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NOVEMBER 1945

MECCANO

MAGAZINE



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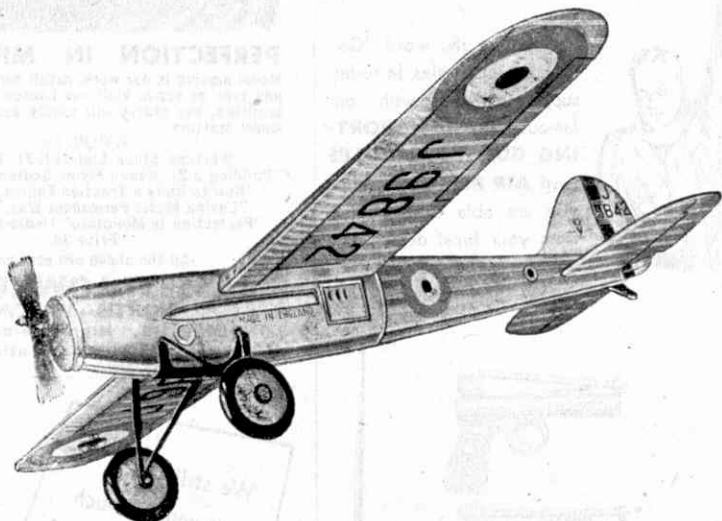
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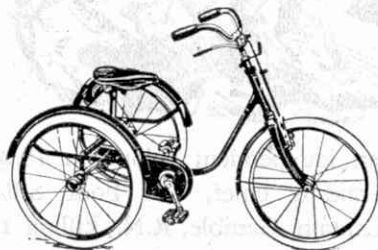
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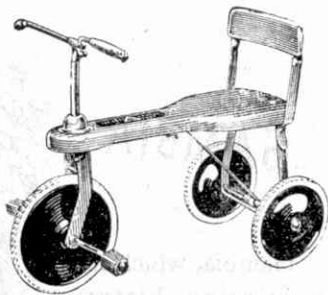
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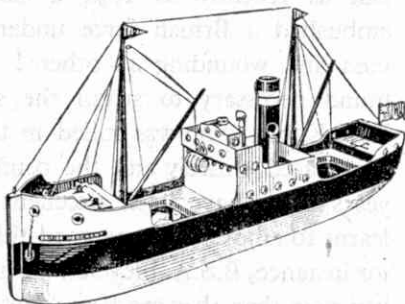
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GAMBIA



Gambia, which has a stirring history dating back to the days of Queen Elizabeth, became an independent colony in 1843. But as recently as 1894 a slave-raiding chief, one Fodi Silla, ambushed a British force under Captain Gamble, R.N., killing 15 men and wounding 47 others! Later still, in March 1901, it was found necessary to storm the stronghold of another slave-raider, Fodi Kabba, who was killed in the fight. Since then slave-raiding has ceased entirely and the country has been at peace. For many years there have been excellent schools for the natives, who have learnt to enjoy the many good things introduced by the white man—for instance, B.S.A. bicycles. These are no more plentiful in Gambia just now than they are here; but very soon there will be a B.S.A. bicycle for *everyone* everywhere—so keep in touch with your B.S.A. dealer wherever you are!

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Next Month: "THE BRITISH CIVIL AIR FLEET." By J. W. R. Taylor

MECCANO

MAGAZINE

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England

Vol. XXX
No. 11

November 1945

With the Editor

England to Australia in 63 Hours

Only 100 years ago "*Thermopylae*," the famous clipper sailing ship, created a sensation by sailing from Start Point to Melbourne in 63 days 17 hours. Now "Lancastrians" fly from England to Australia in 63 hours. So days have become hours for this trip half-way round the world.

The story of this remarkable change is told in the British Overseas Airways "*News Letter*." Early last century sailing ships took anything from four months to a year to complete the voyage, and when steam displaced sail steady progress brought the time down to 42 days about the time of the 1914-1918 war. Then flight came into the picture. In 1919 the Australian Government offered a prize of £10,000 to anyone who could fly from England to Australia in less than 30 days, and this was won by the brothers Ross Smith and Keith Smith, with a flight taking nearly 28 days.

Once the trail had been blazed progress was swift. One by one famous flyers such as Bert Hinkler, Amy Johnson, Kingsford Smith and Jean Batten attacked the record, and brought the time down to about 15 days. Then came the startling achievement of C. W. A. Scott and Campbell Black, who reduced it to 2 days 23 hours. Their machine, the "Comet," was the forerunner of the famous "Mosquito."

All these flights were the prelude to regular services, which began in 1934, when the time allowed was 12½ days. In 1938 the famous Short flying boats reduced this to 10 days, and there the time stood when we entered the war. We emerge from that conflict with a regular service maintained by "Lancastrians," a development of Britain's famous bomber, which regularly make the flight in 63 hours.

How Things Are Made

My readers, quite naturally, differ in their ideas as to the space that should be devoted to different topics. Railway enthusiasts, for instance, think there is too much space given to aviation; aviation "fans" think that railways get more than their share, and so on. But all seem to be equally keen on the articles appearing under the heading "How Things are Made." This month's article describes the making of a Webley air pistol, and next month the production of cardboard will be dealt with. I have other articles in view for this series, but it occurs to me that it would be interesting to have the ideas of readers. I shall be glad to receive suggestions for future articles of this type, with a view to their preparation for next year.

This Month's Special Articles

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Sailing Barge and Motor Coaster

By Frank C. Bowen

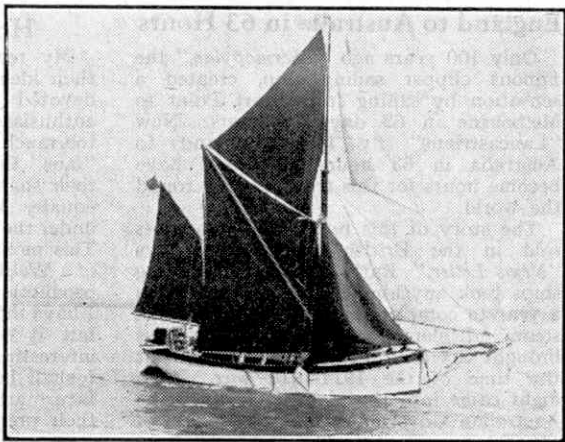
THE red-sailed spritsail barge, like the "*Alf Everard*," which features on the front cover, or her sister the "*Ethel Everard*," which left her bones on Dunkirk beach after gallant work in the evacuation of the British Army, was long one of the most picturesque features of the Thames Estuary, East Anglian Coast, and well down Channel. Now she is rapidly disappearing under economic pressure. There are many very sorry to see her go, not only because of the important work that she did, but for her beauty, ingenuity in design and fine standards of seamanship. Incidentally, she is essentially British in hull and rigs, in spite of certain efforts to claim a Dutch ancestry.

It is true that for centuries the London barges, although very numerous, were primitive in design, and that the great improvements do not go back beyond the nineteenth century. In the latter part of it, thanks to the influence of Henry Dodd, "*The Golden Dustman*," who established the Thames and Medway Barge Races, and to the new generation of barge owners with progressive ideas, these improvements were very striking. The modern barge is remarkably seaworthy, as has been proved by voyages to South America; fast and handy, as is always proved in the barge races, and astonishingly economical within certain limits.

The barge naturally possesses the disadvantages of all types of sailing ship in modern trading conditions. So she must eventually disappear, although her qualities have given her a longer life than other types and she has survived all the more elaborate vessels. She had years of prosperity when the old brigs, brigantines and schooners were being replaced rapidly by steam coasters in the coal and other bulk trades on the coast.

The steam coaster, however, had two big disadvantages. One was the large proportion of her length occupied by the engines and boilers, reducing her carrying capacity and economy; and the other was

that her draught of water debarred her from many of the smaller and more neglected ports except on the top of spring tides. The Thames barges still secured an immense amount of business to such ports over a wide area on both sides of the Channel, but they had their disadvantages too, and the more enterprising and far-sighted barge owners realised the danger of the business being



"*Alf Everard*," the vessel shown on this month's cover. The photographs to this article and the illustration on the cover are by courtesy of F. T. Everard & Sons Ltd.

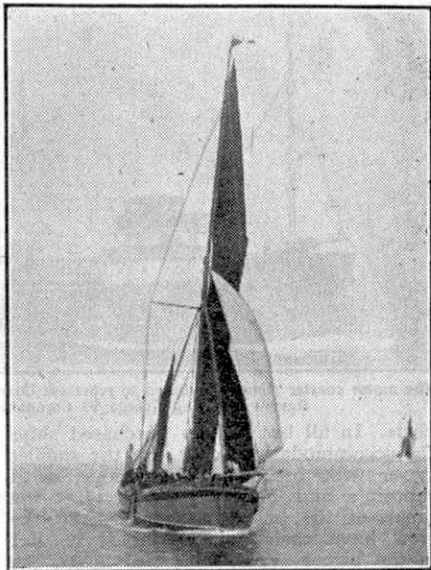
lost to competitors on land.

It was the late Mr. F. T. Everard of Greenhithe and London who saw the solution. If the internal combustion engine which was then being slowly developed for heavy duty could be made suitable for a coaster, she could be built with very much lighter draught than the steamer, could devote a much larger proportion of her hull to cargo, and could be run with greater economy. The engine supplied the big "if." Before the outbreak of the last war Mr. Everard took the risk, building the pioneer motor tramp on the British coast at his own yard at Greenhithe and embodying several features which had proved their value during many years' experience with barges. In those days the engines were very far from ideal as regards reliability, and there were plenty of pessimists who prophesied that he would never secure good engineers

owing to the largely undeserved reputation of the coasting trade for hardships. Although barge experience was useful, many factors in the design and running of the new ships were absolutely novel.

Then the last war intervened and the pioneer was lost on war service. In the meantime the Dutch, who had paid great attention to small carrying craft for centuries, were in a position to make very large profits from the business of taking commodities which had been run through the British blockade into Germany by way of the inland waterways. They made rapid progress in the evolution of a small coaster, suitable for both sea and river work, and rapidly developed it from a sailing vessel, through a sailing vessel with auxiliary motor and a motor vessel with auxiliary sail, to the full powered ship which is demanded to-day. The British had their hands full with the war.

After the peace the Everards did not give up the sailing barges entirely and built a number of conspicuous ones. Included in these were the famous "family" class—"Ethel Everard," "Fred Everard," "Will Everard" and "Alf Everard"—built in 1925 and 1926, and acknowledged to be the finest and biggest spritsail barges under the Red Ensign, each carrying nearly 300 tons deadweight with two men and two boys. They hold many coastal records under sail, even against the fastest



The barge "Sara" winning the River Class Thames Race.

schooners, and are always conspicuous in the barge races, with their white hulls and unusual size. They were built with a propeller aperture for conversion to motorships if necessary.

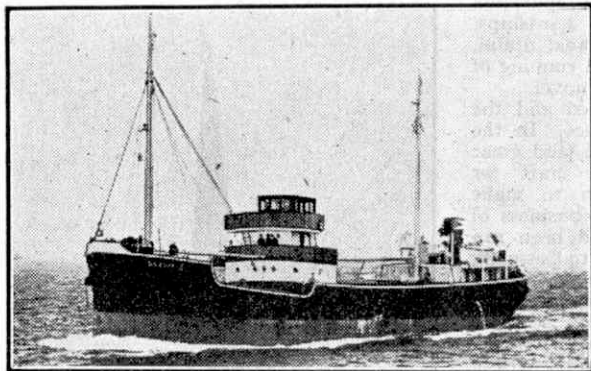
The motor coasters were designed on scientific lines from the first, each hull carefully tested through the tanks like a liner or man-of-war, for the Dutch had to be surpassed at their own game. The resulting standards are shown by the fact that the company's ships were twice chosen to represent coasting tramps at royal reviews, the "Angularity" for King George V's Silver Jubilee and the "Suavity" for King George VI's Coronation.

Similarly, all the Diesel engines of the specially designed ships are built by the Newbury Diesel Company, the "Sirron" type specially intended for coasters and possessing the essential quality of solid reliability while standardised parts simplify the problem of spares. The long service personnel, which is the great pride of the firm, soon got to know them thoroughly and to have confidence in them in all conditions.

In general principles the design of all the motor coasters is on the same lines. The engines are placed aft with ample water ballast to trim the ship in such a way that it can get into numerous small



"Cambria" winning the Thames Coasters Race.



The motor coaster "Suavity" chosen to represent Coasting Tramps at the Review for King George VI Coronation.

ports. In all but certain purchased ships the accommodation is aft. In the smaller types with one hold the bridge, with captain's and mates' quarters, is at the break of the poop and the rest of the crew have their quarters abaft it; but in the bigger types, with two holds, the captain and officers have their quarters under the bridge between the two holds, and it is equal to that of many ocean-going ships.

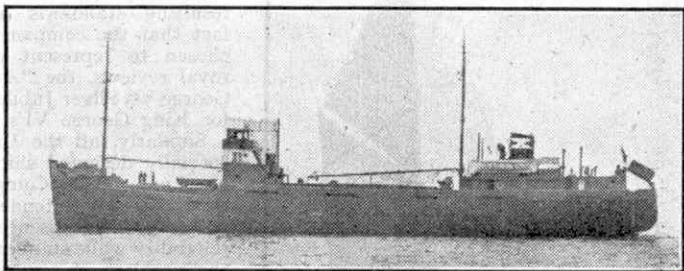
The owners take particular pride in giving their crews the best accommodation on the coast; in all the later vessels the officers and engineers have comfortable saloons in addition to their cabins, and the engineers a duty mess also, where they can snatch meals in the middle of a job without changing. The ratings also have their own messes, and bathrooms and showers are provided, often with hot and cold water; while in the "Adaptity" and "Actuality" a singleberth cabin is provided for every man on board, even to the cabin boy. These ships are the first vessels in the world, designed for tramping, to be given that refinement.

Most of the ships are designed to carry dry cargoes on coastal and short sea voyages to the nearby Continental ports. Many of these are for general trading, suitable for whatever cargo may be chosen by their charterers, but some are

specially designed for small and awkward ports. This entails a considerable range in size and dimensions, the units of the fleet ranging from 220 tons deadweight to 2,700. The firm has a very big connection in the transport of several commodities which demand special qualities in the design. It also owns a number of tankers employed in the transport of ordinary oil, the transshipment and coastal carriage of edible oils from the terminal ports, and the transport of whale oil from the Continent.

A great feature of the fleet is the particular care which has been paid to handling cargo, the factor in which the old sailing barges failed as much as in anything else. In addition to the propelling engines a generating plant is installed in each ship, supplying current to electric winches, generally up to two tons lifting capacity, which are installed on deck and give the ships cargo handling ability superior to many steamers of considerably larger size.

This excellent cargo gear was one of the main factors in causing so many Everard ships to be chosen for the D-Day operations in Normandy—more than from any other fleet in the coasting trade, although no less than 23 had already been lost by enemy action. Some had been very seriously damaged but brought to port by the



Motor Coaster "Adaptity" which provides a singleberth cabin for every man on board.

efforts of their crews and repaired in time for the Great Event. Those included the "Avidity," which had to be given new engines after her adventure with an acoustic mine, and the "Summity," which seemed beyond repair when she was beached at Dover after concentrated air attack in the Battle of Britain.

Jet-Propelled Fighters

The "Vampire" and "Shooting Star"

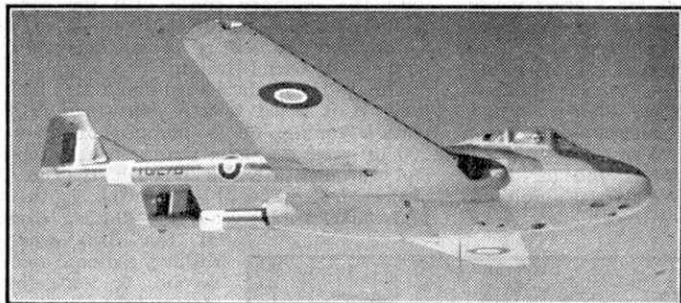
By John W. R. Taylor

DURING the war years we were unfortunately at the receiving end of several ingenious German weapons, with the result that many people were under the impression that the Germans were well

distinction of being the designers of the engines used in the fastest British and American fighters.

Although they are both single-seat, single-engined monoplanes, the "Shooting Star" and "Vampire" are

very different in layout. In each case the engine is mounted in the fuselage aft of the pilot and receives its air through ducts in the wing roots. But, whereas Lockheeds adopted an orthodox layout, with the jet orifice in the tail end of the fuselage, de Havillands went all out for maximum efficiency and used a twin-boomed design with the jet orifice in the rear of the fuselage nacelle, to obtain the thrust very near the aircraft's centre of gravity. As a result the "Vampire" has exceptionally fine



The D.H.100 "Vampire" jet-propelled interceptor fighter. Photograph by courtesy of de Havilland Aircraft Company Ltd.

ahead of us in scientific development. Now that lots of cats are being let out of the official bag it is apparent that the oft-maligned British "back-room boys" were not by any means as backward as the spreaders of gloom and doom would have had us believe.

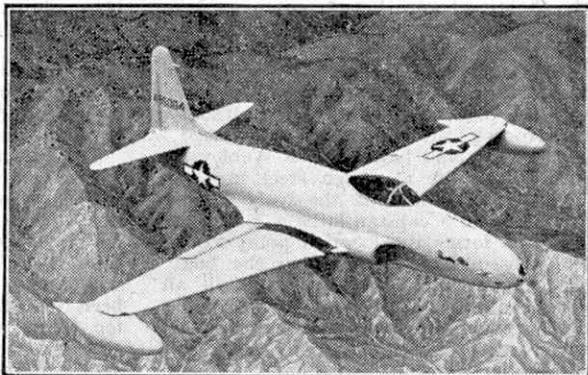
The official release of the de Havilland "Vampire" and Lockheed "Shooting Star" jet-propelled fighters has brought to light yet another story of British achievement—the development of the de Havilland "Goblin" jet-engine. Design work on the "Goblin" was started in the Spring of 1941 under the direction of Major Halford, whose earlier designs include the "Gipsy" and "Sabre" engines. Just twelve months later, on 13th April 1942, it had its first test-bed run, and was test-flown in a Gloster "Meteor" II on 5th March 1943. From the start it was an outstanding success, both from the point of view of power output and ease of maintenance, and so de Havillands set to work designing a fighter to use their revolutionary new engine. The result was the D.H.100 "Vampire" twin-boomed interceptor.

Following immediately after the "Mosquito," the "Vampire" had to be good. Its designers were not disappointed. The prototype flew for the first time on 20th September 1943, piloted by Geoffrey de Havilland Jr., and six months later became the first British aeroplane to exceed by a handsome margin 500 m.p.h. in level flight. It also had an operational ceiling of between 45,000 and 50,000 ft., which put it in a class by itself as an interceptor.

