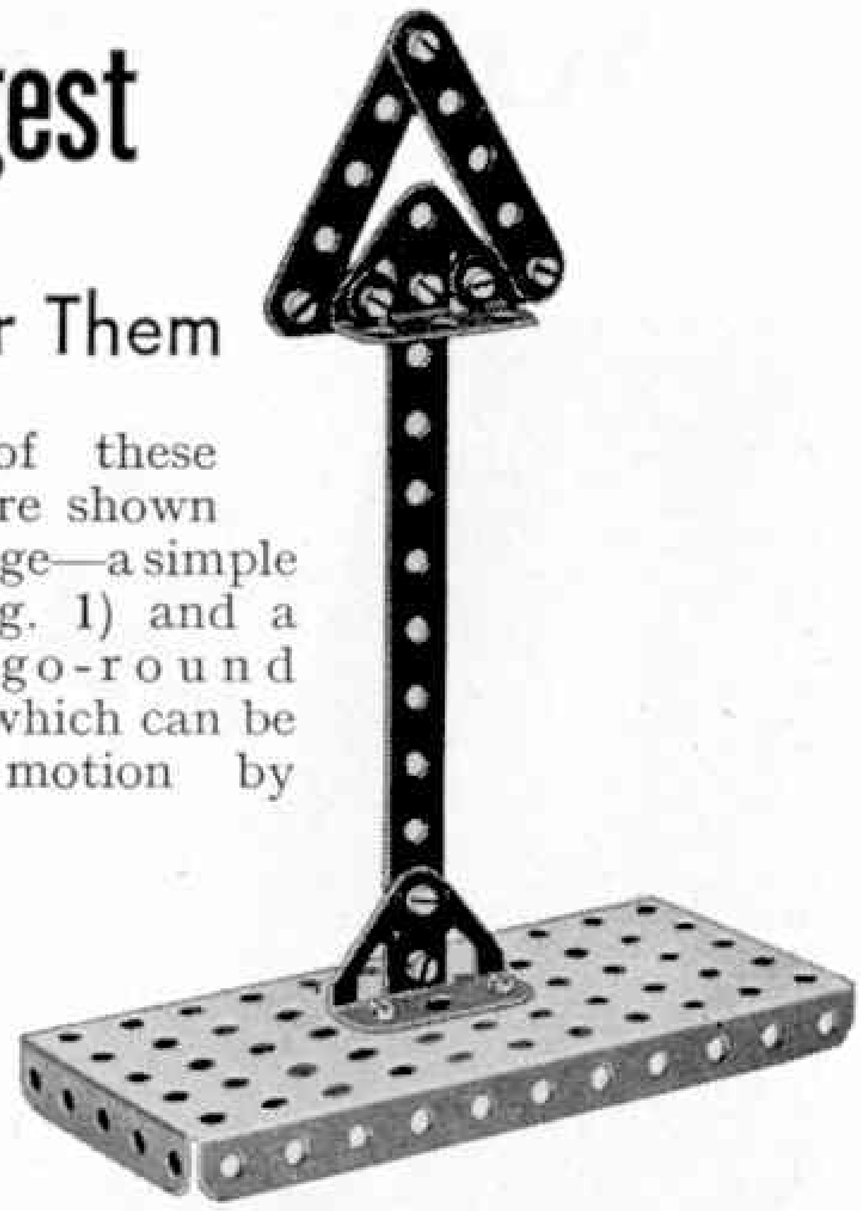


Fig. 2.
Subjects for new models can be found in the home or outdoors. This Road Sign built with Outfit No. 00 is an attractive example of the realistic models that can be made of everyday subjects.

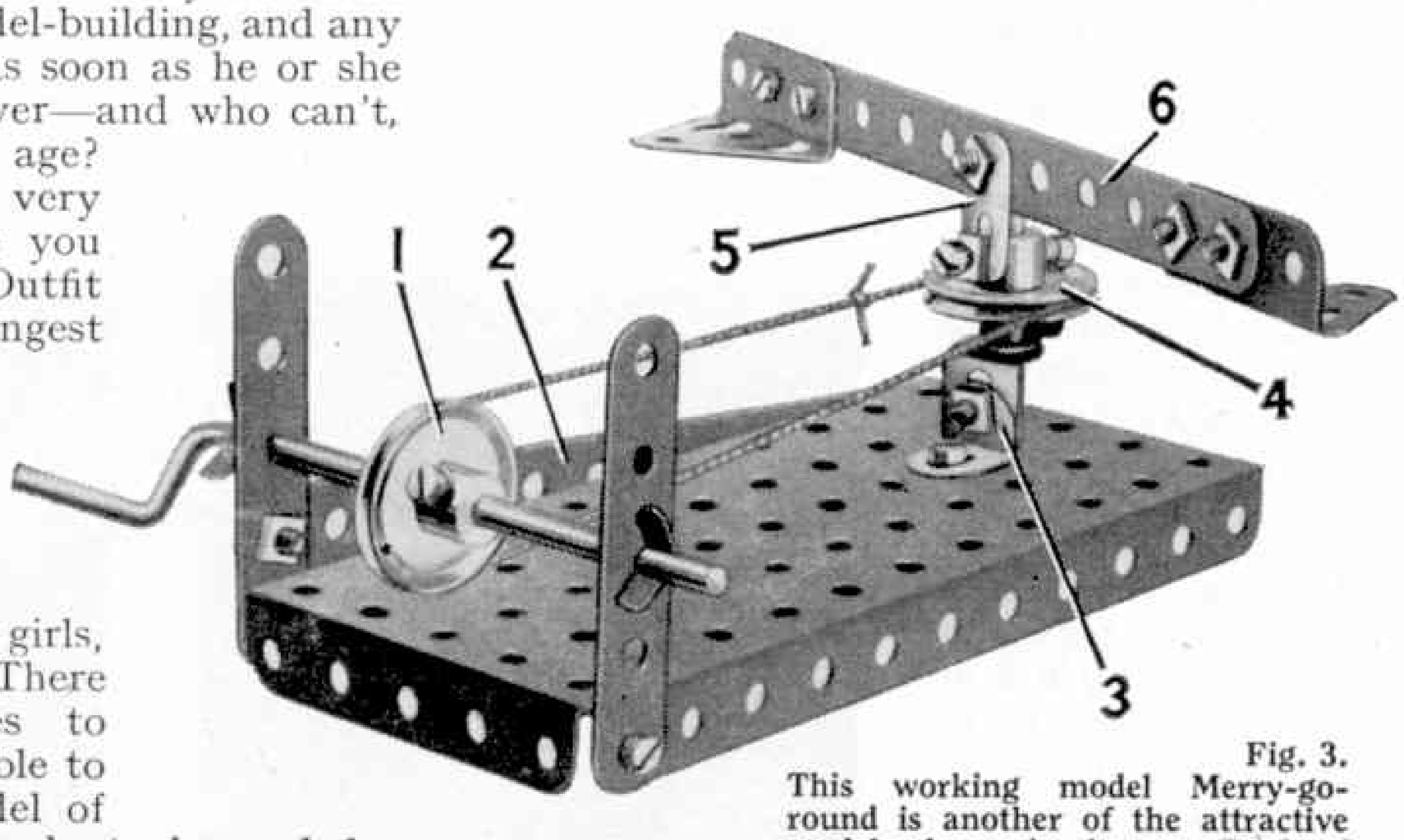


Fig. 3.
This working model Merry-go-round is another of the attractive models shown in the new Book of Instructions.

And the fun doesn't end when you have built all the models shown in the Instructions Booklet. You will soon see

This rear axle drive for a model vehicle is only one example of the many mechanisms that can be built with the parts in the Meccano System.

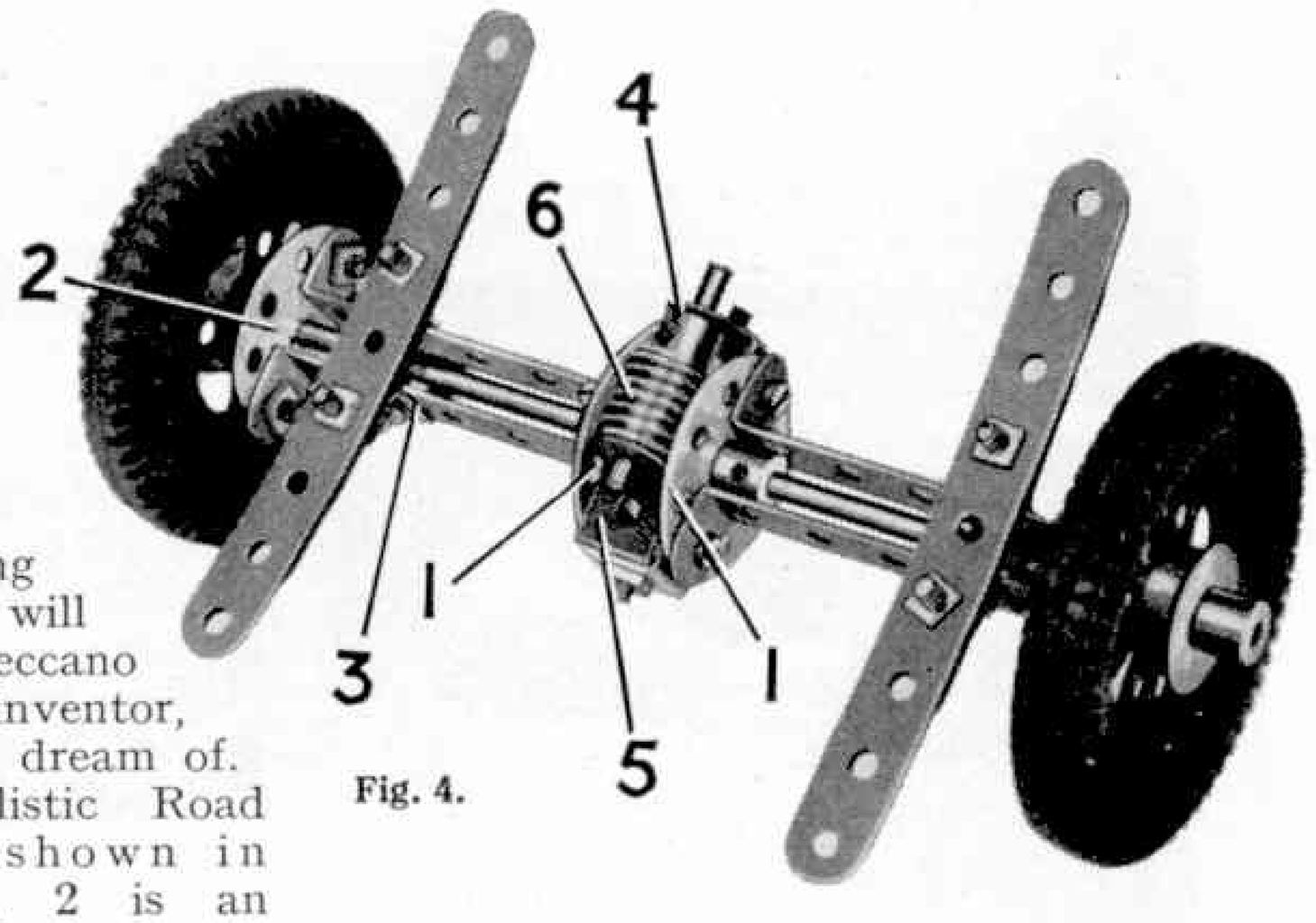


Fig. 4.

how to put together other playthings of your own design. In fact, the parts provided in a No. 00 Outfit have been carefully selected to make it as easy as possible for you to do this. In "making up" models of your own you will experience the real thrill of Meccano for in fact you will become an inventor, and that is something we all dream of.

The realistic Road Sign shown in Fig. 2 is an excellent example

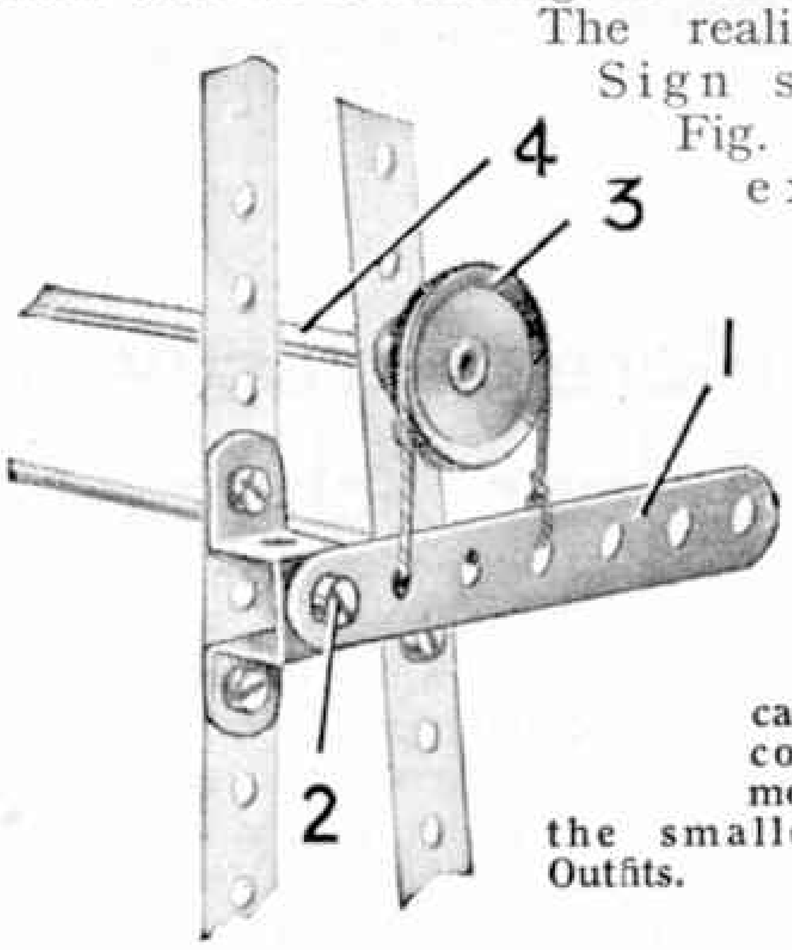


Fig. 5. An easily made band brake that can be used to control many models built with the smaller Meccano Outfits.

of how easy it is to model a familiar object from the parts in a No. 00 Outfit.

It is not necessary to possess a large Outfit in order to enjoy Meccano fun, as this will have shown you, but of course the more parts you possess the larger and more varied the models you will be able to make. Every model-builder always looks ahead to building bigger and better models, and this brings me to the next important point I want to mention, which is, that in order to make it easy for you to enlarge your No. 00 Outfit a special Accessory Outfit is available. This is known as a No. 00A Accessory Outfit and by obtaining one of these, and adding its parts to those in your original No. 00 Outfit, you will have all the parts that are contained in a No. 0 Outfit and will then be able to build another wider range of even more interesting and attractive models.

This you can take still further by adding other Accessory Outfits, of which there is a whole range, from No. 0A to No. 9A, each with an Instructions Book full of more and more fascinating models. As if that were not enough, every Meccano part can be obtained separately, so that you can go on even when you have built up the largest Outfit, No. 10. There is always something new to make for the Meccano model-builder, at whatever stage he may be in this engineer's progress. And last, but not least, you can set your models to work just like the real things, by driving them with one of the splendid range of Motors included in the Meccano System.

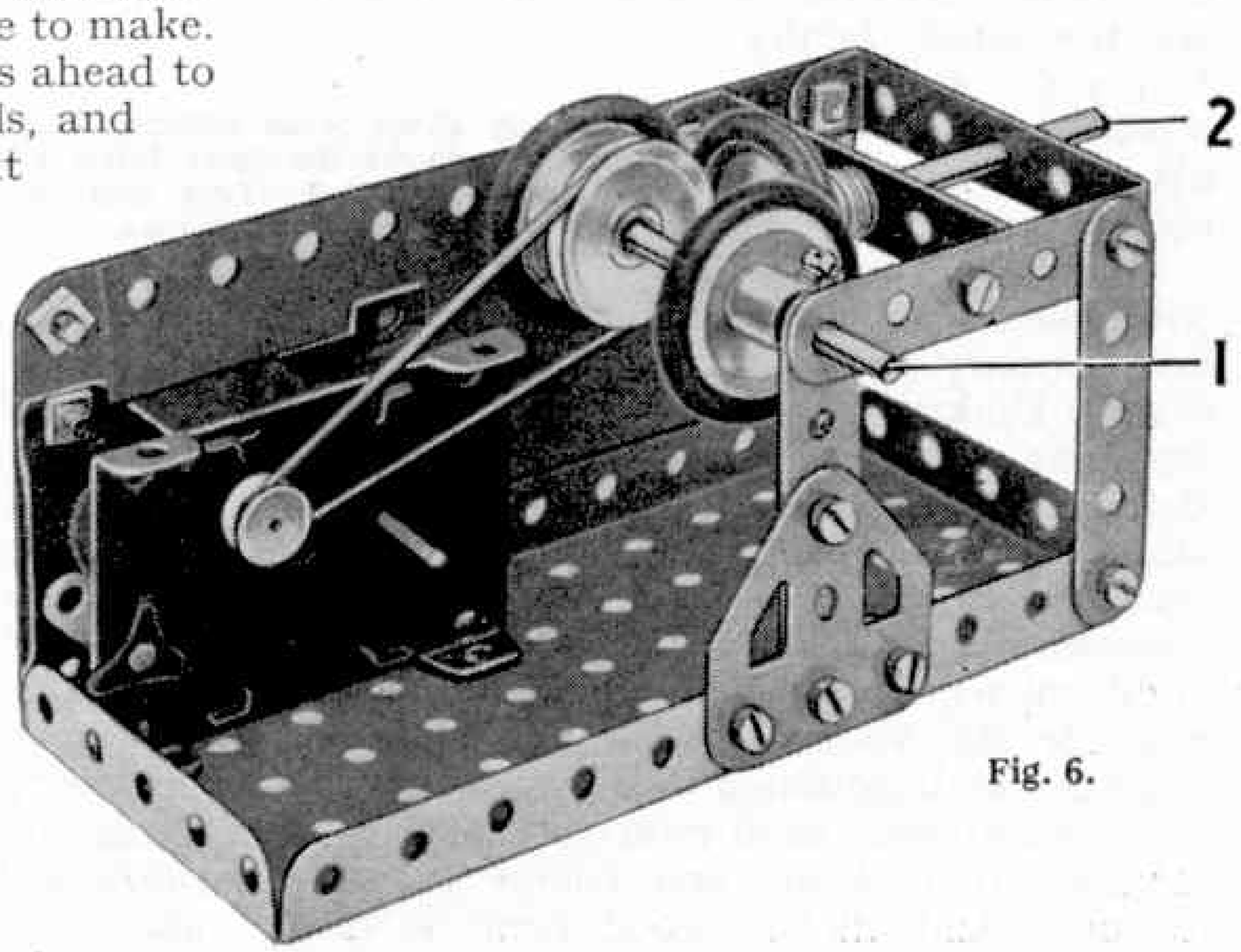


Fig. 6.

Another simple mechanism that can be put to good use in small models of many kinds. This arrangement allows a drive from a Magic Clockwork Motor to be reversed.

DINKY NEWS

More Attractive Colour Schemes

By **THE TOYMAN**

THE picture at the top of this page shows a typical street in a Dinky Toys town, with three Dinky Toys cars prominent in the scene. The models are the Austin Devon and Austin Somerset Saloons and the Studebaker Land Cruiser.

These cars are well-established Dinky Toys favourites and you will already have them in your collections. But if you look closely at the picture, you will see that the models illustrated are different from those formerly available. The difference lies in the colour schemes, as these three models are the latest Dinky Toys to be introduced in new attractive two-tone colour finishes.

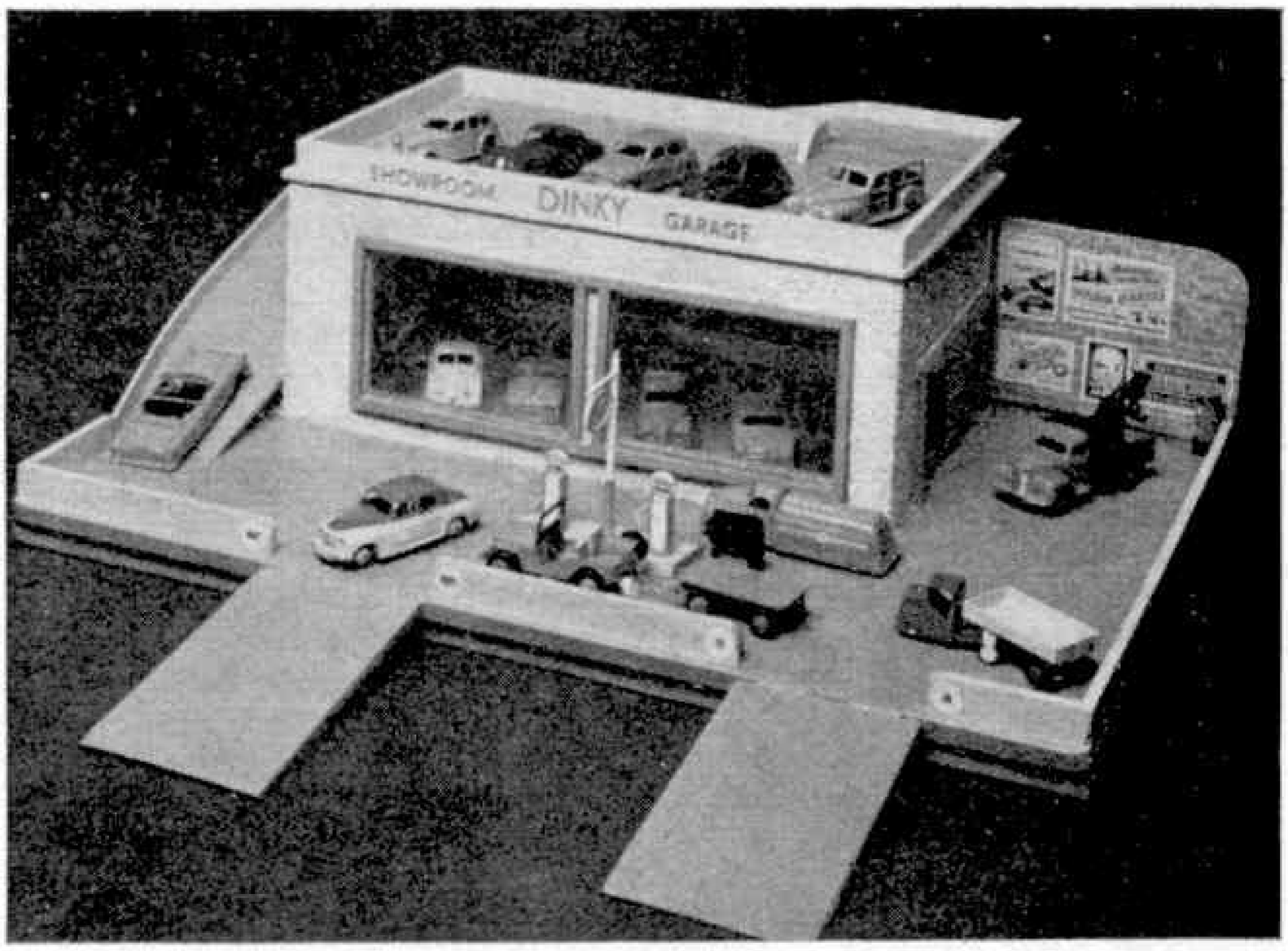
Regular readers will remember that last January I was able to give details of several Dinky Toys cars finished in modern two-tone colour schemes, and I promised that other models in two colours would be added to the range. The first two-tone cars were very well received by Dinky Toys collectors, and I am sure that the latest additions will appeal just as strongly. As in real life the widespread use of two-tone finishes has brightened our cars, and with them our streets, so in miniature the latest models will add life and colour to your layouts. And another good point is that each of the new models is available in two distinct colour combinations, so by getting one of each you can have two cars of the same make without them being identical in every respect.

The Austin Devon, No. 152, can be obtained in cerise or light red and green, or in yellow and blue, while its companion, the Austin Somerset, No. 161, is available in red and yellow, or in black and off-white.

Another good example of two-tone colouring is the Studebaker Land Cruiser, No. 172, now obtainable in burgundy red and stone or in tan and stone. The street scene picture shows the general style of the new colour schemes, but of course it cannot do justice to the rich colours of the actual models. I suggest that you visit your local Dinky Toys Dealer so that you can see for yourself the splendid appearance of the latest styles.

The busy street scene pictured at the top of this page shows the three latest additions to the range of Dinky Toys cars in two-tone colour schemes.

The picture at the head of the opposite page is of a splendid garage and showroom made by Mr. H. F. King, London S.W.19, for his son. This follows the general style of the garage buildings used by most Dinky Toys enthusiasts, with a flat roof designed to provide parking accommodation and approached by a long ramp. An



This splendid miniature garage was built by Mr. H. F. King, London S.W.19, for his son.

Esso Petrol Pump Station and an oil bin provide Dinky Town motorists with adequate refuelling facilities, while gateways clearly marked "In" and "Out" prevent any traffic jams in front of the pumps.

The garage is very well-made and the building is finished in imitation rough-cast that looks most realistic. I am sure Mr. King's son is thrilled with this fine accessory and makes good use of it in his Dinky Toys play schemes.

Now for a change. Look at the picture at the foot of the page. Margaret and John Gillard have certainly found a novel use for their Dinky Toys. When the photograph was taken they were looking forward to a Continental holiday for the first time. The right-hand traffic rule was viewed with some apprehension, however, and so a road layout was planned, and the Dinky Toys were brought out, to help father to get used to the Continental system. The street plan is simply drawn on a large piece of paper, with traffic signs marked at suitable spots.

I hope the Gillard family enjoyed their holiday, and I feel sure that father was able to negotiate any traffic problems he met quite easily after the careful experiments he carried out with the aid of Margaret and John—and of course their Dinky Toys.

This little episode is a good example of the unusual happenings to Dinky Toys and Supertoys, and the uses found for them, that are brought to my notice from time to time. If you have a story to tell about your models, write and let me have details. Possibly your experience will benefit another Dinky Toys collector, but in any case I shall be delighted to hear from you. When you are writing don't forget to enclose a "snap" of your layout if one is available. If it is suitable I may be able to reproduce it in a future *M.M.* for the benefit of other enthusiasts.

With the help of their Dinky Toys, Margaret and John Gillard, Southampton, provide father with right-hand driving practice, in preparation for a holiday on the Continent.

Holiday Railways

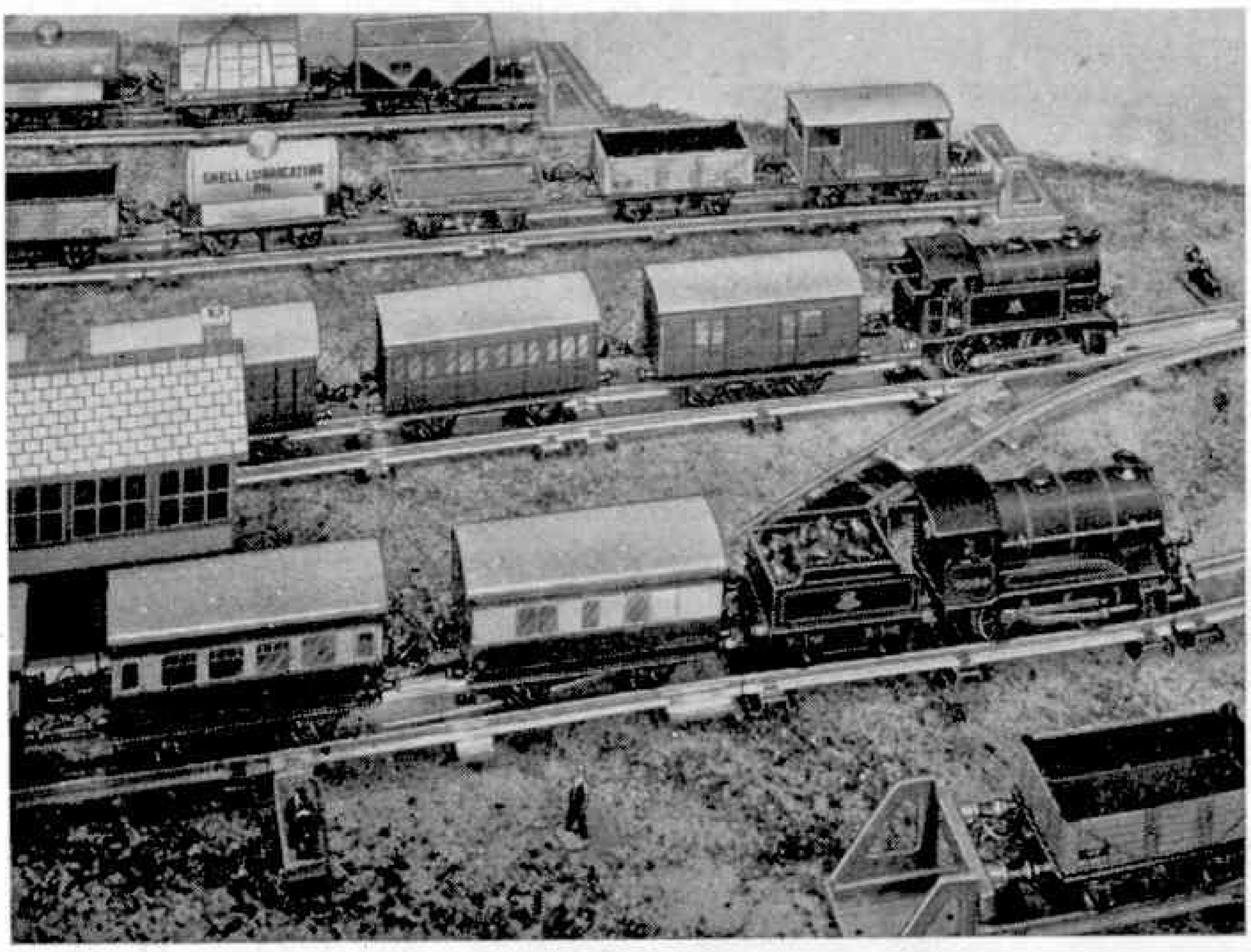
By "Tommy Dodd"

BY the time you read this many of you will have made, or will be ready to make, a long-awaited holiday journey. On this rather special occasion, or during your stay away from home, there may be good opportunities of seeing interesting railway operations that you can reproduce with your Hornby Trains. Although miniature railways generally do not receive so much attention during the summer months, there is the inevitable wet day now and again and this will be just the opportunity of putting your schemes into practice.