Meanwhile a "Goblin" engine had been sent by air to the Lockheed Company in America, to power the prototype XP-80A "Shooting Star," and soon de Havillands could claim the proud

handling qualities for such a speedy machine. Both aircraft are of all-metal construction, with the exception of the pressurised cockpit of the "Vampire," which is of wood. The "Vampire" has four 20 mm. cannons, the "Shooting Star" six .50 in. guns.

The coming of jet-propulsion has gladdened the hearts of pilots and ground staff alike. The pilot has more power under his control and less instruments to worry about. Because of the absence of propellers, it has been possible to fit short undercarriages, which enable ground staff to service the aircraft without the customary "ladders and scaffolding." Added to which Lockheeds state that the engine of the "Shooting Star" can be changed in about 15 min., which is only a fraction of the time needed to change a normal piston-engine. And, as jet-engines run on kerosene or paraffin, their operating costs are low.



P-80A "Shooting Star" jet-propelled fighter. Photograph by courtesy of the Lockheed Aircraft Corporation, U.S.A.

HOW THINGS ARE MADE:

Webley Air Pistols and Air Rifles

EVERY reader will have found reference in some "thriller" or detective story to the "Webley." This of course refers to the revolver for which Webley and Scott Ltd., Birmingham, established over 150 years ago, have been famous for a great many years. It was on account of this vast experience in the manufacture of fire-arms, and of the fact that there was no really accurate air pistol on the market, that the company turned their attention to the production of a first-class air pistol after the first World War.

The Webley air pistols and air rifles first appeared at the Wembley Exhibition, where they provided so much interest at

more interesting as its production is on much the same lines as for small arms. The forging is drilled the full length, and it will be realised that a very small drill is necessary for a .177 hole. Whereas with the ordinary spiral drill the component to be drilled is clamped in a fixture and the drill revolves, the reverse happens in barrel drilling.

The drill is spade shaped and about 1 in. long. It is fitted to a length of crescent section tubing; oil is pumped at about 600 lb. pressure along the crescent tubing and through a small hole in the head of the drill. The object of this is two-fold—first, to lubricate the cutting edge

of the drill when drilling a deep hole; second, to force the steel swarf back along the portion of the barrel already drilled; and it is for this reason that the tube is crescent shaped. If this were not done the swarf would foul the drill and cause it to run out through the side of the barrel. This occasionally happens, even with a substantial oil pressure, when drilling an exceptionally long hole.



Making Webley Air Pistols and Air Rifles; the assembling department. Our photographs are reproduced by courtesy of Webley and Scott Ltd., Birmingham.

the shooting booth that the company were encouraged to continue the development.

In these notes it is proposed to refer mainly to the making of air pistols, the manufacture of which is rather more involved than that of the air rifle, although the processes are very much the same.

The body and barrel of the Webley air pistol start life as rough steel forgings. The first operation on the body forging is to drill on a capstan lathe a $\frac{3}{4}$ in. hole, and this forms the location point for all the subsequent operations on the body. It would be uninteresting to detail all these; suffice it to say that there are in all, on the body alone, approximately 50 separate machining operations, consisting of milling, drilling, reaming, tapping, grinding and profiling.

The making of the barrel is perhaps

Incidentally, it may be mentioned that it is possible on the same machinery to drill holes about 3 ft. long.

On the barrel alone there are upwards of 30 machining operations; there will not be space to detail them all, but the setting, boring and rifling are worthy of note.

The setting operation, which applies more to an air rifle barrel than the shorter air pistol barrel, is a skilled hand operation. There are certain machines used on military barrels for straightening, but there is nothing so satisfactory as a barrel straightened by a skilled setter. It has been said that if 12 youths are trained for barrel setting, only one will prove successful, so great is the degree of skill required.

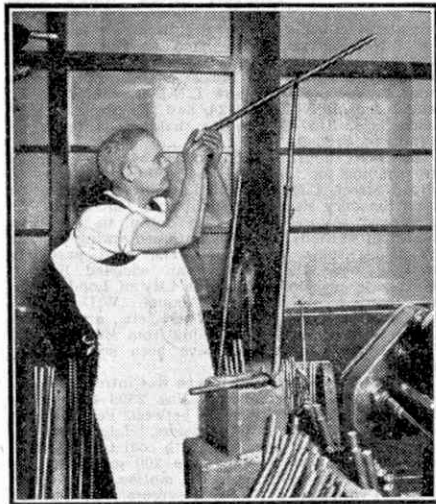
The method adopted by the skilled barrel setter is to view the barrel for

concentricity by looking through it towards the light. He can detect by the breaking of the light and shade, where the ordinary person could not, any deflection, and this he rectifies in what appears to the uninitiated a very crude method—he taps the barrel with a 2 lb. hammer. The skill lies in finding the place to tap and knowing the exact weight of blow required.

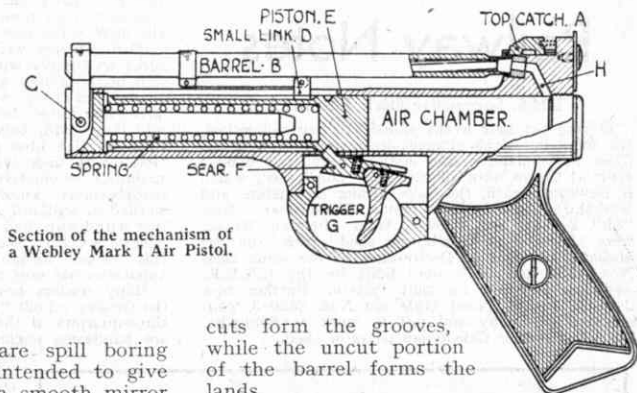
The next operations are spill boring and lapping, which are intended to give the inside of the barrel a smooth mirror finish preparatory to the rifling operation.

The rifling, which is designed to give the pellet its spin to obtain accuracy, is also a skilled operation when dealing with such small bores as .177 and .22, which are the bore sizes of the Webley air pistols and air rifles.

The barrel is clamped in an indexing fixture, which is rotated to give the required number of grooves, and remains stationary in the rifling machine while the cutter, which is governed by a spiral grooved mandrel or former to give it the necessary twist, is drawn through the barrel, taking a cut at each stroke of .0005 in. This is repeated until the grooves are .002 in. deep. The rifling



A barrel setter inspects the barrel.



Section of the mechanism of a Webley Mark I Air Pistol.

cuts form the grooves, while the uncut portion of the barrel forms the lands.

Much rifling has been done by means of broaches during the recent war for larger calibre barrels, and it is quite likely that it will be possible to extend the benefit of this experience to smaller calibre barrels in future years.

The piston is formed from a piece of bar material on a standard capstan lathe. It is subsequently locally hardened so that the portion which is contacted by the sear when the pistol is cocked can withstand a considerable amount of use.

There are upwards of 200 machining operations on the air pistol and over 300 on the air rifle. Each component in the course of manufacture passes through the Inspection Department, and components not to gauge are rejected.

After inspection the components are metal coloured to give a gun barrel blue finish. This is a chemical process, and the component parts, after being treated by a degreasing compound, pass through various vats containing chemicals.

The final stage is the assembly, which is done by skilled fitters accustomed to the more serious work of assembling the Webley revolvers. Each pistol is then tested for accuracy and penetration before being oiled and packed ready for despatch.

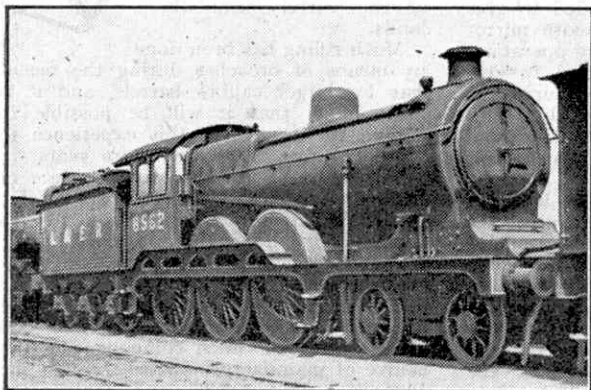
The drawing on this page has been specially prepared to show how a Webley Mark I pistol works. The pistol is shown in the "ready for firing" position.

The method of loading is as follows. Slide back top catch A, lift barrel B, which acts as the cocking lever and pivots at the point C, causing the small link D to engage on the lip of the piston E, thus drawing the piston to the forward end of the pistol and cramping the spring to the position shown in the illustration. The same operation (Continued on page 394)

Railway Notes

L.M.S. Locomotive Stock Alterations

During the four weeks ended 8th September last, the following stock changes took effect: New 4-6-0 Class "5" mixed traffic engines numbered 4890-3 built at Crewe were allocated to "26A" shed, which is Newton Heath, the large former Lancashire and Yorkshire depot just outside Manchester. New "8F" 2-8-0s Nos. 8494-5, from Horwich Works, were allocated to Westhouses shed, "18B," on the Midland Division in Derbyshire; of the same class Nos. 8539 and 8559 were built by the L.N.E.R. and are at work on that system. Further new 2-6-4Ts in the latest style are Nos. 2690-3, constructed at Derby and put to work at Polmadie, "27A," a former Caledonian Glasgow shed.



L.N.E.R. Class "B12/1" 4-6-0 No. 8562 at Norwich. Photograph by H. C. Casserley.

During the same period locomotives withdrawn were No. 14758, another of the 6 ft. 4-6-0s designed for the Highland Railway in 1915 but transferred to the Caledonian on account of weight being too great for the original owners; No. 17648, superheated 0-6-3 mixed traffic engine with 5 ft. wheels, of the one-time series of four numbered 30-3 on the Caledonian; No. 12887, Class "7F," one of the later series of ex-Lancashire and Yorkshire 0-8-0 freight locomotives with large cylinders, 21½ in. diameter; and No. 28138, Class "2F," another of the veteran Webb coal 0-6-0 engines from the former L.N.W. stud. The 0-8-0 freight tender engines numbered 8922 and 9142 have been reclassified "7F" instead of "6F."

L.N.E.R. Locomotive Notes

Apart from No. 1506, which was badly damaged in collision at Colchester in 1913 and scrapped, the first "B12" to be withdrawn, in June 1945, is No. 8534. From 1911, when the pioneer Great Eastern inside cylinder 4-6-0 appeared, until comparatively recent times, the "1500" class was pre-eminent on East Anglian express services. The first 40, numbered 1500-39, were built at Stratford between 1911 and 1917. The next 31, numbered up to 1570, followed from the works of Wm. Beardmore and Co. Ltd., Glasgow, or Stratford, in 1920-2, so that 70 came into the L.N.E.R. stock at grouping. They were shortly afterwards classed "B12" and re-numbered 8500-5 and 8507-70. Another 10, Nos. 8571-80, were constructed for the L.N.E.R. by

Beyer, Peacock and Co. Ltd. having Lentz poppet valves, though these were subsequently replaced by the more usual piston valves.

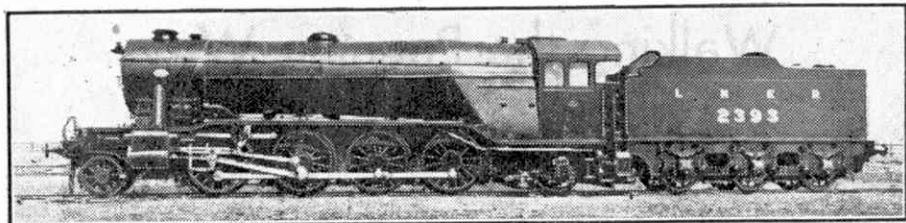
These engines were comparatively small 4-6-0s in order to comply with weight restrictions on bridges and track as well as to be within G.E.R. turntable limits, but they were effective performers. They were impressive looking, with Belpaire fire-boxes and large cabs, being embellished in Great Eastern days by rich blue paint and polished metal work. Green was their later peacetime hue. Most of the unrebuilt locomotives, apart from slight L.N.E.R. modifications, known as "B12/1," have recently worked in Scotland, though three, including No. 8534 just withdrawn, had quite lately returned to Norfolk. Where A.C.F.I. feedwater heaters had been fitted, this rather unsightly though probably efficient apparatus has now been removed.

Many readers nowadays are more familiar with the Gresley rebuilt "B12/3" version, to which nearly three-quarters of the class conform. These rebuilds are handsome engines of considerable power. The cylinder diameter remains at 20 in. in conjunction with 28 in. stroke; boiler pressure at 180 lb. per sq. in. is also unaltered; but the new boiler is decidedly larger, with more superheat, the grate is bigger, and the valve travel is much longer. A good photograph of No. 8579 rebuilt appeared in the July 1941 "M.M.," in which there appeared also a description by Mr. R. A. H. Weight of a good ordinary run from London to Ipswich behind the unrebuilt "B12" that has just been scrapped. Some of these locomotives were renumbered 74xx temporarily during 1942-3. As recorded in these pages, some 15 of the rebuilt ones hauled Services' hospital trains all over the country as required last year.

No. 9000, the new 2-6-4T, is reported to have been doing good work with semi-fast and comparatively long distance outer suburban trains to and from Liverpool Street, King's Cross and Marylebone, in the course of extensive trials. New "8F" L.M.S. type 2-8-0s for L.N.E.R. use are in hand at Doncaster and Darlington, probably to bear L.N.E.R. numbers 3125-67, in which case the 25 engines of this class built by the Southern, now L.N.E.R. Nos. 7651-75, would become Nos. 3100-24, and the present "J50" tanks Nos. 3157-66 are for that reason being re-numbered 3180-9.

L.N.E.R. suburban trains hauled by "N2" 0-6-2Ts are running for the first time at business hours to Broad Street, L.M.S. (North London section) station from Finsbury Park via Canonbury. Through L.M.S. passenger services over that route to L.N.E.R. suburban stations were discontinued owing to war conditions some years ago. The local passenger working over the Metropolitan widened lines to Aldersgate or Moorgate, in the City of London, has also been restored at peak hours. W.D. 2-10-0 freight locomotives Nos. 73774-91, etc., are on loan to the G.E. section and working from March, where L.M.S. type 2-8-0s also have been seen a good deal lately.

In 1925 the 2-8-2 tender type was introduced into Britain by the appearance of Nos. 2393-4, specially built for heavy freight traffic between Peterborough and London Yards with "boosters," later removed, to aid acceleration from rest with coal trains weighing perhaps 1,600 tons up 1 in 200 gradients. As regards boiler, cylinder and motion, they were identical with the "A1" 4-6-2 express type, but the driving wheels were 5 ft. 2 in. in diameter. They were class "P1." Nearly nine years later, Sir Nigel



L.N.E.R. No. 2393, a 2-8-2 mineral engine of Class "P1." Photograph by courtesy of the L.N.E.R.

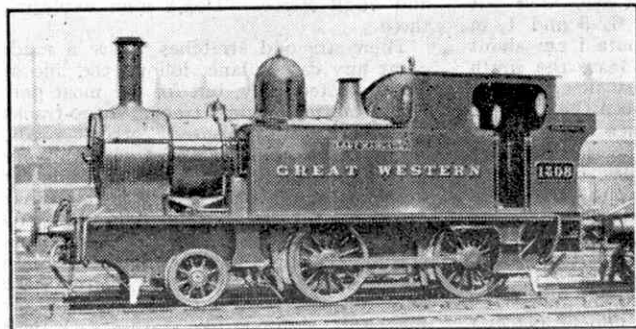
Gresley introduced his remarkable 2-8-2 "Cock o' the North" class for main line passenger services between Edinburgh and Aberdeen, but as readers will be aware, these six "P2" engines have now been converted to "A2" 4-6-2s. As the two mineral locomotives were not standard with any others of the sort, and the operation of 100-wagon trains by them caused difficulties in the way of track clearances at signal stops or in certain yards on account of their vast length, they are being scrapped, although within the last three years they had been reboilered and re-cylindered to correspond to the more powerful "A3 Pacific" standard in those respects. Thus apart from the G.W.R. coal tanks rebuilt with larger bunkers from 2-8-0T, the British 2-8-2 is extinct after a short reign.

No. 1621, one of the last remaining "D17" engines of the famous North Eastern class "M" 7 ft. 1 in. 4-4-0s has been withdrawn, but is to be preserved in York Railway Museum, as she made one of the most remarkable runs at high speed ever recorded under such circumstances during the Race to Aberdeen in 1895. We hope to publish more detail later.

We understand that No. 4470 "Great Northern" has been rebuilt with high-pressure boiler, new cylinders, an inside set of valve gear in place of the original derived motion, and raised running plate, and she is painted blue.

A "VE" Locomotive Shipping Ceremony

On the second day of the "VE" celebrations in May last, there was shipped on the train ferry steamer "Hampton Ferry" from Dover to the Continent W.D. 2-10-0 No. 73755, bearing a special commemorative plate worded "The 1000th British Built Freight Locomotive Ferried to EUROPE SINCE D-DAY." Underneath was the name "Longmoor," and surmounting the plate was a replica of the Royal Engineers badge. Longmoor is the name of the large Railway Operating Training Centre with locomotives, rolling stock, signals, bridging and permanent way equipment.



No. 1308 "Lady Margaret," a diminutive 2-4-0T of the G.W.R. Photograph by H. C. Casserley.

situated in Hampshire and controlled by the British Army.

Great Western Tidings

It is good to learn that various engines leaving Swindon Works after overhaul and repainting, including both tender and tank classes, among them further new 0-6-0 pannier tanks, are now appearing in green again, so indicating a return to the company's peacetime policy. Further "1000" class locomotives of the latest Hawksworth 4-6-0 type are reported in service at Newton Abbot, Bristol and elsewhere.

Apart from an extensive use of oil fuel many years ago, in conjunction with a certain amount of coal, on small engines of the former G.E.R. on the Holden patent system, the employment of oil firing as the steam raising agent on British locomotives has usually been confined in the main to emergency periods when coal was unavailable in sufficient quantity on account of labour disputes. Now, however, comes news of the fitting of a number of G.W.R. 2-8-0 engines for burning oil instead of coal, so saving a considerable amount of coal per mile at a time of shortage. The oil is fed by gravity to a burner placed at the front of the fire-box, being atomised by a steam jet controlled by the fireman on the footplate. Steam heating coils warm the oil as it leaves the 1,800 gall. fuel tank on the tender in order that it may flow freely under various conditions of temperature. The dampers admitting draught, ashpan, and firebricks have been modified to suit the use of oil fuel. For lighting up these engines at the shed, steam is taken by means of pipe connections from another locomotive, or from the steam pipe line kept continuously supplied at some depots. This is rather a cumbersome performance and it will be interesting to hear if the engines in question are notably successful in operation.

Passenger coaches now under construction at Swindon will contain many improvements for the comfort of passengers.

Fluorescent tubes will take the place of the usual electric light bulbs, and will give an even daylight effect without glare or shadow over a whole compartment. The carriages will be more roomy than the present ones, with greater width in vestibules, and compartments, and will be finished with Empire veneers. Specially woven materials will be used for internal furnishing. The vehicles will be turned out at the rate of one per week.

In the "M.M." for February 1944 we described the neat little unusual 2-4-0 tank engine that came from the Liskeard and Looe Railway bearing the name "Lady Margaret" and is now G.W.R. 1308. We now reproduce a photograph of her, taken at Exeter in 1929.

Walking the Pennine Way

Over the Roof of England

By Garry Hogg

THIS is a surprising title, but then it was a surprising walk—no less than an attempt to cover the 200 miles of the "Pennine Way" from north Derbyshire up to Scotland! If you are a lover of outdoors you would find this walk one of the most exciting expeditions you had ever embarked upon. And you would not have to go very far before finding out why this article is called "Over the Roof of England."

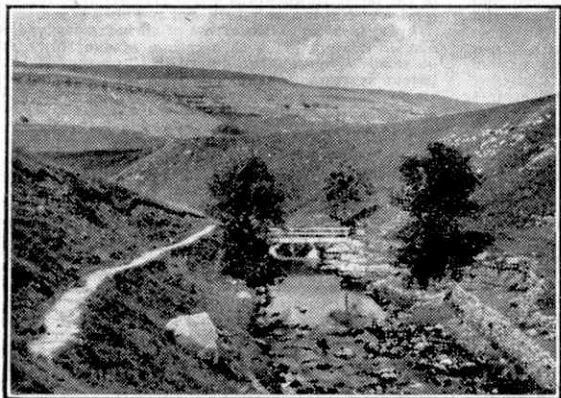
You can follow my route on the half-

Snake Inn, and then wind over Bleaklow, Laddow Rocks, Blackstone Edge, and Wycoller to the Aire Gap near Skipton, and so to Malham Tarn. There is so far no "signposting" of the Way, and true ramblers hope that there never will be. A few well-sited cairns, a few stiles and wooden or stone foot-bridges, between one Youth Hostel and the next, should be enough for anyone handy with a map to pick out the Way for himself. It winds about, first on the eastern and then on the western slopes of the Pennines, keeping for the most part near to the ridge all the time.

At Malham you should explore the Cove and Gordale Scar before heading northward via the tarn for the three great summits of Pen-y-ghent, Ingleborough and Great Whernside, all well over 2,000 ft. high. These are not strictly on the Way, but are an exciting and very strenuous diversion for the rock-climber. Then the switchback section begins, crossing the east-west Dales—Wharfedale, Wensleydale, Swaledale, Teesdale, Weardale, and so on—by various passes such as the famous "Buttertubs" Pass.

Here abound the great waterfalls, or "Forces," such as Caudron Snout, Aysgarth and High Forces. Don't miss exploring these.

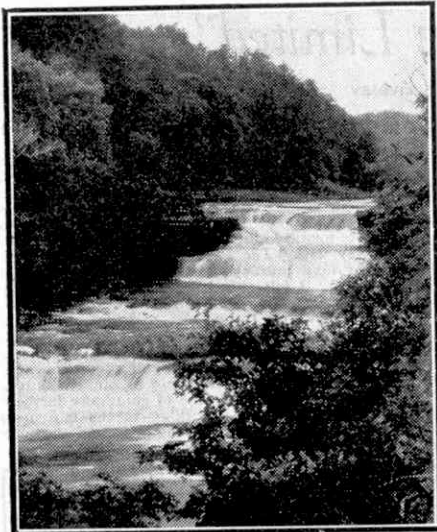
There are odd stretches where a road, or at any rate a lane, follows the line of the projected Way, but for the most part it is a matter of grass tracks, sheep-tracks and the ancient, disused "green" roads. These make grand walking, though very strenuous. Stone dykes cross them at frequent intervals, all to be scaled without dislodging the stones if the flocks of sheep are to be kept intact: this is great sheep-rearing country, for the animals thrive on the heather. For miles at a stretch the only people you will see are solitary shepherds, standing like statues with their hardy sheepdogs, far on the other side of a valley. The sheep themselves, except



Kingsdale Beck, above Thornton Force, Ingleton. The illustrations to this article are from photographs by Will F. Taylor.

inch maps, of course, but the best are the Ordnance Survey maps, one-inch to the mile. If you have these, look out numbers 25, 20, 13, 10, 6, 3 and 1, in that order, because the route I am about to describe was followed from the south northward. You will see at once that the bulk of the track lies between the 1,000-ft. and 2,000-ft. contours: hence my sub-title. It follows a winding course along the whole range of the Pennines, often called the "spine" of England, until they fade away in the Tyne Valley and give place to the Cheviots and the Scottish Border.

The "Pennine Way" does not yet exist, but it is hoped that eventually such a "Way" will be opened for all "who feel the call of the hills and lonely places." It would begin at the head of Edale, in Derbyshire, cross Kinder Scout to the



The lower falls at Aysgarth, Yorkshire.

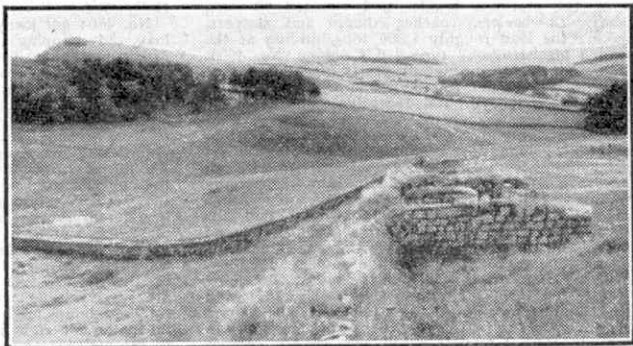
to the lynx-eyes of the shepherd and his dog, are often indistinguishable from the limestone boulders half bedded in the springy turf. But beware bogs; much of this country is peat, very soft and treacherous to walk on, and indeed progress is often possible only by leaping from tussock to tussock of the coarse, hummocky grass. With a rucksack on one's back this is exhausting work!

Where the Pennines end the Roman Wall appears, spanning England for 70 miles between Carlisle and Newcastle-on-Tyne. North of the Wall comes a stretch of low-lying bogland where, as usual, it is wisest to keep to well-marked sheep-tracks and to eschew the enterprising "short cut!" I never found one that proved short in the end! A good point to cross the Wall is by a cart-track half a mile west of Housesteads. The Way actually goes considerably west of this before crossing the Wall, making for Dufton Pike and Alston, the highest market town in England. Near Alston there is a spot where you can amuse yourself by standing with one

foot in Cumberland and one in Durham, and your stick in Northumberland! Alston, by the way, is the highest market-town in England, and Nenthead, near by, the highest English village. The highest road-summit, 2,056 ft., is within a mile or two.

Northward on the last lap the ground rises steadily to Bellingham, Blakelaw and High Rochester. Here there are short sections of Roman roads and, if the military authorities allow you, you can climb the southern slopes of the Cheviots to Chew Green, an interesting Roman camp, and to Coquetdale, Makendon and Windy Gyle. Now you are very near your journey's end. You can follow the actual Border, your left foot in Scotland and your right still in England, over King's Seat and Cairn Hill to Cheviot itself, 2676 ft. high. Then you descend, north-east, by way of Broadstruther and Waud House to Wooler Hostel, the last one in England; your journey is over. Don't travel that last section alone, as I did; it's the loneliest country in all England, and a badly twisted ankle might mean your lying out on the hillside for days or weeks, before you were discovered.

If you follow my footsteps plan your day's walking carefully, making sure that the Hostels near the Way are actually open and have room for you. There are no hotels, few inns, and few farmhouses within easy reach of the Way, and 12 miles' clambering and bog-hopping along those rough, exciting tracks is the equivalent of 20 along a hard road, so that you will have little surplus energy for bed-hunting at the end of the day. Take stout shoes, or better still boots, with nails. Take a compass. Take "iron rations" and the least possible baggage. And—take your time over the Roof of England.



The Roman Wall at Housesteads, Northumberland, showing the remains of the north rampart and north gate.

"The Pacific Limited"

By Edward H. Livesay

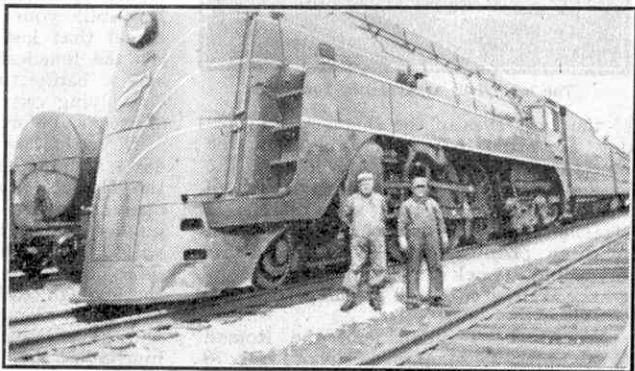
IN my young days express engines generally had big driving wheels; the bigger they were, the more we admired them, and the faster the engines were supposed to go! Small wheels for weight-hauling, big ones for pace. Quite right too, at that time, when valve-gears, steam-flow arrangements, balancing and so forth were less developed and unsuited for high rates of revolution, and steam could neither be got into nor out of the cylinders fast enough. But times have changed, and locomotive design has advanced, particularly in recent years; all the spectacular British speed records, such as "Allard's" 125 m.p.h. and many others, were made with driving wheels 6 ft. 9 in. or less in diameter, and it is unlikely that the figures will be exceeded in future designs. Speed is not the only thing to think about when a locomotive is planned; tractive power is equally vital. The smaller the wheels, other things being equal, the greater the load an engine can haul, and the steeper the gradients it can climb.

American engineers used to favour wheels of moderate or even small size for express work. When the Great Northern was using "8-footers" the Pennsylvania or New York Central was content with 6 ft. 6 in. or less, and four or six-coupled wheels at that. But several classes of engines have been built in America recently with 7 ft. drivers, whereas in Britain none has been turned out for years with wheels bigger than 6 ft. 9 in. It is one of these "big-wheel" American express engines that comes into this story, and right at the outset I must say it is the most impressive machine of its type that I have ever ridden.

"The Pacific Limited" sets out daily from Madison Station, Chicago, to cover 2,446 miles to Seattle, on the shore of its ocean namesake. It is representative of the usual American long-distance expresses, other than the streamlined Diesel-hauled trains. Walking along the platform beside it, I counted 15 cars, mostly 12-wheelers, coaches, diners and sleepers, making the load roughly 1,200 tons, finding at the head a big "Hudson" type 4-6-4 engine, No. 4004. As engineers are generally pretty busy just before train-time I walked round the impressive machine with observant eyes and receptive note-book; the picture of the locomotive reproduces what I saw. The streamlining is carried out neatly and thoroughly, all the boiler-mountings being enclosed in a longitudinal box running from chimney "stack" in America, to cab, with an air-collecting grid in front discharging up behind the said stack. The front of course opens to give access to the smoke-box door, and the Westinghouse brake pump is also inside the rounded prow. The cab is roomy and well arranged, open at the back, not vested to the tender, Canadian fashion. There are three headlights, as on the Diesel "400." The engine's great height, "16 ft." and length quite dwarfs the 7 ft. driving wheels and 25 in. cylinders, their 29 in. stroke striking an unusual note; I cannot recall any British engines with "odd" figure piston-travel. Had No. 4004 been British-built the "unwritten law" would certainly

have given her a stroke of 28 in. or 30 in. But what matter?

A snapshot or two taken, I climbed back into the cab and settled down in the comfortable seat behind Mosley. The air-signal from the Conductor sounded, Kinne pulled the hanging throttle-lever towards him, and exactly at 11.35 a.m. No. 4004 came to life, went forward into the collar and began to move away with "The Pacific Limited" on the first leg of her long journey over prairie and mountain to the Coast. I felt the call of the West; the very names in the timetable had a romantic look, reminding me of cowboys, round-ups, redskins, "Custer's Last Stand" and the rest of it! Look at them, Omaha, Cheyenne, Shoshone, Wyoming, Montana, Idaho. Makes you wish you were going right through, doesn't it? Well, you aren't, only as far as Clinton, Iowa. Shucks! What's the use of going any farther? Romance is dead; there's nothing to the trip nowadays, unless you are in the cab, and nothing



Ready for the start from Chicago. Chicago and North Western 4-6-4 locomotive No. 4004, with Engineer Kinne and Fireman Mosley.

exciting there either except Kinne's language. Ford cars and filling-stations are found now where once the buffalo roamed; the cowboys have gone to Hollywood.

No. 4004 got away well with her heavy 1,200-ton load, only slipping a trifle; sand at once gave her a firmer foothold. The first stop was at Oak Point in suburban Chicago; 9 miles in 15 minutes. After this she picked up rapidly over a straight track, the big 7 ft. wheels soon producing 70 m.p.h., which I was sorry to find was the limit; I was not going to have a chance to enjoy the speed that they could doubtless have given us if free to do their stuff. An automatic device sounds a warning signal in the cab and applies the brakes. It reminded me of the Great Western arrangement, though the latter is different in that it merely indicates the position of signals and does not limit the speed. But both devices call for acknowledgment by the driver, or the brakes go on automatically. I noticed too that on the Chicago and North Western Railroad there are no trackside visual signals; instead there are coloured lamps, red yellow and green, which light up in the cab right in front of the driver, according to the message to be conveyed.

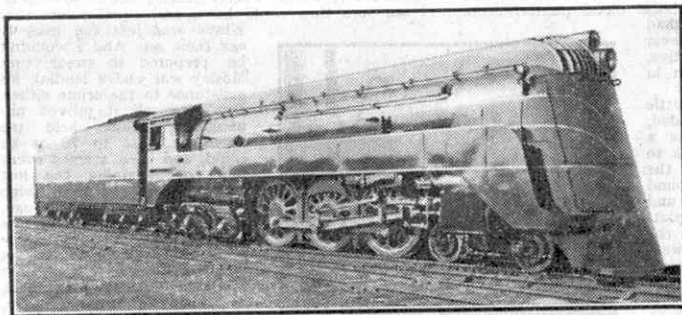
By this time the novelty of the engine had worn off and I could pass judgment upon it and its action;

every engine has its own little peculiarities and wants getting used to. No. 4004's riding was excellent, and the balance of working parts so good that I could feel nothing whatever of the thrust of the 25 in. pistons, which surprised me; I had expected to feel clear evidence in the shape of thrust and pound. She was very little inferior to the L.N.E.R. "A4s" and L.M.S.R. "Coronations," and she was certainly away ahead in smooth working of any transatlantic engine I have ever ridden. I was delighted with her. The cab was breezy and pleasant that warm summer day, though Kinne said it was apt to get hot in sultry weather. Even as it was the water-jar, packed with chunks of ice, came in for attention quite frequently. Another stop at

but it is the only one I have seen in Canada or the States, so it must be fairly popular. It looks pretty crude to me.

Musing over this, suddenly the air-signal from the Conductor sounded in the cab, and the brakes went on with a slam bringing us to a quick stop. The crew of a passing train had noticed smoke coming from under one of "The Limited's" coaches, and had called our people's attention to it. It turned out to be a rubbing brake-shoe, and cost us five more minutes, and arrival at Dixon 11 minutes late. The 40 miles from De Kalb had been covered at 49 m.p.h., with two stops; not bad, hauling 1,200 tons, and held down by a 70 m.p.h. limit.

Mechanical stoking is of course indispensable on big American engines. Nobody could possibly hand-fire the big fire-boxes common in the States with the faintest hope of keeping up steam for long; No. 4004's is 91 sq. ft., for instance; the biggest on British express engines is 50, and I don't believe even that could be handled for long if the engine were going "all out." Mechanism ought to and can take the place of muscle, and the stoker does it where it is most needed. The more I see of the mechanical stoker the more I like it. It is quite



A fine view of No. 4003, of the class referred to in the accompanying article. Photograph by courtesy of the Chicago and North Western Railway.

Geneva, the 26 miles from Oak Park having taken 27 minutes; average speed 58.

A long switchback-like straight followed Geneva, where we overhauled and passed a freight train with scores of hoboes, or tramps, sitting on the roofs, lounging in the open doors of boxcars, or perched on the seats of farm machinery on the flatcars, open trucks without sides, on which such stuff is carried. They looked at peace with the world, enjoying the sunshine and scenery at the company's expense. Why is this allowed? It isn't, but they do it nevertheless. It is part and parcel of railroading in America, the home of the brave and the land of the free. There, if you want to travel a thousand miles or so and haven't the price, you "jump a freight" or "ride the rods," lying across the brake-rigging and tie-rods under the floor. I have seen a freight come into Vancouver with a hundred or more "bums" sitting on the roofs. It looks quaint to the uninitiated, but familiarity breeds contempt; nobody thinks of it across the Atlantic. Dangerous? Well, it can be. You can go to sleep, fall off and get cut to pieces, and in winter freezing to death is simple enough. A few of these non-paying guests can be chucked off by the train crew or Yard police, but a hundred or so is another pair of shoes, and to maintain a staff large enough to tackle the job would be more than it is worth. Besides, it could be mighty dangerous for the staff, so "let 'em ride!"

De Kalb brought us to a stand again; 23 miles at 55, and away six minutes late. No. 4004 could be brought to rest very quickly, thanks to the braking of all wheels, air, not steam; the latter is not used in America. Shortly after we picked up a mailbag "on the fly," the crew drawing my attention to it, apparently thinking this was ultra-modern and typical of American time-saving methods. I pointed out that it had been common practice in Britain for at least half-a-century, and that in addition bags were not simply thrown off through an open door, to fall by the trackside, clear of the wheels if possible, but if not, well, it's just too bad for the mail, and that's that! This is another time-saving idea; I am not saying no other mail-dropping device is used,

efficient and reliable; I have yet to see one give serious bother. On this run some large lumps of coal blocked the opening to the endless-screw conveyor, and Mosley had to clear them away, which is the only thing I have ever seen cause even a temporary hitch. Beyond that he had little to do but sit in his comfortable seat, occasionally turning wheels regulating the steam jets that blow the fuel into the fire-box. Metaphorically he led a life of slipped ease, the tireless stoker-engine doing most of the firing work. No wonder engineers in America so often show signs of avoirdupois with advancing years.