Sometimes several boys get together and combine their railway equipment and this sort of thing can be really good fun, if a workable layout is devised. Real railways are specially busy at this time of the year and of course you will want your railway to be busy as well. So, in many cases you will arrange layouts on which perhaps two or more trains can be running at once.

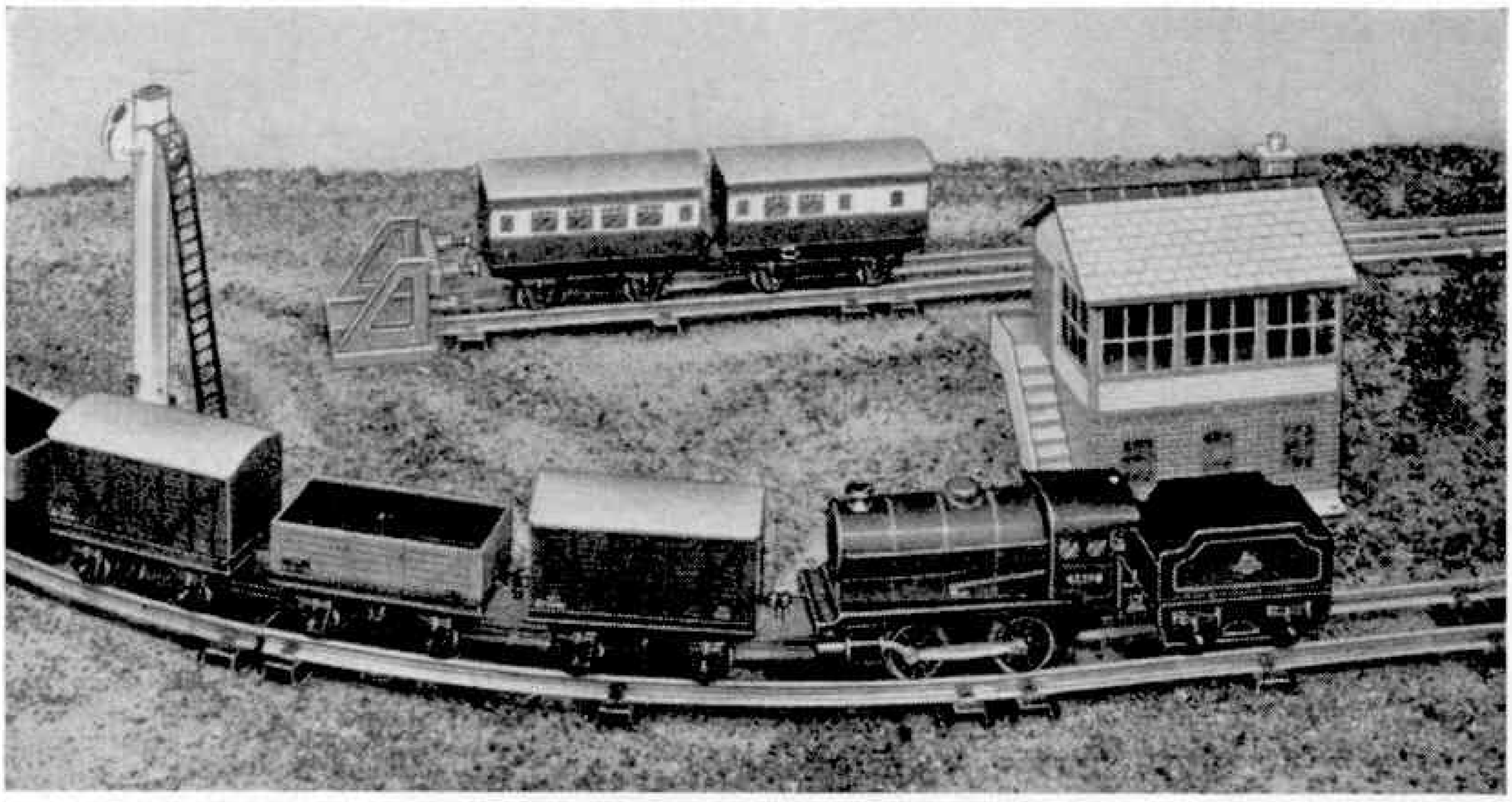
The picture on this page shows this sort of thing being done. On this layout, the usual up and down working on two separate tracks is not being followed, but both the trains shown are running in the same direction. Some operators like to do this for a change at times, but others prefer one-way operation, usually in the direction that brings the engine keyhole conveniently to the operator for winding purposes. It is not always easy to turn the key when it is on the "off" side away from the operator, particularly if the engine happens to stop where there is some accessory close to the track.

One-way traffic with two trains, each on its own track, can be quite exciting because one train may have to make more station stops than the other, and it is quite a thrill to see a through train overtaking one that is busy with its station duties. Now and again, if the layout allows, the trains may exchange tracks and here careful working on the part of the operators is necessary, otherwise there may be some quite awkward results. Each "Driver" and "pointsman" should know exactly what he has to do, and when, but he must always be on the lookout in case something unexpected happens to upset the planned cycle of operations.



A busy section of a Hornby layout with a stopping train and an express running on parallel tracks.

I expect that many of you will manage some train watching during your holiday and you will perhaps notice instances of special or unusual traffic. Many summer service trains run long distances and carry either nameboards or special train numbers at the front of their engines. Some may carry both, but in whatever way these distinctions are arranged, you will probably not find it hard to reproduce something similar in card with the aid of inks, or your paint box, for display on one of your engines.



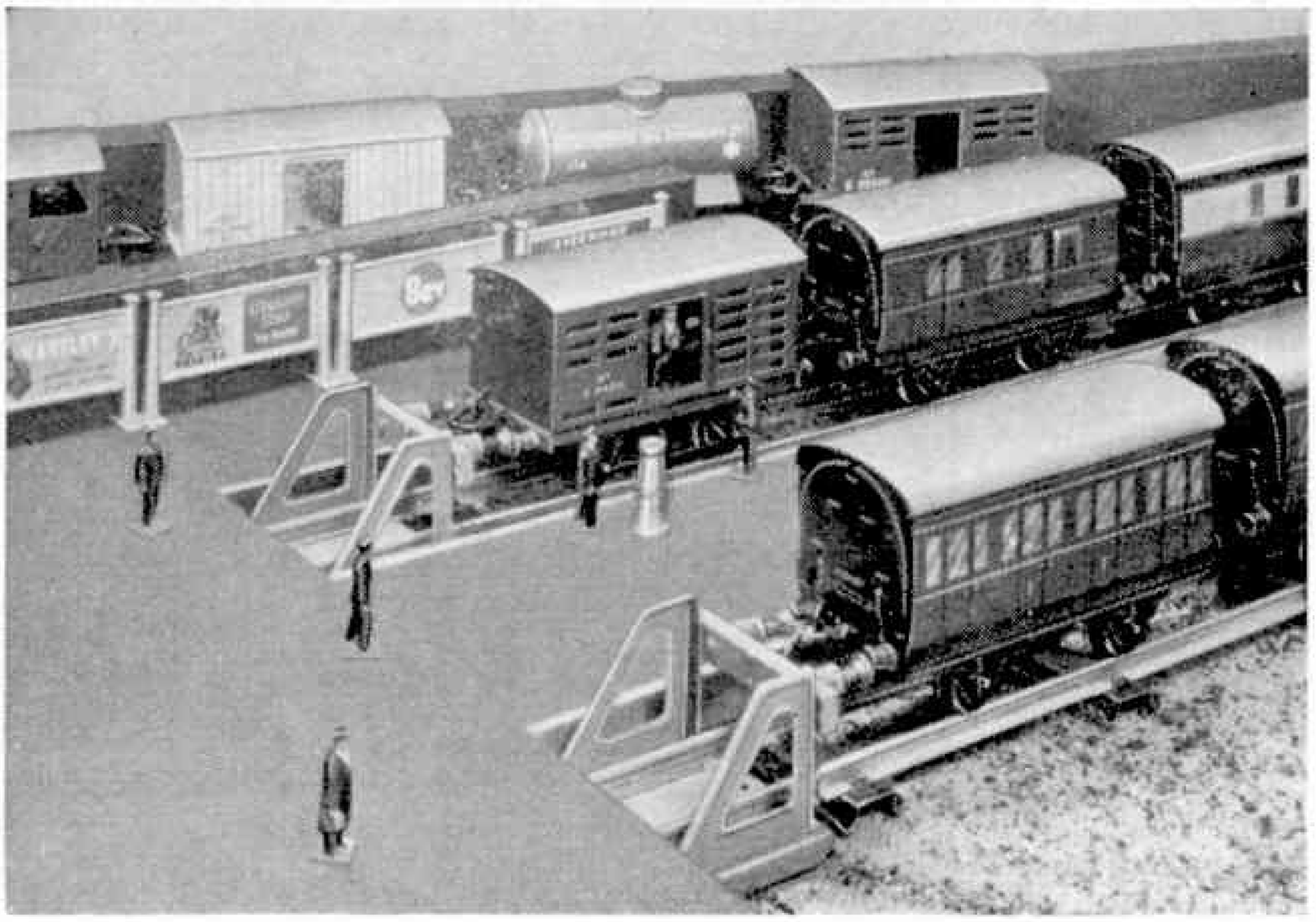
A branch line goods train consisting of Hornby No. 30 components. In the siding are two No. 31 Coaches standing by, in case they are required for "holiday traffic."

Through coaches for different destinations are usually a prominent feature of summer working. You can have a lot of fun in following this sort of thing in miniature, even if your through coaches and your main train really arrive, eventually, at the same station!

This brings us to station working, which is always an interesting business. Terminal stations are of particular interest to the enthusiast and, for a change, I know that some of you will probably like to build up a terminal layout in order to perform the various inward, outward and about the station movements, that you may have seen in real practice. When you have a layout of this kind fixed up, it may be only a there-and-back affair. But this need not matter a great deal as departing trains, that quickly become arrivals, can change their identity, to the operator at least.

Apart from through passenger trains at your holiday spot, local and other freight traffic can always provide something of interest. There may be a local branch line, that can give you some useful ideas, for your own railway working at home. However the railway hobby is followed, the holiday weeks are sure to suggest some new ideas that you can follow up with your Hornby equipment.

There may be a different way of placing some lineside feature that you may have noticed in your travels, a style of fencing, station lamp or water column or something else different from those you have in your own district. So you get busy and endeavour to do the same thing in miniature. Lots of you are handy at making things for the station and lineside and it is a good plan to make a sketch of anything different, while you are on the spot, so that you have something to guide you in your modelling later.



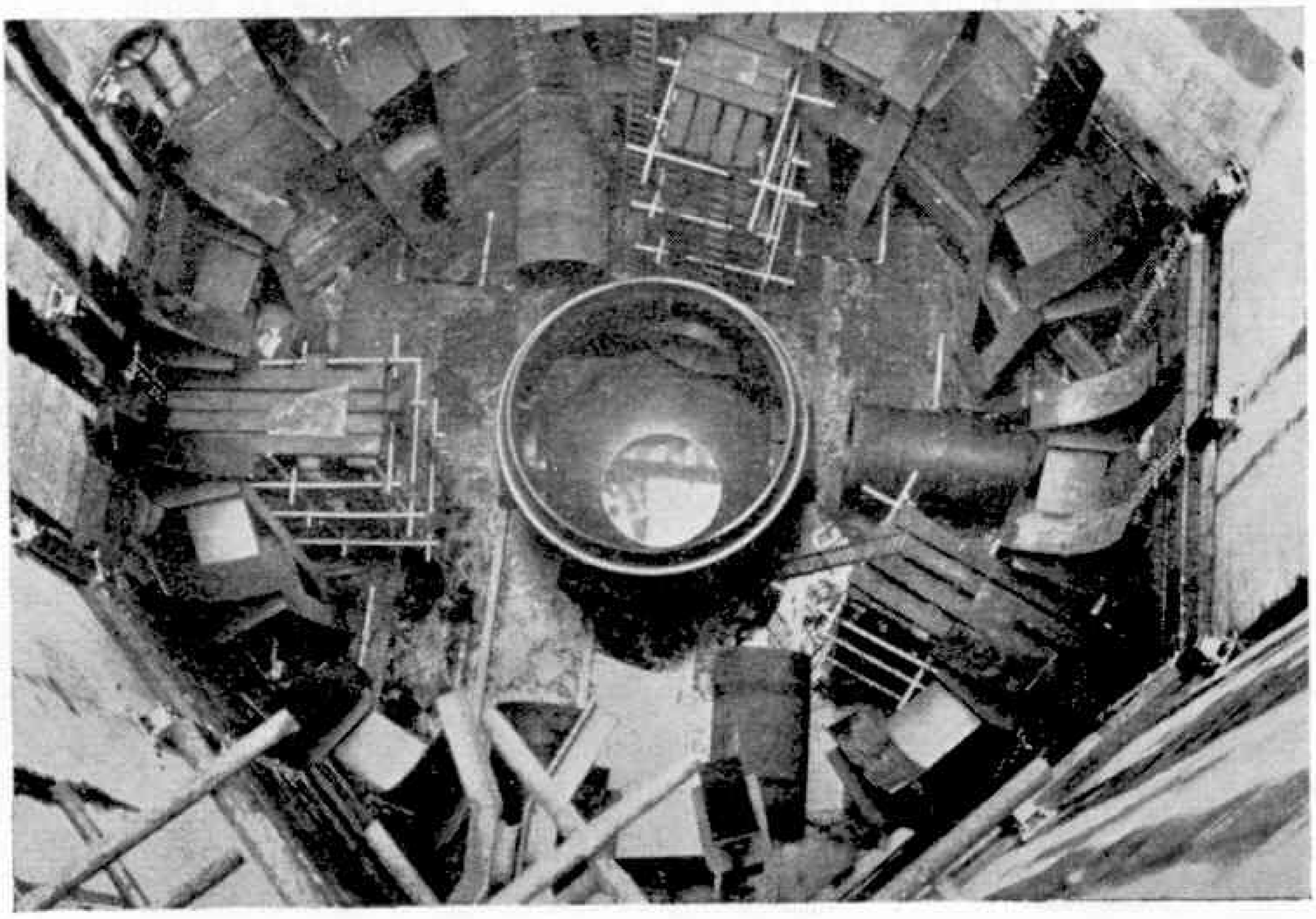
Part of a terminal station layout in which good use has been made of the necessary Buffer Stops, and, alongside the wall, a line of Station Hoardings.

Of General Interest

The Straussler-Lypsoid tyre seen on this tractor is specially useful in travel on soft soils. Photograph by courtesy of Nicholas Straussler and Co. Ltd.

HAVE you ever seen pneumatic tyres as enormous as those on the tractor in the upper picture on this page? For cross-country work a vehicle with tracks is excellent, but driving the tracks takes up a very large proportion of the power of the engine. It is claimed that it is more economical to use a large pneumatic tyre if certain drawbacks can be overcome, and the Straussler-Lypsoid tyre, as the new tyre is called, is designed for this purpose. When it is inflated the cross section of the tyre does not become circular, but forms a flattened arc and the crown of the arc bends inward under load. Thus full contact with the ground over a large area is preserved.

The lower picture on this page gives an interesting glimpse down into the interior of an atomic pile. The photograph was taken while the pile was being constructed, and shows some of the steel plates 6 in. thick that form the thermal shield at the Calder atomic power station. The shield is now completed, and the octagonal concrete wall to which it gives protection is 80 ft. high and 45 ft. across. The English Steel Corporation are supplying 4,500 tons of plates for the reactors at the Calder Hall and Annan atomic power stations. Similar rolled plates form the floor and roof of the chamber of the Calder Hall reactor.



Overhead view of the Calder Hall nuclear reactor chamber while the thermal shield plates were being erected.

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.

"PASSENGERS, PARCELS AND PANTHERS"

By JOHN W. R. TAYLOR (Dennis Dobson, 10/6)

The title of this book by our aviation contributor is a pointer to the great variety of payloads carried by transport aircraft today. These range from military personnel and equipment to civilian passengers and a vast assortment of cargoes—literally "from beans to bullion and bulldozers." The book takes the reader behind the scenes at airports, military airfields, factories and everywhere that aircraft fly throughout the world, and gives a complete picture of the work being done by aviation today. There are many pictures.

"ABC OF BRITISH SPORTS CARS"

By ALBERT DOUGLAS (Ian Allan, price 2/6)

This new edition includes every British sports car which has gained prestige either in races or in rallies. There is at least one good picture of each make of car, with details of outstanding features of chassis, engine and transmission, and other data. The booklet ends with a table of specifications of the cars described and illustrated.

"FOOTPLATE AND SIGNAL CABIN"

By NORMAN MARLOW (Allen and Unwin, 20/–)

This is a book of experiences and observations mainly concerning the two duties in the railway service that attract most interest from outsiders, enthusiasts or otherwise. To the traveller there is something fascinating about the remoteness alike of the enginemen on the footplate and the signalman in his box. The manner of the work done by these railwaymen influences very intimately the running of the train, safely and to time, on which he travels.

The book begins with boyhood recollections which older enthusiasts will particularly appreciate, dealing as they do largely with train watching—the word spotting was not then in use—on the former Midland Railway and its successor the L.M.S., at Desborough and at Kettering. Other systems were attractive to the author when he encountered them, but like many others he developed a preference for the line on which he lived.

Mr. Marlow has the great advantage over many writers on railway subjects that he has worked as a railwayman. He acted indeed as a signalman from 1944 to 1947, carrying out signal box duty, after the necessary examinations, during University vacations. So he is able to take his readers to the privileged floor of the signal box and deals in a fascinating manner with the work done there by day and by night, in good weather and in bad. Train running, locomotive work, gradients, weather and traffic conditions—all have their influence on the working of a signal box, and it is an experience to be taken behind the scenes so completely.

This part of Mr. Marlow's book is perhaps the most interesting to his readers, for footplate work has often been the theme of many railway books, not all based on extended experience. He helps to create a better understanding of the work of the enginemen, and his stories of trips in earlier railway days are attractive and informing. For contrast to the boisterous atmosphere of the steam footplate in this chapter, and in that on the railway today, he includes accounts of two trips on one of the big Southern main line diesels.

Finally, the author deals with the influence of the Train Control Office on the signalman's work and therefore on train movement, and he writes of course from the specially interested point of view of the man in the box.

The illustrations are well chosen and well reproduced.

"ABC OF BRITISH TUGS"

"ABC OF OCEAN TANKERS"

By H. M. LE FLEMING

(Ian Allan, price 2/6 each)

These 1956 editions are compiled to the now familiar pattern, with the owning companies listed in alphabetical order and the ships comprising each fleet dealt with similarly. The different classes of tug are explained in an introductory note. The fleet lists give the name and date of each tug, the h.p. and type of her engine, and—in most cases—the gross tonnage of the vessel. The list of Admiralty tugs includes also the names of the ports from which the tugs operate. Hull and funnel colour details head each list.

Ocean Tankers was first reviewed in the October 1955 *M.M.*, but for the benefit of new readers we repeat that the ships listed in this booklet are mainly those of British companies controlling tankers of 3,000 tons gross and upward, but also included are some of the larger foreign firms whose ships may be seen at British ports. The details given of the ships listed are name and date, gross tonnage, dimensions, type and speed of engine, and hull and funnel colour details.

Each booklet contains the usual abundance of good half-tone illustrations of the types of ships listed.

"OUTPACING THE SUN"

(Temple Press Ltd., price 2/6)

Here is the story of the Fairey Delta 2 research aircraft that regained the Official World Speed Record for Britain last March by attaining an average speed of 1,132 m.p.h. in two runs over a 15 km. course at 38,000 ft.; of its pilot, Peter Twiss; of the men who designed and built the aircraft; and of the method employed to measure the record speed.

The problems that had to be overcome in designing this supersonic research aircraft are described, and also its main structural features. There are some interesting notes, too, on the Rolls-Royce Avon with which the Delta 2 is powered. The immense progress that has been achieved in half a century of flying is indicated by the chronological table of successive air speed records, beginning with that of Santos-Dumont in 1906 when he flew at the then remarkable speed of 25.65 m.p.h.!

There are many excellent illustrations and some helpful diagrams.

"ABC OF CONTINENTAL MILITARY AIRCRAFT"

(Price 3/–)

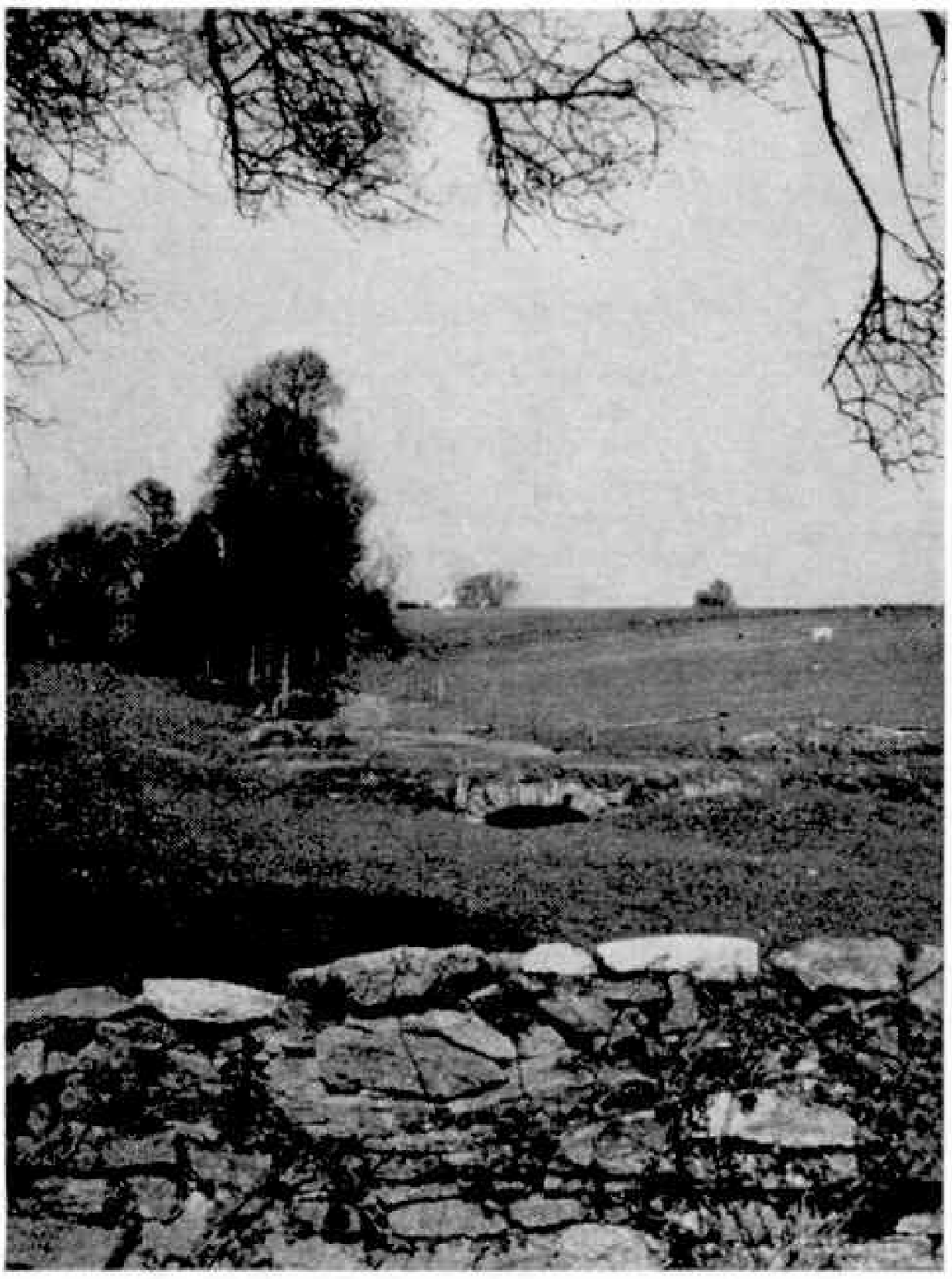
"ABC OF CIVIL AIRCRAFT MARKINGS"

(Price 2/6)

By JOHN W. R. TAYLOR (Ian Allan)

Illustrations and details of several new Soviet fighters and bombers are included, for the first time, in *ABC of Continental Military Aircraft*. "Advanced in concept and fitted in some cases with engines of tremendous power," says the author, "they show that Russian designers no longer have anything to learn from the west." The types of aircraft dealt with in this booklet are arranged in the usual alphabetical order, and in the case of main types include three-view silhouettes as well as half-tone illustrations, specification details and notes on recognition features.

ABC of Civil Aircraft Markings is correct up to 1st February last, and lists in alphabetical order of registration letters all British civil aircraft registered up to that date. It gives lettering, type of machine and name of owner or operator, and, as before, there are lists of overseas airline machines that serve the United Kingdom. There are over 50 half-tone illustrations of current types of civil aircraft.



A view at Crow Down Springs, between Sherston and Didmarton, Wiltshire. Here is the source of the Avon that runs down to the sea through Bath and Bristol. Photographs by Reece Winstone.

The Bristol Avon

By Reece Winstone

HAVE you ever followed a river, not far from your home, from its source to its mouth? It makes a fine if unusual objective for a road ramble and will take you along unfamiliar byways and, all at once, drop you strangely beside familiar landmarks.

While your own local stream or river is as good as any with which to start, it is perhaps wise to select a stretch of only 30 or 40 miles of a long river, as Thames or Severn. This account of an actual ramble along the banks of the Bristol Avon, passing through the counties of Wiltshire, Somerset and Gloucestershire, will perhaps enable you to appreciate the pleasures of such a course.

A one inch map will greatly add to the enjoyment of exploration; you may need gum boots if you are to cross muddy fields in the search for the actual head of the river; and a camera for recording your trip will help you to display your findings to less venturesome tourists. And remember—don't do anything silly or fall in, especially if the stream is deep, in its lower reaches.

Avonhead is not very far from Thameshead, by the way, in quiet hunting country on the borders of Wiltshire and Gloucestershire. It is in fact west of Sherston, amidst Cotswold landscapes. A mile from the hamlet of Luckington is the first road bridge over the tiny stream and, within sight of it, the first little footbridge in the meadows. Eastwards it comes to Sherston, a hilltop village of dignity, associated with a medieval warrior of the name of Rattlebone, who is commemorated by an ancient carving over the church porch and an inn sign opposite.

Under a substantial stone bridge Avon then flows on to the picturesque village of Easton Grey, hidden in a hollow from busy traffic on the main road above. This lovely hamlet often forms the subject of a painter's composition—may it long remain comparatively unknown.

Lanes and main road alike lose sight of Avon for the next two miles to Malmesbury, although the less frequented way to the south gives an unusual view of the Abbey town rising behind the willow-lined stream. Ducks and small boys fishing decorate the scene and one can profitably leave the car to wander around in the old streets near the Avon. A mill, a sturdy old bridge, and the St. John's medieval almshouses repay the curious, well away from the crowded market cross and Abbey precincts.

Examination of the map reveals there are two branches of the Avon, becoming one at Malmesbury; the extra one is a leg flowing south from Tetbury. The joint streams, now widening, turn south-east to the Somerford villages, and then south-west towards Chippenham, passing under the main Bath-Swindon road at Christian Malford. The Avon, almost a river, passes within a stone's throw of Maud Heath's Causeway; a remarkable construction dating from 1474. A Georgian pillar records this as "the Causey of Maud Heath, of Langley Burrell, Widow." The good woman left sufficient property 500 years ago to bring in £8 per annum to maintain a raised walking way beside the road, where flooding occurred, and still does.

Road users hurrying through Chippenham, London-bound, see nothing of the river, but explorers are advised to stop near the bridge and see the many arches carrying A4 over the Avon. Nearby the river serves industry, in a famous chocolate factory, before flowing due south to the most

famous of photographic places—Lacock Abbey, where Fox-Talbot invented the negative in the 1830's. Flooding frequently occurs on the minor road here, too, and a raised footbridge helps the walkers on their way, opposite the Abbey, a National Trust property.

More industry at Melksham, three miles south, this time a well known factory in which tyres are made and given an obvious name. So, through the quiet Wiltshire countryside, to the wonderful old town of Bradford-on-Avon.