We followed the bank of Rock River into Sterling, coming to a stand 14 minutes late; I got down to stretch my legs and take a look round the engine, as if to the manner born, at any rate I must pretend I know something. Casually feeling a big-end I recoiled as if stung, the darned thing was too hot to bear my hand on. A hail came from Mosley: "Not smoking, is she?" Reassured on this point, he relaxed: "Then she's O.K." This was the result of grease lubrication; bearings so cared for run far hotter than on oil-lubricated British engines. I remember getting down from "Commonwealth of Australia" at Edinburgh after her seven hours non-stop run with the "Flying Scotsman," 392 miles, to test this same matter, finding the big-ends only barely warm. That's oil lubrication; I must say I prefer it; it is coming into its own in America now, on many new locomotives.

Leaving Sterling at 2.09 we ran along beside the river for several miles to a little town named Morrison. It is all these stops, often at places of no apparent importance, that cut down the average speed of most American expresses. If the "Coronation Scot" acted like this, it would stop a score of times between London and Glasgow, and such places as Watford, Bletchley, Weedon and Nuneaton, to say nothing of Wolverton and Rugby. Instead of which, as you know, it ignores them all.

On we went, down a long and in places steep gradient, over the Mississippi by a fine steel bridge, past many an ungated level-crossing, notice-boarded "Look out for the cars," into Clinton, Iowa the

first divisional point, where we were all going to abandon ship. The arrival time was 2.42 p.m., so the 138 miles from Chicago had been covered in 187 minutes, with eight stops totalling 33 min., making the average speed inclusive 42 m.p.h. Considering the 1,200-ton load and the numerous stops, the performance, though of a different order from "The Silver Jubilee's," was very good; unfortunately it had given No. 4004 no real chance to show what she was made of. Those beautiful 84 in. wheels had been wasted, the 70 m.p.h. check rein had been tight all the way. In the capable hands of Kinne, given her head and the stops cut out, she could have averaged 60 or more in comfort, and I only wished as I climbed down that she had had the opportunity to do it and "show her stuff." It had been like putting a racehorse on a pantechonion. But in spite of it all, I had to acknowledge I had never ridden on a finer locomotive, and I have no hesitation in admitting it.

Clinton is a pleasant little town, neat and tree-shaded, and I wandered round for a couple of hours; then back to the "Deepot" to await the arrival of the east-bound "Limited," finding Kinne and Mosley already on the platform, in company of the "ground crew," who were assembled with grease-guns, rakes and wrenches to seize on the engine directly it came to a stand and get to work on bearings, pins, pivots and ashpan, and send it off re-juvenated on the last leg of its 2,000-odd-mile pilgrimage from the Pacific shore. This is the usual routine with long-distance trains in America; a ground-crew attends to lubrication en route at every divisional point, these occurring at 125-50 mile intervals. I must say British engines don't get all this attention, or require it. They are expected to do 400 miles or so off their own bat.

Shortly after 5 p.m. the "Limited" came rolling in, looking travel-stained and dusty after its journey across mountain, plain and desert since leaving the coast two days before. It consisted of 16 cars, making the load about 1,300 tons; the engine was No. 4002, a sister of the one I had ridden in the morning. The servicing completed, I climbed aboard, and we pulled out at 5.35, 20 min. behind time, under threatening clouds that broke in thunder-showers a few miles out of Clinton. Having got most of my running notes on the outward trip I could take things easily on the return to Chicago, and just idle, as it were, without straining myself over anything. It is fine, that feeling of conscientious relaxation; I do enjoy it so.

It doesn't take long to water an American engine; they provide big filler-pipes and tender openings, and the job is over in a couple of minutes or so. I noticed this at Dixon, where No. 4002 took a drink. I think it was here that Kinne told me to watch the start closely, as we were on a steep up-gradient complicated by a nasty curve. I entered in my notebook "Very fine start, with only a momentary slip," this with 1,300 tons and no booster. These engines have provision for a booster, but none was fitted when I made my trips. Near De Kalb the Diesel streamliner "City of Denver" swept past, travelling at possibly 100 m.p.h., with its "Mars" headlight weaving to-and-fro across the track. Ours

was doing the same, darkness having fallen by this time. It certainly looks queer when you see it coming towards you; you realise something unusual must be behind it; this is the object of it. But probably nothing will drive sense into the head of a nit-wit "beating the train to a crossing," nothing but an axe. Or a funeral, and then it's too late.

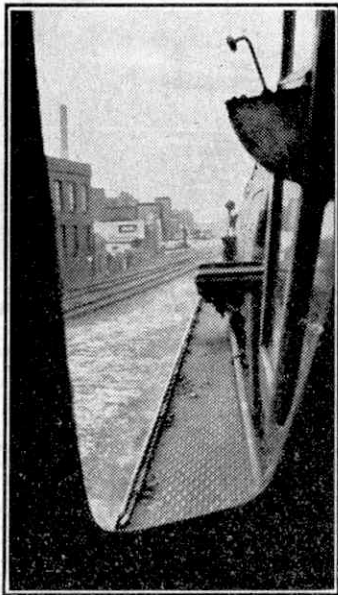
Kinne was evidently trying to make up those 20 lagging minutes; time after time that warning horn sounded its eerie note, and I would feel the brakes begin to take hold. There was no doubt the control device was in good order, and had no intention of letting us get away with anything much over 70. Personally I wished the darn thing was anywhere else than on No. 4002; I would have enjoyed feeling those lovely 84 in. wheels making about 400 r.p.m. I am sure they could have, and equally sure that

Kinne was just the man to egg them on. And I wouldn't be prepared to swear that Mosley was above lending his assistance to the crime either. But after all it proved unnecessary; Kinne held the speed as close to 70 as he could, and there seemed every hope of regaining the lost time. We roared on through the darkness towards Chicago, the headlight lighting up the track ahead, making every post and trackside object stand out clear cut against black shadow; looking back as we swung round a curve, the long line of brightly-lit cars snaked and bent behind us, throwing a flood of light down on the other metals. What a contrast to the last footplate trip I had taken in England a few months before through the blackout! Then, looking out of the cab into fathomless darkness I could see ahead, astern and on either side—nothing!

It got quite chilly in that open-backed cab after dark; in fact I was glad to get down off my seat and stand with my back to the fire-box, simultaneously warming my stern and avoiding the draughts that swirled in from behind, draughts that had been welcome earlier in the day. The ice-water jar snuggled in its locker undisturbed; I pictured

supper, bath and bed; sufficient for the day had been the locomotives thereof. We ran through the light-spangled suburbs of Chicago, the searchlight on the summit of the Wrigley Building sweeping round in the sky and giving us our direction, guiding us in to a stop in Madison station at 8.39 p.m., six minutes ahead of time. Well done Kinne, and No. 4002! The 20 min. had been more than made up, and the frequent warnings of the horn justified! The 138 miles from Clinton, with six stops, had been covered in 184 min. inclusive, an average of 45 m.p.h. Nothing extraordinary, of course, but considering the load, stops, and that exasperating automatic 70-mile control, it had been good. Again I admitted as I got down, saying "Goodbye and goodnight" to Kinne and Mosley: "That's the finest express engine I have ridden on this side of the Atlantic." I still think so. You will find it interesting to compare it with an equally up-to-date British engine, but don't think I wish to laud the one and deprecate the other; they were built for totally different work.

There you have a picture of an up-to-date American locomotive, and a description of the sort of work it does on a typical American express train.



View through the fireman's window as No. 4004 pulls out with "The Pacific Limited."

Blackburn "Firebrand"

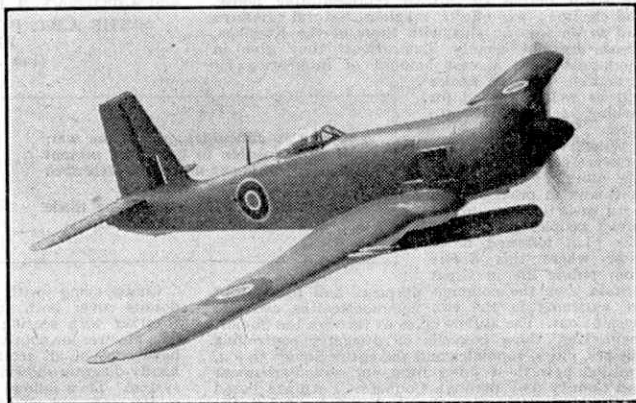
New Fleet Air Arm Torpedo Carrier

THE secrecy that for security reasons has so long hidden many of the wartime achievements of the British aircraft industry has been removed, and during recent months details of several hitherto "hush-hush" types of aircraft have been made known. One of the latest types to come off the "secret" list is the Blackburn "Firebrand" IV Naval attack fighter, now in service with the Fleet Air Arm. It is a combination of fighter, torpedo carrier and dive bomber, and is the only single-seater torpedo-carrying aircraft in the world.

The "Firebrand" is produced by Blackburn Aircraft Ltd., who have specialised in Naval aircraft since the very earliest days and were the builders of the first monoplane to be adopted as standard for the Fleet Air Arm—the "Skua" dive bomber—which brought down the first enemy aircraft to be destroyed by any Service in the war. Relatively little has been published regarding the productions of the Blackburn organisations during the war, but it can now be revealed that in addition to the Blackburn "Skua" fighter dive bomber and the Botha twin-engined medium bomber the company have produced large numbers of Fairey "Swordfish" and "Barracuda" aircraft, and in the Dumbarton works Short "Sunderland" flying boats. Work on the "Firebrand" therefore has only been a relatively small part of the total war effort; although the first prototype of the "Firebrand" has been flying since 1942, the machine has only recently been put into anything like large-scale production. The Marks I and II versions had the Napier "Sabre" engine, but the Marks III and IV have the Bristol "Centaurus" engine, which develops about 2,500 h.p. and is the most powerful radial engine at present in service. The chief difference between the Mark III and the later

version is the larger fin and rudder of the Mark IV; they are placed well forward of the tail.

The "Firebrand" IV is armed with four 20 mm. Hispano cannons electrically controlled from the cockpit. Two of the guns are mounted in each wing in a compartment which has a large access door in the undersurface of the wing. Either a torpedo or two bombs of from 250 lb. to 1,000 lb. each can be carried, the torpedo slung under the fuselage and the bombs



Blackburn "Firebrand" with torpedo carried under the fuselage. This fast Naval fighter is now in service with the Fleet Air Arm. Photograph by courtesy of Blackburn Aircraft Ltd.

fitted one under each wing.

In spite of its heavy duties, and the fact that it is one of the largest and heaviest single-seater aircraft in service, the "Firebrand" can readily take off from and land upon the limited area of a carrier's flight deck. Very large flaps are brought into action to give extra lift for take-off and high braking effect for landing. There are also specially designed dive brakes slightly behind the leading edges of the wings, and with these in action the dive speed of the machine is limited to about 350 m.p.h.

The "Firebrand" has a wing span of 51 ft. 3 in. and an overall length of 39 ft. 1 in., and loaded weighs 15,670 lb. It is a low wing monoplane with folding wings to facilitate stowage below deck. The hinges are so placed that the wings when folded lie parallel (Continued on page 394)

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, and certain others that will be indicated, these should be ordered through a bookseller. We can supply copies to readers who are unable to place orders in this manner. Order from Book Department, Meccano Ltd., Binns Road, Liverpool 13, adding 6d. for postage.

"TWO COMMONWEALTHS"

By K. E. HOLMES (Harrap, 7/6 net)

In the "M.M." for May of this year we reviewed "Landsmen and Seafarers," the first of a series of three books comparing and contrasting the British Empire and the Soviet Union. Here is the second of the series, which is designed to explain the work of Soviet institutions. As in the previous volume the comparison with British institutions is partly pictorial and diagrammatic. Illustrations of corresponding British and Soviet buildings, peoples, customs, factories, playgrounds and so on are placed opposite each other, and there are also Isotype charts giving statistical details of British representative bodies and elections, war efforts, religions, natural resources and so on side by side with those of the Russians. These are not merely illustrations; they give in condensed form a vast amount of interesting information, and the reader will be well rewarded for looking thoroughly into them.

When we turn to the letterpress we find there the story of public life in Russia in practice, and learn what it means to the Soviet peoples themselves. The plan followed is to show where this differs from public life in Great Britain, but the common purposes and ideals that are emerging in the two commonwealths are also brought out. The author takes us through the Soviets themselves, those councils of delegates controlling villages, cities, republics and the entire Soviet Union, showing how these differ from our own Parliament and County and Borough Councils. Both are based on the ideals of freedom, but here this has led to the development of the party system, with all points of view expressed freely, while in Russia it has crystallised into unity of purpose. Then we see how collective farms are run and how trade unions play their part in production. This leads us to the careful planning that lies behind all Soviet life, and is concerned with the use of goods and foodstuffs as well as their production. Finally we get an estimate of the achievements of the Soviet system, which has been faced with the need for doing as much in the few years since 1917 as was done in Great Britain by steady and persistent effort over centuries.

The book is attractively printed and will be appreciated by older readers eager to learn as much as possible about our Allies.

"JAPANESE AIRCRAFT"

By JOHN STROUD

(Harborough Publishing Co. Ltd. 25/- net)

When Japan attacked Pearl Harbour, and British, United States and Dutch territory in the Far East and Pacific, little was known of the enemy aircraft put into service later than 1938. The remarkable extent to which this lack of technical information had been remedied by the Spring of this year is revealed in this book. The task of compiling this vast array of facts and figures, drawings and photographs on a subject hitherto so obscure has been very great, and although the sudden end of the war against Japan has robbed the book of some of its topicality there is good reason to believe that it will become a standard work of reference on the

achievements of the Japanese aircraft industry.

Two pages are allocated to each main operational type of machine dealt with, the first page carrying a specification and history of the aircraft, 3-view drawings and a half-tone general view of the machine; and the facing page having a series of coloured drawings of the machine viewed from different angles, in flight and on the ground. In addition the book contains excellent photographs of transport and training aircraft, and of older operational types still in service. The history of the main Japanese aircraft firms is given briefly, with illustrations of the varied types of machines they have produced, and other interesting features of the book are a map of the Pacific war zone and a dictionary of Japanese aeronautical terms.

"THE A.B.C. OF SOUTHERN AND L.M.S. ELECTRICS"

(Ian Allan, 1/6 net)

A welcome addition to the now familiar books of the A.B.C. Locomotive Series is the present publication by Ian Allan and B. Tatford. It combines a revised edition of the previous "A.B.C. of Southern Electrics," which has been out of print for some time, and a section dealing with the varied electric services of the L.M.S.

Commencing with the S.R., illustrations and details cover both suburban and main line stock, together with seating plans of representative units. The electric locomotives are dealt with, electric train headcodes of all sections are given, and there is a handy diagram showing the extent of the S.R. electric system. Then follows a numerical list of the various motor units and sets, with their code references.

What they may lack in mileage and extent the L.M.S. electric systems in London, Liverpool, Manchester and Lancaster districts make up for in variety of installation and rolling stock. Typical trains are illustrated, accompanied by notes on the systems in use; and there are maps of the lines in the London and Liverpool districts.

Copies of the booklet can be obtained from A.B.C. Locomotive Books Mail Order Department, 33, Knollys Road, Streatham, London, S.W.16, price 1/8⁺ post free.

"BIRD FLIGHT FOR BIRD LOVERS"

By J. PARRHAM

(Harborough Publishing Co. Ltd. 7/6 net)

In his foreword the author, an enthusiastic amateur airman, says that it has always seemed to him rather strange that books on bird life rarely contain any reference to the birds' most remarkable characteristic—the ability to fly. In this very interesting book he has endeavoured to remedy the deficiency. As a background to his observations he tells us that he has always lived an outdoor life, and has had ample opportunity of studying his subject at first hand. He is therefore well able to explain the fascinating similarity of bird flight and that of aircraft. He does this in simple language and in a lighthearted style that nevertheless conveys to the reader a great deal of valuable information. The points he makes are amplified by many attractive black and white explanatory drawings, and there are comparative photographs of birds and aircraft in flight.

Owing to difficulties due to the war, it is impossible to guarantee prompt delivery of books ordered as described above.

Every effort, however, will be made to ensure speedy despatch.

The Triumph of Plastic Armour

By Dr. J. P. Lawrie

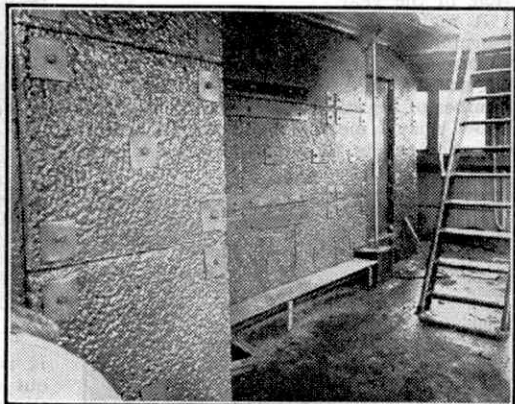
IN the grim days of Dunkirk it was observed on some of the "little ships" that bullets from attacking aircraft failed to penetrate the bituminous deck composition. This is usually a form of mastic asphalt consisting primarily of bitumen and limestone powder to which some grit is added. On heating the ingredients form a soft paste, which is spread in position and hardens when cool. Examination showed that although the stopped bullets were probably almost spent, or had arrived at an angle, the composition of the deck sheathing tended to prevent penetration. An investigation of the possibilities of developing a "plastic armour" was begun in the Road Research Laboratory of the Department of Scientific and Industrial Research, at the request of the Admiralty, and exactly a month later work was commenced on the armouring of vital parts of a merchant ship with the new material.

The "plastic" for plastic armour is made by mixing stone particles and bituminous mortar in a normal four to eight ton capacity mixer, as used in the asphalt industry, for three to four hours, after which the mixture is run off and poured into the space between wood or steel shutterings and the surface to be protected. Removal of the shuttering leaves the plastic in position. In the early days of plastic armour prefabricated 2½-in. slabs with a ¼ in. mild steel backing were produced by spreading the plastic in horizontal wooden moulds. These slabs were used round wheelhouses, radio rooms, machine-gun posts, or any other position requiring protection, especially where vision slots, ports, or vents were required. The steel walls of deckhouses provide ready-made backing for plastic armour, but when precast slabs are used a steel backing plate is provided.

The stone particles break or turn the bullet or projectile, and the steel backing plate stops the relatively slow fragments of shot and stone which would otherwise be projected from the back of the

plastic. The bituminous mortar plays little part in the protection beyond holding the stones in position.

It was soon obvious that the type, size and amount of stone were the most important factors. Some 50 different types of stone were tried and tests showed that certain flint and quartzite gravels gave



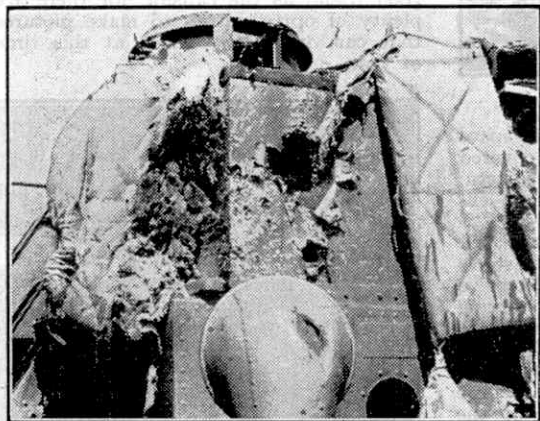
Slabs of plastic armour fitted as bridge protection.

the best protection. The granite first used was immediately superseded by these new materials. The best protection against bullets was obtained when the stone particles had twice the diameter of the shot to be stopped.

By using special methods 70 per cent. by weight of stone could be packed into the plastic, resulting in a considerable improvement in protection, but unfortunately plastic with such a high stone content could not be consolidated. Advantage was taken of this discovery, however, in the development of a new form of plastic armour known as plastic protective plating. This is made by consolidating the hot plastic by vibration in "trays" of thin sheet metal and then bolting on the backplate to the open side of the tray. In this way the plastic is totally enclosed in metal; this gives a much greater resistance to incidental damage from attack and during transport and, what is more important, it allows the best proportion and size of stone to be used.

A further development came in 1942, when pitch was tried in place of bitumen. This was found to allow better consolidation of the plastic, and a special lightweight plastic was developed consisting of pitch, fine sawdust and lime.

Plastic protective plating first went into action in the Dieppe raid. It was used in ships during the "Battle of the Atlantic" and on D-Day in enormous quantities. Parts of Mulberry Harbour were also fitted with the plating, and there have been land uses, such as on portable blockhouses, for which 137,000 plates were made, and on bulldozers.



Plastic protective plating on a landing craft after its return from the raid on Dieppe. There were no casualties on the vessel.

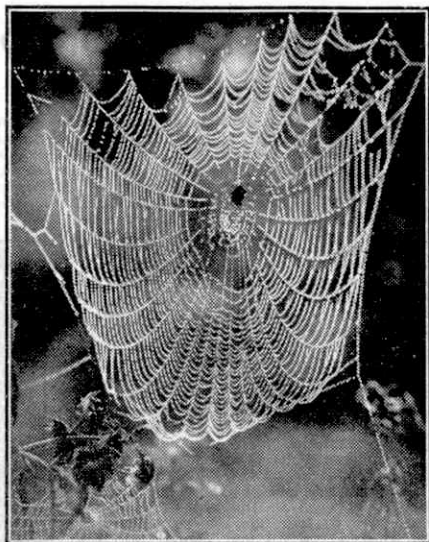
Photography

Autumn Pictures

By E. E. Steele

THE season of Autumn offers much to attract the photographer, for there is a wide variety of subjects peculiar to this time of the year.

A night of mist followed by a bright morning will reveal paradise for the Nature lover. If you have walked abroad on such a morning and seen the vast number of beautiful spider's webs you will know what I mean. When the air is dry no webs are to be seen, but after a few



Web of spider with pearly dewdrops.

It is bright scarlet in colour and grows out of the ground to quite a large size, the cap being covered with whitish scales.

Autumn adds a touch of interest even to the streets and corners, where the brown leaves lie deep and matted by the wind and rain. Should you be fortunate enough to find the old roadman gathering up the leaves in his barrow, it is worth while making an exposure.

Although Autumn heralds the approach of Winter it is a pity to put away such a good friend as the camera, for there are plenty of opportunities to make pictures that can only be obtained at this time of year.



Old roadman gathering leaves.

hours' misty weather every available space on hedgerow and fence is literally covered with glistening webs of marvellous pattern; and often the spider is sitting there enthroned in his pearly palace.

The moist season of Autumn is also best for the colourful and interesting toadstools that are to be seen wherever there is decaying vegetation. Many of them spring from the ground, while others are to be found growing out of dead stumps and trees. Different woods have their own particular kinds of fungi, those of the oak woods differing from those of the pine. The illustration shows a beautiful kind of fungus common in pine woods.



"Fly Agaric" fungus.

New L.M.S. 2-6-4 Tank Locomotive

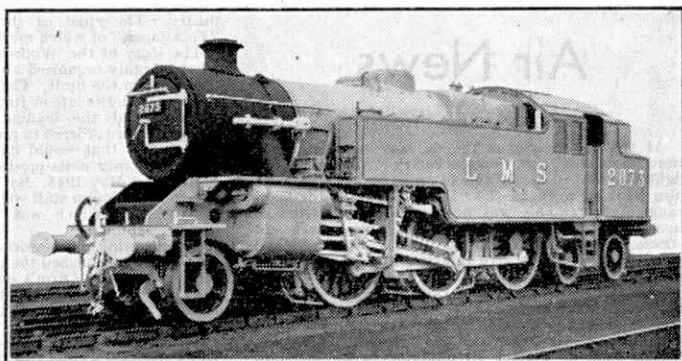
ONE of the most generally useful types of locomotives on the L.M.S. is the 2-6-4 tank. The first engine of this type on the system was introduced in 1927 by Sir Henry Fowler, then Chief Mechanical Engineer, and showed itself equally useful for suburban and main line semi-fast working on the one hand, and for all kinds of freight traffic within the limits of its water supply on the other hand. It is indeed a true mixed traffic type.

In the 18 years since the first was built the class has been steadily developed, more modern features of design having been introduced from time to time. Throughout it has retained its general character unaltered, however, in the form of a simple outside cylinder design with coupled wheels of 5 ft. 9 in. diameter, long travel Walschaerts valve gear and generously proportioned axle-boxes. The boiler pressure is 200 lb. per sq. in. and there is ample grate area.

The first 125 engines of the class, Nos. 2300-2424, were to Fowler's design, with a standard Midland type parallel boiler. In 1935 Sir William Stanier made the first change by fitting a taper boiler with larger heating surface and grate area, so increasing steam production capacity. The cylinders were re-designed, with an increase in diameter from 19 in. to 19½ in., the stroke remaining 26 in. The smoke-box and saddle arrangement were improved, a high coal bunker was installed to allow a clear lookout when running backward, and a side window cab was fitted. Other changes improved the riding qualities of the engine. Altogether 206 further engines, modified in this manner, numbered 2425-2494 and 2537-2672, were introduced.

Recently further modifications were made to this well-tried design by Mr. C. E. Fairburn, the late Chief Mechanical and Electrical Engineer of the

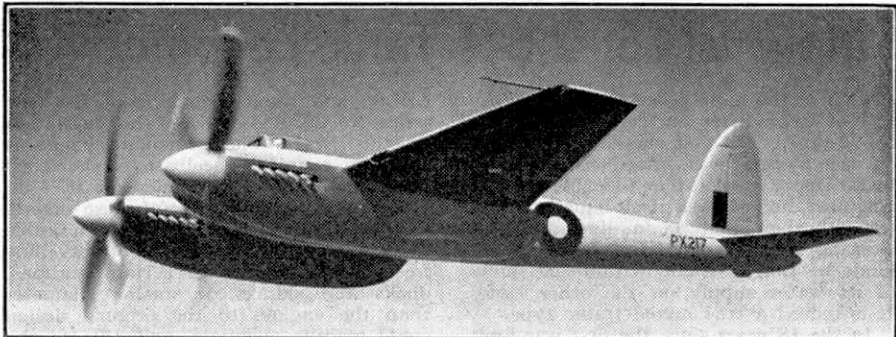
L.M.S., and the first engine of the new series, No. 2673, is shown in the illustration on this page. The principal change is that the coupled wheelbase is shortened by 14 in., from 16 ft. 6 in. to 15 ft. 4 in. With the more general use of these engines as their numbers increased, it is desirable that they should be capable of travelling freely round curves in certain stations, docks and sidings of smaller diameter than the engines of the original design could readily negotiate, and this is the reason for the reduction in wheelbase.



No. 2673, the first of the new L.M.S. 2-6-4 tank locomotives. Photograph by courtesy of the L.M.S.

The change has made it necessary to decrease the weight, for otherwise the weight on the track for each foot run would have been greater than could be allowed. The design generally has therefore been overhauled and every ounce of superfluous weight has been cut out. As can be seen in our illustration, short ladders have been provided in place of the usual footsteps, vertical foot plating in front of the cylinders has been left out, and the footplate angle has been merged into the tank side. These and other changes have reduced the weight by 3 tons 8 cwt., so that the weight when loaded is now 85 tons 5 cwt.

An interesting feature is that the tanks and bunkers have been re-designed, of composite welded and riveted construction, while the coupled spring design has been modified. The greatest care has been taken that all wearing parts should remain interchangeable with those on the previous engines of the class.



The de Havilland "Hornet" long-range fighter. It has a top speed of well over 470 m.p.h.

Air News

The De Havilland "Hornet"

At the same time as the de Havilland company were developing the revolutionary "Vampire" jet-fighter described in the article on page 365 they were also hard at work on the "Hornet" two-motor long-range fighter. This was not intended as a sort of insurance policy in case the "Vampire" was not successful, but followed the usual de Havilland practice of trying to give the country the exact type of aircraft it needs at just the right time.

The "Hornet," shown on this page, was designed as a long-range single-seater, capable of out-fighting any single-engined fighter. Like the "Mosquito" it embodies all the refinements of modern high-speed design such as perfect streamlining, a laminar-flow wing and leading-edge radiators—in fact, it is just about the "cleanest" aeroplane that has ever flown. From the start, the design work was carried out with the full co-operation of Rolls-Royce, and the "Hornet's" closely-cowled "Merlin" engines, each of which develops 2,070 h.p., give it a top speed of well over 470 m.p.h., which almost certainly makes it the fastest propeller-driven aeroplane in the world. It has a rate of climb of 4,500 ft. per min. at sea level, a ceiling of around 35,000 ft., and a range of over 2,500 miles, with long-range tanks.

In many respects the "Hornet" is similar in appearance to its bigger brother, the "Mosquito." But it has a more slender fuselage and smaller, square-cut wings. Other points of difference are the shorter nose and the straighter tailplane. But, of course, it is wrong to compare the two machines from any other but the recognition viewpoint, as the "Hornet" is a completely new design. Its normal armament comprises four 20 mm. cannons, but it could probably also carry rockets or bombs instead of drop fuel tanks, if required.

The prototype flew for the first time at Hatfield on 28th July 1944, only 12 months after the start of design work. It was an immediate success, and was put into production with a particular view to land- and carrier-based operation in the Pacific theatre. Delivery was started in February this year, and there is no doubt that VJ-Day saved the Japanese from other terrors besides the atomic bomb. J.W.R.T.

Heinkel Jet-Propelled Fighter

Early this year it was known that the Germans were developing several new jet-propelled fighter aircraft in a last desperate effort to prevent Allied bomber formations completely destroying their in-

dustry. The chief of these was the Heinkel 162 "Volkswagen," of which more details are now available.

The story of the "Volkswagen" gives a good idea of what a highly-organised aircraft industry can achieve if pushed to the limit. The German Air Staff called a meeting in Berlin late in June 1944, which was attended by seven of the leading aircraft designers. The designers were ordered to prepare preliminary drawings of a fighter that would fly at 620 m.p.h. and which could be easily mass-produced—in fact 1,000 had to be built by May 1945. By the middle of August 1944 the Heinkel design staff were told to start work on the Heinkel 162, which was the most suitable of the designs submitted.

The drawing office worked 70 hrs. a week, and as drawings were finished the parts for several prototypes were made in the firm's experimental shops. All the drawings were completed by the middle of October, and the first fighter was finished two months later. As the stress calculations were not complete, and therefore it was not known if the machine was safe to fly, Heinkel's chief test pilot was told not to exceed 300 m.p.h. in the first tests. He did, the wings came off and he was killed.

When the stress calculations were finished it was found that the aircraft was completely unstable, and so the wing of the other prototypes was moved aft, the tail unit enlarged and 1,000 lb. of lead put in the nose. The second machine flew quite well, and so the "Volkswagen" went into full-scale production.

The He 162 is basically a nicely streamlined single-seat high wing monoplane with a tricycle undercarriage, but its appearance is somewhat spoiled by the B.M.W. 003E-1 jet-unit mounted above the fuselage just aft of the cockpit. It has a wing span of 23 ft. 7½ in., a loaded weight of 5,940 lb. and a top speed of 522 m.p.h. at 19,700 ft. Its normal armament consists of two Mk. 108 30 mm. cannons.

By the 9th May one factory had built 50, another 30 and another 20—an incredible achievement in eight months. But it was an achievement gained only by sweated labour in underground factories. The "Volkswagen" was never used in action, and although it is undoubtedly a fast and quite formidable fighter there is no reason to believe that it would have fared any better than the other enemy jet-planes. J.W.R.T.

Two de Havilland D.H.89A "Dragon Rapides" have been delivered to Jersey Airways, one to Isle of Man Air Services, and one to Olley Air Service. There are now 36 machines operating British internal air lines, and of this total 30 are "Dragon Rapides," the others being two D.H. "Dragons" and four D.H.86 aircraft.

The latest Fairey aircraft is the "Spearfish" torpedo-bomber, a middle wing monoplane.

B.O.A. Return Ferry Service Four Years Old

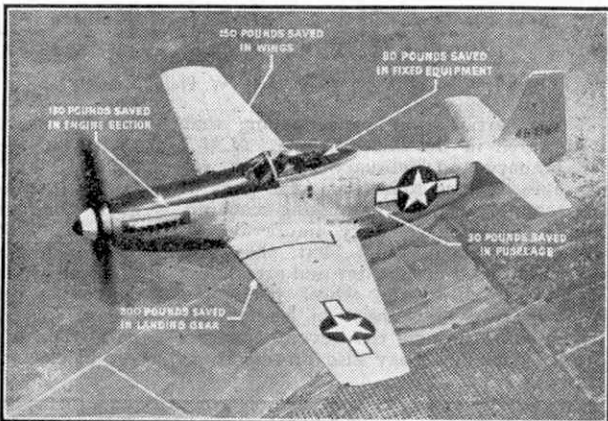
On the 24th Sept. last British Overseas Airways completed four years' operation of the North Atlantic Return Ferry service. Details of this important service were given in the Nov. 1943 "Air News." It was introduced for the return to Canada of air crews who had ferried new aircraft across the Atlantic to the United Kingdom, so as to avoid the delay that would have been caused by sending the men back by sea. The first aircraft used on the service when it was introduced in Sept. 1941 were six converted Consolidated "Liberators," and these machines are still flying.

This all-year air service made history in 1941 when it carried out the first East-to-West winter crossings of the Atlantic. During the four years the Return Ferry has been operating a total of 1,750 crossings have been made, and about 20,000 passengers, roughly 2,000,000 lb. of mail and 1,352,791 lb. of freight have been carried.

A New "Mustang"

A new and speedier model of the North American P-51 "Mustang," the P-51H, is now in service with the U.S.A.A.F., and is illustrated on this page. Radically different from earlier versions, the new "Mustang" was designed in response to the Army Air Force's demand for a fighter with greater range, more speed and higher ceiling for the Pacific war, and is the North American counterpart of the Republic P-47N "Thunderbolt," described in the September "Air News." While achieving the desired increased performance and manoeuvrability the designers of the P-51H also strengthened the "Mustang's" structure throughout by 10 per cent., and yet managed to effect a 700 lb. reduction in its overall weight by skilful re-design.

The most noticeable alteration is in the wing, which has been designed round a new laminar-flow aerofoil section, which gives less drag, and has helped to boost the speed to 460 m.p.h. and give a 37 per cent.



The latest "Mustang," the P-51 H, showing how the saving of nearly 700 lb. in weight has been achieved. Photograph by courtesy of North American Aviation, Inc., U.S.A.

increase in range, without additional fuel load. The heart of the "Mustang" is its Packard-built Rolls-Royce "Merlin" engine, and the version in the P-51H develops over 2,300 h.p. It utilises a fuel-injection pump and drives a new four-bladed AeroProducts propeller, the extra boost giving a ceiling of 42,000 ft. and a rate of climb 26 per cent. better than that of the P-51D.

The undercarriage has been simplified, the engine mounting is 40 per cent. lighter and the electrical controls have all been grouped centrally to reduce wiring. By such means, and by the use of lighter-weight alloys and resin-bonded fabric access panels instead of metal, it was found possible to obtain improved performance without recourse to reducing the fire-power; the P-51H has six .50 in. machine-guns, and can also carry under its wings 10 "Zero Rail" rockets or two 1,000 lb. bombs. J.W.R.T.

U.S. Round-the-World Air Service

U.S. Army Air Forces Transport Command have organised a round-the-world weekly air service scheduled to take only 151 hrs., or roughly 6½ days.

The starting and finishing point of this great 23,147 miles air route is the National Airport, Washington, and the aircraft fly by way of Bermuda, Santa Maria, in the Azores, Casablanca, Tripoli, Cairo, Abadan (Iran), Karachi, Calcutta, Lulian (China) Manila, Guam, Kwajalein Island, Johnston Island, Honolulu, San Francisco, and thence back across the United States to Washington.

The service began on 28th Sept. last when a 4-engined Douglas C-54 "Skymaster" transport, appropriately named "Globeaster," took off from Washington with nine passengers aboard, including a U.S. War Department photographer and several reporters. The inaugural flight was completed on 4th Oct. 70 min. ahead of schedule, having taken 149 hrs. 44 min. Time spent at 13 stopping places en route totalled 33 hrs. 21 min.



Douglas C-54 "Skymaster" transport, a type used extensively by U.S.A.A.F. Transport Command during the war, and now being employed by that Command on their new round-the-world air service described on this page.

Rolls and Roll Grinding

By W. Philip Conolly

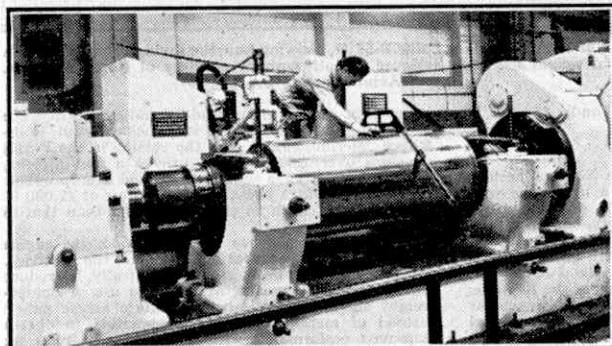
IN the articles on paper-making that appeared in the issues of the "M.M." for January and February reference was made to various rolls that form part of the assembly of a paper-making machine. These may not be very impressive or important-looking units, but they are commonly used in industry and are almost as important as the wheel itself. In paper-making they assist in leading the paper web through the several sections of the machine. They also process it, as

is used. A block is bored to admit the shaft, and is then turned and ground to finished size. All these materials have proved themselves the most suitable for many and varying industrial purposes.