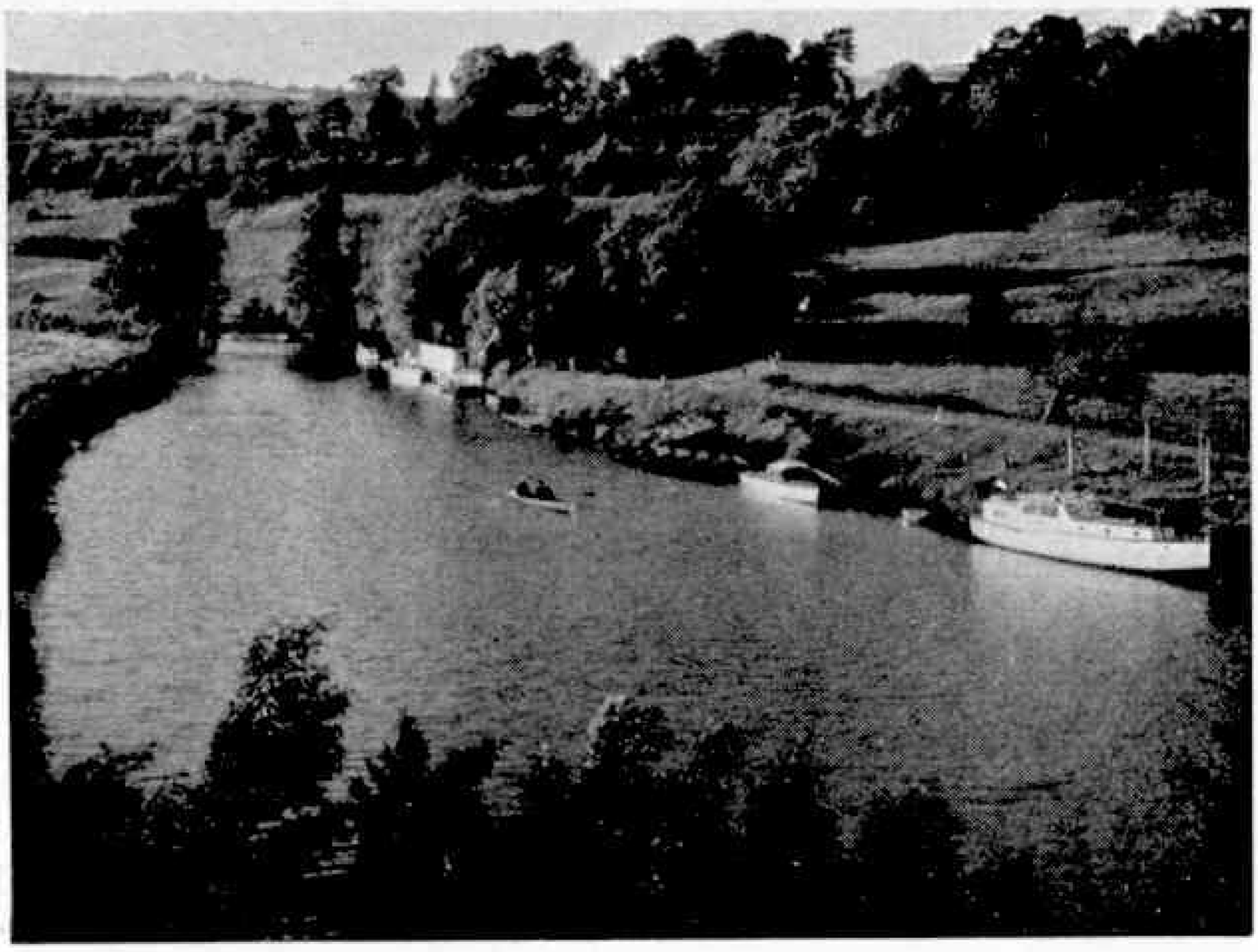
"Wonderful" is not too strong an adjective, for Bradford-on-Avon has practically everything to delight the appreciative visitor—a precious Saxon church, discovered accidentally last century in the most romantic way; a medieval tithe barn; one of the very few bridge chapels remaining in England; lovely old Georgian mansions and Georgian cloth mills beside the river; and quaint narrow streets, awkward for traffic, but a delight to photograph on a Sunday morning. Standing on the medieval bridge one notices the more ancient ford beside it, a ford that gave the place its name long ago.

Limpley Stoke Valley is the next scene for Avon, where river, canal, rail and road make a quartet together. It is a grand day's walk for the nature lover and the artist from Bradford-on-Avon to Bath, and almost any stretch is worth trying. Freshford, Claverton, Bathford, and Bathampton, all in warm Cotswold stone, each with its different charm.

We are now over the border into Somerset and the important Roman and Georgian city of Bath comes into view. Avon has a striking background when seen from the bank opposite to Parade Gardens, which are reached by a narrow, but negotiable way, through a tunnel beside Pulteney Bridge. Here are the Abbey tower, the hotel with its queer upper storey representing Castle, mansion and cottage, and Adam's masterpiece of Pulteney Bridge, with the waterfall in the foreground. Traffic proceeding on the Warminster road gets no glimpse of the water below, because of the shops and houses built on either side of the bridge, one of the very few of its kind in England.

The river now bends north-west, passing under the old Bridge, by the Railway

About a mile from its source the Avon, a little wider and deeper, winds through a Cotswold valley on its southerly way.



New Bridge, Weston, Bath, provides this view of the Avon and its river craft in evening light.

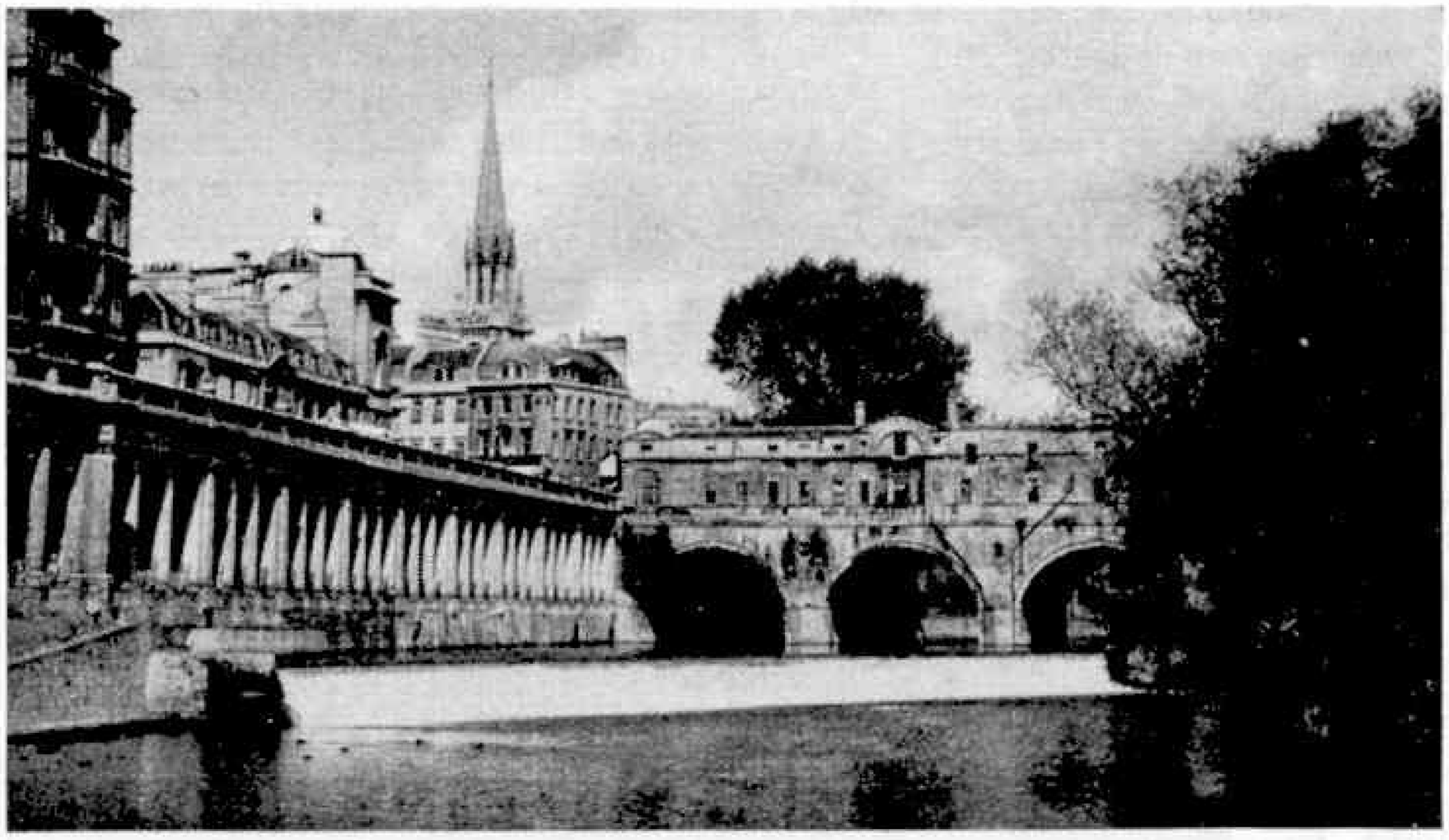
station and under A4 at New Bridge. Weston. These stretches, and all the way to Keynsham, are very popular with boating enthusiasts, and little craft will be tied up to the bank here and there. Both roads to Bristol, north and south of Avon, give their own special views of Saltford, the centre for the boating fans, Keynsham, where another famous chocolate factory was built in the 1930's beside busy A4, and Bitton, on the quieter old road on the right bank. For the last couple of miles of country scenery one must walk beside the river, from Keynsham to Hanham, and then the explorer is over the Bristol boundary.

A popular outing is the river trip from the centre of the city to Hanham—once a very special treat in less sophisticated days. But Bristolians and strangers alike can do worse than take it for an unfamiliar view, as Avon sees the bombed churches in the heart of the old town differently from those in its streets, and industry viewed from a steamer is sometimes difficult to recognise.

Not the least charm of such a port as Bristol is the way ships, cranes and road traffic get thoroughly mixed up. A Danish flag hangs over the pavement, a Dutch stern fills the windscreen round a corner in Prince Street, or Narrow Quay, or above a dockside scene rises the spire of beautiful St. Mary Redcliffe Church. Hotwells—once the Hot Well, rival to Bath in Beau Nash's day—two miles down stream in the Floating Harbour, has three enormous bonded warehouses, where incoming tobacco is stored ready for withdrawal by the cigarette makers; and a road system crossing the two branches of the river, which is quite out of date for the heavy holiday traffic of summer week-ends. Road users bound for Weston-super-Mare and the southwest are often held up for two hours in the bottlenecks on August Saturdays and Sundays. New works are planned, but the bridges still exist only on paper.

However, the greatest bridge of all over the Avon will always be the Clifton Suspension Bridge, now nearly a century old. The two towers of Brunel's masterpiece stayed alone and unfinished for over thirty years because the first company formed ran out of capital. But all went well in 1861-1864, when the job was completed. A toll bridge ever since, it is expected to be free of payment "any year now."

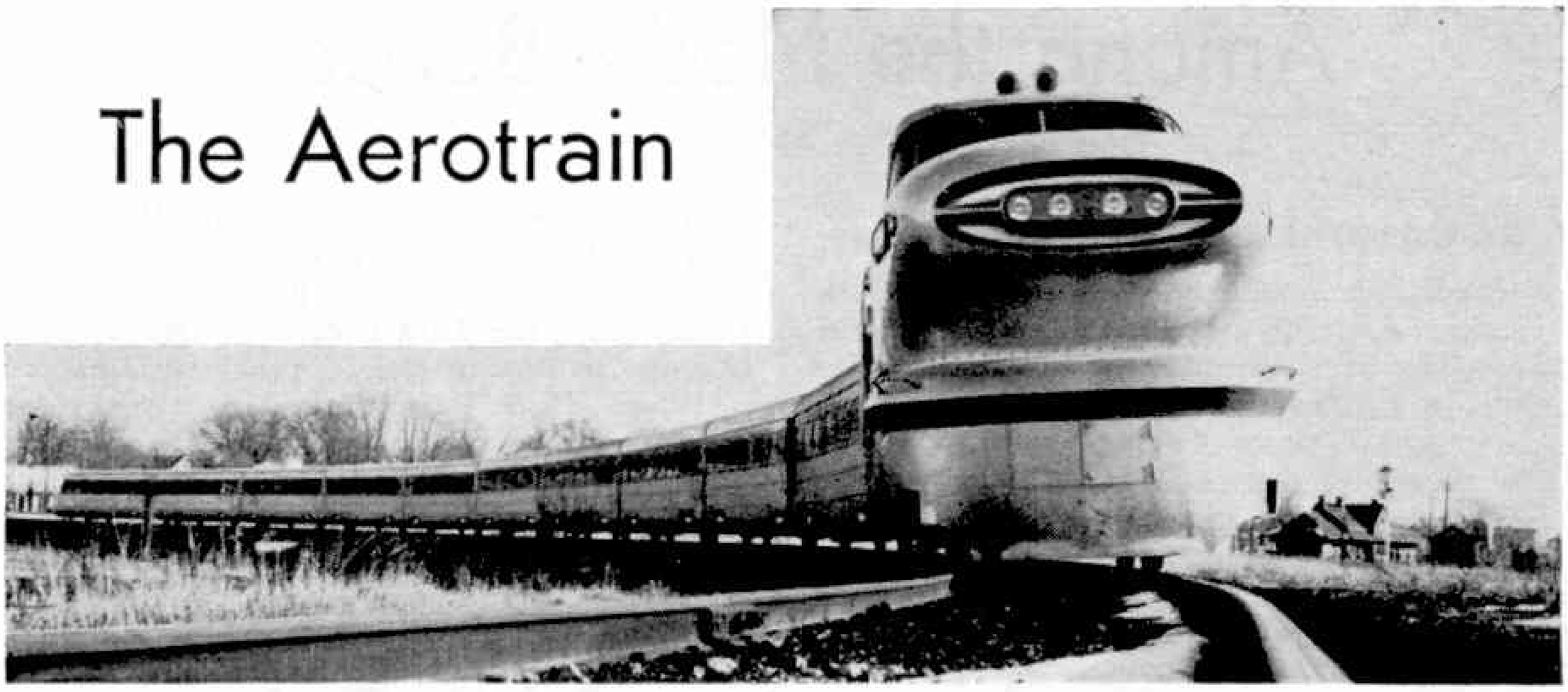
The last stretch of Avonside is via Portway, a brand new four or six lane highway constructed in the 1920's from Hotwells to the mouth of the river. Carrying heavy traffic to and from the great Bristol docks at Avonmouth, it proved its value in the recent war, and nowadays speeds the exporting motor cars from the Midland factories. So we have reached the end of the journey, with perhaps a view where the Avon merges into the Severn Estuary, of a banana boat, or a grain ship, discharging its cargo from warmer climates. And a few miles north may stand some day the wished-for bridge across the Severn.



Pulteney Bridge, Bath, built in 1770, is now a national monument. It still retains its houses and shops, and many cross it without knowing the Avon is beneath it.

Plans are indeed proceeding, through recent action by city and county authorities each side of the Bristol Channel, and the Minister of Transport's sympathetic encouragement is promising for the near erection of the Severn Road Bridge. It will have to be a toll bridge, but think of the great gain in speed such a project will give to traffic across the Severn mouth.

The Aerotrain



THE train approaching you in the picture on this page has a rather terrifying appearance. But it is not a new form of monster. It is only the locomotive at the head of a new type of passenger train that is now making its appearance on certain railways in the United States. The railways there lose enormous sums of money every year in operating passenger trains, and one way of reducing the loss is by the introduction of coaches that are cheaper to make, do not need expensive repairs or overhauls, and require less power to haul.

The train that you see in the picture above is one of the efforts to bring about these very desirable ends. It is the product of the Electro-Motive Division of General Motors, and the particular example illustrated here is one that has been delivered to the Pennsylvania Railroad.

Here in the picture on this page is a new type of train, light and speedy, that is in service on the Pennsylvania Railroad in the United States. The coaches are only half the length of those of normal type, and have pneumatic suspension, and the locomotive is geared for a top speed of over 100 m.p.h.

The idea of the new train was to pick out the most economical form of locomotive and to match it with a train that would allow the greatest possible use at the least possible cost. For the locomotive the diesel was an obvious choice, and the rule that General Motors set for itself was that existing components that had been proved in practice should be used to the greatest possible extent in its construction. So the locomotive of the new train has standard General Motors diesel engines and Electro-Motive generators, traction motors and control apparatus.

The coaches represent a new idea in railway passenger coach design. They are based on the body of the General Motors Truck and Coach Division's 40 passenger road coach of the kind used for transport between cities. In this new design the undercarriage is strongly made to last for years, and no emphasis is laid on styling. In consequence it will need little attention. The body costs very much less than the traditional type of railway passenger coach, and it is thought that it can be replaced by a new one when it reaches the condition requiring overhaul for less money than the railways now spend in repairing and refurbishing standard coaches.

The change from the 40 passenger road coach body has been made by increasing the width to give more comfortable seating space and a wider aisle, and by replacing the driver and engine compartments by vestibules. The new coach has an axle at each end, so that it has only four wheels, and its baggage compartment is under the floor. Passengers ride at practically the same level as in normal railway coaches, but they ride more comfortably on a novel suspension system in which compressed air in rubber bellows stabilises and cushions the ride. The coaches are not articulated.

Two of these 40 passenger cars are equivalent to one 80 passenger conventional railway coach, but they weigh together only 32 tons against the standard 65 of the latter. This means less deadweight to haul, and that in turn makes possible higher railway speed. The new train seen in the picture consists of one locomotive and ten cars, and can attain 100 m.p.h.

Among the Model-Builders

By "Spanner"

Reversing and Gear Change Mechanism

Reversing mechanisms are used in Meccano models of many kinds and sometimes it is an advantage to have the drive in the reverse direction at a speed slower than that of the forward drive. The reversing device illustrated in Fig. 1 should be useful in these circumstances, as a fast direct drive is available in one direction, while a slower but more powerful drive through reduction gearing is provided in reverse. The mechanism was submitted by Mr. F. Richardson, Surbiton.

The bearings for the mechanism illustrated are provided by two Channel Bearings, but of course this arrangement can be modified to suit any particular model. The input or driving shaft is a Rod 1 that carries a ½" Pinion 2 and one half 3 of a Dog Clutch. The other half of the Dog Clutch and a ½" Pinion 4 are fixed on the output or driven shaft 5. A Rod 6 fitted with a 57-tooth Gear 7 and a ½" Pinion 8 is mounted in the Channel Bearings, and a ½" Pinion 9 is fixed on a short Rod and arranged so that it is in constant mesh with the Pinions 4 and 8. The Rods carrying the Pinions 4, 8 and 9 are held in their bearings by Collars, but the Rod 1 must be free to slide slightly in one of the Channel Bearings.

When Rod 1 is moved to the right (Fig. 1), the two sections of the Dog Clutch engage and a direct drive is provided between the input and the output shafts. Movement of Rod 1 to the left however, disengages the Dog Clutch and brings Pinion 2 into mesh with the Gear 7. Thus a 3 : 1 reduction ratio is obtained, and through the action of the gears the direction of the drive between the Rod 1 and the output shaft is reversed.

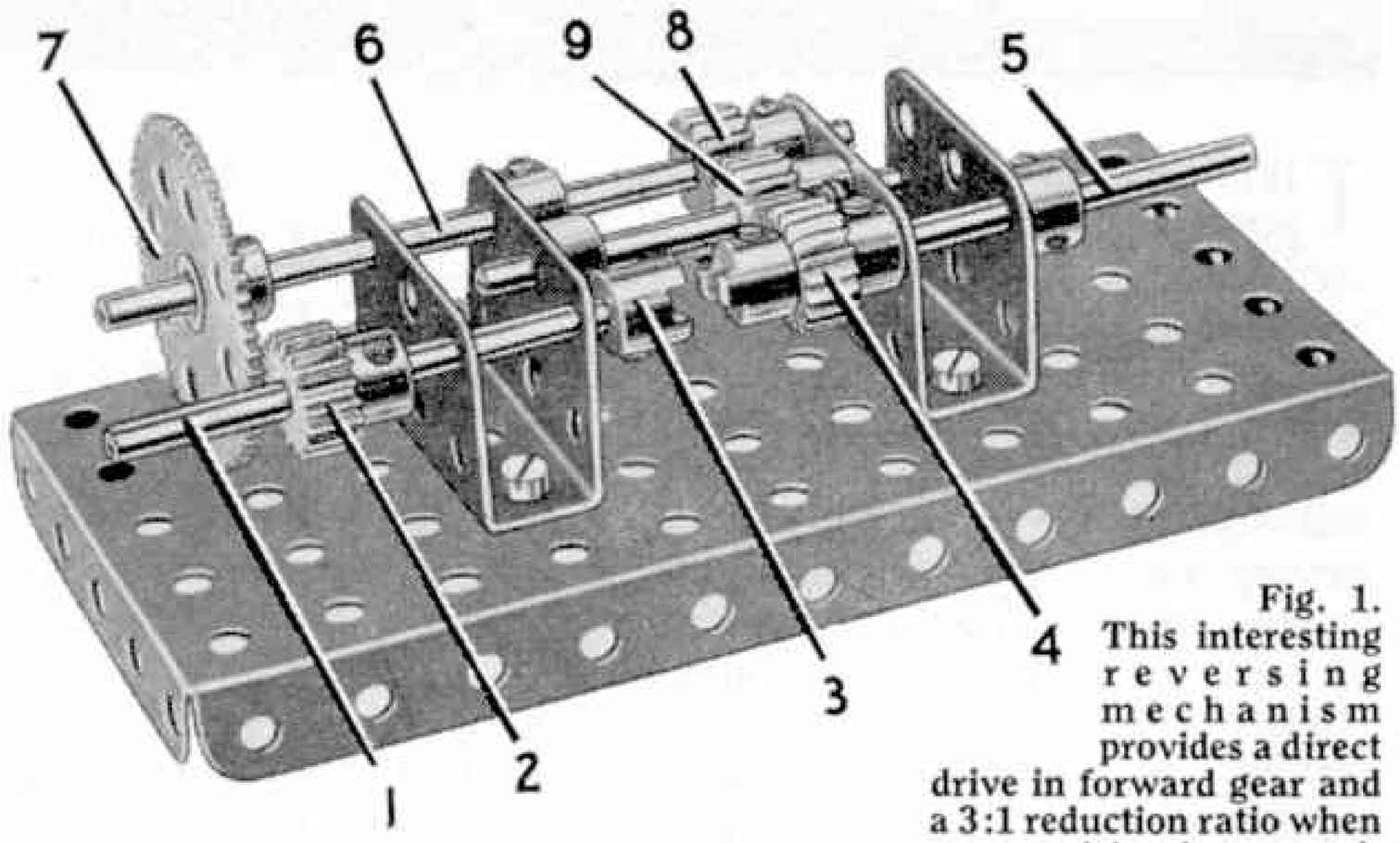


Fig. 1. This interesting reversing mechanism provides a direct drive in forward gear and a 3:1 reduction ratio when reverse drive is engaged.

Internal Expanding Brake

Fig. 2 shows a simple internal expanding brake mechanism that is positive in action and provides a strong retarding effort. The brake is designed primarily for use in connection with model vehicles, but owing to its small size and simplicity it should prove useful in other types of models.

The brake shoes are two 1½" Strips 1 and the actual rubbing surfaces are nuts placed on bolts mounted in the Strips. The Strips are connected together and to a further Strip 2 of suitable length by a lock-nutted bolt 3. The Strip 2 forms the brake

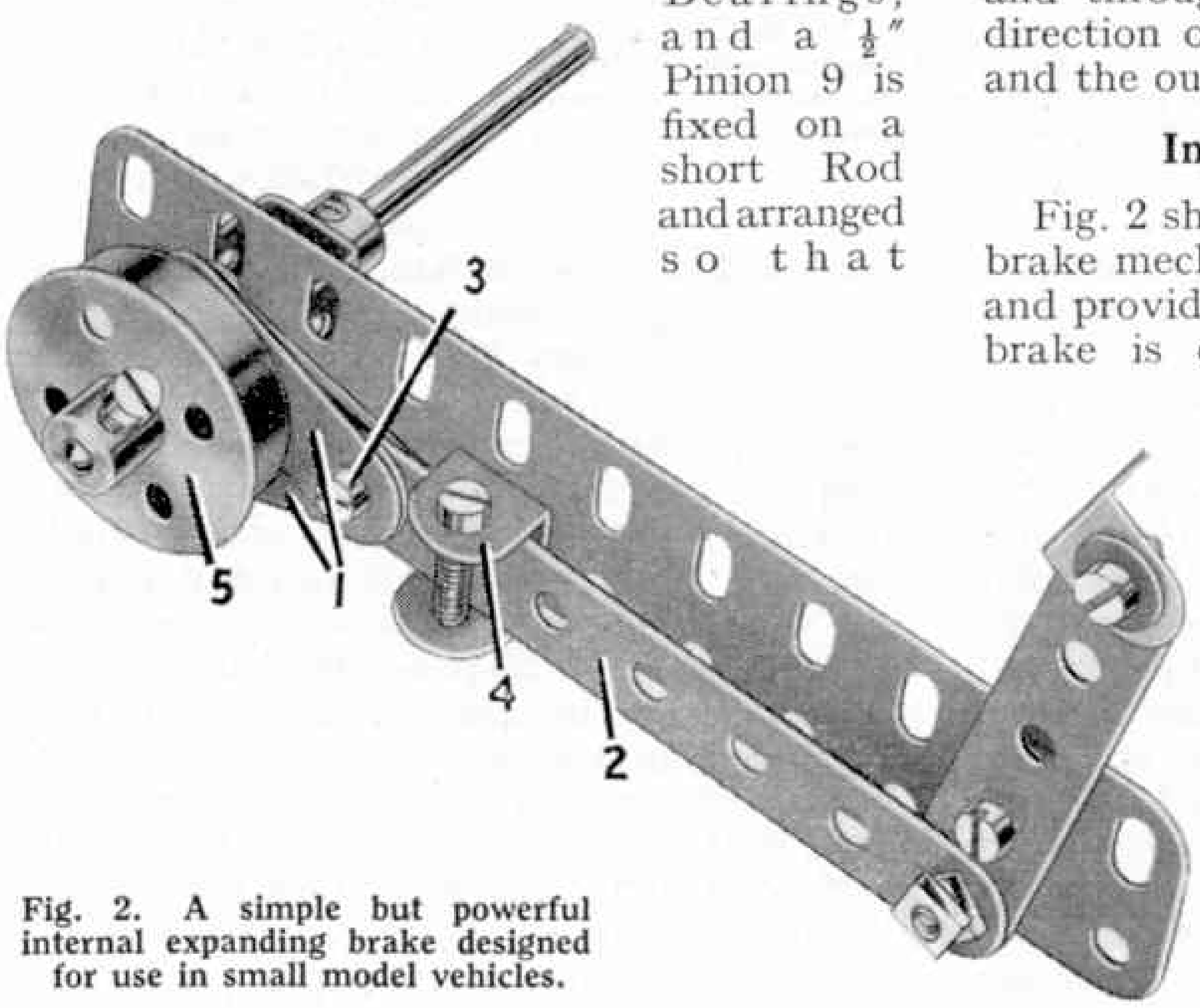


Fig. 2. A simple but powerful internal expanding brake designed for use in small model vehicles.

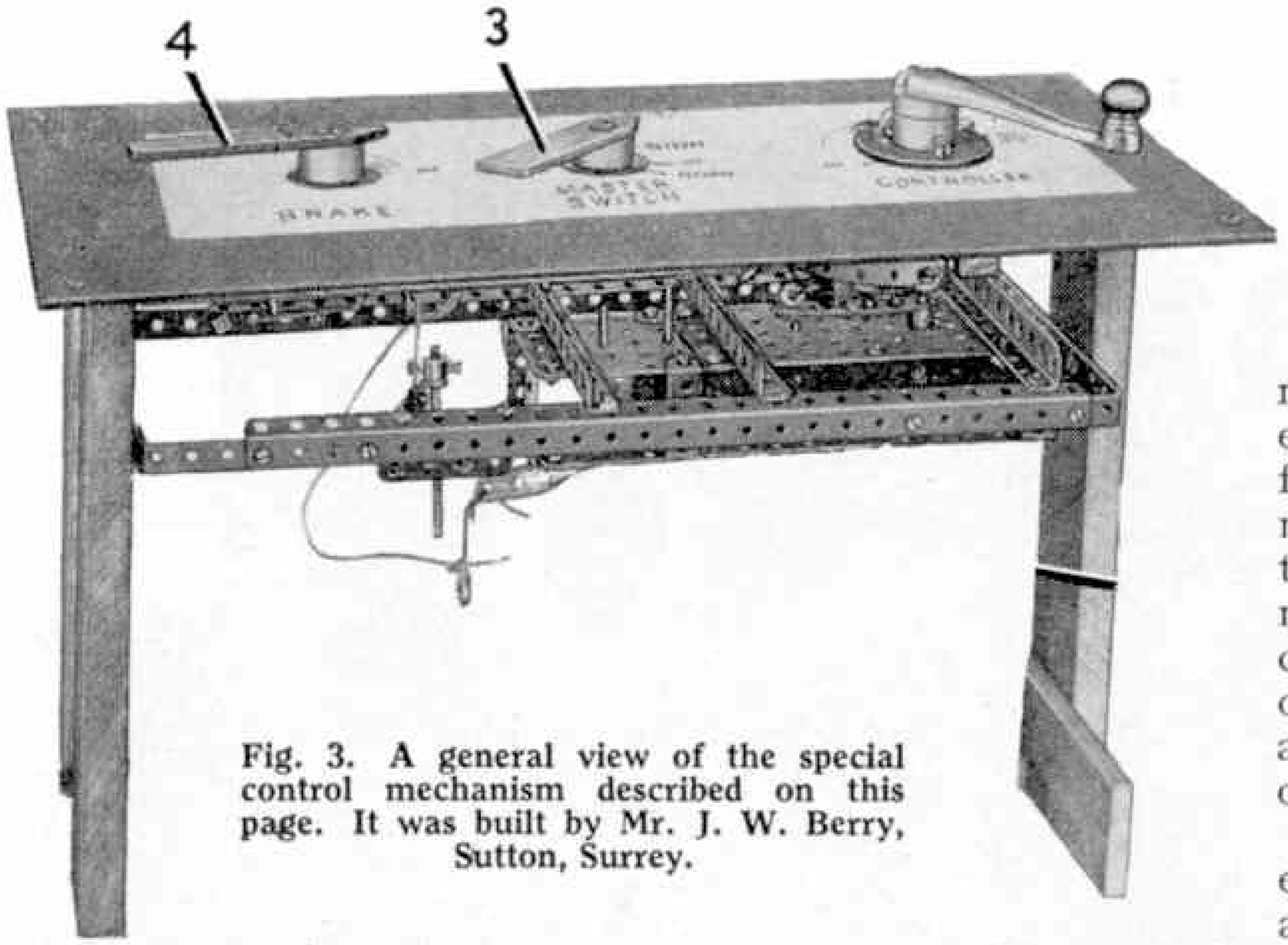


Fig. 3. A general view of the special control mechanism described on this page. It was built by Mr. J. W. Berry, Sutton, Surrey.

control rod and it should be connected to a convenient foot pedal or a hand lever. In Fig. 2 it is shown attached to a simple pedal that represents the foot brake of a car or lorry. The Strip 2 is supported by the lugs of a Double Bracket 4 bolted to the frame of the model and is retained between the lugs by a $\frac{3}{4}$" Bolt.

The Strips 1 are arranged one above and one below the Rod carrying the brake drum 5. A $2\frac{1}{2}$" Driving Band looped round the bolts forming the rubbing surfaces and round the lock-nutted bolt 3 serves as a return spring.

A Meccano Model Train Controller

We have received from Mr. J. W. Berry of Sutton, Surrey, some details of a controller built up by him to represent, externally, the controls of an electric train. Our illustration shows the top panel and interior of the controller, but the sides of the casing normally enclosing the working parts have been removed.

Meccano parts, and various odds and ends, have been ingeniously arranged to provide the various movements needed, so that the movements of the control handles on the top panel are transmitted to a controller inside the built-up unit.