In many of these cases it is necessary to provide a machined finish much finer than can be obtained in a lathe, and this is where the roll grinding machine seen in the accompanying illustration plays its part. The roll is commonly supported in vee blocks; it is made to revolve while a grindstone moves along its face, so giving it an even finish that if necessary can be mirror-like in quality.

Grindstones are produced in many differing qualities. The abrasive of which they are composed, Carborundum for instance, is bonded into a "body" such as shellac. A stone is described by its "grit" number, which indicates how coarse or fine it is. A coarse stone will ensure a heavy or "roughing" cut, while a fine one is employed on finishing cuts.

Where rolls are matched or used together, for example, with press rolls, it is often necessary to grind to such very fine limits of accuracy as less than half a thousandth of an inch. These matched rolls often need to be "cambered" to enable the lower ones to withstand the weight of the uppers, particularly in the case of calender stacks, which may have 10 or more rolls, one above the other, with additional weights placed on them, to ensure a fine finish to the material going through them. When a roll is cambered it is tapered towards each end, and thus given a smaller diameter at its extremities than at its middle. The difference may be only a few thousandths of an inch, but it allows the roll to present a level face to the one above when its middle sags under the load. The cambered roll is the lower one of a pair. After such rolls are ground they are usually tested in stacking frames, any gaps being detected by means of a light.



A roll grinding machine at work. The grinding wheel is carried in a travelling wheelhead, and the machine can deal with rolls up to 16 ft. in length. Photograph by courtesy of Charles Churchill and Co. Ltd.

in the presses, or in the calenders. Rolls are used also in rubber mixers and refiners, and in printing machines.

In most cases a roll is merely a long cylinder with closed ends and is carried in bearings by a journal at each end. It can be made from a wide range of materials such as brass, copper, cast iron and chilled iron. The last-named gives very hard rolls because it is cast in a metal mould that is kept cool while the molten iron is poured, so that the roll is given an extremely hard skin that can only be machined with tungsten carbide tools or by grinding. The roll body may be plated with chromium, or covered with vulcanite, or hard, or soft rubber. Paper in the form of discs, threaded on a central shaft and compressed very tightly, is also used in making rolls, and cotton is another material employed. The rolls made of these materials are usually termed paper or cotton bowls. Aberdeen granite also



Club and Branch News



WITH THE SECRETARY

GUILD AND H.R.C. BADGES

I am delighted to be able to announce that Guild and Hornby Railway Company badges are now again available, so that recruits to these organisations can be supplied with badges as well as certificates and the usual literature right from the start. Any member who has joined during the period when badges could not be supplied can obtain his badge now by simply writing to me, giving his name and address and the date on which he became a member—the date will be found on his certificate—and including stamps or a Postal Order to cover the cost of the badge itself.

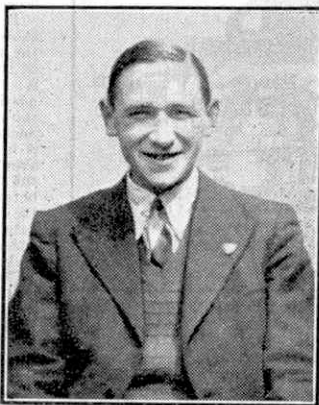
For members living in the British Isles the cost of the Guild badge is 1/- and that of the H.R.C. badge 10d.; the corresponding charges for members living Overseas are 1/6 and 1/3, except in Canada; there they are 30c. and 25c.

JOIN NOW

I am sure that members generally will be as delighted as I am by this development and by the badges themselves. These are of the well-known designs illustrated at the head of the page, and are handsomely finished in blue and gold. Their appearance seems to mark the time when post-war expansion will begin, for a selection of Meccano, Hornby Trains and Dinky Toys will soon be available, and indeed may already be in the shops when these words appear in print, while there will be more to follow. This should lead to a real renewal in enthusiasm, and an increase in the number of recruits for the Guild and the H.R.C. Every enthusiast should join, and every member should get his friends to follow his example. I will supply the necessary application forms, which give full details of the Guild and H.R.C., to any member who can obtain recruits, and to any Meccano or Hornby Train enthusiast who wishes to join.

PROPOSED CLUBS

- BURNLEY.**—Mr. J. L. Collinge, 31, Plover Street, Burnley, Lancs.
EXMOUTH.—Mr. E. G. Sparks, 105, Victoria Road, Exmouth, Devon.
WELWYN GARDEN CITY.—Mr. B. A. M. Ward, 2, Gooseacre, Welwyn Garden City, Herts.
SUNDERLAND.—Mr. B. Posner, 4, Barnes View, Sunderland.
GLASGOW.—Mr. J. H. Turner, 10, Kinfauns Drive, Newton Hearnis, Glasgow, Scotland.
BRISTOL.—Mr. M. E. Frost, 32, Oakwood Road, Henleaze, Bristol.
WESTBURY.—Mr. M. Bluck, 4, The Crescent, Westbury, Wilts.
BELFAST.—Master I. Boyd, 10, Batley Street, Bloomfield, Belfast, N.I.



Mr. W. J. Roche is Leader and Secretary of the Mallow M.C. This Club was affiliated in April 1931, and has now been reformed with Mr. J. Scoffins as President. A fine programme of Model-building Evenings has been arranged, and enjoyable meetings have been held, in which old members as well as new have taken part.

HUNTINGDON.—Mr. J. C. Dennis, 12, Tennis Court Avenue, Huntingdon.

KIRKBY LONSDALE.—Mr. A. Livesley, Queen Elizabeth School, Kirkby Lonsdale, via Carnforth, Lancs.
SOUTH AFRICA.—Mr. D. G. Y. Malcolm, P.O. Box 458, Port Elizabeth, South Africa.

CLUB NOTES

BOSTON M.C.—Special sections have been formed for Meccano Model-building, Fretwork, Table Tennis and Drawing, and members are very keen. General modelling also is carried on. A trip to Skegness was included in the outdoor programme. Club roll: 10.

Secretary: P. E. Luff, 103, Woodville Road, Boston, Lincs.

THORNTON GRAMMAR SCHOOL

M.C.—Steady progress continues. An outstanding event was a talk by the President of the Bradford Engineering Society, illustrated by working models of guns, etc. A Film Show also was successful and brought a welcome addition to Club funds. Club roll: 24.

Secretary: W. Smith, 20, Masefield Avenue, Chellow Grange, Bradford.

ISLINGTON M.C.—The prospects are now good, as an excellent Club room has been secured by the kindness of the Vicar of Holy Trinity Church. A programme is being arranged and all who are interested should get in touch with the Leader, Mr. V. Miller, 3D Block, Samuel Lewis Buildings, Liverpool Road, London N.1.

AUSTRALIA

MAYLANDS (PERTH) M.C.—News of this Club continues good. Owing to Senior members joining the Forces there have been many changes in Leadership, but steady progress has been made in spite of all difficulties. Last year a fine Exhibition of models was arranged, and plans are being made for a further Exhibition. Leader: R. Whitney, 11, Salisbury Street, Maylands, W. Australia.

BRANCH NEWS

URMSTON.—Various layouts have been tried at meetings and these have given valuable experience in operation. A Magazine has been started. A Visit has been paid to a local station, where engines were inspected. **Secretary:** J. A. Denton (Jnr.), 6, Southgate, Urmston, Manchester.

LOCKWOOD.—Members have been very busy designing and laying a track. This occupies two rooms and there is communication between them by means of Morse code and buzzers. A Canteen has been started, and another innovation is a chemical laboratory. Indoor Games also have been played. **Secretary:** G. S. Moss, 35, Holly Road, Thornton Lodge, Huddersfield, Yorkshire.

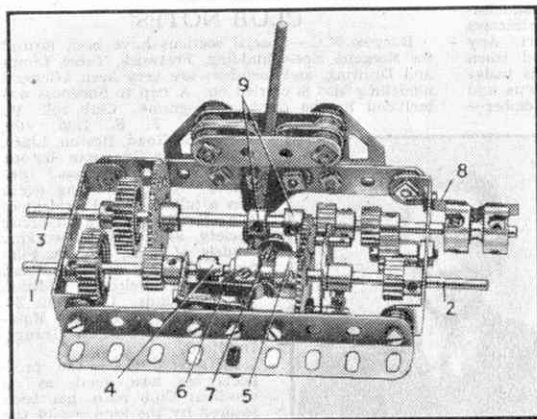
CAER UREA (SOUTH SHIELDS).—Steady preparations are being made for track meetings. Officials have been appointed to take charge of material, and posts on the staff allocated to Seniors, with Junior Assistants for them. A canteen is planned. **Secretary:** G. Burrows, 113, Quarry Lane, Cleaton, South Shields.

Among the Model-Builders

By "Spanner"

A SIMPLE THREE-SPEED AND REVERSE GEAR-BOX

I am utilising most of my space this month to describe a simple three-speed and reverse gear-box, which is shown on this page. I am doing so in order



A simple three-speed and reverse gear-box with gate change, suitable for a car chassis.

to satisfy the demands of several model-builders who have written to me recently asking for help on this subject. The gear-box shown is simple and is a suitable type for incorporation in a motor car chassis.

The driving shaft 1 carries a 1" Gear against the Double Angle Strip, and a $\frac{1}{2}$ " Pinion that bears against the Angle Bracket, and on the other side of the Angle Bracket one member of a Dog Clutch 4. The Rod does not occupy the full extent of the bore of the Dog Clutch member, as this serves also as a bearing for the end of the driven Rod 2.

The Rod 2 is fitted with a $\frac{1}{2}$ " Pinion, the boss of which bears against the Double Angle Strip at the end of the gear-box and so prevents the inner end of the Rod from slipping out of the Dog Clutch. The Pinion is in constant mesh with another Pinion rotating freely on a $\frac{1}{2}$ " Bolt fixed as shown. A Socket Coupling 5 on the Rod 2 carries the second member of the Dog Clutch to engage with the member 4, and a 57-teeth Gear. Two Threaded Pins are attached to the Gear and engage opposite holes in a Bush Wheel fixed on the Rod. The Socket Coupling unit is able to slide on the Rod, but is prevented from rotating by the Bush Wheel and Threaded Pins.

The layshaft 3 is a slideable $6\frac{1}{2}$ " Axle Rod and carries a 1" Gear, a 57-teeth Gear, two Collars 9, two $\frac{1}{2}$ " Pinions and a Socket Coupling.

To each side Angle Girder of the frame is bolted a 1" Corner Bracket, and these support a $3\frac{1}{2}$ " Rod mounted transversely beneath the gear-box. The Rod carries a Double Arm Crank and a Collar. A $3\frac{1}{2}$ " Screwed Rod is inserted in one of the tapped bores of the Collar and is locked securely by a nut, the Collar being fixed to its Rod by the Grub Screw. A $\frac{3}{8}$ " Bolt 7 is attached to the Double Arm Crank by means of two nuts, and forms the selector for changing gear. The head of the bolt can be made to engage between the Collars 9, or the shank can be engaged in the groove of the Socket Coupling 5.

Construction of the gate for the gear lever will be clear from the illustration.

In the illustration the gear-box is shown with the gear-changing lever in the neutral position. Sliding movement of the layshaft and the Socket Coupling is checked by two Pendulum Connections 6 and 8, which are bent as shown to engage the grooves in the Socket Coupling. When the gear lever is in the neutral position, the $\frac{1}{2}$ " Bolt 7 should be in line with the groove of the Socket Coupling 5, and the space between the two Collars 9. By sliding the lever to one or other side of the gate the $\frac{1}{2}$ " Bolt is made to engage either the Socket Coupling or the Collars, and thus the gears can be selected.

First forward speed is obtained when the Bolt 7 engages the Socket Coupling 5, and the lever is moved backward, that is to the right of the illustration.

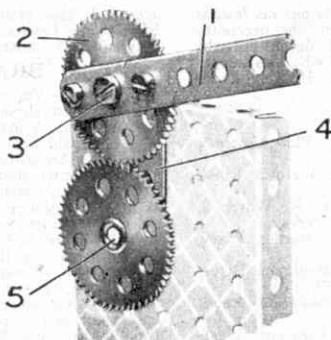
In this position the Socket Coupling is moved against the action of the spring 6, until the 57-teeth Gear engages one of the $\frac{1}{2}$ " Pinions on the layshaft. The drive is then taken through the $\frac{1}{2}$ " Pinion on the driving shaft to the 57-teeth Gear on the layshaft, and through a $\frac{1}{2}$ " Pinion and 57-teeth Gear to the Bush Wheel fixed on the Rod 2. The drive is led through two stages of 3:1 reduction gearing, giving a total reduction ratio of 9:1.

The second forward speed is got by moving the lever back to the neutral position, sliding it through the gate so that the Bolt 7 engages the Collars 9, and then moving it forward. In this position the 1" Gear on the layshaft is brought into mesh with

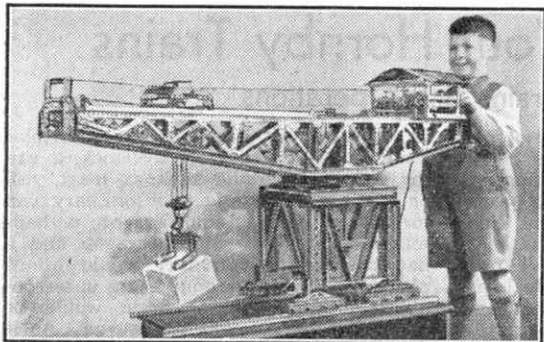
the similar Gear on the driving shaft, and also one of the $\frac{1}{2}$ " Pinions on the layshaft meshes with the 57-teeth Gear of the Socket Coupling unit. In this way the drive is taken through a 1:1 ratio and a 3:1 ratio, the total reduction being 3:1.

To obtain top gear the lever is moved back to neutral, through the gate, and then pushed forward so that the Dog Clutch member in the Socket Coupling 5 engages the member 4. The drive is then taken direct from the Rod 1 to the Rod 2, the Socket Coupling being "keyed" to the latter by the Threaded Pins and Bush Wheel.

To engage reverse gear the gear lever is moved back again to neutral and once more the bolt 7 engages the Collars 9. In this case the layshaft is slid to the right.



Sun and planet mechanism.



A fine example of a Meccano super model block-setting crane, photographed with its builder, John Ryall, Grimsby.

A CHANGE FROM THE CRANK

Builders of beam and other types of steam engines will find it an interesting change to use a "sun and planet" mechanism instead of the customary crank for converting the reciprocating motion of the piston into rotary motion. A simple sun and planet gear is shown at the foot of the facing page. The Strip 1 represents the engine connecting rod, imparting reciprocating motion from the piston. This Strip is bolted to a 57-teeth Gear 2, which is free to move about a Pivot Bolt 3 fixed to a 2" Strip 4. The Strip 1 should be spaced away from the Gear 5 by three Washers.

The Gear 2 does not revolve on its own centre but moves round the axis of the Gear 5, with a slightly oscillating motion; and since the teeth of both Gears are in engagement, a rotary movement is imparted to the Gear 5. The latter revolves twice on its axis to one circuit of Gear 2.

AN IDEA FOR BUILDERS OF MACHINE TOOLS

A suggestion sent by V. Welsby, Cardiff, should interest A. Robins, Shrewsbury, and several other boys who have asked for details of quick-return devices suitable for use in machine tools such as planing and slotting machines. Welsby's idea is shown on this page. The movement is very efficient because the only sliding part is a reciprocating Eye Piece. The driving Crank 1 is pivotally attached to a 3½" Strip secured at 2 to a further 3½" Strip and

a 3" Strip, the last being bolted to a Crank that is free to swing about a fixed pivot 4, which consists of a Pivot Bolt. The second 3½" Strip is connected to the section of the model requiring a quick-return motion, and in the photograph is shown pivoted at 3 to a sliding Eye Piece. In a model planing machine the Eye Piece would be replaced by the work table.

In the position shown, The Crank 1, rotating anti-clockwise, is on the power stroke and thus the Eye Piece slides slowly to the left. When the web of the Crank swings towards the pivot 4 the Eye Piece returns rapidly.

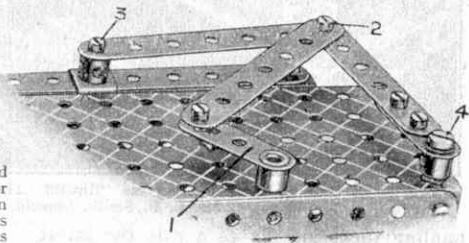
A READER'S SUGGESTION

H. A. Sharp, Uckfield, suggests the introduction of a new Meccano part similar to the present Boiler End (Part No. 162a) but 3" diameter. He says that a part of this type and size would make an excellent road wheel for a vehicle if fitted with a 3" Motor Tyre (Part No. 142b). Such a wheel could be fitted with a brake drum consisting of the present Boiler End, with a Face Plate for the back plate of the device.

The idea is interesting, especially if other uses could be found for the suggested new part. I shall be glad to have model-builders' opinions on the point.

CONTRIBUTIONS—A REMINDER

May I remind readers that I am always glad to receive contributions for "Among the Model-Builders." Payment at the usual rates will be made for material, photographs or sketches that I am able to use.



A quick-return motion that has many uses in Meccano model-building.

"Most Useful Meccano Parts" Competition

In the accompanying panel is a list of 10 Meccano parts. Readers are asked (1) to select from these the part that they think is the most useful in model-building, and (2) to make out a list of the six parts that they think will receive the most votes, placing these in their estimated order of popularity.

Entries should be sent on postcards, which must bear the competitor's name and address. The name or catalogue number of each part must be given and entries should be addressed "Most Useful Parts Contest," Meccano Ltd., Binns Road, Liverpool 13. The closing date for Home entries is 30th November and for

Overseas entries 31st January, 1946.

Prizes will be awarded to competitors in each section whose lists are nearest to the final result, and will be as follows. First, £2/2/-; Second £1/1/-; Third, 10/6. A number of consolation prizes also will be awarded.

If several competitors place the six most useful parts in the correct order as decided by the votes of all competitors, the neatness of their entries will be taken into consideration in making the awards. No competitor may submit more than one entry.

All prizewinners will be notified by letter.