Mr. Berry has tried, with considerable success, to reproduce the gradual acceleration or deceleration characteristic of a real train as the controller handle is advanced or retarded. This has been effected by using what is in fact a spring-governed mechanism, transmitting through a train of gears the movement of the extended control handle to the final drive spindle, which carries a crank engaging the handle of the controller.

A minor, but quite effective part of the arrangement is that the characteristic noises that are heard when a real controller is being notched round are to a certain extent reproduced by a spring-loaded arm 2 that moves with the control handle. The outer end of the arm consists of a Meccano Rod that bears on a Strip to which Angle Brackets are attached at intervals. These have their longer sides vertical and thus project slightly above the level of the Strip. Control positions are marked on a sheet of paper attached to the upper control panel.

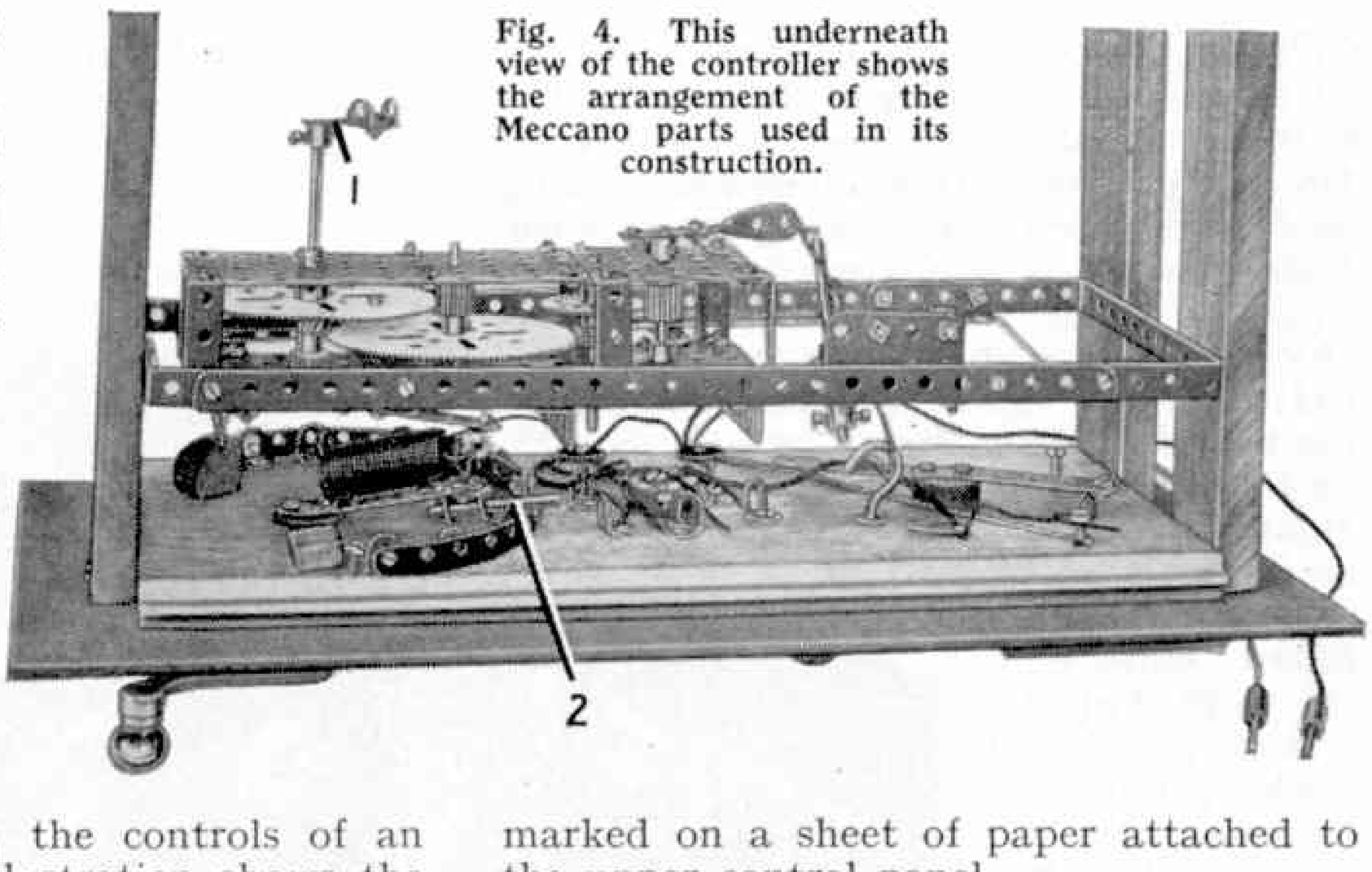


Fig. 4. This underneath view of the controller shows the arrangement of the Meccano parts used in its construction.

The apparatus works on the handle of the controller in one direction only, reversing being accomplished by the central handle 3 on the panel, which represents a master switch. This has three positions, *Forward*, *Off* and *Reverse* respectively, and these indications really tell their own story.

Braking is by means of a third control 4 marked *Brake*.

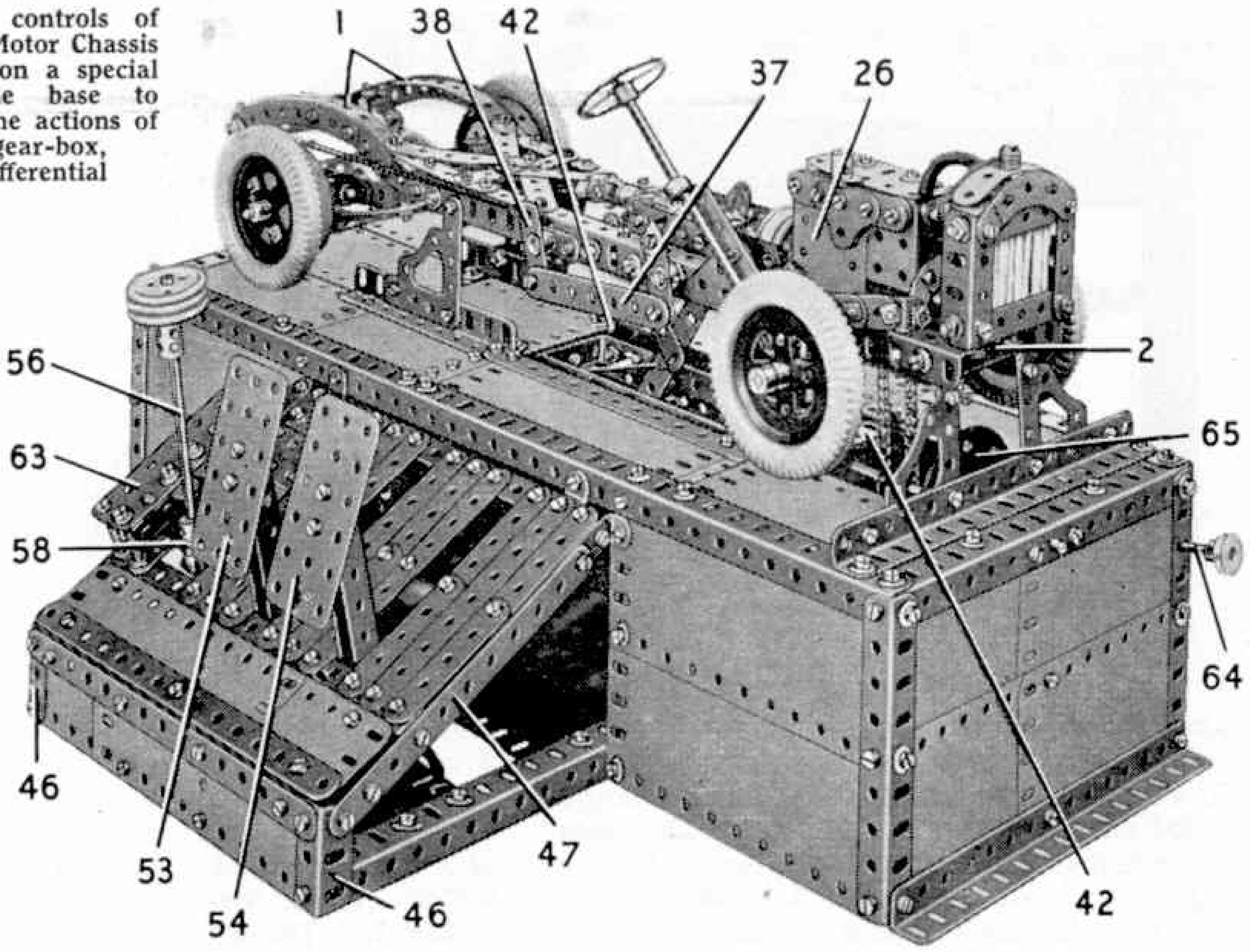


Fig. 1. The controls of this splendid Motor Chassis are mounted on a special panel in the base to demonstrate the actions of the clutch, gear-box, brake and differential mechanisms.

MODEL OF THE MONTH

Motor Chassis

THE splendid Motor Chassis shown in the picture at the top of this page makes a really attractive subject for advanced Meccano enthusiasts who delight in building models with plenty of detail. Although the Motor Chassis is very compact, it is fully equipped with clutch, two speed and reverse gear-box and differential and brake mechanisms, and is driven by an E20R(S) Electric Motor. It is therefore a working model in the fullest sense of the word, but it differs from previous Meccano motor chassis in that it is not designed to travel.

The new Motor Chassis is in fact part of a demonstration model, showing how a motor car works.

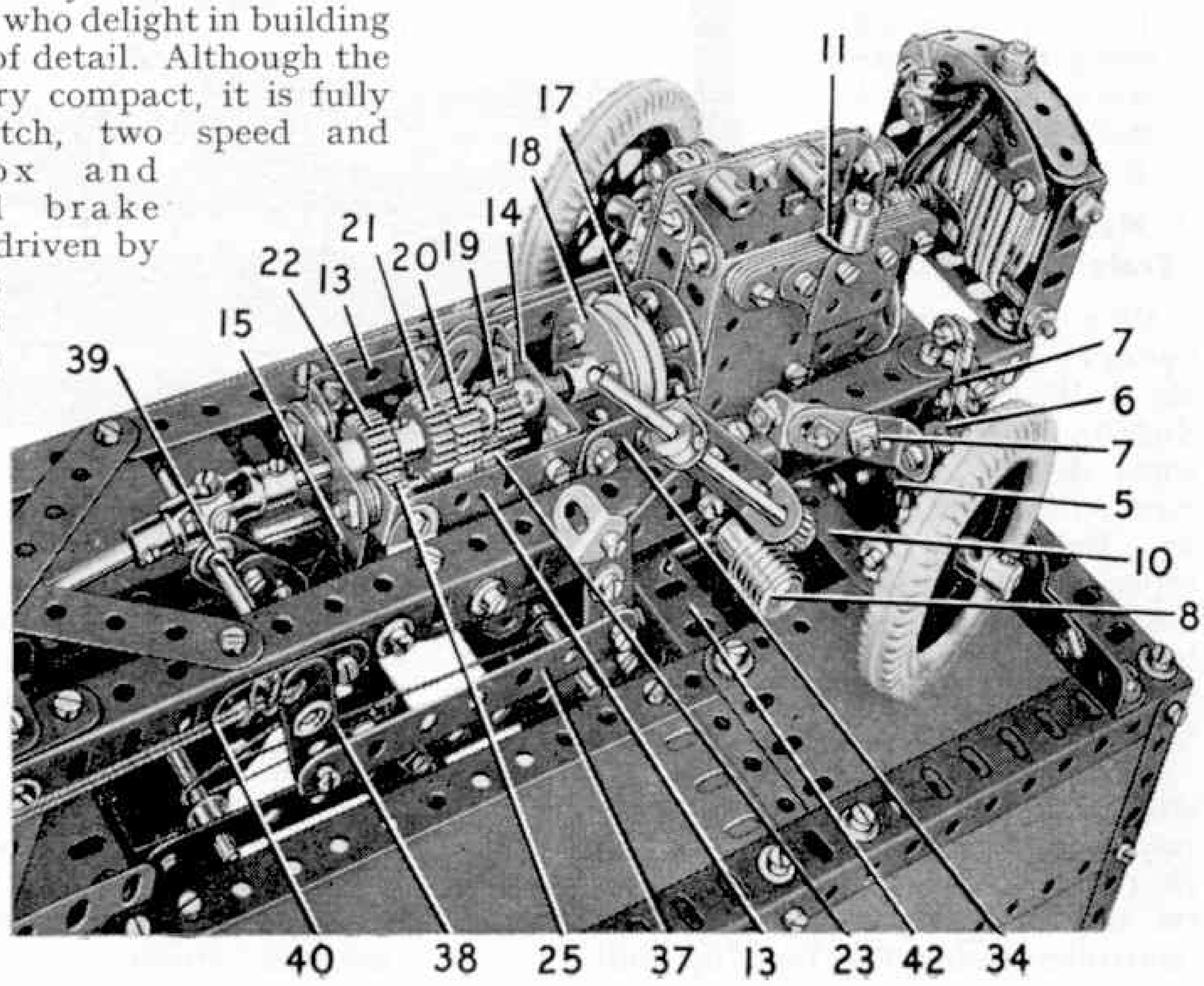


Fig. 2. A close-up of the engine unit, front suspension and the steering mechanism of the Motor Chassis.

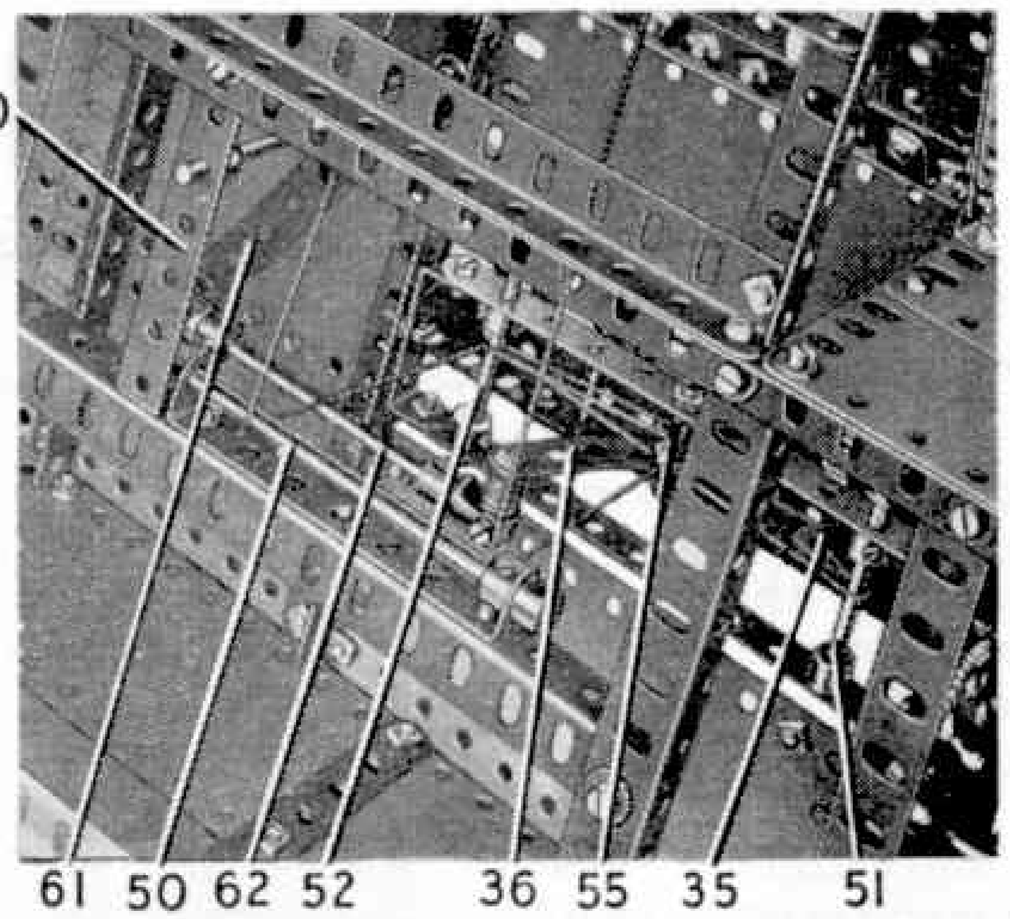


Fig. 3. A detail picture of the control arrangements that link the gear lever, clutch and brake pedals to the Chassis.

It is attached to a strong base so that its wheels are raised, and the E20R(S) driving motor is mounted in the base and is connected to the Chassis engine unit by Sprocket Wheels and Chain. The clutch, brake and gear-box levers are connected to special controls mounted in a panel bolted to the front of the base.

These controls of course are very large compared with the size of the Chassis, and they can be operated very easily, appropriate mechanisms in the Chassis then responding to the movements of the levers. The model is ideally suitable therefore to demonstrate the principles of the mechanisms of a real chassis. The brake pedal operates a simple brake on one rear wheel only, and when the brake is operated the differential mechanism is brought into action and increases the speed of the opposite wheel.

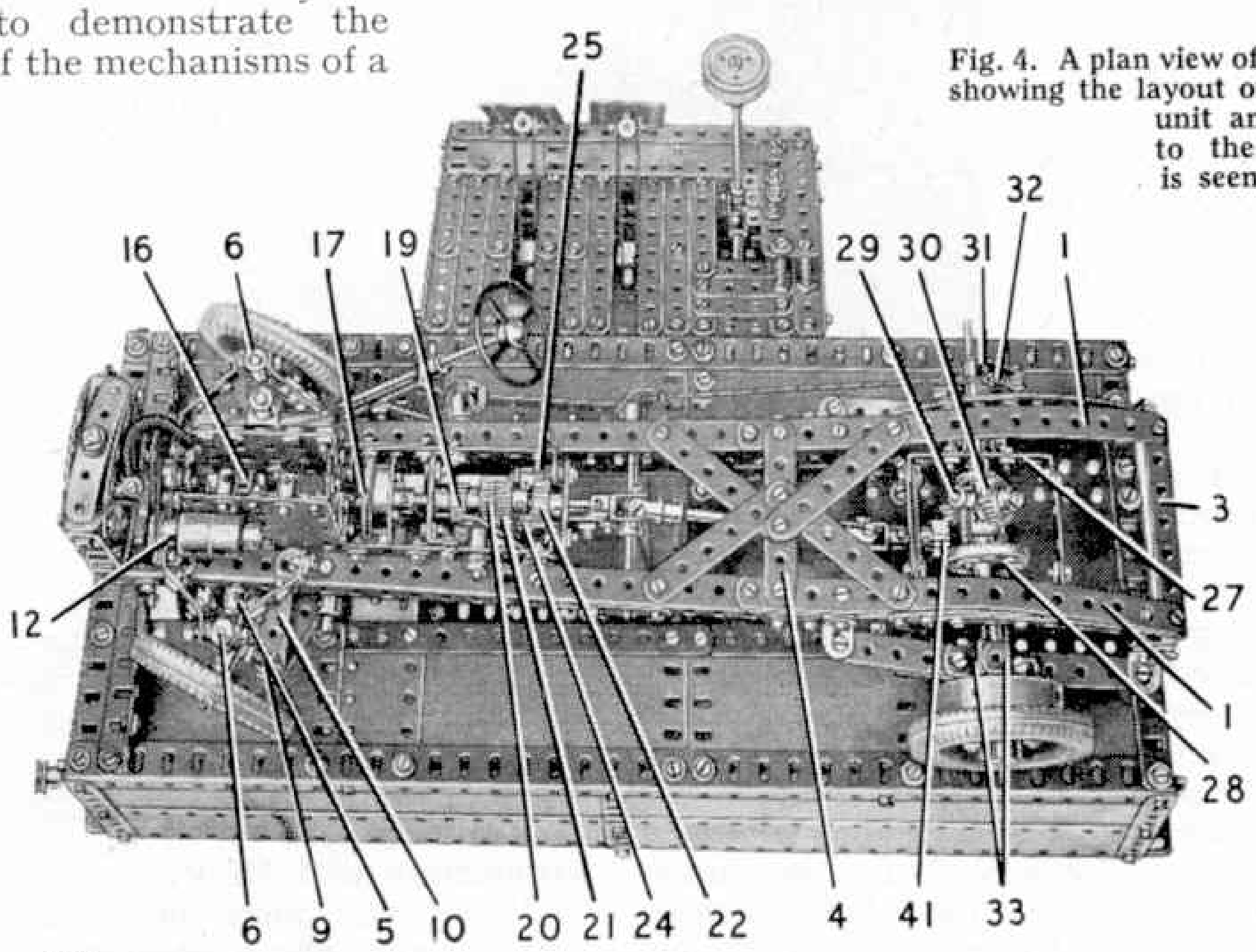


Fig. 4. A plan view of the Chassis, showing the layout of the engine unit and the drive to the rear axle, is seen on the left.

Apart from the mechanisms already mentioned the Motor Chassis is fitted with a neat independent front suspension arrangement controlled by torsion bars, and the steering mechanism is of the rack and pinion type. The model is exceptionally interesting to build and operate, and readers requiring full constructional details can obtain them by writing to the Editor, enclosing a 2d. stamp for return postage.

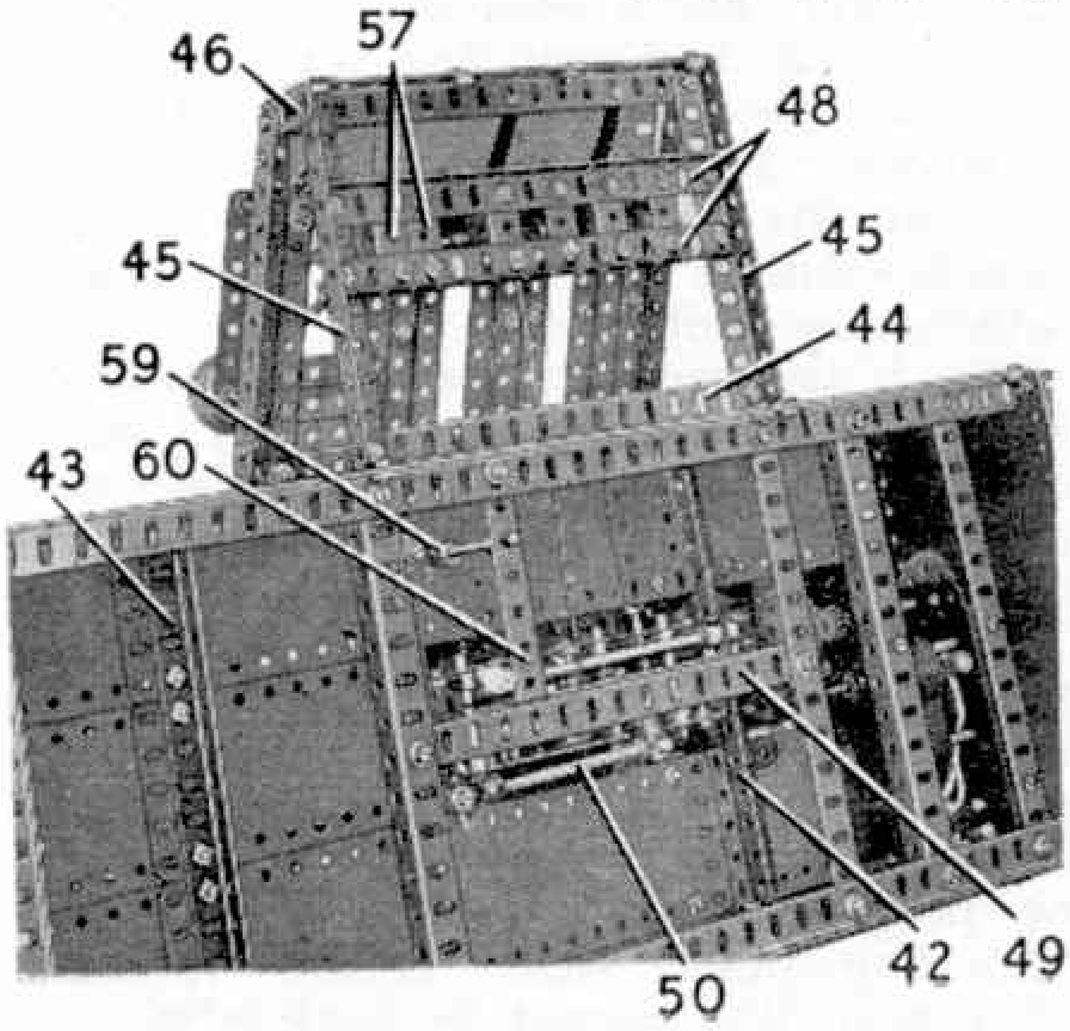


Fig. 5. This underneath view of the base shows the arrangement of the E20R(S) Electric Motor that operates the model.

Summer "Realism" Competition

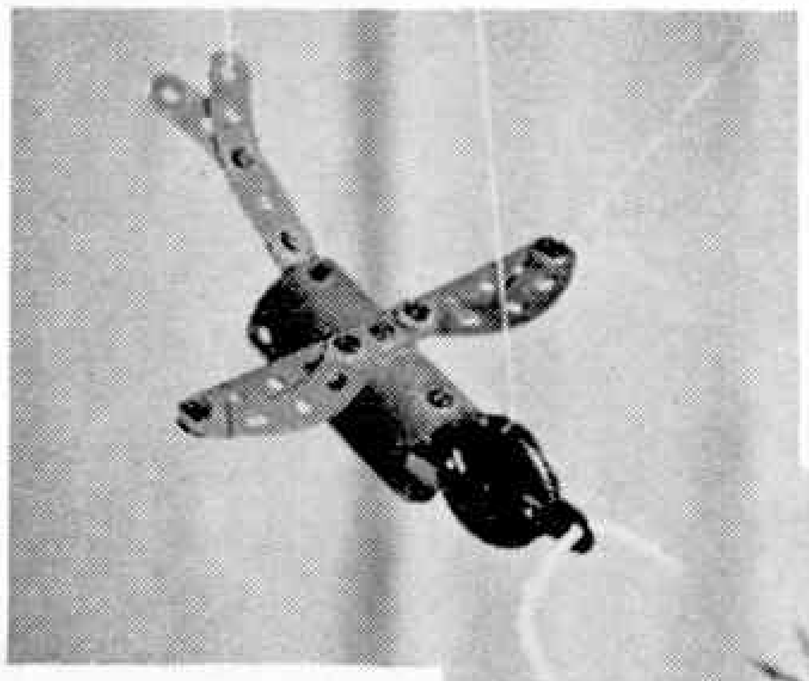
Meccano Models in Realistic Surroundings

THE special Competition we have arranged for the summer months is open for entries until 30th September. Full details were given in the June and July issue of the *M.M.*, but for the benefit of readers who missed the opening announcements we are repeating the main details.

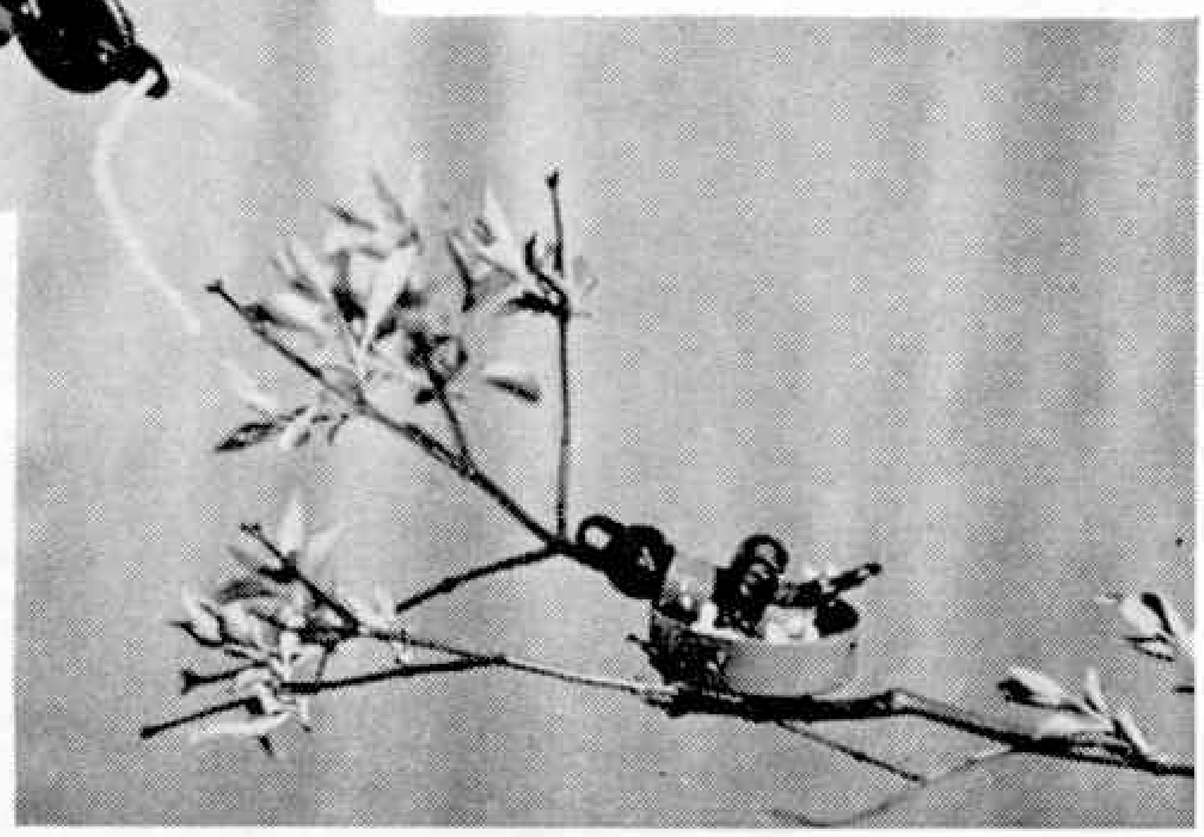
In this Contest competitors are asked to send in photographs or drawings of suitable models arranged in natural and realistic surroundings. There are many models that can be incorporated in effective scenes and it is quite easy to prepare an entry. A bridge spanning a river, a building under construction, or an excavator or bulldozer at work will provide plenty of opportunities to make up really attractive scenes, and the picture on this page shows another simple and easily arranged entry of a kind that might well win a prize in this Contest.

It is not even necessary to build a model specially for this Contest. Of course there must be at least one model in the picture, but any suitable model you may have already built or under construction may be used. The most important thing is to arrange the model or models in surroundings as realistic and as natural as you can devise. You can make use of materials of any kind to build the scene, which can be of any size as long as Meccano is a main feature of it.