SELECT YOUR PARTS FROM THIS LIST

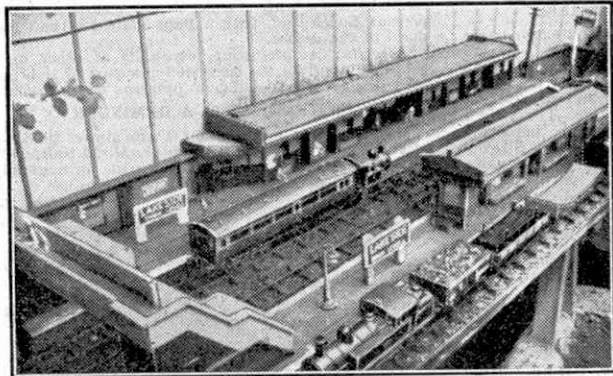
| Part No. | Part No. |
|----------------|--------------------|
| 24 Bush Wheel | 133 Corner Bracket |
| 50a Eye Piece | 137 Wheel Flange |
| 59 Collar | 161 Girder Bracket |
| 63 Coupling | 166 End Bearing |
| 109 Face Plate | 179 Rod Socket |

Fun With Your Hornby Trains

Freight Trains and Operations

IT is probably correct to say that with most miniature railway owners more attention is devoted to the working of passenger trains than is given to the goods side of things. To a certain extent this is to be expected. We see more of real passenger trains in the course of our normal activities, for a great deal of freight traffic is moved overnight; passenger trains have a smarter appearance, and they may be named, or at least bear destination boards, while the engines

or vans but not many of one particular kind. A cattle truck for livestock, a van for perishable traffic such as meat, fish or milk, an open wagon or ordinary van for general goods, a tank wagon, perhaps followed by another open wagon and a flat truck with container would afford plenty of variety without being unreasonable. The tail of the train would be completed by a goods brake van. As it is an ordinary short-distance freight train the engine would display a single headlamp over the left-hand buffer.



A local goods train at "Lakeside" on the "Bincliff, Lakeside and Shedley" layout of Mr. C. B. Smith, Lincoln.

hauling them include as a rule the latest and largest express classes.

There is, however, much that is of interest in connection with freight train operation both real and model. A vast amount of raw material and manufactured commodities is railborne, as also are the fuel and foodstuffs on which our daily lives depend. There is thus clearly no lack of variety in goods traffic and this naturally has its effect on the different vehicles used. This is a point that has special attraction for the model railway owner who is usually fond of mixing vehicles of various kinds together.

We must be careful not to overdo this mixing business, however, otherwise the effect will be not at all realistic. A local goods train picking up traffic for conveyance to a marshalling yard may be quite varied in its make-up. This then is the sort of train for the Hornby Railway owner who has several kinds of wagons

almost as varied in make up would normally be taken by a tender engine, the No. 1 Special or E120 Special tender type being ideal for this. The engine then would display two headlamps, one at the foot of the chimney and the other on the centre lamp bracket above the buffer beam.

If we have a number of wagons or vans of a particular kind we shall no doubt wish to run a bulk train of these as part of the regular programme. Open wagons can be used for trains supposedly handling coal traffic, minerals, bricks and similar "rough" loads. To provide the loads we shall have to make use of the "false bottom" scheme frequently referred to in these pages, a layer of the particular "load" being glued to the top surface of a cardboard shape made to fit inside the wagons. The scheme must be slightly varied if we are dealing with bricks; perhaps the best way out of the difficulty will be to paint the top of the cardboard

For engine power there is plenty of choice for a train of this kind. A tank engine will be sufficient, but a tender engine may be preferred. In the latter case even a fairly large express engine might be pressed into use between more important duties, and it would be permissible for this to run tender first as the L.N.E.R. "Hunt" class 4-4-0 is doing in the lower illustration on page 387. Longer distance mixed freight trains



Another view on the "Bincliff" system; a long "fully-fitted" freight train in charge of a Hornby L.N.E.R. "Yorkshire" Locomotive.

shape and draw lines along and across to represent the bricks.

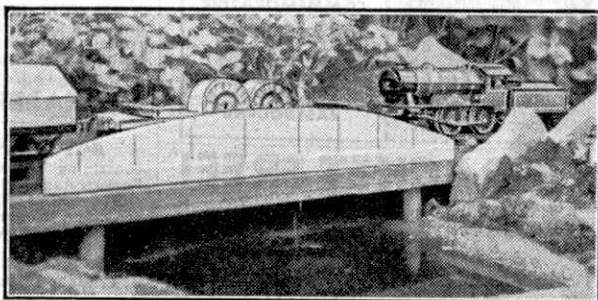
Another suggestion is to assemble a train of tank wagons. These require no load to be represented, and several different kinds on the track together look most attractive. Normally, however, we should not include a milk tank in a train of petrol or oil-carrying tanks. Milk tanks run in ones and twos, perhaps with milk vans, or they may be attached to a convenient passenger train. Alternatively the milk tanks can be run on their own as a sort of special train. When this is done a No. 1 passenger type guard's van should be used in preference to the ordinary type of goods brake. In such circumstances the engine would carry two headlamps, one below the chimney and the other over the left-hand buffer, such a train being supposedly fitted throughout with continuous brakes just like a passenger train, and therefore suitable for travelling at fairly high speeds.

This question of brakes is important in actual freight train operation and it has its effects indirectly on miniature practice. The ordinary freight train with its loose-coupled vehicles is controlled by the engine brake supplemented by the hand brake applied by the guard on his van. This applies to local freight trains and to coal, mineral and ballast trains. At the other end of the scale we have what are known as "fully-fitted" freight trains, in which all vehicles are fitted with continuous

brakes. Most trains for perishable or parcels traffic come into this class. In addition there are "partially-fitted" trains in which a proportion of the vehicles are brake fitted, these being marshalled next to the engine so that all the braked stock is together and assists in controlling the train.

Now in miniature practice we have no continuous brakes, but we have to consider

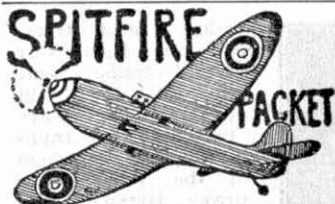
which vehicles are supposed to have them in order to make up and run our trains correctly. The proportion may be quite high on some layouts according to the stock in use. In general all vans such as fish, meat, milk and banana vans will count as being "fitted"; also No. 2 luggage vans as used for express parcels traffic, and possibly the No. 1 type also if we are short of special purpose vans. Milk and gas cylinder tank wagons will be included as these often run in passenger trains. In general open wagons will not be included, but the Hornby Open Wagon "B" with its longitudinal bar for supporting a tarpaulin sheet can be counted in. Another exception in the "rough" traffic section is the No. 2 High Capacity Brick Wagon L.N.E.R.; when this is



A Hornby L.N.E.R. "Hunt" Locomotive running tender first with a goods train on the railway of our reader "Rosco."

included in a mineral train, therefore, it should go behind the engine.

The division of our vehicles in this way and their use accordingly adds a great deal to the interest of operations and results in more realistic working and therefore greater fun and enjoyment.



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Stamp Collecting

Railways on Stamps

By F. Riley, B.Sc.

IT seems only right that railways in various forms should figure on stamps, for the two had their beginnings at about the same time, and ever since railways have provided the principal means of carrying mail. Yet it was not until 20 years after the appearance of the "Penny Black" that a stamp with a definite railway design appeared, and in the next 40 years there were only eight further examples.



old woodburning type. The second place in the list of early railway stamps is occupied by the United States, where a stamp showing a "woodburner" appeared in 1869. This was a 3c., deep ultramarine in colour, which formed part of a very mixed set of 10 designs issued in that year. These designs included portraits and a representation of the landing of Columbus, and it is interesting to find that two other stamps besides the 3c. were concerned with mail carrying, for one of them shows the steamship "Adriatic," which carried mails across the Atlantic, and the other a post rider.

There was a gap of 15 years before the next railway stamp appeared, this time in Paraguay, to be followed in 1894 by a Belgian Congo stamp showing a railway bridge over a river. Then came further stamps with a railway connection from Mexico, Uruguay, Salvador and Honduras. The first two of these appeared in 1895, each showing a locomotive, and the others, with similar subjects, came in the following year.

It is extraordinary that with one exception these pioneer efforts associating stamps with the carriage of letters by rail appeared in the New World, and the exception is an African stamp. It was not until the present century that Europe came into the picture at all as regards railway matters, but the leeway has been well made up, especially since 1935, the year of the first of the railway centenaries on the Continent. Great Britain was the pioneer country in railway transport, but the coming of railways in this country has not been commemorated by the appearance of pictorial railway issues,

providing the pioneer effort belongs to New Brunswick, in Canada, which issued stamps of its own from 1851 to 1868, when the general issues of the Dominion replaced them. One of these stamps, a 1c. value issued in May 1860, was the first ever printed that had a picture of a locomotive on it. The locomotive is one of the



This centenary issue was not by any means the first from Belgium to illustrate railway subjects, for locomotives had previously been pictured, and in addition a special feature had been made on several occasions of a locomotive wheel with wings attached to it. On one set of stamps issued in 1938 the wheel was shown running on a rail, and the design included also a post horn.

Germany celebrated its railway centenary by the issue of an excellent set in 1936. There were four designs in this set, a separate one for each of the values included, and they form an interesting series. The lowest value shows "The Eagle," the first locomotive to run in Germany, and for comparison with

the effort of 100 years ago the stamps show a modern steam engine, "The Flying Hamburger"—a Diesel-hauled train—and a streamlined steam train. Two examples from this set are reproduced on this page. Holland, where the railway centenary fell in 1939, was satisfied with a more restricted effort in the shape of the stamp shown here, which has a rather formal design showing a primitive locomotive.

Every form of locomotive has found its way into the railway stamp collection. I have already mentioned an example of a streamlined train in the German issue of 1936, and there is another on a French stamp of 1937, one of two issued in that year to commemorate an International Railway Congress in Paris. The second stamp in this issue shows an electric locomotive, and other examples of stamps picturing electric locomotives or railways appeared in Austria, 1937, in San Marino, 1932, and in Spain, 1930. The Diesel locomotive too has made its appearance on stamps, in the German centenary issue already noted.

The greater interest in pictorial stamp design shown during the present century led to the production of many other stamps showing locomotives and railway scenes in addition to those marking centenaries. The number indeed is now so large that it is impossible in the space available here to make anything like a complete list and give details of each. Locomotives of course figure prominently. Stations are represented by a stamp from Guatemala issued in 1930, and by



and so the earliest of the centenary sets came from Belgium in 1935. This comprised an issue of 24 values, from 10 c. to 100 fr., but there were only two designs, the lower values illustrating a Diesel locomotive and train, and the higher values showing "La Belge," the pioneer Belgian locomotive, which makes a remarkable contrast with the modern engine figured on the companion stamp.

(Continued on page 394)



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For other Stamp Advertisements see also pages 388 and viii.

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Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

LAST month we illustrated two of the commemorative set of stamps which had been issued by Jamaica, and before we get on to the new set of Nyasaland it can be mentioned that our somewhat adverse comments on the West Indian set have been echoed—generally in a much stronger key—by all who have had anything to say. This is what the Editor of "Gibbons' Stamp Monthly" has written on the subject: "Surely there has never been an issue in recent times that was such a travesty of art.

Unbalance, ugliness and stodginess are combined with depressing colours to make the series one which will stand out on the album page... but not in a way its sponsors intended." It is noticed that one wholesale dealer has actually refused to stock the new Jamaicans.

All this goes to show how necessary it is to produce attractive stamps if full advantage is to be taken of possible sales to collectors. But these self-same

collectors are funny folk. Those who, for some reason or other, hold off buying stamps they need for their collections, make all the greater rush when the stamps become obsolete, so be warned if you need these Jamaica stamps for your collection; buy them now, while they are current.

The new Nyasaland set, two of which are being illustrated this month, is meeting with general approval. It has its faults, but its bright colours and attractive designs are making it a best seller, and whereas it should be the other way about, dealers state that they are selling many more Nyasaland stamps than those of Jamaica. But here there need be no rush to buy,

making it a best seller, and whereas it should be the other way about, dealers state that they are selling many more Nyasaland stamps than those of Jamaica. But here there need be no rush to buy,

and now about the new regulations regarding the import and export of stamps, as they affect collectors who used to receive stamps from friends abroad, either as gifts or as "swops." This is perhaps not the place to discuss whether the Government was justified in stopping the practice of people abroad sending a few foreign stamps to their friends in England, but whereas not



all restrictions have been removed there has been a considerable lightening.

To begin with, any of your friends, in what ever part of the world they live, may send you stamps as gifts; all they need do is to send them direct to you and they will be

allowed in. On the other hand you cannot swap stamps with anyone living outside the sterling area, without official control, and unless you are a dealer; it won't be worth your while to try. But you may swap stamps freely with anyone, without any official control, within the sterling area, and don't forget that while most of the British Empire is in the sterling area, Canada and Newfoundland are not; you cannot do swops with anyone in those two countries without getting permission from the B.P.A. Ltd., 3, Berners Street, London W.1. This Association acts for the Board of Trade, and will supply all particulars on request.

As has been already mentioned, most of the

Dominions are busy preparing "Victory" sets of stamps, and in the case of New Zealand its three dependencies, Cook Islands, Niue and Western Samoa, are also to be allowed to have New Zealand stamps overprinted with their names. This will mean a nice little filip in their finances, so a good and proper thing is being done, but whereas these tiny Pacific Islands are to have "Victory" stamps, colonies under the control of Whitehall, such as our important African and West Indian colonies, are not to have the privilege because those who were consulted on the matter have been allowed to get away with exactly the same bluff as was tried, with less success, when the "Penny Black" was first mooted.

Once more the U.S.A. provides us with a new stamp, the third of a set of four issued in honour of the late President Roosevelt. It is quite an attractive stamp, printed in rose-carmine.

Our next illustration shows a stamp from Germany. It is not a very new stamp, but it is of great interest to collectors on account of its design, which will be left to speak for itself.

The fifth stamp shown here has puzzled the writer, and perhaps some reader can throw light on it. It came with more stamps which were acquired as a lot. It will be noticed that the postmark is Shanghai; the stamp is of an orange colour, and the flag is that of China.

And now for the month's "tip." The three high values of Eire have recently changed watermark, but the old ones, S.G. Nos. 102-4, will be well worth buying at face and a half.

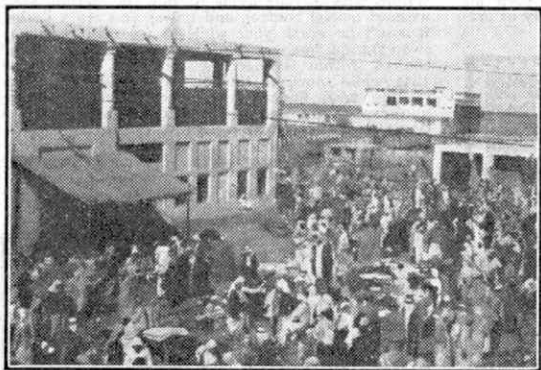


From Our Readers

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.

AN ARAB MARKET DAY

When I was in Bahrain, an independent Arab State in the Persian Gulf, and the centre of the Arab pearl fisheries, I went one day for a walk in the bazaar. It was Wednesday, and the "Sukh Al Araba," or Wed-



The market place in Bahrein, on the Persian Gulf. Photograph by J. Belgrave, London S.W.7.

nesday Market, was in progress in the market place. I hurried through the crowded streets, filled with

Arabs from the country bringing in their produce to sell, and entered the Town Hall, a building that overlooked the market place. I went upstairs and paid my respects to His Highness Shaikh Sir Salman bin Hamad Alkhalifa, Ruler of Bahrain, who was sitting in state on the balcony receiving visitors.

Then I looked out over the balcony and there before me I saw a perfect panorama of the market. All the goods were on mats on the ground, and the whole scene was exceedingly colourful, especially on the left, where there were men's and women's clothes for sale, old and new, all laid out to strike the eye of the prospective buyer. Next to them were the stalls of the basket makers, and of men with a great assortment of things varying from bolts and pieces of wire to anchors and broken sewing machines. Behind them were rabbits, and on their right were larger animals, goats and sheep.

Then I descended and went into the crowd of people. My main object in coming to the market was to buy a rabbit, so I headed towards that part of

inquisitive small boys trying to sell me pigeons and hens. After I had looked for some time, a man appeared who said that he had a rabbit for sale. He produced it, and we immediately started to bargain, aided by the onlookers, who threw in helpful remarks about its value. When I had managed to reduce the price to what I thought was a reasonable one, I paid for it and put it into my basket.

Then I went off to look at the rest of the market. Wherever I went I was followed by the same small boys, trying now to sell me more rabbits. At the clothes stalls there were for sale abbas or Arab clothes, embroidered headcloths, and coloured sandals, all in different colours. When I had managed to free myself from the owner of the stall, who wanted me to buy anything or everything, I went across the road to where there were lots of old ladies selling wooden combs, needles and cotton. One old lady tried to give me a packet of needles as a present, but I thanked her and returned them. By then nearly everything had gone, so I took my bicycle and left.

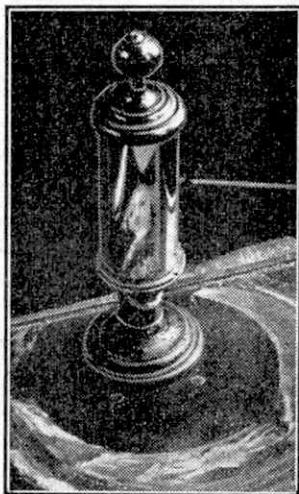
J. BELGRAVE (London S.W.7).

A NEAT SUBTERFUGE

Just two hundred years ago, Bonnie Prince Charlie raised his standard and began the rebellion of the "Forty Five." But before he returned to this country from years spent abroad, it was the custom for his supporters to drink the health of "the King across the water." If they were caught doing this there was trouble, so some of them hit upon an ingenious plan. They placed on their dining table a small board on which were smeared some apparently meaningless daubs of paint. When a polished metal cylinder was placed at a certain spot on this board, the paint was reflected in its curved surface in such a way as to produce a likeness of the Pretender. If they were discovered in the act of raising their glasses to this "secret portrait," all they had to do was to whisk the cylinder away and no evidence was left of their intentions.

Three of these "secret portraits" are said to be still in existence. The one shown in the accompanying illustration is in the Highland Museum at Fort William, where I photographed it this July, with the kind assistance of the curator. A glance at the cylinder shown in the illustration reveals the portrait of the Pretender, and the daubs of paint can be seen in front of the base. The device was one of several tricks that Jacobites used to disguise their actions and beliefs.

E. RICHARDSON (West Bridgford).



The trick portrait described on this page. Photograph by E. Richardson, West Bridgford.

Competitions! Open To All Readers

What Is Wrong With This?