While in this country it is summer, and most readers will find it a pleasant and interesting change to prepare their Competition entries out of doors, we realise that some of our Overseas readers may not find conditions so pleasant in the open just now. Overseas competitors therefore can arrange suitable scenes indoors if they wish, on the same lines as the layouts used in connection with Dinky Toys.



"The Breadwinner returns to its nest." This unique and charming arrangement of a model bird returning to feed its young in the nest, is made up from a few Meccano parts and a branch of a flowering shrub. It is the work of Donald Holliday, Jesmond, Newcastle-upon-Tyne.



When you have prepared your entry you should take a photograph or make a sketch of it, and send the illustration to *Meccano Realism Competition, Meccano Limited, Binns Road, Liverpool 13.* Photographs are preferable, but good clear sketches will do if it is impossible to obtain satisfactory photographs.

There are two sections in the Contest; Section A for competitors under 12 years of age on 30th September, 1956, and Section B for competitors who will be 12 or over on that date.

Details of the prizes to be awarded for the best entries in each Section are given in the panel on this page. Each competitor must write his age, name and address clearly on the back of his entry, which must be posted to reach us not later than 30th September, 1956. Entries received after that date cannot be considered.

THE PRIZES

The following prizes will be awarded in each of the Sections A and B.

	£	s.	d.
First Prize, Cheque for	4	4	0
Second Prize, Cheque for ..	2	2	0
Third Prize, Cheque for	1	1	0
Ten Prizes, each of		10	0
Ten Prizes, each of		5	0

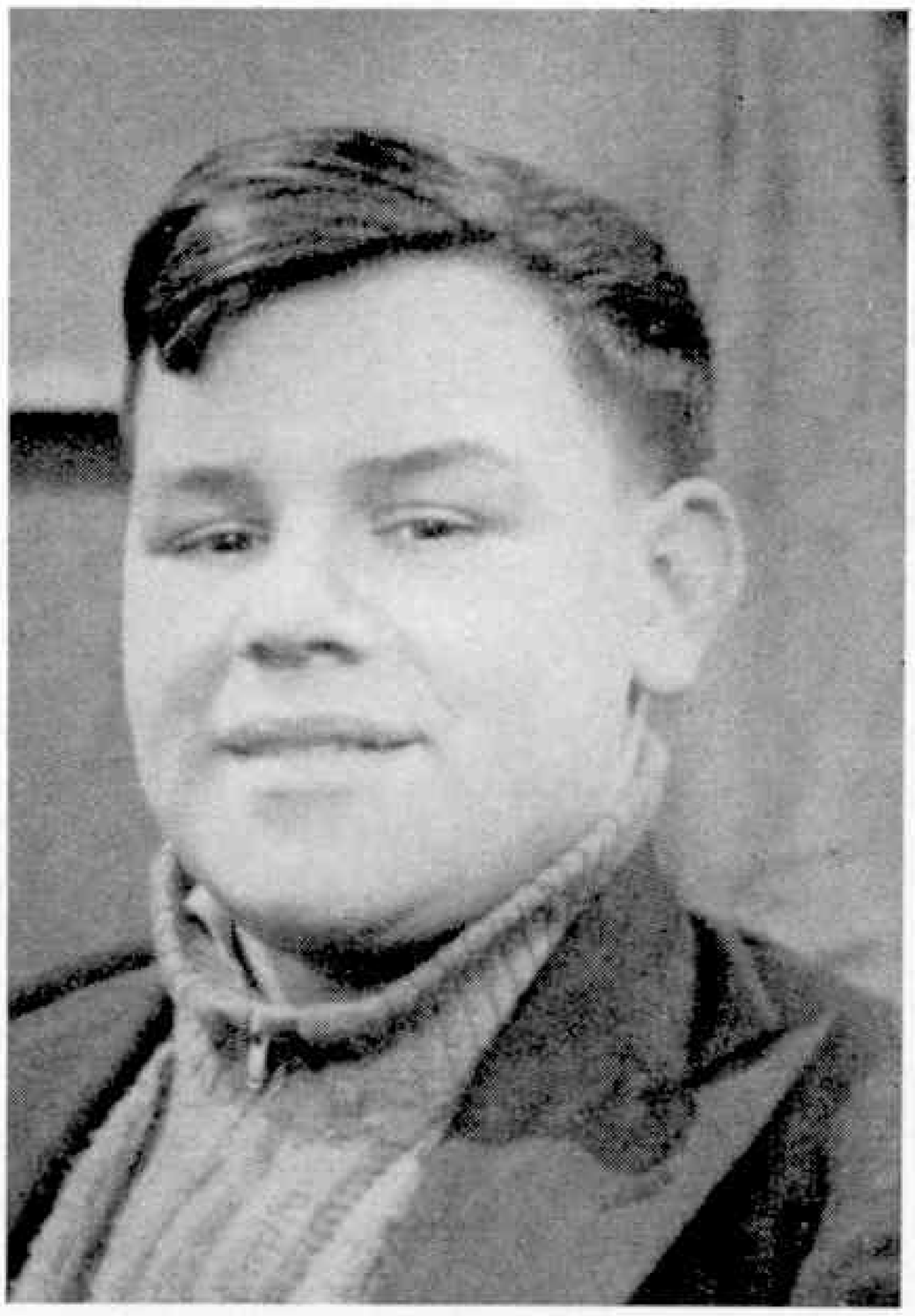
Club and Branch News

WITH THE SECRETARY

SUMMER ACTIVITIES

Clubs that "pack up" during the summer usually find when autumn comes round again that in the meantime some of their members have found other interests, or have just drifted away, resulting in a reduced membership with which to start the indoor season. I am therefore very glad to note from the monthly reports reaching Headquarters that this year more Clubs have realised the importance of maintaining active contact with their members throughout the summer, and that some very interesting programmes suited to this time of year are being carried out. Some Clubs are running regular outdoor Games Evenings in a local park or recreation ground, and in others cycling runs, hiking and other forms of excursion to places of interest are more popular. Some Clubs, like the recently-affiliated one at Belper reported elsewhere on this page, are keen on model aircraft, and have been holding model flying meetings.

These various outdoor recreations give members taking part healthy open-air exercise and lots of fun, and at the same time are of immense value in developing the "team spirit" that is the essence of successful Club life.



Brian Ward, Secretary of the Consett and District Y.M.C.A. M.C. The model-building achievements of this enthusiastic Club have won high praise at local exhibitions, and their working model colliery, illustrated in the M.M. last May, has become a star attraction.

CLUB NOTES

CONSETT AND DISTRICT Y.M.C.A. M.C.—The summer programme includes cycling, hiking, swimming, and, of course, Meccano model-building. The latter includes work on an illuminated Meccano tower that will be over 6 ft. high and erected on a baseboard about 3 ft. square which will be laid out as a park, with hidden lighting effects. The tower will carry the letters Y.M.C.A. and the familiar triangular symbol. The electrification of the Club layout is making good progress. Club roll: 30. *Secretary:* B. Ward, 10, Cyril Street, Number One, Consett, Co. Durham.

ST. THOMAS DISTRICT (EXETER) M.C.—Attendance at meetings has been well maintained, and considerable model-building has been accomplished. Several new members have been enrolled, and the Club has been visited by some Meccano enthusiasts who were staying in the district on holiday. A Club magazine has been started. Club roll: 15. *Secretary:* B. Madge, 42 Duckworth Road, St. Thomas, Exeter.

BELPER PARKS M.C.—Summer outdoor activities have centred around model aeroplane flying. On one occasion the Leader flew his model helicopter, and afterwards a paper aeroplane contest was held. When an outdoor meeting was cancelled owing to bad weather, a discussion on how to build model aircraft was held in the Club room. Club roll: 26. *Secretary:* C. R. Charlton, "Overdale," Mount Pleasant Drive, Belper.

EXETER M.C.—More new members have been enrolled, and attendance at meetings continues to be very good. Meetings are held in the Club room and also at the Leader's home. Weekly outings are proving very popular, and on one to Barley Copse the party picnicked in the woods. Other visits have been to Exmouth and to Killerty Gardens. Club roll: 25. *Secretary:* P. Phillips, 12 Alpha Street, Heavitree, Exeter.

NEW ZEALAND

CHRISTCHURCH M.C.—Up to the time of writing this report the New Zealand Industries Fair at Christchurch had been visited by some 20,000 people. The Club's display at this Fair has attracted much attention, and in the Open model-building competition Club members won three First and two Second prizes. Outdoors a mystery bicycle ride over about 20 miles of country ranged through the counties south and west of Christchurch, and during a halt supper was prepared on a spirit stove. Club roll: 21. *Secretary:* R. Boundy, 49 Evesham Crescent, Spreydon, S.W.1, Christchurch, New Zealand.

SOUTH AFRICA

CAPE PENINSULA (CAPE TOWN) M.C. Meetings are held fortnightly, and in addition to the usual model-building activities members have been busy completing their entries for the Annual Winter Competition. A set of special wooden cabinets to the Leader's design have been purchased, and members are partitioning the drawers in them so that each type of Meccano part will have its own compartment. Club roll: 30. *Secretary:* K. M. Liebbrandt, "Eastbourne," Wargrave Road, Kenilworth, Cape Town, South Africa.

BRANCH NEWS

AVIARY (LEEDS)—During the summer outdoor meetings devoted to organised games are being held in the park whenever weather permits. In consequence progress on the Branch layout has been slowed down. A Film Show has been given by British Railways' Publicity Department Film Unit. *Secretary:* L. Blakey, 21 Arley Street, Armley, Leeds 12.

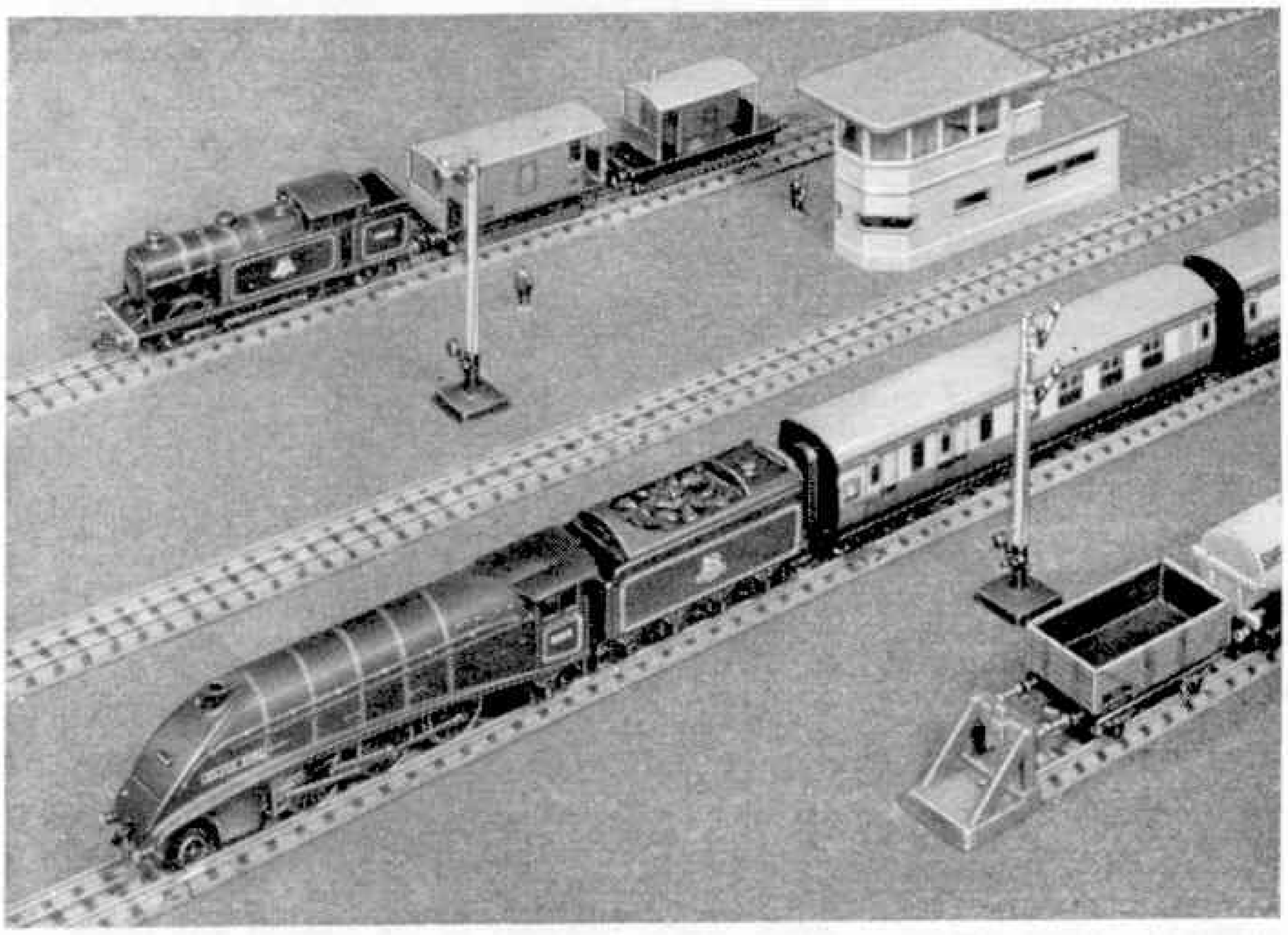
HORNBY RAILWAY COMPANY

Hornby-Dublo Tanks and a New Train

By the Secretary

I EXPECT that many of you will have seen the recently revised Hornby-Dublo *Silver King* Train Set now designated EDP15. This is really a new version of the EDP11 set, and it incorporates the usual number of rails and the familiar A4 *Silver King* Locomotive and D11 Tender. The chief feature about this revised set is that it now incorporates the D12 Coaches, which have hitherto been used only in the "Duchess" train sets.

This change has been made because since the formation of B.R., and indeed before that, a "new look" has been evident on many of the trains of the East Coast main line. So, in order to provide a Hornby-Dublo Train Set reasonably representative of the present order of things, it was decided to incorporate D12 Coaches in a Train Set with the D11 Locomotive and Tender.

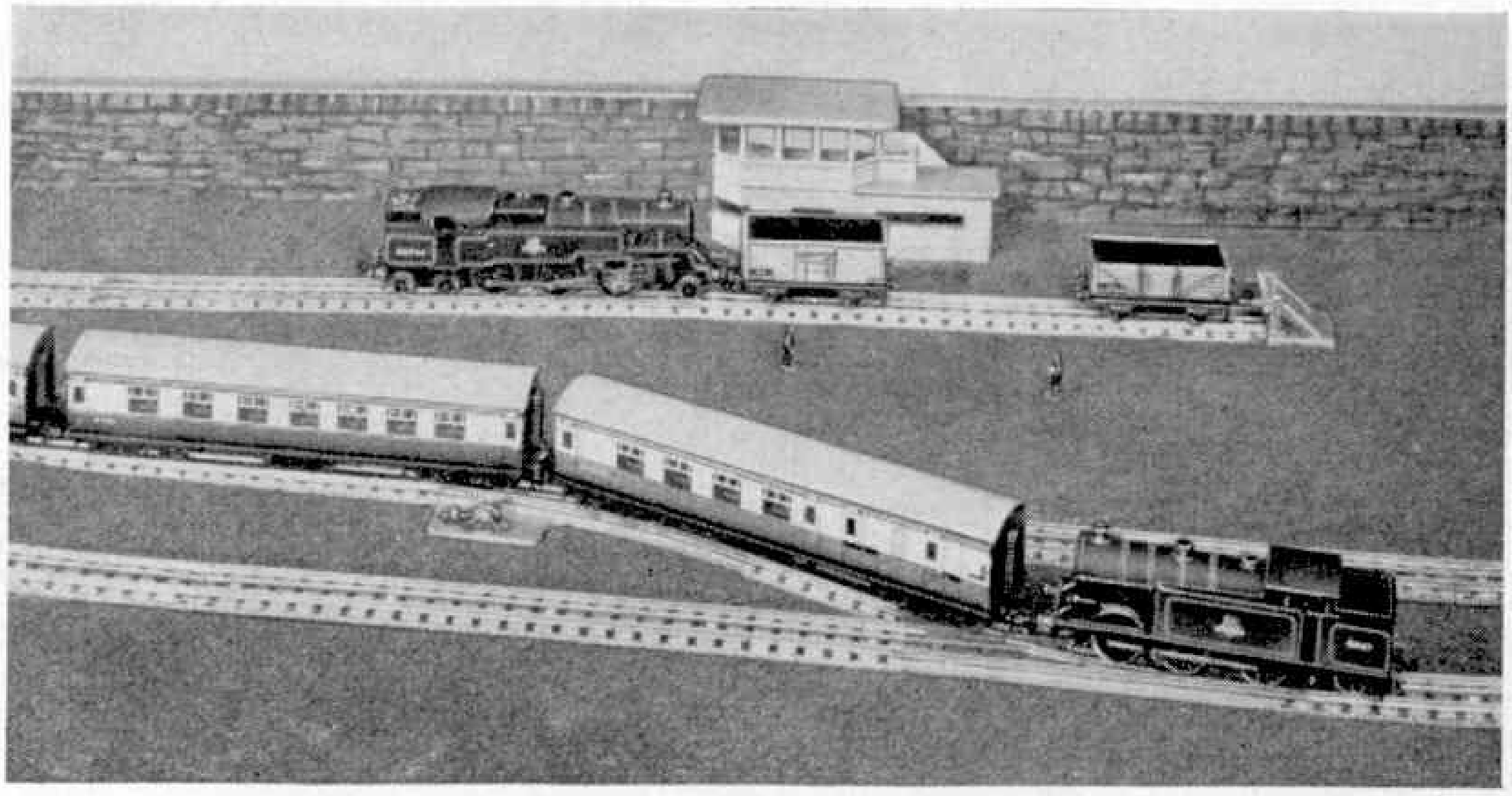


A clear road for the Hornby-Dublo "Silver King." The engine is heading a train of the D12 Coaches now included in the EDP15 Train Set.

The result, as I am sure you will all agree, is very pleasing, and it has the merit of providing those who like the A4 *Silver King* Train Set with rolling stock having corridor partitions and "glazed" windows. The whole train has a smooth, modern look about it, and East Coast enthusiasts will not be slow to recognise that here is the very train they want for representing the crack East Coast flyer, *The Elizabethan*, which during its period of running in the summer makes the longest regular, non-stop run in the world, over the 393 miles between King's Cross and Edinburgh. This fine train is formed of B.R. stock and is invariably an A4 job. So here is just the thing for long main line runs on a Hornby-Dublo layout representing the E. and N.E., or Scottish Regions, or all three together.

Of course, long main line runs have a special attraction about them in miniature. This gives me the opportunity of reminding you that such working cannot be carried out as a regular thing unless your track, locomotive and rolling stock are kept in first class order. I am afraid that some of us tend to overlook the importance of maintenance on our layouts, particularly during the summer months, when there are so many other things to do. We should give attention to track, wheel treads, collector shoes and so on, however, and to the necessary lubrication of gears and bearings.

When maintenance is carried out regularly there is nearly always a tendency to over-oil. This should be avoided at all costs, as otherwise the oil finds its way all over the place where it is not wanted, and a messy, untidy engine and train is the result. A single drop of oil applied to each working part will last quite a long time, in terms of Hornby-Dublo running. Although



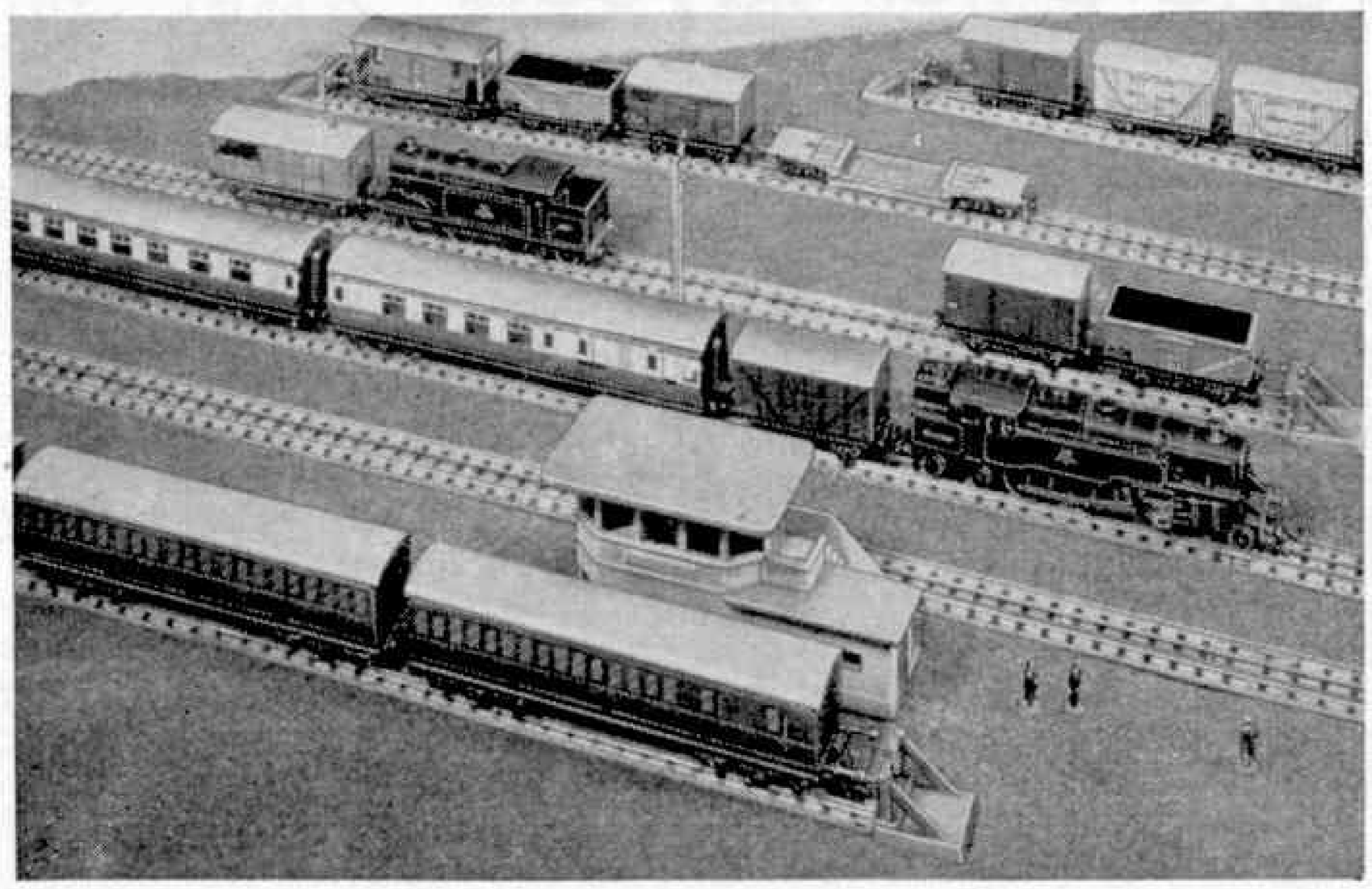
Bringing out the empty stock to form a long-distance express. The Hornby-Dublo 0–6–2 Tank is very useful for this sort of thing.

your train may represent *The Elizabethan*, it is hardly likely to be pegging away for hours at a stretch. Hornby-Dublo Trains may do this sort of thing at exhibitions, but not in the normal course of working.

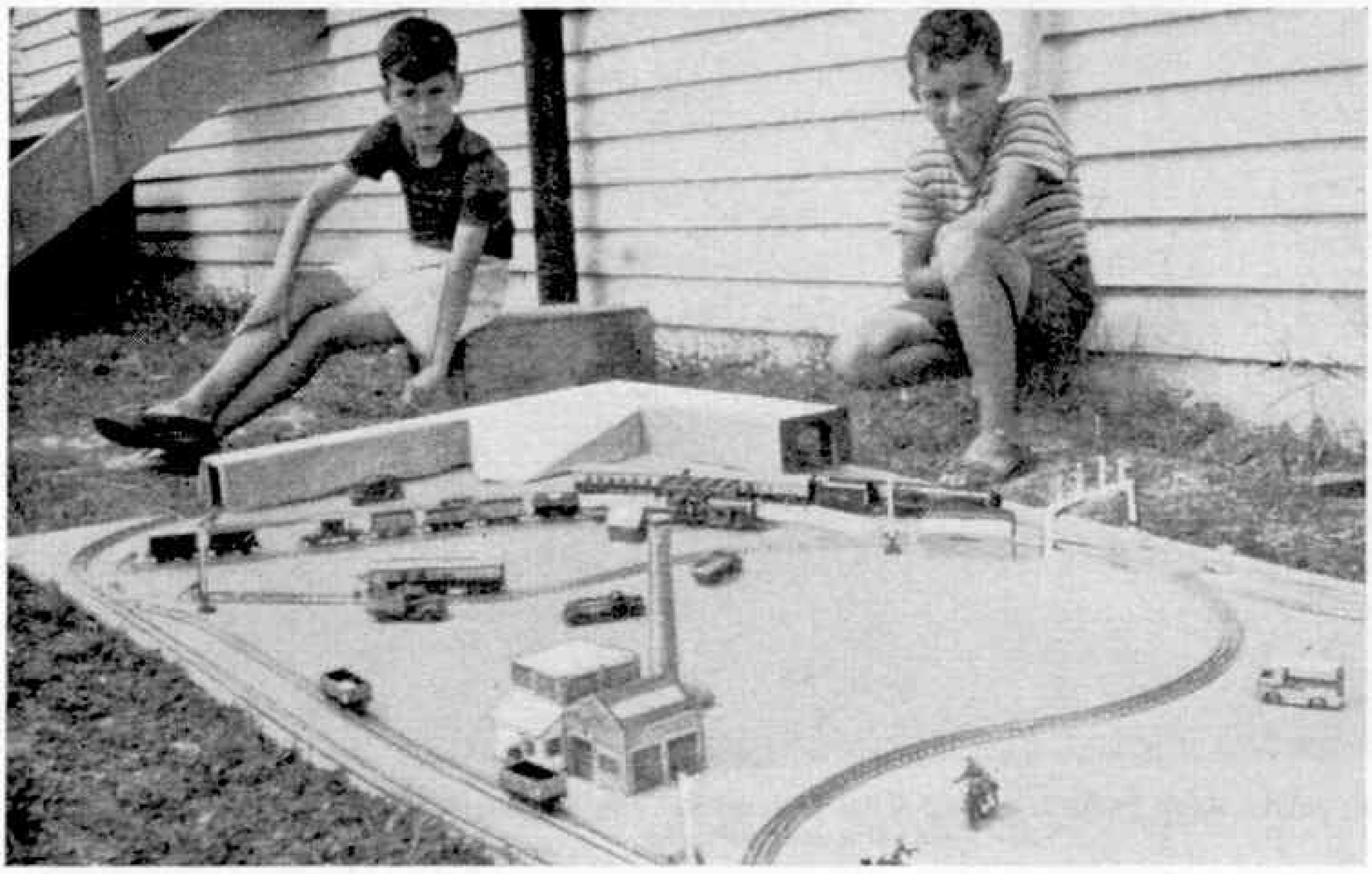
There still seems to be an idea about that Hornby-Dublo Tank Locomotives should only deal with goods or shunting work, or handle local passenger trains. Actually the scope of tank engine duties, either real or in miniature, is much wider than this. Both Hornby-Dublo Tanks can be used for moving empty stock ready to form main line trains, and this is what is going on with the 0–6–2T in the upper picture on this page. Whether the train starts its main line run at a terminal or through station, it is good fun to have a Tank engine to put the train in position at the platform ready for the 4–6–2 express engine to take over.

This kind of working means that you must give careful attention to the location of the necessary Uncoupling Rails and electrical sections. At a terminal station the Tank engine bringing in the empties will have to be uncoupled and wait at the end of the train until the express engine has taken it away. This means that there must be a short section that can be isolated at the Buffer Stop end of the Station. This sort of thing has been mentioned before in the *M.M.* Many of you already use such schemes, but the idea may be new to some.

The large Hornby-Dublo Tank Locomotive, the imposing 2–6–4T, can run quite fast trains over fairly long distances, or it can even handle an express over part of its journey. Perhaps you have some through coach service in operation on your line and for this sort of thing the 2–6–4T can very well be used, just as the real ones often are.



A corridor train in charge of a Hornby-Dublo 2–6–4T. In the sidings beyond, an 0–6–2T is going about its job of shunting.



Roger and Francis Campkin, of New Lynn, Auckland, New Zealand, with their Hornby-Dublo baseboard layout arranged out of doors.

The Hunters' Bay and other Layouts

THE Hornby-Dublo railway shown in the diagram on the opposite page is a very good example of the way in which a useful main line system can be developed from simple beginnings. The line has been built up by the brothers John G. Hunter and Richard A. Hunter (H.R.C. Nos. 208192, 208193 respectively), of Hessle. After preliminary running on an elementary layout built up from the original Train Set, the line progressed to a return loop system on a baseboard situated conveniently in a bay window site. Hence the title of the line, *Hunters' Bay*, which no doubt you will all agree is quite appropriate.

After further building up, which included re-laying of the line to provide double track and, later, a terminal extension, the layout eventually reached the stage of development shown by the diagram. Within limits it is a very workable system, movements between all the roads in the Terminal Station and either of the two main running tracks being readily possible. This means that all the inward and outward traffic passes over the short stretch between the crossover points towards the right hand end of the layout and the corresponding points that lead from the outer main line to the station tracks. Careful management of traffic is needed in order to prevent hold ups, particularly when the line is busy. Up and down traffic is worked correctly so that both main running tracks are constantly used.

Running to actual times is not practised, but there is a definite programme of train running and therefore it is important that trains should be dealt with in the correct sequence. As a rule, before a running session, a list of the trains to be operated is made out. In between trains, as it were, station and goods yard shunting movements are made in order to marshal the vehicles correctly for subsequent operations or to dispose of them after a run.

The working scheme calls for careful arrangement of isolating sections and special attention has been given to this point. As the diagram shows, there are numerous Isolating Rails and these, in conjunction with those Points that are electrically operated, provide a fine degree of remote control. In the drawing the Electrically-Operated Points are distinguished by a representation of the point "motor box" alongside, those not so marked being hand-operated Isolating Switch Points. Naturally, there are Insulating Tabs between the centre rail clips at the joints between the Points forming the two crossovers that connect the inner and outer running tracks, there being separate supply and control arrangements for each of these tracks.

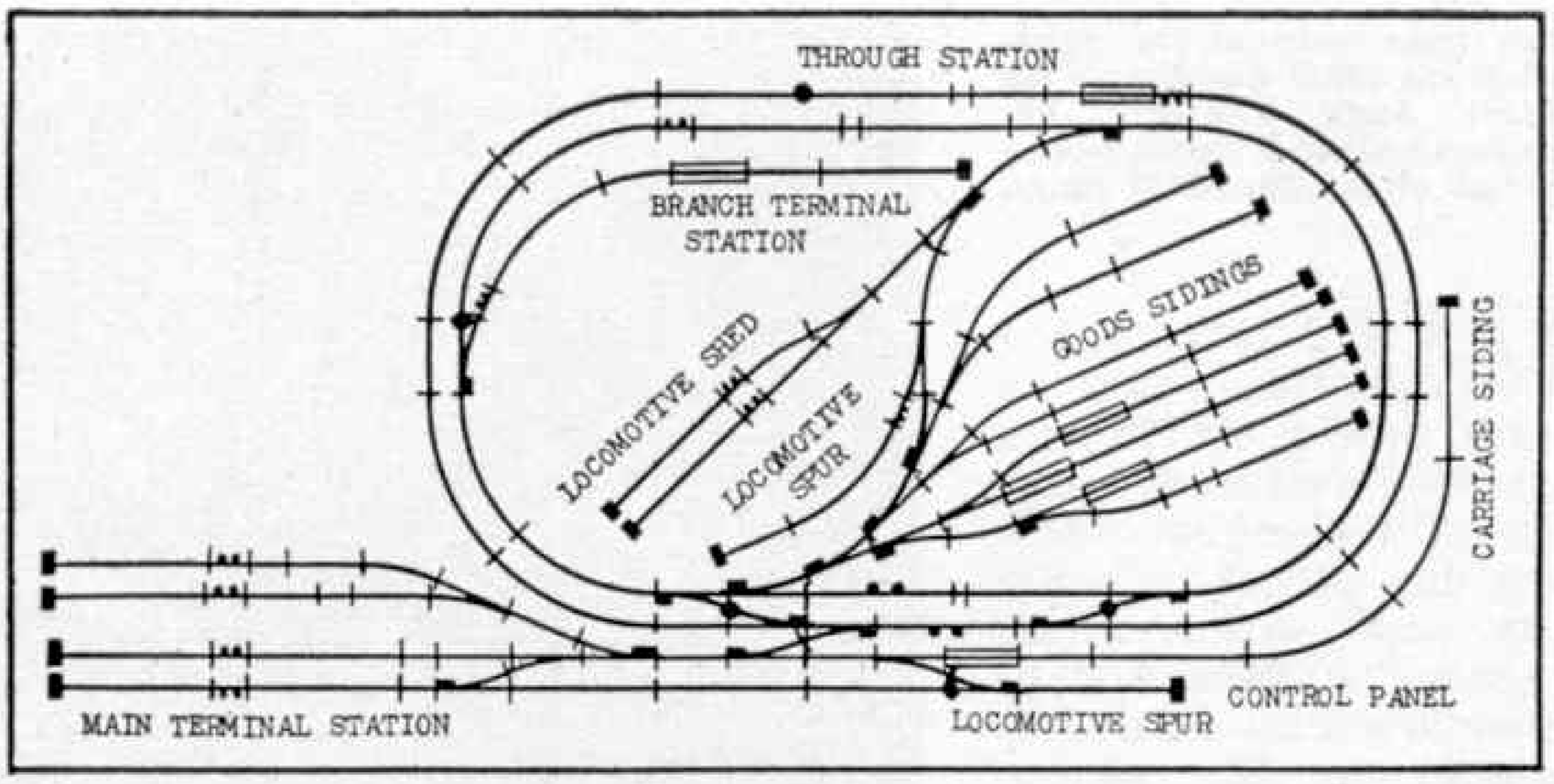


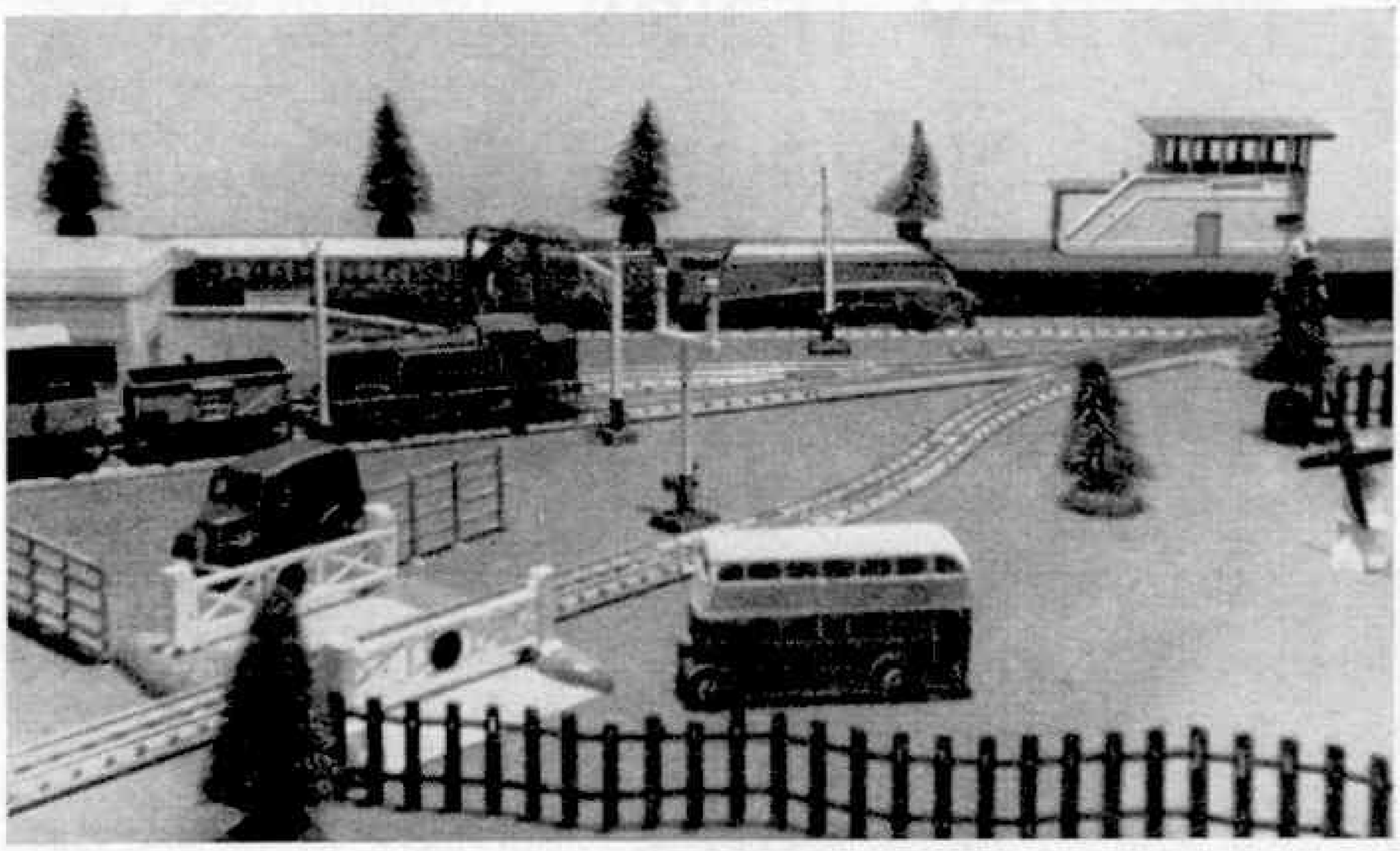
Diagram of the Hunters' Bay layout referred to in this article.

A fine variety of rolling stock is available for train working and each of the standard Hornby-Dublo Locomotives is represented. In addition to present-day models there is also one of the earlier 0–6–2 tanks in L.M.S. livery. To make for a little more variety, some dummy vehicle bodies have been made of card to fit over the bodies of some of the standard Open Wagons. These have to be made a nice fit and they are of course supported by the buffers of the respective vehicles.

So altogether the Hunters' Bay line is a good working railway. Sound operation is the keynote and the amount of stock required has involved the development of the extensive sidings seen in the diagram. For this reason lineside effects are not many, although the essential railway buildings, most of them made at home, are provided. Altogether the layout has an approximate length of 10 ft. and its width over all at the widest point in its bay window site is about 5 ft.

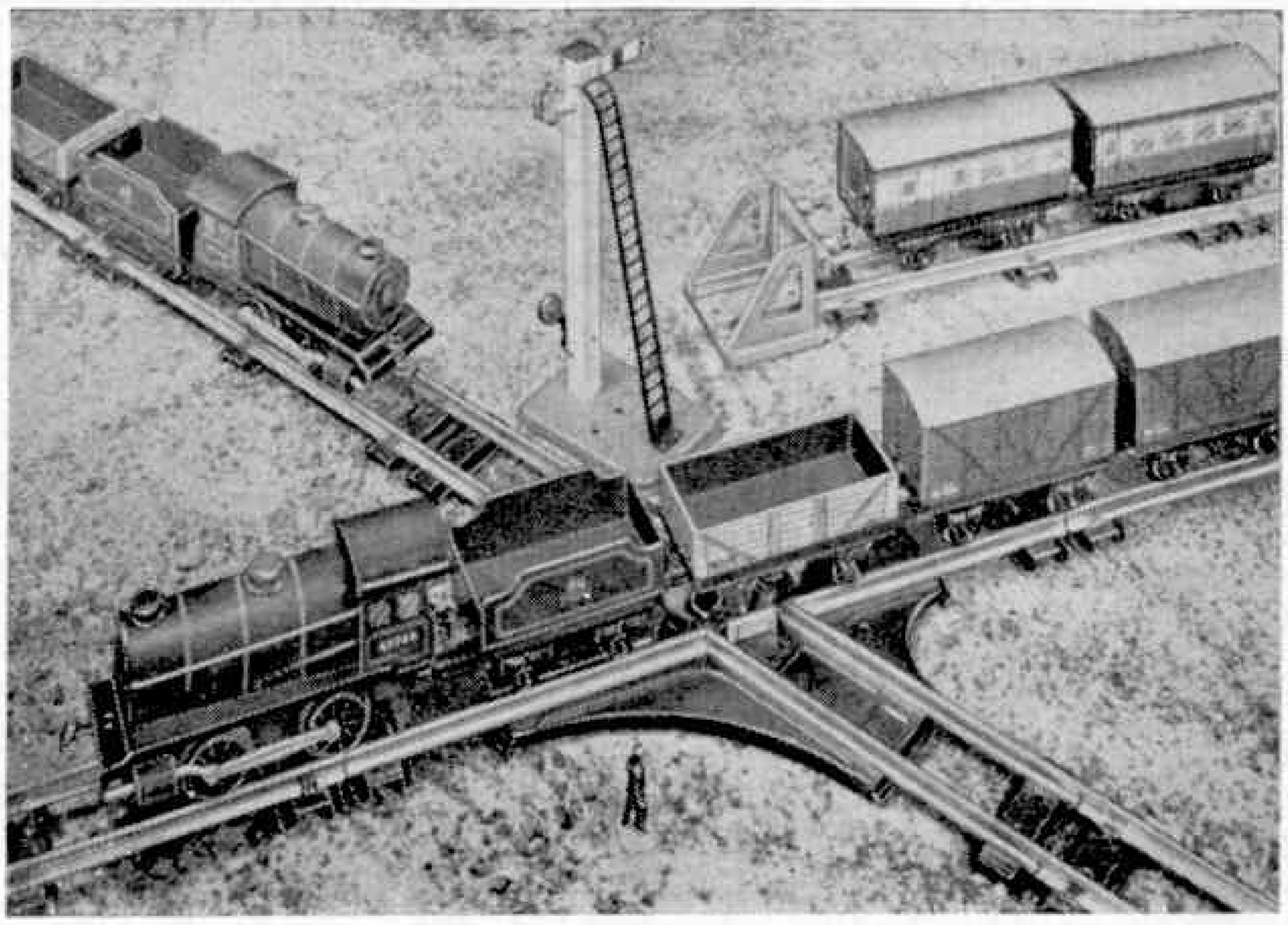
Another layout on which special attention is given to operating arrangements is that of *M.M.* reader Sandy Whyte, of Hamilton. As you will see from the illustration showing part of his line, there is good lineside detail and the Level Crossing scene depicted is very effective. Probably the fencing shown will catch your eye. This is a length of punched "sleeper strip," such as can be obtained at most model shops for track assembly at home. Similar fencing can of course be made from strips of card carefully cut out, or by the assembly of wood strips stuck together with glue.

In addition to their designed purpose, the packets of Station Names that are available for Hornby-Dublo Stations and Signal Cabins are put to a novel use on this layout. They are attached to the sides of various goods vehicles to show their destinations, and the operator and his friends have good times endeavouring to work the vehicles to their appropriate destinations, the stations on the layout being labelled accordingly.



An effective Level Crossing scene on the Hornby-Dublo system of Sandy Whyte, Hamilton.

Roger and Francis Campkin, both *M.M.* readers and joint owners of a Hornby-Dublo layout, also have a lot of fun with their railway, part of which is shown on the opposite page. The line is laid on a baseboard 8 ft. by 4 ft. so it can be used indoors or outside as required.



One train waits at the Signal while the other moves over the Acute Angle Crossing. The engines and stock in this picture are all of the No. 30/31 range.

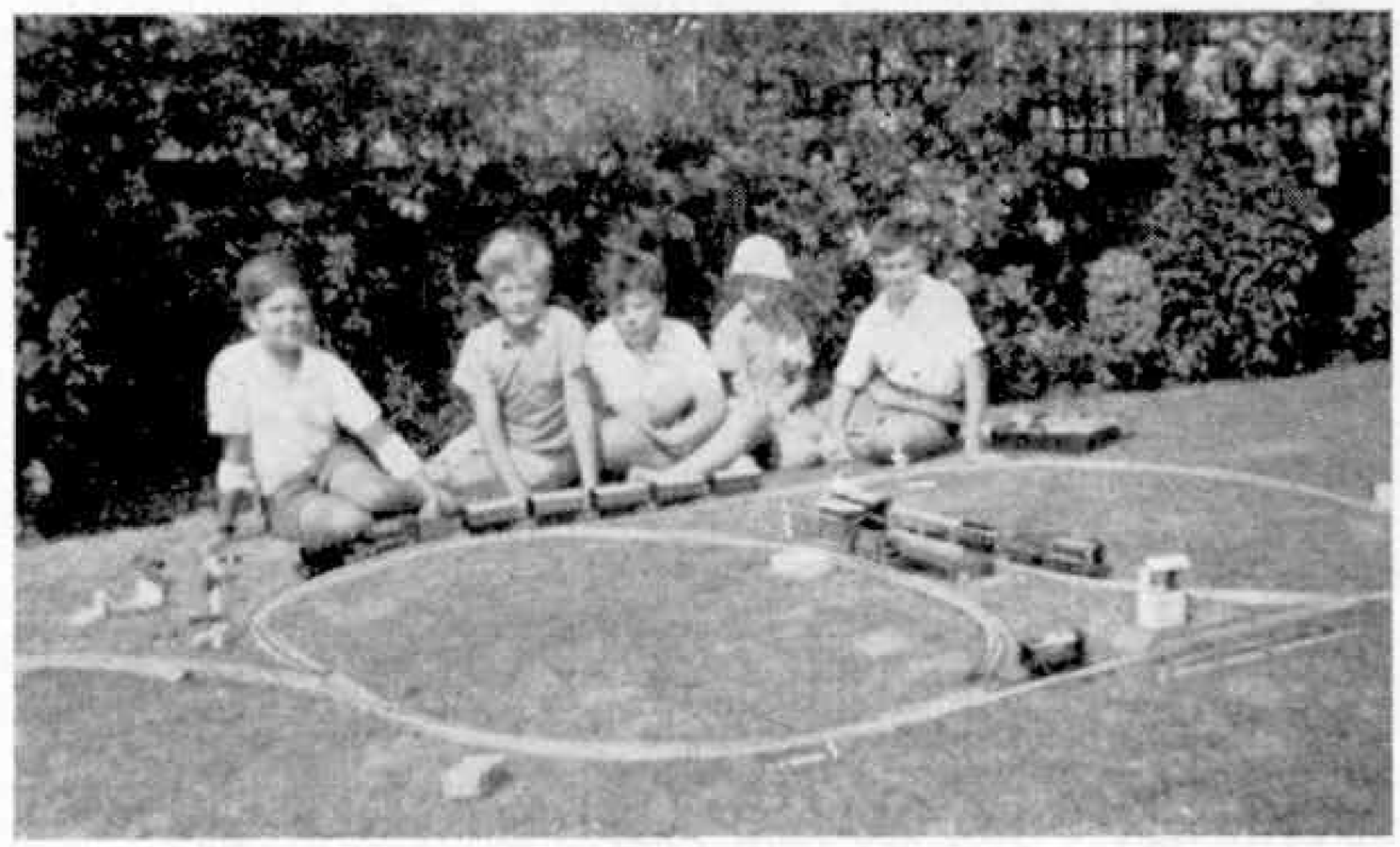
Hornby Trains Out-of-Doors

MANY Hornby railwaymen like to run their railways outside on a fine dry day. To get the best out of this the day should be *really* dry and warm. *M.M.* reader Paul Wilkinson, of Northwich, and his friends in the picture below have chosen the right day for the job and they are having a lot of fun with their trains on the lawn. The lawn can be used, with permission, of course, if it has a nice and level surface, but it is important that the grass should be cut really short; otherwise it is liable to hamper the running of the trains. A special advantage is that there is usually plenty of space and of course there is no need to worry about your "countryside." It is already there, when you put your railway down.

Alternatively, a tiled walk, which is usually level, makes a good base for your railway track, but it is best to avoid a gravelly path unless this is pretty smooth and the stones are small. A rather uneven "permanent way" will be the result if this condition is not observed.

Those of you who have your railway on a baseboard, perhaps in sections, will not usually find much trouble in setting it up outside. You must make quite sure that the board has plenty of support and that there are no drooping corners and so on. If the board can be raised from the ground, perhaps by using boxes or chairs as supports, well and good; but if otherwise, a layout at ground level has no real disadvantages—except perhaps to Father.

Taken all round, Hornby Trains in the garden can be quite good fun, but watch your weather, and make sure that everything is given a careful wipe over after use. It is not a bad idea to examine the running gear of the engines and vehicles. Mechanisms and so on are oily and they attract dust when working out of doors. And should your railway be unlucky enough to get caught in a shower you will have to be specially careful about wiping off the moisture. When the drying part of the business has been completed, a slightly oily wipe over the track particularly, is not a bad idea. Clean up the engines and stock and lightly oil the working parts. Then all will be ready for the next time you want to run your trains.



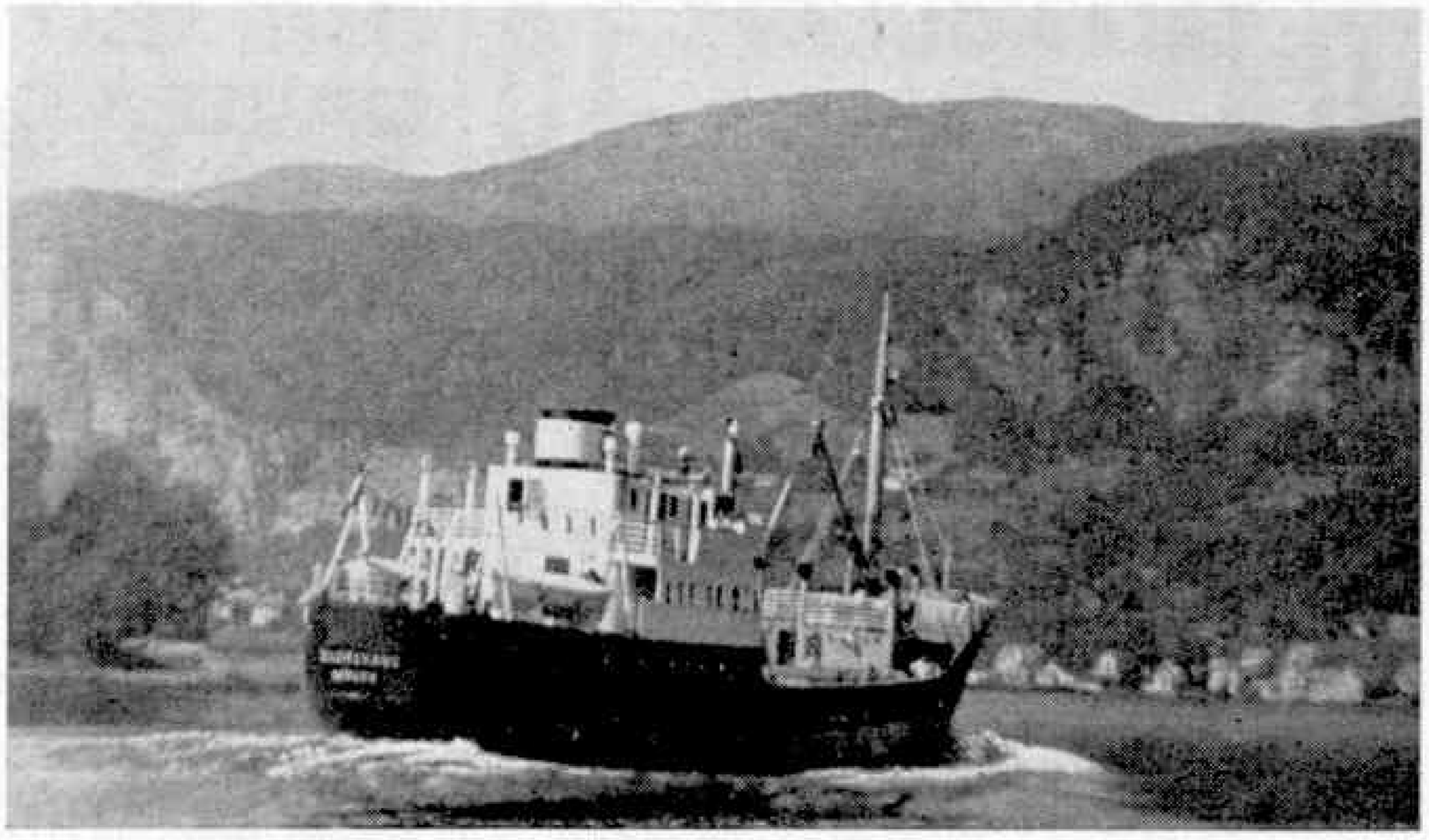
Fun in the sun with Hornby Trains. Paul Wilkinson and his friends, of Northwich, are having a fine time with their trains on the lawn.

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.

Fiord Craft

The accompanying photograph shows a typical vessel operating on the beautiful Hardanger Fiord. The ship is the *Ullensvang*, a modern motor vessel of several hundred tons displacement, built in Bergen in 1951, and fitted with 500 h.p. diesel engines. She is named after the small town of Ullensvang, on the shore of the Sor Fiord, which opens into the Hardanger Fiord, and is one of several ancient and modern craft that ply between Bergen and the two fiords, a distance by ship of about 130 miles.

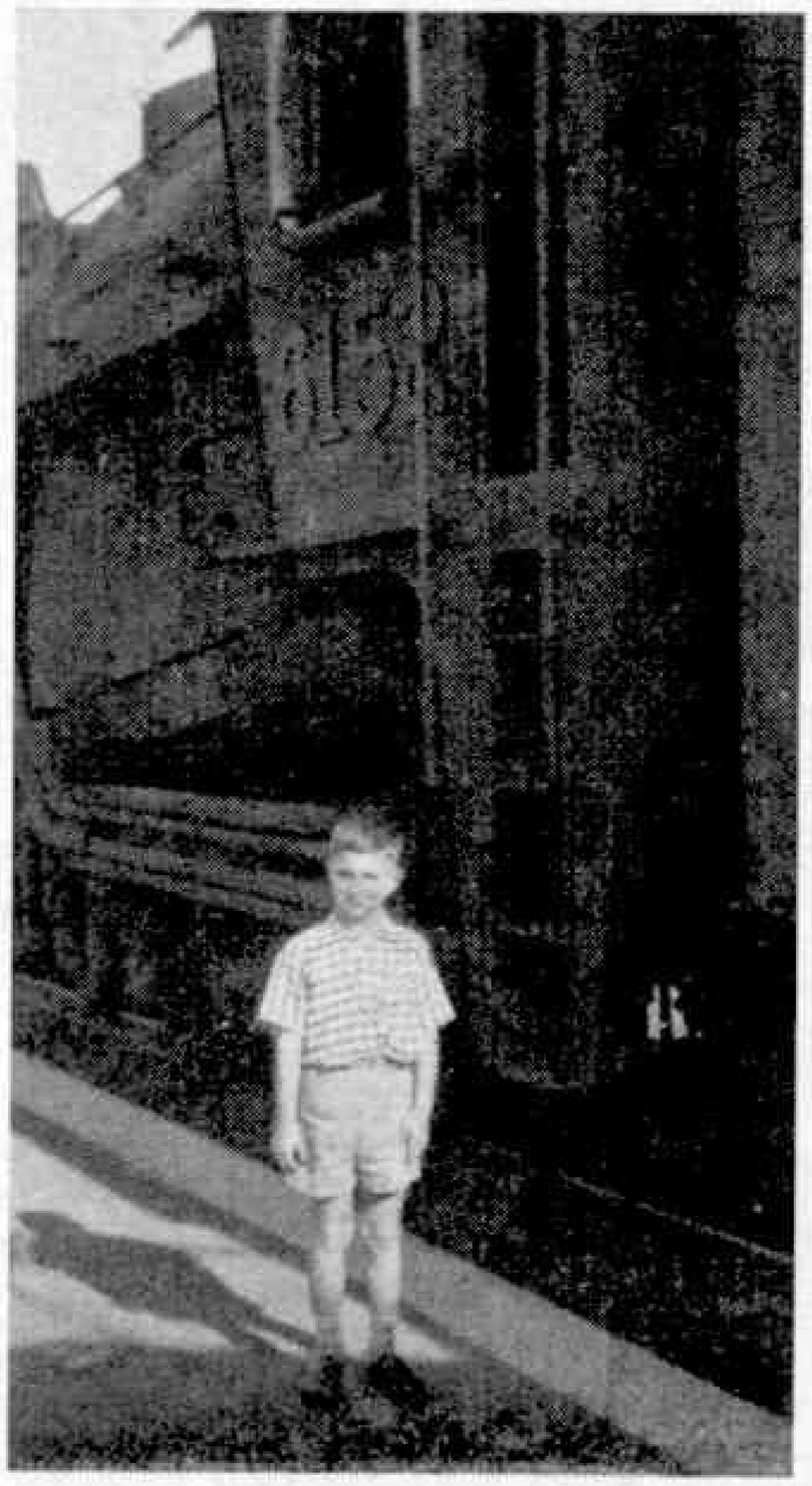


The motor vessel "Ullensvang" approaching a small town on the shore of Hardanger Fiord. Photograph by E. Mitchell, Mexborough.

Another typical fiord vessel is the *Stord*, operating upon the same routes as the *Ullensvang*. The *Stord* is an older vessel sporting the old fashioned counter stern, and was built in Bergen in 1913. She is equipped with steam reciprocating engines. Many of the older ships have been re-engined with diesels.

The larger coastal ports provide a link with the fine express coastal steamers, which maintain a service from Bergen northwards to Vadso, covering a distance of about 2,000 miles.

E. MITCHELL
(Mexborough).



A newcomer from Great Britain alongside a giant C.N.R. locomotive in Montreal. Photograph by A. G. Hamling, Assiniboia, Canada.

A Canadian Note

Here is a photograph of my son, Colin Hamling, standing by the side of the mighty Canadian National Railways locomotive that took our little family from Montreal to Winnipeg a short time ago. This engine seemed so tremendous that I just had to snap it.

In this town, in southern Saskatchewan, we live 200 yards from the C.P.R. station, but we do not see many trains. How different from the busy line at Mossley Hill, Liverpool, near which we lived until recently. There is a daily train from Regina that carries freight, mail, newspapers and passengers. Another interesting thing I have seen is a tree-planting car which helps to boost planting on the prairies by film shows and talks.

A. G. HAMLING
(Assiniboia).

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For other Stamp Advertisements see also pages 438 and xviii

Stamp Collectors' Corner

By F. E. Metcalfe

THE WORLD'S MOST POPULAR HOBBY

Letters reach me continually from would-be collectors of postage stamps, and often the plaint from the writers is that they know nothing about the hobby and would like to know how best to start. Over the past few weeks letters of this kind have been more numerous than ever, and as there are probably many more readers who have not written, but who are in the same position, I think it is about time that I went into the whole problem in a pretty thorough manner. This is what I propose to do for the next month or two. Each article will deal with one phase of the subject, but at the same time I hope to make each link up with the others, so that in the end we shall have a complete picture. Those interested will perhaps keep the articles together, and re-read them when they are completed. If they do that I think they will learn as much about the hobby as they will need to go right ahead and make a start on the right lines.

Many books have been written on stamp collecting, but far too many of them have been from the standpoint of conditions prevailing some years ago that do not obtain today. Postage stamps are now simply pouring off the world's printing presses, and this has altered things considerably. These stamps can be divided into two classes—those known as special issues, which are supposed to mark, or commemorate some particular event, and the definitives, which are the ordinary every-day stamps. As far as our own country is concerned, stamps are of a definite character. Most of the other countries issue set after set nowadays, however, and really none in practice are definitives. But more about this rather important point later on.

The really amazing thing about stamp collecting is its popularity. Kings and dustmen alike enjoy it, and when up to £10,000 can be paid for a stamp, it is certain there is something almost uncanny about these bits of paper. Publicity helps, of course, but most of this publicity comes from the stamps themselves. Newspapers in Britain pay scant attention to stamps, unless they get hold of some sensational statement, like the one about the collection being auctioned in the U.S.A. just now that is expected to bring in about a million pounds. Overseas, particularly in countries like the U.S.A.—incidentally one of my American friends puts the popularity down purely to our squirrelling instincts—the newspapers help a lot.