MIXED LOCOMOTIVE DETAILS

| NAME | CLASS | NUMBER | CYLINDERS |
|------------------------|-------------------------------------|----------|-----------|
| 1. "Bradford City" .. | Jubilee, G.W.R., 4-6-2 .. | 6236 .. | 2 |
| 2. "Sir Nigel Gresley" | Manor, S.R., 4-4-0 .. | 860 .. | 4 |
| 3. "Lord Hawke" .. | "A4," S.R., 4-6-0 .. | 7804 .. | 3 |
| 4. "Brighton" .. | Merchant Navy, L.M.S., 4-6-0 .. | 5714 .. | 3 |
| 5. "Blue Star" .. | "B.17," L.M.S., 4-6-2 .. | 4498 .. | 3 |
| 6. "City of Bradford" | Schools, L.N.E.R., 4-6-0 .. | 2868 .. | 3 |
| 7. "Revenge" .. | Princess Coronation, S.R., 4-6-0 .. | 21C10 .. | 4 |
| 8. "Baydon Manor" | Lord Nelson, L.N.E.R., 4-6-2 .. | 915 .. | 3 |

Can you straighten out the tangle into which the printer has got in setting up the type for the panel shown above? In its details are given of eight locomotives, but it is easy to see at a glance that something has gone wrong. To take the first example, there is no "Jubilee" class locomotive of the name "Bradford City"; if there were its wheel arrangement would not be 4-6-2, and there is no G.W.R. engine of the name.

This mix-up provides a competition that readers will find both easy and interesting. The right descriptions, wheel arrangements and numbers are there, and what they are asked to do is to sort out the mass of

that correct details are given for each of the eight locomotives named. The corrected list should then be sent to "*November Locomotive Contest, Meccano Magazine, Binns Road, Liverpool 13.*"

There are two sections, for Home and Overseas entrants respectively, and in each of these prizes of £1/1/-, 15/- and 10/6 will be awarded for the best entries in order of merit, with Consolation Prizes for other good efforts. If there is a tie for any prize the judges will take neatness and novelty into consideration.

Closing dates: Home Section, 31st December; Overseas Section, 31st May 1946.

These are Bridges!

Here is a contest in which all readers of the "M.M." can join. It concerns bridges, all of which are famous for size or design and should be well known to every one interested in engineering, young or old.

All that is wanted from entrants in this contest is to identify 10 famous bridges from clues to their names. These clues are given below, and each of them points directly to the bridge concerned. The 10 subjects of the contest are widely scattered over the Earth. Some of them are British, but others are to be found in North America, while the remainder are in Africa and Australia. The clues are similar to those generally given in crossword puzzles and we have little hope that they will be beyond the capacity of our readers, so that a large and interesting entry is expected.

1. A world famous battle.
2. Entrance to a fairy palace?
3. Island of skyscrapers.
4. Seems numbered, but none before or after it.
5. Must be high, but can be opened.
6. Water in the name.
7. There have been eight of his name.
8. Sounding Smoke arch.
9. Associated with Palace and Walk.
10. Largest "down under."

When the clues have been considered and all problems associated with them have been solved, the names of the 10 bridges must be written down in order, each with its number. The name and address of the competitor must then be written on the back of the entry, and this is to be forwarded to "*November*

Bridge Contest, Meccano Magazine, Binns Road Liverpool 13."

There are two sections in this contest, as usual, one for Home readers and the other for Overseas entrants. In each of these sections there will be three prizes, of values £1/1/-, 15/- and 10/6, for the best entries in order of merit, and other deserving efforts will be awarded Consolation Prizes. In the event of a tie for any prize the judges will take neatness and novelty into consideration, and the subject is certainly one that lends itself to special treatment as far as presentation of the solution is concerned. The closing dates are 31st December in the Home Section, and 31st May 1946 in the Overseas Section.

November Photographic Contest

This month's photographic contest is the 11th of our 1945 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of the print must be stated exactly what the photograph represents. A fancy title may be added if desired.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed: "*November Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" There will be separate sections for Overseas readers, and in each section prizes of 15/- and 7/6 will be awarded. Closing dates: Home Section, 30th November; Overseas Section, 30th April 1946.

RAILWAY FOR LAUNCHING A LIFE-BOAT

The Royal National Life-Boat Institution have used a variety of launching arrangements to suit different local conditions. One of the most interesting is the slipway at Appledore, which consists of a short length of railway that has a still shorter "branch line." The main length is for use at high water and the branch at low water. The gauge is 5 ft. 6 in. The boat is carried on a trolley as shown in the accompanying picture. This slipway was completed in 1923 and used until 1938. In the latter year a larger life-boat was stationed at Appledore and lies afloat, so that for the past seven years the railway slipway has not been used.

The four values included in the set show station scenes, tunnel excavation in progress and a section of the road with an escalator. When the Moscow Underground was extended three years later there was a further issue, this time of six stamps.

It will be seen that there is ample opportunity for building up an extensive and attractive collection of stamps associated with railways. Most of the stamps that would go to make it are fairly easy to obtain, and tracking them down and planning an effective display would be really enjoyable. A list of stamps of course would help those who are interested in such a project. I have compiled a list, although I do not claim that this is absolutely complete, and I shall be glad to send a copy of this to any reader.

Blackburn "Firebrand"

(Continued from page 375)

with the fuselage and with their leading edges uppermost. A bullet-proof panel in the centre of the windscreen gives frontal protection to the pilot, and there are panels of armour plating in the back and underside of the seat for him, and other armour plating to protect his head. The arrester hook for picking up the landing cables is right aft of the fuselage and arrangements are provided for the use of rocket assisted take-off gear if required. Each R.A.T.O.G. unit comprises three slow-burning rockets and is carried on racks which can be jettisoned after use. The duration of the rockets is about four seconds.

How Webley Air Pistols and Air Rifles are Made—(Continued from page 367)

causes the seat F to engage in the grooved portion at the rear of the piston E.

Insert the pellet in the rear end of the barrel and return the barrel to the position shown. The pistol is then ready for firing. Pull trigger G, which releases seat F from the piston, allowing the piston to fly back with great force under the pressure of the spring to the rear end of the air chamber. This action forces the air that was in the chamber through the vent H, thus driving the pellet into the rifling of the barrel and on to the target.

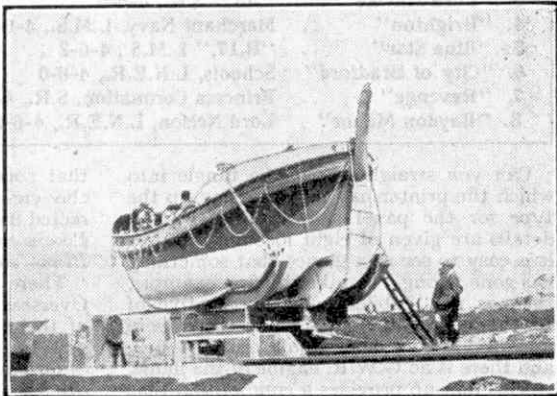
The Webley air pistols and air rifles give boundless pleasure in public and private competitions and have shown their usefulness in teaching both the younger and older generations the elements in the art of shooting.

During the recent war the whole of the plant that was engaged in the manufacture of these products was devoted to work of National importance and produced many thousands of revolvers and aircraft engine components.

Railways on Stamps—(Continued from page 389)

from Algeria, which appeared curiously enough in the same year, bearing a representation of the terminus at Oran. The Guatemala issue of 1930 also included representations of a section of permanent way and of an embankment, and there is a cutting to be seen on each of two stamps issued by Nicaragua, both in December 1932. The issue of these two stamps was a real railway affair, for each is included in a set celebrating the opening of a railway line, the designs in each case including various views along the track. A further interesting point of these sets is that in each case half of the stamps included were for franking airmail.

A particularly interesting corner of the railway collection is provided by Russia in the form of sets of stamps featuring underground railways. The first of these were in a set issued in 1935 to celebrate the opening of the Moscow Underground railway, described in the "M.M." for August of last year.



The Appledore life-boat on the launching rails, a description of which is given on this page. Photograph reproduced by courtesy of Messrs. Lewis and Duvivier, Consulting Engineers, London.

COMPETITION RESULTS

HOME

July "Shunting" Puzzle.—1st Prize: J. O. Gibson, Birmingham 15; 2nd Prize: P. Middleton, West Molesey; 3rd Prize: A. J. Pownall, Ashton-Under-Lyne. Consolation Prizes: R. Higgins, Castle Bromwich; J. T. Dembinski, Woolhampton; R. S. Williams, Mitcham; B. G. Harwin, Lincoln; F. Mills, Kearsley; W. A. Brown, Woodford Green; M. H. Colson, Formby.

July "Aeroplane Recognition" Contest.—1st Prize: D. Masterson, London S.E.1; 2nd Prize: J. Hogg, Pudsey; 3rd Prize: P. Skinner, Sheffield 7. Consolation Prizes: C. E. Wrayford, Bovey Tracey; C. F. White, Sutton-in-Ashfield; G. E. Lee, Leigh-on-Sea; P. Hicks, Cobham; D. Smith, Rosyth; A. E. Mealey, Birchgrove.

OVERSEAS

July "1944 Holiday Drawing" Contest.—1st Prize: H. Ekwensi, Zaria, B.W.A.; 2nd Prize: F. Jowett, Toronto; 3rd Prize: J. Williams, Johannesburg. Consolation Prize: G. Snowden, Bombay.

August "Thrills" Contest.—1st Prize: I. T. G. Johnstone, Wellington; 2nd Prize: R. B. Nunan, Johannesburg; 3rd Prize: L. Beretta, Transvaal. Consolation Prizes: O. Vella, Malta, G.C.; G. B. Welsh, Johannesburg; A. Campbell, Dunedin.

August "Locomotive Names" Contest.—1st Prize: R. A. G. Ogden, Victoria; 2nd Prize: I. T. G. Johnstone, Wellington; 3rd Prize: K. Wild, Toronto. Consolation Prize: J. King, Claremont.

August "Photographic" Contest.—1st Prizes, Section A: G. E. Thorne, Toronto; Section B: C. A. Bolton, Sydney. 2nd Prizes, Section A: Wing Lam Tsun, Transvaal; Section B: H. I. Matthews, Cape Province. Consolation Prize: A. L. Elliott, Auckland.

Fireside Fun

"I hope the boys at school haven't any silly nick-name for you, Johnny."

"Yes, they have, mum. They call me Corns."

"How awful! Why do they call you that?"

"Because I'm always at the foot of the class."

"You've invited 13 people to our garden party. That won't do at all."

"Good gracious! I didn't know you were superstitious."

"I'm not, but we've only got 12 deck chairs."

"Be careful there! You poked your umbrella in my eye."

"I did not."

"Of course you did."

"No, you are mistaken. This umbrella belongs to a neighbour of mine called Murgatroyd."

"Did you see that advertisement for a nurse for a small gentleman's family?"

"No, but I did see one for a mahogany child's chair."

"That's nothing. Here's one for a house wanted for a small family recently papered and painted."

"Say, dad, I'm a kid, baby's a little lamb, and you call mum a dear, so we're all animals. What are you?"

"Well, I must be the goat, kid."

"What is a skeleton, Johnny Green?"

"Please miss, it's all the bones with the people scraped off."

Waiter: "Can I help you with that soup, sir?"

Diner: "Help me? No. What do you mean?"

Waiter: "Sorry, sir. From the sound I thought you might wish me to drag you ashore."

Manager: "There's been a lot of lateness lately, Pat. What can we do to get everybody here in time?"

Foreman: "That's aisy, sorr. Let the last man in blow the whistle."



"So you boys are off the minesweeper. Tell me, where do you sweep them?"

"On the top, Ma! That's where the dust settles."

THIS MONTH'S HOWLER

A generator is an elderly gentleman who gives generously.

BRAIN TEASERS

A CALENDAR PUZZLE

If there were four Mondays and five Tuesdays in July in any year, what was the date of the third Monday in August?

While solving this one see if you can say how many Mondays and Tuesdays there were in the previous December if 1st January falls on Friday.

OVERLAPPING TIMES

From the calendar let us turn to the clock. What time is it when the minute hand first passes over the hour hand after noon? How many times in a day does the minute hand cross the hour hand?



"A license, please."

"What name?"

"Oh! It hasn't got a name. It's one my husband made himself."

ONLY ONE RIGHT WAY

Suppose you write four letters and address the four envelopes required for them. There is only one right way of putting the letters in the envelopes. In how many ways could you put every letter into the wrong envelope?

AN AMERICAN ONE THIS TIME

"Tracks," the Magazine of the Chesapeake and Ohio Railway Company, recently gave its readers an American puzzle that we think will interest readers of the "M.M." There are seven Presidents of the United States whose names have been given to cities in that country. Who are they?

SOLUTIONS TO LAST MONTH'S PUZZLES

The best way to solve the first of our puzzles of last month was to reduce the two magnitudes concerned, 240 cundalls and 500 blimpies, to flitters. To bring cundalls to flitters you simply divide by 20, so that 240 cundalls is 12 flitters. To bring 500 blimpies to flitters divide by 10, giving 50 krulls, and then by 5, giving 10 flitters. From this we see that 240 cundalls are greater than 500 blimpies by two flitters. Some readers may ask what krulls, blimpies, etc. mean. The answer is that they do not mean a thing.

The nine British motor cars in our second puzzle are Austin, Hillman, Morris, Jaguar, Lagonda, Daimler, Ford, Humber and Rover.

In our third puzzle it is easy to see that a woman is supposed to occupy three-quarters of the room taken up by a man, and that the allowances are 2 ft. for a man and 1 ft. 6 in. for a woman. Then five men and five women will take up altogether 17 ft. 6 in.

The famous man now living in the United States whose name begins and ends with the same three letters is Einstein, of relativity fame.

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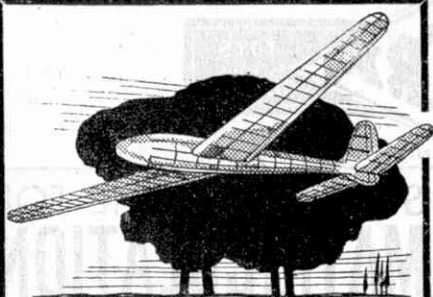
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(See also pages 388 and 390)

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"Meccano Magazines" for September, October and November 1942.—W. Jamieson, N.S. 10F, Room 24/5, Dorland House, Lower Regent Street, London, S.W.1

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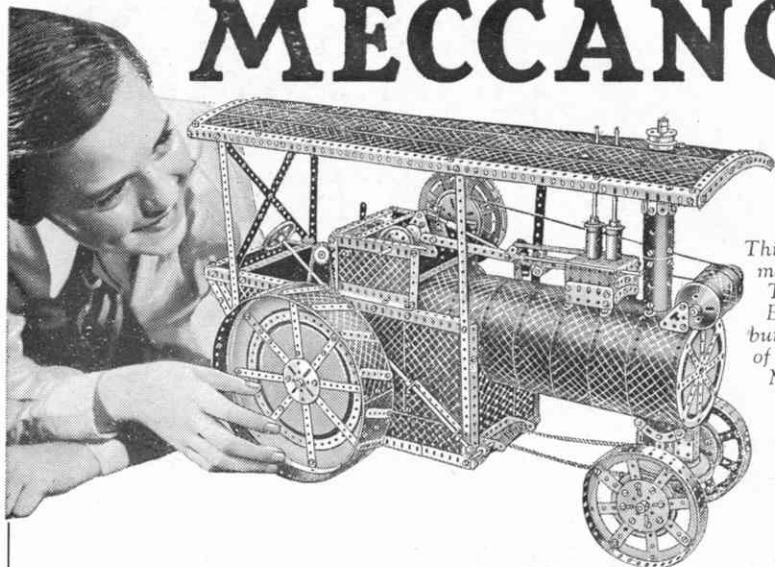
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THE MECCANO MAGAZINE

MECCANO



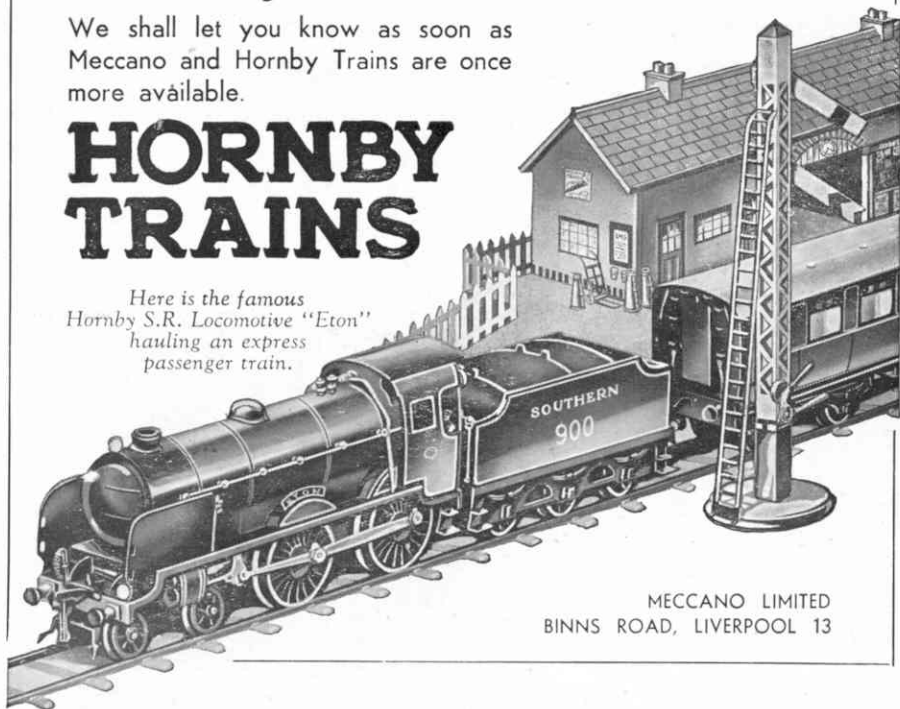
This splendid model of a Traction Engine is built entirely of standard Meccano parts.

Here are two pictures to remind you of the happy days you used to have before the war. It will not be long now before the good times are here again.

We shall let you know as soon as Meccano and Hornby Trains are once more available.

HORNBY TRAINS

Here is the famous Hornby S.R. Locomotive "Eton" hauling an express passenger train.



MECCANO LIMITED
BINNS ROAD, LIVERPOOL 13



MECCANO DINKY TOYS HORNBY TRAINS DUBLO TRAINS

THE GREAT DAY when we shall again be able to supply these famous toys is very near.

Our Works, while still engaged on Government contracts, are changing over to the familiar products as rapidly as possible.

Look out for a first instalment of good news next month!

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