Then there is the question of £ s. d. I know that the average collector does not indulge in the hobby for what he can make out of it. Yet it is only natural that if we have some object, be it a stamp or an antique, the fact that it has a chance to go up in value as time goes on does give added interest to its possession. The fact that stamps have this value has played a part in helping quite a few to get a fresh start in life!

When the Nazis were hounding people out of Germany and Central Europe, previous to the war, it was quite a time before they realised that by letting some of those refugees take their stamp collections with them they were allowing them to take away something valuable, the proceeds of which could be used to enable their owners to get going again. I know of one man in the north, who is quite rich today, whose initial capital was his collection. Yes, this monetary angle plays an important part in the hobby's popularity, and there is no reason why it shouldn't.

I knew of another man, who started life selling newspapers, barefooted on the streets of London, who died very rich. He became ill while in the midst of making his fortune, and his doctor warned him that if he didn't retire and relax he would not live long to enjoy his hard-earned wealth. He retired to the country and took up stamps. It was then that I met him. He had only been collecting a year, but there was little that he did not know about the finer points of the hobby. Believe it or not, in two years he actually spent almost £90,000 on his stamps.

That of course is *not* the way to collect, though I need not stress the point, for ninety thousand pence is far more than most of us can afford for a hobby. And it cannot be emphasised too strongly that stamp collecting is only a hobby. It is certainly the most popular indoor pastime in the world, but better not take it up at all, if you are going to treat it as anything else but a pleasant pursuit. If we cannot afford a stamp we would like—well, never mind, we'll buy one we can afford. There is one thing about the hobby that those who are thinking about taking it up should remember—it is quite suitable for all ages, be one seven or seventy.

I have already remarked that many of the books on philately are written from the standpoint of conditions

(*Continued on page 440*)

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58 High Street, Watford, Herts.

For other Stamp Advertisements see also pages 436 and xviii

Stamp Gossip

PORTRAITS

I suppose that a number of *Meccano Magazine* readers would see that very fine portrait of Queen Elizabeth by the Italian painter, Signor Pietro Annigoni, when it was exhibited in the Royal Academy. It showed Her Majesty in the Garter Robes. Now it has been adopted as the design for three stamps of Fiji, and a nice design it makes too.

The Queen has not been very fortunate with her portrait on some of the stamps. For instance, there is the Malta "Visit" set of 1950. None would even guess that it is supposed to be a likeness of Princess Elizabeth, as she was then. And there is the portrait on the 2½d. and 4d. Coronation stamps of New Zealand. No wonder another one has been sought.

DESIGNS

I have mentioned before that a competition is held each year by an American stamp magazine—*Linn's Stamp News*—to decide which is the best, the worst and the least necessary commemorative stamp issued by the U.S.A. Post Office during the previous year.

Many British collectors are interested in these stamps, and will have copies of them in their collections, but I would be very surprised if all over here would endorse the selection of our American friends. Personally I could not agree less that the 8c. Rotary was the best design of 1955, or the Fort Ticonderoga 3c. the worst. The Andrew Mellon stamp was classified as the least necessary, but about that I have no opinion.

I mentioned last month that I had been asked to select what I considered to be the three best designs of our own British Commonwealth stamps issued during the present reign. We all have our own ideas, but my three were the current 1/0½ Australia, the 1/6 New Zealand Coronation stamp of 1953 and the current 10c. of Canada (Eskimo Hunter). I pondered long over the 5c. "Whooping Cranes" Canada, which I also consider to be a beautifully designed stamp.

I did not take into consideration any of the stamps that have a medallion portrait included, for I consider that such an addition completely spoils the whole effect, and I do wish that the practice would cease. If we want portrait stamps, let us have them, by all means, but let the portrait be the chief motif of the design, as is the case with the low values of Australia and Canada, and not some small addition, stuck in apparently as an afterthought. To show what I mean, just examine some of the current set of Aden, and compare one of these stamps with the latest portrait design of Fiji

NORFOLK ISLAND

Most young collectors, and for that matter most old ones, get a thrill when they buy a set of Pitcairn Island stamps, and quite a lot have grumbled because the current set has been on issue so long. They want more! Well, Norfolk Island—another romantic spot—provided us with a pair of commemorative stamps, which if not actually of the Pitcairns, has to do with them, for these stamps were issued on 8th June to mark the hundredth anniversary of the landing of Pitcairn Islanders on Norfolk Island.

On 18th June, 1856, almost 200 descendants of the *Bounty* mutineers arrived at Norfolk Island, which was certainly not just round the corner, for there are 3,000 miles between Pitcairn and Norfolk. They travelled with the Rev. George Nobbs in the ship *Morayshire*, which had been provided by the British Government. This emigration was undertaken to relieve the congestion on Pitcairn Island, but about 40 became so homesick that they managed to get back to their original homes, where their descendants are living at the present time. The two stamps issued are the 3d. and 2/– values, and with a cover they will make nice pages in your albums.

OUR OWN STAMPS

As readers know, the watermark is being changed not only on British Colonial stamps, but also on our own, and at the time of writing only that of the 3d. value of our postage stamps is unchanged. Britain uses an awful lot of stamps, and from this it may be deduced that used stamps, with the exception of the high values, like the 10/– and £1, will be common, and can be picked up any time for a copper. But this is not correct. So if you collect used modern G.B. stamps, make sure that you fill your blanks at once and that you only take fine copies. You will only pay coppers now, but later on some of the values, say 10d., 11d. and 1/3, will cost more. They will never be rarities, of course, but they will be better than they appear now.

Perhaps you collect Postage Dues as well. Most collectors do nowadays. Well there have been some very interesting changes in this field also. The Colonial Office has decided that the new watermark for the Colonial stamps will not be changed on existing stamps, contrary to what has been decided for our own British. Several postage dues, which only changed the watermark as late as last year, have already changed again to the St. Edward's Crown watermark, so the replaced stamps, with a life of one year, look like being quite nice little items as time goes on.

THE MONTH'S TIP

Overprinted stamps are not popular, nor are those of the Somaliland Protectorate either, at least not to any degree. But the 1951 overprinted Somaliland set will increase in value, for few dealers stocked up to any extent when it was replaced in 1953. Buy it now.

Flying Weathermen—(*Continued from page 400*)

leave the danger area.

Only one year after that typhoon hit the U.S. fleet, flying weathermen over the Atlantic spotted a hurricane heading for the United States. Warning bulletins, kept up-to-date and accurate by the airmen, enabled people to leave the land areas where it was predicted that the storm would strike, and only two lives were lost, although damage reached the staggering total of $500 million. Since then, the lives and property saved on the eastern coast of America by advance warnings have more than paid for the whole worldwide operation of the Air Weather Service. Nor is that all, for there are many airmen who believe that in time it will be possible to destroy a hurricane or typhoon by dropping a small atomic bomb into its "eye" before it has time to do any damage. So, even the dreaded A-bomb might in time become a means of saving thousands of lives.

The "Pioner"—(*Continued from page 405*)

The vessel is fitted with a plant for making fish meal and for processing cod livers to yield oil. The meal plant is just aft of the fish holds, and can handle batches of a ton of raw fish at a time. This is collected in a steel hopper and discharged into a cooker dryer. There the fish is broken down, cooked and partially dried in about 3½ hours of treatment, after which it is transferred to a circulating dryer, while the cooker dryer is immediately recharged with another ton of fish. The final processing takes rather less time than treatment in the cooker dryer, so in practice six tons of raw fish can be dealt with every 24 hours. There is storage space for 35 tons of the final product.

Fish livers are pumped through a 4 in. pipeline into the house in which they are processed. There they enter a receiving tank, from which they are fed into two steam boilers. The cod liver oil extracted is passed through a filter into a storage tank that holds 20 tons. Provision also is made for canning.

The main engines of the *Pioner* are a Mirrlees type 8-cylinder, four stroke, direct reversing oil engine that develops 950–1,100 shaft horse power at 255–265 revolutions a minute, giving a speed of about 12½ knots. There are several generators to supply current for the motors used for various purposes. The control winch generator set consists of a Mirrlees type 380 b.h.p. diesel engine and a generating unit developing 146 kW. Steam for all requirements is provided by a vertical boiler suitable for firing with a very heavy oil fuel.

The navigational equipment of the *Pioner* is thoroughly modern and comprehensive. Radio and direction finding equipment of course is provided, and there is a sound reproduction system within the vessel, with radio receiver and record player, and a loudspeaker in every cabin. This system is used for relaying orders from the wheelhouse throughout the living accommodation.

Stamp Collectors' Corner—(*Continued from page 437*)

that have passed away. Collectors have changed also, and in nothing more than in the care they take to see that they only collect good copies of stamps. I will have more to say about all this later on, but it cannot be stressed too early what false economy it is to buy stamps, no matter how cheap they may appear to be, if their condition is not good. That is, if they are used, see they are clean, with neat postmarks, and if unused, they must also be clean, and not stuck up with lots of bits of mounts on the back.

I recently saw a dealer buy an old collection for £30. If the man who made the collection had taken care to get good copies only, which would have cost very little more, as the collection had been formed many years ago, his stamps would have been cheap at £300, and the dealer would have bought it with greater alacrity. Next month I will go further into this, and other aspects of the world's most popular hobby.

TRANSPORTATION CENTRE R.E. PUBLIC DAY 1956

In the past the Transportation Centre, Royal Engineers, has held a Public Day at Longmoor, usually on the first Saturday in September. This year, they are having that Public Day at Marchwood, near Southampton, on Saturday, 1st September, 1956.

Displays and demonstrations will mainly cover the Port Operating and Inland Water Transport sides of the Centre's activities and will include trips on various craft in Southampton Water. There will also be some representation of the Railway activities, including rides on locomotive footplates. There are many other attractions which cannot be listed here, and the Band of the Corps of Royal Engineers will play during the afternoon.

Public Day starts at 1.30 p.m. and will end at 7 p.m.

Cheap day return tickets will be available from many stations in Southern England and a frequent ferry service will be available between the Town Quay, Southampton, and Marchwood. It is hoped to encourage local 'bus services to run frequent services to this point. Proceeds from the sale of programmes and for certain events in which a small charge will be made, will go to the Royal Engineers' Benevolent Fund.

A NOVEL SCREWDRIVER

Readers of the *M.M.* who are model makers, and many are, will welcome the special "Agrippa" screwdriver recently introduced by Ellemsee Accessories, Wheaton Avenue, Halton, Leeds. This is designed to give a firm grip to screws ranging in size from 12 B.A. to 2 B.A. so that it will cover the requirements of most small scale modellers.

The screwdriver consists of a spring-loaded sleeve, at one end of which twin blades project. When the sleeve is held between finger and thumb, pressure from the palm of the hand causes these blades to close. On releasing the pressure the blades open, to grip the slot of a screw. A screw held in this way stays firmly in position and can readily be inserted in its intended threaded hole.

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Competition! 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.

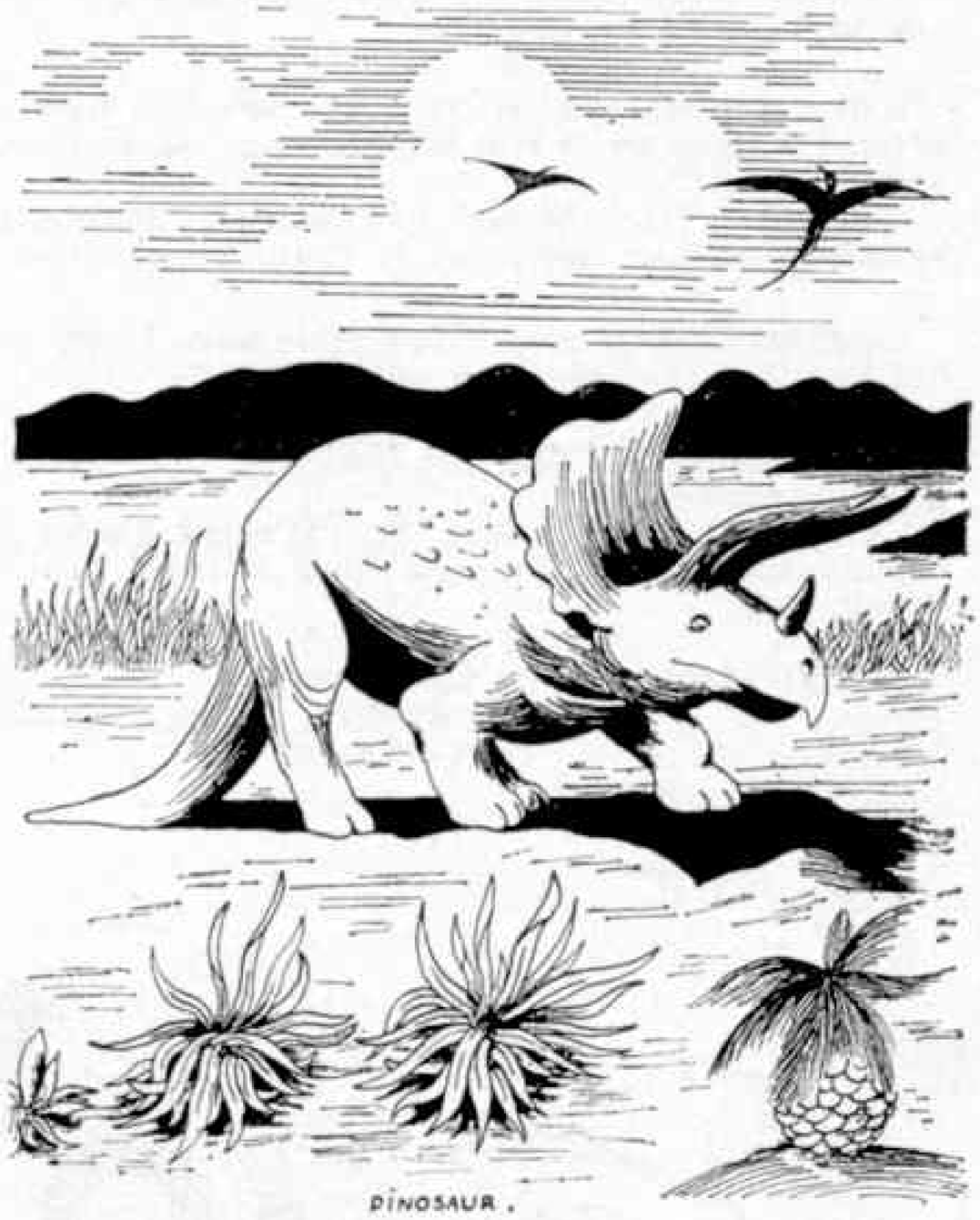
A Holiday Drawing Competition

IN this country July and August are *the* holiday months of the year, and thousands of readers will be making the most of their school vacation. Some will be fortunate enough to be travelling abroad, many others will be having a week or more at the seaside or in the country, and there will be those who are discovering that even a holiday at home can be very enjoyable. Whichever may be the case, they will see plenty of interesting things, and in this competition we invite readers to submit drawings illustrating anything of special interest that they saw or which happened to them during their holiday. To competitors in those far-off countries where it is now winter, this contest refers to their most recent summer holiday.

Any kind of drawing can be submitted. It can be in black and white, or in colour if preferred, but remember that it is the drawing itself and not the colours used that the judges will take into account in assessing the entries.

There will be the usual two sections in this competition, one for Home readers and the other for those living Overseas. In each section there will be two classes, one for competitors of 12 years of age or over, and the other for those under 12, so that younger readers of the *M.M.* need not hesitate to send in entries. In each of the four divisions of the contest prizes of 21/–, 15/– and 10/6 will be awarded for the best entries in order of merit, and in addition there will be consolation prizes for other good efforts. Every competitor should take care to put his name, address and age on the back of his entry.

Entries must be addressed *Holiday Drawing Contest, Meccano Magazine, Binns Road, Liverpool 13.* The closing dates are: Home Section, 29th September; Overseas Section, 31st December.



The many striking drawings submitted in the "Prehistoric Monster Contest," announced in the "M.M." of March last, included this excellent prize-winning one of a Dinosaur by R. Marton, of Peaslake, nr. Guildford.

Competition Results

HOME

MARCH 1956 CROSSWORD CONTEST

1st Prize: H. A. Cook, London W.6. 2nd Prize: F. Holland, London S.E.6. 3rd Prize: R. Armstrong, Ware. Consolation Prizes: R. J. M. Hobbs, Leigh-on-Sea; A. Ross, Renfrew; A. A. Lewis, S. Croydon; R. J. Goodchild, Marlborough; R. Bruce, Hemel Hempstead; D. G. Baldry, Thetford; R. J. McLernon, Magherafelt.

MARCH 1956 PREHISTORIC MONSTER CONTEST

1st Prize, Section A: N. D. Heaton, Maidenhead; Section B: A. F. Heath, Liverpool 23. 2nd Prize, Section A: R. Marton, Peaslake; Section B: T. Sutton, Cleckheaton. 3rd Prize, Section A: F. Inglefield, Ilfracombe; Section B: Q. Nichols, Bristol 7. Consolation Prizes: A. Crosby, Appleby; G. Hird, Willerby; S. B. Caulfield, Glasgow; A. Stephens, Portsmouth; A. Warren, West Harrow; D. France, London W.2; P. Hambleton, Newport; L. Sutton, Cleckheaton; J. Harris, Leicester; A. C. Norman, Ickenham.

OVERSEAS

NOVEMBER 1955 ALERT ENGINEMEN CONTEST

1st Prize: K. R. Rao, Bombay 26, India. 2nd Prize: J. J. Lewis, Rosario de Sante Fe, Argentina. 3rd Prize: A. Porter, Papakura, New Zealand. Consolation Prizes: C. P. O'Connor, Cork, Eire; S. N. Metcalfe, Perth, Australia; T. Stanley, Calcutta, India.

Fireside Fun

Father had struggled dutifully to help his son unravel the puzzling sums he had been given for homework. They were not making much progress.

"Daddy, it's going to be even worse next week," said the boy.

"Why?" demanded father, his drooping spirits sinking to his boots.

"Because next week we start learning the dismal system," replied the lad.

* * * *

Police Superintendent: "I never saw the park so littered with paper as it is this morning. How do you account for it?"

Sergeant: "The Mayor had leaflets distributed yesterday, asking people not to throw paper about."

* * * *

Cannibal Chief to son: "How often have I told you not to talk with someone in your mouth?"

* * * *

"Mrs. Flanagan," said the landlord, "I've decided to raise your rent."

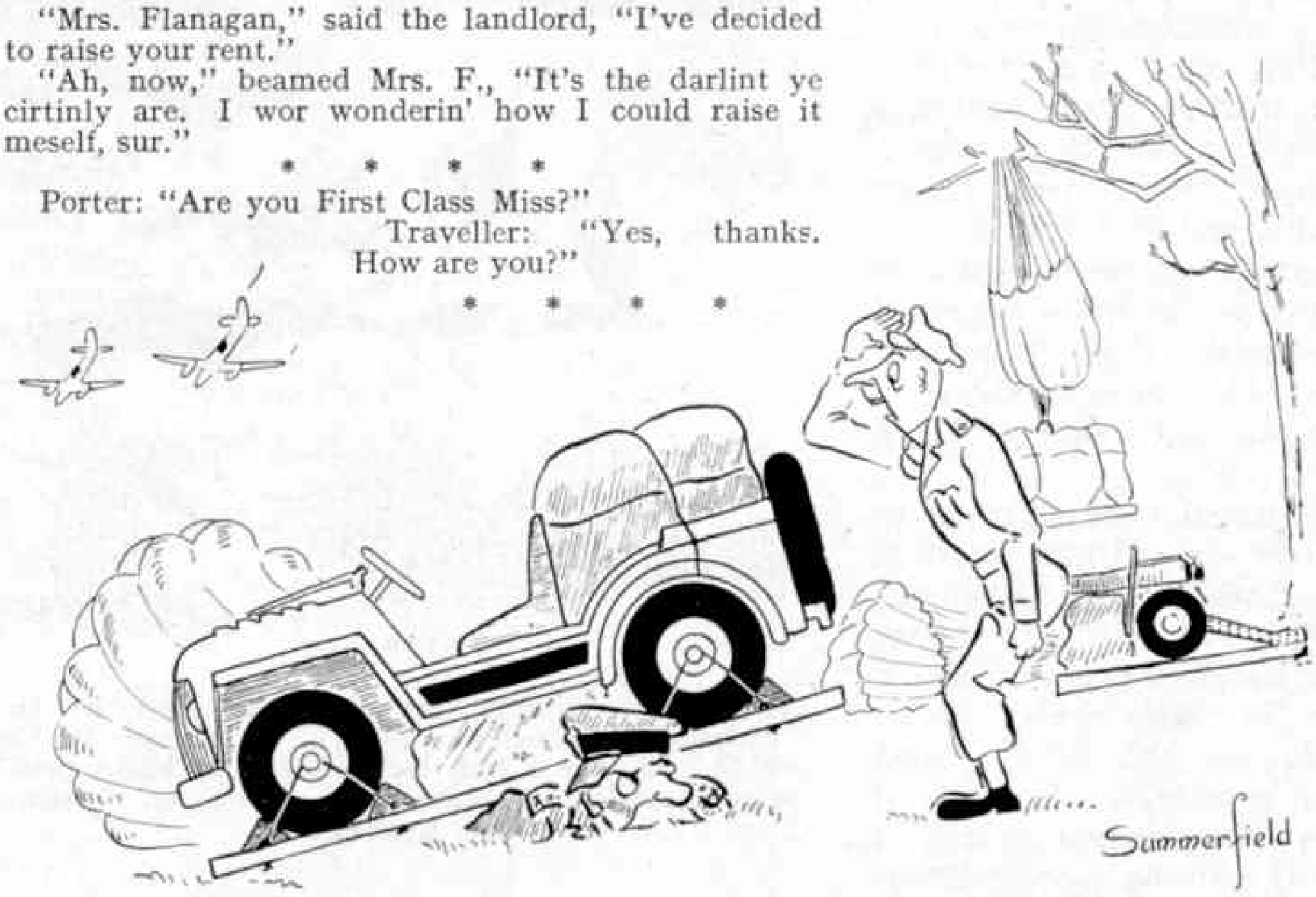
"Ah, now," beamed Mrs. F., "It's the darlint ye cirtinly are. I wor wonderin' how I could raise it meself, sur."

* * * *

Porter: "Are you First Class Miss?"

Traveller: "Yes, thanks. How are you?"

* * * *



"Beg to report—All supplies landed safely, Sir!"

* * * *

Officer taking rifle inspection: "Take this man's name, Sergeant! His rifle is filthy."

Sergeant: "Now, my man, your rifle is your best friend. Where would you be if a 'plane dropped a hydrogen bomb now on this camp? And you with a dirty rifle!"

* * * *

"Oh, oh, little man, you mustn't cry," said the old lady when she saw a little boy stub his toe on the sidewalk, and sprawl on his face.

"Cry, me eye," the boy retorted, "I'm gonna sue beans outa somebody!"

* * * *

Teacher: "Tommy, can you point out Australia on this wall map?" Tommy goes to the map and indicates the country required correctly

Teacher (to the class): "Now, can any one of you tell me who discovered Australia?"

Chorus from class: "Tommy, teacher!"

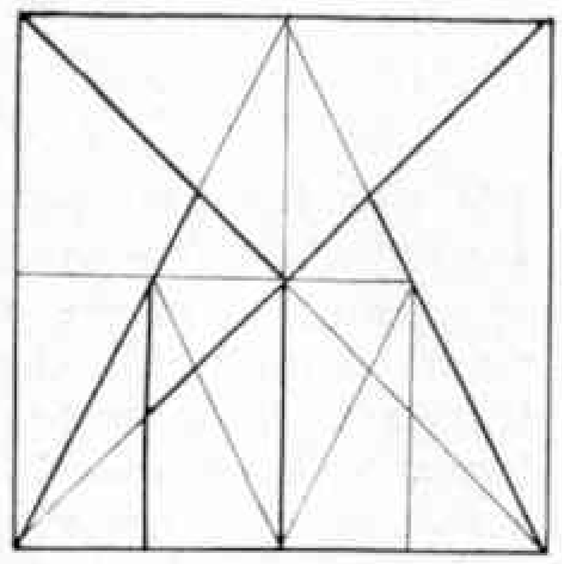
Tongue Twister

What noise annoys a noisy oyster? A noisy noise annoys a noisy oyster.

* * * *

BRAIN TEASERS

How many letters of the alphabet can you find in the square alongside?



* * * *

WHAT AM I?

I have a head, a little head,
That you may scarcely see;
But I have a mouth much bigger
Than my head could ever be.
"That seems impossible," you say;
You think t'would be a bother?
Why, no! My head is at one end
My mouth's away at t'other!

* * *

HOW MANY MARBLES?

"How many marbles have you?" asked Bert's friend. "Well," said Bert, "if you add one-quarter of the number to a third of it you will have 10 more than half the number."

How many marbles had Bert?

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

What Time Is It?

The answer to this problem concerning time is 11 o'clock.

* * * *

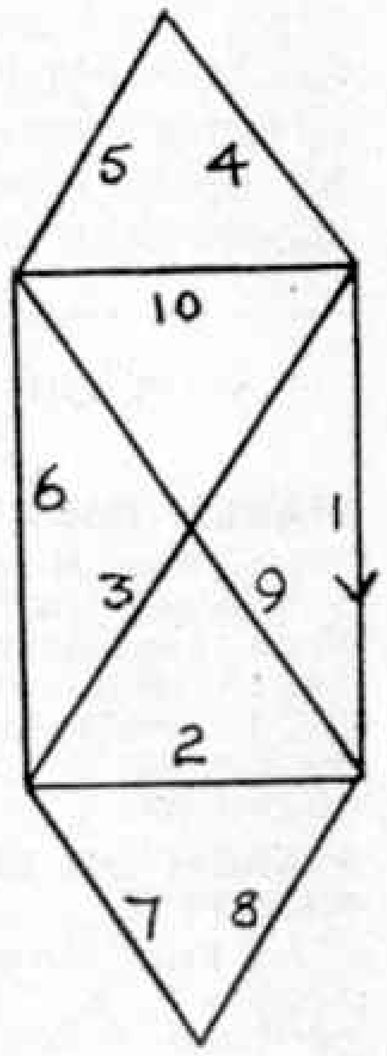
The Untidy Boy and his Socks

In order to be sure of getting one pair of socks of the same colour, either blue or white, he would only have to take any three socks out of the drawer; but to make certain of getting two *blue* socks, he would need to take out no less than eight socks and he would then be absolutely certain to obtain what he wanted. Try it for yourself using pieces of coloured paper in place of the socks.

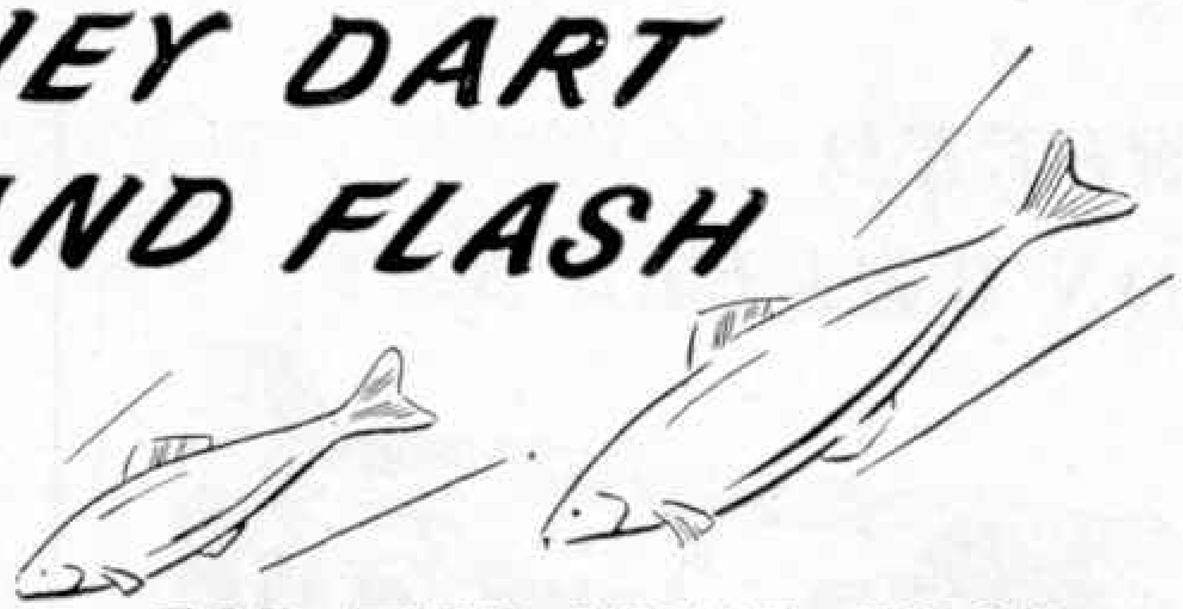
* * * *

Try This

The solution to last month's tracing problem is shown in the sketch herewith. Tracing should start at the top of the line marked 1 and then follow each of the lines marked 2 to 10 as indicated.



THEY DART AND FLASH



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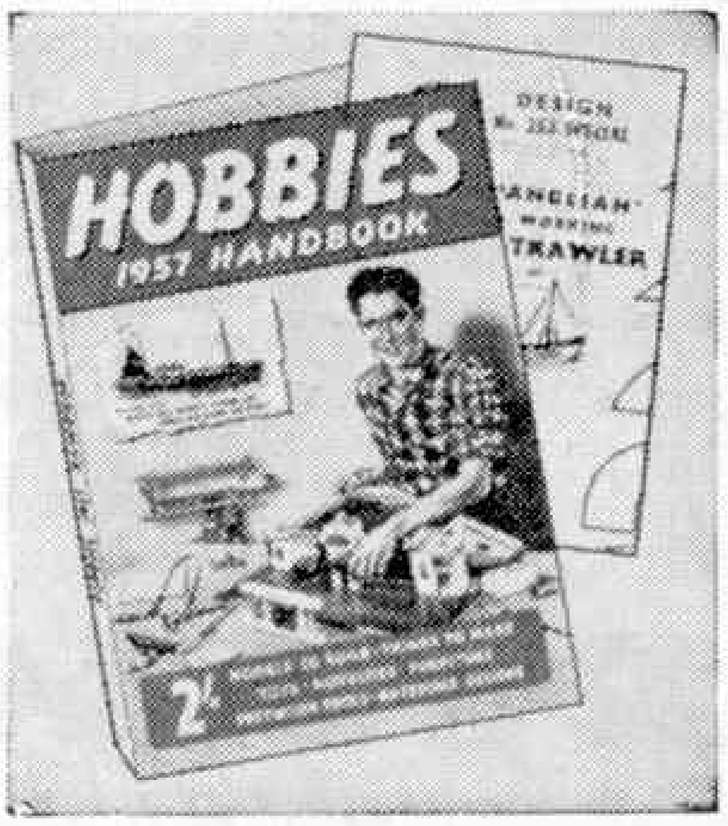

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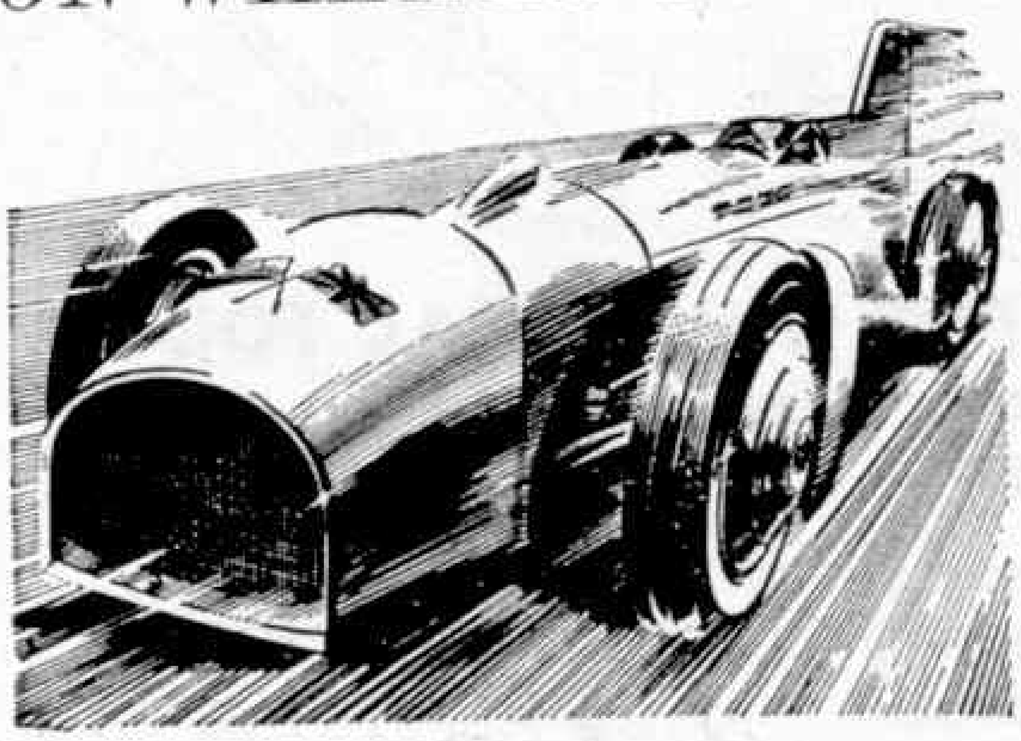
SPEED ON WHEELS No. 3



In the years following Seagrave's passing of the 200 m.p.h. mark the Land Speed Record changed hands and was raised many times. Both Henry Seagrave and Malcolm Campbell were knighted for their achievements. But not until 1932 was the next goal reached. Sir Malcolm Campbell called in Reid Railton to redesign his record-breaking Bluebird. Its bodywork was further streamlined, the tail being reformed with a large fin. With special Dunlop tyres mounted on Dunlop disc wheels, Sir Malcolm arrived at Daytona in 1932 determined to exceed 250 m.p.h. Again he triumphed. The great Bluebird, with its increased engine power, behaved perfectly and the record was raised to 253.97 m.p.h.

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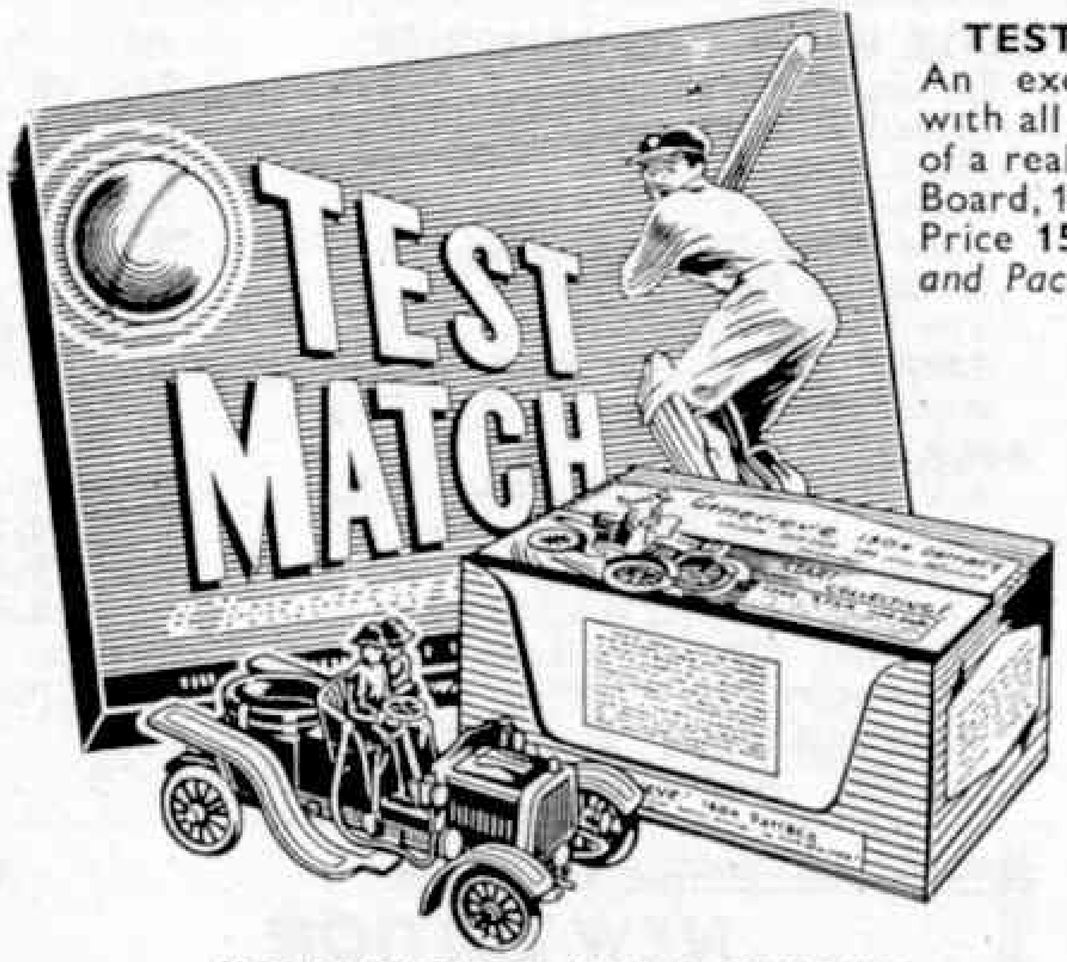

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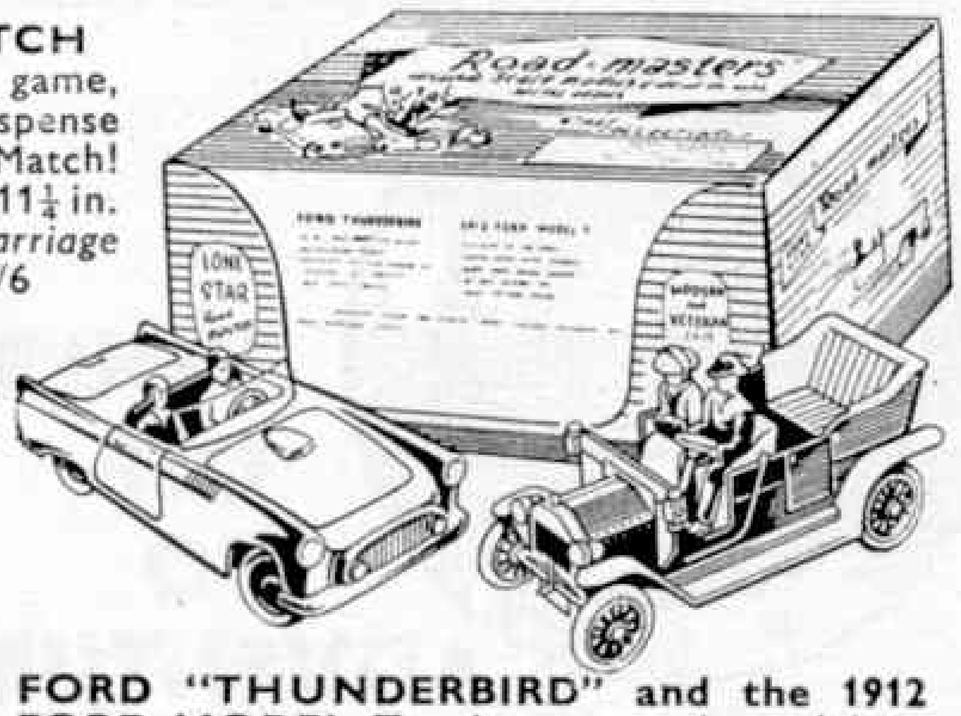

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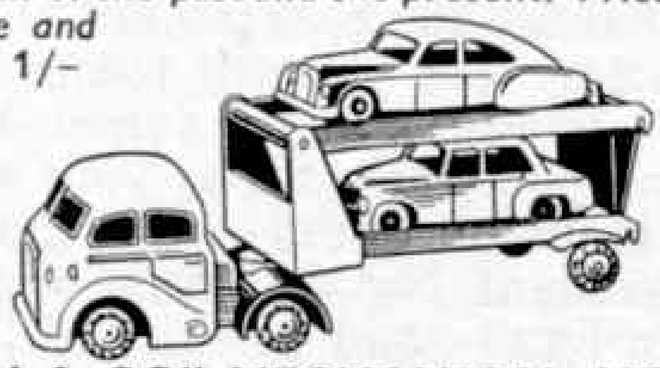

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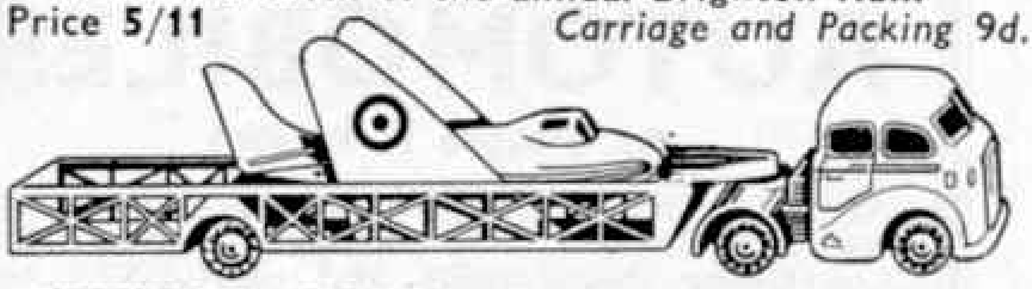

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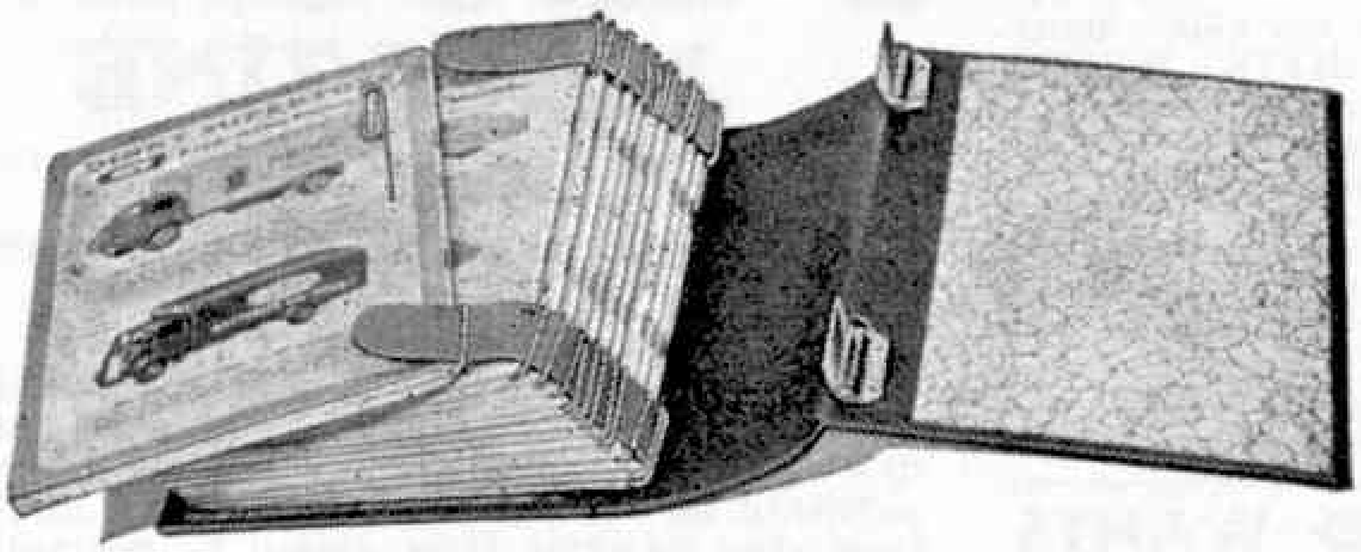

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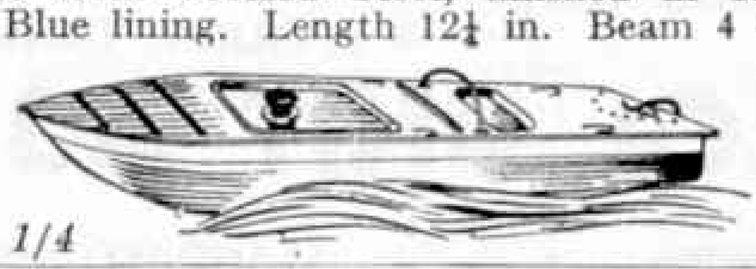

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Construction of the Chassis

Each side-member of the chassis consists of a 12½" Angle Girder extended at the rear by two 2½" Curved Strips and a 4" Curved Strip. A 7½" Strip 1 is bolted to the Angle Girder and is connected to the rear end of the 4" Curved Strip by an Angle Bracket. The side-members are connected by a 2½" x ½" Double Angle Strip 2, a 3½" Angle Girder 3 and a 3" Strip 4. Further 3" Strips are bolted between the Strip 4 and the side-members as shown.

Each of the rear springs consist of a 5½", a 4½" a 3½" and a 2½" Strip. The front end of the 5½" Strip is bolted to an Angle Bracket lock-nutted to the chassis and the rear end is fitted with an Angle Bracket lock-nutted to a Fishplate that also is lock-nutted to the chassis.

The independent front suspension is controlled by torsion bars, each of which consists of two 5½" Strips placed face to face. The rear end of each torsion bar is bolted to a 1½" Angle Girder fixed to the chassis, and a Coupling is screwed tightly to a bolt passed through the front end of the Strips. A 1" Rod fixed in the Coupling is passed through a slotted hole in the chassis side-member and is fitted with a Swivel Bearing 5. A 1½" Rod is held in the "Spider" of the Swivel Bearing and on this Rod a Short Coupling is mounted freely and is held in place by a Collar on the lower end of the Rod. The upper end of the 1½" Rod carries a Collar 6 and the Short Coupling supports another 1" Rod that forms the stub axle for the front wheel. The wheel is held on the axle by a Collar.

Each of the arms 7 is formed by two Obtuse Angle Brackets bolted to a Fishplate. One of the Obtuse Angle Brackets pivots on a bolt screwed into the Collar 6 and the other Obtuse Angle Bracket is lock-nutted to an Angle Bracket bolted to the chassis.

Arrangement of the Steering Mechanism.

The steering column is a 5" Rod supported in a 2½" x ½" Double Angle Strip bolted to a 1½" Corner Bracket that is fixed to the chassis. The Rod carries at its lower end a 7/16" Pinion that engages a Worm 8. This Worm is fixed on a 3½" Rod mounted in two 1" x ½" Angle Brackets bolted underneath the chassis side-members. A Fishplate is fixed to each Angle Bracket so that its round hole covers the slotted hole in the Angle Bracket to support the 3½" Rod. A Collar is fixed on the Rod between the two 1" x ½" Angle Brackets and a 2½" Strip is pivoted on a bolt screwed into the Collar. The other end of the 2½" Strip is pivoted on a bolt screwed into a Collar 9. Collar 9 is fixed on a Threaded Pin screwed into one of the Short Couplings that support the stub axles, and the track rod 10 is pivoted on the same bolt. The Threaded Pin is locked by its nut in the Short Coupling. The track rod consists of a 3½" Strip and a 2" Slotted Strip bolted together, and at its other end it is pivoted on a bolt screwed into a Collar mounted in the same way as the Collar 9.

The Engine Unit, Clutch and Gear-Box

The sides of the engine unit are 2½" x 1½" Flanged Plates and these are connected at each end by a 6-hole Wheel Disc. The engine inlet manifold is represented by six 2½" Strips and two 1" Corner Brackets attached to one of the Flanged Plates by ½" Bolts. The carburetter is represented by a Threaded Boss screwed on to a ½" Bolt passed through an Angle Bracket 11. The dynamo consists of two Chimney Adaptors bolted to one side of the engine and these support a 1½" Rod that carries a ½" Pulley 12. The fan is a Double Arm Crank free to turn on a ¾" Bolt, and held on the Bolt by two nuts. The Bolt is fixed by a nut in a 1" Triangular Plate that is attached to the front of the engine unit by two ⅜" Bolts, but is spaced from the unit by three Washers on each Bolt. The framework for the gear-box consists of two 3½" x ½" Double Angle Strips 13 connected by a 1½" x ½" Double Angle Strip 14 and a 1½" Flat Girder 15. The Flat Girder is spaced from the Double Angle Strips 13 by three Washers on each Bolt, and a 1½" Strip is used to cover the slotted holes in the Flat Girder. Another 1½" Flat Girder is bolted to Double Angle Strip 14.

A 3½" Rod is passed through the centre holes of the two 6-hole Wheel Discs. This Rod carries a ½" Pulley at the front, a ¾" Sprocket 16 inside the engine unit, and a 1" Pulley fitted with a Rubber Ring 17. The Rod projects only part of the way into the boss of the 1" Pulley. The Pulley forms the fixed member of the clutch unit and the sliding member is a 1⅛" Flanged Wheel 18. The Flanged Wheel is freely mounted on a 2" Rod that carries a ½" Pinion 19 and a ¾" Pinion 20. A bolt is fixed by a nut in each hole of the Flanged Wheel, which is pressed against the Rubber Ring 17 by a Compression Spring placed between Double Angle Strip 14 and the Flanged Wheel. A Collar fitted with two 7/32" bolts is fixed on the Rod inside the Flanged Wheel, so that the bolts in the Collar engage the shanks of the bolts in the Flanged Wheel.

The gear-box output shaft is a 2" Rod that carries two ¾" Pinions 21 and 22. The Rod projects partly into the boss of Pinion 20. The gear-box layshaft is a 3" Rod mounted in the two 1½" Flat Girders. This Rod carries a ¾" Pinion 23 and a ½" Pinion 24 arranged with their bosses about 3/16" apart. A Collar on the Rod limits the sliding movement. A ½" reverse Pinion 25 is mounted freely on a ¾" Bolt held by a nut in a Fishplate. The Pinion is retained on the bolt by two nuts and the Fishplate is supported by one of the bolts that holds the Flat Girder 15. Pinion 25 must be in constant mesh with Pinion 22 and it must be arranged so that it can mesh also with Pinion 24.

The engine unit is completed by bolting a 5½" x 1½" Flexible Plate 26 to the two Flanged Plates. The Flexible Plate is arranged to follow the shape of the 6-hole Wheel Discs. The top of the engine unit is a 2½" Flat Girder attached by bolts to Threaded Bosses screwed to one of the Flanged Plates. A 2½" Driving Band is placed round the ½" Pulleys at the front of the engine and the boss of the fan.

Assembly of the Rear Axle.

The housing for the rear axle is made by connecting two 2½" x ½" Double Angle Strips, one of them indicated at 27, by 2" Strips. At the front end of the housing four 2" Strips placed face to face are used to provide a bearing for the driving shaft. At one side two 1½" x ½" Double Angle Strips are bolted to the housing and are connected at their outer ends by a Wheel Disc. At the other side these Double Angle Strips are replaced by made-up 1" x

½" double angle strips, each of which consists of two 1" x ½" Angle Brackets.

The differential crown wheel is a 1½" Contrate 28 fitted with two 1" Screwed Rods held in place by nuts. A Collar 29 is screwed on to each Screwed Rod and these Collars support a 1½" Rod that passes through the centre cross hole of a Coupling. Two ¾" Pinions 30 are free to turn on Pivot Bolts screwed into the Coupling. The differential half shafts are supported in the Wheel Discs and the Double Angle Strips 27, and each carries a ¾" Contrate that engages the Pinions 30.

At one side of the rear axle a simple brake is fitted. The brake shoe consists of three Washers on a ⅜" Bolt fixed in a Crank 31. This Crank is held tightly on a 1" Rod passed through the Wheel Disc. The Rod carries also a Collar in which a ½" Bolt 32 is screwed.

The complete axle is attached to the rear springs by two ½" Reversed Angle Brackets 33 on each side.

Arrangement of the chassis controls and the radiator

The clutch release levers are two 1" Screwed Rods arranged to engage the flange of the Flanged Wheel 18. Each Screwed Rod is locked by a nut in the threaded hole of a Collar, which is fixed on a 2" Rod mounted in two 1" Triangular Plates. Each Triangular Plate is bolted to a 1½" Flat Girder 34 fixed to one of the Double Angle Strips 13. A Crank extended by a 2" Strip 35 is fixed on the 2" Rod between the two Collars.

The gear-box control lever is a Double Arm Crank extended by a 4½" Strip 36. The Double Arm Crank is fixed on the shank of a Threaded Pin passed through one of the Double Angle Strips 13. A ⅜" Bolt is fixed by two nuts in the Double Arm Crank, and its head engages between the Pinions 23 and 24.

The brake pedal is a Double Arm Crank that pivots on a ¾" Bolt attached to the chassis by two nuts. A 3½" Strip 37 is lock-nutted to the brake pedal and to a Double Arm Crank 38 fixed on a 3½" Rod mounted in 1½" Strips bolted to the chassis. This Rod carries a Crank 39 extended by a 2½" Strip. A length of cord 40 is tied between the Double Arm Crank 38 and the Bolt 32.

The engine unit and the gear-box are attached to the chassis by Angle Brackets. An Angle Bracket is bolted to each of the Double Angle Strips 13 and to each side-member of the chassis, and two Angle Brackets are fixed to the 6-hole Wheel Disc at the front of the engine unit. These Angle Brackets support a 1" Triangular Plate that is bolted to the Double Angle Strip 2. A Universal Coupling is fixed on the gear-box output shaft and is connected to a similar Coupling on a 1" Rod that carries a ½" Pinion 41.

The radiator frame consists of two 2" and two 2½" Angle Girders. Two 3" Screwed Rods are passed through the frame and Spring Cord looped round them represents the radiator tubes. The upper end of the radiator is completed by two 2½" Curved Strips and a 2½" Strip supported by nuts on a ¾" Bolt. The radiator is bolted to the front ends of the chassis side-members.

Details of the Base

Each side of the base consists of two 18½" Angle Girders connected by 4½" Angle Girders. The rear side is filled in by four 9½" x 2½" Strip Plates, and the front is partly filled in by four 5½" x 2½" Flexible Plates strengthened by 4½" Strips. The sides are connected by 7½" Angle Girders and each end is completed by four 4½" x 2½" Flexible Plates. Two 7½" Angle Girders 42 are bolted across the top of the base and a similar Girder 43 is fixed in position.

At the front a 7½" Angle Girder 44 is bolted in position and to this are fixed two 5½" Angle Girders 45. These are connected at their outer ends by a 7½" Angle Girder that supports two 1½" Angle Girders 46. Two overlapped 5½" x 1½" Flexible Plates edged by a 7½" Strip are fixed to Girders 46, and two overlapped 5½" Strips 47 are bolted between the Girders 46 and Angle Brackets fixed to the base.

The rear end of the chassis is supported by two Corner Gussets bolted to 4½" Angle Girders. The front also is supported by two Corner Gussets. These are attached to a 7½" Angle Girder fixed across the base and they are connected to Double Angle Strip 2 by Angle Brackets.

Arrangement of the Controls.

The clutch and brake pedals each consist of two 4½" Strips connected at their upper ends by Bolts screwed into a Coupling. A 3" x 1½" Flat Plate is attached to the Coupling by two Bolts, and the lower ends of the Strips are spaced apart by Washers on a ½" Bolt. Each pedal pivots on a 2" Rod passed through the lower next to end holes in the Strips. The Rod is supported in two Trunnions bolted to 7½" Angle Girders 48 and is held in place by Collars.

Two 7½" Angle Girders are fixed across the base and these support another 7½" Angle Girder 49. A 3½" x ½" Double Angle Strip fixed to this Girder carries a 4" Rod 50. Two 5½" Strips are connected by 1½" x ½" Double Angle Strips and these are bolted to the Girders 42. Two 2" Rods 51 and 52 are held in the 5½" Strips by Collars.

A length of Cord tied to the lower end of the clutch pedal 53 is passed under Rod 50 and over Rod 52. It is taken round Rod 51 and is tied to Strip 35. Another Cord tied to the lower end of the brake pedal 54 is passed under Rod 50, over a Pivot Bolt 55 and round the Rod 52. Finally this Cord is tied to the end of the Strip bolted to Crank 39. Springs are arranged between the clutch and brake pedals and the front of the control panel to return the pedals to the normal positions. The gear lever 56 is a 5" Rod that carries a Threaded Coupling to which three 1" loose Pulleys are attached by a ¾" Bolt. The lower end of the Rod is fixed in a Coupling that pivots on a 2" Rod supported in two Trunnions 57. A Compression Spring between the Coupling and one of the Trunnions presses the lever to the left.

A Swivel Bearing 58 is mounted on the gear lever between two Collars and is connected by a Rod to a Collar screwed on to a bolt passed through a Crank 59. The Crank is fixed on a vertical Rod mounted in the top of the base and in a 3½" x ½" Double Angle Strip 60. A Fishplate bolted to the Crank is used to cover the slotted hole. A lever 61 fixed to the vertical Rod consists of a Crank extended by a 3½" Strip, and it is linked to the gear change lever 36 by a Rod 62 and two Swivel Bearings. A rack to hold the gear lever in the desired positions consists of Fishplates bolted to a 3½" Flat Girder 63 that is supported by nuts on 1⅛" Bolts.

The Driving Mechanism

An E2ORS Electric Motor is fixed to two 7½" Angle Girders bolted across the base. A 4" Rod 64 is fixed in a Collar screwed on to a bolt passed through the upper arm of the motor switch. A ½" Pinion on the Motor shaft drives a 57-tooth Gear on a 2½" Rod mounted in the side-plates, and a ½" Pinion on the same Rod engages a 57-tooth Gear on a 3" Rod supported in the upper corner holes of the side-plates. The 3" Rod is held in place by a Collar and it carries a ½" Pinion that drives a 2½" Gear 65. This Gear is mounted on a 5" Rod supported in one end of the base and in one of the Girders 42. A ¾" Sprocket on the 5" Rod is connected by Chain to the Sprocket 16.

Adjusting the Controls

The gear-box provides two forward speeds and reverse. Top gear is obtained by sliding the layshaft to bring Pinion 24 into mesh with both the Pinions 20 and 21. Low gear is obtained by sliding the layshaft so that Pinions 20 and 24 disengage and Pinion 23 moves into mesh with Pinion 19. Reverse gear is provided when Pinion 24 engages Pinion 25 and Pinion 23 meshes with Pinion 19. The positions of the Cranks of the selector mechanism and the arrangement of the Fishplates that locate the gear lever should be adjusted carefully so that the correct gears are engaged when the lever is moved.

The length of the Cord from the clutch pedal should be adjusted so that when the pedal is fully depressed the Flanged Wheel 18 is moved just clear of the rubber ring 17. The brake cord should be adjusted so that when its pedal is depressed the Crank 31 is brought into contact with a Boiler End bolted to the rear wheel.

PARTS REQUIRED

6	of No.	1b	1	of No.	16a	4	of No.	48a	6	of No.	111a
14	" "	2	4	" "	16b	4	" "	48b	6	" "	111c
21	" "	2a	7	" "	17	2	" "	51	4	" "	111d
5	" "	3	3	" "	18a	1	" "	55a	3	" "	115
6	" "	4	6	" "	18b	1	" "	58	2	" "	120b
12	" "	5	1	" "	20	40	" "	59	4	" "	125
9	" "	6	4	" "	20a	5	" "	62	6	" "	126
1	" "	6a	3	" "	22a	4	" "	62b	1	" "	133
4	" "	7a	3	" "	23a	4	" "	63	2	" "	133a
2	" "	8	2	" "	24a	1	" "	63c	2	" "	140
17	" "	8b	2	" "	24c	2	" "	63e	4	" "	142a
2	" "	9	6	" "	25 ✓	2	" "	64	2	" "	147b
2	" "	9a	7	" "	26 ✓	3	" "	77	4	" "	155
1	" "	9c	1	" "	26c ✓	2	" "	80c	2	" "	162a
2	" "	9d	2	" "	27a ✓	2	" "	82	2	" "	164
2	" "	9e	1	" "	27c ✓	2	" "	89b	3	" "	165
2	" "	9f	1	" "	28 ✓	4	" "	90	1	" "	185
14	" "	10	2	" "	29 ✓	2	" "	90a	1	" "	186
21	" "	12	1	" "	32 ✓	1	" "	94	2	" "	188
6	" "	12b	353	" "	37a ✓	2	" "	96a	5	" "	189
8	" "	12c	301	" "	37b ✓	1	" "	103d	16	" "	191
4	" "	15	102	" "	38 ✓	1	" "	103f	6	" "	192
1	" "	15a	1	" "	40	4	" "	103h	4	" "	196
2	" "	15b	3	" "	43	4	" "	108	1	E2ORS Electric Motor.	
4	" "	16	5	" "	48	2	" "	111			